Close Control Air Conditioning

GENERAL AIR CONDITIONING INSTALLATION MANUAL

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Denco Air

CE

Introduction

Denco Limited would like to thank you for purchasing their Air Conditioning Products.

These products have been designed, for indoor use only, to cool, heat, humidify, dehumidify and filter air at atmospheric pressure using (a) a Direct Expansion System ("X", "A" or "W") utilising one of the following refrigerants: R22, R134a or R407C, (b) a Chilled Water System ("CW") using Chilled Water or an Ethylene Glycol solution, or (c) a combination of a Direct Expansion System and Chilled Water System (i.e. Ambicool "F" or Combicool "D"). These products are not authorised for use in any other way.

This manual has been compiled to help ensure the correct installation of the equipment. Please read it fully BEFORE COMMENCING THE WORK.

All installation work, including the running and connecting of services, must be carried out only by COMPETENT PERSONS.

The manual does not cover the detailed commissioning or servicing, which are the subject a separate Operating and Maintenance Manual, and which, also, must be carried out only by COMPETENT PERSONS.

The equipment has been designed and manufactured within a Quality Assurance System conforming to ISO 9001, and Quality Controlled to ensure that it reaches you in perfect condition. A full functional test was performed prior to dispatch. A complete set of electrical schematic diagrams are also secured inside the electrical panel for your information.

It is important for you to appreciate that failure to follow the instructions in this manual may result in damage, incorrect operation or danger to health and safety, and may invalidate the warranty. **Any works planned that are not covered in this Manual must be discussed with, and are subject to the approval of Denco Limited.**

Scope of this Manual

This Installation Manual covers the following ranges and models of Air Handling Units :

- ☐ Small (S) Range [C15, C25, C30, C35 and C40]
- ☐ Medium (M) Range [C45, C65, C85 and C100]
- ☐ Tall Medium (TM) Range [C46, C66, C86 and C101]
- ☐ Tall Medium Quiet (TMQ) Range [C46Q, C66Q, C86Q and C101Q]
- ☐ Series 3 Range [C90, C120, C160, C200, C240, C280 and C360]
- ☐ Series 3F (Ambicool) Range [C120,C200, C280 and C380]
- ☐ Series 3D (Combicool) Range [C120,C200, C280 and C380]
- ☐ Series 3TS (Twin Speed) Range [C120, C160, C240, and C280]
- ☐ Front Service Chilled Water (FSCW) Range [C135, C140, C255, C260, C415, C420, C555 and C560]

For actual model type and number refer to the Serial Plate fitted to the Unit.

Important Note

The data in this booklet refers to equipment with STANDARD CATALOGUE SPECIFICATIONS. Variations sometimes occur depending on specific contract requirements. These can include :

- ☐ Larger fan motors.
- ☐ Larger / smaller compressors.
- ☐ Larger capacity electric heaters (or none at all).

In case of any doubt refer to Contract schematic wiring diagrams supplied by Denco, copies of which will be found inside the electrical panel, and to other contract documentation.

"HEALTH and SAFETY at WORK ACT" (UK)

Due regard shall be given to observing safe procedures when working with or on the equipment. It is the responsibility of the Installer / Operator / Customer to ensure that the "Health and Safety at Work etc. Act (1974)" and Normal Safe Working Procedures are adhered to at all times.

With reference to the "Control of Substances Hazardous to Health Regulations 1988 (COSHH)" the following paragraphs have been extracted from Denco's letter responding to information requested :

" However, certain substances contained within materials used in the manufacture of our units could be hazardous when released, if the unit is misused, abused or maintained by unskilled labour.

In this regard, we notify you that should the expanded polyurethane foam insulation (Bullstrode or similar) be exposed to naked flame, toxic fumes will be given off. Likewise, fumes would be released if pipework or slab foam insulation (Armaflex or similar), electrical insulation or vinyl coatings were exposed to naked flame. It will be seen, therefore, that no naked flame should be applied to any of the above mentioned substances, nor to paint, rubber or plastic parts.

Light oil is applied to some bare metal parts as a protective coating and this could cause dermatic reaction to sensitive skin. Refrigerant 22 contains hydrochlorofluorocarbons (HCFC's). Glycol/water mix is used during manufacture but drained before delivery. The quantities in use are minimal but care should be taken in disposal.

We trust that this information is sufficient but should you require further information regarding our products or maintenance service, please contact our sales department."

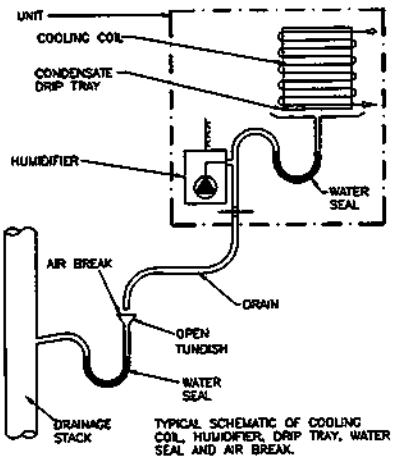
Installers' Responsibilities

- ☐ The 1974 Act is aimed at securing your health, safety and welfare.
- ☐ The Act is also designed to protect people, other than those at work, against risks to health or safety arising out of or in connection with the activities of people at work.
- ☐ Do not attempt to carry out work of a dangerous nature.
- ☐ It is your legal duty to take reasonable care of your own health and safety and of other people who may be affected by your conduct.
- ☐ You must co-operate with your employer in order to comply with any duty or requirement specified in the Act.
- ☐ You must abide by the statutory safety rules of the Company in which you are working.
- ☐ Remember that, in law, you are liable for the same penalties as your employer or site agent if you do not comply with the relevant requirements of the Act.

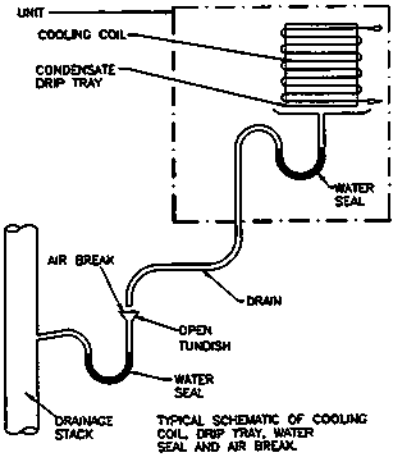
Legionnaires' Disease

An Approved Code of Practice HS(G) 70 "The prevention or control of legionellosis, including legionnaires' disease" [HMSO 1991 IBSN 0 11 885660 X (formely Guidance Note EH48)] came into effect on 15th January 1992.

For further full guidance on minimising the risk of Legionnaires' Disease in Air Conditioning systems (i.e. installation and maintenance guidance) reference should be made to Technical Memorandum TM 13 "Minimising the Risk of Legionnaires' Disease" published by the Chartered Institute of Building Services Engineers (CIBSE). The sketches detail typical schematic arrangements.



TYPICAL SCHEMATIC OF COOLING COIL, HUMIDIFIER, DRIP TRAY, WATER SEAL AND AIR BREAK.



TYPICAL SCHEMATIC OF COOLING COIL, DRIP TRAY, WATER SEAL AND AIR BREAK.

Post Installation Safety Instructions

The following instructions are also provided to remind you of the need to take safety precautions when working on the installed equipment.

Electrical

☐ Isolate at mains isolator BEFORE any access panels are removed for servicing or maintenance. Use FRONT PANEL ON/OFF ROCKER SWITCH first to disable unit before using mains isolator. Mains isolator should be used to stop Air Handling Unit in emergency conditions only. Note : If there is no Mains Isolator identify location of Local Isolator.

☐ Refer to the wiring diagrams and the units rating plate for the mains electrical supply for which the unit is suitable. The units MUST NOT be used on other electrical supplies without the prior approval of the Equipment Supplier.

☐ Observe all electrical safety labels fitted to various parts of the unit/system.

Mechanical

☐ It should be noted that individual components of air cooled systems ("X" and "A" versions) are delivered with holding charges of Nitrogen, which MUST be released before any work is carried out.

☐ Any part of a refrigeration circuit which is being serviced should have the refrigerant gas fully removed BEFORE any work is attempted on any of the refrigeration components. See Control of Refrigerant Discharge.

☐ If any heat or flame is to be used on or near to the unit and its associated installation due care should be taken to avoid contact with any combustible surfaces. Furthermore, it should be noted that some insulation materials and refrigerants may give off toxic fumes when heated. Whenever heat or flame is used, the working area should be thoroughly ventilated BEFORE and DURING the operation. Proper fire precautions should be observed and any necessary fire safety equipment should be on hand, typical for electrical, oil or foam fires.

☐ Observe any safety labels fitted to various parts of the unit/system.

General

☐ Beware of the following danger areas within the unit when running :

(a) Any rotating components (fans, pulleys etc.).
(b) Sharp edges (coil fins, sheetmetal, etc.).
(c) Hot refrigeration or water pipework and electrical heaters.
(d) Steam from the humidifier (if fitted).
(e) Possible live electrical components or terminals.

☐ **When a remote start facility is incorporated within the system great care should be taken to ensure that the Air Handling Unit cannot be started whilst servicing/maintenance is being carried out. In this case a suitable warning label should be affixed to the unit in a clearly visible position.**

☐ **In direct expansion systems incorporating Air Cooled Condensing Units or Condensers, the starting of these units is controlled by the associated Air Handling Units. Therefore these units should be isolated electrically BEFORE any servicing/maintenance is attempted using the isolators fitted to the units.**

Storage Environment

1. Storage conditions for the switchgear / controls of Air Handling Units are as follows :

Maximum Standing Ambient	40 °C
Minimum Standing Ambient	0 °C
Maximum. Humidity	90% non condensing

2. The exterior of an Air Handling Unit is generally dust and damp-proof to IP 41. Do not store unit in areas where the environment contains large concentrations of dust as this will tend to deposit on the controller electronic circuit boards (PCB's) and can cause malfunctions.

3. The humidity sensor can be damaged by aggressive vapours (chlorine, acetone) and must not be stored or used in rooms where the environment contains these vapours.

4. The return air temperature and humidity sensor is dust and damp-proof to IP 20 and therefore the airflow side of the unit is designed to IP 20.

Receiving the Equipment

On receipt, the equipment should be carefully checked against the Despatch Note and examined carefully for damage. Any shortage or damage should be reported to the Carrier without delay.

Please note that air cooled units (versions "X" and "A") are supplied with a nitrogen holding charge, whilst water cooled units (version "W") are supplied fully charged with refrigerant as stated within the service section of the Unit.

Off loading and Lifting

It is recommended that wherever possible all lifting and handling of equipment should be carried out with the packing pallet in position. When slinging or using a fork-lift or stack-a-truck to lift the unit, the two support points should be sufficiently apart to give stability when lifting and suitably placed to distribute the load on the forks. When lifting by crane, use spreader bars to prevent compressing the top of the equipment. Care should be taken not to drop the unit and should this inadvertently happen, it should be immediately unpacked and inspected for damage.

Unpacking Air Handling Units

Remove the wooden crate (if applicable) using appropriate tools and taking care not to damage the cardboard protection and unit beneath. The cardboard case should then be lifted from the unit after first removing the staples fixed through the base of the case to the pallet. The unit is attached to the pallet by means of FOUR OFF M6 bolts passing through existing holes in each corner of the base of the unit except for Medium Range. The pallet may be removed without removing the cardboard case by the removal of the M6 bolts. Beneath the cardboard case is a protective polythene cover. A panel key for the electrical door is located on top of the unit in a plastic bag.

NOTE : A door interlocked type isolator is fitted, its handle and fascia are packed within the control panel for fitting on site on Series 3 and FSCW Ranges [Isolators are optional extras on "S", "M", "TM" and "TMQ" Ranges].

Panelling

IMPORTANT : If any removable panels are removed using the special keys provided, please note that standard panels for tall units can weigh upto 23 kgs (max.). However if full acoustic treatment has been applied to these panels then these panels can weigh between 45 and 50 kgs (max.).

If acoustic panels are fitted to a unit which is installed above floor height, then extra care must be taken when removing them. It is recommended that that this operation is carried out by at least two people. If the unit is installed at a height at which the removal of these panels is considered to be unsafe, then an access platform should be used. A typical method statement for this operation is listed overleaf.

Method Statement for Removal of Denco Air Handling Unit Panels

IMPORTANT : It is recommended that this manual handling operation be carried out by at least TWO people.

- ☐ Place access platform adjacent to Air Handling Unit and stabilise (with outriggers if necessary).
- ☐ Shut down Air Handling Unit and isolate electrically.
- ☐ Release the top and bottom compression locks of the first panel for removal using the special tool supplied with the unit.
- ☐ Support the panel (using Veribor or similar suction lifters if necessary) and test for firm grip.
- ☐ Release the two central compression locks.
- ☐ Remove panel to top of access platform and thence to floor level.
- ☐ Repeat above for all other panels required to be removed.
- ☐ The replacement of the panels is the reverse of the above procedure.

Positioning Air Handling Units

Damage can occur to the unit when positioning, in particular, to the panelling and exterior paintwork. It is therefore necessary to use an adequate number of personnel and the correct moving equipment.

IT IS ADVISABLE TO USE THE POLYTHENE COVER AS PROTECTION THROUGHOUT THE INSTALLATION PERIOD AND IT MAY BE ADVISABLE TO INITIALLY USE THE CARDBOARD PACKING AS ADDITIONAL PROTECTION IF BUILDING OR OTHER CONSTRUCTIONAL WORK IS OCCURRING IN THE AREA WHERE THE UNIT IS TO BE SITED.

Three or four short lengths of 40 mm or 50 mm steel pipe used as rollers will aid positioning. When pushing the unit, try to apply pressure near to the base and at the corners.

The unit is designed to remain upright and therefore care should be taken when lifting the unit up steps, or onto plinths. Denco will take no responsibility for damage caused by mishandling during the positioning of the equipment.

It is recommended that tall Air Handling Units with a small footprint (e.g. TM and TMQ ranges) be suitably stabilised by attachment to an adjacent wall etc. This is especially necessary if the units are standing on a tall plinth or bottom section.

The following height restrictions are recommended :

Floor Void : 300 mm minimum.
Above Unit † : 350 - 500 mm minimum dependent on Unit Size and airflow

(† Above Unit height based on Open Top Discharge / Return)

Levelling Air Handling Units

The unit should be set in an upright position - level in both directions. Failure to carry out levelling correctly may cause operational problems, particularly with regard to the drainage of the equipment. The units are assembled on a level base and any misalignment of panels will indicate that the unit is not level. Pack as recommended below to bring the panels into alignment.

Always use a spirit level for this operation and if packing pieces are used, put them at the corners of the unit. In the case of very large vertical units it is advisable to add additional intermediate packing pieces under the main vertical struts.

Plinths / Base Stands / Top Sections etc. may be part of the system supplied, ensure that adequate gasketing or sealing is provided between each section and that they are securely bolted together.

Noise Considerations

It is important that the problems of noise are considered at all points in the installation of equipment, i.e.

- ☐ The acoustic properties of the room - soft furnishings, curtains and carpets tend to deaden reflections. Bare walls, vertical cabinets etc. tend to produce reflections which result in higher noise levels.
- ☐ Equipment placed hard against a wall can transmit noise through and along the wall into adjacent areas.
- ☐ Floors with high deflections e.g. wooden floors, can amplify the noise produced by the unit.
- ☐ Inadequately fastened pipe runs can transmit vibrations along their full length.

In order to reduce these problems, the following measures are suggested, dependent upon site conditions :

- ☐ Ensure that any vertical planes directly in front of the unit are acoustically dead.
- ☐ Acoustic pads may be placed behind equipment to reduce wall transmissions.
- ☐ In new buildings steel floor framing to match equipment supports may be used to transmit loads to the building columns.
- ☐ In existing buildings supplementary steel framing may be necessary.
- ☐ Acoustic pads (cork, felt, good quality carpet) may be used beneath the equipment.
- ☐ Where units are situated in equipment rooms, acoustic treatment of the walls of the equipment room should be considered.
- ☐ Abrupt bends in pipework should be avoided by fitting long turn elbows or forming long radius bends.
- ☐ All pipes should be rigidly supported to a solid structure.
- ☐ Where pipes pass through walls or partitions, provide an oversize sleeve and pack with fibreglass or similar insulation material.
- ☐ Insulate pipes, and box in with sound-deadening material to solid structures.
- ☐ Connect ductwork via attenuators and flexible make-up pieces (if necessary).

NOISE

The airborne noise emission does not exceed 70 dBA at 3 metres under load conditions measured using a Precision Impulse Sound Level Meter (BS 5969 Type 1) in typical room conditions.

Installation : Service Connections

Ductwork

On units where ductwork is to be used, it is recommended that ductwork connections are completed before any pipework and electrical connections are made in order that the final position of the unit can be fixed.

Pipe Connections

Pipework should be brought to and from the unit through the base only. When running the pipes care must be taken not to obstruct the airflow into the unit, particularly if the base is being used for return air or air discharge.

Mains Water Pipework

All mains water pipework to humidifiers and cooling towers (if applicable) must be installed to national and local standards. In particular, attention must be paid to Local Water Board requirements regarding Mains Water supplies to and overflows from the system.

Humidifier Supply (if fitted)

The unit is fitted with a braided hose with 3/4" BSP connection to the Humidifier at one end and a 15 mm brass compression fitting complete with nut and olive at the other for connection to an external water supply. The water supply should have a stop cock adjacent to the unit and have a pressure of between 0.3 bar (4.5 psig) and 8.0 bar (116 psig).

Condensate and Humidifier Drains

Downflow Units

All cooling coil drip trays have a 22 mm condensate drain that is fitted with a flexible transparent trap within the fan section of the unit with the exception of "M" Range where the trap is copper. The trap is fitted between the drain tray connection and the unit exit termination.

The drain connection is a 22 mm compression fitting located within the bottom of the service section. Access is through the front electrical door and/or right hand end access panel.

Upflow Units

These units are similar to downflow with the exception that they have a copper condensate trap located within the bottom of the services section.

All Units

The drains should run into a 35 mm or larger drain within 3 metres of the unit and should discharged into a trapped air break as detailed in the section "Legionnaires' Disease".

The drain should be run in copper tubing to BS 2871 Table X or equivalent, or high temperature rigid plastic tubing. Drain pipe runs should be adequately supported at regular intervals to avoid bowing and have a slope of at least 1 in 50 to ensure drainage. If the run is long and has a number of bends the tube should be adequately sized and suitable cleaning (rodding) eyes installed at bends. The pipework should be tested for any leakage upon completion of installation.

NB : All drains should be trapped adjacent to the unit, the trap being at least 75 mm (3") in depth.

Fresh Air Kit

If fresh air is required, please contact Denco regarding the Fresh Air Kit and details of the position of the necessary cut-out(s) required in the rear of the Unit.

Installation : Chilled and Condenser Water Pipework

All chilled and condenser water pipework should be designed to good practice as detailed in Denco Code of Practice CP 12. The following should be observed on chilled water units, drycooler (radiator) or cooling tower systems :

- ☐ Lines should be adequately sloped to drain away, by gravity, water which is accumulated from condensing, defrosting or cleaning operations.
- ☐ All plumbing connections should be made in accordance with local Water Board recommendations.
- ☐ Drain lines from drip trays etc., must be trapped and run to open drains. They must not be connected directly to the sewer system (See "Legionnaires' Disease").
- ☐ Control devices such as solenoid valves, modulating valves or hand valves which may cause hydraulic hammer should be protected by a stand-pipe and air pocket to absorb shock.
- ☐ Pipes for chilled water or condenser water should be sized in accordance with accepted practice. Care must be taken when sizing pipework and pumps to make sufficient allowance for the pressure drops.
- ☐ A 40 mesh strainer should be provided at the inlet to each water cooled ("W" version) unit to protect the plate type heat exchangers from fouling.

The following list is submitted as a guide to the installation of chilled and condenser water pipework circuits :

- ☐ All pipework should be installed to local and national standards.
- ☐ Whenever possible it is recommended that "reverse return" piping be used for multiple installations to ensure an easily balanced system.
- ☐ Isolating valves should be provided at all individual items of equipment to enable servicing of the equipment to be carried out without draining down the system.
- ☐ Regulating valves, preferably with pressure test points should be used at strategic points including all coils to enable balancing of water flow rates.
- ☐ All high points and coils should be provided with vent cocks to enable adequate system venting and to prevent air locks. All coils and low points should be provided with drain cocks to enable adequate draining of the system.
- ☐ Pipe expansion and contraction should be allowed for by the installation of expansion bellows (where necessary).
- ☐ A closed type expansion tank should be provided for the system.
- ☐ A strainer with an adequate mesh should be installed prior to the pump inlet.
- ☐ Thermometers and pressure gauge test points should be strategically located at coils, chillers and towers for commissioning and normal service checks.
- ☐ Systems not designed to operate on ethylene glycol should have any external pipework trace heated to give frost protection.
- ☐ Pipework must be properly cleaned and flushed. Refer to BSRIA Technical Memorandum TM 2 / 84.
- ☐ Condenser water, particularly if served by an open evaporative cooling tower, should be treated to prevent the deposit of hard water scale or biofilm on the condenser surfaces and filtered to prevent the circulation of other solid materials.
- ☐ On systems which are designed to operate on ethylene glycol solutions to prevent freezing, the solution strength must be adequate for the minimum ambient temperatures which are likely to be encountered.
- ☐ All chilled water and condenser water pipework should be insulated. Additionally chilled water pipework and valves should be vapour sealed to avoid condensation.

