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SECTION I - Introduction

A. Overview

This Lane Cleaning and Conditioning Machine represents the most advanced technology in automated lane care. Clean and consistent bowling conditions are accomplished through the use of a "user-friendly" keypad linked to an on-board programmable computer.

A patented conditioner metering transfer system, vacuum cleaning and squeegee system, and duster system allow the machine to maintain clean and consistent bowling conditions.

With the expandability of the Programmable Computer, future upgrades are easily done, assuring that your machine will not become obsolete. Kegel's On-line Support Interface (KOSI) is also available as a supplement to this manual.

**IT IS VERY IMPORTANT THAT THE OPERATOR THOROUGHLY READ AND UNDERSTAND THIS OPERATING MANUAL BEFORE USING THE MACHINE.
WHEN ALL ELSE FAILS...READ THE MANUAL OR WATCH KOSI.**

Should you have any questions regarding any procedures pertaining to the proper operation of this machine, please contact Kegel at (863) 734-0200 also via LMC@kegel.net

B. Machine Specifications

Models:

17-5300 **Sanction Standard Elite Plus** (115V/60Hz)
17-5350 **Sanction Standard Elite Plus** (230V/50Hz)

Power Supply:

Class I - Single Phase
110-120 Volts, 60 Cycle, 15 Amps (Use 20A Circuit)
220-230 Volts, 50 Cycle, 12 Amps (Use 15A Circuit)

Dimensions:

Width - 55-1/4"
Height - 14-1/2"
Length - 40-3/4"
Weight - 350 pounds

C. Care and Safety Procedures

This machine is manufactured of the highest quality materials, but keep in mind that this is a sensitive piece of equipment. Care should be taken to see that it is not dropped, knocked around, or handled roughly.

Doing so may damage the programmable computer, its components, the conditioner transfer system, the Duster assembly, or the vacuum cleaning and squeegee system.

For care and safety reasons, follow these precautions:

- Avoid spilling any liquids or chemicals inside of the machine.
- Do not operate the machine with an extension cord or power cord other than the one provided.
- Make sure that the power outlet used provides the correct voltage and amps. It must be a clean circuit with no other loads on it.
- Do not attempt to make any wiring modifications.
- Do not attempt to re-program the computer.
- Do not operate the machine in an upright position.
- Always empty the recovery tank before standing the machine up and transporting it. Failure to empty the tank will cause the dirty cleaner to either spill out through the vacuum motor or out of the squeegee when going over ramps. Then the next time the machine is started, it will blow cleaner out of the vacuum exhaust.

Not following the above recommendations may cause damage to the machine, its computer, persons operating it, or void the warranty.

Persons assigned the responsibility of operating this equipment should be trained in its use by an authorized factory-trained Distributor.

D. Theory of Operation

This machine uses proven and patented Kegel "SANCTION® TECHNOLOGY". This technology is the precise metering of oil to each board by volume.

The machine uses one Fluid Metering Pump. The piston and cylinder are made of ceramic, milled to almost perfect clearances. The pump has no valves to impair its operation. The piston revolves as well as reciprocates during operation.

With the pump rotating at a constant RPM the oil is pumped at an exact flow rate to a three way valve known as the Oil Pattern Control Valve. The valve in its OFF state routes the oil back to the oil tank. When turned ON the valve routes the oil to a line connected to the Oil Head.

The OIL HEAD travels back and forth across the transfer system at a constant speed, much like the printer head on a computer printer. The Oil Pattern Control Valve is then turned ON and OFF according to the chosen program.

The program is designed to apply a series of board to board streams of oil onto the transfer system as the machine travels down the lane. This stream of oil is a consistent, adjustable, and measurable amount per board.

An example of a common league condition in the U.S. might be three 2 board to 2 board streams, followed by two 9 to 9's, two 10 to 10's, and four 11 to 11's as the machine travels down the lane.

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The total volume amount per board of the pattern can then be represented by an exact amount.

This is done by simply multiplying:

- 1) the amount of oil per board value (determined during calibration)

by

- 2) the number of times the stream crossed each board.

Although it is not information that will be used daily, it is a way of explaining a lane condition in exact terms. These measurements can be written down and duplicated in the future.

In other words, it defines a lane condition so that it can be recognized and explained to anyone, much like any other specification of the bowling lane such as the length and width.

**Anyone who uses this machine and pays attention,
will begin to understand lane conditions like never before.**

**Because all adjustments to the oil pattern
are exact and repeatable.**

**Sanction® Technology is an instrument,
not just a lane machine.**

SECTION II - Machine Description

A. Rear; Center; Front; Right; & Left Side

With the machine setting on the approach in a position ready to be operated on the first lane, the following descriptions will be used:

- **CONDITIONING (REAR) END:** The CONDITIONING or REAR END shall be the end of the machine closest to the operator and nearest the approach, where the buffering brush is located.
- **CENTER COMPARTMENT:** The COMPUTER or CENTER COMPARTMENT houses the electrical components and is located between the CONDITIONING END and the CLEANING END. Three partitions make up the compartment:
 - the vacuum and drive motor section (on the right);
 - the buffer motor section (on the left side) and;
 - the computer section (in the center).
- **CLEANING (FRONT) END:** The CLEANING or FRONT END shall be the end nearest to the pins, where the recovery tank and the Duster Assembly is located.
- **RIGHT SIDE:** The RIGHT SIDE is the side to the right of the operator as he faces the pins. This is also the ten-pin side.
- **LEFT SIDE:** The LEFT SIDE is the side opposite the right, to the left of the operator as he faces the pins (seven-pin side).

B. Keypad

Located under the lid of the Conditioning end is the computer keypad. This keypad is used to enter all programming information, as well as to start the machine. The keypad consists of 24 input keys and a two-line Liquid Crystal Display (LCD) where the menu items and prompts appear.

The following keys are used on the keypad:

- **MENU:** Pressing this key will display and advance the available main menus for the operator. It will also act as a zero button when the machine is in operation. When it stops the operating machine it resets the program to ZERO.
- **NEXT:** Use this key to advance within a main menu from one menu prompt to the next.
- **LAST:** This key will return the user to the last menu prompt within a main menu.
- **ENTER:** This key is used to complete an entry of data or information requested by a menu prompt.
- **EXIT:** This key is used to return to the Operators Menus from the Managers Menus.
- **START:** This key will activate the handle start button on the machine when it is in the START MENU sequence.
- **UP & DOWN ARROWS:** Use of these keys will increment or decrement numbers asked for in certain menu prompts, such as the starting lane number. The UP ARROW also works like the button on the handle. It can be used as a back-up switch if the button fails.
- **LEFT & RIGHT ARROWS:** Use of these key in certain menu prompts will increment or decrement the displayed values by a count of ten.

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Also displayed on the keypad are additional input keys. The following keys are used to test inputs and outputs:

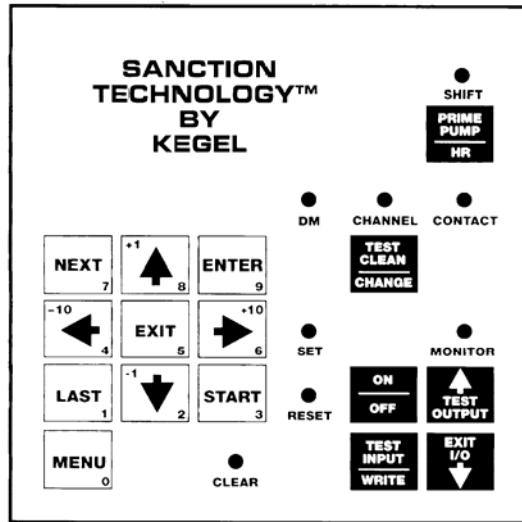
- **TEST OUTPUT (Up arrow):** This key is used to select which output is to be tested. Pressing this key will increment the output number up to the next available output.
- **TEST INPUT (Write):** This key is used to select which input is to be tested. Pressing this key will increment the input number up to the next available input.
- **ON / OFF:** Use of this key will turn ON/OFF the selected output. This key will also turn on and off pindeck spray in the appropriate menus.
- **EXIT I/O (Down arrow):** This key is used to exit the TEST I/O section.

The following keys are used when preparing the machine:

- **PRIME PUMP (HR):** This key will allow the operator to add one extra spray of cleaner to the beginning of each lane.
- **TEST CLEAN (Change):** Use of this key will allow the operator to check how well the machine is cleaning the lane prior to cleaning and conditioning simultaneously.

The following keys are used for internal programming functions in the PC of the machine. Tech Support may instruct you to use the following keys during troubleshooting.

- SHIFT
- HR
- CONTACT
- CHANNEL
- DM
- CHANGE
- MONITOR
- SET
- RESET
- CLEAR
- WRITE



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C. Conditioning (Rear) End Components

Located on the Conditioning end of the machine are the following components:

- **DISTANCE WHEELS:** Located on the inside rear wall of the conditioning end are the distance wheels. These wheels measure the distance the machine travels down the lane in increments of one inch. This is done by storing counts received from a proximity sensor (Lane Distance Sensor) mounted on the center pillow block.
- **BUFFER BRUSH:** Located near the rear wall of the conditioning end is the buffer brush assembly. The belt-driven brush removes conditioner from the transfer brush and places it onto the lane surface. The brush must be replaced regularly to ensure optimum machine performance.
- **CONDITIONER COMPONENT ASSEMBLY:** Located under the splash guard on the rear wall is a plate that holds the conditioning components. This entire assembly can be removed from the machine by disconnecting two plugs and removing two bolts. The assembly holds:
 - the oil pump and motor (with tachometer sensor);
 - the pulse dampener tubing (to smooth oil streams);
 - the valve assembly (24VDC) to control oil flow;
 - the pressure gauge (keep pressure at 10-15 psi);
 - the pressure regulator capillary tube;
 - the oil tank with low-level float and filter (capacity is 0.53 gallons or 2000 milliliters);
 - a vent valve to prevent vacuum in oil tank;
 - a capacitor for the oil pump motor;
 - and a terminal block assembly.
- **BUFFER BRUSH LIFT MOTOR:** Mounted on the left side of the machine is the buffer brush lift motor. A cam connected to the motor actuates switches located inside the conditioning compartment. This motor lifts the buffer brush off the lane. The brush needs to be lifted at times where conditioner is not being applied (i.e. from the end of oil through pideck during all cleaning cycles). The brush parks in the down position. The machine should be stored with the brush down to prevent the transfer brush from spreading the fibers too much.

- **PUMP MOTOR:** Mounted on left side of the rear wall is the cleaner pump motor. This motor pumps the cleaning liquid from the supply tank through the spray tip and onto the lane surface. Check fittings periodically for leaks to prevent potential moisture damage.
- **SUPPLY TANK:** The tank nearest the left side of the rear wall is the cleaner supply tank. The capacity of this tank is approximately 1-7/8 gallons; enough volume to completely clean in excess of 20 lanes.
- **SUPPLY TANK VENT VALVE:** The supply tank also has a vent valve located on the top right side. This valve is constantly open to prevent a vacuum from forming inside the supply tank. This valve has a filter to prevent dirt from being pulled into the tank through the valve.
- **SUPPLY TANK FLOAT SWITCH:** A float switch is located inside the supply tank to indicate when the cleaner level is getting low.
- **OIL HEAD:** Located above the transfer brush is the Moving Head. This head rides along a guide bar and applies the conditioner to the transfer brush. The tip can be removed when performing a calibration check.
- **TRANSFER BRUSH:** Mounted below the moving head is the conditioner transfer brush.
- **PROXIMITY SENSORS:** Located at each end of the head mounting bar is a proximity sensor. These sensors feed information to the PC to reverse the conditioning head. These sensors are also used to "time" the oil position sensors.
- **START/INTERLOCK/RESUME BUTTON:** Located on the handle is the Start/Interlock/Resume button. This button is used to START the machine; STOP it any time during the conditioning run; or to RESUME operation after it has stopped for an error message or some other reason.

- **CORD KILL CIRCUIT:** Mounted on the handle are two plates with electrically conductive Velcro®. The tab on the cord should be connected to these plates to utilize the cord kill error message and protect the cord from damage.

D. Center Compartment Components

The Center Compartment of the machine is divided into three sections. From left to right, they are the buffer motor, computer control panel, and the vacuum and drive motor sections.

The following components are on the left side:

- **BUFFER MOTOR:** Mounted on the left side wall is the buffer brush drive motor. This motor drives the buffer brush on the lane. The Sanction® Standard Elite uses a Variable Speed DC Buffer Motor. This motor is controlled by a speed control board, and the speeds are adjusted from the keypad using menus located within the program of the machine's PC.
- **BUFFER MOTOR TACHOMETER:** The DC Buffer Motor has a tachometer assembly mounted to the right side of the motor. This proximity sensor is used to display the RPM of the variable speed motor.
- **BUFFER MOTOR SPEED CONTROL BOARD:** On the back wall of the buffer compartment are two DC speed control boards. The board toward the left side converts AC voltage into DC voltage for the buffer motor. The board also uses an isolator card that is mounted on it to interface with the analog output card.
- **DRIVE MOTOR SPEED CONTROL BOARD:** Mounted to back wall, to the right of the buffer control board, is the drive motor speed control board. This board converts AC voltage into DC voltage for the drive motor. The board also uses an isolator card that is mounted on it to interface with the analog output card.

NOTE: Do not adjust the trim pots on these speed control boards unless instructed to do so by

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authorized Technical Support personnel.

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The following components are found in the middle compartment:

- **PROGRAMMABLE COMPUTER (PC):** In the center is the Programmable Computer, or PC. The PC is made up of 6 components: the main controller; the power supply; one input module; 2 different output modules; and the mounting rack.



WARNING: The PC contains a Lithium battery. When it is replaced, the old battery should be discarded in accordance with local regulations.

- **PROTECTIVE DEVICES:** Mounted across the control panel is a toggle switch, several fuses, and two circuit breakers. These components protect the operator and machine in the event of a current overload. The following is a list from left to right of the protective devices:

- ◆ **Cleaner Pump Fuse:** The cleaner pump is protected with a slow blow fuse. It is rated at 4A on a 115V model, and at 1.6mA on a 230V model.
- ◆ **Buffer Motor Fuse:** The DC buffer motor control board is protected with a slow blow fuse (ceramic-type). It is rated at 8A on a 115V model, and at 6.3A on a 230V model.
- ◆ **PC Common Fuse:** The PC Outputs are protected by a single slow blow fuse. It is rated at 7.5A on a 115V model, and at 6.3A on a 230V model.
- ◆ **Direction Toggle:** A toggle switch is provided to control which electrical inlet is "live". This toggle switch should point toward the direction of travel, which makes the opposite inlet (away from direction of travel) the "live" one.
EXAMPLE: Connect the power cord to the inlet on the left if moving from lane 1 to lane 2. The toggle switch in this example is pointing toward lane 2.
- ◆ **Drive Motor Fuse:** The drive motor control board is protected by 1 or 2 slow blow fuses depending on voltage. These are ceramic-type fuses rated at 4A.

- ◆ **Oil Pump Motor Fuse:** The oil pump motor is protected with a slow blow fuse. It is rated at 0.75A on a 115V model, and at 315mA on a 230V model.
- ◆ **Vacuum Circuit Breaker:** The vacuum motor is protected with a circuit breaker. It is rated at 10A on a 115V model, and at 8A on a 230V model.
- ◆ **Main Circuit Breaker:** The circuits for the entire machine are protected with a circuit breaker. It is rated at 15A on a 115V model, and at 10A on a 230V model.
- ◆ **PC Program:** The program also acts as a protective device on certain motors. These motors "time out" or have built in monitoring that trips an error message and stops operation. This will prevent the motors from overheating in the event of a locked rotor condition. The following motors are protected with the PC Program: DC Drive motor; Brush Lifting motor; and the Duster Unwind and Wind-Up motors.

NOTE: All components "time-out" when operating from the Test I/O menu as a safety feature.

- **COMPONENT CONTROL RELAYS:** Mounted in the middle compartment are three Component Control Relays (LY2). Each relay controls a specific function of the machine.
 - The first relay (toward the front), **CR #1**, controls the direction of the drive motor.
 - The second relay, **CR #2**, is used to brake the drive motor and prevent coasting.
 - The third relay (toward the rear), **CR #3**, controls the operation of the vacuum motor. When this relay is energized the vacuum will operate.
- **BRAKE RESISTOR:** Mounted on CR#2 is the Brake Resistor. This resistor stops the drive motor when the drive motor relays are turned off.

- **TERMINAL BLOCK ASSEMBLY:** Mounted underneath the control relay plate is the main terminal block assembly for the machine. The relay plate lifts out of the machine to allow access to this wiring when trouble-shooting a problem.

The following components are found in the right section of the center compartment:

- **DRIVE MOTOR:** Mounted to the right side wall, below the vacuum motor, is the DC drive motor. It turns the drive shaft and drives the machine on the lane.
- **VACUUM MOTOR:** Located on the right side is the vacuum motor. This motor is used with the squeegee assembly and recovery tank to vacuum the cleaner off the lane. A specially-designed chamber reduces the noise created by the vacuum. This motor needs regular maintenance, and is mounted on tracks that allow it to be easily removed from the machine.

NOTE: The lid must be removed prior to taking the vacuum assembly out of the machine.

- **EMERGENCY STOP BUTTON:** Located in the right compartment is an emergency stop switch. This safety button will disconnect power to the drive components of the machine if there is an emergency. This button will have to be rotated to be re-set and the start button will need to be pushed to resume operation. If power is applied to the machine, but it is dead, check the position of this kill switch.
- **POWER CORD INLET:** Mounted on the right side wall is the power cord inlet. This inlet is grounded to the machine frame. Make sure to use the correct voltage and amperage when connecting the cord to the inlet. Use the toggle switch to determine which outlet is "live".

E. Cleaning (Front) End Components

The following components are located under the lid on the cleaning end of the machine:

- **POWER CORD INLET:** Mounted on the left side wall is the power cord inlet. This inlet is grounded to the machine frame. Make sure to use the correct voltage and amperage when connecting the cord to the inlet. Use the toggle switch to determine which outlet is "live".



HIGH VOLTAGE WARNING: Use caution with electrical components. Refer servicing to qualified personnel. Observe and follow all Safety labels.

- **DUSTER UP SWITCH:** Located on each side wall is a microswitch. These switches, when actuated, tell the PC that the cushion roller is in the UP position. Avoid getting liquid on these switches. Clean up spills immediately.

- **DMR DUSTER/CLEANING CLOTH ASSEMBLY:** Mounted inside and across the entire front end is the Dual Motor Ratcheting Duster Cleaning Cloth Assembly. Two motors, one located on each side, move the cloth from one core to the next.

The gear motor on the left side is called the **UNWIND MOTOR**. When operated it will let out new cloth from the supply roll. The gear motor on the right side is the **WIND-UP MOTOR**. When operated it will wind up the used, dirty cloth on the white PVC take up roller.

The duster uses gravity to clean the lane. The cushion roller pivots and contacts the lane surface when cloth is unwound. This makes the cloth contour to the lane surface for optimum cleaning.

At the end of the lane, just before the end of travel, the duster winds up dirty cloth and lifts the cushion roller off the lane. The cloth remains wound up during the return travel to the foul line.

For best results, use **Kegel K2** (154-0047P) lane cleaning cloth. The machine will use approximately 1-1/2" (3.81 cm) of cloth per lane.

RECOVERY TANK: The large plastic tank in the center of the compartment is the recovery tank. This tank will hold in excess of 30 lanes of used liquid without needing to be emptied. Empty the tank from the inlet side (connected to squeegee). Use care when removing tank to prevent spilling liquid in the machine.

- **CLEANER DISPENSING HEAD:** Mounted to the front panel is the cleaner dispensing head assembly. The dispensing head moves along the guide bar applying cleaner to the lane surface in front of the cushion roller. The dispensing tip is equipped with a 1-5 psi check valve to prevent drips. The tip can be removed to check the volume output.
- **VACUUM EXHAUST PLATE:** The area where the vacuum exhaust is located is covered with felt in case any moisture blows through the motor. Use a soft rag to absorb any moisture that may collect in this area.
- **SQUEEGEE CAM & SWITCHES:** The position of the squeegee is controlled by two switches mounted on the right side plate. A cam connected to the squeegee motor has an offset lobe that actuates the switches. The switch mounted next to the plate is the squeegee up switch and the switch to the outside is the squeegee down switch.
- **LIFTING HANDLES:** Two spring-loaded handles are mounted to the front wall to raise and lower the machine. Do not attempt to support the entire weight of the machine with these handles.
- **MOMENTARY WHEELS:** Mounted on the front outside wall are two small wheels. These wheels come in contact with the lane momentarily as the machine enters and exits at the foul line.

F. Bottom Side Components

Located on the bottom or underneath the machine are the following components:

- **DRIVE SHAFT:** Located toward the center of the bottom is the lane drive shaft. This shaft is turned by the drive motor.
- **DRIVE WHEELS:** Mounted on the lane drive shaft are the two drive wheels. These wheels rotate under power from the drive motor to move the machine on the lane. Keep these wheels clean to avoid slipping during operation.
- **SQUEEGEE ASSEMBLY:** Mounted near the front of the machine is the squeegee assembly. This assembly vacuums the cleaner and oil off of the lane during lane cleaning. The unique mount for the squeegee allows the tilt or pitch to be adjusted. There are also independent height adjustments for the left and right side.
- **GUIDE ROLLERS:** Mounted on the outside walls are four spring-loaded guide rollers. These tapered rollers ride along the edge of the lane to keep the machine straight and square as it travels on the lane surface.
- **SKID PLATES:** Two small UHMW pieces are mounted to the floor of the machine. These will help prevent damage if the machine travels too far forward and ends up in the pit.

G. Right Side Components

The following components are located on the right outside wall of the machine:

- **DUSTER WIND-UP MOTOR:** Mounted toward the front of the machine is the duster wind-up motor. The brake motor operates to wind-up used cloth and lift the cushion roller from the lane surface.
- **TRANSPORT HANDLE:** A handle is provided to make the machine easier to move while in the transport position.
- **LANE-TO-LANE CASTERS:** Located on the outside of the frame are two lane to lane casters that support machine as it is moved on the approach from one lane to the next.
- **SQUEEGEE MOTOR:** Mounted to the right side plate is the mechanical-brake motor which controls the up and down movement of the squeegee. A cam is mounted on the shaft to hold the adjusting linkage for the squeegee pitch.
- **SQUEEGEE ADJUSTMENT BOLT:** The squeegee height can be adjusted by turning the knurled bolt. There is a separate adjustment for the left and right sides.
- **OIL HEAD TIMING SENSOR:** Mounted toward the rear of the machine is a proximity sensor that controls the oiling head. Protected beneath a cover, this sensor keeps track of the position of the oiling head by sensing a machined target that is passing in front of the sensor. The metal target is connected to an idler pulley that controls the belt tension for the head drive system.
- **OIL/CLEANER HEAD SHAFT:** This shaft is used to mount the board counting target and also extends to the front of the machine to drive the cleaner head assembly.
- **HANDLE CATCH:** A small piece of UHMW is mounted to the top of the side wall to hold the handle in place during transport.

H. Left Side Components

The following components are located on the left outside wall of the machine:

- **DUSTER UNWIND MOTOR:** Mounted toward the front of the machine is the duster unwind motor. The brake motor operates to unwind new cloth and lower the cushion roller onto the lane surface.

- **DRIVE TACHOMETER SENSOR:** Mounted near the bottom of the left side plate is the DRIVE TACH sensor. A metal target is rotated as the drive shaft turns. As the target passes in front of the proximity sensor, pulses are sent to the PC. The PC counts these pulses and calculates the IPS (INCHES PER SECOND) travel speed of the machine. This is used to set the 7 different drive speeds of the machine.

NOTE: In the event there is a problem with the Lane Distance Proximity Sensor, the machine can be programmed to run off the Drive Tachometer Proximity Sensor. This is only recommended in an emergency as a temporary solution.

- **SQUEEGEE ADJUSTMENT BOLT:** The squeegee height can be adjusted by turning the knurled bolt. There is a separate adjustment for the left and right sides.
- **OIL HEAD DRIVE MOTOR:** Located on the outside of the left side panel is the Drive Motor for the Oil Head. This motor, along with a cogged drive belt, moves the head back and forth along a rectangular track above the transfer brush.
- **HEAD MOTOR CAPACITOR:** Mounted beneath a cover is the capacitor for the oil head motor.

