

SPECIFICATIONS

MODEL NO.	INPUT VOLTAGE	WATTS	HERTZ
RX2	120VAC	200	60
ROLLER	230VAC		50/60

INSPECTION: Unpack the unit. Inspect the unit for external and/or internal damage. If the unit is received damaged, file a claim with the delivering carrier. We cannot file the claim for you.

WARNING

INCUBATORS ARE ELECTRICAL DEVICES AND SHOULD BE TREATED AS SUCH. ELECTRICAL REPAIRS SHOULD BE MADE BY COMPETENT ELECTRICAL SERVICE PERSONNEL. DISCONNECT OR UNPLUG THE POWER BEFORE ATTEMPTING REPAIRS OR CLEANING THE INCUBATOR.

IF THE INCUBATOR HAS AN ELECTRICAL RECEPTACLE ON ITS TOP, IT IS FOR OPERATION OF AUTOMATIC TURNERS ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.

GROUNDING: Certain metal and electrical parts of the incubator are grounded. You can identify these parts as they have a GREEN or GREEN WITH YELLOW STRIPED wire connected to them. Grounds are for your protection and should never be removed or tampered with.

POWER CORDS: All incubators and turners have three prong plugs on the power cord. The bottom round prong is a ground connection. It is through this connection that ground is provided for the grounded incubator parts. You should be sure that the outlet the power cord is plugged into is actually grounded. Using an ungrounded outlet or defeating the purpose of the ground by cutting off or removing the ground prong on the plug could, under certain situations, cause serious electrical shock when the parts are touched. Frayed or worn power cords should be replaced immediately.

ELECTRICITY AND MOISTURE: Moisture and electricity do not mix well and because electric incubators must be operated in conditions of high humidity for part of the incubation cycle, certain precautions should be taken. 1. Do not add water to the incubator until it reaches operating temperature. 2. Use distilled water only. 3. As soon as incubation/hatching is complete, remove all water from the unit and dry the area that had water on it. If the top of the incubator is removable, remove it from the base. Allow the top to air dry. If the top is left on or water is not removed, a high concentration of moisture is left in the incubator. As the incubator cools, excessive moisture will accumulate on electrical and metal parts causing deterioration of these components. Failure of the electrical components can occur when the incubator is again used.

INCUBATOR ENVIRONMENT: The environment your incubator is used in can have a pronounced effect on your hatch. Improper environment can cause temperature and humidity control problems during the incubation cycle. For best results, incubators should be used in an area that has a controlled ambient temperature of 70°F. Operating incubators in less than 70°F ambient or in a room that has wide temperature variations can have a detrimental effect on the incubator's operation. It may be necessary to make additional and frequent temperature control adjustments during incubation. Incubators should not be located near heat or in direct sunlight. Avoid locations near windows or doorways or where drafts occur. Remember that the eggs must receive air, avoid locations where carbon dioxide concentration might be high, (i.e., near gas furnaces or hot water heaters).

THE INCUBATOR SHOULD BE BROUGHT TO OPERATING TEMPERATURE FOR 24 TO 48 HOURS BEFORE PUTTING EGGS IN IT. LET YOUR EGGS STAY AT ROOM TEMPERATURE FOR AT LEAST 12 HOURS BEFORE SETTING THEM IN THE INCUBATOR.

HUMIDITY AND ITS CONTROL: There are two very important things you should know about humidity and its control. 1. You control humidity - the incubator can't. As the incubator operator, you set the temperature desired and you determine by adjusting the amount of water surface exposed to the heated air what the humidity in the incubator will be. 2. The wet bulb thermometer reading is not the percent of humidity in the incubator. To give you an example of this: if the incubator dry bulb thermometer reads 100°F, and the wet bulb thermometer reads 84°F, the humidity in the incubator is 51%, not 84%. The hatching manual shipped with your incubator describes how to determine humidity in detail. You should read the section on humidity and calibration thoroughly. **ALWAYS USE A NEW WICK OR CAREFULLY CLEAN AN OLD WICK EACH TIME BEFORE THE INCUBATOR IS USED.**

