

## User manual

Nexpand Row-Based Cooling

Chilled Water units

# NEXPAND



## CW

*Close Control Chilled-Water Unit for high density systems*

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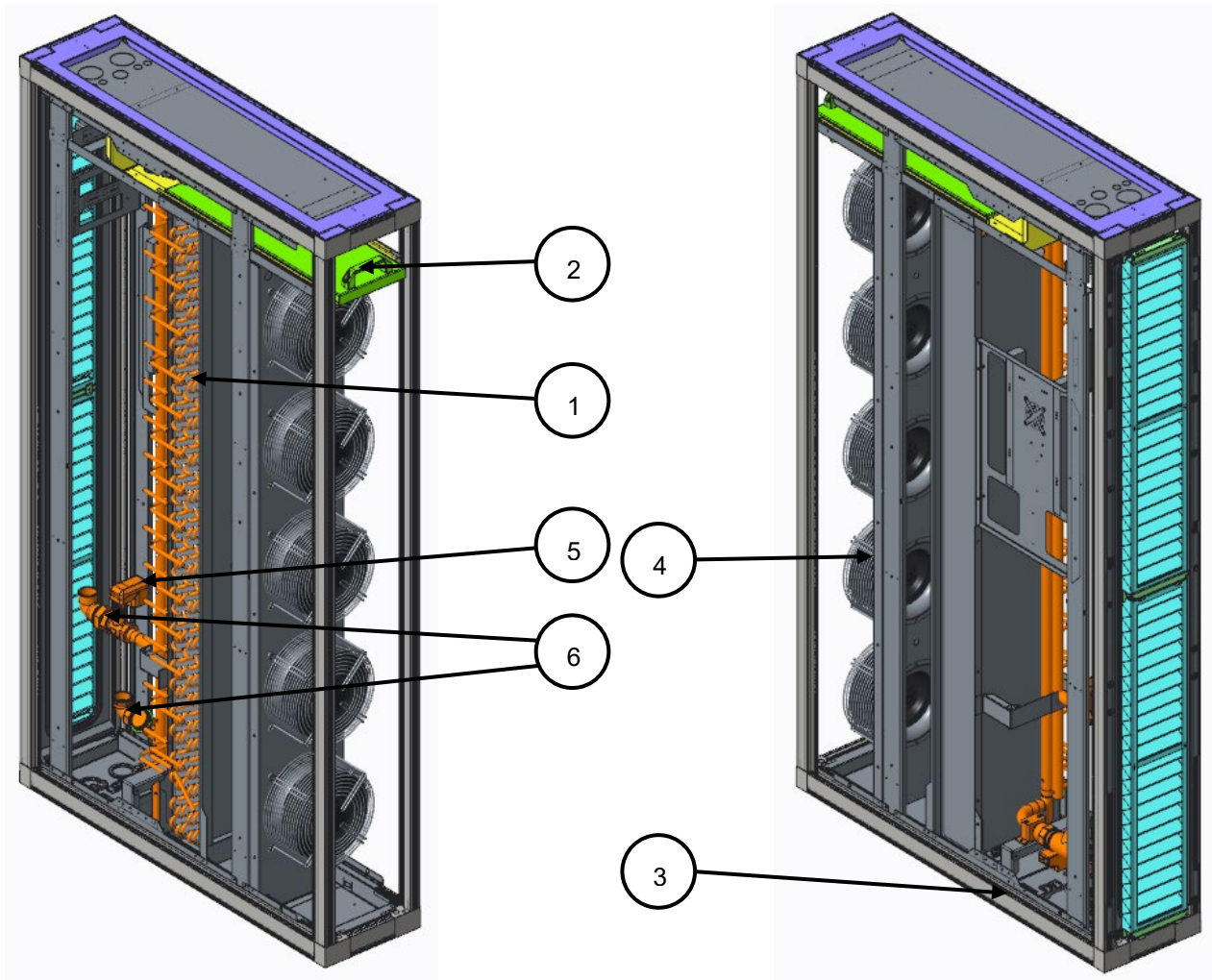
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## 1 General Description