- **BUFFER BELT:** The buffer belt is located beneath a cover on the left side. It is routed around an idler pulley. Check the tension of the belt periodically to ensure proper operation. You should be able to squeeze the belt together and make it just barely touch under moderate pressure. Do not run the belt too loose as it may jump the teeth of the timing pulley. Running the belt too tight will create excessive strain on the buffer motor and increase the amp draw of the machine.
- **TRANSPORT HANDLE:** A handle is provided to make the machine easier to move while in the transport position.
- **HANDLE CATCH:** A small piece of UHMW is mounted to the top of the side wall to hold the handle in place during transport. This piece is attached to both the left side and right side plates.
- **LANE-TO-LANE CASTERS:** Located on the outside of the frame are the lane to lane casters. These casters support the machine as it is moved on the approach from one lane to the next.
- **BUFFER BRUSH LIFT MOTOR:** Mounted on the left side of the machine under the handle is the buffer brush lift motor. This motor lifts the buffer brush off the lane. The brush needs to be lifted at times where conditioner is not being applied (i.e. from the end of oil through pindex during all cleaning cycles). The brush always parks in the down position, even after a clean only function.

SECTION III - Pre-Installation

Preparation of the Bowling Lanes

Prior to operating this equipment for the first time, it is highly recommended that a thorough inspection of the bowling lane and approach area take place.

All loose foul lights, divisions, cappings and adapter blocks and channels should be tightened, repaired or replaced.

High channels or bumper gutters will lift one side of the machine and cause errors. Loose capping screws, loose gutters, and missing capping sections will cause damage to the power cord.

Note: The transition from the gutter to the approach should be as smooth as possible for easy insertion and removal of the lane machine. This will prolong the life of the casters as well as other parts.

Ramps that are used for moving the machine from and to the approach should also be "machine friendly". These ramps should be no less than 12 feet long with no bump on either end of the transition. Improving these transitions not only will extend the life of the machine but will make it easier to operate.

SECTION IV - Operating Instructions

A. Filling the Conditioner Tank

Completely fill the conditioner tank prior to operating on the first lane. To fill the conditioner tank, the machine should be in the operating position on a level surface. Open the splash guard and remove the cap located on the top of the tank.

Insert the funnel assembly provided with the machine. Wrap a rag around the base of the funnel to catch any spills.

Fill the tank until the oil level in the tank is about 1-1/2" from the top of the tank. Failure to watch the level could cause the tank to overflow.

This overflow can drain down onto the lane distance proximity sensor or the buffer brush, which will cause an excess amount of conditioner to be applied to the lane in that area for several lanes. You should place rags beneath the tank to prevent this from happening.

When finished, be sure to remember to replace the cap. Failure to do so could cause a major mess when the machine is lifted to the transport position.

B. Filling of Cleaner Supply Tank

To fill the Cleaner Supply Tank, the machine should be in the down or operating position. Prepare an appropriate mixture of cleaner and water. Open the splash guard and place a rag beneath the tank. Open the tank cap and place a rag around the base of the funnel to prevent foam from overflowing into the machine.

Pour the mixture into the Supply Tank using the supplied funnel until the level in the tank is about 1/2" below the top of the tank. This will prevent an air pocket from forming and blocking the fluid flowing from the funnel. Replace cap tightly when finished.

NOTE: Always use the funnel supplied with the machine. This funnel has a plastic filter screen. This screen filters out all debris and trash to prevent this from contaminating the supply tank and cleaning system.

Not using a funnel with a filter may cause the tank's in-line filter to become clogged frequently. It can also cause premature failure of the cleaner pump. At the very least, this will reduce the cleaner output of the spraying system and result in inadequate stripping. This may lead to customer complaints, ball calls, and an excess of out-of-range pins. When necessary, the supply tank can be removed for cleaning.

Do not spill cleaner on the electrical components. Spills may cause a "short", which may send a false signal to the PC causing improper operation. A wet switch may also produce a dim LED light on the PC.

Any spills or drops of cleaner onto the approach should be wiped up immediately! Any spills on the machine can stain the paint and make the machine ugly. Ugly machines do not run as well as clean, sharp, and highly maintained machines.

NOTE: If the lanes are going to be cleaned make sure the Cleaner Supply Tank is filled, the Recovery Tank is empty, and an adequate supply of Lane Cleaning Cloth is installed before beginning operation. Always empty the recovery tank when filling the supply tank.

C. Turning the Unit On

Carefully set the machine in the operating position on the approach. It should be completely on the approach, with the cleaning end being approximately 6 inches behind the foul line.

Connect the twistlock connector on the power cord to the machine on the side away from the direction of travel. Flip the toggle switch toward the direction of travel.

Connect the power cord into a suitable outlet. **MAKE SURE THAT THE OUTLET IS SUPPLYING THE CORRECT VOLTAGE AND AMP RATING** (see Section 1-1). Connecting the power cord into an outlet located toward the center lanes of the establishment will allow more lanes to be cleaned and/or conditioned without changing outlets.

The power cord supplied with the machine will be long enough to clean in excess of 24 lanes without the need to change outlets. (To accomplish cleaning the maximum number of lanes, the cord should be plugged into an outlet at approximately Lane 12. This will allow enough slack in the cord to place it out of the machine's path as it cleans/conditions lanes 1-24.)

When power is applied to the machine and the toggle switch is in the correct position, the menu screen on the keypad will illuminate. The machine is now ready to run.

If the machine does not appear to have any power after it has been plugged in, check the E-STOP kill switch to make sure it hasn't been accidentally pressed. Rotate the red button to reset this switch. Power will resume immediately (as long as the machine's main circuit breaker has not been tripped).

NOTE: It is necessary to run 2 complete lanes with the machine each time you put out a pattern. After running the two lanes you then can condition your lanes. These 2 warm-up lanes will allow the Transfer Brush to become saturated and will prevent the first pair from being drier.

D. Keypad Display

The keypad display is a two-line LCD (Liquid Crystal Display). During operation and selection of programs, various prompts, which are simply questions or data requests, will appear in the display, along with possibly some numbers.

The prompts will request the operator to input or change data or information within the selecting menu. The numbers will display cleaning and/or conditioning program numbers, distances (feet) or "counts". What the prompts and numbers mean for each menu is explained under each menu heading in this section.

When the numbers appear, there will often be two numbers, both the same, displayed in the LCD. When this occurs, both numbers refer to the current setting for that particular prompt.

When changing the setting by using the UP or DOWN ARROWS, only the number on the right side of the display will change. The number on the left will remain at the previous setting until the **ENTER** key is pressed, at which time both numbers will change to the new setting.

In other menu screens where multiple variables can be changed, the variable that can be changed will be *blinking*. Pressing the **ENTER** key will advance the blinking value to the next variable. This is used in the CHANGE PROGRAM and the CHANGE AUTO SELECT menus.

E. Operators Menu Selections

Operation of the machine is controlled by a series of programs located within the memory of the programmable computer. These programs and settings may be changed or modified by following a simple sequence of prompts within the available menus displayed on the keypad. This section will lead the operator step-by-step through menus and prompts.

To make this section easily understandable, the operator should be familiar with the keypad as detailed in Section II of this manual.

**THE FOLLOWING MENU SELECTIONS
CAN BE ACCESSED BY THE OPERATOR**

1. Standard Elite Start Menu

The Sanction Standard Elite Start Menu will display the cleaning/conditioning program being used, and allow the operator to select the starting and ending lane numbers. The operation of the machine is also started from this menu.

When power is applied to the machine, the following screen should appear:

*** STANDARD ELITE
0400 KEGEL E1107**

Appearing on the second line will be a four-digit number on the left hand side. This number designates how many lanes of cloth are remaining on the duster roll. The "0400" means that approximately 400 lanes are left on the current roll of cloth. The "KEGEL E1107" refers to the version of programming software currently installed in the computer.

If either the lane distance or the buffer tach prox sensor has been re-routed, a message alerting the user will toggle on the screen with the Start Menu. Do not ignore this maintenance notification.

NOTE: If the power interrupt feature is turned OFF, the start screen will change and an asterisk (*) will appear as the last part of the word ELITE (e.g. **ELI ***).

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To begin operation, press **NEXT** on the keypad. The following prompt will appear:

ENTER FIRST LANE

01 * HERE * 01

The PC is asking the operator to input the starting lane number. Also appearing in the LCD Display will be two numbers, one on the lower left side and one on the lower right side.

These numbers indicate the starting lane number the last time the machine was operated. This number should always match the actual lane you are starting on. This way the machine knows which lane it is on.

To change the starting lane number, push either the **UP ARROW** or **DOWN ARROW**. The number on the lower right hand side of the LCD will change, while the number on the left side will remain the same. (The left number will always remain the same while the right number is being changed until the **ENTER** key is pressed.)

NOTE: When entering the starting lane number, pressing the Left Arrow key on the keypad will automatically SUBTRACT 10 lanes from the displayed starting lane (unless lane #01 is displayed). Pressing the Right Arrow key will ADD 10 lanes to the displayed starting lane (unless the number of the last lane in the center is displayed).

Once you have reached the desired starting lane number, press **ENTER**.

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The following prompt will appear:

ENTER LAST LANE

50 * HERE * 50

Now you must input the number of the last lane to be cleaned/conditioned. Appearing with the above prompt will be two numbers, this time displaying the number of the last lane cleaned/conditioned during the previous run.

If these numbers are incorrect, you must enter the correct number. Using the **UP** or **DOWN ARROWS** again, change the number to the number desired. Once again, only the right side number will change.

NOTE: When entering the last lane number, pressing the Left Arrow key on the keypad will automatically SUBTRACT 10 lanes from the displayed last lane (unless lane #01 is displayed). Pressing the Right Arrow key will ADD 10 lanes to the displayed last lane (unless the number of the last lane in the center is displayed).

Once you reach the desired number, press **ENTER**. At this point, this prompt will appear:

PRESS START KEY

01 => 50 PRG 01

This means the machine will run lanes 1 through 50 and the cleaning/conditioning program is #01.

If the starting and ending lane information is incorrect, press the **MENU** key until you return to *** STANDARD ELITE** screen and re-enter the starting and ending lane number information.

If the cleaning/conditioning program is incorrect, it will be necessary to access the Managers Menus to change the program selection.

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Once all information is acceptable, press the **START** key on the keypad.

At this point, this prompt will appear:

0000 #01 IS NEXT

0000 0000 01

The top line tells the operator two things. The first four digits (on the left) are the amount of time the conditioning valve is on during the forward and reverse travel. This number can be used to trouble-shoot the head travel of the machine. If the head slows down this counter will get larger. When running the same pattern on every lane this number should stay fairly consistent.

The number in the center of the top line tells the operator which lane should be conditioned next. This is one of the reasons you should always enter the starting and ending lanes for the actual lanes you will be doing.

The number displayed on the right side of the bottom line is the program being run. The four-digit number displayed on the left is the **running time for the current** lane being cleaned/conditioned (in tenths of seconds).

The four-digit number displayed in the center is the total time for the total of all lanes for the cleaning/conditioning run in seconds (all lanes completed and added together). When all the lanes for the programmed run are finished, it converts this to minutes and seconds.

IMPORTANT NOTE: If the pump needs to be primed or a first lane test-cleaning is needed, these functions must be chosen at this time. Once the Start Button on the Handle is pressed the ability to use these functions is turned off. Refer to the RUN PREP SECTION of the manual.

At this time WITH THE MACHINE ON THE APPROACH, press the start button on the handle once. This will lower the cushion roller/cleaning cloth, the squeegee assembly, and the vacuum motor will come on (if the program being used is a cleaning program).

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Push the machine into the first lane. Press the start button on the handle again and it will begin operating on the lane.

While operating the screen will change to:

**0130 BUFFER HI
0000 0000 21**

The display is telling the operator two important things. The top line is indicating the speed of the Buffer Motor (HI), and the two digits on the bottom right are the travel speed (21 IPS) of the machine.

NOTE: If the Buffer Error is by-passed, no speed will appear on this screen.

When the machine finishes the first lane the screen will change to:

**0151 #02 IS NEXT
0000 0000 01**

If the operator stops cleaning/conditioning the lanes prior to finishing the last lane programmed, this screen will display the next lane to be cleaned/conditioned.

This eliminates the chance of a lane being cleaned or conditioned twice or not at all, but only if you enter the proper starting and ending lanes.

When the last lane is completed the screen will display:

**00 LANES DONE IN
0000 MIN 00 SEC**

2. Return to Foul Line Menu

Press the MENU key until the following appears on the screen:

* RETURN>FOULINE

HIT START BUTTON

To return the machine to the foul line, press the START BUTTON on the handle or the Up Arrow on the keypad. The machine will return to the foul line at about 22 inches per second.

Pressing the button again will stop the machine. When the machine reaches the foul line, if the operator does not stop it, the machine will shut down automatically when the lane distance shaft stops turning.

NOTE: If the Lane Distance Proximity Sensor is by-passed, the machine will run until it "times out", which is after the tach has counted 60 feet of reverse travel.

This menu function also works by pressing the Up Arrow on the keypad, instead of the Handle Button.

3. Duster Control Menu

Press the MENU key until the following appears on the screen:

* DUST CTRL&RSET

0400 HIT EXT ENT

While this screen is displayed, pressing the **DOWN ARROW** key will unwind a portion of duster cloth; pressing the **UP ARROW** will wind up the duster cloth. If the Up Arrow does not work check the Wind-Up Switch; Input 010 could be stuck.

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If more cloth needs to be unwound, press the **START** **BUTTON** on the handle. By holding down this button the cloth will unwind until the button is released. Pressing the start button on the handle again will wind up the cloth until the wind-up switch is actuated (Input 10).

This is very handy when changing the duster cloth. With the handle folded over in the transport position the start button is close to the Cleaning Compartment, right where you need it.

To reset the duster cloth counter, press the **EXIT** then **ENTER** keys while this screen is displayed. Be certain to perform this procedure each time a new roll of duster cloth is installed. After pressing EXIT and then ENTER, the display will change to:

ARE YOU SURE ???
NEW DUSTER ROLL?

This prompt is asking you to make sure you want to reset the duster counter and the default unwind time. If a NEW roll of cloth is being installed press the **EXIT** and then **ENTER** key AGAIN while this screen is displayed. If a new roll is not being installed, press **MENU** to exit.

The next screen will confirm that the values have been reset. It appears on the display as:

DUSTER UNWIND 11
LANES LEFT0400

When reset, the counter will read "0400", the average number of lanes that a roll of cloth will last. It also resets the present unwind time of the duster cloth back to the default time (11).

The *unwind time* is the time the unwind motor is ON to let out duster cloth. While running the machine, this time value increments up one-tenth of a second every **35** conditioning or cleaning runs. These time values are needed to compensate for the changing size of the duster cloth rolls. The fresh roll gets smaller and needs more time to unwind the same amount of cloth.

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The purpose of this is to let out the same amount of cloth every lane. The machine must also unwind enough cloth to allow the cushion roller to contact the lane surface. If too little cloth is unwound, the machine will not clean as well.

IMPORTANT WARNING!!

It is imperative that the duster counter is not reset before the cloth is changed. If this is done, the unwind time will also be set back to the default. This will cause less cloth to be unwound per run.

A partially used supply roll is smaller in diameter than a fresh roll. When running the machine, the cushion roller will not be able to drop far enough to contact the lane. This could result in **bad stripping**.

These problems can be corrected without changing to a new roll of cloth. In the Managers Menu area under the menu "SYSTEM CONTROL DUSTER" the present unwind time can be increased by estimating the amount of cloth remaining.

When power is applied to the machine, if the amount of cloth remaining is less than the number of lanes in the center, the screen will flash the following:

DUST ALMOST OUT
0000 LANE WARNING!!

The remaining number of lanes of cloth will be displayed in the numbers below the message.

The machine can still be operated if this counter decreases to zero and there is still cloth left in the machine. When the supply cloth runs out, the number of additional lanes completed should be noted and the default number of lanes changed in the Managers Menu selections under "SYSTEM CONTROL DUSTER".

Once the cloth runs out the screen will display the following:

ERROR!! DUSTER
0000 CLOTH EMPTY

The cloth will need to be replaced to continue operating the machine.

4. Pump Output Volume Tests

Press the MENU key until the following appears on the screen:

*** PUMP OUTPUT
VOLUME TESTS**

With these menus you will be able to find out exactly how much oil you are using on each lane in Milliliters or Cubic Centimeters (cc).

You can calculate how much oil is being applied per board for every board on the lane, and how much oil is being pumped out by each revolution of the conditioner Pump.

- A.** Hit the NEXT key and the following menu will appear:

**TEST: PROGRAM#01
FWD OIL VOL.<-->**

In this menu you can test the exact quantity of oil for both forward and reverse runs separately. This can be done for any of the 7 programs presently in the memory of the PC.

Using the Up and Down Arrows will change the number in the upper right corner of the screen. Changing this will automatically select that program, you will not need to hit ENTER.

1. Remove the oil tip from the moving head by pushing down and turning counter-clockwise.
2. Place the tip into a clean 25 or 50 ml graduated cylinder.

3. Press the **LEFT** arrow. This will start the oil pump motor running. If the machine is cold let the pump run for approximately 30 seconds.

4. Then press the **RIGHT** arrow. The Oil Head will start running back and forth across the transfer brush as if the machine were operating on the lane. The Oil Program Valve will be turning on and off.

When it finishes the FWD run, the upper left corner of the screen will switch to REV. This designates that the next test will be the reverse oil program.

5. Note the amount in the graduated cylinder.

6. Now press the **LEFT** arrow again, wait 5 seconds, and press the **RIGHT** arrow. The Oil Head will start running again and the programmed amount for the reverse oil will now be dispensed into the graduate.

Note: How to calculate the actual amount of conditioner that each program should dispense is explained in the beginning of **Section VIII - Oil Patterns**.

IMPORTANT! If different readings occur during calibration there may be a problem with the oiling head as it travels across the width of the machine. During calibration, the oil is dispensed while the head travels from one side to the other. If the head binds up and travels too slowly, more oil will be dispensed and the readings will be higher (since pump runs at constant speed). Make sure the head moves freely on the rectangular bar. Only a slight resistance of the motor gearbox should be felt when the head is moved by hand. However, there should not be excessive play or wobble in the oiling head. After cleaning and lubricating the bar, adjust the belt tension if needed. Make a habit of cleaning the lint and hair from the head after running the machine to avoid this problem.

- B. Press the **NEXT** key and the following menu will appear.

TEST: VOLUME PER

BOARD HIT: <-->

This menu is used for calibrating the amount of oil applied per board per pass of the Oil Head.

1. After removing the tip from the head, place it in a clean 25 or 50 ml graduated cylinder.
2. Press the **LEFT** arrow and wait about 5 seconds. The pump will turn on.
3. Press the **RIGHT** arrow. The Oil Head will start traveling and the oil for **400 boards** will be dispensed into the graduate. The default setting for the metering pump will be 40 microliters per board.
4. The amount in the graduated cylinder should be **16 milliliters**. The math is simple: 400 times 40 microliters is 16,000 microliters. To convert this to milliliters (amount shown in the cylinder), this is divided by 1000. The result is 16 milliliters.

CONVERSION NOTE: 1000 microliters is equal to 1 Milliliter.

- C. Press the **NEXT** key and the following menu will appear.

TEST:VOL PER REV
FOR 0000 REVS

This Menu measures the RPM of the pump. It is used to make sure the pump and motor are warmed up and running at a consistent speed.

This test can be run just before the machine is used each day. Run the test 3 or 4 times until the actual number of revolutions comes out the same each time.

**IT IS ESPECIALLY IMPORTANT
TO RUN THIS TEST IN COLD AREAS OR
WHEN USING VERY HIGH VISCOSITY OILS.**

1. Remove the tip from the head and place it in a small container.
2. The pump runs automatically when put in this menu.
3. Press the LEFT arrow and the pump motor will run approximately **532-533** revolutions (at 60 Hz) or approximately **429-430** revolutions (at 50 Hz).

This menu is important to make sure the pump is running at a consistent speed.

5. Tech Support

Press the MENU key until the following appears on the screen:

* TECH SUPPORT
CALL 863-7340200

This is the manufacturer's phone number to call if you have any questions about the Sanction® Standard Elite. A technician from Lane Maintenance Central® is available to assist you on this equipment or any questions about lane maintenance.

6. Copyright

The operating program of the machine is © Copyright protected. Do not attempt to make unauthorized copies of the program or download it into a machine without obtaining permission from Kegel. When pressing MENU, the following screen will appear:

(C) COPYRIGHT
KEGEL CO 2005

In addition to the © Copyright protection, Kegel also owns many of the trademarks and service marks on the machine. These include, but are not limited to, **KEGEL**, the **KEGEL Bird Logo**, **Sanction**, **Standard**, and **Elite**.

F. Operator RUN PREP Options

The operator of this equipment is given two convenient options prior to running the machine. These are called the RUN PREP options, and MUST BE SELECTED BEFORE pressing the Start Button on the Handle.

The RUN PREP keys are located near the right hand side of the keypad.

Once the Starting and Last Lanes have been chosen and the Start key on the keypad has been pressed the following prompt will be displayed:

0000 #01 IS NEXT

0000 0000 01

At this time either one of the RUN PREP options can be activated. **NOTE:** If the Start Button on the Handle has not been pressed these buttons will NOT work.

1. Pre-soak

NOTE: If the Pre-soak option is going to be used the machine should first be pushed onto the lane surface. This will insure that cleaner is not sprayed onto the approach where the cleaner may damage the approach finish.

Pressing the PRIME PUMP key will activate the cleaner head. The head will travel one complete pass and apply extra cleaner to the front of the lane. The pump motor is continuously running. Pressing the "Prime Pump" button will dispense cleaner at any time.

2. Test Clean

The TEST CLEAN option is available to the operator when cleaning and conditioning are being done simultaneously.

When the TEST CLEAN key is pressed the keypad display will change to:

TEST CLEAN #01
0000 0000 01

The TEST CLEAN key will separate the simultaneous run into a separate run, with the machine stopping at the foul line after cleaning. The machine will perform the TEST CLEAN function using the same speed settings as programmed for the conditioning run. Press the START button on the handle to test clean the lane.

After the machine returns to the foul line, the screen will display:

NOW TO OIL #01
HIT START BUTTON

At this point the stripping of the lane can be examined to ensure cleaning is still adequate.

The Start Button on the HANDLE will need to be pressed a second time for the machine to condition the lane. Once the first lane is completed the display will return to the normal display for the second lane.

THIS CONCLUDES ALL MENUS AND FUNCTIONS
ACCESSIBLE WITHIN THE OPERATORS MENUS!

G. Managers Menu Selections

The operation of the machine is controlled by a series of programs located within the memory of the programmable computer. These programs and settings may be changed or modified by following a simple sequence of prompts within the available menus displayed on the keypad. This section will lead the Manager step-by-step through menus and prompts that are available.

**TO ACCESS THE FOLLOWING MENU SELECTIONS, IT WILL BE
NECESSARY TO INPUT THE MANAGERS PASSWORD!**

The Managers Password is a series of three key entries on the keypad which will allow access to the machine's Manager Menus. To enter the password, the keypad LCD must be displaying the * **DUST CTRL&RSET** screen.

The factory-set password information will be given to the Manager by the Authorized Technician during the machine's installation.

To have the Managers Password changed, please contact your Authorized Distributor, or Kegel's Lane Maintenance Central®.

For additional protection, there is a second password to protect the **Change Program Settings Menus** within the Manager's Menus. It will be necessary to have both passwords to make changes to the machine's cleaning/conditioning programs.

The following numbers can be used when changing Password #1 (Manager Menu): 1, 3, 4, 6, 7, 8, and 9.

The following numbers can be used when changing Password #2 (Change Program): 1, 2, 3, 4, 6, 7, 8, and 9.

To make this section easily understandable, the Manager should be familiar with the keypad as detailed in Section II of this manual.

1. Override Auto Program

This menu allows the Supervisor to override the Auto Program Selection and enter a manual program selection for the current conditioning run.

When the Managers Password is first entered, the following screen will appear:

* OVERRIDE AUTO
01 PROGRAM 01

The number 01 will be displayed with this prompt, one on the lower right side of the display and one on the lower left. Use the **UP or DOWN ARROWS** to change the program number. When the desired program number is reached, press the **ENTER** key.

NOTE: Programs selected in the Override Menu will only override the normal Auto Program selection for one cleaning/conditioning run, whether it is the entire center or only a portion. Once all designated lanes have been cleaned/conditioned, or if machine has been stopped and "starting" and "ending" lane numbers have been re-entered, the program used will revert back to the Auto Program Selection.

This concludes the OVERRIDE AUTO PROGRAM menu.

2. Change Program Settings

Seven (7) factory-preset cleaning and/or conditioning patterns are stored in the computer's memory. These preset programs may be altered in the CHANGE PROGRAM SETTINGS menu. This menu cannot be accessed without entering the Manager's Secondary Password. Password #1 allows operators to enter the Managers Menus, but the Program Settings are protected by a second password.

