

# POWERS

A WATTS INDUSTRIES CO.

## TECHNICAL INSTRUCTIONS

431/432/433/434 Hydroguard  
Master Mixing Valves

Form TI430 v3

### DESCRIPTION

The Series 430 Hydroguard thermostatically blends hot and cold water to deliver mixed water at the desired temperature, compensating for temperature, pressure, and flow changes in the supply lines, and reduces flow upon water supply failure. The delivery is adjustable between 40°F and 160°F (4-71°C).

#### WARNING: TO INSURE 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 annual maintenance program to insure proper operation of all critical components

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



### SPECIFICATIONS

Maximum Pressure Differential	100 psi (689 kPa)
Maximum Static Pressure	125 psig (861.25 kPa)
Maximum Hot Water Temperature	200°F (93°C)
Minimum Hot Water Supply Temp	15°F (8°C) Above Set-Point
Temperature Adjustment Ranges*	40°-160°F (4°-71°C)
Listing	ASSE 1017
Certified	CSA B125

\* **Note:** Low limit cannot be less than the cold water temperature. For best operation, hot water should be at least 15°F (8°C) above desired set point.

### SIZING

Table 1, Capacity Tables, present the Hydroguard discharge capacity in GPM and l/m for various pressure differentials (the difference between the lowest inlet pressure and the discharge pressure at the Hydroguard).

**Table 1- Flow Capacity in US gpm at 50-50 Mixed Ratio**

Model	Min Flow Rate*	Min Flow to ASSE 1017	Pressure Drop Across Valves in psi							
			5	10	20	30	45	60	75	100
431	0.5 gpm	4.0 gpm	7.5	11	16	20	25	29	33	38.5
432	0.5 gpm	7.0 gpm	15	20	30	36	45	52	58	67
433	0.5 gpm	10.0 gpm	24	35	51	64	80	93	105	123
434	0.5 gpm	15.0 gpm	40	55	82	101	125	146	165	190

\* Minimum flow when Hydroguard is installed at or near hot water source with recirculated tempered water with continuously operating recirculating pump.

**Flow Capacity in lpm at 50-50 Mixed Ratio**

Model	Min Flow Rate*	Min Flow to ASSE 1017	Pressure Drop Across Valves in kPa							
			34	69	138	207	310	414	517	689
431	1.89 lpm	15 lpm	28.4	41.6	60.6	76.0	94.6	109.8	125.0	145.7
432	1.89 lpm	26 lpm	56.8	76.0	113.5	136.2	170.3	197.0	219.5	253.5
433	1.89 lpm	38 lpm	1.5	2.2	3.2	4.0	5.0	5.9	6.6	7.8
434	1.89 lpm	57 lpm	2.5	3.5	5.2	6.4	7.9	9.2	10.0	12.0

\* Minimum flow when Hydroguard is installed at or near hot water source with recirculated tempered water with continuously operating recirculating pump.

### OPERATION

#### Typical Flow

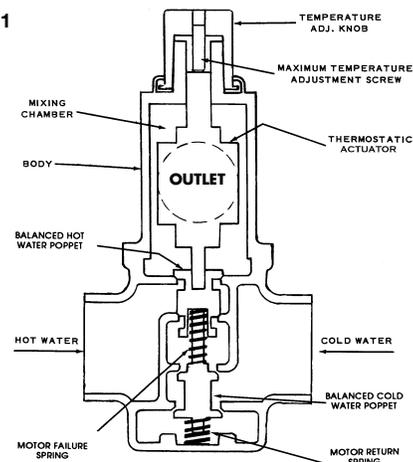
Hot and cold water supplies enter Hydroguard at indicated ports, (see Figure 1) then flow past their respective balanced poppet plug and seats. Next, hot and cold water flow is directed to the mixing chamber where the thermostatic actuator is located.

Temperature adjustment knob 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.

