

OPERATOR'S MANUAL

Mark VII Equipment, Inc.

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INSTALLATION AND OPERATING INSTRUCTIONS

INTRODUCTION

As the purchaser of MARK VII's PROLINE self service car wash system, you now own one of the finest equipment packages in the car wash industry.

PROLINE has been proclaimed to be the "most operator-oriented car wash equipment ever produced", and for good reason. We have taken great care to make the PROLINE system as easy as possible to install and maintain.

Please read these instructions carefully. Doing so will be very helpful to you. However, if you need further assistance, please call your PROLINE distributor or our factory service department. Our international parts and service organization is ready to serve you.

We thank you for buying from MARK VII and we wish you the $\mbox{greatest}$ success possible.

Yours truly,

HARRY MATHEWS President

> Form P2 Rev.1/85

INSTALLATION

NOTE: ALTHOUGH EVERY EFFORT HAS BEEN MADE BY MARK VII EQUIPMENT TO COMPLY WITH ALL LOCAL CODES KNOWN BY MARK VII, COMPLIANCE WITH ALL LOCAL CODES IS THE RESPONSIBILITY OF THE CUSTOMER.

- ROUGH-IN INSTALLATION (refer to MARK VII construction drawings for additional details).
 - A. COIN BOXES AND SAFES Are normally sent in advance so that they may be built into the wall structures. They should be located within two feet of the end of the wall for security purposes. A l" conduit must be run from the top of the coin box to the top of the wall in order to facilitate wiring at a later time.
 - B. DRAINS AND TRAPS Must be of adequate size and comply with local codes.
 - C. BAY FLOORS Be sure to slope your floors for good drainage. Your floors may include MARK VII WINTER SENTRY snow melting and de-icing system. If so, follow installation instruction in WINTER SENTRY MANUAL.
 - D. EQUIPMENT ROOM Must be large enough to accommodate all of the required car wash equipment plus a work area, if desired, and space for chemical storage. The equipment room door should be 4 ft. wide.
 - E. UTILITIES Adequate utilities must be provided for the car wash equipment as well as lighting and heating. Equipment must be protected from freezing. (See PROLINE specifications for requirements)
 - F. BILL CHANGERS Opening(s) must be provided in the equipment room wall for each bill changer. The dimensions for your particular changer are listed with the enclosed literature that comes with your Hamilton or Rowe changer. The bottom of the opening should be 30" above the paving grade. Allow enough room for the bill changer door to open (it is as big as the bill changer and hinges on the left side as you face the rear of the bill changer). Locate an electrical outlet near the bill changer for proper operation (see electrical detail).
 - G. UNDERGROUND CONDUITS Must be placed prior to pouring the concrete for such items as vacuums, exterior light poles, etc.
 - H. OVERHEAD BOOMS Boom mounting brackets must be provided to facilitate erection of the booms at a later time. A sturdy box section of either 1-1/2" angle iron or trussing should be affixed to the roof section capable of holding 400 lbs. minimum.

II. EQUIPMENT INSTALLATION

- A. MOVE IN Locate the equipment as desired, leaving space between each module (appox. 6") for inter-module hook up. Level the equipment on the floor using 1/2" bolts in the threaded holes provided in the feet of each module.
- B. INTER-MODULE CONNECTING Use the short pieces of hose and clamps provided to connect one module to the next. To start the hoses easily, insert each line slightly different in length. This is so that as you move the modules closer to each other you can start each hose individually and not all at once. Work from the fluid module end out. After these connections have been made there should be approx. 2" in between each module.
- C. WATER HOOK-UP Water connections must be made into and out of the water softener. If the factory pre-plumbed water heater has been purchased, a single water hook-up to the fluid service module intake manifold is all that is required. If the water heater has been purchased un-installed, then it must be plumbed to the fluid service module. Water service must also be provided to the WINTER SENTRY unit, and ANTIFREEZE INJECTION unit.
- D. GAS HOOK-UP Gas service must be provided to the water heater, WINTER SENTRY unit, and space heater.

- E. VENTING -All gas appliances must be properly vented in compliance with local codes.
- F. DRAINS The water softener control valve(s) must be connected to the drain (floor or standpipe). Be sure to drain your equipment room well. A good rule of thumb is to include enough drainage to accommodate 2 times your water supply, without significant build up.

G. Electrical -

- 1. SERIES VII High voltage electrical service must be provided between each bay's control panel and the building's main load center. (Note: Systems with 2 or more bays have double control panels serving two bays each; however, each bay must be wired independently from the circuit breakers. One conduit may be run from the main load center to each control panel).
- 2. SERIES XXI- The main load center for the PROLINE pumping plant is included. Electrical service must be run between the building's main load center and the PROLINE's load center.
- 3. ALL COIN BOXES A 1" conduit must be run from each wall above the coin boxes, single or double face, to each of the control panels on the PROLINE pumping plant. Low voltage wire is provided by MARK VII to run in the conduit.
- 4. ALL CONTROL PANELS Strip the coin box cable and install each wire color for color (1 thru 12) on the vertical terminal strip. The use of crimp-on type connectors is recommended for the ease of service and neatness. Crimp-on size is 18-22 gauge forked spade at No.6 stud.
- COLOR CODES Color codes for functions directly correspond with colors assigned on coin box face, instruction signs, and pumping plant tubing.
- 6. OTHER Wires must be pulled to all light fixtures, vacuums, etc. Circulating pumps and heater controls must be wired. Bill changers, ANTIFREEZE INJECTION units, and the water softener, require wall outlets rated at 115 Volts A.C. and 15 Amps. See electrical load specifications for further details.

NOTE: ALL ELECTRICAL EQUIPMENT MUST BE PROPERLY GROUNDED.

H. CONNECT WEEP CONTROL SOLENOID - Located on the left side of the fluid service module, to the outdoor thermostat (provided by MARK VII), or Weepless timer. Connect the wires to Wl and W2 on your last bay's electrical panel as per the Pumping Plant schematic. Make sure the thermostat bulb, or Weepless thermistor, is located outdoors in the shade. NOTE: THE WEEP IS THE MOST IMPORTANT PART OF YOUR CAR WASH DURING THE WINTER MONTHS. It is therefore necessary to test and adjust your weep system BEFORE it is too late. Set your weep flow to 32 oz./min. by adjusting the petcock valve next to the weep lock valve for each bay.

I. WEEP CYCLE SYSTEM.

1. INTRODUCTION

The MARK VII Weep Cycle System is a solid state device designed to reduce weep water consumption and prevent the use of weep water for rinsing by customers. The weep system requires no adjustments or periodic maintenance procedures.

2. THEORY OF OPERATION

The Weep Cycle System uses a thermistor to monitor outside temperature. The signal from the thermistor is continually being checked by the circuit so that when the temperature drops below 36 degrees Fahrenheit the system begins to cycle weep water to your bays.

As the cycle starts, weep water is allowed to run for approximately 2 seconds and then is turned off for about 13 seconds. As the temperature drops, this ON to OFF ratio increases till at 17 degrees Fahrenheit the system is on 100% of the time.

3. INSTALLATION

Mount the unit close to your 24VAC wiring and such that the

thermistor can be mounted in free air, out of direct sunlight, and away from sources of heat i.e. light fixtures, heated floors, control room walls, etc. (See Anti-Freeze Injection Dwg. also, if applicable.)

Terminals are hooked up as such:

- a. 6. This is an auxiliary output used for driving other freeze protection devices such as an antifreeze injection unit. The circuit acts as a switch between terminals 3 and 6 at 36 degrees Fahrenheit and does not cycle with the green lamp. It can also source power on terminals 5 and 6 (only on 24 volt hook-up) to devices like overhead heating systems or auxilary solenoids.
- b. Terminals 1,2,3 are uncommitted relay outputs with contacts rated at 550 watts. These terminals are used for driving the weep solenoid. With the unit on, terminal 3 is connected to terminal 2. As the temperature decreases and the green lamp goes off, terminal 3 is then connected to terminal 1 for as long as the green lamp is out.
- c. 5. 24 VAC common should hook to one side of your 24 volt transformer, this is terminal #2 of your pumping plant control box (purple wire).
- d. 4. 24 VAC hot should hook up to the other side of your transformer. This is terminal #7 of your pumping plant control box (black wire).
- 4. With all wires properly in place and power to the unit, the red power lamp should come on, and in a few seconds the green cycle indicator will illuminate. Both lights will remain on until the temperature drops below 36 degrees Fahrenheit, at which time the cycle indicator will begin to flash with the weep water cycle. If at any time power to the unit fails, your weep system will be activated 100% of the time.
- 5. Test your hook-up by submerging the probe into ice water. The weep valve should come on for approx. 4 seconds every 15 seconds. If not, recheck all wire hook-ups. If the green lamp blinks, the weep-less is working, check the valve. If your red lamp is not on, check the power. Note: It is imperative for the weep flow to be adjusted to 32 oz./min. for proper operation.
- J. BUBBLE BRUSH HOOK-UP Run 3/8" or larger air lines from your compressor to the air line on the manifold panel. Run 5/8" plastic hose from the top of the generator to the bay. Secure hose with clamp to generator. Make sure no kinks are in the line.
 - 1. MOUNTING THE BOOM Install the boom on the opposite wall from the existing coin-box to eliminate high-pressure hose interference. The specifications for the drilling of the boom are listed in Dwg.#18009. Be sure the end of the boom is lower than the feed, so the water will drain out (approx. 1.5" drop). It is recommended that a 3/16" spacer or washers be installed at the bottom bearing (refer to Dwg.#18008) to assist with return of the boom. The boom end should swing towards the coin box end. Attach a 5/8" hose to the swivel located on the top of the boom near the mounting bearings, secure with a hose clamp.

Install the Steal Cable kit in the Bubble Brush hose assembly according to the Cable kit instructions. Install brush holders approximately 24" apart and 36" from the ground under the end of the BUBBLE BRUSH boom. Mount the instruction sign directly above the brush hanger assembly. Now unpack the expansion tank and mount it on the fluid module next to the pump with the steel strapping provided. The tank should hang with the regulator assembly down and the regulator knob pointing towards you. Connect the plastic polyflow tubing from the pump and the pressure switch to the regulator assembly under the tank. These connections need only be hand tight. Connect a length of 3/8" polyflow tubing from the output of the B/B pumping system to the inlet of the B/B manifold assembly on pumping plant.

- K. ANTI-FREEZE INJECTION UNIT The Anti-Freeze system consists of basically two major pieces of equipment, the pumping plant and the control unit. The following instructions are for the installation of the Anti-Freeze pumping system. Refer to the instructions for the "ANTIFREEZE INJECTION CONTROLLER" for electrical hook up.
 - Un-crate the Anti-Freeze pumping system and located it near the bubble brush system where it can permanently rest (this unit requires 110 VAC for its operation).
 - 2. Remove the expansion tank assy. from the inside of the stainless steel tank and locate it in the strapping loop above the pump assy. Loosen the strap and place the tank half way down so that strap bisects the center of the tank with the silver regulator assy. hanging down.
 - Tighten the strap back up, check to make sure the gauge reads right and the tank is firm in its cradle.
 - 4. Affix the plastic polyflow tubing from the outlet of the pump to the inlet of the regulator assy. These fittings do not have to be more than hand tight.
 - 5. Connect a length of tubing to reach from the output of the Anti-Freeze pumping system to the inlet of the Anti-Freeze manifold assy.
 - 6. Check all fitting for tightness.
- L. ANTIFREEZE INJECTION CONTROLLER The Antifreeze Injection Controller monitors both the outside temperature and each Bubble Brush bay. If the outside temperature drops below your turn-on setting, the controller will automatically set itself for one cycle. If no one is using that bay, it will wait approx. forty seconds and then begin antifreeze injection. If the bay is in use it will wait untill the bay is off and has not been used in approx. forty seconds, then it will start antifreeze injection. The controller will then wait for the BUBBLE BRUSH to be used again.

