CE

UFV

HYDRO PRO UNIVERSAL FLANGED VALVE TESTER

OPERATING MANUAL

ORIGINAL INSTRUCTIONS

CALDER
VALVE TESTING & REPAIR SYSTEMS BY CLIMAX

P/N 88471
September 2018
Revision 4

CLIMAX | BORTECH CALDER H&S TOOL

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- Telephone number
- Machine model
- Serial number (if applicable)
- Date of purchase

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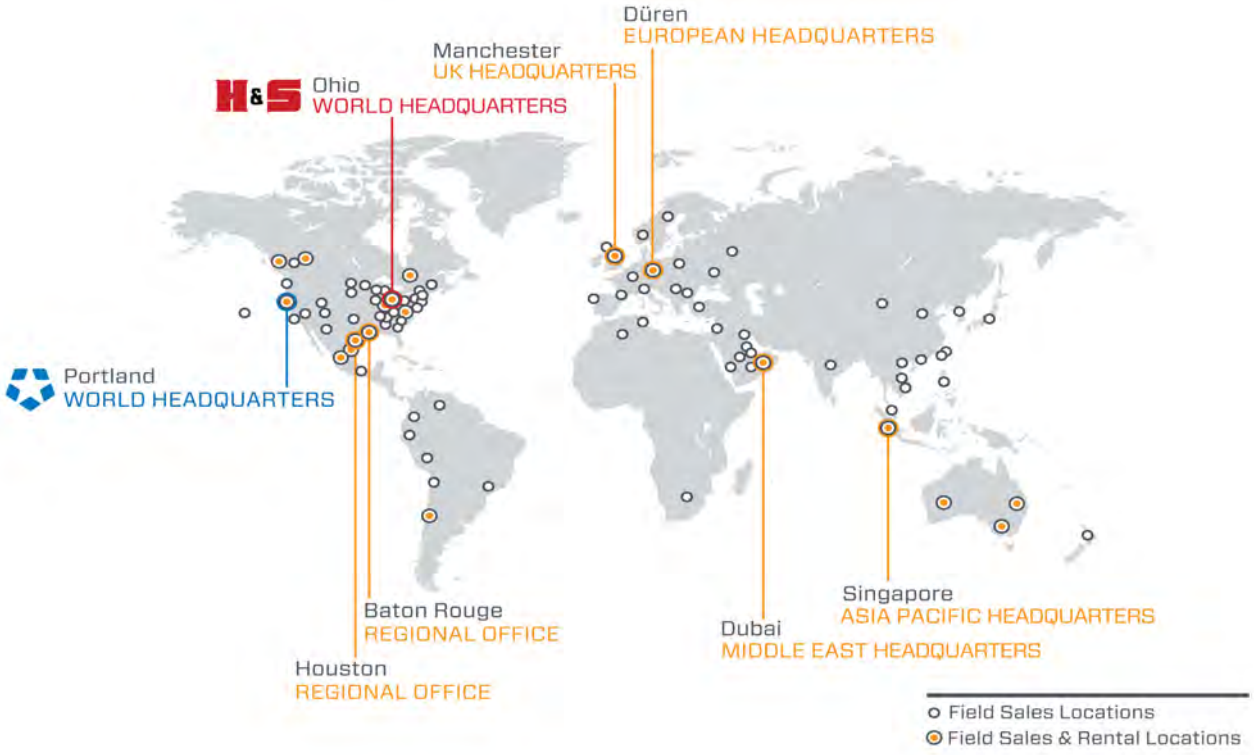
CLIMAX GLOBAL LOCATIONS



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
UNIVERSAL FLANGED VALVE TESTER

Name, type or model, batch or serial number
P/Ns 88847, 88469, 91681, 90173

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
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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: **VP of Engineering; Research & Development**

Date: July 27, 2018

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.

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- 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

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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 UFV.

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 UFV 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 – This machine may produce liquid spray during operation. 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. Do not pressurize the system while the side panels are removed from the test console.

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 Hydro Pro Universal Flanged Valve Testers.

The operator must perform an overall review and on-site risk assessment of the intended application. Due to the unique nature of hydrostatic testing, identifying one or more hazard 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.

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 Hydro Pro Universal Flanged Valve Tester. 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 5.1).
☐	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. UFV-12-100T AND UFV-14-165T LABELS

	P/N 29154 ID plate		P/N 80905 Warning label: hand crush hazard
	P/N 81008 Warning label: wear ear and eye protection		P/N 85417 Warning label: do not release clamp while pressurized
	P/N 87593 Warning label: read the operating manual		P/N 88470 Calder UFV plate

TABLE 1-4. UFV-24-300T LABELS

	P/N 29154 ID plate		P/N 59039 Label: lift point
	P/N 80905 Warning label: hand crush hazard		P/N 81008 Warning label: wear ear and eye protection
	P/N 85417 Warning label: do not release clamp while pressurized		P/N 87593 Warning label: read the operating manual
	P/N 88470 Calder UFV plate		P/N 92124 Warning label: Do not step onto this part

1.7.2 Label locations

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

TABLE 1-5. UFV-12-100T AND UFV-14-165T LABEL LOCATIONS

FIGURE 1-1. CONSOLE LABEL LOCATIONS

Label P/N: 29154, 81008, 85417, 87593, 88470

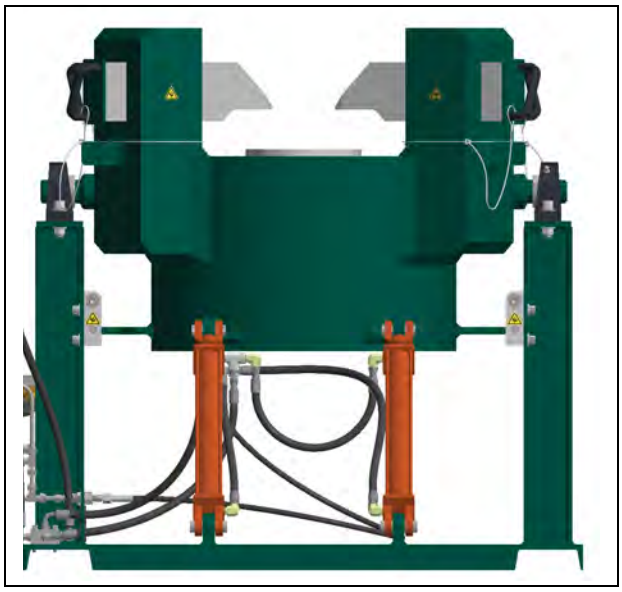

FIGURE 1-2. RIGHT SIDE CLAMP BARREL LABEL LOCATIONS

Label P/N: 80905

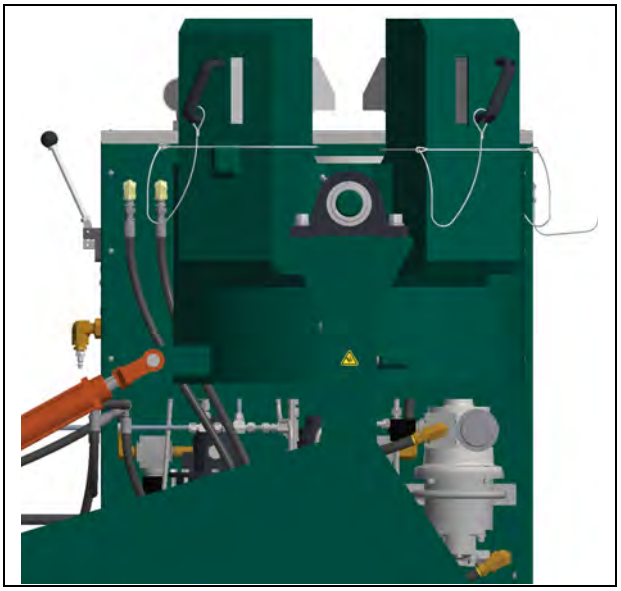

FIGURE 1-3. BACK SIDE CLAMP BARREL LABEL LOCATIONS

Label P/N: 80905

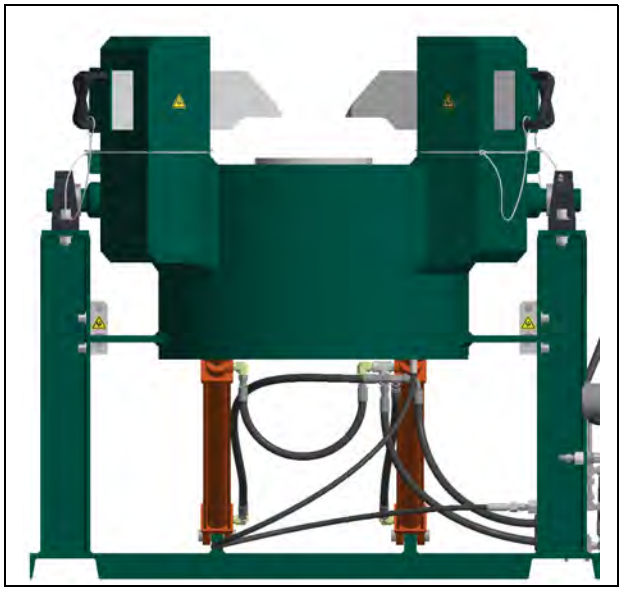

FIGURE 1-4. BACK SIDE CLAMP BARREL LABEL LOCATIONS

Label P/N: 80905

TABLE 1-6. UFV-24-300T LABEL LOCATIONS

FIGURE 1-5. CONSOLE LABEL LOCATIONS

Label P/N: 29154, 81008, 85417, 87593, 88470

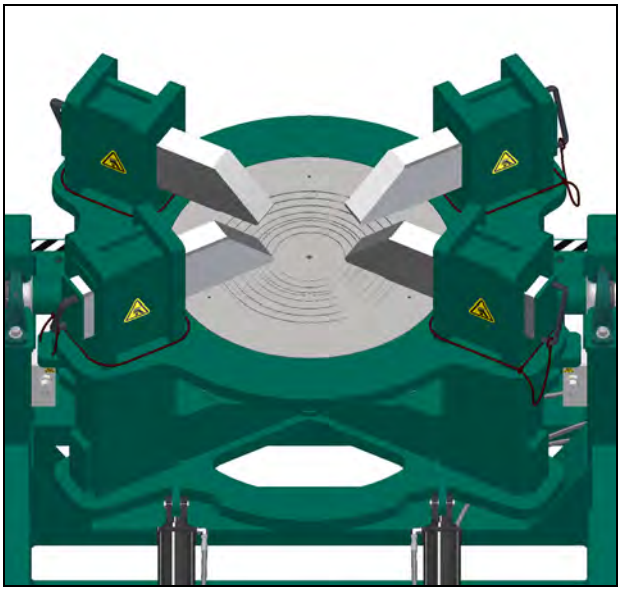

FIGURE 1-6. CLAMP BARREL LABEL LOCATIONS

Label P/N: 80905

FIGURE 1-7. TOP VIEW CLAMP BARREL LABEL LOCATIONS

Label P/N: 59039, 92124

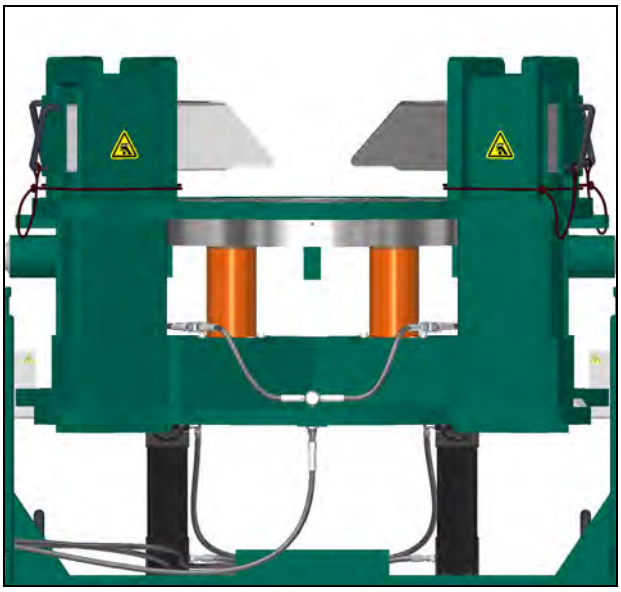

FIGURE 1-8. REAR CLAMP BARREL LABEL LOCATIONS

Label P/N: 80905

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2 OVERVIEW

IN THIS CHAPTER:

2.1 FEATURES AND COMPONENTS

The UFV clamp fixture is a valve testing system that hydraulically clamps and seals flanged valves for hydrostatic and low-pressure air testing. It may be pressurized from a variety of hydrostatic pressure sources up to 9700 psi (669 bar) and low-pressure air sources up to 125 psi (8.6 bar).

Principle components for the UFV-12-100T and UFV-14-165T are shown in Figure 2-1, and principal components for the UFV-24-300T are shown in .

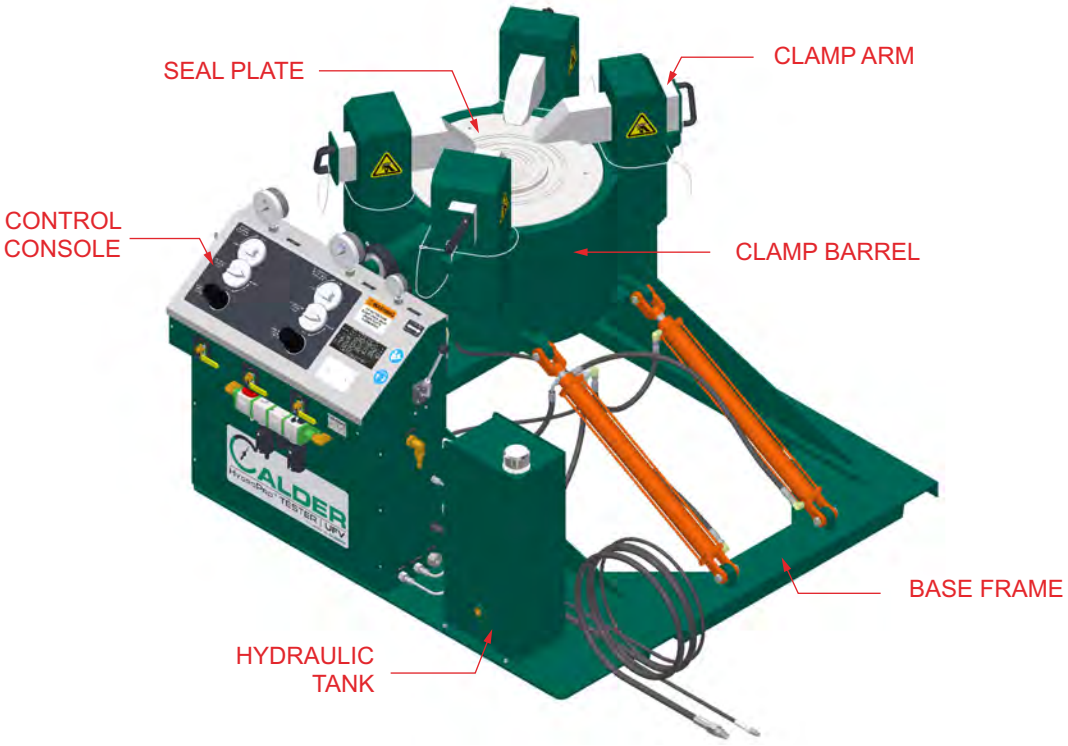

FIGURE 2-1. UFV-12-100T AND UFV-14-165T COMPONENTS

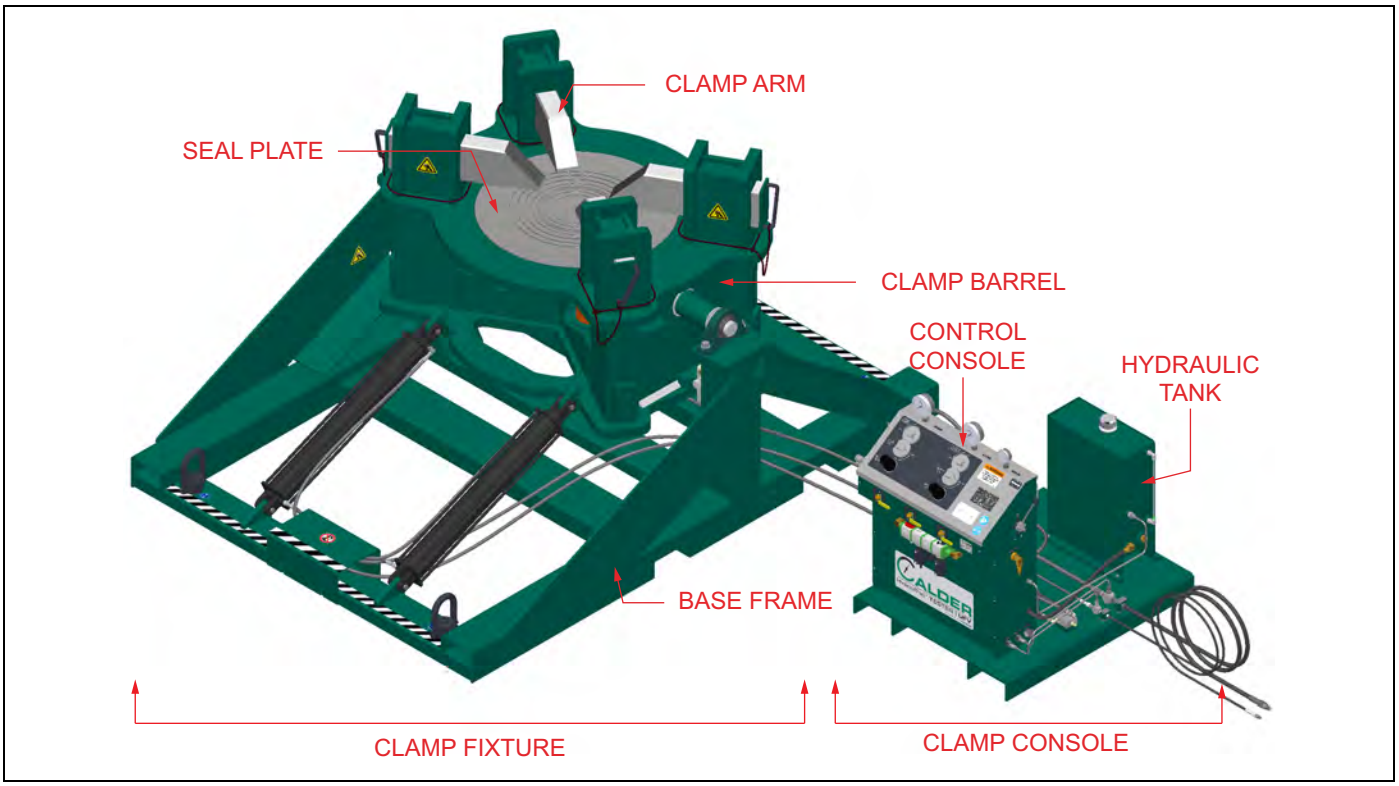

FIGURE 2-2. UFV-24-300T COMPONENTS

Features include:

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

Hydraulic flange seal (HFS) circuit–This provides the option for full body testing without applying hydraulic clamp forces to the valve body when using the Hydro Pro Hydraulic Flange Seal (sold separately).

Hydraulic tilting–This option is available to tilt the valve under test from horizontal to vertical for optimal valve pre-filling with water.

2.2 CONTROLS

The UFV controls are shown in the following figures.

