102-498

Instruction Sheet

Plumb n' Plug "00" Series Cartridge Circulators

SUPERSEDES: January 3, 2014 EFFECTIVE: June 1, 2014

Plant I.D. 001-4222

Application:

The Taco Plumb n' Plug (PNP) "00" Series circulators are designed to increase comfort and conserve water and energy by decreasing the delivery time of hot water to outlet fixtures. An average residence can save up to 25 gallons of water per day, 9,000 gallons a year. A 6 foot line cord is pre-wired on all PNP models providing an easy installation. Simply plumb-it-in then plug-it-in.

Pump Control Options:

1. The basic PNP with line cord is designed for constant circulation where the pump runs 24 hours a day.
2. An optional aquastat kit (#563-2) can be added to control pump operation to maintain water temperature between 95˚F – 115˚F.

   Two automatic timer options are available to control pump operation and increase total energy savings.
3. A 24 hour/15 minute interval analog timer controls pump operation for the same time settings every day, usually early morning and early evening.
4. The digital 7 day programmable timer can be set for up to 8 different on/off and day/time settings to match homeowners' weekly schedules and maximize energy savings.

Benefits:

- **Water Conservation:** The average residence can save up to 25 gallons of water per day, 9000 gallons per year.
- **Comfort and Convenience:** Hot water is always available in seconds.
- **Efficiency:** 24 hour analog timer can be set to control daily pump operation and increase energy savings. 7 day digital timer allows for different settings each day to match homeowner's weekly schedule, for even greater convenience and savings.
- **Reliability:** Unique cartridge design runs quietly and is easy to replace.

Sizing:

- 003-PNP should be used when the total run of pipe (supply and return) is under 200 feet of ¾" pipe.
- 006-PNP should be used when the total run of pipe (supply and return) is from 200 to 400 feet of ¾" pipe.

Suggested Plumbing Installation Procedure:

WARNING: Do not use in swimming pool or spa areas; pump has not been investigated for this application.

WARNING: In the event the retaining screws have been pulled out of the housing, DO NOT replace them. Use of any other screw may short out the stator windings, creating a risk of electrical shock.

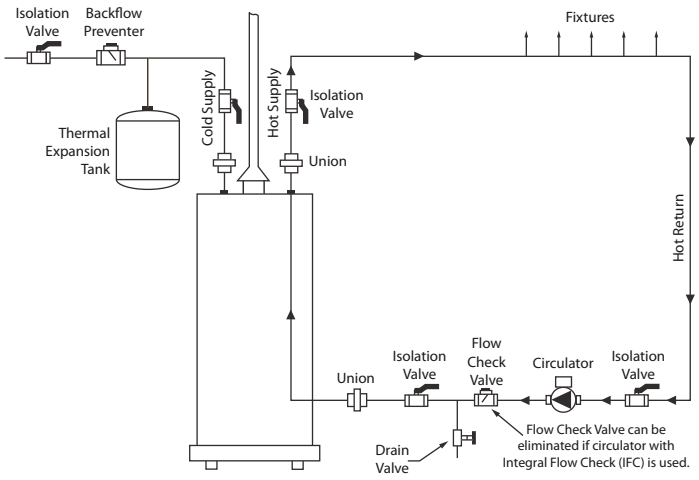
CAUTION: When installing electrical connections, do not apply mechanical loads to the capacitor box; otherwise, retaining screws may be pulled out of the housing, making circulator unusable.

CAUTION: 1. The addition of petroleum based fluids or certain chemical additives to systems utilizing TACO equipment voids the warranty.
2. Use supply wires suitable for 90°C – ATTENTION: Employer des fils d alimentation adequats pour 90°C.

1. Install the PNP circulator and plumbing components as indicated in the Installation Diagram. **DO NOT PLUG IN CIRCULATOR UNTIL SYSTEM IS FILLED WITH WATER AND PURGED.**

WARNING: Do not run the circulator dry! Premature failure of circulator may result. Before starting the circulator, be sure to fill the system completely with water and fully purge all air from the lines.

Installation Diagram



2. Open cold water supply and fill system completely. Open fixture at highest system point to purge air from the lines.
3. When system is filled and purged, close all fixtures and close isolation valve between the water heater and the circulator.

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A Taco resource – saving product

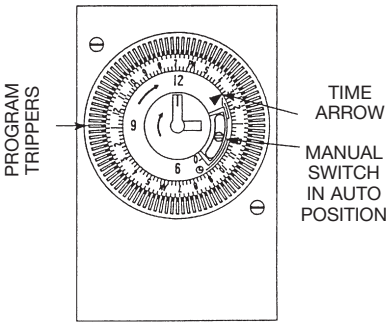
4. Open drain cock valve between the water heater and the circulator. Drain water to a bucket or floor drain until all air is purged and water is clear. Close drain cock valve.
5. Plug in the PNP circulator and set Manual Operation switch to **ON (I)**. Run circulator for 10 minutes to fully purge the circulator cartridge of air and ensure bearings are lubricated.
6. Use the following programming instructions to set the clock timer.

