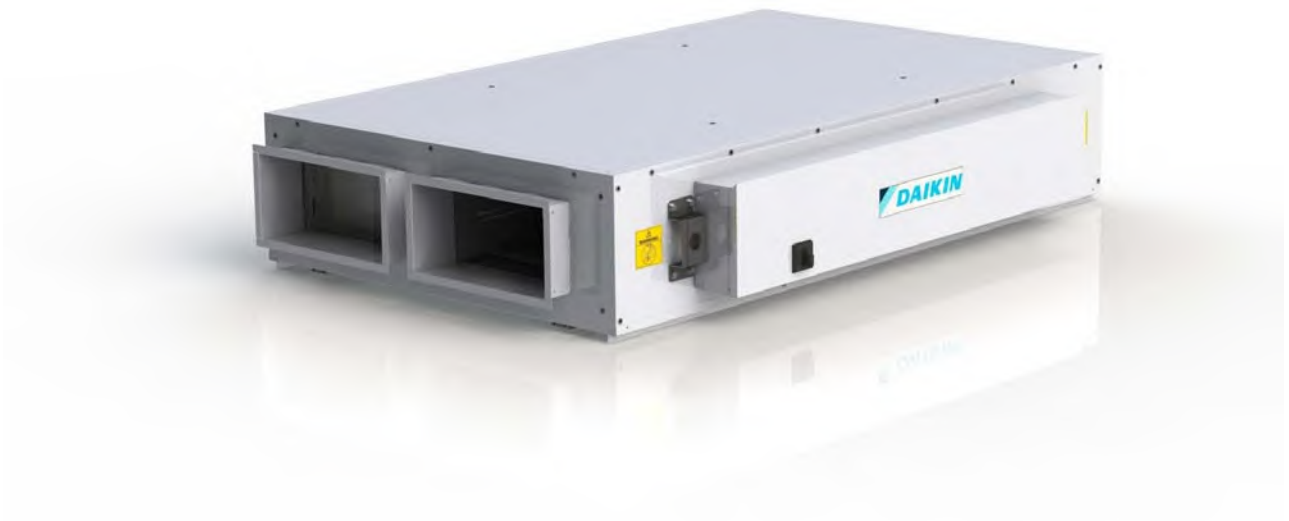
ESIE19-06

Service Manual

Modular L Smart



Part 1. Introduction

This part contains the following chapters:

1.1. Version log

Version code	Description	Date
ESIE19-06	Document release	21/01/2020

1.2. Safety precautions

The precautions described in this document cover very important topics, follow them carefully.

All activities described in the service manual must be performed by an authorized person.

If you are not sure how to install, operate or service the unit, contact your dealer.

In accordance with the applicable legislation, it might be necessary to provide a logbook with the product containing at least: information on maintenance, repair work, results of tests, stand-by periods, …

Also, at least, following information must be provided at an accessible place at the product:

- Instructions for shutting down the system in case of an emergency
- Name and address of fire department, police and hospital
- Name, address and day and night telephone numbers for obtaining service

In Europe, EN378 provides the necessary guidance for this logbook.

1.2.1. Meaning of symbols

	**WARNING** Indicates a situation that could result in death or serious injury.
	**WARNING: RISK OF ELECTROCUTION** Indicates a situation that could result in electrocution.
	**WARNING: RISK OF BURNING** Indicates a situation that could result in burning because of extreme hot or cold temperatures.
	**WARNING: RISK OF EXPLOSION** Indicates a situation that could result in explosion.
	**WARNING: RISK OF POISONING** Indicates a situation that could result in poisoning.
	**WARNING: RISK OF FIRE** Indicates a situation that could result in fire.
	**CAUTION** Indicates a situation that could result in equipment or property damage.
	**INFORMATION** Indicates useful tips or additional information.

1.2.2. Warnings

	**WARNING** Improper installation or attachment of equipment or accessories could result in electric shock, short-circuit, leaks, fire or other damage to the equipment. Only use accessories, optional equipment and spare parts made or approved by Daikin.

WARNING

Make sure installation, testing and applied materials comply with applicable legislation (on top of the instructions described in the Daikin documentation).

WARNING

Make sure the work site environment is clean and safe to work in. Beware of spilled fluids, like water, oil or other substances. Protect bystanders from injury and property from possible damage cause by service works.

WARNING

Wear adequate personal protective equipment (protective gloves, safety glasses,…) when installing, maintaining or servicing the system.

WARNING

Tear apart and throw away plastic packaging bags so that nobody, especially children, can play with them. Possible risk: suffocation.

WARNING

Do NOT touch the air inlet or aluminium fins of the unit.

WARNING

- Do NOT place any objects or equipment on top of the unit.
- Do NOT sit, climb or stand on the unit.

WARNING

During tests, NEVER pressurize the product with a pressure higher than the maximum allowable pressure (as indicated on the nameplate of the unit).

WARNING

- Never mix different refrigerants or allow air to enter the refrigerant system.
- Never charge recovered refrigerant from another unit. Use recovered refrigerant only on the same unit where it was recovered from, or have it recycled at a certified facility.

WARNING: RISK OF FIRE

- When reconnecting a connector to the PCB, do not apply force or damage the connector or the connector pins on the PCB.

WARNING: RISK OF BURNING

- Do NOT touch the refrigerant piping, water piping or internal parts during and immediately after operation. It could be too hot or too cold. Give it time to return to normal temperature. If you must touch it, wear protective gloves.
- Do NOT touch any accidental leaking refrigerant.

WARNING

Always recover the refrigerants. Do NOT release them directly into the environment. Use a recovery pump to evacuate the installation.

Take sufficient precautions in case of refrigerant leakage. If refrigerant gas leaks, ventilate the area immediately.

Possible risks:

- Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.
- Toxic gas may be produced if refrigerant gas comes into contact with fire.

Where applicable, pump down the system and close the service valve, before leaving the site if leak was not repaired, to avoid further leaking of the refrigerant.

WARNING: RISK OF ELECTROCUTION

- Turn OFF all power supply before removing the switch box cover, connecting electrical wiring or touching electrical parts. Where applicable, stop the equipment's operation first and allow (refrigerant) pressure to equalize, before turning OFF the power. Disconnect the power supply for more than 1 minute, and measure the voltage at the terminals of main circuit capacitors or electrical components before servicing. The voltage must be less than 50 V DC before you can touch electrical components. For the location of the terminals, refer to "Wiring diagram" on page 80.
- Do NOT touch electrical components with wet hands.
- Do NOT leave the unit unattended when the service cover is removed.
- Protect electric components from getting wet while the service cover is opened.

WARNING

- Only use copper wires.
- All field wiring must be performed in accordance with the wiring diagram and installation manual supplied with the product.
- If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires may cause an electrical shock, excessive heat generation or fire.
- Secure all terminal connections and provide proper routing for cables, both inside and outside the switchbox.
- NEVER squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges.
- Make sure no external pressure is applied to the terminal connections.
- Make sure to check the earth wiring. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Improper earth wiring may cause electrical shock.
- Make sure to use a dedicated power circuit. NEVER use a power supply shared by another appliance.
- Make sure to check the required fuses and/or circuit breakers before starting works.

WARNING

- After finishing the electrical work, confirm that each electrical component and terminal inside the electrical components box is connected securely.
- Make sure all covers are closed before starting the unit again.

1.2.3. Cautions

CAUTION

Provide adequate measures to prevent that the unit can be used as a shelter by small animals. Small animals that make contact with electrical parts can cause malfunctions, smoke or fire.

CAUTION

- Make sure water quality complies with EU directive 98/83 EC.
- Check the system for leaks after each repair/modification of the water side.
- Check drainage system(s) after repairs.
- Be careful when tilting units as water may leak.

1.2.4. Information

INFORMATION

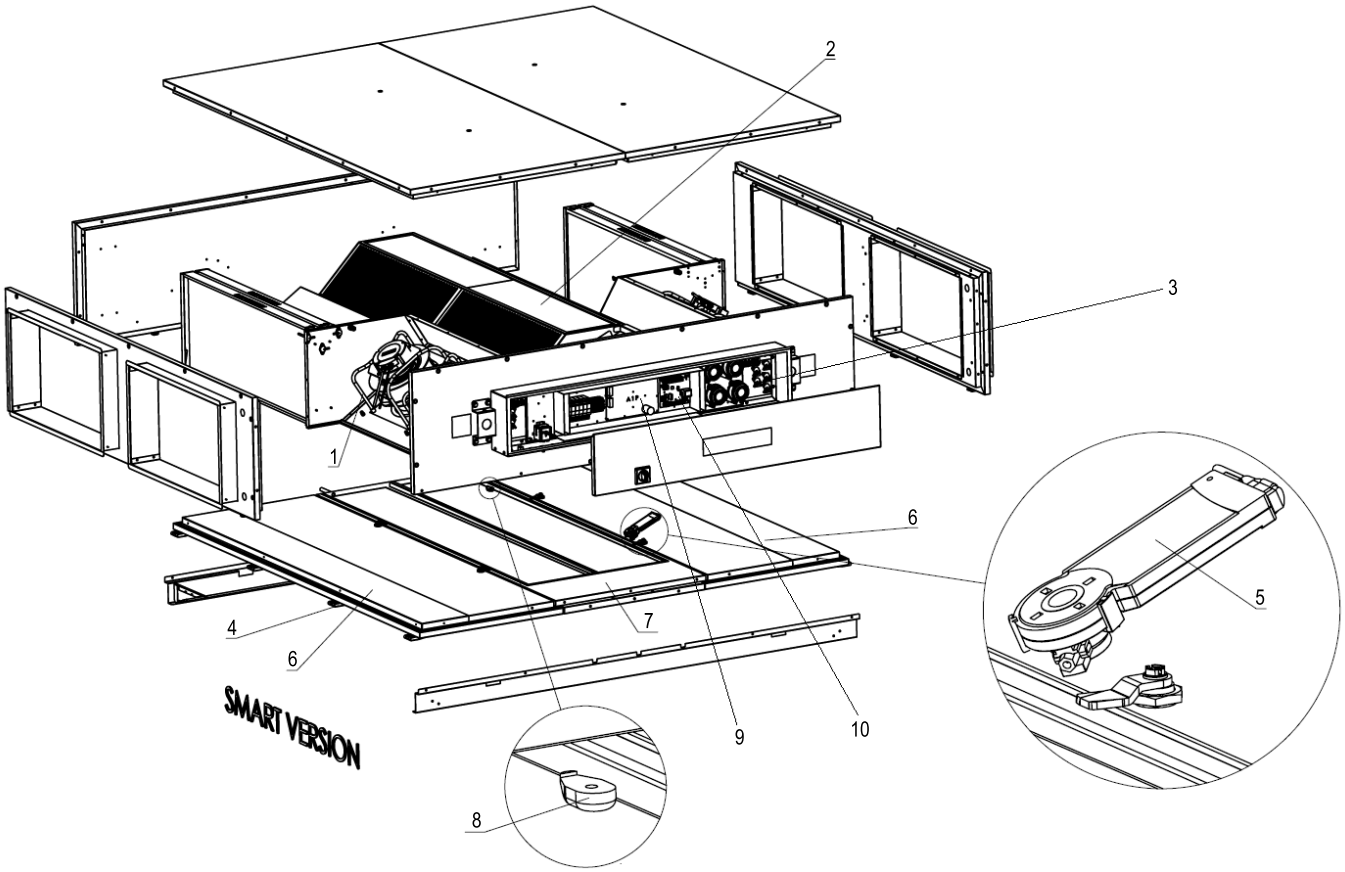
Make sure refrigerant piping installation complies with applicable legislation. In Europe, EN378 is the applicable standard.

INFORMATION

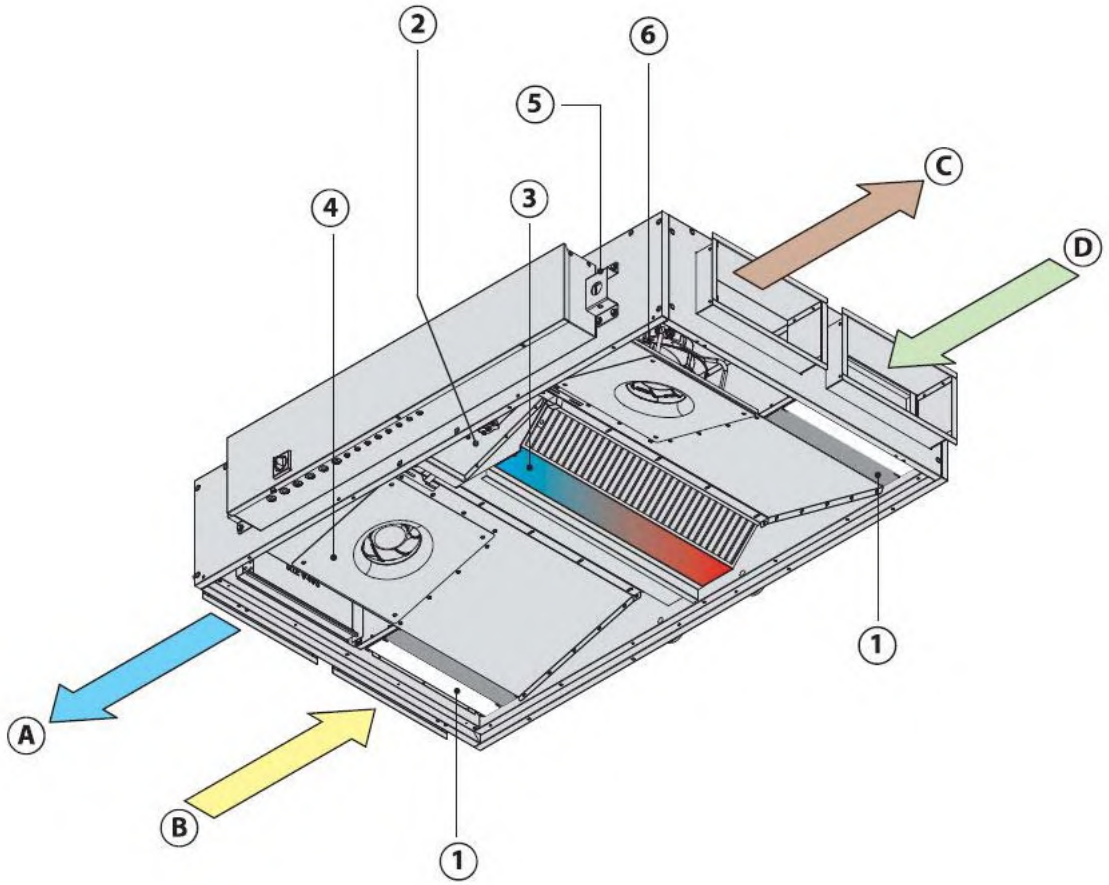
Make sure the field piping and connections are not subjected to stress.

1.3. General operation

- The heat reclaim ventilation units (HRV), model name Modular L Smart, is used to supply outdoor air into the building. The HRV unit is compliant with EN308 regulation according to Lot 6 Ecodesign requirements.
- To reduce the cooling/heating load in the building, the HRV unit can limit the extra load when supplying outdoor air when HRV unit is set into automatic control.
- The HRV unit contains a high efficiency heat exchange element constructed from high efficiency aluminium. The heat exchange unit recover sensible heat by a cross flow pattern.
- From the user interface, the operation mode can be set to automatic control, fixed bypass or fixed heat exchange. When outdoor air temperature drops below +°5C, HRV unit will operate forced in heat-recovery mode.
- The automatic control logic uses air thermistor on the outdoor air intake and the indoor air return side, to control a damper to set unit into heat recovery or bypass the air return. The main purpose is reduce the capacity need to cool down (when return air is higher than set value) or heat up (when return air is lower than set value).
- When the HRV unit is equipped individually with a user interface, the operation mode cooling or heating is set by outdoor air intake temperature.
- When the HRV unit is wired in group to VRV or Sky Air indoor (so on same P1P2 bus), the DX indoor will set the operation mode cooling or heating on the HRV unit.
- The control can operate the fan motor speed according to required ESP setting (15 steps). The proportion of air volume between air supply and air return can be altered in fresh-up operation. The fresh air operation can be set by field setting or voltage free contact input.
- The control can perform a filter contamination check using pressure differential switches.



1. Fan	6. Service door
2. Heat exchanger	7. Drain pan panel
3. Pressure differential switches	8. Nylon socket
4. Hinge	9. Main PCB
5. Bypass actuator	10. Smart Gateway



1. Filter and pre-filter
2. Exchanger by-pass
3. Heat exchanger
4. Supply fan motor assembly
5. Hanging devices
6. Return fan motor assembly

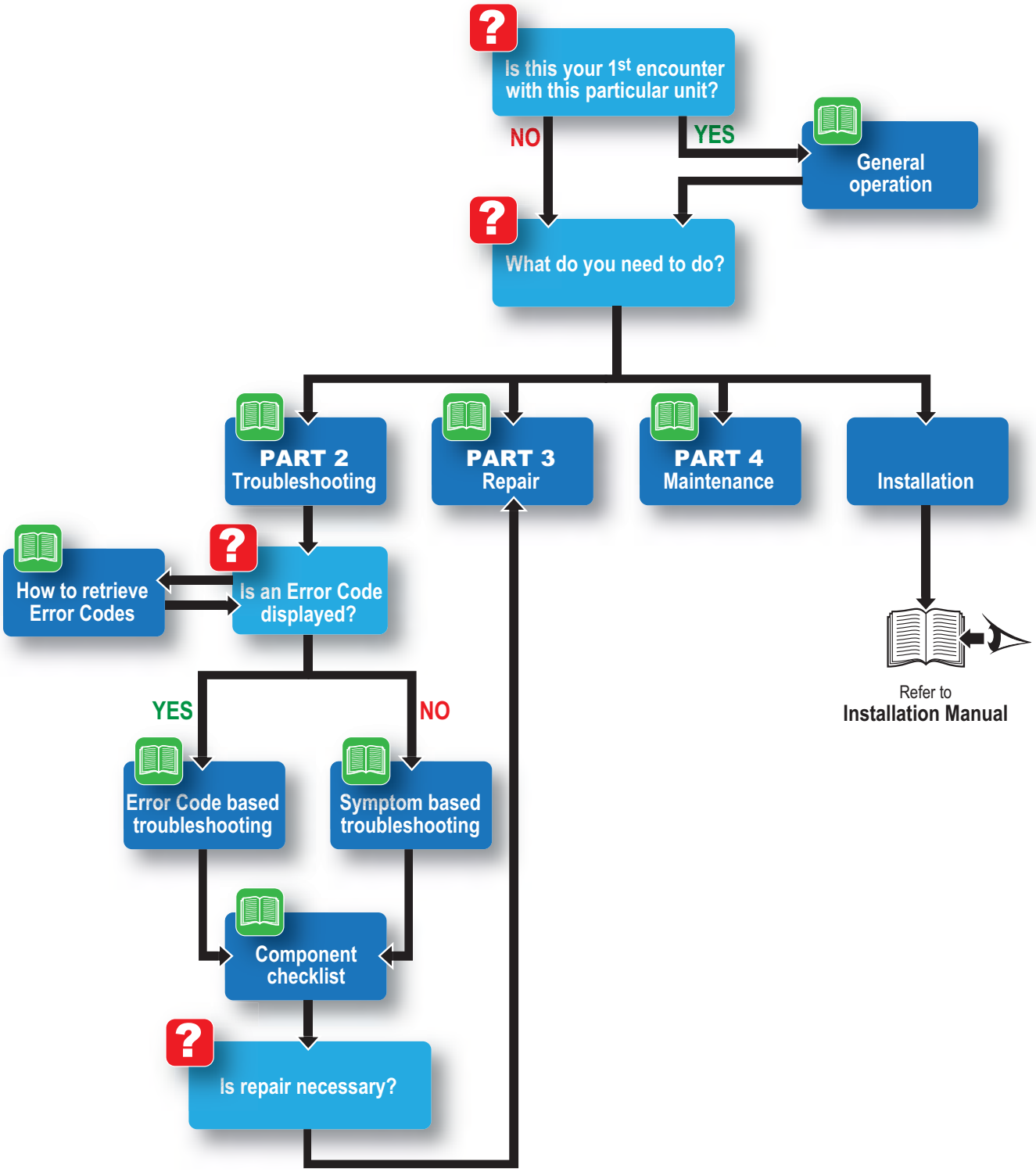
A. Supply air
B. Internal air
C. Exhaust air
D. Fresh air

1.4. How to use

1.4.1. Interactive information flow

This Daikin product Service Manual is intended for professional use only. The actions described hereafter, are only to be performed by qualified and certified persons, taking into account the safety precautions mentioned in this manual and the local regulations as well.

By following the diagram below, the reader can find the relevant information related to his/her task. The digital (pdf) version of this book allows direct page access through all active links. When Adobe Acrobat Reader is used, the <Alt> + <Back Arrow> keys or the arrow in the top right-hand corner of this page can be used to return to the previously viewed page.



1.4.2. Parts of the book

This Daikin product Service Manual is intended for professional use only. The actions described hereafter, are only to be performed by qualified and certified persons, taking into account the safety precautions mentioned in this manual and the local regulations as well.

As can be observed from the Table of Contents, this manual is split up into several chapters:

1.4.2.1. The introduction chapter

The chapter "Introduction" on page 7 includes the safety precautions, this topic and the general operation description of the product(s) this manual refers to.

1.4.2.2. The troubleshooting chapter

The chapter "Troubleshooting" on page 17 not only deals with the methods to recognize and resolve occurring error codes; it also describes the methods how to solve a problem that does not immediately trigger an error code. Such problems are referred to as 'symptom based'. Both the error code based and symptom based troubleshooting tables, indicate possible causes, the necessary checks and in case required, how to repair. The possible causes have been sorted to probability of occurrence and speed of execution.

1.4.2.3. The repair chapter

The chapter "Repair" on page 39 handles the removal and replacement of the major components in the product and discusses cleaning methods as well if applicable, such as for filters. Where applicable, refrigerant handling precautions are mentioned for certain actions; please consider these carefully for your own safety.

1.4.2.4. The maintenance chapter

The chapter "Maintenance" on page 51 of this manual describes the maintenance intervals and procedures to be performed on the product. Remember that a well maintained product, is a more reliable and efficient product.

1.4.2.5. Appendices

Finally, the service manual provides in chapter "Appendix" on page 61 valuable reference data such as piping/wiring diagrams, field settings overview and a checklist to be filled in when you need to escalate an issue to your dealer.

1.4.3. Contact information

This manual has been made with much care and effort. Use it in your daily jobs, as it has been made for you.

Despite our efforts, there is always a chance some cleric or other mistake has been made during the creation of this manual. We kindly ask you to send the found mistakes, or remarks for improvement, to the no-reply email address servicemanual@daikineurope.com.

Part 2. Troubleshooting

This part contains the following chapters:

2.1. Error codes check

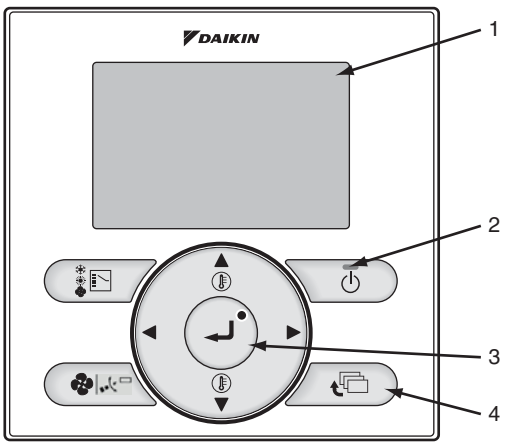
2.1.1. Error codes via remote controller

2.1.1.1. Error codes via wired remote controller BRC1E

2.1.1.1.1 How to retrieve error codes

The following message will be displayed on the screen when a malfunction or a warning occurs during operation.

BRC1E53



1. Screen
2. Operation lamp
3. ‘menu’ button
4. ‘cancel’ button

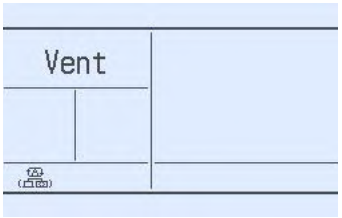
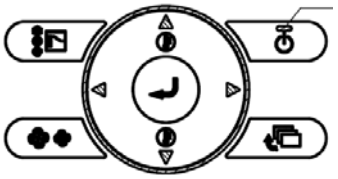
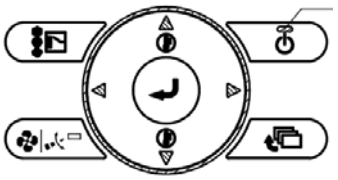
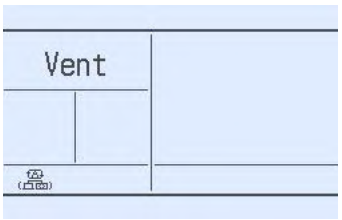
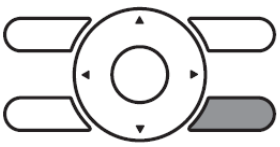
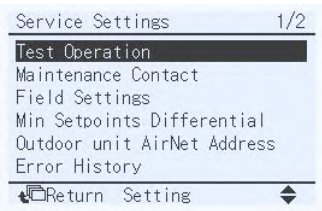
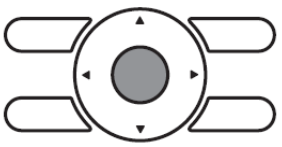
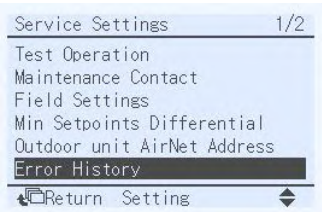
	Operation Status	Display	
Abnormal shut-down	The system stops operating.	The operation lamp (green) starts to blink. The message “Error: Press Menu button” will appear and blink at the bottom of the screen.	
Warning	The system continues its operation.	The operation lamp (green) remains on. The message “Warning: Press Menu button” will appear and blink at the bottom of the screen.	

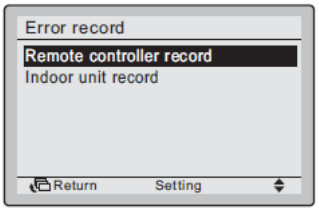
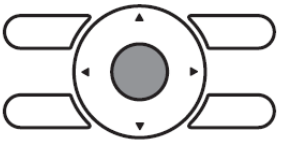
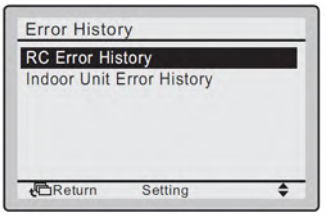
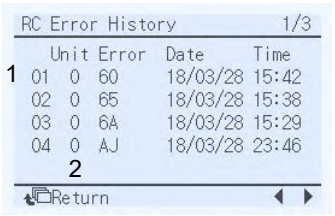
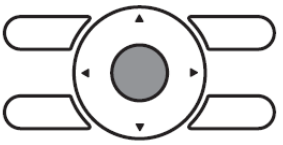
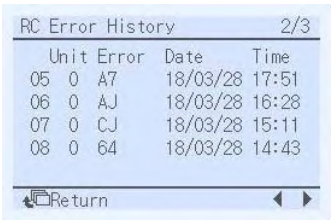
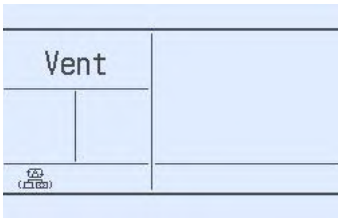
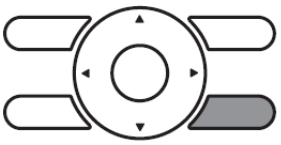
If an error or warning is present, it will be displayed on the user interface screen: for more information about troubleshooting, refer to "Error based troubleshooting" on page 20.

