

74-265

IMPORTANT!

Read this instructions book very carefully before you use the YASUI's Vacuum Wax Injector especially for the sake of Health and Safety.

The V.W.I. is designed and built to ensure that there are no hazards for Health and Safety as long as you observe the following WARNINGS and Instructions.

Therefore, we will not be responsible for any accident caused by failure in observing the WARNINGS and Instructions.

Any breakage or damage to the V.W.I. caused by an erroneous or inattentative operation shall not be the object of the guarantee by us.

WARNINGS

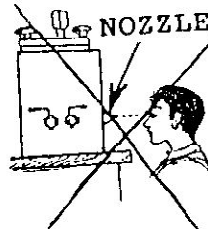
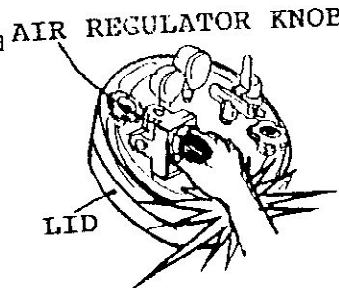
I. General.

When it is inevitable for you to dismantle the V.W.I. with our request or consent for a maintenance or a repair, be certain to cut off the power before an operation.

II. To preclude burns.

Exterior metal parts (areas not coated with paint) may be very hot, e.g. the Nozzle and the Lid of the Wax Pot.

1. Inadvertent contact of the skin with the metal parts aforementioned could cause burns.
 - 1-a. Don't touch the Nozzle with bare finger.
 - 1-b. Care should be taken when regulating the Air Regulator Knob, as the delicate skin of forearm is apt to touch the heated Lid.
2. Don't let wax inject without a rubber mould placed against the Nozzle.
 - 2-a. Under no circumstances should your eyes be positioned in alignment of the Nozzle of the V.W.I.
3. Inadvertent stepping on the Foot-Switch by people or dropping something heavy on the Foot-Switch could cause burns to them with hot wax shooting out from the Nozzle, especially during a rest-hour.



(over)

- 3-a. Turn the Air Regulator Knob to "ZERO" when the operator must leave from the V.W.I. for long minutes.
- 3-b. Place the Foot-Switch at a hidden place, when the operator must leave from the V.W.I. for long minutes.
- 3-c. Turn the Mode Changing Switch to the "MANUAL" position.
- 3-d. Don't precariously leave anything heavy right above the Foot-Switch.

III. To preclude electrical shock.

- 1. The V.W.I. should be properly earthed.
 - 1-a. Connect the proper sized wire in rating to the earth Terminal on the back of the V.W.I.
 - 1-b. An earth line is already incorporated in the Power Cord of the V.W.I. whose number is No.2540 and subsequent.
- 2. Make positive disconnect at the circuit breaker before performing electrical work.

IV. To preclude inhaling of harmful powder.

In such a factory where substantially large amount of Talc Powder is used for easy removal of wax-pattern from the rubber mould, a proper aspiring of Talc Powder is essential by, for example, installing an Aspirator near the V.W.I.

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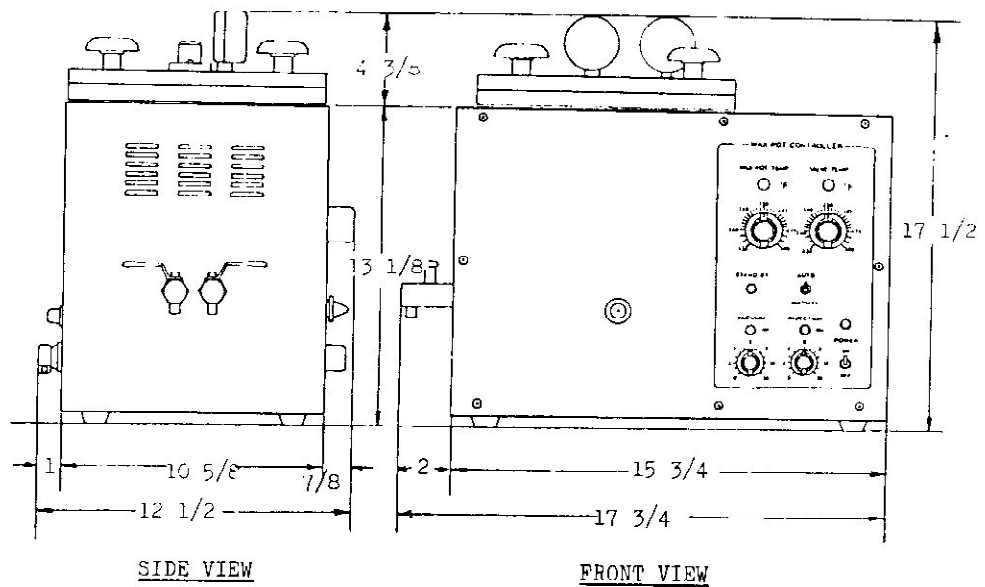


FIG. 1

§1 SPECIFICATION

DIMENSIONS (Refer to FIG. 1)	:	Length: 17 3/4" (450 mm)
	:	Width: 12 1/2" (317 mm)
	:	Overall Height: 17 1/2" (445 mm)
WEIGHT	:	Approx. 44 Lbs. (Approx. 20 kgs.)
SHIPPING WEIGHT	:	47 Lbs. (" 21.5 kg.)
ELECTRICAL	:	Power : Standard Voltage 115 V
	:	Cycle 60 Hz
HEATING SOURCE	:	Electric Band-Heater for Wax-Pot : 650 W
	:	Electric Cartridge Heater for Valve: 50 W
TIMER'S RANGE	:	Vacuum Timer : 0~12 sec.
	:	Injection Timer: 0~12 sec.
THERMO-CONTROL RANGE	:	Wax-Pot Temperature: 131°~185°F (55°~85°C)
	:	Valve Temperature : 131°~185°F (55°~85°C)
CAPACITY OF WAX-POT	:	Approx. 1.5 Lbs. (Approx. 0.68 kg.)
VACUUM GAUGE RANGE	:	0~76 cm Hg
PRESSURE GAUGE RANGE	:	0~2 kg/cm
CARTRIDGE FUSE RATING	:	15 A

