

Installation & Maintenance Manual

Airsweep Models
VA-06 • VA-12 • VA-51



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Airsweep System Installation, Operations and Maintenance Manual

Table of Contents

Section	Pages
General installation notes, system overview	1-2
VA-51 Airsweep and mounting	3-4
VA-12 Airsweep and mounting	5
VA-06 Airsweep and mounting	6
Airsweep controller	7
Airsweep system components and piping diagrams	8-10
VA-51 Airsweep mounting instructions	11-13
VA-06 Airsweep mounting instructions	14-15
VA-12 Airsweep mounting instructions	16-17
DV1251 solenoid valve	18-24
DV06 solenoid valve	25-27
8262 pilot valve for RDV-series diaphragm valves	28
MCA-series solenoid valve	29-30
RCAC-20ST4 ¾" piston valve	31
RCA3DM-series pilot valve	32
Solenoid valve troubleshooting	33-34
J32202 30-gallon air receiver	35
J32203 60-gallon air receiver	36
J32204 80-gallon air receiver	37
Air receiver accessories	38-46
Airsweep maintenance	47
VA-51 exploded parts view	48
VA-12 exploded parts view	49
VA-06 exploded parts view	50
CBO 1 controller	51-52
CBO 4 controller	53-54
CBO 10 controller	55-56
CBO 4-DC	57-58
CBO 10-DC	59-60
NEMA 4X polycarbonate enclosure	61
NEMA 7/9 (explosion-proof) enclosure	62
J11524 (1.5") flexible hose assembly	63
J11512 (¾") flexible hose assembly	64
61105 / 61108 check valves	65
F901G-series particulate filters	66
09R0813 2" regulator	67
R50R-series regulators	68-69
LHBV-series ball valves	70-73

AIRSWEEP® INSTALLATION NOTES

Consult installation drawing (if provided) for proper Airsweep location. It is important to adhere to the recommended locations as the type, number and location of Airsweeps have been selected for thorough "sweep" coverage of the problem surfaces in bin or chute.

It is usually not necessary to clean out or empty the bin before installing the Airsweeps. Even if a "crust" or material has built up inside the bin, the air blasts will generally cut it away from the bin wall over a period of time.

However, the "crust" sometimes breaks away in chunks, and it is possible that these chunks will clog the discharge. If so, the bin should be cleaned manually prior to start up.

CAUTION: NEVER ENTER A BIN WHILE AIRSWEEPS ARE OPERATING

If the material in the bin would have a tendency to run out of a hole cut in the bin wall, the level of material in the bin should be dropped below the Airsweep location before cutting the holes in the bin wall.

When welding, a continuous bead should be used to fasten the mounting to the bin wall on steel bins. On concrete bin walls, anchor bolts can be set in the concrete to coincide with the bolt hole pattern of the mounting plate or flange, so that the mounting can be bolted to the wall.

PIPING INSTALLATION

Follow the piping schematic that is a part of this instruction manual.

Never use smaller pipe size fittings or valves than the ones shown.

It is important that the header be installed below the level of the Airsweeps so that any condensation that may form in the lines will not drain into the Airsweeps. If the header must be installed above the level of the Airsweeps, the feed lines for the individual Airsweeps must be taken off the top of the header (rather than the bottom) to minimize condensation drainage into the Airsweeps and solenoids. A full flow gate or ball valve is recommended as it allows one Airsweep to be taken out of service without shutting down the entire system.

Using flexible air hose in lieu of rigid piping from the header to the solenoids is recommended for ease of installation and for easy removal of the Airsweep when service is required.

NOTE: USING SUITABLE SAFEGUARDS, always blow out all air supply lines thoroughly before final hook up to solenoids. Dirt in supply lines may cause the solenoid valves to malfunction.

When operating properly, and under material, the Airsweeps are almost silent. If an Airsweep begins to chatter, vibrate or "machine gun", it is generally caused by a solenoid valve malfunctioning due to dirt. If this occurs, **SHUT OFF ELECTRIC & AIR SUPPLY** and **DISCHARGE AIR** in system, then clean solenoid thoroughly (see troubleshooting).

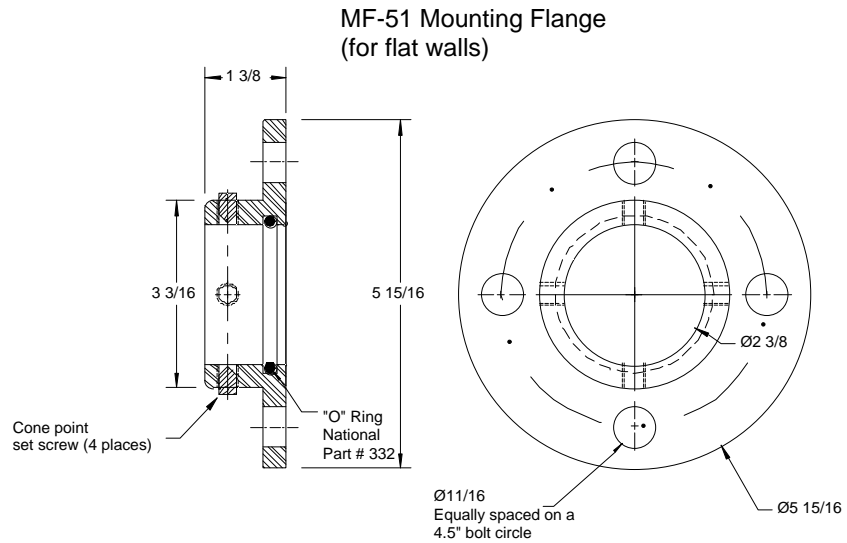
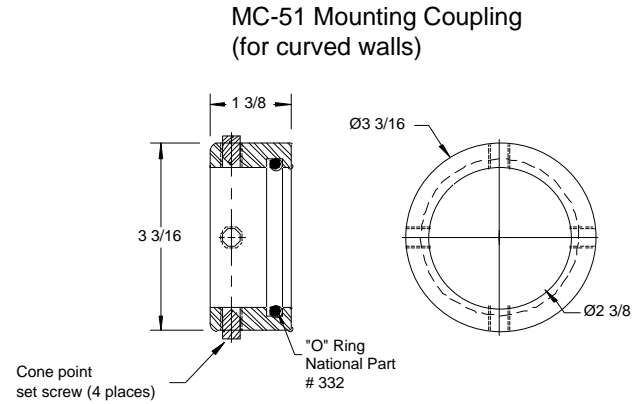
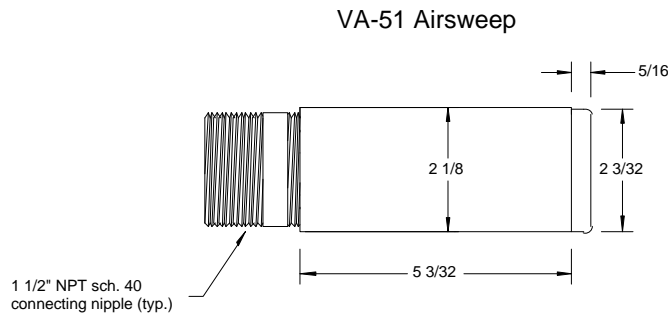
AIR USAGE NOTE

It is important to note that the lower limit of the interval timer is governed by how fast the air receiver can recover its air loss from the preceding Airsweep burst. If there is some doubt, a gauge should be installed on the air receiver tank or header. For example, if the gauge initially reads 95 psi when the receiver is fully pressurized, it should not drop below 80 psi for one burst if the receiver has been properly sized. The instant the receiver again recovers the 95 psi after one Airsweep is fired, it is then ready for another firing. If the gauge never indicates the original pressure, the Airsweeps are firing faster than the air supply can recover.

GENERAL NOTES & SUMMARY:

- Entire electrical system must be properly grounded for personnel safety.
- Distance between air receiver and header has no limit as long as 2" pipe (1" for VA-06) & fittings are used throughout.
- Slope header toward receiver 1/4"/ft. for moisture drainage. Whenever possible, locate header below Airsweeps.
- Always tap feed lines off top of header (even if header is above Airsweeps) to prevent moisture drainage into Airsweeps.
- Never use pipe or fittings smaller than sizes indicated.
- Use location arrangement drawing (if provided) for Airsweep location.
- Whenever possible, complete header loop around the hopper.
- Manual isolation valves (optional) must be gate valves or comparable full orifice valves, to not induce flow restriction in system.
- If hopper is outdoors, air receiver and filter should be located indoors whenever possible.
- Check valve recommended if plant air pressure varies more than 10 psi.
- Air Supply: VA-12 & VA-51 - 80 min. to 100 max. PSIG
VA-06 - 40 min. to 80 max. PSIG
- **IMPORTANT!** Solenoid valves must be located at Airsweep air inlets and not any distance upstream.
- Purge all lines and unions before connecting to solenoid valves. Particulate in lines may result in solenoid valve malfunction and excessive maintenance.
- Use Teflon tape on pipe joints rather than pipe dope, to avoid fouling of solenoid valves.

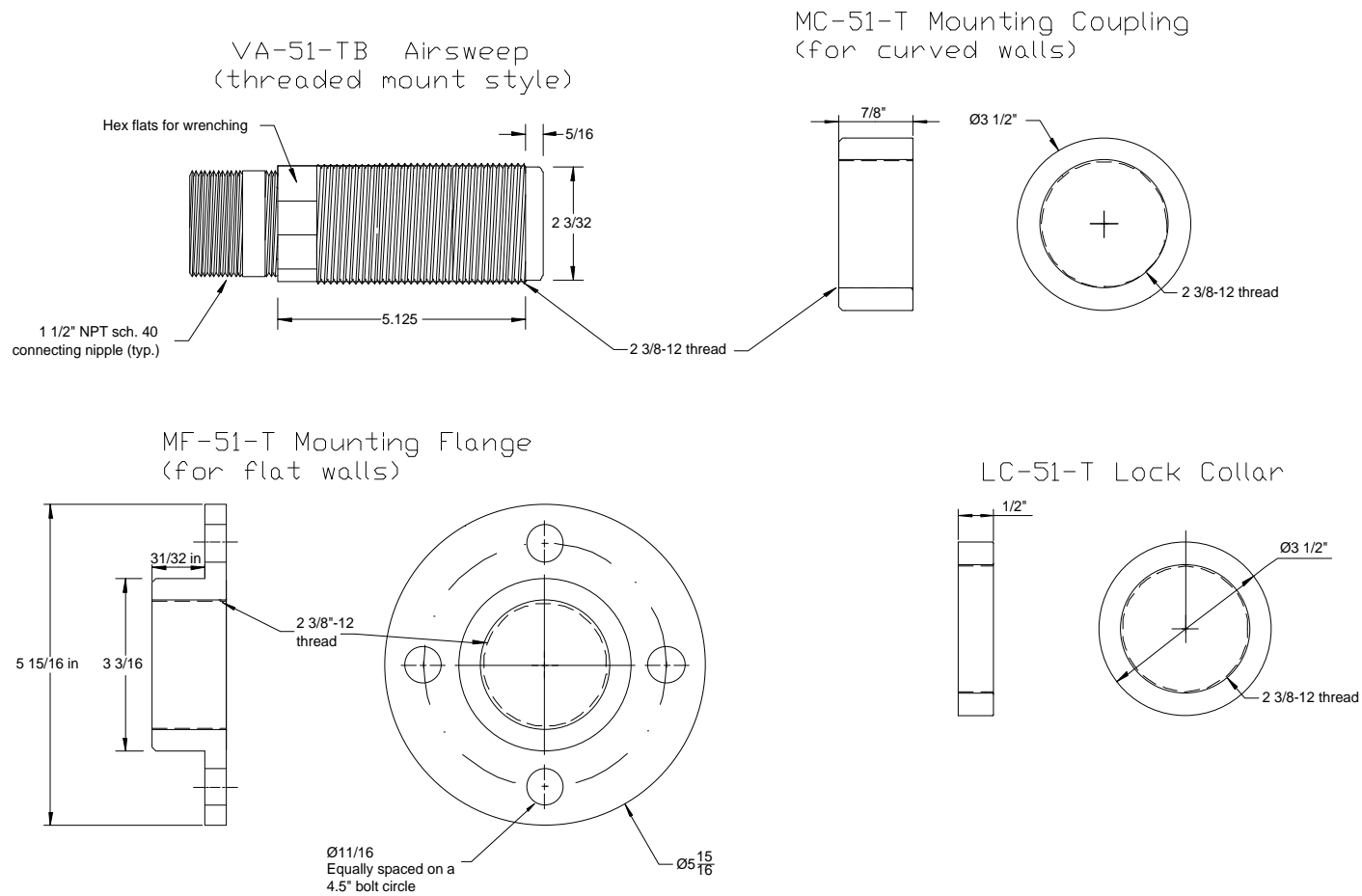
VA-51-NFT Airsweep® and mounting options



Materials of Construction	Diaphragm valve port size	Air Pressure (PSI)	Air Sweep Diameter *	Air consumption (scf) (per 0.25-second pulse)
Carbon Steel 304 or 316 SS	1 1/2"	80	6'	2.1 cubic feet
(other – call factory)		100	8'	2.99 cubic feet

* Average effective diameter of material activation in 75 lbs. per cubic ft. (dry) material, 0.25 sec. air pulse

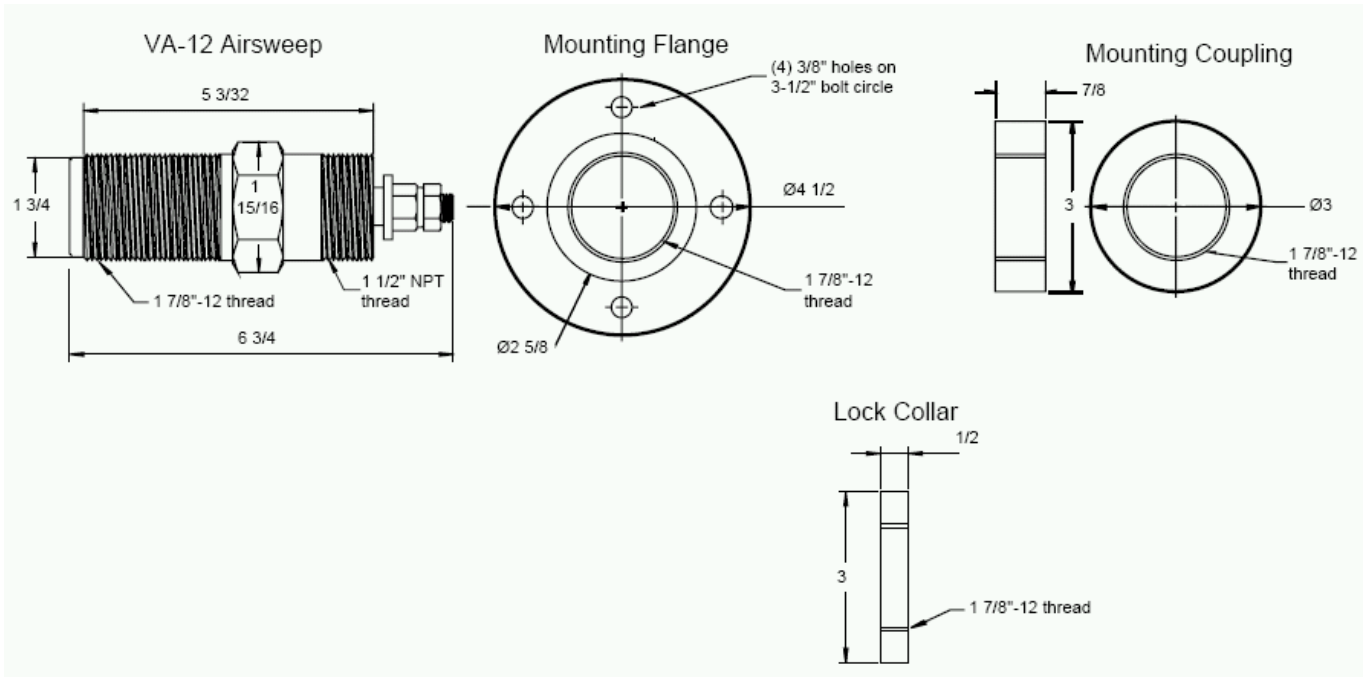
VA-51-TB Airsweep® and mounting options



Materials of Construction	Diaphragm valve port size	Air Pressure (PSI)	Air Sweep Diameter *	Air consumption (scf) (per 0.25-second pulse)
Carbon Steel 304 or 316 SS	1 1/2"	80	6'	2.1 cubic feet
(other – call factory)		100	8'	2.99 cubic feet

* Average effective diameter of material activation in 75 lbs. per cubic ft. (dry) material, 0.25 sec. air pulse

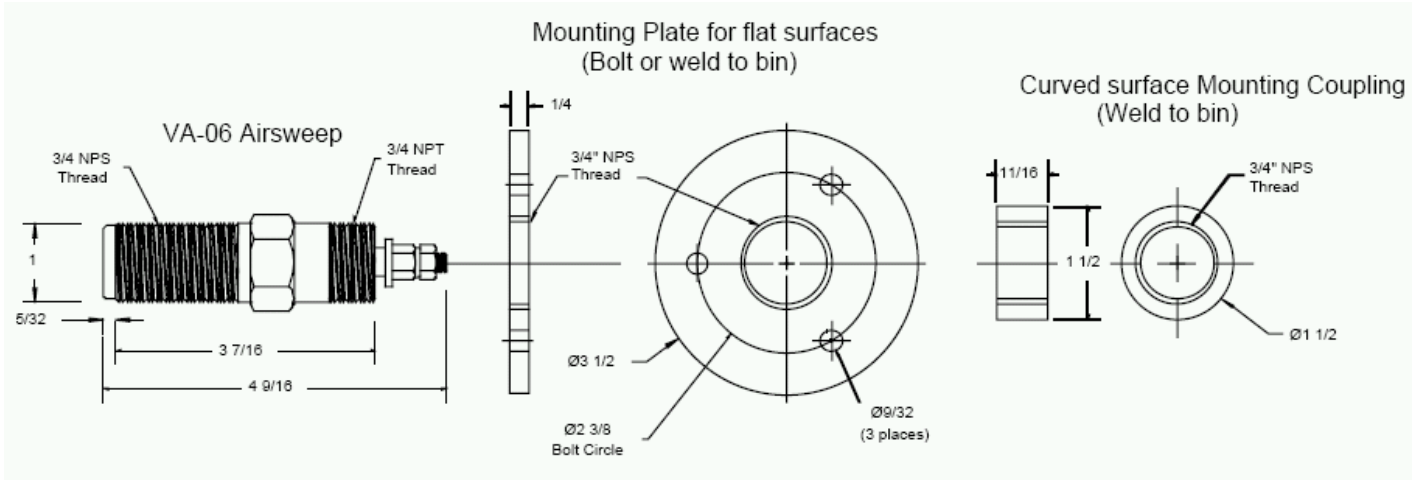
VA-12 Airsweep® and Mounting Options



Materials of Construction	Diaphragm valve port size	Air Pressure (PSI)	Air Sweep Diameter *	Air consumption (scf) (per 0.25-second pulse)
Carbon Steel	1 ½ "	80	4.5'	1.9 cubic feet
304 or 316 SS		100	6'	2.2 cubic feet
(other -- call factory)				

* Average effective diameter of material activation in 75 lbs. per cubic ft. (dry) material, 0.25 sec. air pulse

VA-06 Airsweep® and Mounting Options



Materials of Construction	Diaphragm valve port size	Air Pressure (PSI)	Air Sweep Diameter *	Air consumption (scf) (per 0.25-second pulse)
Carbon Steel 304 or 316 SS	3/4 "	60	2'	0.3 cubic feet
(other -- call factory)		80	3'	0.5 cubic feet

*Average effective diameter of material activation in 75 lbs. per cubic ft. (dry) material, 0.25 sec. air pulse

MYRLEN CBO-SERIES AIRSWEEP CONTROL BOX

The control box is the heart of the Airsweep system. It is this device which fires the Airsweeps in a prescribed sequence and at a prescribed interval to assure on-demand or even discharging of material from the bin, silo or chute. **The firing order is from the discharge (lowest unit) and up.**

The burst signal, sent from the control box to the solenoid valves, is typically set at 0.25 seconds. It is this signal that is responsible for the actual firing of any given Airsweep. In some cases, more than one solenoid valve may be wired to the same output, to effect simultaneous firing of two Airsweeps.

The interval timer governs the "dwell" between successive firings.

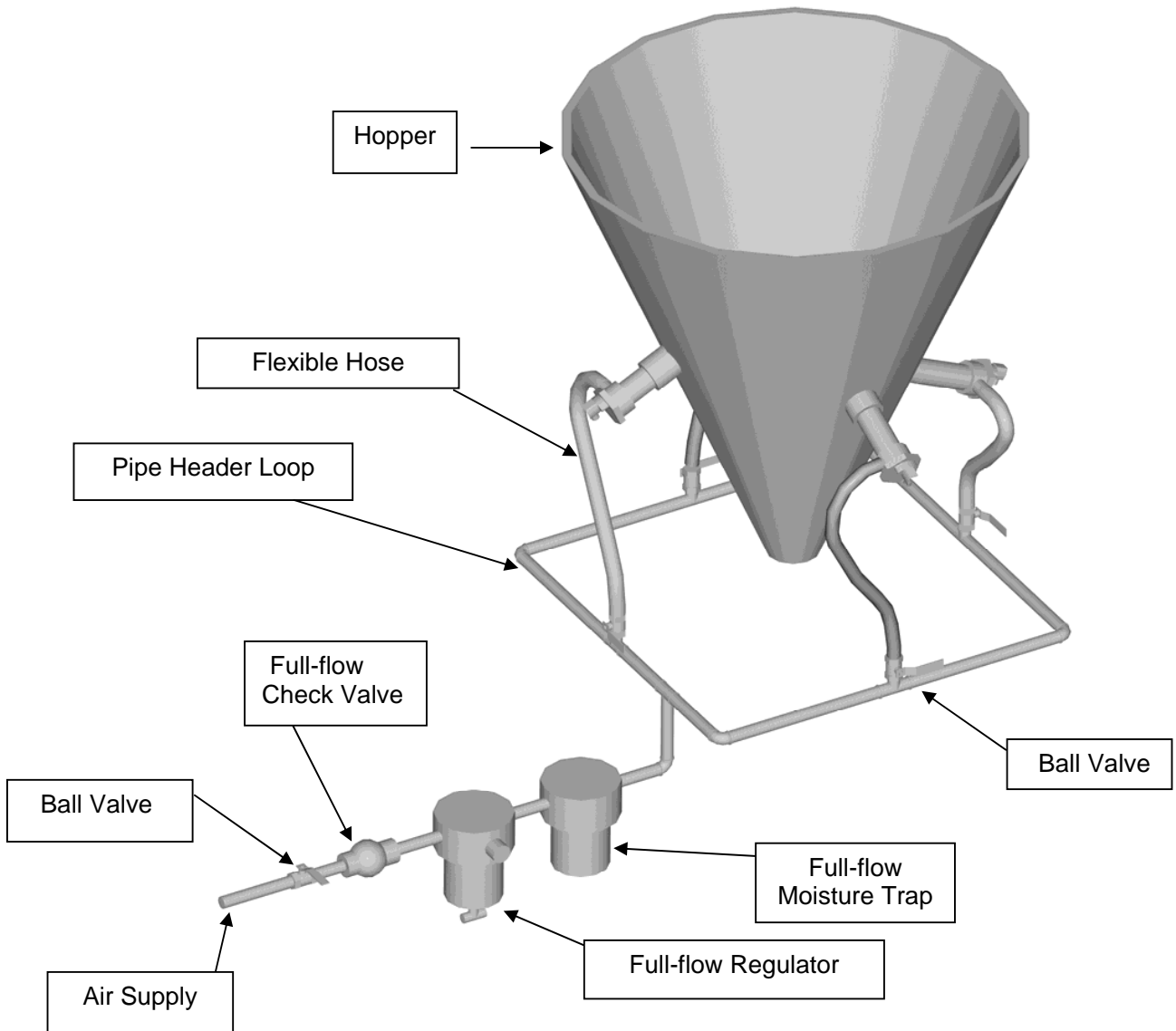
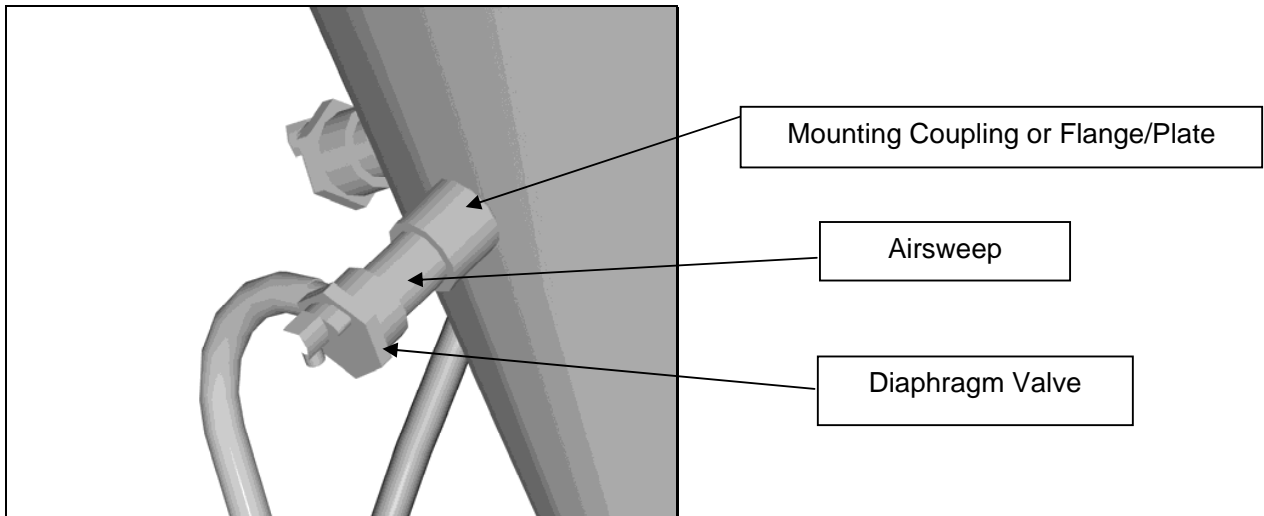
The "dwell" should be set as long as possible without adversely affecting the flow of material. **A longer "dwell" will conserve air.**

External controls, if included on the control box, consist of a rotary ON/OFF switch and a push button labeled "JOG". The "JOG" button is intended to provide manual assistance of rapid firing of the Airsweeps in times of unusual material hang-ups or when increased material flow is required.

