Instruction Manual

940S • 940S-230 • 940S-380
Powerig® Hydraulic Units
Safety Instructions

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.

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.

Notes: are reminders of required procedures.

Bold, Italic type, and underline: emphasize a specific instruction.

WARNINGS: Must be understood to avoid severe personal injury.

CAUTIONS: Show conditions that will damage equipment or structure.
Description

Model 940S Powerig® is a portable, electrically-operated unit designed to operate all Huck hydraulic installation equipment, excluding Huck-Spin® tools. 940S operates on 460 volt AC; 230 volt for model 940S-230; 380 volt for model 940S-380.) 60 Hz, 3-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 contact with an overload relay, a transformer, a relay, two circuit breakers, an ON-OFF switch, and an emergency STOP switch. Hydraulic pressure is developed by a two-stage, gear-piston pump driven by a 3-horsepower electric motor. Pressurized fluid is directed by a four-way directional valve to either the PULL or RETURN port of the installation equipment. The four-way directional valve is operated by a 24-volt AC control circuit. The high-pressure relief valve controls PULL pressure (maximum pressure of the unit) and is adjustable by the operator. An internal relief valve is preset at the factory to protect the operator and the equipment. The internal relief is not adjustable by the operator. A pressure switch controls the RETURN pressure, and turns off the Powerig at the end of an installation cycle. Pressures are adjustable to match the Huck equipment being used. See applicable tool instruction manual for pressure settings for other Huck installation equipment.

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

Specifications

940 series Powerigs are intended for use in indoor factory environments. If used outdoors, they must be protected from the elements.

**ELECTRICAL SYSTEMS:**
940S: 460 volts, 50/60 hertz, 3 phase, AC
940S-230: 230 volts, 50/60 hertz, 3 phase, AC
940S-380: 380 volts, 50/60 hertz, 3 phase, AC

**CONTROL SYSTEM:** Solenoid-operated directional valve, 24 VAC

**MOTOR:**
940S: 3450RPM (60Hz) 2850RPM (50Hz), 3 HP, 4.1 amps nom.
940S-230: 3450RPM (60Hz) 2850RPM (50Hz), 3 HP, 8.2 amps nom.
940S-380: 3450RPM (60Hz) 2850RPM (50Hz), 3 HP, 4.7 amps nom.

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

<table>
<thead>
<tr>
<th>TOOL</th>
<th>WIDTH</th>
<th>LENGTH</th>
<th>HEIGHT</th>
<th>WEIGHT (without hydraulic fluid)</th>
<th>WEIGHT (with hydraulic fluid)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Series</td>
<td>18.6 in. (47.3 cm)</td>
<td>16.5 in. (41.9 cm)</td>
<td>21.4 in. (54.4 cm)</td>
<td>123.5 lbs. (56.0 kg)</td>
<td>162.0 lbs. (73.3 kg)</td>
</tr>
</tbody>
</table>

**PUMP:** 2-stage, gear-piston type
0.56 gpm @ 8000 psi (2.12 l/m @ 552 bar)
1.62 gpm @ 700 psi (6.13 l/m @ 48 bar)
Output pressure adjustable to 8800 psi (607 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.

**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 liters).

**Description**

**Principle of Operation**
Pressure switch (PS) contacts are usually closed. Increasing the pressure opens the contacts. When the tool trigger switch is pressed, 24 volts AC is applied between relay terminals CR13 and CR14, activating the relay coil and closing two sets of contacts: CR9–CR5 and CR12–CR8. Closing set CR9–CR5 starts the motor; closing set CR12–CR8 activates the solenoid coil of the pilot valve. The pilot valve shifts the directional valve spools.

Pressurized fluid is directed to the PULL port of the tool. When the tool trigger switch is released, the relay contacts open. The solenoid coil is deactivated and the spring return of the pilot valve shifts the directional valve spools. Pressurized fluid is directed to the RETURN port of the tool. The motor contact is held closed until the preset RETURN pressure is reached and the pressure switch (PS) contacts open. The motor turns off, the pressure drops, and PS returns to the closed position.

**Preparation for Use**
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.

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 and adjust as necessary. See **CHECKING AND ADJUSTING PRESSURES** above.

   - **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.)
   - **Note**: Be sure that the hose from the PULL pressure on the control panel runs to the port stamped “P” on the tool and 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.

---

**CHECKING PRESSURES**

**WARNINGS above must be understood.**

Check PULL and RETURN pressures before use, before troubleshooting, and after overhauling. See pressures given in the specific tool instruction manual. For checking pressures, use T-124833CE Pressure Gauge and its instruction manual.

