

## 1.0 General

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- When installing, or if work has to be done on a HIROTEC DAT'AIR unit, you should follow the instructions given in this manual and those you find in the unit itself; in all cases take all the necessary precautions for personnel safety.
- Pressures in the refrigeration circuit, electrical components, sharp parts and the centrifugal fan could be harmful during installation and maintenance work.

***Consequently, any work on the unit should be carried out by skilled and qualified people.***

- The guarantee shall be deemed immediately ineffective in the case of non compliance with the instructions provided in this manual and if any alteration is made to the unit for which authorisation has not been given.

***Attention: before carrying out any work on the unit, turn power off.***

## Inspection, Transportation, Positioning

### 2.1 Inspection

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Upon receipt of your unit, please check everything is in good order and condition as the equipment left the factory in perfect condition and the carrier should be notified immediately if any damage is found. Our firm must be informed in writing within 7 days, with details of the extent of the damage.

Ensure you advise our factory within 7 days of any problems in transport.

### 2.2 Lifting and Transporting

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During unloading and positioning of the unit, sudden or violent movements should be avoided. A lift truck can use the base pallet to lift the unit. Handling inside the premises must be done with care, and no part of the machine should be used as a lever for moving into position.

All units should be placed on the floor or on a suitable platform, and if required, install suitable isolation mounts to reduce any vibration.

### 2.3 Base

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The equipment needs no special base since it is not particularly heavy and vibration transmission is minimal. If the unit is to be installed on a raised floor it can be placed directly on the raised floor with, a seal under the unit. The holes in the floor, through which cables and pipes pass, are indicated in the dimensional drawings.

We recommend placing a stiff rubber strip between the floor and the unit base.

Always check the maximum permitted load of the floor on which the unit is to be positioned. The unit base must be level to ensure proper drainage.

Support stands should be adjustable in order to compensate for concrete floor irregularities and to ensure that the base of the equipment is horizontal.

## **2.4 Air Distribution**

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Air treated by HIROTEC DAT'AIR conditioners is used to condition the environment, in which the unit is operating after having passed through the floor plenum (Under unit) or a distribution duct (Over unit) which forms the supply plenum.

Ducting must be designed in the proper way to allow adequate airflow to the unit and provide optimal working operation. For this reason, duct pressure drop should not exceed the available static pressure given by the fans (in the case of particular applications please consult our Technical Department).

When installing ductwork please observe the following recommendations:

- Duct work branch should be avoided at a distance less than 1 metre from the discharge; if this solution is not viable it is recommended to install sound absorbing material and grilles in the duct)
- Duct must be connected to the unit with a flexible joint in order to avoid vibration transmission from the unit to the ductwork.
- All the connections in the ductwork must be sealed in order to avoid air leaks from the duct.

The number of outlets is extremely important in that if there are insufficient outlets it could cause:

- A decrease in the airflow rate, resulting in poor unit performance and efficiency, and consequently an increase in running costs.

## **2.5 Room Characteristics**

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The ceiling, walls and floor of the room should have a vapor barrier to prevent the ingress or egress of moisture between the room and outside.

## **Installations and Connections**

### **3.1 Installation Clearance**

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Clearances indicated in the unit's dimensional drawings must be complied with.

In the case of multiple installations, it is possible that some spaces are common to several units: in this case contact our HIROTEC Technical Department for advice.

The following connections are required to install a DAT'AIR unit:

- Refrigeration connections (\*EDA versions)
- Condenser pipes (\*EDW version)
- Water pipes to water coils (\*FC versions)
- Connection to the condensation drainage
- Connection to the humidifier
- Wiring

\*Denotes available in both under and over air discharge configuration.

**3.2 Connection to Remote Aircooled Condensers**

The route between the HIROTEC DAT'AIR unit and the air cooled condenser should not exceed 25-30 metres (equivalent length), if necessary call our Technical Department or use water cooled models where long pipe runs are required.

All refrigeration piping should be installed by a qualified Refrigeration Technician in accordance with good refrigeration practice and Local Regulations.

The route should be the shortest possible to reduce the quantity of freon in circulation and system pressure drops. If copper pipes have to cross over electrical cables it is advisable to insulate between the two.

Pipe insulation, unless otherwise required by the Customer, can be limited to the following locations;

- a) Hot gas and liquid lines that run in the raised floor cavity of the facility.
- b) Hot gas lines that are exposed to low ambient temperatures (available on request).

The maximum difference in height of 10 metres from the HIROTEC DAT'AIR to the air cooled condenser(s) is recommended.

On rising vertical hot gas pipes, traps or syphons should be fitted every 6 metres to allow oil circulation in the system. On horizontal hot gas discharge pipelines a minimum 1% slope (in flow direction) should be installed to achieve oil return to the compressor.

Pipe diametres can be seen in Table 3.1 depending on the unit size and length of run. Further information on pipe sizes can be obtained by contacting our Technical Department.

