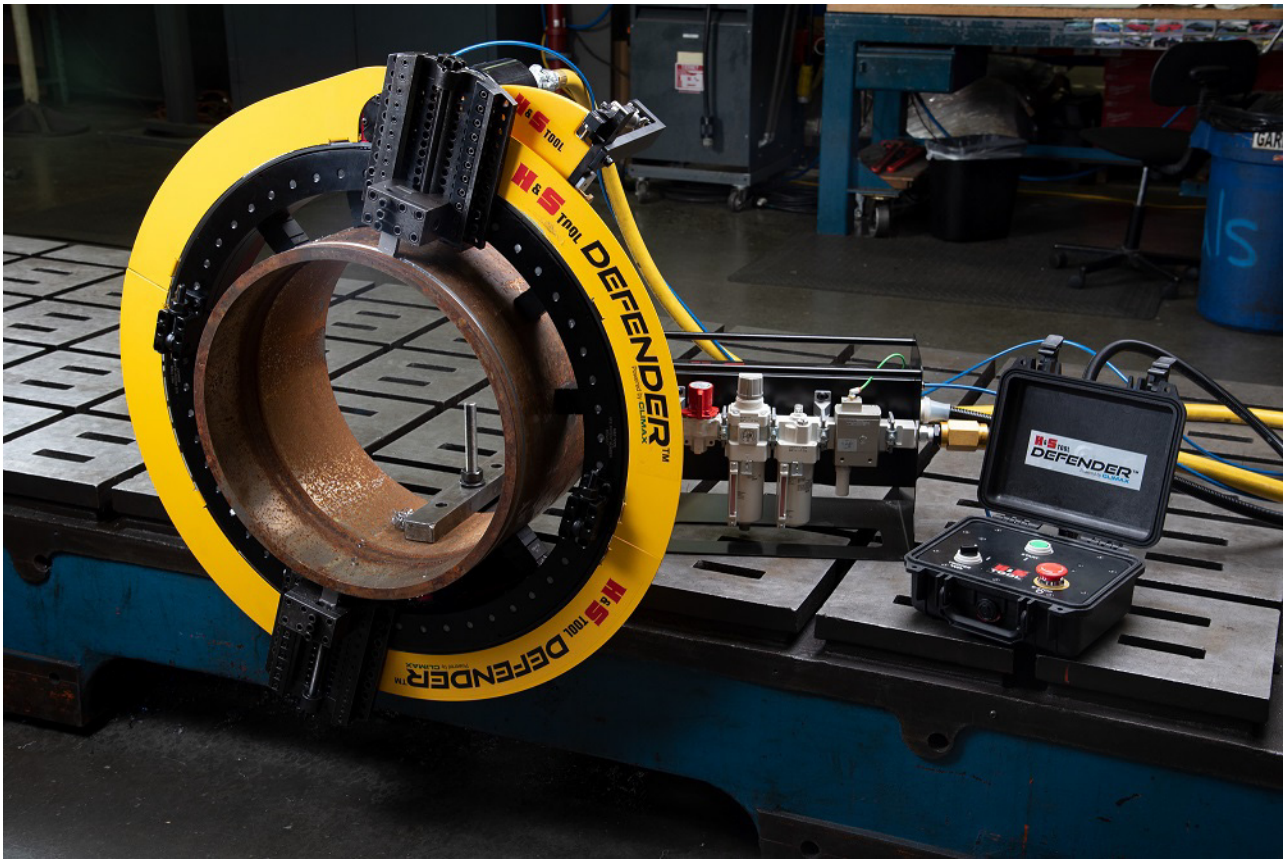
CE DEFENDER™

CLAMSHELL GUARD HANDS-FREE KIT WITH SHARK FIN™ PROTECTION

OPERATING MANUAL

ORIGINAL INSTRUCTIONS



H&S TOOL
A CLIMAX COMPANY

P/N 97475
May 2021
Revision 2

CLIMAX | BORTECH CALDER H&S TOOL

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

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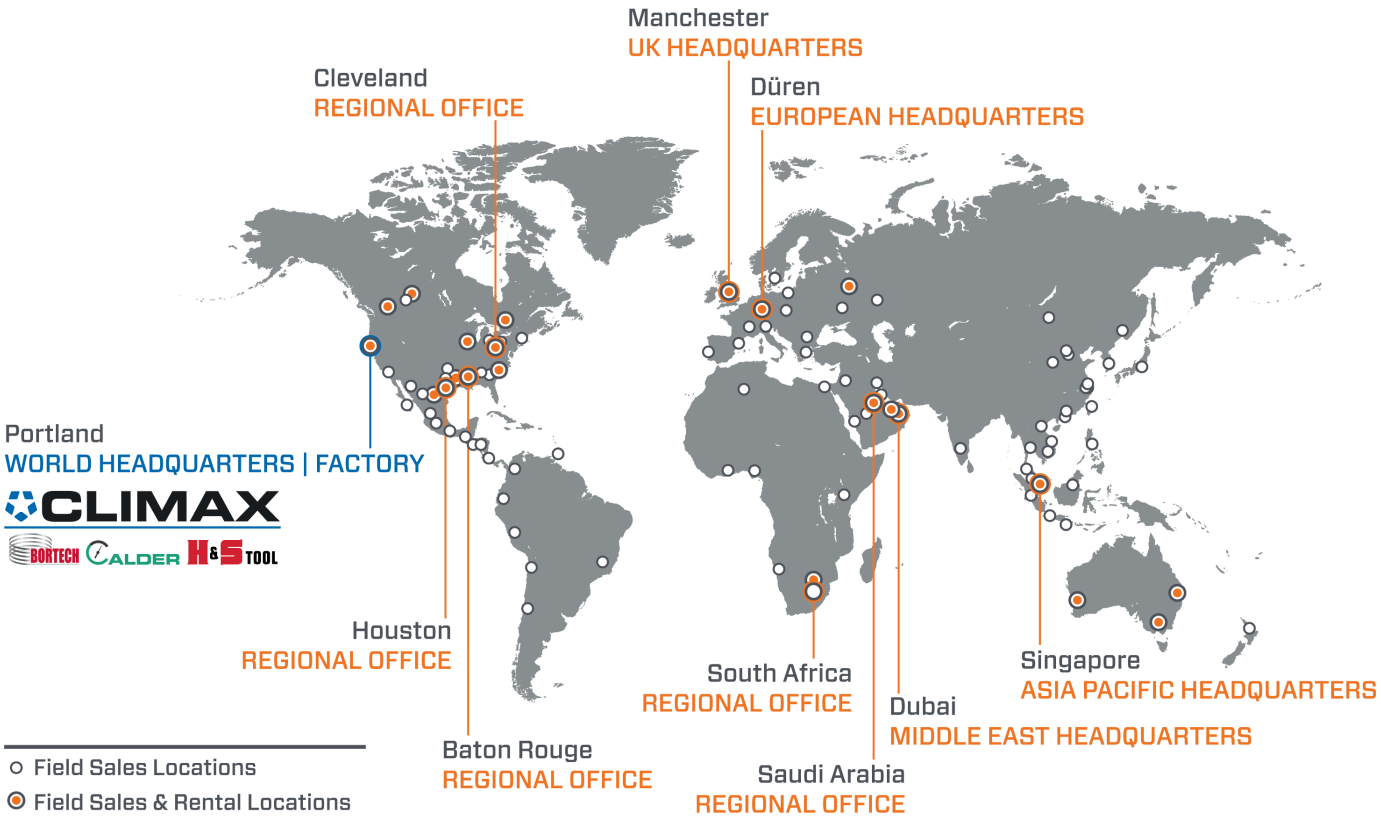

CE DOCUMENTATION

Declaration of Conformity

2006/42/EC Machinery Directive

Choose an item.

Choose an item.

Name of Manufacturer:
H&S Tool

Full postal address including country of origin:
715 Weber Drive, Wadsworth, OH 44281, USA

Object(s) of the Declaration:
Split-Frame Machine(s)

Name, type or model, batch or serial number:
AFC/BFC Series Clamshell Machines S/N Range: 0001-Current

Harmonised Standards used, including number:
EN 349:1993+A1:2008 - Safety of Machinery; Gaps
EN ISO 3744:2010 - Acoustic Power
EN ISO 11201:2010 - Acoustics; Noise Emitted
EN ISO 12100:2010 - Safety for Machinery; Principles
EN 13128:2001+A2:2009 - Milling Machine Safety

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Approved as conforming to Standard ISO 9001:2015 by:
Eagle Registrations Inc.
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Declaration
I declare that the above information in relation to the supply / manufacture of this product is in conformity with the relevant provisions of the Directives and Harmonised Standards listed above in this document along with their respective amendments and other related documents. This declaration of conformity is issued under the sole responsibility of the manufacturer.

Signature of Manufacturer:

Position Held: VP of Engineering

Date and Place: June 25, 2020

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 one year after delivery. If the original purchaser finds any defect in materials or workmanship within the warranty period, the original purchaser should contact its factory representative and return the entire machine, shipping prepaid, to the factory. CLIMAX will, at its option, either repair or replace the defective machine at no charge and will return the machine with shipping prepaid.

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

These warranties do not apply to the following:

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

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

Terms of sale

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

About this manual

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

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1 INTRODUCTION

IN THIS CHAPTER:

1.1 How to use this manual

This manual describes information necessary for the setup, operation, maintenance, storage, shipping, and decommissioning of the Defender™.

TIP:

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 Defender™ 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.

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*.

⚠ WARNING

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

⚠ 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. Flame-resistant clothing with long sleeves and legs is recommended when operating the machine. Hot chips from the workpiece may burn or cut bare skin.

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.

Follow lifting instructions in the setup procedures of this manual.

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 moving 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.

Sharp edges – Cutting tools and workpieces have sharp edges that can easily cut skin. Wear protective gloves and exercise caution when handling a cutting tool or workpiece.

Hot surfaces – During operation, motors, pumps, HPUs, and cutting tools can generate enough heat to cause severe burns. Pay attention to hot surface labels, and avoid contact with bare skin until the machine has cooled.

1.4 MACHINE-SPECIFIC SAFETY PRECAUTIONS

Eye hazard – This machine produces metal chips 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. During testing, the machine produced the sound levels[1] listed in Table 1-1.

TABLE 1-1. SOUND LEVELS

	Motor
Sound power	87.3 dBA
Operator sound pressure	76 dBA
Bystander sound pressure	74 dBA

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

Machine mounting – Do not operate the machine unless mounted to a workpiece in accordance with this manual. If mounting the machine in an overhead or vertical position, do not remove hoist rigging until the machine is mounted to the workpiece in accordance with this manual.

1. Machine sound testing was conducted in accordance with European Harmonized Standards EN ISO 3744:2010 and EN 11201:2010.

1.5 RISK ASSESSMENT AND HAZARD MITIGATION

Machine Tools are specifically designed to perform precise material-removal operations.

Stationary Machine Tools include lathes and milling machines and are typically found in a machine shop. They are mounted in a fixed location during operation and are considered to be a complete, self-contained machine. Stationary Machine Tools achieve the rigidity needed to accomplish material-removal operations from the structure that is an integral part of the machine tool.

In contrast, Portable Machine Tools are designed for on-site machining applications. They typically attach directly to the workpiece itself, or to an adjacent structure, and achieve their rigidity from the structure to which it is attached. The design intent is that the Portable Machine Tool and the structure to which it is attached become one complete machine during the material-removal process.

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 Portable Machine Tools.

