

THEORY OF OPERATION

The DDS-1000TB Dry Dispensing System is designed to dispense one solid product and liquid bleach into a washer. Each dispenser includes a 24 volt water solenoid, Power Bowl Ultra dry detergent feeder (with vacuum breaker), peristaltic pump, step-down transformer, limit-timer control boards, fully assembled and ready to install.

The DDS-1000TB is designed as a “stand alone” two product dispenser for automatic injection of chemical for on-premise laundry machines. It can be manually activated by the operator using the external dispense switches, or connected to washer supply signals for automatic operation.

The dispenser features two KTM-500 timing modules that include a unique button programmable feed timer and a “Lock-Out” feature that is designed to prevent consecutive dispensing where cost containment and control is required. The KTM-500 also features a delay time function, and a “Relay Mode” which allows for a timed signal from a microprocessor laundry machine to control the feed time.

The DDS-1000TB will start a feed cycle when the Start button is pressed or when the signal input terminals receive an external 14-240 VAC trigger signal.

GETTING STARTED

Be sure to inspect the installation site prior to beginning your installation. It's important that you locate the source for dispenser power and signals as well as hot water. To complete the installation, you may need the following parts:

- Hose “Y” with 3/4" female garden hose thread
- High pressure hose, 3/4" MGHT x 3/4" FGHT
- #10 x 1" sheet-metal screws and wall anchors
- Optional top-mount bracket kit #7600668 is available for top mounting the dispenser on the laundry machine

INSTALLATION

- (1) Mount the DDS-1000TB on the wall in a convenient location for operators to load and unload product containers. The dispenser should be installed above the vertical height of the injection point on the washer.
- (2) To connect the solid detergent feed line, connect the 5/8" ID vinyl injection tubing supplied with the unit to the outlet fitting on the bottom of unit. Cut the discharge tubing to desired length and secure to washer supply inlet point. A 70° elbow barb fitting is supplied for connection to washer.
- (3) If an injection point is not available or desired, the injection tube can be manually placed in the machine each load.
- (4) To connect the bleach pump, insert one end of the 1/4" suction tube into the left side of the squeeze tube in the peristaltic pump. Cut the suction tube to length and insert the other end into the supply container using PVC pipe as a support.
- (5) Insert one end of the discharge tubing into the right side of the squeeze tube in the peristaltic pump. Form an anti-siphon loop (with the loop pointing “down”) with the other end of the discharge tubing and insert the end into the supply pocket of the machine.
- (6) Locate the chemical supply outputs on the washer for each product you wish to dispense. These outputs are used to start the time feed sequence controlled by the internal KTM-500 control boards.
- (7) The dispenser must have constant power in order to feed when the washer signals for chemical. Locate a constant source of power (115/208/230 VAC) and connect to the power input terminals on the primary side of the transformer (see wiring diagram on page 4). Use only approved electrical conduit and connect at bottom of

dispenser using conduit fittings. Always use a voltmeter to check power, and turn power off during installation.

- (8) Connect the water source to the dispenser using a 3/4" male garden hose fitting, or 1/2" FNPT x 1/2" barb brass fitting to nylobraid tubing, or to hard-plumb use 1/2" FNPT x 1/2" sweat (copper) fitting. A 3/4" hose "Y" can be used to plumb the dispenser between the water source and the washer (see diagram on page 5).

Important: Check all local plumbing codes for backflow prevention and water line connection standards. Check with chemical manufacturer for recommended water temperature and optimum pressure.

- (9) To maintain consistent injections, water pressure should be regulated at 25-50 PSI. Water temperature and pressure will determine required dispenser run time.
- (10) Connect the vacuum breaker to the unit using the supplied copper tubes. Tighten compression fittings on the inlet and outlet fittings and check for leaks.

CONNECTING WASHER SUPPLY SIGNAL FOR AUTOMATIC DISPENSING

Locate the chemical supply signals in the washer. Connect the chemical signal common and hot leads to the terminals on the KTM-500 circuit board marked "SIG IN". The KTM-500 circuit board will accept supply signal voltages from 14 to 240 VAC. The supply signal must be a minimum 5 seconds to activate chemical injection.

