



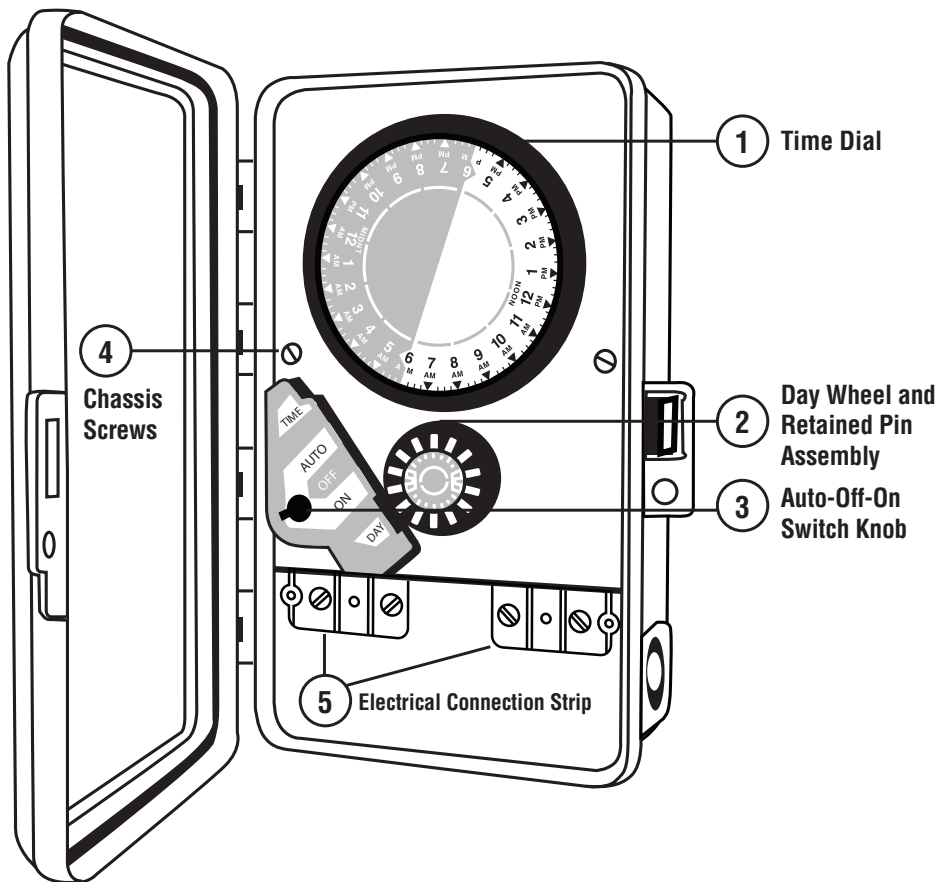
# 2000 Series Single Station Controller



**Instruction Manual**

## CONTROLLER FUNCTIONS

- 1. Time Dial.** Rotates one clockwise revolution every 24 hours. Controller is programmed for automatic (AUTO) operation with the insertion of timing pins in the time dial holes. Once properly set, correct time of day is shown by the alignment of the arrow labeled "TIME" with the time shown on the time dial.
- 2. Day Wheel and Retained Pin Assembly.** Has 14 pin locations for a two week program. Controller will operate in AUTO only on the days programmed by the depression of the day wheel pin. Once properly set, correct day is shown by the alignment of the arrow labeled "DAY" with the day shown on the day wheel.
- 3. Auto-Off-On Switch Knob.** Indicates the function of the controller by turning to ON for manual operation, AUTO for automatic operation, and OFF to stop manual (ON) and automatic (AUTO) functions.
- 4. Chassis Screws.** Secures controller chassis to enclosure.
- 5. Electrical Connection Strip.** Allows for input and output electrical connection. Consult Electrical Circuit and Connection Diagram prior to wiring,



## SETTING AND OPERATING INSTRUCTIONS

- **TO SET THE DAY OF THE WEEK AND TIME OF DAY:** Turn the Day Wheel until correct day is indicated by arrow labeled “DAY”. Turn the Time Dial CLOCKWISE until the correct time is indicated at the arrow labeled “TIME”.



