PD3000

PORTABLE DRILL

OPERATING MANUAL

CLIMAX

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- Telephone number
- Machine model
- Serial number (if applicable)
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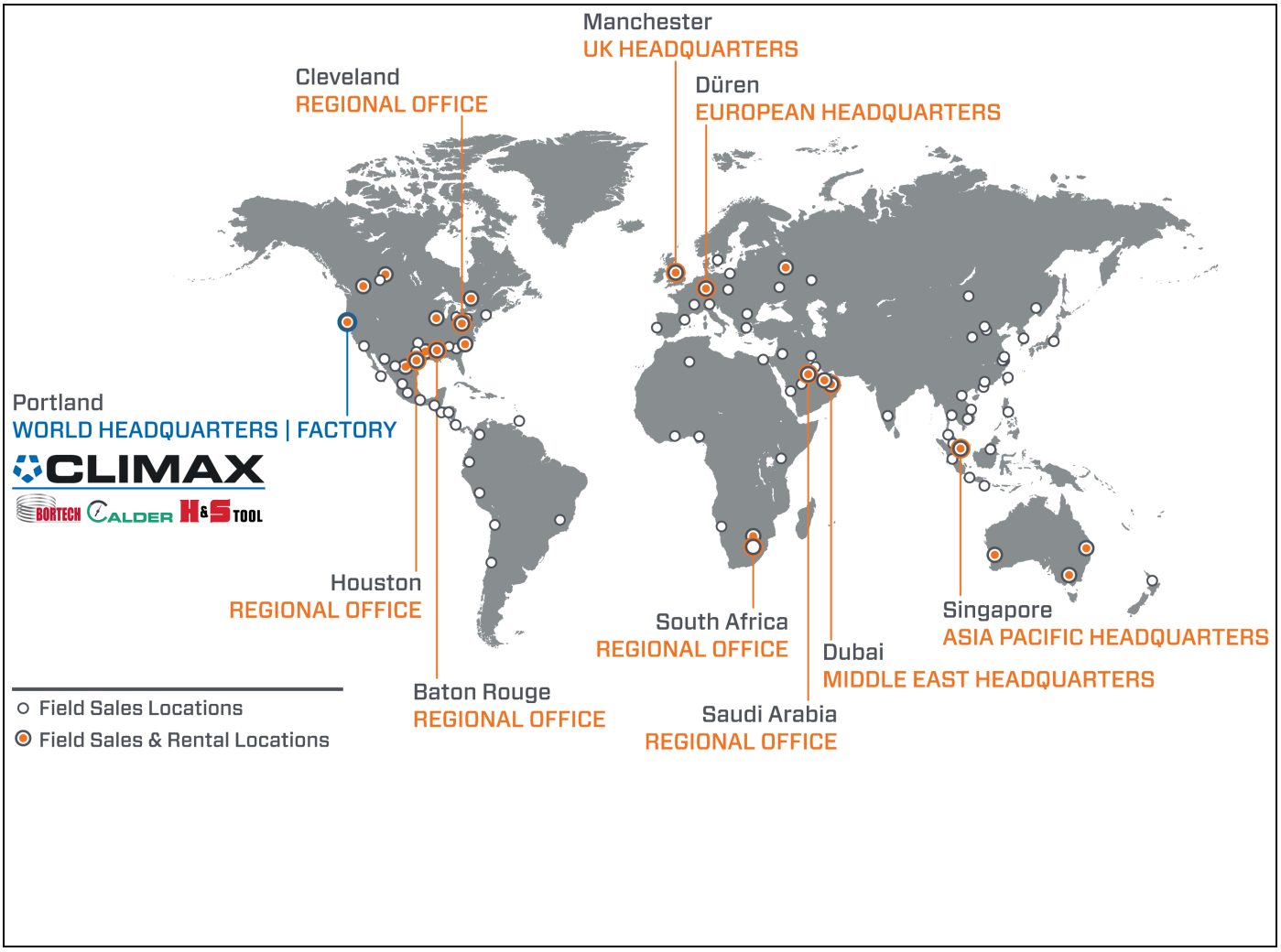

LIMITED WARRANTY

CLIMAX Portable Machining & Welding Systems, 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 prepaid, to the factory. CLIMAX will, at its option, either repair or replace the defective part and/or correct any defect in the labor performed, both at no charge, and return the part or repaired machine shipping prepaid.

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- Damage after the date of shipment not caused by defects in materials or workmanship
- Damage caused by improper or inadequate machine maintenance
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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 the setup, operation, maintenance, storage, shipping and decommissioning of the PD3000 Portable Drill.

NOTICE

For maximum safety and performance, read this entire manual before attempting to set up or operate the machine.

The first page of each chapter includes a list of the chapter contents to help you locate specific information.

The appendices contain supplemental product information to aid in setup, operation and maintenance tasks.

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]

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*.

⚠ DANGER

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

⚠ WARNING

Indicates a hazardous situation which, if not avoided, ***COULD*** result in death or serious 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. Safety is a joint effort. You must do your part by:

- Being aware of your work environment
- Closely following the operating procedures and safety precautions contained in this manual
- Closely following your employer's safety guidelines

When operating or working around the machine, observe the safety precautions contained in this manual

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. Conduct a risk assessment of each job site before setting up and operating this machine (see Section 1.5 and Section 1.6 on page 7).

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 equipment (PPE) when operating this or any other machine tool. Wear flame-resistant clothing with long sleeves and legs when operating the machine, as hot flying chips from the workpiece may burn or cut bare skin.

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

Danger zone – The danger zone of this machine is defined as being inside of 22" (559 mm) from the spindle of the machine.

Lifting – This CLIMAX machine weighs approximately 53 lbs. Whenever necessary, use the proper hoisting equipment and rigging to lift the machine or its components. Always use the lifting points designated on the machine. Follow the lifting instructions in Section 3.2. Use caution. Never drop equipment as this may damage the components.

Lock out/tag out – Lock out and tag out the machine before performing maintenance, or before reaching into the danger zone of this machine.

Moving parts – CLIMAX machines have numerous exposed moving parts and interfaces that can cause severe impact, pinching, cutting, and other injuries. During machine operation:

- Keep hands and tools away from moving parts.
- Secure hair, clothing, jewelry, and pocket items to prevent them from becoming entangled in moving parts.

Sharp edges – Drill bits and workpieces have sharp edges that can easily cut skin. Wear protective gloves and exercise caution when handling a drill bit or workpiece.

Hot surfaces – During operation, motors, pumps, HPUs, and drill bits can generate enough heat to cause severe burns. Pay attention to hot-surface warning 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. Always wear hearing protection when operating the machine or working around it. During testing, the machine produced the following sound levels.[1]

TABLE 1-1. SOUND LEVELS

	Pneumatic
Sound power	99.3 dBA
Operator sound pressure	95.1 dBA
Bystander sound pressure	91 dBA

Hazardous environments – Do not operate the machine in environments where explosive materials, toxic chemicals, or radiation may be present. Do not expose the machine to rain or wet conditions.

Rotating machinery – Rotating machinery can cause serious injuries. Lock out all power sources before performing any adjustment, lubrication, or maintenance.

Hoses – Keep hoses away from heat, oil, sharp edges, and moving parts. Always examine hoses for damage before use.

Adjustments and maintenance – Stop the machine and lock out all power sources before performing any adjustment, lubrication, or maintenance.

Controls – The machine controls are designed to withstand the rigors of normal use. The on/off switches are clearly visible and identifiable. When you leave the machine, disconnect all power sources to the machine. Either disconnect the air hose or turn the lock-out/tag-out valve to the lock position.

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

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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.

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 portable machine tool. However these checklists are typical of the types of risks the assembler and operator should be considering. 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).
☐	I took inventory of all the items required but not supplied (Section on page 10).
☐	I considered how the machine operates and identified the best placement for hose(s) and the operator.
☐	I have assessed any additional risks unique to this application of the portable machine tool.

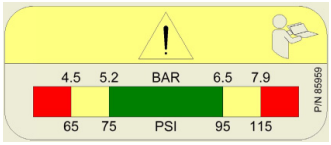
TABLE 1-3. RISK ASSESSMENT CHECKLIST AFTER SET-UP

	After Set-up
☐	I checked that the machine is safely installed (according to Section 3). If the machine is installed at an elevated position, I checked that the machine is safeguarded against falling, and that the fall path is clear and marked.
☐	I identified all possible pinch points, such as those caused by rotating or traveling parts, and informed the affected personnel.
☐	I planned for containment of any chips or debris produced by the machine.
☐	I performed any required maintenance outlined in Maintenance Intervals (Section 5.2).
☐	I checked that all affected personnel have the recommended personal protective equipment, as well as any equipment required by the site or other regulations.
☐	I checked that all affected personnel understand the danger zone and are clear of it.
☐	I have assessed for additional risks unique to this application of the portable machine tool.

1.7 LABELS

Table 1-4 shows the labels that should be on your machine. If any are defaced or missing, contact CLIMAX immediately for replacements.

TABLE 1-4. LABELS

	P/N 35740 CLIMAX serial number, year, and model number plate		P/N 70226 Label CLIMAX logo
	P/N 79328 Refer to the instruction manual label		P/N 78748 Hearing and eye protection required label
	P/N 80510 Warning sharp rotating equipment label		P/N 85959 Operating pressure range label
	P/N 80089 Yellow safety background label		

1.8 PLACEMENT OF LABELS

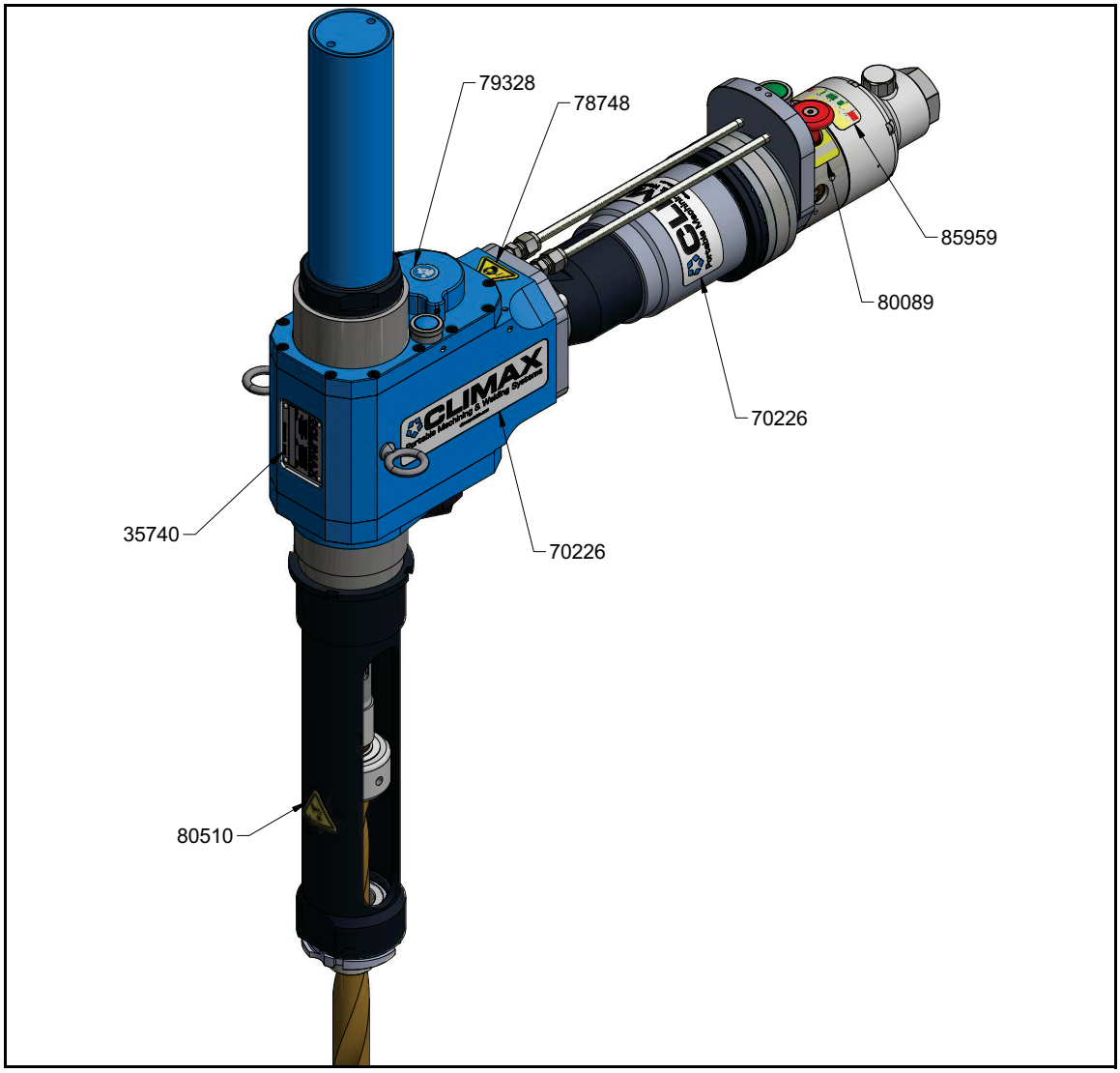


FIGURE 1-5. PD3000 LABEL PLACEMENT BY PART NUMBER

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2 OVERVIEW

IN THIS CHAPTER:

The PD3000 Portable Drill is designed for automatic precision drilling and reaming to a preset depth, followed by fast automatic retraction of the tool and automatic shutoff.

The PD3000 is highly configurable with a variety of options and accessories. The machine you purchased may not have all of these. If you require additional accessories, please contact CLIMAX for assistance.

2.1 FEATURES AND COMPONENTS

High power and torque in a compact design – The PD3000 utilizes a 3 hp (2.24 kW) motor which delivers higher power and torque to produce the fastest drilling times on the market.

Improved quality and reliability – Each gear set is fully supported by two bearings. The clutch system prevents the drill from destroying itself. An innovative shutoff mechanism and dedicated chip wiper bushing help prevent chips and debris from entering the gearbox.

Operator safety – The drill controls have an integrated low-pressure dropout system to protect the operator from an unexpected startup.

Automatic retract – The depth collar determines the hole depth, and then automatically triggers a retract cycle. The drill retracts at approximately 10 times the drill feed rate.

Manual retract – The drill will retract when the operator presses the manual retract button.

2.1.1 Performance characteristics

TABLE 2-1. PERFORMANCE CHARACTERISTICS

Characteristic	Value(s)
Feed rate	0.003" or 0.006" ipr (.076 or .152 mmpr) Feed rate depends on the gearset installation, see Section Section 5.5 on page 43.
Maximum cutting depth	6.5 inch or 4.0 inch (16.5 cm or 10.16 cm) Cutting depth depends on the machine configuration.
Spindle size	Morse taper #3
Drill size	0.69" – 1.38" (1.75 cm - 3.5 cm)
Spindle speed	Variable, 300 RPM free speed

2.1.2 Components

PD3000 components are shown in Figure 2-2.