§2 PARTS OF VACUUM WAX INJECTOR

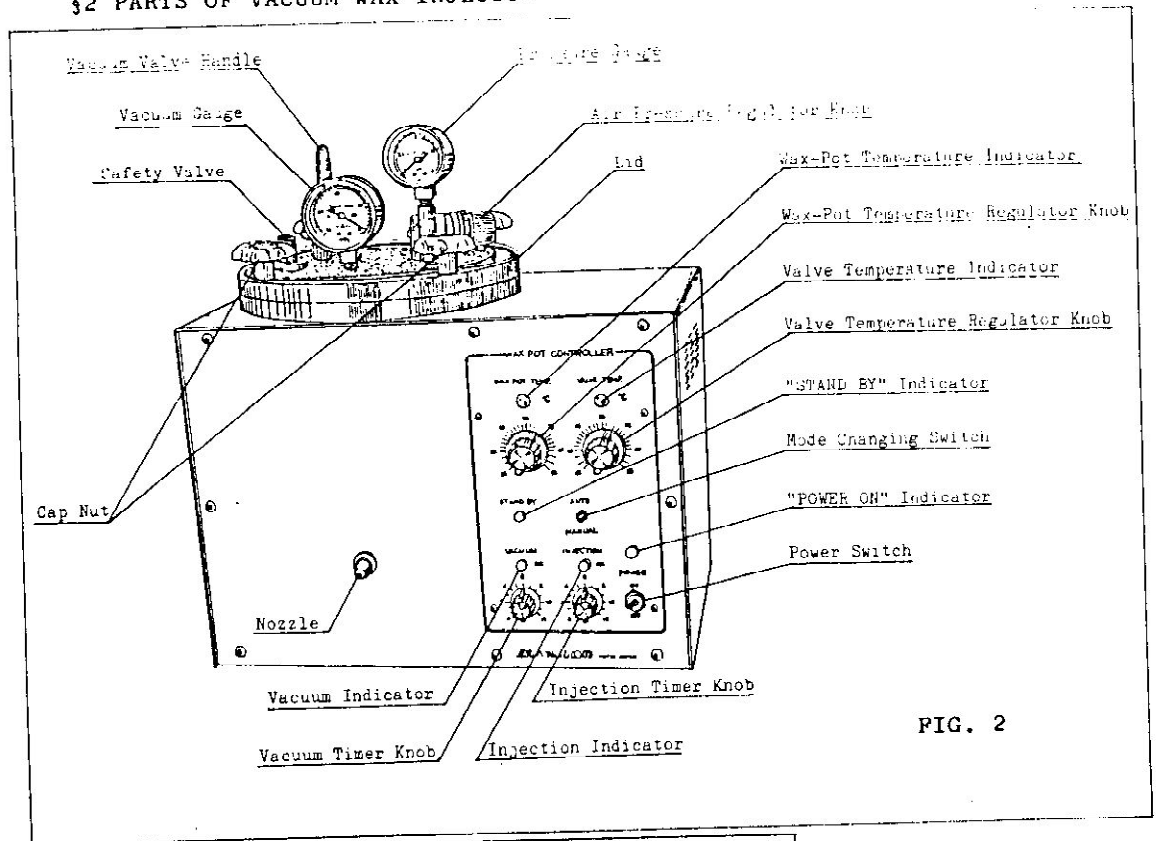


FIG. 2

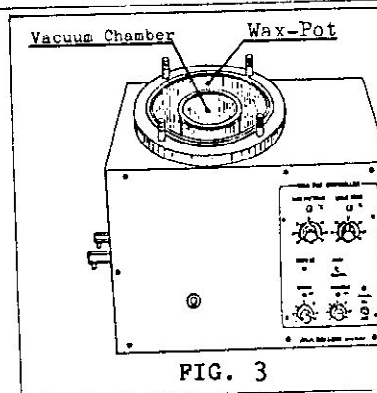


FIG. 3

NOTICE:

The inner chamber is the Vacuum Chamber. The outer chamber is the Wax-Pot. Do not confuse the two.

No wax should ever be placed in the inner chamber.

