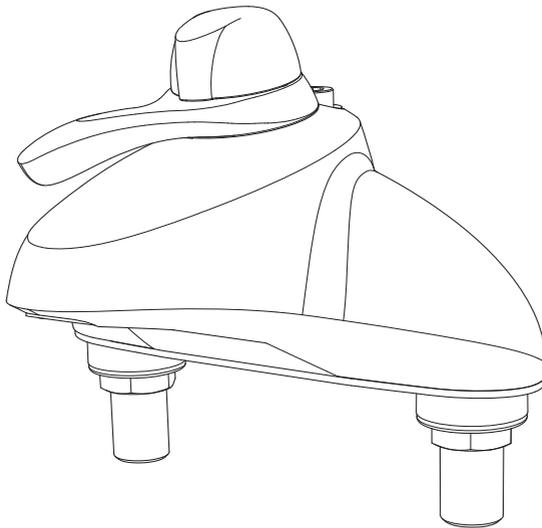




*Autotherm-3* BSM

## THERMOSTATIC BATH SHOWER MIXER



## 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

The Rada Autotherm-3 BSM is a Thermostatic Bath and Shower Mixer (BSM) specified to meet the highest standards of safety, and reliability as demanded by today's users. All Rada products are designed, manufactured and supported in accordance with accredited BS EN ISO 9001: 2000 Quality Systems.

The suffix '3' indicates that this mixer has been certified for use in UK Healthcare premises as a Type 3 valve under the BUILDCERT TMV3 scheme. For Healthcare installation refer to the TMV3 Requirements Manual. This product also complies with the Water Supply (water fittings) Regulations 1999.

The approved designations for **Type 3 Valves** are as follows:

Model	Designation Code
Rada Autotherm-3 BSM	HP-S / HP-T44 / HP-D44 / LP-S / LP-T44 / LP-D44

## Patents and Design Registration

Design Registration:	000165071-0001-0002
Patents:	GB: 2 291 693, 2 392 225, 2 421 297 Germany: 695 13 455.8 France: 0 694 721 (E)
Patent Applications:	GB: 2 419 656, 0428359.4 Euro: 1 672 257, 03254070.0 USA: 2006-0124758-A1, 10/607 025

# DESCRIPTION

The Rada Autotherm-3 BSM is a fully Thermostatic Bath and Shower Mixer, with an integral Flow Control and Divertor. A patented temperature re-setting mechanism automatically reduces the maximum allowable temperature when diverting from bath to shower outlet (i.e. 44°C bath fill to below 41°C shower).

For ease of installation and maintenance this product includes a separate Inlet Manifold which allows access to the Inlet Connections, Filters, Non Return Valves, Flow Regulator (factory fitted to the cold inlet) and Flexible Inlet Hoses incorporating Isolating Ball Valves. It includes maintenance free Cartridges, a Thermostatic Temperature Control Cartridge (based on the well proven Rada 215 / 222 range) and a combined Ceramic Flow and Divertor Cartridge.

To make sure that the installation complies with Water Supply Regulations (backflow prevention) the correct type of Shower Fittings must be fitted.

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

## **SAFETY : WARNINGS**

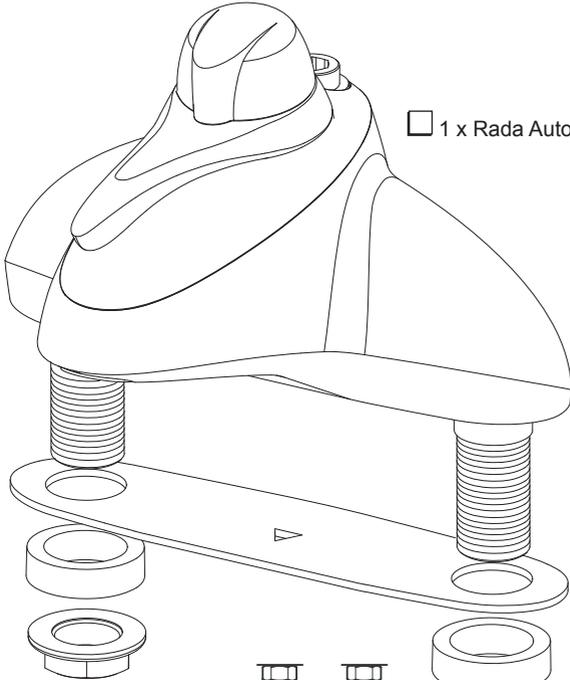
Rada products are precision engineered and should give continued superior and safe performance, provided:

1. They are installed, commissioned, operated and maintained in accordance with the recommendations given in this Manual.
2. Type 3 Valves are only used for applications covered by their approved designations refer to the TMV3 Requirements Manual..
3. Anyone who may have difficulty understanding or operating the controls should be attended when showering/bathing. Particular consideration should be given to the young, the elderly, the infirm or anyone inexperienced in the correct operation of the controls.
4. 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.
5. 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.
6. 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.
7. 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.
8. Ultimately, the user or attendant must exercise due diligence to make sure 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.

# PACK CONTENTS



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

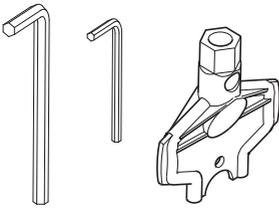


1 x Rada Autotherm-3 BSM

1 x Gasket

2 x Backnut Adaptors

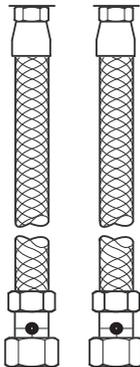
2 x Backnuts



1 x 5 mm Hexagonal Wrench

1 x 3 mm Hexagonal Wrench

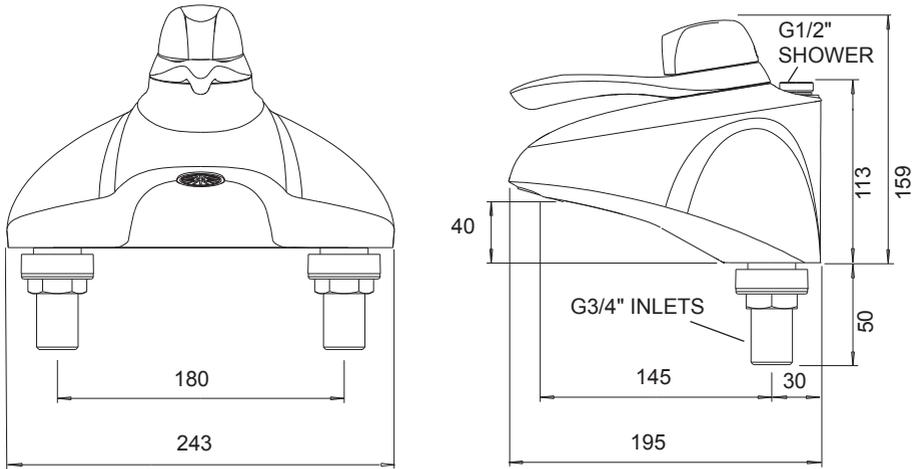
1 x Quad Key



2 x Flexible Hoses  
(With combined isolators)

1 x TMV3  
Requirements Manual

# DIMENSIONS



NOTE:- NOT TO SCALE - All dimensions are in millimetres

# SPECIFICATIONS

## Connections

Inlets: 3/4" BSP Male at 180 mm centres. Hot left, Cold right

Inlet with 0.5 m long Hoses: 22 mm Compression fitting with Isolating Valves.

Shower Outlet: 1/2" BSP Male.

Rada Autotherm-3 is a fully Thermostatic Bath and Shower Mixer with an integral Flow Control and Divertor. It is recommended that Rada Autotherm-3 Shower Fittings are used with this BSM to optimise performance (refer to section: '**Accessories**').

## Weight

Autotherm-3 BSM: 6.3 Kg.

## Temperature Control

**Temperature selection range:** full cold to full hot or max temperature limit.

**Note:** The BSM is preset to a maximum temperature of 43°C - 45°C for the bath fill. It is important to check the maximum temperature during commissioning as the setting will change with different supply conditions.

**Thermostatic Temperature Control:** 35°C - 45°C

**Note:** Optimum performance is obtained when a temperature differential of 20°C or more exists between blend and either supply (i.e. 40°C blend set, cold water temperature maximum 20°C, hot water minimum 60°C). To make sure that the BSM shuts off the hot supply if the cold supply fails to prevent scalding, the minimum hot water temperature must be 12°C above the blend temperature set ( i.e. 44°C blend set minimum hot water temperature 56°C).