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

When performing the on-site risk assessment, it is important to consider the Portable Machine Tool 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. 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 1-2. 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 read the machine assembly instructions (Section 3) and took inventory of all the items required but not supplied (Section 3).
☐	I created a lift plan, including identifying the proper rigging, for each of the setup lifts required during the setup of the support structure and machine.
☐	I located the fall paths involved in lifting and rigging operations. I have taken precautions to keep workers away from the identified fall path.
☐	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 1-3. RISK ASSESSMENT CHECKLIST AFTER SET-UP

	After set-up
☐	I checked that the machine is safely installed (according to Section 3) and the potential fall path is clear. If the machine is installed at an elevated position, I checked that the machine is safeguarded against falling.
☐	I identified all possible pinch points, such as those caused by rotating parts, and informed the affected personnel.
☐	I planned for containment of any chips or swarf produced by the machine.
☐	I followed the required maintenance checklist (Section 5.1) with the recommended lubricants (Section 5.2).
☐	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 1-4. DEFENDER™ LABELS

	P/N 96876 H&S tool horizontal label (black background)		P/N 96877, 96878 H&S Tool vertical labels (black background)
	P/N 96879 H&S Tool Defender label		P/N 96881 H&S Tool label (white background)
		P/N 97510, 97511, 97512 H&S Tool Clamshell logo	
		Defender label -- curved to fit guard on all models See Table 1-5 for part numbers per model	

TABLE 1-5. DEFENDER LABEL PART NUMBERS

Part number	Description
97064	LABEL DEFENDER CLEAR AFC-4
97065	LABEL DEFENDER CLEAR AFC-6
97052	LABEL DEFENDER CLEAR AFC-8 10 X 1.875
97066	LABEL DEFENDER CLEAR AFC-10
96913	LABEL DEFENDER CLEAR AFC-12 10 X 1.875
97067	LABEL DEFENDER CLEAR AFC-14
96880	LABEL DEFENDER CLEAR AFC-16 19.5 X 2.375

TABLE 1-5. DEFENDER LABEL PART NUMBERS

Part number	Description
97068	LABEL DEFENDER CLEAR AFC-18
97069	LABEL DEFENDER CLEAR AFC-20
97053	LABEL DEFENDER CLEAR AFC-24 19.5 X 2.375
97054	LABEL DEFENDER CLEAR AFC-26
97055	LABEL DEFENDER CLEAR AFC-28
97056	LABEL DEFENDER CLEAR AFC-30
97057	LABEL DEFENDER CLEAR AFC-32
97058	LABEL DEFENDER CLEAR AFC-36
97059	LABEL DEFENDER CLEAR AFC-42
97060	LABEL DEFENDER CLEAR BFC-48
97061	LABEL DEFENDER CLEAR BFC-56
97062	LABEL DEFENDER CLEAR BFC-66
97063	LABEL DEFENDER CLEAR BFC-72
97503	LABEL DEFENDER CLEAR BFC-86

1.7.2 Label location

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

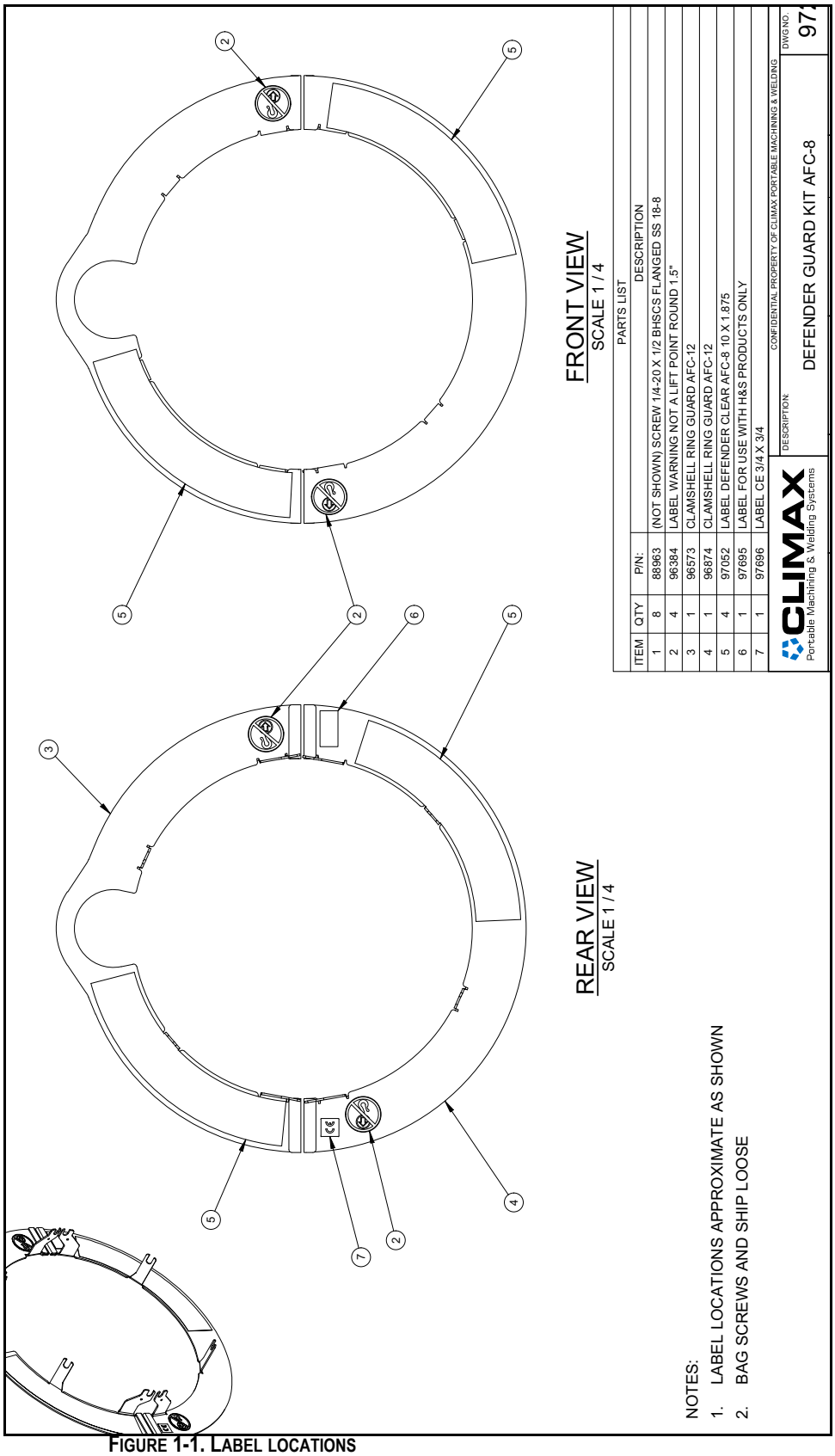

FIGURE 1-1. LABEL LOCATIONS

2 OVERVIEW

IN THIS CHAPTER:

2.1 FEATURES AND COMPONENTS

The Defender™ is a plug-and-play accessory package that can be added to any H&S Clamshell machine measuring from 4–86" (102–2,184 mm).

The easy on-and-off guards eliminate pinch points on the rotating equipment when an operator must be within reach during normal operation.

The Defender™ features a remote pendant that allows the operator to activate and deactivate the tripper mechanism up to 72" (1,829 mm) from the workpiece, so that the operator may observe the machine operation while not risking contact with rotating equipment. This is an important feature when operating in a restrictive area such as ditches, confined areas, or overhead areas.

The remote tripper mechanism connects to a PCU with a CE-compliant emergency stop. The system also includes a low-pressure drop-out function.

If power loss occurs, the machine cannot restart when power is restored without operator action.

2.2 CONTROLS

The Defender™ controls are all located on the operator pendant (P/N 96374, shown in Figure 2-1) or on the pneumatic conditioning unit (PCU).

FIGURE 2-1. OPERATOR PENDANT (P/N 96374) CONTROLS

TABLE 2-1. OPERATOR PENDANT CONTROLS IDENTIFICATION

Number	Component	Function
1	Motor start button	Starts the motor rotation and resets the low-pressure dropout.
2	Emergency STOP	Isolates the supply air and vents the downstream air. Press down to stop the machine; twist and pull up to reset.
3	Tripper engage/disengage switch	Engages and disengages the tripper. The tripper feeds the tool in the engaged position. See Appendix A for parts list information.

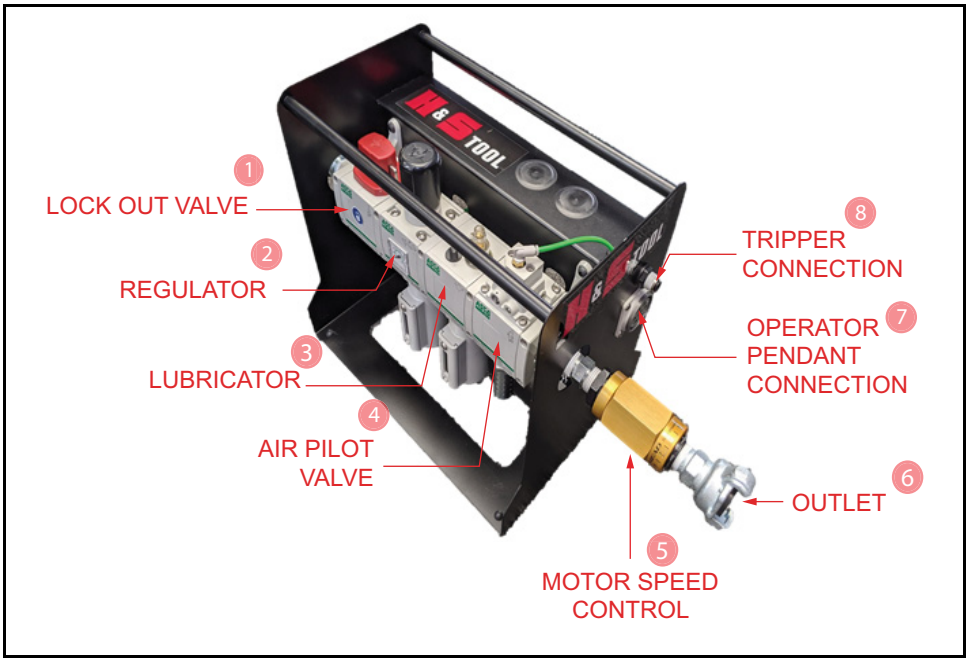

FIGURE 2-2. PCU CONTROLS

TABLE 2-2. PCU CONTROLS IDENTIFICATION

Number	Component	Function
1	Lock-out valve	Isolates air pressure from the machine and provides the ability to lock the valve closed before performing maintenance.
2	Regulator	Controls the air pressure supplied to the machine. The regulator is preset at the factory and does not require adjustment.
3	Lubricator	Provides lubrication to the air. The dial on top sets the oil drip rate.
4	Air pilot valve	Provides low-pressure drop out functionality.
5	Motor speed control	Controls the machine's rate of rotation and is located on the exhaust of the pneumatic assembly.
6	Outlet	Connects to the air motor on the machine.
7	Operator pendant connection	Provides air to the operator pendant
8	TRIPPER CONNECTION	Provides air to the pneumatic cylinder on the tripper assembly.

WARNING

Always stop the machine and lock-out/tag-out the PCU before making adjustments to controls or machine components. Failure to follow this safety precaution may result in severe injury.

Emergency shutdown

To stop machine operation immediately, press the EMERGENCY STOP button on the operator pendant (see Figure 2-1 on page 10).

Before restarting the Defender™, check the following:

1. Close the speed adjustment valve on the PCU.
2. Twist and pull the EMERGENCY STOP button up.
3. Press the START button (repeat step 1 if necessary).

3 3SETUP

IN THIS CHAPTER:

This section describes the setup and assembly procedures for the Defender™ Clamshell guard hands-free kit.

3.1 Receipt and inspection

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

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

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

Contact CLIMAX immediately to report damaged or missing components.

NOTICE

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

The machine ships from CLIMAX with a heavy coating of LPS 3. The recommended cleaner is LPS PreSolve Orange Degreaser. All parts must be cleaned before use.

3.2 Machine assembly

Before assembling the machine, follow the risk assessment checklist in Table 1-2 on page 5.

Do the following to assemble the Defender™, referring to Figure 2-1 on page 10 and Figure 2-2 on page 11:

1. Check that the clamshell is fully installed on the workpiece with the motor and trippers installed.

TIP:

The tool slide may be installed already, but it is easier to mount the guards before mounting the tool slide.

2. Check that the pneumatic conditioning unit (PCU) E-Stop is in the off position, and that the regulator is set to minimum.
3. To determine which screws on the clamshell body need to be replaced, line up the guards with the clamshell. The parts must align with the split line of the clamshell, and one guard has a cutout for the motor.
4. Remove the screws identified for replacement and set them aside. They will be needed for machine disassembly after operation.
5. Mount the guards to the clamshell, making sure to align the face of the guard with the face of the motor cover.

NOTICE

If the guard is not properly positioned, it might rub against the tool slide and cause damage to the guard.

TABLE 3-1. GUARD MOTOR AND COVER IDENTIFICATION

Number	Component
1	Guard
2	Motor cover

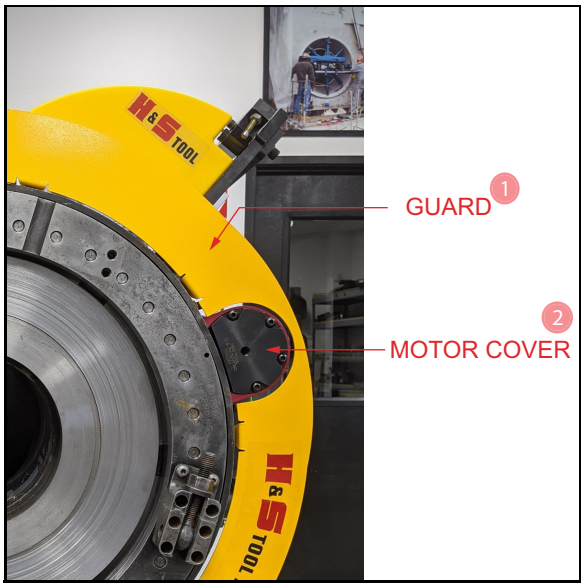

FIGURE 3-1. GUARD AND MOTOR COVER

6. If using a 7" (178 mm) or 10" (254 mm) tripper post, install the Shark Fin™ guard assembly onto the tripper post. The Shark Fin™ guard should be installed as close to the tripper rocker as possible for proper fit. Note that 4" (102 mm) trippers do not need the additional fin assembly.

