COMPACT AIRHANDLING™

CFHR-S Series

CEILING TYPE PAPER CROSS FLOW HEAT
RECOVERY UNIT

INSTALLATION & OPERATION MANUAL

INDEX

1. WARNINGS & SAFETY INFORMATION

Please read this manual before using the product!!!

Prohibitions

⚠ Unauthorized personnel must not interfere in unit and/or must not use unoriginal spare parts.

⚠ Do not operate the unit so as to expose it to the external environment conditions by opening the doors protecting the electrical and electronic equipment of the unit.

⚠ Do not use this product outside the range of its rated voltage and control capacity.

⚠ This product must not be disassembled under any circumstances. Only authorized repair technicians are qualified to conduct disassembly and repairs.

⚠ Don't install the units in a place where contains combustible abrasive and toxic gases and vapors.

Caution

⚠ Install this product in an environment where the temperature ranges from 0 °C to +40 °C and the relative humidity is less than 80%. If condensation is expected to form, heat up the fresh outside air by a duct heater etc.

⚠ This unit is designed for the indoor conditions, not for outdoor use.

⚠ This unit has to be used under proper conditions according to its technical specification and design purpose. [Otherwise responsibility belongs to practitioner]

⚠ Perform the preliminary inspections before starting-up the unit.

⚠ Bare in mind that a wrong cleaning application may result in undesired damage to the unit and/or the operator.

⚠ The disassembled dirty filters should be placed in a closed, isolated box and should be destroyed in compliance with the solid waste procedures.

Transportation & Installation

⚠ Packaging shouldn't be removed until the unit reaches the installation point so that no damage occurs on the unit.

⚠ Select an adequately sturdy position for installing the product and install it properly and securely.

⚠ Do not install this product where it will be directly exposed to rain.

⚠ Do not shake and jerk the units during the transportation.

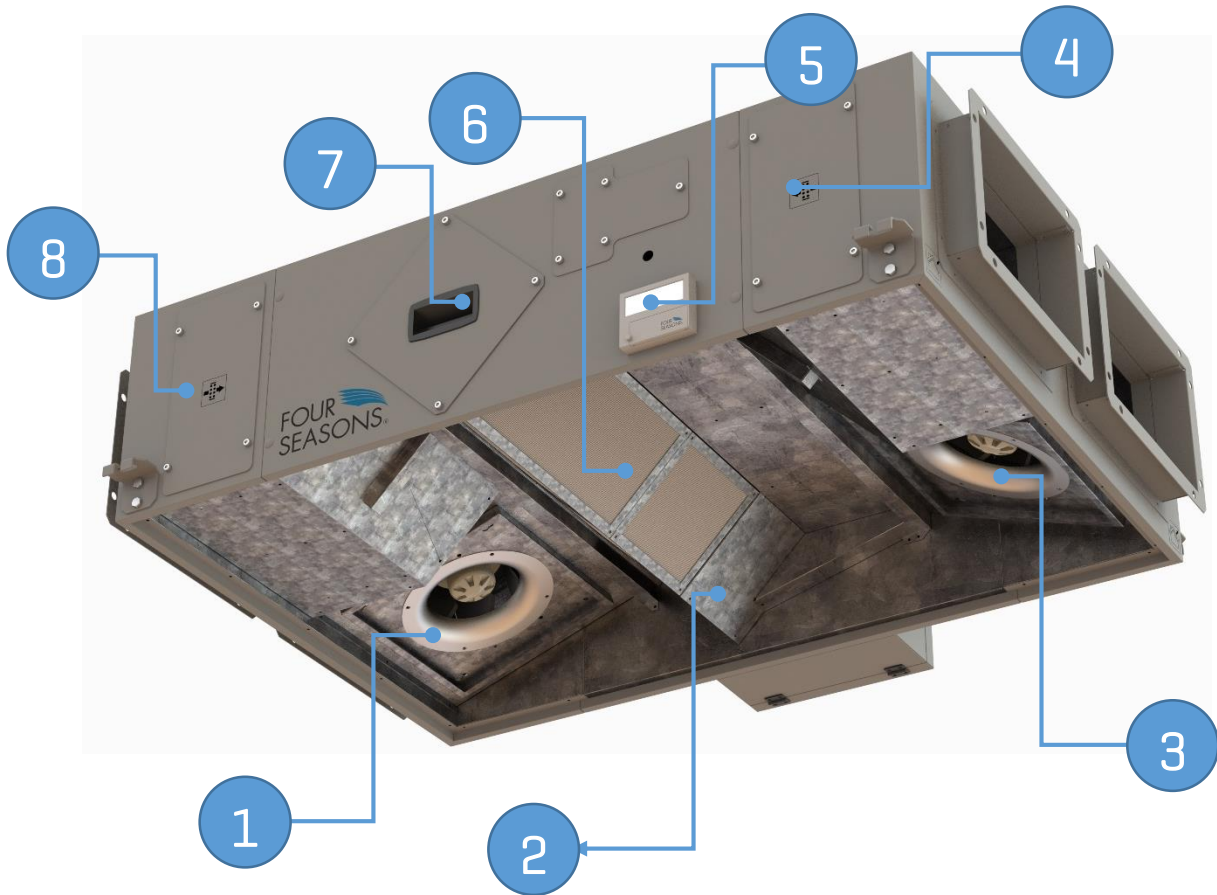⚠ Prevent the vibration and the shake during the transportation for to prevent damages in the unit.

Work Safety

⚠ Never perform maintenance or repair works on plugged in units.

⚠ Do not touch the electrical equipment of the unit with bare hands without any protection.

⚠ While performing any maintenance on the unit, the electricity of the unit should be disconnected and a warning sign should be used to show that the unit is under maintenance.

⚠ Intervention by unauthorized people should not be allowed on any electrical part of the unit.

⚠ Gloves should be worn while installation.

⚠ Do not touch the hot surfaces during the operation of the unit.

Electrical Warnings

⚠ The use of overcurrent fuse is recommended against voltage change for unit safety

⚠ Electrical wiring connections must be made according to the specified electrical wiring diagram.

⚠ This manual is contained the special electrical wiring diagram which show that how could electrical connections make. Electrical connections must be made according to this diagram.

⚠ The electrical connections, which to be made to the user panel from outside, must be according to the rules and directions.

⚠ It must be made sure that the voltage is within ±5% tolerance of the tag value by using a voltmeter.

