

INSTALLATION AND OPERATING INSTRUCTIONS

In-Line Thermal Disinfection Unit for mixing devices.

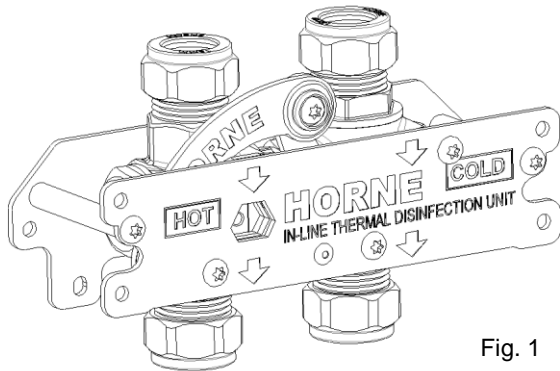


Fig. 1

Overview

The HORNE In-Line Thermal Disinfection Unit (ILTDU), shown in Fig.1, provides a simple and convenient way to pass hot water, at system hot water temperature, through a mixing device in order to thermally disinfect the mixing device and associated local pipework. All integral strainers, check valves, isolating valves, outlet fittings, and all pipework downstream of the HORNE ILTDU are disinfected during this process.

The HORNE ILTDU is a 15mm device, and is intended to be used to disinfect a single outlet at one time, without

wasting water or energy. It may not pass enough hot water to thoroughly heat all the pipework and outlets if used to feed multiple outlets.

- **LOCAL RISK ASSESSMENT SHOULD ALWAYS PREVAIL IN DICTATING THE PARAMETERS FOR DISINFECTION.** In absence of this, a hot water temperature of 60.0°C or greater, and duration of at least 10 minutes may be used as a starting point. Disinfection efficacy reduces drastically at temperatures even slightly below 60.0°C. Calibrate your thermometer if margins are tight.
- The correct connections to the ILTDU must be **STRICTLY** observed (see Fig.3)
- The ILTDU is recommended to serve only one outlet. This is in part to ensure adequate heating of the downstream pipework, and also to ensure safety during disinfection.
- Research suggests that bacteria can migrate up cold or warm pipework as much as 2 metres from the terminal fitting (air/water interface). Many users are satisfied installing 1 metre from the terminal-fitting, however **A LOCAL RISK-ASSESSMENT SHOULD ALWAYS INFORM THE SITING OF THE ILTDU** as other factors may be involved.
- When retro-fitting to outlets with pre-existing colonisation, care should be taken not to spread contamination to the upstream pipework during installation.

How it works

The HORNE ILTDU passes hot water from the Domestic Hot Water System through the downstream pipework. It passes hot water to both the hot inlet and the cold inlet of a mixing device. This bypasses the so-called “fail-safe” characteristic of the mixing device and thus raises the whole mixing device to system hot water temperature. This disinfects the mixing device and local pipework.

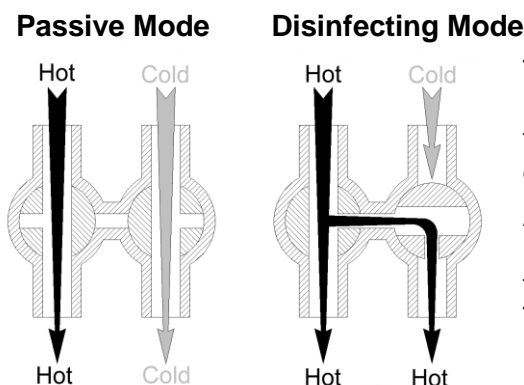


Fig. 2

The HORNE ILTDU has two operating modes – PASSIVE and DISINFECTING (Fig. 2). In PASSIVE mode, the ILTDU passes the hot and cold water supplies straight through to the mixing device and the mixing device operates normally.

