Armstrong®

Rada 50R
Installation and Maintenance

Water Temperature Controls
Recirculation Systems
Thermostatic

This Rada 50R Valve has been supplied for this application based upon information provided to Armstrong at the time the order was placed.

This Rada 50R Valve is configured for use in a central pumped recirculation system and should be installed as per the drawing on page 5.

Rada 50R is **not** designed to deliver tepid water to emergency fixtures.

For further information, please call our technical department Toll Free at 1-888-HOT-HOSE.

Model No. **Rada 50R**

Serial No. _____

Ship Date: _____

ASSE 1017

CSA B125

C US

Thermostatic

Rada 50R

Rada Thermostatic Mixing Valve is designed specifically to be installed as the primary control valve within a pumped recirculation system. Capable of maintaining safe, accurate water temperatures during both peak and zero-demand “idling” periods. With a Rada 50R installed as the primary temperature controller within a pumped recirculation system, there will be a zero minimum blended water flow rate/draw-off requirement. The Rada 50R features a unique integral thermostatic return limiter that maintains recirculating water temperatures within the circuit. Thermostatic return limiters eliminate the requirement for a fitted aquastat and reduce cycling wear and tear on the circulating pump.

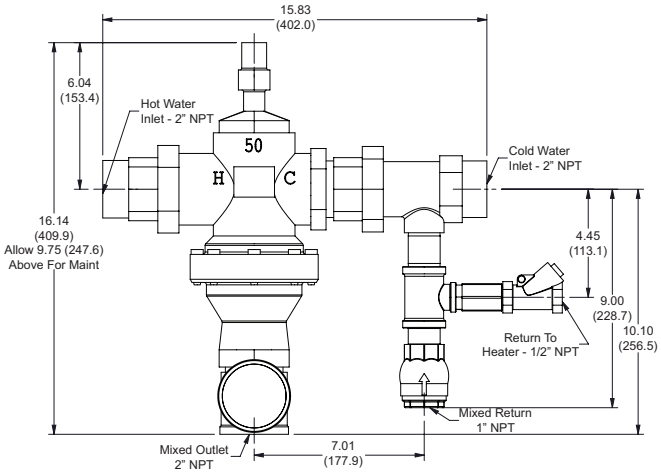
Operational Specifications

- Dual thermostatic elements provide redundancy in the event of individual thermostat failure
- Typical system temperature control +/-5°F
- Single temperature locking feature (removable key)

Technical Specifications

- 2’’ NPT inlets and 2’’ NPT outlets
- DZR brass/stainless steel construction
- Operating pressures
  - Maximum: 150 psi (10 bar)
  - Minimum: 10 psi (.7 bar)
- Maximum pressure drop 20 psi (1.4 bar)
- Maximum flow rate at 7.5 ft/sec (2.3 m/sec):
  - 73 gpm (276 lpm)
- Integral inlet check valves
- Integral thermometer
- Integral thermostatic return limiter
- ASSE 1017 and CSA B125 certified
- Shipping weight 45 lbs (20 kg)

For a submittal drawing, refer to:
D30966 Temps 105-114°F
D30967 Temps 115-125°F
D30968 Temps 126-135°F
D30969 Temps 136-144°F



Rada Thermostatic Mixing Valves (gpm)							
Model	Pressure Drop (psi)				Min. System Draw-off	Maximum Flow @7.5ft/sec. (2.3 m/s)	C_v
	5	10	15	20			
320R	8	11	13	15	0	11	3.4
425R	15	22	27	31	0	18	6.9
40R	36	51	62	72	0	41	16.0
50R	49	70	85	98	0	73	22.0

Rada 50R Components

Rada 50R is supplied with the following components:

Description	Part No.	✓
1 each Rada 50R Thermostatic Mixing Valve with integral inlet check valves and thermometer. (Supplied as checked)	D30966	
	D30967	
	D30969	
1” Mixed Return Check Valve	D10407	✓
1/2” Heater Return Check Valve	D7353	✓

The Rada 50R supplied with this I&M includes the following (checked) Thermostatic Element.

Part No.	System Temperature Range	Stamp Code	✓
D14796	Low 90 - 115°F (32 - 46°C)	2195	
D14797	Standard 115 - 135°F (46 - 57°C)	8883	
D14798	High Above 135°F (57°C)	8887	

Rada 50R supplied with this I&M included the following (checked) 1/2” Thermostatic Return Limiter.

Part No.	System Temperature Range	Stamp Code	✓
D33410	Below 120°F (49°C)	Low/Standard (L)	
D33411	Above 120°F (49°C)	High (H)	

Safety Warnings

The function of a Thermostatic Mixing Valve is to deliver water consistently at a pre-designated temperature.

Rada Thermostatic Mixing Valves are precision engineered to give continued superior and safe performance provided:

1. They are installed, commissioned, operated and maintained in accordance with the recommendations provided and accepted plumbing practices.

2. Periodic attention is given, as necessary, to maintain the product, the accessory fittings and the plumbing system in good functional order.

In keeping with every other mechanical product, Rada Mixing Valves should not be considered as functionally infallible and, as such will never totally replace the vigilance and attention of facility nursing/bathing or other institutional supervisory or industrial safety staff.

Provided that they are installed, commissioned, operated and maintained, the risk of product failure and its associated consequences, if not eliminated, are reduced to the minimum achievable.