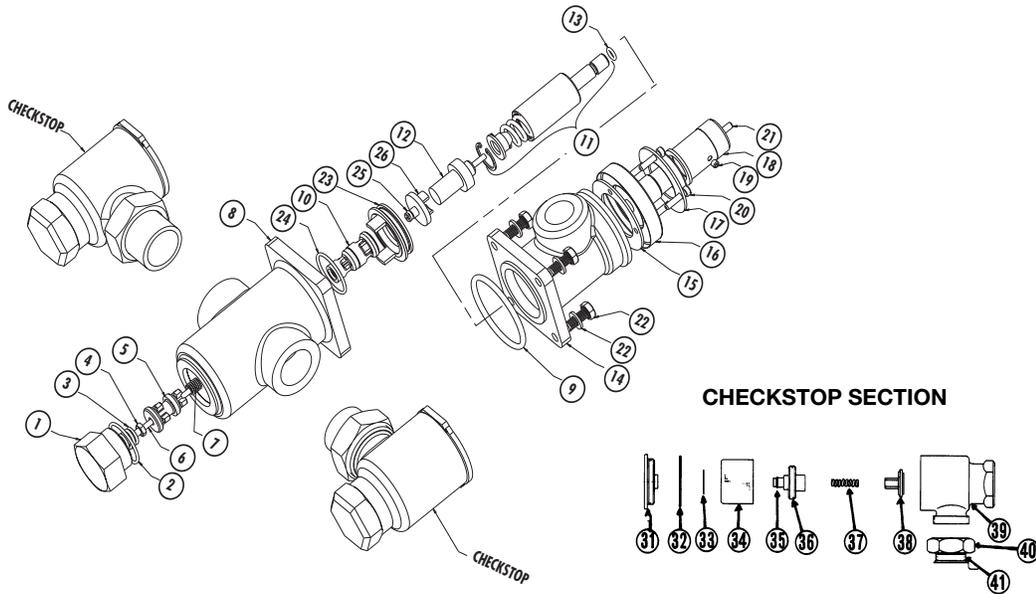
- Cold water supply failure – causes actuator to expand allowing the motor to seat hot water poppet.
- Hot water supply pressure failure – causes actuator to contract allowing return spring to seat cold water poppet.

Figure 1



**PARTS LIST**

NO.	NAME	FINISH	431	432	433	434
1	Body Cap	Rough Bronze Polished Chrome	390-334 390-335	390-334 390-335	390-336 390-337	390-336 390-337
2	"O" Ring	N/A	084-020	084-020	047-132	047-132
3	Return Spring	N/A	390-155	390-155	390-162	390-162
4	Nut	<i>Use Mixing Valve Repair Kit</i>				
5	Cold Water Poppet	<i>Use Mixing Valve Repair Kit</i>				
6	Cold Water Stem	<i>Use Mixing Valve Repair Kit</i>				
7	Motor Failure Spring	N/A	390-248	390-048	390-201	390-092
8	Lower Body	N/A	N/A	N/A	N/A	N/A
9	"O" Ring	N/A	047-035	047-036	047-040	047-047
10	Hot Water Poppet	<i>Use Mixing Valve Repair Kit</i>				
11	Overload Assembly	N/A	N/A	N/A	N/A	N/A
12	Thermal Actuator	<i>Use Thermal Actuator Repair Kit</i>				
13	"O" Ring	N/A	047-022	047-020	047-020	047-020
14	Motor Housing	N/A	N/A	N/A	N/A	N/A
15	Gasket	N/A	390-243	390-051	390-198	390-095
16	Motor Housing Cap	Rough Bronze Polished Chrome	390-225 390-226	390-144 390-145	390-178 390-179	390-156 390-157
17	Adjustment Knob Retainer	Rough Bronze Polished Chrome	390-254 390-255	390-256 390-257	390-258 390-259	390-256 390-257
18	Adjustment Knob	Rough Bronze Polished Chrome	390-340 390-341	390-342 390-169	390-342 390-169	390-342 390-169
19	Set Screw Kit	N/A	430-017	430-016	430-016	430-016
20	Screw	Rough Bronze Polished Chrome	030-068 030-068G	030-068 030-068G	030-109 030-109G	030-061 030-061G
21	Set Screw	N/A	430-020	390-166A	390-166A	390-166A
22	Bolts	Rough Bronze Polished Chrome	080-015 080-015	080-015 080-015	080-015 080-015	080-015 080-015
23	Funnel	N/A	390-006	390-009	390-503	390-506
24	Funnel "O" Ring	N/A	800-064	084-041	084-043	084-042
25	"O" Ring	N/A	047-002	047-020	084-029	084-014
26	Adapter	N/A	390-001	390-010	390-504	390-505



