



# FAULTS & TROUBLESHOOTING

Section

8

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## FAULTS

### 1 - HYDRAULIC LOW LEVEL

#### ***Check hydraulic tank level***

- Fill hydraulic tank with fluid.
- Using the XPert display, test hydraulic fluid input. Replace if defective.
- Check equipment for hydraulic leaks.
- Inspect hoses and fittings for hydraulic leaks.
- Inspect enclosures on main bridge and trolley for hydraulic fluid pooled in bottom.
- Tighten fittings as needed.
- Replace defective hoses as needed.

### 2 - LOW WATER

#### ***Inspect water level in storage tank***

- If storage tank is full, check low level float input on XPert display. It should be On when float is up. If not, replace float.

#### ***Test upper level float***

- If upper float is down but input on the XPert input screen is not On, check wire connections and replace float if necessary.

#### ***Inspect water shut-off valve***

- If shut-off valve is closed, turn On.

### 3 - MONEY ACCEPTED TIME OUT

#### ***Vehicle may have failed to settle on stop station in time***

- Inspect stop station switches for broken cables. Engage each stop station switch and check for inputs on the XPert display action screen. If switches are On, no action may be necessary.

#### ***Vehicle makes stop station, but wash fails to start***

- Inspect the stop station switches on the XPert display. If one or both switches fail to light, replace cables or switches as needed.

#### ***Inspect Optic***

- Inspect the optic input on the XPert display action screen. If optic is not On when not blocked, check alignment of optic.

- When green LED is On, optic has power. Amber LED is On when transmitter is transmitting. Receiver amber LED is On when receiver is aligned and receiving light from transmitter.

- Inspect the optic cables for damage or loose cable connections. Tighten fittings as needed.

### 4 - MAXIMUM OVERALL TIME

#### ***Inspect bay equipment for damage***

- Inspect rails and gears for loose nuts and bolts that could block movement.

#### ***Check adjustable wand for correct position***

- Use the XPert display to rotate the adjustable wand. Check for damage or loose equipment. Adjustable wand should move freely.



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***Check trolley movement***

Use the XPert display to extend and return trolley. Check for damage or loose equipment. Trolley should move freely.

***Check main bridge movement***

Use the XPert display to extend and home the main bridge. Check for damage or loose equipment. Main bridge should move freely.

***Inspect gore tubes for loose or broken sections***

Replace defective section as needed.

***Check main bridge trolley home proximity switches***

Using the XPert display, test proximity switch inputs by placing a wrench or metal object in front of the switch. Input on the XPert display should change state. Replace if defective.

**5 - VEHICLE LEFT STOP STATION EARLY*****Inspect equipment for damage***

Inspect both wands for damage. Check adjustable wand for location and processor position (Fig 9, Pg 5.8).

***Check trolley movement***

Use the XPert display to extend and home trolley. Check for damage or loose equipment. Trolley should move freely.

***Check main bridge movement***

Use the XPert display to extend and home the main bridge. Check for damage or loose equipment. Main bridge should move freely.

***Inspect stop switches for damage***

Inspect stop station switches for broken cables. Engage each stop station switch, and check for inputs on the XPert display action screen. If switches are On, no action is needed.

**6 - VEHICLE LEFT STOP STATION DURING SPOT FREE*****Inspect equipment for damage***

Inspect both wands for damage. Check adjustable wand for location and processor position (Fig 9, Pg 5.8).

***Inspect stop switches for damage***

Inspect stop station switches for broken cables. Engage each stop station switch, and check for inputs on the XPert display action screen. If switches are On, no action is needed.

**7 - ADJUSTABLE WAND FAULT RETRACTING*****Inspect adjustable wand for damage***

Check hoses and cables for damage. Inspect breakaway for damage or loose connections.

***Check adjustable wand for correct position***

Use the XPert display to rotate the adjustable wand to each quadrant, and look for arrow and position number for each move (Fig 9, Pg 5.8). Check for damage or loose equipment. Adjustable wand should move freely.



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## **8 - ADJUSTABLE WAND FAULT EXTENDING**

### ***Inspect adjustable wand for damage***

Check hoses and cables for damage. Inspect breakaway for damage or loose connections.

### ***Check adjustable wand for correct position***

Use the XPert display to rotate the adjustable wand to each quadrant, and look for arrow and position number for each move (Fig 9, Pg 5.8). Check for damage or loose equipment. Adjustable wand should move freely.

## **9 - WAND HIT ON FIRST PASS**

### ***Inspect adjustable wand for damage***

Check hoses and cables for damage. Inspect breakaway for damage or loose connections.

### ***Check adjustable wand for correct position***

Use the XPert display to rotate the adjustable wand. Check for damage or loose equipment. Adjustable wand should move freely. Check adjustable wand for location and processor position (Fig 9, Pg 5.8).