Freeze Prevention of Water Pipework

If water piping is installed in a space where the temperature may drop below freezing, it must be arranged so that it can be easily and completely drained. Condensers or water coils are difficult to drain completely and therefore, to be safe, it is advisable to remove any remaining water by blowing through with compressed air.

If systems are to remain out of operation for long periods, then it is recommended that they be refilled with an anti-freeze solution to prevent corrosion of the inner surfaces of the piping, condensers and coils . The anti-freeze solution should contain inhibitors to ensure it is not aggressive towards any of the materials of construction of the coil or pipework, and the advice of the anti-freeze supplier should be sought.

On re-commissioning the equipment, the anti-freeze solution must be drained and the system refilled with water.

Chilled Water Volumes

The Chilled Water Air Handling Unit volumes shown below include coils, valves and pipework.
The Ambicool Air Handling Unit chilled water volumes shown below include coils, valves, pipework and condensers.

Model Number	WATER VOLUMES - litres			
	Standard Units		Ambicool Units	
	UC	DC	UC	DC
"S" Range				
15	1.5	N/A	N/A	N/A
25	2.1	N/A	N/A	N/A
30	2.7	N/A	N/A	N/A
35	3.5	N/A	N/A	N/A
40	4.6	N/A	N/A	N/A
"M" Range				
45	4.4	4.4	N/A	N/A
65	5.3	5.3	N/A	N/A
85	7.2	7.2	N/A	N/A
100	9.2	9.2	N/A	N/A
"TM" Range				
46	4.9	5.2	N/A	N/A
66	5.9	6.1	N/A	N/A
86	7.8	8.0	N/A	N/A
101	10.3	10.8	N/A	N/A
Series 3 Range				
90	9.1	11.7	N/A	N/A
120	13.0	15.9	16.9	19.6
160	15.3	19.2	N/A	N/A
200	18.4	22.7	24.1	27.6
240	22.0	27.7	N/A	N/A
280	29.0	35.1	36.6	42.2
360	33.5	42.1	N/A	N/A
380	N/A	N/A	40.1	46.2
Front Service Chilled Water Range				
135	17.5	19.7	N/A	N/A
140	22.7	23.2	N/A	N/A
255	26.8	30.1	N/A	N/A
260	34.8	35.5	N/A	N/A
415	37.9	42.8	N/A	N/A
420	48.6	50.2	N/A	N/A
555	46.0	49.1	N/A	N/A
560	59.7	58.6	N/A	N/A

Installation : Refrigeration Pipework

All refrigeration pipework should be installed to national and local standards and as detailed in Denco Code of Practice CP 12 also refer to the appropriate Air Cooled Condenser and Condensing Unit Installation Manual.

Pipes must be properly sized to meet the required design suction line loss, and the pipework system designed, having regard to ensuring oil return to compressors and avoidance of excessive pressure drops in discharge and/or liquid lines. Purpose made oil traps must be fitted to vertical suction lines every 6.1 m (20 ft) when lifting refrigerant from evaporator to compressor or compressor to condenser. Air cooled Condensing Units or Condensers should not be sited more than 15 m (50 ft) above or 4 m (13 ft) below the base of the Air Handling Unit.

Extreme care should be taken to keep refrigeration tubing clean and dry prior to installation and the following procedures will help to adhere to good practice :

1. Only refrigeration grade copper tubing correctly sealed against contamination should be used.

2. Do not carry out installation outside whilst it is raining.

3. Always cap the free end of tubing whilst carrying out installation.

4. Do not leave dehydrated compressors or filter/driers open to the atmosphere.

5. Use only copper eutectic or specialist soft solders containing at least 3.5% silver on suction and liquid lines and high temperature copper eutectic rods or silver solder on discharge lines. It is suggested that one of the following are used :

(a) Copper to copper - Eutectic 1805 (2% silver) - no flux.
(b) Copper to brass - Eutectic 1805 - flux 1802.
(c) Copper to steel - Eutectic 1810 (2% silver) - flux 1820.

NB : STANDARD SOFT SOLDER MUST NOT BE USED.

6. With any high temperature rod where oxidisation is liable to take place use an inert gas such as dry nitrogen or carbon dioxide to avoid scale formation inside the tubing. Dry nitrogen is preferred.

7. When using soldering paste or flux use the minimum required to prevent contamination of the filter and joint. Flux only the male part of the connection - never the female. After making the joint remove the surplus flux with a damp cloth.

8. Where vibration eliminators are used the ends should be wrapped with a damp cloth and rods with a melting temperature of no greater than 650°C (1200°F) should be used to avoid damage to the internal joints.

Leak Testing

After all lines are connected, but before they are insulated, the system must be leak tested. The use of an electronic leak detector or halide torch is recommended. For a satisfactory installation the system MUST be leak tight.

Leak testing should be carried out before initial charging and after any service work has been carried out, and prior to evacuation. This is done by charging refrigerant gas until system pressure is approximately 1.4 bar and then pressurising with dry nitrogen to a maximum of 24 bar. Refer to Control of Refrigerant Discharge.

When leak testing the following general points should be observed :

A. Halide Torch Procedure (not suitable for HFC refrigerants)

1. The space where leak detecting is carried out should be ventilated but free from strong draughts. Without ventilation the air within the space may become saturated with refrigerant vapour, causing the flame to burn green and render the torch useless. The space should be kept free from draughts because small amounts of the refrigerant will be absorbed immediately by the air, thus preventing detection of a small leak.

2. Explore for leaks, by moving the end of the suction hose around all surfaces where the leak might be. Keep the flame in the dark as much as possible, so that any changes in the colour of the flame may be easily noticed.

3. Watch for colour changes. When freon gas is drawn in through the suction hose, the flame colour will change from blue to green or intense violet, indicating a leak. When the hose passes beyond the leak, the flame will clear and will be blue again.

4. Large leaks may release enough gas into the air so that the flame will not completely clear even when the hose is passed over the leak. In this case, watch the variations in the intensity of the green or violet colour as the hose is moved around. The leak will be where the violet colour is the most intense. If the leak is strong enough, it will extinguish the flame.

5. Watch for the presence of oil when detecting leaks. Sometimes the refrigerant pushes oil out ahead of it, and at intervals the refrigerant cannot be picked up with a torch. Use the finger to wipe around the joint or part, and then look for fresh oil. Most of the smaller leaks can be found by this method.

6. When leak detecting on the high side of a fully charged air cooled condensing system, FIRST ENSURE THE PRESSURE SWITCH IS CORRECTLY SET and then the condenser should be blocked off from the fan with a piece of cardboard and the unit should be allowed to run until it is stopped by the high pressure cut-out, then use the torch. (If a water cooled condensing system, shut off the condensing water and run the unit until it is stopped by the high pressure cut-out).

B. Electronic Procedure

1. Test equipment : 'Rilo' leak detector.

2. Switch on and leave the 'Rilo' to warm up.

3. When warming up, the dial needle must not indicate above 0.8 (adjustment is by the left hand control switch).

4. Warm up is complete when the dial needle returns to the zero position and is stable.

5. Check sensitivity with reference leak bottle (leak rate 0.2 oz per year; the dial needle will show at least 0.8 and an increase in the audible sound will be heard). The 'Rilo' is now ready to start the leak test.

6. The leak test is carried out at a travel speed of approximately 6 feet per minute, with a distance of approximately 3/8" between the sensing tube and the joint surface. A leak is indicated by the dial needle showing a reading of at least 0.6 with an increase in the audible sound.

7. If a leak is found, confirm by taking three separate readings, allowing the dial needle to return to zero between each reading by removing the sensing tube from the leak area into clean air.

8. If a liquid line shut-off valve is not fitted then charge until discharge pressure reaches bottle pressure, close the charging valve and valve on cylinder and top up charge as required by low side charging.

9. When the system is leak-free by the above methods, allow to stand for 24 hours noting gauge pressures and ambient air temperatures before and after. If pressures have fallen the system must be retested.

(Note : During the test period pressure changes might occur due to rise or fall in the ambient air temperature surrounding the system. Such changes must be taken into account when making this check.)

R22 Refrigerant Charges

A.H.U. Model	"A" and "X" Versions		"W" Versions	
	kgs	lbs	kgs	lbs
"S" Range				
UC 15	0.30	0.67	N/A	N/A
UC 25	0.41	0.90	N/A	N/A
UC 30	0.45	1.00	N/A	N/A
UC 35	0.60	1.32	N/A	N/A
UC 40	0.79	1.74	N/A	N/A
"M" Range				
UC / DC 45	1.0	2.2	1.3	2.9
UC / DC 65	1.1	2.4	1.6	3.5
UC / DC 85	1.5	3.3	2.0	4.4
UC / DC 100	1.7	3.8	2.3	5.1
"TM" Range				
UC / DC 46	1.0	2.2	1.3	2.9
UC / DC 66	1.1	2.4	1.6	3.5
UC / DC 86	1.5	3.3	2.0	4.4
UC / DC 101	1.7	3.8	2.3	5.1
Series 3 Range				
UC 90	1.8	4.0	2.4	5.3
DC 90	2.1	4.6	2.6	5.7
UC 120	2.4	5.3	3.4	7.5
DC 120	2.7	6.0	3.8	8.4
UC 160	2.5	5.5	3.6	7.9
DC 160	3.0	6.6	4.1	9.0
UC 200	3.2	7.1	4.5	9.9
DC 200	3.8	8.4	5.1	11.3
UC 240	4.2	9.3	5.5	12.1
DC 240	4.9	10.8	6.2	13.7
UC 280	5.0	11.1	6.3	13.9
DC 280	5.8	12.8	7.0	15.4
UC 360	5.8	12.8	7.5	16.5
DC 360	7.0	15.4	8.7	19.2
UC 380F	N/A	N/A		
DC 380F	N/A	N/A		

Notes :

1. Figures shown above are TOTAL for Units and do not include for any interconnecting pipework, liquid receivers, Air Cooled Condensers or Air Cooled Condensing Units.

2. Refer to Air Cooled Condenser and Condensing Unit Installation Manual for relevant Condenser or Condensing Unit R22 refrigerant charge.

Control of Refrigerant Discharge

The discharge of any refrigerants into the atmosphere is thought by many scientists to be causing damage to the planets ozone layer which protects us all, including plants, from the harmful effects of the sun's ultra-violet radiation.

By international agreement the world-wide use of certain refrigerants will be reduced in stages. To this end listed below are suggestions on how refrigeration engineers can make a contribution by the discontinuing of releasing any refrigerant gas to the atmosphere. **Release of refrigerant to the atmosphere is an offence under Section 33 of the Environmental Protection Act 1990.**

DO NOT ...	**DO ...**
(1) Blow off refrigerants to atmosphere.	(1) Pump down into a receiver or empty cylinder using Reclaim Equipment.
(2) Use refrigerants to clean coils etc.	(2) Clean coils etc. using a hand brush, vacuum or compressed air.
(3) Leak test using pure refrigerant.	(3) Leak test using Nitrogen and just a trace of refrigerant gas.
(4) Recharge before mending leaks.	(4) Find and mend leaks before recharging system.
(5) Dispose refrigerant gas to waste.	(5) Send used refrigerant gas back for reprocessing.

Humidifier Information (if fitted)

Water Connections

The humidifier unit may be connected to a standard piped cold water supply observing local regulations where applicable. DO NOT USE demineralised water. Pre-treatment of water fed to the humidifier is unnecessary. Where a salt exchange plant is in use at a site, the feed water to the unit should by-pass this.

Water Quality	
Conductivity	80 - 100 Microsiemens
Hardness	50 - 500 ppm (mg/l)
Feed Water Pressure	0.3 - 8 bar
Feed Water Connection	15 mm O/D Brass pipe
Drain Water Connection	22 mm Compression or Copper
Air Duct Pressure	100 mm H_2O
Water Discharge Rate	4 litres / min
Feed Water Input Temperature	30 °C

Installation : Electrical

WARNING : DANGEROUS VOLTAGE LEVELS EXIST WITHIN THIS EQUIPMENT. USUAL ELECTRICAL SAFETY PRECAUTIONS MUST BE OBSERVED. THIS EQUIPMENT MUST BE EARTHED.

All installation wiring associated with this equipment must comply with the latest edition of the IEE Regulations or to national/international codes of practice. A set of relevant electrical schematic drawings for the unit are secured inside the electrical hinged door for your reference.

Mains Supply

The Mains Supply for this unit can be identified from the schematic wiring diagrams. Voltage tolerance should not exceed tolerances of ± 10%.

This equipment in its standard form, is designed to operate with an electrical supply of 400-415V/3 phase/4 wire/50 Hz or 380V/3 phase/4 wire/50 Hz.

The phase sequence to the isolator is shown on the schematic wiring diagrams.

The classification of this equipment is Class 1, as defined in the IEE Regulations and BS 2754 (1976) as :

"Equipment in which protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in such a way that means are provided for the connection of accessible conductive parts to the protective [earthing] conductor in the fixed wiring of the installation in such a way that accessible conductive parts cannot become live in the event of a failure of the basic insulation".

Always use the appropriate holes provided in the gland plate for terminating incoming and outgoing cables. Do not remove any blanking plugs from redundant holes as these protect against particle ingress. Use the correct gland for the type/size of cable being installed.

IMPORTANT : As a matter of common sense NEVER cut additional entry holes into the top of the electrical enclosure as this will deposit swarf, etc onto the delicate printed circuit boards directly underneath.

Terminate all site earth cable conductors to gland plate earth bolt(s) provided.

Ensure that the mains electrical supply is of the correct voltage, frequency, phase and rating.

Ensure that the cable sizes are of adequate size for the maximum load of the equipment under normal automatic running conditions.

NOTE : Supply cable sizes must not be determined from maximum FLA figures only - other criteria must be considered, e.g.. length of run (and associated volt-drop), installation methods and grouping factors, disconnect times etc. All of these have a de-rating influence on the current-carrying capacity of cables, and are detailed in Appendix 9 of the IEE Regulations. National/International standards may also refer.

Recommended supply fuses should be to BS 88. The fuse size should be determined from the worst FLA shown on the schematic wiring diagram. Generally fuses are selected by taking the next fuse size up from the stated FLA although fuse selection must take into account starting currents and number of starts per hour. Refer to Engineering Data for the particular product range.

Before connection to the equipment, check each installed cable for continuity and short circuit (phase/phase, phase/neutral, phase/earth and neutral/earth). Check the tightness of all electrical connections prior to switching on supply.

Check all site connected items before switching on supply.

Wiring Colour Codes

The wiring colour code for cables within this equipment is as follows :

Green/Yellow	Earth continuity conductors
Black	AC and DC power circuits
Black with Blue Sleeve	Neutral conductors of power circuits
Red	AC control circuits
Blue	M.E.L.V. and DC power circuits (M.E.L.V. Machine Extra Low Voltage not > 25 AC RMS or 60V DC with 10% maximum ripple)
Orange	External interlocks which may remain live when isolator is off

NOTE: This colour code DOES NOT apply to electronics wiring.

Cable Segregation

IMPORTANT :
While every reasonable precaution has been taken to prevent electrical disturbances from affecting the operation of the Air Handling Unit, lack of attention to generally accepted wiring and filtering practises can lead to Air Handling Unit problems in high electromagnetic field environments. Ensure that segregation is maintained between control wiring (24V AC or DC) and mains potential wiring (415V/240V AC) throughout the entire installation.

The ramifications are :

- ☐ Control signals to condensing units must be run in a separate cable to the mains power cabling.
- ☐ Where it is unavoidable that power and signal/control cables run in close proximity, ensure that there is a gap of AT LEAST 30 mm between each category throughout the cable run.
- ☐ Ideally power and signal/control cables should never cross, but if unavoidable, ensure that they cross at 90° (right angles) to each other.

IMPORTANT : Any additional equipment installed in the control section, or supplied from it, will render the warranty invalid, unless it is verified and approved by the **Denco Limited Technical Department**.

The critical and maintenance alarm relays can be interrogated by 240V AC maximum 1A (res.).

When interrogating the volt free contacts of the alarm relay ensure that the cable is installed in the appropriate trunking (low voltage or high voltage).

Suppression

All relay and contactor coils within the Air Handling Unit or condensing units are fitted with CR network type suppressors (120 OHM + 0.1 microfarad). These are mounted either directly across the coil connections, or mounted on PCB's to which the relay or contactor is connected.

If additional relays or contactors (240V or 24V AC) or any other inductive load capable of generating electromagnetic interference (EMI) is to be installed within the equipment (or directly supplied from it), ensure that these components are suppressed as close to the source of EMI generation as possible. This includes any slave relays controlled by the Air Handling Unit's alarm relay(s).

NOTE :
Remember ! Any additional equipment installed in the Air Handling Unit must be verified and approved by the **Denco Limited Technical Department**, and must comply with EMC Standards in force.

Pre-Operational Check List

AFTER ALL NECESSARY INSTALLATION WORK HAS BEEN COMPLETED AND BEFORE THE MAINS SUPPLY IS APPLIED TO THE UNIT, ENSURE YOU HAVE READ ALL THE PREVIOUS SECTIONS OF THIS MANUAL, AND THAT THE RELEVANT PARTS HAVE BEEN FULLY COMPLIED WITH.

- ☐ If the unit has been stored in a colder environment than its final permanent site, allow an adequate period for acclimatisation and evaporation of any condensation that may have occurred before the mains power supply is connected to the unit.
- ☐ Keep ALL access doors and panels closed as much as possible to prevent the unnecessary ingress of dust or other particles.
- ☐ Ensure that all exterior access panels have been replaced and secured in position to ensure the correct airflow when unit is switched on.
- ☐ When the unit is running, if switched off do not switch back on for a period of at least 20 seconds.

IMPORTANT :

- ☐ **Danger exists from Downflow Unit fan discharges, therefore the Unit should not be set to work until all necessary floor tiles have been fitted as the fan discharge is immediately accessible from beneath the Unit.**
- ☐ **Danger exists from Upflow Unit fan discharges, therefore the unit should not be set to work until all necessary ducting or top sections/grilles have been fitted and securely fixed to the unit.**
- ☐ **Danger exists from fans running on following the unit being switched off. It is recommended that no panels are removed for at least 2 minutes to allow the fans/pulleys rotational momentum to cease.**

ALWAYS REPLACE THIS MANUAL IN THE SERVICES SECTION OF THE UNIT.

WARNING : DANGEROUS VOLTAGE LEVELS EXIST WITHIN THIS EQUIPMENT. USUAL ELECTRICAL SAFETY PRECAUTIONS MUST BE OBSERVED.

Operating Environment

1. Room conditions for the switchgear / controls of Air Handling Units are as follows :

Maximum Standing Ambient	35 °C
Minimum Standing Ambient	5 °C
Maximum. Humidity	90% non condensing
Maximum Working Pressure - Refrigerant	25 bar
Maximum Working Pressure - Water	7 bar

2. The exterior of an Air Handling Unit is generally dust and damp-proof to IP 41. Do not install unit in areas where the environment contains large concentrations of dust as this will tend to deposit on the electronic circuit boards (PCB's) and can cause malfunctions.

3. The humidity sensor can be damaged by aggressive vapours (chlorine, acetone) and must not be used in rooms where the environment contains these vapours.

4. The return air temperature and humidity sensor is dust and damp-proof to IP 20 and therefore the airflow side of the unit is designed to IP 20.

Commissioning Details

Commissioning : General

1. All commissioning work must only be entrusted to personnel who are COMPETENT in the necessary refrigeration, water pipework and electrical engineering.

2. The following equipment will be required to fully commission a unit :

- ☐ 1 - Amprobe
- ☐ 1 - Multimeter (preferably digital)
- ☐ 1 - Anemometer
- ☐ 1 - Inclined manometer 0-10" wg
- ☐ 1 - Portable test manometer (0-20 feet 0-50 feet)
- ☐ 1 - Complete set of unit schematic wiring diagrams
- ☐ 1 - Vacuum pump
- ☐ 1 - Oil pump
- ☐ 1 - System analyser gauge manifold
- ☐ 1 - Refrigerant Reclaim Equipment

Direct Expansion Systems ONLY

3. Check the mechanical installation for :

(a) It is necessary before starting the fans to ensure that the mechanical adjustment of the fan drive arrangement is correct. This involves the checking, and perhaps adjustment, of the fan belt tension and the adjustment of the driving and driven pulleys.
(b) External refrigeration and any water pipework and drains are connected correctly. Pay particular attention to the refrigeration pipework for remote Condensing Units or Condensers.

4. Check the electrical installation for :

(a) Segregation of signal and main potential (240V/415V) cabling.
(b) Correct termination and integrity of signal and mains cabling connections. Pay particular attention to the controls cabling for remote Condensing Units or Condensers, which should be run separately to Mains supply.
(c) Understand function and operation of remote interlocks.
(d) Function of auxiliary alarm (if utilised).

