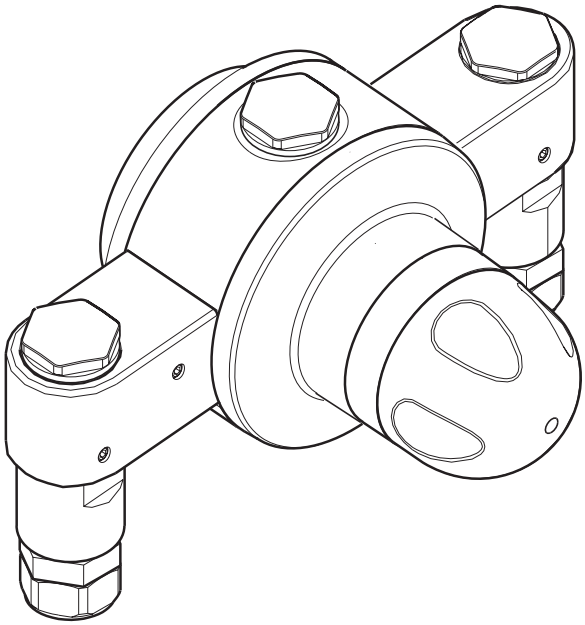
rada

# Thermostatic 425-t3



# PRODUCT MANUAL

## IMPORTANT

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

# INDEX



If you experience any difficulty with the installation or operation of your new mixing valve, then please refer to the **Fault Diagnosis** section, before contacting Kohler Mira Limited. Our telephone and fax numbers can be found on the back cover of this guide.

# SAFETY : WARNINGS

The function of this thermostatic mixing valve is to deliver water consistently at a safe temperature. This requires that:

1. It is installed, commissioned, operated and maintained in accordance with the recommendations given in this Manual.
2. Type 3 valves are only used for applications covered by their approved designations.
3. Periodic attention is given, as necessary, to maintain the product in good functional order. Recommended guidelines are given in the **MAINTENANCE** section.
4. Continued use of this product in conditions outside the specification limits given in this Manual can present potential risk to users.

# ADVICE

The use of the word 'failsafe' to describe the function of a thermostatic mixing valve is both incorrect and misleading. In keeping with every other mechanism it cannot be considered as being functionally infallible.

Provided that the thermostatic mixing valve is installed, commissioned, operated within the specification limits and maintained according to this Manual, the risk of malfunction, if not eliminated, is considerably reduced.

Malfunction of thermostatic mixing valves is almost always progressive in nature and will be detected by the use of proper temperature checking and maintenance routines.

Certain types of system can result in the thermostatic mixing valve having excessive 'dead-legs' of pipework. Others allow an auxiliary cold water supply to be added to the mixed water from the mixing valve. Such systems can disguise the onset of thermostatic mixing valve malfunction.

Ultimately, the user or attendant must exercise due diligence to ensure that the delivery of warm water is at a stable, safe temperature. This is particularly important in such healthcare procedures as supervised bathing of patients unable to respond immediately to unsafe temperatures.

# INTRODUCTION

The Rada 425-t3 Thermostatic mixing valve is specified to meet the highest standards of safety, comfort and economy as demanded by todays users. The Rada 425-t3 is designed, manufactured and supported in accordance with accredited BS EN ISO 9001:1994 Quality Systems.

This Manual covers all Rada 425-t3 Thermostatic mixing valves manufactured from May 2001.

The suffix t3 indicates that the valve has been certified for use in UK healthcare premises as a Type 3 mixing valve under the TMV3 scheme. Where this product is to be used in such an installation, particular Application, Installation, Commissioning and Maintenance requirements apply. These are given in the section 'TYPE 3 VALVES'.

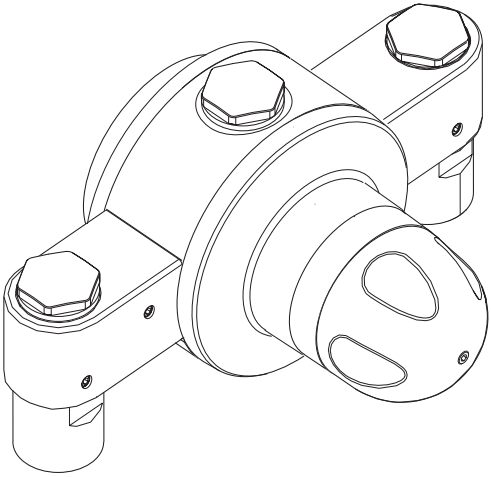
# DESCRIPTION

A 1" inlet/outlet thermostatic mixing valve employing the unique 'thermoscopic' temperature sensor to provide water at safe, accurate temperatures for ablutionary or process requirements.

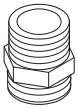
**Rada 425-t3 c** - Exposed model, surface mounted. Angle inlet checkvalve elbows rotate to accept rising, falling or rear-fed supplies.

# PACK CONTENTS

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



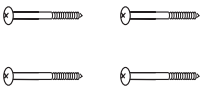
1 x 425-t3 Mixing Valve ☐



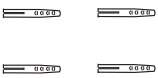
3 x Compression Fittings ☐

3 x Olives ☐

3 x Compression Nuts ☐



4 x Fixing Screws ☐



4 x Wall Plugs ☐

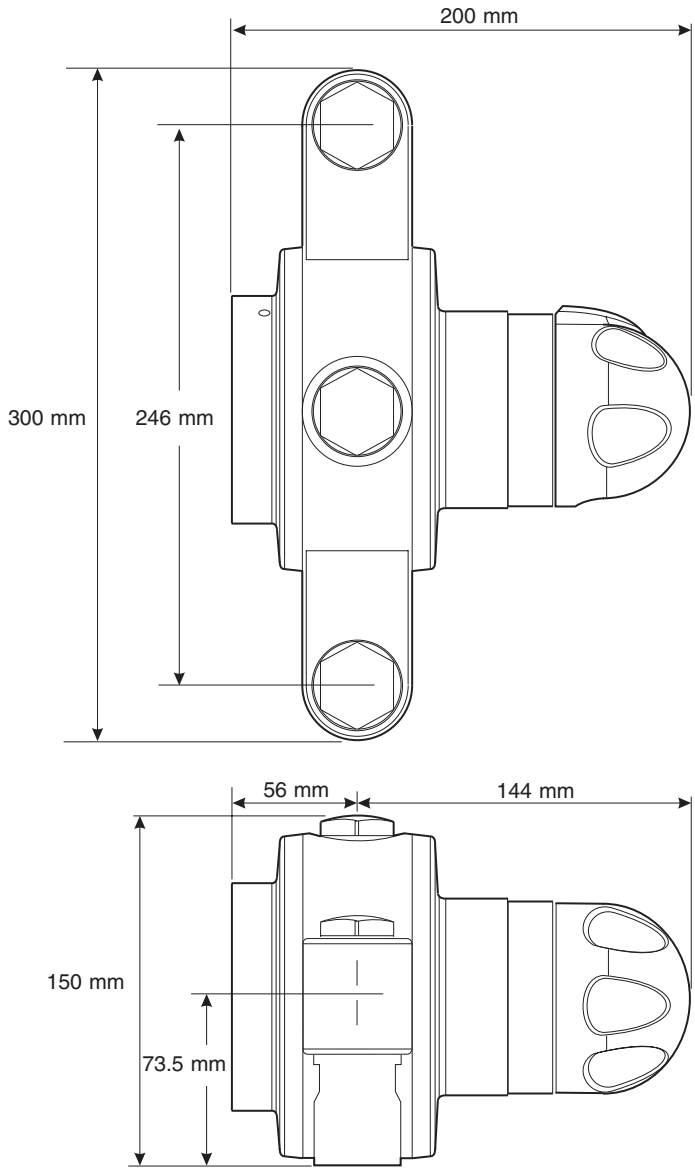
1 x Hexagonal Wrench ☐

## Documentation

1 x Product Manual ☐

# DIMENSIONS

All dimensions are nominal and in mm



# SPECIFICATION

## 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.

## Other Applications

For information on other specific applications or suitability, refer to Kohler Mira Ltd, or Local Agent.

## Disinfection

In applications where system chemical disinfection is practised, chlorine can be used (calculated chlorine concentration of 50 mg/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.

## Operating Parameters

For Type 3 valves the supply conditions specified in **Type 3 Valves - Application** take precedence over the operating parameters which follow.

