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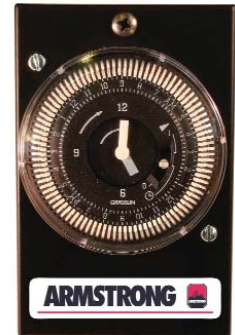
INSTALLATION AND OPERATING INSTRUCTIONS 24-HOUR TIMER and AQUASTAT CONTROL ACCESSORY

TIMER APPLICATION

The Armstrong 24-hour timers provide On/Off pump control according to preset operating times in order to increase comfort and improve the overall efficiency of domestic hot water re-circulation systems. The 24-hour timers are designed only for use with specified Armstrong Astro series wet rotor circulators installed in indoor hot water re-circulation applications.

Typical timer applications will cycle the pump at preset times, allowing the user to select operation of the circulating pump during high peak usage periods in order to decrease the delivery time to outlet fixtures and reduce wasted water.

The timer control is programmable to ¼ hour intervals within a 24-hour time frame utilizing a user friendly analog clock timer with hour and minute hands, two directional arrows, and AM/PM time setting.



AQUASTAT APPLICATION

An optional aquastat is available for constant circulation applications to maintain temperature between 85°F and 105°F (29°C and 41°C). The Armstrong aquastat control accessory is designed for use with Astro Series wet rotor circulators in potable hot water re-circulation installations.

The aquastat control automatically turns the circulator on when the temperature in the hot water line falls below approximately 85°F (ON condition - for example when there is low demand on the hot water supply). The control turns it off again when the temperature exceeds 105°F (OFF condition - as in the case of periods with high demand).



TIMER AND AQUASTAT APPLICATION

The 24-hour timer and aquastat can also be used together giving a comprehensive time and temperature actuated pump control in a domestic hot water re-circulation system. Typical application of the timer and aquastat combination will circulate water only when both time and temperature ON conditions are initiated.

TIMER FEATURES



- Easy to install and program
- Time actuated 24-hour on/off pump control
- Hour and minute time setting with AM/PM function
- Manual override switch modes
- Rugged construction - steel enclosure
- Clear plastic cover for dust and moisture protection of the clock face
- Designed specifically for hot water re-circulation applications
- UL Listed

AQUASTAT FEATURES



- Easy to install
- Temperature actuated pump control
- Environmentally sealed enclosure
- Surface sensing through snap acting bimetallic disc
- UL Listed

24-HOUR TIMER

TECHNICAL DATA

Description:	24-Hour Timer	Power Consumption:	120 V, 0.5 W
Application:	Time actuated On/Off pump control	Supply Voltage:	110-120 VAC, 60 Hz
Shortest Switching Interval:	¼ hour (15 minutes)	Terminals:	¼" spade terminals
Manual Switch Modes:	"Timer", "ON" Override, "OFF" Override	Weight:	Approximately 3 oz.
Ambient Temperature Range:	-40°F to 180°F (-40°C to 82°C)		

TIMER INSTALLATION

WARNING:

Electrical shock hazard - Verify that the electrical rating of the device matches the values shown on the nameplate of the circulator.

All electrical work should be performed by a qualified electrician in accordance with the latest edition of the National Electric Code, local codes and regulations. Failure to follow these instructions could result in serious injury, death and/or property damage.

Note: Steps 1 & 3 apply to retrofit installations.

1. Disconnect the electrical supply to the circulator
Note: Numerical component designations included in Steps 2 through 10 refer to circulator and timer components shown in Fig. 1.
2. Unfasten the mounting screw (4A) and remove the terminal box cover (3).
3. Disconnect motor leads from the power supply.
4. Unfasten the mounting screw (4B) on the timer box cover (10) and detach it from the base (8).
5. Remove the lock nut (5A) from the threaded fitting (6) on the timer box base (8).
6. Attach the timer base (8) to the circulator terminal box (2) by inserting the threaded fitting (6) through the opening on the side of the terminal box base.
7. Fasten the lock nut (5A) on the end of the threaded fitting (6) to securely attach the timer base (8) to the terminal box (2).
8. Connect terminal box lead wires (black, white and green) to the timer unit and the power supply (as shown in Fig. 2).
Note: Lead Wiring Specification - Minimum, 6" (152 mm) long, 14 AWG, rated minimum 140°F (60°C).
 Provided with R/C crimp connectors for attachment to the ground.
9. Re-attach the timer box cover (10) using the mounting screw (4B). Insure that all lead wires are inside the timer assembly.
10. Close the terminal box cover (3) by fastening the mounting screw (4A).
11. Program the timer according to instructions provided on page 4.
12. Connect the unit to electrical supply.
13. Start the circulator.

