
CIV-16-I

AUTOMATIC CYLINDER INVERTER/VALVER AND INSPECTION MACHINE

INSTRUCTION MANUAL



MANUAL NUMBER 21-11-1024

Copyright 1997, Galiso Inc.
22 Ponderosa Ct., Montrose, CO 81401
(970) 249-0233 (800) 854-3789

Revision B Issued MAY, 1998

TABLE OF CONTENTS

Section/Title	Page
1.0 Introduction.....	1-1
1.1 Cylinder Valver.....	1-1
1.2 Cylinder Inverter.....	1-1
1.3 Cylinder Inspection Requirements	1-2
2.0 Specifications	2-1
3.0 Safety	3-1
3.1 Cylinder Preparation	3-1
3.2 Personnel Safety.....	3-2
3.3 Equipment Precautions	3-2
4.0 Installation	4-1
4.1 Receiving and Placement	4-1
4.2 Utility Connections	4-1
4.3 Uses of Gases other than Compressed Air.....	4-1
4.4 Air Lubricator Fill	4-2
5.0 Operations.....	5-1
5.1 CIV-16-I Valver Control Components.....	5-1
5.2 Inverter Control panel Components	5-3
5.3 Loading A Cylinder.....	5-5
5.4 Valve Tong Operation	5-6
5.5 Removing a Valve.....	5-7
5.6 Installing a Valve.....	5-9
5.7 Cylinder Inverting Procedure.....	5-10

TABLE OF CONTENTS

Section/Title	Page
6.0 Maintenance	6-1
6.1 Air Motor and Cylinder Lubrication	6-1
6.2 Additional Pivot Pins and Wear Surfaces	6-2
6.3 Spare Parts	6-3

Attachments:

1. Warranty Terms
2. CIV 16 I P&ID No. 21-61-1024, 2 shts
3. Safety Cage Addendum Operation Instructions
4. Control Pneumatic Circuitry Diagrams

List of Figures

Number/Title	Page
2-1 CIV-16-I	2-1
4-1 Top View Air Lubricator	4-3
5-1 CIV-16-I Valver Control Panel	5-1
5-2 CIV-16-I Inverter Control Panel	5-3
5-3 Cylinder Clamp Control Switch Positions	5-4
6-1 Air Motor Lubricator	6-1
6-2 Top View – Air Lubricator	6-2

List of Tables

Number/Title	Page
Table 5-1 Air Pressure VS Torque	5-2
Table 5-2 Valve Size VS Installation Torque	5-2
Table 5-3 Regulator Setting VS Clamping Force	5-4
Table 6-1 CIV-16-I: Valver Spare Parts	6-3
Table 6-2 CIV-16-I: Inverter Spare Parts	6-3

1.0 INTRODUCTION

Galiso CIV-16-I Valver/Inverter combines the features of the GVM-16 Turnair® Valving Machine and the PCT Cylinder Inverter to provide a convenient tool for inspection and maintenance of the acetylene cylinder bottom head, porous filler, and fusible plugs.

The CIV-16-I facilitates proper inspection of the acetylene cylinder (as described in CGA pamphlet C-13) by lifting the cylinder to provide an unobstructed view of the cylinder bottom head, fusible metal plugs and foot ring. The CIV-16-I is completely air powered to reduce the risk of explosion due to electric spark. The CIV-16-I is mounted on heavy duty casters to allow the unit to be moved from one work station to another. CIV-16-I features include:

1.1 Cylinder Valver

The valver portion of the CIV-16-I is designed to provide a fast, efficient means for removing valves from compressed gas cylinders. It features patented Turnair Valve Tongs, a counter-balanced power head assembly and a powerful pneumatic Cylinder Clamp. A convenient small cylinder stand is also provided to speed and simplify valving or de-valving of almost any type of compressed gas cylinder.

The Turnair Valve Tongs automatically adjust to handle valves with grip/flat cross sections ranging from 7/8" to 1-7/8". The Tong Assembly also features a special Power Multiplier Assembly, which holds the valve securely, no matter how much torque is applied. The patented Turnair design eliminates slipping and valve damage caused by loose fitting conventional tongs.

The CIV-16-I develops 700 ft./lbs of torque with at the maximum air supply, pressure of 120 psi, adequate power to insert or remove almost any cylinder neck valve. Torque is adjustable and may be set to "Stall Out" at any predetermined value. A torque booster button allows override of the torque control to provide additional power for removing particularly stubborn valves.

The Valve Tong Drive Motor is activated by a single control lever. Response is instantaneous in either direction. The unit stops immediately when the lever is released. The Valve Tongs, Drive Motor, and controls are all housed in a counter-balanced steel enclosure, allowing the Valve Tongs to be raised, or lowered as needed.

1.2 Cylinder Inverter

The CIV-16-I includes a powerful air operated Cylinder Clamp, which holds the cylinder securely while the valve is removed or inserted and during the cylinder inverting procedure.

The Clamp Jaws are rubber faced, and fully adjustable to hold cylinders from 3 inches to 16 inches in diameter. Clamping force is controllable up to 3,000 lbs. Since no chains or grooved "V" blocks are used to hold cylinders, the finish on the cylinders is not marred or scarred by clamping action.

A powerful pneumatic clamp assembly firmly grasps the cylinder and then inverts it a full 180 degrees. The cylinder Clamp is adjustable to allow the operator to properly center the cylinder under the clamp jaws. A safety switch prevents the unit from inverting the cylinder unless the Valver Control Box has been raised clear of the path of the inverted cylinder. An additional pneumatic safety circuit prevents the clamp jaws from releasing when the inverter is not in the upright position.

1.3 Cylinder Inspection Requirements

In accordance with D.O.T. regulations, certain cylinders must be periodically requalified and certified safe for use. The requalification procedure and regulations are discussed in detail in the Code Of Federal Regulation (CFR), Title 49, Section 173.34. Copies of the CFR may be obtained from Galiso, Inc. or by writing to the following address:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

The specifications and procedures for visual inspection and requalification of acetylene cylinders, are outlined in Compressed Gas Association pamphlet C-13, "Guidelines for Periodic Visual Inspection and Requalification of Acetylene Cylinders". The Compressed Gas Association pamphlet G-1 contains additional information on the properties, manufacture, transportation, storage, handling and use of acetylene. Copies of Compressed Gas Association pamphlets are available from Galiso, Inc, or by writing to the following address:

Compressed Gas Association
1725 Jefferson Davis Highway
Suite 1004
Arlington, Virginia 22202-4102
(703) 412-0900

2.0 SPECIFICATIONS:

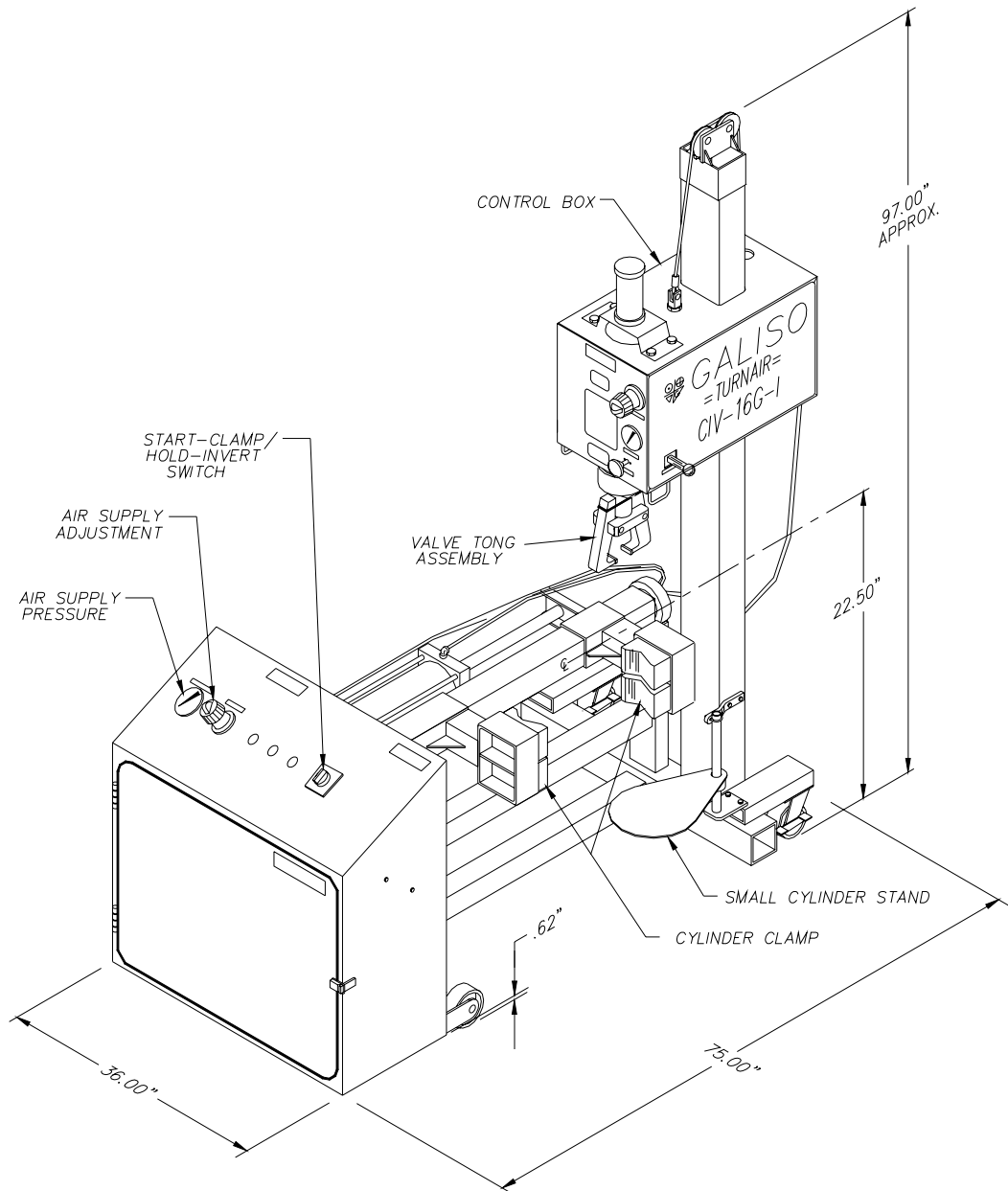


Figure 2 - 1 CIV-16-I

Specifications:

Dimensions: 8 ft. 1 in. High, x 6 ft. 3 in. Long, x 3 ft. Wide.

