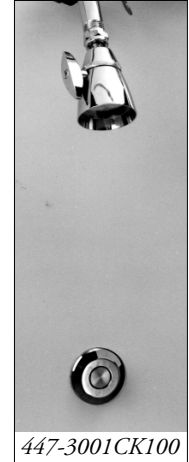


DESCRIPTION

HydroGuard ESP pushbutton shower systems rely on Piezo sensor technology to deliver tempered water to a shower for a predetermined length of time. The shower turns on when the bather depresses the pushbutton, and automatically shuts off when the bather depresses the pushbutton again, or when the maximum shower time has been reached. The shower time is field adjustable from 0 to approximately 7 minutes.

All showers are supplied complete with the Piezo pushbutton assembly, transformer (plug in or box, as specified), solenoid valve, control box and mounting hardware.

The following instructions will serve as a guide when installing the Powers ESP pushbutton operated showers. As always, good safety practices and care are recommended when installing electrical equipment. We suggest that you follow the procedures outlined. If additional assistance is required, please call the Powers Application Department.



INSTALLATION

Prior to Installation

WARNING:

- 24V AC Step down transformer must be used for single and group shower applications.
- Do not allow power transformer wires to touch during wiring, since this could cause permanent damage to the transformer. To avoid this, do not supply power to, or plug in, the transformer until all other wiring is complete.
- Flush water lines thoroughly before connecting solenoid valve.
- All electrical wiring and plumbing should be done in accordance with national/local codes and regulations.
- We recommend the use of stainless steel screws for installation of all components.

TOOLS REQUIRED:

- Slotted and Phillips screwdrivers
- Drill
- Pipe wrenches
- Pipe dope/sealing compound

Powers Series 447 Pushbutton Showers are supplied with a Brass Solenoid Valve, into which tempered water should be connected. A Powers thermostatic mixing valve, such as the HydroGuard Series 430, will ensure safe comfortable water is supplied to your shower system.

Step 1: Determine Shower Component Layout

Several components, including the pushbutton sensor assembly, control box, solenoid and transformer, will need to be installed to ensure proper operation of the pushbutton shower system.

The first location to be identified should be the pushbutton assembly, which must be mounted on the wall. Once the pushbutton location is determined, you can decide on the location of the other components—the control box will need to be within 4' of the pushbutton sensor assembly, and the solenoid is typically located within 2' of the control box. You may use 4 conductor flat

telephone cable and connectors to locate the components as far as 100' away from the sensor.

The solenoid valve should be located as close as possible to the showerhead it is servicing. Access to the valve must be provided for maintenance and servicing.

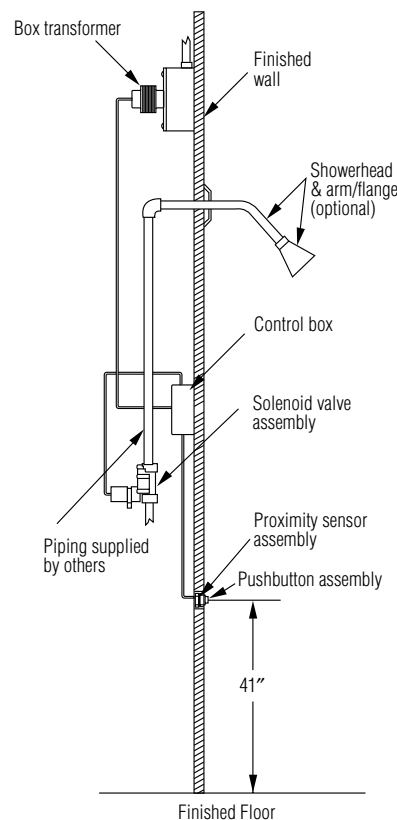
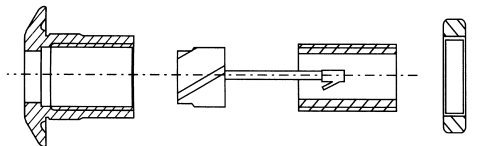
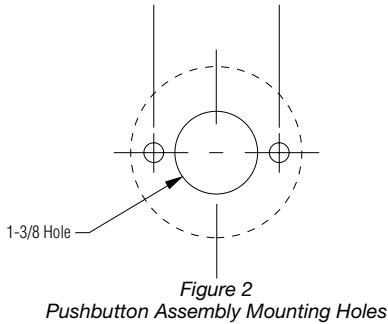


Figure 1
Typical Shower Installation

INSTALLATION, CONTINUED

Suggested height for mounting of the pushbutton assembly for adult men and women is approximately 41"... adjustments to height should be made for adolescents and children. Measure the proper height from the floor... mark pushbutton location on shower wall with a pencil. Refer to *figure 2* and drill a hole, from the shower side of the wall: for routing of the sensor cord and mounting of the pushbutton assembly.

