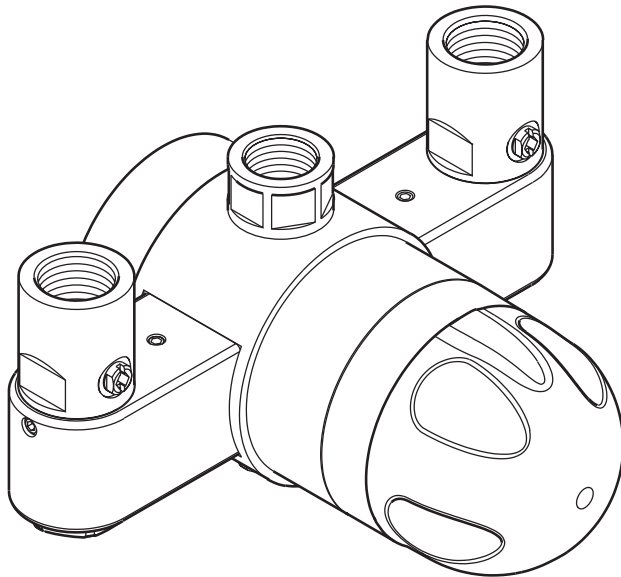


rada

CONTROLS

320 c

PRODUCT MANUAL



IMPORTANT

Installer: This Manual is the property of the customer and must be retained with the product for maintenance and operational purposes.

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INTRODUCTION

Rada Thermoscopic mixing valves are specified to meet the highest standards of safety, comfort and economy as demanded by today's users. All Rada products are designed, manufactured and supported in accordance with accredited BS EN ISO 9001:1994 Quality Systems.

This Manual covers the Rada 320 c valve manufactured from May 1998.

DESCRIPTION

A 3/4" thermostatic mixing valve to suit a wide diversity of applications and installation formats.

Incorporates the Radatherm cartridge, a unique sealed-for-life unit utilising proven durability high-technology materials for extended service-free reliability. This cartridge employs the advanced 2nd generation 'thermoscopic' temperature sensor to provide water at safe, accurate temperatures for showering or process requirements.

The mixing valve inlets incorporate integral isolating valves, strainers and checkvalves.

For connection to surface pipework, includes angled checkvalve elbows with integral isolating ball valve. Supplied with compression type connections.

SAFETY : WARNINGS

WARNING! Continued use of this product in conditions outside the limits listed in this section can severely affect the performance and reduce the effective service life, and can present potential risk to users.

Rada products are precision-engineered and should give continued superior and safe performance, provided:

1. They are installed, commissioned, operated and maintained in accordance with the recommendations given in this Manual.
2. Periodic attention is given, as necessary, to maintain the product in good functional order. Recommended guidelines are given in the **MAINTENANCE** section.

The function of a thermostatic mixing valve is to deliver water consistently at a safe temperature.

In keeping with every other mechanism, it cannot be considered as being functionally infallible and as such, cannot totally replace the vigilance of nursing/supervisory staff where that is necessary.

Provided it is installed, commissioned, operated and maintained within these recommendations, the risk of failure, if not eliminated, is reduced to the minimum achievable.

SPECIFICATION

Important Points:

- 1 The installation, commissioning and maintenance of this product must be carried out in accordance with instructions given in this Manual, and must be conducted by designated, qualified and competent personnel.
2. Installations must comply with all Local/National Water Supply Authority Regulations/Byelaws, and Building and Plumbing (UK: BS6700) Regulations.
3. Rada products are precision-engineered and should give continued superior and safe performance, provided:-
 - they are installed, commissioned, operated and maintained in accordance with these recommendations
 - periodic attention is given as necessary to maintain the product in good functional order. Recommended guidelines are given in the **MAINTENANCE** section.
4. **WARNING!** Continued use of this product in conditions outside the limits listed in this section can severely affect the performance and reduce the effective service life, and can present potential risk to users.
5. Disinfectants: In applications where system chemical disinfection is practised, chlorine can be used (calculated chlorine concentration of 50mg/l (ppm) maximum in water, per one hour dwell time, at service interval frequency). Such procedures must be conducted strictly in accordance with the information supplied with the disinfectant and with all relevant Guidelines/Approved Codes of Practice.

If in any doubt as to the suitability of chemical solutions, refer to Kohler Mira Ltd, or Local Agent.

Normal Operating Conditions are considered as:

- inlet dynamic pressures nominally balanced to within 10% of each other during flow.
- a differential of approximately 50°C between the hot and cold inlet temperatures, and with differentials of 15-35°C between the blend setting and either supply.
- daily usage of 1 - 6 hours.
- installation and usage environment not subject to extremes of temperature, unauthorised tampering or wilful abuse.

Operating Parameters

Pressures/Flow Rates

For **optimum** performance, dynamic supply pressures should be nominally equal.

Minimum Recommended Flow Rate: 6 l/min at mid-blend with equal dynamic supply pressures.

Maximum Recommended Flow Rate: 120 l/min.

Maximum Recommended Pressure Loss Ratio*: should not exceed **10:1**, in favour of either supply, during flow.