## Pressures and Flow Rates

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

**Recommended Minimum Dynamic Supply Pressure: 0.15 bar (0.2 bar healthcare)**.

**Recommended Minimum Flow Rate: 8 l/min** at mid-blend with equal dynamic supply pressures.

**Recommended Maximum Flow Rate: 200 l/min** at mid-blend (which equates to maximum pressure loss of 3.5 bar).

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

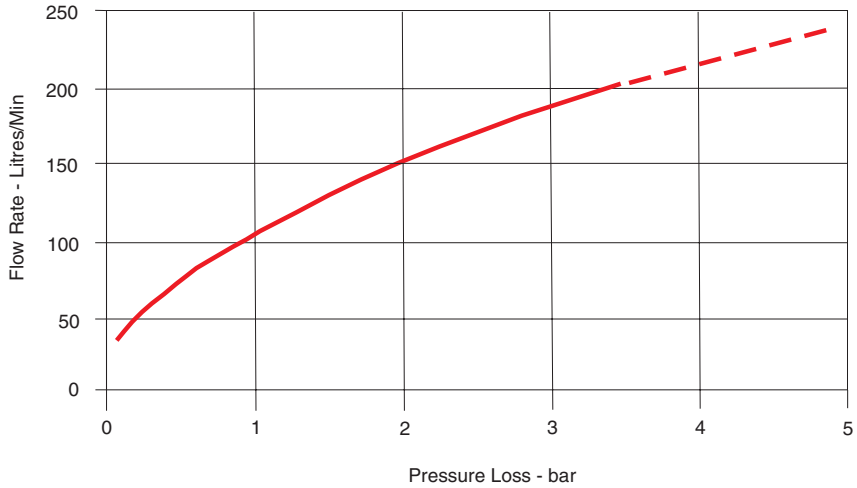
**Maximum Static Pressure** is **10 bar**.

Recommended maximum flow velocity in pipelines is 2 metres/second.

* *Pressure Loss Ratio is determined by subtracting the resistance of the outlet pipework and outlet fittings from the dynamic pressures of the hot and cold water at the inlets of the mixing valve. This is at its extreme when the mixing valve is used at its lowest flow-rate and when the maximum inequality occurs in the pressure of the hot and cold water supplies.*

### Hydraulic Restriction: Flow Rate Pressure Loss Graph

(mixing valve only, equal dynamic supply pressures and mid-blend temperature setting, rising or falling pressure loss).




## Temperatures

Optimum performance is obtained when **temperature differentials of 20°C** or more exist between blend and either supply. Blend control accuracy will begin to diminish at temperature differentials below **12°C**.

**Blend Temperature Range: between ambient cold and approximately 60°C**, according to hot water supply temperatures.

**Thermostatic Control Range: approximately 25-60°C.**

**Optimum Thermostatic Control Range: 35 - 46°C.**

**Recommended Minimum Cold Water Temperature: 1°C.**

**Recommended Maximum Hot Water Temperature: 85°C.**

**Note!** If the hot water supply system does not incorporate safety devices (e.g. non self resetting thermal cut out) to prevent this temperature being exceeded then the use of a tempering valve may be considered to limit the temperature of the water supplied to the mixing valve. The output temperature of this tempering valve must be set to a value not less than 60°C and it must not exceed 85°C if the hot water supplied to it reaches the maximum possible value which may occur under fault conditions in the hot water apparatus.

## Flow Control

The Rada 425-t3 mixing valve does not have integral flow control, appropriate provision must be made for this in the outlet pipework.
This can be in the form of basin/bath tap, stop-cock, mechanical timed-flow controller or solenoid.
The device chosen must be **non-concussive** in operation.

## Connections

Rada 425-t3 c - inlets and Outlet: 1" BSP female/28 mm compression. Angle inlet checkvalve elbows rotate to accept rising, falling or rear-fed supplies.

| | | | |
|---|---|---|---|
| Standard connections are: | hot | - | left (marked red) |
| | cold | - | right (marked blue) |
| | outlet | - | top (can be altered to bottom outlet if required by repositioning the drain plug) |

This model can operate in any plane, provided hot and cold pipework is connected to the appropriate inlets (hot - red, cold - blue).

# 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**. For Type 3 valves see also Installation conditions in TYPE 3 VALVES.
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 (except for strainer and checkvalve access). For all models, allow a minimum 80 mm clearance in front of the temperature control to enable removal of the servicable parts 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. Pipework dead-legs should be kept to a minimum. The mixed water outlet piping should not exceed 2 m and the overall length from the hot water circuit to the discharge point should not exceed 5 m.
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.**

## Outlet Position/Reversed Inlets

The Rada 425-t3 c mixing valve is 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 turn the whole valve through 180° (The internal components are **not** reversible).

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.

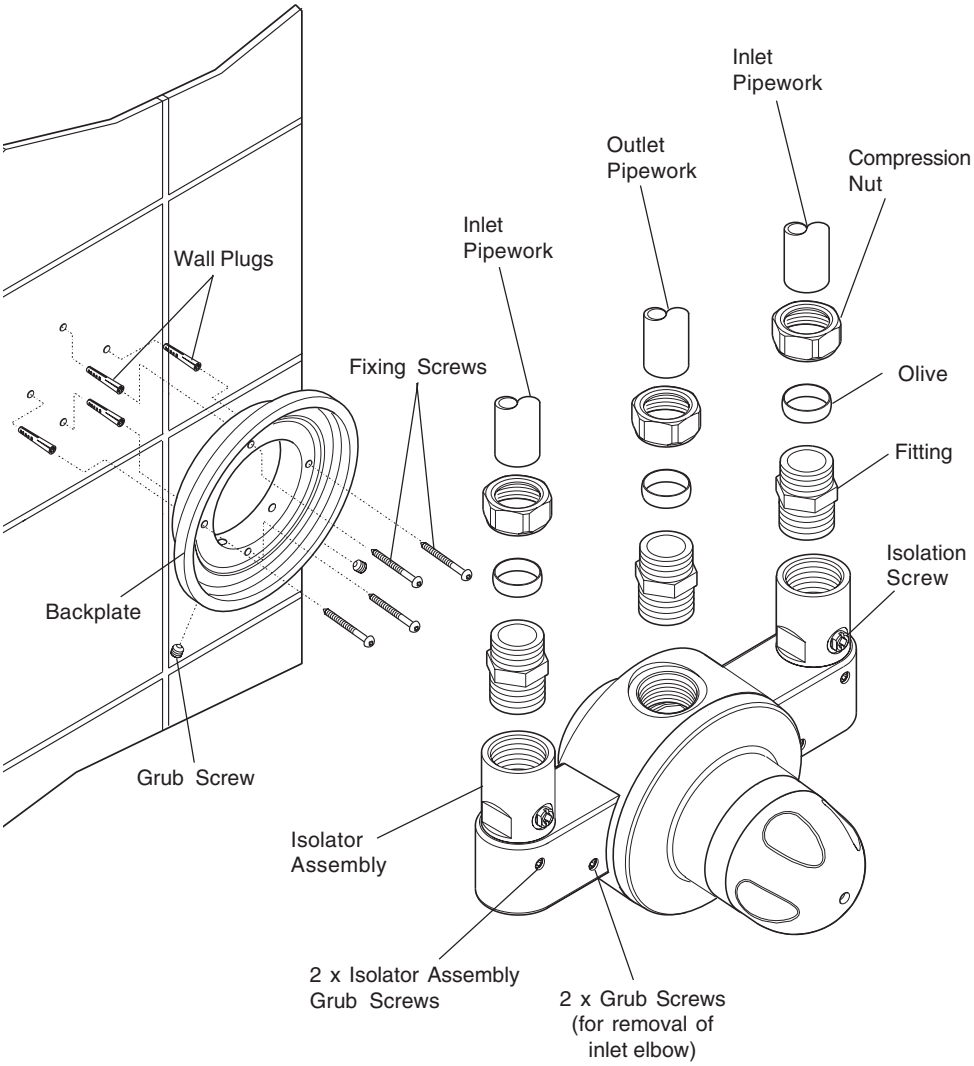
# Installation

The Rada 425-t3 c has 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 four grub screws, two for removal of the isolator assembly and two 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 (2 off) using the 3 mm hexagonal wrench (supplied) and remove the backplate.
3. Position the backplate on the wall and mark the position of the fixing holes (4 off). Remove the backplate and drill the fixing holes.
4. Fix the backplate securely to the wall surface using the fixing screws and wall plugs provided.
5. **Important!** Flush through the hot and cold supplies thoroughly before connection to the valve.
6. Fit the valve onto the backplate and tighten the grub screws (2 off).
7. Connect the hot, cold and outlet supplies using the fittings, olives and compression nuts supplied and check for any leaks.
8. The maximum temperature may now need resetting. Refer to **COMMISSIONING**.




