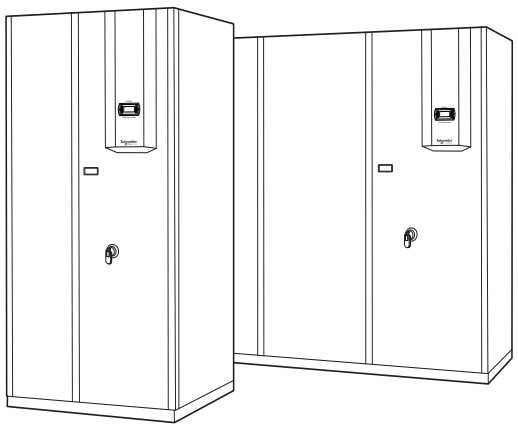
Schneider Electric

Installation

Uniflair
Chilled Water



This manual is available in English on the enclosed CD.

Uživatelská pøíruèka v èeštinì je k dispozici na pøiloženém CD.

Dieses Handbuch ist in Deutsch auf der beiliegenden CD-ROM verfügbar.

Deze handleiding staat in het Nederlands op de bijgevoegde cd.

Este manual está disponible en español en el CD-ROM adjunto.

Ce manuel est disponible en français sur le CD-ROM ci-inclus.

A hasznalati utasitas magyarul megtalalhato a csatolt CD-n.

Questo manuale è disponibile in italiano nel CD-ROM allegato.

本マニュアルの日本語版は同梱の CD-ROM からご覧になれます。

Denne manualen er tilgjengelig på norsk på vedlagte CD.

Instrukcja Obsługi w jezyku polskim jest dostepna na CD.

O manual em Português está disponível no CD-ROM em anexo.

Данное руководство на русском языке имеется на прилагаемом компакт-диске.

Denna manual finns tillgänglig på svenska på medföljande CD.

Bu kullanim kilavuzunun Türkçe'sä, äläxäkte gönderälen CD äçeräsände mevcuttur.

您可以从包含的 CD 上获得本手册的中文版本。

您可以从付属的ＣＤ上获得本手册的中文版本。

동봉된 CD 안에 한국어 매뉴얼이 있습니다 .

Contents

General Information

Overview

This manual describes the cooling units with 208/230V/3pH/60Hz and 460V/3pH/60Hz power supply. It supplies general information, safety instructions, unit transportation, installation information and necessary information about how to use the units.

The descriptions and illustrations in this manual are owned by Schneider Electric. Schneider Electric reserves the right to make any alterations it sees fit in order to improve the product without having to update this document.

The illustrations and images in this manual are examples only and may differ from practical situations.

Symbols

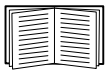
Note the icons here and be observant for them throughout this manual (they are intended to call attention to potential hazards and important information):

Electrical Hazard: Indicates an electrical hazard which, if not avoided, could result in injury or death.

Warning: Indicates a hazard which, if not avoided, could result in personal injury or death.

Caution: Indicates a potential hazard which, if not avoided, could result in damage to the equipment or other property.

Note: Indicates important information.



Indicates that more information is available on the same subject either elsewhere in this document or in another (named) document.

Storage

The following conditions must be respected should the unit require storing for a given period of time:

- Packing must be intact
- Storage area must be dry (<85% R.H.) and protected against extreme temperatures 50°C, 122°F

Note: The unit should remain in its original packaging if it is going to be stored for long periods of time.

Safety

Overview

Warning: Removal of, or tampering with safety devices is a violation of safety standards and will void all warranties.

Warning: During installation authorized personnel must wear approved personal protective equipment (PPE).

Schneider Electric will only consider itself responsible for the safety, reliability and performance of the unit if:

- Repair work has only been carried out by authorized personnel
- Electric installation conforms to the National Electric Code (NEC) and/or local code
- Devices are used in conformity with the appropriate instructions

Carefully read this manual before carrying out any kind of use or maintenance work on the units.

Installation, maintenance and usage must be carried out respecting all work safety standards.

The operator responsible for the mentioned services must possess expert knowledge of the devices.

Schneider Electric refuses all responsibility for damage due to the inobservance of the safety standards.

Warning for Lifting and Transportation

Lifting and transporting the units must be carried out by specialized personnel as described in this manual.

The load must always be solidly anchored to the bearing element of the lifting equipment and means of transport.

No one should be near the suspended load, nor in the working area of the crane, forklift truck or any other lifting equipment or means of transport.

Adopt all of the cautions provided by the relevant safety standards, in order to prevent any possible damage to people or objects.

Warnings for Installation

All work on the electrical installation must be carried out by licensed technicians only.

Technical personnel must use appropriate equipment when checking the grounding of devices.

Installation may only take place in locations where there is NO public access.

Intended Use

The air conditioning units have been designed and produced to provide air conditioning within the limits and methods described in the present manual.

The air conditioners must be used exclusively indoors.

No modifications may be made to the units or their parts without explicit written consent from Schneider Electric.

Warnings for Use

Only use the machinery for the purpose for which it was designed and manufactured.

Environmental Limits for Use

In order to achieve rated performance, the environmental conditions must fall within the following values:

Hot Water Circuit

- Maximum inlet hot water temperature: 77°C (170°F) (test based)
- Minimum inlet hot water temperature: 45°C (113°F)
- Maximum operating pressure hot water circuit: 150 psi

Cold Water Circuit

- Maximum inlet cold water temperature: 25°C (77°F)
- Minimum inlet cold water temperature: 6°C (42°F)
- Maximum glycol percentage: 50%
- Maximum operating pressure cold water circuit: 150 psi

Air

- Maximum inlet air temperature: 35°C (95°F)
- Minimum inlet air temperature: 18°C (64°F)
- Maximum inlet relative humidity: 70%
- Minimum inlet relative humidity: 30%

Safety During Maintenance Work

All work must be carried out by professionals that have been qualified and trained on Schneider Electric cooling products.

Warning: Disconnect the unit from the power supply before starting any maintenance work.

Glycol Mixtures

The units are designed to operate both with pure water and with glycol mixtures.

Glycol mixtures with water ethylene glycol or propylene glycol may not exceed a 50% volume.

Pay attention to any environmental limitations regarding its use.

Note: Please contact Schneider Electric for applications which fall out of the documented specifications.

Presentation of the System

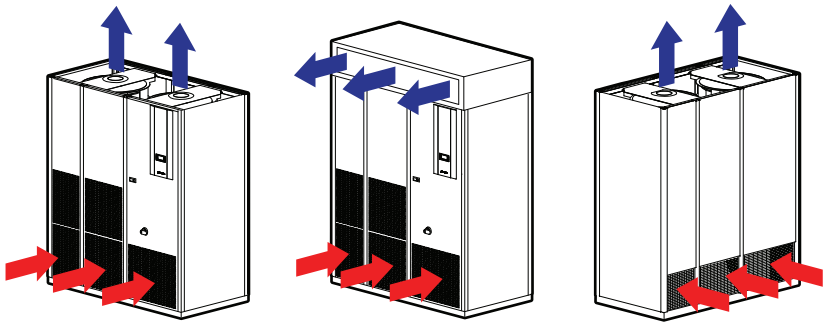
Overview

A precision air conditioner is designed to control environments for telecom rooms, internet hubs and data processing centers. The series consists of 2 types of precision air conditioners: Direct Expansion (DX) and Chilled Water (CW). This manual only covers the Chilled Water precision air conditioners.

Airflow Configurations

Upflow

Upflow units are designed to distribute air through a pre-engineered duct system or by means of a false ceiling. Air intake is usually through the front of the unit but versions are also available with air intake through the rear or the base of the unit.



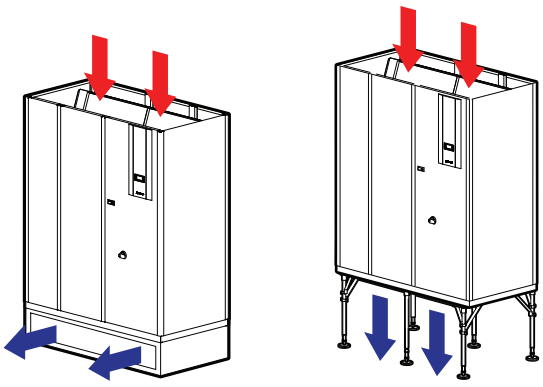
Front Air Suction

Front Air Suction with Front Air Discharge

Back Air Suction

Downflow

Downflow units uniformly distribute large volumes of air into the environment by means of a void under a raised access floor (or a front discharge sub-base plenum when a raised floor is not available). The air enters the unit directly from the environment or through a ventilated or false ceiling.

