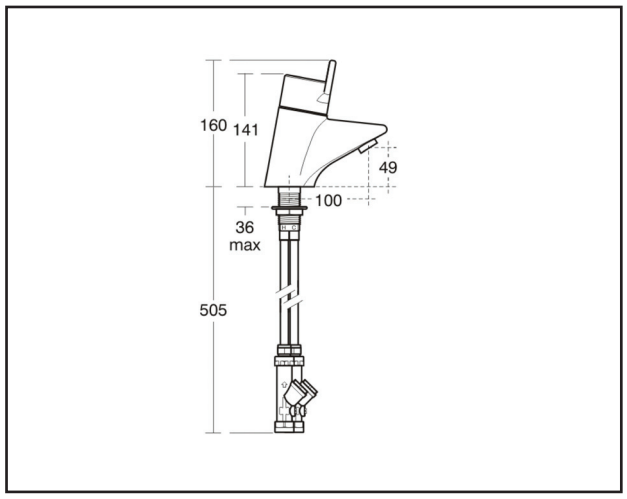
# ARMITAGE SHANKS
# MARKWIK21 THERMOSTATIC BASIN MIXER




## SPECIFICATIONS

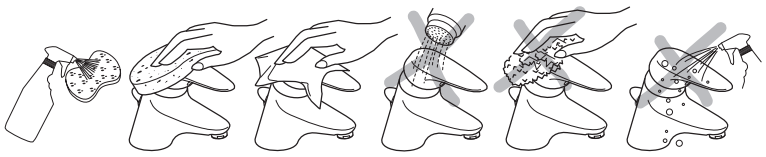
| | |
|---|---|
| **Recommended use** | Healthcare |
| **Colour availability** | Chrome |
| **Pressure rating** | Maximum continuous operating pressure 1000 kPa static, 500 kPa dynamic.<br>For best performance and longer life we recommend 100-500kPa.<br>Balanced hot/cold water pressure is preferred but will work on unbalanced pressure up to a ratio of 5:1 |
| **Temperature rating** | Maximum continuous working temperature 40-41°C |
| **Suitable Hot Water Units** | Storage tank: Yes a 20 kPa minimum pressure<br>Continuous Flow: Yes a 20 kPa minimum pressure<br>Gravity Feed: Yes a 20 kPa minimum pressure |
| **Water Efficiency** | WELS approval not applicable for thermostatic products |
| **Standards** | AS 4032.1: 2005 Thermostatic Valves |

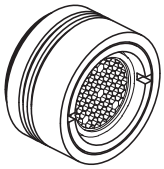
Dimensions are nominal measurements only.

**To see the complete Armitage Shanks range go to www.reece.com.au/bathrooms**

## CLEANING RECOMMENDATIONS

When cleaning chromed products use only a mild detergent, rinse & wipe dry with a soft cloth. Ideally clean after each use to maintain appearance. Never use abrasive, scouring powders or scrapers. Never use cleaning agents containing alcohol, ammonia, hydrochloric acid, sulphuric acid, nitric acid, phosphoric acid or organic solvents. Use of incorrect cleaning products / methods may result in chrome damage which is not covered by the manufacturer's guarantee.





Outlet cleaning. On a regular basis the outlet should be inspected & cleaned. To unscrew and remove the outlet, see section 6.1.

In areas where lime scale build-up is prevalent this should be avoided by regular cleaning. If it should build up, it will have to be removed. An inhibited proprietary scale solvent can be used such as a kettle de-scaling solvent but it is important to follow the manufacturer's guidelines. After de-scaling it is important to rinse the parts thoroughly in clean water. Clean carefully and do not use abrasive materials or scrapers.

WaterMark
AS 4032.1 WMK 25821
SAI Global



**Tech Page Version 1**

Armitage Shanks

reece

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**Important Note**

Mixer must be installed to the requirements of AS/NZS 3500 by a qualified plumber. Your mixer comes to you already factory assembled and tested. We do not recommend the dismantling of any internal part of the mixer. The mixers are factory tested and sealed so as to give the best performance.

## INSTALLATION INSTRUCTIONS

## 5 INSTALLATION GUIDE

Before connection, flush water through pipe-work to remove all debris etc. to prevent damage to the valve mechanism.

THEN ENSURE WATER SUPPLIES HAVE BEEN ISOLATED.

