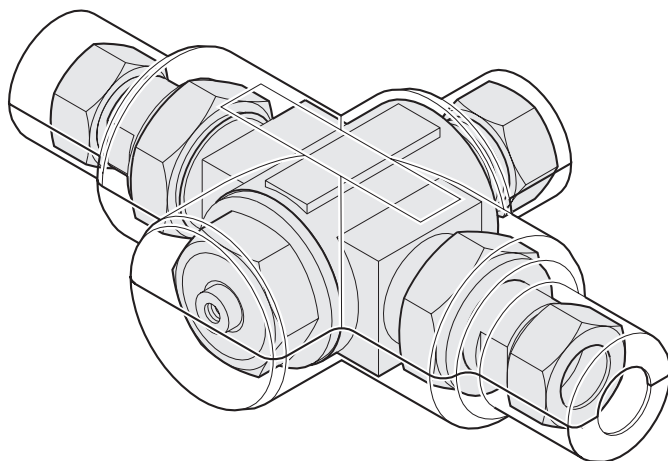




# Meynell

## 15/3

### THERMOSTATIC MIXING VALVE



## 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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If you experience any difficulty with the installation or operation of your new mixing valve, then please refer to the **Fault Diagnosis** section.

## SAFETY:WARNINGS

The function of a 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 'fail-safe' 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 Meynell 15/3Thermoscopic mixing valve is specified to meet the highest standards of safety, comfort and economy as demanded by todays users. All Rada products are designed, manufactured and supported in accordance with accredited BS EN ISO 9001:1994 Quality Systems.

This Manual covers all Meynell series manufactured from June 1997.

The suffix 3 indicates that the valve has been certified for use in UK Healthcare premises as a Type3 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

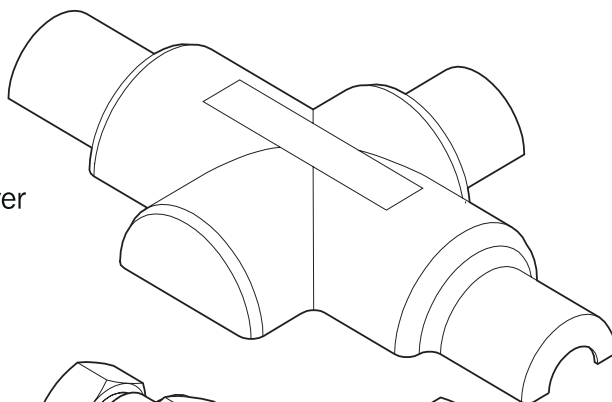
A 1/2" point of use thermostatic mixing valve designed to supply temperature controlled hot water to one or possibly two washbasin outlets.

**Meynell 15/3**      A point of use model with white plastic cover.

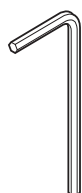
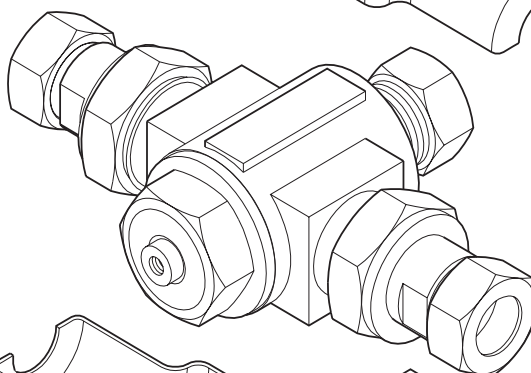
# PACK CONTENTS