Rada 50R Operating Specifications

Maximum Hot Water Supply Temperature	185°F (85°C) *
Minimum Cold Water Supply Temperature	33°F (1°C)
Optimum Inlet to Outlet Temperature Differential	18°F (10°C)
Optimum Thermostatic Control Range	86°F (30°C) - 122°F (50°C) **
Optimum Recirculation Loop Temperature Loss	15°F (8°C)
Maximum Flow Rate	98 gpm (371 lpm)
Minimum System Draw-off	0 gpm (0 lpm)
Maximum Inlet Supply Pressure	150 psi (10 bar)
Minimum Inlet Supply Pressure	10 psi (0.7 bar)

Inlet supply pressure must be nominally equal

* Rada 50R can be supplied with a high temperature thermostat for applications where the outlet temperature required is greater than 130°F (54°C).

**Rada 50R can accept temporary excursions above 185°F (85°C) and maintain control without sustaining internal damage. (ASSE 1017 certification requires exposure to 200°F (93°C) for a period of 30 minutes). Prolonged operation of the mixing valve at such elevated temperatures is not recommended.

Installation

The Rada 50R Thermostatic Mixing Valve must be installed as per the piping schematic provided on page 5. Failure to follow this directive will compromise valve/system performance, void all warranties and may create a user comfort issue and safety concern.

Armstrong has Rada technical support personnel available from 8:00 a.m. to 5:00 p.m. EST. Call Toll Free 1-888-HOT HOSE.

Notes:

1. Rada 50R may be installed in a vertical or horizontal position **BUT** the check valves will be affected by gravity and must be oriented in a horizontal plane only.

2. Rada 50R must be installed in a standard **HOT-LEFT/COLD-RIGHT** inlet supply configuration. There are red(hot) and blue(cold) markings on each valve. The inlet supplies must always match the corresponding inlet ports on the valve.

3. Be sure to thoroughly flush the pipework before fitting the Rada 50R. A good quality “Y” type strainer (40 mesh minimum) should be installed on hot and cold water inlets to mixing valve.

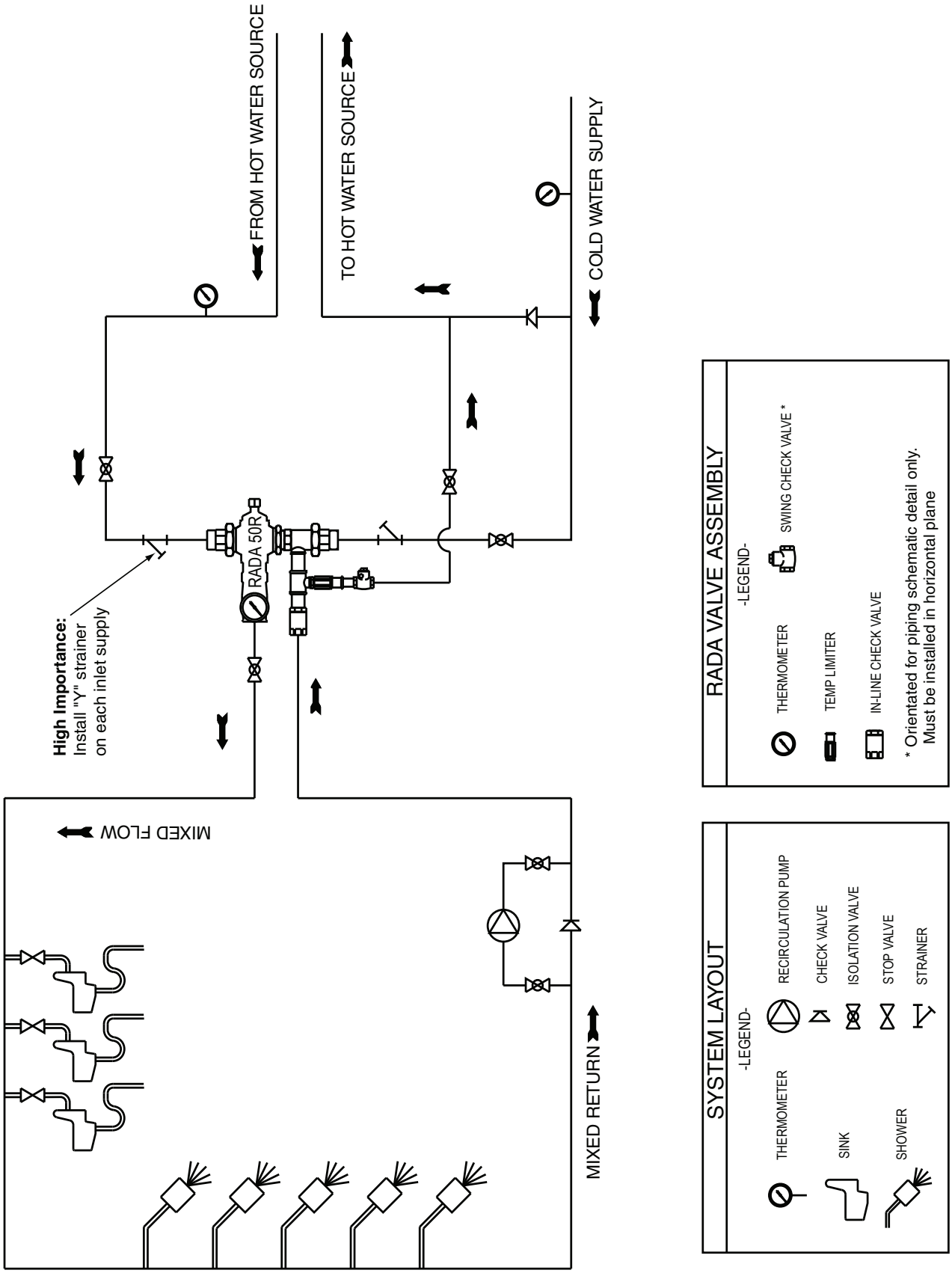
4. Be sure to “make up” all “sweat” or “soldered” fittings ahead of time. Do not expose Rada 50R or any of its fittings to extreme temperatures (such as an acetylene or propane torch).