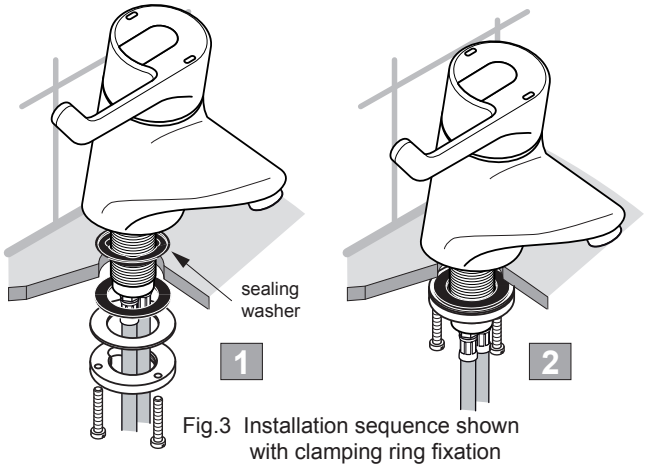
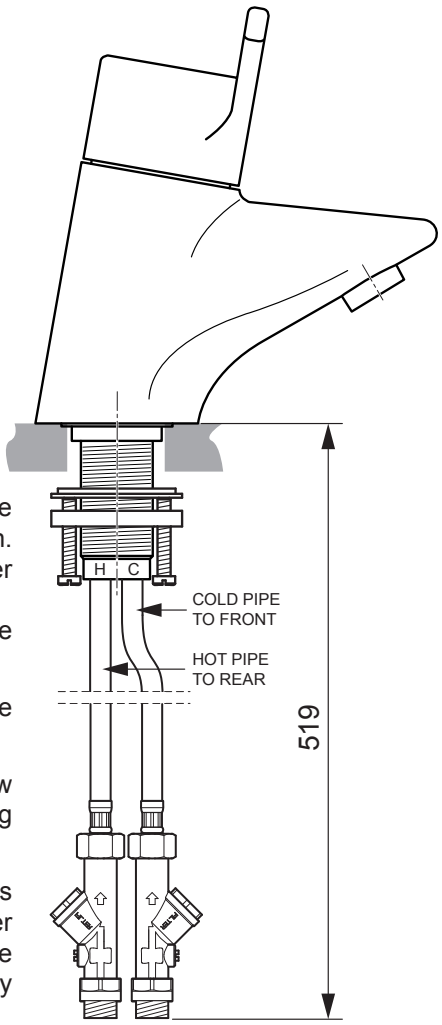



Fig.3 Installation sequence shown with clamping ring fixation




### 5.1 Mounting

1. Remove the mixer mounting kit if already assembled to the mixer tail. Ensure the basin sealing washer is in place as shown. This seal should locate into the base recess of the mixer. Offer the mixer towards the basin hole.
NOTE: if preferred, the copper inlet pipes can be screwed into the bottom of the mixer tail now, or fitted later from under the basin.

Feed the tail (& inlet pipes if fitted) into the basin hole. Allow the mixer to rest on the basin seated on the rubber washer.

2. Partially fit the screws into the brass clamping ring. From below the basin, fit the larger rubber washer, brass washer & clamping ring onto the mixer tail as shown.

3. Hand tighten the clamping ring onto the tail so that the screws contact the brass washer which in turn pushes the rubber washer until it makes contact with the underside of the basin. Ensure the mixer is positioned correctly, & then tighten the screws securely with a slotted-drive screw driver.

**Plumbers, please ensure a copy of the installation instructions is left with the end user for future reference**

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## 5.2 PLUMBING OVERVIEW

Once the mixer has been secured to the basin, consideration should be given to installing & positioning of the service valves.

If not done already, screw the copper inlet pipes into the tail of the mixer. Note these Ø10mm inlet pipes can be trimmed if necessary.

To fit service valves:
Observe arrow markings on the service valves. Ensure water flows in the direction indicated.
With the flat seal in place, screw the inlet adaptors onto the service valves using a 24mm A/F spanner. The service valve can be held with grips or use an adjustable spanner on the flats of the valve body.

Slip the compression nuts & olives of the inlet adaptors onto the inlet pipes. Push the adaptors onto the pipes until they stop against the shoulder. Slide the olives into the top of the adaptors & slightly tighten the compression nuts (17mm A/F spanner).

Orientate the service valve such that the filter cap & isolating screw are easily accessible for future maintenance.
Fit pipe into the supply side of the service valve & make good the all the joints.

NOTE: When the isolator screw slot is parallel to the valve body, the valve is open & permits water to flow. To close the valve, rotate the isolator screw 90°.