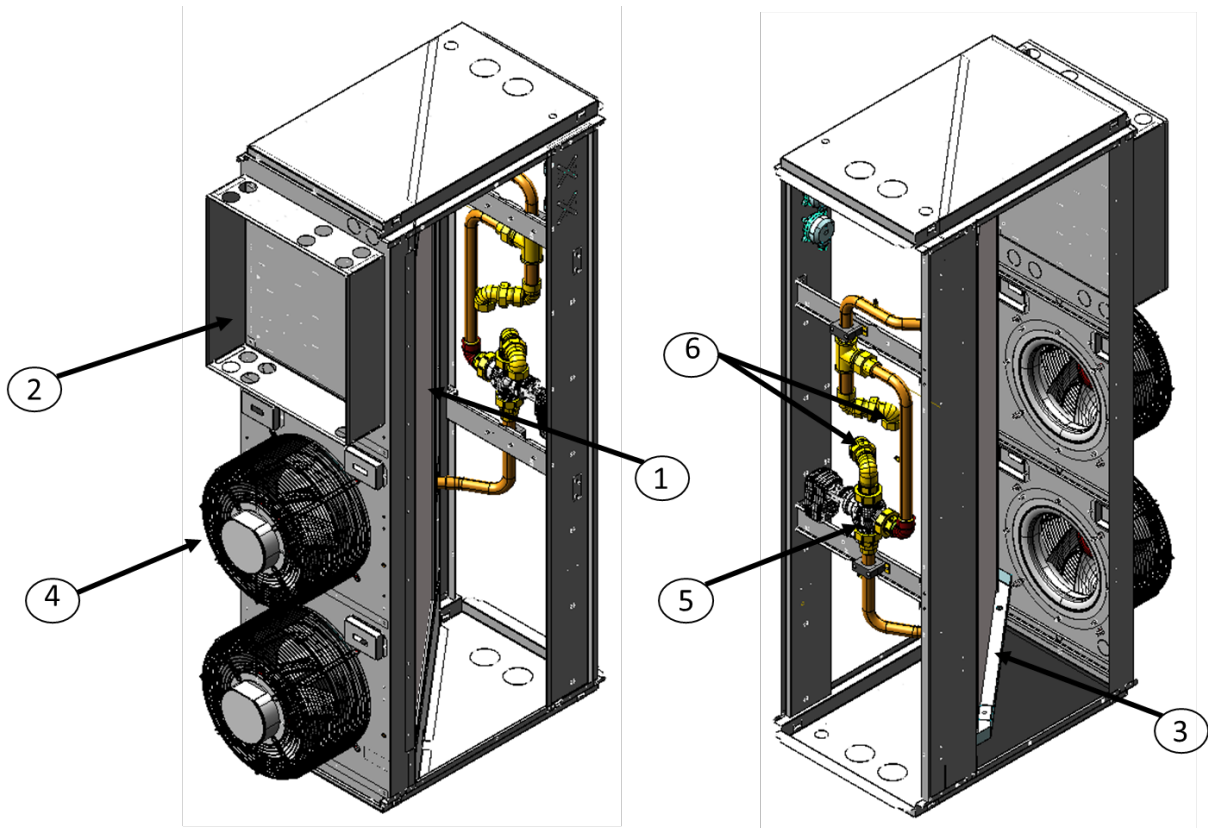
**CW40-CW60 “CCAC”** self-contained units are specially designed for installation in technological environments where a spot cooling is needed . **CW40-CW60** units represent the state of the art between technology and design as well as all **HiRef S.p.A.** products: The depth of 1200 mm, allows the compatibility with standard server rack: furthermore the innovative design and the high tech selected colours make **CW40-CW60** units complementary to the last generation of IT devices. The internal design of the units in firstly made looking to efficiency and reliability but don't losing accessibility: all components, including fans, valves, electrical components, etc. can be maintained from the front . The exclusive use of primary brands components and a fully integrated development process (CAD + CAM, CAE) stands for highest possible quality level regarding efficiency, reliability, maintenance time, pre and after sales support.

