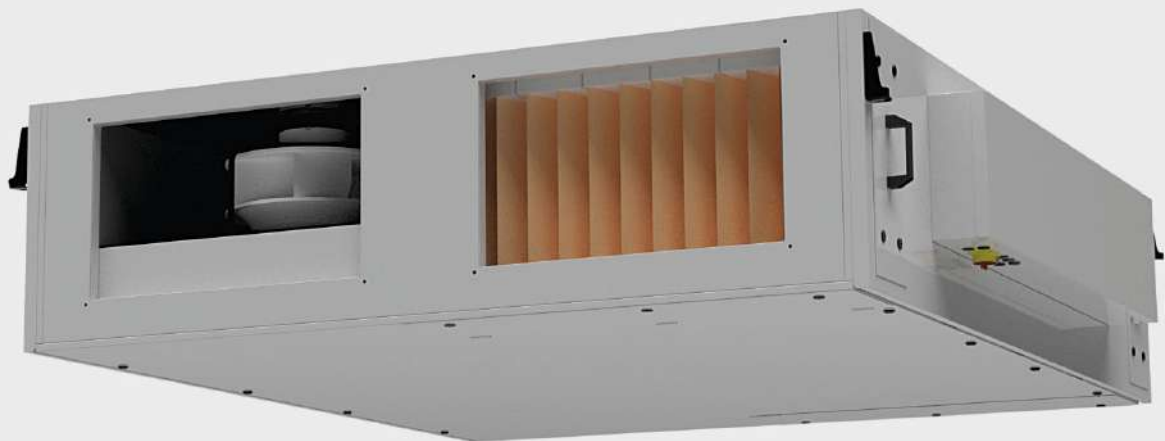




SLIM



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1. INTRODUCTION

Thank you for purchasing a SLIM heat recovery unit. This product has been manufactured according to rigorous technical safety rules in full compliance with applicable EU standards.

Please read this instruction book carefully, as it contains important information for your safety during the installation, use and maintenance of this product.

Keep it at hand for future reference. Please check that the appliance is in perfect condition when you unpack it, as all factory defects are covered by the S&P guarantee.

The installation of this product (implementation, connections, commissioning, maintenance) and all other interventions must be performed by a professional applying the recognized rules of good practice, standards and safety regulations in force. It must conform to the prescriptions related to Electromagnetic Compatibility (EMC) and the Low Voltage Directive (LVD).

S&P shall not be held responsible for possible injuries and/or damages caused by the non-compliance with safety instructions or following a modification of the product.

2. SAFETY INSTRUCTIONS AND “CE” MARKING

S&P technicians are firmly committed to research and development of ever more efficient products and in compliance with current safety regulations.

The instructions and recommendations given below reflect current regulations, principally regarding safety, and therefore are based on compliance with general regulations. Therefore, we recommend to strictly follow the safety regulations in force in your country. S&P will not be held liable for any possible harm or damage caused by non-compliance with the safety regulations, as well as caused by modifying the product.

- Wear appropriate IPE (Individual Protection Equipment) before any intervention.
- Before installing the air treatment unit, make sure that the support and placement are sufficiently resistant to withstand the unit's weight and that of the accessories.
- Do not open the access doors without first switching off the electrical power supply with the main power switch present on the unit.
- If the work is to be performed inside the device, switch off the electrical power supply on the main circuit breaker and make sure that no one can accidentally switch it on. Make sure that the moving parts are stopped.
- Make sure that the motor driven fans are not accessible from the connection taps (connection duct or screened protection).

Before starting, check the following points:

- Make sure that the device does not contain any foreign body.
- Make sure that all the components are attached in their original placements.
- Check manually that the fans do not rub or are not blocked.
- Check the earthing connection.
- Make sure that the access doors are properly closed.
- Make sure the mains voltage corresponds to the voltage indicated on the specifications plate of the unit.

The CE mark and the corresponding declaration of conformity are proof of the product's conformity with current EU regulations.

3. GENERAL INSTRUCTIONS

3.1. ACCEPTANCE-STORAGE

In case of missing, non-conforming, or totally or partially damaged delivered products, the Purchaser must make written reservation on the transporter's receipt and confirm them within seventy-two (72) hours by sending a recommended letter to the transporter, as well as a copy to S&P. Acceptance of the equipment without any reservation will deprive the Purchaser of any subsequent recourse against us. The product must be stored in an area protected from bad weather, shocks and stains due to splashing or splatterings of any kind during its transport from the supplier to the end customer and onto the worksite before installation.

3.2. APPLICATION

The SLIM heat recovery units are designed for double flow air ventilation and air treatment applications in public and private buildings:

- Indoor installation.
- Outdoor air operating temperature limits (with preheater): -20°C / +40°C.

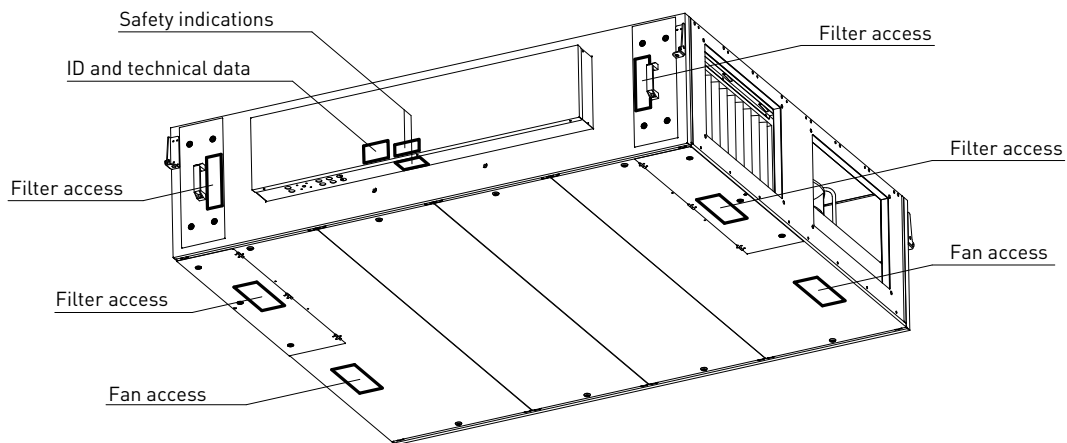


- Outdoor air operating temperature limits (without preheater): -10°C / +40°C.
- To avoid electronic damages the main switch has to be always «ON», except during maintenance.
- Relative humidity: max 95% non-condensing.
- Atmosphere not potentially explosive.
- Atmosphere with low salt content, without corrosive chemical agents.

3.3. WARRANTY

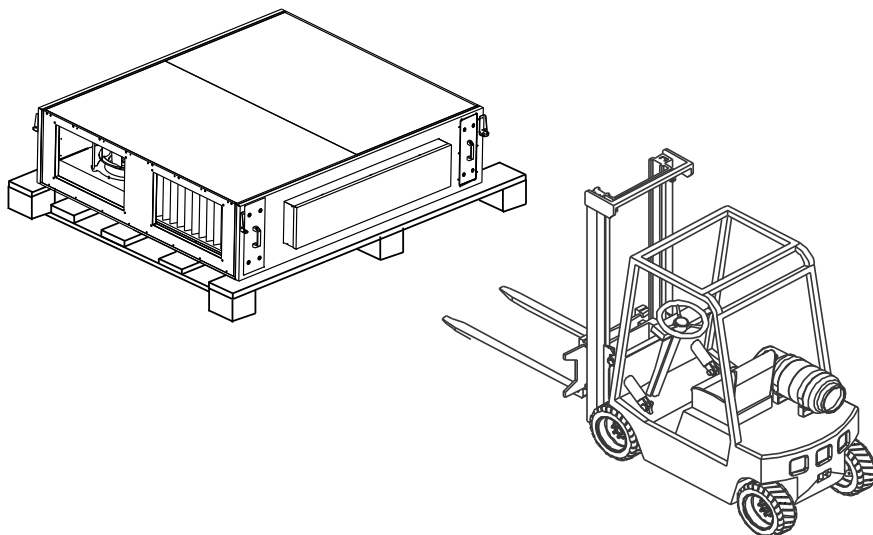
The equipment is guaranteed for 24 months from the invoice date. The warranty is limited to the replacement of parts or equipment whose operation is recognized as defective by the maker, excluding any compensation or penalties. The costs of labour, removal and rest, travel related to the replacement are the responsibility of the Customer. Excluded from our warranty are defects linked to abnormal use or not in accordance with the recommendations in our instructions, defects observed as a result of normal wear and tear, incidents caused by negligence, lack of monitoring or maintenance, defects due to incorrect installation of devices or poor storage conditions prior to assembly. In any case, maker is not responsible for transformed material, even partially repaired.

4. UNIT LABELLING



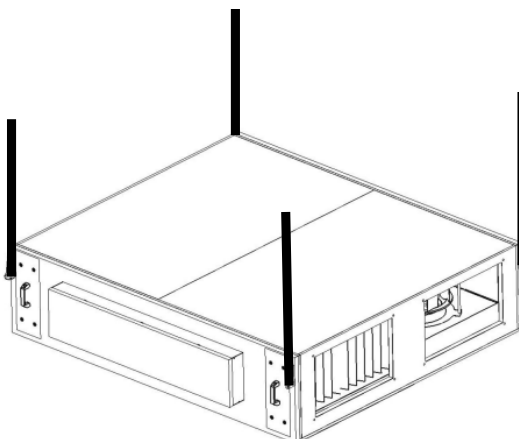
5. HANDLING

SLIM units are delivered fixed with screws to the pallets. The unit can be handled by a pallet transporter, a forklift, or a crane. The handling machines will be adapted to the load and the lifting conditions. In all cases, the lifting will be done at the device's base. The centre of gravity is located at the centre of the unit. The device must be carefully manipulated only in the horizontal position.

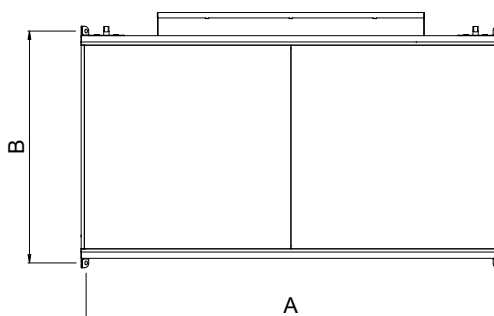


6. INSTALLATION

These models are designed to be installed hanging from the ceiling or located behind a false ceiling. It is mandatory to distribute the unit weight between the 4 supports existing in the units:



Using studded rods ($\varnothing 8$ mm x 4), it can be secured to the ceiling and levelled:



Distance between supports (mm):

Model	A	B
SLIM 800	1652	1124
SLIM 1200	1652	1604
SLIM 1600	1652	1804
SLIM 2000	1952	1804

The installer must ensure that the ceiling structure and the securing elements can bear the weight of the device, taking into account that it is a dynamic load. To prevent the transmission of vibrations, it is necessary that the installer use specific isolation elements such as anti-vibrations elements and flexible connection between the unit and the ducts.

