

POWERS

A WATTS INDUSTRIES CO.

TECHNICAL INSTRUCTIONS

431/432/433/434 Hydroguard
Master Mixing Valves

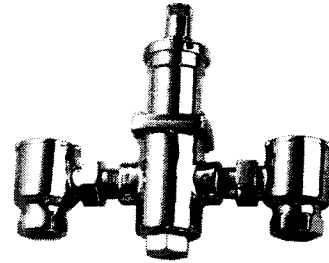
DESCRIPTION

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 Differential100 psi (689 kPa)
Maximum Static Pressure125 psig (861.25 kPa)
Maximum Hot Water Temperature200°F (93°C)
Minimum Hot Water Supply Temp	...15°F (8°C) Above Set-Point
Temperature Adjustment Ranges*40°-160°F (4°-71°C)
ComplianceASSE 1017, CSA B125 Certified

* 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	12.1

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

OPERATION

Typical Flow

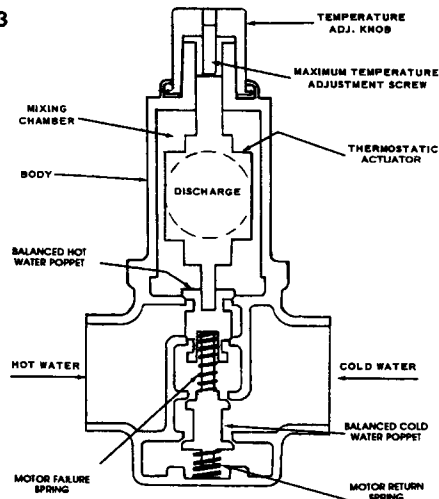
Hot and cold water supplies enter Hydroguard at indicated ports, (see Figure 3) then flow past their respective balanced poppet plug and seats. Next, hot and cold water flow is directed to the mixing chamber where the thermostatic actuator is located.

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.

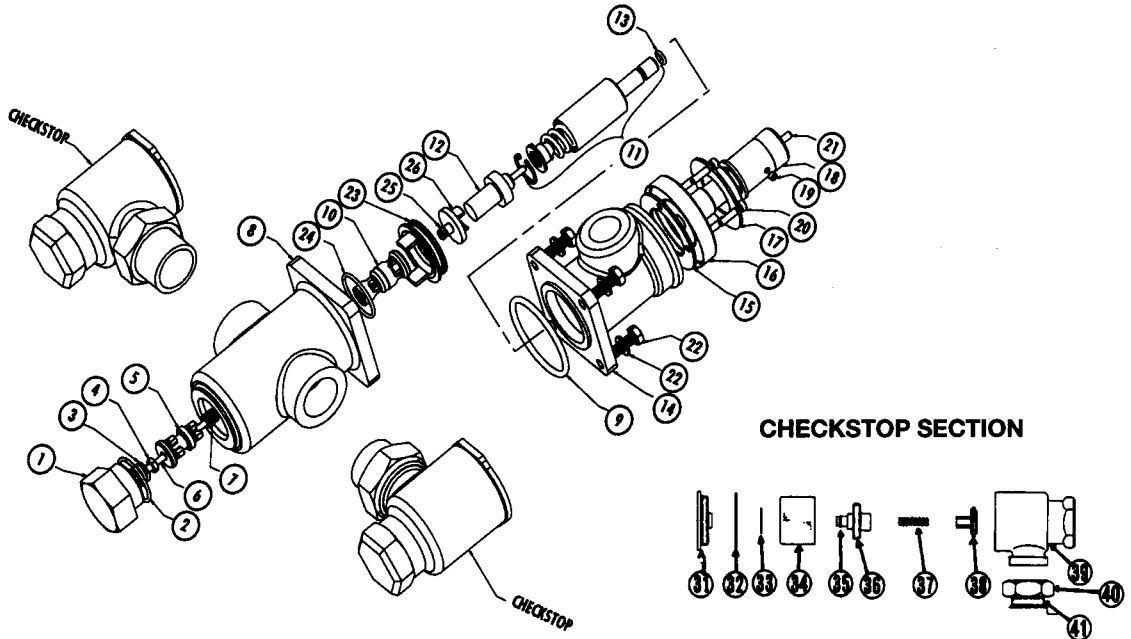
- Cold water supply failure – causes actuator to expand allowing the motor to seat hot water poppet.
- Hot water supply pressure failure – causes actuator to contract allowing return spring to seat cold water poppet.

