Instruction Manual
940S-2 and 940S-2-230
Powerig® Hydraulic Units
Safety Instructions

GLOSSARY OF TERMS AND SYMBOLS:

- Product complies with requirements set forth by the relevant European directives.
- READ MANUAL prior to using this equipment.
- EYE PROTECTION IS REQUIRED while using this equipment.
- HEARING PROTECTION IS REQUIRED while using this equipment.

WARNINGS: Must be understood to avoid severe personal injury.

CAUTIONS: show conditions that will damage equipment and or structure.

Notes: are reminders of required procedures.

**Bold, Italic type and underlining:** emphasizes a specific instruction.

1. A 30-minute hands-on training session with qualified personnel is recommended before using Huck equipment.
2. Huck equipment must be maintained in a safe working condition at all times. Tools and hoses should be inspected at the beginning of each shift/day for damage or wear. Any repair should be done by a qualified repairman trained on Huck procedures.
3. Repairman and Operator must read manual prior to using equipment. Warning and Caution stickers/labels supplied with equipment must be understood before connecting equipment to any primary power supply. As applicable, each of the sections in this manual have specific safety and other information.
4. Read MSDS Specifications before servicing the tool. MSDS Specifications are available from the product manufacturer or your Huck representative.
5. When repairing or operating Huck installation equipment, always wear approved eye protection. Where applicable, refer to ANSI Z87.1 - 2003.
6. Disconnect primary power source before performing maintenance on Huck equipment or changing Nose Assembly.
7. Tools and hoses should be inspected for leaks at the beginning of each shift/day. If any equipment shows signs of damage, wear, or leakage, do not connect it to the primary power supply.
8. Mounting hardware should be checked at the beginning of each shift/day.
9. Make sure proper power source is used at all times.
10. Release tool trigger if power supply is interrupted.
11. Tools are not to be used in an explosive environment unless specifically designed to do so.
12. Never remove any safety guards or pintail deflectors.
13. Where applicable, ensure deflector or pintail collector is installed and operating prior to use.
14. Never install a fastener in free air. Personal injury from fastener ejecting may occur.
15. Where applicable, always clear spent pintail out of nose assembly before installing the next fastener.
16. There is possibility of forcible ejection of pintails or spent mandrels from front of tool.
17. If there is a pinch point between trigger and work piece, use remote trigger. (Remote triggers are available for all tooling.)
18. Unsuitable postures may not allow counteracting of normal expected movement of tool.
19. Do not abuse tool by dropping or using it as a hammer. Never use hydraulic or air lines as a handle or to bend or pry the tool. Reasonable care of installation tools by operators is an important factor in maintaining tool efficiency, eliminating downtime, and in preventing an accident which may cause severe personal injury.
21. There is a risk of crushing if tool is cycled without Nose Assembly installed.
22. Tools with ejector rods should never be cycled with out nose assembly installed.
23. When two piece lock bolts are being used always make sure the collar orientation is correct. See fastener data sheet of correct positioning.
24. Tool is only to be used as stated in this manual. Any other use is prohibited.
25. There is a risk of whipping compressed air hose if tool is pneudraulic or pneumatic.
26. Release the trigger in case of failure of air supply or hydraulic supply.
27. Use only fluids or lubricants recommended.
28. Disposal instruction: Disassemble and recycle steel, aluminum and plastic parts, and drain and dispose of hydraulic fluid in accordance with local lawful and safe practices.
29. If tool is fixed to a suspension device, ensure that the device is secure prior to operating the tool.
940 series Powerigs are intended for use in indoor factory environments. If used outdoors, they must be protected from the elements.

**ELECTRICAL SYSTEMS:**
- **940S-2:** 460 volts, 60 hertz, 3 phase, AC
- **940S-2-230:** 230 volts, 60 hertz, 3 phase, AC

**CONTROL SYSTEM:** (2) Solenoid-operated directional valve, 24 volts AC

**MOTOR:**
- **940S-2:** 3450 RPM, 3 HP, 4.1 amps. nominal
- **940S-2-230:** 3450 RPM, 3 HP, 8.2 amps. nominal

**PUMP:** Double 2-stage, gear-piston type
- Minimum flow per circuit: 2.34 gpm @ 400 psi (8.85 l/m @ 28 bar)
- Minimum flow per circuit: 0.22 gpm @ 8000 psi (0.83 l/m @ 552 bar)
- Output pressure adjustable to 8800 psi (607 bar)