When someone selects Bubble Brush, the controller checks to see how long the Bubble Brush is used, and remembers how long it is turned on each time. If someone is just spinning through the wash selections, the controller will ignore the pulse. When the customer selects Bubble Brush for more than twenty seconds, (enough time to dilute antifreeze), the controller arms itself and waits for the end of the cycle. At the end of Bubble Brush cycle, the controller will wait an additional forty seconds to see of there is any additional use of the Bubble Brush. The injection cycle runs for 20 to 120 seconds total. This is adjustable with a small potentiometer inside the cover, (counter-clockwise for less time). The Antifreeze Injection cycle consists of four timed cycles. It runs its first time cycle with air only, (to loosen foam). The second time cycle injects both air and antifreeze, (mixing out). third time cycle is air only, (to move the solution to the brush). The fourth time cycle injects air and antifreeze, (this is the final introduction of antifreeze to the system). The injection controller then turns off and waits for the next use. If someone turns on Bubble Brush during the injection cycle the controller will immediately turn off and re-arm itself waiting for the end of the cycle.

HOOK-UP - First mount the controller(s) near the pumping plant modules with access to a 110VAC outlet. Run five wires from each Bubble Brush bay to each of the AntiFreeze Controllers, (refer to Dwg. #18062). Label them from each bay accordingly, (Note: Different colored wires are very helpful). Install the thermostat or Weepless timer as in Dwg.#18062. Hook-up five wires to bay one, refering to the wiring diagram, such as, No. 1 on the Bubble Brush terminal strip hooks to either the air or water solenoid for the No. 1 Bubble Brush bay. The No. 1 on the air and fluid terminal strip hooks to one side of the air solenoid and antifreeze solenoid accordingly. The other side of these solenoids are hooked together and connected to the common terminal strip of the Antifreeze Controller. Repeat the above procedure for each additional bay. Plug the controller into 110VAC outlet.

M. TYREFOAM UNIT - First, hang the expansion tank and hook up the pump as with the Bubble Brush unit. Plumb the tire chemical from the fluid module to the tyre cleaner manifold on the pumping plant. Establish the

order of your bays, bay 1, bay 2, etc. This procedure will save you a great deal of confusion later. Run a 1/4" polyflow air line from the air regulator for bay 1 (on the left side of the panel board) to the boom in the number 1 car wash bay. Leave 2 extra feet in the bay to make connections and loops. Do again for all the rest of the bays. Run a 1/4" polyflow tyre cleaner line from the tyre cleaner flow guage (0-8 oz/min) for bay 1 to the boom in number 1 car wash bay. Leave 2 extra feet in the bay to make connections and loops. Repeat this for the remaining bays. NOTE: You will find it easier to combine the preceding steps so that you are pulling both air and tyre cleaner lines to your boom from the panel board in your equipment room. Next, install the Mark VII Tyre Foam Generator in the bay at the boom as in Dwg.#18055. The generator is to be located in the heated junction box when overhead heat is used.

- N. OVERHEAD LINES Run overhead foam lines per BUBBLE BRUSH INSTRUCTIONS. Run overhead TYREFOAM lines per TYREFOAM instructions. Run 3/8" 3000 lb. high pressure hose between the center-mount booms and the high pressure output tee on the pumping plant. Be sure to identify which hose is which by marking them in some way. NOTE: HIGH PRESSURE HOSE IS TO BE FURNISHED BY THE CUSTOMER. If you have the Overhead Heating system, install lines according to Overhead Heating Instructions. Read all these sections carefully and if possible install all overhead lines at the same time. It is far easier to pull all lines together rather than trying to run lines on top of each other.
- O. OVERHEAD SERVICES HEATING SYSTEM Install an appropriate length of the 1/2" poly braid hose between adaptors on boiler and pump, then secure with clamps. You are now ready to run the 1/2" polyethylene tubing through the 4" PVC, (customer supplied), out over your car wash bays. This tubing is very stiff and difficult to handle so take your time.

Measure the distance from the overhead pump out to the farthest boom on each end of your car wash. You will need 2 pieces of tubing the same lenght, to go out to your farthest boom on each side. Use the 1/2" MPT and FPT 90 degree hose barb ells to form your $\overline{}\overline{}\overline{}\overline{}\overline{}$ joint bends at the end of each circuit in your farthest bay's junction box. You will now have "4" tubing ends inside the equipment room. Connect one end from each circuit onto the adaptor on the overhead pump's outlet side. Connect the other ends into the hot water storage tank. These are the return lines.

Now for the electrical connections:
Refer to Dwg.#18002. For Hook-up with outdoor thermostat, connect 24VAC common, (Terminal No. 2 inside equipment control box), to one of the two screws on the overhead heating control box. Connect a wire from the other screw to the "B" screw of your outdoor thermostat. Hook one last wire from terminal "R" of the thermostat to terminal #7 of the equipment control box. For hook-up with the Weepless System, hook terminals 5 and 6 on weepless to the (2) terminals on the control box correspondingly.

Theory of Operation: When the outside temperature drops to near freezing, the thermostat will send 24VAC to the Overhead Services control box, which starts the overhead pump and fires the boiler. The pump circulates hot water through tubing which radiates heat and keeps your overhead services from freezing.

- Radiation rate = 100 BTU/hr. per ft. at 120 degrees -
- P. BILL CHANGER(S) Mount changer(s) in wall. Remove validator and any other electronic components that are fastened to the side of the bill changer. Weld angle iron around the bill changer inside the equipment room to secure the changer (it is not recommended to use bolts unless the bolt can be fashioned so it cannot be removed).
- Q. VENDORS Mount vendors on exterior equipment room wall adjacent to the bill changer(s).
- R. BOOMS Mount center, high pressure booms to the boom mounting brackets which are part of the roof structure. Be sure all booms are well greased.
- S. WAND HOLDERS Mount the wand holder within arms reach of the coin-boxes and generally angled away from coin box face. Swinging wand holders should be mounted in such a way that the square tube hangs under the

axle and the wand will point into the bay. Mount the "Hang Hose On Hook" sign and the hook, in center of bay wall with the hook above eye level.

- T. COIN BOX DOORS Attach door hinge to enclosure, connect coin box wires color for color, (1 thru 12) as per diagram.
- U. IN-BAY HOSES Connect hoses, wands, and brushes, to booms. The short high pressure hose connects to the boom and the high pressure wand hose with a swivel between the two hoses. NOTE: USE TEFLON TAPE BETWEEN ALL HIGH PRESSURE CONNECTIONS.
- V. VACUUMS Anchor vacuums to pad per vacuum drawing. Use a removable nut or bolt type anchor (1/2" or better) for service or damage. If your vac installation includes Doyle units, a mounting "spider" will be included and must be layed into the concrete pad at the time of the pouring.
- W. INSTRUCTION SIGNS Mount signs as follows: General Instructions adjacent to the coin box; Squeeze Trigger above the wand holder; Tire/Engine Cleaning Instructions adjacent to the General Instructions; BUBBLE BRUSH Instruction above brush hangers, located on opposite wall from the coin box.

III. START-UP

- A. TRIGGER WANDS Remove all trigger wands from their bay hoses.
- B. PUMP OIL The crankcases of the pumps have been filled at the factory. However, you must check the oil level of each pump to make sure that there has been no leakage.
- C. CHEMICALS Chemicals that come in five gallon buckets are set right below the fluid module tank. A hydrominder hose from the tank of each chemical mixture is run down into the buckets of their respective chemical, (the color in each hose indicates the function). These five gallon buckets can last as long as four weeks but should be checked every two weeks.
- D. WATER SOFTENER Start up of your water softener by local service representative is included in the purchase price of the softener. Contact your local Culligan Man.
- E. UNDERFLOOR HEAT START-UP Charge the system with antifreeze and water. A 50/50 mixture is recommended for best results. You can calculate the total number of gallons needed by multiplying .0159 times the number of feet of under floor tubing laid. Example: 1000 ft of tubing x .0159 = 15.9 gal. of fluid, half of which should be antifreeze. Turn on heater per heater instruction manual enclosed with heater. With gas valve off, manually turn on circulating pump to help push air from system and introduce solution through 1 1/2" vertical pipe at inlet of circulating pump.
 - 1. Once system has been filled with solution and all air purged, you are ready to treat the system. Set outdoor thermostat at about 38 degrees F. (if outside temperature is above 38 degrees F. turn thermostat up until system comes on). For test turn makeup water supply on at 10 PSI. After the system has been pressurized turn off the water valve for this system. NOTE: MAKE-UP WATER MUST BE TURNED OFF DURING NORMAL OPERATION. Set operating aquastat on heater at 90 degrees F. and high limit at 140 degrees F. Turn on gas, to fire water heater. Adjust valves on return manifold so that plastic lines feel the same temperature in each circuit.

NOTE: Expansion of fluid may cause water to release through release valve. We recommend connecting valve to proper drain.

F. WATER - Turn on the water valve allowing water to flow to the fluid service module. Allow the tanks to fill, first the hot and cold tanks, then the soap, wax, and BUBBLE BRUSH tanks. It is recommended at this point to raise the weighted floats in each of these tanks and fill each

tank one by one so that you may verify the amount of concentrate being mixed by the hydro minder is to your desired tastes. If adjustment is needed see HYDROMINDER INJECTOR INSTRUCTIONS.

G. WATER HEATER - After the water tanks are full, turn on the power to the water heater. Nearly all Mark VII heater systems are "On Demand" type systems, which means hot water is NOT produced until one of the pumps asks for it. Find your "On Demand" plugs (cords with phono plugs on each end) and connect the longest unit (approximately 15') into the side of the boiler in the jack provided on the side of the electrical junction box. Connect the other end in the bottom of electrical enclosure of the closest bay, use all smaller cables to jump from bay to bay in the jacks provided. The last bay will not have a plug for it and will have an empty jack. To test with all the bay power off, but the boiler power on, push on each motor starter. At this time each starter will cause the boiler to come on as long as the motor starter is pushed in. Make sure the hot water in the fluid service module is set at 120 degrees and that the high limit switch on the boiler is set at 180 degrees.

Now, hook up the Overhead Heating System into the "on-demand" system. Find the "Y" phone jack adaptor included, and the 6' cord with male - male phono jack connectors. Plug the 6' cord into the female jack on the control box with the electrical cords wired into it. Plug the other end of the 6' cord into the "Y" adaptor. Unplug the cord from the equipment control box to the boiler utility box at the boiler end. Plug this cord into the "Y" adaptor also, and plug the "Y" adaptor into the boiler utility box. Now plug the overhead pump cord into the control box. Plug the control box into a 120VAC outlet.

- H. TIMERS Check to see that timers are set to the desired price and time before starting up. READ DIRECTIONS CAREFULLY BEFORE SETTING! Replace covers when through.
- -I. TURN 'ON' POWER -At circuit breakers.
 - J. BAY CHECK OUT -
 - Insert quarters in the first bay's coin box with the rotary switch in the 'OFF' position. The green light will turn on after the minimum number of coins have been inserted.
 - Make sure all valves at the manifolds (behind and below the pumps) are turned full to open.
 - 3. Turn rotary switch to "RINSE", the pump should then turn on.