INCUBATOR CLEANING: Clean the incubator as soon as you are done using it. DO NOT WAIT UNTIL YOU NEED TO USE IT AGAIN. Using a low velocity vacuum, remove as much dust and dirt as possible. You may use a mild soap with water to clean all the parts or a weak solution of ammonia and water. Wipe the incubator clean with a cloth coated with the cleaning solution. BE SURE THE ELECTRICAL POWER TO THE INCUBATOR IS DISCONNECTED OR UNPLUGGED BEFORE ATTEMPTING TO CLEAN THE UNIT. Avoid getting liquids on the temperature controller, heater coil and the coil insulators. When cleaning is complete, allow the incubator to dry completely, then cover it in storage until it is used again.

**PLEASE READ THESE INSTRUCTIONS
CAREFULLY.**

1. GENERAL INFORMATION

Position the Roll-X in front of you so that the water fountain is to the back and on your right side. This will aid you in adjusting the Roll-X.

A. Tools needed to assemble the Roll-X:

- Slip joint pliers
- Small phillips screwdriver
- Small flat head screwdriver

B. Carefully unpack and identify all parts:

- Clear plastic dome (packed upside down)
- Blue Plastic base
- Water fountain kit
- The thermometer/hygrometer kit in plastic bag which includes:
 - One flat washer
 - One wing washer/nut
 - One long bolt
 - (3) hex nuts
 - One mercury thermometer with a wick attached to the end of the thermometer (wet bulb),
 - One regular thermometer (dry bulb)

C. Roller Assembly Parts already assembled:

- Screen 130-080 with the following attached:
- Side rails 350-152-I (2)
- Screws SC004-OF-006 (8)
- Rod supports 120-258 (2)
- Support screws SN004-40-006 (4)
- Support nuts NNO04-40-HST (4)

2. IF THE UNIT IS AUTOMATIC, THE FOLLOWING ITEMS ARE ENCLOSED:

- Automatic turner (available in 110VAC and 230VAC).
- Two (2) screws and two (2) washers.

3. ASSEMBLING THE ROLL-X2 W/ROLLERS MANUALLY OPERATED: (See Fig. 233)

If this unit is to be operated manually, all of item 2 above will be missing. However the assembly of the rest of the unit will be the same as for the Automatic unit.

4. ASSEMBLING THE ROLL-X2 WITH ROLLERS AUTOMATIC TURNER: (See Fig. 233)

The following sub assemblies should be assembled first.

A. Attach the actuator arm assembly to the black automatic turner, using the two screws and washers provided.

B. Slide two (2) small O-rings (#300-104) onto the long axle of the Male to Male roller. (# 320-134)

C. Slide five (5) large O-rings over each Male to Male roller. (# 320-134) and Male to Female roller. (# 320-135) There are extra large O-rings to be used if desired. Position one O-ring under the small end of each egg to prevent them from touching each other. Spacing to be determined by the operator.

D. Set the screen and rail assembly into the base, placing the cut corner end of the screen to the back and right hand side. Right and left side is determined by looking from front, toward the back, the front being the end where the motor mounts.

E. Attach one snap clamp to the guard tube even with one end. Secure as tight as possible using pliers. Insert the tube from inside the base, through the guard tube hole, moving the snap clamp tight against the inside wall. Slide the other snap clamp over the tube and tight against the outside wall, tighten with pliers. Place the flexible cap over the tube end.

F. Attach the automatic black turner assembly to the base using the 2 screws and washers provided. Be sure the leveling pad is attached.

G. Insert the drive rod into the clevis. Slide 1 locking collar onto the drive rod before it enters the base. Continue to slide the rod into the base, over the 2 supports and into the guard tube until it touches back of the tube (ie. the tube cap.) Slide the 2nd collar on to the drive rod on the outside of the clevis.

*Be sure both locking collars are loose.