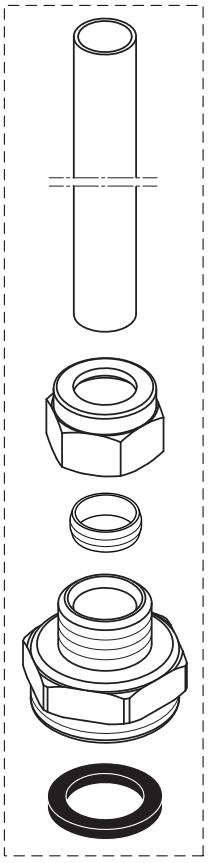

Fig.4

**Check that all joints are securely tightened, test for leaks.**

**DO NOT** apply heat near this product. Heat generated by soldering could damage plastic parts and seals.

# 6 OPERATION

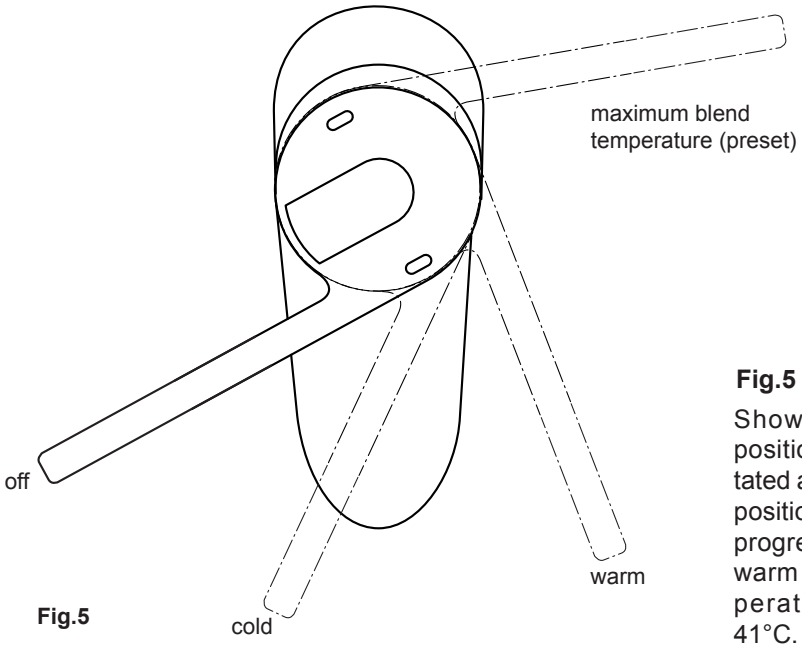


**Fig.5**

**Fig.5**

Showing the handle control positions. As the handle is rotated anti-clockwise from the off position the delivered water progresses from cold through warm to the preset max. temperature of approxximately 41°C.

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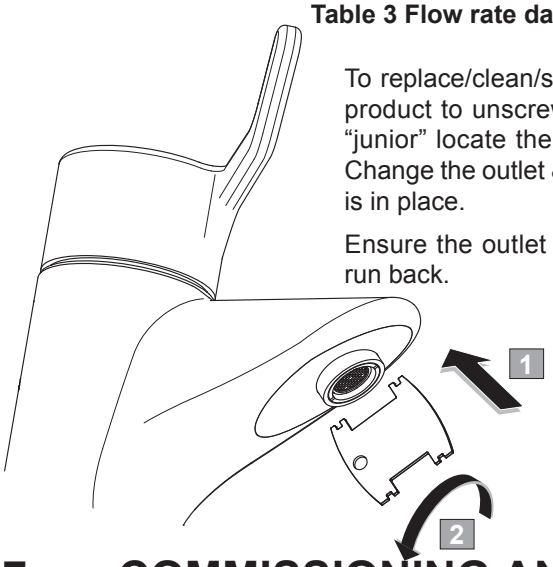
## 6.1 Outlet information

Table 3 shows the flow rate performance for the flow regulator outlet

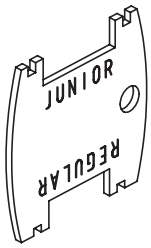
| Q | | |
|---|---|---|
| 300KPa | 3,8 l/min | Ref 7C (fitted) |

**Table 3 Flow rate data (Q=flow rate)**




To replace/clean/service the outlet, use the outlet key supplied with the product to unscrew the AV housing. Using the side of the key marked “junior” locate the key into the inner ring of the housing and unscrew. Change the outlet & re-secure the housing with the key, ensuring the seal is in place.

Ensure the outlet housing is adequately tightened to prevent leaks & run back.




# 7 COMMISSIONING AND AUDITS

The following procedure should be conducted after installation to ensure the product is functioning correctly.

## 7.1 Purpose of commissioning

- To confirm the correct designation of product versus application.
- To confirm the correct supply water conditions for the product / installation.
- To adjust the mixed temperature if necessary to suit the water supply conditions of the installation.
- To check the product is performing properly.
- To start an audit log and record appropriate data.

**This product is factory set at 40±1°C with supplies of circa; 300 KPa balanced pressure and temperatures of 15°C cold & 65°C hot (i.e. an inlet Δt of 50C° & a hot / mix Δt of 24C°)**

## 7.2 Commissioning Process (see decision tree FC1)

- Establish that the supply conditions are within the requirements outlined above. If not investigate.
- When conditions are acceptable record them, together with hot and cold temperatures. Establish Δt.

Check the outlet mix temperature is within 41°C±2°C, if not (probably due to Δt > 5C° difference to factory setting) adjust appropriately. ***(see 9.1)***

- If mixed temperature is correct undertake an 'in field' cold water isolation (CWI) test: ***(see 7.5 )***