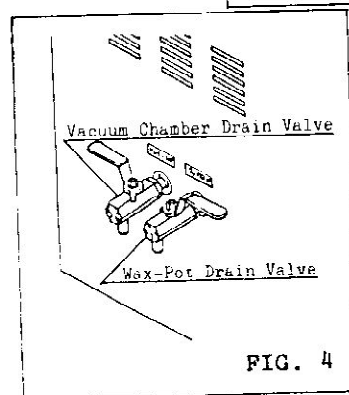


FIG. 4

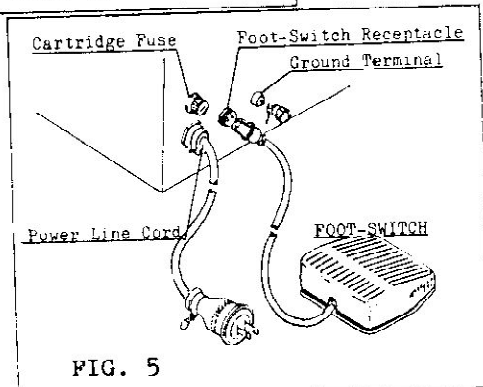


FIG. 5

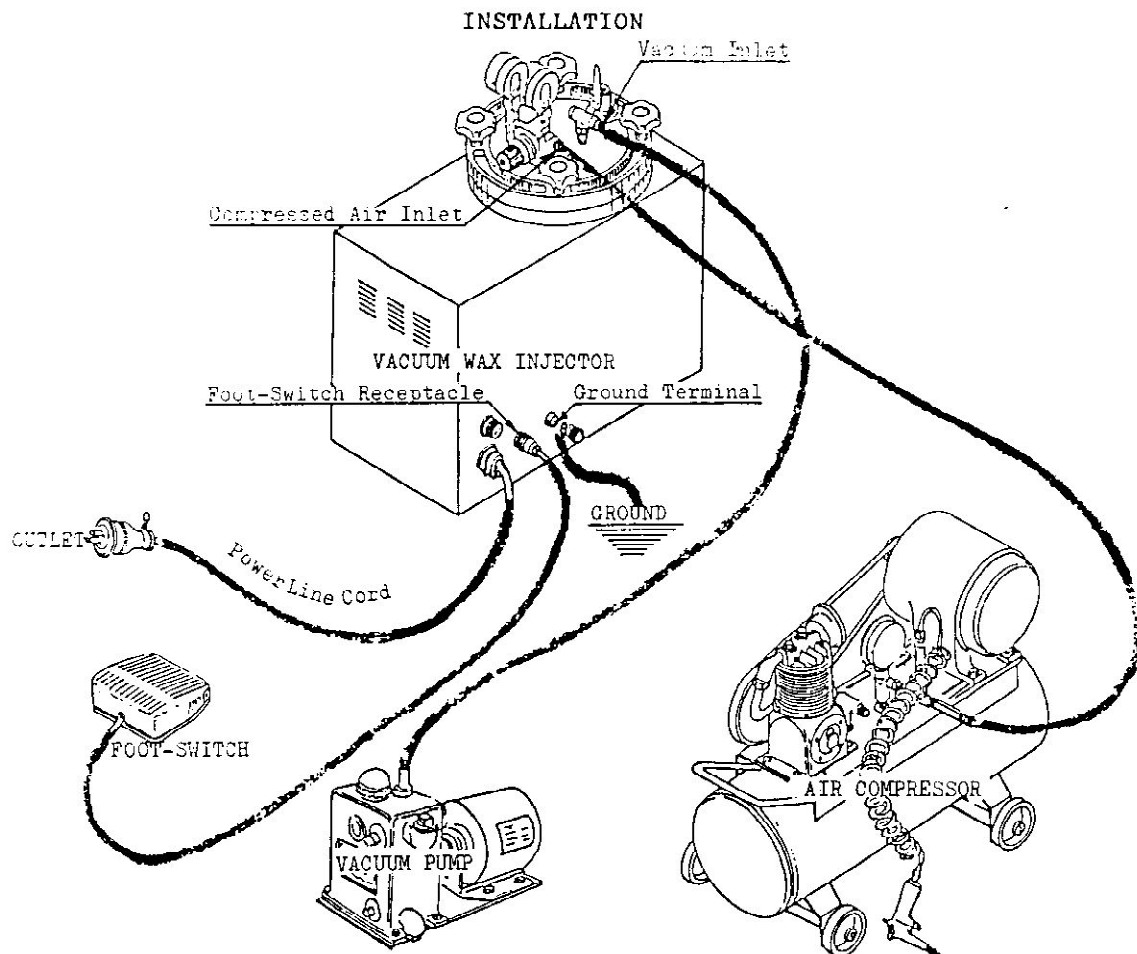


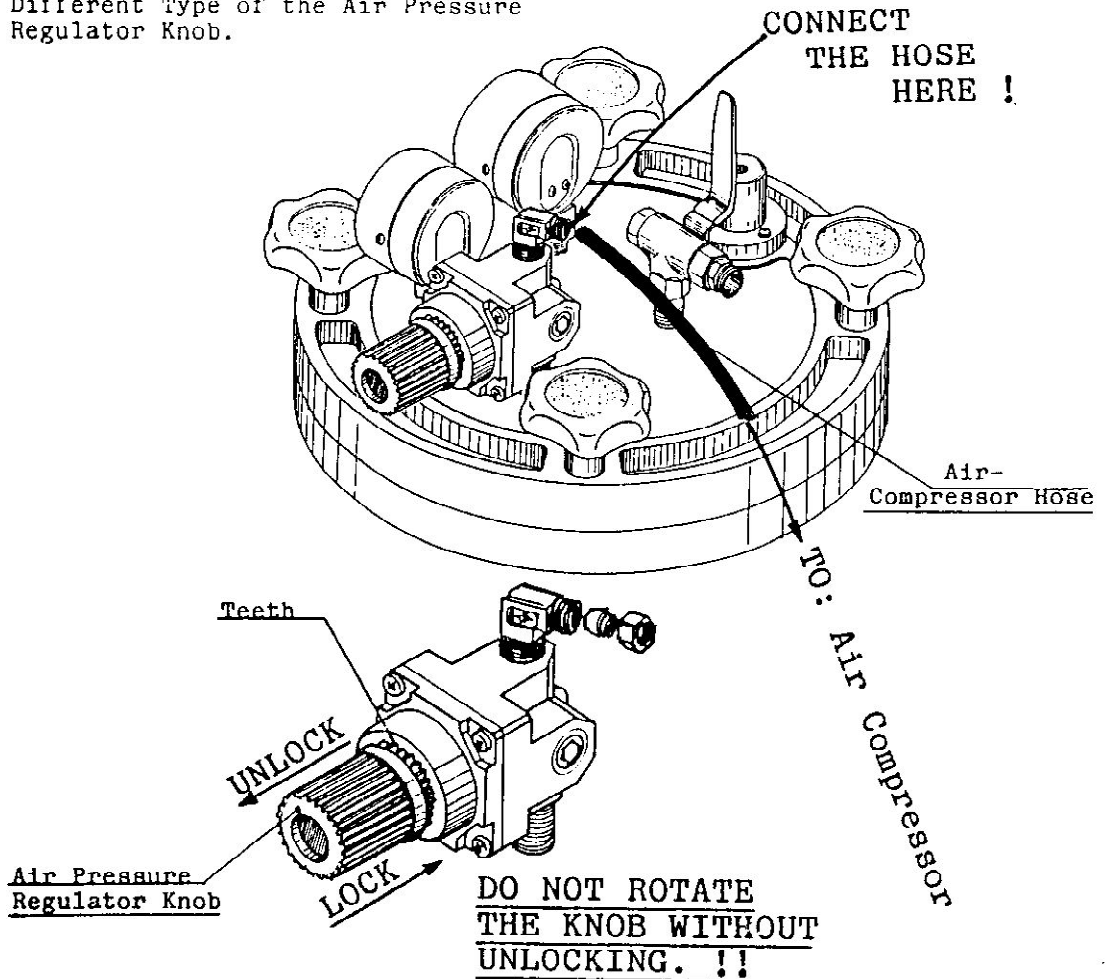
FIG. 6

§3 INSTALLATION

1. Connect the compressor air hose to the Compressor Air Inlet located on top of the Wax-Pot.
2. Connect the vacuum hose between the Vacuum Pump and Vacuum Inlet located on top of the Wax-Pot.
3. Connect Foot-Switch line cord into its receptacle located on the back of Injector.
4. Connect the ground wire between Ground Terminal located on the back of injector and a ground.
5. Make sure the Power Switch on the Front Panel is off. Then, plug Power Line Cord into an outlet of 15 amp. capacity and same voltage as indicated on the nameplate pasted on the back of the Injector.

Additional Page for §3 INSTALLATION

Different Type of the Air Pressure
Regulator Knob.



N-O-T-I-C-E

On some Model, the type of the Air Pressure Regulator Knob is slightly different from the one shown in the previous page.

IF IT IS THE TYPE AS SHOWN IN THIS ILLUSTRATION:

Adjust it in the following manner;

When rotating the Knob, be sure to unlock by pulling it and then rotate.

Push it to lock after an adjustment has been made.

Don't rotate the Knob without unlocking, otherwise the teeth will be damaged. !!

§5 WAX FILLING

The wax to be fed into Wax-Pot must always be clean. Continuous leaking of wax from the nozzle is, in most cases, caused by dirt or foreign particles in the wax which have clogged the valve seat.

Therefore, if dirt or foreign matter is suspected in the wax, or if wax is being reused, it must be filtered through several sheets of cheese cloth after melting at the proper temperature.