IMPORTANT: Plug the turner cord into an appropriate outlet, and activate the drive arm until the clevis is closest to the base. Pull the drive rod out of the guard tube approximately 1/4 inch. Now position the locking collars against the front and back of the clevis, and tighten.

NOTE: Both locking collars must remain tight and secure or the drive rod will not rotate the rollers. They should be inspected often for tightness.

TIP: By positioning the locking collars at different locations, the degree of egg rotation can be controlled. During operation of the unit it will become self evident where and how to position the collars for varying degrees of egg rotation.

INSTALLING YOUR THERMOMETER KIT

H. Locate the hole on the right back side of the base near to the water fountain. From the inside of the base, insert the thermometer assembly and apply the washer and wing nut to the exterior of the blue base. Tighten the wing nut snugly, but do not over tighten. (The thermometer assembly should extend to the right with the wick hanging down to the front right corner).

The bulbs of the thermometers should slant downward but still clear the eggs to be set. Extend the wick of the wet-bulb or hygrometer through the screen cut corner so that the end will rest on the bottom of the base.

I. Attach all M-M, M-F rollers together, by inserting the axle with the small O-rings into the female end of the M-F roller. This will provide 15 roller assemblies. Next set 1 roller assembly into each slot of the rails. Actuate the motor and check to see that all the rollers are rotating. If any roller does not rotate, make sure the o-ring is contacting the drive rod. Reposition the o-ring if necessary by spreading or closing the gap between the o-ring.

CAUTION: If rollers do not rotate, check the following:

- a. Roller axle ends are touching the sides of the base. Trim or cut axle ends enough to allow roller to rotate free.
- b. Assure o-ring gap is enough to allow o-ring to contact the drive rod. Open or close the gap between the rollers as necessary.
- c. Each roller should rock slightly on the drive rod. This insures the o-rings are in contact with the drive rod.

INSTALLING EXTERNAL WATER FOUNTAIN

5. To install the external water fountain:
 - A. Insert the threaded hose barb fitting into the threaded hole provided in the bottom blue base corner where the Thermometer/ Hygrometer kit is mounted. Tighten enough to prevent leaking.
 - B. Push the hose piece provided onto the white hose barb that is screwed into blue base.
 - C. Push the hose barb on the water fountain base into the hose.
 - D. When ready the water fountain bottle height (and thus the water height in the incubator) is adjusted by raising or lowering the nut on the neck of the water fountain bottle.

NOW PLACE ROLL-X DOME ON BLUE BASE

Plug the long cord from the dome into your electric power source. If you have an Automatic Turner, plug the Automatic Turner cord into the electrical receptacle on the dome (Remember: it is only for the automatic turner).

6. SETTING TEMPERATURE CONTROLS

A The incubator was tested and the temperature regulated to 100°F before it was shipped to you. Due to handling in shipment or the environment it is used in, it may require further adjustment. Temperature adjustment is made according to the type of control ordered with the incubator. They are described in the following paragraphs. Watch the thermometer as the temperature in the incubator rises. The indicator light should go off at 100°F. After the set temperature is reached the light will go on and off at short intervals. This on and off of the indicator light and a constant thermometer reading of 100°F indicates the thermostat is controlling the heat.

NOTE: The desired temperature must be constant and stable within the unit **BEFORE** adjusting humidity. Run the incubator without any eggs for a period of 24 to 48 hours, regulating and checking the internal temperature. This period is required to guarantee that the temperature is constant and stable.

VERY IMPORTANT

When adjusting the incubator temperature SET THE BRASS OVER-TEMPERATURE CONTROL TO THE DESIRED TEMPERATURE FIRST, THEN THE PRIMARY SOLID STATE TEMPERATURE CONTROL. For example: To set the over temperature control to 101°F. turn the primary solid state control FULL ON (Full clockwise rotation). Adjust wafer backup control so that the incubator temperature stabilizes at 101°F. Then, turn the primary solid state control counterclockwise until the desired incubation temperature is obtained (In this case 100°F.) When this is set at 100° , you will not hear the clickling sound of the backup wafer thermostat any more.