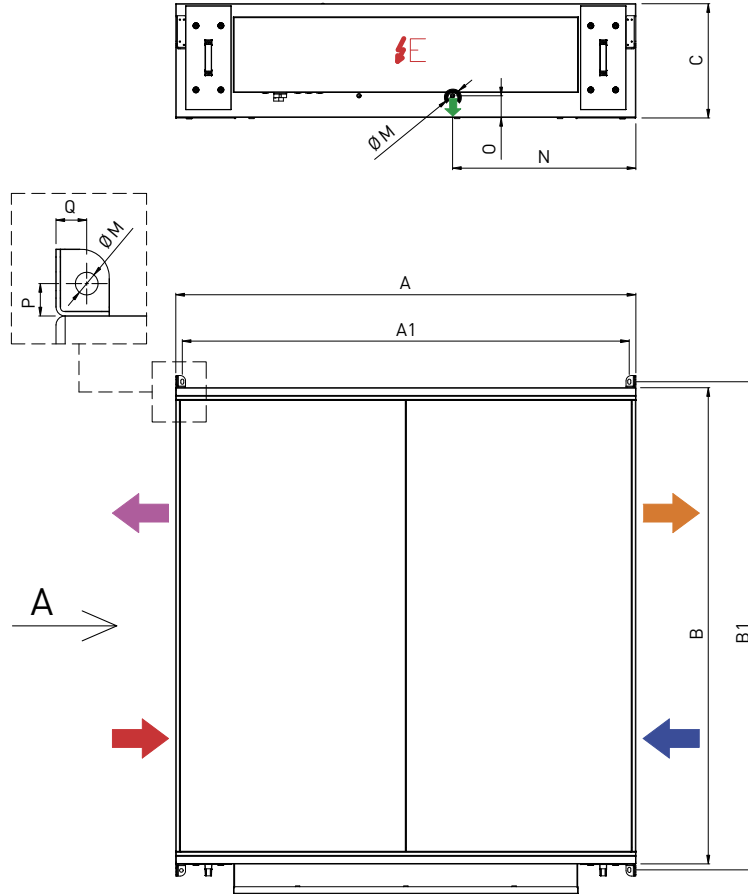
Model	Weight (kg)	Recommended antivibration hangers KIT*	Recommended flexible connection
SLIM 800	172	5130064900 KIT AM COMPACT/SLIM	5132810200 IAE-200
SLIM 1200	231	5130064900 KIT AM COMPACT/SLIM	5132811000 IAE-225
SLIM 1600	266	5130064900 KIT AM COMPACT/SLIM	5132813600 IAE-285
SLIM 2000	315	5130064900 KIT AM COMPACT/SLIM	5132814400 IAE-315

* These KITS include 4 x anti-vibrations pads.

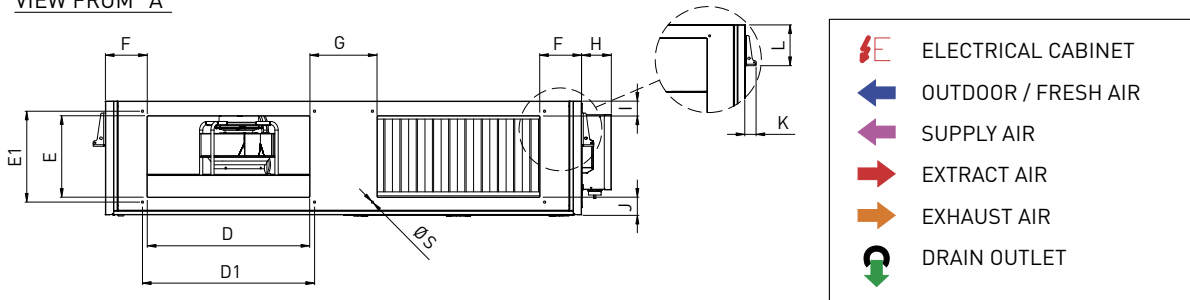
7. DIMENSIONS

7.1. MAIN UNIT DIMENSIONS

SLIM L (Left hand version)



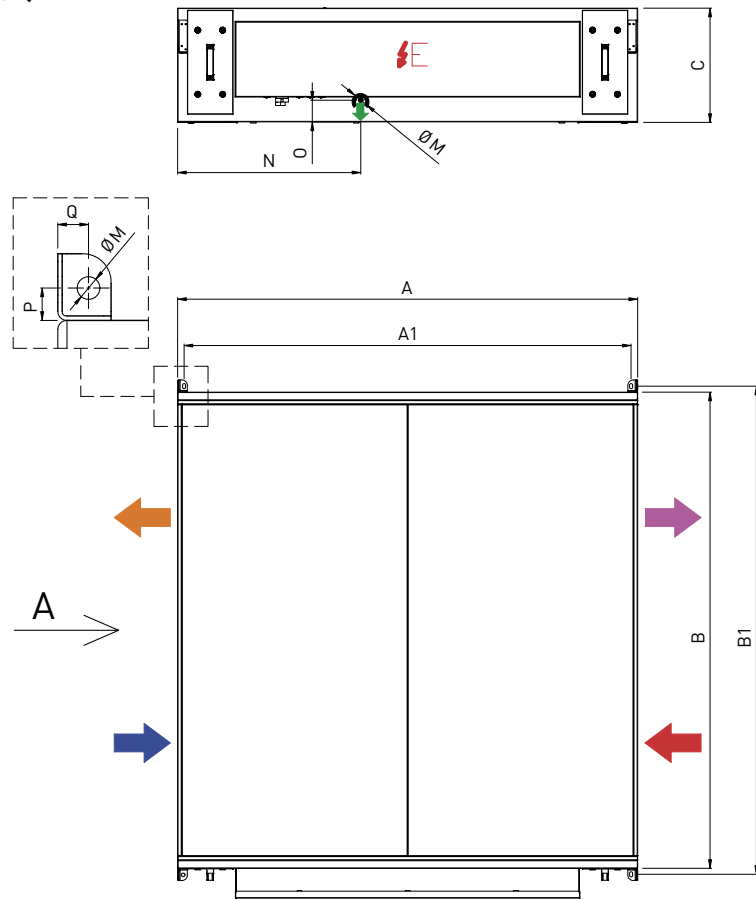
VIEW FROM "A"



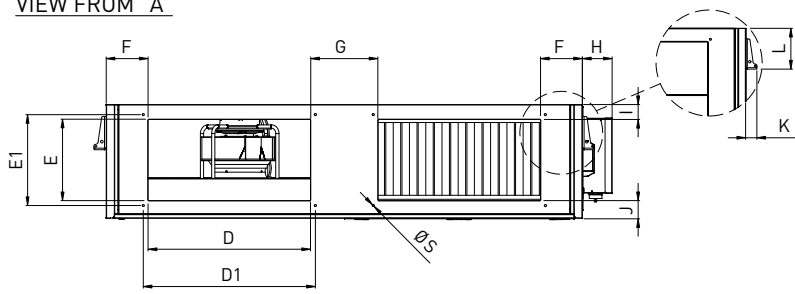
Module	A	A1	B	B1	C	D	D1	E	E1	F	G	H
SL-800	1700	1659	1080	1130	380	400	420	200	220	85	110	110
SL-1200	1700	1659	1560	1610	380	500	520	250	270	155	250	110
SL-1600	1700	1659	1760	1810	420	600	620	300	320	155	250	110
SL-2000	2000	1953	1760	1810	500	600	620	350	370	155	250	110

Module	I	J	K	L	M	N	O	P	Q	R	S
SL-800	55	125	45	167	8	685	80	22	14,4	17	M8
SL-1200	55	75	45	167	8	685	80	22	14,4	17	M8
SL-1600	55	65	45	167	8	677	80	22	14,4	17	M8
SL-2000	55	95	45	167	8	785	86	22	14,4	17	M8

SLIM R (Right hand version)



VIEW FROM "A"

