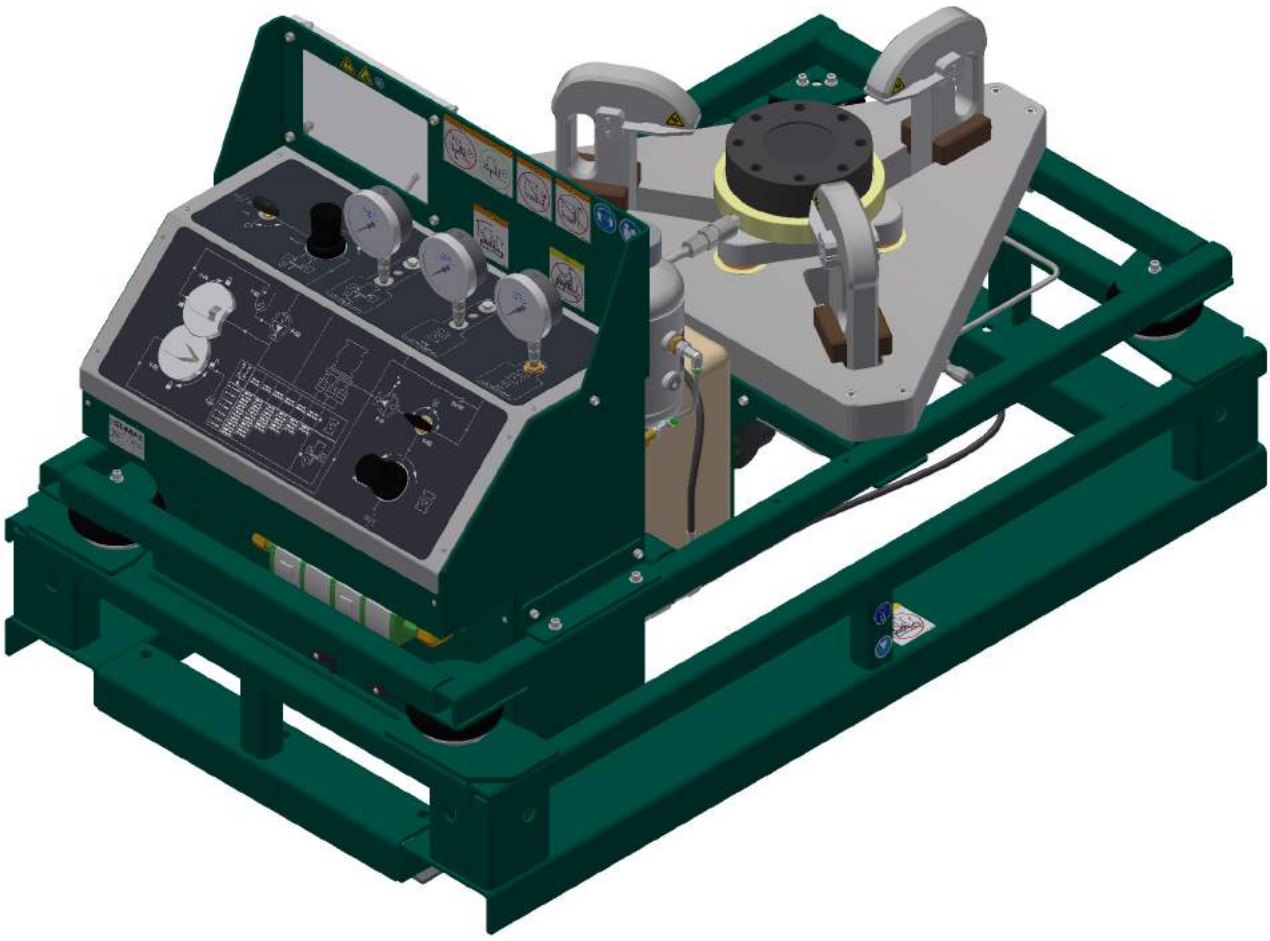
CE

TAT-8-25T

TURN AROUND TESTER FOR VALVES

OPERATING MANUAL

ORIGINAL INSTRUCTIONS



CALDER
VALVE TESTING & REPAIR SYSTEMS BY CLIMAX

P/N 90421
February 2018
Revision 1

CLIMAX | BORTECH CALDER H&S TOOL

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- Your name
- Shipping address
- Telephone number
- Machine model
- Serial number (if applicable)
- Date of purchase

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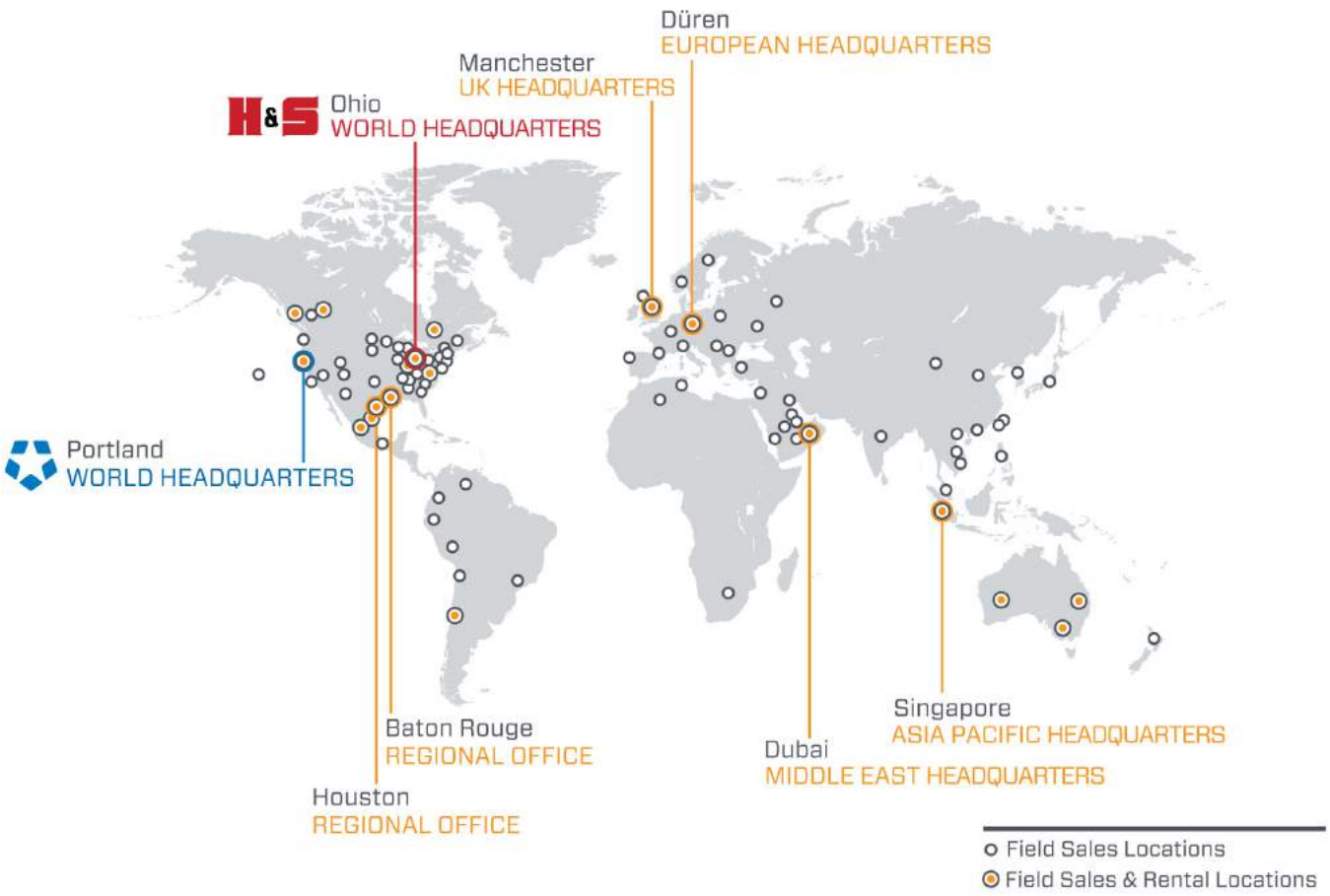
CLIMAX GLOBAL LOCATIONS



CE DOCUMENTATION

DECLARATION OF CONFORMITY

2006/42/EC Machinery Directive

Name of manufacturer or supplier
Climax Portable Machining and Welding Systems

Full postal address including country of origin
2712 E. Second St., Newberg, OR 97132, USA

Description of product
Turn Around Tester

Name, type or model, batch or serial number
MODEL 600; P/N'S 88572, 88576, 88018,
88271, 87988, 87989, 88573, 88577, 88574,
88578, 88575, 88579, 88591, 88581, 88272,
88273, 88990, 87991, 88592, 88583, 88593,
88586, 88594, 88590, 89021

Standards used, including number, title, issue date and other relative documents
EN 349, EN 3744, EN 11201, EN 12100-1, EN 13849-1, EN 14121-1

Name of Responsible Person within the EU
Tom Cunningham

Full postal address if different from manufacturers
Climax GmBH
Am Langen Graben 8
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Declaration

I declare that as the Manufacturer, the above information in relation to the supply / manufacture of this product, is in conformity with the stated standards and other related documents following the provisions of the above Directives and their amendments.

Signature of Manufacturer:

Scott J. Thiel

Position Held: **Vice President of Engineering; Research & Development**

Date: October 5, 2017

CE

LIMITED WARRANTY

CLIMAX Portable Machine Tools, Inc. (hereafter referred to as “CLIMAX”) warrants that all new machines are free from defects in materials and workmanship. This warranty is available to the original purchaser for a period of two years after delivery. If the original purchaser finds any defect in materials or workmanship within the warranty period, the original purchaser should contact its factory representative and return the entire machine, shipping prepaid, to the factory. CLIMAX will, at its option, either repair or replace the defective machine at no charge and will return the machine with shipping prepaid.

CLIMAX warrants that all parts are free from defects in materials and workmanship, and that all labor has been performed properly. This warranty is available to the customer purchasing parts or labor for a period of 90 days after delivery of the part or repaired machine or 180 days on used machines and components. If the customer purchasing parts or labor finds any defect in materials or workmanship within the warranty period, the purchaser should contact its factory representative and return the part or repaired machine, shipping pre-paid, to the factory. CLIMAX will, at its option, either repair or replace the defective part and/ or correct any defect in the labor performed, both at no charge, and return the part or repaired machine shipping prepaid.

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- Damage after the date of shipment not caused by defects in materials or workmanship
- Damage caused by improper or inadequate machine maintenance
- Damage caused by unauthorized machine modification or repair
- Damage caused by machine abuse
- Damage caused by using the machine beyond its rated capacity

All other warranties, express or implied, including without limitation the warranties of merchantability and fitness for a particular purpose are disclaimed and excluded.

Terms of sale

Be sure to review the terms of sale which appear on the reverse side of your invoice. These terms control and limit your rights with respect to the goods purchased from CLIMAX.

About this manual

CLIMAX provides the contents of this manual in good faith as a guideline to the operator. CLIMAX cannot guarantee that the information contained in this manual is correct for applications other than the application described in this manual. Product specifications are subject to change without notice.

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1 INTRODUCTION

IN THIS CHAPTER:

1.1 HOW TO USE THIS MANUAL

This manual describes information necessary for the setup, operation, maintenance, storage, shipping, and decommissioning of the TAT-8-25T.

The first page of each chapter includes a summary of the chapter contents to help you locate specific information. The appendices contain supplemental product information to aid in setup, operation, and maintenance tasks.

Read this entire manual to familiarize yourself with the TAT-8-25T before attempting to set it up or operate it.

1.2 SAFETY ALERTS

Pay careful attention to the safety alerts printed throughout this manual. Safety alerts will call your attention to specific hazardous situations that may be encountered when operating this machine.

Examples of safety alerts used in this manual are defined here[1]:

⚠ DANGER

indicates a hazardous situation which, if not avoided, ***WILL*** result in death or severe injury.

⚠ WARNING

indicates a hazardous situation which, if not avoided, ***COULD*** result in death or severe injury.

1. For more information on safety alerts, refer to *ANSI/NEMA Z535.6-2011, Product safety Information in Product Manuals, Instructions, and Other Collateral Materials*.

⚠ CAUTION

indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

indicates a hazardous situation which, if not avoided, could result in property damage, equipment failure, or undesired work results.

1.3 GENERAL SAFETY PRECAUTIONS

CLIMAX leads the way in promoting the safe use of portable machine tools and valve testers. Safety is a joint effort. You, the end user, must do your part by being aware of your work environment and closely following the operating procedures and safety precautions contained in this manual, as well as your employer's safety guidelines.

Observe the following safety precautions when operating or working around the machine.

Training – Before operating this or any machine tool, you should receive instruction from a qualified trainer. Contact CLIMAX for machine-specific training information.

Risk assessment – Working with and around this machine poses risks to your safety. You, the end user, are responsible for conducting a risk assessment of each job site before setting up and operating this machine.

Intended use – Use this machine in accordance with the instructions and precautions in this manual. Do not use this machine for any purpose other than its intended use as described in this manual.

Personal protective equipment – Always wear appropriate personal protective gear when operating this or any other machine tool.

Work area – Keep the work area around the machine clear of clutter. Restrain cords and hoses connected to the machine. Keep other cords and hoses away from the work area.

Lifting – Many CLIMAX machine components are very heavy. Whenever possible, lift the machine or its components using proper hoisting equipment and rigging. Always use designated lifting points on the machine.

Lock-out/tag-out – Lock-out and tag-out the machine before performing maintenance.

Moving parts – CLIMAX machines have numerous exposed moving parts and interfaces that can cause severe impact, pinching, cutting, and other injuries. Except for stationary operating controls, avoid contact with mov-

ing parts by hands or tools during machine operation. Remove gloves and secure hair, clothing, jewelry, and pocket items to prevent them from becoming entangled in moving parts.

1.4 MACHINE-SPECIFIC SAFETY PRECAUTIONS

Eye hazard – Always wear eye protection when operating the machine.

Sound level – This machine produces potentially harmful sound levels. Hearing protection is required when operating this machine or working around it.

Hazardous environments – Do not operate the machine in environments where potentially explosive materials, toxic chemicals, or radiation may be present.

Pressurization – Do not over-pressurize the valve test system beyond the limits described in this manual and on machine labels.

Test gauges – Do not use any gauge above its rating. Do not remove test gauges while the system is pressurized.

Utility service requirements – Do not exceed the pressure ratings stated in this manual and on the machine labels.

⚠ WARNING

This machine is equipped with interlocking valve control knobs to prevent accidental release of clamp pressure while the valve under test is pressurized.

Do not operate this machine if these interlocking knobs are missing, damaged, or altered. Doing so could result in property damage or personnel injury.

1.5 RISK ASSESSMENT AND HAZARD MITIGATION

To achieve the intended results and to promote safety, the operator must understand and follow the design intent, set-up, and operation practices that are unique to valve testers.

The operator must perform an overall review and on-site risk assessment of the intended application. Due to the unique nature of high-pressure hydrostatic testing, identifying one or more hazards that must be addressed is typical.

When performing the on-site risk assessment, it is important to consider the valve tester and the workpiece as a whole.

⚠ WARNING

High-pressure valve testing may result in the sudden, unexpected release of stored energy with the potential to cause property damage or personnel injury. Potential hazards may include the possibility of high-velocity fluid escaping and high-energy projectile impact. The end-user must assess the application and install protective barrier devices, as appropriate.

1.6 RISK ASSESSMENT CHECKLIST

The following checklist is not intended to be an all inclusive list of things to watch out for when setting up and operating this valve testing machine. However, these checklists are typical of the types of risks the assembler and operator should consider. Use these checklists as part of your risk assessment:

TABLE 1-1. RISK ASSESSMENT CHECKLIST BEFORE SET-UP

	Before set-up
☐	I took note of all the warning labels on the machine.
☐	I removed or mitigated all identified risks (such as tripping, cutting, crushing, entanglement, shearing, or falling objects).
☐	I considered the need for personnel safety guarding and installed any necessary guards.
☐	I considered the potential hazards that are inherent in high-pressure valve testing, including the possibility of high velocity fluid escape or workpiece fragmentation, and have installed appropriate protective barriers.
☐	I read the machine assembly instructions (Section 3) and took inventory of all the items required but not supplied (Section 2.5).
☐	I considered how this machine operates and identified the best placement for the controls, cabling, and the operator.
☐	I evaluated and mitigated any other potential risks specific to my work area.

TABLE 1-2. RISK ASSESSMENT CHECKLIST AFTER SET-UP

	After set-up
☐	I checked that the machine is safely installed (according to Section 3).
☐	I identified all possible pinch points, such as those caused by rotating parts, and informed the affected personnel.
☐	I followed the required maintenance checklist (Section 5).
☐	I checked that all affected personnel have the recommended personal protective equipment, as well as any site-required or regulatory equipment.
☐	I checked that all affected personnel understand and are clear of the danger zone.
☐	I evaluated and mitigated any other potential risks specific to my work area.

1.7 LABELS

1.7.1 Label identification

The following warning and identification labels should be on your machine. If any are defaced or missing, contact CLIMAX immediately for replacements.

