ENERPAC®

POWERFUL SOLUTIONS. GLOBAL FORCE.

Instruction Sheet

Pro Series Electric Torque Wrench Pumps Models ZU4, ZE4 and ZE5

L2926 Rev. D 02/10

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.

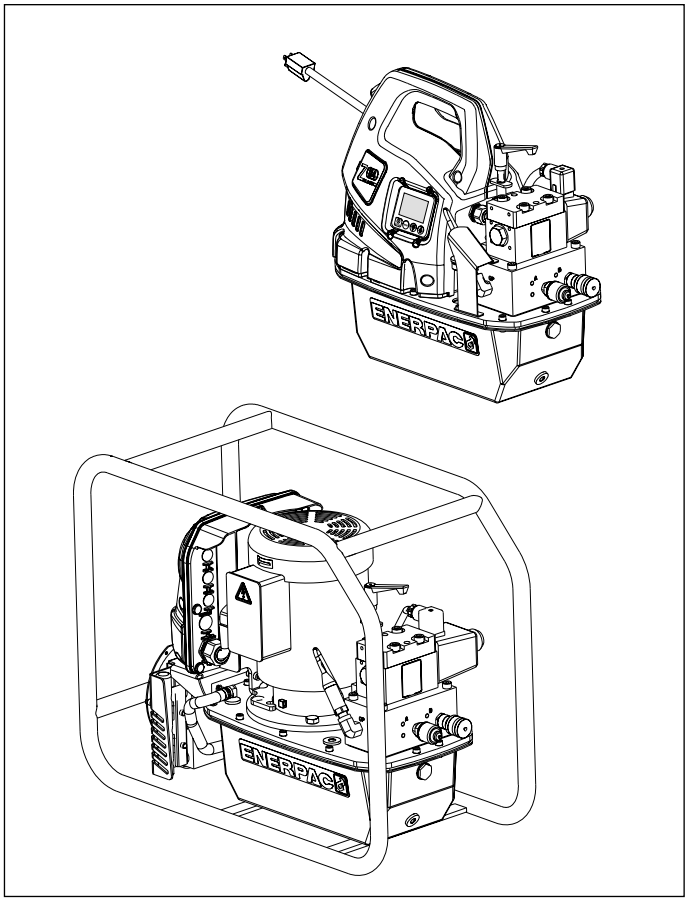
A **CAUTION** is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment or other property.

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: 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 torque wrenches in a coupled system. Never use a torque wrench with unconnected couplers. If the torque wrench becomes extremely overloaded, components can fail catastrophically causing severe personal injury.

3.0 SPECIFICATIONS

Refer to Section 3.1, Performance Chart, for pump performance information and specifications.

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.

WARNING: Do not use electric pumps in an explosive atmosphere. Adhere to all local and national electrical codes. A qualified electrician must do installation and modification.

WARNING: Keep hands clear of moving parts and pressurized hoses.

WARNING: These pumps have internal factory adjusted relief valves, which must not be repaired or adjusted except by an Authorized Enerpac Service Center.

WARNING: To prevent damage to pump electric motor, check specifications. Use of incorrect power source will damage the motor.

3.1 Performance Chart

Pump Model	Motor		Output Flow Rate* in^3/min [l/min]				Sound Level	Relief Valve Adjustment Range	Motor Electrical Specifications	Maximum Current Draw
	hp [kW]	RPM	100 psi [7 bar]	700 psi [50 bar]	5,000 psi [350 bar]	10,000 psi [700 bar]	dBA	psi [bar]	Volts AC-Ph-Hz	Amps
ZU4 (-Q)	1.7 [1,25]	1750	700 [11,5]	535 [8,8]	76 [1,2]	60 [1,0]	85-90	1,400-10,000 [70-700]	115-1-50/60 230-1-50/60	20 (115V) 11 (230V)
ZU4 (-E)	1.7 [1,25]	1750	700 [11,5]	535 [8,8]	76 [1,2]	60 [1,0]	85-90	1,400-11,600 [70-800]	115-1-50/60 230-1-50/60	24 (115V) 11 (230V)
ZE4 (-Q)	1.5 [1,12]	1750	650 [10,7]	600 [9,8]	62 [1,0]	60 [1,0]	75	1,400-10,000 [70-700]	(See motor data plate)	(See motor data plate)
ZE4 (-E)	1.5 [1,12]	1750	650 [10,7]	600 [9,8]	62 [1,0]	60 [1,0]	75	1,400-11,600 [70-800]		
ZE5 (-Q)	3.0 [2,24]	1750	850 [13,9]	825 [13,5]	123 [2,0]	120 [2,0]	75	1,400-10,000 [70-700]		
ZE5 (-E)	3.0 [2,24]	1750	850 [13,9]	825 [13,5]	123 [2,0]	120 [2,0]	75	1,400-11,600 [70-800]		

***** Output flow rate is listed at 60 Hz. Flow rate will be approximately 5⁄6 of shown values at 50 Hz.

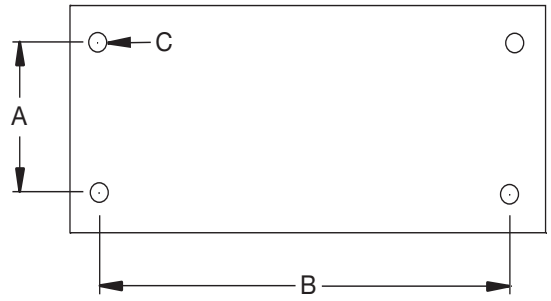
4.0 INSTALLATION

Install or position the pump to ensure that air flow around the motor and pump is unobstructed. Keep the motor clean to ensure maximum cooling during operation.

4.1 Pump Mounting

If desired, the pump may be mounted to a fixed surface. Refer to Figure 1 for mounting dimensions.

(Note: Reservoir viewed from below)



	1-2 Gal. (4-8 L) inch [mm]	2.5 Gal. (10 L) inch [mm]	5 Gal. (20 L) inch [mm]	10 Gal. (40 L) inch [mm]
A	3.75 [95]	11.0 [279]	15.6 [396]	18.9 [480]
B	9.00 [229]	12.0 [305]	12.0 [305]	12.0 [305]
C	tapped holes, M8 x 1.25	Ø 0.34 [8.6] diameter through holes 0.25 [6] deep		

Figure 1, Mounting Dimensions

4.2 Air Breather (See Figure 2)

A shipping plug (A) is installed in the breather port on the top of the reservoir. Before using the pump, replace the shipping plug (A) with the air breather (B) and adapter fitting (C).

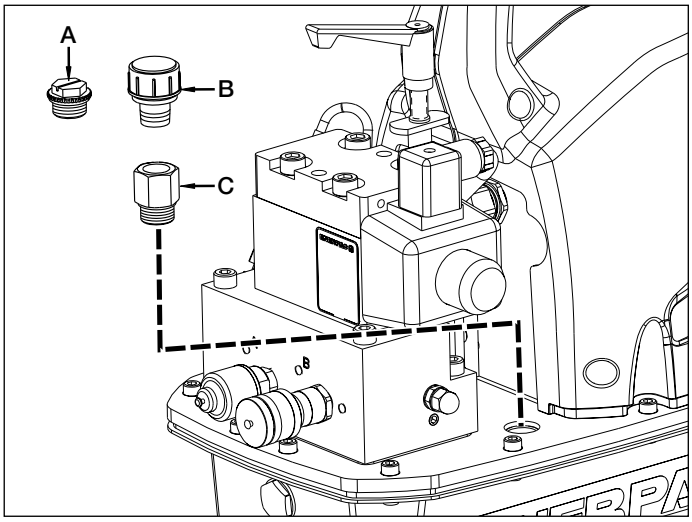


Figure 2, Air Breather (ZU4 shown, ZE4 and ZE5 similar)