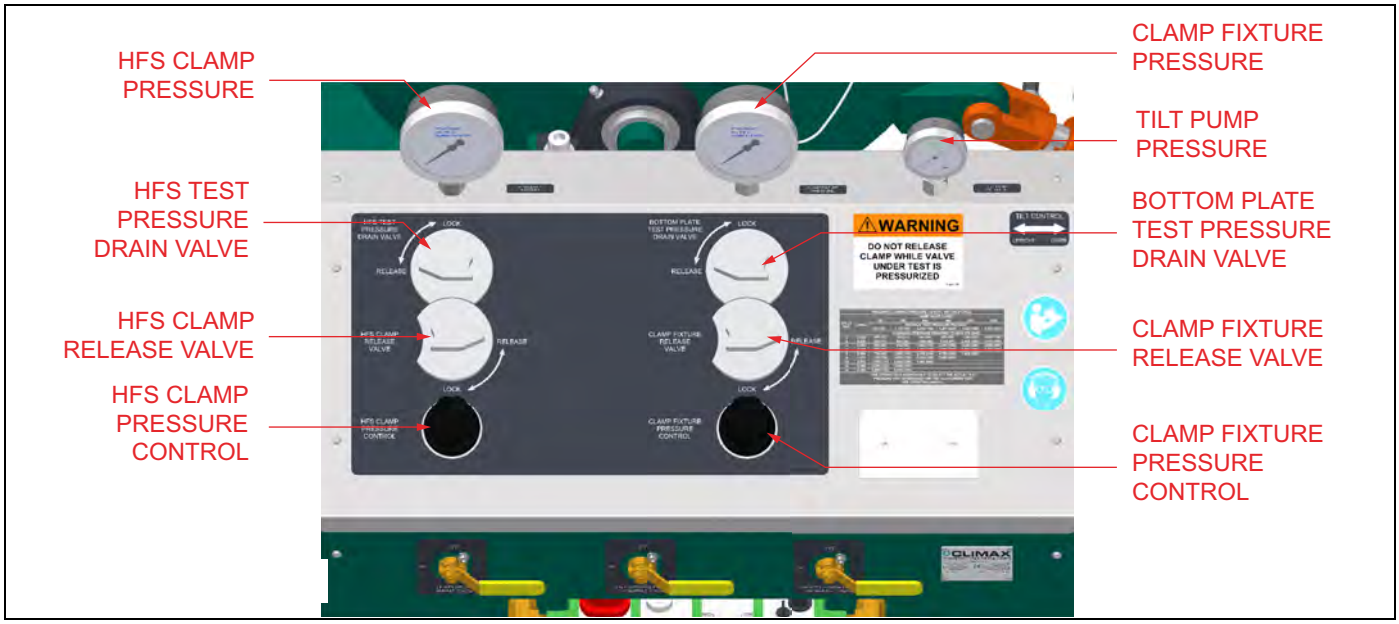

FIGURE 2-3. FRONT CONSOLE CONTROLS

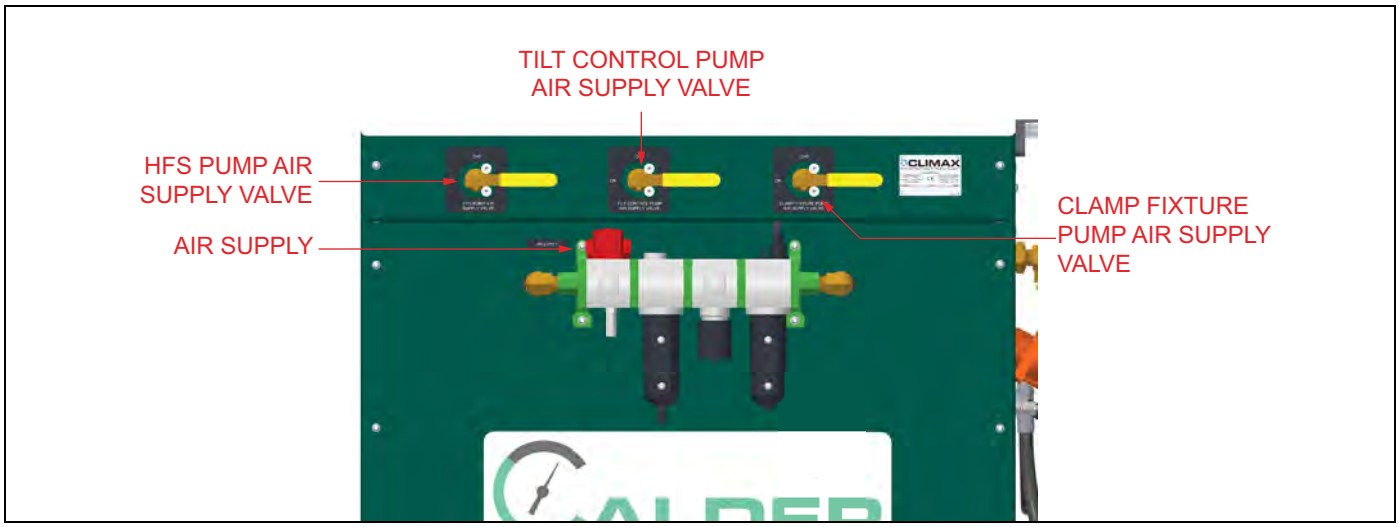

FIGURE 2-4. LOWER CONSOLE CONTROLS

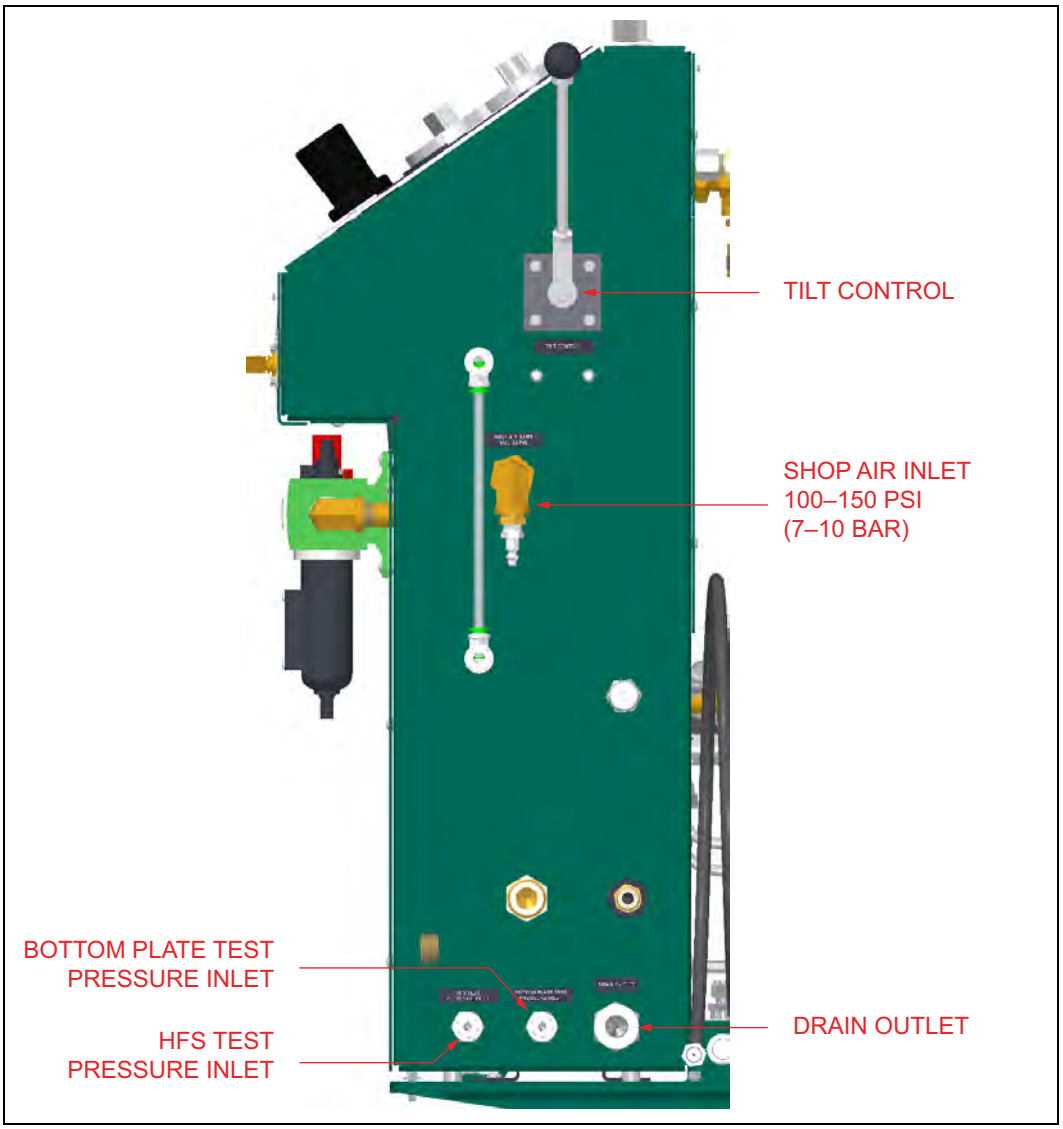

FIGURE 2-5. SIDE CONSOLE CONTROLS

2.3 DIMENSIONS

Figure 2-6 shows the machine and operating dimensions.

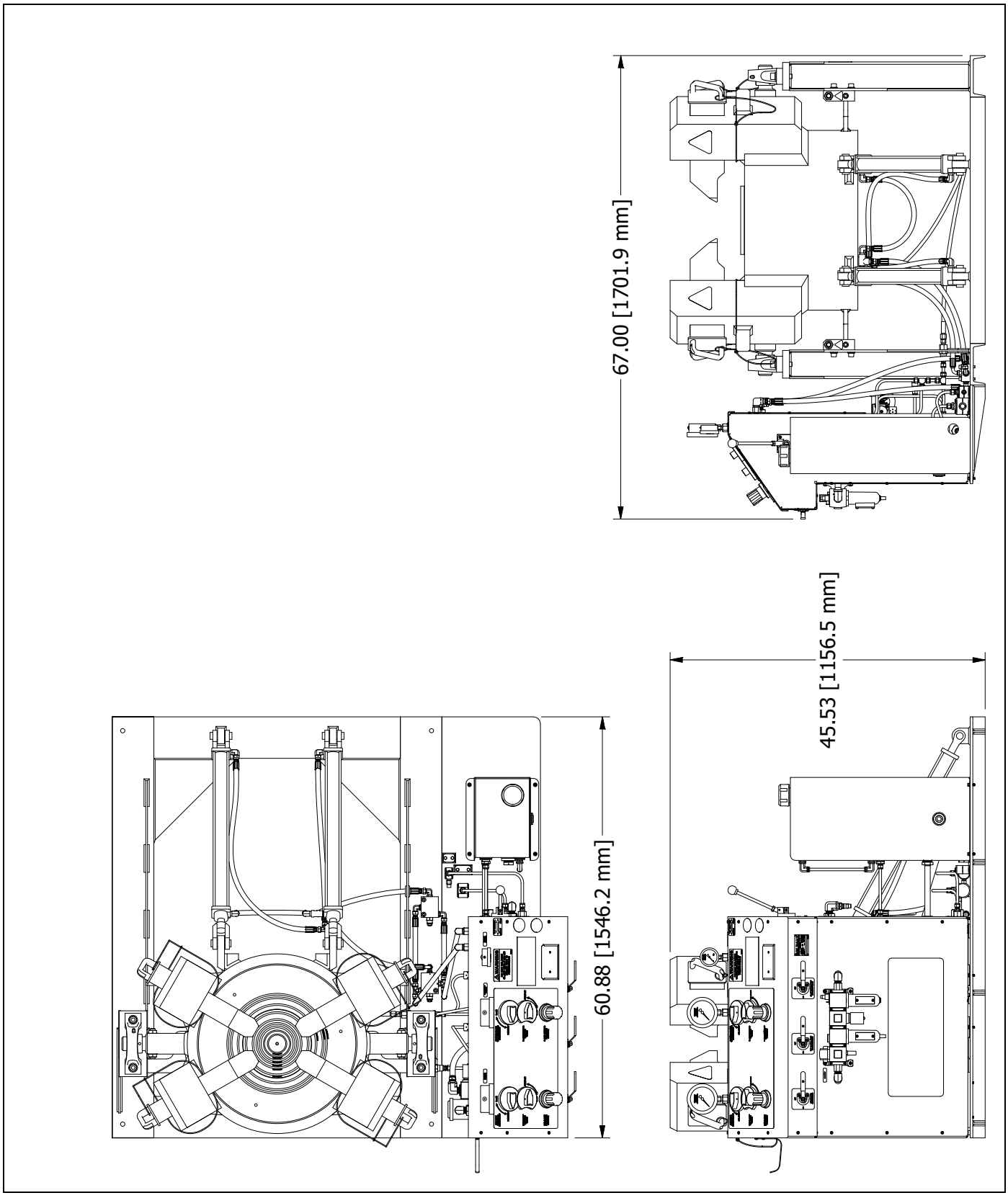

FIGURE 2-6. UFV-12-100T AND UFV-14-165T CLAMP FIXTURE DIMENSIONS

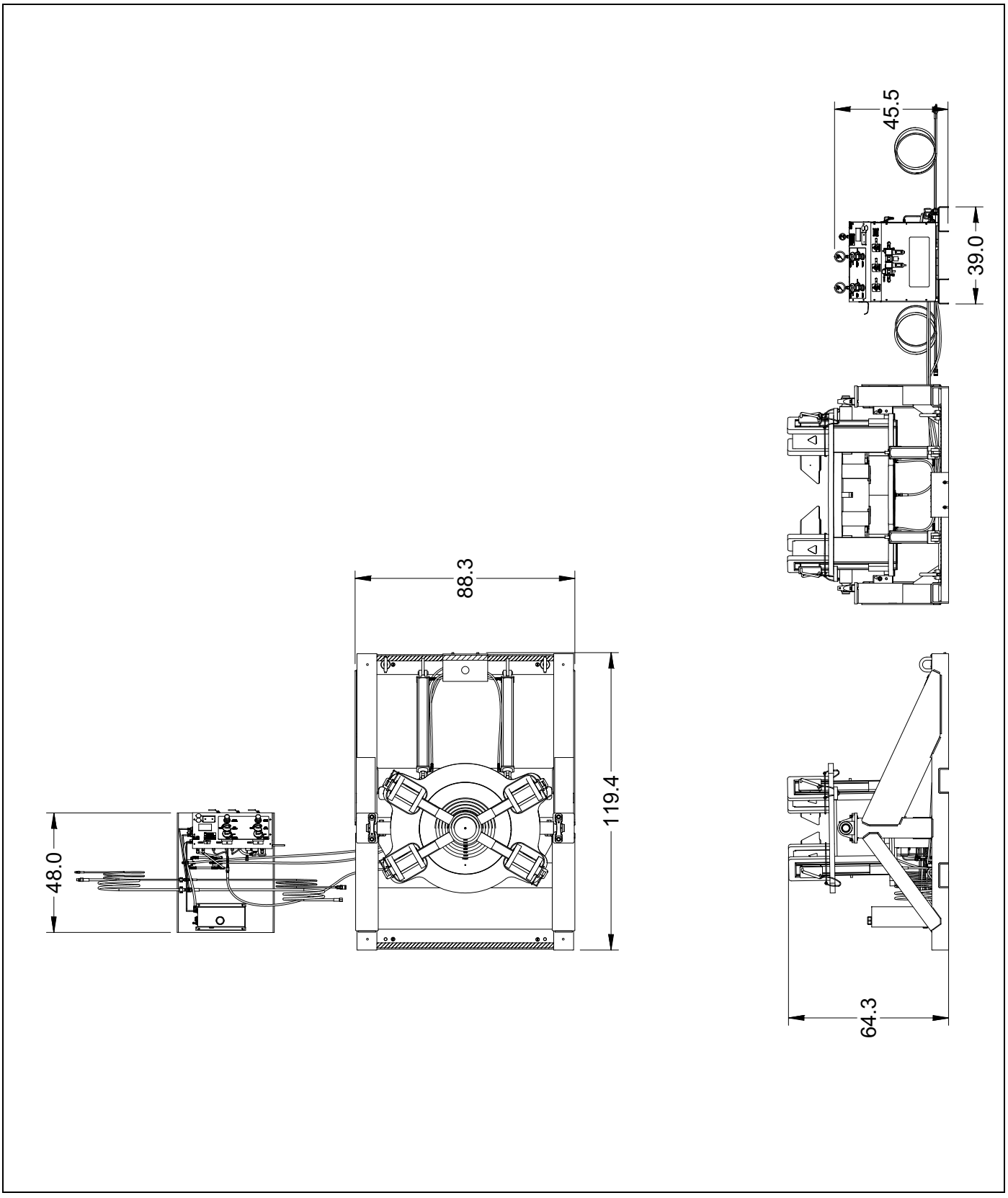

FIGURE 2-7. UFV-24-300T CLAMP FIXTURE DIMENSIONS

2.4 SPECIFICATIONS

The following tables provide the operating specifications. See the marketing literature for additional information.

TABLE 2-1. UFV-12-100T SPECIFICATIONS

Test media:	Water, air, glycol, water soluble oil blends
Maximum water test pressure:	9,700 psi (669 bar)
Maximum air test pressure:	125 psi (8.6 bar)
Types of valves that can be tested:	Flanged ball, globe, gate, butterfly, and check valves
Shop air required:	100–150 psi at 40 scfm (6.9–10.3 bar at 1.13 m^3/min)
Hydraulic ram force:	100 tons (91 tonnes)
Approximate machine weight:	3,400 lbs (1,542 kg)
Approximate shipped weight:	3,800 lbs (1,724 kg)

TABLE 2-2. UFV-14-165T SPECIFICATIONS

Test media:	Water, air, glycol, water soluble oil blends
Maximum water test pressure:	9,700 psi (669 bar)
Maximum air test pressure:	125 psi (8.6 bar)
Types of valves that can be tested:	Flanged ball, globe, gate, butterfly, and check valves
Shop air required:	100–150 psi at 40 scfm (6.9–10.3 bar at 1.13 m^3/min)
Hydraulic ram force:	165 tons (150 tonnes)
Approximate machine weight:	3,600 lbs (1,633 kg)
Approximate shipped weight:	4,000 lbs (1,814 kg)

TABLE 2-3. UFV-24-300T SPECIFICATIONS

Test media:	Water, air, glycol, water soluble oil blends
Maximum water test pressure:	2,500 psi (172 bar)
Maximum air test pressure:	125 psi (8.6 bar)
Types of valves that can be tested:	Flanged ball, globe, gate, butterfly, and check valves
Shop air required:	100–150 psi at 40 scfm (6.9–10.3 bar at 1.13 m^3/min)

TABLE 2-3. UFV-24-300T SPECIFICATIONS

Hydraulic ram force:	300 tons (272 tonnes)
Approximate machine weight (includes clamp fixture and control console):	13,500 lbs (6,124 kg)
Approximate shipped weight (includes clamp fixture and control console):	14,300 lbs (6,490 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.

.

TABLE 2-4. UFV-12-100T VALVE SIZE AND PRESSURE COVERAGE

Valve size (nominal)	ANSI valve class					
	150	300	600	900	1500	2500
	Maximum test pressure (PSI)					
	450 psi (31 bar)	1125 psi (78 bar)	2250 psi (155 bar)	3375 psi (233 bar)	5625 psi (388 bar)	9375 psi (646 bar)
2" (51 mm)	X	X	X	X	X	X
3" (76 mm)	X	X	X	X	X	X
4" (102 mm)	X	X	X	X	X	X
5" (127 mm)	X	X	X	X	X	
6" (152 mm)	X	X	X	X		
8" (203 mm)	X	X	X			
10" (254 mm)	X	X				
12" (305 mm)	X	X				

TABLE 2-5. UFV-14-165T VALVE SIZE AND PRESSURE COVERAGE

Valve size (nominal)	ANSI valve class					
	150	300	600	900	1500	2500
	Maximum test pressure (PSI)					
	450 psi (31 bar)	1125 psi (78 bar)	2250 psi (155 bar)	3375 psi (233 bar)	5625 psi (388 bar)	9375 psi (646 bar)
2" (51 mm)	X	X	X	X	X	X
3" (76 mm)	X	X	X	X	X	X
4" (102 mm)	X	X	X	X	X	X
5" (127 mm)	X	X	X	X	X	X
6" (152 mm)	X	X	X	X	X	
8" (203 mm)	X	X	X	X		
10" (254 mm)	X	X	X			
12" (305 mm)	X	X				
14" (356 mm)	X	X				

TABLE 2-6. UFV-24-300T VALVE SIZE AND PRESSURE COVERAGE

Valve size (nominal)	ANSI valve class		
	150	300	600
	Maximum test pressure (PSI)		
	450 psi (31 bar)	1125 psi (78 bar)	2250 psi (155 bar)
8" (203 mm)	X	X	X
10" (254 mm)	X	X	X
12" (305 mm)	X	X	X
14" (356 mm)	X	X	X
16" (406 mm)	X	X	X
18" (356 mm)	X	X	
20" (457 mm)	X	X	
24" (610 mm)	X	X	

WARNING

The test pressures listed by valve class represent machine capability and may not apply to your valve to be tested. Actual valve test pressures may be lower than the pressures listed in Table 2-5, Table 2-4, and Table 2-6 due to the valve material, intended operating temperature, and potential other factors. Refer to the valve manufacturer's specifications for the correct testing pressure. Failure to do this could result in property damage or personnel injury.

2.5 ITEMS REQUIRED BUT NOT SUPPLIED

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

- Hydraulic oil AW-32 or AW-46
- General purpose air tool oil
- Shop air at 100–150 psi and 40 scfm (6.9–10.3 bar at 1.13 m^3/min)
- Anchor bolts/hardware

3 SETUP

IN THIS CHAPTER:

This section describes the setup and assembly procedures for the UFV Hydro Pro Universal Flanged Valve Tester.

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, lifting the UFV with a forklift using the fork points in the base frame.

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 SECURING THE TEST STAND

The UFV must be anchor-bolted through the base frame to the floor before operation.

NOTICE

Do not operate the machine unless it has been anchored to the floor. The floor must be level within ±5°.

WARNING

All units must be stabilized for operator safety. The operator must determine what is necessary to provide a safe environment.

3.2.1 Cement in place (option 1 – recommended)

Cement the anchor bolts into the floor. The exposed threads of the anchor must protrude a minimum of two threads past the nut and washer. See Figure 3-1.

3.2.2 Drill and anchor (option 2)

Drill holes into the floor for an expanding type anchor sleeve. A .5" (12.7 mm) lag bolt will require a minimum of 1.5" (38.1 mm) thread engagement. See Figure 3-1.

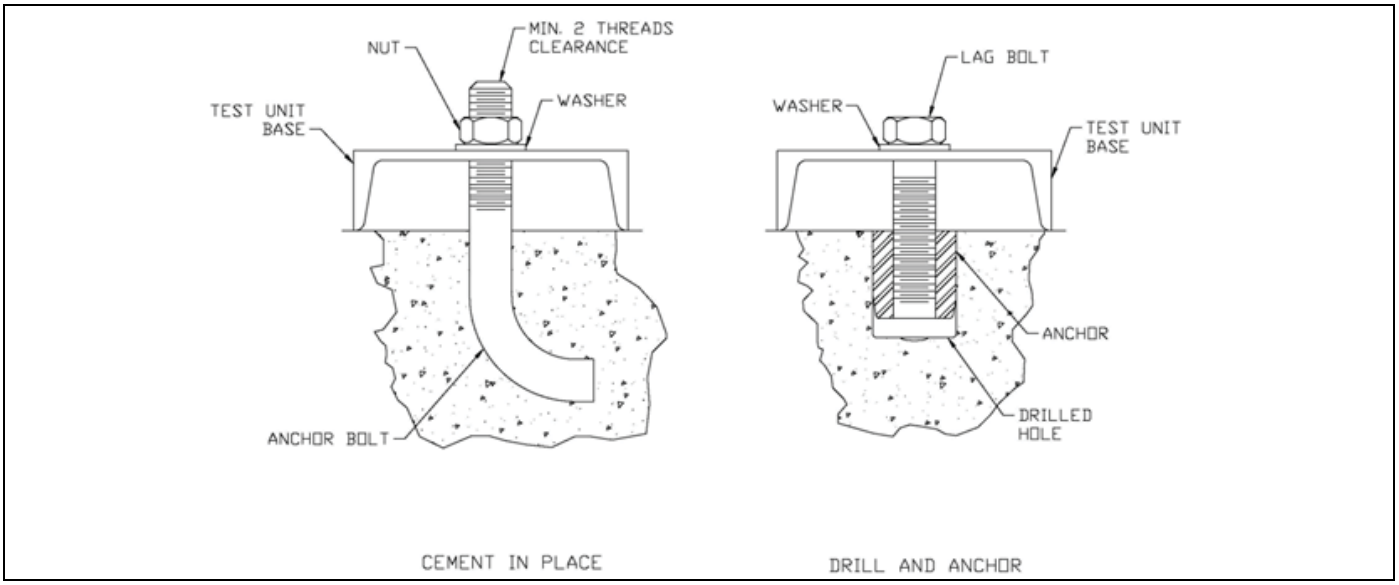

FIGURE 3-1. SECURING THE TEST STAND

3.3 FILLING THE LUBRICATOR AND HYDRAULIC TANK

Do the following to fill the lubricator and hydraulic tank:

1. Check that the lubricator is filled with general purpose air tool oil.
2. Retract the hydraulic cylinders and fill the hydraulic tank with AW-32 or AW-46 hydraulic oil to the top of the sight gauge.