**Installation**
**Figure 1**

# COMMISSIONING

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

## Exercising the Thermostat

Thermostatic mixing valves with wax thermostats are inclined to lose their responsiveness if not used. Valves which have been in storage, installed but not commissioned, or simply not used for some time should be exercised before setting the maximum temperature or carrying out any tests.
A simple way to provide this exercise is:

(a) ensure that the hot and cold water are available at the valve inlets, and the outlet is open.

(b) move the temperature control rapidly from cold to hot and hot back to cold several times, pausing at each extreme.

## Maximum Temperature

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

All Rada Thermostatic mixing valves are fully performance tested individually and the maximum temperature is pre-set to approximately 45 °C under ideal installation conditions at the factory.

Site conditions and personal preference may dictate that the maximum temperature has to be re-set following installation (For Type 3 valves in healthcare installations the maximum blend temperature is determined by the application - see Table under **Application in Type 3 Valves**).

## Maximum Temperature Setting

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

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.(refer to Figure 2).
2. Pull off the hub.

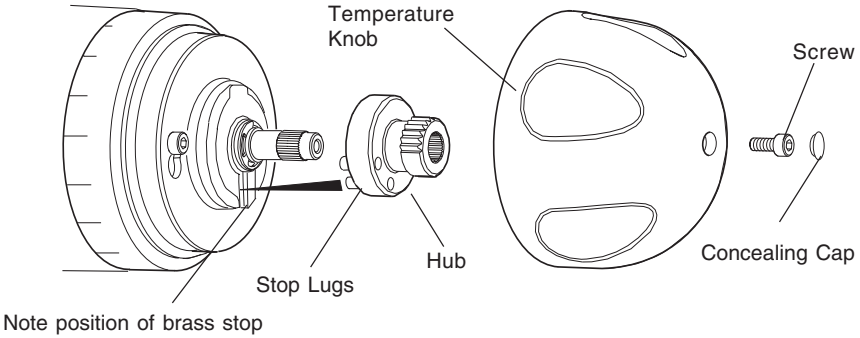
   **Note!** Leave the pressure washer in place on spindle.
3. Invert the hub and use to rotate the spindle until required maximum blend temperature is obtained at discharge point; turn clockwise to decrease, anti-clockwise to increase temperature. Each graduation on the cover shroud equals an approximate change of temperature of 2°C.

   **When resistance is felt do not use force to turn any further, as this can damage the internal parts.**
4. Once the desired maximum blend temperature is achieved, gently remove the hub and, without disturbing the spindle, reposition it so that the stop lug is against the brass stop on the valve cover, so preventing further anti-clockwise rotation. Ensure that the pressure washer is in place on spindle behind hub and that the circlip is secure. Check that blend temperature has not altered.
5. **Important!** rotate hub slowly clockwise until the minimum required cool (but not fully cold) water temperature is obtained, then fit temperature knob onto hub so that the indicator on the temperature knob aligns with the stop lugs on the hub (refer to **Figure 2**).
6. Replace the temperature knob and the screw.

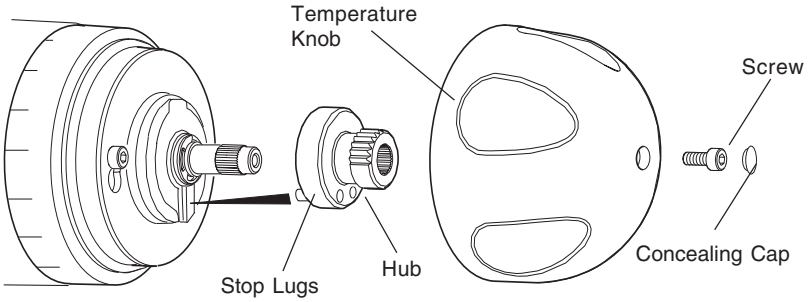
## For Locked Temperature

1. Remove the temperature knob concealing cap and then the screw using the 3 mm hexagonal wrench.(refer to Figure 2).
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 stop lugs in the hub fit over the top of the cartridge stop (refer to **Figure 3**), preventing further rotation. Check that blend temperature has not altered.
5. Re-fit the temperature knob.




**Commissioning - Adjustable Temperature Setting**
**Figure 2**




**Commissioning - Locked Temperature Setting**
**Figure 3**

## Commissioning Checks

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

1. Check inlet pipework temperatures for correct function of checkvalves i.e. that hot water does not cross flow into the cold supply and vice versa.
2. Check that the supply pressures are within the range of operating pressures for the valve.

   (a) ensure that the hot and cold water are available at the valve inlets, and the outlet is open.

   (b) move the temperature control rapidly from cold to hot and hot back to cold several times, pausing at each extreme.
3. All connections and the mixer body are water tight.
4. Exercise the thermostat.
5. Adjust the temperature of the mixed water in accordance with the instructions (refer to **Maximum Temperature Setting**). For type 3 valves refer to the table under Application in TYPE 3 VALVES.

**6.** Operate the outlet flow control and check:

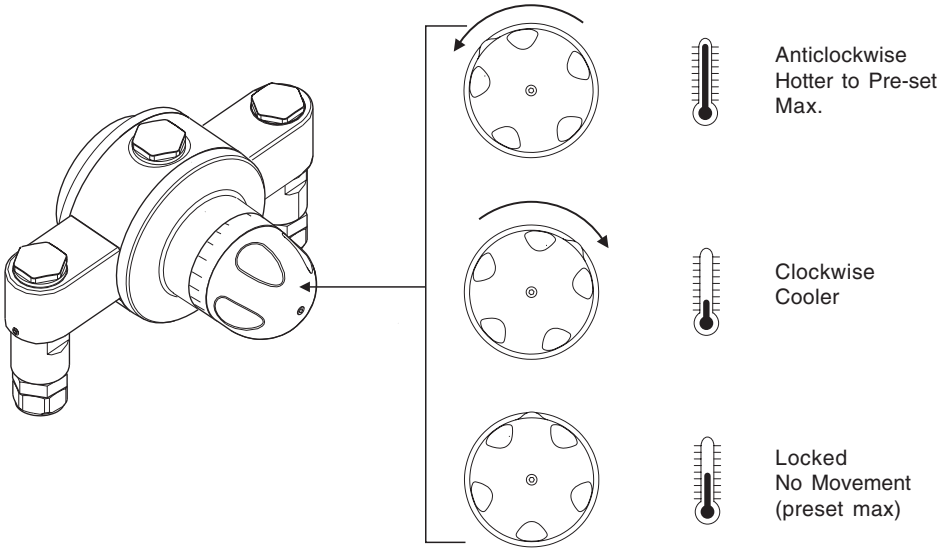
(a) Flow rate is sufficient for the purpose

(b) Temperature(s) obtainable are acceptable.

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. 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 should cause a drop in supply pressure), and note the subsequent effect on blend temperature (should be no more than 2°C change).

# OPERATION

For models with a standard temperature knob fitted, adjustment of the blend temperature from preset maximum to cold is achieved by clockwise rotation of the knob. Each graduation on the cover shroud equals an approximate change of temperature of 2°C.



