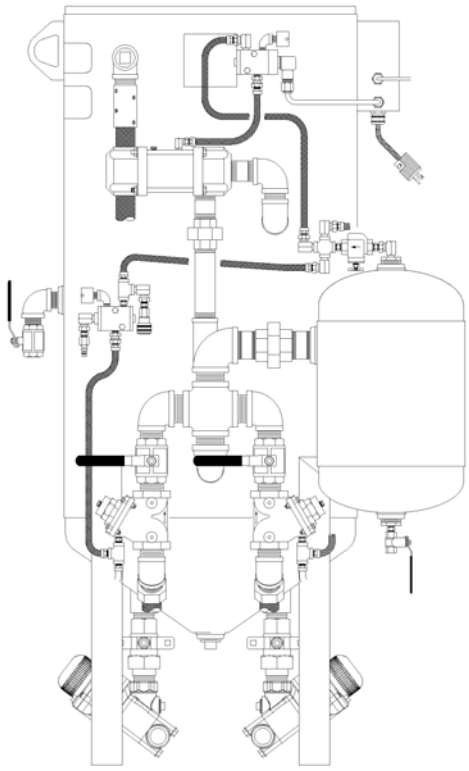
Double Chamber Abrasive Blaster

OPERATION AND MAINTENANCE MANUAL

September 2018



SCHMIDT®

SAVE THIS MANUAL AND MAKE AVAILABLE
TO ALL USERS OF THIS EQUIPMENT!

Manual Part Number 7200-235
(available for downloading from schmidtabrasiveblasting.com)

AXXIOM MANUFACTURING, INC.
engineered abrasive systems

AXXIOM Manufacturing, Inc.
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800.231.2085 * 281.431.0581 * fax 281.431.1717

SCHMIDT®

Visit us at www.schmidtabrasiveblasting.com

WARNING

1. **Any person intending to operate this equipment or any person intending to be in the vicinity during its operation must receive proper training from his/her supervisor, employer and/or supplier. If this equipment is to be leased or rented, the supplier must assure that the lessee or renter has received proper training before the lessee or renter takes possession of the equipment. Consult Axxiom Manufacturing, Inc.**

2. **Any person authorized to operate this equipment or any person intending to be in the vicinity during its operation and who is not capable of reading and understanding this manual must be fully trained regarding the *Rules for Safer Operation* and all operating procedures, and must be made aware of all the Dangers, Warnings, and Cautions identified herein. Consult Axxiom Manufacturing, Inc.**

3. **Do Not operate any abrasive blaster or blast equipment before reading and completely understanding all the warnings, operating procedures and instructions, and the *Rules for Safer Operation* contained in this manual.**

4. **Do Not operate any abrasive blaster or blast equipment without following the *Rules for Safer Operation* and all the operating procedures and instructions. Failure to properly use blast equipment could result in serious injury or death.**

5. **Do Not perform any maintenance on any abrasive blaster or blast equipment while it is pressurized. Always depressurize the abrasive blaster vessel before loading abrasive or performing any maintenance.**

6. **Do Not use abrasives containing free silica. Silica can cause silicosis or other related respiratory damage. All operators must wear personal protective equipment for all abrasive blasting operations. Observe all applicable local, state and federal safety regulations in conjunction with airline filters and respiratory protection. Reference OSHA 29 CFR 1910.134.**

7. **Do Not enter areas during abrasive blasting operations without breathing protection. All personnel in the vicinity of abrasive blasting operations should wear NIOSH approved air fed respirators, hoods or helmets.**

8. **Do Not modify or alter any abrasive blaster, blast equipment or controls thereof without written consent from Axxiom Manufacturing, Inc.**

9. **Do Not use bleeder type deadman valves on any Schmidt® abrasive blaster. The use of A-BEC, Clemco or a similar bleeder type deadman valve can cause unintentional start-up without warning, which can result in serious personal injury.**

10. **Do Not sell, rent, or operate abrasive blasters without remote controls. OSHA regulations require remote controls on all blast machines. Failure to use remote controls can cause serious injury or death to the operator(s) or other personnel in the blasting area. Reference OSHA 29 CFR 1910.244(b).**

11. **Do Not repair or replace any portion of Schmidt® equipment using components that are not Schmidt® original factory replacement parts. Use of replacement components that are not Schmidt® original factory replacement parts may result in equipment failure which can result in serious personal injury and in addition will void all warranties.**

Instructions for use of manual sections

This manual contains information needed to operate and maintain a Schmidt® abrasive blaster. Read this entire operations and maintenance manual before using the abrasive blaster. Pay close attention to the *Rules for Safer Operation* (Section 1.0), and the Dangers, Warnings, and Cautions identified.

The purpose of safety symbols and explanations are to alert operators of the possible hazards and explain how to avoid them. The safety symbols and explanations do not by themselves eliminate any danger. However, following the instructions given and taking proper accident prevention measures will greatly lower the risk of injury to personnel. Below are the three hazard levels as used in this manual.

WHITE LETTERS with RED BACKGROUND

DANGER: Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.

BLACK LETTERS with ORANGE BACKGROUND

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

BLACK LETTERS with YELLOW BACKGROUND

CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may cause property damage.

This manual contains terms that may be specific to the abrasive blast industry. Understanding these terms will help operators understand the procedures and instructions given in this manual. All operators must be familiar with the following terms and refer to them as needed while reading this manual.

Term	Definition
Pressure Vessel	A fabricated tank (or reservoir) that is part of the abrasive blaster which is filled with compressed air and abrasive. (Also referred to as “blast vessel” or “vessel”.)
Pressurize	To manually or automatically fill the abrasive blast vessel with compressed air.
Depressurize	To manually or automatically release all the compressed air from inside the abrasive blast vessel. (Also referred to as “blowdown”.)
Depressurized System	An abrasive blaster that is pressurized only when the deadman activates the blast operation. The blaster automatically depressurizes when the deadman is released.
Pressurized System	An abrasive blaster that is automatically pressurized when the air inlet ball valve is opened. The blaster remains pressurized when the deadman is released.
Blowdown	To manually or automatically release all the compressed air from inside the abrasive blast vessel. (Also referred to as “depressurize”.)
Deadman	A manually operated valve or switch that allows remote starting and stopping of the blast operation. [Also referred to as “deadman valve” (pneumatic blast controls) or “deadman switch” (electric blast controls.)]
Popup	An air pressure operated valve that seals the abrasive inlet at the top of the pressure vessel. Its operation may be manual or automatic.
Abrasive	A granular substance used in an air blast operation that is the means for blasting the surface of an object. (Also referred to as abrasive blasting media.)
Silica	The crystalline chemical compound silicon dioxide (SiO_2) which can be found in many natural abrasives and other substances. Breathing silica dust can cause respiratory diseases such as silicosis. (Also referred to as crystalline silica)

0.0 Warning Decal Identification and Location

Listed below are the warning decals and the corresponding hazards related to this equipment. Refer to Figure 0.1(a), 0.1(b), and 0.1(c) for images of the warning decals. Refer to Figure 0.2 for the locations of these warning decals on the abrasive blaster.

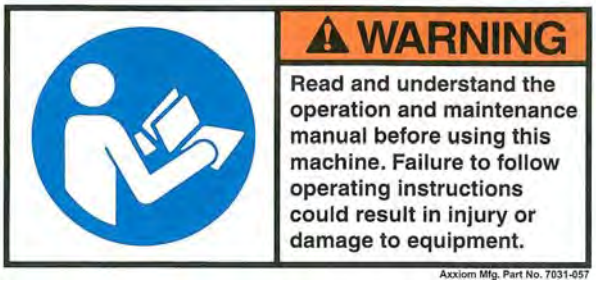
No.	Qty.	Part no.	Description	Hazard
1.	1	7031-001	Medium "Schmidt"	Not Applicable
2.	1	7031-054	"Warning" Airborne particle and loud noise hazard.	Airborne particles and loud noise from blast nozzle and blowdown can cause injury and loss of hearing. Wear approved eye and ear protection. See Section 1.0 and 3.10.
3.	1	7031-007B	"Danger" Pressurized vessel.	Propelled objects will cause serious injury or death. Depressurize vessel prior to performing any maintenance. See Section 6.2.
4.	1	7031-057	"Warning" Read manual before using this machine.	Read and understand operator's manual before using this machine. Failure to follow operating instructions could result in injury or damage to equipment. See Section 1.0.
5.	2	7031-077	"Warning" Pinch point hazard.	Vessel pressurization will close popup. Closing popup can pinch and crush. Keep hands and fingers away from popup.
6.	1	7031-082	"Danger" Pressurized vessel Handway components.	Propelled objects will cause serious injury or death. Incorrect or damaged handway or manway cover components can result in failure. See Section 6.3.
7.	1	7034-001	Welded "Warning" plate General hazard and advisory notes.	Steel "Warning" plate welded to pressure vessel which is a general list of required actions to take before and during the operation of this equipment. See Section 1.0.
8.	1	7031-017	"Inlet"	Not Applicable

1) 7031-001

2) 7031-054

Figure 0.1(a) – Warning decal summary

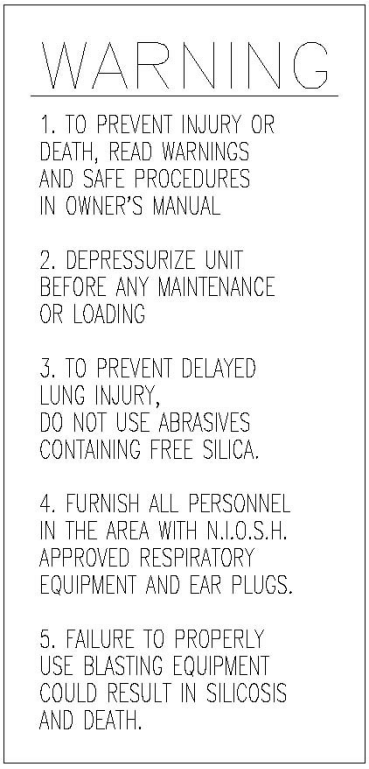
3) 7031-007B



4) 7031-057

5) 7031-077

6) 7031-082



7) 7034-001

Figure 0.1(b) – Warning decal summary (continued)

INLET

8) 7031-017

Figure 0.1(c) – Warning decal summary (continued)

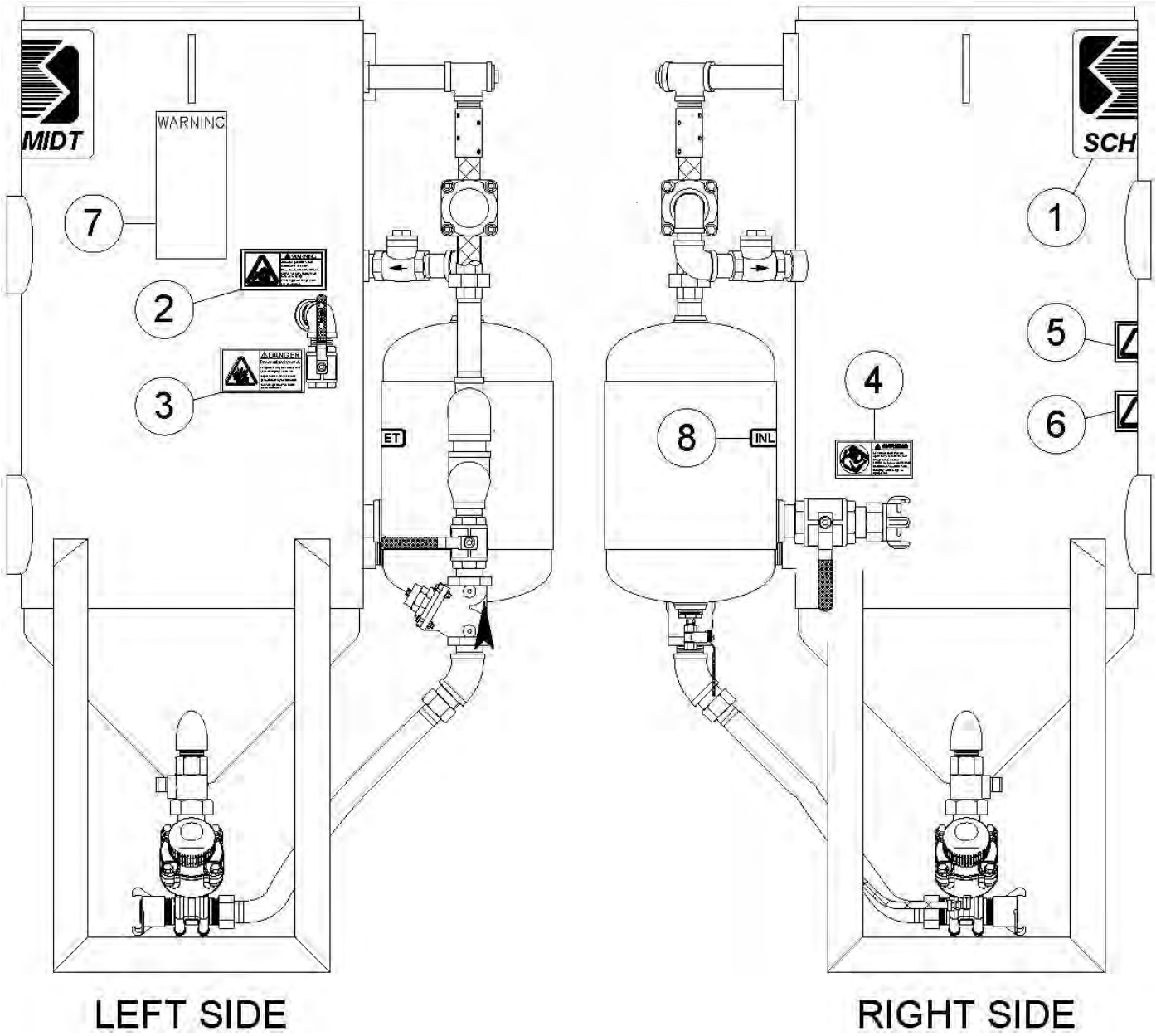


Figure 0.2 – Warning decal placement

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1.0 Rules for Safer Operation

1.1. GENERAL RULE FOR SAFER OPERATION.

SCHMIDT® ABRASIVE BLASTERS HAVE BEEN DESIGNED TO BE SAFE WHEN USED IN THE PROPER MANNER. ALL ABRASIVE BLASTERS ARE POTENTIALLY DANGEROUS IF ALL SAFETY PRECAUTIONS ARE NOT RIGOROUSLY FOLLOWED. PROPER TRAINING IS REQUIRED BEFORE OPERATION. PROPER PROCEDURES MUST BE FOLLOWED. THE ABRASIVE BLASTER AND ALL COMPONENTS MUST BE PROPERLY MAINTAINED. FAILURE TO OPERATE, SERVICE AND MAINTAIN THE ABRASIVE BLASTER AS SET FORTH IN THIS MANUAL MAY CAUSE INJURY OR EVEN DEATH TO ANY PERSON USING, SERVICING OR IN THE VICINITY OF THE ABRASIVE BLASTER.

THIS MANUAL IDENTIFIES POTENTIAL HAZARDS BY DANGER, WARNING, AND CAUTION SYMBOLS. HOWEVER, ALL THE RULES, PROCEDURES AND RECOMMENDATIONS MUST BE FOLLOWED. FAILURE TO OPERATE PROPERLY IS VERY LIKELY TO PLACE PERSONS AND PROPERTY AT HIGH RISK OF DAMAGE, INJURY OR EVEN DEATH.

⚠ DANGER

ABRASIVE BLASTERS AND THE ABRASIVE BLAST OPERATION ARE POTENTIALLY DANGEROUS IF ALL SAFETY PRECAUTIONS ARE NOT FOLLOWED. FAILURE TO OPERATE THE ABRASIVE BLASTER WITHOUT FOLLOWING ALL THE *RULES FOR SAFER OPERATION* MAY RESULT IN SERIOUS INJURY OR DEATH TO OPERATING PERSONNEL OR PERSONS IN THE OPERATING VICINITY.

1.2. KNOW YOUR EQUIPMENT.

Do Not operate this equipment in a manner other than its intended application (see Section 4.0). Do Not operate this equipment or any other Schmidt® equipment without following the *Rules for Safer Operation* and all the operating procedures and instructions. Learn the applications and limitations as well as the specific potential hazards related to this machine. Failure to do so could result in serious injury or death.

1.3. RECEIVE PROPER TRAINING.

Do Not operate this equipment unless you have received operational and maintenance training. Begin by thoroughly reading and understanding this operation and maintenance manual and all included information. Consult an authorized Schmidt distributor or Axxiom manufacturing, Inc.

1.4. PROTECT YOUR FEET.

Do Not operate this equipment without wearing OSHA approved foot protection. Observe all applicable local, state and federal regulations. See Section 3.10 and OSHA 29 CFR 1910.136.

⚠ CAUTION

Heavy objects can shift while being blasted and may fall on operators. All operators and personnel in the vicinity must wear OSHA approved foot protection during the operation of this equipment. See Section 3.10 and OSHA 29 CFR 1910.136.

1.5. PROTECT YOUR EYES.

Do Not operate this equipment without wearing OSHA approved safety glasses. Observe all applicable local, state and federal safety regulations. See Section 3.10 and OSHA 29 CFR 1910.133.

⚠ WARNING

When filling the blast vessel and during the blast operation, abrasive can be blown in the face and eyes of operators. All operators and personnel in the vicinity must wear OSHA approved safety glasses during the operation of this equipment. See Section 3.10 and OSHA 29 CFR 1910.133

1.6. PROTECT YOUR LUNGS.

Do Not operate this equipment without wearing OSHA approved respiratory protection. Abrasive blasting produces dust contaminated with toxic substances from the abrasive used, the coating being removed, and the object being blasted. This dust may contain silica which can cause severe and permanent lung damage, cancer, and other serious diseases. Do Not breathe the dust. Do Not rely on your sight or smell to determine if dust is in the air. Silica and other toxic substances may be in the air without a visible dust cloud. If air-monitoring equipment for silica is not provided at the worksite, then all personnel MUST wear appropriate respiratory protection when using or servicing this equipment. Breathing air supplied to respirators must be of acceptable quality. Consult your employer and OSHA regarding the appropriate respiratory protection and breathing air quality. See Sections 3.9, 3.10, and OSHA 29 CFR 1910.134.

⚠ DANGER

Abrasive blasting produces dust which may contain silica and other toxic substances that can cause severe and permanent lung damage, cancer, and other serious diseases if inhaled. All operators and personnel in the vicinity must wear OSHA approved respiratory protection during the operation of this equipment See Sections 3.9, 3.10, and OSHA 29 CFR 1910.134.

1.7. BREATHING AIR QUALITY.

Do Not use breathing air that does not meet OSHA Class D standards. Use extreme caution when selecting a source of breathing air. Breathing air provided by an oil-lubricated air compressor can contain carbon monoxide; therefore, a carbon monoxide detector is required (See Section 3.10). Carbon monoxide can be in the compressed air produced by an oil-lubricated air compressor when it is operated at extremely high temperature; therefore, a high temperature alarm is required to alert the operators when this condition exists. See Section 3.9 and reference OSHA 29 CFR 1910.134(i).

Extreme caution must be taken when connecting to factory air sources. Factories can have sources of compressed gases such as nitrogen which is fatal if used as a breathing air source. Verify that the air source is breathable air.

⚠ DANGER

Breathing air must meet OSHA Class D standards. Use of breathing air sources that do not meet Class D standards can cause asphyxiation and result in death. Verify that all air sources are breathable quality and use a high-temperature alarm and a carbon monoxide monitor when required. See Sections 3.9, 3.10 and OSHA 29 CFR 1910.134(i).

Enclosed blast areas must be ventilated to reduce airborne dust to an acceptable level as required by OSHA 29 CFR 1910.1000.

1.8. PROTECT YOUR HEARING.

Do Not operate this equipment without wearing OSHA approved hearing protection. Observe all applicable local, state and federal safety regulations. See Section 3.10 and refer to OSHA 29 CFR 1910.95.

Loud noise is produced by the blast nozzle and the blowdown operation of this equipment. All operators and personnel in the vicinity must wear OSHA approved hearing protection during the operation of this equipment. See Section 3.10 and refer to OSHA 29 CFR 1910.95.

1.9. PROTECT YOUR PERSON

Abrasive blasting produces dust contaminated with toxic substances from the abrasive used, the coating being removed, and the object being blasted. All blast operators and other personnel involved in the blast operation or in the vicinity of the blast operation should wear protective clothing. The protective clothing should be disposable or washable work clothes that should be removed at the worksite so that contaminated dust is not transferred into automobiles or homes. See Section 3.10 and refer to OSHA 29 CFR 1910.94 and 1910.134.

1.10. ADHERE TO ALL REGULATIONS.

Do Not operate this equipment without observing all local, state, and federal safety regulations including, but not limited to, OSHA (Occupational Health and Safety Administration).

1.11. STAY ALERT.

Do Not operate this equipment when you are tired or fatigued. Use caution and common sense while operating and/or performing maintenance on this equipment.

1.12. DO NOT USE DRUGS, ALCOHOL, or MEDICATION.

Do Not operate this equipment while under the influence of drugs, alcohol, or any medication.

1.13. PROTECT BYSTANDERS.

Do Not allow blast equipment operators and other personnel to enter the vicinity of the blast operation without providing respiratory protective equipment that meets OSHA regulations. If dust concentration levels exceed the limitations set in OSHA 29 CFR 1910.1000 then respirators are required.

1.14. KEEP CHILDREN AND VISITORS AWAY.

Do Not allow children or other non-operating personnel to contact this equipment or the connecting hoses and cords. Keep children and non-operating personnel away from work area.

1.15. AVOID DANGEROUS ENVIRONMENTS.

Do Not operate this equipment without familiarizing yourself with the surrounding environment. The blast operation creates high level of noise which may prevent the operator from hearing other possible dangers (i.e. traffic or moving equipment). In such situations a stand-by watch person may be necessary to protect against injury to personnel.

1.16. AVOID DANGEROUS ENVIRONMENTS.

Do Not use this equipment in areas cluttered with debris. Debris in the work area can create tripping hazards which can cause the operator to loose control of the blast hose and result in injury to operating personnel. Keep work area clean and well lit. When working at an elevated location, pay attention to articles and persons below.

1.17. AVOID DANGEROUS ENVIRONMENTS.
Do Not operate this equipment in elevated areas without using fall protection equipment. Certain applications of this equipment may require the use of scaffolding. Use of scaffolding creates hazardous situations such as tripping and fall hazards which can result in serious injury or death to operating personnel. Consult OSHA 29 CFR 1910 Subpart D.

1.18. AVOID DANGEROUS ENVIRONMENTS.
Do Not blast objects that are not properly secured. The blast operation can cause the blasted object to shift or move. Extremely large objects to be blasted can create a crush hazard to operating personnel which can result in serious injury or death. Properly secure the object to be blasted.

1.19. AVOID DANGEROUS ENVIRONMENTS.
Do Not blast objects used to store flammable materials. The blast operation can cause sparks which can ignite fumes or residual flammable materials inside enclosed containers which can explode resulting in serious injury or death to operating personnel.

1.20. ELECTRICALLY GROUND EQUIPMENT.
Static electricity is generated by the abrasive flow through the blast hose. To minimize chance of static electrical shock to operating personnel only use static dissipating blast hose and install a grounding strap on the abrasive blaster. See Section 5.14.

1.21. MAINTAIN VESSEL INTEGRITY.
Do Not operate this equipment with the pressure vessel damaged, or with any part of it worn or damaged. Do Not operate this equipment in a condition that may cause failure of the pressure vessel. See sections 1.22 through 1.32 below.

An abrasive blaster is a Pressurized Vessel. Alterations, damage, or misuse of the pressure vessel can result in rupturing. Damaged or incorrect components used on the abrasive blaster can result in rupturing. The compressed air inside a pressurized vessel contains a dangerously high level of energy which can propel objects and cause serious injury or death.

1.22. NEVER OPERATE OVER MAXIMUM WORKING PRESSURE.
Do Not operate this equipment above maximum allowable working pressure (MAWP) at maximum operating temperature (°F) shown on the ASME nameplate attached to the vessel. See Section 2.2 and 8.1.

1.23. INSTALL PRESSURE RELIEF DEVICE.
Do Not operate this equipment without a pressure relief device in place. The ASME Code requires that all vessels be equipped with pressure relief devices prior to installation. The pressure relief device must be set at the maximum allowable working pressure of the abrasive blaster. See the ASME nameplate attached to the vessel typically located above the handway. See Section 3.11 for information regarding the pressure relief valve.

1.24. NEVER OPERATE BEYOND ALLOWABLE TEMPERATURE RANGE.
Do Not operate this equipment above the maximum allowable temperature at the allowable pressure or below the minimum design metal temperature (MDMT) shown on the pressure vessel nameplate. The characteristics of the pressure vessel metal are weakened when the temperature is outside the operating range. Operating the pressure vessel outside of allowable temperature range can result in rupturing and cause serious injury or death.

1.25. ASME NAMEPLATE REQUIRED.
Do Not operate this equipment if the ASME pressure vessel nameplate is missing. Contact Axxiom Manufacturing, Inc. for technical support.

1.26. DO NOT MODIFY VESSEL.
Do Not modify or alter any abrasive blaster, blast equipment, or controls thereof without written consent from Axxiom Manufacturing, Inc. Do Not weld, grind, or sand the pressure vessel. *It will not be safe to operate.* Non-authorized modifications could lead to serious injury or death. Non-authorized modifications will void the warranty and may void the ASME/NB integrity.

1.27. DO NOT HAMMER ON VESSEL.
Do Not hammer on or strike any part of the pressure vessel. Hammering on the pressure vessel can create cracks and cause rupturing.

1.28. FIRE DAMAGE NOTICE.
Do Not operate if the pressure vessel has been damaged by fire. If damaged, take out of service immediately and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support.

1.29. INSPECT VESSEL REGULARLY.
Do Not operate this equipment with damage to the pressure vessel. *It is not safe*. Inspect outside and inside of the pressure vessel regularly for corrosion or damage (i.e. dents, gouges or bulges). If damaged, take out of service immediately and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support. See Section 8.0.

1.30. CHECK FOR LEAKS IN VESSEL.
Do Not operate this equipment if there is a leak in the pressure vessel. If leaking, take out of service immediately and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support.

1.31. NEVER MODIFY BLOWDOWN.
Do Not connect the blowdown on this equipment onto a common header with any other unit of any description, or any other source of compressed air, without first making sure a check valve is used between the header and this unit. Do Not install this equipment sharing piping with another unit of higher discharge pressure and capacity. A safety hazard could occur in the form of a back-flow condition.

1.32. DEPRESSURIZE VESSEL BEFORE PERFORMING MAINTENANCE.
Do Not remove, repair, or replace any item on this equipment while it is pressurized. Do Not attempt to perform maintenance or load abrasive while this equipment is pressurized or is even capable of being pressurized. This means the inlet ball valve should be closed and the air supply should be shut off or disconnected. Anytime the manual blowdown valve is closed it should be assumed that the abrasive blast vessel is pressurized.

An abrasive blaster is a Pressurized Vessel. The compressed air inside a pressurized vessel contains a dangerously high level of energy which can propel objects and cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

1.33. ALWAYS USE REMOTE CONTROLS.

Do Not sell, rent, or operate abrasive blasters without remote controls. OSHA regulations require remote controls on all abrasive blasters. All abrasive blasters must be equipped with automatic (deadman) type remote controls (either pneumatic or electric). Failure to use remote controls can cause serious injury or death to the operator(s) or other personnel in the blasting area. Reference OSHA 29 CFR 1910.244(b).

1.34. NEVER USE BLEEDER TYPE DEADMAN VALVES.

Do Not use bleeder type deadman valves on any Schmidt® abrasive blaster. The use of A-BEC, Clemco, or a similar bleeder type deadman valve can, without warning, cause unintentional start-up which can result in serious personal injury. A particle of dirt from the air hose can plug the bleed hole in the deadman valve and cause the blast outlet to turn on.

1.35. CHECK FOR DAMAGED PARTS.

Do Not use this equipment with damaged components. Damaged components can fail during operation and result in serious injury or death to operating personnel. Periodically check all valves, hoses, and fittings to see that they are in good condition. Repair any component that shows any sign of wear or leakage. See Section 8.0.

1.36. ALWAYS USE SAFETY PINS ON HOSE COUPLING CONNECTIONS.

Do Not use this equipment without hose coupling safety pins in place and hose whip checks installed on all air and blast hoses. All blast hose couplings and air hose couplings have pin holes that must be safety pinned to protect against accidental disconnections. Accidental hose disconnection can cause serious injury or death. See Sections 5.16 and 8.7.

1.37. ALWAYS USE CORRECT REPLACEMENT PARTS AND ACCESSORIES.

Do Not use replacement parts or accessories that are not rated for pressures equal to or higher than the abrasive blaster's operating pressure. Improper hoses and/or fittings used on, or connected to the abrasive blaster can rupture and cause serious injury or death.

Do Not use replacement parts that are not Schmidt® original factory replacement parts. Non-original parts may not fit properly and can cause equipment damage and/or failure which can result in serious injury to operating personnel. Consult Axxiom Manufacturing, Inc.

Use of replacement components that are not Schmidt® original factory replacement parts may result in equipment failure which can result in serious injury to operating personnel.

1.38. ALWAYS USE CORRECT PRESSURE RATED ACCESSORIES.

Do Not use air reservoirs or moisture separator tanks that are not rated for use in compressed air applications. Air reservoirs and moisture separator tanks larger than 6 inches inside diameter must have an ASME code stamp.

An air reservoir or moisture separator tank is a Pressurized Vessel. The compressed air inside a pressurized vessel contains a dangerously high level of energy which can explode propelling objects and result in serious injury or death to operating personnel. Air reservoirs and moisture separator tanks must be ASME coded tanks.

1.39. NEVER AIM BLAST NOZZLE TOWARDS ANY PERSON.
Do Not aim the blast nozzle towards yourself or any person. System malfunction can cause accidental start up and result in injury to personnel.

1.40. NEVER USE ABRASIVE NOT INTENDED FOR BLAST EQUIPMENT.
Do Not use abrasive blast media containing free silica. Silica can cause silicosis or other related respiratory damage. Verify that the abrasive is intended for use in blasting equipment. Personal protective equipment, including airline filters and respirators, must be used for all abrasive blasting operations. Observe all applicable local, state and federal safety regulations. See Section 3.8, 3.10, and reference OSHA 29 CFR 1910.134.

1.41. CHECK ABRASIVE FOR DEBRIS.
Do Not use blast abrasive that contains trash or other debris. Trash or debris can create a blockage and cause equipment malfunction. Screen recycled abrasive to remove trash.

1.42. STOP OPERATION IMMEDIATELY IF ANY ABNORMALITY IS DETECTED.
Do Not operate this equipment if anything abnormal is seen during operation. Stop operation immediately for inspection. See Section 8.0.

1.43. DO NOT OVERLOAD THE LIFT EYES.
Do Not load the lifting eyes above the rated capacity. Do Not lift the blast vessel by any point other than the lifting eyes or designated lift points. Do Not lift the blast vessel while it is pressurized. See Section 2.6.

1.44. DO NOT TRANSPORT BLAST EQUIPMENT LOADED WITH ABRASIVE.
Portable abrasive blasters are not intended to be moved or transported loaded with abrasive. Do Not attempt to roll portable abrasive blasters with abrasive loaded in or on the pressure vessel as equipment damage or personal injury may result.

1.45. MAINTAIN WARNING DECALS.
Do Not remove, cover, obstruct, or paint over any warnings, cautions, or instructional material attached. Warning decals must be installed, maintained, and located to be visible and with enough light for legibility. See Section 0.0 and 8.12.

1.46. SAVE THIS OPERATION AND MAINTENANCE MANUAL.
Refer to this operation and maintenance manual as needed as well as any additional information included from other manufacturers. Never permit anyone to operate this equipment without having him/her first read this manual and receive proper training. Make this manual readily available to all operating and maintenance personnel. If the manual becomes lost or illegible replace it immediately. This operation and maintenance manual should be read periodically to maintain the highest skill level; it may prevent a serious accident.

1.47. SAFETY REFERENCES
See Section 12.4 for safety information sources and contact information. Use these sources to obtain additional information regarding all aspects of blast operation safety.

2.0 Specifications and General Information

2.1 Notes to Distributors and Owners

2.1.1. Verify that the deadman, twinline (or cords), and the operation and maintenance manual are included with the abrasive blaster when it is received. Verify that the deadman, twinline (or cords), and the operation and maintenance manual are included with the abrasive blaster when it is delivered to the purchaser.

2.1.2. This equipment is intended for knowledgeable and experienced users. No person or persons should be allowed to operate this equipment without first receiving proper training in abrasive blasting operation and use of this equipment.

2.1.3. Immediately notify Axxiom Manufacturing, Inc. of any instances of use of this equipment in any manner other than the intended application. See Section 4.0.

2.1.4. Only qualified personnel should load and unload this equipment for shipping. Slings or other lifting devices must only be attached to the designated lifting points. See the lifting diagrams shown in Section 2.6.

2.1.5. For further information on options and accessories available for Schmidt® abrasive blasters visit the Axxiom website or contact us:

Axxiom Manufacturing, Inc.
11927 South Highway 6
Fresno, Texas 77545

Phone: 1-800-231-2085
Fax: 1-281-431-1717
Website: www.schmidtabrasiveblasting.com

2.2 Abrasive Blaster Operational Specifications

Maximum Working Pressure	125 or 150 psig @ 250°F (see ASME nameplate)
Maximum External Pressure	Not designed for external pressure
Minimum Metal Temperature	-20°F @ 125 or 150 psig (see ASME nameplate)
Air Consumption	See Section 13.0 table 1
Abrasive Consumption	See Section 13.0 table 2
Blast Hose Size	See Section 13.0 table 3
Electrical requirements	See Section 3.7
Abrasive Capacity	Upper Chamber: 3.0 cu ft Lower Chamber: 4.25 cu ft Total working volume: 7.25 cu ft

2.3 Important Reference Numbers

Fill in the Abrasive Blaster model number, serial number, and other information in the blank spaces below. This information will be needed for reference when service, maintenance, or technical support is required.

Blaster Model Number_____ Blaster Serial Number_____

National Board Number_____

Blaster Piping Size_____ Cycle Control Box Drawing No._____

2.4 Vessel Information

2.4.1. All pressure vessels used in Schmidt® Abrasive Blasters are manufactured in strict accordance with the provisions of the ASME Code Section VIII, Div. 1.

2.4.2. In order to maintain the high level of quality and quality control used in the manufacture of this vessel, it is required that any and all welded repairs to this vessel be performed by a reputable shop holding a National Board "R" Stamp and/or an ASME "U" stamp, depending on state or city law. Welding on the vessel performed by welders not properly qualified per the ASME Code may void the ASME/NB integrity of the vessel.

2.5 Notes

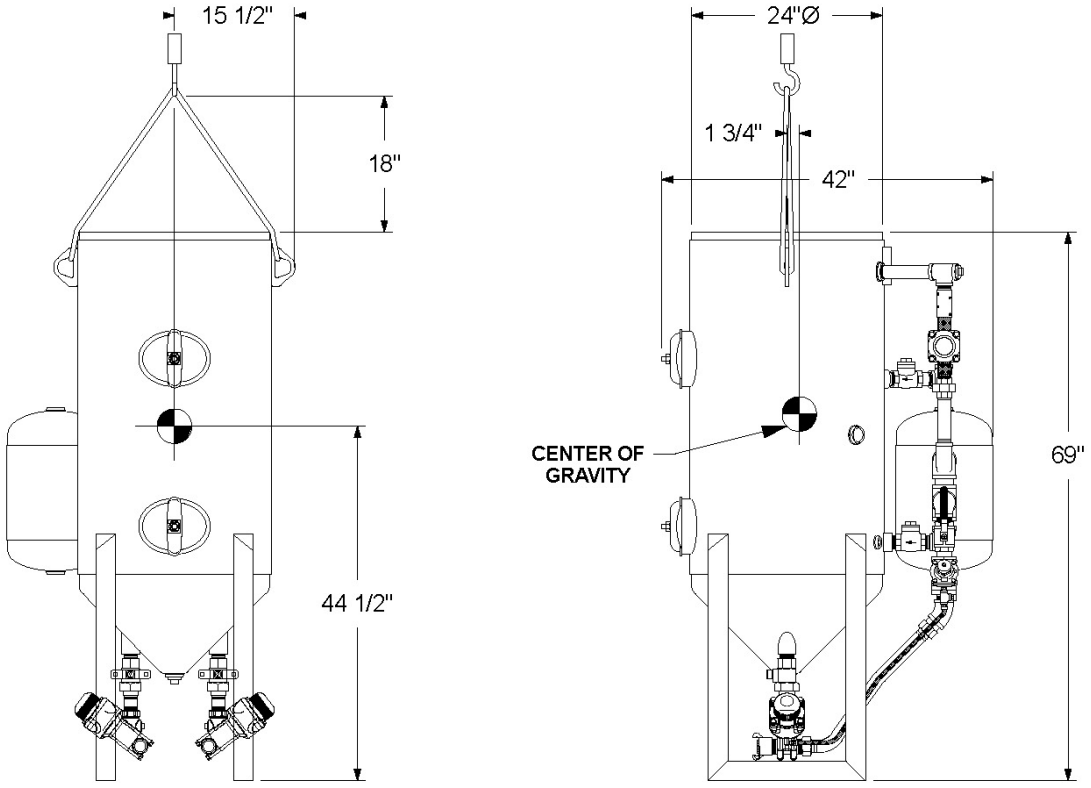
2.6 Abrasive Blaster Lifting Diagrams and Dimensional Specifications

⚠ DANGER

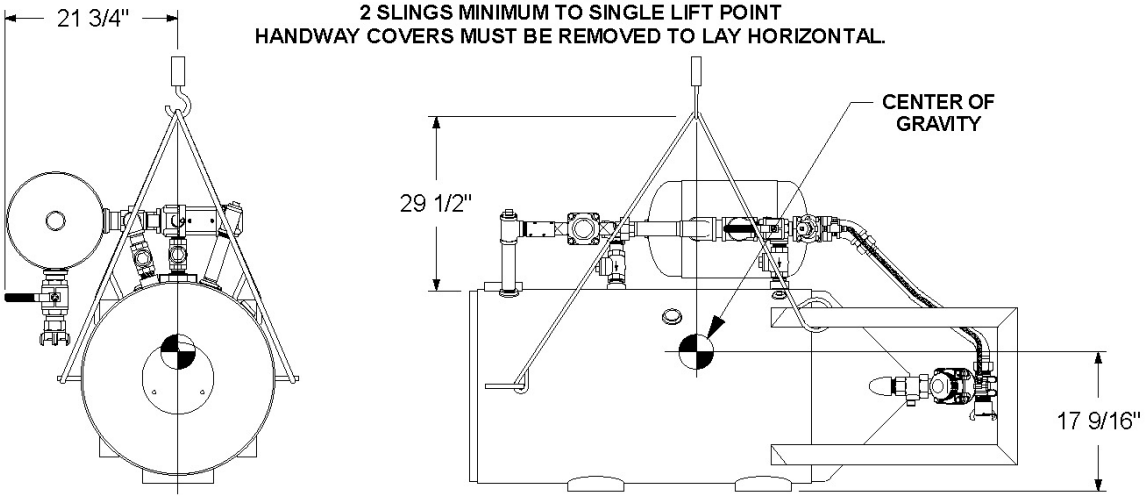
An abrasive blaster is a Pressurized Vessel. The compressed air inside a pressurized vessel contains a dangerously high level of energy which can propel objects and cause serious injury or death. Depressurize vessel and empty of abrasive before lifting, moving, or transporting.

*CRITICAL: THIS DRAWING IS FOR REFERENCE ONLY.
ANY LIFTING MUST BE PERFORMED BY QUALIFIED PERSONNEL
IN CONJUNCTION WITH ALL APPLICABLE SAFETY CODES
LIFT LUG CAPACITY = 6,188 LBS EACH
APPROXIMATE EMPTY WEIGHT = 850 LBS

VERTICAL LIFT: EMPTY LIFTING ONLY
MINIMUM SLING LENGTH: 5 FT.
2 SLINGS MINIMUM TO SINGLE LIFT POINT

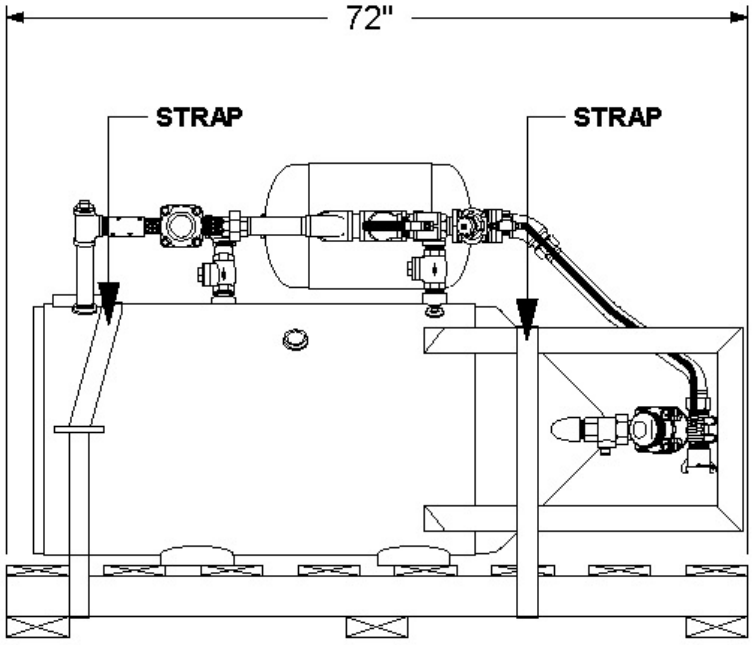


HORIZONTAL LIFT: EMPTY LIFTING ONLY
MINIMUM SLING LENGTH: 11 FT.
2 SLINGS MINIMUM TO SINGLE LIFT POINT
HANDWAY COVERS MUST BE REMOVED TO LAY HORIZONTAL.