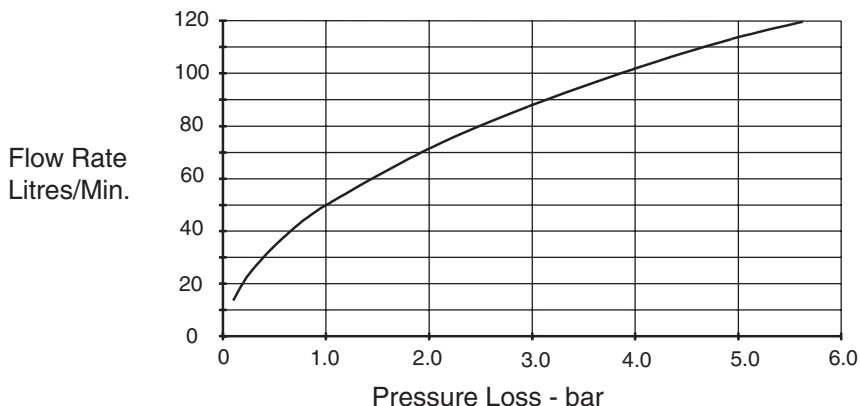
Maximum Static Pressure: 10 bar.

Maximum Dynamic/Maintained Pressure: 5.6 bar.

Minimum Pressure Loss: 0.1 bar.

** Pressure Loss Ratio is determined by subtracting the resistance to flow of the outlet pipework and outlet fittings (generally known as "backpressure", and measured at the outlet of the mixing valve) from the dynamic pressures of the hot and cold water at each inlet of the mixing valve. This is at its extreme when the mixing valve is being used at its lowest flow-rate and when the maximum inequality occurs in the pressure of the hot and cold water supplies.*

Flow Rate/Pressure Loss Graph



Temperatures

Optimum Thermostatic Control Range: 30 - 50°C.

Minimum Cold Water Temperature: 1°C.

Maximum Hot Water Temperature: 85°C.

Connections

- 320 c - Inlets:** 3/4" BSP female thread/22 mm compression (compression fitting supplied)
- **Outlet:** 3/4" BSP female thread/22 mm compression (compression fitting supplied)

Standard Inlet Configuration

hot - left (marked red)

cold - right (marked blue)

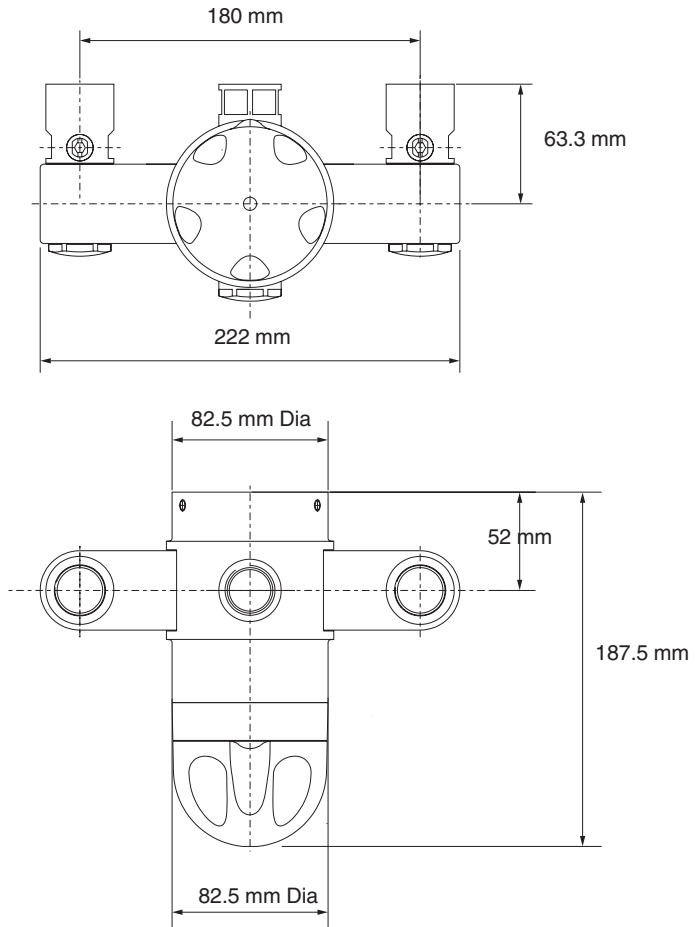
Flow Control

Rada 320 c mixing valves do not have integral flow control; appropriate provision must be made for this in the outlet pipework.

This can be in the form of stop-cock, mechanical timed-flow controller or solenoid.

The device chosen must be non-concussive in operation.

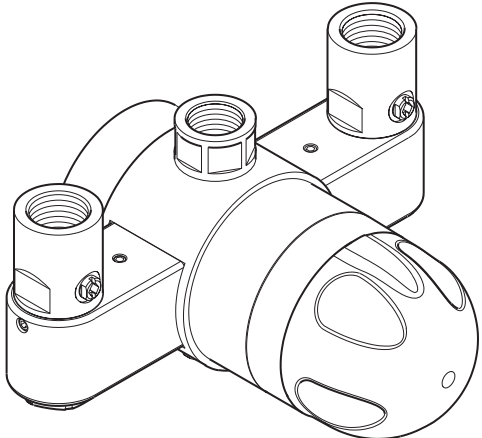
DIMENSIONS



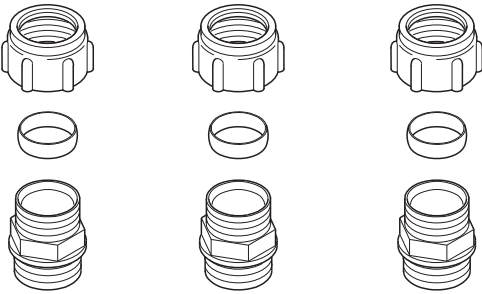
PACK CONTENTS

Tick the appropriate boxes to familiarize yourself with the part names and to confirm that the parts are included.