To see a sample graph and default settings for each of the patterns applied by the programs, please see Section IX in this manual.

To access the next menu option, press **MENU**. The following prompt will appear:

```
* CHANGE PROGRAM  
01 <CHOOSE> 01
```

Along with this prompt will appear two numbers, one on the lower left side of the display, and one on the lower right. Both numbers will display the current program number.

To change the program number and continue through the sub-menus, enter the **secondary password**. Then use the UP or DOWN ARROWS to change the program number to the one that needs to be modified. The number on the right side of the display will change. When the correct number is reached, press the **ENTER** key. At this time, both numbers on the display will be the same as the program number you selected.

WARNING! If **ENTER** is not pressed the program will revert back to what was in the left corner, and you will be changing a different program than you intend.

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To continue within the menu, press **NEXT**. The following prompt will appear:

```
<1:CLEAN  2:OIL>
03  <3:BOTH>  03
```

The number displayed will indicate whether the lanes are going to be (1) cleaned only, (2) oiled only, or (3) both cleaned and conditioned when this program is used.

To select cleaning only, oiling only, or both, use the UP or DOWN ARROWS. The number on the right side of the display will change. When the correct number is reached, press the ENTER key. At this time, both numbers on the display will be the same.

NOTE: During a Cleaning Only Program, the travel speeds and shift points can be controlled by entering "phantom loads". To make the machine shift speeds at a specified point, **set the speed** and then enter loads until the prompt shows the desired footage for the shift point. This also works when the machine is set to clean and oil separately. The machine will automatically travel at 30 IPS after it has reached the Oil Pattern Distance. The pattern distance can be increased up to 55 feet.

To continue within the menu, press ENTER and then NEXT. The following prompt will appear:

```
<1:SIMULTANEOUS>
01<2:SEPARATE>01
```

This screen allows the option of cleaning and oiling the lane (2) separately, or (1) at the same time.

NOTE: If cleaning only or oiling only has been selected, this prompt will be forced to separate (02).

To select simultaneous or separate, use the UP or DOWN ARROWS. The number on the right side of the display will change. When the correct number is reached, press the ENTER key. At this time, both numbers on the display will be the same.

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To continue within this menu, press the **NEXT** key and the following prompt will appear:

START CLEANING

00 DISTANCE 00

This prompt will be displayed with two numbers showing the current distance to begin cleaning. To change this distance, use the UP or DOWN ARROWS. Once again, the right side number will change. Once the correct distance is reached, press ENTER and both numbers will display the new distance.

NOTE: For full lane cleaning, the Start Cleaning Distance should be set at "00". For back-end cleaning, enter the distance where cleaning should begin.

The duster cloth will not drop until the Start Cleaning Distance is reached. The first spray of cleaner will also be delayed on a back-end cleaning run to allow the squeegee time to lower into position.

To continue within this menu, press the **NEXT** key and the following prompt will appear:

END CLEANING

0720 DIST 0720

This prompt will be displayed with two numbers showing the current distance to end cleaning. The lower limit of this value is based on the oil pattern distance. The machine will not stop cleaning before it has reached the end of the oil pattern.

The upper limit of this menu is 750. If the End Cleaning Distance is too high, the machine may go too far into the pit. Use the Up or Down Arrows to adjust the value.

When setting this distance, allow a margin of error for forward travel. Do this by starting the machine a couple of inches past the foul line. This may cause the machine to stop short during the return travel, but it is easier to pull the machine onto the approach, than it is to pull it out of the pit. Once this value is determined all programs should be changed to this setting.

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To continue through the Change Program menu, press **NEXT** if the numbers shown for the End Cleaning Distance are correct. The following prompt will appear:

OIL ONLY DUST?
01 1-YES,0-NO 01

This prompt will be displayed with two numbers showing the current setting of the duster. During an OIL ONLY run, the operator has the opportunity to turn the duster off. This should only be used when conditioning on freshly cleaned lanes. The setting of this prompt will be ignored by the PC if the program is set to clean the lane.

To change this setting, use the UP or DOWN ARROWS. Once again, the right side number will change. Once the desired selection is reached, press ENTER and both numbers will display the new setting.

NOTE: The machine has the ability to run the buffer brush continuously during an oil only run. The default setting stops the brush while the machine is reversing directions. The operator must contact Tech Support to turn this feature on.

THIS CONCLUDES THE CLEANING PORTION OF THE PROGRAM, THE FOLLOWING PROMPTS MAKE CHANGES TO THE CONDITIONING PORTION OF THE PROGRAM.

NOTE: These selections will allow the operator to change the load size, the number of loads, the speed, and each menu of the selected conditioner program.

To continue within this menu, press the **NEXT** key and the following prompt will appear:

OIL PATTERN DIST

40 IN FEET 40

This prompt will be displayed with two numbers showing the current travel distance (buff out) for the conditioning portion of the program selected. To change this distance, use the UP or DOWN ARROWS. Once again, the right side number will change. Once the correct distance in feet is reached, press ENTER and both numbers will display the new travel distance.

IMPORTANT NOTE: If the UP or DOWN arrows are pressed in this screen, then ALL conditioning menus, both forward loads and reverse loads, must have the **ENTER key pressed 4 times** before the **NEXT** key will take you to another menu or the program change area can be exited. This will insure that overlapping load screens do not occur.

The following two menus control the buffer motor speeds. The settings in these menus control the shift points where the speed of the buffer motor changes during Forward and Reverse travel.

Continue within this menu by pressing **NEXT**. The following prompt will appear:

SLOW BUFF MED AT

45 MED OFF 45

Along with this prompt will appear two numbers, one on the lower left side of the display, and one on the lower right. Both numbers will display where the buffer will shift into MEDIUM speed. This number is the forward travel distance in feet.

To change this number, use the UP or DOWN ARROWS. The number on the right side of the display will change. When the correct number is reached, press the ENTER key. At this time, both numbers on the display will be the distance down the lane where the buffer will shift speeds.

To prevent the buffer from changing speeds, enter a value in this menu that is larger than the oil pattern distance. Since this number will never be reached, the program will ignore this setting and will buff the lane at high speed.

When a number is entered that is higher than the oil pattern distance, the second line of the display will change to **OFF**.

To continue within the menu press the **NEXT** key. The following prompt will appear:

SLOW BUFF LOW AT

47 LOW OFF 47

Along with this prompt will appear two numbers, one on the lower left side of the display, and one on the lower right. Both numbers will display where the buffer will shift into LOW speed. This number is the forward travel distance in feet.

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To change this number, use the UP or DOWN ARROWS. The number on the right side of the display will change. When the correct number is reached, press the ENTER key. At this time, both numbers on the display will be the distance down the lane where the buffer will shift into low speed.

To prevent the buffer from changing speeds, enter a value in this menu that is larger than the oil pattern distance. Since this number will never be reached, the program will ignore this setting and will buff the lane at high speed.

When a number is entered that is higher than the oil pattern distance, the second line of the display will change to **OFF**.

NOTE: The speed changes for the buffer motor should be from High to Medium to Low or from Low to Medium to High. Do not program the machine to shift from High to Low, then back to Medium. The speeds must flow in order for the machine's program to operate properly.

If this is correct, press the **NEXT** key. The following prompt will appear:

**01F 2L- 2R X 05
00->10 FT IPS=18**

01F is the menu number for the first load screen for forward oil. There are 15 possible load screens for forward oil. If the oil pattern distance is reached in less than 15 screens, then the remaining screens will not be shown.

The next item **2L- 2R** designates the load (the length of the stream of oil applied to the transfer brush) will run from the 2 board on the left to the 2 board on the right.

The next item **X 05** determines how many 2 to 2's will be applied, in this case it is 5. On the bottom line the **00->10 FT IPS =18** says that the machine will travel from 0 ft (the foul line) to 10 ft at 18 inches per second (IPS).

When the screen is first displayed, the left load size designator **2L** will be blinking. This means it is the one that can be changed.

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By pressing the UP ARROW once the 2L will increment to 3L. It is possible to increment this value to as close as **3 boards** away from the right side designator 2R. When the desired left side load designator is reached press ENTER and the right side designator 2R will begin blinking (kind of like a digital watch).

The blinking designator indicates the right load limit is ready to be changed. Use the Up or Down arrow until you reach your desired number, then press ENTER.

Now **05** will begin blinking, Up or Down arrow this to the number of loads you want and press ENTER.

Two things will now happen: 1)The **IPS** number will begin blinking, and 2)the **distance** it takes for that load screen will re-calculate.

For example, if you increase the load number from 5 to 6 the 00->10 FT will change to 00->12 FT. When you press ENTER, the 18 in IPS=18 is now blinking you now may Up Arrow or Down Arrow the speed.

The speed choices you have are 10, 14, 18, 22, 26, and 30. When the desired speed is reached press ENTER. This will be entered into memory.

Note: Speed changes should be an even flow from slower to faster, from one screen to the next. Speed changes will control the lengthwise taper of the pattern. They also allow the operator to add-in more loads and still have the last load be within the oil pattern distance.

After pressing ENTER, the left side load designator will now begin blinking again. Also, if the speed is changed it will re-calculate the area of the lane for that load sequence.

For example, if you have 5 loads at 18 inches per second, the area of the lane for that load sequence is 00->10 feet, and you change the speed to 14 inches per second, the area for that load sequence will change to 00->07 ft.

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During a Cleaning Only Program, the travel speeds and shift points can be controlled by entering "phantom loads" into these screens. To make the machine shift speeds at a specified point, **set the speed** and then enter loads until the prompt shows the desired footage for the shift point.

Note: The machine will automatically travel at 30 IPS after it has reached the Oil Pattern Distance. The pattern distance can be increased up to 55 feet.

ENTER may be pressed as many times as you want. Pressing ENTER simply steps the blinking variable from one to the next. In the future we will refer to this as "Entering Around". But remember, only the variable that is blinking will be changed with either the Up or Down Arrow at any given time.

If the Up or Down arrow is pressed while in this menu, the enter key must be pressed 4 times before the NEXT key will let you into the next load screen.

Now hit the **NEXT** key. The following menu prompt will appear:

**02F 9L- 9R X 01
10->12 FT IPS=18**

The 9L will be blinking. In the previous screen we left with the load area at 00 to 10 feet, the beginning screen in the second screen forward begins with the ending distance of the previous screen. The area for this screen is calculated from the number of loads and the speed.

Any changes here are performed the same way the first changes were entered. Remember you must press the ENTER key 4 times before you may use the NEXT key to go into the third screen.

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Press **NEXT** and the following menu will appear:

03F 10L-10R X 02
12->17 FT IPS=18

You may now change this screen to anything you want. Remember you must press enter 4 times after any changes of load number or speed before you may use **NEXT** to enter the next load screen.

Press **NEXT** and the following menu will appear:

04F 11L-11R X 03
17->27 FT IPS=22

You may now change this screen to anything you want.

Enter around and press **NEXT**, the following menu will appear:

05F 12L-12R X 01
27->30 FT IPS=22

You may now change this screen to anything you want.

Enter around and press **NEXT**, the following menu will appear:

06F 13L-13R X 01
30->33 FT IPS=22

You may now change this screen to anything you want. Since the area for this load screen is getting close to the overall oil distance set previously ... there is one more rule.

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* Remember the area for the each load is calculated with the ending distance of the previous load screen. This is the starting distance for each successive screen.

The ending distance is calculated with the number of loads versus the speed that the machine is programmed to travel. This is added to the starting distance for each screen.

When changing the number of loads, the program will not allow you to increment the number so that it takes the ending distance beyond the oil travel distance. It won't let you increase the speed so that it takes you beyond the oil pattern distance either.

Remember to hit **ENTER** 4 times. Press **NEXT** and the following menu will appear:

07F 15L-15R X 00
33->40 FT IPS=22

The **last load screen forward must have a 00** for the number of loads. This screen is the buffer distance control. It is a real good idea to always **end all loads at least 4 feet** before the end of travel. This gives time for the last load to get from the brush to the lane.

When 00 for the number of loads is entered and ENTER is pressed on the speed variable, the next blinking variable will now be the ending distance for that screen.

It is possible to increment it up to the travel distance. When the oil travel distance is reached as the ending distance for the screen you are in, it concludes the oil forward screens. Even though 15 screens are possible, the program will show only those needed to reach the travel distance.

Note: If you were to go into the screen with the last oil distance to increment the number of loads from 0 to 1, the program will not allow you to increase the number of loads until you "enter around" to the travel distance and decrement it. Use the down arrow to change it to something less than the oil pattern distance. You may then enter around to the number of loads and change it.

Don't forget you must hit ENTER 4 times after changing any speed or number of loads. If you do this it will open up another forward screen when you press the NEXT key.

The number of loads will be 00 automatically and the ending distance could be anything above the oil travel distance (or even below the starting distance of that screen). Be very careful in this instance. Be sure and enter around and increment the distance up or even down to the oil distance.

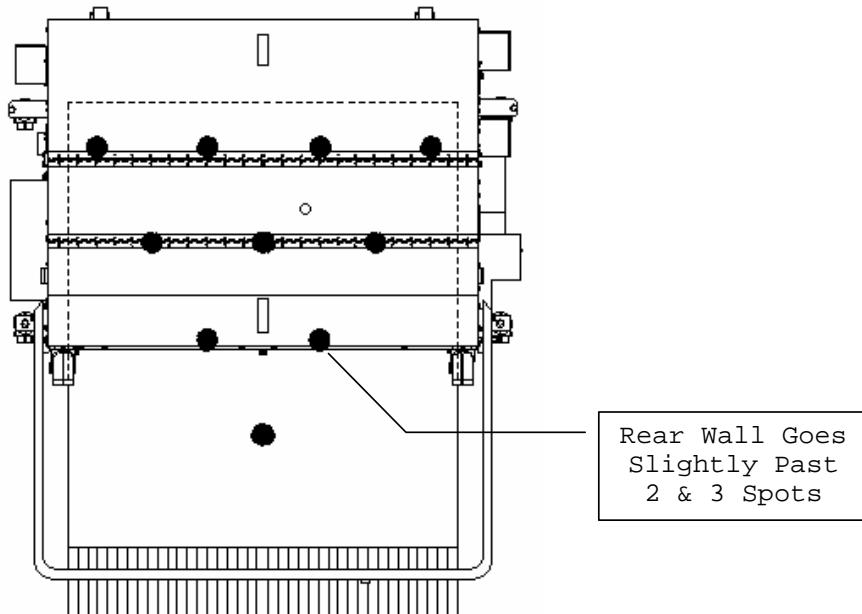
If each screen going forward does not flow from the foul line to the travel distance, the machine will not function properly. Overlapping load areas are only possible when opening up new screens previously not used.

It is also possible to make the machine have loads right up to the travel distance. This is not recommended. You should set the program so that it has at least 4 feet of buff only. In other words you should have it finish loading at least 4 feet before the oil travel distance. The last screen forward must be 0 loads.

After applying the conditioner loads for the forward pass, the machine will continue down the lane (when cleaning) and enter the pindeck area at a speed of 10 inches per second. This slower speed gives the vacuum a better chance to pick-up the cleaner and oil.

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The machine should clear the tailplank as shown in the diagram below.



During the reverse travel, when the machine is set to reverse at SLOW speed, the machine will shift speeds twice in the pindeck area; once into 14 inches per second, then into 22 IPS, before shifting into high speed. This will allow the operator time to work the cord around obstructions, or get out of the way when resuming the machine.

The operator can also choose for the machine to travel at a faster speed of 18 IPS, shifting to 30 IPS, then to high speed. This option is available in the System Control Cleaning menu.

RETURN OIL SCREENS

When the last screen forward has been entered you may now proceed to the next screen.

Press **NEXT** and the following menu will appear:

**01R 2L- 2R X 00
40->28 FT IPS=26**

Notice the screen number is now 01 again and the F has changed to an **R** (meaning reverse). The area for load screen now starts at the oil travel distance and goes down.

The IPS=26 inches per second. This value can be set at 48 IPS in this screen if desired. It is possible to travel in high speed (48 inches per second) in the first screen in reverse only.

To continue in this menu, remember to press the ENTER key 4 times in each load screen to allow yourself to the next screen (if any changes were made to a reverse load screen). Press **NEXT** and the following menu will appear:

**02R 12L-12R X 02
28->22 FT IPS=18**

You may now change this screen to anything you want.

Press **NEXT** and the following menu will appear:

**03R 11L-11R X 02
22->17 FT IPS=18**

You may now change this screen to anything you want.

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Press **NEXT** and the following menu will appear:

**04R 10L-10R X 02
17->12 FT IPS=18**

You may now change this screen to anything you want.

Press **NEXT** and the following menu will appear:

**05R 8L- 8R X 01
12->10 FT IPS=18**

You may now change this screen to anything you want.

Press **NEXT** and the following menu will appear:

**06R 8L- 8R X 01
10->08 FT IPS=14**

You may now change this screen to anything you want.

Press **NEXT** and the following screen will appear:

**07R 2L- 2R X 00
08->00 FT IPS=14**

The last screen in reverse should always end a minimum of **4 feet** before the foul line (or 0 feet). If more than 2 or 3 loads are set for reverse, then end the loads even sooner.

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If you don't want the loads to affect the oil pattern on the next lane, then you must pay attention to where the loads end, and how far the machine can travel as it buffs to the foul line.

There are 15 screens possible in reverse. When the 15th screen is reached, going forward or reverse, the number of loads is forced to 0. The load area last distance is forced to the oil distance going forward, and forced to 0 when going in reverse.

Press **NEXT** and the following menu will appear:

NEXT TO REVIEW

*** MENU TO EXIT ***

In this screen you may press **NEXT** to review the current program settings from the top of the menu, or press **MENU** to exit the Change Program Settings and go into the another Managers Menu.

This concludes the CHANGE PROGRAM SETTINGS menu.

3. Change Auto Program Select

To reach this menu, press the MENU key in the Managers area until the following screen appears:

*** CHANGE AUTO
PROGRAM SELECT**

This menu allows the supervisor to choose the specific conditioning programs to be used for each day of the week within each time period of the day. It also allows the flexibility to change conditioning patterns up to a maximum of **3 times** per operation across the center.

The "real time" clock in the machine's PC keeps track of the time of day and will run the program selected for that specific time period. The time periods are not broken down by the hour, but rather are separated into two time categories, AM and PM.

For example, a conditioning program selected for Monday AM means that operation of the machine any time between 12:01 AM and 12 Noon will apply that selected conditioner program.

To continue within this menu, press the **NEXT** key and the following prompt will appear:

**MON AM01 PROG 01
LANES 01 THRU 16**

When this screen first appears the current program number will flash on and off, designating that the selection being made will be for the program number. Use the UP or DOWN ARROWS to select the number, and press ENTER once it has been reached.

At this point the last lane number will flash. Again use the UP or DOWN ARROW to select the number, pressing ENTER when it has been reached.

NOTE: At any time during this section, if the last lane number for the AM or PM setting is equal to the total number of lanes in the center, the remaining program screens will be skipped. The display will change to the next screen (AM01 or PM01). The number of lanes in the center sets the upper limit in the Auto Program Select Menus.

Press **NEXT** and the following screen will now appear:

MON AM02 PROG 02
LANES 17 THRU 32

When this screen first appears, the current program number will flash on and off. Use the UP or DOWN ARROWS to change the program number, and press ENTER once it has been reached.

At this point again, the last lane number will flash. (The first lane number will automatically be one more than the last lane selected in the previous menu screen.) Use the UP or DOWN ARROW to select the correct number, pressing ENTER when it has been reached.

Press **NEXT** and the following screen will now appear:

MON AM03 PROG 01
LANES 33 THRU 50

Again the program number will flash. Select the correct number by using the UP or DOWN ARROW. (The last lane will automatically be displayed as the last lane in the bowling center for the 3rd change.)

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Press **ENTER** and **NEXT** and the following screen will appear:

MON PM01 PROG 01
LANES 01 THRU 50

Continue through these screens using the same procedure for entering numbers as explained previously for Monday AM.

The manager will have the opportunity to select programming for the following days and times:

Displayed Prompt Day / Time:

MON AM (1 through 3) Monday, 12:01 AM - 12 Noon

MON PM (1 through 3) Monday, 12:01 PM - Midnight

TUES AM (1 through 3) Tuesday, 12:01 AM - 12 Noon

TUES PM (1 through 3) Tuesday, 12:01 PM - Midnight

WED AM (1 through 3) Wednesday, 12:01 AM - 12 Noon

WED PM (1 through 3) Wednesday, 12:01 PM - Midnight

THURS AM (1 through 3) Thursday, 12:01 AM - 12 Noon

THURS PM (1 through 3) Thursday, 12:01 PM - Midnight

FRI AM (1 through 3) Friday, 12:01 AM - 12 Noon

FRI PM (1 through 3) Friday, 12:01 PM - Midnight

SAT AM (1 through 3) Saturday, 12:01 AM - 12 Noon

SAT PM (1 through 3) Saturday, 12:01 PM - Midnight

SUN AM (1 through 3) Sunday, 12:01 AM - 12 Noon

SUN PM (1 through 3) Sunday, 12:01 PM - Midnight

This concludes the program selections that can be used for the AUTO PROGRAM SELECT feature.

4. System Control Cleaning

This series of screens will be used to adjust various cleaning features in the machine's program.

Press the MENU key until the following screen appears:

*** SYSTEM CONTROL
CLEANING**

Press the NEXT key and the following will appear:

**FIRST SPRAY TIME
04 TENTHS 04**

This prompt allows the operator to set how long the First Spray of cleaning solution will stay on. Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired time is reached, press ENTER.

**SPRAY ON TIME
04 IN TENTHS 04**

This prompt, along with the two numbers displayed, is referring to the amount of time for the spray to be "ON" each time cleaning solution is sprayed. (NOTE: The number shown refers to "tenths" of seconds. For example, "04" is actually 0.4 seconds.)

To change the time, use the UP or DOWN ARROW keys. Once again, the right side number will change. When the correct number is reached, press ENTER and both numbers will display the new "Spray On Time".

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If this number is correct, press **NEXT** and the following will appear:

SPRAY OFF DIST.

30 IN INCHES 30

The two numbers displayed on this screen refer to the amount of DISTANCE between sprays. (NOTE: The number shown refers to INCHES. For example, "30" is actually 30 INCHES between spray pulses.)

To change the time, use the UP or DOWN ARROW keys. Once again, the right side number will change. When the correct number is reached, press ENTER and both numbers will display the new "Spray Off Distance".

IMPORTANT!

Correct adjustment of the "Spray On" times and "Spray Off" distances is critical to proper cleaning. For example, if a film remains on the outer boards of the lane, a decrease of the "off" distance and an increase of the "on" time, or both, may be needed. The center jets may also be adjusted if a film remains in the center of the lane.

If this number is correct, press **NEXT** and the following will appear:

LAST SPRAY DIST

45 IN FEET 45

The number displayed will refer to the distance in feet down the lane at which no more sprays of cleaner will be made. To change this distance, use the UP or DOWN arrows. Once the correct distance is reached, press ENTER and both numbers on the display will reflect the new Last Spray Distance.

NOTE: When cleaning the lanes there is an option for a pideck spray. The machine will place an additional spray just in front of the pideck to ensure it is well-cleaned. This allows the last spray distance to be reduced (as short as the oil pattern distance) if desired.

Press the **NEXT** key and the following will appear:

LIFT DUSTER
70 ADJUST 70

This prompt allows the operator to set where the machine will lift the duster. This feature should be used to lift the cushion roller before reaching the end of the pindeck. Lifting the duster early may help eliminate excessive moisture from being pushed off the tail plank.

The numbers on the second line of the display are the number of counts from the end of the travel distance where the duster will lift. Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired number is reached, press ENTER.

Press the **NEXT** key and the following will appear:

PINDK SPRAY DIST
18 ON 18

This prompt allows the operator to add an extra spray of cleaner as the machine enters the pindeck. This will help ensure the proper amount of solution is available to clean the pindeck. If too much cleaning fluid is used on the pindeck, moisture may be pushed off the tail plank. Use this menu to control if, and where the pindeck spray occurs.

The number on the second line of the display is the number of counts from the end of the travel distance where the pindeck spray will occur. If the spray is going into the pit the pins should not be on the deck.

Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired number is reached, press ENTER.

The middle of the second line shows whether the spray is ON or OFF. To change this setting press the ON/OFF key located in the TEST I/O Section of the keypad.

NOTE: Failure to remove the pins from the deck prior to spraying cleaner reduces the cleaning efficiency in the pindeck area and may contribute to Out-of-Range calls.