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

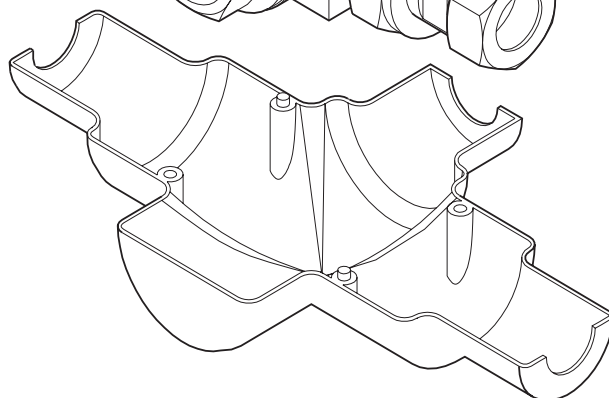
2 x Cover



1 x Thermostatic Mixer



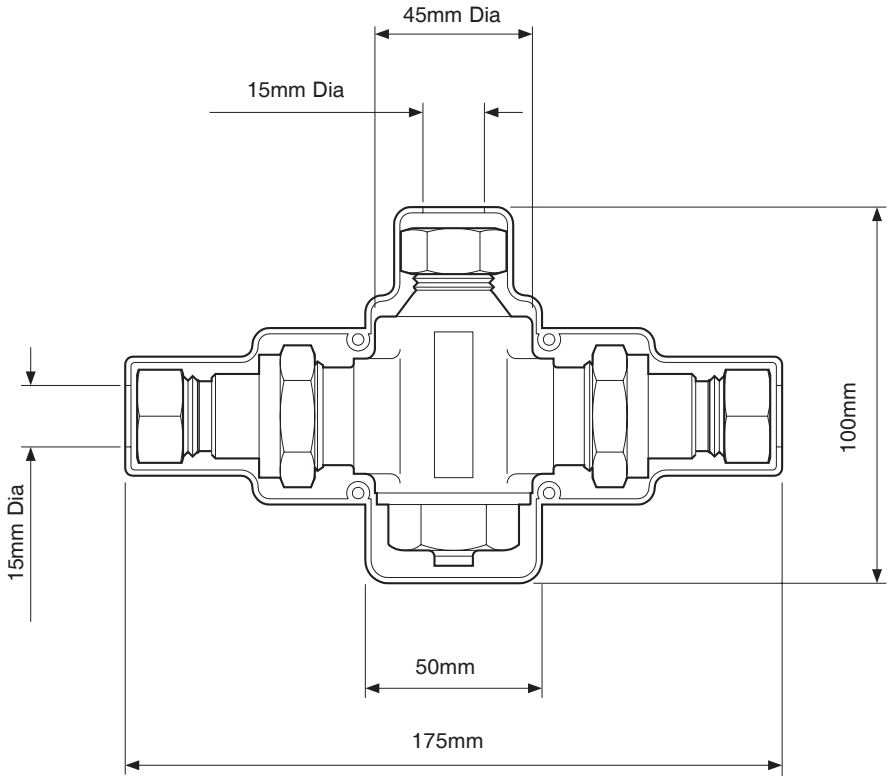
1 x Hexagon Key



1 x Product Manual

1 x NHS Requirements Booklet

# DIMENSIONS



# SPECIFICATION

**Normal Operating Conditions** are considered as:

- inlet dynamic pressures nominally balanced.
- 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 Thorne and Derrick.