## Flow Control

The BSM has an integral Flow Control and Divertor. No other type of user accessible Flow Control should be fitted to the Shower Outlet. Flow Regulators are fitted to control the flow at high pressures. For pressures below 1.0 Bar it is recommended that the Flow Regulators are removed, refer to section: '**Flow Regulator Removal**'.

## Operating Parameters

For Type 3 installations, valves are only to be used for applications covered by their approved designations, refer to the TMV3 Requirements Manual.

### Inlet Supply Pressure

Maintained Inlet Pressures: 0.2 - 5 Bar

Max. Static Pressures: 10 Bar

**Note:** With low pressure systems (below 1 Bar) it may be necessary to remove the Flow Regulators fitted to the product as supplied, refer to section: '**Flow regulator Removal**'. Both hot and cold pressures should be nominally balanced within  $\pm 10\%$ .

### Inlet Supply Temperature

Recommended Hot Temperature: 55°C - 65°C

Recommended Cold Temperature: 5°C - 20°C.

**Note:** The BSM can operate at temperatures up to 90°C for short periods without damage. However for safety reasons it is recommended that the maximum hot water temperatures is limited to 65°C.

### 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.

# INSTALLATION

## General

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

1. The installation must comply with the "water Supply Regulations 1999 (Water Fittings)" or any particular regulations and practices, specified by the local water company or water undertakers.
2. Before commencing, make sure that the installation conditions comply with the information given in section '**Specifications**'. For Type 3 valves, see also installation conditions in the TMV3 Requirements Manual.
3. Care must be taken during installation to prevent any risk of injury or damage.
4. Isolating Valves are combined with the Flexible Hoses and should be positioned for easy access when servicing the BSM.
5. To eliminate pipe debris it is essential that supply pipes are thoroughly flushed through before connection to the BSM.
6. Pipework dead-legs should be kept to a minimum.
7. Supply pipework layout should be arranged to minimise the effect of hydraulic restriction or other system usage upon the dynamic pressures at the BSM inlets. Recommended minimum supply-line pipe diameter is 22 mm or 3/4".
8. Systems which provide maintained supply pressures in excess of 5 Bar must be fitted with suitable pressure reduction equipment to balance the system pressures at an appropriate level.
9. Inlet pressure tappings which allow measurement of the inlet pressures to the BSM under operating conditions are particularly recommended for healthcare applications with Type 3 Valves. Available as an optional accessory, refer to section: '**Accessories**'.

## Important!

Three Flow Regulators are supplied fitted to the product. These are required to limit the flow rate to the bath and shower when installed on high pressure systems (> 1 Bar). On low pressure systems these may need to be removed to increase the flow. Refer to section: '**Flow Regulator Removal**'.

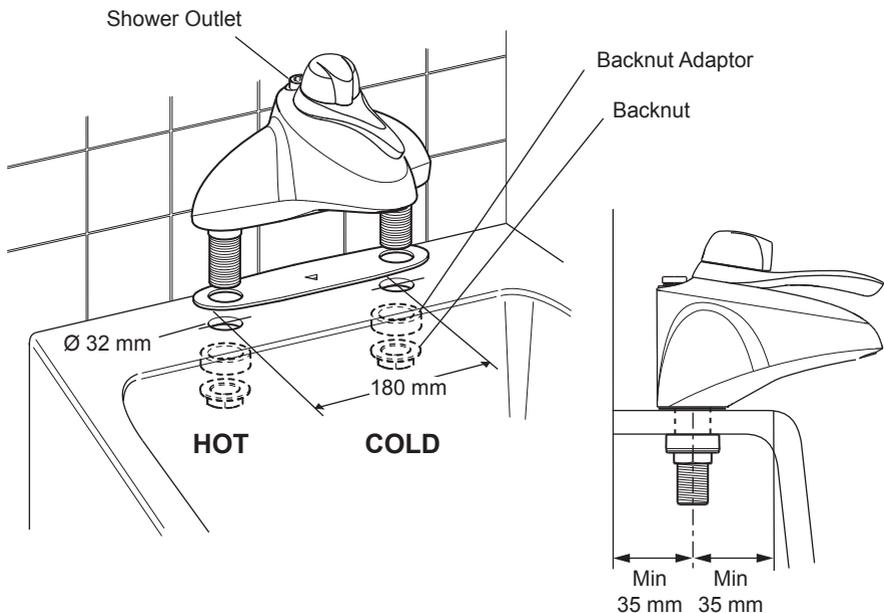
**For combination boilers only**, a fourth (white) Flow Regulator is supplied with the product to make sure that the boiler can supply the Rada Autotherm-3 BSM with an adequate supply of hot water. This must be fitted in the **hot** inlet, refer to section: '**Flow Regulator Removal**'.

**The fitting of this Flow Regulator will render the Rada Autotherm-3 outside the scope of the TMV3 scheme.**

## Installing the BSM

1. The Rada Autotherm-3 BSM can be installed on most standard baths and deck surfaces (refer to illustration).
2. Fit the Bath Sealing Gasket to the BSM with the arrow pointing forward. Carefully position on the bath (refer to illustration).  
**Note:** Make sure that the Gasket provides an adequate seal. If the BSM overhangs the 'roll' of the bath then silicone sealant must be used.
3. Fit the two Backnut Adaptors and the two 3/4" BSP Backnuts and tighten. Take care to prevent damage to the bath.
4. Fit the Flexible Hoses (supplied) to the BSM using the Sealing Washers provided.
5. Thoroughly flush out the incoming hot and cold water supplies before final connection of the BSM.
6. Connect the hot and cold water supplies with the 22 mm compression fittings (supplied).

**Important!** The hot water supply **MUST** be connected to the hot inlet. This is stamped **H** on the top of the Manifold. Reversed connections could be dangerous to the person using the BSM. The connections, when viewed from the front, are: **Hot – left, Cold – right**



7. **For low pressure systems only**, make sure that you remove the three Flow Regulators fitted to the hot and cold inlets and the shower outlet. This will make sure that the highest possible flow rate is achieved, refer to section: '**Flow Regulator Removal**'.
8. **For combination boilers only**, a fourth (white) Flow Regulator is supplied with the product to make sure that the boiler can supply the Rada Autotherm-3 BSM with an adequate supply of hot water. This must be fitted in the **hot** inlet, refer to section: '**Flow Regulator Removal**'.

**The fitting of this Flow Regulator will render the Rada Autotherm-3 outside the scope of the TMV3 scheme.**

In this case the thermostatic performance of the Rada Autotherm-3 will remain unaffected but the delivery flow rates may be reduced due to the operating nature of combination boilers.

9. Check the installation for any leaks. Fully open the Isolating Valves fitted to the Flexible Hoses.
10. Install the Shower Fittings, refer to the appropriate section in the **Shower Fittings Installation and User Guide**.
11. Connect the Shower Hose to the shower outlet of the BSM.
12. This completes the installation of the Rada Autotherm-3 BSM.

**Note:** Following the installation, commissioning checks must be carried out, refer to section: '**Commissioning**'.

# OPERATION

The Rada Autotherm-3 BSM is fitted with a separate On / Off Flow Divertor Lever and Temperature Control Knob which operate as follows:

## 1. On / Off Flow Divertor

From the Off position, anticlockwise movement immediately turns on the flow to bath mode, clockwise movement diverts the flow to shower mode.

When diverting from bath mode to shower mode the maximum preset temperature will be reduced by approximately 3°C, e.g. 44°C to 41°C.

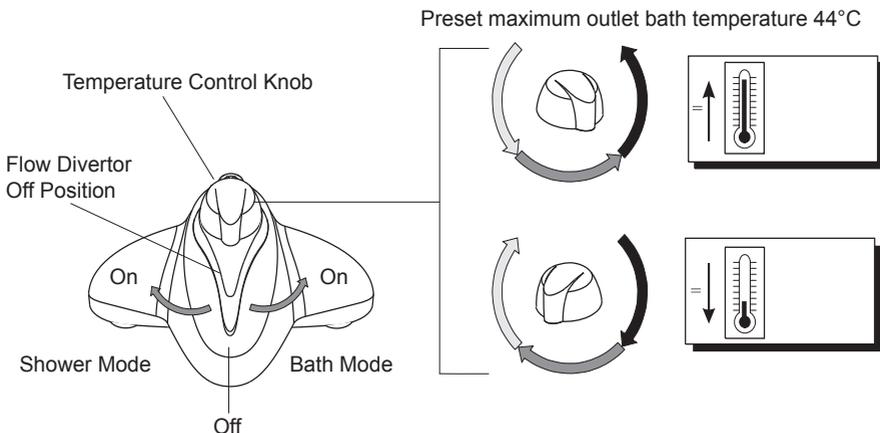
When diverting from shower mode to bath mode the temperature will remain below 41°C until adjusted by the Temperature Control.