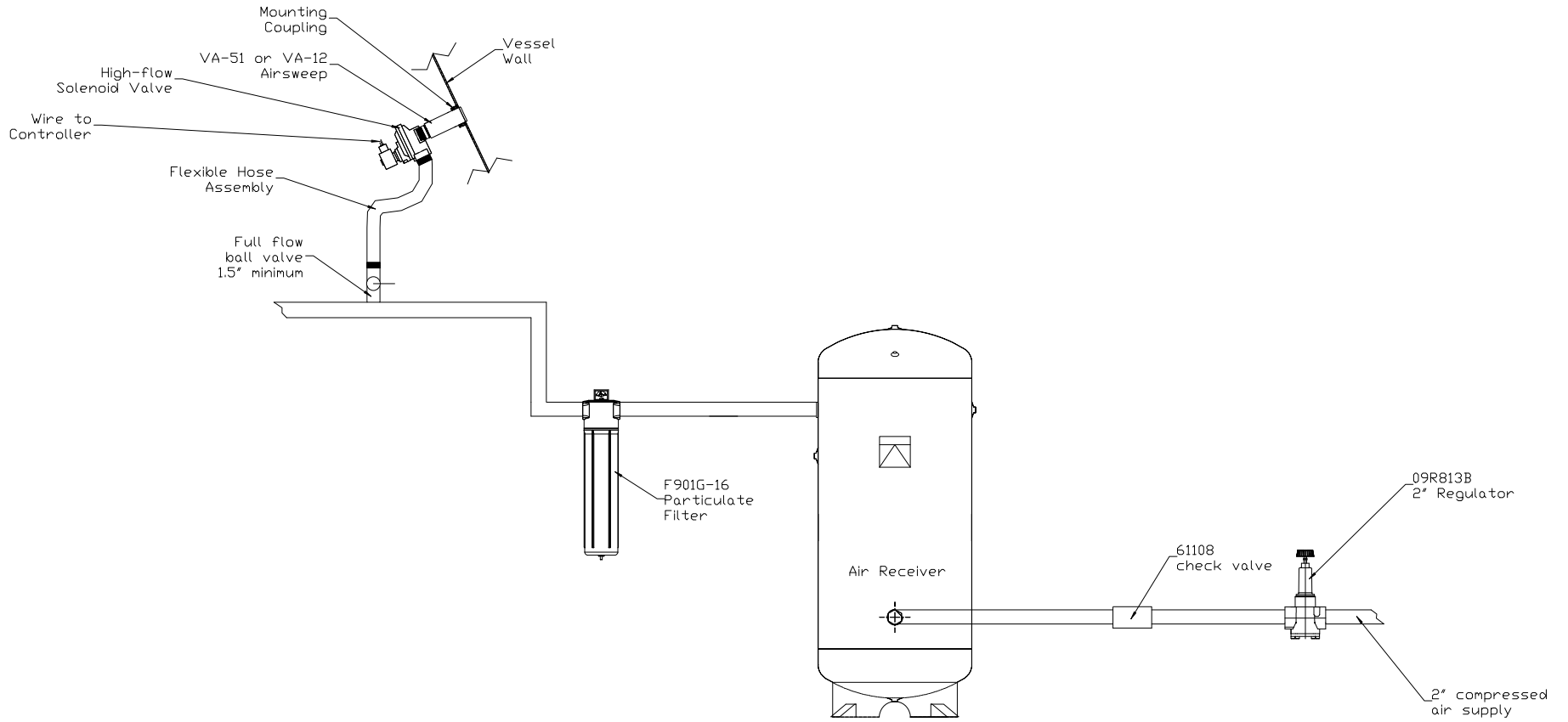
WARNING

**NEVER ALLOW ANYONE TO LOOK INTO OR ENTER BIN
WHEN AIRSWEEPS ARE OPERATING.
EYE OR OTHER INJURY MAY RESULT! SHUT OFF
ELECTRIC & AIR SUPPLY TO AIRSWEEPS AND
DISCHARGE AIR IN SYSTEM BEFORE INSPECTING OR
SERVICING AIRSWEEPS.**

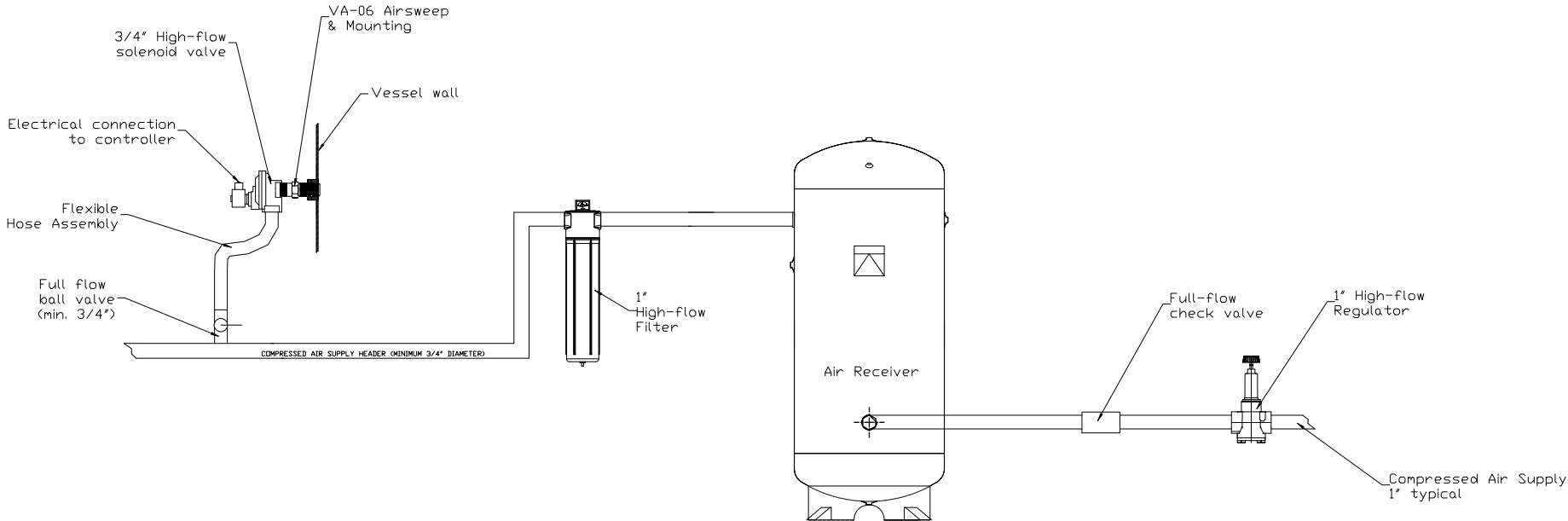
TYPICAL SYSTEM COMPONENTS



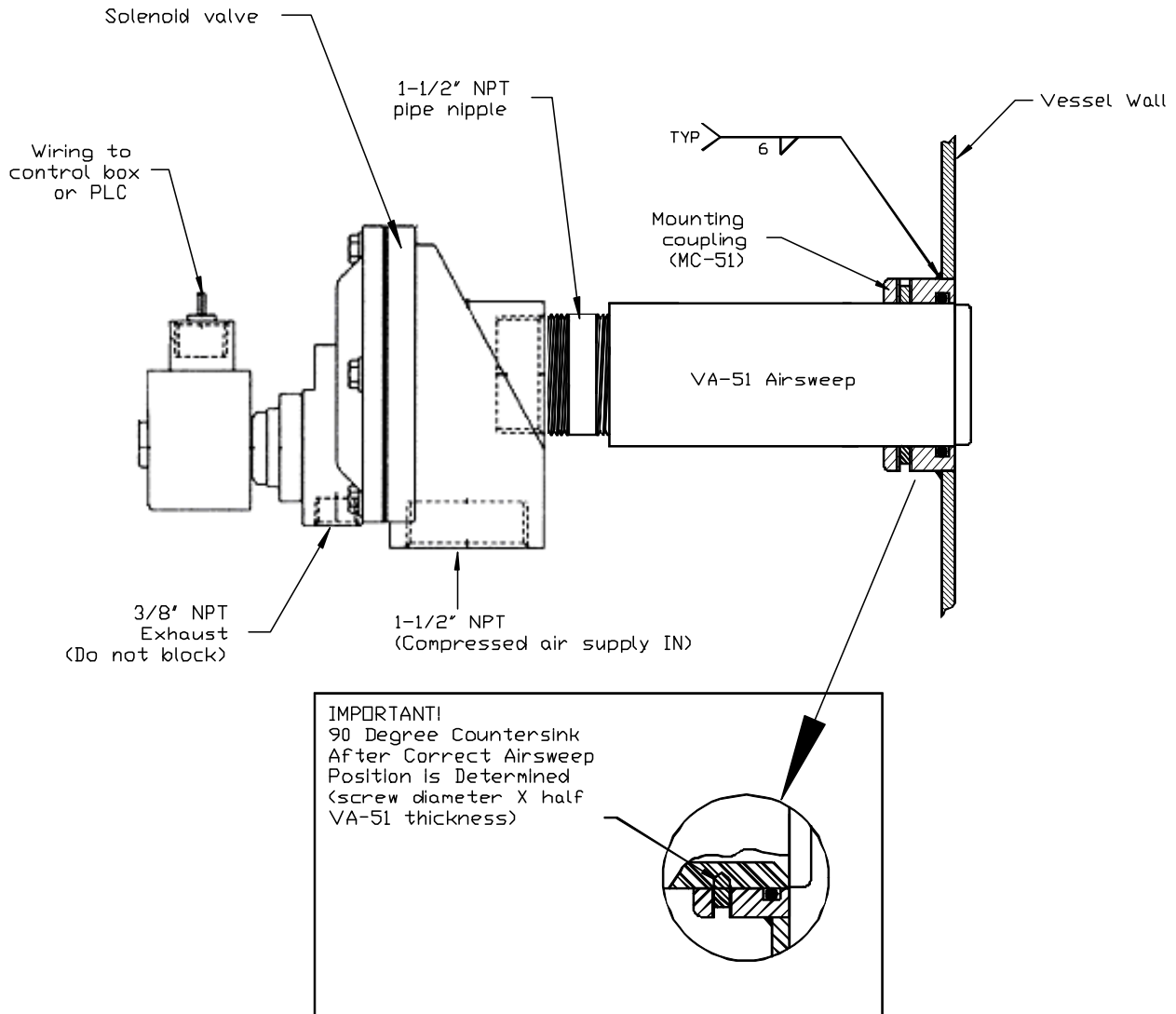
Typical piping and accessories, VA-51 or VA-12 Airsweep system



Typical piping and accessories, VA-06 Airsweep system



MC-51 Mounting Coupling Installation



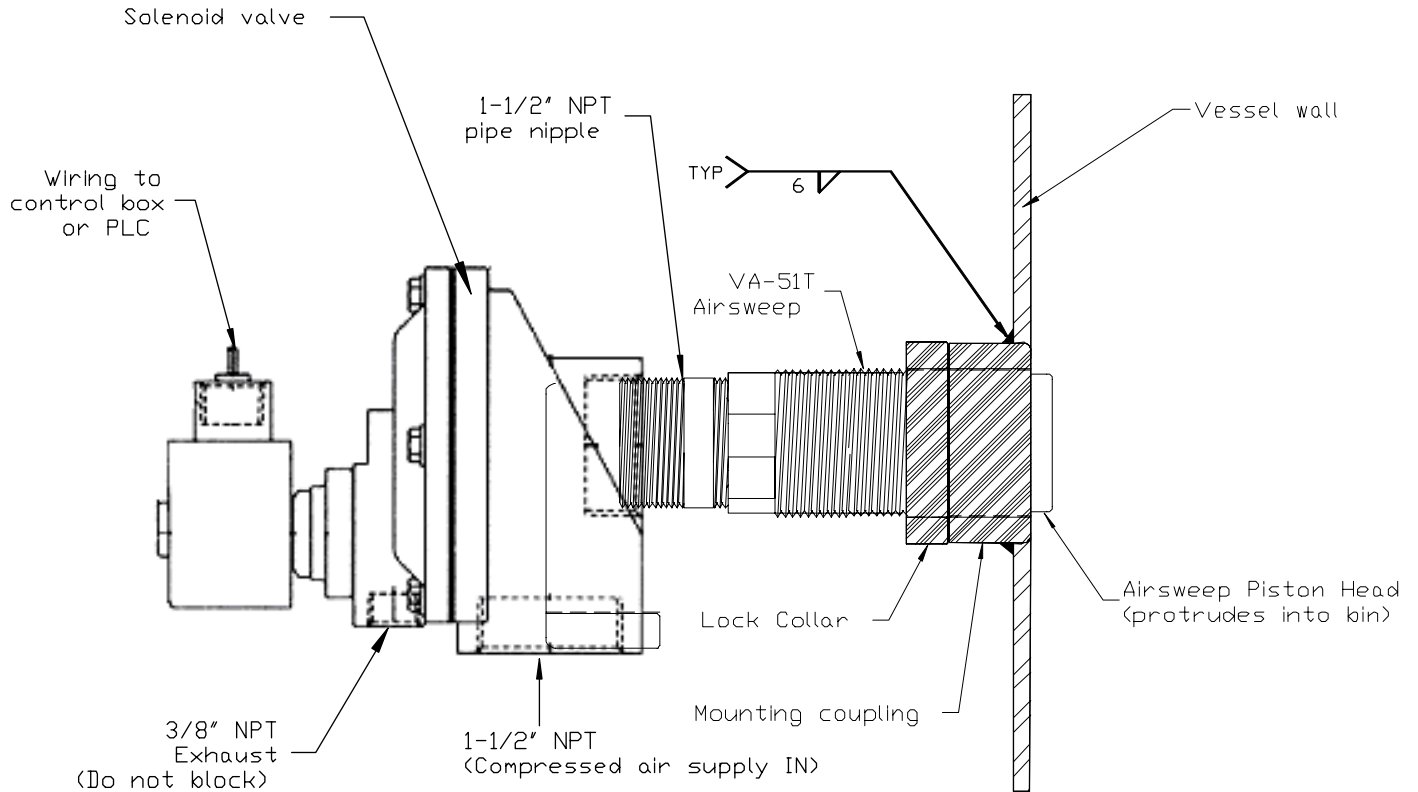
Directions

Cut hole in hopper wall, diameter to fit (1/8" greater than diameter of coupling (3 1/4") is recommended to allow coupling to pass through curved wall).

1. Remove O-Ring, and apply splatter-guard in O-Ring groove. Align coupling flush with inside of vessel wall and weld continuous bead to exterior of wall. Replace O-Ring after flange has cooled. O-Ring groove should be cleaned and free of debris or residue before replacing O-Ring.
2. Slide Airsweep into position, so that front of body of Airsweep is aligned with front of coupling. This will properly position piston head within the bin.
3. After position of Airsweep is determined to be correct, small countersink holes should be drilled in Airsweep body, to allow cone point set screw to engage fully with body.
Failure to countersink set screws in Airsweep body may result in unit slipping or forcibly ejecting from the mounting.

Note: On sharply curved bin walls, body of Airsweep will extend slightly into the bin at top & bottom (12:00 & 6:00 positions), and should be flush at sides (3:00 & 9:00 positions).

MC-51T Mounting Coupling Installation



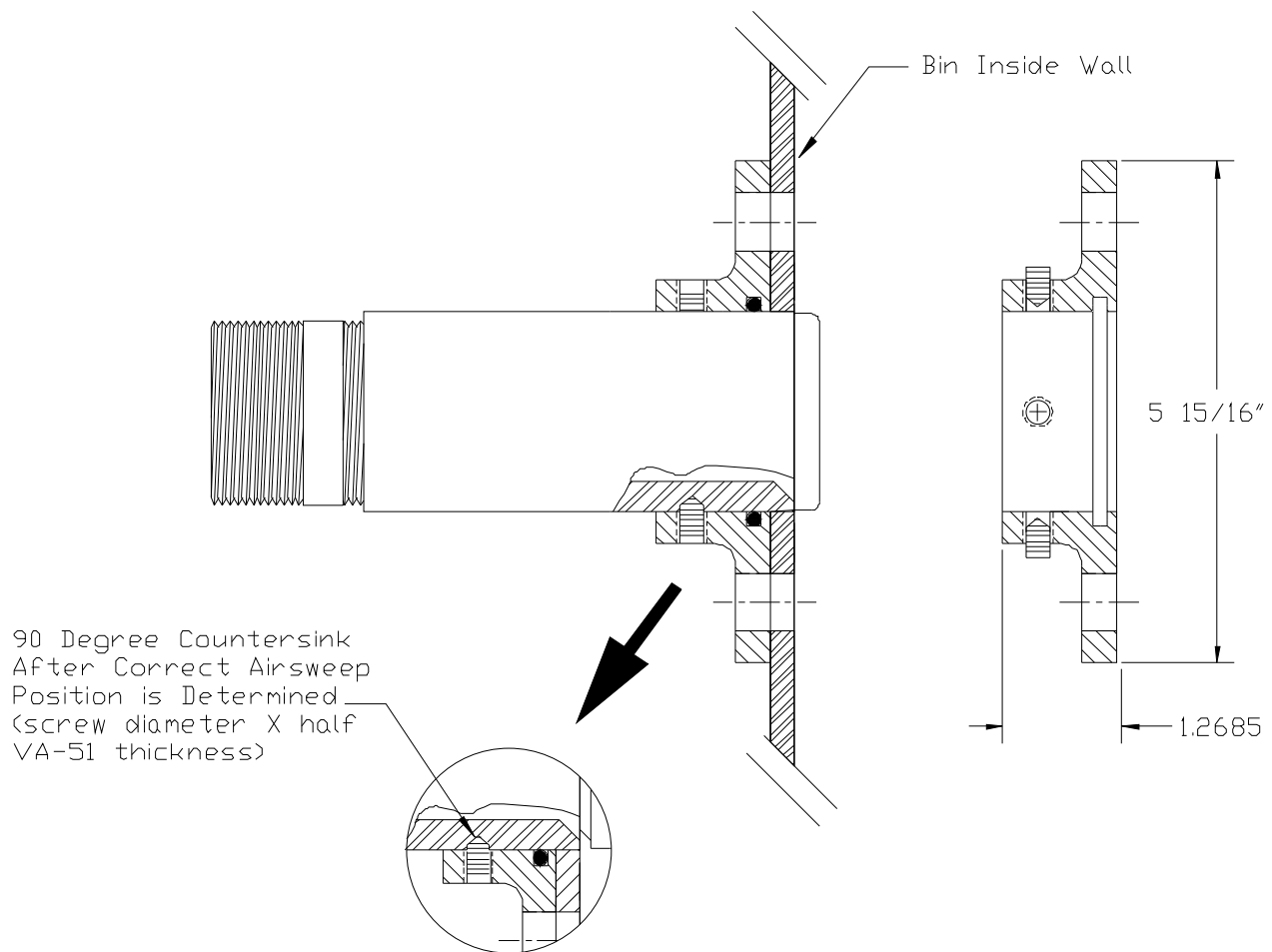
VA-51 Airsweep and solenoid valve

1. Cut hole in hopper wall, diameter to fit (1/8" greater than diameter of coupling (3 1/2 ") is recommended to allow coupling to pass through curved wall).
2. Align coupling flush with inside of vessel wall and weld continuous bead to exterior of wall.
3. Apply anti-seize compound to front threaded section of Airsweep. Thread Airsweep into position, so that front of **body** of Airsweep is aligned with front of coupling. This will properly position piston head within the bin and allow the air pulse to sweep along the inner bin wall when piston opens.
4. After position of Airsweep is determined to be correct, tighten lock collar against coupling to keep Airsweep in position.

Note: On sharply curved bin walls, body of Airsweep will extend slightly into the bin at top & bottom (12:00 & 6:00 positions), and should be flush at sides (3:00 & 9:00 positions).

- Exhaust port (3/8" NPT) on solenoid valve should never be covered or blocked, as valve will not function properly with backpressure to this port. Only connect a 3/8" NPT full-flow muffler, if required.
- For maximum effectiveness, connection between Airsweep and solenoid valve should be as short as possible. When possible, use only the supplied connecting nipple with no additional elbows or pipe.

MF-51 Mounting Flange Installation

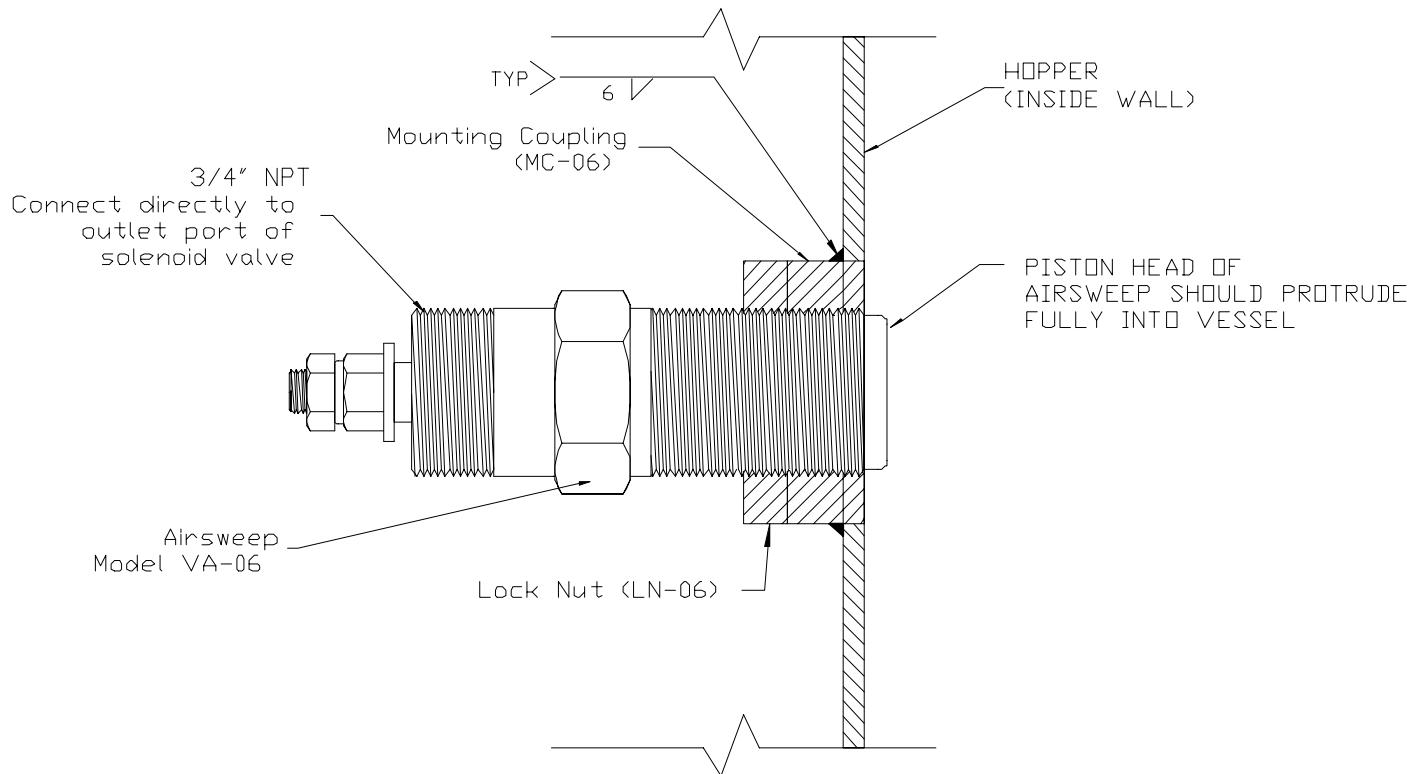


Directions

1. Position flange on wall and mark bolt circle layout (if bolting) and hole for Airsweep.
2. Cut hole in hopper wall for Airsweep, sufficient diameter (min. $\text{Ø}2 \frac{3}{8}$ ") to allow Airsweep to pass through wall.
3. Drill bolt holes, if bolting.
4. If welding, remove O-Ring from flange, and apply splatter-guard in O-Ring groove.
5. Bolt or weld flange to wall. If bolting, use rubber gasket in between wall and flange. Rubber gasket should not be used if welding. If welding, replace O-Ring after flange has cooled. O-Ring groove should be free of debris or residue before replacing O-Ring.
6. Slide Airsweep into position, so that front of body of Airsweep is aligned flush with inside bin wall. This will properly position piston head within the bin.
7. After position of Airsweep is determined to be correct, small countersink holes should be drilled in Airsweep body, to allow cone point set screw to engage fully with body.

Failure to countersink set screws in Airsweep body may result in unit slipping or forcibly ejecting from the mounting.

MC-06 Mounting Coupling Installation



Mounting Coupling Installation

1. Cut hole in hopper wall, diameter to fit (1/8" greater than diameter of coupling is recommended to allow coupling to pass through curved wall).

Recommended Hole size for MC-06: 1-9/16"

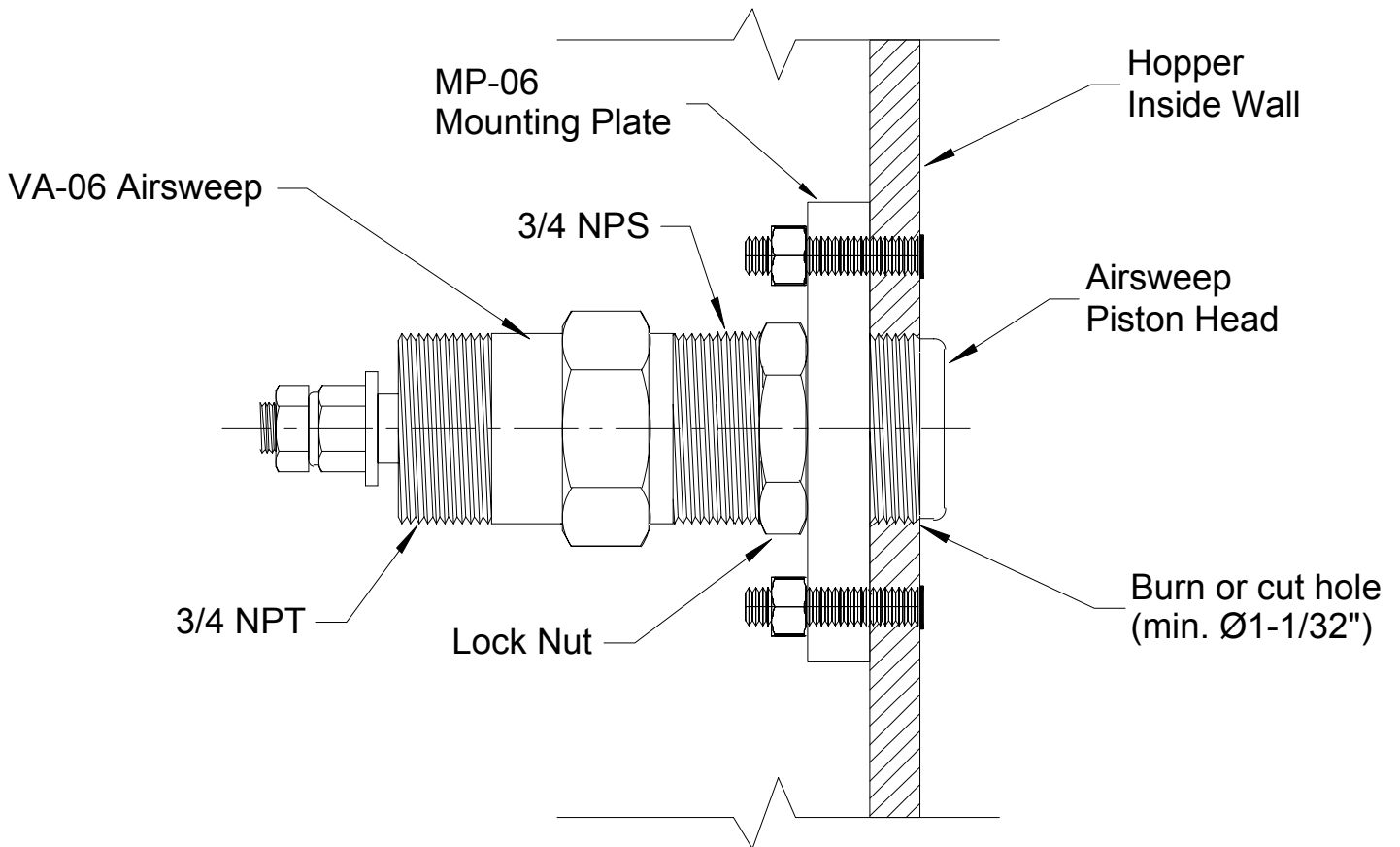
2. Align coupling flush with inside of vessel wall and weld continuous bead to exterior of wall.

3. Apply anti-seize compound to front threaded section of Airsweep. Thread Airsweep into position, so that front of **body** of Airsweep is aligned with front of coupling. This will properly position piston head within the bin.

4. After position of Airsweep is determined to be correct, tighten lock nut against coupling to keep Airsweep in position.

Note: On sharply curved bin walls, body of Airsweep will extend slightly into the bin at top & bottom (12:00 & 6:00 positions), and should be flush at sides (3:00 & 9:00 positions).

