ENERPAC
POWERFUL SOLUTIONS. GLOBAL FORCE.

Instruction Sheet

10,000 PSI TURBO II AIR PUMPS

L2532 Rev. D 05/12

Index:

Repair Parts Sheets for this product are available from the Enerpac web site at www.enerpac.com, or from your nearest Authorized Enerpac Service Center or Enerpac Sales office.

1.0 IMPORTANT RECEIVING INSTRUCTIONS

Visually inspect all components for shipping damage. Shipping damage is not covered by warranty. If shipping damage is found, notify carrier at once. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

SAFETY FIRST

2.0 SAFETY ISSUES

Read all instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation. Enerpac cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect product and/or system operation. Contact Enerpac when in doubt as to the safety precautions and operations. If you have never been trained on high-pressure hydraulic safety, consult your distribution or service center for a free Enerpac Hydraulic safety course.

Failure to comply with the following cautions and warnings could cause equipment damage and personal injury.

A **CAUTION** is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment or other property.

A **WARNING** indicates a potential danger that requires correct procedures or practices to avoid personal injury.

A **DANGER** is only used when your action or lack of action may cause serious injury or even death.

WARNING: Wear proper personal protective gear when operating hydraulic equipment.

WARNING: Stay clear of loads supported by hydraulics. A cylinder, when used as a load lifting device, should never be used as a load holding device. After the load has been raised or lowered, it must always be blocked mechanically.

WARNING: USE ONLY RIGID PIECES TO HOLD LOADS. Carefully select steel or wood blocks that are capable of supporting the load. Never use a hydraulic cylinder as a shim or spacer in any lifting or pressing application.

DANGER: To avoid personal injury keep hands and feet away from cylinder and workpiece during operation.

WARNING: Do not exceed equipment ratings. Never attempt to lift a load weighing more than the capacity of the cylinder. Overloading causes equipment failure and possible personal injury. The cylinders are designed for a max. pressure of 700 bar [10,000 psi]. Do not connect a jack or cylinder to a pump with a higher pressure rating.

Never set the relief valve to a higher pressure than the maximum rated pressure of the pump. Higher settings may result in equipment damage and/or personal injury.

WARNING: The system operating pressure must not exceed the pressure rating of the lowest rated component in the system. Install pressure gauges in the system to monitor operating pressure. It is your window to what is happening in the system.

CAUTION: Avoid damaging hydraulic hose. Avoid sharp bends and kinks when routing hydraulic hoses. Using a bent or kinked hose will cause severe back-pressure. Sharp bends and kinks will internally damage the hose leading to premature hose failure.

Do not drop heavy objects on hose. A sharp impact may cause internal damage to hose wire strands. Applying pressure to a damaged hose may cause it to rupture.

IMPORTANT: Do not lift hydraulic equipment by the hoses or swivel couplers. Use the carrying handle or other means of safe transport.

CAUTION: Keep hydraulic equipment away from flames and heat. Excessive heat will soften packings and seals, resulting in fluid leaks. Heat also weakens hose materials and packings. For optimum performance do not expose equipment to temperatures of 65°C [150°F] or higher. Protect hoses and cylinders from weld spatter.

DANGER: Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin, causing serious injury. If oil is injected under the skin, see a doctor immediately.

WARNING: Only use hydraulic cylinders in a coupled system. Never use a cylinder with unconnected couplers. If the cylinder becomes extremely overloaded, components can fail catastrophically causing severe personal injury.

WARNING: BE SURE SETUP IS STABLE BEFORE LIFTING LOAD. Cylinders should be placed on a flat surface that can support the load. Where applicable, use a cylinder base for added stability. Do not weld or otherwise modify the cylinder to attach a base or other support.

Avoid situations where loads are not directly centered on the cylinder plunger. Off-center loads produce considerable strain on cylinders and plungers. In addition, the load may slip or fall, causing potentially dangerous results.