5. Rada 50R is pre-set at the factory to a fixed outlet temperature of 118°F (48°C). It is highly unlikely that the installation site conditions will match the test conditions. As such:

   RADA VALVE 50R MUST BE RE-SET ONSITE BY QUALIFIED PERSONNEL.
   Rada 50R set up (commissioning) protocol is included on Page 6.

6. Rada 50R requires service access beneath the bonnet assembly. A minimum access clearance of 18” is suggested.

Rada 50R Recirculation System Schematic



Rada 50R Commissioning and Temperature Adjustment

Flood the system by opening all isolation valves. Ensure that the hot and cold supplies are at their designated pressures and temperatures.

Open a few mixed water outlets and wait until the hot and cold inlet temperatures are stable. Note the mixed water temperature.

If the mixed water temperature requires adjustment, turn the adjusting key clockwise (Figure 6-1) to reduce the temperature or counterclockwise to increase the temperature. Turn the key only a 1/2 turn at a time and allow a few seconds for the temperature to stabilize.

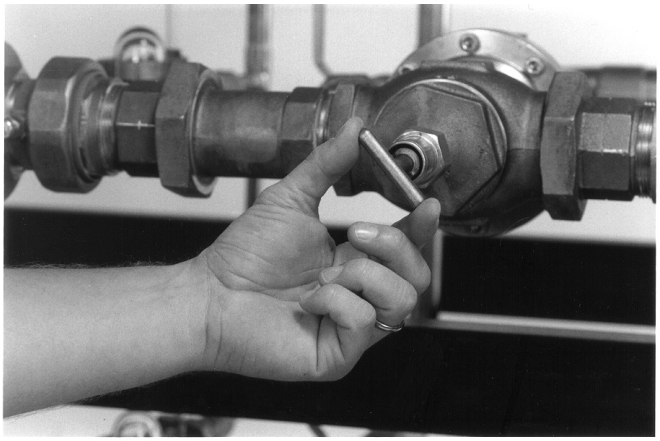


Figure 6-1

When the mixed water temperature has been set, close the outlets which have been running and start the recirculation pump.

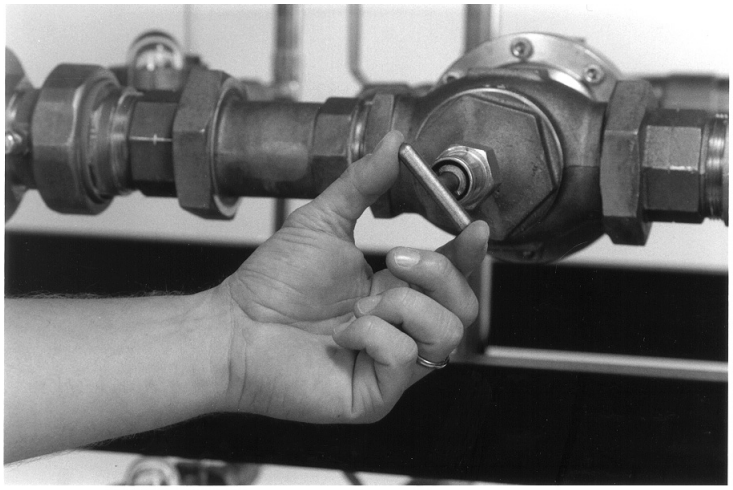
Remember: When making temperature adjustments, two or three outlets must be running. When checking recirculation temperature, all outlets must be closed.

Rada 50R Servicing and Maintenance

Rada 50R Thermostatic Mixing Valves should be inspected annually, or more frequently where acknowledged site conditions such as high mineral content water dictate.

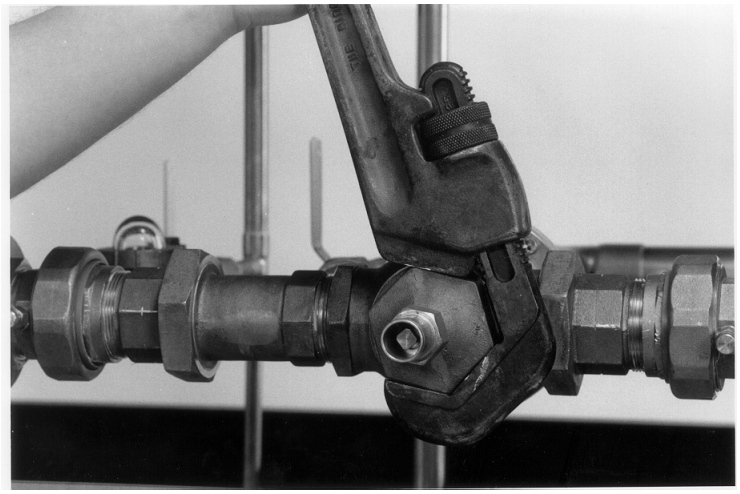
To service the Rada 50R proceed as follows:

Isolate/by-pass the valve by turning off each inlet supply, the outlet and the return line.