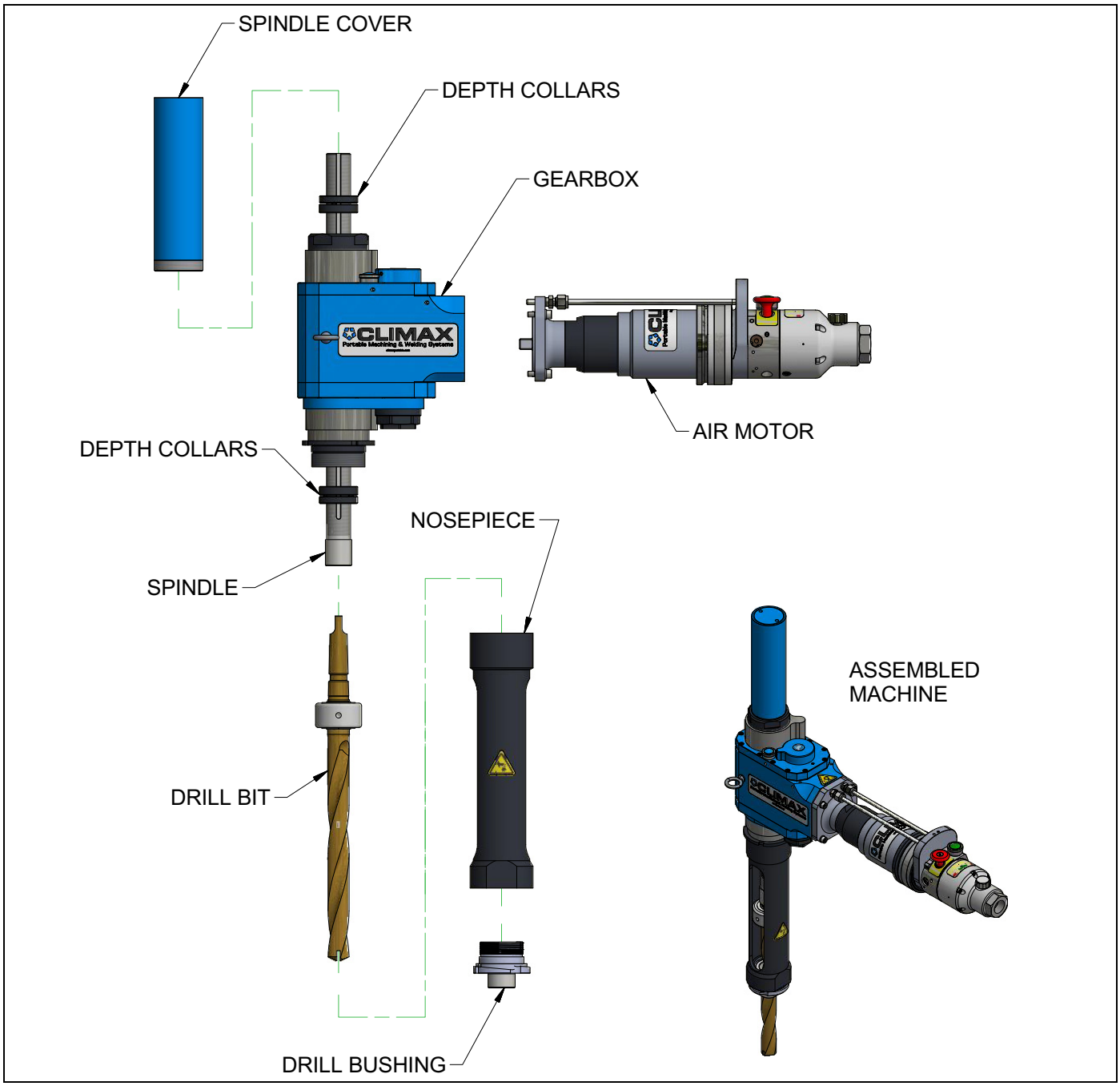

FIGURE 2-2. PD3000 COMPONENTS

NOTICE

The drill bit and drill bushing are unique to the end user application and not included with the machine. See Section 3.4.3 on page 29 and Section 3.4.4 on page 29 for drill bushing and drill bit requirements.

2.2 RIGGING AND LIFTING INFORMATION

There are two lifting eyes on the gearbox assembly that can be used to lift the machine. See Section 3-1 on page 22 for information about lifting the PD3000 using the lifting eyes. The weight for sub-assembly configurations are listed in Table 2-5.

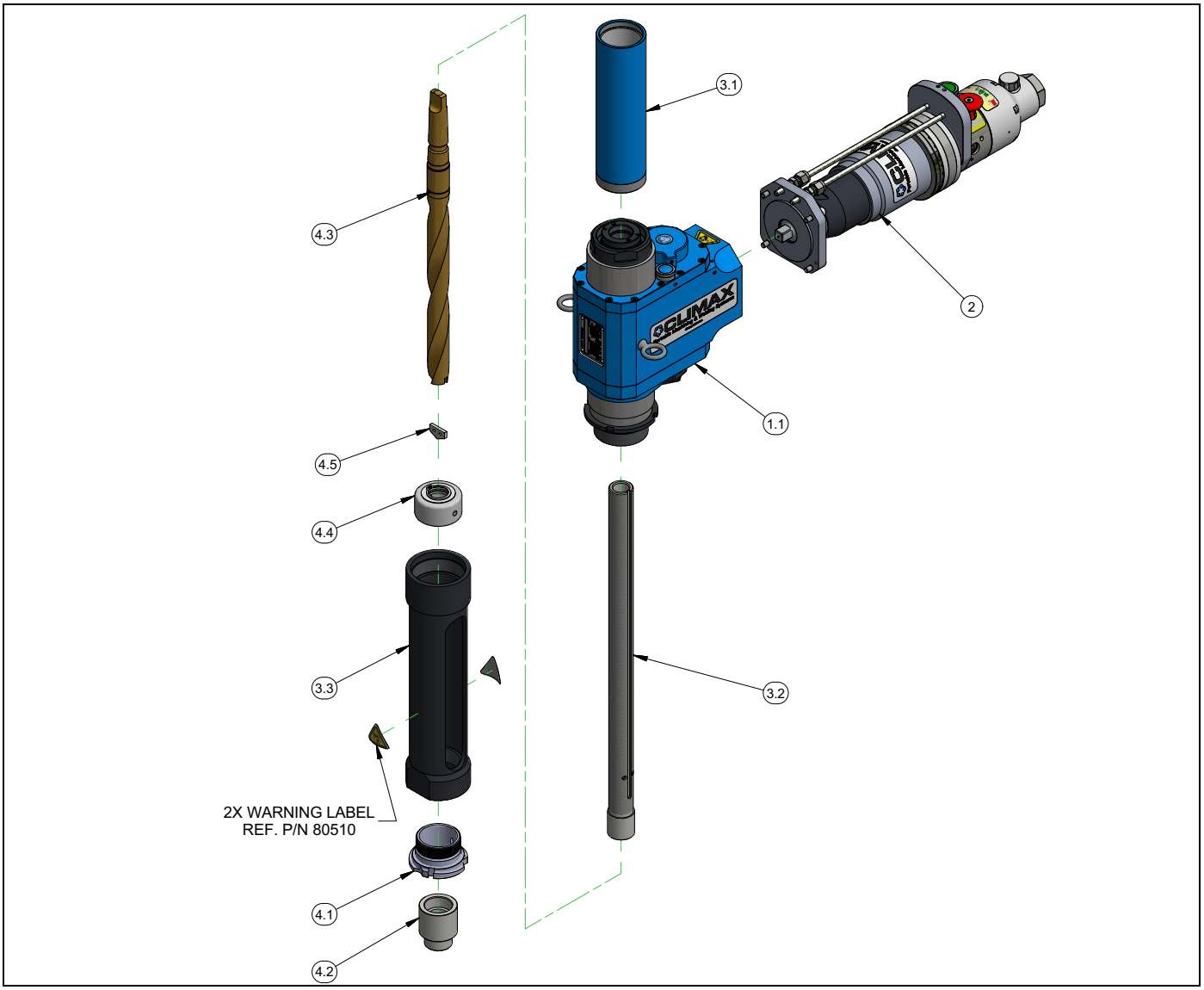

FIGURE 2-3. SUB-ASSEMBLY COMPONENTS

TABLE 2-4. SUB-ASSEMBLY IDENTIFICATION

Item	Name
1.1	PD3000 right angle gearbox
2	PD3000 air motor
3.1	Spindle guard

TABLE 2-4. SUB-ASSEMBLY IDENTIFICATION

Item	Name
3.2	Drill spindle with #3 Morse taper
3.3	Nosepiece
4.1	Drill bushing holder
4.2	Drill bushing
4.3	Drill bit
4.4	Drill bit rotary union
4.5	Drill Bit insert (for spade drills)

To transport the machine without exceeding a 50-lb (22.7 kg) lift, do the following procedure:

1. Assemble all sub-assemblies except the air motor assembly (item 2 in Table 2-5).
2. Mount the machine to the workpiece.
3. Once the machine is mounted to the workpiece, attach the air motor assembly. Refer to Section 3.5.3 on page 36 for instructions.

For complete instructions on machine assembly, see Section 3 on page 21.

Component weights are shown in Table 2-5.

TABLE 2-5. SUB-ASSEMBLY WEIGHTS

Item	Sub-assembly	Mass lbs (kg)
1	Gearbox assembly	26.2 (11.9)
2	Air motor assembly	26.2 (11.9)
3	Spindle components	8.4 (3.8)
4	Spade drill kit	4.0 (1.8)
--	Pelican shipping container (not shown)	28 (12.7)
--	Gearbox assembly, spindle components, and spade drill kit combined	38.6 (17.5)

2.3 CONTROLS

Machine controls are pneumatic. Control functions are listed in Table 2-6. Drill controls are shown in Figure 2-1.

⚠ WARNING

Machine controls require clean, dry air for proper function. Do not operate the machine with air that does not meet the requirements listed in Section 2.4.1.

TABLE 2-6. CONTROL FUNCTIONS

Control		Function	Settings
Operator controls (Figure 2-1)	Start button	Press and hold for 1-2 seconds to start the drill cycle.	Latching
	Emergency stop button	Press to do all of the following: • De-energizes the drill motor • Vent the pneumatic control circuit • Reset the spindle direction to feed Pull to re-enable operation.	Down: stop Up: reset/ready to run
	Manual retract button	During operation, press and release to retract fully in a rapid retract mode.	NA
Automatic controls (Figure 2-1)	Automatic retract switch	When tripped by the top depth collar during operation, the switch retracts the spindle in a rapid retract mode.	Latching
	Automatic stop switch	During operation, the switch stops machine operation when it is pressed by the bottom depth collar.	Momentary

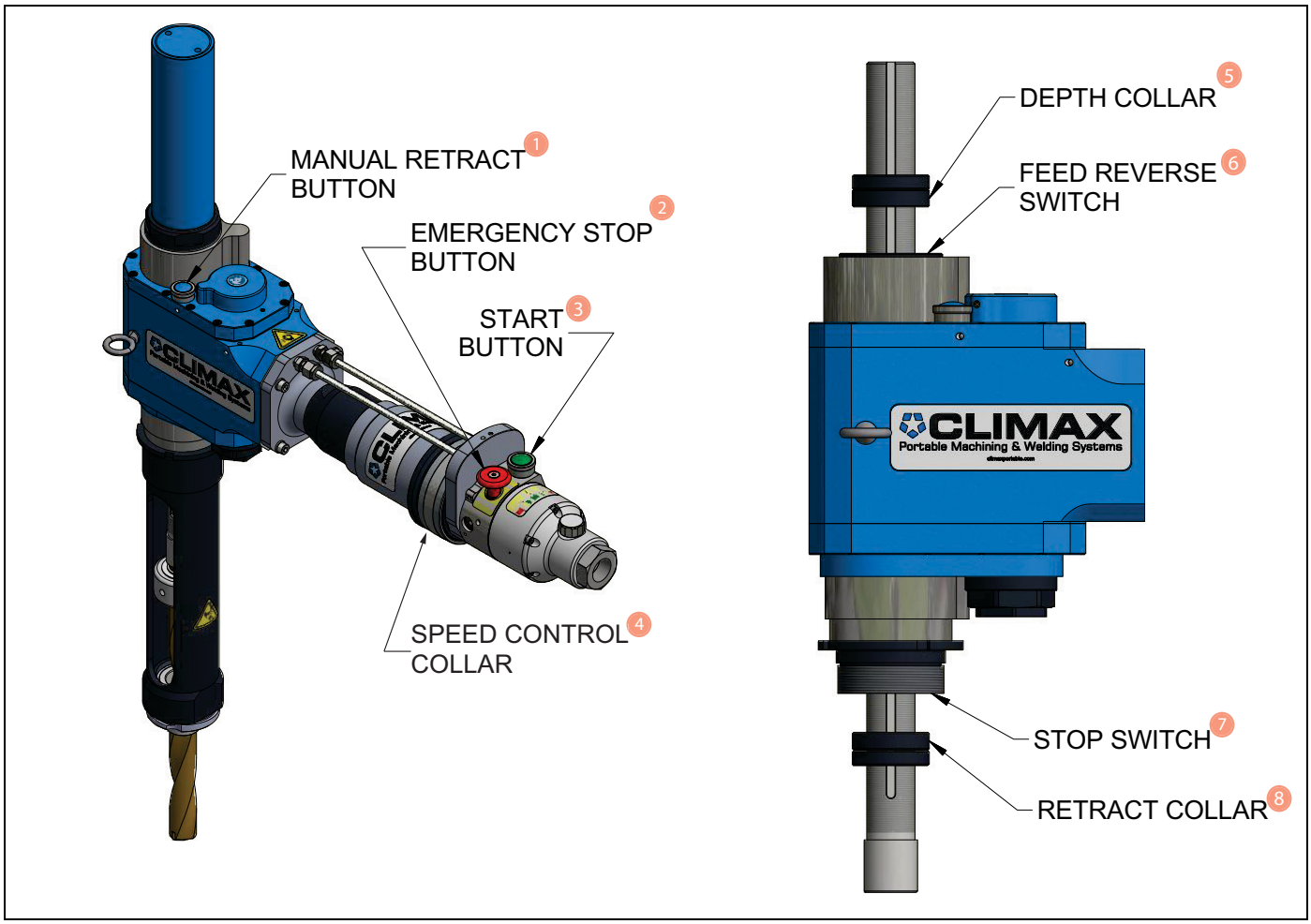

FIGURE 2-1. OPERATOR CONTROLS (LEFT), AUTOMATIC CYCLE CONTROLS (RIGHT)

TABLE 2-7. OPERATOR CONTROLS AND AUTOMATIC CYCLE CONTROLS COMPONENTS IDENTIFICATION

Number	Component
1	Manual retract button
2	Emergency stop button
3	Start button
4	Speed control collar
5	Depth collar
6	Feed reverse switch
7	Stop switch
8	Retract collar

2.3.1 PCU requirements

NOTICE

The operator must ensure that the supplied pneumatic conditioning unit (PCU) or equivalent is used with the PD3000 to ensure reliable operation. Failure to use a PCU with the following requirements will void the warranty.

The PD3000 requires air with the following properties at the inlet of the drill:

- 87 psig air (6 bar)
- The oil used to lubricate the air must have a viscosity between 40 and 380 cst (centi-stokes) depending upon temperature. (1 drop = approximately 15 mm^3)
- Particulate filtered to 5 micron, and free of water droplets

CLIMAX PCU P/N 101920 fulfills all the requirements above.

It is the customer's responsibility to place the lubrication source as close as is necessary to the air motor to make sure sufficient motor lubrication. CLIMAX strongly recommends that the customer use a 3/4" or larger air line. If using 1/2" or smaller hose, significant (and unacceptable) air line pressure losses will occur.

2.4 MACHINE SPECIFICATIONS

2.4.1 Power and utility information

The PD3000 requires a customer air supply meeting the specifications listed in Table 2-8.

TABLE 2-8. SHOP AIR SUPPLY SPECIFICATIONS

Recommended operating pressure	80–90 psi (5.5–6.0 bar)
Required air flow	71 scfm (2,000 slpm)
Particulate filter size (supplied by the customer)	5 micron
Maximum dew point	40 °F (4.4 °C) or 20 degrees below ambient temperature, whichever is lower
Oil application rate	7-8 drops/min @ 71 scfm (2,000 l/min)
Minimum hose/inlet size	3/4" (19 mm)

2.4.2 Operating and storage condition requirements

The PD3000 can be operated and stored in the conditions outlined in Figure 2-1.

TABLE 2-9. OPERATING AND STORAGE CONDITION REQUIREMENTS

Operating temperature	40–105 ºF (7–40 °C)
Operating humidity	10–95% RH
Operating elevation	maximum of 4,000 ft (1,220 m) above sea level
Storage temperature	35–110 ºF (1.6–43.3 °C)
Storage humidity	10–60% RH
Storage location	Out of weather and direct sunlight

2.4.3 Dimensions

Figure 2-10 shows the PD3000 length and width for the 6.5" (165 mm) hole depth configuration.