Distribute the load evenly across the entire saddle surface. Always use a saddle to protect the plunger.

IMPORTANT: Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Authorized ENERPAC Service Center in your area. To protect your warranty, use only ENERPAC oil.

WARNING: Immediately replace worn or damaged parts with genuine ENERPAC parts. Standard grade parts will break causing personal injury and property damage. ENERPAC parts are designed to fit properly and withstand high loads.

3.0 DESCRIPTION

The 10,000 psi TURBO II Air Pumps have an operating pressure of 10,000 psi at 85 psi inlet pressure. They are suited for plant maintenance, fabrication, production, bolting, vehicle repair, and any task that requires hydraulic pressure from air input.

4.0 SPECIFICATIONS

See table below.

5.0 INSTALLATION

5.1 Air Supply

Pump operates with 25-125 psi [2,76 - 8,27 bar] air pressure. An Enerpac RFL-102 (regulator/filter/lubricator) should be installed upstream from pump to provide clean, lubricated air and allow for air pressure adjustment.

5.2 Air Connections

See Illustration 1. Attach air supply to the 1/4 NPT swivel connection on the end of the pump. Use Teflon tape or similar thread sealant. Torque to 20-25 ft. lbs [27-34 Nm].

PARG Models: See Illustrations 2 and 3. Attach air supply to either 1/4 NPT connections on top rear to handle or 1/4 NPT connection on bottom of air pendant. Make sure the unused port is plugged.

5.3 Hydraulic Connections

TORQUE SPECIFICATIONS

Model Numbers Ending In	Hydraulic Ports	Torque Fittings To
N or NB	3/8 NPTF	65 –75 ft-lbs. (88–102 Nm)
P or PB	1/4 BSPP	14 –18 ft-lbs. (19 –24 Nm)

NOTE: Use 1 1/2 wraps of Teflon tape the NPTF hose fittings only, leaving the first complete thread free of tape to ensure that pieces of tape do not break off and enter the system. Do not use tape sealant on BSPP fittings.

PAMG, PARG and PATG Models: See illustration 4. Thread hose(s) into outlet port(s) of pump (A). Hose fittings must be torqued. See Torque Specifications Table. Pumps with treadles (PATG) have one outlet port, and pumps with 4-way valves (PAMG) have 2 outlet ports. Outlet port(s) are located on the opposite end of pump from the air inlet connection.

NOTE: Valve block or treadle should be restrained when torquing fittings. The reservoir base should not be bolted down or restrained to compensate for the fitting installation torque.

SPECIFICATION TABLES

Model No.	Weight-add 1 lb. (.5 kg) for bracket
PATG1102N	18 lbs. [8,2 Kg]
PATG1105N	22 lbs. [10,0 Kg]
PAMG1402N	24 lbs. [10,9 Kg]
PAMG1405N	26 lbs. [11,8 Kg]
PARG1102N	22 lbs. [10,0 Kg]
PARG1105N	26 lbs. [11,8 Kg]

Reservoir Series	Reservoir Capacity	Usable Oil Capacity
2	137 cu.in (2.2 liters)	127 cu.in (2.1 liters)
5	265 cu.in (4.3 liters)	230 cu.in (3.8 liters)

Model Type	Hydraulic Air Ratio	Hydraulic Output Ports	Oil Flow @ 100 psi (6.9 bar)	Oil Flow @ 10,000 psi (700 bar)	Air Pressure Range	Air Consumption @ 100 psi (6.9 bar)	Operating Noise Level (dBA)
PATG, PAMG	100:1	.375-18 NPTF	60 cu.in/min. (1.0 liters/min.)	10 cu.in/min. (0.16 liters/min.)	25-125 psi (1,7-8,6 bar)	12 SCFM (0.34 cu.m/min)	76
PARG	100:1	.375-18 NPTF	45 cu.in/min. (0.74 liters/min.)	5 cu.in/min (0.08 liters/min.)	25-125 psi (1,7-8,6 bar)	12 SCFM (0.34 cu.m/min)	76

PAQG Models:

WARNING: On PAQG and PANG models, you must connect an in-line directional valve to be able to release system pressure and return oil to the reservoir. DO NOT release pressure by disconnecting a pressurized line. Handling pressurized hydraulic lines can result in severe personal injury caused by sudden release of pressurized oil.