Weight: 1200 lbs.(approx.) Crated: 1500 lbs. (approx.).

Maximum Torque: 700 ft./lbs. (fully adjustable).

Maximum Clamping Force: 3000 lbs. (fully adjustable).

Maximum Cylinder Size: 3 in. to 16 in. diameter , 48 in. tall.

Valve Tong Range: 7/8 in. to 1-7/8 in.

Air Requirements: 20 CFM at 120 psi when operating at maximum torque.

2.1 Equipment Options

Two versions of the basic CIV-16G inverter/valver machine are available to suit specific facility and operational requirements. Table 2-1, below, shows the model and part numbers for the available options:

Table 2 - 1 CIV-16G Options

Model No.	Part No.	Max. Cyl. Weight	Max. Cyl. Height	Features
CIV-16G-I	14-54-0212	400	48"	Variable Invert Angle
CIV-16G-ADW	14-54-0214	400	48"	Auto Wash and Dry

Notes: 1. Maximum cylinder height for standard valve installation (removal) without the ETMS.

2.2 Auxiliary Equipment

In addition to the options shown in Table 2-1, the following auxiliary equipment is available from Galiso.

A. Electronic Torque Measuring System (ETMS)

The ETMS provides automatic torque control for installation of cylinder valves to specified torque values. Reference Galiso part number 37-41-9419 for the ETMS option. See the ETMS manual addendum for additional information.

B. Automatic Small Cylinder Lift (SCL)

The SCL provides the capability to valve small cylinders using an air powered piston. Reference Galiso part numbers 14-51-0448 and 14-51-0449 the SCL option.

C. Non-Ferrous Jaw Tong Shoe

A "spark-free" jaw tong shoe is available from Galiso to reduce the risk of sparking from contact between cylinder valves and the jaw tongs. Reference Galiso part number 14-32-0202 for ordering the "spark free" jaw tong shoe.

3.0 SAFETY

Read all instructions before attempting to install or operate CIV-16G-I Series High Speed Turnair Valving Machines. GALISO INC. IS NOT RESPONSIBLE FOR DAMAGE OR INJURY CAUSED BY UNSAFE USE, MAINTENANCE, OR APPLICATION OF THESE MACHINES. Please contact Galiso for guidance when you are in doubt regarding the proper safety precautions to be taken when installing or operating these machines.

3.1 Cylinder Preparation

!! DANGER !!

DEVALVING A PRESSURIZED CYLINDER CAN RESULT IN SEVERE EQUIPMENT DAMAGE, EXTREME BODILY INJURY, OR DEATH.

- A. Cylinders which contain gas should be vented to release pressure prior to removal of the valve. Always observe the applicable regulations and safety precautions regarding disposal of gas product.
- B. To avoid dangerous pressure release, verify that all pressure has been released from the cylinder before attempting to remove the valve. Valves that have been blocked by contaminants will appear to be open, while pressure is still trapped in the cylinder. Check the valve before removing it, by injecting a stream of nitrogen gas through the valve and into the cylinder. Use a blow gun equipped with a rubber tip to inject a small amount of nitrogen (or any other clean inert gas) through the valve and into the cylinder. When the blow gun is removed, the operator should be able to hear or feel the gas escaping through the valve. This indicates that the valve passage is open, and that all pressure has been released from the cylinder.
- C. Verify that the cylinder has not contained a toxic, or flammable gas, and then open the valve all the way. In cases where the cylinder has contained a toxic, or flammable gas, check with your supervisor or safety engineer for proper disposal procedure.
- D. Ensure that the non-ferrous jaw tong “shoe” (reference Galiso part number 14-32-0202) is used whenever the unit is used in a potentially explosive environment.

3.2 Personnel Safety

- A. CIV-16G-I Series Machines are capable of generating very powerful twisting, and clamping forces. Operators must be careful to keep hands, fingers, hair, loose clothing, jewelry, etc. clear of moving parts, and pinch points.
- B. After tightening the Cylinder Clamp adjustment bolt, make certain that hands are clear of the clamp/invert mechanism before actuating the cylinder clamp mechanism.
- C. When operating the inverting mechanism of the CIV-16G, the operator should stand safely behind the Control Console. The operator should stay clear of the cylinder as it

inverts and returns to the upright position. A 36-inch wide safety zone should be maintained on both sides of the clamp arm while the unit is in operation to eliminate the possibility of injury from the swing of the cylinder as it is inverted. The operator should take particular care to keep his feet clear of this safety zone as the machine returns the cylinder to the upright position.

- D. Wear eye protection, head protection, foot protection, and gloves when operating the CIV-16G-I Cylinder Inverter/Valver Machine.
- E. If a compressed gas other than air is used to power the CIV-16G-I, be certain to provide adequate ventilation to prevent dangerous accumulation of exhaust gases. Refer to Section 4.0, Installation, for additional information regarding use of gasses other than compressed air.

3.3 Equipment Precautions

- A. To increase unit life, and maintain proper safety feature operation of the CIV-16G, keep the assembly clean, and lubricated. Report any malfunctions, or minor repairs needed, to your supervisor or safety engineer at once. Take care to keep work area around the CIV-16G-I clean, dry, and free of debris.
- B. CIV-16G-I models feature heavy duty casters which allow the unit to be easily rolled from one work location to another. Before activating the drive motor on portable models, verify that all casters are locked to prevent the machine from slipping, or moving during valving operations.

! CAUTION !

Never insert any object such as a crow bar or breaker bar, between the jaws of the Valve Tongs to apply additional torque to the tongs. Use of a lever or bar to apply additional torque to force a stubborn valve, can damage the Planetary Drive Gearing assembly. NEVER hit the Jaw Tongs with a hammer. Doing so could cause a piece of the Jaw Tong or hammer to break, causing personal injury, and/or damage to the Planetary Drive Gear Assembly.

- C. Prior to operating the cylinder inverting mechanism, raise the Valver Control Box to the top of the support column to clear the area occupied by the cylinder as it swings to the inverted position. The CIV-16G-I is equipped with a safety switch which prevents the inverting mechanism from functioning unless the Valver Control Box has been raised to the top of the Support Column. DO NOT attempt to override the safety switch.
- D. The CIV-16G-I also features a safety circuit that prevents the machine from inverting if the cylinder clamp is not fully clamped. The safety circuit also prevents the machine from unclamping once the cylinder has been lifted off of the ground. DO NOT disable the cylinder clamp/invert safety circuit.
- E. Do not operate the unit without lubrication. See Section 4.0, Installation and 6.0, Maintenance for lubrication instructions.

4.0 INSTALLATION

Read all instructions before attempting to install or operate the CIV-16-I machine.

4.1 Receiving and Placement

Carefully uncrate the CIV-16-I and remove all packing materials.

Select a suitable location for the CIV-16-I. The CIV-16-I should not be installed near a shot blasting system, sand blaster, or other equipment which spreads abrasive material through the work area. Abrasive material such as, sand, or shot may collect at the slide points of the CIV-16-I, and cause the unit to jam.

If the unit has been purchased in the portable configuration, roll the unit to the work area, and lock the casters in place. If the unit is a free standing stationary configuration, move the unit to the installation location and bolt or clip the base to the shop floor.

4.2 Utility Connections

Connect a compressed air supply line (1/2" dia. Minimum) to the port on the CIV-16-I Inverter Box which is labeled AIR IN. The air supply should provide 20 CFM at 120 psi for maximum torque capability.

Facilities that are not equipped with an air compressor may wish to use an alternate source of compressed gas (such as carbon dioxide or nitrogen) to power the CIV-16-I. Any clean, nonflammable, nontoxic, nonoxidizing, noncorrosive gas can be used to power the unit, providing that the precautions discussed below in Section 4.3 Use Of Gases Other Than Compressed Air, are observed.

4.3 Use Of Gases Other Than Compressed Air

Adequate ventilation must be provided, or the exhaust from the GVM-16G-I must be piped to the outdoors to prevent accumulation of dangerous concentrations of gas in the work area. Note that if an extremely long exhaust line is used to pipe exhaust to the outdoors, the CIV-16-I will not be able to provide maximum torque due to the increased back pressure. Accumulation of exhaust gas can deplete the supply of breathing air, resulting in the danger of suffocation.

If Carbon Dioxide or Nitrogen is used to power the unit, the following additional precautions must be taken:

4.3 Use Of Gases Other Than Compressed Air, continued.

- A. A high volume Carbon Dioxide regulator must be installed at the storage unit to reduce the line pressure to between 100 and 120 PSI.
- B. Approximately 20 to 30 feet of 1/2" to 3/4" pipe or tubing must be run between the regulator and the connection to the CIV-16-I. The purpose of the line is to allow the

Carbon Dioxide gas to warm up to ambient temperatures to prevent the drive motor from freezing or sticking.

- C. In the event that the ambient temperature is too low to provide adequate warm up of the gas prior to entering the unit, auxiliary heat of some type should be used to warm the gas to at least 100 degrees Fahrenheit before it enters the machine.

4.4 Air Lubricator Fill

NOTICE

CIV-16-I Units are shipped with the air lubricator reservoirs emptied. Severe air motor and/or pneumatic cylinder damage will occur if the air lubricator reservoirs are not filled prior to operating the unit.

! CAUTION !

Do not operate the CIV-16G machine without the valver side panels in place. Extra caution should be taken when adjusting the oil feed as the air motor will need to be operating.

4.4.1 Valver Air Motor Lubricator Fill procedure

- A. Disconnect air supply to the CIV-16-I and bleed off all trapped air pressure. Open and close the Clamp Control Valve and Directional Control Lever to make certain that all air pressure has escaped from the system.
- B. Remove the fill plug from the Lubricator (through the top hole in the valver control box). Fill with 10 weight non-detergent oil. See figure 4-1.
- C. Replace the fill plug and reconnect air pressure to the CIV-16-I.
- D. The oil feed should already be adjusted to 1 drop per minute at full speed air flow, or one drop every ten seconds when the torque gauge reads 90 PSI.

4.4.2 Inverter Pneumatic Cylinder Lubricator Fill procedure

- A. Disconnect the air supply to the inverter cabinet, open the access panel and bleed all entrapped air by turning the air regulator all the way off. Verify the air pressure reads 0 psig on the inverter top panel air pressure gauge.
- B. Locate the oil reservoir, remove and fill with 10 weight non-detergent oil.
- C. Replace the oil reservoir. The oil feed should already be factory adjusted to approximately one drop per minute at full speed air flow.
- D. Re-adjust the air pressure regulator to the proper air pressure, 100 psig. Close the inverter access panel and re-connect the air supply.