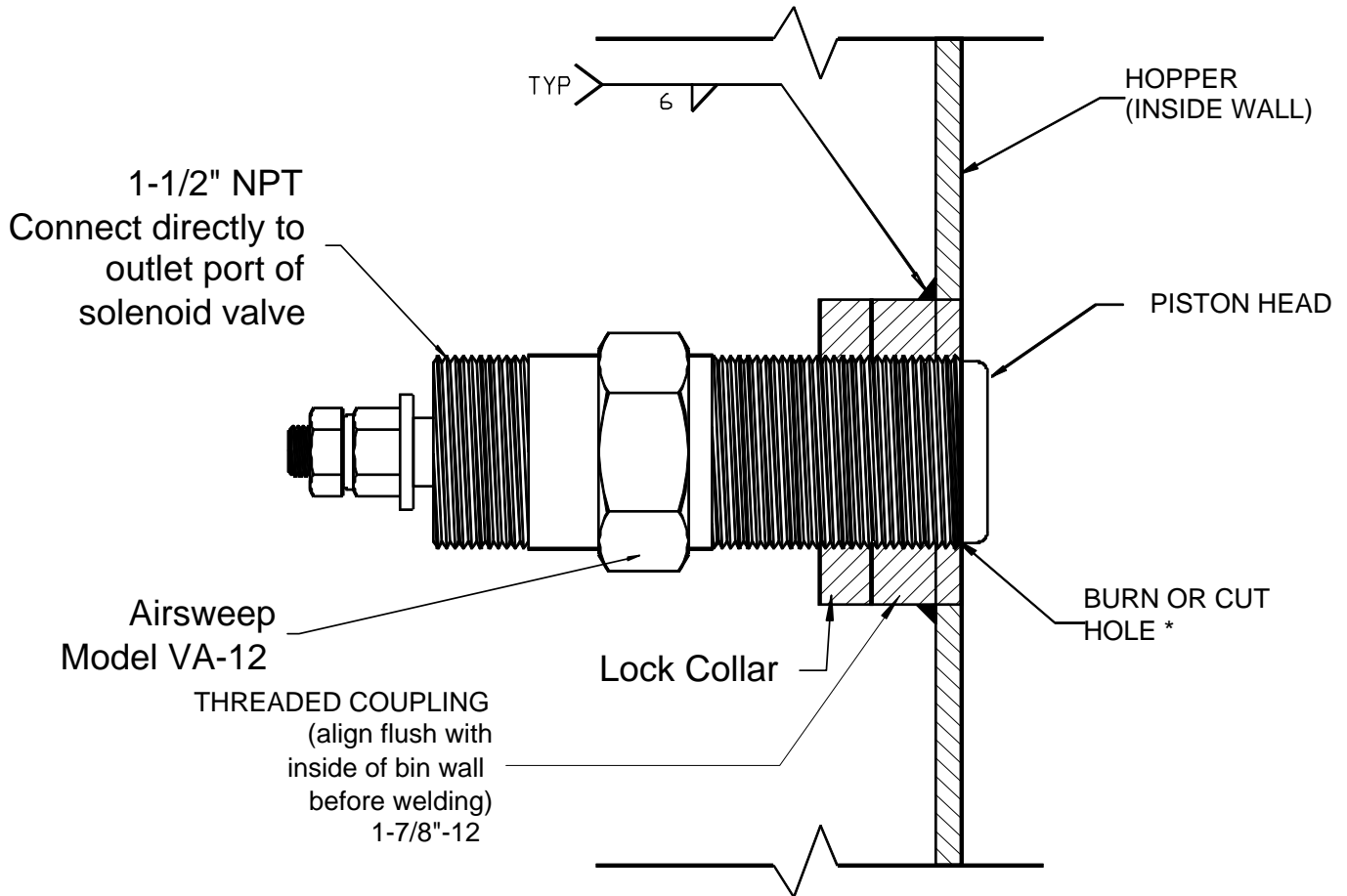
MP-06 Mounting Plate Installation



Mounting flange/plate Installation

- 1.** Position plate on wall surface. Mark hole for Airsweep. If bolting, mark bolt circle layout.
- 2.** Drill or cut hole for Airsweep (and bolt holes, if needed). Hole size for Airsweep should be sufficient diameter to allow Airsweep to pass through wall. Major diameter of VA-06 front thread (3/4" NPS) is 1-1/32".
- 3.** Fasten plate to wall by bolting, or weld continuous bead around plate to exterior of wall.
- 4.** Apply anti-seize compound to front threaded section of Airsweep. Thread Airsweep into position, so that front of body of Airsweep is aligned flush with inside of bin wall. This will properly position piston head within the bin.
- 4.** After position of Airsweep is determined to be correct, tighten lock nut against plate to keep Airsweep in position.

MC-12 Mounting Coupling Installation



Mounting Coupling Installation

1. Cut hole in hopper wall, diameter to fit (slightly greater than diameter of coupling is recommended to allow coupling to pass through curved wall).

*** Hole size = 3-1/16"**

2. Align coupling flush with inside of vessel wall and weld continuous bead to exterior of wall.

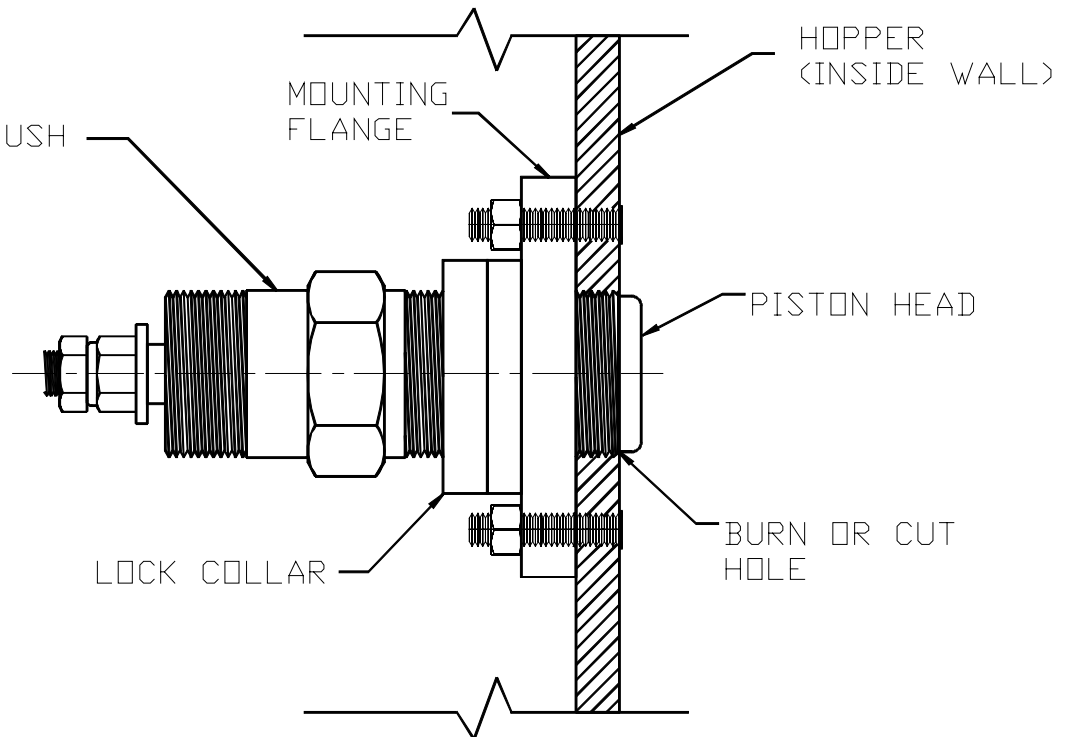
3. Apply anti-seize compound to front threaded section of Airsweep. Thread Airsweep into position, so that front of **body** of Airsweep is aligned with front of coupling. This will properly position piston head within the bin.

4. After position of Airsweep is determined to be correct, tighten lock nut or collar against coupling to keep Airsweep in position.

Note: On sharply curved bin walls, body of Airsweep will extend slightly into the bin at top & bottom (12:00 & 6:00 positions), and should be flush at sides (3:00 & 9:00 positions).

VA-12 Airsweep Mounting Flange Installation

AIRSWEEP MODEL
VA-12 (Body aligned FLUSH
with inside wall)



Mounting flange Installation

1. Position flange on wall surface. Mark hole for Airsweep. If bolting, mark bolt circle layout.
2. Drill or cut hole for Airsweep (and bolt holes, if needed). Hole size for Airsweep should be sufficient diameter to allow Airsweep to pass through wall (approx $\text{Ø}1.875''$).
3. Fasten flange to wall by bolting, or weld continuous bead around flange to exterior of wall.
4. Apply anti-seize compound to front threaded section of Airsweep. Thread Airsweep into position, so that front of body of Airsweep is aligned with the inside wall of vessel. This will properly position piston head within the bin.
4. After position of Airsweep is determined to be correct, tighten lock collar against flange to keep Airsweep in position.

INSTALLATION AND MAINTENANCE

MODEL DV1251

**1 ½" PULSE VALVE With
INTEGRAL SOLENOID PILOT**



DESCRIPTION

Myrlen DV1251-series valve is a 2-way quick opening/closing, high flow, diaphragm-type integral solenoid piloted valve. Also available as a remote pilot-operated valve (model RDV1251).

SOLENOID ENCLOSURES

DV1251-C or D: Watertight, NEMA Types 1, 2, 3, 3S, 4 & 4X enclosure specifications.

DV1251-XP: Explosion-proof & Watertight, NEMA Types 3, 3S, 4 & 4X;

Types 6 & 6P; Type 7 (Explosion-proof, Class 1, Division 1, Groups A, B, C & D) and

Type 9 (Dust ignition-proof, Class II, Division 1, Groups E, F & G) enclosure specifications.

ELECTRICAL (110/120 or 220/240 AC volts, 50/60 Hz)*

Watts: 10.1

VA Holding: 25

VA Inrush: 50

*(other AC & DC voltages available).

CONSTRUCTION (Parts in contact with fluids)

Body: Aluminum (less than 0.4% copper)

Seals: Buna "N"

Discs: Buna "N"

Diaphragm: Hytrel*

*(Viton seals and diaphragm available for high heat applications)

NOMINAL TEMPERATURE RANGES*

Ambient & Fluids: 0°F to 150°F (-19°C to 66°C)

*For high temperature, specify Viton diaphragm & seals.

Viton range: 0°F to 350°F (-18°C to 177°C)

Fluid: Air or Nitrogen (inert gas)

Working Pressures: (minimum) 5 psi.; (maximum) 125 psi.

Cv flow factor: 53

Pipe size: 1 ½" NPT inlet & outlet and 3/8" NPT exhaust port

OPERATION

Normally closed: Valve is closed when solenoid is de-energized.
Valve opens when solenoid is energized.

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage and service.

For DV1251-XP ONLY:

Caution: to prevent fire or explosion, do not install the DV1251-XP where ignition temperature of hazardous atmosphere is less than 165°C.

POSITIONING

This valve is designed to perform properly when mounted in any position.

NOTE: for optimum life and performance, the solenoid should be mounted vertical and upright so as to reduce the possibility of foreign matter accumulating in the core tube area.

PIPING

Connect piping to valve according to markings on valve body (Inlet port is marked with "IN").
3/8" port on upper chamber of valve is exhaust ONLY. Do not connect anything to exhaust port except a high-flow muffler or strainer. Restriction to flow through this port will cause valve to malfunction, operate sluggishly or not operate at all.

Thread seal tape is recommended, rather than pipe compound. If compound is used, apply sparingly to male threads only; if applied to valve threads, it may enter the valve and cause operational difficulty. Pipe strain should be avoided by proper support and alignment of piping. When tightening pipe, do not use valve as a lever. Wrenches applied to valve body or piping should be located as close as possible to connection point.

CAUTION:

To avoid damage to the valve body DO NOT OVERTIGHTEN PIPE CONNECTIONS.

If tape thread seal, spray or similar lubricant is used, use extra care due to reduced friction

WIRING

Wiring must comply with Local and National Electrical Codes. Conduit-style solenoid housings are provided with a hole to accommodate 1/2 inch NPT conduit. The solenoid enclosure may be rotated to facilitate wiring.

SOLENOID TEMPERATURE

Standard DV1251 valves are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched by the hand only for an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

FOR DV1251-XP ONLY: the integral solenoid in the DV1251-XP has an internal non-reset able thermal fuse to limit solenoid temperature in the event that extraordinary conditions occur which could cause excessive temperatures. These conditions could include high input voltage, a jammed core, excessive ambient temperature, or a shorted solenoid, etc.

MAINTENANCE

WARNING: Turn off electrical power supply and de-pressurize valve and header before making repairs. **NOTE:** It is generally not necessary to remove the valve from the pipeline for repairs.

CLEANING

A periodic cleaning of all solenoid valves is desirable. The time between cleanings will vary depending on medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required.

PREVENTIVE MAINTENANCE

1. Keep the medium flowing through the valve as free from dirt and foreign material as possible.
2. While in service, operate the valve at least once a month to insure proper opening and closing.
3. Periodic inspection (depending on medium and service conditions) of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts, seats and bleed holes. Replace any parts that are worn or damaged.

IMPROPER OPERATION

1. **Faulty Control Circuits:** Check the electrical system by energizing the solenoid. A metallic click signifies the solenoid is operating. Absence of the click indicates loss of power supply. Check for loose or blown-out fuses, open-circuited or grounded coil, broken lead wires, terminals or splice connections.
2. **Burned-Out Coil:** Check for open-circuited coil; if faulty, replace coil.
3. **Low Voltage:** Check voltage across coil leads. Voltage must be at least 85% of nameplate rating.
4. **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within 5 - 125 psi.
5. **Excessive Leakage or Failure to Open or Close:** Check for restrictions to or blockage of exhaust port. Disassemble valve and clean all parts. Check for clogged bleed holes or torn diaphragm assemblies. Replace parts that are worn or damaged with a complete spare parts kit for best results

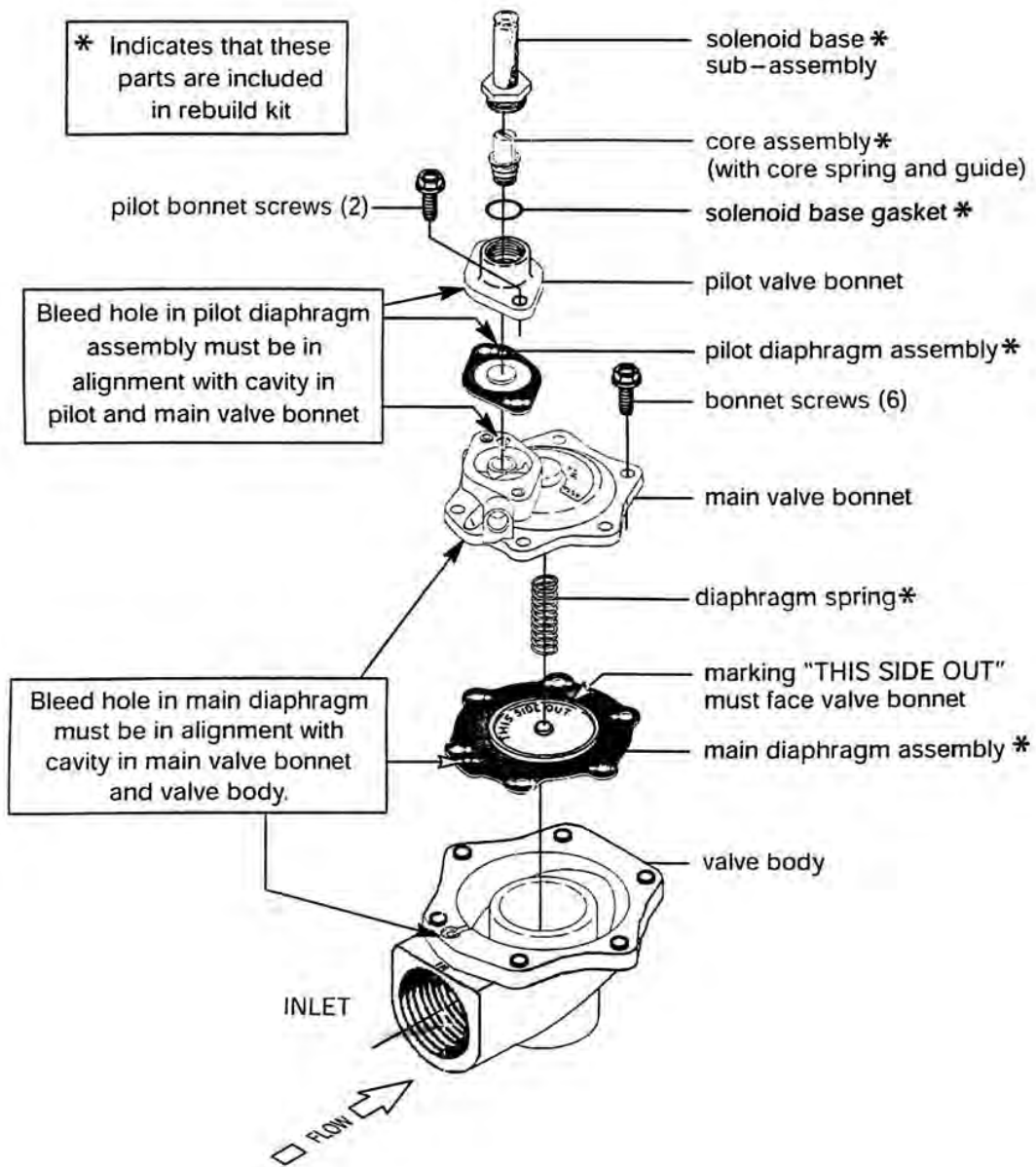
VALVE DISASSEMBLY (Refer to diagram on next page)

De-pressurize valve and turn off electrical power supply. If rigid conduit is used it may be necessary to disconnect it. Proceed in the following manner:

1. Disassemble valve in an orderly fashion, paying careful attention to exploded view provided for identification of parts.
2. Remove retaining clip & plate and slip the entire coil enclosure off the solenoid base sub-assembly.
3. Unscrew solenoid base sub-assembly from pilot bonnet. Remove core assembly, core spring, core guide and solenoid base gasket.
4. Unscrew pilot bonnet screws and remove pilot bonnet and pilot diaphragm assembly.
5. Remove main bonnet screws, main valve bonnet and main diaphragm assembly.
6. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete spare parts kit for best results.

VALVE REASSEMBLY

1. Reassemble in reverse order of disassembly paying careful attention to exploded view provided for identification and placement of parts.
2. Lubricate solenoid base gasket with DOW CORNING 111 Compound lubricant or an equivalent high-grade silicone grease.
3. Replace main diaphragm assembly with marking "THIS SIDE OUT" facing main valve bonnet. Be sure that bleed hole in diaphragm assembly is in alignment with cavity in valve body and bonnet. The external contours of the diaphragm assembly, body and bonnet must all be in alignment.
4. Replace main bonnet and bonnet screws. Torque main bonnet screws in a crisscross manner to 160 ± 10 inch-pounds ($18,1 \pm 1,1$ Newton meters).
5. Position pilot diaphragm assembly in valve bonnet. Be sure bleed hole in pilot diaphragm assembly is in alignment with cavity in bonnet.
6. Replace pilot bonnet and pilot bonnet screws. Torque pilot bonnet screws evenly to 95 ± 10 inch-pounds ($10,7 \pm 1,1$ Newton meters).
7. Position core assembly with core spring and core guide into solenoid base sub-assembly. Engage this assembly into the pilot bonnet. Torque solenoid base sub-assembly to 175 ± 25 inch-pounds ($19,8 \pm 2,8$ Newton meters).
8. Replace coil and retaining clip.
9. After maintenance, operate valve a few times to be sure of proper opening and closing.



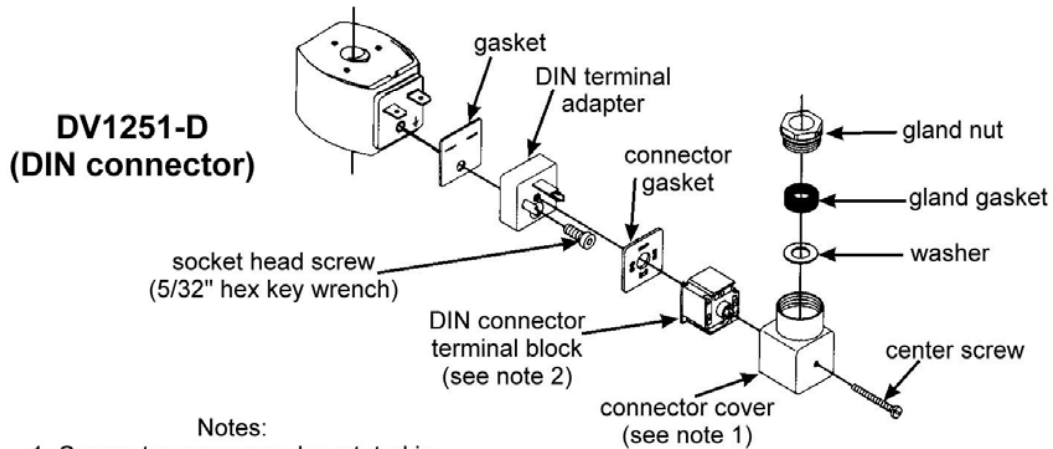
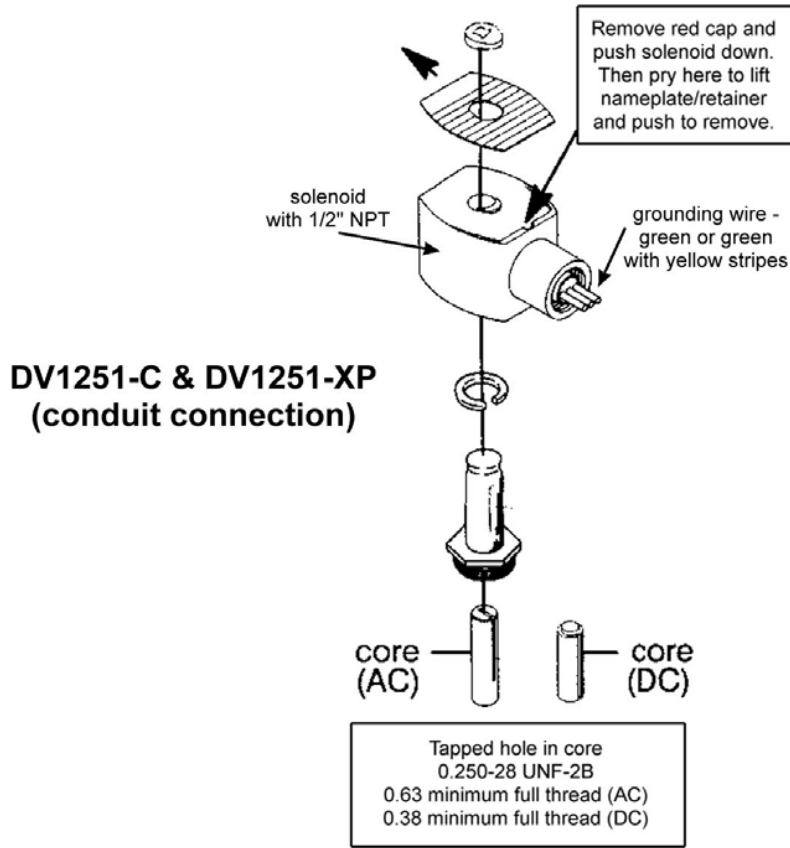
Parts marked with (*) are supplied in spare parts Kit # RK-DV1251.

Torque Chart

Part Name	Torque Value	
	Inch-Pounds	Newton-Meters
Solenoid Base Sub-Assembly	175 ± 2.5	19,8 ± 2,8
Bonnet Screws (pilot)	95 ± 10	10,7 ± 1,1
Bonnet Screws (main)	160 ± 10	18,1 ± 1,1

DV1251 – Coil Connection Options

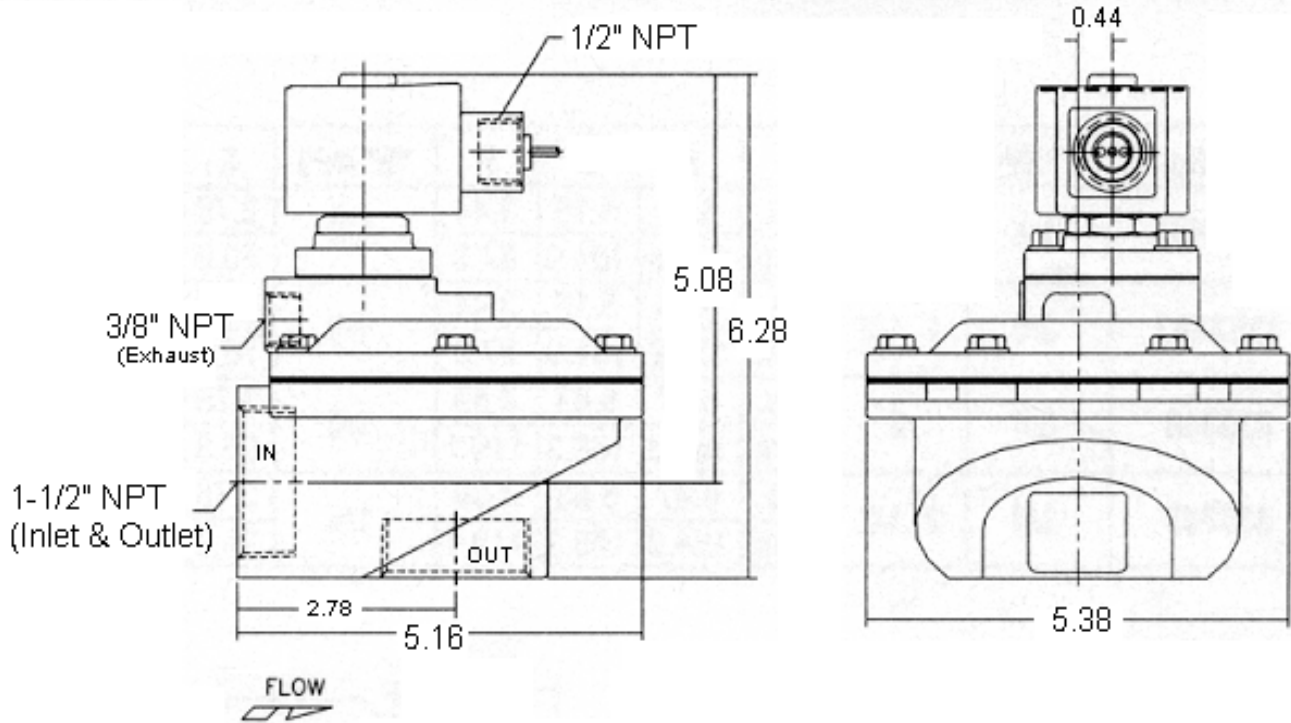
(Note: DIN connector not available on XP valves)



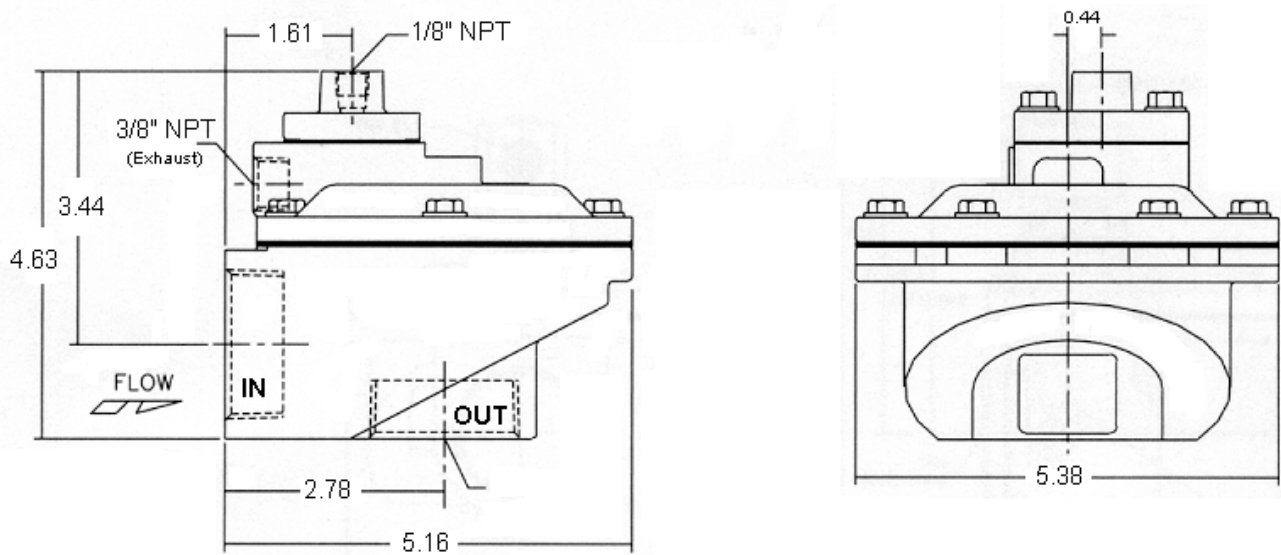
Notes:

1. Connector cover may be rotated in 90-degree increments from position shown for alternate position of cable entry.
2. Refer to markings on DIN connector for proper electrical connections.

DV1251 1-1/2" Diaphragm Valve with Integral Solenoid



RDV1251 1 1/2" Remote Pilot-Operated Diaphragm Valve



INSTALLATION AND MAINTENANCE **MODEL DV06**

**$\frac{3}{4}$ " PULSE VALVE
WITH INTEGRAL SOLENOID PILOT**



DESCRIPTION

Myrlen DV06-series valve is a 2-way quick opening/closing, high flow, piston diaphragm-type integral solenoid piloted valve. Also available as a remote pilot-operated valve (model RDV06).

SOLENOID ENCLOSURES

DV06-C: Watertight, NEMA Types 1, 2, 3, 3S, 4 & 4X enclosure specifications.

DV06-XP: Explosion-proof & Watertight, NEMA Types 3, 3S, 4 & 4X; Types 6 & 6P; Type 7 (Explosion-proof, Class 1, Division 1, Groups A, B, C & D) and Type 9 (Dust ignition-proof, Class II, Division 1, Groups E, F & G) enclosure specifications.

ELECTRICAL (110/120 or 220/240 AC volts, 50/60 Hz)*

Watts: 10.1

VA Holding: 25

VA Inrush: 50

*(other AC & DC voltages available).

