Laboratory Series



CUBE Operating Manual

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1.0 SAFETY

WARNING - Failure to follow the instructions in this manual may result in serious injury or death.

WARNING - Risk of electric shock. This pump has been rated for indoor use only.

WARNING - Risk of electric shock. Connect only to a grounding type receptacle protected by a ground-fault circuit interrupter (GFCI). Contact qualified electrician if you cannot verify that the receptacle is protected by a GFCI and that your installation meets local electrical codes.

WARNING - Risk of electrical shock. Always make sure the voltage on the pump data plate matches the installation voltage before plugging the pump into a wall outlet or hooking up to an electrical supply.

WARNING - Risk of electrical shock. Always disconnect the power to the pump prior to conducting and maintenance or repairs.

WARNING - Risk of chemical exposure. Always wear protective clothing, including gloves and safety eye protection, when working on or near this pump.

WARNING - Risk of chemical exposure. Always depressurize system and drain chemicals prior to installation or maintenance.

WARNING - Risk of fire or explosion. Do not pump flammable liquids.

WARNING - Risk of injury. Severe pinching of fingers can occur while installing and removing the tubing. Caution must be used to keep fingers away from rotating parts.

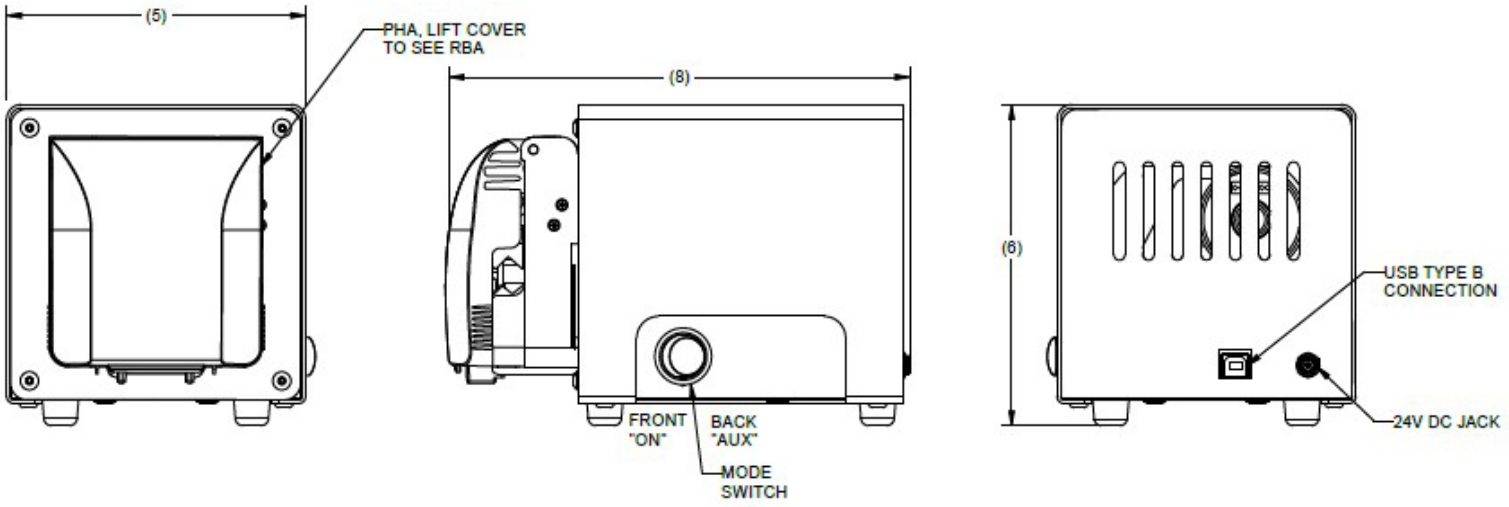
NOTICE - Every precaution for accuracy has been taken in the preparation of this manual, however, ANKO PRODUCTS, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in this manual.