2.1.1.2. How to reset error codes

In "Error based troubleshooting" on page 20 you find a description of how to reset the specific error or warning.

2.1.1.3. History of error codes

Step	Type control	Method	Example display	Location button
1	BRC1E51 BRC1E52 BRC1E53	If the backlight is switched off press once any button so that the backlight is activated.		 
2	BRC1E51	Press and hold the Cancel button for 4 seconds or longer in the Basic screen. The Field Settings menu is displayed.		 Press and hold the Cancel button for 4 seconds or longer while the backlight is lit.
	BRC1E52 BRC1E53	Press and hold the Cancel button for 4 seconds or longer in the Basic screen. The Service Settings menu is displayed.		
3	BRC1E51	Select *Error Record* and press the Menu/Enter button. The Error Record menu is displayed.		 Press the Menu/Enter button.
	BRC1E52 BRC1E53	Select *Error History* and press the Menu/Enter button. The Error History menu is displayed.		

<table>
<tr><td rowspan="2">4</td><td>BRC1E51</td><td>Select RC Error History and press the Menu/Enter button. The error codes and unit No. can be confirmed in the RC Error History screen.</td><td> 
</td><td rowspan="2"> 
Press the Menu/Enter button.</td></tr>
<tr><td>BRC1E52
BRC1E53</td><td>Select RC Error History and press the Menu/Enter button. The error codes and unit No. can be confirmed in the RC Error History screen.</td><td> 
</td></tr>
<tr><td rowspan="2">5</td><td>BRC1E51</td><td>In the RC Record screen the last 10 items are displayed in order.</td><td> 
</td><td rowspan="2">1. Latest record
2. Unit no.
  </td></tr>
<tr><td>BRC1E52
BRC1E53</td><td>In the RC Error History screen the last 10 items are displayed in order.</td><td> 
</td></tr>
<tr><td rowspan="2">6</td><td>BRC1E51</td><td>Press the Cancel button in the RC Record screen 3 times. The Basic screen returns.</td><td rowspan="2"> 
</td><td rowspan="2"> 
Press the Cancel button 3 times. The Basic screen returns.</td></tr>
<tr><td>BRC1E52
BRC1E53</td><td>Press the Cancel button in the RC Error History screen 3 times. The Basic screen returns.</td></tr>
</table>

INFORMATION

The HRV unit error history of each HRV unit can be independently consulted. The last 10 items are displayed in order of appearance.

2.2. Error based troubleshooting

Overview of error codes:

Error code				Unit No.	Error level	Operation state	Cause of error
Main	Sub						
A1	-	flashing	flashing	flashing	error ① (reset remote control)	stop operation	EEPROM error
A6	01	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ① (address 1) lock error
A6	02	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ① (address 3) lock error
A6	05	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ② (address 2) lock error
A6	06	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ② (address 4) lock error
A6	10	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ① (address 1) over-current error or IPM error
A6	11	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ① (address 1) hall-sensor location detection error
A6	12	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ① (address 3) over-current error or IPM error
A6	13	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ① (address 2) hall-sensor location detection error
A6	14	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ② (address 2) lock error or IPM error
A6	15	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ② (address 3) hall-sensor location detection error
A6	16	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ② (address 4) over-current error or IPM error

Error code				Unit No.	Error level	Operation state	Cause of error
Main	Sub						
A6	17	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ② (address 4) hall-sensor location detection error
A6	22	on	off	flashing		keep running	fan power measurement retry Alarm
A8	01	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	power supply error
AJ	01	flashing	flashing	flashing	error ① (reset remote control)	stop operation	capacity adaptor setting error
C0	01	flashing	flashing	flashing	generic error		
C1	01	flashing	flashing	flashing	error ② (recover automati-cally)	stop operation	error (between control & inv PCB)
C6	01	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ① (address 1) driver combination mismatch
C6	02	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ① (address 1) driver setting mismatch
C6	05	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ① (address 1) EEPROM read abnormality
C6	06	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ① (address 1) thermistor malfunction abnormal-ity
C6	07	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ① (address 1) fin temperature abnormality
C6	11	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ① (address 3) driver combination mismatch
C6	12	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ① (address 3) driver setting mismatch
C6	15	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ① (address 3) EEPROM read abnormality
C6	16	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ① (address 3) thermistor fault abnormality
C6	17	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ① (address 3) fin temperature abnormality
C6	21	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ② (address 2) driver combination mismatch
C6	22	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ② (address 2) driver setting mismatch
C6	25	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ② (address 2) EEPROM read abnormality
C6	26	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ② (address 2) thermistor malfunction abnormal-ity
C6	27	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Supply air FAN ② (address 2) fin temperature abnormality
C6	31	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ② (address 4) driver combination mismatch
C6	32	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ② (address 4) driver setting mismatch

Error code				Unit No.	Error level	Operation state	Cause of error
Main	Sub						
C6	35	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ② (address 4) EEPROM read abnormality
C6	36	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ② (address 4) thermistor fault abnormality
C6	37	flashing	flashing	flashing	error ① (reset remote control)	stop fan operation (cause of fault)	Exhaust air FAN ② (address 4) fin temperature abnormality
CH	-	on	off	off	warning	keep running	CO_2 sensor warning
CJ	-	on	off	off	warning	keep running	thermistor fault "BRC..." user interface
60	-	flashing	flashing	flashing	error ② (recover automatically)	stop operation	external error input
60	-	on	off	flashing	alert	keep running	external error input
64	01	on	off	flashing	alert	keep running	air return thermistor alert
64	02	on	off	flashing	alert	keep running	out of operation range alarm due to air return thermistor
65	01	on	off	flashing	alert	keep running	outdoor air intake thermistor alert
65	02	on	off	flashing	alert	keep running	out of operation range alarm due to outdoor air thermistor
65	03	flashing	flashing	flashing	error ① (reset remote control)	stop operation	low outdoor temperature operation alarm during filter contamination function (field setting 29-0-04/05)
6A	-	on	off	flashing	alert	keep running	damper alert
6A	-	flashing	flashing	flashing	error ② (recover automatically)	stop operation	damper error
U5	-	flashing	flashing	flashing	error ② (recover automatically)	stop operation	user interface transmission error missing
U5	-	flashing	flashing	flashing	error ② (recover automatically)	stop operation	user interface control communication error
U8	-	flashing	flashing	off	error ② (recover automatically)	stop operation	transmission abnormality between main/slave liquid crystal remote control
UA	-	flashing	flashing	off	error ② (recover automatically)	stop operation	remote control combination failure
UC	-	on	off	off	warning	keep running	duplication of central group address warning
UE	-	flashing	flashing	flashing	error ② (recover automatically)	stop operation	central control communication error
UE	-	on	off	flashing	alert	keep running	central control transmission alert

2.2.1. HRV unit

2.2.1.1. "6A" – Damper motor malfunction

Trigger	Effect	Reset
The limit switch of the damper motor did not detect move of motor when energized (3 times per minute).	Unit will not stop operating. Control will disable output to damper motor.	Power reset. To remove warning from main history, push the ON/OFF button on the remote controller for 5 seconds in the check mode.

Possible cause	Check	Corrective action
HRV unit - Electrical components		
Faulty limit switch.	Check limit switch changes between open and closed contact when power on HRV unit.	Replace the damper motor assembly.
Faulty damper motor.	Check damper motor rotates when power on HRV unit.	Replace the damper motor assembly.
Faulty main PCB.	Check HAP on main PCB is blinking. Check connectors power and limit switch damper motor.	Replace main PCB. Reconnect plug(s) of power and limit switch damper motor.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.1.2. "60" – External protection device activated

Trigger	Effect	Reset
The input signal JC-C1 is closed + set 28-8-02 or -03.	Unit will not stop operating. Operation resume with (local) contact opens again.	Automatic reset. To remove warning from main history, push the ON/OFF button on the remote controller for 5 seconds in the check mode.

Possible cause	Check	Corrective action
HRV unit - Electrical components		
Local contact is closed.	Check state and wiring to local switch.	Change wiring. Change local switch if contact permanent closed.
Wrong field setting.	Check field setting by user interface.	Adjust field settings by user interface according to installation lay out.
Faulty main PCB.	Check HAP on main PCB is blinking.	Replace main PCB.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.1.3. "64" – Air return thermistor faulty

Trigger	Effect	Reset
Air return sensor abnormal signal.	Unit will not stop operating. Control will use default value for air return sensor.	Automatic reset. To remove warning from main history, push the ON/OFF button on the remote controller for 5 seconds in the check mode.

Possible cause	Check	Corrective action
HRV unit - Electrical components		
Faulty air return sensor.	Read actual air return sensor by user interface. Erase the error record from the remote controller.	Replace the air return sensor.
Faulty main PCB.	Check HAP on main PCB is blinking. Check connector air intake sensor correctly mounted.	Replace main PCB. Reconnect plug of air return sensor.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.1.4. "65" – Air intake thermistor faulty

Trigger	Effect	Reset
Air intake sensor abnormal signal.	Unit will not stop operating. Control will use default value for air intake sensor.	Automatic reset. To remove warning from main history, push the ON/OFF button on the remote controller for 5 seconds in the check mode.

Possible cause	Check	Corrective action
HRV unit - Electrical components		
Faulty air intake sensor.	Read actual air intake sensor by user interface. Erase the error record from the remote controller.	Replace the air intake sensor.
Faulty main PCB.	Check HAP on main PCB is blinking. Check connector air intake sensor correctly mounted.	Replace main PCB. Reconnect plug of air intake sensor.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.1.5. "A1-01" – PCB abnormality

Trigger	Effect	Reset
EEPROM data is not received correctly.	Unit will stop operating.	Power reset via HRV unit.

Possible cause	Check	Corrective action
HRV unit - Electrical components		
Faulty indoor PCB.	Check if error still occurs after turning off power and turning it back on again. Check if the indoor PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to indoor PCB.	Adjust power to the indoor PCB. Replace indoor PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update indoor PCB. Adjust wiring to indoor PCB when required.

2.2.1.6. "A6-00" – Fan motor abnormality

Trigger	Effect	Reset
The rotation speed of the fan motor is not detected while the output voltage to the fan is at its maximum.	Control will perform some retry to operate fan motor. When retries fail, unit will stop operating.	Power reset HRV unit.

Possible cause	Check	Corrective action
Faulty indoor PCB.	Check if error still occurs after turning off power and turning it back on again. Check if the indoor PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to indoor PCB.	Adjust power to the indoor PCB. Replace indoor PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update indoor PCB. Adjust wiring to indoor PCB when required.
Faulty indoor fan motor.	Check the fan motor. Check fan motor connections and wiring.	Replace fan motor when required. Adjust wiring when required.
Indoor fan motor locked.	Switch off the power. Turn fan manually.	Replace fan motor when the fan does not turn smoothly.

2.2.1.7. "A8-00" – Power supply malfunction

Trigger	Effect	Reset
Power supply at main PCB is not correct.	Unit will stop operating.	Power reset HRV unit.

Possible cause	Check	Corrective action
Power supply is not correct.	Voltage & frequency within tolerance. Correct contact circuit breaker. Correct cable specification.	Adjust power supply.

Possible cause	Check	Corrective action
Faulty indoor PCB.	Check if error still occurs after turning off power and turning it back on again. Check if the indoor PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to indoor PCB.	Adjust power to the HRV unit. Replace main PCB when HAP LED is not blinking in regular intervals. Replace inverter fan PCB when HAP LED is not blinking in regular intervals. Install correct spare part. Adjust wiring to main PCB and inverter fan PCB when required.
Faulty indoor fan motor.	Check the fan motor. Check fan motor connections and wiring.	Replace fan motor when required. Adjust wiring when required.

2.2.1.8. "AJ-00" – Capacity setting abnormality

Trigger	Effect	Reset
The capacity setting adaptor is not connected or not recognised by the indoor PCB.	Unit will stop operating.	Power reset HRV unit.

Possible cause	Check	Corrective action
Faulty capacity adapter on indoor PCB (in case of spare part PCB).	Check if the correct adapter is installed. Check if the correct spare part is installed.	Adjust capacity adapter when required. Mount correct PCB.
Faulty indoor PCB.	Check if error still occurs after turning off power and turning it back on again. Check if the indoor PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to indoor PCB.	Adjust power to the indoor PCB. Replace indoor PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update indoor PCB. Adjust wiring to indoor PCB when required.

2.2.1.9. "CH-00" – CO_2 sensor warning

Trigger	Effect	Reset
Disconnected or short circuit CO_2 sensor (optional accessory).	Unit will not stop operating. Control will not adjust RPM according to CO_2 level.	Automatic reset. To remove warning from main history, push the ON/OFF button on the remote controller for 5 seconds in the check mode.

Possible cause	Check	Corrective action
HRV unit - Electrical components		
Faulty CO_2 sensor.	Erase the error record from the remote controller.	Replace the CO_2 sensor.
Faulty main PCB.	Check field settings about control of CO_2 sensor.	Adjust field settings according to installation setup with or without CO_2 sensor kit.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.1.10. "CJ-00" – Remote controller thermistor abnormality

Trigger	Effect	Reset
Disconnected or short circuit remote controller thermistor.	Unit will not stop operating. Control will use air return sensor instead.	Automatic reset. To remove error from main history, push the ON/OFF button on the remote controller for 5 seconds in the check mode.

Possible cause	Check	Corrective action
HRV unit - Electrical components		
Faulty remote controller thermistor.	Erase the error record from the remote controller.	Replace the remote controller.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.1.11. Smart Gateway

The board has four green LEDs (DL1, DL2, DL3, DL4) associated with the status of the differential pressure switches PS1 (DPS Supply Filter), PS2 (DPS Return Filter), PS3 (DPS Supply Fan), PS4 (DPS Return Fan, if present) and PS5 (DPS Frost Protection). In addition there is a green LED (DL5) and two red LEDs (DL6, DL7) for general use.

LED	Color	LED ON	LED OFF	LED BLINK
DL1	Green	PS1 contact alarm	No alarm	-
DL2	Green	PS2 contact alarm	No alarm	-
DL3	Green	PS3 contact alarm	No alarm	-
DL4	Green	PS4 contact alarm	No alarm	-
DL5	Green	Smart Gateway ON - waiting for reception	Smart Gateway OFF - program not running	Smart Gateway ON - receiving message

Alarm	DL6 LED	DL7 LED
Supply Fan alarm	BLINK	ON
Return Fan alarm	ON	BLINK
PS3 (DPS Supply Fan) alarm	BLINK	OFF
PS5 (DPS Frost Protection) alarm	OFF	BLINK
Supply Fan control output error	ON	OFF
Return Fan control output error	OFF	ON
EEPROM reset alarm	ON	ON
Smart Gateway communication alarm	BLINK	BLINK

2.2.2. System

2.2.2.1. "U5-00" – Transmission user interface PCB abnormality

Trigger	Effect	Reset
Main PCB A1P detects abnormal/missing transmission to user interface for a certain time.	Unit will stop operating.	Automatic reset.

Possible cause	Check	Corrective action
Faulty main PCB.	Check if the main PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to main PCB. Check voltage P1P2 ±16 VDC.	Adjust power to the main PCB. Replace main PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update main PCB. Adjust wiring to main PCB when required.
Faulty user interface.	Check user interface.	Replace user interface when required.
User interface is not detected anymore since power was connected.	Check the wiring between main PCB and user interface.	When user interface is required, (re-) connect user interface to main PCB terminals P1P2. When user interface is not further required, reset power of HRV unit.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.2.2. "U8-00" – Main-Sub control error

Trigger	Effect	Reset
Main PCB A1P detects abnormal/missing transmission to dual interfaces.	Unit will stop operating.	Power reset.

Possible cause	Check	Corrective action
Combination of 1 or 2 user interfaces does not correspond to the Main-Sub setting on the interfaces.	Check the setting of the Main and Sub control setting. Check wiring P1P2 between main PCB and interface(s). Check voltage P1P2 ±16 VDC.	When only 1 interface is connected, ensure set to "Main". When 2 user interfaces are connected, ensure 1st user interface set to "Main", 2nd user interface set to "Sub".
Faulty user interface.	Check user interface.	Replace user interface when required.
Faulty main PCB.	Check if the main PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to main PCB. Check voltage P1P2 ±16 VDC.	Adjust power to the main PCB. Replace main PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update main PCB. Adjust wiring to main PCB when required.
Faulty user interface.	Check user interface.	Replace user interface when required.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.2.3. "UA-00" – Wrong user interface used

Trigger	Effect	Reset
Main PCB A1P detects incorrect type interface.	Unit will stop operating.	Automatic reset (when correct type user interface is detected).

Possible cause	Check	Corrective action
Incorrect type user interface.	Confirm used user interface is listed in option list.	Replace user interface to type listed in option list.
Incorrect combination of user interface.	Confirm compatibility between types of user interface.	Replace user interface(s) to type listed in option list.
Faulty user interface.	Check user interface.	Replace user interface when required.
Faulty main PCB.	Check if the main PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to main PCB. Check voltage P1P2 ±16 VDC.	Adjust power to the main PCB. Replace main PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update main PCB. Adjust wiring to main PCB when required.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.2.4. "UC-00" – Duplication group number address

Trigger	Effect	Reset
Main PCB A1P detects multiple HRV units are set same group number in same F1F2 bus.	Unit keeps operating (only warning).	Power reset (if no more duplication of group numbers in same F1F2 bus).

Possible cause	Check	Corrective action
Multiple HRV units on the same F1F2 bus are set same group number.	Check the group number by the user interface on the units indicating UC caution on the central control device.	Change the group number(s) to have only unique group numbers.
Faulty user interface.	Check user interface.	Replace user interface when required.
Faulty main PCB.	Check if the main PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to main PCB. Check voltage P1P2 ±16 VDC.	Adjust power to the main PCB. Replace main PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update main PCB. Adjust wiring to main PCB when required.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.2.2.5. "UE-00" – Transmission fault indoor-central control device

Trigger	Effect	Reset
Main PCB A1P does not detect anymore the central control device.	Unit keeps operating (only warning).	Automatic.

Possible cause	Check	Corrective action
Communication interrupted: • cable to central control device disconnected, or • no more power supply to central control device.	Check voltage on F1F2 at central control device (±16 VDC). Check power supply to central control device.	Reconnect F1F2 wiring to central control device. Reconnect power supply to central control device.
HRV unit has no more group number set.	Check group number setting through user interface.	Set unique group number by user interface.
Faulty main PCB.	Check if the main PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to main PCB. Check voltage P1P2 ±16 VDC.	Adjust power to the main PCB. Replace main PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update main PCB. Adjust wiring to main PCB when required.
External factor (e.g. electrical noise) (error disappears after power reset, but returns after a while).	Check for source which could cause electrical interference.	Avoid electrical interference.

2.3. Symptom based troubleshooting

2.3.1. Unit does not operate

Possible failures	Root cause	Check	Corrective action
Root cause category: component - electrical			
Units do not operate.	Missing power supply to VAM unit.	Check to make sure that the rated voltage is supplied.	Restore the power supply.
	Main PCB damaged (fuse blown).	Check on main PCB: • fuse, • condition of varistors, • jumper present on connector X29A.	Arrange correct power supply to VAM unit. Replace main PCB if damaged component found.
Root cause category: installation			
On controller (BRC) no indication of operation mode HRV (auto, heat exchanger or bypass).	Initialisation not completed.	Check that at terminals P1P2 of VAM there is connection to a remote controller (maybe in group wiring, during installation cable forgotten).	Correct field wiring if no wiring fount at terminals P1P2 of the VAM unit.
Unit does not operate.	HRV unit no controller: • no control “BRC…”, • or no DCS… + group number, • or no external input closed contact.	Check presence of central control (DCS…) & group numbers are found. Check presence of central control (DCS…) & group numbers are found.	If no central control device DCS…, connected wired control BRC… or external on/off contact. If only central control & no indoor found, use wired control BRC… to set each indoor group number.
Root cause category: operating conditions			
Units do not operate.	Unit operates out of the operating range.	Check the outdoor air temperature.	Possible that some special function stops intermediately the unit: • low outdoor air (cold region operation), • direct ducting, • pre-cool/pre-heat function.

2.3.2. Operation sometimes stops

Possible failures	Root cause	Check	Corrective action
Root cause category: component - electrical			
Operation sometimes stops.	A power failure of 2 to 10 cycles (of the power supply sinus) can stop the VAM unit operation (operation lamp off).	Check the power supply.	Restore the power supply.
Root cause category: operating conditions			
Fan stops sometimes.	When the main PCB judges that the damper needs to change position, fan motors will be stopped during the change of the damper.	Check the operation of the damper.	Check the temperature at the outdoor air intake and indoor air return side.

2.3.3. Equipment operates but does insufficient air flow

Possible failures	Root cause	Check	Corrective action
Root cause category: installation			
Low air flow rate.	Field setting of RPM is not according to required ESP.	Check with designer of duct work what ESP is required.	Adjust field setting RPM, or perform an auto ESP check function.
Root cause category: component - mechanical			
Low air flow rate.	Grills on suction or/and discharge changed since start up.	Check if all grills are in correct position.	Perform a new auto ESP check function.
Root cause category: component - electrical			
Equipment operates but does perform target air flow rate.	Incorrect of NG operation of the fan motor(s).	Check operation of fan motor(s).	Replace the fan motor(s) and/or inverter PCB fan motor.

2.3.4. Large operation noise and vibration

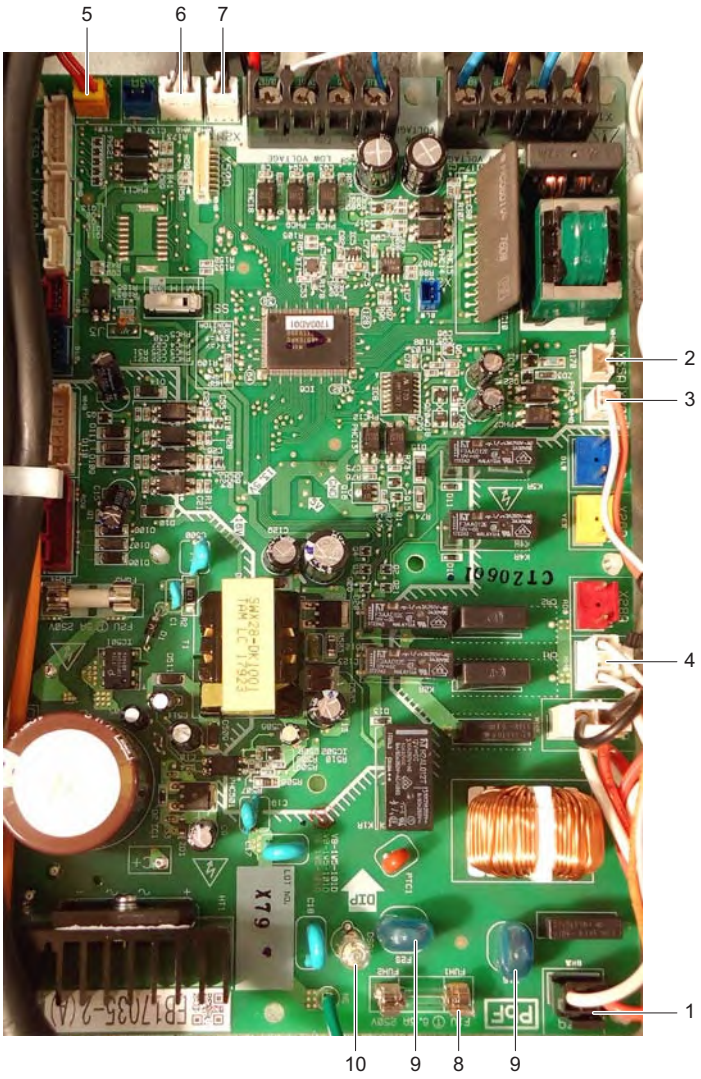
Possible failures	Root cause	Check	Corrective action
Root cause category: installation			
Large operation noise and vibration.	Unit is not installed according the installation manual.	Check to make sure that the required spaces for the installation are provided.	Install the unit according the installation manual.