B. BRASS THERMAL WAFER BACKUP TEMPERATURE CONTROL: A 3 inch diameter brass double wafer that expands with temperature increase and contracts with a drop in temperature. This device should be set 1° F. higher than the incubation temperature setting of the solid state temperature control. It is factory pre-set at 101°F. It operates to help protect your eggs only in the event of failure of the solid state temperature control. When the thermostat is properly adjusted, the wafer expands until the desired temperature is reached. At this point the wafer pushes the plunger on the sensitive snap switch under it, opening the circuit and turning off the heat. As the wafer contracts with temperature drop, it releases the sensitive snap switch turning the heater back on.

To adjust the temperature, loosen the locking wing nut, make the adjustment and lock the setting by retightening the wing nut. You will hear a clicking noise when the wafer opens and closes the circuit.

TURN THE KNOB COUNTER-CLOCKWISE to increase the temperature. To decrease the temperature TURN THE KNOB CLOCKWISE. Turn the knob slowly and carefully making small incremental adjustments. **BE SURE TO LOCK THE SETTING BY TIGHTENING THE WING NUT AFTER EACH ADJUSTMENT.**

B1. SOLID STATE TEMPERATURE CONTROL: The solid state temperature control is mounted on the baffle of the Roll-X. The regulator (adjusting) shaft protrudes through the incubator dome above the control. Turning the shaft **CLOCKWISE** will increase the temperature in the incubator. Turning the shaft **COUNTER-CLOCKWISE** will decrease the temperature. Turn the shaft slowly and carefully when making adjustments.

B2. OPTIONAL TEN TURN POTENTIOMETER SOLID STATE CONTROL: This control performs the same as the solid state control described in paragraph B1 above except that the regulator (adjusting) shaft is a 10 turn potentiometer for precise adjustment. This feature allows approximately one full 360° turn of the control knob to increase or decrease the temperature approximately 2°F.

7. SETTING THE HUMIDITY IN THE RX2 INCUBATOR

Thread the blue plastic nut onto the neck of the water fountain up against the button flare, as high as it will go.

Fill the water fountain with distilled water. Place one finger over the end hole, turn the bottle upside down and insert into the stand. The humidity is adjusted by raising the water fountain using the nut on the neck. Make small incremental adjustments.

WATER WILL BEGIN TO GURGLE OUT OF THE FOUNTAIN. A READING FROM THE WET BULB THERMOMETER INDICATING HUMIDITY CAN BE TAKEN AFTER A FEW MINUTES.

The humidity reading will gradually increase and become stable a few minutes after each adjustment. Increase the humidity in gradual steps until the desired level is achieved.

Remove the water fountain only when necessary. Each removal will increase the water level in the incubator. Practice withdrawing and replacing the water bottle holding a finger over the end of the water tube. This will help eliminate spilling water into the incubator.

HUMIDITY AND ITS CONTROL: THERE ARE TWO VERY IMPORTANT THINGS YOU SHOULD KNOW ABOUT HUMIDITY AND ITS CONTROL
 1. YOU CONTROL HUMIDITY - THE INCUBATOR CAN'T.

As the incubator operator, you set the temperature desired and you determine by adjusting the amount of water surface exposed to the heated air what the humidity in the incubator will be. 2. THE WET THERMOMETER READING IS NOT THE PERCENT OF HUMIDITY IN THE INCUBATOR. To give you an example of this; If the incubator DRY BULB THERMOMETER READS 100° F., and the WET BULB thermometer reads 85°, the Relative Humidity is 53% not 85% . (See chart below) Our Hatching Manual describes how to determine humidity in detail. You should read the section "Humidity and Calibration" thoroughly. **ALWAYS USE NEW OR CLEAN WICK EACH TIME THE INCUBATOR IS USED.**