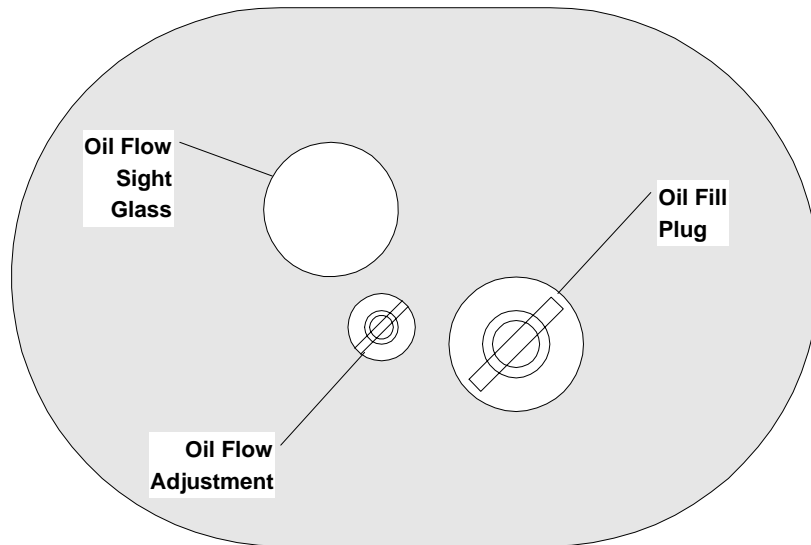


Figure 4 - 1 Top View - Air Lubricator

5.0 OPERATIONS

The CIV-16-I contains separate control panels for cylinder valving and cylinder clamping and inverting. Descriptions of the available controls as well as instructions for the various cylinder operations are included in the following sections.

5.1 CIV-16-I Valver Control Components

The CIV Valver Control Panel Components are shown in figure 5-1.

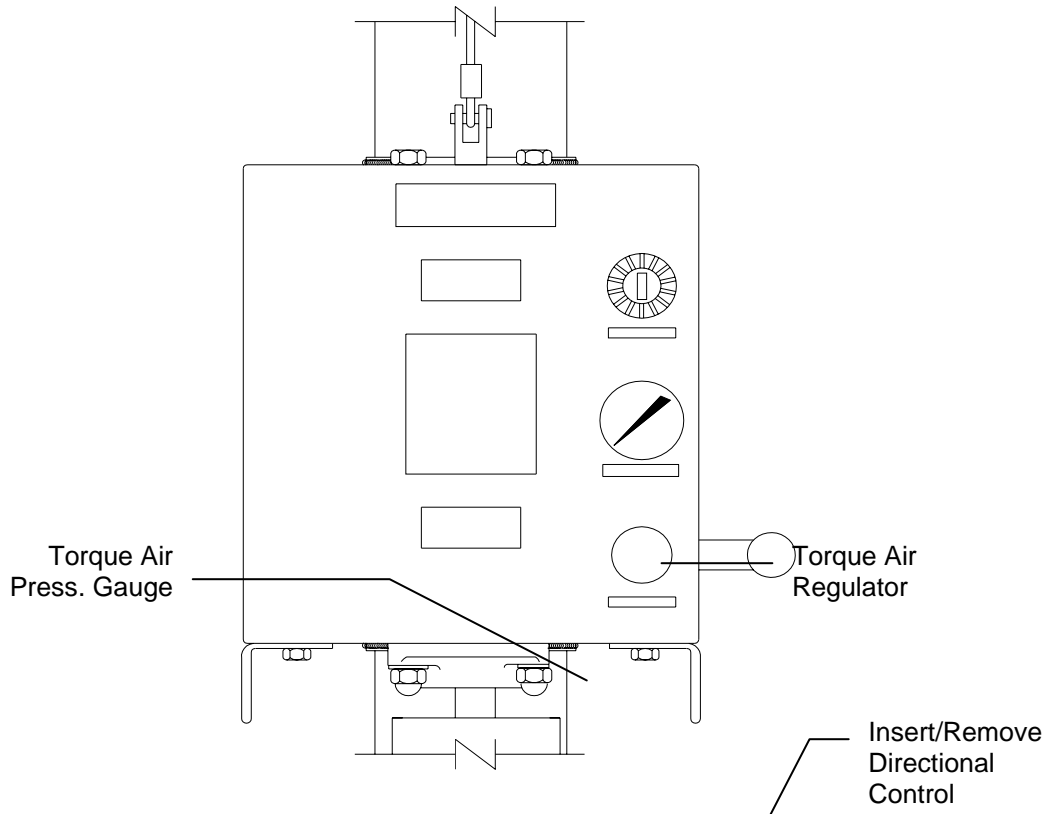


Figure 5 - 1 CIV-16-I Valver Control Panel

5.1.1 Torque Pressure Regulator and Gauge

The gauge and regulator knob located on the right-hand side of the Valver Control Panel are used to control the amount of torque that is applied to the Turnair Valve Tong. Turn the knob clockwise to increase the torque and counter-clockwise to decrease the torque. Table 5-1 shows the amount of torque that is produced in relation to the Torque Pressure Regulator setting. Note that all torque values are approximate.

5.1.1 Torque Pressure Regulator and Gauge, continued

Table 5 - 1 Air Pressure VS Torque

Regulator Setting (PSI)	Torque (Foot/lbs.)
20	80
30	142
40	204
50	267
60	330
70	392
80	454
90	516
100	578

Table 5-2 shows the recommended torque values for insertion of several standard valve sizes, according to MIL-027210D(ASG), using teflon tape conforming to MIL-T-27730.

Table 5 - 2 Valve Size VS Installation Torque

Valve Size	Torque (ft-lbs)
3/8" NPT Male	100
1/2" NPT Male	150
3/4" NPT Male	250
1" NPT Male	350

5.1.2 Insert/Remove Directional Control

The lever located on the right side of the Control Panel (see figure 5-1), controls the direction of the Valve Tong rotation. To remove a valve, push the Insert/Remove Directional Control Lever towards the back of the control box. To install a valve, pull the Insert/Remove Directional Control Lever towards the front of the control box.

When the Insert/Remove Directional Control Lever is allowed to return to the center position, Valve Tong rotation will stop.

5.1.3 Torque Booster Control

The knob located in the lower right-hand corner of the Valver Control Panel is used to temporarily override the regulated torque setting. When the Torque Booster Control is depressed, full line pressure will be delivered to the air motor to provide additional power. This feature is intended for use during valve removal only. When dealing with valves that are particularly difficult to remove, momentarily pressing the torque booster control will usually break the valve loose.

! CAUTION !

When the Torque Booster Control is depressed, full available line pressure is delivered to the air motor. If the air supply provides more than 120 PSI, use of the Torque Booster Control will damage the air motor.

In cases where the available air supply exceeds 120 PSI, a secondary regulator should be installed to limit pressure to the CIV to 120 PSI.

! CAUTION !

Do not use the Torque Booster when installing a valve. Excess torque could damage the valve, cylinder and/or the CIV unit.

5.2 Inverter Control Panel Components

The cylinder clamp and inverter controls for the CIV-16-I are shown in figure 5-2.

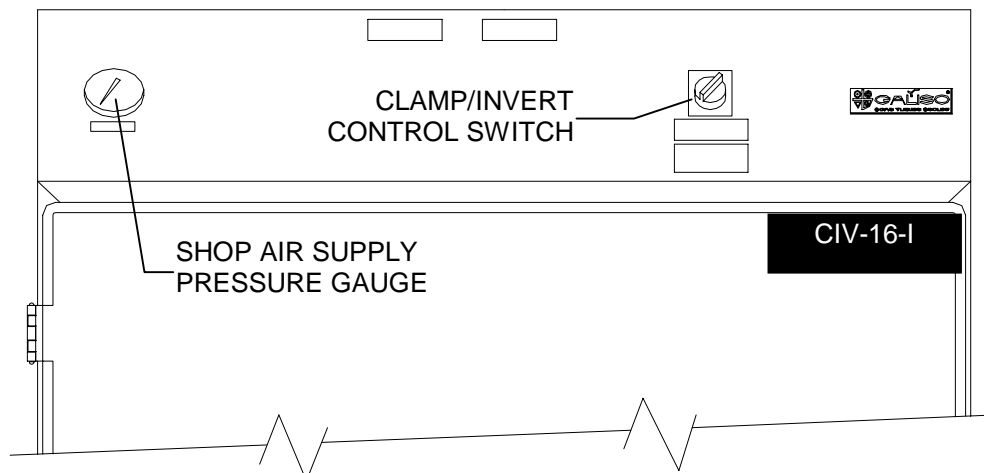


Figure 5 - 2 CIV-16-I Inverter Control Panel

5.2.1 Cylinder Clamp Force Regulator and Gauge

The Cylinder Clamp Force Regulator varies the amount of force applied to the cylinder clamp. Generally, a 60 to 80 psi air pressure setting is adequate for most steel cylinder(s). However, clamp force should be increased when valve tong torque is increased to prevent the cylinder from turning in the Clamp Jaws. Clamp force should be decreased for thin walled cylinders such as Freon; Propane or Ammonia containers. Table 5-3, below, shows the relationship between clamp air regulator pressure (as read on the gauge) and clamping force applied to the cylinder.

