
KNIGHT
IDEX
IDEX CORPORATION



**UniTech Warewash
Instruction Manual**

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CAUTION: Wear protective clothing and eyewear when dispensing chemicals or other materials. Observe safety handling instructions (MSDS) of chemical mfrs.



CAUTION: To avoid severe or fatal shock, always disconnect main power when servicing the unit.



CAUTION: When installing any equipment, ensure that all national and local safety, electrical, and plumbing codes are met.

SPECIFICATIONS

Parameters	Default Value	Range
❶ Pass Code	0000	0 – 9, A – Z
Language	English	English, Spanish, French, German, Dutch, Italian
Rinse Pump Speed	50%	0%-100% (of full speed)
Rinse Limit	60	0 – 60 sec
Rinse Delay	0 sec	0 – 60 sec
Machine Type	DOOR	DOOR/CONVEYOR
Rack Time	10 sec	10 – 255 sec
Detergent Mode	Probe	Probe/Probeless
Detergent Type	Liquid	Liquid / Dry / Small Tank
Detergent Speed	100%	100% (always runs at full speed)
Detergent Concentration	25	0 — 100 Knight units
Alarm Delay	180 sec	0 – 512 sec
Sani Pump Runs With	Rinse	Rinse/Detergent
Sani Pump Speed	50%	0%-100% (of full speed)
Initial Detergent Charge	1 sec	1 — 64 sec (Door Mode) 1 — 128 sec (Conveyor Mode)
Detergent Recharge Time	1 sec	0 – 255 sec
❷ Rack Count	0	0 – 65536
Recharge after n Racks	1	1 – 99
Det Feed Limit	Off	On/Off

- ❶ Pass code does not change when clearing all programmed settings
- ❷ Rack count has its own menu to allow resetting back to zero

SAFETY SYMBOL EXPLANATIONS

Listed below are explanations of the safety symbols that appear either on the unit, in the instruction manual, or both. Please familiarize yourself with the meaning of each symbol.



GENERAL CAUTION: This symbol indicates a general safety caution.



SHOCK HAZARD: This symbol indicates that hazardous voltages are inside the enclosure.



READ MANUAL: This symbol indicates to read the manual for important instructions and procedures related to safety.

PRE-INSTALLATION

Check all applicable plumbing and electrical codes before installation. This will help to ensure that the system is installed in safe and suitable manner. A wiring schematic of the dishwasher is useful. This is provided by the dishwasher manufacturer or may be on the machine itself.

Plan to mount the unit on a nearby wall. Try to keep the unit within three feet from the final rinse line to avoid long tubing runs. Do not mount the unit in the direct path of steam. This can short-circuit and permanently damage the unit. Mounting the unit on the side, on the back, or on the vents of the dishwasher may cause thermal overload and damage the performance of the unit.

If you are going to add a sanitizer pump (optional) to a two-product system, then it should be attached to the unit prior to installation (see page 14).

Before beginning the installation, make sure you have the following tools and materials ready...

- Flat and Phillips screwdrivers. One screwdriver needs to have a long (20 cm) shank to reach the bottom mounting screw on the dispenser.
- Drill and drill bits.
- 18 gauge wire for power, signals, and probe (check local codes).
- Wire cutters, wire strippers, and pliers.
- Wire terminal connectors and a crimping tool.
- Voltmeter (or multi-meter).
- Dry wall inserts and mounting screws.
- Electrical tape.
- Titration kit.
- Dispenser accessory kit.

INSTALLATION — MOUNTING

(1) Remove existing dispenser, if any.



(2) Use the mounting bracket to mark where the holes need to be drilled. Drill the three holes.



(3) Press in the dry wall anchors and mount the bracket.



(4) Hang the dispenser and mark where the bottom hole goes.



(5) Drill last hole and press in final dry wall insert. Do not install the unit on the wall yet.

INSTALLATION — ELECTRICAL

Review the wiring diagrams on pages 20 - 22 to familiarize yourself with the wiring connections that apply to the UniTech model you have.

Important note for pre-wired units: These models have color coded wires for power, signals, and probe. Be sure to use the correct wires for the following electrical connections. The transformer connections in these models are pre-wired for 230V (as shown in the wiring diagrams). **This must be changed inside the unit prior to installation for 115V or 208V applications! European models will always be 230V only!**

Make sure that all power is off to the dishmachine. Open the cover and locate an appropriate source for the wash pump and rinse pump signals, plus a main power source (for single transformer units). Consult the wiring diagram for the dishmachine, if available.



Main Power

A main power connection only applies to single transformer systems (typical). Disregard this section for dual transformer systems.

Connect leads to a 115, 208, or 230 VAC power source that is "on" when the dishmachine is "on." This will provide power for both detergent and rinse however, UniTech will only pump chemical when electrically signaled. Whenever possible, use the dishmachine's ON/OFF switch as the main power source. Avoid using the dishmachine's washpump motor as main power.

Detergent Signal

A detergent signal is required to either activate the detergent probe sensing operation, or to trigger probeless initial charge. A detergent signal is not normally required when using probeless/door mode, as the rinse signal is typically used to trigger initial charge.

Check the dishwasher for a power source that is active during the wash cycle only, for example, the magnetic contactor that controls the wash pump motor.

- Single transformer: Connect leads to the detergent signal source. Signal voltage range is 14 - 240 VAC.
- Dual transformer: Connect leads to the detergent power source (must be 115, 208, or 230 VAC).

Rinse Signal

In addition to running the rinse pump, the rinse power signal triggers detergent recharge injection if probeless mode is selected. The rinse signal can also be used to trigger the detergent initial charge if using probeless/door mode.

Check the dishwasher for a power source that is active during the rinse cycle only, for example, the rinse solenoid or rinse cycle light.

- Single transformer: Connect leads to the rinse signal source. Signal voltage range is 14 - 240 VAC.
- Dual transformer: Connect leads to the rinse power source (must be 115, 208, or 230 VAC).

Probe Installation (if required)

Drain the dishmachine if necessary. Install the probe per the following steps, or replace any existing probe (if there is one). Use new probe wire in either case.

- (1) Install the probe in the wash tank below the water level. It should be away from incoming water supplies, near the recirculating pump intake, and 3 to 4 inches from corners, heating elements, or the bottom of the tank. If an existing mounting hole cannot be located, cut or punch a 7/8" hole.
- (2) Use 18 AWG multi-stranded copper wire for the probe connection. Avoid running the wire near high voltage AC lines. Do not route probe wires through the same conduit as power and signals.
- (3) Connect leads to the probe. Ring-type terminals are recommended (be sure to connect them to the probe terminals with "backing" nuts to prevent the probe tips from being pulled out of the probe). The ring terminals should be secured between the inner (backing) nuts and outer nuts.