2.4. Component checklist

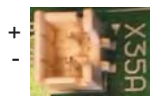
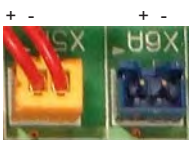
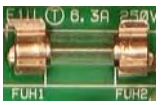
Overview of component checklists:

2.4.1. HRV unit

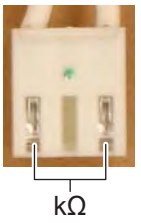
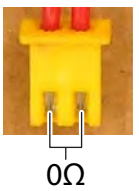
2.4.1.1. Control PCB

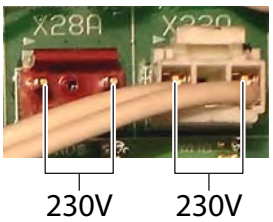
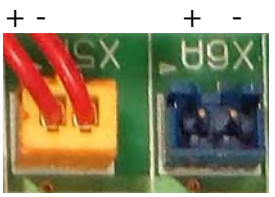


Item	Reference PCB	Description
1	X27A	AC power
2	X35A	DC power
3	X70A	Communication inverter PCB
4	X22A, X28A	Damper motor
5	X5A, X6A	Limit switch
6	X12A	R1T air return thermistor
7	X11A	R2T air intake thermistor
8	F1U	Fuse 6,3 A (slow)
9	F1S, F2S	Varistor
10	DSA1	Surge arrestor
11	HAP	Green LED

Item	Ref	Description	Signal	Method	Remark
1	X27A	AC power	230 VAC		permanent
2	X35A	DC power	16 VDC		permanent
3	X70A	Communication inverter PCB	0~10 VDC		fluctuating
4	X22A, X28A	Damper motor	230 VAC		When damper changes position
5	X5A, X6A	Limit switch	16 VDC		When open status (at bypass & heat-exchange)
6	X12A	R1T air return thermistor	0~5 VDC		depends on temperature
7	X11A	R2T air intake thermistor	0~5 VDC		depends on temperature
8	F1U	Fuse 6,3 A (slow)	0 Ω		No damage
9	F1S, F2S	Varistor	∞		No crack
10	DSA1	Surge arrestor	∞		No crack
11	HAP	Green LED	Blinks ±1/second		

2.4.1.2. Damper motor + limit switch

Disconnected from main PCB					
Part	**Connector**	**Check method**	**Reference (kΩ)**	**Remark**	**Measure point**
motor	X22A, X28A	resistance	12,3	white wires	
limit switch	X15A, X6A	resistance	∞: damper position Hex. & Byp.	while damper moving contact closed 0 Ω	

Connected - main PCB power on					
Part	**Connector**	**Check method**	**Reference (Volt)**	**Remark**	**Measure point**
motor	X22A, X28A	ACV	230	permanent when energized	
limit switch	X15A, X6A	DCV	16	depends on position damper: • at HEX & Bypass: 16 VDC • during change: 0 VDC	

2.4.1.3. Air thermistor

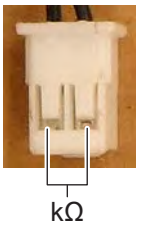
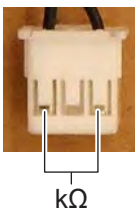
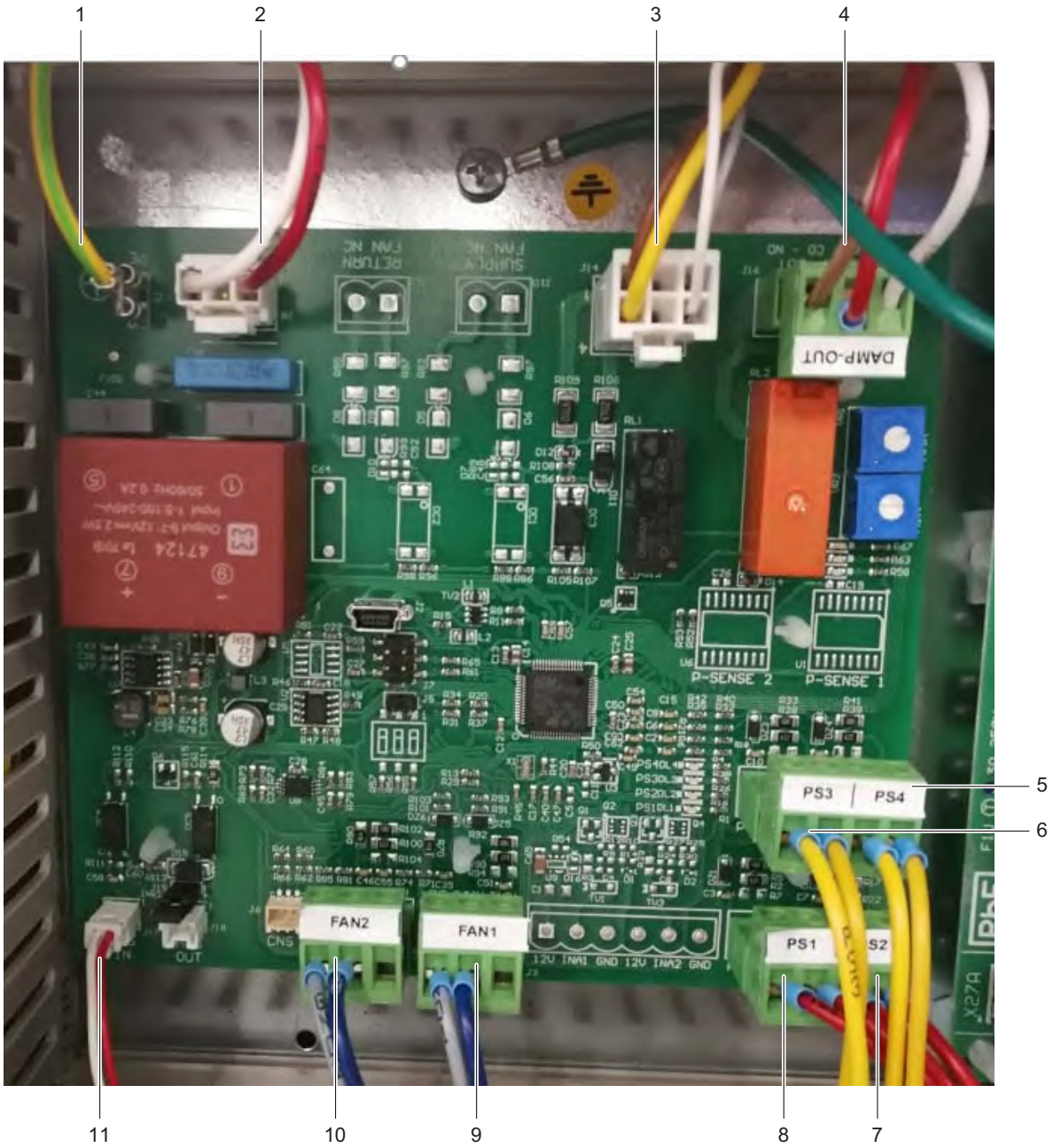
Remove plug from PCB					
Part	**Connector**	**Check method**	**Reference (Volt)**	**Remark**	**Measure point**
air return thermistor	X11A	kΩ	25°C= 20 kΩ	Other temperature, see "Thermistor resistance characteristics" on page 36	
air intake thermistor	X12A	kΩ	25°C= 20 kΩ	Other temperature, see "Thermistor resistance characteristics" on page 36	

Table 2-1: Thermistor resistance characteristics

T °C	kΩ	T °C	kΩ	
-20	197.81	20	25.01	
-19	186.53	21	23.91	
-18	175.97	22	22.85	
-17	166.07	23	21.85	
-16	156.80	24	20.90	
-15	148.10	**25**	**20.00**	Reference point
-14	139.94	26	19.14	
-13	132.28	27	18.32	
-12	125.09	28	17.54	
-11	118.34	29	16.80	
10	111.99	30	16.1	
-9	106.03	31	15.43	
-8	100.41	32	14.79	
-7	95.14	33	14.18	
-6	90.17	34	13.59	
-5	85.49	35	13.04	
-4	81.08	36	12.51	
-3	76.93	37	12.01	
-2	73.01	38	11.52	
-1	69.32	39	11.06	
0	65.84	40	10.63	
1	62.54	41	10.21	
2	59.43	42	9.81	
3	56.49	43	9.42	
4	53.71	44	9.06	
5	51.09	45	8.71	
6	48.61	46	8.37	
7	46.26	47	8.05	
8	44.05	48	7.75	
9	41.95	49	7.46	

T °C	kΩ	T °C	kΩ
10	39.96	50	7.18
11	38.08	51	6.91
12	36.30	52	6.65
13	34.62	53	6.41
14	33.02	54	6.65
15	31.50	55	6.41
16	30.06	56	6.18
17	28.70	57	5.95
18	27.41	58	5.74
19	26.18	59	5.14

2.4.1.4. Smart Gateway



Item	Location	Function
1	PE	Ground connection
2	J8 PIN NL	Main switch connection
3	J14 PIN 1463	Pin 14 connection X22A - pin 63 connection X5A
4	DAMP-OUT	Damper actuator
5	PS4	Return fan dps
6	PS3	Supply fan dps
7	PS2	Return filter dps
8	PS1	Supply filter dps
9	FAN1	Supply air fan
10	FAN2	Return air fan
11	ACS IN	Smart Gateway - control PCB connection

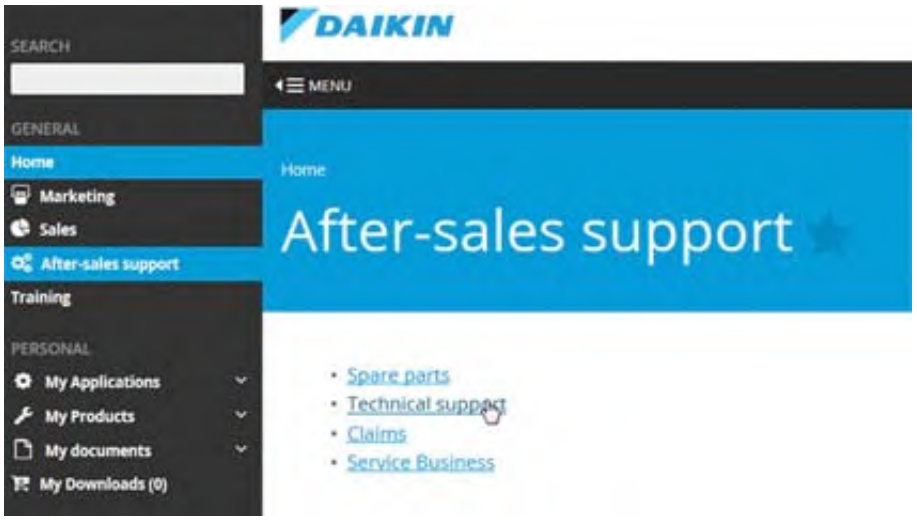
Part 3. Repair

This part contains the following chapters:

3.1. Service tools

For an overview of the applicable service tools, please check the Daikin Business Portal: http://www.mydaikin.eu

Go to the tab “After-sales support” on the left side and then select “Technical support”.



You will then find a button “Service tools” which gives you an overview on which service tool to use for which product. Also additional information on the service tool (instruction, latest software) can be found there.

3.2. Unit specific repair procedures

Overview:

3.2.1. HRV unit

3.2.1.1. Basic removal - removing switchbox cover

PRELIMINARY ACTIONS

1. Switch off the Daikin unit via the user interface.
2. Switch off the Daikin unit with the field supplied circuit breaker.

PROCEDURE

Removal

1. Loosen and remove the screws that fix the switchbox cover.
2. Pull the switchbox cover.

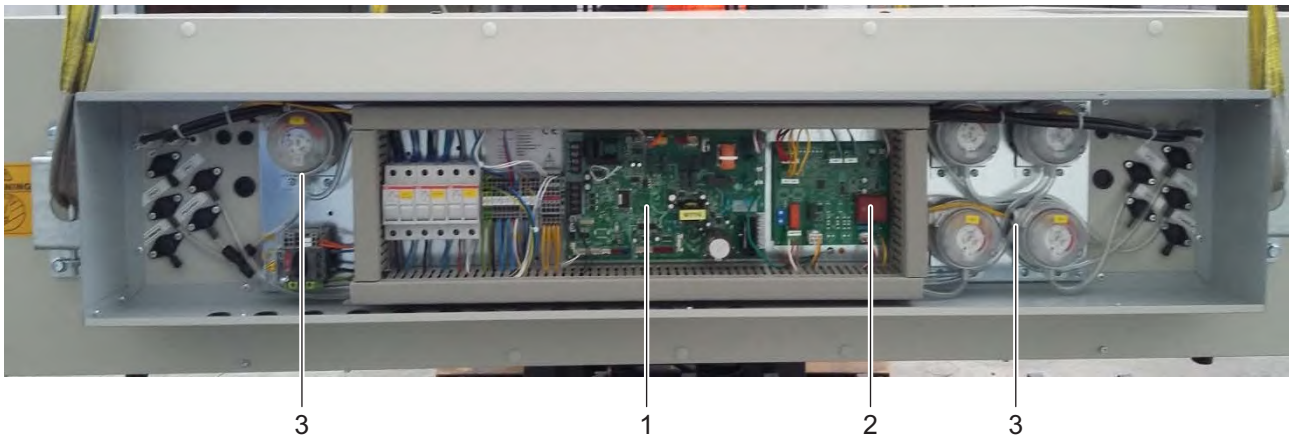
Figure 3-1: Removing the screws

Step 1

1. Screw

Figure 3-2: Pulling the switchbox cover

Step 2



1. Control PCB
2. Smart Gateway
3. Pressure switches

Installation

1. Proceed in reverse order to fix again the switchbox cover.

3.2.1.2. Removing main PCB

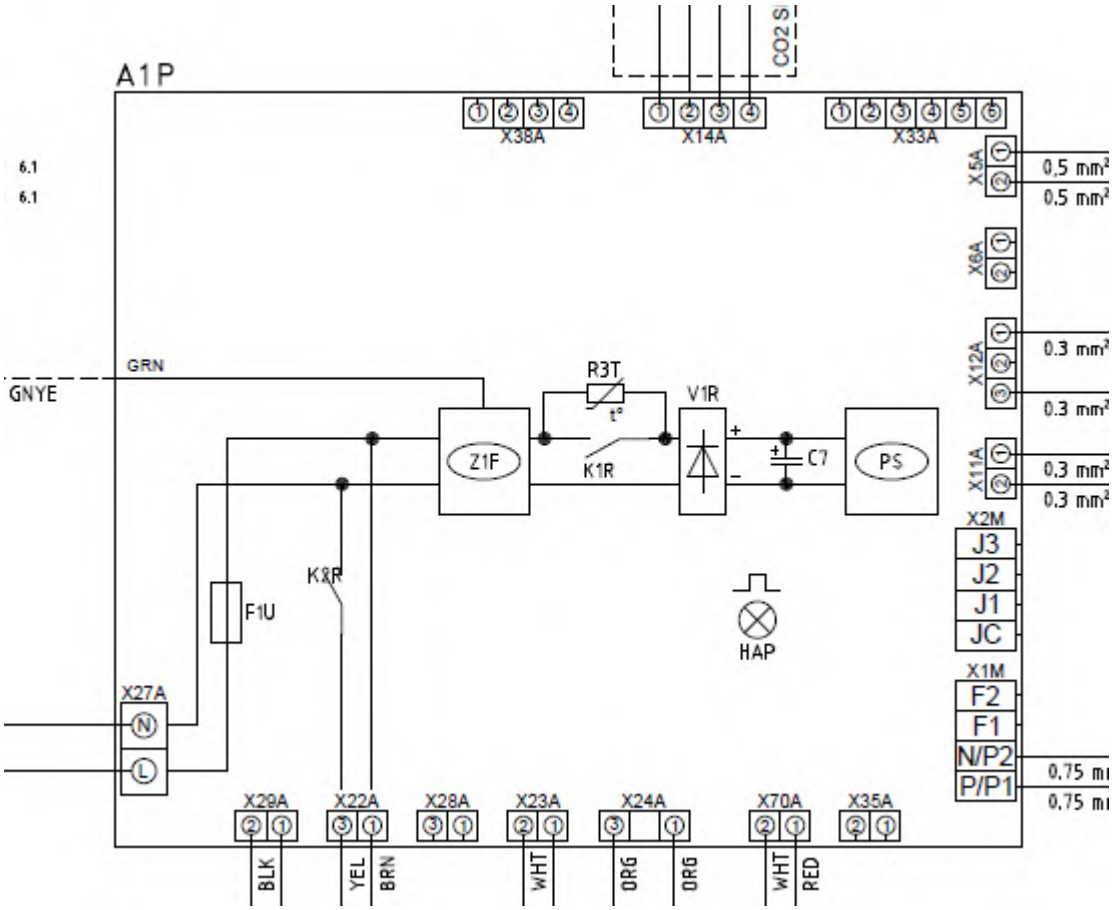
PRELIMINARY ACTIONS

1. Switch off the Daikin unit via the user interface.
2. Switch off the Daikin unit with the field supplied circuit breaker.

PROCEDURE

Removal

1. Remove the switchbox cover, refer to "Basic removal - removing switchbox cover" on page 40.
2. Unplug all connectors from the main PCB, X5A, X11A, X12A, X22A, X24A, X27A, X70A, N/P2&P1/P1 (remote controller, ensure to move the short-circuit jumper on X23A, X29A to new PCB).
3. Unscrew NE cable from the case.
4. Remove clips that fix the board.
5. Remove the main PCB from the switchbox.



Installation

1. Proceed in reverse order to fix again the PCB.

3.2.1.3. Removing Smart Gateway

PRELIMINARY ACTIONS

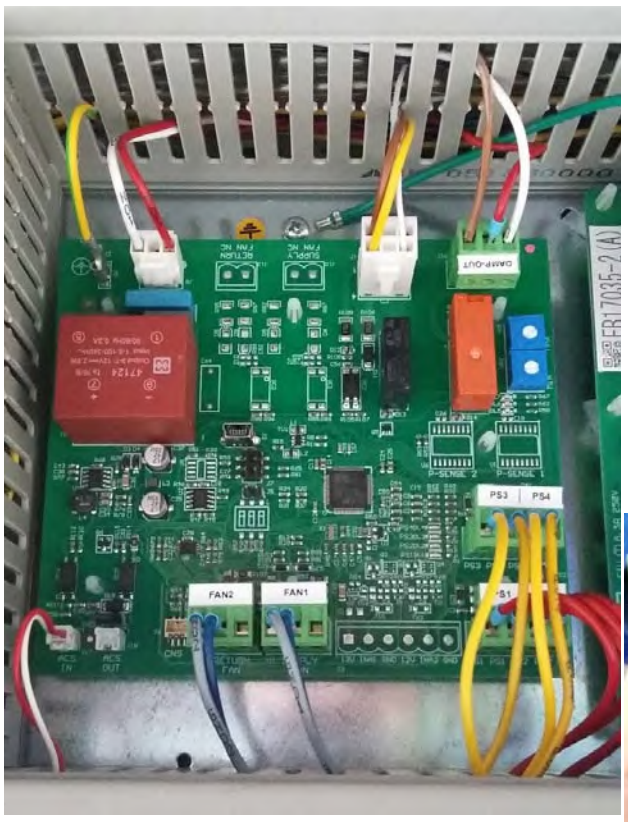
1. Switch off the Daikin unit via the user interface.
2. Switch off the Daikin unit with the field supplied circuit breaker.

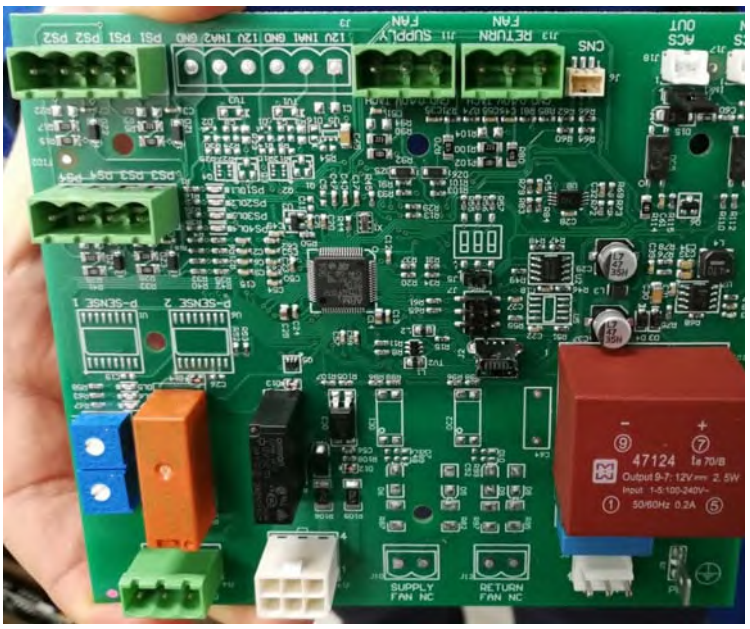
PROCEDURE

Removal

1. Remove the switchbox cover, refer to "Basic removal - removing switchbox cover" on page 40.
2. Unplug all connectors ACS in, FAN1, FAN2, PS1, PS2, PS3, PS4, DAMP OUT, from the board.
3. Remove clips that fix the board.
4. Remove the main board from the switchbox.

Figure 3-3: Removing the Smart Gateway board





Installation

1. Proceed in reverse order to fix again the Smart Gateway..

3.2.1.4. Basic removal - removing doors and central panel

PRELIMINARY ACTIONS

1. Switch off the Daikin unit via the user interface.
2. Switch off the Daikin unit with the field supplied circuit breaker.

PROCEDURE

Removal

1. Loosen the 16 screws of the doors and central panel.
2. Take the doors off.
3. Loosen the 4 drain panel screws.
4. Disconnect the syphon for consedate.
5. Take the central panel off.

Figure 3-4: Removing doors and central panel

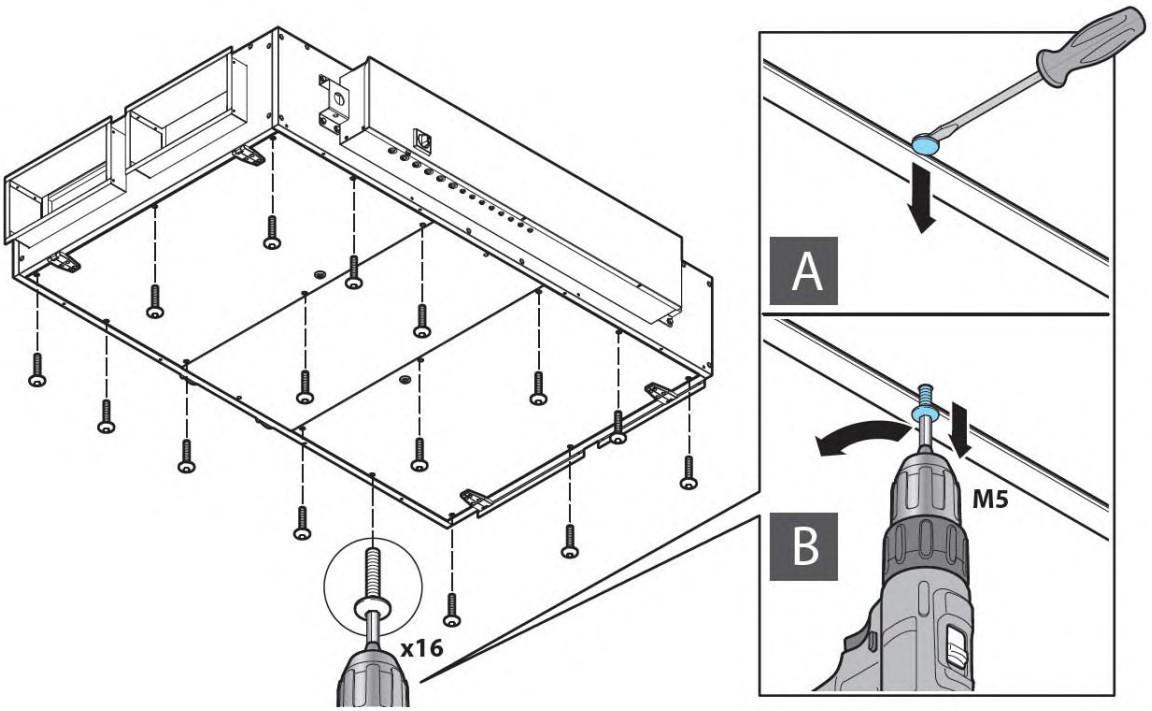
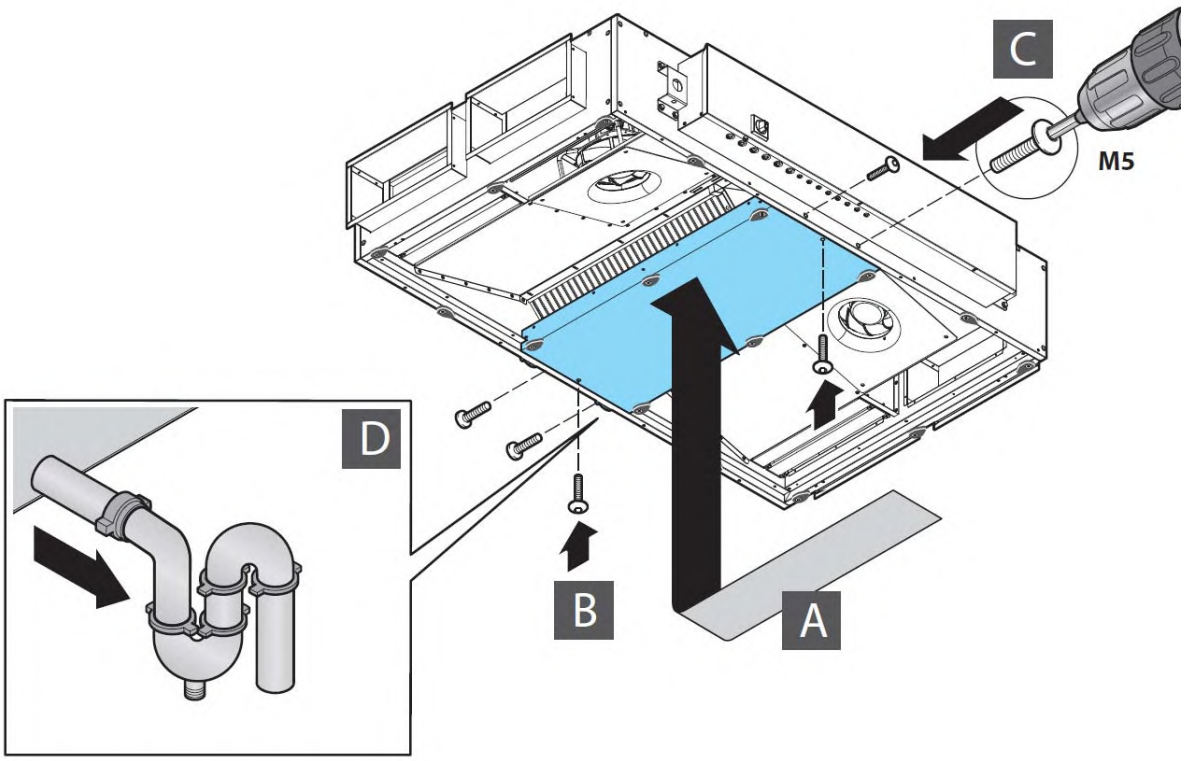


Figure 3-5: Removing the drain panel cover



Installation

1. Proceed in reverse order to fix again the doors and central cover.

3.2.1.5. Removing heat exchanger

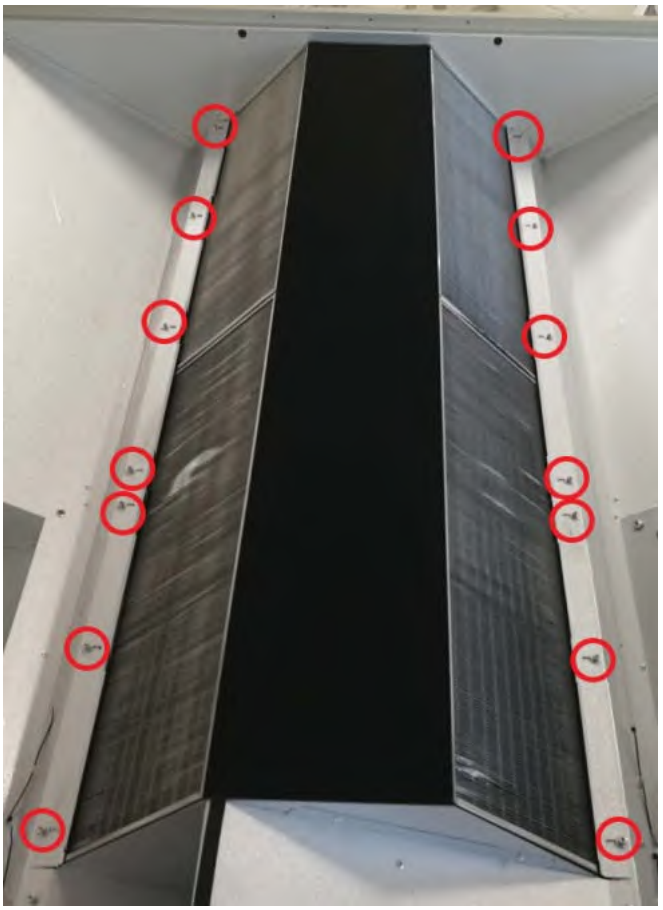
PRELIMINARY ACTIONS

1. Switch off the Daikin unit via the user interface.
2. Switch off the Daikin unit with the field supplied circuit breaker.

PROCEDURE

Removal

1. Remove the black gasket.
2. Loosen and remove the screws that fix the heat recovery and the carpentries.
3. Pull the heat recovery.



Installation

1. Proceed in reverse order to fix again the heat exchanger.

3.2.1.6. Removing EC fan

PRELIMINARY ACTIONS

1. Switch off the Daikin unit via the user interface.
2. Switch off the Daikin unit with the field supplied circuit breaker.

PROCEDURE

Removal

1. Loosen and remove the 4 screws that fix the fan.
2. Remove the cabling: transparent tube, power supply and signal cables.
3. Pull the fan.

Figure 3-6: Loosen and remove the screws

Figure 3-7: Removing the cabling

1. Signal cable	2. Power supply cable

Installation

1. Proceed in reverse order to fix again the fan.

Part 4. Maintenance

This part contains the following chapters:

4.1. HRV unit

4.1.1. Safety precautions for maintenance

WARNING

Ordinary and extraordinary maintenance must be carried out solely by the operator assigned to perform maintenance (mechanical and electrical maintenance staff) according to the regulations in force in the country of use and respecting the laws regarding systems and work safety. Remember that, by operator assigned to perform maintenance is meant the person who can work on the machine to perform ordinary and extraordinary maintenance, repairs and fine tuning. This person must be an expert operator, properly instructed and trained, given the risks involved in such operations.

WARNING

Before performing any ordinary and extraordinary maintenance, the machine must always be stopped (by disconnecting from the mains) and the EMERGENCY button engaged. The switch must have a key that must be removed and held by the operator who will perform the operations until the end of the maintenance itself.