See illustration 5. For this model, the tool used must have a valve in order to release system pressure to the reservoir. If the tool does not have a control valve, you must install a remote directional valve.

If the tool has a valve, thread a hose into pressure port **(A)** of the pump and connect the hose to the pressure port of the tool. Connect a return line hose from the valve to the tank port **(B)**.

If you need to install a valve, connect a hose from the pressure port **(A)** of the pump to the pressure port of the remote valve. Connect return line hose from the valve back to the tank port **(B)**. Connect a hose from the valve to the tool. (Recommended Valves: Enerpac VC Series manual, or VS/VE Series electro-actuated control valves.)

NOTE: Hose fittings must be torqued. See Torque Specifications Table to the left.

PANG Models: The manifold is designed for custom-made valves. PANG models are shipped with a cover and gasket, which are bolted to the manifold block. Remove the four bolts, the cover, and the gasket. Bolt a valve on the manifold using the four holes **(C)** in the manifold block. The mounting holes have M12 x 1,75 threads, which are 0.60" [15,2mm] deep. Connect hoses to valve outlet ports.

5.4 Venting

The pump reservoir must always be vented prior to use. Use either the "vent screw" or "vent/fill assembly".

a) Vent Screw: See illustration 7A, item 1. The vent screw is the primary means to vent the reservoir. It is located near the hydraulic outlet port on top of the reservoir. To allow venting, open the screw 1/2 to 1 full turn. To avoid damaging the threads when closing the vent screw, tighten only until the screw head slightly compresses the O-ring. Apply only about 8-10 in-lbs. [1 Nm] of torque.

b) Vent/Fill Assembly: See illustration 7B, item 2. The vent/fill assembly is located on the air inlet end of the pump, opposite the vent screw. This assembly serves 3 functions; vent, fill port, and return-to-tank port.

To use as a vent, pull up the vent/fill assembly until the first detent is reached (see illustration 8). This is the vented position.

To use as a fill port, pull up the vent/fill assembly past the first detent. Then, completely remove the assembly from the reservoir. If oil level is low, add oil as described in Section 5.6.

To use as a return-to-tank port, remove the hex plug from the vent/fill assembly and install a compatible return line. Torque return line fitting at the vent/fill connection to 15-20 ft. lbs. [20-27 Nm].

CAUTION: Pump reservoir must be vented using one of the two vent options. Failure to do so may cause cavitation and pump damage.

5.5 Mounting Pump

The pump should be mounted only in the horizontal position.

NOTE: Vertical mounting is not recommended and may result in hydraulic oil leakage.

a) Without Mounting Brackets: The four holes in the bottom of the reservoir should be used for bolting through the mounting surface into the reservoir. Use the #10 x 5/8" fasteners included with pump, or allow no more than 3/4" [19 mm] thread engagement into reservoir.

NOTE: A mounting bracket kit, MTB1, can be ordered from Enerpac.

b) With Mounting Brackets: Models with brackets have model numbers ending with the letter 'B'. The mounting bracket may be mounted on the pump or shipped separately. To mount the bracket on the pump, use the #10 x 5/8" fasteners included with pump, or allow no more than 3/4" [19 mm] thread engagement into reservoir. Mount the pump to the mounting surface using the four slots in the mounting bracket.

5.6 Oil Level

Always check oil level with all cylinders or tools in the fully retracted position. If they are advanced when the pump is filled, the reservoir will be over-filled when they are retracted.