# FAULT DIAGNOSIS

| Symptom | Cause/Rectification |
|---|---|
| **1.** Only hot or cold water from outlet. | a. Inlet supplies reversed (i.e. hot supply to cold inlet). Check.<br>b. No hot water reaching mixing valve. Check<br>c. Check filters and inlet fittings for blockage.<br>d. Refer symptom **5** below.<br>e. Installation conditions continuously outside operating parameters: refer to **SPECIFICATION** and **2e** below. |
| **2.** Fluctuating or reduced flow rate. | Normal function of mixing valve when operating conditions are unsatisfactory.<br>a. Check filters and inlet/outlet fittings for flow restriction (check isolators are fully open).<br>b. Ensure that minimum flow rate is sufficient for supply conditions.<br>c. Ensure that dynamic inlet pressures are nominally balanced.<br>d. Ensure that inlet temperature differentials are sufficient.<br>e. (subsequent to rectification of supply conditions) Check thermostatic performance; renew thermostat assembly if necessary. |
| **3**. No flow from mixing valve outlet. | Check inlet isolators are fully open.<br>a. Check filters and inlet/outlet fittings for blockage.<br>b. Hot or cold supply failure; thermostat holding correct shutdown function: rectify, and return to **2e** above. |
| **4.** Blend temperature drift. | Indicates operating conditions changed.<br>a. Refer to symptom **2** above.<br>b. Hot supply temperature fluctuation (rectify and refer to **COMMISSIONING**).<br>c. Supply pressure fluctuation (refer to **INSTALLATION**; General).<br>d. Valve requires servicing. Fit 'O' Seal pack.<br>e. Fit new thermostat pack. |
| **5.** Hot water in cold supply or vice versa. | Indicates check valves require maintenance, refer to **MAINTENANCE**. |

(Continued)

| Symptom | Cause/Rectification |
|---|---|
| | (Continued) |
| **6.** Maximum blend temperature setting too hot or too cool. | a. Indicates incorrect **temperature setting**; refer to **COMMISSIONING**.<br>b. As symptom **4** above.<br>c. As symptom **5** above. |
| **7.** Water leaking from valve body. | Seal(s) worn or damaged.<br>a. Obtain Seal Pack, and renew all seals.<br>b. (If leak persists from around temperature spindle). Renew sleeve and shuttle assembly. |
| | |

# MAINTENANCE

## General

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

   - They are installed, commissioned, operated and maintained in accordance with the recommendations stated in this Product Manual.

   - Periodic attention is given as necessary to maintain the product and its associated installation components in good functional order. Guidelines are given below.

3. 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.

## Planned Maintenance Programmes (Preventative/Precautionary Maintenance)

The frequency and extent of attention required will vary according to prevailing site and operational conditions. In applications (such as non-healthcare) where the risks to the user are too slight to justify the full in-service test procedure and maintenance logging process, the procedure under Performance check is suggested to cover average duty and site conditions.

1. In all other cases it is recommended that a routine of preventative maintenance be employed which is based upon assessment of the risks to the user. The following practices are intended to support such a routine:

   - In-service tests

   - Regular temperature checking in between In-service tests

   - Maintenance of a log of In-service tests and temperature checks together with details of critical parts replacements and any other service work.

2. Thermostatic mixing valves only operate correctly when all components have been serviced and have been tested for correct performance. If any component is faulty, including the thermostat the valve will not operate correctly and could allow full hot water to pass through the valve.

3. As with all other thermostatic mixing valves, the critical sensing element in the Rada 425-t3 c together with other “critical components” (table 1) will exhibit wear over a period of time and usage.

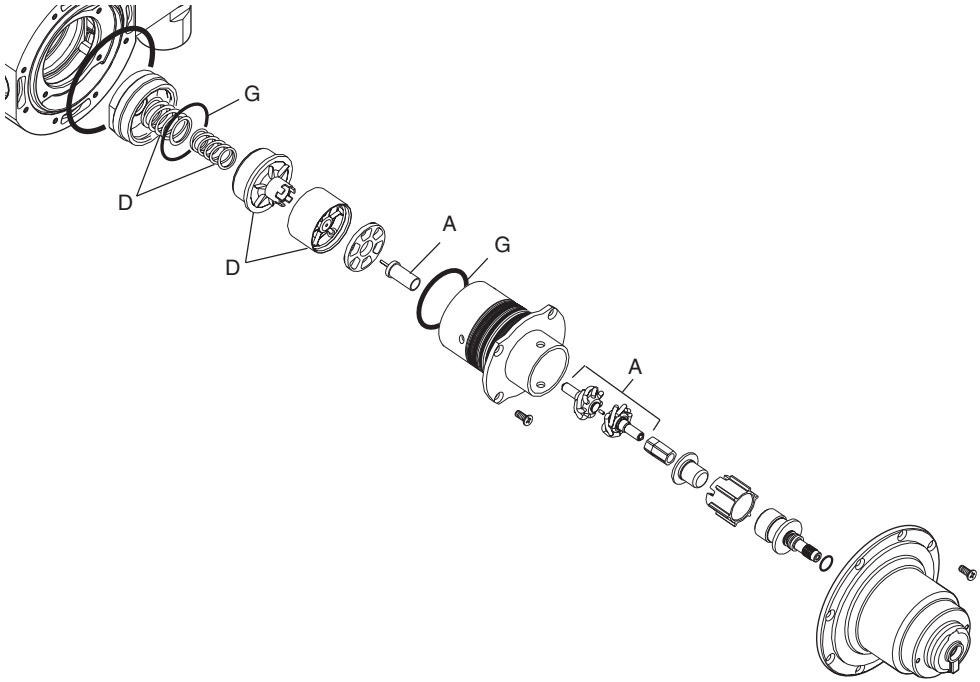
The designed minimum service life of all these “critical components” is 5 years providing the Rada 425-t3 c is operated with the recommended operating conditions and within the recommended operating parameters. However, when supply conditions and/or usage patterns do not conform to the recommended operating parameters and/or the recommended operating conditions, the thermostatic unit and other critical parts may need to be replaced more frequently (‘recommended operating conditions’ and ‘recommended parameters’ are defined on page 7 of this Product Manual under the headings of **‘Normal Operating Conditions’** and **‘Operating Parameters’**).

**Important!** In healthcare applications such as hospitals, aged person facilities, residential care homes, etc. and in any other applications where the user is similarly at risk, irrespective of supply and usage conditions or the evidence of in-service tests, the critical components should be replaced at intervals of no more than 3 years.

| Pack Number | Identified | Description |
|---|---|---|
| 523. 06 | A | Thermoscopic Unit |
| 523. 09 | D | Shuttle |
| 523. 09 | D | Shuttle Seat |
| 523. 09 | D | Overload Spring |
| 523. 09 | D | Return Spring |
| 523. 12 | G | Seal - Shuttle Separator |
| 523. 12 | G | Seal - Retaining Cap |

**During the fitting of critical components listed in the table above it may be necessary to replace other non-critical components.**

**Critical Components**
**Table 1**




**Critical Components**
**Figure 4**

# Performance Check

## Six Monthly

**Exercising the Thermostat:** If the valve has not been in regular or recent use the thermostat should be exercised before any other checking. Where user adjustment of the blend temperature is available the exercising of the thermostat can be achieved as described in **COMMISSIONING**. For valves with locked temperature control it is necessary to isolate and restore each supply in turn a few times.

**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 thermostatic cartridge when necessary.

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

## Service Contracts

To ensure your Rada/Mira products function correctly and give continued safe performance Service Contracts can be undertaken (subject to site survey).
All Service Contract work is carried out by fully trained Rada/Mira Service Engineers who carry a comprehensive range of genuine spare parts.
For details on arranging a Service Contract please contact Aftersales/Service.

## In-service Tests

The principal means for determining the continuing satisfactory performance of the mixing valve is the In-service test.

The In-service test procedure is shown in Figure 11. This should be carried out at both 6 to 8 weeks and 12 to 15 weeks after commissioning the valve. The results of these tests are used to determine when, after initial commissioning, the in-service test is next repeated.

## Frequency of In-service Tests

The 'Guide to in-service test frequency' is shown in Figure 12. The in-service test results over the first 28 weeks after commissioning determine the ongoing frequency of testing shown in the right hand boxes of the Guide.
Whenever a Thermoscopic Unit and/or critical components are replaced, the in-service test frequency should be reassessed as if it was a new valve.

**Note!** In-service tests should be carried out with a frequency, which identifies a need for service work before an unsafe water temperature can result. The general principal to be observed after the first 2 or 3 in-service tests is that, intervals of future tests should be set to those which previous tests have shown can be achieved with no more than a small change in mixed water temperature. But in no case longer than 12 months.

## Temperature Testing

Check and record warm water temperature regularly to confirm correct operating performance of the valve. In health care applications such as hospitals, aged persons facility, nursing homes etc. such checks must be made at least every month. More regular temperature checks should be made where increased risks are perceived such as where patients are unable to immediately respond to an increase in water temperature by either shutting the water off or removing themselves from the contact with the water. Records of warm water temperature checks should be included in a log book.