**CW40**



Pos.	Description	Pos.	Description
1	Chilled water coil	4	Radial Fan
2	Electrical panel	5	Water valve
3	Stainless steel drain pan	6	Water connections

**CW 60**



Pos.	Description	Pos.	Description
1	Chilled water coil	4	Radial Fan
2	Electrical panel	5	Water valve
3	Stainless steel drain pan	6	Water connections

## 1.1 Structure

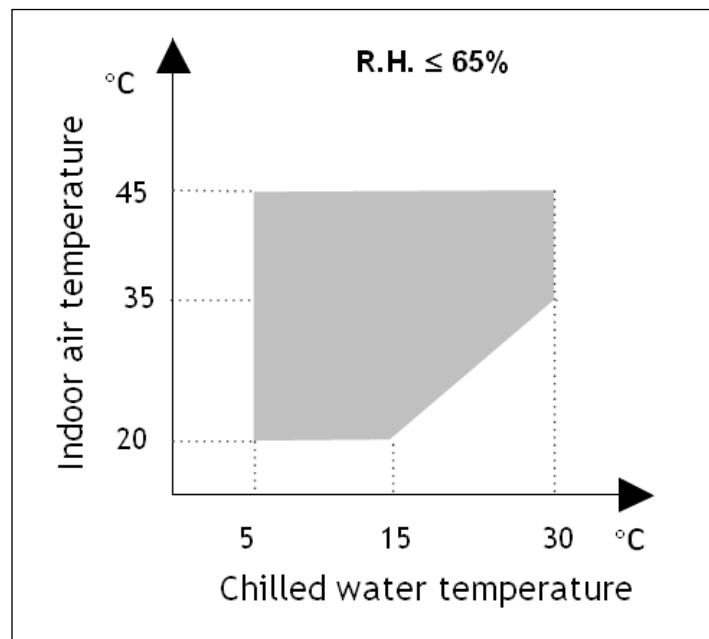
**CW40-CW60** units are designed with a self supporting frame and all components are produced using sophisticated computer driven machines and special tools. All sheet metals are galvanized powder coated giving to the units the image and the quality like last generation of IT devices. All fixing elements are made in stainless steel or in non corroding materials. The drain pan is made in stainless steel in order to ensure long time operation without damages.

## 1.2 Application limits

Tab. 2 Operation limits  
*Power supply limits and storage conditions*

Model		CW40	CW60
Power supply	[Vac / Ph / Hz]	230 (±10%) / 1 / 50-60	400 (±10%) / 3+N / 50
Storage conditions	Temperature	from	-10 °C
		to	+50 °C
	Relative humidity	less than	90 %

Fig. 2 Application limits



## 1.3 Components

### Electric control board

Electric control board: The electric control board is constructed and wired in accordance with Directives 73/23/EEC and 89/336/EEC and related standards. The board may be accessed through a door after the main switch has been turned off.

All the remote controls use 24 V signals powered by a safety transformer situated in the electrical panel.