CONSTRUCTION (Parts in contact with fluids)

Body: Aluminum (less than 0.4% copper)

Seals: Buna "N"

Discs: Buna "N"

Diaphragm: Hytrel

NOMINAL TEMPERATURE RANGES

Ambient & Fluids: 0°F to 150°F (-19°C to 66°C)

Fluid: Air or Nitrogen (inert gas)

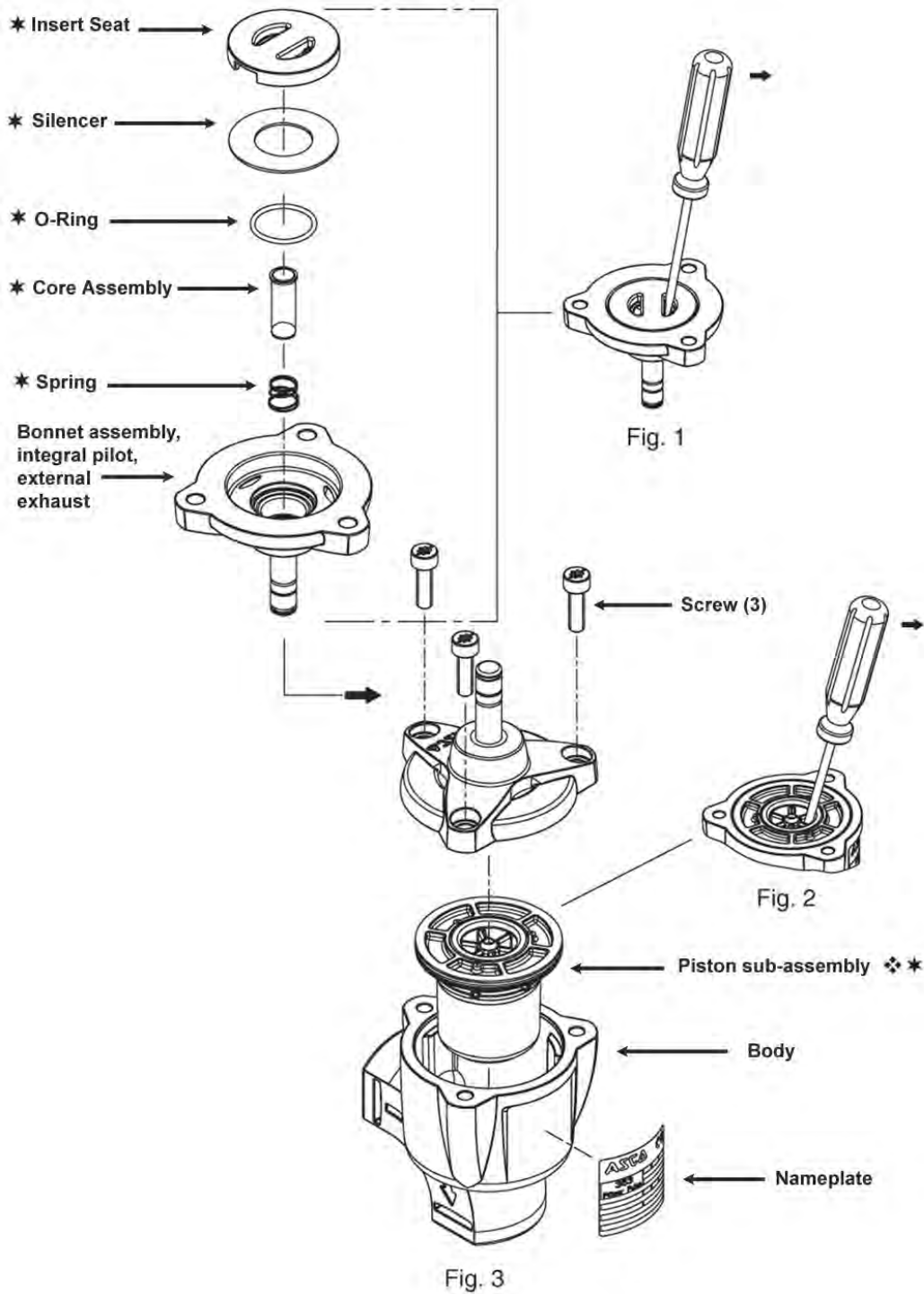
Working Pressures: (minimum) 5 psi.; (maximum) 125 psi.

Cv flow factor: 15

Pipe size: $\frac{3}{4}$ " NPT inlet & outlet.

Total Assembly Weight: 1.5 lbs

DV06 Exploded View (less coil)

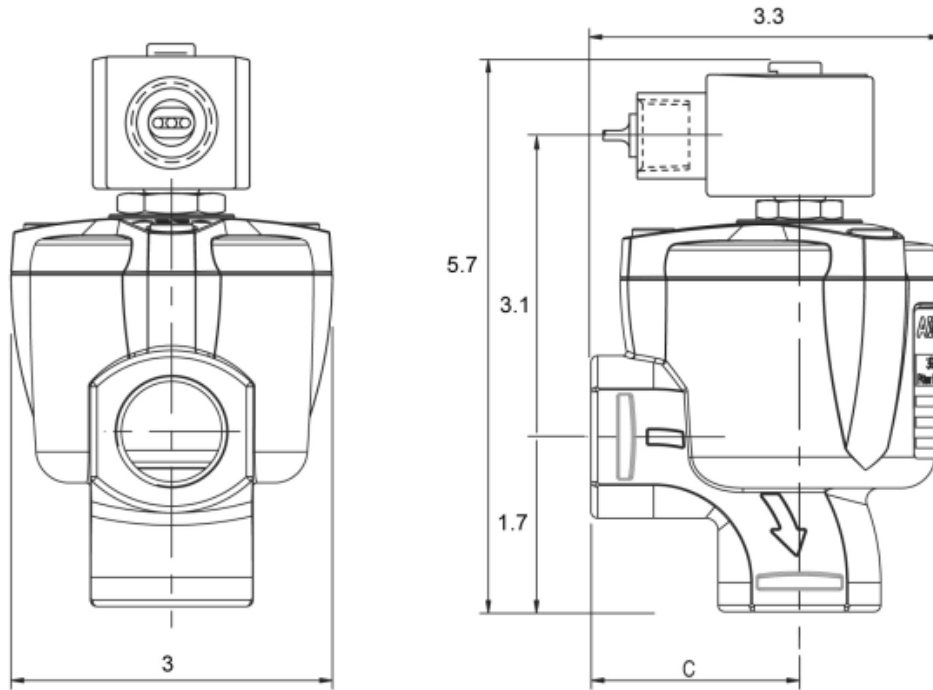


Torque screws to 62 (± 9) in-lbs

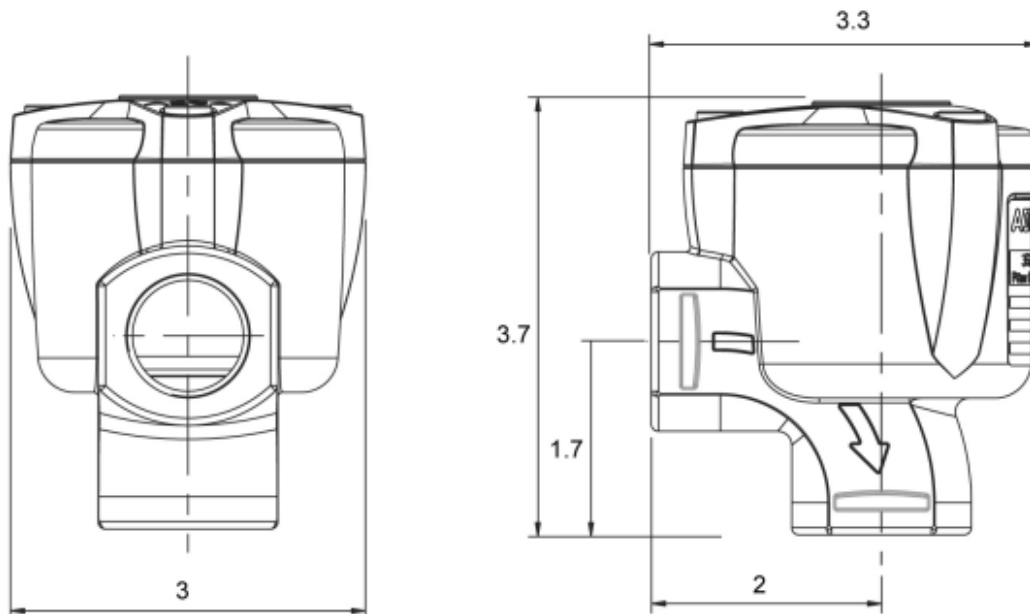
Parts marked (*) Included in parts kit # RK-DV06-08

Piston sub-assembly available individually (Part no.: C117-271)

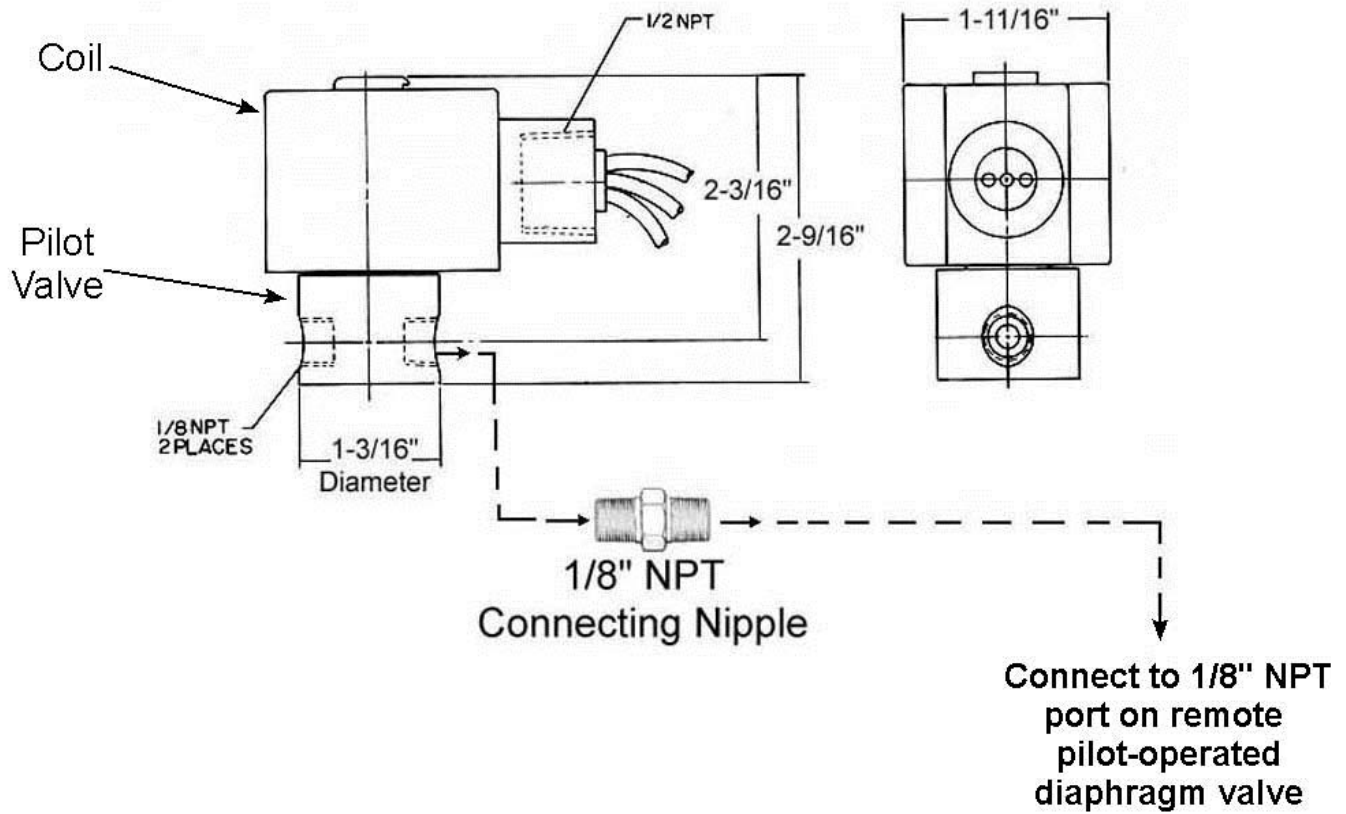
DVO6 3/4" Diaphragm Valve with Integral Solenoid



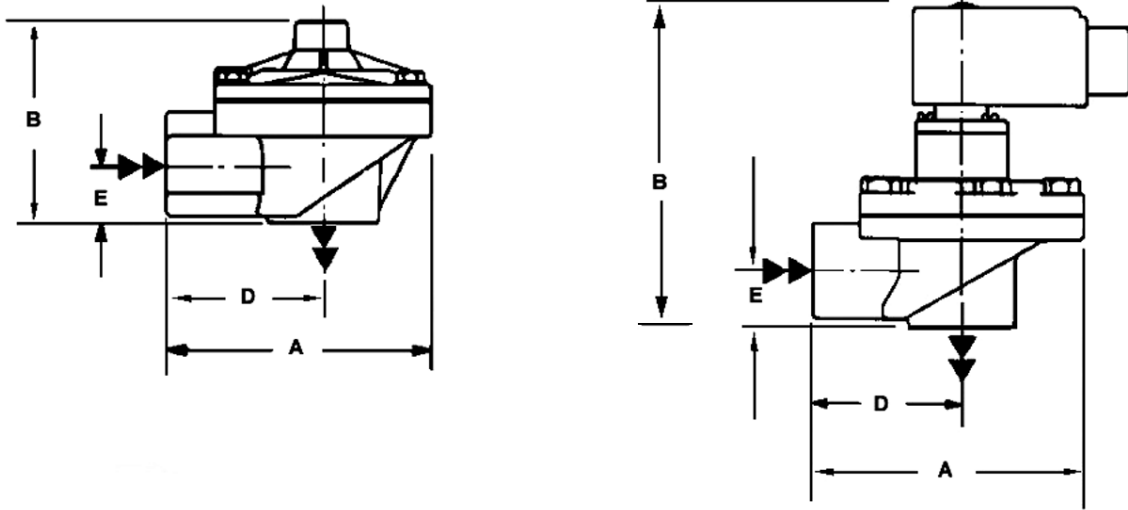
RDV06 3/4" Remote Pilot-Operated Diaphragm Valve



8262 Pilot valve for Remote Pilot-Operated Diaphragm Valves (RDV-series)



Model MCA/RCA Diaphragm Valves (3/4 & 1 1/2")



Dimensions (inches)

Model	Orifice	A	B	C (Width)	D	E
RCA-20T	3/4	3.97	2.97	3.44	2.19	.78
RCA-45T	1 1/2	5.41	4.72	4.96	2.93	1.28
MCA-20T	3/4	3.95	4.91	3.44	2.19	.78
MCA-45T	1 1/2	5.41	6.71	4.96	2.93	1.28

Pilot Connections: 1/8" NPT

Exhaust Connections:

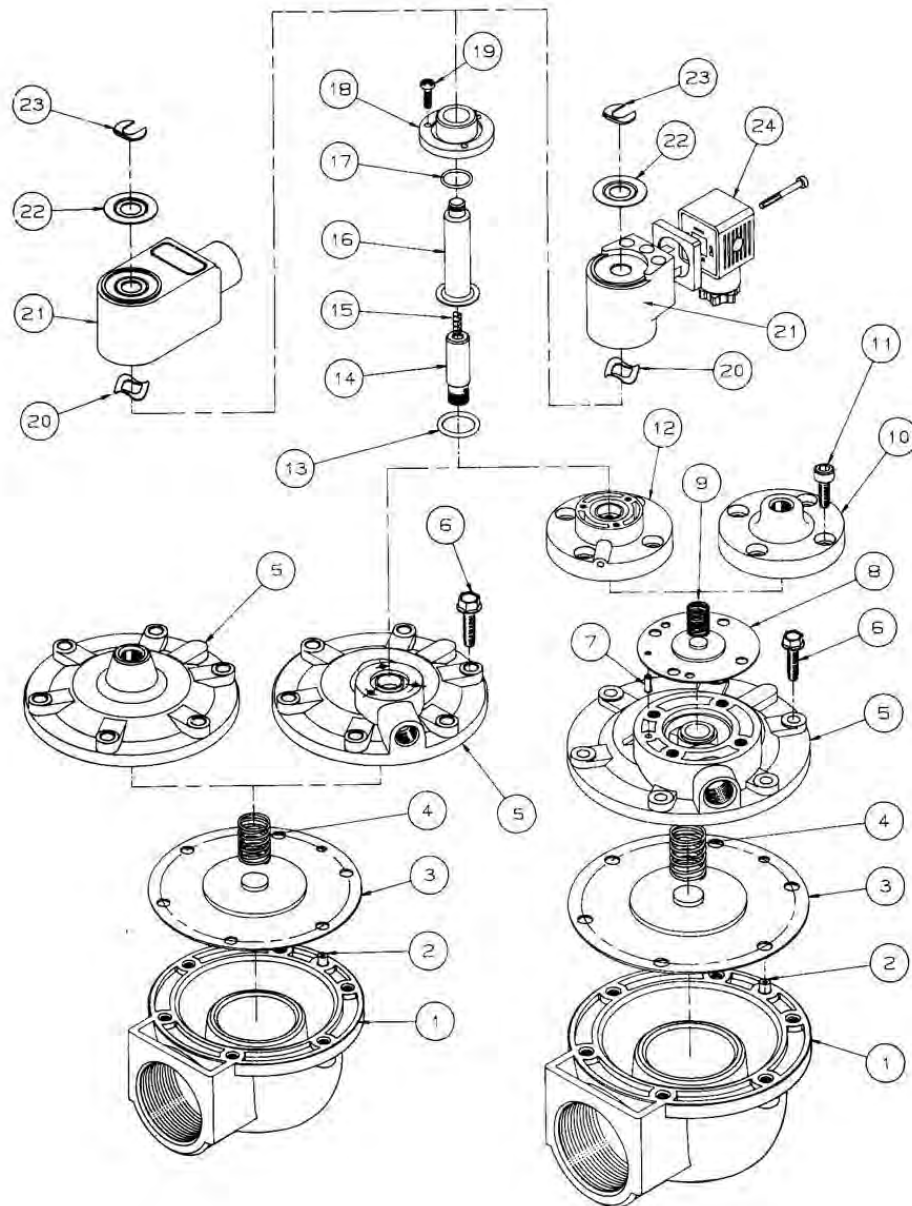
MCA/RCA 20 – 1/8" NPT

MCA/RCA 45 – 3/8" NPT

SPARE PARTS KITS

Model	<u>Solenoid Kit</u>		<u>Diaphragm Kit</u>	
	Buna N	Viton	Buna N	Viton
MCA/RCA-20T	M1131B	M1167B	K2000	M2082
MCA/RCA-45T	M1131B	M1167B	K4502	M2163

MCA/RCA-SERIES DIAPHRAGM VALVE PARTS LIST



ITEM	Description	Quantity	ITEM	Description	Quantity
1	Body	1	13	O-Ring	1
2	Main Bleed Pin	1	14	Plunger	1
3	Main Diaphragm Assembly	1	15	Spring, Plunger	1
4	Spring, Main Diaphragm	1	16	Ferrule Assembly	1
5	Main Cover	1	17	O-Ring	1
6	Hexagonal Screw	4 or 6	18	Ferrule Retainer	1
7	Secondary Bleed Pin	1	19	Screw	3
8	Secondary Diaphragm	1	20	Wave Washer	1
9	Spring, Sec. Diaphragm	1	21	Coil (QR/QD)	1
10	Secondary Cover (RCA)	1	22	Nameplate	1
	Socket Screw	4	23	Clip	1

RCAC20ST4 Series Pulse Jet Valves



Description

High-performance diaphragm valve with short threaded ports. Equipped with 'Shockwave' springless diaphragm, the 4 series valves are available as remote pilot valves and may be converted to an integral pilot using either the RCA3DM or RCA3PV screw-in pilots. Outlet is at 90° to inlet.

Suitable for

Dust collector applications, in particular for reverse pulse jet filter cleaning and its variations including bag filters, cartridge filters and envelope filters.

Construction

Body: Aluminium (diecast)
Screws: 302 Stainless steel
Seals: Nitrile or Viton
Diaphragm: Proprietary high-performance engineering thermoplastic Elastomer

Operation

Recommended on time range:
50 to 500ms

Recommended time between pulses: 1 minute or greater

Maintenance

Diaphragm and pilot unit inspection should be conducted annually.

Approvals

The RCAC20ST4 meet the requirements of the European Electromagnetic Compatibility (EMC), Directive 2004/108/EC and Low Voltage Directive 2006/95/EC, when fitted with the RCA3PV pilot.

Please Note: Pipes must be to Schedule 40 outside diameter.

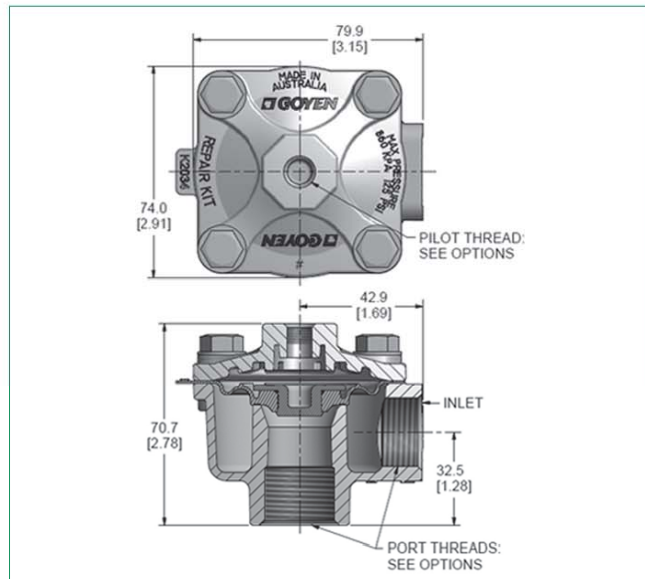
Schedule 40 Size	OD mm	OD Inches
3/4"	26.67	1.05

Weights

Valve	Kg (Lb)
RCAC20ST4	0.30 (0.66)

Dimensions

(Dimensions in mm and [inches])



Maintenance Kits

Model	Nitrile	Shockwave	Viton
Diaphragm Kit			
RCAC20ST4	NA	K2034	K2033

Product Characteristics and Performance

Port Size mm (in.)	No. of Diaph.	Flow Kv (Cv)	Pressure Range kPA (Psi)	Temperature Range °C (°F)	
				Shockwave	Viton Seals
20 (3/4)	1	14 (17)	30(5) to 960(125)	-40(-40) to 82(179.6)	-29(-20.2) to 232(449.6)

Order Code



Examples: RCAC20ST4012
3/4" threaded valve with 1/8" pilot, 3/4" RC port threads, Shockwave diaphragm.

Note:
1/8 Pilot is available in NPT and RC Thread.
1/4 Pilot is only available in G Thread.

RCA3DM Pilot Valve



For Integral Pilot (CA) applications:

The RCA3DM is a pilot valve with an integral silencer and dust shroud which mounts directly (screw-in) to the 4 series valve cover.

RCA3DM and RCA3PV are suitable piloting options for all 4 Series valves and the RCA35T diaphragm valve.

Construction

Encapsulation: PA-6

C-Frame: Mild steel, zinc passivated

Bobbin: PA-6

Insulation class: B/130°C

IP Rating: IP64

Rating: Non-continuous use only

Clip: Mild steel (mechanically plated)

Operation

Recommended on time range: 50 to 500 ms

Recommended time between pulses: 1 minute or greater

Certification and Conformities

- C-Tick
- EMC (89/336/CE)
- LV
- CSA

Spare Parts:

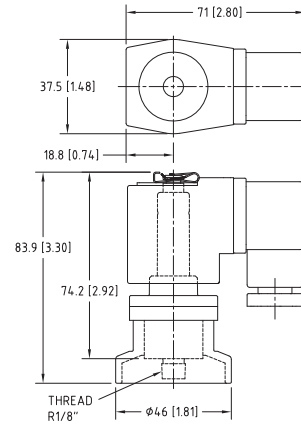
K0380 – Kit includes Nitrile replacement seal, armature, spring and ferrule.

K0384 – Kit includes Viton replacement seal, armature, spring and ferrule.

Please refer to page 3 of the Pilot Valves and Nema 4 Enclosures catalogue for replacement coil options.

Dimensions

(Dimensions in mm and [inches])



Product Performance

Flow	Maximum Working Pressure	Minimum Working Pressure	Temperature Min.	Temperature Max.	Fluid Media
0.32 Cv	860 kPa	0 kPa	-40°C	82°C	Air or
0.27 Kv	125 psi	0 psi	-40°F	180°F	inert gas

How to Order

Part Code

RCA3DM-301

Valve Type

RCA – Pilot valve – Remote-controlled air

Pilot Size

3 – 1/8" Pipe thread

Body Style

DM – Male inlet, R 1/8" thread, suits all Series 4 RCAC valves

Coil Series

3 – Goyen 'Q' coil

Order Code and Electrical Characteristics

Model	Connection Type	Protection Class	Voltage	Power
300	DIN 43650A	IP64	200/240 V 50/60 Hz	23.1 VA
301	DIN 43650A	IP64	100/120 V 50/60 Hz	19.8 VA
302	DIN 43650A	IP64	24 V 50/60 Hz	23.1 VA
303	DIN 43650A	IP64	110 V DC	24 W
304	DIN 43650A	IP64	48 V DC	20 W
305	DIN 43650A	IP64	24 V DC	20 W
306	DIN 43650A	IP64	12 V DC	20 W
310	Conduit (M20x1.5)	IP31	200/240 V 50/60 Hz	23.1 VA
311	Conduit (M20x1.5)	IP31	100/120 V 50/60 Hz	19.8 VA
312	Conduit (M20x1.5)	IP31	24 V 50/60 Hz	23.1 VA
313	Conduit (M20x1.5)	IP31	24 V DC	20 W
314	Conduit (M20x1.5)	IP31	12 V DC	20 W
320	Conduit (1/2" NPSC)	IP31	200/240 V 50/60 Hz	23.1 VA
321	Conduit (1/2" NPSC)	IP31	100/120 V 50/60 Hz	19.8 VA
322	Conduit (1/2" NPSC)	IP31	24 V 50/60 Hz	23.1 VA
323	Conduit (1/2" NPSC)	IP31	24 V DC	20 W
324	Conduit (1/2" NPSC)	IP31	12 V DC	20 W

TROUBLE SHOOTING

PROBLEM

POSSIBLE CAUSE

1. Diaphragm Valve fails to operate (open)

- No pressure in header
- Low or no power to coil
- Coil inoperative
- Pilot valve plunger jammed shut
- Pilot orifice blocked
- Secondary bleed-hold blocked
- Main diaphragm perforated
- Secondary diaphragm perforated
- Pilot valve connecting line too long
- Silencer, if fitted, may be blocked

2. Diaphragm Valve fails to shut

- Pilot valve plunger jammed open
- Foreign matter under pilot valve
- Secondary diaphragm spring broken
- Foreign matter under secondary diaphragm
- Main diaphragm spring broken
- Foreign matter under main diaphragm
- Main diaphragm seating disc damaged
- Main bleed hole blocked
- Secondary bleed hole blocked
- Leak in line connecting pilot valve

3. Unable to build header pressure

- Excessive leakage from main diaphragm seat
- Broken main valve spring
- Secondary diaphragm not seating
- Foreign matter under main or secondary diaphragm seat or under pilot valve seat
- Air supply line too small
- Compressor too small

4. Sluggish operation of diaphragm valve

- Partial blockage of one of the bleed-holes
- Silencer, if fitted, may be blocked

SPECIAL NOTE

To prevent premature failure of a diaphragm valve, special attention must be paid to the quality of the compressed air/gas being handled.