Use the sight glass on the end of the pump to check the oil level. The reservoir is full when the pump is positioned horizontally, and oil level is up to, but not above, the top of the sight glass. If oil level is low, remove vent/fill assembly from reservoir (See Section 5.4b) and add oil as required.

6.0 OPERATION

6.1 Oil Level

Check the oil level of pump and add oil if necessary (See Section 5.6).

6.2 Venting Pump

Make sure the pump reservoir is vented (See Section 5.4).

6.3 Treadle Operation (PATG Models Only):

See illustration 9.

a) To Advance Cylinder: Depress the "PRESSURE" end of treadle and the pump will start to pump hydraulic oil to the system.

b) To Hold The Cylinder Position: The pump will stop and hold pressure when the treadle is in the free/neutral position (treadle is not depressed in either "PRESSURE" or "RELEASE" positions.)

c) To Retract Cylinder: Depress the "RELEASE" end of the treadle to retract cylinder. To stop the cylinder from retracting, release the treadle and return it to the hold position.

6.4 4-Way Valve Operation:

See illustration 10.

a) Listed below are the valve positions and operations:

1 - Flow to Port “B”, Port “A” returns flow to tank

2 - Neutral, Ports “A” and “B” are blocked

3 - Flow to Port “A”, Port “B” returns flow to tank

b) After shifting the valve, depress the treadle to start the pump. This will direct flow to Port A or Port B, depending on the handle’s position. Releasing the treadle will stop pump flow.

NOTE: To prolong pump and cylinder life, DO NOT continue to operate pump after cylinder is fully extended or retracted.

6.5 Treadle Operation (PAMG, PANG, and PAQG models only):

See illustration 11. The treadle can be operated in a momentary or maintained mode. For momentary operation, press the treadle to run the pump and release the treadle to stop the pump. For maintained operation, use the locking pin (A) to hold the treadle down. To lock the treadle:

a) Press and hold the treadle.

b) Press locking pin and hold while releasing treadle.

c) Press treadle briskly to release locking pin and stop pump.

6.6 Pendant Operation (PARG model only)

a) To Advance Cylinder: Depress the “ADV” button on the pendant and the pump will start to pump hydraulic oil into the system.

b) To Hold the Cylinder Position: The pump will stop and hold pressure when neither of the buttons are depressed.

c) To Retract Cylinder: Depress the “RET” button on the pendant. To stop the cylinder from retracting, release the button.

6.7 Priming

Priming of the hydraulic pump is normally not required. If the air motor runs very fast, but no hydraulic pressure is built, the pump may have lost its prime. This pump can lose prime if it is run completely out of oil or if an air bubble is trapped in the pumping chamber. An air bubble could occur during shipment, or when the shipping plug is removed while the pump is held in the vertical (shipping plug up) position.

a) Place the pump on a flat, horizontal surface. Remove the shipping plug. Attach an approved 10,000 psi rated hydraulic hose and cylinder assembly to the hydraulic outlet 3/8” NPT port. Torque fittings to 65-75 ft. lbs. (88-102 Nm).

b) Attach air supply to the 1/4” NPT swivel connection. Torque to 20-25 ft. Lbs (27-34 Nm.).

c) Fill pump with Enerpac Hydraulic Oil, 32 cSt hydraulic oil.

d) Prime the pump with air pressure set to 30-40 psi. If air pressure is different than 30-40 psi follow the procedure below:

e) ON MODELS WITH TREADLE: While holding the treadle down firmly in the RELEASE position, slowly depress the PRESSURE button located under the toe of the treadle near the air supply fitting. Try to get the air motor to operate one or two cycles at a time. Slowly depressing the PRESSURE button will allow you to “throttle” the inlet air pressure

f) Pressing the operating buttons in this manner effectively draws oil through the intake tube to refill the pressure chamber. You may need to hold the treadle and “throttle” the PRESSURE button for a few minutes to completely remove the air and prime the pump models with an air pendant, hold “RET” button down while cycling

g) ON MODELS WITH 4-WAY VALVES: Shift valve to neutral position, press the treadle, and run the pump momentarily several times.

h) On models with an air pendant, hold “RET” button down while cycling “ADV” button momentarily several times.

i) To verify that the pump is primed, operate as normal with cylinder attached. If cylinder does not advance, repeat step 6.7g or 6.7h.