WARNING

It is absolutely prohibited to remove any protections from moving parts and unit protection devices with the machine connected to the mains or operational. Adjustments made with safety devices disengaged must be performed by a single person, expert and authorised, and during this activity it is necessary to prevent access to the area of the machine by other people. Upon completing the adjustments with safety devices disengaged, the protections must be re-engaged as soon as possible.

WARNING

During maintenance the operational space surrounding the machine for a distance of 1.5 metres must be free of obstacles, clean and well lit. It is prohibited for unqualified people to pass through or remain in this space.

WARNING

Use personal protective clothing (safety shoes, safety glasses, gloves, etc.) compliant with regulations.

WARNING

Before carrying out repairs or other work on the machine, always declare out loud your intentions to other operators who are located in the machine area and make sure that they have heard and understood the warning.

4.1.2. Ordinary maintenance

Proper maintenance of the systems maintains efficiency (reducing costs) and consistent performance over time, and increase the usable life of the equipment.

ACTIVITY	FREQUENCY				
	A	B	C	D	E
General cleaning of the machine.		√			
Check and eventual disassembly and washing of filters.				√	
Replacing the filters (when they have deteriorated).	in case of alarm				
Clean the finned surfaces of the heat exchange coils (if provided) with a jet of compressed air and soft brush.	√				
Clean the exchange surfaces of heat recuperators with a jet of compressed air and soft brush.	√				
Empty and clean the condensate collection basins.		√			
Visual inspection for corrosion, limescale, release of fibrous substances, any damage, abnormal vibrations, etc. (if possible, it is advisable to extract the components for a more thorough inspection).			√		
Check condensate drain and cleaning of siphons.		√			
In the case of water coils check for the presence of Legionella.		√			
Check the status of anti-vibration connections.	√				
Cleaning of the heat exchanger.		√			
Check tightness of screws and bolts in the fan section.	√				
Check the auger, impeller and various devices, with removal of any buildup.	√				
Check the integrity of piping connected to pressure gauges and pressure switches.		√			
Check the ground connection.		√			
Power connection terminal torque.	√				

A: annual / B: six months / C: quarterly / D: monthly / E: fortnightly

4.1.2.1. General information on cleaning procedures

WARNING

Read the safety instructions, refer to "Safety precautions for maintenance" on page 51.

WARNING

You should consult with your supplier of chemical products to choose the most suitable for cleaning the unit components.

WARNING

For the cleaning method refer to the instructions of the detergent manufacturer and carefully read the safety data sheet (SDS).

As general guidelines, refer to the following rules:

- Always use personal protection (safety shoes, safety glasses, gloves, etc.).
- Use mild products (pH between 8 and 9) for washing and disinfecting, in normal concentrations. Detergents must not be toxic, corrosive, flammable or abrasive.
- Use a soft cloth or bristle brushes that do not damage the stainless steel surfaces.
- If water jets are used, pressure must be under 1.5 bar and the temperature should not exceed 60°C.
- For cleaning components like motors, damper motors, bearings, pitot tubes, filters and electronic sensors (if applicable), do not spray water directly on them.

- After cleaning make sure that you have not damaged the electrical parts and the seals.
- Cleaning operations should not involve the lubricated parts, like rotation shafts, because this could affect their good operation and create problems with durability.
- For the cleaning of finned components or dampers use an industrial vacuum cleaner and/or a compressor. Attention, the compressed air flow must run opposite to the direction of airflow through the unit.

4.1.2.1.1 Cleaning lamellar components

Remove the dust and fibres with a soft bristle brush or a vacuum cleaner.

WARNING

Be careful when cleaning with compressed air because the exchanger package can be damaged.

CLEANING with pressure jets is allowed if the maximum water pressure is 3 bar and a flat nozzle is used (40° - WEG 40/04 type).

Oils, solvents, etc. can be removed with water or hot grease solvents, by washing or immersion.

Periodically clean the condensate drain tray and fill the drain siphon with water.

4.1.2.1.2 Vents

Periodically check that there are no new sources of contamination near the air intake. Each component must be checked periodically for the presence of contamination, damage and corrosion. The seal can be protected with glycerine-based lubricants or replaced with a new one, if worn.

4.1.2.1.3 Exchange coils

The coils must be cleaned at the slightest sign of contamination.

The coil should be cleaned and washed gently to avoid damaging the fins.

For cleaning using a mild detergent suitable for the purpose. Do not use alkaline, acidic or chlorine-based solutions.

THE coils can be washed with a slightly pressurised water jet (max. 1.5 bar). The jet must NOT contain chemicals or microorganisms. Also the water must be sprayed in the opposite direction to the air flow.

For the direct expansion system, all the coolant in the coils must be collected in the receiver before washing the coil with water. This makes it possible to avoid the increase of the pressure and damage to various parts of the pipe, keeping the airflow clean.

For pertinent accessories, refer to the enclosed documentation.

4.1.2.1.4 Fans

The fans can be cleaned with compressed air or by brushing them with soap and water or with a mild detergent.

Finish the cleaning by rotating the fan by hand to verify the absence of abnormal noises.

4.1.2.1.5 Cleaning filters

WARNING

The machine must NOT be running when the filters are removed to avoid drawing in outside air that might be contaminated.

The filters must be cleaned often and carefully to prevent dust and microbial buildup. Usually, compact filters can be cleaned two or three times before they are replaced. As a general rule, replacement is required after 500-2000 hours of operation (it varies depending on the type of filter, refer to the directions of the manufacturer), but may need to be replaced much sooner if required.

Compact filters can be cleaned using a vacuum cleaner or by blowing with compressed air or hot water (not under pressure).

Only for versions with up-and-over doors: if the opening of the doors was difficult because of the narrowness of the available space, it is possible to remove them by unscrewing the screws that hold the hinges.

At the end of cleaning, it is mandatory to remount the doors.

4.1.3. Extraordinary maintenance

One can not predict extraordinary maintenance as it is normally due to effects of wear or fatigue caused by the incorrect operation of the machine.

4.1.3.1. Replacement of parts

WARNING

The replacement of parts should be performed by expert personnel:

- Qualified maintenance mechanic
- Qualified maintenance electrician
- Manufacturer technician

The machine is designed to be able to perform all the servicing necessary to maintain good efficiency of the components. However, it sometimes happens that a component fails due to malfunction or wear, so for replacement refer to the executive schematic.

These are the components that may need replacement:

- Filters
- Recovery/heating/cooling heat exchange coil
- Fans
- By-pass

For some of these operations of a general nature we will not enter into detail as these are operations that fall within the abilities and professional expertise of the staff assigned to perform them.

4.1.3.2. Consumable components - spare parts

During the operation of the machine there are particular mechanical and electrical components that are most subject to wear. These parts must be monitored in order to carry out their replacement or repair before they cause problems to the correct operation of the machine with consequent downtime.

4.1.3.2.1 Disposal of used materials - waste

Definition of waste

Waste is any substance and object deriving from human activities or natural cycles that is abandoned or destined to be abandoned.

Special waste

Special waste includes:

- Residues from industrial, agricultural, artisanal, commercial and service processes that in quality or quantity are considered different from municipal waste.
- Deteriorated or obsolete machinery and equipment.
- Motor vehicles and their parts that can no longer be used.

Harmful toxic waste

Harmful toxic waste is all waste containing or contaminated by substances listed in the annex to the Italian Presidential Decree 915/52 implementing directives 75/442/EEC, 76/442/EEC, 76/403/EEC, 768/319/EEC.

Following are described the types of waste that may be generated during the lifetime of an air handling unit:

- Cell filters from the suction unit.
- Waste oils and greases from lubricating the fan motor assembly.
- Rags or paper soaked with substances used for the cleaning of the various parts of the machine.

- Residues from cleaning the panelling.
- Drive belts.
- TUV germicidal lamps, which must be disposed of according to current legislation

	**WARNING** Waste from the cell filters are to be handled as special waste or harmful toxic depending on their use, the sector and the environment in which they are used.

Waste and scraps may cause irreparable damage if dispersed in the environment.

Electrical/electronic waste

Under art. 13 of Italian Legislative Decree no. 49 of 2014 "Implementation of the WEEE Directive 2012/19/EU on electrical and electronic equipment waste".

The logo with the crossed-out bin specifies that the product has been placed on the market after 13 August 2005 and that at the end of its useful life it should not be disposed of with other waste but rather must be collected separately. All equipment is made from recyclable metallic materials (stainless steel, iron, aluminium, galvanised steel, copper, etc.) in a percentage higher than 90% by weight. Before disposal make the equipment unusable by removing the power cord and closing any devices for closing compartments or cavities (where present). It is necessary to pay attention to the management of this product at the end of its life by reducing its negative impact on the environment and improving the effective use of resources, applying the principles of "he who pollutes pays", prevention, preparation for reuse, recycling and recovery. Remember that the illegal or improper disposal of the product may result in the application of sanctions provided for by current provisions of law.

Disposal in Italy

In Italy WEEE equipment must be delivered:

- To Collection Centres (also called ecological islands or ecological platforms).
- To the dealer from whom the new equipment was purchased, which is required to collect it free of charge ("one to one" withdrawal).

Disposal in countries of the European Union

The EU Directive on WEEE equipment has been implemented differently by each country, so to dispose of this equipment we suggest contacting local authorities or the dealer to ask for the correct method of disposal.

4.1.4. Diagnostics

4.1.4.1. General diagnostics

The machine's electrical system includes quality electromechanical components and is therefore extremely durable and reliable over time.

Should there be any malfunctions due to malfunctions of electrical components it will be necessary to act as follows:

- Check the fuses of the power supply for the control circuits and if necessary replace them with fuses having the same specifications.
- Check if the thermal protection switch for the motor has been triggered or if its fuses have blown.

If this has occurred, it may be caused by:

- Motor overload due to mechanical problems. They need to be solved.
- Incorrect supply voltage. Verify the protection trip threshold.
- Malfunction and/or short circuits in the motor. Identify and replace the failed component.

4.1.4.2. Electrical maintenance

The machine does not require routine maintenance repairs.

Do not modify the machine for any reason and do not add other devices.

The manufacturer is not liable for resulting malfunctions and problems.

Further clarification is available by contacting the manufacturer's Customer Service.

4.1.5. Troubleshooting table

MALFUNCTION TYPE	COMPONENT	POSSIBLE CAUSE/SOLUTION
NOISE	Fan impeller	Impeller deformed, unbalanced or loose
		Nozzle damaged
		Foreign bodies in the fan
	Transmission	Motor or fan not attached well
	Bearings	Bearing worn or deteriorated
	Motor	Incorrect supply voltage
		Worn bearings
		Contact between the rotor and stator
	Ducts	Excessive speed in the ducts
		Anti-vibration joint too taut
INSUFFICIENT AIR FLOW	Ducts	Load losses superior to the demand
		Dampers closed
		Obstructions in the ducts
	Filters	Too dirty
	Heat exchange coils	Too dirty
EXCESSIVE AIR FLOW	Ducts	Load losses inferior to the demand
		Ducts too big
		Terminals not installed
	Machine	Filters not inserted
		Access doors open
		Dampers not calibrated
INSUFFICIENT THERMAL EFFICIENCY	Heat exchange coil	Connection of inlet/outlet piping
		Heat exchange coil dirty
		Air bubbles in the pipes
		Excessive air flow
		Insufficient water flow
		Insufficient pressure
		Wrong direction of rotation
	Fluid	Temperature different from the project
		Incorrect regulation bodies
WATER LEAK	Fan section	Leak from the heat exchange coil due to corrosion
		Dragging of drops due to high air velocity
		Clogged “overflow” drain

4.1.6. Environmental conditions

Modular L Smart heat recovery units are designed for use in indoor environments, installed on the ceiling. The unit cannot operate in environments containing explosive material and with a high concentration of dust.

Outside air temperature	• -5°C to +46°C without pre heating heating coil • -25°C to +46°C with pre heating electric coil for size 04 & 06 • -20°C to +46°C with pre heating electric coil for size 02 & 03 & 05 & 07
Operating environment temperature	+5°C to +46°C
Temperature of the environment with the machine off (e.g., storage, transport, etc.)	-40°C to +60°C

Thanks to its modularity, each machine is able to adapt to different needs in terms of air flow and thermodynamic treatments.

The optimised choice of every detail, the search for maximum efficiency in each component, the adoption of specific materials and constructive solutions transform environment friendliness and energy savings into valid and advanced technological solutions.

4.1.7. Environmental contamination

Depending on the installation operating environment, specific regulations must be followed and all the necessary precautions must be taken to avoid environmental issues (a system that operates in a hospital or chemical environment can have problems different from those in other sectors, even from the point of view of disposal of consumable parts, filters, etc.).

It is mandatory for the buyer to inform and train workers regarding proper procedures.

4.1.8. Noise

It should be noted that every environment has its own acoustic characteristics that can greatly affect the noise perceived during operation, therefore it is necessary to consider the noise data provided as a point of reference, while it is up to the buyer to perform specific sound level measurements at the installation site and during the machine's actual use.

4.1.9. Ceiling and air duct specifications

The ceiling where you plan to install the machine must be:

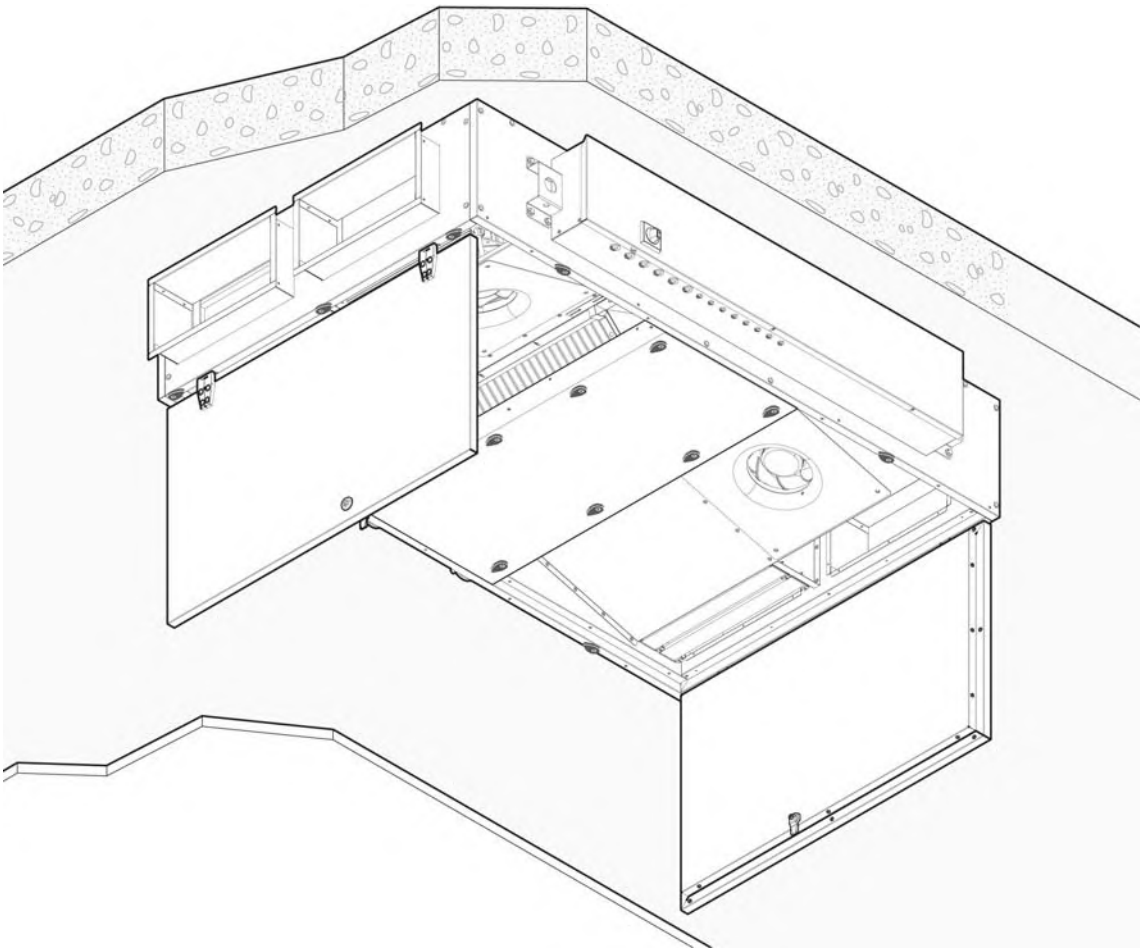
- Perfectly flat and without roughness.
- Vibration resistant.
- Able to support the weight of the equipment considering an appropriate safety margin.

The equipment installed on the ceiling can adapt easily to the presence of a false ceiling.

In fact, without sufficient space for up-and-over door opening, the inspection door can be transformed into a panel able to slide on accessory rails (optional).

If provided, the air ducts must be connected directly to the machine, taking care to insert a suitable anti-vibration system between the machine itself and the duct. When assembly is completed they must not be taut, in order to avoid damage and transmission of vibrations.

To ensure the seal of the connections and the integrity of the machine, it is essential that the air ducts be supported by special brackets that do not weigh directly on the machine.



Part 5. Appendix

This part contains the following chapters:

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5.1. Field setting

5.1.1. HRV unit

5.1.1.1. Configuration

The settings (format: XX(XX)-X-XX), for example 19(29)-1-02, that are used in this chapter are composed of 3 parts, divided by “-”:

- Mode number: for example, 19(29), where 19 is the mode number for group settings and 29 is the mode number for individual settings
- Switch number: for example, 1
- Position number: for example, 02

Operating procedure

You can use either the user interface of the Modular L Smart or of the air conditioner to adjust the heat reclaim ventilation unit settings.

Initial settings

- Mode numbers 17, 18 and 19: group control of Modular L Smart.
- Mode numbers 27, 28 and 29: individual control

To change the settings with BRC1E53

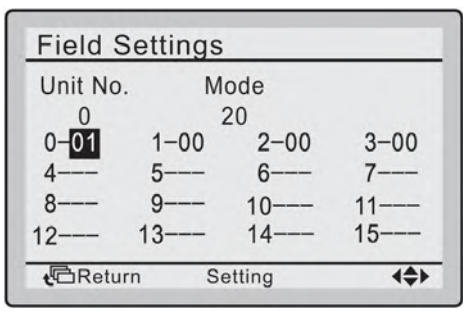
Make sure that the switch box lids on the Modular L Smart are closed.

1. Shortly press a button to turn on the screen light.
2. Press and hold the Cancel button (a) for at least 4 seconds to enter the Service Settings menu.
3. Go to Field Settings with the Up/Down buttons and press the Menu/Enter button (b).
4. Press the Left/Right buttons to highlight the number under Mode.
5. Press the Up/Down buttons to select the required mode number.

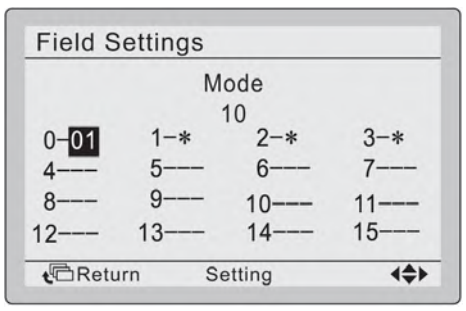
Result: Depending on the mode number that you select, starting at 20, you will also have to select a unit number, for the individual control.

6. Use the Left/Right buttons to highlight the number under Unit No.
7. Use the Up/Down buttons to select a HRV unit number. Selecting a unit number is NOT necessary when you are configuring the entire group.
8. Use the Left/Right buttons to select a position number (0 to 15) for the switch number that you want to change.

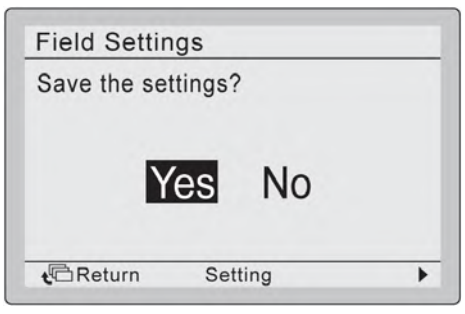
In case of individual settings:



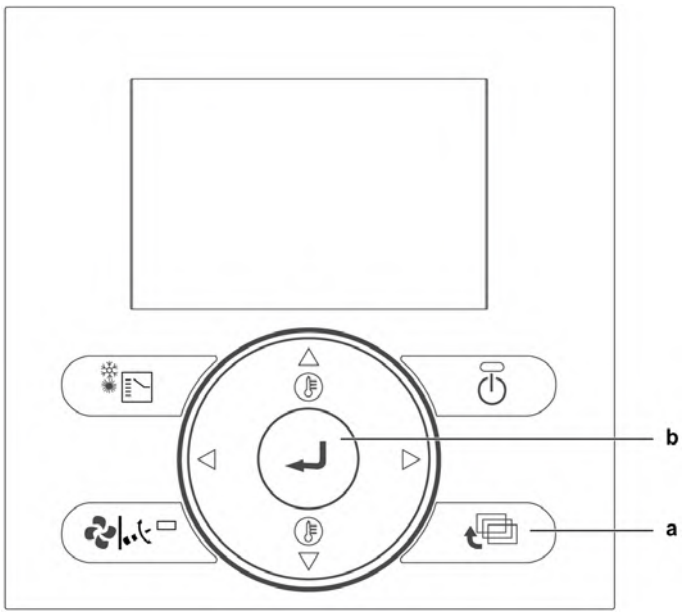
In case of group settings:



9. Use the Up/Down buttons to select the required position.
10. Press the Menu/Enter (b) button and confirm the selection with Yes.



11. After you have completed all the changes, press the Cancel button (a) twice to return to the normal mode.



List of the settings

Setting mode	Setting switch no.	Setting description	Setting position no. 01	02	03	04	05	Setting position no. 06	07	08	09	10	11	12	13	14	15
19(29)	0	Filter contamination inspection setting	Filter contamination check with fan step 1-15	Filter contamination check with new fan step	Timer based check	Target detection filter with fan step 1-15	Auto ESP selection + target detection filter with new fan step										
	1	Low tap setting	Off	Run 1/15 (28 min. off/ 2 min. on)	Run 1/10 (27 min. off/ 3 min. on)	Run 1/6 (25 min. off/ 5 min. on)	Run 1/4 (22.5 min. off/ 7.5 min. on)	Run 1/3 (20 min. off/ 10 min. on)	Run 1/2 (15 min. off/ 15 min. on)	Continuous operation							
										Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
	2	Supply fan step setting*	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12	Step 13	Step 14	Step 15
	3	Exhaust fan step setting*	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12	Step 13	Step 14	Step 15
	4	24 hour ventilation setting	Off	Run 1/15 (28 min. off/ 2 min. on)	Run 1/10 (27 min. off/ 3 min. on)	Run 1/6 (25 min. off/ 5 min. on)	Run 1/4 (22,5 min. off/ 7,5 min. on)	Run 1/3 (20 min. off/ 10 min. on)	Run 1/2 (15 min. off/ 15 min. on)	Continuous operation							
										Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
	7	Reference concentration shift for ventilation flow control (ppm)	0	+200	+400	+600	-200	-400	-600								
	8	Stop ventilation by automatic ventilation air flow control	Allowed	NOT Allowed	Allowed	NOT Allowed											
		Fan residual operation	Off	Off	Heater operation	Heater operation											
	9	Normal ventilation tap on automatic ventilation air flow control					Control by CO_2 sensor										
1A	0	Fresh-up operation**	Off	On													

Setting mode	Setting switch no.	Setting description	Setting position no.					Setting position no.									
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
17(27)	0	Filter cleaning time setting	Approx. 2500 hours	±1250 hours													
	1	Nigh-time free cooling timer (after stop)	Off	On after 2 hours	On after 4 hours	On after 6 hours	On after 8 hours										
	2	Pre-cool/ pre-heat	Off	On													
	3	Pre-cool/ pre-heat duration	30 minutes	45 minutes	60 minutes												
	4	Initial fan speed	High	Ultra-high													
	5	Yes/No setting for duct connection with VRV system	Without duct	With duct	Without duct	With duct											
		Setting for cold areas (fan operation when heater thermostat is off)			Stop	Low	Stop	Low									
	6	Night-time free cooling (fan settings)	High	Ultra-high													
	7	Target temperature for independent Nigh-time free cooling	18°C	19°C	20°C	21°C	22°C	23°C	24°C	25°C	26°C	27°C	28°C	29°C	30°C		
	8	Centralised zone interlock setting	No	Yes													
	9	Pre-heat time extension setting	0 minutes	30 minutes	60 minutes	90 minutes											

Setting mode	Setting switch no.	Setting description	Setting position no.					Setting position no.									
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
18(28)	0	External signal JC/J2	Last command	Priority on external input	Priority on operation	Disable night-time free cooling / Forced stop		24 hours ventilation On/off									
	1	Setting for direct Power	Off	On													
	2	Autorestart setting	Off	On													
	3	Output signal to external damper (X24A)			Damper output (fan operation)	Damper output (fan operation)											
	4	Indication of ventilation mode	On	Off													
	6	Automatic ventilation air flow mode	Linear		Fixed A	Fixed B											
	7	Fresh-up mode	No indication supply	No indication supply	Indication exhaust	Indication exhaust											
	8	External input terminal function selection (between J1 and JC)	Fresh-up	Error output	Error output stop operation	Forced off	Fan forced off	Air-flow up									
	9	BRP4A50A output switching selection (between X3 and X4)	Heater output	Error output	Fan output (Low/ High/ Ultra-high)	Fan output (High/ Ultra-high)	Fan output (Ultra-high)	Fan output (Low/ High/ Ultra-high)									
	11	Filter contamination check**	No action	Reset filter check	Force filter check												

How to select the optimal Ventilation Speed

The fine tuning of the Ventilation Speed can be done properly modifying the following parameters:

- Initial fan speed: High or Ultra-High
- Supply fan step setting: Step 1 to 15
- Exhaust fan step setting: Step 1 to 15

These parameters can be accessed following the procedure The Configuration Service Settings ⟶ Field Settings page, as shown in the List of Settings paragraph.

Both Supply and Return Fans have an optimal speed value, described in term of RPM (Revolution per Minute), that can be retrieved directly from the DAE Unit Selection Software report, as shown below:

3) Fan Supply

Model	K3G190RD4503
Type	EC Centrifugal Fan
Material	Composite
Quantity	1x(Single Fan)
External Static Pressure	100 Pa
Internal Static Pressure	183 Pa
Total Static Pressure	283 Pa
Dynamic Pressure	10 Pa
Flow Design	300 m³/h
Rotation Speed Work • Max	2957 RPM • 4120 RPM
Efficiency	45.3%
Shaft Power	0.07 kW
Electrical Power Input	0.07 kW
Power Class • PMREF (EN13053)	P1 • 0.14 kW
SFPv Class • SFPv (EN13053)	SFP1 • 631 W/(m³/s)

3) Fan Return

Model	K3G190RD4503
Type	EC Centrifugal Fan
Material	Composite
Quantity	1x(Single Fan)
External Static Pressure	100 Pa
Internal Static Pressure	182 Pa
Total Static Pressure	282 Pa
Dynamic Pressure	10 Pa
Flow Design	300 m³/h
Rotation Speed Work • Max	2954 RPM • 4120 RPM
Efficiency	45.3%
Shaft Power	0.07 kW
Electrical Power Input	0.07 kW
Power Class • PMREF (EN13053)	P1 • 0.14 kW
SFPv Class • SFPv (EN13053)	SFP1 • 609 W/(m³/s)

Optimal RPM values for Supply and Return (Exhaust) Fans

Provided the Unit Size is known, you can proceed to set the correspondent Supply/Return Fan step on the BRC controller, according to the following Speed-selection Tables (Make sure to consider “Heat recovery operation” rpm).