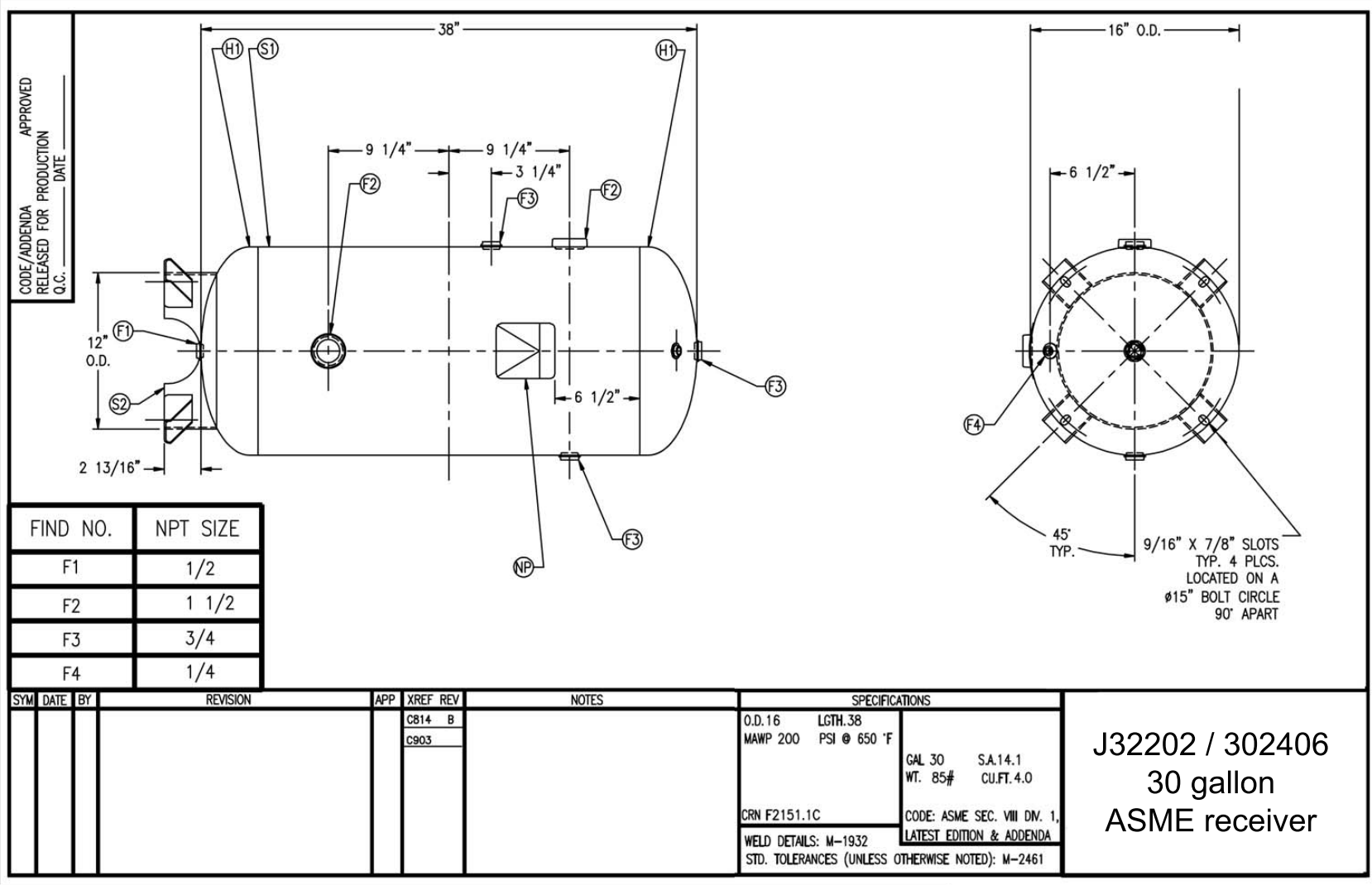
An adequate moisture and oil removal system must be incorporated that takes into account:

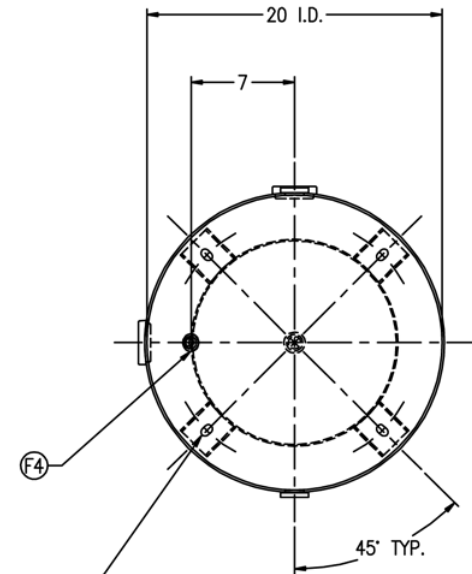
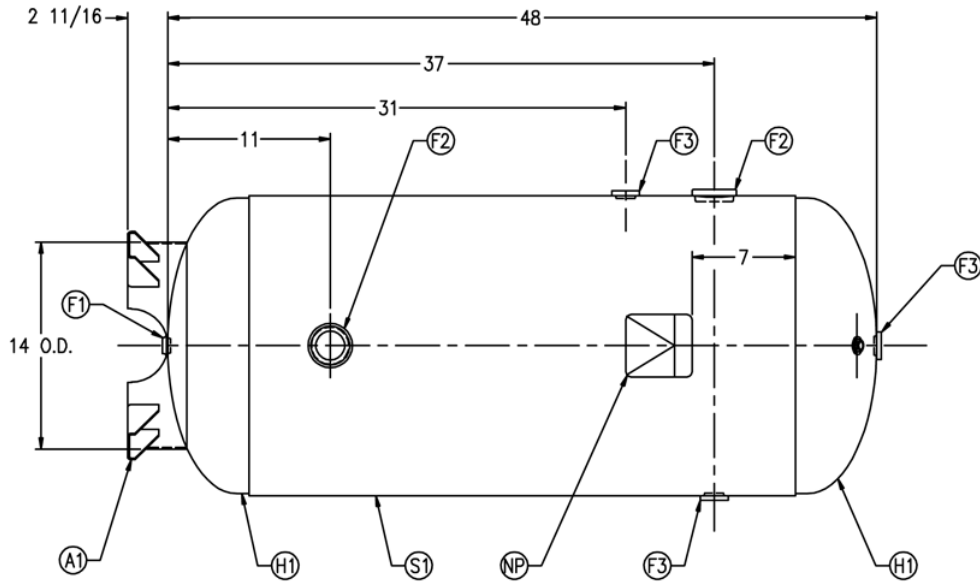
- relative humidity likely to be experienced
- ambient temperatures
- system operating temperatures
- pressure drops (and associated temperature drops) through the valve and also through the blow tube holes (dew point problem)

Also, small traces of chlorine and other aggressive gases, often present in filter systems, can be absorbed in wet areas resulting in corrosion and premature failure.

Apart from valve failures, systems may not perform to expectation for a number of reasons including the following:

- inaccurate mounting/positioning of the Airsweep(s) relative to the vessel wall
- inadequately sized header and/or air supply
- incorrect pulse time
- incorrect intervals between pulses
- improper adjustment or wear of Airsweep(s) piston head





FIND NO.	NPT SIZE
F1	1/2
F2	2
F3	3/4
F4	1/4

NOTES:

SYMBOLS				SPECIFICATIONS			
I.D.	20	LGTH.	48	MAWP	200	PSI @	650 °F
WT.	196	LBS.					
S.A.	22.6	SQ.FT.					
GAL.	60	CU.FT.	8.0	CRN:	E7399.2C		
CODE: ASME SEC. VIII DIV. I, LATEST EDITION & ADDENDA				EXMT UG20(f)			
STD. TOLERANCES: M-2461 (UNLESS OTHERWISE NOTED)				WELD DETAILS: M-1932			

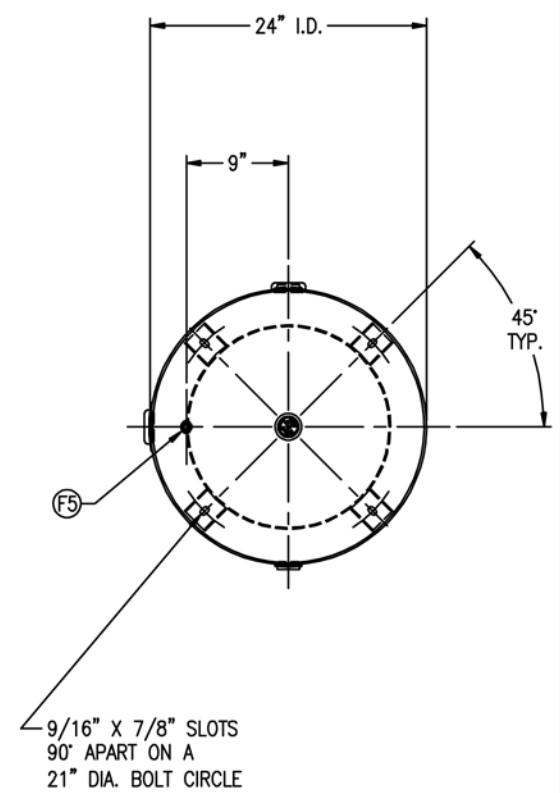
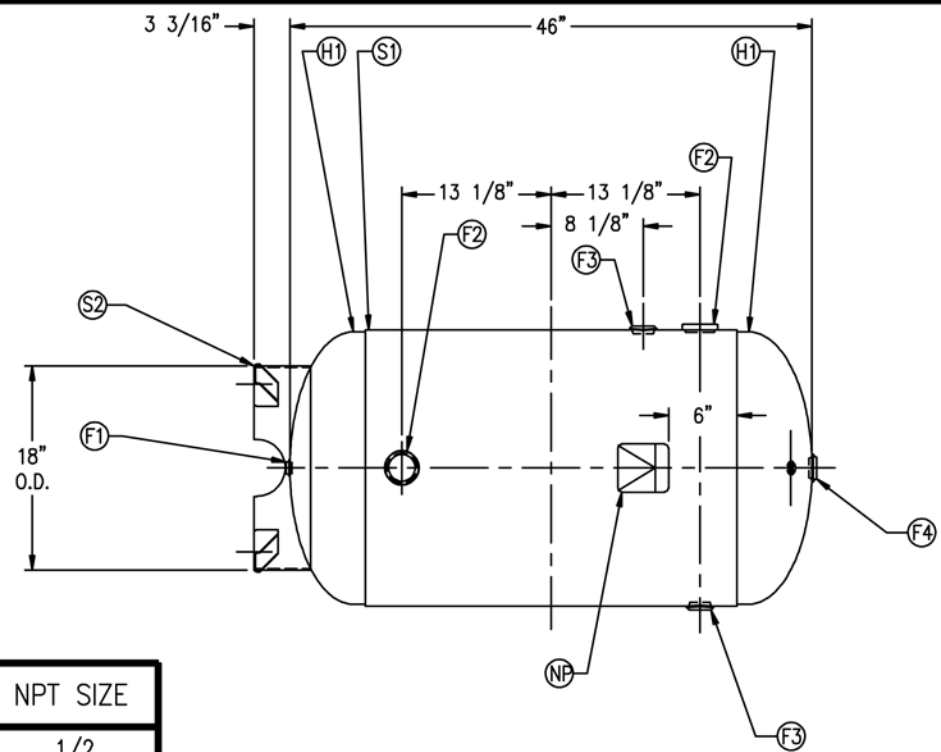
J32203
60 gallon
VERTICAL AIR RECEIVER
FILE LOCATION: \\CORP2\DWG\302

CODE 2004/2006 APPROVED KM
RELEASED FOR PRODUCTION
Q.C. _____ DATE _____
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS
ARE IN: **INCHES**

SYM	DATE	BY	REVISION	APP	XREF	REV

DRAWN BY: _____ DATE: _____
APPR. BY: _____ DATE: _____
SCALE: NONE

CODE/ADDENDA 2004/2005 APPROVED MR
 RELEASED FOR PRODUCTION
 Q.C. DATE



FIND NO.	NPT SIZE
F1	1/2
F2	2
F3	1 1/4
F4	1 1/4
F5	1/4

9/16" X 7/8" SLOTS
 90° APART ON A
 21" DIA. BOLT CIRCLE

SYM	DATE	BY	REVISION	APP	XREF REV.	NOTES	SPECIFICATIONS		J32204 80 gallon VERTICAL AIR RECEIVER	
					C427 D		I.D. 24 LGTH. 46	MAWP 200 PSI @ 650 'F		
					C694 B		CRN E7400.2C	GAL 80 SA. 26.3 WT. 220# CU.FT. 10.7		
							WELD DETAILS: M-1932	CODE: ASME SEC. VIII DIV. I, LATEST EDITION & ADDENDA	DRAWN BY	DATE
							STD. TOLERANCES (UNLESS OTHERWISE NOTED): M-2461		APP. BY	DATE
										SCALE: NONE
										DRAWING NO.



Pressure Gauge

T-53 Auto Drain

1/2" Brass Nipple

Safety Relief Valve

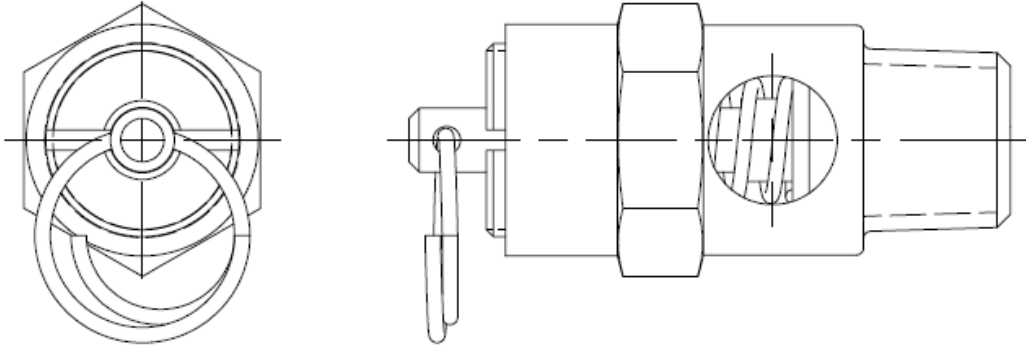
TK12230-F Tank Accessory Kit

1/2" Ball Valve, street elbows and pipe nipple



Pressure Relief Valve

Model: SRV250



Set Pressure Range: 25-450 psig

Set Pressure Tolerance: ± 2 psig up to and including 70 psig, $\pm 3\%$ of set pressure greater than 70 psig. As required in paragraph UG-134(d)(1) of the ASME Boiler & Pressure Vessel Code Sec. VIII Div. 1.

**Seat Leakage: Bubble Tight within 5 psig for set pressure 50 psig or less
Bubble Tight within 10% for set pressure greater than 50 psig
As required in paragraph 2.2.3 of API 527.
2.5 AQL sample testing or 100% testing.**

Flow Factor (Slope Method): 0.74

Operating Temperature Range: -65°F to 400°F

Materials of Construction:

Seat, Cap, Piston: C360 Brass (ASTM B-16) / Stainless Steel

Spring: Stainless Steel

Seal: Silicone / Viton

Valve Weight: 0.150 lbm

Valve Option:

Plating: Nickel Plating

Inlet NPT Sizes: 1/8 NPT or BSPT

1/4 NPT or BSPT

3/8 NPT or BSPT

Certifications:

ASME Boiler & Pressure Vessel Code Section VIII Division 1

CSA B51-03 Boiler, Pressure, Vessel, and Pressure Piping Code

SCALE: 2:1

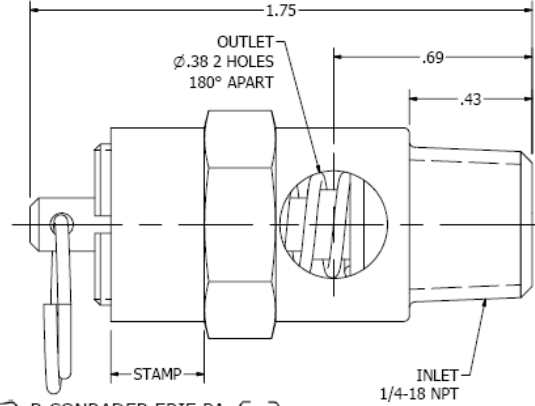
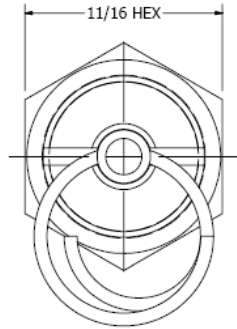
BY: L.CONTI

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CONRADER VALVES

R. CONRADER COMPANY
749 EAST 18TH STREET P.O. BOX 924
ERIE, PA 16512-0924 (814) 898-2727

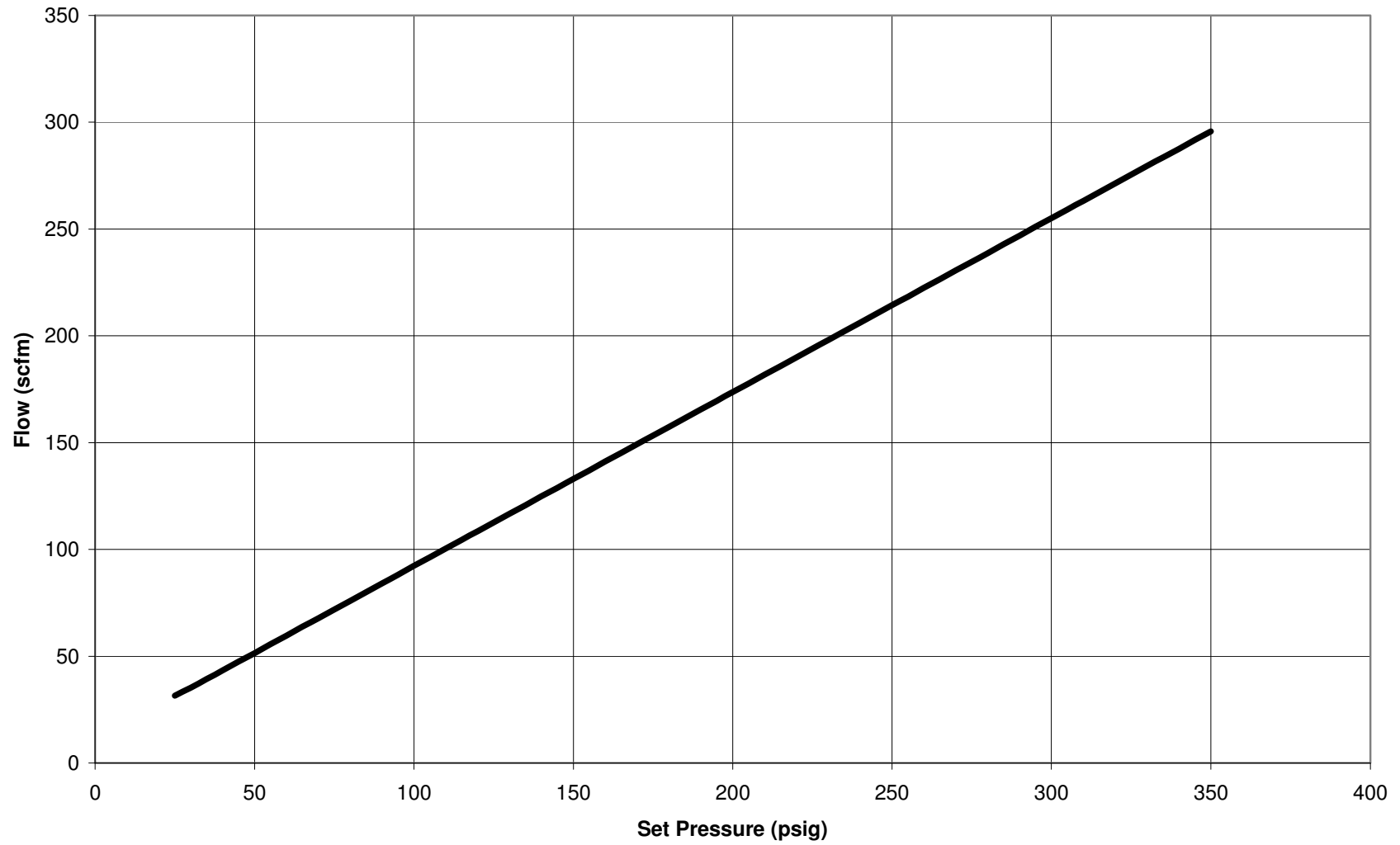


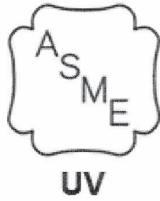
UV R. CONRADER ERIE PA SRV 250 1/4NPT CRN 0G6391.2C *** NB
XXX PSI XXX SCFM (YEAR)

DESCRIPTION	NOUN	DRAWING NO.
DIM OUTLINE	VALVE	1299
SRV250	PAGE 2 OF 2	REVISION: 4/6/2010
MATERIAL:	ISSUED: 8/22/1994	SUPERCEDES: 11/5/2008
		REVISED BY: NRP



SRV250 Set Pressure vs. Flow





CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this certification mark shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

**R. Conrader Company
749 E. 18th St.
Erie, Pennsylvania 16503**

SCOPE:

**Manufacture of pressure vessel pressure relief valves at the above location only
(This authorization does not cover welding or brazing)**

AUTHORIZED: **August 19, 2013**
EXPIRES: **September 4, 2016**
CERTIFICATE NUMBER: **34,454**

Handwritten signature of Bryan A. Eiler.

Vice President, Conformity Assessment

Handwritten signature of David N. Wjda.

Director, Conformity Assessment



**THE NATIONAL BOARD
OF
BOILER & PRESSURE VESSEL INSPECTORS**

Certificate of Authorization



This is to certify that

R. Conrader Company

Nameplate Abbrev.: R. Conrader

749 East 18th St

Erie, PA 16503

UNITED STATES

is authorized to apply the "NB" mark to specified PRESSURE RELIEF DEVICES in accordance with the provisions of the National Board. The scope of Authorization is limited to National Board Certified devices which have been manufactured, assembled and stamped with the following construction codes:

ASME Section VIII, Division 1: "UV" Stamp

ISSUE DATE: September 4, 2013

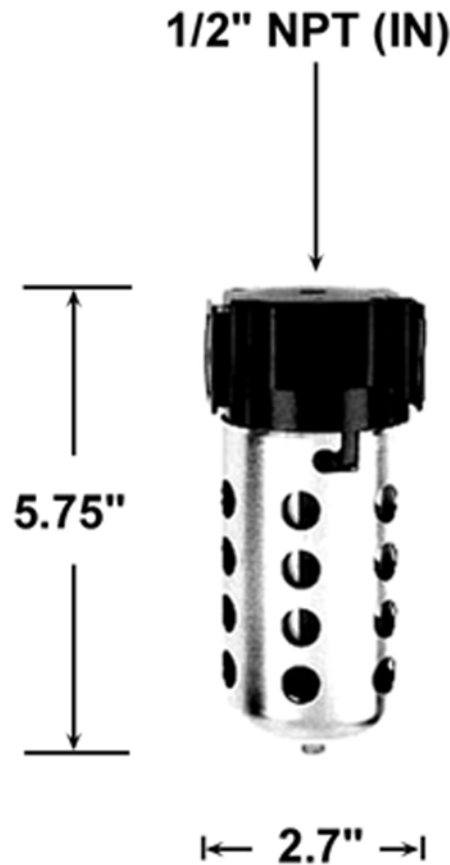
EXPIRATION September 4, 2016

Executive Director

A handwritten signature in black ink, appearing to read 'D. ...', positioned above the 'Executive Director' title.



T53 Automatic Drain (T53-04)



The **T53** series float type drain is provided with a top threaded port. This drain features a protective stainless steel screen with an umbrella baffle, providing a large sump area for oil sludge and dirt. It is used to give continued performance and low maintenance to drain accumulated water and oil from drain lines, receiver tanks, condensate drop legs and filters.

Approximate shipping weight = 2 lbs.

APPLICATIONS

Drop Leg Drain

External Filter Drain

ARROW PNEUMATICS, INC.

DRAIN TRAP INSTRUCTION SHEET

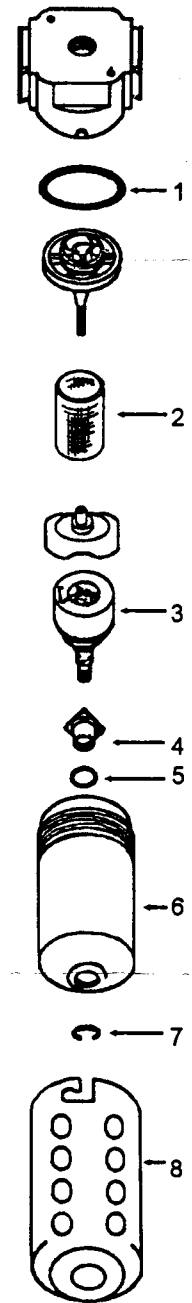
SERIES T53

Bowl	Pressure Range	Temperature Range
Plastic	30 to 150 PSI	40° F to 120° F
Metal	30 to 175 PSI	40° F to 120° F

INSTALLATION: Always mount drain trap in a vertical position. The sump screen will protect the float drain from heavy sludge and pipe scale, but should be removed and cleaned periodically when the system is de-pressurized. For best results check system regularly. When using a plastic bowl always replace the bowl guard.

Warning! For compressed air service only. Not to be used on life support or breathing air systems. Never use polycarbonate plastic bowls on air supplied by a compressor lubricated with synthetic oils or oils containing phosphate esters or chlorinated hydrocarbons. They can carry over into the air distribution systems and chemically attack and possibly rupture the bowls. On these applications use a metal bowl. Also, do not expose these polycarbonate plastic bowls to materials such as trichlorethylene, acetone or paint thinner. Cleaning fluids or other harmful materials will craze and/or rupture the bowl. If materials harmful to polycarbonate are present either inside or outside the bowl, use a metal bowl.

Item	Kit Description	Kit Part Number	Contents
1, 4, 5, 6, 7, 8	Bowl Kit	BKT53	Plastic Bowl Assembly, Bowl Guard, O-Ring
Not Shown		BKT53M	Metal Bowl Assembly, O-Ring
Not Shown		BKT53W	Metal Bowl Assembly w/Sight Glass, O-Ring
3	Auto Drain Kit	5200	Float Drain
2	Screen Kit	SKT53	Screen



PRECISION INSTRUMENT COMPANY

MODEL '102D', BACK CONNECTED GAUGE

- Suitable for air, water, oil, gas or any other media not corrosive to brass.

1/4" MPT connection

0 - 200 psi range

GENERAL SPECIFICATIONS:

Black Steel Case With Chrome Bezel
(Stainless Steel Case Available)

Brass Socket And Movement

Phosphor Bronze Bourdon Tube

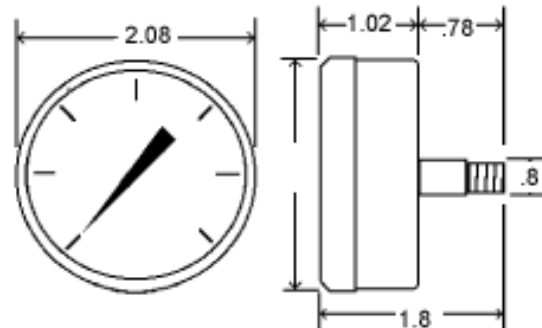
Dry Non-Fillable

3-2-3 % Accuracy

Ambient Temperature: -50 to 160°F

DIAL SCALE:

DUAL SCALE: PSI & BAR (x100=kPa) STANDARD



All dimensions in inches

AIRSWEEP[®] MAINTENANCE INSTRUCTIONS

Maintenance Requirements

Inspection of all components every 6 months is recommended for signs of wear or fatigue. Failure to perform routine inspections may result in sudden failure and possible contamination of material and/or damage to production equipment.

Isolation

Should it be necessary to overhaul any Airsweeps while the system is working, it will be necessary to first close the valve(s) isolating the Airsweep(s) on that part of the hopper. Next, switch on the Airsweep control system for one full cycle. This will allow compressed air to clear from all isolated pipes around the hopper, by cycling all Airsweeps within the system at least once.

CAUTION: to avoid injury, pressure must be relieved from header piping before maintenance is started.

Dismantling

Having first disconnected the electrical leads and the air piping, the Airsweep may be withdrawn by loosening hex setscrews or lock nut and removing Airsweep from mounting flange/plate or coupling.

(NOTE: mark Airsweep body to insure proper re-alignment with interior wall.)

At the work bench the solenoid valve should be unscrewed from the Airsweep.

Holding the front of the valve cap in a vise, loosen and remove the jam nut and elastic stop nut from the valve stem.