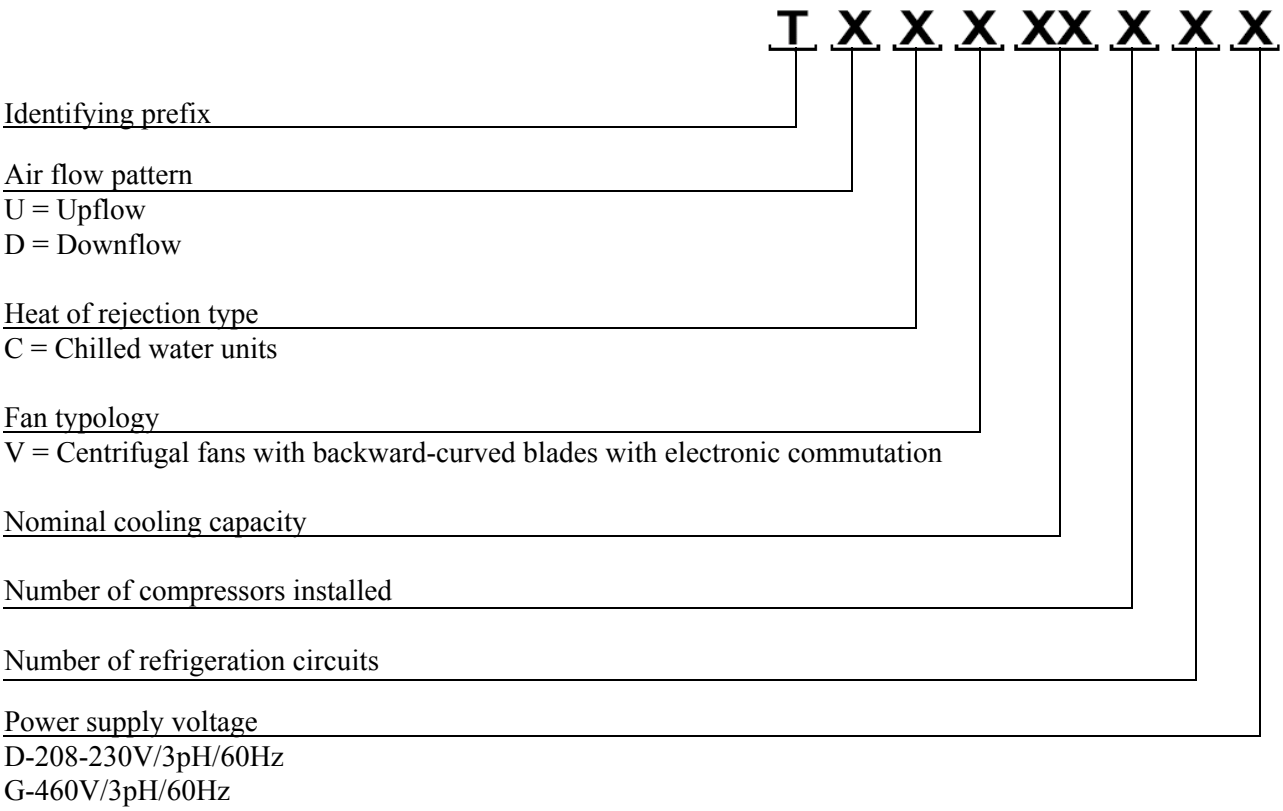


Sub-base Plenum Front Discharge

With Floorstand

Chilled Water Model Number Nomenclature

The code which distinguishes the models is composed of nine characters:

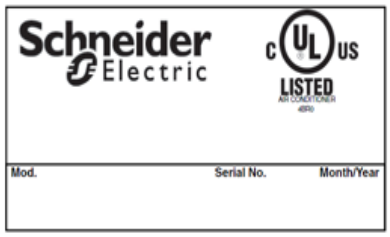


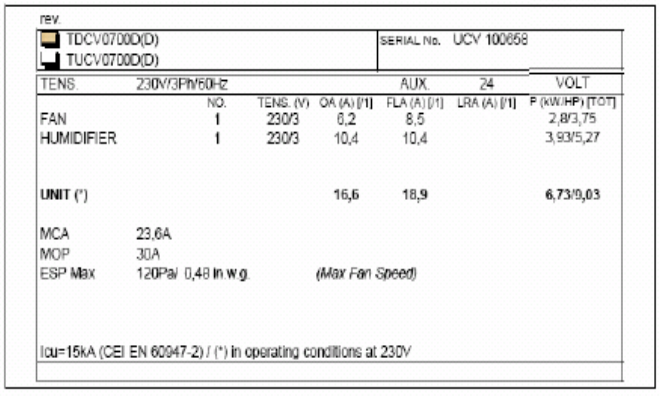
Name Plate

The units can be identified by the name plate which is placed in the electrical panel of the unit. The model and any additional accessories which are installed are indicated by an “X” in the corresponding box.

The plate carries the following data:

- Model and serial number
- Type of power supply
- Overall electrical rating
- Individual load electrical ratings
- FLA: full load amps
- MCA: minimum circuit ampacity
- MOP: maximum overcurrent protection
- Maximum inlet hot water temperature (if present)
- ESP MAX: maximum fan static pressure at max fan speed





Symbols

Symbols applied to the unit

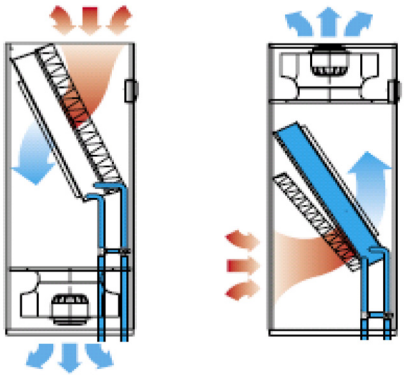
Symbol	Meaning
	High voltage
	Sharp edges
	Moving parts

Symbols applied to the packages

Symbol	Meaning
	Fragile: handle with care
	Do not store in damp conditions: the unit must be stored in a dry place
	Center of gravity: shows the center of gravity of the unit
	Keep away from heat: the unit must be stored away from heat sources
	This side up: indicates the correct position of the unit
	Temperature limits: the unit must be stored in a place within the indicated temperature limits
	Do not use hooks: do not lift the units using hooks
	Do not stack: the units must not be stacked

Operating Description

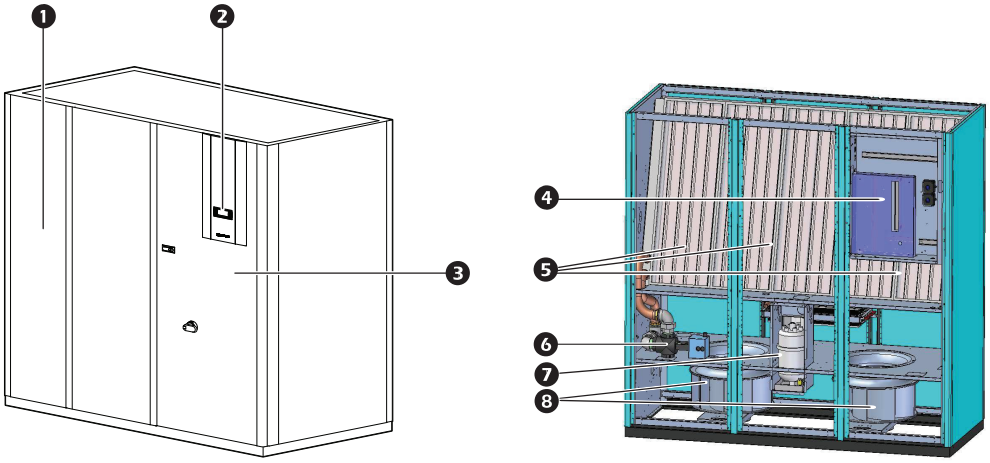
This version has a relatively simple construction and simple airflow pattern though the unit to optimize performance. The microprocessor controls the actuator which is modulating the 3-way (or optional 2-way) chilled water valve to give accurate control. Careful sizing of the evaporator coil allows a high sensible to total cooling ratio under most operating conditions.



Component Identification

Overview

Name and description of the principle components



Item Number	Item
1	Cover panels
2	User interface
3	Electric panel door
4	Electric panel
5	Filters
6	Chilled water valve
7	Humidifier
8	Fans

Cover panels

Allow access to the internal components of the unit.

User interface

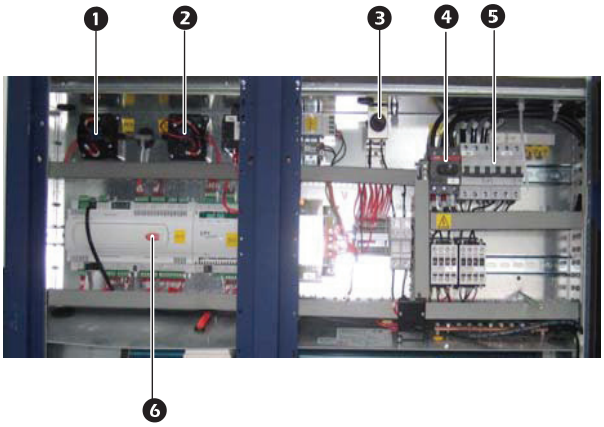
Allows the unit to be turned on or off and displays the configuration and condition of the unit.

Item Number	Item	Description
❶	LCD display	Flat electronic visual display
❷	ALARM button	Visualization and reset of alarms (when the alarm is activated, it flashes red)
❸	PRG button	Access to the configuration menu
❹	ESC button	Exit from the screens
❺	UP button	Scroll through the menu
❻	ENTER button	Confirm
❼	DOWN button	Scroll thru the menu

Electrical panel door

Allows access to the electrical panel of the unit.