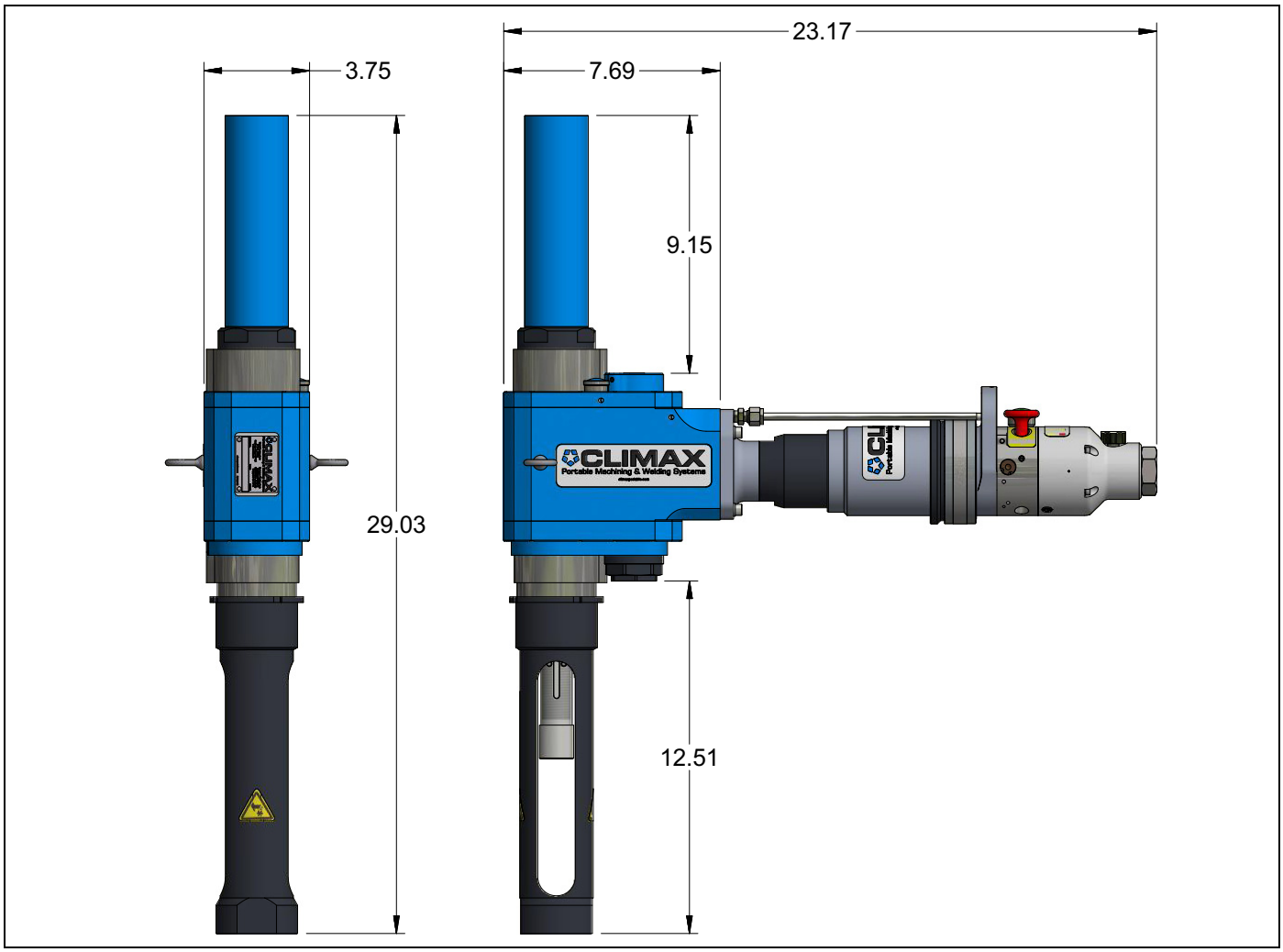

FIGURE 2-10. PD3000 DIMENSIONS

2.5 ITEMS REQUIRED BUT NOT SUPPLIED

During setup, you will need the following items that may not be included with the product:

- Drill bit (e.g. drill/reamer) with a #3 MT shank
- Drill bushing (e.g. Carr-Lane 25000 series)
- Drill guide bushing
- Workpiece hole template
- Drill bushing taper-lok screw (P/N CLIMAX P/N 86186)
- Cutting fluid/lubricant (e.g. Unist Typhoon System)
- Air supply line connection fittings
- Cleaning supplies
- Personal protective equipment: gloves, eye protection, hearing protection, and foot protection

3 SETUP

IN THIS CHAPTER:

This section describes the setup and assembly procedures for the PD3000 Portable Drill.

3.1 RECEIPT AND INSPECTION

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

When you receive your CLIMAX product:

1. Inspect the shipping container for damage.
2. Check the contents of the shipping container against the included invoice to make sure that all components have been shipped.
3. Inspect all components for damage.
4. 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. During machine use, an alternate long-term corrosion preventative may have been used. Be sure to use the correct cleaner for the applied protective coating.

3.2 LIFTING AND RIGGING

⚠ DANGER

To prevent serious injury to yourself and others, always follow the operating procedures outlined in this manual, your own company rules, and local regulations for lifting. Falling machinery may cause serious injury or death. Use caution when lifting the portable drill.

Machine installation is usually done by hand (see Section 2.2). However, the machine is supplied with two optional lifting eyes if rigging of the machine is required.The location of the lifting eyes is shown in Figure 3-1.

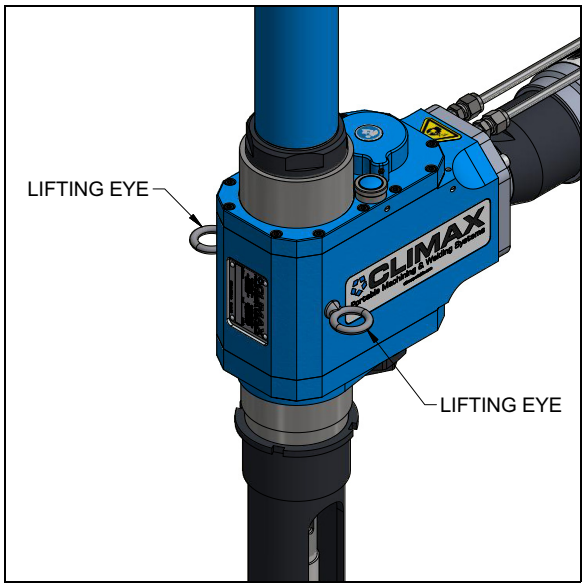

FIGURE 3-1. LOCATION OF LIFTING EYES

3.3 PREPARING THE MACHINE FOR USE

3.3.1 Cleaning the machine

Inspect and clean the machine before each use.

1. Visually check that the machine is free from dirt, chips, and other debris from previous use.

2. Remove all debris.
3. Use solvent to remove any protective coatings.

   The machine ships from CLIMAX with a heavy coating of LPS3. The recommended cleaner is LPS PreSolve Orange Degreaser. During machine use, an alternate long-term corrosion preventative may be used. Be sure to use the correct cleaner for the applied protective coating.

⚠ CAUTION

Metal chips and other debris can damage the machine and degrade its performance. Remove all metal chips and other debris from the machine before and after each use.

3.3.2 Maintaining the machine

1. Complete all required preventative maintenance (Section 5.2 on page 42).
2. Complete any required repairs.

3.3.3 Assessing the work area

The PD3000 is often used in dangerous locations (in elevated positions, near other operating equipment, overhead, etc.) CLIMAX cannot foresee where this machine will be used; therefore, you must perform a site-specific risk assessment (Section 1.5 and Section 1.6 on page 7) for each job before starting work.

⚠ WARNING

Always follow safe work practices, including site-specific safety requirements. It is your responsibility to perform a risk assessment before you set up the machine and each time before you operate the machine.

3.4 SETTING UP THE MACHINE

3.4.1 Adjusting the collars

Do the following to adjust the collars, while referring to Figure 3-1:

1. Determine the desired cutting depth.

TABLE 3-1. DEPTH AND LOCK COLLAR IDENTIFICATION

Number	Component
1	Lock collar
2	Depth collar
3	Retract collar
4	Lock collar

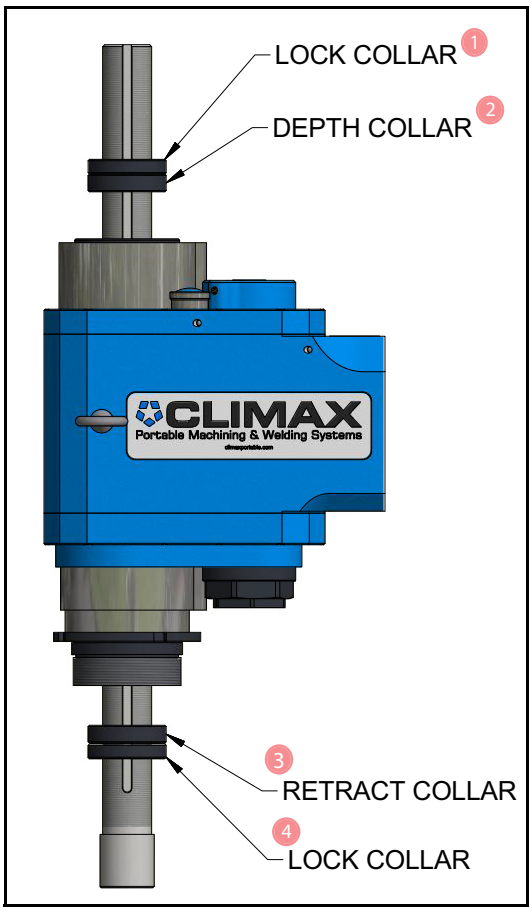

FIGURE 3-1. DEPTH AND LOCK COLLARS

2. Loosen the two M6 locking setscrews in the lock collar.

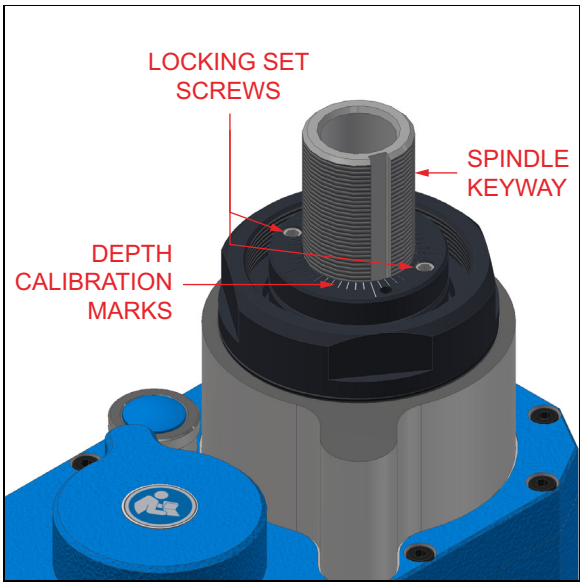

FIGURE 3-2. LOCK COLLAR COMPONENTS

3. Adjust the depth and retract collars by hand until the desired cutting depth/ shutoff depth is achieved. Refer to Figure 3-2.

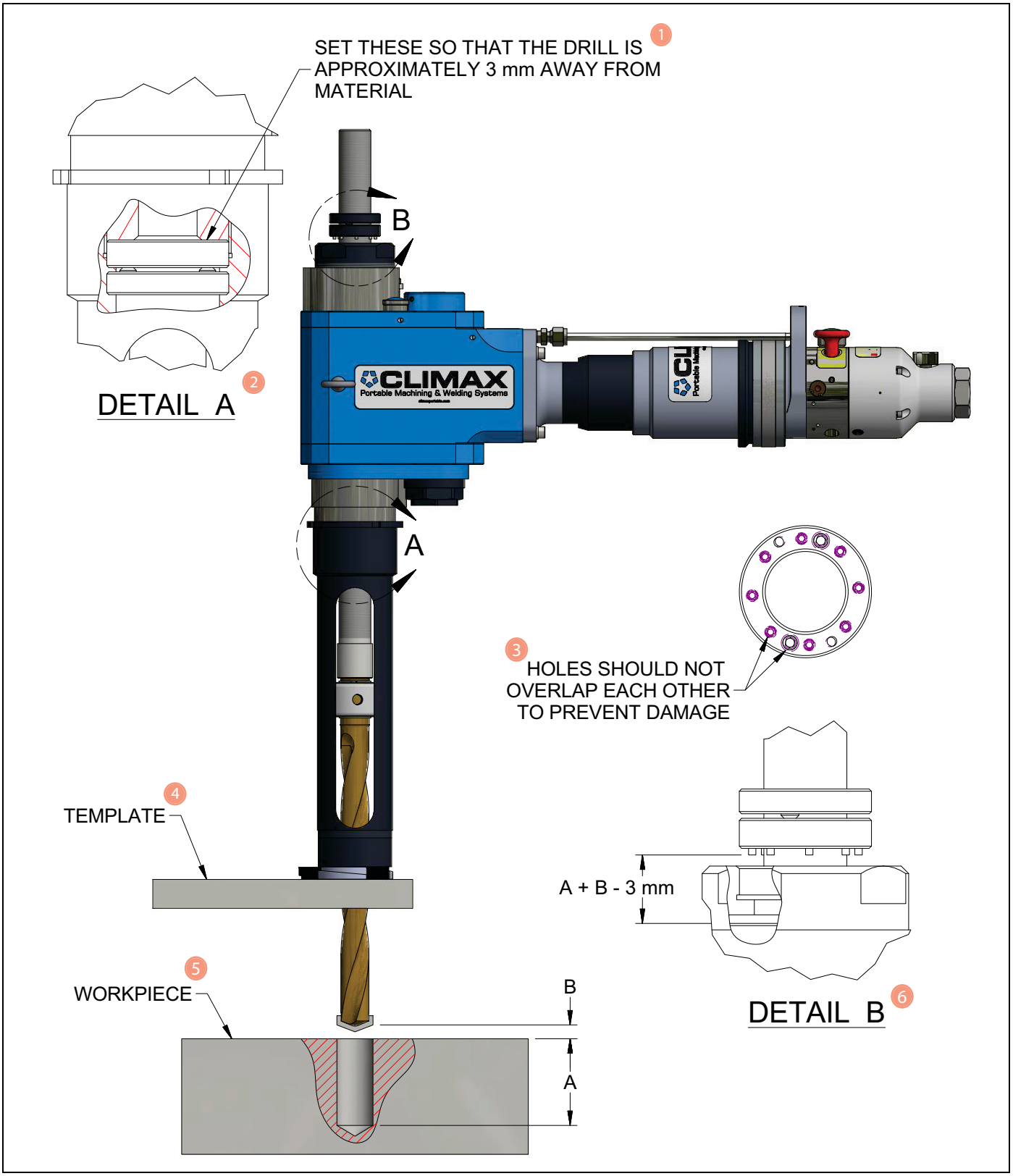

FIGURE 3-2. DRILL SETUP COMPONENTS

TABLE 3-2. DRILL SETUP COMPONENT IDENTIFICATION

Number	Component
1	Set these so that the drill is approximately 3 mm away from the material
2	Detail A
3	To prevent damage, holes should not overlap each other.
4	Template
5	Workpiece
6	Detail B

4. When adjusting the depth and retract collars, turn the collar and its lock collar together.

   One revolution of the lock collar = 0.050" (1.27 mm).
   Each calibration mark = 0.001" (0.025 mm)

NOTICE

Do not overlap the set screw holes in the collars, as that may damage the collars.

5. Lock the depth and retract collars in place by adjusting the lock collar until they are within 1/16" (1.59 mm) from the depth and retract collar.
6. Extend the two M6x1setscrews against the depth and retract collar, locking both collars in place.

NOTICE

Do not adjust the six M4 screws on the depth and retract collars.These were factory set.

3.4.2 Installing the spindle guard

Do the following to install the spindle guard to the right-angle gearbox:

1. Slide the spindle guard over the spindle.
2. Thread the spindle guard into the guard retaining nut (right-hand thread).
3. Tighten the spindle guard hand tight.

TABLE 3-3. SPINDLE GUARD COMPONENTS IDENTIFICATION

Number	Component
1	Spindle guard
2	Upper depth collars
3	Gearbox

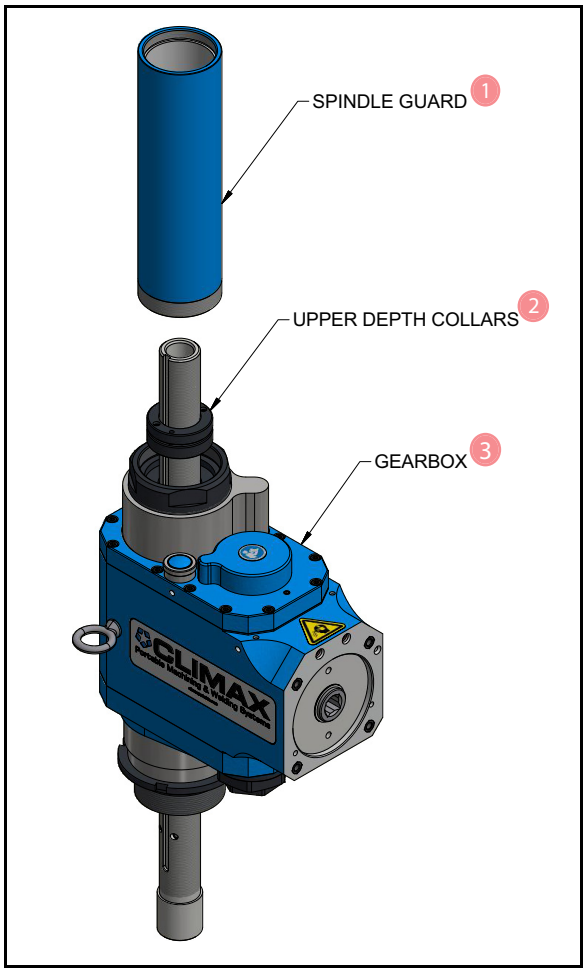

FIGURE 3-3. INSTALLING THE SPINDLE GUARD

3.4.3 Installing the nose-piece bushing

Do the following to install the nose-piece bushing:

1. Thread the appropriate nose-piece bushing (drill size and drill template specific) onto the nose-piece (left-hand thread).
2. Check that the correct drill bushing is pressed into the collar Carr Lane 25000 series before installing the bushing into the nose piece.
3. Tighten the drill bushing wrench tight.

