

---

**KNIGHT**  
**IDEX**  
IDEX CORPORATION



**UP-1100-D / UP-1100-L**  
**Instruction Manual**

---

## TABLE OF CONTENTS

Theory Of Operation .....	3
Installation.....	3
Probe Connection .....	4
Power Connection .....	4
Liquid Detergent Plumbing .....	5
Dry Detergent Plumbing .....	5
Detergent Operation .....	6
Setting The DIP Switches .....	7
Troubleshooting.....	8
Assembly Diagram .....	9
Wiring Diagram.....	10
Warranty Information.....	12
Knight Locations .....	12



CAUTION: The UP1100 dispenser has high voltage connected to the transformer.  
Always disconnect power when servicing the unit.

---

## THEORY OF OPERATION

The Ultra-Pro Series of dispensers are designed to dispense detergent to door, and conveyor-type dishwashing machines, by using microprocessor technology, to meter precise amounts of product to the dishwasher.

The electronic circuit board controls all injection of product that is delivered to the washtank via peristaltic pump or auxiliary dry detergent feeder (D versions only). Injection control is set with DIP switches an easy-to-adjust potentiometer on the circuit board.

Detergent solution strength is sensed and maintained via a conductivity probe mounted inside the dishwasher. Insufficient detergent feed is determined by the system's alarm feature which tracks how long detergent has been feeding and warns of low product, with a flashing LED and audible tone, when a preset time is surpassed.

## INSTALLATION

Before installing the unit, check the installation site for power connection availability, chemical injection point, and a suitable mounting location.

Mount the unit on a wall in a convenient location near the dishwasher.

CAUTION: Mounting the dispenser on the side, on the back, or on the vents of the dishwasher may cause thermal overload, or damage, to the dispenser. Do not mount the dispenser in the direct path of steam. This can short circuit and permanently damage the dispenser.

CAUTION: Application of incorrect voltage can permanently damage the dispenser and is not covered under warranty.

CAUTION: Rigid or flexible conduit, installed in accordance with local electrical codes, should be used to ensure safety and reliable operation.

NOTE: An optional mounting bracket is available for mounting the dispenser on top of the dishwasher (request part # 7530335).

---

## PROBE CONNECTION

CAUTION: Be sure to use a Knight P-120 probe only with this system. Probes from other manufacturers have a different “cell constant” and will affect proper detergent control.

NOTE: A 7/8” hole is required for the installation of the probe in to the washtank. If the dishwasher does not already have a hole (you may have a knock-out plug) create one using a 7/8” punch or hole saw.

Install the probe in to the washtank below the water level, and away from the incoming water supplies, or near the recirculating pump intake, and 3 to 4 inches from corners, heating elements, or bottom of tank. Use the provided gaskets to seal the probe — placing one gasket on either side of the washtank.

The kit containing the probe includes two methods for connecting probe wires:

- Open-end crimp connectors are provided for ease and speed of installation.
- Crimp-on ring terminals and nuts are provided for applications that require a different method of connection (i.e. local electrical codes).

## POWER CONNECTION

- (1) Use a meter to check the dishwasher for a detergent power source for the dispenser.
- (2) Make sure that the available input voltage matches the dispenser (see wiring diagram on page 10).
- (3) Use a power source that is “on” only during the washcycle, such as the contactor that controls the washpump motor.

**Remove power from the dishwasher before continuing on to the next step.**

- (4) Connect detergent power leads from the dishwasher to the proper terminals on the wiring barrier inside the dispenser.

---

## LIQUID DETERGENT PLUMBING

NOTE: A 7/8" hole is required for installing the detergent injection fitting on the wall of the washtank, preferably above the water line. If the dishwasher does not already have a hole ( you may have a knock-out plug) or you create one using a 7/8" punch or hole saw.

If the dishwasher already has a suitable detergent injection fitting (that will accept the poly tubing provided with the dispenser) then a 7/8" hole is not needed and step 1 can be skipped.

- (1) Install the detergent injection fitting on the wall of the washtank. Using the gaskets provided to seal the connection — place one gasket on each side of the washtank.
- (2) Install discharge tubing between the discharge (right) side of the detergent pump and the detergent injection fitting.
- (3) Install suction tubing between suction (left) side of the detergent pump and the pickup tube provided. Be sure to draw tubing through the end of the pickup tube.