Connecting Power/Signals & Probe to UniTech

Steps 1 - 6 pertain to typical installations, where final electrical connections must be completed inside the UniTech dispenser. Disregard steps 1 - 6 for models that are "pre-wired".

- (1) Ensure that all power sources are turned off before proceeding with the following steps.
- (2) Pull the power and signal wires through the conduit. Do not route probe wires through the same conduit.



- (3) Remove the rinse pump from the left side of the dispenser to make room. Remove knockout plug for the conduit by twisting with pliers. Remove knockout plug for the probe wires. Install wire grommet for probe wires.



- (4) Pull wires through the pump case and into the control box. Loosen the end of the conduit so that the male piece can freely rotate. Clearance is tight in the pump case, and you cannot easily rotate the conduit nut. Instead, hold the conduit nut with a wrench and rotate the male piece to tighten.



- (5) Disconnect the wiring harnesses to gain easier access to the wiring terminal strip. The terminal strip panel can be removed by loosening one screw (panel is slotted, therefore the screw does not need to be removed). Slide the panel off the screw and lift out to access. Strip the wires for power, signal, and probe (if used) to 1/4" bare ends and attach to the appropriate terminals on the strip. See wiring diagrams (pages 20 - 22) for further reference.



- (6) Re-attach the terminal strip and tighten the screw. Re-connect all wiring harnesses. Replace rinse pump and attach faceplate.



- (7) When all electrical wiring connections have been performed, it will be time to hang the dispenser on the wall. Install the final screw at the bottom of the dispenser. Use a long shank screwdriver to reach it.



INSTALLATION — PLUMBING

Rinse & Sanitizer Plumbing

The following installation steps apply for rinse and sanitizer pumps alike.

- (1) Install the provided 1/4" tube x 1/8" NPT injection fitting into the side or bottom of the dishwasher rinse line between the rinse solenoid valves and the rinse jets. If necessary, drill a 1 1/32" hole and tap to 1/8" NPT. Use of a saddle clamp may be desired on copper rinse line for better support.
- (2) Cut a suitable length of 1/4" OD poly tubing and connect between the discharge (right) side of the pump's squeeze tube and the injection fitting.
- (3) Cut a suitable length of 1/4" OD poly tubing and connect between the suction (left) side of the pump's squeeze tube and the pickup tube provided. Be sure to draw tubing through the end of the pickup tube.
- (4) Hand-tighten the compression nuts on both the injection fitting and pickup tube. Plastic ties can be used to cinch around the connections where the poly tubing is inserted into the pump's squeeze tube.

Liquid Detergent Plumbing

- (1) Install the provided bulkhead fitting through a wall of the wash tank (above water level). If an existing mounting hole cannot be located, cut or punch a 7/8" hole.
- (2) Cut a suitable length of 1/4" OD poly tubing and connect between the discharge (right) side of the detergent pump's squeeze tube and the bulkhead fitting.
- (3) Cut a suitable length of 1/4" OD poly tubing and connect between the suction (left) side of the detergent pump's squeeze tube and the pickup tube provided. Be sure to draw tubing through the end of the pickup tube.
- (4) Hand-tighten the compression nuts on both the bulkhead fitting and pickup tube. Plastic ties can be used to cinch around the connections where the poly tubing is inserted into the pump's squeeze tube.

Dry Detergent Plumbing

- (1) A powder or solid type feeder (not provided) should be used for dispensing dry detergent products. Follow the instructions included with the detergent feeder for installation, and recommended water temperature/pressure.
- (2) Cut a suitable length of 1/4" OD copper tubing (not provided) and connect between the input side of the water solenoid and the water source. Maximum recommended water temperature is 140°F (60°C).
- (3) Cut a suitable length of 1/4" OD copper tubing (not provided) and connect between the output of water solenoid to a powder or solid detergent feeder.
- (4) Carefully tighten the compression nuts on the water solenoid — over tightening may cause solenoid to leak. Tighten connections to the water source and detergent feeder as needed.

NOTE: If there is an existing dispenser that uses dry detergent, examine the power bowl. Make sure it is not clogged and that the spray pressure is sufficient to dissolve solid/powder products efficiently. Make sure the water source is hot water. If necessary, tap into a hot water line for a new source.



OPERATION

Detergent — Probe Mode

With the detergent signal “on”, the conductivity probe senses detergent concentration. When concentration drops below the setpoint, the control automatically turns on detergent feed. As the detergent feeds, the control senses the rate at which the detergent concentration is approaching the setpoint. The control then begins to pulse feeds to prevent over-use of chemical. The pulse feed rate will depend on how fast the setpoint is being approached.

The detergent alarm will sound if the setpoint is not reached within the alarm delay time period. The alarm can be temporarily silenced. A “feed limit” feature allows you to set the unit to automatically shut off the detergent feed when the alarm has been activated.

Detergent — Probeless Mode

Controls detergent concentration without a probe, based on timed detergent feed modes. Initial charge time feeds detergent to bring the dishmachine to working concentration when initially filled with water. The initial charge can be activated by a detergent signal, or by the rinse signal (of 30 seconds duration, or longer) when using door mode. The initial charge counter will increment for each activation.

Recharge time feeds detergent to maintain detergent concentration as rinse water dilutes the dishmachine. The recharge is triggered after a specified number of racks passes through the machine.

Rinse Pump

The rinse pump will operate whenever the rinse signal is energized. The rinse delay feature will postpone the activation of the rinse pump until the delay time has expired. The rinse limit shuts down the rinse pump after the signal has been present for a selected time. Rinse delay and rinse limit are functional with door machines only.

Sanitizer Pump

A menu selection sets the sanitizer pump to operate with detergent feed, or with rinse feed. The sanitizer pump will run simultaneously with detergent or rinse, whether using probe or probeless mode, rinse delay or rinse limit.

BUTTON FUNCTIONS

- **ENTER:** Holding the enter button for 3 seconds (approx.) switches between run and program modes. Enter also advances through programming menus.
- **SCROLL:** The scroll button moves the position of the cursor in menus where text or number changes are done. The scroll button will “wrap around” at the end of a line of characters, meaning that the cursor will advance to the beginning of the line automatically. The scroll button toggles between choices in menus that have selectable settings. The scroll button also shows the rack count and initial charge count during normal operation.
- **UP (↑):** Increases numeric values or advances upward through available characters. Hold the button down to rapidly advance. The UP button also acts as rinse prime during normal operation.
- **DOWN (↓):** Decreases numeric values or advances downward through available characters. Hold the button down to rapidly advance. The DOWN button also acts as sanitizer prime during normal operation.

De-lime Mode

During normal operation, hold the SCROLL and DOWN buttons simultaneously for 1 full second. When “De-Lime Mode” appears on the display, all chemical feed of the UniTech will be halted. Press the SCROLL and DOWN buttons again, or cycle main power to the unit, to exit the de-lime mode. Otherwise, the unit will automatically exit de-lime mode after 10 minutes.