Commissioning : Chilled Water System

By manually opening the 3-way control valve, balance the chilled water pipework to achieve the design flow rate through the cooling coils and by-pass arrangement.

The best method of measuring water flow is by incorporating orifice and double regulating valves at each unit, so enabling readings to be taken on the orifice valve and regulating flow on the double regulating valve. Alternatively, a double regulating valve with pressure tappings can be used. If these valves have not been installed, pressure drop readings should be taken across the coil and across the 3-way valve (using the CV curve corresponding to that valve).

The double regulating valve in the by-pass line should be set to correspond to the coil pressure drop, thus ensuring correct control by the 3-way valve and constant flow through the system.

Commission the chiller and associated equipment in accordance with manufacturers recommendations.

Commissioning : Direct Expansion System

Ensure that the compressor/remote condensing unit MCB's are in the "OFF" position.

Ensure that the crankcase heater and condenser supply MCB's are in the "OFF" position ("A" version).

Select a low value temperature setpoint compared to the return air temperature. Check that the 24V AC signal is present at the solenoid valves.

Reset the temperature setpoint.

If combined HP/LP pressure switch fitted, set pressure switches to values given below :

Low Pressure Cut Out : 25 psig (1.7 bar)
Differential : 35 psig (2.4 bar)

High Pressure Cut Out : 350 psig (24 bar)

Ensure that all compressor and any interconnecting pipework valves are open.

Thoroughly leak test and evacuate refrigerant systems before proceeding to add the refrigerant and oil type as labelled in the service section of the Unit. Refer to Control of Refrigerant Discharge. During the evacuation process the airflow and/or controls can be commissioned.

Check the operation of the pressure switches.

Revert all cooling MCB's to "ON".

After re-energising Air Handling Unit make the necessary adjustments to achieve the design condensing temperature. Depending on whether a water cooled or air cooled condenser is fitted.

(a) Water cooled condenser.

Adjust water flow rate to condenser.

(b) Air cooled condenser.

Adjust fan pressure switch or fan speed controller depending on which is fitted and check fan operation.

Check and adjust, (if necessary), the expansion valve superheat (4°C).

Adjust setpoint to required design room condition and check for automatic operation within room design limits.

IMPORTANT :

Air cooled Condensing Units / Condensers need to be separately commissioned PRIOR to the commissioning of the refrigeration components in the Air Handling Unit. See the relevant Installation Manual for this action.

General Servicing Check Lists

The General Servicing Check Lists cover the following and are based on 2 monthly intervals :

(a) Air Handling Unit
(b) Chilled Water Systems
(c) Direct Expansion Systems

Servicing : Air Handling Unit

Action	Notes
Generally inspect unit for any problems, including noise, sealing, leaks, insulation, bearings, drains etc.	-
Check pulleys and belts for wear, correct tension and alignment.	-
Check fan mounts, cleanliness and operation	-
Check cleanliness of filters and inspect for break up and correct sealing.	Change if necessary.
Check cleanliness of grilles (if fitted).	-
Check unit for rust especially around cooling and humidifying sections.	Clean off any rust, prime and top coat
Check pipework connections for leaks also condition of local insulation.	-
Check coil and eliminators if fitted, for build-up of dust, and scale in the case of the latter.	Clean with stiff brush if dirty. If eliminator scaled with "salts" they may require cleaning with weak acid solution if hard - always use specialist company and inhibit afterwards. DO NOT LET DIRT ACCUMULATE.
Check drains and ensure they are clear.	-
Clean unit inside and out with vacuum cleaner and wipe down with damp cloth. Rectify any paint damage externally.	-
Isolate switchgear and controls and inspect contactors, relays etc. for signs of overheating or arcing.	-
Check operation of electric heater thermal cut-out.	-
Check that electrical connections on motor and electric heater are tight.	-
Check anti-vibration mounts are okay (if fitted).	Pay particular attention to rubber mounts.
Check pressure drops air/water and compare with commissioning details.	-
Check operation of ALL safety devices such as airflow switches etc.	-

Servicing : Chilled Water Systems

Action	Notes
Generally check all pipework and associated valves etc. for leaks and deterioration.	Tighten glands as required and tighten or remake pipe.
Check high point air vents for air.	Check for smells - often denotes corrosion or electrolytic action - if apparent, consulting water treatment specialist. If water treatment is incorporated query with company.
Check cleanliness of cooling coil fins; clean if necessary.	-
Check that condensate drain is free from obstruction.	-
Check chilled water on and off temperatures at cooling coil.	-
Check operation of three way control valves.	-
Check pump operation (duty/standby) and change-over selected duty pump.	-
Clean system strainers.	-
Check pipework and insulation condition and fixing etc.	-
Check all shut-off valves operate and shut off. Any regulating/balancing valves should be returned to their to their initial noted position, and locked.	Replace any valves that do not shut off.
If ethylene glycol solution check solution strength.	Adjust if necessary.

Servicing : Direct Expansion Systems

Action	Notes
Generally inspect unit for any problems, including noise, sealing, leaks, insulation, bearings, drains etc.	-
Check fan mounts, cleanliness and operation.	-
Check pipework connections for leaks also condition of local insulation.	-
Check generally condition and fixing of all pipework and insulation etc.	-
Check that compressor is securely fixed, anti-vibration mounts are tight and oil level is correct.	-
Check operation of compressor crankcase heater.	-
Check operating pressures.	If not correct check for leaks.
Check operation of ALL pressure switches and safety devices.	-
Check refrigerant temperatures.	-
Check that electrical connections are tight.	-
Check Condensing Unit / Condenser for rust.	Clean off any rust, prime and top coat.
Ensure that air cooled Condensing Units / Condensers are free from leaves, dirt, debris, etc.	-

General Details : Small (X and CW)

		UPFLOW Versions				
		UC 15	**UC 25**	**UC 30**	**UC 35**	**UC 40**
Fans(1)						
No. of Fans	-	1	2	2	2	3
Air Volume	m^3/s	0.3	0.35	0.45	0.5	0.7
Fan Motor	kW	1 x 0.18	1 x 0.18	1 x 0.18	1 x 0.18	1 x 0.245
Electric Reheat						
No. of Stages	-	1	1	2	2	2
Capacity	kW	2.5	2.5	5.0	5.0	5.0
1st Step	kW	2.5	2.5	2.5	2.5	2.5
2nd Step	kW	-	-	2.5	2.5	2.5
Humidifier (2)						
Capacity	kg/hr	4	4	4	4	4
Power	kW	3.0	3.0	3.0	3.0	3.0
Filter (3)						
No. of Pieces	-	1	1	1	1	2
Length	mm	840	840	1040	1040	720
Width	mm	280	280	310	310	310
Depth	mm	25	25	25	25	25

		UPFLOW Versions				
		UC 15	**UC 25**	**UC 30**	**UC 35**	**UC 40**
CW Controls (4)						
Valve Size	ins	1/2	1/2	1/2	1/2	1/2
Valve kv	m^3/h	4.0	4.0	4.0	4.0	4.0

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.
4. The Chilled Water Valve is a modulating 3 way type fitted with an electrical actuator.

General Details : Medium (X, A, W and CW)

DOWNFLOW Versions				ALL SYSTEMS		UPFLOW Versions			
DC 45	**DC 65**	**DC 85**	**DC 100**			**UC 45**	**UC 65**	**UC 85**	**UC 100**
				Fans(1)					
1	2	2	3	No. of Fans	-	1	2	2	3
0.62	1.08	1.25	1.77	Air Volume	m^3/s	0.52	0.84	1.03	1.42
1 x 0.376	2 x 0.376	2 x 0.376	3 x 0.376	Fan Motor	kW	1 x 0.376	2 x 0.376	2 x 0.376	3 x 0.376
0.7	1.2	1.3	1.9	Fan Heat Abs.	kW	0.5	0.9	1.0	1.5
				Electric Reheat					
1	1	2	2	No. of Stages	-	1	1	2	2
6	6	12	12	Capacity	kW	6	6	12	12
6	6	6	6	1st Step	kW	6	6	6	6
-	-	6	6	2nd Step	kW	-	-	6	6
				Humidifier (2)					
4	4	4	4	Capacity	kg/hr	4	4	4	4
3.0	3.0	3.0	3.0	Power	kW	3.0	3.0	3.0	3.0
				Filter (3)					
1	2	2	2	No. of Pieces	-	1	2	2	2
625	425	625	775	Length	mm	625	425	625	775
610	610	610	610	Width	mm	610	610	610	610
50	50	50	50	Depth	mm	50	50	50	50

DOWNFLOW Versions				"A" SYSTEMS	UPFLOW Versions			
DC 45	**DC 65**	**DC 85**	**DC 100**		**UC 45**	**UC 65**	**UC 85**	**UC 100**
36	50	64	80	Compressor Type : MT	36	50	64	80
1	1	1	1	Number fitted	1	1	1	1

DOWNFLOW Versions				"W" SYSTEMS	UPFLOW Versions			
DC 45	**DC 65**	**DC 85**	**DC 100**		**UC 45**	**UC 65**	**UC 85**	**UC 100**
36	50	64	80	Compressor Type : MT	36	50	64	80
10/20	10/30	10/30	10/40	Condenser Type : B	10/20	10/30	10/30	10/40
1	1	1	1	Number fitted	1	1	1	1

DOWNFLOW Versions				"CW" SYSTEMS		UPFLOW Versions			
DC 45	**DC 65**	**DC 85**	**DC 100**			**UC 45**	**UC 65**	**UC 85**	**UC 100**
				CW Controls (4)					
1/2	1/2	1/2	3/4	Valve Size	ins	1/2	1/2	1/2	3/4
4.0	4.0	4.0	6.3	Valve kv	m^3/h	4.0	4.0	4.0	6.3

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.
4. The Chilled Water Valve is a modulating 3 way type fitted with an electrical actuator.

General Details : Tall Medium (X, A, W and CW)

DOWNFLOW Versions				ALL SYSTEMS		UPFLOW Versions			
DC 46	**DC 66**	**DC 86**	**DC 101**			**UC 46**	**UC 66**	**UC 86**	**UC 101**
				Fans(1)					
1	2	2	3	No. of Fans	-	1	2	2	3
0.63	1.10	1.25	1.79	Air Volume	m^3/s	0.55	1.00	1.10	1.59
1 x 0.376	2 x 0.376	2 x 0.376	3 x 0.376	Fan Motor	kW	1 x 0.376	2 x 0.376	2 x 0.376	3 x 0.376
0.7	1.2	1.3	1.9	Fan Heat Abs.	kW	0.6	1.0	1.1	1.6
				Electric Reheat					
1	1	2	2	No. of Stages	-	1	1	2	2
6	6	12	12	Capacity	kW	6	6	12	12
6	6	6	6	1st Step	kW	6	6	6	6
-	-	6	6	2nd Step	kW	-	-	6	6
				Humidifier (2)					
4	4	4	4	Capacity	kg/hr	4	4	4	4
3.0	3.0	3.0	3.0	Power	kW	3.0	3.0	3.0	3.0
				Filter (3)					
1	2	2	2	No. of Pieces	-	1	2	2	2
625	425	625	775	Length	mm	625	425	625	775
490	490	490	490	Width	mm	490	490	490	490
50	50	50	50	Depth	mm	50	50	50	50

DOWNFLOW Versions				"A" SYSTEMS	UPFLOW Versions			
DC 46	**DC 66**	**DC 86**	**DC 101**		**UC 46**	**UC 66**	**UC 86**	**UC 101**
36	50	64	80	Compressor Type : MT	36	50	64	80
1	1	1	1	Number fitted	1	1	1	1

DOWNFLOW Versions				"W" SYSTEMS	UPFLOW Versions			
DC 46	**DC 66**	**DC 86**	**DC 101**		**UC 46**	**UC 66**	**UC 86**	**UC 101**
36	50	64	80	Compressor Type : MT	36	50	64	80
10/20	10/30	10/30	10/40	Condenser Type : B	10/20	10/30	10/30	10/40
1	1	1	1	Number fitted	1	1	1	1

DOWNFLOW Versions				"CW" SYSTEMS		UPFLOW Versions			
DC 46	**DC 66**	**DC 86**	**DC 101**			**UC 46**	**UC 66**	**UC 86**	**UC 101**
				CW Controls (4)					
1/2	1/2	1/2	3/4	Valve Size	ins	1/2	1/2	1/2	3/4
4.0	4.0	4.0	6.3	Valve kv	m^3/h	4.0	4.0	4.0	6.3

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.
4. The Chilled Water Valve is a modulating 3 way type fitted with an electrical actuator.

General Details : Tall Medium Quiet (X and CW)

DOWNFLOW Versions				ALL SYSTEMS		UPFLOW Versions			
DC 46Q	**DC 66Q**	**DC 86Q**	**DC 101Q**			**UC 46Q**	**UC 66Q**	**UC 86Q**	**UC 101Q**
				Fans(1)					
1	1	2	2	No. of Fans	-	1	1	2	2
0.60	0.70	1.00	1.20	Air Volume	m^3/s	0.48	0.56	0.80	0.96
1 x 0.32	1 x 0.32	2 x 0.32	2 x 0.32	Fan Motor	kW	1 x 0.32	1 x 0.32	2 x 0.32	2 x 0.32
0.6	0.7	1.0	1.2	Fan Heat Abs.	kW	0.5	0.6	0.9	1.1
				Electric Reheat					
1	1	2	2	No. of Stages	-	1	1	2	2
6	6	12	12	Capacity	kW	6	6	12	12
6	6	6	6	1st Step	kW	6	6	6	6
-	-	6	6	2nd Step	kW	-	-	6	6
				Humidifier (2)					
4	4	4	4	Capacity	kg/hr	4	4	4	4
3.0	3.0	3.0	3.0	Power	kW	3.0	3.0	3.0	3.0
				Filter (3)					
1	2	2	2	No. of Pieces	-	1	2	2	2
625	425	625	775	Length	mm	625	425	625	775
490	490	490	490	Width	mm	490	490	490	490
50	50	50	50	Depth	mm	50	50	50	50

DOWNFLOW Versions				"CW" SYSTEMS		UPFLOW Versions			
DC 46Q	**DC 66Q**	**DC 86Q**	**DC 101Q**			**UC 46Q**	**UC 66Q**	**UC 86Q**	**UC 101Q**
				CW Controls (4)					
1/2	1/2	1/2	3/4	Valve Size	ins	1/2	1/2	1/2	3/4
4.0	4.0	4.0	6.3	Valve kv	m^3/h	4.0	4.0	4.0	6.3

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.
4. The Chilled Water Valve is a modulating 3 way type fitted with an electrical actuator.

General Details : Series 3 (X, A, W and CW)

DOWNFLOW Versions							ALL SYSTEMS	UPFLOW Versions						
DC 90	**DC 120**	**DC 160**	**DC 200**	**DC 240**	**DC 280**	**DC 360**		**UC 90**	**UC 120**	**UC 160**	**UC 200**	**UC 240**	**UC 280**	**UC 360**
							Fans(1)							
1	1	1	2	2	2	3	No. of Fans	1	1	1	2	2	2	3
1.5	2.2	2.4	3.6	4.2	5.4	6.0	Air Volume - m^3/s	1.3	2.0	2.2	3.2	3.8	4.8	5.4
1	1	1	2	2	2	3	No of Fan Motors	1	1	1	2	2	2	3
1.5	2.2	3.0	2.2	3.0	3.0	3.0	Fan Motor - kW	1.5	2.2	3.0	2.2	3.0	3.0	3.0
1.2	1.8	2.4	3.1	5.4	6.2	7.2	Fan Heat Abs - kW	1.0	1.4	1.9	2.3	3.9	4.4	5.1
							Electric Reheat							
2	2	2	2	2	2	2	No. of Stages	2	2	2	2	2	2	2
12	12	12	12	12	16.2	20.4	Capacity - kW	12	12	12	12	12	16.2	20.4
6	6	6	6	6	8.1	10.2	1st Step- kW	6	6	6	6	6	8.1	10.2
6	6	6	6	6	8.1	10.2	2nd Step - kW	6	6	6	6	6	8.1	10.2
							Humidifier (2)							
4	10	10	15	15	15	15	Capacity - kg/h	4	10	10	15	15	15	15
3.0	7.5	7.5	11.3	11.3	11.3	11.3	Power - kW	3.0	7.5	7.5	11.3	11.3	11.3	11.3
							Filter (3)							
1	2	2	2	2	3	3	No. of Pieces	1	2	2	2	2	3	3
733	733	733	733	733	733	733	Length - mm	1040	1040	1040	1040	1040	1040	1040
633	480	480	683	683	683	683	Width - mm	544	414	414	635	635	635	635
100	100	100	100	100	100	100	Depth - mm	50	50	50	50	50	50	50

DOWNFLOW Versions							"A" SYSTEMS	UPFLOW Versions						
DC 90	**DC 120**	**DC 160**	**DC 200**	**DC 240**	**DC 280**	**DC 360**		**UC 90**	**UC 120**	**UC 160**	**UC 200**	**UC 240**	**UC 280**	**UC 360**
64	50	64	80	100	125	160	Compressor : MT	64	50	64	80	100	125	160
1	2	2	2	2	2	2	Number fitted	1	2	2	2	2	2	2

DOWNFLOW Versions							"W" SYSTEMS	UPFLOW Versions						
DC 90	**DC 120**	**DC 160**	**DC 200**	**DC 240**	**DC 280**	**DC 360**		**UC 90**	**UC 120**	**UC 160**	**UC 200**	**UC 240**	**UC 280**	**UC 360**
64	50	64	80	100	125	160	Compressor : MT	64	50	64	80	100	125	160
10/30	10/30	10/30	10/40	10/40	10/40	35/20	Condenser : B	10/30	10/30	10/30	10/40	10/40	10/40	35/20
1	2	2	2	2	2	2	Number fitted	1	2	2	2	2	2	2

DOWNFLOW Versions							"CW" SYSTEMS	UPFLOW Versions						
DC 90	**DC 120**	**DC 160**	**DC 200**	**DC 240**	**DC 280**	**DC 360**		**UC 90**	**UC 120**	**UC 160**	**UC 200**	**UC 240**	**UC 280**	**UC 360**
							CW Controls (4)							
1.0	1.0	1.25	1.25	1.5	1.5	1.5	Valve Size - ins	1.0	1.0	1.25	1.25	1.5	1.5	1.5
10	10	16	16	25	25	25	Valve kv - m^3/h	10	10	16	16	25	25	25

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.
4. The Chilled Water Valve is a modulating 3 way type fitted with an electrical actuator.

General Details : Series 3F (Ambicool)

DOWNFLOW Versions				ALL SYSTEMS		UPFLOW Versions			
DC 120	**DC 200**	**DC 280**	**DC 380**			**UC 120**	**UC 200**	**UC 280**	**UC 380**
				Fans(1)					
1	2	2	3	No. of Fans	-	1	2	2	3
2.2	3.6	5.4	6.2	Air Volume	m^3/s	2.0	3.2	4.8	5.4
2.2	2.2	3.0	3.0	Fan Motor	kW	2.2	2.2	3.0	3.0
2.0	3.5	6.7	7.2	Fan Heat Abs.	kW	1.9	3.1	5.6	5.7
				Electric Reheat					
2	2	2	2 .	No. of Stages	-	2	2	2	2
12	12	16.2	20.4	Capacity	kW	12	12	16.2	20.4
6	6	8.1	10.2	1st Step	kW	6	6	8.1	10.2
6	6	8.1	10.2	2nd Step	kW	6	6	8.1	10.2
				Humidifier (2)					
10	15	15	15	Capacity	kg/hr	10	15	15	15
7.5	11.3	11.3	11.3	Power	kW	7.5	11.3	11.3	11.3
				Filter (3)					
2	2	3	2 + 2	No. of Pieces	-	2	2	3	2 + 2
733	733	733	733	Length	mm	1040	1040	1040	1040
480	683	683	480 / 683	Width	mm	414	635	635	414 / 635
100	100	100	100	Depth	mm	50	50	50	50
50	80	125	160	Compressor Type : MT		50	80	125	160
10/30	10/40	10/40	35/20	Condenser Type : B		10/30	10/40	10/40	35/20
2	2	2	2	Number fitted		2	2	2	2

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.