Figure 3



PARTS LIST

NO.	NAME	FINISH	431	432	433	434
1	Body Cap	Rough Bronze	390-334	390-334	390-336	390-336
		Polished Chrome	390-335	390-335	390-337	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		
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		
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	390-225	390-144	390-178	390-156
		Polished Chrome	390-226	390-145	390-179	390-157
17	Adjustment Knob Retainer	Rough Bronze	390-254	390-256	390-258	390-256
		Polished Chrome	390-255	390-257	390-259	390-257
18	Adjustment Knob	Rough Bronze	390-340	390-342	390-342	390-342
		Polished Chrome	390-341	390-169	390-169	390-169
19	Set Screw Kit	N/A	430-017	430-016	430-016	430-016
20	Screw	Rough Bronze	030-068	030-068	030-109	030-061
		Polished Chrome	030-068G	030-068G	030-109G	030-061G
21	Set Screw	N/A	430-020	390-166A	390-166A	390-166A
22	Bolts	Rough Bronze	080-015	080-015	080-015	080-015
		Polished Chrome	080-015	080-015	080-015	080-015
23	Funnel		390-006	390-009	390-503	390-506
24	Funnel "O" Ring		800-064	084-041	084-043	084-042
25	"O" Ring		047-002	047-020	084-029	084-014
26	Adapter		390-001	390-010	390-504	390-505



CHECKSTOP SECTION

NO.	NAME	FINISH	431/432	433/434
31	Bonnet*	Rough Bronze	230-267	230-287
		Polished Chrome	230-268	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	230-269	230-289
		Polished Chrome	230-270	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	n/a	n/a
		Polished Chrome	n/a	n/a
40	Nut	Rough Bronze	230-117	230-096
		Polished Chrome	230-118**	230-097**
41	Tail Piece	Rough Bronze	230-119	230-094
		Polished Chrome	230-120**	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)

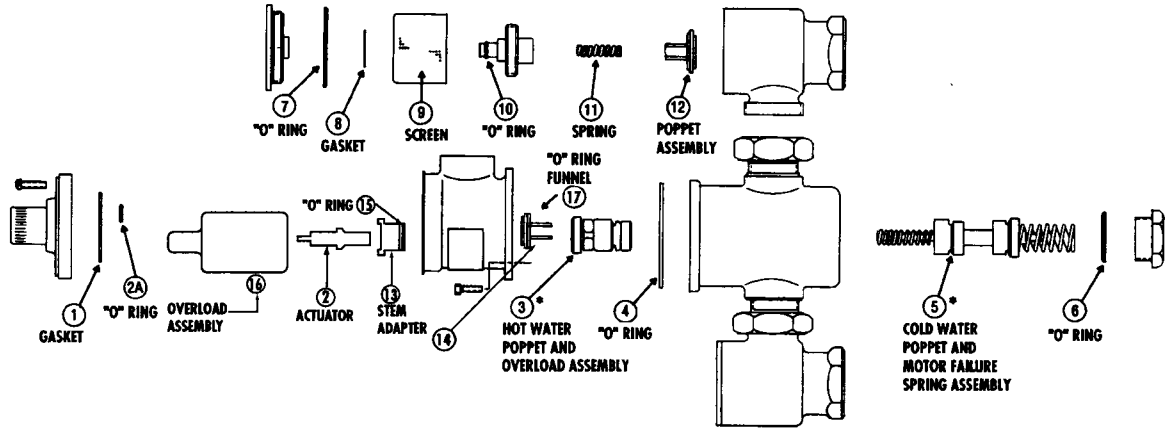


Figure 2

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.