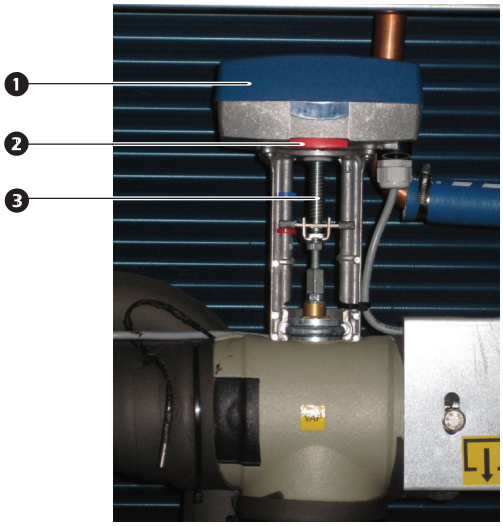
Electrical panel



Item Number	Item
❶	Clogged filter sensor
❷	Airflow sensor
❸	Supply line selector (208/230V version only)
❹	Main switch (may vary based on unit size and heat of rejection type)
❺	Circuit breaker
❻	Interface board

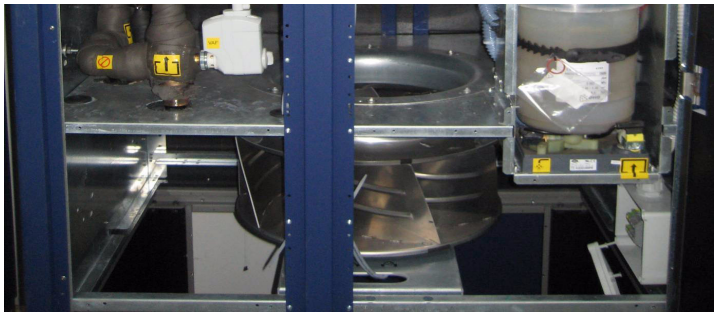
Filters

Chilled water valve

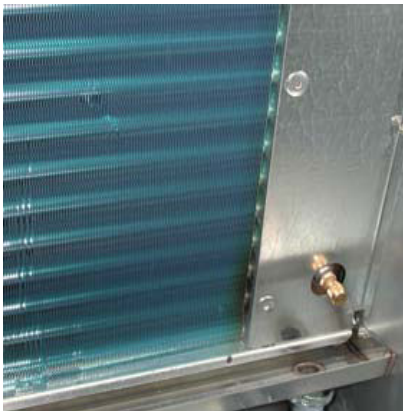


Item Number	Item
1	Actuator
2	Manual control knob
3	Valve stem

Fans



Cooling coil



Initial Unit Inspection

Note: Dispose of the packaging in appropriate collection points; recycle if applicable.

Check that the delivery is complete and inform the carrier of any damage to the unit which may be attributed to careless or inappropriate transportation.

Assure that all tip and shock sensors are intact and not tripped and report any missing or damaged sensors. Also, note any cuts or dents to the exterior packaging.

Lifting and moving the unit must be carried out by proper material handling equipment.

The following documents ship within the unit:

- Uniflair Chilled Water Installation Manual
- Electrical diagrams
- Cooling circuit diagrams
- Uniflair Chilled Water and Direct Expansion Operation and Maintenance Manual

Unloading the Unit

To unload the unit from the pallet:

1. Move the pallet as near as possible to where the unit is to be installed.
2. Remove the blocking screws which fix the unit to the pallet.

Note: Use proper material handling equipment, pallet jacks, dollies, roller bars and/or forklift to properly position and set unit.

Characteristics of the Installation Area

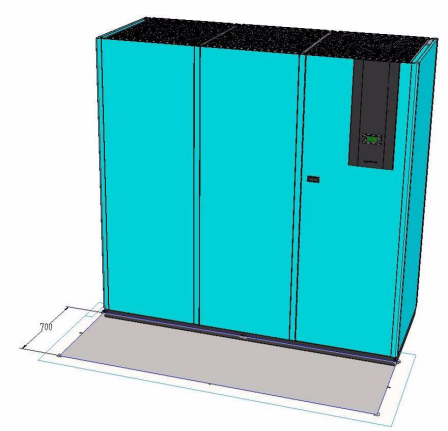
Warning: The unit must be installed in an area that is protected from adverse conditions.

The unit is designed for installation on raised access flooring “using appropriate floor stands supplied on request from Schneider Electric” or, in non-raised floor environments, on a provided sub-base discharge plenum. However, the upflow units with air intake through the rear or front can also be installed on floors which are not raised (these systems may require a sub-base).

The area of installation must have the following characteristics:

- Front of unit must have 700 mm (28”) service clearance; consult local codes
- Air intake and discharge connections must not be blocked in any way
- Unit must be installed on a flat, level surface

Warning: If the surface where the unit is placed is not even and horizontal there is a risk of an overflow from the condensate tray.



Power supply requirements

Review the electrical rating label on the equipment to determine the maximum possible current draw of the equipment.

Note: The equipment must be grounded.

Electrical service must conform to national and local electrical codes and regulations.

Humidifier and drain requirements

If a humidifier is installed, the unit requires a potable cold water supply.

Condensate must be removed by a gravity drain using proper “P” traps, or by an optional condensate pump. For inlet water chemistry requirements for proper operation, see “Feed water” on page 33.

Installation on raised access flooring

Installation on raised access requires the support of a floor stand beneath the unit. The floor stand allows installing the unit before the raised floor is installed, increases absorption of noise and vibrations and facilitates of connection of pipes and cables.

Note: Use a vibration pad under each leg to reduce vibration.

Floor stand installation

Using the floor stand, position the unit on the mounting frame and secure it using the M8 screw inserts found on the base of the unit.

Caution: A flexible seal at least 0.2” thick should be fitted between the raised floor panels and the mounting frame, which should also be isolated from the metallic floor structure.

Note: Minimum raised floor height is 8”.

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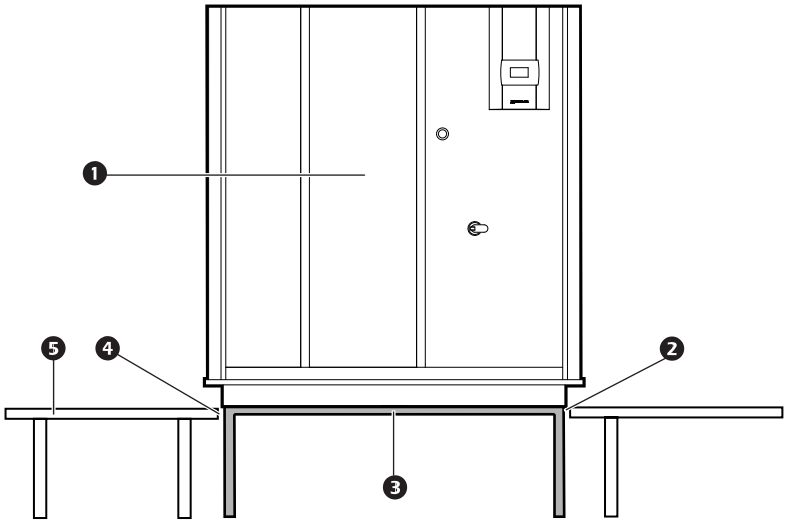


Item Number	Item
❶	Air conditioning unit
❷	Flexible seal
❸	Floor stand
❹	Flexible seal
❺	Raised floor

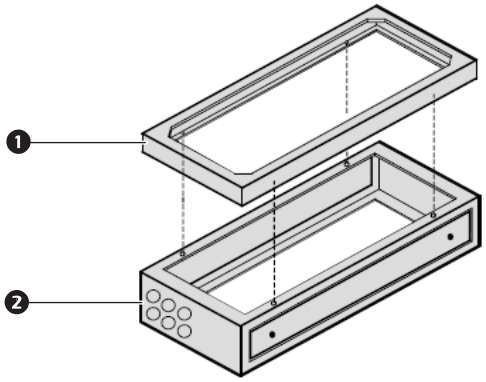
Installation on flooring which is not raised

Installation on flooring which is not raised can occur without using bases, but only on upflow models with rear or front air suction. Installation on this type of floor does not require any additional installation besides that of normal positioning.

Sub-base installation

To install the unit on the sub-base:

1. Position the unit on the sub-base.
2. Secure the unit to the sub-base using the M8 screw inserts found on the base of the unit.



Item Number	Item
1	Base of unit
2	Sub-base

Discharge temperature limit probe (STM) installation

See “Accessories” on page 32 to install the discharge temperature limit probe.