General Details : Series 3D (Combicool)

DOWNFLOW Versions				ALL SYSTEMS		UPFLOW Versions			
DC 120	**DC 200**	**DC 280**	**DC 380**			**UC 120**	**UC 200**	**UC 280**	**UC 380**
				Fans(1)					
1	2	2	3	No. of Fans	-	1	2	2	3
2.2	3.6	5.4	6.0	Air Volume	m^3/s	2.0	3.2	4.8	5.4
2.2	2.2	3.0	3.0	Fan Motor	kW	2.2	2.2	3.0	3.0
2.0	3.5	6.7	6.5	Fan Heat Abs.	kW	1.9	3.1	5.6	5.7
				Electric Reheat					
2	2	2	2	No. of Stages	-	2	2	2	2
12	12	16.2	20.4	Capacity	kW	12	12	16.2	20.4
6	6	8.1	10.2	1st Step	kW	6	6	8.1	10.2
6	6	8.1	10.2	2nd Step	kW	6	6	8.1	10.2
				Humidifier (2)					
10	15	15	15	Capacity	kg/hr	10	15	15	15
7.5	11.3	11.3	11.3	Power	kW	7.5	11.3	11.3	11.3
				Filter (3)					
2	2	3	2 + 2	No. of Pieces	-	2	2	3	2 + 2
733	733	733	733	Length	mm	1040	1040	1040	1040
480	683	683	480 / 683	Width	mm	414	635	635	414 / 635
100	100	100	100	Depth	mm	50	50	50	50

DOWNFLOW Versions				"DA" SYSTEMS	UPFLOW Versions			
DC 120	**DC 200**	**DC 280**	**DC 380**		**UC 120**	**UC 200**	**UC 280**	**UC 380**
50	80	125	160	Compressor Type : MT	50	80	125	160
2	2	2	2	Number fitted	2	2	2	2

DOWNFLOW Versions				"DX" and "DA" CHILLED WATER SYSTEMS		UPFLOW Versions			
DC 120	**DC 200**	**DC 280**	**DC 380**			**UC 120**	**UC 200**	**UC 280**	**UC 380**
				CW Controls (4)					
1.0	1.25	1.5	1.5	Valve Size	ins	1.0	1.25	1.5	1.5
10	16	25	25	Valve kv	m^3/h	10	16	25	25

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.
4. The Chilled Water Valve is a modulating 3 way type fitted with an electrical actuator.

General Details : Series 3TS (Twin Speed)

DOWNFLOW Versions				ALL SYSTEMS		UPFLOW Versions			
DC 120	**DC 160**	**DC 240**	**DC 280**			**UC 120**	**UC 160**	**UC 240**	**UC 280**
				Fans(1)					
1	1	2	2	No. of Fans	-	1	1	2	2
2.2	2.4	4.2	5.4	Air Volume	m^3/s	2.0	2.2	3.8	4.8
2.2	3.0	3.0	3.0	Fan Motor	kW	2.2	3.0	3.0	3.0
1.8	2.4	5.4	6.2	Fan Heat Abs.	kW	1.4	1.9	3.9	4.4
				Electric Reheat					
2	2	2	2	No. of Stages	-	2	2	2	2
12	12	12	16.2	Capacity	kW	12	12	12	16.2
6	6	6	8.1	1st Step	kW	6	6	6	8.1
6	6	6	8.1	2nd Step	kW	6	6	6	8.1
				Humidifier (2)					
10	10	15	15	Capacity	kg/hr	10	10	15	15
7.5	7.5	11.3	11.3	Power	kW	7.5	7.5	11.3	11.3
				Filter (3)					
2	2	2	3	No. of Pieces	-	2	2	2	3
733	733	733	733	Length	mm	1040	1040	1040	1040
480	480	683	683	Width	mm	414	414	635	635
100	100	100	100	Depth	mm	50	50	50	50

DOWNFLOW Versions				"ATS" SYSTEMS	UPFLOW Versions			
DC 120	**DC 160**	**DC 240**	**DC 280**		**UC 120**	**UC 160**	**UC 240**	**UC 280**
100	125	100	125	Compressor Type : MT	100	125	100	125
1	1	2	2	Number fitted	1	1	2	2

DOWNFLOW Versions				"WTS" SYSTEMS	UPFLOW Versions			
DC 120	**DC 160**	**DC 240**	**DC 280**		**UC 120**	**UC 160**	**UC 240**	**UC 280**
100	125	100	125	Compressor Type : MT	100	125	100	125
10/40	10/40	10/40	10/40	Condenser Type : B	10/40	10/40	10/40	10/40
1	1	2	2	Number fitted	1	1	2	2

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.

General Details : Front Service Chilled Water

		DOWNFLOW Versions (DFS)							
		135	**140**	**255**	**260**	**415**	**420**	**555**	**560**
Fans(1)									
No. of Fans	-	1	1	2	2	3	3	4	4
Air Volume	m^3/s	2.6	2.6	4.5	4.5	6.2	6.2	7.4	7.4
Fan Motor	kW	1 x 3.0	1 x 3.0	2 x 3.0	2 x 3.0	3 x 3.0	3 x 3.0	4 x 3.0	4 x 3.0
Fan Heat Abs.	kW	2.6	2.6	5.2	5.3	6.4	6.5	6.4	6.5
Electric Reheat									
No. of Stages	-	2	2	2	2	2	2	2	2
Capacity	kW	12	12	16	16	20	20	24	24
1st Step	kW	6	6	8	8	10	10	12	12
2nd Step	kW	6	6	8	8	10	10	12	12
Humidifier (2)									
Capacity	kg/hr	10	10	15	15	15	15	15	15
Power	kW	7.5	7.5	11.3	11.3	11.3	11.3	11.3	11.3
Filter (3)									
No. of Pieces	-	2	2	3	3	4	4	5	5
Length	mm	833	833	833	833	833	833	833	833
Width	mm	495	495	521	521	495	495	521	521
Depth	mm	100	100	100	100	100	100	100	100

		UPFLOW Versions (UFS)							
		135	**140**	**255**	**260**	**415**	**420**	**555**	**560**
Fans(1)									
No. of Fans	-	1	1	2	2	3	3	3	3
Air Volume	m^3/s	2.4	2.4	4.1	4.1	5.6	5.6	6.7	6.7
Fan Motor	kW	1 x 3.0	1 x 3.0	2 x 3.0	2 x 3.0	3 x 3.0	3 x 3.0	3 x 3.0	3 x 3.0
Fan Heat Abs.	kW	2.1	2.3	4.0	4.3	4.9	5.2	5.6	6.0
Electric Reheat									
No. of Stages	-	2	2	2	2	2	2	2	2
Capacity	kW	12	12	16	16	20	20	24	24
1st Step	kW	6	6	8	8	10	10	12	12
2nd Step	kW	6	6	8	8	10	10	12	12
Humidifier (2)									
Capacity	kg/hr	10	10	15	15	15	15	15	15
Power	kW	7.5	7.5	11.3	11.3	11.3	11.3	11.3	11.3
Filter (3)									
No. of Pieces	-	4	4	3	3	4	4	4	4
Length	mm	570	570	1140	1140	1140	1140	1140	1140
Width	mm	480	480	495	495	510	510	650	650
Depth	mm	50	50	50	50	50	50	50	50

		DOWNFLOW(DFS) and UPFLOW (UFS)Versions							
		135	**140**	**255**	**260**	**415**	**420**	**555**	**560**
CW Controls (4)									
Valve Size	ins	1.25	1.25	1.5	1.5	1.5	1.5	2.0	2.0
Valve kv	m^3/h	16	16	25	25	25	25	40	40

NOTES :

1. Some variation from the above nominal airflows is possible. Enquire if details are required.
2. Electrode boiler type.
3. Efficiency 30% Ashrae 52/76 Eurovent 4/5 arrestance value 90%.
4. The Chilled Water Valve is a modulating 3 way type fitted with an electrical actuator.

General Installation Drawings

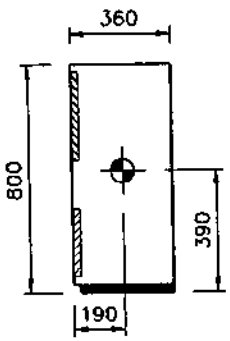
The General Installation Information drawings show the following : overall dimensions, weights, centre of gravity, service access requirements and connection sizes.

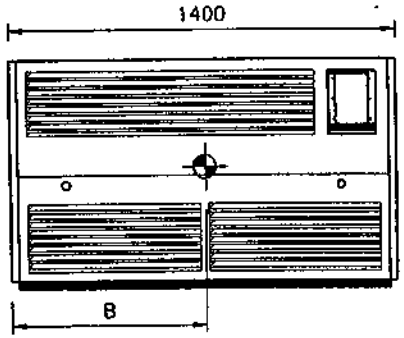
Description		Drawing Number
Small Range		
"S" Range General Installation Information	Floor Mounted	10358-C-220
"S" Range General Installation Information	Wall Mounted	10358-C-221
"S" Range Connection Details		10358-C-222
Medium Range		
"M" Range General Installation Information		10337-C-342
"M" Range Connection Details		10337-C-343
Tall Medium Range		
"TM" Range General Installation Information		10359-C-412
"TM" Range Downflow (DC) Connection Details	"X" and "CW"	10359-C-413
"TM" Range Downflow (DC) Connection Details	"A" and "W"	10359-C-414
"TM" Range Upflow (UC) Connection Details	"X" and "CW"	10359-C-409
"TM" Range Upflow (UC) Connection Details	"A" and "W"	10359-C-410
Series 3 Range		
"S3" Range General Installation Information		10329-C-1255
"S3" Range Connection Details	"X" and "CW"	10329-C-1256
"S3" Range Connection Details	"A" and "W"	10329-C-1257
Series 3 Ambicool Range		
"S3F" Range General Installation Information		10329-C-1258
"S3F" Range Connection Details		10329-C-1259
Series 3 Combicool Range		
"S3D" Range General Installation Information		10329-C-1260
"S3D" Range Connection Details	"X" and "A"	10329-C-1261
Front Service Chilled Water Range		
"FSCW" Range General Installation Information		10364-C-404
"FSCW" Range Connection Details		10364-C-405

Note :

- ☐ For Series 3 Twin Speed (S3TS) refer to Series 3 Range "A" and "W" version drawings.
- ☐ For Tall Medium Quiet (TMQ) refer to Tall Medium "A" and "CW" version drawings.

PROJECTION	N/A





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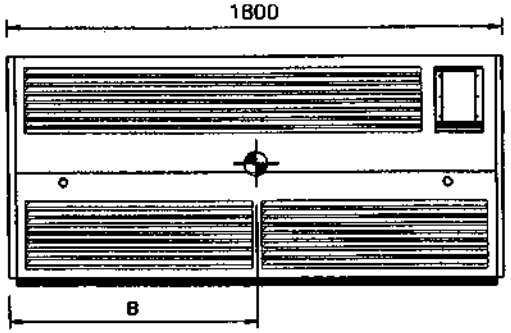
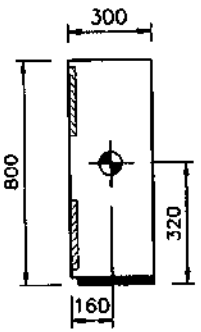
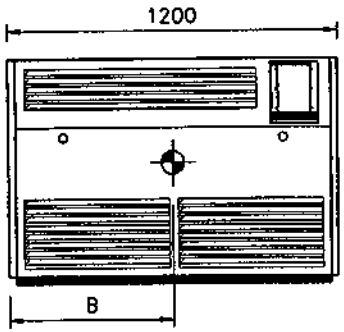


UC40

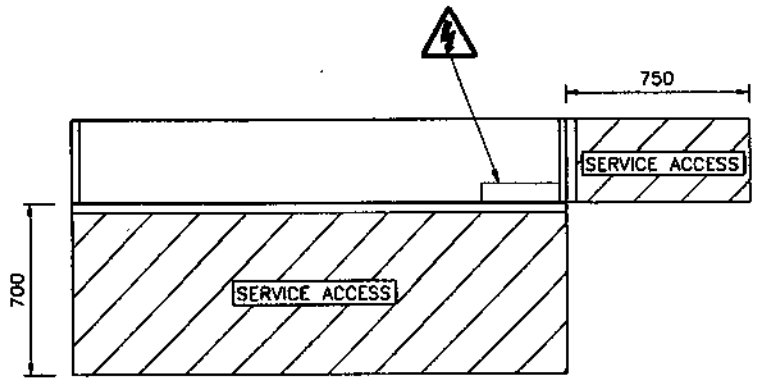
CONNECTION SIZES				
MODEL	X		CW	
	LIQUID	SUCTION	WATER IN	WATER OUT
UC 15	ø3/8"	ø5/8"	15	15
UC 25	ø3/8"	ø5/8"	15	15
UC 30	ø3/8"	ø3/4"	22	22
UC 35	ø3/8"	ø3/4"	22	22
UC 40	ø1/2"	ø3/4"	22	22

MODEL	UNIT WEIGHT (kg)
UC 15	80
UC 25	85
UC 30	95
UC 35	100
UC 40	120





UC 15/25



MODEL	DIMENSION 'B' (mm)
UC 15	635
UC 25	635
UC 30	750
UC 35	750
UC 40	950

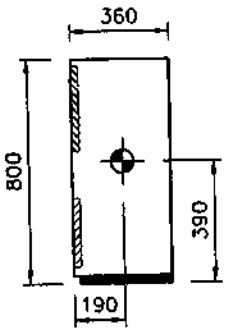
GENERAL DETAILS
ALL DIMENSIONS IN MILIMETRES.
TOLERANCE ON ALL DIMENSIONS ±5mm.
ELECTRICAL SUPPLY INTO R/H END SERVICE SECTION

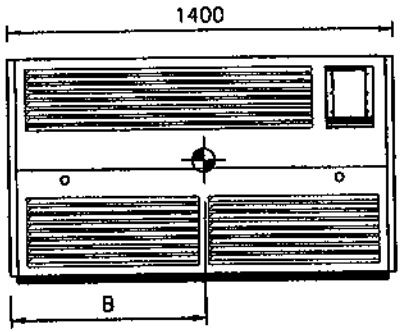
CENTRE OF GRAVITY

ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

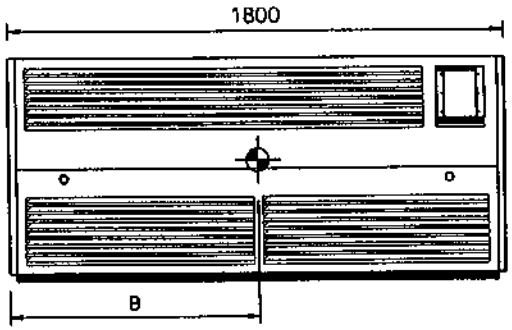
DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE 'S' RANGE UNITS INSTALLATION INFORMATION WALL MOUNTED	Denco HEREFORD ENGLAND	
1	FIRST ISSUE	1555	RS	26/1/95	CHECKED				
PRELIMINARY	PRE-PROD	STANDARD ☒		SCALE	N.T.S.	APPROVED			
LOCATION	I:\SCR\358C220	APPL. UNITS	UC 15 – 40			DATE	26/1/95	DRG. No. 10358-C-220	REV 1

PROJECTION	N/A





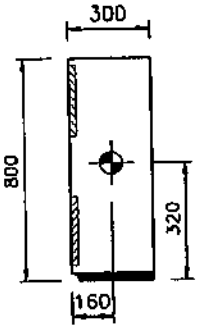
UC 30/35

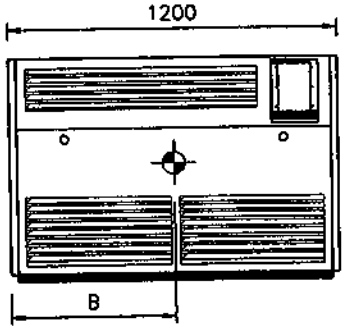


UC40

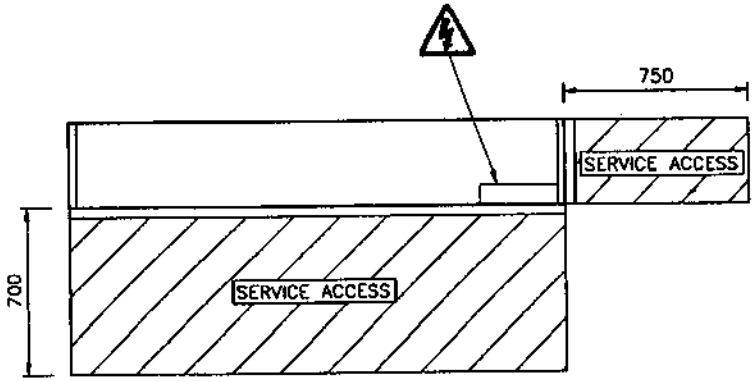
CONNECTION SIZES				
MODEL	X		CW	
	LIQUID	SUCTION	WATER IN	WATER OUT
UC 15	ø3/8"	ø5/8"	15	15
UC 25	ø3/8"	ø5/8"	15	15
UC 30	ø3/8"	ø3/4"	22	22
UC 35	ø3/8"	ø3/4"	22	22
UC 40	ø1/2"	ø3/4"	22	22

MODEL	UNIT WEIGHT (kg)
UC 15	80
UC 25	85
UC 30	95
UC 35	100
UC 40	120





UC 15/25



MODEL	DIMENSION 'B' (mm)
UC 15	635
UC 25	635
UC 30	750
UC 35	750
UC 40	950

GENERAL DETAILS
ALL DIMENSIONS IN MILIMETRES.
TOLERANCE ON ALL DIMENSIONS ±5mm.
ELECTRICAL SUPPLY INTO R/H END SERVICE SECTION

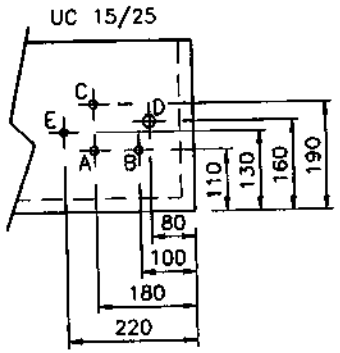
CENTRE OF GRAVITY

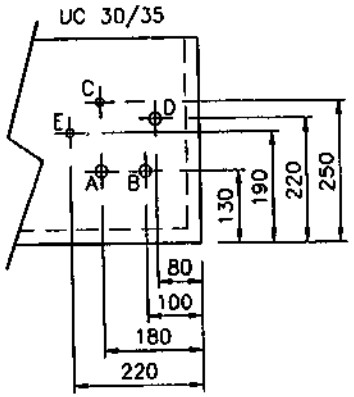
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED - IF IN DOUBT ASK

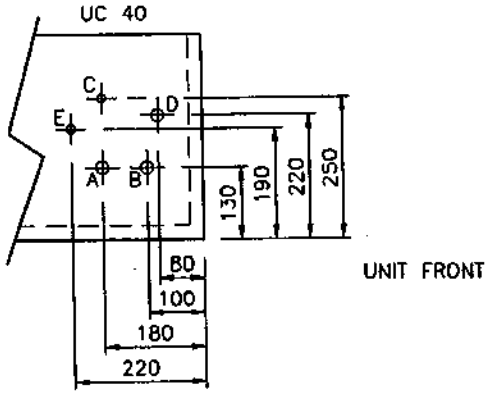
DO NOT SCALE - REFER TO DRAWING OFFICE			QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE 'S' RANGE UNITS INSTALLATION INFORMATION WALL MOUNTED	Denco HEREFORD ENGLAND		
1	FIRST ISSUE	1555	RS	30/1/95	CHECKED					
PRELIMINARY	PRE-PROD	STANDARD ☒	SCALE	N.T.S.	APPROVED			DRG. No. 10358-C-221	REV 1	
LOCATION I:\SCR\358C221		APPL. UNITS UC 15 - 40			DATE	30/1/95				

PROJECTION	N/A

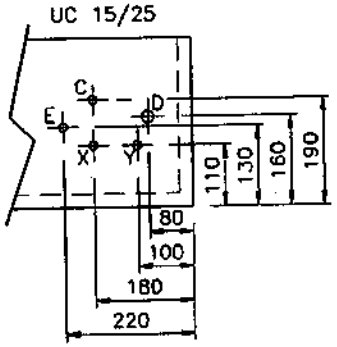
'S' RANGE 'CW' TYPE UNITS

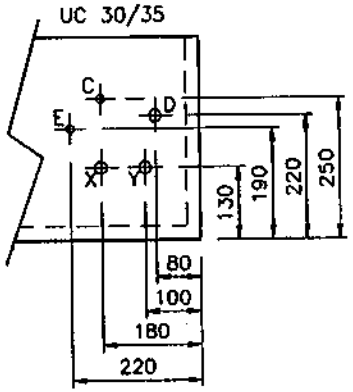


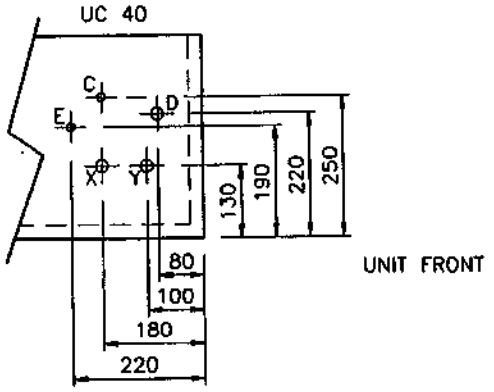




'S' RANGE 'X' TYPE UNITS







CONNECTION DETAILS

A – CHILLED WATER IN
B – CHILLED WATER OUT
C – HUMIDIFIER FEED TERMINATED IN 15mm
D – CONDENSATE DRAIN CONNECTED TO HUMIDIFIER DRAIN AND TERMINATED IN 22mm
E – CONDENSATE DRAIN (WHEN NO HUMIDIFIER) TERMINATED IN 15mm
X – LIQUID IN
Y – SUCTION

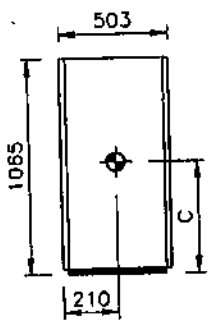
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