2.0 SPECIFICATIONS

General Specifications

Pump Head Series	L400, A300
Tubing Class – L401, A301	ANKO Performance Class
Tubing Class – L402, A302	ANKO Premium Class
Motor Type	Brushless DC
Duty Cycle	Continuous
Voltage	100-240V 50/60Hz External Power Supply
Plug Type	NEMA 1-15-P to DC JACK 2.5mm x 5.5mm
Max Working Pressure	40 PSI (Varies by Tubing)
Enclosure	Powder Coated Steel - IP22 rated
Pump Head	L400: Polycarbonate, IXEF | A300: Polycarbonate
Rotor	L400: Stainless Steel | A300: CRS-Zinc Plated
Rollers	L400: Stainless Steel | A300: Mos2 Filled Nylon
Bearings	Sealed Stainless Steel
Compliance (Europe for CE Mark)	EN 55014-1:2006/A12009/A2:2011 EN 55014-2:2015
Compliance (US and Canada)	UL778, ICES-003, Issue 6: 2016 FCC Part 15b Class A

Dimensions



- When facing the pump, the roller assembly spins in a clockwise direction. The inlet (suction) side is located on the left side of the pump head, and the outlet (discharge) is located on the right.
- Mount the pump in a level, dry location close to the injection point. To minimize back-pressure on the system, keep the discharge tubing a short as possible.
- The recommended location is above the height of the solution tank. Mounting the pump lower than the solution tank will gravity feed the solution and create a “flooded suction” installation. In this scenario, a shut-off valve or other device must be installed to stop the solution flow to the pump during pump servicing.
- In installations involving pressure, a check valve should be used at the point of injection to prevent potential back-flow.
- Do not mount pump directly over an open solution tank as chemical fumes may damage the pump.
- Voltage and frequency of power supply must be the same as shown on unit specification label.
- Ambient air temperature should not exceed 104° F (40° C) and adequate air flow should be provided.

4.0 OPERATION

⚠ **WARNING** - Tube failure may result in fluid being sprayed from pump. Use appropriate measures to protect operator and equipment. Tubing should be inspected periodically for tears, cracks, cuts, or abrasions.

⚠ **WARNING** - Use only factory approved tubing from the designated tubing class. Incorrect tubing can adversely affect performance or damage the pump.

4.1 Controls

All pumps are equipped with a rocker switch mounted on the side of the pump. Always confirm the switch is in the designated OFF position before plugging the pump into any power source.

3-Way Rocker - For units equipped with a 3-way rocker switch, left (to pump head) is full speed ON, center is OFF, and right (to back of pump) is AUX mode (function varies by model).

Potentiometer - Certain models are equipped with either a single-turn or 10-turn potentiometer to regulate pump speed, analog signal scalability, or dispense time.

Momentary Button - Timed dosing models are equipped with a momentary button to test the ON time setting for calibration purposes.

4.2 Adjusting Flow Output

Fixed Speed Models - There is no flow output adjustment.

Variable Speed Models - Flow output is controlled by motor speed. Rates are adjustable from approximately 5% to 100%. Refer to the Remote Operation section for more details on analog and serial controls.

Timed Dosing Models - ON TIME is set by the potentiometer up to the model's maximum dispense time. When the 3-way rocker switch is in the right (AUX) position, the pump will dispense for the selected ON TIME whenever a dry contact pulse signal is received, or the momentary button is pressed.

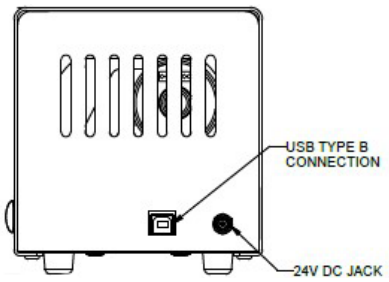
Cycle Timer Models - Cycle time is defined as the sum of the ON TIME and OFF TIME. ON TIME is set by the potentiometer and can be incremented up to the model's maximum total cycle time. In the right (AUX) position, the pump will dispense for the selected ON TIME, remain off for the balance of the total cycle time, and then repeat the on cycle indefinitely until the pump is powered off or switched out of the AUX mode.

Serial Control Models - See Section 4.3 Remote Operations.

Serial Control

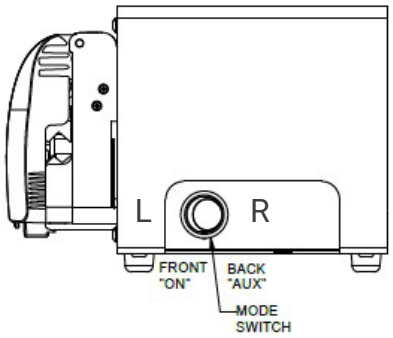
Step 1 - With the 3-way toggle switch in the center position, power the device using the included DC power cable. Connect to the pump with a USB-B cable (Figure 1).

