



Horne Engineering Ltd
 Po Box 7, Rankine Street
 Johnstone, Renfrewshire
 Scotland, PA5 8BD
 Tel: 01505 321455
 Fax: 01505 336287
 Email: technical@horne.co.uk
 Web: www.horne.co.uk

**TSV1-3 THERMOSTATIC SHOWER VALVE
 WITH AUTOMATIC DIVERTER VALVE (T605A & variants)
 INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS
 Installation requirements and specifications**

Approvals

The TSV1-3 Thermostatic Shower Valve within the panel has been independently tested by the WRc and approved to all the requirements of NHS Model Engineering Specifications D08 Thermostatic Mixing Valves (Healthcare Premises) to the following designations and for the following applications:

HP-S	Shower with supply pressures of 1 – 5 bar and unrestricted flow rate
LP-S	Shower with supply pressures of 0.2 – 1 bar and unrestricted flow rate

Supply Water Pressure requirements

The minimum water pressure required to achieve a satisfactory spray at each spray-head is a dynamic head of 20m (30 psi, 2 bar) measured from the spray head.

Note that dynamic head is measured with the water running.

The maximum recommended supply pressure is 6 bar (90 psi, 60m head) for hot and 10 bar (150 psi, 100m head) for the cold.

Supply Water Temperature Requirements

Max. Hot Water Temperature*	65°C
Min. Hot Water Temperature#	55°C
Max. Cold Water Temperature#	20°C

A minimum temperature differential of 5°C should exist between the mixed water temperature and each inlet temperature.

Note that requirements marked * originate from WRAS approval of non-metallic components, and those marked # originate from HTM 04:01, Part A, 2007.

Temperature Adjustment Range

The mixed water temperature can be adjusted from cool through to a top limit (which can be preset during installation – factory set to approx. 41°C - with full anti-scald protection throughout the range).

Water and Energy Conservation

The TSV1 range of shower panels is fitted with a flow regulator at the shower outlet to reduce the flow rate and conserve water and energy. The drawing at the end of this document provides information for accessing the flow regulator for removal or replacement.

Every HORNE TSV1-3 is supplied with an integral WRAS approved single check valve and integral large surface area strainer. The Shower Panel terminates in 15mm copper pipes for hot and cold supplies. The hot pipe is on the left, cold on the right, when viewed from the user's perspective.

HORNE TSV1-3 Thermostatic Shower Panel

Installation Instructions (Surface Mounted with Auto Diverter valve)

General

The surface-mounted panel is supplied with a fitting kit containing the necessary fixings to attach it to the wall, and with hex keys to assist with routine maintenance.

Installation

Installation of the pre-plumbed panel is particularly simple and involves mounting the panel on the wall, connecting and flushing the water supplies.

1) *Position the Pre-plumbed Panel*

Identify a suitable position for the panel and mark a line on the wall level with the top of the casing. Mark a point on the wall that is on the required centreline for the casing, 15mm below the line of the top of the casing, for the support screw (see Fig. 1).

2) *Install the Support Screw*

Drill a 7.0mm dia hole in the wall and insert a wallplug and screw, leaving the head of the screw 11-13mm from the wall surface. Note that a stainless steel screw (corrosion resistant) is supplied for this.

3) *Hang the Panel on the Support Screw*

Release the top cover of the panel by removing the four T-15 screws. Hang the panel on the support screw by the larger hole in the middle of the back strap and let this take the weight of the enclosure (see Fig 2).

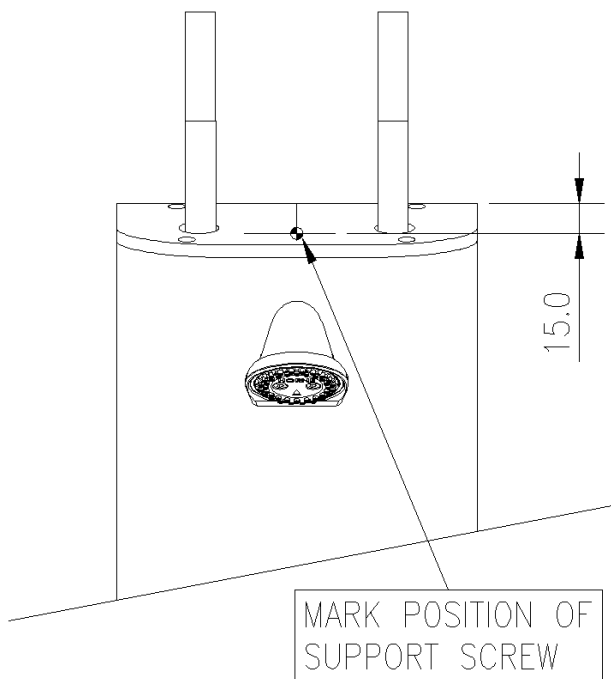


Fig 1

REMOVE COVER SCREWS
AND TOP COVER

HANG ENCLOSURE
ON SUPPORT SCREW

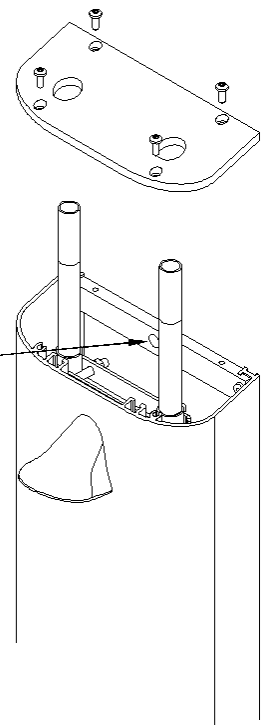


Fig 2.

4) *Mark out the 4 Support Holes*

Ensure that the panel is hanging true and then mark out the holes for the 2 upper support screws. Remove the bottom cover of the panel and mark out the 2 lower support screws (see Fig 3).