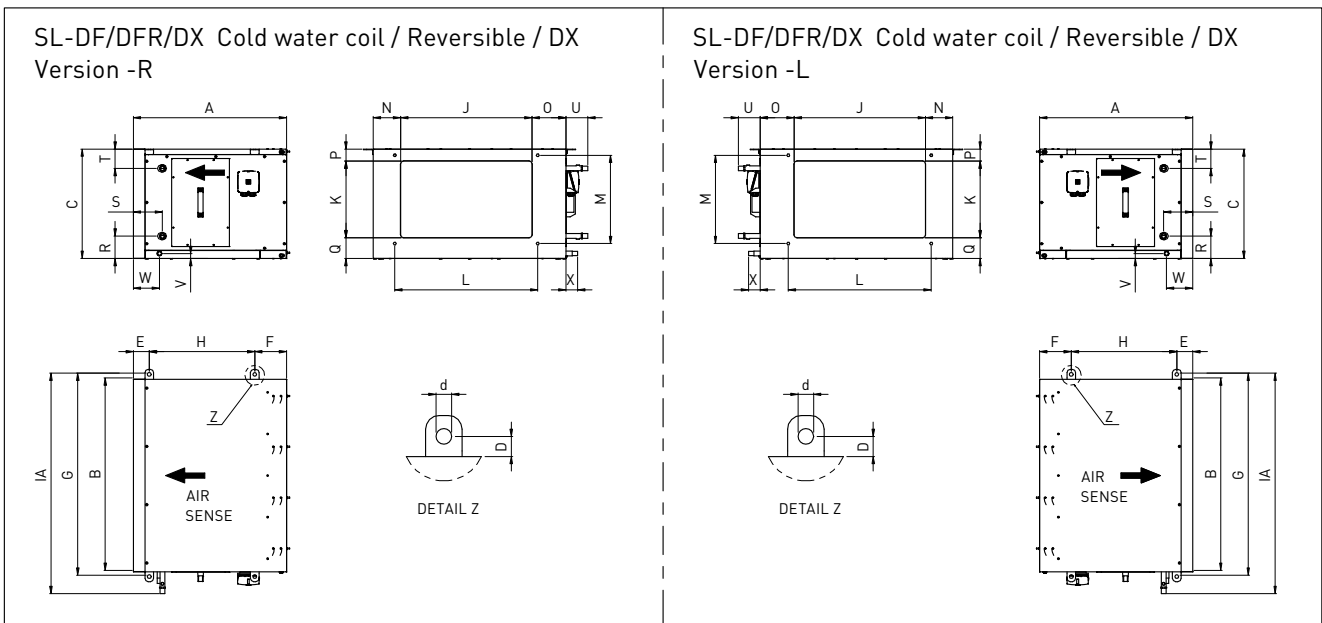
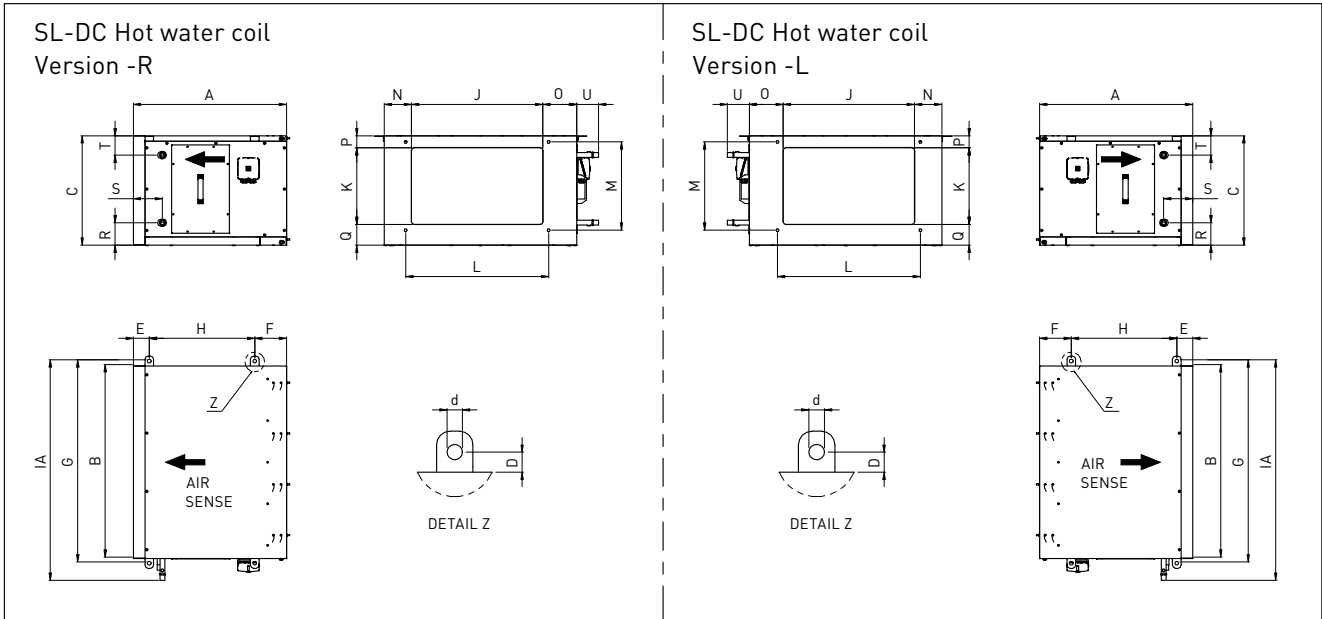


- ELECTRICAL CABINET
- OUTDOOR / FRESH AIR
- SUPPLY AIR
- EXTRACT AIR
- EXHAUST AIR
- DRAIN OUTLET

Module	A	A1	B	B1	C	D	D1	E	E1	F	G	H
SL-800	1700	1659	1080	1130	380	400	420	200	220	85	110	110
SL-1200	1700	1659	1560	1610	380	500	520	250	270	155	250	110
SL-1600	1700	1659	1760	1810	420	600	620	300	320	155	250	110
SL-2000	2000	1953	1760	1810	500	600	620	350	370	155	250	110

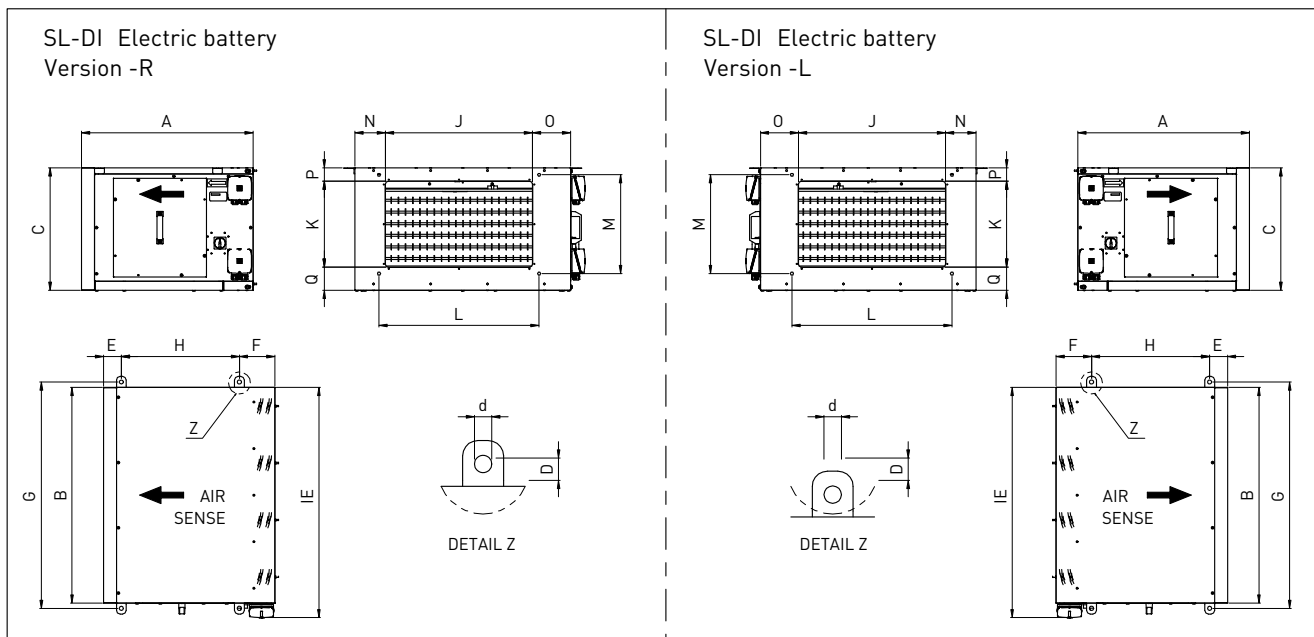
Module	I	J	K	L	M	N	O	P	Q	R	S
SL-800	55	125	45	167	8	685	80	22	14,4	17	M8
SL-1200	55	75	45	167	8	685	80	22	14,4	17	M8
SL-1600	55	65	45	167	8	677	80	22	14,4	17	M8
SL-2000	55	95	45	167	8	785	86	22	14,4	17	M8

7.2. EXTERNAL MODULES DIMENSIONS



Module	A	B	C	d	D	E	F	G	H	IA	J	K	L
SL-800	700	540	380	17	22	73	145	584	482	685	400	200	420
SL-1200	700	780	380	17	22	73	145	824	482	925	500	250	520
SL-1600	700	880	420	17	22	73	145	924	482	1025	600	298	620
SL-2000	700	880	500	17	22	73	145	924	482	1025	600	350	620

Module	M	N	O	P	Q	R	S	T	U	V	W	X
SL-800	220	55	85	55	125	107,6	133	88,4	100	22,7	119,8	54
SL-1200	270	125	155	55	75	107,6	133	88,4	100	22,7	119,8	54
SL-1600	320	125	155	55	67	97,6	133	88,4	100	22,7	119,8	54
SL-2000	370	125	155	55	95	102,6	133	88,4	100	22,7	119,8	54



Module	A	B	C	d	D	E	F	G	H	IE	J	K	L	M	N	O	P	Q
SL-800	700	540	380	17	22	73	145	584	482	645	400	200	420	220	55	85	55	125
SL-1200	700	780	380	17	22	73	145	824	482	885	500	250	520	270	125	155	55	75
SL-1600	700	880	420	17	22	73	145	924	482	985	600	298	620	320	125	155	55	67
SL-2000	700	880	500	17	22	73	145	924	482	985	600	350	620	370	125	155	55	95

8. CONDENSATE PUMP - DRAINAGE SYSTEM

By default, SLIM units are delivered with an integrated silent running centrifugal pump. The pump will activate automatically when the level of condensate grows over a set point.

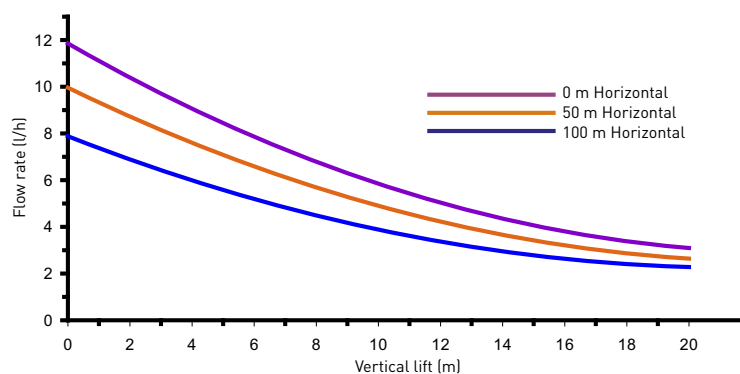
If there is any problem related with the condensates drainage (defective pump, maximum level of condensates reached, etc.) unit will display an alarm in the external touch display. The unit will stop working in case of major failure.

The condensate pump is available as a spare and very easy to replace (it is located inside the drainage tray). Look for the spare part code of the condensate pump in section "34.2. Spare parts list".