 NOTE: The pump will make a lot of noise until the air has been cleared from the intake manifolds. AT THIS TIME CHECK THE ROTATION OF THE MOTORS (3-PHASE ONLY) TO MATCH THE ARROWS CAST AT THE TOPS OF THE PUMP CRANKCASES.
 - 4. After the line out to the bay has been thoroughly flushed, turn the selector switch to "SOAP". Warm water will now flow and again, the pump will make noise due to air in the warm water manifold. After the warm water flush, turn rotary switch to "OFF" and replace the trigger wands back onto the bay hoses. BE SURE THE WANDS HAVE THE PROPERLY SIZED NOZZLES.
 - 5. FROM THIS TIME ON, START-UP WILL REQUIRE TWO PERSONS.

 Turn the selector switch to "RINSE" while holding the wand firmly.

 The high pressure will rise to the factory pre-set pressure with trigger pulled on the wand.
 - 6. Check the pressure reading at the gauge adjacent to the high pressure pump. Make sure that the pressure is not exceeding the limitations of the pump and motor. NOTE: To high of a pressure setting will cause the motor overload to trip.
 - 7. Have a second person release the trigger of the wand while you are watching the gauge. The pressure should rise about 10% above the normal operation pressure.
 - 8. Have the other person squeeze and release the trigger several times to assure proper operation of the unloader valve.

- 9. Make sure the Hot/Cold switch is in the hot position.
- 10. With the trigger constantly being squeezed, adjust the incoming water flow to the pump by slowly closing the red-handled valve marked HOT WATER, (located directly behind and below the operating pump) until the pump starts making a loud sound which indicates that it is starving for water. At this time, begin opening the valve until the noise goes away, then open the valve 1/2 of a turn more. By doing this you have properly adjusted the incoming hot water supply to that pump.
- 11. Repeat step 10 with the COLD WATER intake valve, (upper 2" manifold). Make sure the Hot/Cold switch is in the Cold position.
- 12. Adjust the soap mixture to 4 oz. per minute by turning the black knob located at the bottom of the flow gauge. The soap gauge is marked SOAP and has the yellow hose running to it, which also matches the color of the wiring of the soap control and the SOAP position on the coin box face-plate.

 CAUTION: DO NOT OPEN THE ADJUSTMENT KNOB FULLY AS IT WILL COME OUT OF ITS HOUSING WHICH IN TURN WILL CAUSE THE LEAKAGE OF SOAP CONCEN
- 13. Turn the rotary switch to WAX and set it's mixture to 3 oz. per minute. The wax flow gauge has the clear/pink hose going to it.
- 14. Turn back to the RINSE and make sure that there is no reading on either WAX or SOAP gauges.
- 15. TURN ON WEEP SYSTEM, REGARDLESS OF THE TEMPERATURE, (weepless system requires ice water on the thermistor to cycle), the main weep valve is located at the left front of the fluid module. Check for adequate flow from all wands, (32 oz. per minute). Adjust individual bay valves located along the upper-front manifold, if necessary. This flow rate is critical for insurance against freeze up.
- 16. BUBBLE BRUSH START UP Open or disconnect your output line to the panel board. Fill your B/B tank with (1) part Mark VII Bubble Brush concentrate to (300) parts water with the purple orifice in the Hydrominder. Plug the unit into 110 VAC outlet. Turn the ON/OFF pressure switch lever half-way in between and hold. The motor will then start. Make sure the output is open, as to let the pump prime. If the pump has to run longer than 60 seconds turn it off and check the output to make sure it is open. If necessary disconnect the polyflow at the pump output to insure a free flow. Once the unit is primed turn the switch to the off position and reconnect the output hoses to the pumping unit. Turn the pump back to the half on position. Once the pump has moved past the low limit of approximately 40 pounds you can turn the pump to the full on position and it will stay running until it reaches approximately 55 pounds of pressure. NOTE: The low limit is designed so if the unit runs out of fluid it will not run indefinitely. Adjust the Bubble Brush regulator to 35 pounds output. You will need to screw the knob on the regulator in for more pressure, out for less. Once you have 35 pounds, adjust the lock nut to hold this Turn bay number one on and select Bubble Brush. The air setting. and fluid solenoid should just have turned on. With both solenoids running adjust air to 15 pounds of pressure then adjust the fluid flow control to 48 oz. per minute. The Bubble Brush is now in operation and you should have rich thick foam out at your bay. If the foam is in spurts reduce your air pressure. If the foam is too runny increase air pressure. Repeat procedure for all other bays.
- 17. Turn switch to OFF. Nothing should operate in the bay, but the green light should remain on till end of cycle.
- 18. BUBBLE BRUSH WEEP SYSTEMS There are three different weep systems available: Manual, Automatic, and Anti-Freeze Injection (optional). The first two are basically the same as far as setup. Turn the system on to get foam into the lines going to the bay, then shut the system back off. While there is still foam in the lines, turn on the WEEP SYSTEM (by thermostat or manual valve). Slowly adjust the WEEP regulator at the top right of the last board by opening (clockwise) it until the foam is pushed out the line at about 2 to 4

inches per second. Your weep system is now adjusted for the winter season. For the optional Anti-Freeze injection system refer to ANTI-FREEZE INJECTION UNIT.

19. TYREFOAM START UP - The Tyre Foamer injects the correct amount of Mark VII Tyre cleaner to the bay where a presise amount of air is added to produce foam and operate the Tyre Foam Generator. Under pressure the soap mixture is forced through the nozzle to create a thick, rich cleaning foam. Mark VII Tyre Cleaner is no ordinary soap. It is a very specially balenced formula to foam and clean. Most brands of tire cleaner won't foam and might damage pump or flow meters. Use only Mark VII approved foaming tire cleaners with this unit.

When starting up your unit open or disconnect your output line to the panel board. Fill your tire cleaner tank with one (1) part Mark VII Tyre Cleaner concentrate to four (4) parts water with the Hydrominder. Plug the unit into a 110 VAC outlet. Turn the OFF/ON pressure switch lever half-way in between and hold, the motor will then start. Make sure that the output is open; as to let the pump prime. If the pump has to run longer than 60 seconds turn it off and check the output to make sure it is open. If necessary disconnect the polyflow at the pump output to insure a free flow. Once the unit is primed turn the switch to the off position and reconnect the output hoses to the pumping unit. Turn the pump back to the half on position. Once the pump has moved past the low limit of approximately 40 pounds you can turn the pump to the full on position and it will stay running until it reaches approximately 55 pounds of pressure. NOTE: The low limit is designed so if the unit runs out of fluid it will not run indefinitely.

Adjust the tire cleaner regulator to 35 pounds output. You will need to screw the knob on the regulator in for more pressure, out for less. Once you have 35 pounds adjust the lock nut to hold this setting. Turn bay number one on and select Tyre Cleaner. The air and fluid solenoid should just have turned on. With both solenoids running adjust air to 15 pounds of pressure then adjust the fluid flow control to 8+ oz. per minute. Make sure, if you have a trigger wand, to adjust the panel board only with the trigger fully pulled back. The Tyre Foamer is now in operation and you should have rich thick foam out at your bay. If the foam is in spurts reduce your air pressure. If the foam is too runny increase air pressure. Repeat procedure for all other bays.

20. PRESOAK START UP - Make sure that your TYRE FOAM system is full. Turn on the water supply to the PRESOAK manifold, (inspect for leaks), select PRESOAK on bay 1. The TYRE FOAM and PRESOAK valves should come on at the same time, adjust flow from PRESOAK manifold for approximatly 50 oz/min. The PRESOAK gauge has orange tubing connected to it.(Further adjustment may be made for personal taste). Repeat above steps for all bays.

Maintenance — Make sure that TYRE FOAM tank is always more than 1/2 full, keep all fluid handeling as clean as possible, check all flow meters each month and make any necessary adjustments.

21. ANTI-FREEZE INJECTION START UP - Fill pumping plant unit 1/2 full of water. Connect pump power cord to 110 VAC, turn on unit by holding lever on side of motor pressure control at 45 degrees until the pressure is above 45 lbs. The safety system of the pumping plant will not let the pump operate if it cannot maintain a minimum pressure of 45 lbs. Once the system is above this pressure it will operated automatically from then on, unless it runs out of fluid, and then it will have to be restarted as in above. When the pressure guage is above 45 lbs move the lever into the full on position (horizontal). Turn the regulator down as far as possible, (counterclockwise) and remove the plug from the opposite end of the antifreeze manifold. Purge the manifold by turning back up the regulator to 10 lbs for 3 seconds. BE AWARE that the above step is a wet one and certain prudence should be used in trying to contain excess water.

Turn the system off at the pump and remove the power cord from the outlet. Re-install the plug into the end of the manifold assy.

Drain the water from the pump holding tank and replace it with antifreeze and water at two parts water to one part antifreeze mixture (if you have a hydrominder set-up, no orifice is used when pumping anti-freeze).

Restart the pump system as you did above, turn the thermostat to as high as it will go, and wait. If all has been installed correctly the system will activate in about 40 seconds and will run each bay through one cycle. If this does not happen check the incoming power to the unit, you should have 110 VAC on the primary of the internal transformer in the controller and 24 VAC on the output. Check all wiring to each bay and make sure it conforms to the diagram provided. If only one or more bays fail to operate check the wiring of that bay and recheck all your crimp on connections.

Turn pumping plant regulator to 35 lbs. Turn main air regulator on the Bubble Brush board to 35 lbs. Your system is now ready for operation. As a last adjustment, the first time the system is needed check to see if the Anti-Freeze is getting all the way to the brush out in the bay. If not then increase both the Anti-Freeze pressure and the main air pressure by 5 lbs.

- 22. REPEAT ALL PROCEDURES IN (J) FOR EACH ADDITIONAL BAY.
- K. VACUUMS Start-up vacuums, check for suction leakage and proper price and time settings on timers (see inclosed VACTIMER instruction sheet).
- L. Bill Changers Load Changer(s) with quarters and start up per bill changer manual. NOTE: \$500 IS THE MAXIMUM RECOMENDED DAILY AMOUNT OF CHANGE NEEDED.
- M. Vendor Stock vendors and check for proper coin operation, keep shelf and trigger area clean.

YOU ARE NOW READY TO WASH CARS. OPEN

IV. Safety

Your car wash will be only as safe as you make it. Please observe these safety guidelines:

- A. Never lean on the machinery when it is operating.
- B. Always turn-off the power to the machinery prior to working on it.
- C. Never allow any customers into your equipment room.
- D. Always TURN-OFF circuit breakers to bay before working on equipment.
- E. Never bypass any safety devices such as high limit thermostats on the heaters, overloads on the motor starters, and fuses on the transformers.
- F. Always replace the belt guards after working on the belts, pulleys, pumps, or motors.
- G. Never stand in water in the equipment room.
- H. Always use safety trigger wands.
- I. Always wear safety glasses when you are working in the equipment room when the pumps are running.
- J. Handle all chemicals properly. Always follow label directions.
- K. Keep the wash bays clean. Dirt or mud may cause a customer to slip and fall.
- L. Keep your wash bays ice-free. If there is ice on the floors, close the bays until the ice is removed.
- M. Do not follow a set routine when emptying your coin vaults, ie. different times of day, different days of the week.

V. Lubrication and Adjustment

- A. Grease center-mount boom monthly.
- B. High pressure pumps Follow pump manufacturer's recommendations for oil changing intervals and any other required regular maintenance.
- C. Check pump drive belts for proper tightness. DO NOT OVER-TIGHTEN!
 Adjust belt for 1/2" of play when depressed. Use a straight edge from motor pulley to pump pulley, lay it on top of each pulley, depressing center of the belt. Measure this defection and adjust pump for 1/2" of deflection.
- D. Oil the circulating pumps as required.
- E. Check oil in air compressor, add if required. Follow manufacturer's recommendation for periodic service.
- F. Drain air compressor tank and air line filter daily.
- G. Check chemical concentrations periodically for conformity to desired mixtures. Stir every few days to prevent settling. The following chemical operations are recommended:

PRODUCT	FIRST DILUTION IN TANK	FLOW RATE
H. P. Soap (liquid)	4:1 (gray orifice)	4 oz./min.
Wax	4:1 (gray orifice)	3 oz./min.
Bubble Brush	300 : 1 (purple orifice)	48 oz./min.
Tire Foam	4:1 (gray orifice)	8 + oz./min.
Presoak	No additional chemical	50 oz./min.