If you do not have the unit selection from Daikin tool software, please check individual unit size performances from page 67 onwards.

Speed-selection tables

In order to select the correct step for the Supply and Return Fan it is necessary to:

- Choose the table whose Unit Size number equals the Unit Size provided in the DAE Unit Selection software report.
- Identify the Supply/Return Fan steps by choosing, from H(high) column, the steps whose RPM values are the closest to the Supply/Return Fan RPM provided by DAE Unit Selection software report.
- Set the selected step values on the controller by going to the path Service Settings ⟶ Field Settings and set the following
  - 19(29)-2- Selected_Step_Supply_Fan, for the Supply Fan Step, from 01 to 15
  - 19(29)-3- Selected_Step_Return_Fan, for the Return Fan Step, from 01 to 15
- If both Supply and Return Fan RPM are not present in the column H, but they appear in UH (ultra high) one, then:
- Set the Initial Fan Speed to UltraHigh by going to the path Service Settings ⟶ Field Settings and modifying the default value from 17(27)-4-01(High) to 17(27)-4-02(UltraHigh)
- Set the selected steps as in point 3.

Step		ML Smart Size 02											
		Supply fan						Exhaust fan					
		Heat recovery operation			Bypass operation			Heat recovery operation			Bypass operation		
		UH	H	L	UH	H	L	UH	H	L	UH	H	L
SA Fan RPM setting (19(29)-2-…) / EA Fan RPM setting (19(29)-3-…)	01	2813	2343	1236	2943	2376	1336	3106	2646	1667	2787	2292	1236
	02	2895	2428	1332	3020	2480	1421	3170	2723	1748	2861	2363	1310
	03	2976	2521	1429	3098	2576	1510	3238	2807	1831	2936	2440	1384
	04	3054	2606	1528	3176	2661	1591	3302	2881	1915	3010	2511	1458
	05	3132	2691	1628	3254	2758	1677	3370	2958	2002	3080	2588	1532
	06	3209	2765	1725	3335	2843	1765	3434	3019	2083	3151	2659	1606
	07	3287	2843	1825	3413	2939	1851	3502	3087	2166	3219	2736	1680
	08	3361	2917	1917	3491	3024	1936	3566	3148	2250	3290	2804	1757
	09	3450	3002	2021	3579	3120	2043	3647	3222	2340	3370	2884	1851
	10	3546	3076	2125	3672	3209	2154	3734	3286	2424	3454	2961	1947
	11	3635	3139	2221	3761	3276	2254	3811	3344	2501	3531	3029	2034
	12	3728	3213	2317	3853	3350	2361	3895	3412	2585	3615	3093	2131
	13	3809	3280	2402	3942	3417	2458	3969	3470	2662	3692	3154	2218
	14	3898	3357	2495	4035	3491	2543	4046	3537	2749	3779	3219	2308
	15	3976	3420	2580	4120	3557	2621	4120	3592	2823	3853	3280	2375

This table refers to indicated values subject to tolerances.

In order to adjust the desired airflow value based on measurement at site, while increasing rpm you will obtain more air flow and while decreasing rpm, you will reduce air flow. If needed, kindly change fan speed to reach the target air flow.

Step		ML Smart Size 03 & Size 04 & Size 06											
		Supply fan						Exhaust fan					
		Heat recovery operation			Bypass operation			Heat recovery operation			Bypass operation		
		UH	H	L	UH	H	L	UH	H	L	UH	H	L
SA Fan RPM setting (19(29)-2-…) / EA Fan RPM setting (19(29)-3-…)	01	2356	1962	1035	2464	1990	1119	2601	2216	1396	2334	1919	1035
	02	2424	2033	1116	2529	2077	1190	2655	2280	1464	2396	1978	1097
	03	2492	2111	1196	2594	2157	1264	2711	2350	1534	2458	2043	1159
	04	2557	2182	1280	2659	2229	1333	2765	2412	1604	2520	2102	1221
	05	2622	2253	1364	2725	2309	1404	2822	2477	1676	2579	2167	1283
	06	2687	2315	1444	2793	2380	1478	2876	2528	1744	2639	2226	1345
	07	2752	2380	1528	2858	2461	1550	2933	2585	1814	2695	2291	1407
	08	2814	2442	1605	2923	2532	1621	2986	2636	1884	2755	2348	1472
	09	2889	2514	1692	2997	2613	1711	3054	2698	1959	2822	2415	1550
	10	2969	2576	1779	3075	2687	1804	3127	2752	2030	2892	2480	1631
	11	3044	2628	1860	3149	2743	1888	3191	2800	2094	2957	2536	1703
	12	3121	2690	1940	3227	2805	1977	3261	2857	2164	3027	2590	1784
	13	3190	2746	2012	3301	2861	2058	3323	2906	2229	3092	2641	1857
	14	3264	2811	2089	3379	2923	2129	3388	2962	2302	3164	2695	1933
	15	3329	2864	2160	3450	2979	2194	3450	3008	2364	3226	2747	1989

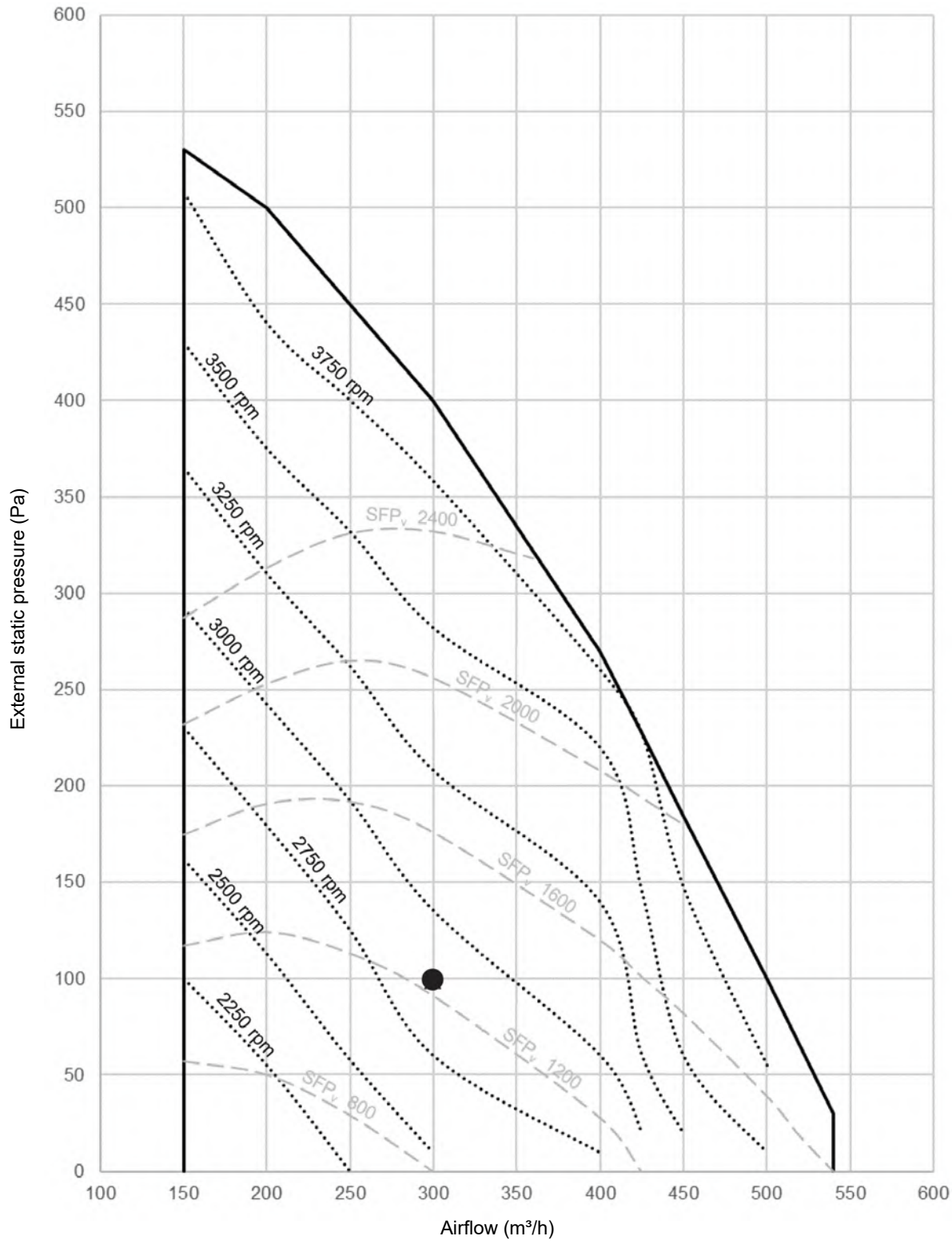
Step		ML Smart Size 05 & Size 07											
		Supply fan						Exhaust fan					
		Heat recovery operation			Bypass operation			Heat recovery operation			Bypass operation		
		UH	H	L	UH	H	L	UH	H	L	UH	H	L
SA Fan RPM setting (19(29)-2-…) / EA Fan RPM setting (19(29)-3-…)	01	2103	1752	924	2200	1776	999	2322	1978	1246	2084	1713	924
	02	2164	1815	996	2258	1854	1062	2370	2036	1307	2139	1766	979
	03	2225	1884	1068	2316	1926	1129	2421	2098	1369	2195	1824	1035
	04	2283	1948	1143	2374	1990	1190	2469	2154	1432	2250	1877	1090
	05	2341	2012	1217	2432	2062	1253	2519	2211	1497	2303	1935	1145
	06	2399	2067	1289	2493	2125	1320	2567	2257	1557	2356	1988	1201
	07	2457	2125	1364	2551	2197	1383	2618	2308	1619	2406	2045	1256
	08	2513	2181	1433	2609	2261	1447	2666	2353	1682	2459	2096	1314
	09	2579	2244	1511	2676	2333	1527	2726	2409	1749	2519	2156	1384
	10	2651	2300	1588	2745	2399	1610	2791	2457	1812	2582	2214	1456
	11	2717	2347	1660	2812	2449	1685	2849	2500	1870	2640	2264	1521
	12	2787	2402	1732	2881	2504	1765	2912	2551	1932	2702	2312	1593
	13	2848	2452	1796	2947	2554	1837	2967	2594	1990	2760	2358	1658
	14	2914	2510	1865	3016	2609	1901	3025	2644	2055	2825	2406	1725
	15	2972	2557	1929	3080	2659	1959	3080	2685	2110	2880	2452	1776

This table refers to indicated values subject to tolerances.

In order to adjust the desired airflow value based on measurement at site, while increasing rpm you will obtain more air flow and while decreasing rpm, you will reduce air flow. If needed, kindly change fan speed to reach the target air flow.

5.1.1.2. Modular L Smart performance curves

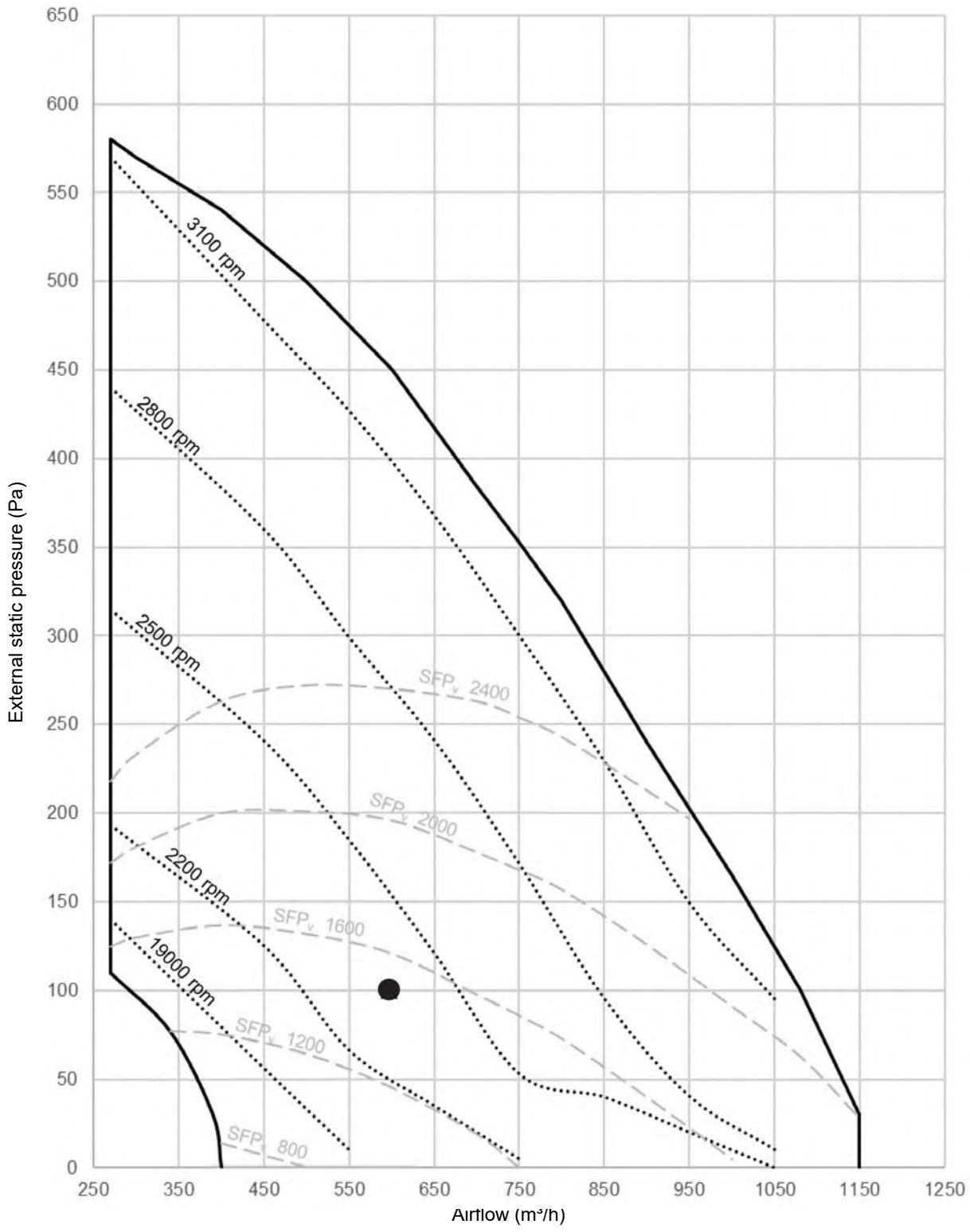
Figure 5-1: Size 02



Nominal conditions

SFPv values are evaluated with F7 and M5 filter respectively for supply and return air side.

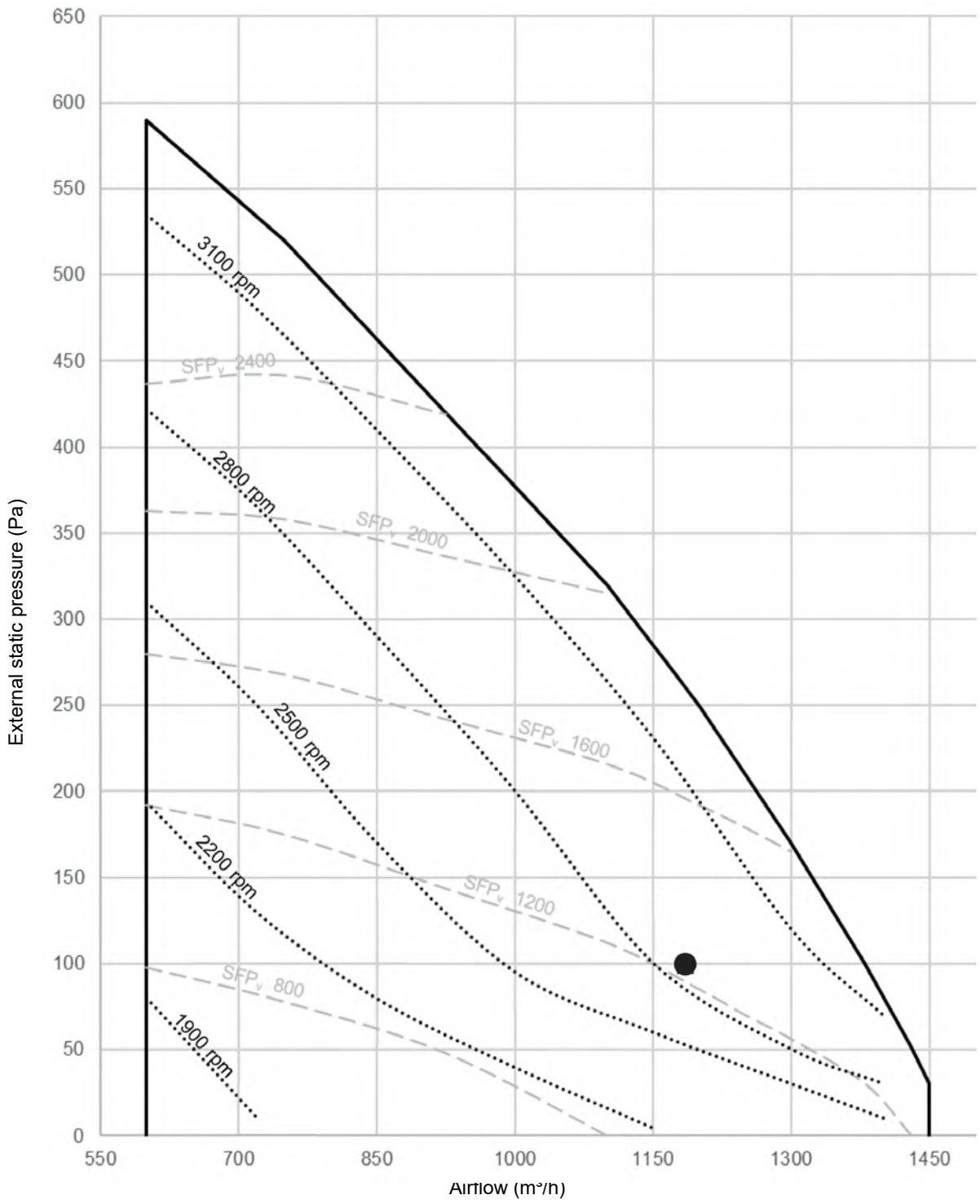
Figure 5-2: Size 03



Nominal conditions

SFPv values are evaluated with F7 and M5 filter respectively for supply and return air side.

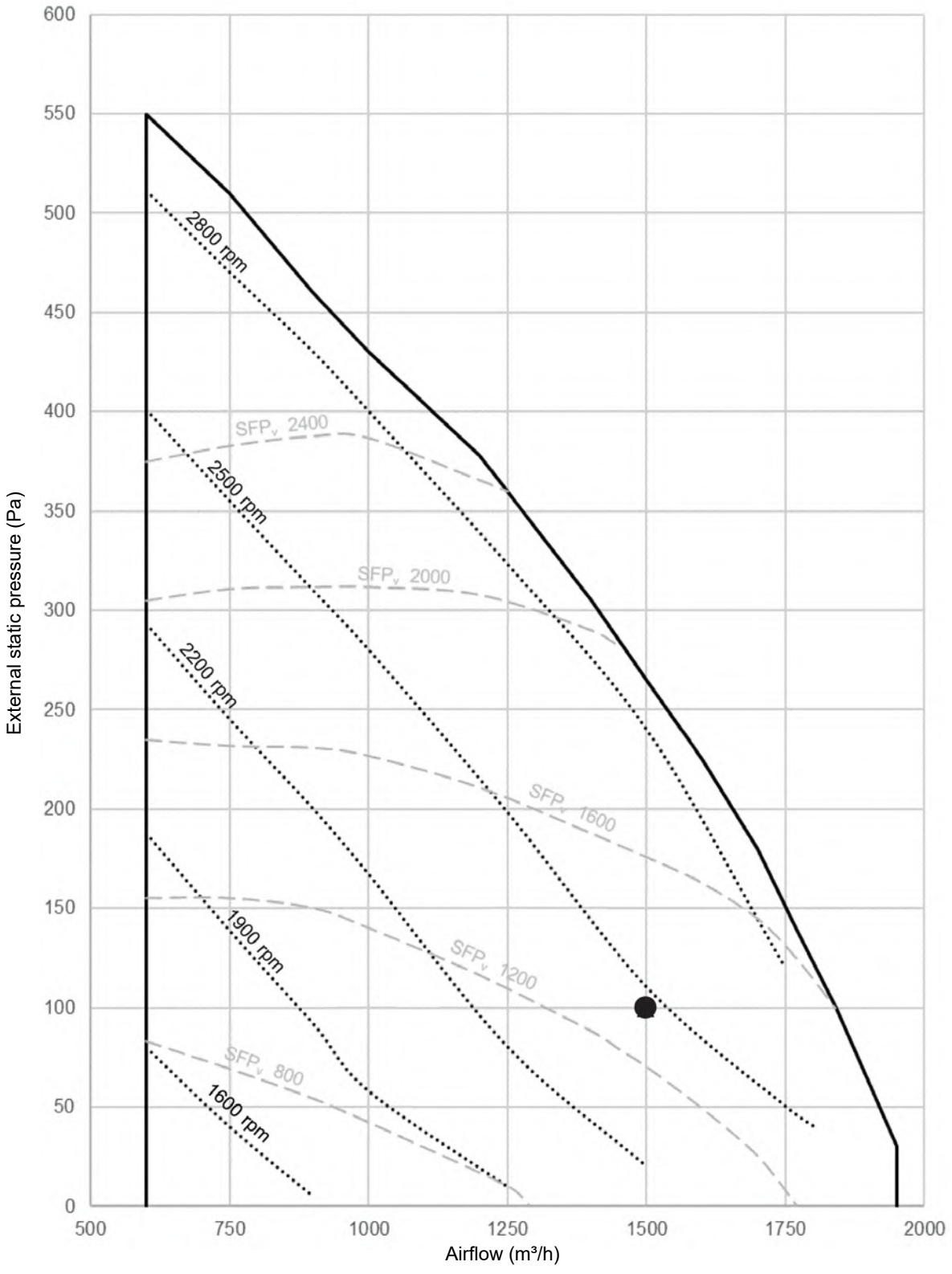
Figure 5-3: Size 04



Nominal conditions

SFPv values are evaluated with F7 and M5 filter respectively for supply and return air side.

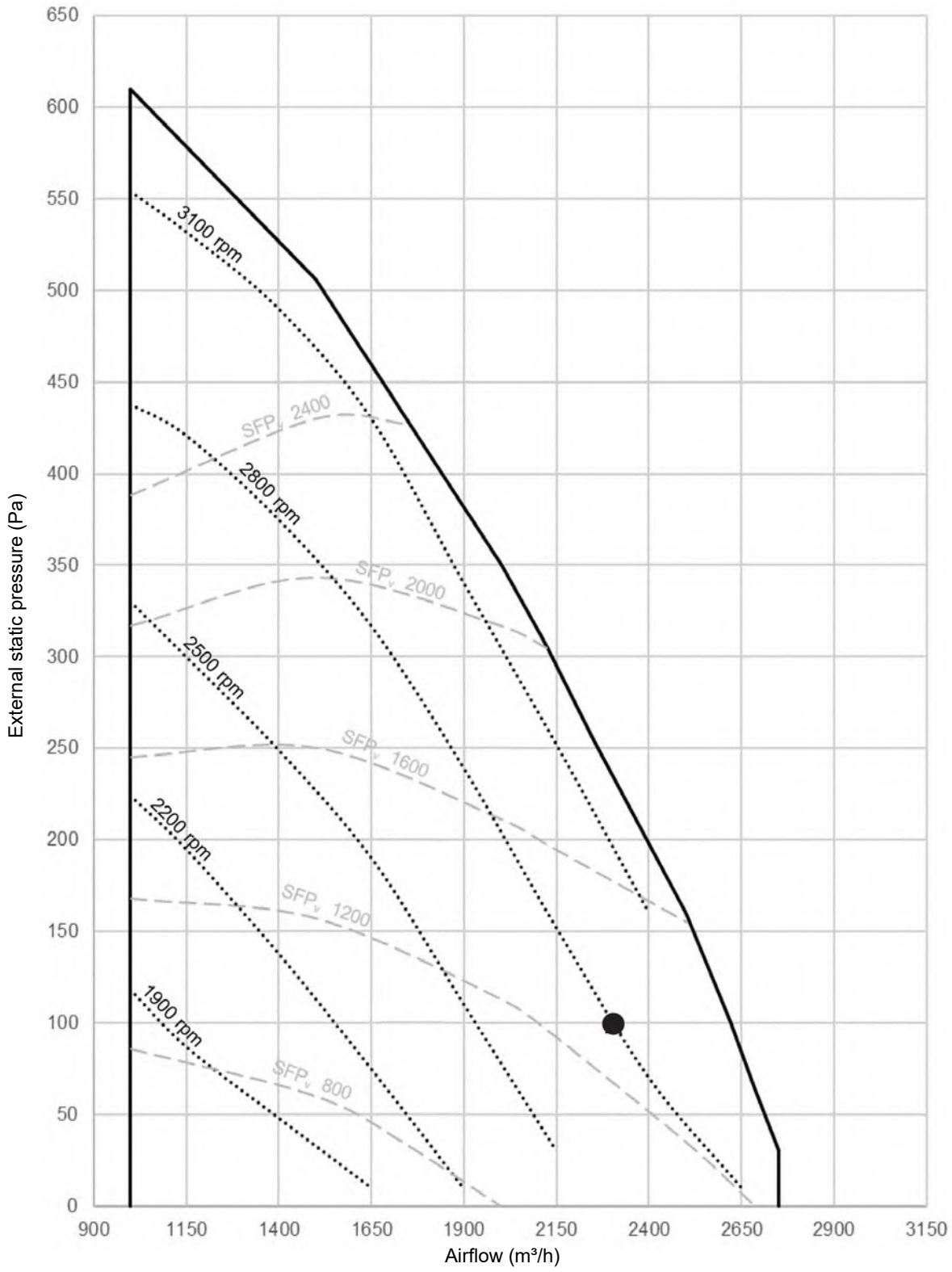
Figure 5-4: Size 05



Nominal conditions

SFPv values are evaluated with F7 and M5 filter respectively for supply and return air side.