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Press the **NEXT** key and the following will appear:

PAUSE AND SUCK
00 TENTHS 00

Don't Laugh! This prompt allows the operator to stop the machine momentarily in the pindeck to allow the vacuum to collect more fluid. By stopping the machine, less fluid is present in the pindeck to be pushed off the back of the tail plank. Use this menu to control how long the machine pauses to extract moisture.

The numbers on the second line of the display are in tenths of a second. The machine will not stop with a setting of 00. Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired time is reached, press ENTER.

Press the **NEXT** key and the following will appear:

SPEED OUT OF PIT
**** SLOW ****

This prompt allows the operator to choose whether the machine will reverse out of the pit area at a slow speed, or a fast speed.

During the reverse travel, when the machine is set to reverse at SLOW speed, the machine will shift speeds twice in the pindeck area; once into 14 inches per second, then into 22 IPS, before shifting into high speed (48 IPS). This will allow the operator time to work the cord around obstructions, or get out of the way when resuming the machine.

When the machine is set to reverse at the FAST speed, the machine will shift into 18 inches per second, then into 48 IPS. The default setting for this menu is SLOW speed.

Press the ENTER key to change the speed the machine travels as it exits the pit.

This concludes the selections in the
SYSTEM CONTROL CLEANING menu.

5. System Control Distance

This series of screens will be used to adjust various travel distances in the machine's program.

* **DO NOT ADJUST THE SETTINGS ACCESSED BY THESE SCREENS UNLESS ABSOLUTELY NECESSARY!!**

Press the MENU key until the following screen appears:

*** SYSTEM CONTROL
DISTANCE**

Press the NEXT key and the following will appear:

**RETURN FOUL LINE
09 ADJUST 09**

This prompt allows the operator to adjust the travel distance of the machine as it travels from the pindeck to the foul line. The number on the second line of the display controls how much adjustment is made when traveling in reverse.

The zero point for this adjustment is 10, meaning the machine will travel the same number of counts forward and reverse. As the number in this menu gets larger than 10 the machine will travel further during its return (because it adds to the forward travel). Conversely, if the number is smaller the machine travels a shorter distance. This menu shows 09 as the adjustment value. This means if the machine is set to go 730 counts forward, it will travel 729 in reverse.

The math is simple, take the value shown in this menu and subtract it from 10. Then that result gets subtracted from the forward counts (End Cleaning Distance) to set the return travel counts. {i.e. $10 - 09 = 1$ then $730 - (1) = \underline{729}$ }

NOTE: Remember that when you subtract a negative number, it is the same as adding a positive number.

It is normal for the reverse travel to be less than the forward travel to prevent the machine from hitting hard at the foul line.

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Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired number is reached, press ENTER.

Press the **NEXT** key and the following will appear:

VACUUM DIST
20 OFF FOR 20

This screen is used to determine how long the vacuum motor will turn off as the machine returns to the foul line. This prompt tells the operator that the machine will move 20' in reverse with the vacuum OFF. At that point the vacuum motor will turn ON for the rest of the travel distance.

If dripping appears on the lane in reverse, the distance it remains OFF may need to be reduced.

This concludes the selections in the
SYSTEM CONTROL DISTANCE menu.

6. System Control Buffer

This series of screens will be used to adjust the distance on the lane in forward or reverse, where the buffing brush is lifted or set down.

Press the MENU key until the following screen appears:

* SYSTEM CONTROL
BUFFER

Press the NEXT key and the following will appear:

BUFF UP STP DELY
00 TENTHS 00

The machine is designed to allow the operator to stop the machine at the end of the oil pattern and lift the buffer brush for a defined oil line. We recommend that this be left at 00 because it is easier on the drive system, and it allows a short feathering out of the oil pattern.

This prompt displays the amount of time the machine will be stopped prior to continuing down the lane. Use the UP or DOWN ARROW to change the number on the right side of the screen. If you want a clean defined oil line, then set this variable to 04 or 05. Less will not give the clean line and more is a waste of valuable time.

What must be done with this menu is really up to the interpretation of your local ABC lane inspection representative. It depends on where they choose to take the graphs of the oil pattern. If the representative insists on taking the tape in the last 12" of the pattern, you will need to enter a stop delay value so the machine has a clean line for them to measure from.

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Press the **ENTER** and then the **NEXT** key and the following will appear:

DROP BUFFER ADV
72 INCHES 72

The machine is designed to lower the Buffing Brush during a simultaneous cleaning and conditioning run when return oil is being applied. It will be traveling at 47-48 inches per second in high speed. For the Buffing Brush to contact the lane at the programmed distance, it must start lowering prior to reaching that distance.

By changing this setting the brush will be lowered onto the lane at, prior to, or after the designated conditioning distance.

The Voltage Supply in the bowling center ultimately determines the final high speed of each machine. Simply watch the operation of the buffer as it is returning from the pindeck. Adjust the *Drop Buffer Advance* until the buffer turns on at the desired location in reference to the end of the oil pattern.

Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired number is reached, press **ENTER**. The factory default for this parameter is 72.

This concludes the selections in the
SYSTEM CONTROL BUFFER menu.

7. System Setup Clock Menus

This series of screens will allow the operator to change the clock settings.

Press the **MENU** key until the following screen appears:

* SYSTEM SETUP
CLOCK

Press the **NEXT** key, the following screen will appear:

SET CLOCK TIME
00 MINUTE 00

Once this screen is entered the internal clock will stop. Use the UP or DOWN ARROWS to change the number displayed on the right. When the number displayed is correct press ENTER. Both numbers displayed will be the same.

Press the **NEXT** key, the following screen will appear:

SET CLOCK TIME
00 HOUR 00

Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired hour number is reached, press ENTER.

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Press the **NEXT** key, the following screen will appear:

SET CLOCK DAY
00 OF MONTH 00

Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired day number is reached, press ENTER.

Press the **NEXT** key, the following screen will appear:

SET CLOCK
00 MONTH 00

Use the UP or DOWN ARROW to change the number on the right side of the screen. When the correct month number is reached, press ENTER.

Press the **NEXT** key, the following screen will appear:

SET CLOCK
00 YEAR 00

Use the UP or DOWN ARROW to change the number on the right side of the screen. When the desired year number is reached, press ENTER.

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Press the **NEXT** key, the following screen will appear:

SET CLOCK DAY
00 SUNDAY 00

Use the UP or DOWN ARROW to change the day code on the right side of the screen. When the desired code number is reached, press ENTER.

Use the following guide for the day codes:

SUNDAY	00
MONDAY	01
TUESDAY	02
WEDNESDAY	03
THURSDAY	04
FRIDAY	05
SATURDAY	06

This concludes the selections in the
SYSTEM SETUP CLOCK menu.

8. System Control Duster Menus

This series of screens will be used to adjust the duster unwind and default times. It is also possible to change the default number of lanes that a new roll of cloth will clean.

Press the **MENU** key until the following screen appears:

* SYSTEM CONTROL
DUSTER

Press the **NEXT** key, the following screen will appear:

PRESENT UNWIND
10 TIME 10

This screen will display the current unwind time setting for each "ratchet" of cloth. This number will automatically increase as the size of the supply cloth roll decreases. This value will return to the default setting when a new roll of cloth is installed and the cloth counter is reset.

This prompt is referring to the amount of time in tenths of seconds. The "10" is actually 1.0 seconds. The time can be adjusted by using the UP or DOWN ARROWS. When the desired time is reached, press ENTER.

NOTE: Resetting the DUSTER counter prior to the roll of cloth being empty could reduce the cleaning efficiency of the machine. The cushion roller must be allowed to drop far enough to contact the lane. In this menu it is possible to correct the present unwind time if one of your pinchasers has presented you with this problem.

The unwind time varies from 10 for a fresh roll to 21 for an almost empty roll. If accidentally reset, use an educated guess on how much of the roll is already used and set your time accordingly. EXAMPLE: If the roll is about half used then set the time to 15.

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Press the **ENTER** and then the **NEXT** key, the following screen will appear:

DEFAULT UNWIND
10 TIME 10

This screen displays the default time for unwinding the duster cloth. This is the unwind time for the cloth when a new roll is installed and the duster counter is reset.

If the value is increased, more cloth will be unwound. If the value is decreased, less cloth will be unwound.

Changes can be made to this number by using the UP or DOWN ARROWS. Use **ENTER** to lock in any changes.

Press the **ENTER** and then **NEXT** key, the following screen will appear:

DUST EMPTY # LNS
0400 ADJUST 0400

This screen displays the default number of lanes that a new roll of cloth will complete. When the duster counter is reset, after installing a new roll of cloth, this is the value that will be displayed.

If changes have been made to the default unwind time, this value may need to be changed. Use the UP or DOWN ARROWS to change the value. When the correct value is displayed press **ENTER**.

This concludes the selections in the
SYSTEM CONTROL DUSTER menu.

9. Adjust Drive IPS Menus

This series of screens will be used to adjust the various drive speeds as the machine changes from 1st to 7th. Six speeds are used for conditioning, with one high speed (7th) for returning to the foul line.

The adjustments are made by entering a value into the following screens. This value is used by the analog card of the PC assembly to regulate the voltage coming from the speed control board.

DO NOT ADJUST THE IPS ACCESSED BY THESE SCREENS

UNLESS THE SPEEDS ARE INCORRECT!!

USE CAUTION WHEN ADJUSTING THE SPEEDS.

THE DRIVE MOTOR WILL BE OPERATING AS ADJUSTMENTS ARE MADE.

Press the **MENU** key until the following screen appears:

*** DRIVE IPS ADJ**

PRESS NEXT

Press the **NEXT** key, the drive motor will run in low speed and the following will appear:

*** USE ARROWS 1**

0750 TO ADJ 10

The prompt is telling the operator that the drive motor is running in low speed (1). The number on the lower right side of the display indicates the speed of the drive wheel surface. This speed is being displayed in INCHES PER SECOND.

To change the first speed, use the UP and DOWN ARROWS to make small adjustments to the number on the lower left side of the display. Use the LEFT and RIGHT ARROWS to make adjustments by 10 to the number on the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press NEXT. The factory setting for the first speed is 10 inches per second.

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After pressing the **NEXT** key, the drive motor will run in 2nd speed and the following will appear:

*** USE ARROWS 2
1010 TO ADJ 14**

The prompt is telling the operator that the drive motor is running in second speed (2). The number on the lower right side of the display indicates the speed of the drive wheel surface. This speed is being displayed in INCHES PER SECOND.

To change the second speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press NEXT. The factory setting for the second speed is 14 inches per second.

After pressing the **NEXT** key, the drive motor will run in 3rd speed and the following will appear:

*** USE ARROWS 3
1350 TO ADJ 18**

The prompt is telling the operator that the drive motor is running in third speed (3). The number on the lower right side of the display indicates the speed of the drive wheel surface. This speed is being displayed in INCHES PER SECOND.

To change the third speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press NEXT. The factory setting for the third speed is 18 inches per second.

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After pressing the **NEXT** key, the drive motor will run in 4th speed and the following will appear:

* USE ARROWS 4
1640 TO ADJ 22

The prompt is telling the operator that the drive motor is running in fourth speed (4). The number on the lower right side of the display indicates the speed of the drive wheel surface. This speed is being displayed in INCHES PER SECOND.

To change the fourth speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press **NEXT**. The factory setting for the fourth speed is 22 inches per second.

After pressing the **NEXT** key, the drive motor will run in 5th speed and the following will appear:

* USE ARROWS 5
1910 TO ADJ 26

The prompt is telling the operator that the drive motor is running in fifth speed (5). The number on the lower right side of the display indicates the speed of the drive wheel surface. This speed is being displayed in INCHES PER SECOND.

To change the fifth speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press **NEXT**. The factory setting for the fifth speed is 26 inches per second.

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After pressing the **NEXT** key, the drive motor will run in 6th speed and the following will appear:

* USE ARROWS 6
2255 TO ADJ 30

The prompt is telling the operator that the drive motor is running in sixth speed (6). The number on the lower right side of the display indicates the speed of the drive wheel surface. This speed is being displayed in INCHES PER SECOND.

To change the sixth speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press **NEXT**. The factory setting for the sixth speed is 30 inches per second.

After pressing the **NEXT** key, the drive motor will run in 7th speed and the following will appear:

* USE ARROWS 7
3970 TO ADJ 48

The prompt is telling the operator that the drive motor is running in high speed (7). The number on the lower right side of the display indicates the speed of the drive wheel surface. This speed is being displayed in INCHES PER SECOND. Input voltage to the machine may affect HIGH SPEED.

To change the high speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press **NEXT**. The factory setting for the high speed is 48 inches per second.

NOTE: Do not operate the machine at a speed higher than 48 IPS. This can cause miscounts during high speed travel and may cause errors or improper machine operation.

Pressing the **NEXT** key will advance the display to the start of this menu, **MENU** advances to next Managers Menu and **EXIT** will bring the Operators Menus to the screen.

This concludes the selections
in the ADJUST DRIVE IPS menu.

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10. Adjust Buffer RPM Menus

This series of screens will be used to adjust the three buffer motor speeds of the machine. The adjustments are made by entering a value into the following screens. This value is used by the analog card of the PC assembly to regulate the voltage coming from the speed control board.

DO NOT ADJUST THE RPM ACCESSED BY THESE SCREENS

UNLESS THE SPEEDS ARE INCORRECT!!

USE CAUTION WHEN ADJUSTING THE SPEEDS.

THE BUFFER MOTOR WILL BE OPERATING AS ADJUSTMENTS ARE MADE.

Press the **MENU** key until the following screen appears:

*** BUFFER RPM ADJ**

PRESS NEXT

Prepare for the buffer to operate and then press the **NEXT** key, the buffer motor will run in low speed and the following will appear:

*** USE ARROWS 1**

0230 TO ADJ 0060

The prompt is telling the operator that the buffer motor is running in low speed (1). The number on the lower right side of the display indicates the surface speed of the buffer brush. This speed is being displayed in REVOLUTIONS PER MINUTE.

To change the first speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display (UP ARROW = +1; DOWN ARROW = -1; LEFT ARROW = -10; RIGHT ARROW = +10).

As this number is adjusted the speed of the motor will change. When the desired setting is reached press **NEXT**. The factory setting for the first speed is 60 revolutions per minute.

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After pressing the **NEXT** key, the buffer motor will run in 2nd speed and the following will appear:

*** USE ARROWS 2**
0350 TO ADJ 0120

The prompt is telling the operator that the buffer motor is running in second speed (2). The number on the lower right side of the display indicates the surface speed of the buffer brush. This speed is being displayed in REVOLUTIONS PER MINUTE.

To change the second speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press **NEXT**. The factory setting for the second speed is 120 revolutions per minute.

After pressing the **NEXT** key, the buffer motor will run in high speed and the following will appear:

*** USE ARROWS 3**
1560 TO ADJ 0720

The prompt is telling the operator that the buffer motor is running in high speed (3). The number on the lower right side of the display indicates the surface speed of the buffer brush. This speed is being displayed in REVOLUTIONS PER MINUTE.

To change the high speed, use the DIRECTIONAL ARROWS to adjust the number on the lower left side of the display. As this number is adjusted the speed of the motor will change. When the desired setting is reached press **NEXT**. The factory setting for the high speed is 720 revolutions per minute.

Pressing the **NEXT** key will advance the display to the start of this menu, **MENU** advances to next Managers Menu and **EXIT** will bring the Operators Menus to the screen.

This concludes the selections
in the ADJUST BUFFER RPM menu.

11. Systems To Be Monitored

This series of screens is useful to the manager to monitor various functions of the machine. These menus can also help the mechanic perform preventive maintenance on the machine.

Press the **MENU** key until the following screen appears:

* **SYSTEMS TO BE
MONITORED**

Press the **NEXT** key and the following screen appears:

**ODOMETER
0000 FT 0000 MI**

The Odometer will display the feet and miles the machine has traveled up to that point.

The machine is equipped with automatic maintenance checks. When one of these messages appear it will be necessary to clear it.

The Odometer screen will toggle between the current mileage and the following screen:

**TO CLEAR MAINT
MESSAGE HIT EXIT**

Follow the procedure outlined in Section VI to clear the message.

NOTE: To avoid clearing the Maintenance Message by mistake, the **MENU** key should be pressed before exiting the Managers Menu Selections!

Press the **NEXT** key and the following screen appears:

BUFFER SQUEEGEE
0000 HOURS 0000

This screen will display the number of hours the buffer motor and squeegee motor has been operating. The number on the left (below BUFFER) indicates the number of hours the buffer motor, belt, and bearings have been running. The number on the right (below SQUEEGEE) indicates the number of hours the squeegee blades have been used. If these components are replaced the value can be reset to zero.

The buffer motor hours can be reset by pressing the **Up Arrow** and the **Enter** key. The squeegee hours can be reset by pressing the **Down Arrow** and **Enter**.

Press the **NEXT** key and the following screen appears:

VAC MTR DRV MTR
0000 HOURS 0000

This screen will display the number of hours the vacuum motor and drive motor have been operating. The number on the left (below VAC MTR) indicates the number of hours the vacuum motor has been running. The number on the right (below DRV MTR) indicates the number of hours the drive motor has been running. If these motors or motor brushes are replaced the value can be reset to zero.

The vacuum motor hours can be reset by pressing the **Up Arrow** and the **Enter** key. The drive motor hours can be reset by pressing the **Down Arrow** and **Enter**.

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Press the **NEXT** key and the following screen appears:

SUN	LANES	MON
0000	RAN	0000

This screen will display the number of lanes that the machine ran on the designated day. The number below SUN indicates how many lanes were run on Sunday. The number below MON indicates how many lanes were run on Monday. These values are available for six days and are reset the day before the machine runs. For example on Saturday, the value for last Sunday is reset to zero.

Press the **NEXT** key and the following screen appears:

TUES	LANES	WED
0000	RAN	0000

This screen will display the number of lanes that the machine ran on the designated day. The number below TUES indicates how many lanes were run on Tuesday. The number below WED indicates how many lanes were run on Wednesday. These values are available for six days and are reset the day before the machine runs. For example on Monday, the value for last Tuesday is reset to zero.

Press the **NEXT** key and the following screen appears:

THUR	LANES	FRI
0000	RAN	0000

This screen will display the number of lanes that the machine ran on the designated day. The number below THUR indicates how many lanes were run on Thursday. The number below FRI indicates how many lanes were run on Friday. These values are available for six days and are reset the day before the machine runs. For example on Friday, the value for last Saturday is reset to zero.

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Press the **NEXT** key and the following screen appears:

SAT LANES TOTAL
0000 RAN 0000

This screen will display the number of lanes that the machine ran on Saturday and the Total Lanes that have been run by the machine. The number below SAT indicates how many lanes were run on Saturday. The number below TOTAL indicates how many lanes the machine has completed. The value for Saturday is available for six days and is reset on Friday. The total number of lanes is never reset (unless a program upgrade is performed).

Press the **NEXT** key and the following screen appears:

NUMBER OF LANES
50 IN CENTER 50

This screen will display the number of lanes in the bowling center. Changes can be made to this number by using the UP or DOWN ARROWS. Press ENTER to lock in a new setting. This number will also automatically change the upper limit in the Auto Program Select Menus.

Press the **NEXT** key and the following screen appears:

BATTERY CHECKS
GOOD!

This screen will display the condition of the battery in the PC. If the Error Light on the PC is illuminated, and the machine still operates, access this menu to check the battery. Replace a **WEAK??** battery immediately.

This concludes the selections in the
SYSTEMS TO BE MONITORED menu.

12. Prox Bypass Menus

Press the **MENU** key until the following screen appears:

* PROX BYPASS

MENUS

This set of menus will allow the functions of the lane distance proximity sensor to be taken over by the drive motor tach sensor, or allow the buffer tach sensor to be turned off. These bypass functions provide a backup system to allow the machine to operate during an emergency when a proximity (prox) sensor has failed.

Press the **NEXT** key, the following screen will appear:

BUFFER ERROR

BYPASSED?? NO

The machine uses this error message to alert the operator that the variable speed buffer motor is not operating as programmed. The operator can bypass the sensor by pressing the **ENTER** key. Pressing this key will toggle the setting in this menu from YES to NO.

NOTE: Do not bypass this sensor unless the machine is operating properly and the buffer motor is changing speeds as programmed. The buffer speed will NOT display on the operating screen when the error is by-passed.

Press the **NEXT** key, the following screen will appear:

LDS PROX
BYPASSED?? NO

The LDS (lane distance sensor) is mounted on the rear panel of the machine and the Drive Shaft "Tach Sensor" is located on the left side of the machine.

If the LDS sensor fails it will cause the machine to display the error message "FORWARD TRAVEL INTERRUPTED" every time you try to start the machine. If it is an intermittent failure you may even get the message "REVERSE TRAVEL INTERRUPTED" periodically with no apparent obstruction that causes the drive wheels to slip.

When "in a pinch" the Lane Distance Proximity Sensor can be by-passed so that all functions of the LDS can be transferred to the TACH. When the LDS is by-passed both forward and reverse travel error messages will be turned OFF.

By-passing the LDS also permits the machine to operate without being on the lane. This may be helpful to troubleshoot problems that occur in mid-cycle.

The operator can bypass the sensor by pressing the **ENTER** key. Pressing this key will toggle the setting in this menu from YES to NO.

NOTE: When the LDS is by-passed the machine will travel less distance forward. The forward counts are reduced when operating from the tachometer to prevent the machine from traveling too far into the pit and not reversing properly.

When operating like this the machine will tend to travel too far toward the foul line and hit the approach. It will function without an LDS to allow you to get the lanes done without the delay of changing the sensor.

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The machine will have to be re-started to continue operation after by-passing the sensor. Repair or replace the bad prox as soon as possible.

This concludes the selections in the
BYPASS menu.

The PROX BYPASS menu is the last menu in the list. Pressing MENU again after these screens will loop you back to the top of the list of main Managers Menus (the OVERRIDE AUTO PROGRAM MENU). When using MENU to go through the main menus, you can "Menu Around" if you miss the one you're looking for the first time.

**TO EXIT THE MANAGERS MENU SELECTIONS AT ANY TIME
(EXCEPT IN THE PROGRAM LOAD MENUS) PRESS
THE "EXIT" KEY AND YOU WILL BE TAKEN
BACK TO THE OPERATORS MENUS.**

THIS CONCLUDES ALL MENUS AND FUNCTIONS ACCESSIBLE
BY THE MANAGERS PASSWORD.

SECTION V - Adjustments

A. Cleaning Cloth Replacement & Adjustment

The Sanction® Standard Elite uses a patented DMR (Dual Motor Ratcheting) Cloth system. The duster assembly operates by means of two cone-brake motors. The first unwinds cloth and sets the cushion roller down on the lane surface. The second winds up used cloth onto the used core.

The wind-up motor also lifts the cushion roller off the lane at the end of the run. This dual action simulates that of a ratcheting duster, helping to eliminate dirt lines during a conditioning run. This system also better controls cloth usage, and has no clutch mechanism to adjust.

IMPORTANT! The machine can NOT be operated without Lane Cleaning Cloth installed.

Lane Cleaning Cloth should be loaded into the machine using the following procedure:

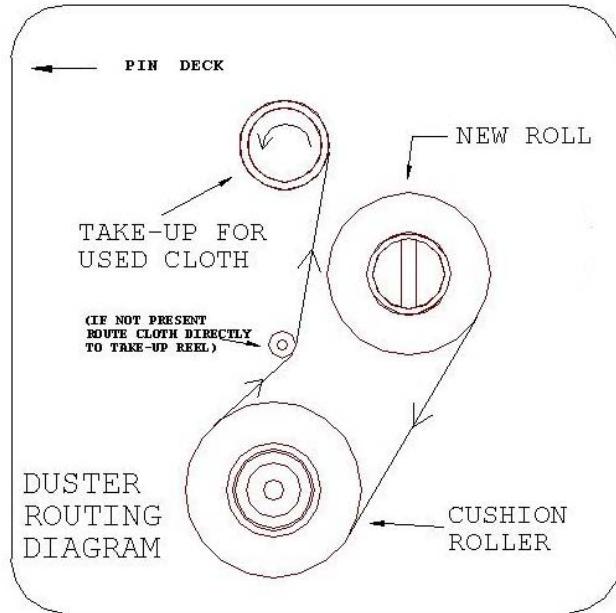
1. Remove the cleaner dispensing tip from the holder and then remove the old cloth.
2. Remove the pipe from the old duster core and insert into the new one. Unroll about 3 feet of cloth and then install the new roll into its location.
3. Route the cloth down between the squeegee and the cushion roller. Pull the cloth under the cushion roller and distribute evenly.
4. Once the cloth is routed under the cushion pull the excess cloth far enough through to get at least 3 or 4 wraps around the PVC take-up reel. Make sure the cloth is wrapped evenly from side to side around the pipe. Use the PVC clamps to hold the cloth.
5. Insert the PVC roll into its location and replace the cleaner dispensing tip.
6. Apply power to the machine and bring up the **SYSTEM CONTROL DUSTER** menu.
7. The start button on the handle can be used to take-up the slack from the fresh roll of cloth. Push and hold the button in, the unwind motor will operate until the button is released. The next time the button is pressed and

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held in, the wind-up motor will run until the duster up switch is actuated. The cloth should be rolled up taut and evenly across the assembly.

