TRANE

Installation
Operation
Maintenance

CLCH
QuantumClimate Changer
Air Handling Units

CLCH-SVX05A-GB

General Information

Foreword

These installation, operation, and maintenance instructions are given as a guide to good practice in the installation, commissioning into service, operation, and periodic maintenance by the user, of CLCH Air Handling Units. They do not contain the full service procedures necessary for the continued successful operation of this equipment. The services of a qualified service technician should be employed through the medium of a maintenance contract with a reputable service company.

Warranty

Trane's standard warranty covers the equipment. It does not cover damage due to misuse, lack of maintenance, or failure to comply with the manufacturer's instructions or recommendations.

Receiving/Handling

On arrival, inspect the unit before signing the delivery note. Specify any damage on the delivery note, and send a registered letter of protest to the last carrier of the goods **within 72 hours** of delivery. Notify the local Trane sales office at the same time. The unit should be totally inspected within 15 days of delivery. If any concealed damage is discovered, stop unpacking the shipment. Take photos of the damaged material if possible. Notify the carrier immediately by phone and registered mail. Notify the local Trane sales office. Concealed damage must be reported **within 15 days** of delivery.

About This Manual

Warnings appear at appropriate places in this instruction manual. Your personal safety and the correct operation of this machine require that you follow the warnings carefully. The manufacturer assumes no liability for installations or servicing undertaken by unqualified personnel.

About The Unit

The information contained in this manual applies to units designated CLCH

Contents

1. Introduction

Please pay particular attention to the instructions on the unit in accordance with the identification label, assembly drawings, and special warnings or advice labels.

2. Delivery Check On Arrival/Off-Loading and Movement To The Site

2.1 Delivery Check

Check the delivery contents on arrival of CLCH units in respect of completeness, and note any damage which may have occurred. In the event of any damage being noted, a claim must be made by return. Only by compliance with this procedure is it possible to submit an insurance claim. Any damage must be noted on the delivery documentation, dated and signed in the presence of the delivery driver, and signalled by registered letter to the last forwarder.

Claims in respect of obvious transport damage or incompleteness of delivery cannot be accepted in retrospect. In the event of any complaints, please notify the relevant Trane office immediately, and in writing within 72 hours.

2.1.1. Identification

All Trane CLCH units are identified by the sales number and manufacturer's works order number given on the unit ID label.

Be sure to refer to the information given on the unit identification label when ordering replacement parts or requesting service. The nameplate (see Figure 1) is mounted on the fan-section access side, and a manufacturer's plate (see Figure 2) is fixed inside the fan section.

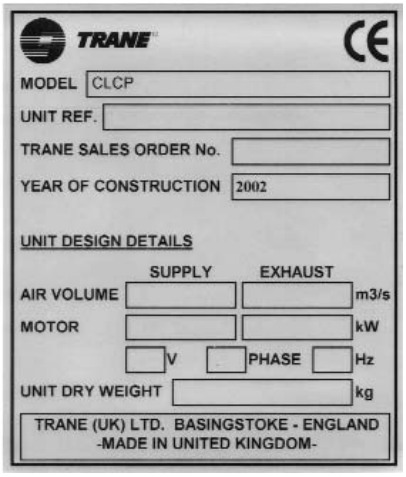

Figure 1 – Nameplate

Figure 2 – Manufacturers Plate

2.2 Off Loading

A specific lifting method for offloading the units is recommended as follows (see Figure 3):

1) 52 mm-diameter lifting holes, or certified lifting lugs, are provided on the unit base frame.
2) ALL LIFTING POINTS in one axis of the unit must be used when offloading and moving the unit.
3) Slings and spreader bars are to be provided by the rigger and attached to ALL LIFTING POINTS.
4) The minimum rated lifting capacity (vertical) of each sling and spreader bar should be no less than the shipping weight.
5) The unit must be lifted with care, avoiding shock load by lifting the unit slowly and evenly.

WARNING

ENSURE SLINGS DO NOT FOUL ON UNIT PROTRUSIONS.

THE CENTRE OF GRAVITY WILL VARY PER UNIT…POSITION THE SLINGS AND SPREADER BARS CAREFULLY TO COMPENSATE FOR THIS.

FAILURE TO DO SO MAY RESULT IN SEVERE PERSONAL INJURY OR DEATH.

2.3 Moving To Position On Site

Trane units are supplied in sections modules, flat packed, or as a complete unit, in accordance with the relevant assembly drawings. Any necessary use of force during unloading or movement of the units must only be applied via the unit base frame or shipping pallet.

WARNING

NEVER LIFT THE UNITS BY COIL CONNECTIONS OR BY ANY OTHER PROTRUSIONS.

THE ROOF IS NOT DESIGNED TO BE WALKED ON, BUT IF THIS IS UNAVOIDABLE, ENSURE A MORE EVEN WEIGHT DISTRIBUTION BY THE USE OF BOARDS.

FAILURE TO DO SO MAY RESULT IN SEVERE PERSONAL INJURY OR DEATH.

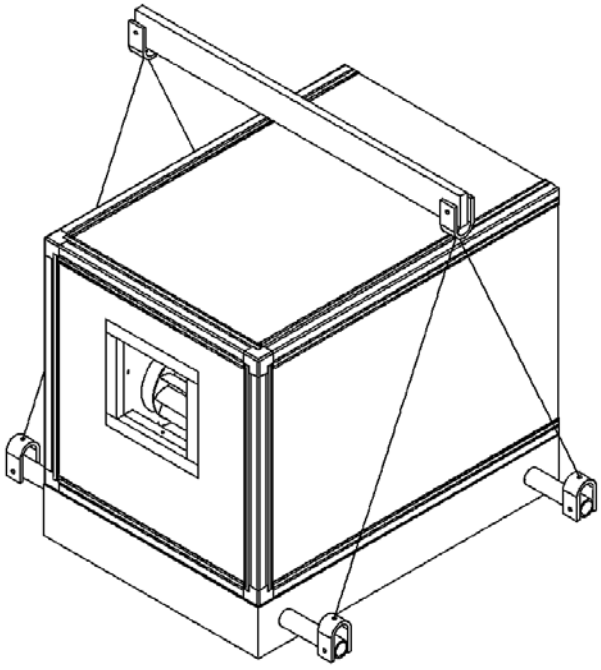

Figure 3

2. Delivery Check On Arrival/Off-Loading and Movement To The Site

2.4 Forklift Trucks

The forks must only be applied under the unit base frame and not against the unit base frame. The lift point should be as near as possible to the centre of gravity (see Figures 4 and 4a). In the case of larger units the use of several forklift trucks may be required.

2.4.1. Roller Movement

Units fitted with base frames may be moved on roller trolleys or tubular rollers (see Figure 5).