## Operating Parameters

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

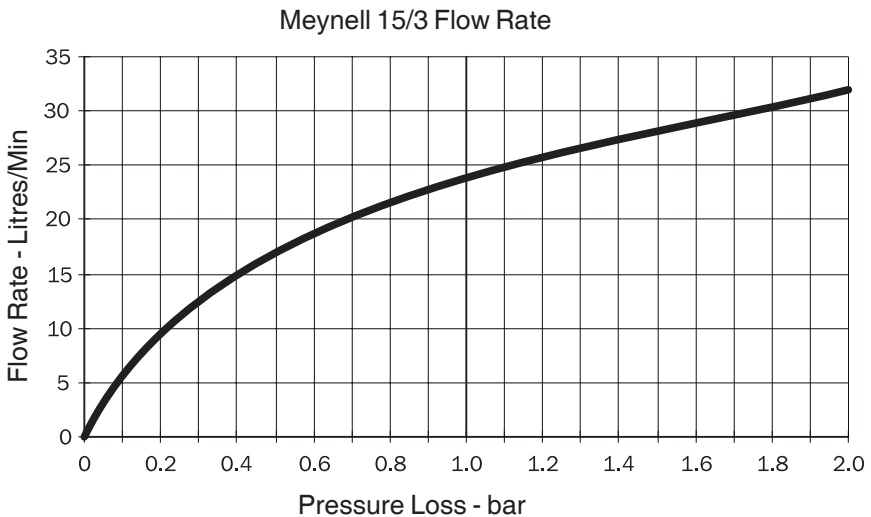
## Pressures and Flow Rates

For optimum performance, maintained supply pressures should be nominally equal.

**Recommended Flow Rate for Basin Applications: 4 to 6 l/min.**

**Maximum Pressure Loss Ratio\*: 10:1.**

**Maximum Static Pressure is 10 bar.**



## Temperature

Minimum temperature differential between hot and outlet temperature: **10°C**

Optimum temperature control range: **35 - 45°C**

Maximum hot water temperature: **85°C** (for safety, a recommended hot water storage temperature maintained below 85°C and for ablutionary installations at between 60 to 65°C).

## Flow Control

The Meynell 15/3 does not have an integral flow control.

Separate outlet flow control such as a tap, mechanical timed flow control device or solenoid is required.

The device chosen should be non-concussive in operation.

## Connections

Inlet and outlet connectors are 15mm compression

Hot (H) and Cold (C) inlets are clearly marked and must be connected this way.

The inlet connections have integral strainer and checkvalve units.

# INSTALLATION

## General

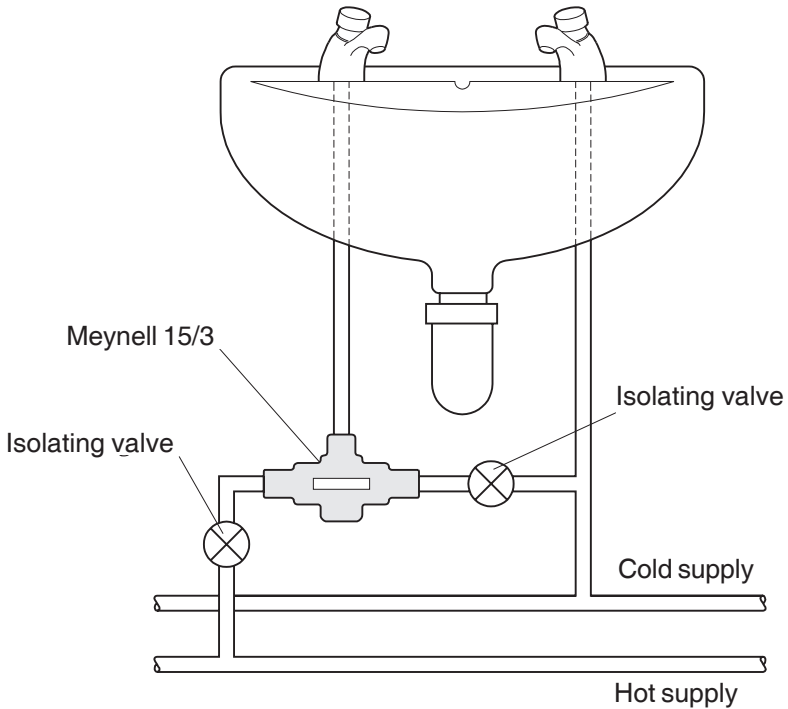
Installation must be carried out in accordance with these instructions, and must be conducted by designated, qualified and competent personnel.

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 serviceable 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.**

## Procedure (see Figure 1)

1. A 50mm minimum clearance around valve to allow cover fitting and tool access is recommended.
2. Install isolator valves on supply pipework. This will assist removal of the unit if required.
3. Determine the layout of pipework that suits the incoming/outlet connections.