Opening of the Door and Removing the Panels

Opening the door

To open the unit door:

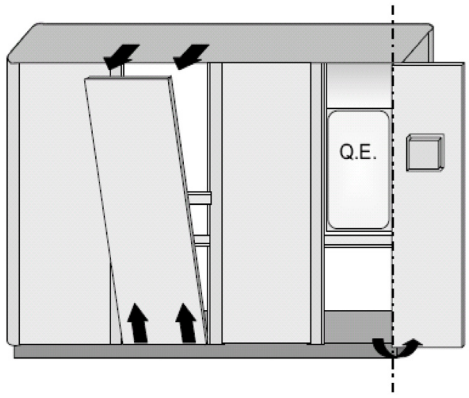
1. Turn the unit’s disconnect handle to the OFF position before opening the front panel.
2. Push the button and pull the handle lightly outwards.
3. Turn the handle downwards until the door opens.

Warning: Before servicing disconnect the power supply.

Removing the front and side panels

To remove the front and side panels:

1. Firmly hold the panel.
2. Lift and incline the panel outwards until it is completely removed.



Note: After having removed the side panels, the non-removable protective panel blocks accessibility to the inside of the unit.

Warning: Do not remove rear panels if the equipment is operating.

Removing the rear panels

Note: For rear return units, the rear panels are removed like the front panels.

To remove the rear panels:

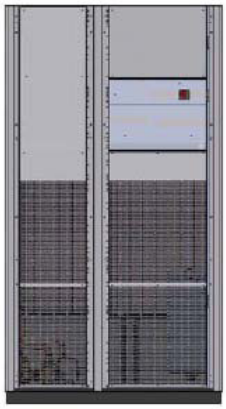
1. Unscrew the screws which fix the panel on the rear of the unit.
2. Firmly hold the panel.
3. Incline the panel outwards until it is completely removed.

Internal Protection Panels

The mechanical compartment, the electric heaters (if present) and the humidifier (if present) are protected by internal protection panels for safety reasons and to allow the opening of the external panels without triggering the safety alarms.

In the following figures, the different types of internal protection panels are shown on various units.

Models TUCV (front air suction)



Models TDCV

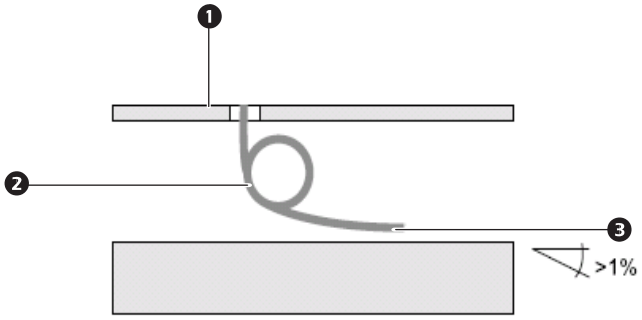
Example: TDCV4300

Connecting to the Drains

The condensate water drains from the tray through a 1 1/4” flexible tube fitted in the unit.

If the unit is fitted with a humidifier, the condensate drain tray and the humidifier drain connection must be connected to the drains of the building.

Connecting to building drains (without humidifier)



Item Number	Item
1	Drain
2	Trap
3	Minimum slope

1. Connect the unit drainage tube to the building drains using a rubber or plastic tube with an internal diameter of 1” (25 mm).
2. Use a trap on the external drainage tube in order to avoid unpleasant odors and to allow the condensate pan to drain properly. Consult local building codes for drain requirements.

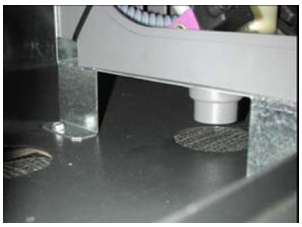
Caution: The installation must comply with local plumbing codes.

3. Once the connections have been made, pour water into the condensate drain until the trap inside the unit is full.

Connecting to building drains (with humidifier)

Warning: The water discharged from the humidifier is at a very high temperature. The drainage tube has to withstand high temperatures (at least 212°F) and must be kept away from electrical cables.

1. Connect the unit drainage tube to the humidifier collection tray.
2. Connect the humidifier drainage tube to the building drains using a rubber or plastic tube, which is resistant to high temperatures minimum (212°F) with an internal diameter of 1.26”.



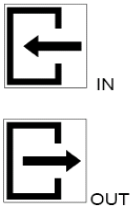
3. Use a trap on the external drainage tube to avoid unpleasant odors and water overflow from the humidifier tray. Consult local building codes for drain requirements.
4. Connect humidifier to 3/4” hose bib connection.
5. Once the connections have been made, pour water into the unit condensate collection tray and in the humidifier condensate collection tray until both traps are full.

Water Connections

For all water connections (except for the condensate drain):

1. Use unions or have the ability to physically separate the unit from the buildings chilled water supply and return lines near the connections.
2. Use shutoff valves to isolate the unit from the water circuit; if possible, use full port ball valves to minimize the pressure drop.
3. Check that the chilled water pipe sizes and the circulating pump characteristics are adequate; an insufficient water flow affects the unit performance.
4. Check that the water flow directions are visibly labeled and connected properly between the unit and building.
5. Insulate all chilled water pipes with closed cell insulating material (for example: Armaflex or equivalent) to avoid condensation; the insulation must allow accessibility to the valves and three-piece joints.
6. Check that the water circuits (both chilled and hot water) are fed with a maximum water pressure of 150 psi; to this purpose the installer must install a safety valve with a setpoint of not more than 150 psi.

Warning: Emptying the unit is recommended in the event of prolonged stoppage.



Filling the Chilled Water Circuit

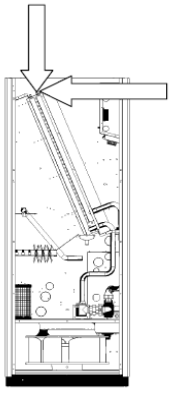
Note: The water used to fill the chilled water circuit must be filtered with a minimum 20 mesh stainless steel screen. Filling the chilled water circuit must be done by a qualified mechanical contractor.

1. Before use disconnect the power supply.
2. Clean the primary circuits before filling the units (a particulate strainer should be installed in the supply water piping within close proximity to the unit).
3. Check that all unit bleed valves are closed.
4. Open the shutoff valves (field installed), if present.
5. Open the bleed valve (on the upper part of the cooling coil) and wait for the water to come out.

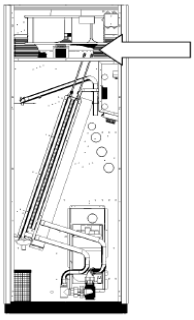
Access to Bleed Valves

Front or top access TDCV 0700

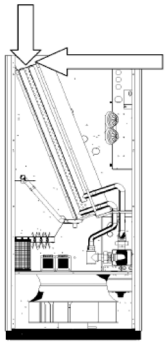
Front or Top Access TDCV 0700



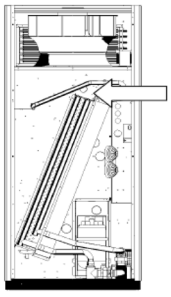
Front Access from Fan Compartment TUCV 0700



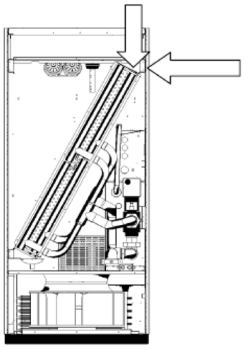
Front or Top Access TDCV 1000-2500



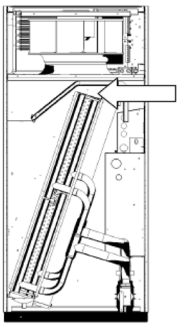
Front Access from Rear of Electrical Panel TUCV 1000-2500



Front or Up Access TDCV 3400-4300

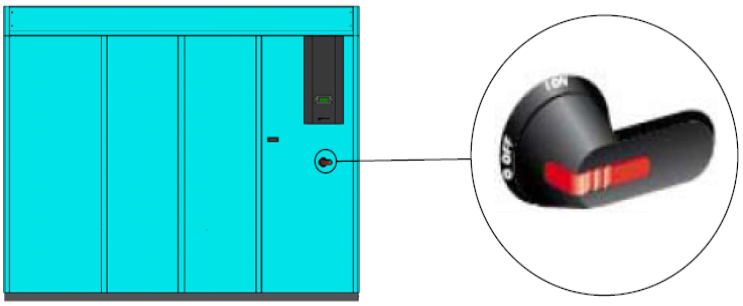


Front Access from Rear of Electrical Panel TUCV 3400-4300



Main Disconnect Switch

Each unit is provided with an external pistol handle main switch with door interlocking. The main switch is positioned in the user interface door.



Electrical Connections

Warning: Electrical connection to the unit to the power supply must ONLY be made by a licensed electrician.

Warning: Electrical lines must be established in full respect of safety standards.

Electrical Hazard: Perform Lockout/Tagout procedures on the cooling unit before servicing. Failure to remove power before servicing this equipment could result in serious injury or death.

To connect the unit's electrical connections to the power supply:

1. Use suitable equipment to check the grounding system efficiency.
2. Ensure that the facility voltage and frequency correspond to those of the unit (see identification label).
3. Ensure the main power switch is in the OFF position.
4. If locked press the button on the door latch and rotate the handle downward to open the door.
5. Remove the metal cover of the main field wiring junction box.
6. Refer to the wiring diagram attached to the equipment and connect the cable to the power supply terminal block. The following is the field wiring junction box:

Power Supply Voltage Setting

1. Check that the right voltage has been set (208V or 230V) (factory setting is 230V).

Note: Does not apply to 460V.