PROGRAMMING

Run Time: (max run time is 12 minutes and 42 seconds)

- (1) Locate the dip-switch pack on the circuit board — set switch #6 to SIGNAL, set switch #7 to RUN TIME and set switch #8 to PROGRAM MODE.
- (2) Using a measuring cup or flask, press Start switch and release when feed starts. Let the unit feed until desired amount of chemical is dispensed then press Start switch again to stop. The run time is now programmed. Repeat step if new volume is required.
- (3) Set mode switch #8 to RUN MODE.

Delay Time: (max delay time is 12 minutes and 42 seconds)

- (1) Locate the dip-switch pack on the circuit board — set switch #6 to SIGNAL, set switch #7 to DELAY TIME and set switch #8 to PROGRAM MODE.
- (2) Press Start switch and release when the LED begins flashing. When the desired delay time has passed, press the Start switch again. The delay time is now programmed. Repeat step if new delay time is required.
- (3) Set mode switch #8 to RUN MODE.

Lock-Out Time: (max lock-out time is 31 minutes)

This feature defeats consecutive dispensing of product for a pre-determined interval. Select a combination of switches 1 – 5 to program total lock-out time.

Example: For 10 minute lock-out, set switches #2 and #4 to ON with all other switches OFF.

For maximum lock-out (31 min) set all switches ON.

For no lock-out, set all switches OFF.

NOTE: If both KTM-500 circuit boards are connected to each other via the "lockout signal wiring" (L/O SIG terminals) then both boards will be locked out from operation when either one has a lockout time active.

OPERATION

Manual activation: Press the Start button on the cover or on the remote switch box for 1 full second. The KTM-500 will begin counting down the delay time (if used) and will then dispense for the amount of time programmed. Once the lock-out time expires the unit will be ready to restart.

Signal activation: When the signal input on the circuit board receives a 14-240 VAC trigger signal for at least 5 full seconds, the delay time (if used) will begin counting down. Then unit will dispense for the amount of time programmed. Once the lock-out time expires the unit will be ready to restart.

Relay Mode: Set switch #6 to RELAY. The feed will activate for as long as an external trigger signal is present, or for

MULTIPLE UNIT CONNECTION

Connecting multiple DDS-1000 dispensers is quick and easy with the DDS-1000 Connector Kit (Part Number 7600672).

- (1) Align units on the mounting surface side by side and as close together as possible. Kit includes a 15 inch length of $\frac{1}{2}$ " ID Nylobraid tubing. →→→



- (2) Remove $\frac{1}{2}$ " plastic plug from brass "T" on bottom of unit.

- (3) Replace plug with $\frac{1}{2}$ " NPT x $\frac{1}{2}$ " Barb Elbow fitting. Be sure to use plumbing tape or pipe sealing compound to prevent leaks. →→→



- (4) Repeat above procedure for each unit connected.

- (5) Insert plastic plug into $\frac{3}{4}$ " hose adapter on each unit except the unit closest to the water source.