4. Connect the pipework to mixer, making sure that the hot and cold supplies and outlet are correctly matched. Tighten all compression nuts and inlet connector nuts.
5. Turn on water supplies and check connections are watertight.
6. Refer to **COMMISSIONING** section to ensure correct outlet setting.
7. Fit the cover pairing around mixer.



**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 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 that is too hot.

The Meynell 15/3 is fully performance tested, and the maximum temperature is preset to approximately 42°C under ideal installation conditions at the factory. Site conditions and personal preference may dictate that the maximum temperature has to be reset following installation.

## Temperature Setting

Make sure that an adequate supply of **hot** water is available at the hot inlet of the Meynell 15/3. The minimum temperature of the hot water must be at least 10°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. Make sure that both inlet isolating valves are fully open.

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

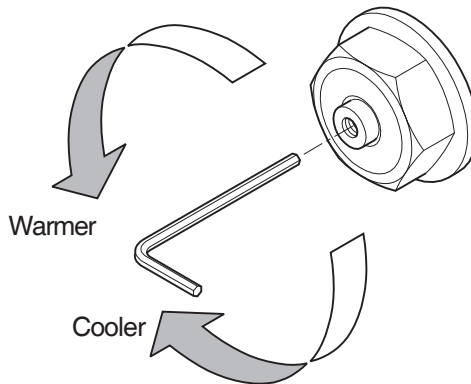
1. Ensure outlet fitting is turned **off**.
2. Turn **on** the water supplies to the mixing valve and check for leaks.
3. Turn the outlet fitting **on** and allow water to run until the temperature stabilizes. Measure the blend temperature from the outlet fitting.
4. If the temperature needs to be adjusted, insert the 2.5mm hexagon key into the centre of valve head.

## Commissioning Checks

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

The procedure should be chosen to imitate both typical and difficult operating conditions, such as any supply pressure fluctuations that may be likely. An ideal method is to locate another outlet on the common cold water supply close to the Meynell 15/3 (operating this outlet should cause a drop in supply pressure), and note the subsequent effect on blend temperature. This should be no more than 2 °C change.

**Note!** Causing thermal shutdown of the Meynell 15/3 by full closure of the cold supply may not adequately indicate the practical capability of the 15/3, nor its service condition. Consequently this is not a recommended performance check, and repeated such testing may ultimately affect service life.



**Commissioning  
Figure 1**

# FAULT DIAGNOSIS

Symptom	Cause/Rectification
1. Only hot or cold water from mixer outlet.	<ul style="list-style-type: none"> <li>a. Inlet supplies reversed (hot supply to cold supply).</li> <li>b. No hot water reaching mixer.</li> <li>c. Check strainers and inlet/outlet fittings for blockage.</li> <li>d. Installation conditions continuously outside operating parameters: refer to <b>SPECIFICATION</b>, and <b>2.e.</b> below.</li> </ul>
2. Fluctuating or reduced flow rate.	<p>Normal function of the thermostatic control when operating conditions are unsatisfactory;</p> <ul style="list-style-type: none"> <li>a. Check strainers and inlet/outlet fittings for blockage.</li> <li>b. Make sure minimum flow rate is sufficient for supply conditions.</li> <li>c. Make sure the maintained inlet pressures are nominally balanced and sufficient.</li> <li>d. Make sure the inlet temperatures differentials are sufficient.</li> <li>e. (Subsequent to rectification of supply conditions) Check thermostatic performance; renew Piston Assembly if necessary.</li> </ul>
3. No flow rate from mixer outlet.	<ul style="list-style-type: none"> <li>a. Check strainers and inlet/outlet fittings for blockage.</li> <li>b. Hot or cold supply failure.</li> </ul>
4. Blend temperature drift.	<p>Indicates operating conditions changed.</p> <ul style="list-style-type: none"> <li>a. Refer to symptom <b>2.</b> above.</li> <li>b. Hot supply temperature fluctuation.</li> <li>c. Supply pressures fluctuating.</li> <li>d. Seal damage or wear. Renew seals or replace Shuttle/Thermostat Assembly.</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 to <b>COMMISSIONING</b> section.</li> <li>b. As symptom <b>4.</b> above.</li> </ul>