Table 5 - 3 Regulator Setting VS Clamping Force

Regulator Setting (PSI)	Force (lbs.)
20	392
30	588
40	784
50	980
60	1176
70	1372
80	1568
90	1764
100	1960
110	2156
120	2352

5.2.2 Cylinder Clamp Control Switch

The cylinder clamp control switch (see figures 5-2 and 5-3) has three positions:

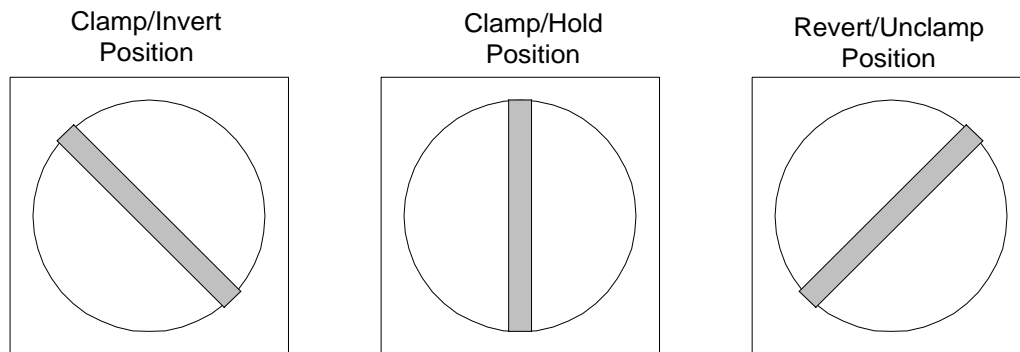


Figure 5 - 3 Cylinder Clamp Control Switch Positions

5.3 Loading A Cylinder:

- A. Adjust the Cylinder Clamp Force Regulator for the cylinder(s) to be processed. Generally, 60 to 80 PSI is adequate for most types of cylinders. However, clamp force should be increased when valve tong torque is increased to prevent the cylinder from turning in the Clamp Jaws. Clamp force should be decreased for thin walled cylinders such as Freon; Propane or Ammonia containers.
- B. Prior to loading the cylinder into the Cylinder Clamp, rotate the Valve Tongs to the loading position. Use the Directional Control Lever to position the Valve Tongs so that the flat "face" of the tongs faces toward the front of the machine.
- C. Carefully grasp one side of the Valve Tongs. While holding the Valve Tong stationary, use the Directional Control Lever to rotate the Cam Actuator until the alignment stripe on the Cam Actuator lines up with the alignment stripe on the Valve Tong Assembly. This will open the Valve Tongs to the widest possible position.
- D. Turn the Clamp Control Switch to the REVERT/UNCLAMP position to open the cylinder clamp jaws.
- E. Load a cylinder into the clamp jaws, aligning the cylinder valve to the centerline of the valve tongs.
- F. Loosen the clamp adjustment bolt (1-1/8"). Adjust the clamp jaws to align the cylinder with the valver jaw tongs and re-tighten the clamp adjustment bolt. Turn the Clamp Control Switch to the CLAMP/HOLD position (see figure 5-3), the cylinder clamp jaws will automatically adjust to grip the cylinder to be serviced.

NOTE:

When the Cylinder Clamp is engaged, the valve flats should align perfectly with the Valve Tong Jaws. If the valve is not properly centered within the Valve Tongs, release the clamp and re-adjust before proceeding.

- G. If many cylinders of the same size are being serviced, it is not necessary to readjust the clamp for each cylinder. Once the clamp has been properly adjusted, load the cylinder into the clamp as straight as possible, actuate the clamp, and then check to make certain that the valve is properly aligned with the Tongs.

5.4 Valve Tong Operation

The patented Turnair Valve Tongs self-adjust to fit valve flat cross sections ranging from 7/8 " to 1-7/8 " wide across the flat side. The Valve Tongs are actuated by the Power Multiplier Assembly, which is located just above the Valve Tongs. To operate the self-adjusting Valve Tongs, proceed as described below.

5.4.1 Closing the Tongs

- A. Position the Valve Tongs so that the flat faces of the tongs are facing the operator. Activate the Directional Control Lever to match up the alignment stripe on the Cam Actuator with the alignment stripe on the center portion of the Valve Tong Assembly.
- B. Lower the Valver Control Box and position the jaws of the valve tongs so that they are approximately level with the flats on the valve.
- C. Actuate the Cylinder Clamp to firmly grip the cylinder.
- D. Carefully grasp one side of the Valve Tongs. While holding the Valve Tong stationary, actuate the Insert/Remove Lever. As the Cam Actuator begins to turn, the cam will meet the resistance of the stationary tongs and force will be applied to close the Valve Tongs.
- E. As the Valve Tong Jaws close against the valve flats, the Valve Tong Assembly will lock and begin to turn as a single unit. Release hand hold from the Valve Tong when the assembly locks and begins to rotate as a unit.
- F. Always hold the Tongs stationary until they have securely clamped onto the flats of the valve, and the Tong Assembly begins to turn as a unit. If the Tong is not held stationary, the Valve Tongs will rotate without closing to grip the valve, resulting in possible damage to both the Tongs and the valve.

The Valve Tong gripping force is much greater than the maximum torque that may be applied by the machine. This assures that the valve tongs will maintain a solid grip on the valve no matter how much torque is applied for insertion or removal.

5.4.2 Releasing the Tongs

To release the Valve Tongs proceed as follows:

- A. In order to speed and simplify operation, the Valve Tongs should always be stopped in the position with the flat side of the Valve Tong facing toward the front of the machine.
- B. Carefully grasp one side of the Valve Tongs. Hold the Valve Tong Assembly stationary and actuate the Insert/Remove Lever to rotate the tongs in the opposite direction until the alignment stripe on the Cam Actuator lines up with the alignment stripe on the Valve Tong Assembly. If the alignment stripes are not matched, it will be very difficult, if not impossible, to remove the cylinder from the Valve Tongs and Cylinder Clamp.
- C. Release the Cylinder Clamp and remove the cylinder.

! CAUTION !

Never insert any object, such as a crow bar or breaker bar, between the jaws of the Valve Tongs to apply additional torque to the tongs. Using a bar or lever to apply additional torque to force a stubborn valve can damage the Planetary Drive Gearing Assembly.

NEVER hit the Jaw Tongs with a hammer! Doing so could cause a piece of the Jaw Tong or hammer to break, causing personal injury, and/or damage to the Planetary Drive Gear Assembly.

5.5 Removing A Valve

!! DANGER !!

DEVALVING A PRESSURIZED CYLINDER CAN RESULT IN SEVERE EQUIPMENT DAMAGE, EXTREME BODILY INJURY, OR DEATH.

Verify that all pressure has been released from each cylinder to be serviced and that the cylinder has not contained a toxic, or flammable gasses. In cases where the cylinder has contained a toxic, or flammable gas, check with your supervisor or safety engineer for the proper disposal procedure.

Use a blow gun equipped with a rubber tip to inject a small amount of nitrogen (or any other clean inert gas) through the valve and into the cylinder. When the blow gun is removed, the operator should be able to hear, or feel the gas escaping through the valve. This indicates that the valve passage is open and that all pressure has been released from the cylinder.

5.5 Removing A Valve, continued

A “spark-free” jaw tong shoe is provided to reduce the risk of sparking from contact between cylinder valves and the jaw tongs. Reference Galiso part number 14-32-0202 for ordering additional “spark free” jaw tong shoes.

With the cylinders properly prepared for valve removal, proceed as follows:

- A. Adjust the Cylinder Clamp Force Regulator for the cylinder(s) to be processed.
- B. Adjust the Cylinder Clamp as described in Section 5.3.
- C. Adjust the Torque Pressure Regulator as described in Section 5.1.1.
- D. Push or pull the control box/jaw tong assembly to position the jaw tongs at the correct height for clamping the cylinder valve flats.
- E. Load a cylinder into the Cylinder Clamp and position the valve within the Valve Tongs as described in Section 5.4, Valve Tong Operation.
- F. Turn the Cylinder Clamp Control Switch to the CLAMP/HOLD position.
- G. Carefully grasp one side of the Valve Tong Assembly and hold it stationary. Push the Insert/Remove Lever to the REMOVE position while holding the Tong stationary and allow the Valve Tong Assembly to self-adjust as described in Section 5.4, Valve Tong Operation.
- H. When the Valve Tongs have self-adjusted, and securely gripped the valve flats, the Valve Tong Assembly will lock and begin to turn as a single unit. Release your grasp from the Valve Tong and allow the CIV to turn the valve out.
- I. If a valve does not begin to unscrew, press the Torque Booster Control Knob. This overrides the regulated torque setting and provides additional torque power for removing particularly stubborn valves. Never use a bar or lever to apply additional torque to the Valve Tongs. Torque applied in this fashion can damage the Planetary Drive Gear Assembly.
- J. After the valve has been removed from the cylinder, carefully grasp one side of the Valve Tongs. Hold the Valve Tong stationary and push the Directional Control Lever to the INSERT position to rotate the Tongs in the opposite direction until the alignment stripe on the Cam Actuator lines up with the alignment stripe on the Valve Tong Assembly.
- K. Remove the valve from the Tong Assembly and tag the valve with the serial number of the cylinder.
- L. Switch the Cylinder Clamp Control Switch to the REVERT/UNCLAMP position to release the Cylinder Clamp. Remove the cylinder from the clamp and proceed to the next cylinder.

5.6 Installing A Valve

Perform the following steps to install a valve in a cylinder:

- A. Tape the valve threads with Teflon Tape conforming to MIL-T-27730.
- B. Match the valve with the cylinder serial number that was recorded on the tag after the valve was removed.
- C. Insert the valve into the cylinder neck and manually turn the valve until it is hand-tight. This will speed the installation procedure and assure that the threads are properly engaged.
- D. Adjust the Cylinder Clamp Force Regulator as described in Section 5.2.1.
- E. Adjust the Cylinder Clamp as described in Section 5.3.
- F. Adjust the Torque Pressure Regulator. See Tables 5-1 and 5-2, and the Torque Setting datasheet, Attachment 2.
- G. Position the Drive Assembly/Control Box at the correct height for the cylinder. The height of the Valve Tong Jaws must align with the height of the valve flats.
- H. Load a cylinder (with partially installed valve) into the Cylinder Clamp and position the valve within the Tongs as described in Section 5.4, Valve Tong Operation.
- I. Turn the Cylinder Clamp Control Switch to the CLAMP/HOLD position.
- J. Carefully grasp one side of the Valve Tong Assembly and hold it stationary. Push the Directional Control Lever to the INSERT position while holding the Tong Stationary and allow the Valve Tong Assembly to self-adjust as described in Section 5.4, Valve Tong Assembly.
- K. When the Valve Tongs have self-adjusted and securely gripped the valve flats, the Valve Tong Assembly will lock, and begin to turn as a single unit. Release your grasp from the Valve Tong and allow the CIV to install the valve.
- L. When the maximum regulated torque is reached, the Tong Assembly will stop turning. Release the Directional Control Lever and allow it to return to the OFF position.
- M. Carefully grasp one side of the Valve Tongs. Hold the Valve Tong stationary and push the Directional Control Lever to the REMOVE position to rotate the Tongs in the opposite direction until the alignment stripe on the Cam Actuator lines up with the alignment stripe on the Valve Tong Assembly.
- N. With the jaw tongs in the fully open position, lift the control box/jaw tong assembly and/or rotate the jaw tong assembly to allow for removal of the cylinder.