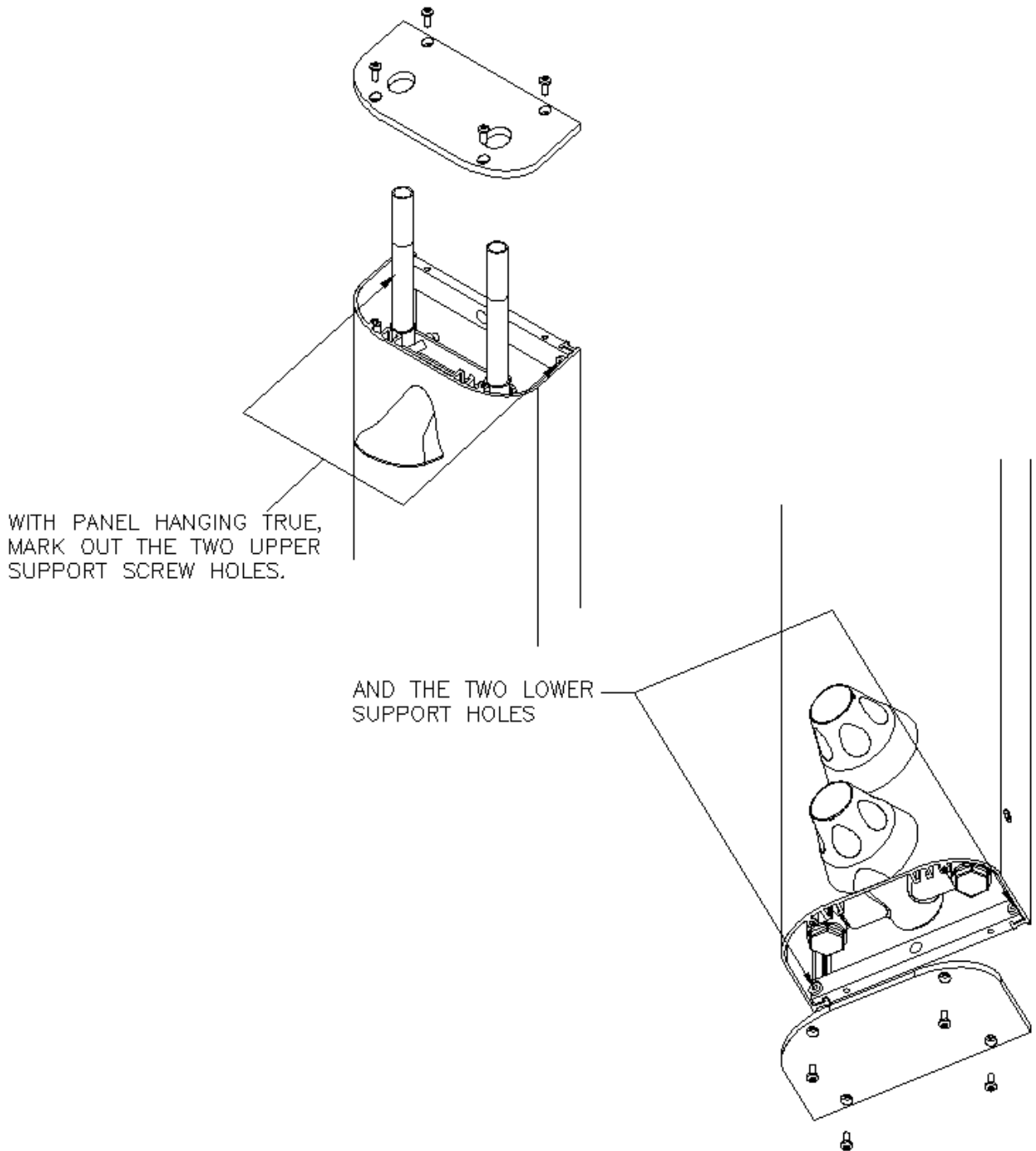


Fig 3

5) *Drill Support Holes*

Carefully remove the panel from the temporary support screw and, being careful not to scratch the panel or its covers, lay it down where it will not be damaged. Drill 4 x 7.0mm holes and install the wall plugs.

6) *Attach the Panel to the Wall*

Carefully re-hang the panel on the temporary screw and then attach it firmly to the wall by the four other screws. Put the four supplied screw bushes in the mounting holes in the panel and then attach the panel firmly to the wall by the four supplied stainless steel cross-head screws (see Fig 4). A bead of silicon mastic can be used, if required, to cover any gaps behind the panel on uneven walls. Do not mastic the lower end cap to the wall as this must be removed for maintenance.