TABLE 1-3. TAT-8-25T LABELS

	P/N 29154 ID plate		P/N 59033 Label: center of balance
	P/N 59039 Label: lift point		P/N 79328 Warning label: read the operating manual
	P/N 80905 Warning label: hand crush hazard		P/N 81008 Warning label: wear ear and eye protection
	P/N 82144 Warning label: danger, use caution		P/N 90160 Warning label: high-pressure water release hazard

TABLE 1-3. TAT-8-25T LABELS

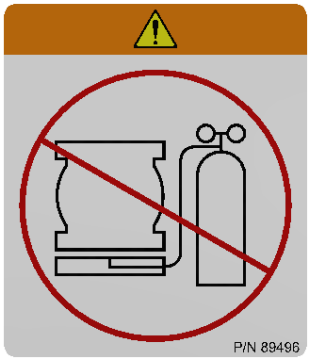
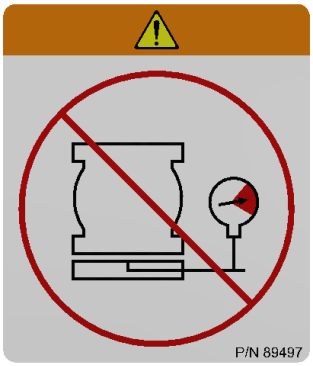
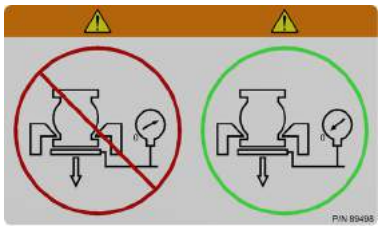
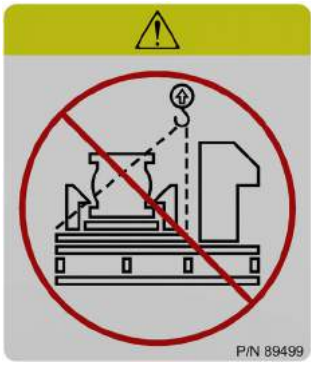
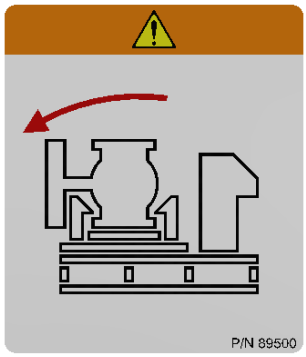
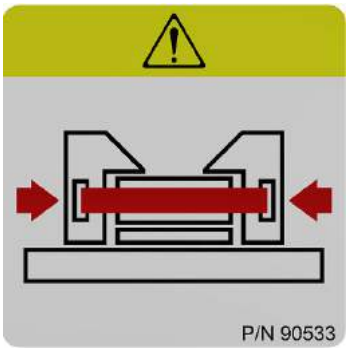
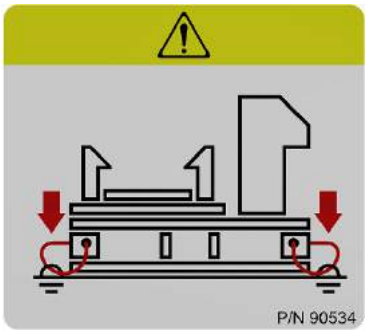
	P/N 89496 Warning label: not for HP gas testing		P/N 89497 Warning label: do not exceed the maximum pressure rating of the valve
	P/N 89498 Warning label: do not release the clamp the valve is pressurized		P/N 89499 Warning label: do not lift with valve clamped
	P/N 89500 Warning label: tip-over hazard		P/N 90533 Label: clamp arm shipping strap
	P/N 90534 Label: frame tie-down points	CALDER TURN-AROUND-TESTER™ Powered by CLIMAX	P/N 90585 Label: Calder TAT

TABLE 1-3. TAT-8-25T LABELS

CALDER | TURN-AROUND-TESTER™ Powered by CLIMAX	P/N 90585 Label: Calder Turn-Around-Tester

1.7.2 Label location

The following figures display the location of the labels on each of the components of the TAT-8-25T. For further identification of location placement, refer to the exploded views in Appendix A.

FIGURE 1-1. CONSOLE LABEL LOCATIONS

Label P/N: 29154, 79328, 81008, 82144, 89494, 89496, 89497, 89498, 89499, 89500, 90585

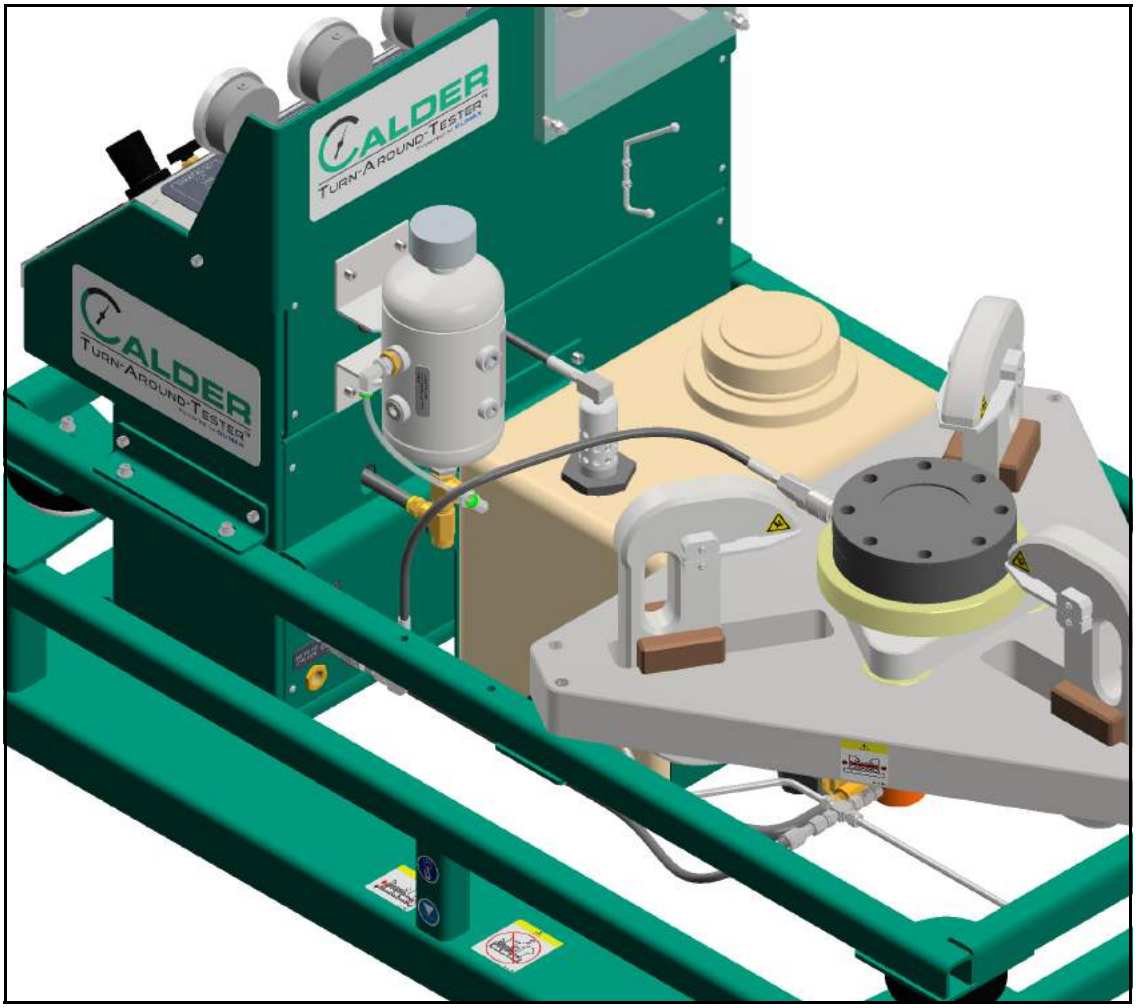


FIGURE 1-2. REAR LEFT LABEL LOCATIONS

Label P/N: 59033, 59039, 80905, 89499, 90533, 90534, 90585

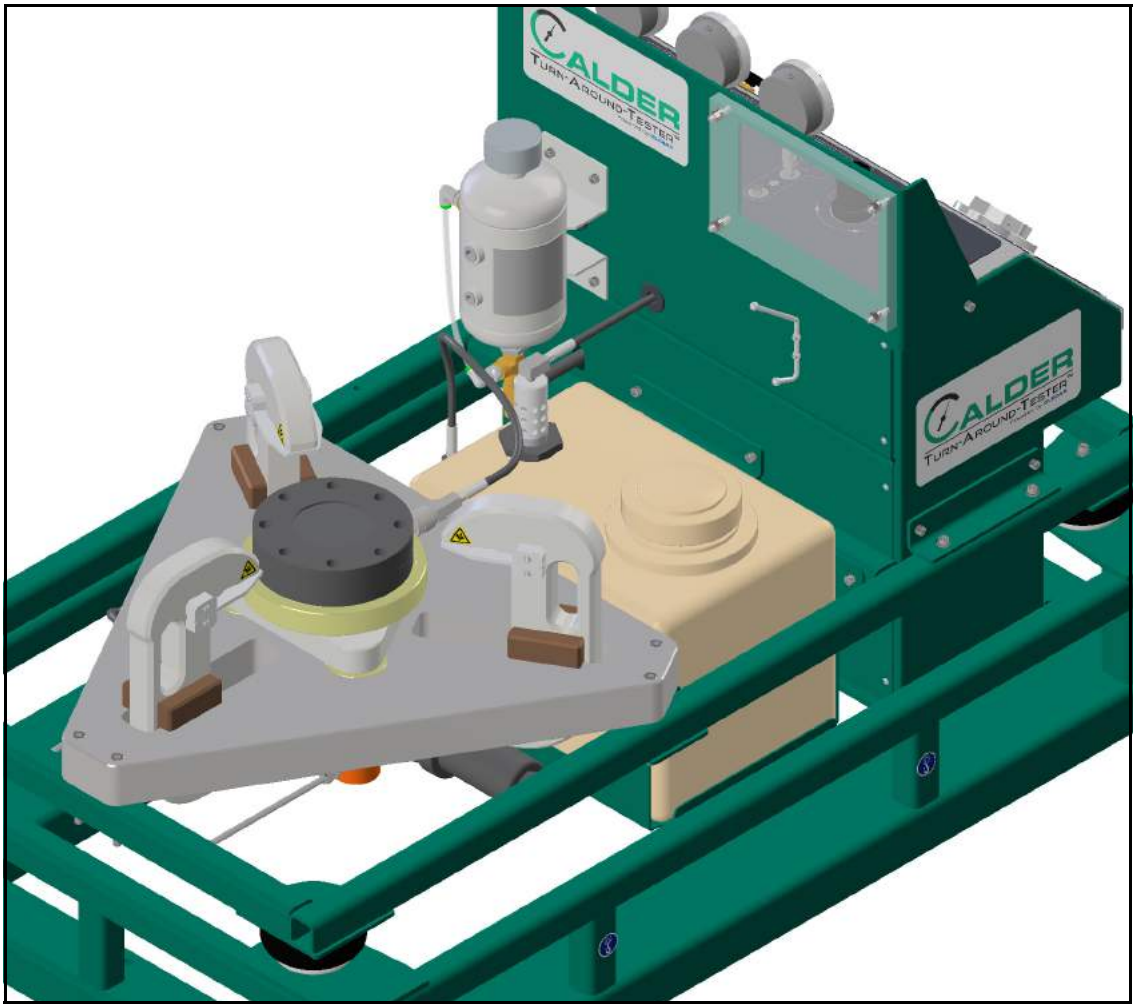


FIGURE 1-3. REAR RIGHT LABEL LOCATIONS

Label P/N: 59039, 80905, 90585

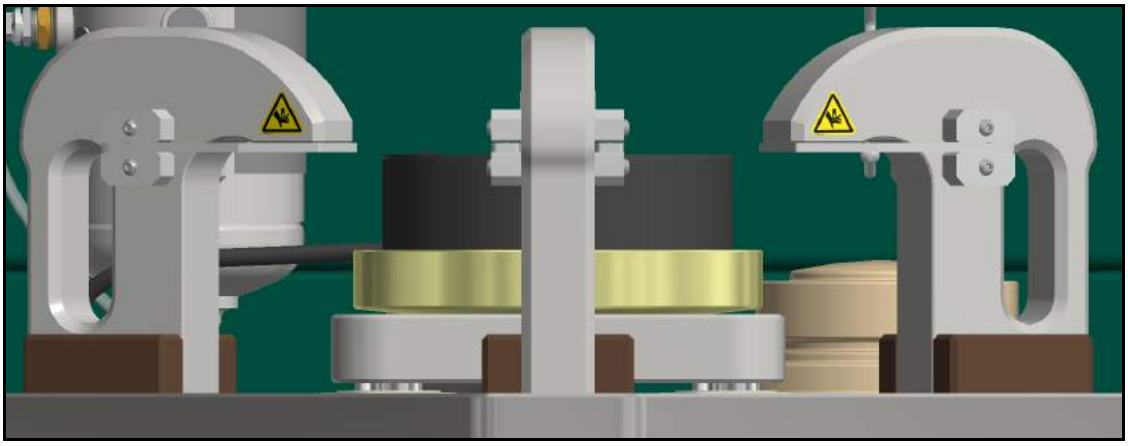


FIGURE 1-4. REAR LABEL LOCATIONS

Label P/N: 80905

2 OVERVIEW

IN THIS CHAPTER:

2.1 FEATURES AND COMPONENTS

The TAT-8-25T is a valve-testing system that hydraulically clamps and seals flanged valves for hydrostatic and low-pressure air testing.

Principal components of the TAT-8-25T include:

Test console – this controls the test pressure of the valve being tested.

Clamp fixture – this holds the valve being tested and maintains a seal between the test equipment and the valve being tested.

Safety interlock – this prevents accidental release of valve clamp hydraulic pressure which the valve under test is pressurized.

The following optional components are sold separately:

Seat leakage fixtures – these capture and measure leakage with a bubble jar (API 527 compliant).

Hydrostatic dampening system – this option allows a more steady pressure application to a safety relief valve (SRV) for cracking tests, as the pulsing from the pressure pump reduces with the charged pressure vessel. The maximum pressure is 4,800 psig (331 bar).

Figure 2-1 shows the TAT-8-25T components.