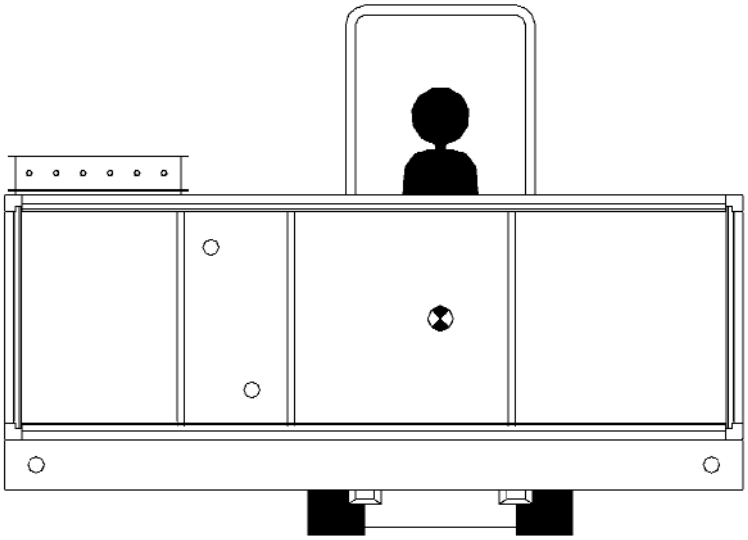

Figure 4

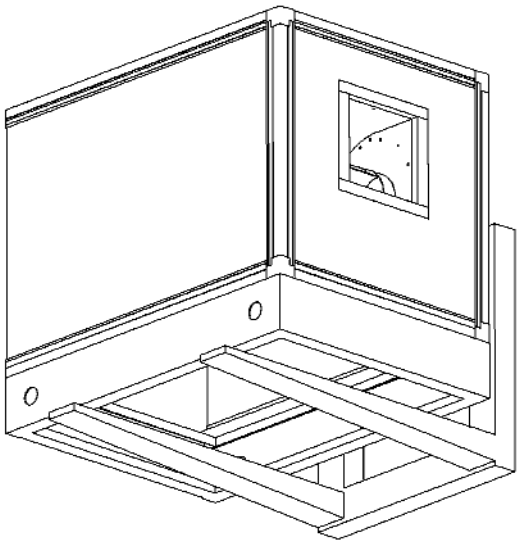

Figure 4A

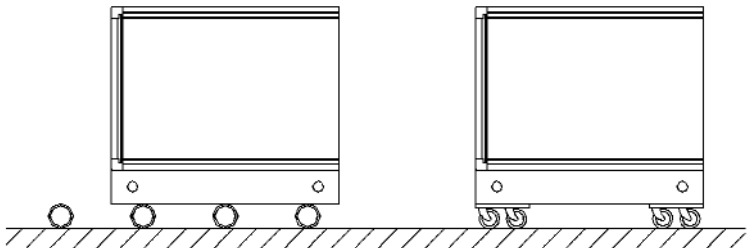

Figure 5

3. Foundations and Erection

3.1 Foundation

When selecting and preparing the unit site, follow these guidelines:

1. Ensure that the site can support the total weight of the unit. Unit weight figures only provide total gross weights and do not include the additional weight for water in any coils.
2. Confirm that the foundation of the mounting platform is large enough to include the unit dimensions plus service plus service access.
3. The floor or foundation must be level for correct coil drainage and condensate flow.
4. Provide adequate lighting for maintenance personnel to perform maintenance duties.
5. When the unit is positioned on site, there must be sufficient space around the unit to ensure that correct operation and effective maintenance can be carried out. Figure 6 gives recommended space allowances.

- On the designated access side of the unit, working areas must be equal to the width of the unit, dimension “P.”
- Allowance for coil connections, dimension “C” must be dimension “P” + 200 mm.
- A clear unobstructed area before and after an air intake or discharge is required to ensure correct air movement. The width of the area must be >= the width of the unit, and the depth (dimension "L") must be >= 0.5 x the overall unit height.

Complete reinforced concrete foundations are suitable or strip foundations may also be used (see Figure 7).

In the case of strip foundations, concrete or steel supports are permissible, but support is required under breakpoints and every 2 m along the unit base.

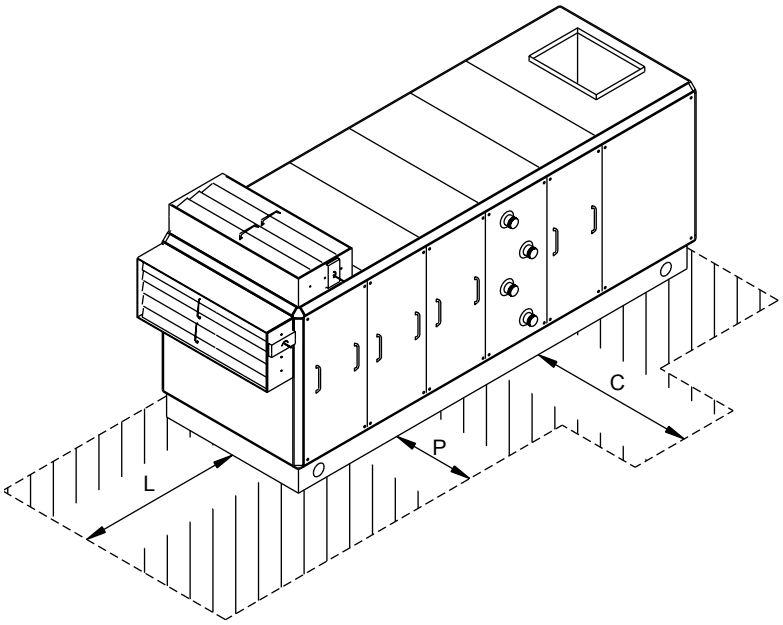

Figure 6

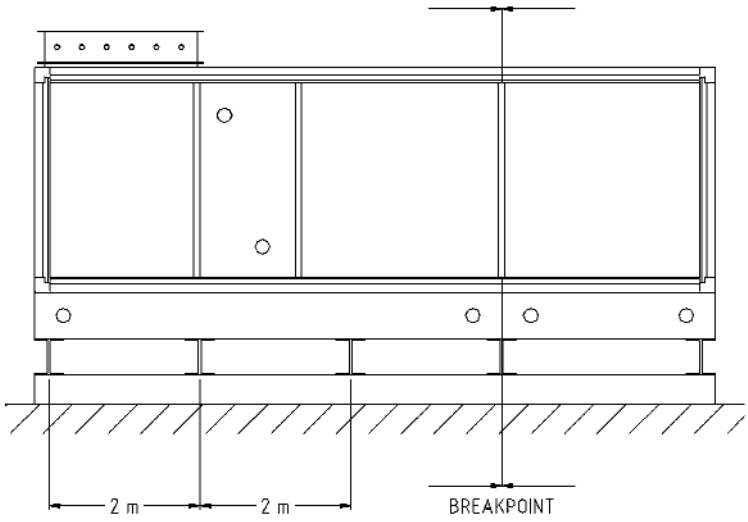

Figure 7 – Air Handling Unit Steels Foundation

3. Foundations and Erection

IMPORTANT

FAILURE TO PROVIDE A LEVEL PLINTH OR SUPPORT WILL RESULT IN DOORS JAMMING AND AIR LEAKS FROM THE CASING.

3.2 Erection

To minimize noise transmission, insulation material such as cork slabbing (TICO pads) may be placed between the unit base and the foundation (see Figure 8).

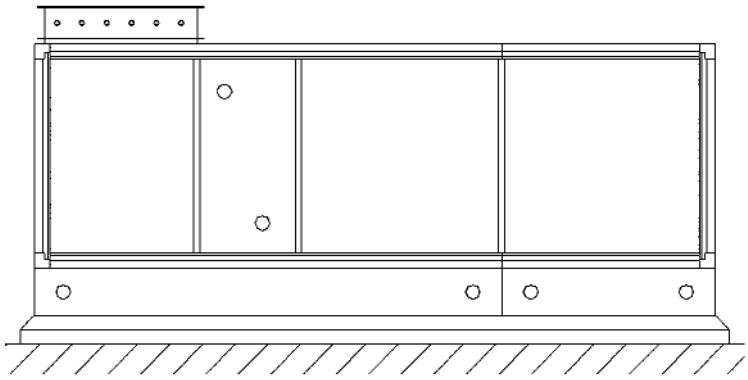

Figure 8 – Air Handling Unit Plinth Foundation

4. Assembly and Installation

4.1 Break Point and General Unit Assembly Instructions

Ensure that all the air-handling unit sections are positioned in the correct order.