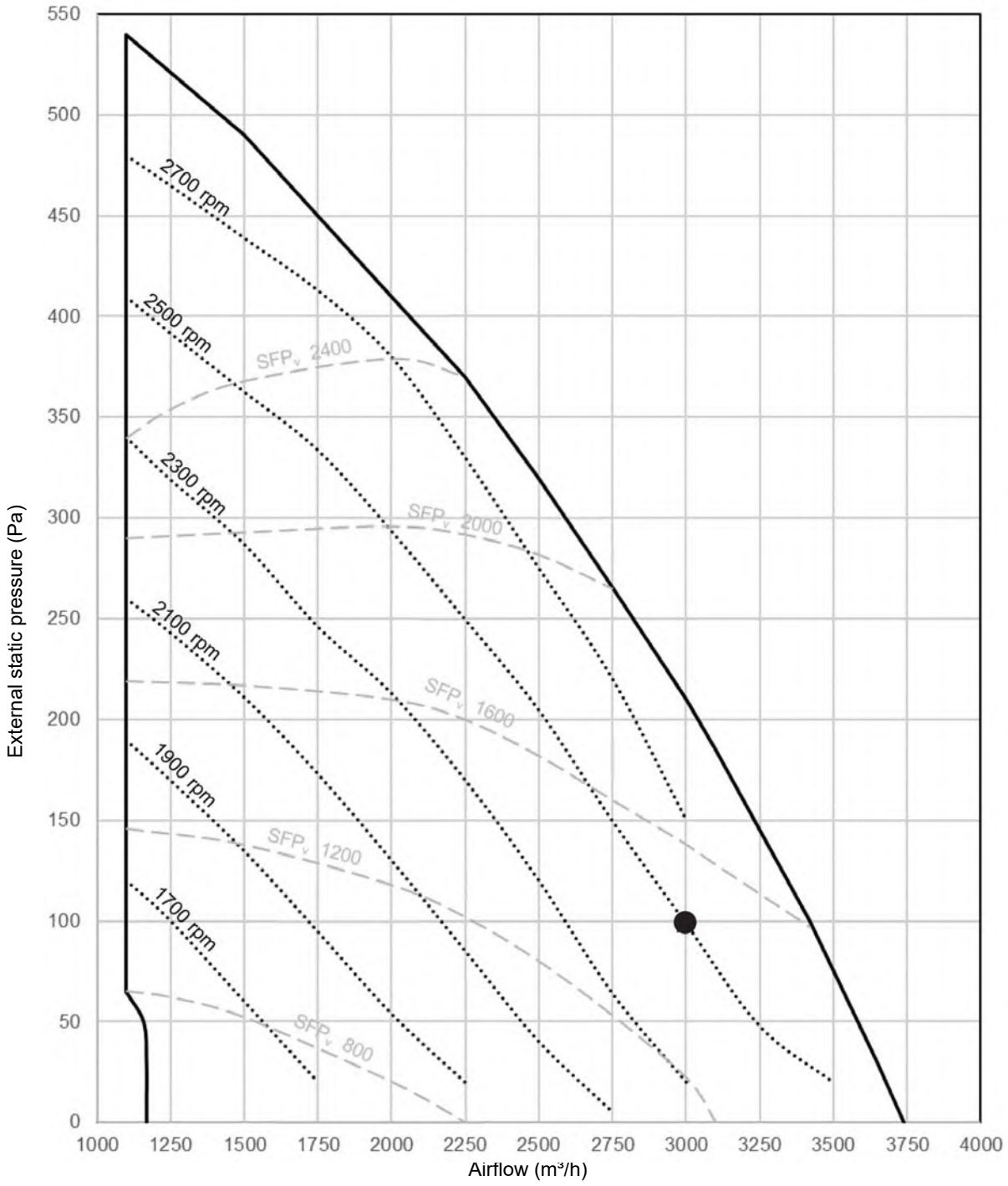
Figure 5-5: Size 06



Nominal conditions

SFPv values are evaluated with F7 and M5 filter respectively for supply and return air side.

Figure 5-6: Size 07



Nominal conditions

SFPv values are evaluated with F7 and M5 filter respectively for supply and return air side.

Factory configuration

Size 02			
Supply		Exhaust	
Volume Flow Rate	ESP	Volume Flow Rate	ESP
300	100	300	100
RPM		RPM	
2889		2853	
17(27)-4-01			
19(29)-2-07		19(29)-3-04	

Size 03			
Supply		Exhaust	
Volume Flow Rate	ESP	Volume Flow Rate	ESP
600	100	600	100
RPM		RPM	
2360		2387	
17(27)-4-01			
19(29)-2-07		19(29)-3-04	

Size 04			
Supply		Exhaust	
Volume Flow Rate	ESP	Volume Flow Rate	ESP
1200	100	1200	100
RPM		RPM	
2891		2913	
17(27)-4-02			
19(29)-2-09		19(29)-3-07	

Size 05			
Supply		Exhaust	
Volume Flow Rate	ESP	Volume Flow Rate	ESP
1500	100	1500	100
RPM		RPM	
2479		2529	
17(27)-4-02			
19(29)-2-08		19(29)-3-06	

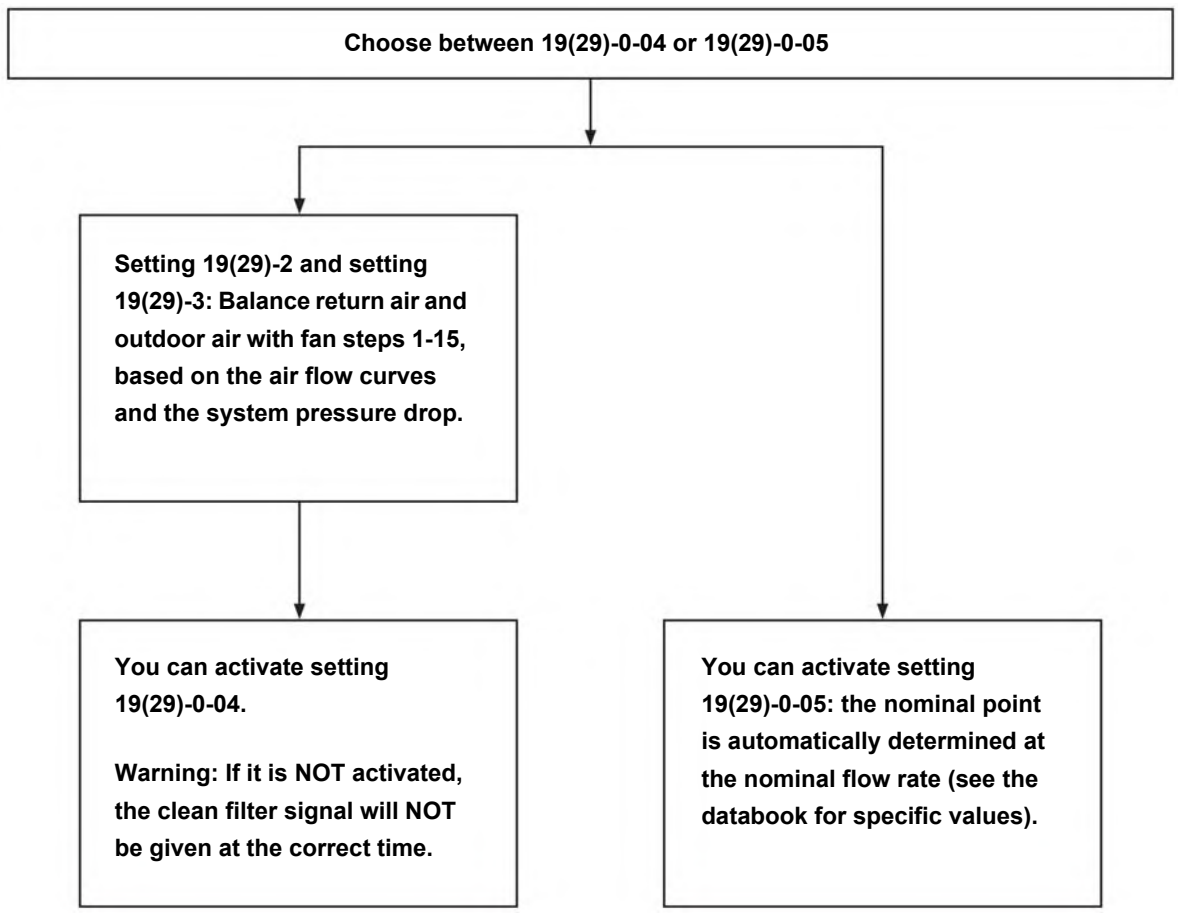
Size 06			
Supply		Exhaust	
Volume Flow Rate	ESP	Volume Flow Rate	ESP
2300	100	2300	100
RPM		RPM	
2816		2933	
17(27)-4-02			
19(29)-2-09		19(29)-3-07	

Size 07			
Supply		Exhaust	
Volume Flow Rate	ESP	Volume Flow Rate	ESP
3000	100	3000	100
RPM		RPM	
2504		2679	
17(27)-4-02			
19(29)-2-08		19(29)-3-09	

“Field setting without preliminary selection”: adjust fan speed according to in duct flow measurement, as explained in the previous pages.

Settings for all configuration

Setting 17(27)-4: First choose the fan speed. Set it to high or ultrahigh.

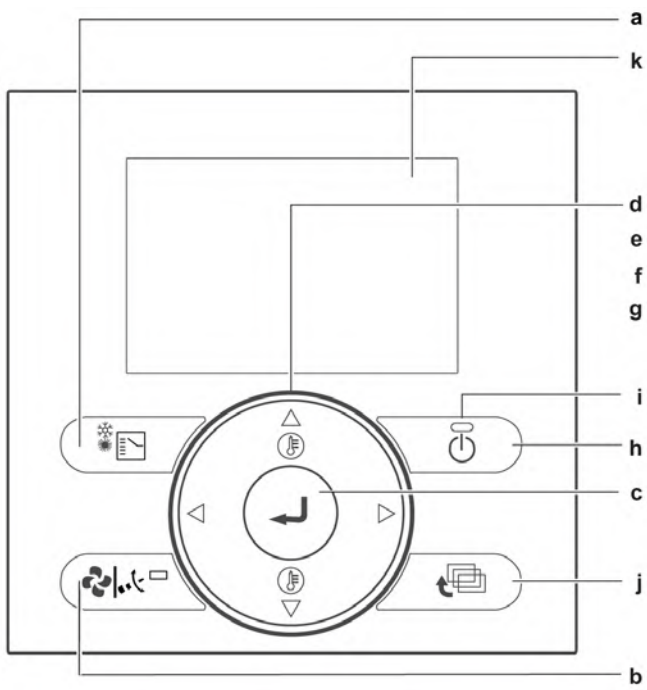


About setting 19(29)-0-04 and 19(29)-0-05

If the user interface is switched off while you are activating setting 19(29)-0-04 or 19(29)-0-05, the configuration is aborted. When you switch the user interface back on, the function starts from the beginning. Setting 19(29)-0-04 takes between 1 and 6 minutes to complete. You can check if the setting was completed successfully by checking if the field setting is changed to 0-01. Setting 19(29)-0-05 takes between 3 and 35 minutes to complete. You can check if the setting was completed successfully by checking if the field setting is changed to 0-02. You can ONLY activate these settings with clean filters. Make sure that the ducting pressure drop of the top and bottom units is balanced. The function starts as soon as it is selected and the user interface is on. Setting 19(29)-0-04 CANNOT be configured if the outside temperature is ≤-10°C, which is out of the operation range. Setting 19(29)-0-05 CANNOT be configured if the outside temperature is ≤5°C. In this case error 65-03 is shown and the unit stops working. Change the setting to 19(29)-0-04. The setting CANNOT be configured if there are alerts or errors present. If booster fans are used, you can ONLY configure setting 19(29)-0-03. You can configure settings 19(29)-0-04 and 19(29)-0-05 for multiple units with 1 user interface.

5.1.1.3. About the user interface

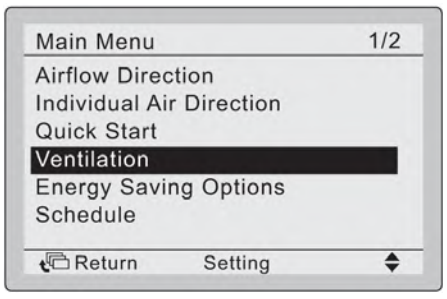
Please read the manual supplied with the user interface for more detailed instructions.



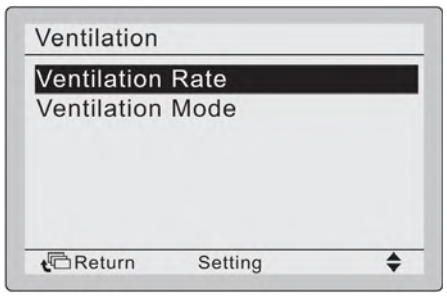
Item	Description
a	Operation Mode Selector button
b	Fan Speed/Airflow Direction button
c	Menu/Enter button
d	Up button
e	Down button
f	Right button
g	Left button
h	ON/OFF button
i	Operation lamp
j	Cancel button
k	LCD (with backlight)

To change the ventilation rate

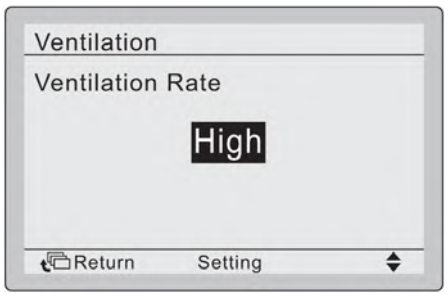
1. Press the Menu/Enter button to display the main menu.
2. Press the Up/Down buttons to select Ventilation and press the Menu/Enter button



3. Press the Up/Down buttons to select Ventilation Rate and press the Menu/Enter button to confirm.



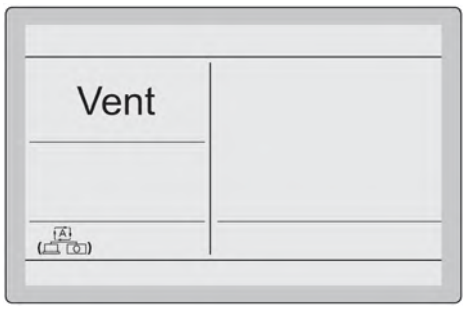
4. Press the Up/Down buttons to change the setting to Low or High and press the Menu/Enter button to confirm.



To select ventilation mode

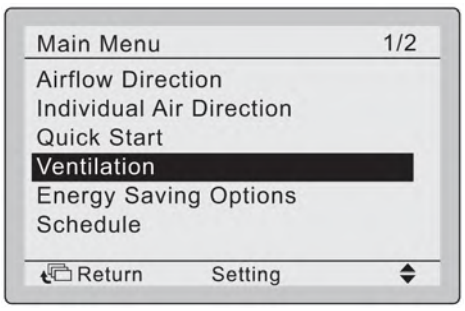
Ventilation mode is used when cooling or heating is unnecessary, so only the heat reclaim ventilation units are operating.

1. Press the Operation Mode Selector button several times, until the ventilation mode is selected list.

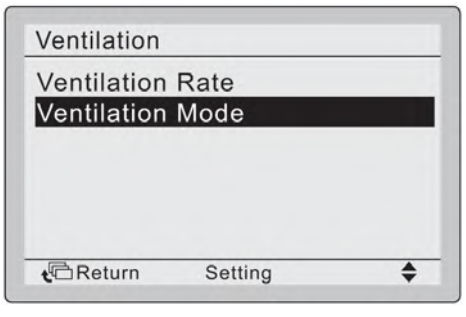


To change the ventilation mode

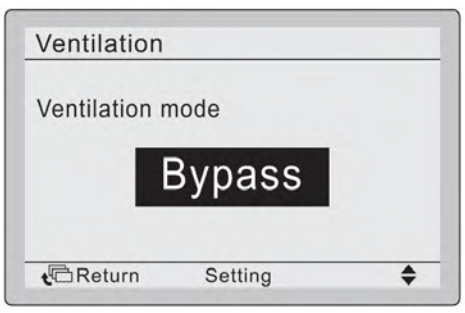
1. Press the Menu/Enter button to display the main menu.
2. Press the Up/Down buttons to select Ventilation and press the Menu/Enter button.

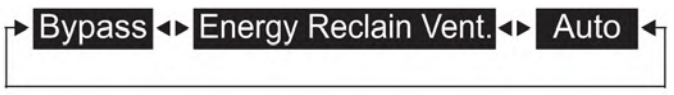


3. Press the Up/Down buttons to select Ventilation mode and press the Menu/Enter button.



4. Press the Up/Down buttons to select the required ventilation mode. For more information about ventilation modes, see Ventilation modes in the installer and user reference guide.





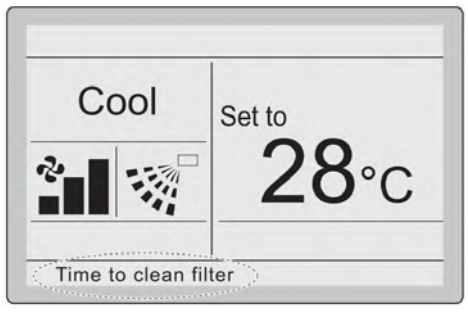
Ventilation modes

You can change the ventilation mode in the main menu.

Mode	Description
Auto mode	Using information from the air conditioner (cooling, heating, fan, and set temperature) and heat reclaim ventilation unit (indoor and outdoor temperatures), this mode automatically changes between Energy Reclaim Ventilation and Bypass mode.
Energy Reclaim Ventilation mode	The outdoor air is supplied to the room after passing through a heat exchange element, where heat is exchanged with the return air.
Bypass mode	The outdoor air bypasses the heat exchange element. This means that outdoor air is supplied to the room without heat exchange with the return air.

Time to clean filter indication

When it is time to clean the filters, the following message or icon shows at the bottom of the basic screen: time to clean the filter.

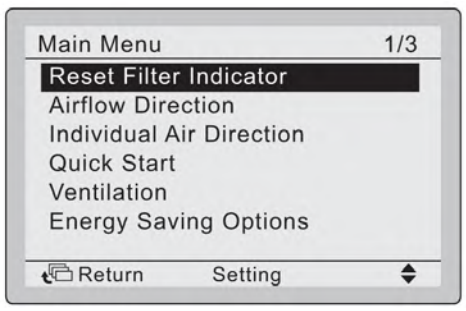


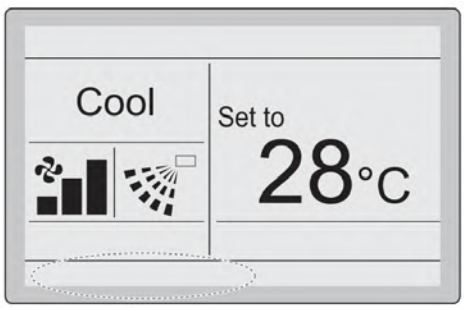
To remove time to clear filter indication

Press the Menu/Enter button.

Press the Up/Down buttons to select Reset Filter Indicator.

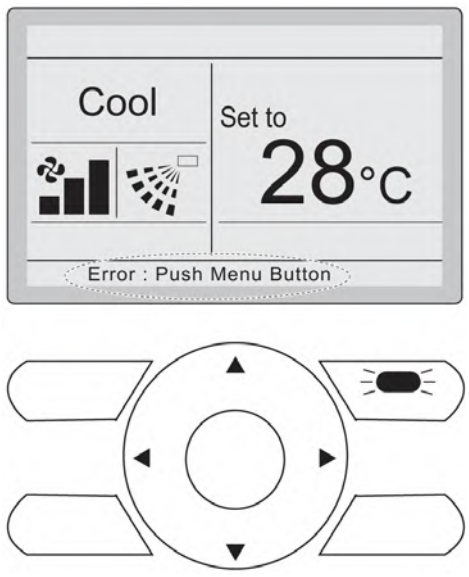
Press the Menu/Enter button.





About error indications

If an error occurs, there is an error icon in the basic screen and the operation lamp blinks. If a warning occurs, ONLY the error icon blinks and the operation lamp does NOT. Press the Menu/Enter button to display the error code or warning and contact information.



The error code blinks and the contact address and model name appear as shown below.

In this case, notify your Daikin dealer about the error code.

Malfunction code	Particular code	Description
A1		EEPROM failure
A6		Locked rotor
A6	22	Unstable fan rpm: failure of filter contamination
A8		Power supply malfunction
AJ		Capacity setting malfunction
C0		Generic error
C1		Fan communication error
C6		Malfunction of fan motor sensor or fan control driver
CH		CO_2 sensor warning
US		Transmission error between the unit and user interface
U8		Transmission error between main user interface and sub user interface
UA		Wrong user interface installed
UC		Repeated central address
UE		Transmission error between the unit and centralised controller
60		External protection device activated
64	01	Indoor air thermistor (R1T) malfunction
64	02	Indoor air thermistor (R1T) out of operation range
65	01	Outdoor air thermistor (R2T) malfunction
65	02	Outdoor air thermistor (R2T) out of operation range
65	03	Functions 19(29)-0-04/05 not possible due to low outdoor temperature operation
6A		Damper-related malfunction
6A		Damper-related malfunction + thermistor

In case of malfunction with the code on grey background, the unit still operates. However, make sure to have it inspected and repaired as soon as possible.

Prevent of frost the heat-exchanger

- If electrical pre-heating is present:
  - electrical pre-heating coil will prevent frosting of the heat-exchanger, modulating once the fresh air temperature goes below the threshold value set at 0°C, in case of heater malfunction or not sufficient flow for its startup, a differential pressure switch will shutdown the unit until the defrosting.
- If electrical pre-heating coil is not present:
  - a differential pressure switch will prevent frosting of heat exchanger, shutting down the unit once the frosting starts.

WARNING

The differential pressure switch will be set according to the nominal air flow. If the Modular L Smart will operate at different condition from nominal airflow, you MUST adjust the setting according to the chart below.

Frost prevent differential pressure switch factory settings						
Size	02	03	04	05	06	07
Pa	225	350	225	275	275	400

Factory settings for frost-protection Differential Pressure Switch:

