DBA PHOENIX-S™
TOURNAMENT EDITION
SANCTION TECHNOLOGY BY KEGEL

The *Phoenix-S* began many years ago as an experiment in lane maintenance with a machine called **"The Sanction Machine"**.

The purpose of any experiment is to try something new or different. This leads to new ideas and better ways to get things done.

As we try new things with the *Phoenix-S* it becomes necessary to update the Operators Manual. Each updated version will have a new Edition Date.

If you feel your manual is outdated, please let us know. The bowling industry is changing rapidly, but with the *Phoenix-S* by Kegel, you won't get left behind.

Edition 11:96

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If all else fails ... read this manual

SECTION I - Introduction

A. Overview

The DBA PHOENIX-S Lane Cleaning and Conditioning Machine represents unequalled 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.

An advanced conditioner metering transfer system, vacuum cleaning and squeegee system, and a patented Lino-Duster system, allow the DBA *PHOENIX-S* to maintain clean and consistent bowling conditions in a manner never before possible.

With the expandability of the Programmable Computer, future upgrades are easily done, assuring that your DBA *PHOENIX-S* will not become obsolete.

IT IS EXTREMELY IMPORTANT THAT THE OPERATOR THOROUGHLY READ AND UNDERSTAND THIS OPERATING MANUAL BEFORE USING THE DBA *PHOENIX-S*.

Should you have any questions regarding any procedures pertaining to the proper operation of this machine, please contact your authorized DBA PHOENIX-S Distributor.

B. Machine Specifications

Power Supply:
115 Volts, 60 Cycle, 17 Amps
220 Volts, 50 Cycle, 9 Amps

Dimensions:
Width - 53"
Height - 13"
Length - 39"
Weight - 350 pounds

C. Care and Safety Procedures

Although manufactured of the highest quality materials, keep in mind that the DBA *PHOENIX-S* is a sensitive piece of equipment. Care should be taken to see that the PHOENIX-S is not dropped, banged 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 *PHOENIX-S* 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 *PHOENIX-S* 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 *PHOENIX-S*, its computer, persons operating it, or void the warranty.

Persons assigned the responsibility of operating the DBA *PHOENIX-S* should be trained in its use by an authorized factory-trained DBA Distributor.

D. Theory of Operation

The *Phoenix-S* uses proven Kegel "SANCTION TECHNOLOGY". This technology is the precise metering of oil to each board by volume. This generation of "SANCTION TECHNOLOGY" used in the *PHOENIX-S* is greatly improved over the first generation of SANCTION MACHINES. It is much faster and gives more control over the lengthwise distribution of the oil pattern.

The *Phoenix-S* 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. This applies 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. would 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.

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

To do this simply multiply:

1) the value of the amount of oil per board of the oil stream (done 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 <u>understand</u> lane conditions like never before. Simply because all adjustments to the oil pattern are exact and repeatable. Sanction Technology is more of an instrument than just a 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 or REAR END:** The CONDITIONING or REAR END shall be the end of the machine closest to the operator and nearest the approach, where the buffing brush is located.

- **COMPUTER or CENTER COMPARTMENT:** The COMPUTER or CENTER COMPARTMENT houses the electrical components and is located between the CONDITIONING END and the CLEANING END.

- **CLEANING or FRONT END:** The CLEANING or FRONT END shall be the end nearest to the pins, where the cleaning tank and the Duster Assembly is located.

- **RIGHT SIDE:** The RIGHT SIDE of the *PHOENIX-S* 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 of the PHOENIX-S 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 of the *PHOENIX-S* is the computer keypad. This keypad is used to enter all programming information, as well as to start the machine. The keypad consists of 28 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 in the *PHOENIX-S* to return to the Operators Menus from the Managers Menus.

- **START:** This key will activate the handle start button on the *PHOENIX-S* when in the START MENU.

- **UP & DOWN ARROWS:** Use of these keys will increment or decrement numbers asked for in certain menu prompts, such as the starting lane number.

- **LEFT & RIGHT ARROWS:** Use of these keys will increment or decrement the starting lane numbers to the first lane or last lane available in the center. In certain menu prompts, these keys will increment or decrement the displayed values by a count of ten. It functions differently in several menu prompts.

Also displayed on the keypad are three additional sections of input keys.

The following keys are located in the **HELP KEYS** section:

- **NEXT HELP:** This key will display the next available help screen information for the displayed error message.
- **LAST HELP:** This key will return to the last displayed help screen.
- **HELP MENU:** Use of this key will display the available help screens for the displayed error message.
- **EXIT HELP:** This key will exit the available help screens.

The following keys are located in the **RUN PREP** section:

- **PRIME PUMP (HR):** This key will allow the operator to prime the spray pump prior to cleaning the first lane.
- **TEST CLEAN (Change):** Use of this key will allow the operator to check how well the *PHOENIX-S* is cleaning the lane prior to cleaning and conditioning simultaneously.

The following keys are located in the **TEST I/O** section:

- **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.
- **EXIT I/O (Down arrow):** This key is used to exit the TEST I/O section.

C. Conditioning (Rear) End Components

Located on the Conditioning end of the PHOENIX-S are the following components:

- **DISTANCE WHEELS:** Located on the outside rear wall of the conditioning end and mounted on the ends of the lane distance shaft are the distance wheels. These wheels measure the distance the *PHOENIX-S* travels down the lane in increments of one inch. This is done by an infra-red LDS (Lane Distance Sensor) mounted on the right pillow block.

- **CONDITIONER TANK:** Mounted to the rear wall on the buffing end is the conditioner tank assembly. This tank holds approximately 1-1/4 gallons of lane conditioner when full. This large capacity allows the *PHOENIX-S* to operate for a longer period before refilling. A float located inside the tank indicates when the conditioner level drops to approximately 1/4 gallon. A filter is located inside the tank.

- **BUFFING BRUSH LIFT MOTOR:** Mounted on the left side of the rear wall is the buffing brush lift motor. This motor lifts the buffing brush off the lane. The buffing brush needs to be lifted at times where conditioner is not being applied (i.e. from the end of oil through pindeck during all cleaning cycles).

- **TRANSFER ROLLERS:** Mounted below the moving head are the conditioner transfer rollers. These two stainless steel rollers are chain driven and transfer conditioner onto the buffing brush.

- **TRANSFER ROLLER DRIVE MOTOR:** Mounted on the right side of the rear wall is the transfer roller drive motor. This motor drives the transfer rollers during conditioning runs.

- **BUFFING BRUSH:** Located near the rear wall of the conditioning end is the buffing brush assembly. The belt-driven buffing brush removes conditioner from the transfer rollers and places it onto the lane surface.

- **START/INTERLOCK/RESUME BUTTON:** Located on the handle is the Start/Interlock/Resume button. This button is used to start the *PHOENIX-S*; stop the *PHOENIX-S* any time during the conditioning run; or to resume operation after the *PHOENIX-S* has stopped for an error message or some other reason.

- **OIL HEAD:** Located above the transfer rollers is the Moving Head. This head rides along a guide bar and applies the conditioner to the transfer rollers.

- **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, move the head back and forth along a rectangular track above the transfer rollers.

D. Computer/Center Compartment Components

Located in the Computer Compartment of the *PHOENIX-S* are the following components:

- **POWER CORD INLET:** Mounted on the left side of the *PHOENIX-S* is the power cord inlet. This is the only inlet to which the power cord can be attached to.

- **15 AMP OR 10 AMP BREAKER:** Mounted on the left side panel of the PHOENIX-S is a 15 amp or 10 amp circuit breaker. The 15 amp breaker is used in a 110 volt model and protects the circuits for the entire machine. The 10 amp breaker is used in a 220 volt machine and protects the circuits for the entire machine.

- **10 AMP OR 8 AMP BREAKER:** Next to the 15/10 amp breaker is a 10 or 8 amp circuit breaker. This breaker protects the vacuum motor.

- **DRIVE MOTOR SPEED ADJUSTING POTS:** The adjusting pots are mounted to a plate in the center of the computer compartment. These pots regulate the speeds of the drive motor. The furthest **LEFT** pot (as you face the pins) controls the **LOWEST** speed (10 inches/second). As you continue right each pot controls the next available speed.

  Facing the unit the proper setting for the pots are in this order:

  9-10 IPS
  13-14 IPS
  17-18 IPS
  21-22 IPS
  25-26 IPS
  29-30 IPS
  RANGE Pot (Adjusts speed from all pots.) and
  54-60 Inches Per Second of travel on the lane.

- **COMPONENT CONTROL RELAYS:** Mounted on a plate on the right hand side of the computer compartment is the Component Control Relay Assembly. This assembly is comprised of four control relays. Each relay controls a specific function of the *PHOENIX-S*.

  From left to right:

  - The first relay **CR #1** controls the forward operation of the drive motor.
  - The second relay **CR #2** controls reverse operation of the drive motor.
  - The third relay **CR #3** controls the operation of the vacuum motor and the lane blower. When this relay is energized the vacuum motor and lane blower will operate.
  - The fourth relay **CR #4** controls the operation of the cleaner spray pump motor. When this relay is energized the spray pump motor will operate.

- **BRAKE RESISTOR:** Mounted to the Forward relay and the Reverse relay is the Brake Resistor. This resistor stops the drive motor when the drive motor relays are turned off.

- **BUFFING MOTOR:** On the left side of computer compartment is the buffing motor. This motor drives the buffing brush.

- **BUFFING MOTOR CONTACTOR:** Located in the center of the computer compartment just below the Drive Motor Speed Adjusting Pots is the Buffing Motor Contactor. When actuated under power, it will operate the buffing motor and the transfer roller motor.

- **SQUEEGEE MOTOR:** Near the center of the computer compartment is the synchronous motor which controls the up and down movement of the squeegee.

- **LANE BLOWER:** Located to the left of the buffer contactor and squeegee motor is the lane blower. This motor is used to force dry the lane during cleaning.

- **PROGRAMMABLE COMPUTER (PC):** Just to the right of center in the computer compartment is the Programmable Computer, or PC. The PC is made up of 4 components, the main controller, one input module and 2 output modules.

- **DRIVE MOTOR:** Mounted directly below the component control relay assembly is the drive motor. It drives the *PHOENIX-S* on the lane.

E. Cleaning (Front) End Components

The following components are located under the lid on the cleaning end of the *PHOENIX-S*:

- **PUMP MOTOR:** Mounted on the far left hand side of the cleaning end of the *PHOENIX-S* is the pump motor. This motor pumps the cleaning liquid from the supply tank through the spray jets and onto the lane surface.

- **VACUUM MOTOR:** Located on the right side of the *PHOENIX-S* is the vacuum motor. This motor is used with the squeegee assembly and recovery tank to vacuum the cleaner off the lane. This motor needs special attention in high dirt areas, especially if the gutters and caps are not dusted regularly.

- **SUPPLY TANK:** The tank nearest the left side is the cleaner supply tank. This tank will hold enough cleaner to completely clean in excess of 32 lanes. A screen filter is located inside the tank.

- **RECOVERY TANK:** The tank nearest the right side is the recovery tank. This tank will hold in excess of 20 lanes of used liquid without needing to be emptied.

- **DMR DUSTER/CLEANING CLOTH ASSEMBLY:** Mounted inside and across the entire front end is the DMR 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 plastic take up roller.

  For best results, use only **DBA #8460** Lane Cleaning Cloth. The DBA *PHOENIX-S* will use approximately 1-1/2" of cloth per lane.

- **SPRAY JET ASSEMBLIES:** Mounted to the front outer wall of the PHOENIX-S are the 4 spray jet assemblies. These assemblies can be tilted up or down, and left or right, to adjust spray coverage to the entire lane. Mounted with the spray tip is a combination check valve/filter.

- **DUSTER UP SWITCH:** Located on each side wall to the topside of the Lino-Duster pivot arms. These switches, when actuated, tell the PC that the duster is in the up position.

- **FAILSAFE SWITCH:** This switch is found on each side wall, below the Duster Up switch. When the cushion roller drops off the end of the lane, the duster pivot arms actuate the failsafe switches. Once actuated the *PHOENIX-S* will travel two inches before it reverses. The failsafe will reverse the machine only when the End of Pindeck counter is set too high. The failsafe switches are a <u>backup</u> system only!

F. Underside Components

Located on the underside of the *PHOENIX-S* are the following components:

- **DRIVE SHAFT:** Located towards the center of the underside is the lane drive shaft. This shaft is driven by the drive motor. The squeegee assembly is also mounted and pivots on this drive shaft.

- **TACH SENSOR:** Mounted to the left pillow block for the drive shaft is the TACH sensor. A ten-tooth timing sprocket is mounted to the drive shaft. As the teeth of the sprocket pass through this 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 speeds of the machine. It also is used by the program to sense if the drive wheels are slipping. The PC compares the rate of pulses coming from the tach sensor to the rate of pulses coming from the LANE DISTANCE SENSOR.

- **DRIVE WHEELS:** Mounted on the lane drive shaft are the two drive wheels. These wheels are powered by the drive motor and drive the *PHOENIX-S* up and down the lane.

- **SQUEEGEE ASSEMBLY:** Mounted to the drive shaft is the squeegee assembly. This assembly vacuums the cleaner and oil off of the lane during lane cleaning.

- **LANE-TO-LANE CASTERS:** Located on the exterior left and right sides of the frame are the lane to lane casters. These casters support the *PHOENIX-S* as it is moved from one lane to the next.

- **GUIDE ROLLERS:** Mounted inside of the side plates are four spring-loaded guide rollers. These guide rollers ride along the edges of the lane to keep the *PHOENIX-S* straight and centered on the lane.

- **OIL PUMP & MOTOR:** Located on the left side of the underside is the Conditioner Pump and Motor. Conditioner is pumped from the tank through the *PULSE DAMPENER TUBE* to the *OIL PRESSURE GAUGE* through the *PRESSURE CONTROL VALVE* then to the oil routing valves.

- **OIL ROUTE CONTROL VALVES:** Two valves are used to meter and route the conditioner flow. The **OIL PATTERN CONTROL VALVE** is controlled by 24V DC. In its normal or OFF state this valve routes the oil from the pump back to the oil supply tank via the oil return line. When turned to the ON state it routes the oil from the pump to the **OIL VOLUME TEST VALVE** (110V AC). The Oil Test Valve in its normal or OFF state the allows the oil to flow to the Oil Head Pencil and on to the main transfer roller. When turned ON it routes the oil to the *OIL CALIBRATION OUTLET* located on the left rear wall of the machine.

SECTION III - Pre-Installation

Preparation of the Bowling Lanes

Prior to operating the *PHOENIX-S* 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 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.

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 *PHOENIX-S* should be in the down position on a level surface. Pull out both gray tank plugs located on the top of the tank. (Push down on the collet before pulling on the plug.)

Insert the white funnel provided with the machine. Located on the right side end of the tank is a clear sight tube.

Fill the tank until the oil level in the tank reaches the bottom edge of the right angle gray fitting on the top side of the machine. Failure to watch the sight glass could cause the tank to overflow.

This overflow can drain down onto 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 an oil rag over the buffer directly below the oil fill vent hole to prevent this. When finished be sure to remember to replace both gray tank plugs. 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 *PHOENIX-S* should be in the down or operating position. Prepare a 2:1 mixture of DBA Cleaner and water. Pour the mixture into the Supply Tank using the supplied funnel. (NOTE: Be sure to always use the red funnel supplied with the machine.) The red funnel has a brass filter screen. This screen filters out all debris and trash and prevents this from contaminating the supply tank.

Failure to pay attention to this will cause the tank filter (located in the outlet of the supply tank) 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 will lead to customer complaints, ball calls, and an excess of out-of-range pins. The Supply tank on the *PHOENIX-S* is removable for cleaning.

Any spills or drops of cleaner onto the approach should be wiped up immediately! Any spills on the machine will stain the aluminum 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.

C. Turning the Unit On

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

Connect the power cord to the *PHOENIX-S*.

Connect the power cord into a suitable outlet. MAKE SURE THAT THE OUTLET IS SUPPLYING THE CORRECT VOLTAGE AND AMP RATING (see Page 1). Connecting the power cord into an outlet located towards 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 *PHOENIX-S* 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 *PHOENIX-S* the menu screen on the keypad will illuminate. The *PHOENIX-S* is now ready to run.

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 with the use of 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, CHANGE AUTO SELECT, and the ADVANCE PROGRAM OVERRIDE menus.

E. Operators Menu Selections

The operation of the DBA *PHOENIX-S* 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. PHOENIX-S Start Menu

The *PHOENIX-S* Start Menu will display the cleaning/conditioning program being used, and allow the operator to select the starting and ending lane number. The operation of the *PHOENIX-S* is also started from this menu.

Once the *PHOENIX-S* is turned on, the **PHOENIX-S START** screen will appear on the two-line LCD of the keypad. Also appearing will be a four digit number on the left hand side of the second line. This number designates the number of lanes of cloth remaining on the current lino-duster roll. It will appear similar to the following:

*** PHOENIX-S START**

0325 MENU PX 9.65

The **"0325"** means that approximately 325 lanes are left on the current roll of cloth. The **"PX 9.65"** refers to the version of programming software currently installed in the Computer.

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

STARTING LANE ?

01 01

The *PHOENIX-S* 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 *PHOENIX-S* 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 depressed.)

NOTE: When entering the starting lane number, depressing the Left Arrow key on the keypad will automatically SUBTRACT 10 lanes from the displayed starting lane (unless lane #1 is displayed). Depressing 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, depress **ENTER**. Now both the right and left side numbers should be the same as the new starting lane number you selected. If this is correct, depress the **NEXT** key.

The following prompt will appear:

LAST LANE?

32 32

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

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, depressing the Left Arrow key on the keypad will automatically SUBTRACT 10 lanes from the displayed last lane (unless lane #1 is displayed). Depressing 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, depress **ENTER**, and both numbers will change to the one you selected. If this is correct, depress the **NEXT** key.

At this point, this prompt will appear:

IS THIS CORRECT?

01 THRU 16 PROG 01

This means the machine will run lanes 1 through 16 and the cleaning/conditioning program is #1.

If the starting and ending lane information is incorrect, depress the **LAST** key until you return to the starting and ending lane number prompts.

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

IMPORTANT! The **"Enter"** key **MUST** be depressed to accept starting and ending lane information, even if new starting and ending lane numbers are not needed. If the **"Enter"** key is not depressed in both the starting and ending screens, the *PHOENIX-S* will not start.

Once all information is acceptable, depress the **START** key.

At this point, this prompt will appear:

LANE #01 IS NEXT

0000 0000 01

The top line tells the operator which lane is the next to be conditioned. 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.

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 depressed 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, depress the start button on the handle once. This will lower the duster/cleaning cloth and the squeegee assembly. The vacuum motor along with the lane blower motor will come on, if the program being used calls for the lanes to be cleaned.

Push the *PHOENIX-S* into the first lane. Depress the start button on the handle again and the *PHOENIX-S* will begin operating on the lane.

When the *PHOENIX-S* finishes the first lane the screen will change to:

LANE #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 chances 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

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

*** RETURN>FOUL LINE**

HIT START BUTTON

To return the machine to the foul line, depress the START BUTTON on the handle. 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 *Phoenix-S* will shut down automatically when the LDS shaft stops turning.

3. Lino Control Menu

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

***LINO CTRL & RSET**

0325 HIT EXT ENT

While this screen is displayed, depressing the **DOWN ARROW** key will unwind a portion of duster cloth; depressing the **UP ARROW** will wind up the duster cloth.

If more cloth needs to be unwound, depress the START BUTTON on the handle. By holding down this button the cloth will unwind until you release the button. Pressing the start button on the handle again will wind up the cloth until it is taut.

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 lino-duster, right where you need it.

To reset the lino-cloth counter, depress the **EXIT** then **ENTER** keys while this screen is displayed. Be certain to perform this procedure each time a new roll of lino-duster cloth is installed in the *PHOENIX-S*.

When reset, the counter will read **"0325"**, 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 **1.1 seconds** which is the default time.

The *unwind time* is the time the unwind motor is ON to let out duster cloth. While running the machine, this time increments up one-tenth of a second every **40** conditioning or cleaning runs.

The purpose of this is to let out the same amount of cloth every lane. As the supply cloth gets smaller less cloth is let out per revolution of the unwind motor.

It must also unwind enough cloth to allow the cushion roller arms to drop far enough to actuate the **Fail-Safe switches** located under the cushion roller pivot arms. This signals the machine to stop and reverse at the end of the pindeck.

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 off the end of the pindeck to depress the fail-safe switch. **This will cause the machine to run off into the pit area.**

If you have this problem it can be corrected without changing to a new roll of cloth. In the Managers Menu area under the menu **"SYSTEM CONTROL LINODUSTER"** the present unwind time can be increased.

When power is applied to the *PHOENIX-S*, if the amount of cloth remaining is less than the # of lanes in the center the screen will flash the following:

LINO ALMOST OUT

0000 LANE WARNING!!

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

The *PHOENIX-S* can 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 LINODUSTER".

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

ERROR! LINO DUST

0000 CLOTH EMPTY

The cloth will need to be replaced for continued operation of the *PHOENIX-S*.

4. Pump Output Volume Tests

Depress 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 Cc's.

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 Metering 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 output of both forward oil and reverse oil 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. This will automatically select that program, you will not need to hit Enter.

1. Place a clean 25 ml graduated cylinder under the OIL CALIBRATION OUTLET on the left rear of the machine.

2. Depress the **LEFT** arrow. This will start the pump running and turn on the OIL TEST VALVE. If the machine is cold let the pump run for approximately 30 seconds.

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

   With the Oil Test Valve ON, the oil will be routed to the graduated cylinder instead of onto the rollers. 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.

4. Note the amount in the graduated cylinder.

5. Now depress 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** (How the Phoenix-S controls the amount of oil ... an exercise in understanding the machine).

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. A small flat-head screw acts as a tensioner for the head. After cleaning and lubricating the bar, adjust this tension if needed. Make a habit of cleaning the lint and hair from the head after running the machine to avoid this problem.

B. Depress 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. Place a clean 25 ml graduated cylinder under the Oil Calibration outlet.

2. Depress the **LEFT** arrow and wait about 5 seconds. The pump will turn on and the Oil Test Valve will turn on.

3. Depress the **RIGHT** arrow. The Oil Head will start traveling and the oil for **100 boards** will be dispensed into the graduate. Standard setting will be 50 microliters per board.

4. The amount in the graduated cylinder should be **5 milliliters.** The math is simple: 100 times 50 is 5000. This is divided by 1000 microliters to convert the amount to Milliliters. The result is 5 milliliters.

C. Depress 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. Place a small container under the Oil Calibration outlet.

2. The pump runs automatically when put in this menu.

3. Depress the LEFT arrow and the pump motor will run approximately **480-510** revolutions. This menu is important to make sure the pump is running at a consistent speed.

F. Operator RUN/PREP Options

The operator of the *PHOENIX-S* is given two RUN/PREP Options that can be selected prior to running the *PHOENIX-S* on the first lane.

NOTE: The RUN/PREP Option **MUST** be selected prior to pressing the Start Button on the Handle.

The RUN/PREP keys are located on the keypad on the right side just below the *PHOENIX-S* logo.

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

LANE #01 IS NEXT

0000 0000 01

At this time any or all of the RUN/PREP options can be activated.

1. Prime Pump

NOTE: *If the PRIME PUMP 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 pump motor. This key can be pressed more than once to check the spray pattern and insure proper flow of cleaner from the spray tips.

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.

At this time the screen will display:

NOW TO OIL #1

HIT START BUTTON

At this point the stripping of the lane can be examined to insure cleaning is still proper.

The Start Button on the HANDLE will need to be depressed 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 DBA *PHOENIX-S* 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.

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 *PHOENIX-S* Manager Menus. To enter the password, the keypad LCD must be displaying the **LINO CTRL & RSET** screen.

The factory-set password information will be given to the Manager by the Authorized DBA Trained Technician.

To have the Managers Password changed, please contact your Authorized DBA Distributor.

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.

This concludes the OVERRIDE AUTO PROGRAM menu.

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.*

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.

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

To continue within the menu, depress **NEXT**. 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, use the UP or DOWN ARROWS. The number on the right side of the display will change. When the correct number is reached, depress 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 depressed the program will revert back to what was in the left corner and you will be changing a different program than you intend.*

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

<1:CLEAN 2:OIL>

01 <3:BOTH> 01

The number displayed will indicate if 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, depress the ENTER key. At this time, both numbers on the display will be the same.

To continue within the menu, depress 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 or oiling only has been selected this prompt will be forced to separate.

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, depress the ENTER key. At this time, both numbers on the display will be the same.

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 for the *PHOENIX-S* 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, depress 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.

If the numbers shown are correct, depress the **NEXT** key. The following prompt will appear:

SPRAY ON TIME

03 IN TENTHS 03

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, "03" is actually 0.3 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, depress ENTER and both numbers will display the new "Spray On Time".

If this number is correct, depress **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, depress 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 in the center of the lane remains.

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

LAST SPRAY DIST

40 IN FEET 40

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, depress ENTER and both numbers on the display will reflect the new Last Spray Distance.

NOTE: When cleaning the lanes a new option for a pindeck spray has been added to the program. The machine will now spray an additional spray just in front of the pindeck to insure the pindeck is well-cleaned. This allows reduced last spray distances, to as short as the oil pattern distance if desired.

THIS CONCLUDES THE CLEANING PORTION OF THE PROGRAM, TO MAKE CHANGES TO THE OILING PORTION OF THE PROGRAM FOLLOW THE STEPS BELOW.

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

38 IN FEET 38

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 is reached, depress ENTER and both numbers will display the new travel distance.

IMPORTANT NOTE: If the UP or DOWN arrows are depressed in this screen, then all conditioning menus, both forwards and reverses, must have the **ENTER key depressed 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.

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

01F 2L -> 2R X 03

00 -> 03 ft IPS=14

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 main transfer roller) will run from the 2 board on the left to the 2 board on the right.

The next item **X 03** determines how many 2 to 2's will be applied, in this case it is 3. On the bottom line the **00 -> 03 ft IPS =14** says that the machine will travel from 0 ft (the foul line) to 3 ft at 14 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.

By depressing 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 depress 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 depress ENTER.

Now **03** will begin blinking, up or down arrow this to the number of loads you want, and depress 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 3 to 4 the 00-> 05 ft will change to 00 -> 07 ft. Since the 14 in IPS=14 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 depress 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.

The left side load designator will now begin blinking again. Also if the speed is changed it will recalculate the area of the lane for that load sequence.

For example, if you have 4 loads at 14 inches per second, the area of the lane for that load sequence is 00 -> 07 feet and you change the speed to 18 inches per second, the area for that load sequence will change to 00 -> 10 ft.

ENTER may be depressed as many times as you want. Depressing 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 depressed while in this menu, the enter key must be depressed 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 02

07 -> 10 ft IPS=14

The 9L will be blinking. In the previous screen we left with the load area at 00 to 07 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 depress the ENTER key 4 times before you may use the NEXT key to go into the third screen.

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

03F 10L -> 10R X 02

10-> 16 ft IPS= 22

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

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

04F 11L -> 11R X 05

16 -> 31 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.

*** 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 the machine is programmed to travel. This is added to the starting distance for each screen.

When changing the # 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. There is an important reason for this.

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

05F 12 -> 12 X 00

31 -> 38ft 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 roller to the lane.

When 00 for the number of loads is entered and ENTER is depressed 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, and want to increment the # 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, with the down arrow, 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 depress 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 <u>not</u> 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 should be 0 loads.

RETURN OIL SCREENS

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

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

01R 10L -> 10R X 00

38-> 10 FT IPS=60

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=60 inches per second. (It is possible to go to 60 inches per second in the first screen in reverse only.)

The first screen in reverse must be a buff only (0 loads) for at least the first 5 feet of return travel. The last screen in reverse should be 0 loads for at least 4 feet before the foul line (just like the last screen forward).

NOTE: *If the machine does not oil in reverse at all, check the* **01R** *screen for loads within the first five feet of return oil travel. Remove any loads to change the screen to a buff only for at least 5 feet.*

To move to the next load, remember to depress the enter key 4 times to allow yourself to the next screen. Depress **NEXT** and the following menu will appear:

02R 8L -> 8R X 03

10-> 5 FT IPS=14

You may now change this screen to anything you want.

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

03R 8L -> 8R X 00

05-> 00 FT IPS=14

Remember 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.

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 also a possible 15 screens in reverse. Normally you will only use the reverse oil to beef up the lay down and or skid area in the first 10 to 20 feet of the lane. Do this with 3 or 4 loads at a slower speed.

Note: 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.

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

YOU MAY NOW

EXIT PROGRAM CHG

In this screen you may exit to the Operators Menus or hit Menu to go into some other Managers Menu.

3. Change Auto Program Select

To reach this menu, depress 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 *PHOENIX-S* 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, depress the **NEXT** key and the following prompt will appear:

MON AM 1 PRGM#01

LANES 01 THRU 32

When this screen first appears, the current program # 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 depress 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, depressing ENTER when it has been reached.

NOTE: At any time during this section, if the last lane # for the AM or PM setting is equal to the total # of lanes in the center, the remaining program screens will be skipped. The display will change to the next 1st screen (AM or PM).

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

MON AM 2 PRGM#01

LANES 17 THRU 32

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

At this point again, the last lane number will flash. (The first lane # 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, depressing ENTER when it has been reached.

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

MON AM 3 PRGM#01

LANES 33 THRU 40

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.)

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

MON PM 1 PRGM#01

LANES 01 THRU 32

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 16) Monday, 12:01 AM - 12 Noon

MON PM (1 through 16) Monday, 12 Noon - Midnight

TUES AM (1 through 16) Tuesday, 12:01 AM - 12 Noon

TUES PM (1 through 16) Tuesday, 12 Noon - Midnight

WED AM (1 through 16) Wednesday, 12:01 AM - 12 Noon

WED PM (1 through 16) Wednesday, 12 Noon - Midnight

THURS AM (1 through 16) Thursday, 12:01 AM - 12 Noon

THURS PM (1 through 16) Thursday, 12 Noon - Midnight

FRI AM (1 through 16) Friday, 12:01 AM - 12 Noon

FRI PM (1 through 16) Friday, 12 Noon - Midnight

SAT AM (1 through 16) Saturday, 12:01 AM - 12 Noon

SAT PM (1 through 16) Saturday, 12 Noon - Midnight

SUN AM (1 through 16) Sunday, 12:01 AM - 12 Noon

SUN PM (1 through 16) Sunday, 12 Noon - Midnight

Following the SUN PM selections, the operator will be given the option to input program selections that can be used for the ADVANCED OVERRIDE feature.

The ADVANCED OVERRIDE feature allows the manager to preset a program for future use. An example of this would be for a tournament being held on a later date. The manager could design an oil program for this tournament, and assign the specific lanes that this program would be applied to.

By using the DATE SELECTION menu, the ADVANCED OVERRIDE program would be chosen for a specific date. After that date has passed the program normally applied on the day of the week would then be applied.

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

AO1 AM01 PRGM 00

LANES 01 THRU 00

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

At this point again, the last lane number will flash. (The first lane # 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, depressing ENTER when it has been reached.

Continue through these screens using the same procedure for entering numbers as explained previously for AO1 (ADVANCED OVERRIDE) AM 1.

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

Displayed Prompt / Time:

AO1 AM (1 through 16)Adv. Override, 12:01 AM-12 Noon

AO1 PM (1 through 16)Adv. Override, 12 Noon - Midnight

AO2 AM (1 through 16)Adv. Override, 12:01 AM - 12 Noon

AO2 PM (1 through 16)Adv. Override, 12 Noon - Midnight

AO3 AM (1 through 16)Adv. Override, 12:01 AM - 12 Noon

AO3 PM (1 through 16)Adv. Override, 12 Noon - Midnight

WARNING!! Do NOT turn off power or exit the Auto Select menus until **ALL days and times** have been properly set. A conditioning program number must be in place for every day/time period through the last lane in the center. Failure to do so will cause improper operation of the Auto Program Select feature.

This concludes the selections on the AUTO PROGRAM SELECT menu.

4. Date Selection for Advanced Override

Depress the MENU key until the following screen appears:

*** DATE SELECTION**

ADVANCE OVERRIDE

This series of screens will be used to determine if and when one or more of the Advance Override programs will be used.

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

ADV OVRRD 1 DATE

05 /17 /94

When this screen first appears, the month will flash on and off. Use the UP or DOWN ARROWS to change the month, and depress ENTER once it has been reached. Once ENTER is pressed the date will flash on and off.

Use the UP or DOWN ARROWS to change the date, and depress ENTER once it has been reached. Once ENTER is pressed the year will flash on and off. Use the UP or DOWN ARROWS to change the year, and depress ENTER once it has been reached.

Continue through these screens using the same procedure for entering numbers as explained previously for ADV OVRRD 1 (ADVANCED OVERRIDE) DATE.

The manager will have the opportunity to select programming for the following dates:

ADV OVRRD 2 DATE

01 /01 /93

and

ADV OVRRD 3 DATE

05 /29 /94

This concludes the selections on the DATE SELECTION for ADVANCED OVERRIDE menu.

5. System Control Cleaning

This series of screens will be used to adjust various travel distances in the pin deck area, the distance down the lane, and return trip to the foul line. **DO NOT ADJUST DISTANCES OR TIMING AND OTHER MISCELLANEOUS FUNCTIONS ACCESSED BY THESE SCREENS UNLESS ABSOLUTELY NECESSARY!!**

Depress the MENU key until the following screen appears:

*** SYSTEM CONTROL**

CLEANING

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

DISTANCE TO END

0734 PNDECK 0734

This prompt allows the operator to set the travel distance of the machine as it travels from the foul line to the pindeck.

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

NOTE: As a check to determine whether the failsafe switch or the travel distance listed above is reversing the *PHOENIX-S*, use the following steps: Once the operator has pressed the Start Key (but not the start button on the handle), press the **HELP MENU** key. The keypad display will change and display the **Pindeck Distance** in the lower left corner and the **Failsafe Distance** in the lower right corner. Operate the machine down the lane. Check the keypad display as the machine is returning to the foul line. The setting that "Tripped" will display "0" indicating that this distance was met. Once the machine reaches the foul line this display will switch back to normal display.

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

RETURN DISTANCE

0730 FLLINE 0730

This prompt allows the operator to set the travel distance of the machine as it travels from the pindeck to the foul line.

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

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

DELAY SPRAYING

01 INCHES 01

This screen is used to determine the point at which the first spray will occur. This prompt tells the operator that the *PHOENIX-S* will move "01" inch on to the lane, dry stripping the lane, prior to spraying any cleaner on the surface.

This option would only be used on worn wood heads during simultaneous cleaning and conditioning, where interaction between cleaner and conditioner may be a concern.

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

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

VACUUM OFF ON

20 RETURN FOR 20

This screen is used to determine the point at which the vacuum motor will turn on as the machine returns to the foul line. This prompt tells the operator that the *PHOENIX-S* 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 have to be reduced.

This concludes the selections in the SYSTEM CONTROL CLEANING 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.

Depress the MENU key until the following screen appears:

*** SYSTEM CONTROL**

BUFFER

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

BUFF UP STP DELY

00 TENTHS 00

The *PHOENIX-S* is designed to allow the operator to stop the machine at the end of the oil pattern and lift the buffing 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 here 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.

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

DROP BUFFER ADV

72 INCHES 72

The *PHOENIX-S* is designed to lower the Buffing Brush during a simultaneous cleaning and conditioning run when return oil is being applied. The *PHOENIX-S* will be traveling at 55-60 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, depress ENTER. The factory default for this parameter is 72.

7. System Setup Clock Menus

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

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

*** SYSTEM SETUP**

CLOCK

Depress 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.

Depress 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 number is reached, depress ENTER.

Depress 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 number is reached, depress ENTER.

Depress 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 desired number is reached, depress ENTER.

Depress 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 number is reached, depress ENTER.

Depress the NEXT key, the following screen will appear:

SET CLOCK DAY

00 OF WEEK 00

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

Use the following guide for the day codes:

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

8. System Control Lino-Duster Menus

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

Depress the MENU key until the following screen appears:

*** SYSTEM CONTROL**

LINO DUSTER

Depress the NEXT key, the following screen will appear:

PRESENT DUSTER

19 UNWIND TIME19

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.

NOTE: Resetting the LINO counter prior to the roll of cloth being empty could cause the failsafe switch to be NOT ACTIVATED when the cushion roller drops off the tail plank! There may not be enough cloth unwound to allow the support arms of the cushion roller to activate these switches. The result of this is a Phoenix-S in the pit. In this menu it is possible to correct the present unwind time when one of your more inquisitive pinchasers have presented you with this problem.

The present unwind time varies from 11 for a fresh roll to 20 for an almost empty roll. Use an educated guess on how much of the roll is already used and reset your time accordingly. EXAMPLE: If the roll is about half use then set the time to 16.

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

DEFAULT DUSTER

11 UNWIND TIME 11

This screen will display the default time for the unwinding of duster cloth. This is the unwind time for the cloth when a new roll of cloth is installed and the lino-duster counter is reset.

If the value is increased, more cloth will be unwound. If the value is decreased, less cloth will be unwound. This is the value that gives the most economy with the least chance of the sending the machine into the pit. We recommend against fooling around with this number. (In fact, this menu may be removed in future upgrades of the program.)

Changes can be made to this number by using the UP or DOWN ARROWS.

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

LINO EMPTY # LNS

0325 DEFAULT 0325

This screen displays the default number of lanes that a new roll of cloth will complete. When the lino-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.

9. Adjust IPS Menus

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

DO NOT ADJUST THE IPS ACCESSED BY THESE SCREENS UNLESS THE SPEEDS ARE INCORRECT!!

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

*** ADJUST IPS 0**

HIT NEXT KEY 00

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

*** ADJUST IPS 01**

HIT NEXT KEY 10

The prompt is telling the operator that the drive motor is running in low speed (01). The second line 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, adjust the first speed pot on left. The factory setting for the first speed is 10 inches per second.

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

*** ADJUST IPS 02**

HIT NEXT KEY 14

The prompt is telling the operator that the drive motor is running in second (02). The number on the far right of the second line displays the speed of the drive wheel surface. Again this is measured in INCHES PER SECOND. To change the second speed adjust the second speed pot from the left. The factory setting for the second speed is 14 inches per second.

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

*** ADJUST IPS 03**

HIT NEXT KEY 18

The prompt is telling the operator that the drive motor is running in third (03). The second line of the display indicates the speed of the drive wheel surface in INCHES PER SECOND. To change the speed, adjust the third speed pot from the left. The factory setting for the third speed is 18 inches per second.

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

*** ADJUST IPS 04**

HIT NEXT KEY 22

The prompt is telling the operator that the drive motor is running in fourth (04). The second line of the display indicates the speed of the drive wheel surface in INCHES PER SECOND. To change the speed, adjust the 4th speed pot from the left. The factory setting for the fourth speed is 22 inches per second.

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

*** ADJUST IPS 05**

HIT NEXT KEY 26

The prompt is telling the operator that the drive motor is running in fifth (05). The second line of the display indicates the speed of the drive wheel surface in INCHES PER SECOND. To change the speed, adjust the 5th speed pot from the left. The factory setting for the fifth speed is 26 inches per second.

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

*** ADJUST IPS 06**

HIT NEXT KEY 30

The prompt is telling the operator that the drive motor is running in sixth (06). The second line indicates the speed of the drive wheel surface in INCHES PER SECOND. To change the speed, adjust the 6th speed pot from the left. The factory setting for the sixth speed is 30 inches per second.

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

*** ADJUST IPS 07**

HIT NEXT KEY 60

The prompt is telling the operator that the drive motor is running in seventh (07). The second line displays the speed of the drive wheel surface in INCHES PER SECOND. To change the speed, adjust the **8th** speed pot from the left. The factory setting for the seventh speed is 60 inches per second (or as high as the voltage in your center allows for 110 volt machines).

The 220 volt machines will go higher than 60 but do <u>not</u> adjust them higher. The pulses coming from the tach and the lane distance sensor will be too fast for the PC to read, and miscounts and errors will occur. If the machine is traveling too fast it usually shows up as an error during reverse travel, frequently just after it comes out of the pindeck and shifts to high.

The seventh pot from the left is for changing the overall **RANGE** of all the speed pots. Only adjust this if you can not get one of the first 6 speeds down low enough or up high enough.

10. Timing Sensor Adjustment Menus

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

*** ADJUST HEAD**

SENSORS

These menu items will make the adjustment of the oil head position sensors a little easier.

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

LFT PROX #12 OFF

POS SENSR #1 OFF

Depress the **NEXT** key AGAIN and the following screen will appear:

RT PROX #13 OFF

POS SENSR #2 OFF

These menus will be explained in the adjustments section of the manual.

11. Odometer Menu

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

*** ODOMETER**

0000 FT 0000 MI

The Odometer will display the feet and miles the *PHOENIX-S* has traveled up to that point.

The *PHOENIX-S* is equipped with automatic maintenance checks. When one of these checks appear it will be necessary to clear this message. The Odometer screen will toggle between the current mileage and the following screen:

TO CLEAR MAINT MSG

HIT EXIT KEY

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 depressed before exiting the Managers Menu Selections!

12. Emergency Menus

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

*** I/O EMERGENCY**

REROUTE MENUS

The *Phoenix-S* has 5 infra-red pass thru sensors that can fail from getting sloppy with the lane oil, and not keeping the machine clean. This set of menus will allow the functions of one sensor to be taken over by another. In other words, we have backup systems.

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

TACH 15 -> LDS 14

REROUTE? NO

The LDS (lane distance sensor) is mounted on the right rear of the machine and the Drive Shaft "Tach Sensor" is located on the right end of the drive shaft.

If either of these sensors fail 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" either the LDS or the TACH Sensor can be by-passed so that all functions of the LDS can be transferred to the TACH and vice-versa. When by-passed both forward and reverse travel error messages will be turned off.

The left and right arrows control which sensor is to be by-passed. If the RIGHT arrow is depressed the arrow on the screen will point from 15 to 14 which means all functions of the TACH will be taken over by the LDS input 14.

To by-pass simply depress ENTER and the "NO" on the bottom right side of the screen will change to "YES". This means the TACH sensor is no longer used and all its functions are taken over by the LDS.

The arrow cannot be changed with YES on the screen. Depressing enter again will switch the YES back to NO and bring the machine back to normal operation.

If the LEFT arrow is depressed, the arrow on the screen will point from the LDS to the TACH. Depress ENTER and the screen will change to YES. All functions of the LDS such as measuring the distances on the lane will be taken over by the TACH.

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

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

OIL SENSOR 1-> 2

REROUTE? NO

Oil sensor 1 counts from left to right the position of the Oil Head. Oil sensor 2 counts from right to left the position of the oil head.

When properly set they both operate at nearly the same time. In fact only one is necessary for operation of the machine. We mounted two for redundancy and back-up.

These are the same sensors used on the TACH and LDS sensors and are interchangeable. They are just as vulnerable to oil and dirt, and can fail.

When a oil head position sensor fails the Error Message will read:

ERROR! OIL HEAD

SENSOR INPUT #001

or

ERROR! OIL HEAD

SENSOR INPUT #002

Use the LEFT and RIGHT arrows to choose which sensor is to be by-passed. Depress ENTER to change the NO to YES. The designated sensor is now by-passed.

After the sensor is either cleaned or replaced, bring the system back to normal by depressing ENTER in this screen and the YES will revert back to NO.

When either of the sensors are by-passed only the by-passed sensor's error message is turned "off".

The EMERGENCY REROUTE menu is the last menu in the list. Depressing 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) DEPRESS 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 *PHOENIX-S* uses a patented DMR (Dual Motor Ratcheting) Cloth system. The DMR assembly operates by means of two duster motors. The first unwinds cloth and sets the duster down on the lane surface. The second winds up used cloth onto the used core.

The wind-up motor also lifts the duster 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 *PHOENIX-S* CAN NOT be operated without Lane Cleaning Cloth installed.

Lane Cleaning Cloth should be loaded into the PHOENIX-S using the following procedure:

1. Unroll about 3 feet of cloth and lay it on the lid. Insert the lino-duster support pipe into the new roll.

2. Route the cloth down between the squeegee and the cushion roller. Wrap the cloth around the cushion roller and pull it up above the front wall.

3. Distribute the cloth evenly around the cushion roller (removing all folds) before routing it around the stainless steel bar. Don't forget to route around the stainless bar. Failure to do this will drastically reduce the cleaning efficiency

4. Once the cloth is square in the machine, push it between the cushion roller and the stainless steel routing bar.

5. Pull the cloth far enough through the lino-duster assembly to get at least 3 wraps around the PVC take-up reel. Make sure the cloth is wrapped evenly from side to side around the pipe.

6. Place the take-up reel in the machine first and then the fresh roll of cloth.

7. Apply power to the machine and bring up the LINO CTRL&RSET menu.

8. 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. The next time the button is depressed and held in, the wind-up motor will run until the button is released. The cloth should be rolled up taut and evenly across the assembly.

WARNING!! If the button is held too long when winding the cloth up tight it could break the PVC take up roller.

B. Cleaning Cloth Counter

The *PHOENIX-S* is equipped with a Cloth Counter which indicates the number of lanes remaining on the current roll of Cloth, and also warns the operator when no cloth is remaining.

When approximately 20 lanes of cloth are left, the LCD screen will toggle between the * PHOENIX-S START screen and the following:

LINO ALMOST OUT!

When the Cleaning Cloth Counter reaches zero, the *PHOENIX-S* will display the following message:

LINO CLOTH EMPTY

REPLACE CLOTH

The *PHOENIX-S* 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 LINO CONTROL MENUS.

After resetting the counter, re-program the *PHOENIX-S* 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 a 2:1 mixture of DBA Cleaner and water.

Pour the mixture into the Supply Tank using the supplied funnel. (NOTE: The Supply tank on the *PHOENIX-S* is removable for cleaning).

Any spills or drops of cleaner should be wiped up immediately!

D. Emptying of Recovery Tank

To empty the Recovery Tank, the *PHOENIX-S* 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.

To reconnect, reverse disconnect procedure.

E. Adjustment of Spray Jets

The *PHOENIX-S* uses a four spray jet system to spray cleaner onto the lane surface. These specially designed Stainless Steel jets spray in a "V" pattern and are capable of spraying cleaner across the entire width of the lane.

The spray jets are factory-set, but may need to be adjusted so all boards across the lane are covered, and so that overspray into the channels does not occur.

If coverage is too narrow and edge boards are not being sprayed, adjust by raising the spray tips slightly, or rotating the jet mounting angle.

If coverage is too wide and overspray occurs, adjust spray tip down or toward the center.

To adjust, simply loosen the hex bolt on the aluminum body of the spray assembly. Rotate the spray jet up or down as needed. Make sure the middle tips are level (horizontal), then tighten hex bolt.

The outside jets can be angled toward the center to eliminate any overspray into the channels. The outside jets should be positioned vertically.

F. Guide Roller Adjustments

Adjustment of the guide rollers on the *PHOENIX-S* 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 mounting bolt, guide roller, spring and bronze bushing from the mounting block. (Bronze bushing is normally between the roller and the side plate of the machine.)

Place the bronze bushing between the head of the mounting bolt and the guide roller. This will give approximately 1/4" additional clearance between the guide rollers and the lane surface.

G. Squeegee Assembly Adjustment

The Squeegee Assembly is adjusted at the factory to insure proper cleaning. This adjustment should be checked when the *PHOENIX-S* 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 bring up the PHOENIX-S START menu.

At the TEST I/O section of the keypad depress the OUTPUT key until the SQUEGY MOTOR (OUTPUT 203) Output is displayed.

Depress 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".**

If the distance is more or less follow the steps below to make the adjustment.

1. Locate the squeegee motor in the center of the machine. Mounted to the motor is a cam. 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 distance between the straight edge and the drive wheel.

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.

H. Buffing Brush Replacement & Adjustment

The buffing brush on the *PHOENIX-S* 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 buffing brush adjustment the brush must first be lowered onto the lane. This is done at the TEST I/O menu. Depress the OUTPUT key until output #205 is displayed. Depress the ON/OFF key to activate this output. This will lower the Buffing Brush into the operating position.

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 buffing brush material should extend approximately **3/32" to 3/16"** beyond the level for proper adjustment. This crush is determined by the amp draw of the buffer motor and smoothness of the conditioning pattern. The buffing 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 rollers have into the brush.)

If adjusting is needed, place the machine in an upright position on the approach. Loosen the jam nuts on the adjusting screws, along with all three lane distance shaft pillow blocks.

Turn the adjusting screws until proper adjustment is reached. (Each full turn on an adjusting screws is equal to about 1/16" adjustment.)

Tighten jam nuts and outside two pillow blocks. Check that the lane distance shaft spins as freely as possible. Tighten the center pillow block.

Recheck that the lane distance shaft turns without any bind. At this time check for excessive end play with this shaft (1/16" maximum).

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

I. End of Pindeck Travel Adjustment

When the *PHOENIX-S* is installed, the End of Pindeck travel distance should be checked.

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.

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

To check the End of Pindeck travel distance press the **Help Menu** button after the starting lane, ending lane, and program number has been entered.

The HELP MENU must be pressed after the START key is pressed, but before the start button is depressed on the handle for the first time.

This will change the display to:

LANE # 1 IS NEXT
PNCNT 0730 FS02

When the machine is placed on the lane and the start button on the keypad is depressed, the counter will start counting down from 730. **PNCNT 0730** is the length of the lane in inches, which is counted by the LDS sensor.

FS means **failsafe.** The failsafe switches are located in the cleaning end. These switches (2) are actuated when the cushion roller drops off the end of the lane. Upon the PC receiving the signal from the failsafe switches, the machine is told to overtravel two inches, wind-up the cloth, and then reverse.

When the *PHOENIX-S* reverses itself to exit the pindeck, the screen should read:

LANE # 1 IS NEXT
PNCNT 0000 FS02

The counter must read **0000** and the failsafe will read **02**. This means the machine reversed itself through the counter (of the lane distance sensor).

When traveling in reverse the screen may read:

LANE # 1 IS NEXT
PNCNT 0003 FS00

When numbers remain in the counter (**0003**), this tells us that the *PHOENIX-S* reversed after a signal from the failsafe switches (**FS00**).

The machine is designed to reverse by using the counter. The failsafe switches are a backup system ONLY! If the machine is always reversing by the failsafe switches, the machine may end up in the pit if they wear out.

To adjust the pindeck travel, get to the **SYSTEM CONTROL CLEANING** menu and press the **NEXT** key. This screen will then appear:

DISTANCE TO END

0730 PNDECK 0730

If the number of counts that remain are **0003**, then decrease the Distance to End value by this number of counts (727). Be sure to press **ENTER** otherwise the PC will not accept the new number.

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 for the **Return Distance to Foulline**. This distance is the next menu in the **System Control Cleaning** menu. It should be adjusted the same amount as the **Distance to End.** The return distance should be a couple of counts less than the distance to the end of the pindeck. If the numbers are the same the machine will more than likely hit the approach too hard.

J. 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.

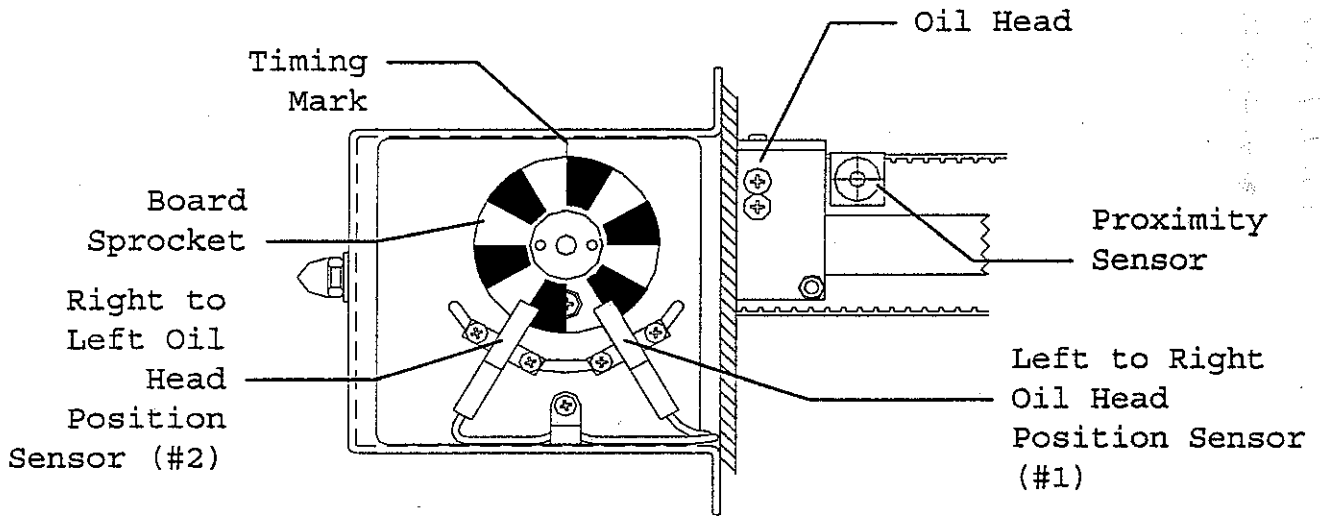
On the 10-pin side of the *PHOENIX-S* is a cover for the head timing sensors. Remove the two 5/16-18 cap nuts that hold the cover. Slide cover off of the mounting bolts. Once the cover is off you will be able to see the belt tension and head timing assembly.

On the face of the timing plate is an etched timing mark for the board counting sprocket. There is also a timing mark on the top of the oil head. 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. With the head against the wall, loosen the set screws for the board sprocket. Once loose, the sprocket should be turned so that one of the set screws is to the top side. The left-hand leading edge of the black section on the sprocket should line up with the sensors as shown in the figure below.



4. The next procedure is to make the position sensors come "ON" in the MIDDLE of the proximity sensors. To do this, you must enter the Managers Menus and get to the ADJUST HEAD SENSOR screen.

5. Once in the ADJUST HEAD SENSOR press the NEXT key and you will see:

LFT PROX #12 OFF

POS SENSOR #1 OFF

6. Move the oil head all the way to the 7-pin side wall (outside of the prox). Slowly move the head toward the middle of the proximity sensor. When the screen reads LEFT PROX ON, slowly continue to move the oil head from left to right.

7. When the screen changes and reads POS SENSOR #1 ON, stop moving the head. The timing mark on the top center of the head should be in the center of the left prox (the center of the head and prox are both marked).

   If not, then an adjustment is needed to the left head position sensor. With the head in the middle of the prox, loosen the two small screws that hold the left position sensor. Rotate the position sensor so that the sensor comes "ON". Tighten the screws and move the belt to make sure that the sensor comes on in the middle of the prox.

8. Press the NEXT key again and this screen will appear:

RT PROX #13 OFF

POS SENSOR #2 OFF

9. Now perform the same procedure as you did for the left position sensor by sliding the head to the 10-pin side wall and repeating steps 6 and 7 for the right side.

10. If you were successful getting the sensors to come on in the middle of both proximity switches then you have successfully timed the oil head.

11. Now it is time to make sure that the sensors are secured and the head assembly is tight. Place the cover back on the head assembly and tighten the acorn nuts.

12. Take the PHOENIX-S out to the lanes and pick a program. Access the Change Program Menu and enter in **01F** about ten 2 - 2 loads. Run the machine to make sure that the oil is distributed properly from 2 - 2, with a 1/4 inch overlap when it starts and stops.

Section VI - Maintenance

Maintenance: The following items should be done to the *PHOENIX-S* on a regular basis:

A. Power Cord

Care should be taken to see that the *PHOENIX-S's* 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 suitable means of 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, it is advisable to wipe it as it is being wound for storage.

B. Squeegee

Wipe with a clean cloth after each operation. Check the blades for wear and tear.

C. Sensors

All sensors can be cleaned by blowing out with an air compressor. This will remove oil and dust build-up which could cause false sensing. Sensors may need to be sprayed lightly with electrical contact cleaner (the type for PC boards).

D. Lane-to-Lane Casters

Clean after each operation.

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!

G. Inside Machine

Wipe up excess dust and dirt daily.

H. Recovery Tank Removal

Remove and drain after each operation.

I. Filters

The supply tank filter is 1/2 inch diameter by 5 inches, and can be inspected by removing the supply tank fill plug. Look inside the opening in the top of the tank to check the filter. There are also four check-valve filters, one on each spray jet, that should be cleaned.