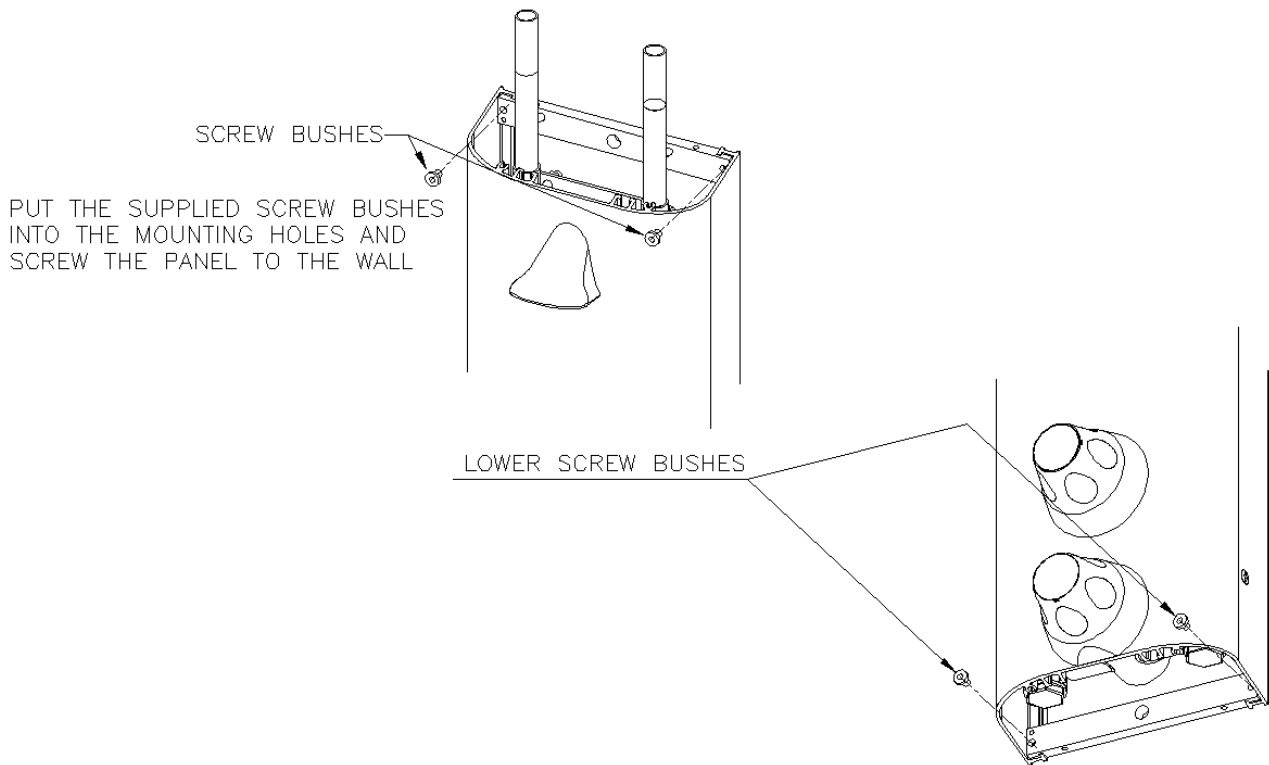


Fig 4.

7) *Connect the Supply Pipes*

N.B. Ensure that the top cover of the panel is replaced prior to connecting up the supply pipes.

Connect the hot water supply to the left hand inlet, and cold water to the right-hand inlet (see Fig 5).

DO NOT OPEN THE WATER SUPPLIES AT THIS STAGE AS THEY HAVE NOT BEEN FLUSHED OUT TO REMOVE THE DEBRIS IN THE PIPEWORK. SUCH DEBRIS CAN DAMAGE THE TSV1-3 VALVE.

HOT INLET

COLD INLET

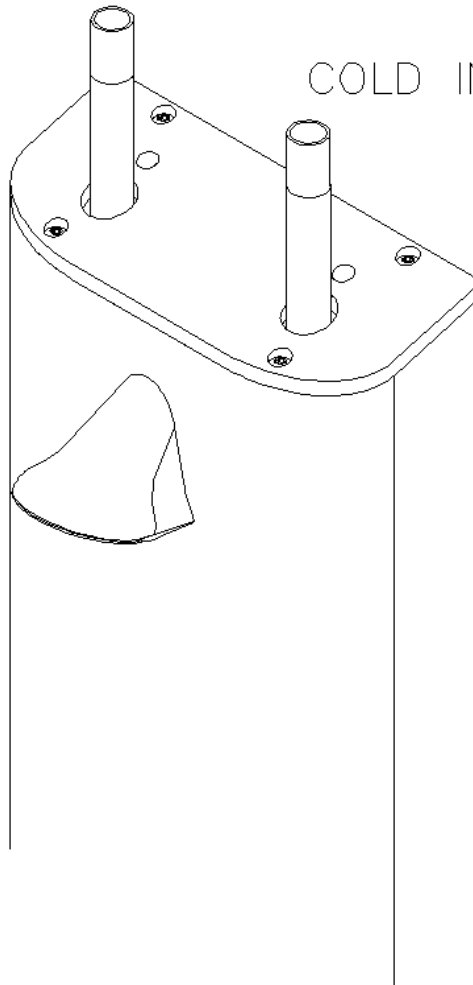


Fig 5

8) *Flush the Pipework*

Flush out the pipework in accordance with Water Bylaws 2000 (Scotland) and BS 6700:1997 (England & Wales). The use of a Horne flushing kit is strongly recommended, because this connects directly to the water inlets on the mixing valve. Access to the flushing points is gained from underneath the casing through the lower end cap. Using the supplied 4mm hex key, isolate the cold and hot water supplies at the low level servicing valves. Remove the strainer cap and strainer basket and screw in the flushing adapter. Place the end of the flushing hose in an appropriate drain or container and turn on the supply to flush as required. Remove the flushing adapter and replace the strainer cap. Repeat for both hot and cold supplies. See Figs 6 & 7.

NOTE THAT IF THERE IS ANY DANGER OF FREEZING THEN THE PIPES AND TSV1-3 MUST BE DRAINED TO AVOID DAMAGE.