2.   COMPONENTS

1] Supply Fan

2] By-Pass Damper

3] Extract Fan

4] Filters

5] Control Panel

6] Counter Flow Heat Exchanger

7] Heat Exchanger Service Door

8] Filters

Air Directions:

SUPPLY AIR

EXHAUST AIR

RETURN AIR

OUTSIDE AIR

3. LABELING

RETURN AIR	OUTSIDE AIR
SUPPLY AIR	FILTER
EXHAUST AIR	DRAINAGE

ELECTRIC PANEL
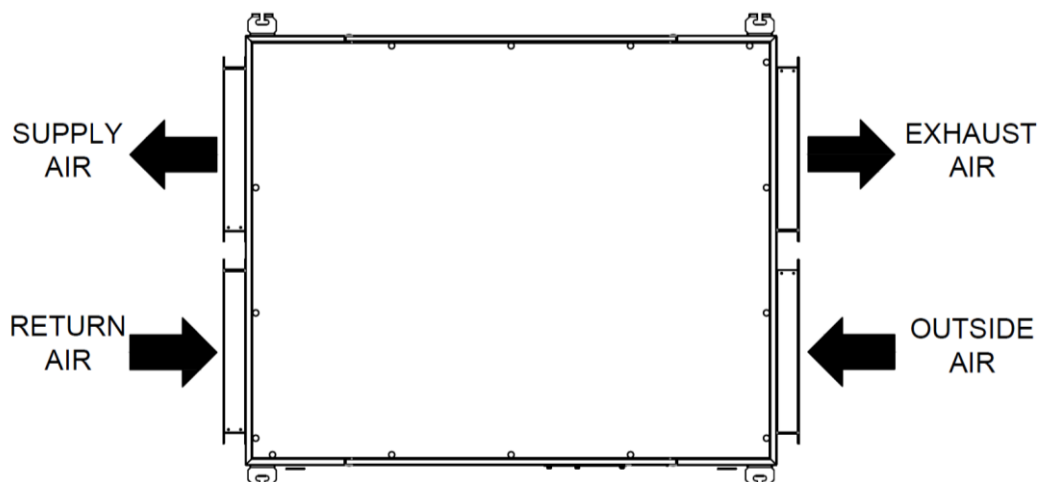
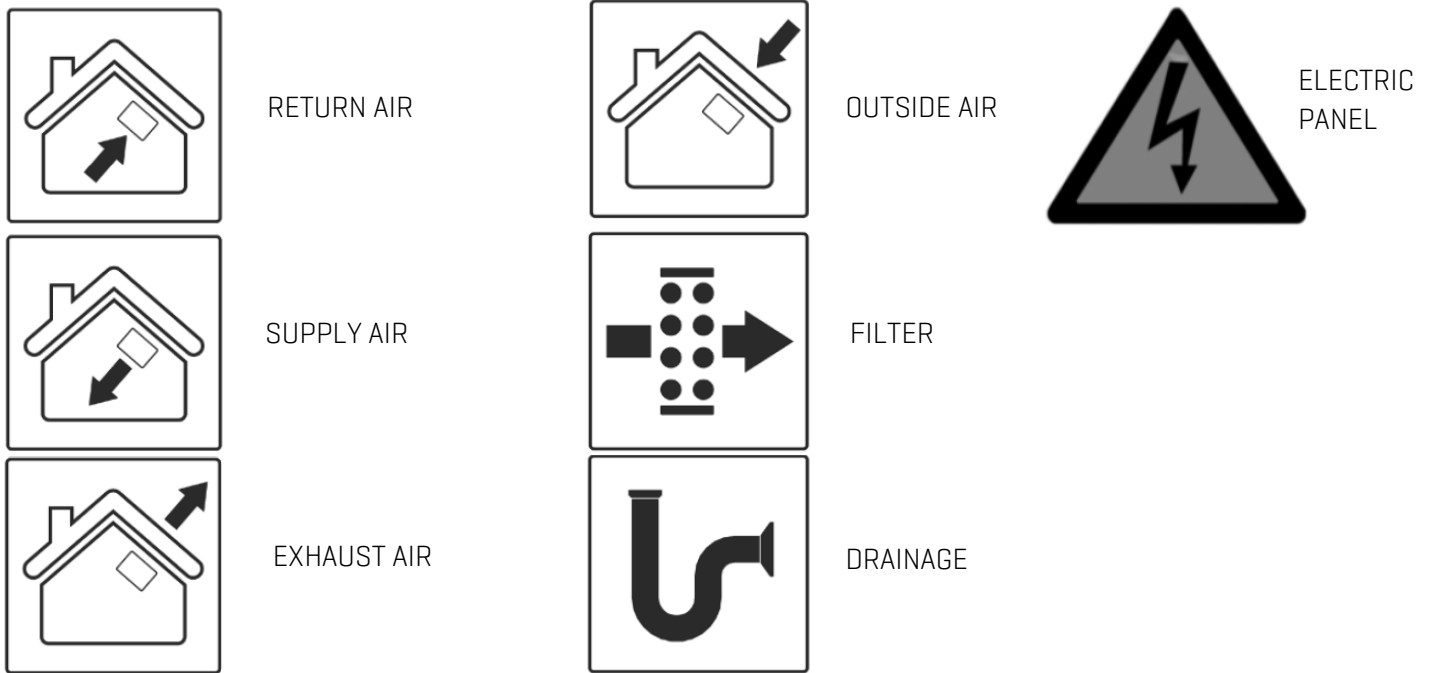# 4. TECHNICAL SPECIFICATIONS

	POWER [W]		VOLTAGE [V] / CURRENT [A]		RPM [1/min]		SOUND LEVEL*
	Supply Fan	Extract Fan	Supply Fan	Extract Fan	Supply Fan	Extract Fan	dB[A]
CFHR-05	83	83	230/0,75	230/0,75	3200	3200	32
CFHR-07	119	119	230/0,9	230/0,9	3635	3635	33
CFHR-10	170	170	230/1,4	230/1,4	2860	2860	37
CFHR-12	170	170	230/1,4	230/1,4	2510	2510	34
CFHR-16	385	385	230/2,5	230/2,5	3400	3400	34
CFHR-25	470	470	230/3,1	230/3,1	2530	2530	42
CFHR-28	500	500	230/2,2	230/2,2	2700	2700	45
CFHR-33	500	500	230/2,2	230/2,2	1850	1850	44
CFHR-40	750	750	230/3,3	230/3,3	2100	2100	47

Sound pressure level is measured 1,5 m away from the device.

	CFHR 05	CFHR 07	CFHR 10	CFHR 12	CFHR 16	CFHR 25	CFHR 28	CFHR 33	CFHR 40
Maximum Air Flow [m³/h]	500	700	1040	1200	1580	2400	2650	3450	4010
Pext. [Pa]	0								
Nominal Air Flow [m³/h]	390	510	845	1000	1440	2100	2200	3000	3510
Pext. [Pa]	150								

	CFHR 05	CFHR 07	CFHR 10	CFHR 12	CFHR 16	CFHR 25	CFHR 28	CFHR 33	CFHR 40
SPI [W/(m³/h)]	0,166	0,164	0,170	0,142	0,240	0,188	0,178	0,150	0,187
SFP [W/(m³/s)]	597	1180	1224	1020	1732	1356	1280	1090	1350
EN 13770 SFP CLASS	CLASS 2	CLASS 4	CLASS 3	CLASS 3	CLASS 4	CLASS 4	CLASS 4	CLASS 3	CLASS 4