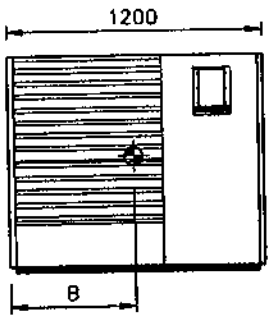
DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY		N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE			
1	FIRST ISSUE	1555	RS	26/1/95	CHECKED		'S' RANGE UNITS INSTALLATION INFORMATION CONNECTION DETAILS			
PRELIMINARY	PRE-PROD	STANDARD X	SCALE	N.T.S.	APPROVED					
LOCATION	E:\SCR\358C222	APPL. UNITS	UC 15 – 40		DATE	26/1/95				

Denco HEREFORD ENGLAND

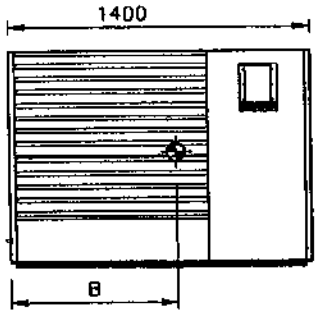
DRG. No. 10358-C-222 REV 1

PROJECTION	N/A

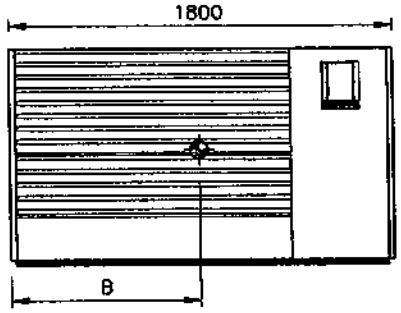




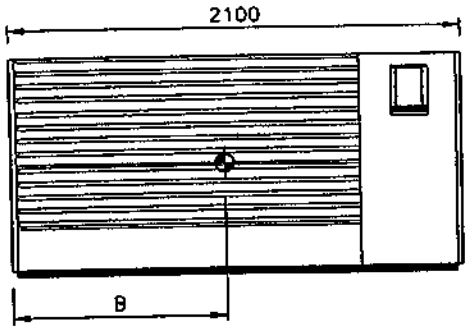
UC/DC 45



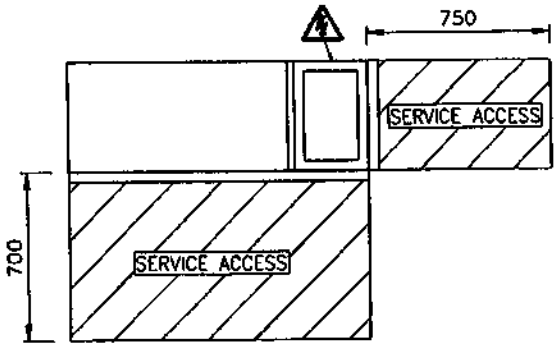
UC/DC 65

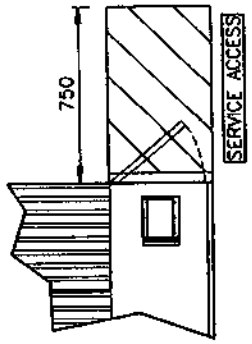


UC/DC 85



UC/DC 100





MODEL	UNIT WEIGHT (kg)	
	CW/X	A/W
UC/DC 45	220	240
UC/DC 65	240	265
UC/DC 85	275	310
UC/DC 100	315	355

MODEL	DIMENSION 'B' (MM)	
	CW/X	A/W
UC/DC 45	565	710
UC/DC 65	640	820
UC/DC 85	875	1095
UC/DC 100	1005	1270

MODEL	DIMENSION 'C' (MM)	
	CW/X	A/W
UC/DC 45	585	460
UC/DC 65	515	420
UC/DC 85	525	440
UC/DC 100	490	420

CONNECTION SIZES (A, W)				
MODEL	A		W	
	LIQUID	DISCHARGE	WATER IN	WATER OUT
UC/DC 45	ø3/8"	ø1/2"	ø28mm	ø28mm
UC/DC 65	ø1/2"	ø3/4"	ø28mm	ø28mm
UC/DC 85	ø1/2"	ø3/4"	ø28mm	ø28mm
UC/DC 100	ø1/2"	ø3/4"	ø28mm	ø28mm

CONNECTION SIZES (CW, X)				
MODEL	CW		X	
	WATER IN	WATER OUT	LIQUID	SUCTION
UC/DC 45	ø28mm	ø28mm	ø3/8"	ø3/4"
UC/DC 65	ø28mm	ø28mm	ø1/2"	ø7/8"
UC/DC 85	ø28mm	ø28mm	ø1/2"	ø1-1/8"
UC/DC 100	ø35mm	ø35mm	ø1/2"	ø1-1/8"

GENERAL DETAILS

ALL DIMENSIONS IN MILLIMETRES.
TOLERANCE ON ALL DIMENSIONS ±5mm.
ELECTRICAL SUPPLY INTO R/H END SERVICE SECTION.

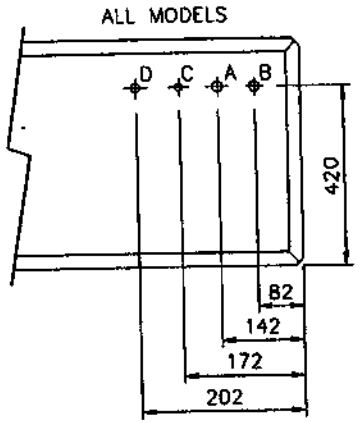
⌖ CENTRE OF GRAVITY

ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

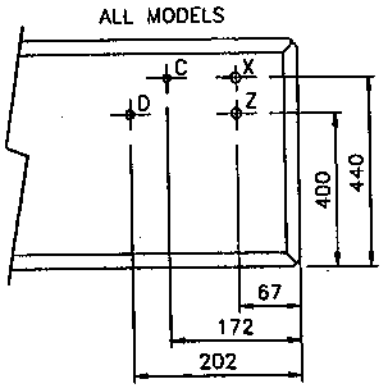
DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY		N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE			
1	FIRST ISSUE	1555	RS	1/2/95	CHECKED		'M' RANGE UNITS INSTALLATION INFORMATION			
PRELIMINARY	PRE-PROD	STANDARD ☒	SCALE	N.T.S.	APPROVED		Denco HEREFORD ENGLAND			
LOCATION	I:\MAHU\337C342	APPL. UNITS	MAHU UC/DC 45 – 100		DATE	1/2/95	DRG. No.	10337-C-342	REV	1

PROJECTION	N/A

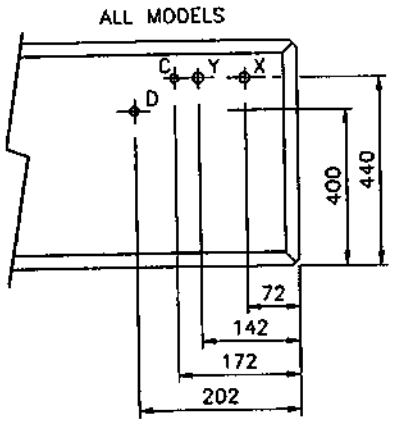
'M' RANGE 'CW' TYPE UNITS



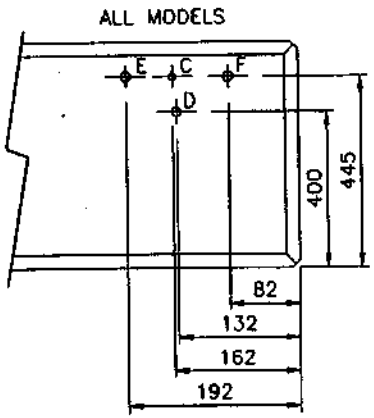
'M' RANGE 'A' TYPE UNITS



'M' RANGE 'X' TYPE UNITS



'M' RANGE 'W' TYPE UNITS



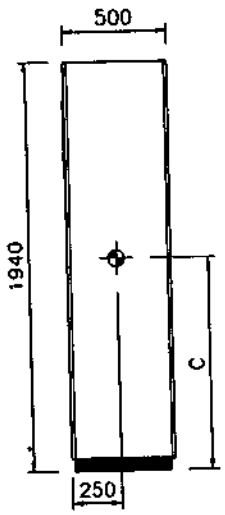
CONNECTION DETAILS

A – CHILLED WATER IN
B – CHILLED WATER OUT
C – HUMIDIFIER FEED TERMINATED IN 15mm
D – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm
E – COOLING WATER IN
F – COOLING WATER OUT
X – LIQUID IN
Y – SUCTION
Z – DISCHARGE

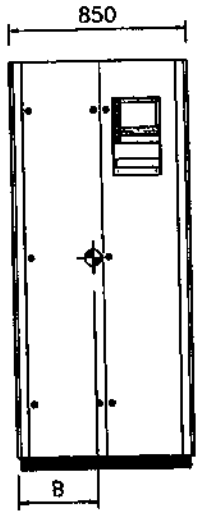
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY		N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE			
1	FIRST ISSUE	N/A	RS	3/2/95	CHECKED		'M' RANGE UNITS INSTALLATION INFORMATION CONNECTION DETAILS	Denco	HEREFORD ENGLAND	
PRELIMINARY	PRE-PROD	STANDARD	X	SCALE	N.T.S.	APPROVED				
LOCATION	I:\MAHU\337C343	APPL. UNITS	MAHU UC/DC 45 – 100		DATE	03/02/95		DRG. No.	10337-C-343	REV 1

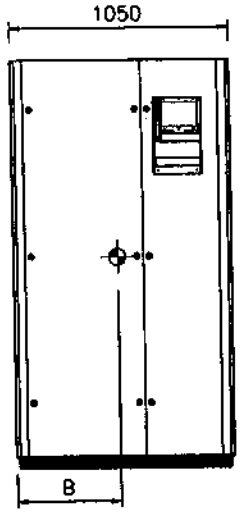
PROJECTION	N/A



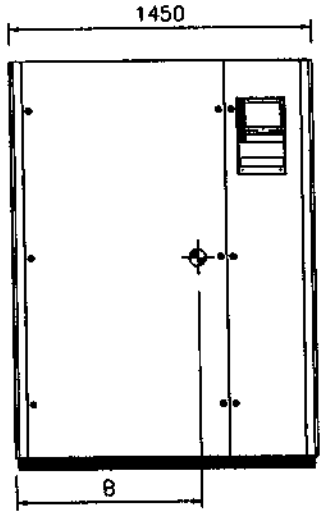
UC/DC



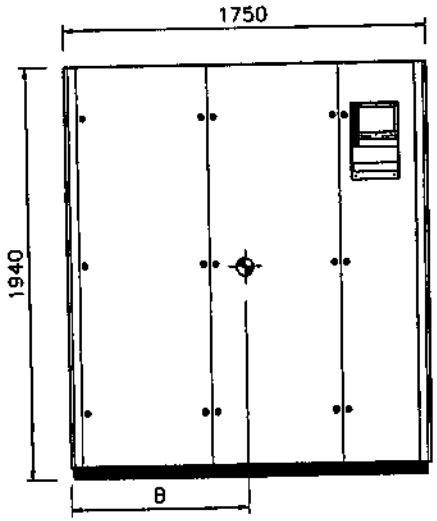
UC/DC 46



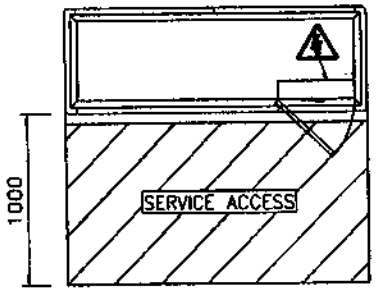
UC/DC 66



UC/DC 86



DC 101



CONNECTION SIZES (CW, X)				
MODEL	CW		X	
	WATER IN	WATER OUT	LIQUID	SUCTION
UC/DC46	ø28mm	ø28mm	ø3/8"	ø3/4"
UC/DC66	ø28mm	ø28mm	ø1/2"	ø7/8"
UC/DC86	ø28mm	ø28mm	ø1/2"	ø1-1/8"
UC/DC101	ø35mm	ø35mm	ø1/2"	ø1-1/8"

CONNECTION SIZES (A, W)				
MODEL	A		W	
	LIQUID	DISCHARGE	WATER IN	WATER OUT
UC/DC46	ø3/8"	ø1/2"	ø28mm	ø28mm
UC/DC66	ø1/2"	ø3/4"	ø28mm	ø28mm
UC/DC86	ø1/2"	ø3/4"	ø28mm	ø28mm
UC/DC101	ø1/2"	ø3/4"	ø28mm	ø28mm

MODEL	UNIT WEIGHT (kg)	
	CW/X	A/W
UC/DC46	220	240
UC/DC66	240	265
UC/DC86	275	310
UC/DC101	315	355

MODEL	DIMENSION 'C' (MM)	
	CW/X	A/W
UC/DC46	1100	820
UC/DC66	1060	760
UC/DC86	1070	800
UC/DC101	1045	780

MODEL	DIMENSION 'B' (MM)	
	CW/X	A/W
UC/DC46	470	390
UC/DC66	575	420
UC/DC86	795	750
UC/DC101	950	930

GENERAL DETAILS

ALL DIMENSIONS IN MILLIMETRES.
TOLERANCE ON ALL DIMENSIONS ±5mm.
ELECTRICAL SUPPLY INTO R/H END SERVICE SECTION.

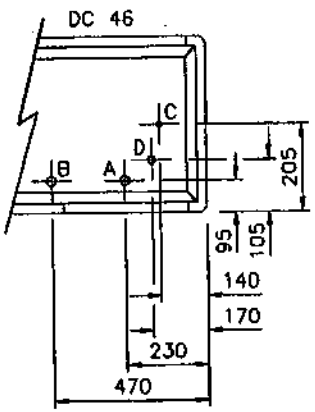
⌖ CENTRE OF GRAVITY

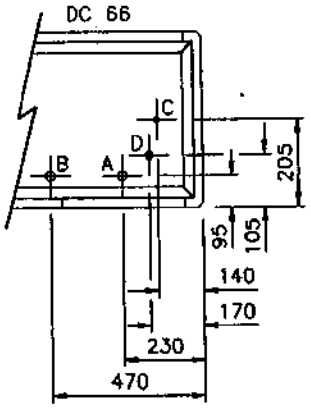
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

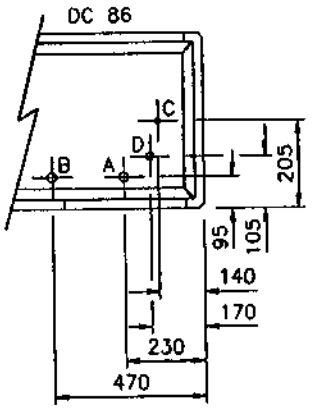
DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY		N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION		DA No.	INIT	DATE	DRAWN	RS	TITLE			
1	FIRST ISSUE		1555	RS	31/1/95	CHECKED		'TM' RANGE UNITS INSTALLATION INFORMATION			
PRELIMINARY		PRE-PROD		STANDARD	X	SCALE	N.T.S.	APPROVED		Denco HEREFORD ENGLAND	
LOCATION	I:\TMR\359C412	APPL. UNITS	TMR 46 – 101			DATE	31/01/95	DRG. No.	10359-C-412	REV	1

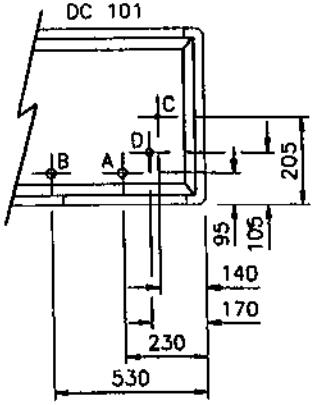
PROJECTION	N/A

'TM' RANGE 'CW' TYPE UNITS

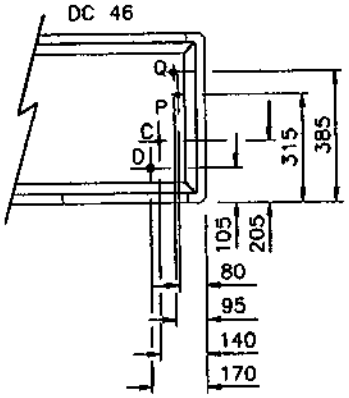


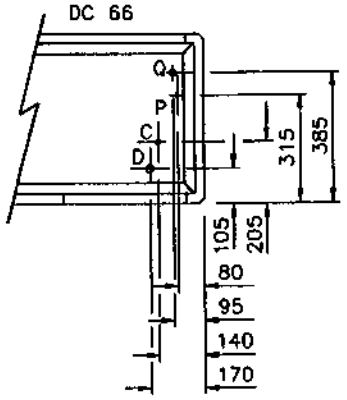


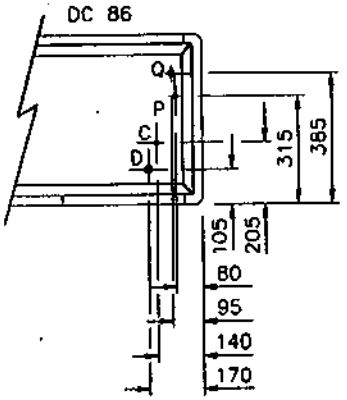


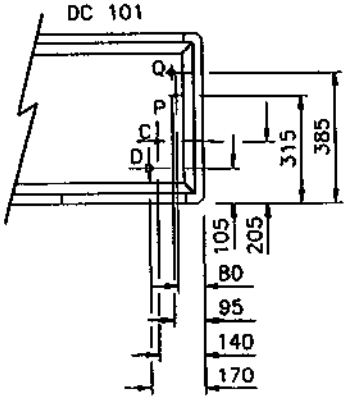


'TM' RANGE 'X' TYPE UNITS









CONNECTION DETAILS

A – CHILLED WATER IN
B – CHILLED WATER OUT
C – HUMIDIFIER FEED TERMINATED IN 15mm
D – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm

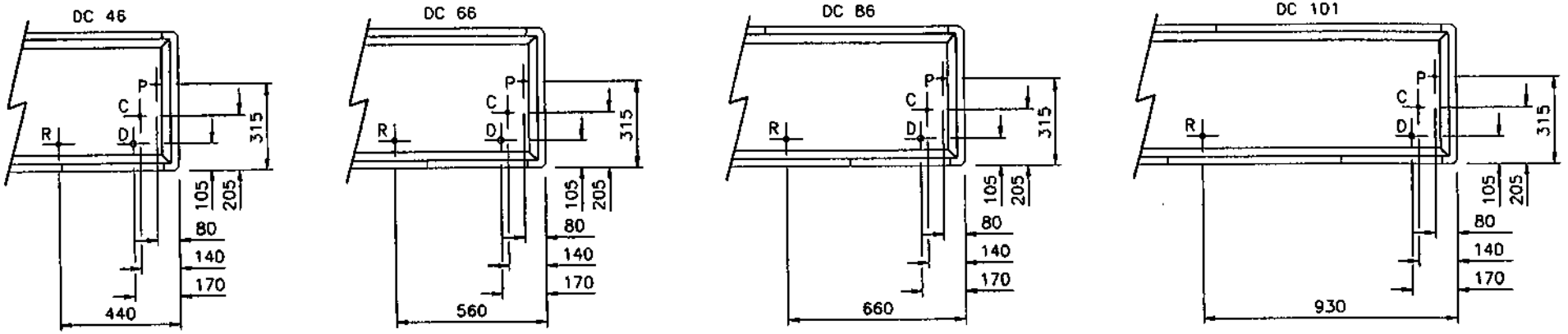
P – LIQUID IN
Q – SUCTION

ALL TOLERANCES AS W.I. G40D4/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

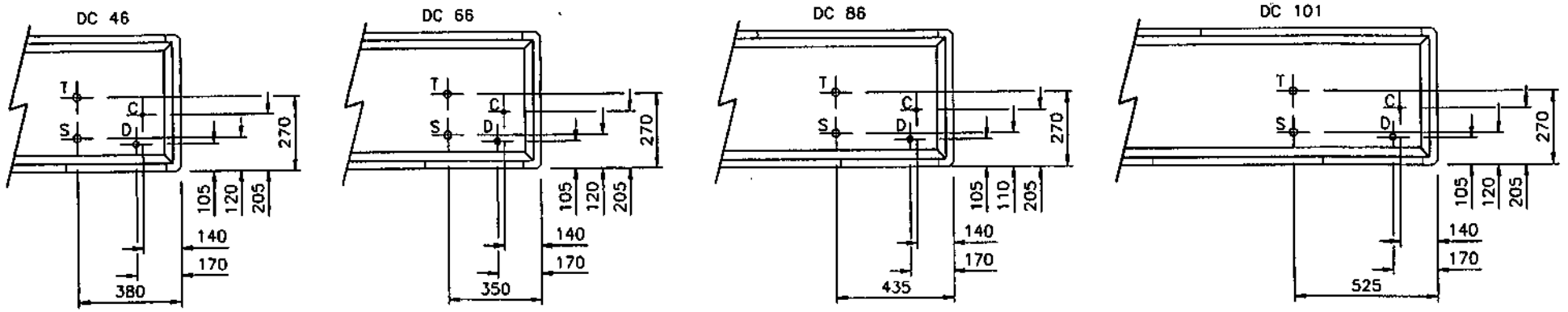
DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY		N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE			
1	FIRST ISSUE	1555	RS	1/2/95	CHECKED		DC 'TM' RANGE UNITS INSTALLATION INFORMATION CONNECTION DETAILS (CW & X)	Denco		HEREFORD ENGLAND
PRELIMINARY	PRE-PROD	STANDARD ☒	SCALE	N.T.S.	APPROVED					
LOCATION	I:\TMR\359C413	APPL. UNITS	TMR 46 – 101		DATE	01/02/95		DRG. No.	10359-C-413	REV 1