J. Changing of Conditioner

1) DRAINING THE TANK:

Located on the left top side of the oil tank is a right-angle fitting with a plug. Provided with the machine is a clear drain line and elbow fitting. Remove the plug from the tank and install the drain line into the fitting with the machine setting down (as it would on the approach).

Go to the I/O Test menus and turn ON the tank vent valve (this is Output #201 on a 110V machine or Output #111 on a 220V machine). Hold the drain line in the air and stand the machine up to the transport position. (**NOTE:** The tank vent valve has a 15 minute time-out function.)

Place the line into an empty oil jug. Then place a one-and-a-half foot 2 x 6 under the right side transport wheels. Allow the conditioner to drain until the tank is empty.

After draining, set the machine back down and remove the drain hose. Insert the plug into the tank fitting.

2) FLUSHING THE LINES:

The oil lines should be flushed to remove all the old conditioner. Located on the top left of the conditioner tank is the Oil Tank Return Line. Disconnect it by pressing in on the gray collet and pulling out on the line. Place the line into a clean cup.

With the return line in the cup, turn the Pump Motor ON through the "Test Output" (this is Output #202 on a 110V machine or Output #103 on a 220V machine). This will pump the majority of the remaining oil out of the lines.

When a large amount of air starts to flow through the lines, turn OFF the output. Do NOT run the pump dry for an extended period of time...damage may occur.

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.

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. Place a cup under the Calibration Tip on the rear of the machine and press the LEFT Arrow. The pump will run about 500 revolutions which will flush the calibration line. Press the LEFT Arrow at least three times to expel all the old conditioner out of the line.

Stand the *PHOENIX-S* up to the storage position. On the bottom side of the machine locate the two small valves. Remove the line coming from the bottom of the right-hand valve and drain into cup. (The gray collet must be depressed to release the hose from the fitting.) This will drain the line that runs to the transfer roller.

3) CHECKING THE PRESSURE:

With the machine still in the upright position, turn ON the Oil Pump (this is Output #202 on a 110V machine or Output #103 for a 220V machine). Check the pressure gauge on the bottom of the machine. Normal operating range is from **5 to 8 PSI**.

If adjustment is needed, loosen the jam nut on the needle valve with a 3/8" wrench. Turn the needle to adjust the pressure (clockwise increases pressure).

NOTE: When using conditioners with a viscosity less than 18 wt., use the special reducer attachment found in the spare parts kit. Attach to the oil return line and adjust the pressure as stated above. (Figure 12 of the Parts Drawings shows the reducer fitting.)

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 02L-02R 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 *PHOENIX-S* does the 2-2 loads, watch closely where the oil streams begin and end. On the top transfer roller there are etched marks at the outside edge of each 2-board. The oil stream should begin about 1/8" inside the mark when the load begins and 1/8" outside of it when it ends. Adjust the height of the tip UP if the stream is starting early, or DOWN if it starts too late.

Tighten both set screws that secure the tip and return the program values to their original settings.

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 PHOENIX-S features an Automatic Maintenance program which alerts the operator when to perform regularly scheduled maintenance. In addition to normal daily maintenance, the *PHOENIX-S* 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 operator has completed the required maintenance inspection.

An odometer in the *PHOENIX-S* records distance traveled through the LDS, then displays it on the keypad in the Managers Menu immediately following the Adjust IPS menu. When the pre-determined maintenance distances are reached, maintenance messages will toggle on the screen opposite the PHOENIX-S START screen:

MAINTENANCE INSP

20 MI NOW DUE

(or 100 MI NOW DUE or 200 MI NOW DUE)

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

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

*** ODOMETER**

0000 FT 0000 MI

This screen will toggle with the following screen:

TO CLEAR MAINT MSG

HIT EXIT KEY

Depress the **EXIT** key and the maintenance message will now be cleared.

Section VII - Inputs and Outputs

The *PHOENIX-S's* PC has 16 inputs, all of which are used. The *PHOENIX-S's* PC has 24 outputs, 21 of which are used.

Inputs accept data from various components in the *PHOENIX-S*, 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 and tach sensors, at which point data in ROM or RAM chips activate certain outputs as programmed. An output example would be one of the duster motors.

The outputs for the 110V machine do not match the 220V machine. Refer to the correct Output listing for the machine voltage.

Here is a list of the **INPUT** numbers for the *PHOENIX-S's* PC, along with their designations:

INPUT#	FROM:
000	CORD KILL INPUT
001	LEFT TO RIGHT OIL HEAD POSITION SENSOR
002	RIGHT TO LEFT OIL HEAD POSITION SENSOR
003	BUFFER UP SWITCH
004	BUFFER DOWN SWITCH
005	FAILSAFE SWITCH
006	SQUEEGEE UP SWITCH
007	SQUEEGEE DOWN SWITCH
008	START BUTTON (HANDLE)
009	OIL LEVEL FLOAT SWITCH
010	DUSTER UP SWITCH
011	PUMP TACHOMETER SENSOR
012	LEFT OIL HEAD REVERSING PROXIMITY SENSOR
013	RT. OIL HEAD REVERSING PROXIMITY SENSOR
014	LANE DISTANCE SENSOR (LDS)
015	DRIVE SHAFT TACHOMETER SENSOR

Here is a list of the **OUTPUT** numbers for the **110V** *PHOENIX-S's* PC, along with their designations:

OUTPUT# CONTROLS:

100 OIL PROGRAM CONTROL VALVE (24V DC)

101 LEFT TO RIGHT OIL HEAD DRIVE

102 RIGHT TO LEFT OIL HEAD DRIVE

103 FORWARD DRIVE MOTOR RELAY CR #1

104 REVERSE DRIVE MOTOR RELAY CR #2

105 OIL CALIBRATION TEST VALVE (110V AC)

106 SPEED CONTROL 3RD SPEED RELAY

107 SPEED CONTROL 4TH SPEED RELAY

108 SPEED CONTROL 5TH SPEED RELAY

109 SPEED CONTROL 6TH SPEED RELAY

110 SPEED CONTROL 7TH SPEED RELAY

111 SPEED CONTROL 2ND SPEED RELAY

200 SPARE 24 VDC OUTPUT

201 OIL TANK VENT VALVE

202 OIL PUMP MOTOR

203 SQUEEGEE MOTOR

204 CLEANER PUMP (CR #4)

205 BUFFER UP/DOWN MOTOR

206 VACUUM AND BLOWER MOTORS (CR #3)

207 DUSTER CLOTH UNWIND MOTOR

208 DUSTER CLOTH WIND UP MOTOR

209 BUFFER MOTOR CONTACTOR

210 NOT USED

211 NOT USED

Here is a list of the **OUTPUT** numbers for the **220V** *PHOENIX-S's* PC, along with their designations:

OUTPUT# CONTROLS:

100 OIL PROGRAM CONTROL VALVE (24V DC)

101 LEFT TO RIGHT OIL HEAD DRIVE

102 RIGHT TO LEFT OIL HEAD DRIVE

103 OIL PUMP MOTOR

104 SPEED CONTROL 2ND SPEED RELAY

105 OIL CALIBRATION TEST VALVE (110V AC)

106 SPEED CONTROL 3RD SPEED RELAY

107 SPEED CONTROL 4TH SPEED RELAY

108 SPEED CONTROL 5TH SPEED RELAY

109 SPEED CONTROL 6TH SPEED RELAY

110 SPEED CONTROL 7TH SPEED RELAY

111 OIL TANK VENT VALVE

NOTE: This output module controls the 24V DC valve and the rest of the module is 110V AC. Outputs beginning with 2 are 220V AC.

OUTPUT# CONTROLS:

200 SPARE 24 VDC OUTPUT

201 FORWARD DRIVE MOTOR RELAY CR #1

202 REVERSE DRIVE MOTOR RELAY CR #2

203 SQUEEGEE MOTOR

204 CLEANER PUMP (CR #4)

205 BUFFER UP/DOWN MOTOR

206 VACUUM AND BLOWER MOTORS (CR #3)

207 DUSTER CLOTH UNWIND MOTOR

208 DUSTER CLOTH WIND UP MOTOR

209 BUFFER MOTOR CONTACTOR

210 NOT USED

211 NOT USED

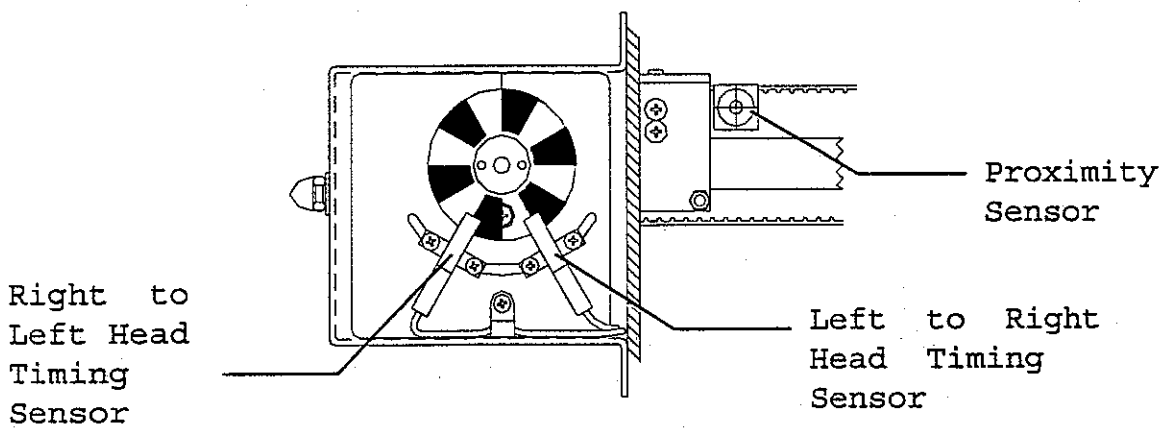
DESCRIPTION OF INPUTS

000 Cord Kill Plug: These plugs are located in two different places depending on when the machine was manufactured. They can be found on each side plate for early models (before PXS-2248) or on both sides of the handle. Attached to the power cord is a plastic connector that has a jumper wire on each pin in that plug. (The jumper wire completes the circuit.)

This switch does not have to be plugged-in to operate the machine. When the machine is started, before each lane, the PC searches for this input. If the kill plug is not being used, the PC ignores it.

If the PC reads that the plug 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 #0 will light on the input module.)

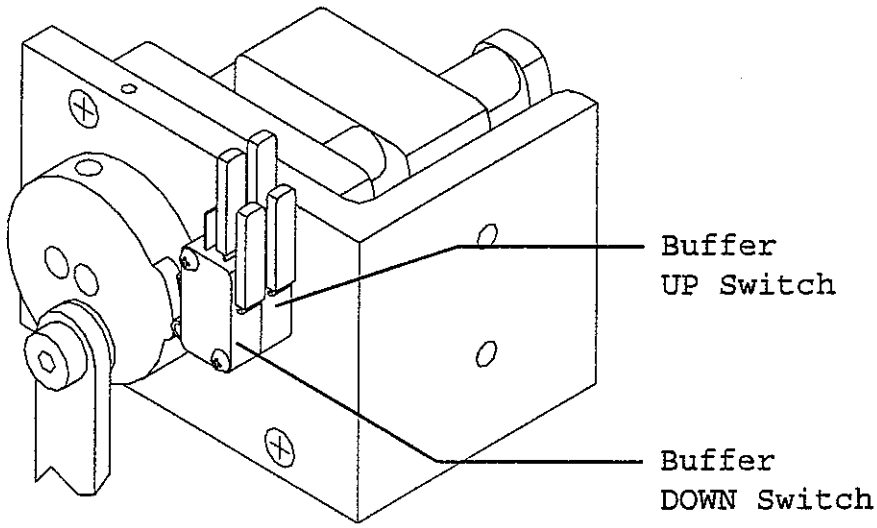
001 Left to Right Oil Head Sensor: This sensor is located next to the side wall when looking at the Head Timing Assembly. This sensor counts the number of boards that the head crosses from left to right. This works along with the proximity sensor that will show the lane edge when moving left to right.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



Oil Head Position Sensor Timing Assembly

002 **Right to Left Oil Head Sensor:** Located on the Head Sensor Timing Assembly across from the left to right oil head sensor. This counts the number of boards from right to left. (Figure on previous page.) (LED #2)

003 **Buffer Up Switch:** This switch is located nearest to the Buffer Up/Down mounting bracket. 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. (LED #3)

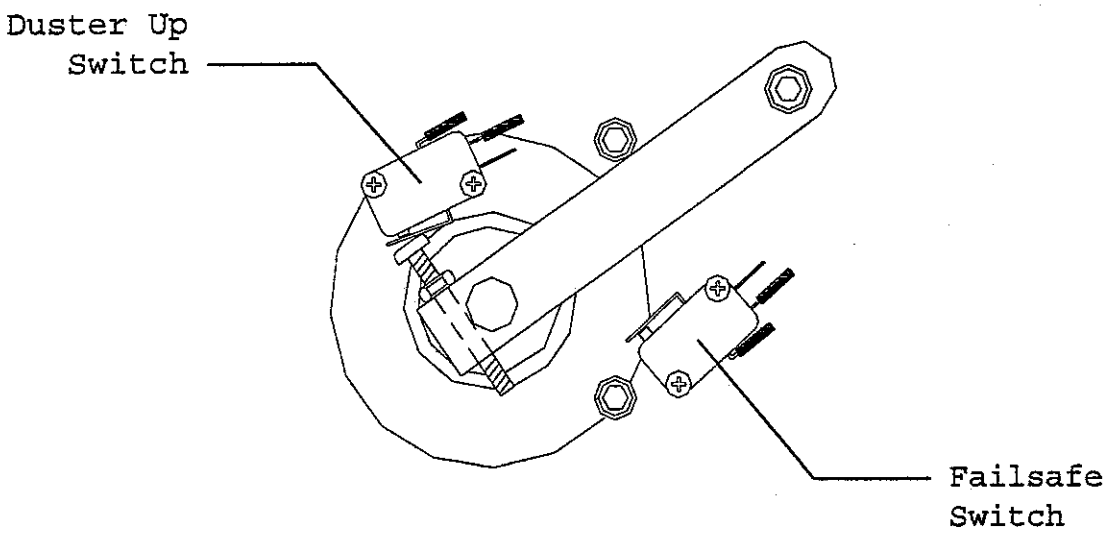


Buffer Brush Lifting Motor Assembly

004 **Buffer Down Switch:** This switch is located furthest from the Buffer Up/Down mounting bracket (next to 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. (LED #4)

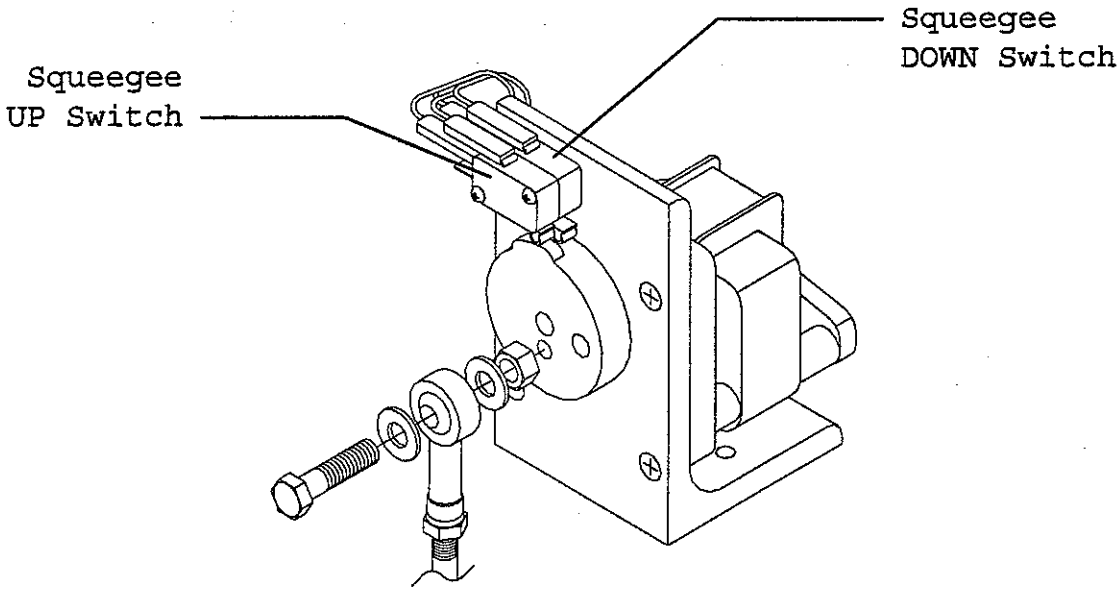
005 **Failsafe Switch:** There are two of these microswitches, located across from each other on the side walls below the Cushion Roller Pivot Arms. When the pivot arms drop and actuate the switches, the machine will travel for two more inches before it reverses itself to exit the pindeck.

This is just a backup system for the *PHOENIX-S*. The reversing of the machine should be controlled through the **Distance To End of Pindeck Menu** which is adjusted in your System Control Cleaning Menu. (LED #5)



Lino-duster Up & Failsafe Switches

006 Squeegee Up Switch: This switch is located nearest to the Squeegee Motor Mounting Bracket. 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. (LED #6)



Squeegee Motor Lifting Assembly

007 Squeegee Down Switch: Located next to the Squeegee Up Switch, this microswitch will tell the PC that the squeegee is in the DOWN position, when 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. (LED #7)

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

When the *PHOENIX-S* is in the RUN mode, the button, when depressed for the **FIRST** time, 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 depressed, the PC will begin running the program on the lane.

* **NOTE**: The **UP ARROW** is also a backup switch to start the machine only.

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 depressed, the machine will automatically return to the approach from the area in which the error had happened.

In the **Lino-duster Control & Reset** screen, the FIRST time the button is depressed, the duster motor will unwind cloth.
The SECOND time it is depressed, the motor will wind-up cloth. Each motor will run continuously while the button is actuated.

009 Oil Level Float Switch: This switch is located inside of the top right corner of the conditioner tank. This float switch 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 #9, and placing a message on the keypad screen.

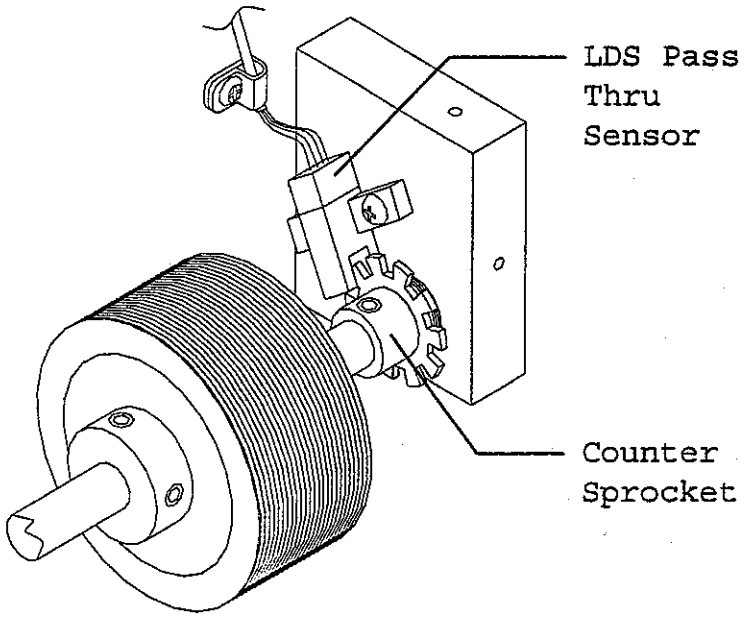
010 **Duster Up Switch:** These two microswitches are located on the top side of the Cushion Roller Pivot Arms. When the cloth is wound up, a signal is sent to the PC by one or both of these switches. (LED #10) (See drawing for Input 005.)

011 **Pump Tachometer Sensor:** This pass thru sensor is located on the Oil Pump Motor Assembly, which is mounted on the underside 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 showing the lane edge when the oil head is traveling from left to right. LED #12 will light up on the input module.

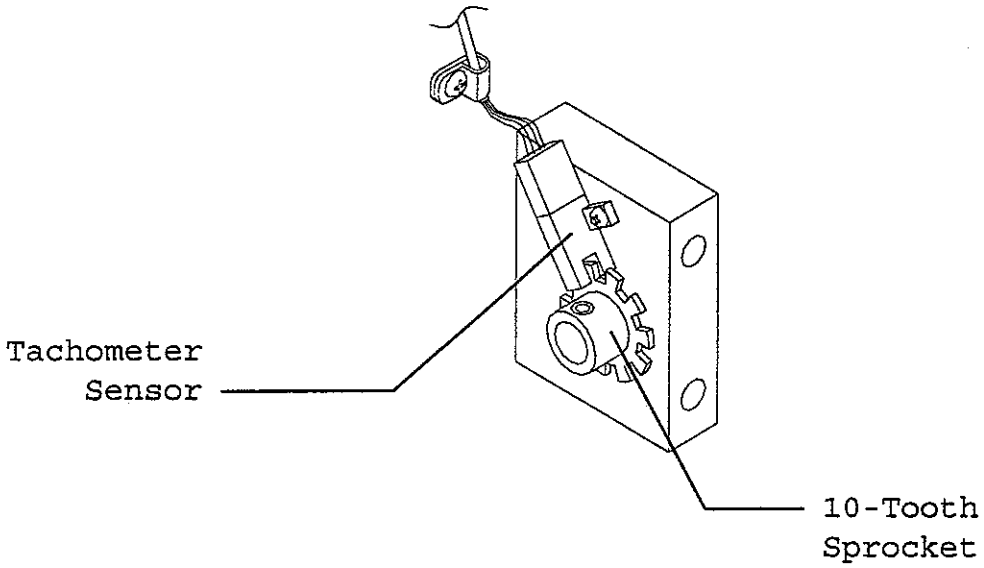
013 **Right Proximity Sensor:** This sensor is found on the right side of the electrical wall in the Conditioning Compartment (1-1/8" from the right side wall). The proximity sensor senses metal, which is in the form of a flat head screw located on the backside of the oil head block. This sensor along 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 showing 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 infra-red pass thru sensor is mounted on the right pillow block, on the outside of the rear wall of the *PHOENIX-S*. A sprocket which passes thru this sensor, as the shaft turns, counts in one inch increments as the machine travels down the lane. If this counter does not receive one pulse to the Drive Shaft Tach Sensor's three pulses the machine will give either a *Forward* or *Reverse Travel Error Message*. LED #14 will flash very quickly.



Lane Distance Sensor & Sprocket

015 **Drive Shaft Tachometer Sensor:** Mounted to the left pillow block for the drive shaft is the TACH sensor. A ten-tooth timing sprocket is mounted to the drive shaft. As the teeth of the sprocket pass through this 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 speeds of the machine. It also is used by the program to sense if the machine's drive wheels are slipping. The PC compares the rate of pulses coming from the tach sensor to the rate of pulses coming from the LANE DISTANCE SENSOR. LED #15 will flash very quickly.



Tachometer Sensor & Sprocket

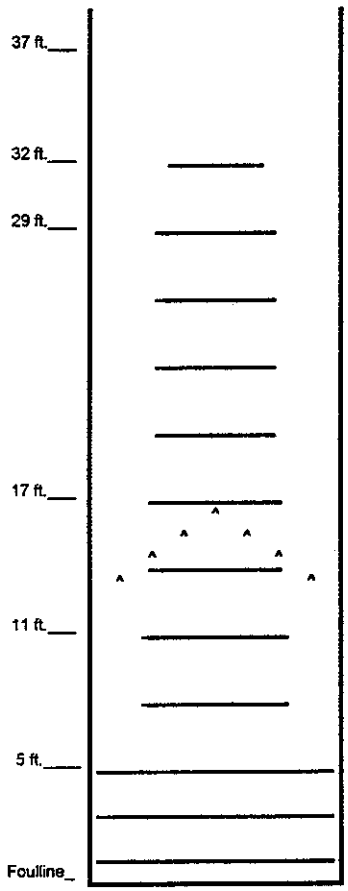
SECTION VIII - Oil Patterns

A. Understanding the Machine

How the Phoenix-S controls the amount of oil.

The Phoenix-S 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 roller, applying streams of oil as it goes. The streams (or loads) are shown in this figure.

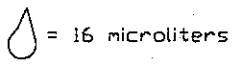


The size of the stream can be set to an exact amount or volume. We achieve this exact stream volume by using a highly accurate fluid metering pump. This pump, running at a constant, speed gives absolute positive displacement of the oil. The accuracy of the pump is + or - 1%.

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 50 microliters per board.

To give you an visual perspective of how much oil is being applied in 50 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 approximately 3 drops of oil.



Since three drops of oil are too small to measure with the naked eye, we must use a minimum of 100 boards to get an amount we can visibly measure. Using 100 boards also makes the math much easier.

The following exercise teaches you to calibrate the machine to confirm the factory pump setting. The pump should be set at 50 microliters per board.

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

PHOENIX-S START

MENU

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 <u>not</u> warmed up press **NEXT** three times to access this display:

***TEST: VOLUME PER**

REV FOR 490 REVS

The pump will begin running as soon as this screen appears.

4. Place a small container under the calibration outlet on the left rear panel.

5. When the **LEFT ARROW** is pressed the number on the screen will change to zero and the pump output will begin running out of the calibration outlet.

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 fall between 480 - 510.

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

***TEST: VOLUME PER**

BOARD HIT: <-->

8. Place a CLEAN 25 milliliter graduated cylinder under the calibration outlet.

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. The output of the pump is routed to the calibration outlet instead of the transfer roller.

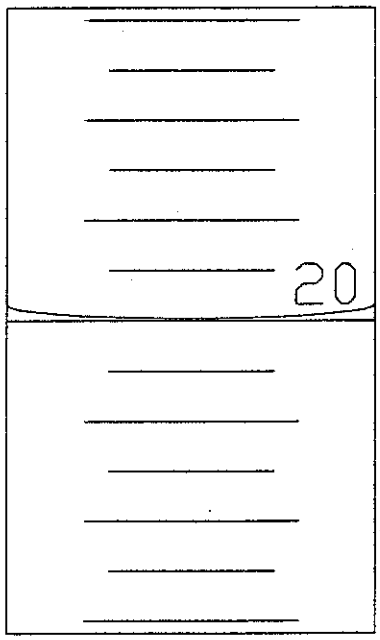
11. The head will travel back and forth 4 times, depositing oil from **2-to-2** twice and **14-to-14** twice in the graduated cylinder. This is equivalent to a total oil stream of **100 boards**. (37 + 37 + 13 + 13 = 100)

12. Remove the graduated cylinder and read the amount. If the pump is set at 50 microliters, then the output in the cylinder should be 5000 microliters or **5 milliliters**.

NOTE: There are 1000 *microliters* (unit of measurement for pump) in one *milliliter* (unit of measurement for graduated cylinder), we divided 5000 by 1000 to get 5.

13. This test should be ran **4 times** into the same graduated cylinder. This will multiply the deviation of the pump (from 50 ml) by 4 times, making it more visible in the graduated cylinder.

14. After running the test four times the amount in the cylinder should be **20 mL** (read bottom of bubble as shown in diagram).

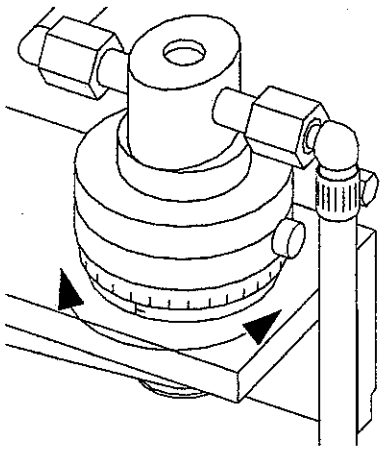


15. If the amount of oil is higher or lower than 20, a pump adjustment is necessary.

16. Beneath the cover on the bottom of the machine is the pump assembly. The diagram shows the calibration ring of the pump. If an adjustment is necessary, turn the dial only about 1/2 microliter.

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 roller, the pump actually revolves about 2-1/2 revolutions as it crosses one board.

Clockwise will decrease the output and counterclockwise will increase the output. (Remember the amount above was the output of four tests.)



17. Clean out the graduated cylinder using the long round 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.

18. Repeat steps 8 through 17 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.)

19. Keep repeating the test until the amount in the graduated cylinder reads **EXACTLY 20 mL.**

This calibration sets the machine to a standard stream size of 50 microliters per board. This allows us to "prove" the oil pattern that is programmed into the machine.

B. Proving the Oil Pattern

The program we will use is the Factory Settings for Program #1. The chart below shows the number of boards crossed for each load and how many times this load is applied.

PROGRAM 1

2 -	2 x 3	(Forward Loads)
9 -	9 x 2	
10 -	10 x 2	
11 -	11 x 4	
13 -	13 x 1	
8 -	8 x 3	(Reverse Loads)

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

After converting all the loads for Program 1, the numbers become very simple.

PROGRAM 1

37 x 3
23 x 2
21 x 2
19 x 4
15 x 1

25 x 3

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 1

37 x 3	=	111
23 x 2	=	46
21 x 2	=	42
19 x 4	=	76
15 x 1	=	15
25 x 3	=	75
		365 Total Boards

In our example there are 290 boards covered during forward travel and 75 boards covered during the reverse travel. This total number (365) can be multiplied by the pump setting (50 ml) to determine the exact amount of oil used when conditioning with this pattern.

365 Boards
x 50 microliters
18,250 microliters

The total amount is 18,250 microliters. To convert this to milliliters the number has to be divided by 1000.

18250/1000 = **18.25 milliliters**

This total program amount can tested by running a **PROGRAM # VOLUME TEST**. The following exercise will make you familiar with this procedure.

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

PHOENIX-S START

MENU

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 a CLEAN graduated cylinder under the calibration outlet.

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. The output of the pump is routed to the calibration outlet instead of the transfer roller.

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.

10. Then press the **RIGHT ARROW** to start the head travel and dispense the 3 reverse loads.

11. When the head stops moving, remove the graduated cylinder and read the amount of oil.

12. The bottom of the oil line should be between **18** and **18.5** milliliters.

Running this test 3 or 4 times should be enough to convince anyone of the Sanction'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 this 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.

PHOENIX-S BOARD CHART

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

LEFT	RIGHT																		
	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
3	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18
4	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
5	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
6	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15
7	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14
8	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13
9	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12
10	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
11	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
12	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
13	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8
14	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7
15	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
16	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5
17	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4
18	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3
19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	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.

PHOENIX-S™ TOURNAMENT EDITION

SANCTION TECHNOLOGY BY KEGEL

Conditioning Program Descriptions

Program 1 is designed for use on **GOOD LANE SURFACES**, both synthetics and freshly resurfaced lanes. The pattern is good for all types of players.

Program 2 is a **HEAVY OIL PATTERN**. Use a pattern like this when conditioning an excessively "hooking" surface. This will distribute a lot of HEAD OIL for problem heads, film overlays, and rough synthetics. Bowlers must be able to handle a lot of oil to play on this condition.

Program 3 is a lighter pattern with **LENGTHWISE TAPER**. This is good for soft-reacting backends (i.e. multiple re-coats, waterbase finishes, and 100% Solids topcoat). The taper helps reduce conditioner carry-down on these surfaces. Pattern is good for Ladies, Seniors, and Kids also.

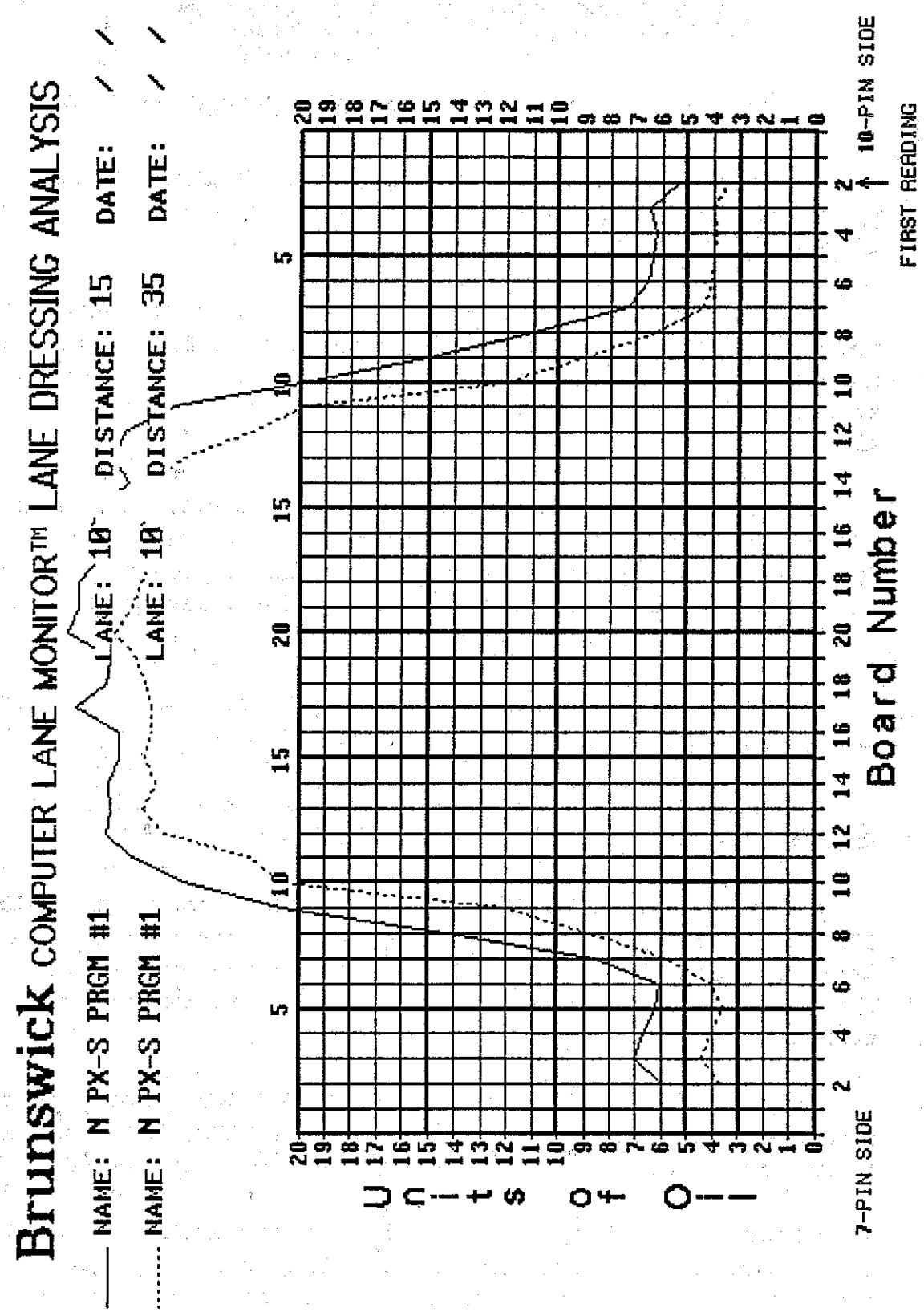
Program 4 is similar to Program #1, only a wider version. It allows the bowlers to play further outside.

Program 5 is similar to Program #2, only a wider version. It allows the bowlers to play further outside.

Program 6 is a TOURNAMENT CONDITION known as the "**CROWN**". A very competitive pattern that poses a challenge by having more oil outside. This forces the bowlers to control their shots; a 220 average on this pattern is exceptional bowling and shot making.

Program 7 is called the "**CHRISTMAS TREE**", everyone's favorite. This pattern allows MULTIPLE ANGLES, but challenges the bowler's accuracy. A definite treat for tournaments.

Program 6 & 7 is a graph showing the amount of HEAD OIL only for Programs 6 & 7. It shows a lot of oil to control breakdown of heads when conditioning for scratch bowlers.



NOTE: This lane graph is only a representation of the pattern that will be applied by the Phoenix-S. Due to many variances, this graph might not match your machine. Several factors can contribute to this, such as the brand of oil, UV content of the oil, the condition of the reader, the calibration strips, and even the type of tape used to take-up the oil. Keep this in mind when reading tapes...the *Phoenix-S* is more accurate than the existing equipment used to measure its output.

Volume Per Board: 50 µ

Phoenix-S Program # 1
Program Record Worksheet

Oil Travel Dist: 37 ft

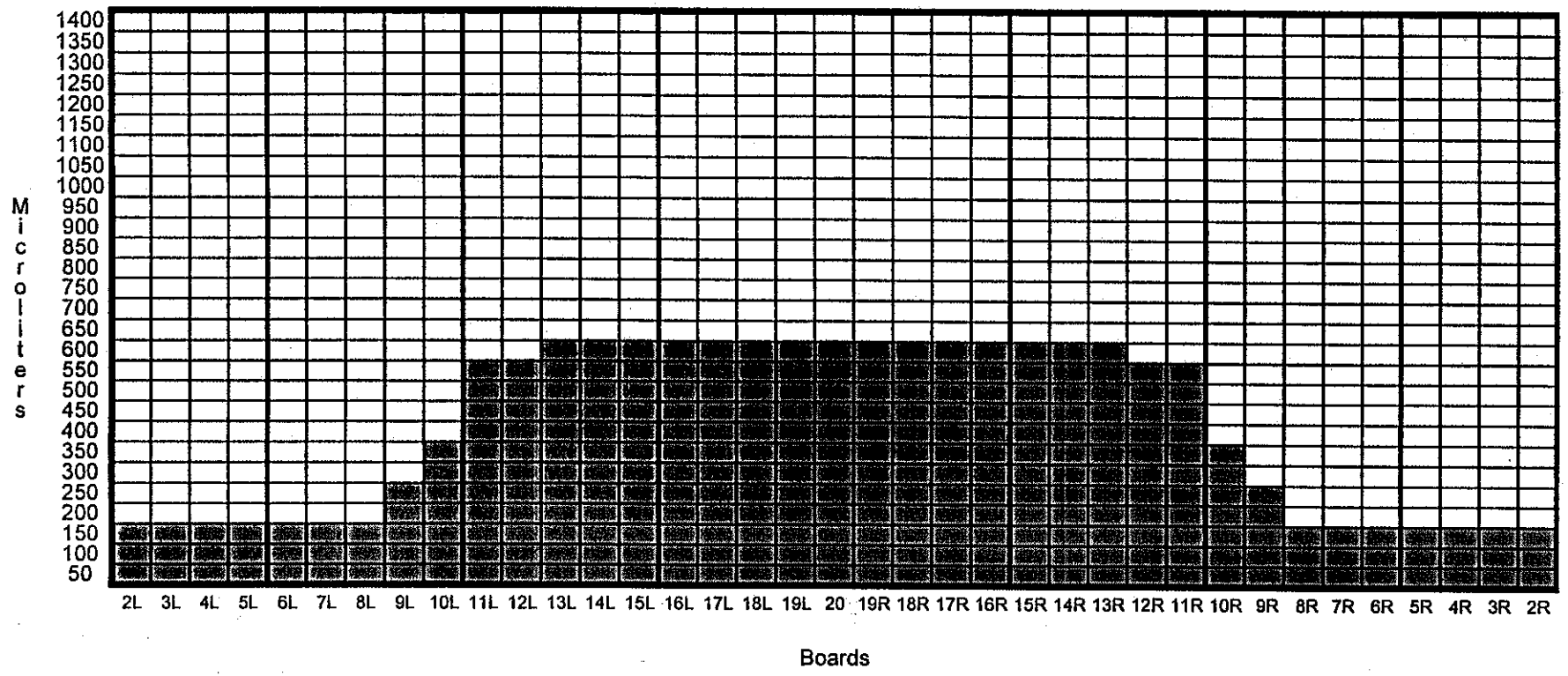
Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F	2	2	3	14	0-5 ft	37	111	
02F	9	9	2	22	5-11 ft	23	46	
03F	10	10	2	22	11-17 ft	21	42	
04F	11	11	4	22	17-29 ft	19	76	
05F	13	13	1	22	29-32 ft	15	15	
06F	##	##	0	26	32-37 ft	0	0	
07F								
08F								
09F								
10F		*These screens are all available, but do not appear in the machine when the last screen used shows the same distance as the oil travel distance*						
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # Boards Crossed on FWD				290	14.5 milliliters
01R	##	##	0	30	37-10 ft	0	0	
02R	8	8	3	18	10-3 ft	25	75	
03R	##	##	0	14	3-0 ft	0	0	
04R								
05R								
06R								
07R								
08R		*These screens are all available, but do not appear in the machine when the last screen used shows 0 feet.*						
09R								
10R								
11R		*When the # of loads = 0, it does not matter what board numbers are in the load screens. This is a buff only screen.*						
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on REV				75	3.75
			Total # Boards FWD and REV				**365**	18.25

Total Oil Volume = Total Boards Crossed x Volume/Board

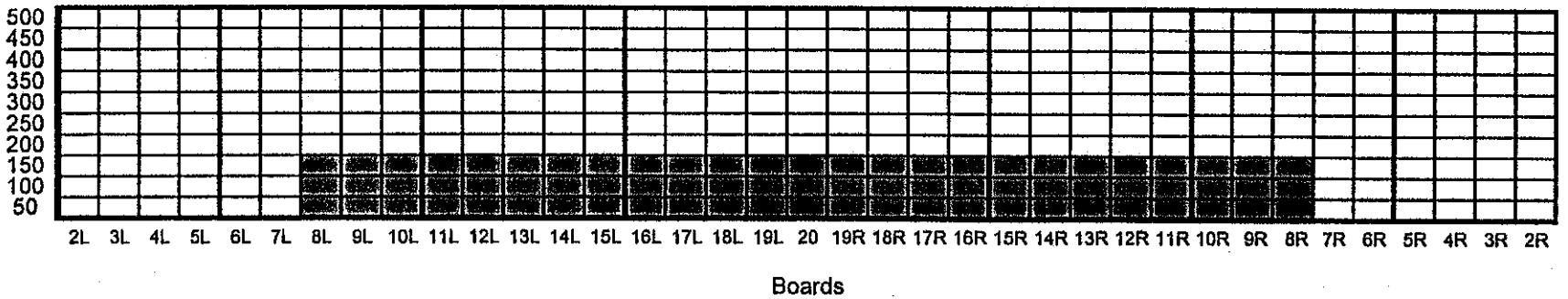
PHOENIX-S
MICROLITER GRAPH
SAMPLE

FORWARD OIL PROGRAM# 1

Pattern Distance: 37 ft. Pump Calibration: 50 Microliters Total Volume Output: 18.25 Milliliters



REVERSE OIL Starting Distance: 10 ft.

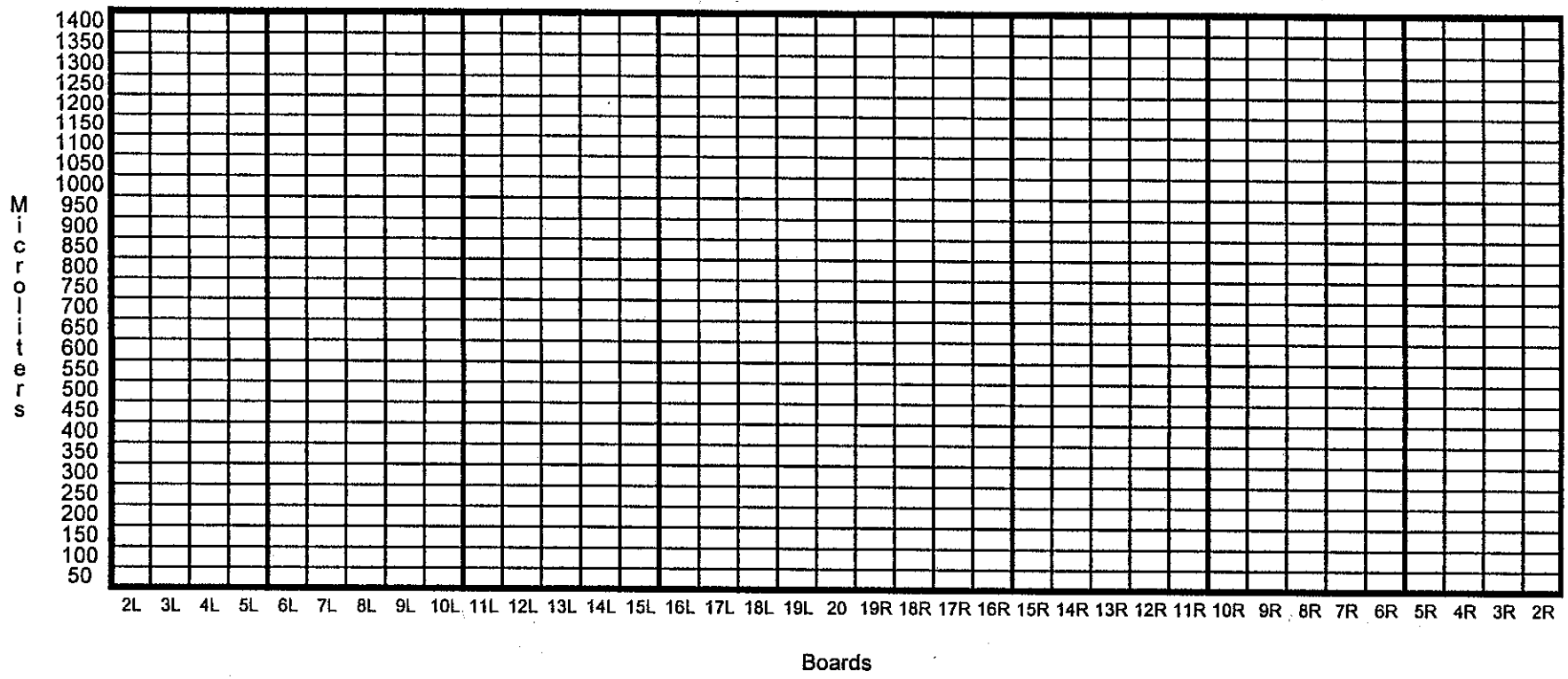


FWD Boards: 290 REV Boards: 75 Total Boards Crossed: 365

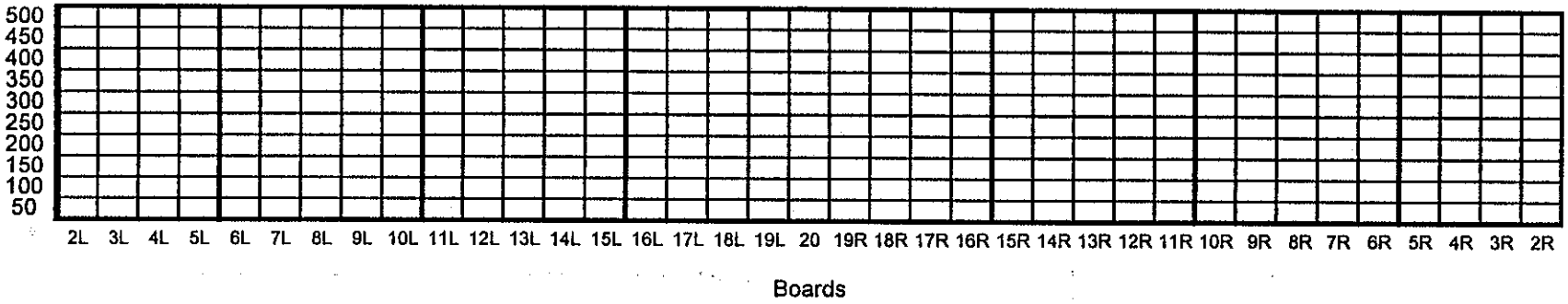
PHO' 'X-S
MICROLI'ER GRAPH

FORWARD OIL PROGRAM# _____

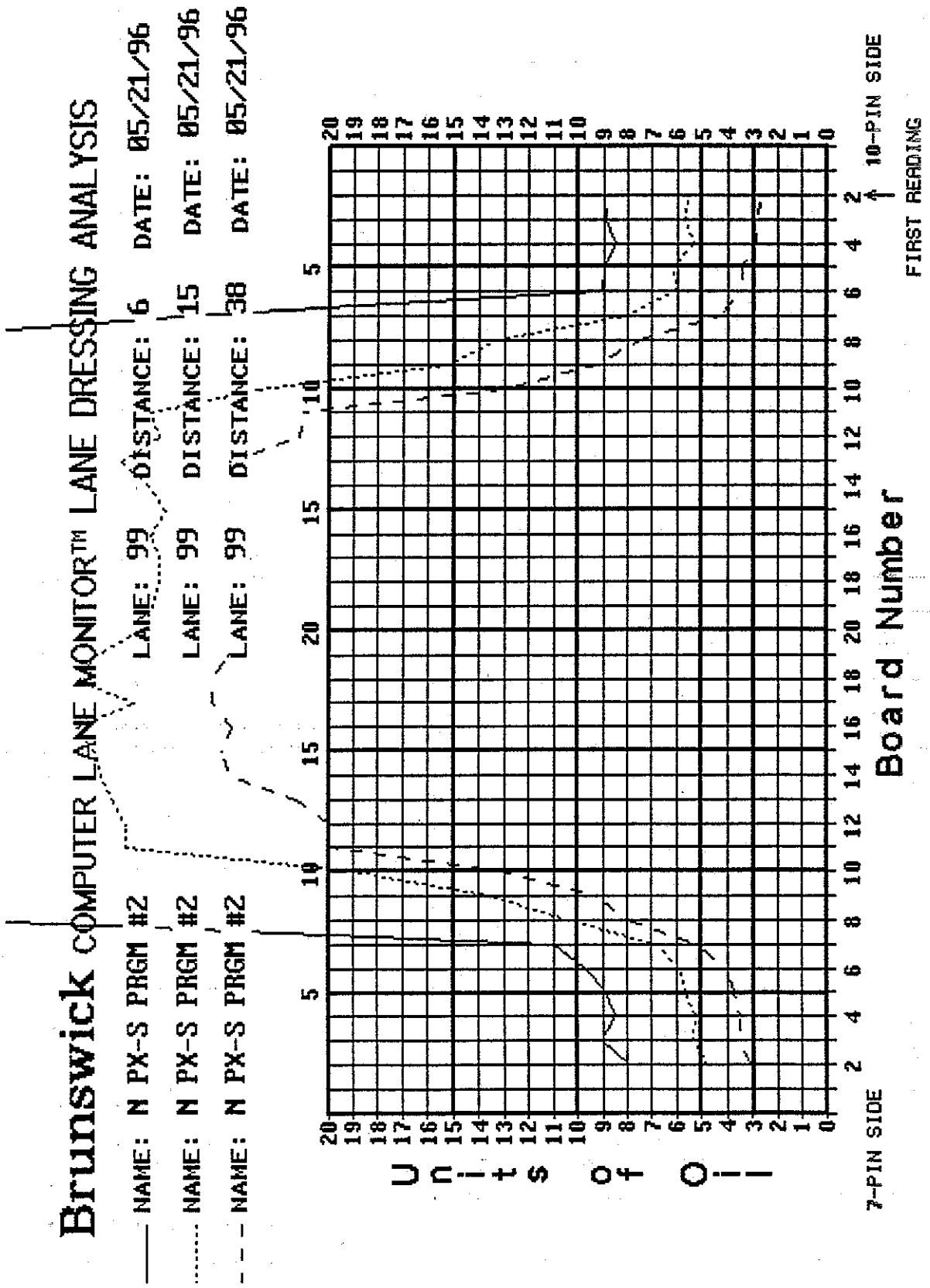
Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)



NOTE: This lane graph is only a representation of the pattern that will be applied by the Phoenix-S. Due to many variances, this graph might not match your machine. Several factors can contribute to this, such as the brand of oil, UV content of the oil, the condition of the reader, the calibration strips, and even the type of tape used to take-up the oil. Keep this in mind when reading tapes...the *Phoenix-S* is more accurate than the existing equipment used to measure its output.

Volume Per Board: 50 μ

Phoenix-S Program # 2
Program Record Worksheet

Oil Travel Dist: 40 ft

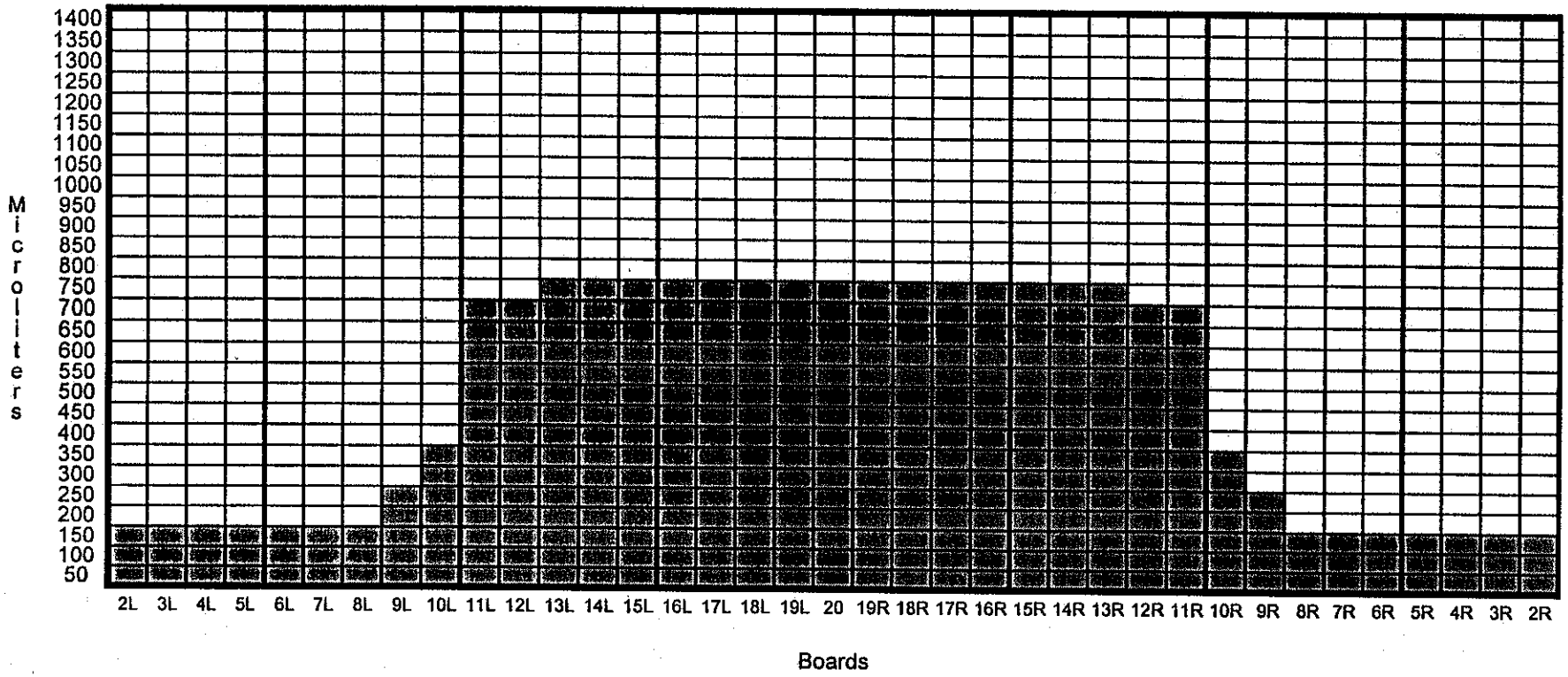
Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F	2	2	3	14	0-5 ft	37	111	
02F	9	9	2	14	5-8 ft	23	46	
03F	10	10	2	18	8-13 ft	21	42	
04F	11	11	7	22	13-34 ft	19	133	
05F	13	13	1	22	34-37 ft	15	15	
06F	##	##	0	22	37-40 ft	0	0	
07F								
08F								
09F								
10F		*These screens are all available, but do not appear in the machine when the last screen used shows the same distance as the oil travel distance*						
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # boards crossed on Fwd				347	17.35 milliliters
01R	##	##	0	30	40-14 ft	0	0	
02R	8	8	7 *	10	14-5 ft	25	175	
03R	##	##	0	10	5-0 ft	0	0	
04R								
05R	* *This is a lot of oil. Reduce to 4 or 5 loads unless more is needed.*							
06R								
07R								
08R		*These screens are all available, but do not appear in the machine when the last screen used shows 0 feet.*						
09R								
10R								
11R		*When the # of loads = 0, it does not matter what board numbers are in the load screens. This is a buff only screen.*						
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on Rev				175	8.75
			Total # Boards Fwd and Rev				**522**	26.1

Total Oil Volume = Total Boards Crossed x Volume/Board

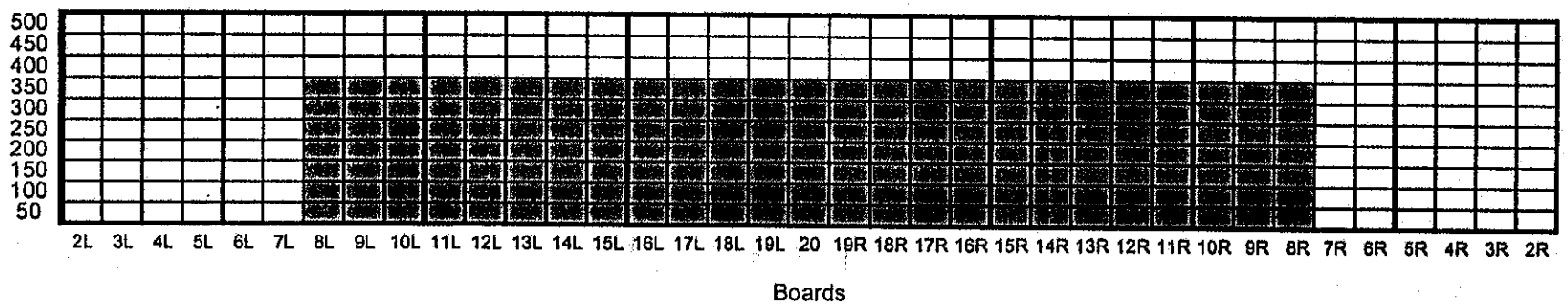
PHOENIX-S
MICROLITER GRAPH
SAMPLE

FORWARD OIL PROGRAM# 2

Pattern Distance: 40 ft. Pump Calibration: 50 Microliters Total Volume Output: 26.1 Milliliters



REVERSE OIL Starting Distance: 14 ft.