**CAUTION:** Set time dial in CLOCKWISE direction only.  
DO NOT FORCE TIME DIAL IN REVERSE DIRECTION.

- **TO OPERATE MANUALLY:** Turn Auto-Off-On switch to ON. When operation is no longer needed, turn Auto-Off-On switch back to OFF.
- **TO SET DAILY OPERATION:** There are 14 days to program on the day wheel. For each day that operation is desired, the day wheel pin should be pushed down fully. For days where operation is not desired, the day wheel pins should be pulled out gently.
- **TO SET OPERATING TIMES:** The 24 hour Time Dial has ninety-six 15 minute increments. The timing pins should be inserted in the Time Dial to indicate the desired operating times. Included with each controller is a package of white 15 minute pins. Longer timing periods may be obtained by placing white pins directly next to each other in Time Dial. Also available are shorter duration 7 minute pins (yellow) and 4 minute pins (orange).
- **TO SET CONTROLLER TO OPERATE A MULTIPLE ZONE VALVE:** The operating times for each zone are represented by one pin or by a group of pins in the Time Dial. Omit at least one pin between each zone of pins in Time Dial.
- **TO START AUTOMATIC OPERATION:** Once the correct time and day have been set and the desired operating times have been programmed, the Auto-Off-On switch knob should be turned to AUTO.

## ELECTRICAL CONNECTION INSTRUCTIONS



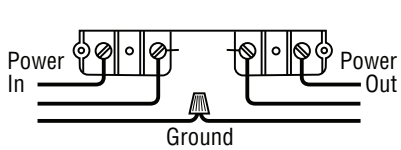
### CAUTION:

PRIOR TO INSTALLATION OR SERVICE, DISCONNECT POWER TO CONTROLLER.

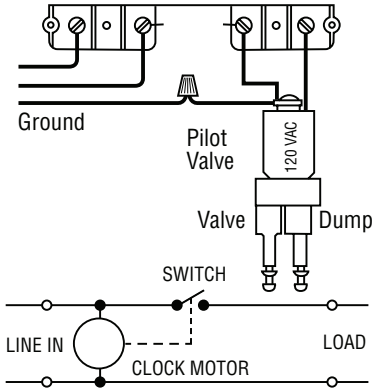
- Ensure proper controller has been selected for the application.
  - Use appropriate gauge wire and ensure that all wiring meets local code.
  - When making wire connections, do not pull excessively on controller wires, as they can become disconnected.
  - Properly ground controller.
  - When reinstalling controller face or lower cover, do not trap wires between standoffs and screws.
- 
- Remove lower cover on controller face.
  - Make wire connections to electrical connection strip as indicated by Electrical Circuit and Connection Diagram.
  - Reinstall lower cover on controller face.

# ELECTRICAL WIRING AND CIRCUIT DIAGRAMS

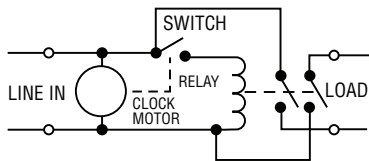
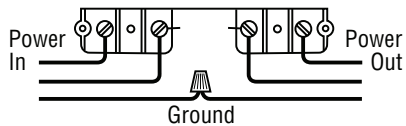
## Model 2110



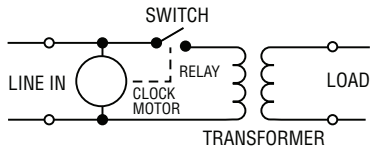
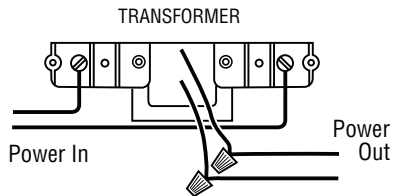
## Model 2116