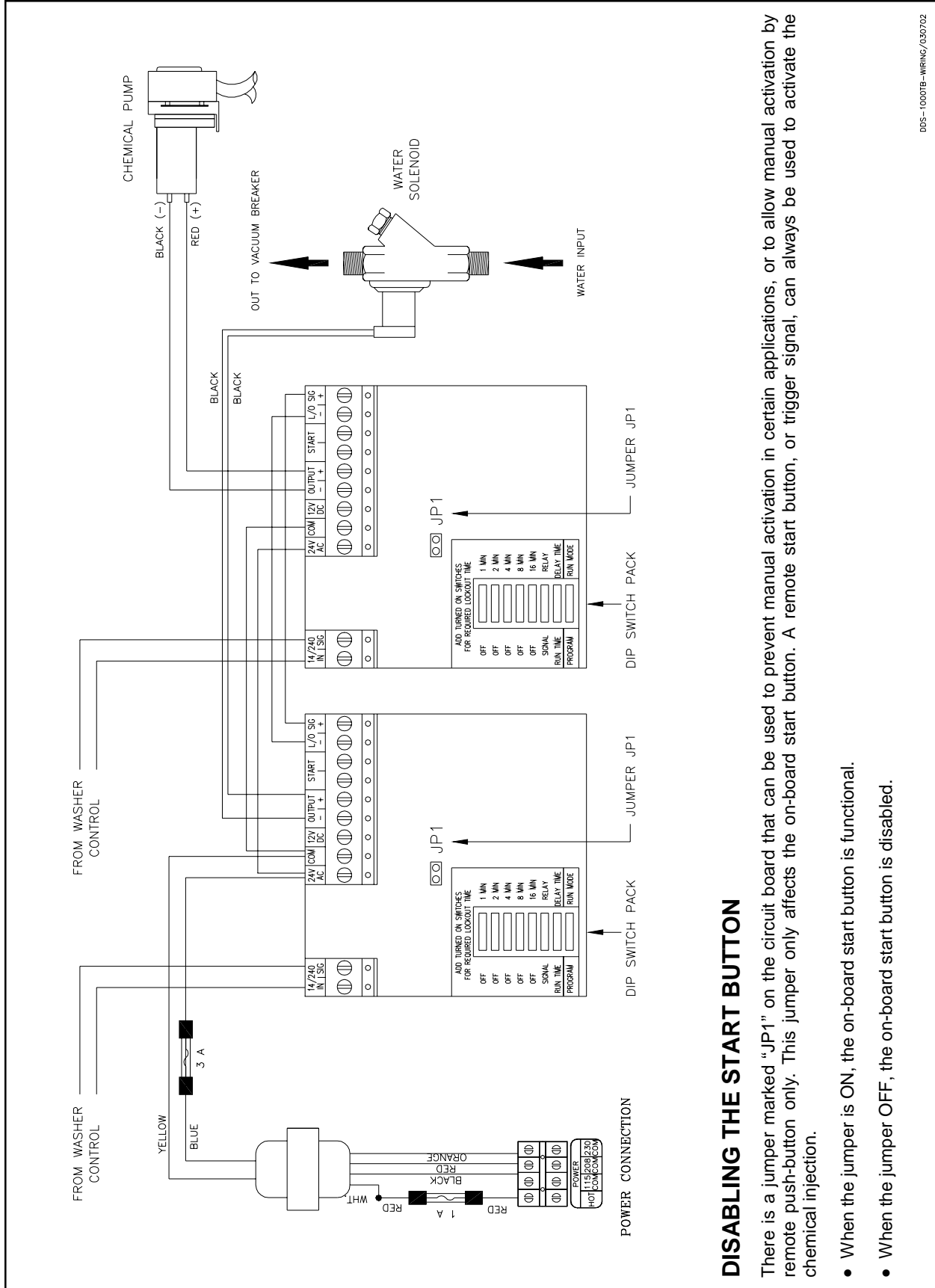
- (6) Connect $\frac{1}{2}$ " Nylobraid tubing to Barb Fittings using stainless steel hose clamps. →→→



- (7) Connect "Source" water supply hose to unit closest to water supply.

- (8) Turn on water supply, press detergent / bleach / softener start buttons and check for leaks.