6.8 Pressure Adjustment

To obtain less than maximum hydraulic pressure, either install an Enerpac V-152 adjustable relief valve in the system or limit the inlet air pressure. When limiting the inlet air pressure, pump will slow down and stall as the hydraulic pressure increases. To obtain a stall-out pressure, lower the inlet air pressure until the pump stalls below the desired hydraulic pressure and increase air pressure until the desired hydraulic pressure is reached. Repeat pump operation to verify the stall-out pressure.

NOTE: 10,000 psi TURBO II pumps were not designed for stall to restart applications. The seals on the pump will not ensure the pressure drop accuracy required for effective stall to restart operation.

7.0 MAINTENANCE

7.1 Maintaining Proper Oil Level

Check the oil level of the pump prior to start-up, and add only ENERPAC hydraulic oil, if necessary, by removing the vent/fill assembly (see instructions in Section 5.6).

7.2 Cleaning The Muffler

Clean the muffler every 250 hours, or more frequently if pump is used in dirty environments. On PATG Models, first remove 2 shoulder bolts **(A)** and treadle **(B)**. See Illustration 12. To expose the muffler, remove 2 screws **(C)** holding down muffler plate. See illustration 13. Wash muffler element in soapy water, dry, and reassemble, installing screws hand tight.

7.3 Changing The Oil

Change the oil every 250 hours. The vent/fill assembly serves as a drain plug for use when changing oil. Refill pump with Enerpac hydraulic oil. Dispose of used oil properly, in accordance with all applicable laws and regulations.

7.4 Cleaning The Air Inlet Filter

Remove the swivel air connector by removing the two cap screws and pulling air filter out of cavity. Using an air nozzle blow debris off filter. (Always use proper eye protection). Re-install filter and swivel connector. Torque cap screws to 16-18 in.lbs [1,8-2,0 Nm].

8.0 TROUBLESHOOTING

Only qualified hydraulic technicians should service the pump or system components. A system failure may or may not be the result of a pump malfunction. To determine the cause of the problem, the complete system must be included in any diagnostic procedure. The following information is intended to be used only as an aid in determining if a problem exists. DO NOT disassemble the pump. For repair service, contact the Authorized ENERPAC Service Center in your area.

PROBLEM		CAUSE
1) Pump will not start		Air turned off or line blocked
2) Motor stalls under load		Low air pressure* Inlet filter plugged, insufficient air flow
3) Pump fails to build pressure		External leak in system Internal leak in pump Internal leak in system component Low oil level
4) Pump builds less than full pressure		Low air pressure* Internal relief valve set low External system leak Internal leak in system component
5) Pump builds pressure, but load does not move		Load greater than cylinder capacity at full pressure Flow to cylinder blocked
6) Cylinder drifts back on its own		External system leak Internal leak in system component
7) Cylinder will not return	A) Single-acting type	Return flow or coupler restricted/blocked No load on a “load return” cylinder Return spring broken on cylinder Release Valve Malfunction
	B) Double-acting type	Return flow or coupler restricted/blocked Valve malfunction
8) Low oil flow rate		Reservoir not vented Inadequate air supply Dirty air filter Clogged inlet filter
* 85 psi (5,86 Bar) air pressure required to obtain 10,000 psi (700 Bar) hydraulic pressure.		