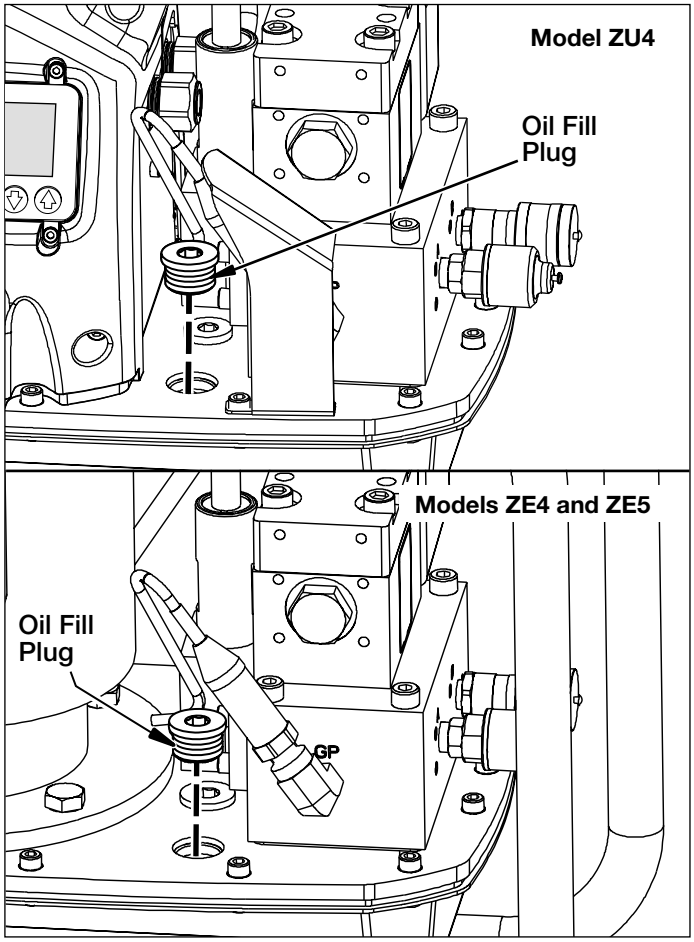


Figure 3, Oil Fill Plug

4.3 Oil Level (See Figures 3 and 4)

Check the pump oil level prior to start-up. The reservoir is full when the oil level is as shown in Figure 4. If necessary, remove the oil fill plug from the cover plate as shown in Figure 3 and add oil as required.

IMPORTANT: Add oil only when all system components are fully retracted, or the system will contain more oil than the reservoir can hold.

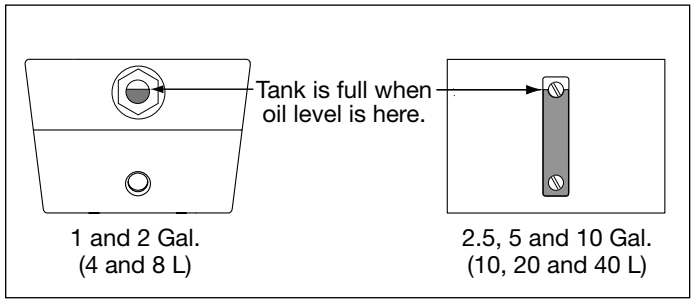


Figure 4, Oil Reservoir Sight Glass

4.4 Electrical Connections

WARNING: The pump is factory equipped with the common electrical plug for a given voltage. Altering the plug type should only be done by a qualified electrician, adhering to all applicable local and national codes.

Note: For 3-Phase ZE4 and ZE5 pumps, no power plug is provided.

1. The disconnect and line circuit protection is to be provided by customer. Line circuit protection is to be 115% of motor full load current at maximum pressure of application.
2. For additional information, refer to power rating on pump name plate and/or motor name plate.

4.5 Hydraulic Hose Connections

Connect hoses as described for your pump type (-E) or (-Q). Refer to Figure 5.

1. (-E) Pump type for use with Enerpac SQD and HXD torque wrenches: Be sure to use hoses marked "Enerpac THC-700 Series - 800 bar/11,600 psi max." The couplers on these hoses are "polarized" at the factory to ensure correct wrench operation.

   The (-E) pump's female couplers are self locking. To connect, press mating couplers together until coupler lock ring snaps forward. To disconnect, twist coupler lock ring clockwise and push away from connection.
2. (-Q) Pump type for use with Enerpac S and W torque wrenches and other brands: Use hoses marked "Enerpac THQ-700 series - 700 bar/10,000 psi max." Couplers must be polarized per Figure 5 for correct wrench operation. Ensure couplers are fully engaged and tightened before operating. Partial coupler engagement will prevent proper wrench operation.

WARNING: When using (-Q) pumps with multi-wrench manifolds, ensure all unused couplers have the protective caps fully installed before starting pump.

Note: When the wrench is first connected to the pump, air will be trapped in the hydraulic circuit. Remove air by placing wrench and straightened hoses below pump, operate wrench without load until it rotates without hesitation.

5.0 OPERATION

1. Be sure that the air breather and adapter fitting have been installed. See Section 4.2.
2. Check the pump oil level and add oil if necessary. See Section 4.3.
3. Connect unit to power. Wait until "READY" is displayed on the LCD before pressing any button on shroud or pendant.

Note: During the boot sequence, the microcontroller identifies any button operation as a potential malfunction and prevents the motor from starting. Reset by disconnecting power for 20 seconds.

4. Set the relief valve pressure. See Section 5.2.
5. Using the LCD control panel, set the desired maximum advance pressure or torque. Refer to sections 6.1 through 6.5 of this document for LCD control panel operation instructions.

WARNING: As motor starts, the torque wrench will retract automatically. Verify torque wrench is positioned to avoid injury or equipment damage before starting motor.

6. Start motor and retract wrench by pressing and releasing the pendant on/off button. The LCD will show the pressure in the retract circuit (B-port bypass), approximately 2500 – 2800 psi [173 – 193 bar].
7. Advance the torque wrench by pressing and holding the pendant advance button.
8. Shut-off motor by pressing the pendant on/off button or the shroud on/off (Motor) button. If no pendant or shroud buttons are pressed within any continuous 20 second period, the pump's built in timer will automatically shut-off the motor.

Note: When the motor is turned off, as the motor stops turning, the valve will automatically cycle to release all pressure in both the advance and retract hoses.

Note: Pumps equipped with heat exchangers: Whenever possible, allow the timer to automatically shut-off the pump. The 20 second delay will allow additional time for oil to circulate through the heat exchanger, resulting in improved oil cooling.

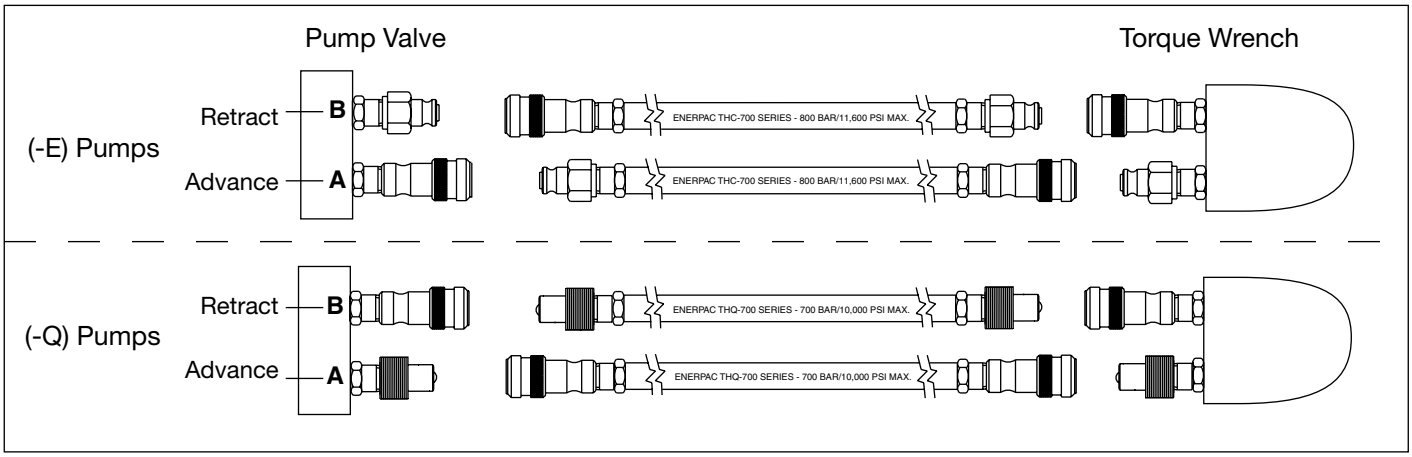


Figure 5, Hose Details

5.1 Pendant Operation

Oil flow and motor operation are both controlled by the pendant. See Figure 6.