5. UNIT DIMENSIONS
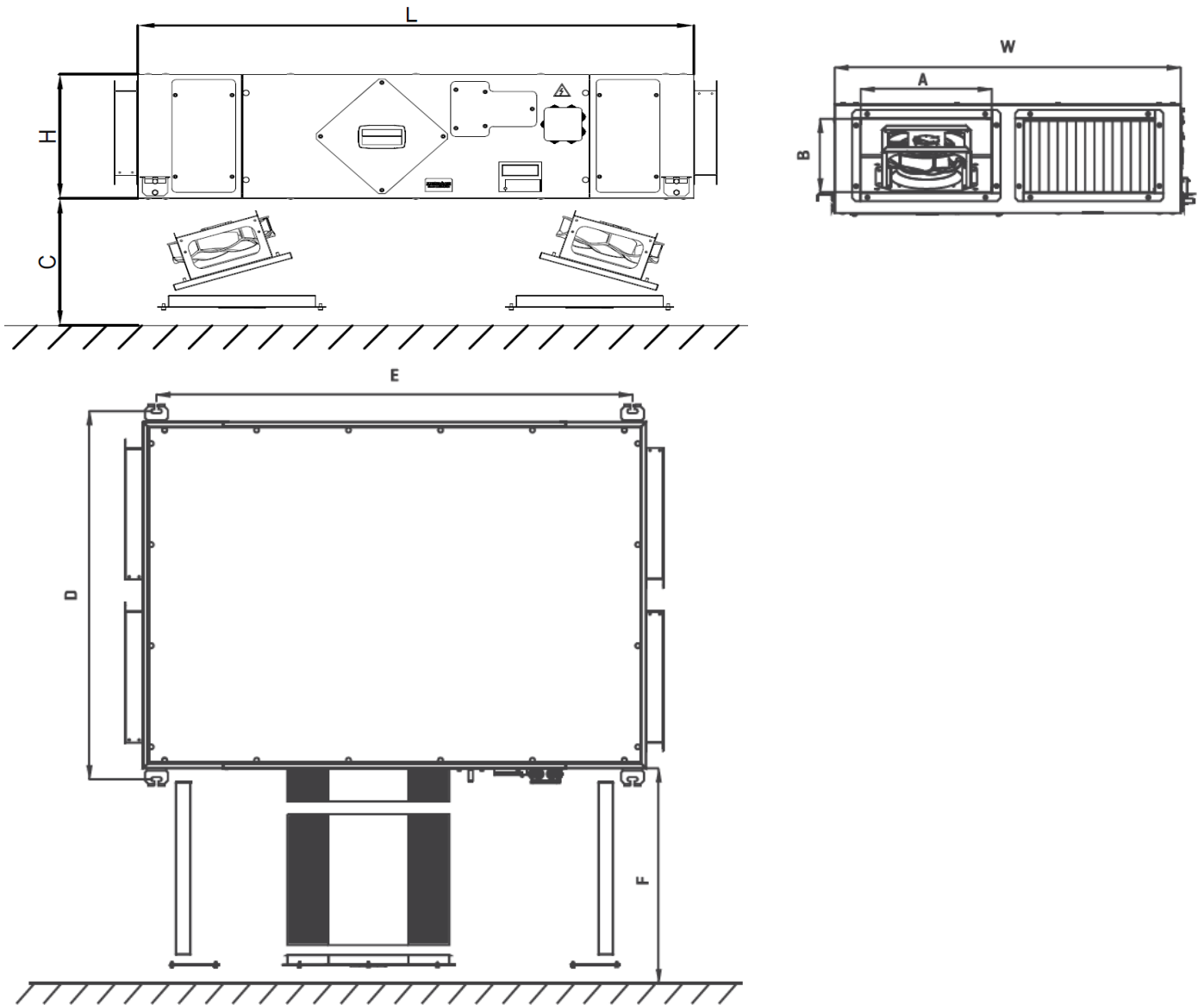
| MODELS	L	W	H	A	B	C	D	E	F	Weight
CFHR-05	1090	580	335	200	230	230	646	1010	450	80
CFHR-07	1090	580	335	200	230	230	646	1010	450	90
CFHR-10	1220	840	335	300	290	290	906	1140	450	130
CFHR-12	1310	1060	335	400	300	300	1126	1460	550	165
CFHR-16	1565	1320	375	450	340	340	1386	1480	600	195
CFHR-25	1665	1650	375	600	350	350	1716	1580	600	270
CFHR-28	1665	1950	375	800	350	350	2016	1580	600	310
CFHR-33	1750	1950	460	800	430	430	2016	1670	600	345
CFHR-40	1890	2000	590	850	520	520	2066	1810	600	370

* All measurement values are mm.

** The values of weight are kg
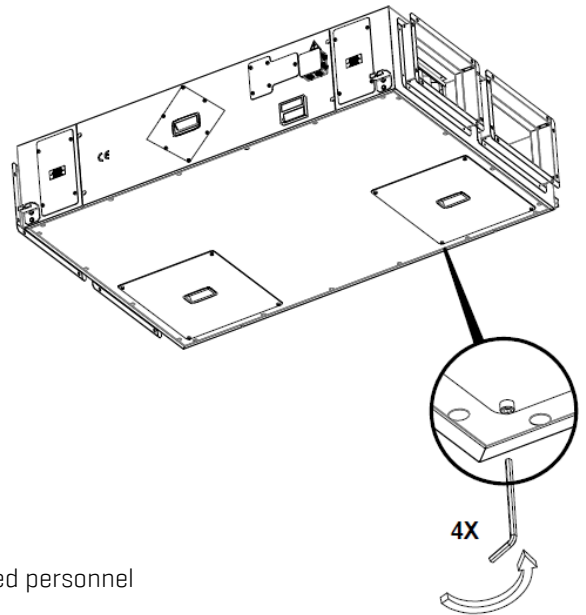
6. INSTALLATION

Wall Mounting:

When wall mounting, consideration should be made regarding wall's strength and its suitability. Take into consideration the position of the electrical equipment and ensure there is adequate access for installation, operation and maintenance.
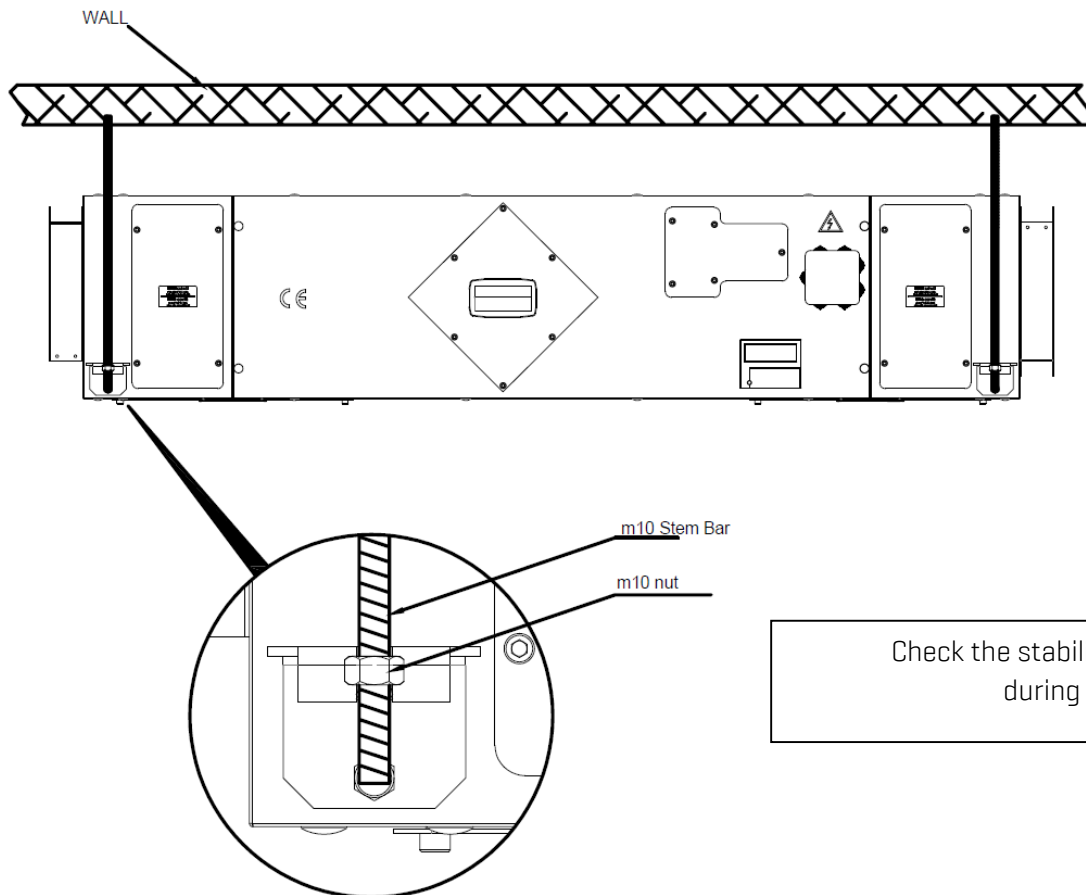
Check the stability of sling bolts during the installation.