NOTICE

If the hydraulic cylinders are not retracted when filled, the hydraulic tank might later overflow when the hydraulic cylinders are retracted.

NOTICE

The fill level must be visible in the sight tube throughout all modes of operation.

3.4 CONNECTING TO THE TEST PRESSURE SOURCE

The UFV can be paired with a variety of hydrostatic and low-pressure air pressure sources as long as the hydrostatic and air pressures are within the limits specified in Section 2.4 on page 17.

Typical Calder testing systems include a clamp fixture, such as this Hydro Pro Universal Flanged Valve Tester, and a test pressure source and control console, such as a Hydro Pro Console. Refer to the operating manual for the Hydro Pro Console (or other pressure source) for setup instructions for that module.

⚠ CAUTION

Always use test pressure hoses rated to the full system working pressure. Failure to do this could result in property damage or personnel injury.

Do the following to assemble the machine:

1. Connect the 1/2" (13 mm)-ID high-pressure inlet hose to the pressure source's primary outlet (that is, the side through which the valve is filled). This is the connection to the bottom plate (when tilted up).

NOTICE

If the pressure source has quick fill ability, connect the outlet line from the test pressure source with quick-fill ability to the 1/2" (13 mm)-ID high-pressure inlet hose.

2. Connect the 1/4" (6 mm)-ID high-pressure inlet hose to the pressure source's second pressure outlet. This is the connection to the optional HFS clamp.

NOTICE

If the pressure source has only one pressure outlet, this hose may be capped or removed and the port plugged.

3.5 CONNECTING THE UTILITIES

Connect shop air to the 3/8" (9.5 mm) NPT SHOP AIR INLET port. Shop air pressure is 100–150 psi (6.9–10.3 bar). The required shop air volume is 40 scfm (1.13 m3/min).

Connect a drain hose with a 1/2" (13 mm) minimum inside diameter and rated to the system maximum pressure or higher to the DRAIN OUTLET port. Route the hose to a safe location. The drain line may be connected to the return port of a recirculation system if the recirculation system does not obstruct the drain line's flow.

⚠ CAUTION

Secure the hose end to prevent hose whip when high-velocity fluid travels through the drain hose. Hose whip could result in property damage or personnel injury.

⚠ WARNING

Do not block the DRAIN OUTLET port. High-pressure fluid vented to the drain must be able to flow freely. Blocking the drain could rupture the drain line or fittings prevent the safety interlock from functioning and may result in property damage or personnel injury.

4 OPERATION

IN THIS CHAPTER:

4.1 PRE-OPERATION CHECKS

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 all hand tools are removed from inside the machine and the area.
4. Check that the o-ring seals in the seal plates are in good condition (free of nicks, tears, and not brittle).
5. Check that the seal plates are in good condition.

⚠ CAUTION

Damage (such as dents and dings) to the seal plates, especially next to the o-ring seals, could cause the valve under test to fail to form a seal against the plates.

6. Check that the air lubricator has adequate volume of air tool oil.
7. Check that the hydraulic tank has adequate volume of hydraulic oil.
8. Check that the machine has adequate shop air pressure and volume.
9. Check that the following valves are closed:
   - HFS PUMP AIR SUPPLY VALVE
   - TILT CONTROL PUMP AIR SUPPLY VALVE
   - CLAMP FIXTURE PUMP AIR SUPPLY VALVE
10. Turn on the AIR SUPPLY valve.
11. Check that the appropriate protective barriers are in place.

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 CLAMPING A VALVE

WARNING

Before clamping the valve to be tested, check that the valve is rated to the pressure for which it will be tested. Check the valve manufacturer's specifications for the correct test pressure. If the valve is not rated to the test pressure that will be applied, the valve or the machine may be damaged and could result in personnel injury.

WARNING

This machine applies a clamping load on the flanges of the valve under test. Before clamping the valve to be tested, check that clamping the valve flanges is a suitable method to clamp the valve during test, and that it can withstand the clamping force that is required. If the valve cannot withstand the clamping force, this could result in property damage and personnel injury.

Do the following to clamp a valve:

1. Check that the clamp barrel fixture is tilted up to the vertical/upright position (if equipped with the tilt option). If the clamp barrel fixture needs to be repositioned, refer to Section 4.3 on page 31.
2. Position the CLAMP FIXTURE RELEASE VALVE into the lock position.
3. Open the CLAMP FIXTURE PUMP AIR SUPPLY VALVE, then position the bottom plate using the CLAMP FIXTURE PRESSURE CONTROL and clamp arms so that there is an opening large enough for the valve under test to fit between them.

TIP:

The bottom plate can only be retracted with the CLAMP FIXTURE RELEASE VALVE in the RELEASE position, which requires placing the bottom plate test pressure drain valve in the release position.

4. Lower the valve under test (typically with an overhead hoist) onto the clamp barrel fixture and position it with its flange centered on the seal plate.
5. Position the four clamp arms so that they full contact the valve flange as close to the valve body as possible.

⚠ WARNING

Use chains or straps to lower the valve under test onto the clamp barrel fixture. Do not place hands or any other body part between the valve and the seal plate, as this could result in bodily injury.

6. Advance the bottom plate using the CLAMP FIXTURE PRESSURE CONTROL until the clamp arm contacts and clamp against the valve flange.
7. Determine the clamp pressure required by using the clamping pressure chart located on the control panel (shown in Table 4-2 on page 29) and by following these steps:
   a) Select the correct valve size in the first column.
   b) Select the correct valve class and test pressure from the header rows.
   c) Determine the hydraulic clamping pressure at the intersection of the selected row and column.

      Example (see highlighted cells in Table 4-1 on page 28): using a 8" class 600 valve at 2,250 psi test pressure = 8,100 psi clamp pressure.

TABLE 4-1. UFV-12-100T CLAMPING PRESSURE

Valve size (inches)	O-ring size	ASME class					
		150	300	600	900	1500	2,500
		Maximum test pressure[a]					
		450 psi (32 bar)	1,125 psi (78 bar)	2,250 psi (156 bar)	3,375 psi (233 bar)	5,625 psi (388 bar)	9,375 psi (647 bar)
		Hydraulic pressure required to seal					
2" (51 mm)	2-230	300 psi (21 bar)	400 psi (28 bar)	800 psi (55 bar)	1,200 psi (83 bar)	2,000 psi (138 bar)	3,200 psi (221 bar)
3" (76 mm)	2-239	300 psi (21 bar)	800 psi (55 bar)	1,500 psi (103 bar)	2,300 psi (159 bar)	3,800 psi (262 bar)	6,200 psi (427 bar)
4" (102 mm)	2-350	500 psi (34 bar)	1,200 psi (83 bar)	2,300 psi (159 bar)	3,400 psi (234 bar)	5,700 psi (393 bar)	9,400 psi (648 bar)
5" (127 mm)	2-358	800 psi (55 bar)	1,800 psi (124 bar)	3,600 psi (248 bar)	5,400 psi (372 bar)	8,900 psi (614 bar)	
6" (152 mm)	2-364	1,000 psi (69 bar)	2,500 psi (172 bar)	5,000 psi (345 bar)	7,500 psi (517 bar)		
8" (203 mm)	2-372	1,700 psi (117 bar)	4,100 psi (283 bar)	8,100 psi (558 bar)			
10" (254 mm)	2-379	2,600 psi (179 bar)	6,400 psi (441 bar)				
12" (305 mm)	2-382	3,500 psi (241 bar)	8,700 psi (600 bar)				

a. The operator is responsible to select the actual test pressure that is required for the valve under test.

TABLE 4-2. UFV-14-165T CLAMPING PRESSURE

Valve size (inches)	O-ring size	ASME class					
		150	300	600	900	1500	2,500
		Maximum test pressure[a]					
		450 psi (32 bar)	1,125 psi (78 bar)	2,250 psi (156 bar)	3,375 psi (233 bar)	5,625 psi (388 bar)	9,375 psi (647 bar)
		Hydraulic pressure required to seal					
2" (51 mm)	2-230	300 psi (21 bar)	300 psi (21 bar)	500 psi (34 bar)	800 psi (55 bar)	1,200 psi (83 bar)	2,000 psi (138 bar)
3" (76 mm)	2-239	300 psi (21 bar)	500 psi (34 bar)	1,000 psi (69 bar)	1,400 psi (97 bar)	2,400 psi (165 bar)	3,900 psi (269 bar)
4" (102 mm)	2-350	400 psi (28 bar)	800 psi (55 bar)	1,600 psi (110 bar)	2,400 psi (165 bar)	3,900 psi (269 bar)	6,500 psi (448 bar)
5" (127 mm)	2-358	500 psi (34 bar)	1,200 psi (83 bar)	2,300 psi (159 bar)	3,400 psi (234 bar)	5,600 psi (386 bar)	9,200 psi (634 bar)
6" (152 mm)	2-364	700 psi (48 bar)	1,600 psi (110 bar)	3,100 psi (214 bar)	4,700 psi (324 bar)	7,800 psi (538 bar)	
8" (203 mm)	2-372	1,100 psi (76 bar)	2,600 psi (179 bar)	5,100 psi (352 bar)	7,600 psi (524 bar)		
10" (254 mm)	2-379	1,600 psi (110 bar)	4,000 psi (276 bar)	7,900 psi (545 bar)			
12" (305 mm)	2-382	2,200 psi (152 bar)	5,400 psi (372 bar)				
14"“ (356 mm)	2-383	2,500 psi (172 bar)	6,300 psi (434 bar)				

a.The operator is responsible to select the actual test pressure that is required for the valve under test.

TABLE 4-3. UFV-24-300T CLAMPING PRESSURE

Valve size (inches)	O-ring size	ASME class		
		150	300	600
		Maximum test pressure[a]		
		450 psi (32 bar)	1,125 psi (78 bar)	2,250 psi (156 bar)
		Hydraulic pressure required to seal		
8" (203 mm)	2-372	600 psi (41 bar)	1,400 psi (97 bar)	2,700 psi (186 bar)
10" (254 mm)	2-379	900 psi (62 bar)	2,100 psi (145 bar)	4,100 psi (283 bar)
12" (305 mm)	2-382	1,200 psi (83 bar)	2,900 psi (200 bar)	5,700 psi (393 bar)
14" (356 mm)	2-383	1,300 psi (90 bar)	3,300 psi (227 bar)	6,500 psi (448 bar)
16" (406 mm)	2-385	1,700 psi (117 bar)	4,200 psi (290 bar)	8,400 psi (579 bar)
18" (356 mm)	2-466	2,300 psi (159 bar)	5,700 psi (393 bar)	
20" (457 mm)	2-470	3,000 psi (207 bar)	7,300 psi (503 bar)	
24" (610 mm)	P/N 90633	3,700 psi (255 bar)	9,100 psi (627 bar)	

a.The operator is responsible to select the actual test pressure that is required for the valve under test.

CAUTION

The test pressures listed by valve class represent machine capability and may not apply to your valve to be tested. Actual valve test pressures may be lower due to the valve material, intended operating temperature, and potential other factors.

Refer to the valve manufacturer's specifications for the correct testing pressure. Failure to do this could result in property damage or personnel injury.

8. Increase the CLAMP FIXTURE PRESSURE CONTROL until the clamp fixture pressure gauge shows the required clamp pressure.

⚠ WARNING

During testing, leave the CLAMP FIXTURE PUMP AIR SUPPLY VALVE open and the CLAMP FIXTURE PRESSURE CONTROL at the clamp pressure setting. This allows the pump to compensate for small amounts of leakage in the case that the hydraulic system begins to slowly leak.

Failure to do this could result in a valve becoming unclamped during testing and could cause property damage or personnel injury.

NOTICE

If the clamp fixture pump cycles after the clamp pressure has been set, it may indicate that the hydraulic system has a leak. Perform a hydraulic leakage check (see Section 5 on page 35) and correct any hydraulic leaks.

4.3 TILTING A VALVE

Do the following to tilt a valve:

1. Check that the valve under test is clamped securely to the required clamp pressure.
2. Disconnect the valve under test from the overhead hoist.
3. Check that all personnel are clear of the clamp barrel fixture and the valve under test, then open the TILT CONTROL PUMP AIR SUPPLY VALVE and use the TILT CONTROL lever to tilt the valve up or down.
4. Turn off the TILT CONTROL PUMP AIR SUPPLY valve after tilting the valve into position.

⚠ CAUTION

Do not tilt the machine unless a test workpiece is installed and clamped to full clamp pressure. Failure to follow this guideline may allow the seal plate, clamp arms, or workpiece to shift or fall during the tilting process. Personnel injury or property damage may occur.

4.4 PRE-TESTING

⚠ CAUTION

Prior to performing a hydrostatic test, check that all air has been vented from the valve under test. Failure to do this could result in property damage or personnel injury.

Check that the valve under test is clamped to the correct clamp pressure.

If no HFS option has been installed for testing, do the following for pre-testing:

1. Lock the bottom plate test pressure drain valve.
2. Fill the valve under test with water by using the Hydro Pro Console test pressure controls (or alternate test pressure source) to fill through the 1/2" (13 mm) line and to vent the air from the valve under test. Refer to the manual of the Hydro Pro Console (or alternate test pressure source) for specific filling instructions.

NOTICE

If testing with water and the machine has the tilt option, check that the valve under test is tilted into the upright position. This allows the valve under test to be filled from the bottom up while air is vented out the top.

If the tilt option has not been purchased or if pressurizing with a single line, the valve under test must be vented while filling using an alternate means. This will vary based on valve design.

If the HFS option has been installed and will be used for testing, do the following for pre-testing:

1. At the clamp fixture control panel, lock the following valves:
   - BOTTOM PLATE TEST PRESSURE DRAIN VALVE
   - HFS TEST PRESSURE DRAIN VALVE (if HFS is being used for testing)
2. Fill the valve under test with water by using the Hydro Pro Console test pressure controls (or alternate test pressure source) to fill through the 1/2" (13 mm) line and to vent the air from the valve under test by releasing the HFS TEST PRESSURE DRAIN VALVE. Refer to the manual of the Hydro Pro Console (or alternate test pressure source) for specific filling instructions.

4.5 TESTING

This machine is designed to perform high-pressure hydrostatic and low-pressure air tests. Refer to Section 2.4 on page 17 for maximum pressures.

⚠ WARNING

Do not use this machine for high-pressure gas testing, which could result in property damage or personnel injury.

Do the following to complete a valve test:

1. Check that the CLAMP FIXTURE PUMP AIR SUPPLY VALVE is open and that the CLAMP FIXTURE PRESSURE CONTROL is set for the correct clamp pressure.
2. At the control panel, lock the following valves if they are not already closed:
   - BOTTOM PLATE TEST PRESSURE DRAIN VALVE
   - HFS TEST PRESSURE DRAIN VALVE (if HFS is being used for testing)
3. Pressurize the valve under test per the instructions provided with the test pressure source.

⚠ WARNING

Do not pressurize the machine above the maximum pressure rating. Refer to Section 2.4 on page 17. Pressurizing the machine above the maximum pressure rating could result in property damage or personnel injury.

⚠ WARNING

Do not attempt to release the clamp pressure while the valve under test is pressurized. Releasing a valve under pressure could result in property damage or personnel injury.

4.6 POST-TESTING

Do the following after completing a test:

1. Shut off the test pressure source.
2. If the clamp fixture was moved into the horizontal position using the tilt option to support testing, tilt the fixture and the valve under test to the vertical position.
3. Drain the test pressure from the valve under test using the controls at the test pressure source.
4. Drain the water from the valve using low-pressure air, if the test pressure source has this feature.

4.7 UNCLAMPING A VALVE

WARNING

Do not release the clamp pressure while the valve under test is pressurized. Releasing a valve under pressure could result in property damage or personnel injury.

Do the following to unclamp a valve:

1. Support the valve under test with an overhead hoist.

CAUTION

Do not release the clamp unless supporting the valve with a hoist or other suitable device. Releasing an unsupported valve could result in property damage or personnel injury.

2. Back off the CLAMP FIXTURE PRESSURE CONTROL and the HFS CLAMP PRESSURE CONTROL (if used during testing) to zero.
3. Close the CLAMP FIXTURE PUMP AIR SUPPLY VALVE and the HFS PUMP AIR SUPPLY VALVE (as applicable).
4. Release the following:
   - BOTTOM PLATE TEST PRESSURE DRAIN VALVE
   - HFS TEST PRESSURE DRAIN VALVE (as applicable)
   - CLAMP FIXTURE RELEASE VALVE
   - HFS CLAMP RELEASE VALVE
5. Lift the valve under test out of the clamp barrel fixture.

5 MAINTENANCE

5.1 MAINTENANCE CHECKLIST

Table 5-1 lists maintenance intervals and tasks.

TABLE 5-1. MAINTENANCE INTERVALS AND TASKS

Interval	Task
Before each use	Check air lubricator level and refill with general purpose air tool oil as necessary.
	Check hydraulic oil level and refill with AW-32 as necessary.
	Check seal plate O-rings/sealing surface condition.
Periodically	Check the condition of the hoses and replace as necessary.
	Replace the air inlet filter with Air Prep Unit Filter (P/N 87437) as necessary.
	Check for hydraulic leakage (see Section 5.2).

5.2 CHECKING FOR HYDRAULIC LEAKAGE

The hydraulic system must be maintained in a leak-free condition to assure consistent and reliable clamping throughout the test. Perform the following check periodically or if the hydraulic system is ever suspected of leaking.

⚠ CAUTION

Do not apply test pressure at any time during this check, as that may result in property damage or personnel injury.

Do the following to check for hydraulic leakage:

1. If equipped with the tilt option, place the clamp barrel fixture in the vertical position.
2. Select a valve or similar component that can be clamped with more than 5,000 psi (345 bar) of clamping pressure.
3. Clamp the valve in the clamp barrel fixture to a minimum of 5,000 psi (345 bar), but not more than the test piece can handle.
4. Keep the test piece supported with an overhead hoist, and shut off the CLAMP FIXTURE PUMP AIR SUPPLY valve and reduce the CLAMP FIXTURE PRESSURE CONTROL regulator to zero. This will allow the system to leak down if a leak is present without the pump replenishing pressure.
5. Monitor the clamp fixture pressure for a minimum of 10 minutes. Pressure loss must not be more than 100 psi (6.9 bar) in 10 minutes.

6. Repeat this process for the HFS clamp pressure control (if this option has been installed).

6 STORAGE AND SHIPPING

6.1 STORAGE

Proper storage of the Hydro Pro Universal Flanged Valve Tester will extend its usefulness and prevent undue damage.

Before storing, do the following:

1. Retract the hydraulic cylinders.
2. Drain all water from the lines and dry the machine surfaces.
3. Drain the hydraulic fluid from the tank and lines.
4. Drain the air lubricator.

6.2 DECOMMISSIONING

To decommission the Hydro Pro Universal Flanged Valve Tester prior to disposal, drain all fluids from the system. Refer to Appendix A for component assembly information.