An OPERATING KEY (Part No 6236) is used to switch between PASSIVE and DISINFECTING modes. A single clockwise half turn of the OPERATING KEY activates DISINFECTING mode. This synchronously operates two 3-way ball valves to divert the

hot water supply into both the HOT and COLD outlets of the HORNE ILTDU, and therefore into both the HOT and COLD inlets of the mixing device.

The outlet is run and this rapidly results in the pipework downstream of the HORNE ILTDU, the mixing device and the Outlet Fitting all being raised to system hot water temperature.

N.B. Scalding water at system hot water temperature will discharge from the outlet fed by the mixing device during disinfection and so suitable safety precautions must be taken to prevent the risk of scalding or damage to sanitary ware, etc.

The OPERATING KEY is specially shaped and interlocked such that it cannot be removed from the ILTDU while the ILTDU is in DISINFECTING mode. The OPERATING KEY has a large red warning triangle chained on to it. This serves as a local visual reminder on the ILTDU that it is being used in DISINFECTING mode and that safety precautions should be taken.

After passing hot water through the mixing device for the desired period, the OPERATING KEY is turned back to its original position and the key is removed from the ILTDU. Removal of the OPERATING KEY from the ILTDU confirms that the ILTDU is in PASSIVE mode and that disinfection has ceased.

It should be noted that disinfection is a completely separate process from cleaning, and this ILTDU only disinfects components using system hot water. An elevated velocity flush should also be undertaken to help clean the treated system and get rid of any loosened biofilm.

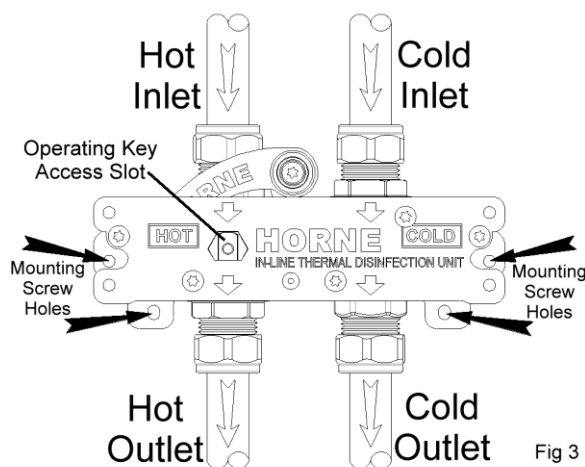
Fitting the HORNE ILTDU

The HORNE ILTDU is fitted into the hot and cold supply pipework feeding a mixing device, a mixer shower or a mixer tap. It should be fitted upstream of the mixing device, but **downstream of the hot water return** (see notes in bold-type on page 1). When not used with a HORNE mixing device, ensure that the mixing device can be heated up to hot water supply temperature without damage.

The HORNE ILTDU has markings on the body showing the hot and cold connections, and arrows showing the direction of flow. It is important to plumb-in the HORNE ILTDU correctly, respecting all the connections and the directions of flow. Note that in order to fully comply with WRAS requirements, a single approved check valve should be fitted at each inlet. **The HORNE ILTDU will not work if it is not plumbed in correctly.** The OPERATING KEY ACCESS SLOT should be readily accessible to the OPERATING KEY when the ILTDU is installed. Note that the operating key is approx. 150mm long, so clearance is required for this. Note that the OUTLET of the HORNE ILTDU connects to the INLETS of the mixing device. The ILTDU is not orientation sensitive and it can be mounted any way up, but the inlets and outlets, and hot and cold connections, must be respected and plumbed correctly.

The HORNE ILTDU has holes on the back plate for mounting screws (not supplied, but 4mm/No 8 round head screws are ideal) for attaching it to a rigid surface, if convenient. There are cut-outs for screwdriver access on the front plate. It also has corresponding holes on the front plate and cut-outs for a screwdriver on the rear plate, for front mounting on the reverse side of a room-facing panel.

The HORNE ILTDU should be sited where the operation of the linkage mechanism will not foul on nearby fixtures or fittings, and where there is no danger of falling debris interfering with the workings of the ILTDU.