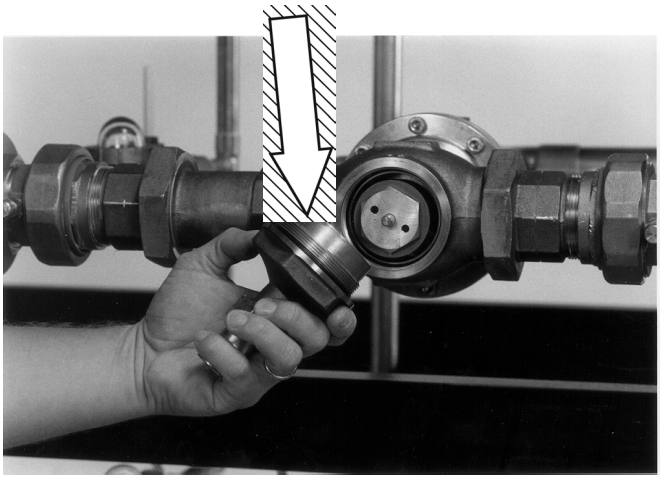
Step 1. Turn the adjustment screw, using the Temperature Adjustment Key (Part No. D18462) provided, counter clockwise until it comes to a stop. To make resetting easier after service, count the number of turns to full stop and note them in the box provided.

Adjustment screw turns



Step 2. Remove the Bonnet Assembly (Part No. D33741) with a large wrench by turning counter clockwise.

Bonnet Assembly
Part No. D33741



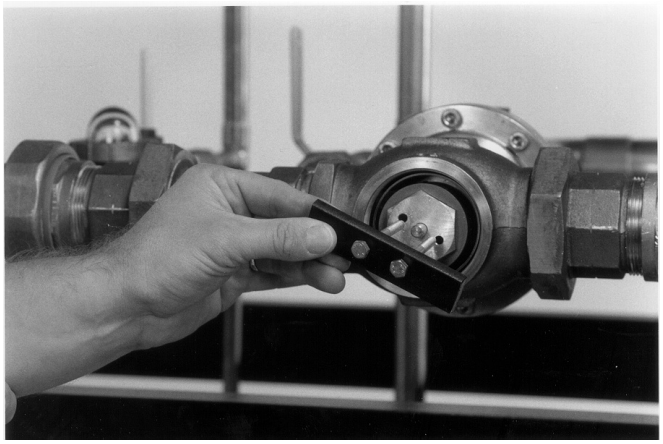
Bonnet Assembly Servicing:
Refer to Drawing 1 Page 11

A. Turn the Adjustment Screw fully clockwise and remove it from the Bonnet Assembly.

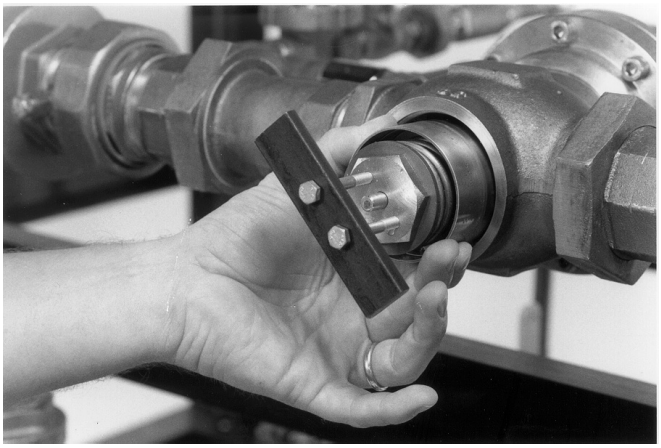
B. Remove the Adjustment O-Seals (3) and Cover O-Seal (Service/O-Seal Kit Part No. D33467).

C. Clean and inspect the Cold Valve Face along with all the other machined surfaces using a scouring cloth or a domestic pot cleaner.

D. Reinstall O-Seals into Bonnet Assembly after first applying a silicone-based lubricant such as Dow 111 and re-install adjustment screw.



Step 3. Fit the Cartridge Removal Tool (Part No. D18463) into the two tappings on the face of the Cartridge Assembly (Part No. D33431 / D33432 / D33433).



Step 4. Gently withdraw the Cartridge Assembly, the Return Spring and Spring Support Washer.

Step 5. Remove Slide Valve Seal (the slide valve seal consists of a white teflon® and black EPDM seal) from the Valve Body; clean seal groove, replace Slide Valve Seal after first applying a silicone based lubricant such as Dow 111. Refer to Drawing 1 Page 11.

Step 6. Using two wrenches, grip the hex at each end of the Cartridge Assembly and carefully unscrew and remove whichever end piece comes loose first. Refer to Drawing 2 Page 12.

Step 7. Remove the Thermostatic Element (Part No. D14792 / D14793 / D14794).

Step 8. Using a screwdriver placed through the cartridge body to “hold back” carefully unscrew the remaining end cap on the Cartridge Assembly.

Rada 50R Servicing and Maintenance

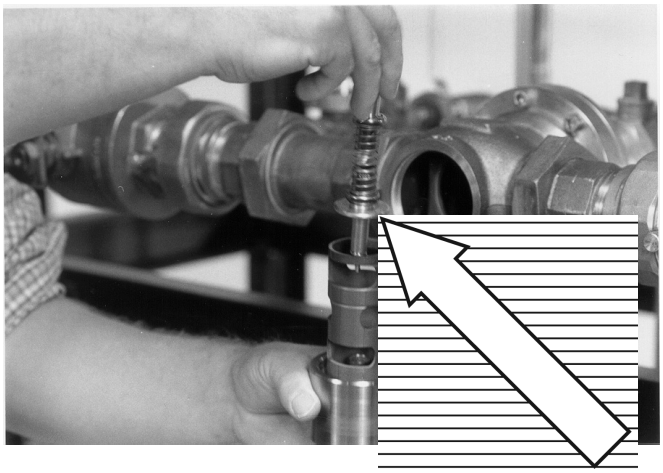
Step 9. Clean the Slide Valve using a scouring cloth or a domestic pot cleaner but **do not attempt to remove the slide valve from the spool.** Refer to Drawing 2 Page 12.

Do not use the scouring cloth on or otherwise scratch the specialty coated surface on the spool. Use a soft cloth and water.