### ***Check trolley movement***

Use the XPert display to extend and home trolley. Check for damage or loose equipment. Trolley should move freely.

### ***Check main bridge movement***

Use the XPert display to extend and home the main bridge. Check for damage or loose equipment. Main bridge should move freely.

## **10 - BRIDGE COUNT PROXIMITY SWITCH OFF**

### ***Inspect main bridge count proximity***

Switch has failed to go Off in allowed preset time. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

### ***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

## **11 - BRIDGE COUNT PROXIMITY SWITCH ON**

### ***Inspect main bridge count proximity***

Switch has failed to come 'On' in allowed preset time. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

### ***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.



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## 12 - TROLLEY COUNT PROXIMITY SWITCH ON

### ***Inspect trolley bridge count proximity***

Switch has failed to come On in allowed preset time. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

### ***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

## 13 - TROLLEY COUNT PROXIMITY SWITCH OFF

### ***Inspect trolley bridge count proximity***

Switch has failed to go Off in allowed preset time. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

### ***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

## 14 - OPTIC FAILURE

### ***Inspect optic for damage***

Inspect transmitter and receiver for damage. Check cables and cable connectors.

### ***Check optic for alignment***

Inspect the optic input on the XPert display action screen. If optic is not On when not blocked, check alignment of optic. Clean optic lens faces with glass cleaner and soft cloth.

### ***Information***

When green LED is On, optic has power. Amber LED is On when transmitter is transmitting. Receiver amber LED is On when receiver is aligned and receiving light from transmitter. When receiver input is lit, I108 on processor will be lit. When receiver is blocked, I109 on processor will be lit.

## 15 - HIGH WATER

### ***Check storage tank floats***

Using a ladder as needed, check storage tank water level. Both floats should be floating upright. Replace float as necessary. Check water supply to ensure flow is sufficient to fill tank in programmed time (2 minutes). Reset machine. Check that inlet is opening and tank is filling.

### ***See '2 - Low Water Fault'***

Follow recommended steps.

## 16 - BRIDGE HOME PROXIMITY SWITCH HAS BEEN ON MORE THAN 4 COUNTS

### ***Inspect main bridge home proximity***

Switch has failed to go Off in allowed time. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.



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***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I100, check terminal strip in bridge for voltage between 100 and 4 (24vdc). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

**17 - MATH OVERFLOW**

***Consult the factory for assistance***

**18 - NOT ASSIGNED**

**19 - TROLLEY COUNTER OUT OF RANGE**

***Consult the factory for assistance***

**20 - BRIDGE HOME PROXIMITY SWITCH CAME ON BEFORE LOW CORRECTION LIMIT AND NOT IN CORRECTION AREA**

***Inspect bridge position count proximity switch***

Bridge count is outside the limits allowed. Inspect bridge count proximity. Switch has failed to come On in the low limit correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I104, check terminal strip in bridge for voltage between 104 and 4 (24vdc). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

**21 - BRIDGE HOME PROXIMITY SWITCH CAME ON BEFORE LOW CORRECTION LIMIT**

***Inspect bridge position count proximity switch***

Bridge count is outside the limits allowed and outside the correction area. Inspect bridge count proximity. Switch has failed to come On in the low limit correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.



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***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I104, check terminal strip in bridge for voltage between 104 and 4 (24vdc). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

**22 - BRIDGE HOME PROXIMITY SWITCH CAME ON AFTER THE HIGH CORRECTION LIMIT*****Inspect bridge position count proximity switch***

Bridge homing count is outside the limits allowed. Visually inspect bridge count proximity. Switch has failed to come On in the high limit correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I104, check terminal strip in bridge for voltage between 104 and 4 (24vdc). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

**23 - BRIDGE EXTENDING DID NOT SEE HOME PROXIMITY SWITCH IN CORRECTION AREA*****Inspect bridge position count proximity switch***

Bridge extending count is outside the limits allowed and outside the correction area. Inspect bridge count proximity. Switch has failed to come On in the correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity switch should glow amber, not red. If proximity light is On and no input is showing on input I104, check terminal strip in bridge for voltage between 104 and 4 (24vdc).

**24 - BRIDGE GOING HOME DID NOT SEE HOME PROXIMITY SWITCH IN CORRECTION AREA*****Inspect bridge position count proximity switch***

Bridge extending count is outside the limits allowed and outside the correction area. Inspect bridge count proximity. Switch has failed to come On in the correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.



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***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity switch should glow amber, not red. If proximity light is On and no input is showing on input I104, check terminal strip in bridge for voltage between 104 and 4 (24vDC).