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APPENDIX A ASSEMBLY DRAWINGS

Drawing list

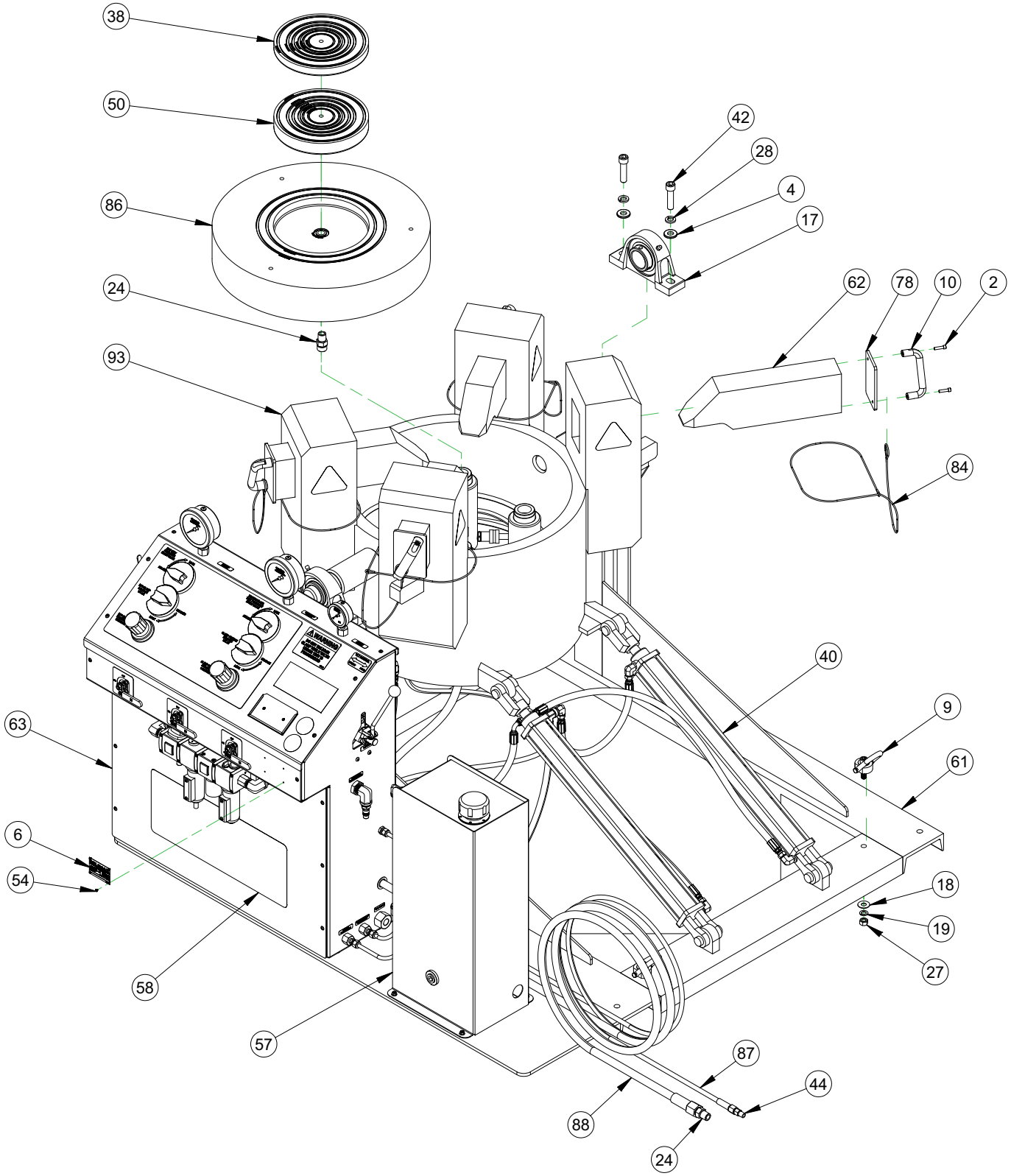

FIGURE A-1. UFV-12-100T VALVE TESTER ASSEMBLY (P/N 88847)

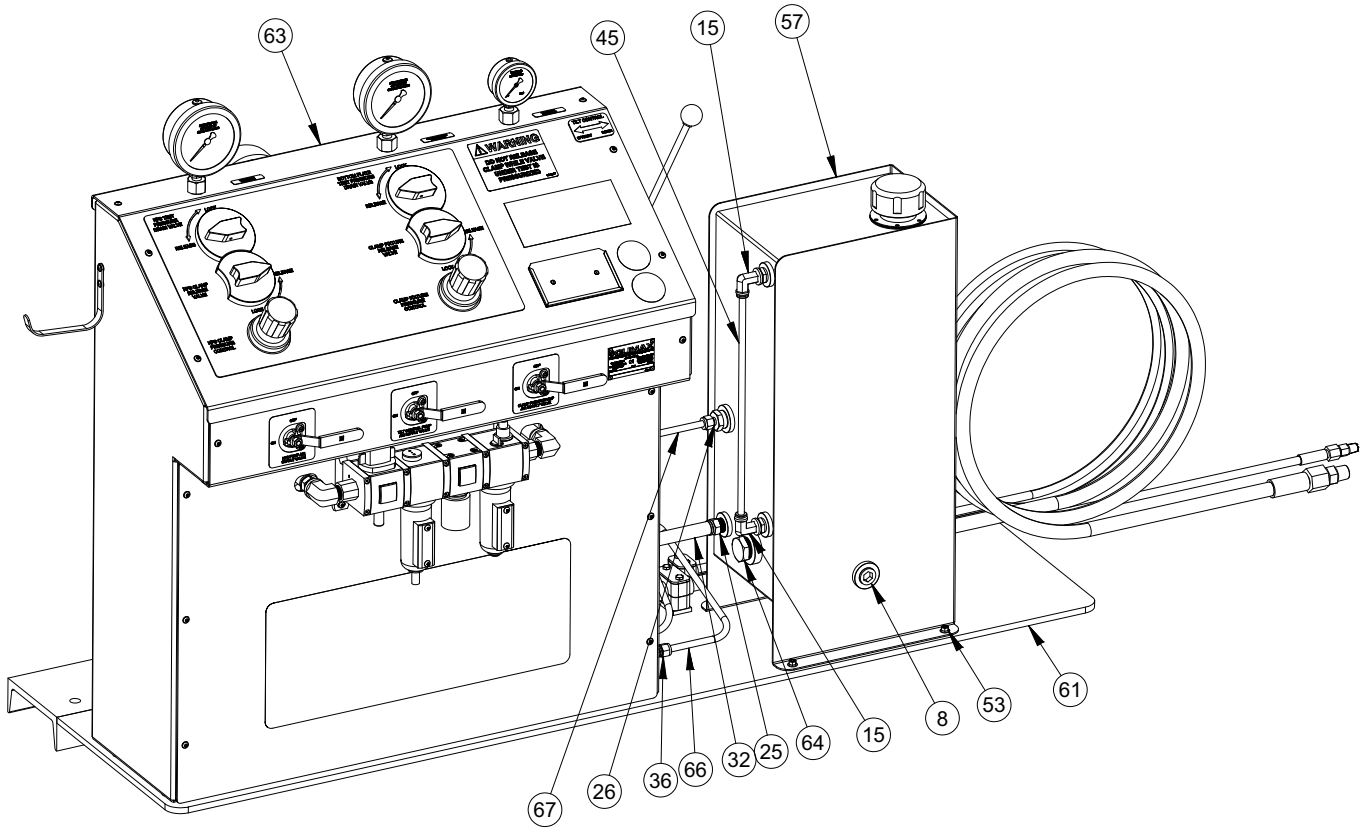

FIGURE A-2. UFV-12-100T CONSOLE FRONT ASSEMBLY (P/N 88847)

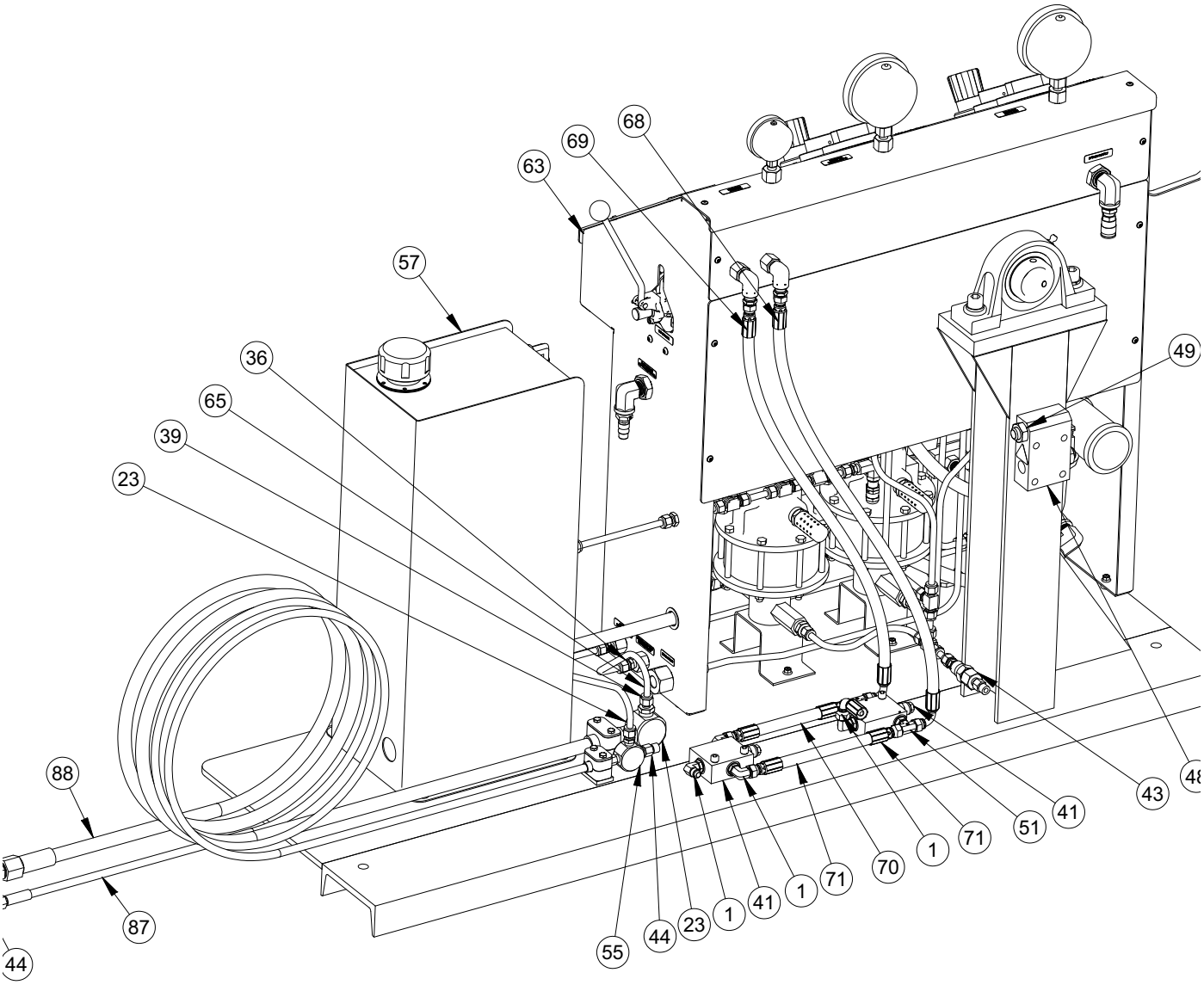

FIGURE A-3. UFV-12-100T CONSOLE BACK ASSEMBLY (P/N 88847)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	12849	FTG ELBOW SAE-6 MALE X #6 JIC MALE 90 DEG
2	8	13625	SCREW 1/4-20 X 1 SHCS SS
3	1	15735	FTG TEE 3/8 STREET
4	4	18109	WASHER 5/8 HVYFLTW HARDENED
5	1	18344	(NOT SHOWN) FTG QUICK COUPLER 1/4B MALE X 1/4 HOSE BARB
6	1	29154	PLATE SERIAL YEAR MODEL CE 2.0 X 3.0
7	1	30533	(NOT SHOWN) FTG QUICK COUPLER 1/4B FEMALE X 1/4 HOSE BARB
8	1	33991	PLUG HEX 3/4 NPT BRASS
9	2	41385	RING HOIST SWIVEL 1/2-13 2500 LBS
10	4	53462	HANDLE PULL 1/4 CBORE MTG 2.0 X 5.12 X 1.02W PLASTIC COATED
11	4	55058	FTG ELBOW 3/8 NPTM X JIC-6 MALE 90 DEG
12	144	56269	(NOT SHOWN) SLEEVE WELD COVER 1" DIA STRAIGHTLINE W/VELCRO CLOSURE
13	144	58287	(NOT SHOWN) SLEEVE WELD COVER 1 1/2" DIA STRAIGHTLINE W/VELCRO CLOSURE
14	1	59196	FITTING STRAIGHT JIC-6 MALE X 3/8 NPTM
15	2	77459	FTG ELBOW 1/2 NPTM X 3/8 TUBE PRESTOLOC SWIVEL 90 DEG BRASS
16	4	77544	WASHER 1/4 FLTW SS
17	2	77738	BRG PILLOW BLOCK 2 DIA
18	2	78415	WASHER 1/2 FLTW SS
19	18	78665	WASHER 1/2 LOCW SS
20	8	78899	SCREW 1/2-13UNC X 2-1/2 SHCS SS
21	8	79103	SCREW 1/2-13 X 1-1/4 SHCS SS
22	4	81810	FTG ADAPTER PIPE 9/16 TYPE M X 3/8 NPTM 15000 PSI
23	1	81871	FTG TEE 1/2 FEMALE NPT SS 15,000 PSI
24	2	81874	FTG MALE ADAPTER SS 15,000 PSI 1-12 TYPE M X 1/2 MNPT
25	1	81917	FTG BARB 1/2 NPTM X 1/2 HOSE SWIVEL BRASS
26	1	82476	FTG TUBE CONNECTOR 3/4 NPTM X 3/8 TUBE
27	2	82613	NUT 1/2-13 HEX SS
28	4	82640	WASHER 5/8 LOCW SS
29	4	82679	SCREW 5/16-18 X 2 SHCS SS
30	4	82687	WASHER 5/16 FLTW SS
31	4	82783	CYLINDER 25 TON SINGLE-ACTING
32	18	82847	HOSE LOW PRESSURE PUSH LOK 1/2 ID
33	144	82865	(NOT SHOWN) HOSE LOW PRESSURE PUSH LOK 1/4 ID
34	1	82883	(NOT SHOWN) FTG QUICK COUPLER 10KSI MALE HALF 3/8 NPTF
35	1	83094	FTG TUBE TEE UNION 3/8 TUBE SUPER DUPLEX
36	8	83105	FTG TUBE CONNECTOR 1/4 NPTM X 3/8 TUBE SUPER DUPLEX
37	8	83429	WASHER 1/2 FLTW SAE STAINLESS STEEL
38	1	83630	SEAL PLATE 2-8 IN 1400-14
39	1	83671	FTG CONNECTOR 1/2 NPTM X 3/8 TUBE SUPER DUPLEX
40	2	83815	TILT CYLINDER 2 IN BORE 24 IN STROKE
41	2	83999	OVERCENTER VALVE & MANIFOLD INLET/OUTLET 9/16 SAE PILOT 9/16 SAE
42	4	84683	SCREW 5/8-11 X 2-1/2 SHCS ZINC
43	2	85232	FTG BULKHEAD 1/4 NPTF 15000 PSI
44	3	85259	ADAPTER 9/16 TYPE M X 1/4 MNPT STAINLESS 15 KSI
45	15	85289	TUBING 3/8 OD X 1/4 ID POLYETHELYNE
46	9	85437	LABEL WARNING - HAND CRUSH/FORCE FROM BELOW 3.80 X 3.29
47	4	85919	SCREW 3/4-10 X 2 SSSCP 18-8 STAINLESS
48	2	86283	BLOCK BARREL STOP ADJ
49	4	86611	NUT 3/4-10 JAMN SS

FIGURE A-4. UFV-12-100T PARTS LIST 1 (P/N 88847)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
50	1	86727	SEAL PLATE TALL 2-8 INCH 1400-14 CUSTOM
51	2	86773	FTG TEE BRANCH JIC-6M X JIC-6M X SAE-6 ORB
52	1	86775	FTG TEE UNION JIC-6M
53	8	87076	SCREW 1/4-20 X 3/4 HHCS FLANGE HEAD GR5
54	4	87775	RIVET BLIND 1/8 DIA SS 316
55	1	87856	FTG TEE 1/4 NPTF 15 KSI
56	1	87857	FTG CROSS 1/4 NPTF 15 KSI
57	1	88147	RESERVOIR HYDRAULIC
58	1	88470	LABEL CALDER UFV SYSTEM 20 X 8
59	1	88471	(NOT SHOWN) MANUAL INSTRUCTION UFV-10K TILT
60	1	88472	(NOT SHOWN) CRATE 78 X 78 X 48 3/4 PLY DOUBLE BOTTOM 1/2 PLY COVER
61	1	88474	1400-14 TILT FRAME WELDMENT
62	4	88477	CLAMP ARM 45 DEG TILT BARREL
63	1	88479	ASSY CONSOLE MAIN UFV-10K HYDRAULIC CLAMPING
64	1	88523	FTG PLUG 1 NPTM HEX HEAD BRASS
65	1	88567	TUBE 3/8 SUPER DUPLEX BOTTOM PLATE TEST PRESSURE INLET
66	1	88568	TUBE 3/8 SUPER DUPLEX HFS TEST PRESSURE INLET
67	1	88571	TUBE 3/8 EXTERNAL HYD RETURN UFV
68	1	88580	HOSE ASSY 3 KSI 3/8 JIC-6F X 31.5 OAL STRAIGHT END AND AND 90 DEG END
69	1	88582	HOSE ASSY 3 KSI 3/8 JIC-6F X 31 OAL STRAIGHT END AND AND 90 DEG END
70	1	88584	HOSE ASSY 3 KSI 3/8 JIC-6F X 9 OAL STRAIGHT ENDS
71	1	88585	HOSE ASSY 3 KSI 3/8 JIC-6F X 11 OAL STRAIGHT ENDS
72	1	88587	HOSE ASSY .23 ID 3/8 NPTM X 9/16 FEM TYPE M X 60 IN OAL 17.4KSI (6/2WL)
73	1	88588	HOSE ASSY 3 KSI 3/8 JIC-6F X 19.5 OAL STRAIGHT ENDS
74	1	88589	HOSE ASSY 3 KSI 3/8 JIC-6F X 23.7 OAL STRAIGHT ENDS
75	1	88606	HOSE ASSY 3 KSI 3/8 JIC-6F X 35 OAL STRAIGHT ENDS
76	1	88608	HOSE ASSY 3 KSI 3/8 JIC-6F X 27 OAL STRAIGHT ENDS
77	1	88609	HOSE ASSY 3 KSI 3/8 JIC-6F X 22.5 OAL 90 DEG BOTH ENDS
78	4	88614	CLAMP ARM REAR STOP PLATE
79	1	88615	CLAMP BARREL FIXTURE HOSE GUARD
80	4	88621	SPACER 1/4 ID X 5/8 OD X 5/16 LG 18-8 SS
81	4	88646	TUBE 3/8 SUPER DUPLEX 1.5 IN STUB
82	1	88657	HOSE ASSY .50 ID 1/2 NPTM SS X 1-12 FEM TYPE M SS X 96 IN OAL 15KSI (13/2W)
83	2	88670	1-1/4" DIA GROMMET FOR 1/4" THICK PANEL
84	4	88873	CLAMP ARM LANYARD ASSY
85	1	89160	(NOT SHOWN) FTG QUICK DISCONNECT FEMALE COUPLER W/ CHECK VALVE 15000 PSI 1/4" FNPT
86	1	89188	CLAMP BARREL FIXTURE TOP SEAL PLATE 12"
87	2	89318	HOSE ASSY .23 ID 1/4 NPTM SS X 9/16 FEM TYPE M SS X 240 IN OAL 17.4KSI (6/2WL)
88	1	89319	HOSE ASSY .50 ID 1/2 NPTM SS X 1-12 FEM TYPE M SS X 240 IN OAL 15KSI (13/2W)
89	2	89466	HOSE ASSY .23 ID 1/4 NPTF FEM X 9/16 FEM TYPE M X 48 IN OAL 15KSI (6/2WL)
90	2	89467	HOSE ASSY .23 ID 1/4 NPTM X 9/16 FEM TYPE M X 32 IN OAL 15KSI (6/2WL)
91	1	89616	(NOT SHOWN) KIT - UFC-12-100T SEAL PLATES O-RINGS
92	1	89728	(NOT SHOWN) HOSE ASSY .23 ID 1/4 NPTM X 3/8 NPTM X 240 IN OAL 17KSI
93	1	91331	BARREL TILT WELDMENT UFV-12-100T
94	1	91447	KIT - LABEL UFV-12-100T US STANDARD

FIGURE A-5. UFV-12-100T PARTS LIST 2 (P/N 88847)

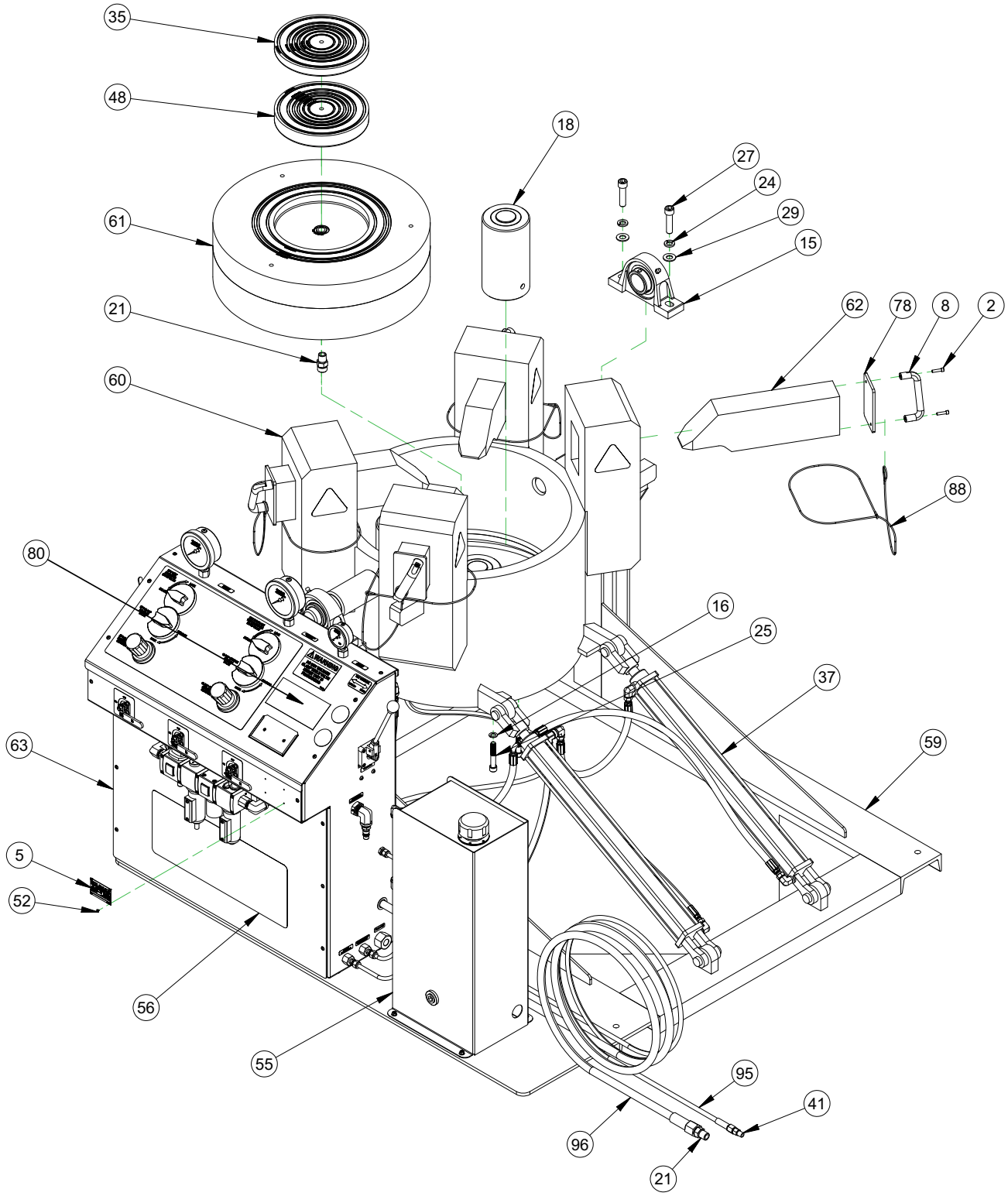

FIGURE A-6. UFV-14-165T VALVE TESTER ASSEMBLY (P/N 88469)