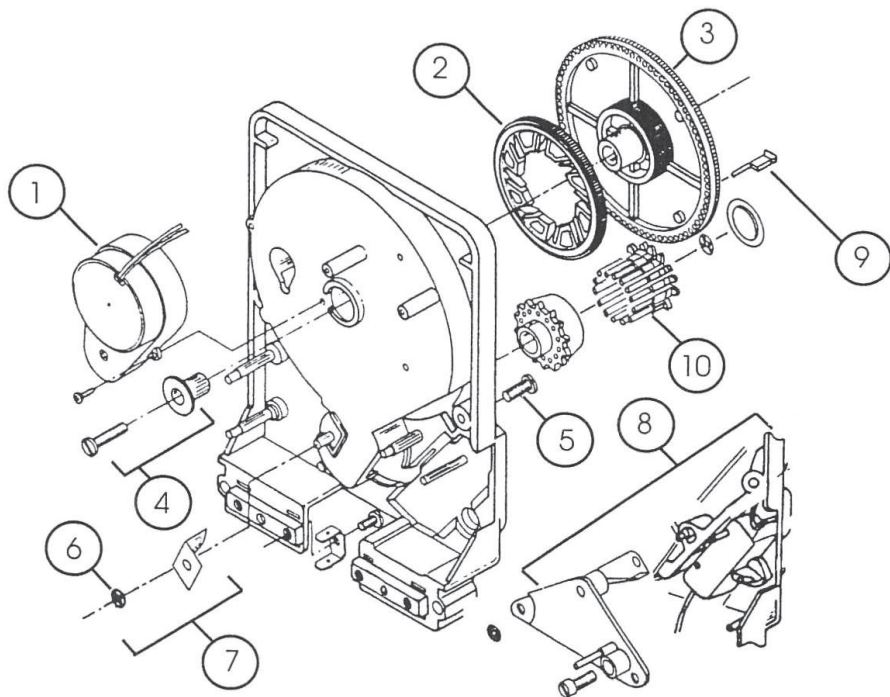
### Models: 2112, 2120 & 2210



### Models: 2114, 2124, 2214



# CONTROLLER DIAGRAM





## PARTS LIST

1	110 VAC motor, 60 cycle	1111025
	220 VAC motor, 60 cycle	1122025
2	Drive gear	1000103
3	Time dial	1000102
4	Time dial retainer and screw	1000104
5	Chassis screws (4)	4331214
6	Black retainer nuts	1009932
7	Day wheel metal spring assembly	1000117
8	Switch assembly (switch, adj. screw, arm, spring, knob and cover)	1000120
9	15 minute white timing pins (18)	1009955
	7 minute yellow timing pins (18)	1009956
	3 minute orange timing pins (18)	1009957
	Mixed assortment of timing pins (6 each)	1009947
	15 hour black timing pins (6)	1009959
10	14 day retained pin set for day wheel	1000114

## OTHER COMPONENTS

Relay, 110 VAC, 60 Hz coil, double throw, single pole, 2 HP	1320110
Relay, 220 VAC, 60 Hz coil, double throw, single pole, 2 HP	1320220
Transformer, 110 VAC input, 24 VAC, 30 VA output	1211027
Transformer, 220 VAC input, 24 VAC, 30 VA output	1222024
Key Lock	1009915
Pilot Valve for model 2116 (w/o solenoid)	1003042

## TROUBLESHOOTING



### CAUTION:

Important! Disconnect power prior to working on power or load.

#### I. PROBLEM Controller fails to keep proper time.

*CAUSE:* No power or improper voltage to motor.

*SOLUTION:* Check Electrical Circuit and Connection Diagram for proper connection of power to controller. Check voltage supply to ensure voltage to motor is 120 or 240 volts as specified for model type.

*CAUSE:* Clock motor running but time dial not turning. Drive gear located behind time dial may be broken.