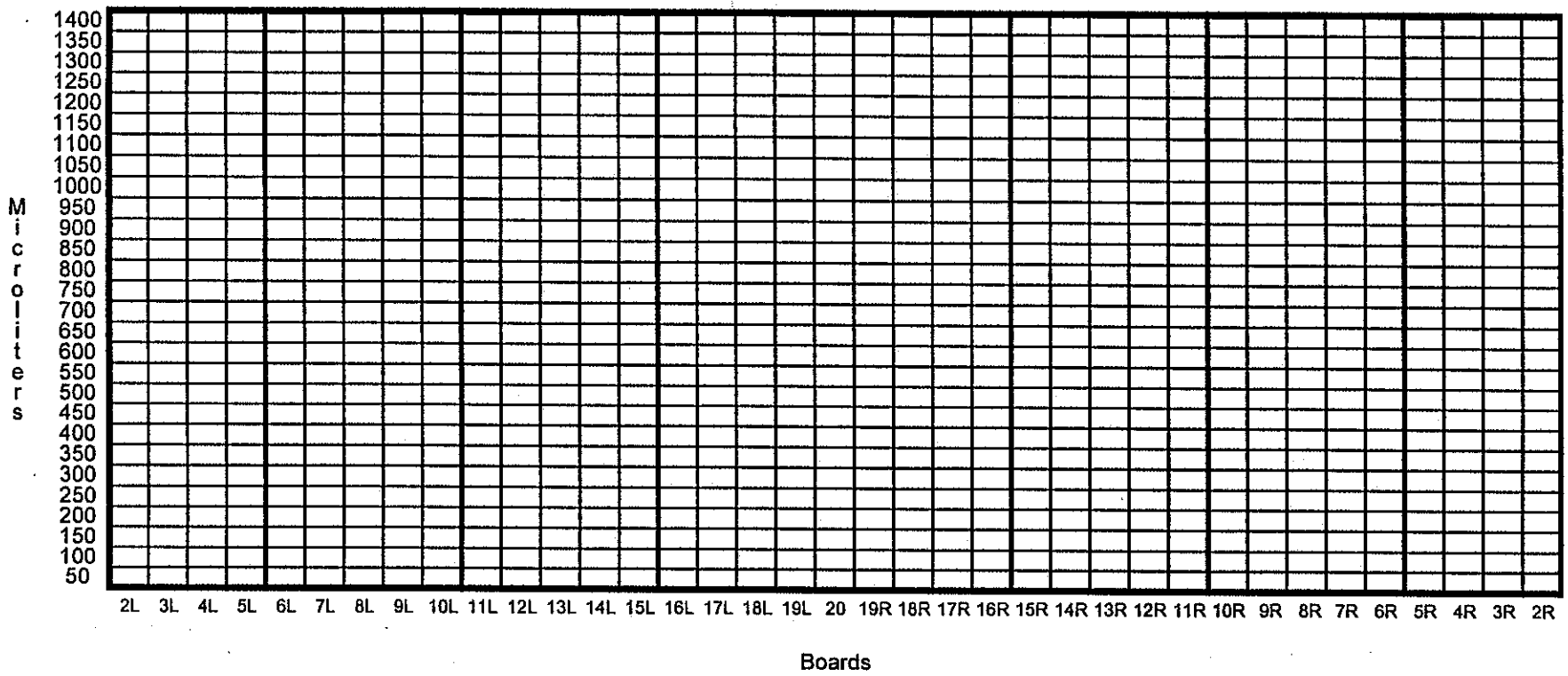


FWD Boards: 347 REV Boards: 175 Total Boards Crossed: 522

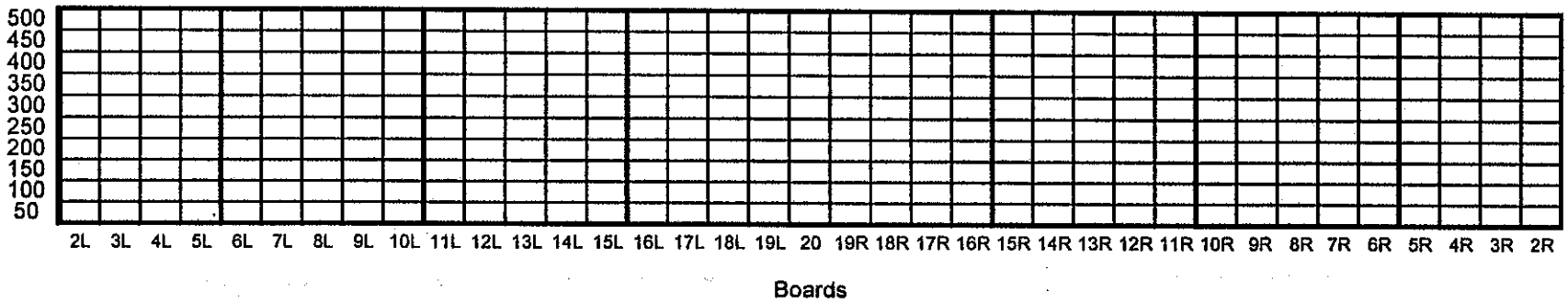
PHO IX-S
MICROLITER GRAPH

FORWARD OIL PROGRAM# _____

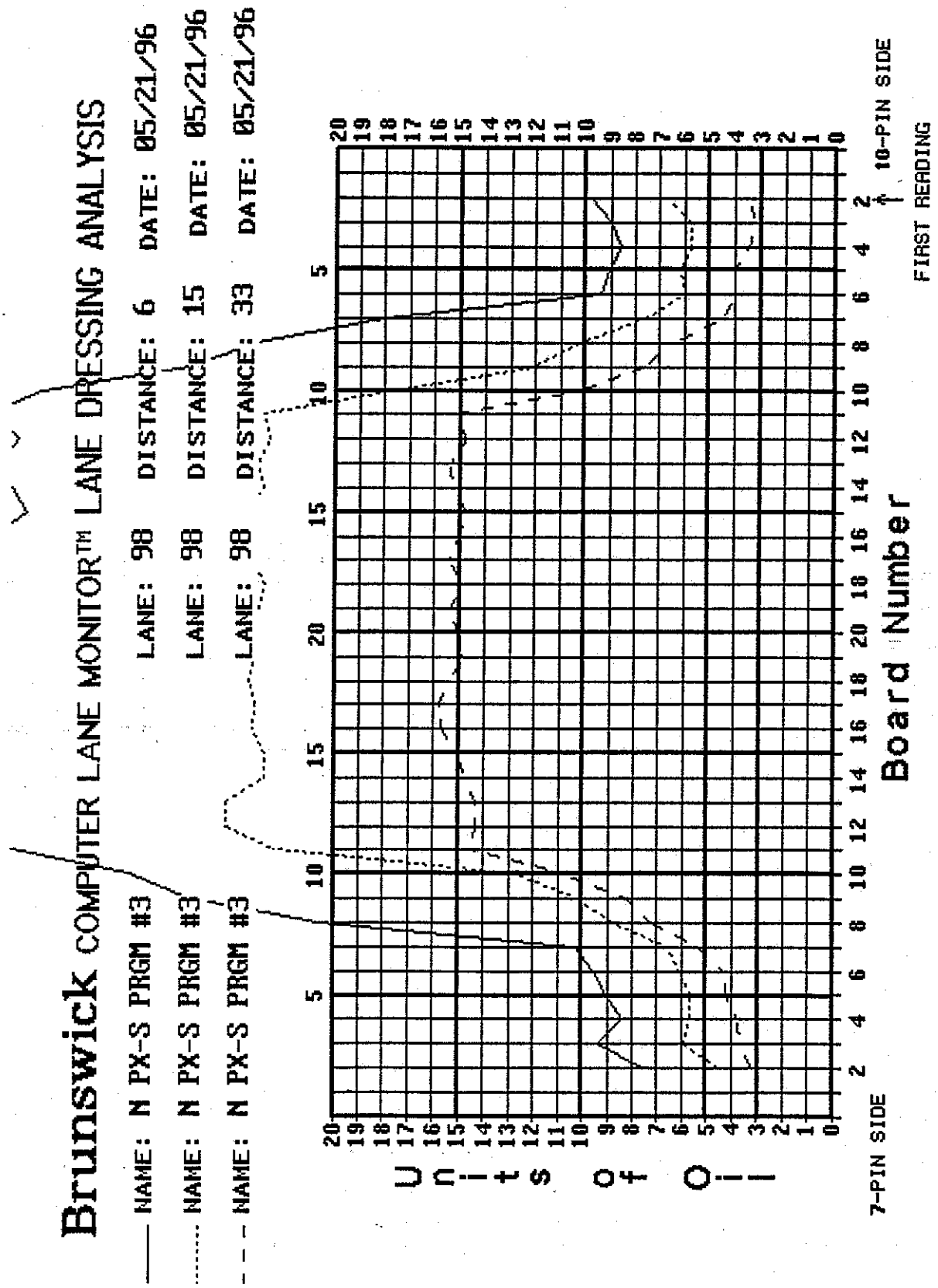
Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)



NOTE: This lane graph is only a representation of the pattern that will be applied by the Phoenix-S. Due to many variances, this graph might not match your machine. Several factors can contribute to this, such as the brand of oil, UV content of the oil, the condition of the reader, the calibration strips, and even the type of tape used to take-up the oil. Keep this in mind when reading tapes...the *Phoenix-S* is more accurate than the existing equipment used to measure its output.

Volume Per Board: 50 µ

Phoenix-S Program # 3
Program Record Worksheet

Oil Travel Dist: 35 ft

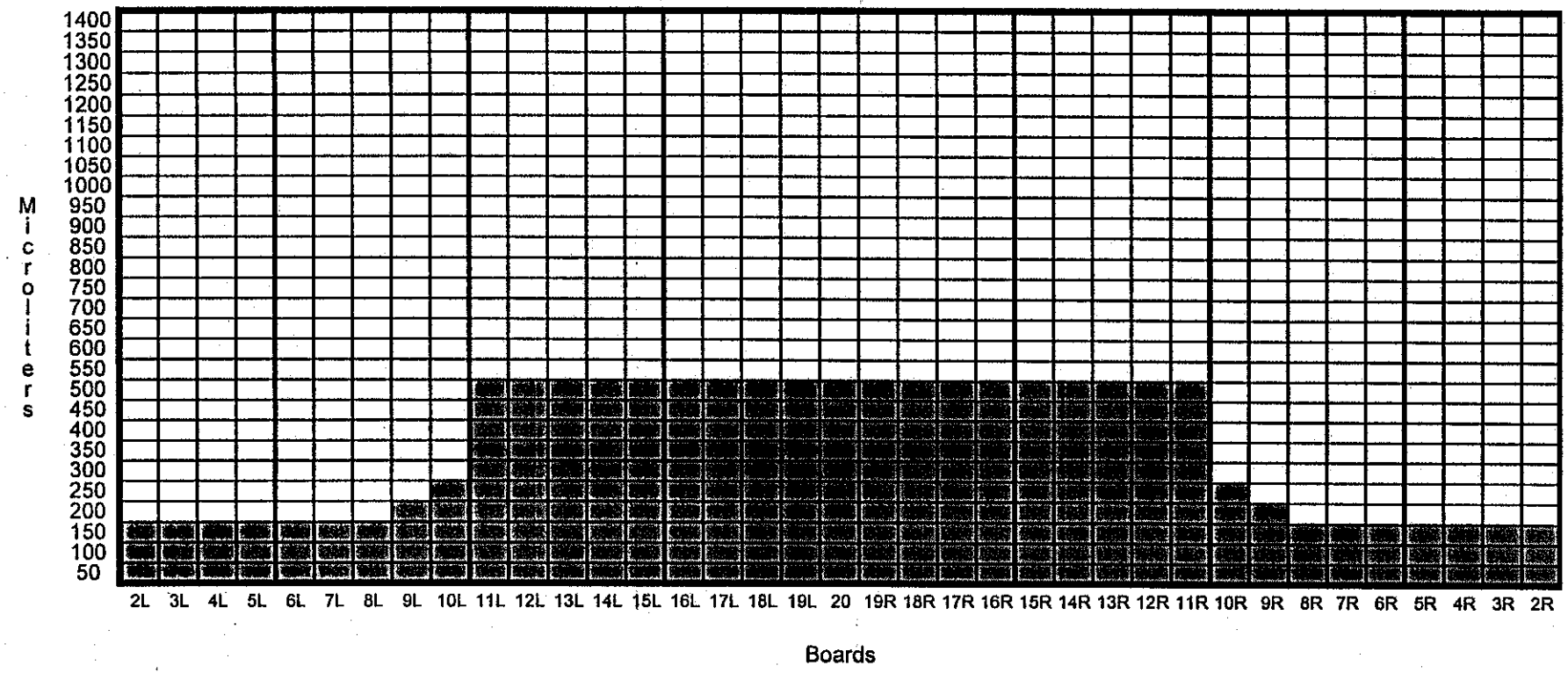
Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F	2	2	3	14	0-5 ft	37	111	
02F	9	9	1	14	5-6 ft	23	23	
03F	10	10	1	14	6-7 ft	21	21	
04F	11	11	5	18	7-19 ft	19	95	
05F	##	##	0	18	19-35 ft	0	0	
06F								
07F								
08F								
09F								
10F		*These screens are all available, but do not appear in the machine when the last screen used shows the same distance as the oil travel distance*						
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # boards crossed on Fwd				250	12.5 milliliters
01R	##	##	0	18	35-8 ft	0	0	
02R	8	8	3	14	8-3 ft	25	75	
03R	##	##	0	14	3-0 ft	0	0	
04R								
05R								
06R								
07R								
08R		*These screens are all available, but do not appear in the machine when the last screen used shows 0 feet.*						
09R								
10R								
11R		*When the # of loads = 0, it does not matter what board numbers are in the load screens. This is a buff only screen.*						
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on Rev				75	3.75
			Total # Boards Fwd and Rev				325	16.25

Total Oil Volume = Total Boards Crossed x Volume/Board

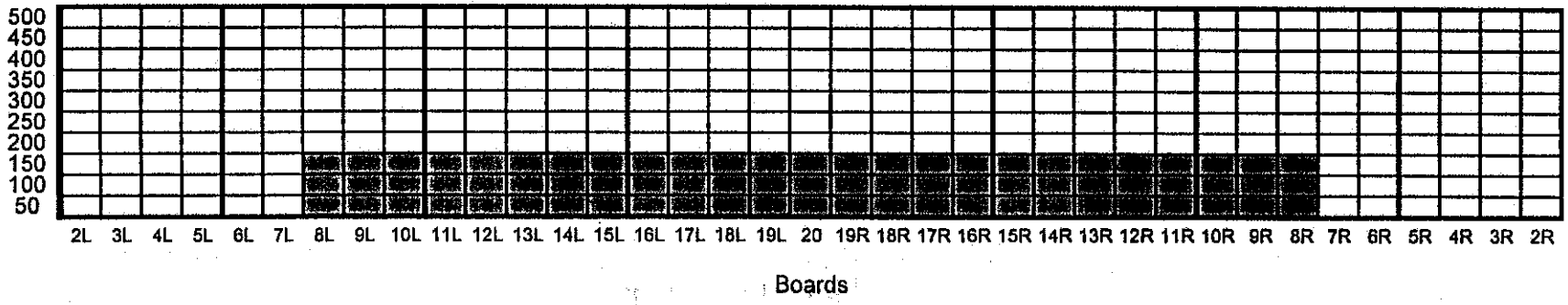
PHOENIX-S
MICROLITER GRAPH
SAMPLE

FORWARD OIL PROGRAM# 3

Pattern Distance: 35 ft. Pump Calibration: 50 Microliters Total Volume Output: 16.25 Milliliters



REVERSE OIL Starting Distance: 8 ft.

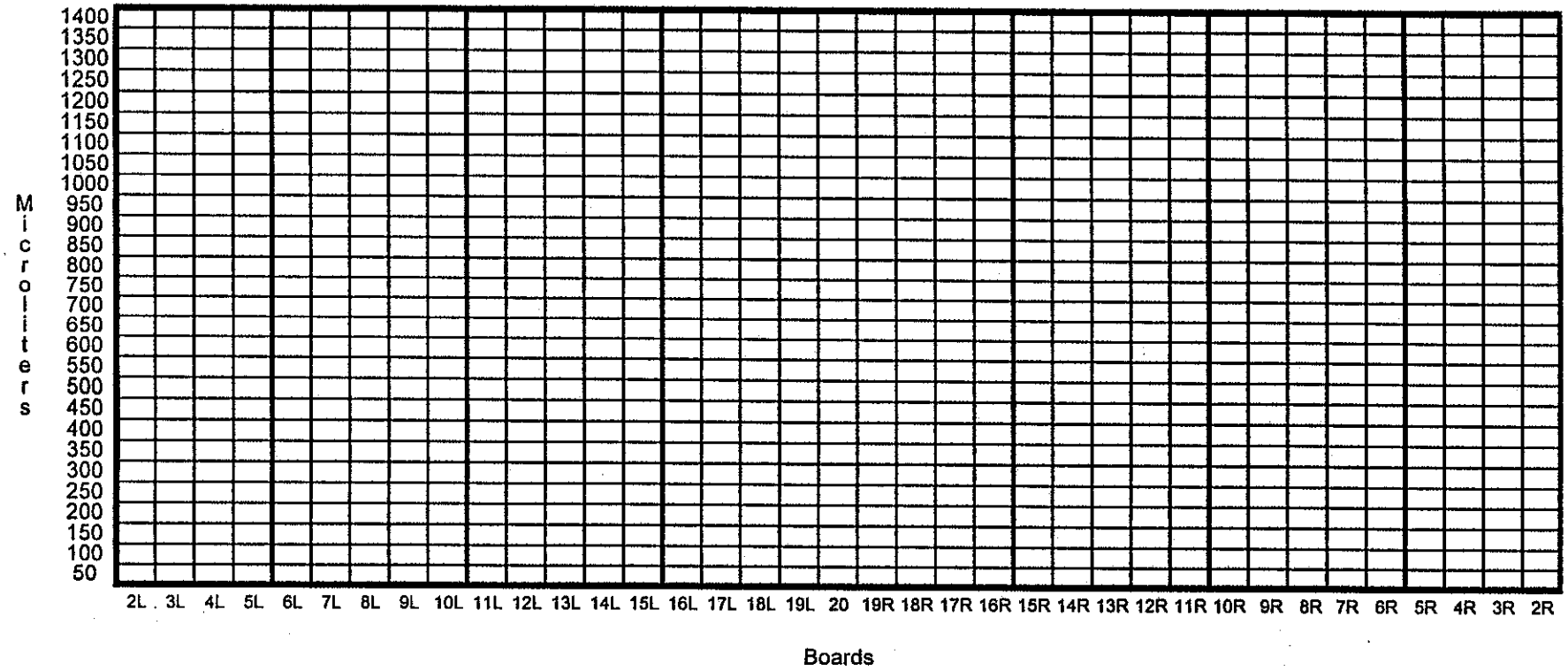


FWD Boards: 250 REV Boards: 75 Total Boards Crossed: 325

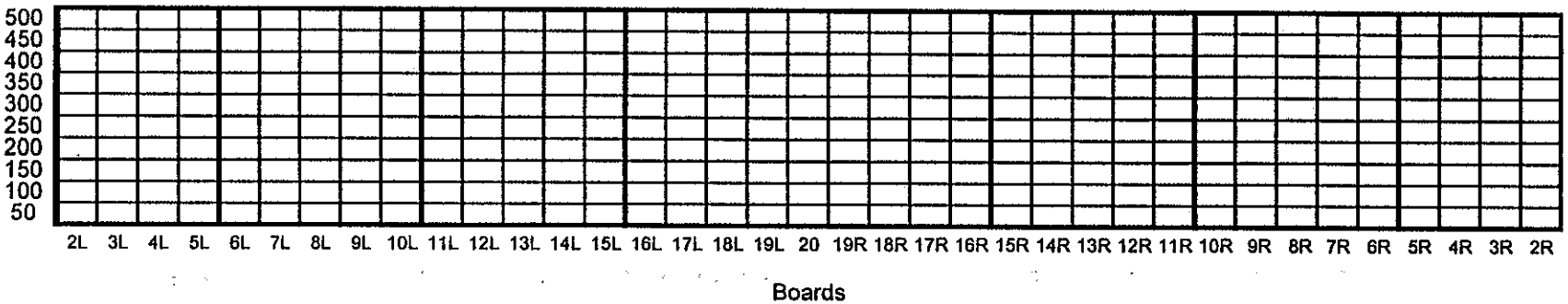
PHC IX-S
MICROLITER GRAPH

FORWARD OIL PROGRAM#_____

Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.

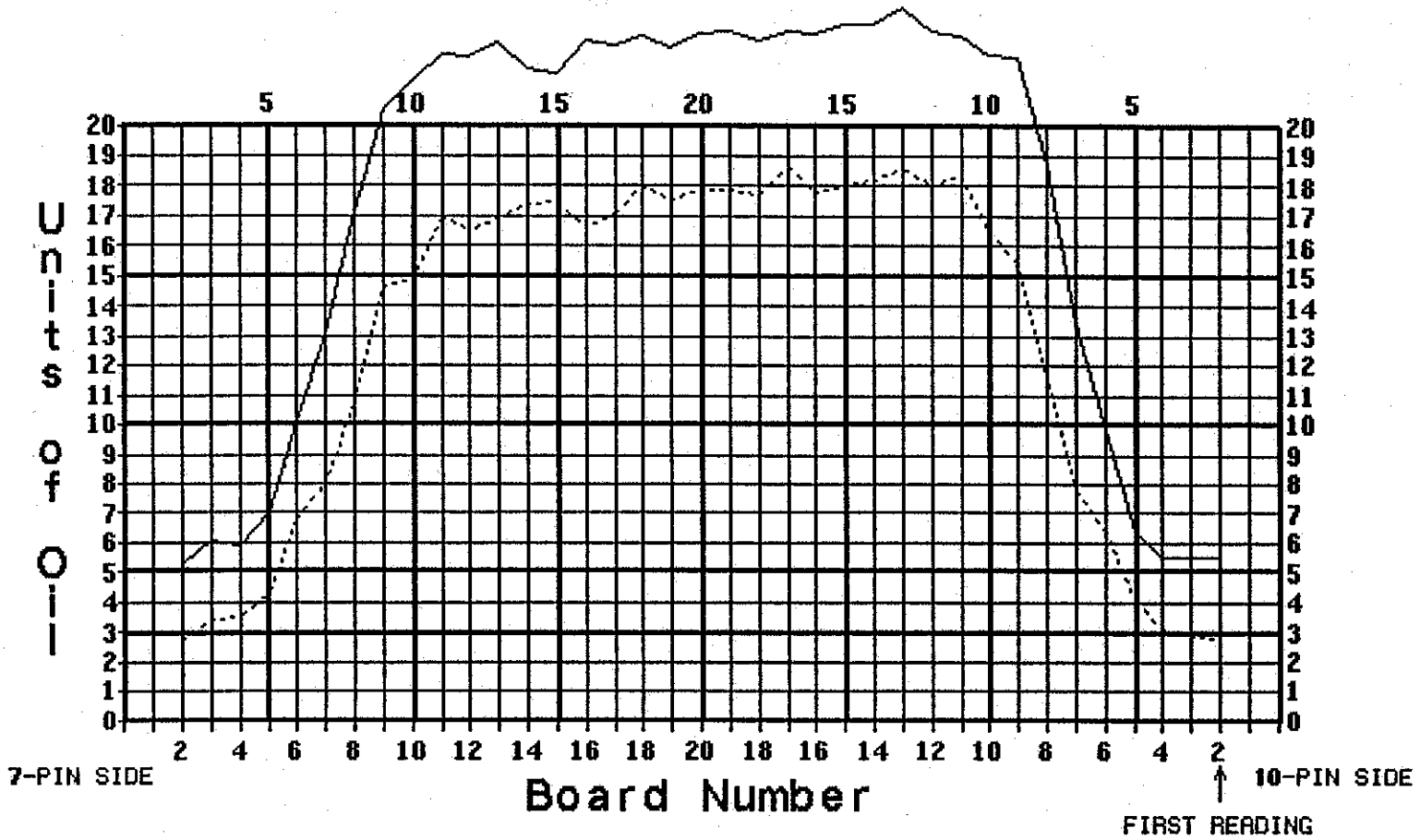


This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)

Brunswick COMPUTER LANE MONITOR™ LANE DRESSING ANALYSIS

—— NAME: N PX-S PRGM #4 LANE: 97 DISTANCE: 15 DATE: 05/22/96

..... NAME: N PX-S PRGM #4 LANE: 97 DISTANCE: 35 DATE: 05/22/96



NOTE: This lane graph is only a representation of the pattern that will be applied by the Phoenix-S. Due to many variances, this graph might not match your machine. Several factors can contribute to this, such as the brand of oil, UV content of the oil, the condition of the reader, the calibration strips, and even the type of tape used to take-up the oil. Keep this in mind when reading tapes...the *Phoenix-S* is more accurate than the existing equipment used to measure its output.

Volume Per Board: 50 µ

Phoenix-S Program # 4
Program Record Worksheet

Oil Travel Dist: 37 ft

Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F	2	2	3	14	0-5 ft	37	111	
02F	7	7	2	22	5-11 ft	27	54	
03F	8	8	2	22	11-17 ft	25	50	
04F	9	9	4	22	17-29 ft	23	92	
05F	11	11	1	22	29-32 ft	19	19	
06F	##	##	0	26	32-37 ft	0	0	
07F								
08F								
09F								
10F		*These screens are all available, but do not appear in the machine when the last screen used shows the same distance as the oil travel distance*						
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # boards crossed on Fwd				326	16.3 milliliters
01R	##	##	0	60	37-10 ft	0	0	
02R	6	6	3	18	10-3 ft	29	87	
03R	##	##	0	14	3-0 ft	0	0	
04R								
05R								
06R								
07R								
08R		*These screens are all available, but do not appear in the machine when the last screen used shows 0 feet.*						
09R								
10R								
11R		*When the # of loads = 0, it does not matter what board numbers are in the load screens. This is a buff only screen.*						
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on Rev				87	4.35
			Total # Boards Fwd and Rev				413	20.65

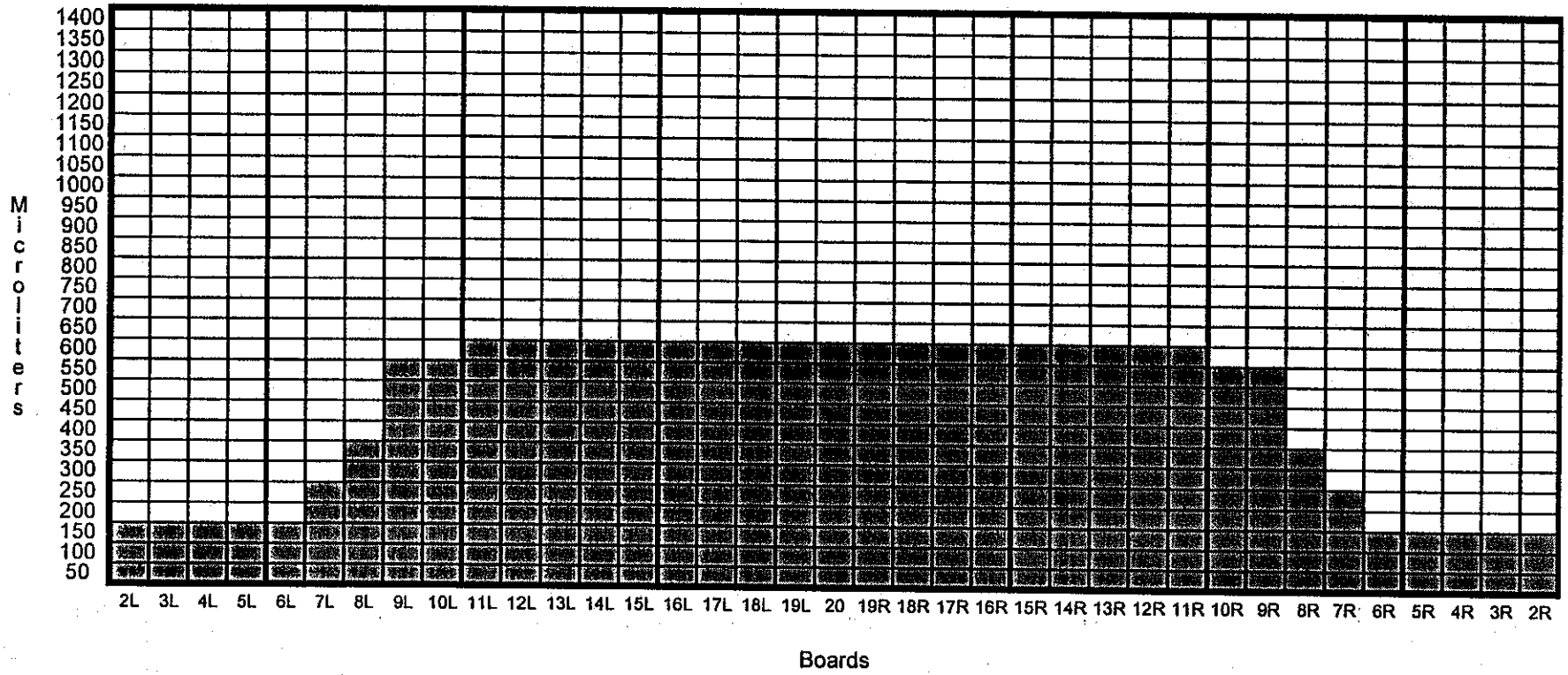
Total Oil Volume = Total Boards Crossed x Volume/Board

PHOENIX-S
MICROLITER GRAPH
SAMPLE

FORWARD OIL

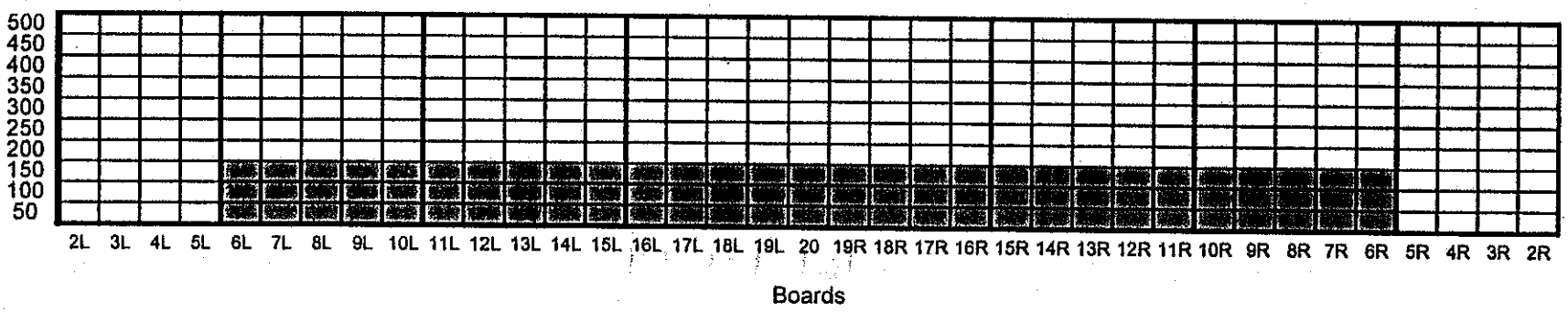
PROGRAM# 4

Pattern Distance: 37 ft. Pump Calibration: 50 Microliters Total Volume Output: 20.65 Milliliters



REVERSE OIL

Starting Distance: 10 ft.

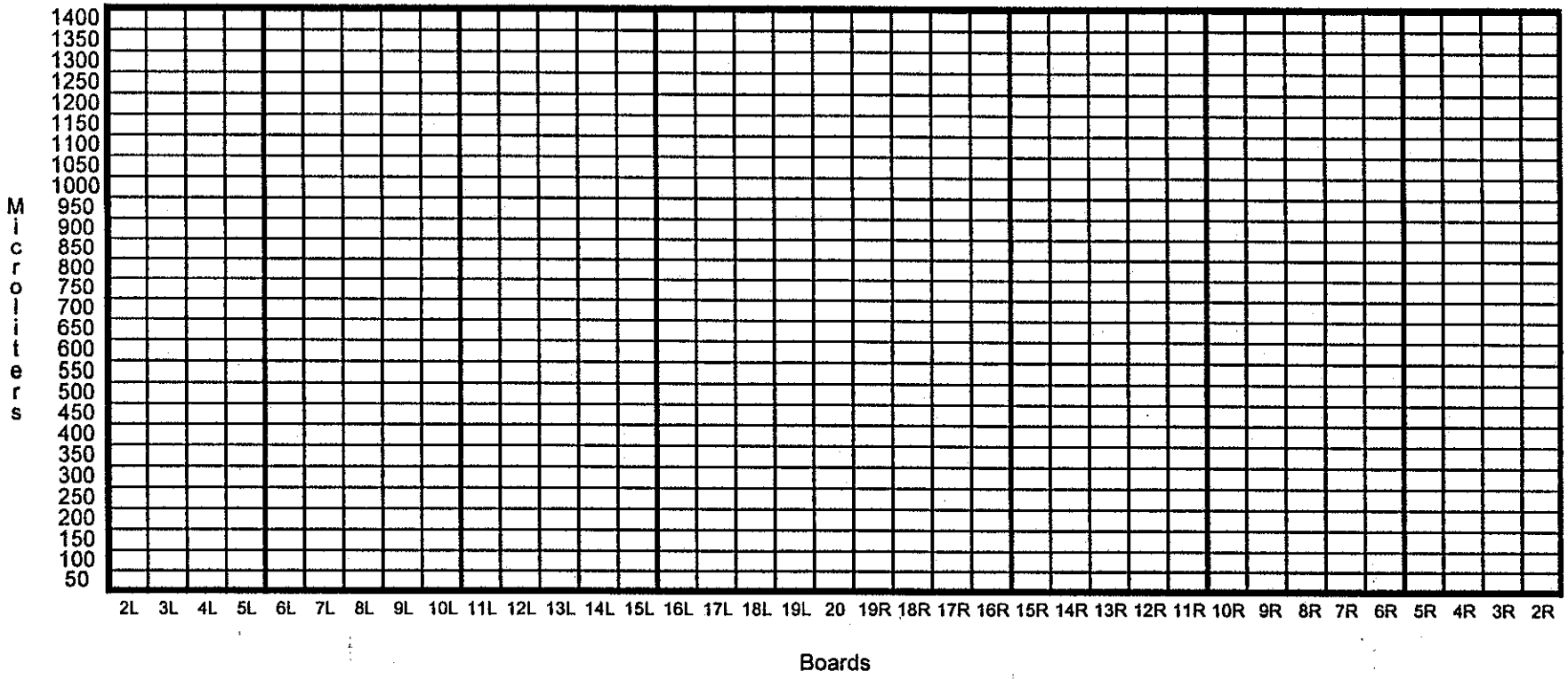


FWD Boards: 326 REV Boards: 87 Total Boards Crossed: 413

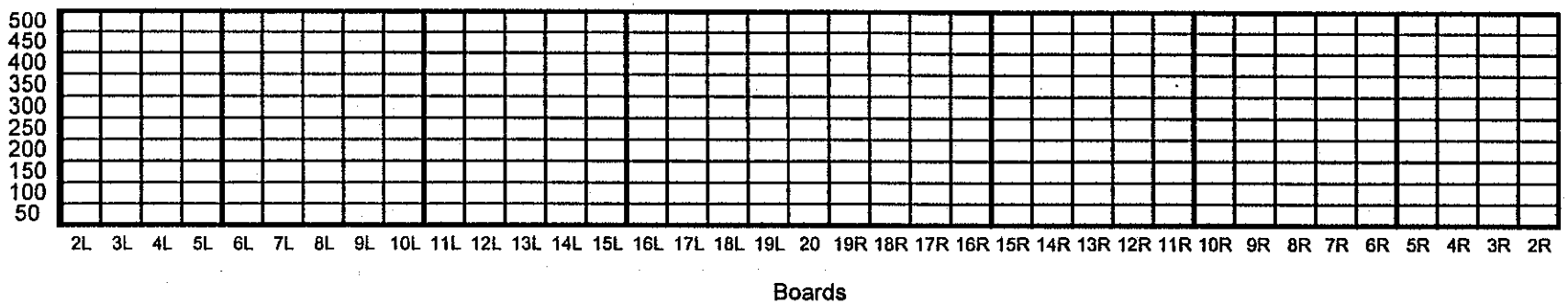
PHO' 'X-S
MICROLITER GRAPH

FORWARD OIL PROGRAM# _____

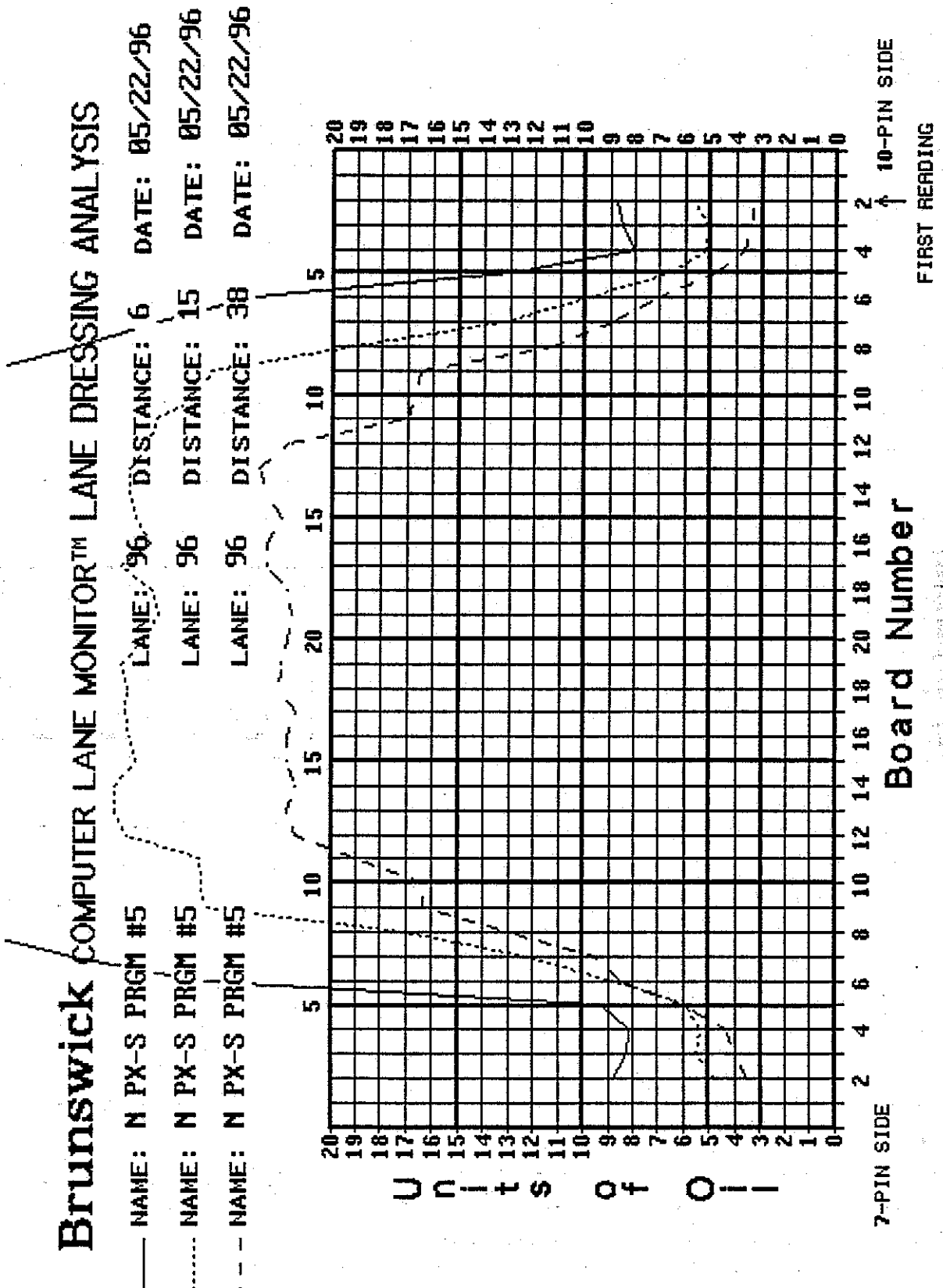
Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)



NOTE: This lane graph is only a representation of the pattern that will be applied by the Phoenix-S. Due to many variances, this graph might not match your machine. Several factors can contribute to this, such as the brand of oil, UV content of the oil, the condition of the reader, the calibration strips, and even the type of tape used to take-up the oil. Keep this in mind when reading tapes...the *Phoenix-S* is more accurate than the existing equipment used to measure its output.

Volume Per Board: 50 µ

Phoenix-S Program # 5
Program Record Worksheet

Oil Travel Dist: 40 ft

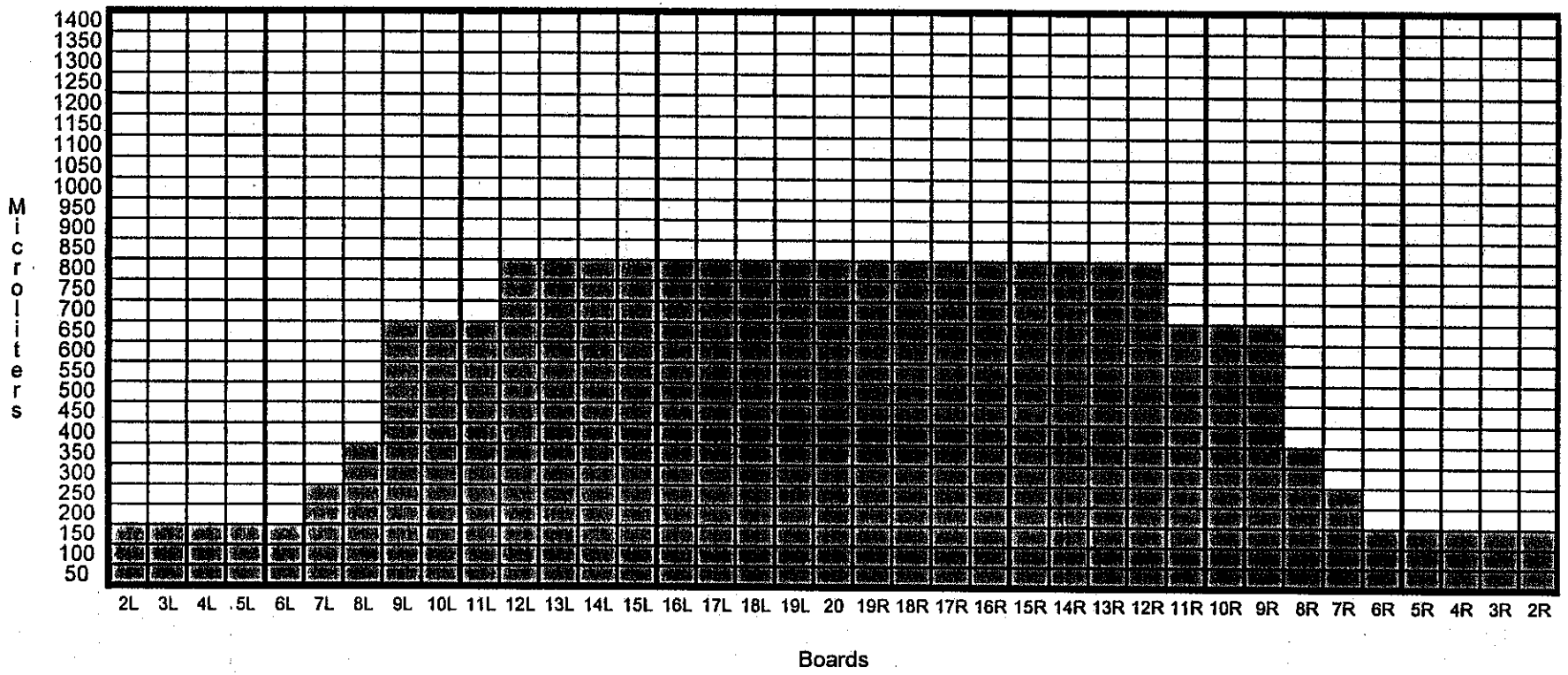
Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F	2	2	3	14	0-5 ft	37	111	
02F	7	7	2	18	5-10 ft	27	54	
03F	8	8	2	18	10-15 ft	25	50	
04F	9	9	6	18	15-30 ft	23	138	
05F	12	12	3	18	30-37 ft	17	51	
06F	##	##	0	10	37-40 ft	0	0	
07F								
08F								
09F								
10F		*These screens are all available, but do not appear in the machine when the last screen used shows the same distance as the oil travel distance*						
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # boards crossed on Fwd				404	20.2 milliliters
01R	##	##	0	30	40-14 ft	0	0	
02R	6	6	4	18	14-4 ft	29	116	
03R	##	##	0	14	4-0 ft	0	0	
04R								
05R								
06R								
07R								
08R		*These screens are all available, but do not appear in the machine when the last screen used shows 0 feet.*						
09R								
10R								
11R		*When the # of loads = 0, it does not matter what board numbers are in the load screens. This is a buff only screen.*						
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on Rev				116	5.8
			Total # Boards Fwd and Rev				520	26.0

Total Oil Volume = Total Boards Crossed x Volume/Board

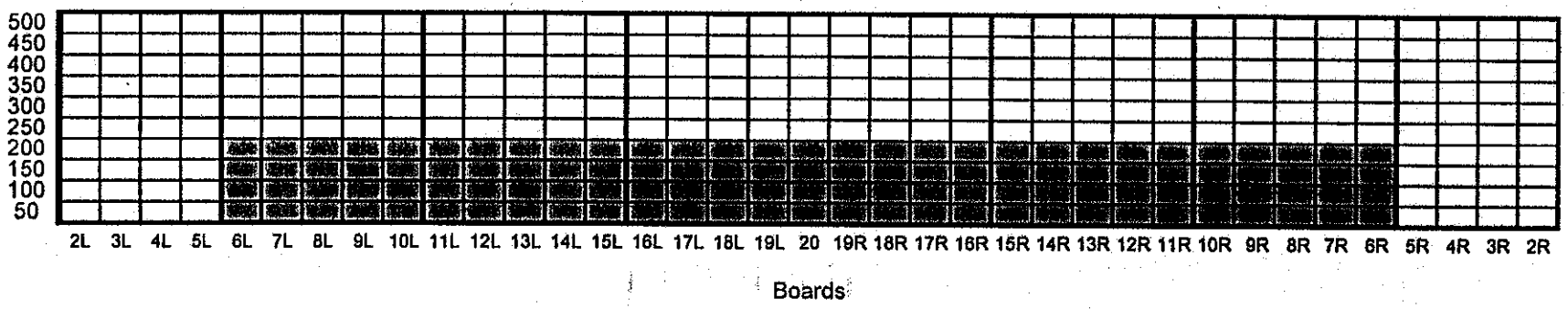
PHOENIX-S
MICROLITER GRAPH
SAMPLE

FORWARD OIL PROGRAM# 5

Pattern Distance: 40 ft. Pump Calibration: 50 Microliters Total Volume Output: 26.0 Milliliters



REVERSE OIL Starting Distance: 14 ft.

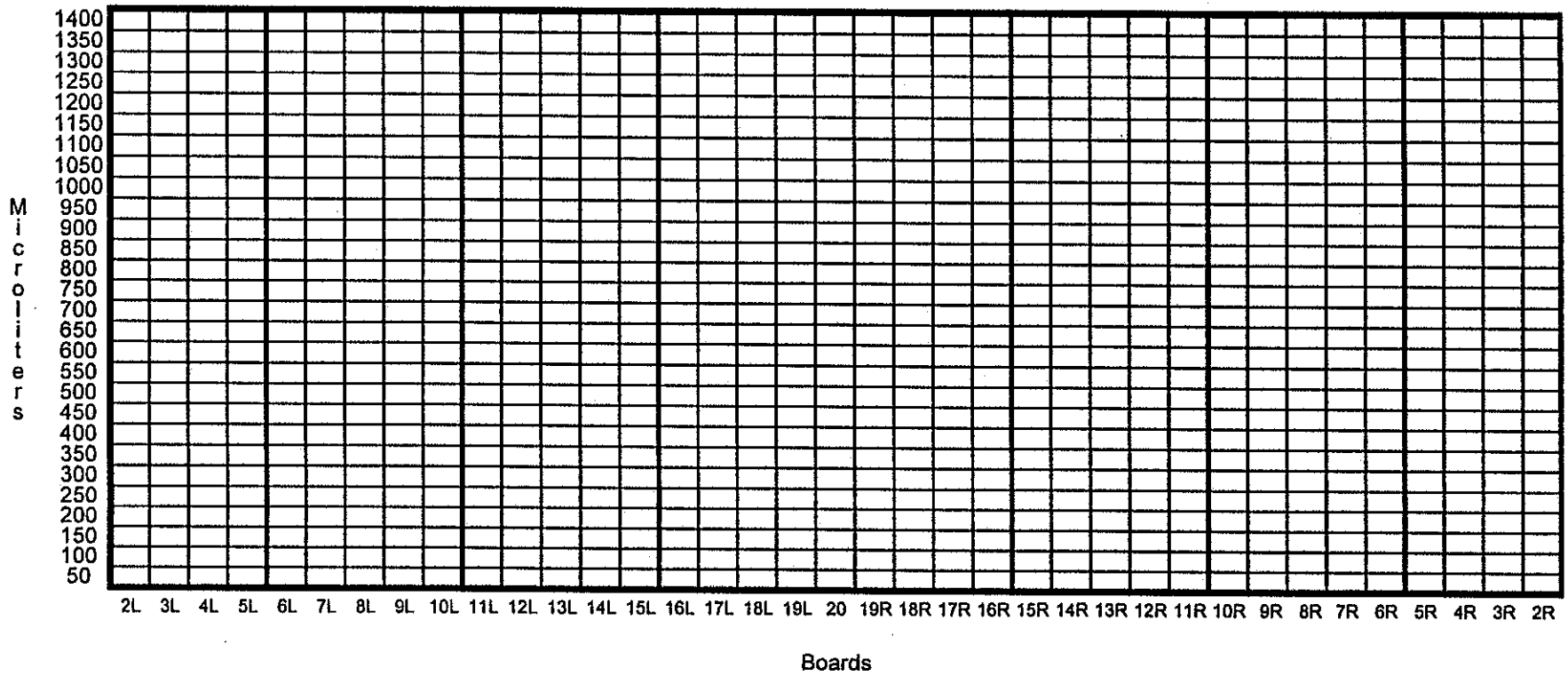


FWD Boards: 404 REV Boards: 116 Total Boards Crossed: 520

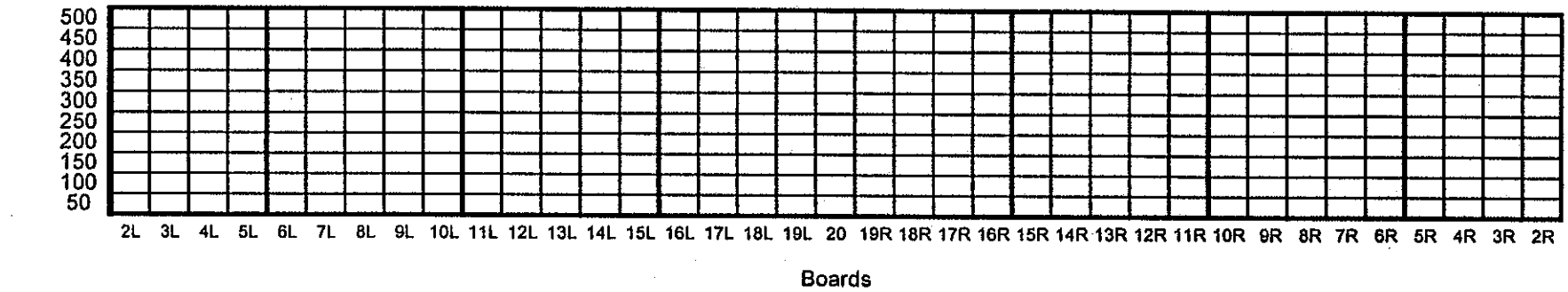
PHC IX-S
MICROLITER GRAPH

FORWARD OIL PROGRAM# _____

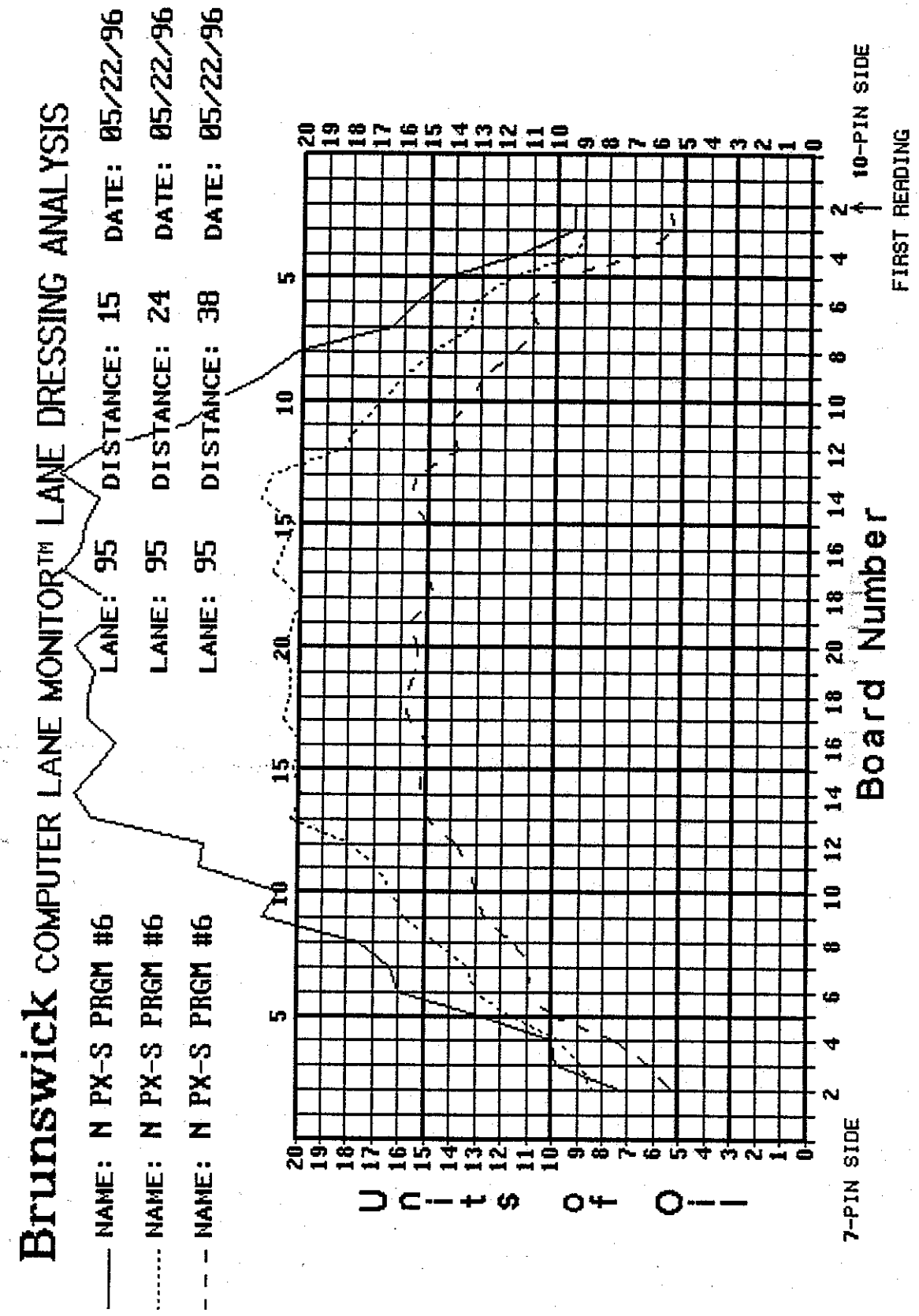
Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)



NOTE: This lane graph is only a representation of the pattern that will be applied by the Phoenix-S. Due to many variances, this graph might not match your machine. Several factors can contribute to this, such as the brand of oil, UV content of the oil, the condition of the reader, the calibration strips, and even the type of tape used to take-up the oil. Keep this in mind when reading tapes...the *Phoenix-S* is more accurate than the existing equipment used to measure its output.