- O. Switch the Cylinder Clamp Control Switch to the REVERT/UNCLAMP position to release the Cylinder Clamp. Remove the cylinder from the clamp and proceed to the next cylinder.

5.7 Cylinder Inverting Procedure

- A. Push the Valver Control Box to the top of the support column. The CIV-16-I is equipped with a safety switch which will prevent the inverting mechanism from operating unless the Valver Control Box is at the top of the support column.
- B. If the CIV-16-I already holds a cylinder in its clamp from the previous section, "Operation: Valving Procedure", proceed to Step 7 below. If the cylinder clamp is empty, proceed to step 3 below.
- C. Turn the Clamp Control Switch to the REVERT/UNCLAMP position to open the cylinder clamp jaws if they are not already open.
- D. Loosen the clamp adjustment bolt (1-1/8"). Adjust the clamp jaws to align the cylinder with the valver jaw tongs and re-tighten the clamp adjustment bolt.
- E. Load a cylinder into the clamp jaws.
- F. Turn the Clamp Control Switch to the CLAMP/HOLD position (see figure 5-3), the cylinder clamp jaws will automatically adjust to grip the cylinder to be serviced.

NOTE:

When servicing many cylinders of the same size, it is not necessary to repeat this step for each cylinder. This step is only necessary when the size of the cylinders being serviced changes.

- G. Turn the Clamp Control Switch to the CLAMP/INVERT position, the cylinder clamp will begin to rotate and invert the cylinder. When the cylinder reaches the desired position, turn the Clamp Control Switch to the CLAMP/HOLD position to stop rotation of the cylinder clamp and hold the cylinder in place for inspection. To continue to invert the cylinder, turn the Clamp Control Switch to the CLAMP/INVERT position and allow the cylinder to reach the desired position.
- H. When servicing acetylene cylinders, the cylinder will commonly be stopped at the horizontal position to allow visual inspection of the cylinder bottom head, foot ring, and fusible metal plugs. The cylinder will also be stopped in the inverted position to allow maintenance of the fusible plugs or to allow the fusible plugs to be removed for inspection of the bottom of the internal porous filler.
- I. To return the cylinder to the upright position after inspection, turn the Clamp Control Switch to the REVERT/UNCLAMP position. The CIV-16-I will return the cylinder to the upright position and release the cylinder clamp.

6.0 Maintenance

6.1 Air Motor and Cylinder Lubrication:

The Air Line Lubricators for the air motor and the inverter pneumatic cylinder must be kept filled with 10 weight non-detergent oil. Fill and adjust the Air Line Lubricator. as described below:

- A. Access and remove the fill plug from the Lubricator through the access hole in the top of the valver control box (see Figure 6-1) and/or below the inverter control panel. Fill with 10 weight non-detergent oil.
- B. Replace the fill plug and reconnect air pressure to the CIV-16-I.
- C. The oil feed should be adjusted to 1 drop per minute at full speed air flow, or one drop every ten seconds when the torque gauge reads 90 PSI.

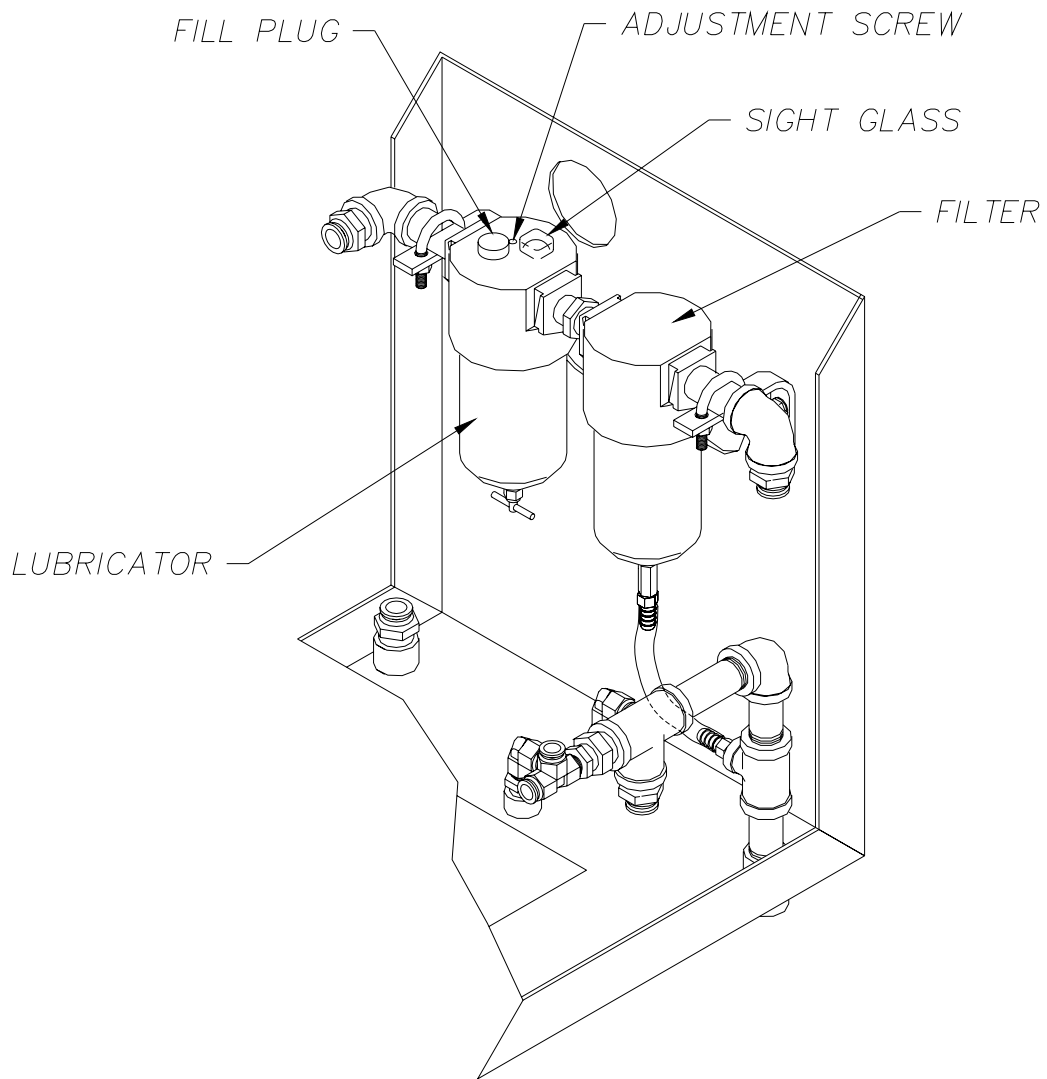


Figure 6 - 1 Air Motor Lubricator

Should it become necessary to remove the side cover(s) on the valver control box, disconnect air supply to the CIV-16-I and bleed off all trapped air pressure. Open and close the Clamp Control Valve and Directional Control Lever to make certain that all air pressure has escaped from the system. Unscrew the side cover panels to gain access. Replace the side cover after performing any required maintenance.

!! CAUTION !!

Do not normally operate the CIV-16-I without the valver control box side panels in place. Extra caution should be taken when adjusting the oil feed as the air pump will need to be operating.

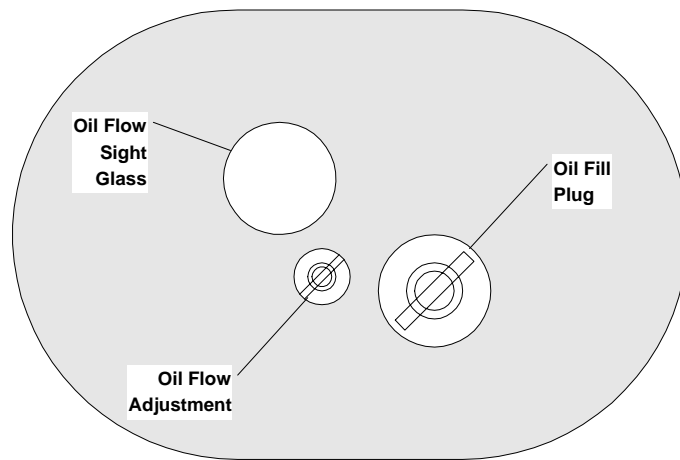


Figure 6 - 2 Top View - Air Lubricator

6.2 Additional Pivot Points and Wear Surfaces

- A. The Valve Tong Pivot Points and Cam surfaces must be regularly lubricated with Molybdenum Disulfide dry spray lubricant.
- B. Lubricate the Clamp Arm, and Valver Control Box Support Column once a month with moly grease.
- C. Two heavy duty $\frac{1}{4}$ " steel cables are used to attach the Valver Control Box to the counter balance weight. Inspect and lubricate these cables at least once every three months. If any evidence of corrosion or fraying is detected, contact Galiso immediately for replacement instructions.
- D. The pivot points on the Valve Tongs, Cam surface, Cylinder Clamp/Inverter Shaft should all be lubricated regularly with Molybdenum Disulfide dry spray lubricant. The Cam Power Multiplier is lubricated at the factory and should not require any attention in normal service.

6.3 Spare Parts

Tables 6-1 and 6-2 list the Galiso part numbers for CIV-16-I Valver and Inverter respectively, which may require replacement from time to time.