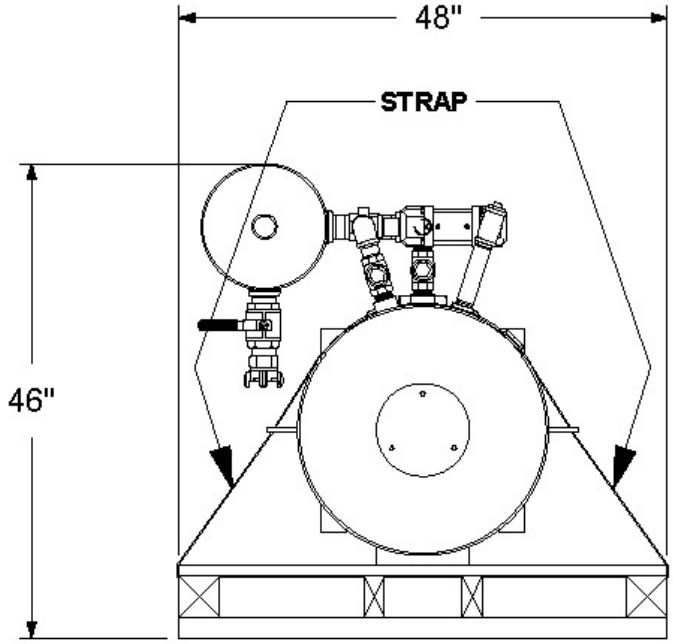


2.7 Abrasive Blaster Strapping / Packing Detail

HANDWAY COVERS REMOVED FOR SHIPPING.
VESSEL TO BE SHIPPED AS SHOWN TO PREVENT DAMAGE TO PIPING.
EMPTY WEIGHT = 850 LBS.
EMPTY WEIGHT WITH PALLET = 930 LBS.



SIDE VIEW



END VIEW

3.0 Installation Requirements and Personnel Protective Equipment

Carefully read and follow all the recommendations regarding the abrasive blast system installation requirements. Improper installation can result in equipment malfunction and significant lost time expenses. Consult an authorized Schmidt® distributor or Axxiom Manufacturing, Inc.

3.1 Double Chamber Blast System Installation Location

i. Double chamber abrasive blasters can be installed below an abrasive hopper with a support structure that can limit access to the abrasive blast system. Install the blast system in a position that will allow access to the handways and the blaster piping. These areas must be accessible to perform required maintenance. Pay close attention to objects that may be in the path of the pressure vessel exhaust air (depressurization). See Sections 5.5 and 5.6 for system depressurization. A long exhaust hose assembly can be installed on double chamber blast systems to direct the exhaust air into the blast room. **Note:** A long blowdown exhaust hose can lengthen the blowdown time and also presents the possibility of blockage.

ii. Double chamber abrasive blasters are provided with mounting holes in the bottom legs. These holes can be used for securing the blaster to the floor or mounting structure.

3.2 Compressed Air Requirements (blast nozzles)

The blast nozzle size and blast pressure determine the compressed air requirements. Available air flow capacity and/or air compressor size must be considered before selecting the blast nozzle size. An air source dedicated to the abrasive blast system is preferred to reduce system pressure drops and back flow of air. If an existing air compressor will be used or a limited air supply is available, then the blast nozzle must be selected based on these conditions. Be aware that as the blast nozzle wears the air demand will increase. See Table 1 in Section 13.0 for air consumption by nozzle size at various pressures. **Note:** Double chamber blasters are dual outlet or can be upgraded to two blast outlets; therefore, this option should be considered when determining compressed air requirements.

Critical: Air capacity is crucial for proper operation of a double chamber blast system. Pressure drops caused by insufficient air capacity is the most common reason for system malfunction. An air compressor dedicated solely to the blast system is highly recommended. See Section 3.12 for the Installation Checklist used as a guide for proper setup of double chamber abrasive blast systems.

3.3 Air Compressor Size (available air capacity)

Air compressor size is crucial to the operation of the abrasive blast system. Blast nozzle selection and desired productivity must be evaluated to determine the air flow requirements prior to selecting the air compressor size. Sufficient air supply capacity is necessary to maintain the system air pressure. Insufficient air flow capacity will result in reduced blast nozzle pressure, lost productivity, and equipment malfunction. **Critical:** Maintaining a consistent system pressure is especially important to a double chamber blaster; therefore, an air compressor dedicated to the blast system is recommended (See Section 3.12). The air compressor or the available air supply must be large enough to supply:

i. The sum of blast air requirements for each nozzle at the highest pressure that will be used (see Section 13.0, Table 1).

ii. The 12 CFM breathing air supplied to each blast operator respirator. **Note**: Reference OSHA regulations regarding requirements for breathing air, especially when an oil-lubricated air compressor is used.

3.4 Blast System Air Supply Line

The air supply hose and fittings must be rated at a minimum of 150 psi operating pressure. The air supply hose from the air compressor to the blast unit should be at least the same diameter as the air inlet piping (see Section 9.0). This size hose will be large enough to supply the required airflow to operate the blast unit controls and each blast nozzle. See Sections 5.16 for further information on air hose connection.

Note: If the abrasive blast system will be installed in a permanent location, the inlet connection can be hard piped. Do Not install hard piping that is smaller than the piping size of the blast system. Smaller piping size will reduce the air flow capacity. If other equipment will be using the same source of air as the abrasive blaster, install a check valve at the air inlet. This will protect against back flow of air pressure that can carry abrasive into the blast controls.

Hard piping connected to the abrasive blaster must be structurally supported so not to apply any loads to the pressure vessel at the points of connection. Unsupported piping can create bending loads at the connections on the pressure vessel and cause failure. Hard piping connections to the pressure vessel must be designed and installed by qualified personnel experienced with piping systems and the applicable codes pertaining to them.

⚠ CAUTION

External loading at piping connections can cause failure of the pressure vessel. Hard piping connected to the pressure vessel must include supports to eliminate the possibility of applying loads on the pressure vessel.

3.5 Blast System Air Pressure

The maximum allowable working pressure (MAWP) for the blast unit is stamped on the ASME nameplate attached to the vessel. For most abrasive blast systems the MAWP is 150psig. Do Not exceed the MAWP. An air pressure regulator can be installed to reduce air supply pressure that is higher than the MAWP. To prevent air pressure backflow only use a non-relieving air regulator. Air pressure backflow will carry abrasive from the blast vessel and contaminate the blast control system. **CRITICAL**: **Any inlet air valve or air pressure regulator added to the system must have sufficient air flow capacity for proper operation of the blast system. Insufficient air flow capacity will cause pressure drop in the blast system resulting in equipment malfunction, abrasive backflow, and reduced blast productivity. Select a valve that will operate with little or no pressure drop (5psi max.) at the required cfm air flow.**

Installing an air pressure regulator allows the option of blasting at low pressure. When blasting at low pressure the air supply to the deadman blast control system must be at least 80psig (see Figure 5.11(a) and 5.11(b)). The valves in the abrasive blast system are “spring closed” and therefore require at least 80psig to operate properly. If the air pressure regulator is set below 80psig the air supply to the blast controls must be taken upstream of the regulator.

3.6 Blast System Air Quality

Air quality is crucial to the operation of an abrasive blaster. Moisture and contaminants can cause components to malfunction. Moisture condensation in a blast system causes abrasive flow problems. Condensation occurs when the hot vapor-filled compressed air cools as it reaches the abrasive blaster. Water droplets formed during condensation can be absorbed by the abrasive in the blast vessel which can cause erratic flow to the abrasive valve. Therefore, a moisture removal device installed for the blast system air supply is recommended (i.e. coalescing moisture separator, air-cooled aftercooler or deliquescent dryer). Contact a local authorized Schmidt® distributor or Axxiom Manufacturing, Inc. to locate one near you.

3.7 Electrical Requirements

All units require electric power for the cycle controls and optional electric blast controls. The most common supply voltages are 120Vac or 12Vdc. Refer to the electrical schematic included in the cycle control electric enclosure. The electrical schematic will indicate the input voltage and maximum power requirement (current in amps).

Note: Insufficient electric power output will result in malfunctioning of the electric blast control system. A power transformer or power supply may be included as an option or may be added if the correct input voltage is not available.

3.8 Abrasive Selection

Abrasive selection is likely the most difficult decision related to the blast operation. Choice of abrasive is based on factors such as blast application type, desired finish and coating requirements, characteristics of object to be blasted, cost and ability to recycle, available equipment, safety, and environmental constraints.

There are many abrasives available that are either natural, manufactured, or processing by-products. Abrasives are available in varying sizes, shapes, and hardness. These characteristics determine the resulting effect on the surface to be blasted and limitations of its use. The effects on the blasted surface are measured by its degree of cleanliness and the surface profile. Standards and required levels of these measurements are established by organizations such as Steel Structures Painting Council (SSPC), National Association of Corrosion Engineers (NACE) and coating manufacturers. See Section 12.5 for contact information of these organizations. Use these sources to obtain information regarding all aspects of surface preparation and abrasive selection guidelines.

Schmidt® abrasive blasters are designed for high production open abrasive blasting with a wide range of abrasives. It is the responsibility of the employer and operators to select the proper abrasive. It is the responsibility of the employer to make certain that the abrasive selected is safe to use for abrasive blasting.

Critical: Always obtain the Material Safety Data Sheet (MSDS) for the abrasive to be used. The MSDS provides the chemical makeup of the abrasive. Do Not use abrasives containing toxic materials. Refer to OSHA 29 CFR for acceptable limits of various toxic substances and additional measures to be taken to protect operating personnel. Always use abrasives containing less than 1% of crystalline silica. Always use a NIOSH approved respirator when handling, loading and cleaning up abrasives. Organic substances which are combustible may only be used in automated blast systems with ventilation that meets OSHA 29 CFR 1910.94.

3.9 Breathing Air Quality

All blast operators must be supplied with and required to use NIOSH approved air-fed respirators. Breathing air supplied to these respirators must meet Grade D air quality standards as specified by OSHA 29 CFR 1910.134(i) and the Compressed Gas Association Specifications ANSI/CGA G-7.1. Consult these specifications when selecting a source of breathing air.

Breathing air must be clean, dry, contaminant-free, and provided at a pressure and volume specified by NIOSH. Use NIOSH approved air filters on all sources of breathing air. See Section 3.10.

Breathing air filters do not remove carbon monoxide or any other toxic gases. Use a carbon monoxide monitor to detect unacceptable levels. Consult OSHA 29 CFR 1910.134(i).

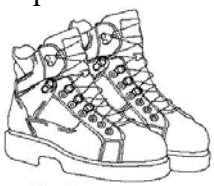
Many sources of breathing air are available such as air cylinders, free-air pumps, oil-less air compressors, and oil lubricated air compressors. The most commonly used is the same air compressor that is used for the blast air which most often is oil lubricated. Breathing air provided by an oil-lubricated air compressor can contain carbon monoxide and therefore requires the use of a carbon monoxide detector (See Section 3.10). Carbon monoxide can be in the compressed air produced by an oil-lubricated air compressor when it is operated at extremely high temperature; therefore, a high temperature alarm is required to alert the operators when this condition exists.

Oil lubricated air compressors can produce carbon monoxide. Carbon monoxide can cause asphyxiation and result in death. Use a high-temperature alarm and a carbon monoxide monitor when an oil lubricated air compressor is used to supply breathing air. Consult OSHA 29 CFR 1910.134(i).

3.10 Personal Protective Equipment (PPE)

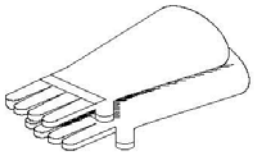
Abrasive blasting has many hazards that may cause injuries to operators. To protect operators from injury each must be supplied with, and required to use Personal Protective Equipment. The Occupational Health and Safety Administration (OSHA) requires the employer to assess the workplace to determine what PPE is necessary and supplied to each operator (Reference 29 CFR 1910 Subpart I). OSHA requires that this equipment meet or be equivalent to standards developed by the American National Standards Institute (ANSI). Figure 3.10 below identifies the minimum personal protective equipment required for each abrasive blast operator. Also identified are the OSHA references for each and the ANSI standard each PPE item must meet. All PPE clothing and equipment should be selected for safe design and quality of construction. Select each for proper fit and for comfort which will encourage operator use.

Safety Glasses
Reference OSHA 29 CFR 1910.133
Must meet ANSI Z87.1 - 1989

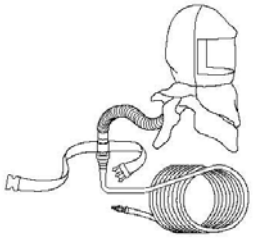


Safety Boots
Reference OSHA 29 CFR 1910.136
Must meet ANSI Z41.1 - 1991

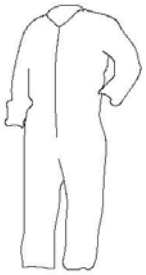
Ear Plugs
Reference OSHA 29 CFR 1926.101
Must meet ANSI S3.19
(Also see OSHA 29 CFR 1910.95)



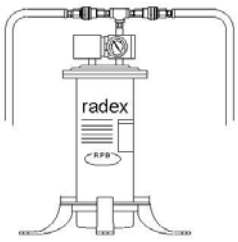
Gloves
Reference OSHA 29 CFR 1910.138
No Applicable ANSI Standard



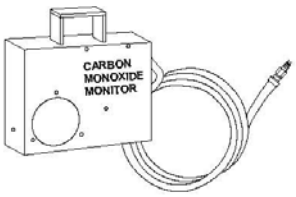
Respirator
Reference OSHA 29 CFR 1910.134
Must be NIOSH approved



Protective Clothing
Reference OSHA 29 CFR 1910.138
No Applicable ANSI Standard



Airline Filter
Reference OSHA 29 CFR 1910.134
Must be NIOSH approved



Carbon Monoxide Monitor

Figure 3.10 - Personal Protective Equipment

3.11 Pressure Relief Valve Installation

Do Not operate this equipment without a pressure relief device installed to protect the blaster pressure vessel from over-pressurization. The ASME Code requires that all vessels be operated with pressure relief devices in place.

If the compressed air system does not provide for the installation of a pressure relief valve one can be installed in the auxiliary port on the pressure vessel. Refer to Figure 3.11 for the recommended alternate location of the air pressure relief valve.

Local regulations set the specifications for pressure relief valves; therefore, it is the responsibility of the owner of the abrasive blaster to install a pressure relief valve that meets *all* applicable regulations. The pressure relief device must be set at the maximum allowable working pressure of the abrasive blaster pressure vessel See the ASME/CE vessel nameplates attached to the pressure vessel.

⚠ DANGER

Rupture Hazard. Operating the pressure vessel above the maximum allowable working pressure can result in rupturing the pressure vessel. Install an air pressure relief valve to protect against over pressurization of the blast vessel.

⚠ WARNING

Airborne particles and loud noise hazards from relief valve exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of exhaust air path. DO NOT place hands or other body parts in the exhaust air path. Make sure no personnel are in the exhaust air path. Direct the relief valve exhaust away from work area.

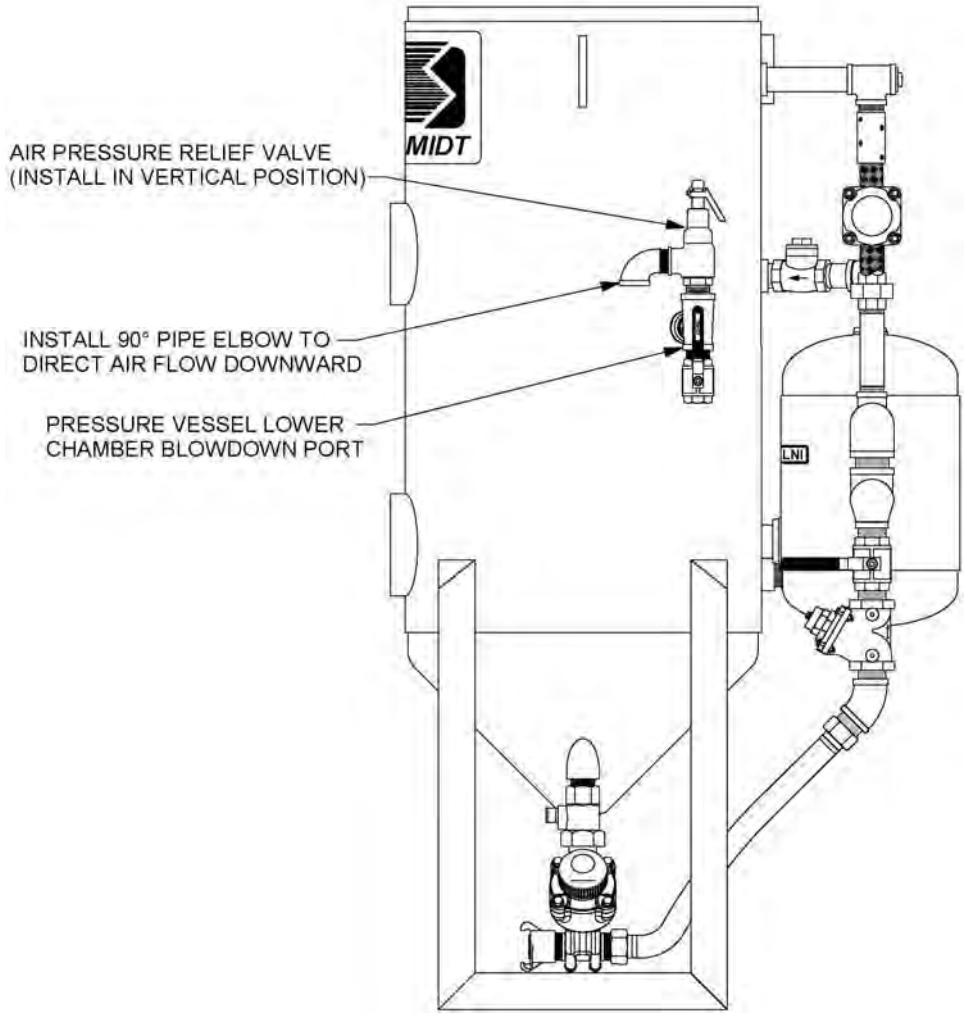


Figure 3.11 – Suggested location for air pressure relief valve

3.12 INSTALLATION CHECKLIST (Photocopy this page to use as a worksheet)

☐ ***Deadman/Twinline (or cords):*** confirm delivery with the abrasive blaster.

☐ ***Handway covers & crab assemblies:*** confirm delivery with the abrasive blaster.

☐ ***Blast accessories:*** confirm receipt as purchased with the blaster.

☐ ***Inspect blaster:*** check for possible damage during shipment. See Section 8.0 for inspection instructions.

☐ ***Popup alignment:*** remove popup dust cover from top head and check upper and lower chamber popup alignment. Shifting of popup is possible during shipment. See Section 8.4 for inspection & alignment instructions.

☐ ***Clean blaster:*** remove handway covers and check for debris inside. Trapped debris can vibrate loose during shipment and later block abrasive flow. If necessary vacuum the bottom of tank. Replace handway covers per instructions in Section 6.3.

☐ ***Accessible location:*** install stationary blasters so that handways are accessible for maintenance. See Section 3.1 for additional information.

☐ ***CFM available:*** determine available air supply (cfm) and record here._____
See Sections 3.2, 3.3, and 3.5 for information on determining air requirements.

☐ ***Air supply connection:*** install air supply piping or connect an air supply hose that is the same size as the blaster piping size or larger. See Section 3.4 for details.

☐ ***Air quality:*** install moisture separator or AirPrep System to remove moisture from blast air supply to protect against abrasive flow problems. See Section 3.6.

☐ ***Electric power:*** provide power for cycle/electric deadman controls. See Section 3.7.

☐ ***Blast abrasive:*** select abrasive suited for application. See Section 3.8.

☐ ***Breathing air:*** provide Grade D air source for blast operators. See Section 3.9.

☐ ***PPE:*** provide all the necessary personal protective equipment. See Section 3.10.

☐ ***Pressure relief valve:*** install relief valve if not provided on air compressor. See Section 3.11 for information on pressure relief valve installation.

☐ ***Blast nozzle:*** select size based on available cfm noted above. See Section 3.2 & 5.15.

☐ ***Blast hose:*** select size three times the nozzle size to be used. See Section 5.14.

☐ ***Adjust media spider:*** adjust height per drawing in Section 9.10.

☐ ***Operator training:*** all operators must completely read and understand the operation and maintenance manual and be properly trained in equipment and blast operations.

☐ ***Abrasive Blaster Setup:*** follow procedures in Section 6.0.

4.0 Abrasive Blast System General Operation

The function of the Schmidt® abrasive blaster is to provide a mixture of dry abrasive and compressed air to a blast nozzle. The abrasive blast stream through the blast nozzle is used for removing rust, paint, or other unwanted surface defects. After abrasive blasting, the surface is ready for new paint or coating.

A double chamber abrasive blaster is one of a group of components used in an abrasive blasting job. The typical components are an air compressor, moisture removal device, an abrasive blaster, blast hose, a blast nozzle, operator personal protective equipment, and blast abrasive. See Figure 4.1.

The blast abrasive is loaded into the abrasive blaster through the abrasive inlet at the top of the blaster. All the compressed air must be removed from inside the abrasive blaster before it can be filled with abrasive. The abrasive can be bag loaded, or loaded from a Schmidt storage hopper. To begin blasting, the abrasive inlet is closed and the abrasive blaster is filled with compressed air from the air compressor. Since moisture creates problems in the blast operation, it is common for the compressed air to be treated by a moisture removal device, such as a Schmidt AirPrep System. The air pressure in the abrasive blast vessel is equal to the air pressure in the blast hose where it connects at the metering valve. This equal pressure is needed to allow the blast abrasive to flow downward by gravity. The abrasive flow is controlled by the metering valve at the bottom of the blaster. From the metering valve the blast abrasive flows into the blast air stream and through the blast hose. The speed of blast air and abrasive mixture is greatly increased by the blast nozzle onto the work surface. The high speed of the air and abrasive is what gives it the energy to blast rust and paint off of surfaces. The abrasive blast stream and the dust it creates are harmful; therefore, all blast operators must use personal protective equipment during the blast operation.

All the components required for the blast operation (except for the air compressor) are available from Axxiom Manufacturing, Inc. Call Axxiom to locate a distributor.

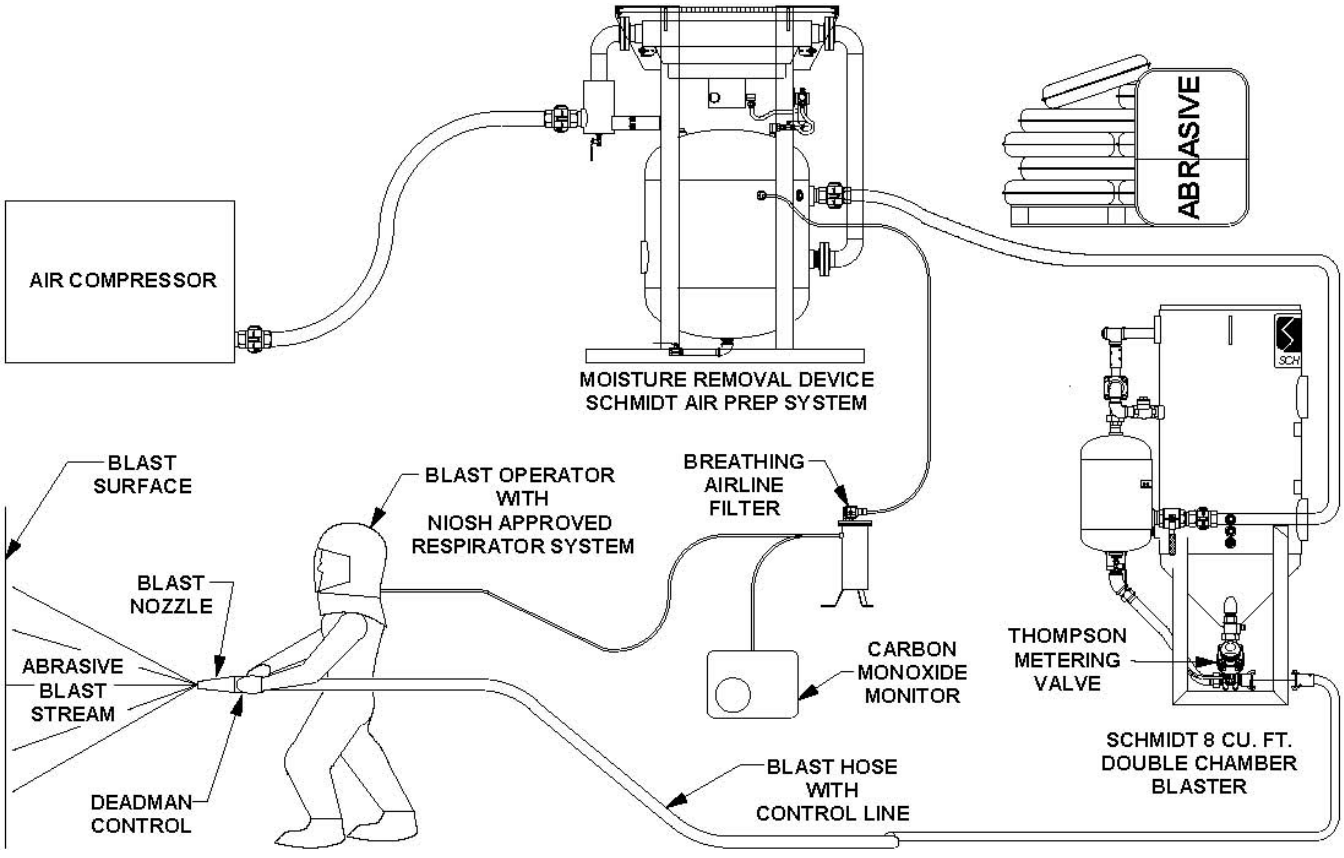


Figure 4.1 – Double Chamber Abrasive Blast System

5.0 Double Chamber Abrasive Blaster General Operation

See Figure 5.0(a) and 5.0(b) to help understand the general operation of the double chamber abrasive blaster. Do not attempt to operate the abrasive blaster before reading all sections of this manual and following all setup procedures. Read sections 5.1 through 5.23 for a detailed explanation of all components of the double chamber abrasive blaster.

A double chamber is a special type of abrasive blaster because it allows the operator to blast continuously without stopping to refill with blast abrasive. A double chamber blaster is simply one vessel on top of another with a connecting a popup valve (#5b) between them. When the upper chamber is depressurized the connecting popup is automatically closed. Once the upper chamber is depressurized, the upper popup (#5a) opens to fill the chamber with abrasive. After filling, the upper chamber popup is closed and the upper chamber is pressurized. When the air pressure in the upper chamber is equal to the air pressure in the lower chamber the connecting popup (#5b) opens automatically. Now the abrasive transfers from the upper to the lower chamber. This constant cycling of the upper chamber keeps a constant supply of blast abrasive in the lower chamber. The operator is not required to stop blasting during the cycling of the upper chamber. The lower chamber remains continuously pressurized during the blast operation.

The cycle of pressurizing and depressurizing the upper chamber is done by the Combo Valve®. The Combo Valve (#28) is controlled by a cycle control system that most often includes a level sensor and a timer (see Section 5.20).

Compressed air enters the blast system when the air inlet ball valve (#3) is opened. Air flows through the moisture separator (#7, optional) and pressurizes the vessel lower chamber. Air is also supplied to the Combo Valve (#28) and to the control system (#23). The lower chamber popup will be simultaneously closed and therefore the lower chamber will pressurize. The lower chamber manual depressurization ball valve (#4) must be closed before opening the air inlet ball valve (#3).

Blasting starts when the control valve (#20) is electrically or pneumatically activated. When the control valve opens it sends an air signal that opens both the automatic air valve (#9) and the Thompson Valve® (#14). Compressed air will pressurize the blast hose (#10) when the automatic air valve (#9) is opened. At the same time, the Thompson Valve (#14) will open allowing abrasive to fall through and into the blast air stream. The abrasive flow can be increased or decreased by turning the knob on top of the Thompson Valve.

Blasting stops when the control valve (#20) is de-activated by releasing the deadman valve/switch (#12). This will close the blast control valve and vent the air signal to the automatic air valve (#9) and the Thompson Valve (#14). When the signal air vents, both valves spring return into their “normally closed” position. The abrasive blaster (#1) lower chamber remains pressurized when the automatic air valve and Thompson Valve are turned off.

The abrasive blaster (#1) is depressurized by setting the control box (#31) power switch to the “off” position, closing the air inlet ball valve (#3), and then opening the blowdown ball valve (#4) to completely vent the compressed air.

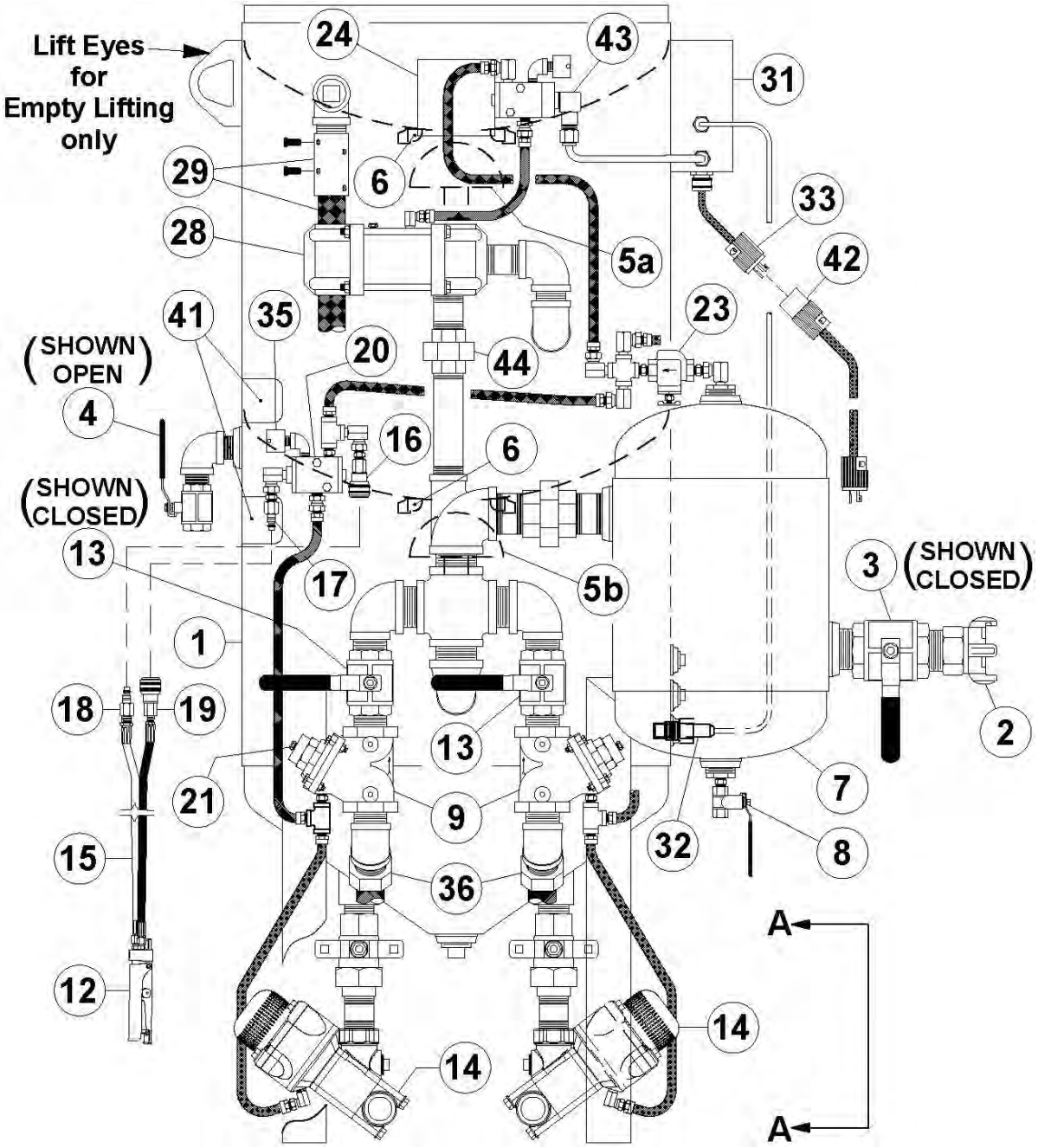


Figure 5.0(a) – Typical double chamber abrasive blaster

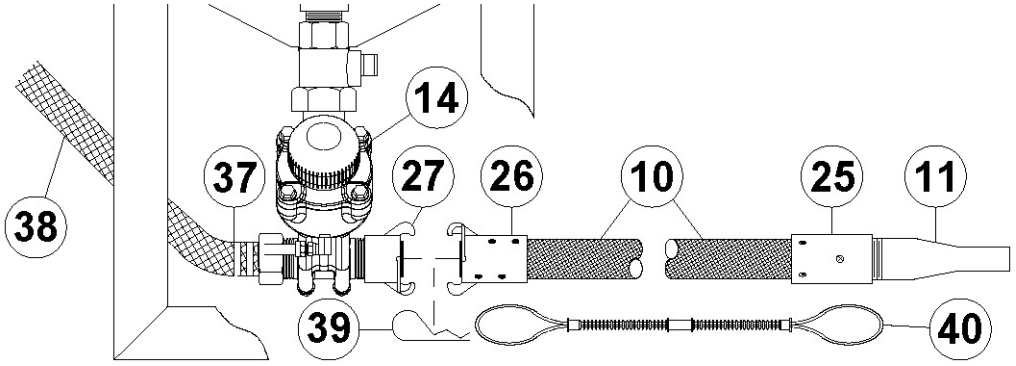


Figure 5.0(b) – Typical double chamber abrasive blaster (View A-A)

5.1 Popup Valve (abrasive inlet)

Each chamber of the double chamber abrasive blaster is filled with abrasive through the abrasive inlet at the top. Each abrasive inlet is sealed by the popup valve (#5a or #5b). The abrasive inlet is automatically sealed by the popup head (#5) when the blaster is pressurized. The air flow into the internal piping pushes the popup up (#5) against the gasket (#6). See Figure 5.1. See Section 5.20 for an explanation of the popup and operation in the cycle control of a double chamber blast pot. **Note:** Air leaks at the popup will prevent proper operation of the cycle control system. Startup and regular inspection is important (See Section 8.4).

⚠ WARNING

Pinch point hazard. Vessel pressurization will close the popup. Keep fingers clear of the popup opening. Disconnect air supply prior to performing popup maintenance.

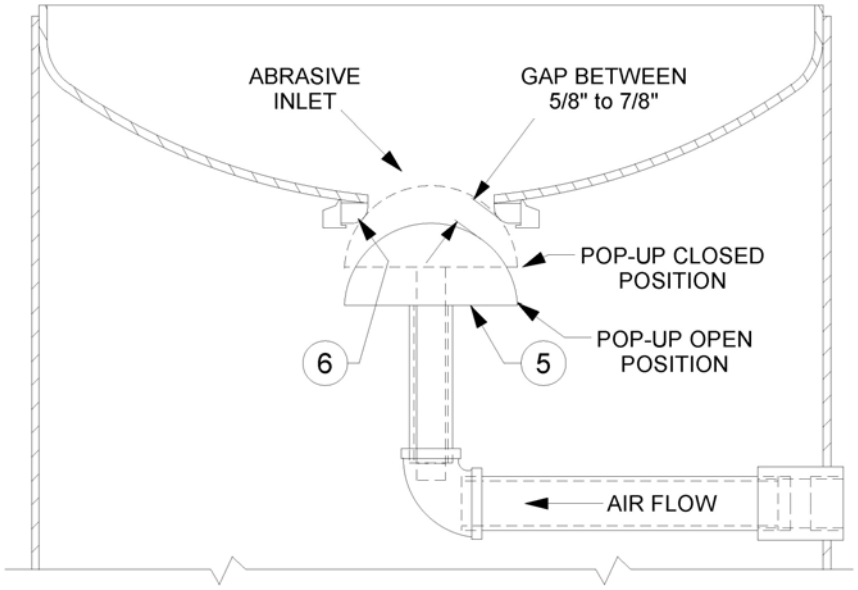


Figure 5.1 – Standard Popup Assembly & Internal Piping

5.2 Air Supply Connection

Air is supplied to the abrasive blaster through a hose connection at the air inlet crowfoot (#2). The air supply hose connected to the abrasive blaster must be same diameter as the air supply piping and rated at a minimum of 150psi operating pressure. See the drawings and parts lists in Section 9.0 and refer to Sections 2.2, 3.4 and 5.16.

5.3 Air Inlet Ball Valve (lower chamber pressurize)

The air inlet ball valve (#3) is used to turn on and turn off the air flow to the abrasive blaster. When the inlet ball valve is opened air will flow through the moisture separator (#7) and into the blast vessel internal piping. The air flow will automatically close the lower chamber popup valve (#5b) and pressurize the lower chamber of the abrasive blaster (see Figure 5.0 and 5.1). The blowdown ball valve (#4) must be closed before opening the air inlet ball valve.

Note: The blaster lower chamber will automatically pressurize when the air inlet ball valve (#3) is opened. The lower chamber must be manually depressurized (See Section 5.5 and 6.2).

⚠ DANGER

The double chamber abrasive blaster is a pressurized vessel. Propelled objects will cause serious injury or death. Read and follow all pre-operation and operating procedures prior to pressurizing the abrasive blaster. See Section 6.0 and 7.0.

5.4 Moisture Separator (optional)

The air inlet moisture separator is an option available on the abrasive blaster. Air flow into the blaster passes through the moisture separator (#7) which removes moisture, oil and dirt particles from the inlet air. The water that is removed by the separator is drained by opening the ball valve (#8) at the bottom of the separator. This ball valve should be left slightly opened anytime the blaster is in operation. This allows water to be drained as it is filtered from the blast air. **Note:** Not all double chamber abrasive blasters are equipped with a moisture separator.

5.5 Lower Chamber Blowdown Ball Valve (depressurize)

The blowdown ball valve (#4) is used to release all the compressed air (depressurize) from inside the lower chamber of the abrasive blaster. The abrasive blaster must be depressurized when shutting down the blast system and before performing any maintenance. The air inlet ball valve (#3) must be closed before depressurizing the lower chamber.

Note: The lower chamber will automatically pressurize when the air inlet ball valve (#3) is opened. The lower chamber must be manually depressurized thereafter. See Section 5.3 and 6.2.

⚠ WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

5.6 Combo Valve® (upper chamber pressurization/blowdown)

The Combo Valve (#28) is a dual purpose valve that controls both the upper chamber pressurization and depressurization (blowdown) operations. At one end the valve pinches the 3/4" blowdown hose (#29) which seals and traps air in the upper chamber. At the other end the Combo Valve opens and allows air to flow into the upper chamber to pressurize it.

The Combo Valve opens and the upper chamber will pressurize.

The Combo Valve closes and the upper chamber will depressurize (blowdown).

When the Combo Valve closes the pinch ram on the blowdown hose (#29) is released and the air inside the upper chamber will exhaust through the blowdown hose. The opening and closing of the Combo Valve requires a solenoid control valve which is automatically operated by the cycle control system (See Section 5.20). Refer to the Combo Valve drawing in Section 9.6.

The cycle control system is an automated system which must be disabled before performing any maintenance on the double chamber abrasive blaster.

⚠ DANGER

The double chamber abrasive blaster is a pressurized vessel. Propelled objects will cause serious injury or death. Read and follow all pre-operation and operating procedures prior to pressurizing the abrasive blaster. See Section 6.0 and 7.0.

⚠ WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

5.7 Combo Valve Union Orifice

The Combo Valve pressurizes and depressurizes the upper chamber of the blast vessel by way of the cycle control system (See Section 5.20). When the upper chamber is pressurized the sudden demand for air can cause a pressure drop at the blast nozzle and disruptions in the abrasive flow. To alleviate this problem there is a union orifice disk (#44) fitted inside the pipe union that restricts the air flow through the Combo Valve (see Figure 5.7). The restriction of the air flow by the reduced orifice will minimize the effects at the blast nozzle.

Note: The disadvantage of the restriction by the union orifice is that it slows the pressurization time of the upper chamber. In most applications this should not be a problem.

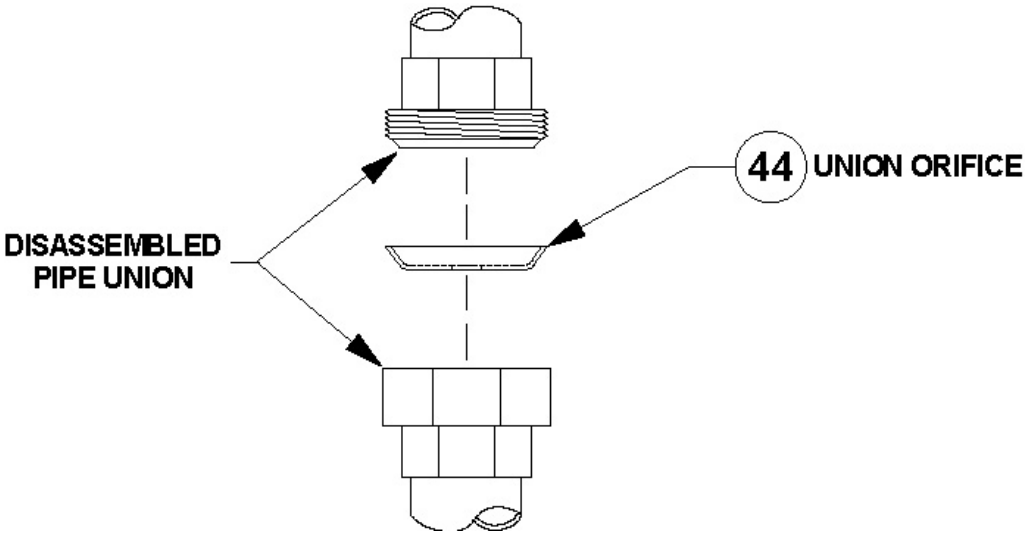


Figure 5.7 – Union Orifice

5.8 Choke Valve

The choke valve (#13) is used to clear any trash that may get into the blast vessel and block the Thompson Valve® orifice. Whenever trash (paint chips, cigarette butts, etc.) blocks the Thompson Valve orifice the procedure is to fully open the Thompson Valve by backing out the knob, then press down the deadman lever (#12) to begin blasting. While blasting, have an assistant close the choke valve completely for about one second. This creates differential pressure at the Thompson Valve (high pressure above; low pressure below). The higher pressure from the blast vessel should be enough to force the trash through the Thompson Valve orifice. Keep the choke valve fully open at all other times while blasting to minimize excess Thompson Valve wear. **Note:** If the abrasive blaster is equipped with the abrasive cutoff feature set the cutoff valve (or switch) to the on-position for the choke procedure. See Section 9.3(a) and 9.3(b).

⚠ WARNING

Do not aim blast nozzle towards yourself or any person. System malfunction can cause accidental start up and result in injury to personnel.

A secondary purpose of the choke valve is as a manual shut off valve for the blast air supply. When the choke valve (#13) is closed it will shut off the blast air supply to the blast outlet. See Figure 5.8(a).