Insert the pushbutton assembly in the hole from the shower side. Secure in place with the nut from the rear.



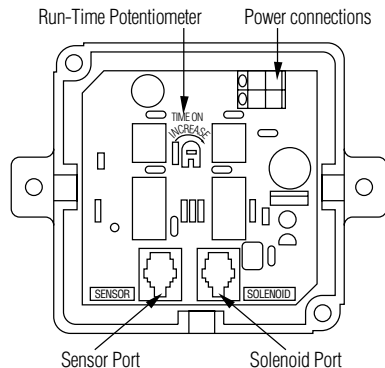
Step 2: Install Solenoid

To facilitate servicing, you may wish to install a service stop directly upstream of solenoid. Prior to installing solenoid, flush lines to be sure supply water is free from grit and sand. Solenoid end connections are 1/2" NPT.

Using thread sealant on male threads only (do NOT use teflon tape), connect supply line to solenoid, checking to be sure the flow is in the proper direction (flow arrow is marked on solenoid body). Connect outlet side of solenoid to showerhead piping.

Step 3: Install Control Box

Keeping in mind that the solenoid must be within 2' and sensor must be within 4' of the control box (unless you're using extra cable and connectors), determine the location for mounting. Using the base of the box as a template, drill two small holes for mounting of the box. Install box.



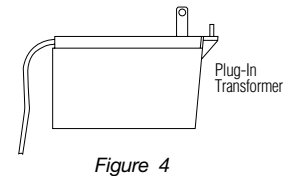
Step 4: Transformer Installation

Transformer can be remotely located (in the chaseway, closet or in ceiling, etc.) and can typically power up to eight shower solenoids. You may wish to install a remote shut-off switch to shut down power to showers during maintenance, cleaning or repair.

For single shower applications, connect supply wires to Control Box by routing cord through back hole in control box, inserting one wire into each of the two power connectors and tightening screws on wire connections. Insert the plug from the solenoid into right receptacle of the control box (note that the word "solenoid" is next to the receptacle) and the plug from the proximity sensor into the other receptacle (marked "sensor"). Be sure to plug the appropriate plug into the marked receptacles for proper operation. Replace cover onto Control Box.

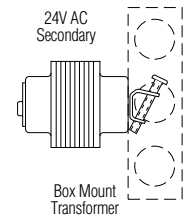
Plug In Transformer

See *figure 4*. This type of transformer is designed to be plugged into a 110V AC wall outlet. Transformer is supplied with a 10' wire, which can be shortened or lengthened to meet installation requirements using 22 gauge bell wire. Connect the feed wires to the screw terminals on the secondary side of the transformer. To avoid permanent damage to the transformer, sensor or solenoid valve, do not plug transformer into outlet until all wiring has been completed!



Box Mount Transformer (see figure 5).

This type of transformer is designed to be mounted on an 110 VAC supply electrical junction box ("J" box) should be mounted inside chase wall or above ceiling). Run wires from secondary side of transformer to control box enclosure. To avoid permanent damage to the transformer, sensor, or solenoid valve, do not supply power to primary side of transformer until all wiring has been completed.



Step 5: Start Up

Supply power to transformer. Turn on water supply and depress pushbutton. Water should come through showerhead. Once water is flowing, check all connections for leaks.

NOTE: To reduce the chance of repeat cycling and minimize the chance of water hammer, the pushbutton proximity sensor is programmed for a 5 second "block out," so that the sensor ignores repeat pushbutton activity. That is, sensor will not respond to commands within 5 seconds of another.

Green lights next to the sensor ports indicate a signal has been sent by the sensor, while red lights next to the solenoid valve ports indicate solenoid activation.

Step 6: Shower Time Adjustment

Shower is activated by depressing the pushbutton, which invades the field of the proximity sensor and activates the solenoid. Shower is deactivated (turned off) by depressing the pushbutton a second time (after at least 5 seconds have elapsed) or allowing the shower to reach its maximum run time. Maximum runtime can be set from 0 to approximately 7 minutes.

INSTALLATION, CONTINUED

The Control Box is factory set to provide the maximum shower time of approximately 6 minutes. If showertime adjustment is required, it is easily adjusted as follows.

Remove the cover from the Control Box. You'll notice a potentiometer in the middle area of the board, labeled "Time On" with an arrow indicating which way to turn to increase the run time. (See figure 6.) Using the small screwdriver provided, rotate the potentiometer in small increments: clockwise to increase the showertime, counterclockwise to decrease the showertime. After each adjustment, check to see if showertime is acceptable.

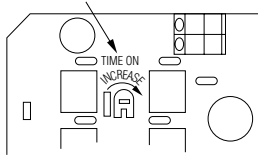


Figure 6

Make adjustments carefully. Over-adjustment can damage potentiometer.