Rada 320 c



1 x 320 c



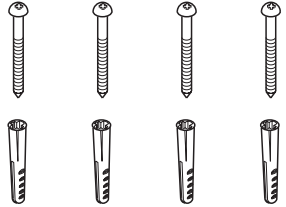
3 x Compression Nuts

3 x Olives

3 x Fittings



1 x 3 mm
Hexagonal Wrench



4 x Screws

4 x Wall Plugs

1 x Product Manual

INSTALLATION

General

Installation must be carried out in accordance with these instructions, and must be conducted by designated, qualified and competent personnel.

1. Before commencing, ensure that the installation conditions comply with the information given in **SPECIFICATION**.
2. Care must be taken during installation to prevent any risk of injury or damage.
3. The mixing valve should be positioned for easy access during use and maintenance. All routine maintenance procedures can be conducted with the mixing valve body in place. For all models, allow a minimum 100 mm clearance in front of the temperature control to enable removal of the Radatherm cartridge during maintenance.
4. The use of supply-line or zone strainers will reduce the need to remove debris at each mixing valve point. The recommended maximum mesh aperture dimension for such strainers is 0.5 mm
5. Pipework must be rigidly supported.
6. Long pipework dead-legs may effect shower performance.
7. Supply pipework layout should be arranged to minimise the effect of other outlet usage upon the dynamic pressures at the mixing valve inlets.
8. Inlet and outlet threaded joint connections should be made with PTFE tape or liquid sealant. Do not use oil-based, non-setting jointing compounds.
9. **To eliminate pipe debris it is essential that supply pipes are thoroughly flushed through before connection to the mixing valve.**
10. Inlet isolators must be used in the fully open position.
11. Do not install the Rada 320 c in a position where it may become frozen.

Outlet Position/Reversed Inlets

All Rada 320 c mixing valves are supplied with the inlet connections configured **hot - left, cold - right, and top outlet** as standard.

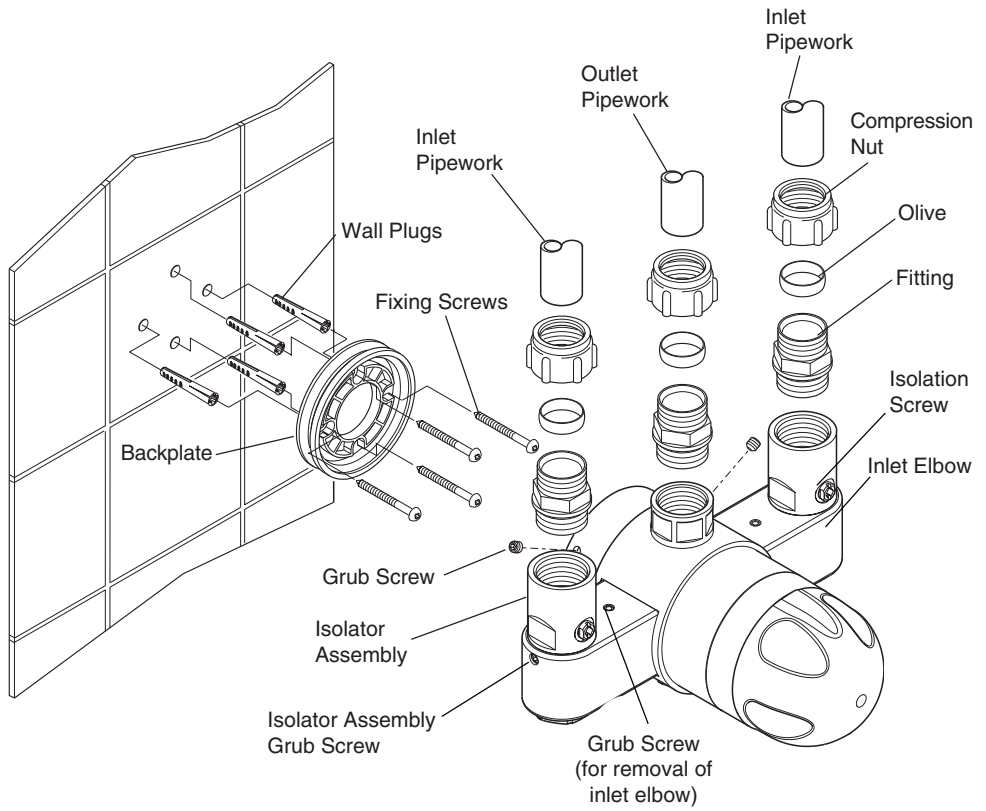
Should the existing hot and cold pipework make this configuration inconvenient then remove the cartridge assembly and turn it through 180° (Refer to **MAINTENANCE** for cartridge removal and re-assembly).

If a bottom outlet position is required, remove the blanking cap from the bottom of the valve and replace it with the fitting from the top of the valve. Then fit the blanking cap to the top of the valve.

Installation

Rada 320 c models have easily adjustable inlet elbows to accommodate rising or falling supplies.