TABLE 3-2. TRIPPER POST AND FIN IDENTIFICATION

Number	Component
1	Tripper post
2	Shark Fin™ guard

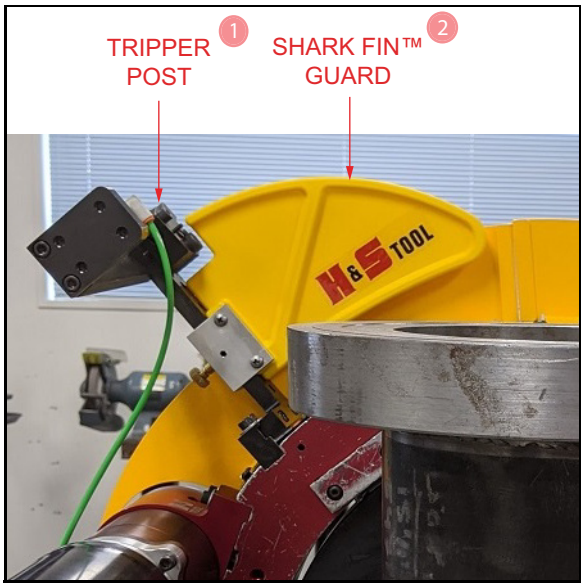

FIGURE 3-2. TRIPPER POST AND SHARK FIN™ GUARD

3.3 CONNECTING THE PCU

Do the following to connect the PCU:

1. Check that the lock out valve on the PCU is in the closed position.
2. Connect an air hose from the air supply with 90 psi (6 bar) pressure using a minimum 0.5" (12 mm) air hose.
3. Connect the air hose from the clamshell air motor to the outlet of the PCU.
4. Connect the pneumatic cable from the PCU to the operator pendant (see Figure 3-3).

TABLE 3-3. PCU CONNECTION IDENTIFICATION

Number	Component
1	Pneumatic cylinder connection
2	Operator pendant connection

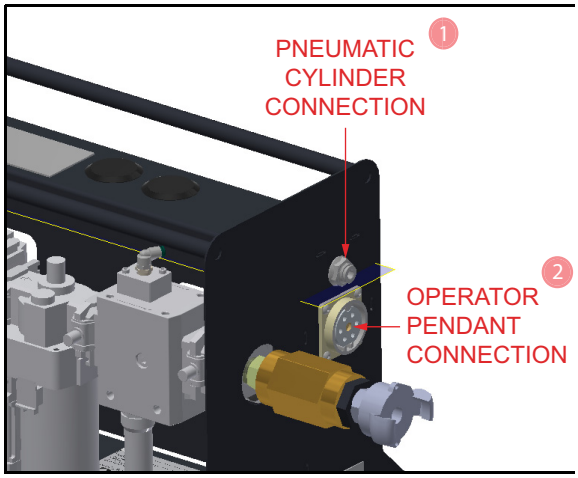

FIGURE 3-3. PCU CONNECTIONS

5. Connect the hose from the tripper connection to the pneumatic cylinder on the tripper assembly (see Figure 3-4).

NOTICE

Make sure to fully install the hose into the PushLok fitting.

CLIMAX recommends using cable ties or otherwise restraining the pneumatic tube to the motor hose to prevent damage to the tube.

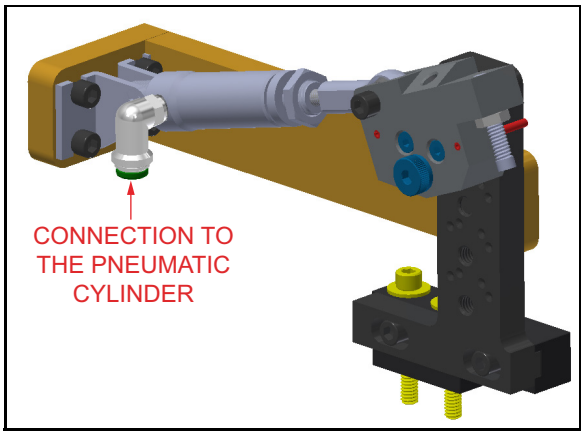

FIGURE 3-4. CONNECTION TO THE PNEUMATIC CYLINDER

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 1-3 on page 5.
2. Check that the work area is clear of non-essential personnel and equipment.
3. Check that the machine control/observation area will not be in the path of hot flying chips during machine operation.
4. Check that the machine is securely mounted to the workpiece.
5. Check that air hoses are routed and secured to avoid tripping, entanglement, damage from hot chips, or other damage should an air hose or connection fail.
6. Check the tool condition and sharpness.
7. On the PCU, check that the oil drip rate is set to 6 drips per minute.
8. Check that all hand tools are removed from inside the machine and the work area.

4.2 OPERATION

⚠ WARNING

Do not leave machine unattended during operation. Unattended machines could cause damage or serious personnel injury.

4.2.1 Starting the machine

Do the following to operate the machine after the setup steps are complete (see Figure 2-1 on page 10 and Figure 2-2 on page 11):

1. Push the START button on the operator pendant.
2. Use the motor speed control on the PCU to turn on the drive motor and to adjust the drive motor speed to achieve the desired rotation rate.

3. Use the TRIPPER switch as required to feed the tool slide and advance the cut (see Section 4.2.4).

4.2.2 Stopping the machine

Do the following to stop the machine (see Figure 2-1 on page 10 and Figure 2-2 on page 11):

1. Set the TRIPPER switch to the off position.
2. Turn the motor speed control to zero so that the machine stops rotating.
3. Press the E-STOP button to prevent accidental restart of the machine.

TIP:

When the cut is complete, the best practice is to first stop the feed and then stop the machine rotation.

4.2.3 Emergency shutdown

To stop machine operation immediately, press the E-STOP button on the operator pendant (see Figure 2-1 on page 10).

Before restarting the Defender™, do the following:

1. Close the speed adjustment valve on the PCU.
2. Twist and pull the E-STOP button up.
3. Press the START button (repeat step 1 if necessary).

4.2.4 Adjusting the machine settings

During machining, the diameter of the cut may be adjusted by engaging the TRIPPER switch (see Figure 2-1 on page 10).

This engages the tripper, which then turns the star wheel as the tool slide passes. Then the cutting tool advances.

See the Clamshell Machine operating manual (P/N 97521) for details on feeding the tools.

4.3 DISASSEMBLY

Do the following to disassemble the Defender™:

1. Disconnect pneumatic cables.
2. Remove the guards and replace the original clamshell screws (see Section 3.2 on page 13).

For more detailed instructions, follow the assembly instructions in Section 3.2 on page 13 in reverse.

5 MAINTENANCE

IN THIS CHAPTER:

5.1 MAINTENANCE CHECKLIST

Before and after each use, remove debris, oil, and moisture from machine surfaces.

5.2 APPROVED LUBRICANTS

CLIMAX recommends using the following lubricants at the locations indicated. Failure to use the appropriate lubricants can result in damage and premature machine wear.

⚠ CAUTION

Avoid damage, premature machine wear, and protect your warranty by using only approved lubricants.

TABLE 5-1. APPROVED LUBRICANTS

Application Area	Lubricant	Biodegradable Lubricant	Viscosity (cSt)	Quantity
Weekly				
PCU	AW 32 hydraulic oil	N/A	32 @ 40 °C 6 @ 100 °C	Refill oil lubricator
Storage				
Unpainted surfaces	LPS 2	N/A	7 @ 25 °C	As required
Unpainted surfaces	LPS 3	N/A	N/A	As required

TABLE 5-1. APPROVED LUBRICANTS

Application Area	Lubricant	Biodegradable Lubricant	Viscosity (cSt)	Quantity
Machine surfaces	LPS PreSolve Orange degreaser (cleaner to remove LPS 3)	N/A	N/A	As required

5.3 MAINTENANCE TASKS

Maintenance tasks are described in the following sections.

5.3.1 Check the PCU oil reservoir levels

Do the following to check the PCU oil reservoir levels:

1. Check the PCU oil reservoir levels.
2. Refill as necessary. See Table 5-1 on page 19 for information on recommended lubricants.
3. Check that the oil drip rate is set at six drops per minute.

5.3.2 Empty the air filter water trap

Check and drain the water from the air filter water trap.

5.3.3 PCU emergency stop check

Do the following to check the emergency stop:

1. With the machine running, press the emergency stop button.
2. Check that the machine stops.
3. Reset the emergency stop by twisting and then pulling the button up.
4. Check the machine doesn’t restart.

5.3.4 PCU drop-out circuit check

The PCU drop-out circuit prevents the machine from restarting unexpectedly after air supply to the PCU is lost and restored. Do the following to check the PCU drop-out circuit:

1. Check that the PCU is connected to an air supply and to the Clamshell Machine.
2. Set the speed adjustment valve to zero
3. Check that the Emergency-Stop is disengaged (that is, pulled up).
4. Press the START button.
5. Slowly open the PCU speed adjustment valve until the rotary drive engages.

6. Close the lock-out valve on the PCU.
7. Check that the Clamshell Machine stops.
8. Open the lock-out valve.
9. Check that the machine does not automatically restart when the lock-out valve is re-opened in step 8.

WARNING

Do not operate the machine if the PCU starts in step 9. Contact CLIMAX for service recommendations. If the machine unexpectedly restarts, it could cause severe personal injury or death.

5.4 DEFENDER KITS

Table 5-2 shows the applicable kits and tripper sizes for each size of H&S Clamshell. Call CLIMAX for more information on obtaining a kit.

TABLE 5-2. DEFENDER KITS

Clamshell	4" (102 mm) tripper kit P/N	7" (178 mm) tripper kit P/N	10" (254 mm) tripper kit P/N	Defender guard kit P/N
AFC 4	97174			97204
AFC 6	97175			97205
AFC 8	97176			97206
AFC 10	97177			97207
AFC 12	97178			97208
AFC 14	97179			97209
AFC 16	97180			97210
AFC 18	97181			97211
AFC 20	97182			97212
AFC 24	97183	97481		97213
AFC 26	97184	97482		97214
AFC 28	97185	97484		97215
AFC 30	97186	97485		97216
AFC 32	97187	97486		97217
AFC 36	97188	97487		97218
AFC 42	97189	97488		97219
BFC 48	97190	97489	97496	97220
BFC 56	97191	97490	97497	97221
BFC 66	97192	97491	97498	97222
BFC 72	97193	97492	97499	97223
BFC 86	97493	97494	97500	97501

Please note that the kits described in Table 5-2 do not include the base Clamshell machines.

See the following pages for example kits.

For example: Table 5-3 shows the 4" tripper kit and Table 5-4 shows the Defender guard kit for the AFC 8.

TABLE 5-3. AFC-8 4" (102 MM) TRIPPER KIT (P/N 97176)

Part number	Description	Quantity
97206	DEFENDER GUARD KIT AFC-8	1
97274	KIT DEFENDER 1/2 NPT AIR CONTROL ASSY W/ 4 IN TRIPPER	1
97475	MANUAL INSTRUCTION 7911-S1	1

For more information on the pneumatic tripper assemblies, see Appendix A.

TABLE 5-4. AFC-8 DEFENDER GUARD KIT (P/N 97206)

Part number	Description	Quantity
88963	SCREW 1/4-20 X 1/2 BHSCS FLANGED SS 18-8	8
96384	LABEL WARNING NOT A LIFT POINT ROUND 1.5"	4
96573	CLAMSHELL RING GUARD AFC-8 MOTOR SIDE	1
96874	CLAMSHELL RING GUARD AFC-8 NON MOTOR SIDE	1
97052	LABEL DEFENDER CLEAR AFC-8	4
97695	LABEL FOR USE WITH H&S PRODUCTS ONLY	1
97696	LABEL CE 3/4 X 3/4	1

Each Defender guard kit contains guards that are unique to the specific Clamshell size, as well as standard labels. Use Figure 5-1 on page 24 and Table 5-5 on page 25 for a breakdown of parts contained in each kit.

For information on the Shark Fin™ guard (P/N 96742), see Appendix A.