Symptom	Cause/Rectification
6. Water leaking from mixer body.	Seal wear or damage. a. Obtain Seal Kit, renew all seals.
7. Flow rate too high or too low.	a. (Too low) Refer to symptom <b>2.a-e.</b> above. b. (Too low) Insufficient supply pressures. c. (Too high) Supply pressure too high. d. (Too high) Refer to symptom <b>2.a-e.</b> above.

# 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 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.

## Preventative/Precautionary Maintenance

### (Planned Maintenance Programmes)

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

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 Meynell 15/3 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 Meynell 15/3 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**').

## 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. When 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. Reset as necessary.

**Performance:** check blend temperature against a known datum (relative **COMMISSIONING** procedure), by isolating cold water supply.

**Function:** any in-line or integral check valves, strainers are clean and in good working order.

## Lubricants

**Important:** Use silicone-only based lubricants. **Do not** use oil based or other lubricant types as rapid deterioration of seals may occur.

Standard silicone-only based lubricants may be used on static seals and threads to assist refitting .

## 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 1. 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 2. 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 19.**

## 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.** The Meynell 15/3 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 component renewal. Components are precision-made, so care must be taken while servicing to avoid damage.

When ordering spare parts, please state product type, i.e. Meynell Thermostatic Mixing Valve 15/3 and identify part name and number. A service pack is available, containing all the seals and strainer screens that may be necessary for renewal during maintenance or servicing. Refer to the **SPARE PARTS** section.

# 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)

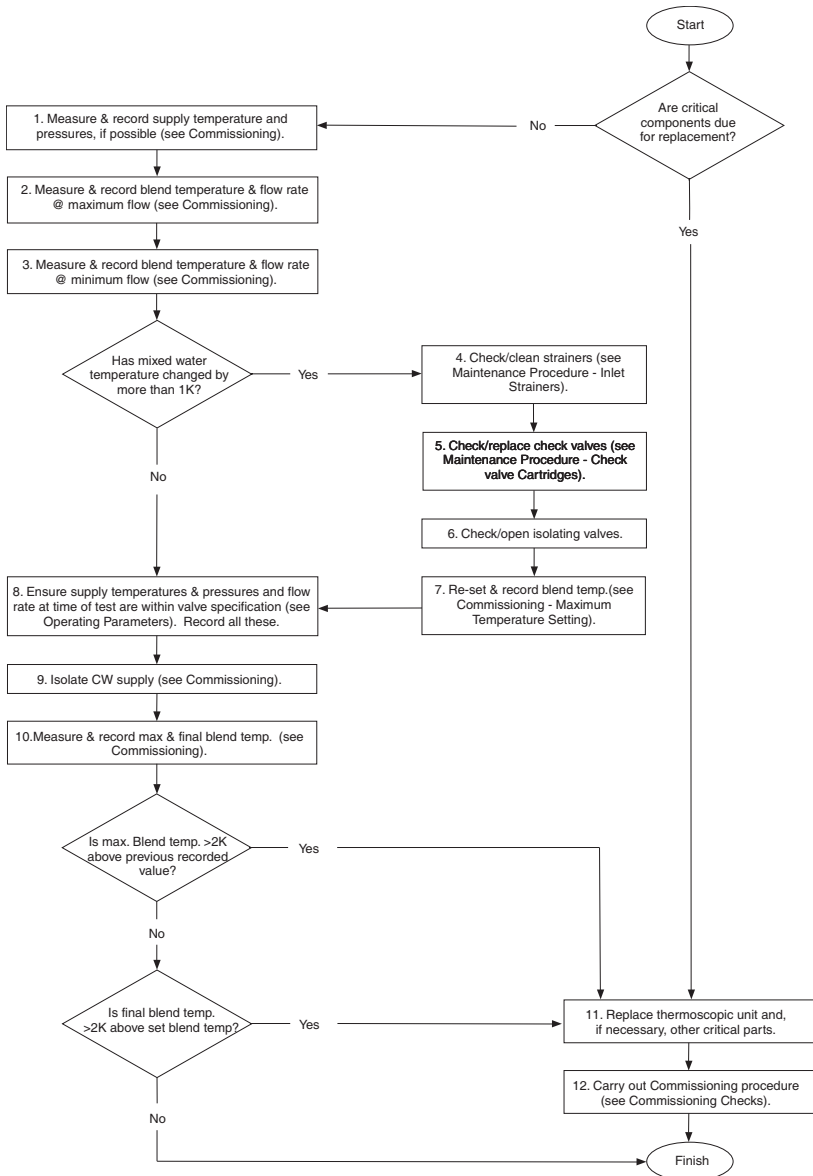
Details of any remedial work, including part replacement, carried out to valve or supply system