ACCUTIME INSTRUCTION

Accutime Instructions

The accutime system is the first stage of the user friendly timers. Many additions have been made to the internal workings to make this a forgiving electronic circuit, yet costly frills have been kept to a minimum to make this the most versatile and cost effective timer on the market.

<u>Install</u> timer on convenient surface close to your 24 volts A.C. wiring and easily accessible so you may change time or price with ease. Terminals are hooked up as such:

- 1. 24 Vac (HOT)
- 2. 24 Vac (COMMON)
- 3. LOAD or OUTPUT
- 4. COIN SWITCH
- 1. The 24 Vac hot should hook to one side of your 24 volt transformer. This wire is usually what you would consider the power wire in that contact of this wire to the motor starter or soap valve would operate it.
- 2. 24 Vac common should hook to the other side of the 24 volt transformer, this wire is the one that is common to all of your valves or motor starters. It may also be called AC LOW.
- LOAD. This is the output of the timer and becomes hot when the right amount of money has been put in the coin switch. This wire usually hooks up to your pilot lamp and your selector switch.
- 4. Coin Switch is a set of contacts between terminals 1 and 4. When the coin switch is closed it tells the timer to count one coin.
- Fig. 1 Diagrams a typical wiring installation.

Note: All switches set the desired amount in the binary system (x2)

Setting The Number of Coins to Start

- 1. Remove cover 'Note Diagram on inside of cover for easy quick reference'.
- 2. Set switch to give your desired number of coins to start. Refer to figure below.

COINS TO START 2 3 4 5 6 7 8 9 10 11 12 13 14 15 COIN **SWITCH** DOT INDICATES SWITCH IN "ON" POSITION

Time Per Coin

Now that you have told the timer how many coins it takes to start, you must tell it how long each coin is worth. This is so it knows how much time to add for additional coins. Example:

(Remember all time is in seconds)

4 Minutes for 4 quarters =

240 Seconds (4x60) for 4 quarters =

240 seconds ÷ 4 quarters = 60 seconds per coin.

You can see that each quarter is worth 60 seconds of time. Now you tell the timer. This is done by setting the set of 12 switches in the timer (you may notice that each switch is 2 times greater than the switch before, this allows for a large time adjustment with only a few switches) use the diagram in the lid of the timer for easy reference of switch values. The time setting is an adding process of switches. For instance, 60 seconds is equal to 32+16+8+4 you would simply turn on these switches on to get the desired time. Any time up to 4095 seconds per coin is possible. Use the chart below to help you find the time you need in seconds per coin.

	1	2	3	4	5	6
1	60	30	20	15	12	10
1,5	90	45	30	22	18	15
2	120	60	40	30	24	20
2,5	150	75	50	37	30	25
3	180	90	60	45	36	30
3,5	210	105	70	52	42	35
4	240	120	80	60	48	40
4,5	270	135	90	67	54	45
5	300	150	100	75	60	50
5,5	330	165	110	82	66	55
6	5 360 180		120	90	72	60
6,5	390	195	130	97	78	65

SECONDS PER COIN

ACCUTIME INSTRUCTIONS

<u>Trouble Shooting 1. Start</u> the timer by jumping terminals 1 to terminal 4, if this works you have miswired the coin switch, trace wire 1 and 4 to the coin switch and repair or replace defective wiring or switch.

2. If this fails, jump terminal 1 to terminal 3. This should turn on your equipment regardless of time or coin setting. If not, then check to make sure that you have 24 VAC at the timer on terminals 1 and 2. This power should be constant. Then check to make sure that terminal 3 is correctly hooked to the load side of your system.

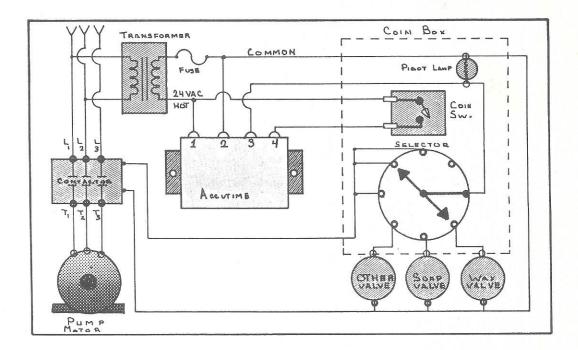
If jumping 1 to 3 does turn on your system check to make sure that terminal 2 (24 VAC common) is correctly placed to the transformer, you should be able to hook a voltmeter across terminals #1 and 2 of the timer and read 24 volts A.C. If not, trace wiring back to transformer.

Repeat step 1.

When you kill the power to the timer in order to erase the time in its memory you must leave it off for 30 seconds, this is so if there is a brief power outage the timer will remember where it was.

When using this timer with an electromechanical counter please order Accutime diode bridge, for it will be necessary for proper operation.

Fig. 1

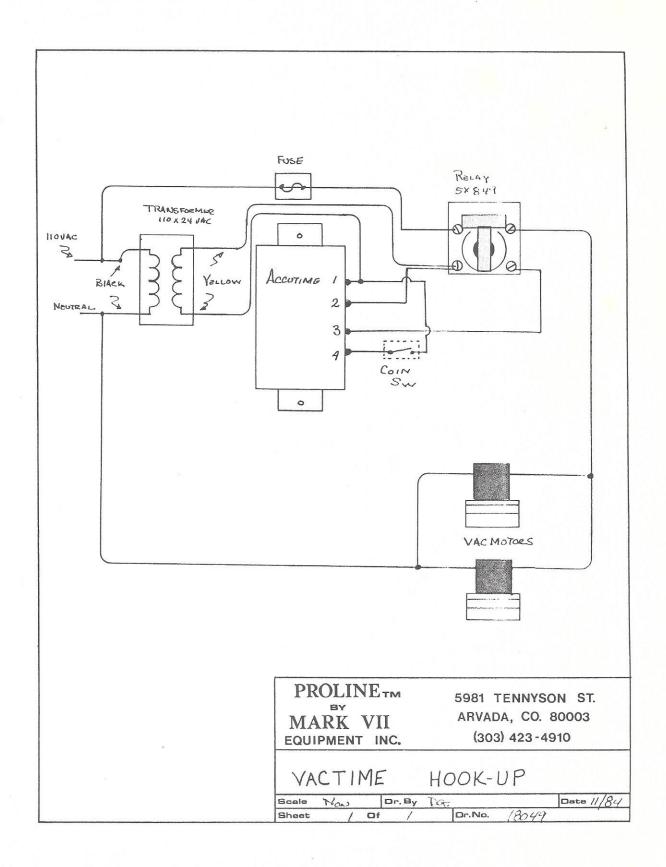


MARK VII

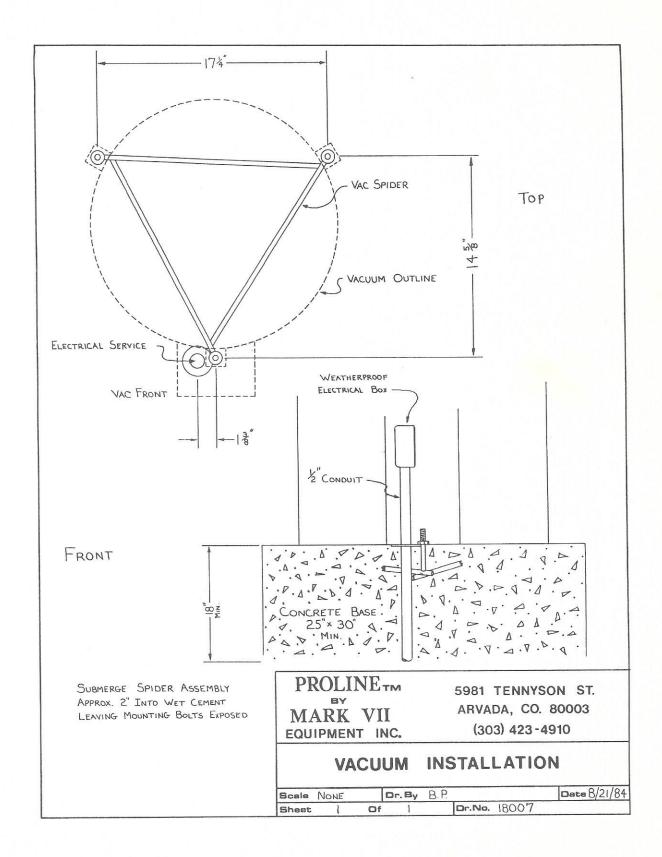
EQUIPMENT SALES, INC.

ACCUTIME INSTRUCTIONS

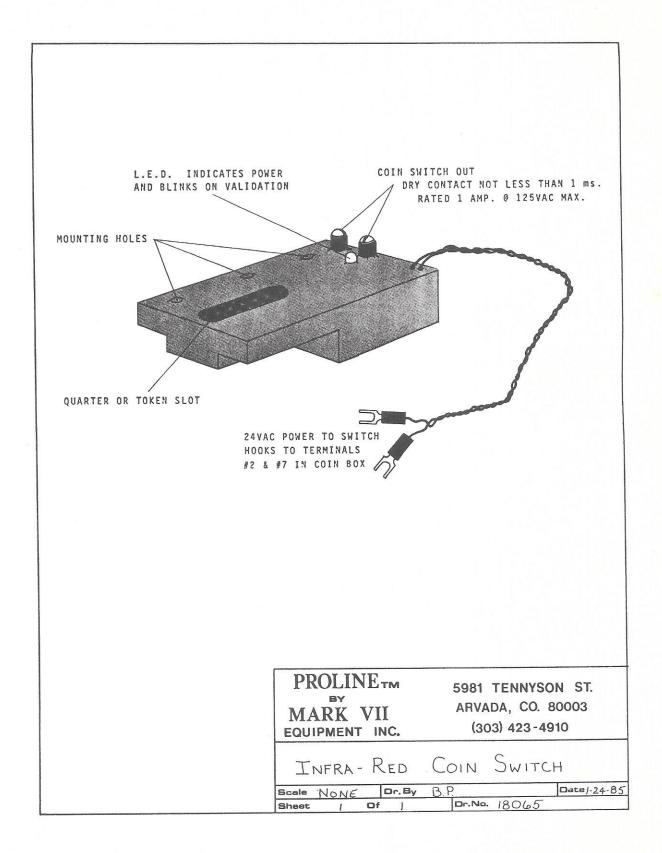
VACTIME INSTRUCTIONS



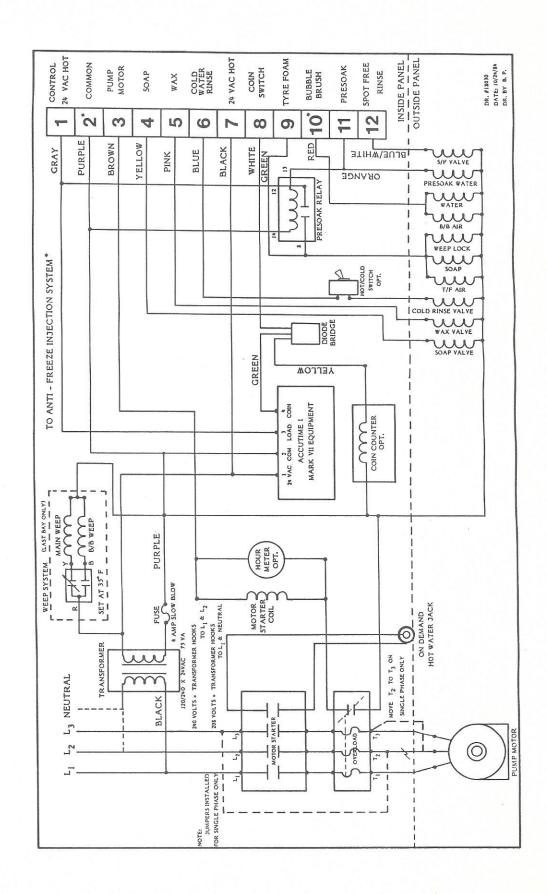
VACUUM INSTALLATION (DOYLE)