Step 10. Ensure that the inner surfaces of the Element Guide, Spool and Spool End cap are clean. Refer to Drawing 2 Page 12.

Step 11. Replace Push Rod Seal (Service/O-Seal Kit Part No. D33467) on Push Rod within Element Guide and reassemble. Refer to Drawing 2 Page 12.

Step 12. Reinstall Element Guide into Cartridge Body being careful to locate the Element Guide at the end of the cartridge, which houses the slide valve. Do not to over torque. Refer to Drawing 2 Page 12.



Step 13. Replace Thermostatic Element after first applying a silicone-based lubricant such as Dow 111 to the pistons at either end. The Thermostatic Element comprises two thermostats joined by a spring. Insert the complete assembly so that the thermostat with the flange (baffle plate) locates first.

Step 14. Replace the Spool Endcap using care not to over torque. Refer to Drawing 2 Page 12.

Step 15. Replace slide valve seal (slide valve consists of white teflon® and black EPDM seal).

Note: Always use new seals (Service/O-Seal Kit Part No. D33467).

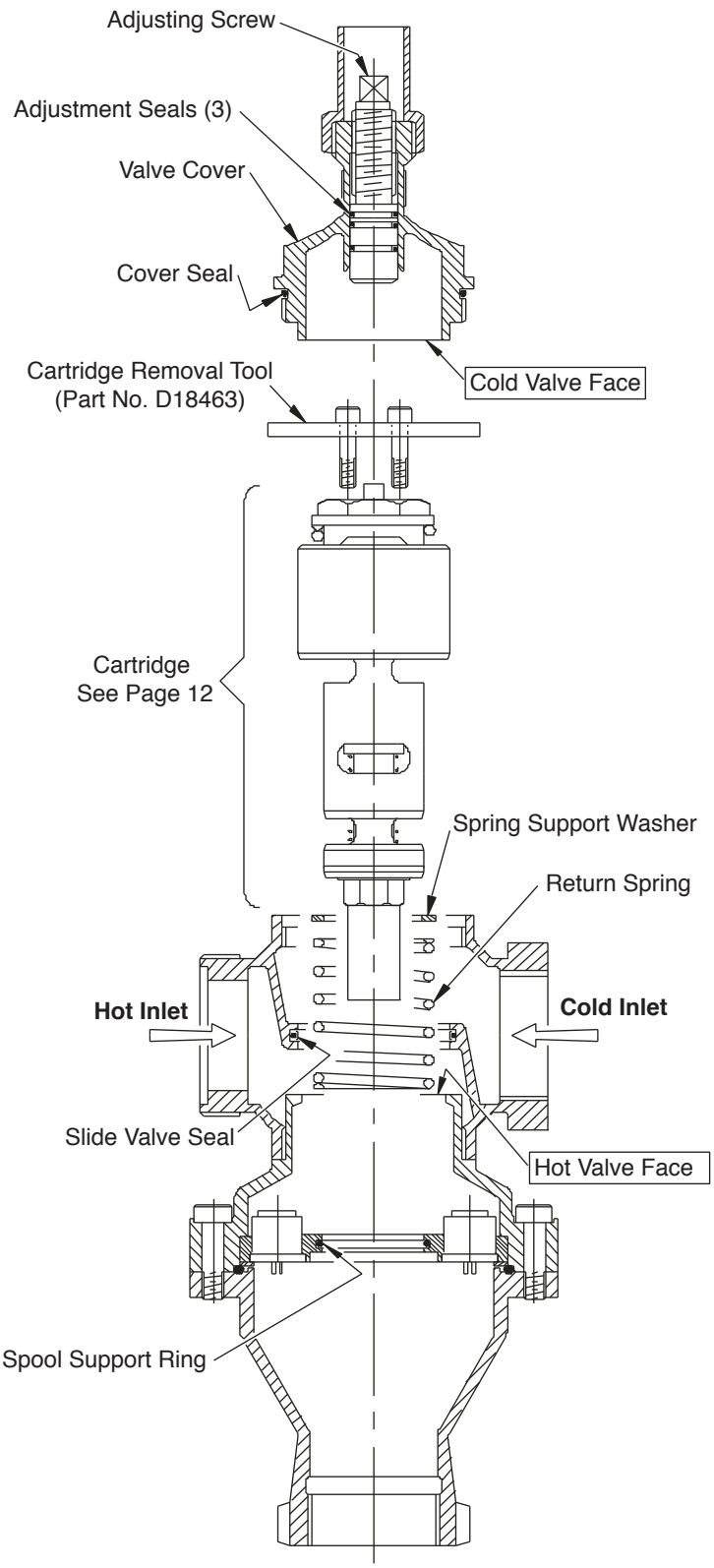
Step 16. Reinstall the Spring Support Washer and Return Spring. Refer to Drawing 1 Page 11.

Step 17. Reinstall the Cartridge Assembly into the Valve Body.

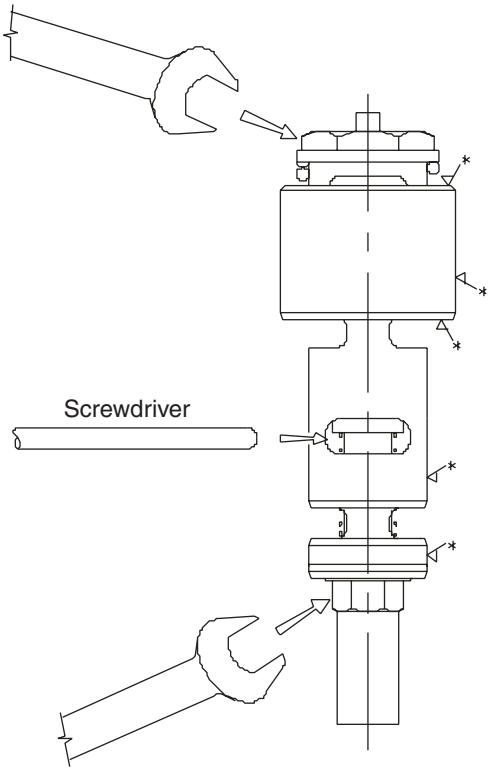
Step 18. Replace Bonnet Assembly with the adjustment screw turned fully counter-clockwise.