1. Pendant ***advance*** button:
   - Press for momentary wrench advance (Automode OFF).
   - Press and hold to auto-cycle wrench between advance and retract (Automode ON).
   - Release to automatically retract wrench (Automode ON or OFF).
2. Pendant ***on/off*** button: Toggles motor ON or OFF.

Notes:

• If motor is ON, pressing the shroud motor on/off button will immediately stop the motor, even when pump is being operated by the pendant.

• If motor is OFF, pressing the shroud motor on/off button will not start the motor, unless the LCD is in Local mode.

See sections 6.3 and 6.5 M for additional information.

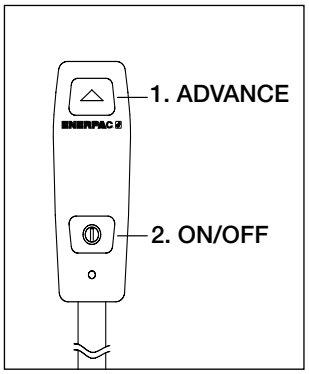


Figure 6, Pendant Buttons

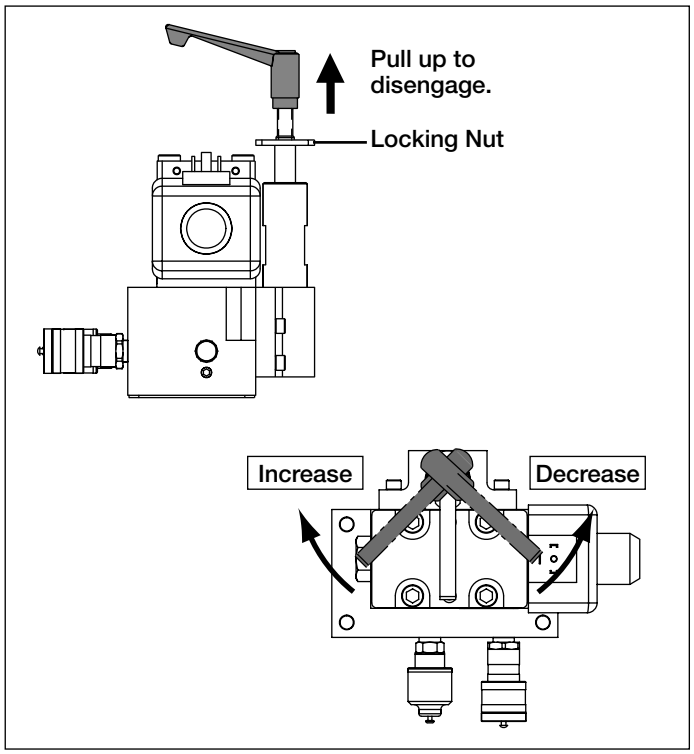


Figure 7, User-Adjustable Relief Valve

5.2 User-Adjustable Relief Valve

The pump provides two methods of limiting the advance (A-port) pressure to the wrench:

A) Automode (See Section 5.3)
B) The user-adjustable relief valve
(Refer to the following paragraphs of this section)

The user-adjustable relief valve limits the maximum advance pressure by opening the relief valve to redirect the pump's oil flow to the reservoir at the user-set pressure value.

WARNING: Make the following adjustments BEFORE putting torque wrench on nut or bolt head. The pump relief valve setting must not be above the pressure needed to provide the required torque for your application. Exceeding required torque will cause equipment damage and may lead to serious personal injury.

Adjust the relief valve pressure setting as described in the following procedure. See Figure 7.

1. Loosen the relief valve locking nut.
2. Rotate relief valve handle counter-clockwise as required, until there is little or no resistance when turning. When this occurs, the valve is at its lowest setting.

Note: Relief valve handle will rotate only about two-thirds of a full turn. When rotation stops, pull up on handle to disengage. Then, reposition and re-engage handle to allow additional adjustment (as required).

3. Disconnect hydraulic hoses from couplers on valve.

WARNING: On (-Q) pumps, ensure all couplers have the protective caps fully installed before starting pump.

4. Connect power to pump. Using the LCD screen and keypad, verify that Automode is OFF or that the “Hi Press” value is set to a minimum of 100 psi [7 bar] higher than the desired relief valve setting (See sections 6.5 D and 6.5 F for additional information).
5. Press the pendant on/off button. The motor will start.
6. Press and hold the pendant advance button. Pressure will begin building in the advance (A-Port) circuit.
7. While continuing to hold down the pendant advance button, SLOWLY rotate relief valve handle clockwise, until the pressure shown on the LCD increases to the desired setting.
8. Release the pendant advance button to allow the system pressure to return to the B-port retract setting. The motor will continue to run.
9. Press and hold the pendant advance button again to recheck the relief valve pressure setting. Verify that the desired pressure is indicated on the LCD screen.

Note: If readjustment is necessary: To obtain an accurate setting, always decrease the pressure to a point below the final setting and then slowly increase the pressure until the final setting is reached.

10. After the desired pressure setting has been obtained, tighten the relief valve locking nut.

5.3 Automode Auto-Cycle Operation (Pressure or Torque Control)

The Automode feature automatically cycles the wrench from *advance* to *retract* operation when the user-adjustable maximum advance pressure or torque value has been achieved.

Choosing a unit of pressure (PSI, BAR or MPa) on the LCD keypad *and* turning Automode ON places the microcontroller in *pressure control* mode. In this mode, the user sets the maximum advance pressure that corresponds to the desired torque value for the wrench being used.

Choosing a unit of torque (Ft-lb or Nm) *and* turning Automode ON places the microcontroller in *torque control* mode. In this mode, the user selects from a list of Enerpac torque wrench models that are programmed into the microcontroller. The maximum allowable advance torque for the selected wrench model will appear on the LCD. If desired, this default torque value can be adjusted lower by the user.

Depressing and holding the pendant advance button starts auto-cycle operation. The wrench will begin auto-cycling between *advance* and *retract*, applying the user-determined torque to the bolt. Cycling will continue for as long as the pendant advance button remains pressed.

The retract pressure setting is factory-preset and is not user adjustable. When retract pressure reaches approximately 2000 psi [138 bar], the pump automatically changes wrench operation from *retract* back to *advance*. The pump microcontroller performs this operation by shifting the electric solenoid valve to redirect the pump's oil flow between ports.

To operate the pump using Automode:

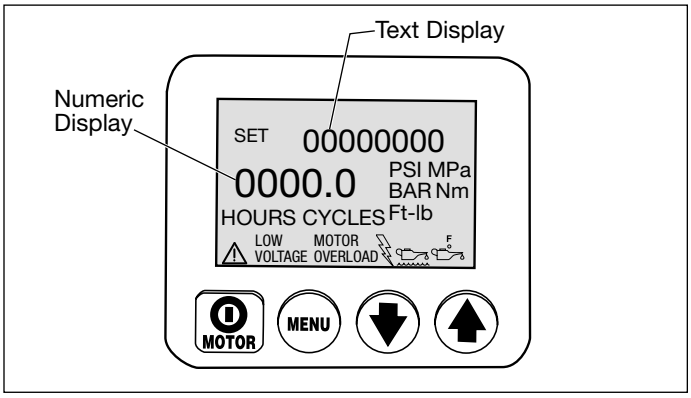
1. Be sure Automode is ON. Set the desired maximum advance pressure or torque value. Refer to sections 6.1 through 6.5 for detailed LCD operation instructions.
2. Start pump motor by pressing the pendant on/off button.
3. Press and hold the pendant advance button to start auto-cycle operation.
4. If the torque wrench does not auto-cycle or does so erratically, increase the user-adjustable relief valve setting to a minimum pressure value of 100 psi [7 bar] higher than the desired auto-cycle value. See Section 5.2 for additional details.

Note: Maximum advance (A-port) pressure is limited by the relief valve setting. If the relief valve is set *lower* than the LCD pressure setting (or set lower than the pressure setting that corresponds to the selected torque value), the desired torque will not be obtained.