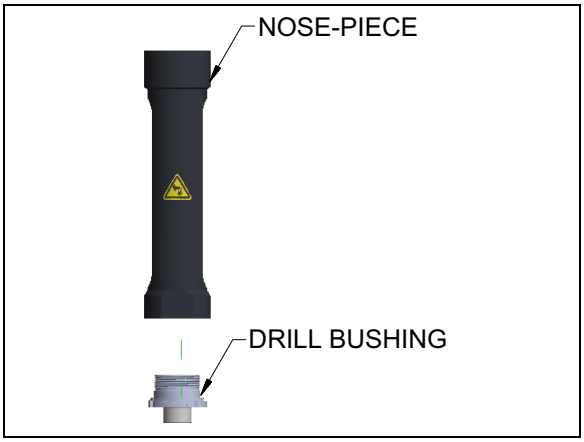

FIGURE 3-3. INSTALLING THE NOSE PIECE BUSHING

3.4.4 Installing the drill bit in the spindle

NOTICE

Drill bits are not included with the drill.

Drill bits must meet the following requirements:

- #3 Morse Taper
- Drill diameter must match the required hole size
- Drill length to match the required hole depth and travel of the PD3000

Optionally, the drill shank may include a rotary union for attaching an air-oil mist system for drill lubrication and to aid with chip evacuation.

Before installing the drill bit in the spindle, inspect the spindle and drill bit taper surfaces for wear or damage (see Figure 3-4).

If you detect wear or damage to the taper surfaces, replace the spindle (Section 5.5) and/or the drill bit.

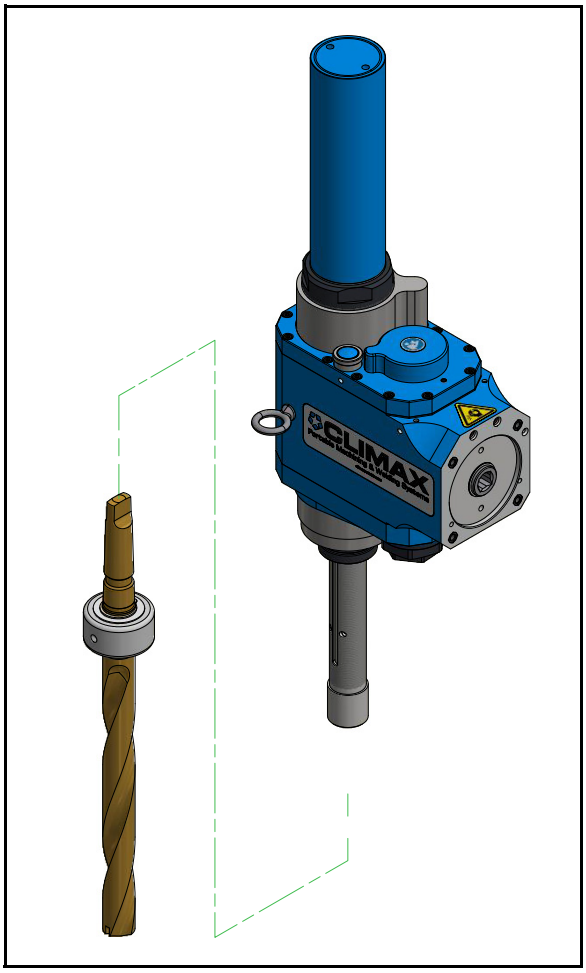

FIGURE 3-4. SPINDLE AND DRILL BIT

⚠ WARNING

The drill bit has very sharp cutting edges. Use caution to avoid injury to your hands.

Refer to Figure 3-4 while doing the following:

1. While holding the drill bit with a gloved hand, align the tang at the taper end of the drill bit with the drive tang slot (gap between two dowel pins) in the lower end of the spindle.
2. With a quick motion, insert the taper end of the tool into the lower end of the spindle to seat the tool in the spindle.

NOTICE

If the drill bit is not fully seated in the spindle it may fall out prior to drilling.

3.4.5 Installing the nose-piece on the gearbox

Refer to Figure 3-2 on page 25 while doing the following:

1. Install the drill bit in the spindle (Section 3.4.4).
2. Install a drill bushing into the end of the nose-piece (left-hand thread). Tighten the drill bushing wrench tight.
3. Slide the nose-piece over the drill bit.
4. Turn the nose-piece onto the gearbox threads (left-hand thread).
5. Use the two provided spanner wrenches to tighten the nose-piece to the gearbox wrench tight.

NOTICE

The nose-piece threads are left-handed. As the machine runs, the nose-piece will tighten on the gearbox. After you run the machine, you might need to put the gearbox in a vise to remove the nose-piece.

3.4.6 Installing the spade drill insert

With the drill tip extending beyond the nose-piece drill bushing, install the spade drill insert per the manufacturers instructions.

3.5 SETTING UP THE MACHINE ON THE WORKPIECE

The PD3000 is shipped with a spade drill, but a customer-supplied twist drill may be used instead.

3.5.1 Attaching the drill template to the workpiece

The drill attaches to the work-piece by means of a customer-supplied drill template. The template needs to be attached to the workpiece with sufficient rigidity to support both the weight of the drilling machine as well as the drilling torque and thrust.

NOTICE

The drill template design and mounting has a significant impact on the location, straightness, and size of the holes drilled. Consult CLIMAX for additional recommendations concerning the design of the drill template.

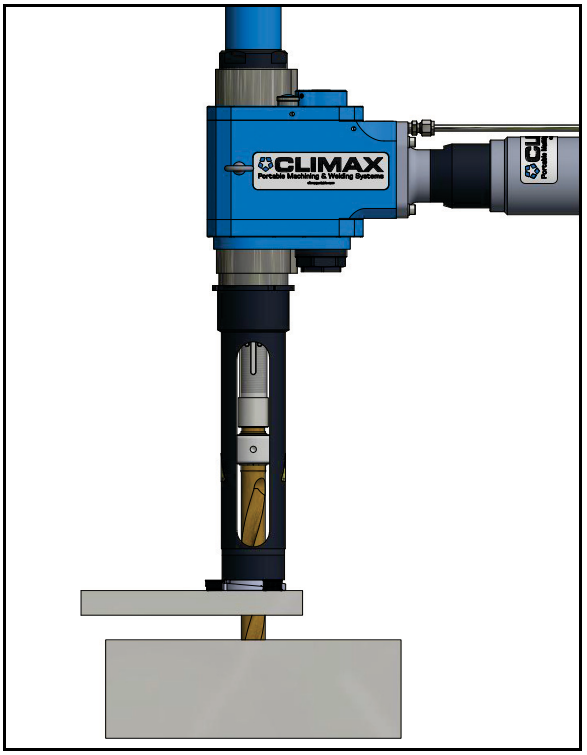

FIGURE 3-5. DRILL, TEMPLATE, AND WORKPIECE

3.5.1.1 Using a twist drill

If using a twist drill, refer to Figure 3-6. The template should be flush to the workpiece.

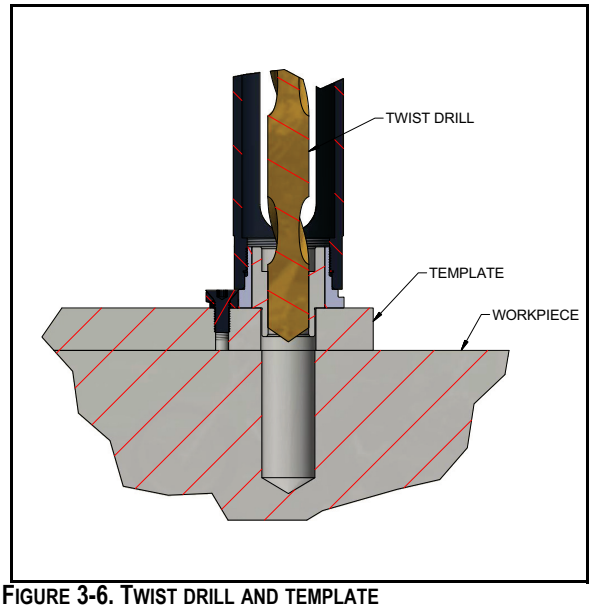

FIGURE 3-6. TWIST DRILL AND TEMPLATE

3.5.1.2 Using a spade drill

CLIMAX recommends that a standoff be used when attaching the drill template to the workpiece that is at least 1" wide or 1x the drill diameter whichever is larger. A gap will allow the chips to be cleared away without having to travel through the nose-piece drill bushing.

⚠ WARNING

Attach the drill template to the workpiece with sufficient rigidity and strength to support both the weight of the drilling machine as well as the drilling thrust and torque loads.

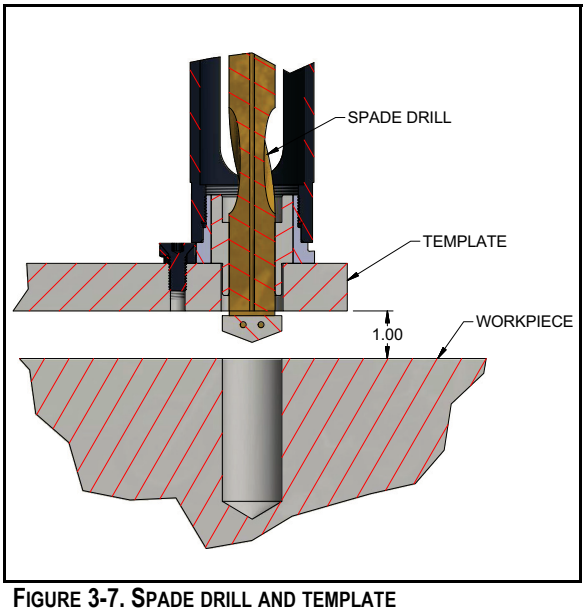

FIGURE 3-7. SPADE DRILL AND TEMPLATE

3.5.2 Attach the drill to the drill template

NOTICE

The AFL lock screws take time to install properly on the drill template to ensure that all three screws are aligned properly and carry the load easily. Once the screws are properly installed, there is no need to remove or adjust them to install or remove the PD3000.

Do the following to attach the drill to the drill template:

1. Attach the customer-supplied template to the workpiece (see Section 3.5.1).
2. Install the customer-supplied drill bushing lock screws into the customer-supplied template. See Figure 3-10 on page 35 for guidance on screws that are okay to use and not okay to use.

NOTICE

P/N 87162 fixture ring (available for purchase with CLIMAX; see Figure 3-8) is recommended for larger hole sizes with higher drilling forces, or when the drilled holes are horizontal and there is the possibility of high cantilever loads on the drill attachment.

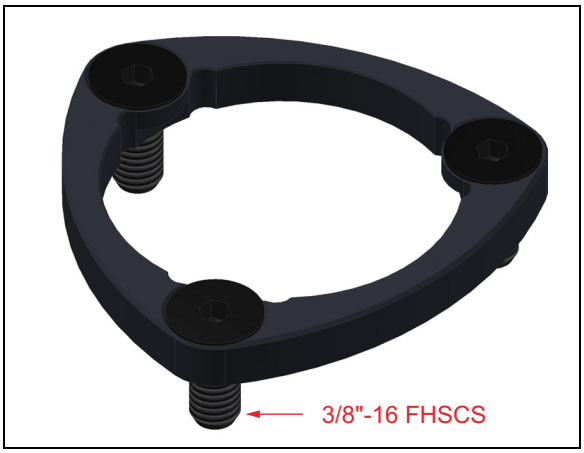

FIGURE 3-8. PD3000 FIXTURE RING (P/N 87162)

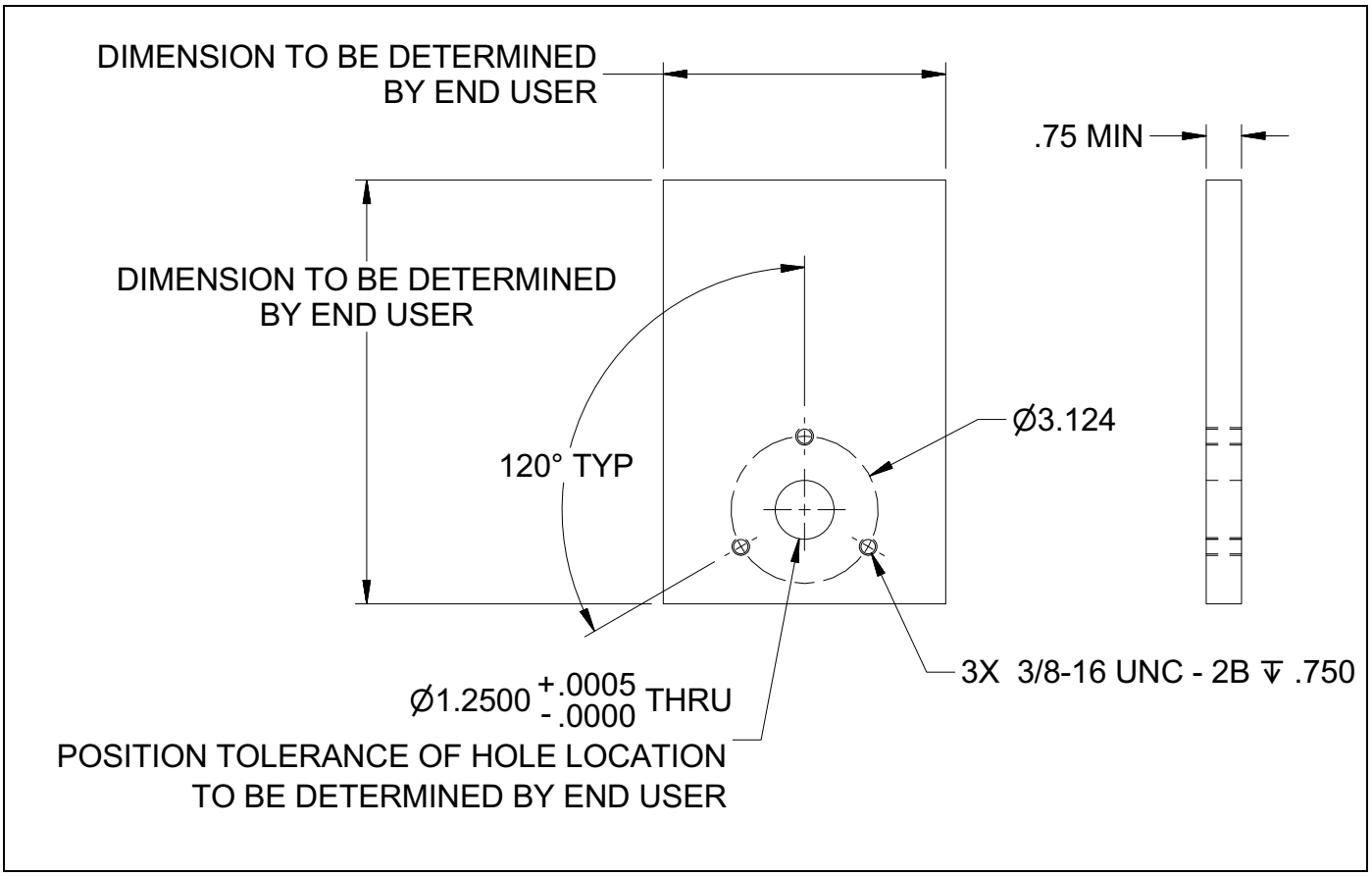

FIGURE 3-9. HOLE PATTERN CALCULATIONS FOR MOUNTING

DANGER

Do not use drill bushing screws which may be loaded in bending (e.g., Carr-Lane LS Lockscrews). Lock screws loaded in bending may fail during drill use, allowing the machine to come loose, damage to equipment, or operator injury.

NOTICE

The PD3000 machine must be used with drill bushing lock screws that can't be loaded in bending during use (e.g., CLIMAX P/N 86186). Lock screws must be torqued to a minimum of 26 ft-lbf (36 Nm) (plain dry fasteners) for approximately 5,000 lbf preload.

3. Insert the nose-piece drill bushing into the template hole.
4. Rotate the drill counter-clockwise to engage the three cam locks of the nose-piece with the lock-screws.