The flow rate is determined by the supply pressures at the inlets of the product control, or by the effective output power of the gas heater appliance. Flow rates for gas water heaters and combination boilers can vary typically between 8 l/min (winter) and 15 l/min (summer).

**Note:** An amount of water may be retained in the bath spout after the Flow Control has been turned off. This will drain over a short period of time.

## 2. Temperature Control

In either the shower or bath fill mode, adjustment of temperature is achieved by clockwise rotation for cooler and anticlockwise rotation for warmer up to the preset maximum.



# COMMISSIONING

## Commissioning Checks

After completing the installation the following commissioning checks must be carried out:

**Note:** Thermostatic mixing valves with wax capsules could 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) Make sure that the hot and cold water are available at the valve inlets, turn on the Flow Divertor Lever to bath mode.
- (b) Turn the Temperature Control Knob rapidly from cold to hot and back to cold several times, pausing at each extreme.

## Maximum Temperature

**Note:** For Type 3 valves in healthcare installations the maximum blend temperature is determined by the application, refer to the TMV3 Requirements Manual.

The maximum blend temperature through the bath or shower outlet should be limited to prevent accidental selection of a temperature which may be too hot. All Rada Thermostatic Mixing Valves are fully performance tested individually and the maximum temperature for the Autotherm-3 BSM is pre-set under ideal installation conditions at the factory to approximately 44°C for bath fill and 41°C for showering. Site conditions may dictate that the maximum temperature has to be re-set following installation or servicing.

To check the temperature:

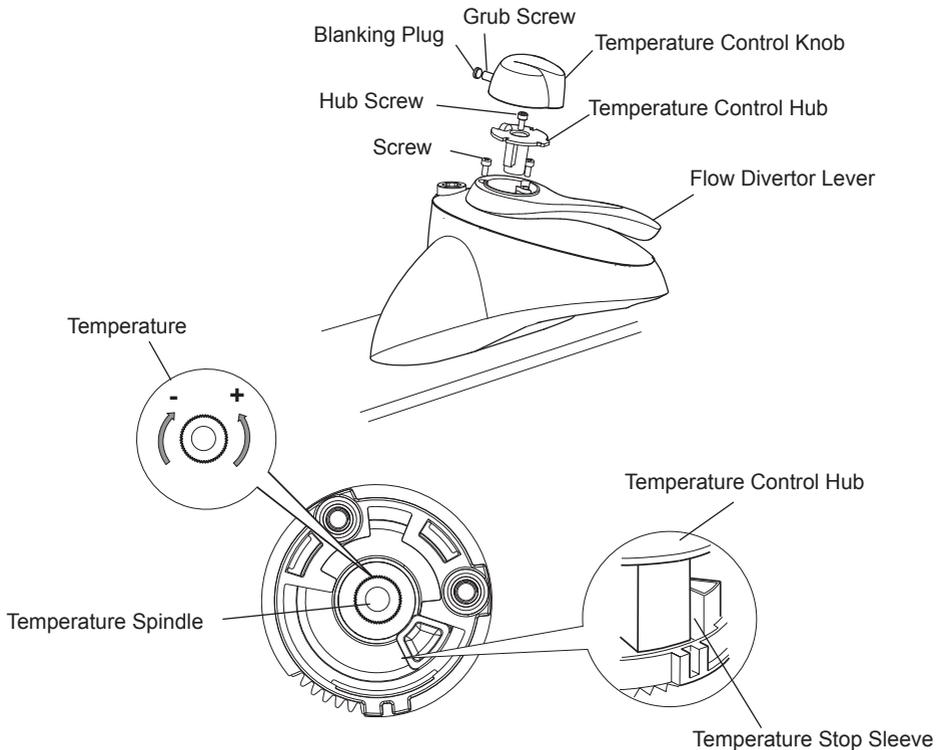
1. Turn the Flow Divertor Lever to bath mode and run for several minutes in order to stabilise the temperature. Make sure that the hot and cold water supplies are within Rada recommendations. Refer to section: '**Specifications**'.
2. Turn the Temperature Control Knob to the hot position (fully anticlockwise) the water temperature from the bath outlet is factory set at approximately 44°C. (To re-set the maximum temperature refer to section: '**Maximum Temperature Setting**'). The actual temperature may vary depending on the supply conditions.
3. Turn the Flow Divertor Lever to shower mode (Check that an adequate spray pattern is delivered from the shower head) and measure shower temperature. This is automatically re-set when the Flow Divertor Lever is turned to shower mode and is set below 41°C.
4. Turn the Flow Divertor Lever to the OFF position.

**Note:** Draining of residual water held in the outlet fittings, may continue for a period after the flow is shut off.

## Maximum Temperature Setting

**Note:** For Type 3 valves in healthcare installations the maximum blend temperature is determined by the application, refer to the TMV3 Requirements Manual.

1. Remove the Blanking Plug, unscrew the Grubscrew and remove the Temperature Control Knob.
2. Unscrew the Hub Screw using a 3 mm hexagonal wrench (supplied) and remove the Temperature Control Hub.
3. Rotate the Flow Divertor Lever to bath mode.
4. Rotate the Temperature Cartridge Spindle using the Temperature Control Hub until a bath outlet temperature of 44°C is obtained from the bath spout.  
**(clockwise = decrease temperature).**
5. Once the desired maximum blend temperature has been achieved, refit the Temperature Control Hub without disturbing the Spindle, positioning the Hub such that the Lug on the Temperature Hub is against the left hand side of the Temperature Stop Sleeve (refer to illustration). Check that the blend temperature has not altered and tighten the Hub Screw.
6. Refit the Temperature Control Knob, tighten the Grubscrew and Refit the Blanking Plug.



## Maximum Temperature Setting

# FAULT DIAGNOSIS

Read the section: **Important Safety Information** first.

Provided that the BSM has been correctly installed and is operated in accordance with the instructions contained in this guide, difficulties should not arise. If any maintenance is required then it must be carried out by a competent tradesperson for whom the fault diagnosis chart and maintenance instructions are provided. Before replacing any parts make sure that the underlying cause of the malfunction has been identified.

Symptom	Cause / Rectification
1. Only hot or cold water from mixer outlet.	<ul style="list-style-type: none"> <li>a. Inlet supplies reversed. Make sure that the hot supply is connected to the left, and the cold supply to the right hand inlet when viewed from the front.</li> <li>b. The Thermostatic Cartridge is fitted incorrectly. Make sure that the hot inlet (marked 'H') is on the left side.</li> </ul>
2. Fluctuating or reduced flow.	<ul style="list-style-type: none"> <li>a. Check that the Inlet Filters are not blocked.</li> <li>b. Make sure that the minimum flow rate is sufficient for the supply conditions.</li> <li>c. Make sure that the maintained inlet pressures are nominally balanced and sufficient.</li> <li>d. Make sure that the inlet temperature differentials are sufficient.</li> <li>e. Check the thermostatic performance.</li> <li>f. Flow Regulators fitted incorrectly (or with Low Pressure system).</li> <li>g. Airlock or partial blockage in pipework.</li> </ul>
3. No flow from mixer outlet.	<ul style="list-style-type: none"> <li>a. Make sure that the Inlet Isolating Valves are open.</li> <li>b. Hot or cold supply failure. Make sure that the hot and cold supplies are available to the BSM.</li> <li>c. Refer to symptom <b>2</b>.</li> </ul>
4. Blend temperature drift.	<ul style="list-style-type: none"> <li>a. Make sure that the inlet valves are open.</li> <li>b. Hot supply temperature fluctuation.</li> <li>c. Supply pressures fluctuating.</li> <li>d. Thermal Cartridge defective.</li> <li>e. Inlet Filters Blocked.</li> </ul>
5. Maximum blend temperature setting too hot or too cold.	<ul style="list-style-type: none"> <li>a. Indicates incorrect maximum temperature setting, refer section: <b>'Commissioning'</b>.</li> <li>b. Refer to symptom <b>4</b>.</li> </ul>

<b>Symptom</b>	<b>Cause / Rectification</b>
6. Flow rate too low or too high.	<ul style="list-style-type: none"> <li>a. (Too low) Insufficient supply pressures.</li> <li>b. (Too low) Refer to symptom <b>2</b>.</li> <li>c. (Too high) Supply pressure too high.</li> <li>d. Flow Regulators fitted incorrectly.</li> </ul>
7. Dripping from bath or shower outlet.	<ul style="list-style-type: none"> <li>a. Remove the Flow Divertor Cartridge and check the Cartridge Inlet Seal. Replace if damaged.</li> <li>b. If leak persists replace the Flow Divertor Cartridge.</li> </ul>
8. Temperature too hot or too cold.	<ul style="list-style-type: none"> <li>a. Refer to symptom <b>1</b>.</li> <li>b. Refer to symptom <b>4</b>.</li> </ul>

# MAINTENANCE

Rada products are precision engineered to provide satisfactory performance provided they are installed and operated in accordance with the recommendations contained in this guide.