**PRESSURE SETTING AS SHIPPED:**
- **RETURN:** 2200–2400 psi (152–166 bar)
- **PULL:** 5400–5700 psi (372–393 bar)

**RESERVOIR CAPACITY:** 5.5 gallons (20.8 liters)

**MINIMUM OPERATING TEMPERATURE (AMBIENT):** 0°F (18°C)

**MAXIMUM HYDRAULIC FLUID TEMPERATURE:** 150°F (65°C)

**HYDRAULIC FLUID:** Hydraulic fluid is not supplied by Huck. Hydraulic fluid shall meet DEXRON® III, DEXRON VI, MERCON®, Allison C-4 or equivalent Automatic Transmission Fluid (ATF) specifications. Fire-resistant fluid may be used if it is an ester-based fluid such as Quintolubric® HFD or equivalent. Water-based fluid shall NOT be used as serious damage to equipment will occur.

*DEXRON* is a registered trademark of General Motors Corp.  
*MERCON* is a registered trademark of Ford Motor Corp.  
*Quintolubric* is a registered trademark of Quaker Chemical Corp.

### Specifications

<table>
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<tr>
<th>UNIT</th>
<th>WIDTH</th>
<th>LENGTH</th>
<th>HEIGHT</th>
<th>WEIGHT (without hydraulic fluid)</th>
<th>WEIGHT (with hydraulic fluid)</th>
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</thead>
<tbody>
<tr>
<td>Entire Series</td>
<td>17.5 in. (44.5 cm)</td>
<td>24.0 in. (61.0 cm)</td>
<td>23.5 in. (59.7 cm)</td>
<td>178.0 lbs. (80.7 kgs)</td>
<td>217.0 lbs. (98.4 kgs)</td>
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</table>
Main Components

**Figure 1**

- Power Cord
- Electrical Enclosure
- Emergency Stop
- High Pressure Relief Valve
- Quick Disconnect Coupler
- Pressure Switch
- Lift Bracket
- Motor & Pump
- Pilot Valve
- 4-Way Directional Valve
- Reservoir

940S-2 and 940S-2-230 Powerig® Hydraulic Units (HK967)
940S-2 and 940S-2-230 Powerig® Hydraulic Units (HK967)

Electrical Schematics

Figure 2a

Figure 2b
Models 940S-2 Powerig® hydraulic power source is a portable, electrically-operated unit designed to operate all Huck hydraulic installation equipment, excluding Huck-Spin® tools.

The 940S-2 operates on 460 volt AC (230 volt for the 940S-2-230 model), 60 Hz, three-phase electrical power. The power cord is type STO 600 volt 14/4 cord. The power cord must be fitted with a plug to connect to your 3-phase power supply; this plug must be grounded. Wiring must be done by a qualified electrician. Motor rotation must be correct for proper power unit operation.

An electrical enclosure contains a motor contactor with an overload relay, two transformers, four control relays, two circuit breakers, an ON-OFF switch, and an emergency STOP switch. (See Figures 5a and 5b.)

Hydraulic pressure is developed by a split-flow, two-stage, gear-piston pump driven by a 3-horsepower electric motor. Pressurized fluid is directed by four-way directional valves to either the PULL or RETURN port of the installation equipment.

The four-way directional valves are operated by a 24-volt AC control circuit. The high-pressure relief valves control PULL pressure (maximum pressure of the unit) and is adjustable by the operator. The PULL pressures for tools #1 and #2 are individually adjustable.

An internal relief valve is pre-set at the factory to protect the operator and the equipment. The internal relief is not adjustable by the operator.

Pressure switches control the RETURN pressure, and turn off the Powerig at the end of an installation cycle. The RETURN pressures for tools #1 and #2 are individually adjustable. Pressures are adjustable to match the Huck equipment being used. See applicable tool instruction manual for pressure settings for other Huck installation equipment. Since two tools can be used, with different operating pressures, take care to ensure that the power unit pressure settings are correct for the tool being used.

Hydraulic fluid is stored in the reservoir which also serves as the base. Remove the filler cap to check the fluid level and to add fluid. Hydraulic quick disconnect couplers are included for connecting hoses from installation equipment.

**Description**

See Figures 2a and 2b (Electrical Schematics).

Pressure switch (PS) contacts are usually closed. Increasing the pressure opens the contacts.