Each section will display a unit drawing with its position OUTLINED.

1. Each of the unit sections should be placed on a level foundation and within 200 mm of its adjoining section.
2. Remove any supports and bracing which are supplied with the unit for transport. All such supports will be clearly marked:

   "FOR TRANSPORT ONLY – REMOVE BEFORE ASSEMBLY"

3. Remove 4 M6 fixing **bolts (A)** from the protruding portion of the 4 framework joining bars (see Figure 9), then loosen the remaining 4 bolts that are located on the fixed side of the break point joining bars.

   Pull together the sections of the unit, ensuring that the joiner bar in each of the 4 corners is fitted into its adjoining section and the plastic "T" section sealing strip locates over the adjoining panel.

   The 52-mm diameter holes provided in the unit base frame should be used to manoeuvre the sections together.

   Greased skid plates will greatly assist the whole assembly operation.

4. Secure the break point joint externally by replacing the 4 M6 bolts and washers, which were previously removed in step (3). Retighten the 8 bolts located on both sides of the break point joint.

Where applicable, complete the assembly of the unit as follows:

4.1.3. Fan sections

Bolt the outlet of the fan to the flexible connection using the M8 bolts provided.

4.1.4. Damper sections

Pop-rivet through the damper spigot and the adjoining plastic "J" section into the adjacent fixed panel using 5-mm-diameter rivets.

4.1.5. Coil sections (with drip pans)

Fix through the top of the drip pan into the box section using the self-drilling screws, which are provided. Then seal along all joints with a waterproof "silicone" based sealant. We recommend "Siloflex."

4.1.6. Weatherproof roofs

Slide on the "Doby" cleats, which are provided, and then fix in position at the ends with the cleat clips on the roof return edge using 5mm diameter rivets.

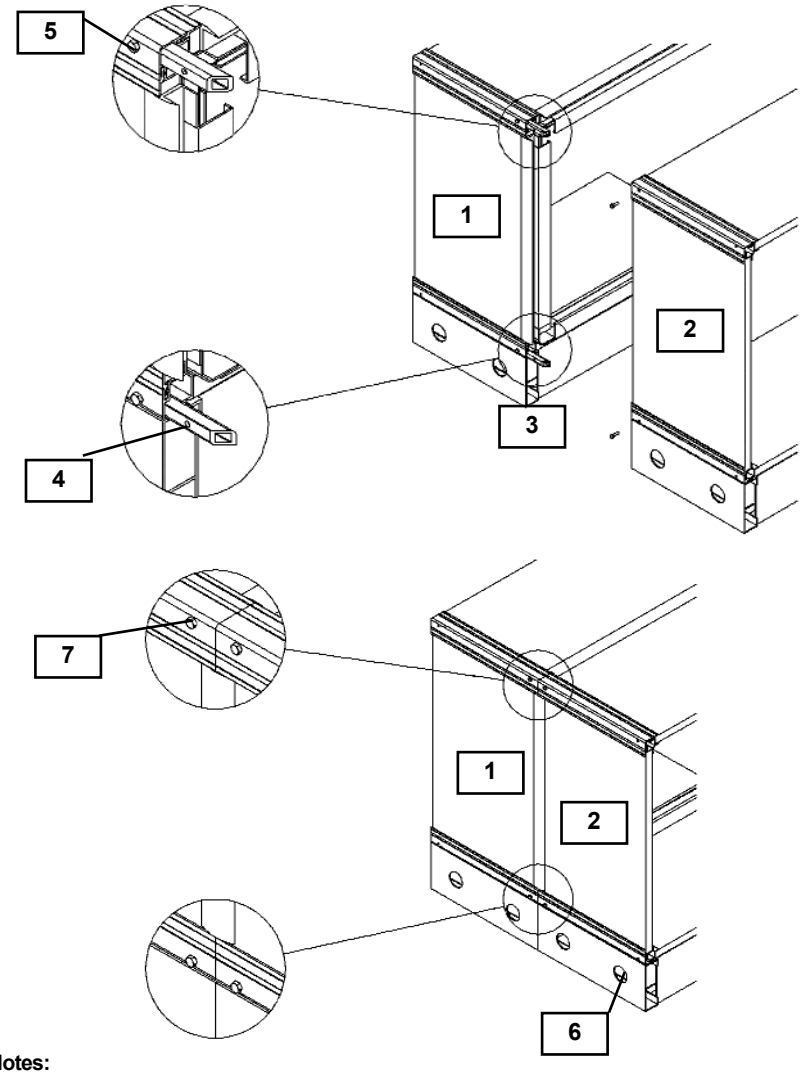

Figure 9

Figure Notes:
1. Part 1
2.Part 2
3. Break Point
4. Bolts "A"
5. Fixed bolts
6. 52 mm diameter holes
7. 8 x M6 bolts (2 per join)

4. Assembly and Installation

4.2 Stacked Units (Top and Bottom)

Lower the top unit into position on top of the bottom unit, taking care not to damage the sealing gaskets.

Fit the self-tapping screws to the fixing brackets, which are already positioned on the top edge of the bottom unit,drilling into the top unit section (10A) or base frame (10B) depending on product, in order to secure the top unit to the bottom unit (see Figure 10).

Fix into position any internal joining strips and/or brackets that are provided, and then seal up any common sections in the top and bottom units.

4.2.1. Stacked units (Side by Side)

Manoeuvre the two units into their correct positions, taking care not to damage any sealing gaskets.

Fix through the fixing brackets which are located at both ends of the units in order to secure the units together. Also fix into position any base frame, unit end, and roof joining brackets that are provided.

Fix into position any internal joining strips and/or brackets that are provided, and then seal up any common sections in both of the units.

If you require further assistance or have any questions please contact your local Trane sales office.

4.3 Assembly of Flatpacked Units

The unit is fully assembled in the factory on a flat and level surface. Prior to disassembly for flat packing (see Figure 11) all items are marked alphanumerically. All items marked “A” are joined at the fixing indicated at this point. These markings are on labels on internal surfaces so they are not evident upon completion. DO NOT remove labels until assembly is complete.

We would recommend opening one unit at a time to avoid confusion.

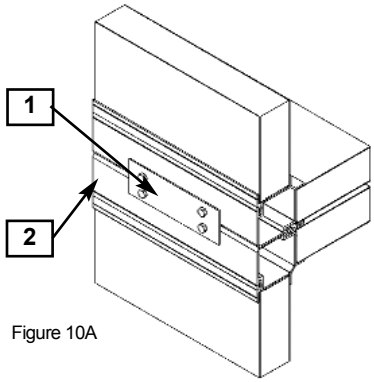

Figure 10A

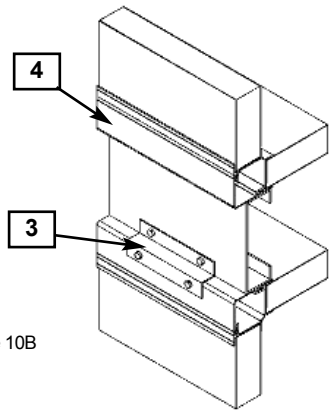

Figure 10B

Figure 10 A/B

Figure Notes:
1. Self tapping screws
2. Bottomframework of TOP unit
3. Fixing bracket
4. Top framework of BOTTOM unit

Figure 11

4. Assembly and Installation

4.4 Condensate Drain From Drain Pan

Correctly-sized traps must be fitted immediately after the drip pan outlet (see Figures 12, 13 and 14).

An “air break,” by means of a tun dish, must be fitted immediately after the trap.