  Pass – restore supply and record mixed temperature,

  Fail – ***See 7.5 in-field 'Cold Water Isolation' test.***

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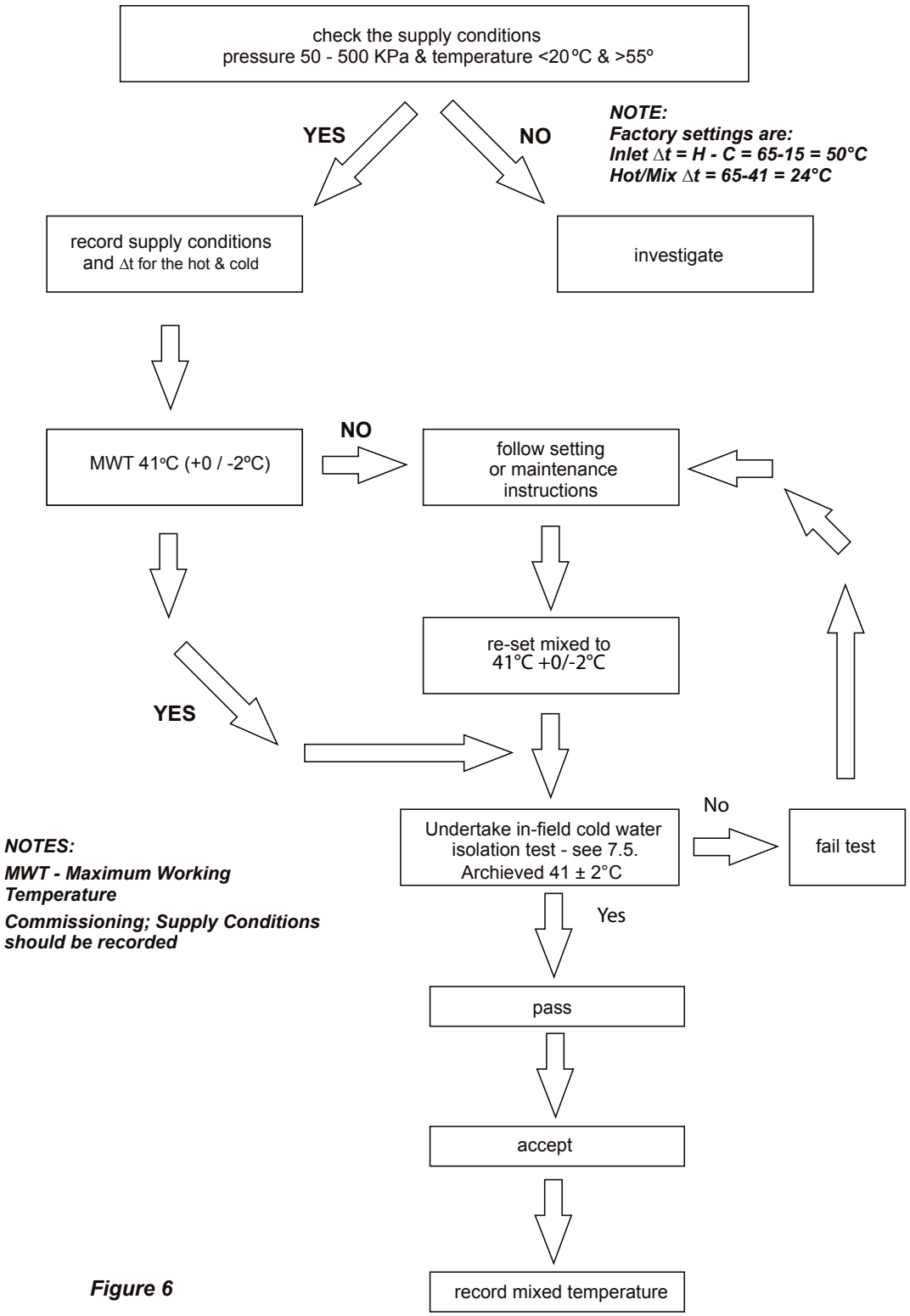
## 7.2 cont. Commissioning process (decision tree FC1)




***NOTES:***

***MWT - Maximum Working Temperature***

***Commissioning; Supply Conditions should be recorded***

***Figure 6***

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## 7.3 Audit Checks on TMV's

The purpose of a performance audit of a product is:

- To check the product continues to perform properly.
- To flag the need for the product to be adjusted due to supply condition changes or mechanism ageing.
- To ultimately identify the need for product maintenance.

*Note - Additionally these audits facilitate regular verification of the supply conditions. (See decision tree FC3)*