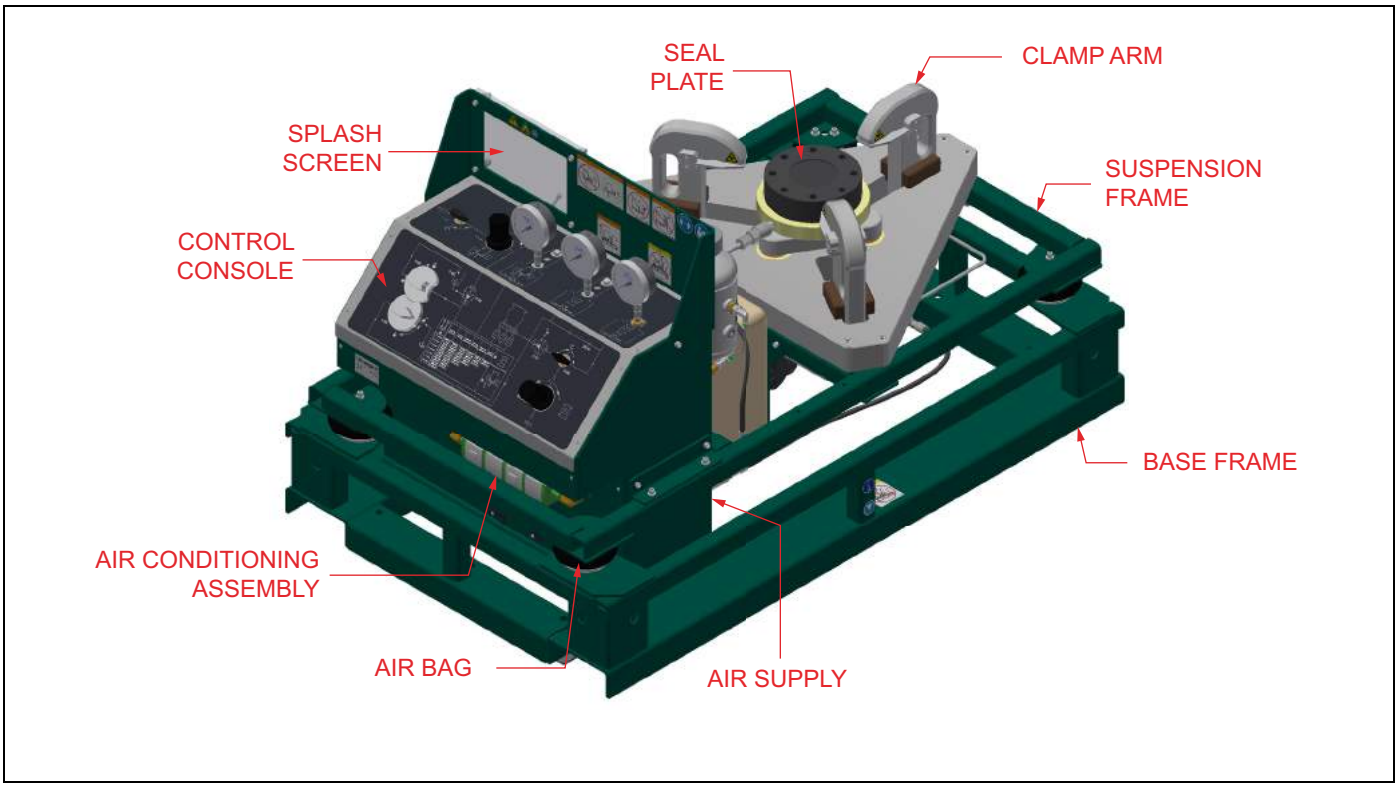


FIGURE 2-1. FRONT COMPONENTS

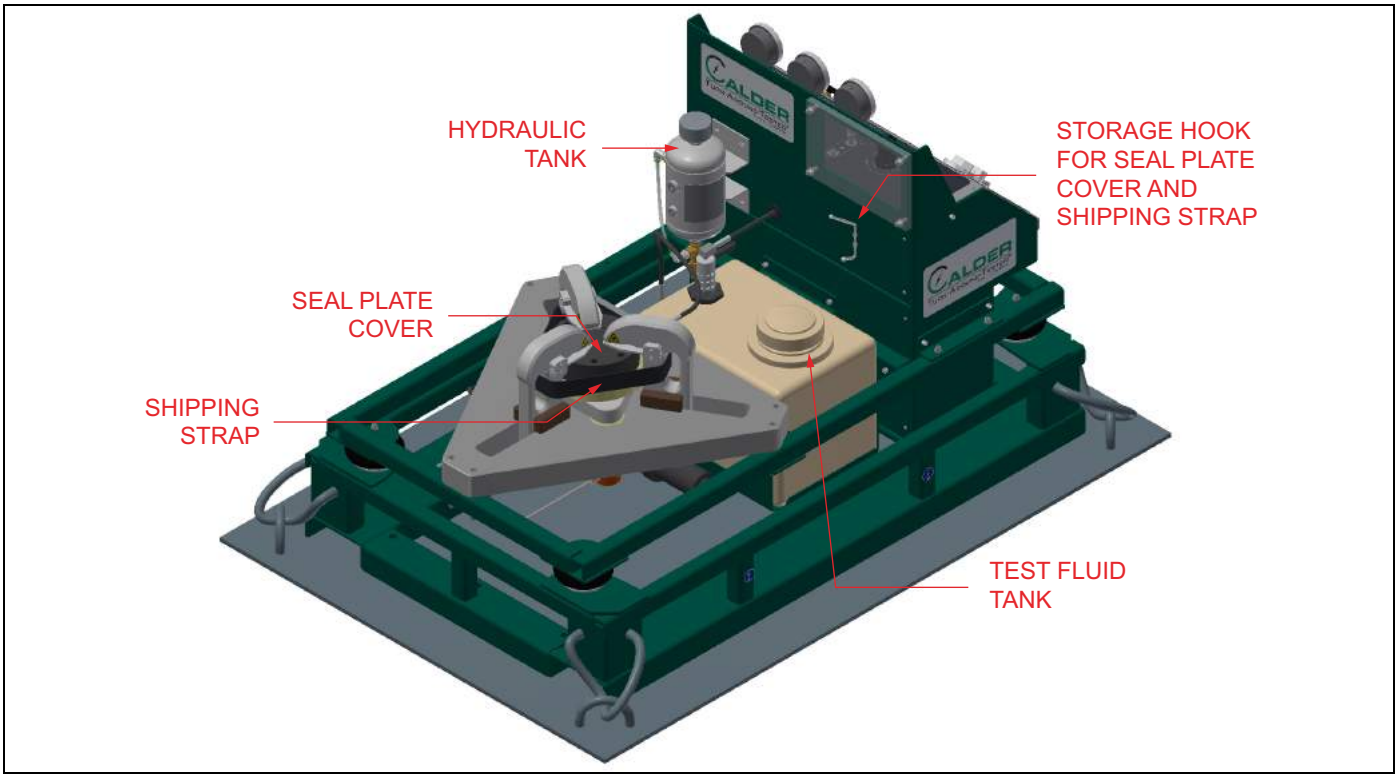


FIGURE 2-2. BACK COMPONENTS

The following maximum pressure limitations apply:

- Test pressure: 9,600 psi (662 bar) in water; 125 psi (8.6 bar) for air
- Clamp pressure: 5,700 psi (393 bar) in hydraulic

2.2 CONTROLS

The controls are all located on the control console and the clamp fixture console.

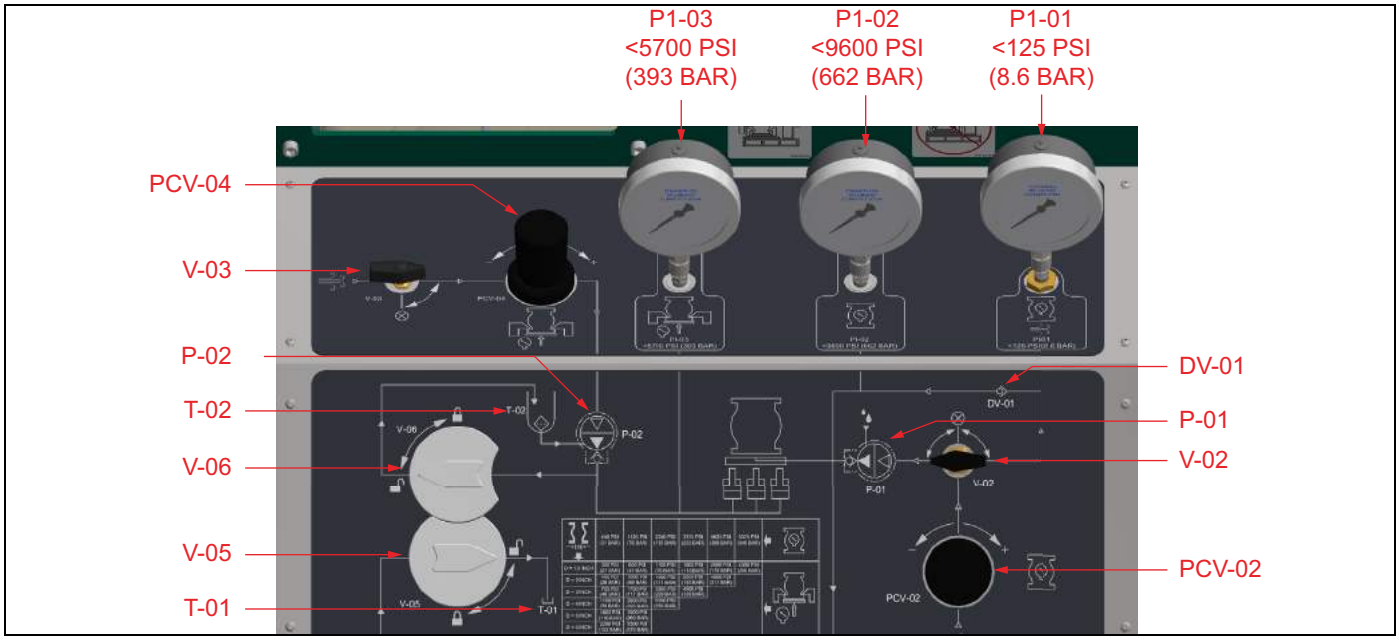


FIGURE 2-3. UPPER CONSOLE CONTROLS

Table 2-1 defines the clamp console controls, moving clockwise from the top.

TABLE 2-1. CONSOLE CONTROL IDENTIFICATION

Console label	Function
P1-03	Clamp pressure gauge
P1-02	Hydrostatic test pressure gauge
P1-01	Low air test pressure gauge
DV-01	Check valve
P-01	Clamp pump
V-02	Test selection valve
PCV-02	Test pressure control valve
T-01	Hydrostatic fluid tank
V-05	Body drain valve
V-06	Clamp release valve

TABLE 2-1. CONSOLE CONTROL IDENTIFICATION

Console label	Function
T-02	Hydraulic fluid tank
P-02	Hydrostatic pump
V-03	Clamp pump air supply valve
PCV-04	Clamp pressure control valve

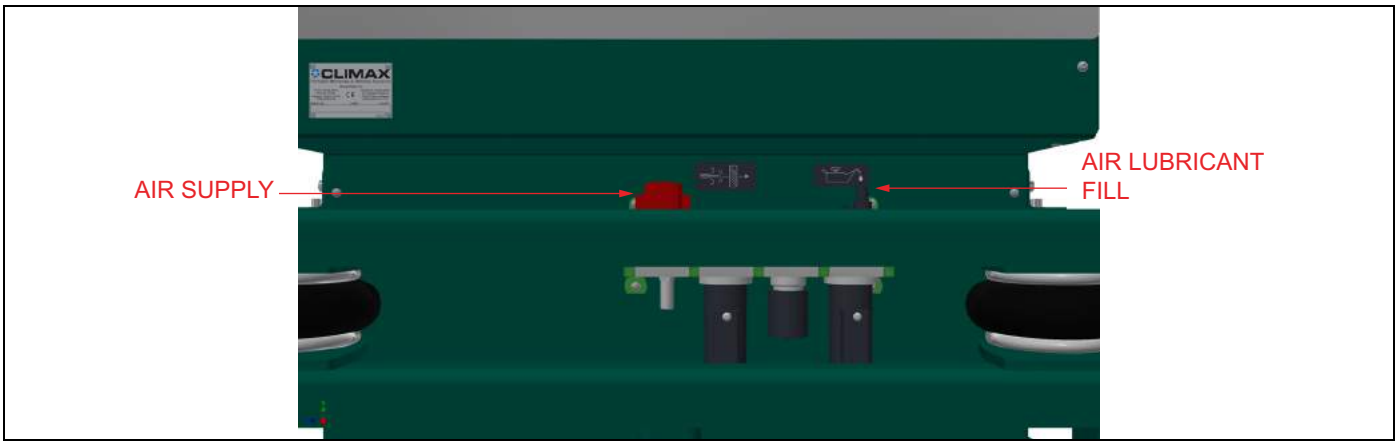


FIGURE 2-4. LOWER CONSOLE CONTROLS

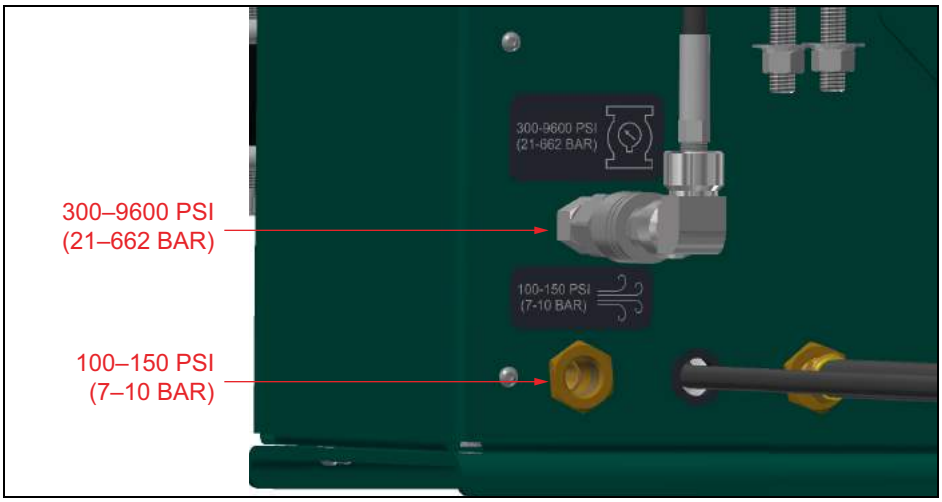


FIGURE 2-5. BACK CONSOLE PORTS

2.3 DIMENSIONS

Figure 2-6 on page 15 shows the machine dimensions.

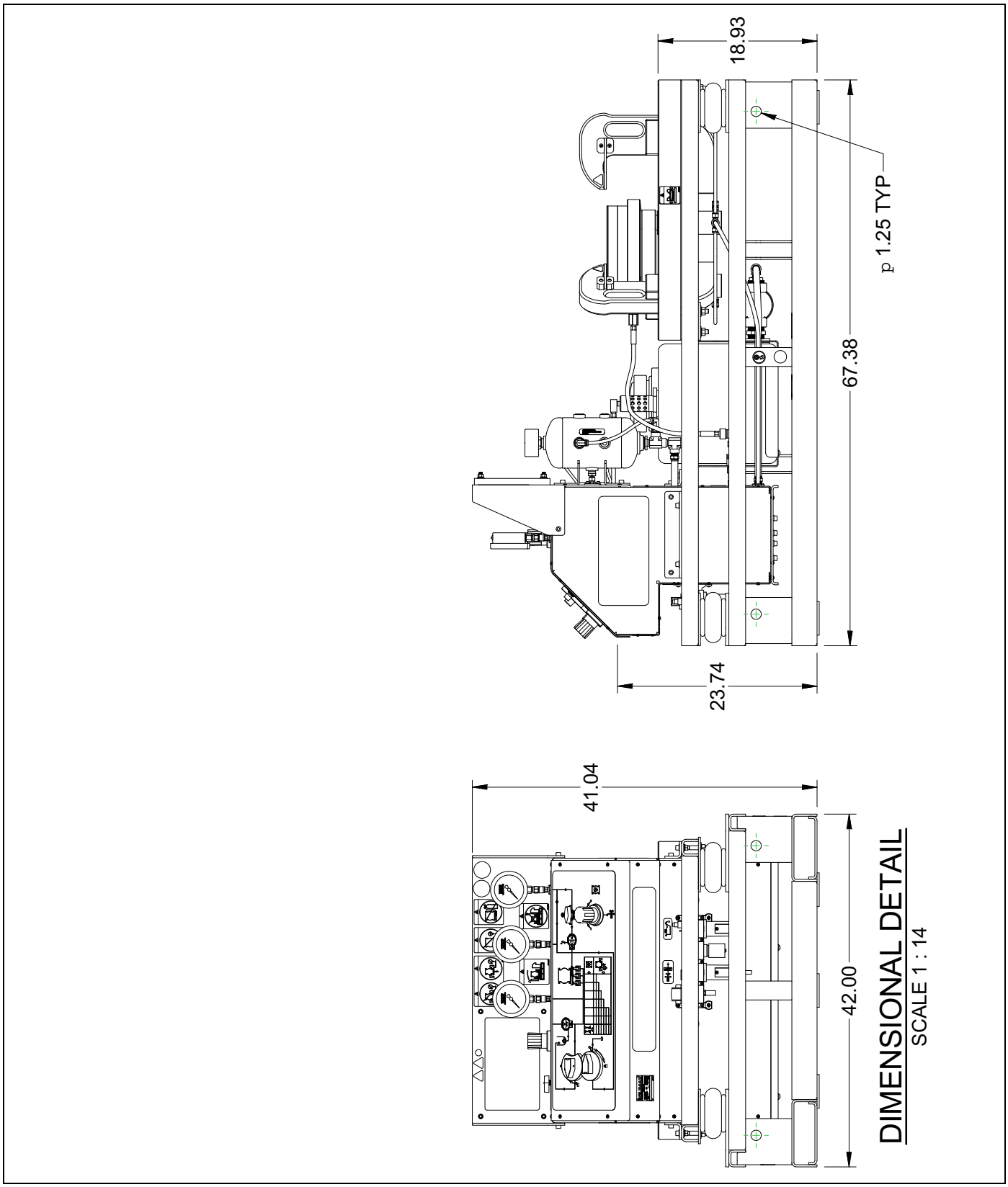


FIGURE 2-6. DIMENSIONS

2.4 SPECIFICATIONS

TABLE 2-2. SPECIFICATIONS

Test media:	Water or air
Maximum water test pressure:	9,600 psi (662 bar)
Maximum air test pressure:	125 psi (8.6 bar)
Types of valves that can be tested:	Straight pattern ball, globe, gate, butterfly, check, and safety relief valves
Shop air required:	100–150 psi at 40 scfm (6.9–10.3 bar at 1.1 m^3/min)
Hydraulic ram force:	25 tons (22.7 tonnes)
Approximate machine weight	1,810 lbs (821 kg) with water
Approximate shipped weight	2,500 lbs (1,134 kg)

WARNING

Do not use the machine in any application that exceeds these operating specifications. Failure to follow these guidelines could result in personnel injury and property damage, and will void the warranty.

2.5 ITEMS REQUIRED BUT NOT SUPPLIED

The following items are required but not supplied in your CLIMAX product kit:

- Shop air (100–150 psi [6.9–10.3 bar])
- Hydraulic fluid AW-32 or AW-46
- Air tool oil (general purpose, such as AW-32)
- Lock-out/tag-out device

3 SETUP

IN THIS CHAPTER:

This section describes the setup and assembly procedures for the TAT-8-25T.

3.1 RECEIPT AND INSPECTION

Your CLIMAX product was inspected and tested prior to shipment, and packaged for normal shipment conditions. CLIMAX does not guarantee the condition of your machine upon delivery.

When you receive your CLIMAX product, perform the following receipt checks:

1. Inspect the shipping containers for damage.
2. Check the contents of the shipping containers against the included invoice to make sure that all components have been shipped.
3. Inspect all components for damage.

Contact CLIMAX immediately to report damaged or missing components.

NOTICE

Keep the shipping container and all packing materials for future storage and shipping of the machine.