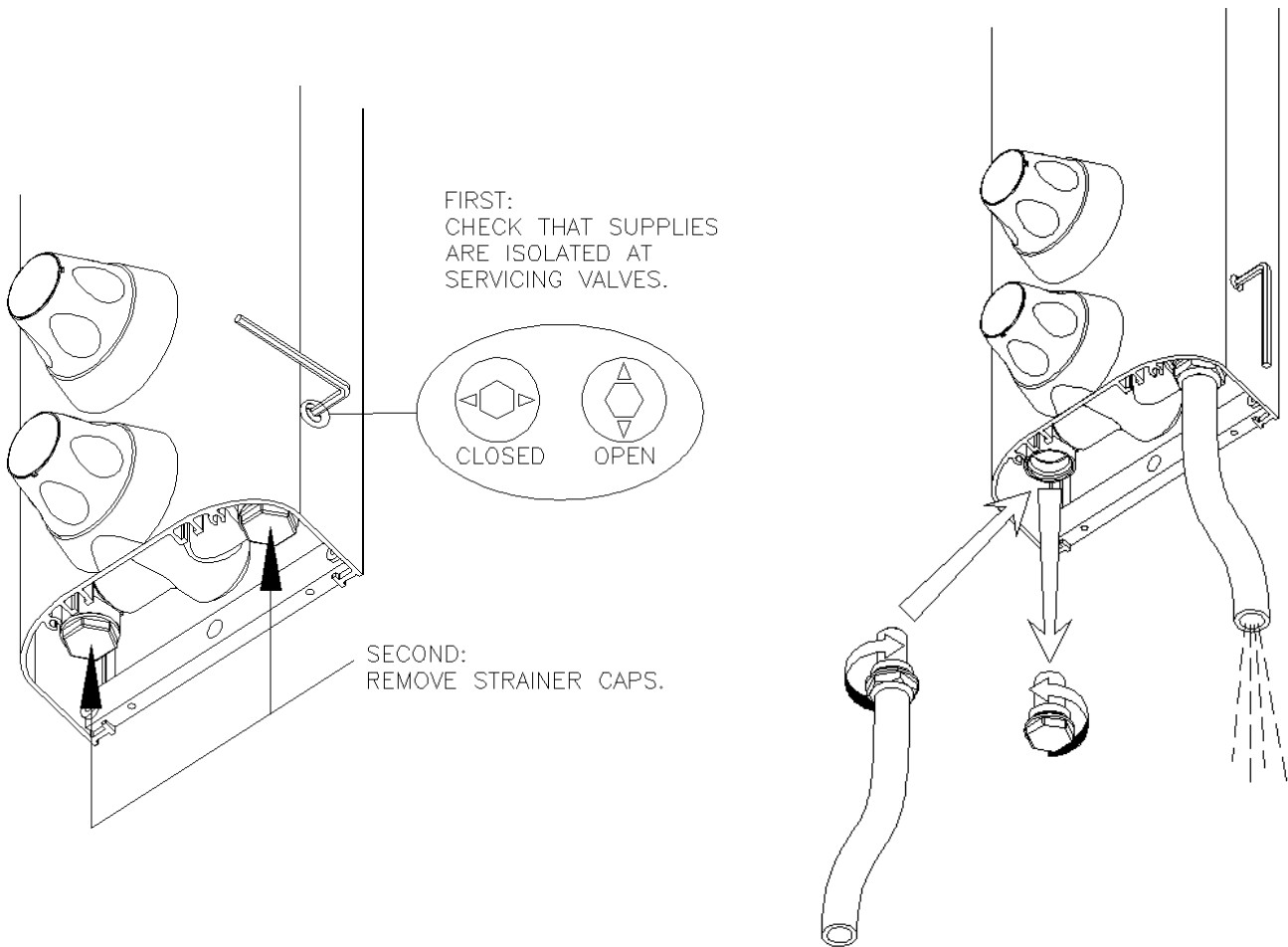


Fig. 6

Fig. 7

9) *Test for Leaks in Pipework*

Ensure that the TSV1-3 on/off control is closed (i.e. turned fully clockwise) and open the supplies. Open the low level servicing valves on the TSV1 casing (Fig. 6). Adjust the temperature control and check for any water leaks upstream of the TSV1-3 valve. Make good any leaks found. The valve is now ready for commissioning.

Note that if the controls, enclosure and shower accessories require cleaning then care must be taken not to scratch them in the process. Wash off any surface dust with the shower spray before cleaning with soapy water.

DO NOT USE ANY ABRASIVE CLEANERS OR SOLVENTS OR THE SURFACES MAY BE DAMAGED.

Supplementary Installation Instructions for 'B' Variants.

TSV1 Panel Mounted Shower Valves are available in versions with flexible braided stainless steel inlet hoses rather than top entry isolating valves. These versions have Product Reference codes with the suffix **B**, e.g. **T605BLR**.

The main difference, from an installation point of view, is that the water supplies may have to be connected before the pre-plumbed enclosure is attached to the wall.

Accordingly, point 7 on the attached installation instructions (Connect the Supply Pipes) should be performed *before* point 6 (Attach the Pre-Plumbed Enclosure to the Wall) unless alternative access is available to the connections, e.g. via an access panel.

Note that the end of the braided hose inlets are colour coded with BLUE for the Cold Water Supply and RED for the Hot Water Supply.

Care should be taken to ensure that the weight of the pre-plumbed enclosure is taken by the mounting screws and NOT by the hoses.

COMMISSIONING

Ensure that the pipework has been flushed out before commissioning the TSV1-3 (see installation instructions).

Ensure that both hot and cold water supplies are open and at, or near to, their design temperatures and pressures and that they are within the requirements of the valve as outlined on page 1. The NHS designation of the valve should match the intended application.

Set the temperature control to the maximum temperature setting (i.e. rotate the control anticlockwise until it stops).

Remove the handset, if fitted. Fully open the on/off control by turning it anticlockwise. It is important that the valve is commissioned using the fixed sprayhead. A burst polythene bag over the sprayhead will help to catch and deflect the spray during commissioning.

Allow the shower to run at maximum temperature setting until the water temperature has stabilised. Should the temperature rise in an uncontrolled fashion, then the hot and cold supplies are probably reversed. Correct this before proceeding.

The TSV1-3 is set in the factory to provide a maximum outlet temperature of approximately 41°C, but this should be checked on site to ensure that the setting has not been altered and to ensure user safety.

If the maximum temperature requires adjustment, remove the temperature control cap using a sharp blade or the tip of a penknife and adjust the small slotted screw in the centre of the spindle. Adjust the screw anticlockwise to increase the temperature, clockwise to decrease the temperature (see Fig. 8).