To feed wax into the Wax-Pot, the following procedures should be used.:

- (1). Slowly reduce the vacuum pressure within the Vacuum Chamber by lowering the Vacuum Valve Handle from a vertical position to a horizontal position.
- (2). Reduce air pressure to zero with Air Pressure Regulator Knob (FIG.2). Make sure the Pressure Gauge reads "0" (zero).
- (3). Unscrew and remove the four Cap Nuts shown in FIG.2 on the top of the Injector.
- (4). Lift the Lid (FIG.2) and remove it from the Injector.
- (5). Place a fresh supply of wax in the outer Wax-Pot chamber.

NOTICE: NEVER PUT WAX IN THE INNER VACUUM CHAMBER.

§6 REGULATING WAX-POT TEMPERATURE

To regulate the Wax-Pot temperature, the following procedures should be used.:

- (1). Flip the Power Switch (FIG.2) on the Wax-Pot Controller Panel to ON.
- (2). Turn the Wax-Pot Temperature Regulator Knob (FIG.2) to the temperature required for the wax being used.
- (3). When the Wax-Pot Temperature Indicator goes off and on repeatedly, it is an indication that the set temperature of the pot has been reached. However, it does not necessarily mean that all the wax has been completely melted. Once the pot is up to temperature, allow time before injection to be sure that all of the wax is melted.

CONSIDERATION: The lower the injection temp. the less shrinkage seen in the wax models. Wax injected into a rubber mold at too high a temp., becomes too fluid, absorbs air, and forms small air pockets in the wax model.

§7 REGULATING VALVE (NOZZLE) TEMPERATURE

All the injectors have been calibrated at our factory, prior to shipment to maintain the temperature at the valve properly.

The valve temperature can be adjusted independently from the Wax-Pot temperature.

To regulate the valve temperature, the following procedures should be used.:

- (1). Regulate the temperature at the valve by turning the Valve Temperature Regulator in **FIG.7** $2^{\circ}\sim 3^{\circ}\text{C}$ ($3.6^{\circ}\sim 5.4^{\circ}\text{F}$) lower than that of Wax-Pot. By doing this, you will get good wax patterns.
- (2). If the valve temperature is higher than the Wax-Pot temperature, small air pockets may become trapped in the wax pattern.
- (3). In the event wax does not fill the fine details of a mold cavity, you may want to change the valve temperature.
Do not operate the injector immediately after a new temperature is set.
A short amount of time must be allowed for temperature stabilization. (**Remember:** when stabilization occurs, the indicator light will go ON and OFF repeatedly.)

§8 REGULATING AIR PRESSURE

When changing air pressure, use the Air Pressure Regulator Knob in FIG.8. Turning it clockwise will increase pressure, while turning it counter-clockwise will decrease the pressure.

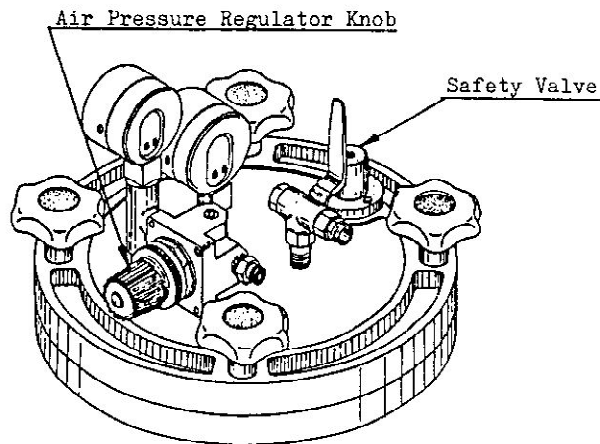
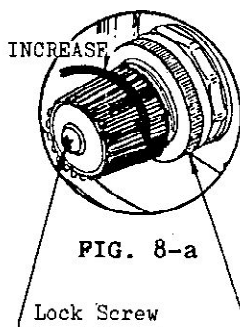
Do not decrease the air pressure rapidly.

NOTE: There are approximately 11 1/4 turns between no pressure and full pressure.

The Lock Screw shown in FIG.8-a. sometimes locks itself and makes the turning of the Knob very difficult. If this occurs, loosen the Lock Screw (FIG.8-a) by turning it counter-clockwise with a screw driver until the Air Pressure Knob turns more easily.

A Safety Valve is provided on the top of the lid as shown in FIG.8. It is set at our factory to release pressure when approximately 20 PSI is reached. DO NOT ALLOW WAX TO GET INTO AND CLOG THIS SAFETY VALVE :

NOTE: The knurled silver colored ring on the Air Pressure Regulator Knob is for mounting purpose only and has nothing to do with regulating or locking. (See FIG.8-a.)



This knurled ring has nothing to do with locking for the Knob or regulating.

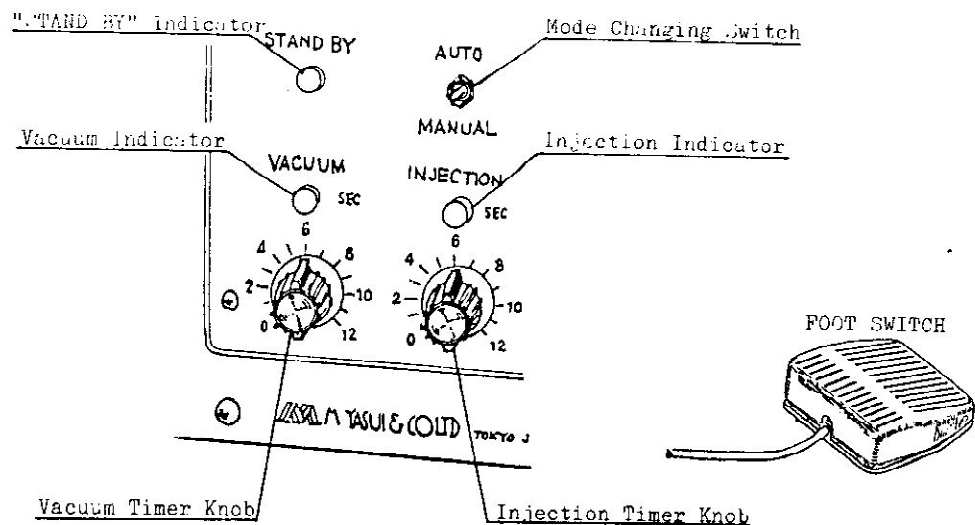


FIG. 9

§9. RUNNING TEST PRIOR TO OPERATION

Prior to an operation, it is recommended to let the machine run in "AUTO" Mode and test it 3~4 times for the correct functioning of each unit.