Note: Maximum retract pressure, also known as B-port bypass, is factory set at approximately 2500 - 2800 psi [173 - 193 bar] and is not user-adjustable.

6.0 LCD ELECTRONIC CONTROLS

6.1 LCD Function Overview



The LCD control panel serves as an interface between the operator and the pump. By using the LCD control panel's four-button switches, and the additional button switches located on the pendant, all functions and settings described in sections 6.3 through 6.5 of this document can be activated.

In the event of an abnormal condition, the LCD also displays fault codes and warning alerts as described in sections 6.6 and 6.7.

CAUTION: Make sure that the plastic overlay that protects the LCD screen and the button switches is not broken or otherwise damaged. Never punch the button switches with a sharp or pointed instrument, use fingertips only. Clean the overlay regularly with a damp cloth. Never use aggressive or abrasive detergents.

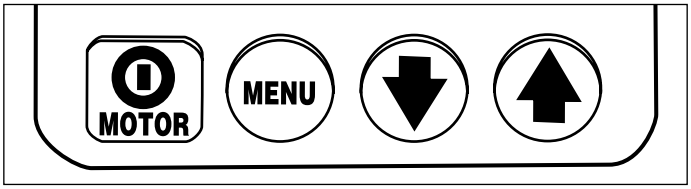
6.2 Boot Sequence

When the pump is connected to electrical power, the LCD screen will show: "FIRMWARE 7.x" for 1 second, then "Model 4" (-E pumps) or "Model 7" (-Q pumps) for 0.5 seconds. Following these messages, "Motor UN", "Motor 1P" or "Motor 3P" will appear for 0.5 seconds. This information may be useful if the pump ever requires servicing or repairs. Additional information may appear, depending on pump model and installed accessories.

The boot sequence is successfully completed when the text display on the LCD screen shows "READY" (sequence takes approximately 3 seconds). The current system pressure or corresponding torque value (typically "0" if motor is not running) will also appear on the numeric display.

6.3 LCD Operation Buttons

The LCD control panel is equipped with four button switches:



On/Off / Menu / Down Arrow / Up Arrow

- Pressing the **MOTOR** on/off button shuts-off the motor during normal operation. The motor OFF function is available on this button even if the pump is being operated by the pendant. However, the MOTOR on/off button will not turn the motor ON except if the LCD is in Local mode (See Section 6.5 M).
- Pressing the **MENU** button enables the operator to step from normal operational mode into a series of menus. Repeated pressing allows the operator to step through all available menus. Pressing the Menu button also saves any changes made. To return to the normal operational mode, press and hold the Menu button for three seconds or do not push any button for 60 seconds.
- The **Down Arrow** and **Up Arrow** buttons serve two purposes. For most LCD menus, the Down Arrow and Up Arrow buttons are used to step through the menu options. Also, when the pump is placed in Local mode, pressing the Up Arrow button switches the valve solenoid on and off (the pendant is non-operational in Local mode).

6.4 LCD Menu Overview

The LCD contains the following available menus:

- ***Normal Operation*** – Default start-up screen. Appears immediately after power is connected and microcontroller has booted.
- ***Units*** – Sets the pressure units to PSI / BAR / MPa, (pressure control) or Ft-lb / Nm (torque control). PSI is the default setting.
- ***Torque Wrench Model Selection*** – (Available only if "Ft-lb" or "Nm" is selected) Selects the model number of the Enerpac torque wrench to be used. Choose from SQD and HXD models (-E pumps) or S and W models (-Q pumps).
- ***Automode*** – Switches the Automode function ON or OFF.
- ***Torque Value Selection*** – (Available only when Automode is ON and if "Ft-lb" or "Nm" is selected) Select the desired torque value at which pump auto-cycle operation will occur. Maximum allowable torque will vary, depending on wrench model selected.

- ***Hi Press*** – (Available only when Automode is ON, and if "PSI", "BAR" or "MPa" is selected) Sets the advance port pressure at which pump auto-cycle operation will occur.
- ***Main*** – Displays pump status after the desired pump operational parameters have been input by the user and saved in the microcontroller memory.
- ***Motor*** – Displays the motor hour meter and on/off cycle counter (non-resettable).
- ***Low Volt*** – Displays the low voltage hour meter (non-resettable).
- **Advance** – Displays the solenoid hour meter and on/off cycle counter for torque wrench advance cycles (non-resettable).
- ***Retract*** – Displays the solenoid hour meter and on/off cycle-counter for torque wrench retract cycles (non-resettable).
- ***Local*** – Switches the pump Local mode ON or OFF.
- ***Language*** – Sets the language of the display to English, Spanish, French, Italian, German or Portuguese, with English being the default setting.
- ***Diagnose*** – Displays input signals from the pendant and other electrical accessories.
- ***Calibration*** – Allows calibration of pump pressure transducer (hidden menu - accessed from the Units menu).

6.5 LCD Menus

See the following paragraphs for descriptions of the LCD menus. Also refer to Table 1, Quick Reference Chart (QRC), located after Section 9.0.

6.5A "Normal Operation" Menu

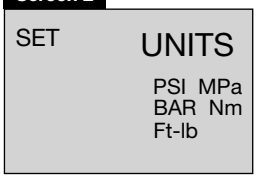
(See Screen 1) LCD screen "READY" indicates that the microcontroller has booted successfully. The pressure or torque reading will be "0" when pump is first connected to power and motor is off. Enter into the remaining menus by pressing the Menu button. Refer to QRC step #1.

Screen 1

6.5B "Units" Menu

(See Screen 2) This screen allows the operator to set the unit of pressure-measurement by pressing the Up or Down Arrow buttons. PSI, BAR, Mpa, Nm and Ft-lb are the available choices, with PSI being the default. Save setting and step forward by pressing the Menu button. Refer to QRC step #2.

Screen 2



6.5C "Torque Wrench Model Selection" Menu (Available only if "Ft-lb" or "Nm" is selected)

(See Screen 3) If foot pounds (Ft-lb) or Newton Meters (Nm) is selected in the Units menu (Section 6.5B), a list of Enerpac torque wrench models will be shown on this screen. Scroll through the list of available models using either the Up or Down Arrow button. Press the Menu button to select the desired model. Refer to QRC step #3.

Screen 3

6.5D "Automode" Menu

(See Screen 4) Toggle Automode ON or OFF by pressing either the Up or Down Arrow button. Save setting and step forward by pressing the Menu button. Refer to QRC step #4.

Screen 4

Notes:

• If PSI, BAR or MPa is selected, the Automode menu will appear after the Units menu (when the Menu button is pressed). However, if Ft-lb or Nm is selected, the Automode menu will appear after the Torque Wrench Model Selection menu.

• If Ft-lb or Nm is selected and Automode is OFF: The Torque Value Selection menu (See Section 6.5E) will not be available, and any previously set torque value will have no effect on the pump. The microcontroller will set the advance torque to the maximum allowable torque value for the wrench model selected.

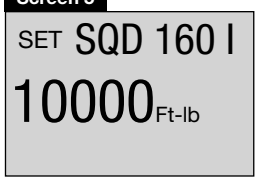
• If PSI, BAR or MPa is selected and Automode is OFF: The Hi Press menu (See Section 6.5F) will not be available, and any previously set Hi Press value will have no effect on pump operation. The microcontroller will set the advance pressure to the maximum allowable value for your pump type.

• Whether Automode is ON or OFF, the maximum pressure or torque will be limited by the relief valve setting (See Section 5.2).

6.5E "Torque Value Selection" Menu (Available only when Automode is ON and "Ft-lb" or "Nm" is selected)

(See Screen 5) After selecting the torque wrench model, the maximum advance torque value will be displayed, either in foot pounds (Ft-lb) or Newton Meters (Nm). If necessary, reduce the value by pressing the Down Arrow button. When the desired torque is shown, press the Menu button for 3 seconds and the Main menu (See Section 6.5G) will appear. Refer to QRC step #4A.

Screen 5



Note: If the Menu button is pressed for *less* than 3 seconds, the selected torque value will be saved. However, the Motor menu (See Section 6.5I) will appear instead of the Main menu.