When the tool trigger for tool #1 is pressed, 24 volt AC power is applied across relay CR1, closing all contacts marked CR1. This energizes CR2. This completes a start circuit for the motor (M). (M) is energized by CR2 and CR1 contacts, and is held on by the (M) contacts and the CR2 contact. CR2 also latches itself on via contact CR2.

When CR1 is energized, SOL "A" is energized, directing oil to the PULL side of tool #1. When trigger #1 is released, SOL "B" is energized, directing oil to the RETURN side of tool #1.

When the setting of PS1 pressure switch is reached on the RETURN side, the holding circuit for CR2, and consequently the motor run circuit (M), is de-energized, stopping the pump and motor. Solenoid "B" is also de-energized and returns the valve to the center position.

Operation of tool #2 is the same theory, using CR3, CR4, PS2, and solenoids "C" and "D". The unit will operate both tools independently or simultaneously.
Preparation for Use

SERVICE
Foreign material in the hydraulic unit will result in poor performance and down time for repair. To avoid this:
1. Clean around the filler cap before removing it.
2. Use a clean funnel with a filter.
3. Keep quick-disconnect couplers off the floor.
4. Wipe off quick-disconnect couplers before connecting them.

BEFORE USE
The Powerig is shipped without hydraulic fluid. Fill the reservoir with hydraulic fluid—approximately 5.5 gallons (20.8 litres)—until the fluid level is between the grooves of the dipstick.
Install a quick-disconnect nipple that is compatible with your shop air supply in the 1/4 female NPT fitting on the control panel.

Checking and Adjusting Pressures

WARNING: The maximum PULL pressure is 8400 PSI. See each tool’s instruction manual for PULL and RETURN pressures. If recommended pressures are not applied, violent equipment failure could result, leading to severe personal injury and tool damage.

CHECKING PRESSURES
Use Huck pressure gauge (P/N T-124833CE) to check the PULL and RETURN pressures: before each use, before troubleshooting, and after overhauling.
• Use the pressure gauge ONLY as directed in its instruction manual.
• See each tool’s instruction manual for the recommended pressures that are specific to that tool.

ADJUSTING THE PULL PRESSURE
Use Huck pressure gauge T-124833CE—ONLY as instructed in its manual—to aid in adjusting the PULL pressure as recommended in each tool-specific instruction manual.
PULL pressure is the maximum Powerig® pressure. Do NOT exceed the pressure rating of the installation tool.

ADJUSTING THE RETURN PRESSURE
Use Huck pressure gauge T-124833CE—ONLY as instructed in its manual—to aid in adjusting the RETURN pressure as recommended in each tool-specific instruction manual.

NOTE: The PULL and RETURN pressures must be set for each set of tool ports.

3. Tighten the jam nut.
4. Use Huck pressure gauge T-124833CE to check the PULL pressure. Follow the instructions in the appropriate section of this manual.

1. Loosen the jam nut of the high pressure relief valve.
2. Turn the adjusting screw:
   • clockwise to increase the pressure
   • counterclockwise to decrease the pressure.
3. Tighten the jam nut on the pressure switch.
4. Use Huck pressure gauge T-124833CE to check the RETURN pressure. Follow the instructions in the appropriate section of this manual.

NOTE: The PULL and RETURN pressures must be set for each set of tool ports.
Operating Instructions

BEFORE EACH USE OF THE POWERIG® HYDRAULIC POWER SOURCE

1. Check the hydraulic fluid level in the reservoir; add fluid as necessary.
2. Inspect hoses for damage and wear. If a hose has wear that has removed more than the surface texture, do NOT use; replace.
3. Check the entire system for leaks; repair as necessary.
4. Check electrical cord and extension for abrasion; replace as necessary.

OPERATING TOOLS

1. Plug the power cord into a grounded wall outlet.
   NOTE: If an extension cord is used, make sure it is UL type SO or STO, 600 volt, and
   • 12/4 (25’ long)
   • 10/4 (50’ long)
2. Check pressures; adjust as necessary. See CHECKING AND ADJUSTING PRESSURES in this manual.
   NOTE: WARNINGS must be understood before checking pressures.
3. Connect a Huck hydraulic tool to the Powerig using a hose kit. (See TABLE 1 for hose kit part numbers.)
   Be sure that:
   • The hose from the PULL pressure on the control panel runs to the port stamped "P" on the tool.
   • The hose from RETURN pressure on the control panel runs to the port stamped "R" on the tool.
4. Plug the control cable from the tool into the two-prong socket on the Powerig control panel.
5. Press the tool trigger switch and let the Powerig operate for a few minutes to circulate fluid and remove air from the system.
6. Attach a nose assembly to the tool. Fasteners can now be installed. Follow the instructions in the applicable tool manual.
Maintenance

PARTS LISTS
See the Assembly Drawings section for part numbers.