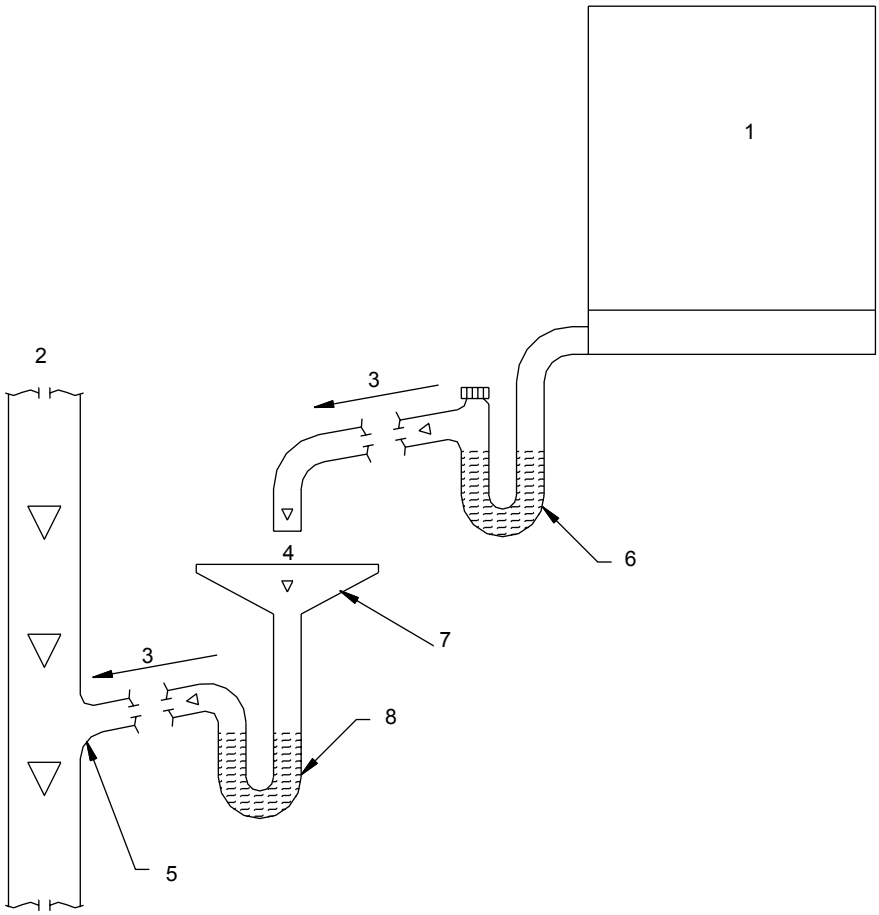

Figure 12 – Typical Air Conditioning Plant Drain

Figure 12 Notes:
1. Cooling coil, humidifier, or chilled battery.
2. Vented drainage stack
3. Fall
4. Air break
5. Swept connection
6. Trap with water seal (with filling cap)
7. Open tun dish or floor gully/channel
8. Trap with water seal

4. Assembly and Installation

Figure Notes:
1. 25 mm for each 250 Pa of maximum negative static pressure + 25 mm
2. 0.5 x dimension 1
3. Dimensions 1 + 2 + pipe diameter + insulation

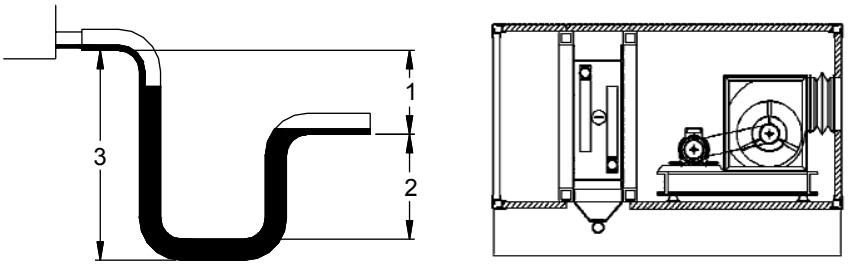

Figure 13 – Negative Pressure Trap (Draw Through)

Figure Notes:
1. Minimum of 12 mm
2. 12 mm + maximum total static pressure

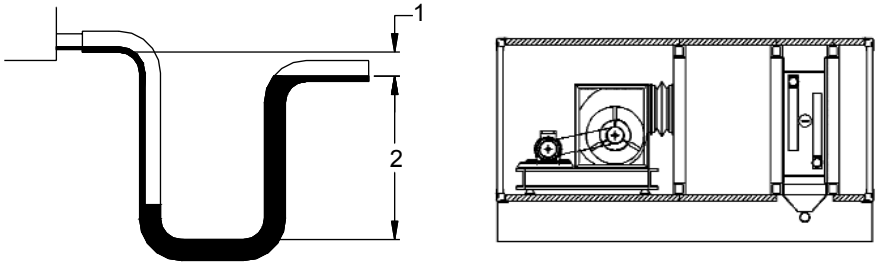

Figure 14 – Positive Pressure Trap (Blow Through)

4.5 Drip Pans

A UPVC elbow and 1-1/2" [38 mm] diameter (internal dimension) discharge pipe is supplied as standard (3.2 mm wall thickness).

A copper elbow and 35 mm diameter discharge pipe is available as an option (1.2 mm wall thickness).

Drip pans (see Figure 15) are not designed to be walked on.

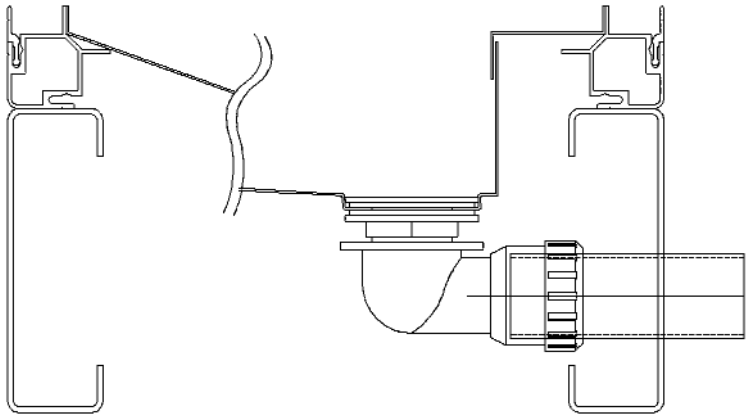

Figure 15 – Drip Pans

4. Assembly and Installation

4.6 Pipework Layout

A correct pipework installation is essential for trouble-free coil operation. Figure 16 gives an example for piping water coils. (The diagram does not limit the type of control system used.)

All pipework must be supported independently from the coils.

All connections must be made in such a way that the expansion and contraction of pipes do not impose forces on the coil headers. Failure to do so may result in coil damage.

