

## Circuit Solver® with Integrated Union (CSU) & Optional Check Valve

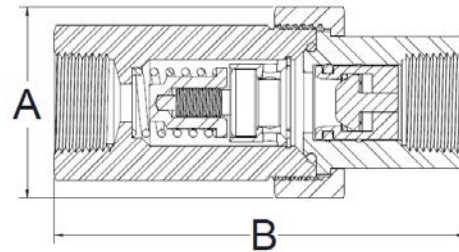
### SUBMITTAL

JOB:	ORDER NO:	DATE:
	SUBMITTED BY:	DATE:
UNIT TAG:	APPROVED BY:	DATE:
CITY:	ENGINEER:	BUILDING TYPE:
STATE:	CONTRACTOR:	CONSTRUCTION TYPE:
COMPLETION DATE:		

#### DESCRIPTION

Circuit Solver® is a thermostatic balancing valve that automatically and continuously adjusts flow to maintain the desired temperature in a domestic hot water supply line. Since the Circuit Solver® responds to water temperature to control the flow entering the recirculation line it eliminates the need to manually balance the system. The “CSU” version Circuit Solver® incorporates a union into the body of the valve and offers an optional check valve insert. The union uses an O-ring seal providing the advantage of a hand tightened leak free connection.

#### DIMENSIONS



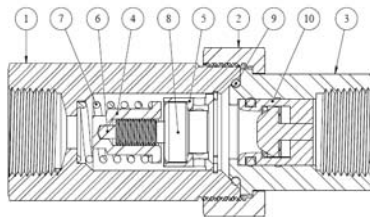
Model No.		Diameter (A)		Length (B)		Weight		C <sub>v</sub>		Max. Pressure		Max. Temp.	
		NPT	IN	MM	IN	MM	LBS.	KG	OPEN	CLOSED	PSIG	BAR	°F
CSU- ½ -XXX	1/2"	1.8	46	3.7	94	1.2	0.5	1.3	0.1	200	14	250	121
CSU- ½ -XXX-CV1								1.3	0.1				
CSU- ¾ -XXX	3/4"	2.0	51	4.3	110	1.9	0.9	1.8	0.1				
CSU- ¾ -XXX-CV1								1.8	0.1				
CSU-1-XXX	1"	2.5	64	4.7	120	3.1	1.4	3.3	0.1				
CSU-1-XXX-CV1								3.3	0.1				

#### Model Number Selection

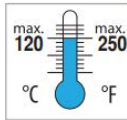
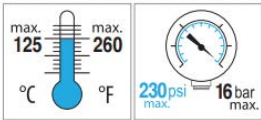
XXX refers to the desired closing temperature. When the water temperature drops below this point the Circuit Solver® will begin to open, allowing water to easily enter the return line. For example, if you want 120°F desired return temperature and the CSU is to be installed on a 3/4" line, the model number would be CSU-3/4-120. To add optional check valve insert -CV1 to the end of the model number. Ex. CSU-3/4-120-CV1

#### FLOW RATE CALCULATION USING “C<sub>v</sub>” FACTOR FOR WATER

$$GPM = C_v \sqrt{\Delta P} \qquad C_v = \frac{GPM}{\sqrt{\Delta P}} \qquad \Delta P = \left[ \frac{GPM}{C_v} \right]^2$$

MATERIALS		
		
ITEM	DESCRIPTION	MATERIAL
1	Valve Body	303 stainless steel
2	Union Nut	303 stainless steel
3	Threaded Insert	303 stainless steel
4	Valve Plug	303 stainless steel
5	Carrier	303 stainless steel
6	Piston	303 stainless steel
7	Spring	302 stainless steel
8	Thermal Actuator	303 stainless steel
9	O-Ring	Buna-N
10	Check Valve (optional)	Glass filled Noryl

Optional Check Valve	
<b>Features and Benefits</b>	
-100% factory tested drip tight operation	
-Snap fit design, no retainer needed	
-Extra low head loss and low cracking pressure	
-External O-ring in groove	
<b>Certification</b>	
-ANSI/NSF 61	
ITEM	MATERIAL
Cap	Glass filled Noryl
Guide	Glass filled Noryl
Plunger	Glass filled Noryl
Lip Spring	EPDM rubber
Spring	Stainless steel AISI 301
O-ring	EPDM rubber

Optional Check Valve Technical Data	
Medium: Clear water only Approximate Cracking Pressure: 0.29 psi	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Continuous</p>  </div> <div style="text-align: center;"> <p>Short-term (5 minutes max.)</p>  </div> </div>

### TYPICAL SPECIFICATION

- I. Furnish and install CIRCUIT SOLVER® as indicated on the plans. CIRCUIT SOLVER® shall be self-contained and fully automatic without additional piping or control mechanisms. Valve shall be a CIRCUIT SOLVER® as manufactured by ThermOmegaTech®, Inc., or equivalent.
  - A. CIRCUIT SOLVER® shall regulate the flow of recirculated domestic hot water based on water temperature entering the CIRCUIT SOLVER® regardless of system operating pressure. As the water temperature increases the valve proportionally closes dynamically adjusting flow to meet the specified temperature.
    1. The CIRCUIT SOLVER® never fully closes, even at the desired set point. There is always sufficient bypass flow back to the recirculating pump to prevent overheating or “dead heading” of the pump.
    2. CIRCUIT SOLVER® is set at the factory for the desired return temperature. No field adjustments. Several temperature set points are available.
- II. CIRCUIT SOLVER® body and all internal components are made with lead free materials with major components constructed of type 303 SS
  - A. CIRCUIT SOLVER® shall be rated to 200 PSIG maximum working pressure.
    1. All CIRCUIT SOLVER® shall be standard tapered female pipe thread, NPT.
  - B. All CIRCUIT SOLVER® shall be rated to 250° F (121.1°C) maximum working temperature.
  - C. Thermal actuator shall be spring loaded and self-cleaning, delivering closing thrust sufficient to keep orifice opening free of scale deposits.
- III. Installation of CIRCUIT SOLVER® shall be made by qualified tradesmen. Install CIRCUIT SOLVER® in each domestic hot water return piping branch beyond last hot water device in that branch.
  - A. Provide suitable line size isolation valves, unions, and strainer as indicated in piping detail shown on the drawings.
  - B. Provide suitable access panel as required in non-accessible ceilings and walls.
  - C. Pay close attention to flow arrow, especially with valves that have an integrated check valve.