PROJECTION	N/A

'TM' RANGE 'A' TYPE UNITS



'TM' RANGE 'W' TYPE UNITS



CONNECTION DETAILS

C – HUMIDIFIER FEED TERMINATED IN 15mm
D – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm

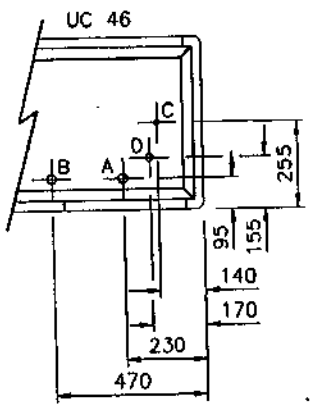
P – LIQUID IN
R – DISCHARGE
S – COOLING WATER IN
T – COOLING WATER OUT

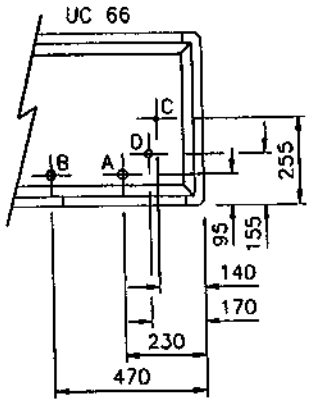
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

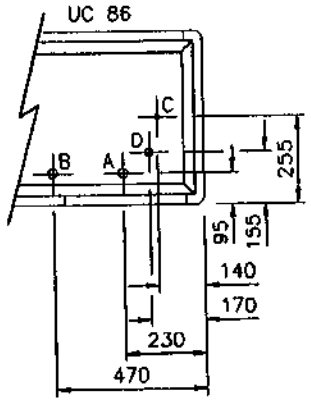
DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY		N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION		DA No.	INIT	DATE	DRAWN	RS	TITLE			
1	FIRST ISSUE		1555	RS	1/2/95	CHECKED		DC 'TM' RANGE UNITS INSTALLATION INFORMATION CONNECTION DETAILS (A & W)			
PRELIMINARY		PRE-PROD		STANDARD	X	SCALE	N.T.S.	APPROVED		Denco	HEREFORD ENGLAND
LOCATION	I:\TMR\359C414		APPL. UNITS	TMR 46 – 101		DATE	01/03/95	DRG. No.	10359-C-414	REV	1

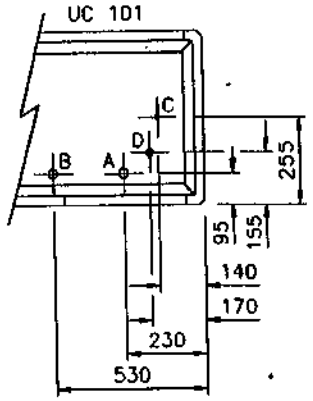
PROJECTION	N/A

'TM' RANGE 'CW' TYPE UNITS

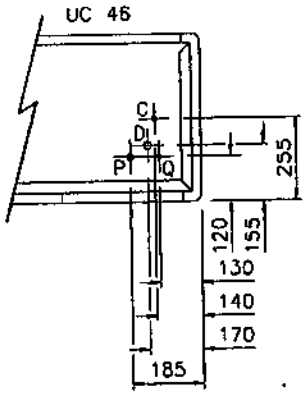


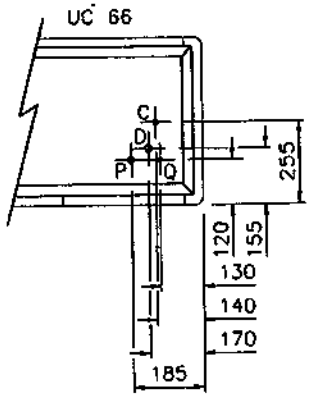


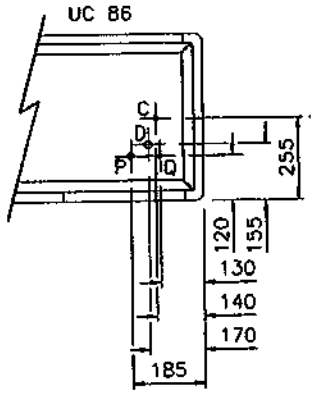


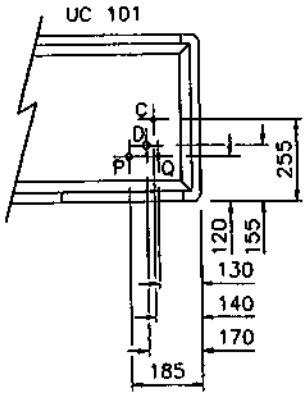


'TM' RANGE 'X' TYPE UNITS









CONNECTION DETAILS

A – CHILLED WATER IN
B – CHILLED WATER OUT
C – HUMIDIFIER FEED TERMINATED IN 15mm
D – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm

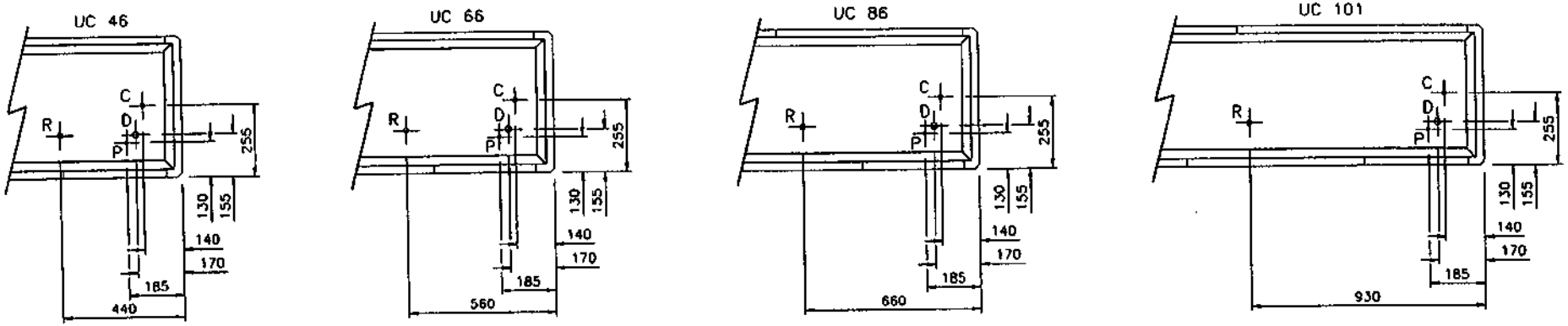
P – LIQUID IN
Q – SUCTION

ALL TOLERANCES AS W.I. C4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

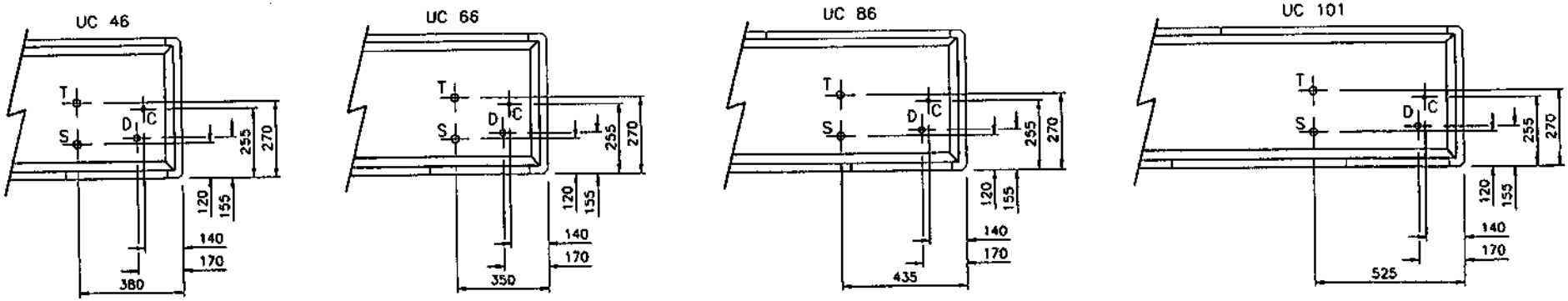
DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY		N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION		DA No.	INIT	DATE	DRAWN	MJR	TITLE: UC 'TM' RANGE UNITS INSTALLATION INFORMATION CONNECTION DETAILS (CW & X)	Denco HEREFORD ENGLAND		
1	FIRST ISSUE		1555	MJR	11/05/95	CHECKED					
PRELIMINARY		PRE-PROD	STANDARD	X	SCALE	N.T.S.	APPROVED		DRG. No.	10359-C-409	REV 1
LOCATION	I:\TMR\359C409		APPL. UNITS	TM RANGE UC46 – 101		DATE	10/05/95				

PROJECTION	N/A

'TM' RANGE 'A' TYPE UNITS



'TM' RANGE 'W' TYPE UNITS



CONNECTION DETAILS

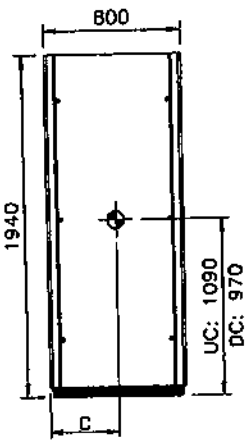
C – HUMIDIFIER FEED TERMINATED IN 15mm
D – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm

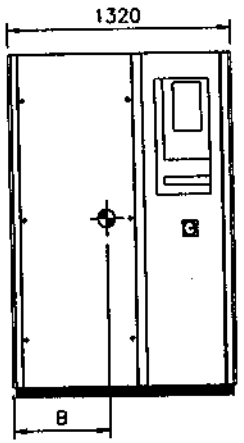
P – LIQUID IN
R – DISCHARGE
S – COOLING WATER IN
T – COOLING WATER OUT

ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

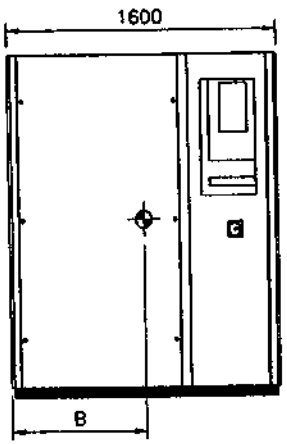
DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY	N/A	MATERIAL	N/A		STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	MJR	TITLE	Denco		HEREFORD ENGLAND	
1	FIRST ISSUE	N/A	MJR	10/05/95	CHECKED		UC 'TM' RANGE UNITS INSTALLATION INFORMATION CONNECTION DETAILS (A & W)				
PRELIMINARY	PRE-PROD	STANDARD ☒	SCALE	N.T.S.	APPROVED			DRG. No.	10359-C-410	REV	1
LOCATION	I:\TMR\359C410	APPL. UNITS	TM RANGE UC 46 – 101		DATE	10/05/95					

PROJECTION	N/A

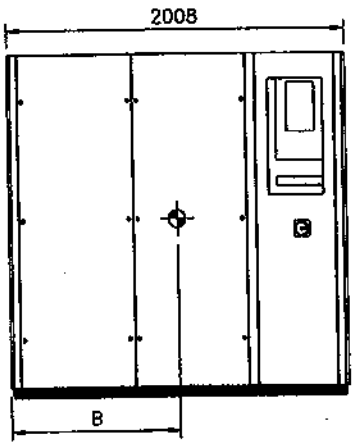




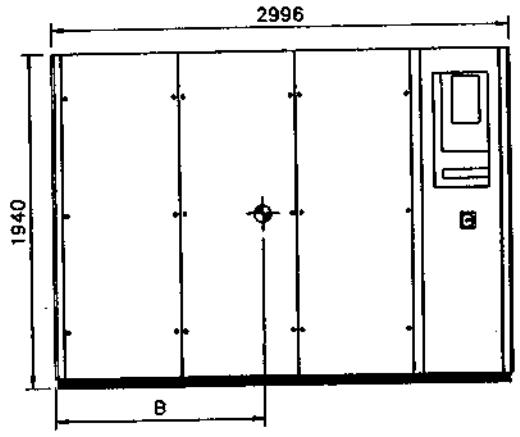
UC/DC 90



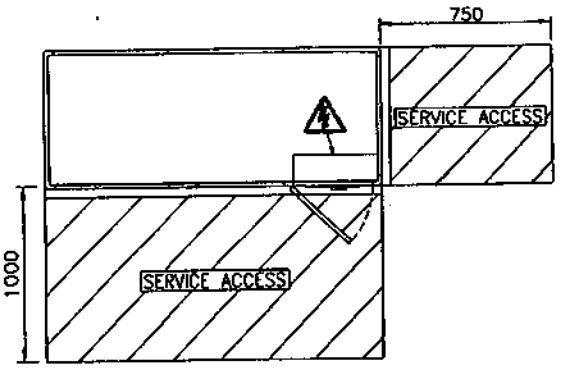
UC/DC 120/160



UC/DC 200/240



UC/DC 280/360



GENERAL DETAILS

ALL DIMENSIONS IN MILLIMETRES.
TOLERANCE ON ALL DIMENSIONS ±5mm.
ELECTRICAL SUPPLY INTO R/H END SERVICE SECTION.

⌖ CENTRE OF GRAVITY

CONNECTION SIZES (CW, X)				
MODEL	CW		X	
	WATER IN	WATER OUT	LIQUID	SUCTION
UC/DC90	ø28mm	ø28mm	ø1/2"	ø7/8"
UC/DC120	ø35mm	ø35mm	ø1/2"	ø7/8"
UC/DC160	ø35mm	ø35mm	ø1/2"	ø7/8"
UC/DC200	ø42mm	ø42mm	ø1/2"	ø1-1/8"
UC/DC240	ø42mm	ø42mm	ø5/8"	ø1-1/8"
UC/DC280	ø54mm	ø54mm	ø5/8"	ø1-1/8"
UC/DC360	ø54mm	ø54mm	ø5/8"	ø1-1/8"

CONNECTION SIZES (A, W)				
MODEL	A		W	
	LIQUID	DISCHARGE	WATER IN	WATER OUT
UC/DC90	ø1/2"	ø3/4"	ø28mm	ø28mm
UC/DC120	ø1/2"	ø3/4"	ø28mm	ø28mm
UC/DC160	ø1/2"	ø3/4"	ø28mm	ø28mm
UC/DC200	ø1/2"	ø3/4"	ø28mm	ø28mm
UC/DC240	ø5/8"	ø7/8"	ø28mm	ø28mm
UC/DC280	ø5/8"	ø7/8"	ø28mm	ø28mm
UC/DC360	ø5/8"	ø7/8"	ø42mm	ø42mm

MODEL	UNIT WEIGHT (kg)	
	CW/X	A/W
UC/DC90	320	430
UC/DC120	360	505
UC/DC160	375	520
UC/DC200	500	665
UC/DC240	525	725
UC/DC280	710	910
UC/DC360	780	985

MODEL	DIMENSION 'B' (MM)	
	CW/X	A/W
UC/DC90	545	765
UC/DC120	700	1015
UC/DC160	680	985
UC/DC200	890	1200
UC/DC240	860	1250
UC/DC280	1240	1755
UC/DC360	1200	1695

MODEL	DIMENSION 'C' (MM)	
	CW/X	A/W
UC/DC90	310	440
UC/DC120	310	440
UC/DC160	310	440
UC/DC200	310	440
UC/DC240	310	440
UC/DC280	310	440
UC/DC360	310	440

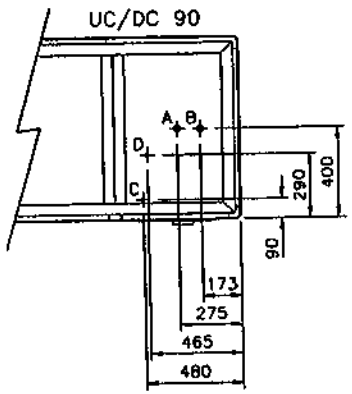
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION		DA No.	INIT	DATE	DRAWN	MJR	TITLE	Denco	HEREFORD ENGLAND
1	FIRST ISSUE		1555	MJR	24/01/95	CHECKED		SERIES 3 UNITS INSTALLATION INFORMATION		
PRELIMINARY		PRE-PROD		STANDARD	X	SCALE	N.T.S.	APPROVED		DRG. No. 10329-C-1255 REV 1
LOCATION	I:\S3329\329C1255		APPL. UNITS	SERIES 3 UC/DC 90 – 360		DATE	24/01/95			

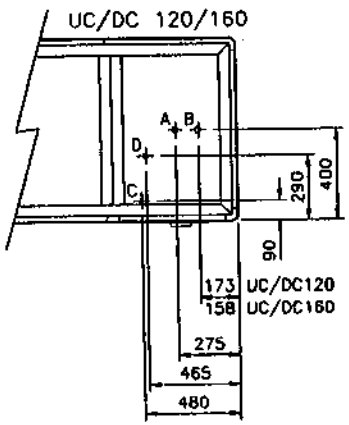
PROJECTION	N/A

SERIES 3 CHILLED WATER UNITS

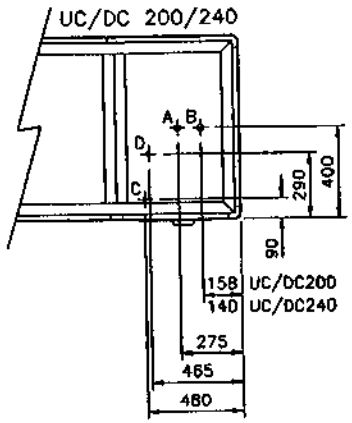
UC/DC 90



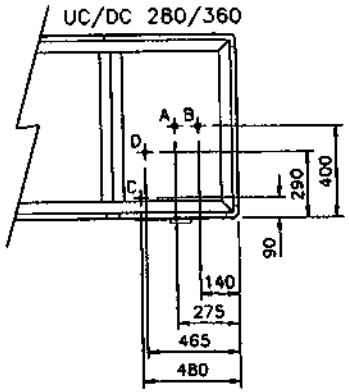
UC/DC 120/160



UC/DC 200/240

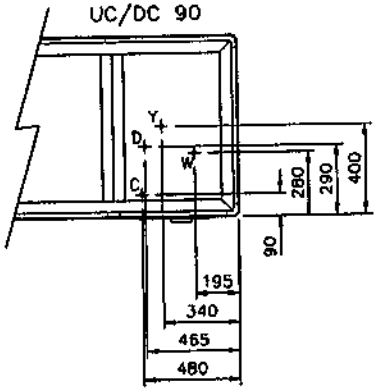


UC/DC 280/360

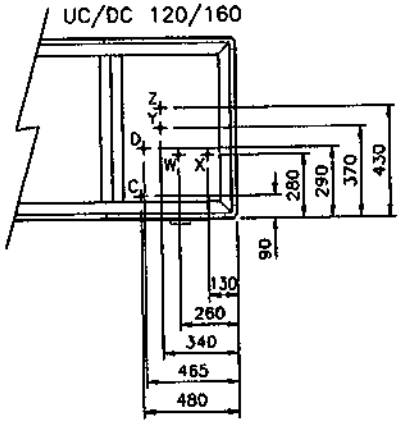


SERIES 3 'X' TYPE UNITS

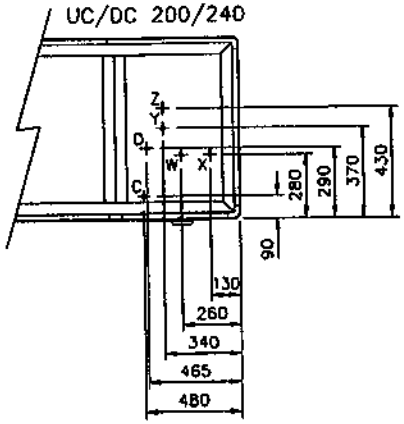
UC/DC 90



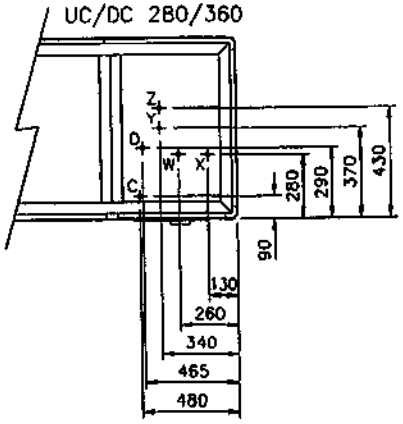
UC/DC 120/160



UC/DC 200/240



UC/DC 280/360



CONNECTION DETAILS

A – CHILLED WATER IN
B – CHILLED WATER OUT
C – HUMIDIFIER FEED TERMINATED IN 15mm
D – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm

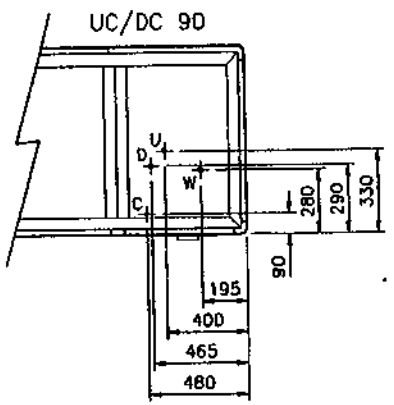
W & X – LIQUID IN
Y & Z – SUCTION

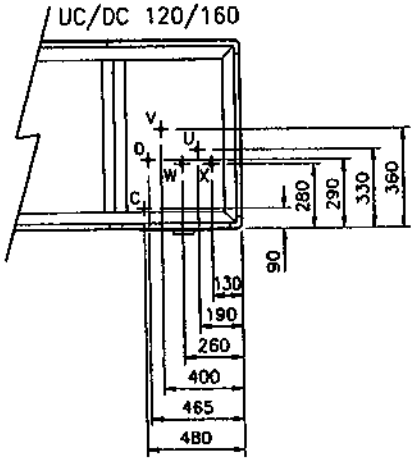
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

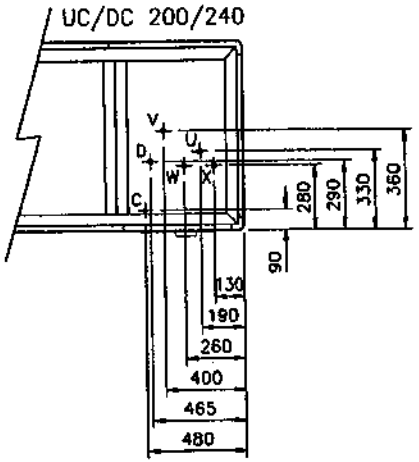
DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE		
1	FIRST ISSUE	1555	MJR	25/01/95	CHECKED		SERIES 3 UNITS INSTALLATION INFORMATION CONNECTION DETAILS (CW & X)		
PRELIMINARY	PRE-PROD	STANDARD	SCALE	N.T.S.	APPROVED		Denco HEREFORD ENGLAND		
LOCATION	I:\S3329\329C1256	APPL. UNITS	SERIES 3 UC/DC 90 – 360	DATE	25/01/95		DRG. No.	10329–C–1256	REV 1

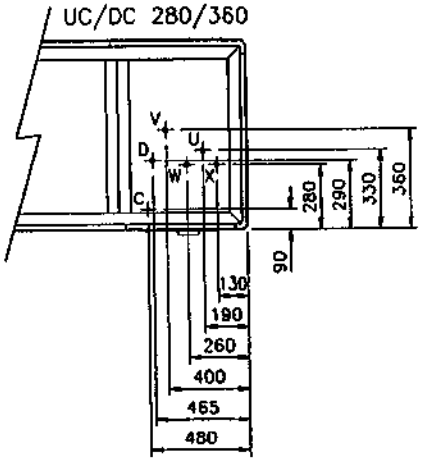
PROJECTION	N/A

SERIES 3 'A' TYPE UNITS

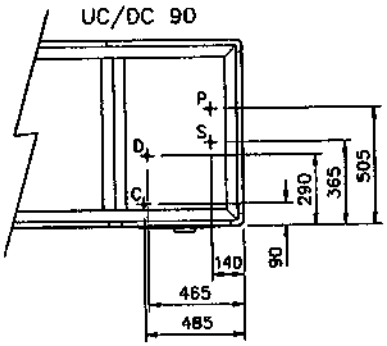


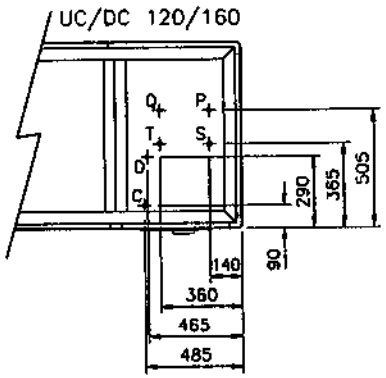


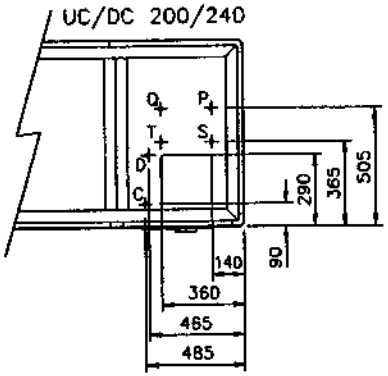


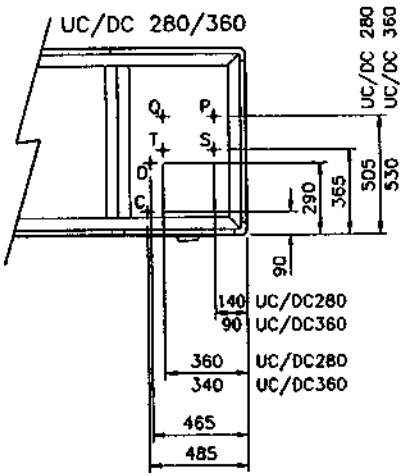


SERIES 3 'W' TYPE UNITS









CONNECTION DETAILS

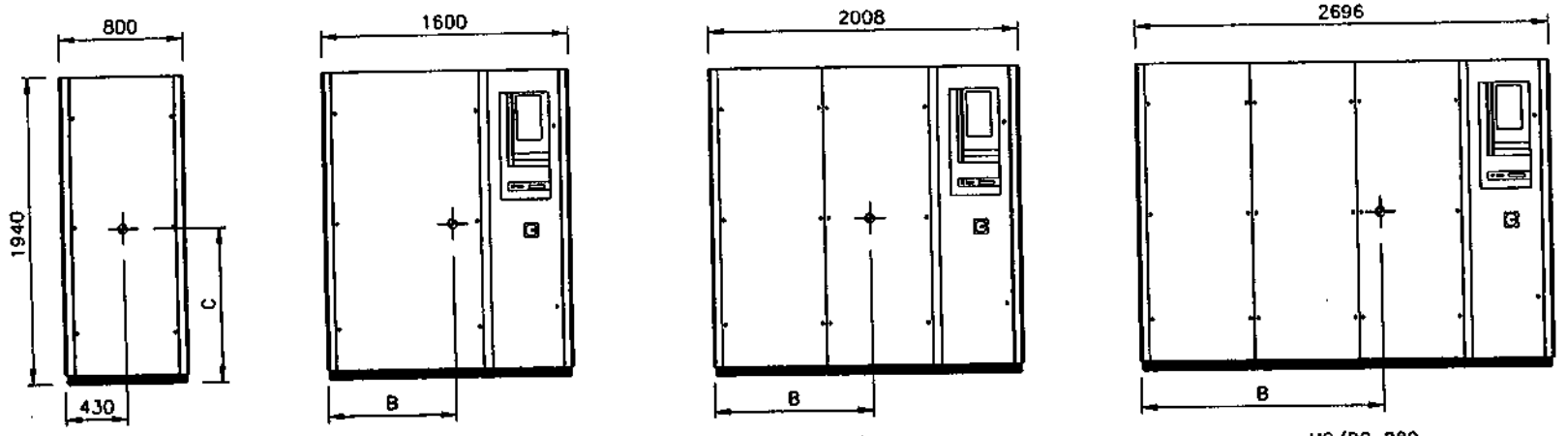
C – HUMIDIFIER FEED TERMINATED IN 15mm
D – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm

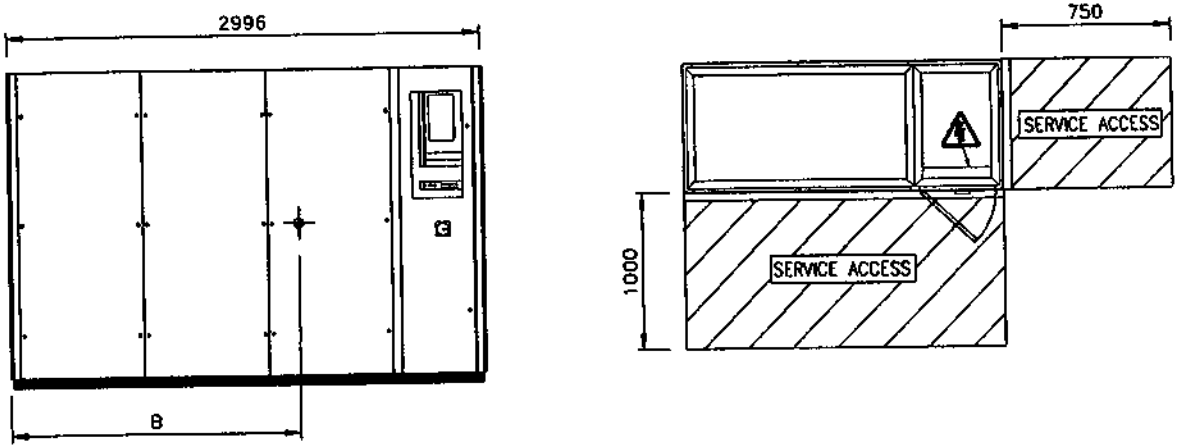
P & Q – COOLING WATER IN
S & T – COOLING WATER OUT
U & V – DISCHARGE
W & X – LIQUID IN

ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE	Denco	HEREFORD ENGLAND
1	FIRST ISSUE	1555	MJR	25/01/95	CHECKED		SERIES 3 UNITS INSTALLATION INFORMATION CONNECTION DETAILS (A & W)		
PRELIMINARY	PRE-PROD	STANDARD ☒	SCALE	N.T.S.	APPROVED			DRG. No.	10329-C-1257 REV 1
LOCATION	I:\S3329\329C1257	APPL. UNITS	SERIES 3 UC/DC 90 – 360	DATE	25/01/95				

PROJECTION	N/A





CONNECTION SIZES (F)		
MODEL	F	
	IN	OUT
UC/DC120	ø35	ø35
UC/DC200	ø42	ø42
UC/DC280	ø54	ø54
UC/DC380	ø54	ø54

MODEL	DIMENSION 'C' (MM) F	MODEL	DIMENSION 'C' (MM) F
UC 120	955	DC 120	1005
UC 200	970	DC 200	1005
UC 280	995	DC 280	1000
UC 380	1065	DC 380	1015

MODEL	DIMENSION 'B' (MM) F	MODEL	DIMENSION 'B' (MM) F
UC 120	900	DC 120	930
UC 200	1140	DC 200	1120
UC 280	1575	DC 280	1555
UC 380	1775	DC 380	1730

MODEL	UNIT WEIGHT (kg) F	MODEL	UNIT WEIGHT (kg) F
UC 120	550	DC 120	570
UC 200	740	DC 200	760
UC 280	1010	DC 280	1035
UC 380	1090	DC 380	1120

GENERAL DETAILS

ALL DIMENSIONS IN MILLIMETRES.
TOLERANCE ON ALL DIMENSIONS ±5mm.
ELECTRICAL SUPPLY INTO R/H END SERVICE SECTION.

⊕ CENTRE OF GRAVITY

ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE			
1	FIRST ISSUE	1555	RS	27/02/95	CHECKED		SERIES 3 (AMBICOOL) UNITS INSTALLATION INFORMATION			
PRELIMINARY	PRE-PROD	STANDARD ☒	SCALE	N.T.S.	APPROVED					
LOCATION	I:\S3329\329C1258	APPL. UNITS	S3 AMBICOOL UC/DC 120-380		DATE	27/02/95				

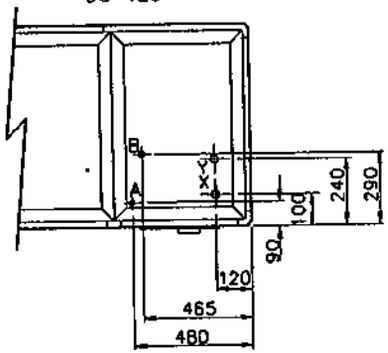
Denco HEREFORD ENGLAND

DRG. No. 10329-C-1258 REV 1

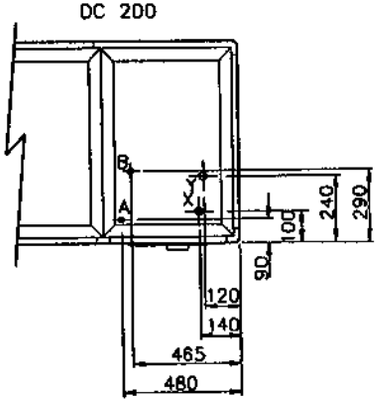
PROJECTION	N/A

SERIES 3 AMBICOOL 'F' TYPE UNITS

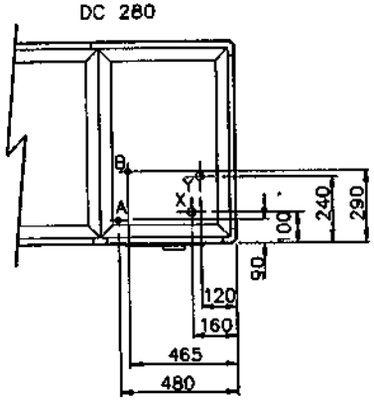
DC 120



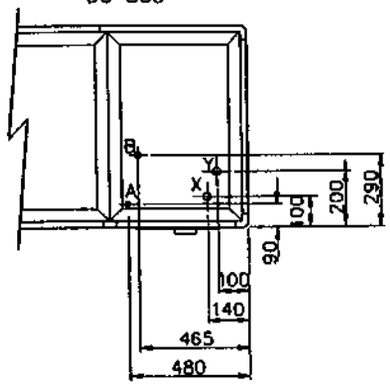
DC 200



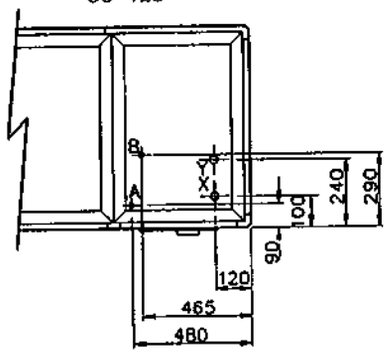
DC 280



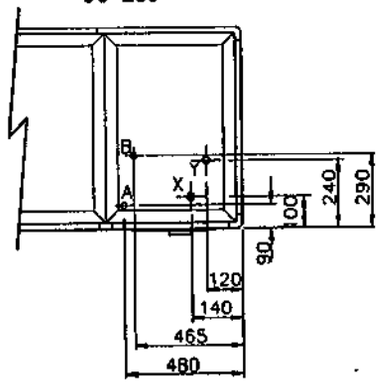
DC 380



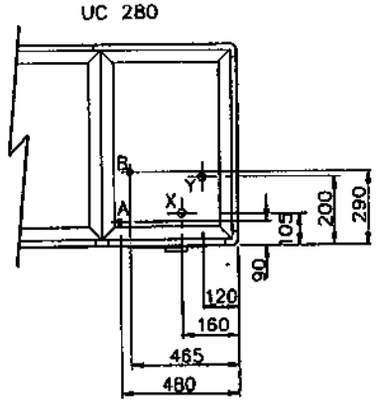
UC 120



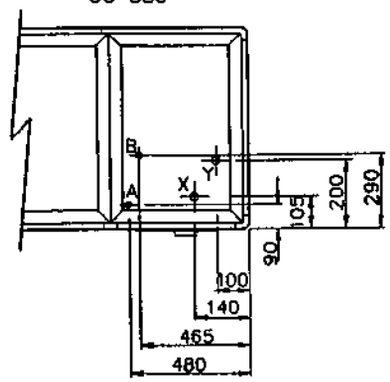
UC 200



UC 280



UC 380



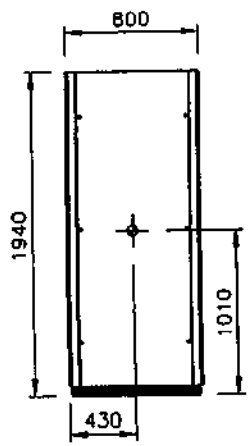
CONNECTION DETAILS

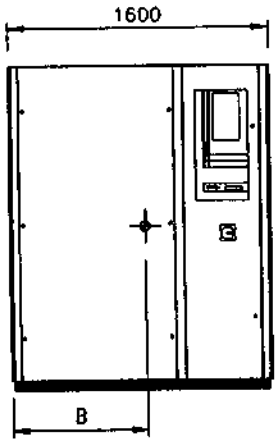
A – HUMIDIFIER TERMINATED IN 15mm
B – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm
X – WATER IN
Y – WATER OUT

ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

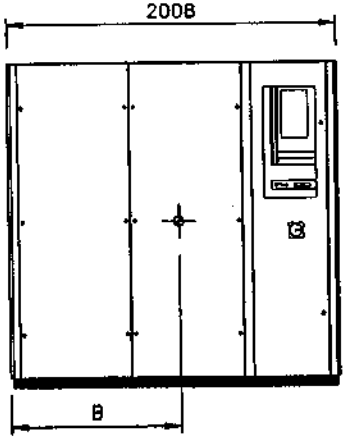
DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY		N/A	MATERIAL	N/A		STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION		DA No.	INIT	DATE	DRAWN	RS	TITLE	Denco		HEREFORD ENGLAND	
1	FIRST ISSUE		1555	RS	28/2/95	CHECKED		SERIES 3 (AMBICOOL) UNITS INSTALLATION INFORMATION CONNECTION DETAILS				
PRELIMINARY		PRE-PROD		STANDARD	X	SCALE	N.T.S.	APPROVED				
LOCATION	I:\S3329\329C1259		APPL. UNITS	S3 AMBICOOL UC/DC 120-380		DATE	28/02/95		DRG. No.	10329-C-1259	REV	1

PROJECTION	N/A

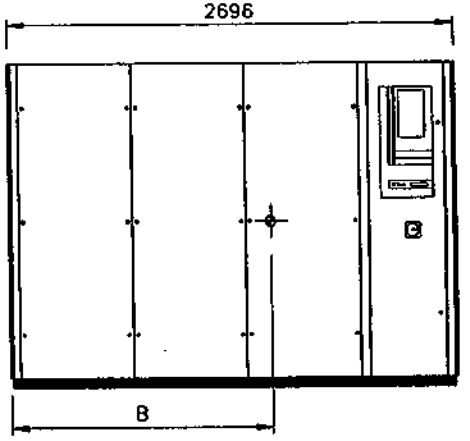




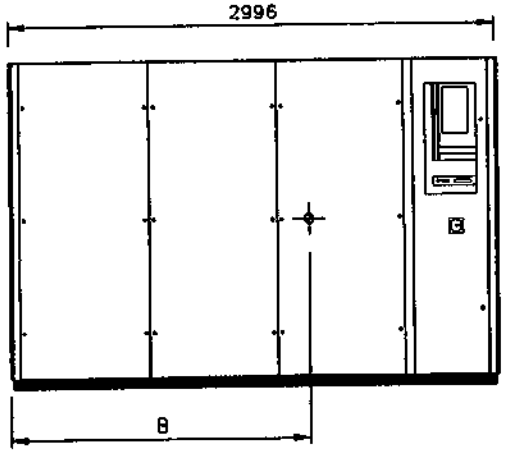
UC/DC 120



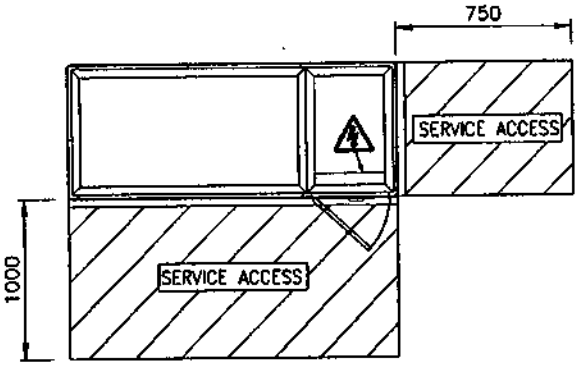
UC/DC 200



UC/DC 280



UC/DC 380



MODEL	DIMENSION "B" mm	
	X	A
UC/DC 120	650	915
UC/DC 200	840	1115
UC/DC 280	1190	1465
UC/DC 380	1350	1665

MODEL	UNIT WEIGHT (kg)	
	X	A
UC/DC 120	480	550
UC/DC 200	660	740
UC/DC 280	880	1010
UC/DC 380	950	1090

CONNECTION SIZES (CW, X)				
MODEL	CW		X	
	WATER IN	WATER OUT	LIQUID	SUCTION
UC/DC 120	ø35mm	ø35mm	ø1/2"	ø7/8"
UC/DC 200	ø42mm	ø42mm	ø1/2"	ø1-1/8"
UC/DC 280	ø54mm	ø54mm	ø5/8"	ø1-1/8"
UC/DC 380	ø54mm	ø54mm	ø5/8"	ø1-1/8"

CONNECTION SIZES		
MODEL	A	
	LIQUID	DISCHARGE
UC/DC 120	ø1/2"	ø3/4"
UC/DC 200	ø1/2"	ø3/4"
UC/DC 280	ø5/8"	ø7/8"
UC/DC 380	ø5/8"	ø7/8"

GENERAL DETAILS

ALL DIMENSIONS IN MILLIMETRES.
TOLERANCE ON ALL DIMENSIONS ±5mm.
ELECTRICAL SUPPLY INTO R/H END SERVICE SECTION.