Alarm Mute

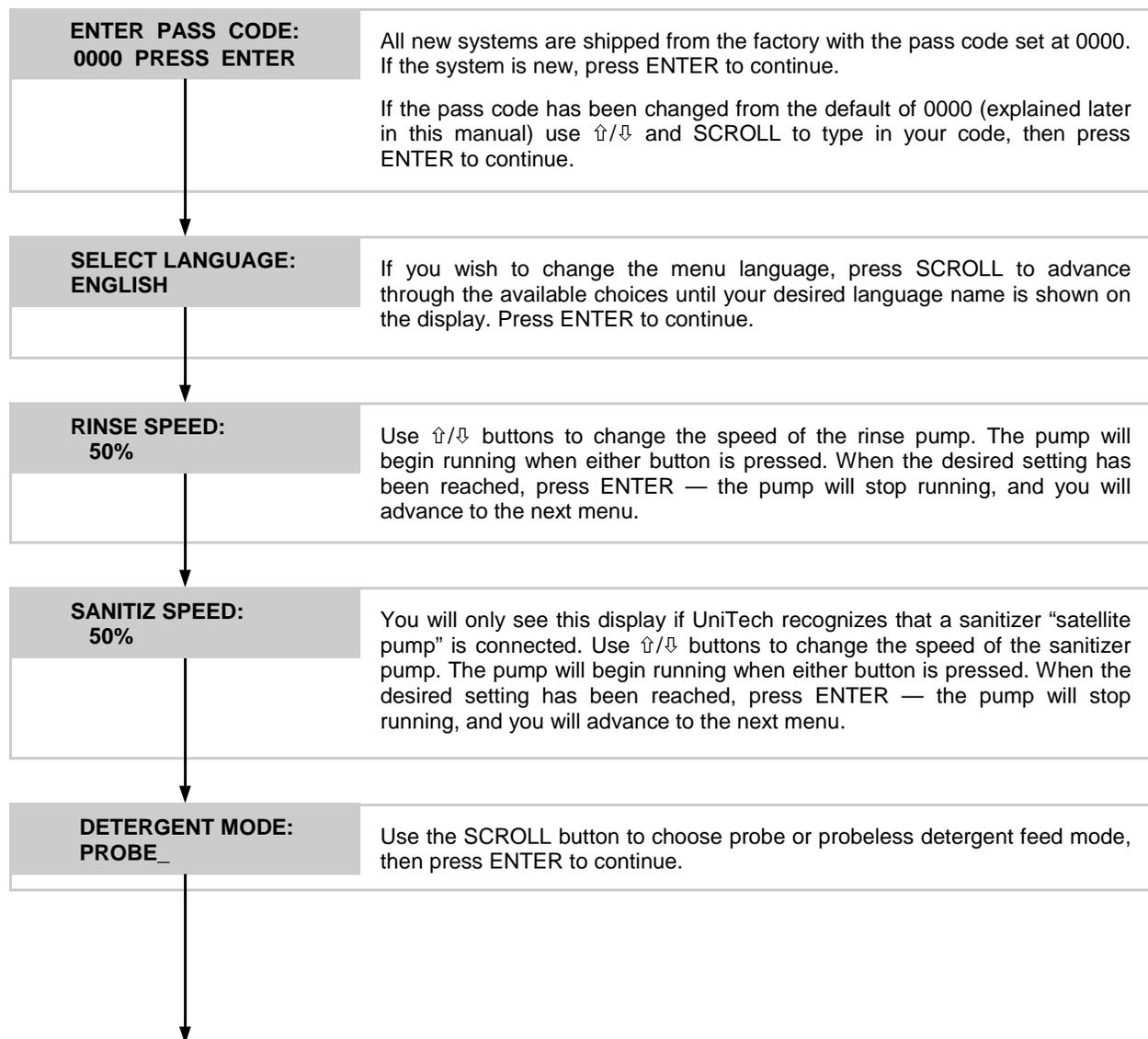
During normal operation, the low detergent alarm (probe mode) can be silenced by pressing the SCROLL and UP buttons simultaneously for 1 full second. The display will show “Alarm Muted” and the audio alarm will turn off for 5 minutes.

PROGRAMMING

You may find it helpful to read through the programming instructions before getting started. This will better familiarize you with the operation of the UniTech, and will make the actual programming go much quicker. Be aware of the following notes.

- If you wish to return to normal operating mode at any point during programming, hold down the ENTER button for 3 seconds to exit the programming mode.
- While programming, if no buttons are pressed for approximately 2 minutes, UniTech will automatically return to normal operating mode.
- Programming changes can be made while UniTech is operating — changes will take effect immediately. This allows you to make minor adjustments “on-the-fly” and fine tune the performance of your system.

When you're ready to get started, hold down the ENTER button for about 3 seconds to go into the programming mode. Release the button when you see the following display...



Continue on next page

- If you chose to use PROBE mode, you will see the following menu...

**DETER CONCEN:
25 KNIGHT UNITS**

Detergent concentration is set in Knight Units. A chart is provided on page 13 to show the relationship between Knight Units and drops of titration. Use the chart to determine the number of Knight Units needed for your desired titration.

Use \uparrow/\downarrow to choose from 0 to 100 Knight Units, then press ENTER to continue.

**DISPLAY DET CONC
ON_**

This setting allows you to choose if you wish to see the actual concentration reading on the display during normal operation. Use SCROLL to turn the concentration display on or off, then press ENTER to continue.

**ALARM DELAY:
180 SEC**

Alarm delay is a time frame that the detergent setpoint is expected to be reached within. If the detergent setpoint is not achieved within the set time, the alarm will sound intermittently until the problem is resolved or power is cycled.

For door machines, this setting should be calibrated to 5 – 10 seconds shorter than the washcycle. For conveyor machines, should be slightly longer than the time it takes for the unit to achieve the setpoint with a fresh tank of water.

Use \uparrow/\downarrow to choose from 0 to 512 seconds, then press ENTER to continue.

**DETER FEED LIMIT
OFF_**

Detergent feed limit works in conjunction with alarm delay. When this feature is “on”, and the detergent setpoint is not reached within twice the alarm delay, the alarm will become continuous and detergent feed will be halted until the problem is resolved or power is cycled.

Use SCROLL to turn the feed limit on or off, then press ENTER to continue.

- If you chose to use PROBELESS mode, you will see the following menu...

**INIT DET CHARGE:
01 SEC**

The initial charge feeds detergent to achieve working concentration when the dishmachine is initially filled with a fresh tank of water. The available timing range depends on whether door or conveyor mode is selected:

DOOR: 1 to 64 seconds
CONVEYOR: 1 to 128 seconds

Use \uparrow/\downarrow to set the initial charge time, then press ENTER to continue.