**25 - ONBOARD DRYER COUNT PROXIMITY SWITCH ON*****Inspect dryer bridge count proximity***

Switch has failed to come On in allowed preset time. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

**26 - ONBOARD DRYER COUNT PROXIMITY SWITCH OFF*****Inspect dryer bridge count proximity***

Switch has failed to go 'Off' in allowed preset time. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

**27 - VEHICLE LEFT STOP STATION DURING ONBOARD DRYER MOVEMENT*****Inspect equipment for damage***

Inspect both wands for damage. Check adjustable wand for location and processor position (Fig 9, Pg 5.8).

***Check dryer bridge movement***

Use the XPert display to extend and home dryer bridge. Check for damage or loose equipment. Dryer bridge should move freely.

***Check main bridge movement***

Use the XPert display to extend and home main bridge. Check for damage or loose equipment. Main bridge should move freely.

***Inspect stop switches for damage***

Inspect stop station switches for broken cables. Engage each stop station switch, and check for inputs on the XPert display action screen. If switches are On, no action is needed.



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## **28 - TROLLEY EXTENDING; COUNT CORRECTION TROLLEY HOME PROXIMITY SWITCH NOT READ IN CORRECTION AREA**

### ***Inspect trolley position count proximity switch***

Trolley extending count is outside the counts allowed and outside the correction area. Inspect trolley count proximity. Switch has failed to come On in the correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

### ***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

### ***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I101, check terminal strip in bridge for voltage between 101 and 4 (24vDC). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

## **29 - TROLLEY GOING HOME; COUNT CORRECTION TROLLEY HOME PROXIMITY SWITCH NOT READ IN CORRECTION AREA**

### ***Inspect trolley position count proximity switch***

Trolley extending count is outside the counts allowed and outside the correction area. Inspect trolley count proximity. Switch has failed to come On in the correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

### ***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

### ***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I101, check terminal strip in bridge for voltage between 101 and 4 (24vDC). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

## **30 - COUNT CORRECTION TROLLEY HOME PROXIMITY SWITCH READ BEFORE COUNT CORRECTION LIMIT**

### ***Inspect trolley position count proximity switch***

Trolley count is outside the limits allowed. Inspect trolley count proximity. Switch has failed to come On in the low limit correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

### ***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.



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***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I101, check terminal strip in bridge for voltage between 101 and 4 (24vDC). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

**31 - COUNT CORRECTION TROLLEY HOME PROXIMITY SWITCH READ AFTER COUNT CORRECTION LIMIT*****Inspect trolley position count proximity switch***

Trolley home count is outside the limits allowed. Inspect trolley count proximity. Switch has failed to come On in the high limit correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I101, check terminal strip in bridge for voltage between 101 and 4 (24vDC). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

**32 - COUNT CORRECTION TROLLEY HOME PROXIMITY SWITCH READ OUTSIDE COUNT CORRECTION LIMIT*****Inspect trolley position count proximity switch***

Trolley count is outside the limits allowed. Inspect trolley count proximity. Switch has failed to come On in the low limit correction area. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.

***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I101, check terminal strip in bridge for voltage between 101 and 4 (24vDC). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.

**33 - TROLLEY HOME PROXIMITY SWITCH HAS BEEN ON MORE THAN 4 COUNTS*****Inspect trolley home proximity***

Switch has failed to go Off in allowed time. Check proximity for damage. Inspect cable for damage and cable ends for loose connections. Replace as needed.



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***Use XPert display to check proximity switch***

First reset the proximity switch gap to  $\frac{1}{8}$ " -  $\frac{1}{4}$ " off proximity target. Next, go to remote mode, move main bridge and watch for counts on display to count up or count down. Replace proximity switch or cable as needed.

***Inspect proximity switch and cables***

Engage proximity switch. Light on proximity should glow amber, not red. If proximity light is On and no input is showing on input I101, check terminal strip in bridge for voltage between 101 and 4 (24vDC). If voltage is present, problem is in cable between bridge and equipment room. Check cable for damage. Temporarily use spare wire until cable replacement arrives.



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## **TROUBLESHOOTING**

### **Failures Not Directly Related To A Given Fault**

#### **BRIDGE STOPS WHILE EXTENDING OR GOING HOME**

Check wand position (Fig 9, Pg 5.8) to ensure position arrow is on for wand location. If not On, check sensor array proximity switches to ensure two and only two are lit.

Inspect rails and V-rollers to ensure nothing is physically stopping bridge. Move bridge with remote function to ensure it moves freely. Reset and test unit.

#### **MONEY PAID, VEHICLE ON TREADLE, MACHINE WILL NOT START**

Inspect the optic input on the XPert display action screen. If optic is not On when not blocked, check alignment of optic. Automatic will not start if optic is Off or blocked. Backup and Drive Forward lights will be displayed in bay, but Stop light will remain Off.