DDS-1000TB WIRING DIAGRAM



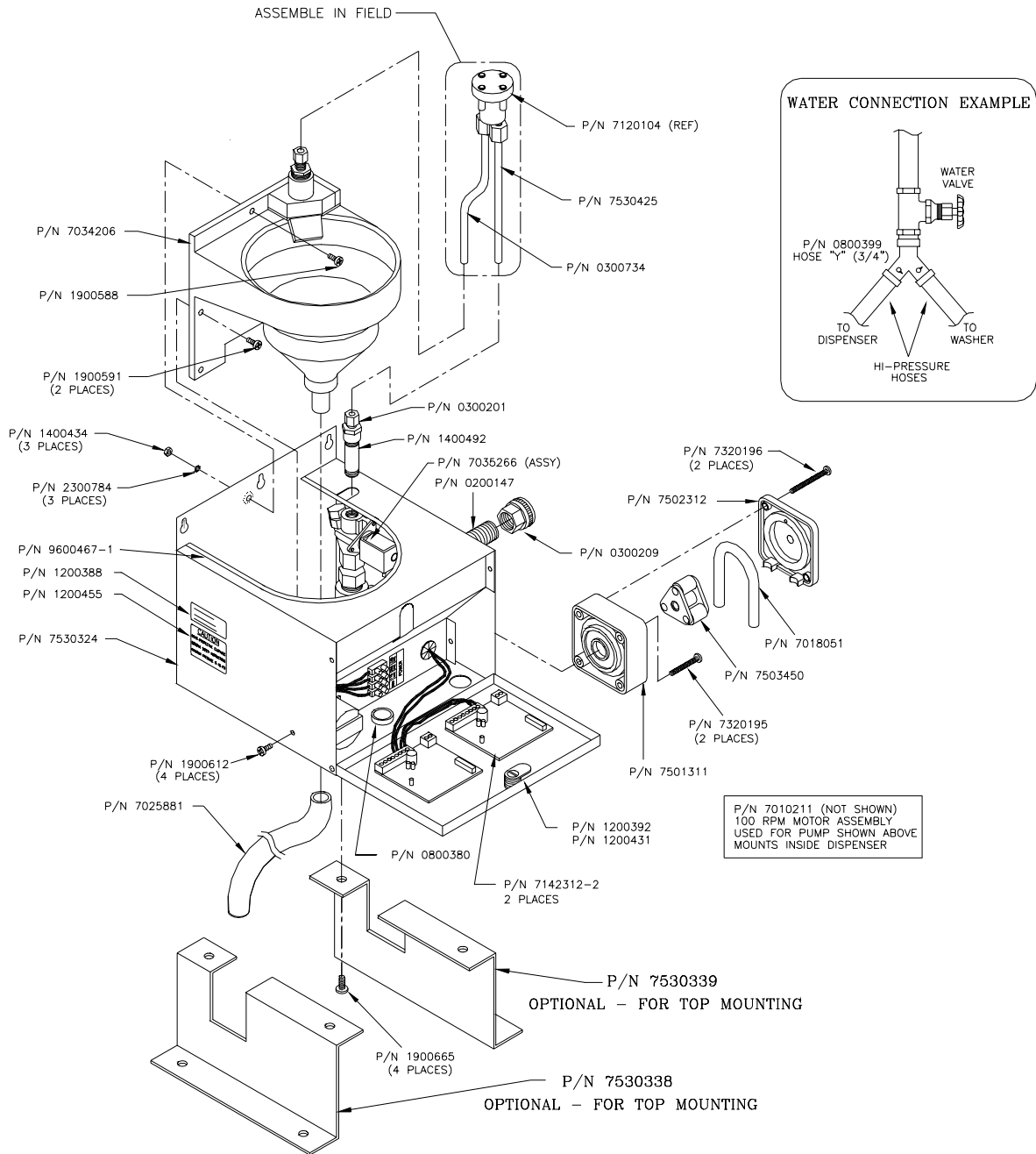
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DISABLING THE START BUTTON

There is a jumper marked "JP1" on the circuit board that can be used to prevent manual activation in certain applications, or to allow manual activation by remote push-button only. This jumper only affects the on-board start button. A remote start button, or trigger signal, can always be used to activate the chemical injection.