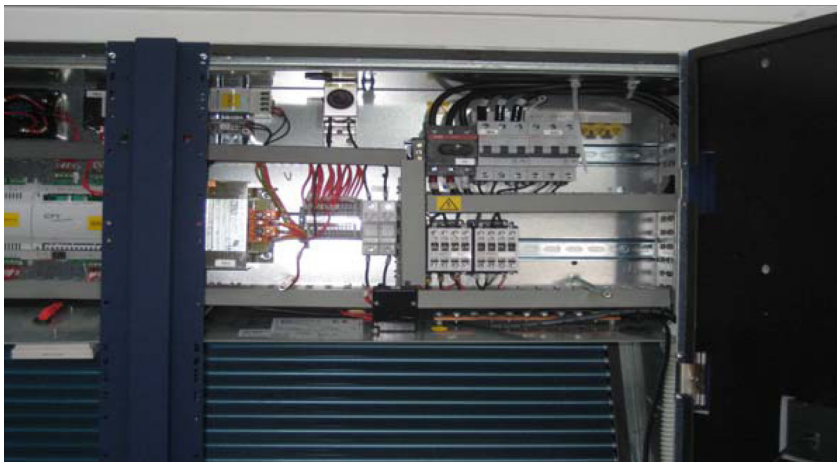
2. Verify and if necessary modify the correct mains voltage on the selector D6: 208V-230V.

Warning: Caution-moving parts. Do not operate unit with panels removed.

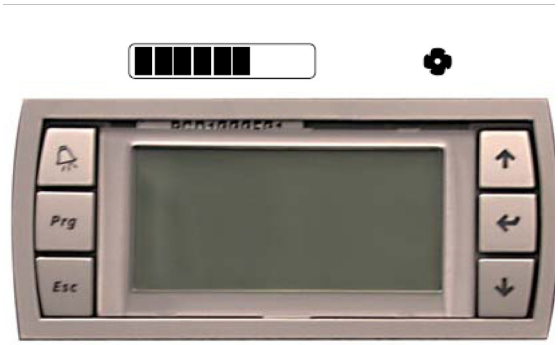
Manual Start Up and Shut Down

Start Up the Unit

1. Unlock the main switch.
2. Open the door and remove the closer panel if necessary.
3. Remove the metal screen from the electrical panel using a screwdriver.
4. Position all of the circuit breakers on the electrical board to “I” (on).



5. Install the cover metal sheet to the electrical panel and secure with the screws.
6. Verify all traps are pre-charged with water and all system pipes have been bled of air.
7. For internal pipe, it is necessary to remove the frontal security metal sheet.
8. Close the door and the front panels.

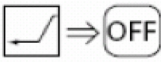


9. On the user interface, press the ENTER button. A sliding bar and a ventilator icon will appear on the display.

If an alarm is indicated, consult the Uniflair Chilled Water and Direct Expansion Operation and Maintenance manual.

Turn Off the Unit

1. On the first user interface screen, press the UP or DOWN buttons until the SWITCH OFF UNIT screen appears.
2. Press the ENTER button. The following icons will appear.



3. Press the ENTER button.

For additional information, see the Uniflair Chilled Water and Direct Expansion Operation and Maintenance manual.

Settings and Adjustments

All the units leave the factory with a nominal fan speed setting that allows the nominal air flow with .08" of external static pressure (ESP).

Power Supply 208-230V/3pH/60Hz			Power Supply 480V/3pH/60Hz		
MODEL	**Normal Air Flow [CFM]**	**Fan Speed [%]**	**MODEL**	**Normal Air Flow [CFM]**	**Fan Speed [%]**
0700D	3650	54	0700G	3650	62
1000D	6030	72	1000G	6030	81
1200D	6320	76	1200G	6320	86
1700D	8650	61	1700G	8650	66
2500D	11000	74	2500G	11000	81
3400D	14700	72	3400G	14700	76
4000D	15300	76	4000G	15300	80
4300D	17350	85	4300G	17350	89

To reach the CFM required by the system with fans on, the fan output percentage can be adjusted from the user interface.

To select the fan output percentage:

1. On the user interface press the PROGRAM button.
2. Using the UP or DOWN button select “Service Menu.”
3. Press the ENTER button.
4. Enter the password (see the envelope attached to the manual).
5. Using the UP or DOWN button select “Hardware Setting.”
6. Press the ENTER button.
7. Using the UP or DOWN button select “Evaporating Fan.”
8. Press the ENTER button.
9. Set the amount.
10. Press the ENTER button.

In the following tables the maximum pressure available expressed in the inches of water column for each unit size and voltage is indicated. The values are given for the maximum air flow expressed in CFM.

Units Without Electrical Heaters

Note: Feet per minute through the cooling coil should be maintained below 500fpm to prevent condensation carry-over.

TDCV0700D						
Air Flow CFM	2680	3197	3714	4230	4747	5264
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.52	0.02	-	-	-	-
55	0.96	0.46	-	-	-	-
60	1.4	0.9	0.36	-	-	-
65	1.83	1.33	0.79	0.22	-	-
70	2.27	1.76	1.23	0.65	0.03	-
75	2.7	2.2	1.66	1.09	0.46	-
80	3.05	2.54	2	1.43	0.81	0.08
85	3.05	2.54	2	1.43	0.81	0.08
100	3.05	2.54	2	1.43	0.81	0.08

TDCV1000D						
Air Flow CFM	3547	4188	4829	5470	6111	6752
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.52	-	-	-	-	-
55	0.93	0.39	-	-	-	-
60	1.32	0.78	0.23	-	-	-
65	1.69	1.14	0.59	0.07	-	-
70	2.02	1.47	0.92	0.41	-	-
75	2.32	1.77	1.22	0.71	0.2	-
80	2.58	2.04	1.49	0.97	0.46	-
85	2.81	2.26	1.71	1.19	0.68	0.08
100	2.81	2.26	1.71	1.19	0.68	0.08

TDCV1200D						
Air Flow CFM	3523	4158	4793	5429	6064	6699
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.52	-	-	-	-	-
55	0.93	0.39	-	-	-	-
60	1.32	0.78	0.22	-	-	-
65	1.69	1.14	0.59	0.07	-	-
70	2.02	1.48	0.92	0.4	-	-
75	2.32	1.78	1.22	0.7	0.19	-
80	2.58	2.04	1.48	0.96	0.45	-
85	2.81	2.26	1.71	1.19	0.67	0.08
100	2.81	2.26	1.71	1.19	0.67	0.08

TDCV1700D						
Air Flow CFM	6187	7236	8284	9333	10382	11430
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.52	0.04	-	-	-	-
55	0.93	0.45	-	-	-	-
60	1.32	0.84	0.28	-	-	-
65	1.69	1.21	0.65	0.07	-	-
70	2.02	1.54	0.98	0.41	-	-
75	2.32	1.84	1.28	0.71	0.15	-
80	2.58	2.1	1.55	0.97	0.41	-
85	2.81	2.33	1.77	1.19	0.63	0.08
100	2.81	2.33	1.77	1.19	0.63	0.08

TDCV2500D						
Air Flow CFM	6727	7913	9099	10284	11470	12656
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.52	-	-	-	-	-
55	0.93	0.4	-	-	-	-
60	1.32	0.79	0.23	-	-	-
65	1.69	1.16	0.59	0.04	-	-
70	2.02	1.49	0.92	0.38	-	-
75	2.32	1.79	1.22	0.68	0.15	-
80	2.58	2.05	1.49	0.94	0.41	-
85	2.81	2.28	1.71	1.16	0.63	0.08
100	2.81	2.28	1.71	1.16	0.63	0.08

TDCV3400D						
Air Flow CFM	9464	11090	12715	14340	15965	17590
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.52	0.02	-	-	-	-
55	0.93	0.44	-	-	-	-
60	1.32	0.83	0.27	-	-	-
65	1.69	1.19	0.63	0.06	-	-
70	2.02	1.53	0.96	0.39	-	-
75	2.32	1.83	1.26	0.69	0.14	-
80	2.58	2.09	1.53	0.96	0.4	-
85	2.81	2.31	1.75	1.18	0.63	0.08
100	2.81	2.31	1.75	1.18	0.63	0.08

TDCV4000D						
Air Flow CFM	9315	10904	12493	14082	15671	17259
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.52	0.03	-	-	-	-
55	0.93	0.45	-	-	-	-
60	1.32	0.84	0.28	-	-	-
65	1.69	1.2	0.64	0.07	-	-
70	2.02	1.54	0.98	0.4	-	-
75	2.32	1.84	1.28	0.7	0.14	-
80	2.58	2.1	1.54	0.97	0.41	-
85	2.81	2.32	1.76	1.19	0.63	0.08
100	2.81	2.32	1.76	1.19	0.63	0.08