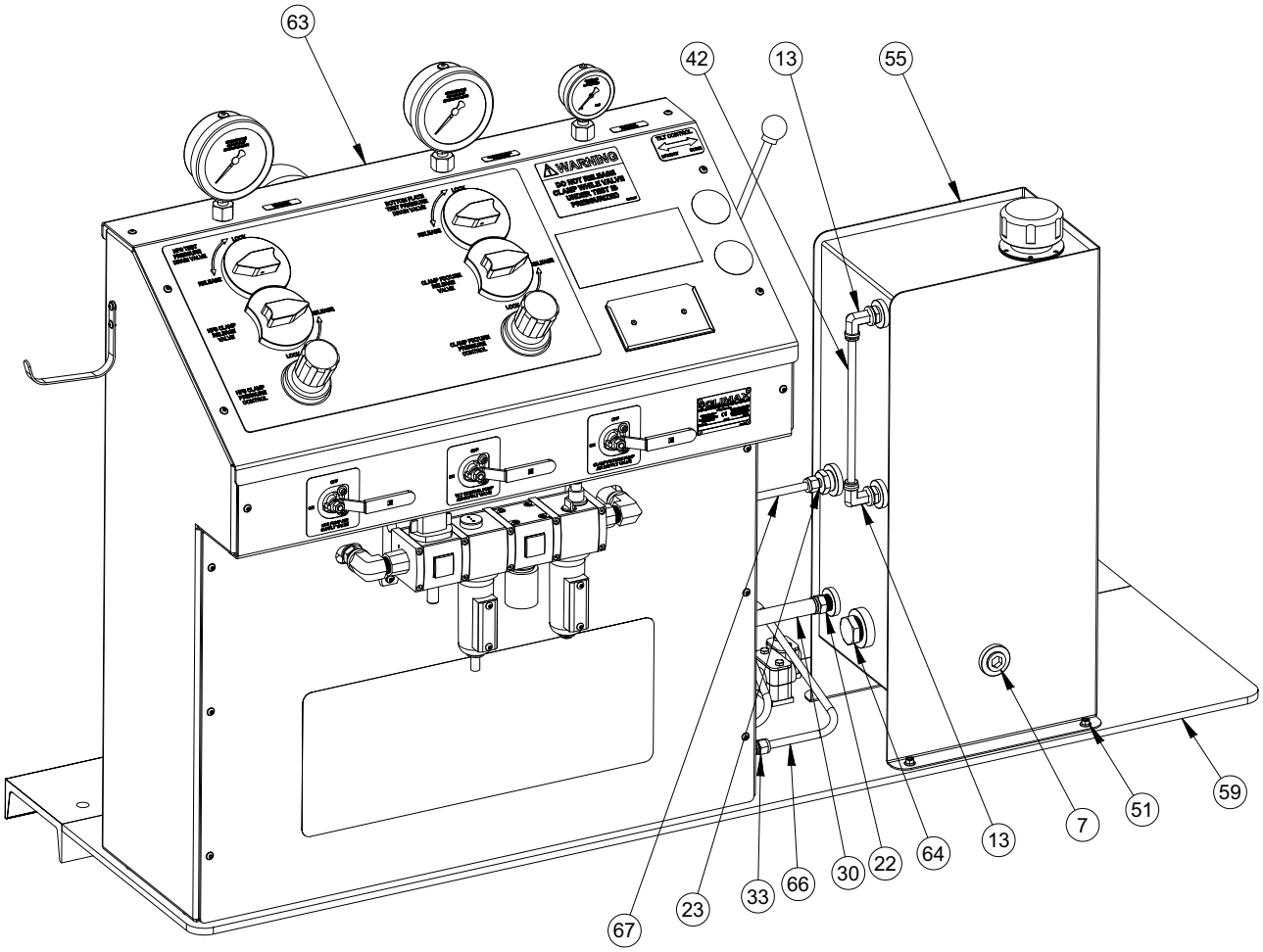

FIGURE A-7. UFV-14-165T CONSOLE FRONT ASSEMBLY (P/N 88469)

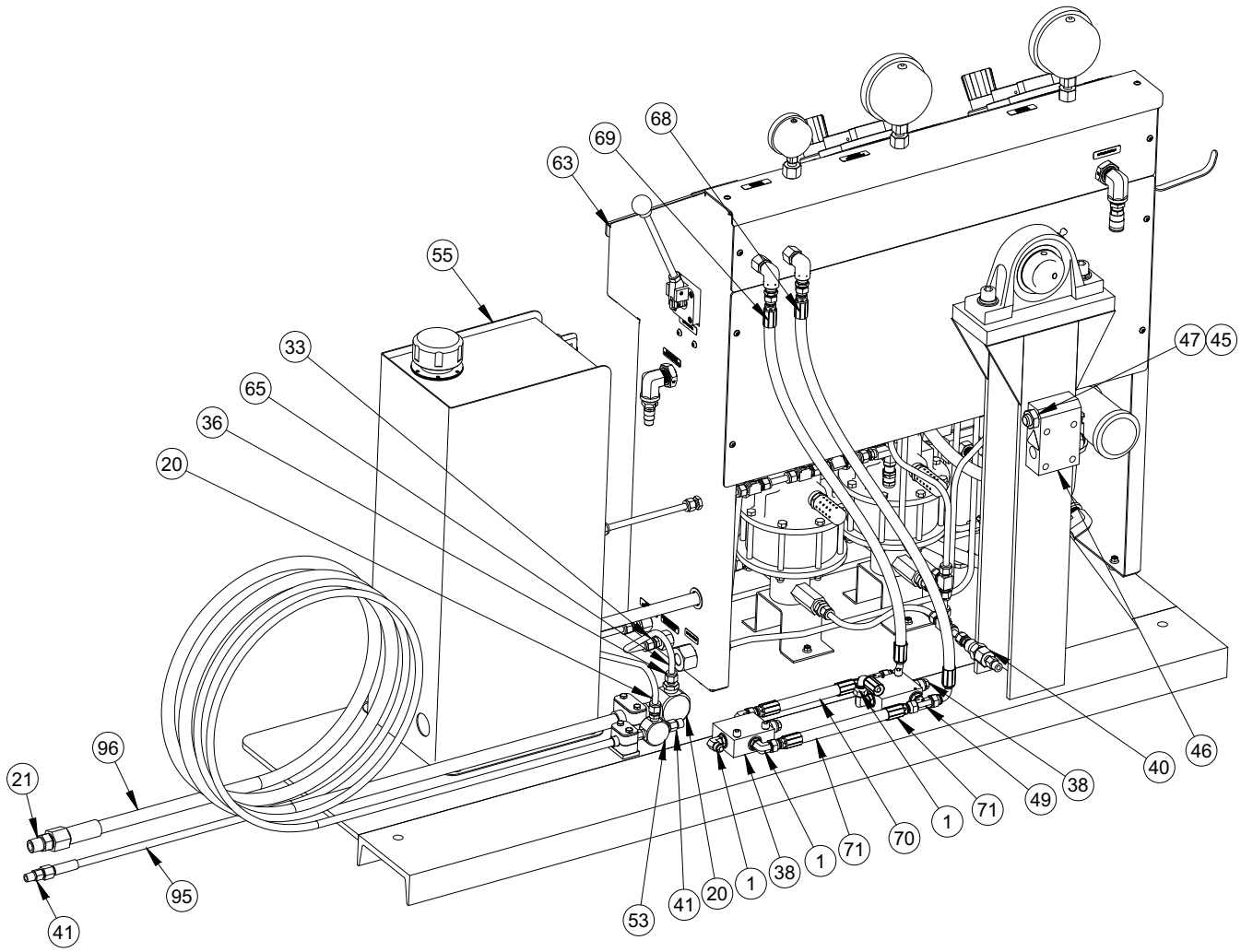

FIGURE A-8. UFV-14-165T CONSOLE BACK ASSEMBLY (P/N 88469)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	12849	FTG ELBOW SAE-6 MALE X #6 JIC MALE 90 DEG
2	8	13625	SCREW 1/4-20 X 1 SHCS STAINLESS STEEL
3	1	15735	FTG TEE 3/8 STREET
4	1	18344	(NOT SHOWN) FTG QUICK COUPLER 1/4B MALE X 1/4 HOSE BARB
5	1	29154	PLATE SERIAL YEAR MODEL CE 2.0 X 3.0
6	1	30533	(NOT SHOWN) FTG QUICK COUPLER 1/4B FEMALE X 1/4 HOSE BARB
7	1	33991	PLUG HEX 3/4 NPT BRASS
8	4	53462	HANDLE PULL 1/4 CBORE MTG 2.0 X 5.12 X 1.02W PLASTIC COATED
9	4	55058	FTG ELBOW 3/8 NPTM X JIC-6 MALE 90 DEG
10	144	56269	(NOT SHOWN) SLEEVE WELD COVER 1" DIA STRAIGHTLINE W/VELCRO CLOSURE
11	144	58287	(NOT SHOWN) SLEEVE WELD COVER 1 1/2" DIA STRAIGHTLINE W/VELCRO CLOSURE
12	1	59196	FITTING STRAIGHT SAE-6 MALE X 3/8 NPTM
13	2	77459	FTG ELBOW 1/2 NPTM X 3/8 TUBE PRESTOLOC SWIVEL 90 DEG BRASS
14	4	77544	WASHER 1/4 FLTW SS
15	2	77738	BRG PILLOW BLOCK 2 DIA
16	14	78665	WASHER 1/2 LOCW SS
17	8	79103	SCREW 1/2-13 X 1-1/4 SHCS SS
18	3	80136	CYLINDER 55 TON SINGLE ACTING SPRING RETURN
19	3	81810	FTG ADAPTER PIPE 9/16 TYPE M X 3/8 NPTM 15000 PSI
20	1	81871	FTG TEE 1/2 FEMALE NPT SS 15,000 PSI
21	2	81874	FTG MALE ADAPTER SS 15,000 PSI 1-12 TYPE M X 1/2 MNPT
22	1	81917	FTG BARB 1/2 NPTM X 1/2 HOSE SWIVEL BRASS
23	1	82476	FTG TUBE CONNECTOR 3/4 NPTM X 3/8 TUBE
24	4	82640	WASHER 5/8 LOCW SS
25	6	82654	SCREW 1/2-13 X 3 SHCS SS
26	4	82679	SCREW 5/16-18 X 2 SHCS SS
27	4	82683	SCREW 5/8-11 X 2-1/2 SHCS SS
28	4	82687	WASHER 5/16 FLTW SS
29	4	82688	WASHER 5/8 FLTW SS
30	18	82847	HOSE LOW PRESSURE PUSH LOK 1/2 ID
31	144	82865	(NOT SHOWN) HOSE LOW PRESSURE PUSH LOK 1/4 ID
32	1	82883	(NOT SHOWN) FTG QUICK COUPLER 10KSI MALE HALF 3/8 NPTF
33	7	83105	FTG TUBE CONNECTOR 1/4 NPTM X 3/8 TUBE SUPER DUPLEX
34	8	83429	WASHER 1/2 FLTW SAE STAINLESS STEEL
35	1	83630	SEAL PLATE 2-8 IN 1400-14
36	1	83671	FTG CONNECTOR 1/2 NPTM X 3/8 TUBE SUPER DUPLEX
37	2	83815	TILT CYLINDER 2 IN BORE 24 IN STROKE
38	2	83999	OVERCENTER VALVE & MANIFOLD INLET/OUTLET 9/16 SAE PILOT 9/16 SAE
39	1	85072	FTG COUPLING 1/4 NPTF X 1/4 NPTF SS HEAVY WALL 10K PSI
40	2	85232	FTG BULKHEAD 1/4 NPTF 15000 PSI
41	3	85259	ADAPTER 9/16 TYPE M X 1/4 MNPT STAINLESS 15 KSI
42	10	85289	TUBING 3/8 OD X 1/4 ID POLYETHELYNE
43	9	85437	LABEL WARNING - HAND CRUSH/FORCE FROM BELOW 3.80 X 3.29
44	16	85628	(NOT SHOWN) CABLE RESTRAINT HOSE WHIP .57 DIA X 11.81 LONG
45	4	85919	SCREW 3/4-10 X 2 SSSCP 18-8 STAINLESS
46	2	86283	BLOCK BARREL STOP ADJ
47	4	86611	NUT 3/4-10 JAMN SS
48	1	86727	SEAL PLATE TALL 2-8 INCH 1400-14 CUSTOM
49	2	86773	FTG TEE BRANCH JIC-6M X JIC-6M X SAE-6 ORB

FIGURE A-9. UFV-14-165T PART LIST 1 (P/N 88469)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
50	1	86775	FTG TEE UNION JIC-6M
51	8	87076	SCREW 1/4-20 X 3/4 HHCS FLANGE HEAD GR5
52	4	87775	RIVET BLIND 1/8 DIA SS 316
53	1	87856	FTG TEE 1/4 NPTF 15 KSI
54	1	87857	FTG CROSS 1/4 NPTF 15 KSI
55	1	88147	RESERVOIR HYDRAULIC
56	1	88470	LABEL CALDER UFV SYSTEM 20 X 8
57	1	88471	(NOT SHOWN) MANUAL INSTRUCTION UFV-10K TILT
58	1	88472	(NOT SHOWN) CRATE 78 X 78 X 48 3/4 PLY DOUBLE BOTTOM 1/2 PLY COVER
59	1	88474	UFV-10K TILT FRAME WELDMENT
60	1	88475	BARREL TILT WELDMENT 1400-14
61	1	88476	WELDMENT TOP PLATE AND SKIRT 1400-14 CUSTOM
62	4	88477	CLAMP ARM 45 DEG TILT BARREL
63	1	88479	ASSY CONSOLE MAIN UFV-10K HYDRAULIC CLAMPING
64	1	88523	FTG PLUG 1 NPTM HEX HEAD BRASS
65	1	88567	TUBE 3/8 SUPER DUPLEX BOTTOM PLATE TEST PRESSURE INLET
66	1	88568	TUBE 3/8 SUPER DUPLEX HFS TEST PRESSURE INLET
67	1	88571	TUBE 3/8 EXTERNAL HYD RETURN UFV
68	1	88580	HOSE ASSY 3 KSI 3/8 JIC-6F X 31.5 OAL STRAIGHT END AND AND 90 DEG END
69	1	88582	HOSE ASSY 3 KSI 3/8 JIC-6F X 31 OAL STRAIGHT END AND AND 90 DEG END
70	1	88584	HOSE ASSY 3 KSI 3/8 JIC-6F X 9 OAL STRAIGHT ENDS
71	1	88585	HOSE ASSY 3 KSI 3/8 JIC-6F X 11 OAL STRAIGHT ENDS
72	1	88587	HOSE ASSY .23 ID 3/8 NPTM X 9/16 FEM TYPE M X 60 IN OAL 17.4KSI (6/2WL)
73	1	88588	HOSE ASSY 3 KSI 3/8 JIC-6F X 19.5 OAL STRAIGHT ENDS
74	1	88589	HOSE ASSY 3 KSI 3/8 JIC-6F X 23.7 OAL STRAIGHT ENDS
75	1	88606	HOSE ASSY 3 KSI 3/8 JIC-6F X 35 OAL STRAIGHT ENDS
76	1	88608	HOSE ASSY 3 KSI 3/8 JIC-6F X 27 OAL STRAIGHT ENDS
77	1	88609	HOSE ASSY 3 KSI 3/8 JIC-6F X 22.5 OAL 90 DEG BOTH ENDS
78	4	88614	CLAMP ARM REAR STOP PLATE
79	1	88615	CLAMP BARREL FIXTURE HOSE GUARD
80	1	88617	HOSE ASSY .23 ID 1/4 NPTM SS X 9/16 FEM TYPE M SS X 27 IN OAL 15KSI (6/2WL)
81	1	88618	HOSE ASSY .23 ID 1/4 NPTM SS X 9/16 FEM TYPE M SS X 48.9 IN OAL 15KSI (6/2WL)
82	1	88619	HOSE ASSY .23 ID 1/4 NPTM SS X 9/16 FEM TYPE M SS X 45 IN OAL 15KSI (6/2WL)
83	4	88621	SPACER 1/4 ID X 5/8 OD X 5/16 LG 18-8 SS
84	1	88646	TUBE 3/8 SUPER DUPLEX 1.5 IN STUB
85	1	88647	TUBE 3/8 SUPER DUPLEX ELBOW BARREL HOSE
86	1	88657	(NOT SHOWN) HOSE ASSY .50 ID 1/2 NPTM SS X 1-12 FEM TYPE M SS X 96 IN OAL 15KSI (13/2W)
87	2	88670	1-1/4" DIA GROMMET FOR 1/4" THICK PANEL
88	4	88873	CLAMP ARM LANYARD ASSY
89	1	88874	(NOT SHOWN) KIT - UFV-10K SEAL PLATES O-RINGS
90	4	88892	(NOT SHOWN) COLLAR RESTRAINT HOSE WHIP .47 TO .49 DIA
91	12	88893	(NOT SHOWN) COLLAR RESTRAINT HOSE WHIP .67 TO .71 DIA
92	1	88894	(NOT SHOWN) COLLAR RESTRAINT HOSE WHIP .79 TO .83 DIA
93	1	88895	(NOT SHOWN) CABLE RESTRAINT HOSE WHIP .89 DIA X 11.81 LONG
94	1	88923	KIT - LABEL UFV 10K US STANDARD
95	2	89318	HOSE ASSY .23 ID 1/4 NPTM SS X 9/16 FEM TYPE M SS X 240 IN OAL 17.4KSI (6/2WL)
96	1	89319	HOSE ASSY .50 ID 1/2 NPTM SS X 1-12 FEM TYPE M SS X 240 IN OAL 15KSI (13/2W)
97	1	89728	(NOT SHOWN) HOSE ASSY .23 ID 1/4 NPTM X 3/8 NPTM X 240 IN OAL 17KSI

FIGURE A-10. UFV-14-165T PARTS LIST 2 (P/N 88469)

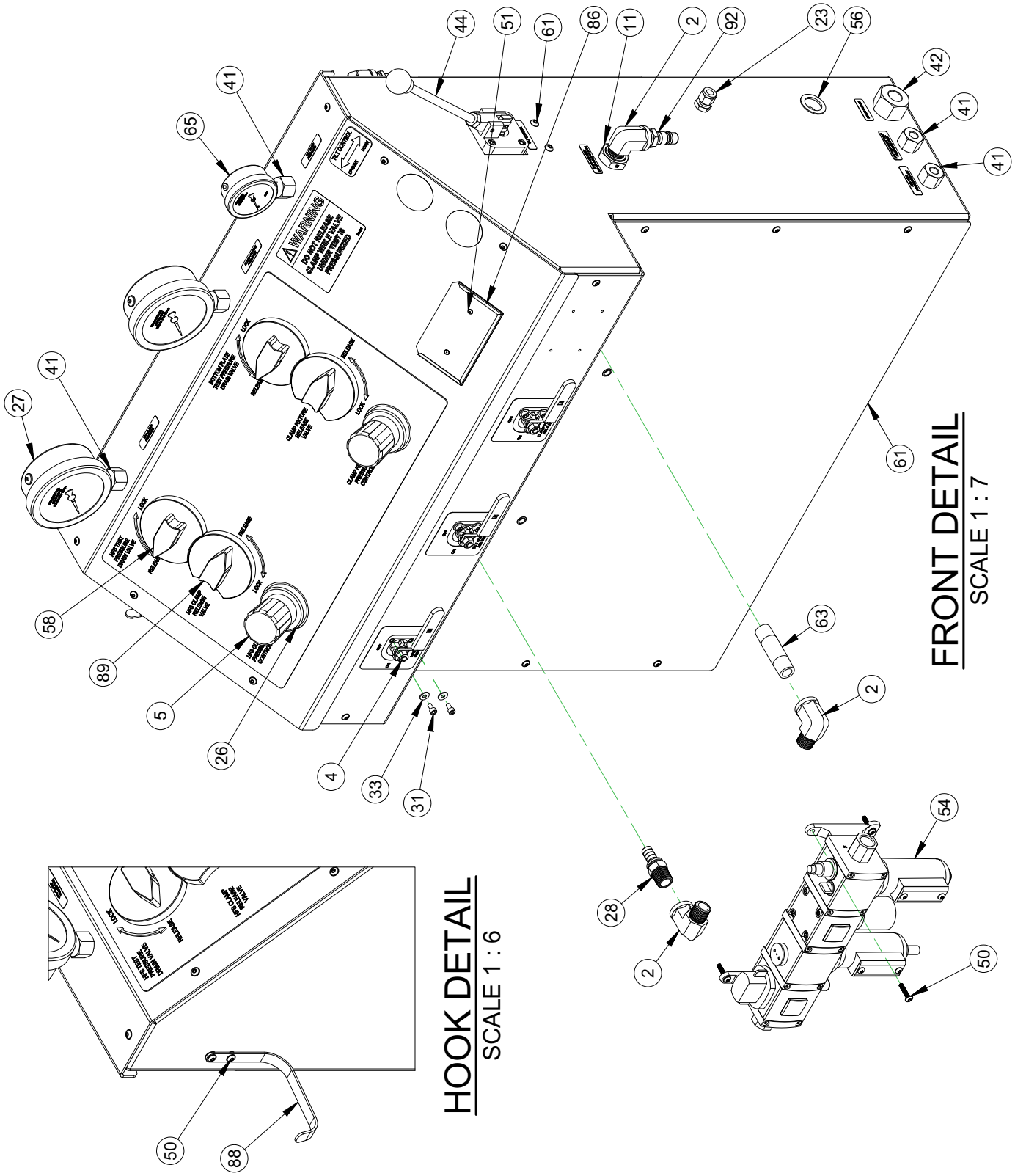

FIGURE A-11. HOOK AND FRONT DETAIL (P/N 88479)