### Thermostatic Mixing Valve Performance Records (Log Book)

It is recommended that the user maintains a log of the in-service tests described herein, together with a record of any service work carried out and the replacement of critical components. It is also recommended that any maintenance personnel sign the user log in respect of all thermostatic mixing valves examined on each attendance at the user's premises. **Refer to 'Recommended content of Maintenance Log' on page 31.**

### Training

Maintenance personnel should also ensure that the user's staff are aware of the importance of reporting temperature variations and that when detected, these should be recorded in the log.

## 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 replacement of parts.

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 425-t3 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.

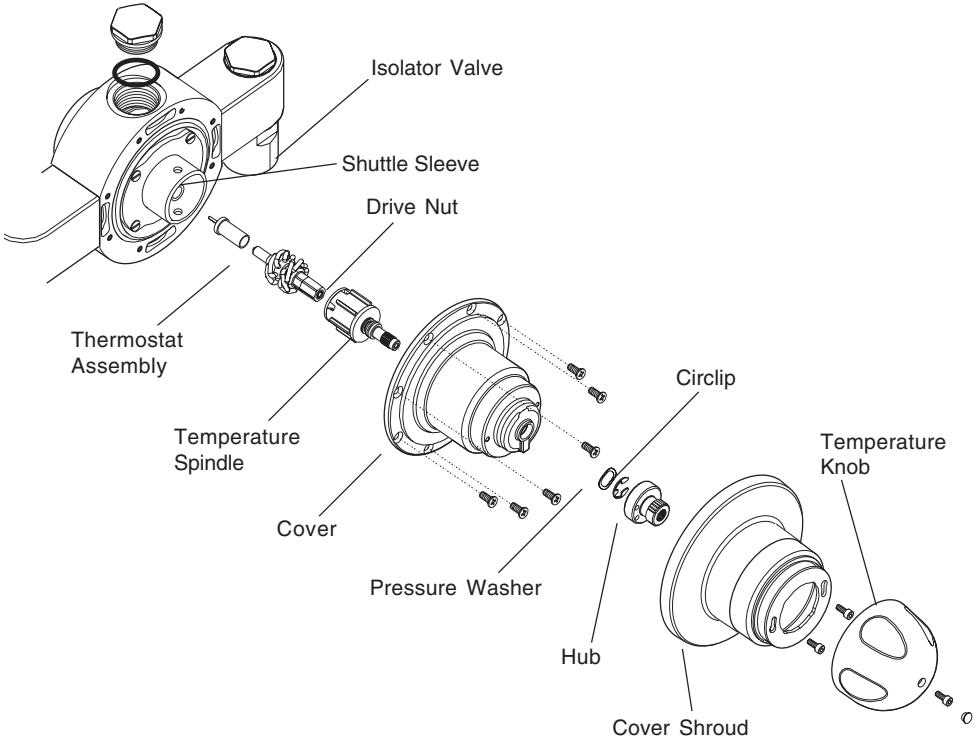
## Lubricant

**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 - Thermostat Assembly

**Removal (refer to Figure 5)**

1. Turn the isolation screw on the isolator valves through 90 ° to isolate the water supplies to the mixing valve . 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.
3. Remove the two screws holding the cover shroud in position and remove the cover shroud.
4. Remove the hub, the circlip and the pressure washer.
5. Remove the eight screws and remove the cover. Note the position of the stop on the cover, so that it can be re-assembled in the same position.
6. Remove the temperature spindle and drive nut.
7. Remove the thermostat assembly and the pinned actuator.




**Thermostat Assembly**
**Figure 5**

**Cleaning/Renewal of Parts**

**8.** The interior surface of the mixing valve body must be clean before refitting the thermostat assembly. Rinse the valve interior thoroughly in clean water to remove any debris before refitting the thermostat assembly.

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

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

**Re-assembly**

**10.** Install the pinned actuator into the shuttle assembly.

**11.** Install the drive nut and the temperature spindle into the cover.

**Note!** The drive nut will need to be aligned with the grooves inside the cover.

**12.** Install the thermostat into the drive nut. Install the cover, lining up the pinned actuator with the thermostat. Rotate the cover so that it is positioned in the same position as it was when you removed it. Secure the cover in position with the eight screws.

**13.** Fit the pressure washer and secure the spindle in position with the circlip. Make sure that the circlip locates correctly in the groove in the temperature spindle.

**14.** Before fitting the hub, the temperature will need resetting; refer to **COMMISSIONING**.

**15.** Fit the cover shroud and secure in position with the two screws.

**16.** Re-fit the temperature knob.

## Maintenance Procedure - Port Sleeve/Shuttle Assembly

**Removal (refer to Figures 6 and 7)**

**1.** Turn the isolation screw on the isolator valves through 90 ° to isolate the water supplies to the valve . 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.

**3.** Remove the two screws holding the cover shroud in position and remove the cover shroud.

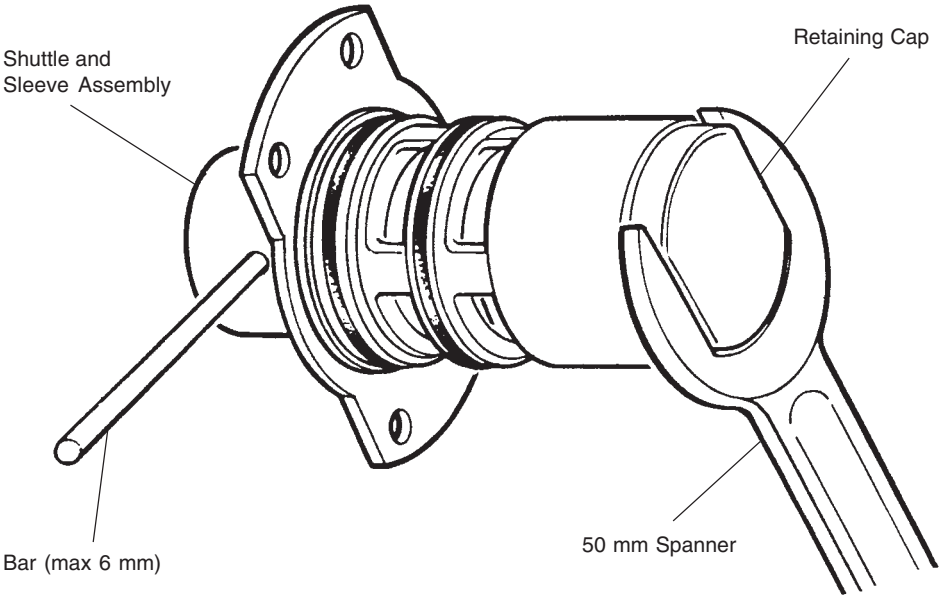
**4.** Remove the hub, the circlip and the pressure washer.

**5.** Remove the eight screws and remove the cover. Note the position of the stop on the cover, so that it can be re-assembled in the same position.

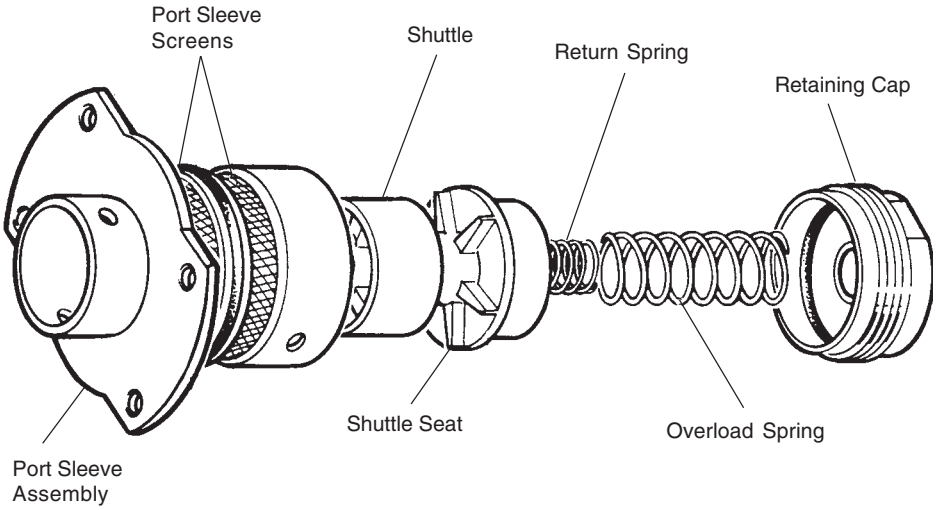
**6.** Remove the temperature spindle and drive nut.