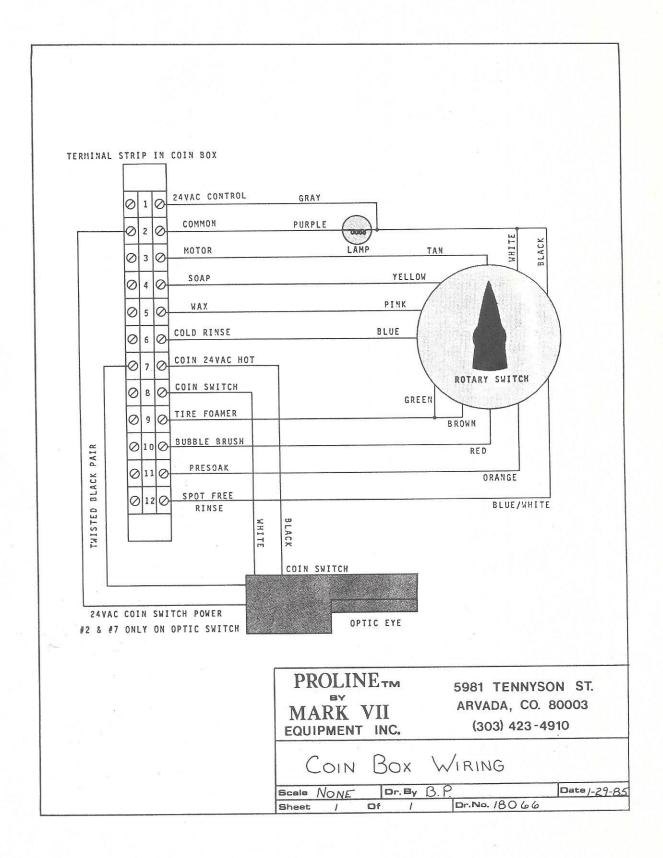
INFRA-RED COIN SWITCH INSTRUCTIONS



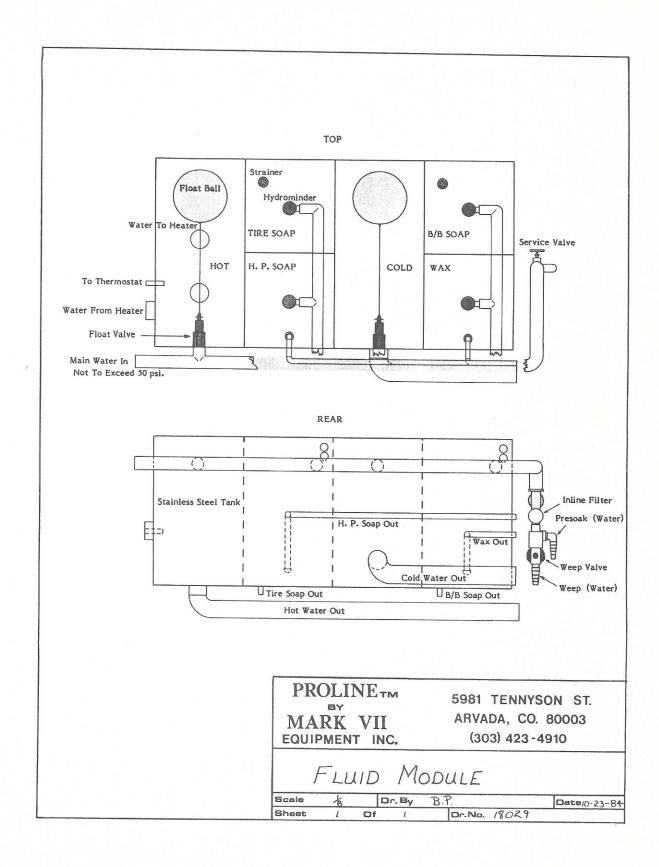
ELECTRICAL DRAWING FOR 220 AND 208 VOLT CONTROL PANEL



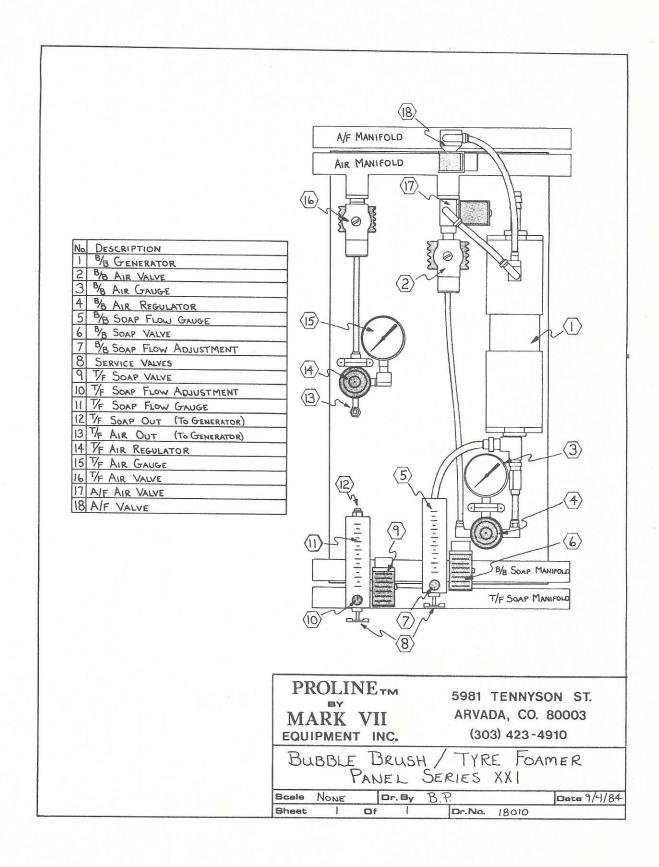
ELECTRICAL DRAWING COIN BOX



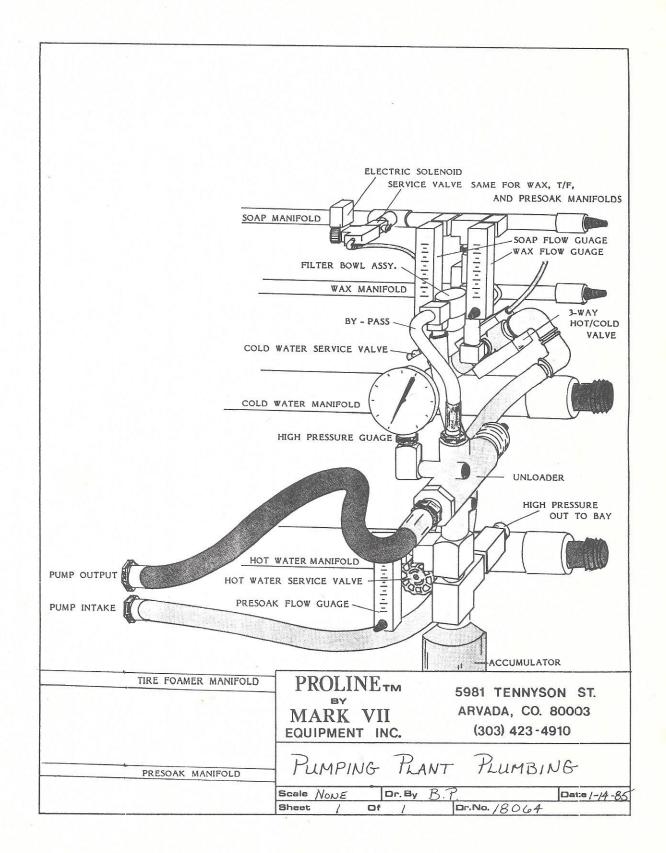
FLUID MODULE



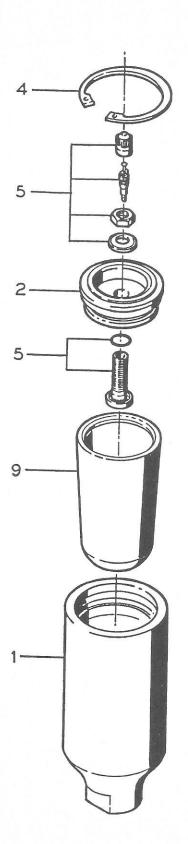
BUBBLE BRUSH / TIRE FOAMER PANEL - SERIES XXI



PUMPING PLANT LAYOUT



PULSATION DAMPNER GIANT TYPE



22023 REBUILDABLE ACCUMULATOR



Item #5 is sold only as one unit.

SPECIFICATIONS

SPECIFICATIONS
Flow Rate: Up to 12 g.p.m.
Operating Pressure: 2500 p.s.i. (max)
Operating Temperature: 200°F (max)
Precharge Pressure: 1250 p.s.i. (max)
Weight: 3 lbs.
Connection: 3/8" female NPT
Capacity: 8½ cu. in.
Burst Strength: 10,000 p.s.i. (min.)
(NOTE: Precharge pressure is always one half of operating pressure)

PULSATION DAMPENR GIANT TYPE

PARTS LIST

MODEL 22023 REBUILDABLE ACCUMULATOR

Item	Part No.	Description	Quantity
1	22024	Body	1
2	22025	Тор	1
9	22028	Bladder	1
4	22027	Snap Ring	1
5	22036	Valve Assembly (sold only as one unit and includes: valve, valve core, nut, valve cap, "o" ring and washer)	1

INSTALLATION INSTRUCTIONS

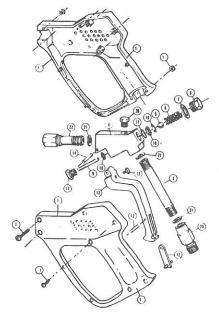
It is recommended that the Model#22023 Accumulator be mounted pointing down as a safety precaution. This mounting procedure also allows the Accumulator to remain cooler during system operation and prolongs the effective operating life of the Accumulator bladder.

NOTE: Shelf life of the nitrogen pre-charge of Accumulators is approximately six months before re-charge is necessary.

Giant recommends the nitrogen pre-charge be checked approximately every three (3) months after Accumulator is installed in a pressure system.

CAUTION: Accumulator is to be pre-charged with nitrogen to one-half of the system operating pressure. Do not pre-charge beyond the rated operating pressure.

CAT WEEP GUN BREAK DOWN



GUN HANDI F PARTS LIST

		GUN	HANDLE PARTS LIST	
ITE	EM	PART		
N	0.	NO.	DESCRIPTION	QTY
	1	30455	Handle Assembly	1
	3	30457	Threaded Pipe	1
	5		Valve Body	1
*	5		Ball-S.S.	1
*	6	30460	Spring-S.S.	- 1
sh	7		Seal Washer	1
	8	(*)	Plug	1
*	9		Actuator Rod	1
	10	30464	O-ring (Viton)	1
	11	225	Sleeve Nut	1
	12		Lever Assembly	1
	14		Needle	1
	17		O-ring (Viton)	1
	18		Seat-S.S.	1
	19	30473	Snap Ring	1 1 3 1
	20	2	Plug	1
	21		Gasket (Aluminum)	3
- 1	22	30476	Discharge Fitting	1
	23		Inlet Fitting	1
189		30448	Repair Kit	1
#		30499	O-ring and Gasket Kit	

and # Items available in kit. "Special order" if purchased individually.