TDCV4300D						
Air Flow CFM	9591	11255	12918	14581	16244	17907
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.52	0.01	-	-	-	-
55	0.93	0.43	-	-	-	-
60	1.32	0.82	0.25	-	-	-
65	1.69	1.18	0.62	0.05	-	-
70	2.02	1.52	0.95	0.38	-	-
75	2.32	1.82	1.25	0.68	0.14	-
80	2.58	2.08	1.51	0.95	0.4	-
85	2.81	2.3	1.74	1.17	0.62	0.08
100	2.81	2.3	1.74	1.17	0.62	0.08

TDCV0700G						
Air Flow CFM	2477	3007	3537	4068	4598	5128
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.41	-	-	-	-	-
55	0.73	0.27	-	-	-	-
60	1.05	0.63	0.08	-	-	-
65	1.36	0.99	0.48	-	-	-
70	1.67	1.33	0.87	0.28	-	-
75	1.97	1.65	1.22	0.68	0.01	-
80	2.28	1.97	1.56	1.05	0.42	-
85	2.58	2.27	1.88	1.39	0.79	0.08
100	2.58	2.27	1.88	1.39	0.79	0.08

TDCV1000G						
Air Flow CFM	3764	4348	4932	5516	6100	6684
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.37	0.19	-	-	-	-
55	0.66	0.48	0.21	-	-	-
60	0.95	0.77	0.5	0.1	-	-
65	1.24	1.05	0.79	0.38	-	-
70	1.52	1.34	1.07	0.67	0.07	-
75	1.81	1.63	1.36	0.96	0.36	-
80	2.1	1.91	1.65	1.24	0.64	-
85	2.39	2.2	1.94	1.53	0.93	0.08
100	2.39	2.2	1.94	1.53	0.93	0.08

TDCV1200G						
Air Flow CFM	3689	4282	4874	5466	6059	6651
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.37	0.19	-	-	-	-
55	0.66	0.48	0.21	-	-	-
60	0.95	0.76	0.5	0.1	-	-
65	1.24	1.05	0.79	0.38	-	-
70	1.52	1.34	1.07	0.67	0.07	-
75	1.81	1.62	1.36	0.96	0.36	-
80	2.1	1.91	1.65	1.25	0.65	-
85	2.39	2.2	1.94	1.54	0.94	0.08
100	2.39	2.2	1.94	1.54	0.94	0.08

TDCV1700G						
Air Flow CFM	5603	6874	8146	9417	10688	11960
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.37	0.07	-	-	-	-
55	0.66	0.36	0.06	-	-	-
60	0.95	0.65	0.34	-	-	-
65	1.24	0.94	0.63	0.24	-	-
70	1.52	1.22	0.92	0.53	-	-
75	1.81	1.51	1.2	0.81	0.27	-
80	2.1	1.8	1.49	1.1	0.56	-
85	2.39	2.09	1.78	1.39	0.85	0.08
100	2.39	2.09	1.78	1.39	0.85	0.08

TDCV2500G						
Air Flow CFM	6536	7795	9055	10314	11574	12833
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.37	0.15	-	-	-	-
55	0.66	0.44	0.18	-	-	-
60	0.95	0.73	0.46	0.07	-	-
65	1.24	1.02	0.75	0.36	-	-
70	1.52	1.3	1.04	0.64	0.06	-
75	1.81	1.59	1.32	0.93	0.35	-
80	2.1	1.88	1.61	1.22	0.64	-
85	2.39	2.17	1.9	1.51	0.93	0.08
100	2.39	2.17	1.9	1.51	0.93	0.08

TDCV3400G						
Air Flow CFM	8660	10586	12512	14438	16364	18289
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.37	0.09	-	-	-	-
55	0.66	0.38	0.09	-	-	-
60	0.95	0.67	0.38	-	-	-
65	1.24	0.96	0.66	0.27	-	-
70	1.52	1.24	0.95	0.56	0.01	-
75	1.81	1.53	1.23	0.85	0.29	-
80	2.1	1.82	1.52	1.14	0.58	-
85	2.39	2.11	1.81	1.43	0.87	0.08
100	2.39	2.11	1.81	1.43	0.87	0.08

TDCV4000G						
Air Flow CFM	8446	10363	12281	14199	16116	18034
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.37	0.08	-	-	-	-
55	0.66	0.37	0.06	-	-	-
60	0.95	0.66	0.35	-	-	-
65	1.24	0.94	0.64	0.25	-	-
70	1.52	1.23	0.92	0.54	-	-
75	1.81	1.51	1.21	0.82	0.28	-
80	2.1	1.8	1.5	1.11	0.57	-
85	2.39	2.09	1.79	1.4	0.86	0.08
100	2.39	2.09	1.79	1.4	0.86	0.08

TDCV4300G High Efficiency						
Air Flow CFM	8849	10784	12718	14653	16587	18521
Fan speed [%]	ESP in.wg					
45	0.08	-	-	-	-	-
50	0.37	0.11	-	-	-	-
55	0.66	0.4	0.11	-	-	-
60	0.95	0.68	0.4	0.01	-	-
65	1.24	0.97	0.68	0.3	-	-
70	1.52	1.26	0.97	0.58	0.02	-
75	1.81	1.54	1.26	0.87	0.31	-
80	2.1	1.83	1.54	1.16	0.6	-
85	2.39	2.12	1.83	1.45	0.89	0.08
100	2.39	2.12	1.83	1.45	0.89	0.08

Units with Electrical Heaters

Note: Feet per minute through the cooling coil should be maintained below 500fpm to prevent condensation carry-over.

TDCV0700D						
Air Flow CFM	3531	3865	4199	4533	4867	5201
Fan speed [%]	ESP in.wg					
55	0.08	-	-	-	-	-
60	0.52	0.15	-	-	-	-
65	0.95	0.58	0.2	-	-	-
70	1.38	1.02	0.64	0.23	-	-
75	1.82	1.45	1.07	0.67	0.23	-
85	2.15	1.79	1.4	1	0.57	0.08
100	2.15	1.79	1.4	1	0.57	0.08

TDCV1000D						
Air Flow CFM	5416	5660	5905	6150	6395	6640
Fan speed [%]	ESP in.wg					
66	0.08	-	-	-	-	-
71	0.41	0.21	0.01	-	-	-
76	0.71	0.51	0.31	0.1	-	-
81	0.96	0.77	0.56	0.36	0.13	-
85	1.16	0.96	0.76	0.55	0.33	0.08
100	1.16	0.96	0.76	0.55	0.33	0.08

TDCV1200D						
Air Flow CFM	5416	5650	5884	6118	6353	6587
Fan speed [%]	ESP in.wg					
66	0.08	-	-	-	-	-
71	0.41	0.21	0.02	-	-	-
76	0.7	0.5	0.31	0.11	-	-
81	0.95	0.76	0.56	0.36	0.15	-
85	1.12	0.92	0.73	0.53	0.31	0.08
100	1.12	0.92	0.73	0.53	0.31	0.08

TDCV1700D						
Air Flow CFM	7474	8146	8817	9489	10161	10832
Fan speed [%]	ESP in.wg					
54	0.08	-	-	-	-	-
59	0.48	0.09	-	-	-	-
64	0.85	0.46	0.06	-	-	-
69	1.19	0.8	0.4	0	-	-
74	1.5	1.11	0.71	0.31	-	-
79	1.77	1.38	0.99	0.59	0.19	-
85	2.05	1.67	1.27	0.87	0.47	0.08
100	2.05	1.67	1.27	0.87	0.47	0.08

TDCV2500D						
Air Flow CFM	9653	10095	10536	10978	11420	11862
Fan speed [%]	ESP in.wg					
65	0.08	-	-	-	-	-
70	0.41	0.19	-	-	-	-
75	0.71	0.49	0.26	0.04	-	-
80	0.98	0.75	0.53	0.31	0.08	-
85	1.2	0.97	0.75	0.53	0.31	0.08
100	1.2	0.97	0.75	0.53	0.31	0.08

TDCV3400D						
Air Flow CFM	12066	12780	13495	14209	14924	15639
Fan speed [%]	ESP in.wg					
60	0.08	-	-	-	-	-
65	0.45	0.15	-	-	-	-
70	0.78	0.48	0.18	-	-	-
75	1.08	0.79	0.48	0.18	-	-
80	1.35	1.05	0.75	0.45	0.14	-
85	1.58	1.28	0.97	0.67	0.37	0.07
100	1.59	1.29	0.99	0.68	0.38	0.08

TDCV4000D						
Air Flow CFM	12066	12736	13407	14077	14747	15418
Fan speed [%]	ESP in.wg					
61	0.08	-	-	-	-	-
66	0.44	0.15	-	-	-	-
71	0.77	0.49	0.2	-	-	-
76	1.07	0.78	0.49	0.2	-	-
81	1.33	1.04	0.75	0.46	0.17	-
85	1.53	1.24	0.95	0.66	0.37	0.08
100	1.53	1.24	0.95	0.66	0.37	0.08