7. Remove the thermostat assembly
8. Remove the four screws.
9. Insert a bar (maximum 6 mm diameter) through the holes provided at the front of the port sleeve and use this with a slight twisting action to carefully pull the shuttle and sleeve assembly out of the valve body.
10. Remove both port sleeve screens by releasing the folded tabs.
11. To dismantle the shuttle and sleeve assembly, again insert the bar through the holes at the front of the port sleeve to hold the assembly whilst the retaining cap is **loosened only** using a spanner (50 mm) across the flats.

    There is spring tension behind the retaining cap, so complete the unscrewing and removal by hand.
12. Lift out the overload spring and return spring and carefully push out the shuttle seat and shuttle (refer to Figure 7).




**Shuttle and Sleeve Assembly (Assembled)**
**Figure 6**




**Shuttle and Sleeve Assembly (Disassembled)**
**Figure 7**

### Cleaning/Renewal of Parts

**13.** Internal parts (with the exception of the Thermostat Assembly) can be cleaned using a mild proprietary inhibited scale solvent e.g. domestic kettle descalent. After descaling, always rinse parts throughly in clean water before refitting.

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

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

**15.** Lightly smear all seals and threads with a **silicone-only based lubricant** to assist re-assembling.

**16.** Inspect the thermostat assembly for signs of damage.

Note! This component cannot be tested individually, its service condition should be assessed as part of the performance check; refer to **Commissioning Checks**.

**17.** Examine the shuttle seat, the shuttle and the port sleeve for signs of damage or corrosion; renew as necessary.

**Re-assembly**

**18.** Insert the shuttle fully into the port sleeve (wider open end) with radius centre face inwards (refer to Figure 8), ensuring that the separator seal remains in place and is not damaged.

**19.** Insert shuttle seat into the port sleeve, ensuring that the cut-outs locate into the webs in the shuttle.

**20.** Insert the return spring through the centre of the overload spring. Insert both springs into the shuttle seat rear face.

**21.** Locate the retaining cap over the springs, compress and screw the cap fully into the port sleeve, ensuring that the threads are correctly engaged.

**22.** Replace the port sleeve screens, positioning the joint against one of the two solid sections. This will prevent debris entering through the slot in the screen.

**23.** Insert the shuttle and sleeve assembly into the valve body and secure in positon with the four screws.

**24.** Install the actuator sleeve and the thermostat assembly into the shuttle assembly.

**25.** Install the drive nut and the temperature spindle into the cover.

**Note!** The drive nut will need to be aligned with the grooves inside the cover

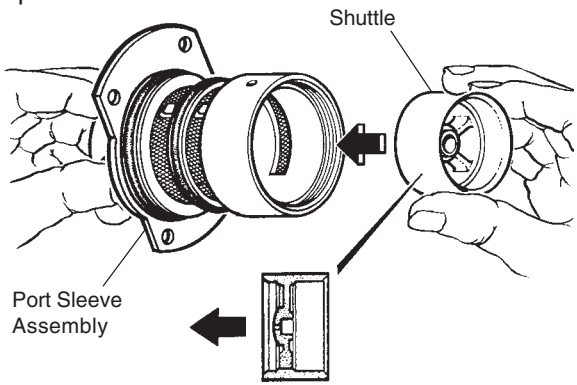
**26.** Fit the cover. Rotate the cover so that it is positioned in the same position as it was when you removed it. Secure the cover in position with the eight screws

**27.** Fit the pressure washer and secure the spindle in position with the circlip. Make sure that the circlip locates correctly in the groove in the temperature spindle.

**28.** Before fitting the hub, the temperature will need resetting; refer to **COMMISSIONING**.

**29.** Fit the cover shroud and secure in position with the two screws.

**30.** Re-fit the temperature knob and secure with the screw.




**Shuttle and Sleeve Assembly**
**Figure 8**

# 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 9**) 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 two 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.

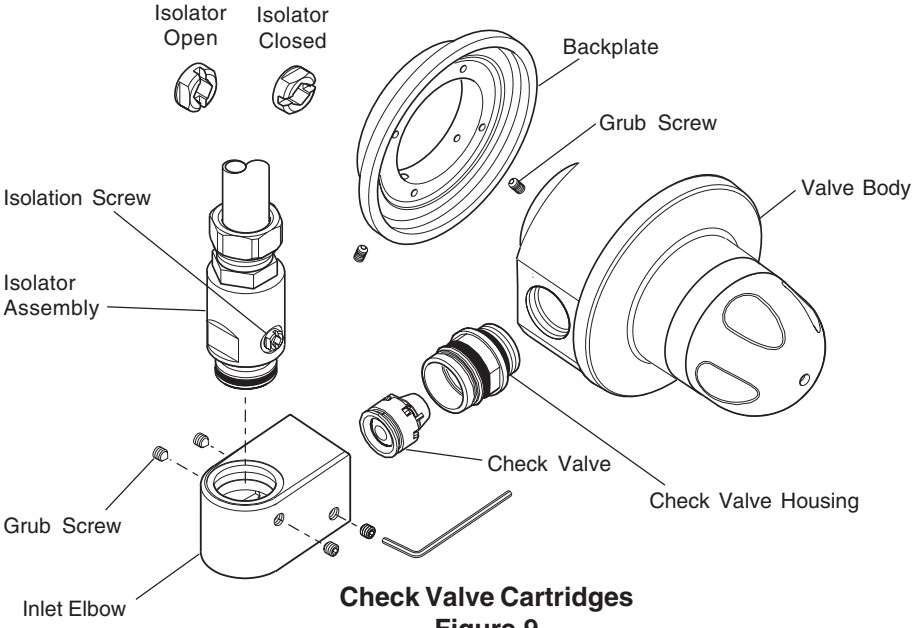
4. Unscrew and remove the check valve housings.

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 9**) to restore the water supplies to the valve and check for leaks.




**Check Valve Cartridges**
**Figure 9**

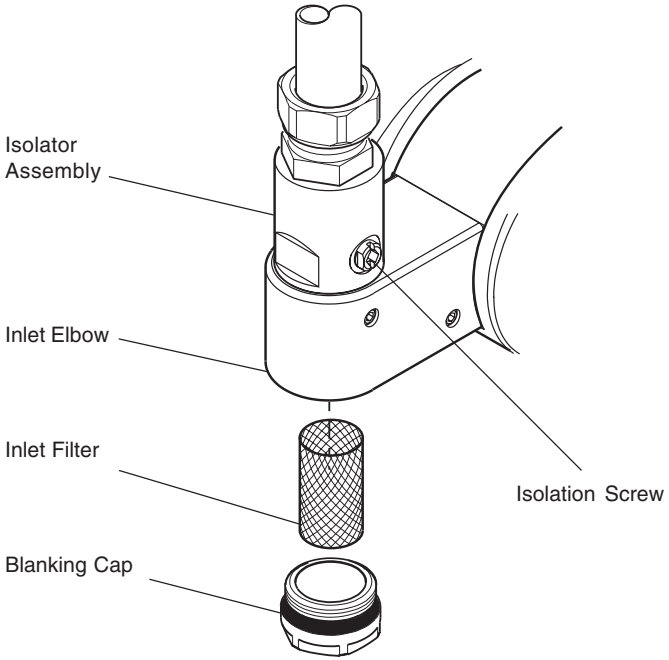
# Maintenance Procedure - Inlet Filters

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 425-t3 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 10**) 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 may require resetting (refer to **COMMISSIONING**).




**Inlet Filters**
**Figure 10**

# Recommended Content of Maintenance Log

It is recommended that the Maintenance Log should record the following:

**Details of valve, location and use, risk level and instructions**

Valve make and model

Valve unique identification number

Valve location

Date installed

Application i.e. type of discharge: bath, shower etc.

Risk assessment report number

Risk level found (e.g. vulnerability of patient)

Frequency of critical component replacement

Frequency of temperature monitoring

Responsibility for temperature monitoring

Location of temperature monitoring records

Source of spares and advice

Issue number of Product Manual (Installation, operating and maintenance instructions).