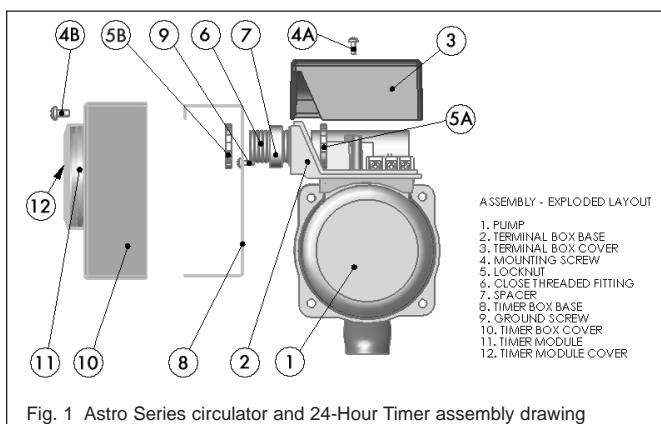


Fig. 1 Astro Series circulator and 24-Hour Timer assembly drawing

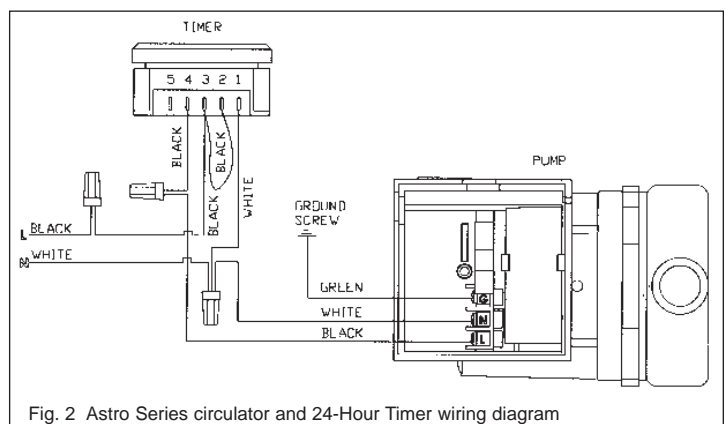


Fig. 2 Astro Series circulator and 24-Hour Timer wiring diagram

AQUASTAT CONTROL ACCESSORY

TECHNICAL DATA

Description: Aquastat (thermostatic) switch
 Type: Surface sensing, snap acting bimetallic disc
 Enclosure: Environmentally sealed
 Switch Modes*: 105 ± 5°F (40 ± 2°C) pump switches OFF
 85 ± 6°F (29 ± 3°C) pump switches ON
 Contact Position: Normally open
 Mounting: 1/2": Clip-on type for 5/8" O.D. system piping size (i.e., 1/2" I.D. copper tubing or 3/8" steel pipe)
 3/4": Clip-on type for 7/8" O.D. system piping size (i.e., 3/4" I.D. copper tubing or 1/2" steel pipe)
 May be mounted on either the inlet or outlet piping of the circulator.
 Lead Length: 14" (356 mm)

*Temperatures indicated are at pipe surface

AQUASTAT INSTALLATION

1. Follow Steps 1, 2 and 3 in the Timer Installation section
2. The aquastat control is a surface temperature sensing device that must be in contact with the system piping to operate properly. Separate models include clip-on mounts for 3/4" (7/8" O.D.) and 1/2" (5/8" O.D.) copper tubing. (See Fig. 3)
3. Connect the black, green and white lead wires according to the wiring diagram (Fig. 4)
Note: Lead Wiring Specification - Minimum, 6" (152 mm) long, 14 AWG, rated minimum 140°F (60°C). Provided with R/C crimp connectors for attachment to the ground.
4. Close the terminal box cover and fasten the screw

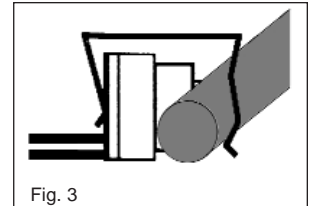


Fig. 3

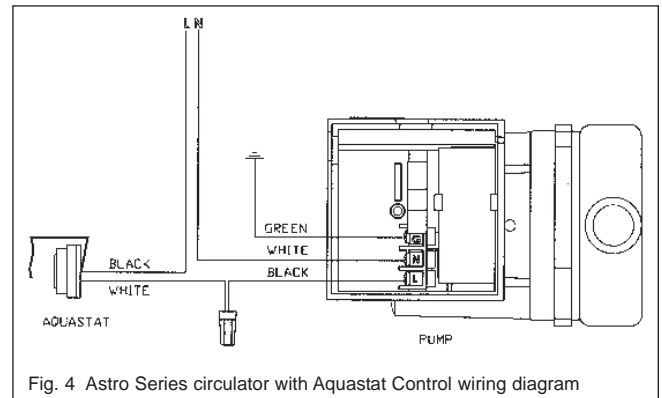


Fig. 4 Astro Series circulator with Aquastat Control wiring diagram

TIMER and AQUASTAT INSTALLATION

Follow the installation steps in both the Timer and Aquastat installation instructions and refer to Fig. 5 for the wiring connections.