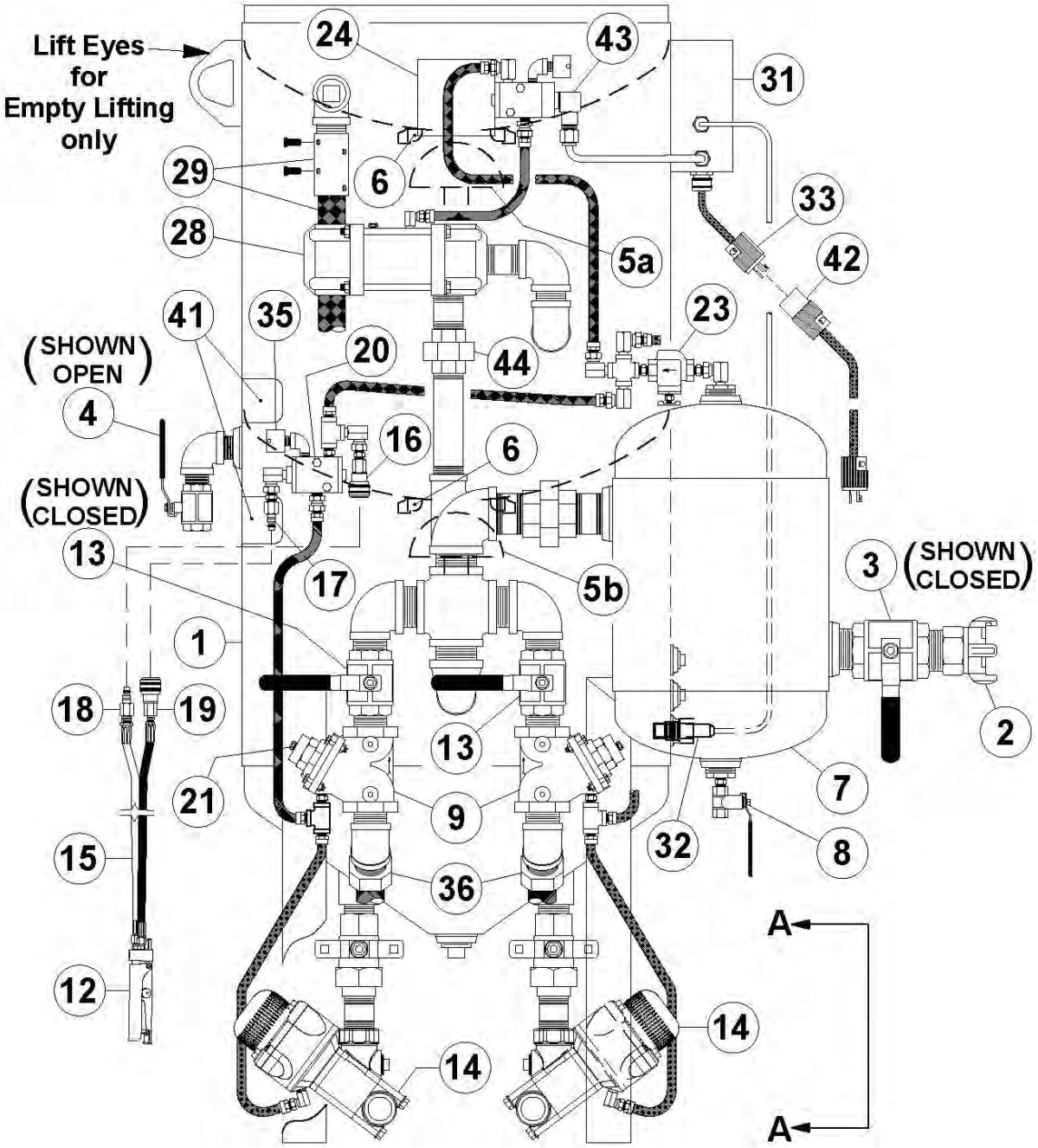


Figure 5.8(a) – Typical double chamber abrasive blaster

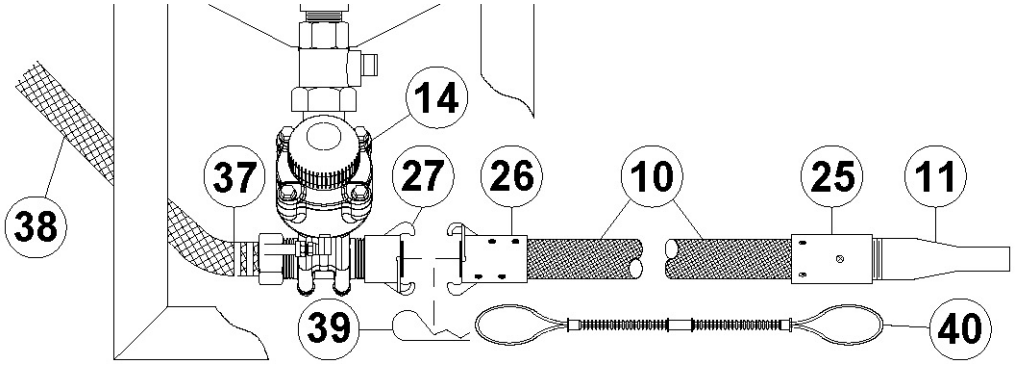


Figure 5.8(b) – Typical double chamber abrasive blaster (View A-A)

5.9 Automatic Air Valve (blast air valve)

The automatic air valve (#9) is a normally closed valve that opens to supply blast air to the blast hose (#10) and blast nozzle (#11). The automatic air valve (#9) opens when it receives air to its signal port. This happens when the deadman lever (#12) is pressed down which opens the blast control valve (#20) sending an air signal to the automatic air valve. When the deadman lever is released, the air signal from the blast control valve vents and the automatic air valve spring closes to stop blast air flow to the blast hose and nozzle. See Section 9.5.

Note: An optional automatic air valve is the High Flow model which offers increased air flow capacity for larger blast nozzles. Consult Axxiom Manufacturing or an authorized distributor.

5.10 Thompson Valve® II (abrasive metering valve)

The Thompson Valve (#14) is a normally closed valve that opens to supply abrasive into the blast air stream. The Thompson Valve opens when it receives air to its signal port (see Section 9.4(a) and 9.4(b)). This happens when the deadman lever (#12) is pressed down which opens the blast control valve (#20) sending an air signal to the Thompson Valve. When the deadman lever is released the air signal from the blast control valve vents and Thompson Valve spring closes to stop abrasive flow to the blast hose (#10) and nozzle (#11).

The Thompson Valve® also controls (meters) abrasive flow by use of an adjustable orifice. The amount this orifice opens is controlled by turning the knob at the top of the Thompson Valve. The knob sets the stopping point of the plunger (See Section 9.4(a) and 9.4(b)). Turning the knob clockwise reduces the orifice size which decreases abrasive flow. Turning the knob counter-clockwise increases the orifice size which will increase the abrasive flow to the blast nozzle. The Thompson Valve II spring retainer has lines on the side to use as reference as to the amount the orifice is open. Adjustments to the abrasive flow should be made by turning the knob a little at a time. Test the adjustment by starting the blast for a short period to determine if further adjustment is needed. See Section 9.4.

The Thompson Valve II has a cleanout port where a ball valve can be installed and used to purge trash that blocks abrasive flow. This is done by opening the clean out valve and pressing down the deadman lever (#12). The blast air flow purges trash through the clean out valve.

Airborne particles and loud noise hazards from purge air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of purge air path. DO NOT place hands or other body parts in the purge air path. Make sure no personnel are in purge air path.

5.11 Deadman Valve/Switch (blast control)

The deadman valve/switch is part of a system that controls the blast operation. The deadman valve/switch (#12) allows the operator to remotely start and stop the blast operation. The deadman is mounted at the end of the blast hose assembly (#10) close to the blast nozzle (#11) to give the operator easy control of the blast operation.

The Deadman is either a pneumatic valve or an electric switch depending on the type of abrasive blaster control system. When the deadman lever is pressed down it sends either a pneumatic or electric signal to the blast control valve (#20). The control valve opens and sends an air signal to the automatic air valve (#9) and the Thompson Valve® (#14). See Sections 9.1, 9.2, 9.7, 9.8, and 9.9.

5.11.1. Pneumatic Deadman System: When the pneumatic deadman lever is pressed down, air supply from the orange hose of the twinline hose (#15) flows into the black hose. Air flows through the black hose to the signal port of the control valve (#20) causing it to open and send air signals to the auto air valve (#9) and the Thompson Valve (#14). When the deadman lever is released the air signal is cut off and the remaining air vents from the breather (#35). See Figure 5.11(a) and the drawings in Section 9.1.

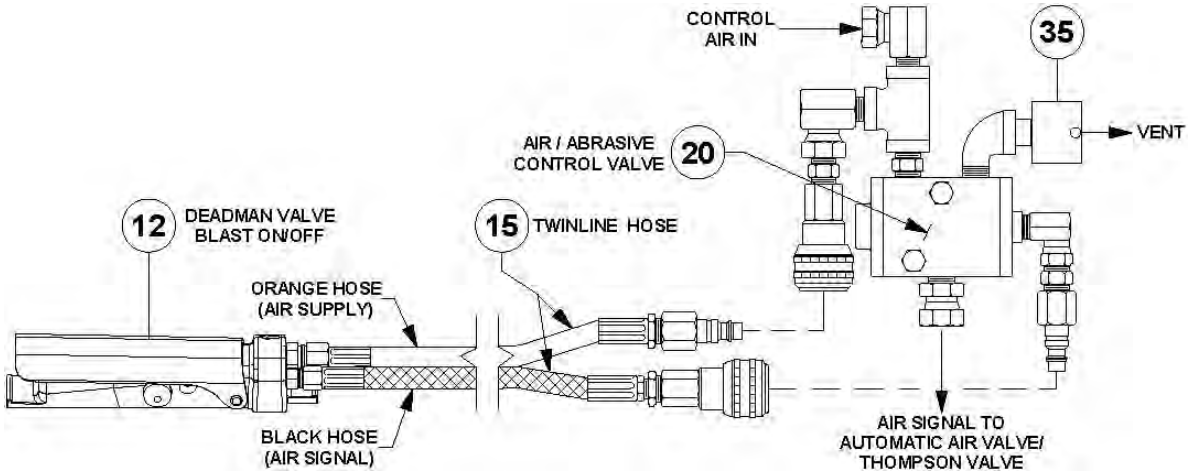


Figure 5.11(a) – Thompson Valve Pneumatic Blast Control System

5.11.2. Electric Deadman System: When the electric deadman lever is pressed down it closes the electric circuit and supplies electric current to the control valve (#20). The control valve opens and sends air signals to the auto air valve (#9) and the Thompson Valve® (#14). When the deadman lever is released the electric circuit is cut off closing the control valve. The signal air vents from the breather (#35). See Figure 5.11(b) and the drawings in Section 9.2.

⚠ CAUTION

Electric shock hazard. Abrasive blasters with electric deadman blast control systems must operate on low voltage supply (12-24 volts). To minimize shock hazard only use low voltage sources and use caution when connecting the power to the abrasive blaster. See Section 3.7.

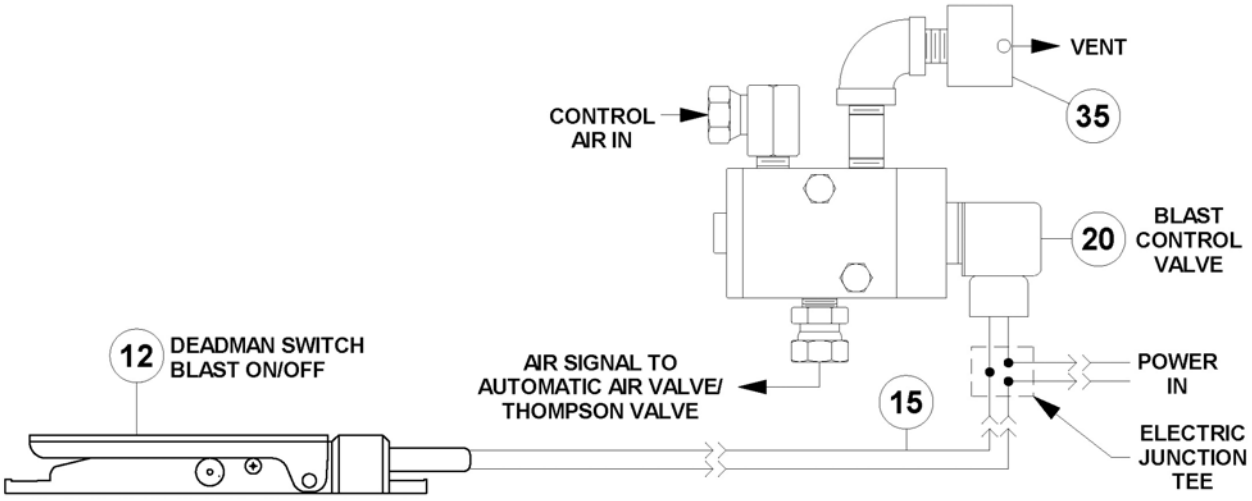


Figure 5.11(b) – Thompson Valve Electric Blast Control System

5.12 Thompson Valve® Abrasive Blaster with Electric Control System

Figure 5.12 shows a double chamber abrasive blaster with the electric deadman system. The popup valve, automatic air valve, and Thompson Valve operate the same as a blaster with a pneumatic blast control system. The difference is that the electric control system uses the electric control valve (#20) operated by the electric deadman switch (#12) as detailed in Section 5.11.2.

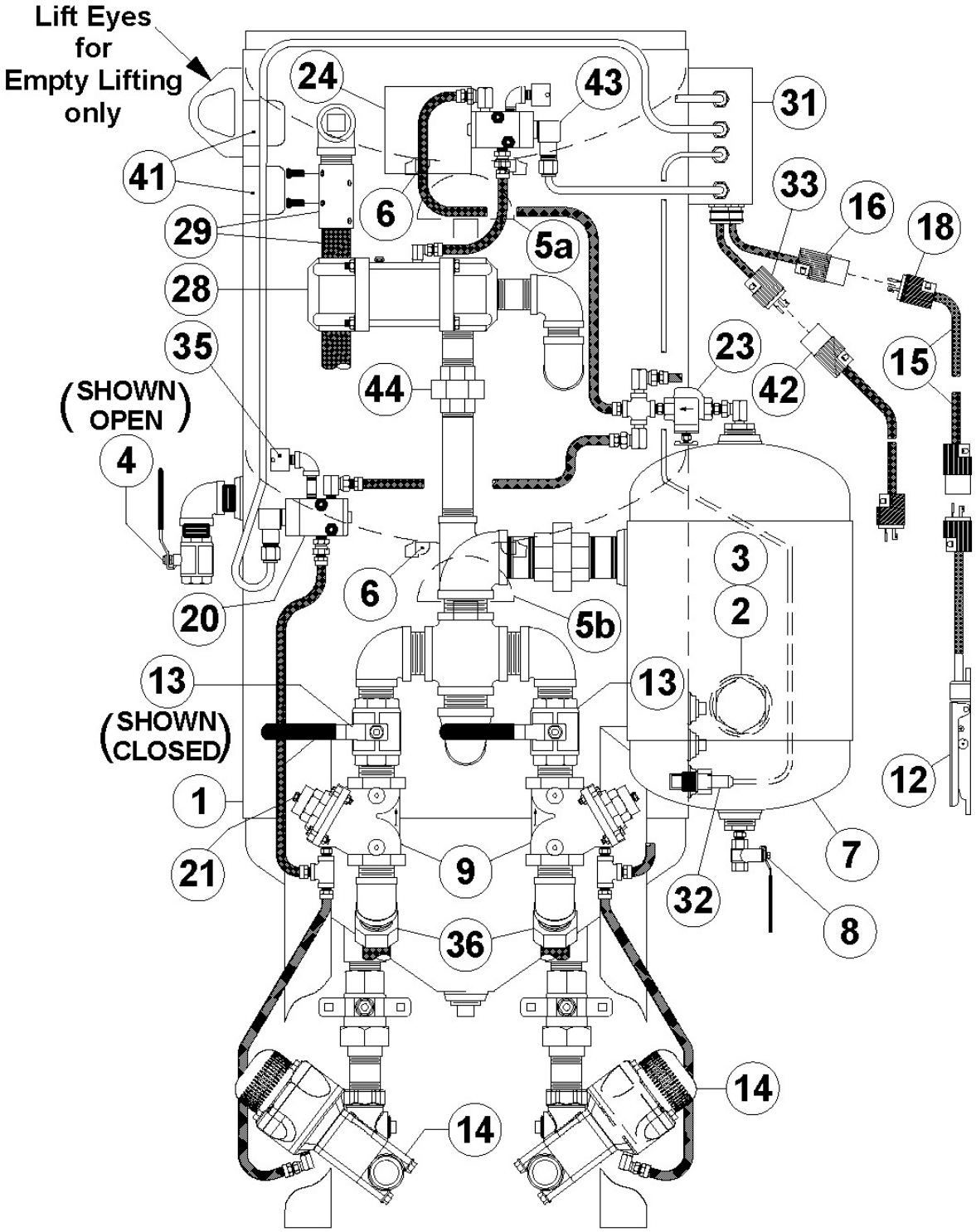


Figure 5.12 – Double Chamber Abrasive Blaster with electric deadman controls

5.13 Abrasive Cutoff

An optional feature of a Thompson Valve blaster is an abrasive cutoff. There are two uses for the abrasive cutoff feature. First is to allow blasting air without abrasive. This is useful for blowing off abrasive from the item blasted. To blast with air only, set the abrasive cutoff valve (or switch) to the "off" position, then press down the deadman lever (#12). This will send a control signal to the automatic air valve only; therefore, only blast air will exit the blast nozzle (#11). For the abrasive cutoff to work a second control valve is needed that provides a signal to the Thompson Valve separate of the air signal to the automatic air valve. See Sections 9.3(a) and 9.3(b).

The second use for the abrasive is to purge abrasive out of a long blast hose. This prevents abrasive from collecting in the blast hose when the blast operation is stopped. The abrasive at rest in the blast hose can cause surges when restarting the blast operation.

Note: The abrasive cutoff feature is optional; however, factory conversion kits are available to upgrade Thompson Valve blasters to include this feature. Consult Axxiom Manufacturing or an Authorized Schmidt® distributor.

5.14 Blast Hose

The blast air and abrasive mixture flows from the Thompson Valve® to the blast nozzle (#11) through the blast hose assembly (#10). The typical length of the blast hose is 50ft; however blast hose extensions can be added to increase length. For higher efficiency keep the blast hose as short as possible. Increased blast hose length causes pressure drop at the blast nozzle which reduces the blast efficiency. For higher efficiency use a blast hose with an inside diameter that is approximately three times the nozzle throat diameter. Keep blast hose as straight as possible. Sharp bends create high wear points. Static electricity is generated by the abrasive flow through the blast hose. To minimize the chance of static electrical shock to operating personnel only use static dissipating blast hose and install a grounding strap on the abrasive blaster.

⚠ CAUTION

Static electric shock hazard. To minimize the chance of static electric shock install a grounding strap on the abrasive blaster and only use static dissipating blast hose.

⚠ WARNING

Longer blast hoses require longer time to dissipate the blast stream when the deadman is released to end the blast operation. This extended dissipation time increases the risk of injury should there be an accidental loss of control of the blast hose.

Note: To reduce operator fatigue a blast whip hose can be used along with the blast hose. A whip hose is thinner wall and lighter weight hose. Consult an Authorized Schmidt® distributor.

5.15 Blast Nozzle

The blast nozzle (#11) is an important part of the blast operation since the size of it determines the air flow and abrasive requirement. The amount of air flow and abrasive determine how quick blasting can be done. The larger the nozzle, the more air and abrasive will be needed. The larger the nozzle size the greater the blast productivity. However, for a fixed amount of air supply, increasing the nozzle size will reduce the blast pressure. For best performance the blast pressure must be maintained as high as possible. Therefore, select the nozzle size based on the amount of air available and then adjust the abrasive flow at the Thompson Valve as needed.

The nozzle size is indicated by a small number on the outside. This number represents the nozzle throat diameter in sixteenths of an inch; for example, a #5 nozzle has a throat diameter of 5/16". See the tables in Section 13.0 for approximate air and abrasive consumption for each nozzle. **Note:** For the best possible mixture of air to abrasive, the blast hose and piping must be at least three times the size of the blast nozzle.

5.16 Hose Connection

All air hose, blast hose, and threaded couplings have pin holes that align when connected. To protect against accidental hose disconnections safety pins must be installed through these holes. As a secondary safety measure each hose connection should also include a hose whip check that will hold the hose if there is an accidental disconnection. Connect one loop to each side of the connection and stretch out as shown in Figure 5.16 below. All air hose, blast hose, and threaded couplings have a gasket that seals the connection and should be replaced when air is leaking.

⚠ WARNING

Failure to install safety pins on all air and blast hose couplings can result in hose disconnects and could result in serious injury or death.

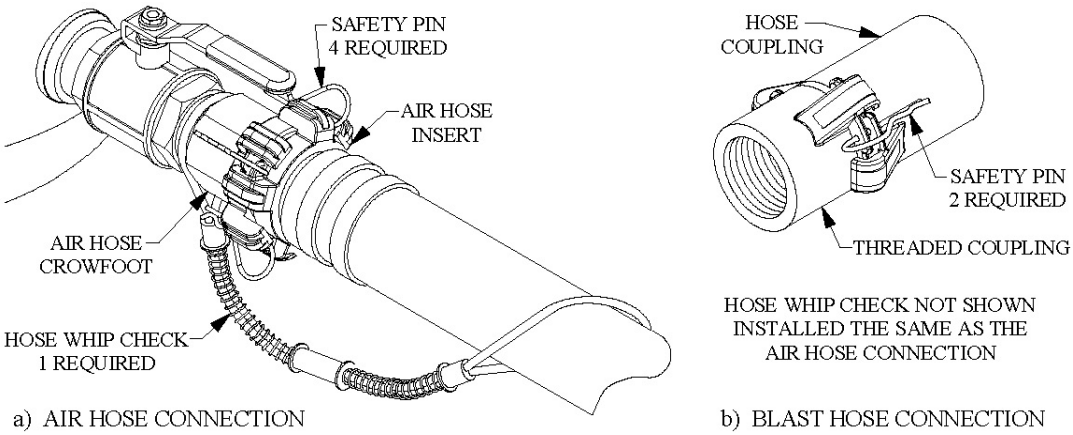


Figure 5.16 – Hose Connection Disconnect Protection

5.17 Blaster Options and Accessories

There are many options, accessories, and field conversion kits available to upgrade Schmidt® abrasive blasters. Options include union end ball valve, media screen & lid, angle flange, door interlock, air pressure regulator, blast hour meter, high flow automatic air valve, “Short Stop” blast control system, ASAP Safety System, and others. Consult Axxiom Manufacturing or an Authorized Schmidt® distributor.

For blasters equipped with special options refer to the supplemental drawing(s) included with this manual. Reference this drawing for additional part identification.

5.18 Union End Ball Valve (optional)

The union ball valve is used to block the abrasive flow to the Thompson Valve®. This allows the user to remove the Thompson Valve from the blast vessel without emptying the abrasive. Turn the union ball valve handle to the horizontal position to block abrasive flow. Loosen the nut to separate the two sections of the union ball valve and remove the Thompson Valve from blast vessel. The handle on the union ball valve can be difficult to turn; however, there are punched holes at each arm of the handle where a standard ratchet wrench can be inserted and used as leverage to open or close the valve (see Figure 5.18).

⚠ DANGER

The Abrasive blaster is a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

Note: The union end ball valve is optional and can be added to any blaster; however, some models may require extensions below the legs for field addition. Consult Axxiom Manufacturing or an Authorized Schmidt® distributor.

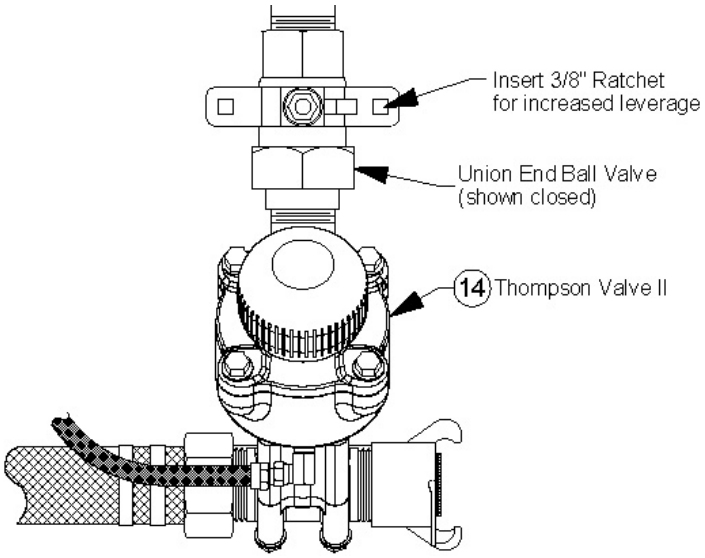


Figure 5.18 – Union End Ball Valve

5.19 Door Interlock Valve (optional for pneumatic blast controls)

A common option to an abrasive blaster for a blast room application is a door interlock control valve. The purpose of the door interlock control valve is to disable the deadman blast controls when the blast room door is opened. The air supply to the blast control valve(s) (#20) is passed through the electric door interlock valve which is energized through a switch attached to the blast room door. When the blast room door is opened the switch opens and the door interlock control valve is deactivated. When the door interlock control valve is deactivated the air supply to the deadman controls is shut off and the blast operation will stop.

The door interlock control valve is required only for abrasive blasters with pneumatic deadman controls to disable. For Blasters with electric deadman controls the power can be wired through the blast room door switch to disable the blast operation; therefore, no additional electric control valve is required. Do Not wire cycle control power through the blast room door switch.

Note: The door interlock control valve is typically double stacked in front of the cycle control valve (#43). See Figure 5.19.

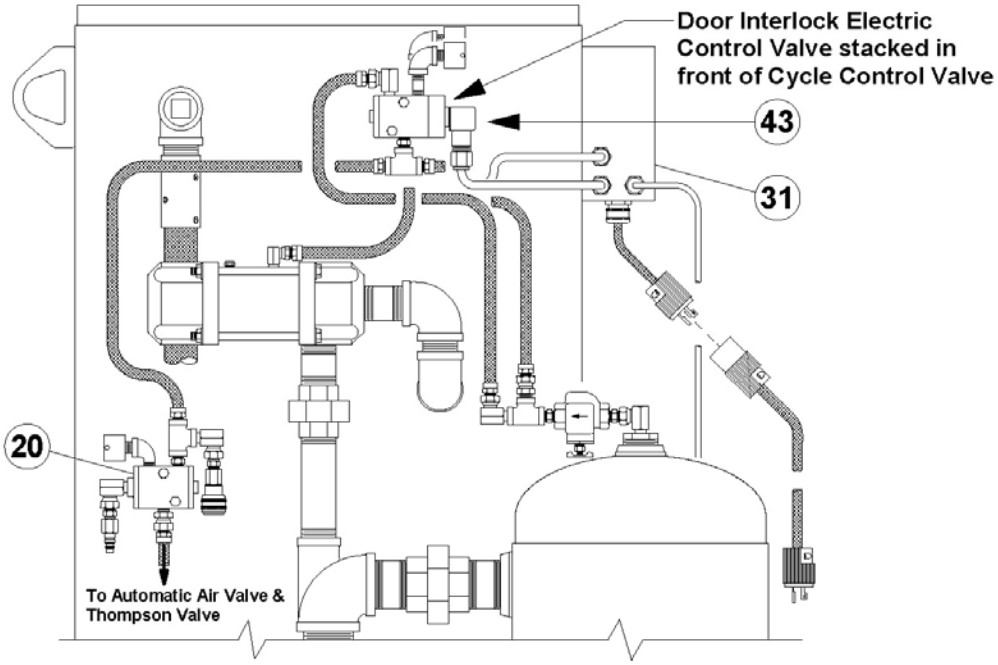


Figure 5.19 – Door interlock Control Valve

5.20 Upper Chamber Cycle Control System (abrasive transfer)

The cycle control system is what controls the depressurization and pressurization of the upper chamber using the Combo Valve® (#28). The opening and closing (cycling) of the Combo Valve is how abrasive is continually transferred from the upper chamber to the lower chamber. When the Combo valve opens it allows air flow into the upper chamber to pressurize it. When the *upper chamber pressure equals the lower chamber pressure* the lower chamber popup (#5b) will fall open and allow abrasive to transfer into the lower chamber. When abrasive transfer is complete the Combo Valve closes the upper chamber depressurizes by venting the air through the blowdown hose (#29). The lower popup (#5b) will automatically close when the upper chamber begins to depressurize. When the upper chamber is completely depressurized the upper popup (#5a) will automatically fall open and allow abrasive to refill the upper chamber. The lower chamber is constantly pressurized during normal operation. The lower chamber is depressurized by closing the inlet ball valve (#3) and then opening the blowdown ball valve (#4). Refer to Sections 5.5 and 6.2.

Note: The equaling of the pressure between the upper chamber and lower chamber is critical for abrasive transfer. If the pressure in the lower chamber is higher than the upper chamber the popup (#5b) will not fall open. Refer to Figure 5.20(b). Refer to Section 11.4 for troubleshooting the cycle control system and abrasive transfer problems. **Critical:** Inadequate air supply causes the majority of double chamber operational problems. Refer to Section 3.0 for information regarding air supply evaluation.

The cycle control of the Combo Valve uses a solenoid control valve (#43) which is automatically operated by the cycle control system. There are two types of cycle control systems commonly used; a repeat cycle timer control (#31), or a level sensor (#32) with timer cycle control system (#31). Figure 5.20(a) shows the stages of cycling of the upper chamber and how abrasive is transferred to the lower chamber. **Note:** Refer to the cycle control drawing provided with this manual and the printed copy that is inside the system control box (#31). This drawing details the type of cycle control system provided with the abrasive blaster. This drawing also provides additional information on the cycle control system.

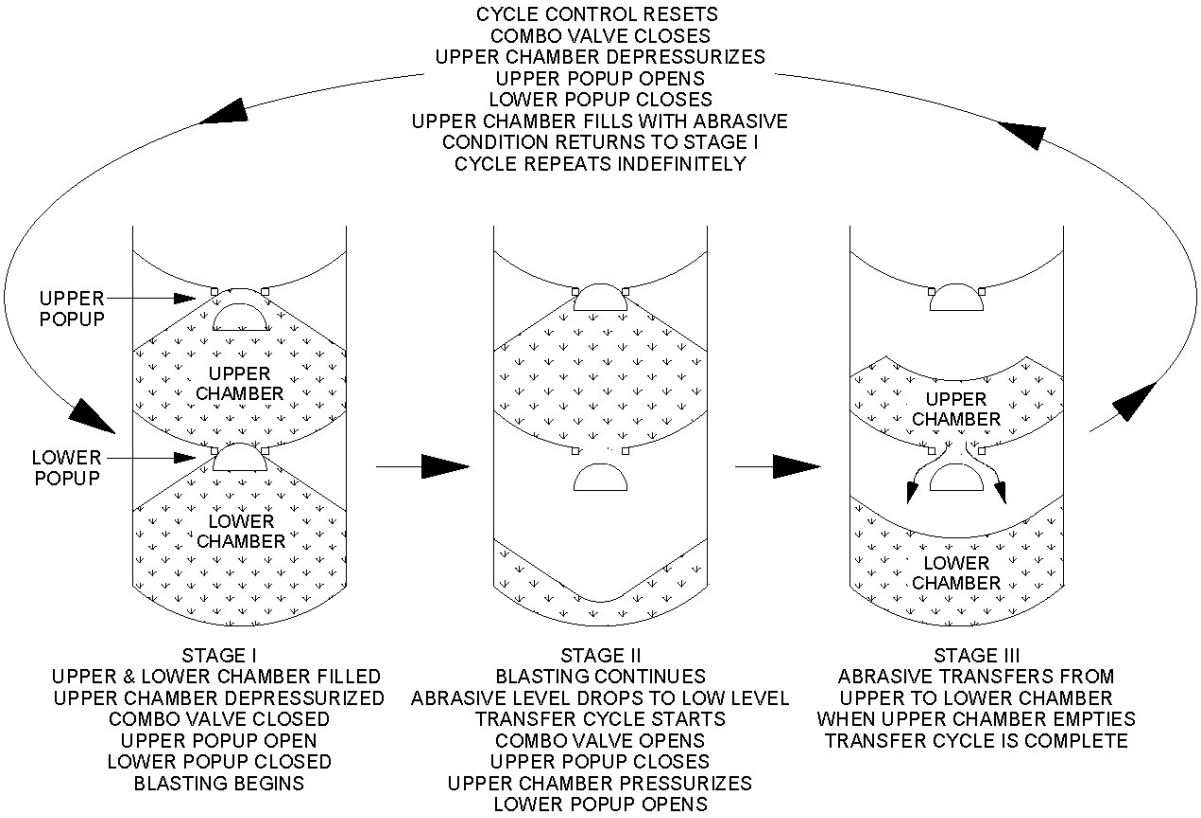


Figure 5.20(a) – Double Chamber Cycle Sequence

⚠ CAUTION

Inadequate air supply will prevent proper operation of the double chamber abrasive transfer cycle and can result in equipment damage. Evaluate air supply system per Section 3.0.

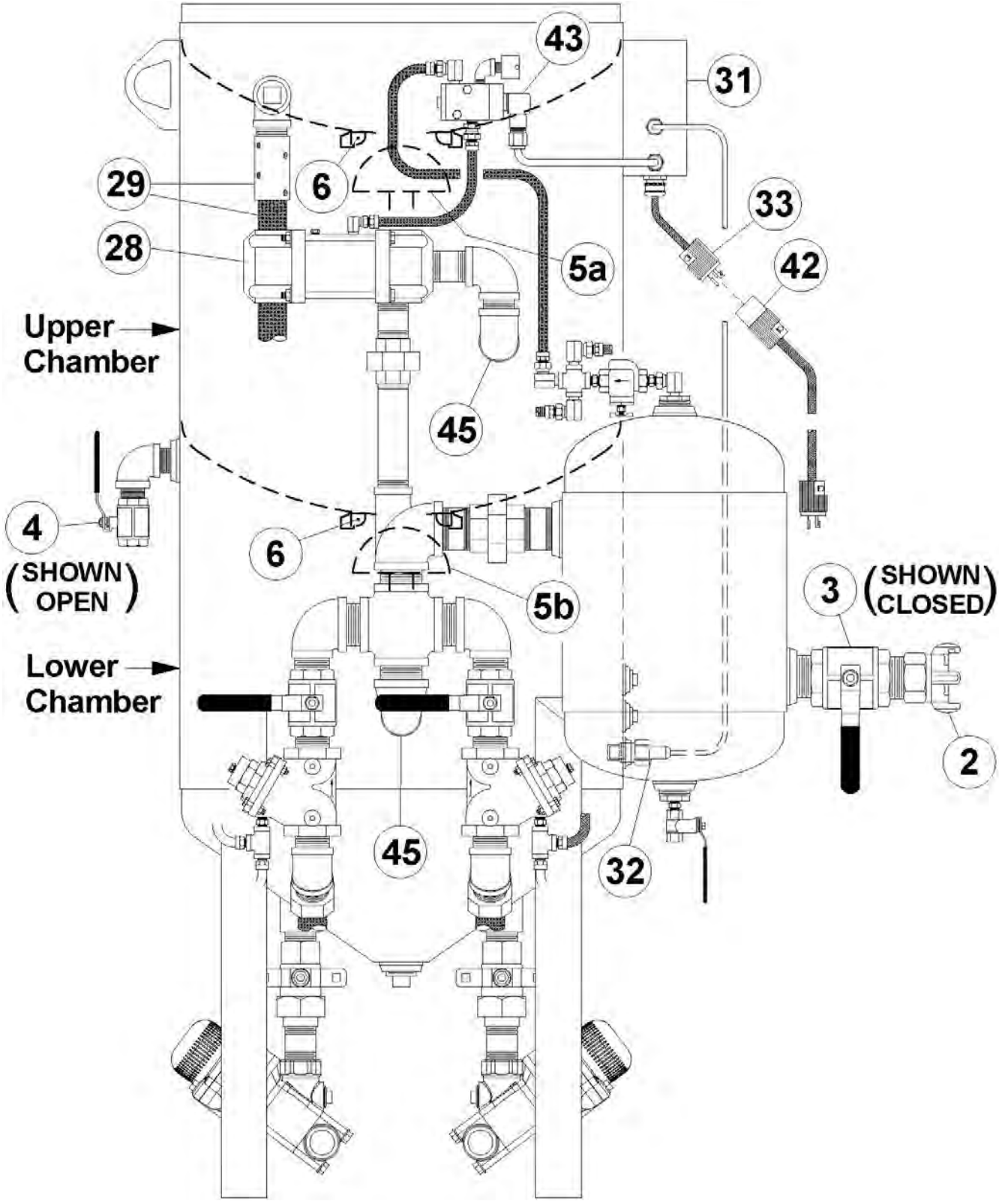


Figure 5.20(b) – Double Chamber Cycle Control Components

5.21 Repeat Cycle Timer Control System

The basic type of cycle control is the repeat cycle timer control system. In this system the Combo Valve® cycling is controlled by a simple on/off timer. The repeat cycle timer control system opens the Combo Valve and pressurizes the upper chamber for a set time “Ton”. During the “Ton” time abrasive transfers to the lower chamber. When timer times out it switches to “Toff” and the Combo Valve will close. The upper chamber will now be depressurized for the set “Toff.”. During the off time (“Toff”) abrasive refills the upper chamber and the upper chamber remains depressurized until the timer “Toff” times out and the cycle repeats.

Transfer Time: The “Ton” time is the amount of time required to pressurize the upper chamber and for the abrasive to transfer to the lower chamber.

Fill Time: The “Toff” time is the period when the upper chamber is open and refills with abrasive. More importantly the “Toff” is the estimated time required for the abrasive in the lower chamber to be used. “Toff” is dependant on the actual blast time, nozzle size, and the number of nozzles. Using these values and the Abrasive Consumption Table in Section 13.2 the abrasive usage can be calculated. For best operation the transfer cycle should be started when the abrasive level is low enough for there to be enough empty volume for the abrasive in the upper chamber to be transferred completely. If there is some abrasive remaining in the upper chamber after the “Toff” time ends there is a possibility that the lower popup will not seal properly when the upper chamber depressurizes. The set “Toff time must be determined in the field based on the abrasive usage. **Note:** Refer to the cycle control drawing provided with this manual and the printed copy that is inside the system control box (#31).

The “Toff” time and “Ton” time periods are set by adjustable dials on the face of the timer. Both times include seven selectable timing ranges of 10 units each: 0.1-1, 1-10, and 6-60 seconds, 1-10 and 6-60 minutes, or 1-10, and 10-100 hours. Then the second dial sets the quantity of the selected timing range units that will total up to equal the “Ton” and “Toff” durations. For example if the “Ton” timing range dial is set to 1-10min. and then the duration dial is set to 5, the “Ton” duration will equal 5 minutes. See Figure 5-21.

Note: Double chamber blaster equipped with repeat cycle timer control systems can be field converted to the more efficient level sensor with timer control system (See Section 5.22). Consult Axxiom Manufacturing or an Authorized Schmidt® distributor.

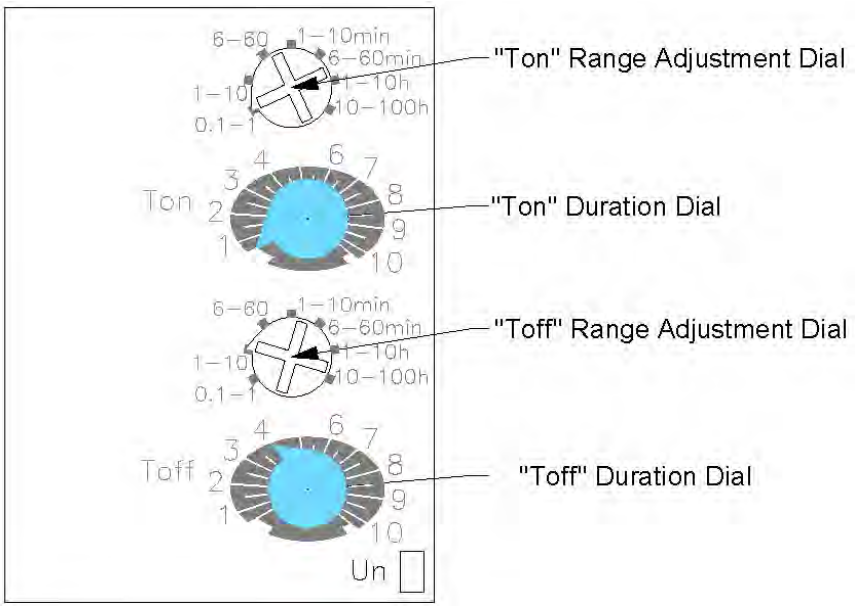


Figure 5.21 – Repeat Cycle Timer Detail

5.22 Level Sensor with Timer Cycle Control System

The most commonly used cycle control is the level sensor with timer cycle control. The level sensor with timer cycle control system is more efficient because it cycles the Combo Valve® only when abrasive is needed in the lower chamber. In this system the abrasive transfer cycle is started when the abrasive level of the lower chamber drops below the level sensor (#32). When the abrasive level drops below the sensor it will signal the control system (#31) to start the transfer cycle. The system timer starts and signals the Combo Valve to open and pressurize the upper chamber. During this "Output On" time abrasive transfers to the lower chamber. When timer times out it switches to "Output Off" and the Combo Valve will close. During this "Output Off" time abrasive refills the upper chamber and it will remain depressurized until the abrasive level again drops below the level sensor (#32) and the cycle repeats.

The "Output On" time period is the time required for the upper chamber to pressurize and for the abrasive to transfer from the upper to lower chamber. This time depends on the volume of the double chamber blaster. The timer is factory set at 5 minutes, but can be field adjusted if necessary. See Section 5.22.2 for details on the timer operation. **Note:** Refer to the cycle control drawing that is inside the system control box (#31).

5.22.1 Level Sensor: The level sensor (#32) is used in the optional "level sensor and timer cycle controls." The purpose of the level sensor is to start the abrasive transfer cycle by detecting when the abrasive level is low. The cycle control will initiate a transfer cycle only when the level sensor becomes uncovered. **Note:** There are three tank couplings for positioning the level sensor at different levels. Adjustment may be necessary due to varying characteristics of the blast abrasive.

There are various types of level sensors that are used; radio frequency (RF), vibratory, and capacitive. The most commonly used is the capacitive type. A capacitive sensor in simple terms is an electrical device with an electrical characteristic that is changed when an object is placed within its sensing field. When an object (abrasive) moves within the sensing field (or leaves the sensing field) it changes the electric capacitance of the sensor and an output signal is sent to a relay in the cycle control box (#31).