Volume Per Board: 50 µ

Phoenix-S Program # 6
Program Record Worksheet

Oil Travel Dist: 40 ft

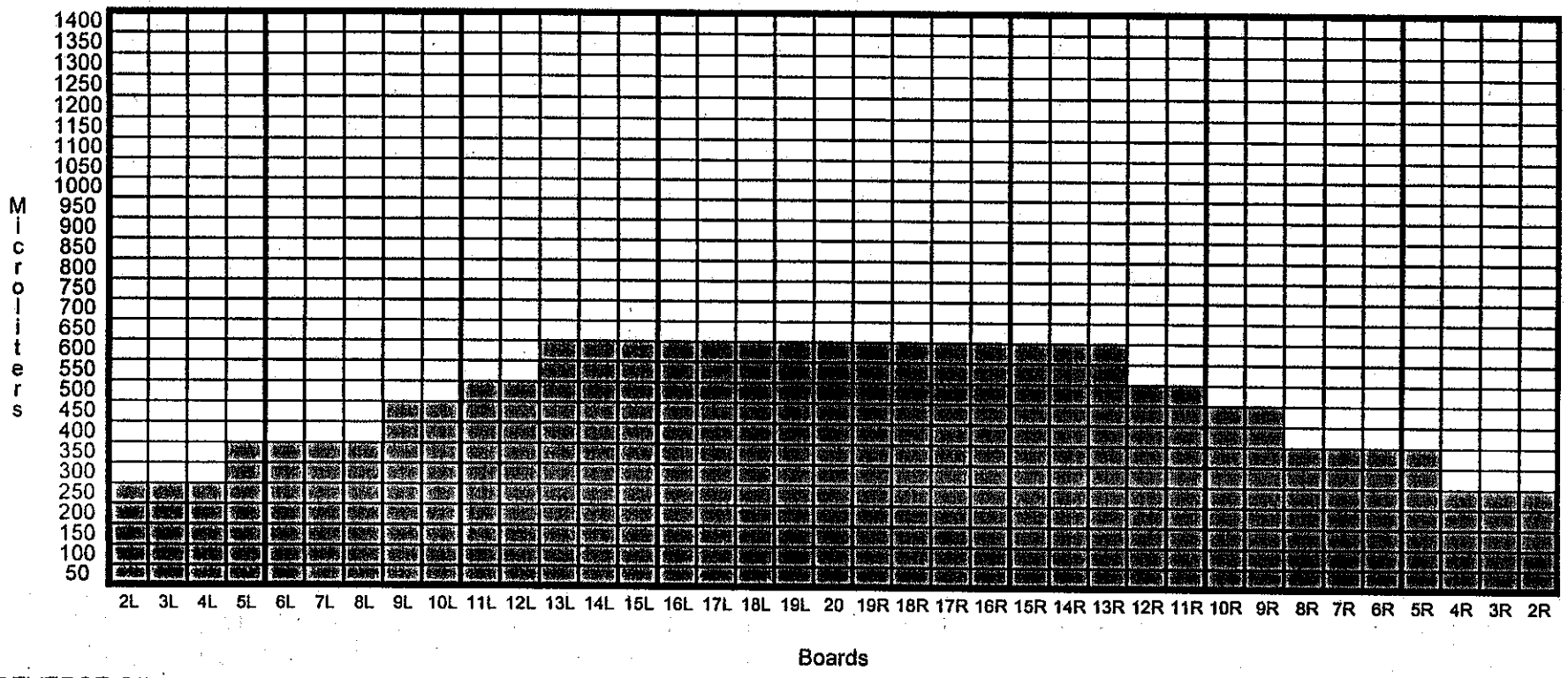
Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F	2	2	4	10	0-5 ft	37	148	
02F	5	5	2	14	5-8 ft	31	62	
03F	9	9	2	14	8-11 ft	23	46	
04F	11	11	1	14	11-12 ft	19	19	
05F	13	13	2	14	12-15 ft	15	30	
06F	2	2	1	14	15-16 ft	37	37	
07F	##	##	0	18	16-40 ft	0	0	
08F								
09F								
10F		*These screens are all available, but do not appear in the machine when the last screen used shows the same distance as the oil travel distance*						
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # boards crossed on Fwd				342	17.1 milliliters
01R	##	##	0	26	40-14 ft	0	0	
02R	12	12	1	18	14-12 ft	17	17	
03R	8	8	2	14	12-9 ft	25	50	
04R	6	6	3	14	9-4 ft	29	87	
05R	##	##	0	14	4-0 ft	0	0	
06R								
07R								
08R		*These screens are all available, but do not appear in the machine when the last screen used shows 0 feet.*						
09R								
10R								
11R		*When the # of loads = 0, it does not matter what board numbers are in the load screens. This is a buff only screen.*						
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on Rev				154	7.7
			Total # Boards Fwd and Rev				**496**	24.8

Total Oil Volume = Total Boards Crossed x Volume/Board

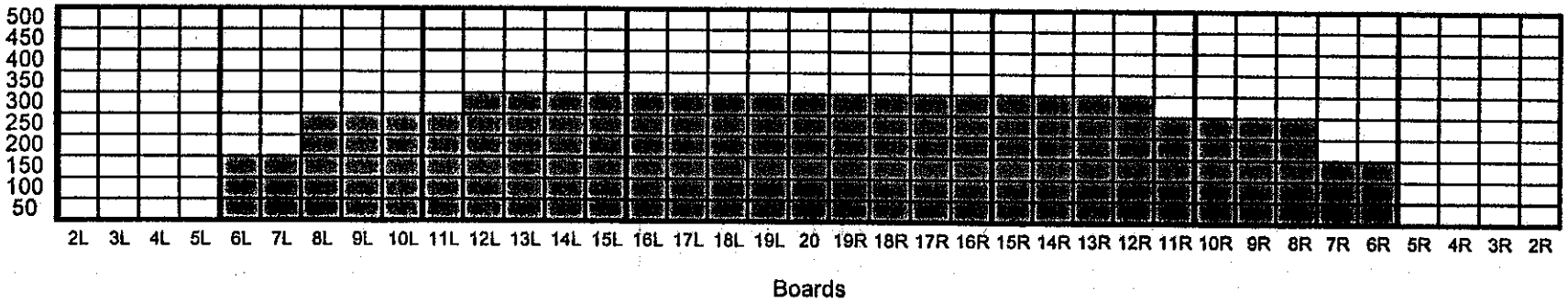
PHOENIX-S
MICROLITER GRAPH
SAMPLE

FORWARD OIL PROGRAM# 6

Pattern Distance: 40 ft. Pump Calibration: 50 Microliters Total Volume Output: 24.8 Milliliters



REVERSE OIL Starting Distance: 14 ft.

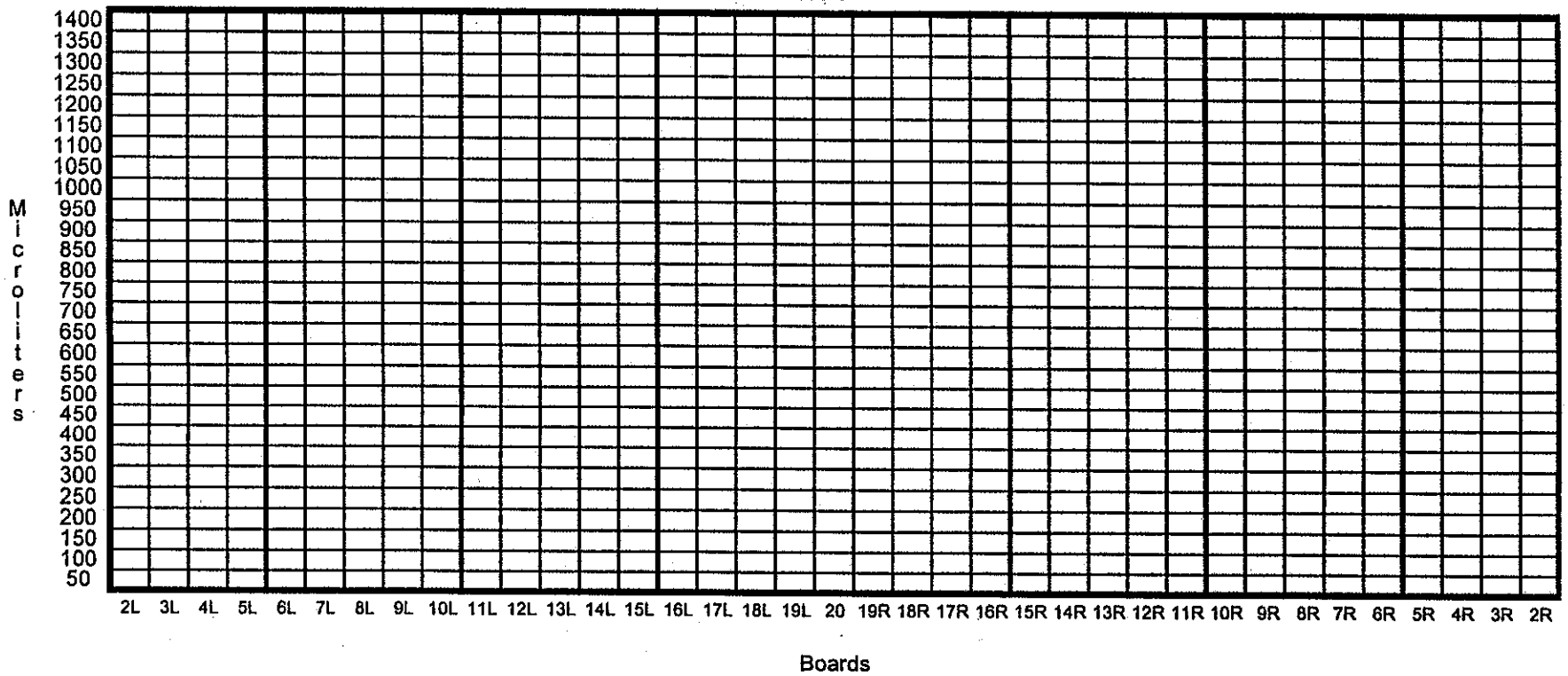


FWD Boards: 342 REV Boards: 154 Total Boards Crossed: 496

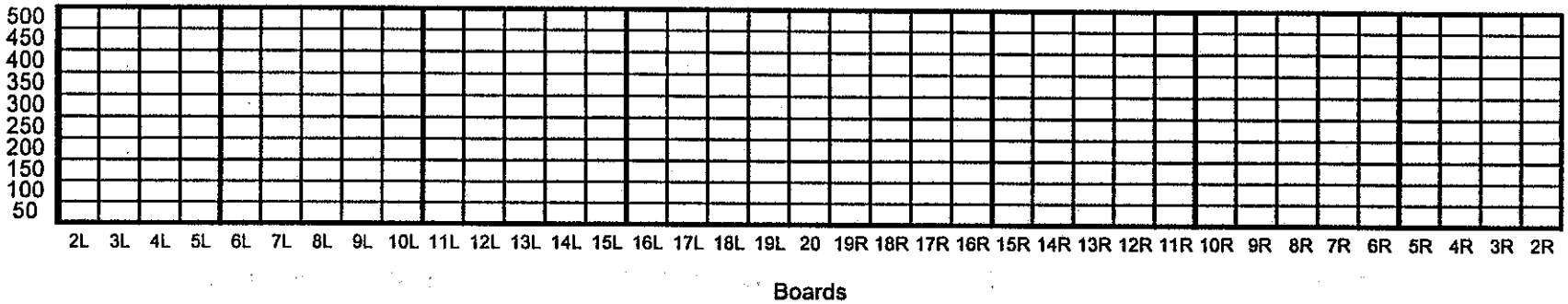
PHC IX-S
MICROLITER GRAPH

FORWARD OIL PROGRAM# _____

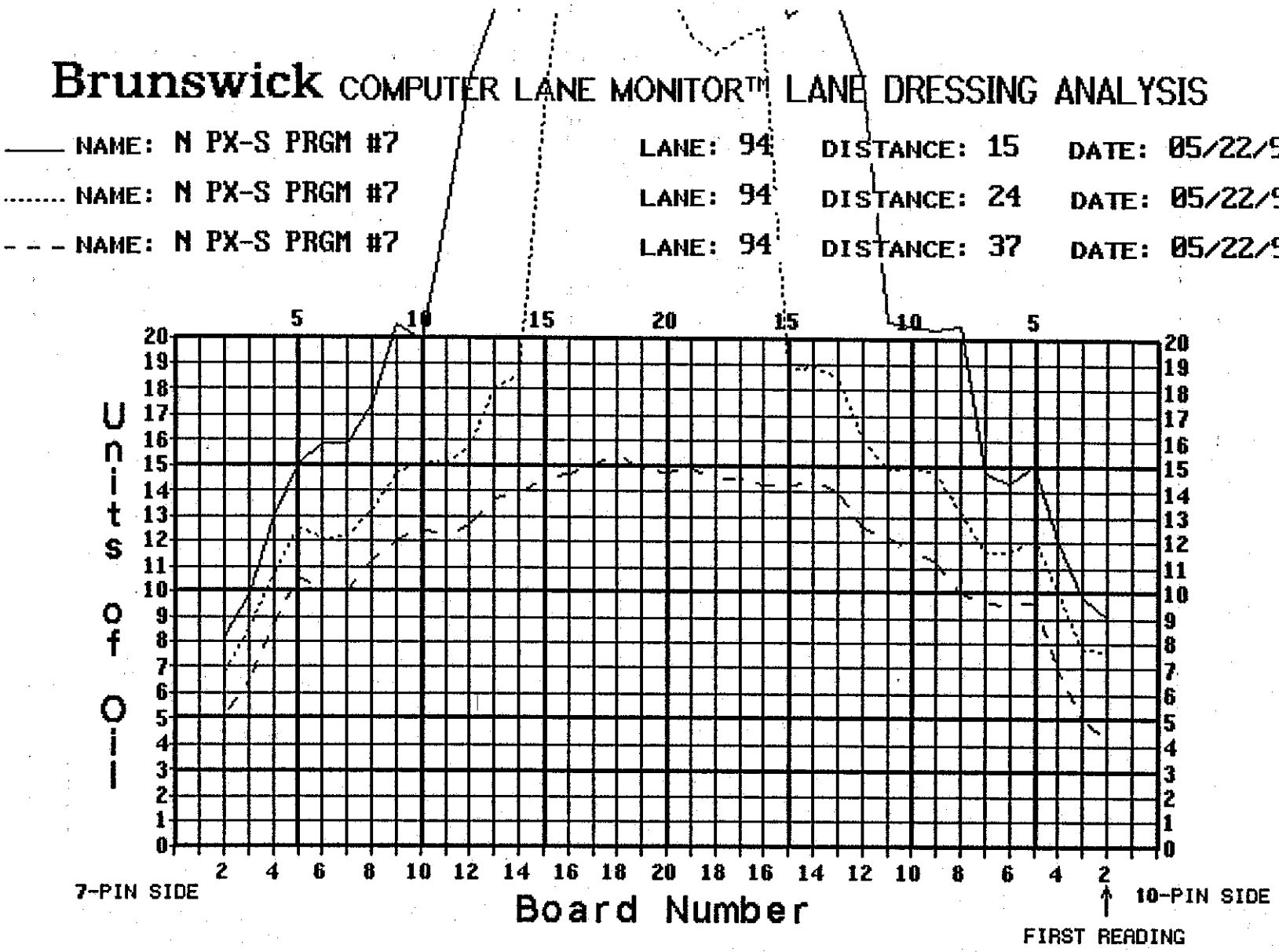
Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)



NOTE: This lane graph is only a representation of the pattern that will be applied by the Phoenix-S. Due to many variances, this graph might not match your machine. Several factors can contribute to this, such as the brand of oil, UV content of the oil, the condition of the reader, the calibration strips, and even the type of tape used to take-up the oil. Keep this in mind when reading tapes...the *Phoenix-S* is more accurate than the existing equipment used to measure its output.

Volume Per Board: 50 μ

Phoenix-S Program # 7
Program Record Worksheet

Oil Travel Dist: 39 ft

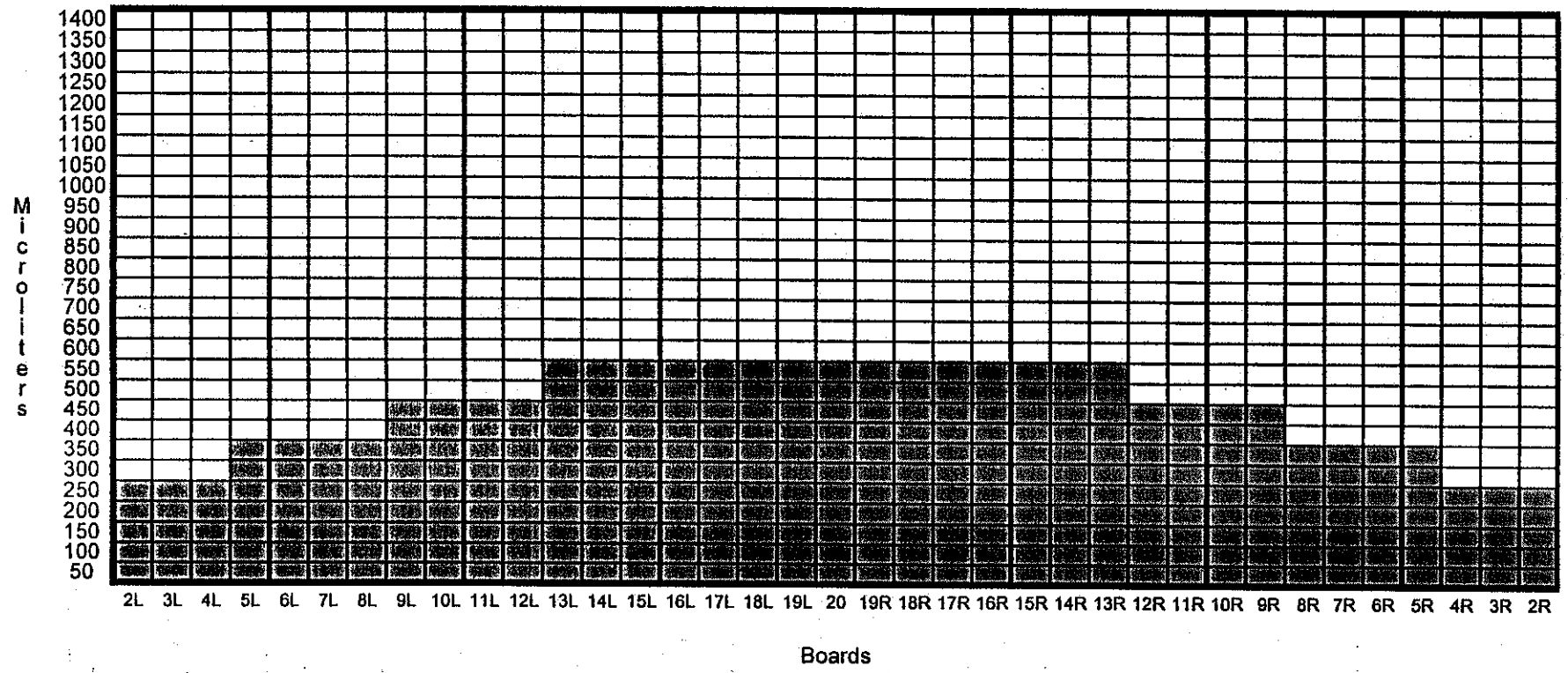
Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F	2	2	5	10	0-7 ft	37	185	
02F	5	5	2	14	7-10 ft	31	62	
03F	9	9	2	14	10-13 ft	23	46	
04F	13	13	2	18	13-18 ft	15	30	
05F	##	##	0	26	32-39 ft	0	0	
06F								
07F								
08F								
09F								
10F		*These screens are all available, but do not appear in the machine when the last screen used shows the same distance as the oil travel distance*						
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # Boards Crossed on FWD				323	16.15 milliliters
01R	##	##	0	30	39-30 ft	0	0	
02R	16	16	4	18	30-20 ft	9	36	
03R	12	12	2	18	20-15 ft	17	34	
04R	8	8	2	18	15-10 ft	25	50	
05R	4	4	3	14	10-5 ft	33	99	
06R	##	##	0	14	5-0 ft	0	0	
07R								
08R		*These screens are all available, but do not appear in the machine when the last screen used shows 0 feet.*						
09R								
10R								
11R		*When the # of loads = 0, it does not matter what board numbers are in the load screens. This is a buff only screen.*						
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on REV				219	10.95
			Total # Boards FWD and REV				**542**	27.1

Total Oil Volume = Total Boards Crossed x Volume/Board

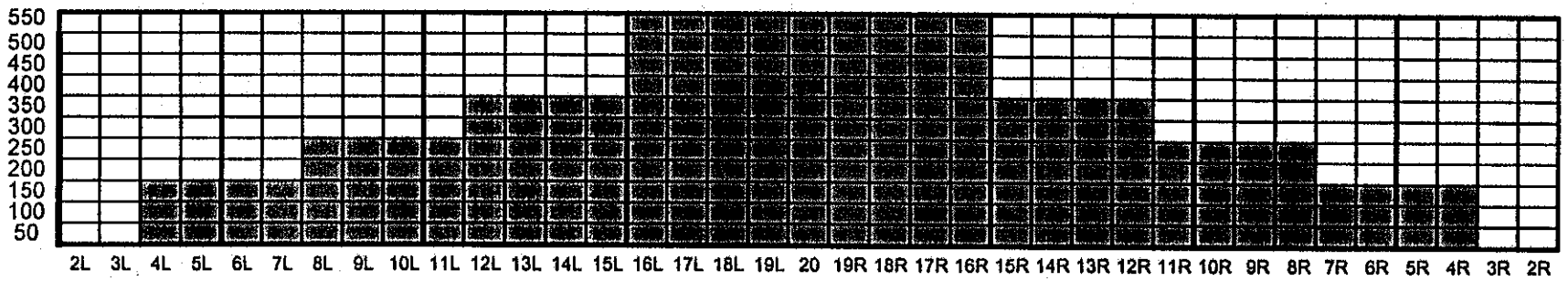
PHOENIX-S
MICROLITER GRAPH
SAMPLE

FORWARD OIL PROGRAM# 7

Pattern Distance: 39 ft. Pump Calibration: 50 Microliters Total Volume Output: 27.10 Milliliters



REVERSE OIL Starting Distance: 30 ft.

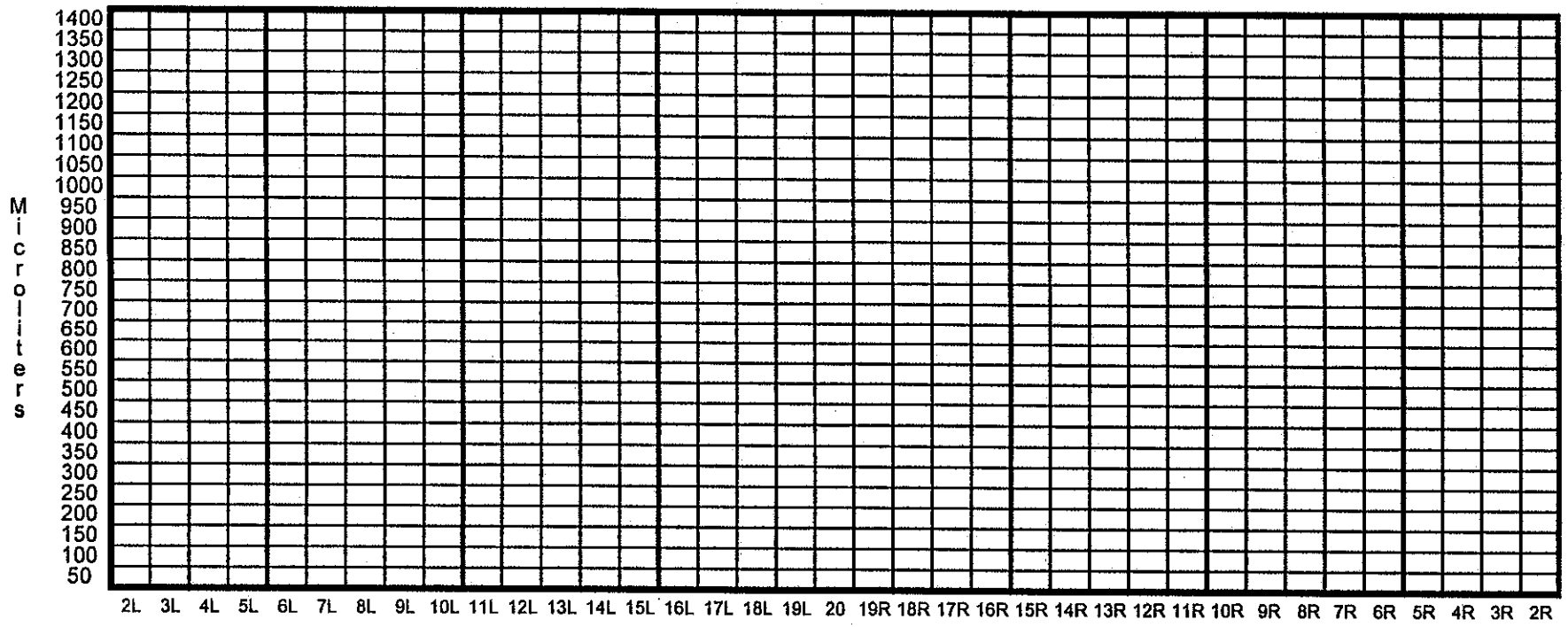


FWD Boards: 323 REV Boards: 219 Total Boards Crossed: 542

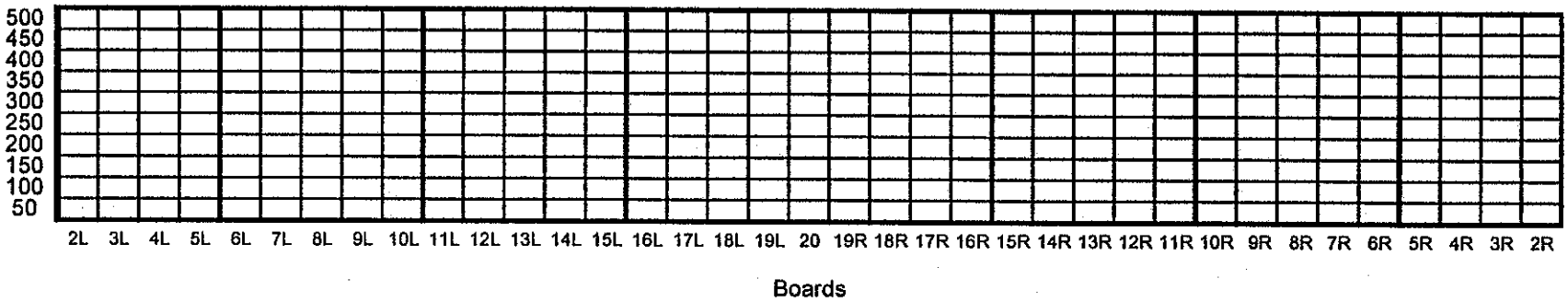
PHO IX-S
MICROLITER GRAPH

FORWARD OIL PROGRAM# _____

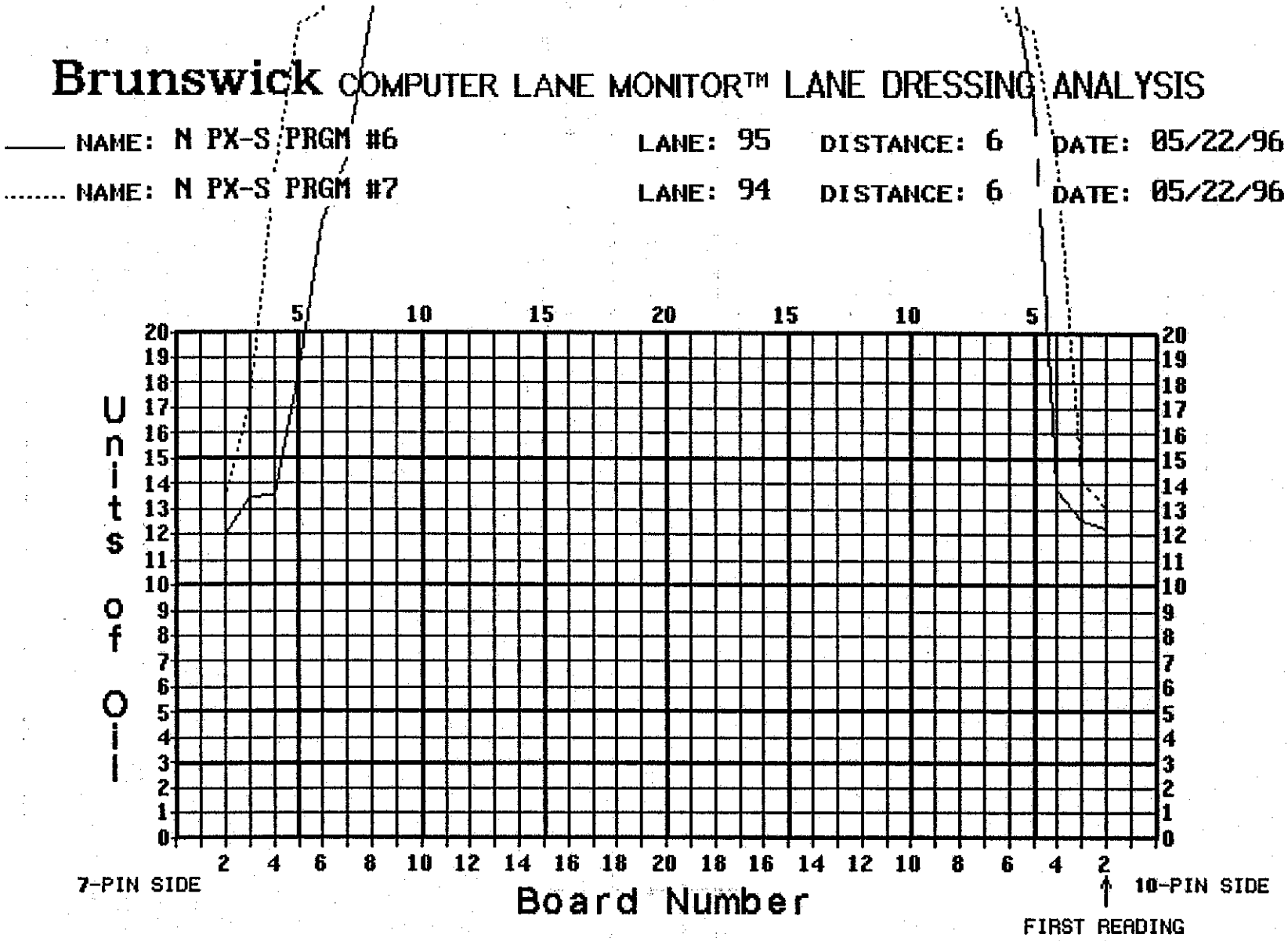
Pattern Distance:_____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)



NOTE: This lane graph is only a representation of the pattern that will be applied by the Phoenix-S. Due to many variances, this graph might not match your machine. Several factors can contribute to this, such as the brand of oil, UV content of the oil, the condition of the reader, the calibration strips, and even the type of tape used to take-up the oil. Keep this in mind when reading tapes...the *Phoenix-S* is more accurate than the existing equipment used to measure its output.

Volume Per Board: μ

Phoenix-S Program # ___
Program Record Worksheet

Oil Travel Dist: ft

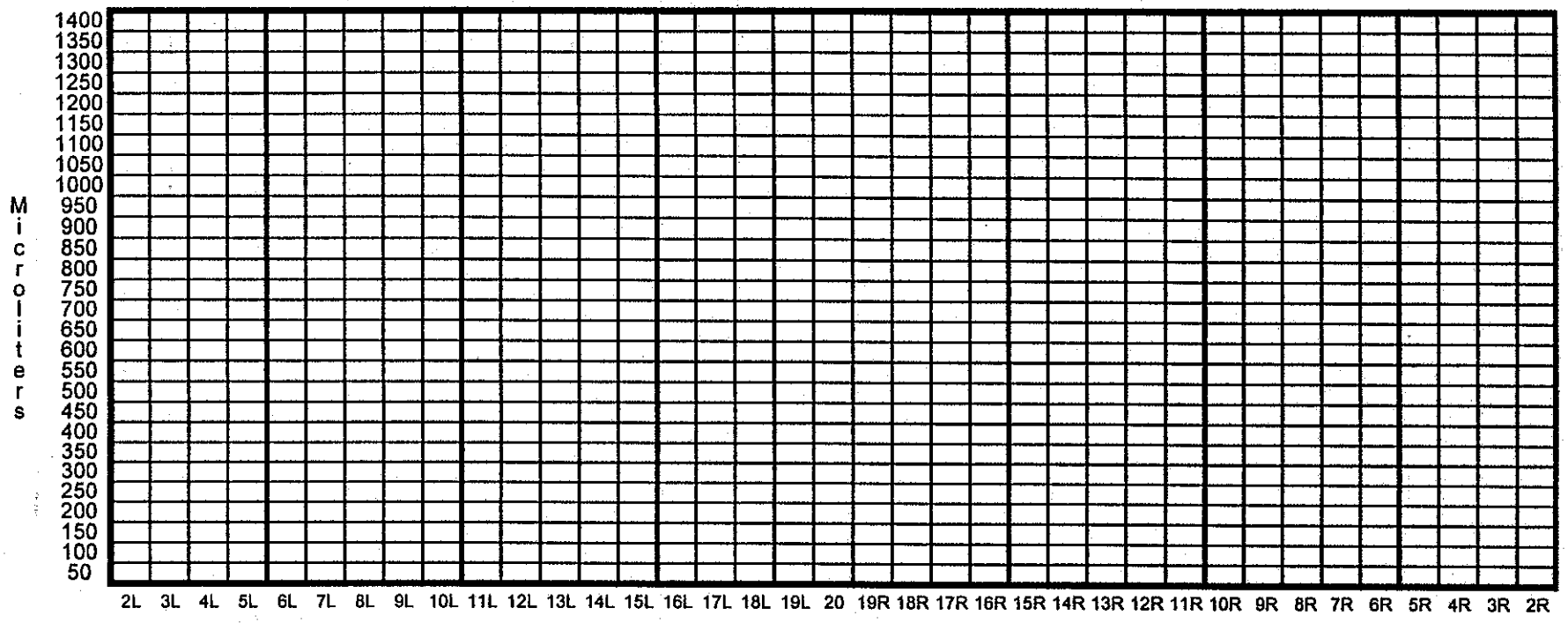
Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F								
02F								
03F								
04F								
05F								
06F								
07F								
08F								
09F								
10F								
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # Boards Crossed on FWD					
01R	##	##	0			0	0	
02R								
03R								
04R								
05R								
06R								
07R								
08R								
09R								
10R								
11R								
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on REV					
			Total # Boards FWD and REV					

Total Oil Volume = Total Boards Crossed x Volume/Board

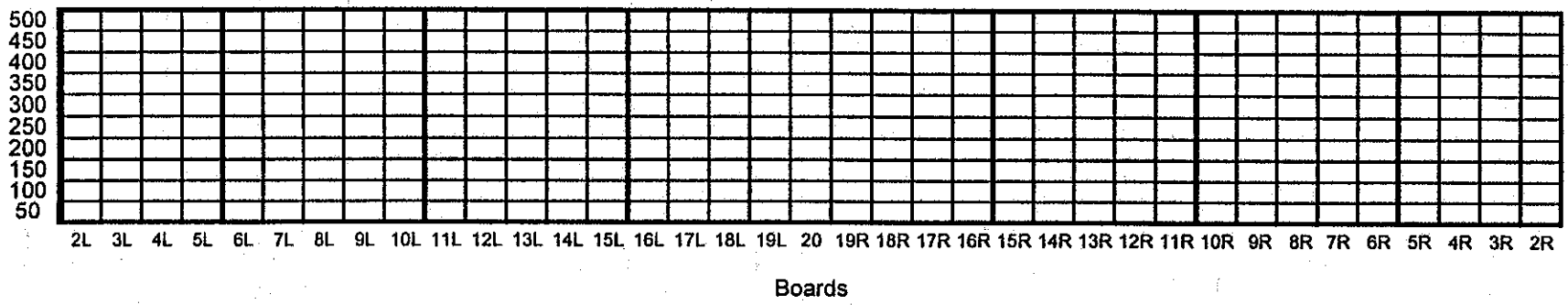
PHOENIX-S
MICROLITER GRAPH

FORWARD OIL PROGRAM# _____

Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)

Volume Per Board: μ

Phoenix-S Program # ___
Program Record Worksheet

Oil Travel Dist: ft

Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F								
02F								
03F								
04F								
05F								
06F								
07F								
08F								
09F								
10F								
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # Boards Crossed on FWD					
01R	##	##	0			0	0	
02R								
03R								
04R								
05R								
06R								
07R								
08R								
09R								
10R								
11R								
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on REV					
			Total # Boards FWD and REV					

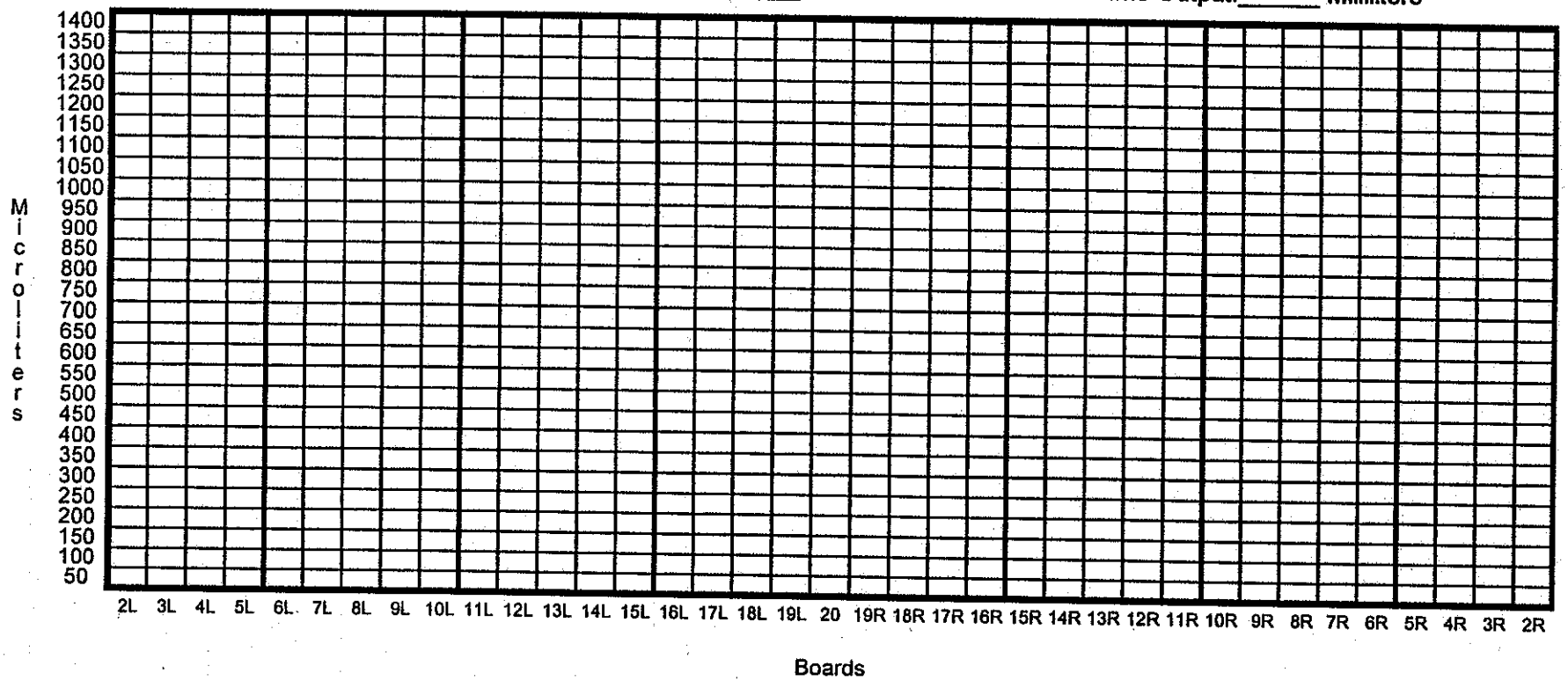
Total Oil Volume = Total Boards Crossed x Volume/Board

PHOENIX-S
MICROLITER GRAPH

FORWARD OIL

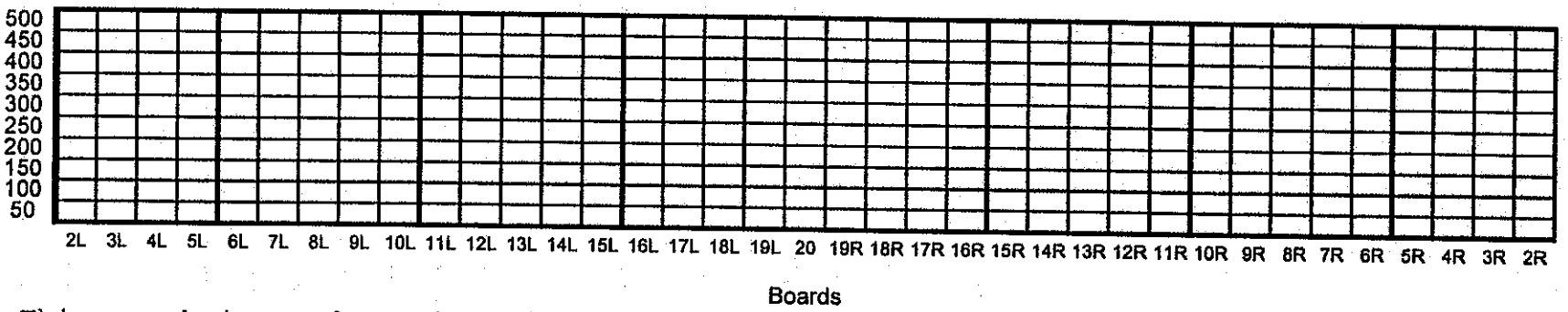
PROGRAM# _____

Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL

Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur on the lane.)

Volume Per Board: μ

Phoenix-S Program # ___
Program Record Worksheet

Oil Travel Dist: ft

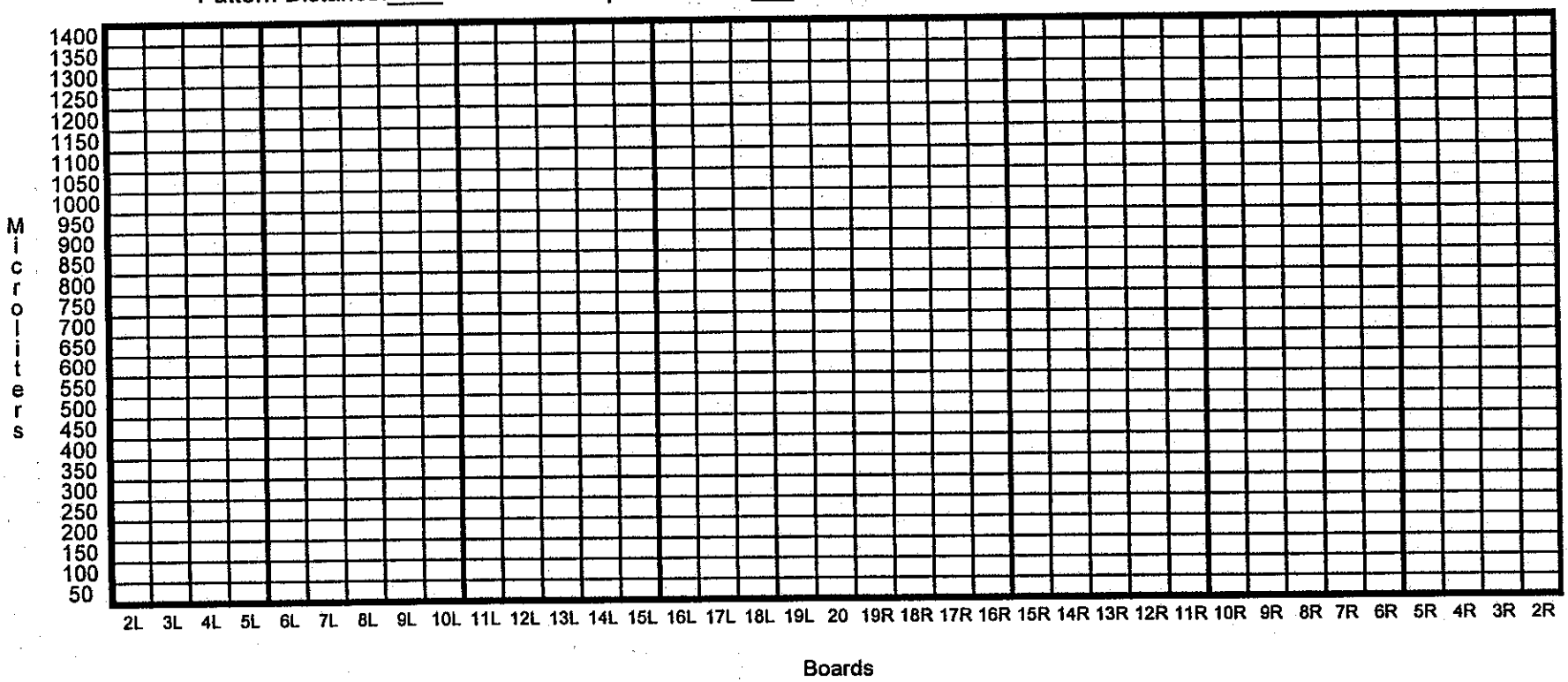
Screen #	Left End of Stream	Right End of Stream	# Loads or Streams	IPS Speed	Distance on Lane for Loads	# Boards Crossed	Total boards	Total Volume of Oil
01F								
02F								
03F								
04F								
05F								
06F								
07F								
08F								
09F								
10F								
11F								
12F								
13F								
14F								
15F	##	##	0			0	0	
			Total # Boards Crossed on FWD					
01R	##	##	0			0	0	
02R								
03R								
04R								
05R								
06R								
07R								
08R								
09R								
10R								
11R								
12R								
13R								
14R								
15R	##	##	0			0	0	
			Total # Boards Crossed on REV					
			Total # Boards FWD and REV					

Total Oil Volume = Total Boards Crossed x Volume/Board

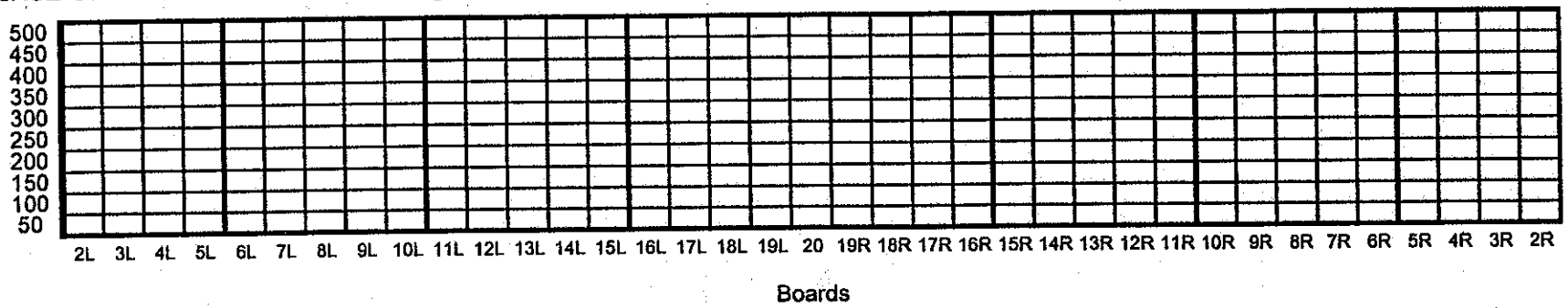
PHOENIX-S
MICROLITER GRAPH

FORWARD OIL PROGRAM# _____

Pattern Distance:____ ft. Pump Calibration:___ Microliters Total Volume Output:_____ Milliliters



REVERSE OIL Starting Distance: _____ft.



This graph is used to show the amount of oil per board (in microliters), spread the length of the pattern. Your PHOENIX-S will have the same volume output per lane (within 1%). Using a highlighter or magic marker, color in the appropriate boxes for the Forward and Reverse Oil. (Graph does not show the order of loads, or the footage that they occur or he lane.)

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 SQUEEGEES CAN AFFECT THE CLEANING QUALITY AND EFFICIENCY!!

3. WIPE ALL SPILLS IMMEDIATELY!! Most cleaners corrode the aluminum.

WEEKLY:

1. Clean entire machine with dry towel.

2. Lightly wipe entire machine down with lane conditioner. This will protect the machine, like wax does for a car.

3. 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.

4. Keep duster and failsafe switches clean. Avoid spilling cleaner on these or any switches. This may cause the machine to malfunction.

5. Wipe the LDS wheels, drive wheels, and casters.

THE 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!!

Besides lane conditioner, also use an aluminum cleaner. This will remove deep down dirt, overspray stains, and mild stains.

If you really care about your valuable investment, and about the consistency of your lanes, you will never regret keeping the *PHOENIX-S* clean.

20 MILE MAINTENANCE INSPECTION

Complete every 20 miles of operation

(Use special 100 and 200 mile checklist at appropriate times)

NOTICE TO *PHOENIX-S* OPERATORS: When the PHOENIX-S 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 buffer brush with air and check adjustment								
Flush recovery tank (use hot water)								
Clean filters and spray tips								
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 *PHOENIX-S* OPERATORS: When the PHOENIX-S 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 cleaner supply lines and tee fittings
		Inspect vacuum hoses for breaks
		Inspect all oil lines and fittings. Check line pressure (5-8 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 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 *PHOENIX-S* OPERATORS: When the PHOENIX-S 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 transfer roller mounting arms for tightness
		Move oil head by hand, checking for free travel along the bar
		Check oil head for excessive play or wobble, adjust if needed
		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
		LDS adjustment bolts and jam nuts (2)
		Bottom transfer roller adjustment bolts and jam nuts (2)
		All frame assembly bolts
		Operator's Initials
		Date
		Supervisor's Initials
		Actual mileage

INSTRUCTIONS TO CLEAN WATER SPRAY PUMP

If water pump output is low, the valves inside the pump may be clogged. First clean or replace the Supply Tank Filter and Spray Jet Check Filters. If pressure continues to be a problem, follow these instructions to disassemble the pump and clean the valves. To prevent cleaner from leaking inside the motor, do not remove the Diaphragm Assembly. (See the exploded view of the pump on page 7.)

DISASSEMBLY:

1. Disconnect power and remove hoses from the pump. Use a rag to catch any cleaner before it spills on the machine.

2. Get the pump out of machine by removing the (4) #10-24 fasteners.

3. With the pump on a work bench remove the Pump Head assembly (refer to back of sheet for exploded view of pump). The Pump Head is held on by (3) long and (3) short #10-32 fasteners. (Note: There is no need to remove the (3) small pressure switch screws.)

4. Remove the Valve Assembly. Make sure the O-ring is in assembly.

5. Rinse the Valve Assembly with warm soapy water, concentrating on the areas where the cleaner passes through the grills. Do not pry on the black rubber pieces, as damage to these will ruin the valves.

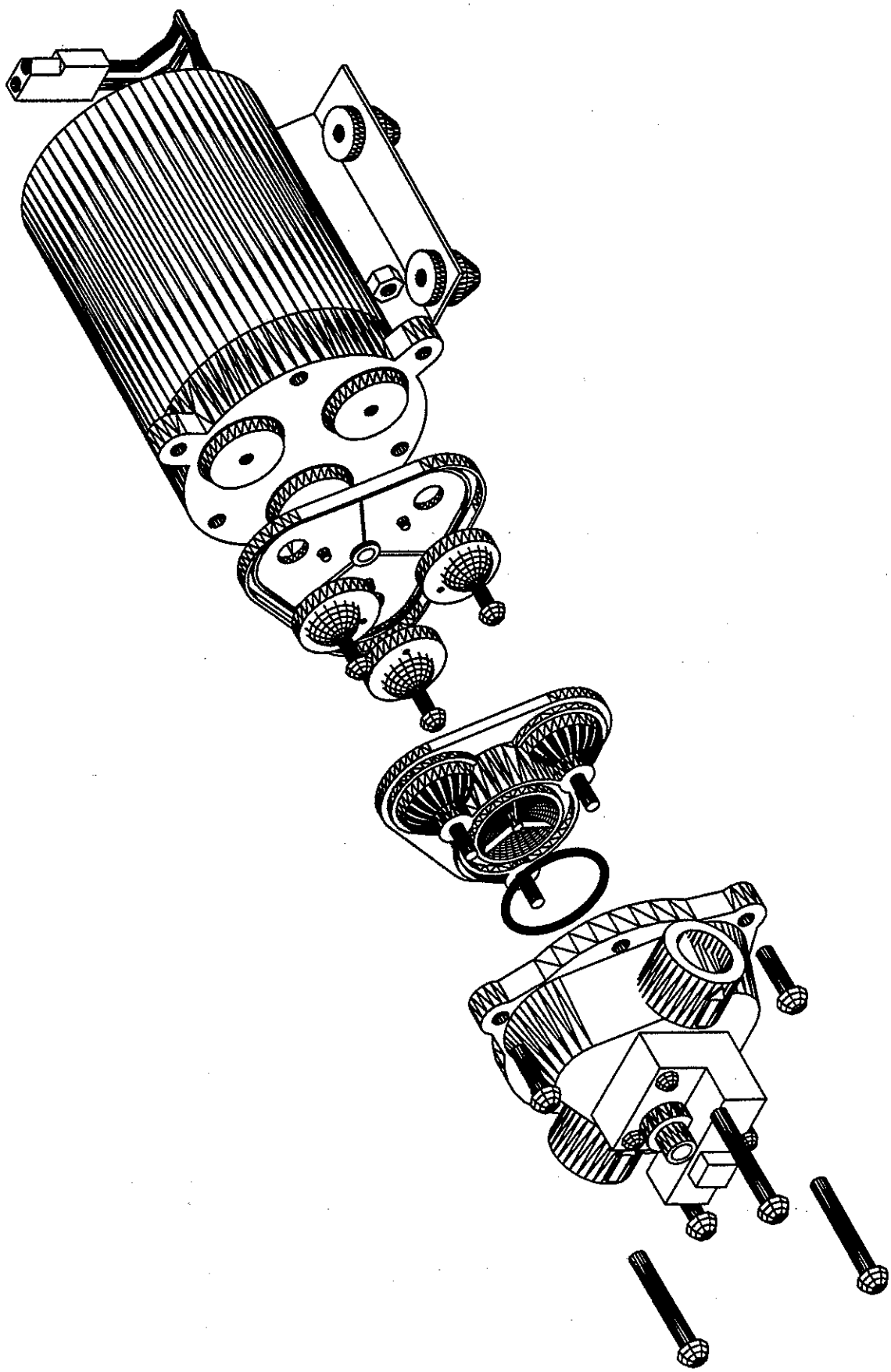
ASSEMBLY:

1. Place the Valve Assembly (with the O-ring) on the Diaphragm. Do NOT force assembly together. It should snap together easily in order to seal properly.