Figure 1



Step 2 - With the 3-way power toggle, switch the device to the right remote management AUX position. (Figure 2)

Figure 2



Step 3 - If using a Windows® device, navigate to “Device Manager” and locate your COM devices. Identify the COM name associated with the serial device. It will appear with a name such as “COM1”, “COM2”, or “COM3”.

Step 4 - Open a terminal emulator program that is compatible with serial devices, such as PuTTY. If using PuTTY, navigate to Session -> “Connection Type” -> Radio Button “Serial”. Do not select Connections -> Serial.

Step 5 - Enter the COM name of the device under Serial Line. Input the following settings if applicable (not required by PuTTY), then open the connection.

Serial Settings

Speed	9600 baud
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None
Serial Line	COM Name Ex: “COM1”

Step 7 - Type “?” in the console for your available commands:

G	Take Control of the PWM Speed
g	Release Control of the PWM Speed
+	Increase Speed by 1%
-	Decrease Speed by 1%
Sx	Set Speed by Number, x is 0 to 100
s	Set Speed to 0
O	Set Speed to last saved number
o	Set Speed to 0 and save last speed
R	Current Set Speed
r	Sensed Speed
V	Clockwise Motor Direction
v	Counterclockwise Motor Direction
Q	Unique ID Number

Remote Start/Stop

For pump models equipped with remote start/stop, this feature operates by receiving a dry contact signal and is intended to be connected to a dry contact switch. The input has no polarity. No voltage is permitted on the input signal. The pump will activate and run while the switch is closed and deactivate and stop when the switch opens.

To activate this feature, install the pair of wires from the dry contact switch closure device into the terminal block (Figure 3). Set the 3-way rocker in the right (AUX) position to place the pump in dry contact mode. The pump will now operate only when receiving a closed contact signal. To return to local control, move the rocker switch to the left (ON) position.



Figure 3

4-20mA Control

For models equipped with a 4-20mA feature, the pump's output will vary according to the level of an incoming analog signal. For scalable models, the maximum output to the 4-20mA analog signal is scalable between 20% and 100%, as determined by the percentage setting on the potentiometer.

For *standard signal* models, the minimum output is approximately 5.0% at 4.8mA and increases in 1.0% increments for every .16mA until 100% of the scaled output (based upon the potentiometer setting) is reached at 20.0mA (Figure 4).

For *inverted signal* models, the maximum output (as established by the potentiometer setting) is reached at 4.8mA and decreases, as above, until reaching zero output at 20.0mA (Figure 5).

For *non-scalable* models see Figure 4 (100%, Blue Line).

NOTE - Loop voltage for all models may not exceed 36VDC.