Figure 1 図1 图1

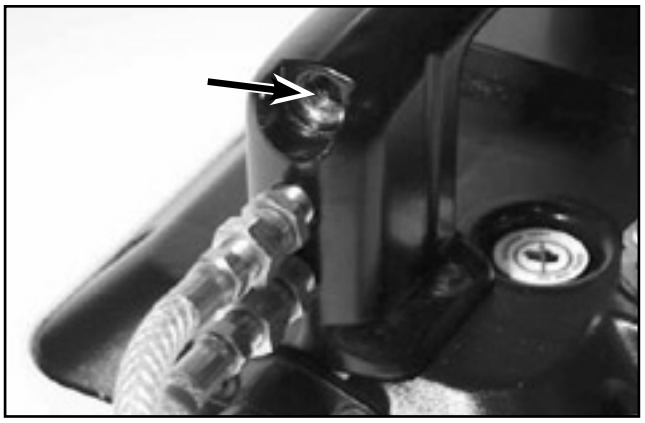

Figure 2 図2 图2

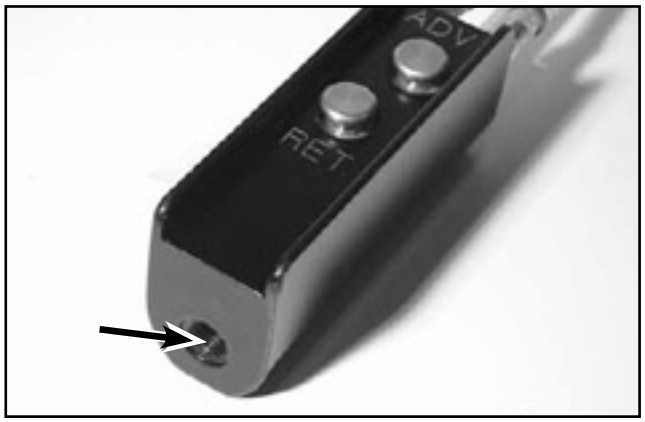

Figure 3 図3 图3

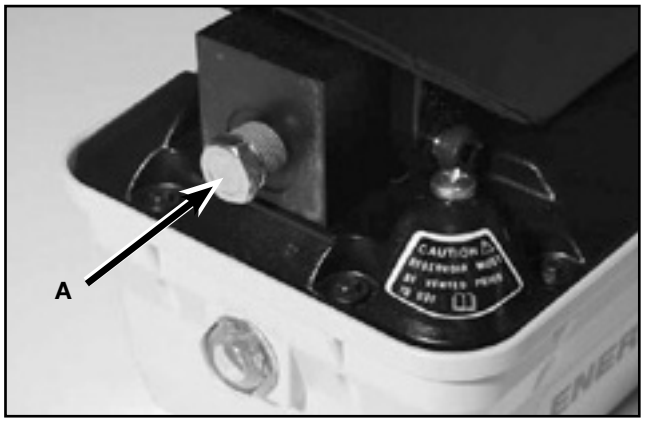

Figure 4 図4 图4

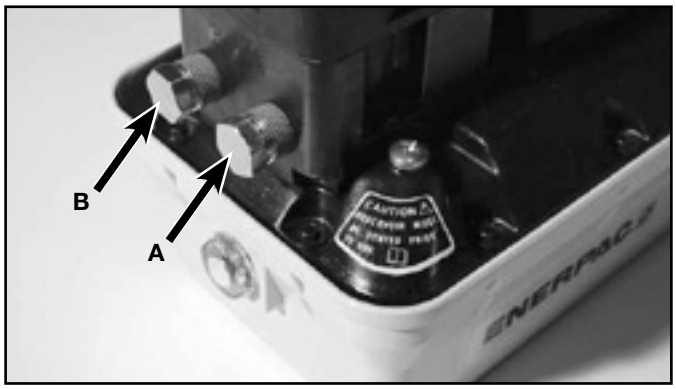

Figure 5 図5 图5