3.2 LIFTING AND RIGGING

Lift the TAT-8-25T at the 3-mark point with straps attached, as seen in Figure 3-1 and Figure 3-2 on page 18.

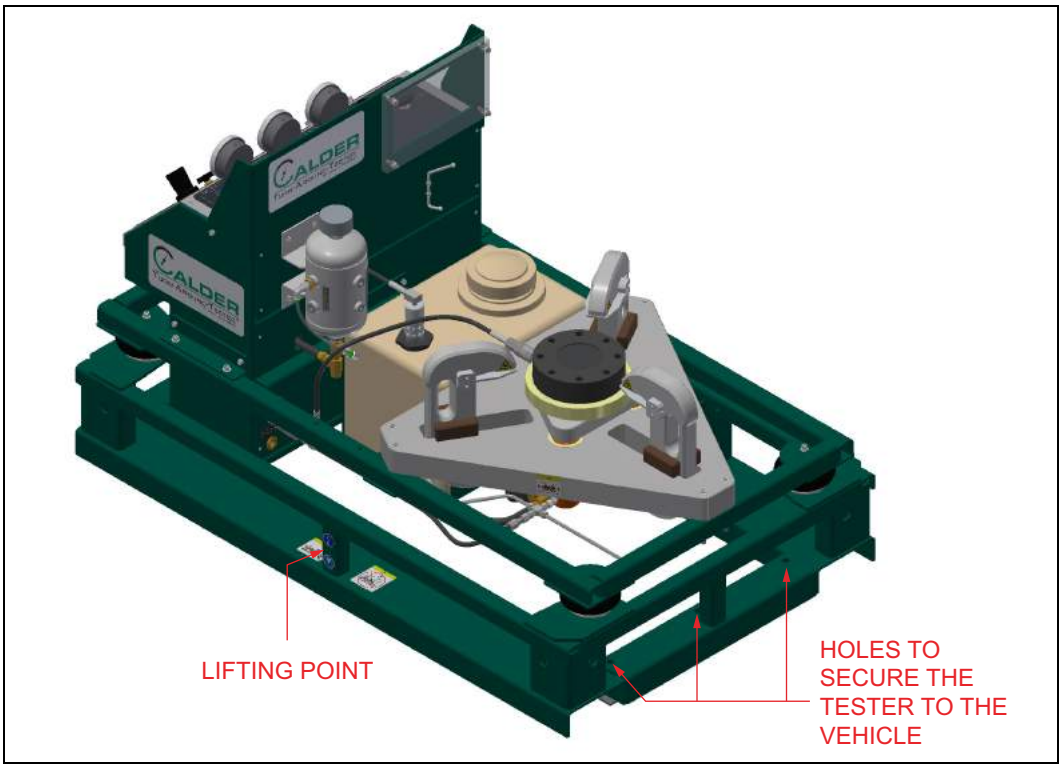


FIGURE 3-1. TAT-8-25T LIFTING AND SECURING POINTS (LEFT SIDE)

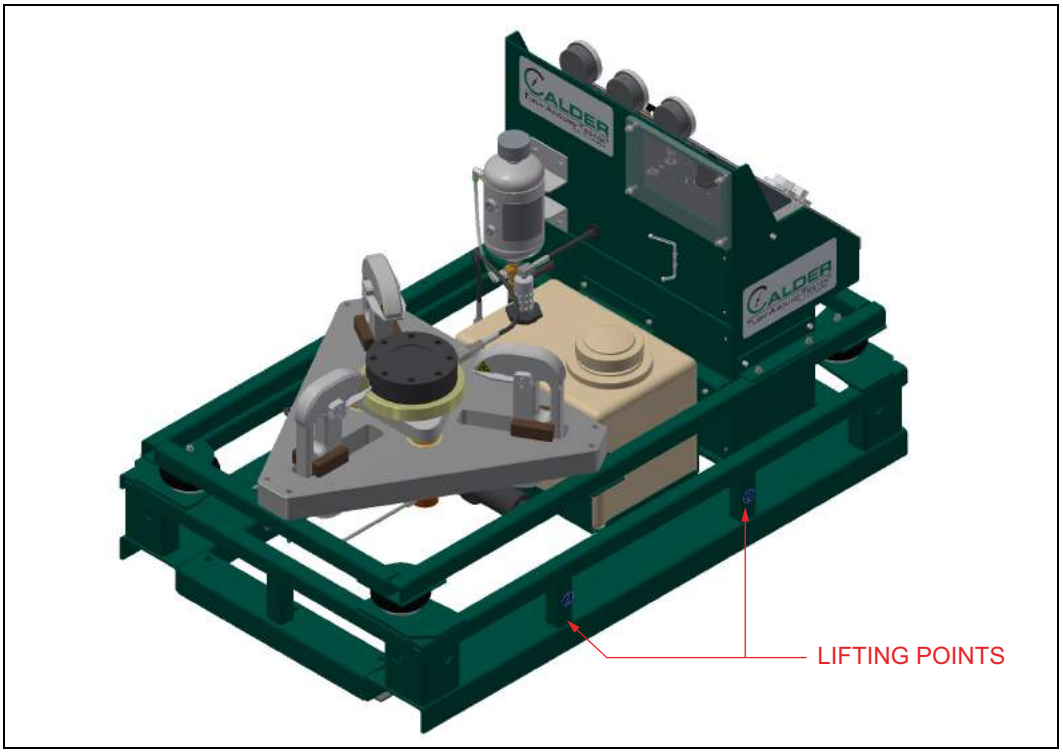


FIGURE 3-2. TAT-8-25T LIFTING AND SECURING POINTS (RIGHT SIDE)

3.3 SECURING THE TEST STAND

The TAT-8-25T has been designed with portability in mind. The service vehicle to transport the TAT-8-25T must have the appropriate weight rating for the test stand and other testing tools included.

3.3.1 Bolting the test stand to a service vehicle

When the test stand must be permanently installed on a vehicle, use the holes on each end of the base frame, as identified in Figure 3-1, to bolt it down to the vehicle. Large square washers are included to be used under the bed to ensure that the bolts do not pull through the bed.

3.3.2 Strapping the test stand to a service vehicle

When the stand is removed at a test site, attaching straps to the test stand is required for safety during transport.

⚠ CAUTION

Do not secure the test stand to the frame above the air bags.

Secure the stand from the corner posts on the lower frame, as seen in Figure 3-3.

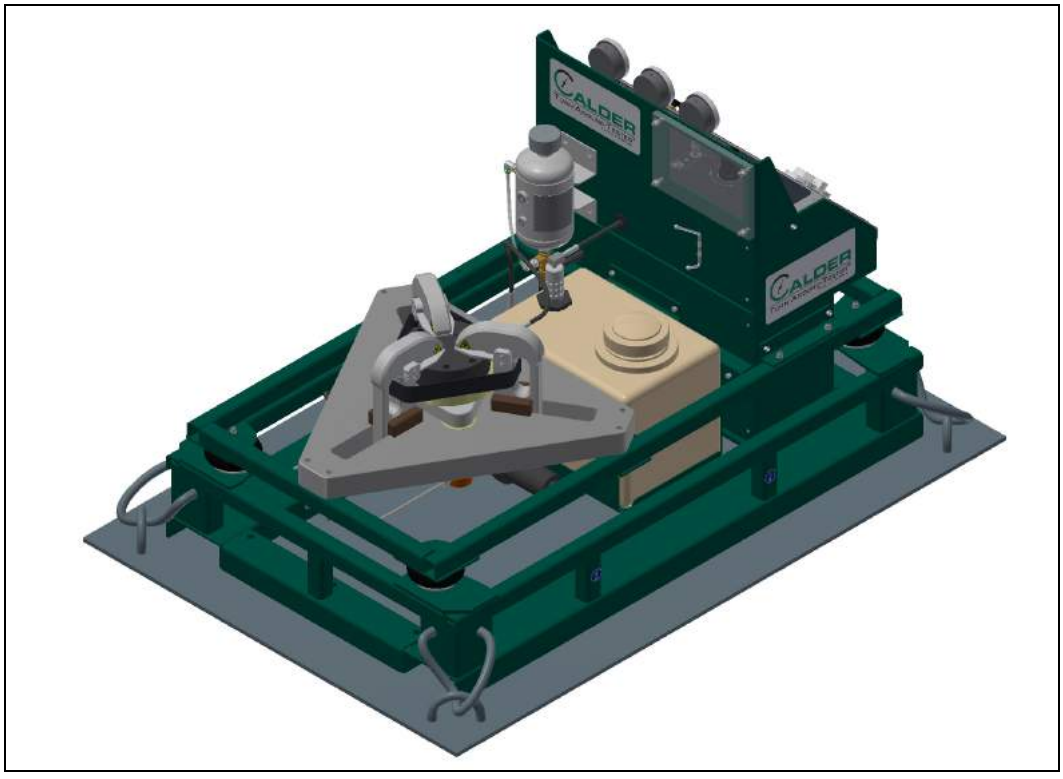


FIGURE 3-3. TAT-8-25T SHIPPING TIE-DOWNS

3.4 FILLING THE RESERVOIRS AND LUBRICATOR

Do the following before operating:

1. Fill the hydraulic reservoir with hydraulic oil (AW-32 or AW-46) to half of the sight gauge.
2. Fill the lubricators with air tool oil (generic purpose, such as AW-32) and adjust the knob to set it to one drop per 25 strokes of the pump.
3. Fill the water tank with testing water.

NOTICE

Operating the pump with insufficient lubrication will result in pump failure.

3.5 CONNECTING AIR FROM THE SOURCE

Low-pressure air (100–150 psi [6.9–10.3 bar]) is the primary source of power in the clamping system. The console has an air filter with a 1/2" (13 mm) NPT air inlet.

TIP:

Use the backing wrench when tightening the fitting.

Connect the shop air to the shop air inlet at 100–150 psi (6.9–10.3 bar).

NOTICE

In the event of valve misfunction, the operator may need to shut off the shop air at the source instead of the console to avoid potential equipment or valve damage.

3.6 CLAMPING PROCEDURE

Do the following (refer to Figure 2-3 on page 13 as needed):

1. Check the integrity of the o-rings on the seal plates. Replace any damaged o-rings.

NOTICE

Any imperfections to the o-ring surface may cause a loss of pressure during testing.

2. Review Table 3-1 on page 22 for the correct clamping pressure.
3. Place the test valve on the table and align the valve with the correct o-ring diameter.

⚠ WARNING

Any opening of the test body (that is, the device under test) should face away from the operator and any other personnel during the test. The splash shield is not rated for high-pressure impact.

4. For a flanged valve, slide the clamp arms in until they securely engage with the flange.
5. Check that the PCV-04 (clamp pressure control valve) is turned counter-clockwise until it stops.
6. On the clamp fixture console, lock the V-06 (clamp release valve).
7. Open the V-03 (clamp pump air supply valve).
8. Turn the PCV-04 (clamp pressure control valve) clockwise while monitoring P1-03 (clamp pressure gauge) until the correct pressure is achieved, as listed in Table 3-1.

NOTICE

Precision in this operation is important to prevent overshooting the designated pressure, which could damage the valve under test.

⚠ WARNING

Check Table 3-1 for recommended clamping pressures. Excess clamp pressures may damage the workpiece and machine and may result in serious personnel injury.

If the valve flange does not seal against the seal plate, refer to Section 5.2 on page 29 for troubleshooting before increasing the clamp pressure.

D	450 PSI (31 BAR)	1125 PSI (78 BAR)	2250 PSI (155 BAR)	3375 PSI (233 BAR)	5625 PSI (388 BAR)	9375 PSI (646 BAR)	
D = 1.5 INCH	300 PSI (21 BAR)	600 PSI (41 BAR)	1100 PSI (76 BAR)	1600 PSI (110 BAR)	2600 PSI (179 BAR)	4300 PSI (296 BAR)	
D = 2 INCH	400 PSI (28 BAR)	1000 PSI (69 BAR)	1900 PSI (131 BAR)	2800 PSI (193 BAR)	4600 PSI (317 BAR)		
D = 3 INCH	700 PSI (48 BAR)	1700 PSI (117 BAR)	3300 PSI (228 BAR)	4900 PSI (338 BAR)			
D = 4 INCH	1100 PSI (76 BAR)	2800 PSI (193 BAR)	5500 PSI (379 BAR)				
D = 5 INCH	1600 PSI (110 BAR)	3900 PSI (269 BAR)					
D = 6 INCH	2200 PSI (152 BAR)	5500 PSI (379 BAR)					
D = 8 INCH	3600 PSI (248 BAR)						

TABLE 3-1. HYDRAULIC LOAD CHART FOR FLANGED VALVES

WARNING

To minimize the risk of damage to the machine, workpiece, and personnel injury, use technical judgment and discretion when increasing the clamping pressure above the recommendations listed in Table 3-1.

Determine the correct hydraulic load by following these steps with Table 3-1:

1. Locate the size of the valve to be tested in the valve nominal diameter column (example: 4").
2. Choose the appropriate required test pressure in the header (example: 1,125 psi [78 bar]).
3. Identify the cell in the valve diameter row and clamp pressure column to find the hydraulic gauge pressure required to seal the valve being tested (example: 2,800 psi [193 bar]).

4 OPERATION

IN THIS CHAPTER:

4.1 PRE-OPERATION CHECKS

Refer to Figure 2-3 on page 13 as necessary.

Do the following checks before operating the machine:

1. Complete the risk assessment checklist in Table 1-2 on page 5.
2. Check that the work area is clear of non-essential personnel and equipment.
3. Check that P1-01 and P1-02 (test pressure gauges) show 0 psi/bar.
4. Check that the following valves are in the specified positions:
   - V-05 and V-06 (drain valve and clamp release valve) are in the unlocked position.
   - V-02 and V-03 (clamp pump air supply and test selection valves) are in the off position.
   - PCV-02 (test pressure control valve) is turned counter-clockwise until it stops.
5. Remove the seal plate transport cover and strap (see Figure 4-1 on page 26). Place them on the hook behind the operating console.
6. Review Table 3-1 on page 22 to check the correct clamping pressure for the valve. (See Section 3.6 on page 35.)

NOTICE

Follow any pressure ratings indicated on the load chart on the console, as shown in Table 3-1 on page 22. Exceeding the rated pressures could result in equipment damage.

⚠ WARNING

High-pressure valve testing may result in the sudden, unexpected release of stored energy with the potential to cause property damage or personnel injury. Potential hazards may include the possibility of high-velocity fluid escaping and high-energy projectile impact. The end-user must assess the application and install protective barrier devices, as appropriate.

4.2 CONDUCTING AN AIR TEST

4.2.1 Test procedure

Do the following for an air test:

1. Clamp the valve into the machine, following the steps in Section 3.6 on page 20.
2. Lock V-05 (drain valve), which interlocks V-06 (clamp release valve).
3. Turn V-02 towards the air test position.
4. Turn PCV-02 (test pressure control valve) clockwise while monitoring P1-01 (low air test pressure gauge), until it reaches the desired test pressure. Increase pressure gradually.

4.2.2 Adjusting the valve on the seal plate

If the safety relief valve (device under test) needs to be adjusted, do the following:

1. Reduce PCV-02 (test pressure control) to zero.
2. Open V-05 (drain valve) to release all remaining pressure within the system and test piece.
3. Check that P1-01 (low air test pressure gauge) shows 0 psi/bar.
4. Unclamp the valve and reposition as necessary, following the steps in Section 4.4 on page 25.
5. Repeat Section 4.2.1 as necessary.

4.3 CONDUCTING HYDROSTATIC OR WATER TEST

4.3.1 Test procedure

Do the following for a hydrostatic or water test:

1. Clamp the valve into the machine, following the steps in Section 3.6 on page 20.
2. Lock V-05 (drain valve), which interlocks V-06 (clamp release valve).
3. Turn V-02 (test selection valve) to hydrostatic test (that is, toward P-01).

4. Turn PCV-02 (test pressure control) clockwise while monitoring P1-02 (hydrostatic pressure gauge), until it reaches the desired test pressure. Increase pressure gradually.

4.3.2 Adjusting the valve on the seal plate

If the valve (device under test) needs to be adjusted, do the following:

1. Reduce PCV-02 (test pressure control) to zero.
2. Open V-05 (drain valve) slowly to release all remaining pressure within the system and to drain water from the test piece as needed from the valve under test.
3. Check that P1-02 (hydrostatic pressure gauge) shows 0 psi/bar.
4. Unclamp the valve and reposition as necessary, following the steps in Section 4.4 on page 25.
5. Repeat Section 4.3.1 as necessary.

4.4 RELEASING THE CLAMP

When all tests have been conducted or the valve needs to be adjusted, do the following to remove the test piece:

1. Rotate PCV-02 (test pressure control) valve to zero.
2. Open V-05 (drain valve) slowly to release all pressure from the system and test piece.
3. Check that P1-01 and P1-02 (test pressure gauges) show 0 psi/bar.
4. Rotate the PCV-04 valve to zero.
5. Open V-06 (clamp release valve) to release the test piece from the test table.
6. Check that P1-03 (clamp pressure gauge) shows 0 psi/bar.
7. Slide the clamp bars away from the test piece and remove from the table.