Step 19. Refer to your reminder on Page 7, Step 1, and return adjustment screw to its original set point. Pressure test and re-commission the Valve and system following the directions on Page 6.

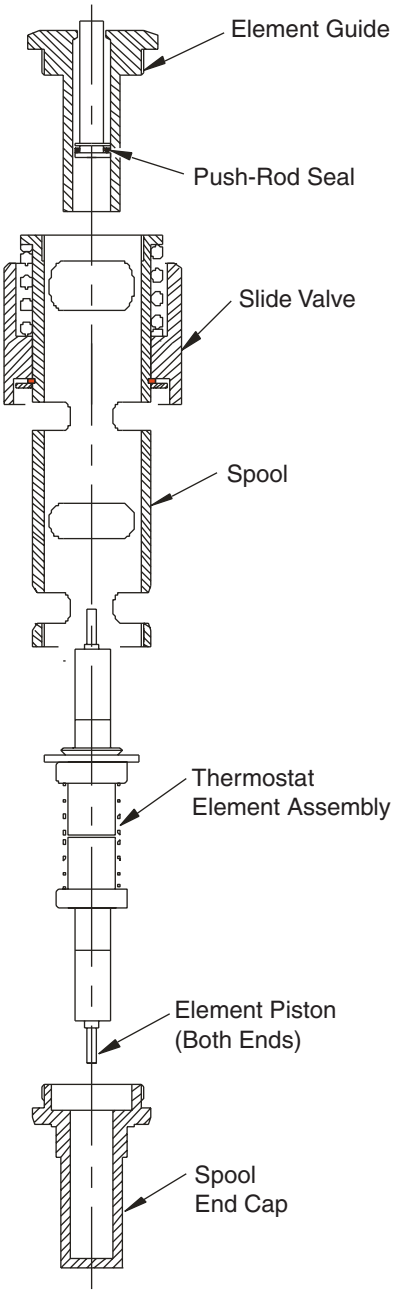
Drawing 1


Adjusting Screw
Adjustment Seals (3)
Valve Cover
Cover Seal
Cartridge Removal Tool
(Part No. D18463)
Cold Valve Face
Cartridge
See Page 12
Spring Support Washer
Return Spring
Hot Inlet
Cold Inlet
Slide Valve Seal
Hot Valve Face
Spool Support Ring

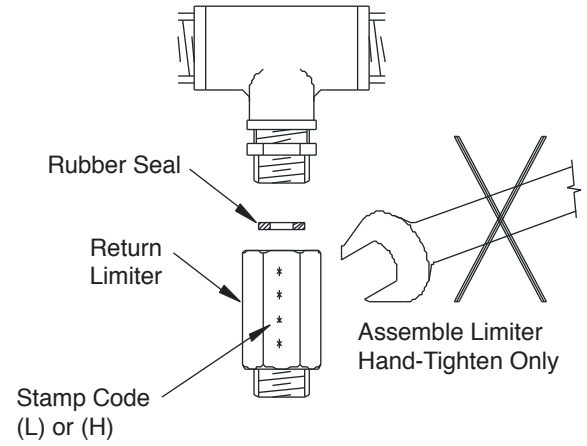
Drawing 2



* Indicates sealing surfaces which must be clean, smooth and undamaged.

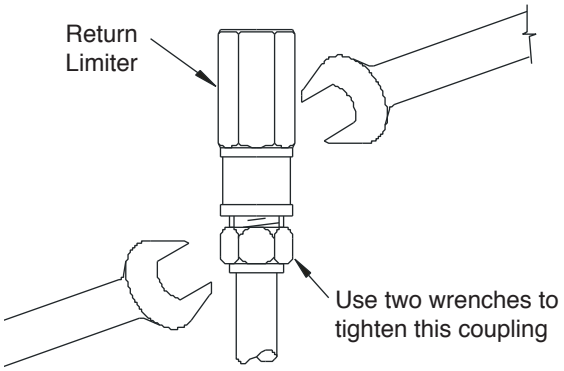


Fitting or Replacing the Return Limiter (Part No. D33410 / D33411)

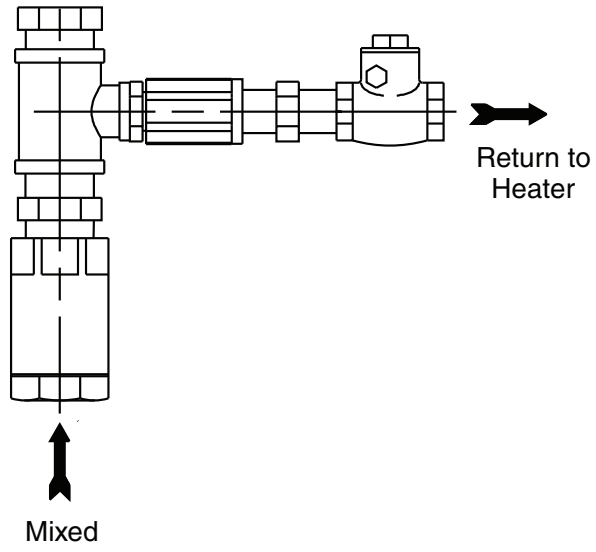


When fitting a new return limiter, make sure that its working temperature is correct for the application/system.