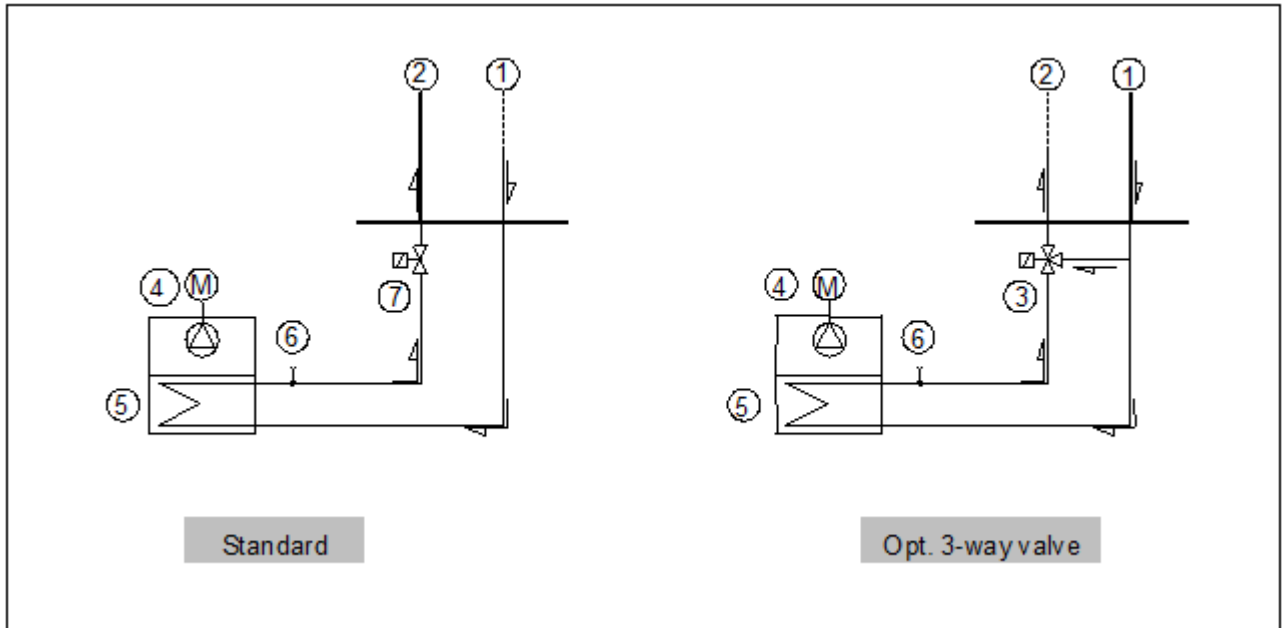
### Microprocessor control

The microprocessor built into the unit allows the different operating parameters to be controlled from a set of pushbuttons situated on the control panel on the door.

- Water valve modulation to maintain the temperature set point
- Alarm management :
  - High / Low temperature;
  - Dirty filters alarm (optional);
  - Air flow alarm.
- Alarm signalling.
- Display of operating parameters.

**See the Software Manual for further details.**

Fig.1 Basic cooling circuit



Pos.	Description	Pos.	Description
1	Chilled water inlet	5	Coil heat exchanger
2	Chilled water outlet	6	Breather valve
3	3-way valve (Opt.)	7	2-way valve
4	Plug fan	-	

## Water Valve

Modulating valves allow an high precision in controlling the rack temperature

- 3 way for constant flow systems
- 2 way valve for variable flow. In this case Free cooling application range will be extended thanks to the increase of return water T once the load decreases.

Valves' technical data:

Model	CW40	CW60
Brand / valve's type	Danfoss / VRG	Danfoss / VRG
PN valve	16	16
Dimension (inch)	1 1/2"	2 1/4"

2-way valve

3-way valve

Actuator



All CW units are supplied with 3 or 2 way valve with 0 ÷ 10 V signal regulation.

## 1.4 Installation warnings

### General rules

- When installing or servicing the unit, you must strictly follow the rules provided in this manual, comply with the directions on the units themselves and take all such precautions as are necessary.
  - The fluids under pressure in the cooling circuit and the presence of electrical components may cause hazardous situations during installation and maintenance work.



**All work on the unit must be carried out by qualified personnel only, trained to do their job in accordance with current laws and regulations.**

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- Failure to comply with the rules provided in this manual or any modification made to the unit without prior authorisation will result in the immediate invalidation of the warranty.



**Warning: Before performing any kind of work on the unit, make sure it has been disconnected from the power supply.**

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## 2 Inspection / Transport / Positioning

### 2.1 Inspection on receipt

On receiving the unit, check that it is perfectly intact: the unit left the factory in perfect conditions; immediately report any signs of damage to the carrier and note them on the "Delivery Slip" before signing it.

**Minkels** or its agent must be promptly notified of the entity of the damage. The Customer must submit a written report describing every significant sign of damage.

### 2.2 Lifting and transport

While the unit is being unloaded and positioned, utmost care must be taken to avoid abrupt or violent manoeuvres. The unit must be handled carefully and gently; avoid using machine components as anchorages or holds and always keep it in an upright position.

The unit should be lifted using the pallet it is packed on; a transpallet or similar conveyance means should be used.



**Warning:** In all lifting operations make sure that the unit is securely anchored in order to prevent accidental falling or overturning.

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### 2.3 Unpacking

The packing must be carefully removed to avoid the risk of damaging the unit. Different packing materials are used: wood, cardboard, nylon etc. It is recommended to keep them separately and deliver them to suitable waste disposal or recycling facilities in order to minimise their environmental impact.

### 2.4 Positioning

Bear in mind the following aspects when choosing the best site for installing the unit and the relative connections:

- positioning and dimensions of the coupling flanges;
- location of power supply;
- solidity of the supporting floor.