5.4.1 AFC Defender kit parts

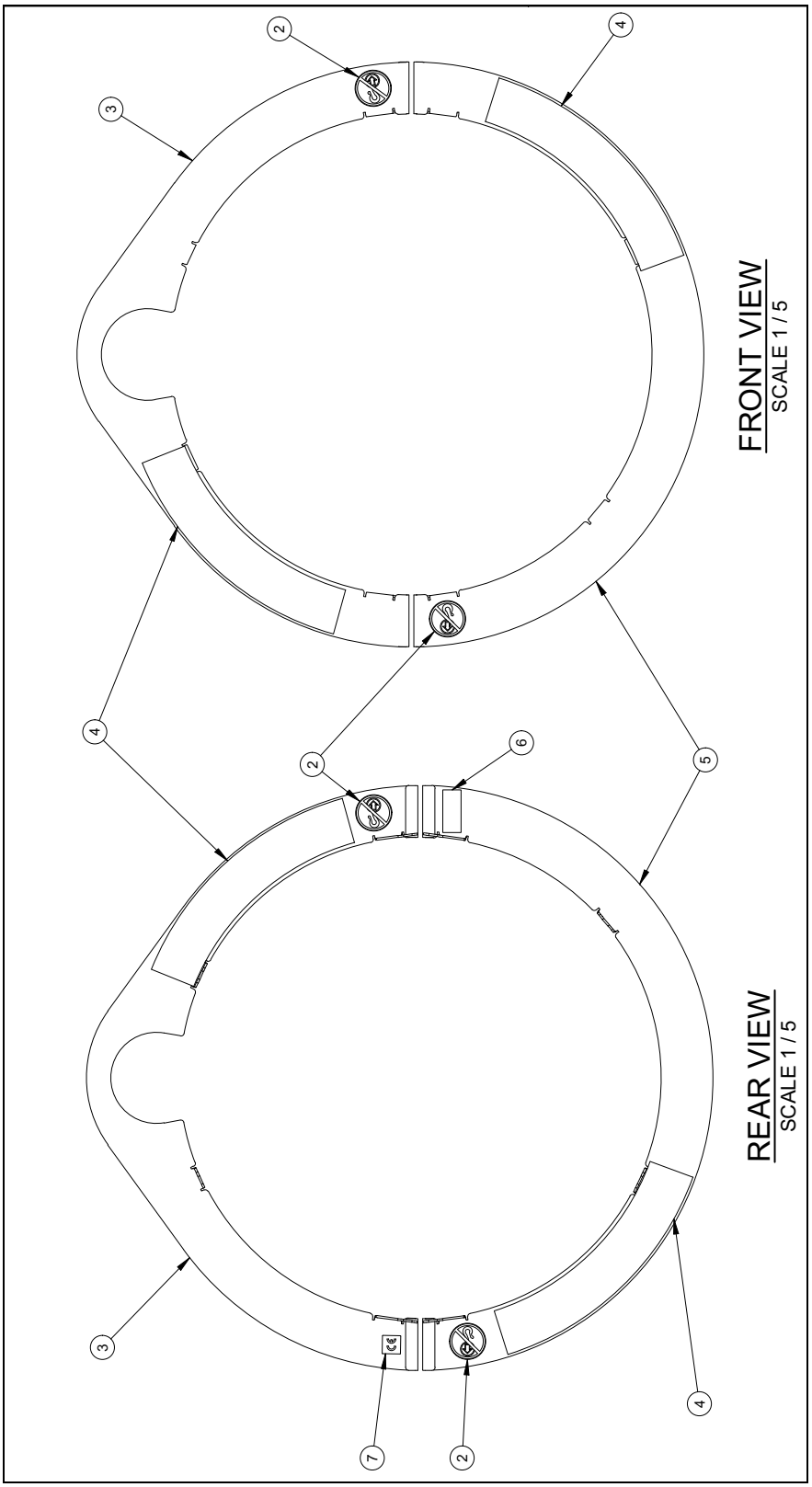

FIGURE 5-1. AFC-14 DEFENDER GUARD KIT EXPLODED VIEW (P/N 97209)

TABLE 5-5. AFC-14 DEFENDER GUARD KIT (P/N 97209)

Item	Part number	Description	Quantity
1	88963	SCREW 1/4-20 X 1/2 BHSCS FLANGED	see Table 5-6
2	96384	LABEL WARNING NOT A LIFT POINT ROUND	4
3	see Table 5-6	RING GUARD MOTOR SIDE	1
4	see Table 5-6	LABEL DEFENDER CLEAR	4
5	see Table 5-6	RING GUARD NON MOTOR SIDE	1
6	97695	LABEL FOR USE WITH H&S PRODUCTS 1.875 X .75	1
7	97696	LABEL CE 3/4 X 3/4	1

.

TABLE 5-6. AFC GUARD ASSEMBLY KITS

Model	Item 1		Item 3		Item 4		Item 5	
	Part number	Quantity	Part number	Quantity	Part number	Quantity	Part number	Quantity
AFC 4	88963	7	96593	1	97064	4	96594	1
AFC 6	88963	8	96595	1	97065	4	96596	1
AFC 8	88963	8	96573	1	97052	4	96574	1
AFC 10	88963	8	97290	1	97066	4	96574	1
AFC 12	88963	8	96851	1	96913	4	96575	1
AFC 14	88963	8	96576	1	97067	4	97420	1
AFC 16	88963	8	96577	1	96880	4	96578	1
AFC 18	88963	9	96579	1	97068	4	96580	1
AFC 20	88963	9	96581	1	97069	4	96582	1
AFC 24	88963	9	96593	1	97053	4	96584	1
AFC 26	88963	9	96585	1	97054	4	96586	1
AFC 28	88963	9	96587	1	97055	4	96588	1
AFC 30	88963	9	96589	1	97056	4	96590	1
AFC 32	88963	9	96591	1	97057	4	96592	1
AFC 36	88963	9	96625	1	97058	4	96626	1
AFC 42	88963	9	96695	1	97059	4	96696	1

If the PCU or operator pendant malfunctions, call CLIMAX to order one of these replacement kits.

Each kit contains the operator pendant, pneumatic conditioning unit, and designated pneumatic tripper assembly.

TABLE 5-7. AFC PNEUMATIC CONTROL KITS

Tripper size	Part number	Description
4" (102 mm)	97274	KIT DEFENDER ½ NPT AIR CONTROL ASSY w/ 4 IN TRIPPER
7" (178 mm)	97275	KIT DEFENDER ½ NPT AIR CONTROL ASSY w/ 7 IN TRIPPER

The parts lists for each pneumatic control kit are shown in the following tables.

TABLE 5-8. 4" (102 MM) TRIPPER PNEUMATIC CONTROL KIT (P/N 97274)

Part number	Description	Quantity
5001144	4" PNEUMATIC TRIPPER SUB ASSY	1
96374	OPERATOR PENDANT HANDS FREE CLAMSHELL CONTROLS	1
97045	PNEUMATIC CONDITIONING UNIT WITH SMC FRL & PRESTOLOK CONNECTOR	1
98031	CABLE BAG H&S EMBROIDERED	1

TABLE 5-9. 7" (178 MM) TRIPPER PNEUMATIC CONTROL KIT (P/N 97275)

Part number	Description	Quantity
5001177	7" PNEUMATIC TRIPPER SUB ASSY	1
96374	OPERATOR PENDANT HANDS FREE CLAMSHELL CONTROLS	1
97045	PNEUMATIC CONDITIONING UNIT WITH SMC FRL & PRESTOLOK CONNECTOR	1
98031	CABLE BAG H&S EMBROIDERED	1

5.4.2 BFC Defender kit parts

.

TABLE 5-10. BFC PNEUMATIC CONTROL KITS

Tripper size	Part number	Description
4" (102 mm)	98734	KIT DEFENDER ½ NPT AIR CONTROL ASSY w/ 4 IN TRIPPER
7" (178 mm)	98735	KIT DEFENDER ½ NPT AIR CONTROL ASSY w/ 7 IN TRIPPER
10" (254 mm)	98736	KIT DEFENDER ½ NPT AIR CONTROL ASSY w/ 10 IN TRIPPER

The parts lists for each pneumatic control kit are shown in the following tables.

TABLE 5-11. 4" (102 MM) TRIPPER PNEUMATIC CONTROL KIT (P/N 98734)

Part number	Description	Quantity
96374	OPERATOR PENDANT HANDS FREE CLAMSHELL CONTROLS	1
97045	PNEUMATIC CONDITIONING UNIT WITH SMC FRL & PRESTOLOK CONNECTOR	1
98031	CABLE BAG H&S EMBROIDERED	1

TABLE 5-12. 7" (178 MM) TRIPPER PNEUMATIC CONTROL KIT (P/N 98735)

Part number	Description	Quantity
5001177	7" PNEUMATIC TRIPPER SUB ASSY	1
96374	OPERATOR PENDANT HANDS FREE CLAMSHELL CONTROLS	1
97045	PNEUMATIC CONDITIONING UNIT WITH SMC FRL & PRESTOLOK CONNECTOR	1
98031	CABLE BAG H&S EMBROIDERED	1

TABLE 5-13. 7" (178 MM) TRIPPER PNEUMATIC CONTROL KIT (P/N 98736)

Part number	Description	Quantity
96374	OPERATOR PENDANT HANDS FREE CLAMSHELL CONTROLS	1
97045	PNEUMATIC CONDITIONING UNIT WITH SMC FRL & PRESTOLOK CONNECTOR	1
98031	CABLE BAG H&S EMBROIDERED	1

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6 STORAGE AND SHIPPING

IN THIS CHAPTER:

6.1 STORAGE

Proper storage of the Clamshell guard hands-free kit will extend its usefulness and prevent undue damage.

Before storing, do the following:

1. Clean the machine with solvent to remove grease, metal chips, and moisture.
2. Drain all liquids from the pneumatic conditioning unit.

Store the Clamshell guard hands-free kit in its original shipping container. Keep all packing materials for repackaging the machine.

6.1.1 Short-term storage

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

1. Retract the tool head from the workpiece.
2. Remove the tooling.
3. Remove hoses.
4. Remove the guards and replace the original clamshell screws.
5. Remove the machine from the workpiece.
6. Clean the machine to remove dirt, grease, metal chips, and moisture.
7. Spray all unpainted surfaces with LPS-2 to prevent corrosion.
8. Store the Clamshell guard hands-free kit in its original shipping box.

6.1.2 Long-term storage

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

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

6.2 SHIPPING

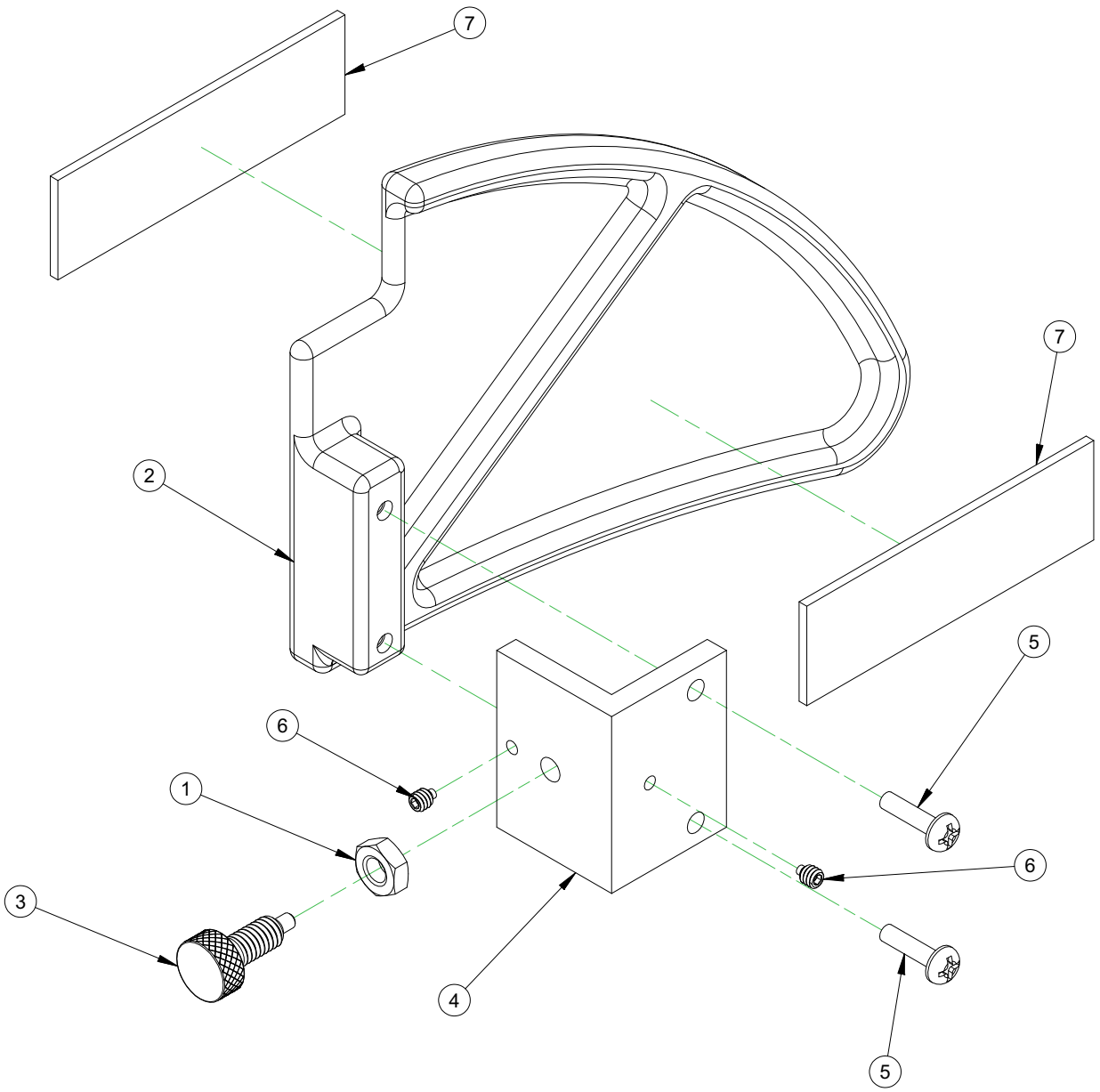
The Clamshell guard hands-free kit can be shipped in its original shipping container.

6.3 DECOMMISSIONING

To decommission the Clamshell guard hands-free kit prior to disposal, remove the drive assembly from the RDU and dispose of the drive assembly separately from the rest of the machine components. Refer to Appendix A for component assembly information.