4.5 PREPARING THE MACHINE FOR TRANSPORT

When transporting the machine to a different location, do the following:

1. Clamp the seal plate transport cover onto the table to protect the seal plate and arm during transport (see Figure 4-1).
2. Follow Section 3.6 on page 20 for clamping the cover and obtaining 250 psi of pressure.

NOTICE

Once pressure is established, do not release the clamp pressure but turn the clamp pressure regulator to minimum.

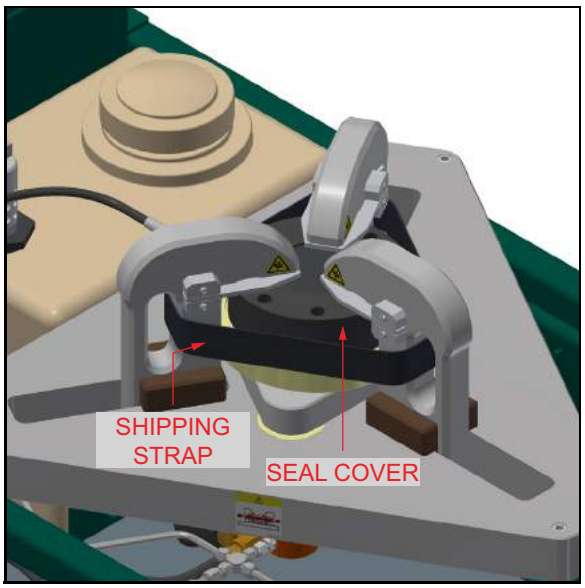


FIGURE 4-1. SHIPPING STRAP AND SEAL COVER

3. Check that there is still clamp pressure holding the seal plate cover in place once the air supply is removed from the test stand.
4. Thread the shipping strap through the clamp arms to keep the arm over the seal plate cover during transportation (see Figure 4-1).
5. Remove the gauges and store them in a vehicle before transporting.

5 MAINTENANCE

5.1 MAINTENANCE CHECKLIST

Table 5-1 lists maintenance intervals and their associated tasks.

TABLE 5-1. MAINTENANCE INTERVALS AND TASKS

Interval	Task
Before each use	Inspect the testing unit, including all hose connections, inlet supply lines, and outlet lines.
	Check the o-rings on the seal plates for cracks or nicks. Replace if necessary.
During use	Check the lubricator to ensure one drip to every 25 strokes of the pump. Adjust as needed. Use air tool oil (general purpose, such as AW-32) for the lubricator.
After each use	Wipe the component parts clean and dry to prevent corrosion.
Once a month	Inspect mufflers for damage and plugging. Replace if any are clogged.
	Check the oil level in the hydraulic clamp reservoir. The level should be half of the sight tube. Use Hydraulic Oil AW-46 or AW-32.
As needed	Change the air filter element (Parker PN PS701P Kit 40 micron).
For shipping or travel	Check that the air bags are inflated to 35 psi (2.4 bar).

5.2 TROUBLESHOOTING

If unable to hold a seal, remove the valve and do the following:

1. Check for the correct minimum hydraulic gauge pressure required to seal, according to Table 3-1 on page 22.
2. Check for the correct test pressure, according to Table 3-1 on page 22.
3. Check that all clamp arms are making good contact with the flange. Adjust if necessary.
4. Check for any cracks or nicks in the O-rings and replace any damaged ones.
5. Check for any damage (such as gouges, scratches, dents) on the raised face of the valve and the seal plate on the test bench.
6. Check the seal plate and raised face for any debris. Clean both surfaces.
7. Check that the source air compressor has minimum cfm requirements to prevent heating or excessive moisture in the air system.

WARNING

To minimize the risk of damage to the machine, workpiece, and personnel injury, use technical judgment and discretion when increasing the clamping pressure above the recommendations listed in Table 3-1 on page 22.

6 STORAGE AND SHIPPING

IN THIS CHAPTER:

6.1 Storage

Proper storage of the TAT-8-25T will extend its usefulness and prevent undue damage.

Before storing, do the following:

1. Clean and dry the machine.
2. Drain the hydraulic fluid and air tool oil.

Store the TAT-8-25T in its original shipping container. Keep all packing materials for repackaging the machine.

6.1.1 Short-term storage

Do the following for short-term storage (three months or less):

1. Remove the tooling.
2. Remove the hoses.
3. Cap the ports.
4. Remove o-rings in the seal plate.
5. Remove the workpiece from the machine.
6. Spray all unpainted surfaces with LPS-2 to prevent corrosion.
7. Store the Turn Around Tester for Valves in its original shipping box.

6.1.2 Long-term storage

Do the following for long-term storage (longer than three months):

1. Follow the short-term storage instructions, but use LPS-3 instead of LPS-2.
2. Add a desiccant pouch to the shipping container. Replace according to manufacturer instructions.
3. Store the shipping container in an environment out of direct sunlight with temperature < 70ºF (21ºC) and humidity < 50%.

6.2 SHIPPING

Verify that the air bags are inflated to 35 psi (2.4 bar).

6.3 DECOMMISSIONING

To decommission the TAT-8-25T prior to disposal, remove the air tool oil and hydraulic fluid before dismantling machine components. Refer to Appendix A for component assembly information.

APPENDIX A   ASSEMBLY DRAWINGS

Drawing list

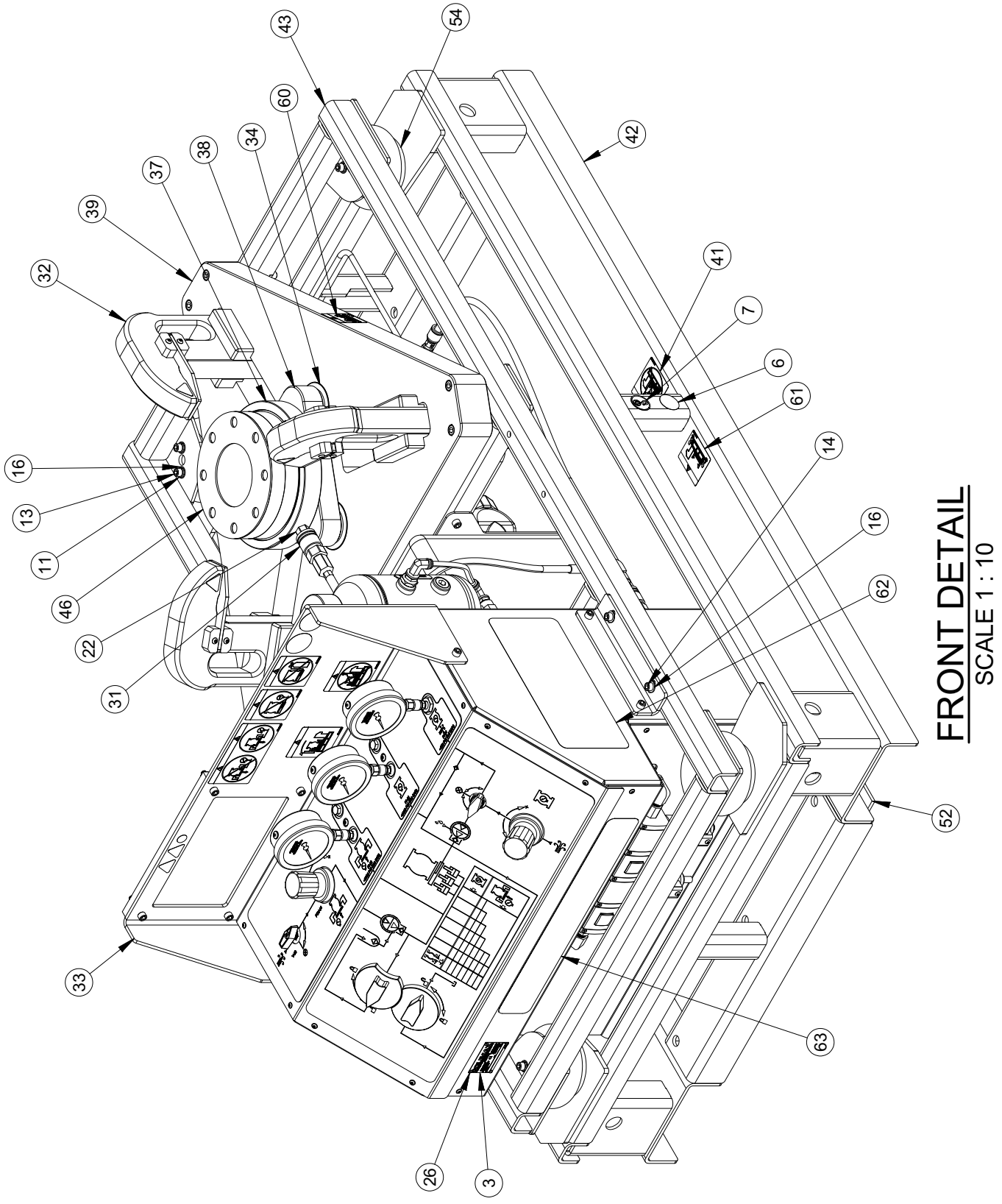


FIGURE A-1. TAT-8-25T ASSEMBLY FRONT DETAIL (P/N 88970)

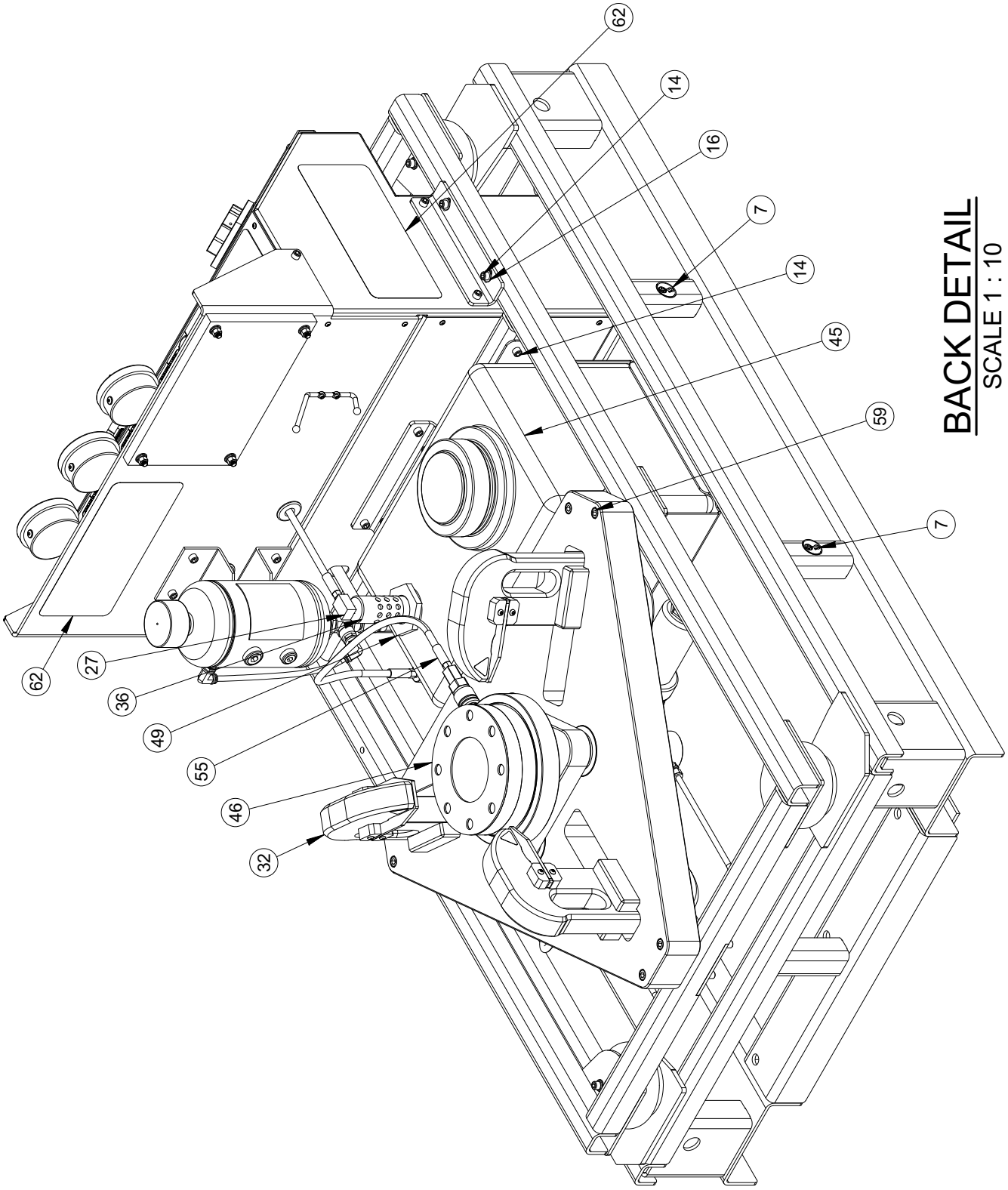


FIGURE A-2. TAT-8-25T ASSEMBLY BACK DETAIL (P/N 88970)

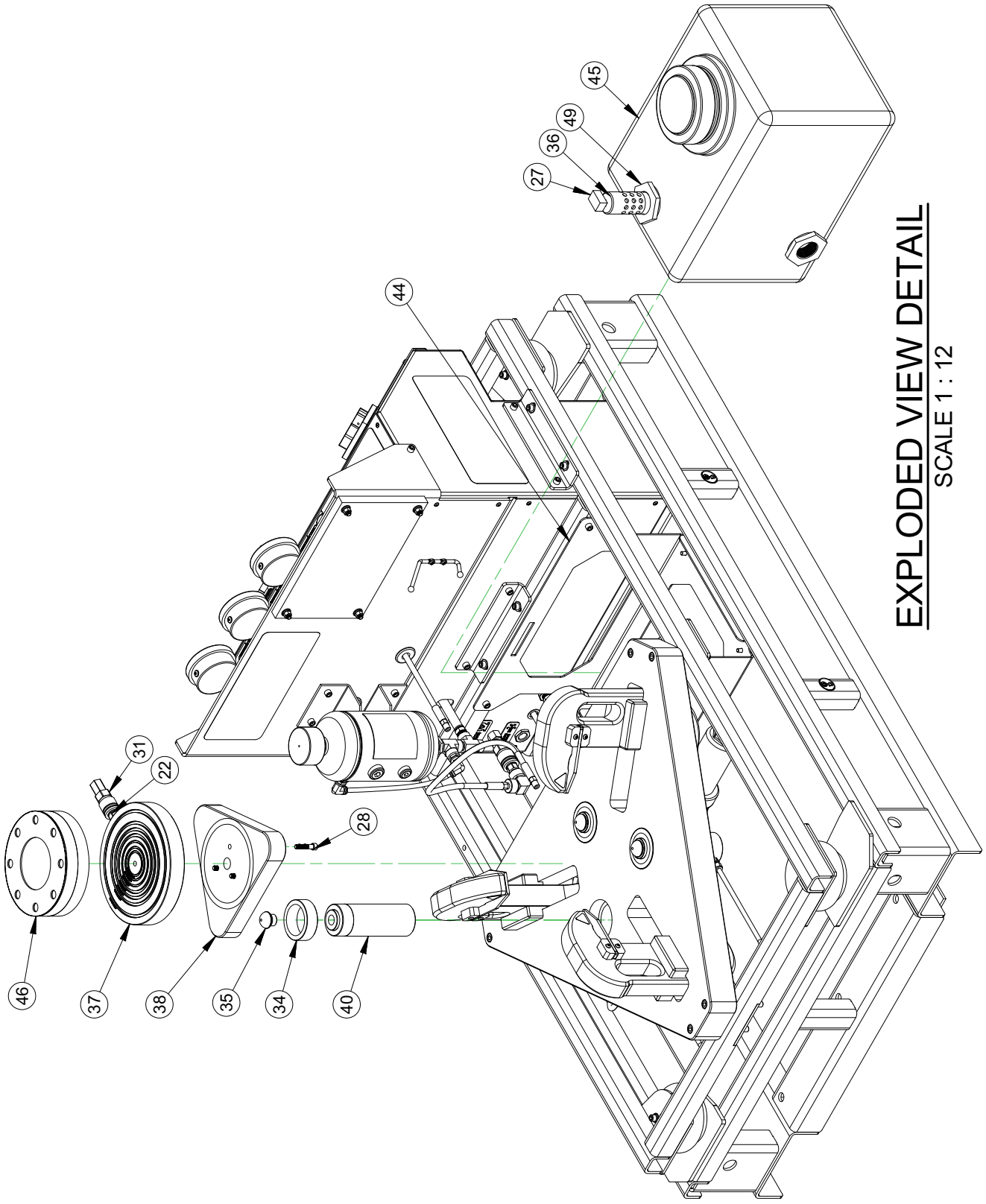


FIGURE A-3. TAT-8-25T ASSEMBLY EXPLODED VIEW DETAIL(P/N 88970)

