POWERS™

TECHNICAL INSTRUCTIONS

HydroGuard® ES Series Emergency Tempering Valves with Dual Internal Cold Water By-Pass Model ES150

Form TI ES150 v3

DESCRIPTION

The Series ES HydroGuard thermostatically blends hot and cold water to deliver tepid water to emergency fixtures, quickly compensating for temperature variations due to changes in inlet temperature or pressure. Powers' exclusive Dual Internal By-Pass* ensures cold water flow in the event of a valve failure or loss of hot water.

** US Patent 6,575,377*

WARNING: TO ENSURE THE ACCURATE AND RELIABLE OPERATION OF THIS PRODUCT, IT IS ESSENTIAL TO:

- Properly size each valve based on the individual application.
- Properly design the recirculation system to minimize pressure and temperature variations.
- Conduct an weekly maintenance program to ensure proper operation of all critical components.

FAILURE TO COMPLY WITH PROPER INSTALLATION INSTRUCTIONS COULD CONTRIBUTE TO VALVE FAILURE, RESULTING IN INJURY OR DEATH.

SPECIFICATIONS

Operating

Maximum Pressure . . . . . 125 psi (861.25 kPa)
Maximum Hot Water Temperature . . . . . 180°F (82° C)
Approach Temperature . . . . . 15°F (8° C)
Temperature Adjustment Range . . . . . 60° F (15° C) - 95° F (35° C)
Factory Set Temperature . . . . . 85°F (29° C)
Compliance . . . . . ANSI Z358.1 1998

Note: Set point cannot be less than the cold water temperature. For best operation, hot and cold water should be at least 15°F (8°C) from desired set point.

SIZING

Table 1, Capacity Tables, present the HydroGuard discharge capacity in gpm and lpm for various pressure differentials (the difference between the lowest inlet pressure and the discharge pressure at the HydroGuard).

Table 1- Capacity Tables

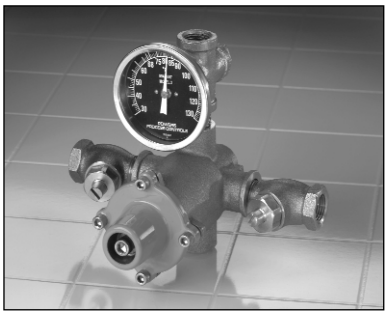
Flow Capacity in US gpm at 50-50 Mixed Ratio

Model	Min. Flow Rate	Pressure Drop Across Valves in psi							
		5	10	20	30	40	45	60	75
ES150	1.0 gpm	4	6	9	14	16	17	20	23

Flow Capacity in lpm at 50-50 Mixed Ratio

Model	Min. Flow Rate	Pressure Drop Across Valves in kPa						
		34	69	138	207	310	414	517
ES150	2.7 lpm	15.2	22.7	34.1	53.0	64.4	75.8	87.1

NOTE: By-Pass flows will vary based on inlet supply conditions including water pressure and cold water temperature.



Model ES150

OPERATION

Typical Flow

Hot and cold water supplies enter HydroGuard at indicated ports, *(see Figure 3)* then flow past their respective plug and seats. Next, hot and cold water flow is directed to the mixing chamber where the thermostatic actuator is located.

Temperature adjustment screw moves the actuator to determine the discharge temperature.

With a rise in discharge temperature due to pressure or temperature fluctuation on the inlet, the actuator expands, decreasing flow of hot water. The reverse occurs with a drop in discharge temperature.

- Cold water supply failure – causes actuator to expand allowing the motor to close the hot water seat.
- Hot water supply pressure failure – causes actuator to contract opening cold water bypass ports. Secondary bypass mechanism opens upon failure of actuator or hot water.