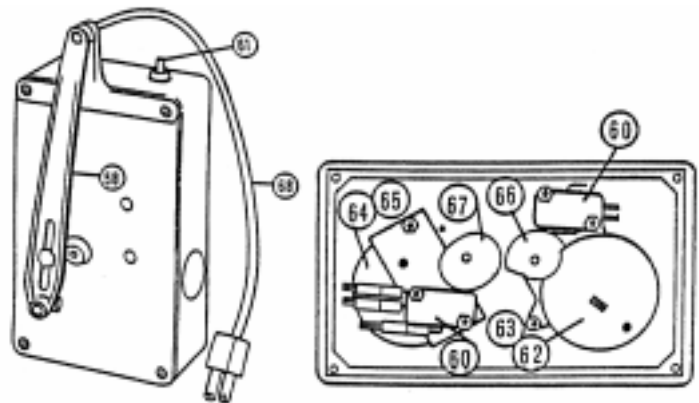
HUMIDITY CALIBRATION

People often get confused by the apparent contradictions in instructions relating to humidity in hatching. This may be because there are two systems of calibrating humidity. Marsh incubators use the "wet bulb thermometer." The wet bulb thermometer consists of a wick that is attached to a thermometer that hangs in the water . The other system gives the true percentage of humidity reading. In order to make the subject matter understood, a chart is provided that shows the difference between the two types of readings when the temperature in the incubator is 100 degrees. For example, a wet bulb reading of 84 means the actual humidity is 50%.

WET BULB - RELATIVE HUMIDITY			EGG HATCHING TIME	
91	=	70%	BREED	HATCH
90	=	68%	Coturnix Quail	16 days
89	=	65%	Bobwhite	23 days
88	=	62%	Pheasant	23 days
87	=	59%	Chukar	21 days
86	=	56%	Bantam	21 days
85	=	53%	Chicken	28 days
84	=	50%	Duck	28 days
83	=	48%	Turkey	28 days
82	=	46%		

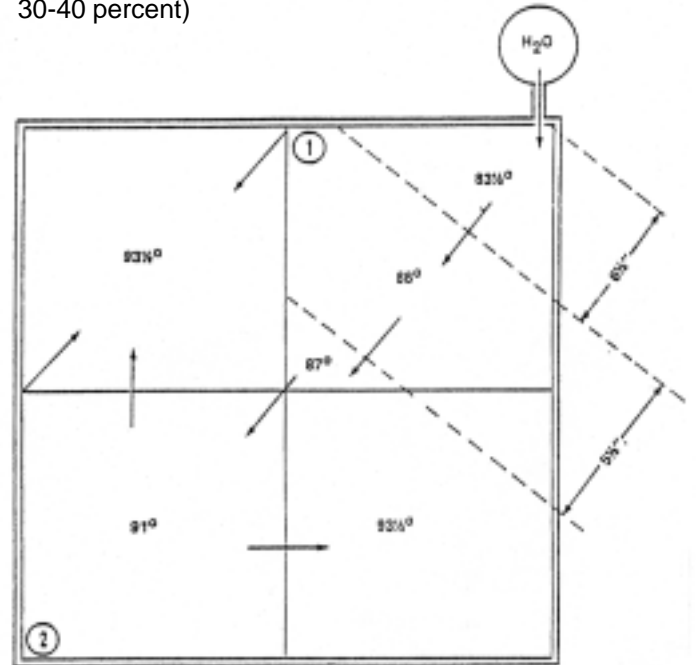
AUTOMATIC TURNER PARTS IDENTIFICATION

AUTOMATIC TURNER PARTS			
ITEM	120VAC	230VAC	PART DESCRIPTION
58	125-000	125-000	AT2 Turner Lever Assy.
60	460-020	460-020	Sensitive Snap Switch
61	460-034	460-034	Push Button Switch
62, 63	320-071	320-072	Power Motor
64, 65	320-076	320-077	Timer Motor
66	350-002	350-002	Power Motor Cam
67	350-000	350-000	Timer Motor Cam
68	200-045	200-045	Power Cord



INCUBATOR TEMPERATURE CONSTANT AND STABLE AT 100° F. (Humidity in the environment approximately 30-40 percent)