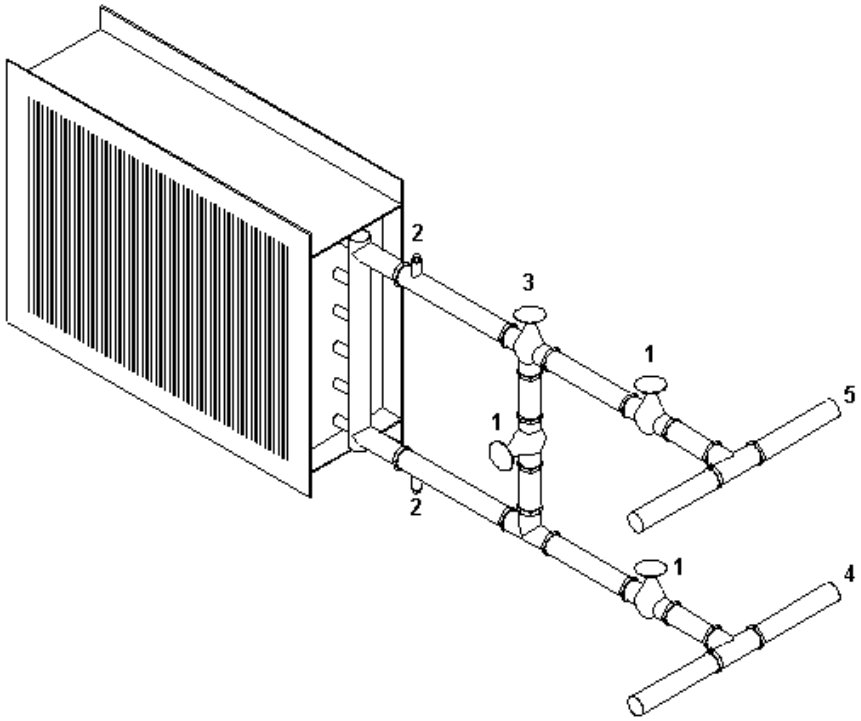

Figure 16 – Fluid Pipework

Figure Notes:
1. Gate Valve
2. Automatic or Manual Drain and Vent
3. Automatic Three-Way Valve
4. Main Supply Water
5. Main Return Water

4. Assembly and Installation

4.7 Water Coils

The air venting of the system should not be carried out through the coil. Air venting should be allowed for in the pipework and any coil vent should be for the sole purposes of venting the coil itself. When incoming air temperature may be colder than 0°C, do not modulate the water flow as this may cause freezing and damage to the coil.

4.7.1. Steam Coils

Overhead condensate-return systems should not be used; allow for vacuum breakers as close as possible to the coil. Include a float or thermodynamic trap on all steam coils (following trap manufacturer recommendations).

CORRECT TRAPPING IS VERY

IMPORTANT

IMPORTANT. FAILURE TO PROPERLY REMOVE CONDENSATE WILL RESULT IN WATER HAMMER AND POSSIBLE COIL FAILURE.

4.7.2. Refrigerant Coils

Refrigerant pipework installation requires specialist design and trained refrigeration engineers for correct installation.

If you have any queries, please contact your local Trane sales office.

4.8 Electrical Connections

The electrical work must be carried out in accordance with all international, national, and local regulations.

Electrical connections passing through the casing to the fan motor should be carried out in a flexible conduit.

Cables passing through the casing must be made with a gland or grommet.

All wiring to other accessories must be carried out in the same manner.

PLEASE REFER TO THE UNIT MOUNTED CONTROLS IOM.

Motor connection details are contained in the cover of the motor terminal box.

If you have any queries, please contact your local Trane sales office.

4.8.1. Duct Connections

To reduce noise transmission, the fitting of an intermediate flexible connection of at least 140 mm width, between the ducting and the unit flange, is recommended. This should be unstressed when initially positioned.

Compliance with the Codes of Practice in duct assembly and acoustic layout are essential, to ensure the best possible performance of the unit whilst avoiding excessive pressure loss in the duct system and minimizing airstream noise.

4.8.2. Motor Connection

Safety measures need to be taken on site against overload, short circuit, high or low voltage, and excessively high ambient temperatures.

Special care must be taken in the connection of motors, especially if two-speed motors are supplied with the unit.

The connection must be carried out in accordance with the nameplate and the wiring diagrams as shown on the inside of the motor terminal box.

Following the connection of the motor, a test run must be carried out in order to check motor performance and rotational direction.

Please see the section on commissioning procedures for additional information.

5. Commissioning Procedure

5.1 Preparations

Initially the complete CLCH unit and all components should be thoroughly cleaned and all dust and other deposits completely removed. The unit must be maintained in a clean condition.

Prior to despatch, each unit is thoroughly checked. Nevertheless, as part of the commissioning procedure, it is imperative to recheck certain items as listed below. Some of the settings on the unit may have changed during transport and during the installation process.

Make sure that the dampers move freely and that all transport packing has been removed.

5.2 Fan/Motor

Check that the fan revolves freely by turning the impeller manually.

Check the tension of the fan belt and the alignment of the pulleys (see the section on maintenance for additional information).

Check that the grub screws in the taper locks are tightened to the torque settings in Table 1.

Check the motor connections and make sure that the correct voltage supply is being used.

Where a standby motor has been supplied, only connect one motor to the power source.

Please refer to the individual supplier's installation, operation, and maintenance manual for additional information.

5.3 Anti-Vibration Mount Brackets

For transport, the fan/motor base anti-vibration mounts are fitted with retaining brackets. These must be removed before the unit is started (see Figure 17).

Table 1 – Torque Settings

Bush Size		1008	1108	1210	1610	2012	2517	3020	3525	4030	4535	5040
Screw Tightening Torque (Nm)		5.6	5.6	20	20	30	50	90	115	170	190	270
Screw Details	Quantity	2	2	2	2	2	2	2	3	3	3	3
	Size (BSW)	1/4"	1/4"	3/8"	3/8"	1/16"	1/2"	5/8"	1/2"	5/8"	3/4"	7/8"
	Hexagon Socket Size (mm)	3	3	5	5	5	6	8	10	12	14	14
Large End Diameter (mm)		35.0	38.0	47.5	57.0	70.0	85.5	108.0	127.0	146.0	162.0	177.5
Approximate Mass (kg)		0.1	0.1	0.2	0.3	0.7	1.5	2.7	3.8	5.6	7.5	11.1

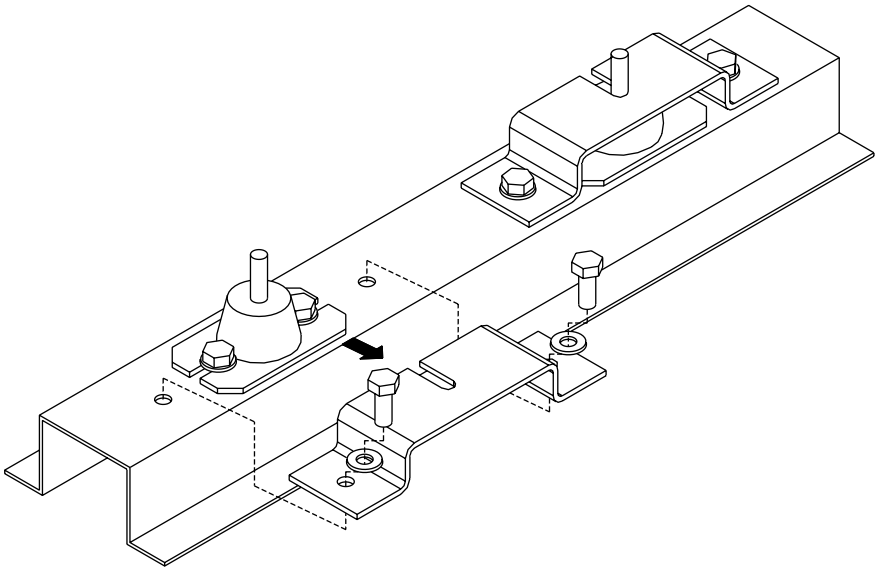

Figure 17 – Anti-Vibration Transport Bracket Removal

5. Commissioning Procedure

5.4 Unit Connections

All electrical, water, and ductwork connections of the unit must be completed by a qualified person.

IMPORTANT

To avoid damaging the coil connections it is essential to grip the hexagonal pipe connection whilst applying counter pressure to tighten the joint (see Figure 18).