NO.	NAME	FINISH	431/432	433/434
31	Bonnet*	Rough Bronze Polished Chrome	230-267 230-268	230-287 230-288
32	"O" Ring	n/a	047-029	047-130
33	Gasket	n/a	230-083	230-083
34	Screen	n/a	230-116	230-104
35	"O" Ring	n/a	047-009	047-009
36	Stem	Rough Bronze Polished Chrome	230-269 230-270	230-289 230-290
37	Spring	n/a	230-127	230-103
38	Poppet Assembly	n/a	230-271	230-293

NO.	NAME	FINISH	431/432	433/434
39	Body	Rough Bronze Polished Chrome	n/a n/a	n/a n/a
40	Nut	Rough Bronze Polished Chrome	230-117 230-118**	230-096 230-097**
41	Tail Piece	Rough Bronze Polished Chrome	230-119 230-120**	230-094 230-095**

\* If Replacing either bonnet or stem on old style checks, you must replace both with new parts. Do not use the new bonnet with an old stem, or vice versa.  
 \*\* Available as complete body, nut and tail piece assembly only.

**REPAIR KITS (Repair Kit Parts)**

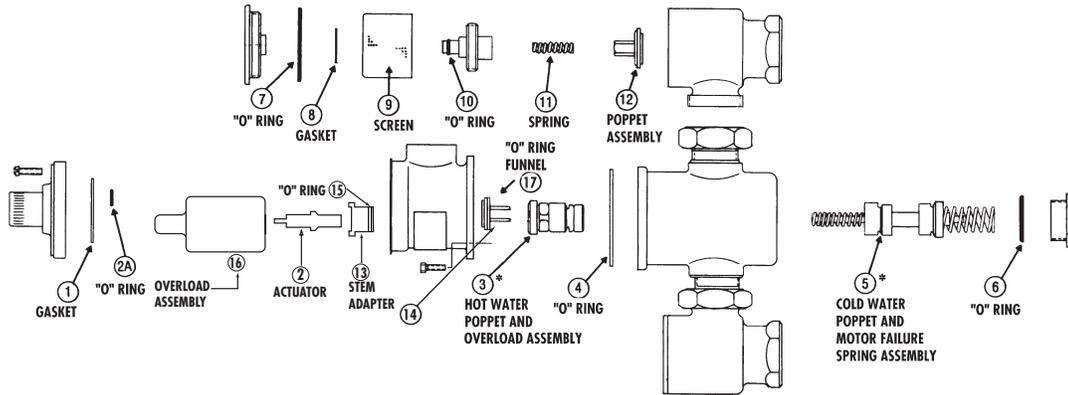


Figure 2

PART DESCRIPTION	REPAIR KIT INCLUDES: (Numbers below correspond with numbers in Figure 2)	431 Part No.	432 Part No.	433 Part No.	434 Part No.
Thermal Actuator	1, 2, 4, 13, 15	390-037	390-036	390-065	390-066
Strainer Replacement	7, 8, 9, and 10	230-134	230-134	230-136	230-136
Checkstop Replacement	7, 8, 10, 11, and 12	230-135	230-135	230-137	230-137
Gasket and Disc Replacement	1, 2A, 4, 6, 7, 8, 10, and 12	390-294	390-298	390-302	390-306
Mixing Valve Replacement	3, 4, 5, and 6	390-067	390-068	390-069	390-070
Upgrade Kits for Older Valves**	1, 2, 2A, 4, 13, 14, 15, 16, 17	390-016	390-017	390-511	390-512

Strainer and Checkstop Repair Kits contain parts for one (1) pair.  
 Repair Kits containing "O" Rings include silicone gel for use on "O" Rings during installation.  
 \*\* For valves shipped prior to 1-1-2001.