The Autotherm-3 BSM is designed for the minimum of maintenance in normal use. If a malfunction occurs with either the Temperature Control Cartridge or the Flow Divertor Cartridge then this will necessitate a complete Cartridge replacement.

**Note:** The Cartridge's contains no internally serviceable parts.

When installed in very hard water areas (above 200 p.p.m. temporary hardness) your installer may advise the installation of a water treatment device to reduce the effects of limescale formation.

The designed service life of the service-free Thermostatic Cartridge is five years, providing the Autotherm-3 BSM is operated with the recommended operating conditions. 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 (refer to section: '**Specifications**' for recommended operating conditions).

**Important!** In healthcare applications such as hospitals, aged person facilities, residential care homes 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 service-free Thermostatic Cartridge should be replaced at intervals of no more than three years.

## Planned Maintenance

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 valve having excessive 'dead-legs' of pipework, or auxiliary cold water supply added to the mixed water from the valve. Such systems can disguise the onset of thermostatic mixing valve malfunction and should not be used.

We recommend a preventative maintenance procedure based on site conditions and the risk to the user. All results must be recorded in a log book.

**Important!** For Type 3 Valves use the In-Service Tests given in the TMV3 Requirements Manual. In the absence of any other instruction or guidance on the means of determining the appropriate frequency of in-service testing, the procedure contained within this guide (taken from Annex F of D08) should be used.

For other commercial installations it is recommended that the correct blend setting is checked every 6 months and that the In-Service Test procedure is followed every 12 months.

## Healthcare

Healthcare applications are hospitals, aged person facilities, residential care homes, etc. and any other applications where the user is similarly at risk.

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

## Critical Components

Irrespective of supply and usage conditions or the evidence of in-service tests, critical components should be replaced at intervals of no more than 5 years.

Pack Number	Description
462.07	Thermostatic Cartridge

**Note:** During the replacement of critical components, it may be necessary to replace other non-critical components.

## Flow Regulator Removal

### Standard Configuration

Three Flow Regulators are fitted to the product. The Pink Flow Regulator fitted to the Shower Outlet on top of the Rada Autotherm-3 BSM limits the maximum flow rate to the Shower Fitting. The Green Regulators are fitted to the hot and cold inlets for high pressure systems. To improve flow rates these can be removed if the inlet pressure is below 1 Bar.

**The Rada Autotherm-3 BSM has been approved for TMV3 installations in these configurations.**

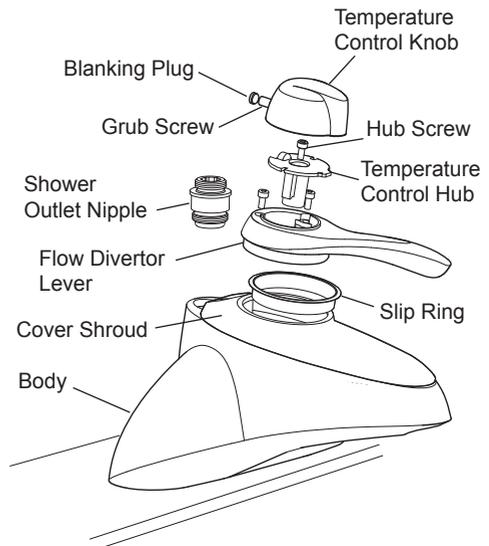
### Alternative Configuration

For combination boilers a fourth (**White**) Flow Regulator is supplied with the product to make sure that the boiler can supply the Rada Autotherm-3 BSM with an adequate supply of hot water. This must be fitted in the **hot** inlet.

**The fitting of this Flow Regulator will render the Rada Autotherm-3 BSM outside the scope of the TMV3 scheme.**

In this configuration the thermostatic performance of the Rada Autotherm-3 BSM will remain unaffected but the delivery flow rates may be reduced due to the operating nature of combination boilers.

1. Turn off the hot and cold water supplies.
2. Operate the Flow Divertor Lever to relieve any trapped pressure.
3. Remove the Blanking Plug from the Temperature Control Knob, unscrew the Grub Screw using a 3 mm hexagonal wrench and pull off the Temperature Control Knob.
4. Unscrew the Hub Screw using a 3 mm hexagonal wrench and remove the Temperature Control Hub.
5. Unscrew the 2 Flow Divertor Lever Retaining Screws using a 3 mm hexagonal wrench and remove the Flow Divertor Lever and Slip Ring.
6. Disconnect the Shower Hose and remove the Shower Outlet Nipple using the quad key or a 12 mm hexagonal wrench.
7. If necessary, remove or replace the Pink Flow Regulator from the Shower Outlet Nipple.



8. Carefully push back and lift off the Cover Shroud.
9. Unscrew the 2 Body Retaining Screws using a 5 mm hexagonal wrench and lift the Body from the Manifold.
10. **For Combination Boilers only** unscrew the hot inlet Non-Return Valve Housing from the Manifold using a suitable spanner, remove the green flow regulator and fit the White Inlet Flow Regulator (refer to illustration).

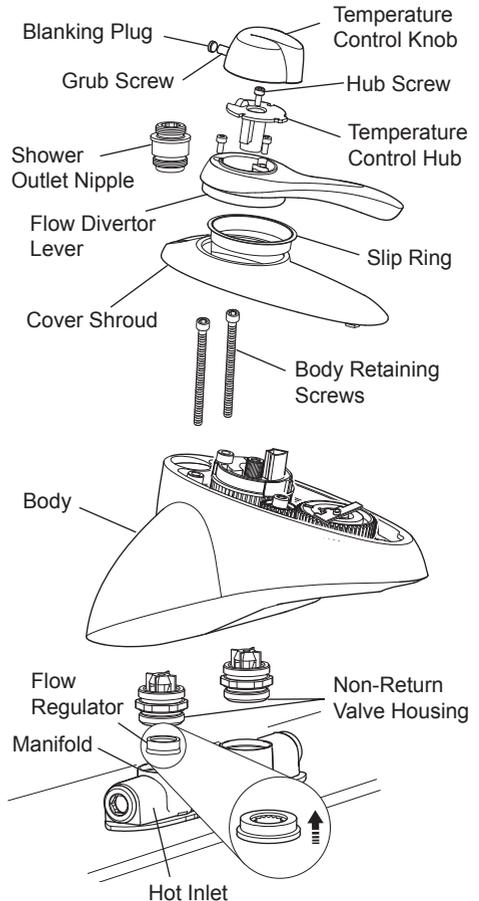
**The fitting of this Flow Regulator will render the Rada Autotherm-3 BSM outside the scope of the TMV3 scheme.**

Refit the hot inlet Non-Return Valve Housing and tighten with a spanner in a clockwise direction.

11. Unscrew the cold inlet Non-Return Valve Housing from the Manifold using a suitable spanner and remove or replace the Green Flow Regulator.
12. Refit the cold inlet Non-Return Valve Housing and tighten with a spanner in a clockwise direction.
13. Refit the Body on the Manifold and refit the 2 Body Retaining Screws.
14. Refit the Cover Shroud.