PARTS LIST				
ITEM	QTY	P/N:	DESCRIPTION	SCHEMATIC I.D.
1	6	10849	NUT 1/2-13 HEX SS	
2	6	13243	(NOT SHOWN) WIRE TIE MEDIUM .14 X 8	
3	1	29154	PLATE SERIAL YEAR MODEL CE 2.0 X 3.0	
4	1	35692	FTG ELBOW 1/2 NPTM X 1/2 NPTF ST 90 DEG BRASS	
5	77	56269	(NOT SHOWN) SLEEVE WELD COVER 1" DIA STRAIGHTLINE W/VELCRO CLOSURE	
6	1	59033	LABEL WARNING - CENTER OF BALANCE 1.5" DIA	
7	3	59039	LABEL WARNING LIFT POINT ROUND 1.5"	
8	120	74933	(NOT SHOWN) FOAM STRIP 1/8 X 1 ADHESIVE BACKED BLACK	
9	3	77489	FTG CONNECTOR 3/8NPTM X 3/8 TUBE	
10	1	77492	FTG CONNECTOR PORT 3/8 TUBE	
11	26	77523	WASHER 3/8 LOCK SS	
12	6	78415	WASHER 1/2 FLTW SS	
13	16	78427	SCREW 3/8-16 X 1 SHCS SS	
14	10	78526	SCREW 3/8-16 X 1 1/4 SHCS SS	
15	6	78665	WASHER 1/2 LOCW SS	
16	32	78672	WASHER 3/8 FLTW SS	
17	2	81917	FTG BARB 1/2 NPTM X 1/2 HOSE SWIVEL BRASS	
18	4	82687	WASHER 5/16 FLTW SS	
19	29	82847	HOSE LOW PRESSURE PUSH LOK 1/2 ID	
20	1	82882	FTG TUBE ADAPTER 1/4 NPTF X 3/8 TUBE SS	
21	10	83159	NUT 3/8-16 HEX SS	
22	2	83456	FTG QUICK DISCONNECT MALE NIPPLE W/O CHECK VALVE 150000 PSI 1/4" MNPT	
23	1	84083	FTG UNION CROSS 3/8 TUBE	
24	1	85193	FTG ELBOW 1/4 NPTF SS 10K HEAVY WALL	
25	3	85628	(NOT SHOWN) CABLE RESTRAINT HOSE WHIP .57 DIA X 11.81 LONG	
26	4	87775	RIVET BLIND 1/8 DIA SS 316	
27	1	88616	FTG ELBOW 1/4 NPTM X 1/4 NPTF STREET 90 DEG 15KSI	
28	3	88740	SCREW 3/8-16 X 1-3/4 SHCS SS 316	
29	3	88892	(NOT SHOWN) COLLAR RESTRAINT HOSE WHIP .47 TO .49 DIA	
30	4	89144	SCREW 5/16-18 X 5/8 BHCS 18-8 SS	
31	1	89160	FTG QUICK DISCONNECT FEMALE COUPLER W/ CHECK VALVE 15000 PSI 1/4" FNPT	
32	3	89416	ASSY CLAMP ARM TAT-8-25T	
33	1	89417	ASSY CONSOLE TAT-8-25T	
34	3	89425	COLLAR THREADED CYLINDER	
35	3	89426	CAP DOME CYLINDER	
36	1	89427	DRAIN DIFFUSER	
37	1	89428	SEAL PLATE TAT	
38	1	89429	TOP PLATE TAT	
39	1	89430	TABLE TOP TAT	
40	3	89487	CYLINDER HYD 15 TON 4-1/8 STROKE SINGLE-ACTING	C-01, C-02, C-03

FIGURE A-4. TAT-8-25T ASSEMBLY PARTS LIST 1 (P/N 88970)

PARTS LIST				
ITEM	QTY	P/N:	DESCRIPTION	SCHEMATIC I.D.
41	1	89499	LABEL CAUTION DO NOT LIFT WITH VALVE CLAMPED	
42	1	89818	WELDMENT OUTER BASE FRAME TAT	
43	1	89874	WELDMENT INNER BASE FRAME TAT	
44	1	89888	SUPPORT TANK 16 GAL TAT	
45	1	89991	TANK 16 GA 14.13 T" X 14.25 W X 20.38 L MODIFIED	T-01
46	1	89993	FLANGE SPACER 9 OD	
47	1	89994	TUBE 3/8 TAT HYD CYL 1	
48	1	89995	TUBE 3/8 TAT HYD CYL 2	
49	2	90000	FTG BULKHEAD 1-1/2 NPTF X 1-1/2 NPTF X 4 L POLYPROPYLENE	
50	1	90001	FTG REDUCER BUSHING 1-1/2 NPTM X 1/2 NPTF BRASS	
51	1	90002	FTG NIPPLE 1-1/2 NPTM X 2.5 L HEX POLYPROPYLENE	
52	6	90003	WASHER 3/4 X 4 W X 1/4 T SQUARE STEEL GAL	
53	1	90004	FTG T STRAINER 1-1/2 NPTF 100 MESH POLYPROPYLENE	F-02
54	4	90005	SHOCK 6.0 DIA X 3 H 100 PSI AIRSTROKE ACTUATOR	
55	1	90006	HOSE ASSY .23 ID 1/4 NPTM SS X 1/4 NPTM SS X 30.5 IN OAL 15KSI (6/2WL)	
56	4	90020	FTG VALVE AIR FILL 1/4 NPTM 1-5/16 L BRASS	
57	1	90021	(NOT SHOWN) STRAP CINCHING BUCKLE 2 W X 48 L POLY STEEL	
58	1	90025	(NOT SHOWN) KIT TAT-8-25T SEAL PLATE 1.5" - 8" O-RINGS	
59	6	90033	SCREW 1/2-13 X 5-1/2 SHCS SS	
60	1	90533	LABEL CAUTION CLAMP ARM SHIPPING STRAP	
61	1	90534	LABEL CAUTION FRAME TIE DOWN	
62	3	90585	LABEL CALDER TURN AROUND TESTER TAT 6 X 13	
63	1	90595	LABEL CALDER TURN AROUND TESTER TAT 2.75 X 19.5	

FIGURE A-5. TAT-8-25T ASSEMBLY PARTS LIST 2 (P/N 88970)

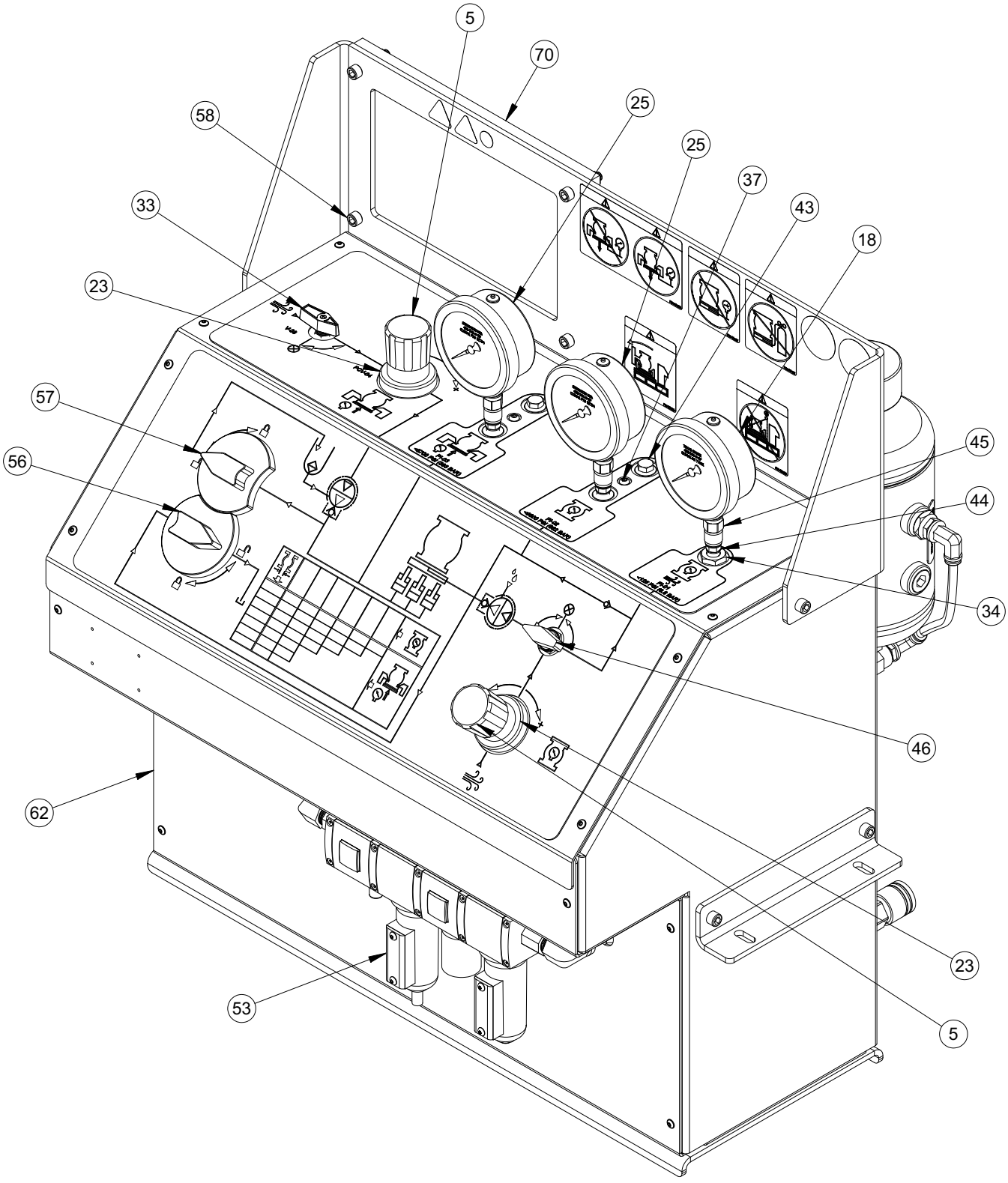


FIGURE A-6. CONSOLE ASSEMBLY FRONT DETAIL (P/N 89417)

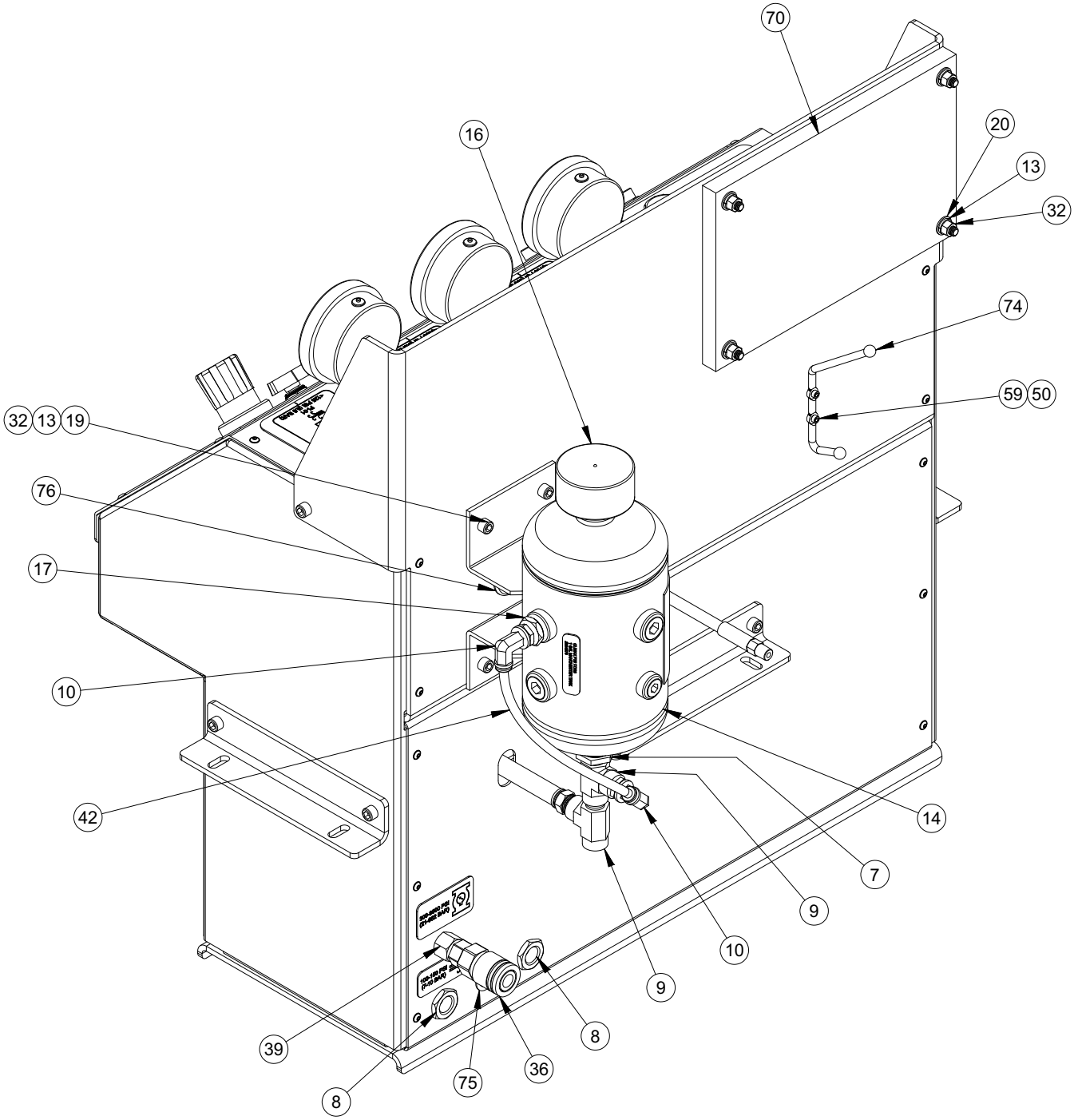
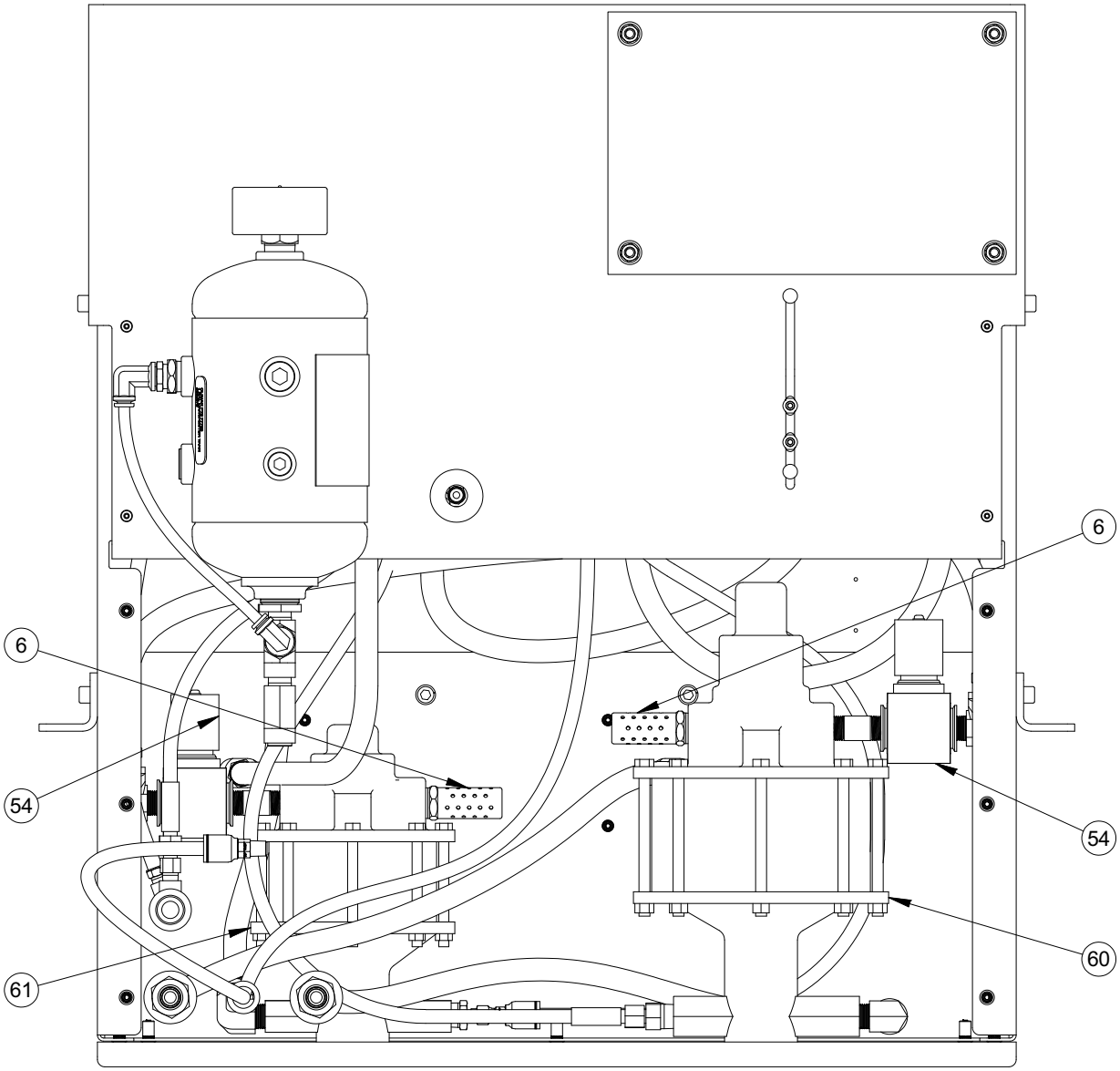


FIGURE A-7. CONSOLE ASSEMBLY BACK DETAIL (P/N 89417)