A sticker similar to the diagram below is affixed to the machine as a reference for proper cloth routing.

WARNING!! If the Wind-Up switches are not adjusted properly, the PVC Take-Up Reel or the microswitches could be damaged if the handle button is held too long when winding the cloth up tight.



B. Cleaning Cloth Counter

The machine is equipped with a Cloth Counter which indicates the number of lanes remaining on the current roll of duster cloth, and it also warns the operator when no cloth is remaining.

When the machine is programmed to run more lanes than the number of lanes left on the roll of cloth, the LCD screen will toggle between * **STANDARD ELITE** screen and the following:

DUST ALMOST OUT!

When the Cleaning Cloth Counter reaches zero, the keypad will display the following message:

DUST CLOTH EMPTY

REPLACE CLOTH

The machine will not operate until the cloth is replaced and the Cloth Counter is reset. To reset the counter, follow the instructions in this manual under DUST CONTROL MENUS.

After resetting the counter, re-program the machine to continue operation.

C. Filling of Cleaner Supply Tank

To fill the Cleaner Supply Tank, the machine should be in the down or operating position. Prepare an appropriate mixture of cleaner and water.

Disconnect power, open the splash guard, and place a rag under the tank. Open the fill and vent fittings, and pour the mixture into the Supply Tank using the supplied funnel (with filter). Fill until the fluid is about 3/4" from the elbow fitting at the top of the tank. Do NOT overfill this tank.

NOTE: The supply tank on the machine is removable for cleaning.

Do not spill cleaner inside the machine. Spills may "short" the electronic components and cause the machine to malfunction. A wet switch may also produce a dim LED light on the PC.

Any spills or drops of cleaner should be wiped up immediately - these may permanently stain the machine!

D. Emptying of Recovery Tank

NOTE: If you notice foam build up in the tank due to soft water conditions at your facility, it is necessary to purchase a de-foaming agent.

To empty the Recovery Tank, the machine must be in the down or operating position. Disconnect the inlet from the side of the recovery tank and the outlet hose from vacuum plate by removing the PVC elbows.

Remove tank from machine and dispose of used cleaner **properly**. Do NOT dump recovery tank in a septic tank or sanitary sewer system. Follow your local environmental regulations for the best method of disposal.

NOTE: When dumping liquid from Recovery Tank, it is best to let liquid flow out the inlet end, or the end which was connected to the squeegee assembly.

If liquid accumulates between baffles on the opposite side of tank, dirty cleaner may be discharged from the vacuum exhaust and onto the lane until the line is cleared.

It is recommended that the inside of the tank and the filter material in the tank be cleaned periodically. Set the tank on a flat surface. Remove the phillips screws from both covers, use a flat-head screwdriver to gently pry covers off. Clean silicone residue from both covers and the tank. Remove filter material from the tank and rinse thoroughly with clean water. Use a clean rag to wipe any dirt or residue from the inside of the tank. Replace filter material in the correct position in tank (filter material is not square, material will only fit one way in tank). Place a bead of silicon on the area where both covers will seat. Replace fasteners in both covers and tighten down. DO NOT over-tighten. Allow silicone to cure before operating machine.

To reconnect, reverse the disconnection procedure.

E. Adjustment of Cleaner Dispensing Tip

The machine uses a single cleaner dispensing tip that moves back and forth to apply cleaner to the lane surface in front of the duster cloth. Factory adjustment of the tip is 3/8" above the lane surface. If tip is adjusted closer to lane, make sure tip does not come in contact with the lane surface when machine enters or exits the lane.

The machine also uses a cog belt to drive the cleaner head back and fourth. This belt can be adjusted to shift the cleaner dispensing head to the left or right if the machine tends to favor one side of the lane. Before loosening the idler place a reference mark on the belt and drive pulley. Loosen the idler and shift the belt one cog on the drive pulley end in the proper direction, **not the idler end**. Once the belt is moved adjust the belt tension and tighten the idler.

F. Guide Roller Adjustments

Adjustment of the guide rollers may be needed if the bowling center has lanes that have been injected, or if the channels are even with the lane surface. In most cases adjustment to the guide rollers on one side will be all that is needed.

To adjust the guide rollers, remove the bottom bolt that holds the mounting block to the frame for the front roller. The rear roller must be completely removed from the machine.

Once you have adequate clearance, remove the guide roller, spring, bronze bushing(s), and the shoulder bolt from the mounting block. The front roller has two bronze bushings, one is normally between the roller and the side plate of the machine and one is between the head of the shoulder bolt and the wheel.

Move the bronze bushing that was placed near the side plate between the head of the mounting bolt and the guide roller (for both rollers) on one side of the machine. This will give approximately 1/4" additional clearance between the guide rollers as the machine travels on the lane surface.

Operate the machine after changing one side. If needed, change the other side of the machine.

G. Squeegee Assembly Adjustment

The Squeegee Assembly is adjusted at the factory to ensure proper cleaning. This adjustment should be checked when the machine is installed.

To check this adjustment and make changes, the machine should be in the upright or transport position. The squeegee will need to be lowered to the down position. To lower the squeegee, apply power to the machine and display * **STANDARD ELITE** menu on the LCD keypad display.

At the TEST I/O section of the keypad press the OUTPUT key until the SQEGY UP/DN is displayed.

Press the ON/OFF key once. The squeegee motor will activate and rotate 180°, this will lower the squeegee.

With the squeegee down, take a straight edge and place it from the squeegee blade across the drive wheels to the lane distance wheels. The gap between the straight edge and the drive wheels should be **1/8"** to **3/16"** on each side.

If the distance is more or less, loosen the bolts (two on each side) that hold the squeegee arms in place. Turn the adjusting bolts on the outside of the machine until the squeegee height is correct. This should be done for both the left and the right side. Tighten the bolts after the adjustment is acceptable. Make sure the mounting plate is square when the plate is re-tightened after an adjustment.

NOTE: Excessive crush on the squeegee may cause the mount to flex slightly on the left side. If needed, this can be corrected by having more of the blades contact the lane on the left compared to the right side of the machine.

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The tilt or pitch of the squeegee can also be adjusted to ensure that both blades are contacting the lane squarely. If a pitch adjustment is necessary, follow the steps below to make the adjustment.

1. Locate the squeegee motor on the right side plate of the machine. Mounted to the motor shaft (inside the machine) is a cam. Remove the three screws holding the switch cover. Mounted to the cam is a rod end and rod. This rod lifts and lowers the squeegee.
2. Remove the bolt that connects the rod end to the cam. Loosen the jam nut between the rod end and the rod.
3. Rotate the rod end as needed to increase or decrease the pitch.
4. Tighten the rod end to the rod with the jam nut and insert and tighten the bolt to connect the rod end to the cam.
5. Re-check the gap between the straight edge and the drive wheels.
6. Check cleaning to ensure adjustment is adequate.
7. Replace the switch cover.

H. Buffer Brush Adjustment

The buffer brush is manufactured of a long-lasting synthetic bristle which, under normal circumstances, can be expected to last approximately 18 months. An Amp Draw should be taken on the buffer motor when adjusting the brush. Too much "crush" can cause excessive load on the motor and wear on the brush.

To check the buffer brush adjustment the brush must first be lowered onto the lane. This is done at the **TEST OUTPUT** menu. If the brush is not already down in the "zero" position, press the NEXT key until **BUFFER UP/DN** is displayed.

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Press the ENTER key to activate this output. This will lower the Buffer Brush into the operating position. If the brush does not stop in the down position, check the condition of the Brush Down Switch.

With the brush down, stand the machine in an upright position and hold a level or straight edge across the drive wheels and rear lane distance wheels. The buffer brush material should extend approximately **3/32"** to **3/16"** beyond the level for proper adjustment. The ideal amount of crush should be determined by the amp draw of the buffer motor and smoothness of the conditioning pattern. The buffer brush is factory adjusted prior to being shipped at approximately **1/8"**.

NOTE: Amp draw is also affected by the amount of crush the transfer brush has into the brush.

If an adjustment is needed, determine how much, and then place the machine on the approach in the operating position. Open the splash guard and locate the adjusting screws. Loosen the jams on the two adjusting screws, along with the three lane distance shaft pillow blocks.

Turn the adjusting screws until proper adjustment is reached (each full turn on an adjusting screw is equal to about **1/16"** adjustment.) Tighten the jam nuts on the adjusting screws.

Make sure that the LDS pillow blocks are firm against the adjusting screws and then tighten the pillow blocks. Always tighten the center block last.

Once the block are secure, check that the LDS shaft turns freely as possible, and that there is a small amount of end play in the shaft. If the shaft does not spin freely, check and make sure the shaft is square throughout the LDS blocks.

NOTE: When cleaning the Buffing Brush, NEVER use any type of cleaner on the brush. Use of cleaners will decrease the brush's ability to hold conditioner, and greatly affect the lengthwise taper of the conditioner pattern. All that is

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needed to clean the Buffer Brush is a clean, soft, dry rag.
Wipe the brush clean daily.

I. Transfer Brush Adjustment

Before making any adjustment to the Transfer Brush you should make these observations.

Apply power to the machine, open the lid to expose the electrical compartment and press the buffer contactor actuator button down to run the motor. Observe the interaction of the two brushes; the buffer brush should look like it is contacting the entire Transfer Brush without bending the bristles back excessively or at all. All of the bristles should be in line with no stray bristles sticking up from the group.

To check the actual penetration into the buffer brush, remove power from the machine and rotate the buffer brush opposite its normal running direction. Observe the gap that is created; the measurement should not exceed $\frac{1}{8}$ " and should not be less than $\frac{1}{4}$ ".

Next, stand the machine up onto its transport casters to observe the bottom transfer brush. With power removed rotate the buffer brush in its normal running direction. The gap that is created should be relatively the same as the upper transfer brush. The adjusting bolt that is in the center of the transfer brush assembly is used to prevent the assembly from being forced back by the buffer brush.

If an adjustment needs to be made be certain that close attention is paid to the reference marks that are around the mounting plates. The reference marks indicate the factory adjustment and should be used as a beginning point for any future adjustments.

J. End Cleaning Distance Travel Adjustment

When the machine is installed the End Cleaning Travel Distance must be checked and adjusted.

This distance is different in each bowling center around the world. These vary because of specification tolerances that are allowed during the construction of the lanes.

Always leave a margin of error when setting the end cleaning distance. This can be accomplished by starting the machine a couple of inches past the foul line when making this adjustment.

Making sure that the machine is traveling the correct distance is important to how well the pindecks are cleaned. If the pindecks are not getting cleaned well enough, the pins slide more, creating Out-of-Ranges. This is an unnecessary call for any bowling center.

To adjust the pindeck travel, go to the **CHANGE PROGRAM SETTINGS** menu and press the **NEXT** key until the screen reads:

END CLEANING
0730 DIST 0730

After the change is made, use the pindeck counter to check your adjustment. When the distance is correct, the machine will travel far enough for the squeegee to clear the end of the pindeck and leave no moisture.

Note: An adjustment may be necessary in the **Return To Foul Line** menu when travel settings are changed. This adjustment is the first menu in the **System Control Distance** menu. It should be adjusted so the machine travels the correct distance back to the foul line. The return distance should be a little less than the End Cleaning Distance. Adjust the setting to control the reverse travel distance.

When the correct **END CLEANING DISTANCE** is determined for your bowling center, this value needs to be entered in every program (in the **CHANGE PROGRAM SETTINGS** menu).

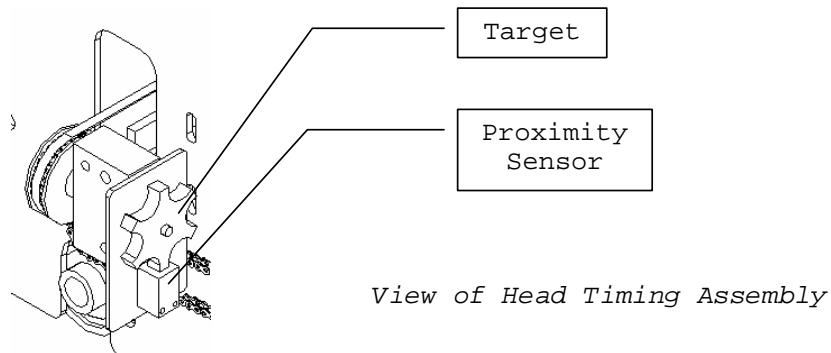
K. Oil Head Timing Adjustment

The timing for the oil head is a precise adjustment. This should not be touched unless the head drive belt needs replacing or the machine is displaying an oil head error.

On the 10-pin side of the machine is a cover for the head timing proximity sensor. Remove the two screws that

hold the cover in place. Slide cover off. Once the cover is off you will be able to see the belt tension and head timing assembly. Follow these steps closely to avoid confusion.

1. Move the oil head against the 10-pin side wall.
2. The tension for the head drive belt should be adjusted at this time. Pushing down on the belt, half-way across the head track, you should feel the belt get tight just before it touches the track.
3. The diagram below shows the board counting target and the board counting proximity sensor. The gap between the target and the proximity sensor should be 0.015 (± 0.005). The proximity sensor should be mounted square to the plate.



4. The next procedure is to adjust the board counting target by using the indicator lights on the proximity sensors. These lights come on when metal is passed by the face of the sensors. The goal is to have the indicator light for the board counting proximity sensor come on when the oil head target is in the middle of both the left and right lane edge sensors (or very close to middle).

NOTE: The distance between the metal target on the oil head and the proximity sensor should be a gap of **0.025"**.

5. Move the oil head all the way to the 10-pin side wall (outside of the proximity sensor). Slowly move the head toward the middle of the lane edge proximity sensor. When the board counting sensor light comes on stop and note the position of the oil head target to the lane edge sensor. Use this same procedure for the 7-pin side.

Section 5-12

6. After doing step #5 if you have the board counting sensor indicator light coming on in the same position for both lane edge sensors then the adjustment is good. If not, go to the next step.
7. If on the 10-pin side the board counting sensor comes on too soon and the 7-pin side comes on late, the board counting target will need to be turned in a counter-clockwise direction and vice-versa if they are off in the other direction.

Note: When determining the direction to turn the target look at the face of the target for clock direction.

- 08** Now it is time to make sure that the board counting target is secured and the head assembly is tight. Place the cover back on the head assembly and tighten the acorn nuts.

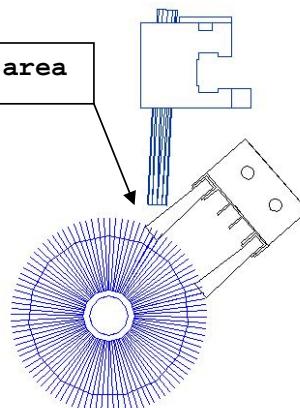
Note: The machine's computer has to park the oil head on the right side to ensure the proper starting point for loads of conditioner. When the head goes to the home or zero position it will bump into the side wall and kick back. The clicking sound that is heard is normal and no damage is occurring to the machine.

L. Momentary Wheel Adjustment:

To adjust the momentary wheels the machine will have to be on the lane. Once the machine is on the lane, loosen (do not remove) the bolts that hold the momentary wheels to the machine. Slide the momentary wheel housing up or down until the gap between the wheel and the lane is approximately $1/16"$. The wheel needs to be as close to the lane as possible without touching. Tighten the bolts in the housing once the desired gap is achieved. Repeat steps for each momentary wheel housing. If you notice that sections of the lane are being missed by the squeegee (mainly on wood lanes), you will have to adjust the momentary wheels further up.

M. Oil Tip Adjustment:

Correct adjustment of the Oil Tip is very crucial and is a determining factor in putting out a consistent pattern. There are two adjustments that can be made to the oil tip. One adjustment is the height of the tip, the other is the position of the tip. The point where the Transfer Brush and the Buffer Brush meet will form a "V". The Oil Tip should be as close to this "V" as possible, without actually dispensing oil into the "V" area. Check this with the buffer brush running. To operate the brush, press the button on top of the buffer motor contactor. After making each position adjustment you will also need to make sure the tip is as close to the black brush as possible without touching. The height can be adjusted by loosening the set screw in the tip holder collar and sliding the tip holder up or down. Retighten set screw when desired height is achieved.



NOTE: If you notice a zig-zag pattern in the oil on the lane, you will need to adjust the Oil Tip position; adjust the oil tip further up the transfer brush to eliminate this problem (make adjustments in small increments until zig-zags disappear).

N. Cleaner Pump Adjustment

There are two ways to adjust cleaner output with the Kustodian Plus. One is to simply adjust the distance the machine applies cleaner in the Systems Control Cleaning menu. The second is to vary the output of the pump with the needle valve mounted with the pump assembly. Maximum output will clean approximately 24-26 lanes with Last Squirt set at 50 ft. This is done with the valve turned off allowing zero flow back to the tank. Minimum output will do approximately 30 lanes or more with Last Squirt set at 50 ft. The valve is opened one quarter turn or more. The minimum output is set by the length of tubing that returns back to the tank. Decreasing the length of this tubing will decrease the volume and increasing the length will increase the volume output.

NOTE: If the cleaner tip is dripping it may be due to a weak check valve. Turning the adjusting valve to the "Closed" position may help reduce this until you can replace the check valve.

Section VI - Maintenance

Maintenance: The following items should be done to the machine on a regular basis:

A. Power Cord

Care should be taken to see that the power cord is handled properly and stored correctly.

Do **NOT** wrap the cord around the machine for storage. Some type of cord wrap or cord spool for storage will add life to the cord.

Make large loops when wrapping the cord.

Should the power cord become damaged or frayed, it should be repaired or replaced **IMMEDIATELY!**

To keep the power cord clean, pull it through a rag as it is being wound for storage. Only replace the cord with one that is identical to the factory specifications.

B. Squeegee

Wipe the blades and housing with a clean cloth after each operation. Check the blades for wear and tear. The edges of the blades should be sharp and square. Rounded edges mean it's time to replace the blades.

C. Sensors

The proximity sensors are sealed, but the pass-thru infrared sensor (for the oil pump tachometer) can be cleaned by blowing it out with a can of compressed air. This will help remove oil and dust build-up, which could cause false sensing. This sensor may need to be sprayed lightly with electrical contact cleaner (the type for PC boards). Do NOT clean the sensor if it does not appear to have oil and dirt build-up around it. The old saying is true, "If it isn't broken, don't fix it".

D. Lane-to-Lane Casters

Clean after each operation. If casters are showing excessive wear inspect gutter adapter blocks for sharp edges.

E. Drive Wheels

Clean daily after each operation.

F. Vacuum Motor

Important! This motor should be wiped off daily and blown out weekly. This is especially important in high dust areas, or bowling centers who do not dust gutters and caps daily. Dirt can build up on the electrical end of the motor which will obstruct the air flow. This will result in increased heat and wear of the brushes and commutator. This will drastically decrease the life of the vacuum motor. You have been warned!

The vacuum is mounted on tracks that allow it to be removed from the machine with little effort. Once the lid is removed, the vacuum motor will slide right out of the machine. Check the motor brushes periodically.

G. Inside Machine

Wipe up excess dust and dirt daily. Pay close attention to the computer compartment to keep dirt from damaging the PC and components. Avoid spilling liquids inside the machine.

H. Recovery Tank Removal

Remove and drain after each operation. Always drain the recovery tank when filling the supply tank.

I. Filters

The cleaner supply tank has an external filter located on top of the cleaner tank and an internal 1/2-inch diameter by **5-inch long filter** to protect the pump. There are also **four check-valve filters**, one on each spray jet, that should be cleaned.

Another **5" filter** is located inside the oil tank.

Periodically clean these filters to keep the machine operating at peak performance.

J. Changing of Conditioner

1) DRAINING THE TANK:

Remove the Oil Assembly from the machine by unplugging the electrical connector, the line to the conditioner supply tank, and the oil fittings. Use rags to prevent spilling fluids inside the machine. Wipe up all spills immediately!

Remove the two bolts securing the assembly to the rear wall and lift it out of the machine. Prepare an area on a bench where the assembly can stand and drain into a container.

Remove the tank cap and drain the conditioner from the tank. Use a rag to prevent spills while draining the tank.

After draining, replace the cap and install the assembly back into the machine. Connect everything except the oil return line from the oil control valve.

2) FLUSHING THE LINES:

The oil lines should be flushed to remove all the old conditioner. Place the oil return line into a clean cup.

With the return line in the cup, turn the Pump Motor ON through the "Test Output". This will pump the majority of the remaining oil out of the lines.

When a large amount of air starts to spit out of the return line, turn OFF the output. Do NOT run the pump dry for an extended period of time...damage may occur.

Important Note: When changing to a conditioner with a higher viscosity, be prepared to change the pressure regulator tubing. Failure to monitor the pressure may result in damage to the pulse dampener tube.

Remove the two gray fill plugs on top of the oil tank and fill it with the new conditioner. Turn the output ON for the Pump Motor and allow it to run until the new conditioner flows into the cup. Re-connect the return line into the fitting. Check for leaks.

Exit the "Test Output" and menu to the "Pump Output Volume Tests" screen located in the Operator's Menu. Press NEXT three times to access the following screen.

TEST: VOL PER REV

FOR 0000 REVS

The pump will begin running when this menu is accessed. Remove the oil tip from the moving head by pushing down, and then turning counter-clockwise. Place it in a cup and press the LEFT Arrow. The pump will run about 500 revolutions which will flush the oil head line. Press the LEFT Arrow at least three times to expel all the old conditioner out of the line. Replace the tip into the moving head.

3) CHECKING THE PRESSURE:

Place the machine in the operating position and turn ON the Oil Pump. Check the pressure gauge on the transfer compartment wall. The normal operating pressure is approximately **10-15 PSI**.

The pressure will affect the amount of pulse dampening for the streams of oil. It primarily determines the appearance of the oil stream, giving it a consistent flow on the transfer brush. Having too little pressure (5 psi) is not a fatal error, but excessive pressure (more than 20 pounds) may blow the pulse dampening tube.

Note: ALWAYS run a Calibration Check when adjusting the pressure. This is the best way to ensure the machine is operating properly.

The conditioner pressure is primarily dependent on viscosity. The type of conditioner and the temperature are what will affect the pressure the most. If an adjustment is needed, adjust the length of tubing connected between the Tee Fitting (for the pressure gauge) and the Oil Control Valve. Different fittings will be needed when changing from a 3/16" line to a 1/4" line. Save any fittings that are removed for future use.

The factory-supplied tubing is 3/16" OD at a length of 12". This typically provides 12-15 pounds of pressure using Defense-S or Offense-HV at a temperature of 72° Fahrenheit.

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Various lengths and sizes of tubing are available depending on the type of conditioner being used. Sizes range from 3/16" OD (light oil) to 1/4" OD. The length of tubing may vary from a few inches to several feet. A chart in the Appendix recommends the proper pressure regulator tubing for each viscosity range, however adjustments may be needed depending on the operating climate.

NOTE: When using conditioners with a viscosity less than 18 centipoise, use the special reducer attachment found in the accessory kit. Attach to the oil return line and adjust the pressure as stated above. This attachment will increase the back pressure of the return line at the oil control valve.

4) CHECKING THE LOAD STREAM:

Once the previous procedures have been completed the oil load stream must be checked. This is done by running a couple of lanes to prime the oil head line.

Select any program and change screen **01F** to 2L- 2R x 06 and 02F to ##L-##R x 00. (The other values are not important.) Run the machine down the lane to the end of the pattern. As the machine does the 2-2 loads, watch closely where the oil streams begin and end.

Adjust the height of the tip UP if the stream is starting early, or DOWN if it starts too late. A collar on the tip holds the position of the tip and locks it into the head. (The collar may need to be rotated on the tip to allow the head tubing move properly within the compartment.)

After the tip height is set properly and the head tubing moves freely, tighten the set screw that secures and locks the tip into the head.

Return the program values to their original settings.

NOTE: In order to make the loads stop and start consistently, the distance between the transfer brush and the tip must be the same on both ends of the brush. The bolts that mount the UHMW (for the head bar) to the transfer system adjustment plate are slotted. The head bar can be raised or lowered at each end after the six bolts holding the UHMW pieces are loosened. Tighten all 6 bolts when transfer brush and head bar are parallel.