**Details of in-service testing and maintenance**

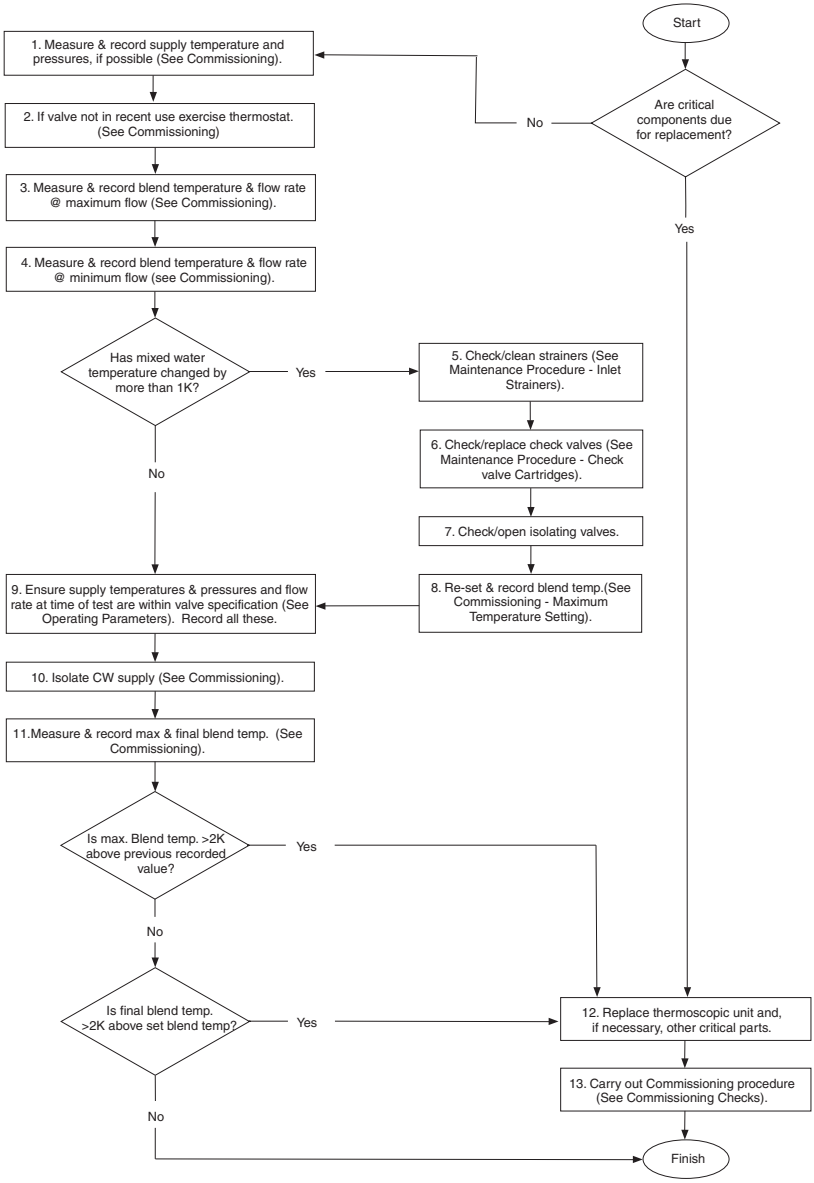
Initial commissioning test data (Supply pressures and temperatures, mixed water temperature, flow rate, result of cold water isolation test, date carried out, signature of maintenance person).

First in-service test due date
First in-service test data (As for initial commissioning)
Details of any remedial work carried out to valve or supply system
Second in-service test due date
Second in-service test data (As for initial commissioning)

Details of any remedial work, including part replacement, carried out to valve or supply system
Next in-service test due date
Next in-service test data (As for initial commissioning)

Details of any remedial work, including part replacement, carried out to valve or supply system.

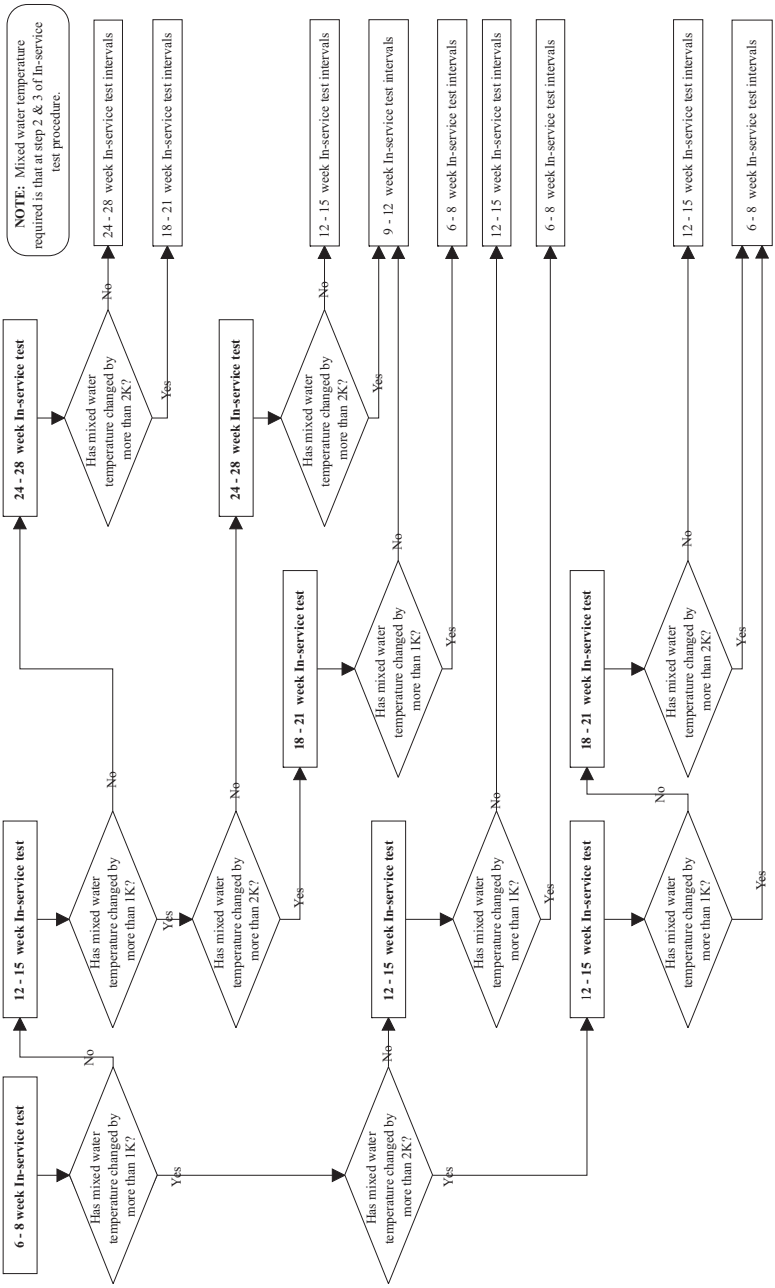
**Note!** Local requirements may demand that additional information be recorded.




**Note!** K = Kelvin, the unit of thermodynamic temperature. The unit "Kelvin" is equal to the unit of "Degree Celsius". Kelvin is used for a difference of Celsius temperature.

**Note!** All measurements should be recorded in the Thermoscopic Mixing Valve Performance Record (Log Book)

**In-service Test Procedure**
**Figure 11**




**Note!** K = Kelvin, the unit of thermodynamic temperature. The unit "Kelvin" is equal to the unit of "Degree Celsius". Kelvin is used for a difference of Celsius temperature.

**Guide to In-service Test Frequency**
**Figure 12**

# Type 3 Valves

## Application

The approved designations are as follows:

| Model | Designation Code |
|---|---|
| Rada 425-t3 c | LP-T44, LP-T46 |
| | |

The permitted application details are:

| Designation | Operating Pressure Range | Application | Mixed Water Temperature† °C |
|---|---|---|---|
| **-HP-B** | **High Pressure** | **Bidet** | **38°C maximum** |
| **-HP-S** | **High Pressure** | **Shower** | **41°C maximum** |
| **-HP-W** | **High Pressure** | **Washbasin** | **41°C maximum** |
| **-HP-T44** | **High Pressure** | **Bath (44°C fill)** | **44°C maximum** |
| **-HP-T46** | **High Pressure** | **Bath (46°C fill)** | **46°C maximum** |
| **-LP-B** | **Low Pressure** | **Bidet** | **38°C maximum** |
| **-LP-S** | **Low Pressure** | **Shower** | **41°C maximum** |
| **-LP-W** | **Low Pressure** | **Washbasin** | **41°C maximum** |
| **R-LP-T44** | **Low Pressure** | **Bath (44°C fill)** | **44°C maximum** |
| **R-LP-T46** | **Low Pressure** | **Bath (46°C fill)** | **46°C maximum** |

†Mixed water temperature at discharge point.
R = Rada 425-t3 approved designations.