### Audit of Supplies To Fittings (FC3)

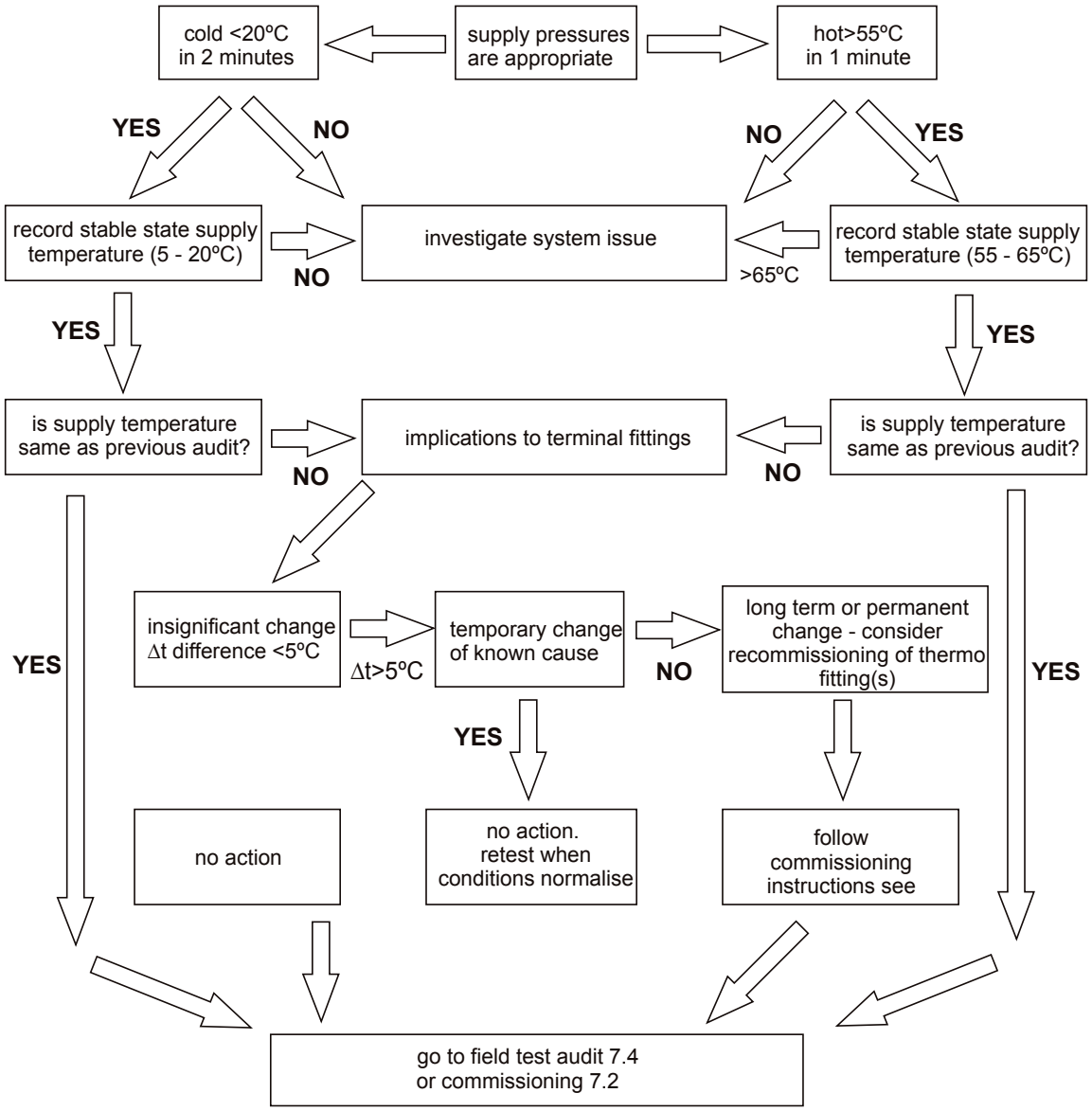


*Figure 7*

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## 7.4 Audit procedure (see decision tree FC2)

- Verify the water supplies conditions are similar to when the product was commissioned i.e. inlet Δt as previous + / - 5C°

  *Note: If inlet Δt change is > 5C° consider the cause of the change, If it is seen as a long term or permanent change, recommission the product. If however, it is only a temporary change, retest when normal conditions resume.*

- If inlet Δt differs from the commissioning Δt by < 5C° carry out field 'cold water isolation' (CWI) test ***(see 7.5 in field Cold Water Isolation test failure).***
- Pass - restore the cold supply and move on to check the mix temperature.

  *Note: If the product fails CWI test, refer to 7.5 and then recommission the valve.*

- Mixed Temperature is as commissioned ±2C°, Accept and record the temperature.

  *Note: If mixed Deviation > ±2C° (1st instance) reset mix as instructions and redo the test from start.* ***See 9.1 Adjustment of the mix temperature.***

- 2nd & subsequent instances follow maintenance instructions.