Table 6 - 1 CIV-16-I: Valver Spare Parts

Part Number	Description	Quantity
14-32-0118	Cable Ass'y (counter weight)	1
14-32-1232	Stub Shaft	1
14-33-0045	Cylinder Grip	1
14-42-0171	Jaw Tong Ass'y	2
14-42-1054	Propane Jaw Tong Ass'y	1
14-32-0202	Jaw tong Shoe	1
48-11-5000	Pulley Wheel	1
62-83-5804	Nilock Nuts	2
62-12-2709	Shoulder Bolts	2
36-11-0520	0-160 psi Gauge	1
37-11-3048	Regulator	1
37-11-3049	Regulator Repair Kit	1
38-11-0017	Air Motor	1
40-91-6339	Retractor O-Ring	1
81-11-0002	Torque Boost Valve	1

Table 6 - 2 CIV-16-I: Inverter Spare Parts

Part Number	Description	Quantity
14-33-0045c	Grip, Cylinder	1
50-00-0021	Bearing, Roller	1
50-00-0025	Bearing, Thrust	1
50-00-0026	Race, Thrust	1
66-33-7001	Pin, Quick Rel. 1/2 Dia x 4.5 L Sst	1
36-11-0520	Guage, Air, 0-160psig	1
83-11-0025	Valve, Check, 3/8	1
83-11-0047	Saftey Valve ¼	1

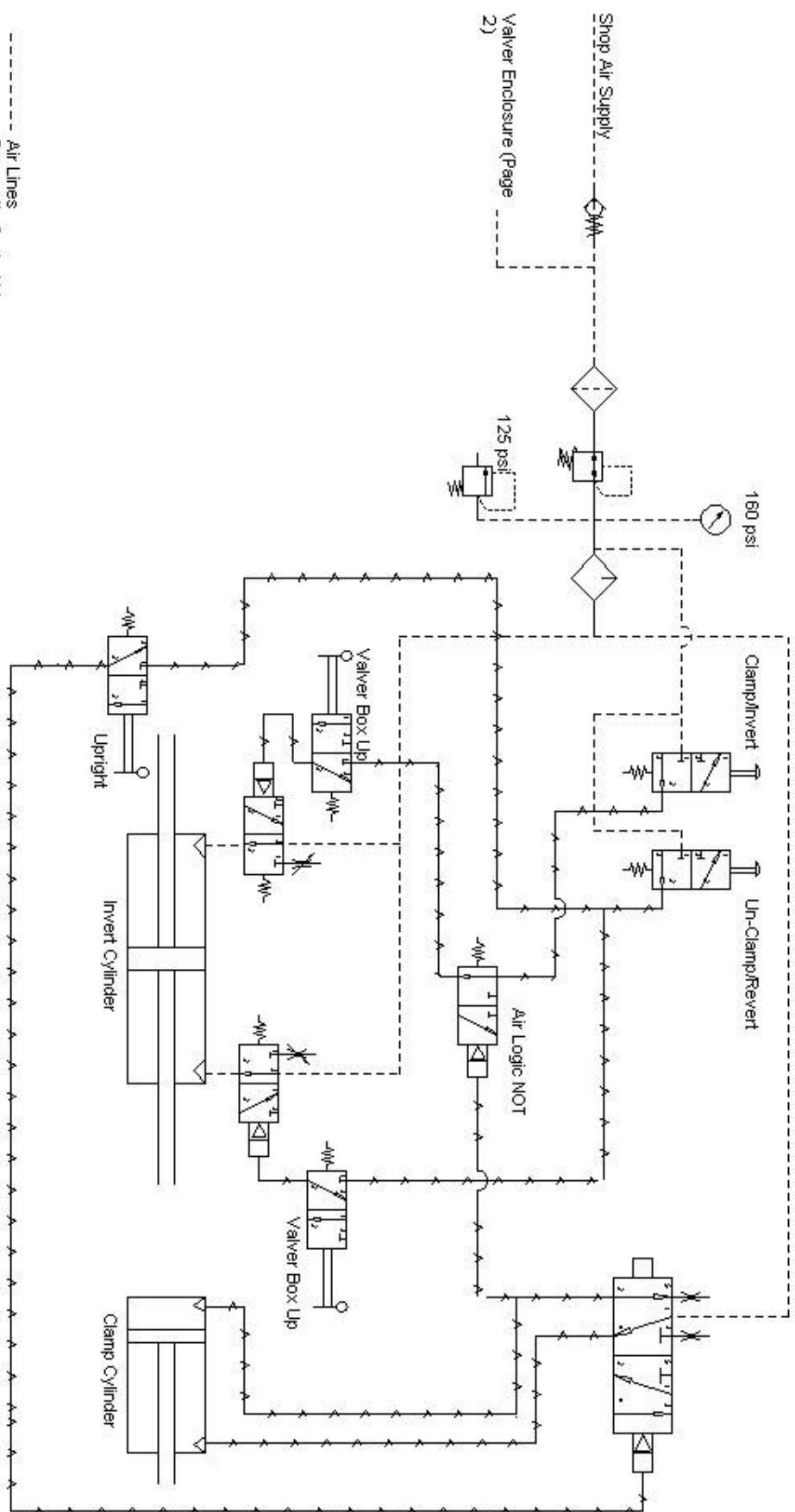
PRODUCT WARRANTY

1. **DURATION:** Galiso provides a one-year warranty from date of purchase, to the original purchaser, for standard products, unless otherwise specified. For all spare parts purchases, Galiso provides a 90-day warranty unless otherwise specified. Soft goods such as our speed seals, and O-rings, which are subject to wear in the normal course of operation, are not covered under this warranty.
2. **COVERAGE:** Galiso manufactured equipment is warranted against defective materials or workmanship. THIS WARRANTY IS VOID IF:
 - A) THE EQUIPMENT HAS BEEN DAMAGED BY ACCIDENT OR UNREASONABLE USE, IMPROPER SERVICE/MAINTENANCE, IMPROPER INSTALLATION, ABNORMAL OPERATING CONDITIONS, NEGLIGENCE, REPAIR BY ANY PERSON NOT AUTHORIZED BY GALISO, INC. OR OTHER CAUSES NOT RELATED TO MATERIAL DEFECTS OR WORKMANSHIP.
 - B) THE SERIAL NUMBER HAS BEEN ALTERED OR DEFACED.
3. **PERFORMANCE:** Galiso reserves the right to make warranty determination only after inspecting the item at the Galiso manufacturing facility. If the warranty determination indicates that the defective item is covered under warranty, the item will be repaired or replaced with same parts/items or parts/items of equivalent quality, at the option of Galiso. In the event of replacements, the replacement unit will continue under the original equipment warranty or carry a 90-day warranty, whichever is longer. No charge will be made for warranty repairs, and/or replacements. All freight charges are the responsibility of the customer requesting warranty service.


If the warranty determination indicates that the item is not covered by warranty, a repair/replacement cost estimate will be submitted to the purchaser for approval prior to initiating any repair work.
4. **CLAIMS:** In the case of equipment malfunction, notify Galiso (1-800-854-3789) and provide the Model Name, Model Number, Serial Number and a description of the problem. Return Authorization Number, shipping and/or service information will be provided on receipt of the required information.
5. **SERVICE EQUIPMENT:** Galiso attempts to make available, whenever possible, a limited amount of service equipment at a minimal use charge, plus freight expense, for those customers wishing to avoid downtime during repair of their equipment. Such items are available on a first come, first served basis and are billable at the specific service charge applying with a one-month minimum.
6. **MODEL CHANGES:** Galiso reserves the right to make changes in materials and specifications, without notice. Galiso may offer, for a stipulated fee, the opportunity to upgrade your equipment to the latest configuration.
7. **DISCLAIMERS:** Galiso provides technical data and assistance to aid customers in the selection and use of our products. There are no implied warranties of merchantability nor suitability for a particular purpose associated with the transmittal of technical data and/or customer assistance.

Galiso does not assume liability for any consequential, incidental, or special damages. Liability under this warranty is limited to repairing, or replacing Galiso equipment items returned to the factory or an authorized facility.

REV	DATE	BY
1	5/7/98	CMH
2	11/19/98	CMH



- Air Lines
- - - - Pneumatic Control Lines
- ==== Water Lines
- ==== Process Lines
- ==== Electric Signal



GALISO
MONROE PLUMBING & SCULPTURE
(970) 249-0233
(970) 669-4607 FAX.

PROPERTY NOTICE
ALL RIGHTS RESERVED. NO PARTS MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION IN WRITING FROM GALISO.

DESIGN STANDARDS
X = ±
XX = ±
XXX = ±
ANGLE ±
VALVE ±
VALVE ±
POLYMER ±

DRAWING NUMBER	21-61-1024	SECTION	B	EXTENSION	VSD
----------------	------------	---------	---	-----------	-----

CIV 161 P&ID

PCT ENCLOSURE

APPROVAL	DATE	DRAWING NAME	SECTION	EXTENSION	SHEET
					1 OF 2

CIV Safety Cage Addendum

Step by Step Instructions for operating the safety cage system:

These instructions are for tools equipped with the safety cage system to help eliminate human error accidents. Do not assume that the cage is a foolproof safety system. Always be alert and focused on the job at hand when operating this tool.

The following items will disallow all tool functions:

1. **Pressing the EMO button.** The EMO button must be in the out position or no tool functions will operate.
2. **Opening the control panel shroud door.** The shroud door must be fully closed and latched, or no tool functions will operate.
3. **Opening the safety cage gate.** The safety cage gate (herein called, 'gate'), must be fully closed and latched, or no tool functions will operate.

If tool operation is in progress, and one of those three safety items are activated, the tool will stop the function. To restart the function from the spot it stopped at, the safety item must be returned to its operating position, and the function properly restarted. If valving/devalving, this may require you to enter the cage and align the 'valving and devalving jaws' (herein called jaws) again, before it is ready to restart valving/devalving.

Assumed operator actions:

1. Before operating clamp, ensure the cylinder is centered in the clamp pad half circle, so the pads will properly clamp the cylinder.
2. Upon exiting the cage, close the gate fully to engage the latch.
3. Control panel shroud door is always kept closed.
4. Parking the jaws is done by placing the valving shaft fully in the up position. The inversion tool function will not operate unless the jaws are parked.
5. Removing the cylinder from the cage may or may not require lowering the lift.