MODELS RX2 REPLACEMENT PARTS LIST		
CATALOG NUMBER		PART DESCRIPTION
120VAC	230VAC	
350-005	350-005	Water Fountain Bottle
500-011	500-011	Thermometer (2 Used)
350-072	350-072	Dome
350-029	350-029	Baffle Plate
320-066	320-116	Fan Motor (Muffin Style)
350-017	350-017	Fan Guard
270-010	270-011	Heating Coil
200-028	200-029	Power Cord
200-049	200-049	Square Receptacle
350-014	350-014	Base
130-000	130-000	Screen
220-010	220-011	Solid State Thermostat
220-012	220-013	10 Turn Thermostat
220-016	220-016	Thermal Wafer
460-018	460-018	Sensitive Snap Switch



Looking down on the incubator base. The above diagram illustrates how various levels of flooding can be achieved in the bottom of the unit to produce various wet bulb readings. These wet bulb readings can be converted to humidity readings by the use of the chart on page 3.



1690 Brandywine Avenue
 Chula Vista, CA 91911
 Telephone (619) 216-3400
 Fax (619) 216-3434
 www.lyonelectric.com

e-mail:lyonelec@cts.com

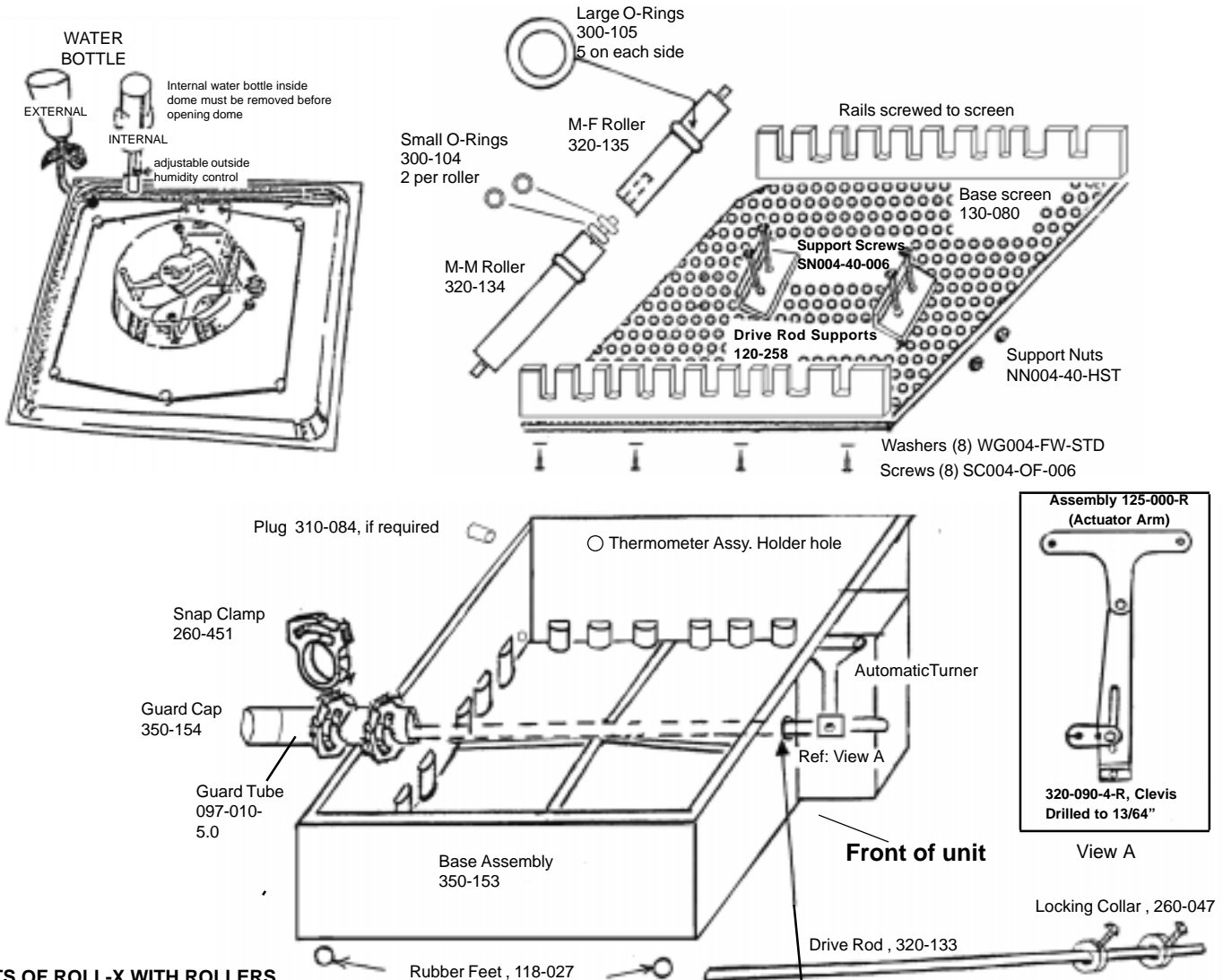
FIGURE 233

ASSEMBLY OF ROLL-X WITH ROLLERS

CONFIGURATION MATRIX OF ALL ROLL-X WITH ROLLERS MODELS

ITEM NUMBER	DESCRIPTION	DOME ASSEMBLY	CONTROL TYPE	USED WITH	VOLTAGE	WATER BOTTLE	OPTIONAL WAFER BACKUP	OPTIONAL ALARM CIRCUIT
910-148	RX2 W/ROLLERS SS/WAFER 120V	115-004	1 TURN	RX2 SS/WAFER	120	external		add suffix "C"
910-149	RX2 W/ROLLERS SS/WAFER 230V	115-005	1 TURN	RX2 SS/WAFER	230	external		add suffix "C"