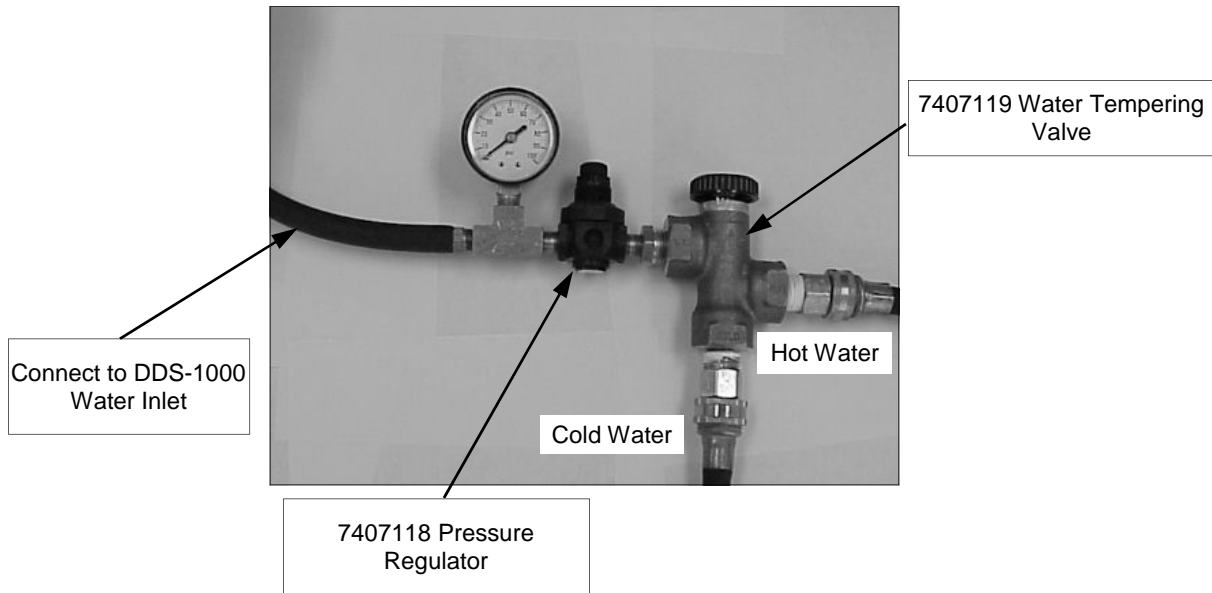
- When the jumper is ON, the on-board start button is functional.
- When the jumper is OFF, the on-board start button is disabled.

DDS-1000TB ASSEMBLY DIAGRAM



OPTIONAL WATER TEMPERING VALVE AND PRESSURE REGULATOR

We recommend the use of a water tempering valve and pressure regulator for optimal dry-feed performance. Connect the tempering valve and pressure regulator before the water inlet of the DDS-1000 (see illustration below). The tempering valve will allow the water temperature to be increased or decreased by turning the adjustment dial. The adjustment range is 120° to 160° F. The pressure regulator will regulate the water pressure from 0 to 60 PSI. Most manufacturers recommend pressure of 18-25 PSI (1.2 – 1.7 BAR) at a temperature of 120°-135° F (48°-57° C).



Pressure gauge assembly can be purchased at your local hardware store (see parts list below)

- 1 - 1/2" MNPT x 1/4" Brass Reducer
- 1 - 1/4" Pressure Gauge
- 2 - 1/4" Brass Close Nipple
- 1 - 1/4" MNPT x 3/8" Barb
- 1 - 1/4" FPT Brass Tee

OPERATION

Insert a chemical capsule into the bowl of the DDS-1000. Run a few test cycles and inspect the operation of both the washer and DDS-1000 to ensure proper chemical feed is achieved. Check all plumbing for leaks.

CALIBRATION OF SOLID DETERGENTS

As general rule of thumb program 10 seconds of run time for one ounce (28.3 grams) of detergent. For 2 ounces (56.7 grams) set the run time for 20 seconds. First weigh the capsule (electronic scale may be needed) then start or signal the dispenser. Weigh the capsule again after the run time is completed to calculate amount dispensed. Run the capsule 2 or 3 times to see if the amount is consistent.

TROUBLESHOOTING

Water leaking from inlet fittings

- Check for proper connection at fittings.
- Check for holes or splits on plumbing lines.

Chemical is not feeding

- Check washer signal for proper operation.
- Check to see if solenoid is opening properly.
- Check to see if water supply is on.
- Check inside of vacuum breaker for any debris or blockage.
- Check for proper water pressure.
- Check operation of Power Bowl Ultra water valve.
- Check operation of Power Bowl Ultra spray-jet.

Concentration too high or too low

- Check water temperature. Consult with solid chemical manufacturer for recommended temperature.
- Check water supply for fluctuations in pressure.
- Check feed time of control and adjust as needed.

Power Bowl Ultra is over-flowing

- Output hose is blocked, or plugged up.
- The end of the output hose is above the mounting height of the DDS-1000.

DISCLAIMER

Knight LLC 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 LLC. Knight products are not for use in potentially explosive environments. Any use of our equipment in such an environment is at the risk of the user, Knight does not accept any liability in such circumstances.

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.

FOOTNOTE

The information and specifications included in this publication were in effect at the time of approval for printing. Knight, LLC reserves the right, however, to discontinue or change specifications or design at any time without notice and without incurring any obligation whatsoever.

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