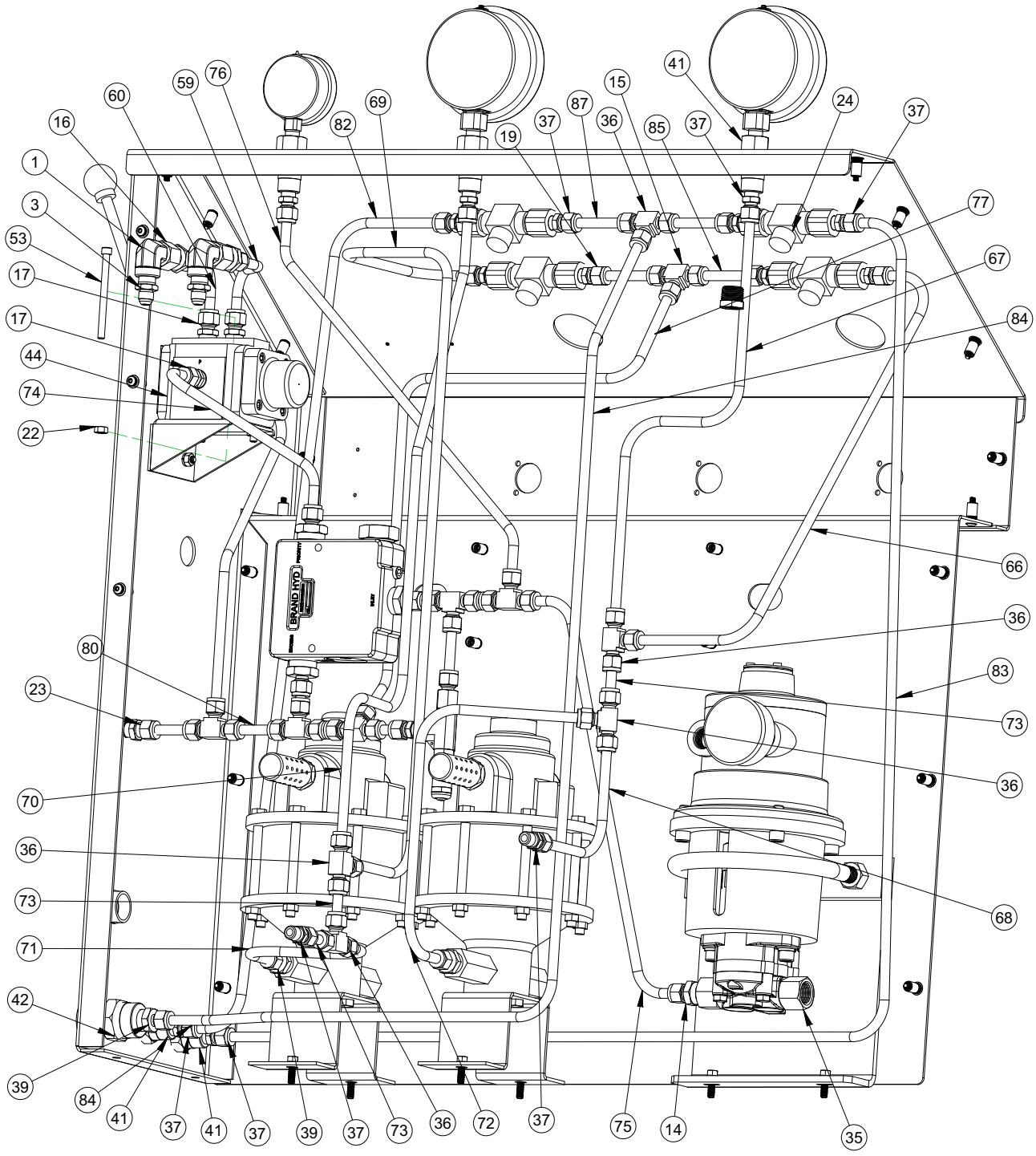

FIGURE A-12. CONSOLE ASSEMBLY (P/N 88479)

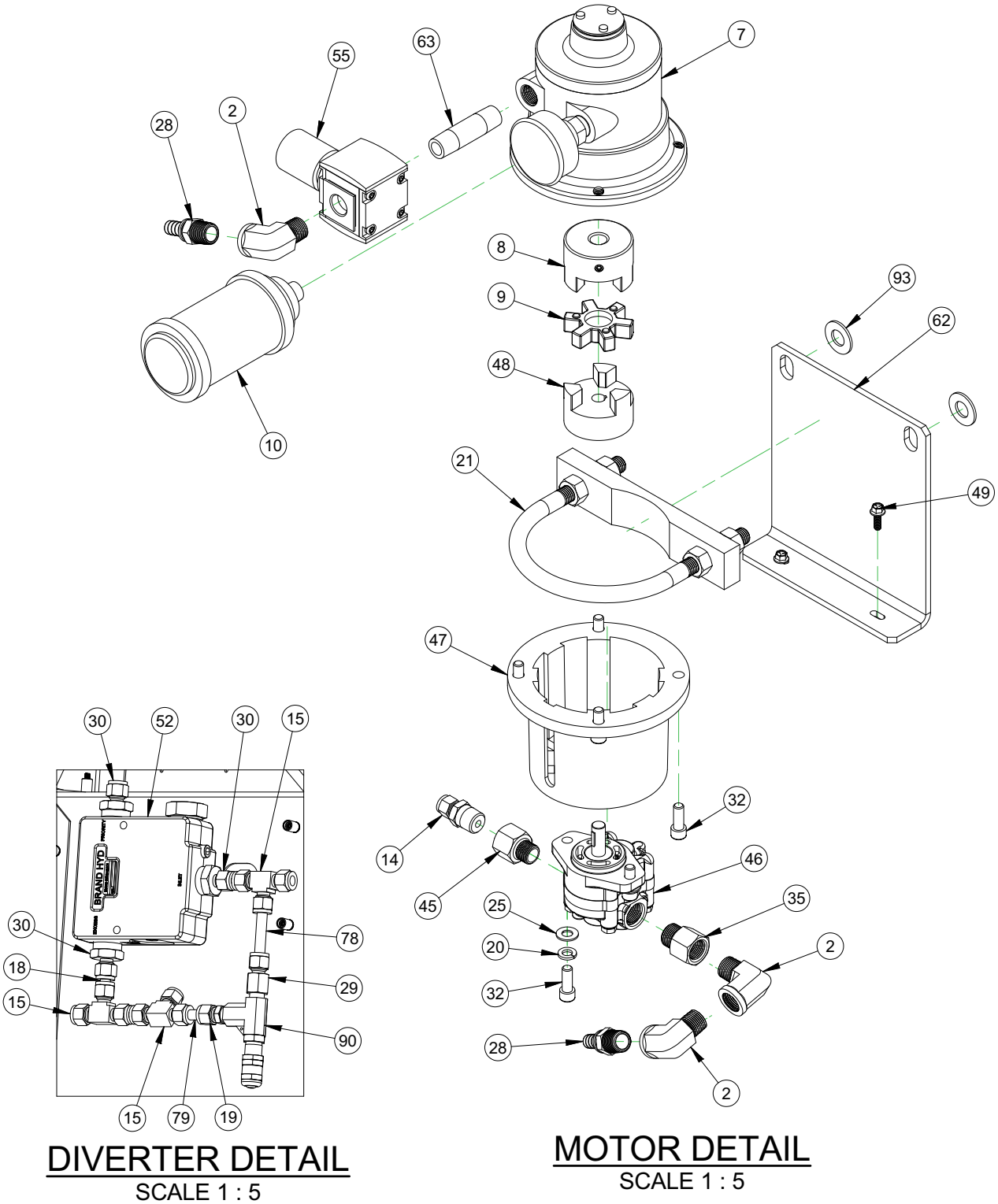

FIGURE A-13. CONSOLE DETAILS ASSEMBLY (P/N 88479)

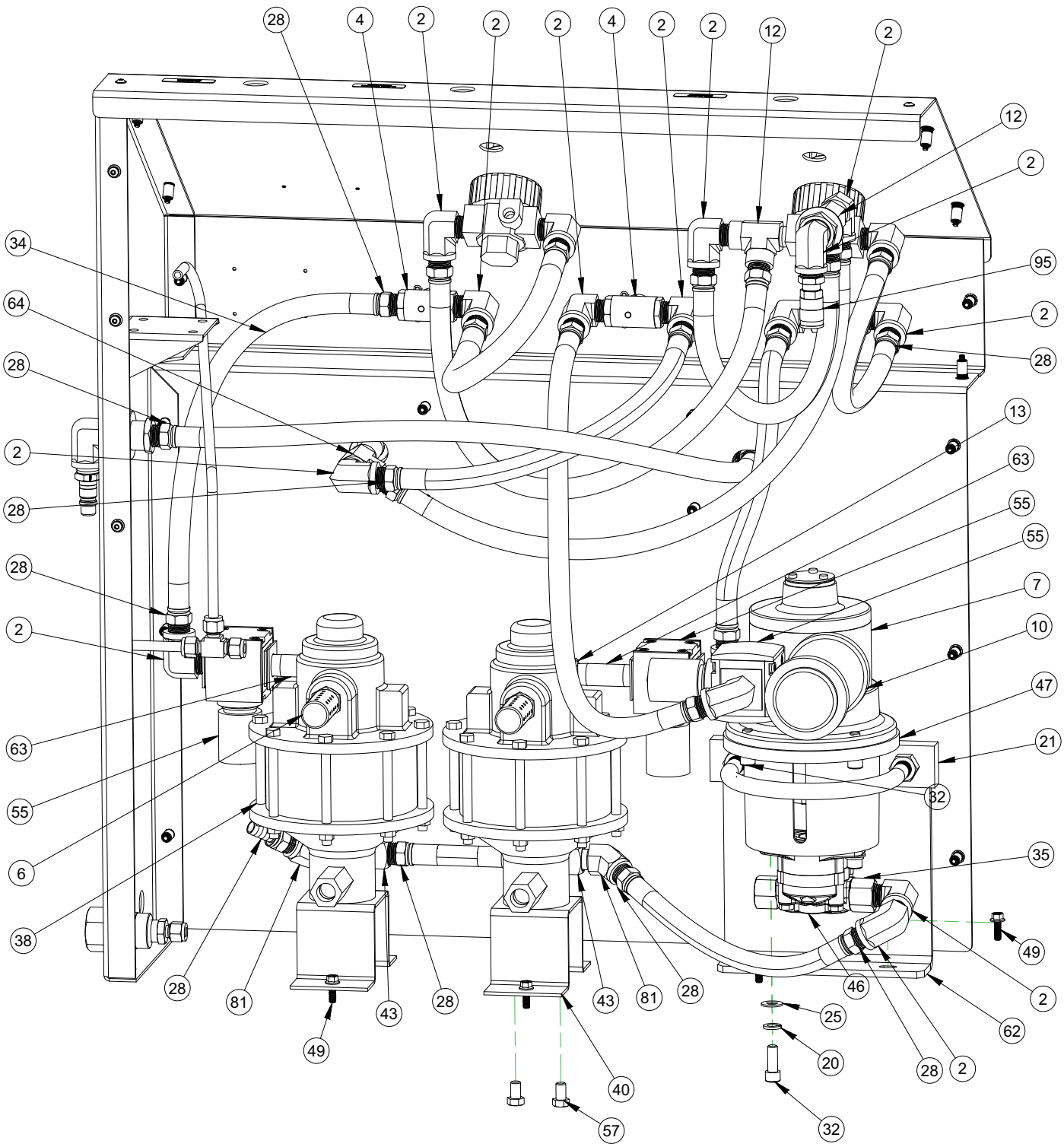

FIGURE A-14. CONSOLE HOSE DETAIL ASSEMBLY (P/N 88479)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	11132	FTG ELBOW 3/8 NPTM X 3/8 NPTF STREET 90 DEG
2	20	35692	FTG ELBOW 1/2 NPTM X 1/2 NPTF ST 90 DEG BRASS
3	2	59196	FITTING STRAIGHT SAE-6 MALE X 3/8 NPTM
4	3	77389	BALL VALVE 1/2 NPT FEMALE 160 PSI
5	2	77394	REGULATOR AIR 1/2 NPT 125 PSI
6	2	77399	HIGH FLOW MUFFLER 3/4 NPTM COMPACT
7	1	77405	MOTOR AIR 1/2 NPTM INLET X 1/2 NPTM OUTLET
8	1	77406	COUPLING SHAFT 5/8 ID X 2-27/32 FLEXIBLE
9	1	77408	SPIDER COUPLING SHAFT
10	1	77409	HIGH FLOW MUFFLER 1/2 NPTM
11	2	77421	FTG BULKHEAD 1/2 NPTF BRASS
12	2	77422	FTG TEE 1/2 NPTM X 1/2 NPTF MALE RUN TEE BRASS
13	2	77457	FTG ELBOW 1/2 NPTM X 1/2 NPTF STREET 90 DEG
14	1	77460	FTG CONNECTOR 1/2 NPTM X 3/8 TUBE
15	6	77461	FTG TUBE TEE UNION 3/8 TUBE
16	2	77465	FTG BULKHEAD 3/8 NPTF X 3/8 TUBE
17	4	77489	FTG CONNECTOR 3/8NPTM X 3/8 TUBE
18	4	77492	FTG CONNECTOR PORT 3/8 TUBE
19	4	77493	FTG CONNECTOR 1/4 NPTM X 3/8 TUBE SS
20	2	77523	WASHER 3/8 LOCK SS
21	1	77561	U-BOLT CLAMPING M16 THREAD FOR 5-13/16 OD 5 PIPE
22	4	77606	NUT 1/4-20 HEX STAINLESS 316
23	1	77728	FTG UNION BULKHEAD 3/8 TUBE SS
24	4	77792	VALVE BALL 2 WAY 1/4 NPTF 10000 PSI
25	2	78672	WASHER 3/8 FLTW SS
26	2	81787	MOUNT NUT REGULATOR PANEL
27	2	81794	GAUGE PRESSURE 4 IN DIA 10000 PSI 1/4" NPT BOTTOM MOUNT
28	25	81917	FTG BARB 1/2 NPTM X 1/2 HOSE SWIVEL BRASS
29	1	82414	FTG STRAIGHT 3/8 TUBE X 1/4 NPTF SS
30	3	82476	FTG TUBE CONNECTOR 3/4 NPTM X 3/8 TUBE
31	6	85457	SCREW 10-24 X 3/8 SHCS SS
32	6	82668	SCREW 3/8-16 X 1 SHCS SS
33	6	82685	WASHER #10 FLTW SS
34	204	82847	HOSE LOW PRESSURE PUSH LOK 1/2 ID
35	1	83048	FTG ADAPTER 7/8-14 SAEM X 1/2 FNPT
36	5	83094	FTG TUBE TEE UNION 3/8 TUBE SUPER DUPLEX
37	12	83105	FTG TUBE CONNECTOR 1/4 NPTM X 3/8 TUBE SUPER DUPLEX
38	2	83521	PUMP AIR DRIVEN 10,000 PSI OIL SERVICE
39	3	83671	FTG CONNECTOR 1/2 NPTM X 3/8 TUBE SUPER DUPLEX
40	2	84859	PUMP BRACKET BLACK
41	5	85232	FTG BULKHEAD 1/4 NPTF 15000 PSI
42	1	85318	FTG BULKHEAD 1/2 NPTF 15000 PSI
43	2	86615	FTG TEE 1/2 NPTM X 1/2 NPTF(2) BRANCH BRASS
44	1	86624	VALVE DIRECTIONAL CONTROL 3 POSITION 4 PORT MANUAL SPRING CENTERED
45	1	86946	FTG ADAPTER 3/4-16 SAEM X 1/2 FNPT
46	1	86947	PUMP HYDRAULIC 3.3 GPM SAE-AA
47	1	86948	ADAPTER MOTOR TO PUMP SAE-AA X NEMA 56C
48	1	86949	COUPLING SHAFT 1/2 ID X 2-35/64 OD FLEXIBLE

FIGURE A-15. CONSOLE ASSEMBLY PARTS LIST 1 (P/N 88310)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
49	6	87076	SCREW 1/4-20 X 3/4 HHCS FLANGE HEAD GR5
50	6	87231	SCREW 10-32 X 1 BHSCS FLANGED SS316
51	2	87775	RIVET BLIND 1/8 DIA SS 316
52	1	87803	PRIORITY DIVIDER ADJ CONSTANT VOLUME
53	4	87822	SCREW 1/4-20 X 3-1/4 SHCS 18-8 SS
54	1	87836	ASSY AIR PREP UNIT & LUBRICATOR USV
55	3	87838	REGULATOR 1/2 NPTF 7-125 PSIG W/BRACKET & PANEL NUT
56	1	88046	GROMMET LOCKING NYLON BLACK 15/16 ID X 1-1/4 PANEL HOLE
57	4	88091	SCREW 3/8-24 X 5/8 HHCS SS 18-8
58	2	88097	KNOB INTERLOCK TOP PLATE DRAIN VALVE
59	1	89715	TUBE 3/8 TILT CONTROL A UFV
60	1	89716	TUBE 3/8 TILT CONTROL B UFV
61	1	88513	CONSOLE CLAMP FIXTURE MODEL 600
62	1	88515	BRACKET LP PUMP
63	4	88521	FTG NIPPLE 1/2 NPTM X 3 BRASS
64	1	88522	FTG TEE 1/2 NPTF UNION BRASS
65	1	88526	GAUGE PRESSURE 2-1/2 IN DIA 1500 PSI GLYCERIN FILLED 1/4 MNPT
66	1	88542	TUBE 3/8 SUPER DUPLEX HFS RELEASE VALVE
67	1	88543	TUBE 3/8 SUPER DUPLEX HFS CLAMP GAUGE
68	1	88544	TUBE 3/8 SUPER DUPLEX HFS BULKHEAD
69	1	88545	TUBE 3/8 SUPER DUPLEX CLAMP FIXTURE RELEASE VALVE
70	1	88546	TUBE 3/8 SUPER DUPLEX CLAMP FIXTURE GAUGE
71	1	88547	TUBE 3/8 SUPER DUPLEX CLAMP FIXTURE PUMP
72	1	88548	TUBE 3/8 SUPER DUPLEX HFS PUMP
73	3	88549	TUBE 3/8 SUPER DUPLEX 2 IN STUB
74	1	88553	TUBE 3/8 DIVIDER TO 3 POS VALVE
75	1	88554	TUBE 3/8 LP PUMP UFV
76	1	88555	TUBE 3/8 TILT PUMP GAUGE UFV
77	1	88556	TUBE 3/8 HYD RETURN UFV
78	1	88557	TUBE 3/8 RELIEF VALVE UFV
79	1	88558	TUBE 3/8 1.8 IN RELIEF VALVE UFV
80	2	88559	TUBE 3/8 INTERNAL HYD RETURN UFV
81	2	88560	FTG ELBOW 1/2 NPTM X 1/2 NPTF ST 45 DEG
82	1	88563	TUBE 3/8 SUPER DUPLEX BOTTOM PLATE DUMP VALVE
83	1	88564	TUBE 3/8 SUPER DUPLEX HFS DUMP VALVE
84	1	88566	TUBE 3/8 SUPER DUPLEX DUMP VALVE DRAIN UFV
85	2	88639	TUBE 3/8 MAIN CONTROL VALVE
86	1	88645	HOLDER LABEL 3 X 5-1/16 ALUMINUM
87	2	88651	TUBE 3/8 SUPER DUPLEX MAIN CONTROL VALVE
88	1	88658	HOOK HOSE 1/2 W X 3-3/4 H X 5 D STEEL ZINC PLATED
89	2	88665	KNOB INTERLOCK CLAMP RELEASE VALVE
90	1	88669	VALVE PRESSURE RELIEF 1/4 MNPT X 1/4 FNPT SET @ 1200 PSI W/ SET PRESS. CERT.
91	1	87903	TUBE 3/8 TILT VALVE RETURN UFV
92	1	66806	FTG QUICK COUPLER 1/2B 1/2 NPTM MALE AIR
93	2	82688	WASHER 5/8 FLTW SS
94	1	77876	FTG BUSHING 1/2 NPTM X 3/8 NPTF BRASS
95	1	86556	FTG QUICK COUPLER 1/4B FEMALE X 3/8 NPTM

FIGURE A-16. CONSOLE ASSEMBLY PARTS LIST 2 (P/N 88310)

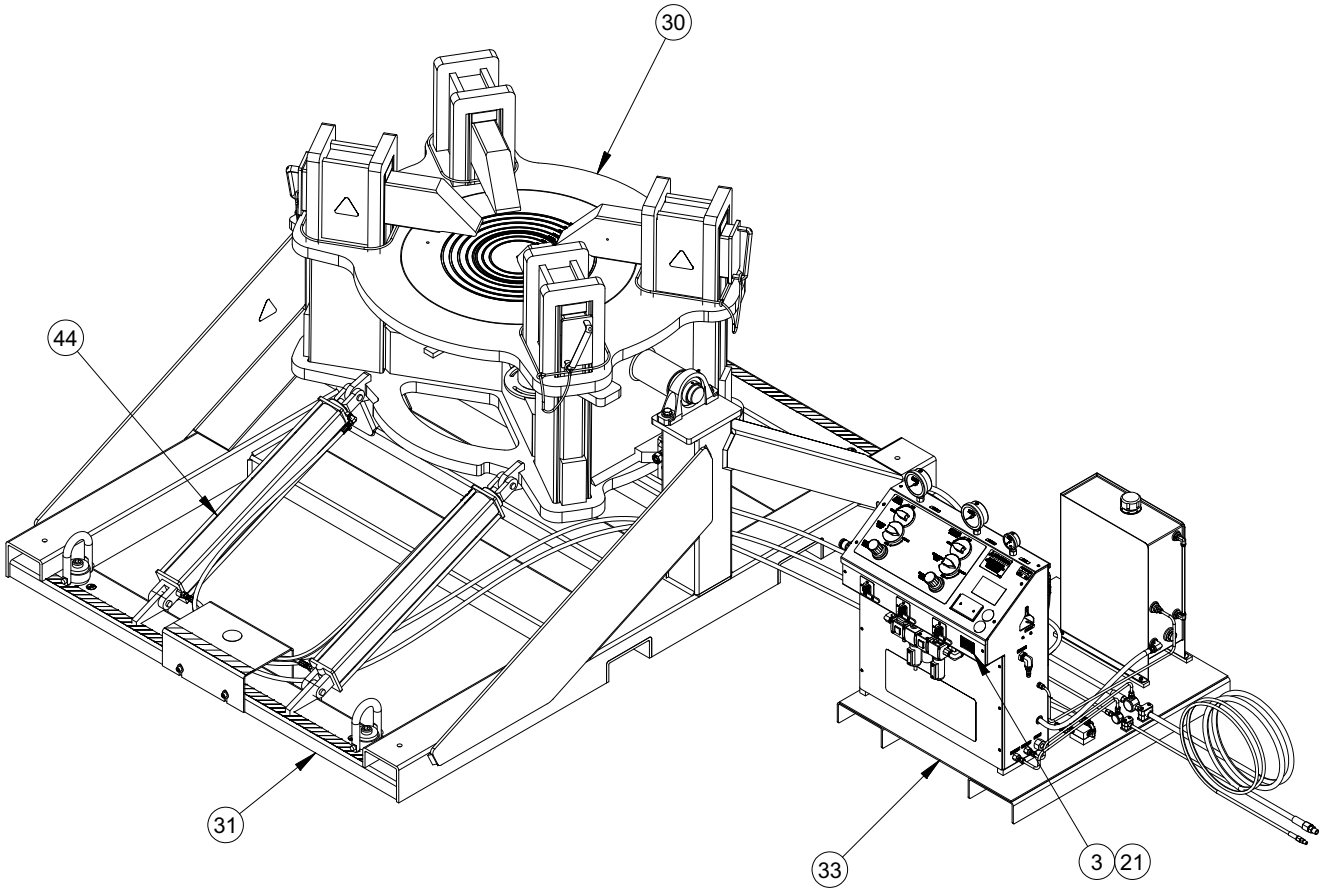

FIGURE A-17. UFV-24-300T ASSEMBLY 1 (P/N 91681)