*SOLUTION:* Remove time dial and inspect drive gear. Install new drive gear noting “this side out”. Reinstall time dial and be sure it turns freely clockwise.

#### II. PROBLEM Controller improperly staying ON.

*CAUSE:* Switch is being activated.

*SOLUTION:* Ensure that wires do not push against switch or relay. Ensure that wires leading to switch are not pulled out.

*CAUSE:* Controller improperly wired.

*SOLUTION:* Check Electrical Circuit and Connection Diagram and make sure that input wires are not wired directly to load.

*CAUSE:* Switch adjustment needed for proper automatic operation.

*SOLUTION:* Make needed switch point adjustment as outlined in part IV of Troubleshooting Guide.

*CAUSE:* Switch knob not in OFF position.

*SOLUTION:* Turn Auto-Off-On knob to OFF position.

### III. PROBLEM Controller does not turn ON in manual mode.

*CAUSE:* No power to controller.

*SOLUTION:* Be sure that controller is properly wired as per Electrical Circuit and Connection Diagram.

*SOLUTION:* Check circuit breaker.

### IV. PROBLEM Controller fails to operate properly in automatic (AUTO) mode.

*CAUSE:* Day Wheel not properly programmed.

*SOLUTION:* Check Setting and Operation Instructions for programming day wheel.

*CAUSE:* Auto-Off-On knob not set properly.

*SOLUTION:* Turn Auto-Off-On knob to auto position.

*CAUSE:* Switch adjustment needed.

*SOLUTION:* Remove controller face from enclosure after disconnecting power to unit. The switch adjustment screw is located on the switch cover. A clicking of the switch should be heard when the switch arm is slowly pulled back at the halfway point between the edge of the time dial and the far edge of the timing pin. With a small screwdriver, tighten the screw clockwise to cause the switch to activate sooner. If switch is activating sooner than desired, turn adjustment screw counter-clockwise slightly.

*CAUSE:* Switch contacts or relay worn out.

*SOLUTION:* Replace switch or relay (see parts list), ensuring that the controller is properly rewired. **NOTE:** A nut driver tool is available to assist in removing black retainer nuts.

Should the above troubleshooting tips fail to correct the problem you may be having, please consult your local K-Rain® distributor for service or replacement.

## WARRANTY

K-Rain® products carry a “Limited Warranty” for two years from the date of purchase. K-Rain® will repair or replace (at the option of K-Rain®) the product or any part of the product that is found to be defective as to workmanship or material. This warranty does not extend to damage to a K-Rain® product resulting from misuse, neglect or abuse, normal wear and tear, or accident, to exterior appearance or color or due to improper installation.

This warranty extends only to an original user of a K-Rain® product.

In no event shall K-Rain® be liable for incidental or consequential damages. All implied warranties are limited in duration to one year following date of purchase. Some states do not permit the exclusion or limitation of incidental or consequential damages or of implied warranties. Therefore, the above exclusions or limitations may not apply to you.

If a defect arises in a K-Rain® product within the two year warranty period, you should promptly contact your K-Rain® installer, distributor, or K-Rain® Manufacturing Corporation at 1640 Australian Avenue, Riviera Beach, Florida 33404.

Please allow up to 4 weeks for completion of repairs or replacement and return of the product. If a product is replaced, the replacement product is covered only for the remainder of the original warranty period dating from the purchase of the original product.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. If you have any questions concerning the warranty or its application, please write to K-Rain® Manufacturing Corporation, 1640 Australian Avenue, Riviera Beach, Florida 33404, Attn: Product Manager.



**K-Rain Manufacturing Corp.**

1640 Australian Avenue

Riviera Beach, FL 33404

561.844.1002 800.735.7246

561.842.9493 FAX

[www.krain.com](http://www.krain.com)

© K-Rain Manufacturing Corp.

AN ISO 9001 CERTIFIED COMPANY

20005109 Rev. 2 Printed in the USA