910-150	RX2 W/ROLLERS TT/WAFER 120V	115-018	10 TURN	RX2 TT/WAFER	120	external		add suffix "C"
910-151	RX2 W/ROLLERS TT/WAFER 230V	115-019	10 TURN	RX2 TT/WAFER	230	external		add suffix "C"
910-152	RX1 W/ROLLERS 120V	115-002	1 TURN	RX1	120	internal	add suffix "W"	
910-153	RX1 W/ROLLERS 230V	115-003	1 TURN	RX1	230	internal	add suffix "W"	
910-154	RX W/ROLLERS 120V	115-014	FIXED	RX	120	internal	add suffix "W"	
910-155	RX W/ROLLERS 230V	115-015	FIXED	RX	230	internal	add suffix "W"	

For automatic turning, please add suffix "A" to the Item Number



PARTS OF ROLL-X WITH ROLLERS

ITEM NUMBER	DESCRIPTION	QUANTITY USED	ITEM NUMBER	DESCRIPTION	QUANTITY USED
300-105	Large O Rings	200	097-010-5.0	Guard Tube	1
300-104	Small O Rings	30	350-154	Guard Tube Cap	1
320-135	M-F Rollers	15	350-152	Side Rails	2
320-134	M-M Rollers	15	SC004-OF-006	Side Rail Screw	8
320-133	SS Drive Rod	1	WG004-FW-STD	Side Rail Washer	8
120-258	Drive Rod Supports	2	350-153	Base	1
SN004-40-006	Nylon Support Screws	4	310-084	Water Hole Plug	1
NN004-40-HST	Nylon Support Nuts	4	940-039	Rubber Feet	4
130-080	Base Screen	1	140-039	Water Bottle Kit	1
125-000-R	Actuator Assembly	1	FIGURE 233	Parts Breakdown	1
260-451	Snap Clamp	2	260-047	Locking Collar	2
			SC008-32-014	Screw 8-32 x 7/8	2

NOTE: Base 350-150 is drilled out at 13/64" for the drive rod, on the turner end, and drilled out at 35/64" for the Guard Tube, opposite to the turner end. It becomes P/N 350-153 after drilling.