PANEL REMOVED BACK DETAIL

SCALE 1 : 6

FIGURE A-8. CONSOLE ASSEMBLY BACK DETAIL WITH PANEL REMOVED (P/N 89417)

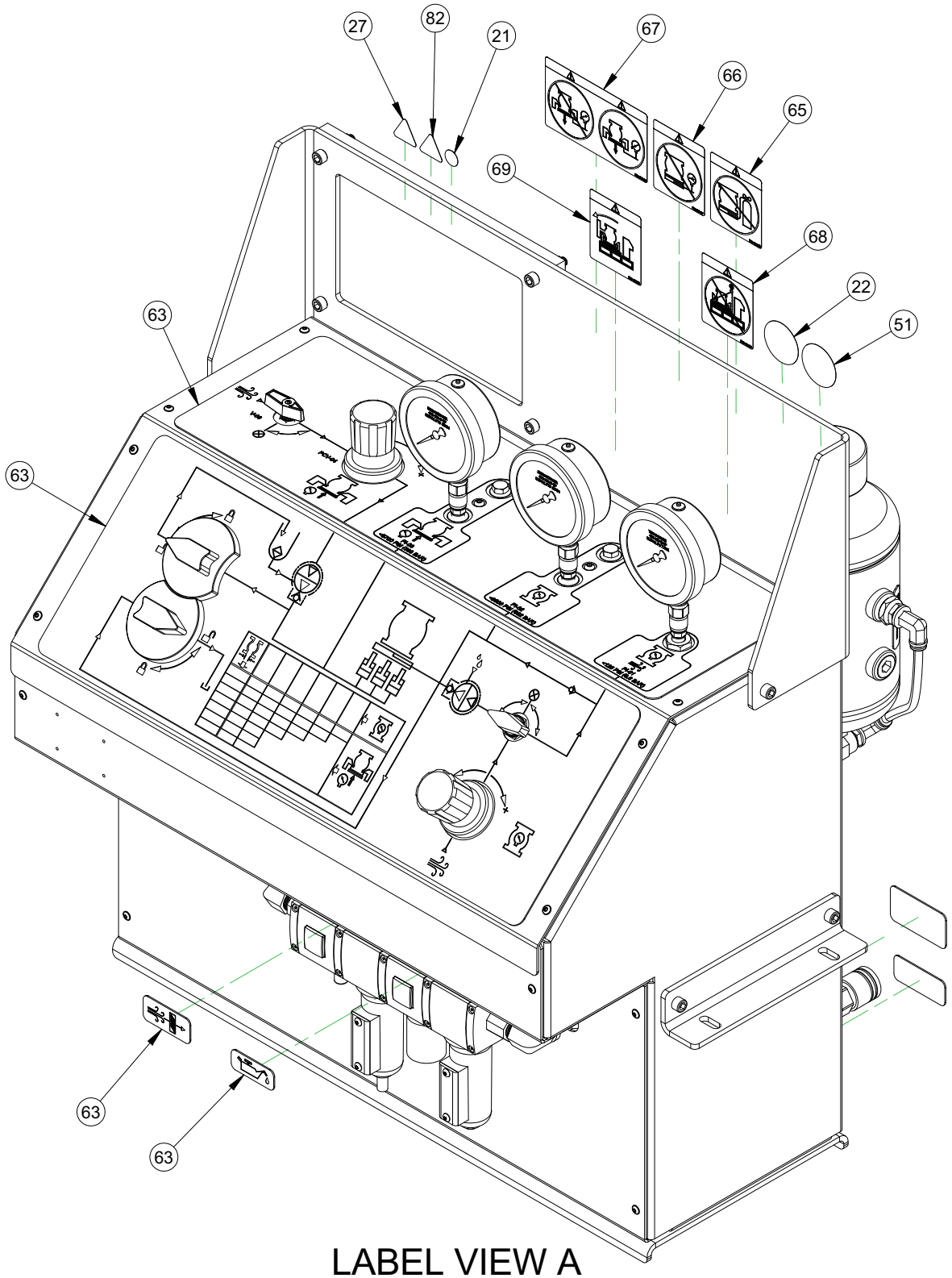
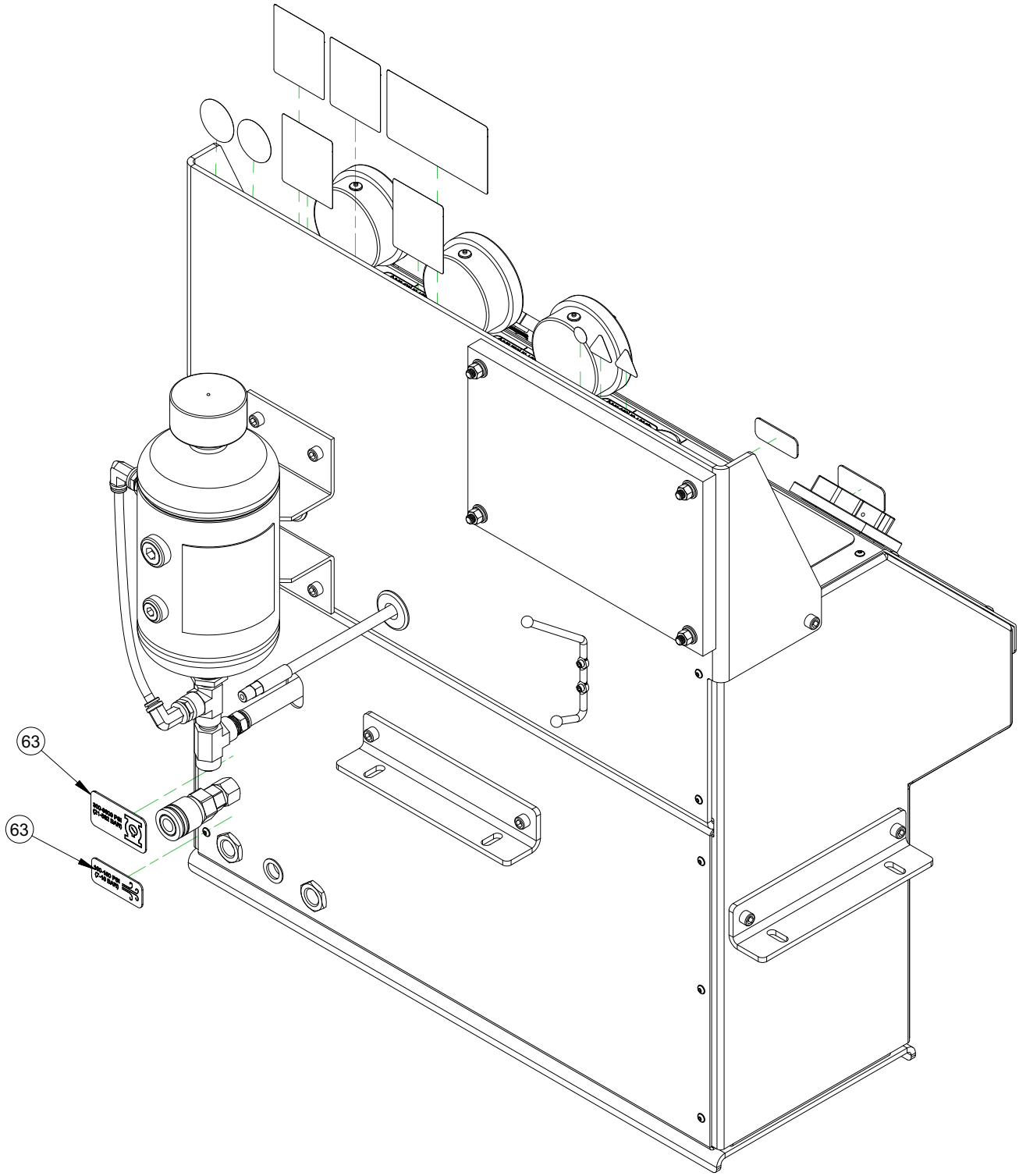


FIGURE A-9. CONSOLE ASSEMBLY FRONT LABELS (P/N 89417)



LABEL VIEW B
SCALE 1 : 6

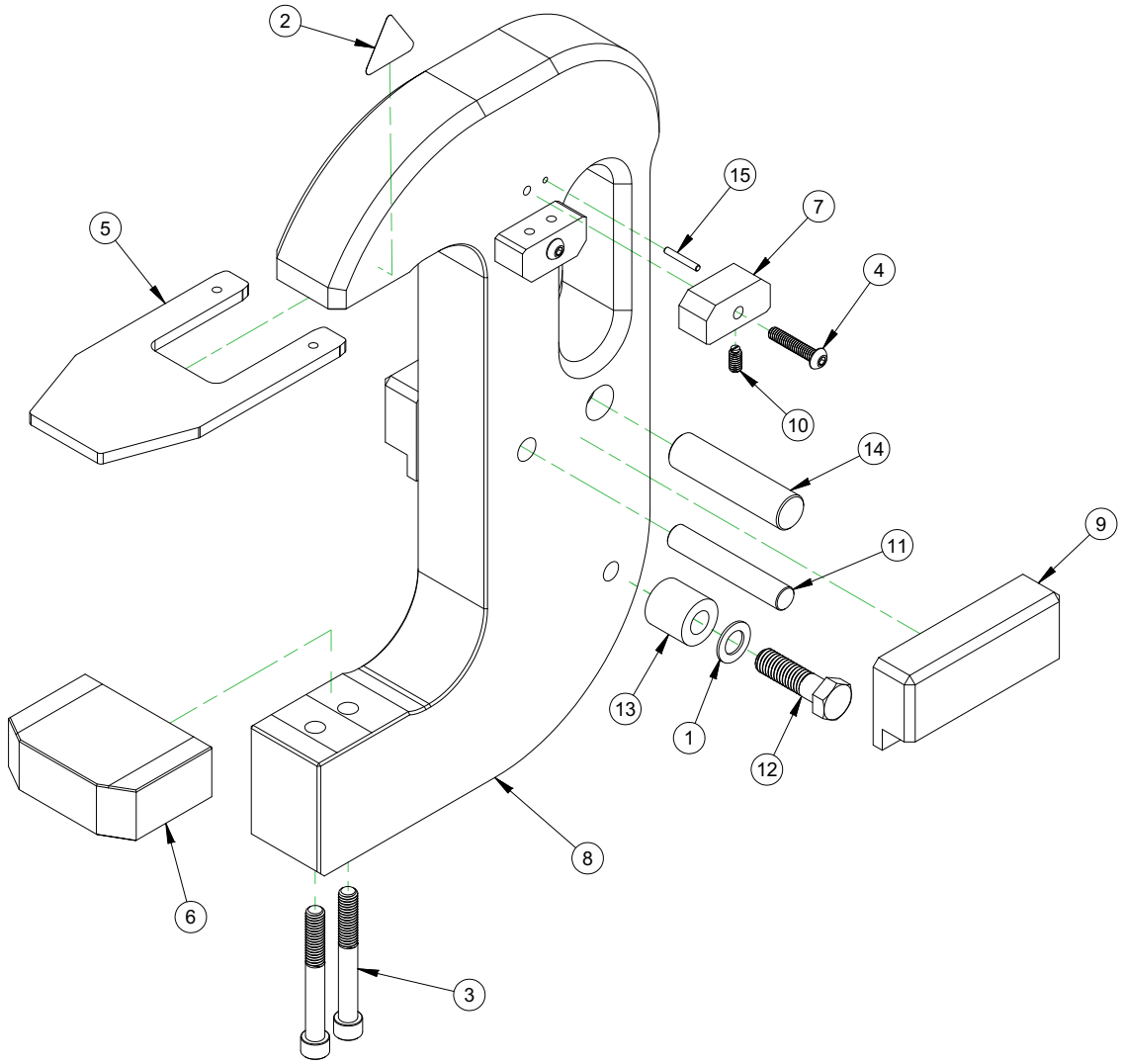
FIGURE A-10. CONSOLE ASSEMBLY BACK LABELS (P/N 89417)

PARTS LIST				
ITEM	QTY	P/N:	DESCRIPTION	SCHEMATIC I.D.
1	28	10704	HOSE PUSH LOK 801 1/4ID X 1/2OD	
2	2	10705	FTG BARB 1/4 NPTM X 1/4 HOSE BRASS	
3	1	12579	FTG PLUG 1/2 NPTM SOCKET	
4	13	35692	FTG ELBOW 1/2 NPTM X 1/2 NPTF ST 90 DEG BRASS	
5	2	77394	REGULATOR AIR 1/2 NPT 125 PSI	PCV-02, PCV-04
6	2	77399	HIGH FLOW MUFFLER 3/4 NPTM COMPACT	M-01, M-02
7	1	77403	STRAINER OIL 1 NPTM X 1/2 NPTF	F-03
8	2	77421	FTG BULKHEAD 1/2 NPTF BRASS	
9	3	77422	FTG TEE 1/2 NPTM X 1/2 NPTF MALE RUN TEE BRASS	
10	2	77459	FTG ELBOW 1/2 NPTM X 3/8 TUBE PRESTOLOC SWIVEL 90 DEG BRASS	
11	1	77460	FTG CONNECTOR 1/2 NPTM X 3/8 TUBE	
12	3	77489	FTG CONNECTOR 3/8NPTM X 3/8 TUBE	
13	12	77523	WASHER 3/8 LOCK SS	
14	1	77788	RESERVOIR HYDRAULIC 1 GAL	T-02
15	2	77792	VALVE BALL 2 WAY 1/4 NPTF 10000 PSI	V-05, V-06
16	1	77804	FILLER BREATHER 3/4 NPTM	F-04
17	1	77877	FTG BUSHING BRASS 3/4 NPTM X 1/2 NPTF	
18	1	77881	GAUGE PRESSURE 4 INCH DIA 160 PSI 1/4 NPTM BOTTOM MOUNT GLYCERIN FILLED	P1-01
19	4	78427	SCREW 3/8-16 X 1 SHCS SS	
20	4	78672	WASHER 3/8 FLTW SS	
21	1	79328	LABEL WARNING - CONSULT OPERATOR'S MANUAL GRAPHIC .75 DIA	
22	1	81008	LABEL WEAR HEARING AND EYE PROTECTION 2.0 DIA	
23	2	81787	MOUNT NUT REGULATOR PANEL	
24	1	81791	FTG CHECK VALVE 1/4 FNPT 10 KSI SS	
25	2	81794	GAUGE PRESSURE 4 IN DIA 10000 PSI 1/4" NPT BOTTOM MOUNT	PI-02, PI-03
26	18	81917	FTG BARB 1/2 NPTM X 1/2 HOSE SWIVEL BRASS	
27	1	82144	LABEL WARNING - GENERAL DANGER GRAPHIC 1.30 X 1.13	
28	2	82465	FTG BARB 1/4 NPTM X 1/4 HOSE 90 DEG ELBOW BRASS	
29	237	82847	HOSE LOW PRESSURE PUSH LOK 1/2 ID	
30	2	83105	FTG TUBE CONNECTOR 1/4 NPTM X 3/8 TUBE SUPER DUPLEX	
31	1	83135	FTG BUSHING 1/2 NPTM x 1/4 NPTF BRASS	
32	8	83159	NUT 3/8-16 HEX SS	
33	1	83364	VALVE BALL 2-WAY 1/2 NPTF 1000 PSI BRASS	V-03
34	1	83984	FTG BULKHEAD 1/4 NPTF X 1/4 NPTF BRASS	
35	2	84571	FTG TEE 1/4" NPT STREET BRASS	
36	1	84796	FTG QUICK DISCONNECT FEMALE COUPLER W/ CHECK VALVE 15000 PSI 1/4 MNPT	
37	2	84926	SCREW 1/4-20 X 3/8 BHSCS 18-8 SS	
38	1	85192	FTG HEX NIPPLE 1/4 MNPT SS 10K HEAVY WALL	
39	1	85232	FTG BULKHEAD 1/4 NPTF 15000 PSI	
40	1	85259	ADAPTER 9/16 TYPE M X 1/4 MNPT STAINLESS 15 KSI	
41	4	85271	SCREW 3/8-24 X 3/4 SHCS SS	
42	11	85289	TUBING 3/8 OD X 1/4 ID POLYETHELYNE	
43	6	85330	FTG PLUG 1/4 NPTM HEX HEAD 15 KSI	

FIGURE A-11. CONSOLE ASSEMBLY PARTS LIST 1 (P/N 89417)