**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.  
 (Installer: California law requires that this warning be given to the consumer.)  
 For more information: [www.wattind.com/prop65](http://www.wattind.com/prop65)

**INSTALLATION INSTRUCTIONS**

- IMPORTANT:** Flush all piping thoroughly before installing.
- Valve should be installed close to the hot water supply and should easily be adjusted and repaired.
- Remove body screws to turn outlet to any of four positions. The Hydroguard body can be rotated to any position due to the union inlets. **Note: Make certain the body screws and unions are tightened securely to prevent leakage.**
- 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.
- Before use, check maximum discharge temperature. Reset if necessary.**

**OPERATION CHECK:**  
 After Hydroguard is installed, make certain the supply stop valves and strainers are free and clean and ready for operation by disassembling checkstops as shown in "Servicing", steps 1, 2, and 3.

**MAINTENANCE AND TROUBLESHOOTING**

**What to look for if:**

- The flow of water is less than desired.**
  - Stop valves or supply to Hydroguard not fully open.
  - Clogged checkstop strainer screens.
  - Accumulation of lime deposits around valve seats.
  - Low supply pressures or unusual supply temperatures.
- The flow of water is completely shut off.**
  - Stop valves or supply valves are completely closed.
  - Valves downstream from Hydroguard fully closed.
  - Loss of either hot or cold water supply pressure.

- Discharge temperature varies:**
  - Very large restriction in outlet flow.
  - Very large drop in inlet pressure.
  - Very large fluctuation of hot water supply temperature.
  - Worn valve seats.
  - Minimum flow requirement not achieved.

## SERVICING

**Note: Before disassembling, make certain both water supplies to the Hydroguard are shut off.**

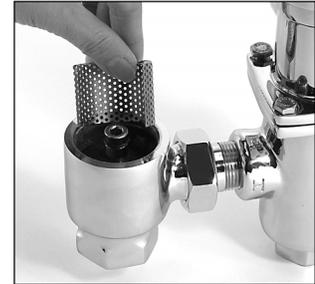
### CHECKSTOP DISASSEMBLY



Close both inlet checkstop valves by turning stop valve stem clockwise with 1/4" (6.4mm) allen key.



Remove bonnet with 2-1/4" (57mm) wrench or use a 3/4" socket wrench.



Lift out strainer screen (reassemble in reverse order).

### VALVE DISASSEMBLY



Remove thermal housing cap screws and lift out thermal element.



Lift out the adapter and hot water poppet.



Remove body cap with wrench to service cold water assembly. **NOTE: Cap is spring loaded. Remove with caution.**

### ADJUSTMENTS

#### Maximum Temperature Setting



#### Temperature Adjustment and Lock



#### Maximum temperature setting for 430 Series Valves:

1. Turn off re-circulation pump (if one is in the system).
2. Open up enough fixtures to meet minimum flow requirement of:
  - 431 = 4 gpm
  - 432 = 7 gpm
  - 433 = 10 gpm
  - 434 = 15 gpm
3. Loosen set screw on side of knob.
4. Turn maximum temperature screw counter-clockwise to full hot position.
5. Then start adjusting the screw clockwise to desired temperature.

Counter-clockwise adjustment: Mixes more hot water  
Clockwise adjustment: Mixes more cold water

**Note: Please allow valve temperature to settle in before making your next adjustment.**

6. When desired temperature is set, tighten set screw on side of knob.  
Turn re-circulation pump back on. Close open fixtures.

**NOTE: AFTER COMPLETING REPAIRS, CHECK MAXIMUM DISCHARGE TEMPERATURE (115°F [46°C]). RESET IF NECESSARY. WARNING: FAILURE TO PERFORM THIS OPERATION COULD RESULT IN UNSAFE DISCHARGE TEMPERATURE, WHICH MAY CAUSE INJURY OR DEATH.**

**POWERS**  
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