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 1



# Type 3 Valves

## Application

The approved designations are as follows:

Model	Designation Code
Meynell 15/3	HP-S, HP-W, LP-S, LP-W

The permitted application details are:

Designation	Operating Pressure Range	Application	Mixed Water Temperature °C
HP-B	High Pressure	Bidet	38°C maximum
M-HP-S	High Pressure	Shower	41°C maximum
M-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
-HP-D44	High Pressure	Bath (44°C fill) with diverter to shower 41°C	44°C maximum (shower 41°C max)
-HP-D46	High Pressure	Bath (46°C fill) with diverter to shower 41°C	46°C maximum (shower 41°C max)
LP-B	Low Pressure	Bidet	38°C maximum
M-LP-S	Low Pressure	Shower	41°C maximum
M-LP-W	Low Pressure	Washbasin	41°C maximum
-LP-T44	Low Pressure	Bath (44°C fill)	44°C maximum
-LP-T46	Low Pressure	Bath (46°C fill)	46°C maximum
-LP-D44	Low Pressure	Bath (44°C fill) with diverter to shower 41°C	44°C maximum (shower 41°C max)
-LP-D46	Low Pressure	Bath (46°C fill) with diverter to shower 41°C	46°C maximum (shower 41°C max)

<sup>†</sup>Mixed water temperature at discharge point.