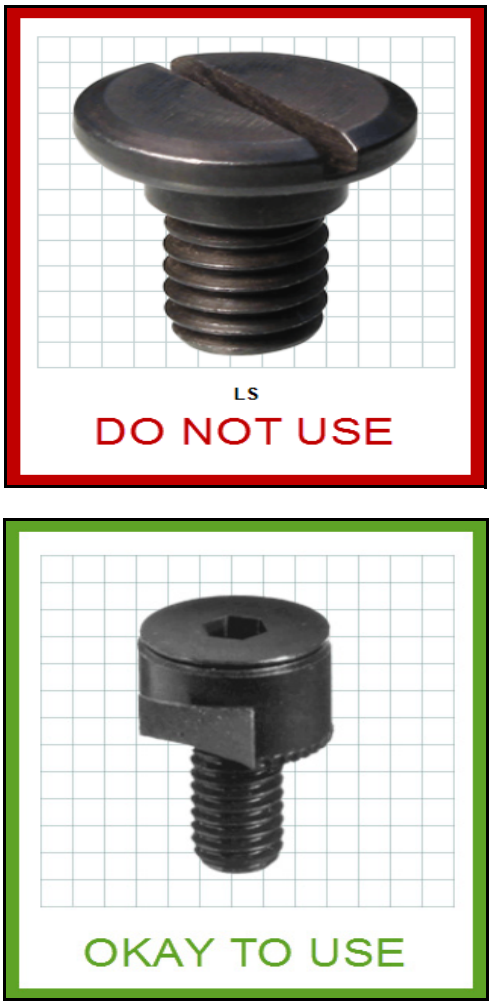

FIGURE 3-10. DRILL BUSHING SCREWS OKAY TO USE AND NOT OKAY TO USE

3.5.3 Install the air motor on the drill

Install the air motor to the drill by doing the following:

1. Partially insert the motor square drive shaft with the gearbox square drive socket.

TABLE 3-4. AIR MOTOR INSTALLATION COMPONENTS IDENTIFICATION

Number	Component
1	Air supply holes
2	Square drive socket
3	Air supply tubes

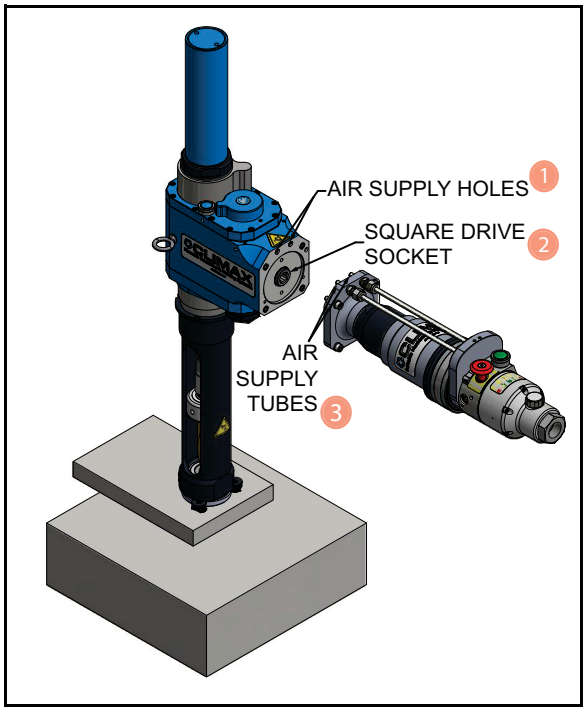

FIGURE 3-4. INSTALLING THE AIR MOTOR TO THE GEARBOX

2. With the motor shaft inserted, rotate the air motor to align the two air supply tubes with the corresponding holes on the gearbox.
3. Fully seat the air motor.
   This seats the air motor tubes inside of the radial o-rings, making the pneumatic connections at the same time.
4. Tighten the four captive M6 socket head cap screws to 106 in-lb (12 Nm).

3.5.4 Connect the air supply to the machine

1. Install a 3/4" (19 mm) fitting to connect the air motor to the air supply.
2. Check that the shop air source can supply 71 scfm at 87 psi (see Table 2-8).

NOTICE

Do not restrict the air flow below 71 scfm with fittings or hoses smaller than 3/4", or with a filter or lubricator that are not appropriately sized.

3.5.5 Connect the tool lubrication system to the machine (optional)

CLIMAX recommends that you use a misting lubrication system (not supplied) with the drill bit. Follow the manufacturers instructions when installing the misting lubrication system. For more information, contact CLIMAX.

4 OPERATION

IN THIS CHAPTER:

4.1 OVERVIEW

When the start button is pressed, the air motor is energized and begins turning and advancing the spindle. The pneumatic motor causes the spindle to rotate through a pair of gear sets with differing gear ratios. The gear ratio difference between the two gear sets causes the threaded spindle to feed toward the workpiece in proportion to its rotation.

When the spindle reaches the retract depth set by the position of the upper depth collar, the auto retract switch causes the spindle to retract in a rapid mode. Then the spindle retracts until the lower depth collar triggers the auto shutoff switch; the machine automatically de-energizes the air motor and resets the pneumatic circuit for the next drilling cycle.

The spindle feed rate can be changed by replacing the differential gear set with a different gear set.

4.1.1 Emergency stop

When the emergency stop button is pressed during drill operation, the air motor is de-energized and the pneumatic circuit is vented. When the emergency stop button is reset (pulled out), the drill can be restarted by pressing the start button again. If the drill is restarted, it will complete its operation cycle from the point of interruption unless the emergency stop button is pressed again.

4.1.2 Manual retract

When the manual retract button is pressed, the spindle will retract in a rapid mode until the auto shutoff switch is tripped. The auto shutoff switch then de-energizes the air motor and resets the pneumatic circuit for the next drilling cycle.

4.2 OPERATION

The PD3000 Portable Drill is designed for automatic precision drilling and reaming to a preset depth, followed by fast automatic retraction of the tool and automatic shutoff. Refer to Figure 2-1 on page 17 for machine control locations.

4.2.1 Pre-operation checks

Before each use of the machine, do the following:

1. Check that the machine is connected to an air source meeting the specifications listed in Table 2-8.
2. Check that the air source filtration is replaced systematically per the manufacturer recommendations.
3. Check that the air motor is installed properly (Section 3.5.3).
4. Check that all drill bushing lock screws are of the proper style and installed to the proper torque (Section 3.5).
5. Check that the nose-piece and drill bushing are installed properly (Section 3.4.3 and Section 3.4.3 on page 29).
6. Check that the drill bit (drill/reamer) is in good condition.
7. Perform a drill function check to make sure all machine functions are operating properly. (Section 4.2.2).

4.2.2 Drill function check

Before performing a drill function check, make sure the drill is properly supported and the spindle has sufficient clearance to travel without hitting any obstacles.

Do the following to perform a drill function check:

1. Start the machine by holding the green start button to start the drill. Make sure that the feed latches.
2. Depress the e-stop button to make sure the machine stops.
3. Reset the e-stop.
4. Start the machine by holding the green start button to start the drill.
5. Press the blue retract button. Make sure that the machine retracts fully and automatically shuts off.

If the above functions all operate as intended the function check is complete. Otherwise consult the trouble shooting section of the manual. (Section 5.7)

4.2.3 Starting the machine

To start a cutting cycle, press and hold the start button for 1-2 seconds. This moves the lower depth collar pair off of an automatic stop switch and latches the machine in feed mode.

NOTICE

Small air leaks from machine orifices during operation are normal.

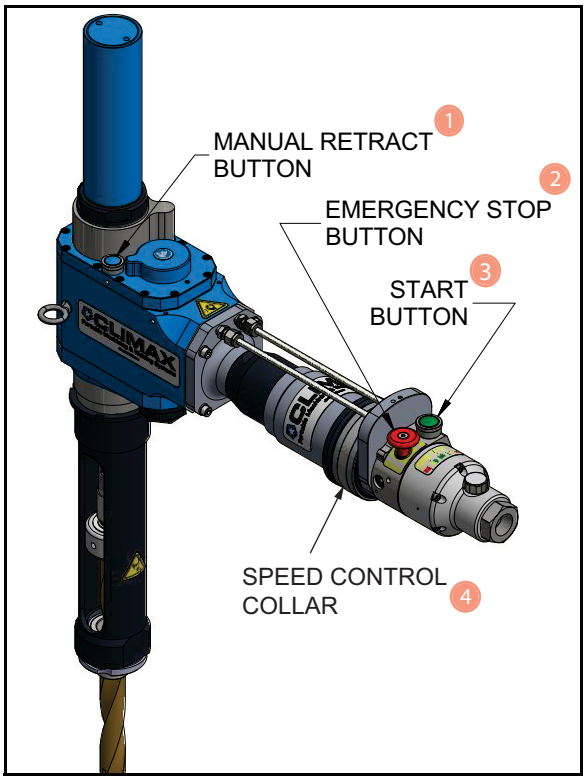

FIGURE 4-1. OPERATOR CONTROLS

4.2.4 Stopping the machine in an emergency

To immediately stop machine operation and de-energize the system, press the emergency stop button.

4.2.5 Resetting the machine

To re-enable machine operation after an emergency stop, pull the emergency stop button out.

4.2.6 Controlling the drill speed

To adjust the speed of the machine during operation, rotate the speed control collar clockwise to slow the drill, or rotate counter-clockwise to increase the speed. See Figure 4-1.

4.2.7 Manually retracting the tool

To retract the spindle during machine operation before the spindle reaches its preset cutting depth, press the manual retract button.

4.2.8 Stopping the machine

During normal operation, the machine will stop automatically at the end of the cutting cycle.To stop the machine in an emergency, press the emergency stop button (see Figure 4-1).

4.2.9 Lock-out/tag-out

Disconnect the air supply hose from the air motor. Follow your organizations additional lock-out/tag-out procedures.

5 MAINTENANCE AND TROUBLESHOOTING

IN THIS CHAPTER:

5.1 OVERVIEW

This chapter explains periodic maintenance intervals and provides troubleshooting guidance.

⚠ CAUTION

Failure to properly clean and maintain the machine can result in machine damage and void the warranty.
Always keep moving parts clear of metal chips.

Do the following checks for every operation to avoid drill malfunctioning:

- Ensure that the drill is supplied with clean lubricated air.
- Blow the air hoses clean before connecting the PD3000.
- Check that the end connection fittings are clean.
- Check that the inlet filter at the air motor is not damaged or clogged with debris.

⚠ CAUTION

The PD3000 has small internal air passages. Contamination can cause drill malfunctioning.

Follow the required maintenance schedule and these guidelines to obtain normal machine life:

- Keep all machine components in clean, working condition.
- Make sure parts such as mounting surfaces, fittings, and the tools are free of metal chips, nicks, and burrs.
- To prevent corrosion, rinse any machine parts that are exposed to salt water with an evaporative metal cleaner such as evapo-wash, then coat parts with light oil.
- Gear life, or the life expectancy of the drill, is a function of the diameter of the holes being made by the drill. Consistently drilling large holes will mean fewer years of functionality for the drill. Proper set up of the machine will increase gear life.

5.2 MAINTENANCE INTERVALS

TABLE 5-1. MAINTENANCE TASKS AND INTERVALS

Interval	Task	Section ref.
After every operation cycle	Remove chips from the spindle threads	--
Whenever the gearset or spindle are changed or every year	Grease the gear surfaces	5.5
Annually	Inspect input bevel gear	5.3
	Replace the seals	5.4
After the torque limiter is engaged for 120 seconds (consecutive)	Send the gear assembly to CLIMAX for overhaul	--

5.3 INSPECTING THE INPUT BEVEL GEAR

Do the following to inspect the input bevel gear:

1. Using a spanner wrench un-thread the gear retaining nut at the rear of the gearbox.

NOTICE

Take care not to lose the shims under the nut flange. Reassembly without the correct shim thickness will result in damage or premature wear to the gear.

2. Inspect the spiral bevel gear teeth for cracks, yielding, or abnormal wear.
3. Contact CLIMAX if a replacement gear is needed.

5.4 REPLACE THE SEALS

Do the following to replace the seals:

1. Using a dental pick or similar tool remove the o-rings from the groove.
2. Insert the replacement o-rings into the groove.

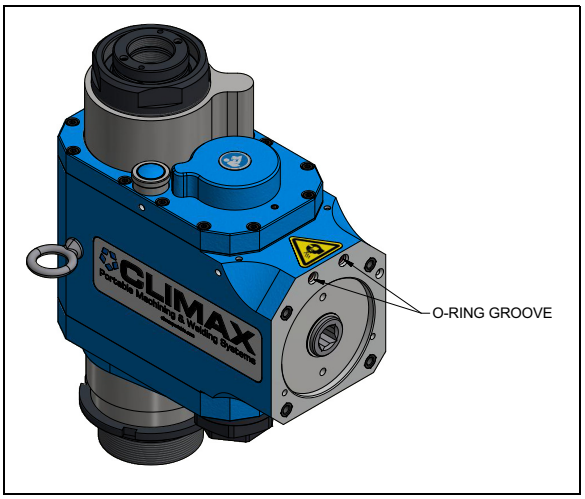

FIGURE 5-2. LOCATION OF O-RING GROVE

5.5 CHANGING THE FEED GEAR

5.5.1 Preparing the gearbox for disassembly

Do the following to prepare the gearbox for disassembly:

1. Remove the spindle guard from the gearbox (Section 3.4.2).
2. Remove the nose-piece from the gearbox (Section 3.4.2).
3. Remove the drill bit from the spindle (Section 3.4.4).
4. Remove the upper lock and depth collars from the spindle (Section 3.4.1).

5.5.2 Disassembling the gearbox

Do the following to disassemble the gearbox:

1. Remove the eleven M4 x 16mm socket head cap screws from the lower housing cover.
2. Separate the lower housing cover and spindle from the gearbox until the upper end of the spindle is free of the main gearbox. (Figure 5-4).
3. You now have access to the differential gear set and the spindle (Figure 5-4). To replace the differential gear set, refer to Section 5.5.3 through Section 5.5.7. To replace the spindle, refer to Section 5.5.8.

Refer to Figure 5-4 or Figure 5-6 while you do the tasks in Sections 5.5.3 through 5.5.8.

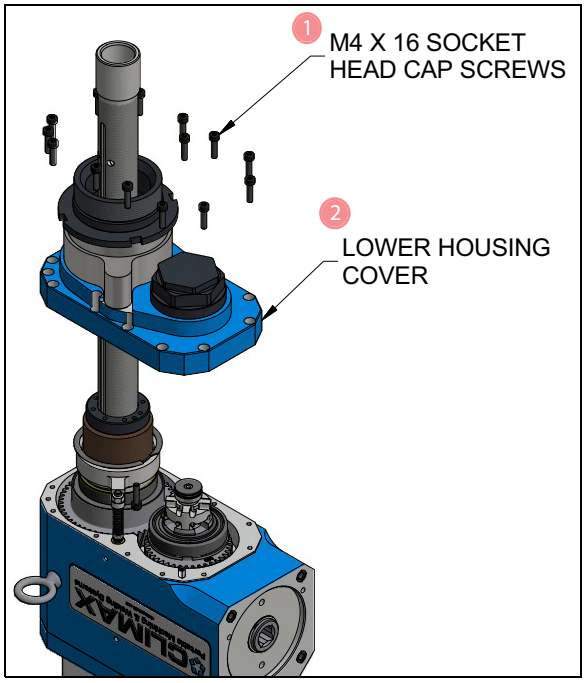

FIGURE 5-3. REMOVE THE LOWER HOUSING COVER

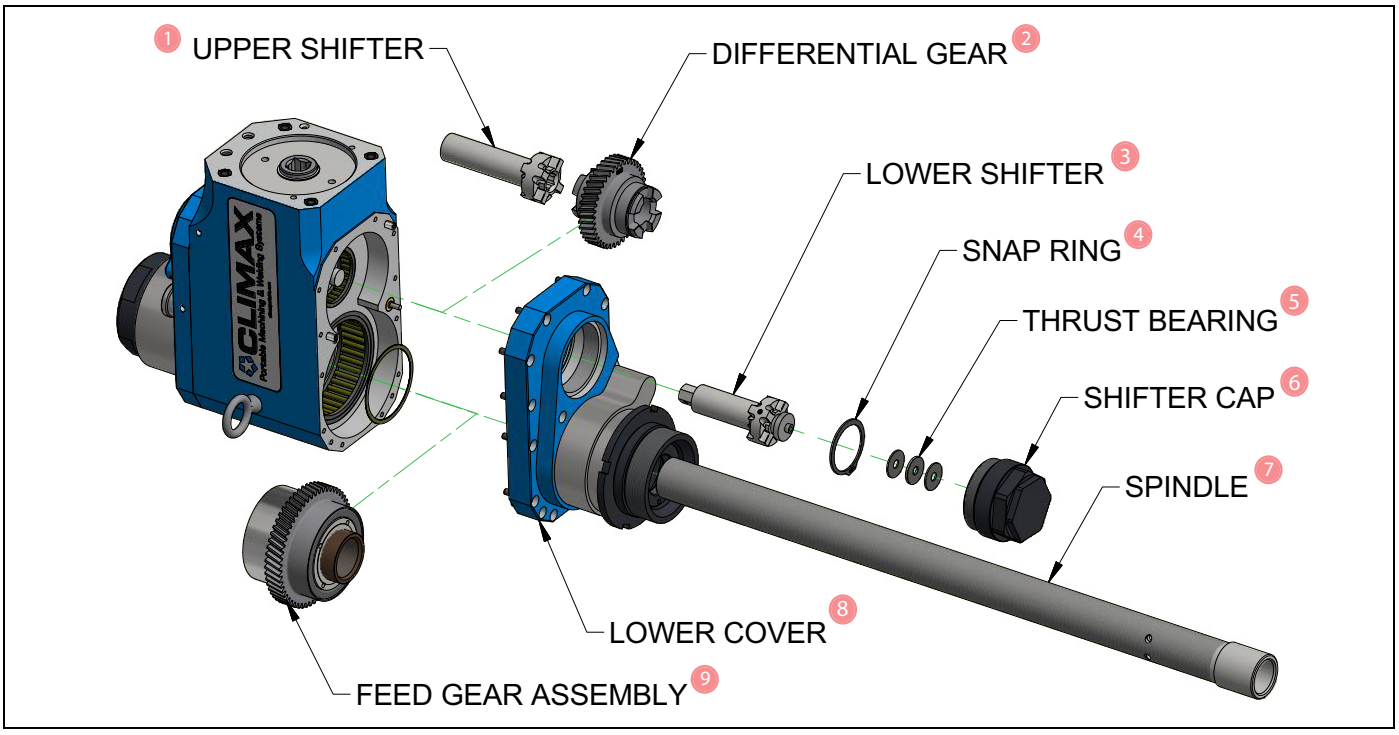

FIGURE 5-4. GEARBOX ASSEMBLY

5.5.3 Remove the feed gear assembly and spindle from the gearbox

Do the following to remove the feed gear assembly and spindle from the gearbox:

1. Turn by hand the feed gear assembly off of the upper end of the spindle.

NOTICE

The spindle has a left-hand thread.