Tighten the limiter body in place using hand pressure only, the rubber washer will make the seal. Over-tightening with a wrench may cause damage.



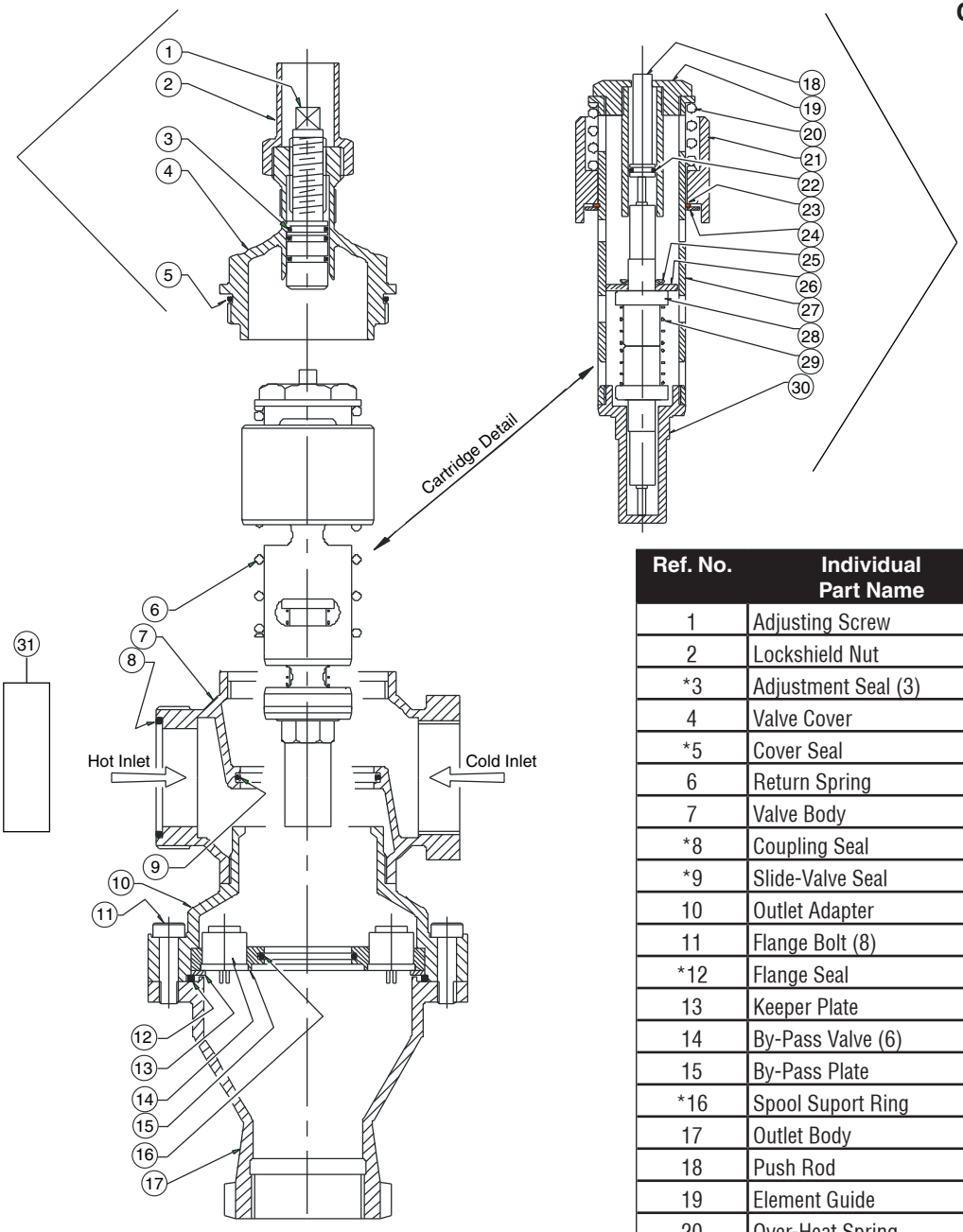
When tightening-up, or loosening-off the pipe coupling at the limiter outlet, use two wrenches so that torque is not transmitted through the limiter body.



Rada 50R Parts List

Bonnet Assembly
Part No. D33741

Cartridge Assembly
Part No. D33431
D33432
D33433



Ref. No.	Individual Part Name	Spare Part Assembly Name
1	Adjusting Screw	Bonnet Assembly
2	Lockshield Nut	
*3	Adjustment Seal (3)	
4	Valve Cover	
*5	Cover Seal	
6	Return Spring	Consult Factory
7	Valve Body	
*8	Coupling Seal	
*9	Slide-Valve Seal	
10	Outlet Adapter	Consult Factory
11	Flange Bolt (8)	Screw Pack
*12	Flange Seal	
13	Keeper Plate	Consult Factory
14	By-Pass Valve (6)	
15	By-Pass Plate	
*16	Spool Suport Ring	
17	Outlet Body	Consult Factory
18	Push Rod	Cartridge Assembly
19	Element Guide	
20	Over-Heat Spring	
21	Slide Valve	
*22	Push Rod Seal	
23	Slide Valve Retainer	
*24	Spring Support Washer	
†25	Baffle Plate Retainer	
†26	Baffle Plate	
27	Spool	
†28	Thermostatic Element (2)	
†29	Element Support Spring	
30	Spool End-Cap	
31	Inlet Check Valve	Inlet Check Valve (2)