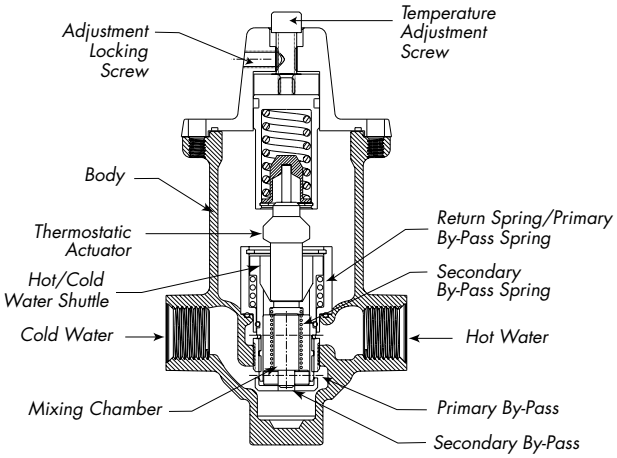
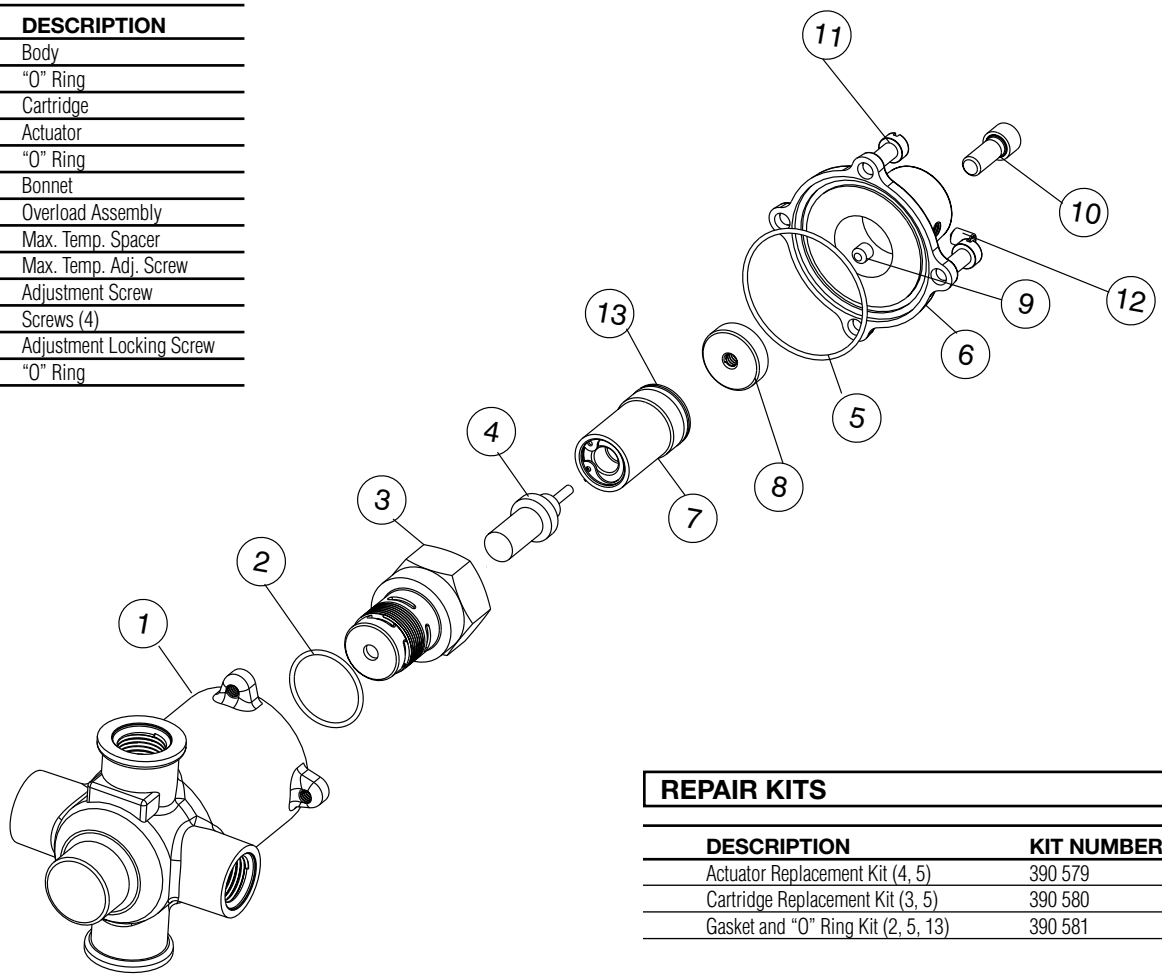