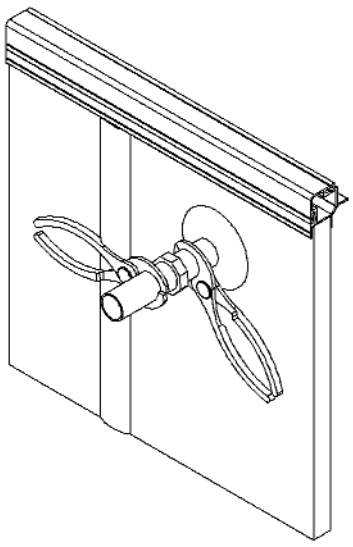

Figure 18

Completely stress-free connections are essential. The pipework of the coils should be arranged to facilitate easy removal of the coil for any required maintenance purposes.

5.5 Coils

Check that the coil connections and valves are not leaking. If there are leaks, rectify the problem.

IMPORTANT

Cooling medium refrigerant Freon.

When direct condensers or air-cooled condensers are fitted, the system must be filled with refrigerant.

In this case a refrigerant engineer must carry out the installation and pipework.

5.6 Operating

In general, heating and cooling coils should be filled with water containing additives to protect against freezing and corrosion:

Open the air vents.

Open the water supply valve a little so that the heater battery fills slowly. This avoids thermal stress.

As soon as the battery heater is full, close the air vent.

Open the water valve fully and switch on the fan.

Finally, the entire pipe system must be completely vented.

All traps connected to the AHU drip trays must be primed prior to operating the unit.

5.7 Steam Operating Filling

Open the system air vent and drain valve gradually on the condensate drain.

Open the steam valve a small amount until steam penetrates through the condensate drain valve and air vent.

Close the condensate drain valve and air vent, and open the steam valve fully.

Vent regularly during operations.

If the installation is occasionally on standby, condensate must not be

CAUTION

allowed to remain in the pipes on account of freezing and corrosion risk. To prevent overheating coils, the fan stop must be delayed by 3 to 5 minutes after the steam valve has been closed.

5.8 Electric Heaters

Electric heaters are fitted with thermal cutouts. These must be connected to the control panel on site, to prevent overheating of the unit. The fan is fitted with an overrun for a period of 3 to 5 minutes.

5.9 Filters

Check that the filters are correctly fitted, with the working side of the filter exposed to the contaminated air stream. Refer to the data sheets with regard to the clean/dirty pressure drop readings.

Ensure that any pressure testing devices are fitted correctly and that they are zeroed to the right values (clean/dirty pressure drops).

Over time, the liquid in the pressure-testing device will fade.

5. Commissioning Procedure

5.10 Humidifiers and Water Quality

The humidifier water supply quality is very important to ensure correct operation.

IMPORTANT

The use of incorrectly treated or untreated water in this equipment may result in scaling, erosion, corrosion, algae, or slime.

The services of a qualified water treatment specialist should be engaged to determine what treatment, if any, is required. The Trane warranty specifically excludes liability for corrosion or deterioration. Trane assumes no responsibility for equipment damage or failure that results from the use of treated water, or saline, or brackish water.

Please refer to the individual supplier's installation, operation, and maintenance manual for additional information.

5.11 Gas Burners

The gas burner supplier will commission this equipment when installed on site.

Please refer to the individual supplier's installation, operation, and maintenance manual for additional information.

5.12 HEPA Filters

The HEPA filter section is supplied with complete front withdrawal framework.

HEPA filters are supplied in original packaging with the unit.

A specialist sealing company must be employed to seal up the filter framework, fit and seal the HEPA filters, and complete a DOP test or equivalent.

5.13 Inverters

The inverter needs to be set up and run in accordance with the supplier's IOM.

Please refer to the individual supplier's installation, operation, and maintenance manual for additional information.

5.14 Controls

See controls IOM and wiring diagrams.

Please refer to the individual supplier's installation, operation, and maintenance manual for additional information.

5.15 Test Run

Following the completion of all preparatory work, the unit is started up for a test run.

IMPORTANT

To conduct a test run that involves the measurement of motor and fan performance, the unit must be connected to the complete installation.

CAUTION

All access doors must all be closed to avoid pressure loss in the installation, which may result in motor damage.

Before staring the fan, open *ALL* dampers. The fan must not be started if the dampers are closed. When *starting* the fan, open the dampers. The fan should not work against closed dampers.

After switching on, check that the direction of the rotation is correct. In addition, the running power consumption should be checked on all phases and compared with the power data on the nameplate. If the running power is too high, there is probably a faulty connection and the unit must be switched off immediately. Check the fan and motor bearings for undue noise. Measure the air volume and external pressure.

The following situations may arise:

1. The air volume is lower, as the system pressure is much higher than designed.
2. The air volume is higher, as the system pressure is much lower than designed.

IMPORTANT

Increasing the fan speed should only be carried out after careful study of the measured point on the appropriate fan curve.

In extreme cases exchanging the motor, fan and drive may be necessary.

The adjustment of variable belt-drive pulleys is carried out with the system at rest, ensuring that the system is not restarted unexpectedly. Remove the pulley safety screws and turn through half of the pulley circumference to carry this out. Then retighten the screws and readjust the pulley belt tension.

Following any change in the pulley ratio, the motor power consumption must be rechecked.

The nominal output rating quoted on the nameplate must not be exceeded.

In all cases of airflow not conforming to the specifications, please contact your sales office.

6. Maintenance

The maintenance interval periods are stated, guidelines only. Any large deviations in the pattern of usage may necessitate further maintenance attention.

IMPORTANT

During maintenance operations the unit must be completely isolated and precautions taken to prevent any premature restart.

6.1 Fan

If the fan/motor assembly is going to be stored for over two weeks before use, the fan should be rotated by hand at weekly intervals to avoid bearing damage.

If storage will be over one month it is recommended that the belts be slackened as well.

Check for soiling, damage, corrosion, and any tendency to bind. Clean as necessary.

Check that the flexible connections are securely fixed.

Check the function of all antivibration mounts.

Check for any obstructions or blockages of all the air intakes and discharges.

Check the traps for leaks or blockages and prime as necessary.

6.2 Bearing Test

Check that the fan bearing is tightened and is not unduly noisy, by sounding it using a metal bar as a conductor.

Where a belt guard has been supplied, check that it is fitted correctly.

If there is any irregular noise or knocking, renew both bearings. Fan bearings are greased for life, but larger units with standard bearings require annual lubrication. These have grease line extensions. In the case of extreme running conditions, lubricate in accordance with the following recommendations:

Recommended lubricants;

ALVANIA	
GREASE 3	(SHELL)
MOBILUX 3	(MOBIL)
BEACON 3	(ESSO)
SKF 28	(BALL BEARING GREASE)

IMPORTANT

Do not overlubricate bearings.

Excessive pressure caused by overlubrication can displace bearing grease seals or cause grease to overheat the bearing, resulting in premature bearing failure.

6.3 Motor

Check the state of cleanliness of the motor and clean it if necessary. Check the noise level of the motor bearing by listening to it with a metal conductor. If there is any irregularity or undue noise, the bearing should be changed or the motor replaced.

6.4 Belt Drive

Belts that are split or have frayed edges or any other signs of damage must be replaced. Rubber shred on the fan section floor is a sign of abnormal wear.

6.5 Belt Drive Tensioning

Tensioning of the drive belt is achieved by moving the motor in relation to the fan (see Figure 19).

The motor is moved on slide rails.