1. When unpacked, the inlet elbows are positioned to accept falling supplies. Should the installation require rising supplies then the inlet elbows will need adjusting.
 - Loosen each inlet elbow grub screw using the 3 mm hexagonal wrench (supplied).
Note! Each inlet elbow has two grub screws, one for removal of the isolator assembly and one for removal of the inlet elbow.
 - Pull the inlet elbow away from the valve body and refit in the desired position.
 - Loosen isolator assembly grub screws and position so that the isolator is accessible.
 - Tighten the grub screws.
2. Loosen the backplate grub screws (3 off) using the 3 mm hexagonal wrench (supplied) and remove the backplate.
3. Fix the backplate securely to the wall surface using the fixing screws and wall plugs provided.
4. **Important!** Flush through the hot and cold supplies thoroughly before connection to the valve.
5. Fit the valve onto the backplate and tighten the grub screws (3 off).
6. Connect the hot, cold and outlet supplies using the fittings, olives and compression nuts supplied and check for any leaks.
7. The maximum temperature may now need resetting. Refer to **COMMISSIONING**.



COMMISSIONING

Commissioning must be carried out in accordance with these instructions, and must be conducted by designated, qualified and competent personnel.

Maximum Temperature

The maximum blend temperature obtainable by the user should be limited, to prevent accidental selection of a temperature that is too hot.

All Rada Thermostatic mixing valves are fully performance tested and the maximum temperature is preset to approximately 43°C under ideal installation conditions at the factory.

Site conditions and personal preference may dictate that the maximum temperature has to be reset following installation.

Maximum Temperature Setting

Check that an adequate supply of **hot** water is available at the hot inlet of the mixing valve.

Note! The minimum temperature of the hot water must be at least 12°C above the desired blend, however during resetting this should be close to the typical storage maximum to offset the possibility of any blend shift due to fluctuating supply temperatures.

Check that both inlet isolating valves are fully open.

Temperatures should always be recorded using a thermometer with proven accuracy.

For Adjustable Temperature

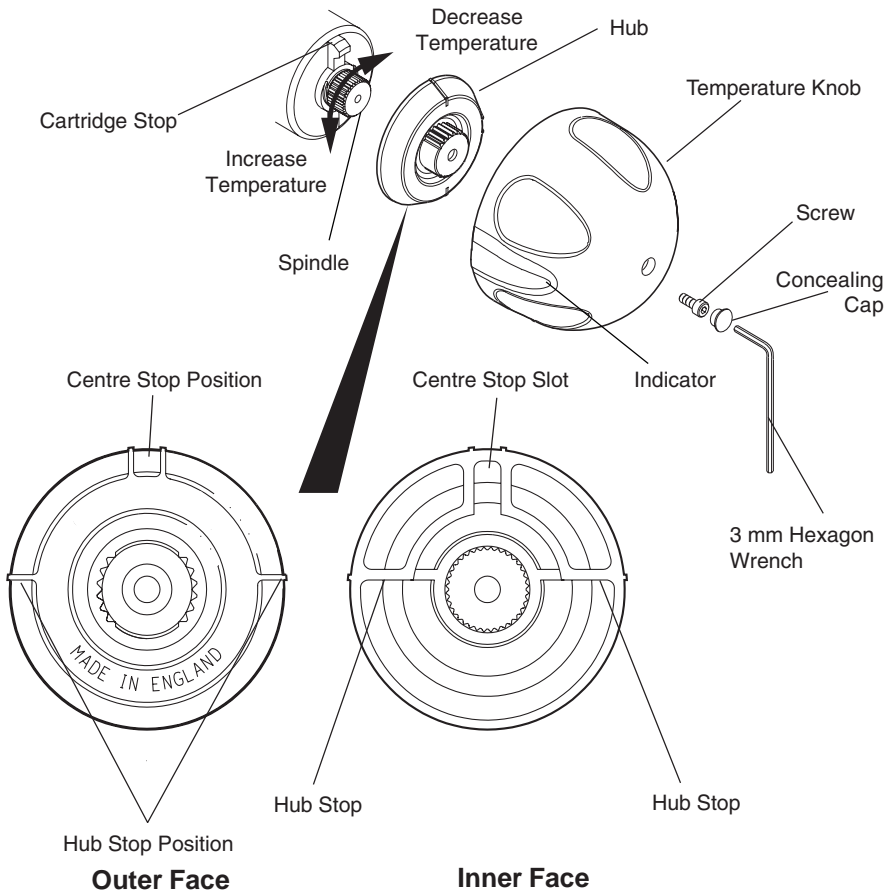
1. Remove the temperature knob concealing cap and then the screw using the 3 mm hexagonal wrench (supplied). Remove the temperature knob.
2. Pull off the hub.
3. Rotate the spindle until required maximum blend temperature is obtained at outlet point (**clockwise = decrease temperature, anticlockwise = increase temperature**) (refer to **Figure 2**).

When resistance is felt do not use force to turn any further, as this will damage the internal parts.

4. Once the desired maximum blend temperature is achieved, refit the hub without disturbing the spindle: Position the hub so that the hub stop comes up against the cartridge stop (refer to **Figure 2**) preventing any further rotation in an anticlockwise direction. Check that blend temperature has not altered.
5. Refit the temperature knob. Make sure that the indicator points to 9 o'clock.

For Locked Temperature

1. First, remove the temperature knob concealing cap and then the screw using the 3 mm hexagonal wrench (supplied).
2. Pull off the hub.



3. Rotate the spindle until required maximum blend temperature is obtained at discharge point (**clockwise = decrease temperature, anticlockwise = increase temperature**).

When resistance is felt do not use force to turn any further, as this will damage the internal parts.