**Note: air cooled units are shipped with a 3 bar precharge of nitrogen**

**Table 3.1 Refrigeration Lines**  
(\*EDA version) (')

<i>Model</i>	<i>Hot Gas</i>	<i>Liquid</i>
50	16	12
80	16	12
100	16	12
110	16	12
140	18	12
150	18	12
170	18	12
180	18	12
230	18	12
235	18	12
260	22	16
350	22	16
440	28	16
520	28	16
550	28	16
280	18	12
360	18	12
460	18	12
13V	18	12
15V	22	16
20V	22	16
26V	28	16
30V	28	16

(') valid for lenth's up to 30 m (equivalent length).

### 3.2.2 Pipe Installation

Pipe installation is one of the most important operations to have an efficient refrigerant system.

Pipes must be handled with care to avoid damage.

Pipes should be cut to the exact size with a proper pipe cutter, pipes must then be cleaned to remove dust and swarf.

Dust in the pipes can cause damage and lead to the premature failure of the system.

Pipe bending should be carried out with a proper pipe bending tool using pulleys and with a curve dimension of the same size as the pipe diameter.

### 3.2.3 Refrigeration Pipe Connections

Once refrigerant pipes are installed, they should be connected to the indoor and outdoor sections – not left open.

#### Unit Refrigerant Pipe Connections

<b>MINIDAT &amp; CONSOLE</b>					
<b>Model O/UEDA</b>	<b>50</b>	<b>80</b>	<b>110</b>	<b>150</b>	<b>170</b>
Hot Gas Line O.D. Copper (mm)	16	16	18	18	18
Liquid Line O.D. Copper (mm)	12	12	12	12	12

<b>MODULAR</b>										
<b>Model O/UEDA</b>	<b>100</b>	<b>140</b>	<b>180</b>	<b>230</b>	<b>235</b>	<b>260</b>	<b>350</b>	<b>440</b>	<b>520</b>	<b>550</b>
Hot Gas Line O.D. Copper (mm)	18	18	18	18	18	22	22	22	22	22
Liquid Line O.D. Copper (mm)	12	12	12	12	12	16	16	16	16	16

<b>BIGDAT UNITS</b>								
<b>Model O/UEDA</b>	<b>280</b>	<b>360</b>	<b>460</b>	<b>13V</b>	<b>15V</b>	<b>20V</b>	<b>26V</b>	<b>30V</b>
Discharge Line O.D. Copper (mm)	2×18	2×18	2×18	2×22	2×22	2×22	2×22	2×22
Liquid Line O.D. Copper (mm)	2×12	2×12	2×12	2×16	2×16	2×16	2×16	2×16

Once connections have been completed, it is necessary to clean the circuit by using nitrogen, after which a vacuum must be obtained in the pipes and condenser using the charging port fitted in the system.

We strongly advise against using the compressor as a vacuum pump, in this case the guarantee is deemed ineffective.

Refrigeration piping on air cooled systems should be flushed and pressure tested for leaks with dry nitrogen.

At this point, shut-off valves fitted in the unit must be opened. Nitrogen gas will transfer through the refrigerant circuit. Leaks must be checked in the pipe connections with a leak detector and a vacuum of 300 microns achieved.

**Table III – Units Refrigerant Charge R22 – R407c [kg]**

MODEL	50	80	110	150	170	100	140	180	230	235
*EDA (')	2.2	2.4	2.6	4.0	4.4	2.6	4.0	4.4	4.7	5.8
*EDW	1.0	1.3	1.5	1.9	2.4	1.5	1.9	2.4	2.7	3.4

MODEL	260	350	440	520	550
*EDA (')	8.3	8.9	9.6	10.5	12.6
*EDW	3.8	3.9	4.2	4.5	5.4

MODEL	280	360	460	13V	15V	20V	26V	30V
*EDA (')	8.0	8.8	9.4	12.5	16.6	17.8	19.2	21.0
*EDW	3.8	4.8	5.4	6.5	7.6	7.8	8.4	9.0

(') Denotes fitted with air-cooled condenser.

**3.3 Piping Connections**

**3.3.1 To the Water Condenser (\*EDW)**

Threaded copper pipes are used for water pipe connections on all units. Inlet and outlet connections are shown in the technical data sheets (section 2). The water cooled models are designed to run with cooling tower or closed circuit dry coolers.

Supply water pressure should range from 2-10 bar, if this differs please contact our Technical Department.

A pressure regulating valve is fitted to all units operating with a cooling tower.

Water flow rates and the relative pressure drops are given in the technical details. It is recommended to fit ball valves at the inlet and outlet of the condenser, so the air conditioner can be isolated in the case of extraordinary maintenance, or if they have to be relocated.