Analog 24 Hour Timer Programming:

1. Set clock to the exact time of day by turning the outer black ring clockwise to move the hour/minute hands to the correct position. Pay special attention to the white arrow pointing to the correct **AM/PM** time in the 24 hour outer ring.
2. Set the desired **ON/OFF** times by pushing the trippers away from the clock face for **ON** operation. Leave the trippers toward the clock face for **OFF** operation. Each tripper represents a 15 minute interval.
3. Set switch in the middle position ◷ for automatic operation.

Analog Timer Manual Switch Settings:

1. Up = On, Constant Circulation I
2. Middle = Automatic Operation ◷
3. Down = Off O

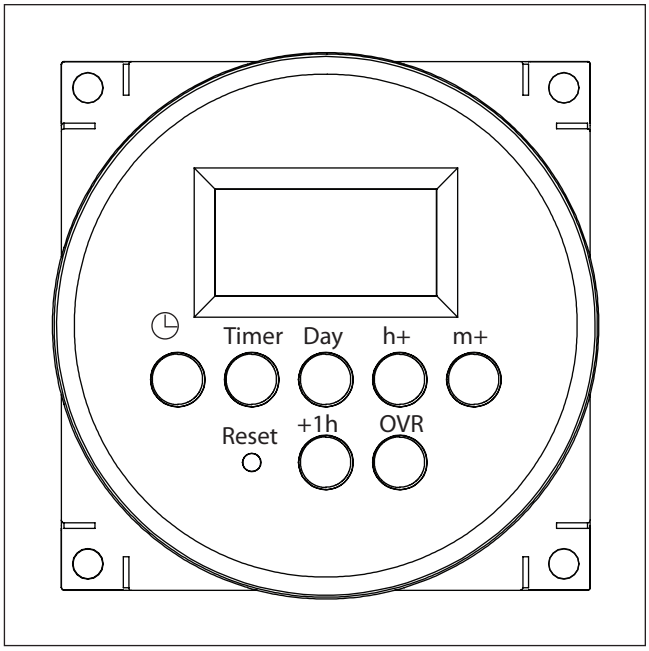


Analog Timer Diagram

Digital 7 Day Programmable Timer:

The Plumb n' Plug (PNP) digital timer features a large LCD display with user friendly keys for setting time and run programs. An internal re-chargeable battery holds programmed settings for up to 2,500 hours during power outages.

Note: Although the Plumb n' Plug digital timer contains some degree of spike and electrical noise protection, as with all electronic devices, these units can be affected by electrical noise. It is recommended that they be powered from a voltage source that has no switching devices or inductive loads connected.



Setting the Time of Day

Follow this procedure to set the time of day and day of the week.

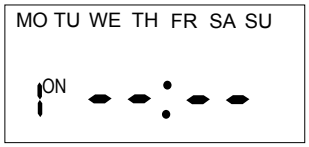
1. Press and release the **Reset** button with a blunt object to reset the unit. The timer screen flashes.
2. Press and hold ◷ and **h+** simultaneously to access the **12:00 AM** screen.
3. Take one of these actions.

If..	Then...
Your time zone currently is in Daylight Savings Time,	Press the +1h button. Go to step 4.
Your time zone is not in Daylight Savings Time	Go to step 4 to set the current time.

4. Press and hold ◷ and press **h+** repeatedly until you advance to the current hour.
5. Press and hold ◷ and press **m+** repeatedly until you advance to the current minute.
6. Press and hold ◷ and press **Day** repeatedly until you advance to the current day.

Programming Events

To set ON/OFF event pair, set ON event and then repeat procedure to set OFF event. The timer enables up to 7 ON/OFF event pairs.



1. Press the **Timer** button. Dashed lines appear to indicate no event is set for event 1.
2. Press **Day** to select the days of the week for the ON event. **NOTE:** To set the ON event:

ON a Specific Day	Select: The desired day
Every Day of Week	Select: **MO, TU, WE, TH, FR, SA, SU**
Every Weekday:	Select: **MO, TU, WE, TH, FR**
Every Weekend:	Select: **SA, SU**
Monday through Saturday	Select: **MO** through **SAT**
Monday, Wednesday, Friday	Select: **MO, WE, FR**

3. Press **h+** to scroll to the desired hour for ON event.
4. Press **m+** to scroll to the desired minute for the ON event.
5. Press **Timer** to advance to the OFF event screen.
6. Press **Day** to select the days of the week for the OFF event.
7. Press **h+** to scroll to the desired hour for the OFF event.
8. Press **m+** to scroll to the desired minute for the OFF event.

Take one of these actions.

If...	Then...
You need to program another ON/OFF event pair,	Press **Timer** to advance to the next event ON screen and repeat steps 2 through 8.
All the required ON/OFF events are programmed,	Press ◷ to return main screen. The procedure is complete.

NOTE: If events include or intersect with each other, each ON/OFF event can be independently executed at the setpoint.