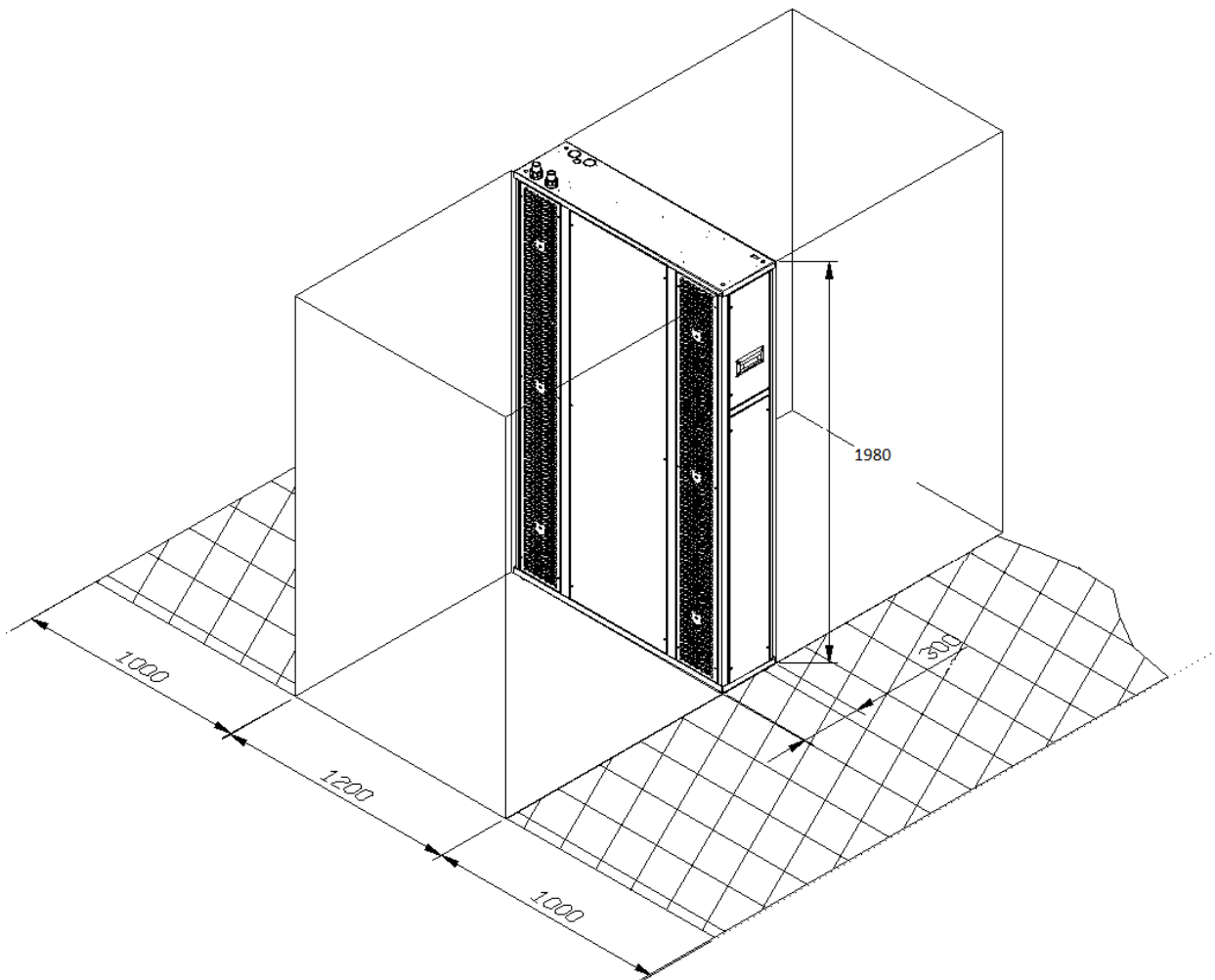
It is recommended to first prepare the floor/wall for passing through the power cables.

The dimensions of the air outlet and the positions of the holes for the screw anchors and power cables are shown in the dimensional drawing (see the documentations delivered together with the unit)

### 3 Installation

The **CW40-CW60** air-conditioning unit is suitable for all environments except aggressive ones. Do not place any obstacles near the units and make sure that the air flow is not impeded by obstacles and/or situations causing back suction.

Fig. 7 Service area



For the option to exchange the entire unit, a space of 1400mm is required on one side.

The following steps should be carried out to ensure proper installation:

- Position the unit on the floor and adjust with the levelling feet to align with the adjacent racks.

## 4 Electrical Connections

### 4.1 Generalities



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Before carrying out any job on electrical parts, make sure the power supply is disconnected.

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Check that the mains electricity supply is compatible with the specifications (voltage, number of phases, frequency) shown on the unit rating plate.



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The size of the cable and line protections must conform to the specifications provided in the wiring diagram.