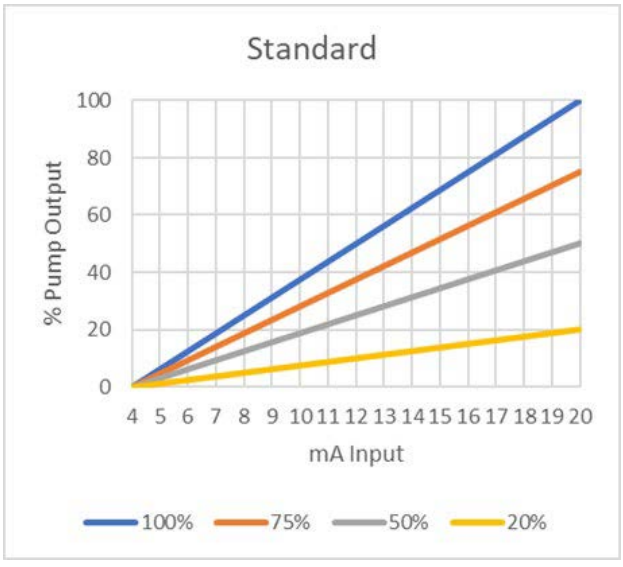


Figure 4

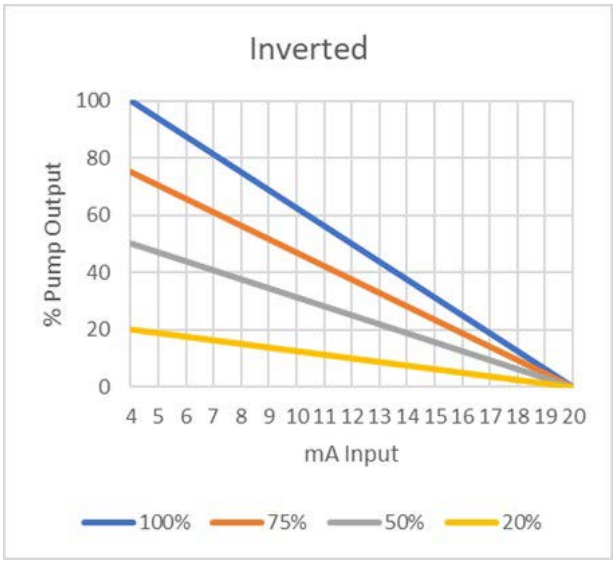


Figure 5

0-10VDC Control

For models equipped with a 0-10VDC feature, the pump's output will vary according to the level of the incoming analog DC signal. For scalable models, the maximum output to the 0-10VDC analog signal is scalable between 20% and 100%, as determined by the percentage setting on the potentiometer.

For *standard signal* models, the minimum output is approximately 5.0% at .5 VDC and increases in 1.0% increments until 100% of the scaled output (based upon the potentiometer setting) is reached at 10VDC (Figure 6).

For *inverted signal* models, the maximum output (as established by the potentiometer setting) is reached at 10VDC and decreases, as above, until reaching zero output at 0VDC (Figure 7).

For *non-scalable* models, see Figure 6 (100%, Blue Line).

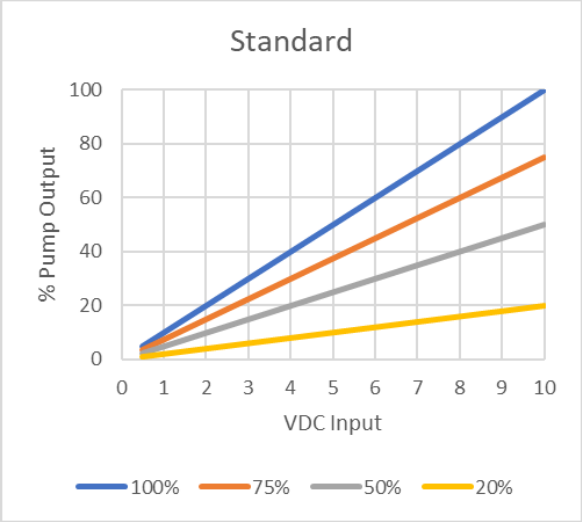


Figure 6

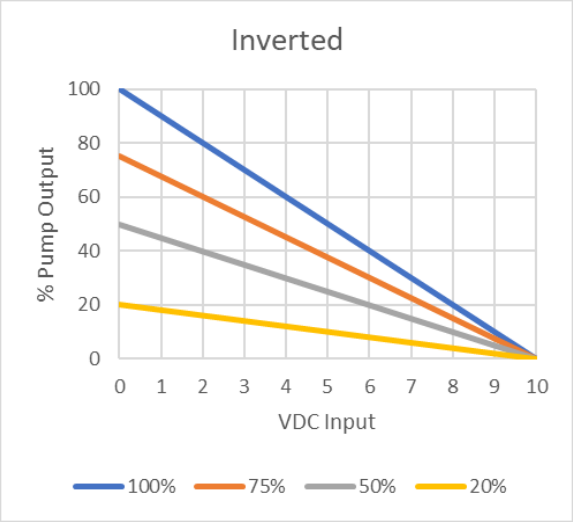


Figure 7

Establishing Analog Connection

To establish and operate the analog control feature:

Step 1 - Install the two-wire lead (right side of terminal is positive, left is negative) from the 4-20mA or 0-10VDC source into the terminal block (Figure 8).

Step 2 - For scalable models, set the potentiometer to the desired scaling percentage. To operate without scaling, set the potentiometer to 100%.

Step 3 - Set the 3-way rocker in the right (AUX) position to activate the control feature. The pump will now operate only when receiving the analog signal.

While in the AUX control mode, the pump can be turned off by setting the potentiometer to 0%.

To return the pump to manual control, place the rocker switch in the left (ON) position.