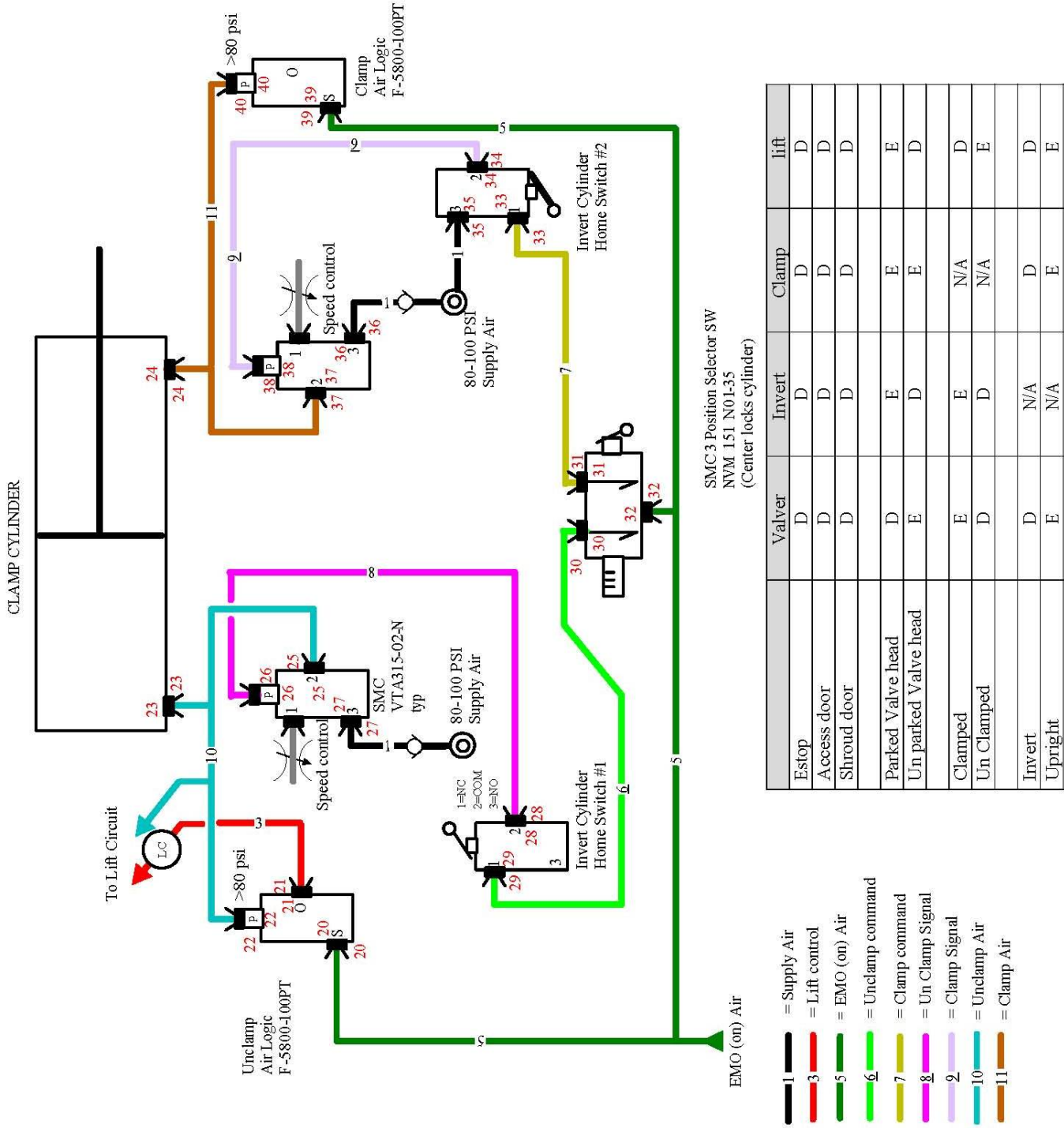
Operation Steps:

1. Ensure that shop protocol has been followed to make the cylinder ready to safely devalue it. This includes, but is not limited to, ensuring the cylinder is checked to have zero pressure in it, and that all flammable gas has been evacuated from the cylinder. A foolproof method must be used to ensure the cylinder is safe to remove the valve.
2. Ensure that the shop air supply to the CIV tool is between 90 - 120 PSI for optimum working pressure. The control pneumatic system may not operate if below 85, and the safety valve will pop-off (release pressure) at 125 PSI.
3. Place the cylinder on the 'height adjusting paddle' (herein called, 'paddle'), exit outside of the gate, and close the gate.
4. Adjust the cylinder height for valving, clamp the cylinder, and enter the cage.
5. Align the jaws with the valve flats, and exit the cage.
6. Use the controls to remove the valve part-way, then enter the cage, and fully remove the valve with a hand wrench.

7. Park the jaws, and exit the cage.
8. Invert the cylinder. Wait for motion to stop and enter the cage. Proceed with inspections.
9. Upon completion of inspections, exit the cage, and revert the cylinder.
10. Enter the cage, and reinsert the valve by starting the valve into the cylinder threads by hand.
11. Align the jaws, and exit the cage.
12. Adjust the torque to the proper setting, and torque the valve in the cylinder to specification.
13. Unclamp the cylinder and enter the cage.
14. Park the jaws, and remove the cylinder from the cage.

Safety Cage Control Pneumatics Circuitry

Note: All table references to D = Disabled; and E = Enabled.



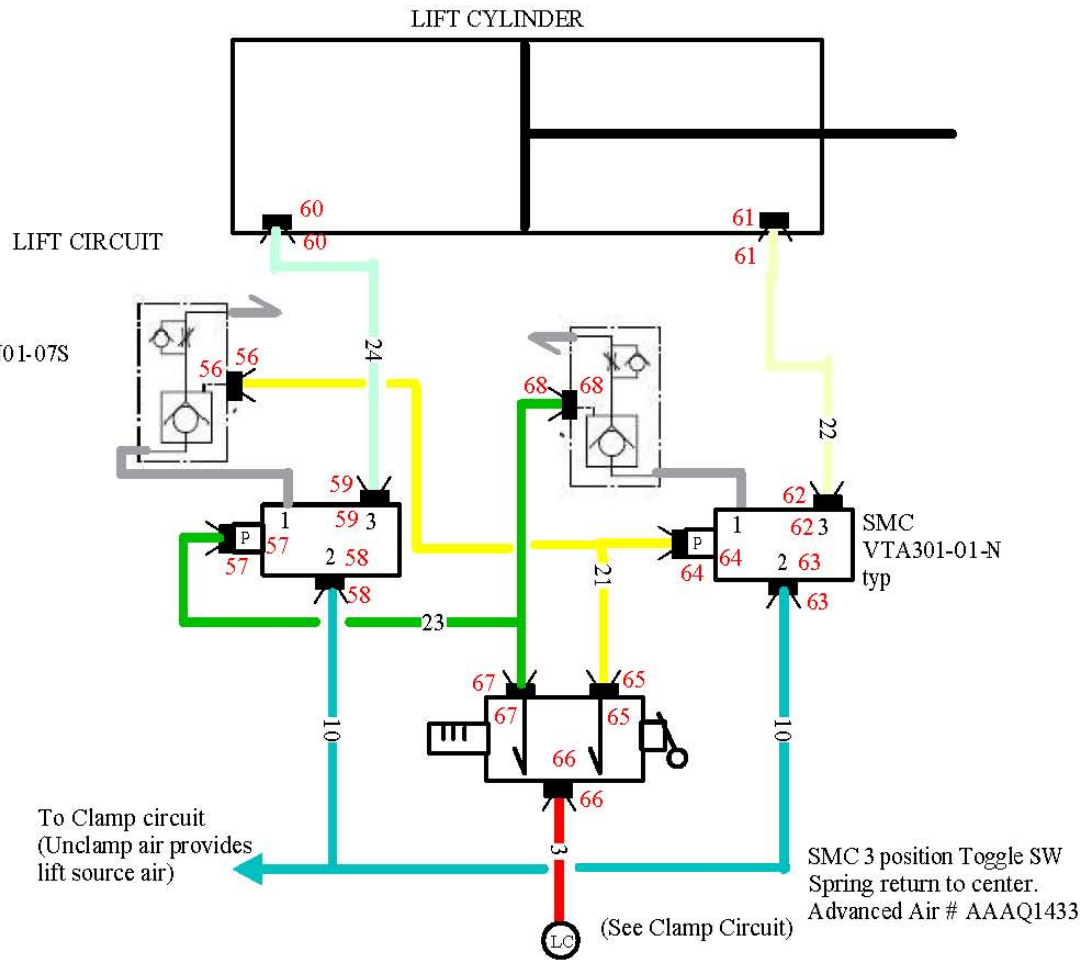
	Valver	Invert	Clamp	lift
Estop	D	D	D	D
Access door	D	D	D	D
Shroud door	D	D	D	D
Parked Valve head	D	E	E	E
Un parked Valve head	E	D	E	D
Clamped	E	E	N/A	D
Un Clamped	D	D	N/A	E
Invert	D	N/A	D	D
Upright	E	N/A	E	E

- 1 = Supply Air
- 3 = Lift control
- 5 = EMO (on) Air
- 6 = Unclamp command
- 7 = Clamp command
- 8 = Un Clamp Signal
- 9 = Clamp Signal
- 10 = Unclamp Air
- 11 = Clamp Air



	BOC	CIV
4/19/06	AIR Diagram - CLAMP Circuit	Drawn by
	Pneumatic Control Circuit	Randy Thibeau
Pg 1 of 5	GALISO INC	Air Schematic