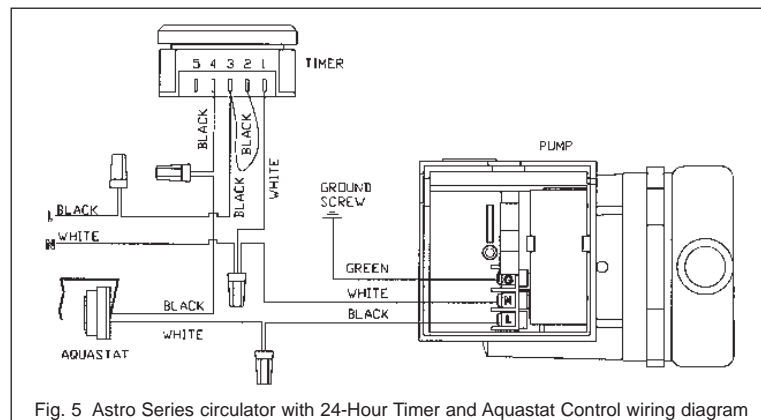


Fig. 5 Astro Series circulator with 24-Hour Timer and Aquastat Control wiring diagram

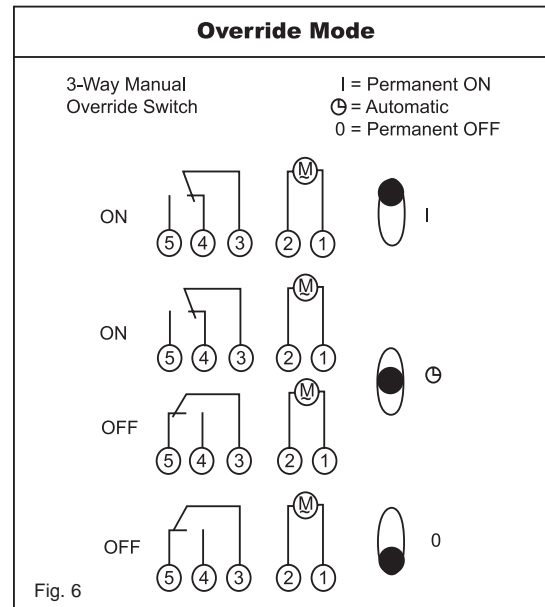
TIMER PROGRAMMING with MANUAL OVERRIDE SWITCH

Automatic Mode

In order to operate the time switch in the automatic mode, the manual switch must be in the center position. (See Fig. 6)

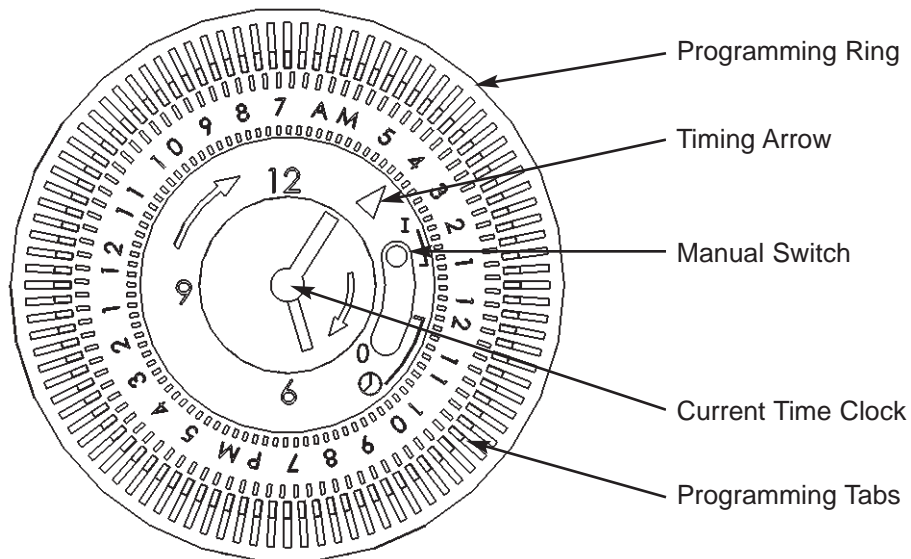
Manual Mode

With the manual switch selector lever the selected programs can be overridden. In the lower position, marked "O", terminals 3 and 5 are permanently closed. In the upper position, marked "I", terminals 3 and 4 are permanently closed. (See Fig. 6)



TIMER PROGRAMMING

1. Set the current time by turning the programming ring clockwise until the timing arrow points to the current time of day.
2. Restore power to the circulator and set the manual switch on the timer dial to the "ON" position ("I").
3. Set the required "ON/OFF" times by pushing the programming tabs to the outer position for "ON" time intervals. For "OFF" ("O") operation keep the programming tabs in the inner position.
4. Set the manual switch to the center position, between the "I" and "O" on the timer dial in order to cycle the pump according to the programming tab settings. The pump will run continuously when the switch is set to "I" (ON) position. The "O" (OFF) position of the switch will shut the circulator off at all times.
5. In the event of power outage, the timer must be adjusted for the correct time of day after power is restored. Note: The 24-hour timer requires manual resetting for daylight savings time.



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