The main features of the HORNE ILTDU are shown in the illustration, Fig. 3, which shows the front view. Note the flow direction arrows on the front plate, the screw holes on the rear plate (identified by arrows), and the hot and cold designations. The hot and cold sides, and inlets and outlets must be plumbed correctly for the ILTDU to work as intended. The mounting holes on the front panel are shown, but not highlighted. Note that all the pipework around the HORNE ILTDU should be equi-potentially bonded.

Observe good plumbing practice and use two spanners to make off the compression fittings at the inlets and outlets of the HORNE ILTDU. Operate the mechanism using the OPERATING KEY to provide access to all spanner flats when making off the compression fittings. Do not strain the mechanism linkage with the spanners while making off the compression fittings.

Commissioning the HORNE ILTDU

Ensure that the installation is free from leaks, then commission the ILTDU as follows:

- Check that the ILTDU is connected exactly as shown in Fig. 3. It is expressly **not** permissible to swap over inlets and outlets, or hot and cold pipework, even if these are done symmetrically. Check the plumbing against the connections shown in Fig. 3, and double check that the outlet of the HORNE ILTDU is connected to the INLETS of the mixing device.
- Before inserting the OPERATING KEY, open the supplies and run the outlet until normal temperature at the outlet is reached. Measure and record this temperature. Ensure that the HOT water pipe to the mixing device is HOT, and that the COLD water pipe to the mixing device is COLD.
- Insert the OPERATING KEY into the ACCESS SLOT on the front plate, and DO NOT TURN THE KEY. Ensure that the short leg of the OPERATING KEY is pointing in the same direction as the outlet pipes going to the mixing device. If it is not, the ILTDU is not plumbed correctly, so correct the pipework before proceeding.
- Turn the OPERATING KEY exactly a half turn clockwise, until you feel the mechanism reaching the end stop. The short leg of the OPERATING KEY should now be pointing towards the inlet pipework.
- Turn on the outlet and ensure that the HOT water pipe between the HORNE ILTDU and the mixing device is HOT, and also that the COLD water pipe between the HORNE ILTDU and the mixing device is HOT. BOTH pipes should be hot (this is how the HORNE ILTDU heats up the mixing device for disinfection purposes).
- Measure the water temperature at the outlet and ensure that it is at system hot water temperature. **Note that if the hot water system cannot achieve 60.0°C, it is unlikely that effective disinfection will be achievable within a reasonable timescale.**
- Turn the OPERATING KEY back half a turn anti-clockwise against the end stop and remove the key. Ensure that the temperature at the outlet rapidly returns to normal.
- Perform a cold water isolation test on the mixing device to ensure that it is still providing scald protection.
- ALWAYS remove the OPERATING KEY from the HORNE ILTDU when the device is in the PASSIVE MODE. Do NOT leave the OPERATING KEY in the device when in PASSIVE mode.

The HORNE ILTDU is now commissioned.

Using the HORNE ILTDU

Before the ILTDU is used, a local risk assessment should be undertaken to establish:

- Any bacterial load present and the most appropriate time/temperature regime to deal with it.
- The scalding risk and how to minimise it during disinfection.
- Any necessary precautions to protect sanitary ware from the hot water.
- The most appropriate frequency for a disinfection routine to be scheduled.

The use of the HORNE ILTDU will now be described in the context of it having been fitted to pipework feeding a Horne TMV.

- Ensure that the Hot Water Temperature available is consistent with that recommended by the local risk assessment. **Note that effective disinfection is unlikely to be achieved with temperatures even slightly lower than 60.0°C.**
- Ensure that no vulnerable people are able to access the outlet while the disinfection process is underway.
- Perform a cold water isolation test on the TMV being disinfected. If the cold water isolation test is satisfactory then proceed with the disinfection procedure. If the TMV does not pass the test, then address that before proceeding by following normal maintenance procedures for the TMV.
- Fully turn on the outlet, insert the OPERATING KEY into the HORNE ILTDU, and then turn the OPERATING KEY one half turn clockwise, against the end stop. When used with the HORNE Optitherm tap, turn on both the hot and cold levers as this will encourage very rapid heating of the

whole tap. The OPERATING KEY will remain in the HORNE ILTDU during this time – it cannot be removed.