**Caution!** Make sure that the front lip of the Cover Shroud is located into the slot at the front of the BSM Body.

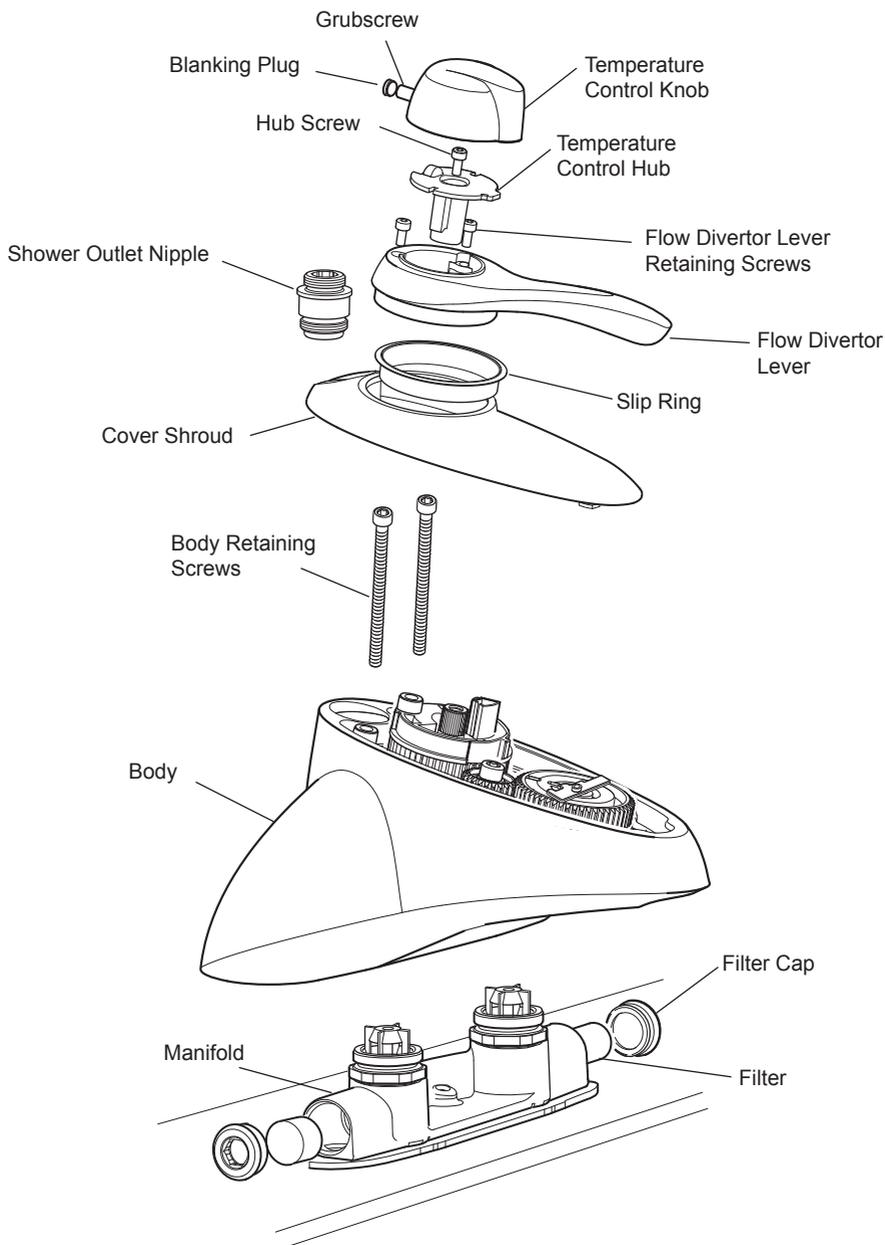
15. Refit the Flow Divertor Lever and Slip Ring and tighten the 2 Flow Divertor Lever Retaining Screws.
16. Refit the Shower Outlet Nipple and the Shower Outlet Hose.
17. Turn on the hot and cold water supplies and check for any leaks.
18. Set the Maximum Temperature and refit the controls, refer to the relevant instructions in section: **'Maintenance, Maximum Temperature Setting'**.



## Filter Cleaning/Replacement

Blockage of the Inlet Filters can lead to poor flow performance and reduced Temperature Control. It is essential that the Inlet Filters are periodically cleaned or, if necessary, renewed as part of a preventative maintenance programme.

1. Turn off the hot and cold water supplies.
2. Remove the Blanking Plug, unscrew the Grubscrew using a 3 mm hexagonal wrench and remove the Temperature Control Knob.
3. Unscrew the Hub Screw using the 3 mm hexagonal wrench (supplied) and remove the Temperature Control Hub.
4. Unscrew the 2 Flow Divertor Lever Retaining Screws using the 3 mm hexagonal wrench (supplied) and remove the Flow Divertor Lever.
5. Disconnect the Shower Hose and remove the Shower Outlet Nipple using the quad key (supplied) or a 12 mm hexagonal wrench.
6. Carefully push back and lift off the Cover Shroud and Seal.
7. Unscrew the 2 Body Retaining Screws using the 5 mm hexagonal wrench (supplied) and lift the Body from the Manifold.
8. Unscrew the Filter Cap from the Manifold using the quad key (supplied) or a 12 mm hexagonal wrench and remove the Filter.
9. Clean under a jet of water, or renew if damaged (refer to section: '**Spare Parts**').
10. Push the Filters into the Filter End Caps and screw into the Manifold. Tighten using the quad key (supplied) or a 12 mm hexagonal wrench.
11. Refit the Body on the Manifold and refit the 2 Body Retaining Screws.
12. Refit the Cover Shroud and Seal.  
**Caution!** Make sure that the front lip of the Cover Shroud is located into the slot at the front of the BSM body.
13. Refit the Flow Divertor Lever and Slip Ring and tighten the 2 Flow Divertor Lever Retaining Screws.
14. Refit the Shower Outlet Nipple and the Shower Outlet Hose.
15. Turn on the hot and cold water supplies and check for leaks.
16. Refit the Temperature Control Hub, tighten the Hub Screw and refit the Temperature Control Knob. Refer to section '**Maximum Temperature Setting**'.



## Maintaining the Non Return Valves

The Non Return Valves are located inside the Manifold and inside the Shower Outlet Nipple.

**Note:** For showers **only** perform instructions 2 to 4.

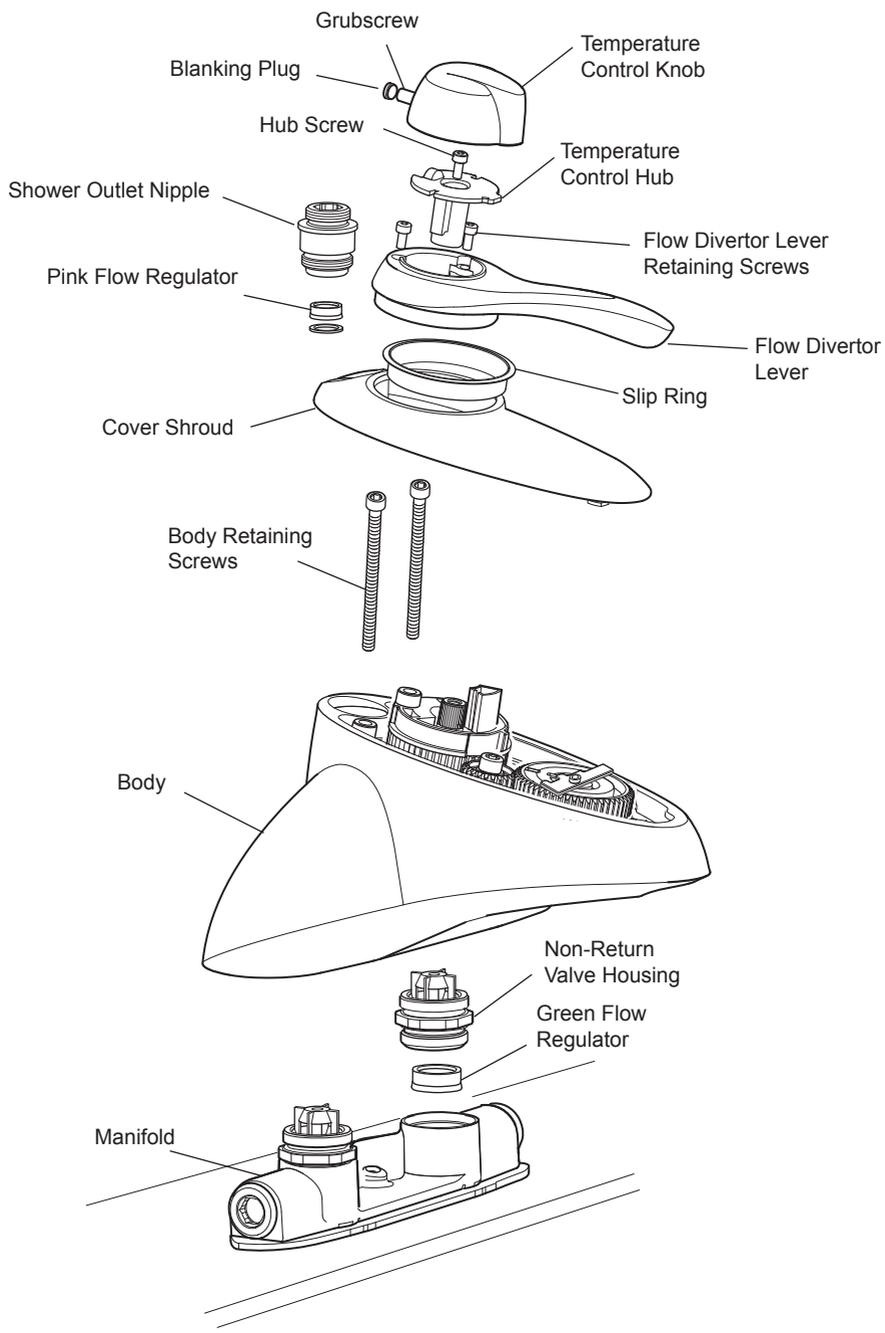
1. Turn off the hot and cold water supplies.
2. Disconnect the Shower Hose and remove the Shower Outlet Nipple using the quad key (supplied) or a 12 mm hexagonal wrench.
3. Remove the Flow Regulator, the Retaining Circlip (using circlip pliers) and the Non Return Valve from the Nipple.
4. Rinse the Non Return Valve and clean out any debris, or renew if necessary (refer to section: '**Spare Parts**').