## DRY DETERGENT PLUMBING

For dry powder or solid detergent applications, an auxiliary feeder, such as the Knight Power-Bowl, is required to dissolve the product and deliver it to the washtank. The solenoid on the UP-1100-D will be plumbed into the feeder.

- (1) Follow the installation instructions that came with the Power-Bowl.
- (2) Install copper tubing from a water line to input side of the UP solenoid. Water temperature should never exceed 140° F (60° C).
- (3) Install copper tubing from output side of the UP solenoid to the Power-Bowl.
- (4) Insert a capsule into the Power-Bowl, or fill the reservoir with detergent, depending on the model of Power-Bowl used.

---

## DETERGENT OPERATION

Set the DIP switches according to your application (see page 7 for setting dip switches), the system should then be calibrated for the detergent concentration setpoint.

Before calibrating, remove the pickup tube from the container of chemical (for dry chemical, shut off water source that connects to dry chemical feeder). This prevents chemical from injecting inadvertently during the setup operation.

- (1) Ensuring the dishwasher is off, turn the concentration control adjustment on the circuit board fully counter-clockwise. Set the concentration range to LOW (SWITCH-2 on the 6-position DIP switch in the ON position).
- (2) Determine the degree of water hardness and capacity of wash tank, then fill wash tank with water. Put a pre-determined amount of chemical into wash tank to give proper solution strength for tank capacity, water hardness, soil load, etc. This is the concentration setpoint. Verify the concentration with a titration test kit. Manually add chemical as needed to meet concentration.
- (3) Start the dishwasher's recalculating pump when water reaches operating temperature. The detergent FEED light on the UP-1000 circuit board should be OFF.
- (4) Adjust the concentration control adjustment slowly clockwise until the detergent FEED light starts to blink. If you are able to turn the adjustment to full clockwise without the FEED light blinking, turn the adjustment back to full counter-clockwise. Set the concentration range to HIGH (switch-2 on the DIP switch to the OFF position) and begin turning the adjustment clockwise again until the FEED light blinks.

The rapid blinking light indicates that the unit is in Pulse Feed Mode, and that you are within 15% of the concentration setpoint. Now slowly adjust the concentration adjustment back, counter-clockwise, until the FEED light is OFF. This is your exact concentration setpoint.

NOTE: When the FEED light is OFF, concentration has been achieved. When the FEED light blinks rapidly, the unit is in Pulse Feed Mode, and within 15% of the concentration setpoint. When the FEED light blinks slowly, the unit is in Constant Feed Mode and well below the concentration setpoint.

- (5) Insert chemical pickup tube back in appropriate chemical container (or turn the water supply back on). The unit is now ready to feed chemical.

### ***Alternative Concentration Setup Procedure:***

- (1) Turn the concentration control adjustment clockwise to a setting estimated to be just below your desired concentration setpoint.
- (2) Turn on the dishwasher and let the UP unit feed chemical until the FEED light is OFF.
- (3) Check chemical concentration with a titration test kit.
- (4) Adjust the concentration adjustment clockwise until the appropriate titration is achieved. Only take titration readings when the FEED light is OFF and the unit is not feeding chemical.

---

## SETTING THE DIP SWITCHES

A 6-position DIP switch located on the UP-1000 circuit board configures the system's chemical feed operation. Choose the appropriate settings.

- ❑ **SWITCH 1:** Dishwasher Type
  - ON:** Door
  - OFF:** Conveyor

This switch is used in conjunction with switch 6 to set a time limit for detergent feed to reach the concentration setpoint. If the setpoint is not reached within the time limit, the low chemical level alarm will activate (by flashing a red light on the front of dispenser, and sounding a beeper).

If switch 1 is set to DOOR:  
When switch 6 is OFF, alarm sound is intermittent after 25 seconds, then constant after 50 seconds, of continuous feed. When switch 6 is ON, alarm sound is intermittent after 50 seconds, then constant after 100 seconds, of continuous feed.

If switch 1 is set to CONVEYOR:  
When switch 6 is OFF, alarm sound is intermittent after 84 seconds, then constant after 168 seconds, of continuous feed. When switch 6 is ON, alarm sound is intermittent after 168 seconds, then constant after 336 seconds, of continuous feed.