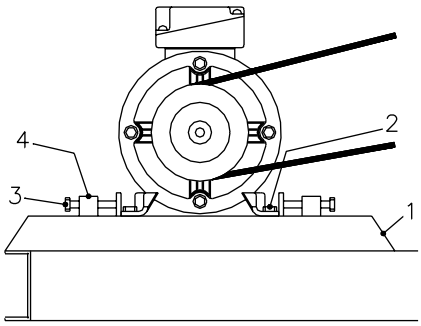

Figure 19

Figure Notes:
1. Slide rails
2. Lock nut
3. Tensioning screw
4. Tensioning pad

Loosening the **motor retaining bolt** and then turning the tensioning screw carries out the adjustment. It is important to maintain the precise alignment of the pulleys.

This should be checked with a straight edge following each adjustment.

Following completion of the adjustment, retighten the **motor retaining bolts**.

The belt tension should be checked by using a proprietary instrument such as the Browning belt-tension checker.

The belt drive must be retensioned after the first 10 hours of operation.

The high performance of Fenner Precision Built belts requires correct tension; we recommend using the Fenner Belt Tension Indicator.

6. Maintenance

Method of Belt Tensioning using Fenner Belt Tension Indicator.

1. Calculate the deflection distance in mm, on a basis of 16 mm per meter, of centre distance (see Figure 20).

   Centre distance (m) x 16 = deflection (mm).
2. Set the lower marker ring at the deflection distance required in mm on the lower scale.
3. Set the upper marker ring against the bottom edge of the top tube.
4. Place the belt tension indicator on the top of the belt at the centre of the span. Apply a force at right angles to the belt, deflecting it to the point where the lower marker ring is level with the top of the adjacent belt.*
5. Read off the force value indicated by the top edge of the upper marker ring.
6. Compare this force to the kgf value shown in Table 2.

***NOTE:**
For a single belt drive, a straight edge should be placed across the two pulleys to act as a datum for measuring the amount of deflection.

If the measurement force falls within the values given, the drive should be satisfactory. A measured force below the lower value indicates undertensioning.

A new drive should be tensioned to a higher value to allow for the normal drop in tension during the running-in period.

After the drive has been running for 30 minutes, the tension should be checked and readjusted to the higher value, if necessary.

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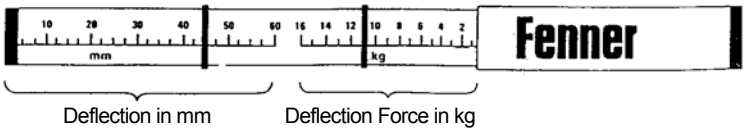
Table 2 – Tensioning Forces (Force required to deflect belt 16 mm per metre of span)

Belt Section	SPZ		SPA		SPB		SPC		Z	A	B	C
Small Pull Diameter (mm)	56 to 95	100 to 130	80 to 132	140 to 200	112 to 224	236 to 315	224 to 355	375 to 560	56 to 100	80 to 140	125 to 200	200 to 400
Newton (N)	13 to 20	20 to 25	25 to 35	35 to 45	45 to 65	65 to 85	85 to 115	115 to 150	5 to 7.5	10 to 15	20 to 30	40 to 60
Kilogram-Force (kgf)	1-3 to 2-0	2-0 to 2-5	2-5 to 3-6	3-6 to 4-6	4-6 to 6-6	6-6 to 8-7	8-7 to 11-7	11-7 to 15-3	0-5 to 0-8	1-0 to 1-5	2-0 to 3-1	4-1 to 6-1



Deflection in mm Deflection Force in kg

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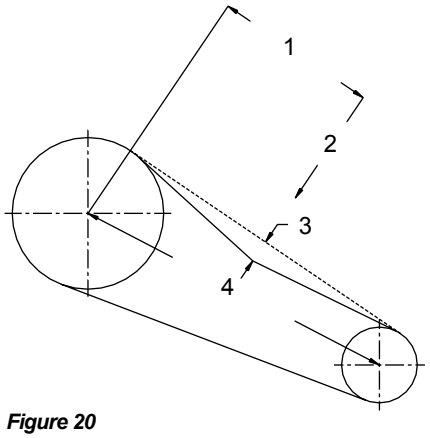

Figure 20

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Figure 20 Notes:
1. 1/2 Centres
2. Force
3. 16 mm deflection / 1 m of centre distance
4. Centre Distance

IMPORTANT

Damage to the motor and fan bearings can result from the belt being overtensioned.

In the event of the belt adjustment being too slack, undue wear and slippage may result.

6. Maintenance

6.6 Belt Replacement

Where a belt guard has been supplied, please remove the belt guard before starting work.

To change the belt (or belts), first move the motor towards the fan by a sufficient amount to enable the old belts to be taken off the pulleys and the new belts to be put on.

If the belt drive has more than one belt, replace all belts at the same time (see Figure 21). In such cases, use matched belts, such as sets in which all belts are exactly the same lengths.

Tension the belts as per Section 6.5.

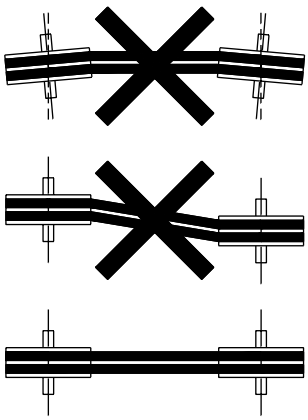

Figure 21

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TO INSTALL

1. Remove the protective coating from the bore and outside of bush, and bore of hub. After ensuring that the mating tapered surfaces are completely clean and free from oil or dirt, insert bush in hub so that holes line up.
2. Sparingly oil thread and point of grub screws, or thread and under head of cap screws. Place screws loosely in holes threaded in hub.
3. Clean shaft and fit hub to shaft as one unit and locate in position desired, remembering that bush will nip the shaft first and then hub will be slightly drawn onto the bush.
4. Using a hexagon wrench, tighten screws gradually and alternately to the torques shown in Table 3.
5. Hammer against large end of bush, using a block of sleeve to prevent damage. (This will ensure that the bush is seated squarely in the bore.) Screws will now turn a little more. Repeat this alternate hammering and screw tightening once or twice to achieve maximum grip on the shaft.
6. If a key is to be fitted, place it in the shaft keyway before fitting the bush. It is essential that it is a parallel key and side fitting only, and has TOP CLEARANCE.
7. After the drive has been running under load for a short time, stop and check tightness of the screws.
8. Fill empty holes with grease to exclude dirt.

TO REMOVE

1. Slacken all screws by several turns. Remove one or two according to the number of jacking off holes. Insert screws in jacking off holes after oiling thread and point of grub screws or thread and under head of cap screws.
2. Tighten screws alternatively until bush is loosened in hub and assembly is free on shaft.
3. Remove assembly from shaft.

Table 3 – Torque Settings

Bush Size		1008	1108	1210	1610	2012	2517	3020	3525	4030	4535	5040
Screw Tightening Torque (Nm)		5.6	5.6	20	20	30	50	90	115	170	190	270
Screw Details	Quantity	2	2	2	2	2	2	2	3	3	3	3
	Size (BSW)	1/4"	1/4"	3/8"	3/8"	1/16"	1/2"	5/8"	1/2"	5/8"	3/4"	7/8"
	Hexagon Socket Size (mm)	3	3	5	5	5	6	8	10	12	14	14
Large End Diameter (mm)		35.0	38.0	47.5	57.0	70.0	85.5	108.0	127.0	146.0	162.0	177.5
Approximate Mass (kg)		0.1	0.1	0.2	0.3	0.7	1.5	2.7	3.8	5.6	7.5	11.1

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6. Maintenance

6.7 Filter Sections

During system start-up, filters are likely to become rapidly blocked.

Filter sections may be supplied with a manometer, which gives a visual indication of filter conditions and pressure drop.

Throw-away panel filters and bag filters must be replaced each time or when the pressure drop reaches the indicated dirty condition. Permanent synthetic or metallic filters must be cleaned periodically.