**Note:** For showers **only** go to instructions 16 and 17.

5. Remove the Blanking Plug, unscrew the Grubscrew and remove the Temperature Control Knob.
6. Unscrew the Hub Screw using the 3 mm hexagonal wrench (supplied) and remove the Temperature Control Hub.
7. Unscrew the 2 Flow Divertor Lever Retaining Screws using the 3 mm hexagonal wrench (supplied) and remove the Flow Divertor Lever.
8. Carefully push back and lift off the Cover Shroud and Seal.
9. Unscrew the 2 Body Retaining Screws using the 5 mm hexagonal wrench (supplied) and lift the Body from the Manifold.
10. Unscrew the hot and cold inlet Non Return Valve Housings from the Manifold using a suitable spanner.
11. Remove the Green Flow Regulator from the cold Non Return Valve Housing.
12. Rinse the Non Return Valves and clean out any debris, or renew as necessary (refer to section: '**Spare Parts**').
13. Refit the Green Flow Regulator into the hot and cold Non Return Housings. Refit the hot and cold Non Return Valve Housings into the Manifold and tighten with a spanner in a clockwise direction.

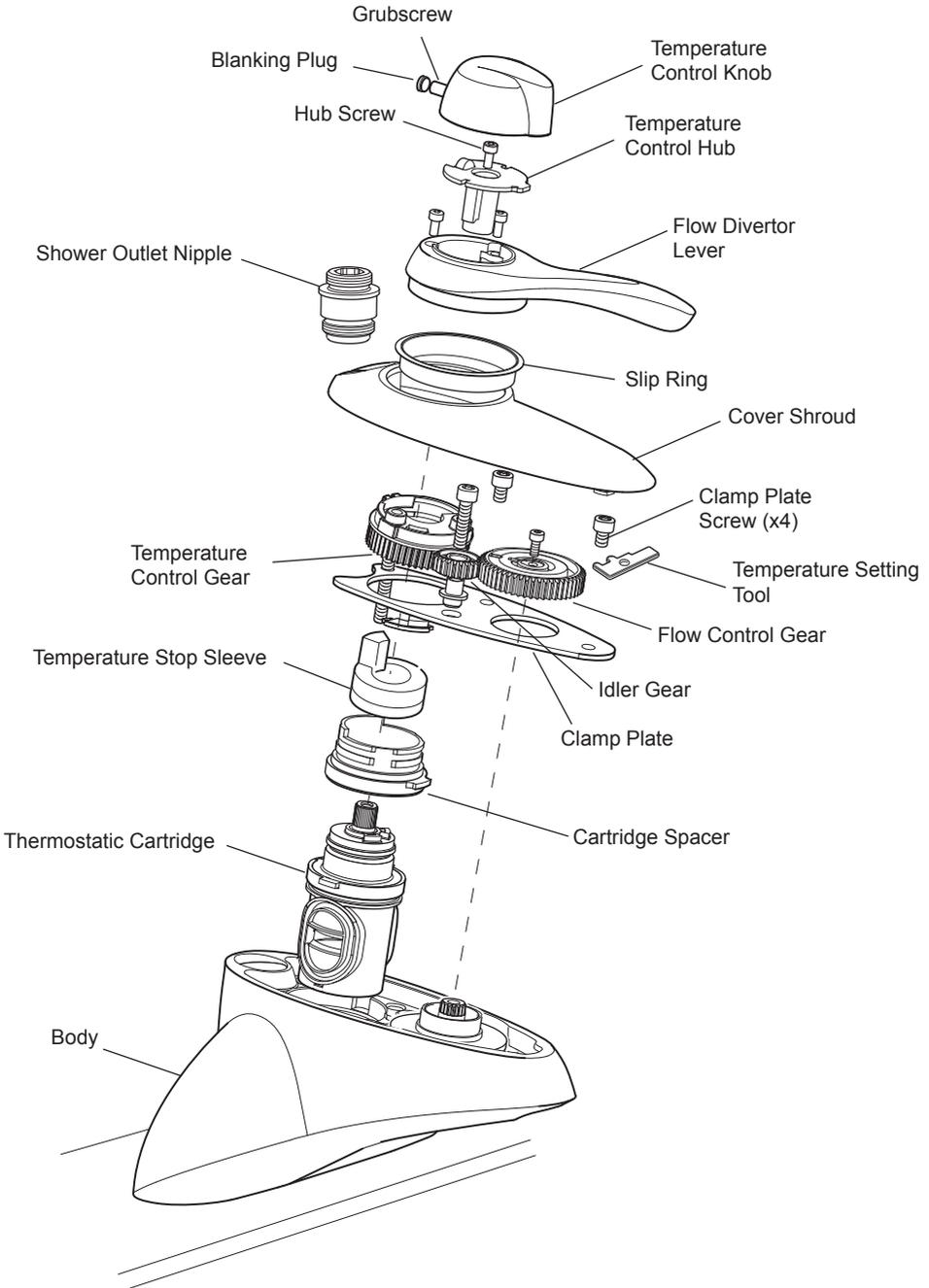
**Note:** The Plastic Housing must be fitted in the hot (left) inlet and the Brass Housing must be fitted in the cold (right) inlet.

14. Refit the Body on the Manifold and refit the 2 Body Retaining Screws.  
**Caution!** Make sure that the front lip of the Cover Shroud is located into the slot at the front of the Body.
15. Refit the Flow Divertor Lever and Slip Ring and tighten the 2 Flow Divertor Lever Retaining Screws.
16. Refit the Flow Regulator into the Shower Outlet Nipple.
17. Refit the Shower Outlet Nipple and the Shower Outlet Hose.
18. Turn on the hot and cold water supplies and check for leaks.
19. Refit the Temperature Control Hub, tighten the Hub Screw and refit the Temperature Control Knob. Refer to section: '**Maximum Temperature Setting**'.



## **Removing the Thermostatic Cartridge**

- 1.** Turn off the hot and cold water supplies.
- 2.** Remove the Blanking Plug, unscrew the Grubscrew and remove the Temperature Control Knob.
- 3.** Unscrew the Hub Screw using the 3 mm hexagonal wrench (supplied) and remove the Temperature Control Hub.
- 4.** Remove the 2 Flow Divertor Lever Retaining Screws using the 3 mm hexagonal wrench and remove the Flow Divertor Lever.
- 5.** Disconnect the Shower Hose and remove the Shower Outlet Nipple using the quad key (supplied) or a 12 mm hexagonal wrench.
- 6.** Carefully push back and lift off the Cover Shroud.
- 7.** Unscrew the Flow Control Gear Securing Screw using a 3 mm hexagonal wrench supplied and remove the Flow Control Gear and the Red Temperature Setting Tool.
- 8.** Turn the Temperature Control Gear through 180° clockwise and lift off.
- 9.** Unscrew the Idler Gear Securing Screw using a 5 mm hexagonal wrench (supplied) and remove the Idler Gear and Bush.
- 10.** Remove the 4 Clamp Plate Screws using a 5 mm hexagonal wrench (supplied) and remove the Clamp Plate.
- 11.** Remove the Temperature Stop Sleeve and Cartridge Spacer.
- 12.** Refit the Temperature Control Hub to the Thermostatic Cartridge and pull out the Thermostatic Cartridge.
- 13.** Remove the Temperature Control Hub from the Cartridge.