- ❑ **SWITCH 2:** Concentration Range
  - ON:** Low (1 to 16 drops titration)
  - OFF:** High (11 to 26 drops titration)

Sets the range of control for the system. Drop range shown was derived using a Knight Titration Test Kit with .4 normal hydrochloric acid.

- ❑ **SWITCH 3:** Feed Limit
  - ON:** Detergent Feed Limit
  - OFF:** Over-ride Feed Limit

When switch is ON, detergent feed will stop when alarm sound is constant (switches 1 & 6). When switch is OFF, detergent feed will not stop until concentration setpoint is reached, or power is off.

- ❑ **SWITCH 4:** Alarm Volume
  - ON:** High
  - OFF:** Low

Alarm volume can be further reduced by placing a piece of electrical tape over the alarm opening.

- ❑ **SWITCH 5:** Chemical Type
  - ON:** Liquid
  - OFF:** Dry

This switch sets the optimum pulse feed rate for detergent to quickly achieve and accurately maintain the concentration setpoint. When switch is ON, detergent will feed for 4 seconds, then pause for 1 second, when concentration is close to the setpoint. When switch is OFF, detergent will feed for 1/2 a second, then pause for 2 seconds, when concentration is close to the setpoint.

- ❑ **SWITCH 6:** Feed Time Limit
  - ON:** Long
  - OFF:** Short

See details for switch 1.

---

## **TROUBLESHOOTING**

### **☐ *Power light does not illuminate:***

Check the voltage from the dishwasher. Ensure it is occurring during the correct cycle of operation.

Check the in-line fuse from the dishwasher to the power transformer.

Check the voltage at the transformer. The connection from the dishwasher should match the input voltage connection for the transformer.

Check fuse on the circuit board.

Check input terminals on board for correct input voltage. The Ultra-Pro circuit board operates properly when 24 VAC is applied, refer to the wiring diagram for voltage input terminals.

### **☐ *Pump or solenoid will not activate:***

Check pump output terminals for loose screws and disconnected wires.

Check for proper voltage across motor windings (or solenoid contacts).

Check for obstruction in pump head (or solenoid).

### **☐ *Too much detergent:***

Check the voltage to the system.

Check the concentration adjustment(s) on the control board for the proper setting.

Check the probe in the wash tank for corrosion or foreign particles.

Check for open wires between the probe and the connections to the circuit board barrier.

### **☐ *Too little detergent:***

Check the voltage to the system.

Check the concentration adjustment(s) on the control board for the proper setting.

Check the probe in the wash tank for corrosion or foreign particles.

Check pump operation for proper speed (or check bowl feeder for obstructions).