- The key should not be used without the red warning triangle, showing the text “WARNING VERY HOT WATER”, being present. Please note that it is impossible to safely operate the ILTDU without the correct operating key, and it is dangerous to make any attempt to do so.
- Measure the temperature of the water coming out of the outlet. This should rise to system hot water temperature. When it reaches the minimum temperature recommended by the local risk assessment, start timing, and permit the water to run for the required duration. Measure the temperature during this time to ensure that the temperature is maintained at the required high level. If the temperature does not reach the required level, or is not maintained at the required level, stop the process and address the water temperature. Satisfactory disinfection cannot be assured otherwise.
- After the water has run for the required time, turn the OPERATING KEY one half turn anti-clockwise back to its original position, and again against the end stop, and then remove the key. Always remove the OPERATING KEY whenever the ILTDU is returned to the PASSIVE mode. Do not leave the OPERATING KEY in the ILTDU when it is in PASSIVE mode.
- Let the tap run until the water temperature drops to a safe and comfortable limit.
- Perform a cold water isolation test on the TMV and ensure that it closes off the hot water supply, and is thus still preventing scalding. If it does not, do not allow use of the TMV until it does. Check also that the correct mixed water temperature is re-established.
- Record the parameters of the disinfection process on a record sheet (see page 5 of this document, or download a customisable sheet from www.horne.co.uk)
- Note that disinfecting is a separate process from cleaning. This process will disinfect the TMV and pipework, but will not, in itself, clean the system. It is advisable to perform a high velocity flushing procedure, using an appropriate Horne Flushing Kit for the TMV in question, to encourage removal of loosened biofilm and accumulated debris. The use of a Horne Flushing Kit permits full-bore flushing and bypasses flow regulators within the TMV in order to ensure flushing the pipework with the maximum water velocity possible.
- Where the outlet fitting is a thermostatic tap or shower, the tap or shower should also be appropriately cleaned.

Maintenance

The HORNE ILTDU has no user serviceable parts, and does not require any ongoing maintenance, other than occasional cleaning and lubrication of the metal link mechanism to prevent jams. If the ILTDU fails to work properly, it should be replaced. No attempt should be made to disassemble the ILTDU.

If the OPERATING KEY is lost, do not attempt to operate the ILTDU without it. It will not operate satisfactorily, the ILTDU could be damaged, and it could be dangerous. Replacement Keys (Part No 6236) can be ordered from Horne Engineering Ltd (contact details below).

The Horne ILTDU is patented. UK Patent No GB2510119. EU Patent No. EP2948716

International Patents: AU2014208950; CA2898656; CN105102896; DK2948716; WO2014114914; HK1200521; IL240094; JP6275748; RU 2621659; US2015369382; US9702470

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Brochure Ref: L-220 (ILTDU)

HORNE ENGINEERING LTD
Horne In-Line Thermal Disinfection Unit (ILTDU) Record Sheet

In-Service Usage Record
Establishment: Location of ILTDU: Outlet protected (Tap, TMV, Shower):

Date:	Facilities Operator	Elevated velocity flush carried out too?		Yes/No
Temperature measured at outlet during thermal disinfection:°C	Duration of thermal Disinfection: mins	cfu count before use: (if appropriate)	cfu count after use: (if appropriate)	

Date:	Facilities Operator	Elevated velocity flush carried out too?		Yes/No
Temperature measured at outlet during thermal disinfection:°C	Duration of thermal Disinfection: mins	cfu count before use: (if appropriate)	cfu count after use: (if appropriate)	

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