## Cleaning and Reassembly of the Thermostatic Cartridge

1. The interior surface of the BSM Body must be clean before refitting the Cartridge. If scale or deposition is present clean using a mild proprietary inhibited scale solvent, e.g. domestic kettle descaler. After descaling, rinse interior thoroughly in clean water before refitting the Cartridge.

**Note:** The BSM Body interior must be cleaned carefully and not damaged in any way. Do not use any abrasive material.

2. Cartridges may only be cleaned by flushing thoroughly under a jet of water to remove lodged particles.

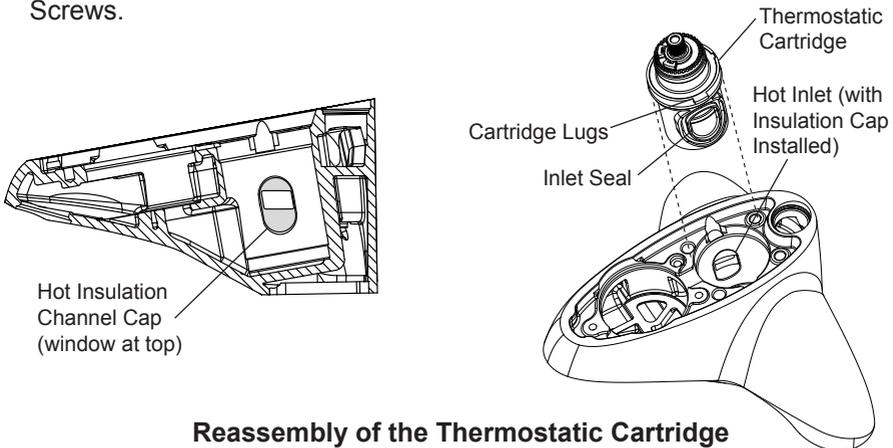
**Do not descale. Cartridges are not serviceable, and must not be dismantled. If the Cartridge is faulty or damaged a new one should be fitted (refer to section: 'Spare Parts').**

Cartridges cannot be tested individually, service condition should be assessed as part of the performance check. Refer to section: '**Commissioning**'.

3. Examine all accessible seals for signs of deformation or damage, and renew as necessary, taking care not to damage seal grooves.
4. Make sure that the Insulation Channel Cap is aligned with the hot inlet, and the face is below the surface of the Cartridge sealing bore.

**Note:** Make sure that the orientation is correct, as illustrated below.

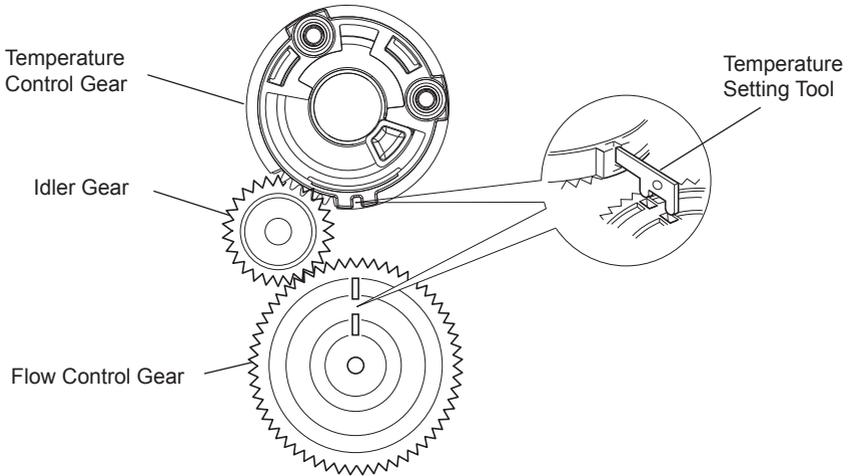
5. Lightly coat all seals with a **silicone-only based lubricant** to assist reassembling.
6. Identify which is the hot inlet to the Body (left hand side when viewed from the front) and align the Cartridge accordingly (stamped 'H' on the Cartridge Lug). Carefully push the Cartridge back into the Body, checking that the 2 Cartridge Inlet Seals and the Hot Insulation Channel Cap remain in place and locate the Cartridge Lugs into the appropriate Body Slots.
7. Refit the Cartridge Spacer and Temperature Stop Sleeve with the upstand to the back of the product.
8. Refit the Clamp Plate and Idler Gear Bush and tighten the 4 Clamp Plate Screws.



**Reassembly of the Thermostatic Cartridge**

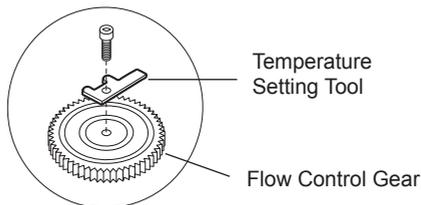
9. Line up the Temperature Control Gear with the Cartridge Spacer, push on and rotate anti-clockwise through 180°.
10. Refit the Flow Control Gear and line up with Temperature Control Gear using the Temperature Setting Tool.
11. Refit the Idler Gear and tighten the Screw.

**Caution! Do not overtighten the Screw as damage may occur causing the Idler Gear to jam on the Bush.**



**Temperature Setting Tool**

12. Place the Temperature Setting Tool over the Flow Control Gear and tighten the Screw.
13. Refit the Cover Shroud.  
**Caution!** Make sure that the front lip of the BSM is located into the slot on the front of the BSM Body.
14. Refit the Flow Divertor Lever and Slip Ring and tighten the 2 Flow Divertor Lever Retaining Screws.
15. Refit the Shower Outlet Nipple and the Shower Outlet Hose.
16. Turn on the hot and cold water supplies and check for any leaks.
17. Set the maximum temperature. Refer to section: **'Maximum Temperature Setting'**.