**DET RECHARG TIME
01 SEC**

The recharge feeds detergent to maintain the working concentration as rinse water dilutes the dishmachine. The available timing range is 0 to 255 seconds.

Use \uparrow/\downarrow to set the recharge time, then press ENTER to continue.

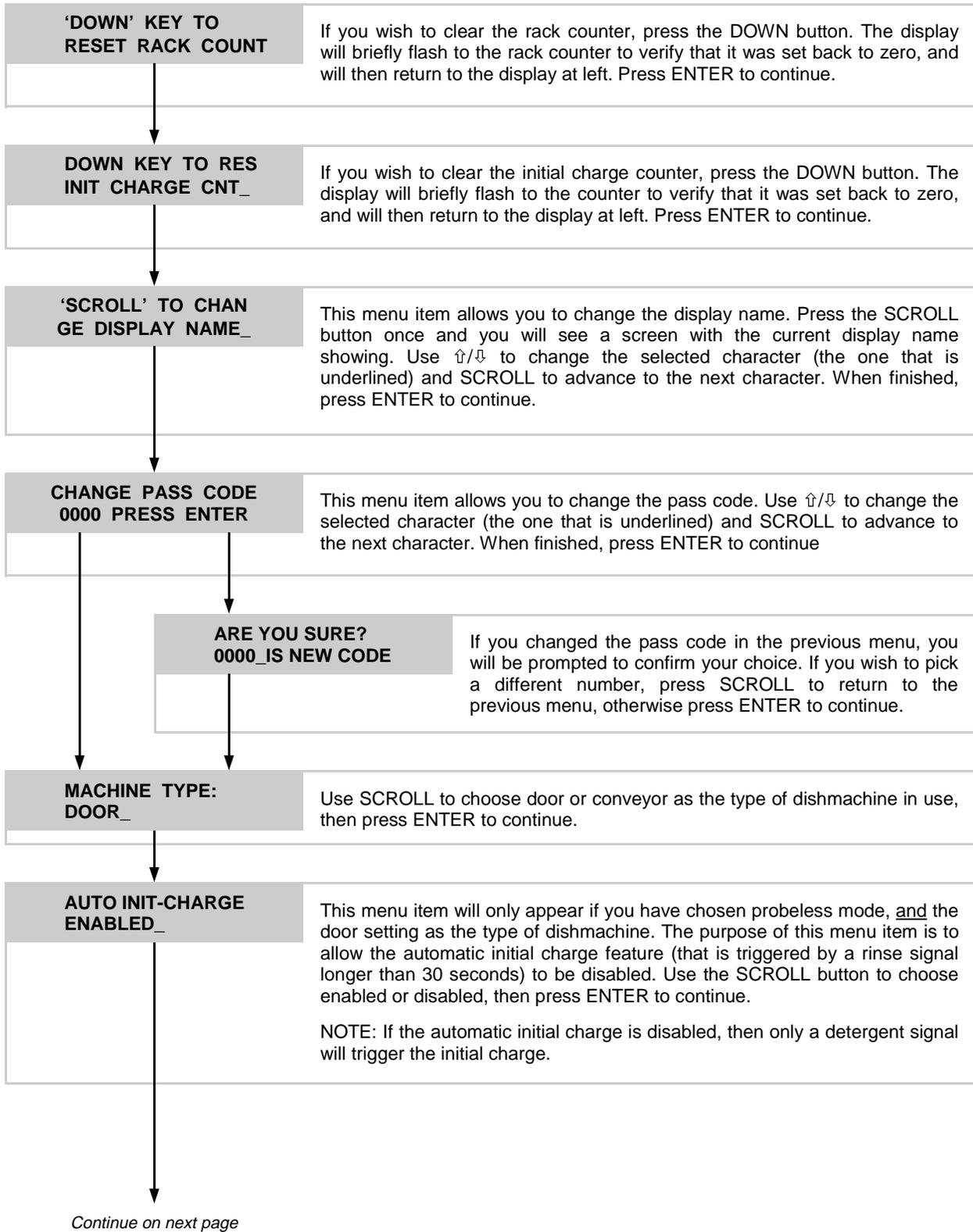
**RECHARGE AFTER
01 RACKS**

This setting allows you to choose how many racks will be counted before triggering the recharge feed. The range is 1 to 99 racks.

Use \uparrow/\downarrow to set recharge rack count, then press ENTER to continue.

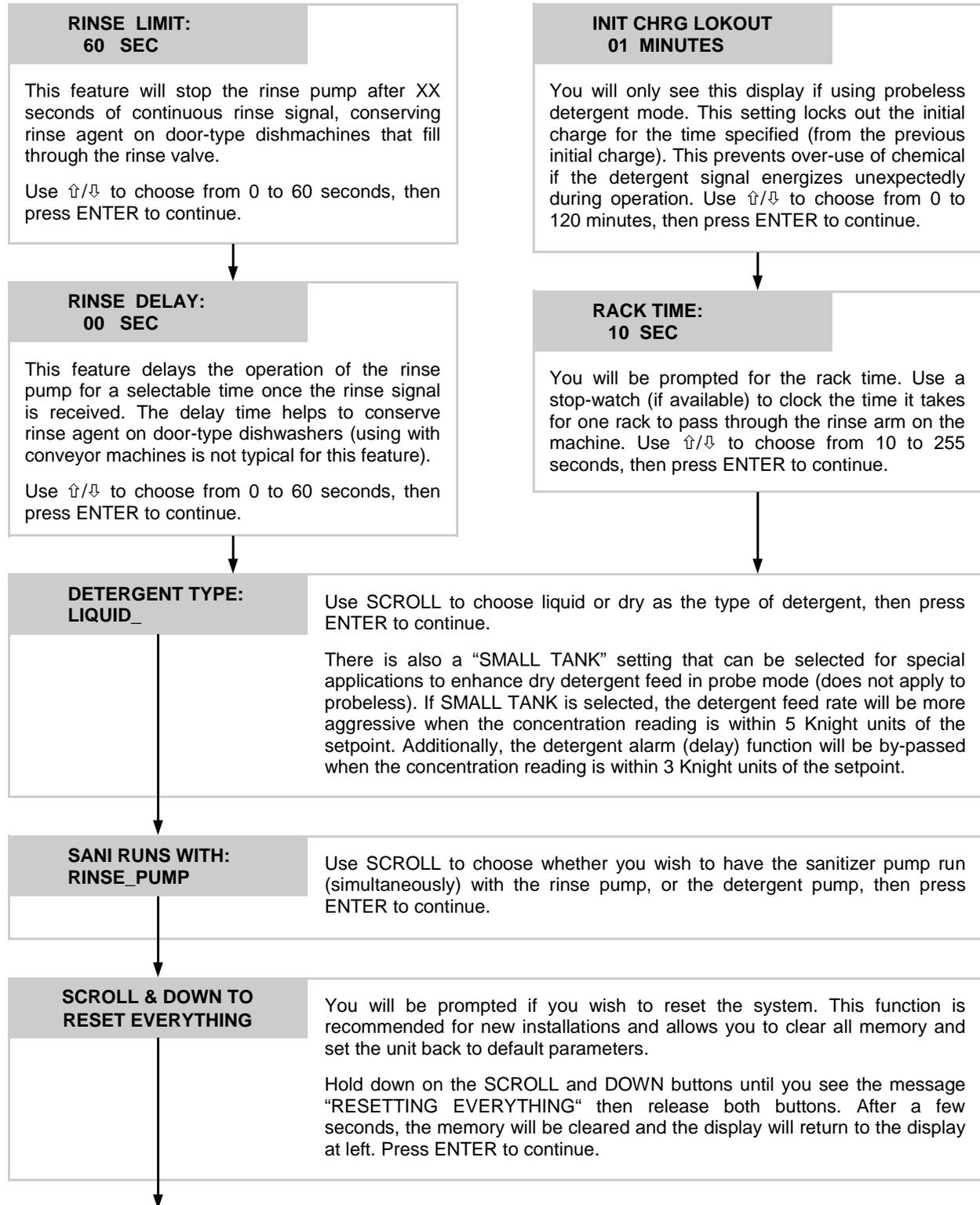
NOTE: Ensure that this setting is for 1 rack if using a two-transformer unit on a door machine.