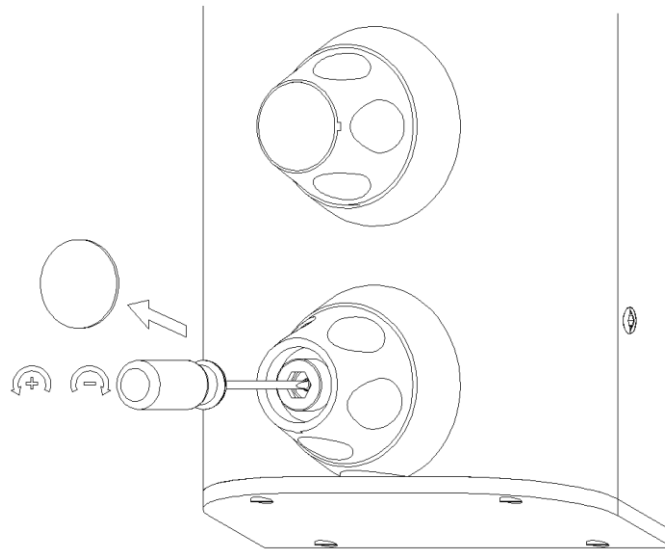


Fig 8.

After setting the maximum temperature, turn the shower on and off a few times and check that the maximum setting is correct. Record the commissioning information on the attached maintenance sheet to permit the in-service performance of the valve to be assessed.

The automatic diverter valve switches flow between the fixed head and the handset. When the handset is attached the flow is automatically diverted to it. Removing the handset automatically reverts flow to the fixed head.

Finally, check the thermal shut-off facility of the TSV1-3 by performing a thermal shut off test. While the shower is running, shut off the cold water supply. The flow from the showerhead should immediately stop or reduce to a trickle, in which case the mixed water temperature rise should be less than 3°C. In either case, there is no scalding risk. If the temperature rises above this then it is likely that there is contamination in the TSV1-3 that is preventing it from shutting off the hot supply. Refer to the maintenance section of this booklet or phone the factory for advice.

MAINTENANCE

Maintenance of the TSV1-3 shower valve is essential to ensure the product continues to perform to specification after installation, and continues to afford scald protection. Record all maintenance carried out on the attached commissioning and maintenance record.

When cleaning the external panel and knobs, never use cleaners containing abrasives or solvents as they may damage the chrome plating. Use only a soft cloth and soap.

The frequency of routine maintenance of the TSV1-3 internals (i.e. cleaning, descaling etc) depends largely on the condition of the water supplies, and local knowledge will dictate suitable intervals. In addition to this the following precautions should be observed.

Initially check the strainer baskets for debris every three months and clean if required. This period can be increased if appropriate once the general condition and cleanliness of the water is established.

Perform a thermal shut-off test every three months, and check the maximum temperature setting. See the last paragraph in the Commissioning Instructions for details of the thermal shut-off test and re-adjustment of the maximum temperature setting, if required.

If the maximum water temperature rises by more than 3°C from the commissioned setting then ensure that the strainers are clean and that the isolating valves are fully open. Test the non-return valves as described below. If these tests do not highlight the reason for the temperature rise then follow the procedure below for investigating failure of the thermal shut-off test.

If the TSV1-3 fails the thermal shut-off test then remove the temperature control knob and the thermostatic cover (see installation instructions for details) and check the internal surfaces for scaling. If the TSV1-3 body requires descaling then it should be removed from the casing to do this. All rubber parts must be removed prior to descaling. Do not forget the slide valve seal located inside the TSV1-3 body, which should always be replaced with a new seal after removal. Maintenance kits, which contain "O" rings and/or the thermostatic element, are available. Smear all "O" rings with silicon grease/oil prior to installing them. Torque the TSV1-3 cover to 13 Nm (10 lbft). This is to prevent the user from inadvertently unscrewing the cover during temperature adjustment. Do not over tighten the cover.

Replace the "O" rings every three years (A Maintenance kit with spare "O" rings is available). Smear silicon oil on all "O" rings prior to installation. Lightly smear the outside diameter of the slide valve with silicon oil prior to installation.

Replace the thermostatic element and slide valve assembly at least once every 6 years in all TSV1-3 valves, or more often if problems are experienced or in installations where the water is aggressive.

The on/off mechanism uses a ½ " washer, which should be replaced when it leaks. Remove the cosmetic trim and unscrew the on/off assembly. The washer is retained by a small nut. Do not over tighten this nut. Ensure the on/off assembly is torqued down to 13 Nm (10 lbft) to prevent the user from inadvertently unscrewing the assembly during flow control. Do not over tighten the assembly.

The automatic diverting valve diverts water to the handset whenever the handset is attached. Flow to the handset is stopped by a check valve when the handset is removed.

The check valves prevent cross flow between hot and cold water supplies under unequal pressure conditions, and are designed for long life with no maintenance. Their function can be tested as follows:

To test the check valves on the hot side, shut off the hot supply and ensure the cold supply is open. Be prepared for leakage of trapped water from the pipe and remove the strainer basket on the hot side. Any continuing leakage evident from the strainer body is likely to be coming through the hot supply check valves (N.B. Ensure the hot isolating valve shuts off tight or it may cause leakage here).

To test the check valves on the cold side, shut off the cold supply and ensure the hot supply is open. Be prepared for leakage of trapped water from the pipe and remove the strainer basket on the cold side. Any continuing leakage evident from the strainer body is likely to be coming through the cold supply check valves (N.B. Ensure cold isolating valve shuts off tight or it may cause leakage here).

If either check valves is leaking then the inlet elbow (complete with check valves and strainer basket) should be replaced. It is not possible to satisfactorily remove the check valves itself from the inlet elbow and should not be attempted. The shower valve body must be removed from the pre-plumbed enclosure in order to remove the inlet elbows. See Fig. 9 for the location of the parts.