**Fitting Field Test Audit (FC2)**

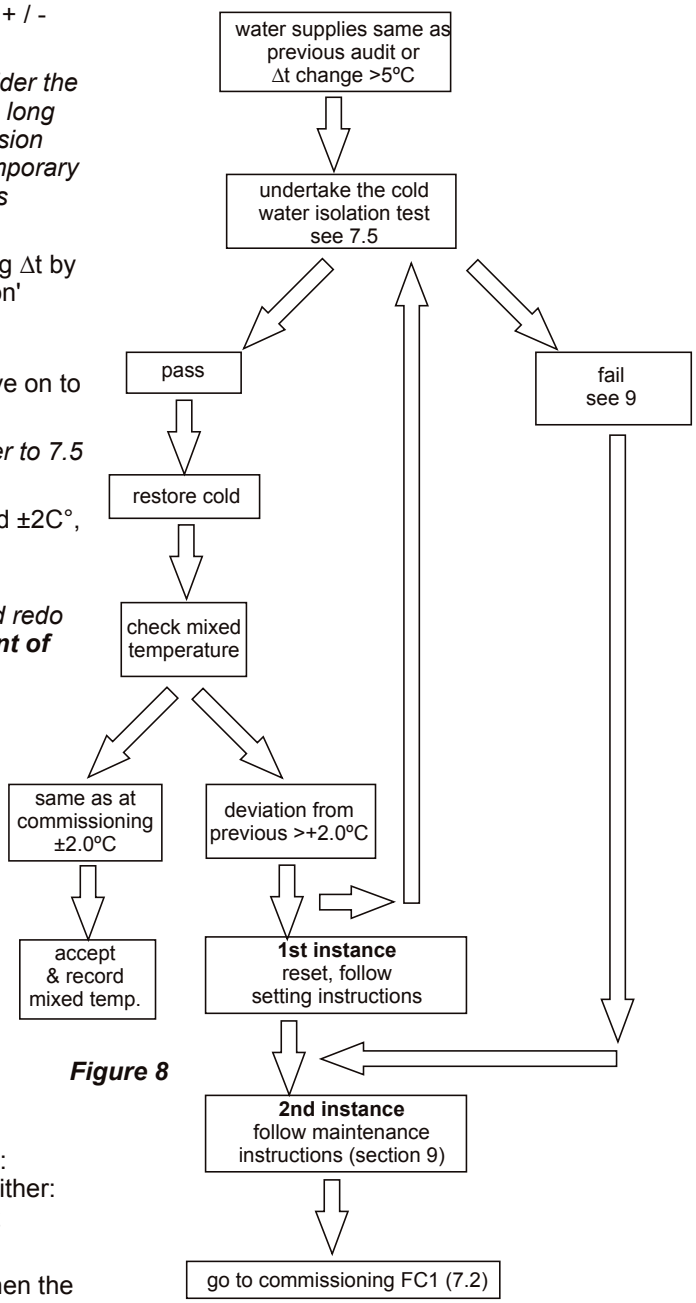


***Figure 8***

## 7.5 In-field 'Cold Water Isolation´(CWI) test.

Locate the cold inline isolating valve under the basin.
See Fig.11, section 10.
Using a flat-blade screw driver, the screw can be rotated 90° anti-clockwise to isolate the cold water supply.

Before commencing the CWI test, ensure:

1. The water supply conditions are met either:
   A. For commissioning a new product

   B. Or the inlet Δt is within ±5°C to when the product was commissioned ***(see 7.4)***.

***NOTE It is important that the hot temperature is greater than 55°C***

2. Mixed water outlet temperature is correct ***(see table 2, section 8)***.

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To perform a CWI test, operate the product by rotating the lever fully to the right.
Then conduct the following procedure:

1. Record the steady state temperature of both hot and cold water supplies. Note the $\Delta t$.
2. Record the temperature of the mixed water at the outlet.
3. Isolate the cold water supply (by rotating the isolating screw 90° & monitor the flow of water from the outlet.

If the flow ceases, CWI test passed:

1. Restore the cold water supply by rotating the isolator screw 90° clockwise.
2. Re-check the temperature of the stabilised mixed water at the outlet to ensure it is still correct.

Accept & record mixed temperature.

If there is an ongoing flow of water from the mixed water outlet, then 5 seconds after CWI collect the discharging water into a measuring vessel for 60 seconds. To pass the CWI test the volume of collected water should be less than 120ml.

If the product fails CWI test, see FC2 ***(see section 7.4)***. Follow product maintenance ***(see section 9)*** and servicing ***(see section 8)*** instructions.

## 8 SERVICING

The need for servicing is normally identified as a result of the regular performance auditing.

| Application | Maximum mixed water temperature during normal operation | Permitted maximum stabilised temperature recorded during site testing - excluding transient spikes |
|---|---|---|
| Washbasin | 41ºC | 43ºC |

**Table 2 A guide to maximum temperature sets**

### 8.1 FREQUENCY OF REGULAR SERVICING

The purpose of servicing regularly is to monitor any changes in performance due to changes in either the system or the product. This may highlight the need to adjust either the supply system or the product. These products should be audited 6 to 8 weeks and again 12 to 15 weeks after commissioning. The results are to be compared against original commissioning settings.
If there are no significant changes at the mixed temperature outlet then a 6 monthly servicing cycle may be adopted. Otherwise, servicing checks should be carried out more frequently (e.g. every 4 months).

Follow the recommended auditing and maintenance procedures detailed in sections 7 & 9.

During servicing, note the following:

**1**. Repeat the procedure of recording and checking supply temperatures. (The same type of measuring equipment should be used)

**2.** If the temperature has changed significantly from the previously recorded valves, the following should be checked:

- ***a.*** *All in-line or integral valve filters are clear of obstruction.*
- ***b.*** *All in-line or integral check valves are clean and working properly to prevent backflow.*
- ***c.*** *Any isolating valves are fully open.*
- ***d.*** *The thermostat is free of debris*

**3.** When satisfied with the mixed outlet temperatures re-record the temperatures.

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## 9 MAINTENANCE

When installed in a healthcare application, we recommend that the commissioning and maintenance procedures, detailed under 7 & 8, be carried out.

### 9.1 Adjustment of the mix temperature

- ***Note: Cartridge is factory pre-set at 40±1°C at 300 Kpa.***

1. Move the lever to the fully on (max) position.
2. Remove the lever by prising out the cover button and unscrewing the retaining screw using a 4mm Allen key.
3. Remove the upper Anticlockwise stop ring (slide off spindle).
4. Rotate spindle (using lever handle) to achieve correct mix temperature. (40±1ºC) Rotate clockwise to reduce and anticlockwise to increase
5. Refit the upper stop ring against cartridge stop face.

*Note:1. This is the normal maximum temperature range for the product and as such there is a wide zone of spindle movement that gives this mix temperature. For best performance you should refit the stop at the first point of anticlockwise rotation that achieves the desired setting.*

*Note:2. If you are unable to achieve 40±1°C Max and you have the correct ∆t's it may be due to fine debris.*
***See 9.2 Removal and inspection of cartridge.***

6. Upon successful completion of the temperature adjustment, conduct the ***Cold Water Isolation (CWI) test (See 7.5)*** to ensure product is working properly.
7. Refit the lever and record the mix temperature.