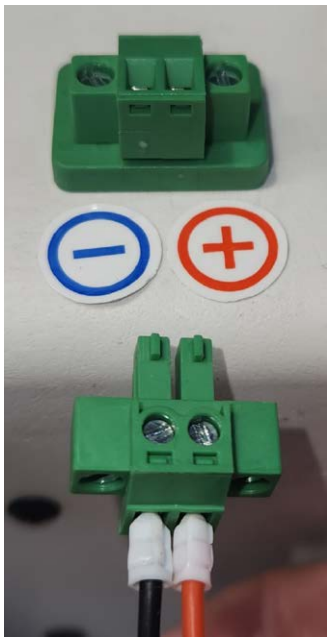


Figure 8

5.0 MAINTENANCE

5.1 Routine Inspection

The pump should be inspected on a weekly basis. Inspect for any signs of leaking and early indications of potential tube failure (e.g., swelling, cracking or discoloration). Replace any worn or damaged components immediately. Always check the chemical compatibility and pressure rating of the tubing prior to use.

5.2 Replacing the Tubing

Pump tubing must be replaced on a regular basis. While replacement within 500 hours of run time is recommended, tube longevity is ultimately determined by many factors, including tube formulation, the chemical composition of the fluid being pumped, system back pressure, pump speed, temperature, and more.

⚠ **WARNING** - Tubing connections may be under pressure. Always depressurize the system prior to connecting or disconnecting the pump.

⚠ **WARNING** - Tubing may contain chemicals. Wear protective clothing, gloves and safety glasses when working with or near the pump.

⚠ **WARNING** - Severe pinching of fingers can occur while installing and removing the tubing. Caution must be used to keep fingers away from rotating parts. Always disconnect the pump before beginning tube replacement procedures.

Use only factory designated tubing. Incorrect tubing can adversely affect performance or damage the pump.
Official replacements parts available at: **ankoproducts.com**

Tubing Installation - L400 Pump Heads

Step 1 - With the pump turned off, lift the front cover.

Step 2 - Insert tubing into the opening above the roller assembly and push to the rear of the channel.

Step 3 - If using side-to-side tubing exit, simply close the cover to lock tubing in place.

Step 4 - If using bottom tubing exits, use spring-loaded retention clips in each channel to lock tubing in place prior closing front cover.



Figure 9

Tubing Removal - L400 Pump Heads

Step 1 - Disconnect the suction and discharge tubing from the pump tubing.

Step 2 - Lift the front cover.

Step 3 - If using side tubing exits, simply remove tubing.

Step 4 - If using bottom tubing exits, open the spring-loaded retention clamp and pull the tubing out of each pump head channel.

Tubing Installation - A300 Pump Heads

Start with a section of tubing at least 9” in length. Once installed, this length will result in approximately 1 1/2” extending below both sides of the pump head for fittings and attachments.

Step 1 - With the pump running, insert tube into the channel of the inlet (suction) of pump head. (Figure 10)

Step 2 - Carefully guide the tube into pump head and through the channel of the outlet (discharge) side of the pump head and then stop the pump. (Figure 11)

Step 3 - Reinstall the pump head cover. (Figure 12)

Step 4 - Attach retention clips on inlet and outlet tubing, just below the base of the pump head, to prevent tube migration during operation. (Figure 13)

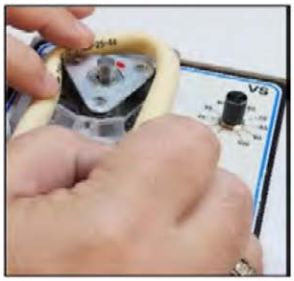


Figure 10



Figure 11



Figure 12



Figure 13

Tubing Removal - A300 Pump Heads

Step 1 - Disconnect any suction and discharge tubes from the pump tube.

Step 2 - Remove the pump head cover.

Step 3 - With the pump running in clockwise rotation, pull the inlet (left) side of the tubing out of the pump head channel. Carefully guide the tube clockwise away from the rollers and pull the tube out of the pump head.

L400 Pump Head Maintenance

Occasionally, the pump head may require partial disassembly for cleaning or roller assembly conversion/replacement. Always inspect the pump head for cracks or other visible damage and ensure rollers turn freely. Be sure all cleaning solvents are removed prior to reassembly and tube replacement.

Step 1 - Remove tubing per the Tubing Removal procedure.

Step 2 - Turn power off to the drive unit.

Step 3 - Lift pump head cover.