2. Slide the spindle out of the lower cover.
3. Use a clean cloth to wipe chips and debris from the spindle surface.

5.5.4 Remove the differential gear

Refer to Figure 5-4 while you do the following:

1. Remove the shifter cap (right hand thread) from the lower housing cover.
2. Remove the upper shifter from the lower shifter by loosening the setscrew.
3. Remove the lower shifter assembly from the differential gear.
4. Remove the snap ring from the differential gear.
5. Remove the differential gear from the lower cover bearing.

5.5.5 Select a differential gear set

Select the feed and differential gears for the desired tool feed rate from the gear pairs listed in Table 5-5.

TABLE 5-5. DIFFERENTIAL GEAR SETS

Feed rate (inch/rotation)	Feed gear assembly P/N (1)	Differential gear P/N (2)
.003	80639	80350
.006	80577	80352

NOTICE

Differential gear sets must be installed in pairs as listed in Table 5-5, and cannot be mixed.

5.5.6 Install the differential gear in the lower cover

Do the following to install the differential gear in the lower cover:

1. Lubricate the differential gear teeth and needle roller contact surfaces with Mobilith SHC 460 grease.
2. Insert the differential gear into the lower bearing.
3. Replace the snap ring on the bottom of the differential gear.
4. Replace the lower shifter assembly in the differential gear.

5. Install the upper shifter onto the lower shifter and tighten the locking set-screw wrench tight.

NOTICE

If the shifter assembly is properly assembled the shifter cap should not be difficult to tighten until approximately the final 1/8".

5.5.7 Install the feed gear and spindle in the lower cover

Do the following to install the feed gear and spindle in the lower cover:

1. Lubricate the feed gear teeth and needle roller contact surfaces with Mobilith SHC 460 grease.
2. Slide the upper end of the spindle through the lower cover bushing.
3. Turn the new feed gear onto the upper end of the spindle at least 4 1/2". The thread used here is left handed.
4. Seat the feed gear in the lower cover bearing.

5.5.8 Install the spindle and differential gearset assembly in the gearbox

Do the following to install the spindle and differential gearset assembly in the gearbox:

1. Slide the upper end of the spindle into the gearbox until it touches the rotational drive gear.
2. Align the rotational drive gear key with the spindle keyway.
3. Make sure the upper shifter tang is aligned with a recess on the upper gear.
4. Slide the spindle completely into the gearbox.
5. Seat the lower cover on the gearbox.
6. Attach the lower cover to the gearbox with eleven M4 x 16mm socket head cap screws. Torque to 36 in-lb (4 Nm).
7. Turn the top depth and lock collars onto the end of the spindle.
8. Install the shifter cap.

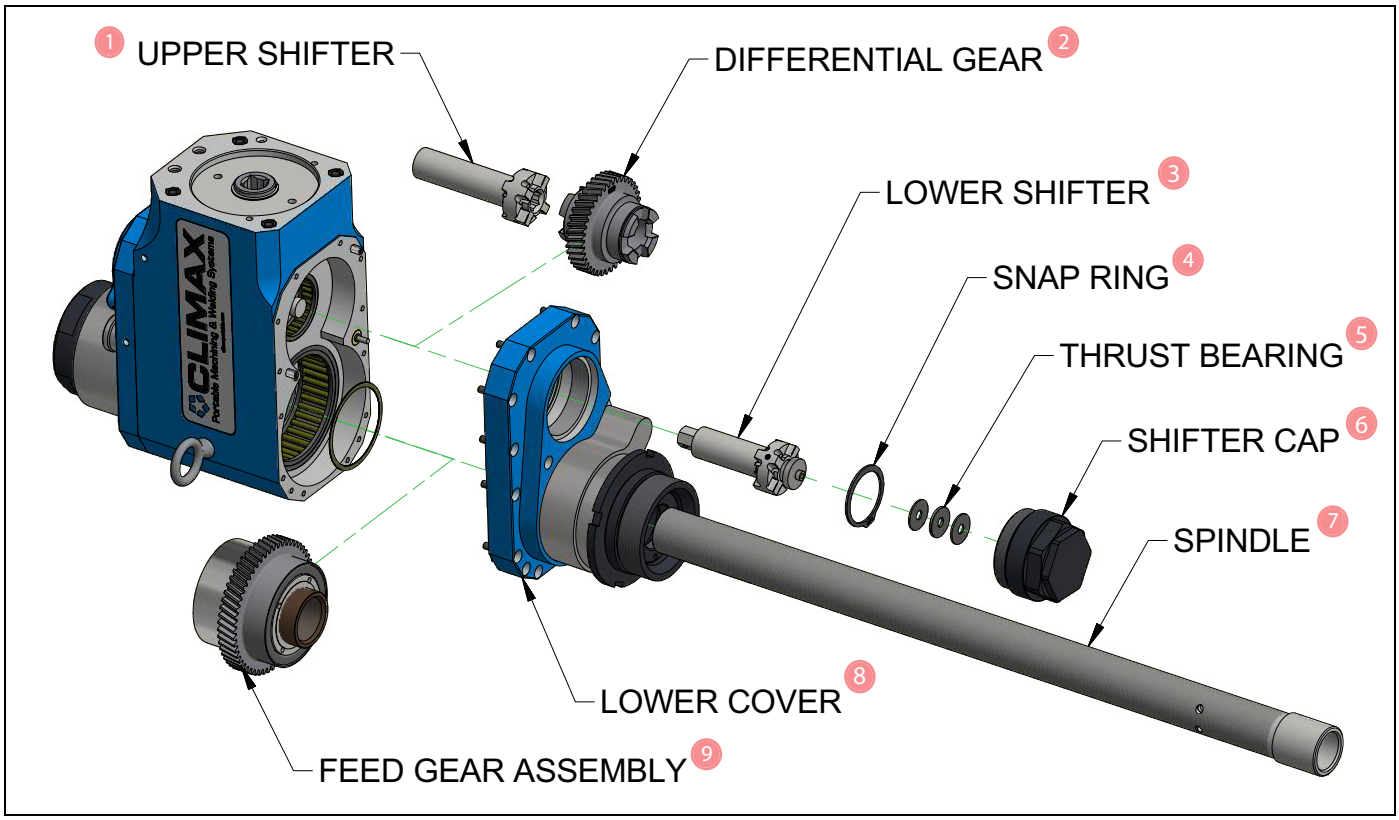

FIGURE 5-6. GEARBOX REASSEMBLY

5.6 OVERHAUL INSTRUCTIONS

For information on machine overhaul, contact CLIMAX.

5.7 TROUBLESHOOTING

If a corrective action in listed Table 5-7 does not fix the problem, or if you experience a problem with your machine that is not listed in Table 5-7, contact CLIMAX.

TABLE 5-7. TROUBLESHOOTING

Problem	Possible cause	Corrective action
The cutting depth is too deep.	The upper depth collar is positioned too high on the spindle.	Move the upper depth collar lower on the spindle.
The cutting depth is too shallow.	The upper depth collar is positioned too low on the spindle.	Move the upper depth collar higher on the spindle.
The drill bit does not retract far enough.	The lower depth collar is positioned too high on the spindle.	Move the lower depth collar lower on the spindle.
The drill bit retracts too far.	The lower depth collar is positioned too low on the spindle.	Move the lower depth collar higher on the spindle.
The spindle retracts unexpectedly.	The retract piston orifice has become clogged.	Clean or replace the retract piston orifice.
The drill speed surges while drilling, a clicking noise is present.	The drill is operating beyond the intended capacity.	Reduce the drill feed rate or reduce the drill size.
The drill has bound up against the housing either feeding or retracting.	The drill shutoff switch as failed.	Consult CLIMAX for instructions to unbind the spindle.

5.8 TOOL KIT

TABLE 5-8. PD3000 TOOL KIT

P/N	Description	Piece	UOM
38678	WRENCH HEX SET 1.5- 10MM BONDHUS BALL END (KB)	1	Piece
58350	WRENCH END 46mm X 8-9/16 LONG TIGHT ACCESS	1	Piece
80818	ROD TOOL KNOCKOUT	1	Piece
81223	WRENCH END 40mm (SINGLE OPEN END TIGHT ACESS)	1	Piece
81225	WRENCH SPANNER 3-5/32 TO 3-5/64 5MM THICK	1	Piece
82171	WRENCH END 65MM (SINGLE OPEN END SERVICE STYLE)	1	Piece

5.9 SPARE PARTS LIST

Table 5-9 lists items most frequently replaced due to wear, loss or damage. Avoid downtime by maintaining a small inventory of these critical parts.

TABLE 5-9. PD3000 SPARE PARTS LIST

P/N	Description	Piece	UOM
26060	BRG THRUST 1.575 ID X 2.362 OC X .118	1	Piece
26061	WASHER THRUST 1.575 ID X 2.362 OC X .037	2	Piece
32275	RING SNAP 2-1/8 ID X .078 TH	1	Piece
44042	SPRING COMP .28 OD X .028 WIRE X 1-3/8 3.5LB	2	Piece
62498	RING SNAP 1-3/8 ID X .05 TH BLACK FINISH	1	Piece
70226	LABEL CLIMAX LOGO 1.5 X 5.5	1	Piece
78748	LABEL WARNING - FLYING DEBRIS/LOUD NOISE GRAPHIC 1.13" TRIANGLE YEL-LOW	1	Piece
79296	GASKET PNEUMATIC VALVE	1	Piece
79307	CARTRIDGE VALVE POPPET 2-WAY NORMALLY-CLOSED	3	Piece
79308	CARTRIDGE VALVE POPPET 3-WAY NORMALLY-CLOSED	1	Piece
79309	RING SNAP 5/8 ID X .018 STAINLESS	1	Piece
79310	RING SNAP 12 MM X 1 MM EXTERNAL STAINLESS	1	Piece
79328	LABEL WARNING - CONSULT OPERATOR'S MANUAL GRAPHIC .75 DIA	1	Piece
80089	LABEL BACKGROUND YELLOW STOP BUTTON	1	Piece
80094	SPRING PLUNGER 10-32 X .513 SS BALL WITH THREAD LOCK	1	Piece
80293	BRG ROLLER 1.1811 ID X 1.8504 OD X .4331	1	Piece
80295	BRG BALL 1.3780 ID X 2.1654 OD X .3937	5	Piece
80377	BRG NEEDLE 1.378 ID X 1.6535 OD X .4724	2	Piece
85959	LABEL NOTICE - OPERATING PRESSURE RANGE 65-90 PSI	1	Piece

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6 SHIPPING AND STORAGE

IN THIS CHAPTER:

6.1 SHIPMENT AND SHORT-TERM STORAGE

The PD3000 Portable Drill can be stored and shipped in the provided Pelican shipping container (Figure 6-1). Short-term storage is defined as less than three months.

Do the following for short-term storage:

1. Disassemble the machine.
2. Remove chips, dirt and oil from the machine components.
3. Spray a light layer of oil on all unpainted metal surfaces.
4. Place the components in the storage case as shown in Figure 6-1.

Drill bushings and tools can also be stored in the additional storage compartment in the case.

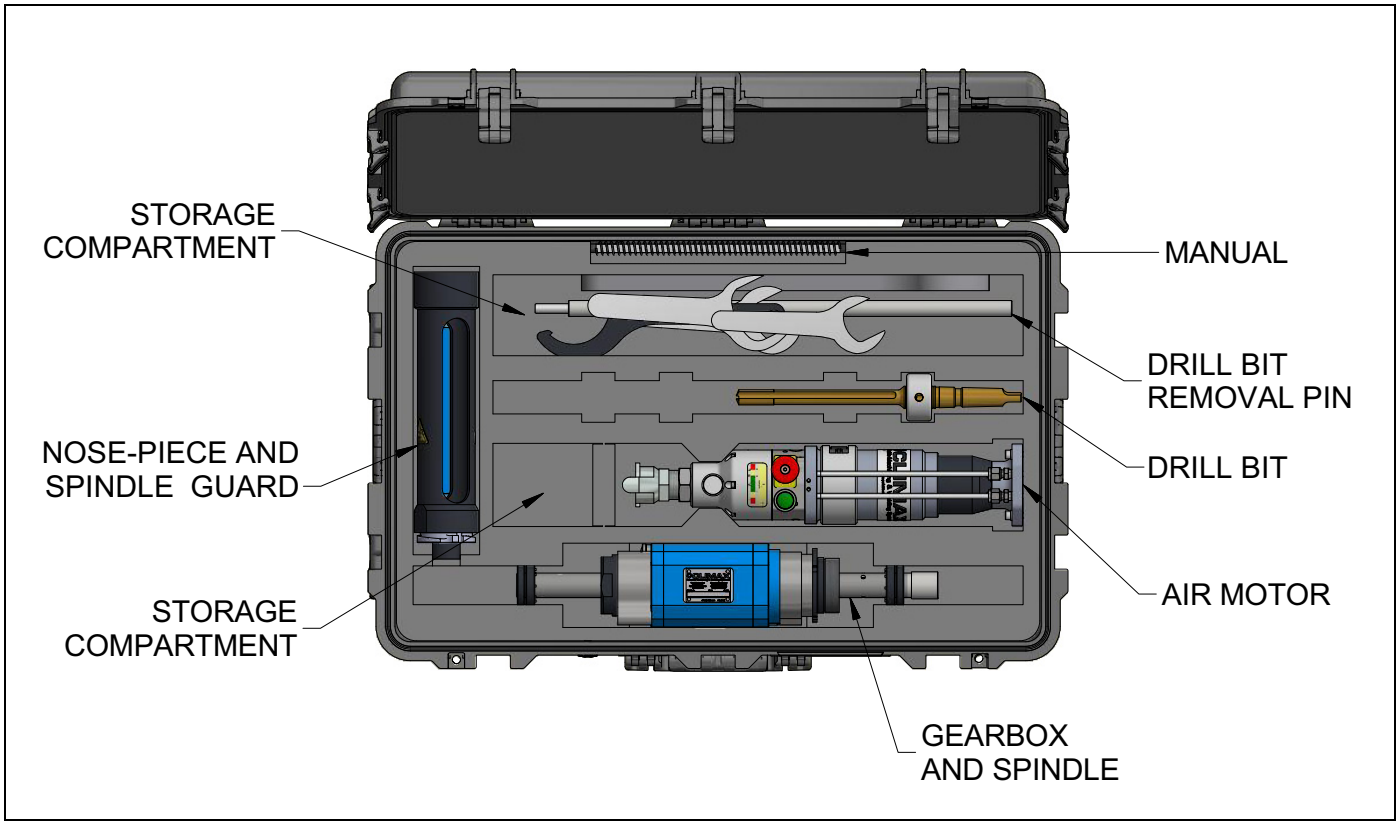


FIGURE 6-1. PD3000 CASE LAYOUT

The required storage conditions are listed in Table Figure 6-1.