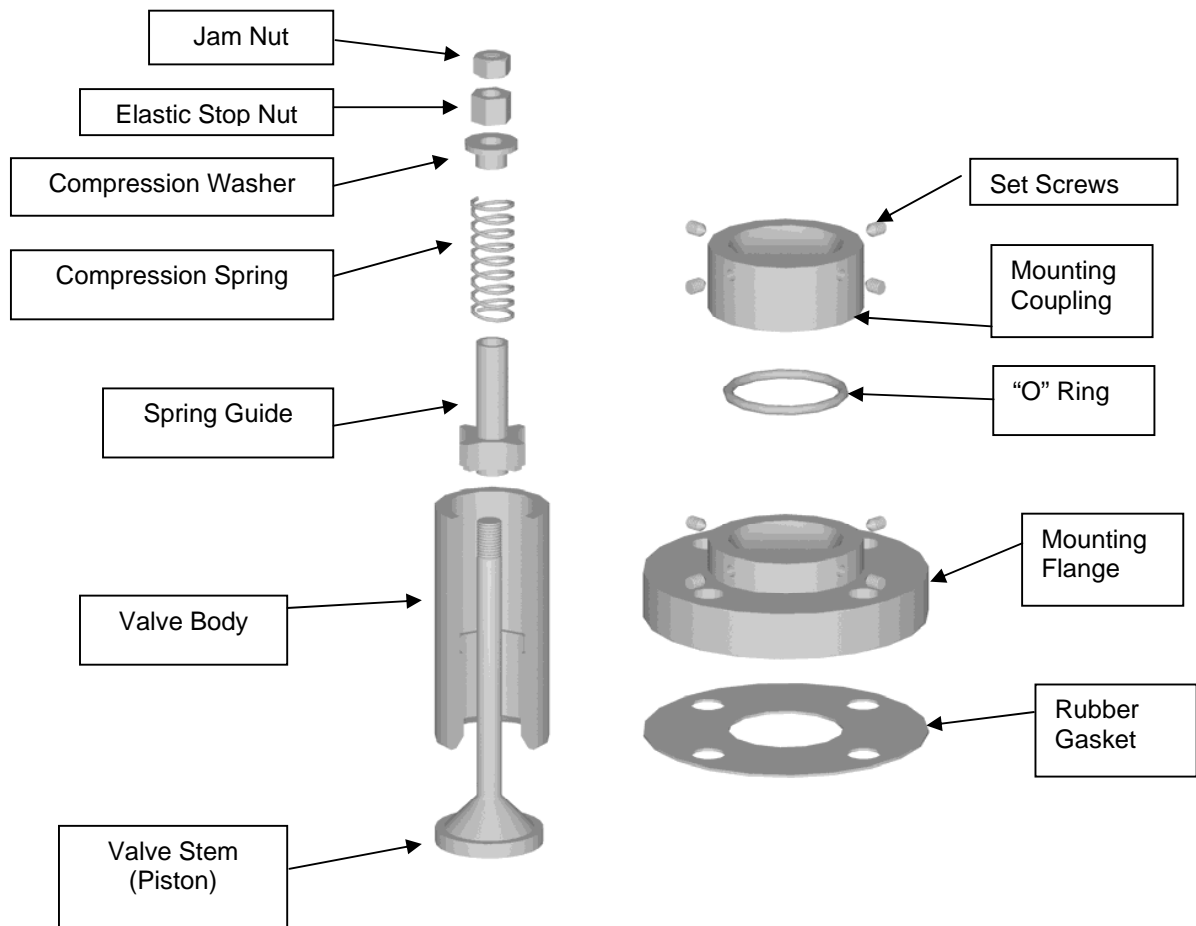
The compression washer, compression spring, spring guide and valve stem can then be taken out. Inspect all parts for signs of wear or fatigue. Particularly note threads of the valve stem and the front seat of the valve cap. Replace worn or damaged parts.

Reassembly

Reassemble valve assembly. Tighten elastic stop nut to 3mm (1/8") of internal stop (front spring guide). Check 1/8" dimension by manually pushing on rear of valve stem to extend (front) cap from body. Reinstall jam nut, and tighten against elastic stop nut. Reassemble with solenoid and place back in hopper.

IMPORTANT: Front of Airsweep valve body must align with interior of hopper wall.

VA-51 Airsweep® Assembly and Mounting

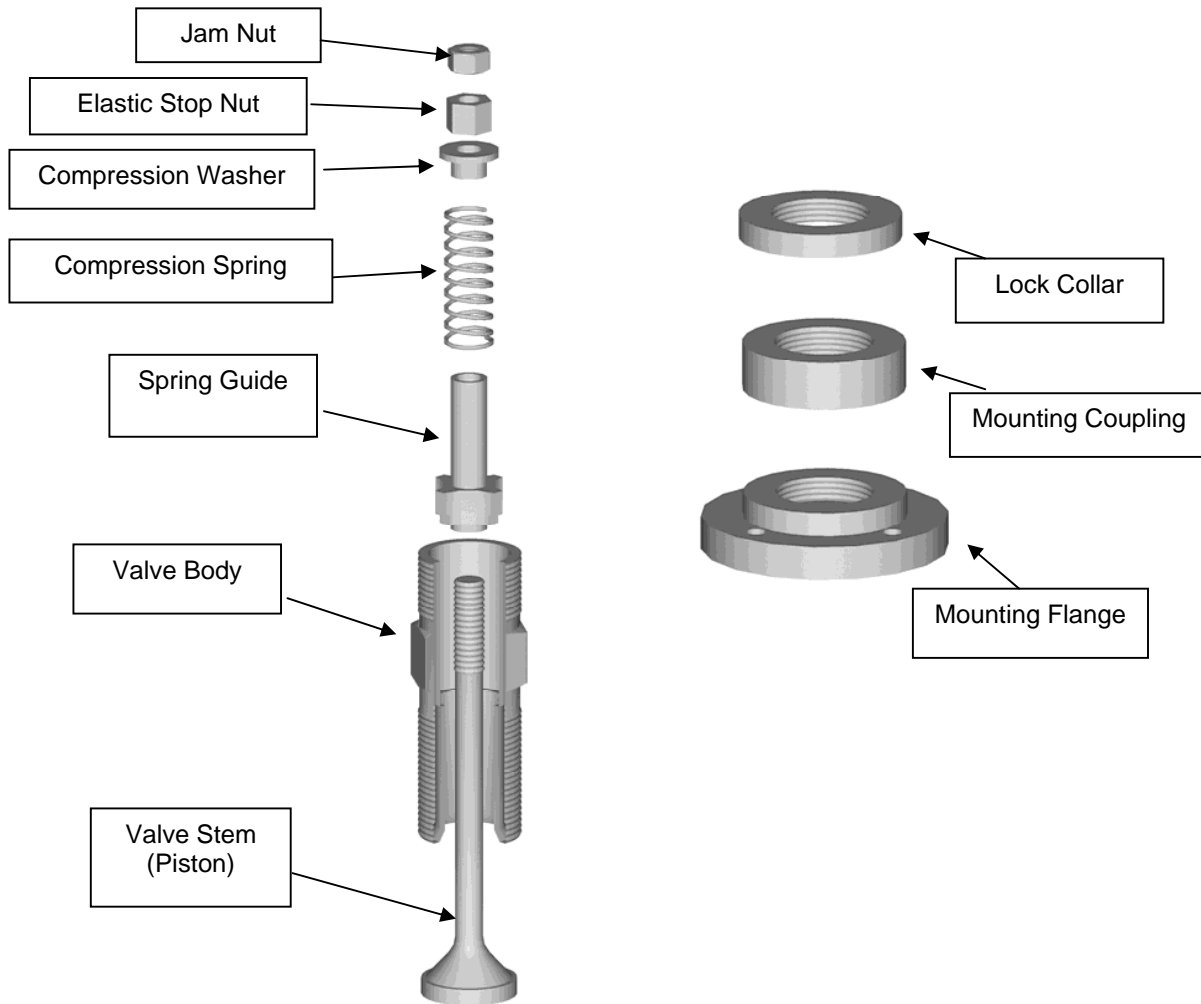


Qty	DESCRIPTION	CARBON STEEL	STAINLESS STEEL
1	Valve Body	VB-51	VB-51-SS
1*	Valve Stem	VCW-51	VCW-51-SS
1*	Spring Guide	SG-51	SG-51-SS
1*	Compression Spring	CS-12/51	CS-12/51-SS
1*	Compression Washer	CW-12/51	CW-12/51-SS
1*	Elastic Stop Nut	ESN-12/51	ESN-12/51-SS
1*	Jam Nut	JN-12/51	JN-12/51-SS
1	Mounting Flange	MF-51	MF-51-SS
1	Mounting Coupling	MC-51	MC-51-SS
1	Rubber Gasket	RG-51	RG-51
1	O-Ring**	OR-51	OR-51

Note: (*) denotes part included in rebuild kit
 Order **RK-51** for carbon steel construction
 Order **RK-51-SS** for stainless steel construction

**For temperatures above 250° F, specify Viton O-ring (OR-51-V)

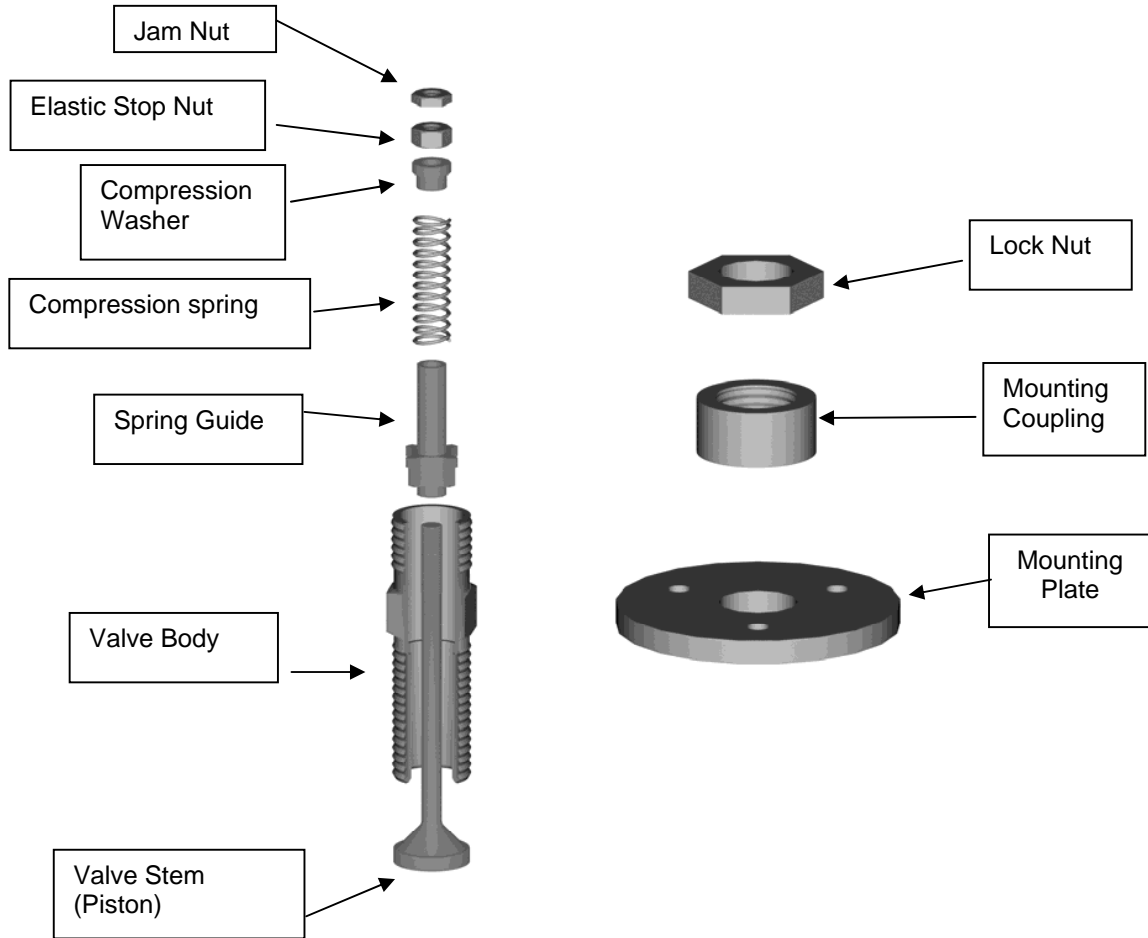
VA-12 Airsweep® Assembly and Mounting



Qty	Description	Part Number (carbon steel)	Part Number (stainless steel)
1	Valve Body	VB-12	VB-12-SS
*1	Valve Stem	VCW-12	VCW-12-SS
*1	Spring Guide	SG-12	SG-12-SS
*1	Compression Spring	CS-12/51	CS-12/51-SS
*1	Compression Washer	CW-12/51	CW-12/51-SS
*1	Elastic Stop Nut	ESN-12/51	ESN-12/51-SS
*1	Jam Nut	JN-12/51	JN-12/51-SS
1	Mounting Coupling	MC-12	MC-12-SS
1	Mounting Flange	MF-12	MF-12-SS
1	Lock Collar	LC-12	LC-12-SS

Note: (*) denotes part included in rebuild kit
 Order **RK-12** for carbon steel construction
 Order **RK-12-SS** for stainless steel construction

VA-06 Airsweep® Assembly and Mounting



Qty	Description	Part Number (carbon steel)	Part Number (stainless steel)
1	Valve Body	VB-06	VB-06-SS
*1	Valve Stem	VCW-06	VCW-06-SS
*1	Spring Guide	SG-06	SG-06-SS
*1	Compression Spring	CS-06	CS-06-SS
*1	Compression Washer	CW-06	CW-06-SS
*1	Elastic Stop Nut	ESN-06	ESN-06-SS
*1	Jam Nut	JN-06	JN-06-SS
1	Mounting Plate	MP-06	MP-06-SS
1	Mounting Coupling	MC-06	MC-06-SS
1	Lock Nut	LN-06	LN-06-SS

Note: (*) denotes part included in rebuild kit
 Order **RK-06** for carbon steel construction
 Order **RK-06-SS** for stainless steel construction

CBO-1 & CBO 1-220 Single Output Timer for Controlling *Airsweep*[®] Systems

Installation

1. Mount the control or enclosure in any convenient location.
Direction of the control does not affect performance.

2. Connect power supply to terminals H & N (Neutral to N, High to H).
For CBO 1-220, connect L1 to H, L2 to N.

3. Connect one wire of solenoid (load) to terminal 4 (+).
Connect the remaining (common) wire from solenoid to terminal 3.
Output rating is 5 amps at 120 VAC (220 VAC, for CBO 1-220), maximum.

NOTE: Load circuit must be in place across terminals 3 and 4 for timer circuit to operate.

Remote Jog Function

Output can be instantly energized, and off time reset, via remote switch or relay by closing circuit between terminals 5 and 6. When circuit is re-opened, preset off-time timing will resume.

Adjustable Time ranges*

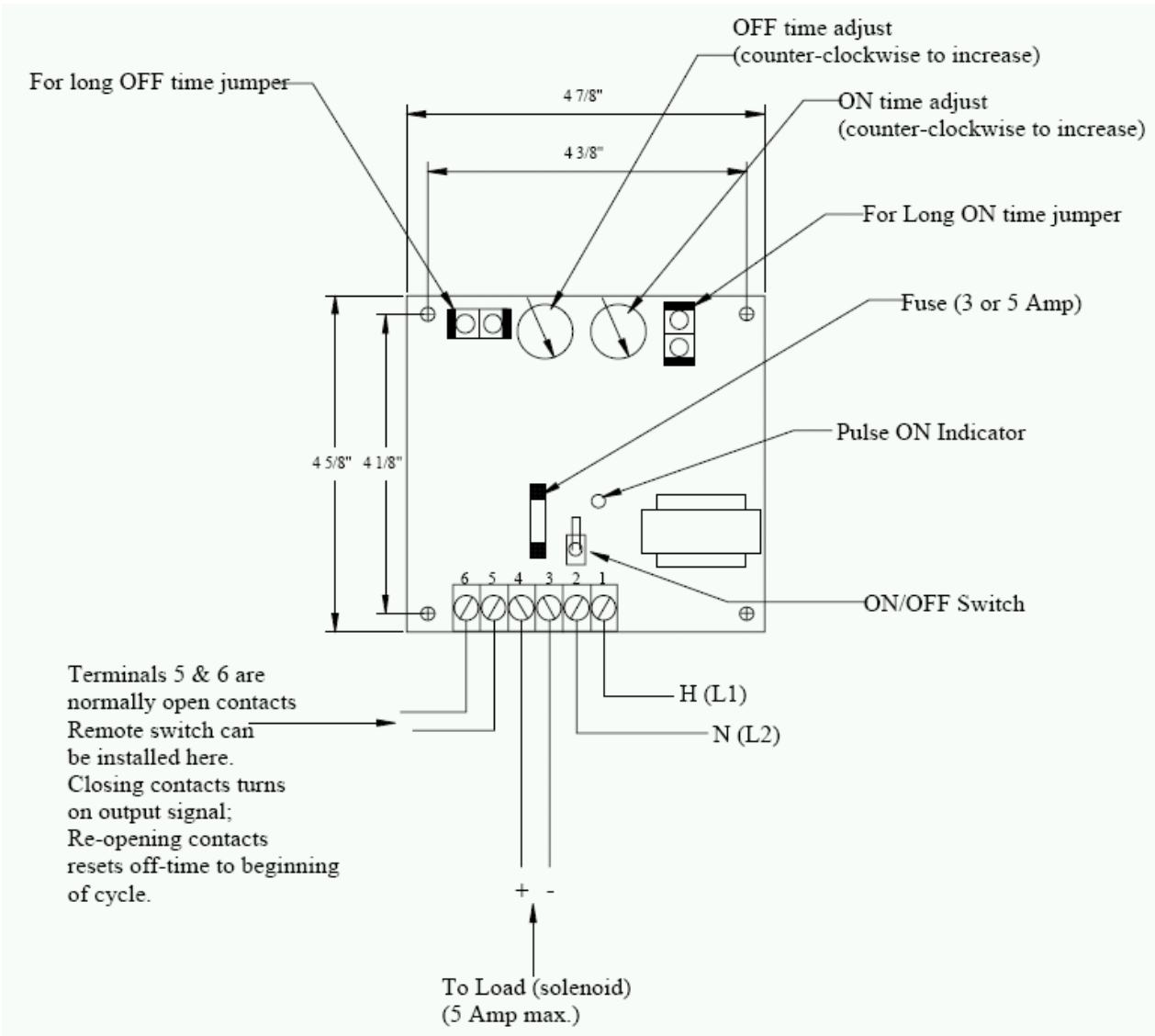
(Standard, as supplied by factory - **other times available by special order**)

On time range: 30 milliseconds to 1.2 seconds

Off (dwell) time range: 2 seconds to 2 minutes.

*OFF (dwell) time ranges can be extended by inserting a jumper on the spade terminals to the left of the OFF time adjustment potentiometer.

CBO 1 & CBO 1-220 Single Output Controller



Circuit board layout (not to scale)
Revised 11-00

CBO-4 & CBO-4-220

1-4 Output Sequence Timers for Controlling *Airsweep*[®] Systems

Installation

1. Mount the control or enclosure in any convenient location. Direction of the control does not affect performance.
2. Connect 110/120 VAC, 50/60 Hz supply to terminals H & N.
For CBO4-220, connect 220/230 VAC, L1 to (N), L2 to (H).
3. Connect one wire of each solenoid (load) to terminals 1 - 4 (as required). Connect the remaining (common) wire from solenoid to terminal N.
Output rating is 3 amps at 115 VAC, maximum (3 amps at 230 VAC, for CBO 4-220).

Sequence

Output #1, then #2, and so on to last selected output.
Sequence will then repeat, beginning at output #1.
Sequence will always begin at output #1 at power-up.

Remote Stop Function

Sequence can be paused via remote switch or relay by closing circuit between terminals A and C. When circuit is re-opened, sequence will resume at the point where it was stopped.

Selecting total number of outputs

If less than 4 outputs are desired, remove the program jumper from the socket by pulling lightly until it retracts. Reinsert the jumper in the numbered position corresponding to the amount of outputs desired. Sequence will begin at #1 position, cycle through consecutive outputs, and repeat the sequence after reaching the output corresponding to jumper position.

Adjustable time ranges*

(standard, as supplied by factory)

On time range:

30 milliseconds to 1.2 seconds;

Off (dwell) time range:

2 seconds to 2 minutes.

*OFF (dwell) time ranges can be extended by inserting 16 VDC capacitor between terminals A and C. Positive (+) lead of capacitor is connected to terminal A, negative (-) lead of capacitor is connected to terminal C.

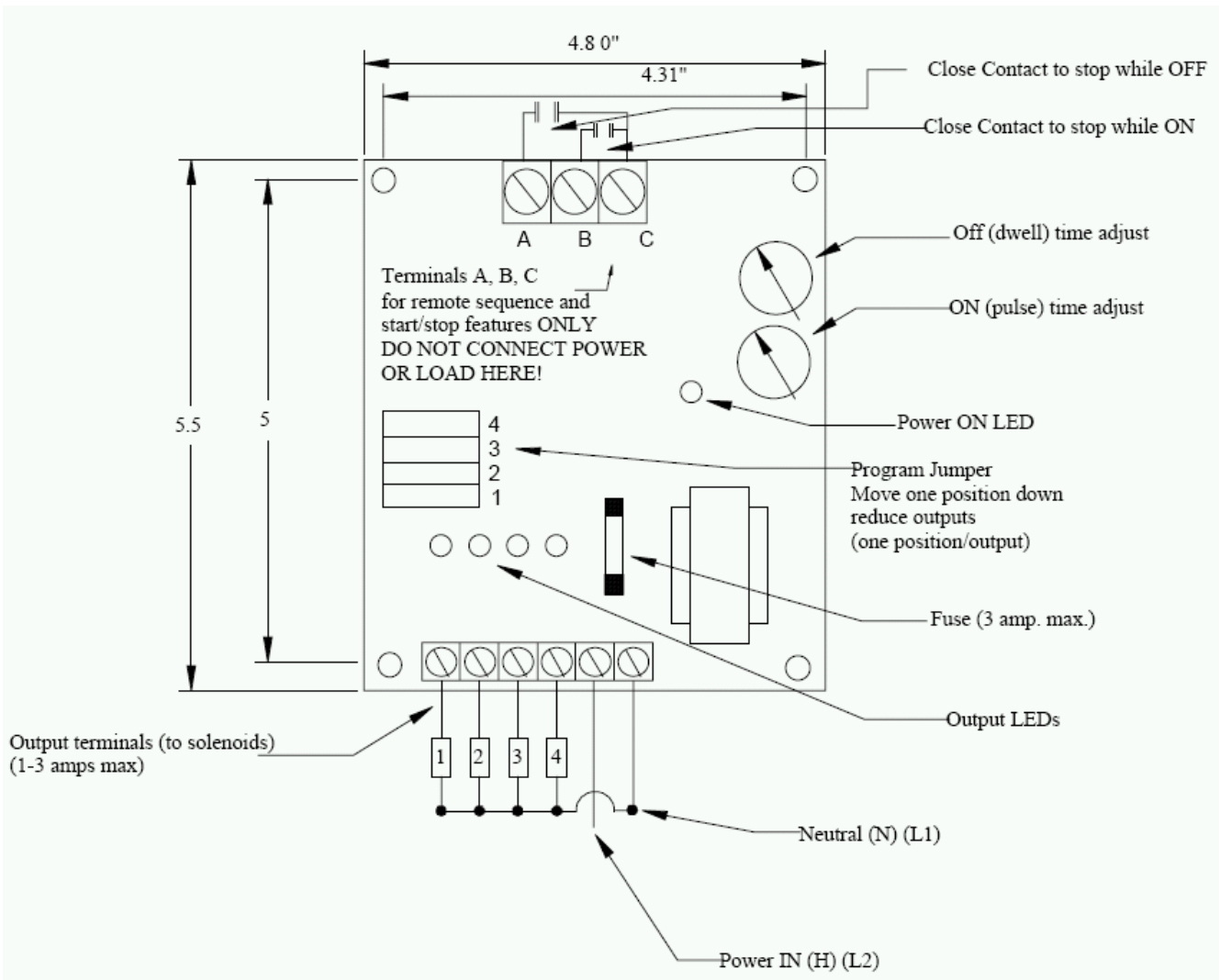
16 VDC capacitor values and corresponding time ranges are below.

Other times available by special order.

TIME RANGE	value (mfd)
16 - 600 Milliseconds	.1
30 Milliseconds to 1.2 seconds	.2
.1 to 6 seconds	1.0
.2 to 12 seconds	2.2
.3 to 20 seconds	3.3
1 to 60 seconds	10
2 seconds to 2 minutes	22
15 seconds to 10 minutes	100
30 seconds to 20 minutes	220
1 to 45 minutes	470

CBO-4 & CBO 4-220

1-4 Output Sequence Controllers



Circuit board layout (not to scale)
Revised 11-00

CBO-10

10-Output Sequence Timer for Controlling *Airsweep*[®] Systems

Installation

1. Mount the control or enclosure in any convenient location. Direction of the control does not affect performance.
2. Connect 110/120 VAC, 50/60 Hz supply to terminals H & N.
For CBO 10-220, connect 220/230 VAC supply, L1 to H, L2 to N.
3. Connect one wire of each solenoid (load) to terminals 1 - 10 (as required). Connect the remaining (common) wire from solenoid to terminal N.
Output rating is 3 amps at 115 VAC, maximum (3 amps at 220 VAC, for CBO 10-220).

Sequence

Output #1, then #2, and so on to last selected output.
Sequence will then repeat, beginning at output #1.
Sequence will always begin at output #1 at power-up.

Remote Stop Function

Sequence can be paused via remote switch or relay by closing circuit between terminals A and C. When circuit is re-opened, sequence will resume at the point where it was stopped.

Selecting total number of outputs

Number of outputs is determined by the position of the program jumper, which is generally shipped in the #9 position. If 10 outputs are desired, the jumper should be removed. If less than 10 outputs are desired, remove the jumper from the socket by pulling lightly until it retracts. Reinsert the jumper in the

numbered position corresponding to the amount of outputs desired.

Sequence will begin at #1 position, cycle through consecutive outputs, and repeat the sequence after reaching the output corresponding to jumper position.

Adjustable time ranges*

(Standard, as supplied by factory)

On time range:

30 milliseconds to 1.2 seconds;

Off (dwell) time range:

2 seconds to 2 minutes.

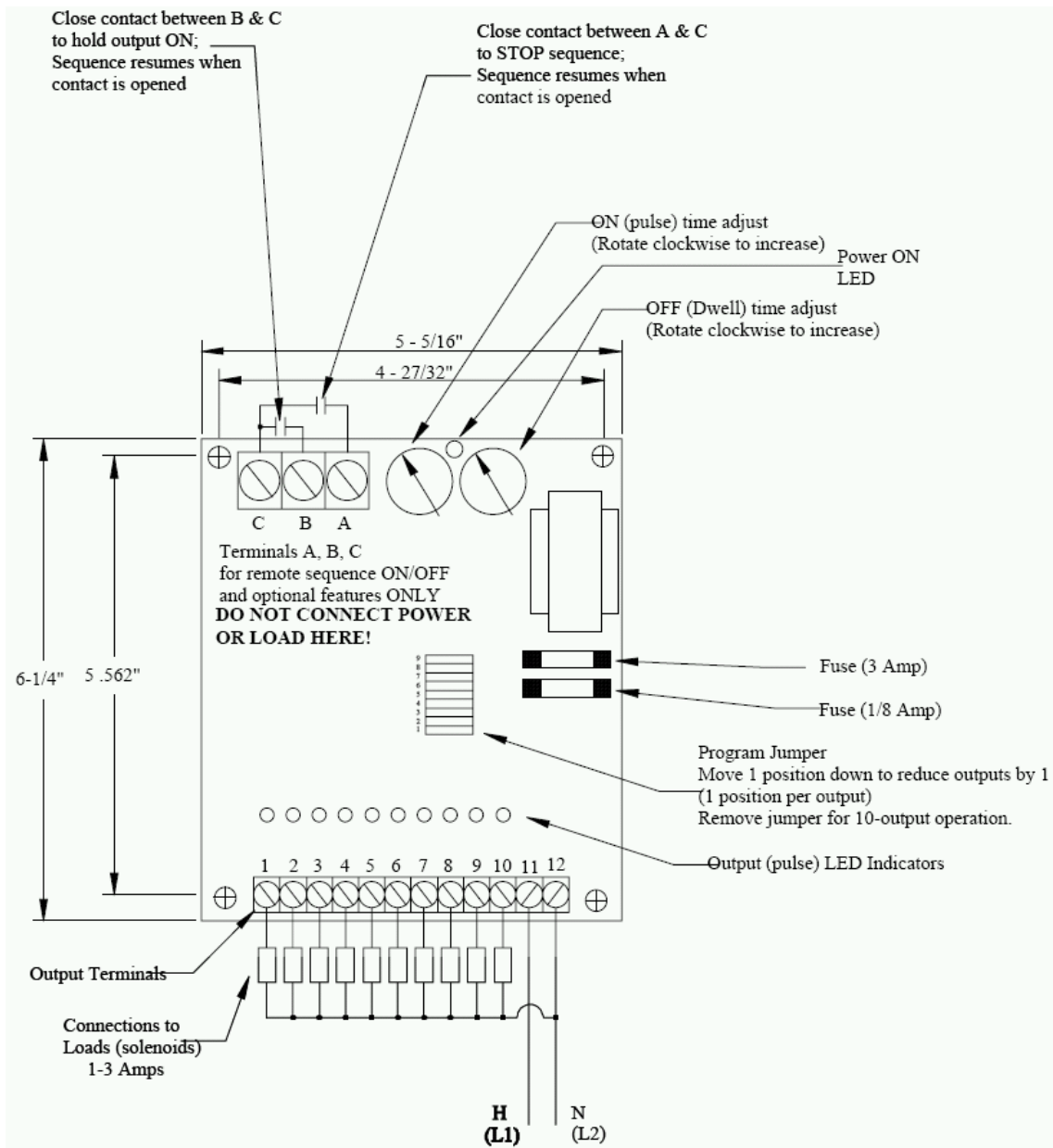
*OFF (dwell) time ranges can be extended by inserting 16 VDC capacitor between terminals A and C. Positive (+) lead of capacitor is connected to terminal A, negative (-) lead of capacitor is connected to terminal C.