Continue on next page



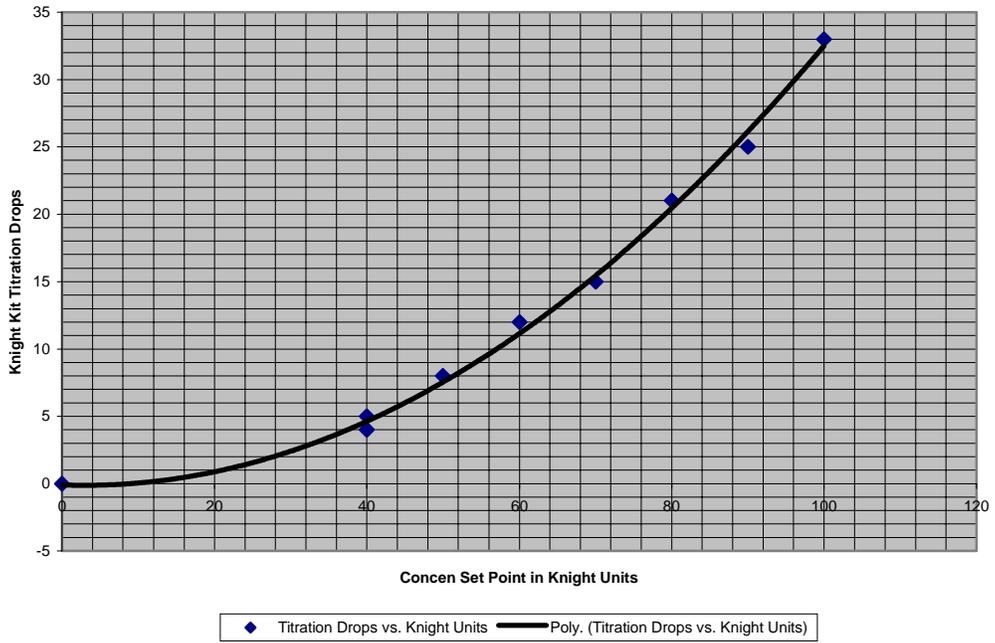
- If you chose DOOR as machine type, you will see the following menu...

- If you chose CONVEYOR as machine type, you will see the following menu...

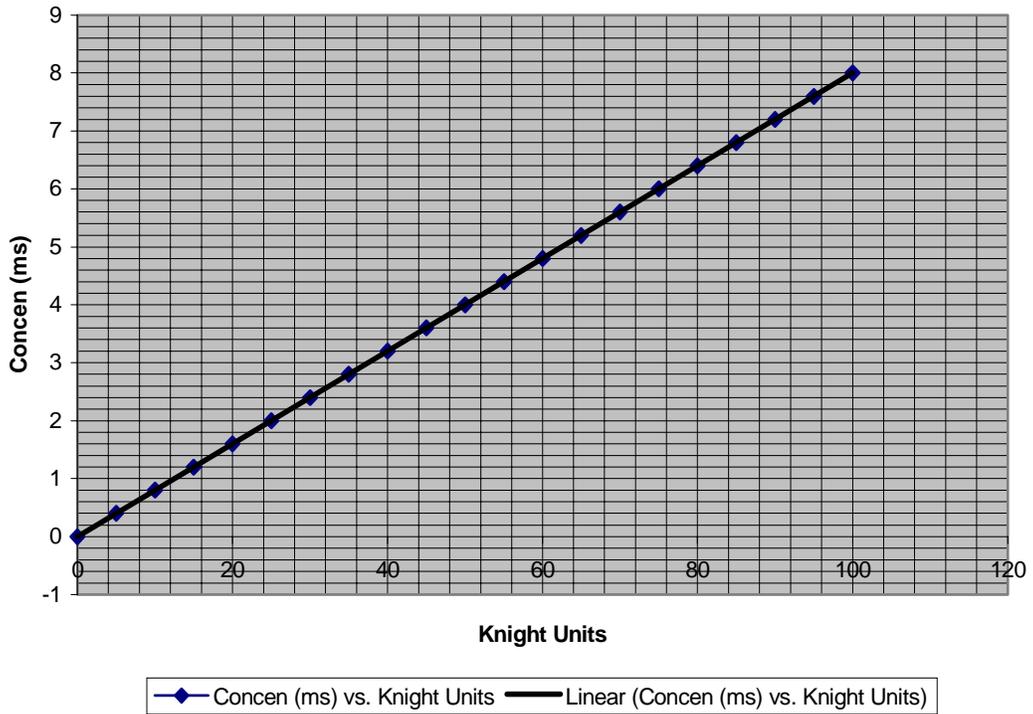


Wrap around to first menu item

UniTech Titration Drops vs. Knight Units



UniTech Det Concen(ms) vs. Knight Units



ADDING A SANITIZER PUMP

Adding an optional sanitizer pump to an existing 2-product system requires just a few simple steps. The sanitizer pump is normally mounted on the right side (as you face the unit) of the UniTech dispenser, however can be mounted on the left side if necessary.

- (1) Turn the unit over and lie it down, preferably on a smooth surface that won't scratch the display.
- (2) Remove the cover on the right-hand side of the unit by gently prying it up with a flat screwdriver tip.



- (3) Line up the sanitizer pump in the slot on the UniTech. Ensure the 4-pin (bus) connectors are aligned and slowly slide the pump into place.



- (4) Insert the two provided screws and tighten.