### **☐ *Pump runs too slowly:***

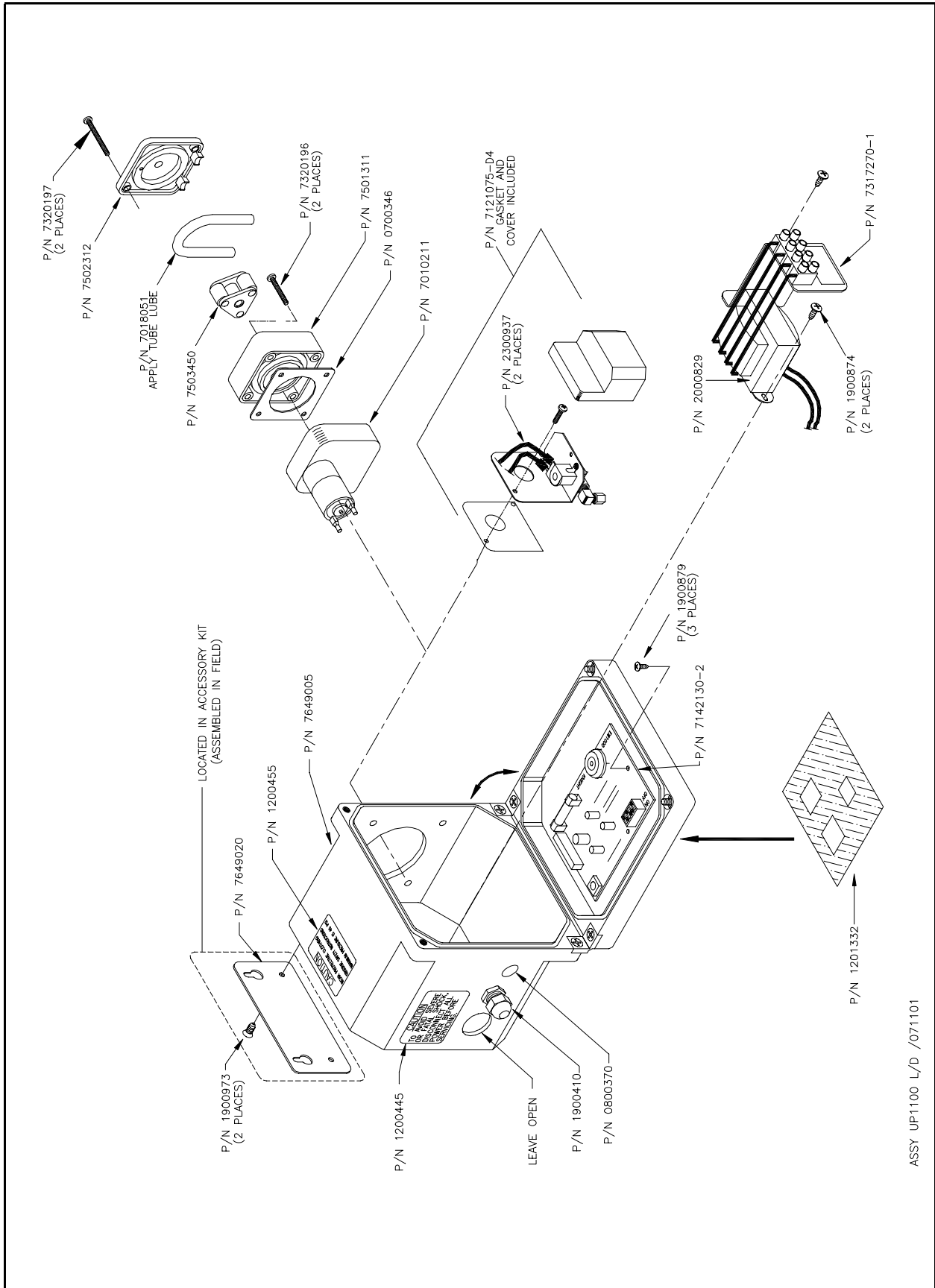
Check roller block for binding.

Check for proper input voltage (24 VDC applied to the pump motor terminals will result in the highest speeds).

Check for lubrication on squeeze tube.