4. Once the desired maximum blend temperature is achieved, refit the hub without disturbing the spindle, positioning it so that the centre stop slot in the hub fits over the top of the cartridge stop (refer to **Figure 2**), preventing further rotation. Check that blend temperature has not altered.
5. Refit the temperature knob. Make sure that the indicator points to 6 o'clock.

Commissioning Checks

(Temperatures should always be recorded using a thermometer with proven accuracy).

- Check inlet pipework temperatures for correct function of checkvalves.
- Operate the outlet flow control and check:
 1. Flow rate is sufficient for purpose.
 2. Temperature(s) obtainable are acceptable.
 3. All connections and mixer body are water tight.
- It is advisable to establish a performance check at this time, which should be noted for future reference as part of a Planned Maintenance Programme (a Maintenance Record Card has been provided with this Manual).

The procedure should be chosen to imitate both typical and difficult operating conditions, such as any supply pressure fluctuations that may be likely. An ideal method is to locate another outlet on the common cold water supply close to the mixing valve (operating this outlet may cause a drop in supply pressure), and subsequently have a temporary effect on blend temperature (should be no more than 2°C change).

Note! Causing thermal shutdown of the mixer by full closure of the cold supply may not adequately indicate the practical capability of the mixer, nor its service condition. Consequently this is not a recommended performance check, and repeated such testing may ultimately affect service life.

OPERATION

For models with knob fitted for adjustable temperature control, adjustment of blend temperature from preset maximum to cold is achieved by clockwise rotation of the knob.

For models with locked temperature control, no user adjustment is intended.

Control of flow is via separate outlet valve(s), refer **Flow Control**.

FAULT DIAGNOSIS

Symptom	Cause/Rectification
1. Only hot or cold water from outlet.	<ul style="list-style-type: none"> a. Inlet supplies reversed (i.e. hot supply to cold inlet). Check. b. No hot water reaching mixing valve. Check c. Check filters and inlet fittings for blockage. d. Refer symptom 5 below. e. Installation conditions continuously outside operating parameters: refer to SPECIFICATION and 2e below.
2. Fluctuating or reduced flow rate.	<p>Normal function of mixing valve when operating conditions are unsatisfactory.</p> <ul style="list-style-type: none"> a. Check filters and inlet/outlet fittings for flow restriction (check isolators are fully open). b. Ensure that minimum flow rate is sufficient for supply conditions. c. Ensure that dynamic inlet pressures are nominally balanced. d. Ensure that inlet temperature differentials are sufficient. e. (subsequent to rectification of supply conditions) Check thermostatic performance; renew cartridge assembly if necessary.
3. No flow from mixing valve outlet.	<p>Check inlet isolators are fully open.</p> <ul style="list-style-type: none"> a. Check filters and inlet/outlet fittings for blockage. b. Hot or cold supply failure; thermostat holding correct shutdown function: rectify, and return to 2e above.
4. Blend temperature drift.	<p>Indicates operating conditions changed.</p> <ul style="list-style-type: none"> a. Refer to symptom 2 above. b. Hot supply temperature fluctuation (rectify and refer to COMMISSIONING). c. Supply pressure fluctuation (refer to INSTALLATION; General).
5. Hot water in cold supply or vice versa.	<p>Indicates check valves require maintenance, refer to MAINTENANCE.</p>
6. Maximum blend temperature setting too hot or too cool.	<ul style="list-style-type: none"> a. Indicates incorrect temperature setting; refer to COMMISSIONING. b. As symptom 4 above. c. As symptom 5 above.

(Continued)

Symptom	Cause/Rectification
(Continued) 7. Water leaking from valve body.	Seal(s) worn or damaged. a. Obtain Seal Pack, and renew all seals. b. (If leak persists from around temperature spindle). Renew cartridge assembly.

MAINTENANCE

General

Rada products are precision-engineered and should give continued superior and safe performance, provided:

1. They are installed, commissioned, operated and maintained in accordance with our recommendations.
2. Periodic attention is given as necessary to maintain the product in good functional order. Guidelines for frequency are given below.

All functional parts (except the temperature or locking knob) are contained within service-free cartridges, so any maintenance requirement is reduced to temperature, performance and functional checks and inspection, with cartridge renewal when necessary. In larger installations with a number of mixing valves, it is good policy to maintain a small stock of spare cartridges so that no mixing valve or facility need be out of commission for more than the time it takes to exchange the cartridge, and also, eventually, a rolling programme of cartridge renewal can be undertaken as part of a planned maintenance procedure. The designed minimum service life of all cartridges is five years under normal operating conditions (refer to **SPECIFICATION**).

The use of main supply-line or zone strainers (recommended maximum mesh aperture dimension is 0.5 mm) will reduce the need to remove debris at each mixing valve point.

Rada Service Engineers/Agents will call by prior arrangement, if required. Service Contracts may be undertaken, subject to survey - details upon request.

Planned Maintenance Programmes

(Preventative/Precautionary Maintenance)

The frequency and extent of attention required will vary according to prevailing site and operational conditions however, the following guideline schedule is suggested to cover average duty and site conditions:

Six Monthly

Blend Temperature: check for correct blend setting and/or maximum preset temperature. Reset as necessary.

Performance: check blend stability against known datum (e.g. commissioning check) for an induced pressure or flow change. Renew cartridge assembly when necessary.