OPERATION

1. Depression of the pushbutton activates the sensor, sending a signal to the control box, which activates the solenoid. The open solenoid then allows tempered water to flow to the showerhead.
2. When the bather depresses the pushbutton again, the water flow stops automatically. If the bather does not depress the pushbutton again, the shower will only continue until the preset shower time, at which time the flow of water stops to prevent water waste. It is then ready for the next user, or for reactivation by the present user.

NOTE: The pushbutton has been programmed to ignore repeat cycling commands within 5 seconds. That is, the shower cannot be shut off within 5 seconds of activation, nor can the shower be turned on within 5 seconds of shut off, regardless of the number of times the pushbutton is depressed. This "5 second block out" is designed to reduce the chance of repeat shower activation and shower misuse.

MAINTENANCE AND TROUBLESHOOTING

To ensure trouble-free performance, routine maintenance is required.

- Check all electrical connections, making sure they are free of corrosion and securely connected.
- Check solenoid valve to ensure that it is operating properly and is free of dirt and lime build up.
- Check to be sure the tempered water being supplied to the shower is at the proper temperature for safe comfortable bathing.

If the shower does not function properly:

- Check to see if transformer feed wires are securely attached to terminals at modular junction box and at transformer.
- Check to see if green LED on control box lights when button is pressed.

- Check to see if there is power to the transformer, using a voltmeter. If power is going into the transformer but not coming out of the transformer, replace transformer.
- If transformer is functioning properly and power is being supplied, but LED still doesn't light after sensor activation, replace sensor assembly.

1. If sensor light is lit upon sensor activation, but no water comes from showerhead...

- Check to be sure supply line is open and water is being supplied.
- Check to see whether solenoid is functioning. If system still fails to operate, repair or replace solenoid assembly (see solenoid repair information below).
- Maximum run time may have been reached. If additional shower time is desired, reset run time potentiometer in control box or instruct bather to depress pushbutton after 5 second delay.

2. If water is on all the time, regardless of sensor activation, unplug solenoid from control box. If water continues to run, the problem may be rectified by checking the following:

- Check for debris and/or lime build-up within the solenoid, which is preventing it from closing. Dismantle, clean and flush the solenoid valve (see solenoid maintenance and repair section following).

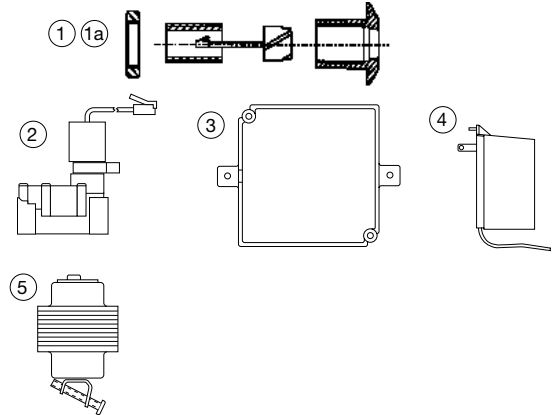
If, after unplugging solenoid from control box, water stops, problem is electronic. Check to see if power wires are incorrectly connected within control box. Refer to instructions above and rewire, checking electrical connections.

3. For multiple shower applications utilizing the central control box, troubleshooting is easy...

- a. If controller is not functioning...
 - Green light indicates whether the control box is receiving power... if light is not on, check power to transformer. If no power from transformer to control box, replace transformer.
- b. If controller is powered but inputs (sensors) are not functioning,
 - Red lights next to the solenoid ports indicate whether solenoids have been activated... if lights are not on, check to be sure modular plugs are fully inserted into receptacles. Also check to be sure they are plugged into correct ports.
- c. If inputs are functioning but outputs (solenoid valves) are not activating,
 - Green lights next to the sensor ports indicate whether signal has been received from the sensor. If lights are not on, check to be sure modular plugs are fully inserted into receptacles, both at controller and at solenoid valves. Next, controller might need resetting... turn off power to controller, wait 15 seconds and turn power back on. If still not working, micro-processor is faulty... notify manufacturer.
- d. If Sensor is activated at one fixture, but different fixture responds, inputs and outputs are not matched. Refer to figure 3 and be sure appropriate sensors and solenoids are in corresponding receptacles (#1 sensor activates #1 solenoid, etc.).

PARTS LIST

No.	Description	Part No.
1	Piezo Sensor	444-260
1A	Pushbutton Assembly w/Switch	
	Wall Thickness: .063" - .25"	444-274A
	Wall Thickness: .25" - 1.5"	444-274G
	Wall Thickness: 1.5" - 4.5"	444-274D
	Wall Thickness: 4.5" - 6.5"	444-274E
	Wall Thickness: 6.5" - 8.5"	444-274F
2	Solenoid Assembly	444-175
3	Control Box	444-161
4	Plug In Transformer	444-118
5	Box Transformer	444-119



CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.) For more information: www.wattsind.com/prop65



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 USA Phone: 1.800.669.5430 • Fax 1.847.824.0627
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