APPENDIX A ASSEMBLY DRAWINGS

Drawing list



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	20175	NUT 5/16-18 JAM
2	1	96453	CLAMSHELL FIN GUARD
3	1	96743	SPRING PLUNGER 5/16-18 THD BRASS KNOB
4	1	96750	FIN GUARD MOUNTING BRACKET
5	2	96751	SCREW NO 10 X 3/4 SELF TAPPING 410SS
6	2	96752	SCREW 10-24 X 3/16 SSSDP NYLON TIP
7	2	96881	LABEL H&S CLEAR 3.75 X 1.125

FIGURE A-1. CLAMSHELL SHARK FIN™ GUARD ASSEMBLY (P/N 96742)

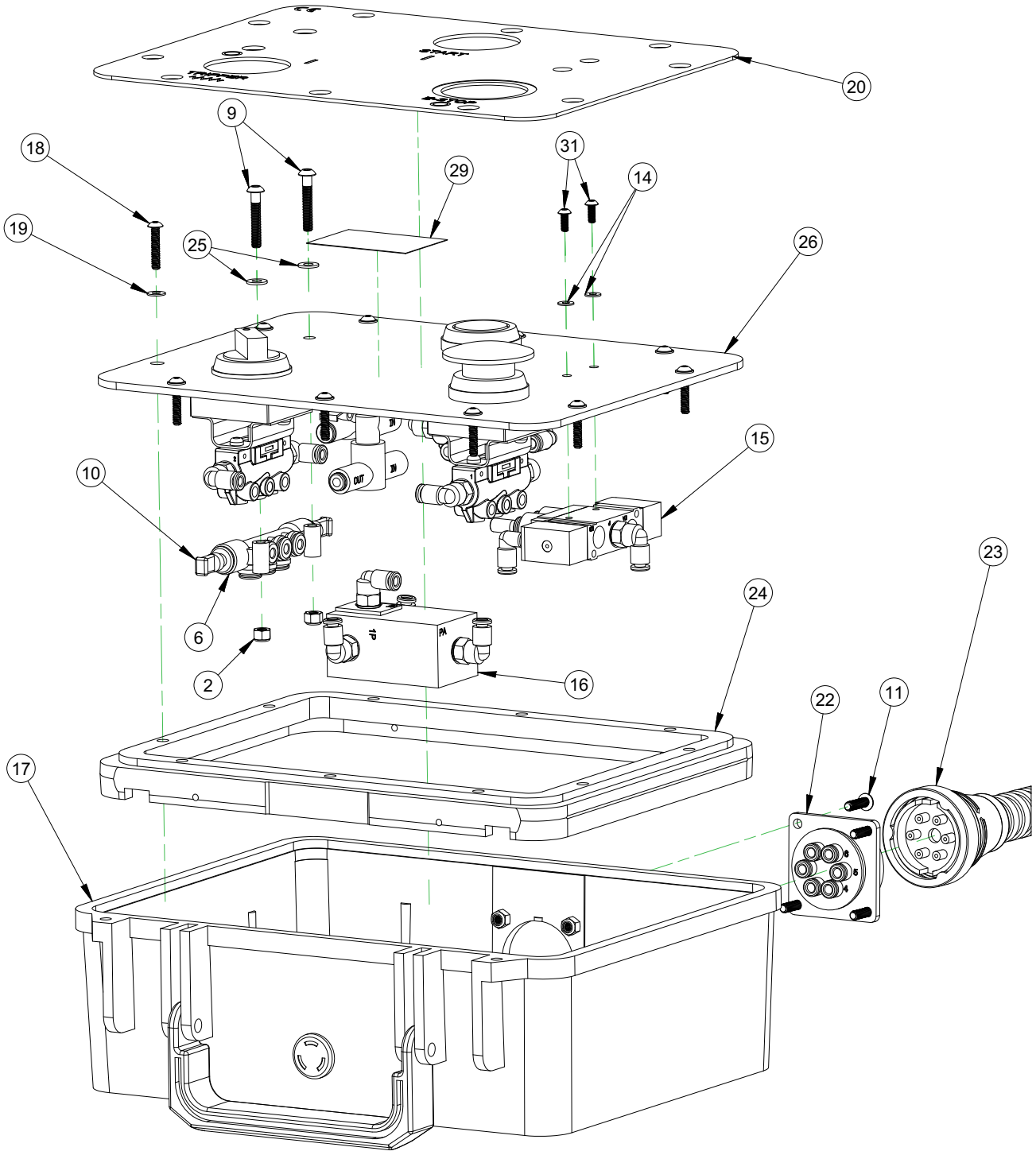


FIGURE A-2. OPERATOR PENDANT ASSEMBLY 1 (P/N 96374)

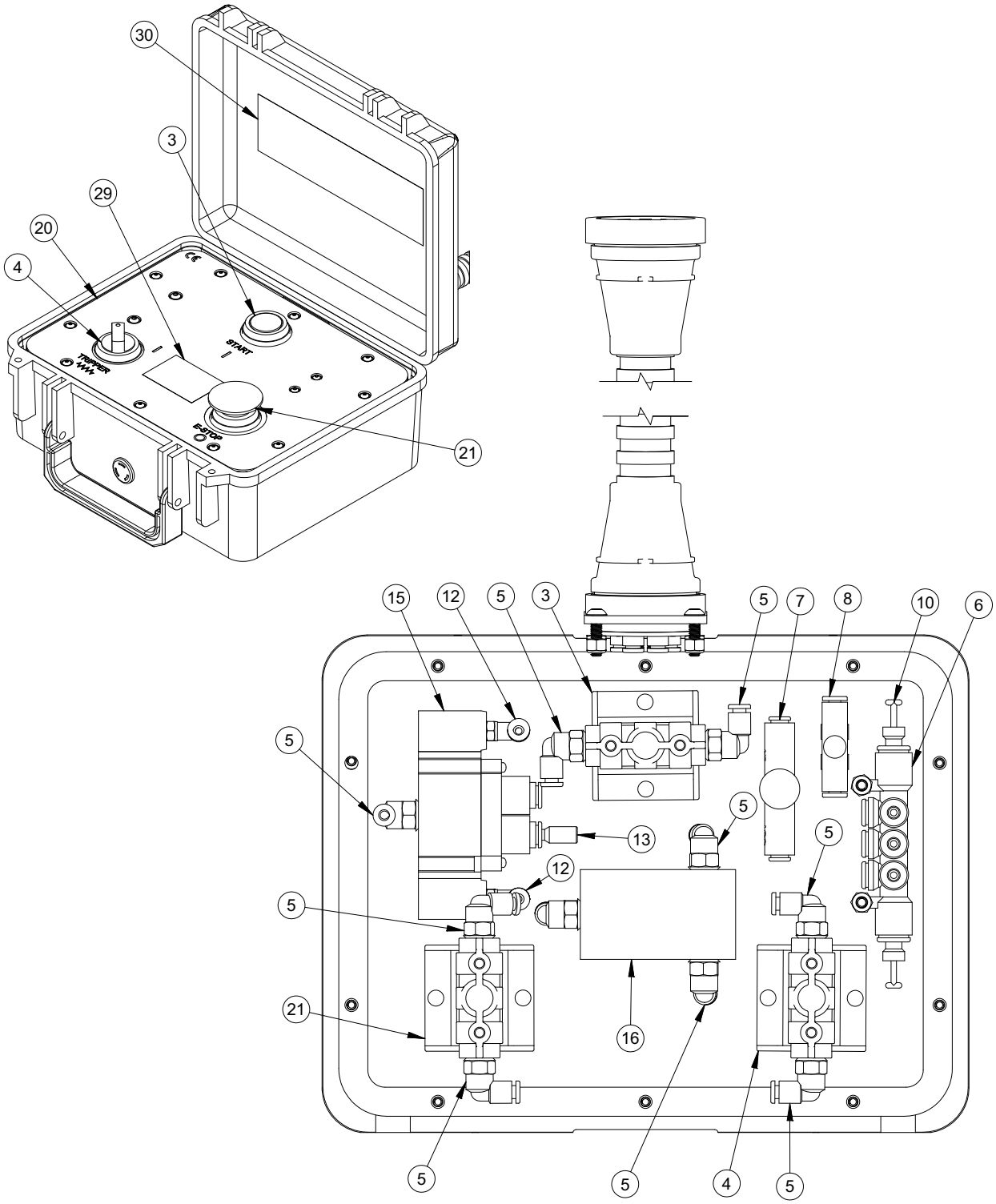
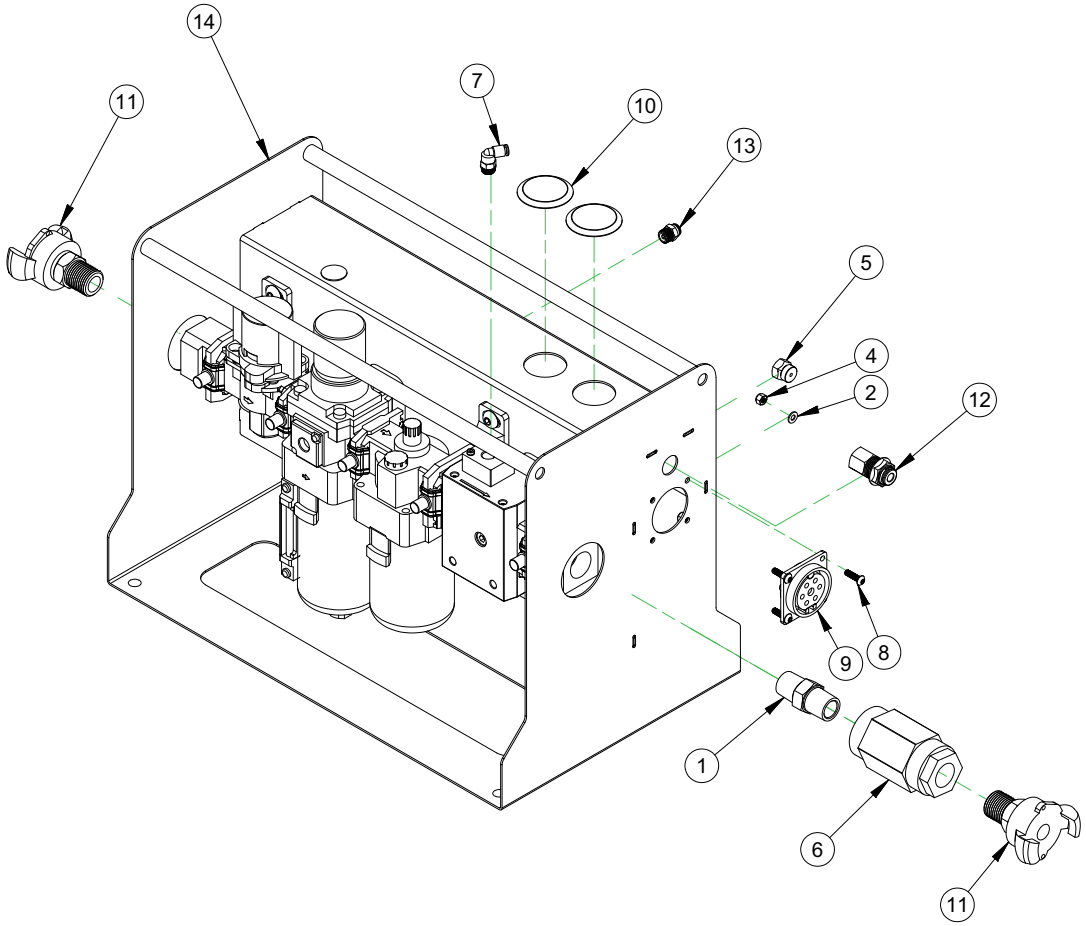


FIGURE A-3. OPERATOR PENDANT ASSEMBLY 1 (P/N 96374)