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The supply voltage may not undergo fluctuations exceeding  $\pm 10\%$  of the rated values indicated on the nameplate



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The above operating conditions must always be complied with: failure to ensure said conditions will result in the immediate invalidation of the warranty.

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The electrical connections must be made in accordance with the information shown in the wiring diagram provided with the unit and with current and local regulations. An earth connection is **mandatory**. The installer must connect the earthing wire using the earthing terminal (yellow and green wire) situated on the electric control board (CW60 unit) or in the mains inlet at the back side (CW40 unit). The power supply to the control circuit is taken from the power line through an insulating transformer situated on the electric control board. The control circuit is protected by suitable fuses or automatic breakers depending on the unit size.

The recommended sizes for the power cables are shown in the electrical diagram attached on the unit documentation.



**When the motor runs independently due to air flowing through or if it continues to run down after being turned off, dangerous voltages of over 50V can arise on the motor internal connections through operation of the generator.**



**Even after disconnecting the mains voltage, life-threatening charges can appear between the protective ground "PE" and the mains connection. The protective earth is conducting high discharge currents (dependent on the switching frequency, current source voltage and motor capacity). Earthing in compliance with EN specifications shall therefore be observed even for testing and trial conditions (EN 50 178, Art.5.2.11).**

Regarding the differential protection that needs to be installed upstream, it is necessary to use a type A switch that is sensitive to direct currents. It is mandatory for it to have the following features:

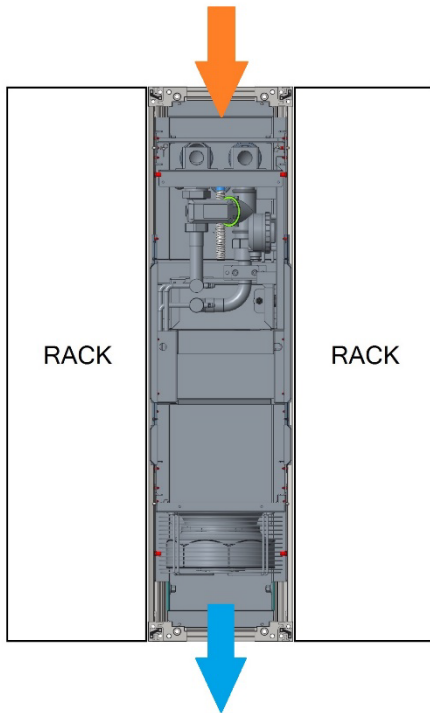
1. Calibratable operation threshold 300mA
2. Calibratable operation delay 200ms

## 5 Operating Diagrams

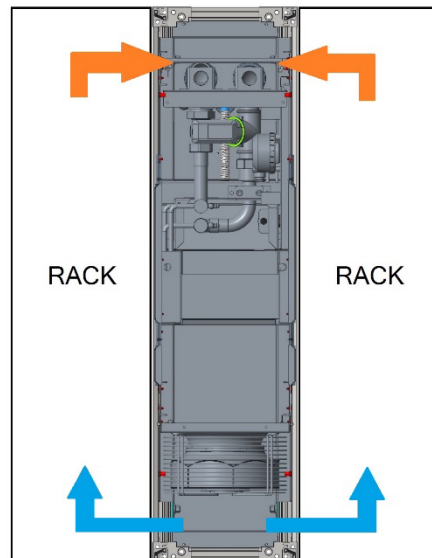
Changing the side, frontal and rear pannels it's possible to modify the air flow configuration of the CW40 as in the following pictures. On the CW60 only "Horizontal Air Flow (Rear-Front)" configuration is possible.

Fig. 11 Operating diagrams

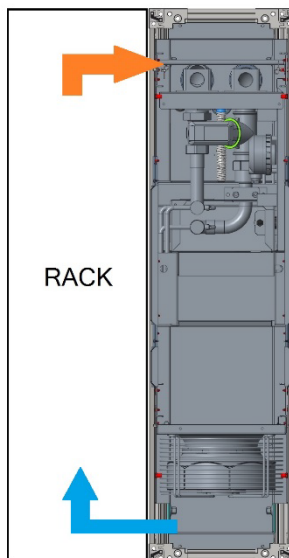
Horizontal Air Flow (Rear-Front)