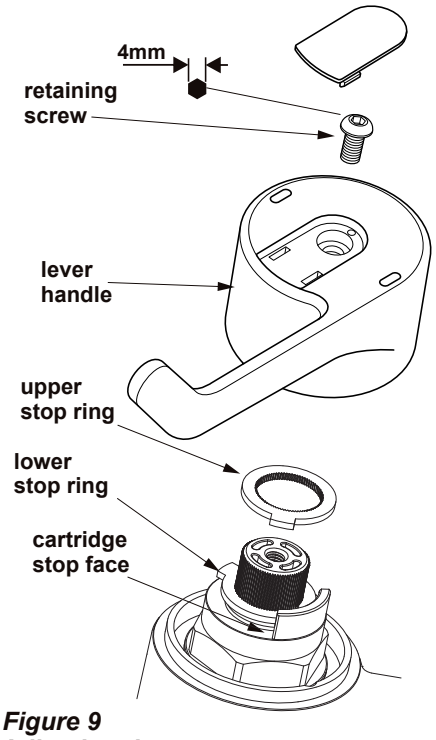


***Figure 9***
**Adjusting the pre-set temperature**

### 9.2 Removal and inspection of cartridge

After checking that supply conditions are within the specified parameters, if the fitting malfunctions or should the test results fail to fall within the specified limits consider replacing the cartridge with a new one. ***See 9.3 Important notes on debris.***

Isolate the fitting by turning the isolating valves 90º anti-clockwise (viewed facing the iso-valve).

Remove the lever handle as described in 9.1. Unscrew the cartridge from the body with a 36mm a/f deep socket. Inspect cartridge for damage.

Replace cartridge if necessary and reassemble cartridge into body.

The replacement cartridge should be tightened to a torque of 15Nm. (To re-secure the cartridge we recommend the use of Loctite 2400 or equivalent applied to the thread of the cartridge)

Replace lever handle and reinstate the supplies.

After fitting the new cartridge start the test procedure from the section on commissioning.

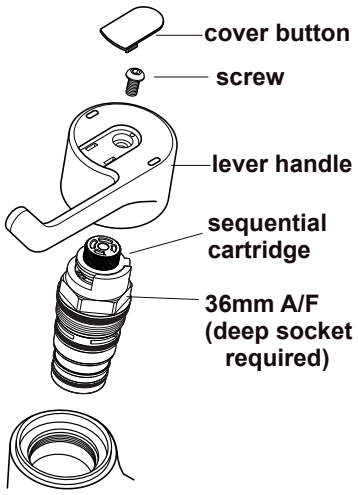


***Figure 10***
**Exploded view showing sequential cartridge**

- Redo the Cold Water Isolation (CWI) test ***(See 7.5)***.
- Once satisfied with the CWI test, re-check and if necessary, adjust the maximum mix temperature, see ***(See 9.1).***
- Record the mix temperature.

**NOTE: During servicing (or replacing): the thermostatic cartridge fitted in this product does NOT require lubrication.**

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## 9.3 Important notes on debris

Although this product is protected by the service valve filters, debris can still find its way to the thermostat housing area. This can happen during servicing for example. Remove cartridge (see section 9.2) and carry out an inspection.

## 9.4 Thermostatic Cartridge Ageing

Following many years of normal service you may notice the following:
1. The need to carry out more frequent adjustment of mixed temperature.
2. The thermostatic element may not pass the CWI test.

These issues could be due to the ageing of the thermostat which loses some expansion capability over time.

These are the principle objectives of testing, as they serve to indicate to maintenance staff the declining performance capability of the thermostatic cartridge.

For this reason the audit testing flow chart highlights that 2nd Instance CWI test failure or 2nd instance mixed deviation even with stable 'as commissioned' supply conditions and correct inlet supply $\Delta$t's, is potentially the first indication of the need to replace the cartridge.

# 10 SERVICE VALVES

The service valves contain filter, check, isolating valve & 4lpm regulator.

Isolation valves facilitate 4 activities:
1) Cleaning strainers & check valves
2) Servicing the cartridge
3) Disinfection
4) Audit cold water failure testing

**Strainers**
To ensure trouble free operation of the fitting, the strainer elements should be checked and cleaned in accordance with the commissioning and servicing guide (see section 8).

To access the strainer element, simply close the isolating valve and unscrew the strainer cap. The strainer element should be washed with clean water and refitted.

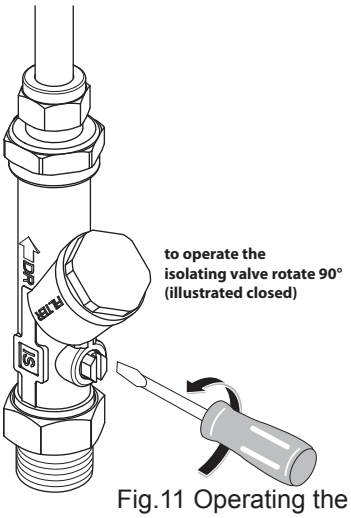


Fig.11 Operating the isolating valve

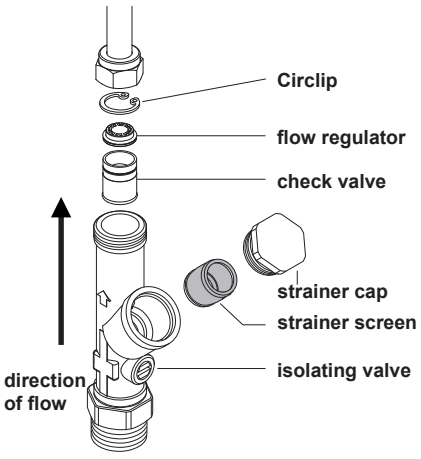


Fig.12 Exploded view of isolating valve

To achieve a suitable flow rate where supply pressures are very low it may be necessary to remove the inline flow regulator.
NOTE: The flow regulator is retained within the valve body by a small circlip. A pair of circlip pliers will be required to remove the regulator.