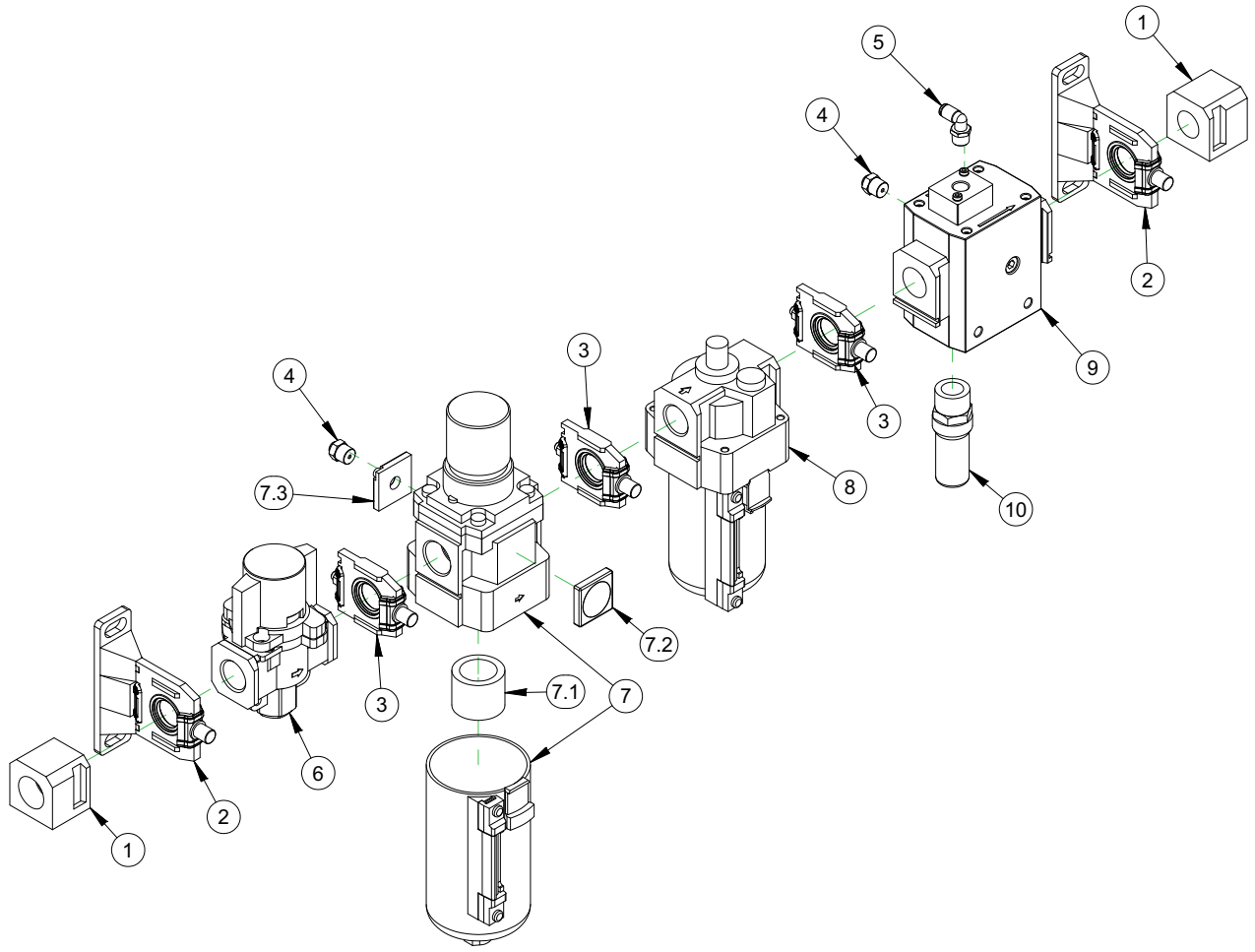
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	36	76356	(NOT SHOWN) TUBE POLYURETHANE 4MM OD X 2.5MM ID
2	6	78947	SELF-LOCKING HEX NUT DIN985-M4-8-ZN
3	1	96364	FLUSH PUSH BUTTON 3 PORT 1/8 PORT SIZE
4	1	96365	TWIST SELECTOR SWITCH 2 POSITION 1/8 PORT SIZE BLACK
5	11	96366	FTG ELB 4MM PUSH LOK TUBE X 1/8 NPTM 140PSI MAX
6	1	96367	MANIFOLD PUSH LOK 4MM 6 OUTLET X 6MM 2 OUTLET
7	1	96368	SHUTTLE VALVE 4MM PUSH LOK TUBE
8	1	96369	FTG NEEDLE VALVE SPEED CONTROLLER 4MM PUSH LOK TUBE
9	2	96371	SCREW BHSCS M4 X 0.7 X 25MM LG BLACK OXIDE
10	2	96372	PLUG PUSH LOK 6MM TUBE STEM WHITE NYLON
11	4	96375	SCREW BHSCS M4 X 15MM LG 18-8 SS
12	2	96376	FTG ELBOW 4MM PUSH LOK TUBE X M5 THD
13	1	96379	FTG PLUG PUSH LOK 4MM
14	2	96380	WASHER FLTW M3 SCREW 18-8SS BLACK OXIDE
15	1	96381	AIR PILOT VALVE 5 PORT 4MM PUSH LOK 2 POSITION DOUBLE
16	1	96382	3/2 AIR PILOT SPRING VALVE 1/8 PORT
17	1	96383	PELICAN 1200 CASE MODIFIED BLACK NO FOAM
18	10	96385	SCREW BHSCS 6-32 X 3/4 LG 18-8SS
19	10	96394	WASHER FLTW FOR M3.5 SCREW 18-8 SS
20	1	96395	OPERATOR PENDANT INTERFACE PANEL
21	1	96399	VALVE MUSHROOM PUSH BUTTON RED 3 PORT
22	1	96423	PNEUMATIC CONNECTOR SOCKET 6 PORT 4MM PUSH LOK TUBE
23	1	96429	PNEUMATIC CABLE 6 FT LONG 6 PORTS 4MM PUSH LOK TUBE
24	1	96431	PANEL FRAME FOR PELICAN 1200 AND 1300 CASES
25	2	96432	WASHER FLTW M4 SCREW 18-8SS BLACK OXIDE
26	1	96496	OPERATOR PENDANT MOUNTING PANEL
27	1	96781	(NOT SHOWN) FTG TEE 4MM PUSH LOK TUBE
28	1	96877	LABEL H&S BLACK 4 X 2.75
29	1	96878	LABEL H&S BLACK 2 X 1.375
30	1	96879	LABEL DEFENDER BRUSHED METAL 6.75 X 2
31	2	97345	SCREW M3 X .5 X 8MM BHSCS

FIGURE A-4. OPERATOR PENDANT ASSEMBLY 1 (P/N 96374)



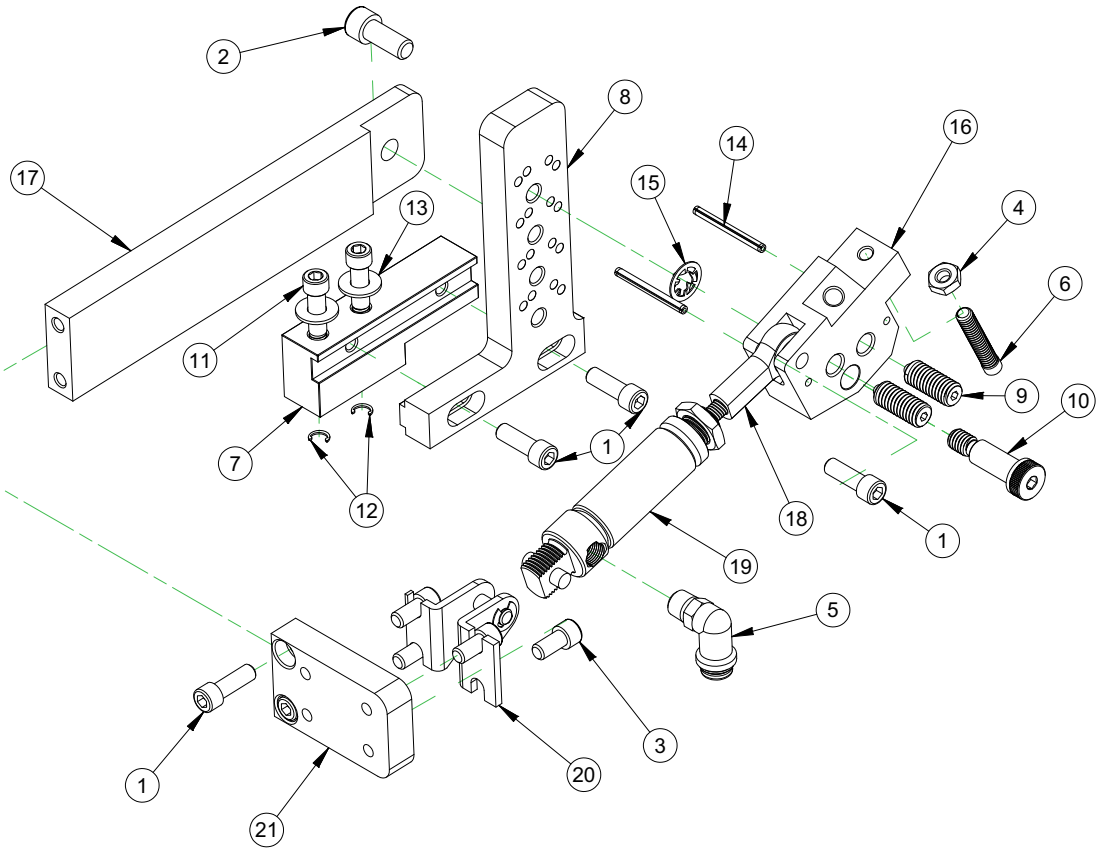
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	14704	FTG NIPPLE 1/2 NPTM X 1/2 NPTM
2	4	38065	WASHER M4 FLTW DIN 125
3	24	76356	(NOT SHOWN) TUBE POLYURETHANE 4MM OD X 2.5MM ID GREEN
4	4	78947	SELF-LOCKING HEX NUT DIN985-M4-8-ZN
5	1	82177	FTG - STRAIGHT - UNI 1/4 X 4MM TUBE PUSH NICKEL
6	1	96358	INLINE FLOW CONTROL VALVE 1/2 NPTF 1000PSI MAX
7	1	96366	FTG ELB 4MM PUSH LOK TUBE X 1/8 NPTM 140PSI MAX
8	4	96375	SCREW BHSCS M4 X 15MM LG 18-8 SS
9	1	96423	PNEUMATIC CONNECTOR SOCKET 6 PORT 4MM PUSH LOK TUBE
10	2	96434	PANEL PLUG SNAP IN 1.25 ID HOLE BLACK
11	2	96439	FTG COUPLER 1/2 NPT X AM-2 CHICAGO 150PSI
12	1	96443	FTG BULKHEAD 4MM PUSH LOK TUBE X 1/4 NPTF
13	1	96572	FTG 4MM PUSH LOK TUBE X 1/8 NPTM STRAIGHT
14	1	96916	PNEUMATIC CONDITIONING UNIT UNFINISHED BASE UNIT FOR SMC 40 SERIES

FIGURE A-5. PCU ASSEMBLY (P/N 97045)



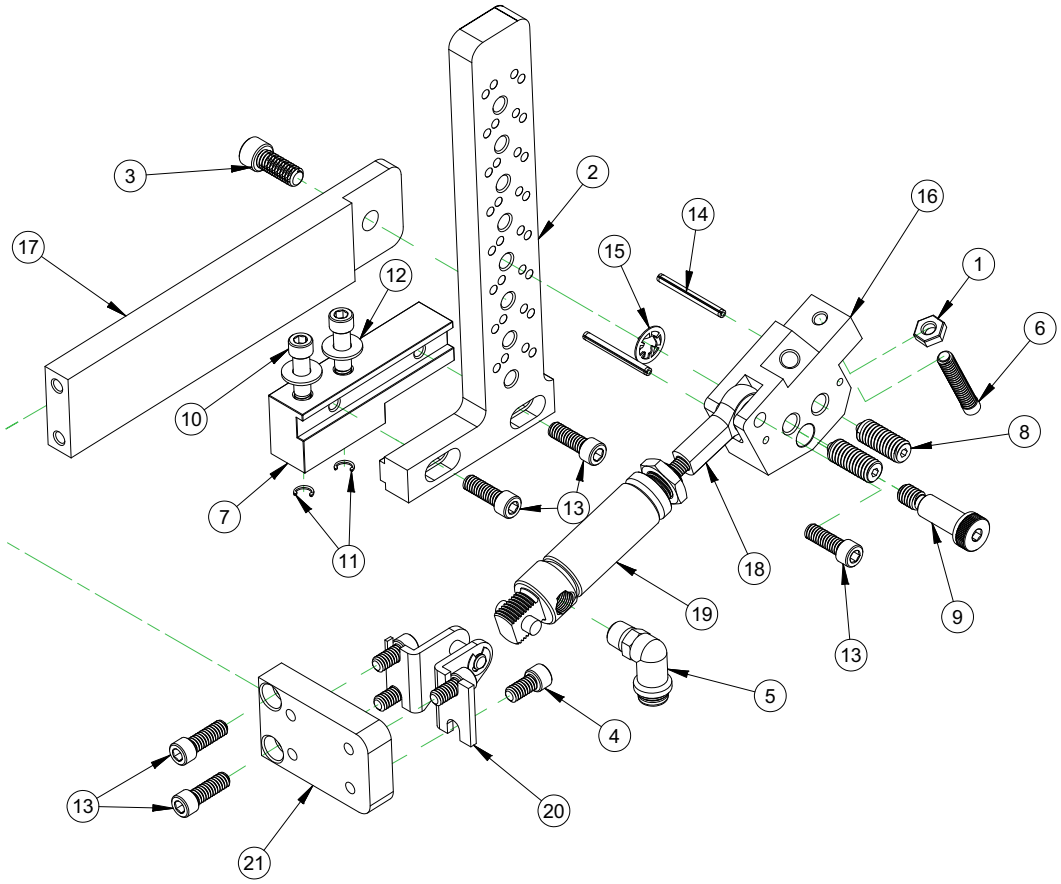
PARTS LIST					
ITEM	QTY	CLIMAX P/N:	DESCRIPTION	MANUFACTURER	MANUFACTURER P/N
1	2	N/A	ADAPTER PIPE 1/2 INCH NPT FOR SMC SIZE 40 FRL	SMC	E400-N04-A
2	2	N/A	SPACER WITH BRACKET FOR SMC SIZE 40 FRL	SMC	Y400T-A
3	3	N/A	SPACER FOR SMC SIZE 40 FRL	SMC	Y400-A
4	2	N/A	FTG ADAPTER STRAIGHT 1/8 NPT X 5/32 TUBING PRESS FIT	SMC	KQ2H03-34AS
5	1	N/A	FTG ELBOW 1/8 NPT X 5/32 TUBING PUSH FIT	SMC	KQ2L03-34AS
6	1	96732	SP VALVE ISOLATION/SHUTOFF WITH 1/2 INCH PORTS	SMC	VHS40-N04B-S-Z
7	1	96733	SP REGULATOR & FILTER W/ GAGE & SIGHT GLASS 7-125 PSI 1/2 PORTS	SMC	AW40-N04-8Z-B
7.1	1	96735	SP FILTER PNEUMATIC	SMC	AF40P-060S
7.2	1	97635	SP INDICATOR PRESSURE 1 MPA FOR SMC FRL	SMC	GC3-10AS-X2103
7.3	1	N/A	PLATE THREADED PORT WITH O-RING	SMC	AR20P-320AS-N01
8	1	96736	SP LUBRICATOR PNPEUMATIC W/ SIGHT INDICATOR 1/2 PORT	SMC	AL40-N04-8Z-A
9	1	96737	SP QUICK EXHAUST VALVE WITH METAL 1/2 INCH PORTS	SMC	NAVA4000-N04
10	1	97616	MUFFLER 1/2 NPT	SMC	AN40-N04