M = Meynell 15/3 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**

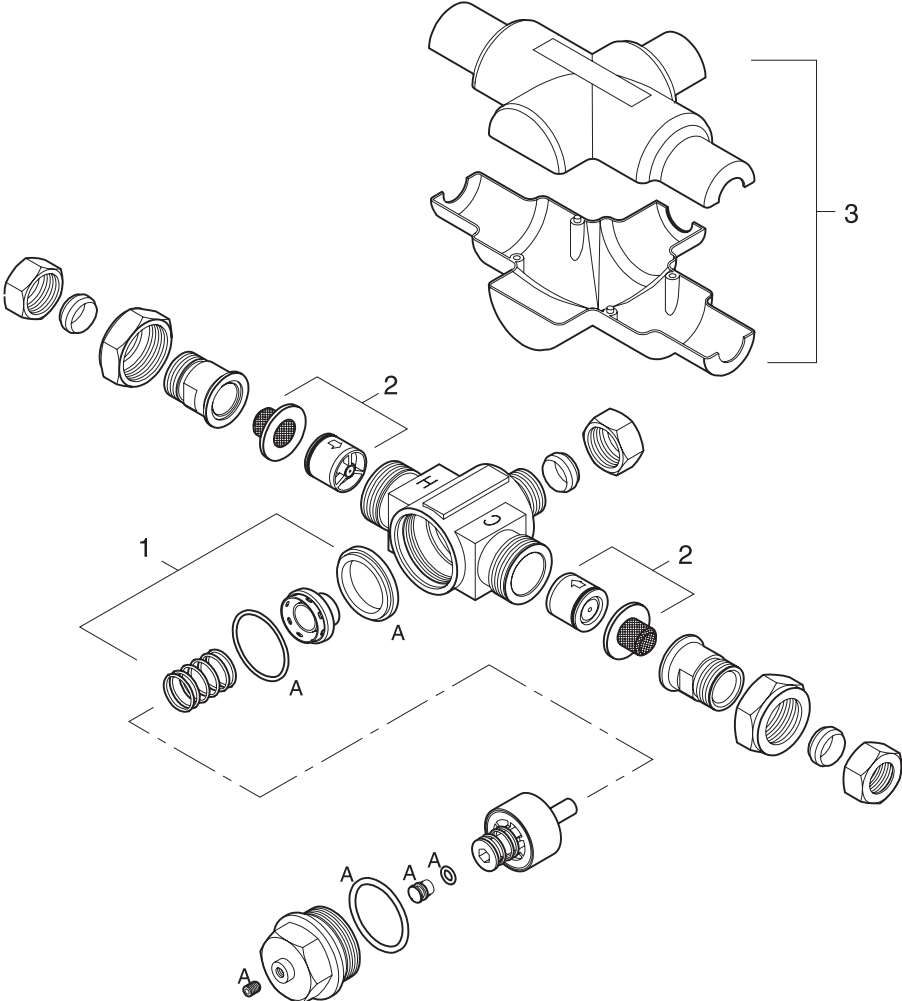
## Maintenance

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 16-18.

# SPARE PARTS

## Spare Parts Lift

- 1 SPPN0001J Piston Assembly
- 2 SPCV0022J Strainer & Checkvalve Kit
- 3 SPCA0018U Cover Kit
- A SPSK0048J Seal Kit



# NOTES

# NOTES

# CUSTOMER CARE

## Guarantee

This product is guaranteed against both faulty materials and manufacturing process for a period of two years from date of purchase, provided that the product has been installed correctly and used in accordance with the instructions in this manual.

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 instructions supplied.

The product should not be modified or dismantled except by a person authorised by the manufacturer. Your statutory rights are not affected by this guarantee.

## Customer Service Policy

If within the guarantee period the product does not function correctly, first check the fault finding analysis in the manual to see if the difficulty can be resolved.

Failing this, please contact your installer to check that the product has been installed and commissioned in accordance with this manual.

If the fault can not be resolved, please contact the Customer Service Department who will try to assist, or will arrange a local Service Engineer or Agent to call and arrange a visit.

Within the guarantee period there will be no charge for parts or labour if the fault concerned is due to the product. However, the guarantee does not cover difficulties due to incorrect installation or misuse.

During the service visit yourself or a responsible person should be present at all times. If the Service Engineer or Agent can not gain access at the prearranged time a callout charge may be made.

Payment for the service visit, if applicable, should be made direct to Service Engineer or Agent using Access, Visa or cheque supported by a banker's card.

## Spare Parts

Functional spare parts are available for your products maintenance. Items can be identified from spares drawing inside manual, please contact Customer Service to confirm spare and details of a spares stockist for your area. Your product serial number or date mark (if available) may be useful to identify parts.



THORNE AND DERRICK UK – LEAK DETECTION  
TEL: 0044 (0)191 490 1547 FAX: 0044 (0)191 477 5371  
TEL: 0044 (0)117 977 4647 FAX: 0044 (0)117 477 5582  
WWW.HEATTRACING.CO.UK  
WWW.THORNEANDDERRICK.CO.UK  
e-mail: northersales@thorneandderrick.co.uk



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Reg. No. FM 14648



**Meynell**