All level sensors are either normally open or normally closed output, or can be switched to either type. The double chamber level sensor system uses a normally closed sensor. Normally closed means that in the normal state (no object detected) the sensor contact will be closed and will create an output signal. Therefore, when abrasive is covering the sensor the contact will be open. When the abrasive level drops below the sensor the contact will close and send an output signal to energize a relay in the cycle control box (#31). The relay then starts the cycle control timer.

Capacitive and radio frequency level sensors include a sensitivity adjustment that may require adjustment at the time the blast tank is placed into service. The sensor may give a false "covered" state by detecting falling abrasive during the transfer cycle or by detecting residual abrasive dust on the sensor surface. Refer to the manufacturers' installation and calibration procedures included with this manual. **Note:** Check the electrical drawing inside the cycle control box (#31) for the operating voltage of the level sensor and the cycle control system.

Radio frequency (RF) and capacitive level sensors include a small LED indicator that will light when the output contact closes. Therefore, since the level sensor is normally closed, the LED will be off when the sensor is covered with abrasive. The capacitive sensor led is visible on the side wall slightly past the end of the plastic mount well threaded into the blaster pressure vessel. The RF indicator is located on the circuit board and is only visible by removing the threaded cover on the body of the sensor.

5.22.2. Universal Timer: The timer used in the level sensor with timer cycle control system is a multi-function timer with various modes of operation. Timer Mode "D" is used with the level sensor with timer system. The mode must not be changed from the factory setting. Refer to the electrical drawing provided with this manual and the printed copy inside the cycle control box (#31).

The face of the timer has five wheels; the first on the left sets the timer mode. The next three wheels set the timer duration from 1 to 999. The last wheel furthest on the right is to set the timing units; i.e. seconds, minutes, hours, etc. Above and below each wheel is a button to scroll the setting up or down.

At the top of the timer is the output display window that indicates the output state; "on" or "off". The digital display visually indicates the countdown of the output time as a percent remaining rolling down 100% to 0% right to left. See Figure 5.22.

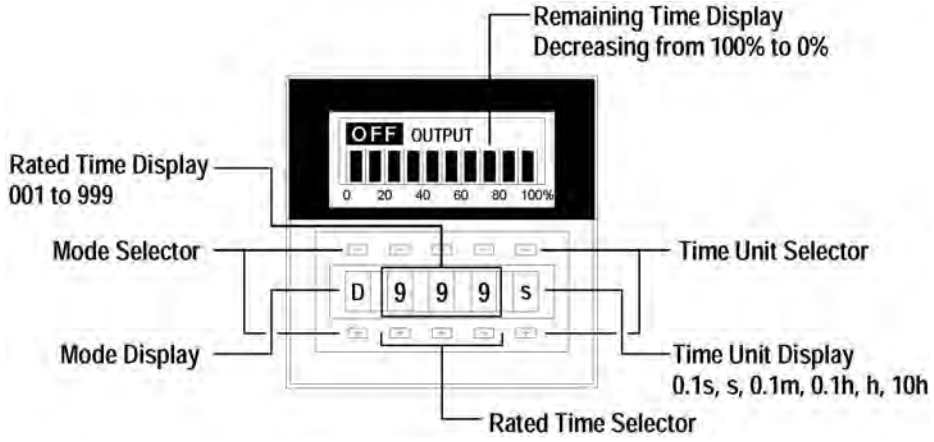


Figure 5.22 – Universal Timer Detail

5.23 Dual Outlet Blast System

The drawings in this manual reflect a double chamber abrasive with the optional second blast outlet. Double chamber blast vessels are fabricated with three abrasive outlet couplings; one center and two offset. Single outlet blast systems use the center coupling as the abrasive outlet and the two offset couplings are plugged. The double chamber abrasive blaster can be purchased as dual outlet or single outlet and later field converted to dual outlet blasters. Consult Axxiom Manufacturing or an Authorized Schmidt® distributor.

When converting a single outlet system to a dual outlet blast system it is best to relocate the single outlet Thompson Valve® from the center coupling to one of the side abrasive outlet couplings. This allows balanced abrasive use from the blast vessel. See Figure 5.23.

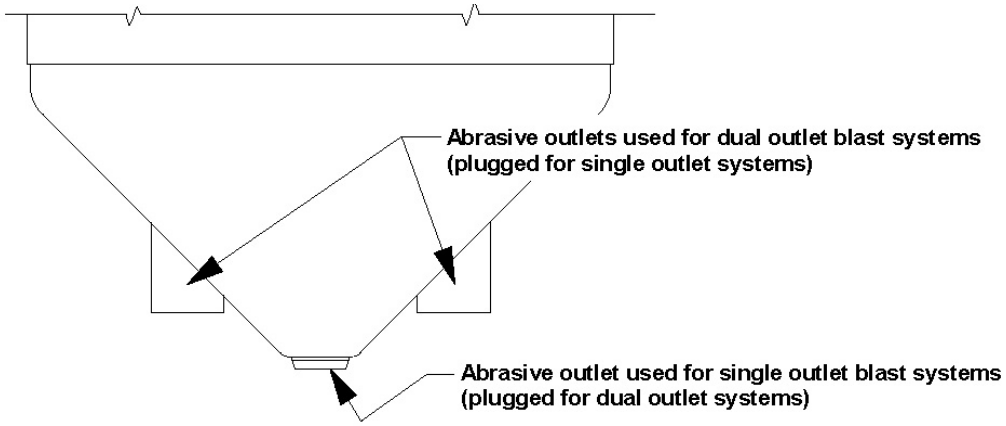


Figure 5.23 – Blast Vessel Abrasive Outlets

5.24 Chamber Air Inlet Check Valves

The upper and lower chamber air inlet piping include a swing check valve (#45) that protects against backflow of air from the blast tank. Pressure drop in the air supply upstream of the piping will cause the air pressure to flow backwards from the blast tank to equalize the system pressure (air flows from high pressure to low pressure). Backflow of air pressure is a problem in a blast system because abrasive can be carried backwards from the tank into the piping and control system. The result is that abrasive contaminates blast controls and the control valves will malfunction.

In a double chamber blaster backflow is more likely because of the cycling of the upper chamber. When the Combo Valve opens to pressurize the upper chamber there is a momentary pressure drop that will cause backflow from the lower chamber. The check valve protects against the backflow of air. See Figure 5.20(b) and 5.24.

Double chamber blasters are more prone to problems caused by inadequate air supply because of the possibility of an upstream pressure drop during the fill cycle. The result is that the lower chamber can be at a higher pressure and will prevent the lower popup from opening when the upper chamber pressurizes. To help in this situation there is a small hole drilled into the lower chamber check valve flapper disk to allow some backflow of air for system pressure equalization. However; this modification will not cure extreme cases of inadequate air supply. **Note:** Upper chamber check valve does not require drilled hole.

Extreme cases of high pressure drops will cause premature failure of the check valve which will allow abrasive to be carried into the control system and blaster piping. This abrasive can then be blown back into the blast vessel and cause costly internal wear damage. Periodic inspection of the check valve internal components is necessary to protect against equipment damage. **Note:** It is extremely important to have sufficient air and minimal pressure drop within the blast system for dependable operation. Refer to Section 3.0 for information regarding air supply.

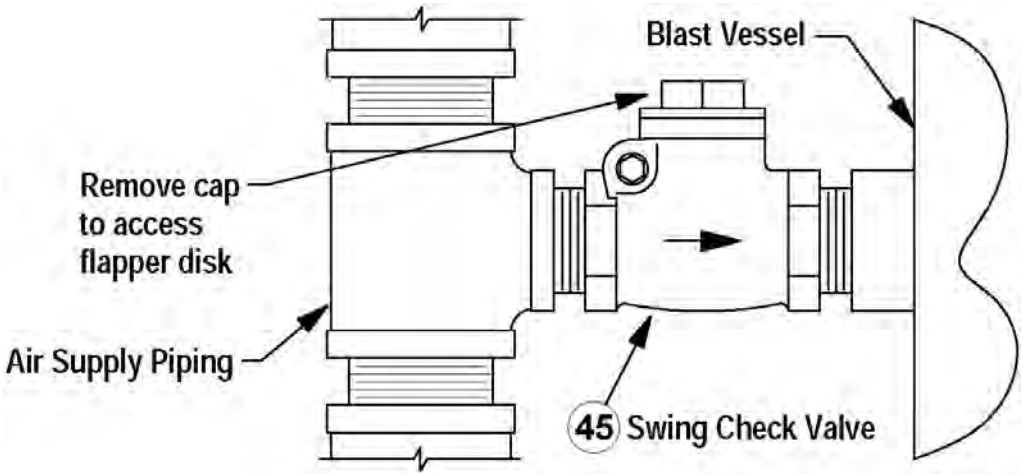


Figure 5.24 – Chamber Air Inlet Check Valve

⚠ CAUTION

Inadequate air supply can cause check valve failure and result in costly equipment damage. Refer to Section 3.0 for information regarding evaluation of air supply. Periodically disassemble the check valve and inspect for faulty components. See Section 8.15.

6.0 Pre-operation Procedures

⚠ DANGER

Failure to follow the procedures below could result in serious injury or death. Also completely read and understand all sections of this *Abrasive Blaster Operation and Maintenance Manual*.

⚠ DANGER

The Abrasive Blaster is a pressurized vessel. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

6.1 Abrasive Blaster Setup Procedure (see Figure 6.2(a) and 6.2(b))

6.1.1. Print and follow the steps listed on the *Installation Checklist* in Section 3.12.

6.1.2. Static electricity is generated by the abrasive flow through the blast hose. To minimize the chance of static electric shock to operating personnel only use static dissipating blast hose and install a grounding strap on the abrasive blaster.

⚠ CAUTION

Static electric shock hazard. To minimize the chance of static electric shock install a grounding strap on the abrasive blaster and only use static dissipating blast hose.

6.1.3. Do Not operate this equipment without a pressure relief device in place. The ASME Code requires that all vessels be provided with pressure relief devices. See Section 3.11.

⚠ DANGER

Rupture Hazard. Operating the pressure vessel above the maximum allowable working pressure can result in rupturing the pressure vessel. Install an air pressure relief valve to protect against over pressurization of the blast vessel. See Section 3.11.

6.1.4. Make certain that the abrasive blaster is not pressurized. Follow the depressurizing procedure given in Section 6.2.

⚠ WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

6.1.5. Properly install the handway covers (#22) and gaskets (#34). See Section 6.3.

6.1.6. Verify that all required personal protective equipment is available for each operator and in good operating condition (safety glasses, safety shoes, ear plugs, gloves, airline filter, respirator, & carbon monoxide monitor). *Critical: Adhere to all local, state, and federal regulations including, but not limited to, OSHA (Occupational Health and Safety Administration). Pay close attention to requirements regarding breathing air quality. When an oil-lubricated air compressor is used, additional requirements for a high temperature alarm and/or a carbon monoxide monitor become necessary. See Sections 3.9 and 3.10.*

⚠ WARNING

Failure to use personal protective equipment could result in serious injury or death.

6.1.7. Hose clamp the deadman (#12) to the blast hose assembly in a comfortable position behind the nozzle holder (#25).

6.1.8. Wire tie the twinline hose (#15) or electric deadman extension cords to the blast hose assembly (#10).

6.1.9. Screw nozzle (#11) into the nozzle holder (#25) at end of the blast hose assembly (#10).

6.1.10. Connect the blast hose coupling (#26) to the threaded coupling (#27) on the abrasive metering valve (#14). Then install safety pins (#39) and a hose whip check (#40) to protect against accidental disconnections during operation. See Sections 5.16, and 8.7.

⚠ WARNING

Failure to install safety pins on all blast hose couplings can result in hose disconnects and could result in serious injury or death. See Sections 5.16 and 8.7.

6.1.11. Connect the twinline hose quick disconnects (#18 & #19) or the electric deadman extension cord to the mating disconnects on the abrasive blaster piping (#16 & #17).

⚠ WARNING

On multi-outlet blasters confirm connection will operate the corresponding blast outlet.

6.1.12. Connect a 150 psi rated (minimum) air supply hose to the air inlet crowfoot (#2) and install safety pins (#39) and a hose whip check (#40) to protect against accidental disconnections during operation. See Section 5.16 and 8.7.

⚠ WARNING

Failure to install safety pins on all air hose couplings can result in hose disconnects and could result in serious injury or death. See Section 5.16 and 8.7.

6.1.13. Connect the power cord (#42) to the control box connector (#33). See Figure 6.1.

6.1.14. Connect the electric power cord (#42) to the 120Vac or 12Vdc power source (refer to the electrical drawing provided inside the control box (#31) for the correct power requirements. **Note:** 120Vac to 12Vdc Power converter kits are available for field installation. Consult Axxiom Manufacturing or an Authorized Schmidt® distributor.

⚠ CAUTION

Electric shock hazard. Abrasive blasters with electric deadman blast control systems must operate on low voltage supply (12-24 volts). To minimize shock hazard only use low voltage sources and use caution when connecting the power to the abrasive blaster. See Section 3.7.

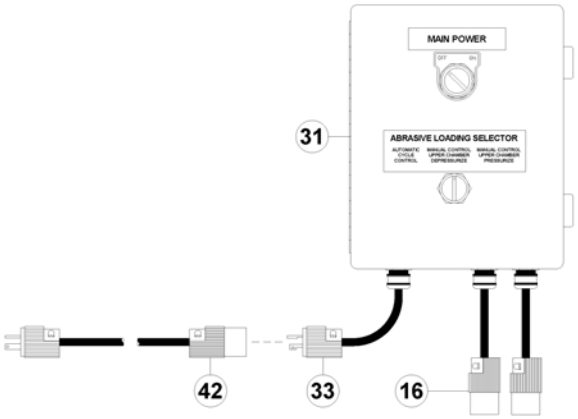


Figure 6.1 – Electric power connection

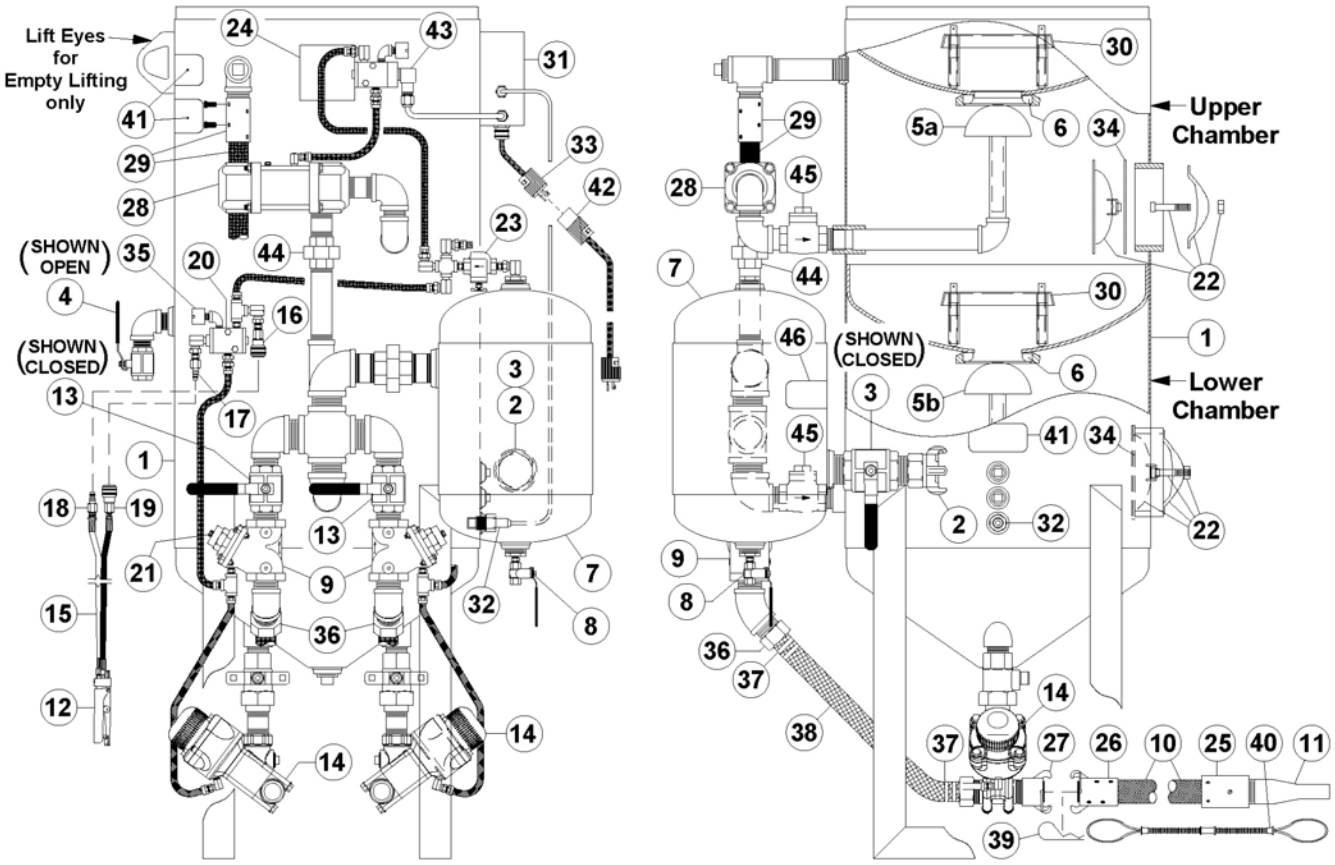


Figure 6.2(a) – Double Chamber Abrasive Blaster with pneumatic blast controls

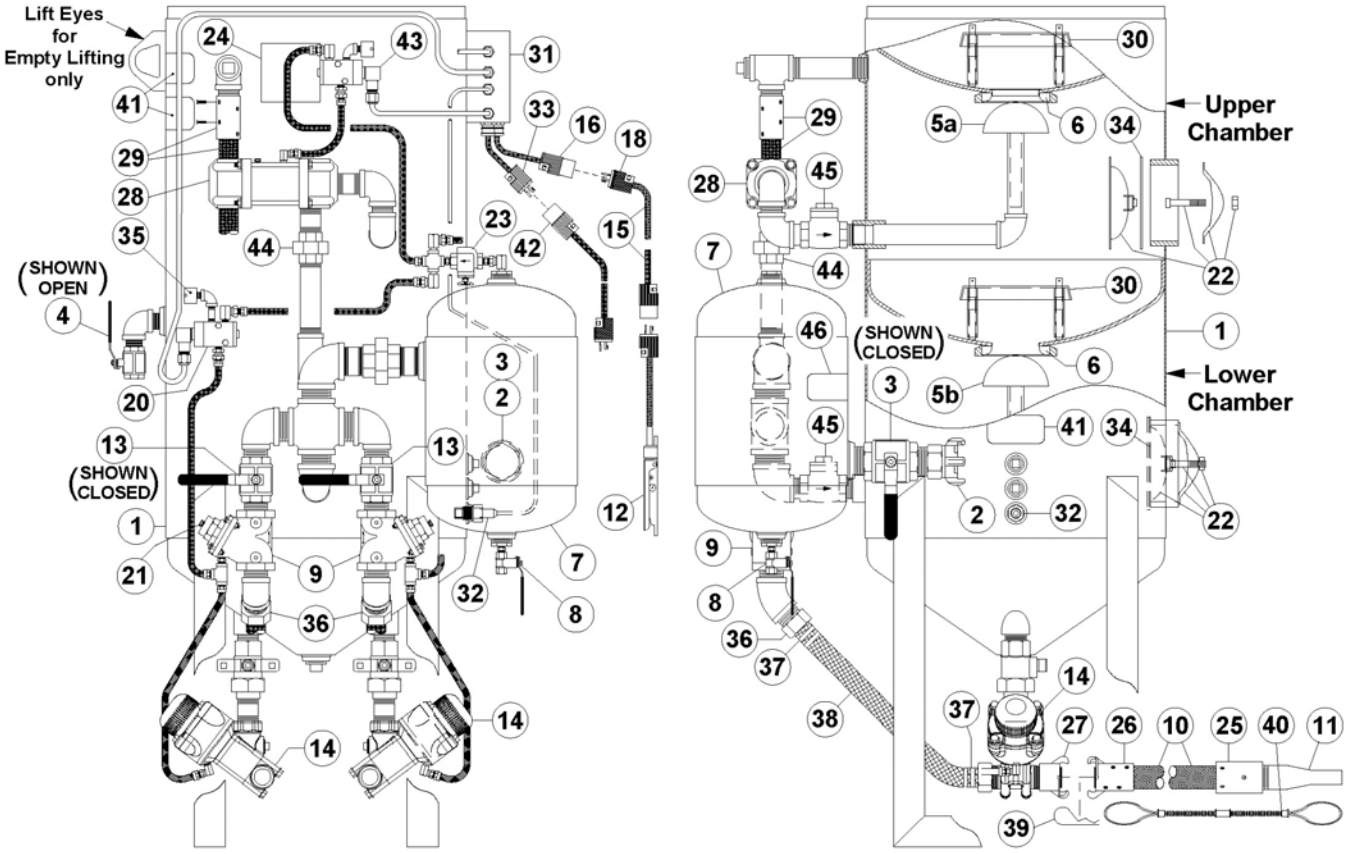


Figure 6.2(b) – Double Chamber Abrasive Blaster with electric blast controls

6.2 Double Chamber Abrasive Blaster Depressurizing Procedure

⚠ CAUTION

Do not leave the abrasive blaster pressurized during long periods of no usage. Undetected air leaks can cause costly wear damage to the pressure vessel (i.e. at abrasive inlet and handways).

6.2.1 Disable cycle control system by setting the control box (#31) main power switch to the "off" position. This will close the Combo Valve and depressurize the upper chamber. Then disconnect power cord (#42).

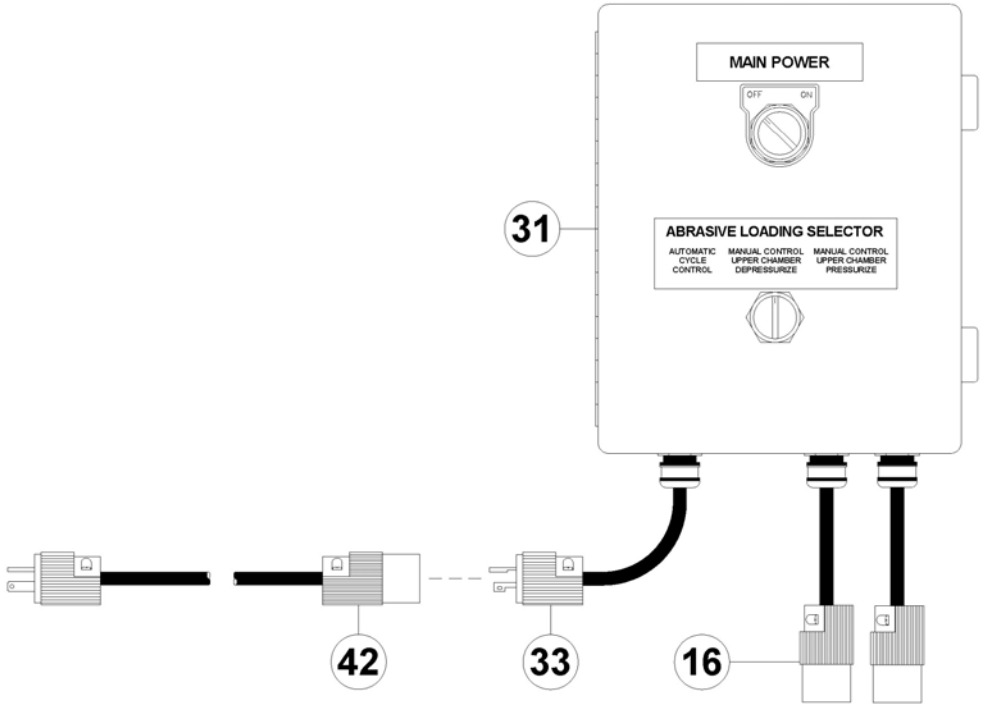


Figure 6.2 – Cycle Control Box

6.2.2. Close the air inlet ball valve (#3). The ball valve is closed when the handle is fully turned to the position shown in Figure 6.2(a) (handle perpendicular to body). The handle tab will bottom against the ball valve body in the closed position.

6.2.3. Slowly open the blowdown ball valve (#4). As the blowdown ball valve (#4) is opened air pressure inside will exhaust out and depressurize the vessel lower chamber (#1).

⚠ WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

6.2.4. The double chamber blast vessel (#1) is completely depressurized when the air inlet ball valve (#3) is closed and the blowdown ball valve (#4) is open with no airflow from it. The both the upper chamber and lower chamber popup (#5a & #5b) will fall open when the blast vessel is completely depressurized.

⚠ WARNING

When depressurizing, abrasive can be blown out of the blast vessel and into the face and eyes of the operator when the popup opens. Wear OSHA approved safety glasses. See Section 3.10.

6.3 Handway Cover Installation Procedures (See Figure 6.3(a))

6.3.1. Check that the handway cover, crab, bolt, and gasket are dimensionally correct for the size handway weld ring of the pressure vessel.

a) Measure and write down the inside dimensions “A” and “B” of the handway weld ring. See Figure 6.3(a).

b) Verify the size of the handway assembly by comparing the weld ring measurements from step “a” to the dimensions shown in Table 6.3(c).

c) Verify that the dimensions of the cover, crabs, bolts, and gasket match the corresponding dimensions given in Table 6.3(c). **Note:** The actual dimensions may vary by up to 1/4" from those given in Table 6.3(c).

d) Replace any component that is not dimensionally correct. Incorrect dimensions indicate that the component is part of a different size handway assembly.

⚠ DANGER

The handway assembly is part of a Pressurized Vessel. Use of incorrect handway components will result in assembly failure. Assembly failure will propel objects causing serious injury or death.

6.3.2. Inspect the handway gasket for tears, cracks, or other wear. Replace if necessary.

6.3.3. Inspect the handway weld ring sealing surface inside the vessel. Inspect the handway cover sealing surface. Both surfaces must be smooth.

6.3.4. Place the gasket on the handway cover then fit both through the opening.

6.3.5. Place the cover and gasket in position against the inside edge of the handway weld ring. Apply a pulling force to hold in position then proceed.

6.3.6. Center the gasket on the handway weld ring.

6.3.7. Center the handway cover on the gasket.

6.3.8. Center the handway crab on the outside weld ring.

6.3.9. Slide the handway crab bolt to the inside edge of the slot before tightening. See Figure 6.3(a).

6.3.10. When all components are centered and the crab bolt is bottomed in the slot, tighten the nut onto the bolt with a wrench until snug.

6.3.11. Only after completing all the pre-operation procedures in Section 6.0 and the abrasive blast vessel is then pressurized, re-tighten the nut with a wrench until snug again.

6.3.12. Do not over-tighten the crab nut and bolt. Over-tightening could bend the crab out of shape resulting in malfunction of the assembly.

6.3.13. Periodically check for leaks.

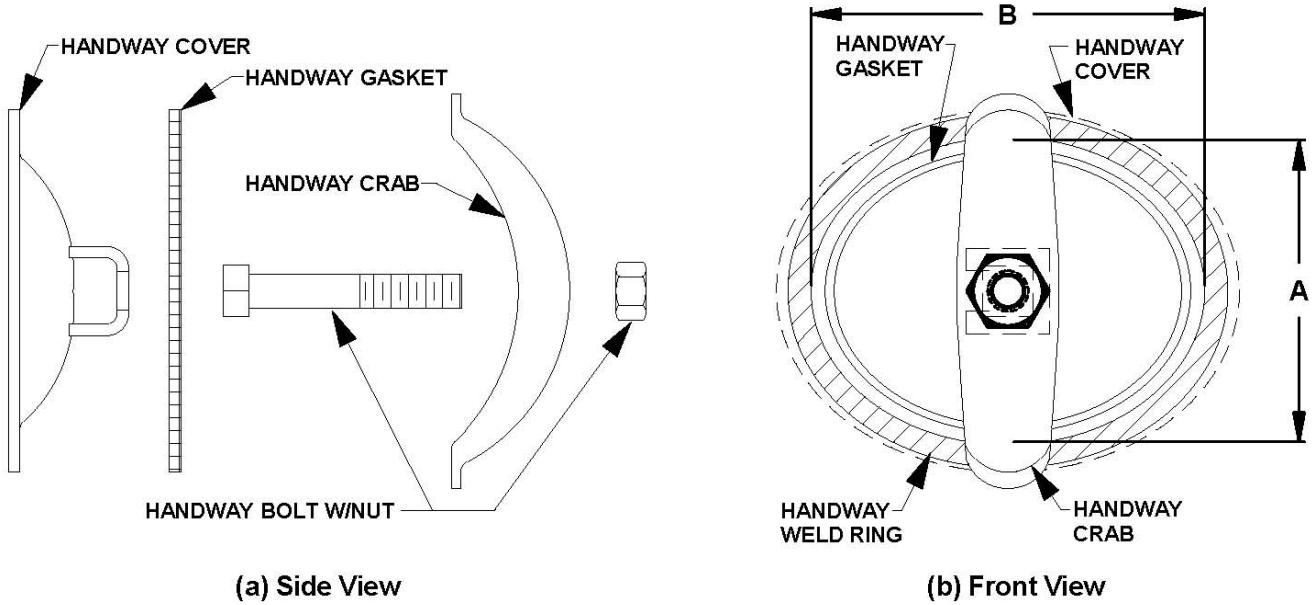


Figure 6.3 (a) – Handway Assembly

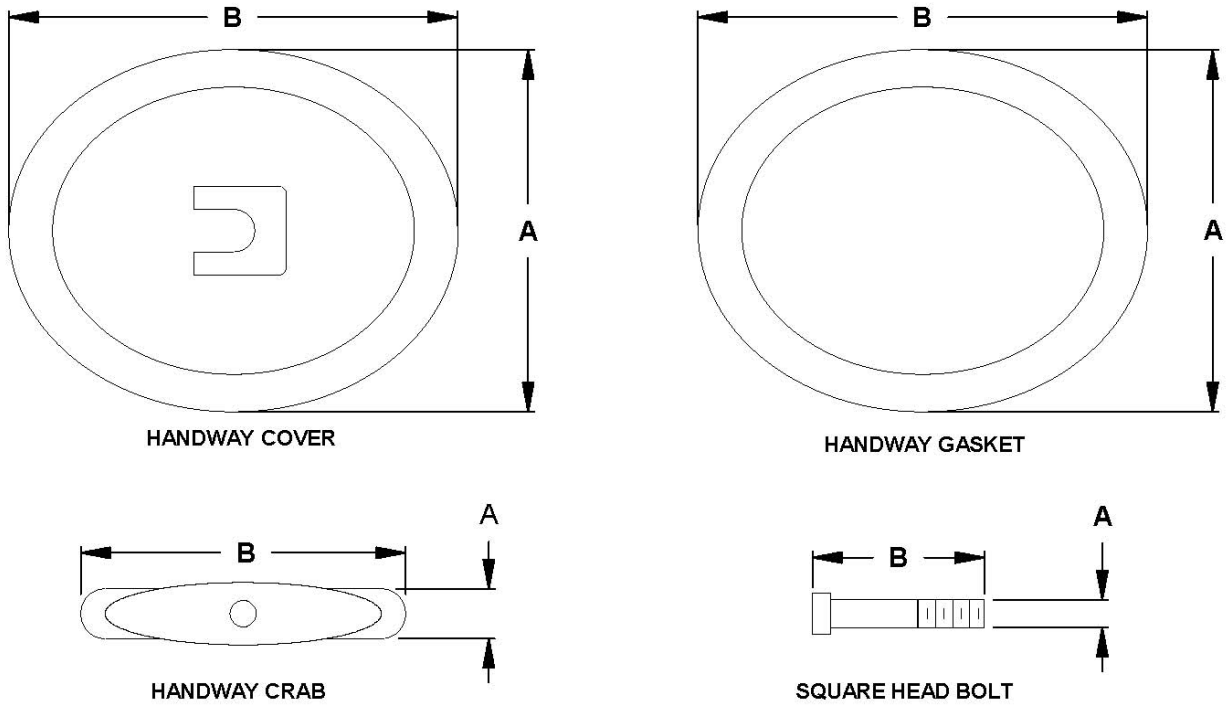


Figure 6.3 (b) – Handway Components

6” x 8” Handway Dimensions		
Component	A	B
Weld Ring	6-5/8”	8-1/2”
Handway Cover	7-11/16”	9-7/8”
Handway Gasket	7-3/4”	9-3/4”
Handway Crab	2-3/8”	8-3/4”
Square Head Bolt	3/4”-10 UNC	4-1/2”

Table 6.3 (c) – Handway Component Dimensions

7.0 Operating Instructions

7.1 Filling the Abrasive Blaster with Abrasive

7.1.1. The abrasive blaster must be completely depressurized before filling with abrasive. Follow the depressurizing procedure in Section 6.2. Disable the blaster by closing the air inlet ball valve (#3).

⚠ WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

7.1.2. Set the control box (#31) "Abrasive Loading Selector" switch to the "Manual Control: Upper Chamber Depressurized" position.

7.1.3 Remove the vessel lid and screen to check that the upper popup (#5a) has dropped open. The open popup indicates that the upper chamber is depressurized. See Figure 7.2(a).

7.1.4. Set the control box (#31) "Main Power" switch to the "On" position.

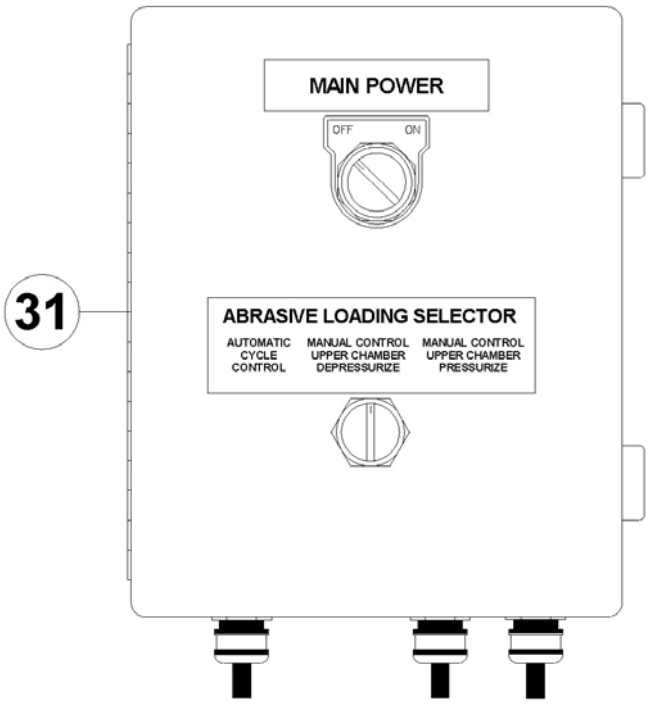


Figure 7.1 – Cycle Control Box

7.1.5. Open the abrasive hopper outlet valve and fill the blaster through the abrasive inlet (#6) with enough abrasive to cover the level sensor (#32). The level sensor LED indicator light will turn off when abrasive is detected. Pass recycled abrasive through the screen to remove trash. Do not over-fill the blast vessel. An excessive amount of abrasive piled above the lower chamber popup (#5b) after the blast vessel is full may prevent the popup from sealing properly. Close the abrasive hopper outlet valve when the sensor LED turns off.

Note: For blasters with repeat cycle timer control system load the bottom chamber with approximately 4.0 cubic foot of abrasive.

7.1.6. Close the lower chamber blowdown ball valve (#4).

7.1.7. Open the air inlet ball valve (#3) to pressurize the lower chamber. Check the lower chamber popup (#5b) for leaks by accessing it through the upper chamber handway.

⚠ WARNING

Pinch point hazard. Vessel pressurization will close the popup. Keep hands and fingers away from popup. Disconnect air supply prior to performing popup maintenance.

7.1.8. Re-install upper chamber handway per Section 6.3.

7.1.9. Set the control box (#31) "Abrasive Loading Selector" switch to the "Manual Control: Upper Chamber Pressurized" position to pressurize the upper chamber. Check the upper popup (#5a) for leaks. See Section 8.4 for popup maintenance information.

⚠ WARNING

Pinch point hazard. Vessel pressurization will close the popup. Keep hands and fingers away from popup. Disconnect air supply prior to performing popup maintenance.

7.1.10. Set the control box (#31) "Abrasive Loading Selector" switch back to the "Manual Control: Upper Chamber Depressurized" position to depressurize the upper chamber.

⚠ WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

7.1.11. After completing all the pre-operation procedures in Section 6.0 and 7.1 set the control box (#31) "Abrasive Loading Selector" switch to the "Automatic Cycle Control" position to initialize the upper chamber cycle control. Periodically check the popups for leaks thereafter.

7.1.12. Open the abrasive hopper outlet valve.

7.2 Beginning the Blasting Operation (See Figure 7.2(a) and 7.2(b))

7.2.1. The abrasive blaster must be properly setup and all operating personnel must be thoroughly trained before beginning the blast operation. All operators must completely read and understand all sections of this manual before beginning the blast operation. See the pre-operation setup procedures given in Section 6.0.

7.2.2. Perform the required inspections and maintenance before beginning the blast operation. See the instructions given in Section 8.0.

⚠ DANGER

The abrasive blaster is a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

7.2.3. Open the abrasive shutoff valve (optional, see Section 5.18).

7.2.4. Open the choke valve (#13). Leave the choke valve completely open at all times while blasting. Close the choke valve only for the "choke" procedure (see Section 11.3.2.). Do Not blast for long periods with the choke valve partially closed since this will cause excessive wear in the Thompson Valve (#14).

7.2.5. For initial startup the Thompson Valve® (#14) should only be partially open. Turn the valve knob clockwise to completely close, then turn counterclockwise about four turns to partially open. The best setting for the valve varies depending on abrasive type, blast pressure, and nozzle size; therefore, it may take more than one adjustment to achieve the desired air/abrasive mixture. Further adjustment can be made later as needed.

7.2.6. Close the blowdown ball valve (#4). The ball valve is closed when the handle is perpendicular to the body (See Figure 7.2(a)).

7.2.7. Slowly open the inlet ball valve (#3). This will pressurize the abrasive blaster and supply air to the deadman controls (#12 & #15).

7.2.8. Slightly open the ball valve (#8) on bottom of the moisture trap (#7) to permit moisture to continually drain during the blast operation (optional, see Section 5.4). Once each day completely open the drain valve to blow out all moisture and dirt particles.

7.2.9. Check the handways, hoses, and piping for leaks while the blaster is pressurized. Periodically check for leaks thereafter.

7.2.10. The following steps are for abrasive flow setting which may require several adjustments and testing of the blast flow. It is recommended that testing of the blast be made on a test piece so not to damage anything of value.

7.2.11. With one hand grip the blast hose assembly (#10) and with the other hand press in the deadman safety button. To begin blasting, aim the blast nozzle at the object to be blasted, then firmly press down the deadman lever (#12). Air and blast abrasive will flow into the blast hose and out of the blast nozzle (#11).

⚠ WARNING

Do not aim blast nozzle towards yourself or any person. System malfunction can cause accidental start up and result in injury to personnel.

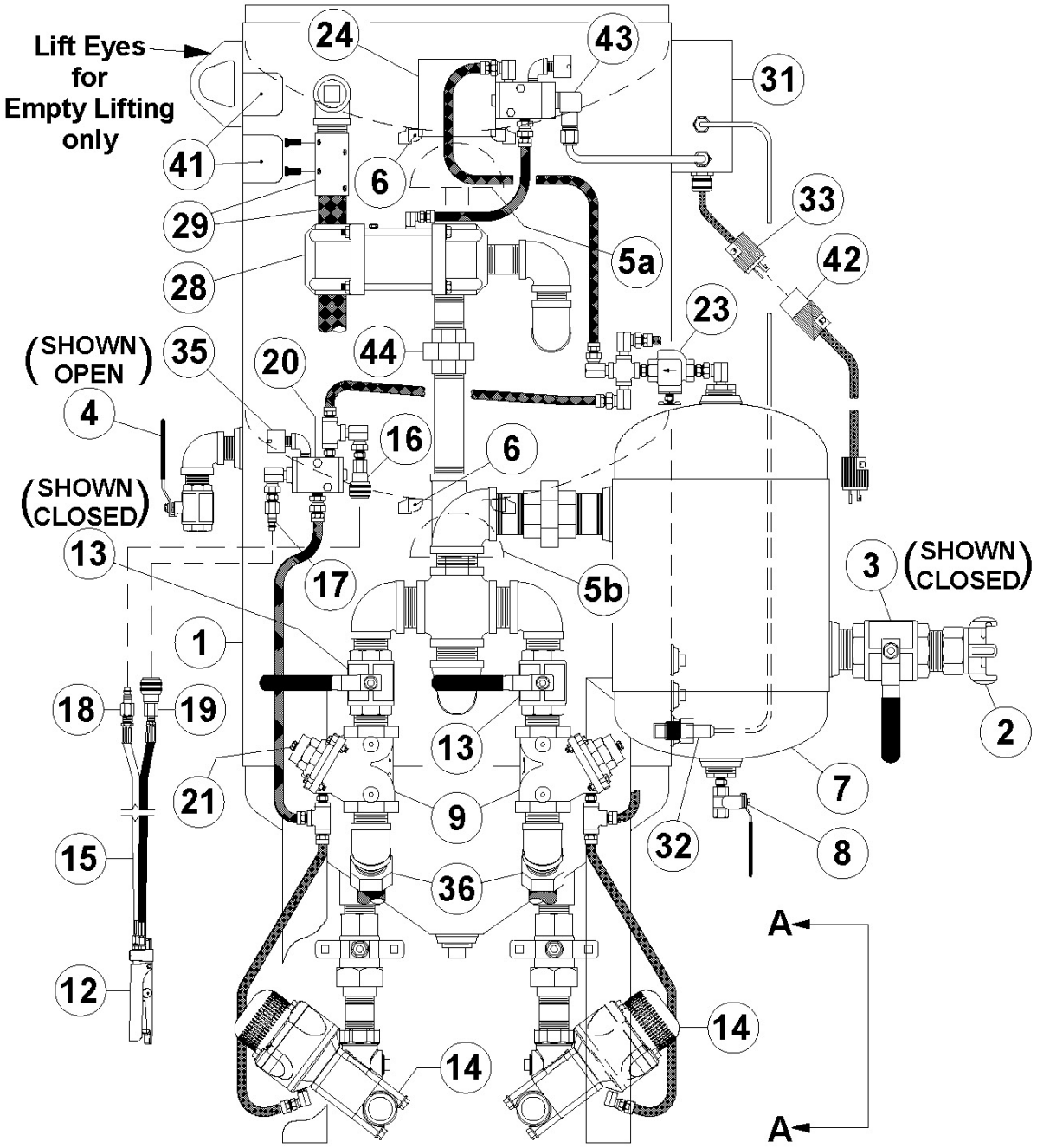


Figure 7.2(a) – Typical double chamber abrasive blaster

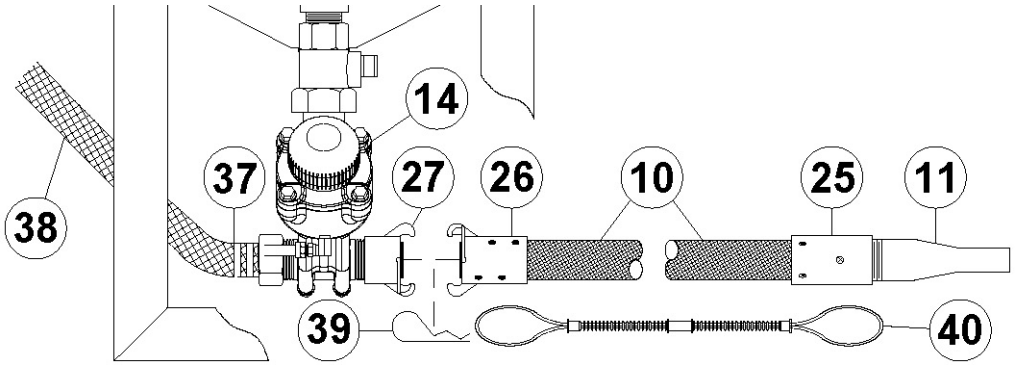


Figure 7.2(b) – Typical double chamber abrasive blaster (View A-A)

7.2.12. Observe the blast stream and the coating removal rate. A bluish color in the blast stream indicates a good abrasive to air mixture. Release the deadman lever to stop blasting.