INSTALLATION INSTRUCTIONS

- IMPORTANT:** Flush all piping thoroughly before installing.
- Except in applications where the valve is used as a primary mixer to feed a whole building, locate the Hydroguard as close as possible to the fixture being supplied to avoid waste of fuel and water.
- 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.

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.wattsind.com/prop65

MAINTENANCE AND TROUBLESHOOTING

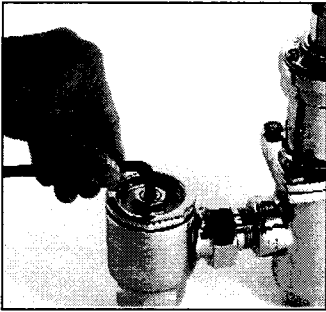
What to look for if:

- 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.

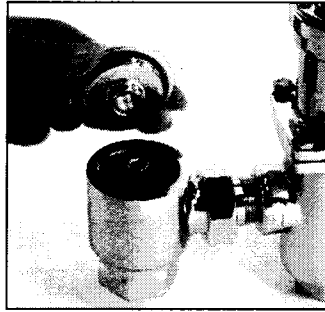
SERVICING

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

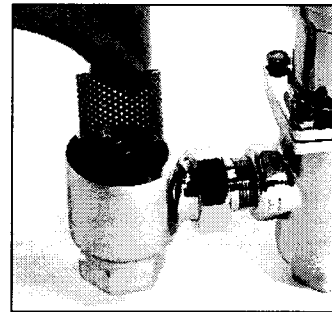
CHECKSTOP DISASSEMBLY



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

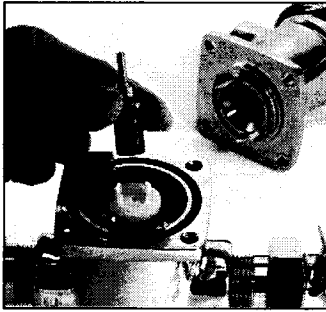


Remove bonnet with 2-1/4" (57mm) wrench or use a 3/4" socket wrench.

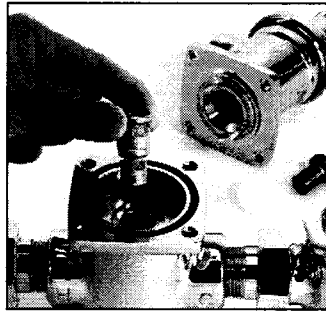


Lift out strainer screen (reassemble in reverse order).

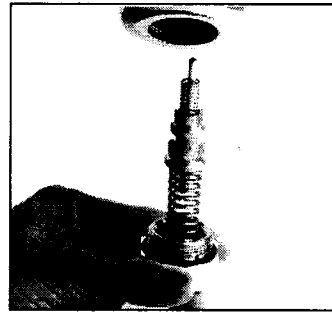
VALVE DISASSEMBLY



Remove thermal housing cap screws and lift out thermal element.



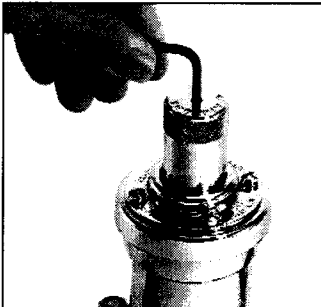
Lift out the adapter and hot water poppet.



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

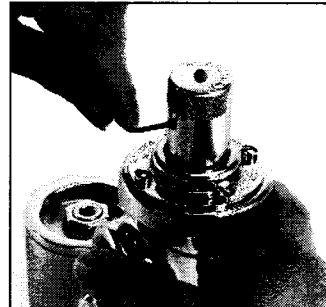
ADJUSTMENTS

Maximum Temperature Setting



To lower maximum temperature setting, turn adjustment knob to full hot position (counterclockwise). Insert hex key in adjusting screw as shown. Hold adjustment knob and turn adjusting screw until desired maximum temperature is obtained.

Temperature Adjustment and Lock



To vary discharge temperature, turn temperature adjustment knob. This knob may be locked in place by inserting a hex key inside opening and turning lock screw clockwise until tight.

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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