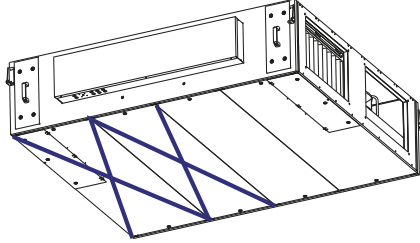
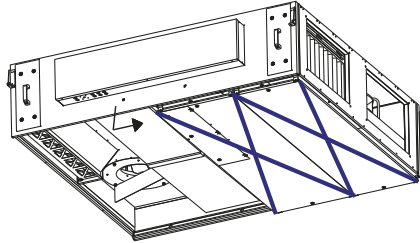
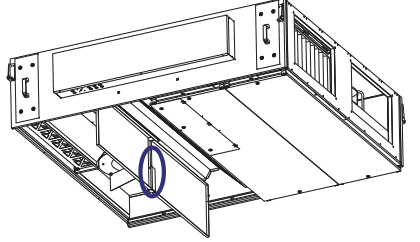
Main characteristics:

- Electronic Energy Control System (EECS) with alarm circuit. All electronic components are encapsulated to protect them from moisture.
- Max flow capacity: 12 l/h
- Max suction height: 1 m Max delivery height: 19,8 m Discharge tube: $\varnothing 6$ mm

Performance chart – condensate pump



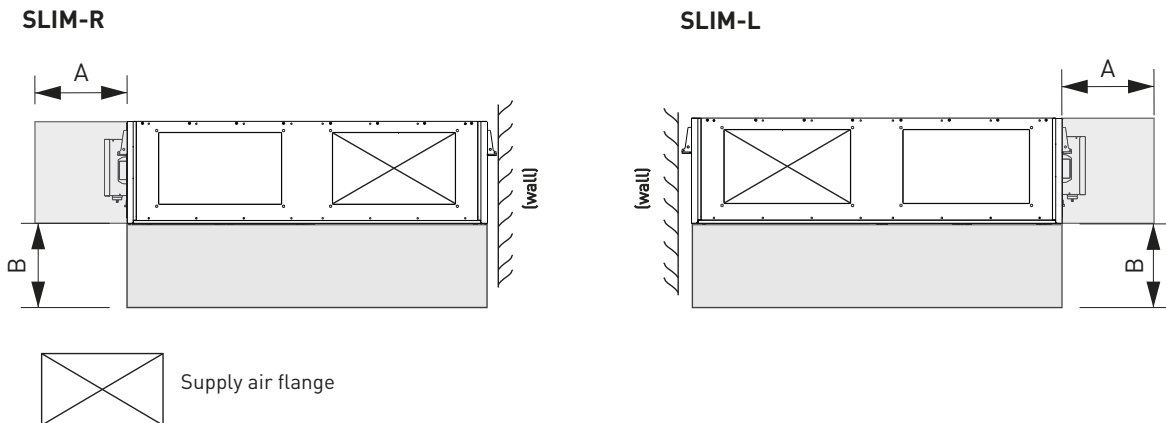
8.1. HOW TO REPLACE THE CONDENSATE PUMP

<p>1. Open the two sliding doors marked on the image</p>	<p>Outdoor duct connections</p>  <p>Indoor duct connections</p> <p>SLIM-R</p>
<p>2. Move the panels to access the condensate tray</p>	 <p>SLIM-R</p>
<p>3. Turn the condensate tray to find the condensate pump</p>	 <p>SLIM-R</p>

9. DIMENSIONS AND FREE-SPACE FOR MAINTENANCE

9.1. UNITS WITH NO EXTERNAL MODULE ASSEMBLED

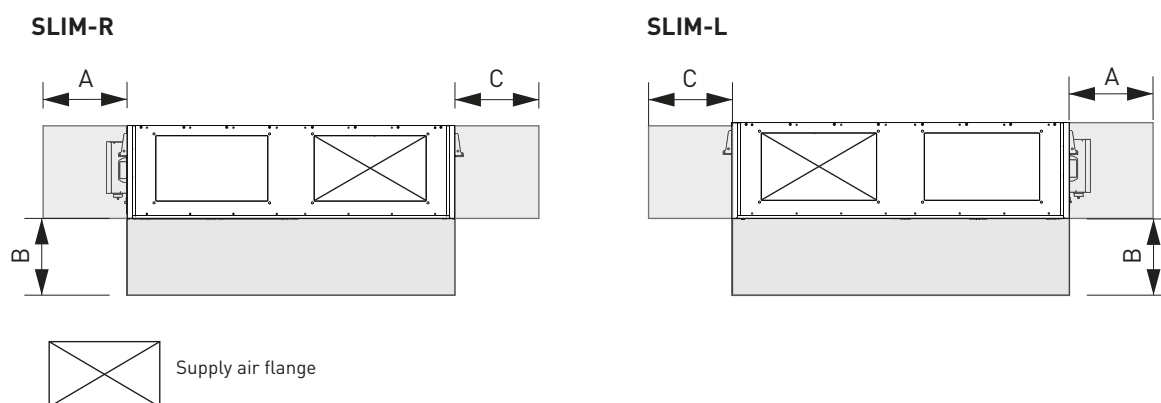
SLIM can be installed close to the wall as long as no external module has been assembled. Maintenance will in any case be done through bottom and side:



Model	A (electrical cabinet and filters)	B (heat exchanger, bypass, filters, condensate tray and motors)
SLIM 800	600	380
SLIM 1200	800	380
SLIM 1600	900	420
SLIM 2000	950	500

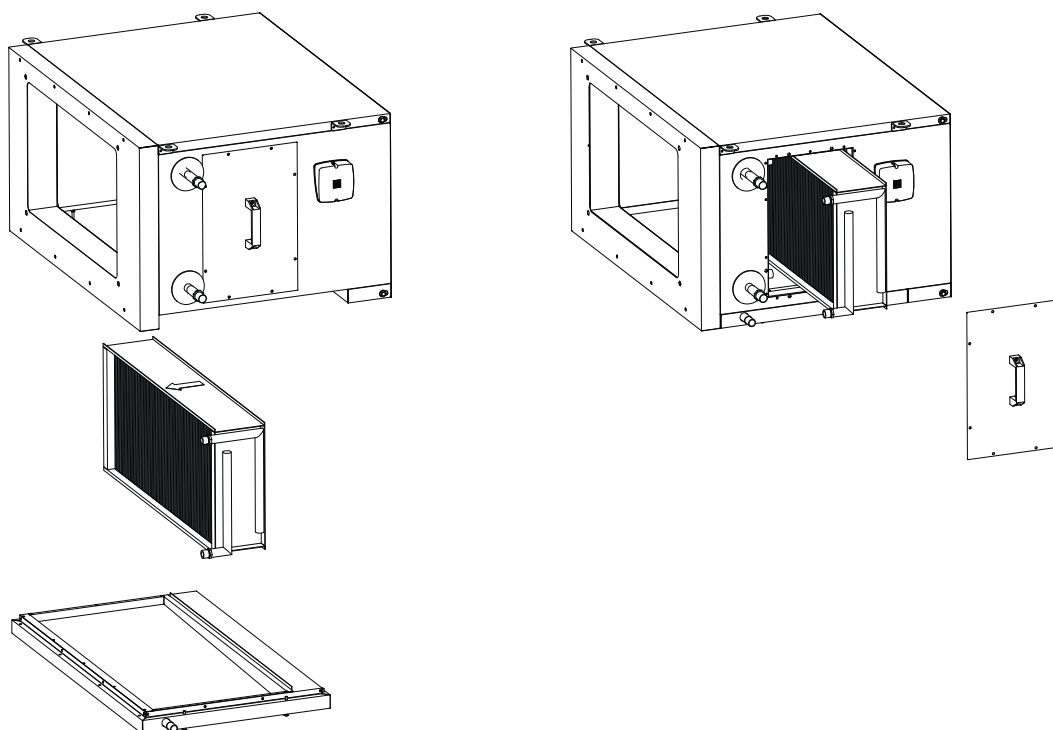
9.2. UNITS WITH EXTERNAL MODULE ASSEMBLED

In case an external module has been added to the air handling unit:



Model	A (electrical cabinet and filters)	B (core, bypass, filters, condensate tray and motors)	C* (hydraulic connections – external DX and water modules)	C (electrical connections – external DI modules)
SLIM 800	600	380	650	200
SLIM 1200	800	380	900	200
SLIM 1600	900	420	1000	200
SLIM 2000	950	500	1000	200

* The coils can be removed from the external modules through the lateral or the bottom. If the removal of the coils is expected to be done through the bottom, C dimension can be 500 mm for all sizes.



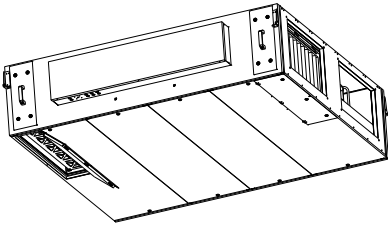
10. FILTER REPLACEMENT

The heat recovery unit is supplied within a F7 (ePM1 50%) filter in the supply side and M5 (ePM10 50%) filter in the extract side. There is no possibility to mount a second filter inside the unit.

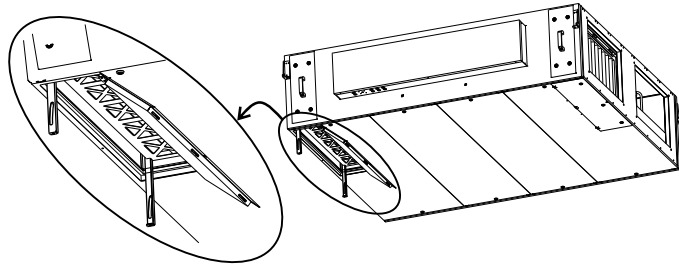
The supplied filters can be removed both from bottom (1) and side (2):

10.1. REMOVING THE FILTER THROUGH THE BOTTOM

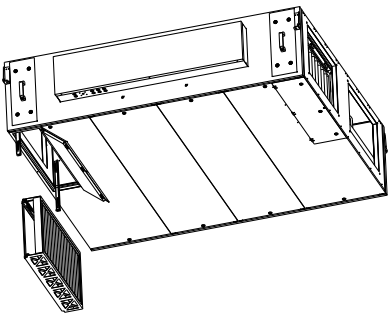
a) Open the specific hinged panel for filter replacement.



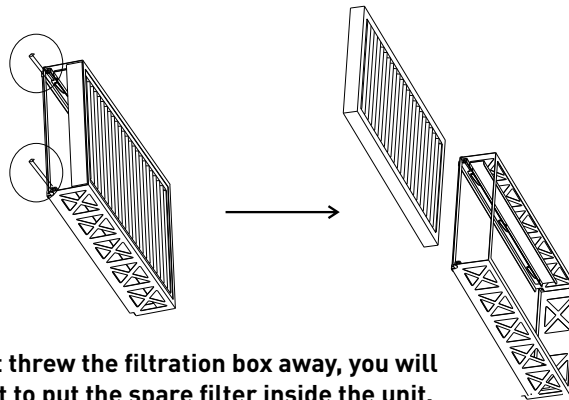
b) Push from the fixation pieces to loose the filtration box.



c) Remove the filtration box.



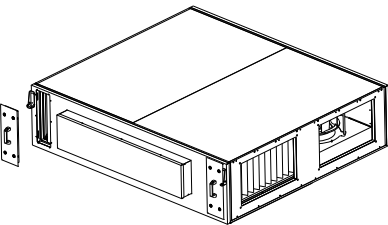
d) Remove the filter from the filtration box: first step is to push from the pieces that fix the filter to the box. Then, the filter will be liberated.