Function: check inlet pipework temperature for correct function of checkvalves, and maintain/renew as necessary. Check and clean filters as appropriate. Lubricate accessible seals when necessary using **silicone-only based lubricant**.

Maintenance Procedures

Maintenance must be carried out in accordance with these instructions, and must be conducted by designated, qualified and competent personnel.

This mixing valve is designed for minimal maintenance under conditions of normal use.

External surfaces may be wiped clean with a soft cloth, and if necessary, a mild washing-up type detergent or soap solution can be used.

Warning! Many household and industrial cleaning products contain mild abrasives and chemical concentrates, and should not be used on polished, chromed or plastic surfaces.

Should an internal malfunction occur then this will probably require cartridge renewal. The cartridge assembly and check valves contain no user-serviceable parts, and must not be dismantled.

Components are precision-made, so care must be taken while servicing to avoid damage.

When ordering spare parts, please state product type, i.e. Rada 320 c, and identify part name and number (refer to **PARTS LIST**). A Seal pack is available, containing all the seals that may be necessary for renewal during maintenance or servicing.

Lubricants

Important! All seals are pre-lubricated. If you need to lubricate the seals, use only a small amount of silicone-only based lubricants on this product. Do not use oil-based or other lubricant types as these may cause rapid deterioration of seals.

Maintenance Procedure - Cartridge Assembly

Removal

1. Turn the isolation screw on the isolator valves through 90 ° to isolate the water supplies to the valve (refer to **Figure 4**). Open an outlet fitting to release pressure and to assist the draining of residual water.
2. Remove the temperature knob concealing cap and then the screw using the 3 mm hexagonal wrench (supplied). Remove the temperature knob, the temperature indicating ring and the hub.
3. Remove the six screws holding the cartridge assembly into the body.
4. Use a suitable tool inserted into the cut-outs to lever the cartridge assembly from the body.
5. Remove the cartridge assembly from the body.

Cleaning/Renewal of Parts

6. The interior surface of the mixing valve body must be clean before refitting the cartridge. Rinse the valve interior thoroughly in clean water to remove any debris before refitting the cartridge.

Note! The body interior must be cleaned carefully and not damaged in any way. Do not use any abrasive material.

7. Cartridges may only be cleaned by flushing through under a jet of clean water to remove debris.

Do not descale. Descaling solution MUST not be used on any parts of the 320 valve. Cartridges are not serviceable, and must not be dismantled.

Cartridges cannot be tested in isolation, service condition should be assessed as part of the performance check; refer **Commissioning Checks**.

8. Examine all accessible seals for signs of deformation or damage, and renew as necessary, taking care not to damage the seal grooves.

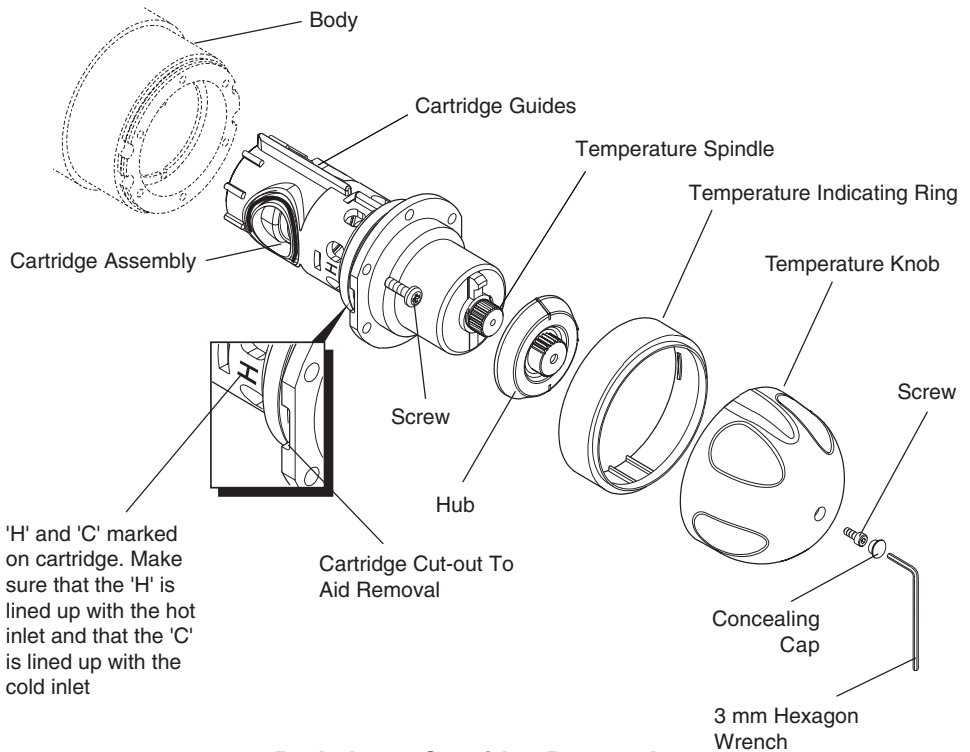
Re-assembly

9. Identify which is the hot inlet to the mixing valve body, and align the cartridge assembly accordingly.

Note! There is a 'H' and 'C' marked on the cartridge. Make sure that the 'H' aligns with the hot inlet and that the 'C' aligns with the cold inlet (refer to **Figure 3**).

Align the cartridge guides (refer to **Figure 3**) with the slots in the body and carefully push the cartridge assembly back into the body, checking that the 2 cartridge inlet port seals remain in place.