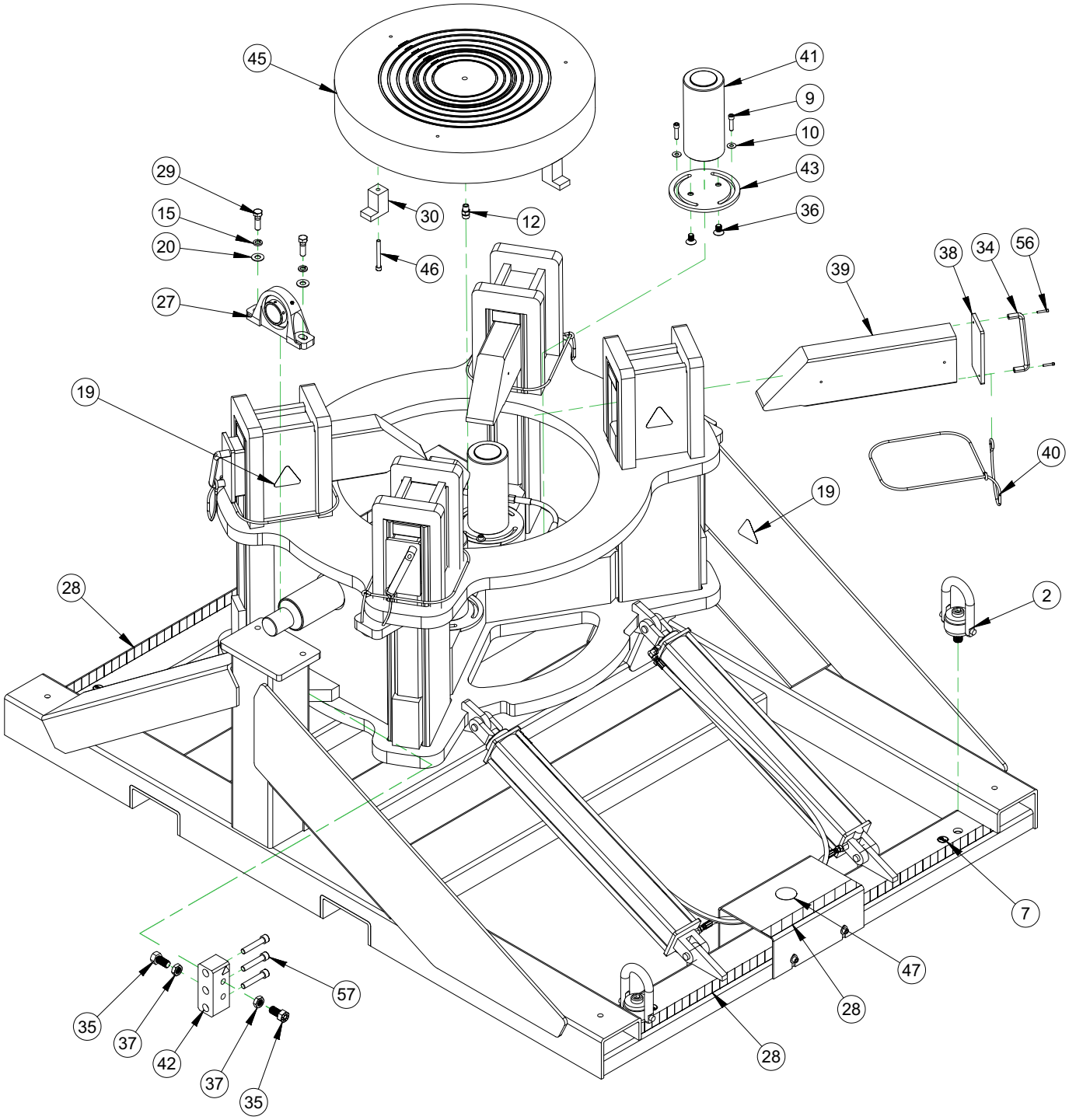

FIGURE A-18. UFV-24-300T ASSEMBLY 2 (P/N 91681)

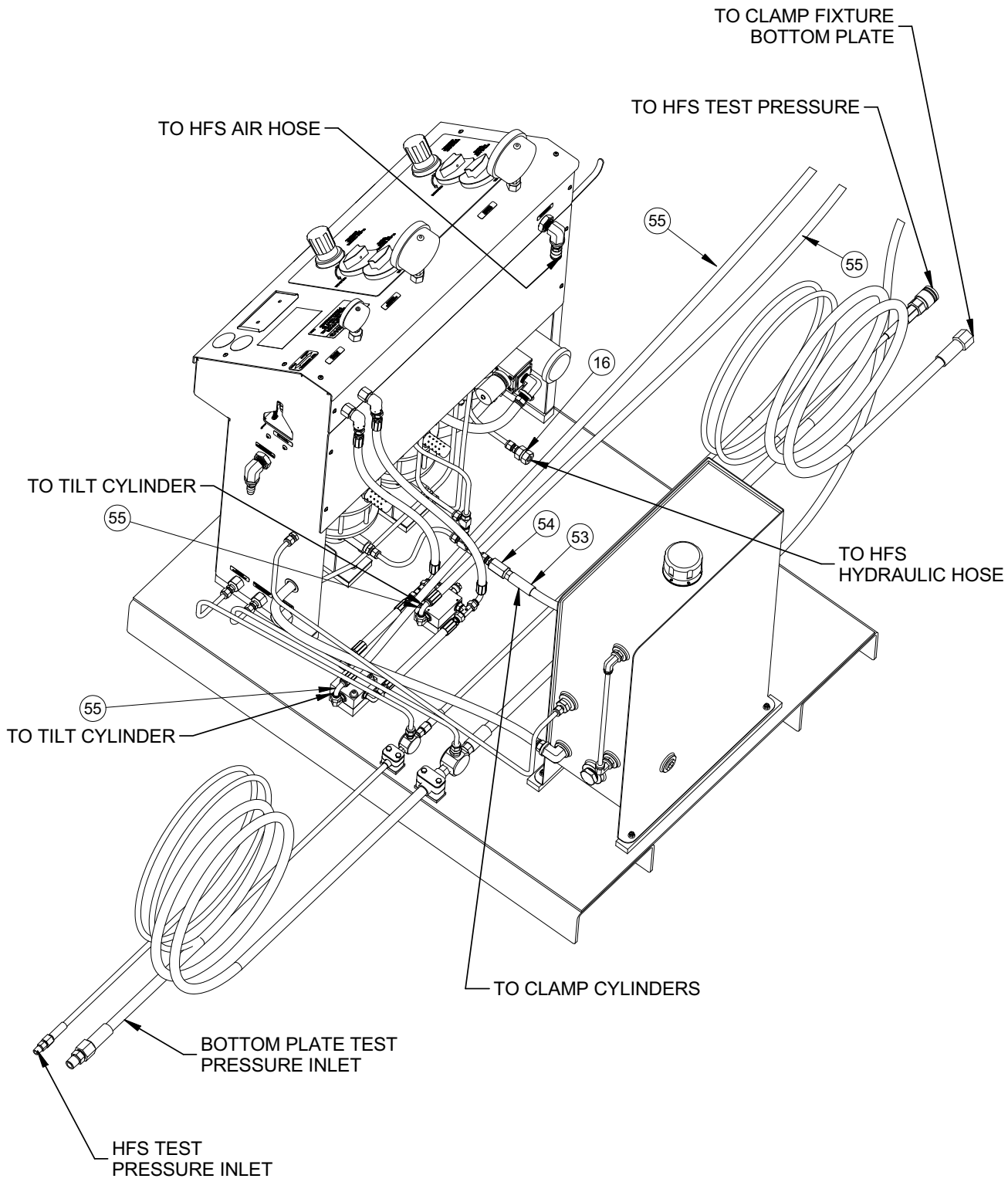

FIGURE A-19. UFV-24-300T HOSE ASSEMBLY (P/N 91681)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	18344	(NOT SHOWN) FTG QUICK COUPLER 1/4B MALE X 1/4 HOSE BARB
2	2	22993	HOIST RING 1-1/4-7 X 1-7/8 3-1/2 ID 5 OD 10-9/16 OAL 15000 LBS SWIVEL
3	1	29154	PLATE SERIAL YEAR MODEL CE 2.0 X 3.0
4	1	30533	(NOT SHOWN) FTG QUICK COUPLER 1/4B FEMALE X 1/4 HOSE BARB
5	144	56269	(NOT SHOWN) SLEEVE WELD COVER 1" DIA STRAIGHTLINE W/VELCRO CLOSURE
6	2	58733	FTG ADAPTER SAE-8M TO JIC-6M
7	4	59039	LABEL WARNING LIFT POINT ROUND 1.5"
8	2	59382	FTG ELBOW SAE-8M TO JIC-6M 90 DEG
9	8	78402	SCREW 1/2-13 X 2 SHCS SS 316 FULL THREAD
10	8	78415	WASHER 1/2 FLTW SS
11	4	80905	LABEL WARNING - HAND CRUSH / FORCE FROM ABOVE GRAPHIC 1.13 TALL TRIANGLE YELLOW
12	1	81874	FTG MALE ADAPTER SS 15,000 PSI 1-12 TYPE M X 1/2 MNPT
13	240	82865	(NOT SHOWN) HOSE LOW PRESSURE PUSH LOK 1/4 ID 350 PSI
14	1	82883	(NOT SHOWN) FTG QUICK COUPLER 10KSI MALE HALF 3/8 NPTF
15	4	83280	WASHER 3/4 LOCW SS
16	1	85072	FTG COUPLING 1/4 NPTF X 1/4 NPTF SS HEAVY WALL 10K PSI
17	5	85270	FTG ADAPTER 3/4 TYPE M X 3/8 NPTM SS 15KSI
18	1	85407	FTG BULKHEAD 3/8 NPTF X 3/8 NPTF 15000 PSI SS
19	10	85437	LABEL WARNING - HAND CRUSH/FORCE FROM BELOW 3.80 X 3.29
20	4	85904	WASHER 3/4 FLTW 18-8 STAINLESS
21	4	87775	RIVET BLIND 1/8 DIA SS 316
22	3	88057	FTG HEX NIPPLE 3/8 NPTM X 3/8 NPTM 15000 PSI
23	3	88059	FTG TEE 3/8 FEMALE NPT SS 15,000 PSI
24	1	88471	(NOT SHOWN) MANUAL INSTRUCTION UFV-10K TILT
25	1	89160	(NOT SHOWN) FTG QUICK DISCONNECT FEMALE COUPLER W/ CHECK VALVE 15000 PSI 1/4" NPTF
26	1	89728	(NOT SHOWN) HOSE ASSY .23 ID 1/4 NPTM X 3/8 NPTM X 240 IN OAL 17KSI
27	2	90039	BRG PILLOW BLOCK 2.9375 DIA
28	160	90564	STICKER EDGE MARKING
29	4	90594	SCREW 3/4-10 X 2-1/2 HHCS SS
30	1	91819	WELDMENT CLAMP FIXTURE UFV-24-300T
31	1	91820	WELDMENT TILT FRAME UFV-24-300T

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
32	2	91943	FTG BULKHEAD BRANCH TEE 6 JICM X 6 JICM X 6 JICM
33	1	92014	ASSY CONSOLE & RESERVOIR UFV-24-300T
34	4	92043	HANDLE PULL ALUM
35	4	92044	SCREW 1-8 X 2 HHCS GRADE 9 ZINC PLATED
36	8	92045	SCREW 3/4-10 X 1-1/4 FHSCS STAINLESS 18-8
37	4	92046	NUT 1-8 JAMN ZINC PLATED
38	4	92047	CLAMP ARM STOP PLATE UFV-24-300T
39	4	92048	CLAMP ARM 45 DEG UFV-24-300T
40	4	92052	CLAMP ARM LANYARD ASSY USV-24-300T
41	4	92053	RAM HYDRAULIC 75 TON 6-1/8 INCH STROKE
42	2	92054	CLAMP FIXTURE STOP 300T
43	4	92055	ADAPTER CYLINDER PLATE
44	2	92056	CYLINDER HYDRAULIC TILT W/PINS 4 IN BORE 36 IN STROKE
45	1	92057	TOP SEAL PLATE UFV-24-300T
46	4	92118	SCREW 1/2-13 X 4-1/2 SHCS STAINLESS 18-8
47	1	92124	LABEL NO STEP 3.0 DIA
48	2	92129	HOSE ASSY .39 ID 3/8 NPTM SS X 3/4 FEM TYPE M SS X 14 IN OAL 15KSI (10/2W)
49	2	92130	HOSE ASSY .39 ID 3/8 NPTM SS X 3/4 FEM TYPE M SS X 20.5 IN OAL 15KSI (10/2W)
50	1	92131	HOSE ASSY 3 KSI 3/8 JIC-6F X 54 OAL STRAIGHT ENDS
51	1	92132	HOSE ASSY 3 KSI 3/8 JIC-6F X 45 OAL STRAIGHT ENDS
52	2	92133	HOSE ASSY 3 KSI 3/8 JIC-6F X 15 OAL STRAIGHT ENDS
53	1	92134	HOSE ASSY .39 ID 3/8 NPTM SS X 3/4 FEM TYPE M SS X 240 IN OAL 15KSI (10/2W)
54	1	92135	COUPLING ADAPTER 1/4 NPTF X 3/8 NPTF SS 15KS1
55	2	92136	HOSE ASSY 3 KSI 3/8 JIC-6F X 240 OAL 90 DEG BOTH ENDS
56	8	92138	SCREW 1/4-20 X 1-3/8 SHCS STAINLESS 18-8
57	6	92139	SCREW 3/4-10 X 4 SHCS ZINC PLATED
58	1	92141	(NOT SHOWN) KIT - UFV-24-300T 10K SEAL PLATE O-RINGS
59	1	92146	(NOT SHOWN) PALLET 120 X 88 UFV-24-300T
60	1	92151	(NOT SHOWN) CRATE UFV-24-300T CONTROL CONSOLE

FIGURE A-20. UFV-24-300T ASSEMBLY PARTS LIST (P/N 91681)

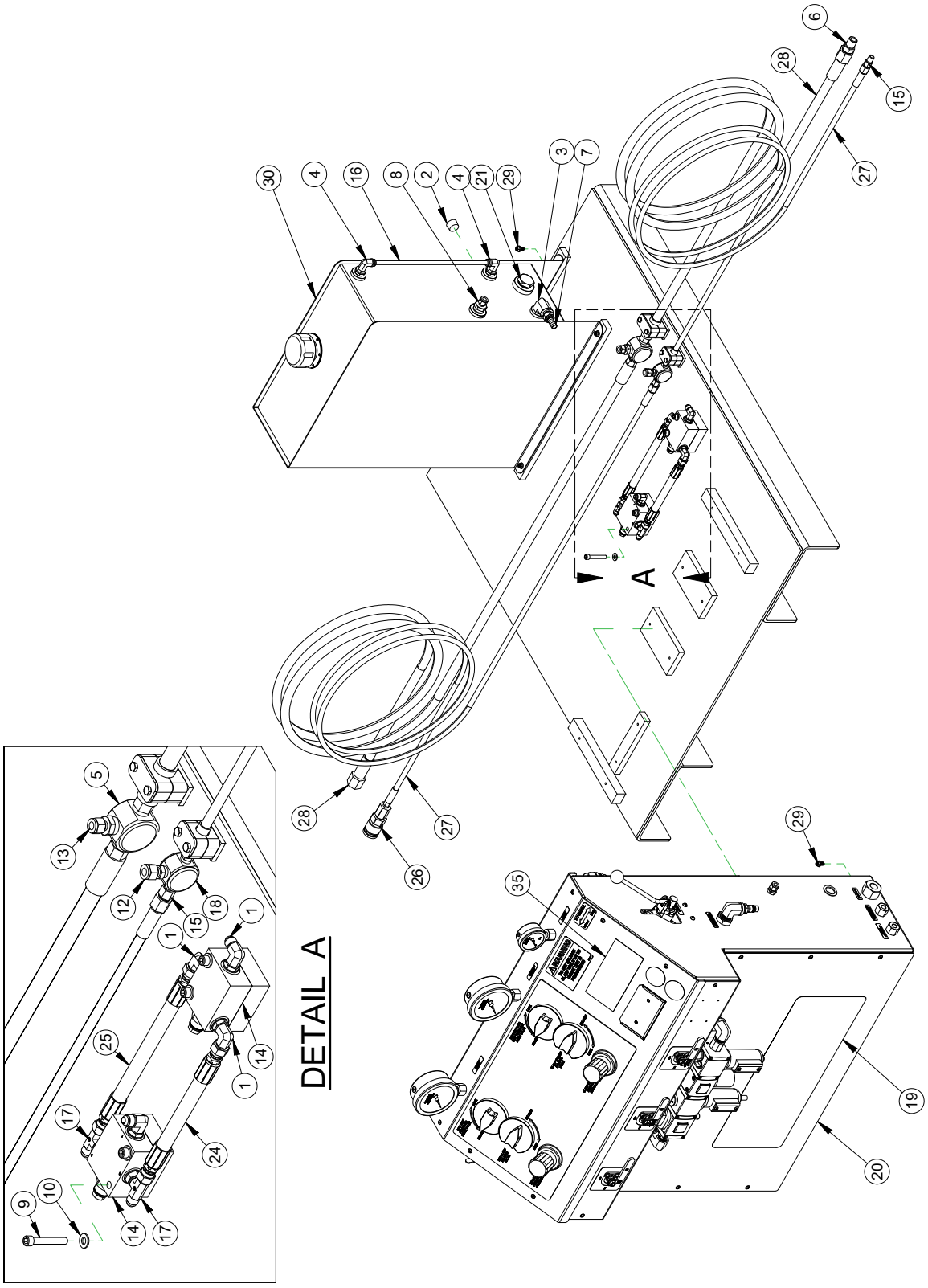

FIGURE A-21. UFV-24-300T CONSOLE ASSEMBLY (P/N 91681)

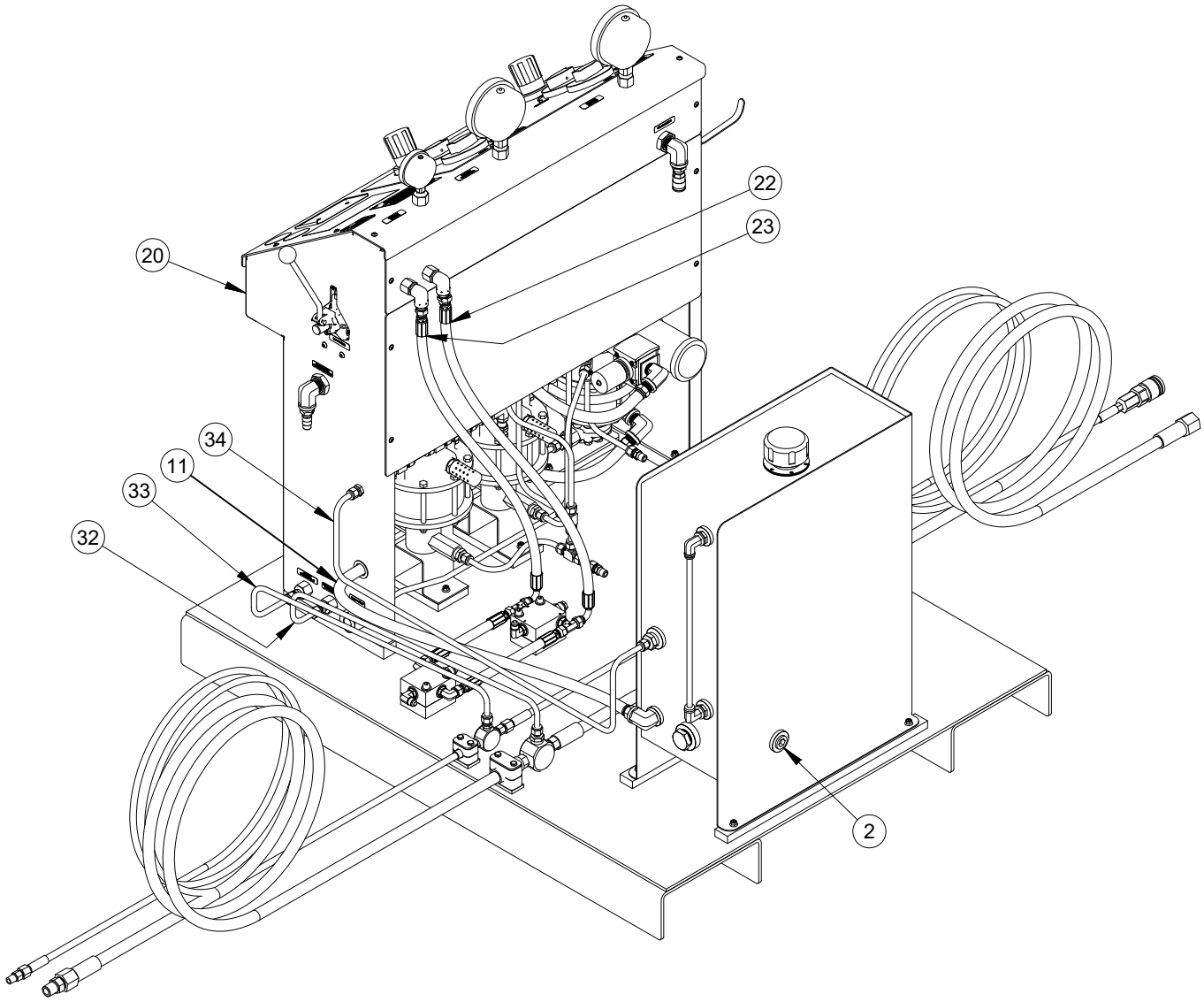

FIGURE A-22. UFV-24-300T REAR CONSOLE ASSEMBLY (P/N 91681)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	12849	FTG ELBOW SAE-6 MALE X #6 JIC MALE 90 DEG
2	1	33991	PLUG HEX 3/4 NPT BRASS
3	1	35692	FTG ELBOW 1/2 NPTM X 1/2 NPTF ST 90 DEG BRASS
4	2	77459	FTG ELBOW 1/2 NPTM X 3/8 TUBE PRESTOLOC SWIVEL 90 DEG BRASS
5	1	81871	FTG TEE 1/2 FEMALE NPT SS 15,000 PSI
6	1	81874	FTG MALE ADAPTER SS 15,000 PSI 1-12 TYPE M X 1/2 MNPT
7	1	81917	FTG BARB 1/2 NPTM X 1/2 HOSE SWIVEL BRASS
8	1	82476	FTG TUBE CONNECTOR 3/4 NPTM X 3/8 TUBE
9	4	82679	SCREW 5/16-18 X 2 SHCS SS
10	4	82687	WASHER 5/16 FLTW SS
11	38	82847	HOSE LOW PRESSURE PUSH LOK 1/2 ID
12	3	83105	FTG TUBE CONNECTOR 1/4 NPTM X 3/8 TUBE SUPER DUPLEX
13	1	83671	FTG CONNECTOR 1/2 NPTM X 3/8 TUBE SUPER DUPLEX
14	2	83999	OVERCENTER VALVE & MANIFOLD INLET/OUTLET 9/16 SAE PILOT 9/16 SAE
15	10	85259	ADAPTER 9/16 TYPE M X 1/4 MNPT STAINLESS 15 KSI
16	1	85289	TUBING 3/8 OD X 1/4 ID POLYETHELYNE
17	2	86773	FTG TEE BRANCH JIC-6M X JIC-6M X SAE-6 ORB
18	1	87856	FTG TEE 1/4 NPTF 15 KSI
19	1	88470	LABEL CALDER UFV SYSTEM 20 X 8
20	1	88479	ASSY CONSOLE MAIN UFV-10K HYDRAULIC CLAMPING
21	1	88523	FTG PLUG 1 NPTM HEX HEAD BRASS
22	1	88580	HOSE ASSY 3 KSI 3/8 JIC-6F X 31.5 OAL STRAIGHT END AND AND 90 DEG END
23	1	88582	HOSE ASSY 3 KSI 3/8 JIC-6F X 31 OAL STRAIGHT END AND AND 90 DEG END
24	1	88584	HOSE ASSY 3 KSI 3/8 JIC-6F X 9 OAL STRAIGHT ENDS
25	1	88585	HOSE ASSY 3 KSI 3/8 JIC-6F X 11 OAL STRAIGHT ENDS
26	1	89160	FTG QUICK DISCONNECT FEMALE COUPLER W/ CHECK VALVE 15000 PSI 1/4" FNPT
27	2	89318	HOSE ASSY .23 ID 1/4 NPTM SS X 9/16 FEM TYPE M SS X 240 IN OAL 17.4KSI (6/2WL)
28	2	89319	HOSE ASSY .50 ID 1/2 NPTM SS X 1-12 FEM TYPE M SS X 240 IN OAL 15KSI (13/2W)
29	8	89573	SCREW 1/4-20 X 1/2 HHCS FLANGE HEAD GR5
30	1	90043	RESERVOIR HYDRAULIC USV 300T
31	1	92013	WELDMENT CLAMP CONSOLE PLATFORM UFV-24-300T
32	1	92024	TUBE 3/8 SUPER DUPLEX BOTTOM PLATE TEST PRESSURE INLET
33	1	92025	TUBE 3/8 SUPER DUPLEX HFS TEST PRESSURE INLET
34	1	92032	TUBE 3/8 EXTERNAL HYD RETURN UFV
35	1	92049	LABEL CLAMPING CHART 300 TON 12 IN