6.5F "Hi Press" Menu (Available only when Automode is ON and PSI, BAR or MPa is selected)

(See Screen 6) This screen allows the operator to set the advance port pressure at which the torque wrench will auto-cycle. Make changes in increments of 50 psi [3.5 bar] by pressing either Down or Up Arrow button once. Press and hold either button to scroll quickly through the available settings. Maximum pressure value is 11,600 psi [800 bar] for (-E) pumps and 10,000 psi [700 bar] for (-Q) pumps. Save setting and step forward to the Main menu (See Section 6.5H) by pressing the Menu button for 3 seconds. Refer to QRC step #4C.

Screen 6

Note: If the Menu button is pressed for *less* than 3 seconds, the selected Hi Press setting will be saved. However, the Motor menu (See Section 6.5I) will appear instead of the Main menu.

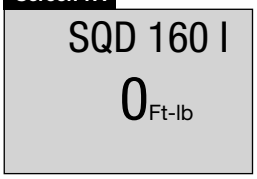
6.5G "Main" Menu (Ft-lb or Nm selected)

(See Screens 7A and 7B) If Automode is ON, and a unit of torque has been selected, the screen text will alternate between the selected torque wrench model and "AUTO". Refer to QRC step #4B.

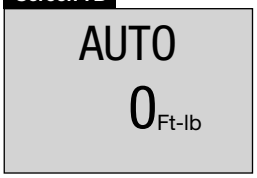
(See Screens 7A and 7C) If Automode is OFF, the screen text will alternate between the selected torque wrench model and "READY".

Whether Automode is ON or OFF, the actual torque value (based on system pressure) will appear on the numeric display. It will remain at "0" until pump motor is started.

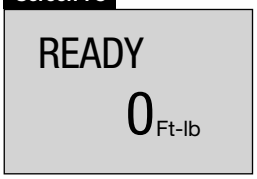
Screen 7A



Screen 7B



Screen 7C



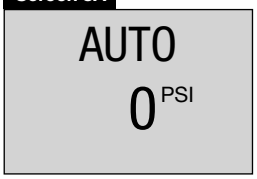
6.5H "Main" Menu (PSI, BAR or MPa selected)

(See Screen 8A) If Automode is ON, and a pressure unit has been selected, the screen will display "AUTO". Refer to QRC step #4D.

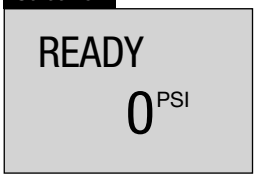
(See Screen 8B) If Automode is OFF, the screen will display "READY".

Whether Automode is ON or OFF, the actual system pressure will appear on the numeric display. It will remain at "0" until pump motor is started.

Screen 8A



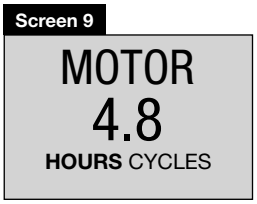
Screen 8B



6.5I "Motor" Menu

(See Screen 9) This screen allows the operator to read the number of hours or on/off cycles the motor has been operated. Toggle between hours and cycles by pushing either the Down or Up Arrow button. Step forward by pressing the Menu button. Refer to QRC step #5.

Screen 9



General note for all hour and cycle displays:

HOURS DISPLAYED

- up to 9999.9 the display will show decimal hours.
- between 10,000 - 99,999 whole hours will be displayed (decimal "." is not displayed).
- over 99,999 hours the meter starts over at 0.0 reading decimal hours.

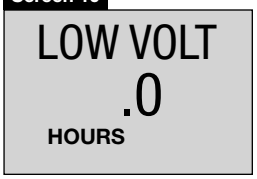
CYCLES DISPLAYED

- over 99,999 cycles the meter starts over at 0.

6.5J "Low Volt" Menu

(See Screen 10) This screen allows the operator to read the number of hours the pump has been operated in a low-voltage condition. Step forward by pressing the Menu button. Refer to QRC step #6.

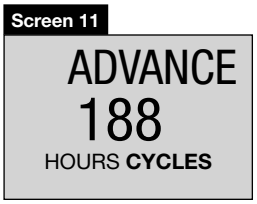
Screen 10



6.5K "Advance" Menu

(See Screen 11) This screen allows the operator to read the total number of hours that the valve solenoid has been in the *advance* position. It also displays the total number of advance cycles. Toggle between hours and cycles by pushing either the Down or Up Arrow buttons. Step forward by pressing the Menu button. Refer to QRC step #7.

Screen 11



6.5L "Retract" Menu

(See Screen 12) This screen allows the operator to read the total number of hours that the valve solenoid has been in the *retract* position. It also displays the total number of retract cycles. Toggle between hours and cycles by pushing either the Down or Up Arrow buttons. Step forward by pressing the Menu button. Refer to QRC step #8.

Screen 12

6.5M "Local" Menu

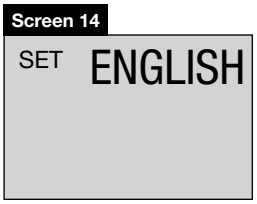
(See Screen 13) This screen allows the operator to toggle the Local mode ON or OFF (default is OFF). Local mode allows operation of the pump if the pendant or pendant cord is damaged. With Local mode ON, the shroud buttons replace the pendant buttons as the method of operating the pump, and the pendant buttons become deactivated. Toggle Local mode ON or OFF by pressing the Down or Up Arrow button. When Local mode is ON, the text "LOCAL" replaces "READY" on the Normal Operation menu. Save setting and step forward by pressing the Menu button. Refer to QRC step #9.

Screen 13

6.5N "Language" Menu

(See Screen 14) This screen allows the operator to change the LCD display language. When a language is shown on the LCD, press the Down or Up Arrow buttons to select a different language. Save setting and step forward by pressing the Menu button. Refer to QRC step #10.

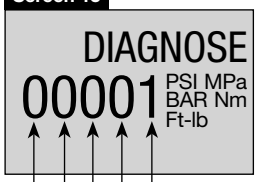
Screen 14



6.5O "Diagnose" Menu

(See Screen 15) This screen allows the operator to troubleshoot various pendant problems. If the number "1" does not appear when a pendant button is pushed, problems with the pendant button switches and/or pendant cord may be present (See Screens 16 and 17). Use Local mode to operate pump until the problem can be corrected. Refer to QRC step #11.

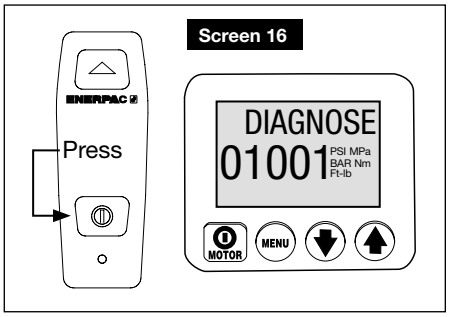
Screen 15



Pendant ***on/off*** button
Pendant ***advance*** button
(not used on this pump version)

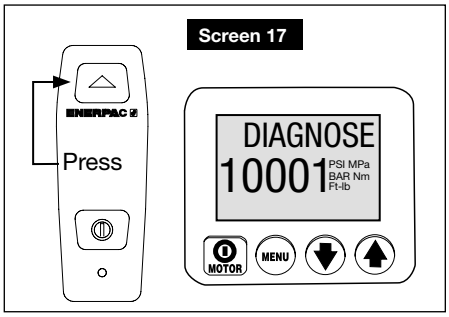
Diagnose screen with pendant ***on/off*** button pushed.

Screen 16



Diagnose screen with pendant ***advance*** button pushed.

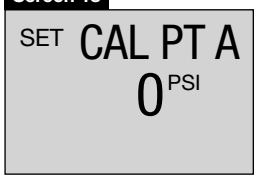
Screen 17



6.5P "Calibration" Menu

(See Screen 18) This screen allows the operator to adjust the pressure value shown on the LCD to match a master gauge.

Screen 18



To access the Calibration menu, first go to the Units menu.

Then, press and hold the shroud Motor on/off button for 7 seconds. ENTRY CODE will appear on the LCD.

Then, press and hold both the Down Arrow and Up Arrow buttons for 7 seconds. CAL PT A will appear on the LCD.

See Table 2, "Z-Class Pressure Transducer Calibration", located near the end of this document. Follow the steps in the table to perform calibration procedures.