Section 6-5

The hose must be routed properly to prevent the head from hitting the tubing as it travels to the left. The head tubing must be secured to the tip holder so when it travels to the left the hose falls toward the rear of the machine and allows the head to travel all the way to the side wall.

K. Buffing Brush

If build-up of dirt occurs, the brush should be wiped with a clean cloth. Do not use any cleaner. Cleaning agents can affect the brush's ability to hold oil.

L. Automatic Maintenance Checks

The machine features an Automatic Maintenance program which alerts the operator when to perform regularly scheduled maintenance. In addition to normal daily maintenance, the machine requires inspections at 20, 100 and 200 miles of travel.

Each time these distances are reached, a maintenance message will appear. These messages can only be cleared by the Supervisor once the inspection has been completed.

An odometer in the machine records the distance traveled through the LDS, then displays it on the keypad in the Managers Menu in the Systems To Be Monitored. When the pre-determined maintenance distances are reached, maintenance messages will toggle on the screen opposite * **STANDARD ELITE** screen:

MAINTENANCE INSP

20 MILE NOW DUE

(or 100 MILE NOW DUE or 200 MILE NOW DUE)

For the specific maintenance items that need to be checked at these intervals, refer to the worksheets in the Appendix Section of this manual.

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To clear a maintenance message, access the Managers Menus by using the Managers Password and press the **MENU** key until the following screen appears:

*** SYSTEMS TO BE MONITORED**

Press the **NEXT** key and a screen similar to the following will appear:

**ODOMETER
0005 FT 0050 MI**

This screen will toggle with the following screen:

**TO CLEAR MAINT
MESSAGE HIT EXIT**

Press the **EXIT** key and the maintenance message will now be cleared. Be sure to complete the necessary maintenance before resetting the counter.

M. Transfer Brush

The Transfer Brush should be cleaned periodically to prevent excessive build up of lint. Use an air compressor or a comb like tool to remove lint from the brush. The mounting angle and surrounding area should be wiped clean of oil after each use.

N. Oil & Cleaner Head Rails

For smooth operation of the oil and cleaner assemblies it is important to keep the rails lubricated. Lack of lubrication will result in possible errors and conditioning/cleaning problems.

Section VII - Inputs and Outputs

The PC assembly of the machine has 16 inputs, 16 outputs, and an Analog Module to control the DC drive motor and DC buffer motor. Inputs accept data from various components in the machine, and then use that information to control functions of the machine through its outputs. As an example, distances are input to the PC from the lane distance proximity sensor, at which point data in ROM or RAM chips activate certain outputs as programmed. An output example would be one of the cone-brake motors.

Here is a list of the **INPUT** numbers for the PC, along with their designations:

<u>INPUT#</u>	<u>FROM:</u>
000	BUFFER TACHOMETER PROXIMITY SENSOR
001	OIL HEAD POSITION PROXIMITY SENSOR
002	OIL FLOAT SWITCH
003	BUFFER UP SWITCH
004	BUFFER DOWN SWITCH
005	CORD KILL SWITCH
006	SQUEEGEE UP SWITCH
007	SQUEEGEE DOWN SWITCH
008	START BUTTON (HANDLE)
009	CLEANER FLOAT SWITCH
010	DUSTER UP SWITCH
011	PUMP TACHOMETER INFRARED PASS-THRU SENSOR
012	LEFT OIL HEAD REVERSING PROXIMITY SENSOR
013	RIGHT OIL HEAD REVERSING PROXIMITY SENSOR
014	LANE DISTANCE PROXIMITY SENSOR (LDS)
015	DRIVE SHAFT TACHOMETER PROXIMITY SENSOR (TACH)

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Here is a list of the **OUTPUT** numbers for the PC, along with their designations on the machine:

OUTPUT# CONTROLS:

100	OIL PROGRAM CONTROL VALVE (24V DC)
101	LEFT TO RIGHT OIL HEAD DRIVE
102	
103	RIGHT TO LEFT OIL HEAD DRIVE
104	SQUEEGEE UP/DOWN MOTOR
105	
106	CLEANER PUMP MOTOR
107	BUFFER UP/DOWN MOTOR
108	VACUUM MOTOR (CR #3)
109	DUSTER CLOTH UNWIND MOTOR
110	DUSTER CLOTH WIND-UP MOTOR
111	OIL PUMP MOTOR
112	REVERSE DRIVE MOTOR RELAY (CR #1)
113	DRIVE MOTOR BRAKE RELAY (CR #2)
114	NOT USED
115	NOT USED

NOTE: This output module controls two 24V DC valves and the rest of the module is AC Voltage.

OUTPUT# CONTROLS:

A-101	DC DRIVE MOTOR
A-102	DC BUFFER MOTOR

NOTE: This output module is an analog card that allows speed adjustments to be made through the keypad. The card sends a range of voltage to the speed control board to determine which speed the motor will operate.

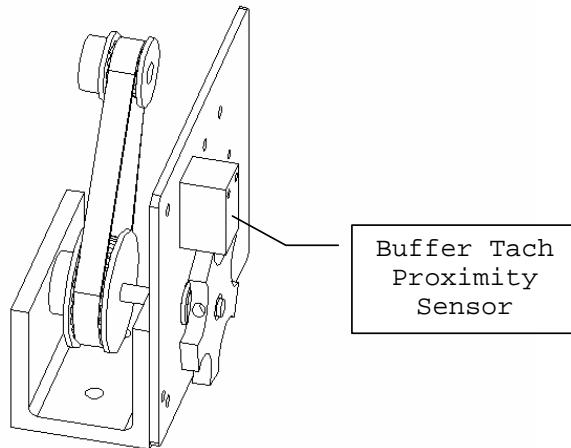
DESCRIPTION OF INPUTS

The machine monitors the Input Module for DC Voltage. If the terminal strip pops loose, an Error Message will appear on the keypad display. This error will appear:

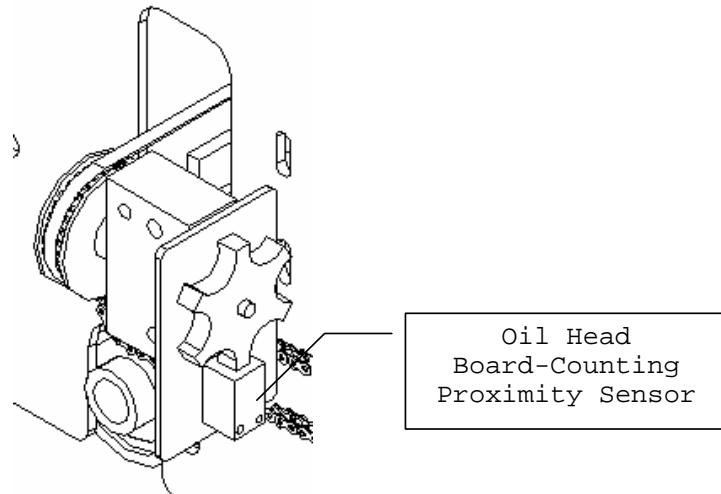
INPUT ERROR!
CHECK TERM STRIP

This screen is alerting the operator to check the terminal strip on the ID212 Input Module of the PC Assembly. If the terminal strip is in place, check the Yellow and Brown wiring on the PC Power Supply.

- 000 Buffer Tachometer:** This proximity sensor is located in the buffer motor compartment. This sensor counts the revolutions of the variable speed DC buffer motor. This information is displayed on the keypad as Revolutions Per Minute. (LED #0 will light when this input is actuated.)



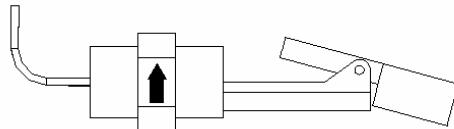
- 001 **Oil Head Proximity Sensor:** This sensor is located next to the side wall when looking at the Head Timing Assembly. This sensor counts the number of boards that the head crosses from left to right. This works along with the proximity sensor that will show the lane edge when moving left to right. (LED #1 will light when this input is actuated.)



Oil Head Position Timing Assembly

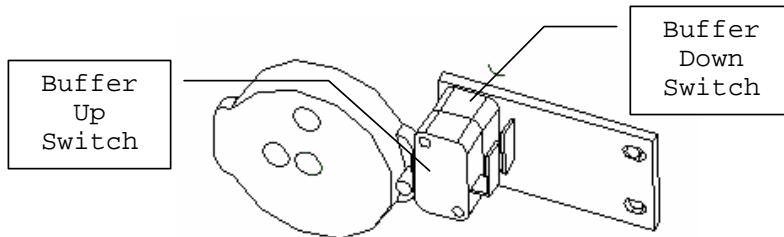
- 002 **Oil Float Switch:** This input controls the float switch for the conditioner supply tank. The PC monitors the switch, which is actuated by the oil level. When the oil level is one inch from the bottom, the float switch is actuated, lighting up the LED #2, and placing a message on the keypad screen. The arrow on the float should point UP (when the machine is operating with program version E1002 or after).

Any time the fluid level is low enough to actuate this float switch, the machine will have to be filled and re-started to continue operation.



Section 7-4

- 003 **Buffer Up Switch:** This switch is located on an adjusting plate, mounted on top of the Down Position Switch (it's the outside switch). When the lobe of the cam on the motor shaft actuates this switch, the PC receives a signal that the brush is in the UP position. This switch is wired Normally Open. (LED #3)



Buffer Brush Switches

- 004 **Buffer Down Switch:** This switch is located on the mounting plate between the plate and the Up Switch. When the lobe of the cam actuates this switch, the PC receives a signal that the brush is in the DOWN position. The down switch must be actuated for the buffer drive motor to function during any oiling operation.

This switch is wired Normally Open. The brush parks in the Down Position and this switch indicates the brush is in the zero position (as shown in the diagram). (LED #4 will light when this input is actuated.)

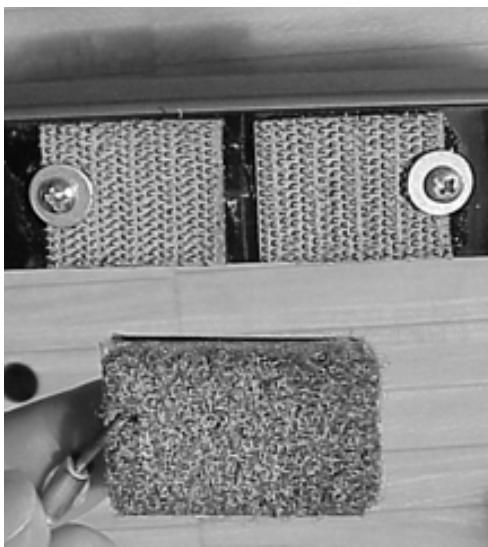
If the motor cam coasts past the switch an Error Message will occur. The screen will change to:

**CHECK INPUT #4
BRUSH DOWN SWITCH**

The machine will have to be re-started after this error.

Note: All microswitches on the machine are wired Normally Open. When replacing switches make sure the wiring is connected to the **COM** and **NO** contacts.

- 005 **Cord Kill Circuit:** These plates are located on both sides of the handle. Attached to the power cord is a Velcro® covered piece that attaches to the handle plates. When the cord piece touches both sides of the Velcro®, it completes a low-voltage electrical circuit. If the cord pulls from the handle plate this circuit is broken and the error message is tripped. This circuit does not have to be connected to operate the machine. When the machine is started (before each lane) the



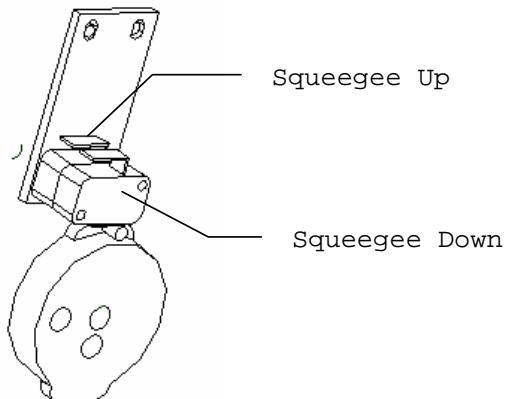
PC searches for this input. If the kill plate is not being used, the PC ignores it. If the PC reads that the plate is being used, it will watch for the circuit to be broken. If the circuit is broken, a signal is sent to the PC to stop the

machine before the cord is damaged. (LED #5 will light on the input module.)

Conductive Cord Plate

- 006 **Squeegee Up Switch:** This switch is located on the right inside wall of the cleaning compartment, just below the cam. The switch works the same way as the Buffer Up Switch. When the cam lobe actuates the switch the PC receives the signal telling the machine the squeegee is UP.

This switch is wired Normally Open. The squeegee parks in the Up Position and this switch indicates the squeegee is in the zero position. (LED #6)



- 007 **Squeegee Down Switch:** This switch is located on the right inside wall of the cleaning compartment, just above the cam. The microswitch tells the PC when the squeegee is in the DOWN position. A signal is sent to the PC when the switch is actuated by the cam lobe. While operating the squeegee must be in the down position. If the PC does not get the signal from this switch, an error message will appear on the screen. This switch is wired Normally Open. (LED #7)

If the motor cam coasts past the switch an Error Message will occur. The screen will change to:

CHECK INPUT #7
SQUEEGEE DOWN SW

The machine will have to be re-started after this error.

- 008 **Start Button:** Located on the handle, this normally open push button has a couple of different functions during operation. (LED #8)

With the machine in the RUN mode, when the button pressed for the **FIRST** time, it will send a signal to the PC. This signal will tell the PC to run specific outputs as needed in the program (i.e. lower the squeegee, duster cloth, and brush).

The **SECOND** time the button is pressed, the PC will begin running the program on the lane.

NOTE: The **UP ARROW** on the keypad is also a back-up switch that can perform all the functions of the Start Button (located on the handle).

During operation, the button acts as a **Pause and Resume** Button for the machine.

In the **Return to Foulline Menu**, when the start button is pressed, the machine will automatically return to the approach from the area where the error has happened.

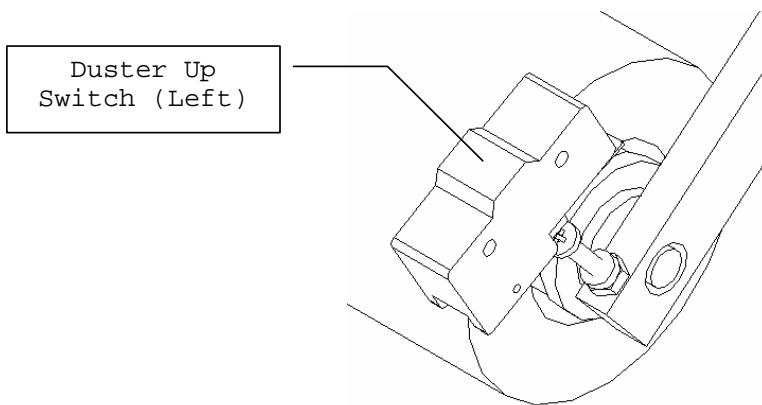
In the **Duster Control & Reset** screen, the FIRST time the button is pressed, the brake motor will unwind cloth until the handle button is released. The SECOND time it is pressed, the motor will wind-up cloth until the wind-up switch is actuated.

- 009 **Cleaner Float Switch:** This input controls the float switch in the cleaner tank. The PC monitors this switch, which is actuated by the cleaner level. When the fluid level is one inch from the bottom, the float switch is actuated, lighting up the LED #9, and placing a message on the keypad screen.

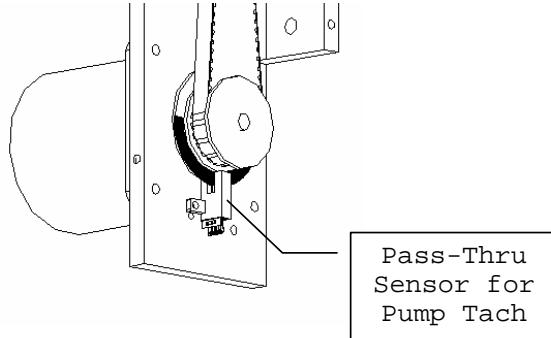
Any time the fluid level is low enough to actuate this float switch, the machine will have to be filled and re-started to continue operation.

NOTE: Always empty the recovery tank when filling the cleaner supply tank.

- 010 **Duster Up Switch:** These two microswitches are located on the top side of the Cushion Roller Pivot Arms, on each side of the machine. When the cloth is wound up, a screw in the pivot arm activates the switch and a signal is sent to the PC by one or both of these microswitches. These switches are wired Normally Open. (LED #10)



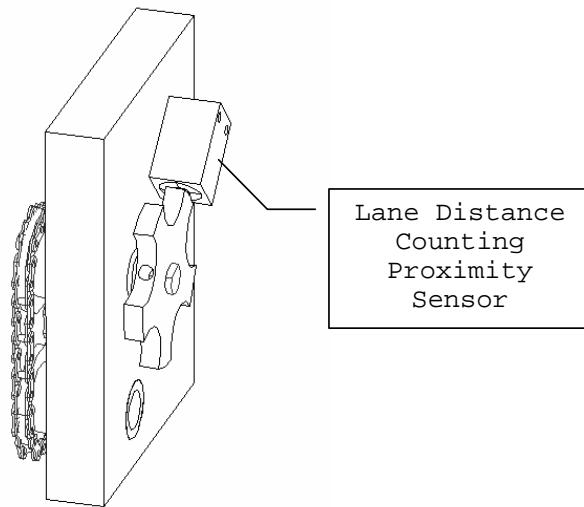
- 011 **Oil Pump Tachometer Sensor:** This pass-thru infrared sensor is located on the Oil Pump Motor Assembly, which is mounted on the rear wall of the machine. The sensor counts each revolution of the pump. (LED #11)



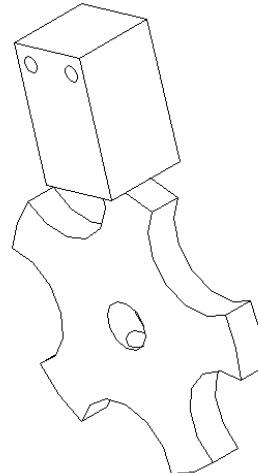
- 012 **Left Proximity Sensor:** This sensor is found on the left side of the Conditioning Compartment (1-1/8" from the left side wall). The proximity sensor senses metal, which is in the form of a flat head screw located on the backside of the oil head block. This sensor along with the right sensor have multiple purposes. The main purpose is to reverse the head drive motor. The proximity sensor also acts as a guide for the position sensor by indicating the lane edge when the oil head is traveling from left to right. LED #12 will light up on the input module.

- 013 **Right Proximity Sensor:** This sensor is found on the right side of the electrical wall in the Conditioning Compartment (1-1/8" from the right side wall). The proximity sensor senses metal, which is in the form of a flat head screw located on the backside of the oil head block. This sensor along with the left sensor have multiple purposes. The main purpose is to reverse the head drive motor. The proximity sensor also acts as a guide for the position sensor by indicating the lane edge when the oil head is traveling from right to left. LED #13 will light up on the input module.

- 014 **Lane Distance Sensor (LDS):** This proximity sensor is mounted on a block on the rear wall of the machine. A metal target passes in front of this sensor as the shaft turns. It counts in one inch increments as the machine travels down the lane. If this counter does not receive pulses as the machine travels on the lane, there will be either a *Forward* or *Reverse Travel Error Message*. LED #14 will flash very quickly.



- 015 **Drive Shaft Tachometer Sensor:** Mounted to the left side of the machine is the TACH proximity sensor. A metal target passes in front of the sensor as the drive shaft rotates. As the proximity sensor turns on and off, pulses are sent to the PC. The PC counts these pulses and calculates the **IPS** (INCHES PER SECOND) travel speed of the machine. This is used to set the 7 different speeds of the machine. In an emergency, the functions of the Lane Distance Proximity Sensor can be re-routed to the TACH sensor. LED #15 will flash very quickly.



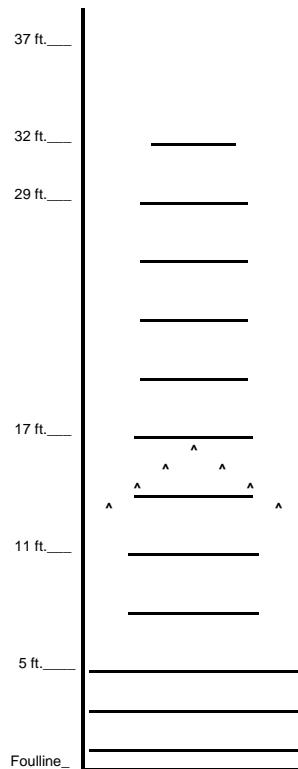
SECTION VIII - Oil Patterns

A. Understanding the Machine

How the machine controls the amount of oil.

The machine is capable of applying precise amounts of lane conditioner. An explanation of how this is accomplished will help you understand the operation of the machine.

When conditioning a lane the head travels back and forth across the transfer brush, applying streams of oil as it goes. The streams (or loads) are shown in this figure.



The size of the stream can be set to an exact amount or volume. We achieve this exact stream volume by using a highly accurate fluid metering pump. This pump, running at a constant speed, gives absolute positive displacement of the oil. The accuracy of the pump is $\pm 1\%$.

Section 8-1

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The oil head traveling at a constant speed lays down the same amount of oil as it travels across each board. The pump allows us to set the exact amount of oil that goes on each and every board within the stream. We measure this amount as the **Volume Per Board**.

The pump output is measured in *microliters*, a very small quantity. This is a metric measurement for fluid volume. The factory setting for the pump is 40 microliters per board.

To give you a visual perspective of how much oil is being applied in 40 microliters, we'll measure only one drop of oil. About 16 microliters make up one drop of oil. So each time a stream of oil crosses one board, it applies less than 3 drops of oil.



Since three drops of oil are too small to measure with the naked eye, we must use a minimum amount that we can visibly measure. Using 400 boards allows the volume to be checked within reasonable accuracy.

The following exercise teaches you to calibrate the machine to confirm the factory pump setting. The pump should be set at 40 microliters per board.

1. Apply power to the machine and menu to the:

* STANDARD ELITE
0347 KEGEL E1107

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2. Press **MENU** three times to access the:

*** PUMP OUTPUT**
VOLUME TEST

No Password is needed to access this menu.

3. a.) If the machine is already warmed up, press **NEXT** twice to access the:

TEST: VOLUME PER
BOARD HIT: <-->

If the pump has been running skip to Step 8.

- b.) If the machine is not warmed up press **NEXT** three times to access this display:

TEST:VOL PER REV
FOR 0533 REVS

The pump will begin running as soon as this screen appears. The pump should run at about 533 RPM at 60 Hertz and about 430 RPM for 50 Hertz.

4. Remove the oiling head and place it in a small container.

5. When the **LEFT ARROW** is pressed the number on the screen will change to zero and the pump output will begin running (make sure the tip is in an appropriate container).

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6. Run this test several times, until the number of revolutions on the screen stops at the same number each time. This indicates the pump is running consistently. The number of revolutions should typically be either 430 (50 Hz) or 533 (60 Hz).

7. Once the pump is warmed up, press the **LAST** key to return to this screen:

**TEST: VOLUME PER
BOARD HIT: <-->**

8. Place the tip into a **CLEAN** 25 or 50 milliliter graduated cylinder.

9. Press the **LEFT ARROW** to start the pump and wait about 5 seconds.

10. Then press the **RIGHT ARROW** to start the head travel. Make sure the tip is in an appropriate container as 400 boards worth of conditioner will be dispensed.

11. The head will travel back and forth several times, depositing load streams of oil from **2-to-2** a total of eight times and **14-to-14** a total of eight times. This is equivalent to a total oil stream of **400 boards**. $(37 \times 8) + (13 \times 8) = 400$

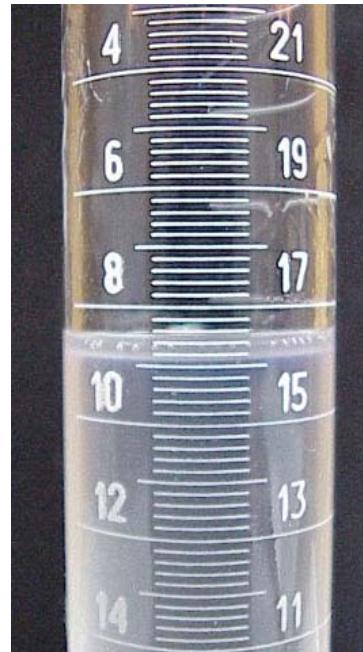
12. Remove the tip from the graduated cylinder and read the amount. If the pump is set at 40 microliters, then the output in the cylinder should be 16,000 microliters (or **16 milliliters**).

The math for this would be 40 microliters x 400 boards = 16,000 total microliters.