⊕ CENTRE OF GRAVITY

ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A

REV	DESCRIPTION	DA No.	INIT	DATE
1	FIRST ISSUE	1555	RS	28/2/95

DRAWN	RS
CHECKED	
APPROVED	
DATE	28/02/95

PRELIMINARY		PRE-PROD		STANDARD	X	SCALE	N.T.S.

LOCATION	I:\S3329\329C1260	APPL. UNITS	S3 COMBICOOL UC/DC 120-380

TITLE
SERIES 3 (COMBICOOL)
UNITS INSTALLATION
INFORMATION

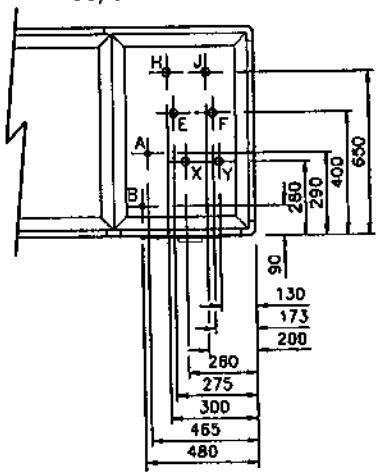
Denco HEREFORD ENGLAND

DRG. No.	10329-C-1260	REV 1

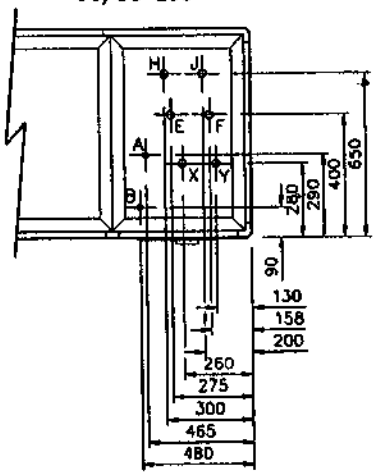
PROJECTION	N/A

SERIES 3 COMBICOOL 'X' TYPE UNITS

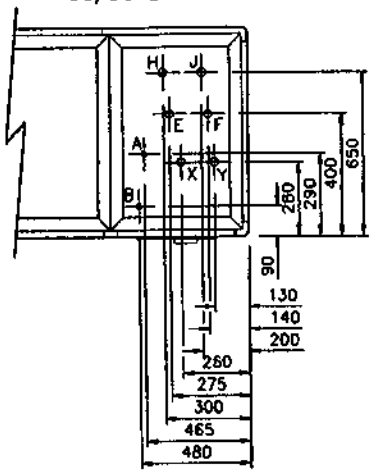
UC/DC 120



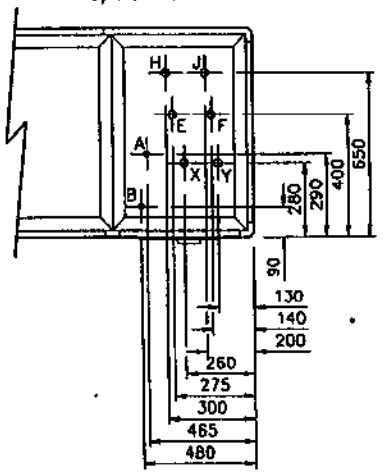
UC/DC 200



UC/DC 280

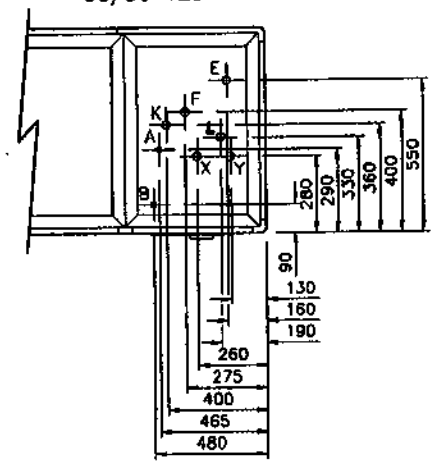


UC/DC 380

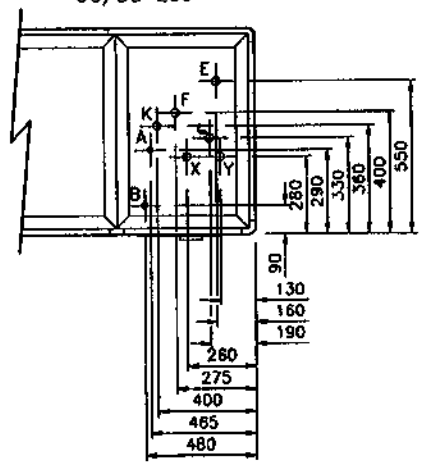


SERIES 3 COMBICOOL 'A' TYPE UNITS

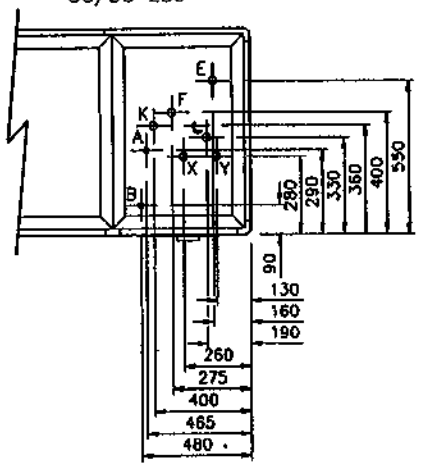
UC/DC 120



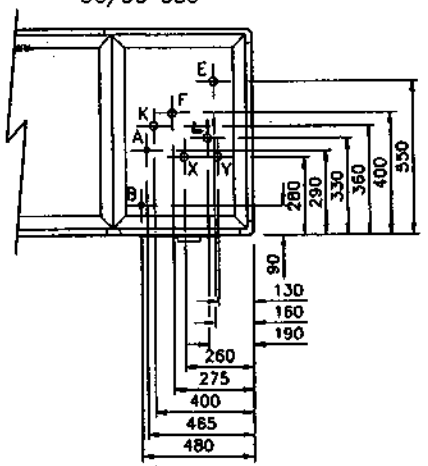
UC/DC 200



UC/DC 280



UC/DC 380



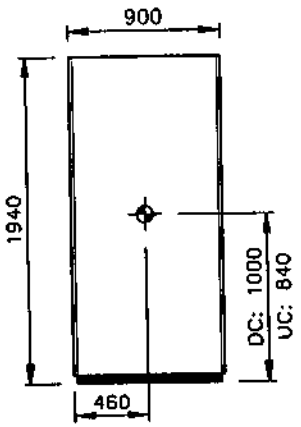
CONNECTION DETAILS

A – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm
B – HUMIDIFIER FEED TERMINATED IN 15mm
E – CHILLED WATER IN
F – CHILLED WATER OUT
H & J – SUCTION
X & Y – LIQUID
K & L – DISCHARGE

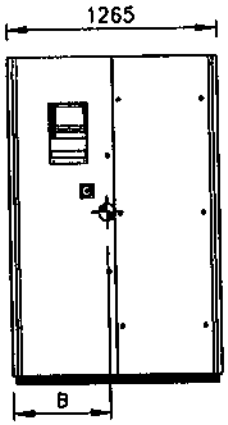
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

DO NOT SCALE – REFER TO DRAWING OFFICE		QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE	Denco	HEREFORD ENGLAND
1	FIRST ISSUE	1555	RS	2/3/95	CHECKED		SERIES 3 (COMBICOOL) UNITS INSTALLATION INFORMATION CONNECTION DETAILS		
PRELIMINARY	PRE-PROD	STANDARD	SCALE	N.T.S.	APPROVED			DRG. No.	10329-C-1261 REV 1
LOCATION	I:\S3329\329C1261	APPL. UNITS	S3 COMBICOOL UC/DC 120-380	DATE	01/03/95				

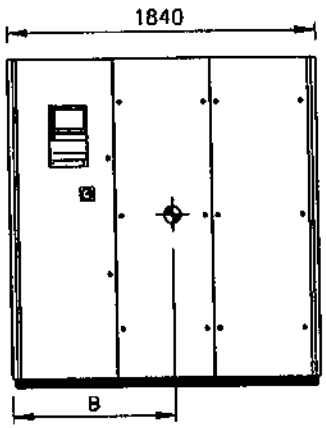
PROJECTION	N/A



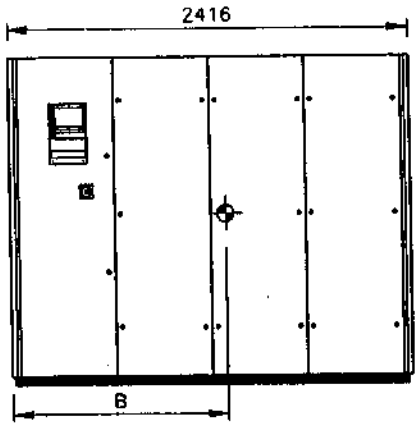
UC/DC



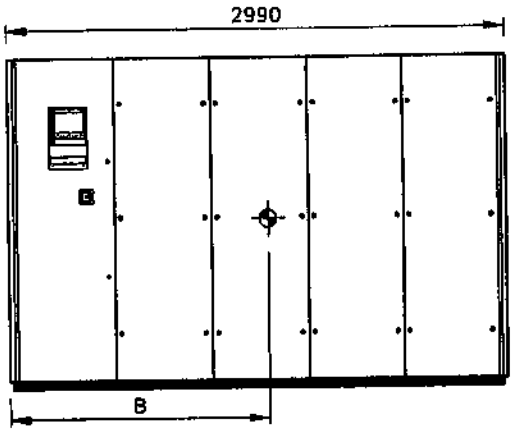
UC/DC 135/140



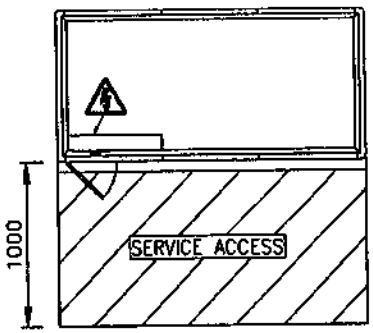
UC/DC 255/260



UC/DC 415/420



UC/DC 555/560



CONNECTION SIZES (CW)		
MODEL	CW	
	WATER IN	WATER OUT
UC/DC 135	ø35mm	ø35mm
UC/DC 140	ø35mm	ø35mm
UC/DC 255	ø42mm	ø42mm
UC/DC 260	ø42mm	ø42mm
UC/DC 415	ø54mm	ø54mm
UC/DC 420	ø54mm	ø54mm
UC/DC 555	ø54mm	ø54mm
UC/DC 560	ø54mm	ø54mm

UNIT WEIGHT (kg)			
MODEL	CW	MODEL	CW
UC 135	375	DC 135	395
UC 140	380	DC 140	400
UC 255	545	DC 255	565
UC 260	550	DC 260	570
UC 415	790	DC 415	820
UC 420	800	DC 420	830
UC 555	940	DC 555	980
UC 560	950	DC 560	990

MODEL	DIMENSION 'B' (mm)
UC/DC 135	580
UC/DC 140	580
UC/DC 255	855
UC/DC 260	855
UC/DC 415	1120
UC/DC 420	1120
UC/DC 555	1400
UC/DC 560	1400

GENERAL DETAILS

ALL DIMENSIONS IN MILLIMETRES.
TOLERANCE ON ALL DIMENSIONS ±5mm.
ELECTRICAL SUPPLY INTO L/H END OF UNIT.

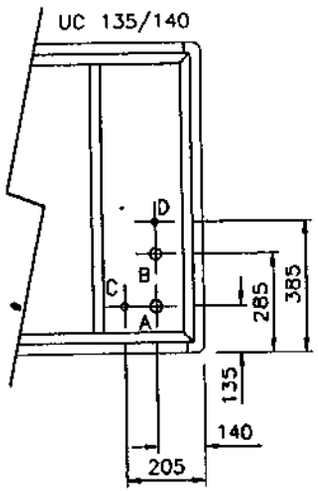
⊕ CENTRE OF GRAVITY

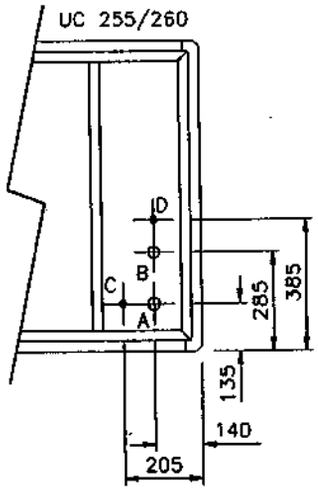
ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

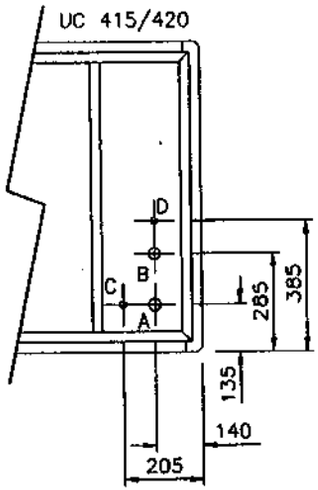
DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY	N/A	MATERIAL	N/A	STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION	DA No.	INIT	DATE	DRAWN	RS	TITLE			
1	FIRST ISSUE	1555	RS	2/1/95	CHECKED		FSCW UNITS INSTALLATION INFORMATION			
PRELIMINARY	PRE-PROD	STANDARD ☒	SCALE	N.T.S.	APPROVED		Denco HEREFORD ENGLAND			
LOCATION	I:\FSCW\364C404	APPL. UNITS	FSCW 135 – 560		DATE	02/01/95	DRG. No.	10364-C-404	REV	1

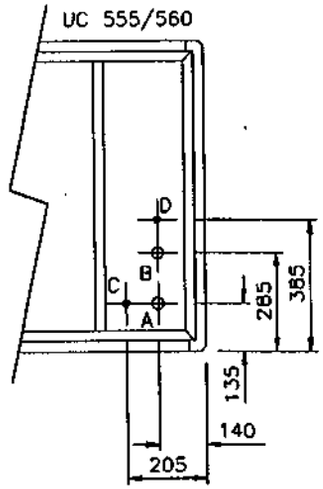
PROJECTION	N/A

FRONT SERVICE UC 'CW' TYPE UNITS

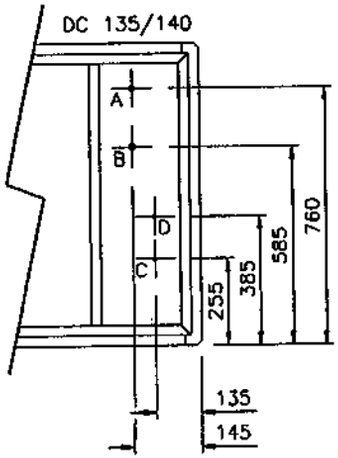


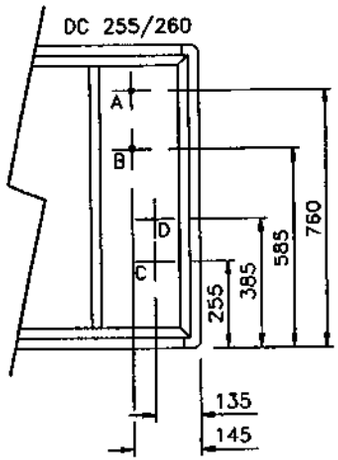


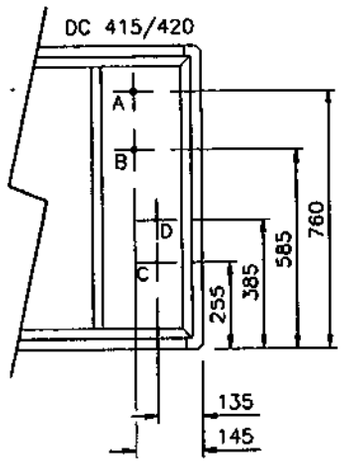


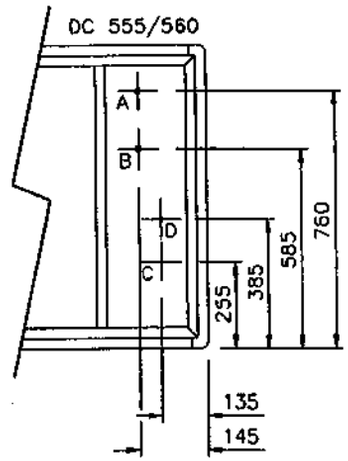


FRONT SERVICE DC 'CW' TYPE UNITS









CONNECTION DETAILS

A – CHILLED WATER IN
B – CHILLED WATER OUT
C – HUMIDIFIER FEED TERMINATED IN 15mm
D – HUMIDIFIER DRAIN AND/OR CONDENSATE DRAIN TERMINATED IN 22mm

ALL TOLERANCES AS W.I. G4004/12 UNLESS OTHERWISE STATED – IF IN DOUBT ASK

DO NOT SCALE – REFER TO DRAWING OFFICE			QUANTITY		N/A	MATERIAL	N/A		STOCK CODE No.	N/A	TOOL No.	N/A
REV	DESCRIPTION		DA No.	INIT	DATE	DRAWN	RS	TITLE				
1	FIRST ISSUE		1555	RS	2/1/95	CHECKED		FSCW UNITS INSTALLATION INFORMATION CONNECTION DETAILS		Denco HEREFORD ENGLAND		
PRELIMINARY		PRE-PROD		STANDARD	X	SCALE	N.T.S.	APPROVED				
LOCATION	I:\FSCW\364C405		APPL. UNITS	FSCW 135 – 560		DATE	02/01/95			DRG. No.	10364-C-405	REV 1

Notes

Denco Limited - General Information

The first choice in Close Control Air Conditioning

For over 30 years Denco have been a market leader in design, manufacture and installation of air conditioning for close control environments.

Denco products incorporate the very latest in environmental and energy saving technology. Applications include computer rooms, telephone exchanges, clean rooms - anywhere that a requirement exists for precise control of air temperature, relative humidity and filtration.

Denco engineers, and overseas distributors, have the skill and experience to arrive at the most suitable and cost effective solutions to meet your needs and will willingly assist with the selection of equipment for any project.

The Quality

These units are designed and built to BS EN ISO 9001 Quality Standards, using our unrivalled experience in close control air conditioning, with extensive testing of components and complete systems. Every aspect is engineered to ensure maximum reliability, economy of operation and long working life, together with ease of installation and maintenance.

Your Denco Distributor is :

Denco Service Network

The Denco Field Services organisation offers a nationwide service network 24 hours a day, 365 days a year to all its customers wherever they might be located on the mainland of Great Britain. Furthermore the response time is guaranteed to be no greater than four hours.

This level of service has been enhanced by continuous improvement over the past thirty years. There are over one hundred mobile and highly trained service engineers working out of six regional depots. To support these engineers a large spare parts stock is held within the regional stores throughout the country in addition to a central store at the Head Office in Hereford.

Faced with the increasing complexity of the equipment now likely to be found in Commerce and Industry, it has become necessary to train our already highly skilled engineers in the areas of electronics and microprocessor control.

Contracts offering scheduled preventative maintenence and emergency call-out are available nationwide. All schemes can be tailored to suit all requirements.

This vital service will ensure that your air conditioning system is kept in peak operating condition.

Denco Air Conditioning Overseas

Denco products serve computer rooms and telephone exchanges in many countries around the world, with an enviable reputation for quality and reliability.

Distributors in many countries have Denco trained engineers and can provide full commissioning and maintenance facilities. Denco equipment is designed with overseas requirements very much in mind, and dedicated export sales and shipping departments at Hereford provide expert help at all stages.

London office : 47 High Street, Rickmansworth, Hertfordshire, WD3 1EX. Telephone: (01923) 771466, Telex: 35144, Fax: (01923) 770424
Scottish office : Unit 3, Cairnhill Trading Estate, Cairnhill Road, Airdrie, ML6 9HA. Telephone: (01236) 754641, Telex: 35144, Fax: (01236) 765258.
Southampton office : Unit A9, City Commerce Centre, Marsh Lane, Southampton, SO14 3EW. Telephone: (01703) 226527, Telex: 35144, Fax: (01703) 221164.
Dinnington office : Unit 16, Abbey Way, North Anston Trading Estate, Dinnington, Sheffield, S31 7JL Telephone: (01909) 560048, Telex: 35144, Fax: (01909) 560024.
Warrington office : Unit 16, Thelwall New Road Industrial Estate, Warrington, WA4 2LY. Telephone: (01925) 860270, Telex: 35144, Fax: (01925) 261423.
Central sales office : PO Box 11, Holmer Road, Hereford, HR4 9SJ. Telephone: (01432) 277277, Telex: 35144, Fax: (01432) 343282.
Export sales office : PO Box 11, Holmer Road, Hereford, HR4 9SJ. Telephone: (01432) 277277, Telex: 35144, Fax: (01432) 355988.

Denco Air

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