6.6 LCD Fault Conditions

Any fault condition will shut down the pump and prevent it from starting.

6.6A Clearing a Fault Condition from the LCD

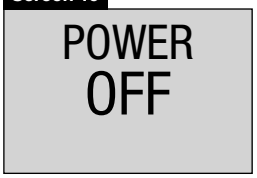
After the fault causing problem has been corrected, clear the fault message from the LCD by disconnecting electrical power from the pump. Wait until all characters clear the LCD (~ 20 seconds), then reconnect power.

6.6B Power Off Fault

Display: "POWER OFF"

See Screen 19) The Power Off fault occurs when the AC line power drops to 65% or less of nominal voltage. The pump will automatically shut-off the valve solenoid and motor, and "Power Off" will be displayed on the LCD. **Note:** The Power Off message will also appear for several seconds after the pump has been disconnected from electrical power.

Screen 19



6.6C Button Fault

Display: "BUTTON FAULT"

(See Screen 20) The Button fault occurs when the microcontroller detects that any button has been pressed during the boot sequence or if the shroud Motor on/off button has been pressed for more than 3 seconds.

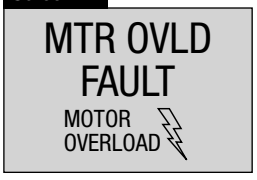
Screen 20

6.6D Motor Overload Fault

Display: "MTR OVLD FAULT" and "Motor Overload"

(See Screen 21) The Motor Overload fault occurs when the electrical current draw exceeds the pre-set limit of the pump's internal circuit breaker. The circuit breaker will automatically reset in about 2 to 3 minutes after the condition has been corrected. However, before the pump can be restarted, the operator must clear the fault by disconnecting and reconnecting electrical power as described in Section 6.6 A.

Screen 21



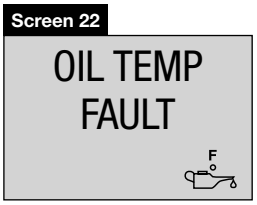
6.6E Oil Temperature Fault

Display: "OIL TEMP FAULT"

Note: The LCD will display this fault only if the pump is equipped with the optional oil / level temperature switch (available only on 2.5, 5, and 10 gallon reservoir sizes).

(See Screen 22) The Oil Temperature fault occurs when the temperature of the oil inside the reservoir exceeds 175 °F [80 °C].

Screen 22



6.6 F Oil Level Fault

Display: "OIL LEVEL FAULT"

Note: The LCD will display this fault only if the pump is equipped with the optional oil / level temperature switch (available only on 2.5, 5, and 10 gallon reservoir sizes).

(See Screen 23) The Oil Level fault occurs when the oil level drops to less than 1.3" [34 mm] above the bottom of the reservoir.

Screen 23

OIL LEVEL FAULT

6.7 LCD Low Voltage Warning

Display: "LOW VOLT" and ⚠ "Low Voltage"

(See Screen 24) A "Low Voltage" condition is defined as an operating condition when the AC line power is at or below 80% of nominal voltage. While running the pump under this condition, the "Low Voltage" signal will flash on the LCD and the Low Voltage hours will be counted and stored by the microcontroller.

Screen 24

LOW VOLT

⚠ LOW VOLTAGE

The microcontroller will allow the pump to continue operating at reduced voltage, provided that no fault conditions occur (See Section 6.6). The Low Voltage warning will automatically clear once the low voltage condition has been resolved.

IMPORTANT: Pump operation during a Low Voltage condition is not recommended. Motor RPM and hydraulic flow will be reduced. Excessive current draw may cause the pump's internal circuit breaker to trip, resulting in a Motor Overload fault (See Section 6.6 D).

7.0 MAINTENANCE

Frequently inspect all system components for leaks or damage. Repair or replace damaged components. Electrical components, such as the power cord, may only be repaired or replaced by a qualified electrician, adhering to all applicable local and national codes.

WARNING: Disconnect pump from electrical power before performing any maintenance or repairs.

7.1 Check Oil Level

Check the pump oil level prior to start-up. If oil level is low, remove the SAE #10 plug from the cover plate and add oil as needed (See Figures 3 and 4). Always be sure torque wrench is fully retracted before adding oil to the reservoir.

7.2 Change Oil and Clean Reservoir

Enerpac HF oil is a crisp blue color. Frequently check oil condition for contamination by comparing pump oil to new Enerpac oil. As a general rule, completely drain and clean the reservoir every 250 hours, or more frequently if used in dirty environments.

Note: The following procedure requires that you remove the pump from the reservoir. Work on a clean bench and dispose of used oil in accordance with all applicable laws and regulations.

1. Remove the drain plug and drain all oil from the reservoir. Clean and reinstall the drain plug.
2. Unscrew the 13 bolts holding the cover plate to the reservoir and lift the pump unit out of the reservoir. Be careful not to damage the filter screen.
3. Thoroughly clean the reservoir and reservoir magnet (if equipped) with a suitable cleaning agent.
4. Remove the pick-up filter screen for cleaning. (Do not pull on the screen or the bottom of the intake to avoid possible damage.) Clean the screen with solvent and a soft brush. Reinstall.
5. Reassemble the pump and reservoir, installing a new reservoir gasket.
6. Fill the reservoir with clean Enerpac hydraulic oil. The reservoir is full when oil level is as shown in Figure 4.

7.3 Motor Brush Replacement (ZU4 Models Only)

To prevent motor damage, the ZU4 motor brushes incorporate an automatic motor stop when one of the brush carbons wears to a length of 0.25" [6 mm]. Inspect both brushes.

1. Disconnect pump from electrical power.

DANGER: To avoid possible electrocution, pump must be completely disconnected from electrical power before brush servicing is attempted.

2. Remove both brush caps (A) by deflecting the brush cap latch (B) and gently prying outward. See Figure 8.
3. Remove motor brushes by turning black cap counter-clockwise.
4. Replace both brushes and reverse procedure to reassemble.

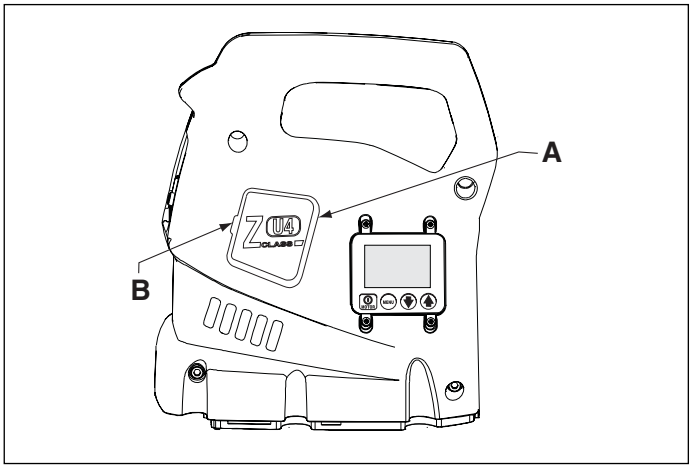


Figure 8, Brush Cap Removal

A. Brush Cap B. Brush Cap Latch

8.0 INSTALLATION OF ACCESSORIES

- For ZU4 heat exchanger (optional equipment) installation instructions, refer to Enerpac instruction sheet L2752.
- For ZE4 and ZE5 heat exchanger (optional equipment) installation instructions, refer to Enerpac instruction sheet L2656.
- For ZE4 and ZE5 oil filter (optional equipment) installation instructions, refer to Enerpac instruction sheet L2628.
- For pressure transducer replacement instructions, refer to Enerpac instruction sheet L2627.
- For pendant replacement instructions, refer to Enerpac instruction sheet L2625.

9.0 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. For repair service, contact your local Authorized Enerpac Service Center.