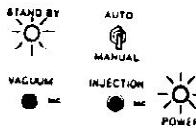
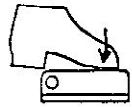
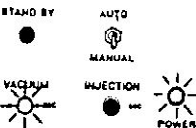
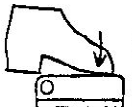

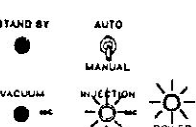

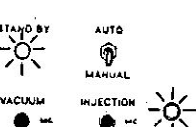

- (1). Turn the Mode Changing Switch (FIG.9) to the "AUTO" position.
- (2). Turn the Vacuum Timer Knob (FIG.9) to a time desired.
- (3). Turn the Injection Timer Knob (FIG.9) to a time determined.
- (4). Depress the Foot Switch (FIG.9) lightly and remove foot from it at once.
- (5). Vacuum Indicator will light.
- (6). When set vacuum time is up, the Vacuum Indicator will go off.
- (7). Next, the Injection Indicator will light.
- (8). When set injection time is up, the Injection Indicator will go off.
- (9). At this point, the "STAND BY" Indicator will light.
- (10). Test the operation-cycle 3~4 times for correct sequential functions.

If correct, the functioning of each Timer is confirmed in the test and "STAND BY" Indicator is ON, the wax injector may now be operated at any time in either "MANUAL" or "AUTO" mode.

NOTE: What you must bear in mind most when depressing Foot-Switch is to step on it lightly and then off quickly to prevent it from repeating operation-cycles endlessly.

§11. FLOW CHART FOR WAX INJECTION (in "MANUAL" Mode)

In "MANUAL" Mode:

INDICATOR	STATE OF FOOT-SWITCH	OPERATOR'S ACTION	MACHINE'S FUNCTION
<p>NOTE: Pay attention which Indicator lights.</p> 		<p>Hold rubber-mold against nozzle.</p> <p>Depress Foot-Switch →</p>	Electric circuit closed.
		<p>Hold rubber-mold against nozzle.</p> <p>Keep depressing Foot-Switch. →</p>	<p>Electric circuit is kept being closed.</p> <p>↓</p> <p>Evacuating starts.</p> <p>↓</p>
↓		<p>Hold rubber-mold against nozzle.</p> <p>Keep depressing Foot-Switch.</p>	<p>Vacuum Timer functioning (NOTE: Despite the mode in "MANUAL", vacuuming is accomplished by Vacuum-Timer automatically.)</p> <p>↓</p> <p>Set vacuum time up (vacuum ready)</p> <p>↓</p>
		<p>Hold rubber-mold against nozzle.</p> <p>Keep depressing Foot-Switch.</p> <p>Estimate appropriate injection time.</p>	<p>Injection starts.</p> <p>↓</p> <p>Injection goes on as long as Foot-Switch is being depressed.</p> <p>↓</p>
		<p>Remove foot from Foot-Switch.</p> <p>Remove rubber-mold from nozzle.</p>	<p>Electric circuit is opened. Injection stops.</p> <p>Injection completed.</p> <p>"STAND BY" Indicator comes on, indicating ready for next operation.</p>

§12. MAKING WAX PATTERNS

When the Wax Temperature and Valve Temperature Indicator lights go OFF and ON repeatedly with an interval of approximately 4 seconds, the injector can be operated at any time.

Turn the handle of Three Way Valve on the top of the injector to the vertical position and draw down full vacuum in the Vacuum Chamber. (Turn the same to the horizontal position when machine is not in use.)

Optimum vacuum time as well as injection time for each wax pattern-making can be determined through practice and experience. For making small patterns, 1 second may prove to be adequate for vacuum time. Most small rings can be filled completely with a vacuum time of 1 second and wax injection time of 1 2 seconds.

Large wax patterns will require longer vacuum and wax injection times.

In the operation of injection, a rubber mold should be sandwiched between two flat pieces of metal (1/8" thick aluminum or brass sheet will do) or glass plates while pressing the mold against the nozzle. Without the metal, the rubber would bend and the injected wax pattern would be distorted.

§13. SUGGESTIONS FOR VENTS IN RUBBER MOLD

With a Vacuum Wax Injector, a perfect and precise wax pattern is possible, since wax is forcibly injected into the cavity of the rubber mold which has been evacuated beforehand.

An existing mold which already has vents can be used. A mold without vents is usually filled better because a better vacuum is formed within the cavity. It is advisable to prepare a rubber mold without vents and try injection several times first.

If the details are not as desired, you could partly prepare vents. These vents should be blind and should not lead to outside of the mold.

The reason for this, is to make it possible to maintain full vacuum in the cavity of the mold.

The greater the vacuum in the Vacuum Pump, the better the produced wax pattern quality is.

§14 HOW TO REMOVE TRAPPED WAX FROM THE VACUUM CHAMBER

It is very important to remove any wax residue trapped in the bottom of the Vacuum Chamber. If cleaning is neglected, the wax residue could clog the tubings of the Vacuum Chamber, and prevent the Vacuum Chamber from forming a vacuum. It is advisable to clean the wax residue regardless of how small the amount when you finish a day's job.

BE CERTAIN TO REMOVE THE TRAPPED WAX FROM THE VACUUM CHAMBER BEFORE WAX FILLS APPROXIMATELY AS HIGH AS THE MID-HEIGHT OF THE VACUUM CHAMBER.!!

If your V.W.I. is the type shown in FIG.15-a., cleaning procedures are as follows:

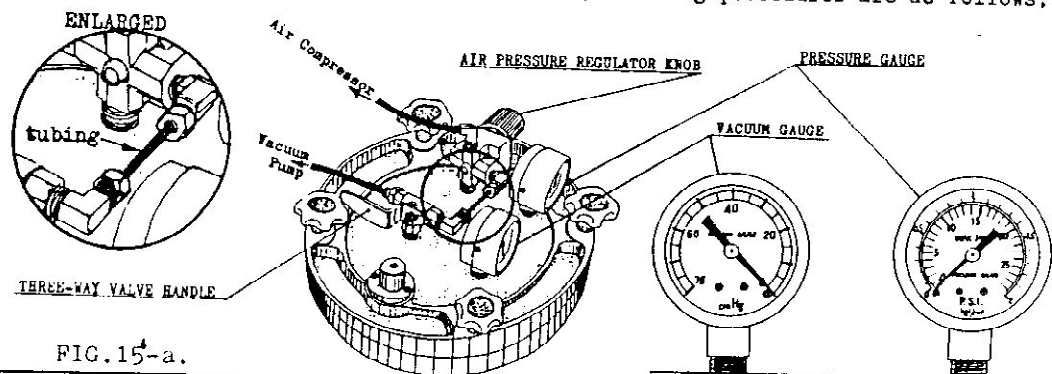


FIG.15-a.