2. Place the Pump Head over the Valve & Diaphragm Assembly. Insert (3) long #10-32 screws until each head touches the Pump Head. Then tighten each screw securely.

3. Tighten the (3) small outer screws and nuts.

4. Replace pump in machine. Replace hoses and test for leaks.



PROCEDURE FOR CLEANING OIL CONTROL VALVES

The following steps outline the procedure for disassembling the metering valves on the Phoenix-S. Be careful when removing the oil lines from the fittings since they will leak. A #8 screw can be used as a plug in each 1/4" line to block it off.

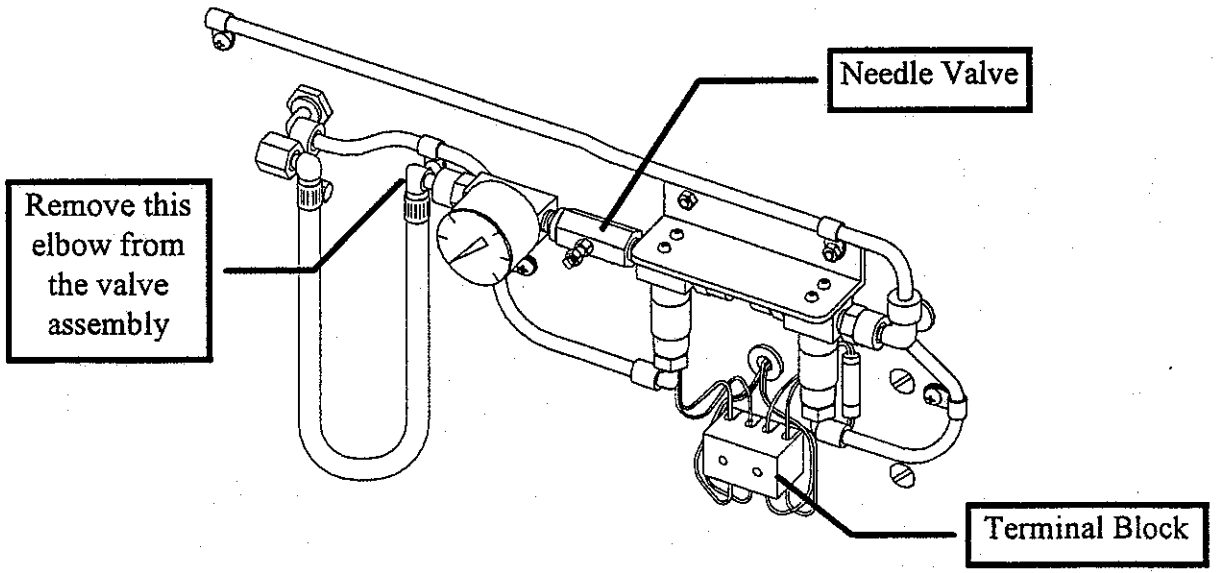
Keep the oil lines and the valves free from dirt and debris while they are disassembled. Clean up any conditioner spills immediately, the sensors and electronic components do not like oil baths.

1. Disconnect power and stand the machine in the upright or transport position.

2. Remove the wires for each valve from the small gray terminal block beneath the floor. The 24 VDC valve has a white and a yellow wire. The 115 VAC valve has a white and a blue wire.

3. Remove the cover for the oil pump and motor with a #2 Phillips screwdriver. With the 2 screws removed the cover will drop straight down. Pull cover away from the floor, then inspect and clean this area.

4. Use a long #2 Phillips screwdriver to remove the two screws holding the valve mounting angle to the floor. An 11/32" wrench will hold the nuts beneath the floor.



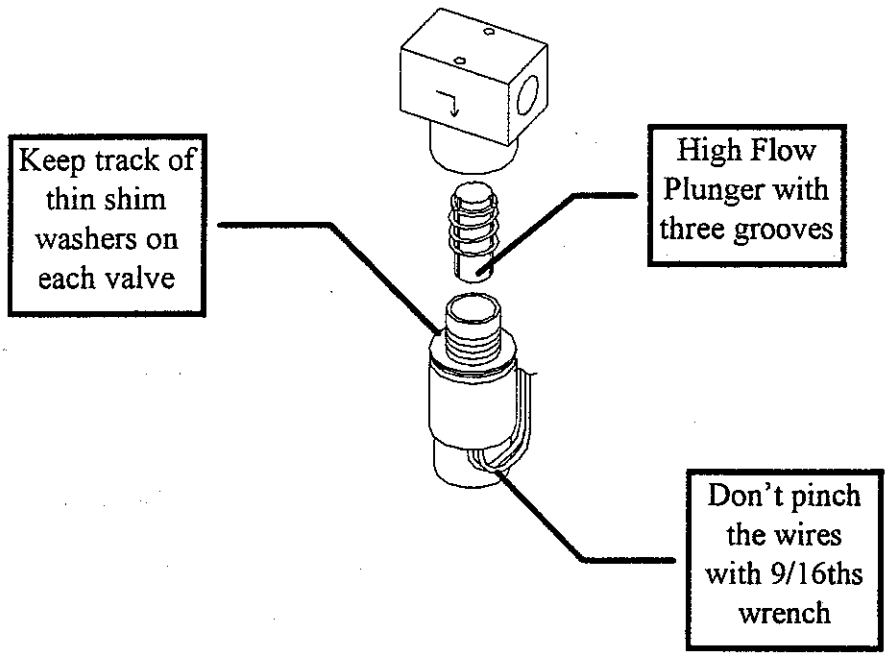
5. Pull the assembly off the floor and remove the elbow from the pressure gauge fitting (see figure on previous page). There is enough slack in the black hose to pull the assembly to the right and get your fingers on the fitting. PUSH IN on the outer collet to release the elbow. Plug the open end of the elbow to prevent dirt from entering the line and stop the oil from leaking.

6. Remove the lines from the bottom of both valves and the last remaining line on the right side of the assembly. Plug them up to prevent leaking and keep them clean.

7. The pressure gauge, needle valve, and valve manifold can remain together. Remove the valves from the mounting angle and disconnect the tubing that connects them together.

8. Work on only one valve at a time. Each valve is different and must be reassembled with the exact same parts. Do not interchange any components from either valve.

9. 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.



10. 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.

11. Inspect the pressure gauge, needle valve, and valve manifold under a bright light. Clean with canned air or alcohol. Do not lose the setting of the needle valve.

12. The bottom section contains a plunger and spring. Make sure the <u>three</u> grooves on the sides of the plunger are clean. This part should be cleaned with a cotton swab and alcohol to remove the debris.

13. 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 (941) 382-6588 if a replacement is needed.

14. Replace the valve body on the head of the first valve and repeat the cleaning procedure for the other valve.

15. Replace the valves on the mounting angle. Make sure the 24 VDC coil is on the LEFT side and the 115 VAC coil is on the RIGHT.

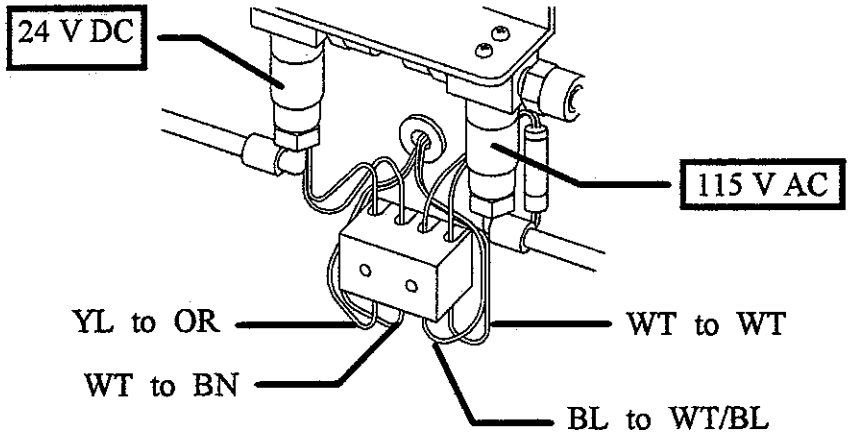
16. Plug each line back into the proper fitting and clean around all connections.

17. Replace the valve assembly on the machine.

18. Wire each valve into the terminal block. The wiring from left to right is:

    Yellow from 24 VDC valve connects to **Orange** from PC Output 100
    White from 24 VDC valve connects to **Brown** from Terminal Block 3

    Blue from 115 VAC valve connects to **White/Blue** from PC Output 105
    White from 115 VAC valve connects to **White** from Terminal Block 1



19. 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.

20. Place the machine in the Operating Position and run the *** PUMP OUTPUT VOLUME TEST**. Check the volume of conditioner output for a typical program and adjust the pump if necessary.

21. Replace the pump and motor cover. Make sure the bottom edge is positioned in the notch underneath the motor and pump mounting angle (touching to the floor). It will drag the lane if it is not installed properly.

PROCEDURE FOR CLEANING SENSORS

The following steps outline the procedure for cleaning the photoelectric sensors used for the drive speed tachometer, the lane distance counter, the oil head timing, and pump tachometer. If these sensors become contaminated with dirt and oil they will not function properly. With a little care they can be taken apart and cleaned.

1. Remove the protective cover for the sensor and check for proper sprocket alignment. Make sure the teeth of the sprocket cannot touch either side of the sensor.

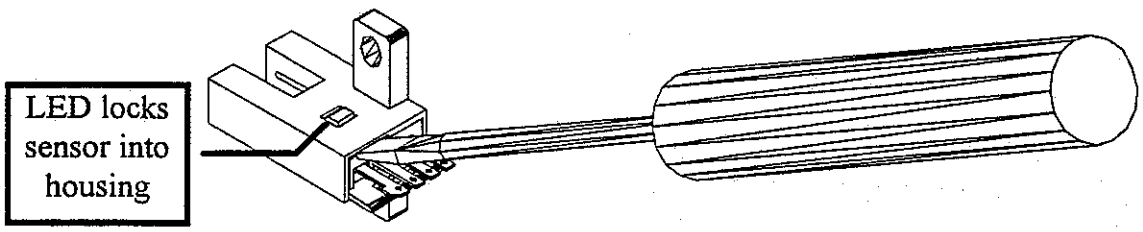
2. Apply power to the machine and check for proper operation before removing the sensor. When actuated a light will appear on the Input module at the designated number. There is also a light on the sensor that will appear if there is no obstruction blocking the pass-thru area.

3. If a problem is evident, remove power and unplug the sensor cable.

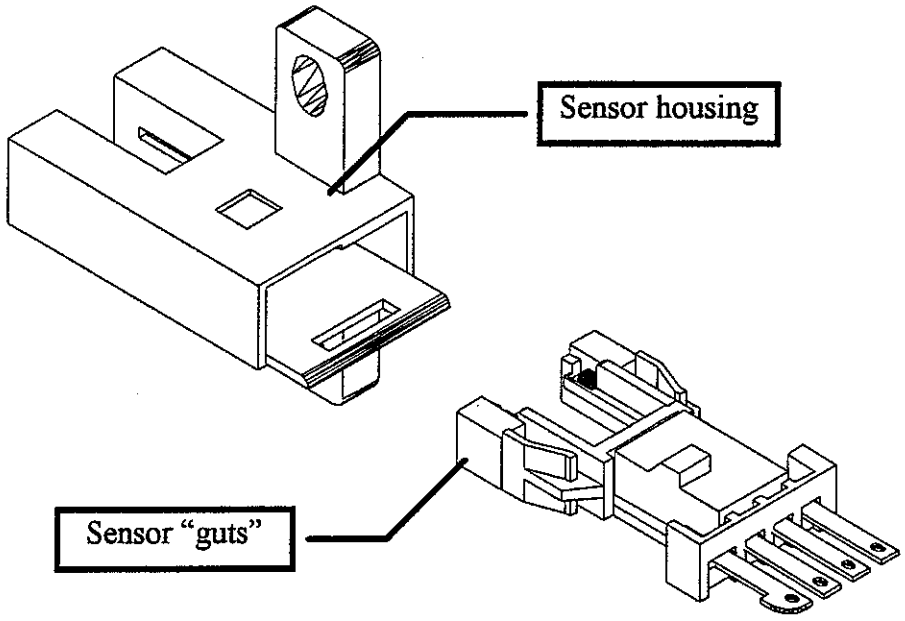
4. Carefully remove the sensor from the mounting surface. (Note: When replacing the speed tachometer on the drive shaft do not lose the 4 shim washers behind the sensor.)

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 an electrical contact cleaner to remove any oil and dirt build-up on the sensor and inside the housing. Use a contact cleaner that is safe for PC boards.

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.

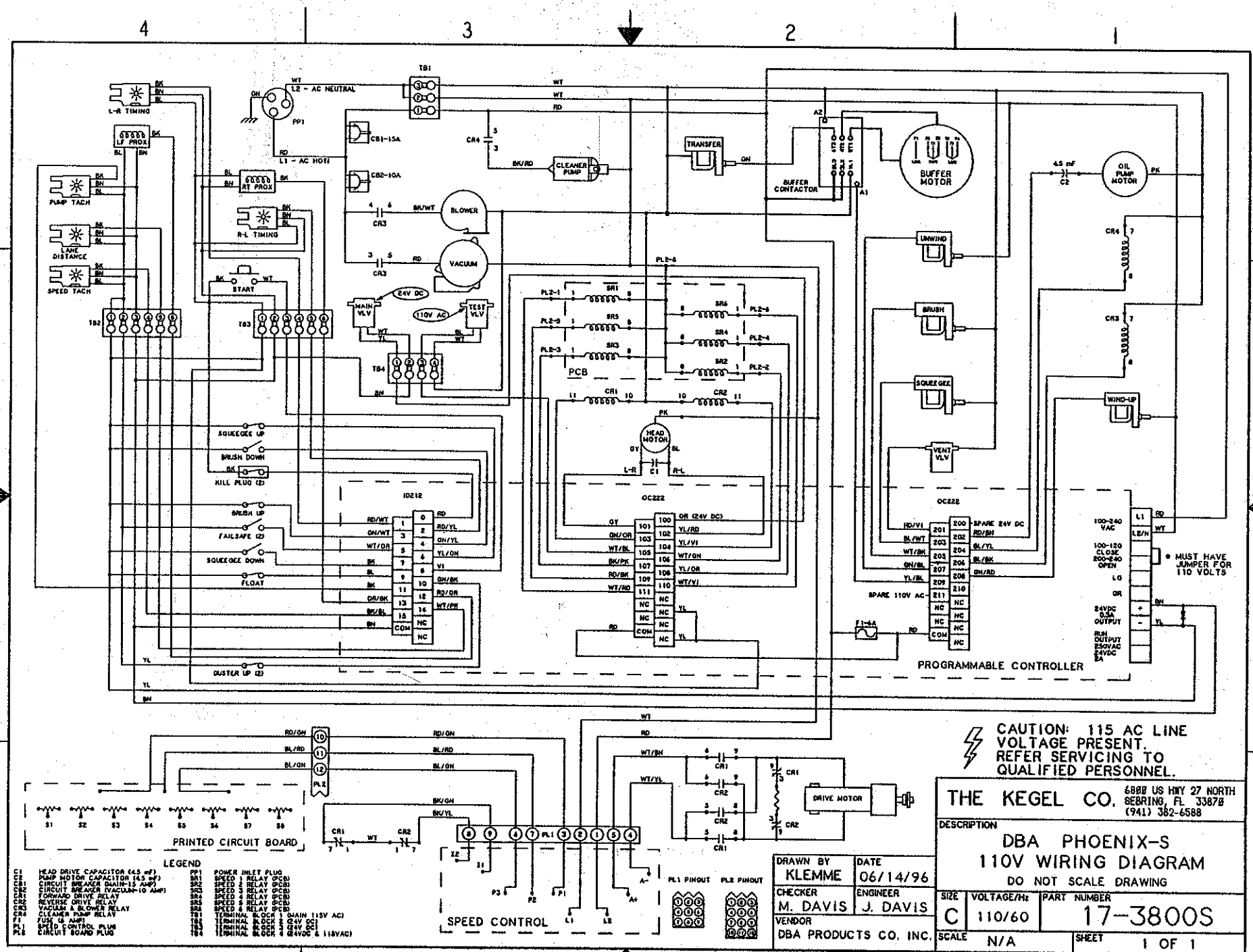
12. If the sensor passes this test, disconnect power and re-install it on the machine.

13. Check for proper sprocket alignment and replace the protective cover.

DBA PHOENIX-S™
TOURNAMENT EDITION
SANCTION TECHNOLOGY BY KEGEL

Mechanical Drawings - Table of Contents

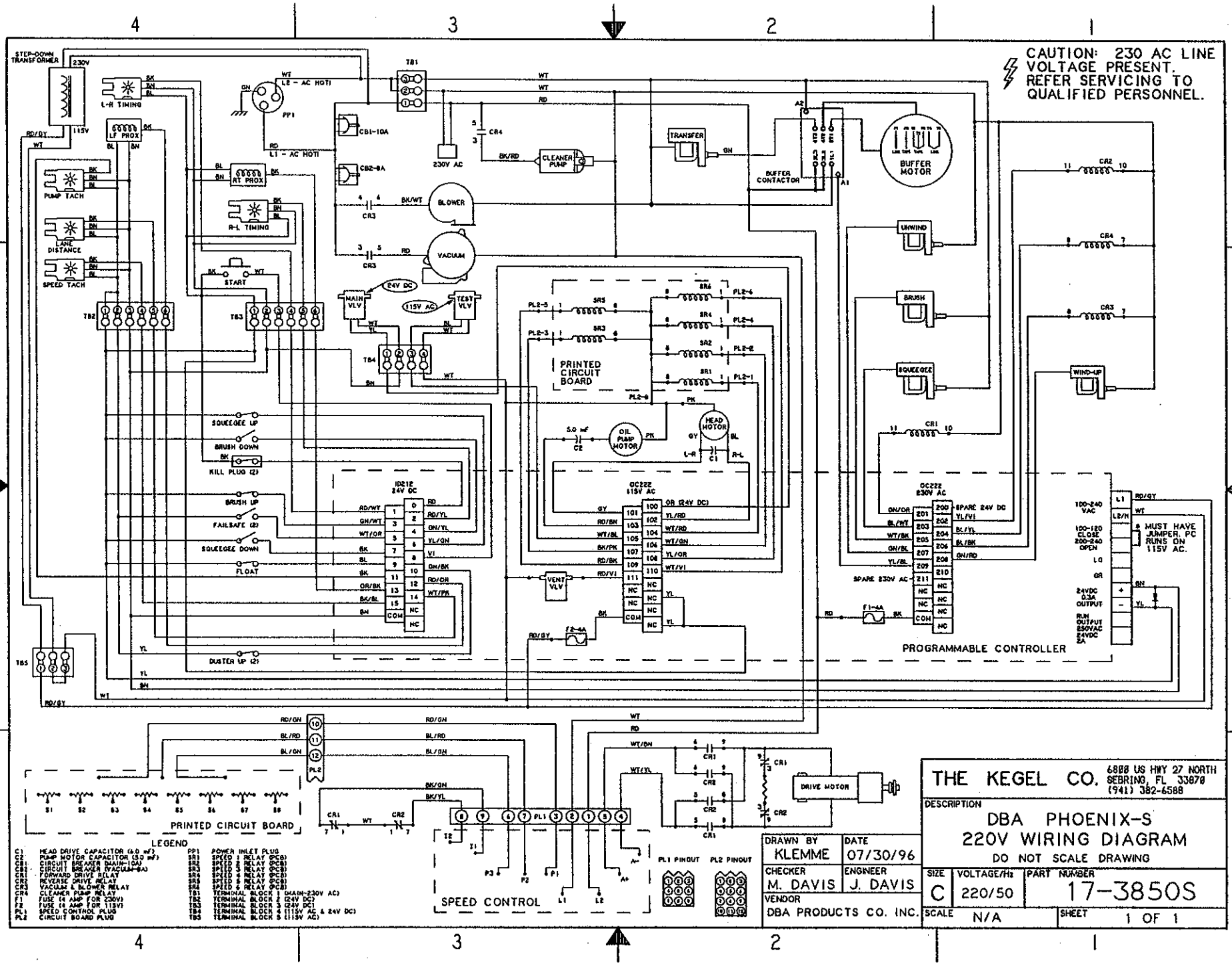
Edition 2:97

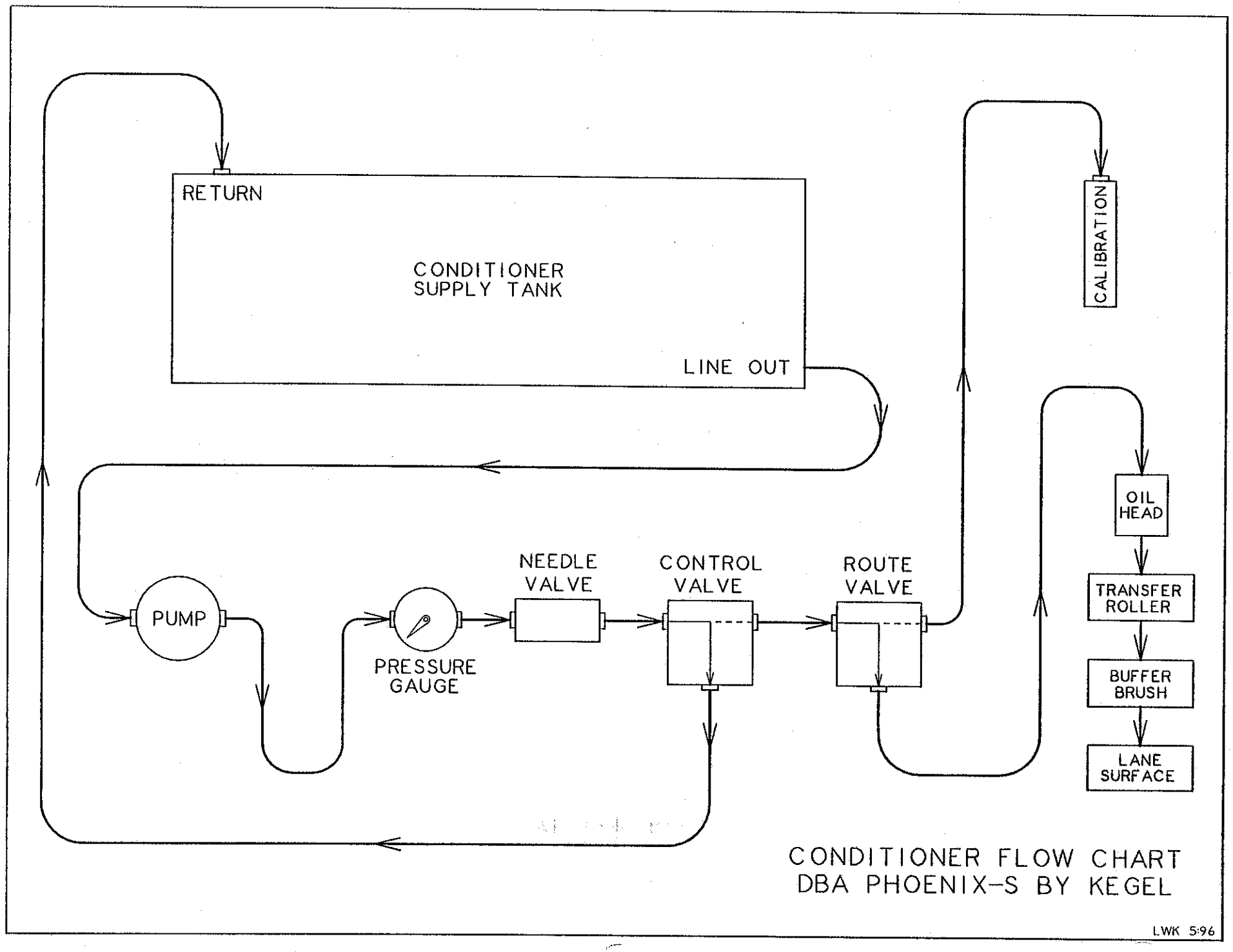


LEGEND

C1	HEAD DRIVE CAPACITOR (4.5 mF)	PP1	POWER INLET PLUG
C2	PUMP MOTOR CAPACITOR (4.5 mF)	SR1	SPEED 1 RELAY (PCB)
CB1	CIRCUIT BREAKER (MAIN-15 AMP)	SR2	SPEED 2 RELAY (PCB)
CB2	CIRCUIT BREAKER (VACUUM-10 AMP)	SR3	SPEED 3 RELAY (PCB)
CR1	FORWARD DRIVE RELAY	SR4	SPEED 4 RELAY (PCB)
CR2	REVERSE DRIVE RELAY	SR5	SPEED 5 RELAY (PCB)
CR3	VACUUM & BLOWER RELAY	SR6	SPEED 6 RELAY (PCB)
CR4	CLEANER PUMP RELAY	TB1	TERMINAL BLOCK 1 (MAIN 115V AC)
F1	FUSE (4 AMP)	TB2	TERMINAL BLOCK 2 (24V DC)
PL1	SPEED CONTROL PLUG	TB3	TERMINAL BLOCK 3 (24V DC)
PL2	CIRCUIT BOARD PLUG	TB4	TERMINAL BLOCK 4 (24VDC & 115VAC)

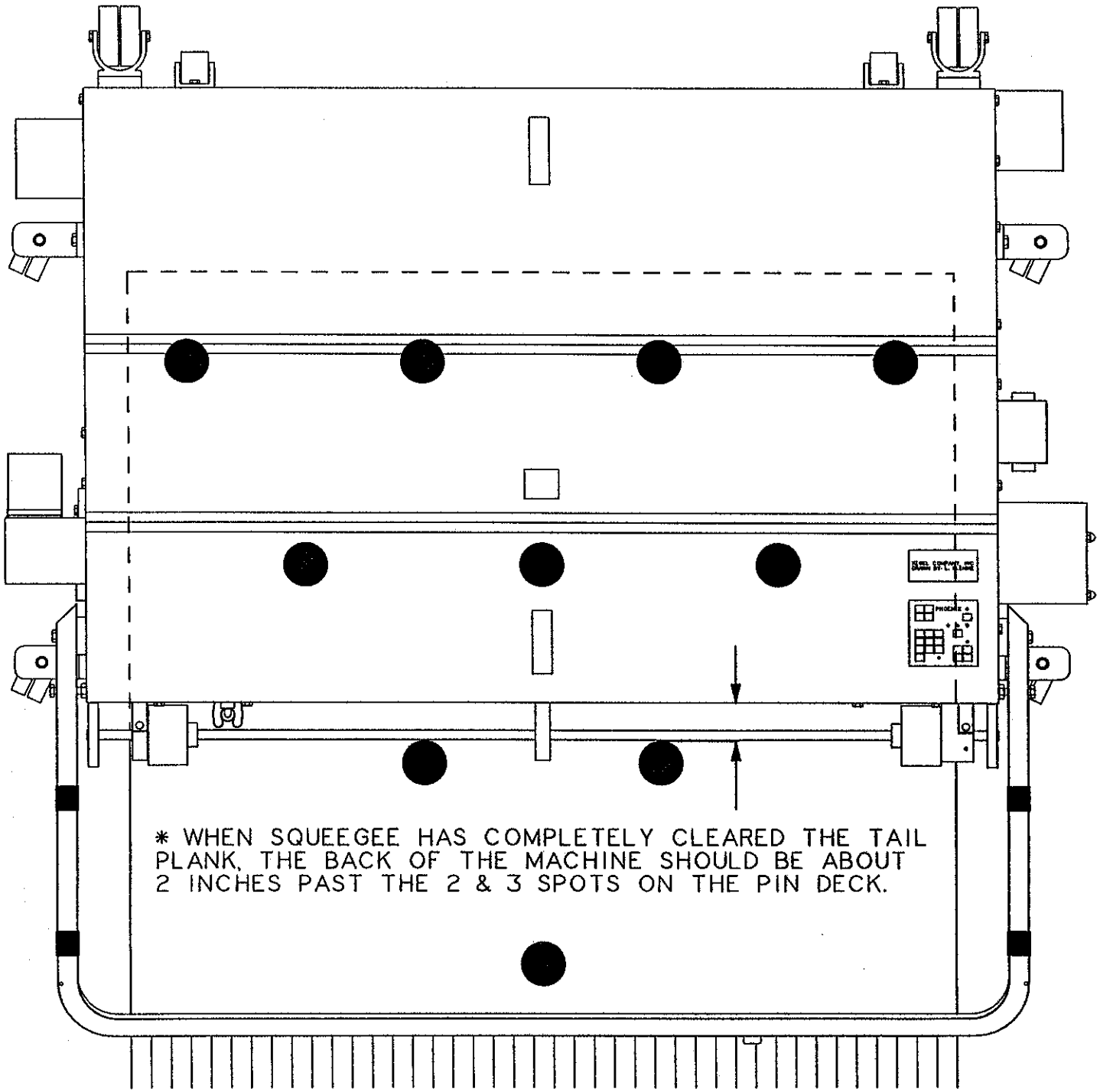
THE KEGEL CO.	6800 US HWY 27 NORTH SEBRING, FL 33870 (941) 382-6588
DESCRIPTION	DBA PHOENIX-S 110V WIRING DIAGRAM
	DO NOT SCALE DRAWING
DRAWN BY: KLEMME	DATE: 06/14/96
CHECKER: M. DAVIS	ENGINEER: J. DAVIS
VENDOR: DBA PRODUCTS CO. INC.	SIZE: C / VOLTAGE/Hz: 110/60 / PART NUMBER: 17-3800S
	SCALE: N/A / SHEET: 1 OF 1


CAUTION: 230 AC LINE VOLTAGE PRESENT. REFER SERVICING TO QUALIFIED PERSONNEL.
STEP-DOWN TRANSFORMER
230V
115V
L-R TIMING
LF PROX
PUMP TACH
LANE DISTANCE
SPEED TACH
AT PROX
A-L TIMING
START
TB1
TB2
TB3
TB4
TB5
CB1-10A
CB2-8A
230V AC
CR4
CLEANER PUMP
BLOWER
CR3
VACUUM
24V DC
115V AC
MAIN VLV
TEST VLV
TRANSFER
BUFFER CONTACTOR
BUFFER MOTOR
UNWIND
BRUSH
SQUEEGEE
WIND-UP
CR2
CR4
CR3
CR1
PRINTED CIRCUIT BOARD
SR6
SR5
SR4
SR3
SR2
SR1
PL2-6
PL2-5
PL2-4
PL2-3
PL2-2
PL2-1
PL2-8
OIL PUMP MOTOR
HEAD MOTOR
5.0 mf
C2
C1
L-R
R-L
VENT VLV
SQUEEGEE UP
BRUSH DOWN
KILL PLUG (2)
BRUSH UP
FAILSAFE (2)
SQUEEGEE DOWN
FLOAT
DUSTER UP (2)
ID212 24V DC
OC222 115V AC
OC222 230V AC
OR (24V DC)
SPARE 24V DC
SPARE 230V AC
F1-4A
F2-4A
PROGRAMMABLE CONTROLLER
100-240 VAC
100-120 CLOSE 200-240 OPEN
24VDC 0.3A OUTPUT
RUN OUTPUT 250VAC 24VDC 2A
* MUST HAVE JUMPER, PC RUNS ON 115V AC.
PRINTED CIRCUIT BOARD
S1 S2 S3 S4 S5 S6 S7 S8
PL2
PL1
SPEED CONTROL
P1 P2 P3
L1 L2
A+ A-
DRIVE MOTOR
PL1 PINOUT
PL2 PINOUT
LEGEND
C1 HEAD DRIVE CAPACITOR (4.0 mf)
C2 PUMP MOTOR CAPACITOR (5.0 mf)
CB1 CIRCUIT BREAKER (MAIN-10A)
CB2 CIRCUIT BREAKER (VACUUM-8A)
CR1 FORWARD DRIVE RELAY
CR2 REVERSE DRIVE RELAY
CR3 VACUUM & BLOWER RELAY
CR4 CLEANER PUMP RELAY
F1 FUSE (4 AMP FOR 230V)
F2 FUSE (4 AMP FOR 115V)
PL1 SPEED CONTROL PLUG
PL2 CIRCUIT BOARD PLUG
PP1 POWER INLET PLUG
SR1 SPEED 1 RELAY (PCB)
SR2 SPEED 2 RELAY (PCB)
SR3 SPEED 3 RELAY (PCB)
SR4 SPEED 4 RELAY (PCB)
SR5 SPEED 5 RELAY (PCB)
SR6 SPEED 6 RELAY (PCB)
TB1 TERMINAL BLOCK 1 (MAIN-230V AC)
TB2 TERMINAL BLOCK 2 (24V DC)
TB3 TERMINAL BLOCK 3 (24V DC)
TB4 TERMINAL BLOCK 4 (115V AC & 24V DC)
TB5 TERMINAL BLOCK 5 (115V AC)
THE KEGEL CO.
6888 US HWY 27 NORTH
SEBRING, FL 33870
(941) 382-6588
DESCRIPTION
DBA PHOENIX-S
220V WIRING DIAGRAM
DO NOT SCALE DRAWING
DRAWN BY KLEMME
DATE 07/30/96
CHECKER M. DAVIS
ENGINEER J. DAVIS
VENDOR DBA PRODUCTS CO. INC.
SIZE C
VOLTAGE/Hz 220/50
PART NUMBER 17-3850S
SCALE N/A
SHEET 1 OF 1



CONDITIONER FLOW CHART
DBA PHOENIX-S BY KEGEL

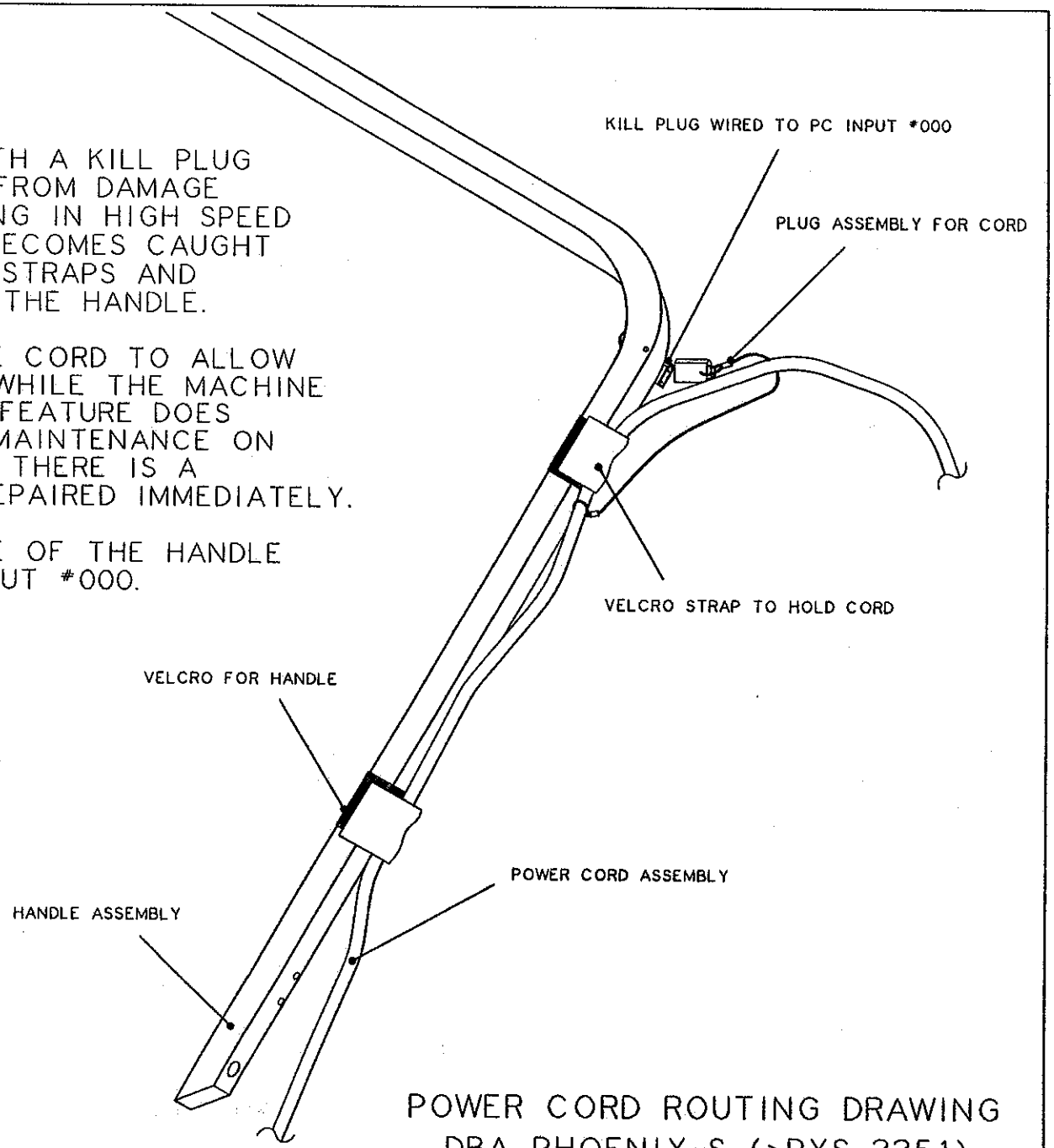
LWK 5:96


* WHEN SQUEEGEE HAS COMPLETELY CLEARED THE TAIL PLANK, THE BACK OF THE MACHINE SHOULD BE ABOUT 2 INCHES PAST THE 2 & 3 SPOTS ON THE PIN DECK.

THE PHOENIX-S IS EQUIPPED WITH A KILL PLUG TO PROTECT THE POWER CORD FROM DAMAGE WHEN THE MACHINE IS TRAVELING IN HIGH SPEED DURING REVERSE. IF THE CORD BECOMES CAUGHT IT WILL RIP FROM THE VELCRO STRAPS AND DISENGAGE THE "KILL PLUG" ON THE HANDLE.

THERE IS ENOUGH SLACK IN THE CORD TO ALLOW IT TO PULL FROM THE HANDLE WHILE THE MACHINE IS COASTING TO A STOP. THIS FEATURE DOES NOT ELIMINATE THE NEED FOR MAINTENANCE ON THE GUTTERS AND CAPPINGS. IF THERE IS A "CATCH POINT" IT SHOULD BE REPAIRED IMMEDIATELY.

THE KILL PLUGS ON EITHER SIDE OF THE HANDLE ARE WIRED INTO THE PC AT INPUT #000.



POWER CORD ROUTING DRAWING
DBA PHOENIX-S (>PXS-2251)

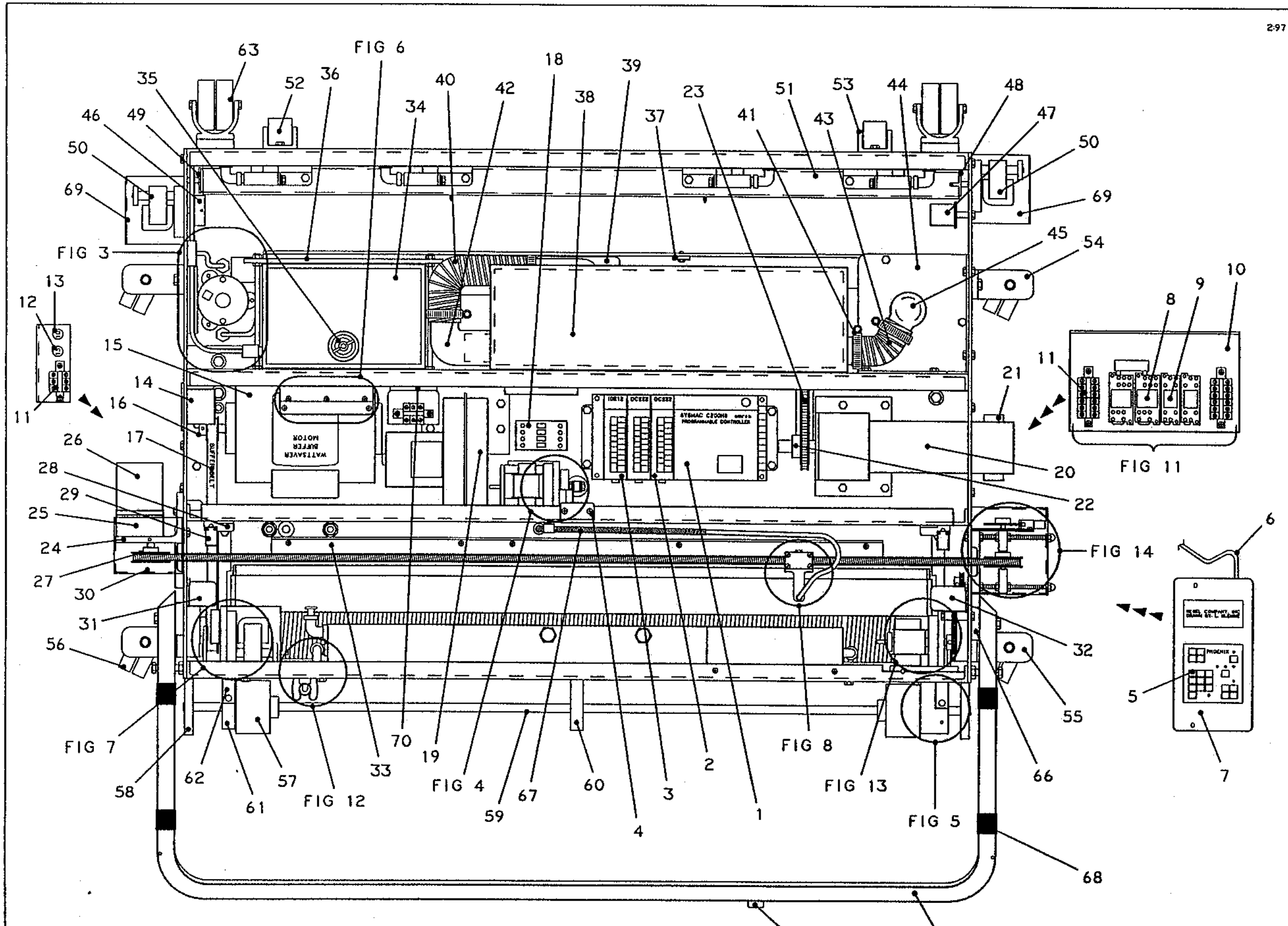

2-97
FIG 6
FIG 3
FIG 11
FIG 14
FIG 8
FIG 13
FIG 5
FIG 7
FIG 12
FIG 4
WATTSAVER
BUFFER
MOTOR
SYSMAC C200HS
PROGRAMMABLE CONTROLLER
PHOENIX

FIGURE 1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
1	1	153-1801	C200HS MICROPROCESSOR
1	2	154-8231	OUTPUT MODULE ASSEMBLY - OC222 (WITH 24V DC RELAY)
1	3	153-1816	INPUT MODULE - ID212
1	4	154-6252	CATCH PLATE FOR ELECTRICAL LID
1	5	153-1002PX	PRO27 KEYBOARD (C200H WITH PHOENIX DECAL)
1	6	153-1005	KEYBOARD CABLE (C200H)
1	7	153-6813	KEYBOARD MOUNTING PLATE (PHOENIX)
1	8	153-1018	LY3 RELAY (110 VOLT)
1	8	153-1618	LY3 RELAY (220 VOLT)
1	9	153-1016	LY2 RELAY (110 VOLT)
1	9	153-1616	LY2 RELAY (220 VOLT)
1	10	153-6856	RELAY MOUNTING PLATE
1	11	153-1021	TERMINAL BLOCK
1	12	153-1817	CIRCUIT BREAKER (15-AMP) FOR 110 VOLT
1	12	153-1810	CIRCUIT BREAKER (8-AMP) FOR 220 VOLT
1	13	153-1030	CIRCUIT BREAKER (10 AMP)
1	14	153-1823	FLANGED TWISTLOCK INLET - 125V/20A
1	14	153-1826	FLANGED TWISTLOCK INLET - 250V/20A
1	15	154-8236	BUFFER MOTOR-1/2 HP (1725 RPM-110V 60 Hz)
1	15	154-8237	BUFFER MOTOR-1/2 HP (1725 RPM-220V 50/60 Hz)
1	16	153-9013	BUFFER MOTOR PULLEY (10L050-1/2")
1	17	153-9015	T-BELT 322LO50 (BUFFER MOTOR)
1	18	153-1004	BUFFER MOTOR CONTACTOR (110 VOLT)
1	18	153-1604	BUFFER MOTOR CONTACTOR (220 VOLT)
1	19	153-8801	BLOWER MOTOR ASSEMBLY - 110V/140 CFM
1	19	153-8802	BLOWER MOTOR ASSEMBLY - 220V/140 CFM
1	20	153-8065	DRIVE MOTOR ASSEMBLY (DAYTON 130VDC/165 RPM)
1	21	153-1057H	DAYTON DC MOTOR BRUSHES
1	22	153-9801	SPROCKET - 40B14 (3/4" BORE) FOR 220 VOLT
1	22	153-9805	SPROCKET - 40B18 (3/4" BORE) FOR 110 VOLT
1	23	153-9804	DRIVE CHAIN - PHOENIX (40P35) FOR 110 VOLT
1	23	153-9814	DRIVE CHAIN - PHOENIX (40P33) FOR 220 VOLT

FIGURE 1

MECHANICAL DRAWINGS INDEX

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
1	24	154-6222	MOUNTING ANGLE - HEAD DRIVE MOTOR
1	25	154-1206	GEARBOX FOR HEAD DRIVE MOTOR (5:1 RATIO)
1	26	154-8232	HEAD DRIVE MOTOR ASSEMBLY - 110V PX-S
1	27	154-9205D	PULLEY - HEAD DRIVE MOTOR (24XL 3/8" BORE) 60 Hz
1	27	154-9205B	PULLEY - HEAD DRIVE MOTOR (28XL 3/8" BORE) 50 Hz
1	28	154-6218L	MOUNTING ANGLE - LEFT PROXIMITY SENSOR
1	29	154-1220	INDUCTIVE PROXIMITY SENSOR (TL-Q5MC1)
1	30	154-6201	GUARD FOR HEAD DRIVE PULLEY (LEFT SIDE)
1	31	154-8241	FELT PAD AND MOUNTING ANGLE ASSEMBLY - LEFT SIDE
1	32	154-8242	FELT PAD AND MOUNTING ANGLE ASSEMBLY - RIGHT SIDE
1	33	154-6203A	GUARD FOR TRANSFER COMPARTMENT
1	34	153-6840A	SUPPLY TANK (1-1/2 GALLON) USES EXPANSION PLUG
1	35	153-0246A	EXPANDABLE PLUG FOR SUPPLY TANK
1	36	153-6847	MOUNTING BAR FOR SUPPLY TANK
1	37	153-6854	UHMW RETAINER FOR RECOVERY TANK
1	38	153-6841	RECOVERY TANK (3-1/2 GALLON CAPACITY)
1	39	153-6223	SQUEEGEE HOSE ADAPTER
1	40	154-0260	FLEXIBLE HOSE STOCK - SQUEEGEE TO TANK (1-1/2" ID) 10"
1	41	153-2406	HOSE CLAMP (1/2")
1	42	153-8827T	1-1/4" PVC ELBOW FOR RECOVERY TANK (NO THREADS)
1	43	154-0260	FLEXIBLE HOSE STOCK - TANK TO VACUUM (1-1/2" ID) 3"
1	44	153-6810B	VACUUM MOTOR ADAPTER (BENT FLANGES)
1	45	153-8827	1-1/4 PVC ELBOW FOR RECOVERY TANK (5/8")
1	46	153-8201B	DMR LINODUSTER HUB ASSEMBLY (CARDBOARD CORE) 1/4-28
1	47	153-6850	UHMW LINODUSTER PLUG FOR CARDBOARD CORE
1	48	153-8202B	DMR LINODUSTER SOLID HUB ASSEMBLY (PVC DRIVE) 1/4-28
1	49	153-6853	UHMW LINODUSTER PLUG FOR PVC TAKE-UP REEL
1	50	153-8403	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-110 VOLT)
1	50	153-8803	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-220 VOLT)
1	51	153-8824	PVC TAKE-UP REEL ASSEMBLY (PHOENIX=44-5/8")
1	52	153-8311	MOMENTARY WHEEL ASSEMBLY (URETHANE)
1	53	153-6029	MOMENTARY WHEEL HOUSING

FIGURE 1

MECHANICAL DRAWINGS INDEX

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
1	54	154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER (3 x 3.625)
1	55	154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER (3 x 3.625)
1	56	153-0812	TRANSPORT CASTER - HEAVY DUTY (2" - DUAL WHEEL)
1	57	153-7002AA	LANE DISTANCE COUNTER WHEEL-TREADED (2 INCH)
1	58	153-7401	UHMW KICK-UP WHEEL
1	59	153-6435	LANE DISTANCE COUNTER SHAFT (FOR KICK-UP WHEEL)
1	60	153-8421	LANE DISTANCE PILLOWBLOCK ASSEMBLY (CENTER)
1	61	153-8033	LANE DISTANCE COUNTER PILLOWBLOCK ASSEMBLY (LEFT)
1	62	153-6027	LANE DISTANCE ADJUSTMENT BLOCK
1	63	153-0001	TRANSPORT CASTER (3" DUAL WHEEL)
1	64	154-8249	HANDLE ASSEMBLY WITH KILL PLUGS (30")
1	65	153-1408	PUSH BUTTON (RED = NORMALLY OPEN)
1	66	153-6851	UHMW HANDLE SPACER
1	67	154-0206	SPRING - OIL LINE CONTROL (10")
1	68	154-0242A	VELCRO FOR HANDLE (ADHESIVE)
1	69	153-6412	LINODUSTER MOTOR SHIELD (FOR 7 RPM)
1	70	154-8248	STEP-DOWN TRANSFORMER ASSEMBLY (220V MACHINE ONLY)

FIGURE 1

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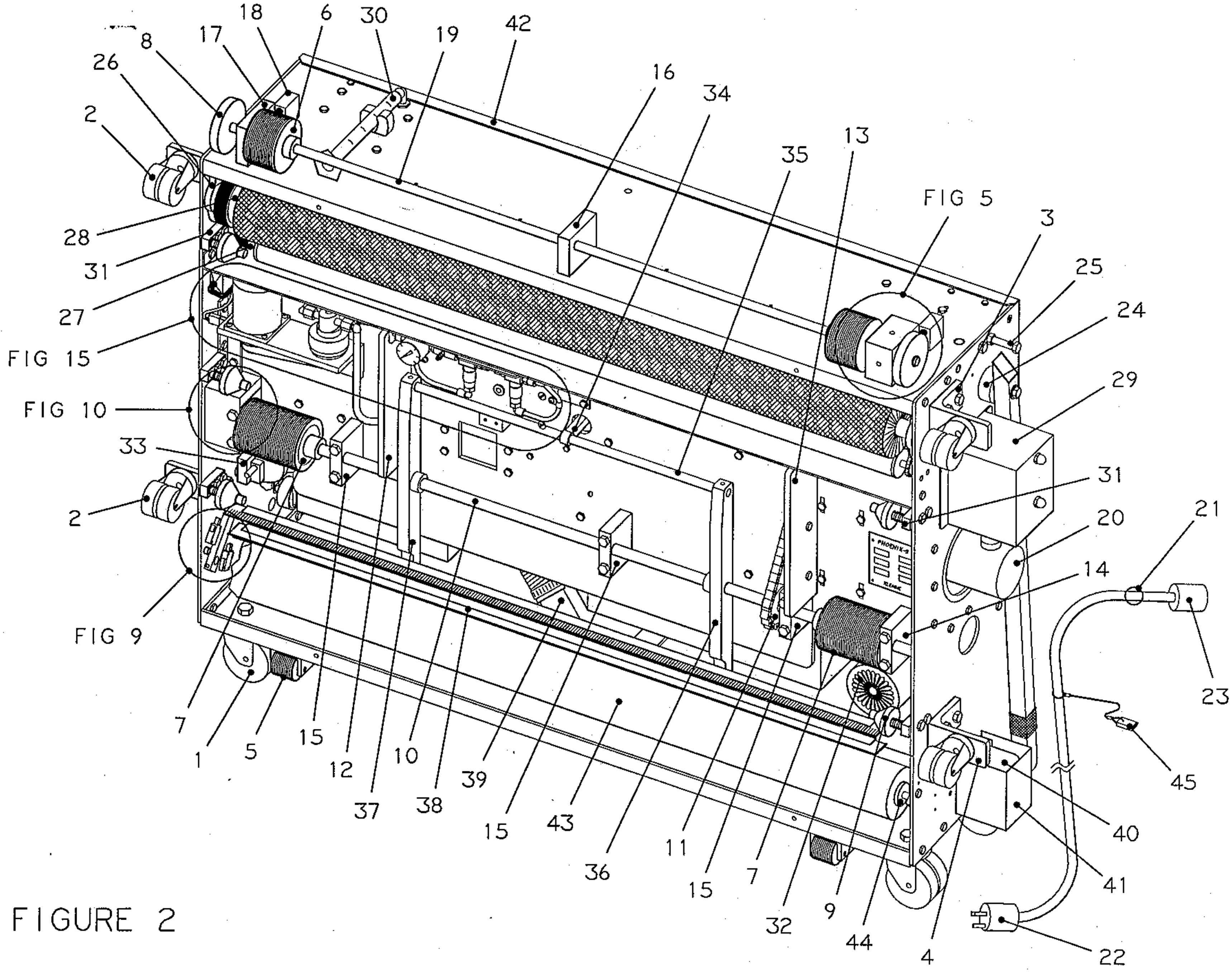
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FIGURE 2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
2	1	153-0001	TRANSPORT CASTER (3" DUAL WHEEL)
2	2	153-0812	TRANSPORT CASTER - HEAVY DUTY (2" - DUAL WHEEL)
2	3	154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER (3 x 3.625)
2	4	154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER (3 x 3.625)
2	5	153-8311	MOMENTARY WHEEL ASSEMBLY (URETHANE)
2	6	153-7002AA	LANE DISTANCE COUNTER WHEEL-TREADED (2 INCH)
2	7	153-7013	URETHANE-BLEND LANE DRIVE WHEEL (FOUR-INCH TREADED)
2	8	153-7401	UHMW KICK-UP WHEEL
2	9	153-8410	LANE EDGE GUIDE ROLLER ASSEMBLY (1/2" BORE)
2	10	153-6820A	MAIN DRIVE SHAFT (PHOENIX)
2	11	153-9003	SPROCKET - 40B10 (5/8" BORE)
2	12	154-6237	UHMW FLOOR SKID - LEFT SIDE PX-S
2	13	154-6238	UHMW FLOOR SKID - RIGHT SIDE PX-S
2	14	153-8814	DRIVE SHAFT PILLOWBLOCK ASSEMBLY - FLANGED BUSHING
2	15	153-8813	DRIVE SHAFT PILLOWBLOCK ASSEMBLY - PLAIN BUSHING
2	16	153-8421	LANE DISTANCE PILLOWBLOCK ASSEMBLY (CENTER)
2	17	153-8033	LANE DISTANCE COUNTER PILLOWBLOCK ASSEMBLY (LEFT)
2	18	153-6027	LANE DISTANCE ADJUSTMENT BLOCK
2	19	153-6435	LANE DISTANCE COUNTER SHAFT (FOR KICK-UP WHEEL)
2	20	153-8065	DRIVE MOTOR ASSEMBLY (DAYTON 130VDC/165 RPM)
2	21	154-8229A	POWER CORD ASSEMBLY - 125 FEET (110V 12 AWG)
2	21	154-8230	POWER CORD ASSEMBLY - 125 FEET (220V 12 AWG)
2	22	153-1025	MALE PLUG - 125V/15A
2	22	153-1625	MALE PLUG - 250V/15A
2	23	153-1822	FEMALE TWISTLOCK - 125V/20A
2	23	153-1824	FEMALE TWISTLOCK - 250V/20A
2	24	153-6851	UHMW HANDLE SPACER
2	25	153-2818	HHCS - 3/8-16 X 2-1/2 (GRADE 8)
2	26	153-9816	3/4" FLANGED BEARING - 5/16-18 TAPPED
2	27	153-8039	BUFFER BELT IDLER ASSEMBLY
2	28	154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)
2	29	154-6202	GUARD FOR HEAD IDLER PULLEY & SENSORS (RIGHT SIDE)