**Note!** For washbasins, it is assumed that you are washing under running water.

**Note!** Bath fill temperatures of more than 44°C should only be available when the bather is always under the supervision of a competent person (e.g. nurse or care assistant).

In order to achieve the safe water temperatures expected of a Type 3 valve it is essential that the valve is used only for the applications covered by its approved designations, with the appropriate water supply pressures and temperatures, and it is commissioned, maintained and serviced in accordance with the recommendations contained in this guide.

## Installation Conditions

For healthcare applications where a Type 3 valve is required, the supply conditions must comply with the values in the following table. Note that both supply pressures must lie within the same pressure range.

| Operating Pressure Range | High Pressure | Low Pressure |
|---|---|---|
| Maximum Static Pressure - bar | 10 | 10 |
| Maintained Pressure, Hot and Cold - bar | 1 to 5 | 0.2 to 1 |
| Hot Supply Temperature - °C | 52 to 65 | 52 to 65 |
| Cold Supply Temperature - °C | 5 to 20 | 5 to 20 |

## Commissioning

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

1. Check that the designation of the thermostatic mixing valve matches the intended application.
2. Check that the supply pressures are within the range of operating pressures for the designation of the valve.
3. Check that the supply temperatures are within the range permitted for the valve and by guidance information on the prevention of legionella etc.
4. Check inlet pipework temperatures for correct function of checkvalve.
5. All connections and mixer body are water tight.
6. Operate the outlet flow control and check:
   (a) Flow rate is sufficient for purpose.
   (b) Temperature(s) obtained are acceptable.
7. Exercise the thermostat (refer to COMMISSIONING).

8. Adjust the temperature of the mixed water in accordance with the instructions in this manual and the requirement of the application and then carry out the following sequence:

**(a)** record the temperature, and pressures if possible, of the hot and cold water supplies.

**(b)** record the temperature and flow rate of the mixed water at the largest draw-off flow rate.

**(c)** record the temperature and flow rate of the mixed water at a smaller draw-off flow rate.

**(d)** isolate the cold water supply to the mixing valve and monitor the mixed water temperature.

**(e)** record the maximum temperature achieved as a result of (d) and the final temperature.

**Note!** The final mixed water temperature should not exceed the values shown in Table 1 below. Any higher temperatures should only occur briefly.

**(f)** record the date, equipment, thermometer etc. used for the measurements.

| Application | Mixed Water Temperature °C |
|---|---|
| Bidet | 40 |
| Shower | 43 |
| Washbasin | 43 |
| Bath (44°C fill) | 46 |
| Bath (46°C fill) | 48 |

**Guide to Maximum Continuous Temperatures During Site Tests**
**Table 2**

## Maintenance

Planned maintenance for Type 3 valves must use the In-service test, at the frequency given in the Guide to In-service test frequency and should employ Temperature Testing, Performance Log books and Training as detailed on pages 31 -34.

# SPARE PARTS

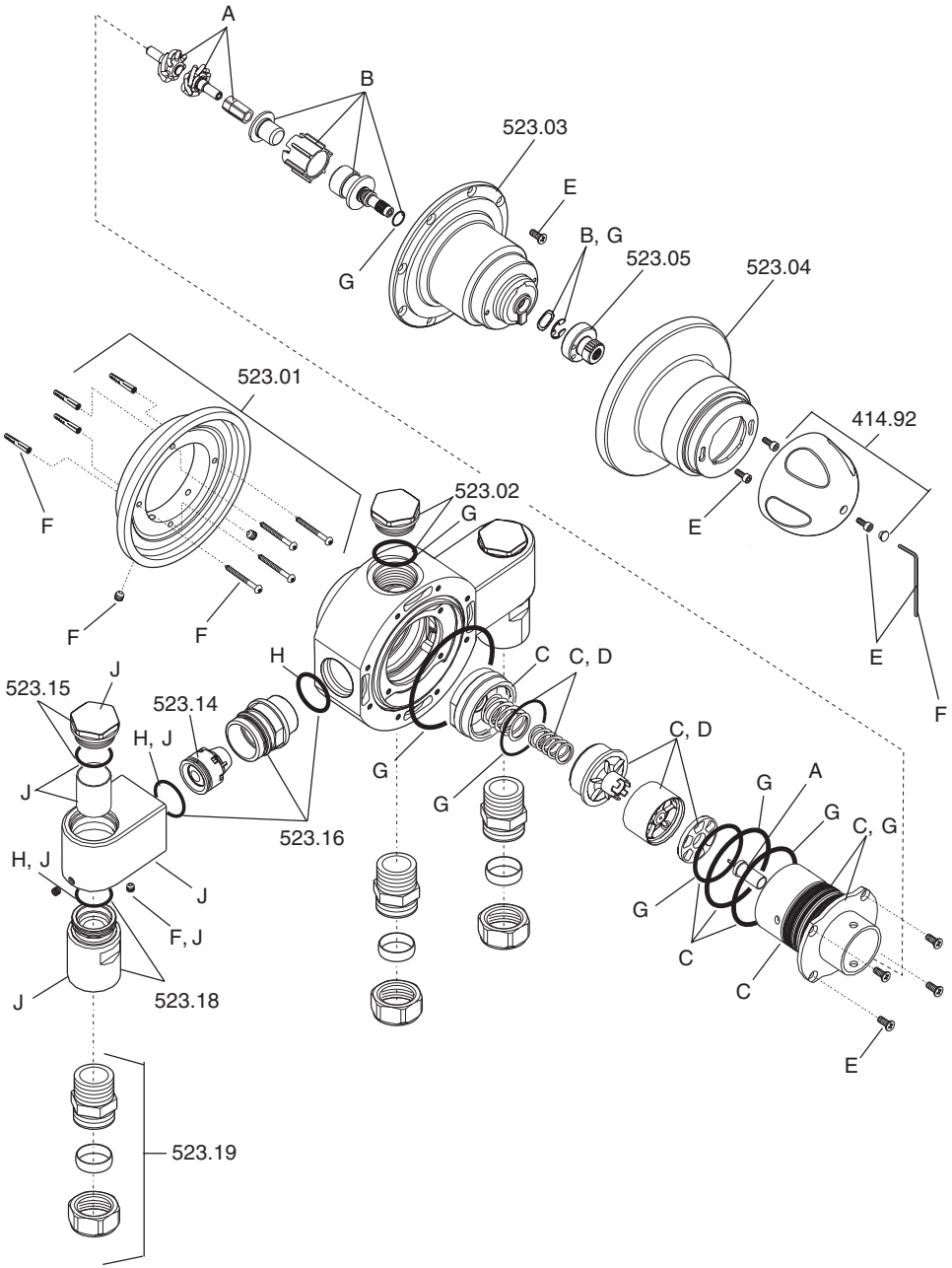
# SPARE PARTS

## Spare Parts List

| | |
|---|---|
| 414.92 | Knob Pack |
| 523.01 | Backplate Pack |
| 523.02 | Drain Plug |
| 523.03 | Cover |
| 523.04 | Cover Shroud |
| 523.05 | Hub Pack |
| 523.06 | Thermostat Pack - components identified ‘A’ |
| 523.07 | Drive Mechanism Pack - components identified ‘B’ |
| 523.08 | Port Sleeve Pack - components identified ‘C’ |
| 523.09 | Shuttle Pack - components identified ‘D’ |
| 523.10 | Cover Screw Pack - components identified ‘E’ |
| 523.11 | Fixing Screw Pack - components identified ‘F’ |
| 523.12 | ‘O’ Seal Pack - components identified ‘G’ |
| 523.13 | Filter/Elbow ‘O’ Seal Pack - components identified ‘H’ |
| 523.14 | 1 1/4” Check Valve Pack |
| 523.15 | Filter Cap Pack |
| 523.16 | Inlet Adaptor Pack |
| 523.17 | Elbow Pack - components identified ‘J’ |
| 523.18 | Ball Valve Pack |
| 523.19 | Compression Fittings |
| 523.22 | Critical Component Pack - consists of: |

| | |
|---|---|
| 523.06 | Thermostat Pack |
| 523.09 | Shuttle Pack |
| 523.12 | ‘O’ Seal Pack |

# 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:

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Tel.: + 44 (0)1242 221221
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