FIGURE A-6. PCU MANUFACTURER PARTS (P/N 96917)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	5	10160	SCREW 1/4-20 X 3/4 SHCS
2	1	10657	SHCS 5/16-18 X 3/4
3	4	10800	SCREW 1/4-20 X 1/2 SHCS
4	1	12894	NUT 1/4-20 JAMN
5	1	48648	FTG ELBOW 1/8 NPTM X 1/4 TUBE PRESTOLOK
6	1	5001001	TRIPPER PIN
7	1	5001003	TRIPPER BASE
8	1	5001004	4 IN TRIPPER STAND
9	2	5001008	3/8-16 SPRING PLUNGER
10	1	5001009	3/8 X 7/8" SHOULDER SCREW 5/16-18 THREAD
11	2	5001030	AIR MOTOR ASSY MOUNTING SCREW
12	2	5001031	1/4 LOW CLEARANCE RETAINING RING
13	2	5001032	FLTW 250 OD 625
14	2	5001062	1/8 X 1-3/8 STEEL SLOTTED SPRING PIN
15	1	5001063	5/16 PUSH NUT
16	1	5001105	AFC TRIPPER ROCKER
17	1	5001106	CYLINDER BRACKET
18	1	5001107	ROD END 1/4-28 UNF
19	1	5001109	PIVOT MOUNT CYL 3/4 DIA X 1/2 STROKE
20	1	5001113	PIVOT BRACKET FOR 3/4 CYLINDER
21	1	5001115	CYLINDER BLOCK

FIGURE A-7. 4" (102 MM) PNEUMATIC TRIPPER ASSEMBLY AFC (P/N 5001144)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	5001002	1/4-20 UNC JAM NUT
2	1	5001007	7 IN TRIPPER STAND
3	1	5001070	5/16-18 x 3/4 SOCKET HEAD CAP SCREW
4	4	5001420	1/4-20 X 1/2 SOCKET HEAD CAP SCREW
5	1	48648	FTG ELBOW 1/8 NPTM X 1/4 TUBE PRESTOLOK
6	1	5001001	TRIPPER PIN
7	1	5001003	TRIPPER BASE
8	2	5001008	3/8-16 SPRING PLUNGER
9	1	5001009	3/8 X 7/8" SHOULDER SCREW 5/16-18 THREAD
10	2	5001030	AIR MOTOR ASSY MOUNTING SCREW
11	2	5001031	1/4 LOW CLEARANCE RETAINING RING
12	2	5001032	FLTW 250 OD 625
13	5	5001061	1/4-20 X 3/4 SOCKET HEAD CAP SCREW
14	2	5001062	1/8 X 1-3/8 STEEL SLOTTED SPRING PIN
15	1	5001063	5/16 PUSH NUT
16	1	5001105	AFC TRIPPER ROCKER
17	1	5001106	CYLINDER BRACKET
18	1	5001107	ROD END 1/4-28 UNF
19	1	5001109	PIVOT MOUNT CYL 3/4 DIA X 1/2 STROKE
20	1	5001113	PIVOT BRACKET FOR 3/4 CYLINDER
21	1	5001115	CYLINDER BLOCK

FIGURE A-8. 7" (178 MM) PNEUMATIC TRIPPER ASSEMBLY AFC (P/N 5001177)

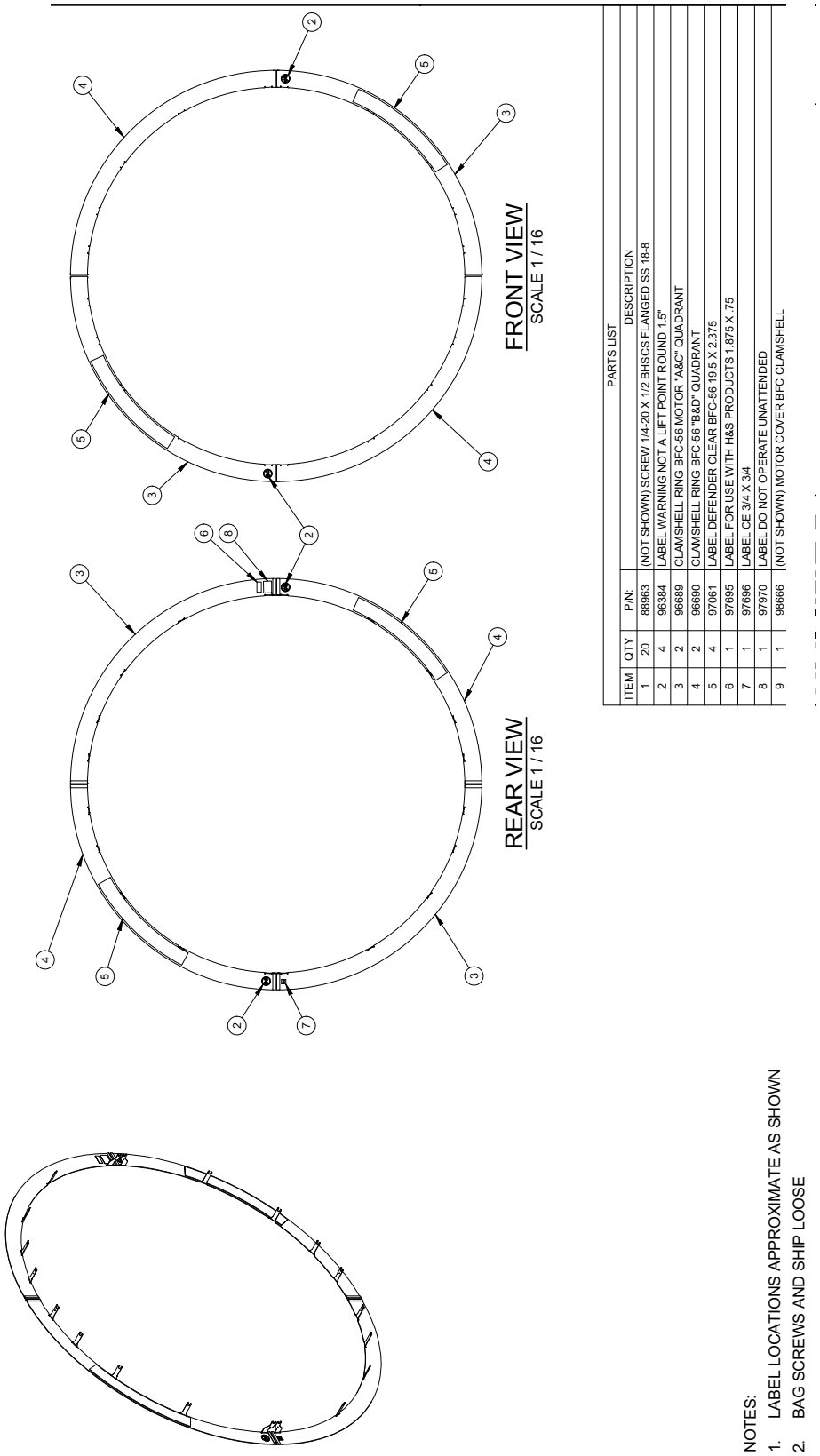


FIGURE A-9. BCF-56 DEFENDER GUARD KIT ASSEMBLY (P/N 97221)

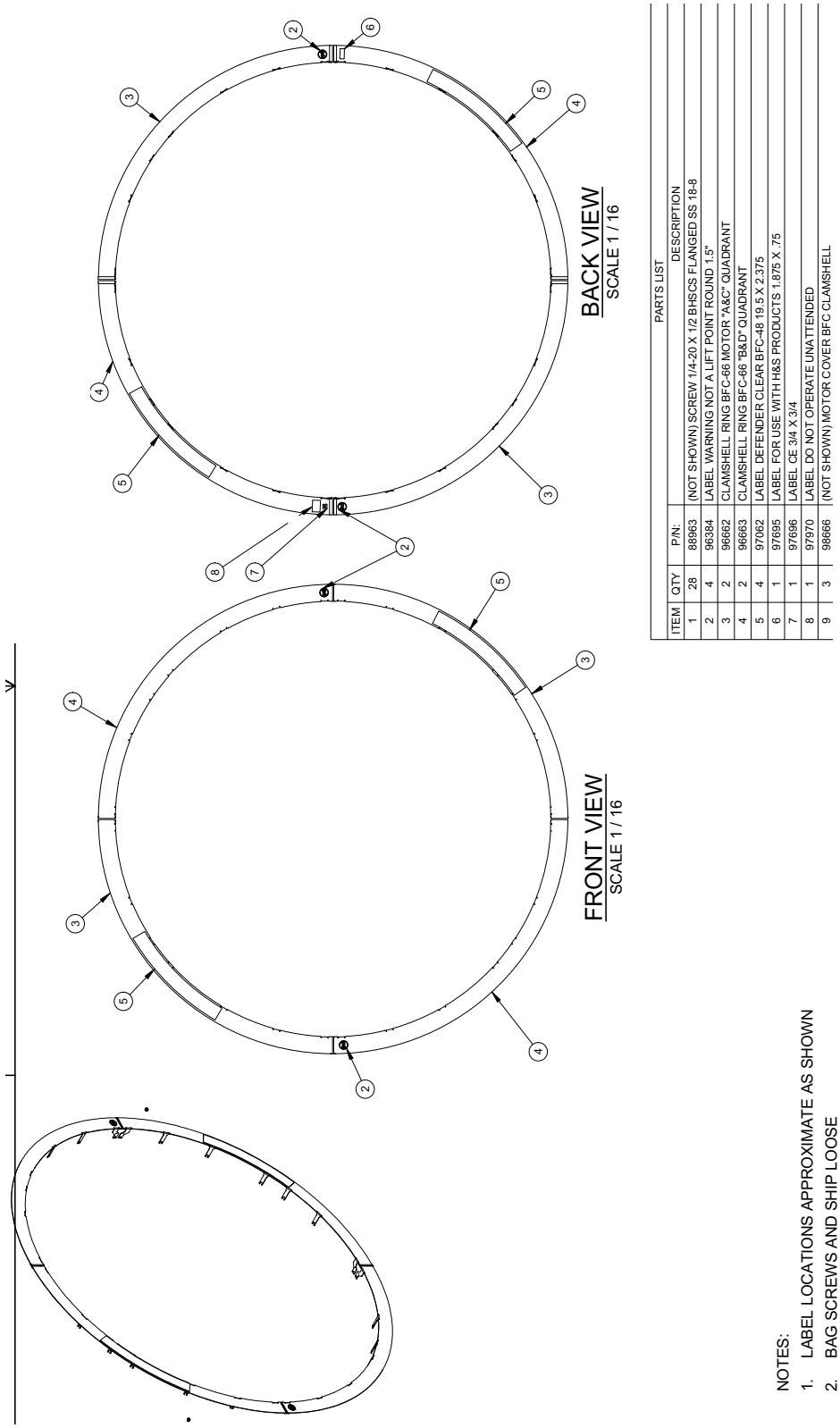
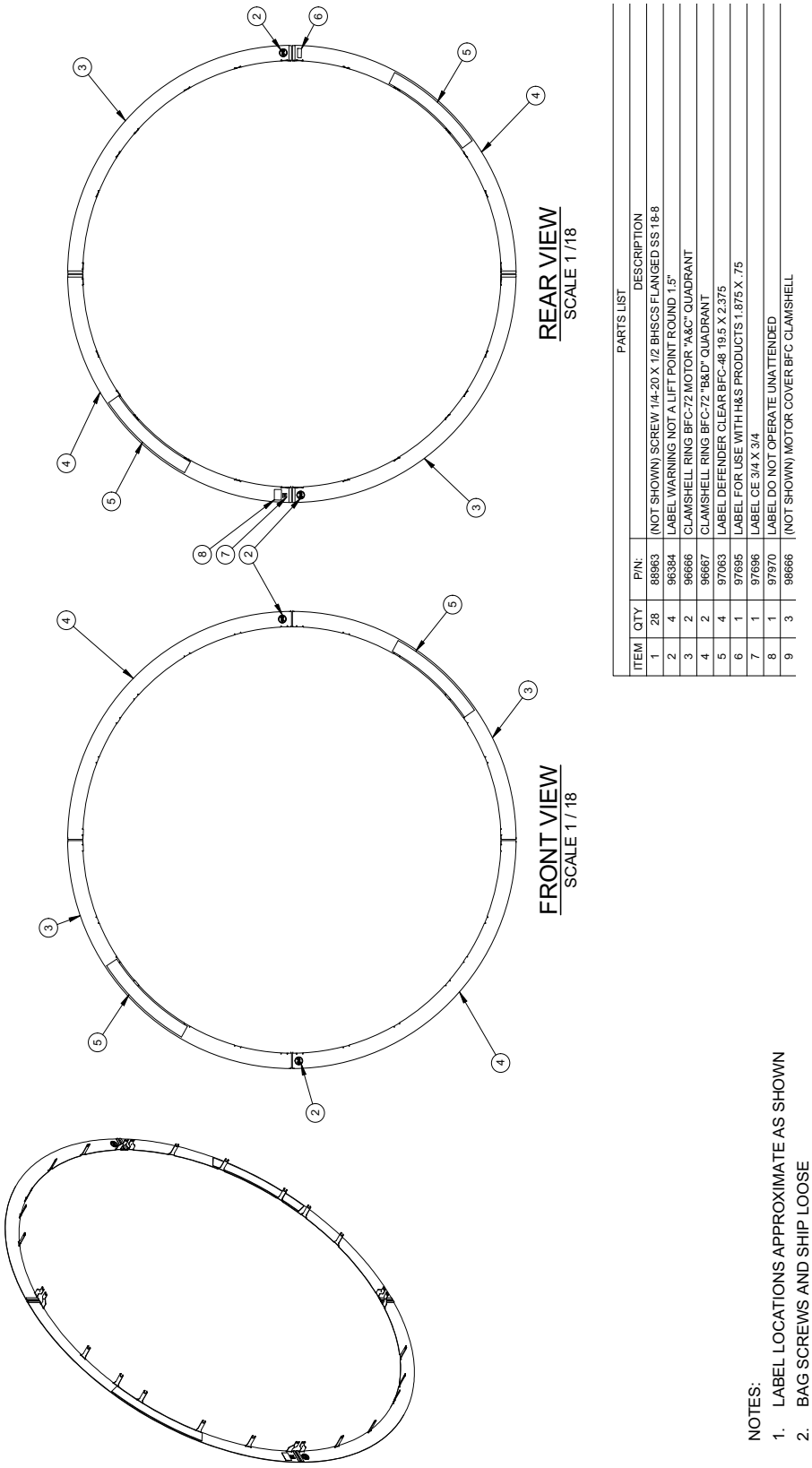