**ADJUSTING PRESSURES**

**NOTE**: Using gauge T-124833CE, set pressures according to the specific installation equipment manual.

---

**WARNINGS:**

Maximum PULL pressure is 8400 psi. Refer to specific tool instruction manual for PULL and RETURN pressures. Severe personal injury may occur if excessive pressures cause violent failure of equipment. Higher than normal pressures will also cause premature wear of equipment.

If recommended maximum pressure is exceeded, violent failure of fastening system may occur. This may cause severe personal injury.

---

**ADJUSTING PULL PRESSURE**

**NOTE**: PULL pressure is the maximum POWERIG® pressure. Do not exceed the pressure rating of the installation equipment. See the installation equipment manual for pressure rating.

1. Loosen the jam nut of the high pressure relief valve.
2. Turn the adjusting screw clockwise to increase PULL pressure OR counterclockwise to decrease PULL pressure.
3. Tighten the jam nut after PULL pressure has been adjusted.
4. Check PULL pressure. Follow instructions in the appropriate section of this manual.

**ADJUSTING RETURN PRESSURE**

1. Loosen the jam nut on pressure switch.
2. Turn the adjusting screw clockwise to increase RETURN pressure OR counterclockwise to decrease RETURN pressure.
3. Tighten the jam nut on pressure switch after return pressure has been adjusted.
4. Check RETURN pressure. Follow instructions in the appropriate section of this manual.
Maintenance

PARTS LISTS
See the Assembly Drawings section for part numbers.

WIRING
See Figure 5 (Electrical Schematics) and Figure 6 (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 maintenance, Directional Valve Kit 129437 should be kept on hand at all times. This kit contains spools, poppets, seats, O-rings, and back-up rings required to service one directional valve.
Other parts that should be available to the service technician are: 103918 Pump to Motor Coupling, 506366 Relay, 507352 Transformer, and 124831 Pilot Valve.

DIRECTIONAL VALVE OVERHAUL
If overhaul of the directional valve is necessary, a valve repair kit that has the spools, cartridges & poppets is 129437, is available for purchase, and should be kept on hand. To rebuild valve, follow instructions included with kit.

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 hack cover.
Main Components 1 of 2

Figure 1
Main Components 2 of 2

Figure 3
115753 Pressure Switch

**Figure 8**

Electrical Switch & Control Cord Assembly

**Part No. 113056**

*(12 ft. Auxiliary Switch used with Pressure Gauge T-124833CE)*
Electrical Schematic Diagram for HUCK 940S Powerig®

Hydraulic Pump
3-Phase
3 HP
2850 RPM @ 50 Hz
3450 RPM @ 60 Hz
4.1 FLA
CCW from lead end

Overload Relay
Setting Detail
**Electrical Schematic Diagram for HUCK 940S-230 Powerig®**

- **Hydraulic Pump**: 3-Phase
- **3 HP**
- **2850 RPM @ 50 Hz**
- **3450 RPM @ 60 Hz**
- **8.2 FLA**
- **CCW from lead end**

**Overload Relay Setting Detail**

- **CB1 0.5A**
- **OL 4.5A**
- **T1 T2 T3**
- **MTR**
- **L1 L2 L3**
- **PE**

**External Trigger Circuit**

**Hyd Valve**

**CB2 0.2A**

**S1**
Electrical Schematic Diagram for HUCK 940S-380 Powerig®

Hydraulic Pump
- 3-Phase
- 3 HP
- 2850 RPM @ 50 Hz
- 3450 RPM @ 60 Hz
- 4.7 FLA
- CCW from lead end

Overload Relay Setting Detail
Figure 6

940S and 940S-230 Powerig® Hydraulic Units (HK947)

Wiring Diagram 940S Series

Note: Wires labeled with a trailing asterisk (*) indicate multi-conductor cables.

L2 connects to:
TR1-H6 for 460V
TR1-H5 for 380V
TR1-H3 for 230V

ON-OFF Switch

Motor Cord

Solenoid Cord

24VAC Trigger

Press Sw Cord

Note:
Wires labeled with a trailing asterisk (*) indicate multi-conductor cables.
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 to start 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 contact.
   h) Defective transformer.

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

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

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

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

6. **Pump making noise throughout entire cycle.**
   a) Pump is cavitting; 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 cavitting; 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.

Kits & Accessories

**KITS**

**Hose and Control Cord Kits**

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

**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.

<table>
<thead>
<tr>
<th>TABLE 1 - HOSE AND CONTROL CORD KITS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length (feet)</strong></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>26</td>
</tr>
<tr>
<td>38</td>
</tr>
<tr>
<td>52</td>
</tr>
</tbody>
</table>

* Use in severe conditions and in welding environment.
Limited Warranties

Limited Lifetime Warranty on BobTail® Tools:

Huck International, Inc. warrants to the original purchaser that its BobTail® installation tools manufactured after 12/1/2016 shall be free from defects in materials and workmanship for its useful lifetime. This warranty does not cover special order / non-standard products, or part failure due to normal wear, tool abuse or misapplication, or user non-compliance with the service requirements and conditions detailed in the product literature.