FIGURE A-23. UFV-24-300T CONSOLE ASSEMBLY PARTS LIST (P/N 91681)

TABLE A-1. UFV-12-100T SPARE PARTS LIST (P/N 89616)

Part number	Description	Quantity
42815	O-RING 4-3/8 ID X 4-3/4 OD X 3/16 W NITRILE 90 DUROMETER (2-348)	4
77588	O-RING 2-1/2 ID X 2-3/4 OD X 1/8 W NITRILE 90 DUROMETER (2-230)	4
77589	O-RING 3-5/8 ID X 3-7/8 OD X 1/8 W NITRILE 90 DUROMETER (2-239)	4
78456	O-RING 5-5/8 ID X 6 OD X 3/16 W NITRILE 90 DUROMETER (2-358)	4
78457	O-RING 6-3/4 ID X 7-1/8 OD X 3/16 W NITRILE 90 DUROMETER (2-364)	4
78458	O-RING 8-3/4 ID X 9-1/8 OD X 3/16 W NITRILE 90 DUROMETER (2-372)	4
78513	O-RING 11 ID X 11-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-379)	4
78514	O-RING 13 ID X 13-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-382)	4
83898	O-RING 1-1/16 ID X1-7/16 OD X 3/16 W NITRILE 90 DUROMETER (2-319)	2

TABLE A-2. UFV-14-165T SPARE PARTS LIST (P/N 88874)

Part number	Description	Quantity
88874	KIT - UFV-10K SEAL PLATES O-RINGS (includes O-rings listed below)	1
77588	O-RING 2-1/2 ID X 2-3/4 OD X 1/8 W NITRILE 90 DUROMETER (2-230)	4
77589	O-RING 3-5/8 ID X 3-7/8 OD X 1/8 W NITRILE 90 DUROMETER (2-239)	4
77590	O-RING 4-5/8 ID X 5 OD X 3/16 W NITRILE 90 DUROMETER (2-350)	4
78456	O-RING 5-5/8 ID X 6 OD X 3/16 W NITRILE 90 DUROMETER (2-358)	4
78457	O-RING 6-3/4 ID X 7-1/8 OD X 3/16 W NITRILE 90 DUROMETER (2-364)	4
78458	O-RING 8-3/4 ID X 9-1/8 OD X 3/16 W NITRILE 90 DUROMETER (2-372)	4
78513	O-RING 11 ID X 11-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-379)	4
78514	O-RING 13 ID X 13-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-382)	4
78590	O-RING 14 ID X 14-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-383)	4
83898	O-RING 1-1/16 ID X1-7/16 OD X 3/16 W NITRILE 90 DUROMETER (2-319)	2
87437	FILTER ELEMENT REGULATOR AIR 40 MICRON	1

TABLE A-3. UFV-24-300T SPARE PARTS LIST (P/N 92141)

Part number	Description	Quantity
78458	O-RING 8-3/4 ID X 9-1/8 OD X 3/16 W NITRILE 90 DUROMETER (2-372)	4

TABLE A-3. UFV-24-300T SPARE PARTS LIST (P/N 92141) (CONTINUED)

Part number	Description	Quantity
78513	O-RING 11 ID X 11-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-379)	4
78514	O-RING 13 ID X 13-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-382)	4
78590	O-RING 14 ID X 14-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-383)	4
78591	O-RING 16 ID X 16-3/8 OD X 3/16 W NITRILE 90 DUROMETER (2-385)	4
82729	O-RING 18-1/2 ID X 19 OD X 1/4 W NITRILE 90 DUROMETER (2-466)	4
90054	O-RING 21 ID X 21-1/2 OD X 1/4 W NITRILE 90 DUROMETER (2-4	4
90633	O-RING 23-1/2 ID X 24 OD X 1/4 W NITRILE 90 DUROMETER	4

APPENDIX B SCHEMATICS

Schematics list

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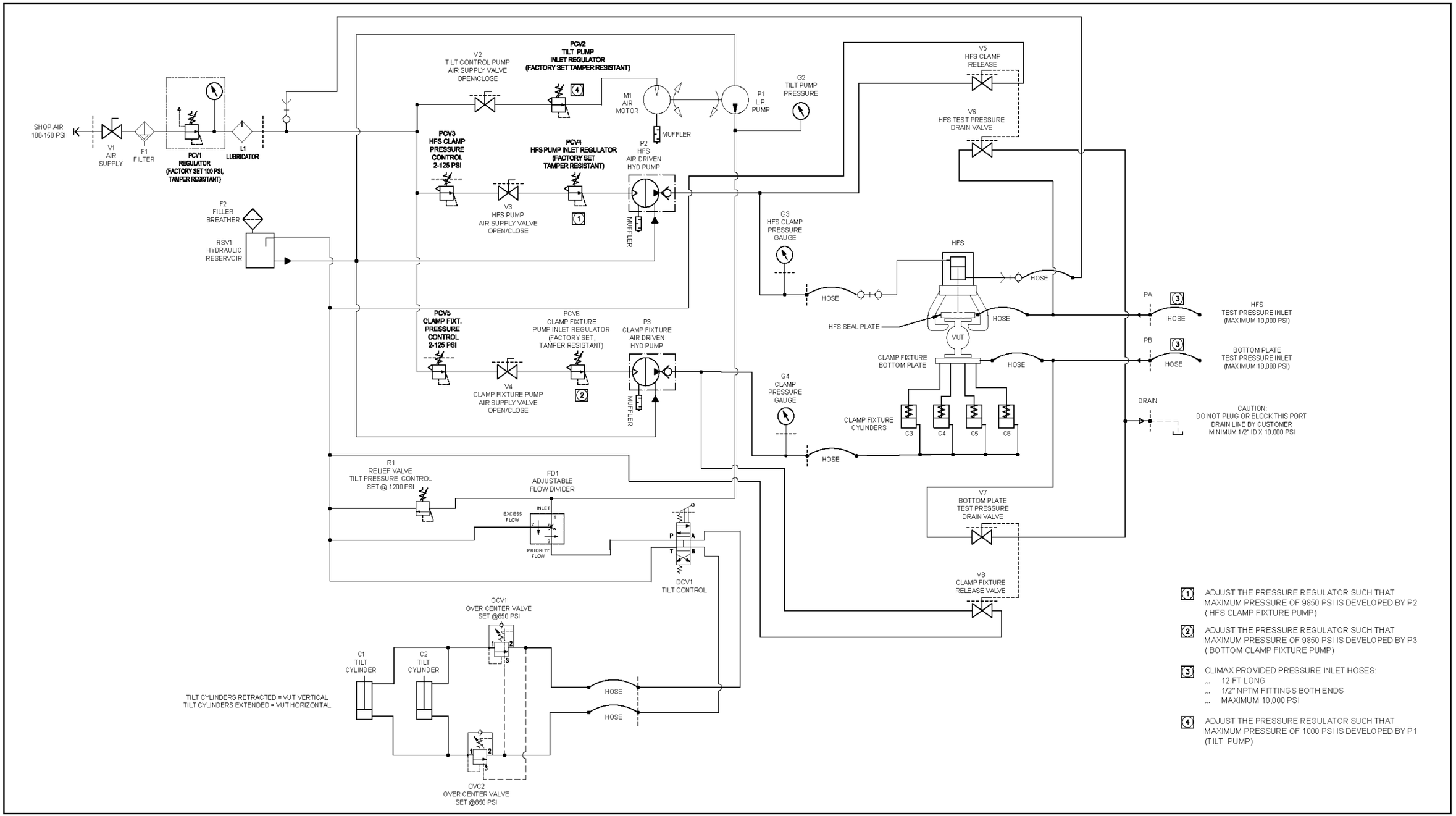

FIGURE B-1. UFV-12-100T SCHEMATIC (P/N 91973)

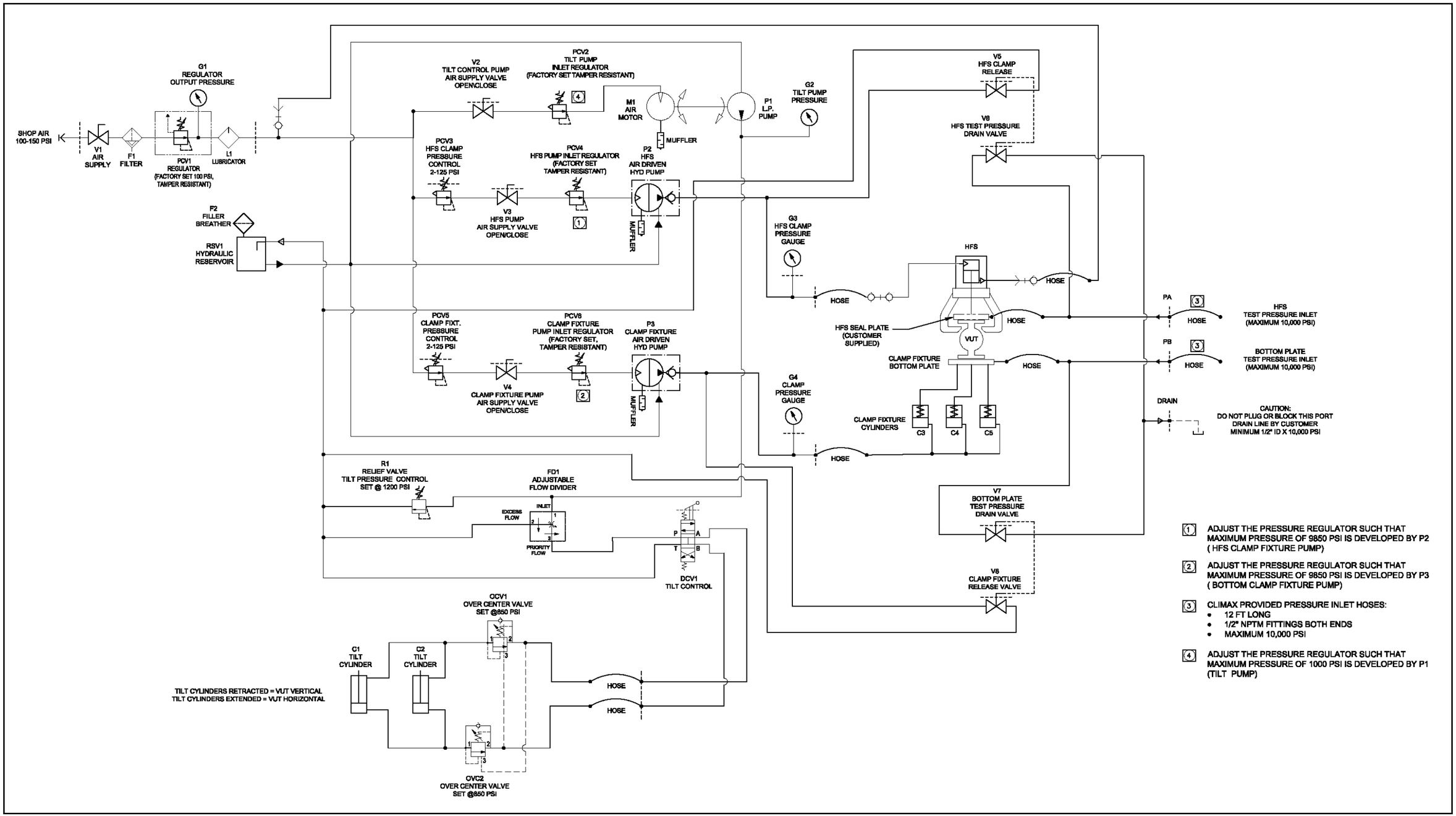

FIGURE B-2. UFV-14-165T SCHEMATIC (P/N 87958)

APPENDIX C SDS

Safety Data Sheet list

SAFETY DATA SHEET

CITGO A/W Hydraulic Oil 32

Section 1. Identification

GHS product identifier : CITGO A/W Hydraulic Oil 32

Synonyms : Hydraulic Fluid

Material uses : Lubricating oil

Code : 633491001

Supplier's details : CITGO Petroleum Corporation
P.O. Box 4689
Houston, TX 77210
sdsvend@citgo.com

Emergency telephone number (with hours of operation) : Technical Contact: (800) 248-4684
Medical Emergency: (832) 486-4700
CHEMTREC Emergency: (800) 424-9300
(United States Only)

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : Warning

Hazard statements : Injection of pressurized hydrocarbons can cause severe permanent tissue damage. Initial symptoms may be minor.

Precautionary statements

General : Avoid contact with eyes, skin and clothing. Thoroughly wash exposed areas and clothing with soap and water. IF IN EYES: Rinse cautiously with water for several minutes. IF SWALLOWED: Do not induce vomiting. If you feel unwell, seek medical attention and show the label when possible. Keep out of reach of children.

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Hazards not otherwise classified : Injection of petroleum hydrocarbons requires immediate medical attention.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Hydraulic Fluid

CAS number/other identifiers

CAS number : Not applicable.

Section 3. Composition/information on ingredients

Ingredient name	%	CAS number
Distillates (petroleum), hydrotreated heavy paraffinic	≥90	64742-54-7
Residual oils (petroleum), solvent-dewaxed	≤5	64742-62-7

Any concentration shown as a range is to protect confidentiality or is due to process variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : Injection of pressurized hydrocarbons can cause severe permanent tissue damage. Initial symptoms may be minor.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In the event of injection in underlying tissue, immediate treatment should include extensive incision, debridement and saline irrigation. Inadequate treatment can result in ischemia and gangrene. Early symptoms may be minimal.

Specific treatments : Treat symptomatically and supportively.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Section 5. Fire-fighting measures

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 7. Handling and storage

Bulk Storage Conditions: Maintain all storage tanks in accordance with applicable regulations. Use necessary controls to monitor tank inventories. Inspect all storage tanks on a periodic basis. Test tanks and associated piping for tightness. Maintain the automatic leak detection devices to assure proper working condition.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Distillates (petroleum), hydrotreated heavy paraffinic	**ACGIH TLV (United States, 3/2016).** TWA: 5 mg/m³ 8 hours. Form: Inhalable fraction **OSHA PEL (United States, 6/2016).** TWA: 5 mg/m³ 8 hours. **NIOSH REL (United States, 10/2013).** TWA: 5 mg/m³ 10 hours. Form: Mist STEL: 10 mg/m³ 15 minutes. Form: Mist
Residual oils (petroleum), solvent-dewaxed	**ACGIH TLV (United States, 6/2013).** TWA: 5 mg/m³ 8 hours. Form: Inhalable fraction **NIOSH REL (United States, 4/2013).** TWA: 5 mg/m³ 10 hours. Form: Mist STEL: 10 mg/m³ 15 minutes. Form: Mist **OSHA PEL (United States, 2/2013).** TWA: 5 mg/m³ 8 hours.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, vapor controls, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Avoid skin contact with liquid. Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Leather boots are not protective for liquid contact.

Section 8. Exposure controls/personal protection

Respiratory protection : Avoid inhalation of gases, vapors, mists or dusts. Use a properly fitted, air-purifying or supplied-air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Light amber [Light]

Odor : Mild petroleum odor [Slight]

pH : Not applicable.

Boiling point : Not available.

Flash point : Open cup: 214°C (417.2°F) [Cleveland.]

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Not available.

Relative density : Not available.

Density lbs/gal : 7.14 lbs/gal

Density gm/cm³ : 0.86 g/cm³

Gravity, °API : 33.6

Flow time (ISO 2431) : Not available.

Viscosity : Dynamic (room temperature): Not applicable.
Kinematic (room temperature): Not applicable.
Kinematic (40°C (104°F)): 0.32 cm^2/s (32 cSt)

Viscosity SUS : 155 SUS @100 F

Section 10. Stability and reactivity

Reactivity : Not expected to be Explosive, Self-Reactive, Self-Heating, or an Organic Peroxide under US GHS Definition(s).

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Distillates (petroleum), hydrotreated heavy paraffinic	LD50 Oral	Rat	>5000 mg/kg	-

Conclusion/Summary :

Section 11. Toxicological information

Distillates (petroleum), hydrotreated heavy paraffinic: Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicities in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mists well above applicable workplace exposure levels include lung inflammatory reaction, lipoid granuloma formation and lipoid pneumonia. In acute and sub-acute studies involving exposures to lower concentrations of mineral oil mists at or near current work place exposure levels produced no significant toxicological effects.

Irritation/Corrosion

Not available.

Skin : No additional information.

Eyes : No additional information.

Respiratory : No additional information.

Sensitization

Not available.

Skin : No additional information.

Respiratory : No additional information.

Mutagenicity

Not available.

Conclusion/Summary : No additional information.

Carcinogenicity

Not available.

Conclusion/Summary : No additional information.

Reproductive toxicity

Not available.

Conclusion/Summary : No additional information.

Teratogenicity

Not available.

Conclusion/Summary : No additional information.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : Injection of pressurized hydrocarbons can cause severe permanent tissue damage. Initial symptoms may be minor.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Section 11. Toxicological information

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Section 12. Ecological information

Toxicity

Not available.

Conclusion/Summary : Not available.

Persistence and degradability

Conclusion/Summary : Not available.

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid

Section 13. Disposal considerations

dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.

Oil: The product(s) represented by this SDS is (are) regulated as “oil” under 49 CFR Part 130. Shipments by rail or highway in packaging having a capacity of 3500 gallons or more or in a quantity greater 42,000 gallons are subject to these requirements. In addition, mixtures containing 10% or more of this product may be subject to these requirements.

Special precautions for user : **Transport within user’s premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations :

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Water Act (CWA) 307: Phosphorodithioic acid, O,O-di-C1-14-alkyl esters, zinc salts; toluene; phenol

Clean Water Act (CWA) 311: toluene; phenol

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

SARA 302/304

Composition/information on ingredients

Name	%	EHS	SARA 302 TPQ		SARA 304 RQ	
			(lbs)	(gallons)	(lbs)	(gallons)
Phenol	<0.001	Yes.	500 / 10000	-	1000	-

SARA 304 RQ : 106837606.8 lbs / 48504273.5 kg [14899387.7 gal / 56400318 L]

SARA 311/312

Classification : Not applicable.

Section 15. Regulatory information

Composition/information on ingredients

No products were found.

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

Pennsylvania : None of the components are listed.

California Prop. 65 Clear and Reasonable Warnings (2018)

⚠ **WARNING**: This product can expose you to chemicals including Ethyl acrylate, which is known to the State of California to cause cancer, and Toluene, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ingredient name	%	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
toluene	<0.01	No.	Yes.	-	Yes.
ethyl acrylate	<0.001	Yes.	No.	-	-

International regulations

WHMIS (Canada) : Not controlled under WHMIS (Canada).

Inventory list

United States : All components are listed or exempted.

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan : **Japan inventory (ENCS)**: Not determined.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : All components are listed or exempted.

Philippines : All components are listed or exempted.

Republic of Korea : All components are listed or exempted.

Taiwan : Not determined.

Thailand : Not determined.

Turkey : Not determined.

Viet Nam : Not determined.

Section 16. Other information

National Fire Protection Association (U.S.A.)

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Section 16. Other information

Procedure used to derive the classification

Classification	Justification
Not classified.	

History

Date of printing : 4/30/2018

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Version : 3

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

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