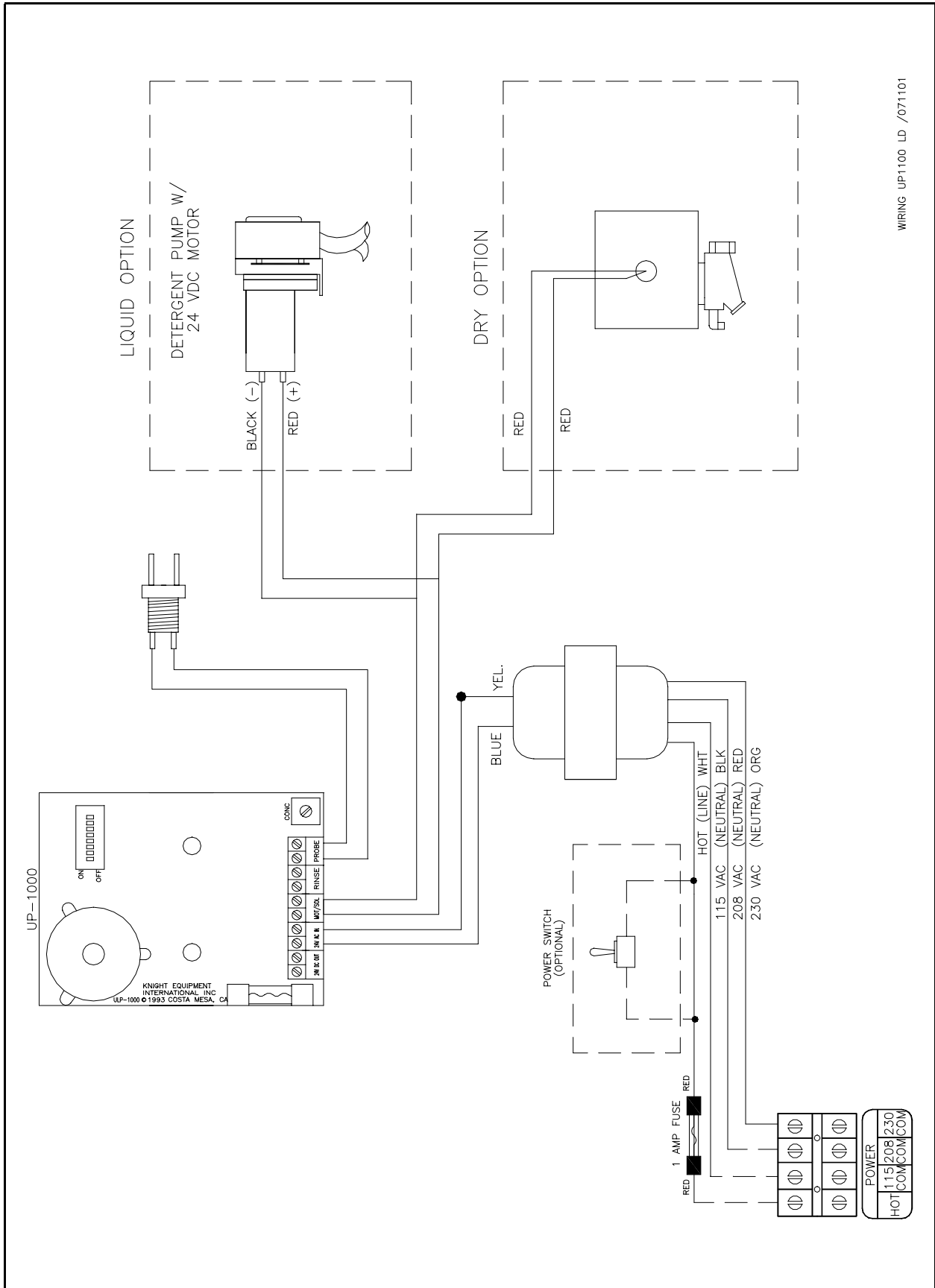


# ASSEMBLY DIAGRAM OF UP-1100-D/L



ASSY UP1100 L/D /071101

# WIRING DIAGRAM OF UP-1100-D/L



WIRING UP1100 LD /071101

---

**NOTES**

---

## **DISCLAIMER**

Knight Inc. does not accept responsibility for the mishandling, misuse, or non-performance of the described items when used for purposes other than those specified in the instructions. For hazardous materials information consult label, MSDS, or Knight Inc.

## **WARRANTY**

All Knight controls and pump systems are warranted against defects in material and workmanship for a period of ONE year. All electronic control boards have a TWO year warranty. Warranty applies only to the replacement or repair of such parts when returned to factory with a Knight Return Authorization (KRA) number, freight prepaid, and found to be defective upon factory authorized inspection. Bearings and pump seals or rubber and synthetic rubber parts such as "O" rings, diaphragms, squeeze tubing, and gaskets are considered expendable and are not covered under warranty. Warranty does not cover liability resulting from performance of this equipment nor the labor to replace this equipment. Product abuse or misuse voids warranty.

### ***KNIGHT INC.*** A Unit of IDEX Corporation

World Headquarters:  
20531 Crescent Bay Dr.  
Lake Forest, CA  
92630-8825 USA  
TEL: (949) 595-4800  
FAX: (949) 595-4801

Atlanta Branch:  
8111 Technology Dr. NE  
Covington, GA  
30014 USA  
TEL: (770) 787-9400  
FAX: (770) 787-1155

Toronto Branch:  
2880 Argentia Road, Unit 6  
Mississauga, Ontario  
L5N 7X8 Canada  
TEL: (905) 542-2333  
FAX: (905) 542-1536

London Branch:  
#15 Brunel Centre  
Newton Road, Crawley  
West Sussex UK RH102UB  
TEL: (44) 1293-615570  
FAX: (44) 1293-615585

Sydney Branch:  
Unit 28, 317-321  
Woodpark Rd., Smithfield  
NSW Australia 2164  
TEL: 61-29-725-2588  
FAX: 61-29-725-2025

Amsterdam Branch:  
Marssteden 68  
7547 TD Enschede  
The Netherlands  
TEL: 31-53-428-58-00  
FAX: 31-53-428-58-09