7.2.13. If necessary adjust the abrasive flow with the knob on the Thompson Valve® (#14). Turn clockwise for less abrasive flow, or turn counter-clockwise for more abrasive. Due to the length of the blast hose there will be a slight delay in control of the abrasive flow at the nozzle; therefore, allow a few seconds before adjusting further. **Note:** If the blaster is equipped with the optional abrasive cutoff feature the switch must be set to the "on" position to blast with abrasive. See Sections 5.13, 9.3(a), and 9.3(b).

7.2.14. Note the markings on the side of the Thompson Valve II spring retainer to view the knob position relative to the abrasive flow. The markings relative to the knob can be used as reference when changing nozzle size or abrasive for different applications.

7.2.15. Re-test the blast air and abrasive mixture again on a test piece to determine is further adjustment is needed. Release the deadman lever to stop blasting. Replace screen and lid to prevent debris from entering blaster vessel.

7.3 Ending the Blast Operation (See Figure 7.3(a) and 7.3(b))

⚠ CAUTION

Do not leave the abrasive blaster pressurized during long periods of no usage. Undetected air leaks can cause costly wear damage to the pressure vessel (i.e. at abrasive inlet and handways).

7.3.1. Disable cycle control system by setting the control box (#31) main power switch to the "off" position. This will close the Combo Valve® and depressurize the upper chamber. Then disconnect power cord (#42).

7.3.2. Close the air inlet ball valve (#3). The ball valve is closed when the handle is fully turned to the position shown in Figure 7.3(a) (handle perpendicular to body). The handle tab will bottom against the ball valve body in the closed position.

⚠ CAUTION

Do not turn off the air compressor and allow the abrasive blaster air pressure to back flow through the air supply system. Back flow will carry abrasive into the moisture trap (#7) and contaminate the controls.

7.3.3. Completely open the drain ball valve (#8) at the bottom of the moisture trap (#7) to allow all the accumulated moisture to be drained out. Close the ball valve after draining.

7.3.4. Completely depressurize the abrasive blast vessel (#1) by slowly opening the blowdown ball valve (#4). See Section 6.2 for blowdown procedure.

⚠ WARNING

Airborne particles and loud noise hazard from the blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

7.3.5. For long periods of no usage remove remaining blast abrasive from blast vessel to minimize moisture contamination.

⚠ CAUTION

Steel abrasive left inside the blast vessel can be contaminated by moisture and solidify inside causing costly damage.

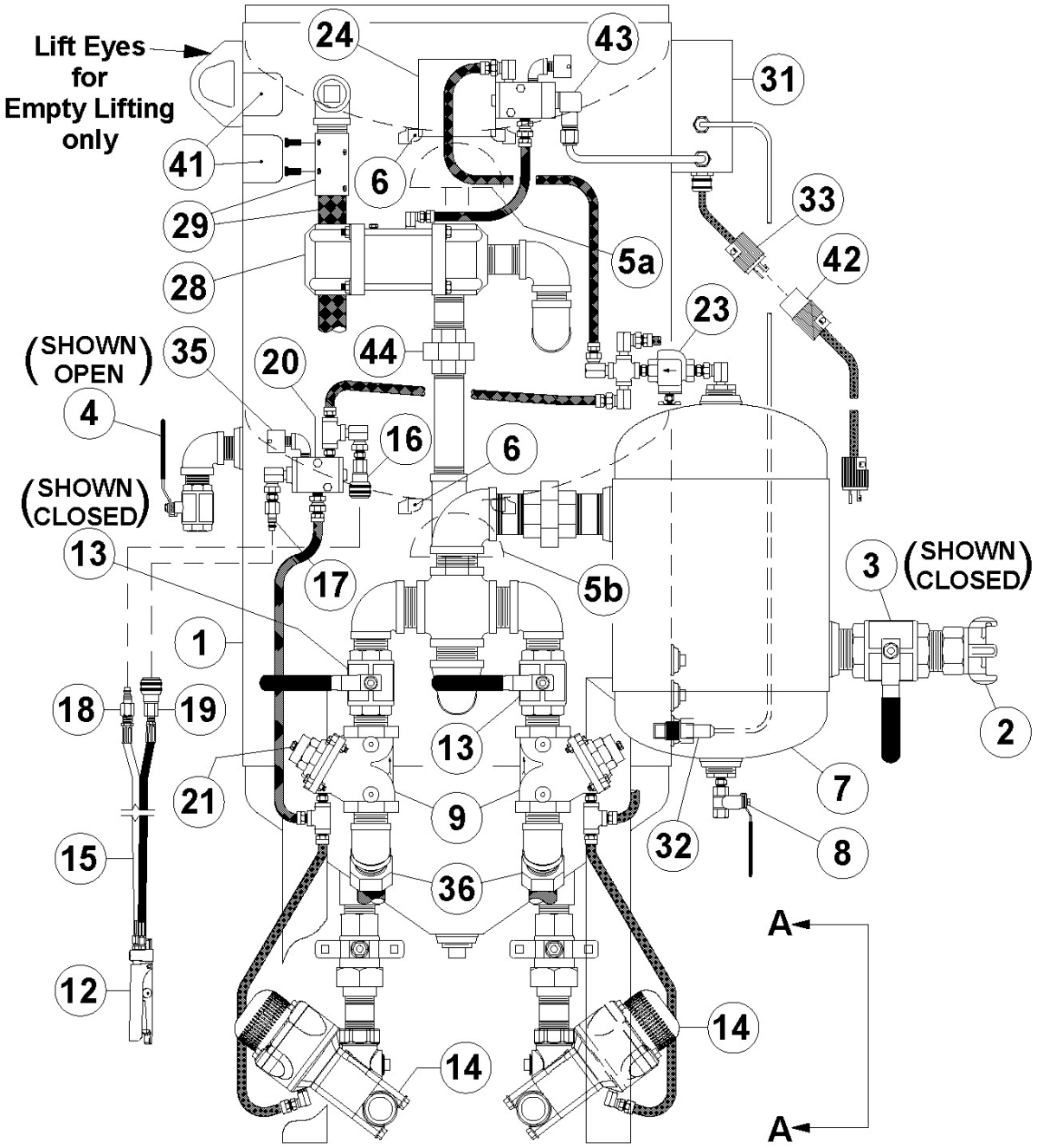


Figure 7.3(a) – Typical double chamber abrasive blaster

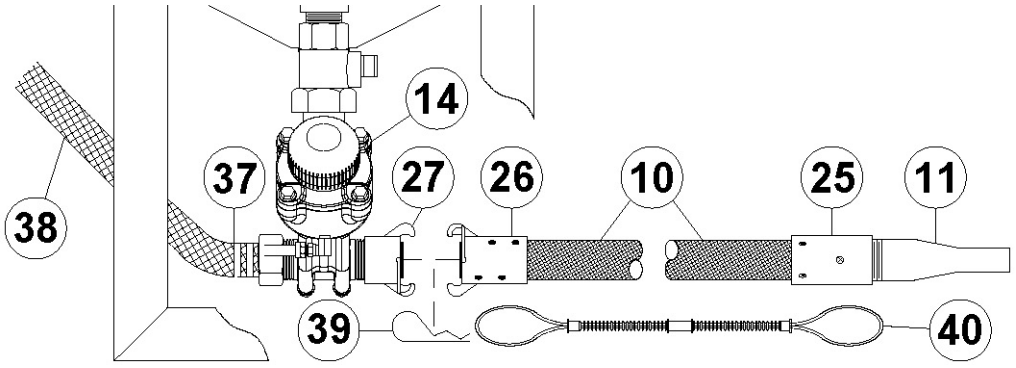


Figure 7.3(b) – Typical double chamber abrasive blaster (View A-A)

8.0 Maintenance and Inspection Instructions

⚠ DANGER

The abrasive blaster is a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

⚠ WARNING

For proper operation, maintenance should be performed with the assistance of a qualified serviceman.

8.1. ***Blaster Pressure Vessel:*** The ASME Code is a standard covering materials, design, fabrication, and installation. Vessel integrity subsequent to purchase is the responsibility of the owner and/or user. At intervals required by state law and/or local authorities, the vessel should be subjected to a hydrostatic test as described in the ASME Code, Section VIII, Division 1. Do Not subject the abrasive blaster pressure vessel to a pneumatic proof test exceeding the maximum allowable working pressure. In no case should the hydrostatic test pressure exceed 1.3 times the maximum allowable working pressure (MAWP) shown on the pressure vessel nameplate (#24). Thoroughly clean and dry the vessel before re-assembly. Moisture or debris left in vessel can cause equipment malfunction.

8.2. ***Blaster Pressure Vessel:*** Any damage to an abrasive blaster can make it unsafe. Inspect the exterior of the abrasive blast vessel daily for corrosion, pitting, or other damage (i.e. dents, gouges or bulges). If damaged, take out of service immediately and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support.

8.3. ***Blaster Pressure Vessel:*** The interior condition of the abrasive blast vessel (#1) should be inspected quarterly. Pitting caused by corrosion will reduce the wall thickness of the vessel. If excessive corrosion is found, have the abrasive blast vessel inspected by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support. Refer to the ASME Data Report for the vessel minimum thickness.

Check the pressure vessel internal piping for corrosion, cracks, and holes. See Figure 8.1.

8.4. ***Popup Assemblies:*** The popup alignment and operation is tested by the manufacturer, however vibration and creeping during shipment may cause the internal popup support piping to shift resulting in misalignment. Check the popup gap and alignment prior to initial usage and weekly thereafter.

Critical: Proper operation of the popup is critical to the operation of a double chamber abrasive blaster. Air leaks at either of the popups creates pressure unbalances and will result in improper operation of the blast function and abrasive transfer function.

An air leak at the upper popup will prevent the upper chamber from reaching full pressure; meaning that the upper chamber pressure will be less than the lower chamber pressure. This unbalance will prevent the lower popup from opening and will prevent the abrasive from transferring to the lower chamber. The blaster(s) will run out of abrasive.

An air leak at the lower popup will create a pressure unbalance (reverse differential pressure) that will prevent proper flow of abrasive to the blast outlet. The operator(s) may view this as running out of abrasive. The operator(s) also may respond to this by “choking” the outlet (see Section 11.3.2) to equalize the pressure. This will result in excessive wear to the Thompson Valve® because the abrasive is basically being blasted through the valve

Inspect the popup as follows:

a) Depressurize the abrasive blaster per Section 6.2.

b) Disconnect air supply hose from the crowfoot (#2).

c) Inspect the popup gasket (#6) and popup head (#5a/5b) sealing surfaces for wear or deformations. Replace either if necessary.

d) Check that the popup is centered within the gasket opening. If necessary, use a pry bar as a lever between the popup and gasket to deflect the internal support piping and shift the popup to the center of the gasket opening.

e) Check the popup gap (distance between the popup surface and the gasket). It should be between 5/8" and 7/8". The lower chamber popup is difficult to see; however, the gap can be felt by use of a finger as a gauge.

   If the popup is centered but an excessive gap is present it is most caused by a vertical nipple that is too short. This usually occurs only if the internal piping has been repaired or replaced. An excessive gap will expose the top of the vertical nipple to abrasive when the popup closes which could result in premature wear to the popup.

f) After checking the alignment and gap, the blast vessel can be re-pressurized and the popup is then checked for leaks. If a leak is present, repeat the above steps to isolate the problem.

⚠ WARNING

Pinch point hazard. Vessel pressurization will close the popup. Keep hands and fingers away from popup. Disconnect air supply prior to performing popup maintenance.

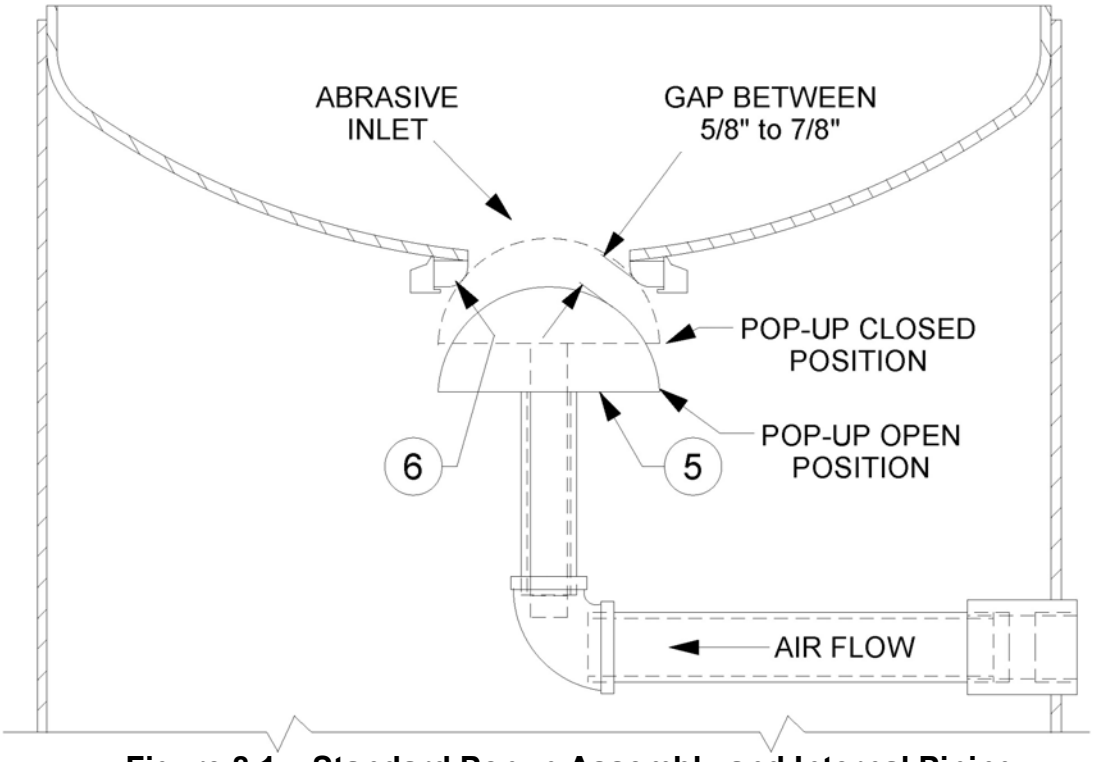


Figure 8.1 – Standard Popup Assembly and Internal Piping

8.6. ***Blast and Air Hoses:*** All air hoses, blast hoses, control hoses, and wires should be inspected daily for wear, dry rotting, cracking or leakage. Repair or replace any hoses or wires that show any signs of wear, leakage or other damage. Damaged wires and/or hoses can cause system malfunctions and can result in serious injury or death to operating personnel.

Blast hoses are a high wear component of the abrasive blast system. Sharp bends in the blast hose create high wear points resulting in soft spots that can rupture while blasting. Check the full length of the blast hose assembly for soft spots caused by wear. To protect against serious injury to personnel replace blast hoses with soft spots. **Note:** Static electricity is generated by the abrasive flow through the blast hose. To minimize chance of electric shock to operators only use static dissipating blast hose and install a grounding strap on the abrasive blaster.

⚠ WARNING

Worn blast hose assemblies can rupture while blasting and the resulting abrasive blast stream can cause serious personal injury.

⚠ CAUTION

Static electric shock hazard. To minimize the chance of static electric shock install a grounding strap on the abrasive blaster and only use static dissipating blast hose.

⚠ WARNING

Longer blast hoses require longer time to dissipate the blast stream when the deadman is released to end the blast operation. This extended dissipation time increases the risk of injury should there be an accidental loss of control of the blast hose.

8.7. ***Blast and Air Hoses:*** All air hose, blast hose, and threaded couplings have pin holes that align when connected. To protect against accidental hose disconnections safety pins must be installed through these holes. Each hose connection must also include a hose whip check that will hold the hose if there is an accidental disconnection. Connect one loop to each side of the connection and stretch out as shown in Figure 8.2 below. Check hose connections daily and replace missing or damaged pins and whip checks.

⚠ WARNING

Failure to install safety pins on all air and blast hose couplings can result in hose disconnects and could result in serious injury or death.

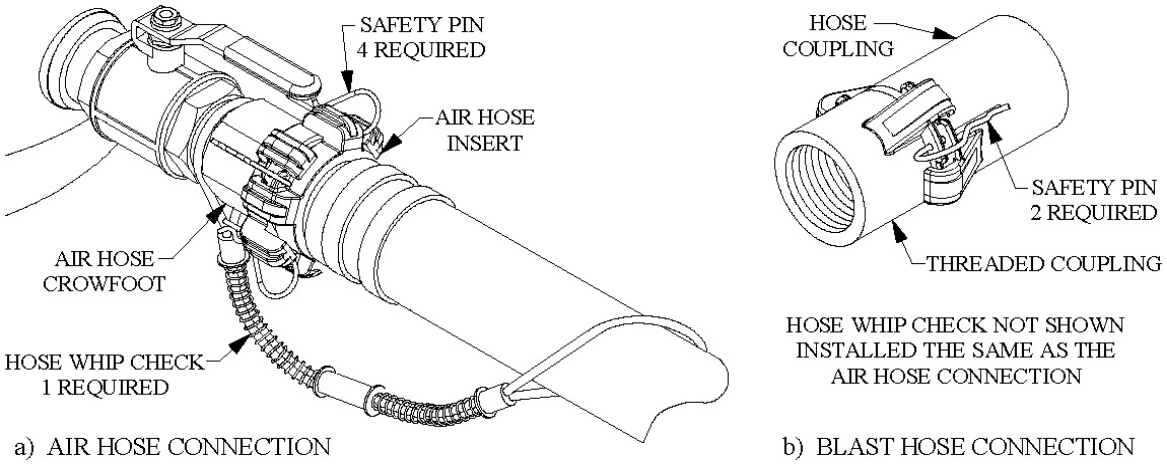


Figure 8.2 – Hose Connection Disconnect Protection

8.8. ***Blast and Air Hoses:*** All air hose, blast hose, and threaded couplings have gaskets that seal the connection. To reduce loss of air pressure and/or premature abrasive wear replace these gaskets when leaks are found. Inspect the couplings daily for leaks and wear. Replace gaskets when visible wear or leaks are found. When installing or replacing hose couplings cut the hose end square for secure fit (see Figure 8.3). To insure proper coupling connection always use fittings that are the same brand. See the drawings and part lists in Section 9.0.

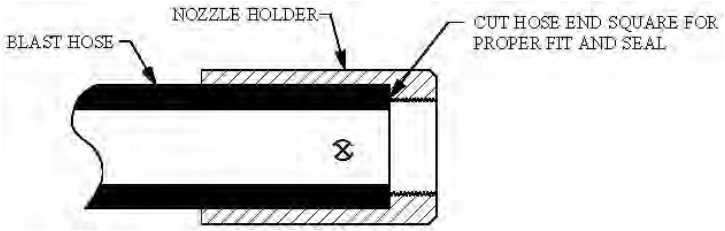


Figure 8.3 – Hose End Fit up

8.9. ***Blast Nozzle(s):*** Remove the blast nozzle daily and check the jacket and thread condition. Check nozzle throat diameter. An over-sized throat diameter reduces blast efficiency. Replace the blast nozzle if worn or damaged.

8.10. ***Valves:*** Combo Valve®, Thompson Valve®, automatic air valves, control valves, and deadman valves should be disassembled and inspected quarterly, or more frequently if heavily used. The Thompson Valve cylinder should be cleaned and lubricated with an anti-seize compound. Replace parts as needed with Schmidt® original factory replacement parts furnished by an authorized Schmidt distributor. Periodically check if air is leaking from end of blast nozzle when the blast operation is off. A worn Thompson Valve seat usually causes this. It is replaced by removing the four bolts in the base of the valve to allow disassembly. Refer to valve drawings in Sections 9.0.

⚠ DANGER

Depressurize vessel before performing any maintenance. See Section 6.2. Removing the Thompson valve bolts with the abrasive blaster pressurized will result in serious injury or death.

⚠ WARNING

Use of replacement components that are not Schmidt original factory replacement parts may result in equipment failure which can result in serious personal injury.

8.11. ***PPE:*** Check daily to verify that all personal protective equipment is available for each blast operator. Check daily to verify that all personal protective equipment is in good operating condition. Consult the operating and maintenance instructions provided by the manufacturer of each PPE item. See Section 3.10 and reference OSHA 29 CFR 1910 Subpart I.

⚠ WARNING

Failure to use personal protective equipment could result in serious injury or death.

8.12. ***Warning Decals:*** Check monthly to verify that all the warning decals are in position and legible. See Section 0.0 for full descriptions and locations.

⚠ DANGER

Failure to maintain warning decals risks the possibility of not alerting the abrasive blaster operator to potential dangers which can result in serious injury or death. See Section 0.0.

8.13. ***Combo Blowdown:*** The blowdown hose (#29) that passes through the combo valve (#28) is a 3/4" blast hose. Abrasive carry-over can wear a hole through the wall of the hose. Depressurize the abrasive blaster per Section 6.2 and check condition of hose weekly. Replace as needed.

8.14. ***Handway Assemblies:*** Refer to Section 6.3 for installation and inspection procedures.

8.15. ***Chamber Air Inlet Check Valves:*** Remove the access cap monthly to check condition of the check valve flapper disks in both upper and lower chambers. Check more frequently if an extreme pressure drop condition exists. See Section 5.24 for further information.

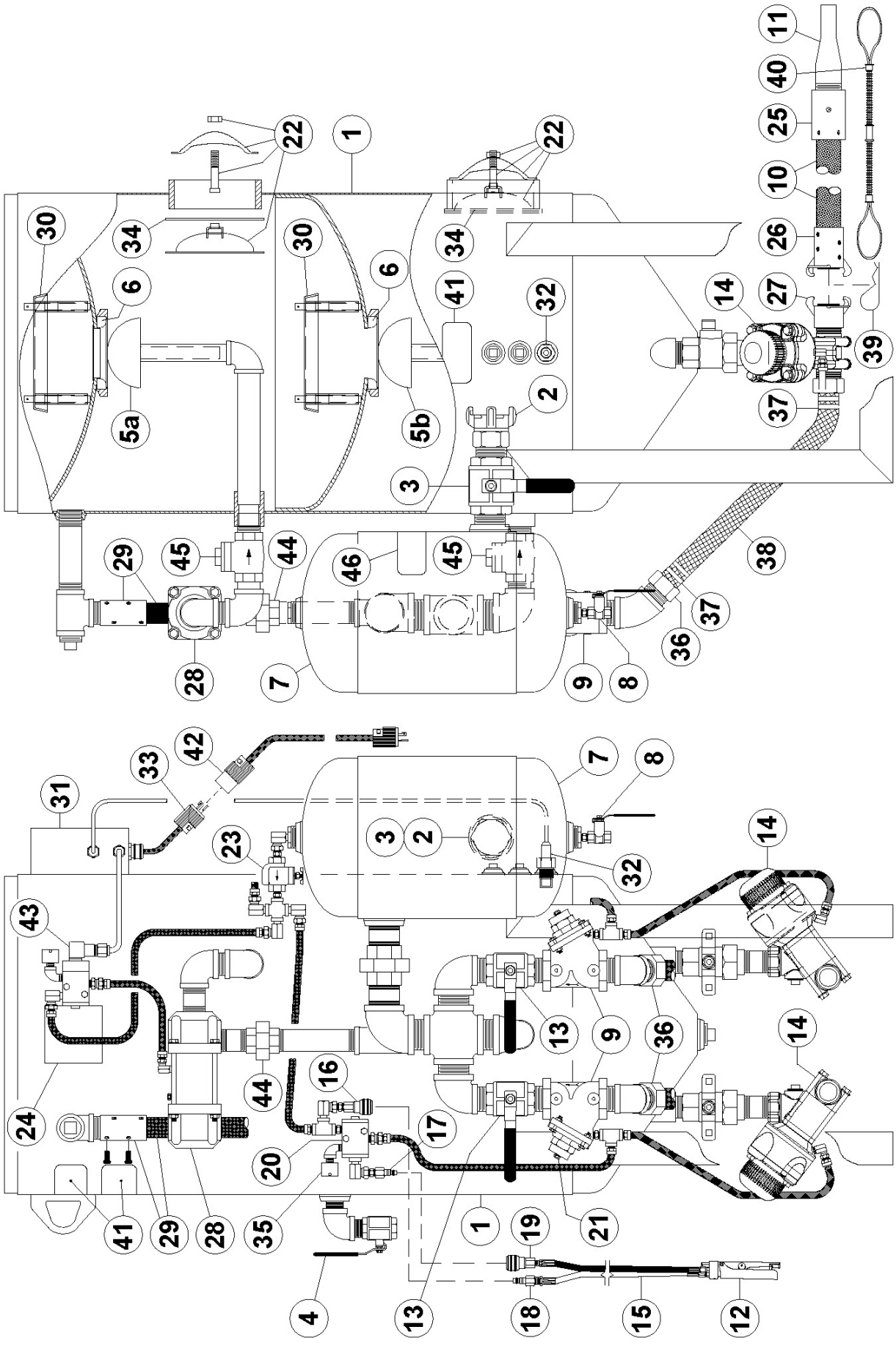
8.16. Maintenance Schedule Quick Reference Chart

DOUBLE CHAMBER ABRASIVE BLASTER MAINTENANCE SCHEDULE					
ITEM	**MAINTENANCE REQUIRED**	**DAILY**	**WEEKLY**	**MONTHLY**	**QUARTERLY**
Blaster Vessel	Hydrostatic Test See Section 8.1	As required by state law and/or local authorities			
Blaster Vessel	Check for exterior damage (corrosion, dents, bulges). See Section 8.2	X			
Blaster Vessel	Check for interior damage (corrosion / pitting). See Section 8.3				X
Popups	Check sealing surfaces, alignment and gasket to popup gap. See Section 8.4		X		
Blast & Air Hoses	Check hoses for soft spots, wear, cracks, or air leaks See Section 8.6	X			
Remote Control Hoses	Check hoses for soft spots, wear, cracks, or air leaks See Section 8.6	X			
Remote Control Wires	Check wiring for bare spots, fraying, or cracks See Section 8.6	X			
Blast & Air Hose Couplings	Check for safety pins and whip checks See Section 8.7	X			
Hose Coupling Gaskets	Check for leaky air and blast hose coupling gaskets See Section 8.8	X			
Blast Nozzle(s)	Check blast nozzle threads and jacket and for air leaks See Section 8.9	X			
Valves	Disassemble, inspect, and lubricate. See Section 8.10				X
Personal Protective Equipment	Check condition of all personal protective equipment See Section 3.10 and 8.11	X			
Warning Decals	Check the condition of warning decals. See Sections 0.0 and 8.12			X	
Combo Valve Blowdown Hose	Check condition of blowdown hose See Section 8.13		X		
Handway Assemblies	Check condition of gasket and sealing surfaces See Sections 8.14 and 6.3.			X	
Chamber Check Valves	Disassemble and check condition of internal flapper disk. See Sections 8.15 and 5.24.			X	

9.0 Drawings and Parts Lists

The following pages contain drawings representing typical blast control systems and components. Determine the type of control system the abrasive blast system is equipped with (pneumatic or electric controls) then reference the appropriate drawing and parts list to determine the required parts. To insure the proper operation of the blast system only use Schmidt® original factory replacement parts furnished by an authorized Schmidt distributor. See Section 1.37 and Section 12.2.12.

9.1(a) Double Chamber Blaster Pneumatic Control System (1-1/4” Piping)

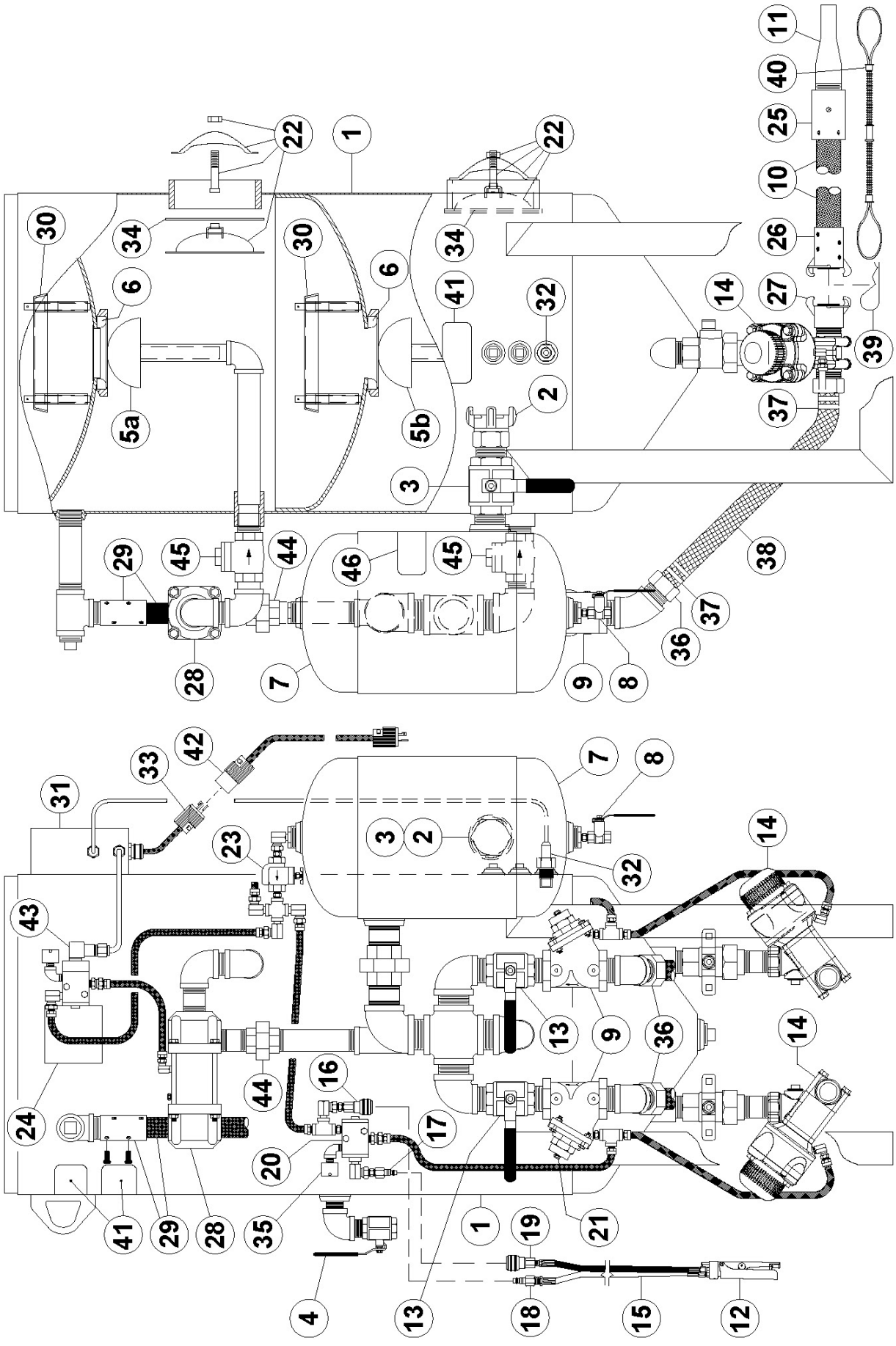


1 1/4" Thompson Valve II Piping (Pneumatic Controls)

Item	Part Number	Description
1	1022-008	Double Chamber Blaster Pressure Vessel, 8 cf 2-Outlet
2	4211-109	Crowfoot, 2" 4-lug with Gasket
	4211-999	Crowfoot Gasket
3	2401-509	Air Inlet Ball valve, Full Port 2"
4	2401-506	Lower Chamber Blowdown Ball valve, full port 1"
5a	2100-010	Popup Head Upper Chamber
5b	2100-010	Popup Head Lower Chamber
6	2100-011	Popup Gasket Upper/Lower Chamber
7	1200-080-04	Moisture Separator, 800 CFM (2" Inlet & 2" Outlet)
8	2401-502	Drain Ball Valve, 1/4"
9	2123-107	Automatic Air Valve, 1-1/4" N.C. (See Section 9.5)
10	4104-40X-0X	Blast hose (specify size and length)
11	5000-XXX	Blast nozzle (specify size)
12	2263-002	G2 Pneumatic Deadman (See Section 9.8(a))
13	2401-507	Choke Ball valve, full port 1-1/4"
14	2152-007	Thompson valve II, 1-1/4" Tungsten Carbide (See Section 9.4(b))
	2152-107	Thompson valve II, 1-1/4" Polyurethane (See Section 9.4(b))
15	4100-501	Twinline Hose Assembly, 55ft
	4100-701	Twinline Hose Assembly, 110ft
16	4224-301-02	Female Quick Connect, 1/4"
17	4224-300-02	Male Quick Connect, 1/4"
18	4224-300-02	Male Quick Connect, 1/4"
19	4224-301-02	Female Quick Connect, 1/4"
20	2229-000	Blast Control Valve, Pneumatic (See Section 9.7)
21	2014-300	Breather Vent, 1/8"
22	7000-001-11	Hanway Crab Assembly, 6" x 8" with Gasket
23	2301-902-90	Strainer, 1/4"
24	---	Pressure Vessel Nameplate
25	4215-XXX	Nozzle Holder (specify size)
26	4213-XXX	Blast hose Coupling (Specify Size)
	4214-999	Coupling Gasket
27	4214-107-01	Threaded Coupling, 1-1/4"
	4214-999	Coupling Gasket
28	2223-000	Combo valve
29	4115-005-10	Blowdown Hose Assembly, 3/4" x 10'
	4115-005-15	Blowdown Hose Assembly, 3/4" x 15'

Item	Part Number	Description
30	7001-000-02	Spider Disk 9"
	7001-000-05	Spider Spacer, 2-1/4"
	7001-000-04	Spider Spacer, 3/4"
	7001-000-03	Spider Spacer, 1"
31	7066-XXX	Cycle Control Box (refer to electrical drawing)
	7220-401	Selector Switch, 2-position (power on-off)
	7220-341-02	Selector Switch, 3-position (abrasive loading selector)
	7122-136	Relay, 120Vac
	7122-134	Relay, 24Vdc
	7122-132	Relay, 12Vdc
	7124-026	Timer, Universal AC/DC 12-240V
	8400-187-38	Repeat Cycle Timer, 24Vdc
32	5013-801-05A	Level Sensor, 20-250 AC/DC N.O./N.C.
	5013-801-01	Level Sensor, 10-55Vdc N.O./N.C.
	5013-300-12	Sensor Mount Well
	5013-600	Level Sensor, Radio Frequency 120Vac
	5013-100	Level Probe Complete, 120Vac (Vibratory)
	5013-100-02	Level Probe Control Unit, 120Vac w/plugn-in (Vibratory)
	5013-100-03	Level Probe Plug-in, 120 Vac (Vibratory)
33	7109-301	Male Plug, 3-Prong Twist-lock
34	7000-001-06	Handway Gasket, 6" x 8"
35	2013-402	Dust eliminator, 1/4"
36	4205-107	Hose Insert Swivel, 1-1/4"
	4205-107-99	Insert Gasket, 1-1/4"
37	4235-007	Hose Clamp Double Bolt, 1 1/4"
38	4102-007	Air Hose, 1-1/4"
39	7119-002	Safety Pin, Air/Blast Coupling
40	8710-98778	Hose Whip Check (Safety Cable)
41	7031-999-02A	Warning Decal Kit (Excludes "Inlet" Decal)
42	7109-300	Female Connector, 3-Prong Twist-lock
43	2229-105	Cycle Control Valve, 120Vac (See Section 9.7)
	2229-102	Cycle Control Valve, 24Vdc (See Section 9.7)
	2229-100	Cycle Control Valve, 12Vdc (See Section 9.7)
44	3024-007-03	Union Orifice
45	2490-907	Check Valve, Swing 1-1/4" (w/ weep hole)
46	7031-017	Decal "Inlet"

9.1(c) Double Chamber Blaster Pneumatic Control System (1-1/2” Piping)

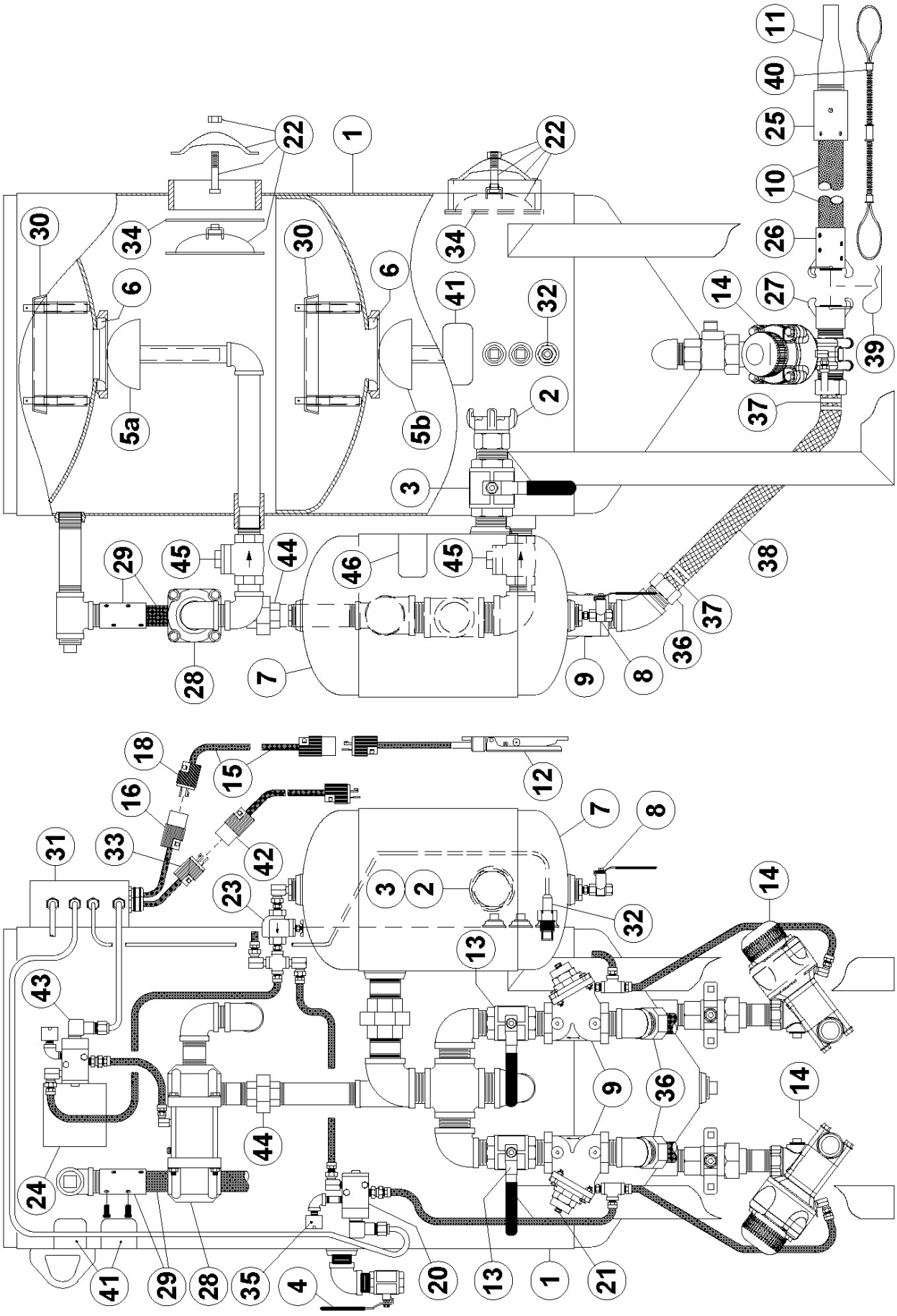


1 1/2" Thompson Valve II Piping (Pneumatic Controls)

Item	Part Number	Description
1	1022-008	Double Chamber Blaster Pressure Vessel, 8 cf 2-Outlet
2	4211-109	Crowfoot, 2" 4-lug with Gasket
	4211-999	Crowfoot Gasket
3	2401-509	Air Inlet Ball valve, Full Port 2"
4	2401-506	Lower Chamber Blowdown Ball valve, full port 1"
5a	2100-010	Popup Head Upper Chamber
5b	2100-010	Popup Head Lower Chamber
6	2100-011	Popup Gasket, Upper/Lower Chamber
7	1200-080-04	Moisture Separator, 800 CFM (2" Inlet & 2" Outlet)
8	2401-502	Drain Ball Valve, 1/4"
9	2123-108	Automatic Air Valve, 1-1/2" N.C. (See Section 9.5)
10	4104-40X-0X	Blast hose (specify size and length)
11	5000-XXX	Blast nozzle (specify size)
12	2263-002	G2 Pneumatic Deadman (See Section 9.8(a))
13	2401-508	Choke Ball valve, full port 1-1/2"
14	2152-008	Thompson valve II, 1-1/2" Tungsten Carbide (See Section 9.4(b))
	2152-108	Thompson valve II, 1-1/2" Polyurethane (See Section 9.4(b))
15	4100-501	Twinline Hose Assembly, 55ft
	4100-701	Twinline Hose Assembly, 110ft
16	4224-301-02	Female Quick Connect, 1/4"
17	4224-300-02	Male Quick Connect, 1/4"
18	4224-300-02	Male Quick Connect, 1/4"
19	4224-301-02	Female Quick Connect, 1/4"
20	2229-000	Blast Control Valve, Pneumatic (See Section 9.7)
21	2014-300	Breather Vent, 1/8"
22	7000-001-11	Hanway Crab Assembly, 6" x 8" with Gasket
23	2301-902-90	Strainer, 1/4"
24	---	Pressure Vessel Nameplate
25	4215-XXX	Nozzle Holder (specify size)
26	4213-XXX	Blast hose Coupling (Specify Size)
	4214-999	Coupling Gasket
27	4214-107-01	Threaded Coupling, 1-1/4"
	4214-999	Coupling Gasket
28	2223-000	Combo valve
29	4115-005-10	Blowdown Hose Assembly, 3/4" x 10'
	4115-005-15	Blowdown Hose Assembly, 3/4" x 15'