TDCV4300D High Efficiency						
Air Flow CFM	13892	14282	14673	15064	15454	15845
Fan speed [%]	ESP in.wg					
70	0.08	-	-	-	-	-
75	0.38	0.22	0.06	-	-	-
80	0.65	0.49	0.32	0.16	0	-
85	0.87	0.71	0.55	0.39	0.23	0.07
100	0.89	0.72	0.56	0.4	0.24	0.08

TDCV0700G						
Air Flow CFM	3531	3838	4145	4451	4758	5065
Fan speed [%]	ESP in.wg					
60	0.08	-	-	-	-	-
65	0.48	0.13	-	-	-	-
70	0.86	0.53	0.16	-	-	-
75	1.22	0.91	0.56	0.17	-	-
80	1.55	1.26	0.93	0.57	0.16	-
85	1.84	1.56	1.24	0.9	0.51	0.08
100	1.84	1.56	1.24	0.9	0.51	0.08

TDCV1000G						
Air Flow CFM	5416	5655	5895	6135	6374	6614
Fan speed [%]	ESP in.wg					
60	0.08	-	-	-	-	-
65	0.37	0.15	-	-	-	-
70	0.65	0.44	0.19	-	-	-
75	0.94	0.73	0.48	0.19	-	-
80	1.23	1.01	0.77	0.48	0.15	-
85	1.52	1.3	1.06	0.77	0.44	0.06
100	1.54	1.33	1.08	0.79	0.46	0.08

TDCV1200G						
Air Flow CFM	5414	5648	5881	6114	6348	6581
Fan speed [%]	ESP in.wg					
60	0.08	-	-	-	-	-
65	0.37	0.16	-	-	-	-
70	0.65	0.44	0.2	-	-	-
75	0.94	0.73	0.49	0.21	-	-
80	1.23	1.02	0.78	0.5	0.18	-
85	1.5	1.29	1.05	0.77	0.45	0.08
100	1.5	1.29	1.05	0.77	0.45	0.08

TDCV1700G						
Air Flow CFM	7476	8268	9059	9851	10642	11434
Fan speed [%]	ESP in.wg					
55	0.08	-	-	-	-	-
60	0.37	0.13	-	-	-	-
65	0.65	0.42	0.15	-	-	-
70	0.94	0.71	0.44	0.11	-	-
75	1.23	0.99	0.72	0.4	-	-
80	1.52	1.28	1.01	0.68	0.29	-
85	1.8	1.57	1.29	0.97	0.57	0.08
100	1.8	1.57	1.29	0.97	0.57	0.08

TDCV2500G						
Air Flow CFM	9653	10179	10706	11233	11759	12286
Fan speed [%]	ESP in.wg					
61	0.08	-	-	-	-	-
66	0.37	0.16	-	-	-	-
71	0.65	0.45	0.21	-	-	-
76	0.94	0.74	0.5	0.22	-	-
81	1.23	1.02	0.79	0.51	0.19	-
85	1.48	1.28	1.04	0.77	0.45	0.08
100	1.48	1.28	1.04	0.77	0.45	0.08

TDCV3400G						
Air Flow CFM	12066	12959	13853	14747	15640	16534
Fan speed [%]	ESP in.wg					
60	0.08	-	-	-	-	-
65	0.37	0.15	-	-	-	-
70	0.65	0.44	0.2	-	-	-
75	0.94	0.73	0.49	0.21	-	-
80	1.23	1.01	0.77	0.5	0.18	-
85	1.5	1.28	1.04	0.77	0.45	0.08
100	1.5	1.28	1.04	0.77	0.45	0.08

TDCV4000G						
Air Flow CFM	12066	12912	13759	14605	15452	16298
Fan speed [%]	ESP in.wg					
61	0.08	-	-	-	-	-
66	0.37	0.16	-	-	-	-
71	0.65	0.44	0.21	-	-	-
76	0.94	0.73	0.5	0.23	-	-
81	1.23	1.02	0.79	0.52	0.22	-
85	1.43	1.23	0.99	0.73	0.43	0.08
100	1.43	1.23	0.99	0.73	0.43	0.08

TDCV4300G High Efficiency						
Air Flow CFM	13889	14461	15032	15604	16175	16747
Fan speed [%]	ESP in.wg					
67	0.08	-	-	-	-	-
72	0.37	0.2	0.02	-	-	-
77	0.65	0.49	0.3	0.1	-	-
82	0.94	0.78	0.59	0.39	0.17	-
85	1.1	0.93	0.75	0.55	0.32	0.08
100	1.1	0.93	0.75	0.55	0.32	0.08

Setting the Regulation and Safety Devices

After starting up the system, set the following setpoints:

- Room temperature (cooling and heating setpoint)
- Relative room humidity (humidification and dehumidification setpoint)
- Clogged filter differential pressure switch

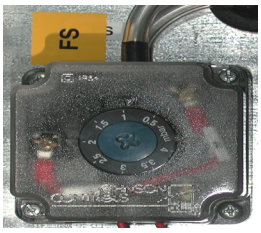
See “Setting the Clogged Filter Sensors” on page 31.

Caution: Do not modify safety device settings.

Setting the Air Flow Sensor

The fan differential pressure switch closes or opens if the fan (or one of the fans) stops working. The factory setpoint of the fan differential pressure switch is at .20” wc 0.5 mbar. It may be necessary to set the instruments after installation because the pressure difference between fan suction and discharge depends on air flow. Ensure that the contact closes when the fans are operating. To set the fan differential pressure switch:

1. Check that the pressure switch closes and opens. If the pressure switch does not close or open, gradually increase the setting until the pressure switch switches off.
2. Using an adjustment screw, set the fan differential pressure switch on a scale from .20” wc (0.5 mbar) to 1.6” wc (4.0 mbar).



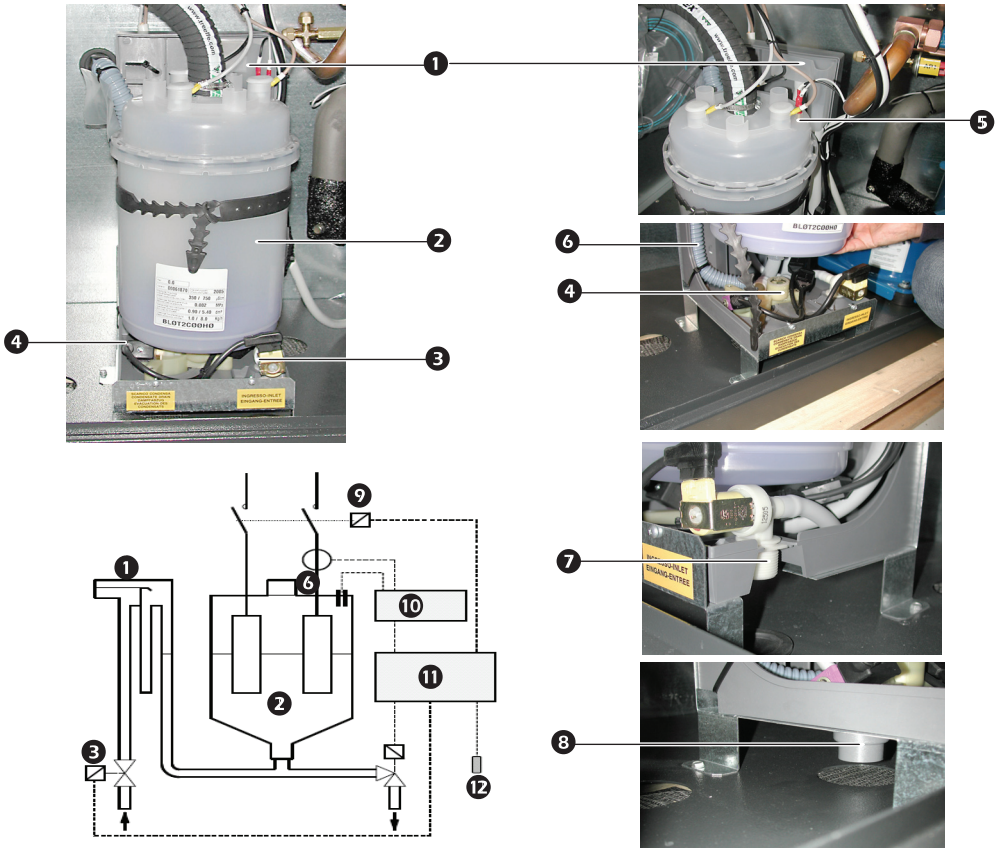
Setting the Clogged Filter Sensors

The differential pressure switch is set according to the loss of load dependent on the dirt inside the filters and the air flow. The differential pressure switch must be set at 1.2” wc (3 mbar). To set the pressure switch:

1. Gradually cover the air filter surface and check that the pressure switch activates when the filter is about 50-60% covered. If the pressure switch does not activate, gradually lower the setting, if it cuts in too soon, increase the setting.
2. Using a star screwdriver, turn the pressure switch’s regulation screws to the desired value.