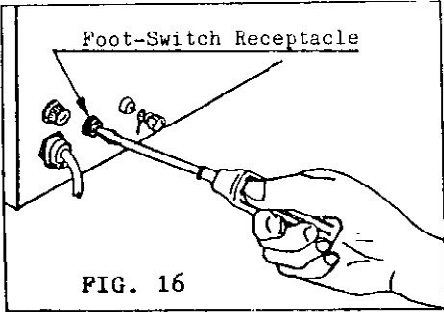
No.	DESCRIPTION OF PROCEDURES	WHERE TO HANDLE	READING OF GAUGE
	<p>The illustration on the right side shows that the Vacuum Wax Injector is in a working phase;</p> <p>THREE-WAY VALVE HANDLE: in vertical position.</p> <p>VACUUM GAUGE: indicates 76 cmHg.</p> <p>PRESSURE GAUGE: may indicate around 0.7~0.8 kg/cm². (one of examples.)</p>		
1	<p>Turn the Air Pressure Regulator Knob counter-clockwise as far as it can go;</p> <p>VACUUM GAUGE: indicates 76 cmHg.</p> <p>PRESSURE GAUGE: will indicate 0 kg/cm².</p>		
2	<p>Turn the Three-Way Valve Handle to the horizontal position;</p> <p>VACUUM GAUGE: may indicate around 20~30 cmHg.</p> <p>PRESSURE GAUGE: indicates 0 kg/cm².</p>		
3	<p>Turn slowly the Air Pressure Regulator Knob clockwise until the Pressure Gauge indicates around 0.1~0.2 kg/cm²;</p> <p>VACUUM GAUGE: indicates 0 cmHg.</p> <p>PRESSURE GAUGE: indicates 0.1~0.2 kg/cm².</p> <p>NO STRONGER PRESSURE SHOULD EVER BE APPLIED LEST THE POINTER OF VACUUM GAUGE SHOULD BE PUSHED AGAINST THE STOPPER AND BROKEN.</p>		
4	<p>Open the Vacuum Chamber Drain Valve. Wax should come out.</p>		

§15. TROUBLE SHOOTING

I. NO WAX WILL COME OUT FROM THE NOZZLE WAX COMES OUT FROM THE NOZZLE BUT NOT SUFFICIENTLY

1. Check the Power Line Cord for sure insertion into an outlet.
2. Check the Power Switch on the panel for being "ON".
3. Inspect the Cartridge Fuse for possible "melt-down".
4. Check the Foot-Switch for normal functioning.

FOOT SWITCH WILL NOT FUNCTION (FUNCTIONING SOUND IS NOT HEARD AT ALL) (Assuming that it is properly depressed.)

- 4.- (1). Disconnect the Foot-Switch Cord from the Foot Switch Receptacle.
 - 4.- (2). Make a short circuit with a screw driver as shown in FIG. 16.
 - 4.- (3). If injection functions properly it is evidence that the Foot-Switch is defective. (Replace the Foot-Switch.)
- 
- FIG. 16
5. Check the Pressure Gauge for sufficiently enough pressure.
 6. Check the Injection Timer Knob on the panel if it is set at "0" (Zero).
 7. Inspect the bottom of the Wax Pot if there are deteriorated wax or foreign particles which clog the path for wax.-----Clean away all wax residue and foreign particles from the bottom of the Wax Pot.
 8. Inspect the Nozzle and the Valve Assembly (inside of the V.W.I. housing) if there are clogged wax or foreign particles in their path for wax.
-----Disassemble them and clean away all wax residue or foreign particles from the Nozzle or the Valve Assembly. (Refer to the separate Manual.)
 9. Inspect the Valve Heater (inside of the V.W.I. housing) for any disconnection.
If the Valve Heater is found surely connected at the receptacle, it is evidence that the heating element is broken down.
-----Replace the broken Valve Heater with a new one.

HOW TO DETERMINE THE BREAK-DOWN OF THE HEATING ELEMENT

- 9.- 1). In case that the Heating Element has been broken down, the Valve Temp. Indicator never goes off however dim the light may be.
In case that the Heating Element is normal, the Indicator should go off at the same time when the thermistor cuts off the power to the Valve Heater.

§15. TROUBLE SHOOTING (Continued)

10. Check the Mode Changing Switch on the panel if the switch is thrown to the position of "MANUAL". In the "MANUAL" Mode, wax comes out of the Nozzle only while the Foot-Switch is depressed.

REMEMBER that in "MANUAL" Mode wax stops coming out of the Nozzle the instant the Foot-Switch is stepped off.

II. WAX WILL LEAK CONTINUOUSLY FROM THE NOZZLE

(The STAND-BY Indicator (Green lamp) is being lit)

1. Inspect the Valve Seat of the Valve Assembly (inside of the V.W.I. housing) for a perfect closing. If dirt or foreign particles mixed in wax clog the Valve Seat, it cannot achieve full-closing, thus causing continuous leaking of wax from the Nozzle.

-----Disassemble the Valve Assembly and clean it thoroughly.
The reused wax must be filtered through several sheets of cheese cloth prior to feeding into the Wax Pot.

2. Check the Timer (for Vacuum and Injection) for normal functioning.

If something is wrong with the Timer, the Vacuum Indicator or the Injection Indicator never goes off.

-----Consult your dealer for repair.

III. VACUUM WILL NOT BE ACCOMPLISHED

1. The Vacuum Gauge may be defective.

Negligence in cleaning the trapped wax in the Vacuum Chamber will cause wax not only to fill the Vacuum Chamber but also to enter into the Vacuum Gauge, which consequently will indicate inaccurate reading.

-----Replace the Vacuum Gauges.

2. The path for wax may have been clogged with wax.

In the same case as in the above, wax might have filled as far as the Three Way Valve and the tubing.

-----Dismount the Three Way Valve and the tubing and dip them into hot water in a basin and get rid of wax. In the worst case, it may be necessary to replace the parts.

3. Inspect the O-ring in the Vacuum Chamber for possible deterioration.

-----Replace the deteriorated O-ring with a new one.

4. Inspect the air-tightness at the conjunctions between the tubing and the main-body of V.W.I. or between the tubing and the Vacuum Pump.

-----If air-leakage is found at the conjunction, secure air-tightness by fastening the parts more tight.

4. Check the Vacuum Chamber Drain Valve for possible open.-----Close the Valve.

5. Inspect the sealing of the Vacuum Chamber Drain Valve for air-tightness.

-----If air-tightness is found poor, dismount the Vacuum Chamber Drain Valve and remount the Valve applying generous amount of sealant and fastening more tight. If the Vacuum Chamber Drain Valve is defective itself, replace it with a new one.