Item	Part Number	Description
30	7001-000-02	Spider Disk 9"
	7001-000-05	Spider Spacer, 2-1/4"
	7001-000-04	Spider Spacer, 3/4"
	7001-000-03	Spider Spacer, 1"
31	7066-XXX	Cycle Control Box (refer to electrical drawing)
	7220-401	Selector Switch, 2-position (power on-off)
	7220-341-02	Selector Switch, 3-position (abrasive loading selector)
	7122-136	Relay, 120Vac
	7122-134	Relay, 24Vdc
	7122-132	Relay, 12Vdc
	7124-026	Timer, Universal AC/DC 12-240V
	8400-187-38	Repeat Cycle Timer, 24Vdc
32	5013-801-05A	Level Sensor, 20-250 AC/DC N.O./N.C.
	5013-801-01	Level Sensor, 10-55Vdc N.O./N.C.
	5013-300-12	Sensor Mount Well
	5013-600	Level Sensor, Radio Frequency 120Vac
	5013-100	Level Probe Complete, 120Vac (Vibratory)
	5013-100-02	Level Probe Control Unit, 120Vac w/plugn-in (Vibratory)
	5013-100-03	Level Probe Plug-in, 120 Vac (Vibratory)
33	7109-301	Male Plug, 3-Prong Twist-lock
34	7000-001-06	Handway Gasket, 6" x 8"
35	2013-402	Dust eliminator, 1/4"
36	4205-108	Hose Insert Swivel, 1-1/2"
	4205-108-99	Insert Gasket, 1-1/2"
37	4235-008	Hose Clamp Double Bolt, 1 1/2"
38	4102-008	Air Hose, 1-1/2"
39	7119-002	Safety Pin, Air/Blast Coupling
40	8710-98778	Hose Whip Check (Safety Cable)
41	7031-999-02A	Warning Decal Kit (Excludes "Inlet" Decal)
42	7109-300	Female Connector, 3-Prong Twist-lock
43	2229-105	Cycle Control Valve, 120Vac (See Section 9.7)
	2229-102	Cycle Control Valve, 24Vdc (See Section 9.7)
	2229-100	Cycle Control Valve, 12Vdc (See Section 9.7)
44	3024-007-03	Union Orifice
45	2490-907	Check Valve, Swing 1-1/4" (w/ weep hole)
46	7031-017	Decal "Inlet"

9.2(a) Double Chamber Blaster Electric Control System (1-1/4” Piping)

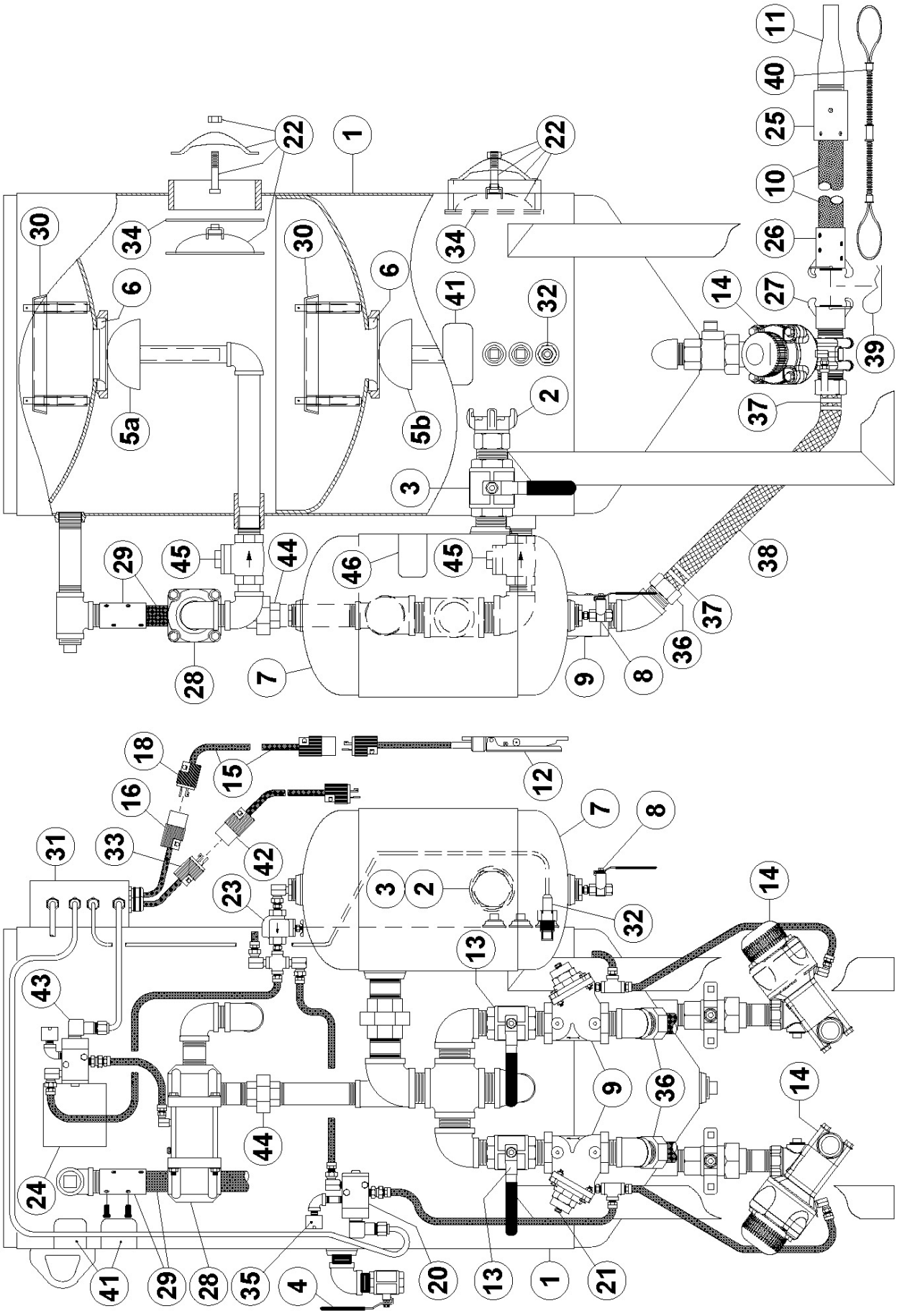


9.2(b) Double Chamber Blaster Electric Control Parts List (1-1/4” Piping)

1 1/4" Thompson Valve II Piping (Electric Controls)

Item	Part Number	Description
1	1022-008	Double Chamber Blaster Pressure Vessel, 8 cf 2-Outlet
2	4211-109	Crowfoot, 2" 4-lug with Gasket
	4211-999	Crowfoot Gasket
3	2401-509	Air Inlet Ball valve, Full Port 2"
4	2401-506	Lower Chamber Blowdown Ball valve, full port 1"
5a	2100-010	Popup Head Upper Chamber
5b	2100-010	Popup Head Lower Chamber
6	2100-011	Popup Gasket Upper/Lower Chamber
7	1200-080-04	Moisture Separator, 800 CFM (2" Inlet & 2" Outlet)
8	2401-502	Drain Ball Valve, 1/4"
9	2123-107	Automatic Air Valve, 1-1/4" N.C. (See Section 9.5)
10	4104-40X-0X	Blast hose (specify size and length)
11	5000-XXX	Blast nozzle (specify size)
12	2263-402-01	G2 Electric Deadman w/plug (See Section 9.9)
13	2401-507	Choke Ball valve, full port 1-1/4"
14	2152-007	Thompson valve II, 1-1/4" Tungsten Carbide (See Section 9.4(b))
	2152-107	Thompson valve II, 1-1/4" Polyurethane (See Section 9.4(b))
15	7074-055	Extension cord, 55 ft
	7074-110	Extension cord, 110 ft
16	7109-300	Female Connector, 3-prong Twist-Lock
17		
18	7109-301	Male plug, 3-prong twist-lock
19		
20	2229-100	Blast Control Valve, 12Vdc (refer to electrical drawing)
	2229-102	Blast Control Valve, 24Vdc (See Section 9.7)
21	2014-300	Breather Vent, 1/8"
22	7000-001-11	Hanway Crab Assembly, 6" x 8" with Gasket
23	2301-902-90	Strainer, 1/4"
24	---	Pressure Vessel Nameplate
25	4215-XXX	Nozzle Holder (specify size)
26	4213-XXX	Blast hose Coupling (Specify Size)
	4214-999	Coupling Gasket
27	4214-107-01	Threaded Coupling, 1-1/4"
	4214-999	Coupling Gasket
28	2223-000	Combo valve
29	4115-005-10	Blowdown Hose Assembly, 3/4" x 10'
	4115-005-15	Blowdown Hose Assembly, 3/4" x 15'
30	7001-000-02	Spider Disk 9"
	7001-000-05	Spider Spacer, 2-1/4"
	7001-000-04	Spider Spacer, 3/4"
	7001-000-03	Spider Spacer, 1"
31	7066-XXX	Cycle Control Box (refer to electrical drawing)
	7220-401	Selector Switch, 2-position (power on-off)
	7220-341-02	Selector Switch, 3-position (abrasive loading selector)
	7122-136	Relay, 120Vac
	7122-134	Relay, 24Vdc
	7122-132	Relay, 12Vdc
	7124-026	Timer, Universal AC/DC 12-240V
	8400-187-38	Repeat Cycle Timer, 24Vdc
32	5013-801-05A	Level Sensor, 20-250 AC/DC N.O./N.C.
	5013-801-01	Level Sensor, 10-55Vdc N.O./N.C.
	5013-300-12	Sensor Mount Well
	5013-600	Level Sensor, Radio Frequency 120Vac
	5013-100	Level Probe Complete, 120Vac (Vibratory)
	5013-100-02	Level Probe Control Unit, 120Vac w/plugn-in (Vibratory)
	5013-100-03	Level Probe Plug-in, 120 Vac (Vibratory)
33	7109-301	Male Plug, 3-Prong Twist-lock
34	7000-001-06	Handway Gasket, 6" x 8"
35	2013-402	Dust eliminator, 1/4"
36	4205-107	Hose Insert Swivel, 1-1/4"
	4205-107-99	Insert Gasket, 1-1/4"
37	4235-007	Hose Clamp Double Bolt, 1 1/4"
38	4102-007	Air Hose, 1-1/4"
39	7119-002	Safety Pin, Air/Blast Coupling
40	8710-98778	Hose Whip Check (Safety Cable)
41	7031-999-02A	Warning Decal Kit (Excludes "Inlet" Decal)
42	7109-300	Female Connector, 3-Prong Twist-lock
43	2229-105	Cycle Control Valve, 120Vac (See Section 9.7)
	2229-102	Cycle Control Valve, 24Vdc (See Section 9.7)
	2229-100	Cycle Control Valve, 12Vdc (See Section 9.7)
44	3024-007-03	Union Orifice
45	2490-907	Check Valve, Swing 1-1/4" (w/ weep hole)
46	7031-017	Decal "Inlet"

9.2(c) Double Chamber Blaster Electric Control System (1-1/2” Piping)



9.2(d) Double Chamber Blaster Electric Control Parts List (1-1/2" Piping)

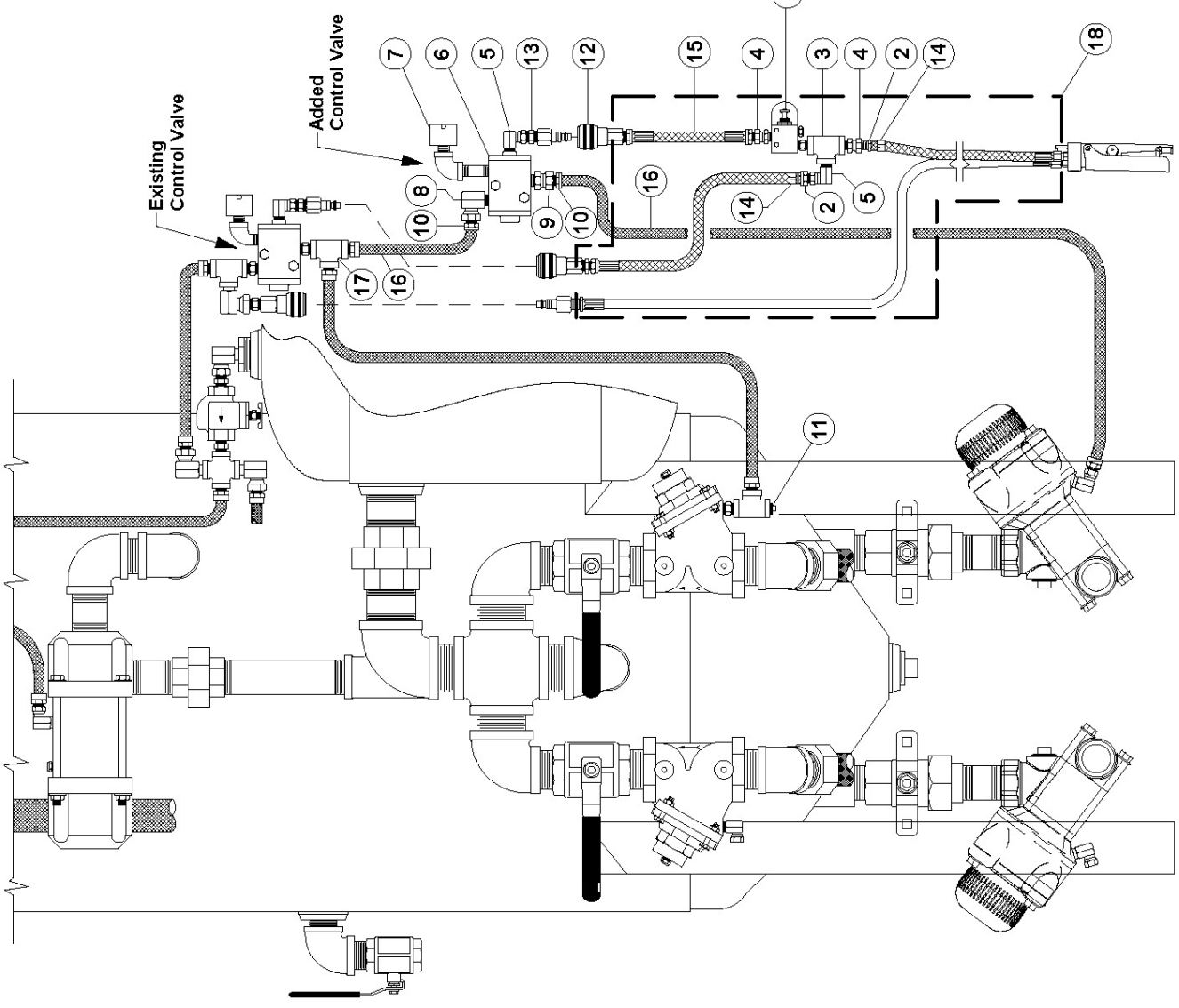
1 1/2" Thompson Valve II Piping (Electric Controls)

Item	Part Number	Description
1	1022-008	Double Chamber Blaster Pressure Vessel, 8 cf 2-Outlet
2	4211-109	Crowfoot, 2" 4-lug with Gasket
	4211-999	Crowfoot Gasket
3	2401-509	Air Inlet Ball valve, Full Port 2"
4	2401-506	Lower Chamber Blowdown Ball valve, full port 1"
5a	2100-010	Popup Head Upper Chamber
5b	2100-010	Popup Head Lower Chamber
6	2100-011	Popup Gasket Upper/Lower Chamber
7	1200-080-04	Moisture Separator, 800 CFM (2" Inlet & 2" Outlet)
8	2401-502	Drain Ball Valve, 1/4"
9	2123-108	Automatic Air Valve, 1-1/2" N.C. (See Section 9.5)
10	4104-40X-0X	Blast hose (specify size and length)
11	5000-XXX	Blast nozzle (specify size)
12	2263-402-01	G2 Electric Deadman w/plug (See Section 9.9)
13	2401-508	Choke Ball valve, full port 1-1/2"
14	2152-008	Thompson valve II, 1-1/2" Tungsten Carbide (See Section 9.4(b))
	2152-108	Thompson valve II, 1-1/2" Polyurethane (See Section 9.4(b))
15	7074-055	Extension cord, 55 ft
	7074-110	Extension cord, 110 ft
16	7109-300	Female Connector, 3-prong Twist-Lock
17		
18	7109-301	Male plug, 3-prong twist-lock
19		
20	2229-100	Blast Control Valve, 12Vdc (refer to electrical drawing)
	2229-102	Blast Control Valve, 24Vdc (See Section 9.7)
21	2014-300	Breather Vent, 1/8"
22	7000-001-11	Hanway Crab Assembly, 6" x 8" with Gasket
23	2301-902-90	Strainer, 1/4"
24	---	Pressure Vessel Nameplate
25	4215-XXX	Nozzle Holder (specify size)
26	4213-XXX	Blast hose Coupling (Specify Size)
	4214-999	Coupling Gasket
27	4214-107-01	Threaded Coupling, 1-1/4"
	4214-999	Coupling Gasket
28	2223-000	Combo valve
29	4115-005-10	Blowdown Hose Assembly, 3/4" x 10'
	4115-005-15	Blowdown Hose Assembly, 3/4" x 15'
30	7001-000-02	Spider Disk 9"
	7001-000-05	Spider Spacer, 2-1/4"
	7001-000-04	Spider Spacer, 3/4"
	7001-000-03	Spider Spacer, 1"
31	7066-XXX	Cycle Control Box (refer to electrical drawing)
	7220-401	Selector Switch, 2-position (power on-off)
	7220-341-02	Selector Switch, 3-position (abrasive loading selector)
	7122-136	Relay, 120Vac
	7122-134	Relay, 24Vdc
	7122-132	Relay, 12Vdc
	7124-026	Timer, Universal AC/DC 12-240V
	8400-187-38	Repeat Cycle Timer, 24Vdc
32	5013-801-05A	Level Sensor, 20-250 AC/DC N.O./N.C.
	5013-801-01	Level Sensor, 10-55Vdc N.O./N.C.
	5013-300-12	Sensor Mount Well
	5013-600	Level Sensor, Radio Frequency 120Vac
	5013-100	Level Probe Complete, 120Vac (Vibratory)
	5013-100-02	Level Probe Control Unit, 120Vac w/plugn-in (Vibratory)
	5013-100-03	Level Probe Plug-in, 120 Vac (Vibratory)
33	7109-301	Male Plug, 3-Prong Twist-lock
34	7000-001-06	Handway Gasket, 6" x 8"
35	2013-402	Dust eliminator, 1/4"
36	4205-108	Hose Insert Swivel, 1-1/2"
	4205-108-99	Insert Gasket, 1-1/2"
37	4235-008	Hose Clamp Double Bolt, 1 1/2"
38	4102-008	Air Hose, 1-1/2"
39	7119-002	Safety Pin, Air/Blast Coupling
40	8710-98778	Hose Whip Check (Safety Cable)
41	7031-999-02A	Warning Decal Kit (Excludes "Inlet" Decal)
42	7109-300	Female Connector, 3-Prong Twist-lock
43	2229-105	Cycle Control Valve, 120Vac (See Section 9.7)
	2229-102	Cycle Control Valve, 24Vdc (See Section 9.7)
	2229-100	Cycle Control Valve, 12Vdc (See Section 9.7)
44	3024-007-03	Union Orifice
45	2490-907	Check Valve, Swing 1-1/4" (w/ weep hole)
46	7031-017	Decal "Inlet"

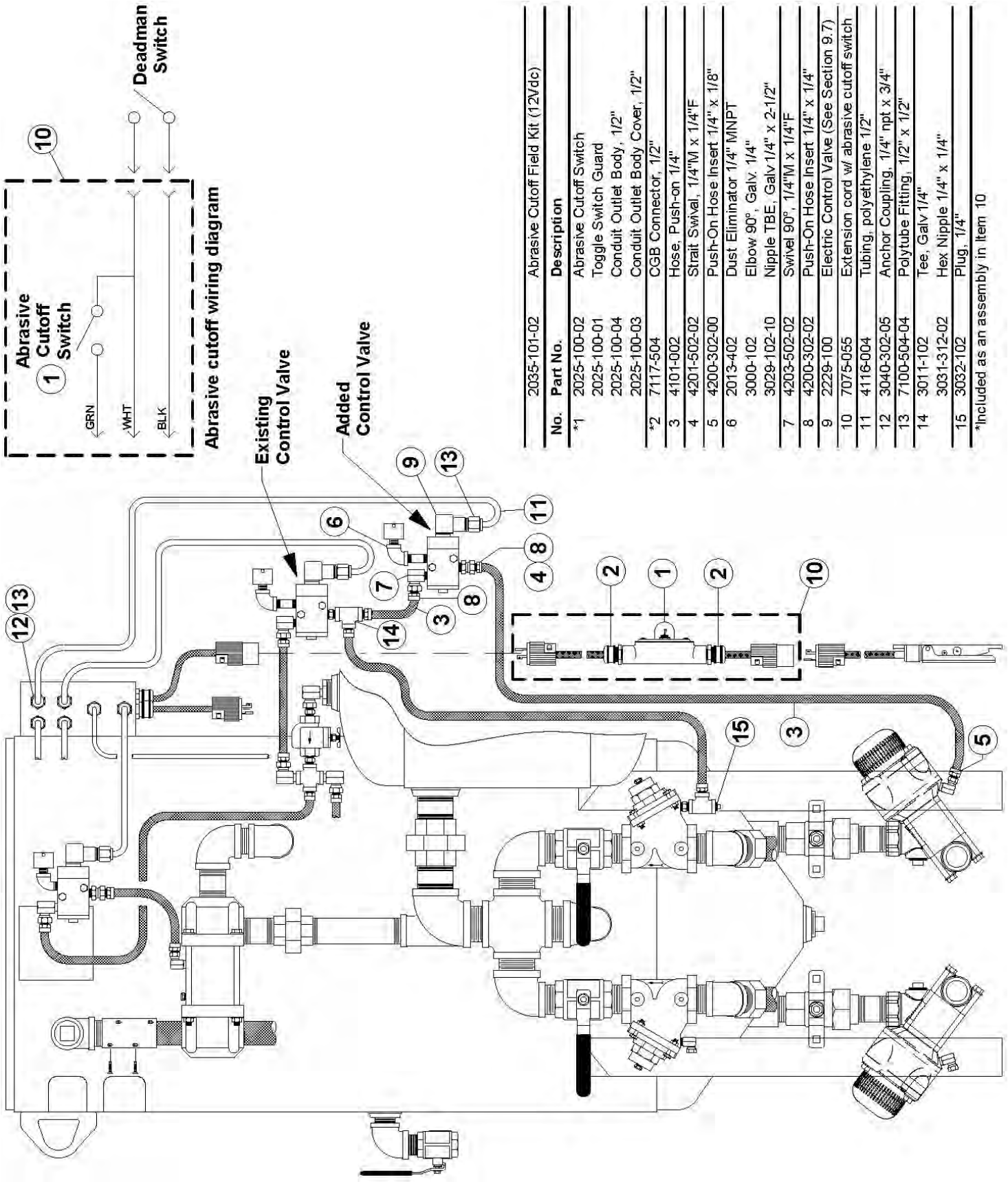
9.3(a) Double Chamber Blaster Remote Abrasive Cutoff (Pneumatic)

2035-001-01	Abrasive Cutoff Field Kit (Pneumatic)
No.	**Part No.**	**Description**
1	2025-010	Abrasive Cutoff Valve
	2025-100-01	Toggle Switch Guard
	2014-300	Breather Vent, Brass 1/8"
	3031-300-00	Hex Nipple 1/8" x 1/8"
2	4204-301-00	Hose Insert, Rigid 3/16" x 1/8" Brass
3	3011-100	Tee, Galv 1/8"
4	4201-500-00	Strait Swival, 1/8"M x 1/8"F
5	4203-500-00	Swivel 90, 1/8"M x 1/8"F
6	2229-000	Pneumatic Control Valve (See Section 9.7)
7	3029-102-09	Nipple TBE, Galv. 1/4" x 2"
	3000-102	Elbow 90°, Galv. 1/4"
	2013-402	Dust Eliminator 1/4" MNPT
8	4203-502-02	Swivel 90°, 1/4"M x 1/4"F
9	4201-502-02	Strait Swival, 1/4"M x 1/4"F
10	4200-302-02	Push-On Hose Insert 1/4" x 1/4"
11	3032-102	Plug, 1/4"
12	4224-301-02	Q. Connect SSO/BR Socket 1/4"
13	4224-300-02	Q. Connect SSO/AL Plug 1/4"
	3031-302-00	Hex Nipple 1/4" x 1/8"
14	8710-98753	Band Clamp, 1/4"
15	4100-501-04	Hose, Green ACO Assembly 55ft.
16	4101-002	Hose, Push-on 1/4"
17	3011-102	Tee, Galv 1/4"
	3031-312-02	Hex Nipple 1/4" x 1/4"
*18	4100-501-02	Twinline Hose Assembly w/abrasive cutoff valve 55ft.
	4100-701-02	Twinline Hose Assembly w/abrasive cutoff valve 110ft.

*Not included in field kit



9.3(b) Double Chamber Blaster Remote Abrasive Cutoff (Electric)

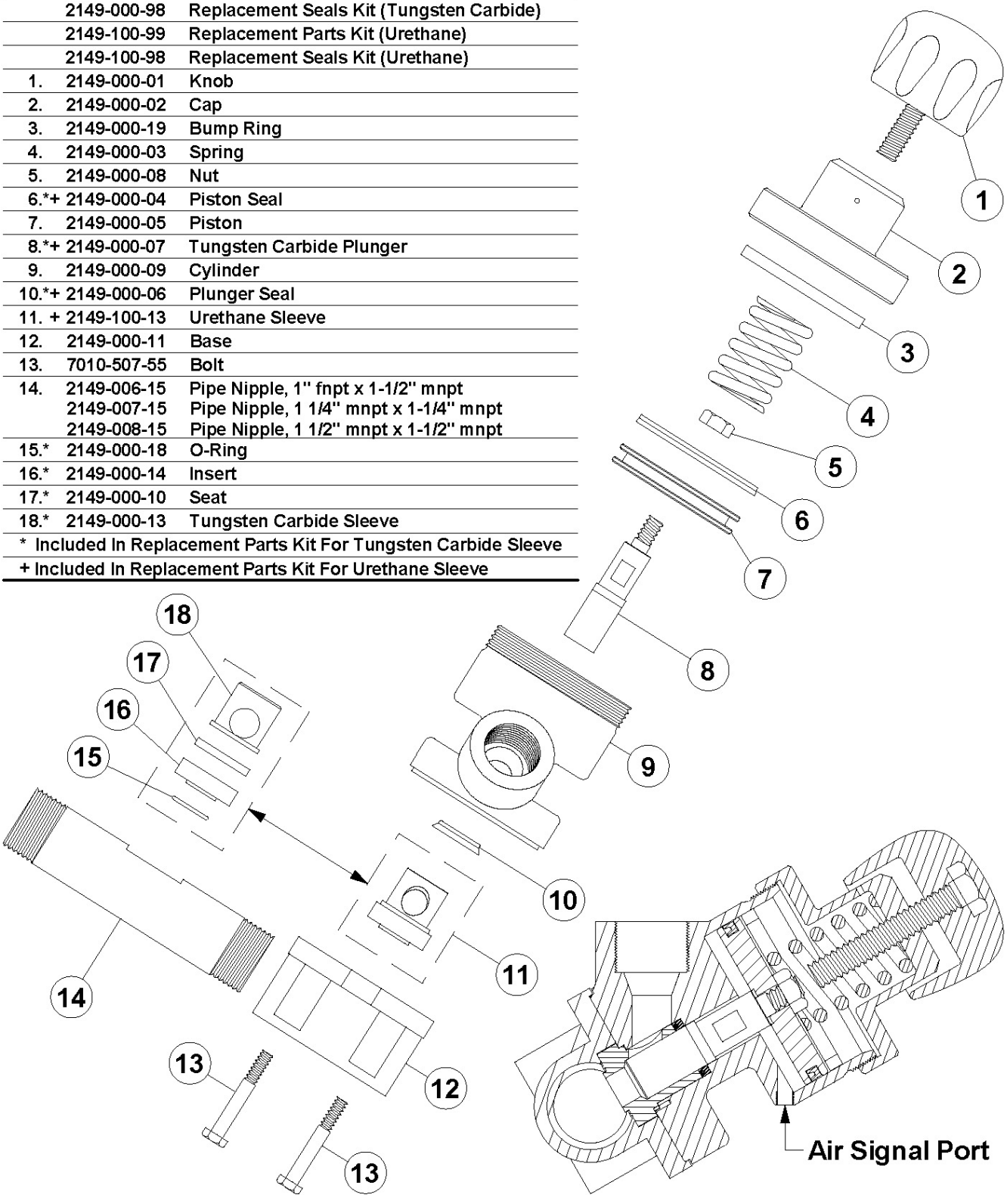


	2035-101-02	Abrasive Cutoff Field Kit (12Vdc)
No.	Part No.	Description
*1	2025-100-02	Abrasive Cutoff Switch
	2025-100-01	Toggle Switch Guard
	2025-100-04	Conduit Outlet Body, 1/2"
	2025-100-03	Conduit Outlet Body Cover, 1/2"
*2	7117-504	CGB Connector, 1/2"
3	4101-002	Hose, Push-on 1/4"
4	4201-502-02	Strait Swival, 1/4"M x 1/4"F
5	4200-302-00	Push-On Hose Insert 1/4" x 1/8"
6	2013-402	Dust Eliminator 1/4" MNPT
	3000-102	Elbow 90°, Galv. 1/4"
	3029-102-10	Nipple TBE, Galv 1/4" x 2-1/2"
7	4203-502-02	Swivel 90°, 1/4"M x 1/4"F
8	4200-302-02	Push-On Hose Insert 1/4" x 1/4"
9	2229-100	Electric Control Valve (See Section 9.7)
10	7075-055	Extension cord w/ abrasive cutoff switch
11	4116-004	Tubing, polyethylene 1/2"
12	3040-302-05	Anchor Coupling, 1/4" npt x 3/4"
13	7100-504-04	Polytube Fitting, 1/2" x 1/2"
14	3011-102	Tee, Galv 1/4"
	3031-312-02	Hex Nipple 1/4" x 1/4"
15	3032-102	Plug, 1/4"

*Included as an assembly in Item 10

9.4(a) Thompson Valve®

	2149-006	1" Valve With Tungsten Carbide Sleeve
	2149-106	1" Valve With Urethane Sleeve
	2149-007	1 1/4" Valve With Tungsten Carbide Sleeve
	2149-107	1 1/4" Valve With Urethane Sleeve
	2149-008	1 1/2" Valve With Tungsten Carbide Sleeve
	2149-108	1 1/2" Valve With Urethane Sleeve
No.	Part No.	Description
	2149-000-99	Replacement Parts Kit (Tungsten Carbide)
	2149-000-98	Replacement Seals Kit (Tungsten Carbide)
	2149-100-99	Replacement Parts Kit (Urethane)
	2149-100-98	Replacement Seals Kit (Urethane)
1.	2149-000-01	Knob
2.	2149-000-02	Cap
3.	2149-000-19	Bump Ring
4.	2149-000-03	Spring
5.	2149-000-08	Nut
6.*+	2149-000-04	Piston Seal
7.	2149-000-05	Piston
8.*+	2149-000-07	Tungsten Carbide Plunger
9.	2149-000-09	Cylinder
10.*+	2149-000-06	Plunger Seal
11. +	2149-100-13	Urethane Sleeve
12.	2149-000-11	Base
13.	7010-507-55	Bolt
14.	2149-006-15	Pipe Nipple, 1" fnpt x 1-1/2" mnpt
	2149-007-15	Pipe Nipple, 1 1/4" mnpt x 1-1/4" mnpt
	2149-008-15	Pipe Nipple, 1 1/2" mnpt x 1-1/2" mnpt
15.*	2149-000-18	O-Ring
16.*	2149-000-14	Insert
17.*	2149-000-10	Seat
18.*	2149-000-13	Tungsten Carbide Sleeve
* Included In Replacement Parts Kit For Tungsten Carbide Sleeve		
+ Included In Replacement Parts Kit For Urethane Sleeve		

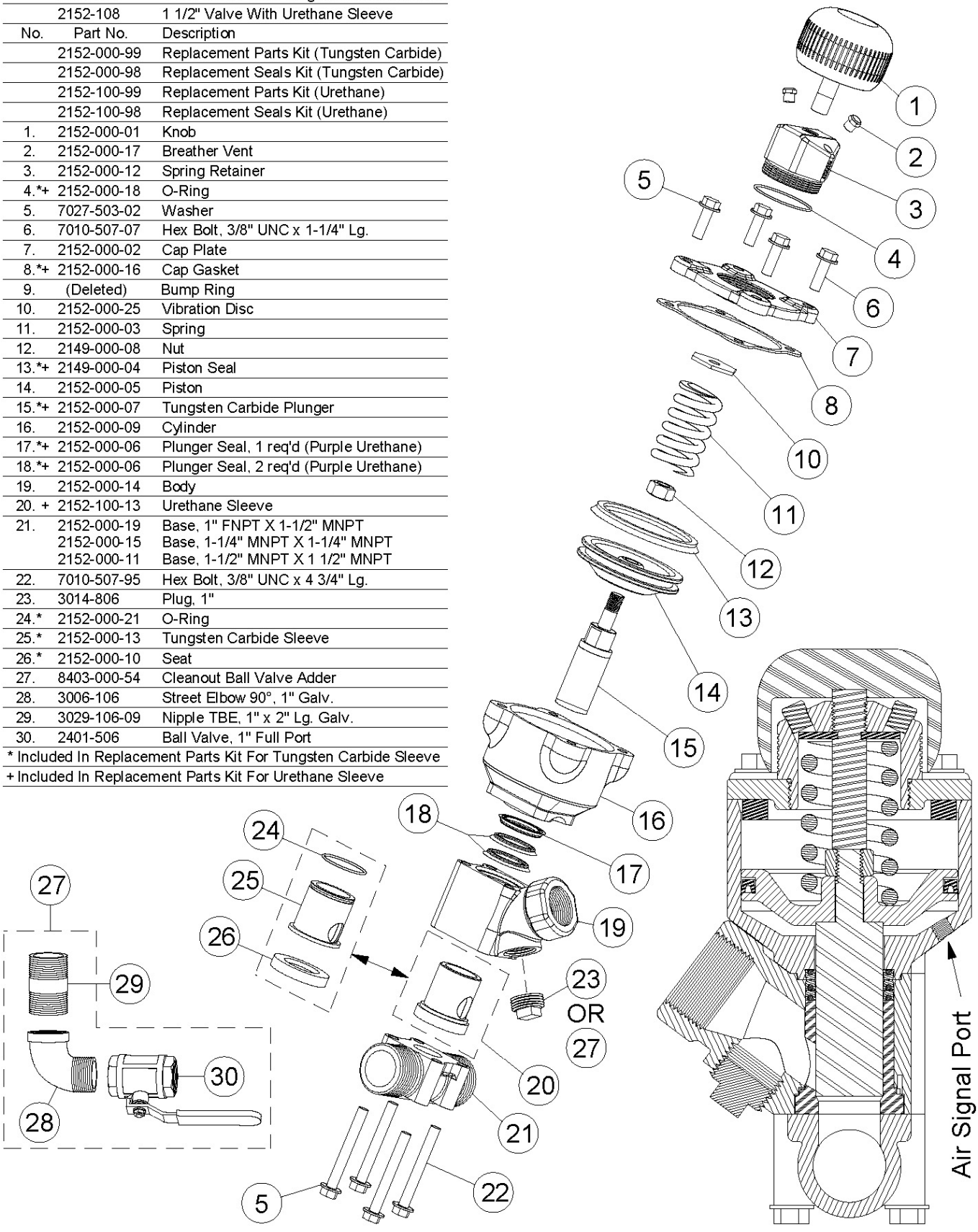


9.4(b) Thompson Valve® II

	2152-006	1" Valve With Tungsten Carbide Sleeve
	2152-106	1" Valve With Urethane Sleeve
	2152-007	1 1/4" Valve With Tungsten Carbide Sleeve
	2152-107	1 1/4" Valve With Urethane Sleeve
	2152-008	1 1/2" Valve With Tungsten Carbide Sleeve
	2152-108	1 1/2" Valve With Urethane Sleeve
No.	Part No.	Description
	2152-000-99	Replacement Parts Kit (Tungsten Carbide)
	2152-000-98	Replacement Seals Kit (Tungsten Carbide)
	2152-100-99	Replacement Parts Kit (Urethane)
	2152-100-98	Replacement Seals Kit (Urethane)
1.	2152-000-01	Knob
2.	2152-000-17	Breather Vent
3.	2152-000-12	Spring Retainer
4.*+	2152-000-18	O-Ring
5.	7027-503-02	Washer
6.	7010-507-07	Hex Bolt, 3/8" UNC x 1-1/4" Lg.
7.	2152-000-02	Cap Plate
8.*+	2152-000-16	Cap Gasket
9.	(Deleted)	Bump Ring
10.	2152-000-25	Vibration Disc
11.	2152-000-03	Spring
12.	2149-000-08	Nut
13.*+	2149-000-04	Piston Seal
14.	2152-000-05	Piston
15.*+	2152-000-07	Tungsten Carbide Plunger
16.	2152-000-09	Cylinder
17.*+	2152-000-06	Plunger Seal, 1 req'd (Purple Urethane)
18.*+	2152-000-06	Plunger Seal, 2 req'd (Purple Urethane)
19.	2152-000-14	Body
20. +	2152-100-13	Urethane Sleeve
21.	2152-000-19	Base, 1" FNPT X 1-1/2" MNPT
	2152-000-15	Base, 1-1/4" MNPT X 1-1/4" MNPT
	2152-000-11	Base, 1-1/2" MNPT X 1 1/2" MNPT
22.	7010-507-95	Hex Bolt, 3/8" UNC x 4 3/4" Lg.
23.	3014-806	Plug, 1"
24.*	2152-000-21	O-Ring
25.*	2152-000-13	Tungsten Carbide Sleeve
26.*	2152-000-10	Seat
27.	8403-000-54	Cleanout Ball Valve Adder
28.	3006-106	Street Elbow 90°, 1" Galv.
29.	3029-106-09	Nipple TBE, 1" x 2" Lg. Galv.
30.	2401-506	Ball Valve, 1" Full Port

* Included In Replacement Parts Kit For Tungsten Carbide Sleeve

\+ Included In Replacement Parts Kit For Urethane Sleeve



9.5 Automatic Air Valve

	2123-106	1" Valve
No.	Part No.	Description
	2123-006-99	Replacement Parts Kit
	2123-006-97	Hard Parts Kit
1.*	2123-007-20	Gasket
2.*	2123-006-02	Diaphragm
3.*	2123-006-03	O-ring
4.	2123-006-04	Retainer Bushing
5.*	2123-007-05	O-ring
6.+	2123-006-06	Disk Retainer
7.*	2123-006-07	O-ring
8.	2123-006-08	Seat
9.+	2123-006-09	Disc Plate
10.	"Deleted"	Lock Washer, Internal
11.*	7082-504	Lock Nut
12.	2123-106-12	Cap
13.*	2123-006-13	Lock Nut
14.	7010-503-06	Cap Screw
15.+	2123-006-15	Diaphragm Plate
17.	7082-503	Lock Nut
18.	2123-006-18	Body, 1"
19.**	2123-006-19	Shaft
20.*	2123-007-20	Gasket
21.*	2123-006-21	Disc
22.**	2123-106-22	O-ring
23.+	2123-106-23	Spring Retainer
24.	2123-106-24	Spring
25.*	2014-300	Vent, 1/8"
26.*	2123-007-20	Gasket

* Included In Replacement Parts Kit

\+ Included In Hard Parts Replacement Kit

	2123-107	1 1/4" Valve
	2123-108	1 1/2" Valve
No.	Part No.	Description
	2123-007-99	Replacement Parts Kit
	2123-007-97	Hard Parts Kit
1.*	2123-009-01	Gasket
2.*	2123-007-02	Diaphragm
3.*	2123-007-03	O-ring
4.	2123-007-04	Retainer Bushing
5.*	2123-007-05	O-ring
6.+	2123-007-06	Disk Retainer
7.*	2123-007-07	O-ring
8.	2123-007-08	Seat
9.+	2123-007-09	Disc Plate
10.	"Deleted"	Lock Washer, Internal
11.*	7082-504	Lock Nut
12.	2123-107-12	Cap
13.*	7082-506	Lock Nut
14.	7010-503-07	Cap Screw
15.+	2123-007-15	Diaphragm Plate
17.	7082-503	Lock Nut
18.	2123-007-18	Body, 1 1/4"
	2123-008-18	Body, 1 1/2"
19.**	2123-007-19	Shaft
20.*	2123-007-20	Gasket
21.*	2123-007-21	Disc
22.**	2123-107-22	O-ring
23.+	2123-107-23	Spring Retainer
24.	2123-107-24	Spring
25.*	2014-300	Vent, 1/8"
26.*	2123-009-01	Gasket