FIGURE 2

MECHANICAL DRAWINGS INDEX

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
2	30	154-0215	GRADUATED CYLINDER FOR CALIBRATION TEST (25 ml)
2	31	153-6417	GUIDE ROLLER MOUNTING BAR (ALUMINUM)
2	32	153-8205	VACUUM MOTOR ASSEMBLY - 110 VOLT/104 CFM
2	32	153-8805	VACUUM MOTOR ASSEMBLY - 220 VOLT/96 CFM
2	33	153-8206	WATER SPRAY PUMP ASSEMBLY - 110 VOLT
2	33	153-8806	WATER SPRAY PUMP ASSEMBLY - 220 VOLT
2	34	153-6842	SQUEEGEE ROD END (5/16-18 X 4-5/8)
2	35	153-6254	SQUEEGEE ARM SHAFT
2	36	153-8809	SQUEEGEE PIVOT ARM ASSEMBLY - PHOENIX RIGHT SIDE
2	37	153-8808	SQUEEGEE PIVOT ARM ASSEMBLY - PHOENIX LEFT SIDE
2	38	153-0202A	COMPLETE SQUEEGEE ASSEMBLY (2-PIECE BROWN)
2	39	153-6223	SQUEEGEE HOSE ADAPTER
2	40	153-8403	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-110 VOLT)
2	40	153-8803	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-220 VOLT)
2	41	153-6412	LINODUSTER MOTOR SHIELD (FOR 7 RPM)
2	42	154-8202	COMPLETE LID ASSEMBLY - PX-S
2	43	153-8238	CUSHION ROLLER ASSEMBLY (DMR LINODUSTER = 44")
2	44	153-9050	CUSHION ROLLER PLUG
2	45	154-8209A	CABLE ASSEMBLY WITH CORD KILL PLUG

FIGURE 2

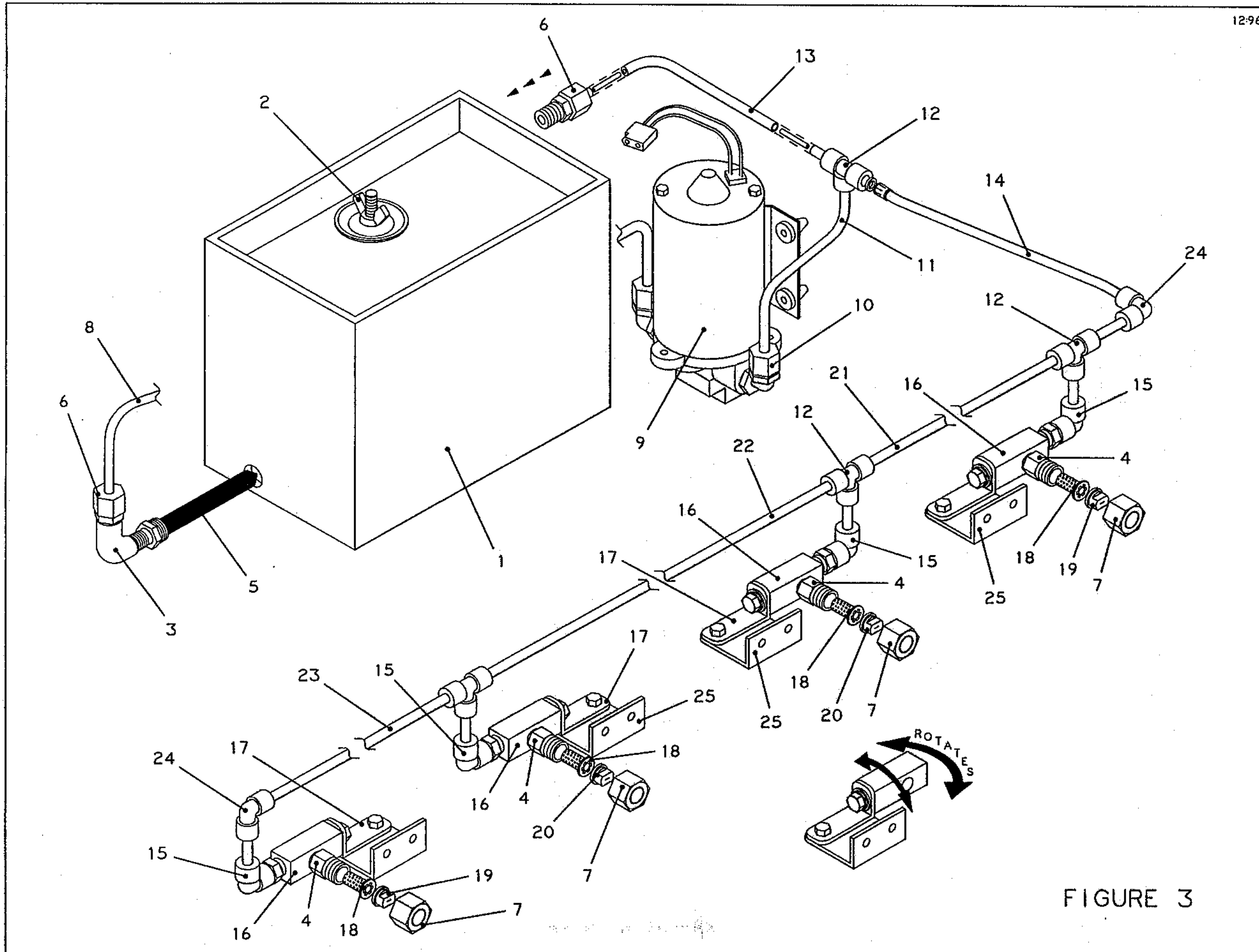
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FIGURE 3

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
3	1	153-6840A	SUPPLY TANK (1-1/2 GALLON) USES EXPANSION PLUG
3	2	153-0246A	EXPANDABLE PLUG FOR SUPPLY TANK
3	3	153-0216	ELBOW (1/4 - MPT X 1/4 - FPT)
3	4	153-0217	MALE BODY (1/4 - NYLON)
3	5	154-0212	TANK FILTER (5" SS)
3	6	153-0209	MALE CONNECTOR (1/4 X 1/4 - MPT)
3	7	153-0218	TIP RETAINER CAP CONNECTOR
3	8	153-0806A	SPRAY HOSE - SUPPLY TANK TO PUMP (23")
3	9	153-8206	WATER SPRAY PUMP ASSEMBLY - 110 VOLT
3	9	153-8806	WATER SPRAY PUMP ASSEMBLY - 220 VOLT
3	10	153-0212	MALE ELBOW (1/4 X 3/8 - MPT)
3	11	153-0807	SPRAY HOSE - PUMP TO TEE (7")
3	12	153-0815	UNION TEE (1/4 X 1/4 X 1/4 - QUICK DISCONNECT)
3	13	153-0809A	SPRAY PRESSURE REGULATOR HOSE - TEE TO TANK (8-1/2")
3	14	154-8225A	SPRAY HOSE - TEE TO LEFT OUTSIDE JET
3	15	153-0818	MALE SWIVEL ELBOW - 1/4 TUBE X 1/4 NPT
3	16	153-6252	SPRAY JET BODY
3	17	153-6251S	SPRAY JET SWIVEL MOUNTING ANGLE
3	18	153-0220	SCREEN CHECK VALVE (POLYPROPYLENE - 10#)
3	19	154-0007	SPRAY TIP - STAINLESS STEEL (1501)
3	20	153-0207A	SPRAY TIP - STAINLESS STEEL (11003)
3	21	154-8226	SPRAY HOSE - LEFT JET TO LEFT MIDDLE JET
3	22	154-8227	SPRAY HOSE - LEFT MIDDLE JET TO RIGHT MIDDLE JET
3	23	154-8228A	SPRAY HOSE - RIGHT MIDDLE JET TO RIGHT OUTSIDE JET
3	24	154-0243	UNION ELBOW (1/4 X 1/4 - QUICK DISCONNECT)
3	25	153-6251M	SPRAY JET WALL MOUNTING ANGLE

FIGURE 3

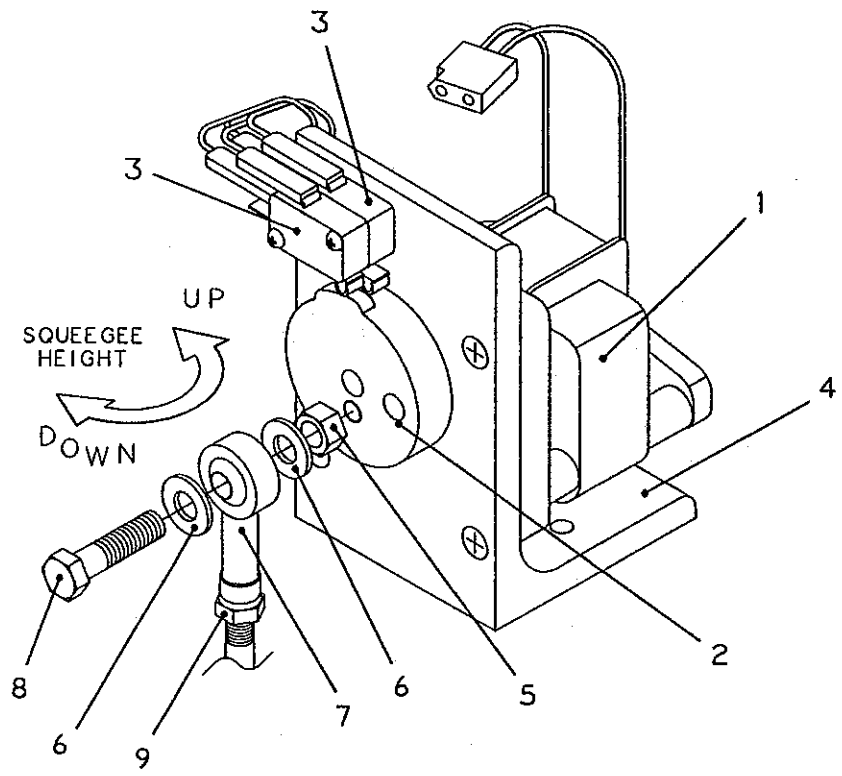


FIGURE 4

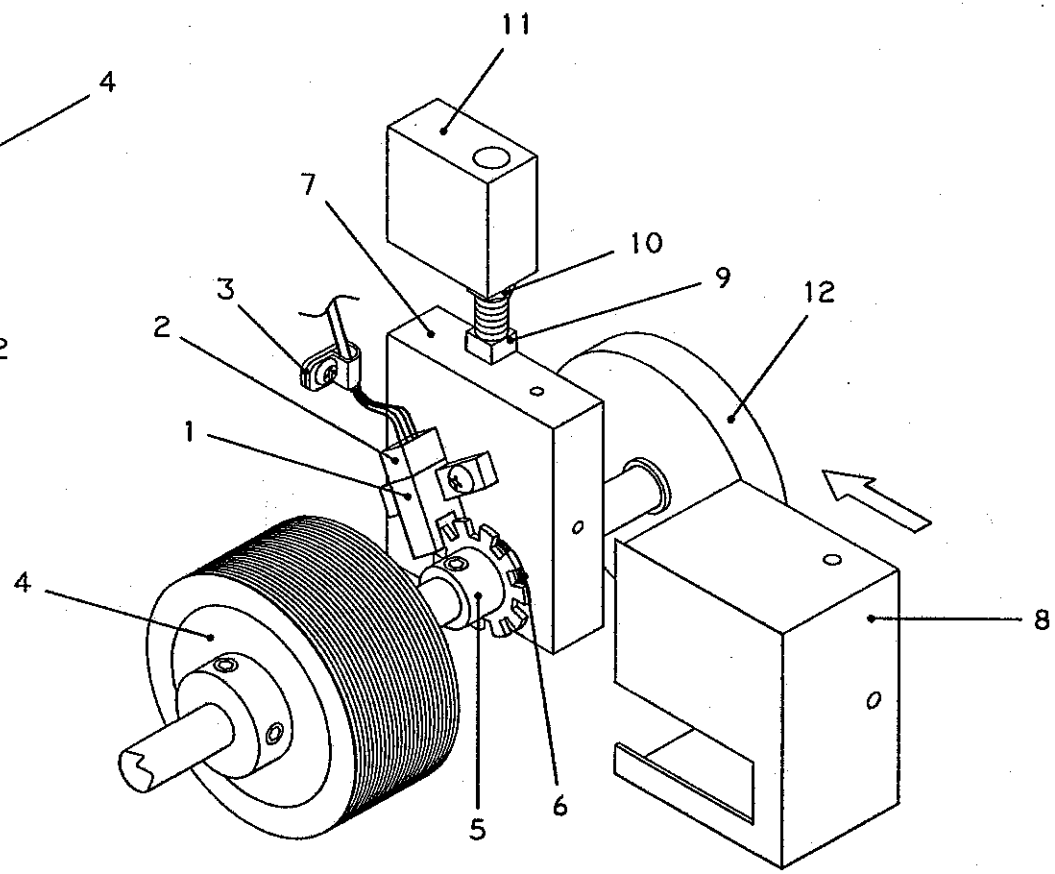
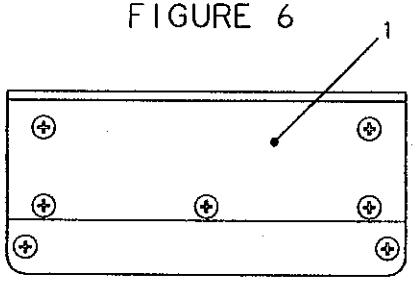


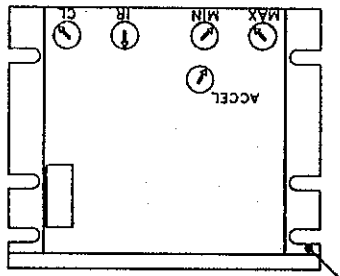
FIGURE 5

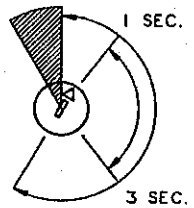
FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 4 PART NUMBERS			
4	1	153-8207	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-110 VOLT)
4	1	153-8807	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-220 VOLT)
4	2	154-6243	MOTOR CAM - DUAL LOBES (3/8 & 5/8 OFFSET)
4	3	153-1203	MICROSWITCH - WITH ROLLER (SQUEEGEE & BRUSH)
4	4	153-6832B	MOUNTING ANGLE-25 RPM MOTOR (SQUEEGEE)
4	5	153-2027A	JAM NUT - 5/16-18
4	6	153-2005	FLAT WASHER - 5/16
4	7	153-0211	SQUEEGEE ROD END WITH FITTING (ON MOTOR)
4	8	153-2062	HHCS - 5/16-18 X 1-1/4
4	9	153-2214	JAM NUT - 5/16-24

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 5 PART NUMBERS			
5	1	153-1031A	PASS-THROUGH SENSOR
5	2	153-1031B	SENSOR PLUG & CABLE
5	3	153-1049D	WIRE HARNESS CLAMP - 1/8
5	4	153-7002AA	LANE DISTANCE COUNTER WHEEL-TREADED (2 INCH)
5	5	153-9110	COUNTER SPROCKET (10-TOOTH)
5	6	153-2010	NYLON FLAT WASHER (1/2 - 0.030)
5	7	153-8031	LANE DISTANCE COUNTER PILLOWBLOCK ASSEMBLY (RIGHT)
5	8	153-8049	LANE DISTANCE SENSOR GUARD ASSEMBLY
5	9	153-2047	SQUARE HEAD SET SCREW - 3/8 X 2
5	10	153-2027	JAM NUT - 3/8-16
5	11	153-6027	LANE DISTANCE ADJUSTMENT BLOCK
5	12	153-7401	UHMW KICK-UP WHEEL

FIGURE 6







ACCEL TRIMPOT ADJUSTMENT

DO NOT ROTATE TRIMPOT INTO THE SHADED AREA

110 VOLT SPEED CONTROL SETTINGS

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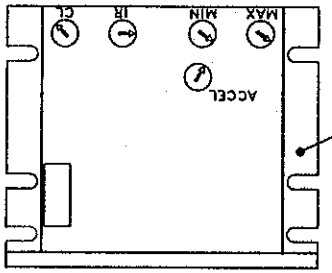

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220 VOLT SPEED CONTROL SETTINGS

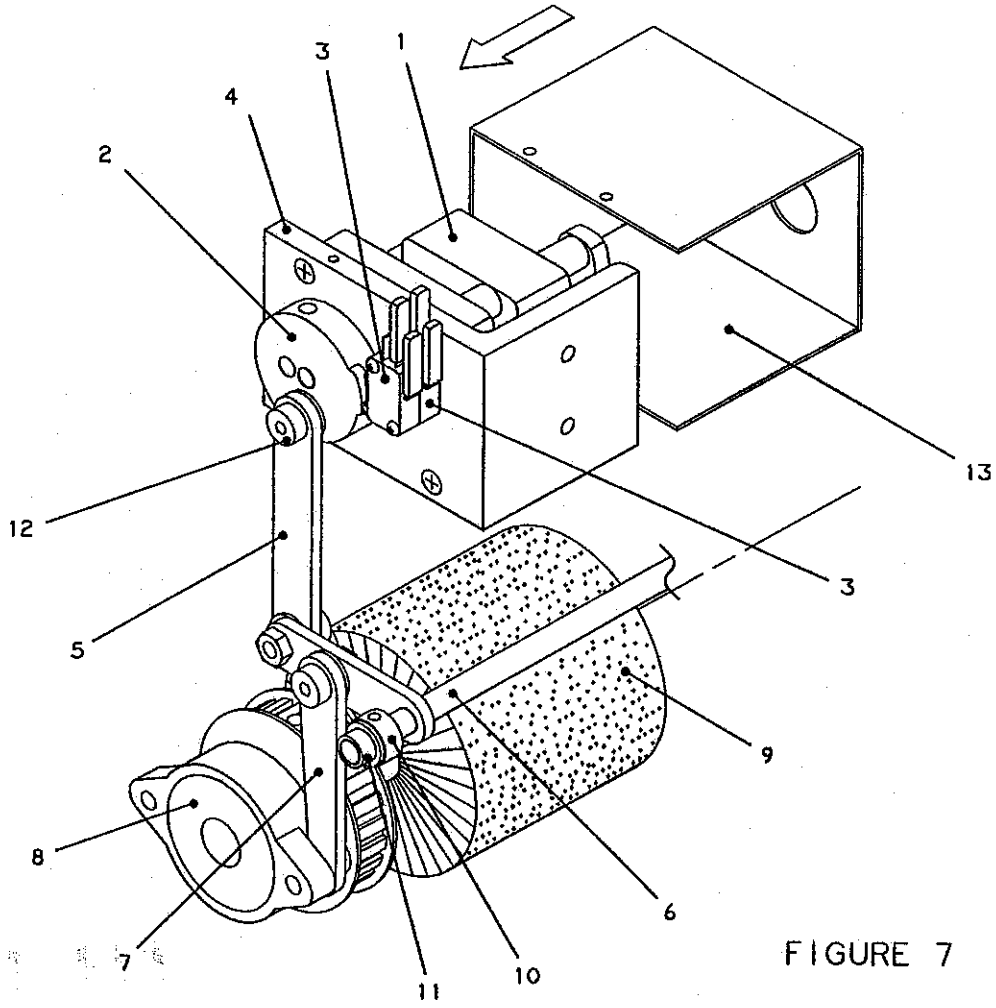
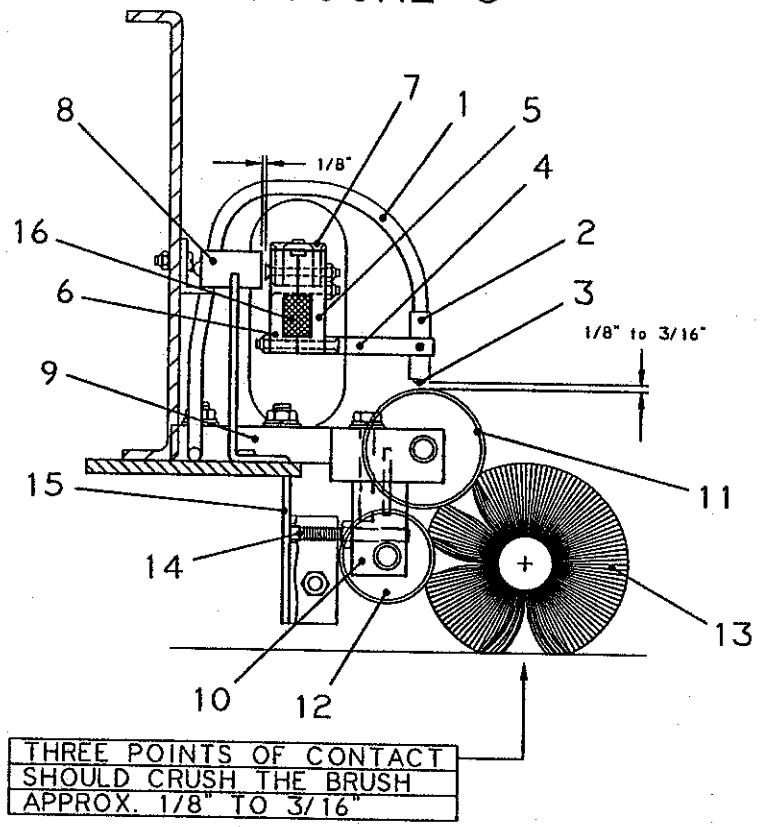


FIGURE 7

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 6 PART NUMBERS			
6	1	154-8210	CIRCUIT BOARD ASSEMBLY FOR SPEED CONTROL - 110V
6	1	154-8211	CIRCUIT BOARD ASSEMBLY FOR SPEED CONTROL - 220V
6	2	153-1012	SPEED CONTROL FOR DC MOTOR (KBIC-120) FOR 110 VOLT
6	3	153-1812	SPEED CONTROL FOR DC MOTOR (KBIC-240) FOR 220 VOLT

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 7 PART NUMBERS			
7	1	153-8207	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-110 VOLT)
7	1	153-8807	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-220 VOLT)
7	2	154-6243	MOTOR CAM - DUAL LOBES (3/8 & 5/8 OFFSET)
7	3	153-1203	MICROSWITCH - WITH ROLLER (SQUEEGEE & BRUSH)
7	4	154-6247	MOUNTING ANGLE-25 RPM MOTOR (BRUSH LIFT)
7	5	153-8818	CONNECTING LINK ASSEMBLY - MOTOR CAM/PIVOT ARM
7	6	153-6814	PIVOT SHAFT ASSEMBLY FOR LIFTING BRUSH
7	7	153-8819L	CONNECTING LINK ASSEMBLY - BEARING/PIVOT (LEFT)
7	8	153-9816	3/4" FLANGED BEARING - 5/16-18 TAPPED
7	9	154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)
7	10	153-2804	COLLAR - 3/8 X 3/4 X 3/8
7	11	153-9803	FLANGED BUSHING (3/8 X 1/2 X 1/4)
7	12	153-2801	SHOULDER BOLT - 3/8 X 3/8 (5/16-18) BRUSH LIFT
7	13	153-6858	SHIELD FOR MOTOR (BRUSH LIFT)

FIGURE 8



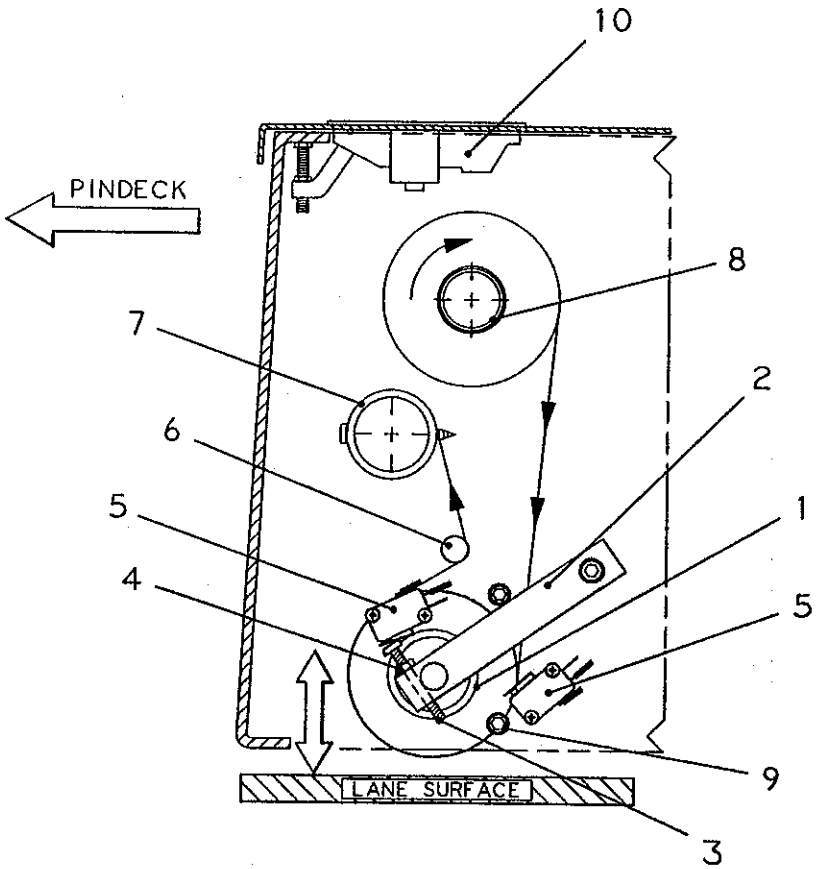
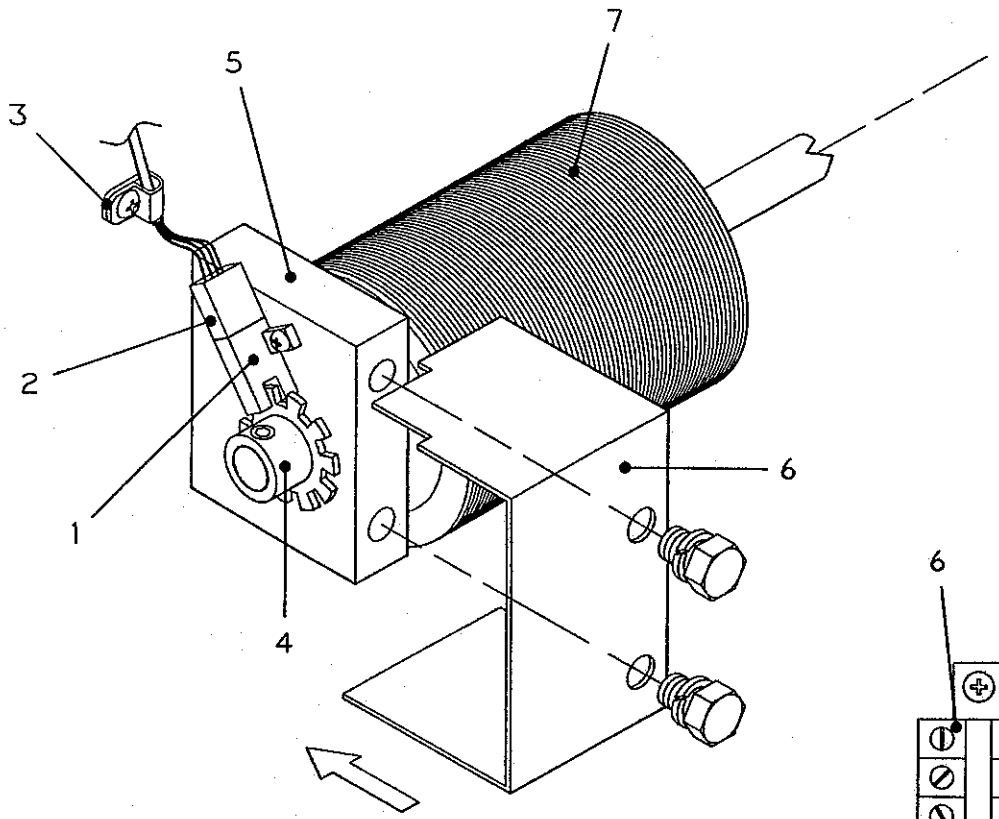


FIGURE 9

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 8 PART NUMBERS			
8	1	154-8220	TUBING - ROUTING VALVE TO OIL HEAD TIP (34.5")
8	2	154-6209	TIP HOLDER FOR OIL TUBING
8	3	154-8213	PENCIL TIP FOR OIL HEAD
8	4	154-6241	MOUNT FOR PENCIL TIP
8	5	154-6230	UHMW SLIDING HEAD
8	6	154-6230C	UHMW SLIDING HEAD (COUNTERSUNK HOLE)
8	7	154-6219	MOUNTING PLATE - HEAD BELT
8	8	154-1220	INDUCTIVE PROXIMITY SENSOR (TL-Q5MC1)
8	9	154-8204R	TRANSFER ROLLER ARM ASSEMBLY - PX-S TOP RIGHT
8	10	154-8205R	TRANSFER ROLLER ARM ASSEMBLY - PX-S BOTTOM RIGHT
8	11	154-8207	TRANSFER ROLLER ASSEMBLY - 2.25 DIAMETER (TOP)
8	12	154-8208	TRANSFER ROLLER ASSEMBLY - 1.75 DIAMETER (BOTTOM)
8	13	154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)
8	14	153-2519	SQUARE HEAD SET SCREW - 1/4-20 X 2
8	15	154-6203A	GUARD FOR TRANSFER COMPARTMENT
8	16	154-6210	BAR FOR HEAD DRIVE SYSTEM

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 9 PART NUMBERS			
9	1	153-8238	CUSHION ROLLER ASSEMBLY (DMR LINODUSTER = 44")
9	2	153-8420	CUSHION ROLLER PIVOT ARM ASSEMBLY
9	3	153-2090	MS PHILLIPS - 8-32 X 1-1/2
9	4	153-2414	HEX NUT - 8-32
9	5	153-1202	MICROSWITCH - WITHOUT ROLLER (DMR LINODUSTER)
9	6	153-6825	LINODUSTER CLOTH ROUTING BAR (SS)
9	7	153-8824	PVC TAKE-UP REEL ASSEMBLY (PHOENIX=44-5/8")
9	8	153-0429	DMR LINODUSTER TAKE-UP SUPPORT PIPE (40")
9	9	153-2412	SHCS - 1/4-20 X 1/2 (CUSHION ROLLER STOP)
9	10	153-2232A	LID LATCH - FLUSH MOUNT DUAL BUTTON (HEAVY DUTY)

FIGURE 10



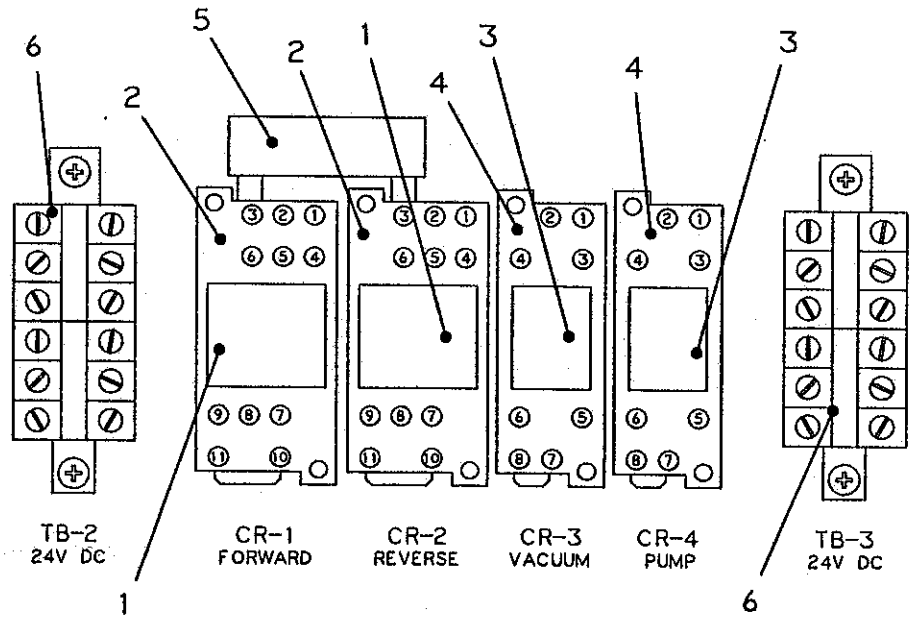


FIGURE 11

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 10 PART NUMBERS			
10	1	153-1031A	PASS-THROUGH SENSOR
10	2	153-1031B	SENSOR PLUG & CABLE
10	3	153-1049D	WIRE HARNESS CLAMP - 1/8
10	4	153-9110	COUNTER SPROCKET (10-TOOTH)
10	5	153-8815	DRIVE SHAFT PILLOWBLOCK ASSEMBLY - TACHOMETER
10	6	153-6859	SENSOR GUARD FOR TACHOMETER
10	7	153-7013	URETHANE-BLEND LANE DRIVE WHEEL (FOUR-INCH TREADED)

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 11 PART NUMBERS			
11	1	153-1018	LY3 RELAY (110 VOLT)
11	1	153-1618	LY3 RELAY (220 VOLT)
11	2	153-1019	LY3 RELAY BASE
11	3	153-1016	LY2 RELAY (110 VOLT)
11	3	153-1616	LY2 RELAY (220 VOLT)
11	4	153-1017	LY2 RELAY BASE
11	5	153-1011	BRAKE RESISTOR
11	6	153-1021	TERMINAL BLOCK

FIGURE 12

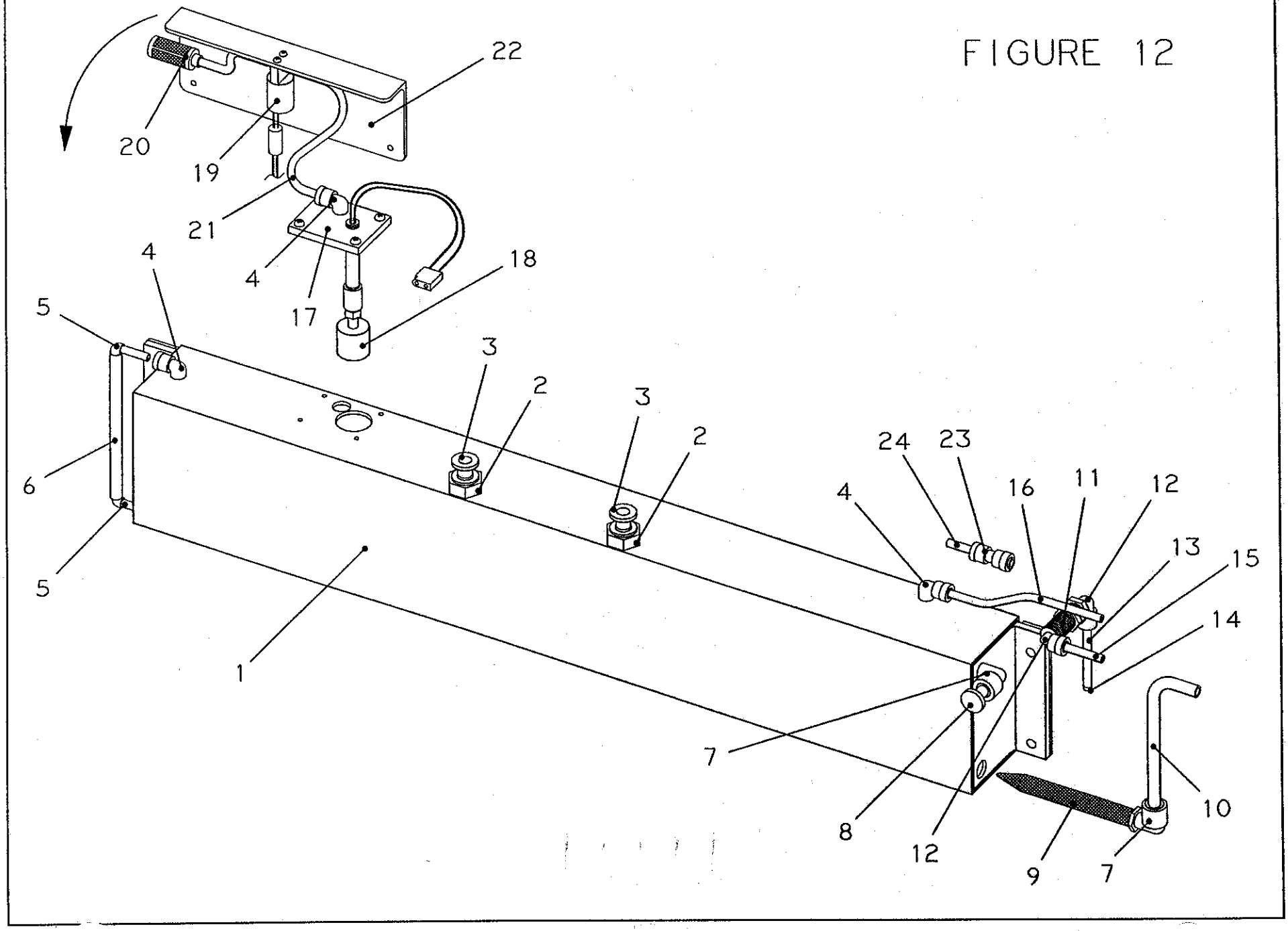
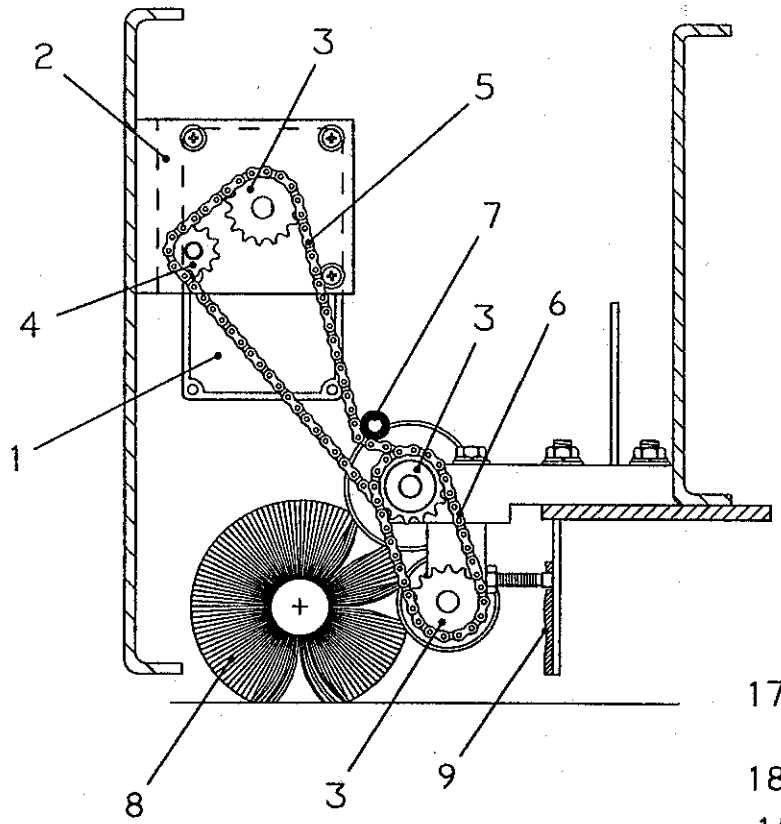


FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
12	1	154-8201	OIL TANK ASSEMBLY - PX-S
12	2	154-0232D	MALE CONNECTOR - 1/2" TUBE x 1/2 NPT (DRILLED FOR VENT)
12	3	154-0231	PLUG - 1/2" TUBE ID
12	4	154-0223	ELBOW (90 DEGREE) - 1/4 NPT x 1/4" TUBE
12	5	154-0227	ELBOW - TUBE TO HOSE BARB (1/4" STEM x 5/16 ID HOSE)
12	6	154-8214	TUBING - 5/16 CLEAR PVC (5.25" FOR SIGHT GLASS)
12	7	154-0225	ELBOW - 3/8 TUBE OD x 1/4 NPT
12	8	153-1054	3/8" PLUG (GRAY PLASTIC)
12	9	154-0212	TANK FILTER (5" SS)
12	10	154-8215	TUBING - OIL TANK TO PUMP (3/8" OD x 1/4" ID) 32.75"
12	11	154-0221	BULKHEAD UNION - 1/4" TUBING
12	12	154-0222	ELBOW - 1/4" STEM x 1/4" TUBING OD
12	13	154-8224	TUBING - CALIBRATION FITTING TO TIP
12	14	154-8213A	TIP FOR CALIBRATION
12	15	154-8223	TUBING - FLOOR FITTING TO CALIBRATION FITTING
12	16	154-8218	TUBING - RETURN FITTING TO OIL TANK
12	17	154-6244	MOUNTING PLATE - OIL TANK FLOAT
12	18	154-8203	FLOAT SWITCH ASSEMBLY (OIL TANK)
12	19	154-1212	VALVE FOR TANK VENT - 115V AC 2-WAY
12	20	154-8246	FILTER ASSEMBLY FOR VENT VALVE
12	21	154-8221	TUBING - OIL TANK TO VENT VALVE
12	22	154-6240	MOUNT ANGLE - TANK VENT VALVE
12	23	154-0241	STRAIGHT UNION - 1/4" TUBE (FOR LIGHT OIL)
12	24	154-8213B	RESTRICTION TUBING (USE ONLY WITH 18W OIL & LOWER)

FIGURE 13



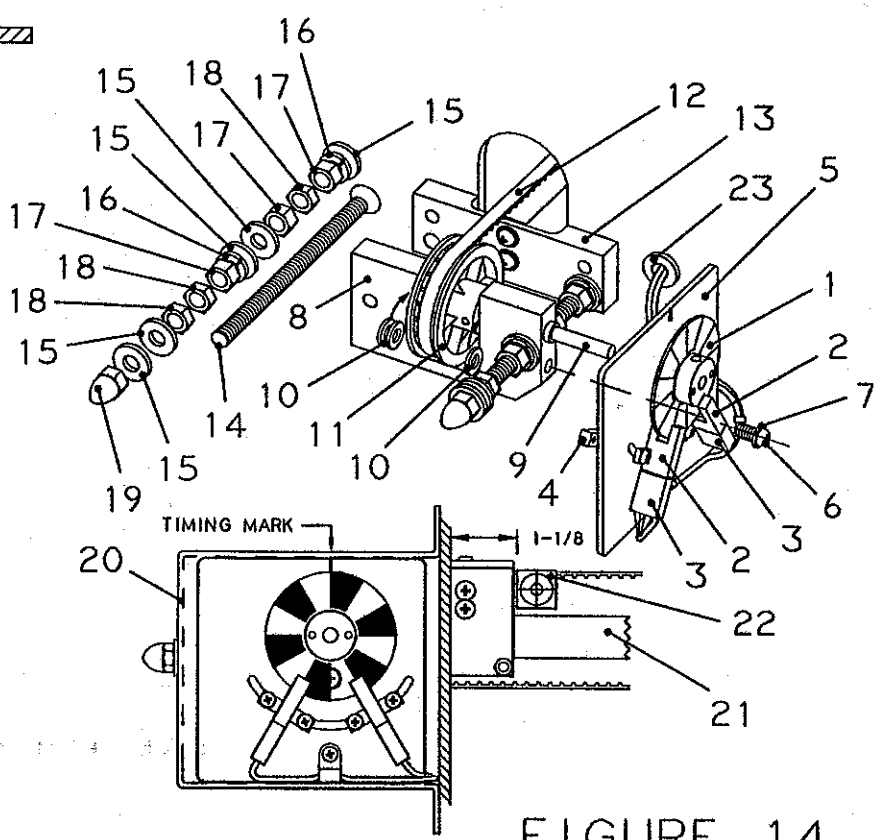
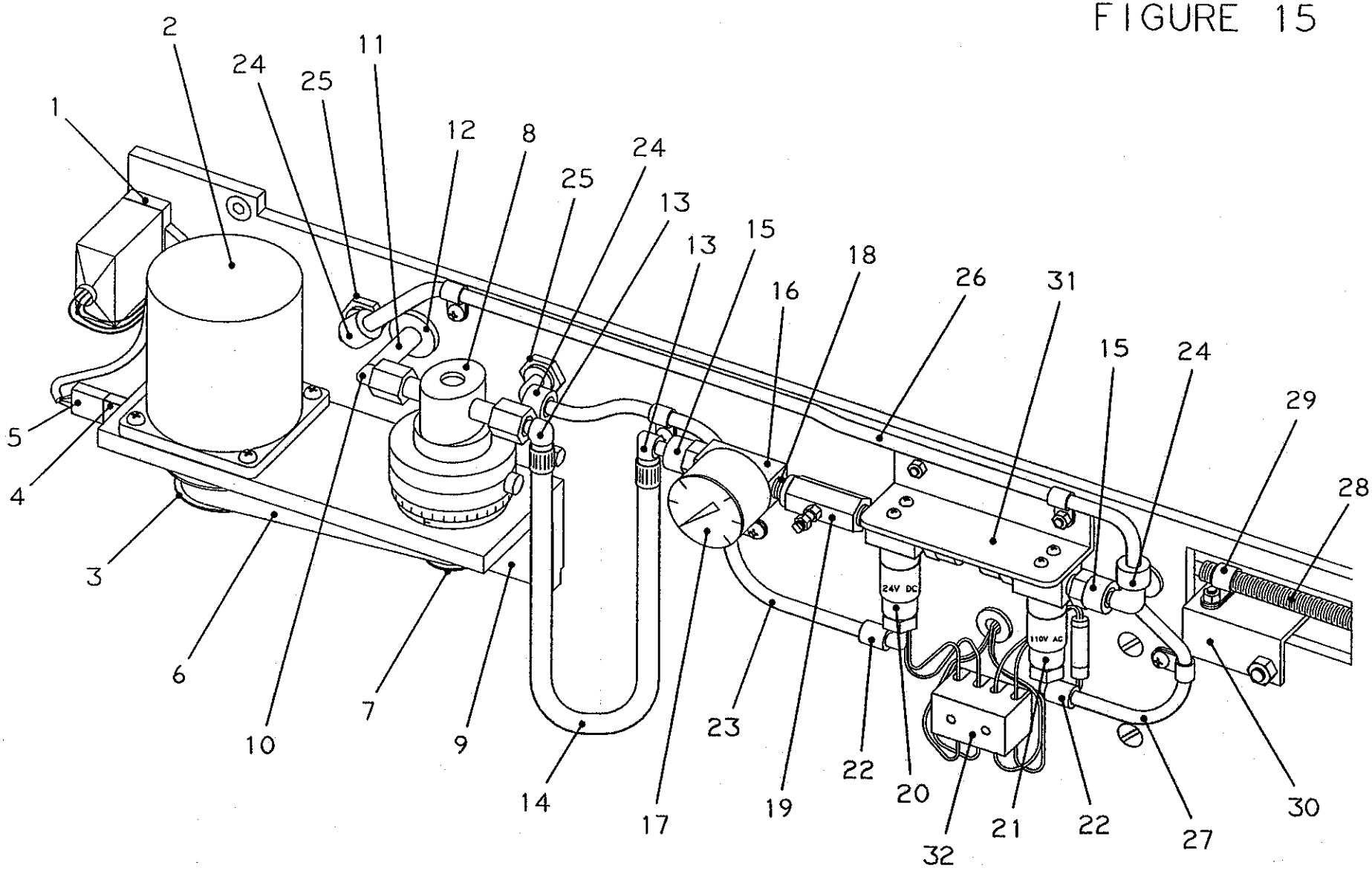


FIGURE 14

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 13 PART NUMBERS			
13	1	154-8206	TRANSFER ROLLER MOTOR - 25 RPM (110V)
13	1	154-8206A	TRANSFER ROLLER MOTOR - 25 RPM (220V)
13	2	153-6849	MOUNTING ANGLE - TRANSFER ROLLER MOTOR
13	3	153-9010	SPROCKET - 25B15 (TRANSFER DRIVE-3/8")
13	4	154-8247	IDLER SPROCKET ASSEMBLY (TRANSFER - 25B10)
13	5	154-9209	TRANSFER ROLLER TOP DRIVE CHAIN (25P65)
13	6	154-9210	TRANSFER ROLLER BOTTOM DRIVE CHAIN (25P31)
13	7	154-6236	IDLER FOR TRANSFER CHAIN - DELRIN
13	8	154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)
13	9	154-0228	FELT FOR TRANSFER GUARD (1/8" GRAY)

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
FIGURE 14 PART NUMBERS			
14	1	154-8238	SENSOR ACTUATOR ASSEMBLY (6-TOOTH FOR HEAD TIMING)
14	2	153-1031A	PASS-THROUGH SENSOR
14	3	153-1031B	SENSOR PLUG & CABLE
14	4	154-6211	MOUNTING BAR FOR PASS-THRU SENSOR
14	5	154-6216	MOUNTING PLATE - HEAD TIMING SENSORS
14	6	153-2086A	MS PHILLIPS - 8-32 X 3/8
14	7	153-2013	LOCK WASHER - #10
14	8	154-8243	MOUNTING BRACKET ASSEMBLY FOR TIMING PULLEY SHAFT
14	9	154-6212	SHAFT FOR IDLER PULLEY
14	10	153-2510	NYLON WASHER - 1/4 (0.060)
14	11	154-9204	PULLEY - HEAD IDLER (32XL-1/4)
14	12	154-9201	HEAD BELT - XL025
14	13	154-6215	MOUNTING BRACKET-HEAD DRIVE BAR (RIGHT)
14	14	153-2502	FHMS - 5/16-18 X 5
14	15	153-2005	FLAT WASHER - 5/16
14	16	153-2015	LOCK WASHER - 5/16
14	17	153-2024	HEX NUT - 5/16-18
14	18	153-2027A	JAM NUT - 5/16-18
14	19	153-2512	ACORN NUT - 5/16-18
14	20	154-6202	GUARD FOR HEAD IDLER PULLEY AND TIMING SENSORS
14	21	154-6210	BAR FOR HEAD DRIVE SYSTEM
14	22	154-1220	INDUCTIVE PROXIMITY SENSOR (TL-Q5MC1)
14	23	153-2040	SPOOL GROMMET - 1/2

FIGURE 15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24V DC
110V AC

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION
15	1	154-1207	MOTOR CAPACITOR (4.5 µF) HEAD DRIVE & OIL PUMP @ 60Hz
15	1	154-1207A	MOTOR CAPACITOR (5.0 µF) OIL PUMP @ 50 Hz
15	2	154-8234	MOTOR ASSEMBLY FOR METERING PUMP - 110V PX-S
15	3	154-8239	SENSOR ACTUATOR & TIMING PULLEY FOR PUMP
15	4	153-1031A	PASS-THROUGH SENSOR
15	5	153-1031B	SENSOR PLUG & CABLE
15	6	154-9202A	BELT FOR METERING PUMP (130XL037)
15	7	154-9208	PULLEY - METERING PUMP (12XL-5/16)
15	8	154-1214	FLUID METERING PUMP (RH0CKC) - 0.05 ml/STROKE
15	9	154-6223	MOUNTING ANGLE - PUMP & MOTOR
15	10	154-0226	ELBOW - TUBE TO HOSE BARB (1/4" STEM x 1/4 ID HOSE)
15	11	154-8215	TUBING - OIL TANK TO PUMP (32.75")
15	12	154-0218	GROMMET - 7/16 ID x 1/4 PANEL
15	13	154-0227	ELBOW - TUBE TO HOSE BARB (1/4" STEM x 5/16 ID HOSE)
15	14	154-8216	TUBING (VITON) - PUMP TO METERING VALVE (9.25")
15	15	154-0224	MALE CONNECTOR - 1/4" TUBE x 1/8 NPT
15	16	154-0234	TEE FITTING - 1/8 NPT (PRESSURE GAUGE MOUNT)
15	17	154-1225	PRESSURE GAUGE (0-30 PSI) - 1-1/2 DIA
15	18	154-0233	3/4" x 1/8" NPT GALVANIZED NIPPLE (VALVE)
15	19	154-1222	NEEDLE VALVE - 1/8 NPT (OIL PRESSURE CONTROL)
15	20	154-1209	VALVE FOR OIL CONTROL - 24V DC 3-WAY (1/8" NPT)
15	21	154-1210	VALVE FOR CALIBRATION - 115V AC 3-WAY (1/8" NPT)
15	22	154-0238	SWIVEL ELBOW - 1/4" TUBE x 1/8 NPT
15	23	154-8217	TUBING - METERING VALVE TO RETURN FITTING (9.5")
15	24	154-0222	ELBOW - 1/4" STEM x 1/4" TUBING OD
15	25	154-0221	BULKHEAD UNION - 1/4" TUBING
15	26	154-8222	TUBING - ROUTING VALVE TO FLOOR FITTING (19")
15	27	154-8220	TUBING - ROUTING VALVE TO OIL HEAD TIP (34.5")
15	28	154-0206	SPRING - OIL LINE CONTROL
15	29	153-1049E	WIRE HARNESS CLAMP - 3/8
15	30	154-6251	MOUNTING ANGLE FOR HEAD HOSE SPRING
15	31	154-6220	MOUNTING ANGLE - METERING VALVES
15	32	154-1221	TERMINAL BLOCK FOR VALVES

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	1	153-1801	C200HS MICROPROCESSOR	1
		ATTACHING PARTS		
		153-1811	PC MOUNTING RACK (C200H 3-SLOT)	1
		153-1818	WIRE TIE - 34" (C200HS PC)	1
		153-2004	FLAT WASHER - 1/4	12
		153-2014	LOCK WASHER - 1/4	4
		153-2023	HEX NUT - 1/4-20	4
		153-2029	ACORN NUT - 1/4-20	4
		153-2075	CARRIAGE BOLT - 1/4-20 X 2-1/2	4
		153-2093	SPRING - 0.42 OD X 0.75 (PROCESSOR)	8
		153-6811A	C200HS PC PLATE	1
1	2	154-8231	OUTPUT MODULE ASSEMBLY - OC222	2
		ATTACHING PARTS		
		153-1811	PC MOUNTING RACK (C200H 3-SLOT)	1
1	3	153-1816	INPUT MODULE - ID212	1
		ATTACHING PARTS		
		153-1811	PC MOUNTING RACK (C200H 3-SLOT)	1
1	4	154-6252	CATCH PLATE FOR ELECTRICAL LID	1
		ATTACHING PARTS		
		153-2507	FHMS PHILLIPS - 8-32 X 3/4	2
		153-2002	FLAT WASHER - #8	2
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
1	5	153-1002PX	PRO27 KEYBOARD (C200H WITH PHOENIX DECAL)	1
		ATTACHING PARTS		
		153-0019	KEYBOARD BACK PLATE	1
		153-0019B	KEYBOARD VIBRATION DAMPENER (3")	2
		153-2080	METRIC PAN HEAD SCREW - M3 X 8 (PRO27 MOUNT)	2
		153-6813	KEYBOARD MOUNTING PLATE (PHOENIX)	1
1	6	153-1005	KEYBOARD CABLE (C200H)	1
1	7	153-6813	KEYBOARD MOUNTING PLATE (PHOENIX)	1
		ATTACHING PARTS		
		153-2002	FLAT WASHER - #8	6
		153-2019	LOCKNUT - 8-32 (NYLOK)	6
		153-2086	MS PHILLIPS - 8-32 X 5/8	6
		153-6830	MOUNTING ANGLE - C200H KEYBOARD (4")	1
		153-6831	MOUNTING ANGLE - C200H KEYBOARD (2-3/8")	1

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ATTACHING PARTS FOR MECHANICAL DRAWINGS

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	8	153-1018	LY3 RELAY (110 VOLT)	2
1	8	153-1618	LY3 RELAY (220 VOLT)	2
		ATTACHING PARTS		
		153-1019	LY3 RELAY BASE	1
		153-1020	RELAY CLAMP	2
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2087	MS PHILLIPS - 8-32 X 3/4	2
1	9	153-1016	LY2 RELAY (110 VOLT)	2
1	9	153-1616	LY2 RELAY (220 VOLT)	2
		ATTACHING PARTS		
		153-1017	LY2 RELAY BASE	1
		153-1020	RELAY CLAMP	2
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2087	MS PHILLIPS - 8-32 X 3/4	2
1	10	153-6856	RELAY MOUNTING PLATE	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	5
		153-2014	LOCK WASHER - 1/4	3
		153-2023	HEX NUT - 1/4-20	3
		153-2078	FHMS - 1/4-20 X 3/4	1
		153-2052	HHCS - 1/4-20 X 7/8	2
1	11	153-1021	TERMINAL BLOCK	5
		ATTACHING PARTS		
		153-1022	TERMINAL BLOCK END FOOT	1
		153-1023	JUMPER FOR TERMINAL BLOCK	1
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2086	MS PHILLIPS - 8-32 X 5/8	2
1	12	153-1817	CIRCUIT BREAKER (15-AMP) FOR 110 VOLT	1
1	12	153-1810	CIRCUIT BREAKER (8-AMP) FOR 220 VOLT	1
1	13	153-1030	CIRCUIT BREAKER (10 AMP)	1
1	14	153-1823	FLANGED TWISTLOCK INLET - 125V/20A	1
1	14	153-1826	FLANGED TWISTLOCK INLET - 250V/20A	1
		ATTACHING PARTS		
		153-2002	FLAT WASHER - #8	3
		153-2019	LOCKNUT - 8-32 (NYLOK)	3
		153-2086	MS PHILLIPS - 8-32 X 5/8	3