Figure 5-7: Size 02

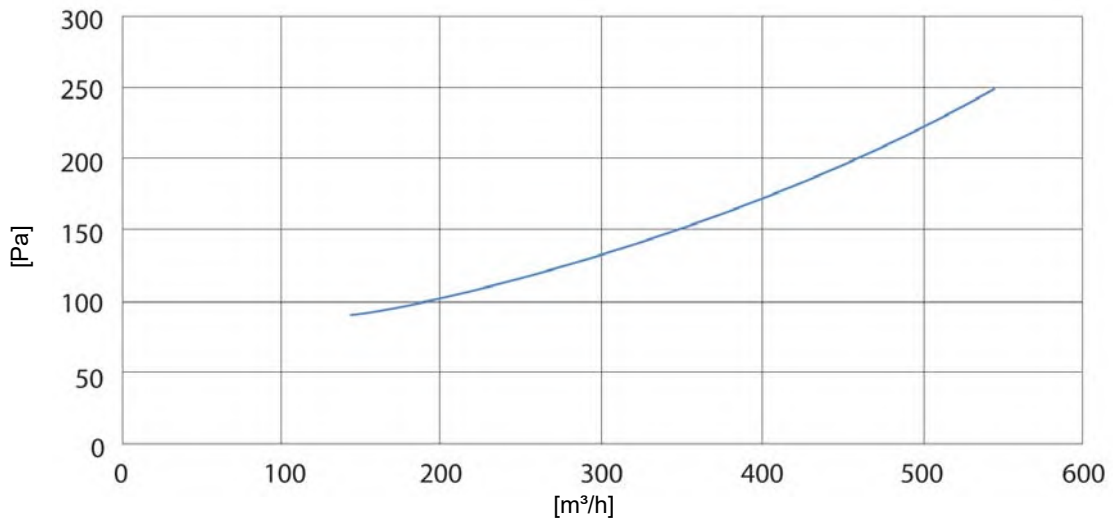


Figure 5-8: Size 03

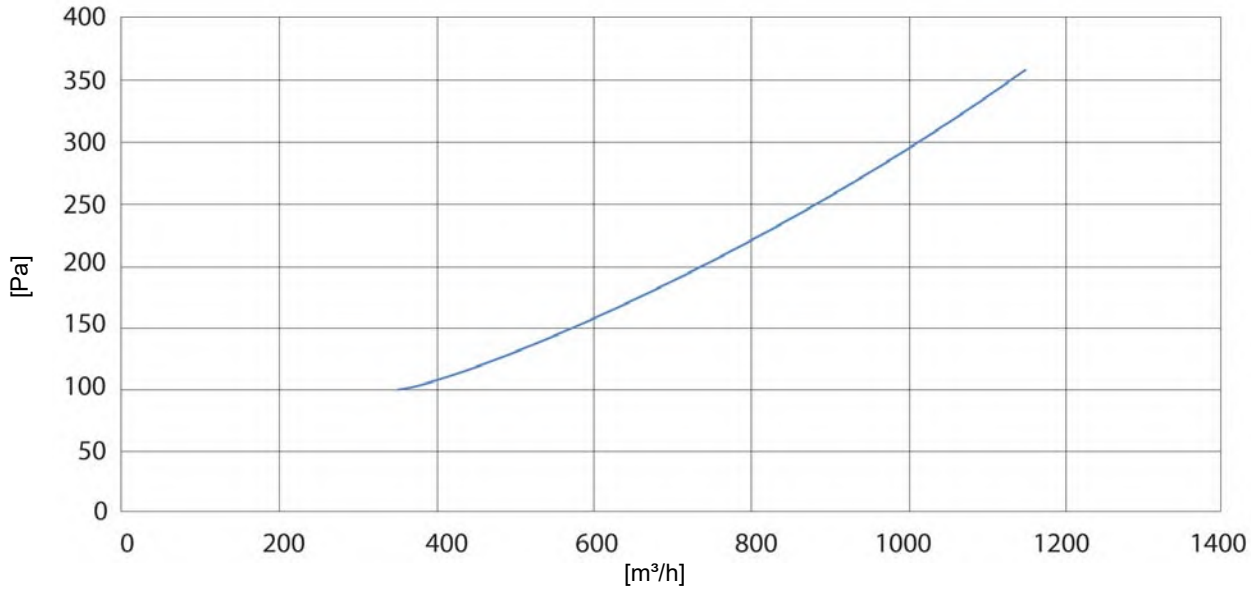


Figure 5-9: Size 04

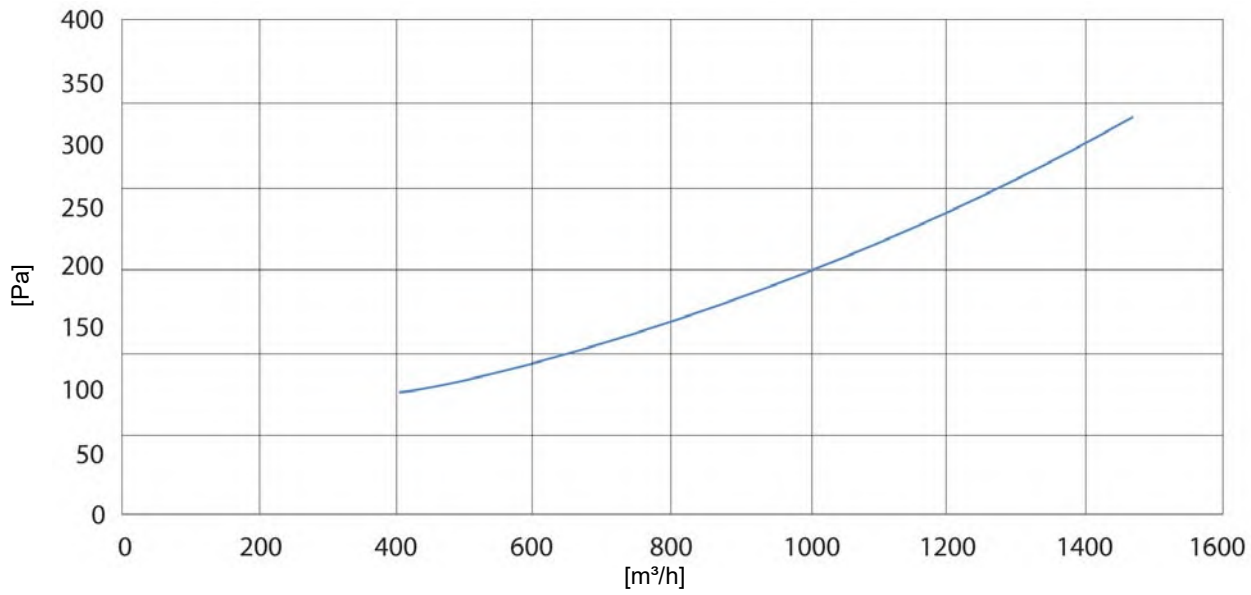


Figure 5-10: Size 05

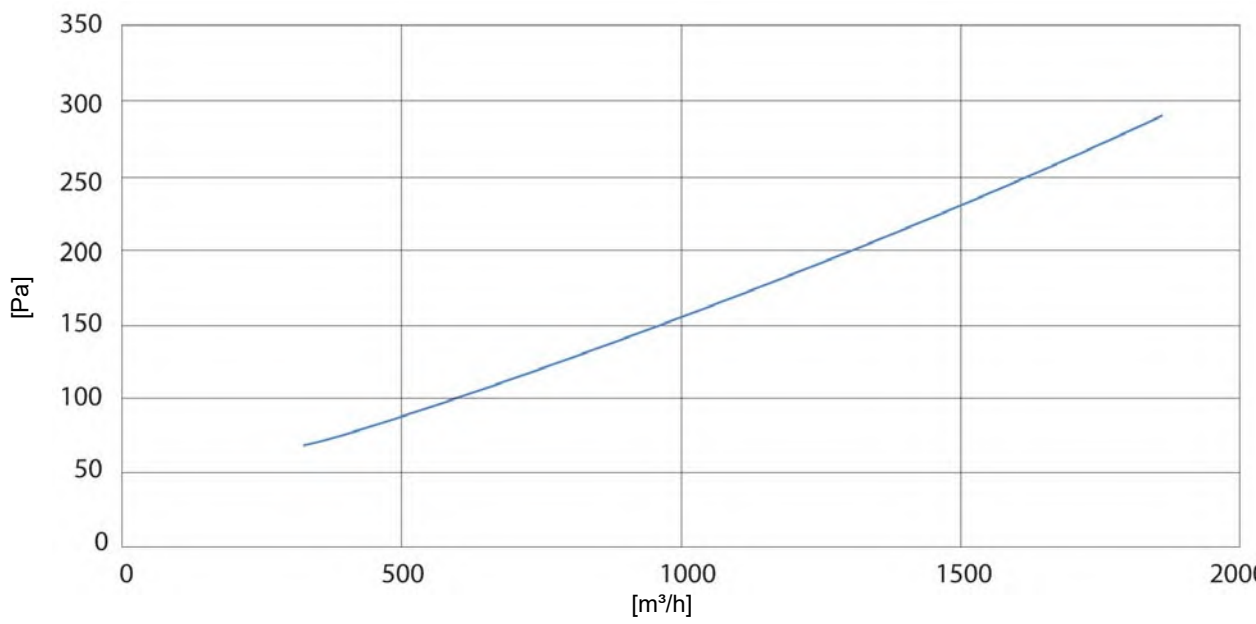


Figure 5-11: Size 06

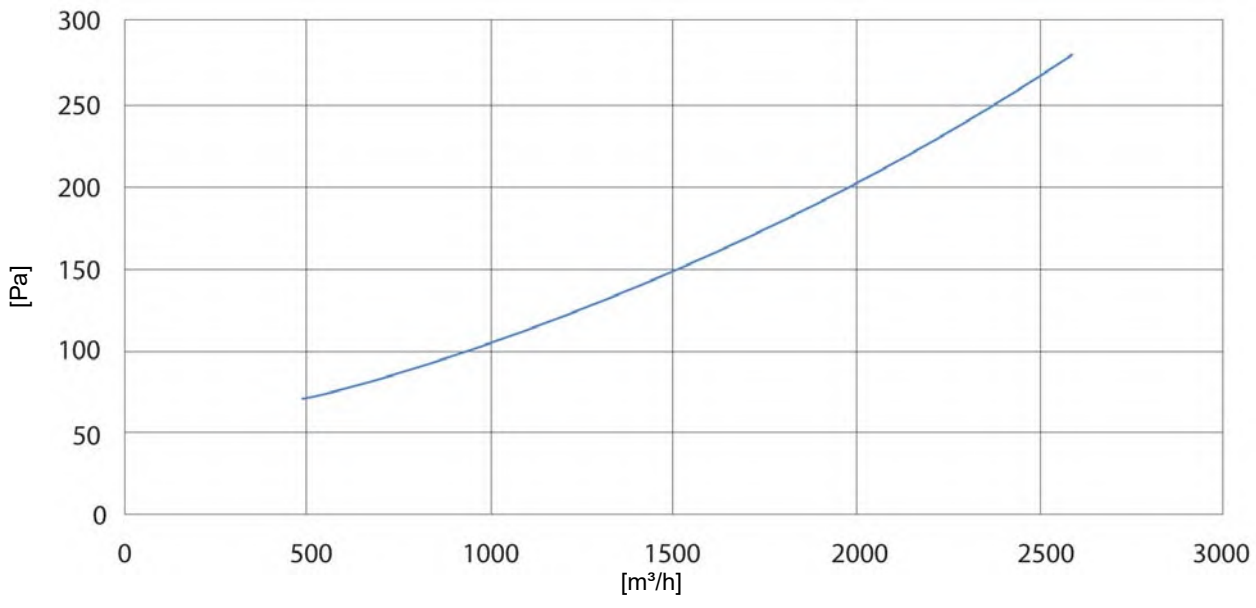
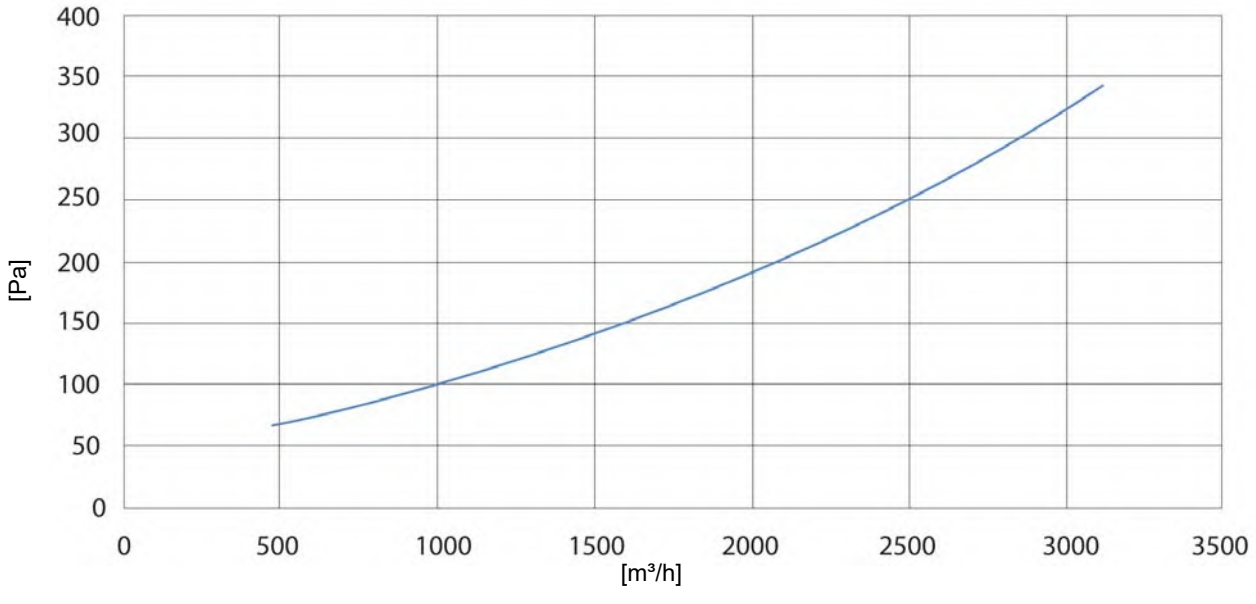


Figure 5-12: Size 07



5.2. Wiring diagram

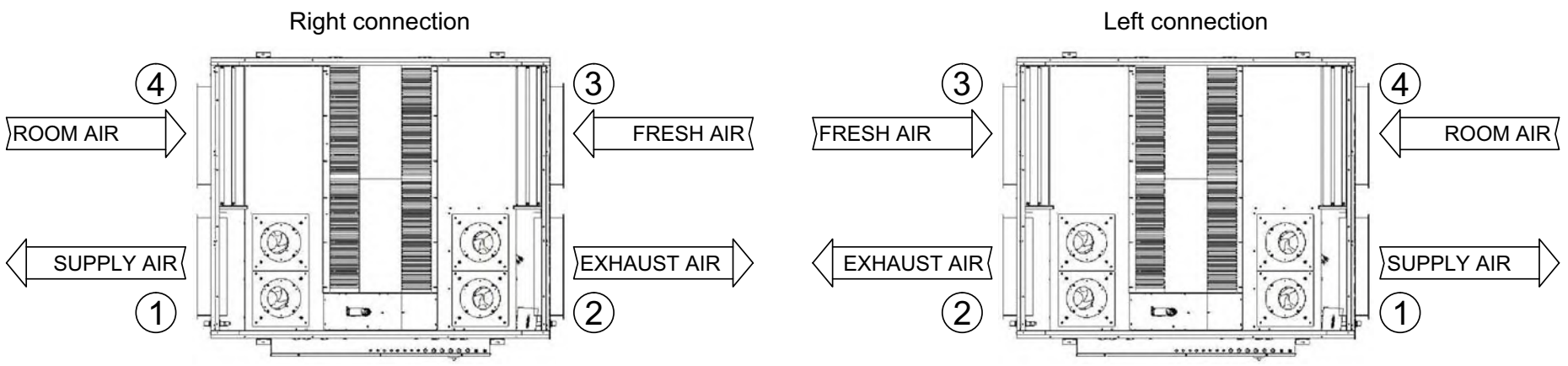
5.2.1. HRV unit

5.2.1.1. Legend

Figure 5-13: Legend

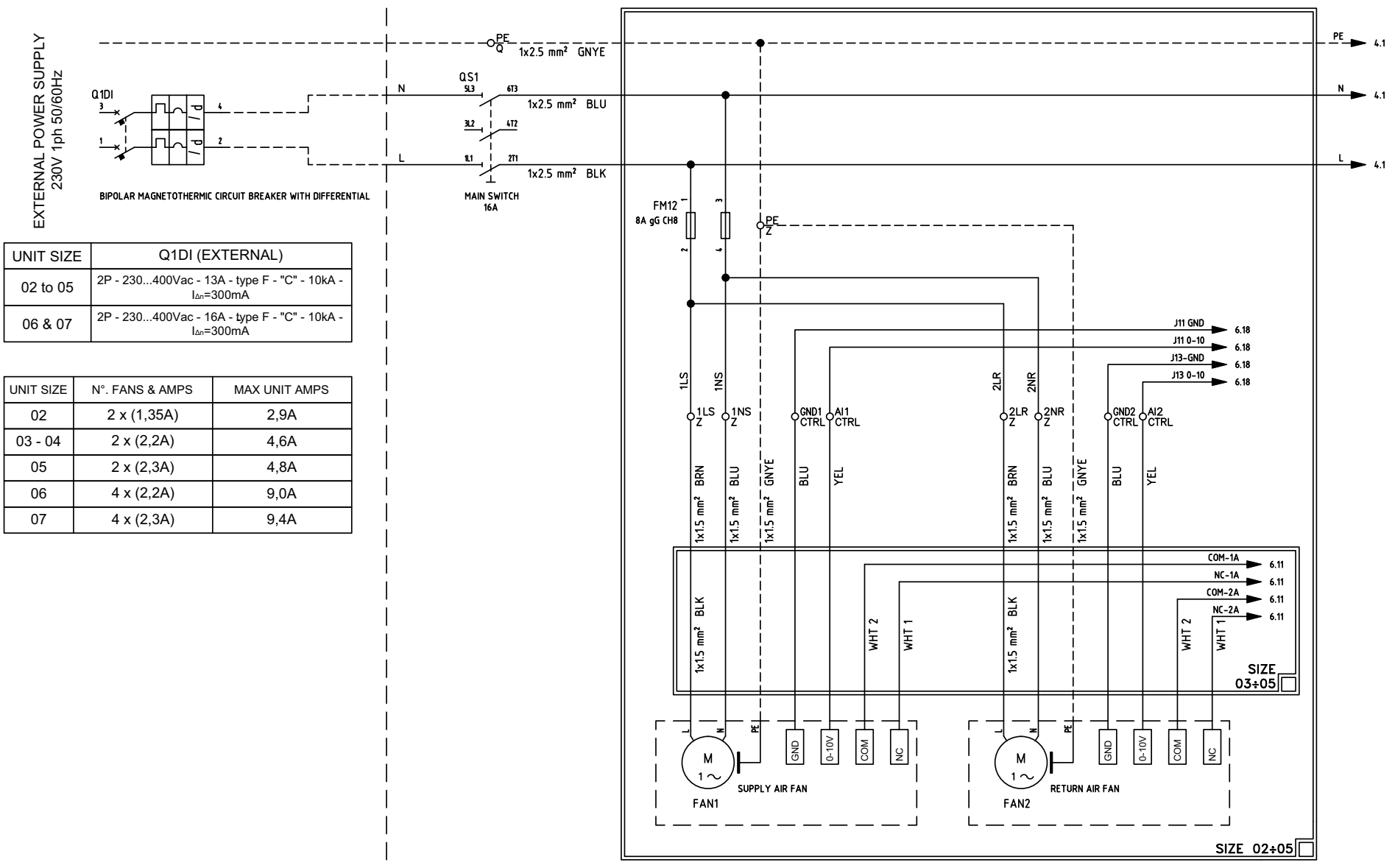
5.2.1.2. Unit layout

Figure 5-14: Unit layout - Bottom view



5.2.1.3. Power supply and fan-S fan-R size 02 to 05

Figure 5-15: Power supply and fan-S fan-R size 02 to 05

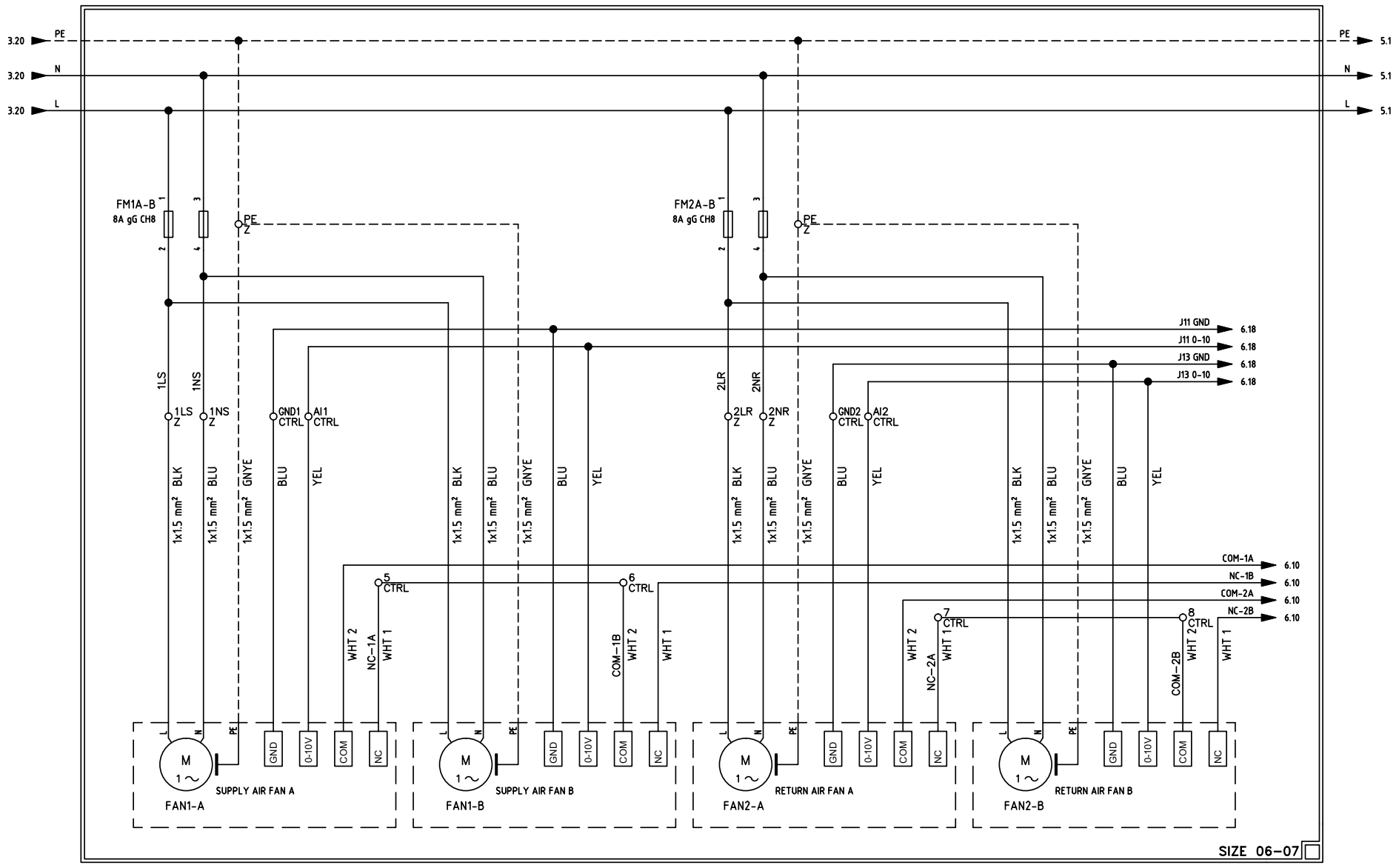


UNIT SIZE	Q1DI (EXTERNAL)
02 to 05	2P - 230...400Vac - 13A - type F - "C" - 10kA - $I_{\Delta n}$=300mA
06 & 07	2P - 230...400Vac - 16A - type F - "C" - 10kA - $I_{\Delta n}$=300mA

UNIT SIZE	N°. FANS & AMPS	MAX UNIT AMPS
02	2 x (1,35A)	2,9A
03 - 04	2 x (2,2A)	4,6A
05	2 x (2,3A)	4,8A
06	4 x (2,2A)	9,0A
07	4 x (2,3A)	9,4A

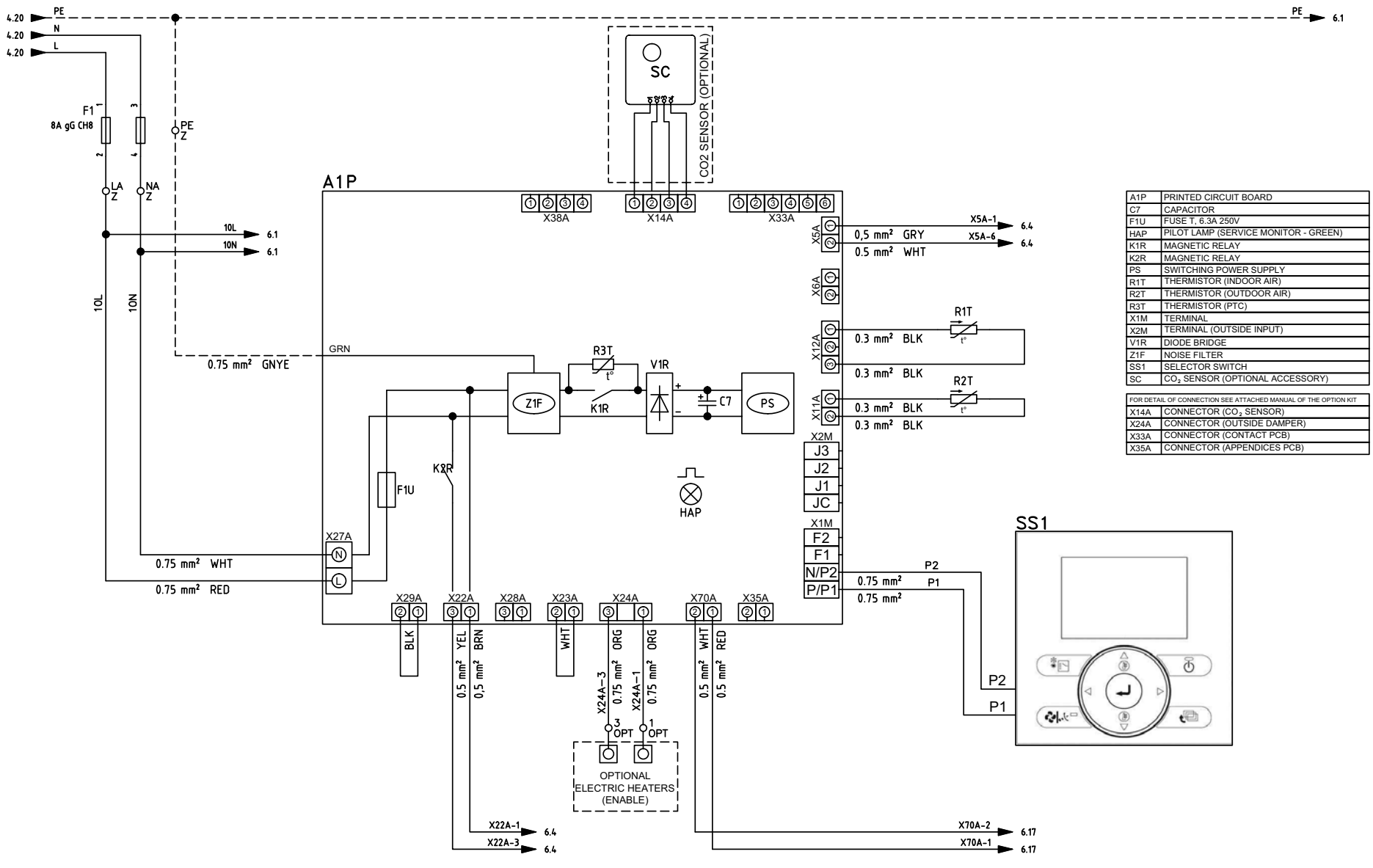
5.2.1.4. Fan-S fan-R size 06 and 07

Figure 5-16: Fan-S fan-R size 06 and 07



5.2.1.5. Control unit board

Figure 5-17: Control unit board

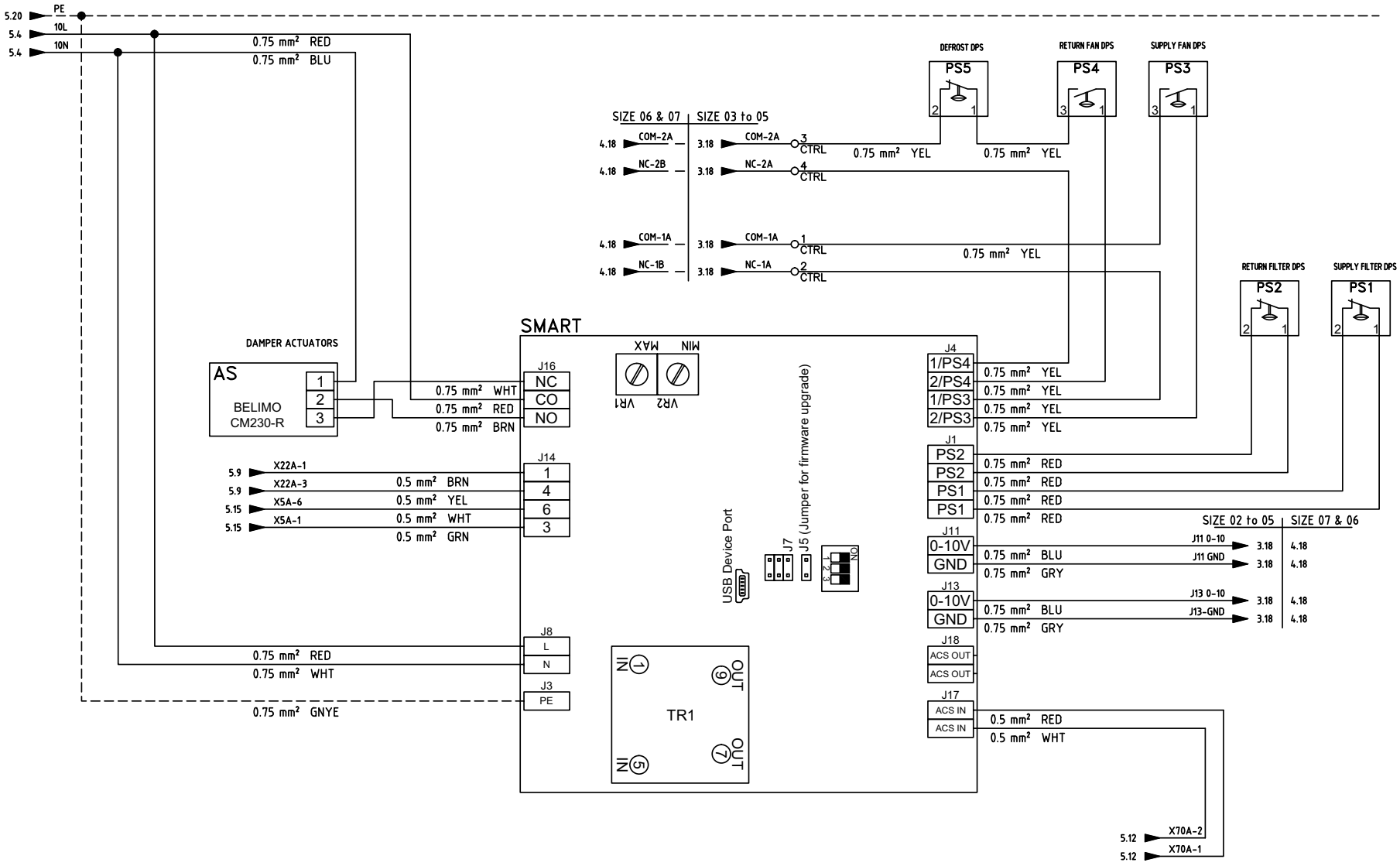


A1P	PRINTED CIRCUIT BOARD
C7	CAPACITOR
F1U	FUSE T, 6.3A 250V
HAP	PILOT LAMP (SERVICE MONITOR - GREEN)
K1R	MAGNETIC RELAY
K2R	MAGNETIC RELAY
PS	SWITCHING POWER SUPPLY
R1T	THERMISTOR (INDOOR AIR)
R2T	THERMISTOR (OUTDOOR AIR)
R3T	THERMISTOR (PTC)
X1M	TERMINAL
X2M	TERMINAL (OUTSIDE INPUT)
V1R	DIODE BRIDGE
Z1F	NOISE FILTER
SS1	SELECTOR SWITCH
SC	CO_2 SENSOR (OPTIONAL ACCESSORY)

FOR DETAIL OF CONNECTION SEE ATTACHED MANUAL OF THE OPTION KIT	
X14A	CONNECTOR (CO_2 SENSOR)
X24A	CONNECTOR (OUTSIDE DAMPER)
X33A	CONNECTOR (CONTACT PCB)
X35A	CONNECTOR (APPENDICES PCB)