16 VDC capacitor values and corresponding time ranges below.

Other times available by special order.

TIME RANGE	value (mfd)
16 - 600 Milliseconds	.1
30 Milliseconds to 1.2 seconds	.2
.1 to 6 seconds	1.0
.2 to 12 seconds	2.2
.3 to 20 seconds	3.3
1 to 60 seconds	10
2 seconds to 2 minutes	22
15 seconds to 10 minutes	100
30 seconds to 20 minutes	220
1 to 45 minutes	470

CBO-10 & CBO 10-220 2-10 Output Sequence Controllers



Circuit board layout (not to scale)
Revised 11-00

CBO-4 (12/24 VDC)

1-4 Output Sequence Timer for Controlling *Airsweep*® Systems

Installation

1. Mount the control or enclosure in any convenient location. Direction of the control does not affect performance.
2. Connect 12 or 24 VDC supply to terminals H & N (Minus to -, Plus to +).
3. Connect one wire of each solenoid (load) to terminals 1 - 4 (as required). Connect the remaining (common) wire from solenoid to terminal (-).
Output rating is 5 amps at 12 or 24 VDC, maximum.
4. For 24 VDC, remove red jumper.

Sequence

Output #1, then #2, and so on to last selected output.
Sequence will then repeat, beginning at output #1.
Sequence will always begin at output #1 at power-up.

Remote Stop Function

Sequence can be paused via remote switch or relay by closing circuit between terminals A and C. When circuit is re-opened, sequence will resume at the point where it was stopped.

Selecting total number of outputs

If less than 4 outputs are desired, remove the Program jumper from the socket by pulling lightly until it retracts. Reinsert the jumper in the numbered position corresponding to the amount of outputs desired. Sequence will begin at #1 position, cycle through consecutive outputs, and repeat the sequence after reaching the output corresponding to jumper position.

Adjustable Time ranges*

(Standard, as supplied by factory)

On time range:

30 milliseconds to 1.2 seconds;

Off (dwell) time range:

2 seconds to 2 minutes.

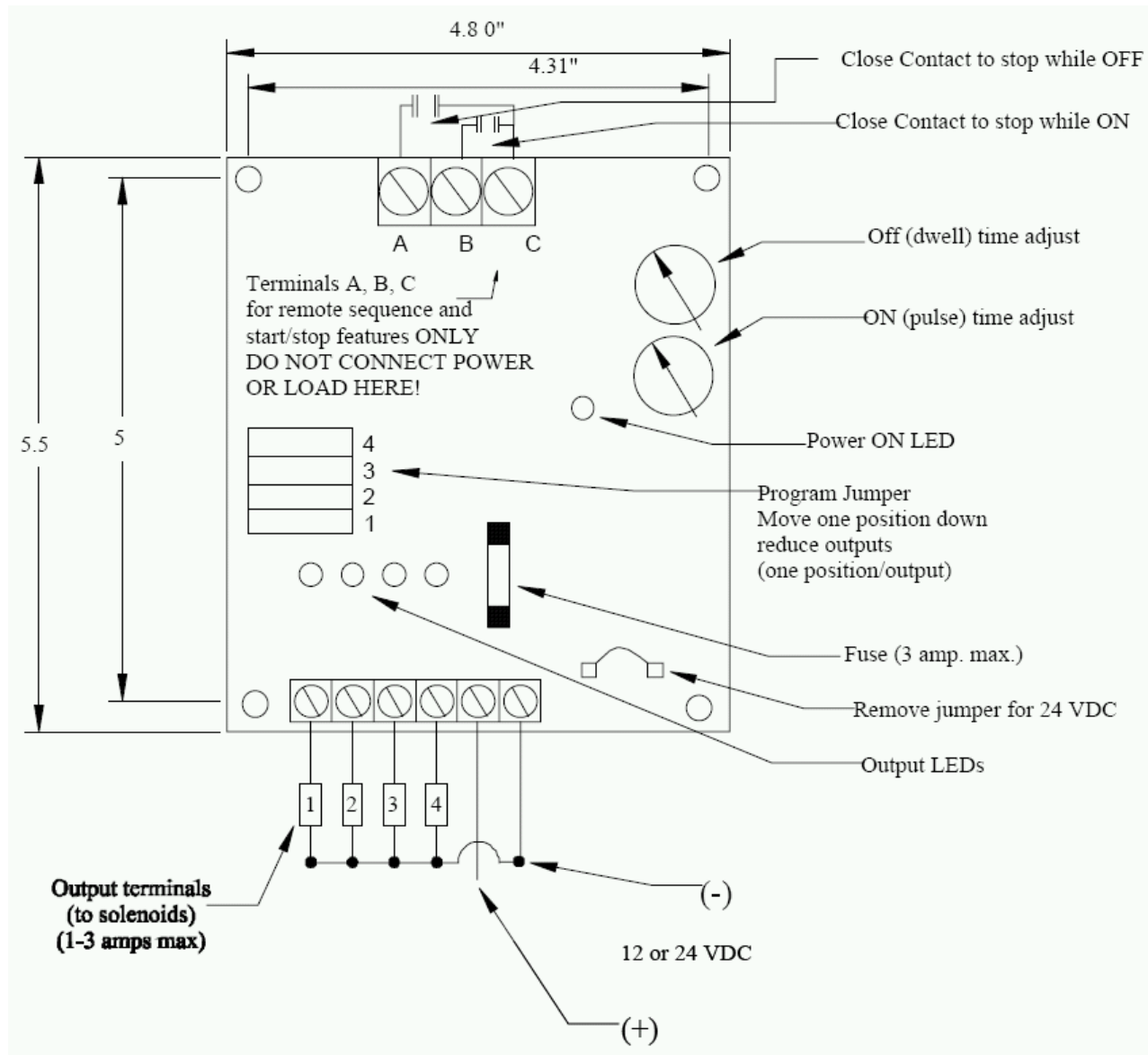
*OFF (dwell) time ranges can be extended by inserting 16 VDC capacitor between terminals A and C. Positive (+) lead of capacitor is connected to terminal A, negative (-) lead of capacitor is connected to terminal C.

16 VDC capacitor values and corresponding time ranges are below.

Other times available by special order.

TIME RANGE	value (mfd)
16 - 600 Milliseconds	.1
30 Milliseconds to 1.2 seconds	.2
.1 to 6 seconds	1.0
.2 to 12 seconds	2.2
.3 to 20 seconds	3.3
1 to 60 seconds	10
2 seconds to 2 minutes	22
15 seconds to 10 minutes	100
30 seconds to 20 minutes	220
1 to 45 minutes	470

CBO-4 (12 or 24 VDC) 1-4 Output Sequence Controller



Circuit board layout (not to scale)
Revised 11-00

CBO-10 (12/24 VDC)

2-10 Output Sequence Timer for Controlling *Airsweep*® Systems

Installation

1. Mount the control or enclosure in any convenient location. Direction of the control does not affect performance.
2. Connect 12 or 24 VDC supply to terminals 11 & 12 (- to 12, + to 11).
3. Connect one wire of each solenoid (load) to terminals 1 - 10 (as required). Connect the remaining (common) wire from solenoid to terminal 12. Output rating is 5 amps at 12 or 24 VDC, maximum.
4. For 24 VDC, remove red jumper.

Sequence

Output #1, then #2, and so on to last selected output.
Sequence will then repeat, beginning at output #1.
Sequence will always begin at output #1 at power-up.

Remote Stop Function

Sequence can be paused via remote switch or relay by closing circuit between terminals A and C. When circuit is re-opened, sequence will resume at the point where it was stopped.

Selecting total number of outputs

If less than 10 outputs are desired, remove the program jumper from the socket by pulling lightly until it retracts. Reinsert the jumper in the numbered position corresponding to the amount of outputs desired.

Sequence will begin at #1 position, cycle through consecutive outputs, and repeat the sequence after reaching the output corresponding to jumper position.

Adjustable time ranges*

(Standard, as supplied by factory)

On time range:

30 milliseconds to 1.2 seconds;

Off (dwell) time range:

2 seconds to 2 minutes.

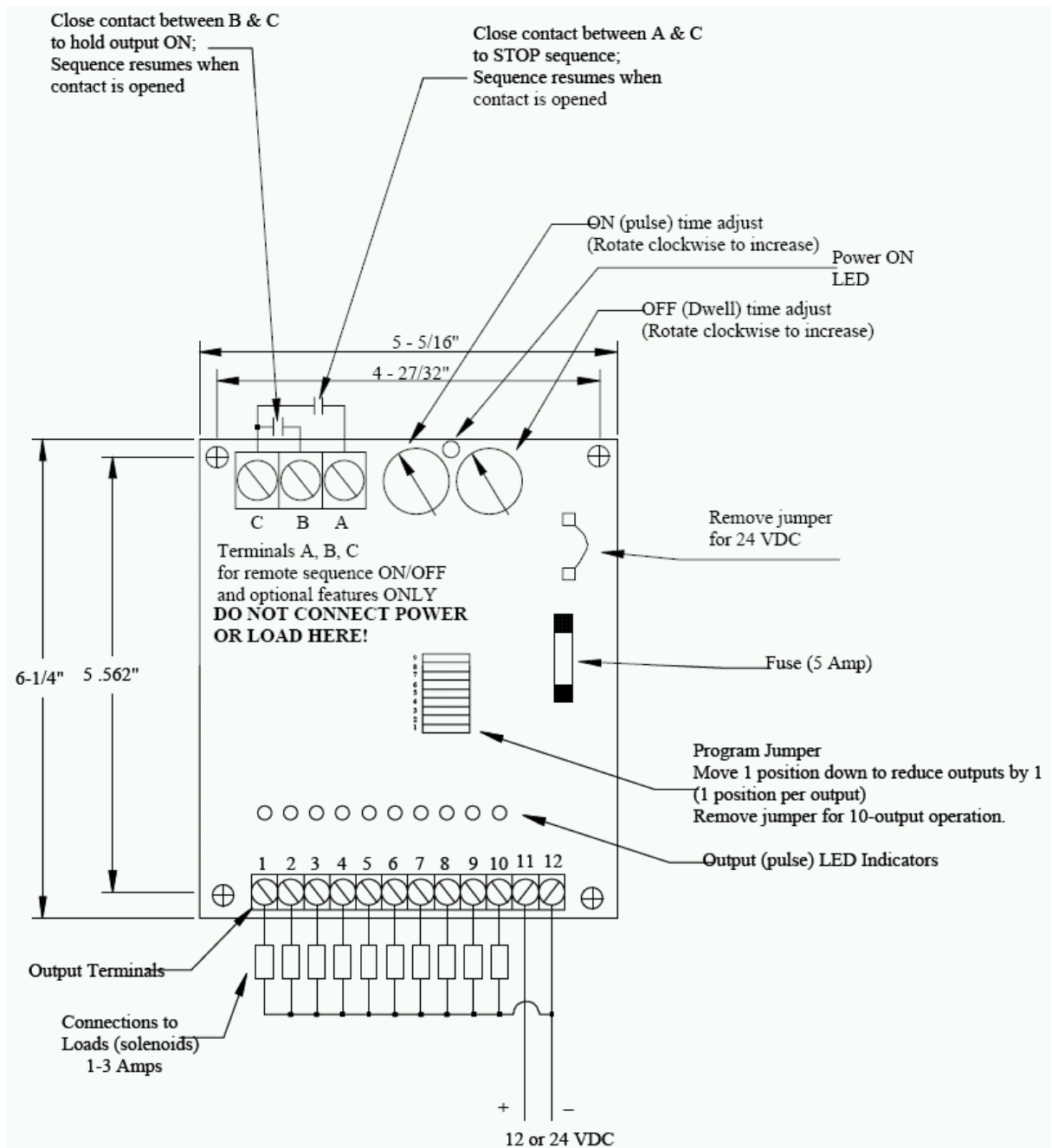
*OFF (dwell) time ranges can be extended by inserting 16 VDC capacitor between terminals A and C. Positive (+) lead of capacitor is connected to terminal A, negative (-) lead of capacitor is connected to terminal C.

16 VDC capacitor values and corresponding time ranges are below.

Other times available by special order.

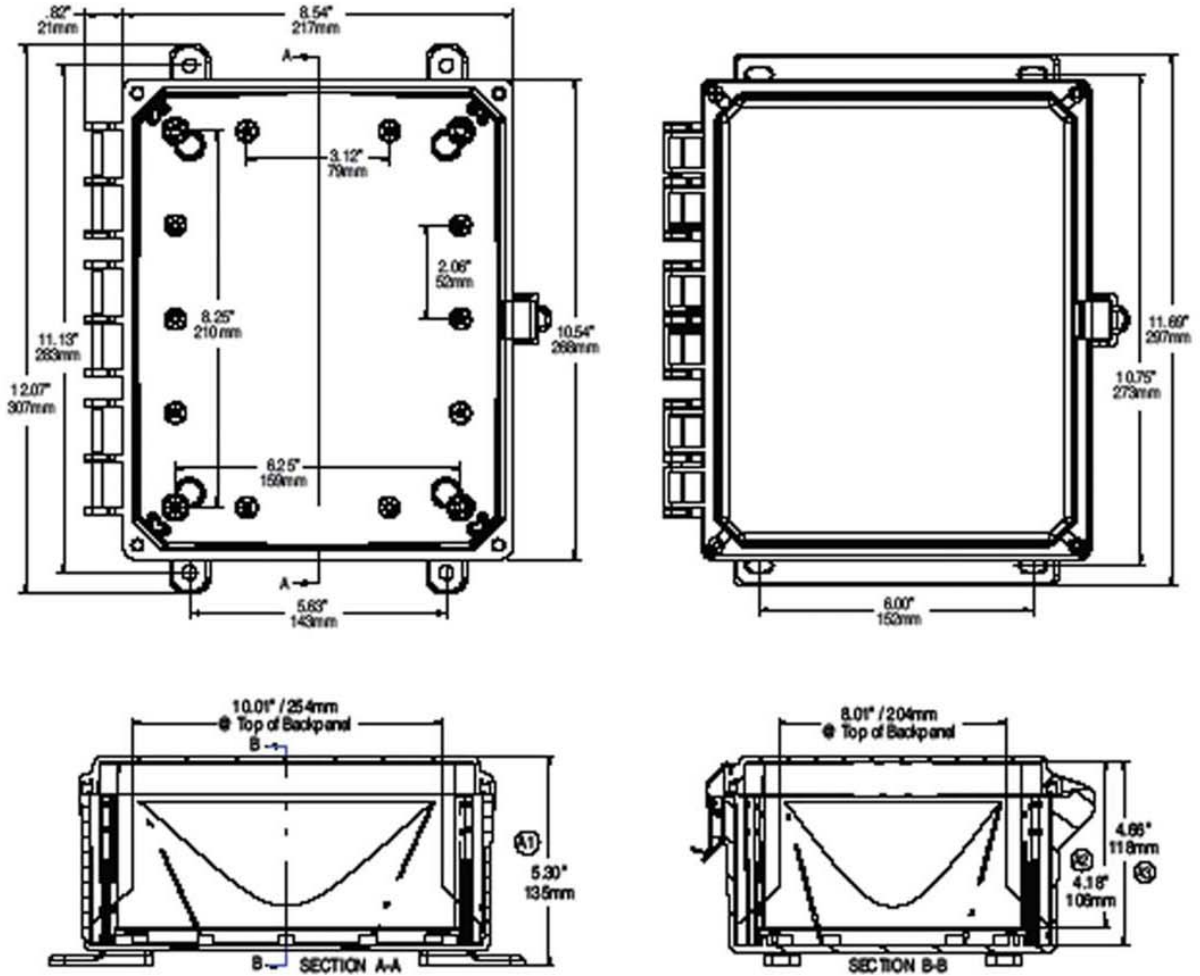
TIME RANGE	value (mfd)
16 - 600 Milliseconds	.1
30 Milliseconds to 1.2 seconds	.2
.1 to 6 seconds	1.0
.2 to 12 seconds	2.2
.3 to 20 seconds	3.3
1 to 60 seconds	10
2 seconds to 2 minutes	22
15 seconds to 10 minutes	100
30 seconds to 20 minutes	220
1 to 45 minutes	470

CBO-10 (12 or 24 VDC) 2-10 Output Sequence Controller



Circuit board layout (not to scale)
Revised 11-0

NEMA 4 / 4X POLYCARBONATE ENCLOSURE (CBO 4-4 & CBO 10-4)



Mechanical and Thermal	Test Spec.	Unit	Premium Line
Instrumented Dart Impact @ 73° F		in/lb.	565
Falling Ball/Impact @ 73° F	UL-746	in/lb.	900
Deflection Temperature @ 264 psi	ASTM D648	Deg. F	270
Modulus of Elasticity	ASTM D790	x 10 ⁴ 5 lb/in ²	3.4
Temperature Range		Deg. F	-40 to 265
Flammable / UV Ratings	Test Spec.	Unit	Premium Line
Flame Rating - UL	UL 94	-	V2
Outdoor UV Exposure	UL	-	F1

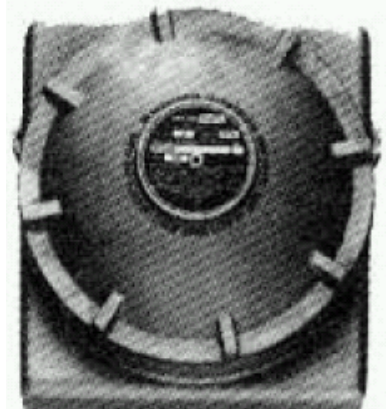
UL-50/c-UL Type 4X Listed (file #E207562)



Atex pending, contact factory for details

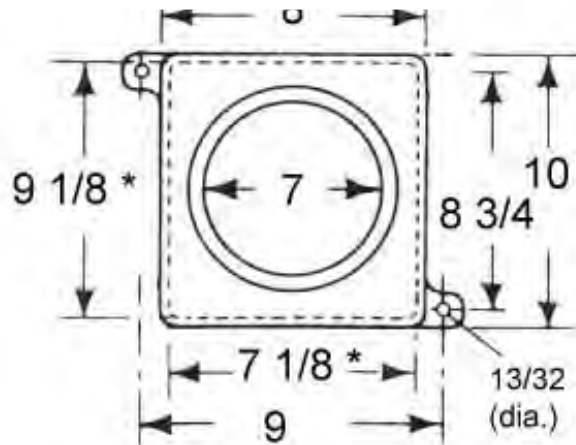
Enclosure Specifications
CBO 1-7/9XP • CBO 4-7/9XP • CBO 10-7/9XP

Enclosure is suitable for indoor or outdoor use in hazardous areas. Body construction is Feraloy iron alloy with electro galvanized and aluminum acrylic paint finish. Cover is constructed of copper-free aluminum with a natural finish. The cover is supplied with a neoprene O-ring gasket to meet NEMA/EEMAC 4 requirements for watertight seal.

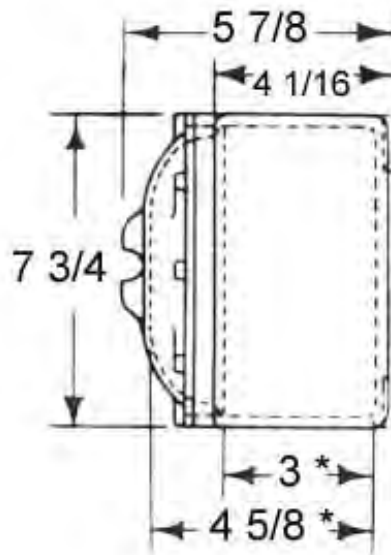


Meets: NEC/CEC Class I, Division 1 & 2, Groups B,C,D; Class II, Division 1, Groups E,F,G; Class II, Division 2, Groups F,G; Class III.

UL standard 886. CSA standard C22.2 No. 30
 Explosion proof, dust-ignition proof, wet locations, watertight.

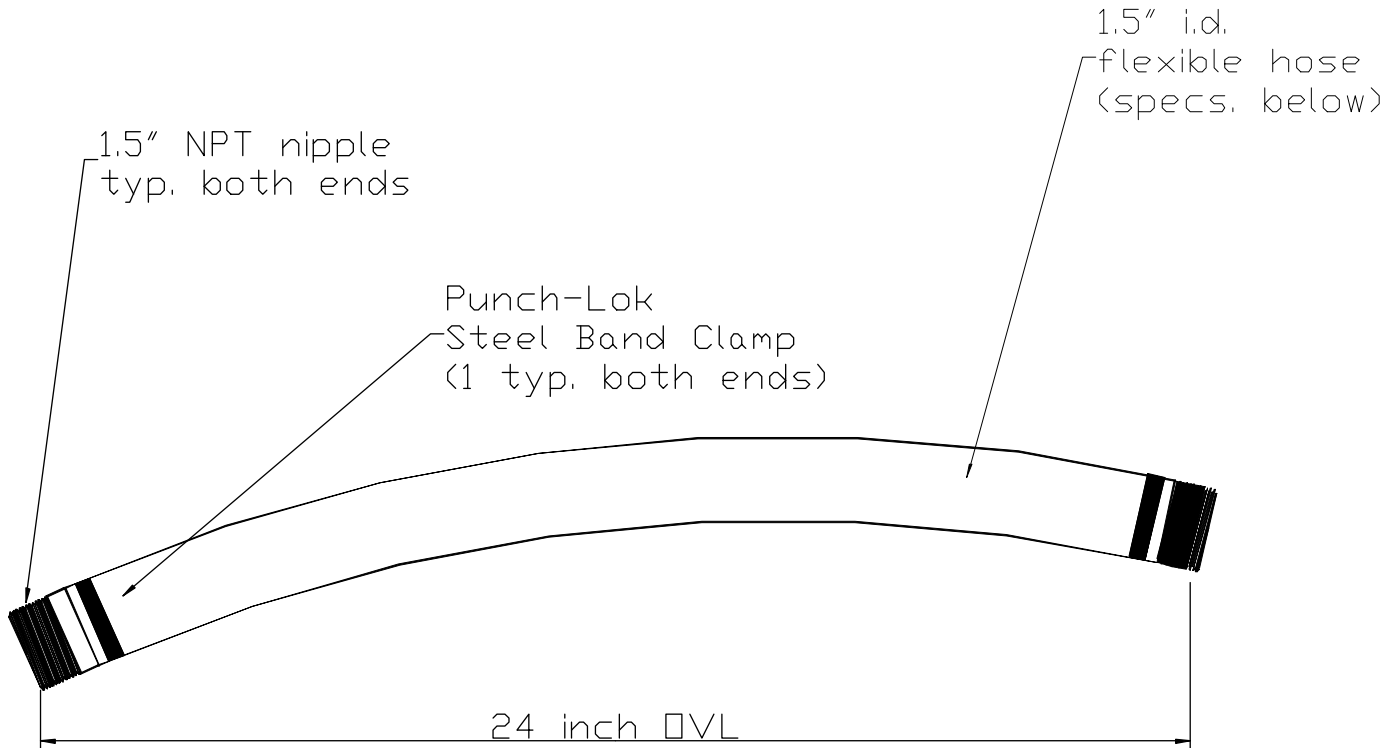


* = inside dimensions



All dimensions in inches.

**1½" Flexible Hose Assembly
Part Number J11524**



Specifications:

1 ½" i.d. x 24" overall length

Tube: Black Versigard® synthetic rubber

Cover: Black Versigard synthetic rubber (wrapped finish) with yellow spiral stripe

Reinforcement: Spiral plied synthetic fabric with wire helix

Temperature Range: -40°F to 180°F (-40°C to 82°C)

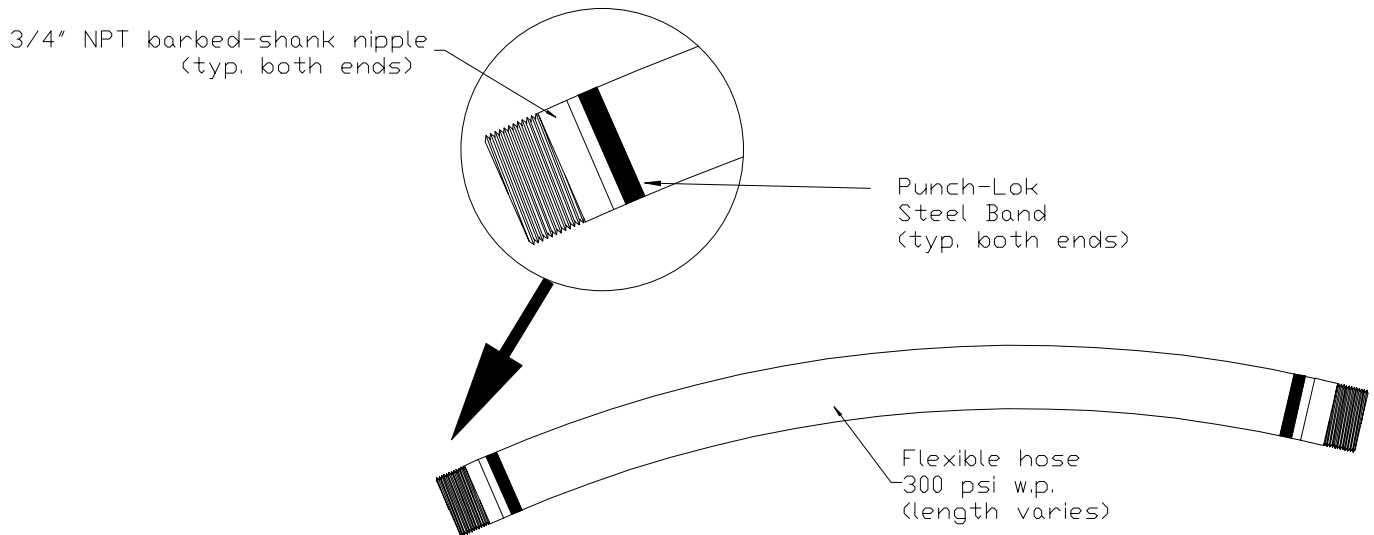
Maximum Working Pressure: 125 PSI (0.86 Mpa)

Bend Radius: 4.0 in / 102 mm

Male Nipple: 1 ½" NPT plated steel

Punch-Lok band clamp, both ends

J11512 Flexible Hose Assembly



Hose Specifications

Tube: Nitrile synthetic rubber, RMA Class A (high oil resistance)
Cover: Red Chemivic®, RMA Class B (Medium-High Oil Resistance)
Reinforcement: Spiral synthetic yarn
Temperature Range: -20°F to 190°F (-29°C to 88°C).
Working Pressure: 300 PSI / 2.07 Mpa
Nominal I.D.: 3/4" / 19.0 mm
Nominal O.D.: 1.19 / 30.2 mm
Non-conductive

Nipple Specifications

Dixon STC5 shank nipple, plated steel, 3/4" male NPT
Punch-Lok steel band, both ends

Models 61105 (1") & 61108 (2")

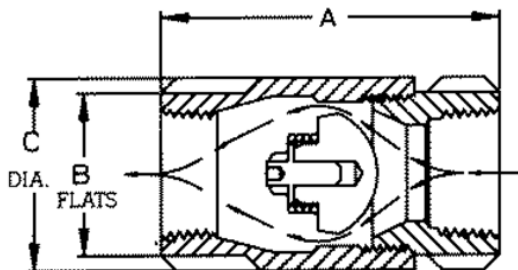
Bronze Ball-Cone Check Valves



Prevents reverse flow with minimum change in flow velocity.

Features

- Tight Shut Off.
- No Radial Alignment Necessary.
- Straight Through And Streamlined For Minimum Change In Velocity.
- Ball-Cone™ Check Is Spring Loaded For Fast Seating Action (constructed of RPTFE).