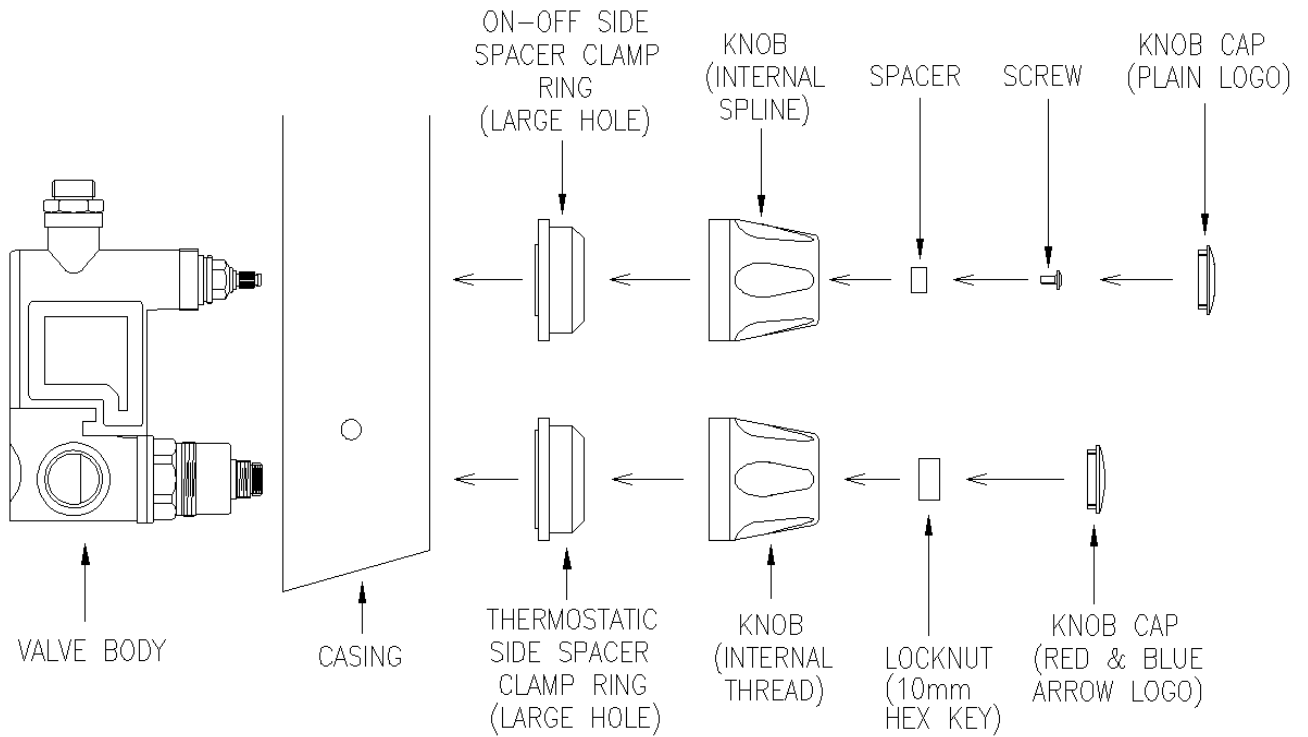


Fig 9.