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## 11 SPARE PARTS

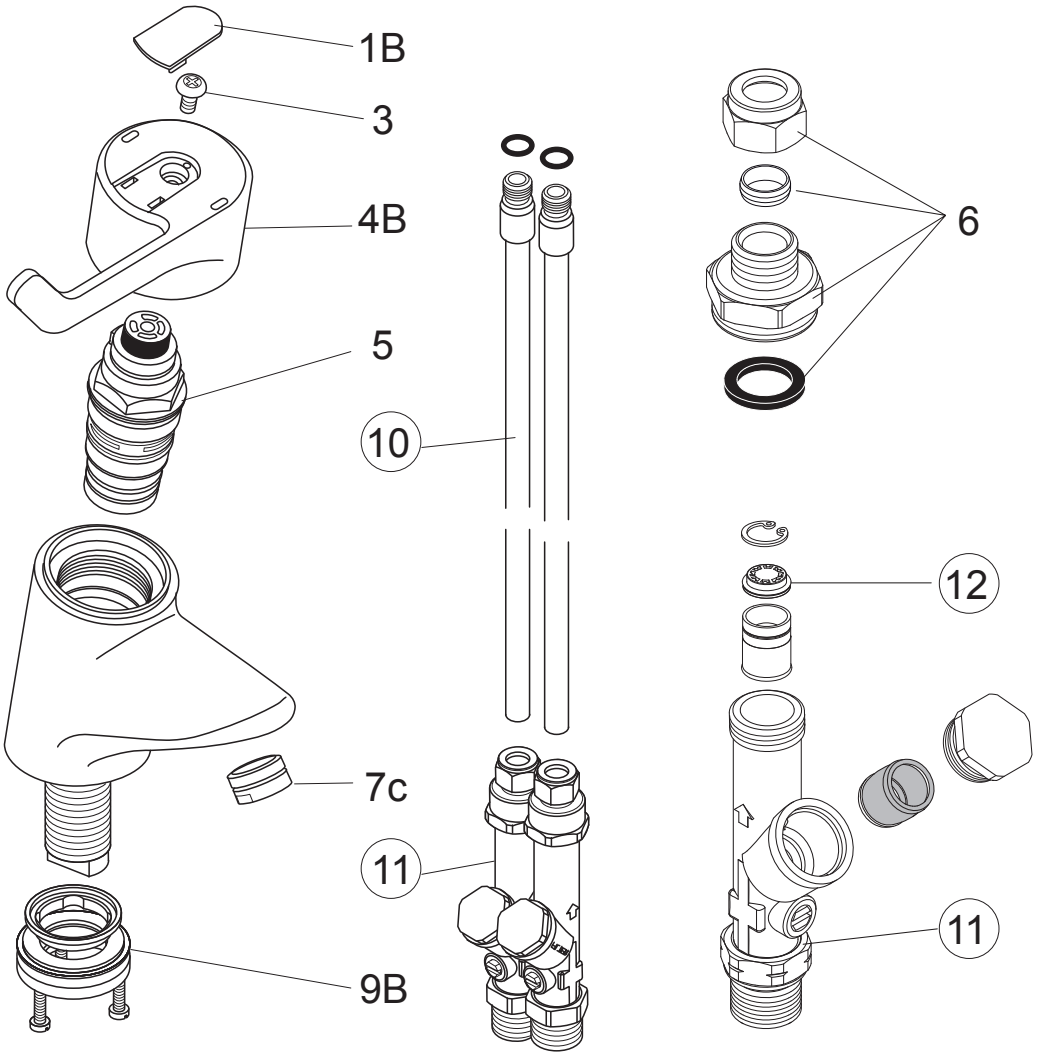


Fig.13 Exploded views

| Ref. | Description | Part No. |
|---|---|---|
| 1B | Cover cap, non-res, AS logo | A962017AA |
| 3 | Handle retaining screw | A961950NU |
| 4B | Lever handle | A961823AA |
| 5 | Thermostatic cartridge | A962280NU |
| 5A | Sequential, thermostatic cartridge (10 bulk pack) | F960879NU |
| 6 | Couplers –copper tails PAIR | F961107NU |
| 7C | 3.8 lpm laminar Flow Insert with Housing | A860970AA |
| 9B | Clamping kit & seal | A963381NU |
| 10 | 10mm copper tails - PAIR | F961106NU |
| 11 | Isolating valves-PAIR | F961105NU |
| 12 | Flow regulator | A962570NU |

**Plumbers, please ensure a copy of the installation instructions is left with the end user for future reference**