5.2.1.6. Smart Gateway

Figure 5-18: Smart Gateway



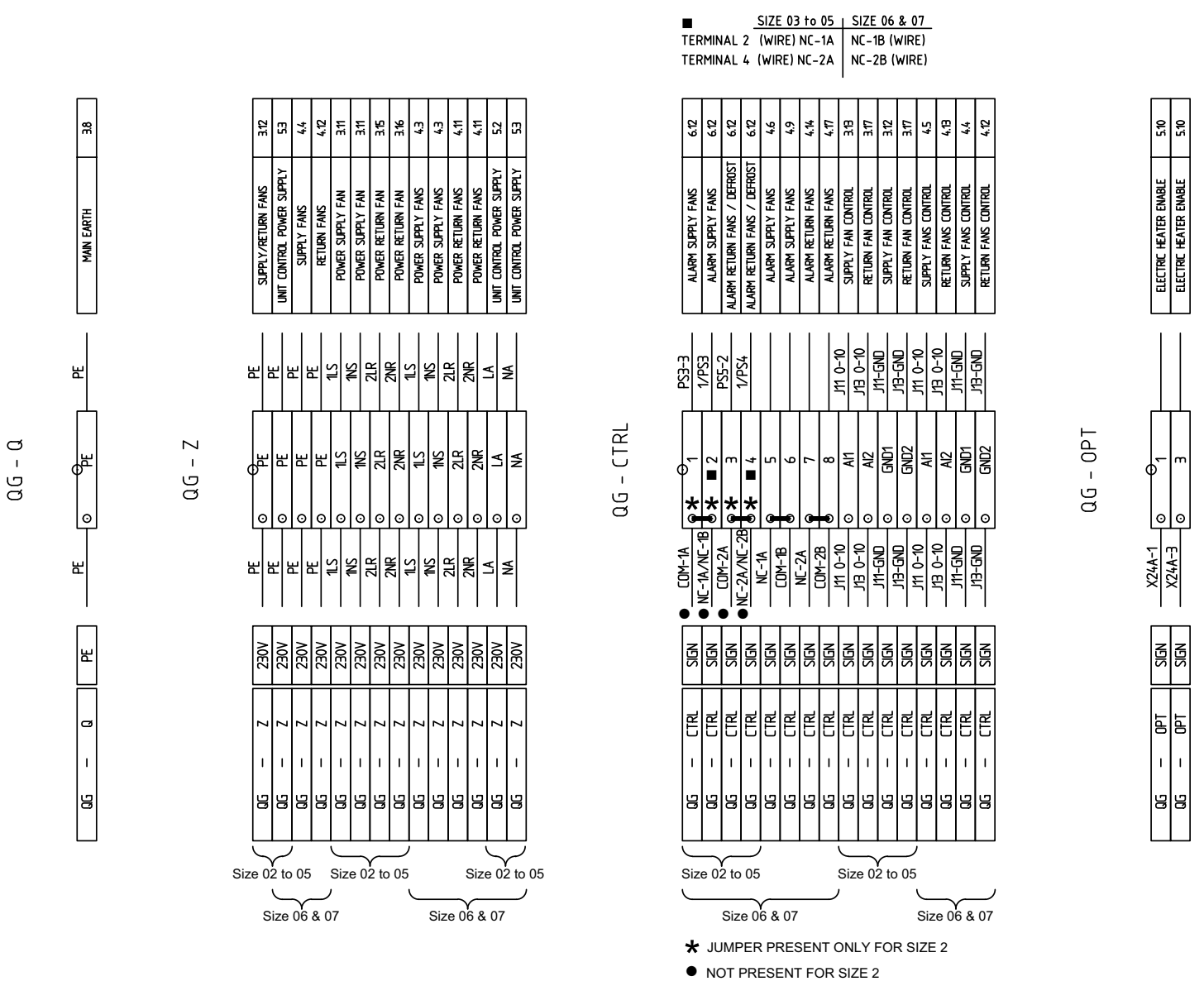
5.2.1.7. Tag list

Figure 5-19: Tag list

ITEM	DESCRIPTION	SHEET	Q.TY
A1P	DAIKIN UNIT CONTROLS BOARD	5	1
AS	DAMPER ACTUATORS	6	1
F1	AUXILIARY CONTROLS FUSES	5	1
FAN1	SUPPLY AIR FAN	3	1
FAN1-A	SUPPLY AIR FAN A	4	1
FAN1-B	SUPPLY AIR FAN B	4	1
FAN2	RETURN AIR FAN	3	1
FAN2-A	RETURN AIR FAN A	4	1
FAN2-B	RETURN AIR FAN B	4	1
FM12	FANS FUSES SIZE 02 TO 05	3	1
FM1A-B	FANS FUSES - SIZE 06 & 07	4	1
FM2A-B	FANS FUSES - SIZE 06 & 07	4	1
LEFT CONNECTION	UNIT SIDE AIR CONNECTION	2	1
PS1	SUPPLY FILTER DPS	6	1
PS2	RETURN FILTER DPS	6	1
PS3	SUPPLY FAN DPS	6	1
PS4	RETURN FAN DPS	6	1
PS5	DEFROST DPS	6	1
Q1DI	BIPOLAR MAGNETOTHERMIC CIRCUIT BREAKER WITH DIFFERENTIAL	3	1
QS1	MAIN SWITCH	3	1
R1T	INDOOR AIR THERMISTOR	5	1
R2T	OUTDOOR AIR THERMISTOR	5	1
RIGHT CONNECTION	UNIT SIDE AIR CONNECTION	2	1
SC	CO2 SENSOR (OPTIONAL ACCESSORY)	5	1
SIZE 02÷05	SUPPLY & RETURN AIR FAN SIZE 2-5	3	1
SIZE 06-07	SUPPLY & RETURN AIR FAN SIZE 6-7	4	1
SMART	SMART GATEWAY	6	1
SS1	REMOTE CONTROLLER	5	1

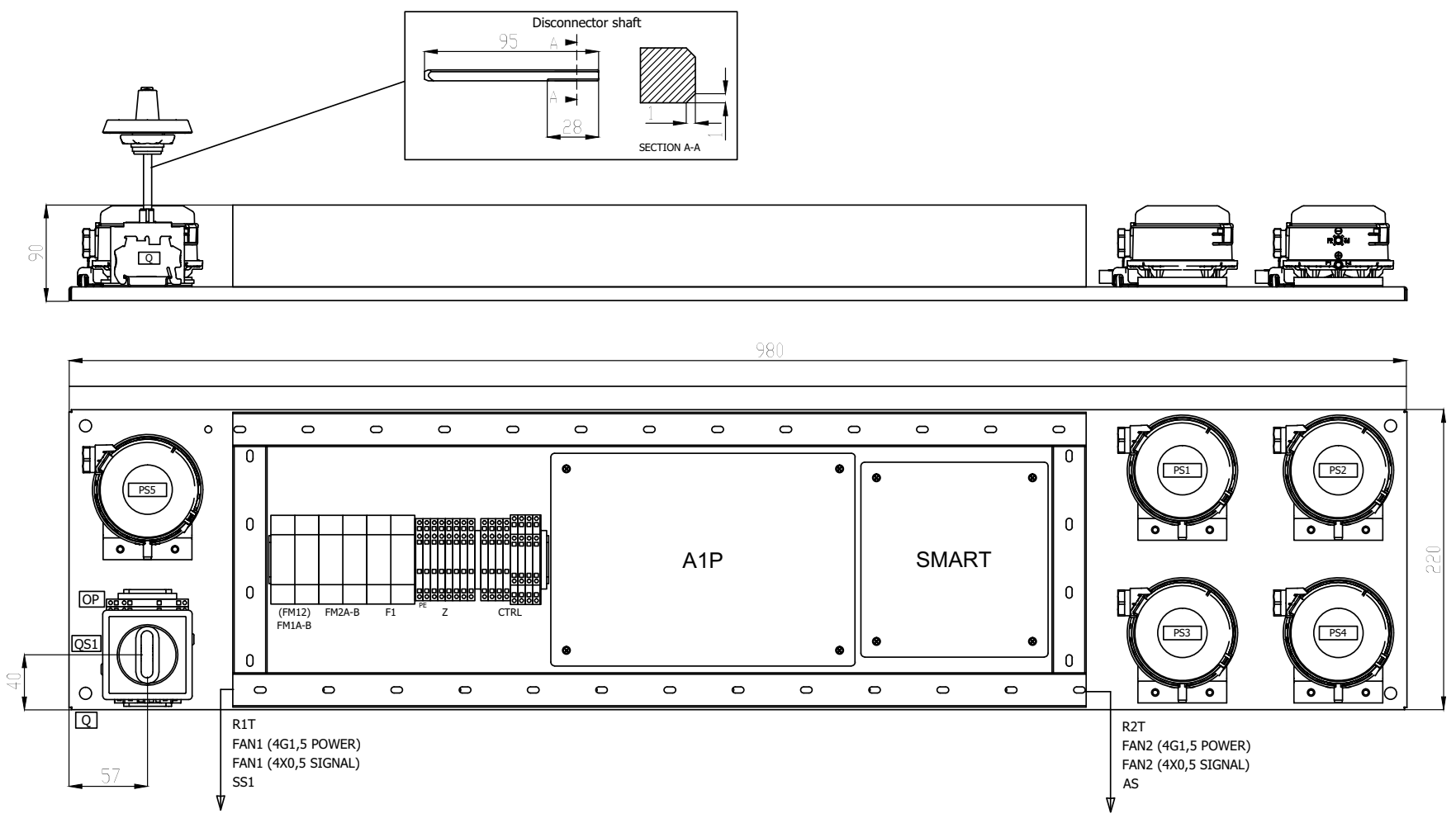
5.2.1.8. Terminals

Figure 5-20: Terminals



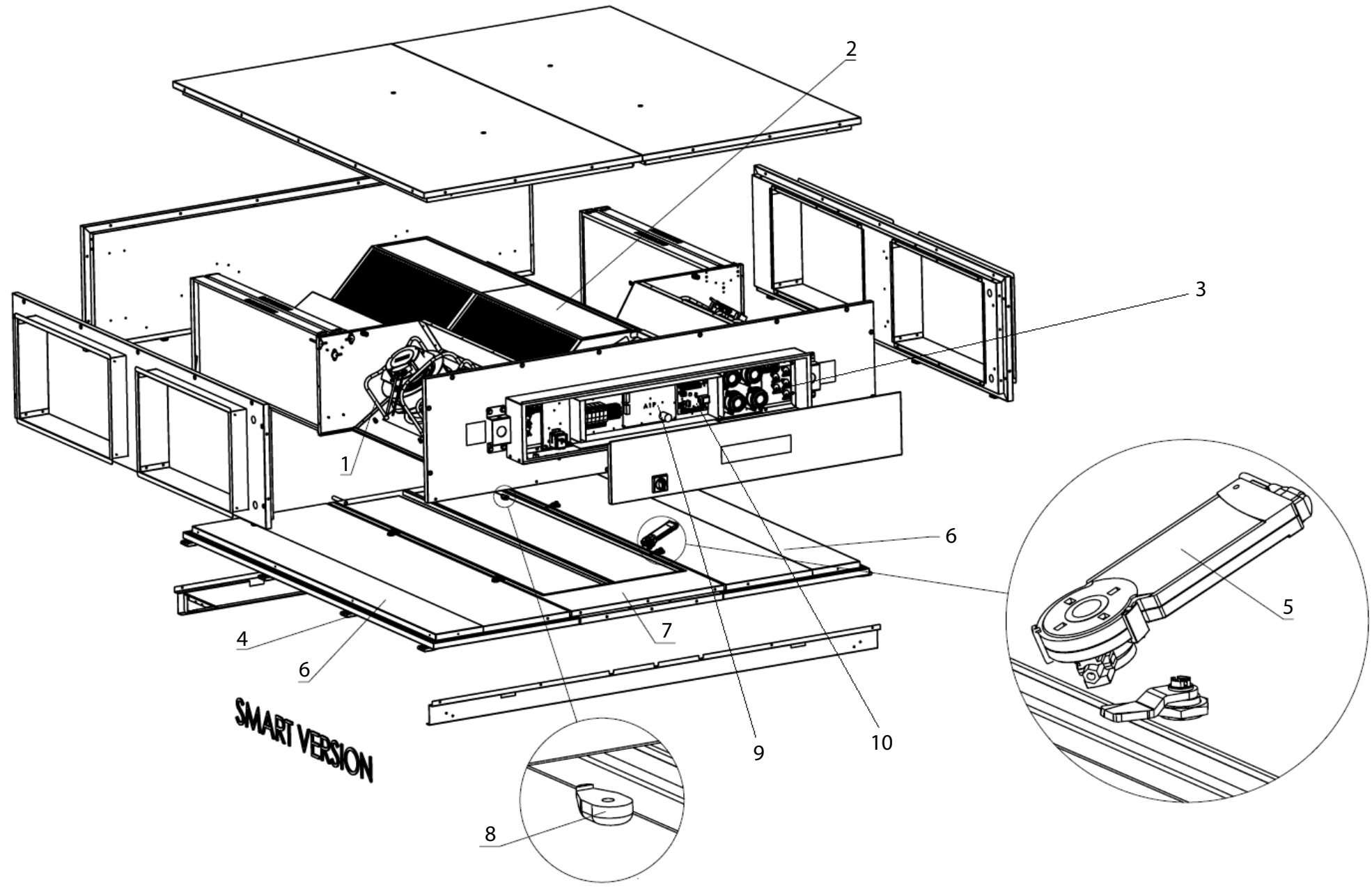
5.2.1.9. Electrical panel layout

Figure 5-21: Electrical panel layout



5.3. Component overview of unit

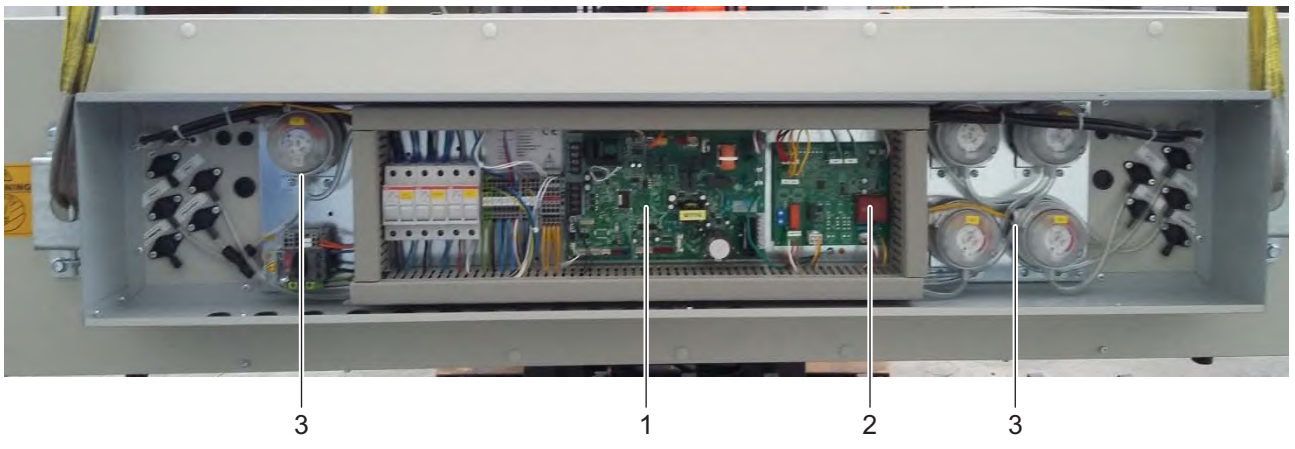
5.3.1. HRV unit



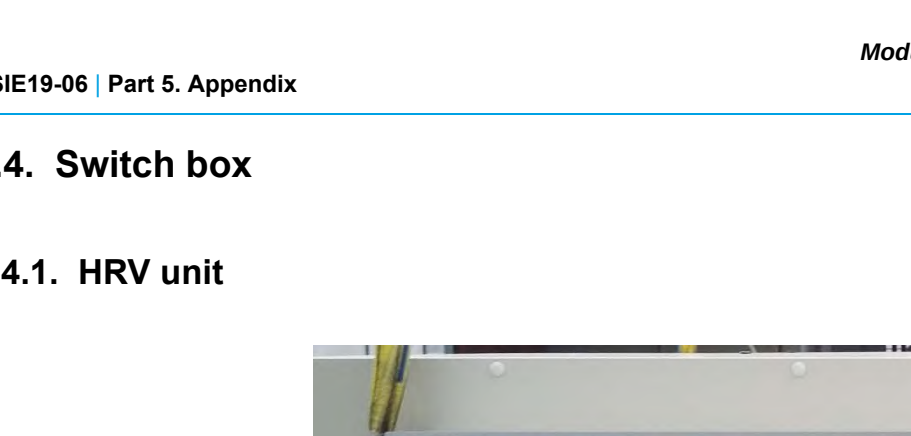
Item	Part description
1	Fan
2	Heat exchanger
3	Pressure switch
4	Hinge
5	Bypass actuator
6	Service door
7	Drain pan panel
8	Nylon socket
9	Main PCB
10	Smart Gateway

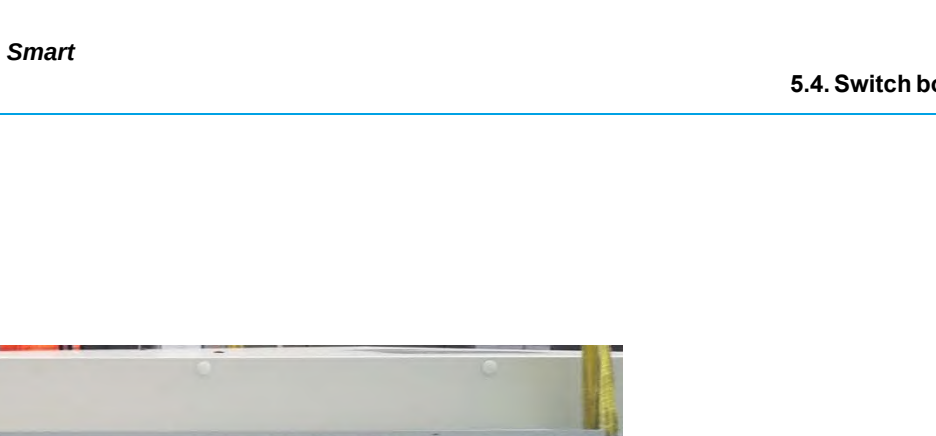
5.4. Switch box

5.4.1. HRV unit



Item	Part description
1	Control PCB
2	Smart Gateway
3	Pressure differential switches





Item	Part description
PS1	Supply filter
PS2	Return filter
PS3	Supply fan
PS4	Return fan
PS5	Defrost

Figure 5-22: Smart Gateway

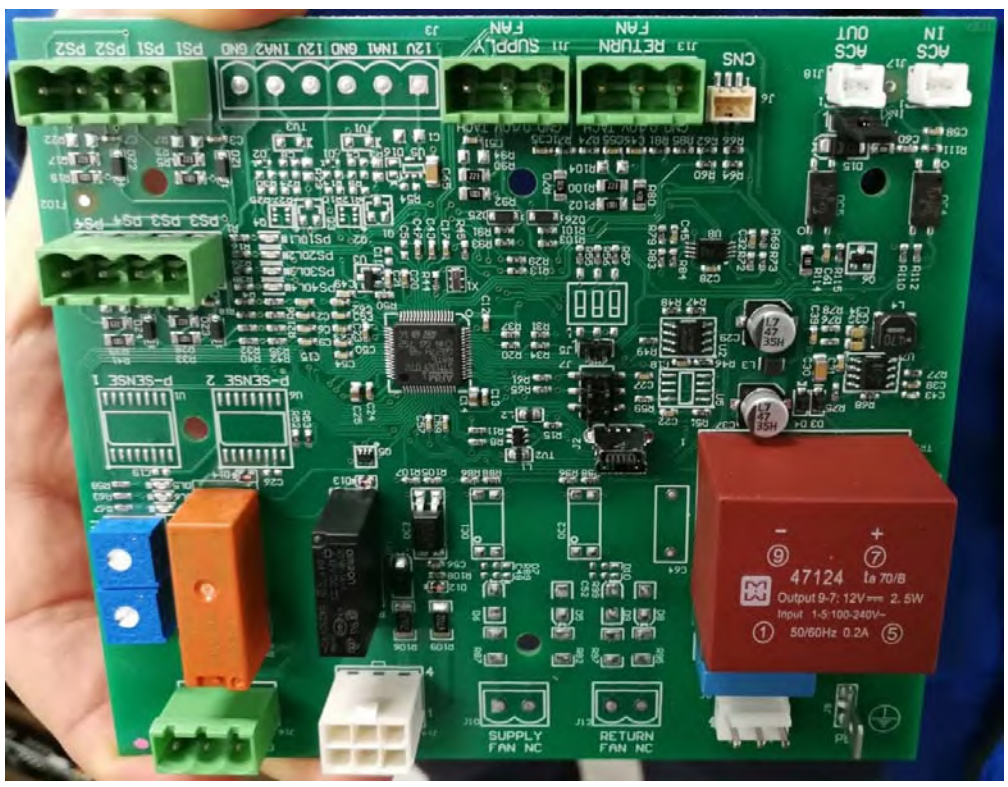
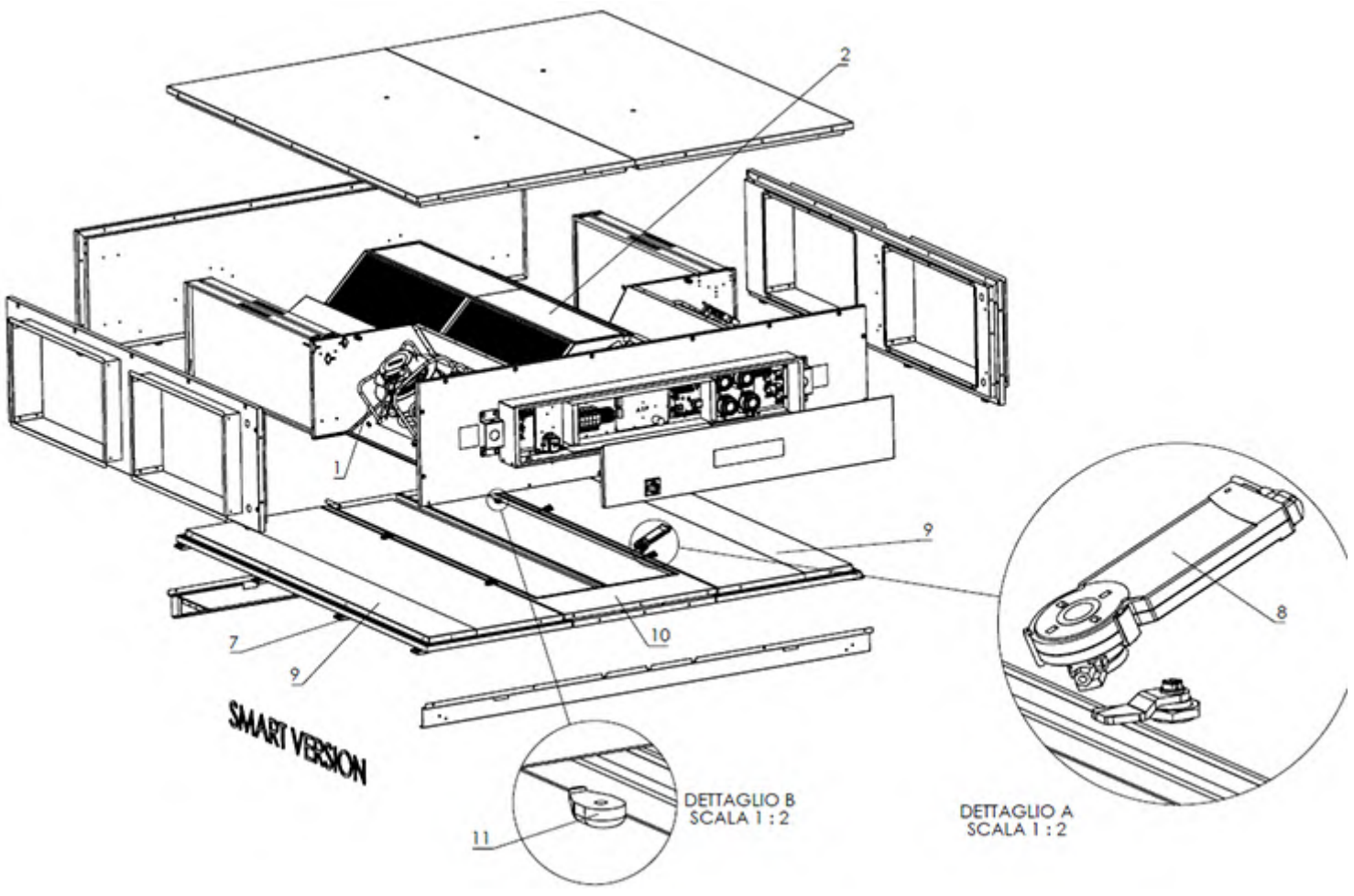


Figure 5-23: Control PCB

5.5. Spare parts list

D-AHU MAIN UNIT			Qty per unit						Balloon
Type	Description	DAE spare parts code	ALB02RBS ALB02LBS	ALB03RBS ALB03LBS	ALB04RBS ALB04LBS	ALB05RBS ALB05LBS	ALB06RBS ALB06LBS	ALB07RBS ALB07LBS	
Fan	K3G190-RD45-03	AHFEC-ALB02[A]	2						1
	R3G250-RR01-H1	AHFEC-ALB03[A]		2	2		4		
	K3G250-PR04-H2	AHFEC-ALB05[A]				2		4	
Heat exchanger	PCF18	AHRHALB02	1						2
	PCF25	AHRHALB03		1					
	PCF35	AHRHALB05			1	1			
	PCF45	AHRHALB07					1	1	
Pressure switch	PS-differ. press. switch 50-500 IP65	AHPDF50-500PA00AHP1	5	5	5	5	5	5	5
Pressure transducer	DP transducer 0-3000Pa 0.5-4.5V	AHQEAIRDPS0-3000	2	2	2	2	2	2	6
Hinge	Hinge	AHCR095IZAMNERO	4	4	6	6	8	8	7
Bypass actuator	Actuator modulating 24V	AHAT-MODUL-CM24SRTR	1	1	1	1	1	1	8
Service door	Service door - original	AHPNMLDR02BSP	2						9
		AHPNMLDR03BSP		2					
		AHPNMLDR0405BSP			2	2			
		AHPNMLDR0607BSP					2	2	
Service door with aluminium socket	Service door - new	AHPNMLDR02NSP	2						
		AHPNMLDR03NSP		2					
		AHPNMLDR0405NSP			2	2			
		AHPNMLDR0607NSP					2	2	
Drain pan panel	Centre panel with drain pan - original	AHPNMLDP02BSP	1						10
		AHPNMLDP03BSP		1					
		AHPNMLDP0405BSP			1	1			
		AHPNMLDP0607BSP					1	1	
Drain pan panel with aluminium socket	Centre panel with drain pan - new	AHPNMLDP02NSP	1						
		AHPNMLDP03NSP		1					
		AHPNMLDP0405NSP			1	1			
		AHPNMLDP0607NSP					1	1	
Aluminium socket	Panel blocking socket	AHBPBLOCCAPANNELLI3	16	16	20	20	20	20	11
Main PCB	Daikin electronic board VAM - EUW RoHS PCB	AHQE-VAMPCB[A]	1	1	1	1	1	1	12
Smart Gateway	ACS Gateway for modular light VAM	AHQE-ACSGATEPCB	1	1	1	1	1	1	13



5.6. Field information report

See next page.

In case a problem occurred on the unit which could not be resolved by using the content of this service manual or in case you have a problem which could be resolved but of which the manufacturer should be notified, we advise you to contact your distributor.

To facilitate the investigation, additional information is required. Please fill out the following form before contacting your distributor.

DAIKIN

FIELD INFORMATION REPORT

Key person info	
Name:	Company name:
Your contact details Phone number:	E-mail address:
Site address:	
Your reference:	Date of visit:

Claim info	
Title:	
Problem description:	
Error code:	Trouble date:
Problem frequency:	
Investigation steps done:	
Insert picture of the trouble.	
Current situation (solved, not solved, …):	
Countermeasures taken:	
Comments and proposals:	
Part available for return (if applicable):	

Application info
Application (house, apartment, office, …):
New project or refurbishment:
APPLICATIONS (Office, restaurant, hotel, …):
Layout (simple schematic):

Unit / Installation info	
Model name:	Serial number:
Installation / commissioning date:	
Software version user interface:	
Minimum water volume:	
Air flow (m^3/h):	
ESP (Pa):	
Additional accessories fitted (silencers, coil section, filters, others, ...):	

Provide pictures of the field settings overview (viewable on the user interface).