§15. TROUBLE SHOOTING (Continued)

6. Inspect the Vacuum Pump for normal functioning.
7. The Valve located at the vacuum-side of the Valve Assembly (inside of the V.W.I. housing) may not have been fully closed owing to the existence of dirt or foreign particles.

IV. A JOB-CYCLE WILL BECOME ENDLESS (in the "AUTO" Mode)

One Job-Cycle which consists of sequences, STAND-BY, evacuation, injection, and STAND-BY again will be repeated endlessly.

1. There may have been a short-circuit of wire or of the Contacts in the Foot-Switch.
2. If the sort-circuit is suspected, follow the procedures described in 4. of I. FOOT SWITCH WILL NOT FUNCTION.
3. If the Foot-Switch is found to be quite normal, the printing circuit board may be defective.

-----Consult your dealer for repair.

V. WAX-POT TEMPERATURE WILL RISE REGARDLESS THE SET TEMPERATURE

If the Temperature Indicators (for the Wax Pot and the Valve) never go off notwithstanding the Wax Pot and the Nozzle look to have attained the set temperature, it is suspected that something is wrong with the Thermistor.

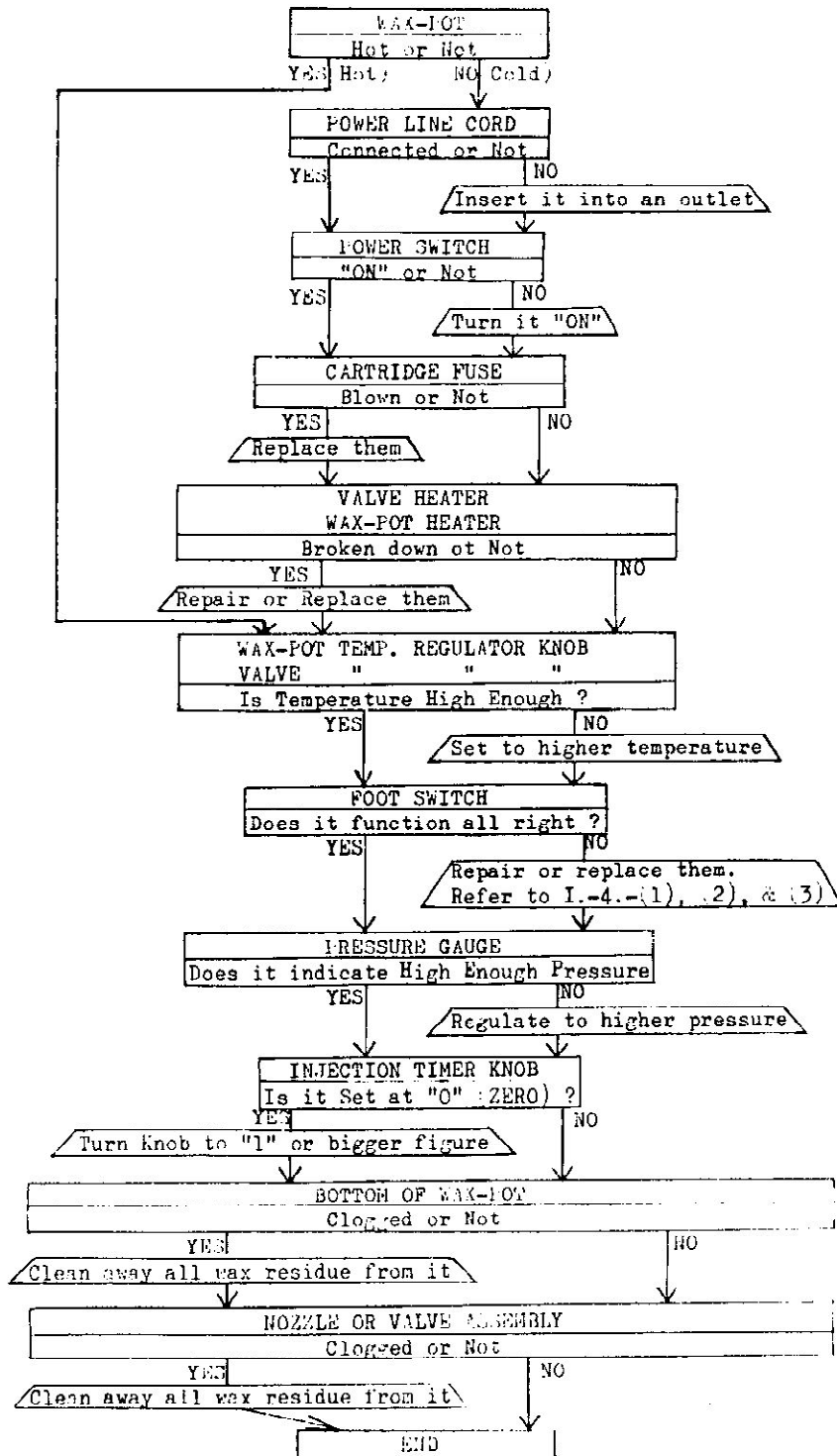
Check the Thermistor for perfect connection at the receptacles.

If it shows the same symptom even after the perfect connection of the Thermistor has been confirmed, it is evidence that the Thermistor is defective.

-----Replace it with a new one.