NOTE: There are 1000 microliters (unit of measurement for pump) in one milliliter (unit of measurement for graduated cylinder), we divided 16,000 by 1000 to get 16.

Section 8-4

13. To properly read the amount of conditioner in the graduated cylinder, which is **16 mL**, read the line at the bottom of bubble (as shown in diagram).



14. If the amount of oil is higher or lower than 16, a pump adjustment is necessary.

Note: Check to make sure the head is moving freely. If it binds up during travel the oil output may be affected.

15. Beneath the splash guard on the rear wall of the machine is the pump assembly. The picture shows the calibration ring of the pump. If an adjustment is necessary, turn the dial only about 1/2 microliter.



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Each small mark on the dial is 1/10 microliter, each large mark is a one microliter change in the output of the pump per 1 revolution of the pump. The pump is revolving at 3400 RPM. At the speed the oil head is traveling across the transfer brush, the pump actually revolves about 2-1/2 revolutions as it crosses one board.

Clockwise will decrease the output and counterclockwise (direction of arrow in the picture) will increase the output. Remember to make small adjustments when calibrating the pump.

16.Clean out the graduated cylinder using the long felt wick that is provided with the machine. A thorough cleaning is important because any oil left clinging to the sides of the cylinder will give inaccurate readings.

NOTE: When felt gets soaked with oil it can be cleaned by squeezing it in a rag.

17.Repeat steps 8 through 16 to check any adjustments that were made (i.e. If a change makes the output too low, then unscrew the pump about 1/2 of the amount it was previously adjusted.)

18.Keep repeating the test until the amount in the graduated cylinder reads **EXACTLY 16 mL.**

This calibration sets the machine to a standard stream size of 40 microliters per board. This allows us to "prove" the oil pattern that is programmed into the machine.

Section 8-6

B. Proving the Oil Pattern

We will use some sample settings for Program #01 as an example. The chart below shows the position of the loads and how many times each different load is applied.

PROGRAM 01

2 - 2 x 4 (Forward Loads)

9 - 9 x 1

10 - 10 x 2

11 - 11 x 3

12 - 12 x 1

13 - 13 x 1

12 - 12 x 2 (Reverse Loads)

11 - 11 x 2

10 - 10 x 2

8 - 8 x 1

8 - 8 x 1

Each load can quickly be condensed to a total number of boards by referring to the Board Chart at the end of Section 8. Using the Board Chart we can determine that a load or stream of oil from **2 - 2 covers 37 boards.**

This information is also provided for the factory programs on the Program Record Worksheets located in Section IX.

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After converting all the loads for Program 01,
the numbers become very simple.

PROGRAM 01

37 x 4

23 x 1

21 x 2

19 x 3

17 x 1

15 x 1

17 x 2

19 x 2

21 x 2

25 x 1

25 x 1

When all these loads are multiplied and added
together, the result is the total number of boards
that are covered by a stream of oil.

PROGRAM 01

37 x 4 = 148

23 x 1 = 23

21 x 2 = 42

19 x 3 = 57

17 x 1 = 17

15 x 1 = 15

17 x 2 = 34

19 x 2 = 38

21 x 2 = 42

25 x 1 = 25

25 x 1 = 25

466 Total Boards

In our example there are 302 boards covered
during Forward travel and 164 boards covered
during the Reverse travel.

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This total number (**466**) can be multiplied by the pump setting (**40 μL**) to determine the exact amount of oil used when conditioning with this pattern.

$$\begin{array}{r} 466 \text{ Boards} \\ \times \underline{40 \text{ microliters}} \\ \hline 18,640 \text{ microliters} \end{array}$$

The total amount is 18,640 microliters. To convert this to milliliters the number has to be divided by 1000.

$$18640/1000 = \mathbf{18.64 \text{ milliliters}}$$

This total program amount can be confirmed by running a **PROGRAM # VOLUME TEST**. This step is one important element in the *Process Verification Procedure* you should perform when conditioning lanes for competition.

The following exercise will make you familiar with this procedure.

1. Apply power to the machine and menu to the:

* STANDARD ELITE
0347 KEGEL E1107

2. Press **MENU** three times to access the:

* PUMP OUTPUT
VOLUME TEST

3. Press the **NEXT** key to access this screen:

TEST: PROGRAM #01
FWD OIL VOL.<-->

In this screen the PC will run only the oiling part of the program.

4. The program number is displayed in the upper right corner of the screen. If the number is different than the one you want to check, use the UP or DOWN ARROWS to change to the correct program number.

TEST: PROGRAM#01
FWD OIL VOL.<-->

5. Place the tip in a CLEAN graduated cylinder.

6. Press the **LEFT ARROW** to start the pump and wait about 5 seconds.

7. Then press the **RIGHT ARROW** to start the head travel.

8. When the head stops moving, the FWD in the bottom left corner of the screen will change to **REV**. This tells you the machine is now ready to apply the reverse oil loads.

TEST: PROGRAM#01
REV OIL VOL.<-->

9. Press the **LEFT ARROW** to start the pump and wait about 5 seconds.

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10. Then press the **RIGHT ARROW** to start the head travel and dispense the reverse loads.
11. When the head stops moving, remove the tip from the graduated cylinder and read the amount of oil.
12. The bottom of the oil line should be between **18.5** and **19** milliliters.

Running this test 3 or 4 times should be enough to convince anyone of the machine's accuracy and repeatability. Any time you run a different program you should calculate the total boards and volume.

Blank worksheets are provided at the back of the lane graph section to assist with this task. Having the total output for the program will insure that the program values are entered correctly. It will also help you to better understand each change you do make.

C. Board Chart for Calculating Program Loads

This chart shows the total number of boards the head travels across when distributing conditioner. This will make it much easier to determine the amount of oil that is used for your pattern, on paper, before it is measured by the machine through the Program Calibration Test.

	R	I	G	H	T	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	19	19	19	19	
3	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	19	18	18	18	18	
4	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	17	17	17	17	
5	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	17	16	16	16	16	
6	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	15	15	15	15	
7	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	14	14	14	14	
L	8	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	13	13	13	
E	9	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	12	12	12	
F	10	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	11	11	11	
T	11	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	10	10	10	
	12	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	9	9	9	
	13	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	8	8	8	
	14	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	7	7	7	
	15	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	6	6	6	
	16	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	5	5	5	
	17	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	4	4	4	
	18	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	3	3	3	
	19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	3	*	*	*	
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	*	*	*	*	*	

* Each load of oil must cross at least three boards.

SECTION IX - Program Descriptions

The following pages contain sample program settings for League and Tournament patterns. The machine's PLC is capable of holding Seven programs at a time; the first four are League/House patterns and the last three are Tournament Patterns. Programs can be easily changed in the machine with **Kegel On-line Support Interface (KOSI)**. This software allows you to store an unlimited number of programs for future download. KOSI also contains video tips, an electronic manual, and tutorials on machine maintenance.

A. League/House Sample Pattern Settings

The programs in this section have been created using **KOSI**. Contact Lane Maintenance Central at (863) 734-0200 or (800) 280-2695 if you have questions about these patterns.

B. Tournament Sample Pattern Settings

The programs in this section have been created using **KOSI**. Contact lane Maintenance Central at (863) 734-0200 or (800) 280-2695 if you have questions about these patterns.

Pattern Trouble-shooting Tips

Here are some suggestions to common questions about lane conditioning. These tips should help you make the proper adjustments to the patterns supplied in this manual.

Q: What should I do if I have too much **carry down**?

A: Shorten the applied oil distance. Too much oil in the middle, at the end of the pattern, causes carry down. Change only the buff-out distance, do not shorten the pattern, as this only creates more transition and possibly more moves. Make sure the machine is cleaning properly before making any pattern adjustments.

Q: What should I do if the **backends** are too strong?

A: Lengthen the pattern to tone down the reaction. Tamer backends provide predictable ball reaction and makes spare shooting easier. Be aware of potential carry down problems when the pattern length is increased.

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Q: What should I do if I do not have enough **hold**?

A: The distance of the applied oil on the return pass creates hold. This area is known as the mid-lane (from about 18-32 feet). The mid-lane provides direction to the breakpoint and dictates the score-ability of a pattern. Starting the reverse oil loads farther down the lane will help increase hold.

Q: What should I do if the **heads hook**?

A: The amount of oil in the lay down area, or a lane surface in poor condition, can cause the heads to hook. In both instances, the lane machine should run slower in the heads. This is better controlled on the return oil due to the direction of travel and the rotation of the buffer brush. Apply oil loads during the return travel that finish closer to the foul line (but not less than 4 feet).

Q: What should I do if I have no **swing**?

A: The amount of oil on the outside boards, or adverse lane topography, can affect swing. Reducing the length (or volume) of the applied oil will increase the amount of swing. If this is a topography issue, the pattern should be adjusted by reducing the amount of oil on the outside boards to allow bowlers to play a more direct line to the pocket. This should create more area in play at the breakpoint.

Q: What should I do if the **track** dries up too quickly?

A: Many bowling centers do not apply enough oil to the track on both forward and return passes. The volume, in units, at the end of the pattern should be slightly more than the outside boards. Applying oil to the track on the return pass provides longevity and stability. This application of oil can be started further down the lane on the return without drastically affecting the forward oil readings and ball reaction.

Q: What should I do if there is no **taper** to my pattern?

A: The easiest way to create taper in the pattern is to make adjustments to your drive speeds during the forward loads only. Increasing the drive speed on your forward run will allow the lane condition to taper properly.

Section 9-2

A. League/House Sample Pattern Settings

These programs have been created using **KOSI**. These graphs are only a representation of the patterns that will be applied by the machine. Many variables can affect the graph, so it may not match your machine exactly.

Pattern 1 League/House Pattern for Low Friction Surfaces. This is a starting point pattern for lower friction synthetic surfaces and for wood surfaces with lower friction coatings. This is a **39 ft.** pattern. This pattern is saved as Program **#1** in the machine.

Pattern 2 League/House Pattern for High Friction Lane Surfaces. This is the starting point pattern for non-synthetic lane surfaces with a significant amount of wear or synthetic lane surfaces that are more than 15 years old in age. This is a **41 ft.** pattern. This pattern is saved as Program **#2** in the machine.

Pattern 3 League/House Pattern for Guardian Lane Surfaces. This is the starting point pattern for lanes with **Guardian™** lane surfaces or **Brunswick Barricade™** lane surfaces. This is a **41 ft.** pattern. This pattern is saved as Program **#3** in the machine.

Pattern 4 League/House Pattern for Wood and Higher Friction Lane Surfaces. This is the starting point pattern for wood in good condition and synthetics that are less than 5 years old. This is a **40 ft.** pattern.

Pattern 5 League/House Pattern for High Friction Lane Surfaces. This is the starting point pattern for non-synthetic lane surfaces with a significant amount of wear or synthetic lane surfaces that are more than 15 years old in age. This is a **40 ft.** pattern.

Pattern 6 This pattern was designed for Sport Bowling competition. All forward loads, it meets both the ABC/WIBC specifications and Sport Bowling compliances. This is a **35 ft.** pattern.

B. Tournament Sample Pattern Settings

These programs have been created using **KOSI**. These graphs are only a representation of the patterns that will be applied by the machine. Many variables can affect the graph, so it may not match your machine exactly.

Pattern 1 2004 Intercollegiate Bowling Championships-Nationals. This pattern was used for the 2004 IBC Nationals at Riverlanes in Tulsa, Oklahoma. This pattern met all ABC/WIBC specifications and passed all Sport Bowling compliances.

Pattern 2 2004 American Bowling Congress Championship Tournament. This pattern was used for the 2004 ABC Championship Tournament at the National Bowling Stadium in Reno, Nevada. It met all ABC/WIBC specifications.

Pattern 3 2004 Women's International Bowling Congress Championship Tournament. This pattern was used for the 2004 WIBC Tournament at Northrock Lanes in Wichita, Kansas. This pattern met all ABC/WIBC Specifications.

Pattern 4 2003 Intercollegiate Bowling Championships-Nationals. This pattern was used for the 2003 IBC Nationals at River Lanes in Tulsa, Oklahoma. This pattern met all ABC/WIBC specifications and passed all Sport Bowling compliances.

Pattern 5 2003 American Bowling Congress Tournament. This pattern was used for the 2003 ABC Tournament in Knoxville, Tennessee. It met all ABC/WIBC specifications.

Pattern 6 2003 Women's International Bowling Congress Championship Tournament. This pattern was used for the 2003 WIBC Tournament at AMF Bowlero in Milwaukee, Wisconsin. It met all ABC/WIBC specifications.

SECTION X - Appendix

A. Recommended Maintenance Inspections

DAILY:

1. Clean entire oil compartment with a dry towel. This will help keep the pattern consistent from day to day.
2. Wipe squeegee blades after each use with a damp cloth. When the squeegee dries it becomes tackier, making it harder to clean. FAILURE TO CLEAN SQUEEGEE BLADES CAN AFFECT THE CLEANING QUALITY AND EFFICIENCY!!
3. Wipe cord down when wrapping after use.
4. Clean the Lane to Lane Casters, Transport Casters, and the Drive Wheels.
5. Wipe off Vacuum Motor. Lint can clog the air intake.
6. Drain Recovery Tank and WIPE UP ALL SPILLS IMMEDIATELY!! Most cleaners corrode the aluminum.

WEEKLY:

1. Clean entire machine with dry towel.
2. Blow out the vacuum motor with air. This is especially critical in high dust areas. Dirt will restrict air flow and cause premature wear of the motor.
3. Keep duster and squeegee position switches clean. Avoid spilling fluids on these, or any switches. This may cause the machine to malfunction.
4. Wipe the LDS wheels, drive wheels, and all casters.

CLEANING COMPARTMENT:

When changing the duster cloth, always use this opportunity to clean the front area of the machine.

KEEP YOUR PRECISION INSTRUMENT LOOKING NEW!!

Buffing the machine with a light coat of wax will seal the paint and protect the finish of the machine. This will also help remove deep down dirt and mild stains.

If you really care about your valuable investment, and about the consistency of your lanes, you will never regret keeping the machine clean.

20 MILE MAINTENANCE INSPECTION**Complete every 20 miles of operation**

(Use special 100 and 200 mile checklist at appropriate times.)

NOTICE TO OPERATORS: When the 20 mile maintenance is due, please examine the entire machine thoroughly, paying close attention to items listed below on the 20 mile checklist. When your inspection and repairs are complete, review what you have done with your Supervisor, then have them clear the Maintenance message on the keypad.

	20 mile	40 mile	60 mile	80 mile	100 mile	120 mile	140 mile	160 mile
Clean entire machine thoroughly								
Inspect lane-to-lane casters								
Inspect LDS and Drive wheels								
Inspect sensors and switches Clean if needed								
Inspect drive motor brushes & clean cap with compressed air								
Clean lint from transfer brush								
Clean buffer brush with air and check adjustment								
Flush recovery tank (use hot water)								
Clean filters and spray tip								
Check squeegee for wear and adjustment								
Check all chain tensions								
Check all belt tensions (buffer, head, and oil pump)								
Operator's Initials								
Date								
Actual Mileage								
Supervisor's Initials								

100 MILE MAINTENANCE**Complete every 100 miles of operation**

NOTICE TO OPERATORS: When the 100 mile maintenance inspection is due, please examine the entire machine thoroughly, paying close attention to the items listed below. When your inspection and repairs are complete, review what has been done with your Supervisor, then have them clear the Maintenance message on the keypad.

100 mile	200 mile	COMPLETE THE FOLLOWING INSPECTIONS:
		Complete all 20 mile maintenance inspections
		Inspect all motor pulleys and remove dirt build-up
		Inspect all cleaner supply lines and tee fittings
		Inspect vacuum hoses for breaks
		Inspect all oil lines and fittings. Check line pressure (10-15 psi)

PERFORM THE FOLLOWING MAINTENANCE:

	Lubricate all drive chains with 2-3 drops of 50w oil
	Lubricate the felt washers with 10w oil until saturated
	Lubricate LDS shaft bushings with 2 drops of 10w oil
	Lubricate buffer belt idler bushing with 3 drops of 10w oil
	Lubricate Oil Head rail
	Lubricate timing pulley shaft bushings (See Fig. 14)
	Lubricate pivot arm bushings on the duster assembly with 2 drops of 10w oil
	TIGHTEN ALL SET SCREWS (brush, cams, pulleys, sprockets, hubs, and wheels)
	Operator's Initials
	Date
	Supervisor's Initials
	Actual mileage

200 MILE MAINTENANCE INSPECTION

Complete every 200 miles of operation

NOTICE TO OPERATORS: When the 200 mile maintenance inspection is due, please examine the entire machine thoroughly, paying close attention to the items listed below. When your inspection and repairs are complete, review what has been done with your Supervisor, then have them clear the Maintenance message on the keypad.

200 mile	400 mile	COMPLETE THE FOLLOWING INSPECTIONS:
		Complete all 20 and 100 mile maintenance inspections

COMPUTER AREA:

		Tighten PC and PC Mounting plate
		Tighten all terminal strips and wire blocks

CONDITIONER AREA:

		Check set screws in Cleaner & Conditioner cog pulleys
		Move oil head by hand, checking for free travel along the bar
		Check head drive rails for lubrication
		Inspect all wires for tightness and breaks

MISCELLANEOUS:

		Inspect all wires in cleaning end for tightness and breaks
		Test all inputs and outputs through I/O Test on keypad
		Check LDS for excessive play (1/16" maximum)
		Check for excessive play in squeegee assembly

**200 MILE MAINTENANCE INSPECTION
(CONTINUED)**

200 mile	400 mile	INSPECT THE FOLLOWING ASSEMBLIES FOR TIGHTNESS:
		Lane guide rollers (4)
		Lane-to-lane casters (4)
		Main drive (5) and LDS (3) shaft pillow block
		All frame assembly bolts
		Operator's Initials
		Date
		Supervisor's Initials
		Actual mileage

We recommend replacing the following parts at:

560 miles (23,500 lanes):

Buffer Brush	154-8641
Cushion Roller	153-8839
Squeegee Blades	153-8204
Buffer Belt	154-9615
Vacuum Motor bushes	153-0204B (115V) 153-0204C (230V)
Drive Motor Brushes	154-1809B

We also recommend having the following parts on hand after:

1760 miles (71,000 lanes):

Speed Control Board	154-8633 (115V) 154-8634 (230V)
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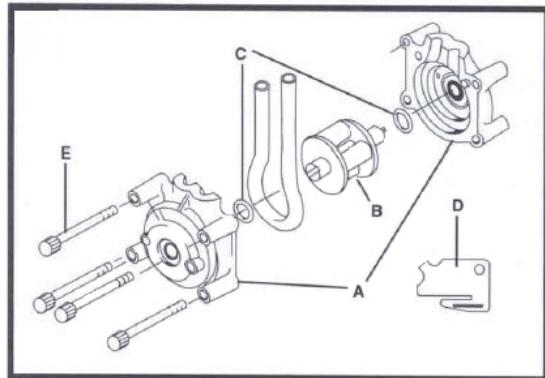
Recommendations are based on a 32 lane house conditioning twice a day (annually)

B. Instructions To Change Cleaner Pump Tubing

If the pump max volume output is a problem, follow these instructions to disassemble the pump and replace the tubing (See the exploded view of the pump on the following page.) To perform the following steps you will need to use the tubing loading key. This key is attached to the top of the cleaner pump assembly with a screw. Replace the key when finished.

STEPS:

1. Release both tube fittings from quick disconnects (Depress collet and pull tube from quick disconnect fitting).
2. Remove the (4) screws that attach pump to mount plate.
3. Remove both stem elbows from tubing (note direction of elbows). Save for re-installment on new tubing.
4. Separate the end bells (the pump head valves). Hold the end bell containing the rotor as shown with tubing retainer grooves pointing down. Remove old tubing.
5. Place new tubing (which is broken in at the factory before shipping) in the right groove and against the first two rollers. Hold tubing with your thumb. Near the groove, insert smaller prong of loading key between the top of the rotor and tubing. Push key in as far as possible.
6. Push down and turn key counterclockwise (ccw) completely around the rotor. The key will push the tubing uniformly into the end bell assembly. Hold the second end of tubing. Remove the key.



A. End Bells
B. Rotor Assembly
C. Thrust Washer (2)
D. Tubing Loading Key
E. Mounting Screws (4)

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7. Position the other end bell on top and press the end bells together. Be careful not to pinch the tubing. If end bells do not snap tightly together, reload tubing. If necessary, turn key in slot on rotor shaft to adjust tubing.
8. With key in slot on rotor shaft, turn key to align tang on rotor shaft with slot in motor drive shaft. Point tubing retainer grooves up. Shift the pump head slightly until it snaps on the alignment pins (if present).
9. Replace stem elbows in new tubing. Make sure elbows are facing correct direction.
10. Re-attach pump to mount plate.
11. Press stems back into quick disconnects.

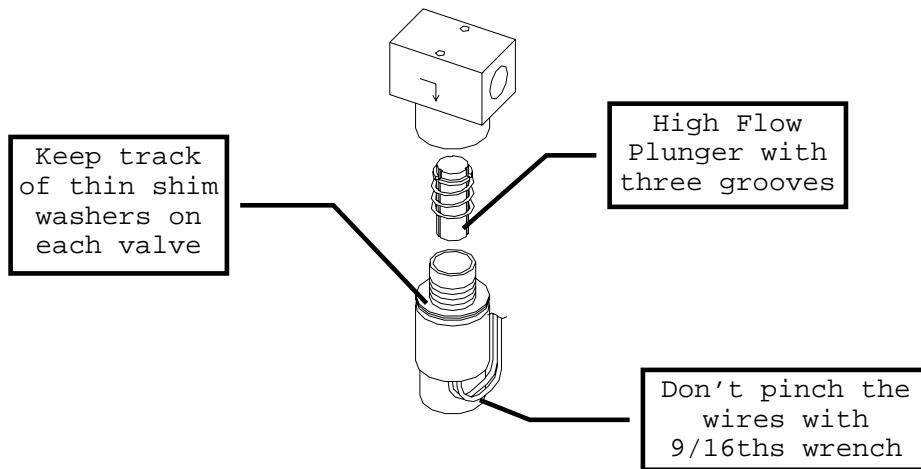
C. Procedure For Cleaning Oil Control Valve

The following steps outline the procedure for disassembling the conditioner metering valve. Be careful when removing the oil lines from the fittings since they will leak.

Block off the stem elbows to prevent them from leaking all over the machine (do not split the stem). Open 1/4" lines can be blocked off with a #8 screw.

Keep the oil lines and the valve free from dirt and debris while they are disassembled. Clean up any conditioner spills immediately, the sensors and electronic components do not like oil baths.

1. Disconnect power and place the machine in the operating position.
2. Remove the oil assembly from the rear wall.
3. Clean the area around the oil assembly.
4. Use a Phillips screwdriver to remove the two screws holding the valve to the back plate.
-----Comment [PC1]:
5. Remove the two stem elbows on the top of the valve. PUSH IN on the outer collet to release each elbow. Plug the open ends of the elbows to prevent dirt from entering the lines and to stop the oil from leaking (do not split the elbow).
6. Use a 9/16" open-end wrench to remove the bottom half of one valve. Do not pinch the small wires on the base of the valve. Keep track of the thin shim washers on the valve. Make sure to use the same washers during re-assembly.



7. The top section of the valve should be blown out with a canister of compressed air. Air should flow freely from the bottom through both sides at the top. A few short bursts of canned air in both holes should displace any debris. Alcohol can also be used to remove any build-up of sediment. (Do not use an air compressor to blow out the valves, water in the lines may be forced into the manifold.)
8. The bottom section contains a plunger and spring. Make sure the three grooves on the sides of the plunger are clean. This part should be cleaned with a cotton swab and alcohol to remove the debris.
- IMPORTANT:** If a valve is found to have only one groove please contact *The Kegel Company, Inc.* for an immediate replacement. All machines should have the "high flow" valves, which are machined with three grooves. Please call **(863) 734-0200** if a replacement is needed.
9. Replace the valve body on the head of the valve using the same shim washers.
10. Replace the valve on the back plate.
11. Plug each elbow back into the proper fitting and clean around all the connections.
12. Return the oil assembly to the machine and plug in the connections.

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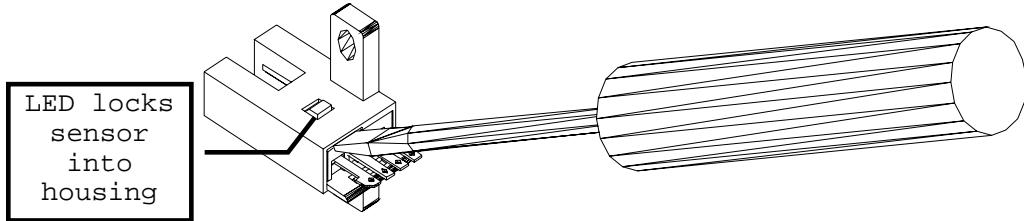
- 13.Run a **TEST: VOL PER REV** at least twice to remove the air from the lines (refer to Section 4). Check the line pressure after all the lines are full of conditioner. Examine each connection for leaks.
- 14.Run the *** PUMP OUTPUT VOLUME TEST**. Check the volume of conditioner output for a typical program and adjust the pump if necessary.