* Available in Service/O-Seal Pack Part No. D33467

† Also included with Thermostat Assembly Part No. D14796
D14797
D14798

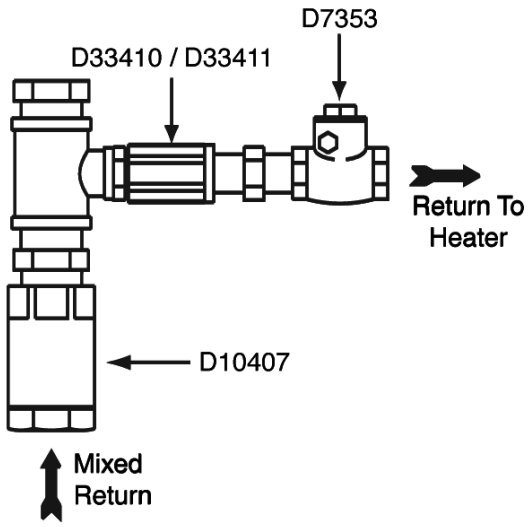
Rada 50R Part Numbers

Rada 50R

Part No.	Description	System Temp. Range
D18462	Temperature Adjustment Key	—
D18463	Cartridge Removal Tool	—
D33467	Service/O-Seal Kit	—
D14796	Thermostatic Element Low Temp.	90 - 114°F
D14797	Thermostatic Element Standard	115 - 135°F
D14798	Thermostatic Element High Temp.	Above 136°F
D33468	Cartridge Assembly Low Temp.	90 - 125°F
D33469	Cartridge Assembly Standard	113 - 143°F
D33470	Cartridge Assembly High Temp.	Above 136°F
D33741	Rada 50R Bonnet Assembly	—
D33435	Screw Pack Rada 40 and 50 (6) Item 11	—
D33472	Inlet Check Valve Kit (2 each)	—
D8931	Outlet Thermometer	—

Rada 50R

Part No.	Description
D33410	1/2” Thermostatic Return Limiter ≤ 125°F
D33411	1/2” Thermostatic Return Limiter ≥ 126°F
D7353	1/2” Check Valve (return line to heater)
D10407	1” Check Valve (return line to TMV)



Fault Diagnosis

Symptom	Possible Cause	Action
1. Mixed Water Temperature too high when mixed water is being used.	Temperature setting too high. Temperature has been set when hot supply temperature is too low.	Re-adjust temperature setting. See Page 6.
	Hot water has migrated into cold water supply.	Close all mixed water outlets and check that cold supply pipework remains cold.
	Thermostat element has failed.	Replace thermostat element. See Pages 7 thru 10.
2. Mixed water temperature increases when no mixed water is being used. (Recirculation only)	Return limiter has failed.	Replace return limiter. See Page 13.
3. Mixed water temperature too low when mixed water is being used.	Temperature setting too low.	Re-adjust temperature setting. See Page 6.
	Hot supply temperature is low.	Check temperature at hot supply pipework. Check temperature at boiler or waterheater.
4. Mixed water temperature too low, when no mixed water is being used. (Recirculation only)	Recirculation has failed due to pump failure or air-locking.	Check - Rectify
5. Mixed water temperature varies, and does not respond to adjustment.	The “Cartridge” has seized in the Thermostatic Mixing Valve.	Carry out a full service. See Pages 7 thru 10.
	The “Thermostat Element” has failed.	Replace Thermostat Element. See Pages 7 thru 10.
6. Mixed water flow rate is reduced.	Partly blocked strainers.	Clean the strainers at the hot and cold inlets.
	Supply pressure has fallen.	Check pressurization unit and boiler pressure. Check that all valves are at full open.
	Extra demand has been added to the system.	Check maximum flow-rate for the “Mixing Valve” against maximum expected flow-rate. See Pages 2 and 4.
7. Mixed water temperature suddenly runs cold.	Maximum allowable flow-rate has been exceeded. See Pages 2 and 4.	Fit auxiliary mixing valve in parallel or reduce the system demand.

Limited Warranty and Remedy

Armstrong Hot Water Group, Inc. (“Armstrong”) warrants to the original user of those products supplied by it and used in the service and in the manner for which they are intended, that such products shall be free from defects in material and workmanship for a period of one (1) year from the date of installation, but not longer than 15 months from the date of shipment from the factory [unless a Special Warranty Period applies, as listed below]. This warranty does not extend to any product that has been subject to misuse, neglect, or alteration after shipment from the Armstrong factory. Except as may be expressly provided in a written agreement between Armstrong and the user, which is signed by both parties, Armstrong **DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE**. The sole and exclusive remedy with respect to the above limited warranty or with respect to any other claim relating to the products or to defects or any condition or use of the products supplied by Armstrong, however caused, and whether such claim is based upon warranty, contract, negligence, strict liability, or any other basis or theory, is limited to Armstrong’s repair or replacement of the part or product, excluding any labor or any other cost to remove or install said part or product, or, at Armstrong’s option, to repayment of the purchase price. As a condition of enforcing any rights or remedies relating to Armstrong products, notice of any warranty or other claim relating to the products must be given in writing to Armstrong: (i) within 30 days of last day of the applicable warranty period, or (ii) within 30 days of the date of the manifestation of the condition or occurrence giving rise to the claim, whichever is earlier. **IN NO EVENT SHALL ARMSTRONG BE LIABLE FOR SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF USE OR PROFITS OR INTERRUPTION OF BUSINESS.** The Limited Warranty and Remedy terms herein apply notwithstanding any contrary terms in any purchase order or form submitted or issued by any user, purchaser, or third party and all such contrary terms shall be deemed rejected by Armstrong.

Designs, materials, weights and performance ratings are approximate and subject to change without notice.
*Visit **armstrong**international.com for up-to-date information.*

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