IMPORTANT

Filters must be installed following the direction of the airflow arrow.

Bag filter pockets should be vertical when installed.

6.8 Coil Sections

In the event of coils being out of commission for some time, it is advisable to completely drain down the coil. On each occasion when refilling is undertaken, check that the coil is effectively vented.

Periodic cleaning of the coils is required.

Dirty coils have increased airside pressure drops and reduced heat transfer, thus unbalancing the cooling or heating system.

6.8.1. Cleaning

In the event that fin edges have been bent, they can be straightened with the aid of a coil comb.

The cleaning is carried out with the unit intact using a powerful vacuum cleaner on the dust-contaminated side. If the unit is very dirty it will need to be removed and wet cleaned.

If required, soft cleaning brushes may be used ensuring that the heat exchanger fins are not damaged.

6.8.2. Frost protection

Check that frost protection is working before the commencement of each winter period. Ensure that the frost sensor is correctly installed and fitted and is working within the correct temperature range.

6.8.3. Drop eliminator

Check the cleanliness of the droplet separator section and the blades annually. If the blades are dirty, remove and clean them. Contamination can result in damage through water droplets in the system and to a reduction in the system's performance. Ensure that the blades are correctly repositioned and that they are not distorted.

6.8.4. Steam heater coils

In the case of steam heater batteries, arrange for automatic steam shutoff when the unit is at rest, and check the function of the fan overrun in this context.

6.8.5. Direct expansion coils

Never use hot water or steam to clean these coils. During normal operation, the fin block must not ice up. If this occurs, check the refrigeration system.

6.9 Electric Heaters

Check the heater for any dirt accumulation. If required, clean the heating elements with a soft brush. Check safety controls and fan overrun controls.

6.10 Steam Humidifier

Maintain in accordance with the manufacturer directions. The following details are general purpose instructions:

Check the steam distributor and ensure there are no undesirable deposits.

Check that the steam feeds do not leak.

Check that the condensate drain is functioning.

6.10.1. Evaporative Humidifier

Any evaporative modules that are strongly encrusted with calcium deposits should be replaced. Trane cannot be responsible for the proper cleaning of evaporative humidifiers.

In order to avoid excess clogging of the evaporative humidifiers, it is advisable to interlock the spray pipe operation with the fan operation.

6.11 Dampers

Check for dirt deposits, damage, or signs of corrosion. Clean with high-pressure air or with a steam jet.

6.12 Sound Attenuators

Silencer modules are basically maintenance free. Within the framework of wider maintenance programmes, check for any dust deposits and vacuum as necessary.

6.13 Weather Louvres/ Hoods

Check for any obstructions or blockages in all of the air intakes and discharges.

6.14 Plate Heat Exchangers

Plate type heat exchangers are aluminum; their service life is virtually unlimited. Maintenance is limited to cleaning operations. Clean the condensate drain, check the trap, and top up as necessary.

Any accumulation of fibres or dust at the exchanger point-of-entry may be removed with a brush or vacuum.

Any oil or greasy deposits must be removed. If a bypass is fitted, maintain as you would for dampers.

6.15 Heat Wheel

The drive unit should be maintained in line with the manufacturer recommendations. The construction of the matrix is such that it is virtually completely self-cleaning. The rotor may be cleaned with pressurized air, water, or steam jet and domestic detergents as necessary.

6. Maintenance

6.16 Maintenance Plan for Air Handling Units

The following table (see Table 4) gives recommended maintenance intervals for the CLCH unit. Intervals are based upon normal running conditions, in a moderate climate, and assuming 24-hour running.

Units operating outside these guidelines may require shorter or longer maintenance intervals.

Table 4 – Recommended Maintenance Intervals

Component	Check the Following	Weekly (see section)	Monthly (see section)	3-6 Monthly (see section)	Annually (see section)
Fan / Motor	Fan In General	Yes (6.1)			
	For Corrosion		Yes (6.1)		
	Flexible Connection		Yes (6.1)		
	Anti-Vibration Mounts			Yes (6.1)	
	Inlet Guide Vane Controller			Yes	
	Drainage		Yes (6.1)		
	Fan Bearing			Yes (6.2)	
	Motors In General		Yes (6.3)		
	Motor Bearing			Yes (6.3)	
	Belt Drive In General		Yes (6.5)		
Filters	Panel Or Bag Filters	Yes (6.7)			
	Roll Filters			Yes	
	Absolute Filters	Yes			
Coils	Fin Block			Yes (6.8.1.)	
	Frost Protection				Yes (6.8.2.)
	Drainage	Yes			
	Drop Eliminator			Yes (6.8.3.)	
	Steam Coils		Yes (6.8.4.)		
Humidifiers	Scaling		Yes (6.10)		
	Condensate Drain		Yes (6.10)		
Dampers	Dampers			Yes (6.11)	
Attenuators	Scilencers				Yes (6.12)
Inlet / Outlet	Hoods And Louvers		Yes (6.13)		
Energy Recovery Components	Plate Heat Exchangers				Yes (6.14)
	Thermal Wheel			Yes (6.15)	
Controls	Control Box And Wiring				Yes

7. Troubleshooting

Symptom	Probable Cause	Recommended Action
Bearing is excessively hot	Overtensioned belts. No lubricant (plummer block type). Overlubrication. Misaligned bearing.	Retension belts. Apply grease. Clean surface of grease and purge. Correct alignment and check that shaft is level.
Motor stalls	Short circuit, phase to earth. Overloaded motor.	Check line phases and terminal block connection. Reduce system load, fan driven speed or increase motor capacity.
Motor overheats	Overloaded motor. Motor fan damaged.	Reduce load or replace with larger motor. Replace motor fan/clean.
Excessive vibration	Poor pulley alignment. Transport brackets not removed. Overtensioned belts. Fan/unit vibration isolator collapsed.	Check pulley alignment. Remove items used for transport only. Retension belts. Replace vibration isolator.
Excessive motor noise	Motor mounting bolts loose. Worn motor bearings.	Tighten motor mounting bolts. Replace bearings and seals.
Excessive fan noise	Fan rubbing on inlet cone or guard. Worn fan bearings. Loose impeller.	Remove item and repair. Replace bearings and seals. Retighten hub.
Premature belt wear	Incorrect tension or alignment. Dirt or grease on belts. Belts rubbing. Odd belts being fitted.	Re-tension and align. Clean belts and pulleys; check for grease leaks. Remove obstruction. Replace with full set.
Filters collapsing	Blocked with dirt. Air velocity too high.	Change at advised dirty condition. Check unit running conditions. Filters wrong size. Replace with filter sizes as supplied from Trane.
Damper seizing	Blade bent. Spindle or mechanism loose. Actuator loose.	Repair or replace blade. Tighten lever fixings. Refit actuator correctly.
Low coil capacity	Incorrect airflow. Incorrect water flow. Incorrect water temperature. Coil tubes are blocked. Expansion valve not operating DX. Poor refrigerant distribution DX.	Check fan operating conditions. Check water pumps, valves, and lines for obstructions. Provide correct water temperature. Clean and unblock tubes. Check sensing-bulb location and valve operation. Check for blockage in distributor and tubes.
Leaking coil	Header/exposed pipe damage. Cracks in joints due to strain of pipework on headers. Swelling of joints due to frost. (Water-hammer Steam Coils)	Repair damaged part. Check support and alignment of pipework and rectify. Check frost protection method and correct, improve. Trapping of steam supply.
Drain pan overflow	Incorrect hydraulic trapping. Blockage in trap.	Resize/fit trap and check air break arrangement. Clean trap and refit.

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