- (5) Set the DIP switches (back of sani pump) so that switch #1 is ON and all other switches are OFF.



- (6) Process complete! Now ready for mounting.



Display Shown on Power Up

When the UniTech dispenser is powered up for the first time after adding a sanitizer pump, the system will automatically check for new devices and the following display will appear.

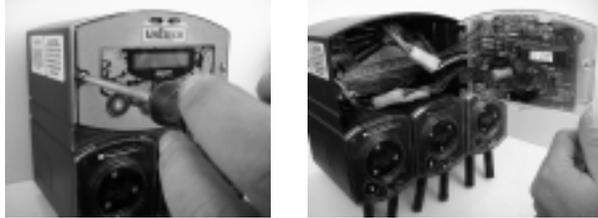
**500 PMP Found
Device #1 = Sani**

This display shows that UniTech has recognized the sanitizer pump connected to the bus. The #1 indication simply means that this is the first "satellite" pump added to the unit. This message will appear briefly, then the system will automatically advance on to the normal display.

NOTE: A sanitizer pump is the only satellite pump that can be added to a UniTech warewash unit.

CHANGING THE CIRCUIT BOARD

- (1) Ensure that power to the unit is off.
- (2) Loosen the two screws and swing the cover open.



- (3) Remove mounting screw from the center of the circuit board. Disconnect wiring harnesses and all remaining wires that attach the circuit board to the terminal strip. Note the location of wires for later.



- (4) Gently push up on the two upper mounting tabs while pulling the circuit board away from the cover. Once the top is loose, the bottom will pull away freely from the lower tabs.



- (5) Replace with new circuit board and carefully line up the buttons and LED's with the holes on the cover. Snap the board into place on the upper and lower mounting tabs. Set the jumpers per table below.



- (6) Re-connect all wires to the terminal strip (that were disconnected in step 3) and re-connect the wiring harnesses. Replace the mounting screw.



- (7) Carefully tuck all wires in while closing the cover. Tighten the cover screws.

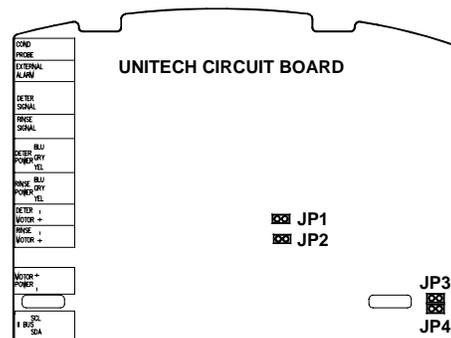


- (8) Process complete! Now ready to be powered up.

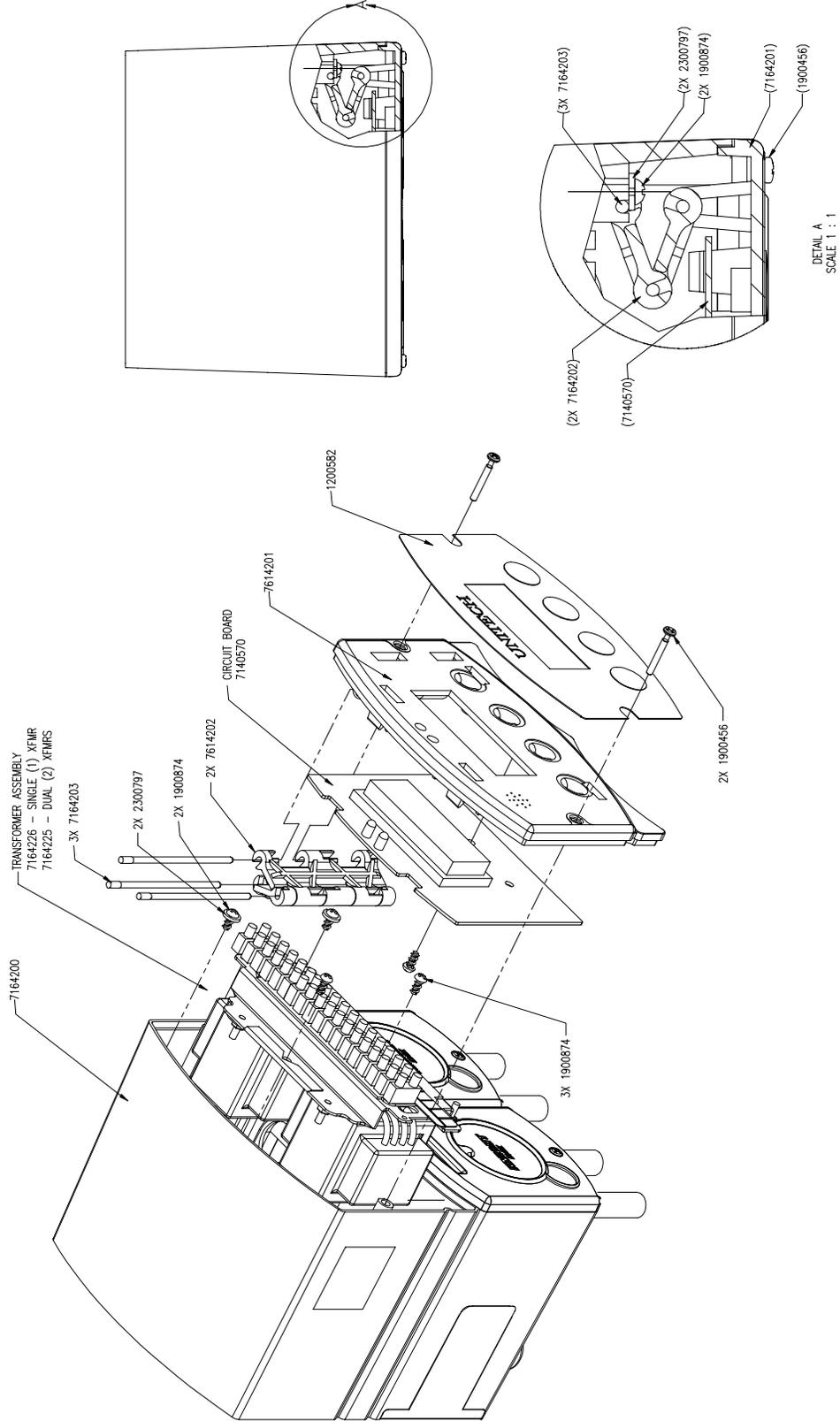
Jumper Settings

The circuit board has shunt jumpers that must be set according to the transformer configuration of your UniTech system (diagram to the right shows jumper locations). This is particularly important when changing circuit boards so the new board will work correctly.