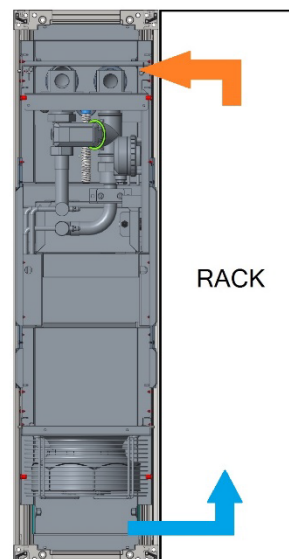
Side Air Flow (Left-Right)



Left Side Air Flow



Right Side Air Flow



## 6 Start-Up

### 6.1 Preliminary checks

Check that the electrical connections have been made properly and that all the terminals **are securely tightened**.

This check should also be included in a periodic one year inspection.

### 6.2 Starting operations

Before starting the unit, turn the main switch on, select the operating mode desired from the control panel and press the "ON" button on the control panel.

**If the unit fails to start up, check if the service thermostat has been set according to the nominal values provided.**



**You should not disconnect the unit from the power supply during periods when it is inoperative but only when it is to be taken out of service for a prolonged period (e.g. at the end of the season).**

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**Never attempt to modify internal electrical connections: any undue modifications will immediately invalidate the warranty.**

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## 7 Setting Operating Parameters

### 7.1 Generalities

All the control devices are set and tested in the factory before the unit is dispatched. However, after the unit has been in service for a reasonable period of time you can perform a check on the control devices. The settings are shown in Tab. 5.



**All servicing of the equipment is to be considered extraordinary maintenance and may be carried out BY QUALIFIED TECHNICIANS ONLY: incorrect settings may cause serious damage to the unit and injuries to persons.**

The operating parameters and control system settings configurable by means of the microprocessor control are password protected if they have a potential impact on the integrity of the unit.

Tab. 5 Setting of control devices

Control device		Set point	Differential
Differential air pressure switch (dirty filter)	Pa	350	20

*Values to be calibrated depending on the application.*

## 8 Maintenance

The only operations to be performed by the user are to switch the unit on and off. All other operations are to be considered maintenance work and must thus be carried out by qualified personnel trained to do their job in accordance with current laws and regulations.

### 8.1 Warnings



**All the operations described in this chapter MUST ALWAYS BE PERFORMED BY QUALIFIED PERSONNEL ONLY.**



**Before carrying out any work on the unit or accessing internal parts, make sure you have disconnected it from the mains electricity supply.**



**Be especially careful when working in proximity to finned coils since the 0.11 mm-thick aluminium fins can cause superficial injuries due to cuts.**



**After completing maintenance jobs, always replace the panels enclosing the units and secure them with the fastening screws provided.**

### 8.2 Generalities

To guarantee a constantly satisfactory performance over time, it is advisable to carry out routine maintenance and checks as described below. The indications are related to standard tear and wear.