WIRING
See Figures 2a and 2b (Electrical Schematics) and the Wiring Diagrams.

PREVENTIVE MAINTENANCE
An effective preventive maintenance program includes scheduled inspections to detect and correct minor troubles. Perform the following steps monthly during normal use:

- Inspect hydraulic and electrical fittings to be sure they are secure.
- Inspect hoses for signs of damage. Replace hoses if abrasion is deeper than the surface texture.
- Rotate hoses end-for-end to equalize wear and fatigue.
- Inspect during operation to detect any abnormal heating, vibration, or leakage.
- Inspect hydraulic fluid. If contamination (particles, water, sludge, etc.) is detected, clean the reservoir and replace the fluid.
- Clean exterior surfaces.
- Check the supply voltage. Do not operate the Powerig® hydraulic power source if the line voltage is more than 5 percent above or below the operating voltage (230 or 460 volts, depending on the hydraulic unit being used).

SPARE PARTS
The quantity of spare parts that should be kept on hand varies with the application and number of the Powerig units in service. For directional valve and pilot valve maintenance, Seal Kit 124100 (see Figure 7) should be kept on hand at all times. This kit contains O-rings and back-up rings required to service one directional valve and one pilot valve.

Other parts that should be available to the service technician are: Pump to Motor Coupling, Relay, Transformer, Pilot Valve, and Motor Brushes.

DIRECTIONAL VALVE OVERHAUL
If minor overhaul of the directional valve (cleaning and replacing O-rings and back-up rings) is necessary, Seal Kit 124100 (see Figure 7) is available. If a major overhaul is necessary, return the directional valve to the nearest repair facility listed on the inside of the back cover.

Clean components in mineral spirits. Smear LUBRIPLATE® 130-AA (Huck P/N 502723), or equivalent, on O-rings and mating surfaces to aid assembly and prevent damage to O-rings. LUBRIPLATE is available in most localities.

INTERNAL ADJUSTMENT OF PRESSURE SWITCH
See Figure 8.

1. Remove the top cover of the switch.
2. Loosen the two screws in the bottom of the switch housing.
3. Place a 0.20-inch-thick shim between the spring retainer and the platen.
4. Loosen the set screw on the spring retainer until it contacts the shim.
5. Lock the spring retainer in place with the set screw.
6. Slide the switch mounting bracket toward the switch button until it contacts the platen surface.
7. Secure with the two screws located in the middle of the bottom cover.
8. Connect a volt/ohm meter to the electrical cord.
9. Tighten the switch adjustment screw against the switch mounting bracket until the switch button contacts the platen and actuates. The volt/ohm meter will react when the button actuates. A click can be heard.
10. Continue tightening the switch adjustment screw 1/8 of a turn after the switch button actuates.
11. Replace the top cover of the switch.

REPLACING PUMP TO MOTOR COUPLING
The pump to motor coupling can be replaced by removing the four socket cap screws holding the motor housing to the cover plate and lifting the motor to one side. Lift out the original coupling with needle-nose pliers. Drop in the new coupling, align the slots, and reassemble motor to cover plate.

PUMP OVERHAUL
If the pump requires an overhaul, return it (or the complete unit) to the nearest repair facility listed on the inside of the back cover.

LUBRIPLATE is a registered trademarked of Fiske Brothers Refining Co.
NOTE: The final assembly for the 940S-2-230 model has the following exceptions:

- Item 2, Electrical Enclosure Assembly is P/N 125322.
- Item 6, Motor Cord Assembly is P/N 125353.
Figure 5A

125300 Electrical Control Assembly 940S-2

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PART NO QTY DESCRIPTION ITEM
Seal Kit 124100, Location of Rings

**TABLE 7**

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<th>PART NO.</th>
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1. USE THREAD COMPOUND #503237 ON ALL MALE PIPE THREADS
Pressure Switch

**Figure 8**

Electrical Switch & Control Cord Assembly

**Figure 9**

**Part No. 113056**
(12 ft. Auxiliary Switch used with Pressure Gauge T-124833CE)
Wiring Diagram 940S-2-230

Figure 6b
Troubleshooting

Always check the simplest possible cause (such as a blown fuse, tripped circuit breaker, defective switch or control cord) of a malfunction first. Then proceed logically, eliminating other possible causes until the cause is discovered. Where possible, substitute known good parts for suspected defective parts. A qualified electrician should examine the electrical system. Use this section as an aid in locating trouble and correcting it. Use this Troubleshooting information to aid in locating and correcting trouble.