Check stop station or virtual treadle for proper operation.

Check that all voltages on control panel are proper.

#### **TROLLEY OR BRIDGE FAIL TO MOVE WHEN VEND STARTS**

Go to 'Setup' on the XPert display, then move up to the 'Speed Setup' screen and press the enter key. If trolley or bridge fail to move when starting, adjust low end speed up. Make adjustments in increments of 200 up. Incremental adjustments should be made until smooth movement is noted when machine starts a test vend.

#### **TROLLEY OR BRIDGE SPEED IS SLOW OR TOO FAST WHEN IN HIGH SPEED ZONE**

Go to 'Setup' on the XPert display, then move up to the 'Speed Setup' screen and press the enter key. Adjust trolley or bridge speed to the required speed. Make adjustment in increments of 200 up or down. Test speeds after making adjustments by running a test wash.

#### **TROLLEY, WAND OR BRIDGE COUNTER LOSES COUNT ON AN EXTENDED BAY INSTALLATION**

##### ***Check for DC voltage drop at node***

Contact the factory for assistance.

#### **VALVE FAILS TO COME ON OR GO OFF DURING A VEND**

With volt meter set to read 24vDC, check terminals on valve. If not opening, check with valve on. If not closing, check with valve off. If voltage is correct, disassemble valve and check pistons or diaphragm for damage, wear or debris. Replace or repair as needed.



**TROUBLESHOOTING**  
**Pump Stand**  
**[See Also Pgs 10.69 - 10.76]**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Pulsation	Faulty or damaged pump valve.	Check all valves. Repair or replace as needed.
Low Pressure	Worn nozzles.	Replace nozzles. Use proper size.
	Belt slippage.	Tighten or replace. Use correct belt.
	Air leak in inlet plumbing.	Repair or replace defective parts.
	Relief valve stuck, partially plugged or improperly adjusted; valve seat worn.	Disassemble, reseal (or replace), and reassemble.
	Worn packing.	Replace packings. Complete seal kit recommended.
	Abrasives in pumped fluid.	Install proper filter.
	Inadequate water.	Check inlet water supply pressure. Look for restrictions in water line. Suction at inlet manifold must be limited to lifting less than 20 feet of water or -8.5 PSI vacuum.
	Fouled or dirty inlet or discharge valves.	Clean inlet and discharge valve assemblies.
Pump runs extremely rough, pressure very low	Discharge valve blocked or dirty.	Replace worn valves and/or valve seats.
	Leaky discharge hose.	Replace discharge hose.
	Restricted inlet, or air entering the inlet plumbing.	Properly size inlet plumbing. Check for air-tight seal.
Pump runs extremely rough, pressure very low	Inlet restrictions and/or air leaks.	Replace worn cup or cups. Clean out foreign material.
	Stuck inlet or discharge valve.	Replace worn valves.



**TROUBLESHOOTING**  
**Pump Stand**  
**[See Also Pgs 10.69 - 10.76]**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Water leakage from under manifold	Worn packing or seals.	Install new packing and/or seals.
Oil leak between crankcase and pumping section	Worn crankcase piston rod seals. O-rings on plunger retainer worn.	Replace crankcase piston rod seals. Replace O-rings.
Oil leaking in the area of crankshaft	Worn crankshaft seal or improperly installed oil seal O-ring. Bad bearing.	Remove oil seal retainer and replace damaged O-ring or seals. Replace bearing.
Excessive play in the end of the crankshaft pulley	Worn main bearing possibly from excessive tension on drive belt.	Replace crankcase bearing and properly tension drive belt.
Water in crankcase	Humid air condensing inside the crankcase. Worn packing and/or piston rod sieve. O-rings on plunger retainer worn.	Change oil intervals. Use any high grade automotive 30 weight non-detergent oil. Replace packing. Replace O-rings.
Oil leaking from underside of crankcase	Worn crankcase piston rod seals.	Replace seals.
Oil leaking at the rear portion of the crankcase	Damaged crankcase or O-rings.	Replace rear cover O-ring, drain plug O-ring, or sight glass O-ring.
Loud knocking noise in pump	Pulley loose on crankcase. Broken or worn bearing.	Check key and tighten screw. Replace bearing.



## TROUBLESHOOTING

### Pump Stand

[See Also Pgs 10.69 - 10.76]

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Frequent or premature failure of the packing	Scored, damaged or worn plunger.	Replace plungers.
	Overpressure to inlet manifold.	Reduce inlet pressure.
	Abrasive material in the fluid being pumped.	Install proper filtration on pump inlet plumbing.
	Excessive pressure and/or temperature of fluid.	Check pressures and fluid inlet temperature. Be sure they are within specified range.
	Overpressure of pumps.	Reduce pressure.
	Pump running without water	Check water inlets. Never run pump without water.