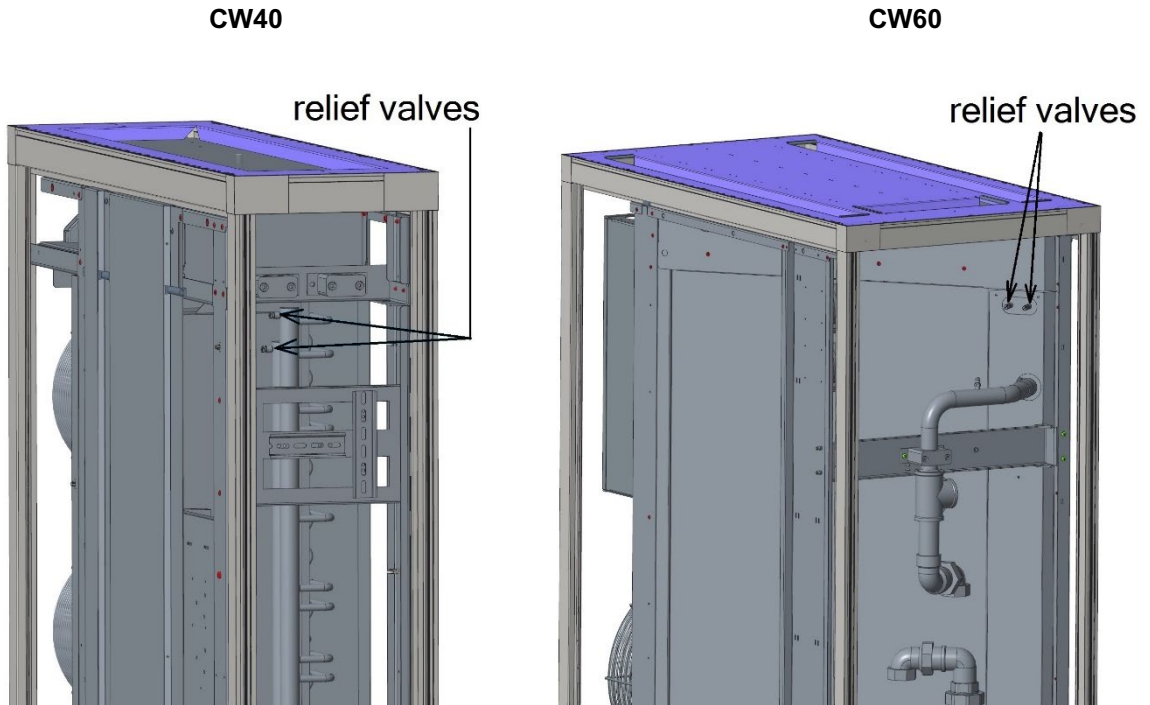
Tab. 7 Routine maintenance

Operation	Frequency
Check the efficiency of all the control and safety devices.	Once a year
Check the terminals on the electric control board to ensure that they are securely tightened. The movable and fixed contacts of the circuit breakers must be periodically cleaned and replaced whenever they show signs of deterioration.	Once a year
Check the efficiency of the dirty filter differential pressure switch.	Every 6 months
Check the condition of the air filter and replace it if necessary.	Every 6 months



Fig. 15 Purging the air out of the water coil

The relief valve is accessible from the backside of the unit



## 9 Troubleshooting

On the next pages you will find a list of the most common reasons that may cause the package unit to fail or any malfunction. These causes are broken down according to easily identifiable symptoms.



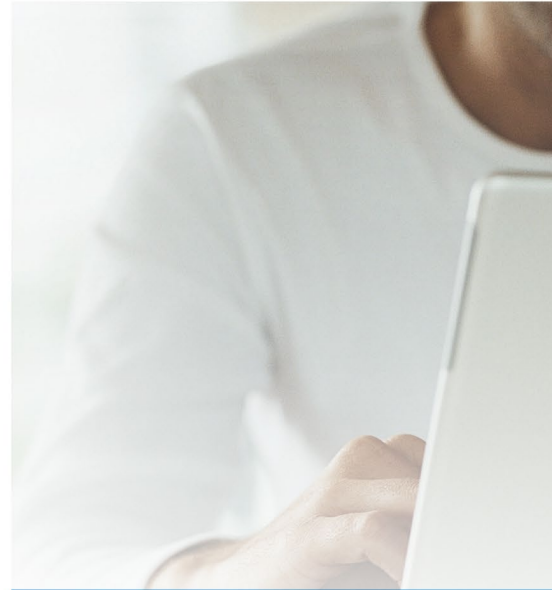
**You should be extremely careful when attempting to implement any of the possible remedies suggested: overconfidence can result in injuries, even serious ones, to inexperienced individuals. Therefore, once the cause has been identified, you are advised to contact the manufacturer or a qualified technician for help.**

Tab. 9 Fault - Causes - Corrections

FAULT	POSSIBLE CAUSES	CORRECTIVE ACTIONS
<b>The unit does not start</b>	No power supply.	Check if power is being supplied both to the primary and auxiliary circuits.
	The electronic card is cut off from the power supply.	Check the fuses.
	Alarms have been released.	Check whether any alarms are signalled on the microprocessor control panel, eliminate the causes and restart the unit.
<b>Air in the hydraulic circuit</b>	During external connections.	Drain the air using the relief valves (see Fig.15)
<b>Water out from the unit</b>	The drain pan hole is closed.	Open the front panels, remove the sheet metal just below the e-panel (down flow units) and clean it.
	The siphon is missing.	Check for the presence and provide for a new one.
	The air flow is too high.	Reduce the fan speed up to reaching the nominal air flow.







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### MINKELS HEADQUARTERS & INTERNATIONAL

Eisenhowerweg 12

P.O. Box 28

5460 AA Veghel

t. +31 (0)413 311 100

[info@minkels.com](mailto:info@minkels.com)