TABLE 6-2. STORAGE CONDITION REQUIREMENTS

Storage temperature	35 ºF (1.6 ˚C) to 110 ºF (43.3 ˚C)
Storage humidity	10-60% RH
Storage location	Out of weather and direct sunlight

6.2 LONG-TERM STORAGE

In addition to the steps listed in Section 6.1, do the following to prepare the machine for long-term storage. Long-term storage is defined as more than three months.

Do the following for long-term storage:

1. Spray all unpainted machine surfaces with a layer of LPS3 or equivalent.
1. Add a desiccant pouch to the shipping container. Replace according to manufacturer instructions.
2. Inspect the case seal before long term storage. Replace as necessary.
3. Store the case in an environment that meets the requirements listed in Table 6-2.

APPENDIX A EXPLODED VIEWS AND PARTS LISTS

Drawing list

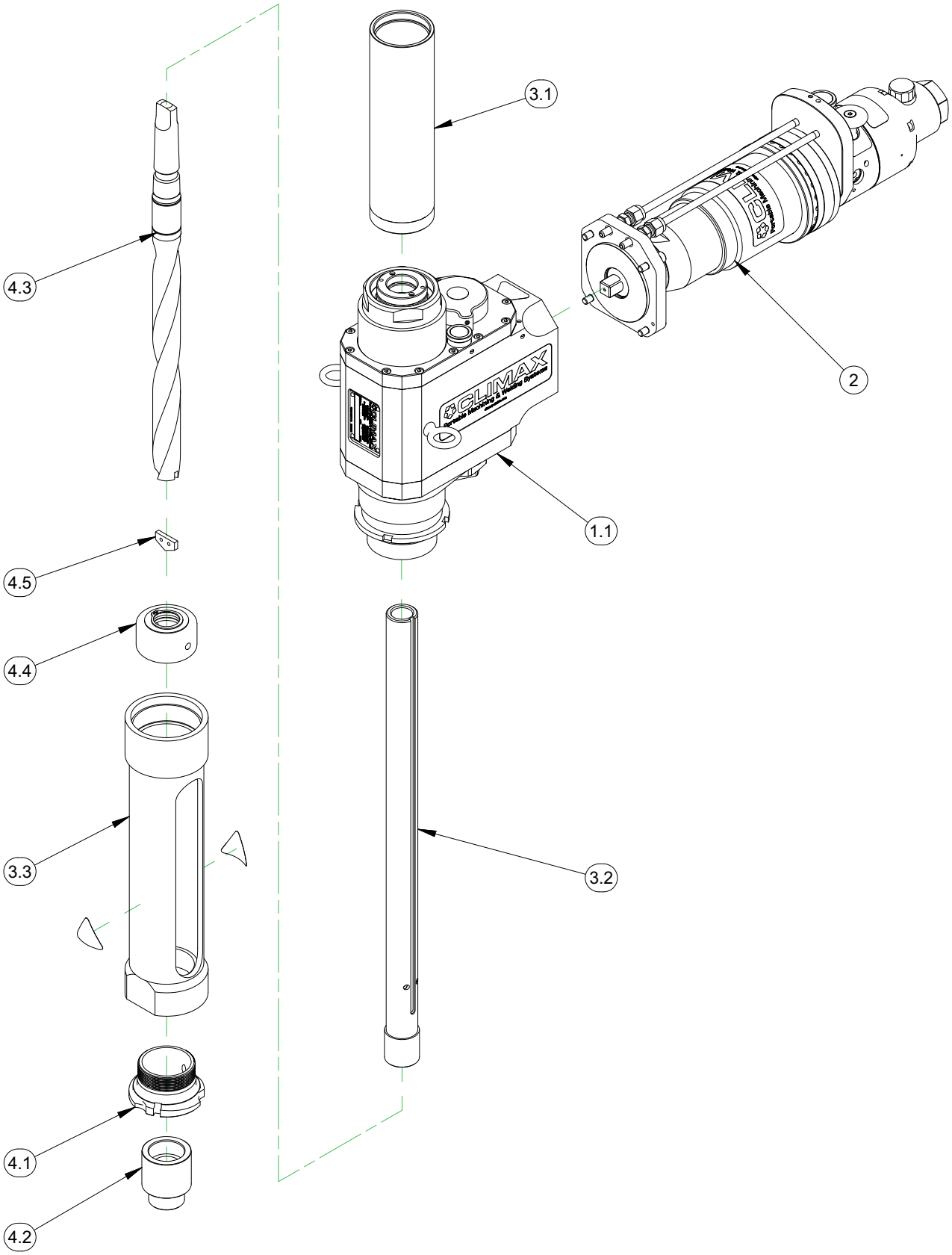


FIGURE A-1.P/N 85825 PD3000 PORTABLE DRILL ASSEMBLY

TABLE - FEED GEAR ASSEMBLIES	
P/N	DESCRIPTION
85833	SET FEED GEARS .003 IPR
85836	SET FEED GEARS .006 IPR

PARTS USED WITH z 4 IN. HOLE CONFIG.

PARTS USED WITH z 6.5 IN. HOLE CONFIG.

PARTS LIST					
4	6.5	ITEM	QTY	P/N:	DESCRIPTION
X	X	1	1	85825	BASE UNIT PD3000 PORTABLE DRILL DOMESTIC PNEUMATIC PELICAN CASE
X	X	1.1	1	85590	ASSY GEAR BOX RIGHT ANGLE - LESS FEED GEARS
X	X	1.2	1	85848	(NOT SHOWN) CONTAINER SHIPPING PELICAN CASE WITH INSERT MODEL PD3000
X	X	1.3	1	85847	(NOT SHOWN) KIT TOOL MODEL PD3000
X	X	1.4	1	85846	(NOT SHOWN) MANUAL INSTRUCTION MODEL PD3000
X	X	2	1	85624	ASSEMBLY AIR MOTOR WITH CONTROLS
	X	3	1	85827	COMMON COMPONENTS FOR 6.5 INCH DEEP HOLE
X				85826	(NOT SHOWN) COMMON COMPONENTS FOR 4 INCH DEEP HOLE
	X	3.1	1	80803	COVER TUBE SPINDLE 12 INCH STANDARD
X				85854	(NOT SHOWN) COVER TUBE SPINDLE 6 INCH STANDARD
	X	3.2	1	85817	SPINDLE MT3 19.00 INCH
X				85818	(NOT SHOWN) SPINDLE MT3 16.75 INCH
	X	3.3	1	85850	NOSEPIECE STANDARD 2 7/16-16 UNS LH X 2-16 UNS LH BUSHING 11.75 INCH
X				85851	(NOT SHOWN) NOSEPIECE STANDARD 2 7/16-16 UNS LH X 2-16 UNS LH BUSHING 9.25 INCH
	X	4	1	85829	KIT SPADE DRILL 15/16" DIA 6.5 INCH DEEP HOLE
X				85828	(NOT SHOWN) KIT SPADE DRILL 15/16" DIA 4 INCH DEEP HOLE
X	X	4.1	1	80740	BUSHING DRILL AIR FEED CARR LANE 25000 FOR 6.5 INCH HOLE
X	X	4.2	1	81293	25000 SHANK 1.2500 OD X .9560 ID X .675 LENGTH FOR 6.5 INCH HOLE
	X	4.3	1	86080	DRILL .969-1.378 DIA / 9.25 DEPTH HELICAL FLUTE MT3 FOR 6.5 INCH HOLE
X				TBD	(NOT SHOWN) DRILL FOR 4 INCH HOLE
X	X	4.4	1	79654	ADAPTER ROTARY COOLANT 2T-3SR FOR 6.5 INCH HOLE
X	X	4.5	1	86074	TA HSS DRILL INSERT 31/32" AM200 COATING TC CHIP BREAKER
X	X	4.6	1	86076	(NOT SHOWN) TA HSS DRILL INSERT 1-3/8" AM200 COATING TC CHIP BREAKER
X	X	5	1	TABLE	(NOT SHOWN) SET FEED GEARS - SEE 85590 GEAR BOX ASSEMBLY DRAWING

FIGURE A-2.P/N 85825 PD3000 PORTABLE DRILL ASSEMBLY PARTS LIST

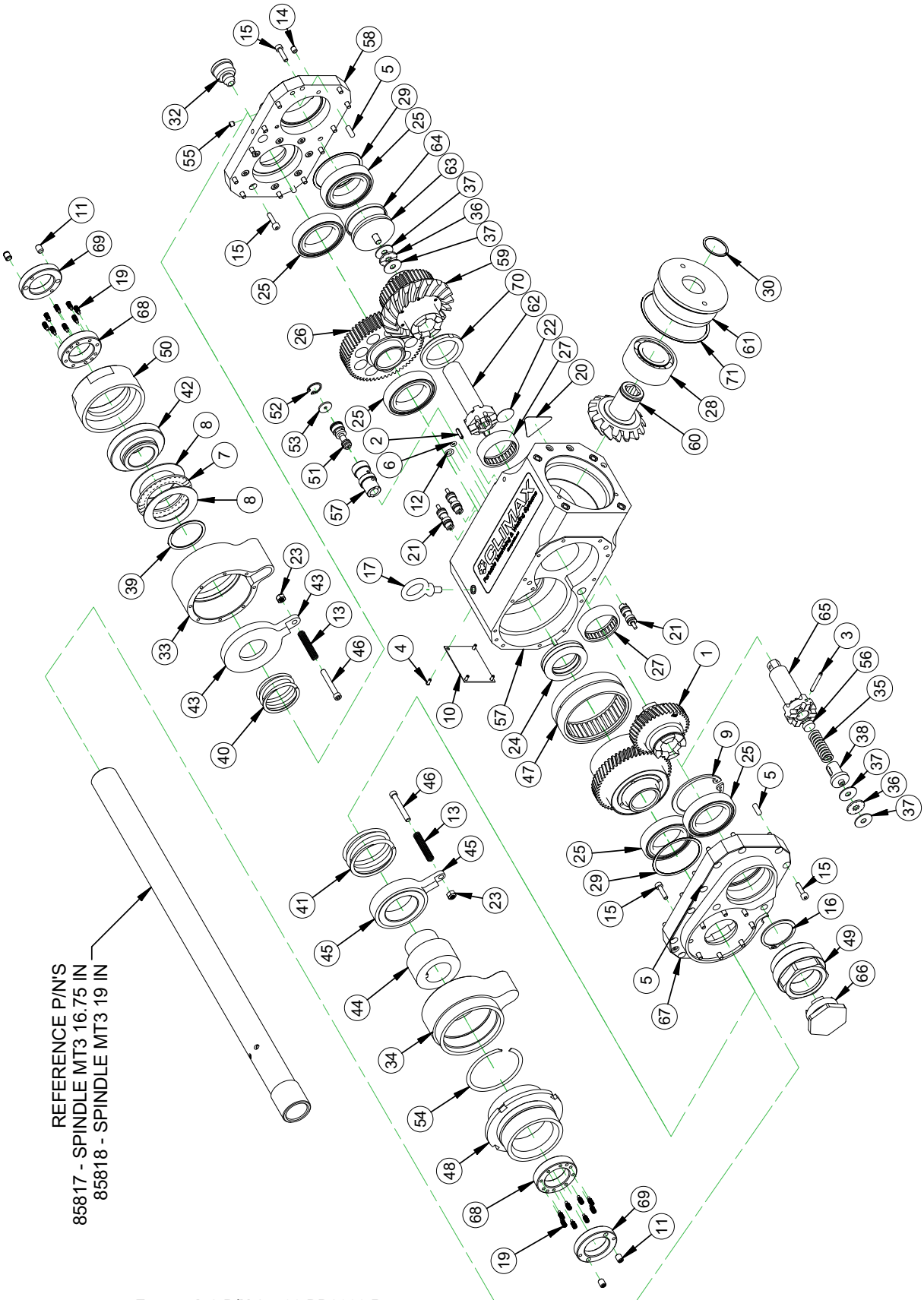
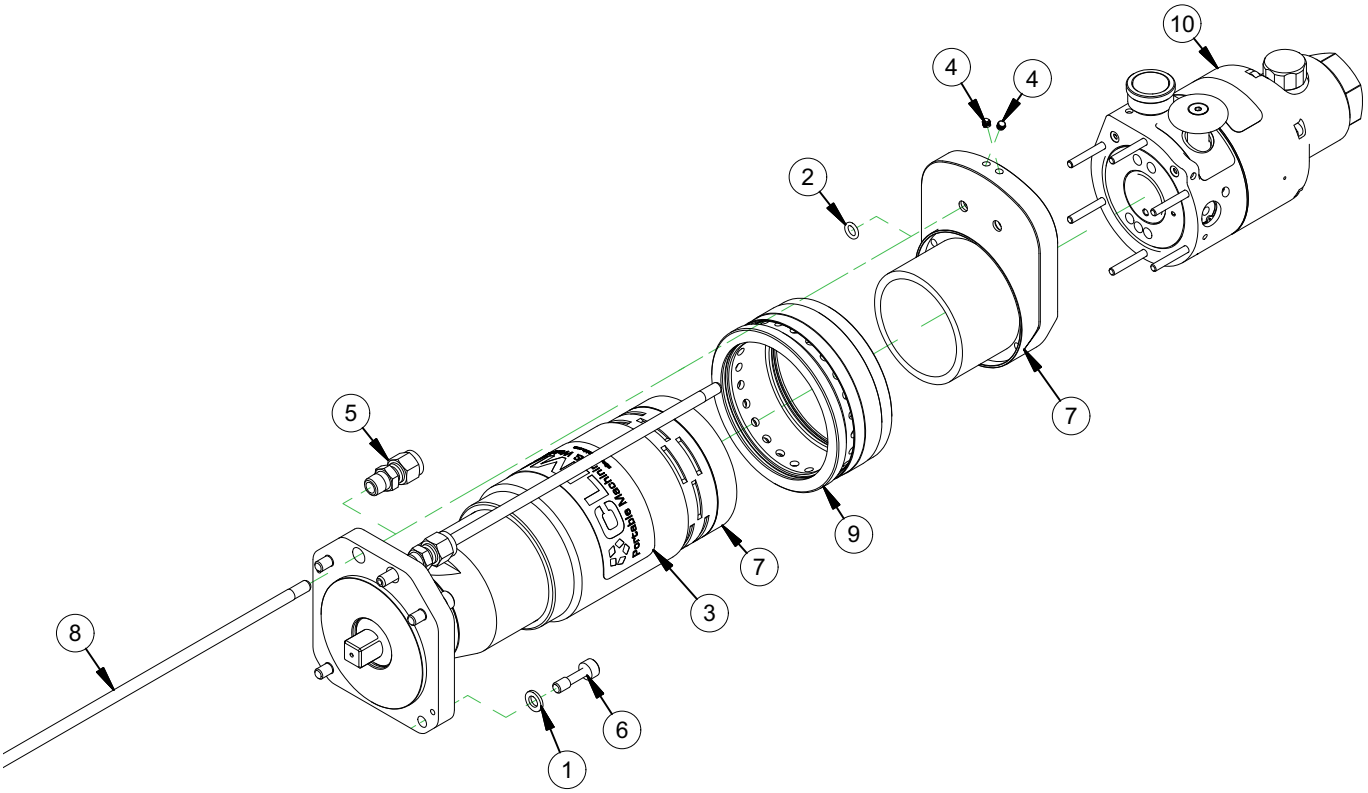