SELECTION:

Select a gun to match your system flow and pressure requirements, temperature and function being performed.

INSTALLATION:

Install the appropriate relief valve when using a shut-off gun to avoid pressure splkes when the gun is shut off. Severe damage can occur to your system without this device.

OPERATION:

Flow through the gun occurs by squeezing the trigger on the gun. This activates the actuator rod, lifting the ball off the seat and allowing the pumped fluid to flow through the valve body chamber in the gun. Releasing the trigger shuts off the flow. The special machined hole in the valve body will allow approximately 1/2 gallon per minute to weep through gun during shut-off to prevent freezing.

SERVICING:

- 1) Remove the 7 machined screws (M8) and nuts (M4) 1) Hemove the / machined screws (Mb) and huts (Mb) and the 2 screws (M13) from the body valves. Separate body halves.

 2) Remove plug (#8), seal washer (#7) and ball (#5) from the valve body.

 3) Remove snap ring (#19). Then remove valve seat (#18) and O-ring (#17).

 4) Remove sleeve nut (#11) and O-ring (#10) with the actuator rod (#9)

- actuator rod (#9).

 After installing new seat (#18) and ball (#5), tap the ball lightly with a hammer to assure a proper
- seating between the ball and seat.
 6) Examine all O-rings and replace as necessary.
 7) Reassemble in reverse order.

TROUBLE SHOOTING:

- Water leaking out the discharge of the gun:
 a. object lodged between the seat and ball. b. seat worn.
- c. O-ring under seat worn.
- Water leaking out the lever area:a. O-ring around push rod worn.

581-45-7M

Products described hereon are covered by one or more of the following U.S. patents: 3558244, 3652188, 3809508, 3920356, and 3930756



P.O. Box 885 MINNEAPOLIS, MN 55440 Phone (612) 780-5440 • Telex 29-0276

N.V. CAT PUMPS INTERNATIONAL S.A Harmoniestraat 29 B-2000 Antwerp, Belgium

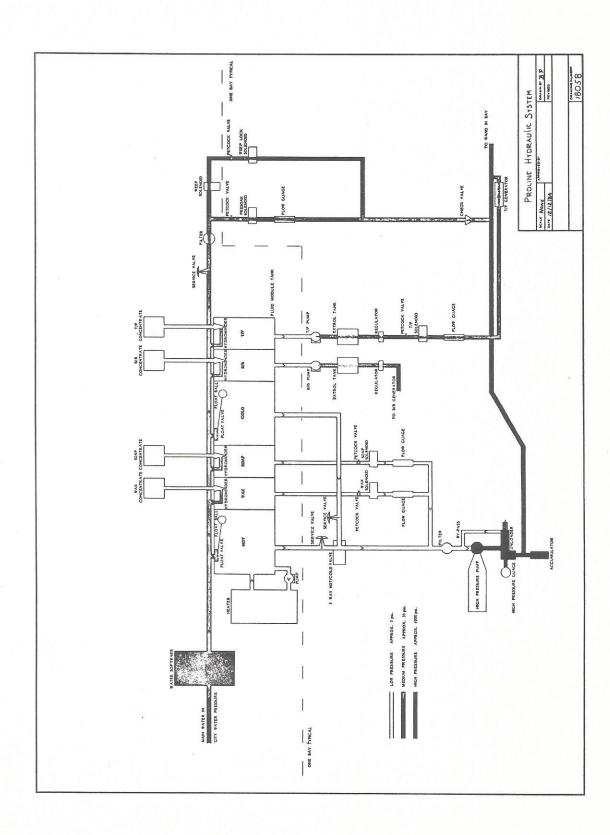
CAT PUMPS — A.G. Loretohöhe 5 CH-6300, ZUG, Switzerland

CAT PUMPS DEUTSCHLAND GmbH Rostocker Strasse 9 6200 Wiesbaden Bierstadt West Germany

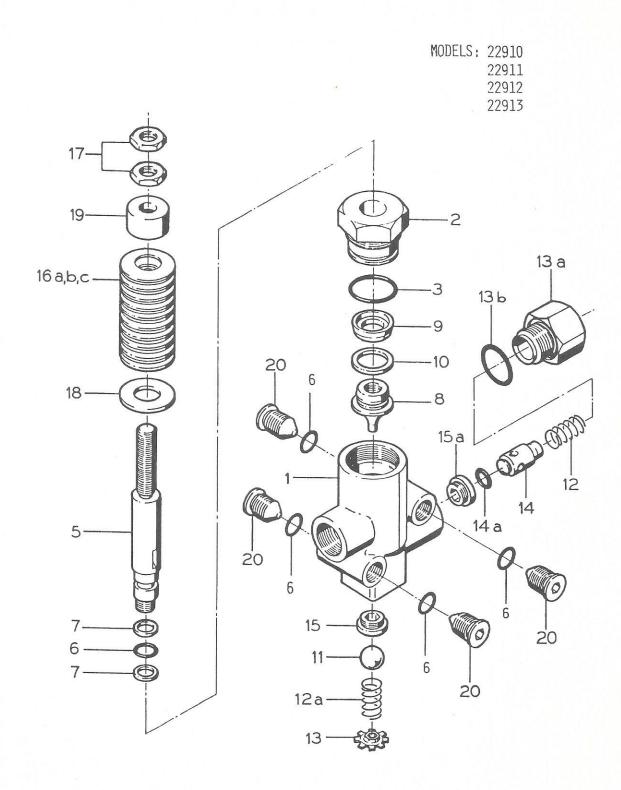
CAT PUMPS (U.K.) LTD. 17A Kings Road, Fleet Hampshire GÚ13 9AA England

Distributed By:

PROLINE HYDRAULIC SYSTEM



UNLOADER, GIANT



UNLOADER GIANT

GIANT INSTALLATION OF THE SERIES 29000 UNLOADER

- 1. The unloader is to be positioned on the discharge side of the pumping unit.
- 2. The bottom port (in) receives the pump discharge.
- 3. The side port (out) is the pressure outlet. Make sure all side parts are tightened securely.
- 4. The back-side port (by-pass) re-directs the pumped media when the pressure outlet is closed.
- 5. The proper sized by-pass line can be directed to a holding tank, to atmosphere, or back to the pump inlet.

NOTE:

By-pass lines returning to the pump inlet should be equipped with a thermal relief to prevent excessive heat buildup in the by-pass line that can damage the pumping system during periods of prolonged by-pass.

CAUTION: Improper placement of the accumulator can affect the unload capacity of your unloader and can lead to severe system damage and possible bodily injury.

If an accumulator is used as a pulsation damper in your pumping system, the accumulator must be positioned on the downstream side of the unloader.

CAUTION: A properly sized pressure gauge must be used when attempting to adjust your unloader to its pressure setting. Position gauge between the pump and unloader.

7. Select the proper spring assembly for your Series 22900 unloader. All spring ratings are based on the maximum operating pressure of the respective unloaders in the series.

22910 Silver Springs - Maximum 800 psi operating pressure, 13 gpm 22911 Yellow Springs - Maximum 1400 psi operating pressure, 13 gpm 22912 Red Springs - Maximum 2400 psi operating pressure, 13 gpm 22913 Orange Springs - Maximum 3000 psi operating pressure, 13 gpm

NOTE: Cracking pressures at which the unloader is activated can rise 300-400 psi over rated operating pressures depending on your system.

8. Always adjust unloader springs to system pressure with the system open. Be sure before adjusting that the spray nozzle orfice is properly sized for the volume and pressure you desire and then fine tune the unloader.

CAUTION: Never use the unloader to compensate for a worn nozzle as you risk bottoming-out unloader causing unloader malfunction that can lead to severe system damage and possible bodily injury.

 Giant Products Co. strongly recommends the use of a pop-off valve positioned downstream of the unloader as a safety backup to unloader malfunction.

PARTS LIST

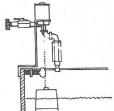
ITEM #	PART #	DESCRIPTION	QTY.	ITEM #	PART #	DESCRIPTION	QTY.
1	12087	Valve Body	1	13B	12092	O-Ring, Spring Retainer	1
2	12003	Valve Cap	1	14	12093	Outlet Valve Outlet Valve	1
3	12004	O-Ring, Valve Cap	1	14A	12094	O-Ring, Outlet Valve	1
4	12005	Set Screw, Valve Cap	1	15	12095	Seat, Inlet (S.S.)	1
5	12016	Valve Stem	1	15A	12096	Seat, Outlet Valve (Brass)	1
6	12100	O-Ring, Valve Stem	5	16	22829	Spring, Silver (800 psi)	19
7	12018	Back-up ring, Valve Stem	2	16A	22830	Spring, Yellow (1400 psi)	17
8	12015	Piston	1	16B	22831	Spring, Red (2400 psi)	17
9	04006	Cup (23mm)	1	16C	22835	Spring, Orange (3000 psi)	17
10	04018	Back-up Ring, Piston	1	17	12021	Nut	2
11	12089	Ball, Inlet	1	18	12023	Washer, Spring	1
12	12090	Spring, Outlet Valve	1	19	12097	Limiting Cap	1
12A	12011	Spring, Inlet	1	20	12098	Side Port Plug	4
13	12012	Spring Retainer, Inlet	1				
13A	12091	Spring Retainer, Outlet Valve	1				

HYDRO-MINDER

HydroMinder Model 505

Package Contains:

- 1. Proportioner with U-clamp for mounting
- 2. Float with chain
- Supply tube with foot valve 9 ft.
 Discharge tube 2 ft.
- 5. Metering tip kit 10 tips
- 6. Product Information Sheet
- 7.



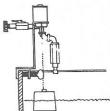
Installation:

- Select metering tip (see next section) and insert tip into suction stub on eductor body.
- Slide open end of suction tube over the eductor stub.
- Attach end of discharge tube with clamp and flooding ring to discharge barb on eductor.
- 4. Mount unit in level position on edge of reservoir. U-clamp may be repositioned or removed as necessary.
- Insert foot valve end of suction tube into chemical concentrate container. (Level of concentrate must be below level of unit, or it will continue to draw after it is turned off.)
- 6. Adjust chain length to position float at the desired level of solution. To prevent foaming, be certain that the solution level will be above the point of discharge.
- Install min. 1/2 inch water hose between inlet swivel and water spigot (min. 15 psi pressure required).

Metering Tip Selection:

Viscosity of the chemical concentrate should be considered because final concentration is related to both the size of the metering tip opening and the viscosity of the liquid being siphoned. If product viscosity is noticeably greater than water, consult the procedure for measurement of concentration and guide to selection of tip to achieve your desired water:product ratio. For water-thin products, consult the chart below. Two undrilled white tips are supplied for drilling sizes not listed. If greater dilution of concentrate is required, an additional HydroMinder may be installed on an adjoining reservoir for two-step ailution.