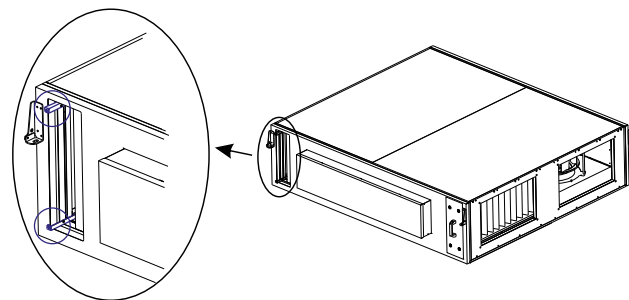
Do not throw the filtration box away, you will need it to put the spare filter inside the unit.

10.2. REMOVING THE FILTER THROUGH THE LATERAL

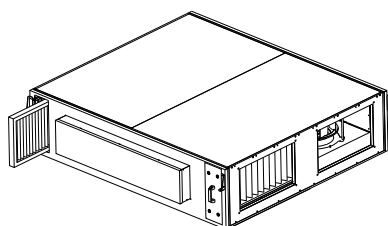
a) Remove the specific panel for filter replacement.



b) Push from the fixation pieces.



c) Remove the filter. The filtration box remains inside the unit.



11. RANGE SPECIFICATIONS

11.1. MAIN UNIT

Version without preheater

Model	Connection (mm)	Nominal airflow (m ³ /h)	Efficiency heat exchanger* (%)	Power supply	Max. abs. Power (kW)	Max. Current (A)	Weight (kg)
SLIM-800	400x200	800	92,4	1/230V, 50Hz	0,46	2,9	172
SLIM-1200	500x250	1200	92,4	1/230V, 50Hz	0,91	4,1	231
SLIM-1600	600x300	1600	91,7	1/230V, 50Hz	0,93	3,7	266
SLIM-2000	600x350	2000	93,8	1/230V, 50Hz	0,97	4,5	315

* EXT: -10°C @ 90%RH
INT: 20°C @ 50%RH

Version with integrated preheater

Model	Connection (mm)	Nominal airflow (m ³ /h)	Efficiency heat exchanger* (%)	Power supply	Max. abs. Power (kW)	Max. Current (A)	Weight (kg)
SLIM-800 PH	400x200	800	92,4	1/230V, 50Hz	2,66	12,9	176
SLIM-1200 PH	500x250	1200	92,4	1/230V, 50Hz	3,91	17,8	236
SLIM-1600 PH	600x300	1600	91,7	3/400V + N, 50Hz	6,93	12,8	273
SLIM-2000 PH	600x350	2000	93,8	3/400V + N, 50Hz	8,47	15,9	323

* EXT: -10°C @ 90%RH
INT: 20°C @ 50%RH

11.2. EXTERNAL BATTERIES

In this section the technical characteristics of the preheater and post-treatment modules are described. For further details see sections: "7.2. External modules dimensions", "30.1. Installation of an electrical preheater", and "30.2. Configuration of an electrical preheater".

11.2.1. External module - electrical post heaters

ELECTRIC POST-HEATER										
Type	Outdoor Air (ODA)	Indoor Air (ETA)	Supply Air (SUP1) before the coil	Supply power (kW)	Absorbed current (A)	Air		Supply Air (SUP2) after the coil (°C)	Voltage (V)	Weight (kg)
						Flow rate (m ³ /h)	Pressure drop (Pa)			
SL-DI 800 3 M				3	14	800	20	22	1/230V, 50Hz	34,5
SL-DI 1200 4 M	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	4	18	1200	20	20	1/230V, 50Hz	42
SL-DI 1600 7,5 T				7,5	34	1600	20	24	3/400V, 50Hz	51,6
SL-DI 2000 9 T				9	41	2000	20	24	3/400V, 50Hz	54,4

11.2.2. External module - hot water coils

HOT WATER COIL															
Type	Weight (without liquid) (kg)	Outdoor Air (ODA)	Indoor Air (ETA)	Supply Air (SUP1) before the coil	Water temp. (°C)	Heating Power (kW)	Supply Air (SUP2) after the coil	Air			Water			In/Out coil connection ø (")	Recommended 3 way valve
								Flow rate (m ³ /h)	Pressure drop (Pa)	Speed (m/s)	Flow (m ³ /h)	Pressure drop (kPa)	Intern volume coil (L)		
SL-DC 800 2	7,6	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	50/40	4,48	+27,3°C / 6,9%	800	59	2,96	0,4	11,50	0,4	1/2	5407037900 - 3WV DN15 KVS1 PROP 24V
					70/60	7,53	+38,3°C / 3,7%	800	59	2,96	0,7	27,85	0,4	1/2	5407038000 - 3WV DN15 KVS1,6 PROP 24V
SL-DC 1200 2	9,7	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	50/40	6,61	+27,1°C / 7%	1200	53	2,78	0,6	11,44	0,7	1/2	5407038000 - 3WV DN15 KVS1,6 PROP 24V
					70/60	11,32	+38,4°C / 3,7%	1200	53	2,78	1	30,03	0,7	1/2	5407038000 - 3WV DN15 KVS1,6 PROP 24V



Type	Weight (without liquid) (kg)	Outdoor Air (ODA)	Indoor Air (ETA)	Supply Air (SUP1) before the coil	Water temp. (°C)	Heating Power (kW)	Supply Air (SUP2) after the coil	Air			Water			In/Out coil connection ø (")	Recommended 3 way valve
								Flow rate (m³/h)	Pressure drop (Pa)	Speed (m/s)	Flow (m³/h)	Pressure drop (kPa)	Intern volume coil (L)		
SL-DC 1600 2	11,4	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	50/40	9,31	+28°C / 6,7%	1600	46	2,54	0,81	9,48	1	1/2	5407038100 - 3WV DN15 KVS2,5 PROP 24V
					70/60	15,73	+39,5°C / 3,5%	1600	46	2,54	1,4	23,98	1	1/2	5407038100 - 3WV DN15 KVS2,5 PROP 24V
SL-DC 2000 2	12,4	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	50/40	11,73	+28,1°C / 6,6%	2000	43	2,44	1,02	13,55	1,1	1/2	5407038100 - 3WV DN15 KVS2,5 PROP 24V
					70/60	19,83	+39,8°C / 3,4%	2000	43	2,44	1,73	34,54	1,1	1/2	5407038100 - 3WV DN15 KVS2,5 PROP 24V

11.2.3. External module - reversible water coils

REVERSIBLE WATER COIL FOR 2 PIPES INSTALLATION - HEATING MODE															
Type	Weight (without liquid) (kg)	Outdoor Air (ODA)	Indoor Air (ETA)	Supply Air (SUP1) before the coil	Water temp. (°C)	Heating Power (kW)	Supply Air (SUP2) after the coil	Air			Water			Coil connection ø (")	Recommended 3 way valve
								Flow rate (m³/h)	Pressure drop (Pa)	Speed (m/s)	Flow (m³/h)	Pressure drop (kPa)	Volume coil (L)		
SL-DFR 800 3	8,4	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	50/40	4,28	+26,6°C / 7,2%	800	63	2,96	0,4	14,18	0,6	1/2	5407037900 - 3WV DN15 KVS1 PROP 24V
					70/60	7,04	+36,6 / 4,1%	800	63	2,96	0,6	32,72	0,6	1/2	5407037900 - 3WV DN15 KVS1 PROP 24V
SL-DFR 1200 3	10,8	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	50/40	7,17	+28,4 / 6,5%	1200	61	2,78	0,62	12,50	1	1/2	5407038000 - 3WV DN15 KVS1,6 PROP 24V
					70/60	11,77	+39,4 / 3,5%	1200	61	2,78	1,03	28,29	1	1/2	5407038000 - 3WV DN15 KVS1,6 PROP 24V
SL-DFR 1600 3	12,6	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	50/40	9,23	+27,8°C / 6,7%	1600	52	2,54	0,8	4,42	1,3	3/4	5407038200 - 3WV DN20 KVS4 PROP 24V
					70/60	15,61	+39,3°C / 3,5%	1600	52	2,54	1,4	11,13	1,3	3/4	5407038200 - 3WV DN20 KVS4 PROP 24V
SL-DFR 2000 3	13,7	-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	50/40	11,68	+28°C / 6,7%	2000	49	2,44	1	5,90	1,7	3/4	5407038200 - 3WV DN20 KVS4 PROP 24V
					70/60	19,75	+39,6°C / 3,4%	2000	49	2,44	1,7	15,06	1,7	3/4	5407038200 - 3WV DN20 KVS4 PROP 24V

REVERSIBLE WATER COIL FOR 2 PIPES INSTALLATION - COOLING MODE															
Type	Weight (without liquid) (kg)	Outdoor Air (ODA)	Indoor Air (ETA)	Supply Air (SUP1) before the coil	Water temp. (°C)	Cooling Power (kW)	Supply Air (SUP2) after the coil	Air			Water			Coil connection ø (")	Recommended 3 way valve
								Flow rate (m³/h)	Pressure drop (Pa)	Speed (m/s)	Flow (m³/h)	Pressure drop (kPa)	Volume coil (L)		
SL-DFR 800 3	8,4	+35°C / 40%	+26°C / 50%	+28°C / 60%	7/12	3,41	+21°C / 79%	800	85	2,96	0,6	38,07	0,6	1/2	5407037900 - 3WV DN15 KVS1 PROP 24V
SL-DFR 1200 3	10,8				7/12	5,8	+20°C / 82%	1200	84	2,78	1	34,67	1	1/2	5407038000 - 3WV DN15 KVS1,6 PROP 24V
SL-DFR 1600 3	12,6				7/12	6,76	+21°C / 79%	1600	71	2,54	1,2	9,98	1,3	3/4	5407038200 - 3WV DN20 KVS4 PROP 24V
SL-DFR 2000 3	13,7				7/12	8,58	+20°C / 80%	2000	67	2,44	1,5	13,32	1,7	3/4	5407038200 - 3WV DN20 KVS4 PROP 24V

11.2.4. External module - cold water coils

CHILLED WATER COIL															
Type	Weight (without liquid) (kg)	Outdoor Air (ODA)	Indoor Air (ETA)	Supply Air (SUP1) before the coil	Water temp. (°C)	Cooling Power (kW)	Supply Air (SUP2) after the coil	Air			Water			Coil connection ø (")	Recommended 3 way valve
								Flow rate (m³/h)	Pressure drop (Pa)	Speed (m/s)	Flow (m³/h)	Pressure drop (kPa)	Volume coil (L)		
SL-DF 800 5	10,5				7/12	4,76	+18°C / 86%	800	146	2,96	0,8	30,86	1	1/2	5407038000 - 3WV DN15 KVS1,6 PROP 24V
SL-DF 1200 5	13,7	+35°C / 40%	+26°C / 50%	+28°C / 60%	7/12	8,3	+16°C / 89%	1200	143	2,78	1,4	30,86	1,6	1/2	5407038100 - 3WV DN15 KVS2,5 PROP 24V
SL-DF 1600 5	15,8				7/12	10,85	+17°C / 88%	1600	114	2,54	1,9	36,97	2,3	1/2	5407038100 - 3WV DN15 KVS2,5 PROP 24V
SL-DF 2000 5	17,3				7/12	13,78	+17°C / 88%	2000	107	2,44	2,4	38,63	3	3/4	5407038200 - 3WV DN20 KVS4 PROP 24V