Transformers	JP1	JP2	JP3	JP4
Single (1) xfmr	OFF	OFF	ON	ON
Dual (2) xfms	ON	ON	OFF	OFF



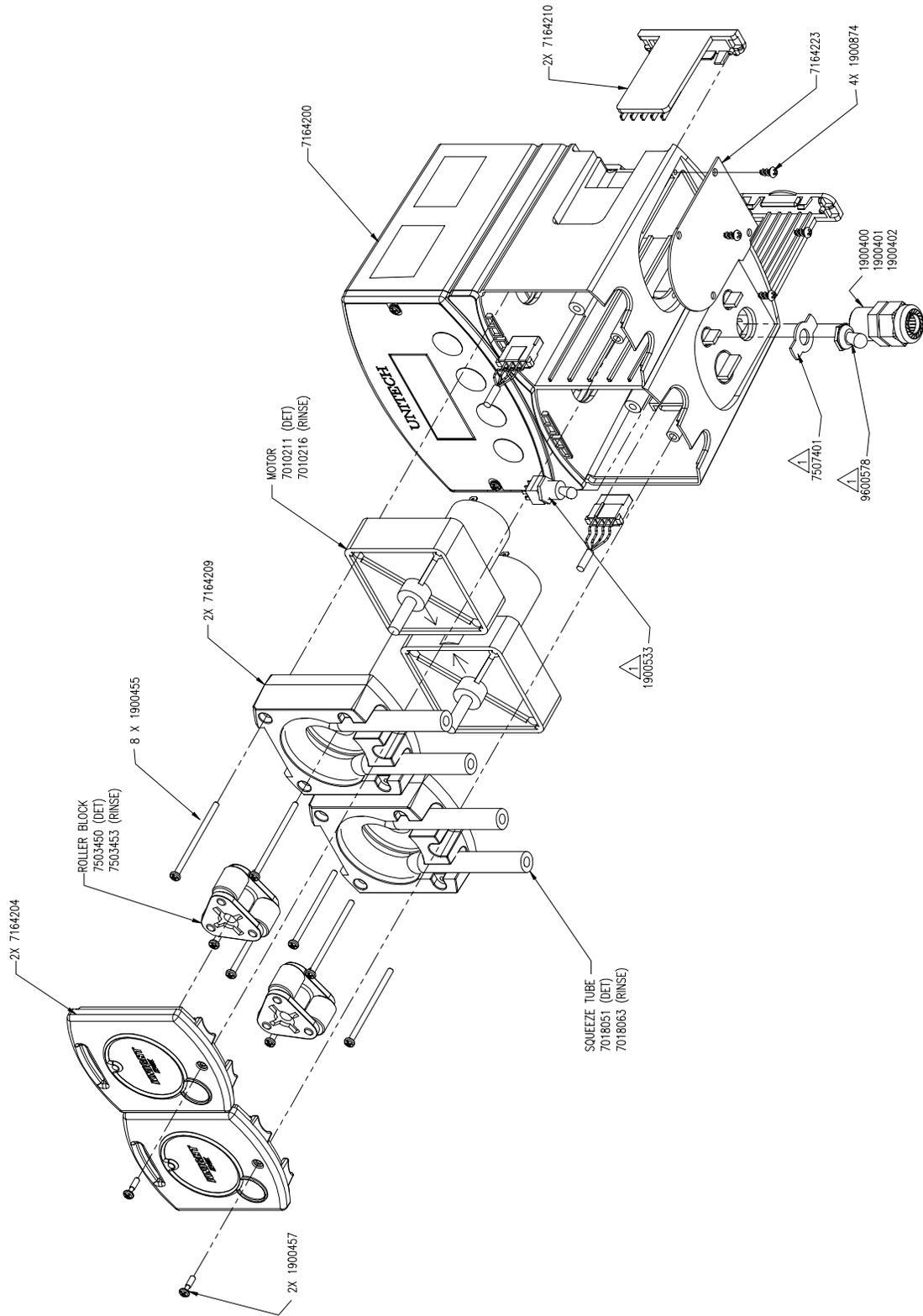
PARTS DIAGRAM — ALL CONFIGURATIONS



UJ-PARTSUG-CASEZ/040104

DETAIL A
SCALE 1 : 1

PARTS DIAGRAM — LIQUID DETERGENT

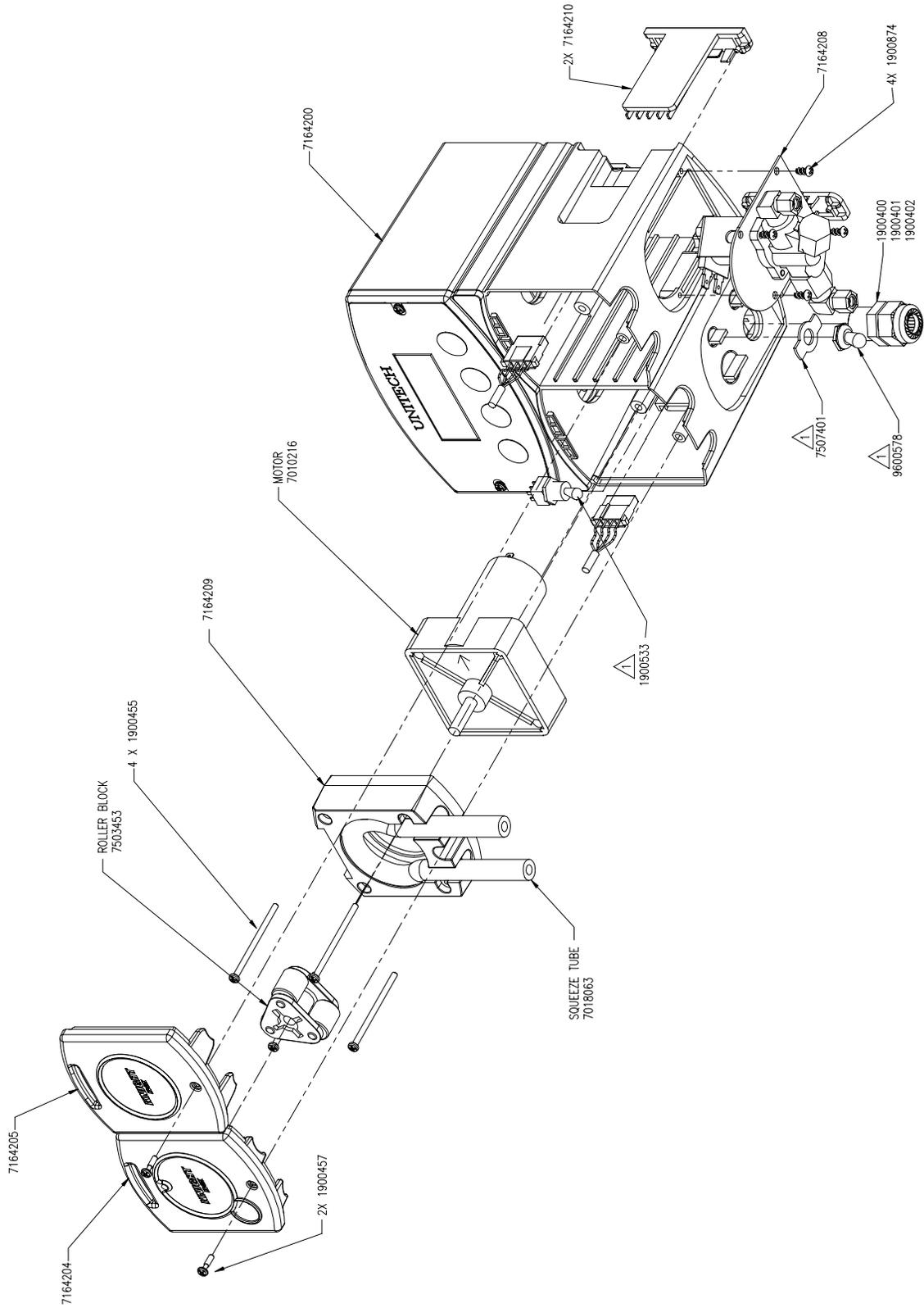


UT-PARTS&AG-LIQUID/040104

NOTES:
 ▲ COMPONENTS INCLUDED FOR SWITCH OPTION

PARTS DIAGRAM — DRY DETERGENT

Brass Solenoid Model

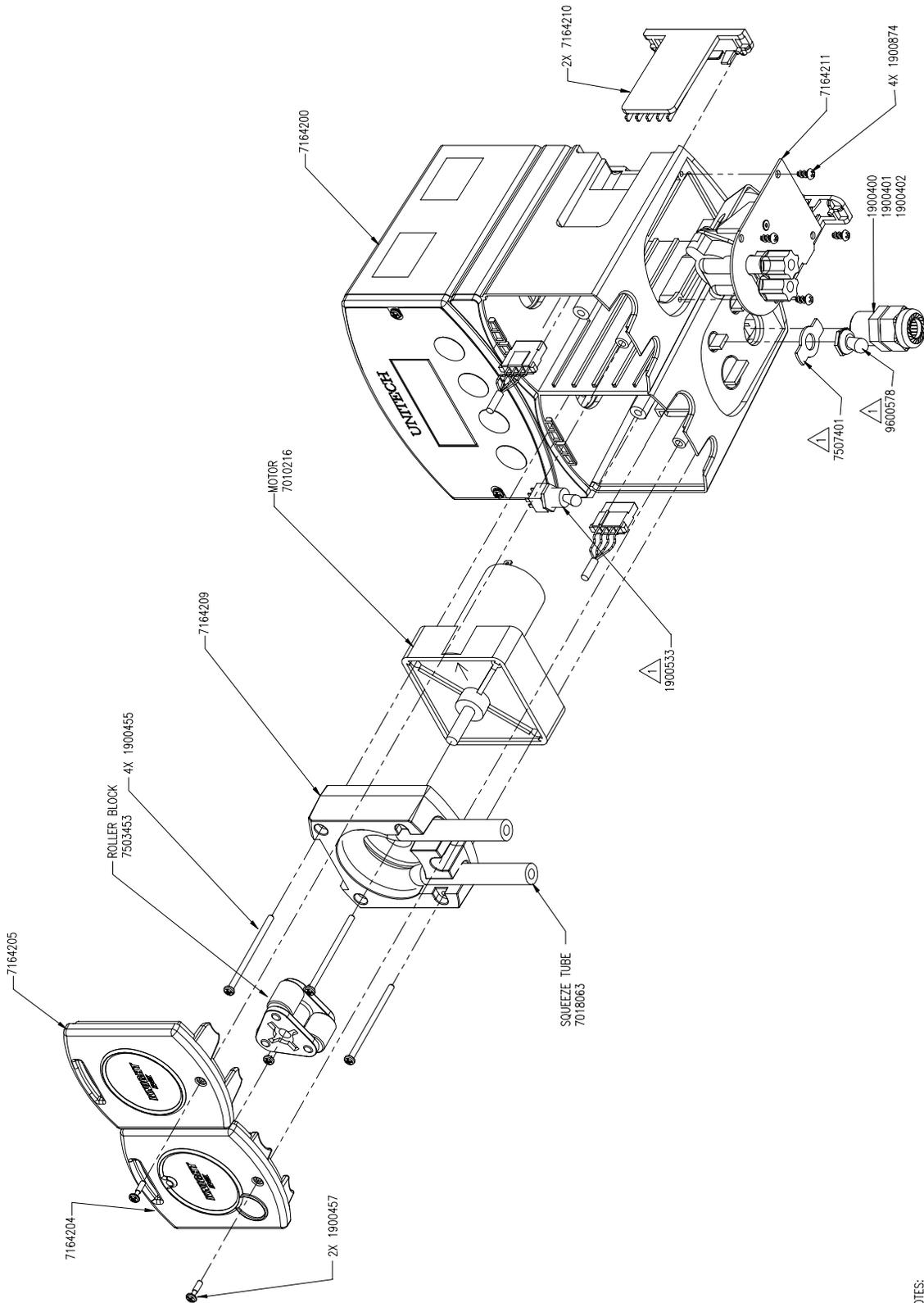


UT-PARTS-BAG-DRY(BR)/040104

NOTES:
 1 COMPONENTS INCLUDED FOR SWITCH OPTION

PARTS DIAGRAM — DRY DETERGENT

Plastic Solenoid Model



UT-PARTSDIAG-DRY(PL)/060104

NOTES:
 ▲ COMPONENTS INCLUDED FOR SWITCH OPTION



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EC – DECLARATION OF CONFORMITY

Equipment Description: Chemical Dispensing Equipment

Type/Model Number: UNITECH

The signing legal authorities state that the above mentioned equipment meets the requirements for emission, immunity and safety according to

GUIDELINE OF COUNSEL DIRECTIVE 89/336 EEC

(Adaptation of the regulations of the member countries regarding the electromagnetic compatibility (EMC))

AND

GUIDELINE OF COUNSEL DIRECTIVE 73/23 EEC AS AMENDED BY COUNCIL DIRECTIVES 92/59 EEC AND 93/68 EEC

(Adaptation of the regulations of the member countries regarding the low voltage directive (LVD))

and there it is allowed to carry the **CE – PROTECTION LABEL**.

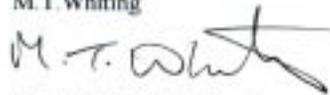
The evaluation procedure of conformity was assured according to the following standards:

EN 55014
EN 61010

The EC –DECLARATION OF CONFORMITY is based on tests carried out at CSA International, Irvine CA and DNB Engineering, Riverside, CA.

Name: M.T. Whiting

Signature:



Position: Vice President, Engineering

Date: June 1st 2004



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.

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Fax: 34.93.215.2019

North Asia Pacific
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Southeast Asia
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