PARTS LIST				
ITEM	QTY	P/N:	DESCRIPTION	SCHEMATIC I.D.
44	3	87040	FTG TEST POINT 10 KSI 1/4 NPTM - M12 X 1.5 SS W/SS COVER	
45	3	87041	FTG TEST POINT GAUGE ADAPTER 10 KSI 1/4 NPTF - M12 X 1.5 FEMALE SS	
46	1	87225	VALVE DIVERTING 3-PORT 1/2 NPTF BRASS	V-02
47	4	87231	SCREW 10-32 X 1 BHSCS FLANGED SS316	
48	1	87277	VALVE PRESSURE RELIEF AIR 150 PSI 1/4 NPTM	PRV-01
49	2	87422	MANIFOLD GAUGE HTC 10 KSI	
50	2	87533	NUT 10-24 STDNYLOC SS	
51	1	87593	LABEL WARNING - CONSULT OPERATORS MANUAL 2.0 DIA	
52	1	87608	FTG ADAPTER 9/16 TYPE M X 1/2 NPTM STAINLESS 15 KSI	
53	1	87836	ASSY AIR PREP UNIT & LUBRICATOR USV	V-01, F-01, PCV-01, L-01
54	2	87838	REGULATOR 1/2 NPTF 7-125 PSIG W/BRACKET & PANEL NUT	PCV-05, PCV-03
55	2	88033	FTG NIPPLE 1/2 NPTM X 2-1/2 BRASS	
56	1	88097	KNOB INTERLOCK TOP PLATE DRAIN VALVE	
57	1	88665	KNOB INTERLOCK CLAMP RELEASE VALVE	
58	4	88740	SCREW 3/8-16 X 1-3/4 SHCS SS 316	
59	2	89117	SCREW 10-24 X 3/4 SHCS SS	
60	1	89375	PUMP AIR DRIVEN 9700 PSI OIL OR WATER SERVICE	P-01
61	1	89377	PUMP AIR DRIVEN 5800 PSI OIL SERVICE	P-02
62	1	89418	CONSOLE TEST SYSTEM TAT-8-25T	
63	6	89419	LABEL OVERLAY SET CLAMP FIXTURE TAT-8-25T	
64	1	89478	FTG TEE STREET 1/4 MNPT X 1/4 FNPT X 1/4 FNPT SS 15 KSI	
65	1	89496	LABEL WARNING NOT FOR HP GAS TESTING	
66	1	89497	LABEL WARNING DO NOT EXCEED MAX RATING OF DUT	
67	1	89498	LABEL WARNING DO NOT RELEASE CLAMP WHILE VALVE IS PRESSURIZED	
68	1	89499	LABEL CAUTION DO NOT LIFT WITH VALVE CLAMPED	
69	1	89500	LABEL WARNING TIP OVER HAZARD WITH ACTUATOR OVERHANGING	
70	1	89988	SHEET HYGARD BR750 9.0" X 14.0"	
71	1	89996	TUBE 3/8 TAT CONSOLE 1	
72	1	89997	TUBE 3/8 TAT CONSOLE 2	
73	1	89998	TUBE 3/8 SUPER DUPLEX TAT CONSOLE 3	
74	1	90007	HOOK 1/2 W X 6-7/8 H X 3-3/4 D STEEL CHROME PLATED	
75	1	90008	GROMMET LOCKING NYLON BLACK 3/4 ID X 1 PANEL HOLE	
76	2	90009	GROMMET 3/4 ID X 1-13/16 OD 1/4 PANEL	
77	1	90010	HOSE ASSY 1/4 ID 1/4 NPTM SS X 1/4 FEM JIC SS WITH 1/4 NPTM SS ADAPTER X 71 IN OAL 6KSI (4M6K)	
78	1	90012	HOSE ASSY 1/4 ID 1/4 NPTM SS X 1/4 FEM JIC SS WITH 1/2 NPTM SS ADAPTER X 42 IN OAL 6KSI (4M6K)	
79	1	90013	HOSE ASSY .23 ID 1/4 NPTM SS X 1/4 NPTM SS X 28 IN OAL 15KSI (6/2WL)	
80	1	90014	HOSE ASSY .23 ID 1/4 NPTM SS X 9/16 FEM TYPE M SS X 34 IN OAL 15KSI (6/2WL)	
81	1	90015	HOSE ASSY .23 ID 1/4 NPTM SS X 9/16 FEM TYPE M SS X 21 IN OAL 15KSI (6/2WL)	
82	1	90160	LABEL WARNING - EXPLOSION RELEASE OF PRESSURE 1.30 X 1.13	

FIGURE A-12. CONSOLE ASSEMBLY PARTS LIST 2 (P/N 89417)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	42334	WASHER 1/2 X 7/8 X .053 FLTW
2	2	80905	LABEL WARNING - HAND CRUSH / FORCE FROM ABOVE GRAPHIC 1.13 TALL TRIANGLE YELLOW
3	2	82666	SCREW 3/8-16 X 3 SHCS SS
4	4	87534	SCREW 1/4-20 X 1-1/4 BHSCS SS
5	1	89420	PLATE SHIM CLAMP ARM
6	1	89421	BLOCK CONTACT CLAMP ARM
7	4	89422	BLOCK SHIM GUIDE CLAMP ARM
8	1	89423	ARM CLAMP MAIN
9	2	89424	SHOE CLAMP ARM
10	2	89480	SPRING PLUNGER 1/4-20 X .531 SS 2-4 LBS BALL
11	1	89481	PIN DOWEL 1/2 DIA X 3 SS
12	1	89482	SCREW 1/2-13 X 1-3/4 HHCS SS
13	1	89483	SPACER 1/2 ID X 1 OD X 1 L ACETAL
14	1	89484	PIN DOWEL 3/4 DIA X 3 SS
15	4	89489	PIN DOWEL 1/8 DIA X 7/8 SS

FIGURE A-13. CLAMP ARM ASSEMBLY (P/N 89416)

TABLE A-1. O-RINGS KIT P/N 90025

Part number	Description	Quantity
77589	O-RING 3-5/8 ID X 3-7/8 OD X 1/8 W NITRILE 90 DUROMETER (2-239)	2
77590	O-RING 4-5/8 ID X 5 OD X 3/16 W NITRILE 90 DUROMETER (2-350)	2
78456	O-RING 5-5/8 ID X 6 OD X 3/16 W NITRILE 90 DUROMETER (2-358)	2
78457	O-RING 6-3/4 ID X 7-1/8 OD X 3/16 W NITRILE 90 DUROMETER (2-364)	2
78458	O-RING 8-3/4 ID X 9-1/8 OD X 3/16 W NITRILE 90 DUROMETER (2-372)	2
90026	O-RING 1-7/8 ID X 2-1/8 OD X 1/8 W NITRILE 90 DUROMETER (2-225)	2
90027	O-RING 2-5/8 ID X 2-7/8 OD X 1/8 W NITRILE 90 DUROMETER (2-231)	2

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APPENDIX B SCHEMATICS

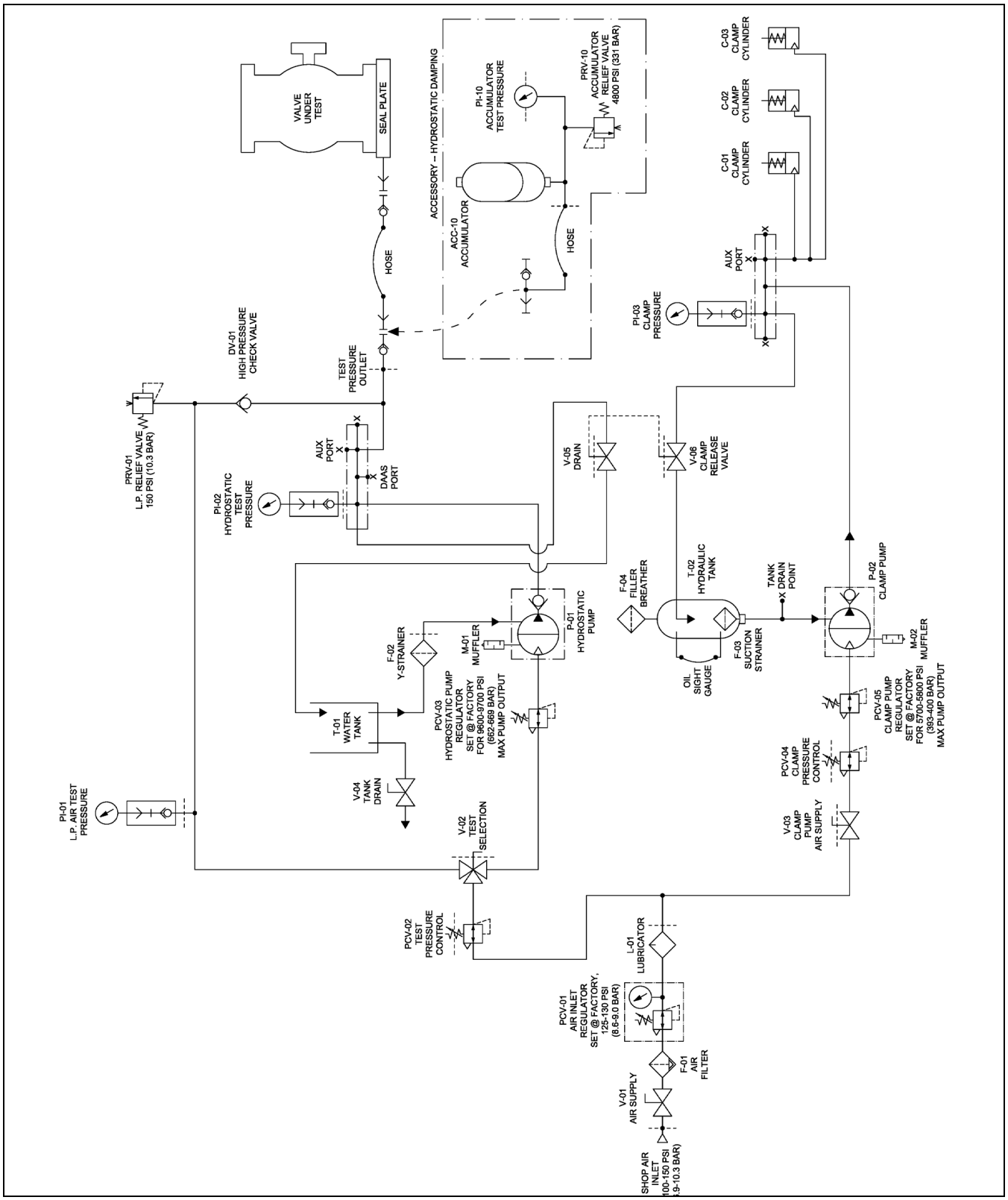

FIGURE B-1. SCHEMATIC (P/N 90024)

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APPENDIX C SDS

Safety Data Sheet list

MATERIAL SAFETY DATA SHEET
76 Unax AW 32, 46, 68

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: 76 Unax AW 32, 46, 68

Product Code: 4641032000, 4642046000, 4643068000

Synonyms: 76 Unax AW 32
76 Unax AW 46
76 Unax AW 68

Intended Use: Industrial oil

Chemical Family: Petroleum hydrocarbon

Responsible Party: 76 Lubricants
A Division of ConocoPhillips
600 N. Dairy Ashford
Houston, TX 77079-1175

For Additional MSDSs 800-762-0942

Technical Information: 800-435-7761

The intended use of this product is indicated above. If any additional use is known, please contact us at the Technical Information number listed.

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:

Spill, Leak, Fire or Accident
Call CHEMTREC
North America: (800)424-9300
Others: (703)527-3887 (collect)

California Poison Control System: (800) 356-3129

Health Hazards/Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Physical Hazards/Precautionary Measures: Keep away from all sources of ignition.

Appearance: Clear and bright

Physical form: Liquid

Odor: Mild petroleum

NFPA Hazard Class:

```
Health:       1 (Slight)
Flammability:1 (Slight)
Reactivity:   0 (Least)
```

HMIS Hazard Class

```
Health:           1 (Slight)
Flammability:     1 (Slight)
Physical Hazard:  0 (Least)
```

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	% WEIGHT	EXPOSURE GUIDELINE		
		Limits	Agency	Type
Zinc Compound CAS# Proprietary	<1	Not Established		

OTHER COMPONENTS	% WEIGHT	EXPOSURE GUIDELINE		
		Limits	Agency	Type
Lubricant Base Oil (Petroleum) CAS# Various	>99	(See: Oil Mist, If Generated)		
Additives CAS# Proprietary	<1	Not Established		

REFERENCE	EXPOSURE GUIDELINE		
	Limits	Agency	Type
Oil Mist, If Generated CAS# None	5 mg/m3	ACGIH	TWA
	10 mg/m3	ACGIH	STEL
	5 mg/m3	OSHA	TWA
	2500 mg/m3	NIOSH	IDLH
	5 mg/m3	NOHSC	TWA

The base oil for this product can be a mixture of any of the following highly refined petroleum streams: CAS 64741-88-4; CAS 64741-89-5; CAS 64741-96-4; CAS 64741-97-5; CAS 64742-01-4; CAS 64742-52-5; CAS 64742-53-6; CAS 64742-54-7; CAS 64742-55-8; CAS 64742-56-9; CAS 64742-57-0; CAS 64742-62-7; CAS 64742-63-8; CAS 64742-65-0; CAS 72623-85-9; CAS 72623-86-0; CAS 72623-87-1

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

1%=10,000 PPM.

All components are listed on the TSCA inventory.

3. HAZARDS IDENTIFICATION

Potential Health Effects:

Eye: Contact may cause mild eye irritation including stinging, watering, and redness.

Skin: Contact may cause mild skin irritation including redness, and a burning sensation. Prolonged or repeated contact can worsen irritation by causing drying and cracking of the skin leading to dermatitis (inflammation). No harmful effects from skin absorption are expected.

Inhalation (Breathing): No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

Ingestion (Swallowing): No harmful effects expected from ingestion.

Signs and Symptoms: Effects of overexposure may include irritation of the nose and throat, irritation of the digestive tract, nausea and diarrhea.

Cancer: Inadequate evidence available to evaluate the cancer hazard of this material. See Section 11 for carcinogenicity information of individual components, if any.

Target Organs: No data available for this material.

Developmental: No data available for this material.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin disorders.

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Wipe material from skin and remove contaminated shoes and clothing. Cleanse affected area(s) thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Note To Physicians: High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. Often these injuries require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury.

5. FIRE FIGHTING MEASURES

Flammable Properties:
Flash Point: >384°F/>196°C (COC)
OSHA Flammability Class: Not applicable
LEL/UEL%: No Data
Autoignition Temperature: No Data

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Use good personal hygiene practices.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional engineering controls may be required.

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified air purifying respirator with a Type 95 (R or P) particulate filter may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a NIOSH approved self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode if there is potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Skin: The use of gloves impervious to the specific material handled is advised to prevent skin contact and possible irritation (see manufacturers literature for information on permeability).

Eye/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

Suggestions for the use of specific protective materials are based on readily available published data. Users should check with specific manufacturers to confirm the performance of their products.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).
Appearance: Clear and bright
Physical State: Liquid
Odor: Mild petroleum
pH: Not applicable
Vapor Pressure (mm Hg): <1
Vapor Density (air=1): >1
Boiling Point/Range: No Data
Freezing/Melting Point: <-27°F / <-33°C
Solubility in Water: Negligible
Specific Gravity: 0.855-0.871
Percent Volatile: Negligible
Evaporation Rate (nBuAc=1): Negligible
Viscosity: 22-68 cSt @ 40°C / 4.3-8.7 cSt @ 100°C
Bulk Density: 7.13-7.26 lb/gal
Flash Point: >384°F / >196°C (COC)
Flammable/Explosive Limits (%): No Data

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Conditions To Avoid: Extended exposure to high temperatures can cause decomposition.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Combustion can yield carbon, nitrogen, sulfur, phosphorus, and zinc oxides.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Lubricant Base Oil (Petroleum) (CAS# Various)

Carcinogenicity: The petroleum base oils contained in this product have been highly refined by a variety of processes including solvent extraction, hydrotreating, and dewaxing to remove aromatics and improve performance characteristics. None of the oils used are listed as a carcinogen by NTP, IARC, or OSHA.

12. ECOLOGICAL INFORMATION

Not evaluated at this time

13. DISPOSAL CONSIDERATIONS

This material under most intended uses would become used oil due to contamination by physical or chemical impurities. RECYCLE ALL USED OIL. While being recycled, used oil is regulated by 40 CFR 279. Use resulting in chemical or physical change or contamination may also subject it to regulation as hazardous waste. Under federal regulations, used oil is a solid waste managed under 40 CFR 279. However, in California, used oil is managed as hazardous waste until tested to show it is not hazardous. Consult state and local regulations regarding the proper handling of used oil. In the case of used oil, the intent to discard it may cause the used oil to be regulated as hazardous waste.

Contents should be completely used and containers emptied prior to discard. Rinsate may be considered a RCRA hazardous waste and must be disposed of with care and in compliance with federal, state and local regulations. Large empty containers, such as drums, should be returned to the distributor or a drum reconditioner. To assure proper disposal of small empty containers, consult with state and local regulations and disposal authorities.

14. TRANSPORT INFORMATION

DOT Shipping Description: Not classified as hazardous

15. REGULATORY INFORMATION

EPA SARA 311/312 (Title III Hazard Categories):

Acute Health:	No
Chronic Health:	No
Fire Hazard:	No
Pressure Hazard:	No
Reactive Hazard:	No

SARA 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Component	CAS Number	Weight %
Zinc Compound	Proprietary	<1

California Proposition 65:

Warning: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

--None Known--

Carcinogen Identification:

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any.

EPA (CERCLA) Reportable Quantity:

--None--

Canada - Domestic Substances List: Listed

WHMIS Class:

Not regulated
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

Issue Date: 02/06/03

Previous Issue Date: 01/01/02
Product Code: 4641032000, 4642046000, 4643068000
Revised Sections: New Format
Previous Product Code: 4641032000
MSDS Number: 722330
Status: Final

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. **HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.** No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.


CLIMAX
BORTECH
CALDER
H&S TOOL