Pilot operated
Check valve &
Speed control
SMC ASP330-N01-07S

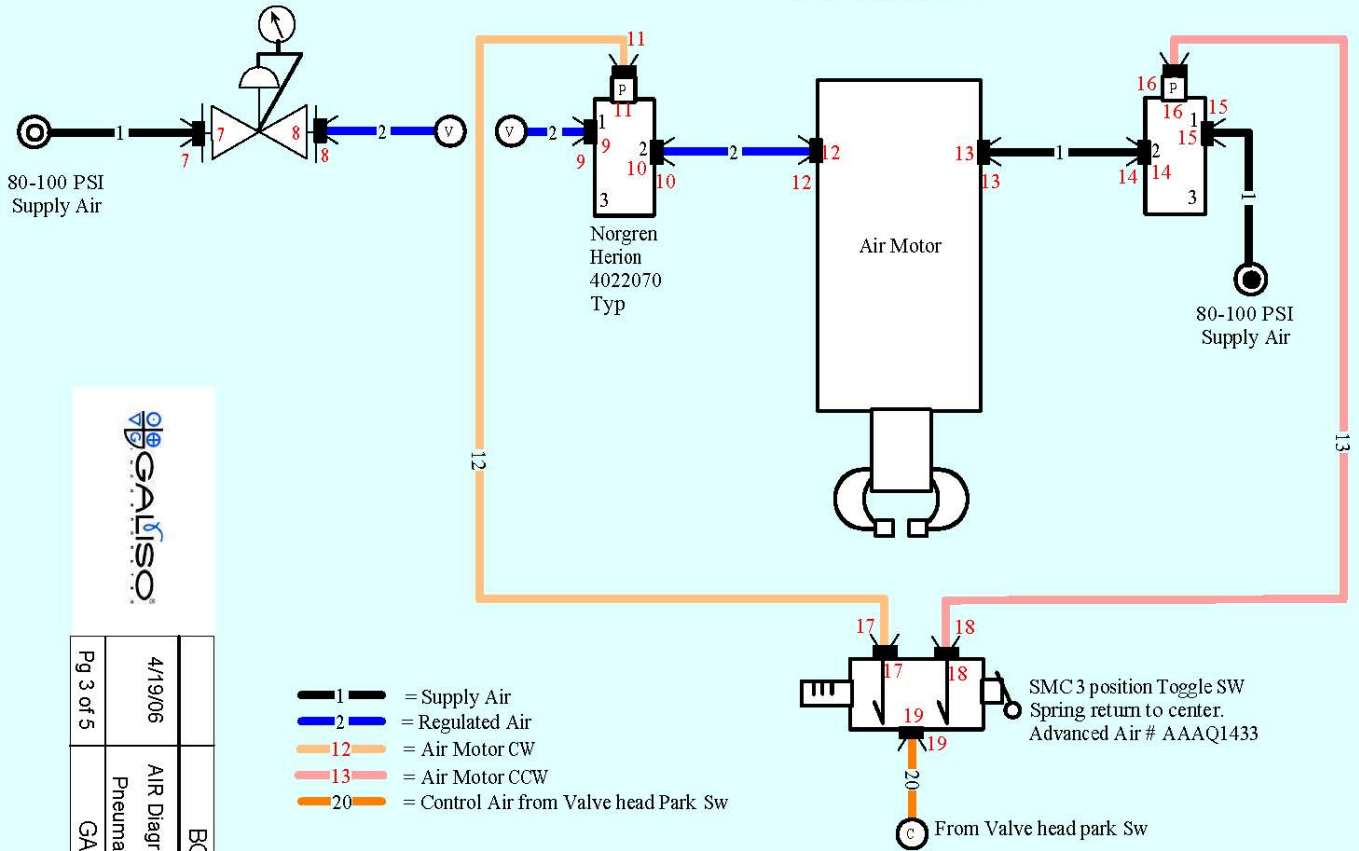


- 1 = Supply Air
- 3 = Lift control from Un Clamp Air Logic
- 21 = Lift command
- 22 = Lift Air
- 23 = Lower Command
- 24 = Lower Air
- 10 = Unclamp Air

	Valver	Invert	Clamp	lift
Estop	D	D	D	D
Access door	D	D	D	D
Shroud door	D	D	D	D
Parked Valve head	D	E	E	E
Un parked Valve head	E	D	E	D
Clamped	E	E	N/A	D
Un Clamped	D	D	N/A	E
Invert	D	N/A	Blocked	Blocked
Upright	E	N/A	E	E

Pg 2 of 5	4/20/06	BOC CIV
AIR Diagram - LIFT Circuit	Pneumatic Control Circuit	BOC CIV
GALISO INC	Drawn by Randy Thibeau	Air Schematic

AIR MOTOR CIRCUIT

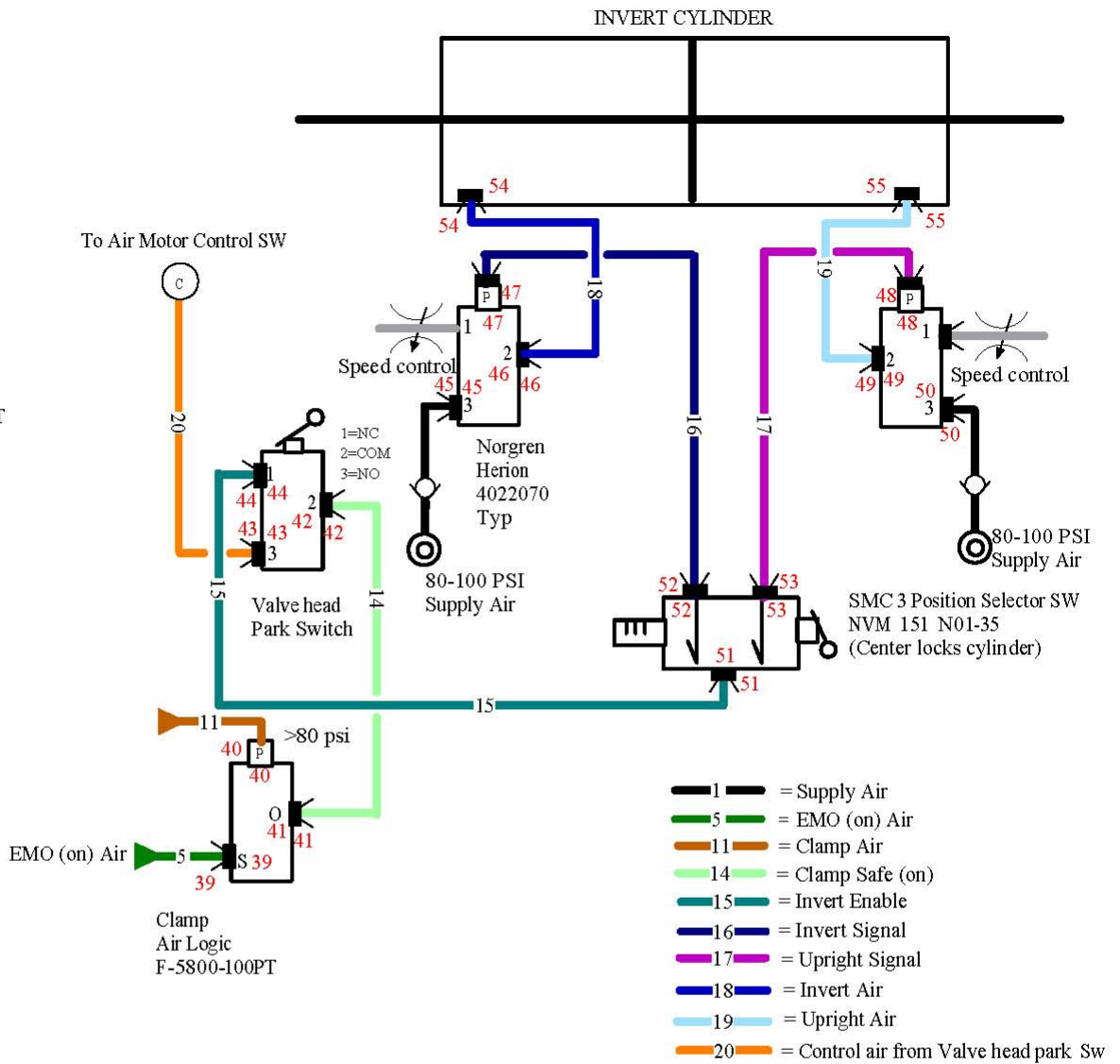


GALISO

Pg 3 of 5	4/19/06	BOC CIV
GALISO INC	AIR Diagram - AIR MOTOR Pneumatic Valver Circuit	
Air Schematic	Drawn by Randy Thibeau	

	Valver	Invert	Clamp	lift
Estop	D	D	D	D
Access door	D	D	D	D
Shroud door	D	D	D	D
Parked Valve head	D	E	E	E
Un parked Valve head	E	D	E	D
Clamped	E	E	N/A	D
Un Clamped	D	D	N/A	E
Invert	D	N/A	Blocked	Blocked
Upright	E	N/A	E	E

INVERT CIRCUIT

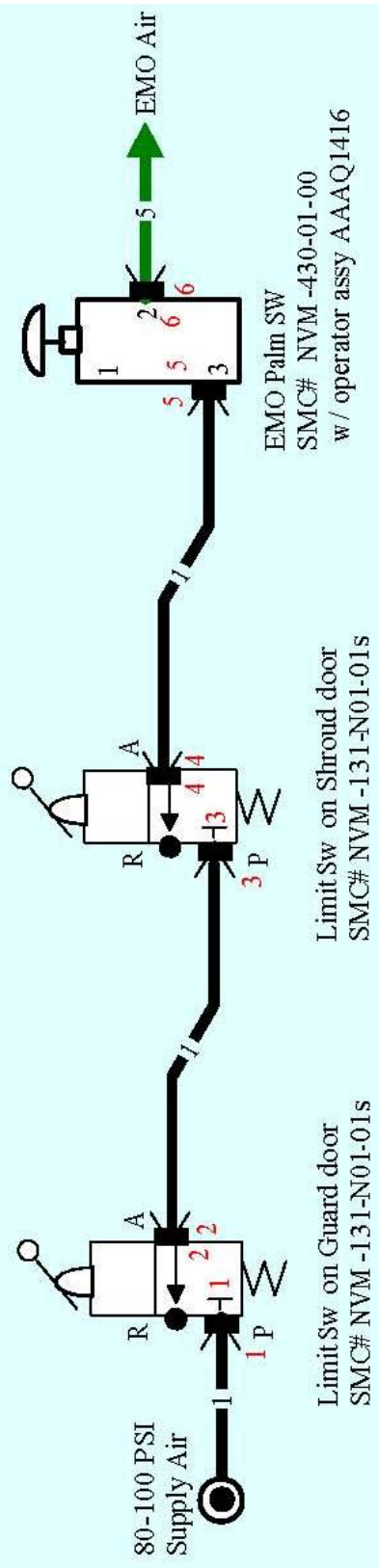


- 1 = Supply Air
- 5 = EMO (on) Air
- 11 = Clamp Air
- 14 = Clamp Safe (on)
- 15 = Invert Enable
- 16 = Invert Signal
- 17 = Upright Signal
- 18 = Invert Air
- 19 = Upright Air
- 20 = Control air from Valve head park Sw

Pg 4 of 5	4/20/06	BOC CIV
GALISO INC	AIR Diagram - INVERT Circuit Pneumatic Control Circuit	Drawn by Randy Thibeau
	Air Schematic	

	Valver	Invert	Clamp	lift
Estop	D	D	D	D
Access door	D	D	D	D
Shroud door	D	D	D	D
Parked Valve head	D	E	E	E
Un parked Valve head	E	D	E	D
Clamped	E	E	N/A	D
Un Clamped	D	D	N/A	E
Invert	D	N/A	D	D
Upright	E	N/A	E	E

	BOC CIV	
4/19/06	AIR Diagram - EMO Circuit Pneumatic Control Circuit	Drawn by Randy Thibeau
Pg 5 of 5	GALISO INC	Air Schematic



= Supply Air
 = EMO (on) Air