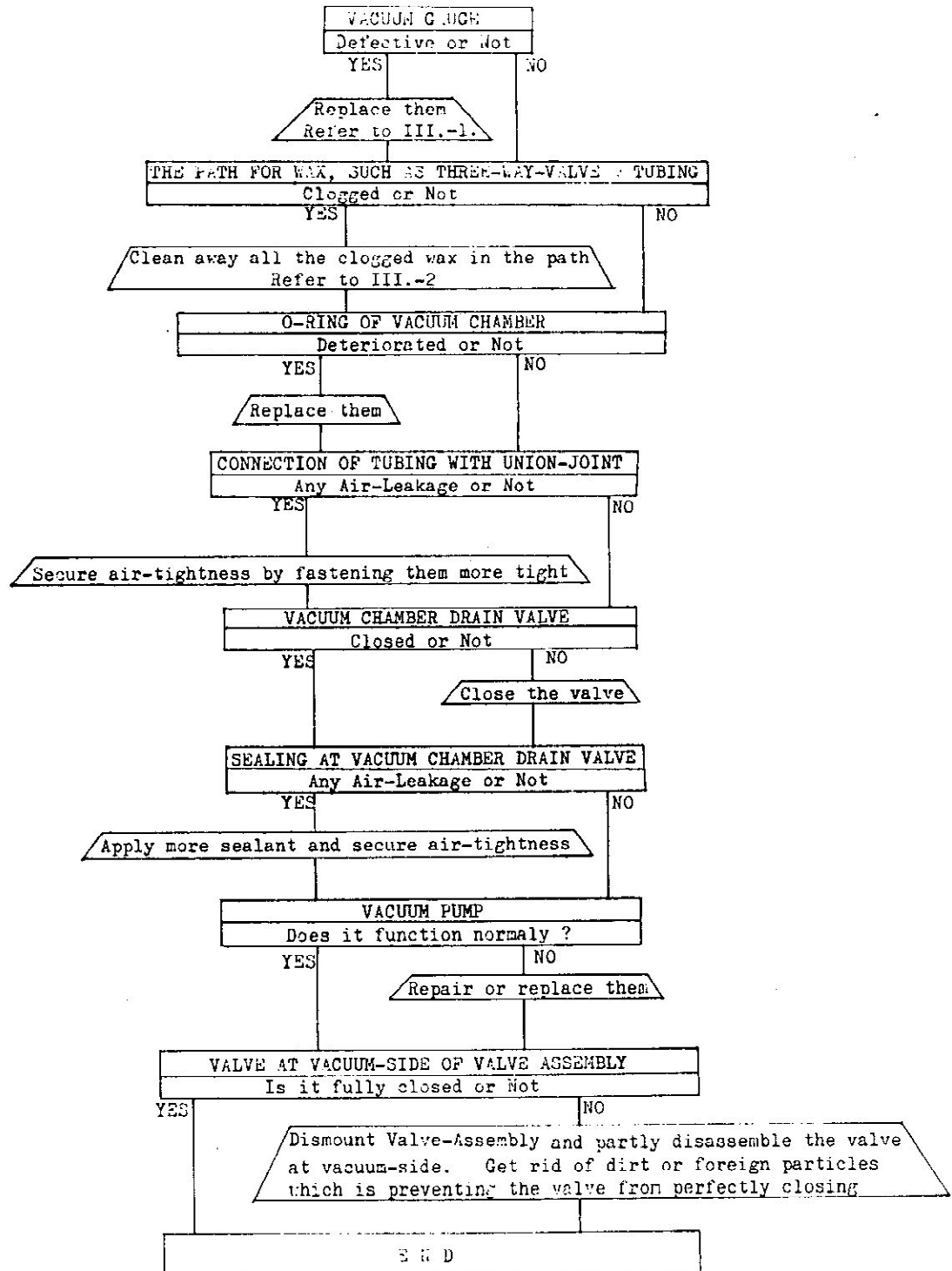
-LO-78-2
TROUBLE SHOOTING

I. NO WAX WILL COME OUT FROM THE NOZZLE



FLOW-CHART
For
TROUBLE SHOOTING

VACUUM WILL NOT BE ACCOMPLISHED

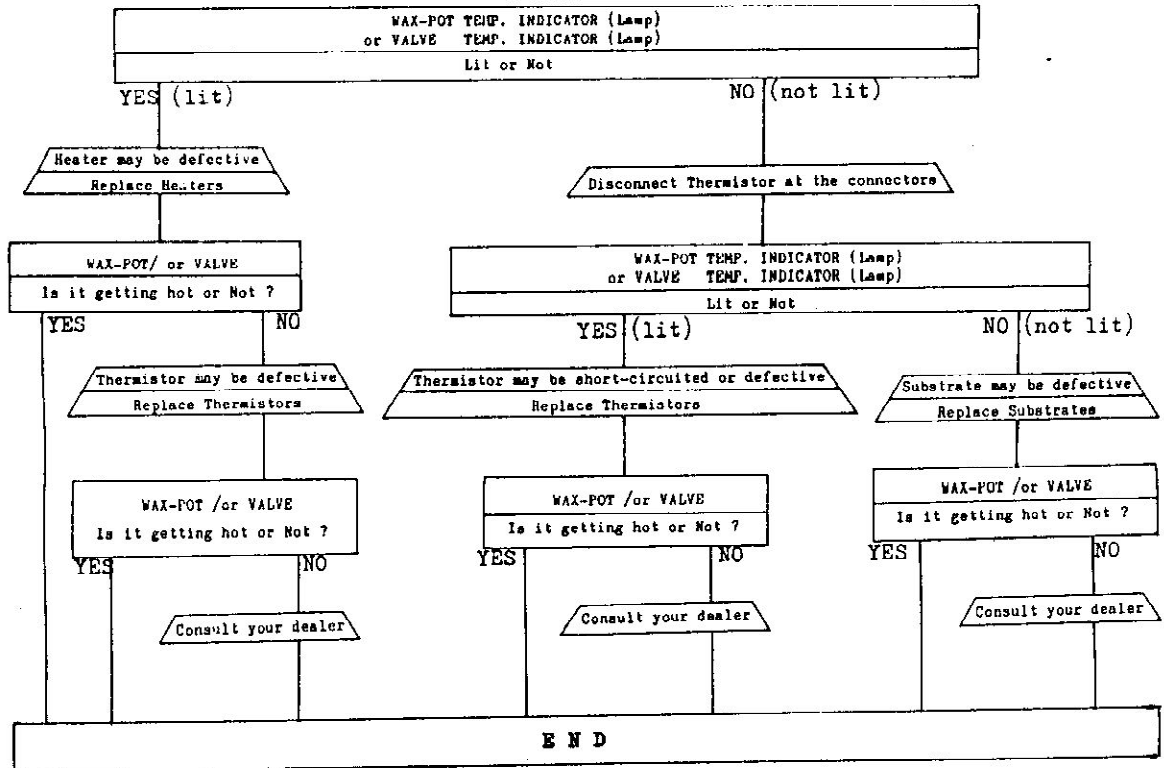


WAX-POT (or VALVE) WILL NOT GET HOT AT ALL

I. FLOW-CHART

REMARKS:

This Flow-Chart is made on the assumption that the Indicator light bulb is normal, which means that it is essential the light bulb is not burnt out.



II. DATA ABOUT THERMISTOR

II.-1. Electric Resistance

Thermistor's electric resistance-----10 K Ohm(10 K Ω)-----at 25°C

The higher the temperature will be, the lower the Thermistor's electric resistance will become, because of the characteristic properties of semi-conductor.

II.-2. Symptom caused by Faulty Thermistor

CAUSE	WHAT SENSOR SENSES	EFFECT
Short-circuit of Thermistor	it senses temperature as being so high that heating must be stopped.	Heater will be "Off"
Disconnection of Thermistor	it senses temperature as being so low that heating must be started.	Heater will be "ON" but indefinitely * Fear of Overheat.