Tip Color	Drill Size	Dilution Ratio at 40 psi (Water-thin Viscosity 0.8CP)
No tip		2:1
orange	20	3:1
gray	30	4:1
black	40	8:1
gold	50	13:1
red	55	20;1
blue	60	35:1
green	70	75:1
yellow	76	150:1



HYDRO-MINDER

	Key	Part No.	Description
97	4	5030-K	mounting bracket kit
and the second s			
h			
i			
- 1			
5 j 😂	-	5051 14	
L d	5	5051-K	magnet parts kit
k			g. screw
I — ())			h. washer
m ——¥			i. magnet cover
			j. magnet assembly
			k. spring, magnet
- Andrews			1. yoke, magnet
(°°)	6	E0E2-V	m. chain clip
4	0	5052-K	valve parts kit
			n. valve guide assemblyp. spring, armature
			Taken - Anthre Loggi - Anthre London Lands and Anthre London
			q. armature r. diaphram
1	7	5039-IN	water valve body
l	8	5056	street elbow
	9	5037-K	eductor kit
	10	5045-K	metering tip kit
1	11	5057-A	discharge tube assembly
n			s. hose clamp
₿			t. flooding ring
6 P			u. discharge tube
q —↓	12	5058-9A	suction tube/foot valve assy.
			(includes 13-17)
1	13	5058	suction tube only (order per foot)
	14	5093-7	ring clamp
8-0	15	5093-A	foot valve assembly
			(includes 16 & 17)
	16 10 17	5099	weight only
	/ '!	3408	strainer only
	18	5043-A	float & chain assembly
, –			
3	A -		
11 1 13-	111		
	TIT		
l u e			
14	T = I		
	1-1-1-		
18-	12		
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17~	Z		

Form 505 12/80

THERMOSTAT SPEC.



INSTALLATION AND OPERATING INSTRUCTIONS TEMPERATURE CONTROLS MODELS 2E206 AND 2E207

FORM 5S1421 6881

DAYTON ELECTRIC MANUFACTURING CO. CHICAGO 60648

0180/483

ATTENTION: READ CAREFULLY BEFORE ATTEMPTING TO INSTALL OR OPERATE THE DAYTON TEMPERATURE CONTROLS! RETAIN FOR FUTURE REFERENCE.



Figure 1

Description

The single stage Model 2E206 and the two stage Model 2E207 thermostats incorporate single-pole double-throw switches for controlling automatic ventilation or heating in livestock barns, poultry houses, milk houses, brooder houses and other buildings. The 30 to 110°F, temperature range permits use for many space applications.

The enclosed switches are sealed against dust and other foreign material found in farm buildings. A compact helical temperature element, specially treated against corrosion, is firmly attached to the exterior of the case and when the thermostat is mounted with bulb pointed down it is protected from falling objects, such as straw, hay, dust, etc.

Specifications

MODEL 2E206: One SPDT switch (one set of contacts opens on temperature rise as the other set closes simultaneously).

MODEL 2E207: Two SPDT switches, with one stage operating 3 $^{\circ}\text{F}.$ higher than the other stage.

Range: 30° to 110°F. (140°F. maximum overrun temperature).

Differential: Approximately $3\frac{1}{2}$ °F. (Each switch has this differential on Model 2E207).

Temperature between stages: (Model 2E207) This difference is fixed; the low stage makes contacts R to Y at the dial setting while the high stage makes contact approximately 3°F, above the dial setting.

Case: .062" cold rolled steel. Gray baked enamel

Cover: .025 $^{\prime\prime}$ cold rolled steel. Gray baked enamel finish.

Contact Unit: Snap-acting contacts in dust-tight tamper proof enclosure.

Controls are UL recognized. Electrical Ratings: See chart. Dimensions: See chart, Figure 2

ELECTRICAL RATINGS

MODEL 2E206

Voltage, A.C.	120	208	240	277
Full Load Amps.	16.0	9.2	8.0	_
Locked Rotor Amps.	96.0	55.2	48.0	-
Non-Inductive or Resistance Load Amps.* (Not Lamp Loads)	22.0	22.0	22.0	22.0

*SPST RATING.

MODEL 2E207

Voltage, A.C.	120	208	240
Full Load Amps.	16.0	9.2	8.0
Locked Rotor Amps.	96.0	55.2	48.0
Non-Inductive or Resistance Load Amps. (Not Lamp Loads)	16.0	9.2	8.0

NOTE: When used as a two circuit switch, the total connected load must not exceed 2000 VA.

General Safety Information

- Disconnect power supply before wiring connections are made to prevent possible electrical shock or damage to equipment.
- All wiring should conform to the National Electrical Code and local regulations.
- Loads exceeding the rating of the thermostat should be handled with a relay or motor starter.
- 4. These controls are designed for open high and open low applications. Where critical or high value products are to be maintained within a specific temperature differential, a single control should not be applied to function as both an open high and open low control. In these applications, a separate back-up control with alarm contacts should be wired to indicate when the back-up control operates.

THERMOSTAT SPEC.

FORM 5S1421 6881

MODELS 2E206 & 2E207

Operation

Figure 10 illustrates the operation of Model 2E207. On a temperature increase to the dial setting, the circuit between R and Y of the low stage switch (RYL) closed. Simultaneously the circuit between R and B (RBL) opens. On a further increase in temperature the high stage switch operates and closes (RYH) while simultaneously opening (RBH). The reverse sequencing takes place on a temperature fall.

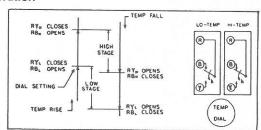


Figure 10 Operational diagrams of Model 2E207.

Trouble Shooting Chart

	MODEL 2E206						
SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION					
Cooling or fan does not operate.	Improper wiring. Thermostat dial set above space temperature.	Check wiring. Set dial to lower temp.					
Cooling or Fan runs continuously.	Improper wiring. Thermostat dial set below space temp.	Check wiring. Set dial to higher temp.					
System operates in reverse.	Improper wiring.	Check wiring					
Heating unit does not operate.	Improper wiring. Thermostat dial set below space temp.	Check wiring. Set dial to higher temp.					
Heating unit runs continuously.	Improper wiring. Dial set above space temperature.	Check wiring. Set dial to lower temp.					
	MODEL 2E207						
SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION					
Cooling or fan does not operate.	Improper wiring. Thermostat dial set too high.	Check wiring. Adjust dial to lower setting.					
Cooling or fan runs continuously.	Improper wiring. Thermostat set too low.	Check wiring. Adjust to higher setting.					
Heating does not operate, (Figure 9).	Improper wiring. Thermostat set too low.	1. Check wiring 2. Adjust thermostat to higher setting. First stage of heating should come on when dial setting equals space temp. As dial is adjusted to higher temp. (3°F.) second stage of heating unit should come on.					
Heating system runs continuously	Improper wiring. Thermostat set too high.	Check wiring. Adjust to lower setting.					
System runs in reverse.	Improper wiring.	Check wiring.					

LIMITED WARRANTY

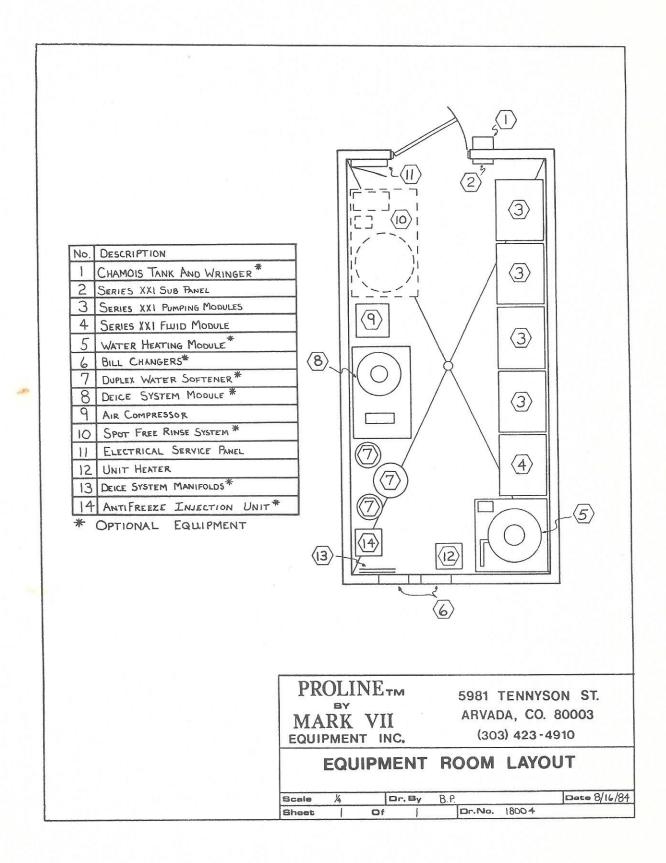
Dayton temperature controls. Models 2E206 & 2E207, are warranted by Dayton Electronal to the original user against delects in workmanship or materials under normal use trental use excluded, for one year after date of purchase. Any part which is determined to be defective in material or workmanship and returned to an authorized service location, as Dayton designates, shipping costs prepaid, will be repaired or replaced at Dayton's option. For warranty claim procedures, see "Prompt Disposition" below. This warranty gives uprohasers specific legist rights, and purchasers may also have her rights within vary from state to state.

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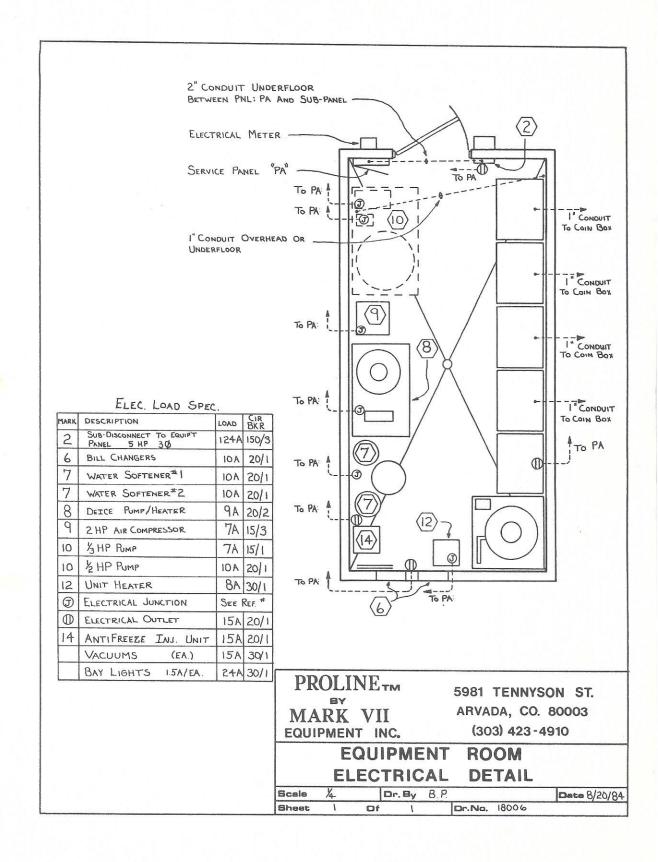
Except as provided below, no warranty or all ritimation of lact, expressed or implied, other than as stated in "LIMITED WARRANTY" above is made or authorized by Dayton, and Dayton's liability in all events is limited to the purchase price paid.