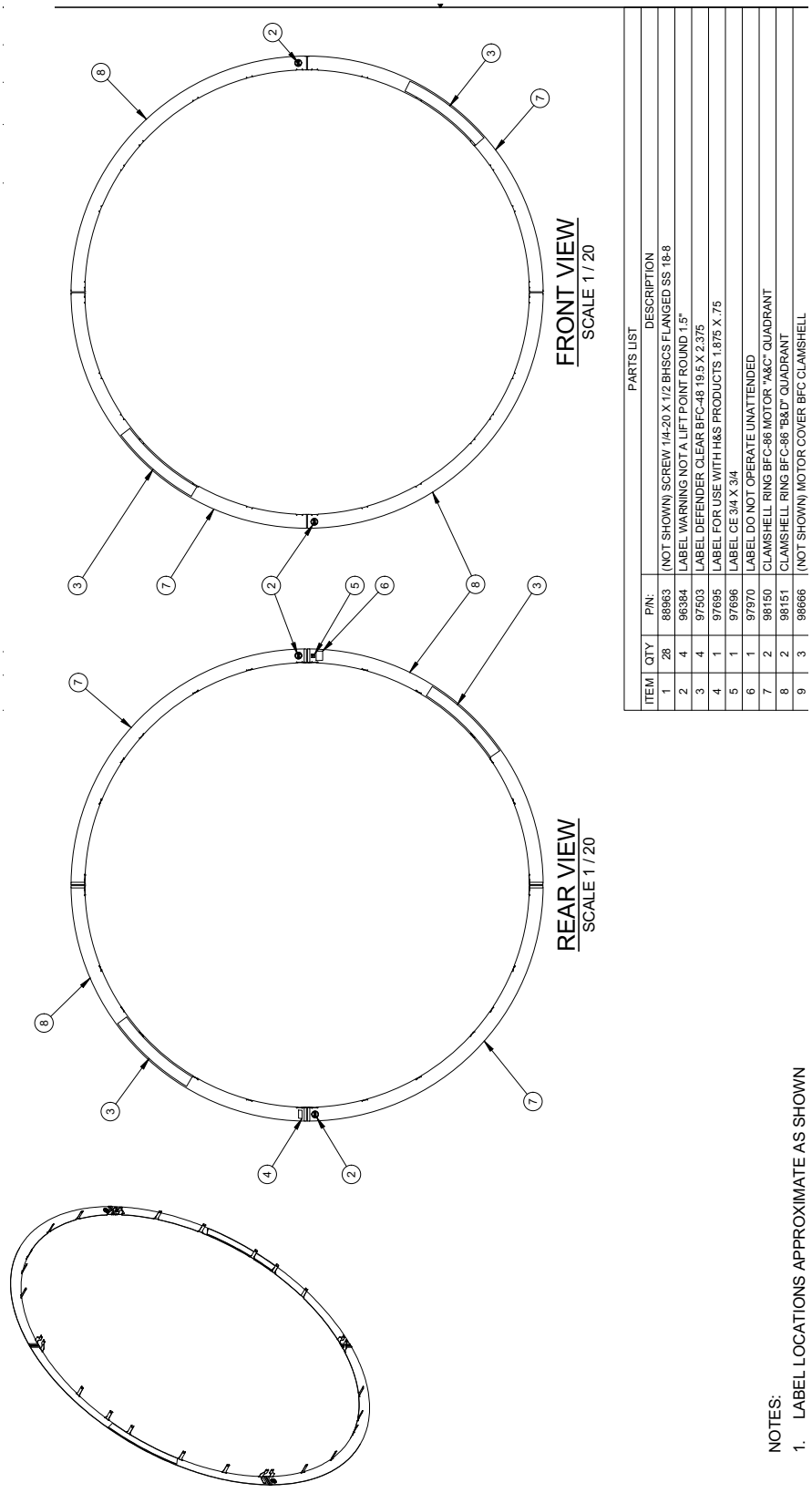
FIGURE A-10. BCF-66 DEFENDER GUARD KIT ASSEMBLY (P/N 97222)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	28	88963	(NOT SHOWN) SCREW 1/4-20 X 1/2 BHSCS FLANGED SS 18-8
2	4	96384	LABEL WARNING NOT A LIFT POINT ROUND 1.5"
3	2	96666	CLAMSHELL RING BFC-72 MOTOR "A&C" QUADRANT
4	2	96667	CLAMSHELL RING BFC-72 "B&D" QUADRANT
5	4	97063	LABEL DEFENDER CLEAR BFC-48 19.5 X 2.375
6	1	97695	LABEL FOR USE WITH H&S PRODUCTS 1.875 X .75
7	1	97696	LABEL CE 3/4 X 3/4
8	1	97970	LABEL DO NOT OPERATE UNATTENDED
9	3	98666	(NOT SHOWN) MOTOR COVER BFC CLAMSHELL

NOTES:
1. LABEL LOCATIONS APPROXIMATE AS SHOWN
2. BAG SCREWS AND SHIP LOOSE

FIGURE A-11. BCF-72 DEFENDER GUARD KIT ASSEMBLY (P/N 97223)



PARTS LIST

ITEM	QTY	P/N:	DESCRIPTION
1	28	88963	(NOT SHOWN) SCREW 1/4-20 X 1/2 BHSCS FLANGED SS 18-8
2	4	96384	LABEL WARNING NOT A LIFT POINT ROUND 1.5"
3	4	97503	LABEL DEFENDER CLEAR BFC-48 19.5 X 2.375
4	1	97695	LABEL FOR USE WITH H&S PRODUCTS 1.875 X .75
5	1	97696	LABEL CE 3/4 X 3/4
6	1	97970	LABEL DO NOT OPERATE UNATTENDED
7	2	98150	CLAMSHELL RING BFC-86 MOTOR "A&C" QUADRANT
8	2	98151	CLAMSHELL RING BFC-86 "B&D" QUADRANT
9	3	98666	(NOT SHOWN) MOTOR COVER BFC CLAMSHELL

NOTES:
1. LABEL LOCATIONS APPROXIMATE AS SHOWN
2. BAG SCREWS AND SHIP LOOSE

FIGURE A-12. BCF-86 DEFENDER GUARD KIT ASSEMBLY (P/N 97501

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APPENDIX B SCHEMATICS

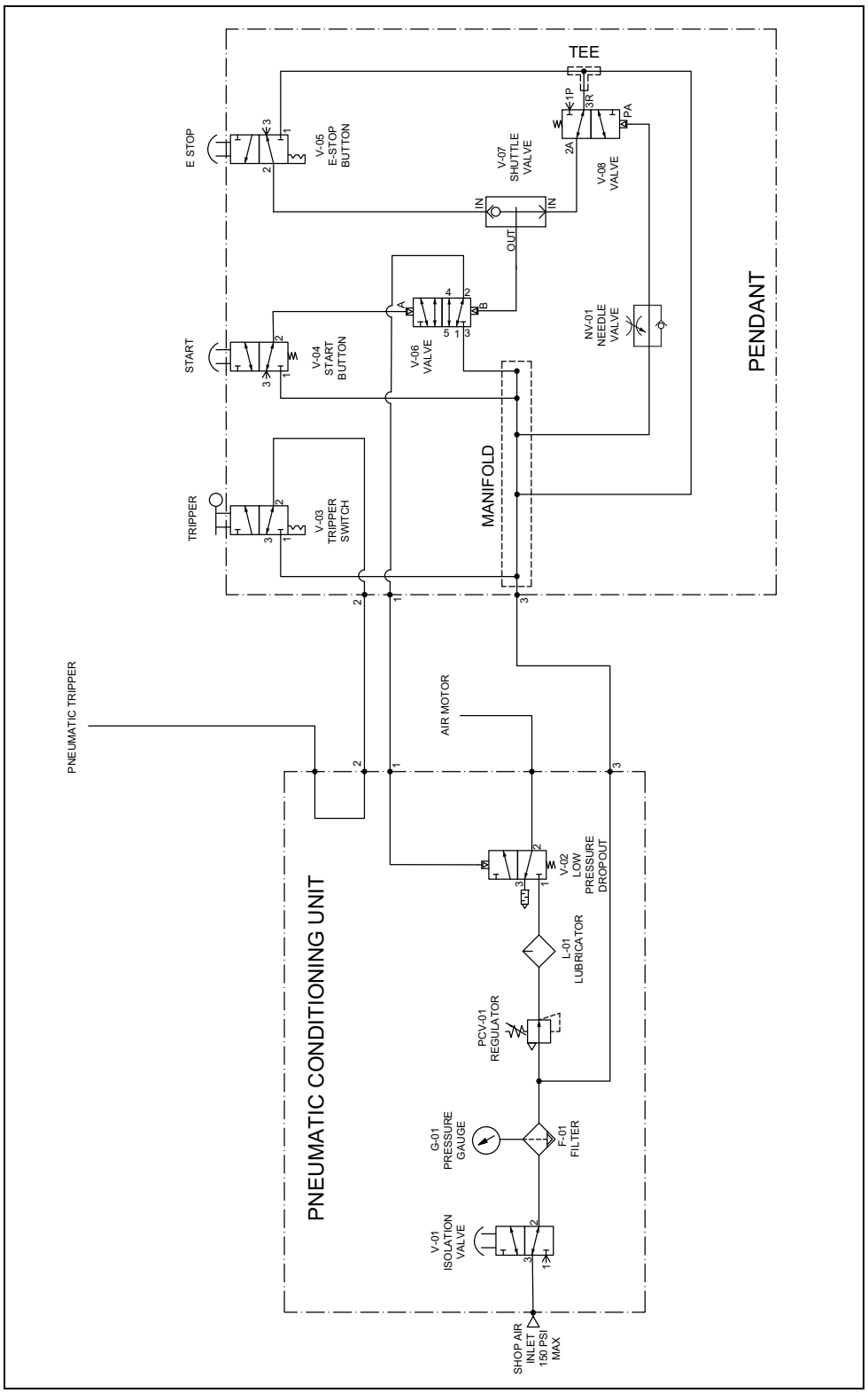

FIGURE B-1. PNEUMATIC CONDITIONING UNIT SCHEMATIC

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APPENDIX C SDS

Contact CLIMAX for the current Safety Data Sheets.

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H&S TOOL