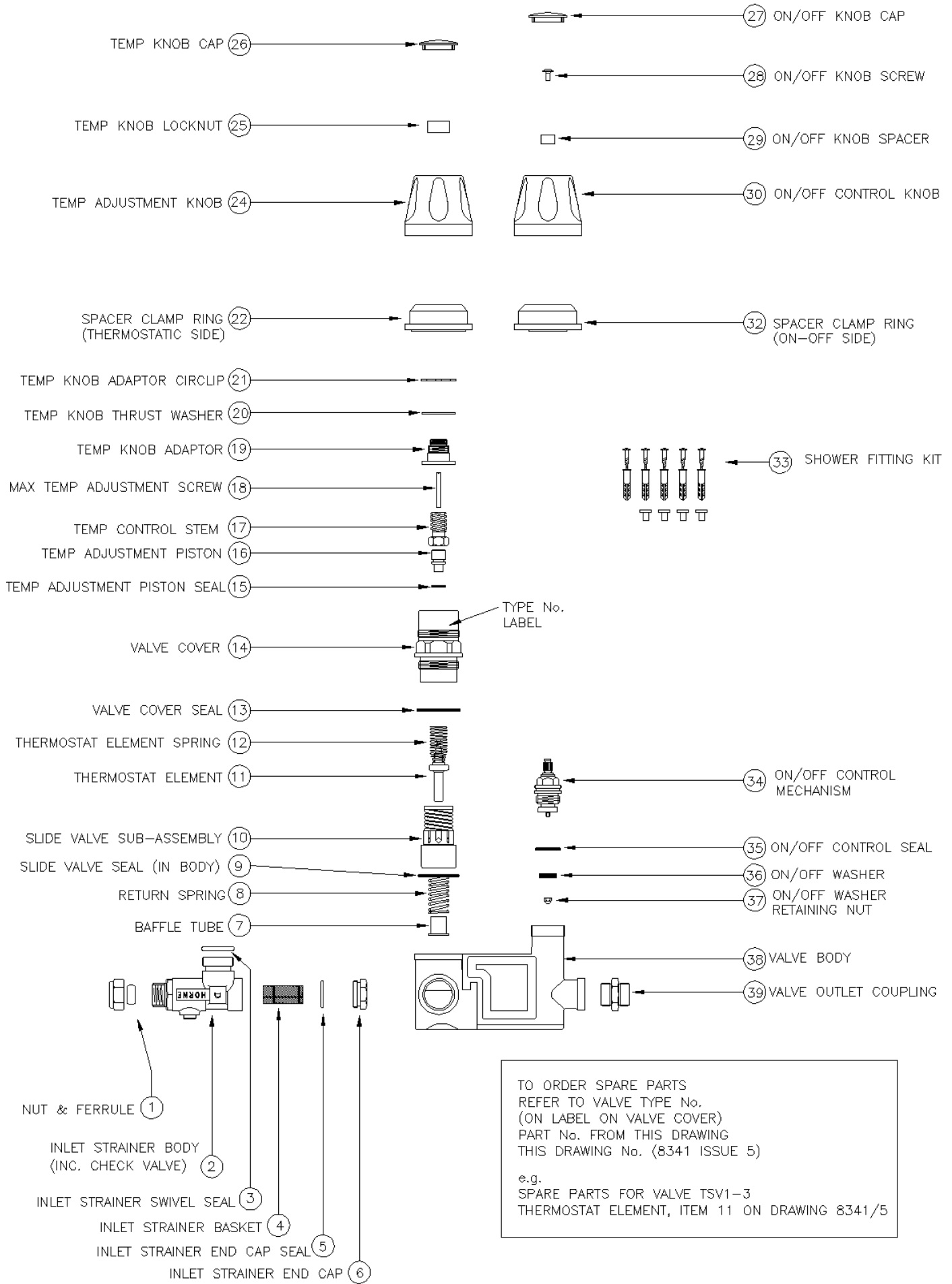
IN-SERVICE TESTING

Periodic testing should be carried out to check whether or not any deterioration has occurred in the performance of the TSV1-3.

A thermal shut-off test, as described under maintenance, above, should be carried out. If the mixed water coming from the showerhead is at a temperature of more than 3°C above the maximum mixed water temperature setting then the TSV1-3 is due for maintenance.

Note: A thermostatic mixing valve in need of maintenance can be undetectable in normal use and only become apparent when disruption occurs in the hot or cold water supply temperatures or pressures.

The frequency of in-service testing depends upon the condition of the water passing through the TSV1-3. In-service testing must be carried out more frequently in hard water areas than in soft water areas. As a general guide, in-service testing should be carried out at intervals somewhere between six months and 12 months. In-service testing should be carried out at least every 12 months and, where the water is hard, the interval may be less than 6 months. Experience of local conditions and the in-service testing record will dictate the frequency of in-service testing.



TO REMOVE FLOW REGULATOR

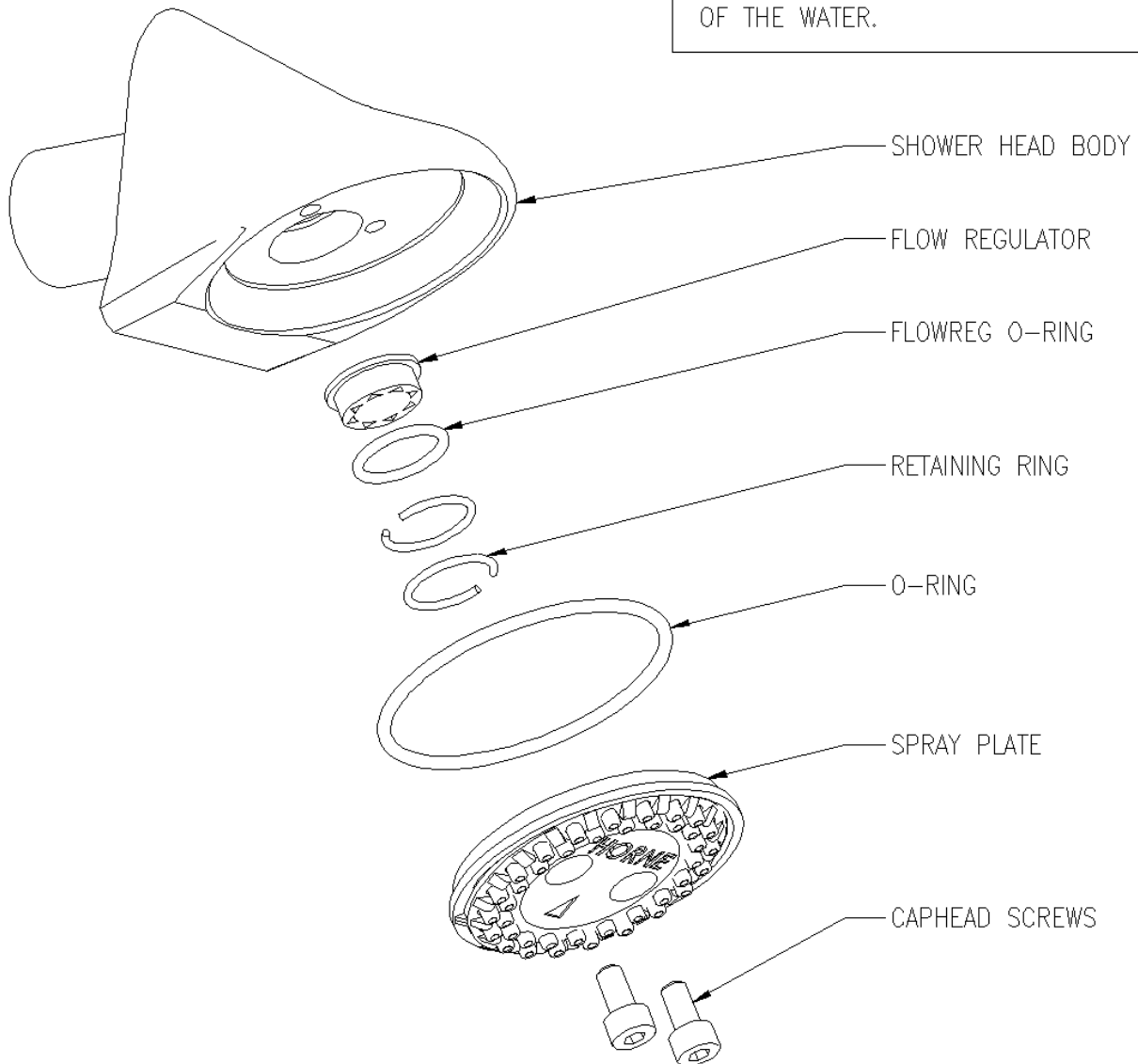
- 1> REMOVE THE 2 CAPHEAD SCREWS (USING 3MM HEX KEY)
- 2> PRISE SPRAYPLATE OUT WITH A BLADE OR SIMILAR
- 3> REMOVE THE 2 RETAINING RINGS
- 4> REMOVE FLOW REGULATOR WITH ITS O-RING