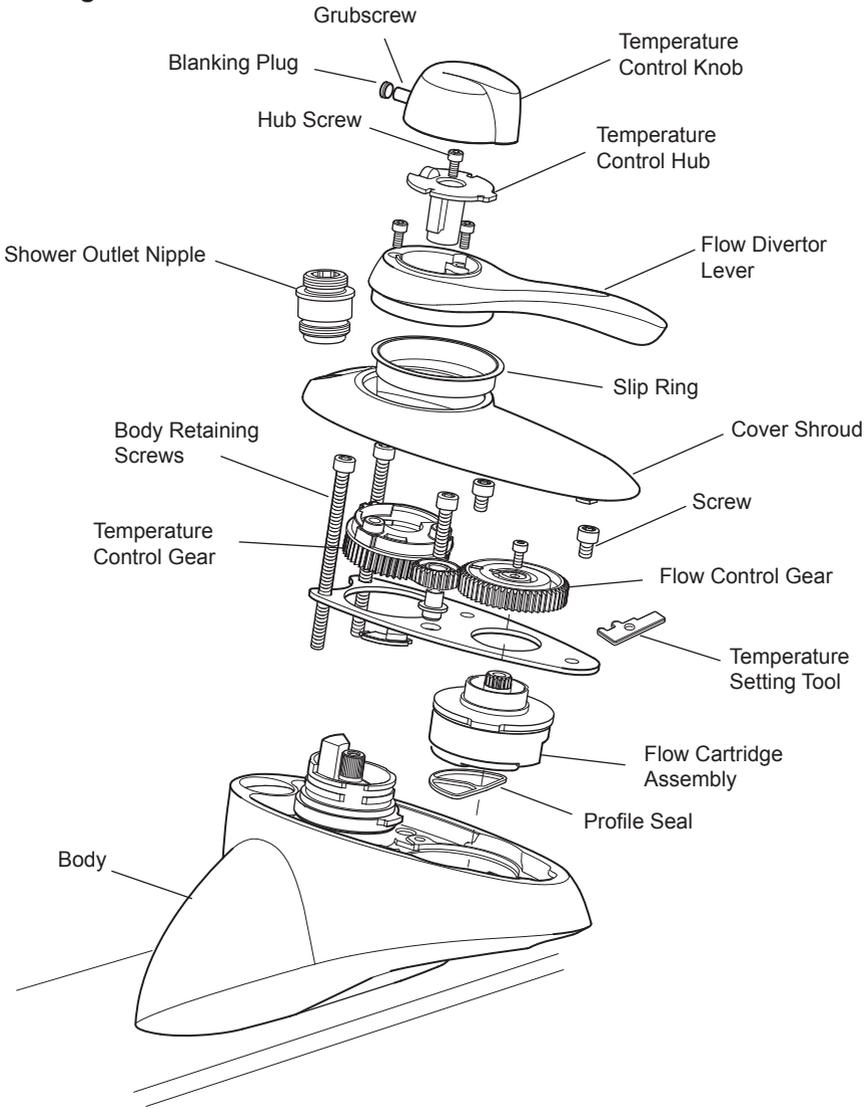


**Temperature Setting Tool**

## Replacement of the Flow Cartridge

1. Turn off the hot and cold water supplies.
2. Remove the Blanking Plug, unscrew the Grubscrew and remove the Temperature Control Knob.
3. Unscrew the Hub Screw using the 3 mm hexagonal wrench (supplied) and remove the Temperature Control Hub.
4. Unscrew the 2 Flow Divertor Lever Retaining Screws using the 3 mm hexagonal wrench (supplied) and remove the Flow Divertor Lever.
5. Disconnect the Shower Hose and remove the Shower Outlet Nipple using the quad key (supplied) or a 12 mm hexagonal wrench.
6. Carefully push back and lift off the Cover Shroud.
7. Unscrew the Flow Control Gear Securing Screw using a 3 mm hexagonal wrench (supplied) and remove the Flow Control Gear and the Red Temperature Setting Tool.
8. Turn the Temperature Control Gear through 180° clockwise and lift off.
9. Unscrew the Idler Gear Securing Screw using a 5 mm hexagonal wrench (supplied) and remove the Idler Gear and Bush.
10. Remove the 4 Clamp Plate Screws using a 5 mm hexagonal key (supplied) and remove the Clamp Plate.
11. Refit and secure the Flow Control Gear upside down on the Flow Cartridge and pull out the Flow Cartridge.
12. Remove the Flow Control Gear from the Cartridge and discard the Cartridge.
13. Fit the new Flow Cartridge and Profile Seal.  
**Note:** The large tab must be towards the back of the BSM body.
14. Refit the Clamp Plate and Idler Gear Bush and tighten the 4 Clamp Plate Screws.
15. Line up the Temperature Control Gear with the Cartridge Spacer and rotate anti-clockwise through 180° (refer to illustrations '**Temperature Setting Tool**' in section: '**Cleaning and Re-assembly of the Thermostatic Cartridge**').
16. Refit the Flow Control Gear and line up with Temperature Control Gear using the Temperature setting tool (refer to illustrations: '**Temperature Setting Tool**' in section: '**Cleaning and Reassembly of the Thermostatic Cartridge**').
17. Refit the Idler Gear and tighten the Screw.  
**Caution! Do not overtighten the Screw as damage may occur causing the Idler Gear to jam on the Bush.**
18. Place the Temperature setting tool over the Flow Control Gear and tighten the Screw. (refer to illustrations '**Temperature Setting Tool**' in section: '**Cleaning and Re-assembly of the Thermostatic Cartridge**').
19. Refit the Cover Shroud.  
**Caution!** Make sure that the front lip of the Cover Shroud is located into the slot at the front of the BSM body.

- 20. Refit the Flow Divertor lever and slip ring and tighten the 2 Flow Divertor lever retaining Screws.
- 21. Refit the Shower Outlet nipple and the Shower Outlet Hose.
- 22. Turn on the hot and cold water supplies and check for any leaks.
- 23. Set the Maximum Temperature. Refer to section: **'Maximum Temperature Setting'**.



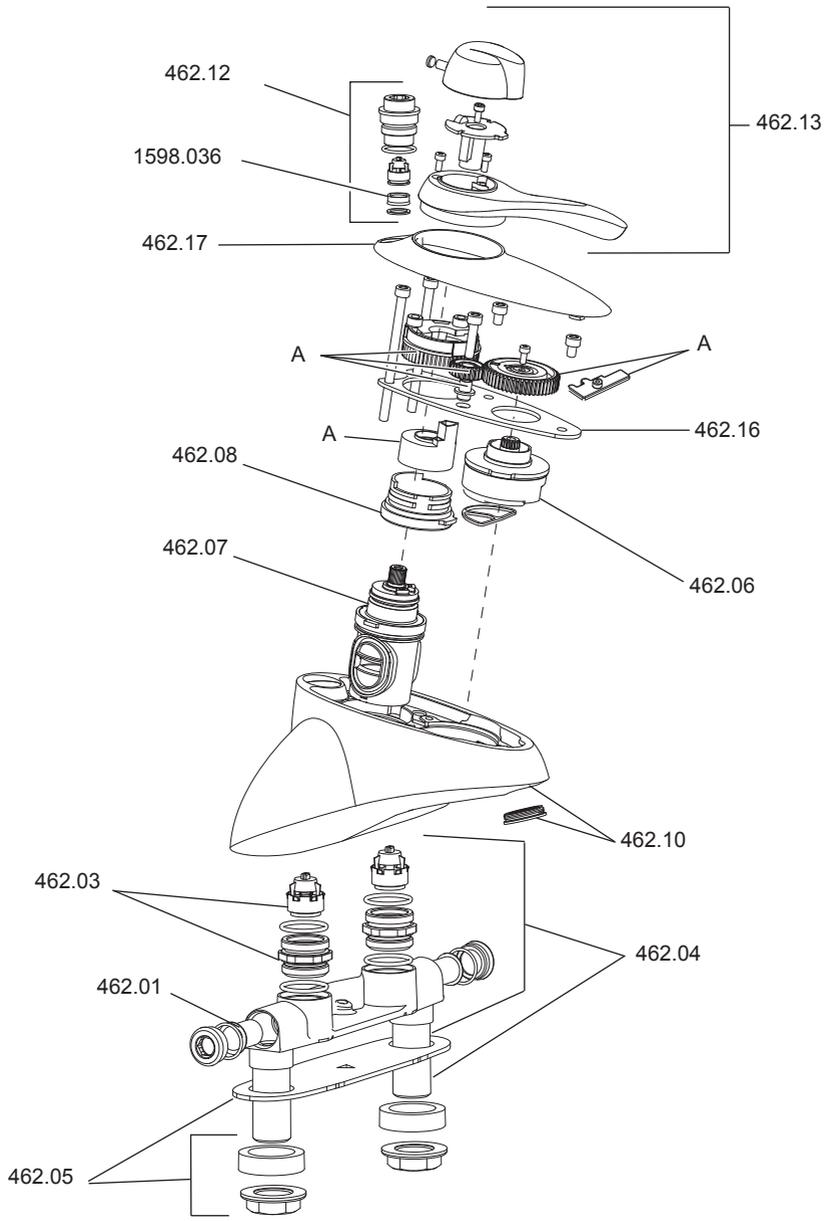
## SPARE PARTS

462.01	Filter Pack (2)
462.03	Non-Return Valve Assembly
462.04	Manifold Assembly
462.05	Back Nuts and Gasket
462.06	Flow Cartridge
462.07	Thermostatic Cartridge
462.08	Cartridge Spacer
462.09	Temperature Adjustment Pack (items shown as A - see illustration)
462.10	Flow Straightener
462.12	Shower Nipple Assembly
462.13	Handle Pack
462.14	Screw Pack (Not Illustrated)
462.15	Seal Pack (Not Illustrated)
462.16	Clamp Plate
462.17	Cover Shroud
462.18	Inlet Hose (Not Illustrated)
1598.036	Flow Regulator Kit

## ACCESSORIES

Available as optional accessories from your Rada stockist:

1533 115	Rada 3/4" Isolating Test Point
1533 117	Rada Autotherm-3 BSM Shower kit (category 3)
1533 118	Rada Autotherm-3 BSM Shower kit (category 5)



# NOTES

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# CUSTOMER SERVICE

Your product has the benefit of our manufacturer's guarantee which commences from date of purchase or from the date of commissioning when product commissioning has been conducted within the UK by the Rada Commercial Field Service Team.

Outside of the UK please contact your local agent for all guarantee terms and conditions or visit [www.radacontrols.com](http://www.radacontrols.com) for further information.

**For UK (only) Customer Service & Post Installation enquiries**, including details of the Rada Commissioning, Responsive and Maintenance Contract Service Packages please contact:



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**01242 282595**



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Gloucestershire GL52 5EP

**For UK (only) Pre-Specification Enquiries** please contact:



**0344 571 1777**



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