Figure 3

PARTS LIST

TAG	DESCRIPTION
1	Body
2	"O" Ring
3	Cartridge
4	Actuator
5	"O" Ring
6	Bonnet
7	Overload Assembly
8	Max. Temp. Spacer
9	Max. Temp. Adj. Screw
10	Adjustment Screw
11	Screws (4)
12	Adjustment Locking Screw
13	"O" Ring



REPAIR KITS

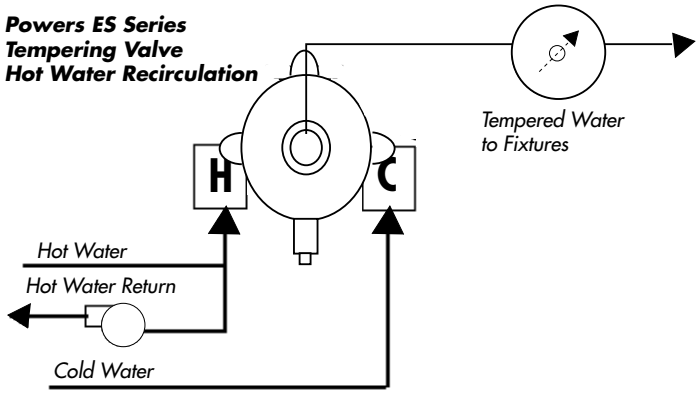
DESCRIPTION	KIT NUMBERS
Actuator Replacement Kit (4, 5)	390 579
Cartridge Replacement Kit (3, 5)	390 580
Gasket and "O" Ring Kit (2, 5, 13)	390 581

RECIRCULATION

The mixing valve should be mounted as close as possible to the fixture(s) that it serves.

If the valve is some distance from the hot water source, recirculation may be required to keep the hot water supply within specified limits.

CAUTION: Use care in installing the cold water line such that it does not pass through areas with high ambient temperatures or become exposed to direct sunlight. Cold water must be less than set point.



INSTALLATION INSTRUCTIONS

1. **IMPORTANT: Flush all piping thoroughly before installing.**
2. Locate the HydroGuard as close as possible to the fixture being supplied.
3. **CAUTION:** When the HydroGuard supplies tempered water to self-closing and/or solenoid valves, provide a shock absorber (Powers Part No. 460-353) on the discharge line. This protects the HydroGuard thermostatic motor from damage by water shock waves generated by the quick closing valves.
4. **Consult proper medical/safety authorities for the optimum temperature for your application. Before use, check for proper discharge temperature. Reset if necessary. Valve is preset for 85°F (29°C).**

ADJUSTMENT AND TESTING

1. Replace adjustment screw and set to proper temperature (85°F typical.) Open all fixtures and verify outlet temperature is adequate.

Consult proper medical/safety authorities for optimum temperature for your application. Before use, check for proper discharge temperature. Reset if necessary.

2. Verify adequate flow rate from fixtures.
3. Close the cold water checkstop. Verify that flow shuts down immediately.
4. Open cold water checkstop, and close hot water checkstop. Verify adequate flow from fixture(s).
5. Open hot water checkstop, verify temperature returns to set temperature.
6. Record test data on maintenance tag which should be attached to the valve.

Contact factory for high temperature readjustment procedure.

OPERATION OF EMERGENCY VALVES AND FIXTURES SHOULD BE TESTED WEEKLY PER ANSI Z358.1 1998.

MAINTENANCE AND TROUBLESHOOTING

What to look for if:

- **The flow of water is less than desired.**
  a. Stop valves or supply to HydroGuard not fully open.
  b. Clogged checkstop strainer screens.
  c. Accumulation of lime deposits around valve seats.
  d. Low supply pressures or unusual supply temperatures.