STEPS <2> THROUGH <4> CAN BE DONE BY TURNING ON THE WATER SUPPLY AND CATCHING THE PARTS IN A BUCKET

TO RE-FIT FLOW REGULATOR

- 1> INSERT FLOWREG INTO HOLE, FLANGED SIDE UP
- 2> PUSH O-RING INTO GAP AROUND FLOWREG
- 3> INSERT RETAINING RINGS SO THAT THE GAPS ARE FACING OPPOSITE DIRECTIONS
- 4> FIT THE LARGE O-RING ONTO THE SPRAYPLATE AND FIT THE SPRAYPLATE
- 5> RE-FIT THE CAPHEAD SCREWS

NOTE THAT THE SPRAY PLATE CAN BE FITTED IN 2 DIFFERENT ORIENTATIONS TO ALLOW GREATER OR LESSER 'THROW' OF THE WATER.



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MATERIAL : MATERIAL SPECIFICATION

HORNE ENGINEERING LTD.
JOHNSTONE
RENFREWSHIRE

PART :
REMOVAL / REPLACEMENT
OF FLOW REGULATOR
(VANDAL RESISTANT HEAD)

PRODUCT :
HORNE SHOWER PANELS

SCALE	DO NOT SCALE
DRAWN	MJ (24/5/2012)
CHECKED	
ISSUE	1

DR'G. No. 10393

COMMISSIONING, MAINTENANCE & IN-SERVICE TESTING RECORD

Establishment:					
Type of Valve: Horne TSV1-3 Shower Valve		Date Installed:		Installed by:	
Location of Valve:					
Commissioning Details Note: Fill in ALL information during commissioning.					
Hot Water Supply :	HW Temp	C	HW Pressure	Bar	Temp:
Cold Water Supply:	CW Temp	C	CW Pressure	Bar	Pressure:
Instrumentation:					
Mixed Temp at max draw-off:	Mixed Temp:	C	Flowrate at max draw-off:	l/min	
Mixed Temp at low draw-off:	Mixed Temp:	C	Flowrate at low draw-off:	l/min	
Instrumentation Used:	Temp:		Press:	Flow:	
Cold Water Isolation Test	Max Mixed Water Temp during CW Isolation test: C		Mixed Water Temp on restoration of CW Supply: C		
Note: MWT should return within 2 degrees of set temp, and be no greater than 43C after this test.					
Comments:					
In-Service Testing Record					
Date:					
Hot Water Supply :	HW Temp	C	HW Pressure	Bar	Temp:
Cold Water Supply:	CW Temp	C	CW Pressure	Bar	Pressure:
Instrumentation:					
Mixed Temp at max draw-off:	Mixed Temp:	C	Flowrate at max draw-off:	l/min	
Mixed Temp at low draw-off:	Mixed Temp:	C	Flowrate at low draw-off:	l/min	
Instrumentation Used:	Temp:		Press:	Flow:	
Cold Water Isolation Test	Max Mixed Water Temp during CW Isolation test: C		Mixed Water Temp on restoration of CW Supply: C		
Note: MWT should return within 2 degrees of set temp, and be no greater than 43C after this test.					
Comments:					
Recommended Date of Next In-Service Test:					

Horne Engineering Ltd
IN-SERVICE TESTING RECORD

(Note: Photocopy this page)

In-Service Testing Record		Establishment:		Location of Valve:	
Date:		Type of Valve : TSV1-3 Shower Valve			
Hot Water Supply :	HW Temp	C	HW Pressure	Bar	Instrumentation: Temp:
Cold Water Supply:	CW Temp	C	CW Pressure	Bar	
Mixed Temp at max draw-off:	Mixed Temp:	C	Flowrate at max draw-off:	l/min	
Mixed Temp at low draw-off:	Mixed Temp:	C	Flowrate at low draw-off:	l/min	
Instrumentation Used:	Temp:		Press:	Flow:	
Cold Water Isolation Test	Max Mixed Water Temp during CW Isolation test: C				Mixed Water Temp on restoration of CW Supply: C
Note: MWT should return within 2 degrees of set temp, and be no greater than 43C after this test.					
Comments:					
Recommended Date of Next In-Service Test:					

In-Service Testing Record		Establishment:		Location of Valve:	
Date:		Type of Valve : TSV1-3 Shower Valve			
Hot Water Supply :	HW Temp	C	HW Pressure	Bar	Instrumentation: Temp:
Cold Water Supply:	CW Temp	C	CW Pressure	Bar	
Mixed Temp at max draw-off:	Mixed Temp:	C	Flowrate at max draw-off:	l/min	
Mixed Temp at low draw-off:	Mixed Temp:	C	Flowrate at low draw-off:	l/min	
Instrumentation Used:	Temp:		Press:	Flow:	
Cold Water Isolation Test	Max Mixed Water Temp during CW Isolation test: C				Mixed Water Temp on restoration of CW Supply: C
Note: MWT should return within 2 degrees of set temp, and be no greater than 43C after this test.					
Comments:					
Recommended Date of Next In-Service Test:					

Horne Engineering Ltd
PO Box 7
Rankine Street
Johnstone
SCOTLAND
PA5 8BD
Tel: +44 (0)1505 321455
Fax: +44(0)1505 336287
Email: Technical@horne.co.uk
www.horne.co.uk

Brochure Ref: L-180