Two Year Limited Warranty on Installation Tools:

Huck International, Inc. warrants that its installation tools and Powerigs® manufactured after 12/1/2016 shall be free from defects in materials and workmanship for a period of two years from date of purchase by the end user. This warranty does not cover special order / non-standard products, or part failure due to normal wear, tool abuse or misapplication, or user non-compliance with the service requirements and conditions detailed in the product literature.

90 Day Limited Warranty on Nose Assemblies and Accessories:

Huck International, Inc. warrants that its nose assemblies and accessories shall be free from defects in materials and workmanship for a period of 90 days from date of purchase by the end user. This warranty does not cover special clearance noses, or special order / non-standard product, or part failure due to normal wear, abuse or misapplication, or user non-compliance with the service requirements and conditions detailed in the product literature.

Useful lifetime is defined as the period over which the product is expected to last physically, up to the point when replacement is required due to either normal in-service wear, or as part of a complete overhaul. Determination is made on a case-by-case basis upon return of parts to Huck International, Inc. for evaluation.

Tooling, Part(s) and Other Items not manufactured by Huck:

HUCK makes no warranty with respect to the tooling, part(s), or other items manufactured by third parties. HUCK expressly disclaims any warranty expressed or implied, as to the condition, design, operation, merchantability, or fitness for use of any tool, part(s), or other items thereof not manufactured by HUCK. HUCK shall not be liable for any loss or damage, directly or indirectly, arising from the use of such tooling, part(s), or other items or breach of warranty or for any claim for incidental or consequential damages.

Huck shall not be liable for any loss or damage resulting from delays or non-fulfillment of orders owing to strikes, fires, accidents, transportation companies or for any reason or reasons beyond the control of the Huck or its suppliers.

Huck Installation Equipment:

Huck International, Inc. reserves the right to make changes in specifications and design and to discontinue models without notice.

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.

Complete repair facilities are maintained by Huck International, Inc. Please contact one of the offices listed below.

Eastern
One Corporate Drive Kingston, New York 12401-0250
Telephone (845) 331-7300 FAX (845) 334-7333

Outside USA and Canada
Contact your nearest Huck International location (see reverse).

In addition to the above repair facilities, there are Authorized Tool Service Centers (ATSC’s) located throughout the United States. These service centers offer repair services, spare parts, Service Parts Kits, Service Tool Kits and Nose Assemblies. Please contact your Huck Representative or the nearest Huck International location (see reverse) for the ATSC in your area.
Arconic Inc. (NYSE: ARNC) creates breakthrough products that shape industries. Working in lose partnership with our customers, we solve complex engineering challenges to transform the way we fly, drive, build and power.

Arconic Fastening Systems and Rings world-wide locations:

**AMERICAS**

**Kingston Operations**
1 Corporate Drive
Kingston, NY 12401
800-278-4825
845-331-7300
FAX: 845-334-7333

**Tucson Operations**
3724 East Columbia
Tucson, AZ 85714
800-234-4825
520-747-9898
FAX: 520-748-2142

**Carson Operations**
900 Watson Center Rd.
Carson, CA 90745
800-421-1459
310-830-8200
FAX: 310-830-1436

**Acuña Operations**
Hidalgo #120
Parque Industrial Amistad
26220 Acuña Coahuila
Mexico
FAX: 525-515-1776
TELEX: 1173530 LUKSME

**Waco Operations**
PO Box 8117
8001 Imperial Drive
Waco, TX 76714-8117
800-388-4825
254-776-2000
FAX: 254-751-5259

**EUROPE**

**Telford Operations**
Unit C, Stafford Park 7
Telford, Shropshire
England TF3 3BQ
01952-290011
FAX: 01952-290459

**Us Operations**
BP4
Clos D'Asseville
95450 Us par Vigny
France
33-1-30-27-9500
FAX: 33-1-34-66-0600

**FAR EAST**

**Melbourne Operations**
11508 Centre Road
Clayton, Victoria
Australia 3168
03-764-5500
Toll Free: 008-335-030
FAX: 03-764-5510


NOTICE: The information contained in this publication is only for general guidance with regard to properties of the products shown and/or the means for selecting such products, and is not intended to create any warranty, express, implied, or statutory; all warranties are contained only in Huck’s written quotations, acknowledgments, and/or purchase orders. It is recommended that the user secure specific, up-to-date data and information regarding each application and/or use of such products.

© 2017 Huck International, Inc.
1 Corporate Drive, Kingston, NY 12401 • Tel: 800-431-3091 • Fax: 845-334-7333