11.2.5. External module - DX coils

DIRECT EXPANSION COIL																	
Type	Weight (empty) (kg)	Outdoor Air (ODA)	Extract Air (ETA)	Supply Air (SUP1) before the coil	Cooling mode 7°C EVAP. R-410A Refrigerant*				Heating mode 39°C COND. R-410A Refrigerant*				Air			Volume coil (L)	Liquid/gas connection
					Cooling power (kW)	(kg/h)	(kPa)	Supply Air (SUP2) after the coil	Heating power (kW)	(kg/h)	(kPa)	Supply Air (SUP2) after the coil	Flow rate (m³/h)	Pressure drop (Pa)	Speed (m/s)		
SL-DX 800 4	9,7	+35°C / 40%	+26°C / 50%	+28°C / 60%	4,48	91,7	11,93	+18°C / 89%	-	-	-	-	800	133	2,9	0,8	1/2"
		-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	-	-	-	-	4,42	81,2	5,28	+27°C / 7%					
SL-DX 1200 4	12,7	+35°C / 40%	+26°C / 50%	+28°C / 60%	7,38	150,9	16,47	+17°C / 90%	-	-	-	-	1200	131	2,8	1,2	1/2"
		-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	-	-	-	-	7,17	131,6	6,47	+28°C / 7%					
SL-DX 1600 4	15,5	+35°C / 40%	+26°C / 50%	+28°C / 60%	8,43	172,4	11,11	+18°C / 91%	-	-	-	-	1600	118	2,5	1,7	1/2"
		-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	-	-	-	-	8,79	161,5	4,01	+27°C / 7%					
SL-DX 2000 4	16,6	+35°C / 40%	+26°C / 50%	+28°C / 60%	11,55	236,4	22,72	+18°C / 90%	-	-	-	-	2000	104	2,44	2,3	1/2"
		-10°C / 90%	+20°C / 50%	+11,2°C / 19,3%	-	-	-	-	11,59	212,9	7,73	+28°C / 7%					

* Subcooling: 0°C; Overheating: 5°C

11.3. ELECTRICAL PREHEATERS (delivered as accessories)

The SLIM PH is a version equipped with built-in preheater from factory. In units ordered without preheater it is also possible to add the preheater on site.

ELECTRIC PRE-HEATER						
Type	Supply power (kW)	Absorbed current (A)	Voltage (V)	Air		Weight (kg)
				Flow rate (m³/h)	Pressure drop (Pa)	
SL-PH 800 2,2 M	2,2	10	1/230V, 50Hz	800	20	1,8
SL-PH 1200 3 M	3	14	1/230V, 50Hz	1200	20	3,6
SL-PH 1600 6 T	6	9	3/400V, 50Hz	1600	15	5,4
SL-PH 2000 7,5 T	7,5	11,4	3/400V, 50Hz	2000	15	7,2

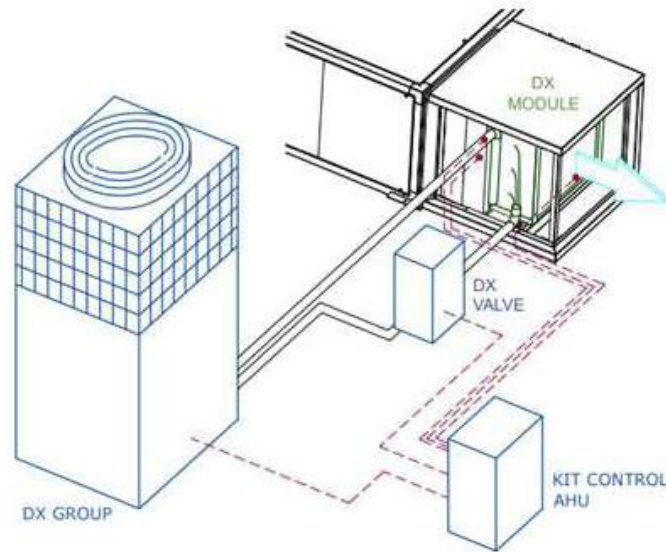
12. INTEGRATION IN “DX” DIRECT EXPANSION SYSTEMS

The SLIM controller does not allow to control the components of the refrigeration circuit. It is essential to provide the rest of components of the refrigeration circuit (not supplied by S&P) such as:

- Refrigeration condensing unit (compressor-condenser)
- DX direct expansion valves
- DX system control

With regard to the selection of components, verify the following:

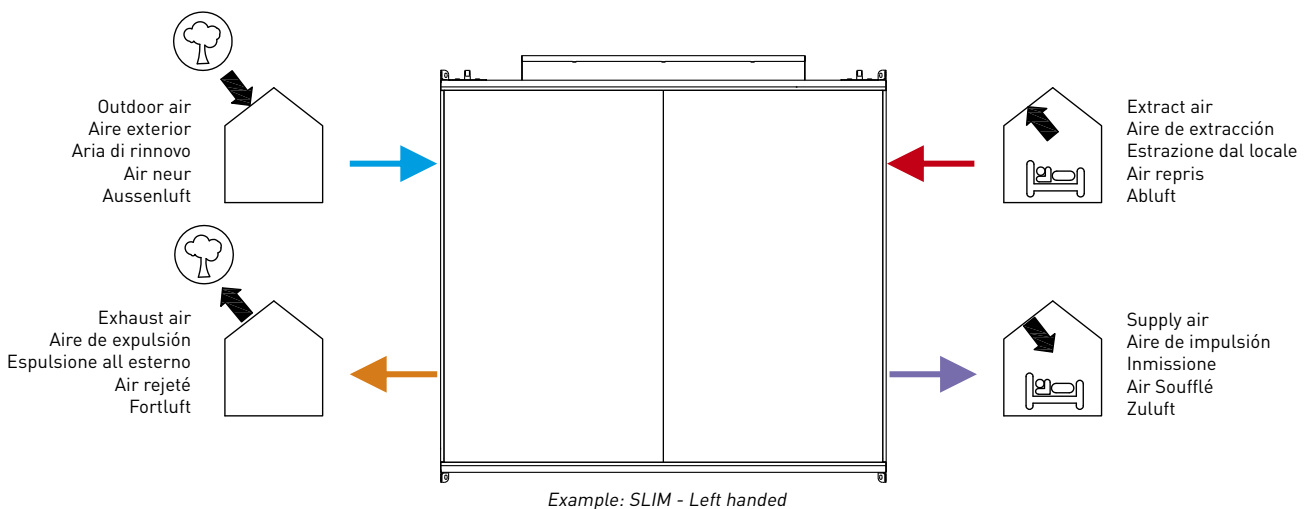
- The condensing unit allows to obtain the required thermal capacity by the DX coil, considering the real working conditions (Temperature and ambient relative humidity and evaporation temperature considered).
- DX coil pressure drop as well as internal coil volume are compatibles with the KIT DX VALVE (not supplied by S&P) and the refrigeration condensing unit.



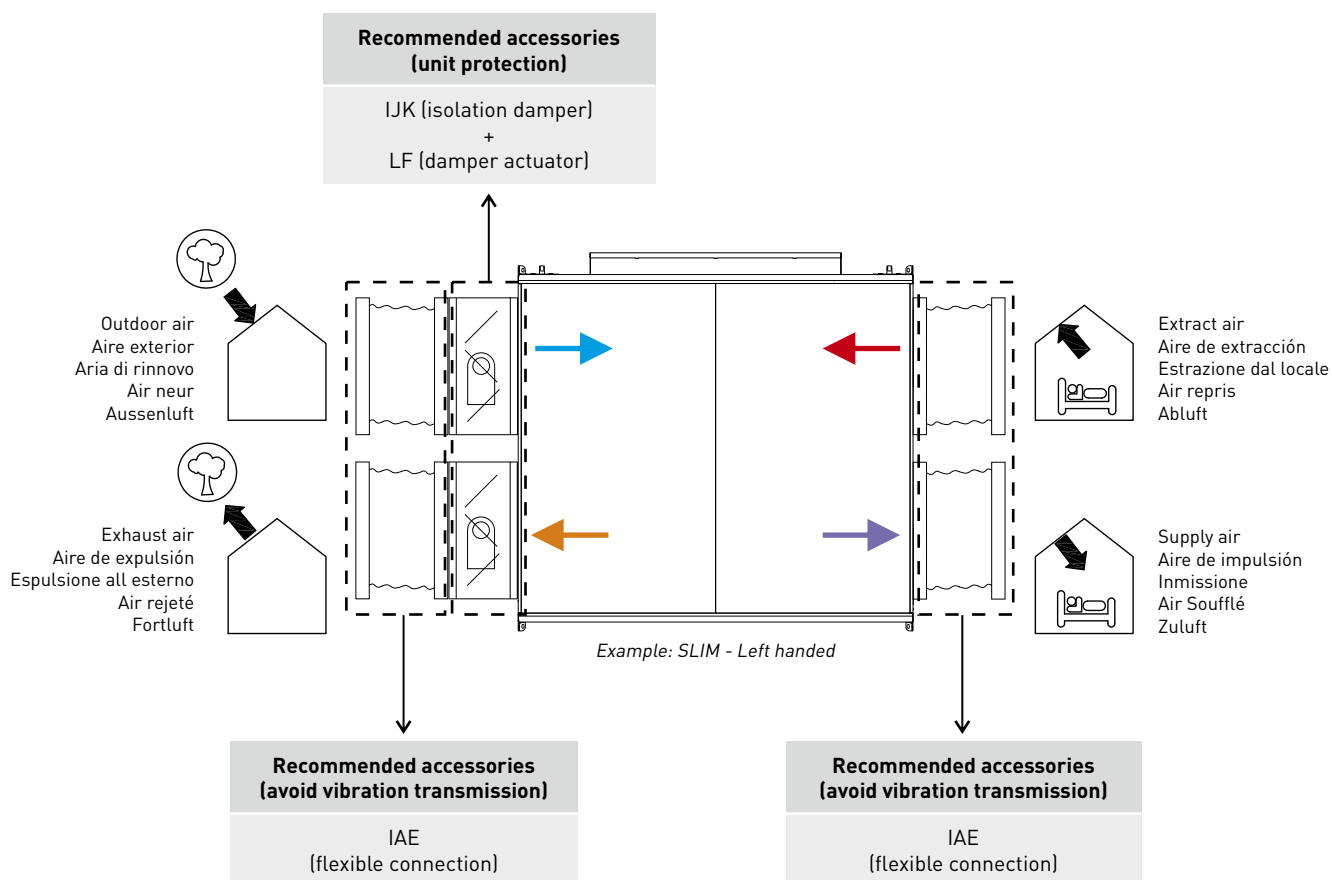
13. DUCTS AND PIPING CONNECTIONS

13.1. CONNECTION WITH AIR DUCT

Before making the ductwork connections, identify the labels in each inlet/outlet of the heat recovery unit.