Accessories

Humidifier



Item Number	Item
❶	Water supply tray
❷	Cylinder
❸	Feed water solenoid valve
❹	Cylinder drain solenoid valve
❺	High water level detector electrodes in the humidifier cylinder
❻	Overflow hose
❼	Water input
❽	Drain
❾	Amperometric transformer (TAM) for measuring the current (within the electrical panel)
❿	Humidifier interface board (inside the electrical panel)
⓫	Microprocessor control board
⓬	Temperature and humidity probe

Theory of operation

In the electrode humidifier, current flowing between the electrodes in the water generates the heat necessary to boil the water and the amperometric transformer (TAM) regulates electric current in the humidifier by controlling water level and mineral concentration in the steam cylinder. This is accomplished by opening and closing the feed water solenoid valve and the cylinder electric drain valve.

When steam is needed, the humidifier contact is closed, providing power to the immersed electrodes. When the current falls below the value required as a result of the fall in the water level, the feed water solenoid valve is opened.

The cylinder electric drain valve is opened at intervals depending on the characteristics of the feed water supply in order to maintain the optimum concentration of dissolved minerals in the water in the cylinder.

Feed water

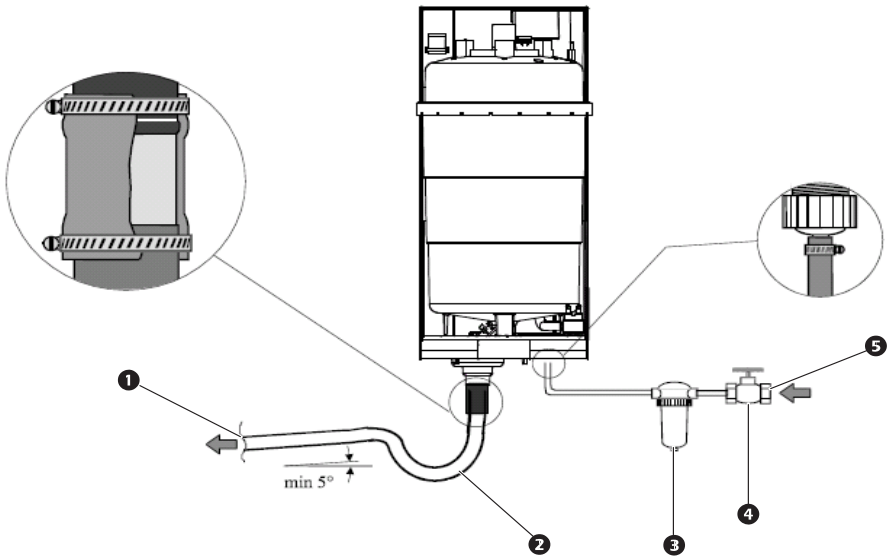
Values for the feed water for medium-high level of conductibility of a humidifier with immersed electrodes:

			LIMITS	
Description		**Units**	**Minimum**	**Maximum**
Hydrogen ion activity	pH	-	7	8.5
Specific conductibility at 20°C	σ_R, 20°C	µS/cm	300	1250
Total dissolved solids	TDS	mg/l	(1)	(1)
Residual fixed at 180°C	R180	mg/l	(1)	(1)
Total hardness	TH	mg/l	100(2)	400
Temporary hardness		mg/l	60(3)	300
Iron + manganese		mg/l Fe + Mn	0	0.2
Chlorides		ppm Cl	0	30
Silica		mg/l	0	20
Residual chloride		mg/l	0	.2
Calcium sulphate		mg/l	0	100
Metallic impurities		mg/l	0	0
Solvents, diluents, soaps, lubricants		mg/l	0	0

(1) Values dependent on the specific conductibility; in general: TDS @ 0,93 * s20; R180 @ 0,65 * s20
(2) Not lower than 200% of the Chloride content in mg/l di Cl-
(3) Not lower than 300% of the Chloride content in mg/l di Cl-

Connections

The humidifier installation requires connection to the water drain feed tubes.



Item Number	Item
1	Drain
2	Trap
3	Filter
4	Valve
5	Feed tubes

Electrical heaters

The Uniflair units can be equipped from the factory with electric heating elements complete with safety thermostats to cut off the power supply and activate the alarm in the event of overheating.

The finned elements are characterized as high efficiency in order to maintain a low power density on the surfaces, therefore limiting overheating the elements and consequently increasing their durability.

Due to the low surface temperature of the heating elements, the air ionization effect on the air is limited.

This heating system has a dual purpose:

- Heating the air to bring it up to the setpoint
- Post-heating during dehumidification in such a way as to retain the air temperature at setpoint (therefore, the capacity of heating installed is able to maintain the dry bulb temperature in the room during dehumidification)

Electrical Heaters Capacity with 230V/3pH/60Hz Power Supply

Chilled Water Unit	Number of Elements	kW	Operating Amps
0700D	2	6	15.1
1000D-1200D	3	9	22.6
1700D-2500D	5	15	37.7
3400D-4000D-4300D	6	18	45.2

Electrical Heaters Capacity with 208V/3pH/60Hz Power Supply

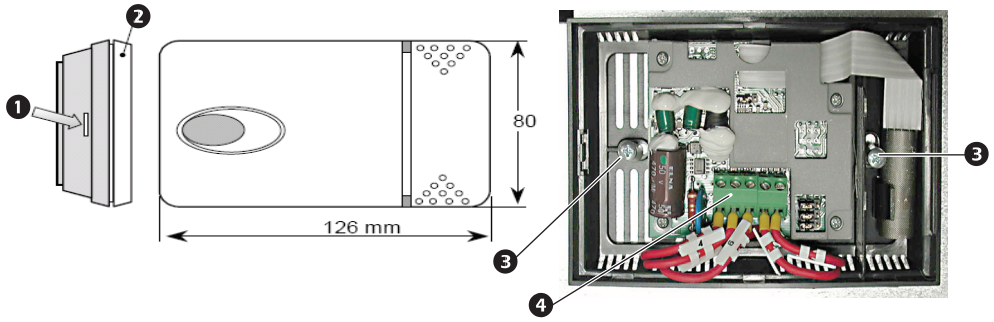
Chilled Water Unit	Number of Elements	kW	Operating Amps
0700D	2	4.9	13.6
1000D-1200D	3	7.4	20.4
1700D-2500D	5	12.3	34.1
3400D-4000D-4300D	6	14.7	40.9

Electrical Heaters Capacity with 460V/3pH/60Hz Power Supply

Chilled Water Unit	Number of Elements	kW	Operating Amps
0700G	2	6	7.5
1000G-1200G	4	12	15.1
1700G-2500G	4	12	15.1
3400G-4000G-4300G	6	18	22.6

Temperature and Humidity Sensor

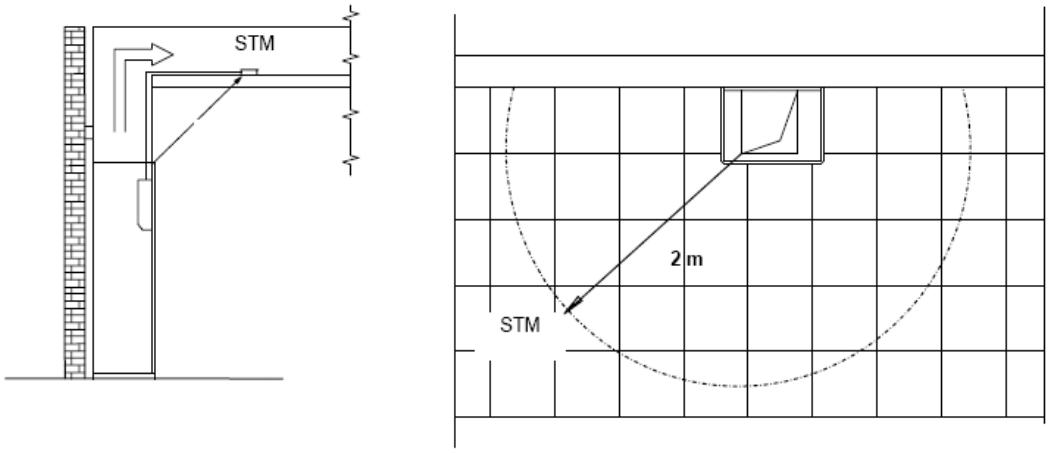
The diagram shows an optional temperature and humidity sensor. When replacing the sensor, release the white plastic lid by pressing on point ❶ with a screwdriver or a pointed tool; lifting the lid ❷ to gain access to the screws ❸ and the terminals ❹. A shielded cable is used for the electrical connections to the sensor. The connections to the terminals are shown on the electrical diagram.



Discharge Temperature Threshold Sensor

An NTC temperature sensor is an optional accessory which maintains the supply air temperature of the unit above a threshold value. The sensor is connected to the microprocessor control system as described in the electrical diagram of the unit.

The sensor has a temperature range of -58°F and 122°F and a protection level of IP67. It can be installed outside the unit by means of a cable which is 3 m (9.8') long. A minimum distance of 2 m (6.5') is advisable from the unit discharge, as shown in the diagram for upflow units.



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  - **www.apc.com/support/**
    Global support searching APC Knowledge Base and using e-support.
- Contact the APC Customer Support Center by telephone or e-mail.
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990-4484-001 **7/2011**