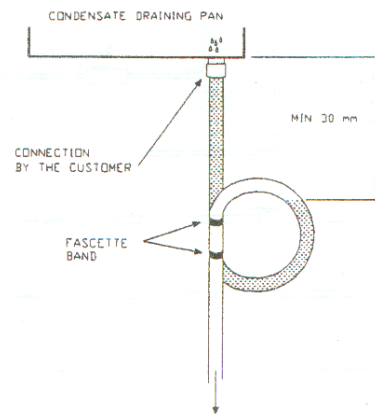
**Note:** “condenser water inlet” identifies the inlet water connection.

**All condensers assembled on dat'air units are of the plate type, for this reason we strongly recommend the installation of a metal mesh filter on the water inlet pipe, mesh max.1 mm**

**3.3.2 To the Cooling Coil (\*FC)**

Threaded connections are used for water pipe connections on all units. Inlet and outlet connections are shown in the technical data sheets. Each unit is fitted with a three way,

servo controlled modulating valve operated by a microprocessor controller in accordance with the environmental temperature load and humidity load (HH versions).



**3.3.3 Condensate Drainage**

A condensate drain connection is required for the condensate tray. Install a trap to avoid the return of bad smells and to ensure the correct draining of the system. Once this operation is completed, verify that condensate is properly draining by filling the tray with water away from the draining hole.

**3.3.4 Connection to Humidifier (HH Versions)**

For those units, fitted with a humidifier, connect the inlet to a filtered water supply and outlet to a drain system. The humidifier controller detects water hardness and automatically drains the salt rich water.

For additional instructions see the humidifier's use and maintenance manual (CDD).

**Warning: do not supply demineralised or softened water into the humidifier! Supply water pressure should be between 0.3 and 0.6 bar.**

### 3.3.5 General Advice on Water Pipe Connections

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- Gate or globe valves to isolate the unit from the water circuit.
- Metal mesh filter (in the inlet pipe) with a maximum mesh of 1 mm, to protect the heat exchanger from waste or impurities present in the pipes.
- Air valves, located at the highest point of the water circuit, to allow bleeding of air from the system.
- Automatic filling valves to maintain system pressure and to compensate for thermal expansion.
- Drain cock, and where necessary, a drainage tank to empty the unit for maintenance.

## 3.4 Electrical Power and Earthing

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### 3.4.1 General

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- Check visually that the electrical circuits have not been damaged during transportation.
- Check that the screws on all various terminals are well secured.
- Check that supply voltage corresponds to the unit's nominal data (voltage, phases and frequency) shown on the label on the equipment.

For cable entry, use the special hole in the base of the unit(s).

***Cable section and line protections should conform to the information given on the wiring diagram and local requirements.***

Supply voltage should not be subject to variations greater than  $\pm 5\%$  and the unbalance between phases should always be lower than 2%.

If this is not the case, contact our Technical Department to decide upon the most appropriate protection.

Electrical connections should be carried out following the instructions given on the wiring diagram supplied with the unit.

Earthing is compulsory by law. The installer shall connect the earth cable to the earth bar on the electrical panel.

Power for the control circuit is from the main line through a transformer located in the electric panel.

The control circuit is protected by a circuit breaker.

Wiring diagrams are attached to the equipment inside the electric panel. The power cable has to be connected to the input terminals.

**3.4.2 Alarm and External Connections**

In the terminal block, there is a voltage free contact for a general alarm.

For a remote ON-OFF of the unit, connect the external switch to contacts indicated in the wiring diagram.

**N.B: The external switch disables the ON-OFF control on the small front panel of the unit.**

When carrying out the connections described, follow exactly the instructions given in the wiring diagram.

**Operating Limits**

Table 1 – Operational Limit

**Air Cooled**

	Min	Max		Min	Max
Room inlet air temperature °C	18	30	Condenser Inlet air temperature °C	15	40

**Water Cooled**

	Min	Max		Min	Max
Room inlet air temperature °C	18	30	Condenser inlet water temperature °C	19	47
			Outlet water temperature °C	27	50
			Water thermal difference °C (°)	3	8

(°) Water thermal difference must always guarantee water inlet-outlet operation limit

Table II – Freezing Point for Water Ethylene Glycol Mixtures.

Weight percentage	%	10	20	30	40	50
Freezing point	°C	-4.8	-9.9	-17.2	-26.6	-38.3

Table III – Control and Safety Devices, Factory Settings.

CONTROL/SAFETY DEVICE		SET POINT	DIFFERENTIAL	RESET TYPE
Control Thermostat	°C	24	2	--
Control Humidstat (HH versions)	%	50	2	--
High pressure switch	bar	26	7.7	Manual
Low pressure switch	bar	0.7	1.0	Automatic

HIROTEC DAT'AIR units are designed to work properly over a wide operating range, it is highly recommended not to exceed these operating limits, room temperature, outdoor air and water temperatures.

If this situation should occur the unit may stop due to safety devices. In the worst case, it may fail. These limits are reported in Table 1. If there is need to exceed these limits, please contact our Technical Department.

**Refrigerant Relief Valve**

Each (Direct Expansion) unit is fitted with a relief valve on the liquid line in order to reduce the risk of damage to the system in the event of high system pressure.