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	15	154-8236	BUFFER MOTOR-1/2 HP (1725 RPM-110V 60 Hz)	1
1	15	154-8237	BUFFER MOTOR-1/2 HP (1725 RPM-220V 60 Hz)	1
		ATTACHING PARTS (NOTE: PULLEY IS INCLUDED IN ASSEMBLY)		
		153-1038	WIRE JOINT (SMALL)	1
		153-2005	FLAT WASHER - 5/16	6
		153-2015	LOCK WASHER - 5/16	4
		153-2024	HEX NUT - 5/16-18	4
		153-2061	HHCS - 5/16-18 X 1	2
		153-2503	FHSS - 5/16-18 X 1-1/4	2
1	16	153-9013	BUFFER MOTOR PULLEY (10L050-1/2")	1
		ATTACHING PARTS		
		153-2051A	SET SCREW - 1/4-20 X 1/4 (INCLUDED WITH PULLEY)	1
1	17	153-9015	T-BELT 322LO50 (BUFFER MOTOR)	1
1	18	153-1004	BUFFER MOTOR CONTACTOR (110 VOLT)	1
1	18	153-1604	BUFFER MOTOR CONTACTOR (220 VOLT)	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2089	MS PHILLIPS - 8-32 X 1	2
1	19	153-8801	BLOWER MOTOR ASSEMBLY - 110V/140 CFM	1
1	19	153-8802	BLOWER MOTOR ASSEMBLY - 220V/140 CFM	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	4
		153-2023	HEX NUT - 1/4-20	4
		153-2052	HHCS - 1/4-20 X 7/8	4
1	20	153-8065	DRIVE MOTOR ASSEMBLY (130VDC/165 RPM)	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	4
		153-2023	HEX NUT - 1/4-20	4
		153-2052	HHCS - 1/4-20 X 7/8	4
1	21	153-1057H	DAYTON DC MOTOR BRUSHES (SET OF 2)	1
1	22	153-9801	SPROCKET - 40B14 (3/4" BORE) FOR 110 VOLT	1
1	22	153-9805	SPROCKET - 40B18 (3/4" BORE) FOR 220 VOLT	1
		ATTACHING PARTS		
		153-2051	SET SCREW - 1/4-20 X 1/2 (INCLUDED WITH SPROCKET)	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	23	153-9804	DRIVE CHAIN - PHOENIX (40P35) 110 VOLT	1
1	23	153-9814	DRIVE CHAIN - PHOENIX (40P33) 220 VOLT	1
		ATTACHING PARTS		
		153-9047	40 MASTER LINK	1
		153-9048	40 OFFSET LINK (110V MACHINES ONLY)	1
1	24	154-8222	MOUNTING ANGLE - HEAD DRIVE MOTOR	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	4
		153-2014	LOCK WASHER - 1/4	2
		153-2023	HEX NUT - 1/4-20	2
		153-2053	HHCS - 1/4-20 X 1	1
		153-2054	HHCS - 1/4-20 X 1-1/4	1
1	25	154-1206	GEARBOX FOR HEAD DRIVE MOTOR (5:1 RATIO)	1
1	26	154-8232	HEAD DRIVE MOTOR ASSEMBLY - 110V PX-S	1
		ATTACHING FASTENERS ARE INCLUDED WITH GEARBOX		
1	27	154-9205D	PULLEY - HEAD DRIVE MOTOR (24XL-60 Hz)	1
1	27	154-9205B	PULLEY - HEAD DRIVE MOTOR (28XL-50 Hz)	1
		ATTACHING PARTS		
		153-2049	SET SCREW - 8-32 X 3/16	2
1	28	154-6218L	MOUNTING ANGLE - LEFT PROXIMITY SENSOR	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2086	MS PHILLIPS - 8-32 X 5/8	2
1	29	154-1220	INDUCTIVE PROXIMITY SENSOR (TL-Q5MC1)	2
		ATTACHING PARTS		
		153-2505	MS PHILLIPS - 4-40 X 1	2
1	30	154-6201	GUARD FOR HEAD DRIVE PULLEY (LEFT SIDE)	1
		ATTACHING PARTS		
		153-2013	LOCK WASHER - #10	3
		153-2086A	MS PHILLIPS - 8-32 X 3/8	3
1	31	154-8241	FELT PAD AND MOUNTING ANGLE-LEFT	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2806	FHMS - 8-32 X 5/8	2
1	32	154-8242	FELT PAD & MOUNTING ANGLE - RIGHT	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2806	FHMS - 8-32 X 5/8	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	33	154-6203A	GUARD FOR TRANSFER COMPARTMENT	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	4
		153-2014	LOCK WASHER - 1/4	2
		153-2023	HEX NUT - 1/4-20	2
		153-2052	HHCS - 1/4-20 X 7/8	2
		153-2019	LOCKNUT - 8-32 (NYLOK)	5
		153-2086	MS PHILLIPS - 8-32 X 5/8	3
		153-2089	MS PHILLIPS - 8-32 X 1	2
1	34	153-6840A	SUPPLY TANK (FOR EXPANSION PLUG)	1
		ATTACHING PARTS		
		153-0830	PROTECTIVE SLEEVE FOR ALL-THREAD (5-1/2")	1
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	2
		153-2020	LOCKNUT - 1/4-20 (NYLOK)	2
		153-2023	HEX NUT - 1/4-20	4
		153-2029	ACORN NUT - 1/4-20	2
		153-2821	SUPPLY TANK MOUNTING ROD (7-1/2" ALL-THREAD)	2
		153-6847	MOUNTING BAR FOR SUPPLY TANK	1
1	35	153-0246A	EXPANDABLE PLUG FOR SUPPLY TANK	1
1	36	153-6847	MOUNTING BAR FOR SUPPLY TANK	1
		ATTACHING PARTS		
		153-0830	PROTECTIVE SLEEVE FOR ALL-THREAD (5-1/2")	1
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	2
		153-2020	LOCKNUT - 1/4-20 (NYLOK)	2
		153-2023	HEX NUT - 1/4-20	4
		153-2029	ACORN NUT - 1/4-20	2
		153-2821	SUPPLY TANK MOUNTING ROD (7-1/2" ALL-THREAD)	2
1	37	153-6854	UHMW RETAINER FOR RECOVERY TANK	1
		ATTACHING PARTS		
		153-2002	FLAT WASHER - #8	1
		153-2019	LOCKNUT - 8-32 (NYLOK)	1
		153-2087	MS PHILLIPS - 8-32 X 3/4	1
1	38	153-6841	RECOVERY TANK (3-1/2 GALLON CAPACITY)	1
1	39	153-6223	SQUEEGEE HOSE ADAPTER	1
		ATTACHING PARTS		
		153-2014	LOCK WASHER - 1/4	2
		153-2052A	BHSS - 1/4-20 X 7/8	2
		153-6243A	SQUEEGEE MOUNTING ANGLE (PHOENIX)	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	40	154-0260	FLEXIBLE HOSE - SQUEEGEE TO TANK (10")	10*
		ATTACHING PARTS		
		153-2406	HOSE CLAMP (1/2")	2
1	41	153-2406	HOSE CLAMP (1/2")	3
1	42	153-8827T	ELBOW FOR RECOVERY TANK (NO THREADS)	1
1	43	154-0260	FLEXIBLE HOSE - TANK TO VACUUM (3")	3*
		ATTACHING PARTS		
		153-2406	HOSE CLAMP (1/2")	2
1	44	153-6810B	VACUUM MOTOR ADAPTER (BENT FLANGES)	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	4
		153-2023	HEX NUT - 1/4-20	4
		153-2052	HHCS - 1/4-20 X 7/8	4
1	45	153-8827	1-1/4 PVC ELBOW FOR RECOVERY TANK (5/8")	1
1	46	153-8201B	DMR LINODUSTER HUB ASSEMBLY	1
		ATTACHING PARTS		
		153-2050	SET SCREW - 1/4-28 X 3/8	1
1	47	153-6850	UHMW LINODUSTER PLUG FOR CARDBOARD CORE	1
		ATTACHING PARTS		
		153-2020A	LOCKNUT - 1/4-20 (STOVER)	1
		153-2807A	SHOULDER BOLT - 5/16 X 2 (1/4-20) WITHOUT HEAD	1
		153-2808	SPRING - 0.42 OD X 1.25 (LINODUSTER)	1
1	48	153-8202B	DMR LINODUSTER SOLID HUB ASSEMBLY (PVC DRIVE)	1
		ATTACHING PARTS		
		153-2050	SET SCREW - 1/4-28 X 3/8	1
1	49	153-6853	UHMW LINODUSTER PLUG FOR PVC TAKE-UP REEL	1
		ATTACHING PARTS		
		153-2020A	LOCKNUT - 1/4-20 (STOVER)	1
		153-2807	SHOULDER BOLT - 5/16 X 2 (1/4-20) LINODUSTER PLUG	1
		153-2808	SPRING - 0.42 OD X 1.25 (LINODUSTER)	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	50	153-8403	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-110 VOLT)	1
1	50	153-8803	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-220 VOLT)	1
		ATTACHING PARTS		
		153-2003	FLAT WASHER - #10	3
		153-2013	LOCK WASHER - #10	3
		153-2091	MS PHILLIPS - 10-32 X 3/4	3
		153-2604	MS FLAT PHILLIPS - 10-32 X 1/2	1
1	51	153-8824	PVC TAKE-UP REEL ASSEMBLY (PHOENIX=44-5/8")	1
		ATTACHING PARTS		
		153-6853	UHMW LINODUSTER PLUG FOR PVC TAKE-UP REEL	1
		153-8202B	DMR LINODUSTER SOLID HUB ASSEMBLY (PVC DRIVE)	1
1	52	153-8311	MOMENTARY WHEEL ASSEMBLY (URETHANE)	2
		ATTACHING PARTS		
		153-2049	SET SCREW - 8-32 X 3/16	1
		153-6006	MOMENTARY LANE ROLLER SHAFT	1
1	53	153-6029	MOMENTARY WHEEL HOUSING	2
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	4
		153-2015	LOCK WASHER - 5/16	2
		153-2024	HEX NUT - 5/16-18	2
		153-2049	SET SCREW - 8-32 X 3/16	1
		153-2061	HHCS - 5/16-18 X 1	2
1	54	154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER	2
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	4
		153-2016	LOCK WASHER - 3/8	2
		153-2025	HEX NUT - 3/8-16	2
		153-2067	HHCS - 3/8-16 X 1-1/4	2
1	55	154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER	2
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	4
		153-2016	LOCK WASHER - 3/8	2
		153-2025	HEX NUT - 3/8-16	2
		153-2805	FHSS - 3/8-16 X 1-1/4	2
1	56	153-0812	TRANSPORT CASTER - HEAVY DUTY (2")	4
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	2
		153-2016	LOCK WASHER - 3/8	1
		153-2025	HEX NUT - 3/8-16	1
		153-2068	HHCS - 3/8-16 X 1-1/2	1

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FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	57	153-7002AA	LANE DISTANCE COUNTER WHEEL-TREADED (2")	2
		ATTACHING PARTS		
		153-2050	SET SCREW - 1/4-28 X 3/8	2
1	58	153-7401	UHMW KICK-UP WHEEL	2
		ATTACHING PARTS		
		153-2413	SNAP RING - 1/2	2
1	59	153-6435	LANE DISTANCE COUNTER SHAFT (KICK-UP WHEEL)	1
1	60	153-8421	LANE DISTANCE PILLOWBLOCK ASSEMBLY (CENTER)	1
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	2
		153-2015	LOCK WASHER - 5/16	2
		153-2061	HHCS - 5/16-18 X 1	2
1	61	153-8033	LANE DISTANCE PILLOWBLOCK ASSEMBLY (LEFT)	1
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	2
		153-2015	LOCK WASHER - 5/16	2
		153-2061	HHCS - 5/16-18 X 1	2
1	62	153-6027	LANE DISTANCE ADJUSTMENT BLOCK	2
		ATTACHING PARTS		
		153-2027	JAM NUT - 3/8	1
		153-2047	SQUARE HEAD SET SCREW - 3/8 X 2	1
		153-2802	FHSS - 5/16-18 X 5/8	2
1	63	153-0001	TRANSPORT CASTER (3" DUAL WHEEL)	4
		ATTACHING PARTS		
		153-2007	FLAT WASHER - 1/2	2
		153-2017	LOCK WASHER - 1/2	1
		153-2026	HEX NUT - 1/2-13	1
		153-2073A	HHCS - 1/2-13 X 1-1/2	1
1	64	154-8249	HANDLE ASSEMBLY WITH KILL PLUGS (30")	1
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	4
		153-2021A	LOCKNUT - 3/8-16 (STOVER)	2
		153-2027	JAM NUT - 3/8-16	2
		153-2815	HHCS - 3/8-16 X 2-1/4 (GRADE 8)	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
1	65	153-1408	PUSH BUTTON (RED = NORMALLY OPEN)	1
		ATTACHING PARTS		
		153-1209	BUTTON GUARD	1
		153-1344	WIRE FOR START BUTTON (GRAY JACKET-RED & BLACK)	8 FEET
1	66	153-6851	UHMW HANDLE SPACER	2
1	67	154-0206	SPRING - OIL LINE CONTROL (10")	1
		ATTACHING PARTS		
		153-1049E	WIRE HARNESS CLAMP - 3/8	1
		153-2002	FLAT WASHER - #8	1
		153-2019	LOCKNUT - 8-32 (NYLOK)	1
		153-2806	FHMS - 8-32 X 5/8	1
1	68	154-0242A	VELCRO FOR HANDLE (ADHESIVE)	4
		ATTACHING PARTS		
		153-2034	ALUMINUM RIVET (0.187 X 0.700 X 0.375)	2
1	69	153-6412	LINODUSTER MOTOR SHIELD (FOR 7 RPM)	2
		ATTACHING PARTS		
		153-2113	MS PHILLIPS - 8-32 X 3/8 (SELF TAP)	2
		153-6412C	COVER FOR LINODUSTER MOTOR SHIELD	1
1	70	154-8248	STEP-DOWN TRANSFORMER ASSEMBLY (230V AC)	1
		ATTACHING PARTS		
		153-2003	FLAT WASHER - #10	8
		153-2013	LOCK WASHER - #10	4
		153-2523	FLAT HEAD PHILLIPS - 10-32 x 4	4
		153-2524	HEX NUT - 10-32	4
		155-0203	LOCKNUT - 10-32	4

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
2	1	153-0001	TRANSPORT CASTER (3" DUAL WHEEL)	4
		ATTACHING PARTS		
		153-2007	FLAT WASHER - 1/2	2
		153-2017	LOCK WASHER - 1/2	1
		153-2026	HEX NUT - 1/2-13	1
		153-2073A	HHCS - 1/2-13 X 1-1/2	1
2	2	153-0812	TRANSPORT CASTER - HEAVY DUTY (2")	4
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	2
		153-2016	LOCK WASHER - 3/8	1
		153-2025	HEX NUT - 3/8-16	1
		153-2068	HHCS - 3/8-16 X 1-1/2	1
2	3	154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER	2
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	4
		153-2016	LOCK WASHER - 3/8	2
		153-2025	HEX NUT - 3/8-16	2
		153-2805	FHSS - 3/8-16 X 1-1/4	2
2	4	154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER	2
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	4
		153-2016	LOCK WASHER - 3/8	2
		153-2025	HEX NUT - 3/8-16	2
		153-2067	HHCS - 3/8-16 X 1-1/4	2
2	5	153-8311	MOMENTARY WHEEL ASSEMBLY (URETHANE)	2
		ATTACHING PARTS		
		153-2049	SET SCREW - 8-32 X 3/16	1
		153-6006	MOMENTARY LANE ROLLER SHAFT	1
2	6	153-7002AA	LANE DISTANCE COUNTER WHEEL-TREADED (2")	2
		ATTACHING PARTS		
		153-2050	SET SCREW - 1/4-28 X 3/8	2
2	7	153-7013	URETHANE-BLEND LANE DRIVE WHEEL (4" TREADED)	2
		ATTACHING PARTS		
		153-2819	SET SCREW - 5/16-24 X 3/8	2
2	8	153-7401	UHMW KICK-UP WHEEL	2
		ATTACHING PARTS		
		153-2413	SNAP RING - 1/2	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
2	9	153-8410	LANE EDGE GUIDE ROLLER ASSEMBLY (1/2" BORE)	4
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	1
		153-2401	SPRING - 0.54 OD X 0.75 (GUIDE ROLLER)	1
		153-2407	SHOULDER BOLT - 3/8 X 1-3/4 (5/16-18) GUIDE ROLLER	1
		153-9034	PLAIN BUSHING (3/8 X 1/2 X 1/4)	1
2	10	153-6820A	MAIN DRIVE SHAFT (PHOENIX)	1
2	11	153-9003	SPROCKET - 40B10 (5/8" BORE)	1
		ATTACHING PARTS		
		153-2051A	SET SCREW - 1/4-20 X 1/4 (INCLUDED WITH SPROCKET)	1
2	12	154-6237	UHMW FLOOR SKID - LEFT SIDE PX-S	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	6
		153-2014	LOCK WASHER - 1/4	4
		153-2023	HEX NUT - 1/4-20	4
		153-2052	HHCS - 1/4-20 X 7/8	2
		153-2078	FHMS - 1/4-20 X 3/4	2
		153-6837	MOUNTING ANGLE - UHMW FLOOR SKID	1
2	13	154-6238	UHMW FLOOR SKID - RIGHT SIDE PX-S	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	4
		153-2023	HEX NUT - 1/4-20	4
		153-2052	HHCS - 1/4-20 X 7/8	4
		153-6837	MOUNTING ANGLE - UHMW FLOOR SKID	1
2	14	153-8814	DRIVE SHAFT PILLOWBLOCK - FLANGED BUSHING	1
		ATTACHING PARTS		
		153-0043	THICK FELT WASHER	1
		153-2006	FLAT WASHER - 3/8	4
		153-2016	LOCK WASHER - 3/8	2
		153-2025	HEX NUT - 3/8-16	2
		153-2036	SNAP RING - 5/8	1
		153-2235	HHCS - 3/8-16 X 3-1/4	2
2	15	153-8813	DRIVE SHAFT PILLOWBLOCK - PLAIN BUSHING	3
		ATTACHING PARTS		
		153-0043	THICK FELT WASHER	1
		153-2016	LOCK WASHER - 3/8	2
		153-2025	HEX NUT - 3/8-16	2
		153-2036	SNAP RING - 5/8	1
		153-2814	FHMS - 3/8-16 X 3-1/8	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
2	16	153-8421	LANE DISTANCE PILLOWBLOCK ASSEMBLY (CENTER)	1
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	2
		153-2015	LOCK WASHER - 5/16	2
		153-2061	HHCS - 5/16-18 X 1	2
2	17	153-8033	LANE DISTANCE PILLOWBLOCK ASSEMBLY (LEFT)	1
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	2
		153-2015	LOCK WASHER - 5/16	2
		153-2061	HHCS - 5/16-18 X 1	2
2	18	153-6027	LANE DISTANCE ADJUSTMENT BLOCK	2
		ATTACHING PARTS		
		153-2027	JAM NUT - 3/8	1
		153-2047	SQUARE HEAD SET SCREW - 3/8 X 2	1
		153-2802	FHSS - 5/16-18 X 5/8	2
2	19	153-6435	LANE DISTANCE COUNTER SHAFT (KICK-UP WHEEL)	1
2	20	153-8065	DRIVE MOTOR ASSEMBLY (130VDC/165 RPM)	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	4
		153-2023	HEX NUT - 1/4-20	4
		153-2052	HHCS - 1/4-20 X 7/8	4
2	21	154-8229A	POWER CORD ASSEMBLY - 125 FEET (110V 12 AWG)	1
2	21	154-8230	POWER CORD ASSEMBLY - 125 FEET (220V 12 AWG)	1
2	22	153-1025	MALE PLUG - 125V/15A	1
2	22	153-1625	MALE PLUG - 250V/15A	1
2	23	153-1822	FEMALE TWISTLOCK - 125V/20A	1
2	23	153-1824	FEMALE TWISTLOCK - 250V/20A	1
2	24	153-6851	UHMW HANDLE SPACER	2
2	25	153-2818	HHCS - 3/8-16 X 2-1/2 (GRADE 8)	2
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	2
		153-2021A	LOCKNUT - 3/8-16 (STOVER)	1
		153-2027	JAM NUT - 3/8	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
2	26	153-9816	3/4" FLANGED BEARING - 5/16-18 TAPPED	2
		ATTACHING PARTS		
		153-2009	NYLON FLAT WASHER (3/8 - 0.030)	2
		153-2801	SHOULDER BOLT - 3/8 X 3/8 (5/16-18) BRUSH LIFT	1
		153-9803	FLANGED BUSHING (3/8 X 1/2 X 1/4)	1
2	27	153-8039	BUFFER BELT IDLER ASSEMBLY	1
		ATTACHING PARTS		
		153-0040A	1/4" SPACER (5/8" LONG - BUFFER BELT IDLER)	1
		153-2006	FLAT WASHER - 3/8	2
		153-2016	LOCK WASHER - 3/8	1
		153-2025	HEX NUT - 3/8-16	2
		153-2405A	3/8-16 X 2-3/4" STEEL STUD	1
2	28	154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)	1
		ATTACHING PARTS		
		153-2009	NYLON FLAT WASHER (3/8 - 0.030)	2
		153-2801	SHOULDER BOLT - 3/8 X 3/8 (5/16-18) BRUSH LIFT	2
		153-9803	FLANGED BUSHING (3/8 X 1/2 X 1/4)	2
		153-9816	3/4" FLANGED BEARING - 5/16-18 TAPPED	2
2	29	154-6202	GUARD FOR HEAD IDLER PULLEY & SENSORS	1
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	4
		153-2027A	JAM NUT - 5/16-18	4
		153-2502	FHMS - 5/16-18 X 5	2
		153-2512	ACORN NUT - 5/16-18	2
2	30	154-0215	GRADUATED CYLINDER FOR CALIBRATION (25 ml)	1
		ATTACHING PARTS		
		154-0214	RETAINING CLIP FOR GRADUATED CYLINDER	1
		153-2019	LOCKNUT - 8-32 (NYLOK)	1
		153-2086	MS PHILLIPS - 8-32 X 5/8	1
		154-0210	FELT FOR CLEANING 25 ml GRADUATED CYLINDERS	1
2	31	153-6417	GUIDE ROLLER MOUNTING BAR (ALUMINUM)	4
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	2
		153-2015	LOCK WASHER - 5/16	2
		153-2061	HHCS - 5/16-18 X 1	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
2	32	153-8205	VACUUM MOTOR ASSEMBLY - 110 VOLT/104 CFM	1
2	32	153-8805	VACUUM MOTOR ASSEMBLY - 220 VOLT/96 CFM	1
		ATTACHING PARTS		
		153-0204B	VACUUM MOTOR BRUSHES - FOR 110 VOLT (PAIR)	1
		153-0204C	VACUUM MOTOR BRUSHES - FOR 220 VOLT (PAIR)	1
		153-2004	FLAT WASHER - 1/4	12
		153-2014	LOCK WASHER - 1/4	3
		153-2023	HEX NUT - 1/4-20	6
		153-2020	LOCKNUT - 1/4-20 (NYLOK)	3
		153-2233	HHCS - 1/4-20 X 3-1/4 (FULL THREAD)	3
2	33	153-8206	WATER SPRAY PUMP ASSEMBLY - 110 VOLT	1
2	33	153-8806	WATER SPRAY PUMP ASSEMBLY - 220 VOLT	1
		ATTACHING PARTS		
		153-2003	FLAT WASHER - #10	8
		153-2207	MS PHILLIPS - 10-24 X 1-1/4	4
		153-2208	LOCKNUT - 10-24 (NYLOK)	4
2	34	153-6842	SQUEEGEE ROD END (5/16-18 X 4-5/8)	1
		ATTACHING PARTS		
		153-0211	SQUEEGEE ROD END WITH FITTING (ON MOTOR)	1
		153-1047	WIRE TIE (4")	1
		153-2214	JAM NUT - 5/16-24	1
		153-2226	FELT STRIP	1
2	35	153-6254	SQUEEGEE ARM SHAFT	1
		ATTACHING PARTS		
		153-2051A	SET SCREW - 1/4-20 X 1/4	2
2	36	153-8809	SQUEEGEE PIVOT ARM - PHOENIX RIGHT SIDE	1
		ATTACHING PARTS		
		153-0043	THICK FELT WASHER	1
		153-2036	SNAP RING - 5/8	1
		153-2045	STEEL COLLAR - 5/8 X 1-1/8 X 1/2	1
		153-2051A	SET SCREW - 1/4-20 X 1/4	1
2	37	153-8808	SQUEEGEE PIVOT ARM - PHOENIX LEFT SIDE	1
		ATTACHING PARTS		
		153-0043	THICK FELT WASHER	1
		153-2036	SNAP RING - 5/8	1
		153-2045	STEEL COLLAR - 5/8 X 1-1/8 X 1/2	1
		153-2051A	SET SCREW - 1/4-20 X 1/4	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
2	38	153-0202A	COMPLETE SQUEEGEE ASSEMBLY (2-PIECE BROWN)	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	4
		153-2014	LOCK WASHER - 1/4	2
		153-2023	HEX NUT - 1/4-20	2
		153-2052	HHCS - 1/4-20 X 7/8	2
		153-2078	FHMS - 1/4-20 X 3/4 (MOUNTING FOR 153-6423A)	4
		153-2403	COUNTERSUNK LOCK WASHER - 1/4 (UNDER SQUEEGEE)	4
		153-6243A	SQUEEGEE MOUNTING ANGLE - PHOENIX	1
2	39	153-6223	SQUEEGEE HOSE ADAPTER	1
		ATTACHING PARTS		
		153-2014	LOCK WASHER - 1/4	2
		153-2052A	BHSS - 1/4-20 X 7/8	2
		153-6243	SQUEEGEE MOUNTING ANGLE	1
2	40	153-8403	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-110 VOLT)	2
2	40	153-8803	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-220 VOLT)	2
		ATTACHING PARTS		
		153-2003	FLAT WASHER - #10	3
		153-2013	LOCK WASHER - #10	3
		153-2091	MS PHILLIPS - 10-32 X 3/4	3
		153-2604	MS FLAT PHILLIPS - 10-32 X 1/2	1

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FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
2	41	153-6412	LINODUSTER MOTOR SHIELD (FOR 7 RPM)	1
		FOR ATTACHING PARTS SEE FIGURE 1:69		
2	42	154-8202	COMPLETE LID ASSEMBLY - PX-S	1
		ATTACHING PARTS		
		153-2002	FLAT WASHER - #8	2
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2086	MS PHILLIPS - 8-32 X 5/8	2
2	43	153-8238	CUSHION ROLLER ASSEMBLY (44")	1
		ATTACHING PARTS		
		153-0038B	HEAVY CUSHION WEIGHT - 42-3/4" (INSIDE ROLLER)	1
		153-2038	ROLL PIN - 1/8 X 1	2
		153-6422	CUSHION ROLLER SHAFT (45-7/8")	1
		153-9050	CUSHION ROLLER PLUG (1.660 X 0.140 X 0.375)	2
2	44	153-9050	CUSHION ROLLER PLUG	2
2	45	154-8209A	CABLE ASSEMBLY WITH CORD KILL PLUG	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
3	1	153-6840A	SUPPLY TANK (FOR EXPANSION PLUG)	1
		ATTACHING PARTS		
		153-0830	PROTECTIVE SLEEVE FOR ALL-THREAD (5-1/2")	1
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	2
		153-2020	LOCKNUT - 1/4-20 (NYLOK)	2
		153-2023	HEX NUT - 1/4-20	4
		153-2029	ACORN NUT - 1/4-20	2
		153-2821	SUPPLY TANK MOUNTING ROD (7-1/2" ALL-THREAD)	2
		153-6847	MOUNTING BAR FOR SUPPLY TANK	1
3	2	153-0246A	EXPANDABLE PLUG FOR SUPPLY TANK	1
3	3	153-0216	ELBOW (1/4 - MPT X 1/4 - FPT)	1
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
3	4	153-0217	MALE BODY (1/4 - NYLON)	4
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
3	5	154-0212	TANK FILTER (5" SS)	1
3	6	153-0209	MALE CONNECTOR (1/4 X 1/4 - MPT)	2
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
3	7	153-0218	TIP RETAINER CAP CONNECTOR	4
3	8	153-0806A	SPRAY HOSE - SUPPLY TANK TO PUMP (23")	1
		ATTACHING PARTS		
		153-1047	WIRE TIE (4")	2
3	9	153-8206	WATER SPRAY PUMP ASSEMBLY - 110 VOLT	1
3	9	153-8806	WATER SPRAY PUMP ASSEMBLY - 220 VOLT	1
		ATTACHING PARTS		
		153-2003	FLAT WASHER - #10	8
		153-2207	MS PHILLIPS - 10-24 X 1-1/4	4
		153-2208	LOCKNUT - 10-24 (NYLOK)	4
3	10	153-0212	MALE ELBOW (1/4 X 3/8 - MPT)	2
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
3	11	153-0807	SPRAY HOSE - PUMP TO TEE (7")	1
3	12	153-0815	UNION TEE (1/4 X 1/4 X 1/4 - QUICK DISCONNECT)	4

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
3	13	153-0809A	PRESSURE REGULATOR HOSE - TEE TO TANK	1
		NOTE: METERING TUBE IS INSIDE THE HOSE		
3	14	154-8225A	SPRAY HOSE - TEE TO LEFT OUTSIDE JET	1
3	15	153-0818	MALE SWIVEL ELBOW - 1/4 TUBE X 1/4 NPT	4
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
3	16	153-6252	SPRAY JET BODY	4
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	1
		153-2015	LOCK WASHER - 5/16	1
		153-2602	HHCS - 5/16-18 X 3/4	1
3	17	153-6251S	SPRAY JET SWIVEL MOUNTING ANGLE	4
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	2
		153-2014	LOCK WASHER - 1/4	1
		153-2023	HEX NUT - 1/4-20	1
		153-2052	HHCS - 1/4-20 X 7/8	1
3	18	153-0220	SCREEN CHECK VALVE (POLYPROPYLENE - 10#)	4
3	19	154-0007	SPRAY TIP - STAINLESS STEEL (1501)	2
3	20	153-0207A	SPRAY TIP - STAINLESS STEEL (11003)	2
3	21	154-8226	SPRAY HOSE - LEFT JET TO LEFT MIDDLE JET	1
3	22	154-8227	SPRAY HOSE - LEFT MIDDLE TO RIGHT MIDDLE JET	1
3	23	154-8228A	SPRAY HOSE - RIGHT MIDDLE TO RT OUTSIDE JET	1
3	24	154-0243	UNION ELBOW (1/4 X 1/4 - QUICK DISCONNECT)	2
3	25	153-6251M	SPRAY JET WALL MOUNTING ANGLE	4
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	4
		153-2014	LOCK WASHER - 1/4	2
		153-2023	HEX NUT - 1/4-20	2
		153-2052	HHCS - 1/4-20 X 7/8	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
4	1	153-8207	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-110 VOLT)	1
4	1	153-8807	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-220 VOLT)	1
		ATTACHING PARTS		
		153-2813	MS FLAT PHILLIPS - 10-32 X 3/4	4
4	2	154-6243	MOTOR CAM - DUAL LOBES (3/8 & 5/8 OFFSET)	1
		ATTACHING PARTS		
		153-2051	SET SCREW - 1/4-20 X 1/2	1
4	3	153-1203	MICROSWITCH - WITH ROLLER (SQUEEGEE & BRUSH)	2
		ATTACHING PARTS		
		153-2505	MS PHILLIPS - 4-40 X 1	2
4	4	153-6832B	MOUNTING ANGLE-25 RPM MOTOR (SQUEEGEE)	1
		ATTACHING PARTS		
		153-2403	COUNTERSUNK LOCK WASHER - 1/4	2
		153-2078	FHMS - 1/4-20 X 3/4	2
		153-9807	BEARING FOR MOTOR SHAFT	1
4	5	153-2027A	JAM NUT - 5/16-18	1
4	6	153-2005	FLAT WASHER - 5/16	2
4	7	153-0211	SQUEEGEE ROD END WITH FITTING (ON MOTOR)	1
4	8	153-2062	HHCS - 5/16-18 X 1-1/4	1
4	9	153-2214	JAM NUT - 5/16-24	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
5	1	153-1031A	PASS-THROUGH SENSOR	1
		ATTACHING PARTS		
		153-2001	FLAT WASHER - #6	2
		153-2081	MS PHILLIPS - 6-32 X 1/2	2
5	2	153-1031B	SENSOR PLUG & CABLE	1
5	3	153-1049D	WIRE HARNESS CLAMP - 1/8	1
		ATTACHING PARTS		
		153-2113	MS PHILLIPS - 8-32 X 3/8 (SELF TAP)	1
5	4	153-7002AA	LANE DISTANCE COUNTER WHEEL-TREADED (2")	2
		ATTACHING PARTS		
		153-2050	SET SCREW - 1/4-28 X 3/8	2
5	5	153-9110	COUNTER SPROCKET (10-TOOTH)	1
		ATTACHING PARTS		
		153-2051A	SET SCREW - 1/4-20 X 1/4 (INCLUDED)	1
5	6	153-2010	NYLON FLAT WASHER (1/2 - 0.030)	6 or 7
5	7	153-8031	LANE DISTANCE PILLOWBLOCK ASSEMBLY (RIGHT)	1
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	2
		153-2015	LOCK WASHER - 5/16	2
		153-2061	HHCS - 5/16-18 X 1	2
5	8	153-8049	LANE DISTANCE SENSOR GUARD ASSEMBLY	1
		ATTACHING PARTS		
		153-2086A	MS PHILLIPS - 8-32 X 3/8	3
5	9	153-2047	SQUARE HEAD SET SCREW - 3/8 X 2	2
5	10	153-2027	JAM NUT - 3/8-16	2
5	11	153-6027	LANE DISTANCE ADJUSTMENT BLOCK	2
		ATTACHING PARTS		
		153-2027	JAM NUT - 3/8	1
		153-2047	SQUARE HEAD SET SCREW - 3/8 X 2	1
		153-2802	FHSS - 5/16-18 X 5/8	2
5	12	153-7401	UHMW KICK-UP WHEEL	2
		ATTACHING PARTS		
		153-2413	SNAP RING - 1/2	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
6	1	154-8210	CIRCUIT BOARD ASSEMBLY-110V SPEED CONTROL	1
6	1	154-8211	CIRCUIT BOARD ASSEMBLY-220V SPEED CONTROL	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2806	FLAT HEAD PHILLIPS - 8-32 X 5/8	2
6	2	153-1012	SPEED CONTROL FOR DC MOTOR FOR 110 VOLT	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2806	FLAT HEAD PHILLIPS - 8-32 X 5/8	2
6	3	153-1812	SPEED CONTROL FOR DC MOTOR FOR 220 VOLT	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2806	FLAT HEAD PHILLIPS - 8-32 X 5/8	2
7	1	153-8207	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-110 VOLT)	1
7	1	153-8807	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-220 VOLT)	1
		ATTACHING PARTS		
		153-2813	MS FLAT PHILLIPS - 10-32 X 3/4	4
7	2	154-6243	MOTOR CAM - DUAL LOBES (3/8 & 5/8 OFFSET)	1
		ATTACHING PARTS		
		153-2051	SET SCREW - 1/4-20 X 1/2	1
7	3	153-1203	MICROSWITCH - WITH ROLLER (SQUEEGEE & BRUSH)	2
		ATTACHING PARTS		
		153-2505	MS PHILLIPS - 4-40 X 1	2
7	4	154-6247	MOUNTING ANGLE-25 RPM MOTOR (BRUSH LIFT)	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	2
		153-2014	LOCK WASHER - 1/4	2
		153-2052	HHCS - 1/4-20 X 7/8	2
		153-9807	BEARING FOR MOTOR SHAFT	1
7	5	153-8818	CONNECTING LINK ASSEMBLY - MOTOR CAM/PIVOT	1
		ATTACHING PARTS		
		153-2024	HEX NUT - 5/16-18	1
		153-2801	SHOULDER BOLT - 3/8 X 3/8 (5/16-18) BRUSH LIFT	2
7	6	153-8814	PIVOT SHAFT ASSEMBLY FOR LIFTING BRUSH	1
		ATTACHING PARTS		
		153-2604	COLLAR - 3/8 X 3/4 X 3/8	2
		153-9803	FLANGED BUSHING (3/8 X 1/2 X 1/4)	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
7	7	153-8819L	CONNECTING LINK ASSEMBLY-BEARING/PIVOT-LEFT	1
		ATTACHING PARTS		
		153-2024	HEX NUT - 5/16-18	1
		153-2801	SHOULDER BOLT - 3/8 X 3/8 (5/16-18) BRUSH LIFT	2
7	8	153-9816	3/4" FLANGED BEARING - 5/16-18 TAPPED	2
		ATTACHING PARTS		
		153-2006	FLAT WASHER - 3/8	1
		153-2801	SHOULDER BOLT - 3/8 X 3/8 (5/16-18) BRUSH LIFT	1
		153-9803	FLANGED BUSHING (3/8 X 1/2 X 1/4)	1
7	9	154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)	1
		FOR ATTACHING PARTS SEE FIGURE 2:28		
7	10	153-2804	COLLAR - 3/8 X 3/4 X 3/8	2
7	11	153-9803	FLANGED BUSHING (3/8 X 1/2 X 1/4)	2
7	12	153-2801	SHOULDER BOLT - 3/8 X 3/8 (5/16-18) BRUSH LIFT	6
7	13	153-6858	SHIELD FOR MOTOR (BRUSH LIFT)	1
		ATTACHING PARTS		
		153-1049A	WIRE HARNESS CLAMP - 1/4	1
		153-2086A	MS PHILLIPS - 8-32 X 3/8	2
		153-2417	GROMMET - 15/16" OD	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
8	1	154-8220	TUBING - ROUTING VALVE TO OIL HEAD TIP (34.5")	1
8	2	154-6209	TIP HOLDER FOR OIL TUBING	1
		ATTACHING PARTS		
		153-2049	SET SCREW - 8-32 X 3/16	2
8	3	154-8213	PENCIL TIP FOR OIL HEAD	1
8	4	154-6241	MOUNT FOR PENCIL TIP	1
		ATTACHING PARTS		
		153-2501	FLAT HEAD PHILLIPS - 8-32 X 1-1/2	2
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
8	5	154-6230	UHMW SLIDING HEAD	1
8	6	154-6230C	UHMW SLIDING HEAD (COUNTERSUNK HOLE)	1
		ATTACHING PARTS FOR ASSEMBLY		
		153-2501	FLAT HEAD PHILLIPS - 8-32 X 1-1/2	3
		154-0202A	PENCIL TUBING STOCK	1/8"
		153-2520	FLAT HEAD PHILLIPS - 8-32 X 1-1/4	1
		153-2019	LOCKNUT - 8-32 (NYLOK)	4
8	7	154-6219	MOUNTING PLATE - HEAD BELT	1
		ATTACHING PARTS		
		153-2504	MS PHILLIPS - 4-40 X 3/8	1
		153-2514	FLAT HEAD PHILLIPS - 8-32 X 5/8 (SELF TAP)	4
8	8	154-1220	INDUCTIVE PROXIMITY SENSOR (TL-Q5MC1)	2
		ATTACHING PARTS		
		153-2505	MS PHILLIPS - 4-40 X 1	2
8	9	154-8204R	TRANSFER ROLLER ARM - TOP RIGHT	1
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	2
		153-2015	LOCK WASHER - 5/16	2
		153-2024	HEX NUT - 5/16-18	2
		153-2513	FHSS - 5/16-18 X 1-1/2	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
8	10	154-8205R	TRANSFER ROLLER ARM - BOTTOM RIGHT	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	1
		153-2014	LOCK WASHER - 1/4	1
		153-2056	HHCS - 1/4-20 X 1-3/4	1
		153-2038	ROLL PIN - 1/8 X 1	1
8	11	154-8207	TRANSFER ROLLER ASSEMBLY - 2.25 Ø (TOP)	1
8	12	154-8208	TRANSFER ROLLER ASSEMBLY - 1.75 Ø (BOTTOM)	1
8	13	154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)	1
		FOR ATTACHING PARTS SEE FIGURE 2:28		
8	14	153-2519	SQUARE HEAD SET SCREW - 1/4-20 X 2	2
		ATTACHING PARTS		
		153-2304	JAM NUT - 1/4-20	1
8	15	154-6203A	GUARD FOR TRANSFER COMPARTMENT	1
		FOR ATTACHING PARTS SEE FIGURE 1:33		
8	16	154-6210	BAR FOR HEAD DRIVE SYSTEM	1
		ATTACHING PARTS		
		153-2013	LOCK WASHER - #10	4
		153-2086A	MS PHILLIPS - 8-32 X 3/8	4

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
9	1	153-8238	CUSHION ROLLER ASSEMBLY (DMR LINODUSTER=44")	1
		ATTACHING PARTS		
		153-0038B	HEAVY CUSHION WEIGHT - 40" (INSIDE ROLLER)	1
		153-2038	ROLL PIN - 1/8 X 1	2
		153-6422	CUSHION ROLLER SHAFT (45-7/8")	1
		153-9050	CUSHION ROLLER PLUG (1.660 X 0.140 X 0.375)	2
9	2	153-8420	CUSHION ROLLER PIVOT ARM ASSEMBLY	2
		NOTE: PLACE WASHER BETWEEN THE ARM & THE SIDE PLATE		
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	1
		153-2020A	LOCKNUT - 1/4-20 (STOVER)	1
		153-2090	MS PHILLIPS - 8-32 X 1-1/2	1
		153-2408	SHOULDER BOLT - 5/16 X 1/2 (1/4-20) CUSHION PIVOT	1
		153-2414	HEX NUT - 8-32	1
9	3	153-2090	MS PHILLIPS - 8-32 X 1-1/2	2
9	4	153-2414	HEX NUT - 8-32	2
9	5	153-1202	MICROSWITCH - WITHOUT ROLLER (DMR)	4
		ATTACHING PARTS		
		153-2001	FLAT WASHER - #6	2
		153-2216A	MS PHILLIPS - 4-40 X 7/8	2
		153-2231	LOCKNUT 4-40 (NYLOK)	2
9	6	153-6825	LINODUSTER CLOTH ROUTING BAR (SS)	1
		ATTACHING PARTS		
		153-2409	SHOULDER BOLT - 1/4 X 3/8 (10-24) LINODUSTER ROD	2
		153-9409	FLANGED BUSHING (1/4 X 3/8 X 1/4)	2
9	7	153-8824	PVC TAKE-UP REEL ASSEMBLY (PHOENIX=44-5/8")	1
		FOR ATTACHING PARTS SEE FIGURE 1:51		
9	8	153-0429	DMR LINODUSTER TAKE-UP SUPPORT PIPE (40")	1
9	9	153-2412	SHCS - 1/4-20 X 1/2 (CUSHION ROLLER STOP)	4
		ATTACHING PARTS		
		153-2020	LOCKNUT - 1/4-20 (NYLOK)	1
9	10	153-2232A	LID LATCH - FLUSH MOUNT DUAL BUTTON	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
10	1	153-1031A	PASS-THROUGH SENSOR	1
		ATTACHING PARTS		
		153-2001	FLAT WASHER - #6	2
		153-2081	MS PHILLIPS - 6-32 X 1/2	2
10	2	153-1031B	SENSOR PLUG & CABLE	1
10	3	153-1049D	WIRE HARNESS CLAMP - 1/8	1
		ATTACHING PARTS		
		153-2113	MS PHILLIPS - 8-32 X 3/8 (SELF TAP)	1
10	4	153-9110	COUNTER SPROCKET (10-TOOTH)	1
		ATTACHING PARTS		
		153-2051A	SET SCREW - 1/4-20 X 1/4	1
10	5	153-8815	DRIVE SHAFT PILLOWBLOCK ASSEMBLY - TACH	1
		ATTACHING PARTS		
		153-0043	THICK FELT WASHER	1
		153-2006	FLAT WASHER - 3/8	2
		153-2016	LOCK WASHER - 3/8	2
		153-2036	SNAP RING - 5/8	1
		153-2067	HHCS - 3/8-16 X 1-1/4	2
10	6	153-6859	SENSOR GUARD FOR TACHOMETER	1
		ATTACHING PARTS		
		153-2016	LOCK WASHER - 3/8	2
		153-2525	HHCS - 3/8-16 X 1/2	2
10	7	153-7013	URETHANE-BLEND LANE DRIVE WHEEL (4" TREADED)	2
		ATTACHING PARTS		
		153-2819	SET SCREW - 5/16-24 X 3/8	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
11	1	153-1018	LY3 RELAY (110 VOLT)	2
11	1	153-1618	LY3 RELAY (220 VOLT)	2
		ATTACHING PARTS		
		153-1020	RELAY CLAMP	2
11	2	153-1019	LY3 RELAY BASE	2
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2087	MS PHILLIPS - 8-32 X 3/4	2
11	3	153-1016	LY2 RELAY (110 VOLT)	2
11	3	153-1616	LY2 RELAY (220 VOLT)	2
		ATTACHING PARTS		
		153-1020	RELAY CLAMP	2
11	4	153-1017	LY2 RELAY BASE	2
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2087	MS PHILLIPS - 8-32 X 3/4	2
11	5	153-1011	BRAKE RESISTOR	1
11	6	153-1021	TERMINAL BLOCK	1
		ATTACHING PARTS		

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
12	1	154-8201	OIL TANK ASSEMBLY - PX-S	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	8
		153-2014	LOCK WASHER - 1/4	4
		153-2023	HEX NUT - 1/4-20	4
		153-2053	HHCS - 1/4-20 X 1	4
12	2	154-0232D	MALE CONNECTOR - 1/2" TUBE x 1/2 NPT (DRILLED)	2
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
12	3	154-0231	PLUG - 1/2" TUBE ID	2
12	4	154-0223	ELBOW (90 DEGREE) - 1/4 NPT x 1/4" TUBE	4
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
12	5	154-0227	ELBOW - TUBE TO HOSE BARB (1/4" STEM x 5/16)	2
12	6	154-8214	TUBING - 5/16 CLEAR PVC (5.25")	1
12	7	154-0225	ELBOW - 3/8 TUBE OD x 1/4 NPT	1
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
12	8	153-1054	3/8" PLUG (GRAY PLASTIC)	1
12	9	154-0212	TANK FILTER (5" SS)	1
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
12	10	154-8215	TUBING - OIL TANK TO PUMP (32.75")	1
12	11	154-0221	BULKHEAD UNION - 1/4" TUBING	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
12	12	154-0222	ELBOW - 1/4" STEM x 1/4" TUBING OD	1
12	13	154-8224	TUBING - CALIBRATION FITTING TO TIP	1
12	14	154-8213A	TIP FOR CALIBRATION	1
12	15	154-8223	TUBING - FLOOR FITTING TO CALIBRATION FITTING	1
12	16	154-8218	TUBING - RETURN FITTING TO OIL TANK	1
12	17	154-6244	MOUNTING PLATE - OIL TANK FLOAT	1
		NOTE: USE A SMALL AMOUNT OF SILICONE TO SEAL THE PLATE		
		ATTACHING PARTS		
		153-2013	LOCK WASHER - #10	4
		153-2086	MS PHILLIPS - 8-32 X 5/8	4
12	18	154-8203	FLOAT SWITCH ASSEMBLY (OIL TANK)	1
		NOTE: USE TEFLON TAPE WHEN REPLACING FLOAT		
12	19	154-1212	VALVE FOR TANK VENT - 115V AC 2-WAY	1
		ATTACHING PARTS		
		153-2504	MS PHILLIPS - 4-40 X 3/8	2
12	20	154-8246	FILTER ASSEMBLY FOR VENT VALVE	1
12	21	154-8221	TUBING - OIL TANK TO VENT VALVE	1
12	22	154-6240	MOUNT ANGLE - TANK VENT VALVE	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2806	FHMS - 8-32 X 5/8	2
12	23	154-0241	STRAIGHT UNION - 1/4" TUBE (FOR LIGHT OIL)	1
		NOTE: THIS IS AN OPTIONAL FITTING TO BE USED WITH LIGHT OIL		
12	24	154-8213B	RESTRICTION TUBING (18W OIL & LOWER)	1
		NOTE: THIS IS AN OPTIONAL PIECE OF TUBING TO BE USED WITH LIGHT OIL		

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
13	1	154-8206	TRANSFER ROLLER MOTOR - 25 RPM (110V)	1
		154-8206A	TRANSFER ROLLER MOTOR - 25 RPM (220V)	1
		ATTACHING PARTS		
		153-2002	FLAT WASHER - #8	7
		153-2019	LOCKNUT - 8-32 (NYLOK)	4
		153-2816	MS PHILLIPS - 8-32 X 2 (SS)	4
13	2	153-6849	MOUNTING ANGLE - TRANSFER ROLLER MOTOR	1
		ATTACHING PARTS		
		153-2005	FLAT WASHER - 5/16	4
		153-2015	LOCK WASHER - 5/16	2
		153-2024	HEX NUT - 5/16-18	2
		153-2061	HHCS - 5/16-18 X 1	2
13	3	153-9010	SPROCKET - 25B15 (TRANSFER DRIVE-3/8")	4
		ATTACHING PARTS		
		153-2051A	SET SCREW - 1/4-20 X 1/4	1
13	4	154-8247	IDLER SPROCKET ASSEMBLY (TRANSFER - 25B10)	1
		ATTACHING PARTS		
		153-9028A	PLAIN BUSHING (1/4 X 5/16 X 1/2)	1
13	5	154-9209	TRANSFER ROLLER TOP DRIVE CHAIN (25P65)	1
		ATTACHING PARTS		
		153-9045	25 MASTER LINK	1
13	6	154-9210	TRANSFER ROLLER BOTTOM DRIVE CHAIN (25P31)	1
		ATTACHING PARTS		
		153-9045	25 MASTER LINK	1
13	7	154-6236	IDLER FOR TRANSFER CHAIN - DELRIN	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	4
		153-2014	LOCK WASHER - 1/4	1
		153-2023	HEX NUT - 1/4-20	2
		153-2055	HHCS - 1/4-20 X 1-1/2	1
13	8	154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)	1
		FOR ATTACHING PARTS SEE FIGURE 2:28		
13	9	154-0228	FELT FOR TRANSFER GUARD (1/8" GRAY)	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
14	1	154-8238	SENSOR ACTUATOR ASSEMBLY (6-TOOTH)	1
		ATTACHING PARTS		
		153-2049	SET SCREW - 8-32 X 3/16	2
14	2	153-1031A	PASS-THROUGH SENSOR	2
		ATTACHING PARTS		
		153-2001	FLAT WASHER - #6	2
		153-2522	MS PHILLIPS - 4-40 X 1/2	2
		154-6211	MOUNTING BAR FOR PASS-THRU SENSOR	1
14	3	153-1031B	SENSOR PLUG & CABLE	2
14	4	154-6211	MOUNTING BAR FOR PASS-THRU SENSOR	2
14	5	154-6216	MOUNTING PLATE - HEAD TIMING SENSORS	1
		ATTACHING PARTS		
		153-2086A	MS PHILLIPS - 8-32 X 3/8	1
		153-2013	LOCK WASHER - #10	1
14	6	153-2086A	MS PHILLIPS - 8-32 X 3/8	1
14	7	153-2013	LOCK WASHER - #10	1
14	8	154-8243	MOUNTING BRACKET ASSEMBLY FOR TIMING PULLEY SHAFT	1
		ATTACHING PARTS		
		153-2502	FHMS - 5/16-18 X 5	2
		153-2005	FLAT WASHER - 5/16	4
		153-2015	LOCK WASHER - 5/16	2
		153-2024	HEX NUT - 5/16-18	4
		153-2027A	JAM NUT - 5/16-18	2
14	9	154-6212	SHAFT FOR IDLER PULLEY	1
14	10	153-2510	NYLON WASHER - 1/4 (0.060)	3
14	11	154-9204	PULLEY - HEAD IDLER (32XL-1/4)	1
		ATTACHING PARTS		
		153-2049	SET SCREW - 8-32 X 3/16	1
14	12	154-9201	HEAD BELT - XL025	1
		NOTE: USE 1-5/8" PIECE OF BELT TO LOCK TEETH TOGETHER IN THE HEAD		
		ATTACHING PARTS		
		153-2504	MS PHILLIPS - 4-40 X 3/8	1
		153-2514	FLAT HEAD PHILLIPS - 8-32 X 5/8 (SELF TAP)	4
		154-6219	MOUNTING PLATE - HEAD BELT	1
		154-9201A	BELT RETAINER - XL025 (1-5/8")	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
14	13	154-6215	MOUNTING BRACKET-HEAD DRIVE BAR (RIGHT)	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	2
		153-2014	LOCK WASHER - 1/4	2
		153-2052	HHCS - 1/4-20 X 7/8	2
14	14	153-2502	FHMS - 5/16-18 X 5	2
14	15	153-2005	FLAT WASHER - 5/16	10
14	16	153-2015	LOCK WASHER - 5/16	6
14	17	153-2024	HEX NUT - 5/16-18	6
14	18	153-2027A	JAM NUT - 5/16-18	6
14	19	153-2512	ACORN NUT - 5/16-18	2
14	20	154-6202	GUARD FOR HEAD IDLER PULLEY & TIMING SENSORS	1
		ATTACHING PARTS		
		153-2502	FHMS - 5/16-18 X 5	2
		153-2005	FLAT WASHER - 5/16	4
		153-2015	LOCK WASHER - 5/16	2
		153-2027A	JAM NUT - 5/16-18	4
		153-2512	ACORN NUT - 5/16-18	2
14	21	154-6210	BAR FOR HEAD DRIVE SYSTEM	1
		FOR ATTACHING PARTS SEE FIGURE 8:16		
14	22	154-1220	INDUCTIVE PROXIMITY SENSOR (TL-Q5MC1)	2
		FOR ATTACHING PARTS SEE FIGURE 8:8		
14	23	153-2040	SPOOL GROMMET - 1/2	1

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
15	1	154-1207	MOTOR CAPACITOR (4.5 µF) OIL PUMP @ 60 Hz	1
		154-1207A	MOTOR CAPACITOR (5.0 µF) OIL PUMP @ 50 Hz	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	1
		153-2086	MS PHILLIPS - 8-32 X 5/8	1
15	2	154-8234	MOTOR ASSEMBLY FOR METERING PUMP-110V PX-S	1
		ATTACHING PARTS		
		153-1038	WIRE JOINT - 22-18 AWG (INCLUDED W/MOTOR ASSEMBLY)	1
		153-2013	LOCK WASHER - #10	4
		153-2087	MS PHILLIPS - 8-32 X 3/4	4
15	3	154-8239	SENSOR ACTUATOR & TIMING PULLEY FOR PUMP	1
		ATTACHING PARTS		
		153-2049	SET SCREW - 8-32 X 3/16	1
15	4	153-1031A	PASS-THROUGH SENSOR	1
		ATTACHING PARTS		
		153-2081	MS PHILLIPS - 6-32 X 1/2	
15	5	153-1031B	SENSOR PLUG & CABLE	1
15	6	154-9202A	BELT FOR METERING PUMP (130XL037)	1
15	7	154-9208	PULLEY - METERING PUMP (12XL-5/16)	1
		ATTACHING PARTS		
		153-2049	SET SCREW - 8-32 X 3/16	1
15	8	154-1214	FLUID METERING PUMP (RH0CKC) - 0.05 ml/STROKE	1
		ATTACHING PARTS		
		153-2013	LOCK WASHER - #10	2
		153-2087	MS PHILLIPS - 8-32 X 3/4	2
15	9	154-6223	MOUNTING ANGLE - PUMP & MOTOR	1
		ATTACHING PARTS		
		153-2503	FHSS - 5/16-18 X 1-1/4	2
		153-2005	FLAT WASHER - 5/16	2
		153-2015	LOCK WASHER - 5/16	2
		153-2024	HEX NUT - 5/16-18	2