* Included In Replacement Parts Kit

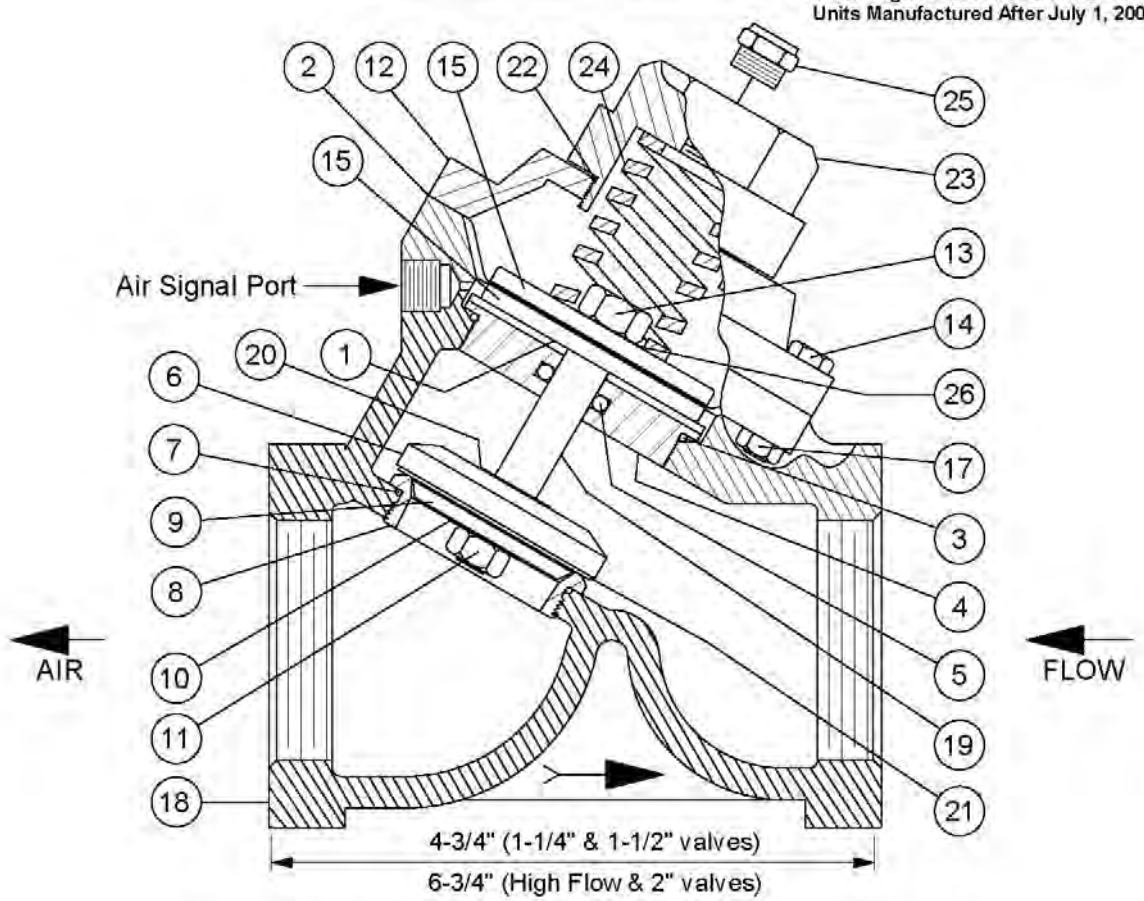
\+ Included In Hard Parts Replacement Kit

**	2123-108L	1-1/2" High Flow Valve
	2123-109	2" Valve
No.	Part No.	Description
	2123-009-99	Replacement Parts Kit
	2123-009-97	Hard Parts Kit
1.*	2123-009-01	Gasket
2.*	2123-009-02	Diaphragm
3.*	2123-009-03	O-ring
4.	2123-009-04	Retainer Bushing
5.*	2123-009-05	O-ring
6.+	2123-009-06	Disk Retainer
7.*	2123-009-07	O-ring
8.	2123-009-08	Seat
9.+	2123-007-15	Disc Plate
10.	"Deleted"	Lock Washer, Internal
11.*	7082-506	Lock Nut
12.	2123-109-12	Cap
13.*	7082-506	Lock Nut
14.	7010-505-07	Cap Screw
15.+	2123-009-15	Diaphragm Plate
17.	7082-505	Hex Nut
18.	2123-009-27	Body, 1-1/2" high flow
	2123-009-18	Body, 2"
19.**	2123-009-19	Shaft
20.*	2123-009-01	Gasket
21.*	2123-009-21	Disc
22.**	2123-107-22	O-ring
23.+	2123-109-23	Spring Retainer
24.	2123-109-24	Spring
25.*	2014-300	Vent, 1/8"
26.*	2123-009-28	Washer

* Included In Replacement Parts Kit

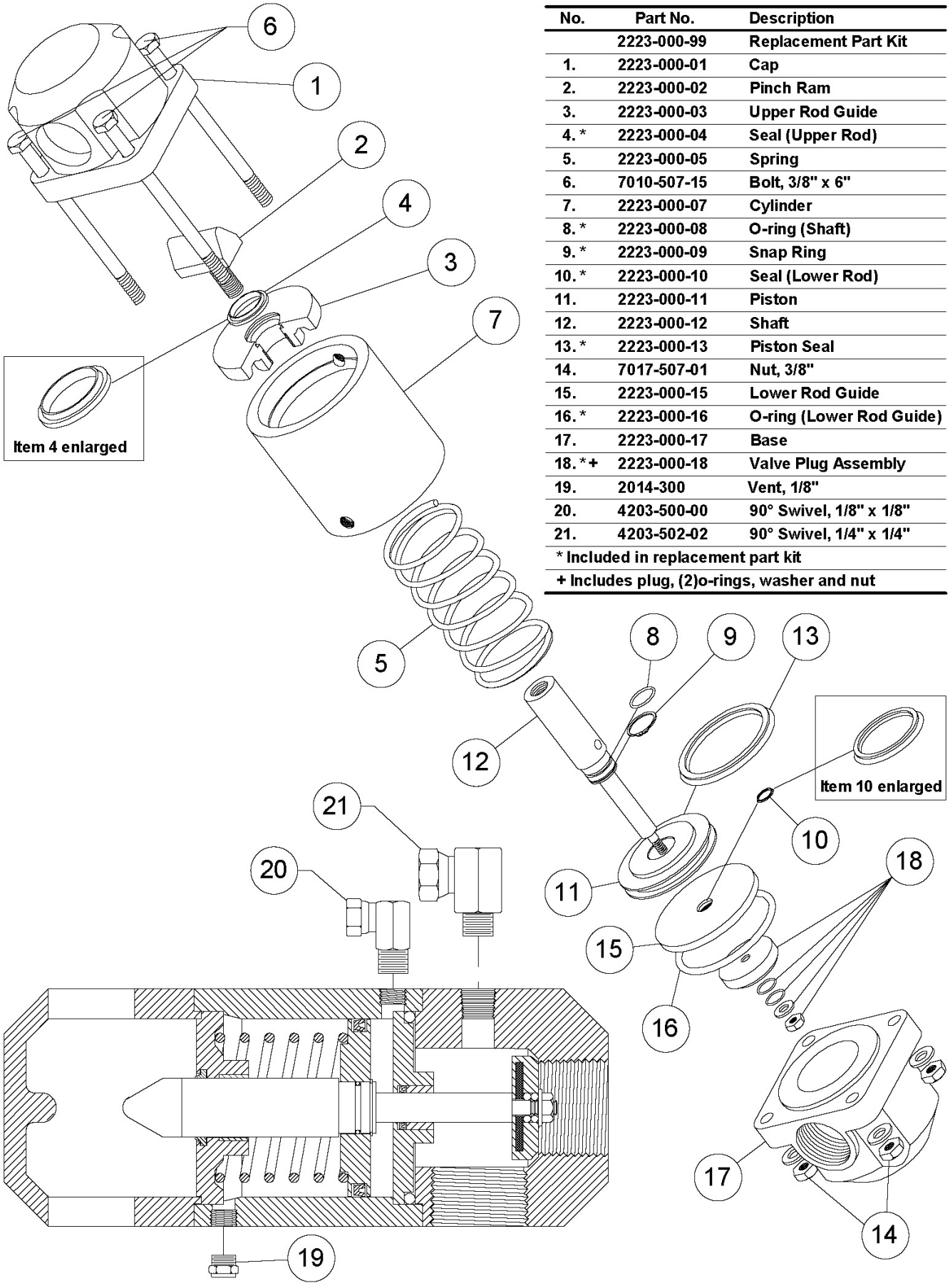
\+ Included In Hard Parts Replacement Kit

** 1-1/2" High Flow Valve is Standard On Units Manufactured After July 1, 2008



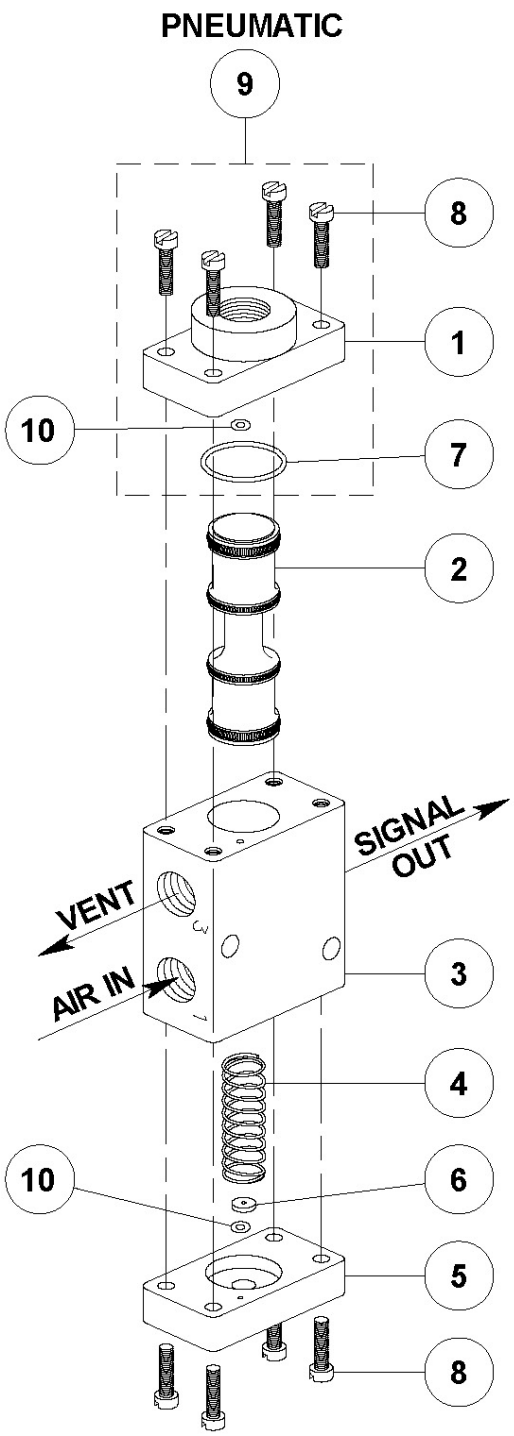
NOTE: With spring closed valve air flow is in opposite direction from arrow on valve body.

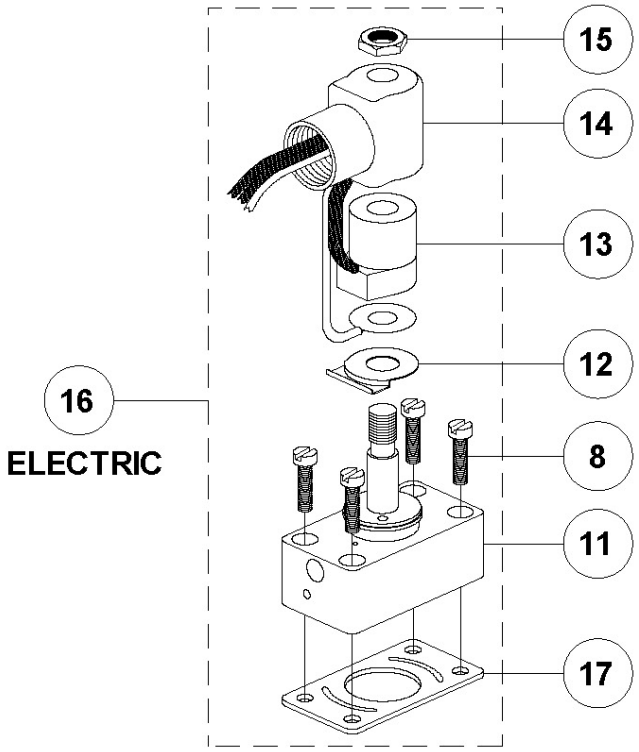
9.6 Combo Valve



	2223-000	Combo Valve
No.	Part No.	Description
	2223-000-99	Replacement Part Kit
1.	2223-000-01	Cap
2.	2223-000-02	Pinch Ram
3.	2223-000-03	Upper Rod Guide
4. *	2223-000-04	Seal (Upper Rod)
5.	2223-000-05	Spring
6.	7010-507-15	Bolt, 3/8" x 6"
7.	2223-000-07	Cylinder
8. *	2223-000-08	O-ring (Shaft)
9. *	2223-000-09	Snap Ring
10. *	2223-000-10	Seal (Lower Rod)
11.	2223-000-11	Piston
12.	2223-000-12	Shaft
13. *	2223-000-13	Piston Seal
14.	7017-507-01	Nut, 3/8"
15.	2223-000-15	Lower Rod Guide
16. *	2223-000-16	O-ring (Lower Rod Guide)
17.	2223-000-17	Base
18. *+	2223-000-18	Valve Plug Assembly
19.	2014-300	Vent, 1/8"
20.	4203-500-00	90° Swivel, 1/8" x 1/8"
21.	4203-502-02	90° Swivel, 1/4" x 1/4"
* Included in replacement part kit		
+ Includes plug, (2)o-rings, washer and nut		

9.7 Control Valves (pneumatic and electric)

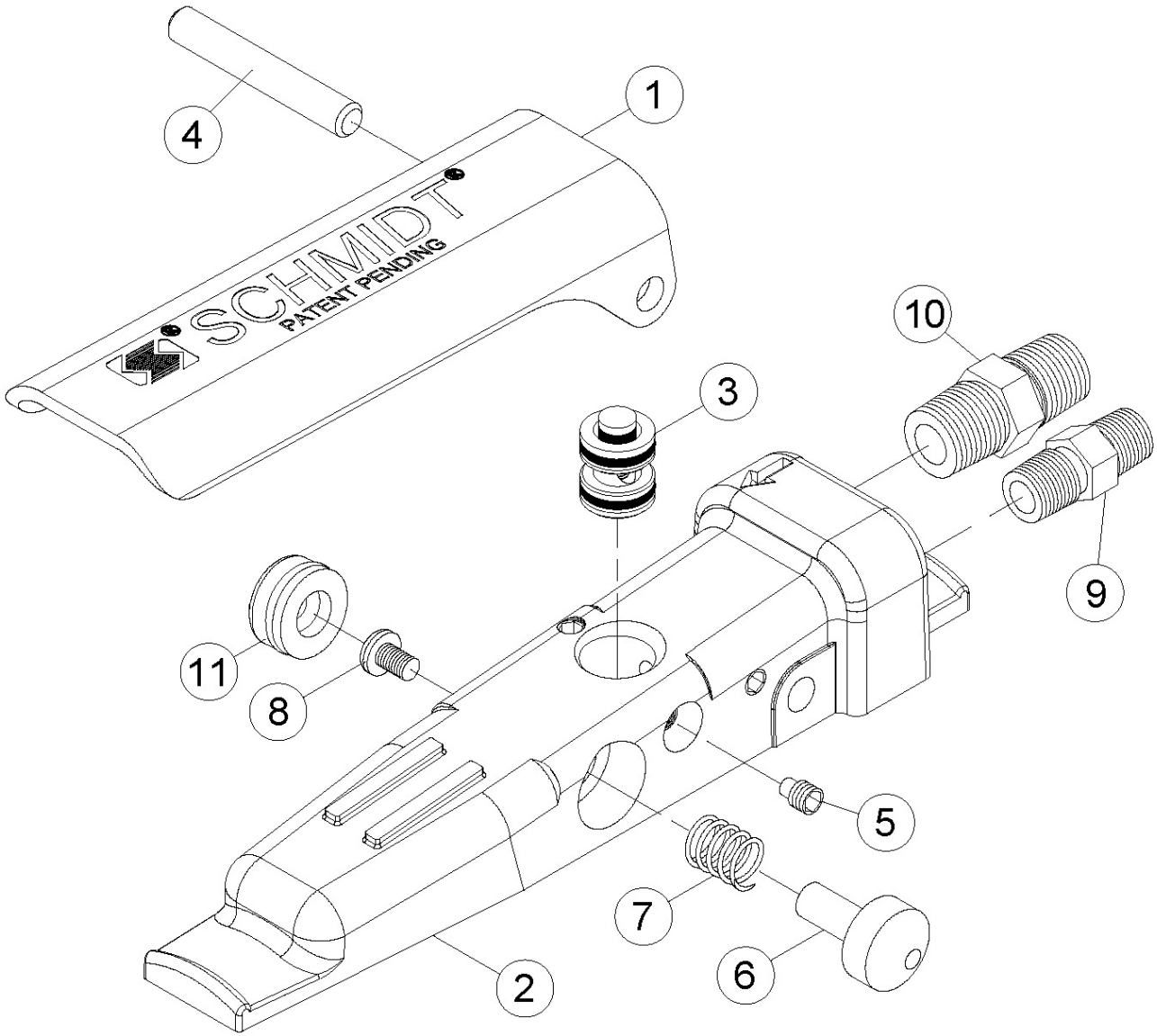




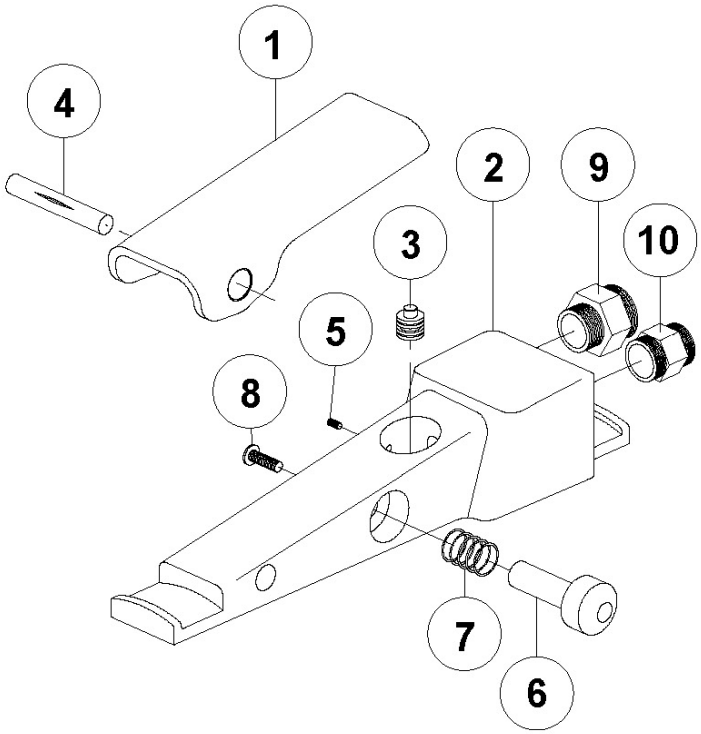
	2229-000	Pneumatic Control Valve
	2229-100	Electric Control Valve, 12 Volt D.C.
	2229-101	Electric Control Valve, 12 Volt A.C.
	2229-102	Electric Control Valve, 24 Volt D.C.
	2229-100	Electric Control Valve, 24 Volt A.C.
	2229-105	Electric Control Valve, 120 Volt A.C.
No.	Part No.	Description
	2229-000-99	Replacement Parts Kit (Pneumatic)
	2229-100-99	Replacement Parts Kit (Electric)
1.	Not Available	Air Operator Cap
2.*+	2229-000-02	Plunger w/O-Rings
3.	Not Available	Valve Body
4.*+	2229-000-04	Spring
5.	Not Available	Spring Retainer
6.*+	2229-000-06	Filter Disk
7.*	2229-000-07	O-Ring (Large)
8.	Not Available	Screw (8)
9.	2229-000-09	Air Operator Assembly
10.*+	2229-000-10	O-Ring (2 ea)
11.	Not Available	Electric Operator Cap
12.	Not Available	Coil Cover Bottom
13.	2229-100-03	Coil 12 Volt D.C.
	2229-101-03	Coil 12 Volt A.C.
	2229-102-03	Coil 24 Volt D.C.
	2229-100-03	Coil 24 Volt A.C.
	2229-105-03	Coil 120 Volt A.C.
14.	Not Available	Coil Cover
15.	Not Available	Nut
16.	2229-100-06	Solenoid Pilot Assembly, 12 Volt D.C.
	2229-101-06	Solenoid Pilot Assembly, 12 Volt A.C.
	2229-102-06	Solenoid Pilot Assembly, 24 Volt D.C.
	2229-100-06	Solenoid Pilot Assembly, 24 Volt A.C.
	2229-105-06	Solenoid Pilot Assembly, 120 Volt A.C.
17. +	2229-100-07	Gasket (Electric Only)
* Included In replacement parts kit-pneumatic		
+ Included In replacement parts kit-electric		

9.8(a) G2 Pneumatic Deadman

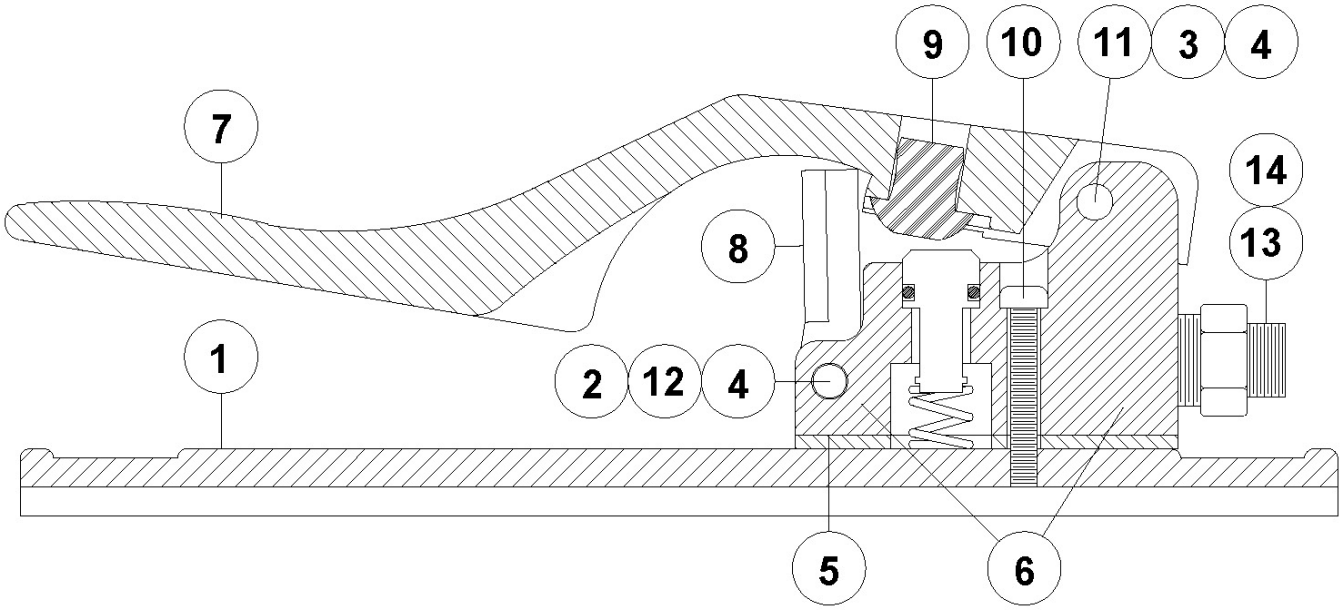
	2263-002	G2 Pneumatic Deadman
Item	Part No.	Description
	2263-002-99	G2 Replacement Parts Kit
1.	2263-002-01	G2 Deadman Lever
2.	2263-002-02	G2 Deadman Body
* 3.	2263-002-03	G2 Deadman Cartridge Assembly
4.	2263-002-04	G2 Deadman Hinge Pin
* 5.	2263-002-05	G2 Deadman Cartridge Set Screw
6.	2263-002-06	G2 Deadman Button
* 7.	2263-002-07	Deadman Spring
* 8.	2263-000-08	Deadman Screw For Button
9.	3031-300-00	Hex Nipple, 1/8" x 1/8" With Ball Seat
10.	3031-302-02	Hex Nipple, 1/4" x 1/4" With Ball Seat
*11.	2263-002-10	G2 Deadman Dust Plug
* Items included in Replacement Kit		



9.8(b) Deadman Valves (Pneumatic)

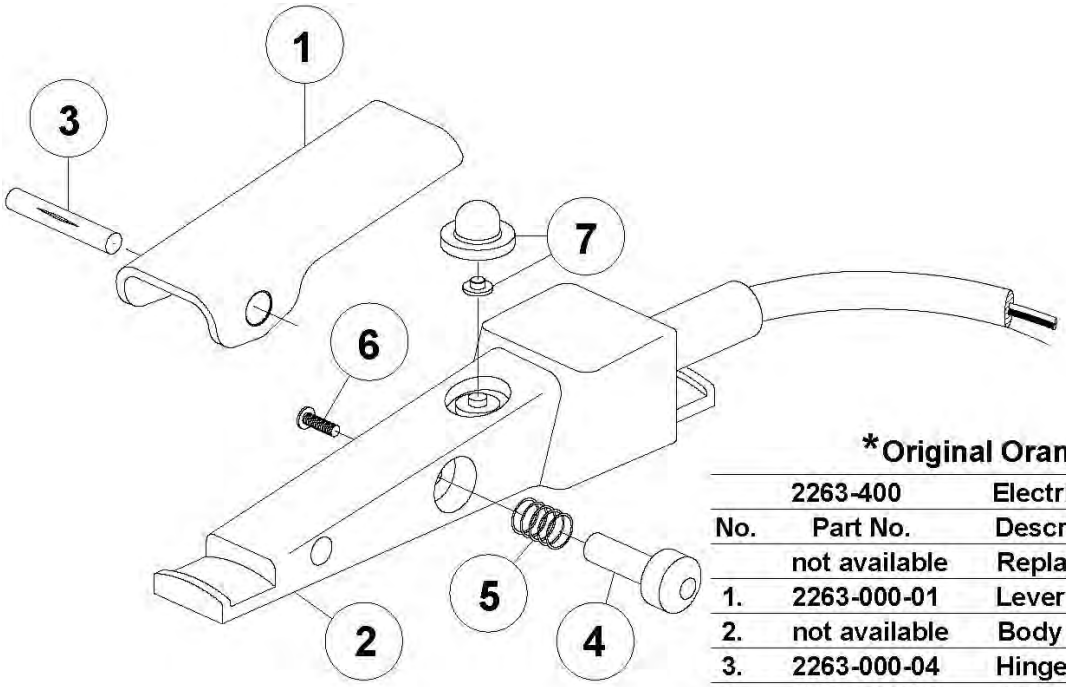


	2263-000	Pneumatic Deadman
No.	Part No.	Description
	2263-000-99	Replacement Parts Kit
1.	2263-000-01	Lever
2.	2263-000-02	Body
*3.	2263-000-03	Cartridge
4.	2263-000-04	Hinge Pin
*5.	2263-000-05	Set Screw
6.	2263-000-06	Safety Button
*7.	2263-000-07	Spring
*8.	2263-000-08	Screw for Button
9.	3031-302-00	Hex Nipple, 1/8" x 1/4"
10.	3031-300-00	Hex Nipple, 1/8" x 1/8"
* Included in replacement parts kit		



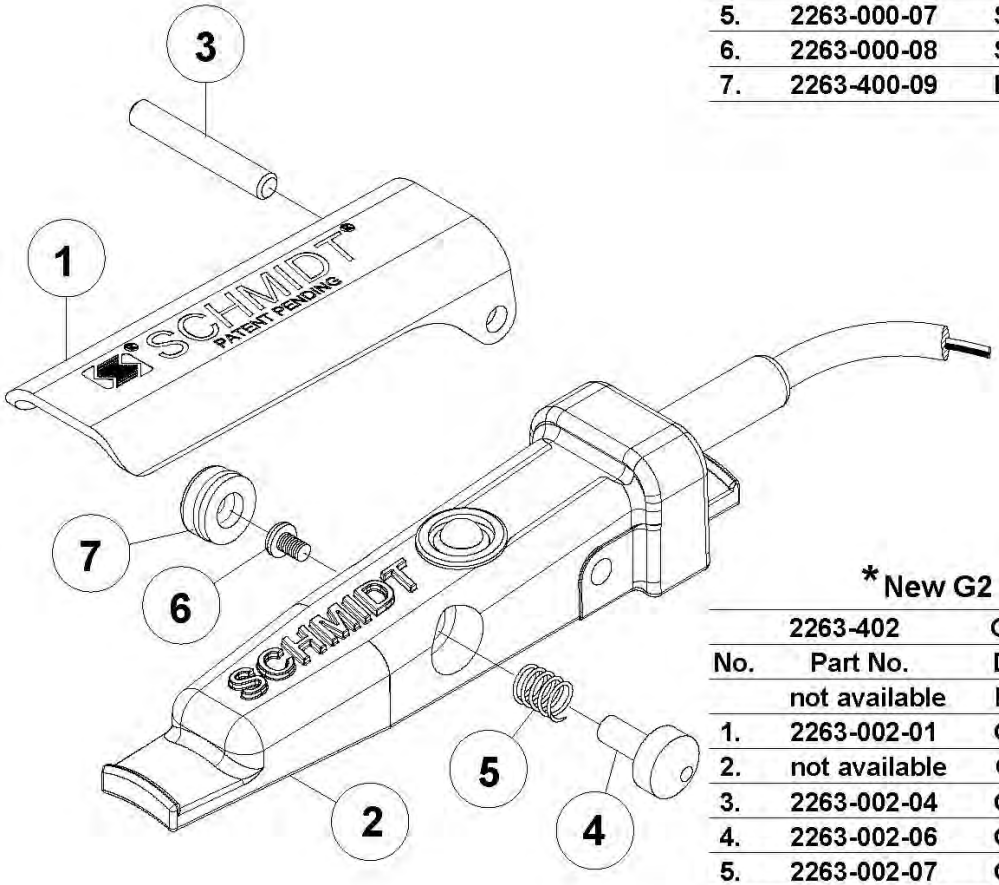
	2263-001	Pneumatic Deadman II			
No.	Part No.	Description	No.	Part No.	Description
	2263-001-99	Replacement Parts Kit Level I	8. +	2263-001-08	Safety Flap
	2263-001-98	Replacement Parts Kit Level II	9.*+	2263-001-09	Plunger Plug
1.	2263-001-01	Base	10.	2263-001-10	Body Mounting Screw
2. +	2263-001-02	Safety Flap Spring	11.	2263-001-11	Lever Spring
3. +	2263-001-03	Lever Hinge Screw	12. +	2263-001-12	Flap Hinge Screw
4.	2263-001-04	Hinge Pin Nut	13.	3031-302-00	Hex Nipple, 1/8" x 1/4"
5.*+	2263-001-05	Body Gasket	14.	3031-300-00	Hex Nipple, 1/8" x 1/8"
6.*+	2263-001-06	Valve Body Assembly	* Included in replacement parts kit, Level I		
7.	2263-001-07	Lever	+ Included in replacement parts kit, Level II		

9.9 Deadman Switches (Electric)



*Original Orange

	2263-400	Electric Deadman
No.	Part No.	Description
	not available	Replacement Parts Kit
1.	2263-000-01	Lever
2.	not available	Body w/Molded Switch
3.	2263-000-04	Hinge Pin
4.	2263-000-06	Safety Button
5.	2263-000-07	Spring
6.	2263-000-08	Screw for Button
7.	2263-400-09	Dust Cover w/Insert



*New G2 Electric

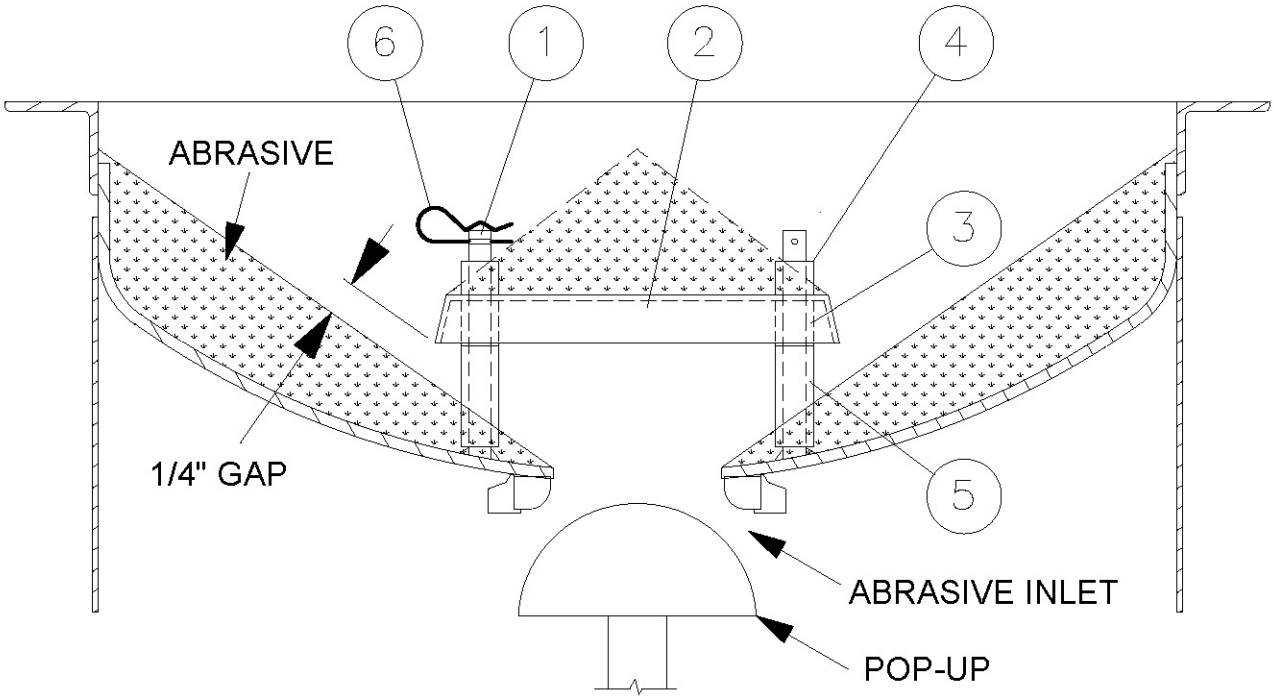
	2263-402	G2 Electric Deadman
No.	Part No.	Description
	not available	Replacement Parts Kit
1.	2263-002-01	G2 Lever
2.	not available	G2 Body w/Switch
3.	2263-002-04	G2 Hinge Pin
4.	2263-002-06	G2 Safety Button
5.	2263-002-07	G2 Spring
6.	2263-000-08	Screw for Button
7.	2263-002-10	G2 Dust Plug

⚠ WARNING

*Electric shock hazard. To minimize shock hazard use electric deadman in low voltage applications only (12-24 volts).

9.10 Abrasive Spider (field adjustment required)

ITEM	QTY	PART NO.	DESCRIPTION
1	1	7001-000-98	SPIDER STUDS INSTALLED
2	1	7001-000-02	SPIDER DISK 9"
3	3	7001-000-03	SPIDER SPACER, 1"
4	3	7001-000-04	SPIDER SPACER, 3/4"
5	3	7001-000-05	SPIDER SPACER, 2-1/4"
6	3	7119-002	SAFETY PINS, AIR BLAST HOSE COUPLINGS



The abrasive spider is a standard feature installed on double chamber abrasive blasters because they are for blast room applications which typically have an abrasive storage hopper above. The spider provides a void area above the popup which shields the popup from a head of abrasive above. The void allows free movement of the popup for proper sealing against the gasket. Pour abrasive into the vessel top head and allow it flow in and form the areas of dead abrasive above the spider plate and to the sides as shown above. The gap should be approximately 1/4". The spider spacers can be removed to lower the spider disk. The spacers can be cut shorter if necessary.

⚠ WARNING

Pinch point hazard. Vessel pressurization will close the popup. Keep hands and fingers away from popup. Disconnect air supply prior to performing popup maintenance.

10.0 Recommended Spare Replacement Parts Lists

A) ELECTRIC and PNEUMATIC CONTROLS (see note below & refer to Section 9.0 drawings)			
Item No.	**Qty.**	**Part No.**	**Description**
2	10	4211-999	Crowfoot Gasket
3	1	2401-509	Air Inlet Ball Valve, 2”
4	1	2401-506	Blowdown Ball Valve, 1”
5	2	2100-010	Popup With Stem
6	2	2100-011	Popup Gasket
9	1	2123-10**X**	Auto Air Valve (specify piping size)
9	1	2123-00**X**-02	Auto Air Valve Diaphragm (specify size)
9	1	2123-10**X**-24	Auto Air Valve Spring (specify size)
9	1	2123-00**X**-99	Auto Air Valve Replacement Kit (specify size)
9	1	4115-005-**XX**	Blowdown hose assembly, (specify length)
10	1	4104-40**X-XX**	Blast hose assembly (specify size and length)
11	1	500X-**XXX**	Blast nozzle (specify size and type)
13	1	2401-50**X**	Choke Ball Valve (specify piping size)
14	1	2152-**XXX**	Thompson Valve II (specify piping size and sleeve type)
14	1	2152-000-03	Thompson Valve® II Spring
14	1	2152-000-**XX**	Thompson Valve II Base (specify piping size)
14	1	2152-000-98	Thompson Valve II Replacement Part Seals Kit
14	1	2152-**XXX**-99	Thompson Valve II Replacement Part Kit (specify sleeve type)
23	1	2301-902-90	Strainer, 1/4"
25	2	4215-**XXX**	Nozzle Holder (specify size and type)
26	2	4213-**XXX**	Blast Hose Coupling (specify size)
27	2	4214-**XXX**-01	Threaded coupling (specify size and type)
27	20	4214-999	Coupling Gasket (fits hose and threaded couplings)
28	1	2223-000	Combo Valve
28	1	2223-000-99	Replacement Parts Kit, Combo Valve
31	1	7122-XXX	Relay (specify voltage)
31	1	7124-XXX	Timer (specify type)
32	1	5013-XXX-XX	Level Sensor (specify voltage and type)
34	2	7000-001-06	Handway Gasket, 6” x 8”
36	2	4205-10**X**	Hose insert (specify size)
36	10	4205-10**X**-99	Insert gasket
37	2	4235-00**X**	Hose clamp, double bolt (for field installation) (specify size)
38	10ft	4102-00**X**	Air hose (specify size)
39	20	7119-002	Safety Pin, Air/Blast Hose Coupling
40	2	8710-98778	Hose whip check
41	1	7031-999-02A	Safety decal kit (See Section 0.0)
-	1	2408-907	Union end ball valve (optional) See Section 5.18
43	1	2229-**XXX**	Cycle Control Valve (specify voltage)
43	2	2229-10**X**-03	Control Valve Coil (specify voltage)
43	2	2229-100-99	Electric Control Valve Replacement Parts Kit
45	1	2490-90X	Check Valve, w/ weep hole (specify size)
B) ITEMS FOR PNEUMATIC CONTROLS ONLY (see note below)			
12	1	2263-002	G2 Pneumatic Deadman Valve
12	2	2263-000-99	Pneumatic Deadman Valve Replacement Parts Kit
15	1	4100-501	Twinline Hose, 55ft.
16,19	1	4224-301-02	Quick Disconnect Socket, 1/4"
17,18	1	4224-300-02	Quick Disconnect Plug, 1/4"
20	1	2229-000	Pneumatic Control Valve
20	2	2229-000-99	Pneumatic Control Valve Replacement Parts Kit
C) ITEMS FOR ELECTRIC CONTROLS ONLY (see note below)			
12	1	2263-402-01	G2 Electric Deadman Switch With Plug
15	1	7074-055	Extension Cord 55'
16	1	7109-300	Female Twist-lock Connector, 3-Prong
18	1	7109-301	Male Twist-lock Plug, 3-Prong
20	1	2229-100	Electric Control Valve, 12Vdc
20	1	2229-100-03	Control Valve Coil, 12Vdc

NOTE: Determine the type of blast controls on the abrasive blaster (either electric or pneumatic). Then, the required list of spare parts is List “A” plus either List “B” or “C”. For blasters with special options refer to supplemental drawing(s) included with this operation and maintenance manual.

11.0 Troubleshooting

This section lists probable causes of problems that may occur during operation of the abrasive blaster. Not all of the "probable causes" may apply to your particular abrasive blaster. The probable cause may not apply because of the control type and accessories on the abrasive blaster. Refer to Figure 11.1 and the drawings in Section 9.0.

⚠ DANGER

Abrasive blasters are Pressurized Vessels. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

11.1 Malfunction With Deadman Lever In The "Off" Position

11.1.1. Blast air stops but abrasive will not shut off

(1) Trash stuck between plunger and seat in Thompson Valve® (#14) prevents closing.
(2) Defective valve plunger in Thompson Valve (worn by abrasive or broken).
(3) Defective sleeve in Thompson Valve (worn by abrasive).
(4) Blocked air hose to Thompson Valve (trash blockage or pinched hose).
(5) Defective or broken spring in Thompson Valve (check length of spring).
(6) Thompson Valve cap (or spring retainer) not screwed all the way down (hand tighten only).

11.1.2. Abrasive stops but blast air will not shut off

(1) Defective or broken spring in automatic air valve (#9).
(2) Defective seat in automatic air valve.
(3) Blocked signal air hose to automatic air valve.
(4) Defective o-ring in automatic air valve (around shaft).

11.1.3. Both blast air and abrasive will not shut off

(1) Twinline hoses to deadman valve (#12) are crossed.
(2) Non-Schmidt deadman (#12) has been installed.
(3) Control valve (#20) stuck in the "ON" position.
(4) Blocked twinline hose.
(5) Defective deadman valve (#12). Pneumatic deadman cartridge plunger stuck in the "ON" position (down). Cartridge plunger is visible below deadman handle.
(6) Defective or broken Combo Valve (#28) spring.
(7) Defective Combo Valve (#28) lower rod guide seal.

11.1.4. Blast outlet turns on accidentally

(1) The deadman lever (#12) is worn out.
(2) The safety button on the deadman is missing. See drawings in Section 9.8 and 9.9.
(3) A bleeder type deadman valve has been installed. A bleeder type deadman valve *is not safe* because a particle of dirt from the air hose can plug the bleed hole and cause the blast outlet to turn on. See *Warnings* and *Rules for Safer Operation* in Section 1.0.
(4) Defective electric deadman switch or electric wiring (check for an electric short).
(5) Defective Combo Valve (#28) lower rod guide seal.