- M10 flush steel dubel is fixed to wall.
- The M10 imbus bolt is compressed so that it passes though the hanger.
- Hang the device.
- Must be horizontal balance when wall and floor mounting.

7.   FAN MAINTENANCE
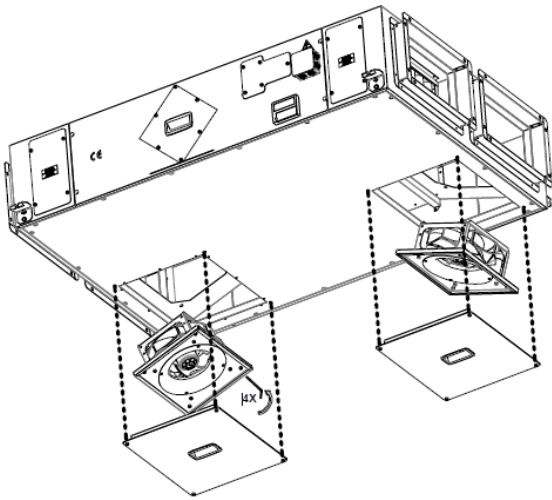
The fan installation and maintenance operations must be only by authorized personnel in necessary situations, which following below directives.

- Shut off the electric before any operation.
- Open the fan service doors.
- Dismantle all the socket with allen wrench like shown above figures.
- If desired, can be dismantle the base of fan with allen.
- Remove the fans.

* Only by authorized personnel.

8.   FILTER MAINTENANCE

- Do not wash the filters.
- Clean the filters with gently vacuum.
- Must change after 3 cleaning.
- Change when pores have damaged.
- Do not clean to F Class filters, directly replaced.
- Do not used pressured during cleaning.
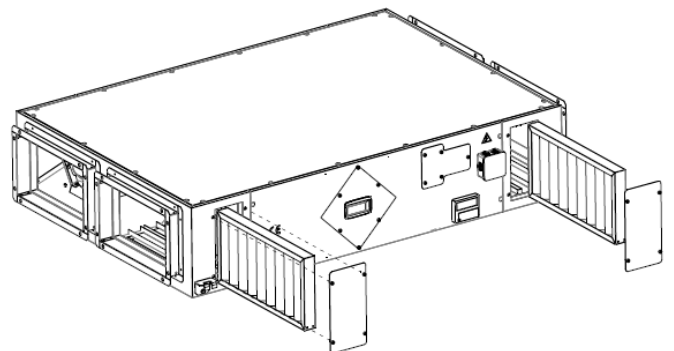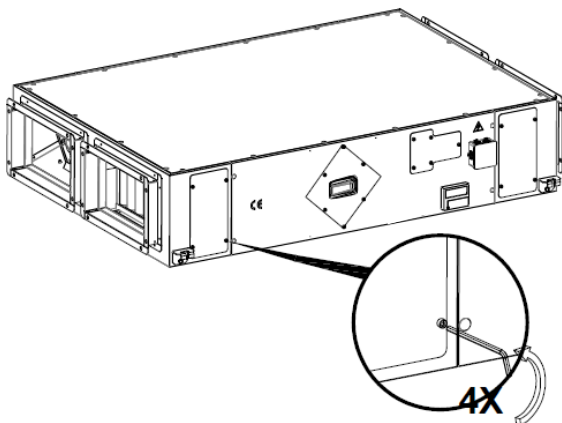
9. HEAT EXCHANGER MAINTENANCE
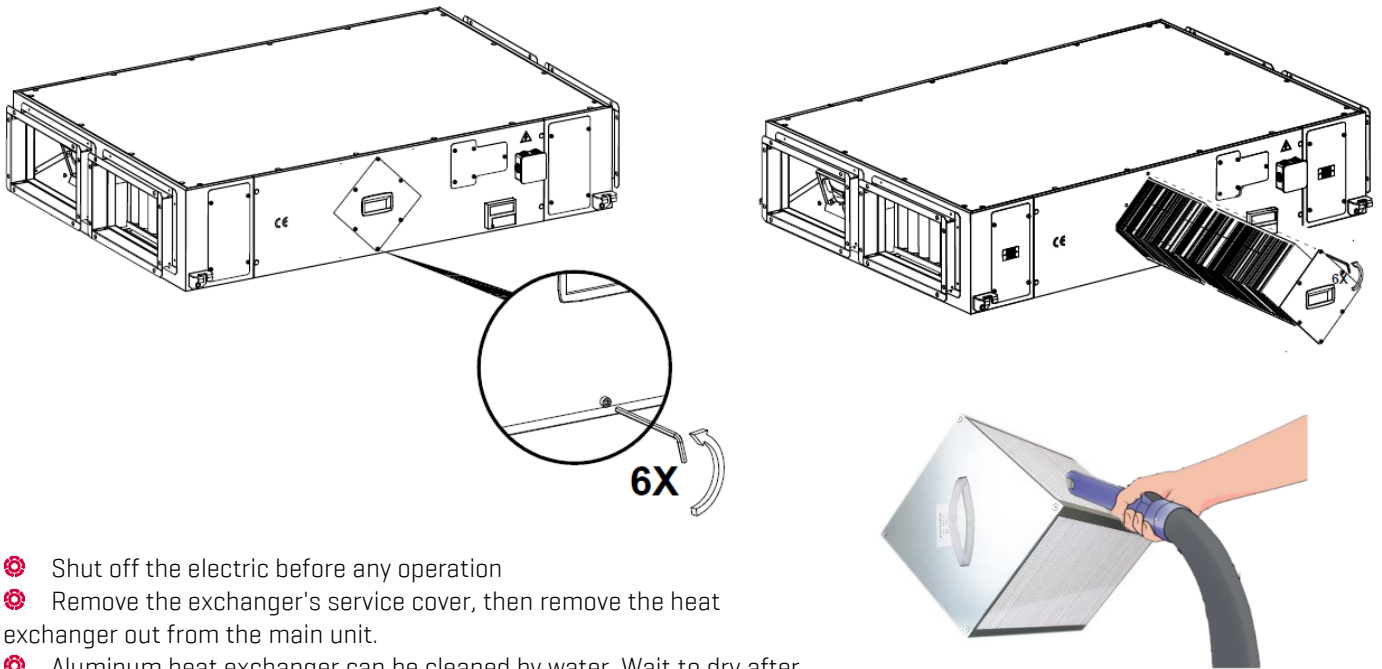
- Shut off the electric before any operation
- Remove the exchanger's service cover, then remove the heat exchanger out from the main unit.
- Aluminum heat exchanger can be cleaned by water. Wait to dry after cleaning heat exchanger.
- Connect the unit after making sure that the heat exchanger has dried
- Do not use corrosive, chemical matter and detergent.
- Do not apply force during cleaning operation.

* Only by authorized personnel

10. DAMPER DISASSEMBLY
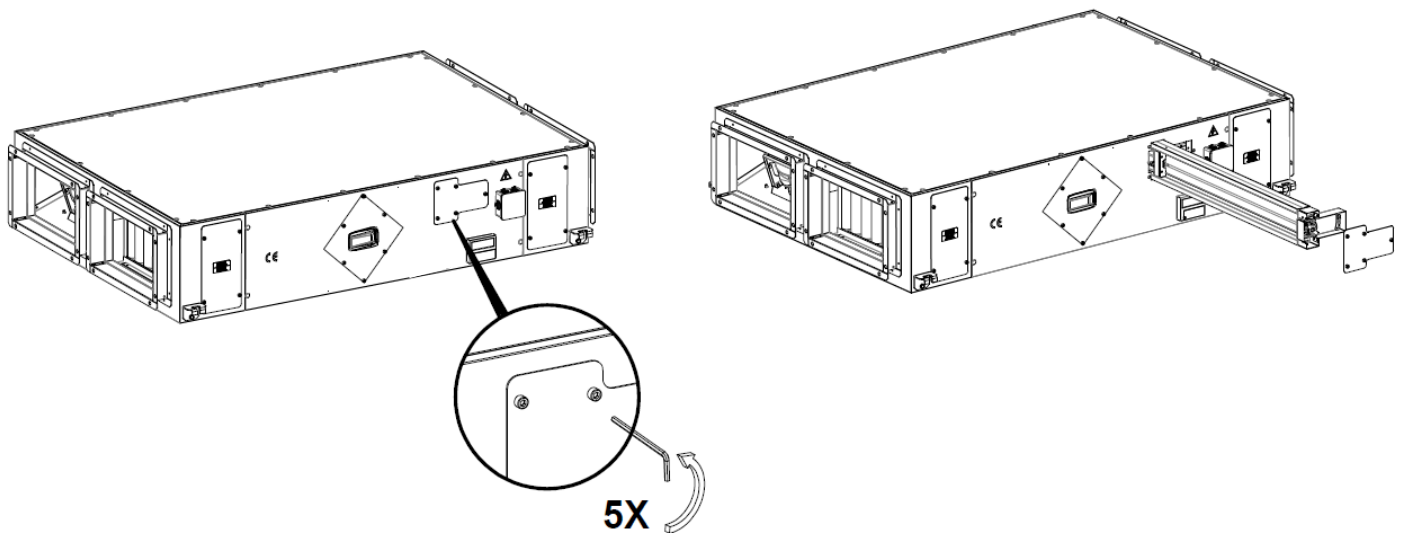
- Shut off the electric before disassembly
- Remove the damper's service cover with allen wrench like shown above figure.
- Remove the damper from area where fixed to the case of the unit.
- Do the installation by following the same procedures backwards.

11.   ELECTRIC HEATER INSTALLATION
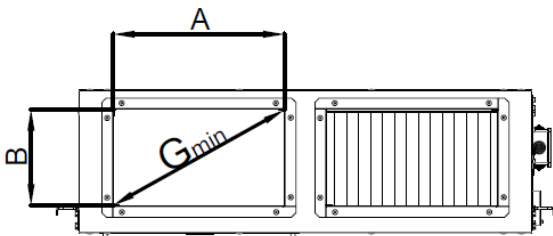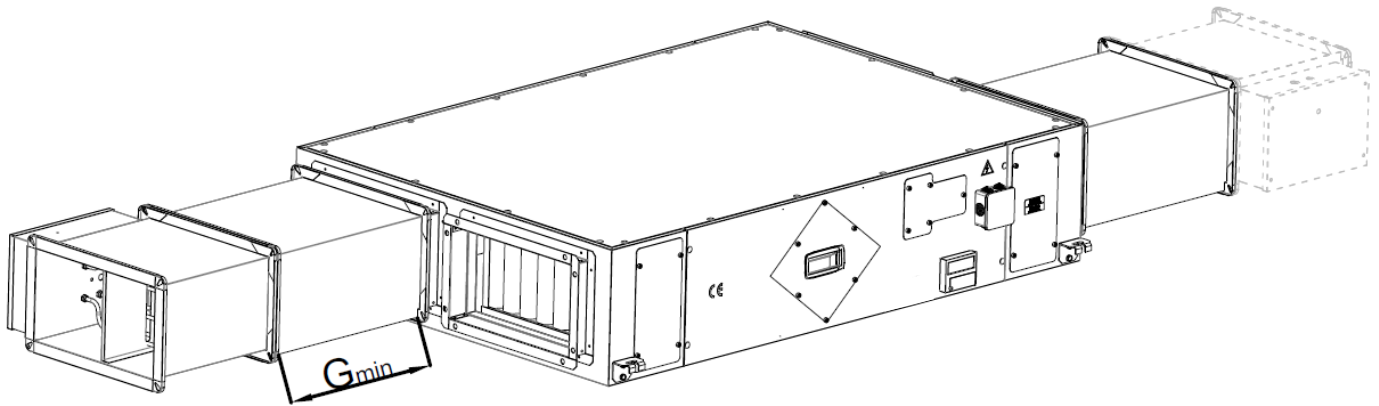
	CFHR-05	CFHR-07	CFHR-10	CFHR-12	CFHR-16	CFHR-25	CFHR-28	CFHR-33	CFHR-40
$G_{min.}$	310	310	380	465	520	650	840	860	965

Install the electric heater as far as the minimum diagonal of air duct.

12. CONTROL PANEL

12.1. Display buttons and LEDs

This section is applicable to Corrigo units with display and buttons but also to the hand terminal E3-DSP. For third generation controllers, it is also possible to connect an external display to units that are equipped with a display and buttons.

12.1.1. Display

```
CFHR
 2019-05-19   09:19
System: Stopped
Sp: 18.0 Act: NaN °C            ↓
```
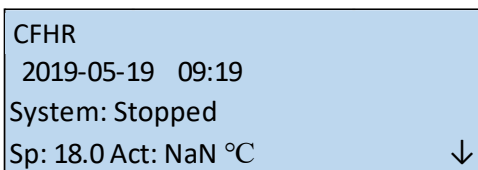
The display has 4 rows of 20 characters. It has background illumination. The illumination is normally off, but is activated as soon as a button is pressed. The illumination will be turned off again after a period of inactivity.

12.1.2. Button and LEDs

OK:

Open/Activate a selected menu/setting. [Confirm a parameter value]

ARROW UP:

Move up a row in the menu. [Increase parameter value]

ALARM LED:

Red, flashing light when there is an unacknowledged alarm. Non-flashing light when there is an acknowledged alarm which has not been reset.

ALARM:

Press to view the alarm list

WHİTE LED:

Some menus contain settable values. This is indicated by the yellow LED flashing. The value can be changed by pressing OK.

```
CFHR
 2019-06-19   09:19
System: Stopped
Sp: 18.0 Act: NaN ℃   ↓
```

ARROW LEFT:

Move to a higher menu level. [Move the cursor to the left in the parameter]

ARROW RIGHT:

Move to a lower menu level. [Move the cursor to the right in the parameter]

CLEAR:

Reset/Abort a parameter change unless OK has already been pressed.

ARROW DOWN:

Move down a row in the menu. [Decrease parameter value]

12.2. The Menu System

12.2.1. Navigating The Menus

```
CFHR
17.05.2019 08:04
System: Stopped
Sp: 18.0 Act: NaN  ℃↓
```

The display to the left is normally shown at start-up and is located at the basic level of the menu tree. The appearance of the start display may vary since there are 5 types to choose from during configuration.

The text in the first row can also be changed using E tool©. Sp and Av are set point and actual value for the supply air controller. This also applies when using cascaded room temperature or extract air temperature control. Actual value = The current measured temperature. Set point value = The desired configured temperature. Pressing ARROW DOWN will move you through the menu choices at this, the lowest level. ARROW UP will move you back through the choices. Which menus are shown depends on which access level you are using (see the section Access rights for more information about logging on to higher levels). The basic access level, the level normally active when you have not logged on, only shows a limited number of menus and submenus:

12.2.2. Running Mode

Here, you can view and set the unit's running mode, as well as view selected control functions and alarm events.

12.2.2.1. Temperature, Air Control and Humidity Control

Here, relevant values and set point values are displayed. Set points can only be changed if you have Operator access or higher.

12.2.2.2. Time Settings

Here, the time, date and set running times are shown. Values can only be changed if you have Operator access or higher.

12.2.2.3. Access Right

Here, you can log on to a higher level, log off to the basic level and change the password.

| Running Mode |
| Temperature |
| Air Control |
| Humidity |
| Time Settings |
| Configuration |
| Access Rights |

A user with Normal access, the basic level, can view a limited selection of menus. The unit's running mode can be changed and alarms acknowledged. If you have Operator access, you can access more information and change other operation parameters like set points and time functions.

To get to the next menu level, use ARROW UP and ARROW DOWN to place the display marker opposite the menu you wish to access and press ARROW RIGHT. If you have sufficient log on privileges the display will change to the menu you have chosen. At each level there may be several new menus through which you may move using the

ARROW UP and ARROW DOWN buttons. There are sometimes further submenus linked to a menu or menu item. This is indicated by

an arrow symbol at the right-hand edge of the display. To choose one, use ARROW RIGHT again. To go to a previous menu level, press ARROW LEFT.

12.2.2.4. Change Parameters

In some menus there are parameters that can be set. This is indicated by the yellow LED with $\otimes$ flashing.

A quick blinking (2 times/s) indicates that the parameter can be changed using the present user access.

A slower blinking (1 time/s) indicates that a higher user access is required to change the parameter.

To change a parameter, first press the OK button. If you need a higher user access than you have to change the parameter, a log on menu will be displayed, see below. Otherwise, a cursor will appear at the

first settable value. If you wish to change the value, do so by pressing the ARROW UP and ARROW DOWN buttons.

In numbers containing several digits you can move between the digits using the ARROW LEFT/RIGHT buttons. When the desired value is displayed press OK.

If there are further settable values displayed the cursor will automatically move to the next one. To pass a value without changing it, press RIGHT.

To abort a change and return to the initial setting, press and hold the C-button until the cursor disappears. Collected here are a number of menus showing running mode, selected functions, alarm events and status of inputs and outputs.
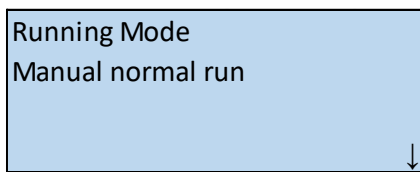
12.3. Running Mode

| →Running Mode |
| Temperature |
| Air Control |
| Time Settings |

➡

| →Running Mode |
| Selected functions |
| Alarm events |
| Inputs/Outputs |
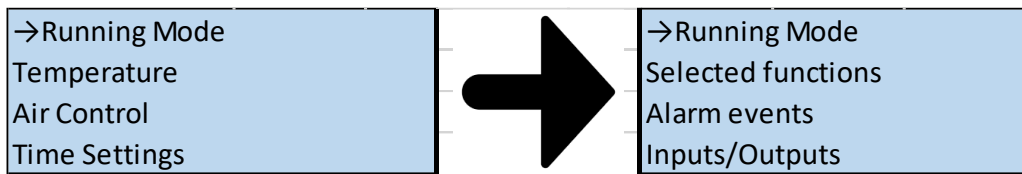
12.3.1. Running Mode Unit

The unit's running mode can be changed without logging on.
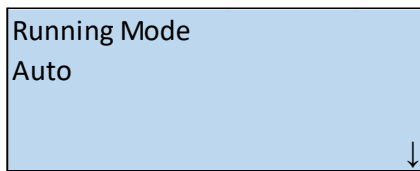
| Running Mode |
| Auto |

The running mode can be set to Auto, Off, Manual reduced run or Manual normal run.

The Auto mode should normally be used.

Off can be used to stop the unit for service and similar.

| Running Mode |
| Manual normal run |

Manual normal run or Manual reduced run will start the unit even if the timer says that the running mode should be "Off".

If the running mode is set to Off, Manual normal run or Manual reduced run, a C alarm is activated: Running mode Manual. The alarm automatically resets when the running mode is set to Auto again.

| Op Time ↑ |
| SAF: 0.0   h |

| Op Time ↑ |
| EAF: 0.0   h |
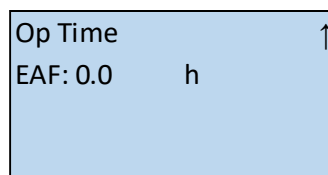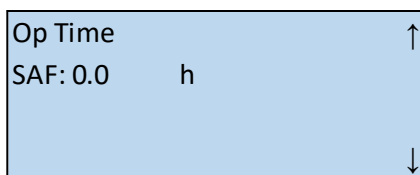
Shows the accumulated running times for the fans.

12.3.2. Selected Functions

| Running Mode |
| → Selected functions |
| Alarm events |
| Inputs/Outputs |

Control functions	In these menus, you can see how some of the most important functions
Supply air control	have been configured. Changes cannot be made.
Fan control	
Pressure	

Heating: Water	Heater, exchanger and cooling type. If one of the functions is not used,
Exchanger: Plate exc	it will be shown as "Not used".
Cooling: Water	

| Free cool active | This function is used during the summer to cool the building night-time using cool outdoor air, thereby reducing the need for cooling during the day and saving energy. |

Support control	Support control is used for adjusting the room temperature outside of
Active: Yes	the normal running time. If there is a heating or cooling demand in the
CO_2/VOC active	room, the unit will start and the temperature will be adjusted.
If timer on	

Fire damper function	The fire function determines the settings for the fire dampers and the
Not Active	unit's running mode when a fire alarm is activated.
Operation when alarm	
Stopped	

Frost protection	Frost protection is normally always used in water heating systems. The
Active	cooling recovery function starts the heat exchanger in order to return
Cooling Recovery	cooling from the extract air when the extract air is colder than the
Not Active	outdoor air and cooling is required.

| External set point | An analogue input can be configured for an external set point device e.g. |
| Not active | TG-R4/PT1000 |

12.3.3. Alarm Events

|		
Running Mode Selected Funcitions →Alarm Events Inputs/Outputs	➡	19 May 19:19 B Malfunction supply Air fan Acknowledged
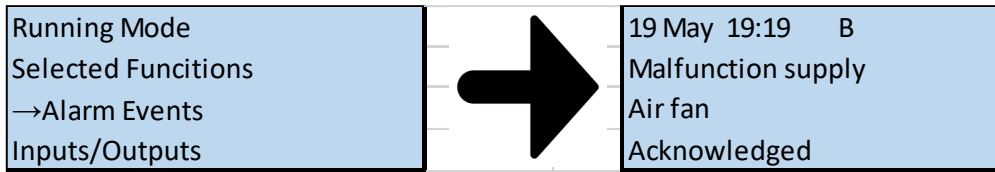
Alarm log, containing the 40 latest alarm events. The most recent event is listed first. The alarm log can only be used for viewing the alarm history. Alarms are handled in a special area, see the section Alarm handling.

12.3.4. Inputs/Outputs

|		
Running Mode Selected Funcitions Alarm Events →Inputs/Outputs	➡	→AI DI UI AO DO
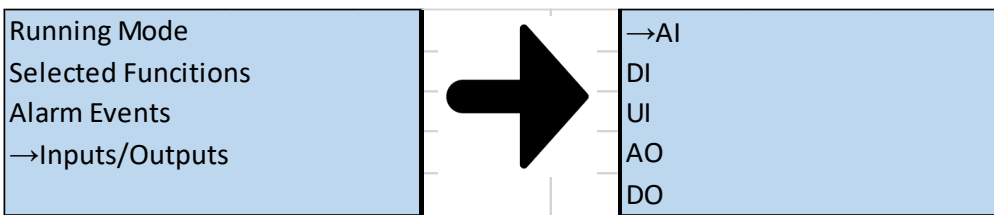
These menus show the current values for all configured inputs and outputs. These are read-only menus. No changes can be made here. Universal inputs can be configured as either analogue or digital inputs. Analogue inputs and digital outputs are shown here as examples.

12.3.5. Temperature

Running mode →Temperature Air control Time settings
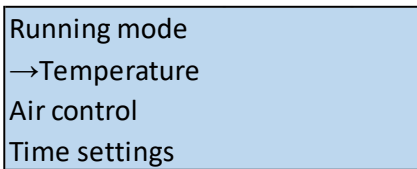
Here you can view all actual and set point values for temperature control. The menu is visible to all users, regardless of log on level. However, to make changes you need at least Operator authority. Only menus for activated functions will be shown.

12.3.6. Set point Supply Air Temperature Control

Outd temp: NaN ℃ Supply air temp Act: NaN ℃   Setp→ Setp: 18.0 ℃   ↓
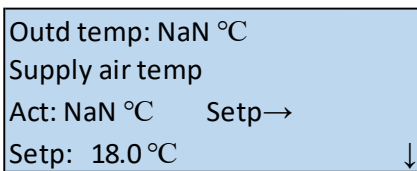
Here, actual and set point values are shown, as well as the outdoor temperature if an outdoor sensor has been configured. This is a read-only menu. No settings can be made here.

Supply air temp Act: 18.0 ℃   ↓
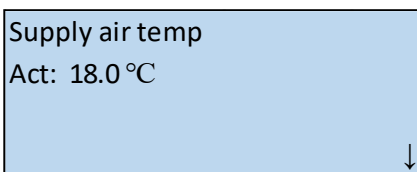
Submenu: Set point. No settings can be made here.

12.4. Air Control

Running Control
Temperature
→Air Control
Time Settings

This menu is only shown if frequency controlled fans have been configured.

Depending on the choice of fan control, different combinations of the menus below will be shown.

12.4.1. Manual Frequency Control SAF and EAF

Frequency Control
manual SAF
Output: 0 %   →

Frequency control
manual SAF
Output 1/1: 75 %
Output 1/2: 75 ⁹   ↓

Here, Actual and Set point values are displayed. This is a read-only menu. No settings can be made here.

Frequency Control   ↑
manual EAF
Output: 0 %   →

Frequency control
manual EAF
Output 1/1: 75 %
Output 1/2: 75 ⁹   ↓

Submenu Set point values for normal speed [1/1] and reduced speed [1/2]. The set point is set in % of the full output. 100 % = 10 V output signal.

12.4.2. Time Settings
12.4.2.1. General

Time/Date
Timer normal speed
Timer reduced speed
Extended running
Timer output1   →
Timer output2   →
Timer output3   →
Timer output4   →
Timer output5   →
Holidays   →

Corrigo has a year-base clock function. This means that a week-schedule with holiday periods for a full year can be set. The clock has an automatic summertime/wintertime change-over.

Individual schedules for each week-day plus a separate holiday setting. Up to 24 individual holiday periods can be configured. A holiday period can be anything from one day up to 365 days. Holiday schedules take precedence over other schedules.

Each day has up to two individual running periods. For two-speed fans and pressure controlled fans there are daily individual schedules for normal speed and reduced speed, each with up to two running periods.

Up to 5 digital outputs can be used as timer controlled outputs. Each with individual week schedules with two activation periods per day. These outputs can be used to control lighting, door locks etc. Only outputs which have been configured will be shown. Timer output 5 can be used to control a recirculation function.

12.4.3. Time Date

```
Normal speed
Monday
Per 1: 07:00 - 16:00
Per 2: 22:00 - 00:00
```

These settings will be ignored if single speed fans are configured.
Should periods for normal speed and periods for reduced speed overlap, normal speed takes precedence.
Structure and function is otherwise identical with Timer Normal speed.

12.4.4. Access Rights

```
Temperature
Air control
Time settings
→Access rights
```

There are four different access levels, Normal level which has the lowest access and does not require logging on, Operator level, Service level and Admin level which has the highest access. The choice of access level determines which menus are shown, as well as which parameters can be changed in the displayed menus.

The basic level only permits changes in Running mode and gives read-only access to a limited number of menus.

Operator level gives access to all menus except Configuration.

Service level gives access to all menus except the submenus Configuration/In- and Outputs and Configuration/System.

Admin level gives full read/write access to all settings and parameters in all menus.

```
→Log on
Log off
Change password
```

Repeatedly press down-arrow when the start-up display is shown until the arrow-marker to the left of the text-list points to Access rights. Press RIGHT.

12.4.4.1. Log On

```
Log on
Enter password: ****
Actual level: None
```

In this menu it is possible to log on to any access level by entering the appropriate 4-digit code. The log on menu will also be displayed should you try to gain access to a menu or try to do an operation requiring higher authority than you have.

Press the OK button and a cursor marker will appear at the first digit position. Repeatedly press the UP button until the correct digit is displayed. Press the RIGHT button to move to the next position. Repeat the procedure until all four digits are displayed. Then press OK to confirm. After a short while the text on the line: Present level will change to display the new log on level. Press the LEFT button to leave the menu.

Factory set passwords:

Admin: 1111

Service: 2222

Operator: 3333

Normal: 5555

12.4.4.2. Log Off

```
Log off?
No
Actual level: Admin
```

Use this menu to log off from the present level to the basic "no-log on" level.

12.4.4.3. Automatic Log Off

If the access level is Operator, Service or Admin, the user will automatically be logged off to Normal after a settable time of inactivity. The time is settable.

12.4.4.4. Change Password

```
Change password for
level: Operator
New password: ****
```

You can only change the password for access levels lower or equal to the presently active level.

12.5. Other Functions

12.5.1. Alarm Handling

If an alarm condition occurs, the red alarm LED on the front panel of units with display or the alarm LED on a connected display unit will start flashing. The LED will continue to flash as long as there are unacknowledged alarms.

Alarms are logged in the alarm list. The list shows type of alarm, date and time for the alarm and the alarm class (A, B or C alarm).

To access the alarm list, press the alarm button, the front panel button with the red button top.

```
Sensor error supply
air temp
21 May  21:05      Class: B
Reset                  ▼
```

If there are multiple alarms, this is indicated by up / down arrow symbols at the right-hand edge of the display.

Use the UP and DOWN buttons to access the other alarms.

At the left end of the bottom display line the alarm status is shown. For active, unacknowledged alarms the space is blank. Alarms that have been reset will be indicated by the text Acknowledged. Still active or blocked alarms are indicated by the text Acknowledged or Blocked.

Alarms are acknowledged by pressing the OK button. You are then given the choice of acknowledging the alarm or blocking the alarm

Acknowledged alarms will remain on the alarm list until the alarm input signal resets.

Blocked alarms remain on the alarm list until the alarm has reset and the block has been removed. New alarms of the same type will not be activated as long as the block remains.

Since blocking alarms can be potentially hazardous, you need a high log on authority to block alarms.

Class A and B alarms will activate alarm output(s) if these have been configured.

Class C alarms do not activate the alarm output(s).

Class C alarms are removed from the alarm list when the alarm input resets even if the alarm has not been acknowledged.

12.5.2. Free Text

If RIGHT is pressed once when the start menu is shown, a menu is shown in which it is possible to enter any text of your choice. This text can be used to show information concerning the commissioning company, name and phone number to service personnel etc. The easiest way to enter text is to use E tool©, but the buttons can also be used. Up to 4 lines of 20 characters each can be entered.

12.5.3. Revision Numbers

If RIGHT is pressed twice when the start menu is shown, a menu is displayed showing the program revision number, its date of release and ID number.

12.5.4. Language

If RIGHT is pressed three times when the start menu is shown, a menu is displayed in which the language can be changed.

The different language files are stored in the application memory and are downloaded to the work memory. If a Corrigo has been reloaded with a program revision newer than the factory revision using E tool©, the controller will not allow language files to be downloaded from the application memory. This is because there is a risk that the language files are not compatible with the new revision. Therefore, you are limited to the two languages you have downloaded using E tool©.

12.5.5. Indication LEDs

Status indication can be found in the upper left corner of the controller. For controllers with display, the alarm indication and change mode LEDs are located in the keypad area.

12.5.6. Status Indication

| Designation	Colour	Description
Tx	Green	Port 1/2, transmitting
Rx	Green	Port 1/2, receiving
Serv (…Lon models)	Yellow	Service LED LON, commissioning
LAN (…W models)	Yellow /Green	Green: Connected to other network equipment
		Blinking green: Network traffic Blinking yellow: For identifying
P/H (Power/Battery)	Green/Red	Power on/Battery error
Controllers with built-in display		
🔔	Red	Alarm indication. Flashing: There are unacknowledged alarms. Fixed: There are alarms which have been acknowledged but where the fault remains.
✏️	Yellow	Change mode. Flashing rapidly: The display contains changeable values. Flashing slowly: A password is needed to make changes in the display.

12.5.7. Changing The Battery

Corrigo has an internal battery to ensure the operation of the memory and real-time clock in the event of a power failure.

When the alarm" Internal Battery" is activated and the battery LED lights up red, the battery has become too weak and needs to be changed. Nonetheless, due to a backup capacitor, the controller will function at least 10 minutes without power supply.

Since changing the battery requires knowledge of proper ESD protection, as well as dismantling and opening of the unit, this should be handled by skilled service personnel.

12.6. Wiring Diagram
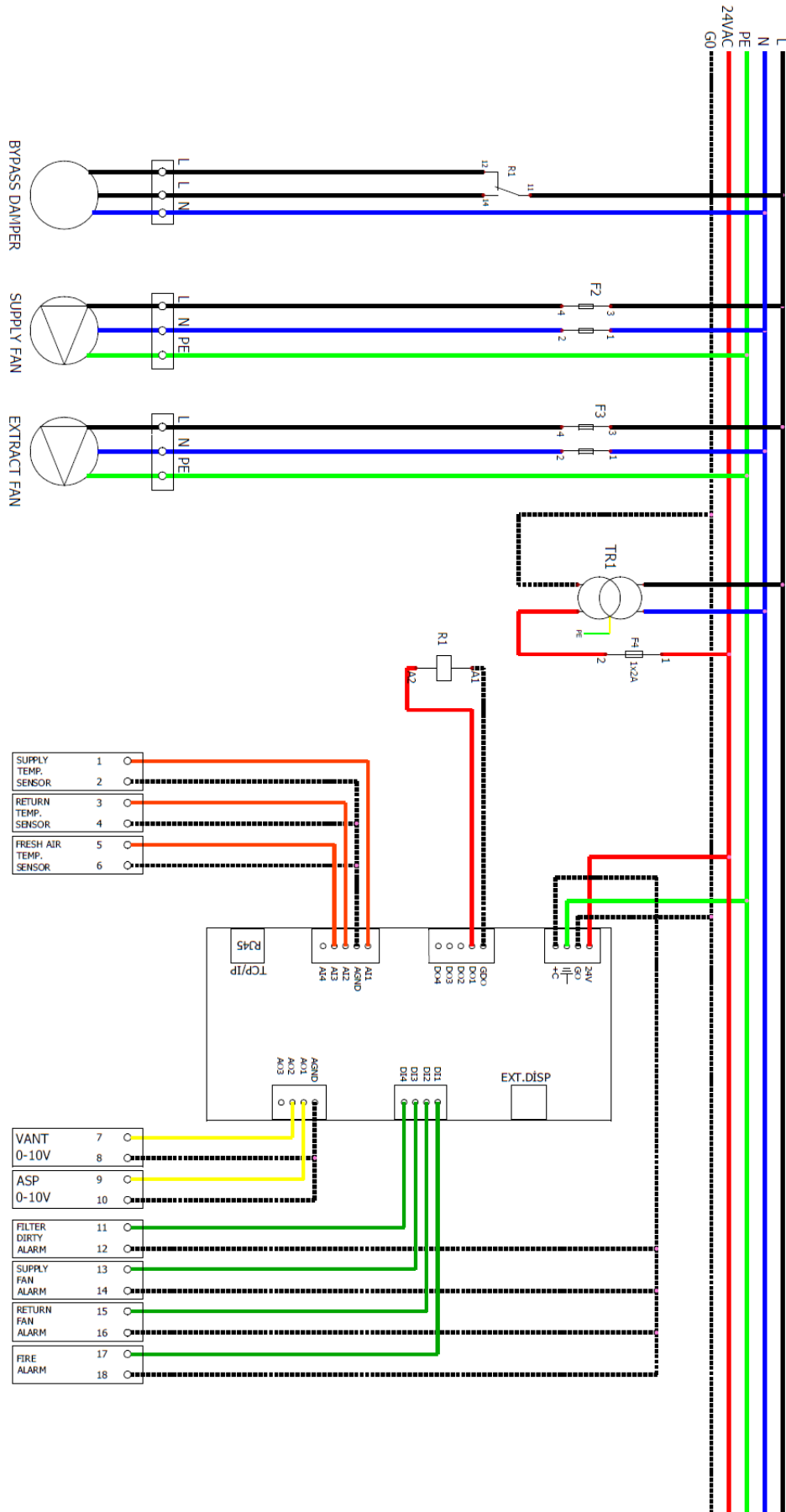
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