1. **Motor fails when tool switch is pressed.**
   a) Loose or defective control cord or connectors.
   b) Power source not properly fused.
   c) Defective tool switch.
   d) Loose wire(s).
   e) Defective relay.
   f) Incorrect power source.
   g) Defective motor contactor.
   h) Defective transformer.

2. **Motor runs, but tool will not reciprocate.**
   a) Hoses not properly coupled.
   b) Hydraulic fluid viscosity not proper or level is low.
   c) Defective pilot valve solenoid or coil.
   d) Unloading valve missing in tool.
   e) Bind in tool or nose assembly.
   f) Defective directional valve.
   g) Pump to motor coupling damaged.

3. **Pintail of fastener fails to break off.**
   a) PULL pressure set too low.
   b) Worn or defective hose couplers.
   c) Hydraulic fluid viscosity not proper or level is low.
   d) Hydraulic fluid overheated.
   e) Worn or defective directional valve.
   f) Internal relief valve set too low or defective.
   g) Worn or defective pump.

4. **Tool will not return when switch is released, or will not push nose assembly off swaged fastener.**
   a) RETURN pressure set too low.
   b) Hoses not properly coupled.
   c) Worn or defective solenoid.
   d) Worn or defective pilot valve.

5. **Motor fails to shut-off when installation cycle is completed.**
   a) RETURN pressure switch set too high.
   b) Hydraulic fluid viscosity not proper or level is low.
   c) Hydraulic fluid overheated.
   d) Defective limit switch in pressure switch assembly.

6. **Pump making noise throughout entire cycle.**
   a) Pump is cavitating; fluid level too low or fluid viscosity too heavy.
   b) Strainer is dirty and clogged.

7. **Tool operation slow; entire cycle does occur.**
   a) Pump is cavitating; fluid level too low or fluid viscosity too heavy.
   b) Strainer is dirty and clogged.
   c) Worn or defective directional valve.
   d) Worn or damaged pump.
   e) Worn or defective hydraulic couplers.

8. **Huck-Spin® tool does not spin onto fastener.**
   a) Air motor is spinning in the wrong direction because the air hoses are reversed; swap hoses at control panel.

Kits & Accessories

**KITS**

**Hose and Control Cord Kits**

Kits are available with hoses of various lengths (12' to 52') as shown in TABLE 1.

**TABLE 1 - HOSE AND CONTROL CORD KITS**

<table>
<thead>
<tr>
<th>Length</th>
<th>Huck Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12'</td>
<td>110838</td>
</tr>
<tr>
<td>26'</td>
<td>110839, 111955*</td>
</tr>
<tr>
<td>38'</td>
<td>110840</td>
</tr>
<tr>
<td>52'</td>
<td>110841, 112176*</td>
</tr>
</tbody>
</table>

* For use in severe conditions and in a welding environment.

**ACCESSORIES**

**Auxiliary Switch and Control Cord - 113056**

An auxiliary switch for use when checking and adjusting pressures, and troubleshooting; see Figure 9.

**Pressure Gauge - T-124833CE**

Recommended for use when checking and adjusting pressures, and troubleshooting; see Figure 10.
Limited Warranties

Tooling Warranty:
Huck warrants that tooling and other items (excluding fasteners, and hereinafter referred as “other items”) manufactured by Huck shall be free from defects in workmanship and materials for a period of ninety (90) days from the date of original purchase.

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Huck’s sole liability and Buyer’s exclusive remedy for any breach of warranty shall be limited, at Huck’s option, to replacement or repair, at FOB Huck's plant, of Huck manufactured tooling, other items, nonstandard or custom products found to be defective in specifications, workmanship and materials not otherwise the direct or indirect cause of Buyer supplied molds, material, tooling or fixtures. Buyer shall give Huck written notice of claims for defects within the ninety (90) day warranty period for tooling, other items, nonstandard or custom products described above and Huck shall inspect products for which such claim is made.

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Huck Installation Equipment should be serviced by trained service technicians only.

Always give the Serial Number of the equipment when corresponding or ordering service parts.

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Contact your nearest Huck International Office, see back cover.

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