NOTE: If an ON event and OFF event occur at the same time, the timer will run the OFF event.

Daily Operation

Below is an overview of the different operation modes for FM1D14.

Mode	Timer Display	Description
Auto ON	MO TU WE TH FR SA SU OVR AUTO ON 08:35 +1h AM OFF PM	Appears when an ON setpoint has been triggered
Auto OFF	MO TU WE TH FR SA SU OVR AUTO ON 08:35 +1h AM OFF PM	Appears when an OFF setpoint has been triggered
OVR ON	MO TU WE TH FR SA SU OVR AUTO ON 07:00 +1h AM OFF PM	Indicates relay has been overridden to ON status
OVR OFF	MO TU WE TH FR SA SU OVR AUTO ON 08:30 +1h AM OFF PM	Indicates relay has been overridden to OFF status

NOTE: To execute an ON/OFF status override, press the **OVR** button on the timer to override an ON or OFF status. The override remains active until the next programmed event.

Modifying an Event

Follow this procedure to review or modify an event.

1. Press Timer to scroll to ON or OFF event you want to modify.
2. Take one of these actions.

If you want to modify the...	Then...
Days of the week for ON/OFF event,	Press **Day** repeatedly to scroll to desired days of the week Go to step 3.
Hour for ON or OFF event,	Press **h+** to scroll to desired hour Go to step 3.
Minute for ON or OFF event,	Press **m+** to scroll to desired minute Go to step 3.

3. Repeat steps 1 and 2 as needed to modify additional events.
4. When all the desired events are modified, press ◷ to confirm event settings and return to the time of day screen.

Deleting an Event

Follow this procedure to delete an event.

1. Press **Timer** to scroll to ON or OFF event you want to delete.
2. Press **OVR** to delete the event. Dashed lines appear in place of the time to indicate the event is deleted.
   NOTE: If necessary, repeat this procedure to delete both ON and OFF settings for the event.
3. When the modifications are complete, press ◷ to return to time of day screen.

Retrieving an Event

The timer enables deleted events to be retrieved. All deleted events can be retrieved until a new event is programmed in place of event.

1. Press Timer to scroll to the ON/OFF event you previously deleted. Dashed lines appear in place of the event time.
2. Press OVR to retrieve deleted event. The event ON or OFF time replaces the dashed line indicating that the event is retrieved.
   NOTE: If necessary, repeat this procedure to retrieve both ON and OFF settings for the event.
3. When the modifications are complete, press ◷ to return to time of day screen.

Adjusting Daylight Saving Time

Press **+1h** button to add the Daylight Saving Time hour to the current time or remove the hour to return to standard time.
NOTE: Do not perform this procedure if your area does not use Daylight Saving Time.

Resetting the Timer

In case of a timer malfunction or to delete all previous settings, the unit can be reset.
To reset the timer, use a blunt pointed object to press **Reset** as shown in Figure 4 on the next page. The timer resets and **deletes all the settings in the unit.**

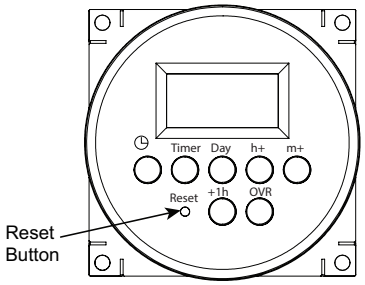


Figure 4. Reset Button

Overview of Power Loss Functions

In the event of a power loss, the digital timer does the following:

- Relay will be in the OFF state
- Upon power restore, relay will go to the current programmed state

Notes:

LIMITED WARRANTY STATEMENT

Taco, Inc. will repair or replace without charge (at the company's option) any Taco 00 Series circulator or circulator part which is proven defective under normal use within three (3) years from the date of manufacture.

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local Taco stocking distributor or Taco in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local Taco stocking distributor or Taco. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any Taco product or part not installed or operated in conformity with Taco instructions or which has been subject to misuse, misapplication, the addition of petroleum-based fluids or certain chemical additives to the systems, or other abuse, will not be covered by this warranty.

If in doubt as to whether a particular substance is suitable for use with a Taco product or part, or for any application restrictions, consult the applicable Taco instruction sheets or contact Taco at (401-942-8000).

Taco reserves the right to provide replacement products and parts which are substantially similar in design and functionally equivalent to the defective product or part. Taco reserves the right to make changes in details of design, construction, or arrangement of materials of its products without notification.

TACO OFFERS THIS WARRANTY IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS IS IN EFFECT ONLY FOR THE DURATION OF THE EXPRESS WARRANTY SET FORTH IN THE FIRST PARAGRAPH ABOVE.

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TACO WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS OR ANY INCIDENTAL COSTS OF REMOVING OR REPLACING DEFECTIVE PRODUCTS.

This warranty gives the purchaser specific rights, and the purchaser may have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or on the exclusion of incidental or consequential damages, so these limitations or exclusions may not apply to you.

Do your **best work.**

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