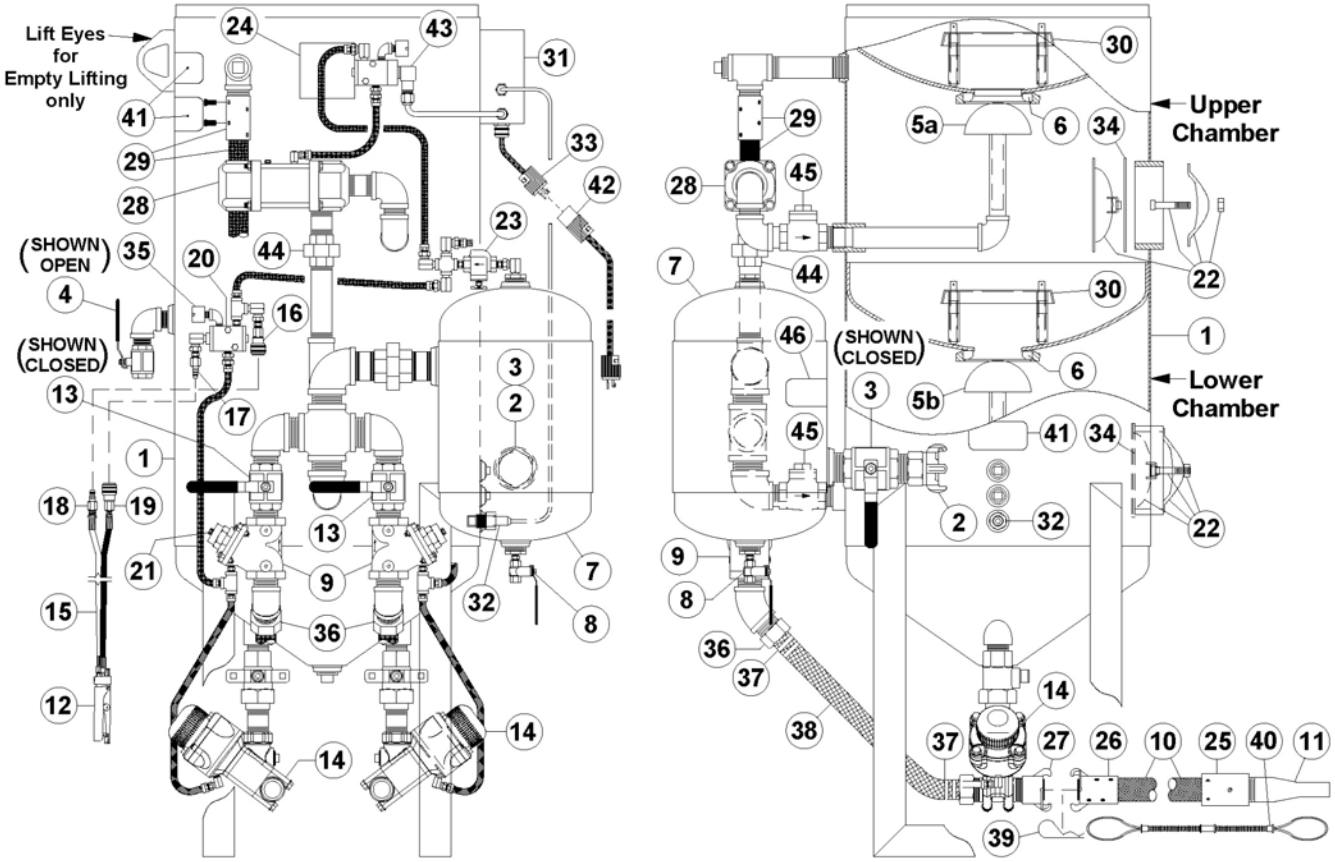


Figure 11.1 – Double Chamber Abrasive Blaster with pneumatic blast controls

11.2 Malfunction With Deadman Lever In The "On" Position

11.2.1. Air blasts with no abrasive

(1) Check abrasive level in blast vessel (even if optional second outlet blasts normally).
(2) Blocked control air hose to Thompson Valve® (#14) prevents opening.
(3) Thompson Valve (#14) plunger stuck in closed position.
(4) Trash plugging opening from tank to Thompson Valve (#14). See Section 11.3.
(5) Insufficient air pressure to open Thompson Valve (fully open requires 80 psig).
(6) Abrasive flow problems. See Section 11.3.
(7) Defective Thompson Valve piston seal (air will leak from breather).
(8) Upper or lower chamber popup or handway air leak reduces pressure slowing abrasive flow.

11.2.2. Abrasive choking out of blast hose with low blast air pressure

(1) Thompson Valve (#14) abrasive adjustment knob is open too far.
(2) Control air hose to automatic air valve (#9) blocked, pinched, or leaking prevents opening.
(3) Choke valve (#13) is partially closed causes differential pressure increases abrasive flow.
(4) Low air compressor output cfm (unit may cycle on and off). See Section 3.0.
(5) Blocked automatic air valve (#9) breather vent (#21) prevents full opening.

11.2.3. Reduced Pressure At The Nozzle (with or without abrasive flow)

(1) Low air compressor output CFM. See Section 3.0 to determine air requirements.
(2) Air supply hose to blaster is too small. See Section 3.0.
(3) Thompson Valve abrasive adjustment knob (#14) is open too far.
(4) Check for leaks in blast vessel (popup or handway) or control piping.
(5) Choke valve (#13) is partially closed.
(6) Trash may be partially plugging the nozzle orifice (#11).
(7) Blocked automatic air valve (#9) breather vent (#21) prevents full opening.

11.2.4. Blast is slow to turn on or will not turn on when deadman lever is pressed down.

(1) Check quick couplings (#16 & #17) on control hoses to see if they are connected properly.
(2) Control valve (#20) stuck in exhaust position or midway (air will leak from breather #35).
(3) 1/4" strainer (#23) blocked; restricts air flow to deadman.
(4) Twinline control hoses are blocked.
(5) Cartridge in deadman valve (#12) is blocked.
(6) Low air compressor output CFM (unit may cycle on and off). See Section 3.0.
(7) Air leaks in twinline hose from the deadman valve (#12) to control valve (#20).
(8) Trash blocking the blast nozzle orifice (#11).
(9) Blocked automatic air valve (#9) breather vent (#21) prevents full opening.

11.3 Additional Information on Abrasive Flow Problems

11.3.1. Thompson Valve® operation

If abrasive flow is a problem, remember; the Thompson Valve only opens and closes. The total travel to full open is approximately 3/4 of an inch. This can be quickly checked with the adjustment knob on the abrasive valve.

For this procedure manually close the choke valve (#13) and the media shut-off valve to stop blast flow. This test is to verify that the Thompson Valve is opening.

With the deadman off, screw the Thompson Valve knob down until it stops. Notice that the knob turns easily when the deadman is off. Next, back the knob out 3/4 of an inch or slightly less, then press the deadman lever down to open the Thompson Valve. The knob should get tight or more difficult to turn because the valve has opened against the adjustment. This guarantees that the valve is fully open. If the material will not flow with the valve fully open, you have an abrasive flow problem, not a problem with the Thompson Valve. The abrasive may be wet, or there may be trash blocking the opening. Try choking the blast outlet to clear the opening. Proceed to step 11.3.2. If the knob does not get tighter during this test troubleshoot the controls and the Thompson Valve piston seal.

⚠ DANGER

Do Not hammer on any part of the pressure vessel to improve abrasive flow. This can cause cracks that may lead to pressure vessel rupture.

11.3.2. Choking the blast outlet

The choke valve (#13) is used to clear any trash that may get into the blast vessel and block the Thompson abrasive valve orifice. Whenever trash (paint chip, cigarette butt, etc.) blocks the abrasive valve orifice, the procedure is to fully open the valve by turning the knob counterclockwise, then press down the deadman lever (#12) to begin blasting. While blasting, have an assistant close the choke valve completely for about one second. This creates differential pressure at the abrasive valve (high pressure above; low pressure below). The higher pressure from the blast vessel should be enough to loosen the trash blocking the abrasive valve orifice and blast it through the blast nozzle (#11). To minimize excess wear of the Thompson Valve keep the choke valve fully open during normal blasting. If the blaster is equipped with the abrasive cutoff feature set the valve (or switch) to the on-position for the choke procedure.

Note: Thompson Valve II has a cleanout port to use for this procedure. See the valve drawing in Section 9.4(b) (Item 27).

11.3.3. Blast control hoses

Remember, the blaster controls and valves are normally closed. Therefore, the control hoses are depressurized to turn the blast off and pressurized to turn the blast on. If a needle gauge is available, it is the quickest way to check to see if there is pressure in the control hoses. If no needle gauge is available, disconnect each control hose fitting one at a time until the problem is located.

11.3.4. Reclaimed abrasive

Additional abrasive flow problems are possible when abrasive is reclaimed into a storage hopper for reuse. Trash and other debris will be collected with the reclaimed abrasive and can possible pass into the abrasive blaster. Trash or other debris can clog the Thompson Valve® and prevent abrasive flow. Note: Reclaimed abrasive must be passed through a screen to prevent debris from entering the abrasive blaster. Confirm that a screen is present in the abrasive hopper or within the reclaim system.

11.4 Troubleshooting Double Chamber Operation

The most common cause of problems with double chamber abrasive blasters is related to the air supply. Insufficient air supply causes pressure drops, pressure unbalance between the upper and lower chambers, and within the blast system. These pressure problems will prevent proper operation of the blaster. Review the information in Section 3.0 and confirm that the air supply pressure and cfm meets the requirements as explained.

11.4.1. Cycle Control Does Not Operate (upper chamber does not pressurize)

(1) Confirm power supply; check control box (#31) electric breaker(s).
(2) Confirm correct supply voltage and amperage; check electrical drawing.
(3) Confirm correct supply polarity (DC systems); check electrical drawing.
(4) Confirm correct control box (#31) timer mode; check electrical drawing.
(5) Level sensor (#32) false “covered” state; check sensitivity adjustment.
(6) Level sensor (#32) position too high; confirm uncovered when abrasive runs out.
(7) Faulty level sensor (#32); remove and confirm operation.
(8) Faulty control box (#31) relay; check manual relay operation.
(9) Faulty control box (#31) timer.
(10) Faulty control valve (#43); no output signal to Combo Valve®.
(11) Faulty Combo Valve (#28) piston seal.
(12) Faulty Combo Valve (#28); breather vent plugged.

11.4.2. Blaster Runs out of Abrasive (upper chamber pressurized)

(1) Lower chamber popup not opening; insufficient air supply leads to system pressure drops causing pressure unbalance between chambers.

(2) Lower chamber popup not opening; obstruction at upper chamber popup leads to air leak causing pressure unbalance between chambers.

(3) Lower chamber popup not opening; misalignment of upper chamber popup leads to air leak causing pressure unbalance between chambers.

(4) Lower chamber popup not opening; stuck open caused by popup misalignment. See Section 8.4 for popup maintenance.

(5) Lower chamber popup not opening; stuck open caused by popup stem jammed. Check for abrasive inside popup piping.

(6) Lower chamber popup not opening; faulty Combo Valve (#28) lower rod guide seal leads to partial opening causing pressure unbalance between chambers.

(7) Lower chamber popup not opening; worn/leaking Combo Valve blowdown hose causing pressure unbalance between chambers.

(8) Lower chamber popup not opening; leaking upper chamber handway causing pressure unbalance between chambers.

(9) Low abrasive supply; reclaim system/hopper abrasive level low.

(10) Low abrasive supply; hopper abrasive screen clogged.

(11) Low abrasive supply; faulty hopper outlet valve

12.0 Warranty and Reference Information

12.1 Warranty

This following section is to be used as a guide in determining warranty policies and procedures for SCHMIDT® products. It is to be used in determining whether a warranty is justified and as a procedural guide in completing a SCHMIDT warranty claim.

12.2 Warranty Policy

1. All SCHMIDT products are guaranteed to be free of defects in material and workmanship at time of shipment. Axxiom Manufacturing, Inc. warrants its products against defects in material and workmanship under normal and proper use for a period of ninety (90) days from the date of delivery. Such warranty is extended only to the buyer who purchases the equipment directly from Axxiom Manufacturing, Inc. or its authorized distributors. This warranty does not include expendable parts such as, but not limited to, hoses, nozzles, and seals.

2. The obligation under this warranty is strictly limited to the replacement or repair, at Axxiom's option, of machines and does not include the cost of transportation, loss of operating time, or normal maintenance services. Axxiom Manufacturing, Inc. shall have no liability for labor, consequential damages, freight or special charges.

3. This warranty does not apply to failure occurring due to abuse, misuse, negligence, corrosion, erosion, normal wear and tear, alterations or modifications made to the machine without express written consent of Axxiom Manufacturing, Inc.

4. Warranty requests must be submitted in writing within thirty (30) days after failure.

5. Written authorization to return merchandise under warranty must first be obtained from Axxiom Manufacturing, Inc. In no case is merchandise to be returned to Axxiom for credit without authorization. At the time of authorization, Axxiom will issue a return authorization number that must be included on all packages and correspondence. Any material returned without prior authorization will remain the property of the sender and Axxiom will not be responsible for it.

6. All returns must be shipped prepaid freight. All returns may be exchanged for other equipment or parts of equal dollar value. If goods are not exchanged, they are subject to a 20% restocking charge. Any cost incurred by Axxiom Manufacturing, Inc. to restore such goods to first class condition will be charged to the customer.

7. Axxiom Manufacturing, Inc. reserves the right to inspect and make the final decision on any merchandise returned under warranty.

8. Axxiom Manufacturing, Inc. offers no warranty with respect to accessories, including but not limited to, engines, motors, batteries, tires and any other parts not manufactured by Axxiom Manufacturing, Inc., but which the original manufacturer warrants.

9. Axxiom Manufacturing, Inc. reserves the right to make product changes or improvements without prior notice and without imposing any obligation upon itself to install the same on its products previously sold.

10. The above warranty conditions can only be altered by Axxiom Manufacturing, Inc. Axxiom must confirm alterations in writing for each specific transaction.

11. Axxiom Manufacturing, Inc. reserves the right to establish specific warranty terms for used or demo machines on an individual transaction basis. Invoices covering such merchandise will clearly state the provisions of the applicable warranty for each specific transaction.

12. USE OF NON-ORIGINAL SCHMIDT® FACTORY REPLACEMENT PARTS ON ANY SCHMIDT EQUIPMENT VOIDS ALL WARRANTIES.

13. AXXIOM MANUFACTURING, INC. DOES NOT AUTHORIZE ANY PERSON, REPRESENTATIVE OR SERVICE OR SALES ORGANIZATION TO MAKE ANY OTHER WARRANTY OR TO ASSUME ON BEHALF OF AXXIOM MANUFACTURING, INC. ANY LIABILITY IN CONNECTION WITH THE SALE OF OUR PRODUCTS OTHER THAN THOSE CONTAINED HEREIN.

14. UNDER NO CIRCUMSTANCES SHALL AXXIOM MANUFACTURING, INC. BE LIABLE TO CUSTOMER OR ANY OTHER PERSON FOR ANY DIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT OR ARISING OUT OF ANY BREACH OF ANY WARRANTY OR FOR ANY SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER, INCLUDING WITHOUT LIMITATIONS, DAMAGES FOR ANY LOSS OF GOODWILL, WORK STOPPAGE, OR ANY AND ALL OTHER COMMERCIAL DAMAGES OR LOSSES.

15. AXXIOM MANUFACTURING, INC. MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE SCHMIDT PRODUCTS SOLD PURSUANT THERETO.

12.3 Trademarks, Patents, and Proprietary Statements

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Products manufactured and marketed by Axxiom Manufacturing, Inc. are protected by patents issued or pending in the United States and other countries.

The text, diagrams, and drawings contained in this manual are proprietary information intended solely for instruction in the operation of the specified equipment. Use of any text, diagrams, or drawings contained in this manual for any reason other than its intended purpose without the written consent of Axxiom Manufacturing, Inc. is strictly prohibited.

12.4 Safety Information Sources

Axxiom Manufacturing, Inc
This equipment and all Schmidt® equipment are manufactured exclusively by Axxiom Manufacturing, Inc. If any operational or safety related questions arise relating to this equipment contact Axxiom Manufacturing, Inc.

Phone: 1-800-231-2085
Website: www.schmidtabrasiveblasting .com

Axxiom Manufacturing, Inc.
11927 South Highway 6
Fresno, Texas 77459

Occupational Safety and Health Administration (OSHA) establishes and enforces regulations regarding safety practices in the workplace including the abrasive blasting industry. Any questions, reporting of work related injuries, or reporting of unsafe work practices can be made to the following contact information. Answers to most any safety related questions can be found at the OSHA website shown below.

Phone: 1-800-321-6742
Website: www.osha.gov

U.S. Department of Labor
Occupational Safety and Health Administration
200 Constitution Avenue
Washington D.C. 20210

National Institute of Occupational Safety and Health (NIOSH) is a federal agency responsible for conducting research and recommendations for the prevention of work related injuries and sickness.

Phone: 1-800-356-4674
Website: www.cdc.gov/niosh

National Institute of Occupational Safety and Health
Hubert H. Humphrey Bldg.
200 Independence Avenue, SW
Room 715H
Washington, DC 20201

American National Standards Institute (ANSI) coordinates the development and use of voluntary consensus standards including safety standards.

Phone: 1-202-293-8020
Website: www.ansi.org

American National Standards Institute
1819 L Street, NW
6th Floor
Washington, DC 20036

12.5 Surface Preparation Information Sources

The Society for Protective Coatings (SSPC) consists of research and testing committees, conducts seminars and establishes industry standards on surface preparation methods, abrasive and coatings.

Phone: 1-412-281-2331
Website: www.sspc.org

The Society for Protective Coatings
40 24th Street
Pittsburg, PA 15222-4643

National Association of Corrosion Engineers (NACE) develops test methods and recommended practices on surface preparation techniques and coatings.

Phone: 1-281-228-6200
Website: www.nace.org

National Association of Corrosion Engineers
1440 South Creek Drive
Houston, TX 77084

12.6 Table of Blast Abrasive Characteristics

Abrasive Type	Hardness (Mohs)	Grain Shape	Density Lbs/ft3	Color	Free Silica Content	No. of Recycles	Initial Cost	Typical Use
Corn Cobs	2	angular	35-45	tan	none	4-5	low	stripping paint from delicate substrates
Sodium Bicarbonate	2.8	crystal	60	white	none	4-5	medium	cleaning and stripping paint from delicate substrates
Walnut Shell	3	angular	45	lt. brown	none	4.5	low	stripping paint from delicate substrates
Plastic	3.2	angular	45-60	white	none	8-10	medium	Paint stripping, deburring, and cleaning
Glass Beads	4.5	spherical	90	crystal	none	8-10	low	cleaning finishing
Starblast XL	6.5	spherical	128	lt. brown	<1%	4-5	medium	outdoor blasting
Coal Slag	7	angular	85	black	none	1-2	medium	outdoor blasting
Copper Slag	7	angular	112	black	none	1-2	medium	outdoor blasting
Garnet	7	angular	147	pink	<2%	4-5	medium	outdoor blasting
Steel Shot	8	spherical	280	steel grey	none	200	low	cleaning and peening
Steel Grit	8	angular	280	steel grey	none	200	medium	removing heavy scale
Aluminum Oxide	9	angular	120	brown	<1%	6-8	medium	cleaning and finishing, deburring and etching

13.0 Blasting Data

13.1 Table 1 Approximate Air Consumption (CFM) Per Blast Nozzle

	NOZZLE PRESSURE						
NOZZLE SIZE	**60 psi**	**70 psi**	**80 psi**	**90 psi**	**100 psi**	**120 psi**	**140 psi**
No.2 1/8"	14	16	18	20	22	26	30
No.3 3/16"	32	36	41	45	49	58	66
No.4 1/4"	57	65	72	80	90	105	121
No.5 5/16"	90	101	113	125	140	160	185
No.6 3/8"	126	145	163	182	200	235	270
No.7 7/16"	170	193	215	240	270	315	360
No.8 1/2"	230	260	290	320	350	410	470
No.10 5/8"	360	406	454	500	550	640	740
No.12 3/4"	518	585	652	720	790	925	1060

13.2 Table 2 Abrasive Consumption (lbs. per hour) Per Blast Nozzle

	NOZZLE PRESSURE						
NOZZLE SIZE	**60 psi**	**70 psi**	**80 psi**	**90 psi**	**100 psi**	**120 psi**	**140 psi**
No.2 1/8"	90	105	115	130	140	165	190
No 3 3/16"	205	230	260	290	320	375	430
No.4 1/4"	365	420	460	500	560	660	760
No.5 5/16"	575	650	725	825	900	1050	1200
No.6 3/8"	840	945	1050	1155	1260	1475	1700
No.7 7/16"	1150	1300	1450	1600	1750	2050	2350
No.8 1/2"	1460	1660	1850	2000	2250	2650	3000
No.10 5/8"	2290	2600	2900	3125	3520	4100	4750
No.12 3/4"	3300	3750	4180	4500	5060	5950	6800

13.3 Table 3 Hose Selection Guide (blasting @ 100 Psi)

NOZZLE SIZE	**No.4 1/4"**	**No.5 5/16"**	**No.6 3/8"**	**No.7 7/16"**	**No.8 1/2"**
CFM @ 100psi	90	140	200	270	350
AIR HOSE	1 1/4"	1 1/4"	1 1/2"	1 1/2"	2"
BLAST HOSE	1"	1 1/4"	1 1/4"	1 1/2"	1 1/2"
ABRASIVE (lbs per hr)	560	900	1260	1750	2250

13.4 Additional Information on Blasting Productivity

Air volume and pressure are very important. The blasting production rate will increase with higher blasting pressures and decrease with lower blasting pressures. The National Association of Corrosion Engineers' data suggests that for each 1 psi reduction in nozzle pressure, there is a 1.5% production loss. Pressure drop through a Schmidt® blast unit is normally less than 1 psi, while blast units manufactured by some of our competitors have pressure losses as high as 12 psi resulting in an 18% loss of production. Air pressure loss can also be avoided by using the shortest possible hose of adequate size. The inside diameter of both the blast hose (other than whip hose) and the air hose should be approximately three times the diameter of the orifice in the blast nozzle.

Standard Schmidt blast units are rated for a maximum pressure of 125 psi or 150 psi. Refer to the pressure vessel nameplate for maximum operating pressure.

14.0 Cycle Control Electrical Drawing and Level Sensor Data

This section includes the cycle control box (#31) electrical drawing and the manufacturer's data for the level sensor. This section also contains supplemental drawings of special options that may have been purchased for this abrasive blaster.

IFM Efector Sensitivity Adjustment Procedures

All Efector capacitive proximity sensors have a potentiometer which allows sensor sensitivity to be adjusted for best results in each application. To establish the proper sensitivity for a particular set of target conditions, follow the simple procedure outlined here for a normally closed sensor:

Step 1.

Mount the sensor in the actual application in which it will be used. Then set up the worst case conditions which can cause a "false covered" condition. As an example, assume the sensor is being used to detect the level of a liquid through a sight glass. To establish the worst case conditions, fill the sight glass, then reduce the level so that moisture and any residue are present on the inside of the sight glass. If the LED is off, turn the potentiometer counterclockwise (CCW) until it just turns on. If the LED was on, turn the potentiometer clockwise (CW) until the LED turns off, then turn CCW until the LED just turns on.

Step 2.

Now bring the target into position. (In the example, bring the liquid level in the sight glass above the sensor.) The LED should now be off. Turn the potentiometer CCW and count the number of turns until the LED turns on.

Step 3.

Turn the potentiometer CW for 1/2 the number of turns observed in Step 2. For example, if it took four turns CCW to have the LED go on in Step 2, now rotate the potentiometer 2 turns CW. The sensor will now be set in the midpoint of its sensitivity range for maximum stability.

Note: If you have trouble during Step 2, (for example, when trying to sense very lightweight materials) contact the manufacturer's application engineering department.

ifm electronic

CE

Operating instructions
Capacitive sensors
efector150

UK

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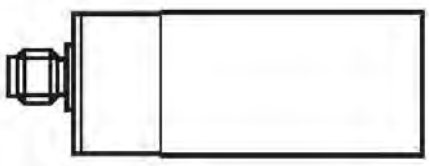


Contents

Preliminary note

- An instruction is indicated by "▶":
  Example: ▶Check whether the unit operates correctly.
- A reaction to the action is indicated by ">":
  Example: > Yellow LED lights.


Important note
Non-compliance can result in malfunctions or interference.


Information
Supplementary note.

UK

1 Safety instructions

- Please read the product description prior to set-up of the unit. Ensure that the product is suitable for your application without any restrictions.
- The unit conforms to the relevant regulations and EC directives.
- Improper or non-intended use may lead to malfunctions of the unit or to unwanted effects in your application.
- That is why installation, electrical connection, set-up, operation and maintenance of the unit must only be carried out by qualified personnel authorised by the machine operator.

2 Functions and features

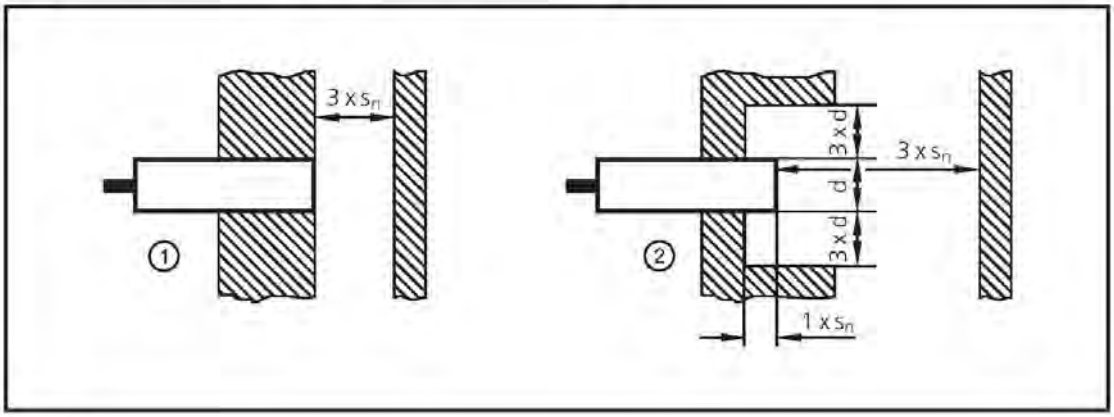
- The capacitive sensor detects without contact metals, almost all plastics, glass, ceramics, wood, paper, oils, greases, water and all hydrous materials and indicates their presence by providing a switched signal.

3 Installation

3.1 Notes on flush and non-flush installation

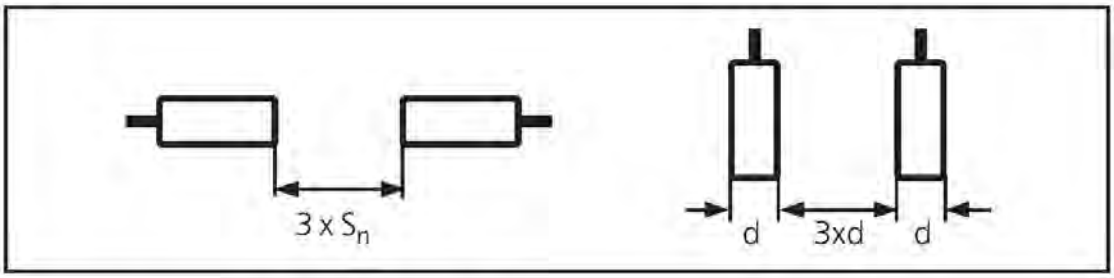
In case of flush installation of non-flush units the sensor properties change and the sensor can remain permanently switched (loss of function).

▶ Observe the free space around the sensing face.



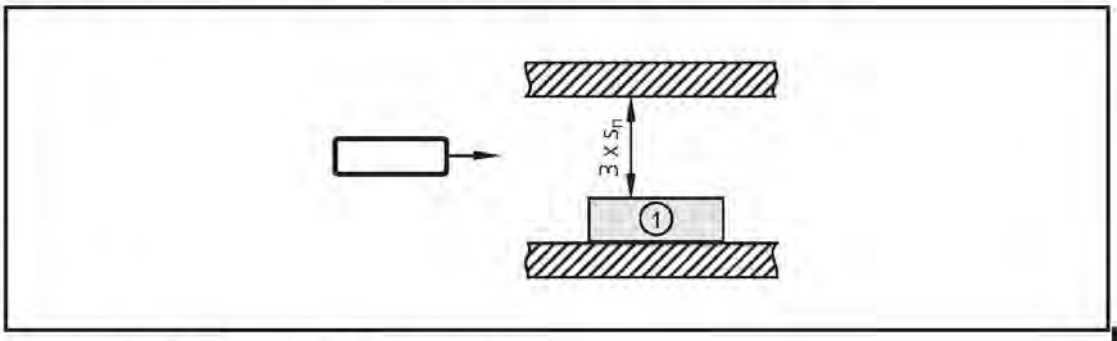
1: flush
2: non-flush
S_n: nominal sensing range (see data sheet)
d: unit diameter

▶ Observe the minimum distances when installing several sensors of the same type.



S_n: nominal sensing range (see data sheet)
d: unit diameter

▶ Observe the minimum distance when installing the type KD



1: sensor type KD (only non-flush installation)

UK

The distances need to be determined by the user in his application.

4 Electrical connection

The unit must be connected by a qualified electrician. The national and international regulations for the installation of electrical equipment must be adhered to.

▶ Disconnect power.

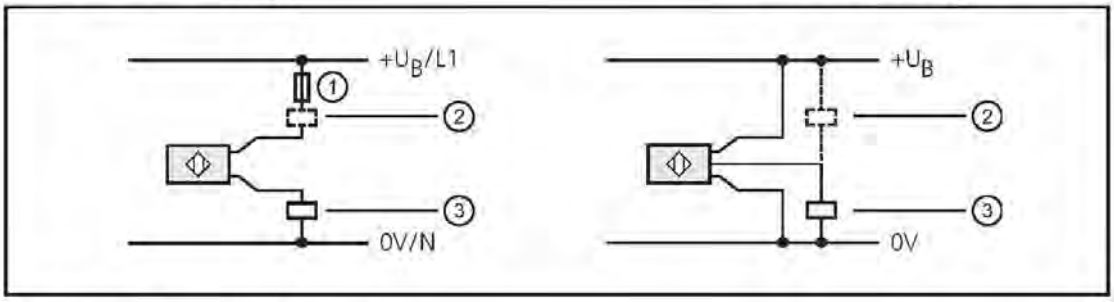
▶ Connect the sensor according to the indications on the type label.

Note: use a miniature fuse according to the technical data sheet, if specified.
Recommendation: check the safe functioning of the unit after a short circuit.

4.1 Wiring

2-wire technology

3-wire technology



1: miniature fuse (for AC units)
2: negative switching
3: positive switching

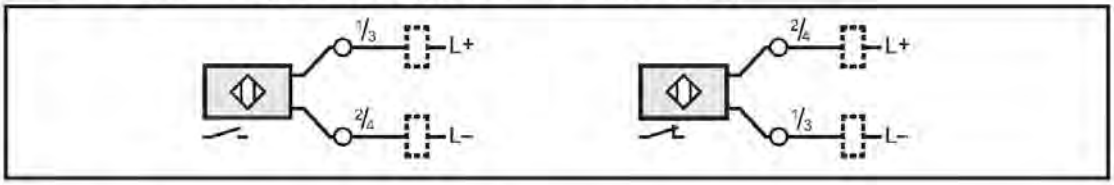
4.2 Programming

4.3 Type KI (with connector)

4.3.1 Programming via the link in the connector

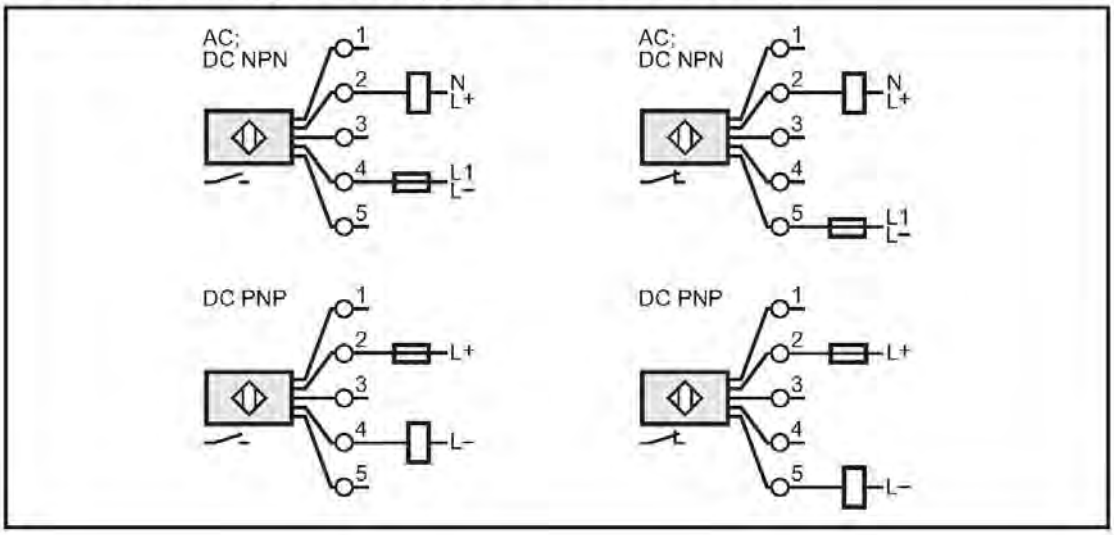
1: programmed as normally open (factory setting)
2: programmed as normally closed

4.3.2 Programming via wiring (KGE - DC PNP/NPN)



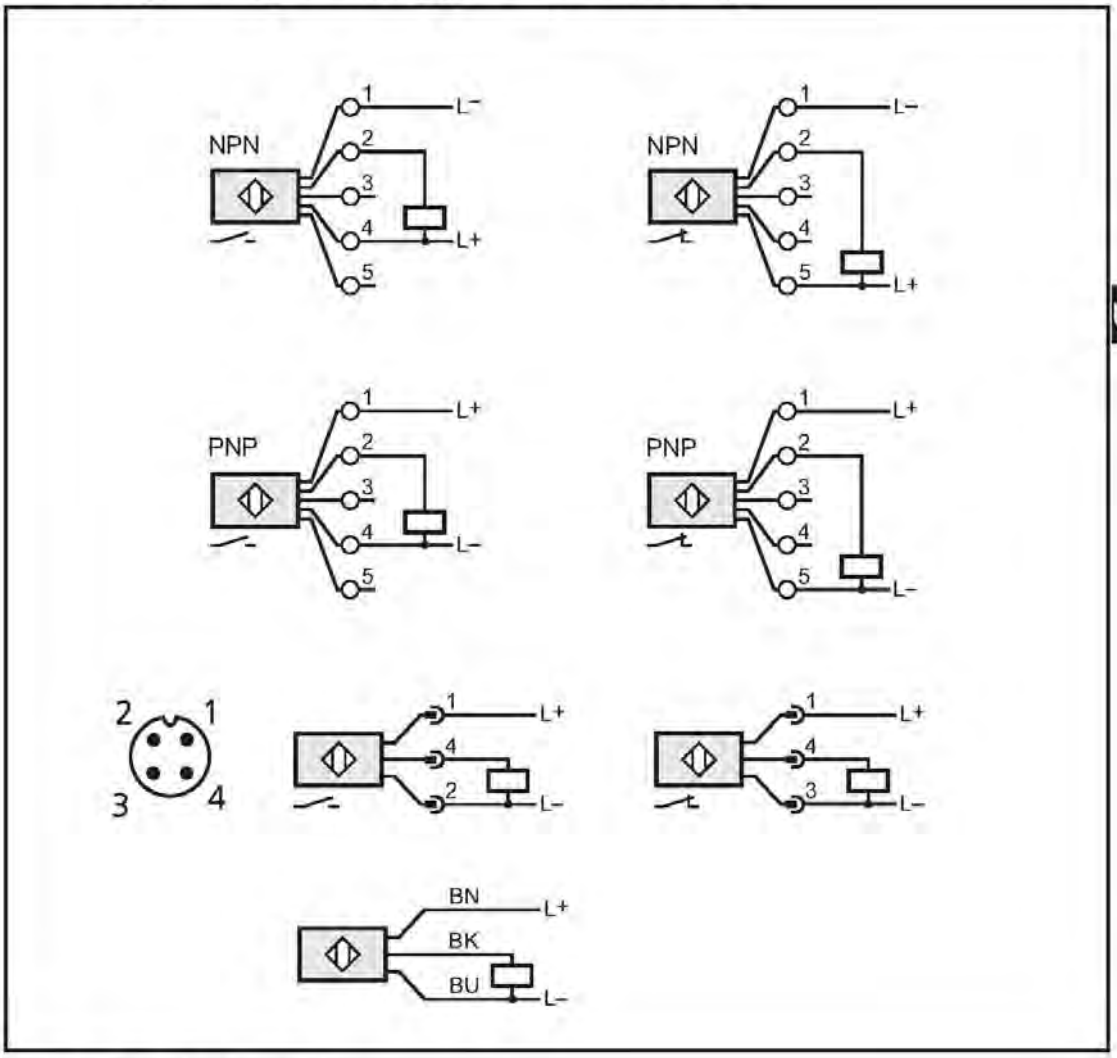
4.4 Type KDE - two-wire technology

4.4.1 Programming via wiring (KDE - AC/DC PNP/NPN)



4.5 Type KDE - three-wire technology

4.5.1 Programming via wiring (KDE - DC PNP/NPN)



Core colours of ifm sockets:
BN (brown), BU (blue), BK (black).

UK

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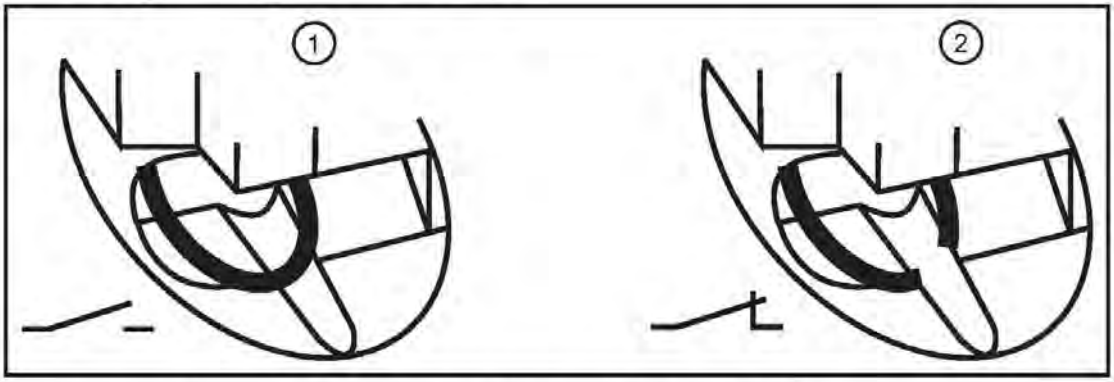
4.6 Type KIE / KGE

4.6.1 Programming via the wire link

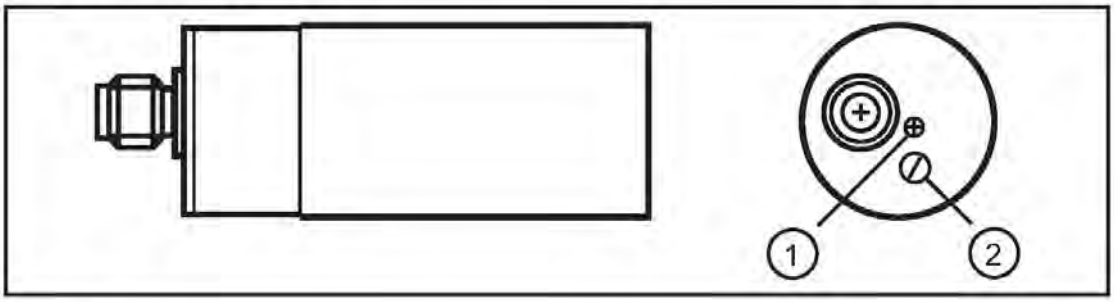


1: programmed as normally open (wire link closed, factory setting)
2: programmed as normally closed (wire link open)

▶ Use an appropriate tool to disconnect the wire link.

5 Operating and display elements

5.1 Example type KB

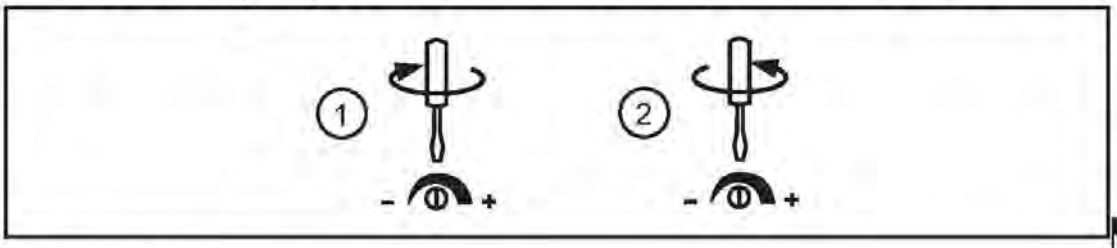


1: LED
2: potentiometer

6 Settings

6.1 Sensing range

▶ Set the sensing range via the potentiometer using the enclosed screwdriver.



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1: increase the sensing range
2: reduce the sensing range

7 Operation

Check whether the unit operates correctly. Bring about a sensor response by taking suitable measures.

Display by LEDs:

LED yellow out: switching output disabled

LED yellow on switching output enabled

8 Maintenance, repair, disposal

The operation of the unit is maintenance-free. To ensure a correct function:

- keep the sensing face and a clear space, if any, free from deposits and foreign bodies.

It is not possible to repair the unit.

After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.

9 Definitions

Active zone

Area above the sensing face in which the sensor reacts to the approach of the target.

Output function

Normally open: object within the active zone - output switched.

Normally closed: object within the active zone - output blocked.

Programmable: choice between normally closed or normally open.

Positive switching: positive output signal (to L-).

Negative switching: negative output signal (to L+).

Power-on delay time

The time the sensor needs to be ready for operation after application of the operating voltage (in the millisecond range).

Hysteresis

Difference between the switch-on and the switch-off point.

Leakage current

Current for the internal supply of 2-wire units, also flows through the load when the output is blocked.

Current consumption

Current for the internal supply of 3-wire DC units.

Switch point drift

Shifting of the switch point owing to changes of the operating conditions (e.g. temperature, pressure, air humidity).

Short-circuit protection

ifm sensors which are protected against excessive current by means of a pulsed short-circuit protection. The inrush current of incandescent lamps, electronic relays and low resistance loads may cause this protection to cut in and turn the sensor off!

Operating voltage

The voltage range in which the sensor functions safely. A stabilised and smoothed direct voltage should be used! Take into account residual ripple!

Technical data and further information at
www.ifm.com → Select your country → Data sheet direct: