

FREE COOLING SYSTEM

USER MANUAL



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1. Free Cooling System

This User Manual contains two types of Free Cooling System.

- **55W Free Cooling System**
- **190W Free Cooling System**

Free Cooling System is an energy-saving system which is designed for indoor areas. Operation of System is very simple. Instead of cooling the warm air inside the station, system transfers it to the outside. Colder air is transferred from outside after passing through the filter system by fan. Then, the heated air rises to the air-outlet unit and system provides cooling by air flow. When the fan is not enough for cooling, system activates the A/C units. Fan, A/C or both ensure to make system temperature stable according to system software algorithm.

Fan speed is controlled by the difference of indoor and outdoor temperature (Δt). If Δt increases, fan speed will increase proportionally also. In this way, system manages the cooling power of fan and energy consumption.

2. The Content of Free Cooling System

Properties		Unit	190W		55W
Free Cooling Operating Voltage		V	-60/+60Vdc		- 60/+60Vdc
Maximum Air Flow		l/s	595		302
		m ³ /h	2145		1090
Cooling Capacity (For Temperature Difference)	$\Delta t = 5^{\circ}\text{C}$	kW	3.6		1.8
	$\Delta t = 7^{\circ}\text{C}$		5.1		2.5
	$\Delta t = 10^{\circ}\text{C}$		7.3		3.6
Cooling Capacity (For Unit Temperature Difference)		W/K	732		370
Maximum Fan Current (48VDC)		A	6.15		1.3
Maximum Power Consumption of Fan (48VDC)		W	225		80
Filter	Class	G2	G3	G4	
Filter Area	m ²	0.75		0,55	
Dimensions (YxGxD)	mm	550x540x500			
Air Inlet Section Area Dimensions on The Wall (YxG)	mm	485x210		280x550	

a. 55WFree Cooling Competents:

FCS Unit:

- FCS-04 Control Unit
- Temperature and Humidity Sensor (internal)
- Temperature Sensor (external)
- USB Data Cable
- User Manual and CD
- Mounting Screws

Filter:

- G4 Air Filter (305*592*200 / 4 Cep 55 Pa. 2000 m3/h)

Fan:

- EBMPAPST WG200-HH01-52 48 VDC or WG200-HH77-52 24 VDC Fan
- Fan Grid

Auxiliary Mechanical Equipment:

- Fan Paddle-Box
- Door Paddle-Box
- Fan Vent
- Mounting Screws

b. 190WFree Cooling Competents:

FCS Unit:

- FCS-04 Control Unit
- Temperature and Humidity Sensor (internal)
- Temperature Sensor (external)
- USB Data Cable
- User Manual and CD
- Mounting Screws

Filter:

- G2 Air Filter / 460*535*10 (Pa. 3200 m3/h)
- G3 Air Filter / 460*535*45 (Pa. 3200 m3/h)

Fan:

- EBMPAPST R3G310-AN12-30 48 VDC Fan
- Fan Grid
- Analog Differential Pressure Sensor (for measuring the filter occupancy)

Auxiliary Mechanical Equipment:

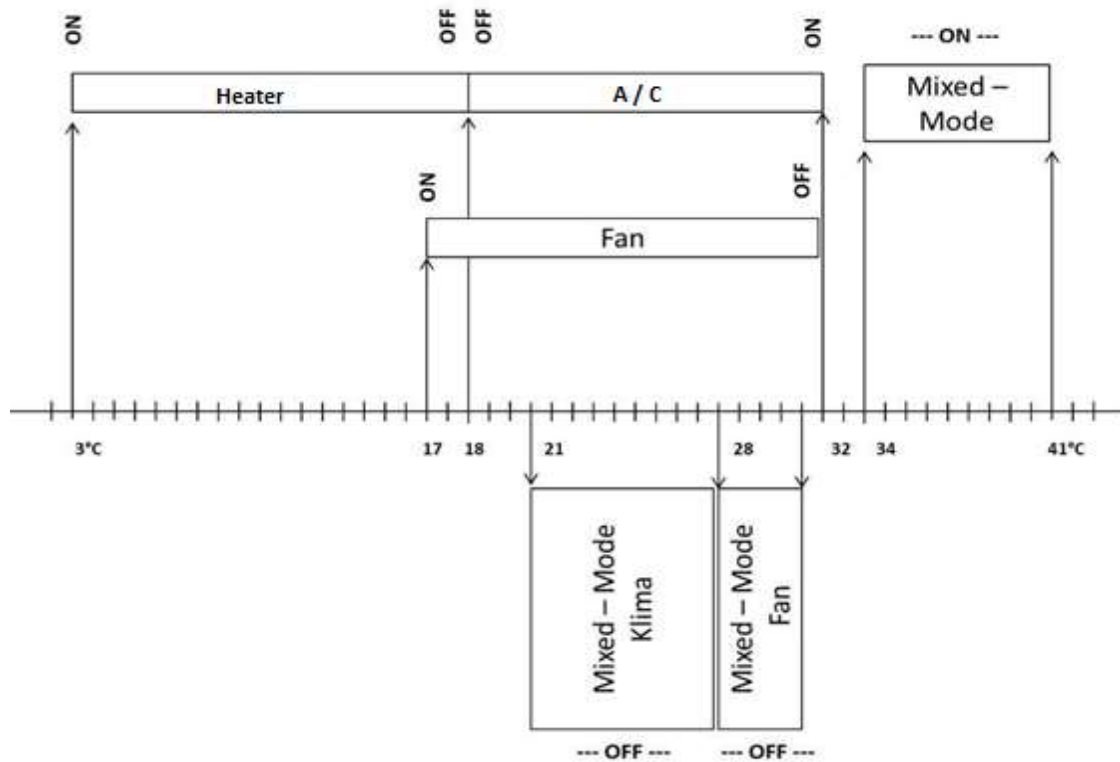
- Fan Paddle-Box
- Door Paddle-Box
- Fan Vent
- Mounting Screws

c. Optional Components:

- External Alarm Card (16 canal)
- External Input Card (16 canal)
- Digital Pressure Sensor

3. System Operation Algorithm

System Operation Algorithm is shown as below. These values are limits of the system. User can change the start and stop values of A/C, Fan and heater between these limits.



4. Hardware

a. General Features

- Ability to run at +24/-48 VDC
- Proportional Speed Control
- Ethernet Connection
- Battery Voltage Indicator
- Mains Voltage Indicator
- Instant Fan Power Indicator
- Instant Air conditioning Power Indicator
- Ability to drive both AC and DC (EC) fan
- 16 External Alarm Output (Optional)
- Real-Time Clock
- Storing data and parameters
- Analog-Digital Differential Pressure Sensor
- Operating external air-conditioning unit and heater
- Testing sensor conditions frequently during operating time
- Ability to operate air-conditioning unit/s on by-pass mode in any case of trouble
- Fan speed data is received from tachometer line
- System protects peripherals (air-conditioning unit&fan) itself in any case of faulty connection
- 18276 event reports about fan/air-conditioning unit logs for 12 months and amount of power consumptions can be saved in the log memory
- Menu Access requires password
- System prevents noise problem by using day/night mode
- Split fuses for main board and fan
- When fire alarm is active , system shuts down itself
- There are USB, RS485 and Ethernet inputs for remote and local access

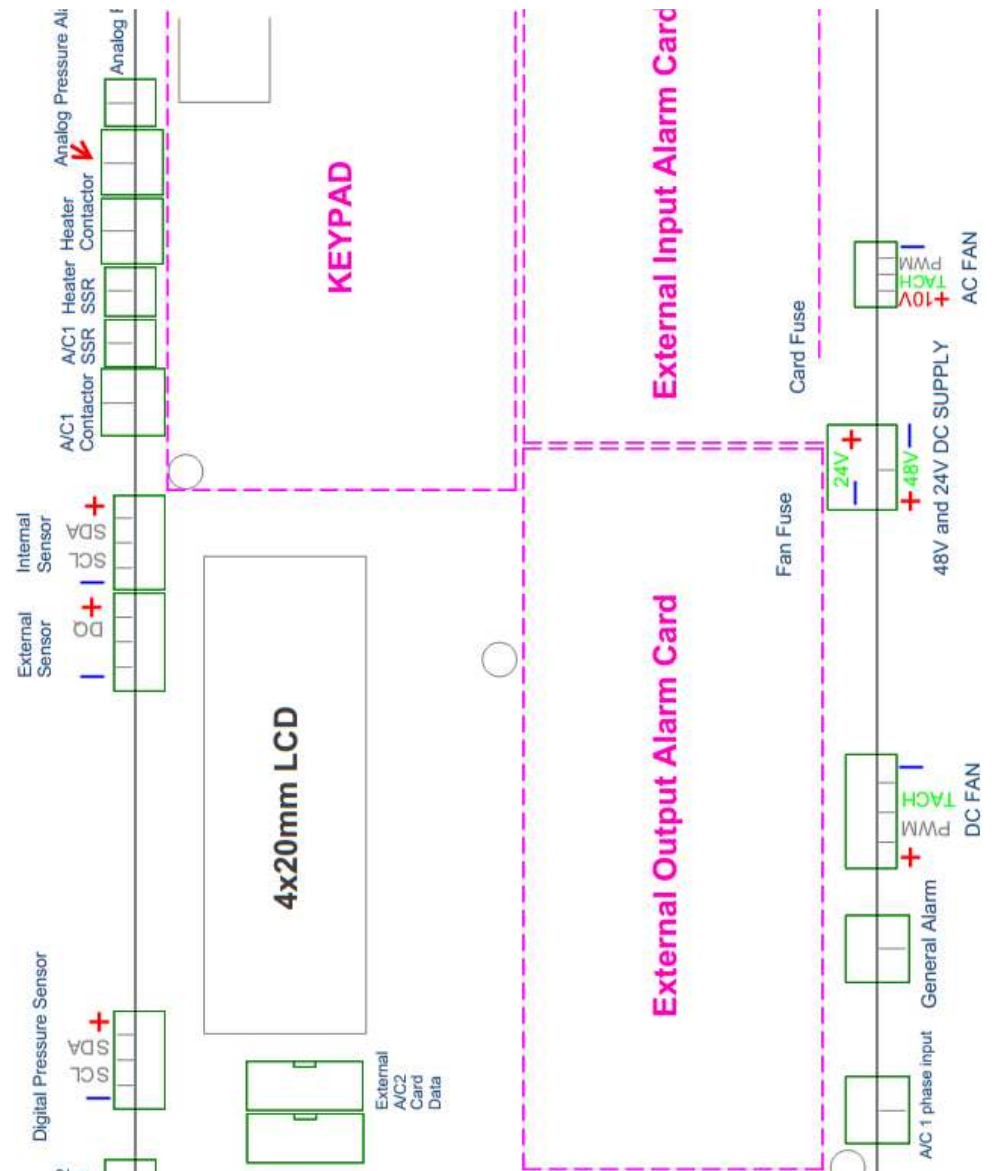
a.1-Technical Features of A/C card

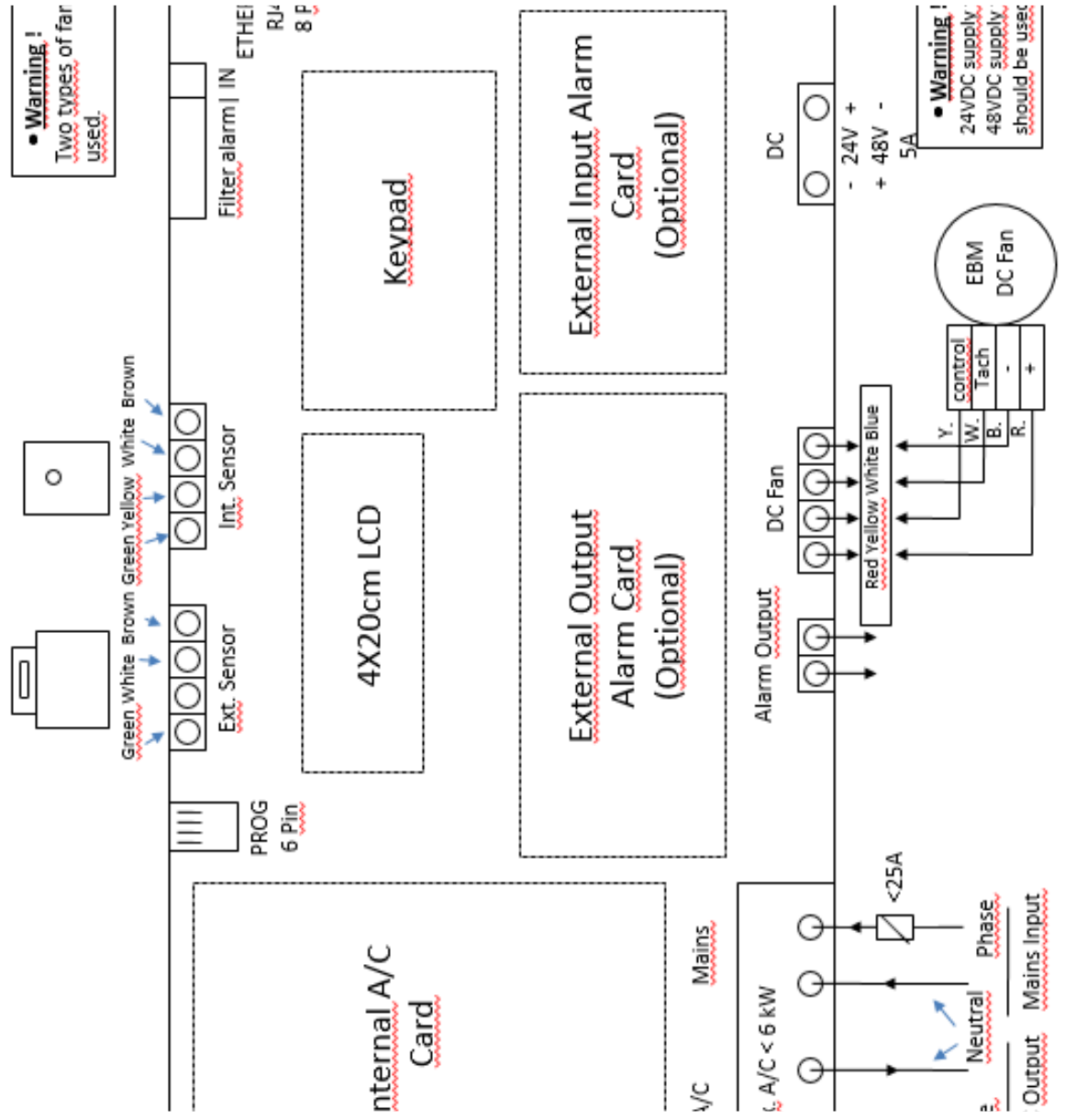
- Operation Voltage : 120-250Vac
- Power Consumption : 1.86W @220Vac
- Contact Life : 100,000 open close
- A/C Power : <6kW

Power consumption is less than 8 W when fan is not active. When fan is active, the maximum power consumption is 8 W more than maximum fan power. User doesn't need this power because system controls the fan proportionally.

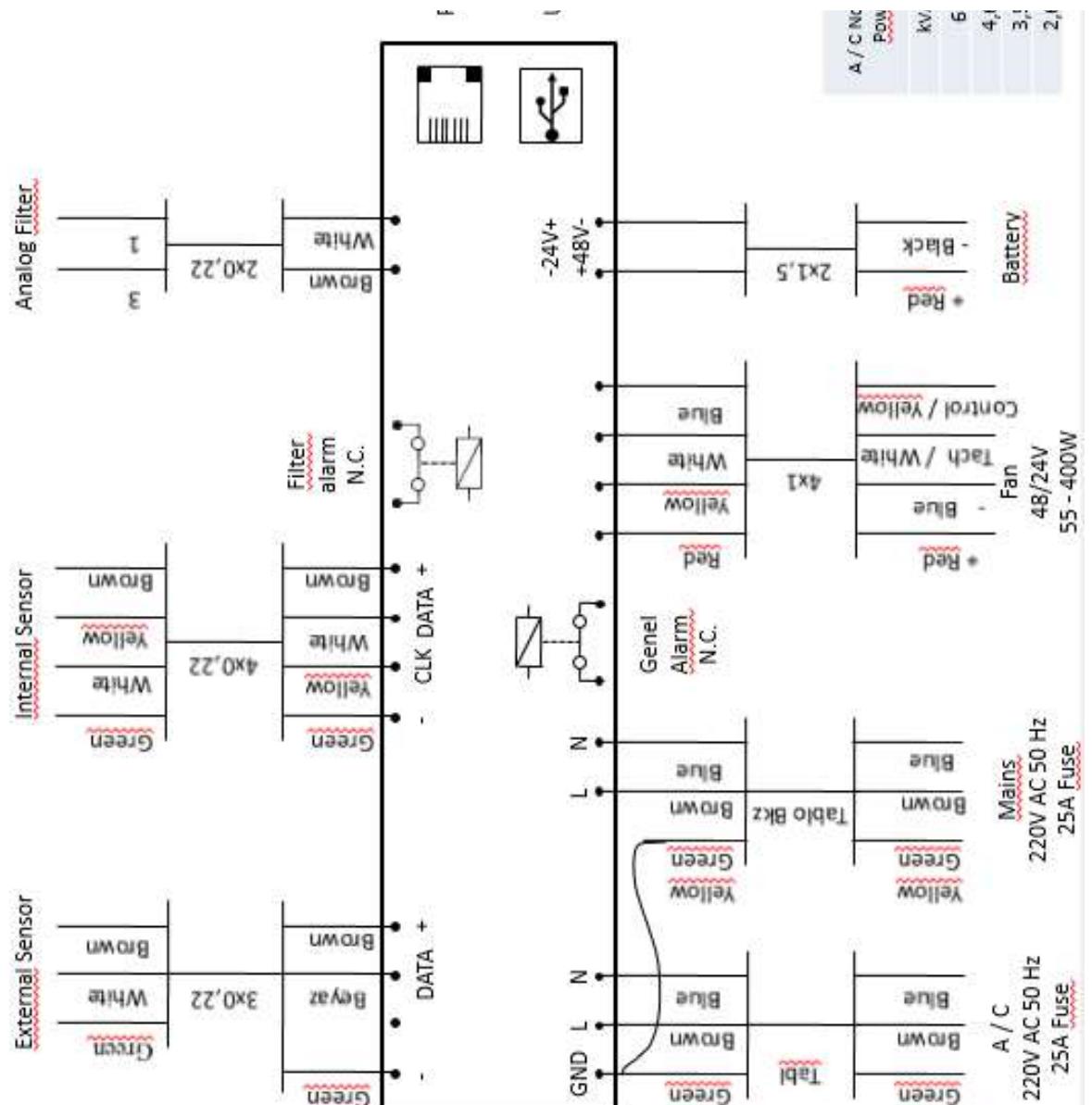
When using the keypad, if user doesn't press any button in 120 seconds, display returns to the main screen.

b. Connection Ports





c. Connection Diagram



d. LCD Lines

At the first line, there are date and time informations : 01/01/2012 – 00:00:00

At the second line, there is outdoor temperature information: Tout 25.0

And then;

Day

T	o	u	t		2	5	.	0			M	o	n	d	a	y			
---	---	---	---	--	---	---	---	---	--	--	---	---	---	---	---	---	--	--	--

Supply Voltage

T	o	u	t		2	5	.	0			(-	4	8		V)		
---	---	---	---	--	---	---	---	---	--	--	---	---	---	---	--	---	---	--	--

Day/Night Mode

T	o	u	t		2	5	.	0			D	A	Y	T	I	M	E		
---	---	---	---	--	---	---	---	---	--	--	---	---	---	---	---	---	---	--	--

Fan speed (Rpm) or %rpm

T	o	u	t		2	5	.	0					0		R	P	M		
---	---	---	---	--	---	---	---	---	--	--	--	--	---	--	---	---	---	--	--

Mains Voltage (Volt)

T	o	u	t		2	5	.	0			2	2	0	.	0		V		
---	---	---	---	--	---	---	---	---	--	--	---	---	---	---	---	--	---	--	--

If the system has Analog pressuresensor: ----- ,

If the system has Digital pressuresensor: 0.0 pa

T	o	u	t		2	5	.	0				0	.	0		p	a	
---	---	---	---	--	---	---	---	---	--	--	--	---	---	---	--	---	---	--

Versiyon No:

T	o	u	t		2	5	.	0		V	E	R		4	.	0		
---	---	---	---	--	---	---	---	---	--	---	---	---	--	---	---	---	--	--

At the bottom of the line, there is operation mode information. These modes are shown as below;

- Free Cooling

M	o	d		:		F	r	e	e		C	o	o	l	i	n	g	
---	---	---	--	---	--	---	---	---	---	--	---	---	---	---	---	---	---	--

- Repair Mode

M	o	d		:		R	e	p	a	i	r		M	o	d	e		
---	---	---	--	---	--	---	---	---	---	---	---	--	---	---	---	---	--	--

- Air Conditioner

M	o	d		:		A	i	r		C	o	n	d	i	t	i	o	n
---	---	---	--	---	--	---	---	---	--	---	---	---	---	---	---	---	---	---

- Heater

M	o	d		:		H	e	a	t	e	r		M	o	d	e		
---	---	---	--	---	--	---	---	---	---	---	---	--	---	---	---	---	--	--

- Mixed Mode

M	o	d		:		M	i	x	e	d		M	o	d	e			
---	---	---	--	---	--	---	---	---	---	---	--	---	---	---	---	--	--	--

e. Alarms

- **Low Batt Alarm**

If the device supply voltage is less than the set voltage value, system creates this alarm.

- **High Batt Alarm**

If the device supply voltage is more than the set voltage value, system creates this alarm.

- **Low Temp Alarm**

If the indoor temperature is less than the set value, system creates this alarm.

- **High Temp Alarm**

If the indoor temperature is more than the set value, system creates this alarm.

- **Very High Temp Alarm**

If the indoor temperature is much higher than the set value, system creates this alarm.

- **Filter Pressure Alarm**

If the filter is full or blocked, system creates this alarm.

- **A/C Phase Power 1 Alarm**

If there is no A/C 1 mains power, system creates this alarm.

- **Poor Heating Alarm**

When the indoor temperature is less than the set value, system turns on the heater. If the heater can't hold the temperature on desired value in 60 minutes, system creates this alarm.

- **Poor Cooling Alarm**

If the A/C unit can't hold the indoor temperature on desired value in 60 minutes, system creates this alarm.

- **Fan Power Alarm**

If the fan fuse is blown or it doesn't run for any reason, system creates this alarm.

- **Fan Speed (RPM) Alarm**

If the fan doesn't work as requested, system creates this alarm.

- **Maximum Humidity Alarm**

If the indoor humidity value is higher than the set value, system creates this alarm.

- **DewPoint Alarm**

When the dew begins to form, system creates this alarm.

- **A/C Phase Power 2 Alarm (2 phase systems)**

If there is no A/C 2 mains power, system creates this alarm.

- **FCS OFF Alarm**

System creates this alarm when there are sensor failures or when the device on maintenance mode. Free Cooling System turns off and A/C units start to control the indoor temperature.

f. Buttons

ESC :

If user uses that button when the display is on main screen, system opens “return to default” menu. System can be returned to default by using the right button combination.

ENT :

If user uses that button when the display is on main screen, system opens settings menu.

UP :

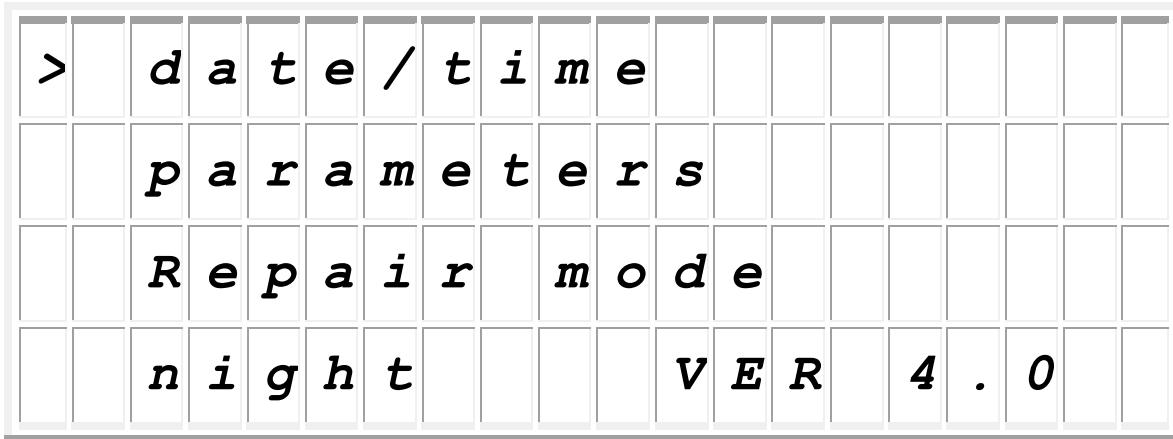
If user uses that button when the display is on main screen, system logs will be deleted after the password is entered.

DN :

The function of that button is to go down.

- **ENT Tuşu Fonksiyonları**

If user uses that button when the display is on main screen, system opens settings menu.



User can move with UP and DN buttons. Also any option can be chosen by using ENT button. If user doesn't push any button in 120 seconds, display returns to the main screen.

The version of system is shown at the lower right side of the display. (VER 4.0)

➤ **Date/Time**

Date and Time settings can be set from Date/Time menu. User can access this menu by entering the password.

After Date and Time are set, user can pass to summer-winter time zone by using ENT button.

➤ Parameters

User should enter the password to access the “Parameters” menu. If the password is wrong, it will return to the main screen. If it is right, user see the display which is shown as below.

	E	S	C	:		C	a	n	c	e	l							
		U	P	:		D	e	f	a	u	l	t						
		D	N	:		N	e	w										
	E	N	T	:		M	o	d	b	u	s	_	c	o	n	f	i	g

- ESC button provides user to return to the main screen.
- UP button provides user to save default settings and return to the main screen.
- DN button provides user to save desired settings and return to the main screen.
- ENT button provides user to choose device’s MODBUS parameters and communication port.

➤ Repair Mode/Other Mode

User should press ENT button when it’s on “repair mode”. Heater, fan, alarm and A/C unit situations will be as below. FCS turns off.

- Heater OFF
- Fan OFF
- Alarm ON
- A/C ON

When it’s on the main screen and if user accesses to the menu again by using ENT button, user can switch to the “other mode” by choosing with ENT.

➤ Daytime/Night

Night mode can be used if it's desired to decrease the fan noise. User can switch to the night mode by pressing ENT when the cursor is on the "NIGHT". After that, the fan runs on desired set values (time and speed). When time is over, fan continues to run in normal way.

When the device is on night mode, user can switch to "daytime mode" by accessing the settings.

- **Function of DN Button – New Password**

If user presses DN button on the main screen, password screen will be shown. After entering the current password, new password can be entered.

- **Function of UP Button –Log Deletion**

If user presses UP button on the main screen, password screen will be shown. After entering the password, the display will appear as below.

	A	c	t	i	o	n		i	s		r	e	g	i	s	t	e	r	e
	E	N	T	E	R			-	>		C	o	n	t	i	n	u	e	
			E	S	C			-	>		C	a	n	c	e	L			
	P	r	e	s	s		K	e	y										

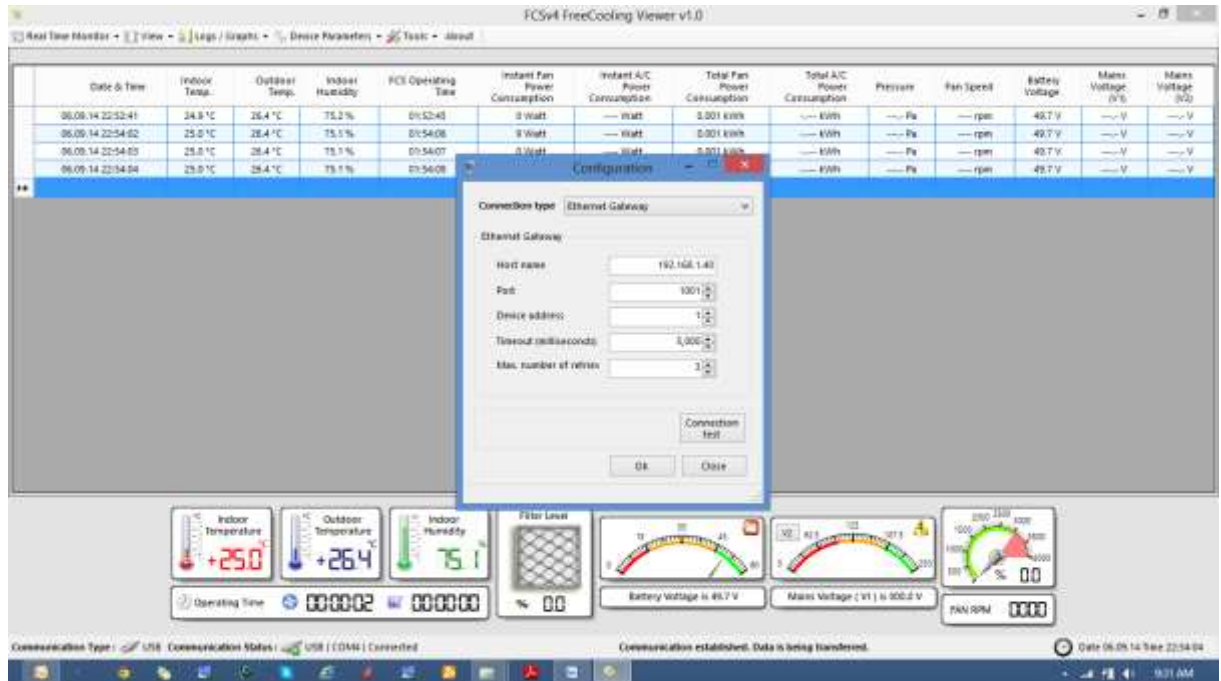
If user presses ENT button, log entries will be deleted. System restarts. If ESC button is used, system returns to the main screen.

- **Function of ESC Button**

If user uses the ESC button when the device is on the main screen, a text will be shown as "return to default". It will provide user to return the default settings and password. Then when ENT – ENT – UP – ENT – DN – ENT buttons are pressed by turns, a text will be shown as "successful".

g. PC Connection

1. Internet Connection with Ethernet



After launching Free Cooling Viewer, “Tools -> Communication Configuration -> Connection Type -> Ethernet Gateway” is selected. Then user can determine the values to communicate with FCS unit and apply this settings by using “Connection Test” button. After applying the settings, these settings can be saved by using “Ok” button.

2. Connection with USB 2.0



After launching Free Cooling Viewer, “Tools -> Communication Configuration -> Connection Type -> Modbus RTU (RS485/RS232/USB)” is selected. Then user can determine the values to communicate with FCS unit and apply this settings by using “Connection Test” button. After applying the settings, these settings can be saved by using “Ok” button.

h. New Password

User should press “DN” button when it’s on the main screen to define new password. First, Old Password is required. After entering the old password, user can define the new password.

User can enter the password by using “UP” and “DOWN” buttons. Default password is “2009”. But if the password is entered incorrectly, it will show “Password nochange” on display.

	O	l	d		P	a	s	s	w	o	r	d	?					
*	*	*	*															

	N	e	w		P	a	s	s	w	o	r	d	?					
*	*	*	*															

i. Relays

There are two relays on the device as alarm and pressure. When these relays are “OFF”, relay contact outputs are as below;

- Alarm OFF – open output circuit
- Basınç OFF – open output circuit

h. Wire-OR and Discrete Alarm Output

If user uses external alarm card, all alarm outputs pass from external alarm card. Also, all alarms combine on CON5 connector as dry contact output.

5. Parameter Settings

User can access the “Parameters” by pressing ENT button when it’s on the main screen. FCS operation parameters are defined from here.

a. 55W FCS Control Unit Settings

	Parameter	Status	Unit	Default	Min	Max
1	A/C delay protection		Sn	300	0	300
2	A/C minimum operating voltage		V	120	100	200
3	A/C maximum operating voltage		V	245	220	270
4	Forced A/C mode operation	ON / OFF	-	OFF		
	Forced A/C mode operation		Min.	15	0	180
5	A/C minimum work time 8 minutes	ON / OFF	-	OFF	-	-
6	Turn off if A/C if it opr. poor	ON / OFF	-	OFF	-	-
7	Out temp high FC operation	ON / OFF		ON		
	Out temp high FC operation		°C	25	18	32
8	A/C turn on temperature		°C	28	24	32
9	A/C turn off temperature		°C	24	18	26
10	*A/C1 - A/C2 Delta temperature		°C	5	1	10
11	*Switch the A/C using timing	ON / OFF		OFF		
	*Switch the A/C using timing		min	120	120	240
12	Fan turn on temperature		°C	22	15	25
13	Fan turn off temperature		°C	28	24	32
14	Selection of Fan type	DC / AC	-	DC	-	-
15	Fan power type	55w,120w,190w,380w	Watt	55w	-	-
	Fan speed (Daytime)		%	100	15	100
	Fan speed (Night)		%	50	15	100
16	Indoor-outdoor delta temperature		°C	2	2	5
17	Critical indoor temp max fan	ON / OFF		ON		
	Critical indoor temp max fan speed,no AC			30	28	35
18	A/C phase fail fan speed	HALF-MAX		HALF		

19	Fan with work the A/C mode	ON / OFF		OFF		
20	Show Fan Speed Value Type On	%RPM / Decimal		% RPM		
21	Mixed Mode Start Temperature		°C	35	34	41
22	Mixed mode fan turn off temp	Set - Dif		Set		
	Mixed mode fan turn off temp		°C	32	28	35
23	Mixed mode A/C turn off temp		°C	25	21	28
24	Heating method	A/C - Heater	-	A/C		
25	Heater turn on temperature		°C	10	2	10
26	Heater turn off temperature		°C	16	14	18
27	*Heater 1 and 2 Delta temerature		°C	5	1	10
28	Fan off,outdoor temp. high	ON / OFF	-	OFF		
	Fan off,outdoor temp. high		°C	45	40	60
29	Fan off,outdoor temp. low	ON / OFF	-	OFF		
	Fan off,outdoor temp. low		°C	10	-20	10
30	Fan off,Maximum indoor humidity	ON / OFF	-	ON		
	Fan off,Maximum indoor humidity		°C	85	80	90
31	Fan Paramater enable in mixmode	ON / OFF	-	OFF		
32	Start of the night		-	20:00		
	Stop of the night		-	08:00		
33	Low batt alarm threshold		V	-44 (+22)	-42 (*21)	-46(*23)
34	High batt alarm threshold		V	-54 (+27)	-54 (*27)	-60(*30)
35	Low temp alarm threshold		°C	8	4	12
36	High temp alarm threshold		°C	35	25	35
37	Very High temp alarm threshold		°C	40	35	45
38	Low voltage alarm	ON / OFF	-	OFF		
39	High voltage alarm	ON / OFF	-	OFF		
40	Low temp alarm	ON / OFF	-	ON		
41	High temp alarm	ON / OFF	-	ON		
42	Very High temp alarm	ON / OFF	-	ON		
43	Filter pressure alarm	ON / OFF	-	OFF		
	Threshold		Pa	500	200	500
44	A/C phase power alarm	ON / OFF	-	OFF		
45	Poor heating alarm	ON / OFF	-	OFF		
46	Poor cooling alarm	ON / OFF	-	OFF		
47	Fan power alarm	ON / OFF	-	OFF		
48	Fan spped (RPM) alarm	ON / OFF	-	OFF		
49	Max humidity alarm	ON / OFF	-	ON		
50	Dew-point alarm	ON / OFF	-	OFF		
51	Show FCS alarms on LCD	ON / OFF	-	ON		
52	NMS time (dk)		-	5	5	240
53	Send event data to the NMS	ON / OFF	-	ON		

b. 190W FCS Contol Unit Settings

	Parameter	Status	Unit	Default	Min	Max
1	A/C delay protection		Sn	300	0	300
2	A/C minimum operating voltage		V	120	100	200
3	A/C maximum operating voltage		V	245	220	270
4	Forced A/C mode operation	ON / OFF	-	OFF		
	Forced A/C mode operation		Min.	15	0	180
5	A/C minimum work time 8 minutes	ON / OFF	-	OFF	-	-
6	Turn off if A/C if it opr. poor	ON / OFF	-	OFF	-	-
7	Out temp high FC operation	ON / OFF		ON		
	Out temp high FC operation		°C	25	18	32
8	A/C turn on temperature		°C	28	24	32
9	A/C turn off temperature		°C	24	18	26
10	*A/C1 - A/C2 Delta temerature		°C	5	1	10
11	*Switch the A/C using timing	ON / OFF		OFF		
	*Switch the A/C using timing		min	120	120	240
12	Fan turn on temperature		°C	22	15	25
13	Fan turn off temperature		°C	28	24	32
14	Selection of Fan type	DC / AC	-	DC	-	-
15	Fan power type	55w,120w,190w,380w	Watt	190w	-	-
	Fan speed (Daytime)		%	100	15	100
	Fan speed (Night)		%	50	15	100
16	Indoor-outdoor delta temperature		°C	2	2	5
17	Critical indoor temp max fan	ON / OFF		ON		
	Critical indoor temp max fan speed,no AC			30	28	35
18	A/C phase fail fan speed	HALF-MAX		HALF		
19	Fan with work the A/C mode	ON / OFF		OFF		
20	Show Fan Speed Value Type On	%RPM / Decimal		% RPM		
21	Mixed Mode Start Temperature		°C	35	34	41
22	Mixed mode fan turn off temp	Set - Dif		Set		
	Mixed mode fan turn off temp		°C	32	28	35
23	Mixed mode A/C turn off temp		°C	25	21	28
24	Heating method	A/C - Heater	-	A/C		
25	Heater turn on temperature		°C	10	2	10
26	Heater turn off temperature		°C	16	14	18
27	*Heater 1 and 2 Delta temerature		°C	5	1	10
28	Fan off,outdoor temp. high	ON / OFF	-	OFF		
	Fan off,outdoor temp. high		°C	45	40	60
29	Fan off,outdoor temp. low	ON / OFF	-	OFF		
	Fan off,outdoor temp. low		°C	10	-20	10

30	Fan off,Maximum indoor humidity	ON / OFF	-	ON		
	Fan off,Maximum indoor humidity		°C	85	80	90
31	Fan Paramater enable in mixmode	ON / OFF	-	OFF		
32	Start of the night		-	20:00		
	Stop of the night		-	08:00		
33	Low batt alarm threshold		V	-44 (+22)	-42 (*21)	-46(*23)
34	High batt alarm threshold		V	-54 (+27)	-54 (*27)	-60(*30)
35	Low temp alarm threshold		°C	8	4	12
36	High temp alarm threshold		°C	35	25	35
37	Very High temp alarm threshold		°C	40	35	45
38	Low voltage alarm	ON / OFF	-	OFF		
39	High voltage alarm	ON / OFF	-	OFF		
40	Low temp alarm	ON / OFF	-	ON		
41	High temp alarm	ON / OFF	-	ON		
42	Very High temp alarm	ON / OFF	-	ON		
43	Filter pressure alarm	ON / OFF	-	OFF		
	Threshold		Pa	500	200	500
44	A/C phase power alarm	ON / OFF	-	OFF		
45	Poor heating alarm	ON / OFF	-	OFF		
46	Poor cooling alarm	ON / OFF	-	OFF		
47	Fan power alarm	ON / OFF	-	OFF		
48	Fan spped (RPM) alarm	ON / OFF	-	OFF		
49	Max humidity alarm	ON / OFF	-	ON		
50	Dew-point alarm	ON / OFF	-	OFF		
51	Show FCS alarms on LCD	ON / OFF	-	ON		
52	NMS time (dk)		-	5	5	240
53	Send event data to the NMS	ON / OFF	-	ON		

* These are + 24 VDC supply values and two phase systems.

“A/C Delay Protection”

In case of frequent power cut, compressor is disabled during the set time and system protects A/C.

“A/C Minimum Operating Voltage”

Minimum operating voltage is adjusted according to A/C features. With this way, when mains voltage is low, system protects A/C.

“A/C Maximum Operating Voltage”

Minimum operating voltage is adjusted according to A/C features. With this way, when mains voltage is high, system protects A/C.

“Forced A/C Mode Operation”

After A/C runs, continuous operating time is determined.

“A/C Minimum Work Time in 8 Minutes”

When this mode is ON, A/C operates at least for 8 minutes.

“Turn Off A/C if it Opr. Poor”

When this mode is ON and if cooling performance of A/C is unsatisfactory, system stops the A/C to save the energy.

“Out Temp High F/C Operation”

With this mode is ON, when the outside temperature exceeds the setpoint, Free Cooling mode is disabled and let A/C to operate.

“A/C Turn On Temperature”

The Indoor temperature is adjusted to let A/C to operate when Free Cooling mode is unsatisfactory for cooling. But minimum operating voltage should be provided by mains to let A/C to work. Otherwise, A/C does not operate.

“A/C Turn Off Temperature”

Indoor temperature is adjusted to stop A/C.

*** “A/C1 - A/C2 delta temperature” (Two phase systems)**

Operating temperature is adjusted for A/C2 when A/C1 is inefficient in two phase systems.

*** “Switch the A/C using timing” (Two phase systems)**

When the both A/C exceed the setpoints of operation times, system switches A/C units from active to passive. With this way, both A/C can run equally and stable.

“Fan Turn On Temperature”

Indoor temperature is adjusted for operation of fan to run. If;

- fan fuse(F1) is not plugged in
- humidity value is higher than the setpoint
- DC power supply is not proper for fan
- There is dewpoint alarm

Fan does not run.

“Fan Turn Off Temperature”

Indoor temperature is adjusted for operation of fan to stop.

“Selection of Fan Type”

DC fan is chosen on installation. But DC or AC fan can be chosen.

“Fan Power Type & Day-Night Speed”

Fan Power and Fan Day-Night Speed parameter settings can be adjusted.

“Fan Work With The A/C Systems”

With this mode, after A/C started to run, according to indoor/outdoor temperature (Δt), fan can run if it's desired.

“Indoor- Outdoor Delta Temperature (Δt)”

Δt is determined for fan's maximum speed. Δt is effective on cooling capacity. If measured Δt is equal to or bigger than set Δt , fan will work at maximum speed.

“Critical Indoor Temp Max Fan Speed,No AC”

When inside temperature is on critical value and fan can be operated on maximum speed by using this mode. Also inside temperature is adjusted to run fan on maximum speed when there is no energy.

“A/C Phase Fail Fan Speed”

Fan speed can be adjusted from here.

“Mixed Mode Start Temperature”

Inside temperature value is adjusted to start mixed mode.

“Mixed Mode Fan Turn Off Temp”

“Mixed Mode Fan turn off temperature” can be set from this mode by choosing “Set”. When it’s on mixed mode and when set value is under 3°C, fan will stop.

“Mixed Mode A/C Turn Off Temp”

If inside temperature exceeds “Mixed Mode Start Temperature”, A/C & fan run together to decrease inside temperature.

“Heater Turn Off Temperature”

“Heater Turn Off Temperature” is determined with this mode.

*** “Heater 1 - 2 delta temperature” (Two phase systems)**

When 1.heater(A/C) is inefficient for heating, the temperature level is adjusted to run 2.heater(A/C).

“Fan Off,Outdoor Temperature High”

When the outdoor temperature increases to set value, operation of the fan and air flow stops.

“Fan Off,Outdoor Temperature Low”

When the outdoor temperature decreases to set value, operation of the fan and air flow stops.

“Fan Off,Maximum Indoor Humidity”

When indoor humidity increases to set value, operation of the fan and air flow stops. With this mode, indoor humidity value is held between desired range which devices can work decently.

“Fan Parameter Enable in Mixmode”

On mixmode when the outdoor temperature is low/high or value of indoor humidity is high, operation of the fan and air flow stops.

“Start of Night” - “Stop of the Night”

Night mode can be used when user want to reduce the noise of fan.

“Low Batt Alarm Threshold”

Default “Low Battery Alarm Threshold” is adjusted “-44 VDC” when supply voltage is “-48 VDC”, “22 VDC” when supply voltage is “24 VDC”. When supply voltage is under these values, user receive Low Battery Alarm and system doesn’t run the DC Fan.

“High Batt Alarm Threshold”

Default High Battery Alarm Threshold is adjusted “-54 VDC” when supply voltage is “-48 VDC”, “27 VDC” when supply voltage is “24 VDC”. When supply voltage is under these values, user receive High Battery Alarm and system doesn’t run the DC Fan.

“Low Temp Alarm Threshold”

The minimum indoor temperature is determined that user can get Low Temperature Alarm.

“High Temp Alarm Threshold”

The maximum indoor temperature is determined that user can get High Temperature Alarm.

“Very High Temp Alarm Threshold”

The maximum indoor temperature is determined that user can get Very High Temperature Alarm.

“Low Voltage Alarm”

If the voltage of the device is lower than normal supply voltage, system sends Low Voltage Alarm.

“High Voltage Alarm”

If the voltage of the device is higher than normal supply voltage, system sends High Voltage Alarm.

“Low Temp Alarm”

If indoor temperature is lower than adjusted minimum value, system sends Low Temperature Alarm.

“High Temp Alarm”

If indoor temperature is higher than adjusted minimum value, system sends High Temperature Alarm.

“Very High Temp Alarm”

If indoor temperature is much higher than adjusted minimum value, system sends Very High Temperature Alarm.

“Filter Pressure Alarm”

If air filter does not let air flow because it's too dirty & blocked, system sends Filter Pressure Alarm. User can set the desired pressure value and if the filter pressure value reaches to this level, user receives the alarm.

“A/C Phase Power Alarm 1”

When the mains voltage is off, system sends A/C Phase Power Alarm 1.

“Poor Heating Alarm”

If indoor temperature does not reach to the desired value (heater OFF temperature) in one hour while heating, system sends Poor Heating Alarm.

“Poor Cooling Alarm”

If indoor temperature does not reach to the desired value in one hour while cooling, system sends Poor Cooling Alarm.

“Fan Power Alarm”

If somehow fan doesn't run, system sends Fan Power Alarm.

“Fan Speed (RPM) Alarm”

If there is a problem about fan speed, system sends Fan Speed Alarm.

“Max Humidity Alarm”

If indoor humidity is higher than adjusted humidity value, system sends Max Humidity Alarm.

“Dew-Point Alarm”

In any Dew-Point situation, system sends Dew-Point Alarm.

“Show FCS Alarms On LCD”

When this mode is ON, user can see all alarms on the screen.

“Send event data to the NMS”

When this mode is ON, all occurred events and alarms deliver to network management system.

"Modbus_config"

Device addr : It's the part that user defines the Modbus address. It can be between 1 – 247.

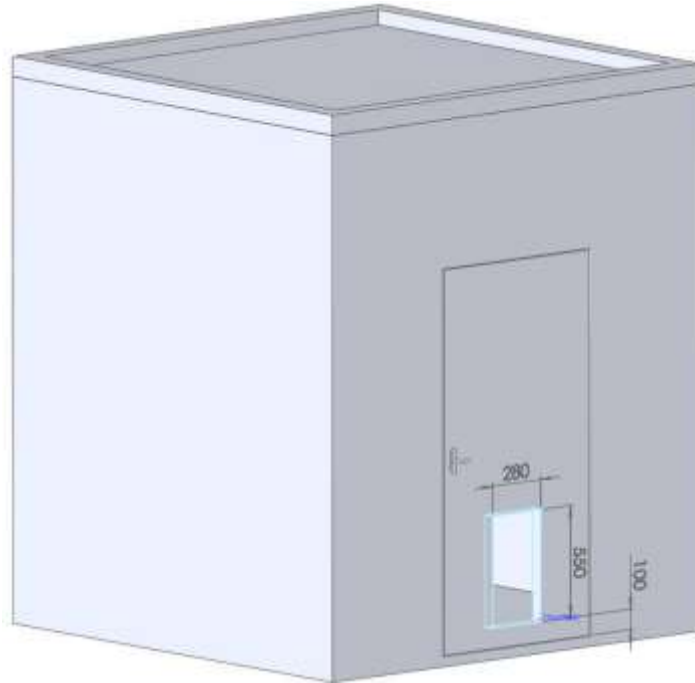
Baudrate :Communication speed of Modbus is adjusted from here. Baudrate intervals are 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800.

Connection : If device communication won't be form USB connector, it should be defined from here. External communication ports; GPRS/RS485, Ethernet.

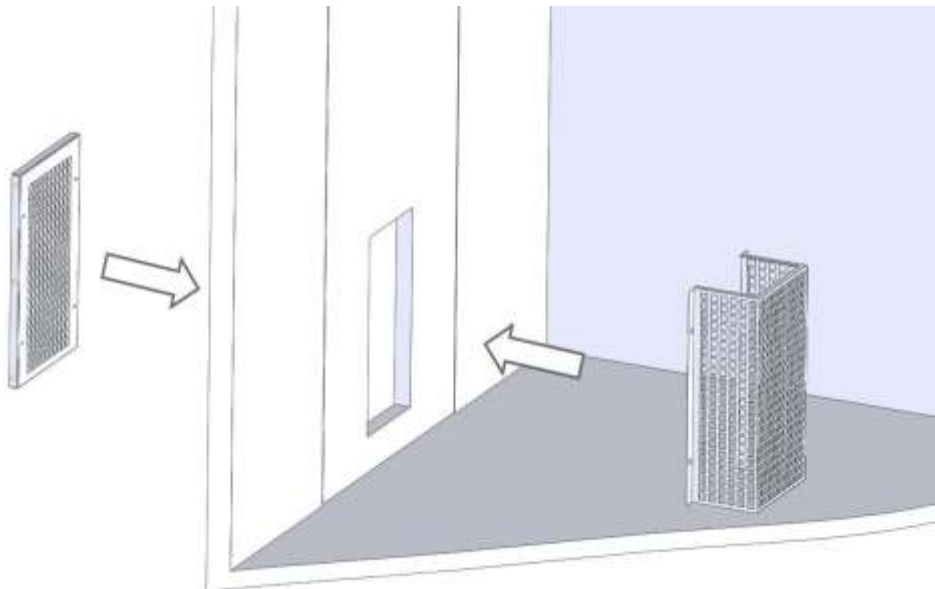
NMS time (dk) :On this screen user can define how often the system is set to send data to the device management system.

6. 55W Free Cooling Mechanical Installation:

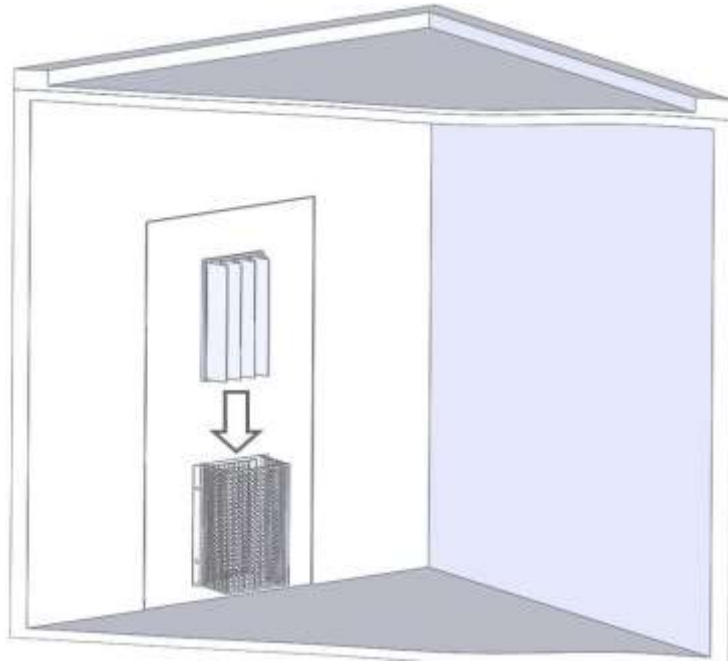
There should be opened an air-inlet space 100 mm above the ground.



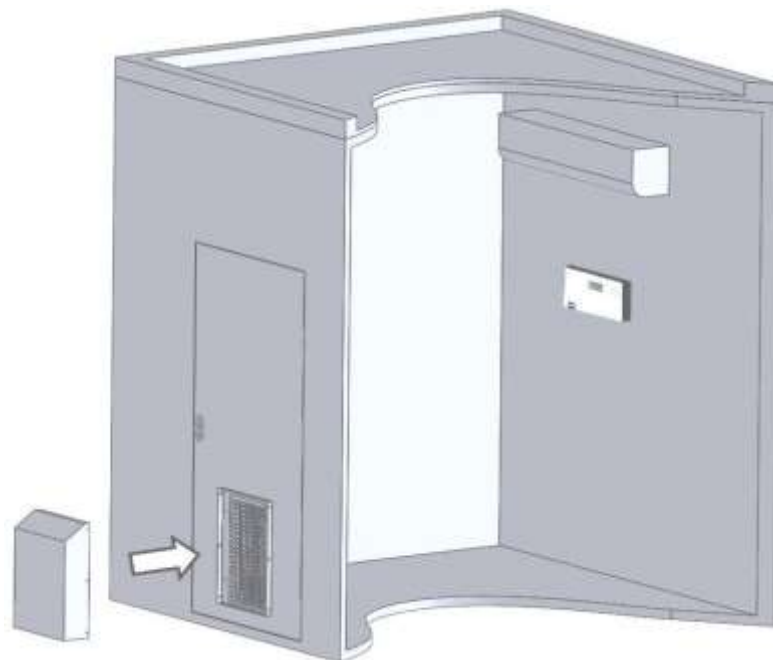
Door hood is mounted from outside and filter skeleton is mounted from inside.



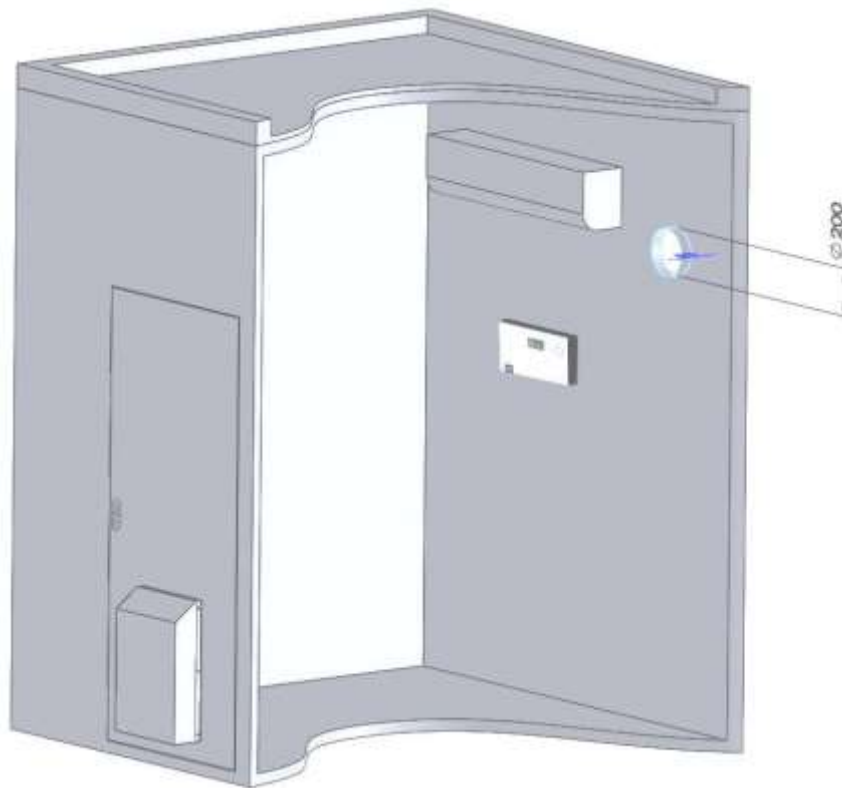
Filtre is put into the filter frame as shown.



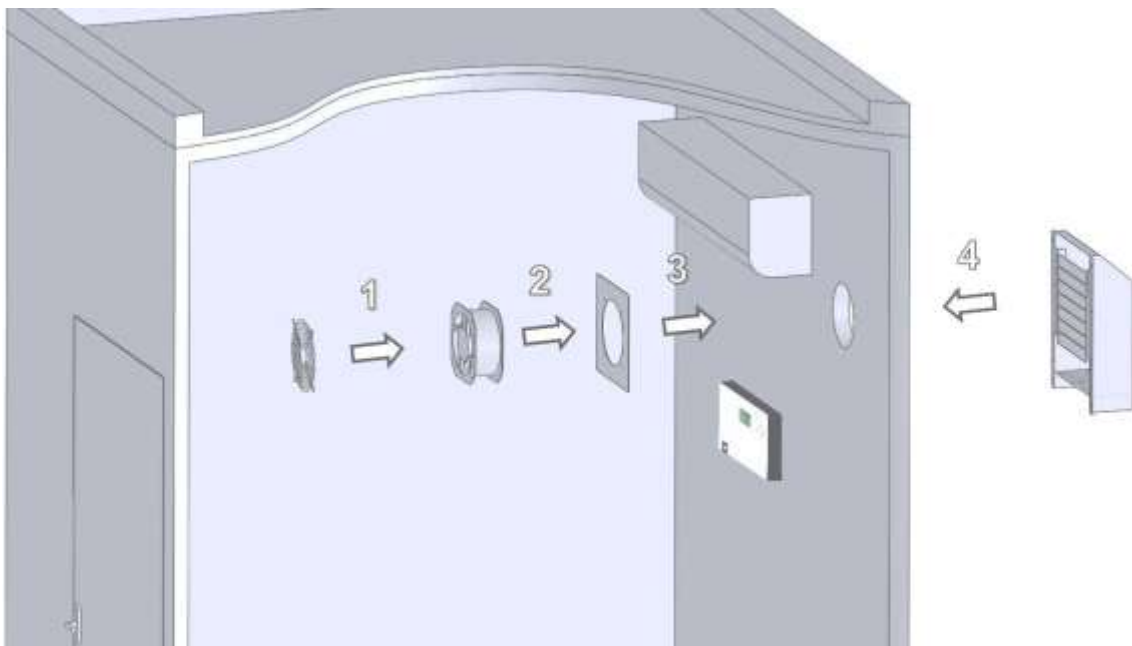
Outdoor hood and FCS control unit are mounted as shown. Internal sensor is mounted close to the ceiling which shouldn't be towards to A/C.



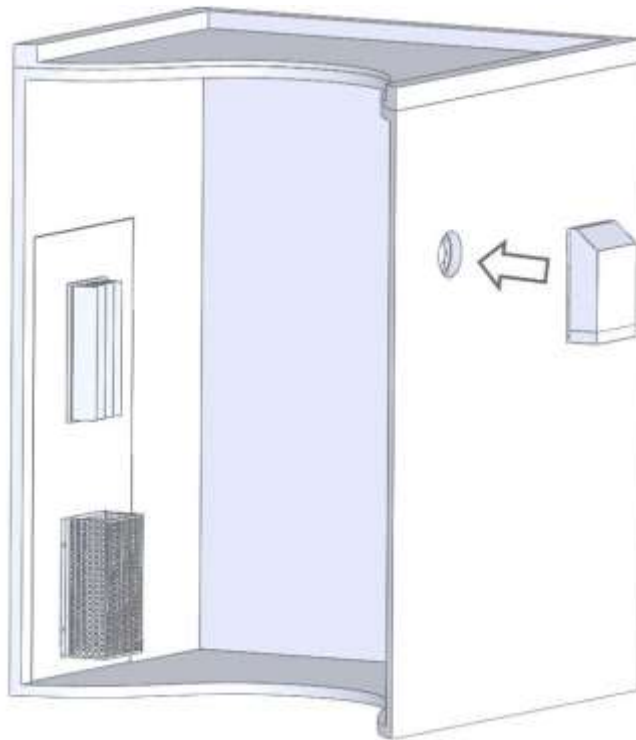
There should be opened an air-outlet hole around 200mm diameter to upside of the wall as shown.



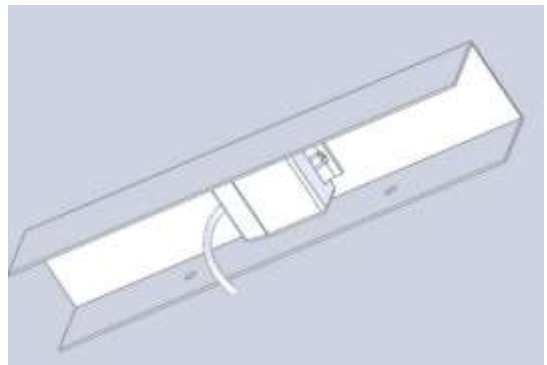
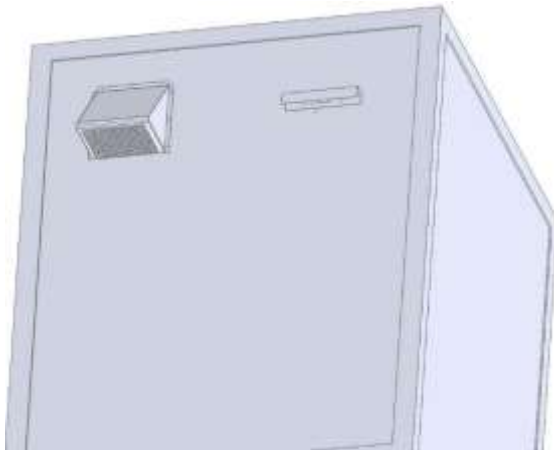
Fan unit is mounted by turns as shown.



Paddle-box is mounted as shown.




External sensor is mounted into a 300x100 mm raceway as shown.



a. 55W Mounting Accessories

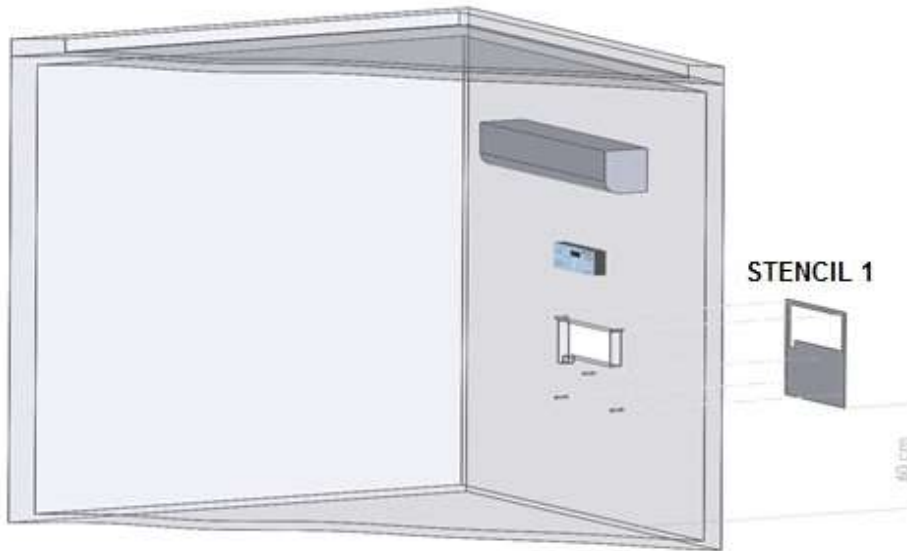
Product Name		Figure
FCS Control Unit 230x135x37 mm (W-H-D)	FCS4	
Paddle Box(for door) 396x590x137 mm (W-H-D)	FCS3M01	
Cap of Paddle Box 588x390x27 mm (W-H-D)	FCS3M02	
Filter 302x592x125 mm (W-H-D)	G4 Filter	

<p>Filter Skeleton</p> <p>382x590x202 mm</p> <p>(W-H-D)</p>	<p>FCS3M03</p>	
<p>Fan (Axial)</p> <p>225x225X80 mm</p> <p>(W-H-D)</p>	<p>FAN 55W</p>	
<p>Fan Grille</p> <p>255x255x5 mm</p> <p>(W-H-D)</p>	<p>FCS3M04</p>	
<p>Paddle Box (for fan)</p> <p>387x137x488 mm</p> <p>(W-H-D)</p>	<p>FCS3M05</p>	
<p>295x295x1,5 mm</p> <p>(W-H-D)</p>	<p>FCS3M06</p>	

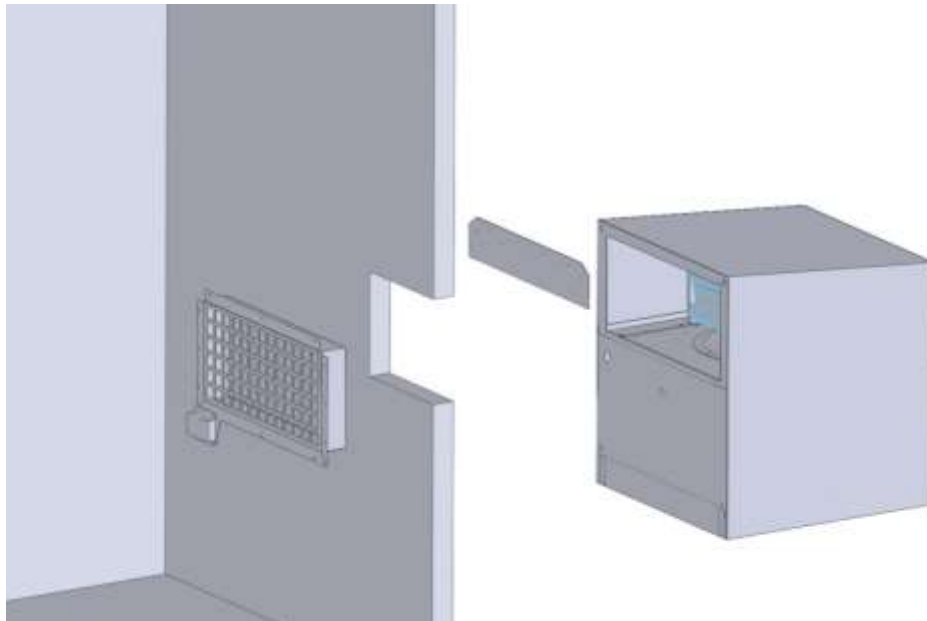
<p>Internal Sensor</p> <p>66x41x16 mm</p> <p>(W-H-D)</p>	<p>SENSOR</p>	
<p>External Sensor</p> <p>60x75x30 mm</p> <p>(W-H-D)</p>	<p>SENSOR</p>	

7. 190W Free Cooling Mechanical Installation

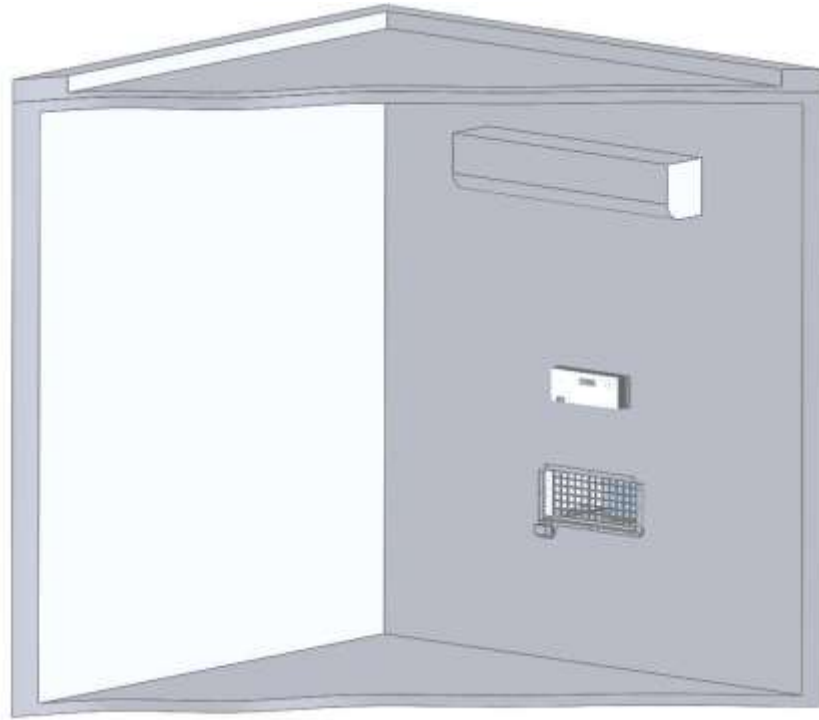
Under the A/C and 60 cm above the ground, an air-inlet location is opened with STENCIL 1 as shown.



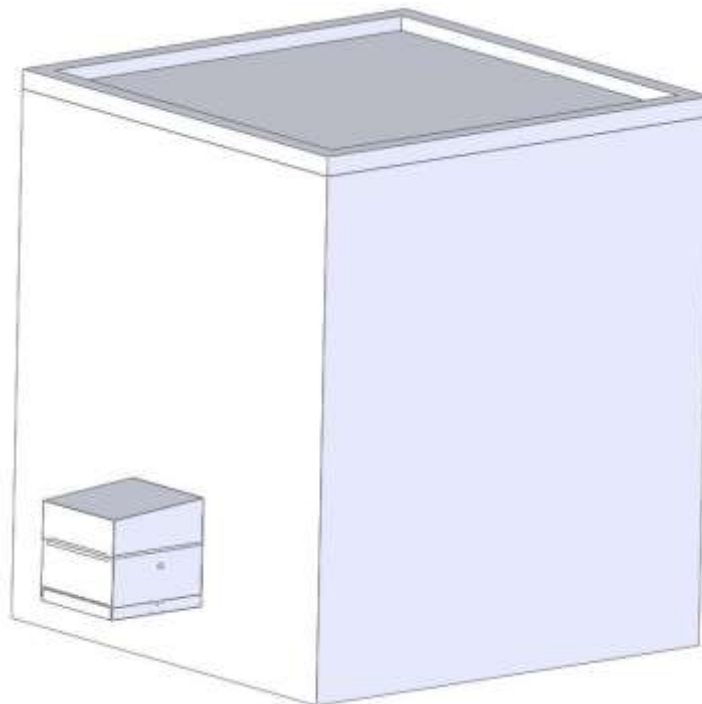
Then unit holder and fan box are mounted as below.



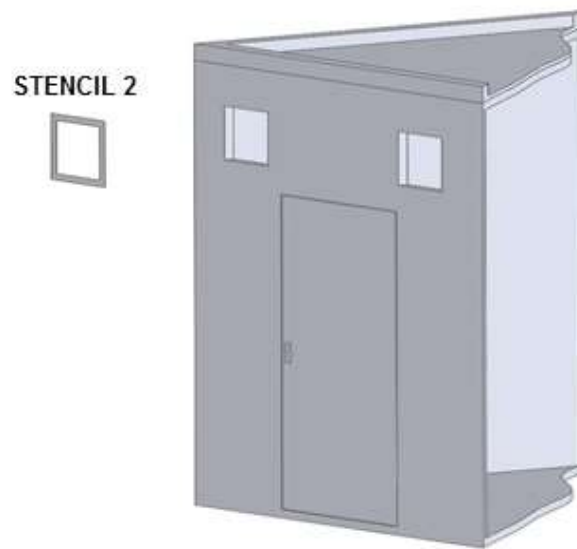
FCS control unit is mounted as shown. Internal sensor is mounted close to the ceiling which shouldn't be towards to A/C.



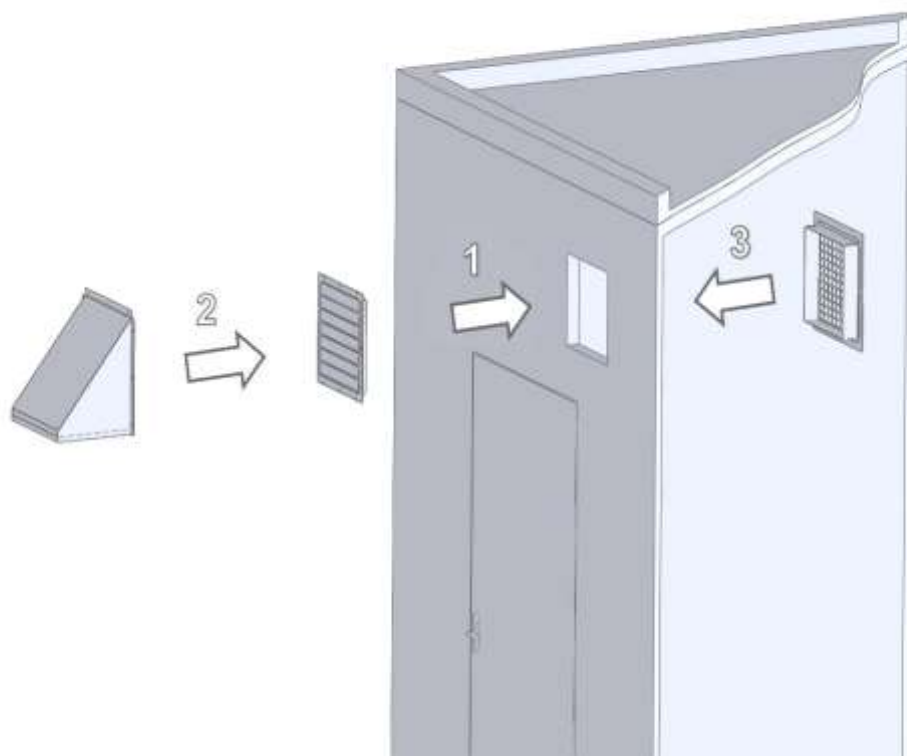
Fan box will be seen as below.



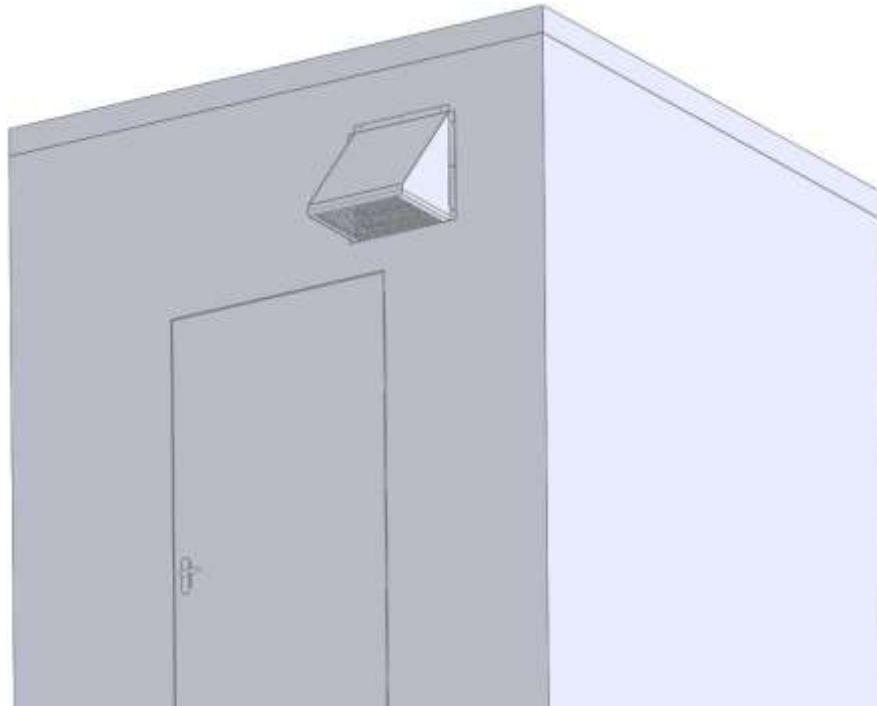
There will be opened two locations with STENCIL 2 to the right and left upside of the cabin door.



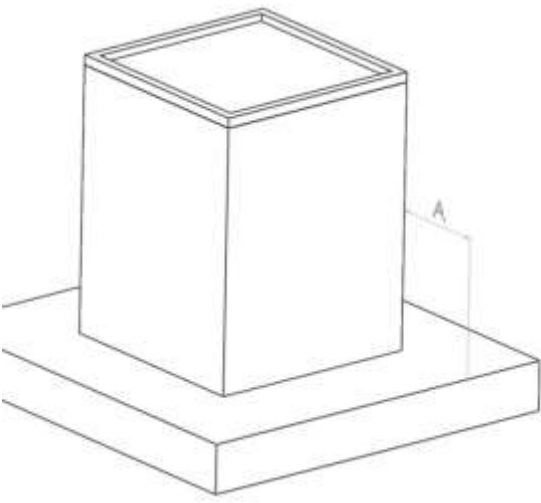
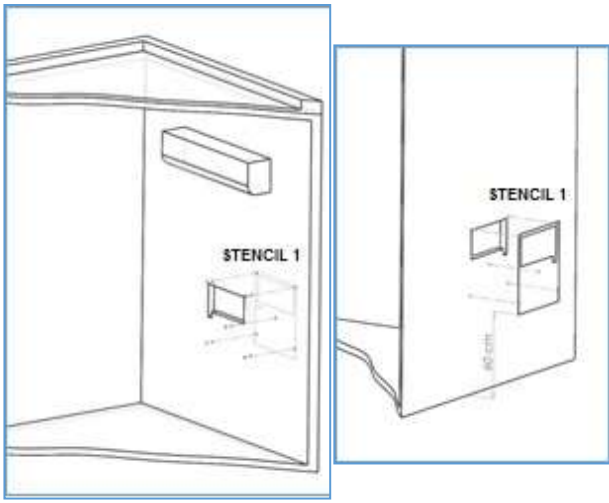
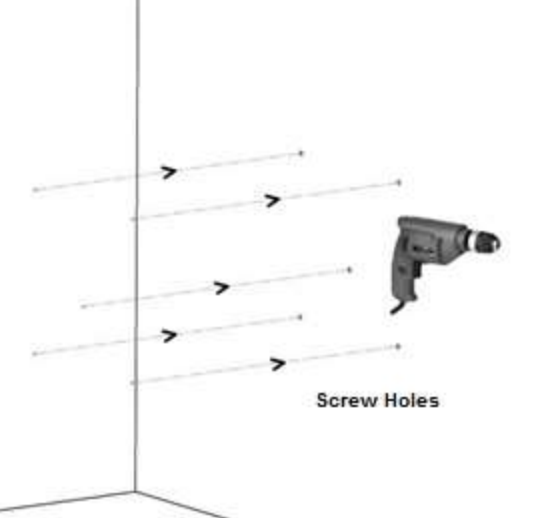
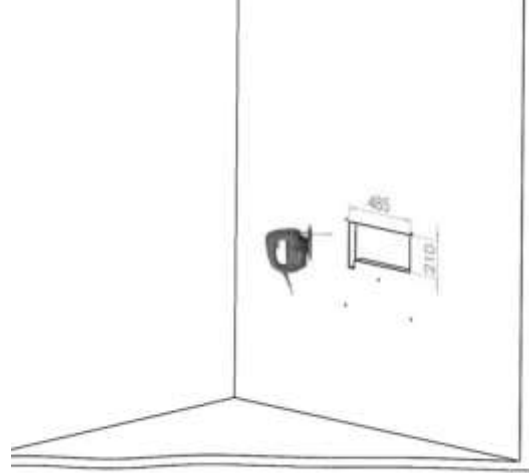
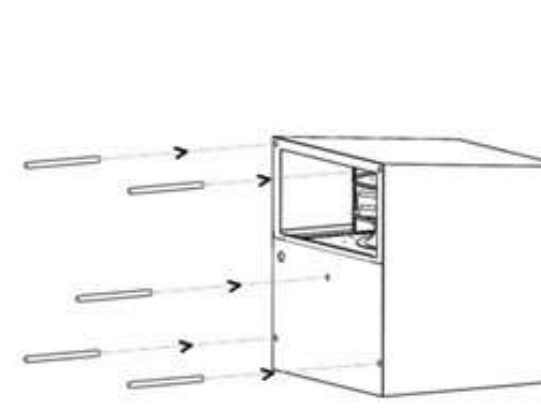
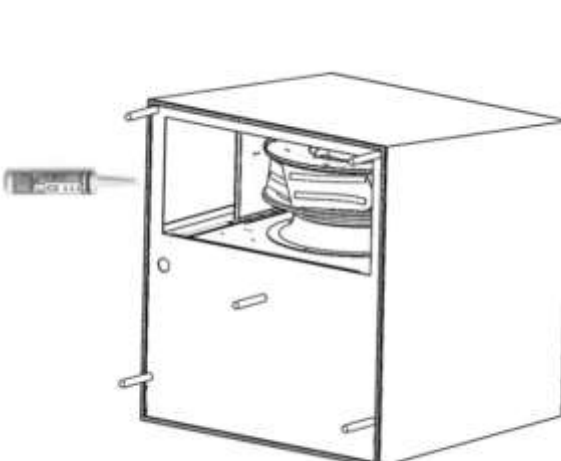
Air-outlet paddle box, vent and cap are mounted by turns as below.



It will seem like as shown.

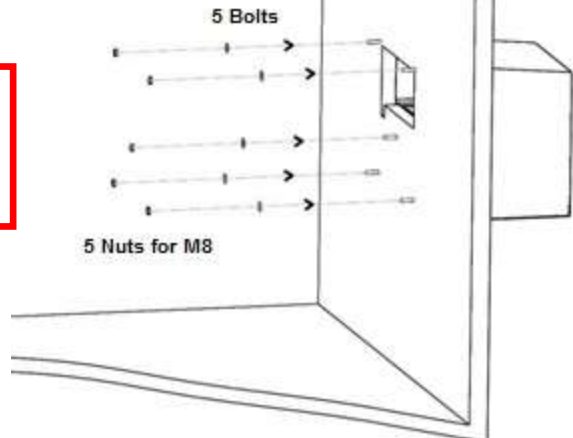


a. 190W Mounting Steps

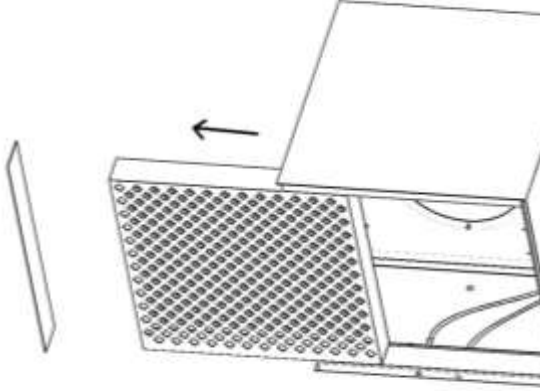
 <p>1. The location of Fan Box should be observed.</p>	 <p>2. Under the A/C and 60cm above the ground, an air-inlet location is determined with ŞABLON1 as shown.</p>
 <p>3. Holes are opened with drill.</p>	 <p>4. Then that air-inlet and cable locations are opened as with jigsaws 485x210cm.</p>
 <p>5. Rods are screwed to Fan Box.</p>	 <p>6. Silicon is applied at the front face of Fan Box.</p>

OBSOLETE

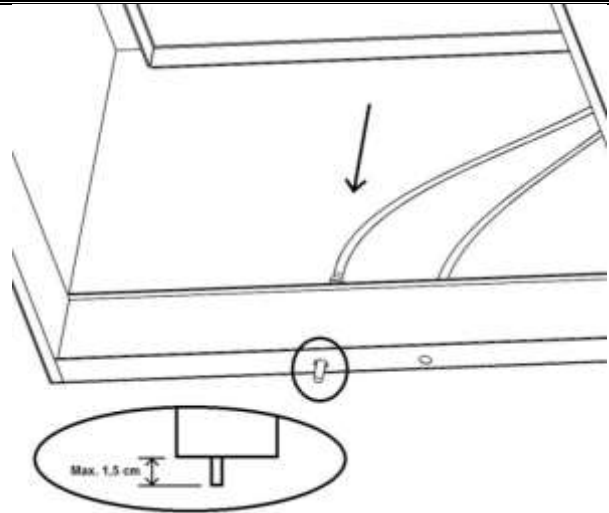
7. Unit holder and fan are mounted from outside of the wall.



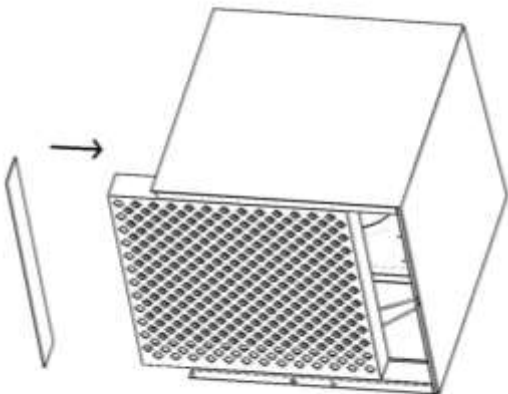
8. Fan Box must be safety with nuts and washers.



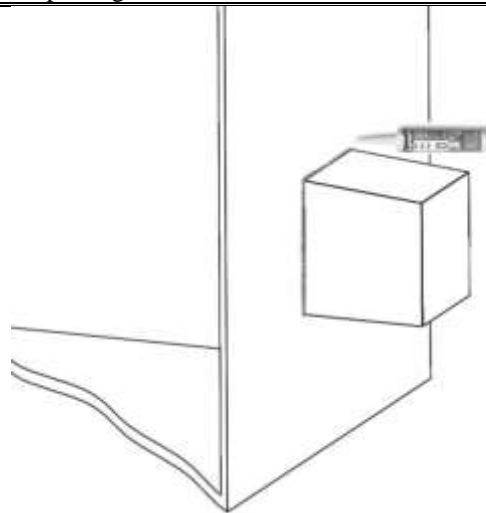
9. Filter cap and Filter should be removed to mount the external sensor.



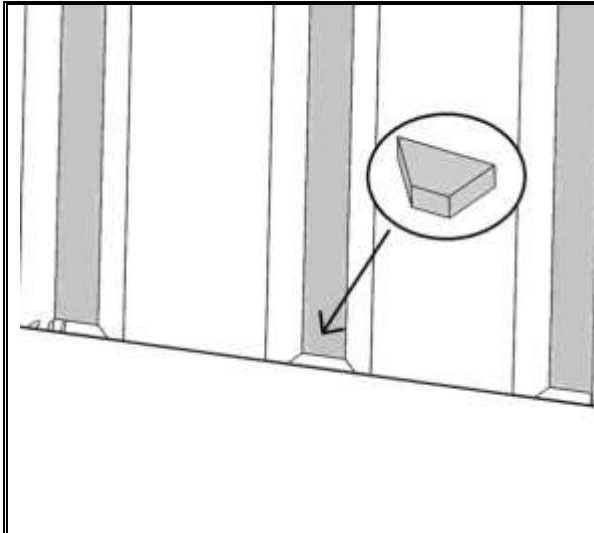
10. After installation is finished, sensor is appeared at the top of figure.



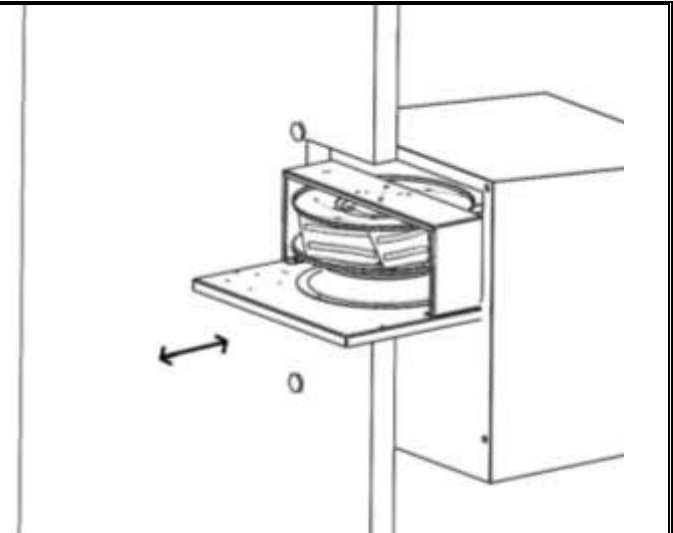
11. Filter cap and filter are mounted again.



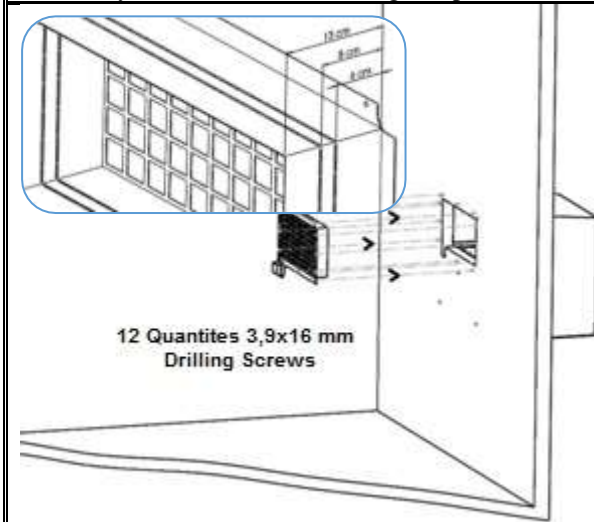
12. If there are any space between fan box and surface, it's filled with silicon.



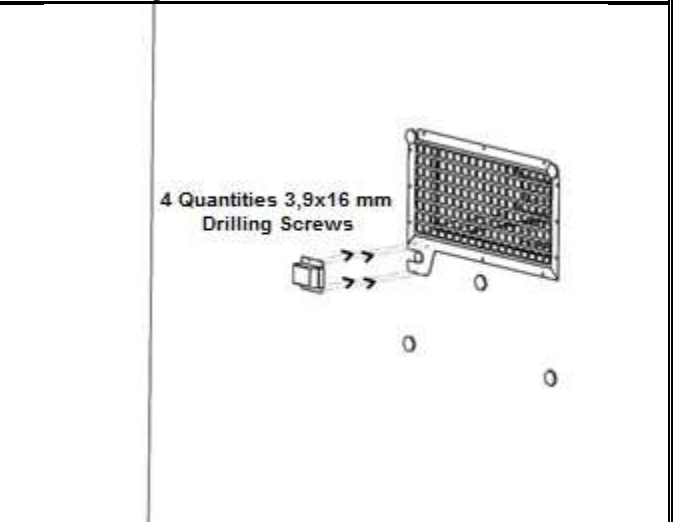
13. Styrofoam is used for corrugated places.



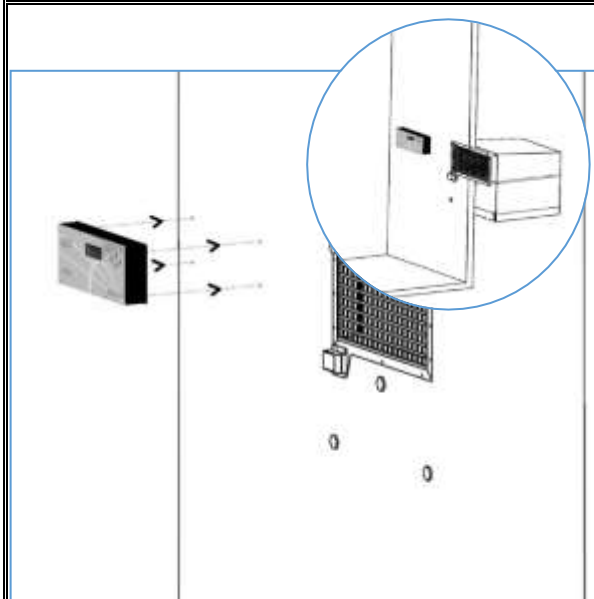
14. Motor plate is mounted with two screws.



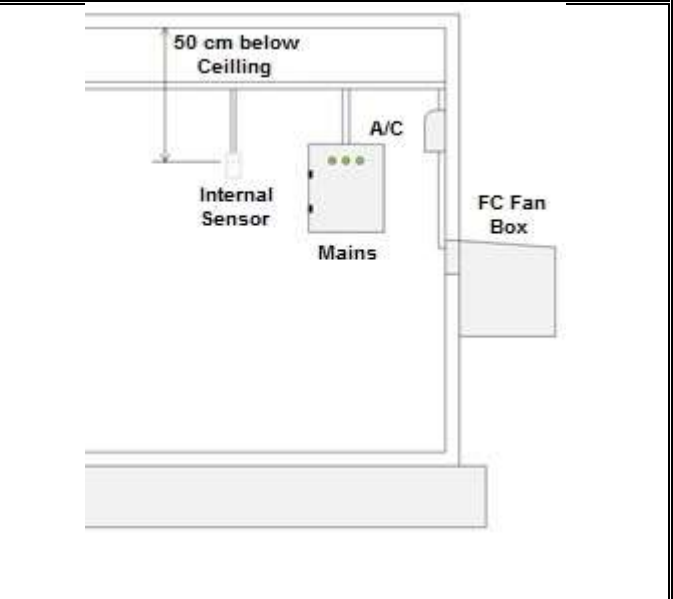
15. Air-inlet grille is mounted as above.



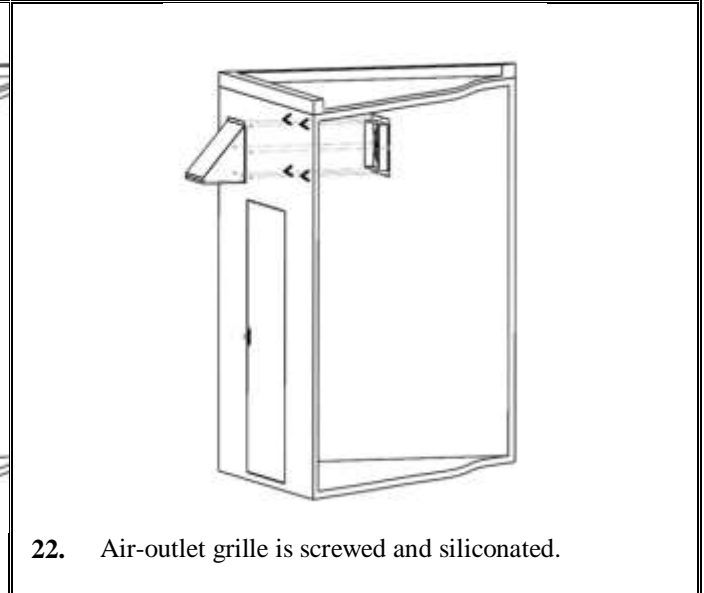
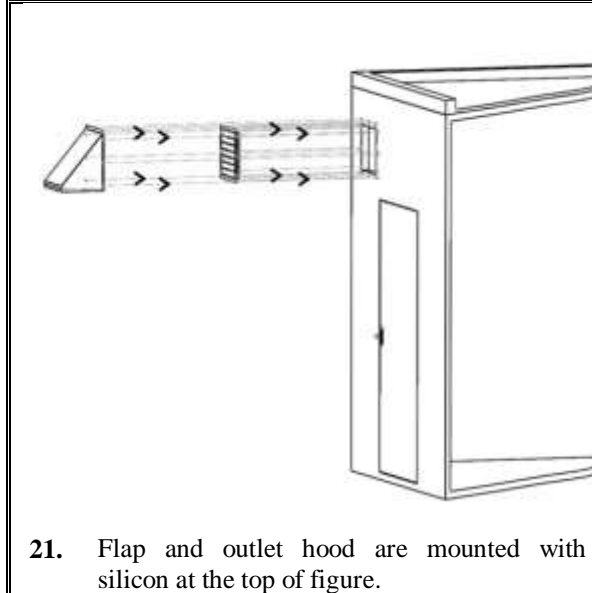
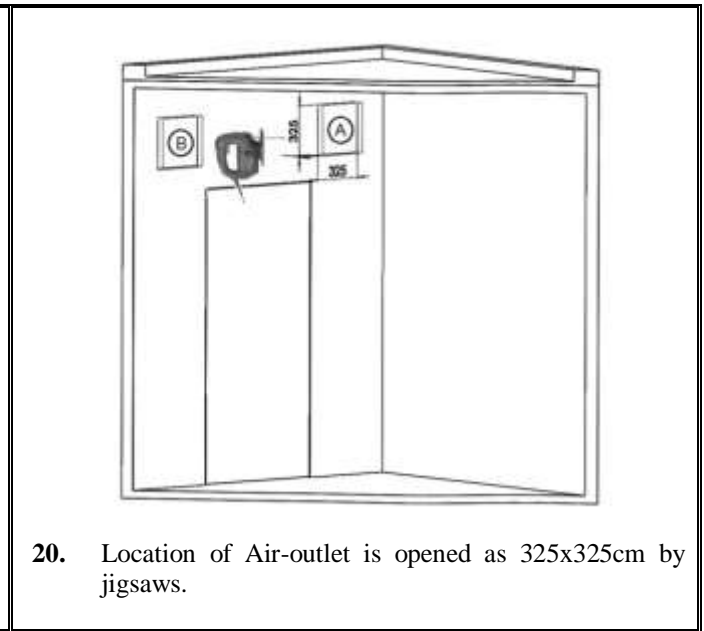
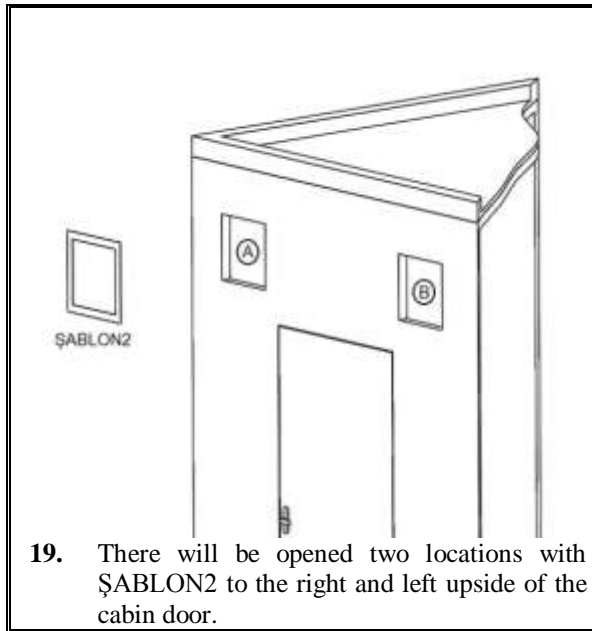
16. Cable protection cap is mounted.

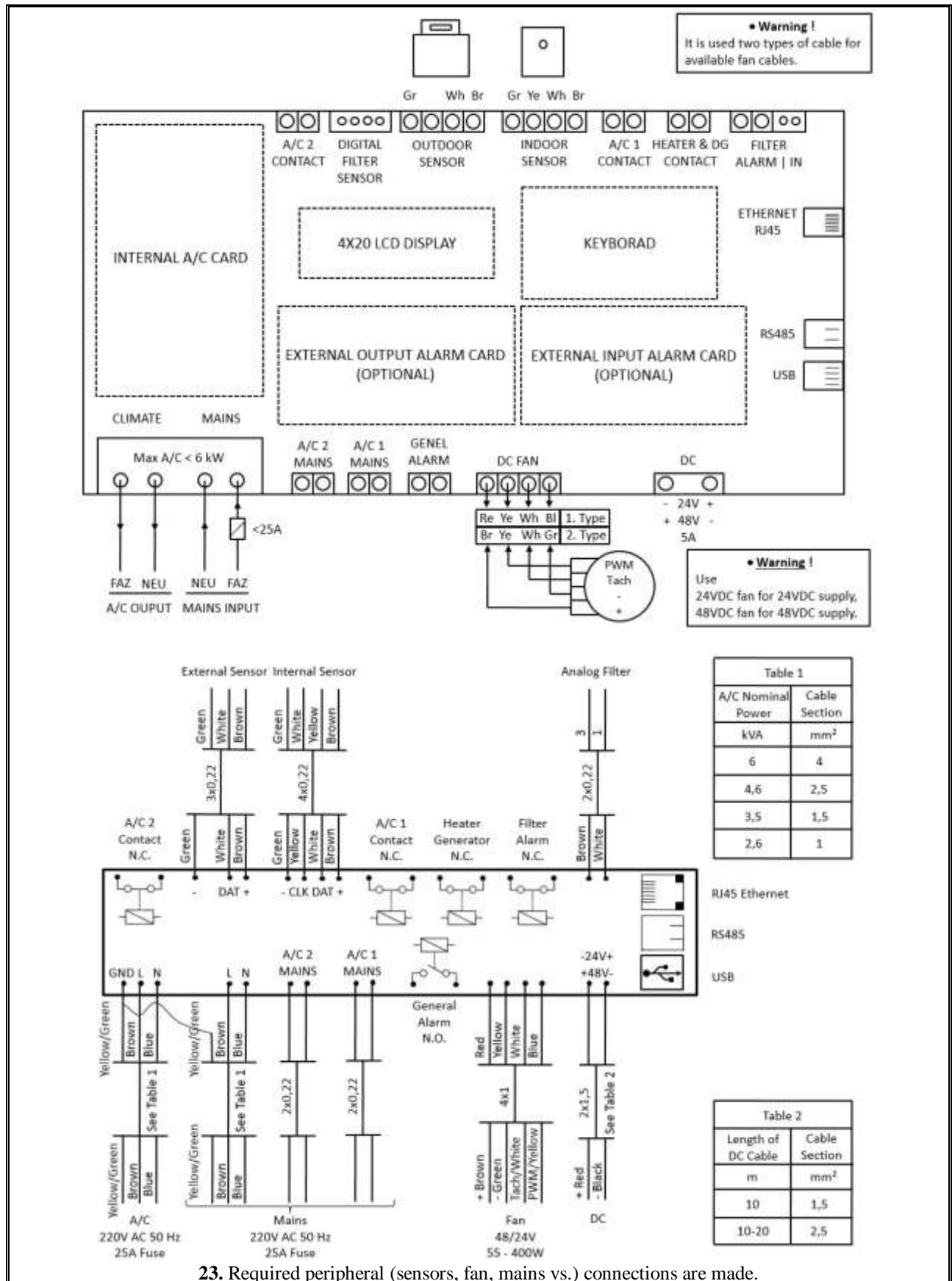


17. FCS4 control unit is mounted to the wall.

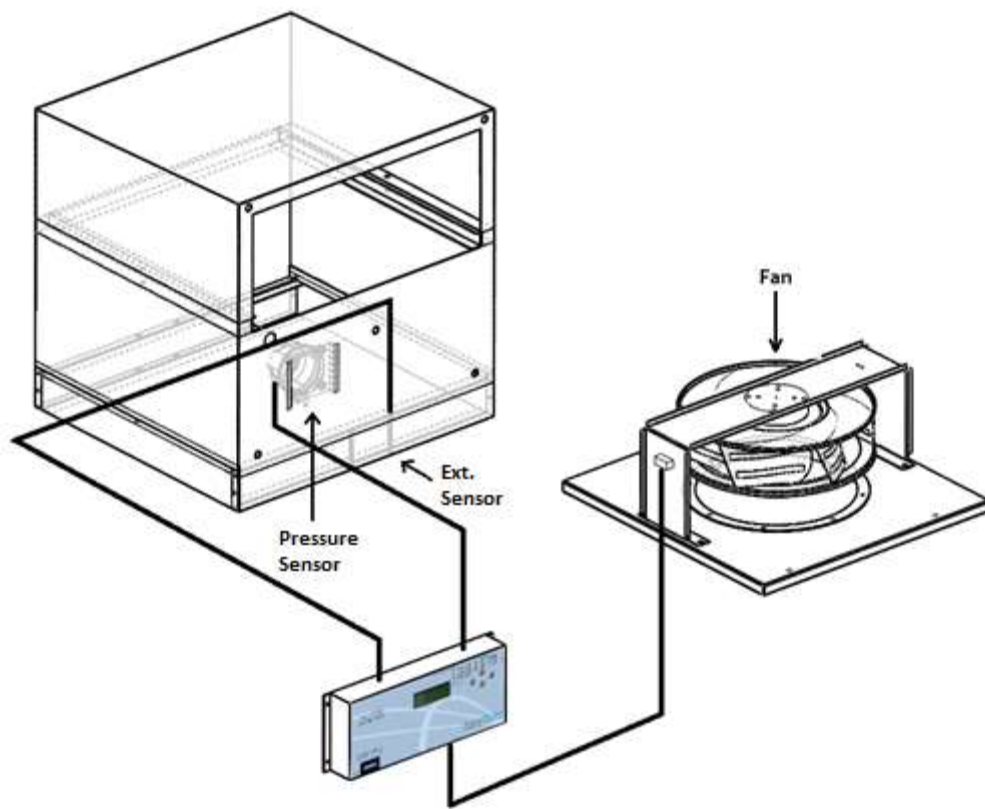


18. Internal sensor is mounted 50 cm below the ceiling.





Not: After the installation is done, user should switch the fan type as 190W on FCS control unit.



b. 190W Mounting Accessories

Product	Part Number	Figure
FCS Control Unit 230x135x37 mm (W-H-D)	FCS4	
FCS FAN Box 500x550x500 mm (W-H-D)	FAN BOX	
Frame 500x320x60 mm (W-H-D)	FCS4M1	
Cable Raceway 70x72x25 mm (W-H-D)	FCS4M2	

<p>Air-Outlet Cap 400x400x61.5 mm (W-H-D)</p>	<p>FCS4M3</p>	
<p>Air-Outlet Vent 370x370x37 mm (W-H-D)</p>	<p>FCS4M4</p>	
<p>Air-Outlet Hood 428x423x302 mm (W-H-D)</p>	<p>FCS4M5</p>	
<p>Pressure Sensor</p>		
<p>Internal Sensor 66x41x16 mm (W-H-D)</p>		

<p>External Sensor</p> <p>60x75x30 mm</p> <p>(W-H-D)</p>		
<p>FAN (centrifugal)</p> <p>Ø318x120 mm</p> <p>(DiameterxY)</p>	FAN	
<p>G3 Filter</p> <p>460x535x45 mm</p> <p>(W-H-D)</p>	Filter	
<p>G2 Filter</p> <p>460x535x10 mm</p> <p>(W-H-D)</p>	Filter	

8. Terms of Warranty

FCS device is not covered by warranty in the following cases.

- Wrong connection failures
- Any damage in case of a lightning strike
- Any damage when mains voltage and DC supply voltage are not on the operation range
- Any damage in case of any ground failure
- Any damage that may occur as a result of exposure to throwing, hitting, crushing etc.
- Opening the cover of the device when it's still under the warranty
- When the mounting is made by unauthorized persons.
- When service and maintenance performed by unauthorized persons.

9. Contact Info

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(34470) Ümraniye / İstanbul

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Fax : 216 466 88 03