Troubleshooting Guide*		
Problem	**Possible Cause**	**Action**
Pump will not start.	Fault condition.	See Section 6.6, LCD Fault Conditions.
	Motor brushes worn to end of life (ZU4 Models only).	See Section 7.3, Motor Brush Replacement.
Pendant does not function.	Pump in LOCAL mode.	See Section 6.5 M, Local Menu.
	Pendant damaged.	See Section 6.5 O, Diagnose Menu. See authorized service center.
Motor stops under load.	Low voltage.	See Section 6.5 J and 6.7. Turn off other electric loads. Use heavier gauge extension cord.
Solenoid valve will not operate.	No power to pump or wrong voltage.	Connect to correct power source per pump nameplate.
	Solenoid cable disconnected or damaged.	Connect, repair, or replace cable.
	Solenoid coil not operational.	See authorized service center.
	Valve out of adjustment or malfunctioning.	See authorized service center.
Pump fails to build pressure or less than full pressure.	Low oil level.	Add oil per Section 4.3.
	Relief valve set too low.	Adjust per Section 5.2.
	External system leak.	Inspect and repair or replace.
	Internal leak in pump.	See authorized service center.
	Internal leak in valve.	
	Internal leak in system component.	
Pump builds full pressure, but torque wrench does not advance.	Torque greater than wrench capacity at full pressure.	Use torque wrench with larger capacity.
	Advance flow to wrench restricted or blocked.	Check couplers for full engagement per Section 4.5.
Torque wrench does not auto-cycle or cycles erratically.	Automode is OFF.	Turn Automode ON. See sections 5.3 and 6.5 D.
	Relief valve setting at or below “HI PRESS” value (or below the corresponding pressure setting for the selected torque).	Increase relief valve setting. See Section 5.2.
	HI PRESS setting below 1400 PSI [96 bar].	Raise HI PRESS setting above 1400 PSI [96 bar].
Torque wrench will not retract.	Return flow line restricted or blocked.	Check couplers for full engagement per Section 4.5. Run motor when retracting.
	Valve malfunction.	See authorized service center.
Pump runs hot.	Advance or retract flow restricted.	Check couplers for full engagement per Section 4.5.
	High ambient temperature.	Install heat exchanger.

* Refer as needed to sections 6.6 and 6.7 for LCD fault codes and warnings.

Table 1, QRC: Quick Reference Chart • Pump Firmware Version 7.x • Pump Types 4 and 7

Step	Switch (MOTOR / MENU / ↓ / ↑)				Text Display	Expected reading / symbol / status digital display	Units	Comments
1					READY	0	PSI, BAR, MPa, Ft-lb or Nm	Firmware version 7.x, pump type 4 (-E pumps) or 7 (-Q pumps), and motor type “UN” “1P” or “3P” will briefly appear on LCD. “READY” appears after power on and boot sequence has completed.
2		X			SET UNITS		PSI	Save previous setting and step forward to select units, Default is PSI. Ft-lb or Nm = Torque Control Mode. PSI, BAR or MPa = Pressure Control Mode.
			X		"		Ft-lb	
			X		"		Nm	
			X		"		BAR	
			X		"		MPa	
		X						Torque Control Mode: Save and step to #3 by pressing Menu button. Pressure Control Mode: Save and step to #4 by pressing Menu button.
3					SET	SQD XXXXX HXD XXXXX S XXXXX W XXXXX		If “Ft-lb” or “Nm” is selected: List of available wrench models will appear. Models will vary, depending on pump type. (-E) pumps: Enerpac SQD and HXD series wrenches only. (-Q) pumps: Enerpac S and W series wrenches only.
			X		"	Next wrench model (each push).		Scroll down list of available wrench models using the Down Arrow button.
				X	"	Previous wrench model (each push).		Scroll up list of available wrench models using the Up Arrow button.
		X						Save and step to #4 by pressing Menu button.
4			X		AUTOMODE	OFF		Toggle between “ON” and “OFF” using the Arrow buttons.
			X			ON		
		X						Save and step to #4A or #4C by pressing Menu button. **Note:** To step to #5 Motor screen, turn Automode OFF and press Menu button once.
4A					SET	SQD XXXXX HXD XXXXX S XXXXX W XXXXX — XXXXX (Ft-lb or Nm)	Ft-lb or Nm	If “Ft-lb” or “Nm” is selected and Automode is ON: Set max torque (Ft-lb or Nm) for selected wrench model default is max torque. **Note:** torque is not adjustable when Automode is OFF.
			X			Next lower torque value (each push).	"	Minimum torque will vary, depending on wrench model.
				X		Next higher torque value (each push).	"	Maximum torque will vary, depending on wrench model.
		X						Save and step to #4B by pressing Menu button for 3 seconds.
4B					AUTO or READY	SQD XXXXX HXD XXXXX S XXXXX W XXXXX — 0 (Ft-lb or Nm)	Ft-lb or Nm	Text Display: Automode ON: Alternate between “AUTO” and wrench model. Automode OFF: Alternate between “READY” and wrench model. Numeric display will show “0” when motor is OFF.

(Continued on next page)

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Table 1, QRC: Quick Reference Chart • Pump Firmware Version 7.x • Pump Types 4 and 7

Step	Switch				Text Display	Expected reading / symbol / status digital display	Units	Comments
	MOTOR	MENU	↓	↑				
4C					SET HI PRESS	XXXXX (PSI, BAR or MPa)	PSI, BAR or MPa	If “PSI”, “BAR” or “MPa” is selected and Automode is ON. Set max. pressure, default value for (-Q) pump is 10,000 psi [700 bar]. Set max. pressure, default value for (-E) pump is 11,600 psi [800 bar]. **Note:** pressure not adjustable when Automode is OFF.
				X	"	Up 50 psi [4 bar] per 0.5 sec. for first 3 sec. Then up 50 psi [4 bar] every 0.05 sec.	"	Only if pressure transducer is detected, hold down button for 4 sec. minimum.
			X		"	Down 50 psi [4 bar] per 0.5 sec. for first 3 sec. Then down 50 psi [4 bar] every 0.05 sec.	"	Only if pressure transducer is detected, hold down button for 4 sec. minimum.
		X						Save and step to #4D by pressing Menu button for 3 seconds.
4D					AUTO or READY	0 PSI 0 BAR 0 MPa	PSI, BAR or MPa	Text Display: “AUTO” if Automode ON “READY” if Automode OFF Numeric display will show “0” when motor is OFF.
5		X			MOTOR	Number of hours 0.0.	HOURS	Select hour meter function (motor).
			X		"	Number of cycles.	CYCLES	Select cycle counter function (motor).
6		X			LOW VOLT	Number of hours at low voltage, displayed as 0.0.	HOURS	Select hour meter function (low voltage condition).
7		X			ADVANCE	Number of hours, displayed as 0.0.	HOURS	Select hour meter function (solenoid advance).
			X		"	Number of cycles.	CYCLES	Select cycle counter function (solenoid advance).
8		X			RETRACT	Number of hours, displayed as 0.0.	HOURS	Select hour meter function (solenoid retract).
			X		"	Number of cycles.	CYCLES	Select cycle counter function (solenoid retract).
9		X			LOCAL	OFF		Select “LOCAL” mode. Toggle between “ON” and “OFF”.
			X		"	ON		
			X		"	OFF		
10		X			ENGLISH			Select language, default is English.
				X	ESPANOL			
				X	FRANCAIS			
				X	ITALIANO			
				X	DEUTSCH			
				X	PORTUGUES			
				X	ENGLISH			Save and step to #11 with Menu button.
11		X			DIAGNOSE	00001	PSI, BAR, MPa, Ft-lb or Nm	Pressure or torque units will appear, indicating that pressure transducer is connected. When pendant buttons are pushed, the digital display is expected to show processor inputs that are “turned on”.
						10001		With pendant On/Off button pushed.
						01001		With pendant ADVANCE button pushed.
12		X			- - -			Hold for 3 seconds to return to step 4B or 4D.