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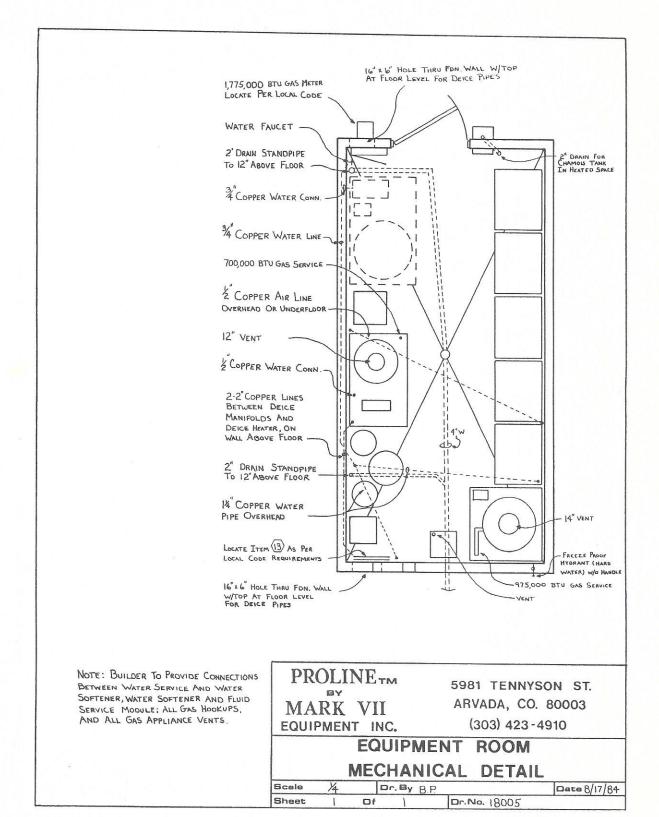
DAYTON ELECTRIC MFG. CO., 5959 W. HOWARD STREET, CHICAGO, ILLINOIS 60648



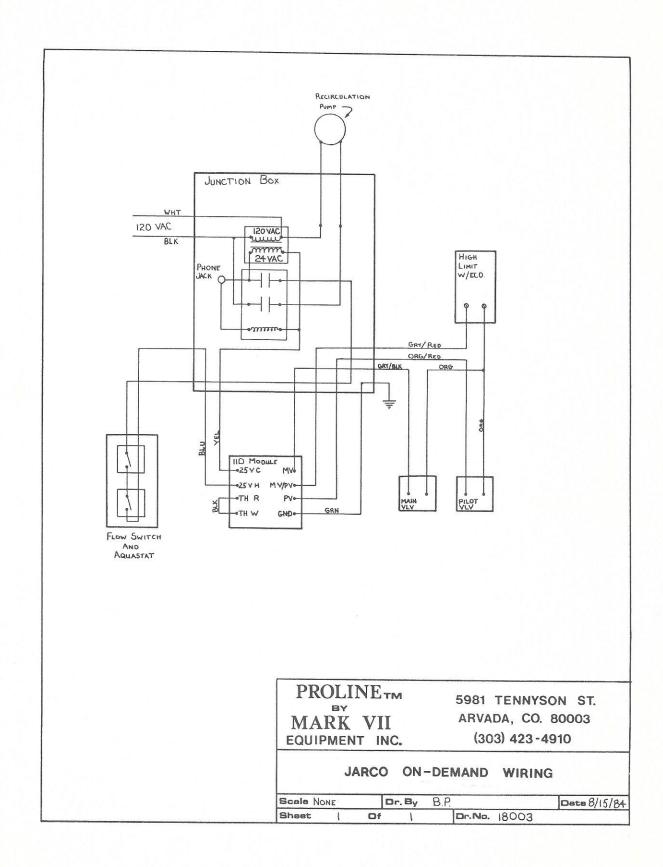
ELECTRICAL DETAIL INSTALLATION

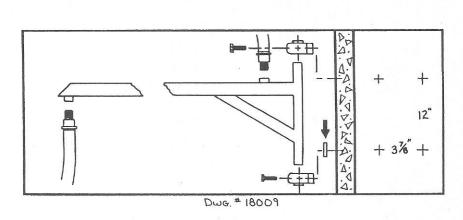


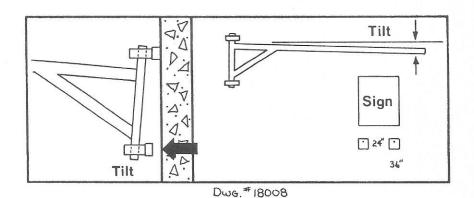
MECHANICAL DETAIL INSTALLATION



JARCO ON-DEMAND WIRING







PROLINE TM

MARK VII

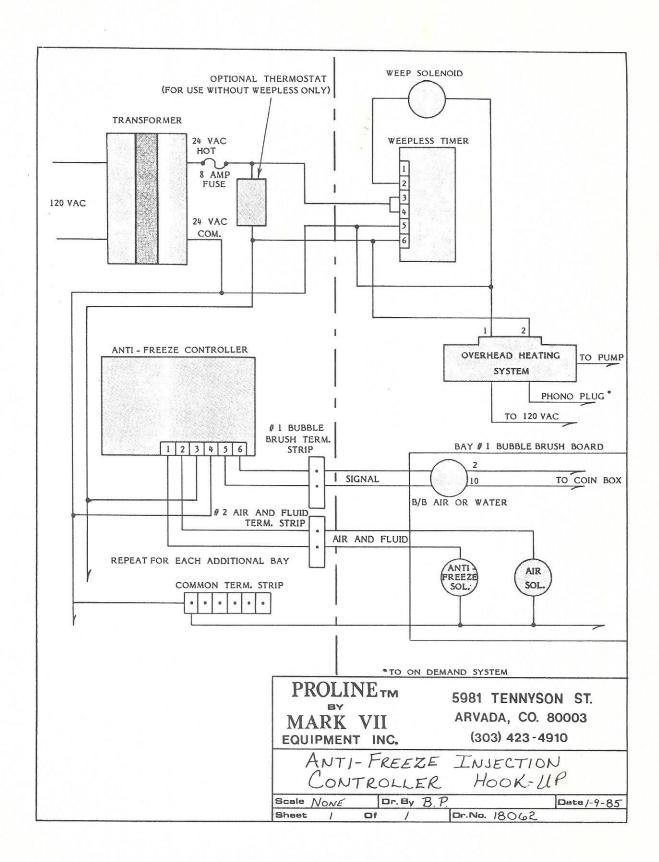
EQUIPMENT INC.

5981 TENNYSON ST. ARVADA, CO. 80003 (303) 423-4910

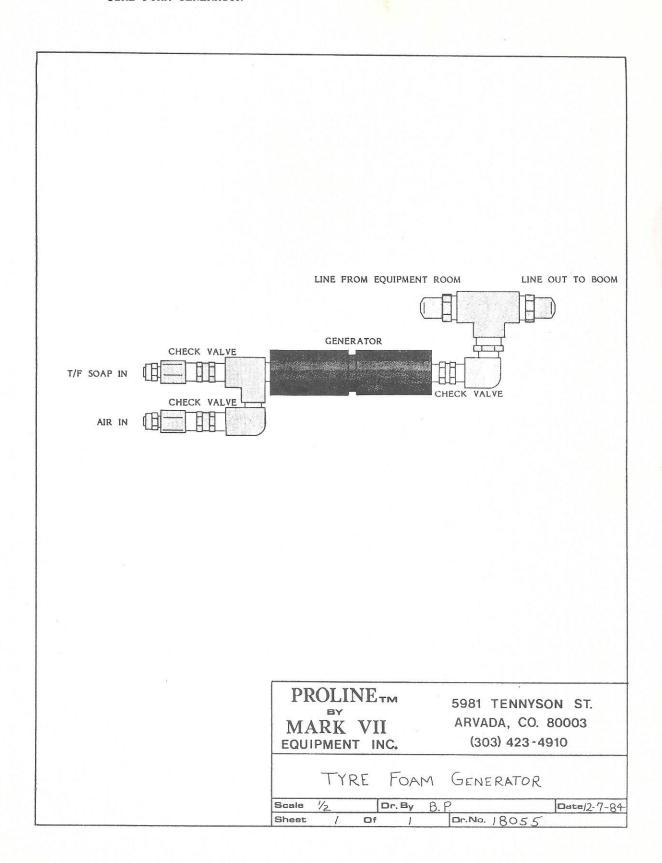
MOUNTING THE BOOM

Scale None | Dr. By 3.7. | Date 231-8"

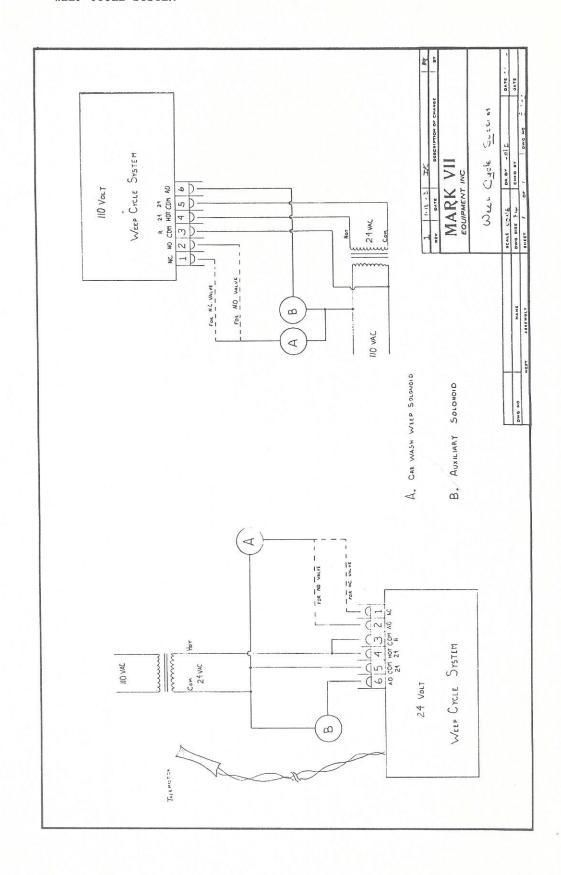
ANTI-FREEZE INJECTION (ILLUS.)



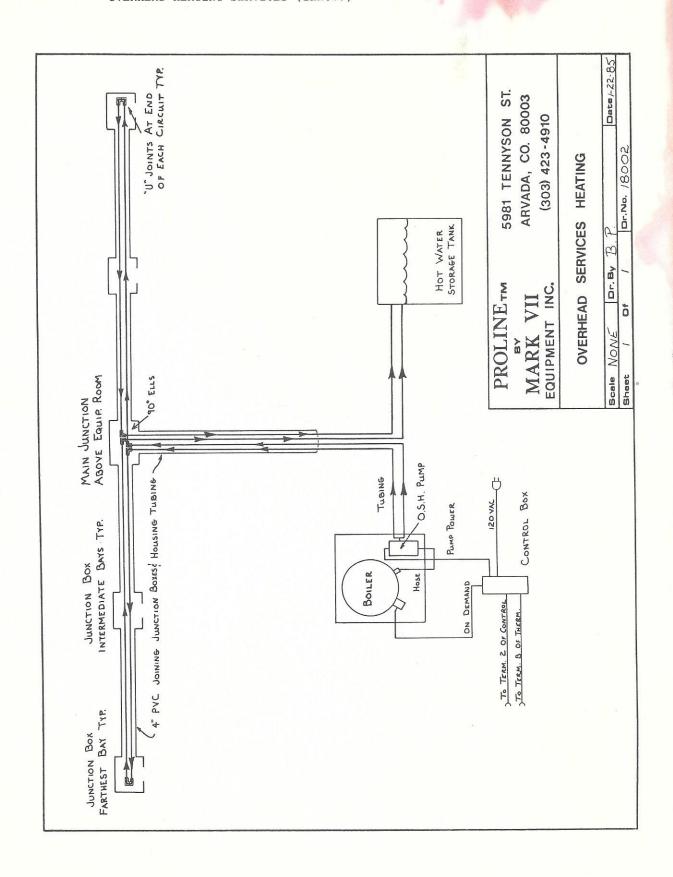
TIRE FOAM GENERATOR



WEEP CYCLE SYSTEM



OVERHEAD HEATING SERVICES (ILLUS.)



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