Dimensions

Model	Size	A		B		C	Approx. Open Pressure	Weight
		in./mm.	in./mm.	in./mm.	in./mm.			
61105	1	3.500	1.750	1.938		1/2 PSIG	1.45	
	25	88.900	44.450	49.225			.65	
61108	2	6.000	3.000	3.688		1/2 PSIG	7	
	50	152.400	76.200	93.675			2.85	

Reinforced ball-cone check and stainless steel springs, these valves offer exceptional resistance to chemicals and corrosion. Bronze construction (standard); stainless steel construction also available.

Pressure/Temperature Ratings

°F	PSIG
-20 to 100	400
200	200
250	160
275	150
300	140
325	130
353	125



ANSI SYMBOL

F901G-08G pictured

3.0 Micron Particulate Filter F901G Series

Application

The particulate filter is designed for heavy dirt loading. Large particles such as rust, desiccant dust, and debris will rob the life of your pneumatic components. Contaminant is generated from desiccant type air dryers, older carbon steel pipes, and from the intake of a compressor.

The F901G series features a pleated design - folds of cellulose composite media which provide a large amount of surface area and extend the life of the element. When air flows - from the outside of the element to the inside - the particles are trapped in the space between the filter bowl and the element.

Recommended Uses

- Solid bulk contamination removal
- Afterfilter to a desiccant dryer
- Protection for coalescers in heavy aerosol applications
- 3 micron particle removal in 'dry' systems

Specifications

	OPTIONS	NONE	A	G	N	AG	GN
	Port	all	all	all	all	all	all
Max. press.	PSIG (bar)	250 (17)	250 (17)	250 (17)	250 (17)	250 (17)	250 (17)
Max. temp.	°F (°C)	275 (135)	150 (66)	175 (80)	130 (55)	150 (66)	130 (55)

Materials of Construction

Body: aluminum

Seals: Viton®

Drain: brass

End caps: anodized aluminum

Flow Ratings

NOTE: Maximum efficiency occurs at stated flows

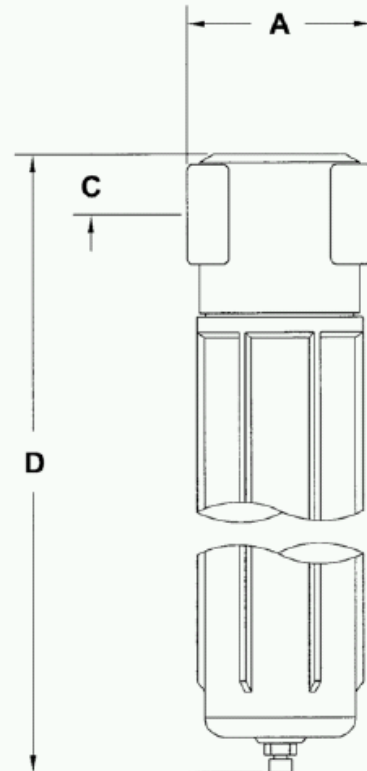
MODEL NUMBER	SCFM Based on 60 PSI inlet w/1.5 PSID	dm ³ /s
F901G-08	150	71
F901G-16	825	388

MODEL NUMBER	SCFM Based on 100 PSI inlet w/.75 PSID	dm ³ /s
F901G-08	220	103
F901G-16	1270	597

Filter Dimensions — inches (millimeters)

MODEL	A	B	C	D	E*
F901*-08	4.6 (116)		1.32 (34)	14.69 (373)	8.5 (215)
F901*-16	6.3 (160)		1.69 (43)	26.80 (681)	19.7 (500)

* The "E" dimension refers to the amount of space needed below the bottom of the bowl in order to remove the bowl.

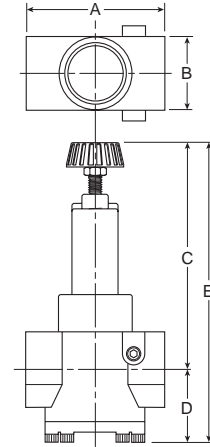


09R Regulators – Hi-Flow



Features

- Piston design for reduced downtime.
- High flow.
- Balanced poppet for quick and accurate regulation.
- Two full flow 1/4" gauge ports which can be used as additional outlets.
- Self relieving piston standard.
- High Flow: 2" – 1000 SCFM[§]



Port Size	NPT
Without Gauge	
2"	09R813BA

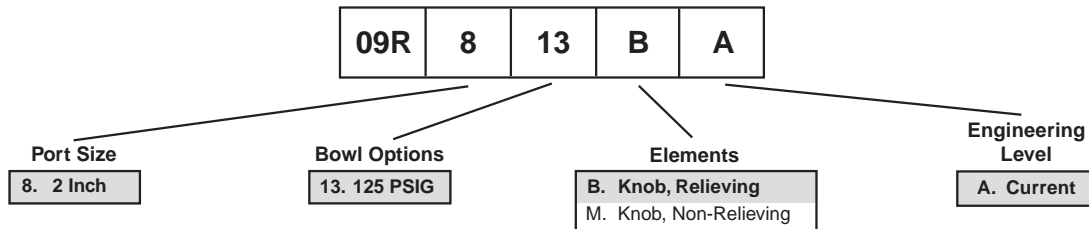
Standard part numbers shown, for other models refer to ordering information below.

[§] SCFM = Standard cubic feet per minute at 100 PSIG inlet, 90 PSIG no flow secondary setting and 10 PSIG pressure drop.

⚠ WARNING
 Do not connect regulator to bottled gas.
 Do not exceed maximum primary pressure rating.
 Product rupture can cause serious injury.

09R Regulator Dimensions		
A 5.30 135mm	B 3.60 91mm	C 9.10 231mm
D 2.80 71mm	E 11.90 302mm	

Ordering Information

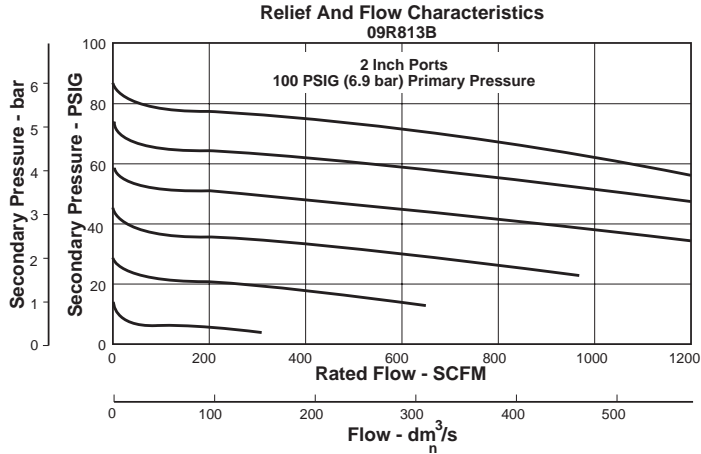


CAUTION:

REGULATOR PRESSURE ADJUSTMENT – The working range of knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design.

NOTE: Shaded items are standard.

Technical Information



09R Regulator Kits & Accessories

- Body Service Kit PS603P
- Gauges – 160 PSIG (0 to 1100 kPa) P781642
- Mounting Bracket Kit PS605P
- Service Kit – Non-Relieving PS604P
- Springs – 2-125 PSIG Range PS602P

Specifications

- Gauge Ports Two Ports 1/4"
 (Can be used as additional Full Flow 1/4 Inch Outlet Ports)
- Port Threads 2"
- Primary Pressure Rating –
 Maximum Primary Pressure 250 PSIG (1725 kPa)
- Secondary Pressure Range – 10 to 125 PSIG (69 to 863 kPa)
- Temperature Rating 32°F to 150°F (0°C to 66°C)
- Weight 10.82 lb. (53 kg)



Materials of Construction

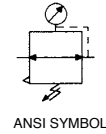
- Adjusting Stem & Springs Steel
- Body Zinc Alloy, Die Cast
- Bonnet, Piston Stem, Valve Poppet & Cap Aluminum
- Piston, Cap Plastic
- Seals Nitrile





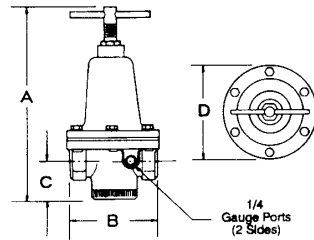
50 Series Regulator R50 Series

- Diaphragm-operated regulator
- T-handle standard
- Standard output pressure 0-125 PSIG



Specifications

Temperature Range °F (°C)	40-120 (4.4-46.9)
Max. Pressure PSIG (BAR)	300 (20.7)
1/4 & 3/8 Weight, lbs. (kg.)	1.8 (.81)
1/2 Weight, lbs. (kg.)	2.8 (1.27)
3/4 & 1 Weight, lbs. (kg.)	6.2 (2.8)
1 & 1 1/2 Weight, lbs. (kg.)	7.2 (3.3)



Flow Ratings

MODEL	PIPE SIZE	SCFM* @ REDUCED PRESSURE OF		
		25 PSIG	60 PSIG	80 PSIG
R50R-02	1/4	60	80	90
R50R-03	3/8	70	90	100
R50R-04	1/2	160	180	200
R50R-06	3/4	370	385	395
R50R-08	1	370	385	395
R50R-10	1 1/4	370	385	395
R50R-12	1 1/2	370	385	395

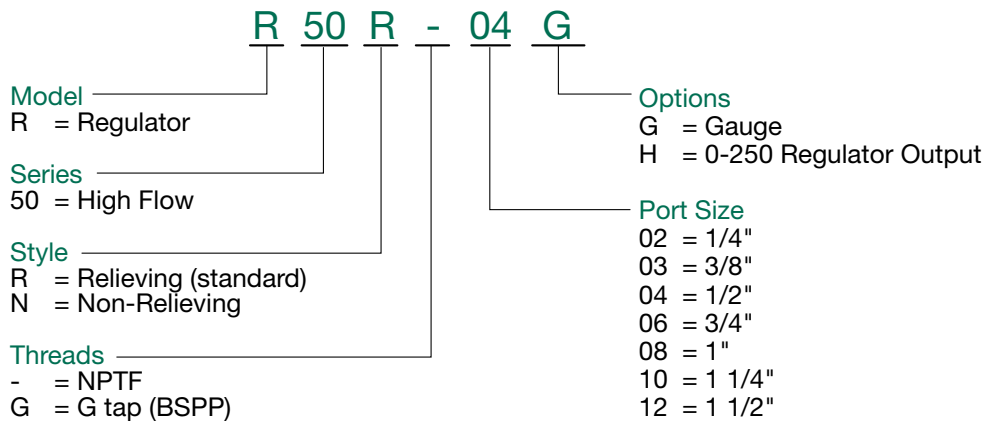
Dimensions

top dimensions = inches
bottom dimensions (in parenthesis) = millimeters

SIZE	A	B	C	D
1/4 & 3/8	6.19 (157.0)	2.75 (70.0)	1.38 (35.0)	3.0 (76.0)
1/2	6.75 (171.0)	3.75 (83.0)	1.47 (37.0)	3.56 (90.0)
3/4 & 1	8.81 (224.0)	4.56 (116.0)	1.94 (49.0)	7.88 (200.0)
1 1/4	9.53 (242.0)	5.19 (132.0)	1.28 (33.0)	8.25 (210.0)
1 1/2	9.53 (242.0)	5.19 (132.0)	1.28 (33.0)	8.25 (210.0)

* Flow rates based on 100 PSIG inlet and 25% PSID.

How To Order



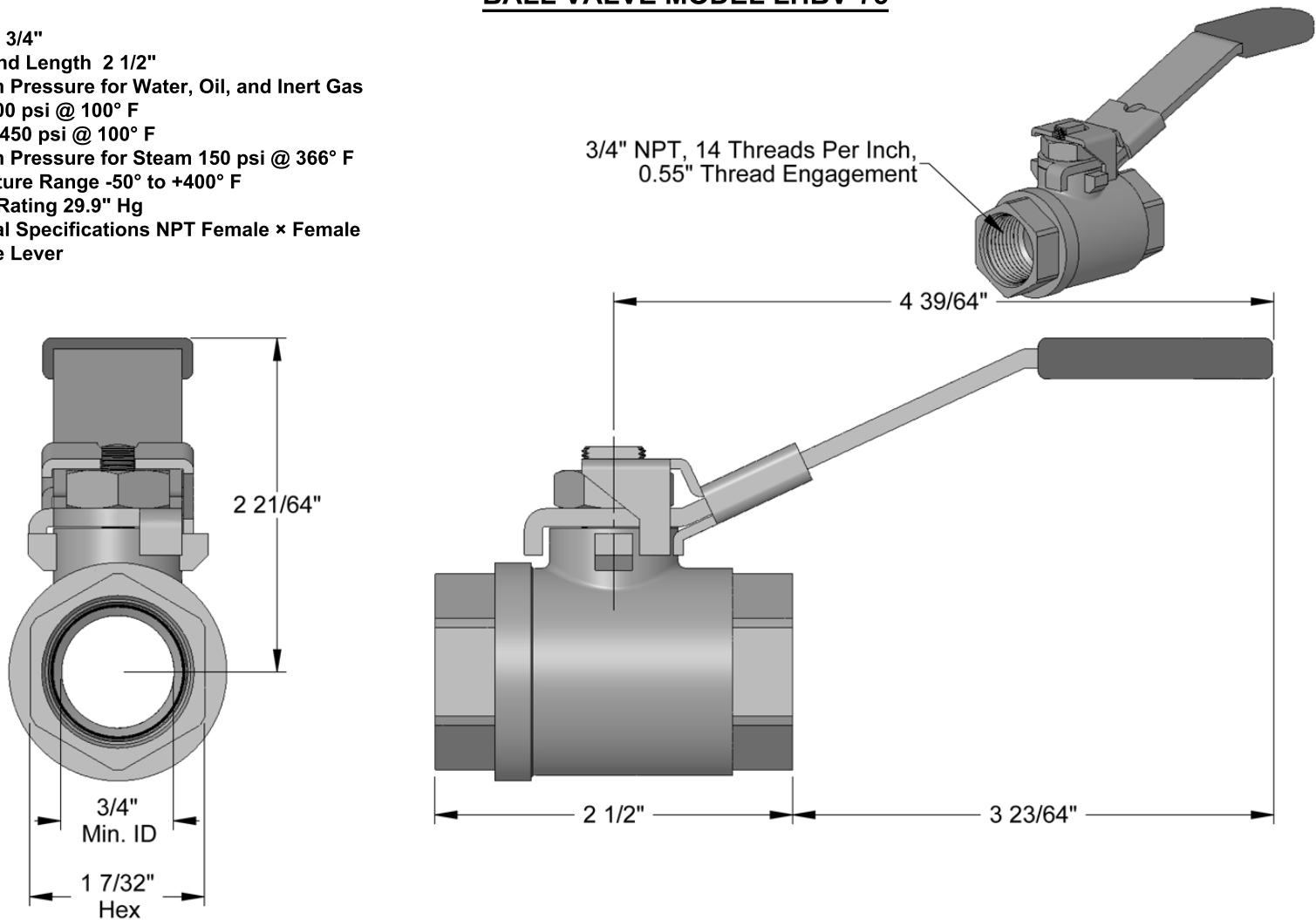
NEED MORE PARTS AND INFORMATION?

- See page 10 for information on ordering replacement parts.

Information subject to change without notice. For ordering information or regarding your local sales office visit www.numatics.com.

BALL VALVE MODEL LHBV-75

Pipe Size 3/4"
End-to-End Length 2 1/2"
Maximum Pressure for Water, Oil, and Inert Gas
1/4"-2" 600 psi @ 100° F
2 1/2"-4" 450 psi @ 100° F
Maximum Pressure for Steam 150 psi @ 366° F
Temperature Range -50° to +400° F
Vacuum Rating 29.9" Hg
Additional Specifications NPT Female x Female
Lockable Lever

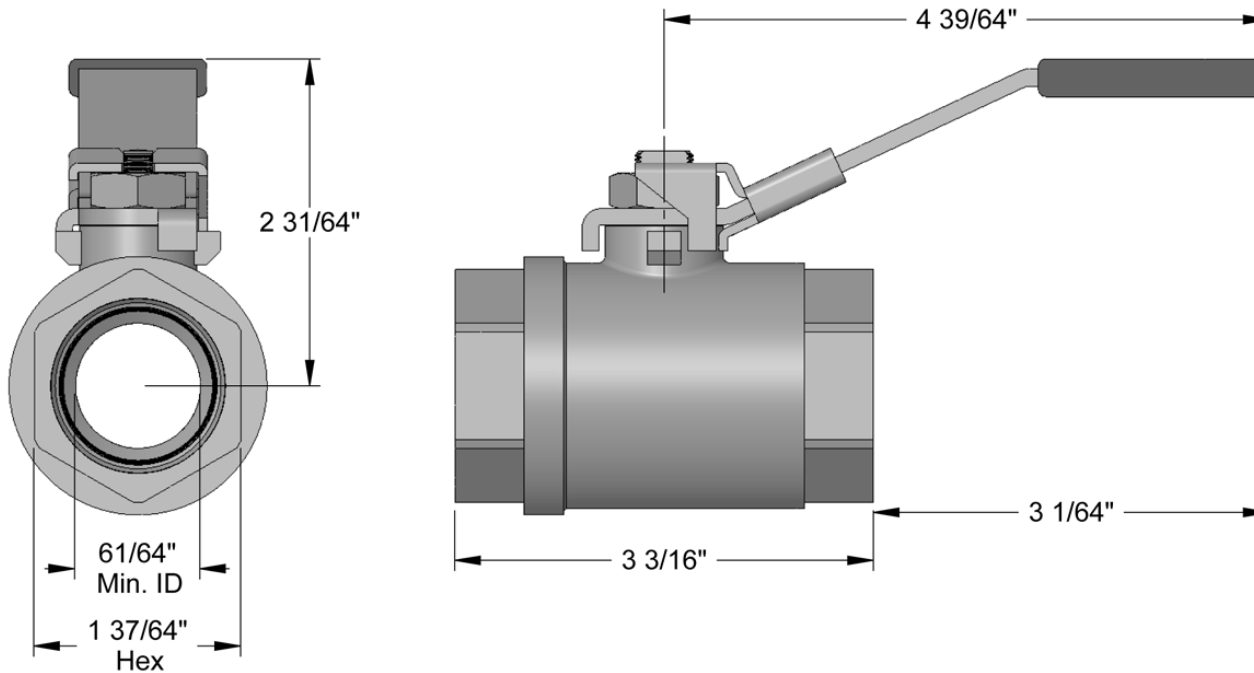
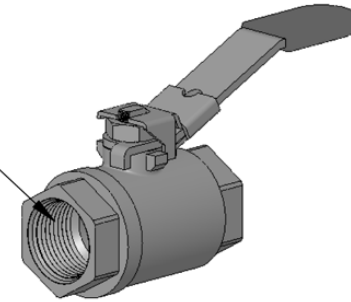


Body is brass, ball is chrome-plated brass, and seats are PTFE.
Valves have unrestricted flow (full port). Valves with up to 2" pipe size or tube size are UL and C-UL certified.
NPT—Female x female have a fluoroelastomer seal, except t-handle valves, which have a PTFE seal.
All are CSA and CSA-US certified. Valves with up to 2" pipe size are FM approved.
Lockable valves can be locked in position using a padlock (not included) with shackle diameter of 9/32".

BALL VALVE MODEL LHBV-100

Pipe Size 1"
End-to-End Length 3 3/16"
Maximum Pressure for Water, Oil, and Inert Gas
1/4"-2" 600 psi @ 100° F
2 1/2"-4" 450 psi @ 100° F
Maximum Pressure for Steam 150 psi @ 366° F
Temperature Range -50° to +400° F
Vacuum Rating 29.9" Hg
Additional Specifications NPT Female x Female
Lockable Lever

1" NPT, 11-1/2 Threads Per Inch,
0.68" Thread Engagement

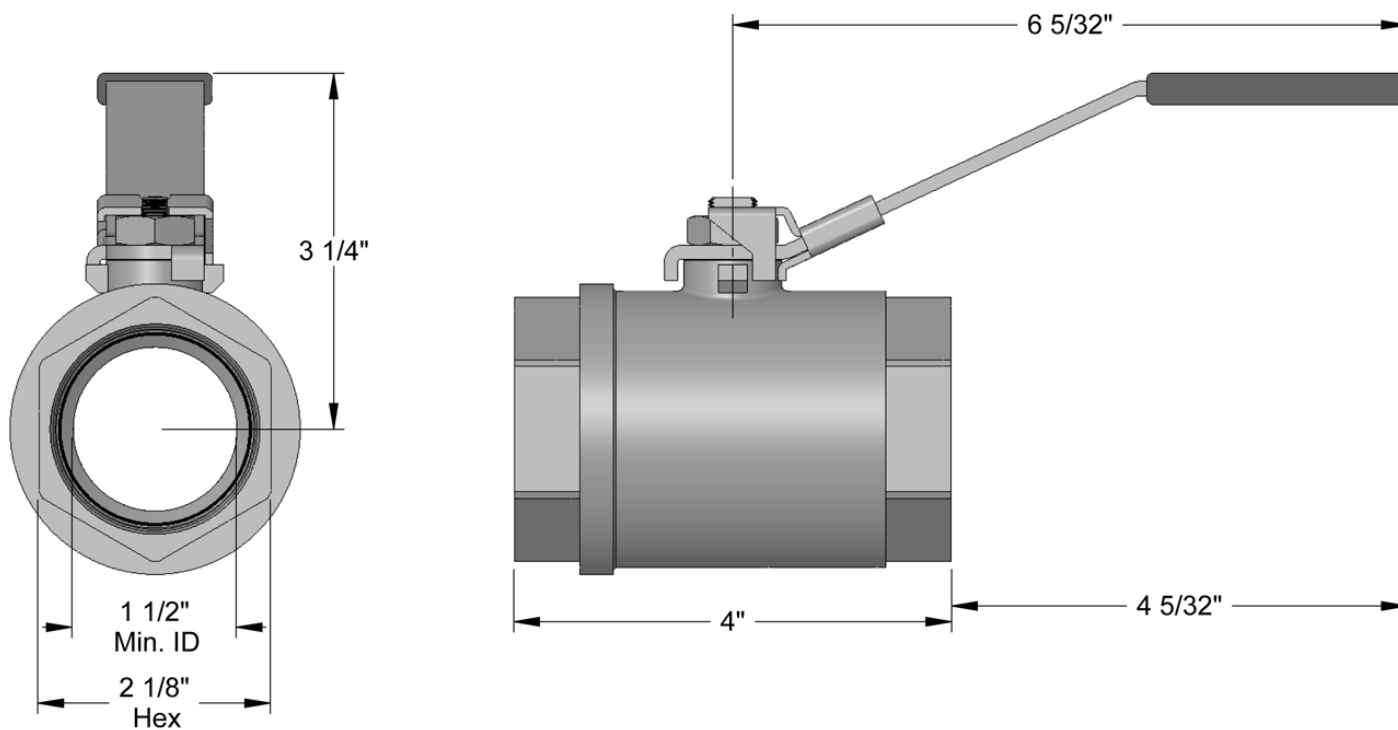
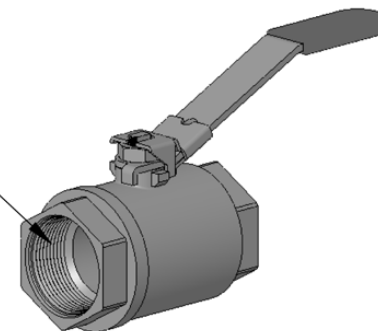


Body is brass, ball is chrome-plated brass, and seats are PTFE.
Valves have unrestricted flow (full port). Valves with up to 2" pipe size or tube size are UL and C-UL certified.
NPT—Female x female have a fluoroelastomer seal, except t-handle valves, which have a PTFE seal.
All are CSA and CSA-US certified. Valves with up to 2" pipe size are FM approved.
Lockable valves can be locked in position using a padlock (not included) with shackle diameter of 9/32".

BALL VALVE MODEL LHBV-150

Pipe Size 1 1/2"
End-to-End Length 4"
Maximum Pressure for Water, Oil, and Inert Gas
1/4"-2" 600 psi @ 100° F
2 1/2"-4" 450 psi @ 100° F
Maximum Pressure for Steam 150 psi @ 366° F
Temperature Range -50° to +400° F
Vacuum Rating 29.9" Hg
Additional Specifications NPT Female x Female
Lockable Lever

1 1/2" NPT, 11-1/2 Threads Per Inch,
0.72" Thread Engagement

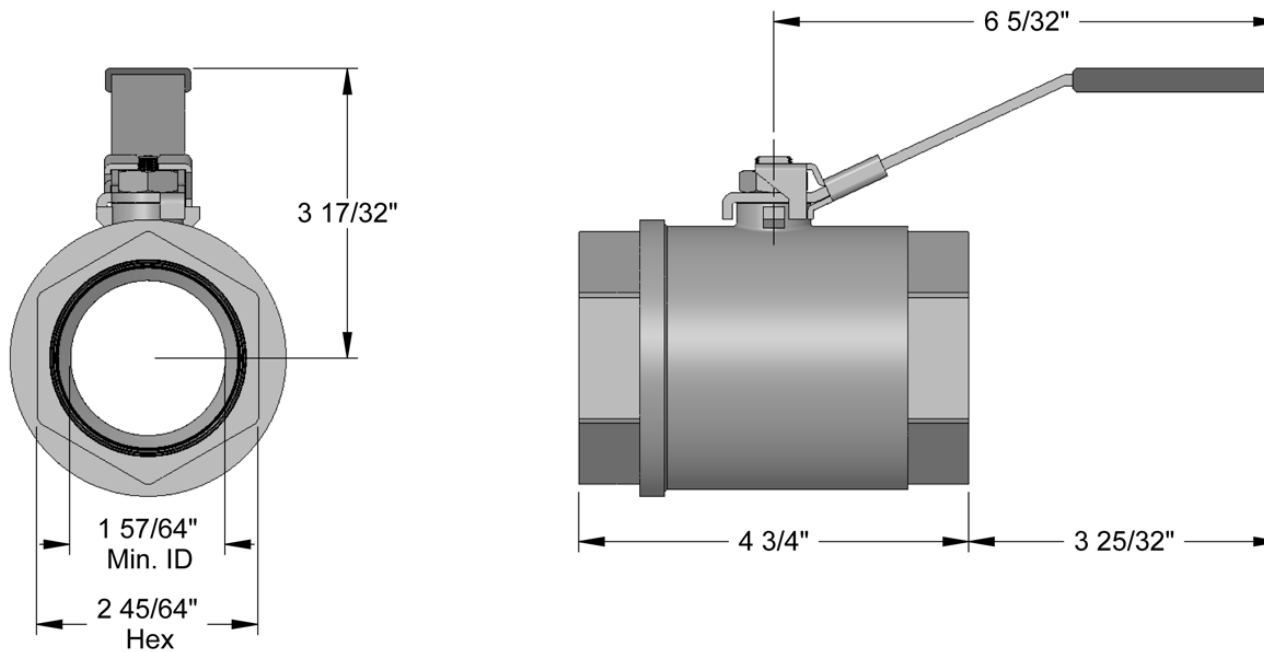
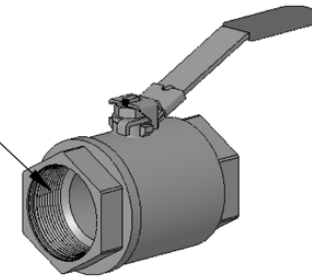


Body is brass, ball is chrome-plated brass, and seats are PTFE.
Valves have unrestricted flow (full port). Valves with up to 2" pipe size or tube size are UL and C-UL certified.
NPT—Female x female have a fluoroelastomer seal, except t-handle valves, which have a PTFE seal.
All are CSA and CSA-US certified. Valves with up to 2" pipe size are FM approved.
Lockable valves can be locked in position using a padlock (not included) with shackle diameter of 9/32".

BALL VALVE MODEL LHBV-200

Pipe Size 2"
End-to-End Length 4 3/4"
Maximum Pressure for Water, Oil, and Inert Gas
1/4"-2" 600 psi @ 100° F
2 1/2"-4" 450 psi @ 100° F
Maximum Pressure for Steam 150 psi @ 366° F
Temperature Range -50° to +400° F
Vacuum Rating 29.9" Hg
Additional Specifications NPT Female × Female
Lockable Lever

2" NPT, 11-1/2 Threads Per Inch,
0.76" Thread Engagement



Body is brass, ball is chrome-plated brass, and seats are PTFE.
Valves have unrestricted flow (full port). Valves with up to 2" pipe size or tube size are UL and C-UL certified.
NPT—Female × female have a fluoroelastomer seal, except t-handle valves, which have a PTFE seal.
All are CSA and CSA-US certified. Valves with up to 2" pipe size are FM approved.
Lockable valves can be locked in position using a padlock (not included) with shackle diameter of 9/32".