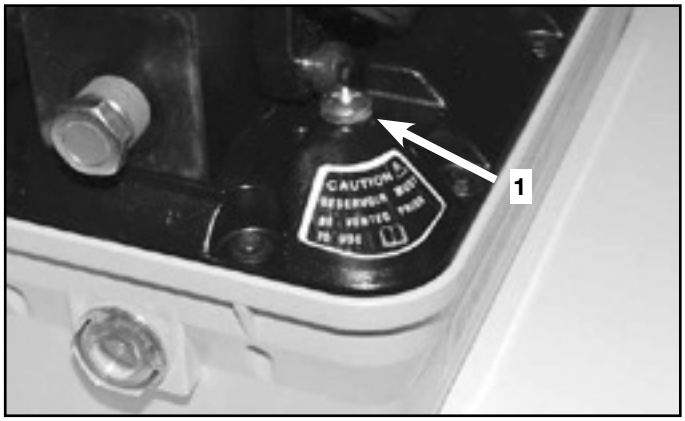

Figure 7A 図7A 图7A

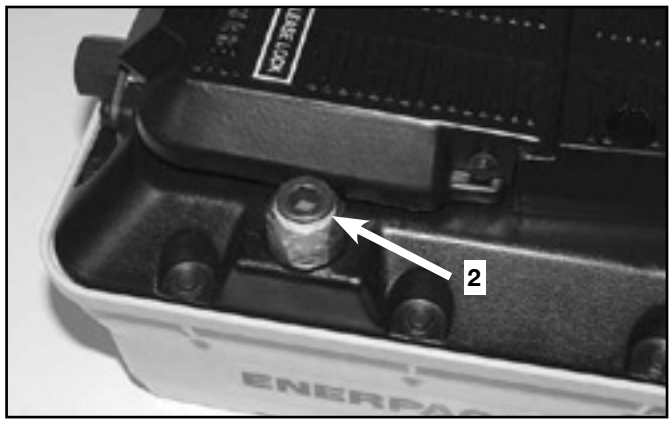

Figure 7B 図7B 图7B

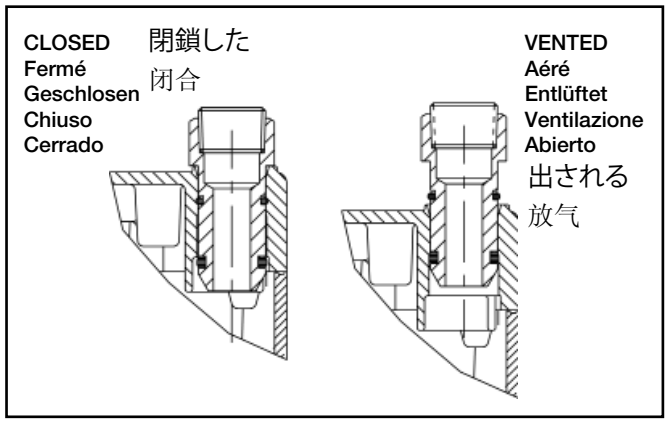

Figure 8 図8 图8

Figure 9 図9 图9

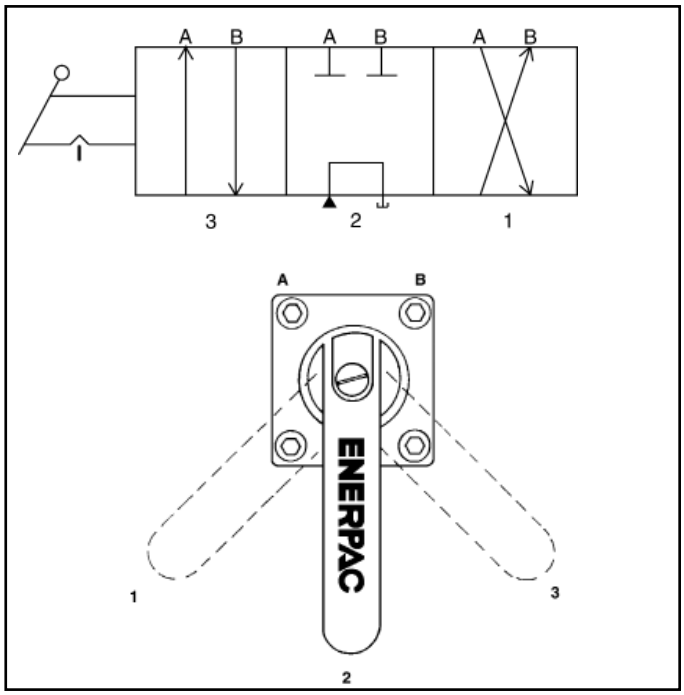