10. Install the six screws and tighten.
11. Fit the temperature indicating ring.
12. Turn the isolation screw on the isolator valves through 90 ° to restore the water supplies to the valve and check for any leaks.
13. Before fitting the hub, the temperature will need resetting; refer to **COMMISSIONING**.
14. Secure the temperature knob.



**Radatherm Cartridge Removal
Figure 3**

Maintenance Procedure - Check Valve Cartridges

Hot water entering the cold supply, or vice versa, indicates that immediate attention is necessary. This is carried out by removing and cleaning, or renewing as necessary, the two check valves.

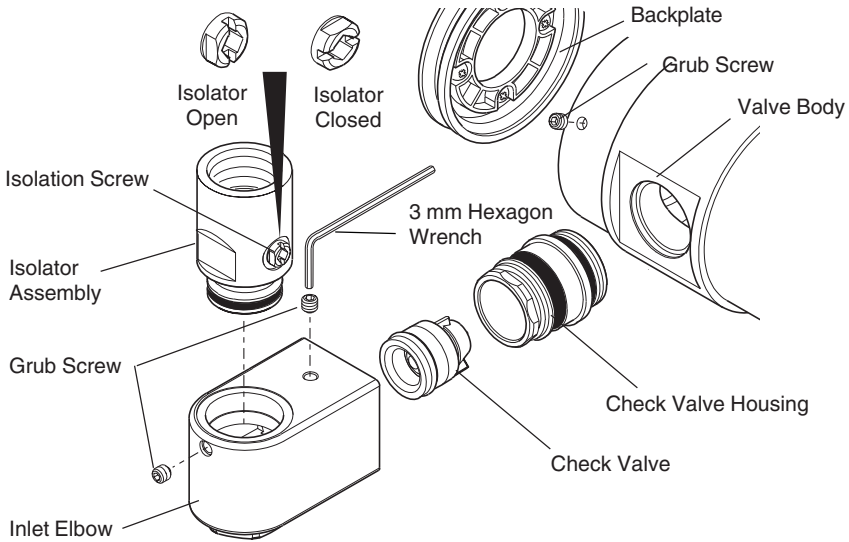
1. Turn the isolation screw on the isolator assemblies through 90 ° (refer to **Figure 4**) to isolate the water supplies to the valve. Open an outlet fitting to release pressure and to assist the draining of residual water.
2. Loosen the isolator grub screws and remove the isolator assemblies from the inlet elbows.

Note! If necessary, loosen the three grub screws that hold the valve body onto the backplate and undo the outlet compression fitting. This is so that you can lower the body away from the backplate. This will give enough clearance to remove the isolator assemblies from the inlet elbows.

3. Remove the inlet elbow grub screws and remove the inlet elbows.
4. Unscrew and remove the check valve housings.
5. Push out the check valves.

The check valve is not a serviceable item, so any apparent wear or damage will require its renewal.

6. Re-assembly into the valve is a reversal of the above procedures.
7. Turn the isolation screw on the isolator assemblies through 90 ° (refer to **Figure 4**) to restore the water supplies to the valve and check for leaks.



**Check Valve Cartridges
Figure 4**

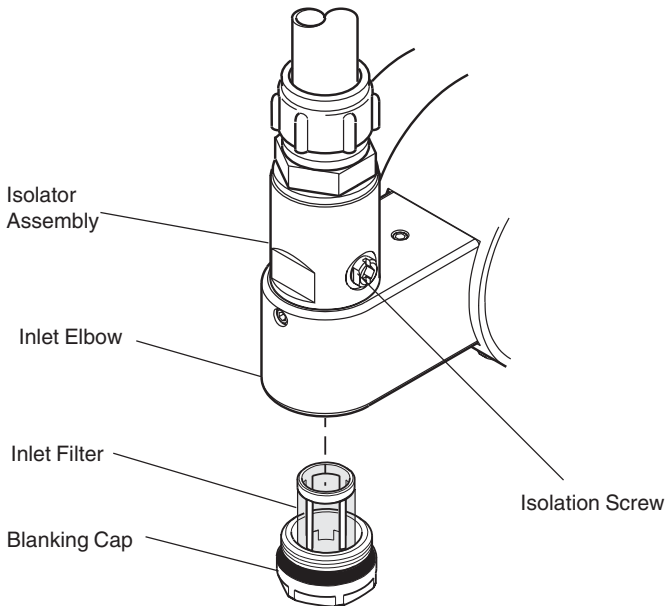
Maintenance Procedure - Inlet Filters

Blockage of the inlet filters can lead to poor flow performance and reduced temperature control. It is essential that the inlet filters are cleaned or, if necessary, renewed as part of the six-monthly maintenance operations.

Caution! Do not operate the Rada 320 c without filters. Product damage may occur.

A filter pack is available containing two strainer screens and all the seals which may be needed during filter inspection.

1. Turn the isolation screw on the isolator assemblies through 90 ° (refer to **Figure 4**) to isolate the water supplies to the valve. Open an outlet fitting to release pressure and to assist the draining of residual water.
2. Unscrew and remove the blanking cap.
3. The inlet filters are a push-fit into the blanking cap.
4. The inlet filters may be cleaned under a jet of water, or renewed.
5. Re-assembly into the inlet elbows is a reversal of the above procedures.
6. Restore the water supplies and check for leaks.
7. Operate the valve at full hot and full cold. The maximum temperature will require resetting (refer to **COMMISSIONING**).