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
15	10	154-0226	ELBOW - TUBE TO HOSE BARB (1/4" STEM x 1/4)	1
15	11	154-8215	TUBING - OIL TANK TO PUMP (32.75")	1
15	12	154-0218	GROMMET - 7/16 ID x 1/4 PANEL	1
15	13	154-0227	ELBOW - TUBE TO HOSE BARB (1/4" STEM x 5/16)	2
15	14	154-8216	TUBING (VITON) - PUMP TO METERING VALVE (9.25")	1
		NOTE: INSPECT TUBING REGULARLY & REPLACE WHEN IT SHOWS FATIGUE		
		ATTACHING PARTS		
		153-2517	HOSE CLAMP (5/16")	2
		154-8216C	TUBING - CLAMP SLEEVE FOR VITON TUBING	2
15	15	154-0224	MALE CONNECTOR - 1/4" TUBE x 1/8 NPT	4
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
15	16	154-0234	TEE FITTING - 1/8 NPT (PRESSURE GAUGE MOUNT)	1
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
15	17	154-1225	PRESSURE GAUGE (0-30 PSI) - 1-1/2 DIA	1
		NOTE: USE TEFLON TAPE WHEN REPLACING THE GAUGE		
15	18	154-0233	3/4" x 1/8" NPT GALVANIZED NIPPLE (VALVE)	2
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		
15	19	154-1222	NEEDLE VALVE - 1/8 NPT (OIL PRESSURE CONTROL)	1
		NOTE: USE TEFLON TAPE WHEN REPLACING THE VALVE		
15	20	154-1209	VALVE FOR OIL CONTROL - 24V DC 3-WAY	1
		ATTACHING PARTS		
		153-2504	MS PHILLIPS - 4-40 X 3/8	2
		153-2506	SLOTTED SHIM WASHER - 3/8	1
15	21	154-1210	VALVE FOR CALIBRATION - 115V AC 3-WAY	1
		ATTACHING PARTS		
		153-2504	MS PHILLIPS - 4-40 X 3/8	2
		153-2506	SLOTTED SHIM WASHER - 3/8	1
15	22	154-0238	SWIVEL ELBOW - 1/4" TUBE x 1/8 NPT	2
		NOTE: USE TEFLON TAPE WHEN REPLACING FITTING		

FIGURE NUMBER	INDEX NUMBER	PART NUMBER	PART NAME & DESCRIPTION	QUANTITY NEEDED
15	23	154-8217	TUBING - METERING VALVE TO RETURN FITTING (9.5")	1
15	24	154-0222	ELBOW - 1/4" STEM x 1/4" TUBING OD	2
15	25	154-0221	BULKHEAD UNION - 1/4" TUBING	2
15	26	154-8222	TUBING - ROUTING VALVE TO FLOOR FITTING (19")	1
15	27	154-8220	TUBING - ROUTING VALVE TO OIL HEAD TIP (34.5")	1
15	28	154-0206	SPRING - OIL LINE CONTROL	1
		ATTACHING PARTS		
		153-1049E	WIRE HARNESS CLAMP - 3/8	1
		153-2019	LOCKNUT - 8-32 (NYLOK)	1
		153-2806	FHMS - 8-32 X 5/8	1
15	29	153-1049E	WIRE HARNESS CLAMP - 3/8	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	1
		153-2806	FHMS - 8-32 X 5/8	1
15	30	154-6251	MOUNTING ANGLE FOR HEAD HOSE SPRING	1
		ATTACHING PARTS		
		153-2004	FLAT WASHER - 1/4	2
		153-2014	LOCK WASHER - 1/4	1
		153-2023	HEX NUT - 1/4-20	1
		153-2053	HHCS - 1/4-20 X 1	1
15	31	154-6220	MOUNTING ANGLE - METERING VALVES	1
		ATTACHING PARTS		
		153-2019	LOCKNUT - 8-32 (NYLOK)	2
		153-2089	MS PHILLIPS - 8-32 X 1	2
15	32	154-1221	TERMINAL BLOCK FOR VALVES	1
		ATTACHING PARTS		
		153-2231	LOCKNUT - 4-40 (NYLOK)	2
		153-2516	MS PHILLIPS - 4-40 X 1-1/2	2

PART #	PART DESCRIPTION	UOM
153-0001	TRANSPORT CASTER (3" DUAL WHEEL)	EA
153-0010B	CONTINUOUS LID HINGE (46-3/8")	EA
153-0013A	SHIPPING SKID (40 x 64)	EA
153-0019	KEYBOARD BACK PLATE	EA
153-0019B	KEYBOARD VIBRATION DAMPENER (3")	EA
153-0033A	LID HINGE BRACKET MOUNT	EA
153-0036	LID VIBRATION STRIP (SOLD BY INCH)	IN
153-0037	DECAL (MADE IN USA)	EA
153-0037B	DECAL (1994 TEAM USA)	EA
153-0038B	DMR LINODUSTER HEAVY CUSHION WEIGHT (42-3/4")	EA
153-0040A	1/4" SPACER (5/8" LONG - BUFFER BELT IDLER)	EA
153-0043	THICK FELT WASHER (5/8 ID)	EA
153-0202A	COMPLETE SQUEEGEE ASSEMBLY (2-PIECE BROWN)	EA
153-0204B	VACUUM MOTOR BRUSHES - 110 VOLT (SOLD AS PAIR)	PR
153-0204C	VACUUM MOTOR BRUSHES - 220 VOLT (SOLD AS PAIR)	PR
153-0207A	SPRAY TIP - STAINLESS STEEL (11003)	EA
153-0209	MALE CONNECTOR (1/4 X 1/4 - MPT)	EA
153-0211	SQUEEGEE ROD END WITH FITTING (ON MOTOR)	EA
153-0212	MALE ELBOW (1/4 X 3/8 - MPT)	EA
153-0216	ELBOW (1/4 - MPT X 1/4 - FPT)	EA
153-0217	MALE BODY (1/4 - NYLON)	EA
153-0218	TIP RETAINER CAP CONNECTOR	EA
153-0220	SCREEN CHECK VALVE (POLYPROPYLENE - 10#)	EA
153-0225	1-1/4" PVC ELBOW (1-1/4 - MPT)	EA
153-0246A	EXPANDABLE PLUG FOR SUPPLY TANK	EA
153-0252	SUPPLY TANK FUNNEL	EA
153-0429	DMR LINODUSTER ROLL SUPPORT PIPE (40")	EA
153-0801	KEYBOARD DECAL (PHOENIX)	EA
153-0802	LINODUSTER ROUTING DIAGRAM - PHOENIX	EA
153-0806A	SPRAY HOSE - SUPPLY TANK TO PUMP (23")	EA
153-0807	SPRAY HOSE - PUMP TO TEE (7")	EA
153-0809A	SPRAY PRESSURE REGULATOR HOSE - TEE TO TANK (8-1/2")	EA
153-0810	SHIPPING BOX (40.25 X 14.5 X 58)	EA
153-0812	TRANSPORT CASTER - HEAVY DUTY (2" - DUAL WHEEL)	EA
153-0815	UNION TEE (1/4 X 1/4 X 1/4 - QUICK DISCONNECT)	EA
153-0818	MALE SWIVEL ELBOW - 1/4 TUBE X 1/4 NPT	EA
153-0830	PROTECTIVE SLEEVE FOR ALL-THREAD (5-1/2")	EA
153-0842	SERIAL NUMBER & ID PLATE - PHOENIX	EA
153-1001C	PC REPLACEMENT BATTERY (C200H-BAT09)	EA
153-1002PX	PRO27 KEYBOARD (C200H WITH PHOENIX DECAL)	EA
153-1004	BUFFER MOTOR CONTACTOR (110 VOLT)	EA
153-1005	KEYBOARD CABLE (C200H)	EA
153-1011	BRAKE RESISTOR	EA

PART #	PART DESCRIPTION	UOM
153-1012	SPEED CONTROL FOR DC MOTOR (KBIC-120)	EA
153-1015	HORSEPOWER RESISTOR	EA
153-1016	LY2 RELAY (110 VOLT)	EA
153-1017	LY2 RELAY BASE	EA
153-1018	LY3 RELAY (110 VOLT)	EA
153-1019	LY3 RELAY BASE	EA
153-1020	RELAY CLAMPS	PR
153-1021	TERMINAL BLOCK	EA
153-1022	TERMINAL BLOCK END FOOT	EA
153-1023	JUMPER (USED ON TERMINAL BLOCK)	EA
153-1025	MALE PLUG - 125V/15A	EA
153-1029	FUSE (4 AMP) FOR 220 VOLT	EA
153-1030	CIRCUIT BREAKER (10 AMP)	EA
153-1031A	PASS-THROUGH SENSOR	EA
153-1031B	SENSOR PLUG & CABLE	EA
153-1032	PC OUTPUT RELAY	EA
153-1034	FEMALE QUICK DISCONNECT-3/16 (18 AWG)	EA
153-1034A	FEMALE QUICK DISCONNECT-3/16 (14 AWG)	EA
153-1036B	RING TERMINAL - 16-14 AWG (#8 STUD)	EA
153-1037	WIRE JOINT - 18 AWG (LARGE)	EA
153-1038	WIRE JOINT (SMALL)	EA
153-1039	PIN & SOCKET CONNECTOR 9 CIRCUIT PANEL RECEPTACLE	EA
153-1040	PIN & SOCKET CONNECTOR 9 CIRCUIT FREE PLUG (MALE PINS)	EA
153-1041	PIN & SOCKET CONNECTOR 2 CIRCUIT FREE RECEPTACLE	EA
153-1042	PIN & SOCKET CONNECTOR 2 CIRCUIT PANEL PLUG (MALE PINS)	EA
153-1043	PIN & SOCKET CONNECTOR 3 CIRCUIT PANEL PLUG (MALE PINS)	EA
153-1044	PIN & SOCKET CONNECTOR 3 CIRCUIT FREE RECEPTACLE	EA
153-1045	PIN FOR FEMALE SOCKET	EA
153-1046	PIN FOR MALE SOCKET	EA
153-1047	WIRE TIE (4")	EA
153-1048	WIRE TIE (21")	EA
153-1049A	WIRE HARNESS CLAMP - 1/4	EA
153-1049B	WIRE HARNESS CLAMP - 1/2	EA
153-1049C	WIRE HARNESS CLAMP - 3/4	EA
153-1049D	WIRE HARNESS CLAMP - 1/8	EA
153-1049E	WIRE HARNESS CLAMP - 3/8	EA
153-1054	OIL VENT HOSE PLUG (GRAY PLASTIC)	EA
153-1057H	DAYTON DC MOTOR BRUSHES	PR
153-1202	MICROSWITCH - WITHOUT ROLLER (DMR LINODUSTER)	EA
153-1203	MICROSWITCH - WITH ROLLER (SQUEEGEE & BRUSH)	EA
153-1205	RIGHT ANGLE FEMALE QUICK DISCONNECT-1/4 (18-14AWG)	EA
153-1206	RIGHT ANGLE FEMALE QUICK DISCONNECT-1/4 (16-12 AWG)	EA
153-1209	BUTTON GUARD	EA

PART #	PART DESCRIPTION	UOM
153-1214	IN-LINE FUSE HOLDER	EA
153-1356	WIRE FOR HANDLE (GRAY JACKET-RED/BLACK/WHITE)	FT
153-1404	SILICON RECTIFIER DIODE	EA
153-1408	PUSH BUTTON (RED = NORMALLY OPEN)	EA
153-1602	PIN & SOCKET CONNECTOR 12 CIRCUIT PANEL RECEPTACLE	EA
153-1603	PIN & SOCKET CONNECTOR 12 CIRCUIT FREE PLUG (MALE PINS)	EA
153-1604	BUFFER MOTOR CONTACTOR (220 VOLT)	EA
153-1616	LY2 RELAY (220 VOLT)	EA
153-1618	LY3 RELAY (220 VOLT)	EA
153-1625	MALE PLUG - 250V/15A	EA
153-1801	C200HS MICROPROCESSOR	EA
153-1810	CIRCUIT BREAKER (8-AMP) FOR 220 VOLT	EA
153-1811	PC MOUNTING RACK (C200H 3-SLOT)	EA
153-1812	SPEED CONTROL FOR DC MOTOR (KBIC-240)	EA
153-1816	INPUT MODULE - ID212	EA
153-1817	CIRCUIT BREAKER (15-AMP)	EA
153-1818	WIRE TIE - 34" (C200HS PC)	EA
153-1822	FEMALE TWISTLOCK - 125V/20A	EA
153-1823	FLANGED TWISTLOCK INLET - 125V/20A	EA
153-1824	FEMALE TWISTLOCK - 250V/20A	EA
153-1826	FLANGED TWISTLOCK INLET - 250V/20A	EA
153-1827	FUSE (6 AMP) FOR 110 VOLT	EA
153-2001	FLAT WASHER - #6	EA
153-2002	FLAT WASHER - #8	EA
153-2003	FLAT WASHER - #10	EA
153-2004	FLAT WASHER - 1/4	EA
153-2005	FLAT WASHER - 5/16	EA
153-2006	FLAT WASHER - 3/8	EA
153-2007	FLAT WASHER - 1/2	EA
153-2009	NYLON FLAT WASHER (3/8 - 0.030)	EA
153-2010	NYLON FLAT WASHER (1/2 - 0.030)	EA
153-2013	LOCK WASHER - #10	EA
153-2014	LOCK WASHER - 1/4	EA
153-2015	LOCK WASHER - 5/16	EA
153-2016	LOCK WASHER - 3/8	EA
153-2017	LOCK WASHER - 1/2	EA
153-2018	LOCKNUT - 6-32 (NYLOK)	EA
153-2019	LOCKNUT - 8-32 (NYLOK)	EA
153-2020	LOCKNUT - 1/4-20 (NYLOK)	EA
153-2020A	LOCKNUT - 1/4-20 (STOVER)	EA
153-2023	HEX NUT - 1/4-20	EA
153-2024	HEX NUT - 5/16-18	EA
153-2025	HEX NUT - 3/8-16	EA

PART #	PART DESCRIPTION	UOM
153-2026	HEX NUT - 1/2-13	EA
153-2027	JAM NUT - 3/8-16	EA
153-2027A	JAM NUT - 5/16-18	EA
153-2029	ACORN NUT - 1/4-20	EA
153-2034	ALUMINUM RIVET (0.187 X 0.450 X 0.375)	EA
153-2035	BLIND RIVET WASHER	EA
153-2036	SNAP RING - 5/8	EA
153-2037	ROLL PIN - 1/8 X 1-3/4	EA
153-2038	ROLL PIN - 1/8 X 1	EA
153-2040	SPOOL GROMMET - 1/2	EA
153-2045	STEEL COLLAR - 5/8 X 1-1/8 X 1/2	EA
153-2047	SQUARE HEAD SET SCREW - 3/8 X 2	EA
153-2049	SET SCREW - 8-32 X 3/16	EA
153-2050	SET SCREW - 1/4-28 X 3/8	EA
153-2051	SET SCREW - 1/4-20 X 1/2	EA
153-2051A	SET SCREW - 1/4-20 X 1/4	EA
153-2052	HHCS - 1/4-20 X 7/8	EA
153-2053	HHCS - 1/4-20 X 1	EA
153-2054	HHCS - 1/4-20 X 1-1/4	EA
153-2055	HHCS - 1/4-20 X 1-1/2	EA
153-2056	HHCS - 1/4-20 X 1-3/4	EA
153-2057	HHCS - 1/4-20 X 2	EA
153-2061	HHCS - 5/16-18 X 1	EA
153-2062	HHCS - 5/16-18 X 1-1/4	EA
153-2067	HHCS - 3/8-16 X 1-1/4	EA
153-2068	HHCS - 3/8-16 X 1-1/2	EA
153-2072	HHCS - 3/8-16 X 3-1/2	EA
153-2073A	HHCS - 1/2-13 X 1-1/2	EA
153-2075	CARRIAGE BOLT - 1/4-20 X 2-1/2	EA
153-2078	FHMS - 1/4-20 X 3/4	EA
153-2080	METRIC PAN HEAD SCREW - M3 X 8 (PRO27 MOUNT)	EA
153-2081	MS PHILLIPS - 6-32 X 1/2	EA
153-2083	MS PHILLIPS - 6-32 X 7/8	EA
153-2086	MS PHILLIPS - 8-32 X 5/8	EA
153-2086A	MS PHILLIPS - 8-32 X 3/8	EA
153-2087	MS PHILLIPS - 8-32 X 3/4	EA
153-2089	MS PHILLIPS - 8-32 X 1	EA
153-2090	MS PHILLIPS - 8-32 X 1-1/2	EA
153-2091	MS PHILLIPS - 10-32 X 3/4	EA
153-2093	SPRING - 0.42 OD X 0.75 (PROCESSOR)	EA
153-2100	KEYSTOCK - 3/16 X 3/4	EA
153-2108	DOME RIVET - 1/8"	EA
153-2113	MS PHILLIPS - 8-32 X 3/8 (SELF TAP)	EA

PART #	PART DESCRIPTION	UOM
153-2201	SET SCREW - 10-32 X 3/8 (SMALL DMR DRIVE HUB)	EA
153-2207	MS PHILLIPS - 10-24 X 1-1/4	EA
153-2208	LOCKNUT - 10-24 (NYLOK)	EA
153-2214	JAM NUT - 5/16-24	EA
153-2216	MS PHILLIPS - 4-40 X 5/8	EA
153-2216A	MS PHILLIPS - 4-40 X 7/8	EA
153-2217	HHCS - 3/8-16 X 3-1/4	EA
153-2219	MS PHILLIPS - 10 X 2 (SELF TAP)	EA
153-2226	FELT STRIP FOR ROD END	EA
153-2231	LOCKNUT - 4-40 (NYLOK)	EA
153-2232A	LID LATCH - FLUSH MOUNT DUAL BUTTON (HEAVY DUTY)	EA
153-2233	HHCS - 1/4-20 X 3-1/4 (FULL THREAD)	EA
153-2304	JAM NUT - 1/4-20	EA
153-2401	SPRING - 0.54 OD X 0.75 (GUIDE ROLLER)	EA
153-2402	SPOOL GROMMET - 3/8	EA
153-2403	COUNTERSUNK LOCK WASHER - 1/4	EA
153-2405A	3/8-16 X 2-3/4" STEEL STUD	EA
153-2406	HOSE CLAMP (1/2")	EA
153-2407	SHOULDER BOLT - 3/8 X 1-3/4 (5/16-18) GUIDE ROLLER	EA
153-2408	SHOULDER BOLT - 5/16 X 1/2 (1/4-20) CUSHION PIVOT	EA
153-2409	SHOULDER BOLT - 1/4 X 3/8 (10-24) LINODUSTER ROD	EA
153-2412	SHCS - 1/4-20 X 1/2 (CUSHION ROLLER STOP)	EA
153-2413	SNAP RING - 1/2	EA
153-2414	HEX NUT - 8-32	EA
153-2417	GROMMET - 15/16" OD	EA
153-2501	FLAT HEAD PHILLIPS - 8-32 X 1-1/2	EA
153-2502	FHMS - 5/16-18 X 5	EA
153-2503	FHSS - 5/16-18 X 1-1/4	EA
153-2504	MS PHILLIPS - 4-40 X 3/8	EA
153-2505	MS PHILLIPS - 4-40 X 1	EA
153-2506	SLOTTED SHIM WASHER - 3/8 (FOR VALVE)	EA
153-2507	FHMS PHILLIPS - 8-32 X 3/4	EA
153-2508	ROLL PIN - 5/32 x 2-1/2	EA
153-2509	CIRCUIT BOARD MOUNT	EA
153-2510	NYLON WASHER - 1/4 (0.060)	EA
153-2511	SPRING NUT - 8-32	EA
153-2512	ACORN NUT - 5/16-18	EA
153-2513	FHSS - 5/16-18 X 1-1/2	EA
153-2514	FLAT HEAD PHILLIPS - 8-32 X 5/8 (SELF TAP)	EA
153-2515	SHOULDER BOLT - 3/8 X 1/2 (5/16-18) CORD	EA
153-2516	MS PHILLIPS - 4-40 X 1-1/2	EA
153-2517	HOSE CLAMP (5/16")	EA
153-2519	SQUARE HEAD SET SCREW - 1/4-20 X 2	EA

PART #	PART DESCRIPTION	UOM
153-2520	FLAT HEAD PHILLIPS - 8-32 X 1-1/4	EA
153-2521	MS PHILLIPS - #6 X 3/8 (SELF TAP-PLASTIC)	EA
153-2522	MS PHILLIPS - 4-40 X 1/2	EA
153-2523	FLAT HEAD PHILLIPS - 10-32 x 4	EA
153-2524	HEX NUT - 10-32	EA
153-2525	HHCS - 3/8-16 X 1/2 (TACH COVER MOUNT)	EA
153-2602	HHCS - 5/16-18 X 3/4	EA
153-2604	MS FLAT PHILLIPS - 10-32 X 1/2	EA
153-2801	SHOULDER BOLT - 3/8 X 3/8 (5/16-18) BRUSH LIFT	EA
153-2802	FHSS - 5/16-18 X 5/8	EA
153-2804	COLLAR - 3/8 X 3/4 X 3/8	EA
153-2805	FHSS - 3/8-16 X 1-1/4	EA
153-2806	FLAT HEAD PHILLIPS - 8-32 X 5/8	EA
153-2807	SHOULDER BOLT - 5/16 X 2 (1/4-20) LINODUSTER PLUG	EA
153-2807A	SHOULDER BOLT - 5/16 X 2 (1/4-20) WITHOUT HEAD	EA
153-2808	SPRING - 0.42 OD X 1.25 (LINODUSTER)	EA
153-2813	MS FLAT PHILLIPS - 10-32 X 3/4	EA
153-2814	FHMS - 3/8-16 X 3-1/8	EA
153-2815	HHCS - 3/8-16 X 2-1/4 (GRADE 8)	EA
153-2816	MS PHILLIPS - 8-32 X 2 (SS)	EA
153-2818	HHCS - 3/8-16 X 2-1/2 (GRADE 8)	EA
153-2819	SET SCREW - 5/16-18 X 3/8	EA
153-2821	SUPPLY TANK MOUNTING ROD (7-1/2" ALL-THREAD)	EA
153-6006	MOMENTARY LANE ROLLER SHAFT	EA
153-6027	LANE DISTANCE ADJUSTMENT BLOCK	EA
153-6029	MOMENTARY WHEEL HOUSING	EA
153-6223	SQUEEGEE HOSE ADAPTER	EA
153-6243A	SQUEEGEE MOUNTING ANGLE (PHOENIX)	EA
153-6251M	SPRAY JET WALL MOUNTING ANGLE	EA
153-6251S	SPRAY JET SWIVEL MOUNTING ANGLE	EA
153-6252	SPRAY JET BODY	EA
153-6254	SQUEEGEE ARM SHAFT	EA
153-6412	LINODUSTER MOTOR SHIELD (FOR 7 RPM)	EA
153-6412C	COVER FOR LINODUSTER MOTOR SHIELD	EA
153-6417	GUIDE ROLLER MOUNTING BAR (ALUMINUM)	EA
153-6422	CUSHION ROLLER SHAFT (45-7/8")	EA
153-6435	LANE DISTANCE COUNTER SHAFT (FOR KICK-UP WHEEL)	EA
153-6437	PUSH BUTTON MOUNTING PLATE	EA
153-6801S	FLOOR PLATE	EA
153-6802S	LEFT SIDE PLATE	EA
153-6803S	RIGHT SIDE PLATE	EA
153-6804	FRONT WALL	EA
153-6805	TANK & VACUUM WALL	EA

PART #	PART DESCRIPTION	UOM
153-6807	REAR WALL	EA
153-6810B	VACUUM MOTOR ADAPTER (BENT FLANGES)	EA
153-6811A	C200HS PC MOUNTING PLATE	EA
153-6813	KEYBOARD MOUNTING PLATE (PHOENIX)	EA
153-6814	PIVOT SHAFT ASSEMBLY FOR LIFTING BRUSH	EA
153-6820A	MAIN DRIVE SHAFT (PHOENIX)	EA
153-6825	LINODUSTER CLOTH ROUTING BAR (SS)	EA
153-6827	MOUNTING ANGLE - SIDE PLATE/FLOOR	EA
153-6830	MOUNTING ANGLE - C200H KEYBOARD (4")	EA
153-6831	MOUNTING ANGLE - C200H KEYBOARD (2-3/8")	EA
153-6832B	MOUNTING ANGLE-25 RPM MOTOR (SQUEEGEE)	EA
153-6835	MOUNTING ANGLE-TERMINAL BLOCK & CIRCUIT BREAKER	EA
153-6837	MOUNTING ANGLE - UHMW FLOOR SKID	EA
153-6840A	SUPPLY TANK (1-1/2 GALLON CAPACITY) FOR EXPANSION PLUG	EA
153-6841	RECOVERY TANK (3-1/2 GALLON CAPACITY)	EA
153-6842	SQUEEGEE ROD END (5/16-18 X 4-5/8)	EA
153-6847	MOUNTING BAR FOR SUPPLY TANK	EA
153-6849	MOUNTING ANGLE - TRANSFER ROLLER MOTOR	EA
153-6850	UHMW LINODUSTER PLUG FOR CARDBOARD CORE	EA
153-6851	UHMW HANDLE SPACER	EA
153-6853	UHMW LINODUSTER PLUG FOR PVC TAKE-UP REEL	EA
153-6854	UHMW RETAINER FOR RECOVERY TANK	EA
153-6856	RELAY MOUNTING PLATE	EA
153-6858	SHIELD FOR MOTOR (BRUSH LIFT)	EA
153-6859	SENSOR GUARD FOR TACHOMETER	EA
153-7002AA	LANE DISTANCE COUNTER WHEEL-TREADED (2 INCH)	EA
153-7013	URETHANE-BLEND LANE DRIVE WHEEL (FOUR-INCH TREADED)	EA
153-7401	UHMW KICK-UP WHEEL	EA
153-8031	LANE DISTANCE COUNTER PILLOWBLOCK ASSEMBLY (RIGHT)	EA
153-8033	LANE DISTANCE COUNTER PILLOWBLOCK ASSEMBLY (LEFT)	EA
153-8039	BUFFER BELT IDLER ASSEMBLY	EA
153-8049	LANE DISTANCE SENSOR GUARD ASSEMBLY	EA
153-8065	DRIVE MOTOR ASSEMBLY (DAYTON 130VDC/165 RPM)	EA
153-8201B	DMR LINODUSTER HUB ASSEMBLY (CARDBOARD CORE) 1/4-28	EA
153-8202B	DMR LINODUSTER SOLID HUB ASSEMBLY (PVC DRIVE) 1/4-28	EA
153-8205	VACUUM MOTOR ASSEMBLY - 110 VOLT/104 CFM	EA
153-8206	WATER SPRAY PUMP ASSEMBLY - 110 VOLT	EA
153-8207	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-110 VOLT)	EA
153-8238	CUSHION ROLLER ASSEMBLY (DMR LINODUSTER = 44")	EA
153-8311	MOMENTARY WHEEL ASSEMBLY (URETHANE)	EA
153-8403	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-110 VOLT)	EA
153-8410	LANE EDGE GUIDE ROLLER ASSEMBLY (1/2" BORE)	EA
153-8420	CUSHION ROLLER PIVOT ARM ASSEMBLY	EA

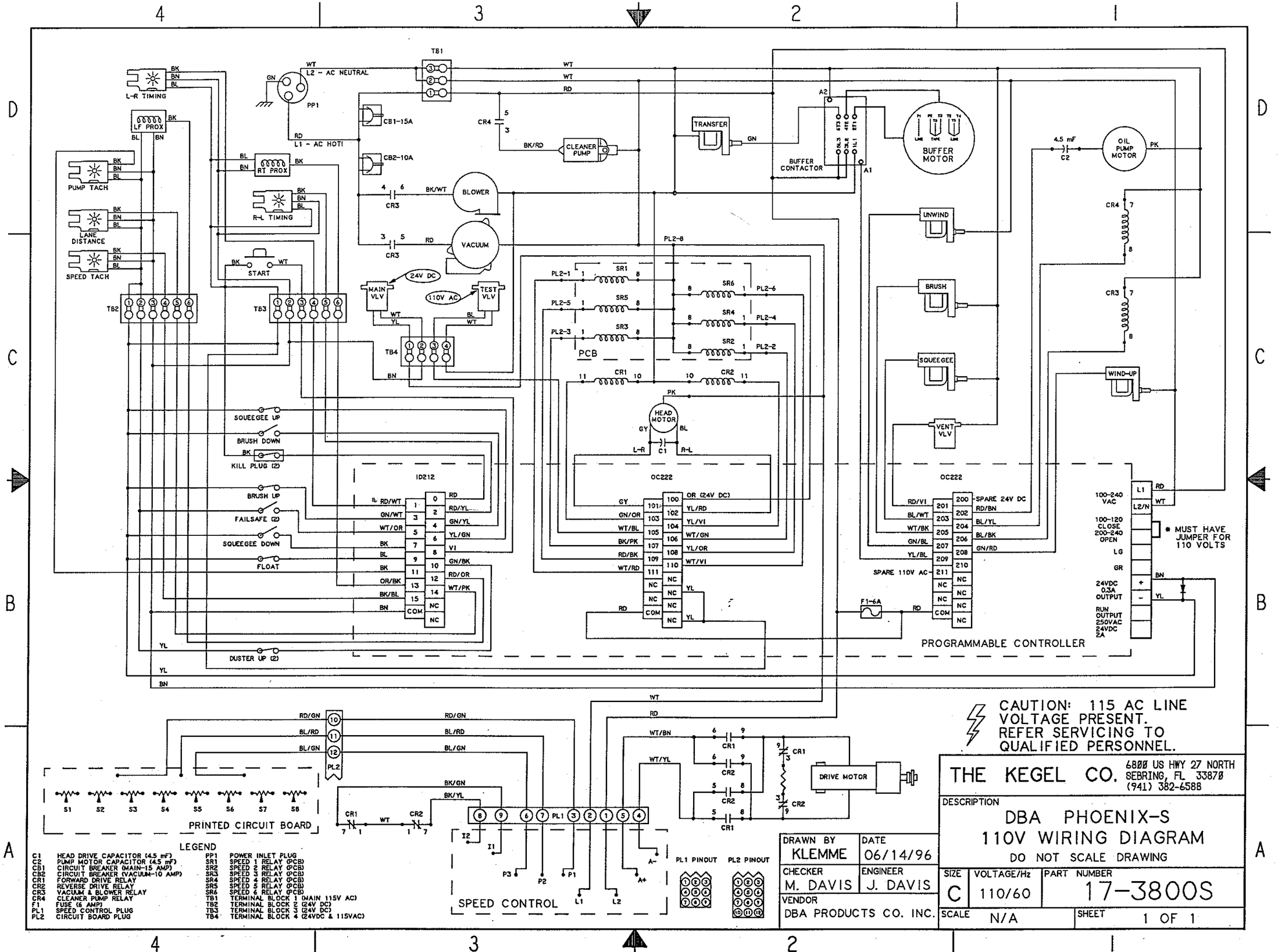
PART #	PART DESCRIPTION	UOM
153-8421	LANE DISTANCE PILLOWBLOCK ASSEMBLY (CENTER)	EA
153-8424B	BUTTON ASSEMBLY WITH SOLDERED WIRES	EA
153-8801	BLOWER MOTOR ASSEMBLY - 110V/140 CFM	EA
153-8802	BLOWER MOTOR ASSEMBLY - 220V/140 CFM	EA
153-8803	COIL-BRAKE MOTOR ASSEMBLY (7 RPM-220 VOLT)	EA
153-8805	VACUUM MOTOR ASSEMBLY - 220 VOLT/96 CFM	EA
153-8806	WATER SPRAY PUMP ASSEMBLY - 220 VOLT	EA
153-8807	CONE-BRAKE MOTOR ASSEMBLY (25 RPM-220 VOLT)	EA
153-8808	SQUEEGEE PIVOT ARM ASSEMBLY - PHOENIX LEFT SIDE	EA
153-8809	SQUEEGEE PIVOT ARM ASSEMBLY - PHOENIX RIGHT SIDE	EA
153-8813	DRIVE SHAFT PILLOWBLOCK ASSEMBLY - PLAIN BUSHING	EA
153-8814	DRIVE SHAFT PILLOWBLOCK ASSEMBLY - FLANGED BUSHING	EA
153-8815	DRIVE SHAFT PILLOWBLOCK ASSEMBLY - TACHOMETER	EA
153-8817	BLACK TRIM FOR DRIVE MOTOR (14")	EA
153-8818	CONNECTING LINK ASSEMBLY - MOTOR CAM/PIVOT ARM	EA
153-8819L	CONNECTING LINK ASSEMBLY - BEARING/PIVOT-LEFT	EA
153-8819R	CONNECTING LINK ASSEMBLY - BEARING/PIVOT-RIGHT	EA
153-8820A	SQUEEGEE MICROSWITCH WIRE HARNESS	EA
153-8824	PVC TAKE-UP REEL ASSEMBLY (PHOENIX=44-5/8")	EA
153-8827	MACHINED ELBOW FOR RECOVERY TANK (OUTLET)	EA
153-8827T	PVC ELBOW FOR RECOVERY TANK (INLET-NO THREADS)	EA
153-8834	SQUEEGEE BLADE REPLACEMENT KIT (BROWN-42")	EA
153-9003	SPROCKET - 40B10 (5/8" BORE)	EA
153-9010	SPROCKET - 25B15 (TRANSFER DRIVE-3/8")	EA
153-9013	BUFFER MOTOR PULLEY (10L050-1/2")	EA
153-9015	T-BELT 322L050 (BUFFER MOTOR)	EA
153-9023	FLANGED BUSHING (1/2 X 3/4 X 3/4)	EA
153-9024A	PLAIN BUSHING (5/8 X 7/8 X 3/4)	EA
153-9025	FLANGED BUSHING (5/8 X 7/8 X 1)	EA
153-9028A	PLAIN BUSHING (1/4 X 5/16 X 1/2)	EA
153-9031	PLAIN BUSHING (1/4 X 3/8 X 3/4)	EA
153-9034	PLAIN BUSHING (3/8 X 1/2 X 1/4)	EA
153-9035	PLAIN BUSHING (3/8 X 1/2 X 3/4)	EA
153-9037	PLAIN BUSHING (1/2 X 3/4 X 3/4)	EA
153-9045	25 MASTER LINK	EA
153-9047	40 MASTER LINK	EA
153-9048	40 OFFSET LINK	EA
153-9050	CUSHION ROLLER PLUG (1.660 X 0.140 X 0.375)	EA
153-9110	COUNTER SPROCKET (10-TOOTH)	EA
153-9402	FLANGED BUSHING (3/8 X 1/2 X 1/2)	EA
153-9404	PLAIN BUSHING (3/8 X 1/2 X 1)	EA
153-9409	FLANGED BUSHING (1/4 X 3/8 X 1/4)	EA
153-9801	SPROCKET - 40B14 (3/4" BORE)	EA

PART #	PART DESCRIPTION	UOM
153-9803	FLANGED BUSHING (3/8 X 1/2 X 1/4)	EA
153-9804	DRIVE CHAIN - PHOENIX (40P35) FOR 110 VOLT	EA
153-9805	SPROCKET - 40B18 (3/4" BORE)	EA
153-9807	BEARING FOR MOTOR SHAFT (0.312 x 0.866 x 0.274)	EA
153-9814	DRIVE CHAIN - PHOENIX (40P33) FOR 220 VOLT	EA
153-9816	3/4" FLANGED BEARING - 5/16-18 TAPPED	EA
154-0005	LID LATCH - FLUSH MOUNT SLIDE ACTION	EA
154-0006	BUMPER GUARD - POLYURETHANE	EA
154-0007	SPRAY TIP - STAINLESS STEEL (1501)	EA
154-0203	MACHINE STICKER - PHOENIX-S TOURNAMENT EDITION	EA
154-0206	SPRING FOR OIL LINE (10")	EA
154-0209	PROTECTIVE STICKER FOR TRANSFER WALL (28 X 5-1/2)	EA
154-0210	FELT FOR CLEANING 25 ml GRADUATED CYLINDERS	EA
154-0212	TANK FILTER (5" SS)	EA
154-0214	RETAINING CLIP FOR GRADUATED CYLINDER	EA
154-0215	GRADUATED CYLINDER FOR CALIBRATION TEST (25 ml)	EA
154-0218	GROMMET - 7/16 ID	EA
154-0221	BULKHEAD UNION - 1/4" TUBING	EA
154-0222	ELBOW - 1/4" STEM x 1/4" TUBING OD	EA
154-0223	ELBOW (90 DEGREE) - 1/4 NPT x 1/4" TUBE	EA
154-0224	MALE CONNECTOR - 1/4" TUBE x 1/8 NPT	EA
154-0225	ELBOW - 3/8 TUBE OD x 1/4 NPT	EA
154-0226	ELBOW - TUBE TO HOSE BARB (1/4" STEM x 1/4 ID HOSE)	EA
154-0227	ELBOW - TUBE TO HOSE BARB (1/4" STEM x 5/16 ID HOSE)	EA
154-0228	FELT FOR TRANSFER GUARD (1/8" GRAY)	EA
154-0229	STEM FOR FLOAT (3" x 1/8 NPT NIPPLE)	EA
154-0230	IN-LINE COUPLER (1/8" NPT) FLOAT	EA
154-0231	PLUG - 1/2" TUBE OD	EA
154-0232D	MALE CONNECTOR - 1/2" TUBE x 1/2 NPT (DRILLED)	EA
154-0233	3/4" x 1/8 NPT GALVANIZED NIPPLE (MOUNT FOR VALVE)	EA
154-0234	TEE FITTING - 1/8 NPT	EA
154-0235	FUNNEL - PX-S OIL FILL	EA
154-0238	SWIVEL ELBOW - 1/4" TUBE x 1/8 NPT	EA
154-0239	ELBOW - 5/16 HOSE BARB x 3/8 STEM (FOR DRAIN HOSE)	EA
154-0240	CONNECTOR - 1/2" TUBE x 1/2 HOSE BARB (FOR FUNNEL)	EA
154-0241	STRAIGHT UNION - 1/4" TUBE (FOR LIGHT OIL)	EA
154-0242	VELCRO STRAP FOR CORD (5")	EA
154-0242A	VELCRO FOR HANDLE (5" WITH ADHESIVE)	EA
154-0243	UNION ELBOW (1/4 X 1/4 - QUICK DISCONNECT)	EA
154-0260	FLEXIBLE VACUUM HOSE STOCK (1-1/2" ID)	IN
154-1206	GEARBOX FOR HEAD DRIVE MOTOR (5:1 RATIO)	EA
154-1207	MOTOR CAPACITOR (4.5 µF) HEAD DRIVE & OIL PUMP @ 60Hz	EA
154-1207A	MOTOR CAPACITOR (5.0 µF) OIL PUMP @ 50 Hz	EA

PART #	PART DESCRIPTION	UOM
154-1208	MOTOR CAPACITOR (6.0 µF) HEAD DRIVE @ 50 Hz	EA
154-1209	VALVE FOR OIL CONTROL - 24V DC 3-WAY (100 PSIG) 1/8 NPT	EA
154-1210	VALVE FOR CALIBRATION - 115V AC 3-WAY (100 PSIG) 1/8 NPT	EA
154-1212	VALVE FOR TANK VENT - 115V AC 2-WAY (1/8" BARB)	EA
154-1214	FLUID METERING PUMP (RH0CKC) - 0.05 ml/STROKE	EA
154-1214S	STICKER FOR CALIBRATION RING ON FMI PUMP	EA
154-1220	INDUCTIVE PROXIMITY SENSOR (TL-Q5MC1)	EA
154-1221	TERMINAL BLOCK FOR VALVES	EA
154-1222	NEEDLE VALVE - 1/8 NPT (OIL PRESSURE CONTROL)	EA
154-1225	PRESSURE GAUGE (0-30 PSI) - 1-1/2 DIA	EA
154-1228	BLACK LIGHT BULB (4 FT)	EA
154-1228A	BLACK LIGHT BULB (2 FT)	EA
154-6201	GUARD FOR HEAD DRIVE PULLEY (LEFT SIDE)	EA
154-6202	GUARD FOR HEAD IDLER PULLEY AND TIMING SENSORS (RIGHT SIDE)	EA
154-6203A	GUARD FOR TRANSFER COMPARTMENT	EA
154-6204	GUARD FOR PUMP AND MOTOR	EA
154-6206	CENTER WALL OF TRANSFER COMPARTMENT (PX-S)	EA
154-6209	TIP HOLDER FOR OIL TUBING	EA
154-6210	BAR FOR HEAD DRIVE SYSTEM	EA
154-6211	MOUNTING BAR FOR PASS-THRU SENSOR	EA
154-6212	SHAFT FOR IDLER PULLEY - PX-S	EA
154-6214	MOUNTING BRACKET-HEAD DRIVE BAR (LEFT)	EA
154-6215	MOUNTING BRACKET-HEAD DRIVE BAR (RIGHT)	EA
154-6216	MOUNTING PLATE - HEAD TIMING SENSORS	EA
154-6218L	MOUNTING ANGLE - LEFT PROXIMITY SENSOR	EA
154-6218R	MOUNTING ANGLE - RIGHT PROXIMITY SENSOR	EA
154-6219	MOUNTING PLATE - HEAD BELT	EA
154-6220	MOUNTING ANGLE - METERING VALVES	EA
154-6221	MOUNTING ANGLE - HEAVY DUTY CASTER (3 x 3.625)	EA
154-6222	MOUNTING ANGLE - HEAD DRIVE MOTOR	EA
154-6223	MOUNTING ANGLE - PUMP & MOTOR	EA
154-6230	UHMW SLIDING HEAD (1 x 1.5 x 2)	EA
154-6230C	UHMW SLIDING HEAD (1 x 1.5 x 2) COUNTERSUNK HOLE	EA
154-6236	IDLER FOR TRANSFER CHAIN - DELRIN	EA
154-6237	UHMW FLOOR SKID - LEFT SIDE PX-S	EA
154-6238	UHMW FLOOR SKID - RIGHT SIDE PX-S	EA
154-6240	MOUNT ANGLE - TANK VENT VALVE	EA
154-6241	MOUNT FOR PENCIL TIP	EA
154-6242	MOUNTING BRACKET FOR TUBING	EA
154-6243	MOTOR CAM-DUAL LOBES (3/8 & 5/8 OFFSET-STACKED SWITCHES)	EA
154-6244	MOUNTING PLATE - OIL TANK FLOAT	EA
154-6245	SUPPORT ANGLE - LEFT FLOOR SKID	EA
154-6246	CIRCUIT BOARD MOUNT FOR SPEED CONTROL RELAYS	EA

PART #	PART DESCRIPTION	UOM
154-6246C	COVER FOR CIRCUIT BOARD TRIMPOTS	EA
154-6247	MOUNTING ANGLE-25 RPM MOTOR (BRUSH LIFT)	EA
154-6251	MOUNTING ANGLE FOR HEAD HOSE SPRING	EA
154-6252	CATCH PLATE FOR ELECTRICAL LID	EA
154-6255	TRANSFORMER MOUNT (220V STEPDOWN)	EA
154-8201	OIL TANK ASSEMBLY - PX-S	EA
154-8202	COMPLETE LID ASSEMBLY - PX-S	EA
154-8203	FLOAT SWITCH ASSEMBLY (OIL TANK)	EA
154-8204L	TRANSFER ROLLER ARM ASSEMBLY - PX-S TOP LEFT	EA
154-8204R	TRANSFER ROLLER ARM ASSEMBLY - PX-S TOP RIGHT	EA
154-8205L	TRANSFER ROLLER ARM ASSEMBLY - PX-S BOTTOM LEFT	EA
154-8205R	TRANSFER ROLLER ARM ASSEMBLY - PX-S BOTTOM RIGHT	EA
154-8206	TRANSFER ROLLER MOTOR - 25 RPM (110V)	EA
154-8206A	TRANSFER ROLLER MOTOR - 25 RPM (220V)	EA
154-8207	TRANSFER ROLLER ASSEMBLY - 2.25 DIAMETER (PX-S TOP)	EA
154-8208	TRANSFER ROLLER ASSEMBLY - 1.75 DIAMETER (PX-S BOTTOM)	EA
154-8209A	CABLE ASSEMBLY WITH KILL PLUG	EA
154-8210	CIRCUIT BOARD ASSEMBLY FOR SPEED CONTROL - 110V	EA
154-8211	CIRCUIT BOARD ASSEMBLY FOR SPEED CONTROL - 220V	EA
154-8213	PENCIL TIP FOR OIL HEAD	EA
154-8213A	TIP FOR CALIBRATION	EA
154-8213B	RESTRICTION TUBING FOR LIGHT OIL	EA
154-8214	TUBING - 5/16 CLEAR PVC (5.25" FOR SIGHT GLASS)	EA
154-8214A	TUBING - 5/16 CLEAR PVC (36" FOR DRAIN)	EA
154-8215	TUBING - OIL TANK TO PUMP (3/8" x 1/4") 32.75"	EA
154-8216	TUBING (VITON) - PUMP TO METERING VALVE (3/8" x 1/4") 9.25"	EA
154-8216C	TUBING - CLAMP SLEEVE FOR VITON TUBING (1/2" x 3/8") 0.5"	EA
154-8217	TUBING - METERING VALVE TO RETURN FITTING (1/4" x 1/8") 9.5"	EA
154-8218	TUBING - RETURN FITTING TO OIL TANK (1/4" x 1/8") 31.5"	EA
154-8219	TUBING - METERING VALVE TO ROUTING VALVE (1/4" x 1/8") 1.5"	EA
154-8220	TUBING - ROUTING VALVE TO OIL HEAD TIP (1/4" x 1/8") 34.5"	EA
154-8220A	TUBING - ROUTING VALVE TO OIL HEAD TIP (3/16" x 1/16") 34.5"	EA
154-8221	TUBING - OIL TANK TO VENT VALVE (1/4" x 1/8") 7"	EA
154-8222	TUBING - ROUTING VALVE TO FLOOR FITTING (1/4" x 1/8") 19"	EA
154-8223	TUBING - FLOOR FITTING TO CALIBRATION FITTING (1/4" x 1/8") 25"	EA
154-8224	TUBING - CALIBRATION FITTING TO TIP (1/4" x 1/8") 2"	EA
154-8225A	SPRAY HOSE - TEE TO LEFT OUTSIDE JET (#1) 5.375"	EA
154-8226	SPRAY HOSE - LEFT JET TO LEFT MIDDLE JET (#2) 9.25"	EA
154-8227	SPRAY HOSE - LEFT MIDDLE JET TO RIGHT MIDDLE JET (#3) 22.875"	EA
154-8228A	SPRAY HOSE - RIGHT MIDDLE JET TO RIGHT OUTSIDE JET (#4) 9"	EA
154-8229A	POWER CORD ASSEMBLY - 125 FEET (110V 12 AWG)	EA
154-8230	POWER CORD ASSEMBLY - 125 FEET (220V 12 AWG)	EA
154-8231	OUTPUT MODULE - OC222 (SEPARATE 24VDC RELAY)	EA

PART #	PART DESCRIPTION	UOM
154-8232	HEAD DRIVE MOTOR ASSEMBLY - 110V PX-S	EA
154-8234	MOTOR ASSEMBLY FOR METERING PUMP- 110V PX-S	EA
154-8236	BUFFER MOTOR ASSEMBLY - 1/2 HP-1725 RPM (110V 60 Hz)	EA
154-8237	BUFFER MOTOR ASSEMBLY - 1/2 HP-1725 RPM (220V 50 Hz)	EA
154-8238	SENSOR ACTUATOR ASSEMBLY (6-TOOTH FOR HEAD TIMING)	EA
154-8239	SENSOR ACTUATOR & TIMING PULLEY (FOR PUMP TACHOMETER)	EA
154-8241	FELT PAD AND MOUNTING ANGLE ASSEMBLY - LEFT SIDE	EA
154-8242	FELT PAD AND MOUNTING ANGLE ASSEMBLY - RIGHT SIDE	EA
154-8243	MOUNTING BRACKET ASSEMBLY FOR TIMING PULLEY SHAFT	EA
154-8244	BUFFER BRUSH ASSEMBLY - 3-3/4" Ø (HEAVY FILL)	EA
154-8245	BLACK LIGHT FIXTURE AND BULB (110V - 4 FT)	EA
154-8245A	BLACK LIGHT FIXTURE AND BULB (220V - 4 FT)	EA
154-8245B	BLACK LIGHT FIXTURE AND BULB (110V - 2 FT)	EA
154-8246	FILTER ASSEMBLY FOR VENT VALVE	EA
154-8247	IDLER SPROCKET ASSEMBLY (TRANSFER - 25B10)	EA
154-8248	STEP-DOWN TRANSFORMER ASSEMBLY (230V AC)	EA
154-8249	HANDLE ASSEMBLY WITH KILL PLUGS (30")	EA
154-8250	SPEED CONTROL WITH WIRE HARNESS - 110V PX-S	EA
154-8251	SPEED CONTROL WITH WIRE HARNESS - 220V PX-S	EA
154-8252	FELT STRIP FOR FRONT WALL	EA
154-9201	BELT FOR HEAD DRIVE (XL025 - 9 FEET)	EA
154-9201A	BELT RETAINER - XL025 (1-5/8")	EA
154-9202A	BELT FOR METERING PUMP (130XL037)	EA
154-9204	PULLEY - HEAD IDLER (32XL-1/4" BORE-W/SET)	EA
154-9205B	PULLEY - HEAD DRIVE MOTOR (28XL 3/8" BORE) 50 Hz	EA
154-9205D	PULLEY - HEAD DRIVE MOTOR (24XL 3/8" BORE) 60 Hz	EA
154-9208	PULLEY - METERING PUMP (12XL-5/16" BORE W/SET SCREW)	EA
154-9209	TRANSFER ROLLER TOP DRIVE CHAIN (25P65)	EA
154-9210	TRANSFER ROLLER BOTTOM DRIVE CHAIN (25P31)	EA
154-9212	PLAIN BUSHING - 3/8 X 1/2 X 1/2	EA
155-0203	LOCKNUT - 10-32	EA
DBA-801	DBA CLEAR HIGH VISCOSITY LANE CONDITIONER	EA
DBA-850	DBA CLEAR SUPER HIGH VISCOSITY LANE CONDITIONER	EA
DBA-7594	DBA CLEAN LANE CLEANER	EA
DBA-8460	DBA LINO-DUSTER CLOTH (BLUE)	EA



CAUTION: 115 AC LINE VOLTAGE PRESENT. REFER SERVICING TO QUALIFIED PERSONNEL.

LEGEND

C1	HEAD DRIVE CAPACITOR (4.5 mF)	PP1	POWER INLET PLUG
C2	PUMP MOTOR CAPACITOR (4.5 mF)	SR1	SPEED 1 RELAY (PCB)
CB1	CIRCUIT BREAKER (MAIN-15 AMP)	SR2	SPEED 2 RELAY (PCB)
CB2	CIRCUIT BREAKER (VACUUM-10 AMP)	SR3	SPEED 3 RELAY (PCB)
CR1	FORWARD DRIVE RELAY	SR4	SPEED 4 RELAY (PCB)
CR2	REVERSE DRIVE RELAY	SR5	SPEED 5 RELAY (PCB)
CR3	VACUUM & BLOWER RELAY	SR6	SPEED 6 RELAY (PCB)
CR4	CLEANER PUMP RELAY	TB1	TERMINAL BLOCK 1 (MAIN 115V AC)
F1	FUSE (6 AMP)	TB2	TERMINAL BLOCK 2 (24V DC)
PL1	SPEED CONTROL PLUG	TB3	TERMINAL BLOCK 3 (24V DC)
PL2	CIRCUIT BOARD PLUG	TB4	TERMINAL BLOCK 4 (24VDC & 115VAC)

THE KEGEL CO. 6800 US HWY 27 NORTH SEBRING, FL 33870 (941) 382-6588

DESCRIPTION
DBA PHOENIX-S
110V WIRING DIAGRAM
DO NOT SCALE DRAWING

DRAWN BY	DATE
KLEMME	06/14/96
CHECKER	ENGINEER
M. DAVIS	J. DAVIS
VENDOR	
DBA PRODUCTS CO. INC.	

SIZE	VOLTAGE/Hz	PART NUMBER
C	110/60	17-3800S
SCALE	N/A	SHEET 1 OF 1

CAUTION: 230 AC LINE VOLTAGE PRESENT. REFER SERVICING TO QUALIFIED PERSONNEL.

STEP-DOWN TRANSFORMER
230V
115V
RD/GY
WT
L-R TIMING
LF PROX
PUMP TACH
LANE DISTANCE
SPEED TACH
RT PROX
R-L TIMING
START
PP1
L2 - AC HOT!
L1 - AC HOT!
CB1-10A
CB2-8A
230V AC
TB1
CR4
CLEANER PUMP
BK/RD
TRANSFER
GN
A2
A1
BUFFER CONTACTOR
BUFFER MOTOR
CR3
BK/WT
BLOWER
VACUUM
24V DC
115V AC
MAIN VLV
TEST VLV
TB2
TB3
TB4
PRINTED CIRCUIT BOARD
SR1
SR2
SR3
SR4
SR5
SR6
PL2-1
PL2-2
PL2-3
PL2-4
PL2-5
PL2-6
PK
5.0 mF
C2
OIL PUMP MOTOR
HEAD MOTOR
GY
BL
L-R
R-L
C1
UNWIND
BRUSH
SQUEEGEE
WIND-UP
CR1
CR2
CR3
CR4
SQUEEGEE UP
BRUSH DOWN
KILL PLUG (2)
BRUSH UP
FAILSAFE (2)
SQUEEGEE DOWN
FLOAT
DUSTER UP (2)
TB5
ID212
24V DC
OC222
115V AC
OC222
230V AC
VENT VLV
F2-4A
F1-4A
SPARE 230V AC
SPARE 24V DC
PROGRAMMABLE CONTROLLER
100-240 VAC
100-120 CLOSE 200-240 OPEN
24VDC 0.3A OUTPUT
RUN OUTPUT 250VAC 24VDC 2A
* MUST HAVE JUMPER. PC RUNS ON 115V AC.

PRINTED CIRCUIT BOARD
S1 S2 S3 S4 S5 S6 S7 S8
PL2
SPEED CONTROL
PL1
I1 I2 P1 P2 P3 A+ A- L1 L2
PL1 PINOUT
PL2 PINOUT
DRIVE MOTOR

LEGEND

C1	HEAD DRIVE CAPACITOR (6.0 mF)	PP1	POWER INLET PLUG
C2	PUMP MOTOR CAPACITOR (5.0 mF)	SR1	SPEED 1 RELAY (PCB)
CB1	CIRCUIT BREAKER (MAIN-10A)	SR2	SPEED 2 RELAY (PCB)
CB2	CIRCUIT BREAKER (VACUUM-8A)	SR3	SPEED 3 RELAY (PCB)
CR1	FORWARD DRIVE RELAY	SR4	SPEED 4 RELAY (PCB)
CR2	REVERSE DRIVE RELAY	SR5	SPEED 5 RELAY (PCB)
CR3	VACUUM & BLOWER RELAY	SR6	SPEED 6 RELAY (PCB)
CR4	CLEANER PUMP RELAY	TB1	TERMINAL BLOCK 1 (MAIN-230V AC)
F1	FUSE (4 AMP FOR 230V)	TB2	TERMINAL BLOCK 2 (24V DC)
F2	FUSE (4 AMP FOR 115V)	TB3	TERMINAL BLOCK 3 (24V DC)
PL1	SPEED CONTROL PLUG	TB4	TERMINAL BLOCK 4 (115V AC & 24V DC)
PL2	CIRCUIT BOARD PLUG	TB5	TERMINAL BLOCK 5 (115V AC)

DRAWN BY: KLEMME	DATE: 07/30/96
CHECKER: M. DAVIS	ENGINEER: J. DAVIS
VENDOR: DBA PRODUCTS CO. INC.	

THE KEGEL CO.
6800 US HWY 27 NORTH
SEBRING, FL 33870
(941) 382-6588

DESCRIPTION
DBA PHOENIX-S
220V WIRING DIAGRAM
DO NOT SCALE DRAWING

SIZE	VOLTAGE/Hz	PART NUMBER
C	220/50	17-3850S

SCALE: N/A
SHEET: 1 OF 1