Figure 10 図10 图10

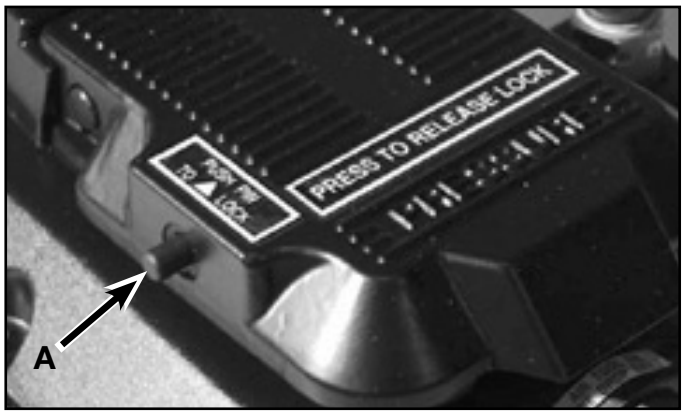

Figure 11 図11 图11

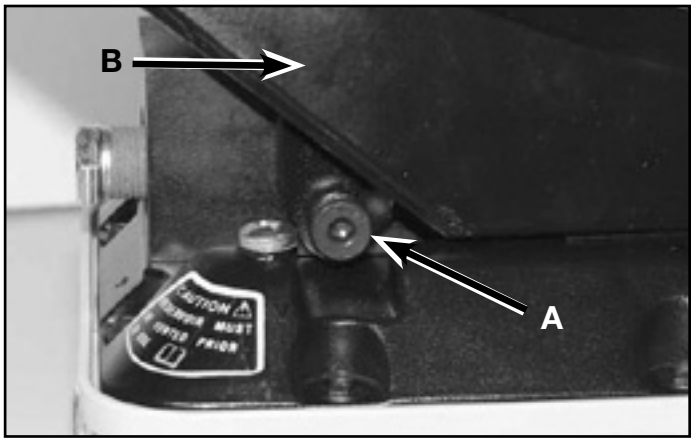

Figure 12 図12 图12

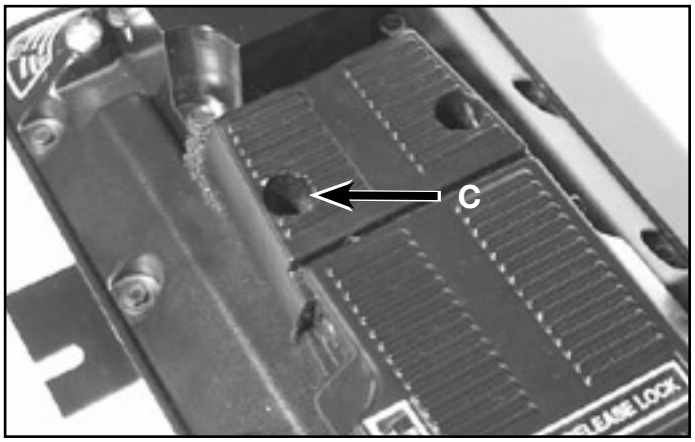

Figure 13 図13 图13

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