Step 4 - Using a 1/16' Allan wrench, remove screws securing the front bridge of pump head. (Figure 14)

Step 5 - Pull bearing bridge and locating pins straight out of pump head. (Figure 15)

Step 6 - Remove thrush washer. (Figure 16)

Step 7 - Remove roller assembly by pulling and sliding it off the output shaft. (Figure 17)

To install a new assembly, reverse the steps above.



Figure 14



Figure 15



Figure 16

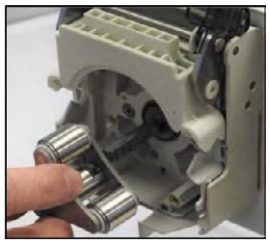


Figure 17

A300 Pump Head Maintenance

Step 1 - Remove tubing per the Tubing Removal procedure.

Step 2 - Disconnect power to the pump.

Step 3 - Remove the pump head cover.

Step 4 - Slide roller assembly off motor shaft. For two roller configurations, first open the spring clip to release it from the motor shaft. (Figure 18)

Step 5 - Remove roller assembly by sliding it off the motor shaft.

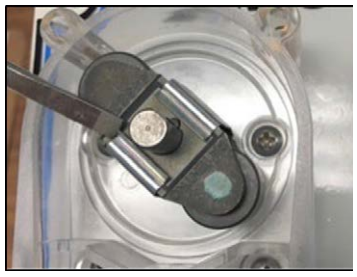


Figure 18

To install a new assembly, reverse the steps above.

6.0 REPLACEMENT PARTS & TUBING

Visit our website for factory authorized tubing, pump head components and accessories. Interact with the icons below to learn more.

Click for Replacement Parts

Click for Pump Tubing

Click to visit ankoproducts.com

7.0 TROUBLESHOOTING

Problem	Potential Cause	Solution
Fluid Leaking	Pump tubing worn	Replace tubing
	Excessive back pressure	Ensure system pressure does not exceed tube pressure rating
	Tube connection are not tight	Ensure tubing connection are properly connected
Pump Will Not Start	Outlet is not powered	Verify that the unit is plugged into functioning outlet
	DC Jack has a loose connection	Verify the power cord is firmly attached to the DC receptacle
	Gearbox assembly is worn	Replace unit
Pump Runs but Does Not Meet Rated Flow	Tubing is worn	Replace tubing
	Non-compatible tubing used	Use specified tubing
	Fluid viscosity is too high	Lower viscosity, use larger bore tubing
	Pump height is too high	Reduce pumping height
Shortened Tube Life	Non-compatible tubing used	Use specified tubing
	Seized rollers caused abrasion on tube	Clean roller assembly or replace
	Fluid is not compatible with tubing	Use chemically compatible tubing
Unit is ON but Pump Will Not Turn	Non-compatible tubing used	Use specified tubing
	Gearbox assembly worn	Replace unit

8.0 LIMITED WARRANTY

Anko Products, Inc, (“ANKO”) warrants, subject to the conditions and exceptions herein, to replace or repair free of charge, any of its products which fail within three years of the date of manufacture. Any failure must be a result of a defect in material workmanship and not because of normal operation as described in the product user manual.

This warranty is limited to repairing or replacing any device or part of any device which is returned, transportation prepaid, to the factory and is proven to be defective upon our examination. The warranty shall not apply to repairs required for normal wear and tear, lack of reasonable and proper maintenance, chemical attack, electrical surge, or products that have been misused in our sole judgment. All consumable items such as tubing, and pump head rollers are excluded.

ANKO disclaims all liability for any loss, damage or expense directly or indirectly related to or arising from the use of its products, including damage to other products, machinery, or property. ANKO shall not be liable for any consequential damages including, without limitation, loss of profits, loss of product or loss of production. This warranty does not obligate ANKO to bear any costs of removal, installation, transportation, or other charges which may arise in connection with a warranty claim.

ANKO makes no warranties, either express or implied, other than those stated above. No representative has authority to change or modify this warranty in any respect. Jurisdiction and venue for enforcement of this warranty may be brought only in the State of Florida. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

9.0 RETURN AND REPAIR

To return merchandise visit ankoproducts.com/pages/contact-us for a Return Material Authorization (“RMA”), then, if applicable, Buyer may return the defective Products to ANKO with all costs prepaid by Buyer. ANKO will incur shipping costs for warranty products shipped from our factory. All replaced parts shall become the property of ANKO. No repair or replacement will extend the original warranty period.

Model: _____

Date of Installation: _____

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