D. Procedure For Cleaning Infrared Sensors

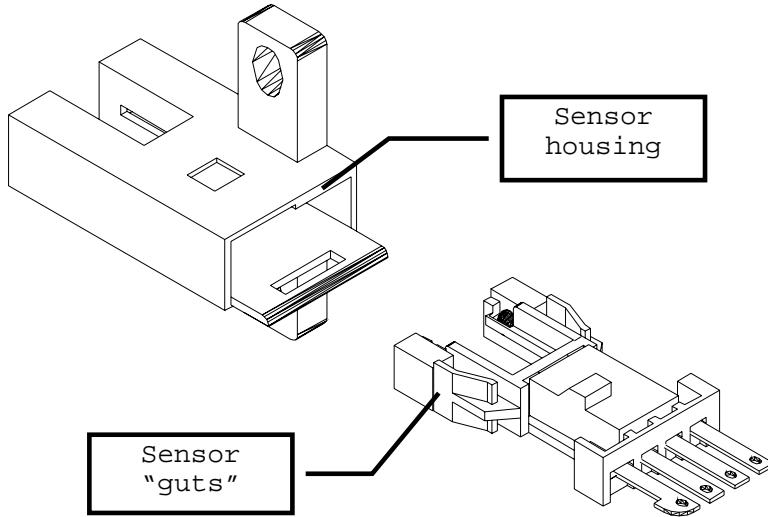
The following steps outline the procedure for cleaning a photoelectric sensor. This type of sensor is used for the conditioner pump tachometer.

If this sensor becomes contaminated with dirt and oil it will not function properly. With a little care it can be taken apart and cleaned.

1. Remove the protective cover for the sensor and check for proper disk alignment. Make sure the disk does not touch either side of the sensor.
2. Apply power to the machine and check for proper operation before removing the sensor. When actuated a light will appear on the Input module at the designated number. There is also a light on the sensor that will appear if there is no obstruction blocking the pass-thru area.
3. If a problem is evident, remove power and unplug the sensor cable.
4. Carefully remove the sensor from the mounting surface. (Note: Do not lose the shim washers used to space the sensor from the mounting surface.)
5. Locate the LED indicator on the sensor. It is the white section on top of the sensor. It acts as a key that locks the photoelectric section into the black plastic housing
6. Use a small standard screwdriver to carefully pry up on the black housing behind the LED.



7. With the housing raised off of the LED, pull back on the screwdriver using the tip to drag the guts out of the housing. Do not break the sensor housing, only pry on it far enough to get the leading edge of the LED underneath it.



8. Use warm soapy water to remove any oil and dirt build-up on the sensor and inside the housing. Rinse with clean water. Dry thoroughly before re-assembling.
9. Slide the guts of the sensor back into the housing and plug it into the cable.
10. Apply power and check the light on the sensor. It should illuminate if the sensor is functioning properly.
11. Block the sensor off to make the LED go dark, then check the PC Input module. An LED should be lit at the designated Input number.
12. If the sensor passes this test, disconnect power and re-install it on the machine.
13. Check for proper disk alignment and replace the protective cover.

E. Operators Menu Selections

* STANDARD ELITE 0400 KEGEL E1107	* RETURN>FOULINE HIT START BUTTON	* DUST CTRL&RSET 0400 HIT EXT ENT	* PUMP OUTPUT VOLUME TESTS
ENTER FIRST LANE 01 * HERE * 01		ARE YOU SURE ??? NEW DUSTER ROLL?	TEST: PROGRAM#01 FWD OIL VOL.<-->
ENTER LAST LANE 50 * HERE * 50		DUSTER UNWIND 10 # LANES LEFT0400	TEST: VOLUME PER BOARD HIT: <-->
PRESS START KEY 01 => 50 PRG 01			TEST:VOL PER REV FOR 0000 REVS
0151 #01 IS NEXT 0000 0000 01			

* TECH SUPPORT CALL 863-7340200	* (C) COPYRIGHT KEGEL CO 2005

NOTE: The values shown in these tables are sample screens and may not reflect the actual default menu settings for the machine.

These menu items are available to the operator when power is applied to the machine. It is easy to navigate through the menus by pressing either the **MENU** key to move to the right (top) menu or press the **NEXT** key to move down within the same column. The display will loop around the main screens continuously when **MENU** is pressed.

The Managers Menus are protected by a three digit password. This password should be entered at the **Dust Control and Reset** screen to access the additional menus that control the functions of the machine. For an explanation of each menu read Section IV.

The **Change Program** Menu within the Managers Menu Selections is protected by a second password that is different from the Managers Menu password. This allows additional protection from unauthorized tampering with the primary program settings, but still allows access to the rest of the menus.

F. Managers Menu Selections

The following tables show the Managers Menus for the Standard Elite. Navigate through these tables the same way you would for the Operators Menus.

* OVERRIDE AUTO 01 PROGRAM 01	* CHANGE PROGRAM 01 <CHOOSE> 01	* CHANGE AUTO PROGRAM SELECT	* SYSTEM CONTROL CLEANING	* SYSTEM CONTROL DISTANCE
	<1:CLEAN 2:OIL> 03 <3:BOTH> 03	MON AM01 PROG 01 LANES 01 THRU 12	FIRST SPRAY TIME 04 TENTHS 04	RETURN FOUL LINE 11 ADJUST 11
	<1:SIMULTANEOUS> 01<2:SEPARATE>01	MON AM02 PROG 05 LANES 13 THRU 24	SPRAY ON TIME 04 IN TENTHS 04	VACUUM DIST 20 OFF FOR 20
	START CLEANING 00 DISTANCE 00	MON AM03 PROG 07 LANES 25 THRU 50	SPRAY OFF DIST. 30 IN INCHES 30	
	END CLEANING 0720 DIST 0720	MON PM01 PROG 01 LANES 01 THRU 16	LAST SPRAY DIST 45 IN FEET 45	
	OIL ONLY DUST? 01 1-YES,0-NO 01	MON PM02 PROG 03 LANES 17 THRU 28	LIFT DUSTER 70 ADJUST 70	
	OIL PATTERN DIST 40 IN FEET 40	MON PM03 PROG 04 LANES 29 THRU 50	PINDK SPRAY DIST 18 ON 18	
	SLOW BUFF MED AT 45 MED OFF 45	TUE AM01 PROG 01 LANES 01 THRU 08	PAUSE AND SUCK 00 TENTHS 00	
	SLOW BUFF LOW AT 47 LOW OFF 47	TUE AM02 PROG 03 LANES 09 THRU 18	SPEED OUT OF PIT **** SLOW ****	
	01F 2L- 2R X 04 00->10 FT IPS=18	TUE AM03 PROG 02 LANES 19 THRU 50		
	02F 9L- 9R X 01 10->12 FT IPS=18	TUE PM01 PROG 06 LANES 01 THRU 14		
	03F 10L-10R X 02 12->17 FT IPS=18	TUE PM02 PROG 01 LANES 15 THRU 22		
	04F 11L-11R X 03 17->26 FT IPS=22	TUE PM03 PROG 04 LANES 23 THRU 50		
	05F 12L-12R X 01 26->29 FT IPS=22	CONTINUES		
	06F 13L-13R X 01 29->32 FT IPS=22	FOR EACH		
	07F 15L-15R X 00 32->40 FT IPS=22	DAY OF		
	01R 2L- 2R X 00 40->28 FT IPS=26	THE WEEK		
	02R 12L-12R X 02 28->23 FT IPS=18			
	03R 11L-11R X 02 23->18 FT IPS=18			
	04R 10L-10R X 02 18->13 FT IPS=18			
	05R 8L- 8R X 01 13->11 FT IPS=18			
	06R 8L- 8R X 01 11->10 FT IPS=14			
	07R 2L- 2R X 00 10->00 FT IPS=14			
	NEXT TO REVIEW * MENU TO EXIT *			

MANAGERS MENU SELECTIONS (CONTINUED)

* SYSTEM CONTROL BUFFER	* SYSTEM SETUP CLOCK	* SYSTEM CONTROL DUSTER	* DRIVE IPS ADJ PRESS NEXT 00
BUFF UP STP DELY 00 TENTHS 00	SET CLOCK TIME 00 MINUTE 00	PRESENT UNWIND 10 TIME 10	* USE ARROWS 1 0000 TO ADJ 00
DROP BUFFER ADV 72 INCHES 72	SET CLOCK TIME 00 HOUR 00	DEFAULT UNWIND 10 TIME 10	* USE ARROWS 2 0000 TO ADJ 00
	SET CLOCK DAY 00 OF MONTH 00	DUST EMPTY # LNS 0400 ADJUST 0400	* USE ARROWS 3 0000 TO ADJ 00
	SET CLOCK 00 MONTH 00		* USE ARROWS 4 0000 TO ADJ 00
	SET CLOCK 00 YEAR 00		* USE ARROWS 5 0000 TO ADJ 00
	SET CLOCK DAY 05 FRIDAY 05		* USE ARROWS 6 0000 TO ADJ 00
			* USE ARROWS 7 0000 TO ADJ 00

* BUFFER RPM ADJ PRESS NEXT	* SYSTEMS TO BE MONITORED	* PROX BYPASS MENUS
* USE ARROWS 1 0000 TO ADJ 00	ODOMETER 0000 FT 0000 MI	BUFFER ERROR BYPASSED?? NO
* USE ARROWS 2 0000 TO ADJ 00	TO CLEAR MAINT MESSAGE HIT EXIT	LDS PROX BYPASSED?? NO
* USE ARROWS 3 0000 TO ADJ 00	BUFFER SQUEEGEE 0000 HOURS 0000	
	VAC MTR DRV MTR 0000 HOURS 0000	
	SUN LANES MON 0000 RAN 0000	
	TUES LANES WED 0000 RAN 0000	
	THUR LANES FRI 0000 RAN 0000	
	SAT LANES TOTAL 0000 RAN 0000	
	NUMBER OF LANES 50 IN CENTER 50	
	BATTERY CHECKS GOOD!	

NOTE: The values shown in the previous tables are sample screens and may not reflect the actual default menu settings for the machine.

G. Troubleshooting

Troubleshooting of the machine is simplified by using the **TEST I/O** keys on the keypad. These keys allow the operator to activate an Input or Output and check that it is functioning properly. Refer to **Section VII** to see a list of the Inputs and Outputs for each machine.

1. Inputs

All of the machine's Inputs are controlled by the Left Module (7-Pin Side) of the PC and have a prefix of "0". To test an INPUT, for example the Buffer Up Switch, apply power to the machine and bring up * **STANDARD ELITE** menu. Press the **TEST INPUT** key at the **TEST I/O** section of the keypad.

The screen will display:

```
* TEST INPUT # 000  
BUFFER TACH OFF
```

The display is telling the operator that the Buffer Motor tachometer is not sending a signal to the PC. If the proximity sensor is actuated, the display would change to "ON".

To advance to the Buffer Up Switch press the **TEST INPUT** key three more times. This will advance the display past Input #001 and Input #002, and the keypad will display:

```
TEST INPUT # 003  
BUFFER UP SW ON
```

The display is telling the operator that the buffer is in the up position as designated by the "ON" in the lower right corner of the display. The operator can also check LED for Input #003 at the Input Module. This LED should be illuminated when the switch is activated.

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Press the **TEST INPUT** key again and the display will change to:

TEST INPUT # 004

BUFFER DN SW OFF

The display is telling the operator that the buffer is not in the down position as designated by the "OFF" in the lower right corner of the display. The operator can also check LED for Input #004 at the Input Module. This LED would be illuminated if the switch was activated. The display will change from "OFF" to "ON" when the switch is activated.

Simply pressing the **TEST INPUT** key will advance through all the Inputs allowing the operator to test each one. When the last input is shown, the menu will begin at 000 once again. If you miss the Input you are looking for you can "menu around" to it again.

To return to the Operators Menu selections depress the **EXIT I/O** key.

2. Outputs

The steps to test an Output are similar to testing an Input. Apply power to the machine and bring up * **STANDARD ELITE** menu. Press the **TEST OUTPUT** key at the **TEST I/O** section of the keypad. The screen will display:

TEST OUTPUT #100
24VDC VALVE OFF

To test the valve press the **ON/OFF** key in the TEST I/O section. The display will change to "ON" and the valve will open. Press the ON/OFF key once again to turn the valve off again.

NOTE: All Outputs will stop functioning after a few seconds, this is normal safety feature in the program. This will prevent accidentally leaving one on too long under load.

Press the **TEST OUTPUT** key again and the display will change to:

TEST OUTPUT #101
L>R OIL HEAD OFF

To run the head motor from left to right press the **ON/OFF** key in the TEST I/O section. The display will change to "ON" and the motor will operate for a short time. Continue through the Outputs by pressing the **TEST OUTPUT** key.

NOTE: Refer to **Section 7** of the manual for a list of the Outputs for each model of the machine.

WARNING: Do not activate the Pump Motor on the approach!

NOTE: The program prevents the Buffer Brush from running while in the raised position. Use the Test I/O menu to lower the brush prior to operating the output.

To return to the Operators Menu selections depress the **EXIT I/O** key.

H. Machine Error Messages

The machine is equipped with Error Messages that are displayed in the event the machine malfunctions. These messages describe the operation of the machine at the time the error occurred.

In most cases, restarting the machine after an Error Message can be done by simply correcting the problem and pressing the start button on the handle. In some instances, the machine will need to be returned to the foul line and the starting and ending lane numbers will need to be re-programmed.

Follow the Error Message information shown here to get several suggestions as to the reason the error occurred. Along with these suggestions there are troubleshooting suggestions. The following is a list of the errors that may occur.

ERROR!! FORWARD

TRAVEL INTERRUPTED

- 1) Machine is not seated, high gutters, or drive wheels are slipping.
- 2) Lane Distance Sensor signal failure, or the LDS Shaft is binding. **Input Bypass** is available for trouble-shooting.
- 3) Drive Motor or Speed Control failure.
- 4) Go to I/O Test Menu and Check LDS Input #014, Drive Forward Output, and Control Relay #1.

ERROR!! REVERSE

TRAVEL INTERRUPTED

- 1) Machine is traveling too fast, or is not seated.
- 2) Lane Distance Sensor has partial failure at High Speed, or the LDS Shaft is binding. **Input Bypass** is available for troubleshooting.
- 3) Drive Motor or Speed Control failure.
- 4) Go to I/O Test Menu and Check LDS Input #014, Drive Reverse Output, Control Relay #2, Drive Forward Output, and Control Relay #1.

ERROR!! SQUEEGEE

DID NOT LOWER

*** **Menu Out** of the Program and Return machine to approach.

- 1) Machine was put on the lane before Squeegee was lowered.
- 2) If Squeegee Motor runs continuously, Input #007 is not getting the signal from the Squeegee Down Switch.
- 3) If Squeegee Motor does not run go to I/O Test Menu and Check Input #007 (Squeegee Down Switch) and Test the Output for the Squeegee Up/Down Motor.

ERROR!! SQUEEGEE

DID NOT RAISE UP

*** **Menu Out** of the Program and Return machine to approach.

- 1) If Squeegee Motor runs continuously, Input #006 is not getting the signal from the Squeegee Up Switch.
- 2) Go to I/O Test Menu and Check Input #006 (Squeegee Up Switch) and the Output for the Squeegee Up/Down Motor.

ERROR!! BUFFER

DID NOT LOWER

*** **Menu Out** of the Program and Return machine to approach.

- 1) If Brush Lift Motor runs continuously, Input #004 is not getting the signal from the Brush Motor Down Switch.
- 2) Go to I/O Test Menu and Check Input #004 (Buffer Down Switch) and the Output for the Buffer Up/Down Motor.

ERROR!! BUFFER

DID NOT RAISE UP

*** **Menu Out** of the Program and Return machine to approach.

- 1) If Brush Lift Motor runs continuously at the end of the pattern, Input #003 is not getting the signal from the Brush Motor Up Switch.
- 2) Go to I/O Test Menu and Check Input #003 (Buffer Up Switch) and the Output for the Buffer Up/Down Motor.

ERROR!! DUSTER

CLOTH EMPTY

*** **Menu Out** of the Program and Return machine to approach.

- 1) Replace cloth & Reset Duster Counter.
- 2) One or both of the Duster Up Switches are stuck.
- 3) Duster did not unwind.
- 4) Go to I/O Test Menu and Check Input #010 (Duster Up Switch) and the Output for the Duster Unwind Motor.

ERROR!! DUSTER

DID NOT WIND UP

*** **Menu Out** of the Program and Return machine to approach.

- 1) Motor did not operate or the set screw is loose.
- 2) Ensure that Duster Rolls are seated in Hubs and Routed properly.
- 3) Check adjustment of Wind-Up Switches.
- 4) Go to I/O Test Menu and Check Input #010 (Duster Wind Up Switch) and the Output for the Duster Wind-Up Motor.

POWER INTERRUPT

OR LOW VOLTAGE

- 1) Check electrical connections on Power Cord and Receptacles.
- 2) Check the load on the circuit where the machine is connected.

Note: This error can be by-passed if absolutely necessary.

Contact tech support if this error becomes a nuisance.

When by-passed, an asterisk (*) will appear on the right top corner of * **STANDARD ELITE** menu screen. The screen will change to * **STANDARD ELI *** when by-passed.

INPUT ERROR!

CHECK TERM STRIP

- 1) Check Input Terminal Strip on the ID212 Module and on the PC Power Supply.
- 2) If the Squeegee and Brush Lift Motors run continuously when power is applied, check Input power.

OIL LEVEL LOW

FILL AND RESTART

- 1) Check fluid level in Conditioner Tank.
- 2) Fill tank, Re-enter Lanes left, & Restart the machine.

CLEANER LOW

FILL AND DUMP TANK

- 1) Check fluid level in the Cleaner Supply Tank.
- 2) Fill Supply, Empty Recovery, & Re-program the machine.

ERROR! OIL HEAD

PROX INPUT #1

Screen Toggles to Read

OR OIL HEAD

STOPPED MOVING

- 1) Go to I/O Test Menu and check Input #001.
- 2) Check to make sure the Head Drive operates freely without binding (Output #101).

ERROR HEADTIMING

PUSH BUTTON

- 1) This Error will appear if the Oil Control Valve is not opening and closing properly as the head travels between the two proximity sensors. This error does not prevent the machine from running, but the Start Button on the handle must be pressed to resume operation.
- 2) Use the Blacklight to monitor the loads as the machine travels on the lane. This will help you determine the severity of the problem. Do not allow Head Timing problems to undermine the consistency of the machine.
- 3) Using the machine with the head out of adjustment will result in missed or improperly placed loads. Adjust the head timing As Soon As Possible if this error occurs. Refer to **Section V** for instructions on adjusting the head timing.
- 4) If the travel speeds of the machine are improperly set the program may try to load oil up until the end of the pattern. This will not cause the Head Timing Error, however this problem should be fixed to eliminate improperly placed loads.

CHECK INPUT #4

BRUSH DOWN SWITCH

- 1) Check the Brush Motor Cam to make sure it is actuating the Brush Down Switch. This error can occur if the motor cam coasts past the switch.
- 2) Restart the Machine.

CHECK INPUT #7

SQUEEGEE DOWN SW

- 1) Check the Squeegee Motor Cam to make sure it is actuating the Squeegee Down Switch. This error can occur if the motor cam coasts past the switch.
- 2) Restart the Machine.

This concludes the ERROR MESSAGES that are available.

I. Technical Support Instructions

Please follow these steps if there is a problem with the machine.

1. Obtain as much information about the problem as possible. Can you duplicate the problem? If so, **write down** the steps that cause it to occur. Keep in mind that the technical support person will have to fix your problem with the information you provide. The more details you can provide the quicker we can find a solution.
2. Check for error messages while operating the machine. Use the stickers on the machine to get tips on what may be causing the problem. Investigate these suggestions.
3. Go to the **TEST I/O MENU** and check all Inputs and Outputs. If any of these do not work, check the wiring to the component. Each Input and Output also has an LED on the Control Module. These lights can also be used to check the machine's functions during operation.
4. Check the Operators Manual to see if it addresses your problem. This may give you enough information to solve the problem yourself, or at least it gives you the background to communicate the problem more readily to a technical support person. **If all else fails...read the manual!**
5. If you still need to call for help, get the following information ready:

Machine Serial Number (On Bottom of Machine)

Machine Production Date (On Bottom of Machine)

Installation Date (Or Machine Mileage)

Program Version (On Bottom Right of Start Screen)

Program Number Where Problem Occurs (If Not All)

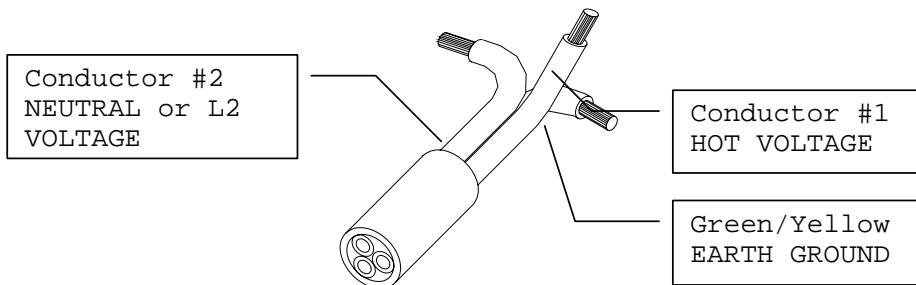
Line Voltage Coming into the Machine (AC)

6. Get the machine powered up near a phone **before** you call for help. You should also have a meter handy to check AC and DC voltages and continuity. (This is an especially helpful tool during trouble-shooting.)
7. **Call Kegel at (863) 734-0200.** The Kegel factory is located in Lake Wales, Florida USA. Office hours are typically from 7:00 am to 5:30 p.m. EST Monday through Friday. Calls outside these hours will be handled by an automated message system. Once a message is taken, a tech will be notified and you will be called back as soon as possible.

Following these steps before you call will allow a technical support person to isolate and solve the problem much faster. Each time you call take notes on how the problem was solved to refer back to if the problem occurs again.

Important Note About The Power Cord

The machine power cord is certified to comply with UL, CSA, CE Safety Directives. To achieve all these certifications, two of the wire conductors in the cord are colored **BLACK**. Each conductor has a number printed on it: 1 or 2. The #1 conductor should be connected to the **HOT** leg of the voltage source. The #2 conductor should be connected to the **NEUTRAL** or the **L2** leg of the voltage source (on 230V). Make sure to follow the proper wiring instructions when replacing the cord ends.



J. Pressure Regulator Tubing Chart

The following ranges of conditioner viscosity have been tested in the machine to determine the size and length of the pressure regulator tubing that is needed. Keep in mind that these are only **guidelines**, temperature greatly affects viscosity and may change these results.

Testing was performed at 72-degrees Fahrenheit with a variety of conditioners. Equipment is available to measure the viscosity of any conditioner. A Viscosity Cup, Thermometer, and a Stopwatch are valuable tools if you are mixing your own blend of conditioner. Call Kegel for more information on how to obtain this equipment.

<u>Viscosity Range</u>	<u>Length</u>	<u>Size (OD)</u>	<u>Conditioner</u>
<10	6~7 Ft.	3/16"	LV2 or U-300
~10	30 In.	3/16"	DBA #501
~20	15 In.	3/16"	Clear #801
~29.7	15 in.	3/16"	Prodigy
~39.1	6 In.	3/16"	Defense-S & Offense
~40	36 In.	1/4"	Special Blend
~50	12 In.	1/4"	Clear Super 50
>60	*See Note	1/4"	Special Blend

*Note: When using a conditioner with a higher viscosity than 60, use a 1/4" OD piece of tubing that is approximately 3" long and connect it between the Tee Fitting and the Oil Control Valve Input Fitting. Store all the elbows, fittings, and lines in a safe place in case you want to switch back to a lighter conditioner. Machine has been tested up to 100 centistokes.

To purchase stock tubing for adjusting the regulator lengths order the following part numbers:

- 154-0202A** - 1/4" OD Tubing Stock (Inch)
- 154-0202B** - 3/16" OD Tubing Stock (Inch)

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SECTION XI - Mechanical Drawings

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Edition 03:05

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SANCTION STANDARD
IMPORTANT NOTES