- **The flow of water is completely shut off.**
  a. Stop valves or supply valves are completely closed.
  b. Valves downstream from HydroGuard fully closed.
  c. Loss of cold water supply pressure.

DISASSEMBLE AND REPAIR INSTRUCTIONS

Due to the safety nature of this product, we recommend removal of the valve and a full inspection of all components whenever the valve is disassembled for any reason.

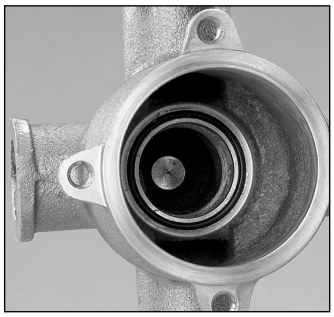
- **Disassembly:**
  1. Close supply valves and/or checkstops.
  2. Remove bonnet screws, bonnet, and actuator.
  3. Loosen cartridge with a 1-3/8" deep socket and remove.
  4. Remove the “O” ring from the back of the body.

- **Inspection:**
  1. Inspect the body for any damage, deposits, or pitting - clean or replace as necessary.
  2. Check the cartridge for any damage, deposits or pitting. Ensure the shuttle is free by placing the cartridge on a hard surface and pressing on the shuttle with your thumb. Shuttle should move smoothly approximately 1/8" with approximately 20 lb. pressure. Press on the bypass poppet with a ball point pen or similar instrument to ensure it moves freely and smoothly. Poppet should move about 1/16" with less than 1 lb. force. Do not attempt to disassemble the cartridge. If any component appears stuck, work or damaged, replace the entire cartridge.
  3. Check the actuator for proper operation. Make and note the entire length of the actuator or mark the stem with a piece of tape at room temperature. Place the actuator in hot water (105-110°F) for one (1) minute. Actuator stem should extend at least 1/8" longer than when at room temperature. *Note:* This measurement must be made quickly as the actuator will cool rapidly.*

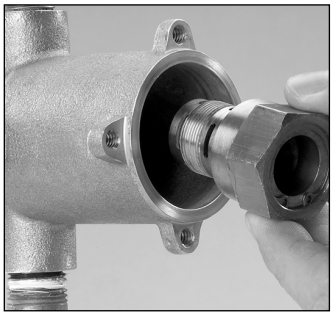
CALIFORNIA PROPOSITION 65 WARNING

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

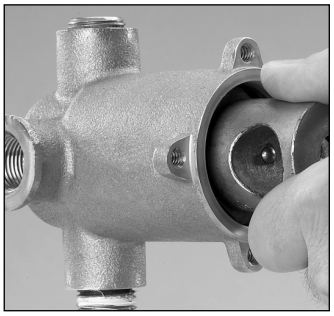
REASSEMBLY



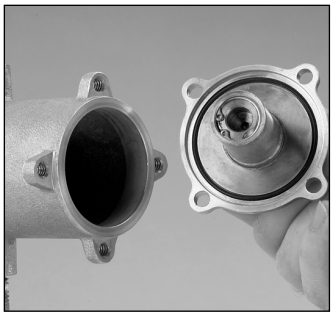
Lubricate cartridge “O” ring and place in groove in back of the body.



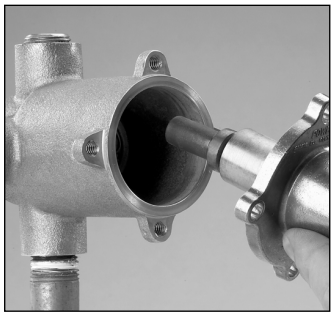
Thread the cartridge into the body.



Hand tighten with 1-3/8” deep socket until snug.
Do not overtighten.



Lubricate the bonnet “O” ring, and place in groove or bonnet.
CAUTION: If the overload assembly has been removed from the bonnet ensure that high temperature limit stop with set screw is in place before assembling the valve.



Place actuator into overload assembly and install bonnet onto valve with four (4) screws.
Adjust and test per instructions on page 3.

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