Table 2 , Z-Class Pressure Transducer Calibration, Firmware 7.x
Torque Wrench Pumps Equipped with Single Solenoid Valve

No.	Operator action	LCD Reading		Comments
1	Connect a master gauge to port A (Advance port)			
2	Connect electrical power to pump.	FIRMWARE 7.x, then “READY”	0 psi	Boot sequence.
3	At main screen, press the Menu button once to display “UNITS” screen.	UNITS	psi	psi is the current unit of pressure measurement.
4	Press and hold the ON/OFF button for seven seconds.	ENTRY	CODE	Step into the hidden calibration mode.
5	Press and hold the Arrow-up and Arrow-down buttons together for seven seconds.	CAL PT A	0 psi [0 bar]	Start of calibration process. The advance-solenoid will be powered up to access the pressure transducer through valve-port A.
6	Open the pump’s user-adjustable relief valve and verify both pump LCD and master gauge read zero.	CAL PT A	0 psi [0 bar]	Calibrate the zero-offset, point “A”.
7	Press the Menu button to accept the pressure value into temporary memory.	SAVE A	no	
8	Press one Arrow button to change from “no” to “yes”.	SAVE A	yes	Confirm the pressure data should be stored to memory.
9	Press the Menu button once.	CAL PT B	5000 psi [345 bar]	Calibrating gain is done with two points, starting with point “B”.
10	Press and release the shroud’s ON/OFF motor-button to switch the pump motor on. Reading the master gauge, apply a pressure of 5000 psi by closing the pump’s user-adjustable relief valve.	CAL PT B	5000 psi [345 bar]	First obtain the pressure value on the master gauge (ie 5000 psi). Then use the arrow buttons to match the LCD value to the master gauge.
11	Press the Menu button to accept the pressure value into temporary memory.	SAVE B	no	
12	Press one Arrow button to change from “no” to “yes”.	SAVE B	yes	Confirm the pressure data should be stored to memory.
13	Press the Menu button once.	CAL PT C	8000 psi [548 bar]	Calibrating gain is done with two points, finishing with point “C”.
14	Reading the master gauge, apply a pressure of 8000 psi.	CAL PT C	8000 psi [548 bar]	First obtain the pressure value on the master gauge (ie 8000 psi). Then use the arrow buttons to match the LCD value to the master gauge.
15	Press the Menu button to accept the pressure value into temporary memory.	SAVE C	no	
16	Press one Arrow button to change from “no” to “yes”.	SAVE C	yes	Confirm the pressure data should be stored to memory.
17	Press the Menu button once.	USE DFLT	off	Re-confirm calibration data. Leave “off” to proceed with new calibration data. Only set to “on” to change calibration data back to factory default settings. Press Arrow button to change.
18	Press the Menu button once.	CAL PT A	0 psi [0 bar]	Save calibration data to permanent memory.
19	Press and hold the Menu button for three seconds to step out of the calibration mode.	READY	0 psi [0 bar]	Calibration complete. Motor stops and electric valve releases pressure.

Enerpac Worldwide Locations

✦ **e-mail:** info@enerpac.com

✦ **internet:** www.enerpac.com

Africa
ENERPAC Middle East FZE
Office 423, JAFZA 15
P.O. Box 18004
Jebel Ali, Dubai
United Arab Emirates
Tel: +971 (0)4 8872686
Fax: +971 (0)4 8872687

Australia, New Zealand
Actuant Australia Ltd.
Block V Unit 3
Regents Park Estate
391 Park Road
Regents Park NSW 2143
(P.O. Box 261) Australia
Tel: +61 297 438 988
Fax: +61 297 438 648

Brazil
Power Packer do Brasil Ltda.
Rua dos Inocentes, 587
04764-050 - Sao Paulo (SP)
Tel: +55 11 5687 2211
Fax: +55 11 5686 5583
Toll Free in Brazil:
Tel: 0800 891 5770
vendasbrasil@enerpac.com

Canada
Actuant Canada Corporation
6615 Ordan Drive, Unit 14-15
Mississauga, Ontario L5T 1X2
Tel: +1 905 564 5749
Fax: +1 905 564 0305
Toll Free:
Tel: +1 800 268 4987
Fax: +1 800 461 2456
Technical Inquiries:
techservices@enerpac.com

China
Actuant Industries Co. Ltd.
No. 6 Nanjing Road
Taicang Economic Dep Zone
Jiangsu, China
Tel: +86 0512 5328 7529
+86 0512 5328 7500 7529
Fax: +86 0512 5335 9690

Actuant China Ltd. (Peking)
709B Diyang Building
Xin No. 2
Dong San Huan North Rd.
Beijing City
100028 China
Tel: +86 10 845 36166
Fax: +86 10 845 36220

France, Switzerland
francophone
ACTUANT - ENERPAC
France S.A., ZA de Courtaboeuf
32, avenue de la Baltique
91140 Villebon / Yvettte
France
Tel: +33 1 60 13 68 68
Fax: +33 1 69 20 37 50

Germany, Austria, Switzerland,
Greece, Baltic States, Central
and Eastern Europe
ENERPAC GmbH
P.O. Box 300113
D-40401 Düsseldorf
Willstätterstrasse13
D-40549 Düsseldorf
Germany
Tel: +49 211 471 490
Fax: +49 211 471 49 28

India
ENERPAC Hydraulics
(India) Pvt. Ltd.
No. 1A,
Peenya Industrial Area,
IInd Phase
Bangalore, 560 058 India
Tel: +91 80 40 792 777
Fax: +91 80 40 792 792

Italy
ENERPAC S.p.A.
Via Canova 4
20094 Corsico (Milano)
Tel: +39 02 4861 111
Fax: +39 02 4860 1288

Japan
Applied Power Japan LTD KK
Besshochou 85-7
Kita-ku,
Saitama-shi 331-0821
Japan
Tel: +81 48 662 4911
Fax: +81 48 662 4955

Middle East, Turkey and
Caspian Sea
ENERPAC Middle East FZE
Office 423, JAFZA 15
P.O. Box 18004
Jebel Ali, Dubai
United Arab Emirates
Tel: +971 (0)4 8872686
Fax: +971 (0)4 8872687

Russia and CIS
(excl. Caspian Sea Countries)
Actuant LLC
Admiral Makarov Street 8
125212 Moscow, Russia
Tel: +7-495-9809091
Fax: +7-495-9809092

Sweden, Denmark, Norway,
Finland and Iceland
ENERPAC Scandinavia AB
Fabriksgatan 7
412 50 Gothenburg
Sweden
Tel: +46 31 7990281
Fax: +46 31 7990010
scandinavianinquiries@enerpac.com

Singapore
Actuant Asia Pte. Ltd.
37C, Benoi Road Pioneer Lot,
Singapore 627796
Tel: +65 68 63 0611
Fax: +65 64 84 5669
Toll Free: +1800 363 7722
Technical Inquiries:
tech.service-sg@enerpac.com

South Korea
Actuant Korea Ltd.
3Ba 717,
Shihwa Industrial Complex
Jungwang-Dong, Shihung-Shi,
Kyunggi-Do
Republic of Korea 429-450
Tel: +82 31 434 4506
Fax: +82 31 434 4507

Spain and Portugal
ENERPAC SPAIN, S.L.
Avda. Los Frailes, 40 – Nave C
& D
Pol. Ind. Los Frailes
28814 DAGANZO DE ARRIBA
(Madrid)
Spain
Tel: +34 91 884 86 06
Fax: +34 91 884 86 11

Sweden, Denmark, Norway,
Finland and Iceland
Enerpac Scandinavia AB
Fabriksgatan 7
412 50 Gothenburg
Sweden
Tel: +46 (0) 31 7990281
Fax: +46 (0) 31 7990010
Inquiries:
Scandinavianinquiries@enerpac.com

The Netherlands, Belgium,
Luxembourg
ENERPAC B.V.
Galvanistraat 115, 6716 AE Ede
P.O. Box 8097, 6710 AB Ede
The Netherlands
Tel: +31 318 535 800
Fax: +31 318 525 613
+31 318 535 848
beneluxinquiries@enerpac.com
Technical Inquiries Europe:
techsupport.europe@enerpac.com

United Kingdom, Ireland
Enerpac Ltd
Bentley Road South
Darlaston, West Midlands
WS10 8LQ, United Kingdom
Tel: +44 (0)121 50 50 787
Fax: +44 (0)121 50 50 799

USA, Latin America
and Caribbean
ENERPAC
P.O. Box 3241
6100 N. Baker Road
Milwaukee, WI 53209 USA
Tel: +1 262 781 6600
Fax: +1 262 783 9562

User inquiries:
+1 800 433 2766
Inquiries/orders:
+1 800 558 0530
Technical Inquiries:
techservices@enerpac.com

ENERPAC
704 W. Simonds
Dallas, TX 75159 USA
Tel: +1 972 287 2390
Fax: +1 972 287 4469

09/30/09

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