FIGURE A-3.P/N 85590 PD3000 RIGHT ANGLE GEARBOX ASSEMBLY

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	-	SEE TABLE - FEED GEAR ASSEMBLIES
2	1	10133	PIN ROLL 1/8 DIA X 1/2
3	2	10166	PIN ROLL 1/8 DIA X 1
4	4	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
5	4	13948	PIN DOWEL 3/16 DIA X 1/2
6	1	15263	RING O 1/16 X 1/8 ID X 1/4 OD
7	1	26060	ROLLER THRUST BEARING FNT-4060
8	2	26061	THRUST WASHER 40MM X 60MM X 1MM
9	1	32275	RING SNAP 2-1/8 ID
10	1	35740	PLATE SERIAL YEAR MODEL 1.5 X 2.0
11	4	42852	SCREW M6 X 1.0 X 8 mm SSSFP
12	3	42854	RING O 1/16 X 1/4 ID X 3/8 OD
13	2	44042	SPRING COMP .28 OD X .028 WIRE X 1-3/8 3.5LB
14	1	46637	SCREW M5 X .8 X 6mm SSSFP
15	43	58672	SCREW M4 X 0.7 X 16MM SHCS
16	1	62498	RING SNAP 1-3/8 ID X .05 TH BLACK FINISH
17	2	63954	LIFTING EYE M6 X 1 X 12 THREAD 19 ID 460 LBS 210 KG
18	2	70226	LABEL CLIMAX LOGO 1.5 X 5.5
19	16	76477	SCREW M4 X 0.7 X 10 MM SSSHDP
20	1	78748	LABEL WARNING FLYING DEBRIS/LOUD NOISE
21	3	79307	CARTRIDGE VALVE POPPET 2-WAY NORMALLY-CLOSED
22	1	79328	LABEL WARNING - CONSULT OPERATOR'S MANUAL
23	2	80249	NUT M5 X 0.8 NYLON INSERT LOCKNUT ZINC PLATED
24	1	80293	BRG ROLLER 1.1811 ID X 1.8504 OD X .4331
25	5	80295	BRG BALL 1.3780 ID X 2.1654 OD X .3937
26	1	80346	GEAR SPUR 18DP 59T 20PA .58 FACE
27	2	80377	BRG NEEDLE 1.378 ID X 1.6535 OD X .4724
28	1	80384	BRG BALL DOUBLE ROW .9843 ID X 2.0472 OD X .8110
29	2	80415	SHIM SET 1.90 ID X 2.15 OD .001/.002/.005 THICK
30	1	80442	RING SNAP 1 ID X .042 THICK EXTERNAL SPIRAL
31	2	80510	(NOT SHOWN) LABEL WARNING ENTANGLEMENT OF HAND/ROTATING SHAFT GRAPHIC 1.13 TALL TRIANGLE
32	1	80586	PUSH BUTTON ASSY MANUAL RETRACT
33	1	80603	COVER RETRACT TRIGGER
34	1	80604	COVER STOP TRIGGER
35	1	80605	SPRING .480 OD X .080 X 2 MUSIC WIRE
36	2	80606	BRG THRUST 6MM ID X 19MM OD X 2MM
37	4	80607	WASHER THRUST 6MM ID X 19MM OD X 1MM

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
38	1	80615	GUIDE SHIFTER
39	1	80629	RING SNAP 1-3/8 ID X .050 TH SPIRAL HEAVY DUTY
40	1	80633	SPRING COMP 1.595 OD X .125 WIRE X .99 LENGTH
41	1	80634	SPRING COMP 1.922 OD X .156 WIRE X 1.35 LENGTH
42	1	80635	BUSHING RETRACT
43	1	80636	TRIGGER RETRACT
44	1	80637	BUSHING SPINDLE
45	1	80638	TRIGGER STOP
46	2	80646	SCREW MODIFIED M5 X 0.8 X 35 MM
47	1	80650	BRG NEEDLE ROLLER 65MM ID X 78MM OD X 25MM
48	1	80660	ADAPTER NOSEPIECE STANDARD 2-7/16-16 UNS LH
49	1	80687	ADAPTER CAP SHIFTER
50	1	80769	NUT SPINDLE COVER
51	1	80850	PILOT CARTRIDGE VALVE
52	1	80851	RING SNAP 7/16 OD X .035 TH INTERNAL
53	1	80852	WASHER PRECISION 3MM ID X 14MM OD X 1.5
54	1	81651	RING SNAP 2.375 ID X .031 TH SPIRAL LIGHT DUTY
55	1	82051	ORIFICE .015 DIA 10-32 X 3/16 BRASS
56	1	82098	SPACER SPRING .160 INCH
57	1	85589	HOUSING RIGHT ANGLE
58	1	85591	COVER HOUSING UPPER
59	1	85592	GEAR ASSEMBLY BEVEL & SPUR
60	1	85593	GEAR SPIRAL BEVEL 6PD 14T 20PA 35DEG SPIRAL
61	1	85594	NUT BEVEL GEAR
62	1	85595	ROD SHIFTER UPPER
63	1	85596	PISTON SHIFTER
64	1	85718	SEAL PISTION 37.5MM ID X 45MM OD X 3.8MM PNEUMATIC
65	1	85724	ROD SHIFTER LOWER
66	1	85725	CAP SHIFTER
67	1	85729	COVER HOUSING LOWER
68	2	85781	COLLAR DEPTH
69	2	85782	COLLAR LOCK
70	1	85987	BEARING PLAIN THRUST
71	1	86070	SHIM SET 2.77 ID X 2.990 OD .001/.002/.005 THICK STEEL

FIGURE A-4.P/N 85590 PD3000 RIGHT ANGLE GEARBOX ASSEMBLY PARTS LIST



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	35891	WASHER M6 FLTW DIN 125
2	2	42854	RING O 1/16 X 1/4 ID X 3/8 OD
3	1	70226	LABEL CLIMAX LOGO 1.5 X 5.5
4	2	79412	PLUG SEALING 5/32 ID
5	2	85649	FTG CONNECTOR MALE 1/8 NPTM X 1/4 TUBE BORED THROUGH
6	4	85655	SCREW M6 X 1.0 X 22MM SHCS CAPTIVE 8 THD STAINLESS
7	1	85661	AIR MOTOR CUSTOM RH TURN
8	2	85830	TUBING PNEUMATIC O-RING CONNECTION
9	1	86288	SPEED CONTROL SERIES 25
10	1	95333	ASSY PD3000 AIR MOTOR CONTROLS

FIGURE A-5.P/N 85624 PD3000 AIR MOTOR ASSEMBLY WITH CONTROLS

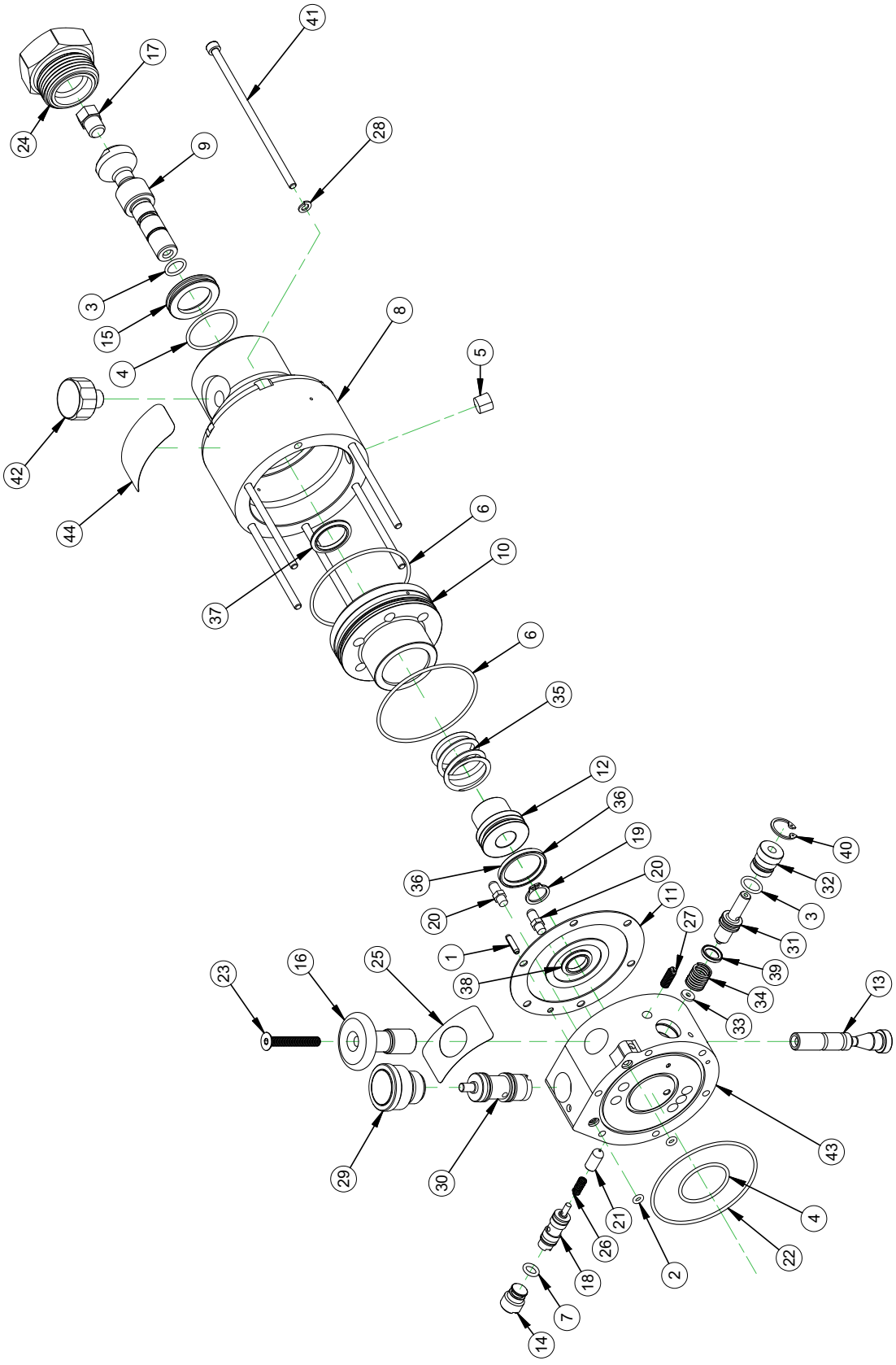


FIGURE A-6.P/N 95333 PD3000 AIR MOTOR ASSEMBLY WITH CONTROLS

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	10133	PIN ROLL 1/8 DIA X 1/2
2	2	15263	RING O 1/16 X 1/8 ID X 1/4 OD
3	2	21797	RING O 1/16 X 3/8 X 1/2 OD
4	2	24541	RING O 1/16 X 1-1/16 ID X 1-3/16 OD
5	1	26204	FTG PLUG 1/8 NPT FLUSH SOCKET BRASS
6	2	33856	RING O 1/16 X 2-1/4 ID X 2-3/8 OD
7	1	42854	RING O 1/16 X 1/4 ID X 3/8 OD
8	1	79291	BODY INLET 6275-S1
9	1	79293	POPPET MAIN VALVE
10	1	79294	SLEEVE PISTON MAIN VALVE
11	1	79296	GASKET PNEUMATIC VALVE
12	1	79297	PISTON MAIN VALVE
13	1	79298	ROD STOP
14	1	79301	PLUG RETAINING 6275-S1
15	1	79302	SEAT MAIN VALVE 6275-S1
16	1	79305	STOP KNOB 6275-S1
17	1	79306	VENT BREATHER 1/16 NPTM 13 MAX SCFM 1/2 HEIGHT
18	1	79308	CARTRIDGE VALVE POPPET 3-WAY NORMALLY-CLOSED
19	1	79310	RING SNAP 12 MM X 1 MM EXTERNAL STAINLESS
20	2	79311	MUFFLER 10-32 UNF MALE 5/8 HEIGHT BRONZE
21	1	79313	ACTUATING PLUNGER 6275-S1
22	1	79395	RING O 1/16 X 2-3/8 ID X 2-1/2 OD
23	1	79414	SCREW M5 X 0.8 X 35MM FHSCS SS
24	1	79889	FTG ORB 1-5/16-12 WITH SCREEN ASSY

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
25	1	80089	LABEL BACKGROUND YELLOW STOP BUTTON
26	1	80092	SPRING COMP .24 OD X .024 WIRE X .38 LONG
27	1	80094	SPRING PLUNGER 10-32 X .513 SS BALL WITH THREAD LOCK
28	6	80676	WASHER LOCK M4 (LOCW) 4.4 MM ID X 7.6 MM OD X 0.8 MM TH STEEL ZINC
29	1	81140	ASSY START BUTTON LARGE
30	1	81148	CARTRIDGE VALVE POPPET 2-WAY NORMALLY-CLOSED 5/8 DIA
31	1	81209	VALVE LOW PRESSURE DROPOUT
32	1	81211	RETAINER LOW PRESSURE DROPOUT VALVE
33	1	81214	WASHER SEAL .105 ID X .300 OD X .050 THCK FIBER REINFORCED DIAPHGRAM
34	1	81226	SPRING COMP 0.420 OD X .045 WIRE X 1.00 LG 17LB/IN
35	1	81244	SPRING COMP 1.053 OD X .105 WIRE X .88 LENGTH STAINLESS
36	1	81260	SEAL PISTON 28MM OD X 22MM ID X 2.85MM
37	1	81261	SEAL ROD 18MM ID X 24MM OD X 2.85MM
38	1	81263	SEAL ROD 12MM ID X 18MM OD X 2.85MM
39	1	81264	SEAL PISTON 12MM OD X 8MM ID X 2MM
40	1	81265	RING SNAP 9/16 ID X .035 TH STAINLESS
41	6	81266	SCREW M4 X 0.7 X 105MM SHCS
42	1	85282	GAUGE PRESSURE MINIATURE
43	1	85623	BODY MANIFOLD 6275-S1
44	1	85959	LABEL NOTICE - OPERATING PRESSURE RANGE 65-90 PSI

FIGURE A-7.P/N 95333 PD3000 AIR MOTOR ASSEMBLY WITH CONTROLS PARTS LIST

APPENDIX B SCHEMATICS

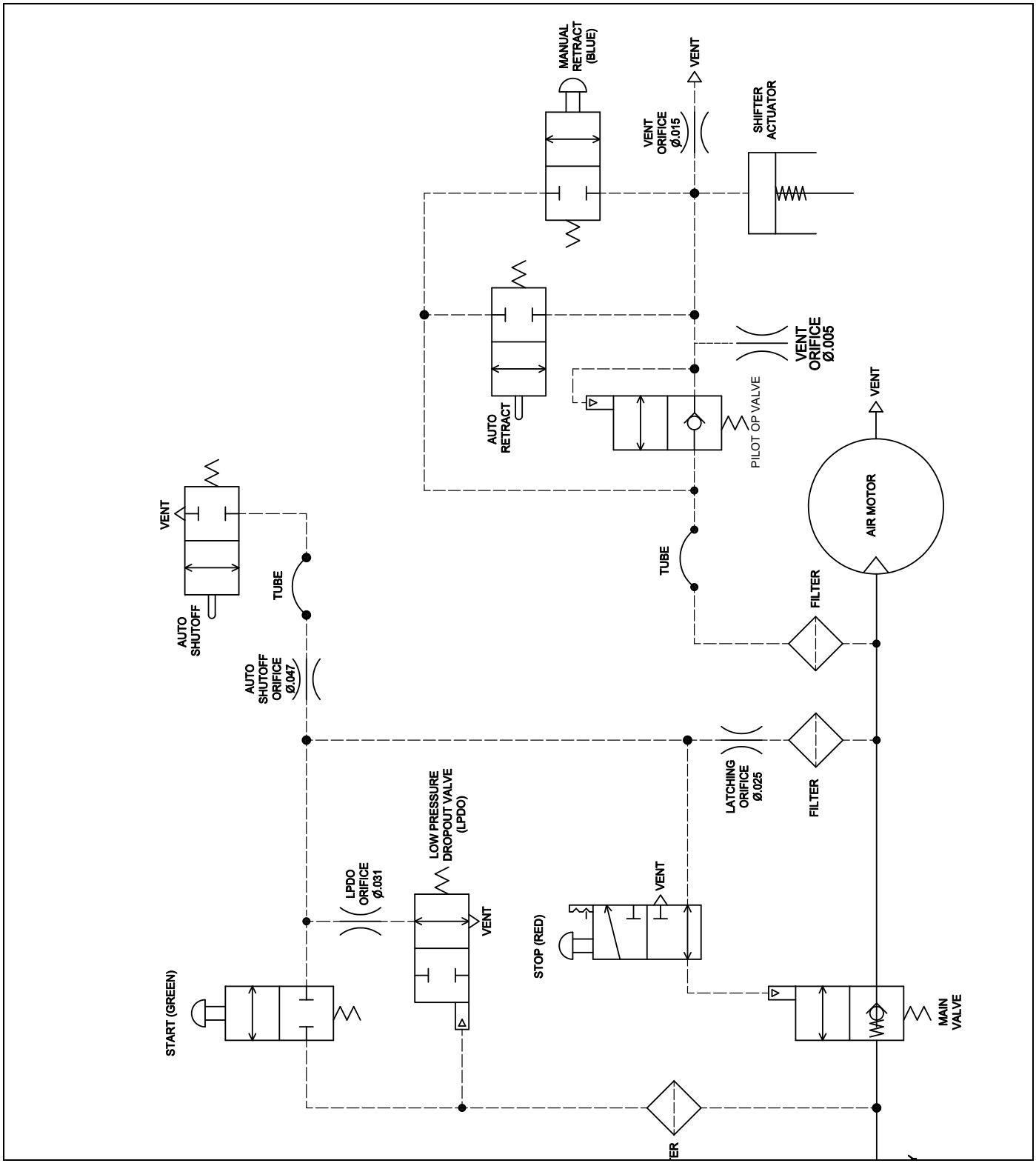


FIGURE B-1. PNEUMATIC SCHEMATIC P/N 82077

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CLIMAX
BORTECH
CALDER
H&S TOOL