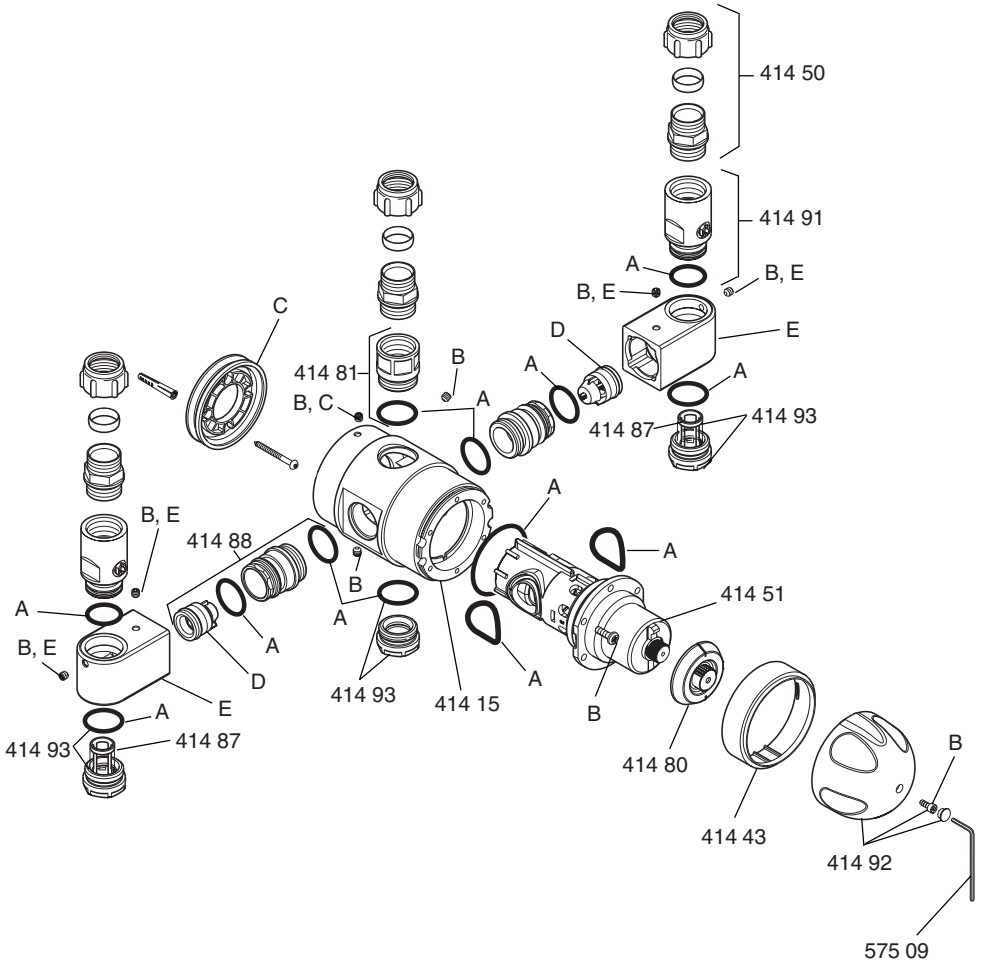
Inlet Filters
Figure 5

SPARE PARTS

Spare Parts List

414 14	Body
414 43	Temperature Indicating Ring
414 50	Compression Fitting
414 51	Cartridge Assembly
414 80	Hub Pack
414 81	Adaptor, Female
414 84	Seal Pack - components identified 'A'
414 85	Screw Pack - components identified 'B'
414 86	Backplate Kit - components identified 'C'
414 87	Filter Pack
414 88	Inlet Connector Assembly
414 89	Checkvalve Pack - components identified 'D'
414 90	Inlet Elbow Pack - components identified 'E'
414 91	Isolator Assembly
414 92	Knob Pack
414 93	Blanking Cap
575 09	3 mm Hexagonal Wrench

Spare Parts Diagram



CUSTOMER CARE

Guarantee

This product is guaranteed against any defect of materials or workmanship for one year from the date of purchase, provided that the product has been installed correctly and used in accordance with the instructions supplied.

Any part found to be defective during the guarantee period will be replaced or repaired - at our option - without charge, provided that the product has been properly used and maintained.

Routine cleaning and maintenance should be carried out in accordance with the instructions supplied.

The product should not be modified or repaired except by a person authorised by Rada.

Your statutory rights are in no way affected by this guarantee.

After Sales Service - how we can help you

We have a network of fully trained staff ready to provide assistance, should you experience any difficulty operating your Rada equipment.

Spare Parts

All functional parts of Rada products are kept for up to ten years from the date of final manufacture.

If during that period, our stock of a particular part is exhausted we will, as an alternative, provide an equivalent new product or part at a price equating to the cost of repair to the old, bearing in mind the age of the product.

Customer Care Policy

If within a short time of installation the product does not function correctly, first check with the operation and maintenance advice provided in this Manual to see if the difficulty can be overcome.

Failing this, contact your installer to ensure that the product has been installed and commissioned in full accord with our detailed installation instructions.

If this does not resolve the difficulty, please ring your nearest Rada contact who will give every assistance and, if appropriate, arrange for the local Service Engineer or Agent to call on a mutually agreeable date.

Contact:

Rada Controls

Cromwell Road,
Cheltenham, England,
GL52 5EP, UK.

Tel.: + 44 (0)870 600 0221

Fax.: + 44 (0)1242 221925

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