13.1.1. Schematic air duct connection (example)



13.1.2. Isolation dampers (accessory)

We strongly recommend to install isolation dampers in the outdoor air connections in order to protect the unit in winter, during the night or during periods of prolonged unit stoppage. When talking about the indoor air connections, if the ductwork is expected to pass through cold areas, it must be isolated.

Model	Isolation damper	Actuator (spring return)
SLIM 800 L	5416743800 IJK-200	5416762900 LF-230 S
SLIM 800 R		
SLIM 1200 L	5416743900 IJK-225	5416762900 LF-230 S
SLIM 1200 R		
SLIM 1600 L	5416744100 IJK-285	5416762900 LF-230 S
SLIM 1600 R		
SLIM 2000 L	5416744200 IJK-315	5416762900 LF-230 S
SLIM 2000 R		

13.1.3. Flexible connections (accessory)

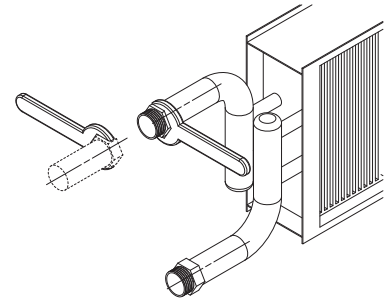
Flexible connections are strongly recommended to avoid vibration transmission to the ductwork. Find the flange dimensions and the recommended flexible-connection in the table below:

Model	Flange dimensions (mm)	Recommended flexible connection
SLIM 800	400 x 200	(4x) 5132810200 IAE-200
SLIM 1200	500 x 250	(4x) 5132811000 IAE-225
SLIM 1600	600 x 300	(4x) 5132813600 IAE-285
SLIM 2000	600 x 350	(4x) 5132814400 IAE-315



13.2. CONNECTION WITH COIL PIPING

- When connecting a coil to the water network:
 - Maximum pressure: 10 bar
 - Maximum temperature: 100°C
 - Minimum water temperature: -20°C (with the addition of the corresponding antifreeze)
- SLIM coils have threaded connections. Secure the coil manifold with the appropriate tool when tightening the threads. This will prevent the force from being transmitted to the manifold, damaging it.
- The following table indicates the size and type of thread used on each coil model:



Model/size	SL-DC (Heating water coil)	SL-DFR (Reversible water coil)	SL-DF (Chilled water coil)	SL-DX (Direct expansion coil)
800	1/2"	1/2"	1/2"	1/2"
1200	1/2"	1/2"	1/2"	1/2"
1600	1/2"	3/4"	1/2"	1/2"
2000	1/2"	3/4"	3/4"	1/2"

- To ensure the good behaviour of the installation, it is essential that the installation includes the following elements:
 - Unit intake pre-filter which traps suspended particulate matter.
 - Bleed valves should be fitted at each of the high points in the installation.
 - Self-filling valve to keep the appropriate water level.
 - Pressure switch to detect the lack of water pressure.
 - Shut-off valves must be installed at each connection on the water line to allow the unit to be isolated if necessary (allowing filters cleaning, reparations and maintenance tasks) the need to completely drain the water circuit.
 - Anti-vibration devices should be installed at the inlet and outlet from the unit to prevent the transmission of vibrations that could damage the heat exchanger coil due to excess stress on the circuits.
- Once the installation is performed check that the heating water flow is adequate.

14. ELECTRICAL CONNECTIONS

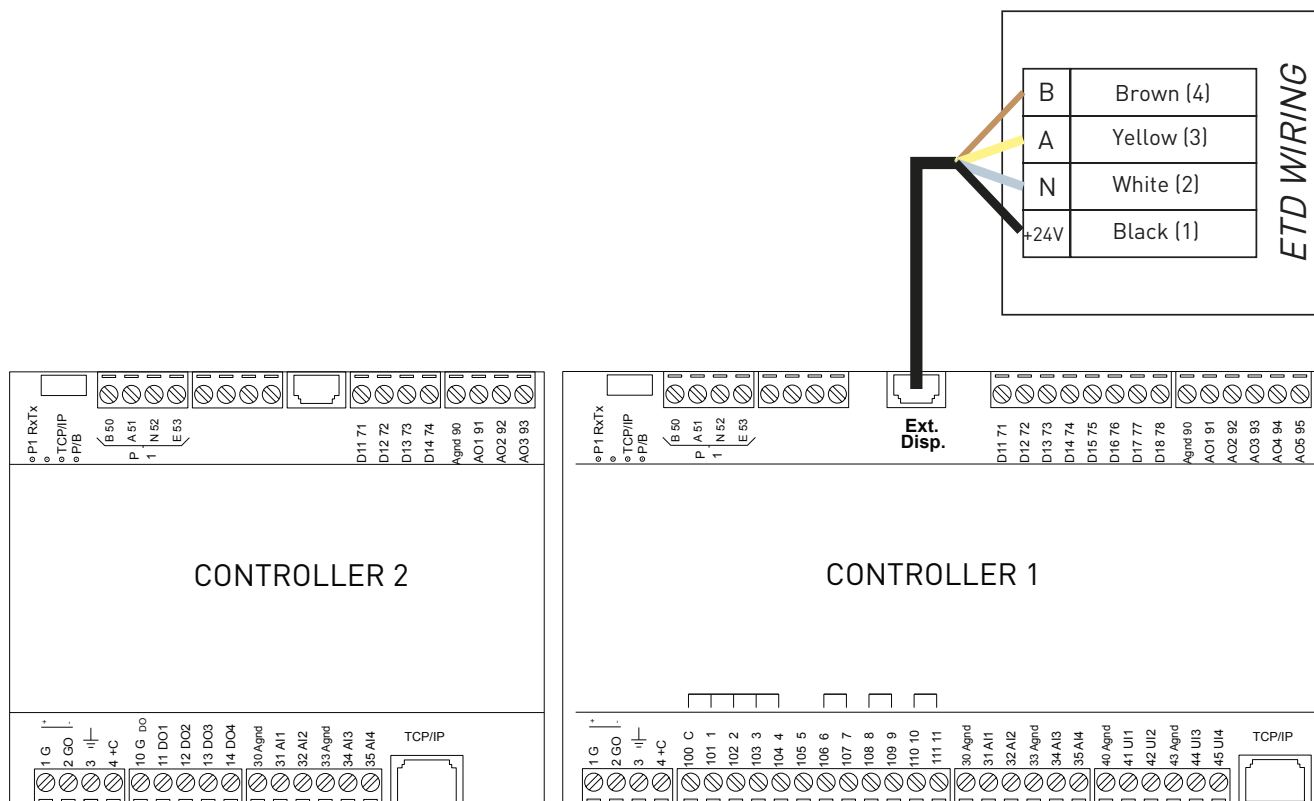
All components integrated in the device are electrically wired into the electrical cabinet (fans, pressure transmitters, pressure switches, temperature probes and by-pass damper).

The electrical connection is then limited to the connection of the external display (10 m. of supplied cable) and possible electrical accessories such as CO2 sensors or control valves for water coils, and finally the connection of the power supply line.

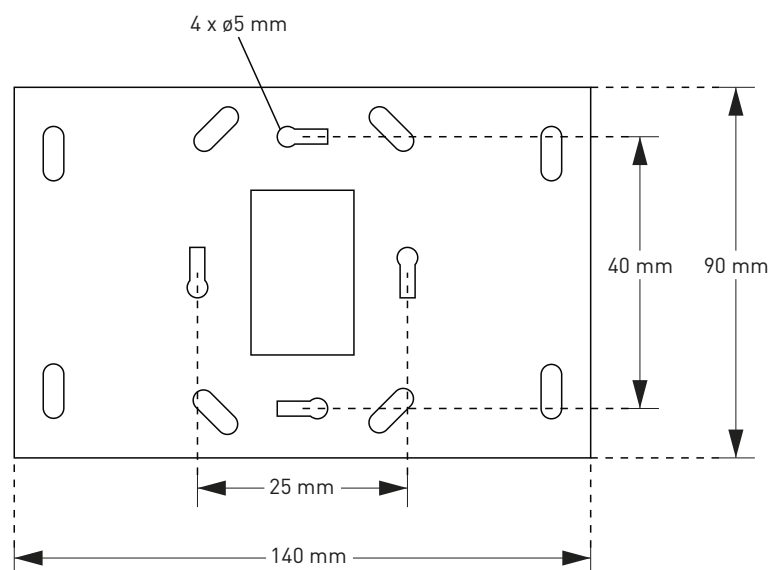
Make electrical connection in accordance to the described in the corresponding wiring diagram.

14.1. EXTERNAL TOUCH DISPLAY (ETD) CONNECTION

The ETD must be connected to the controller with a 4 wires **shielded twisted-wire** pair cable of 100 m max length. Delivered with the unit cable of 10 m length. 4P4C connector is reserved for ETD. Inside the electrical cabinet there are two controllers. Find how to connect the ETD here:

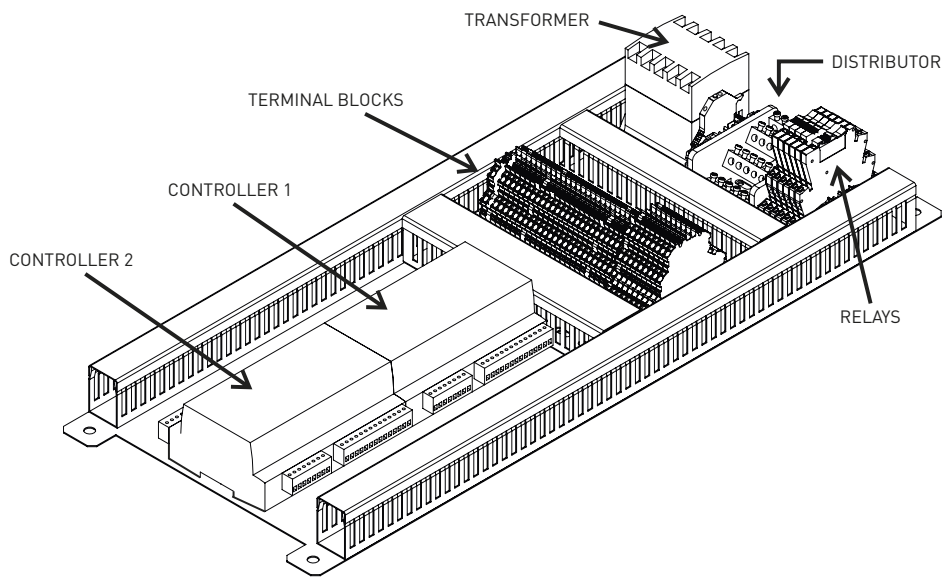


The ETD has an electrical protection IP-20 degree, so it is reserved exclusively for an indoor usage sheltered from moisture. The ETD is delivered within a wall fixation support, find the fixation support dimensions below:



14.2. CORRIGO CONTROLLERS

14.2.1. External electrical box - composition



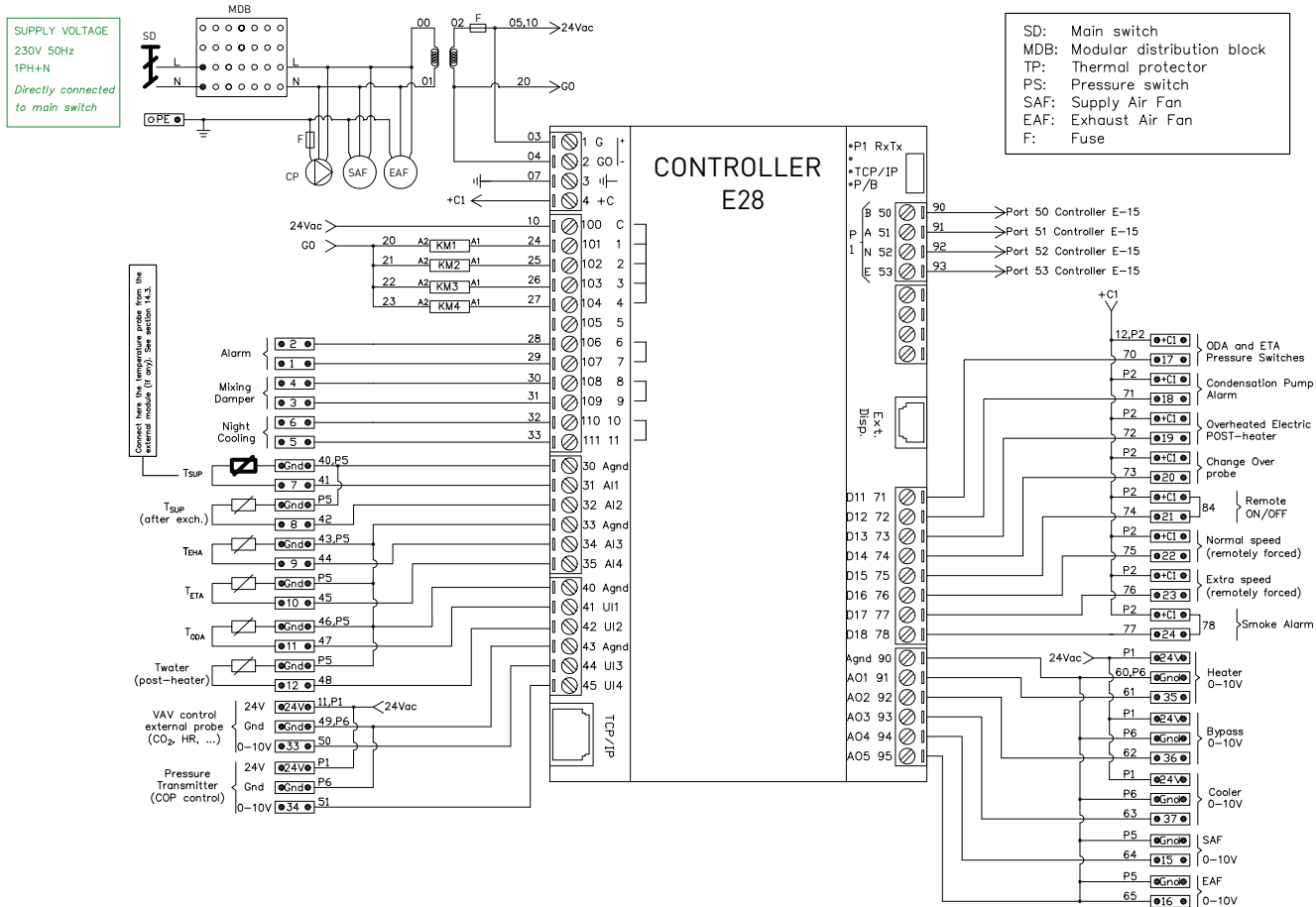
Notes

- Terminal blocks: Terminals in which the installer has to carry out with the connections (see section "14.4. External components connection drawings (examples)").
- Transformer to 24V (controllers supply).
- Relays: Informative digital outputs (see section "14.3.5. Inputs & Outputs").

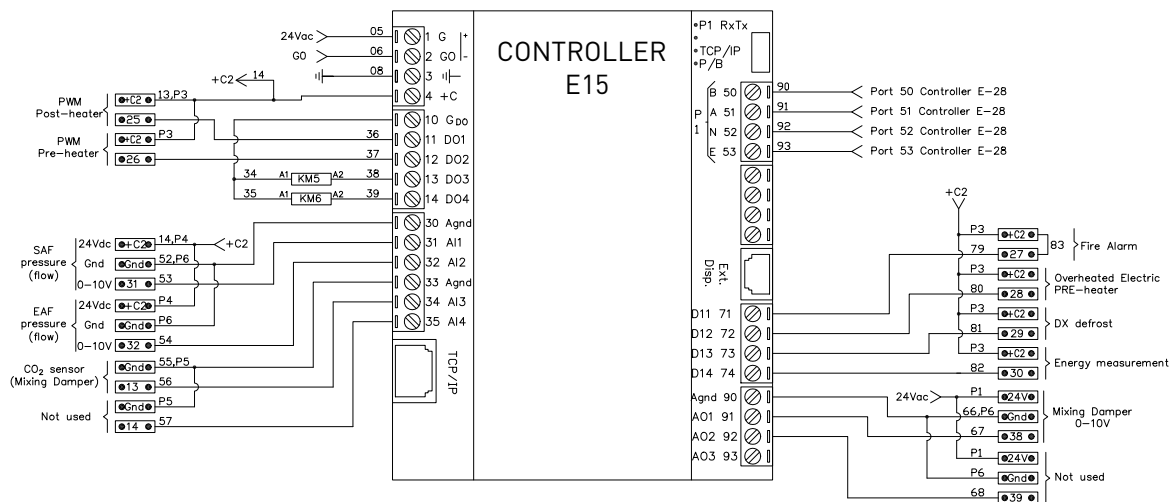
14.3. FACTORY WIRING

14.3.1. SLIM 800 & SLIM 1200 without preheater

CONTROLLER 1 (E28)



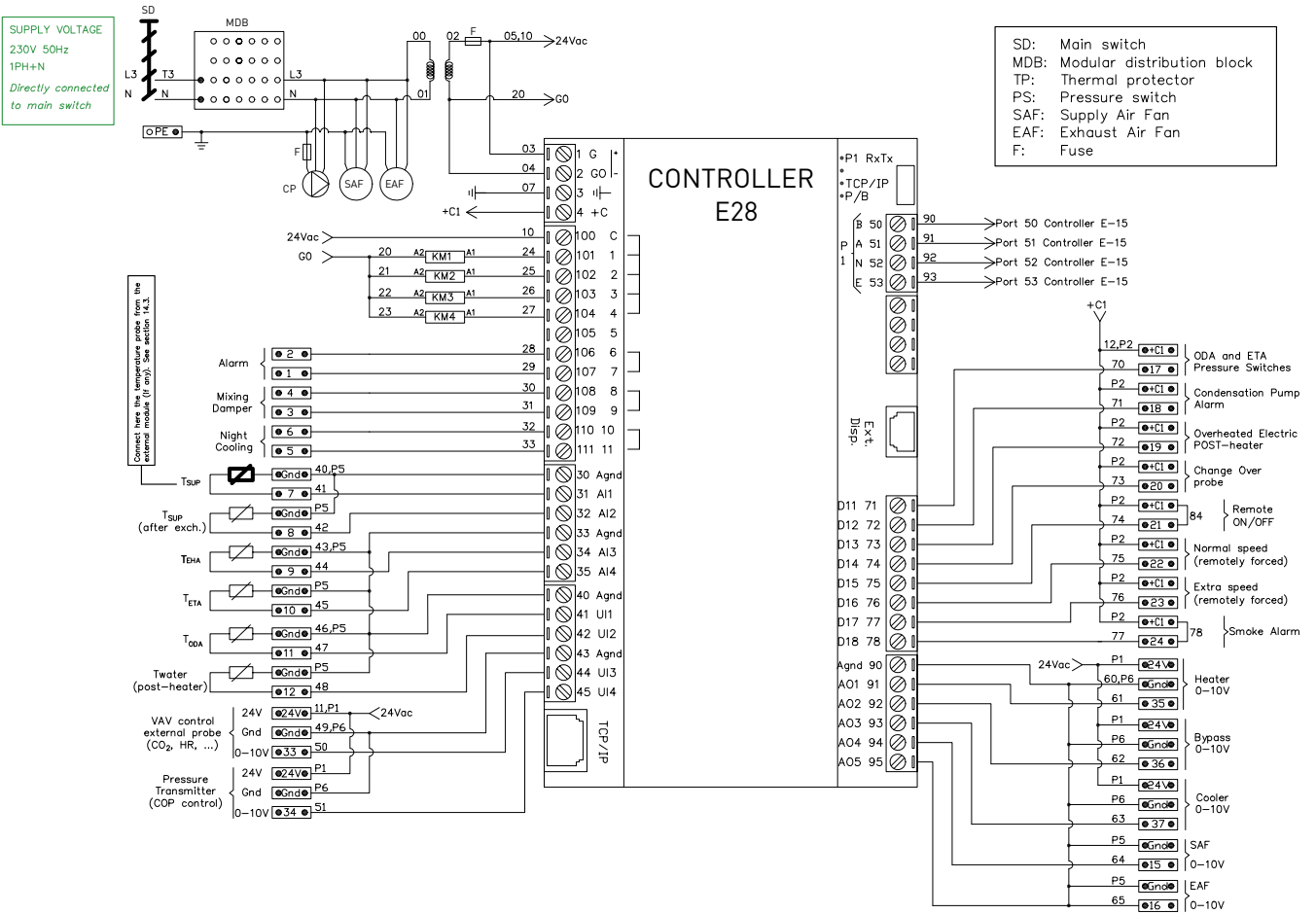
CONTROLLER 2 (E15)



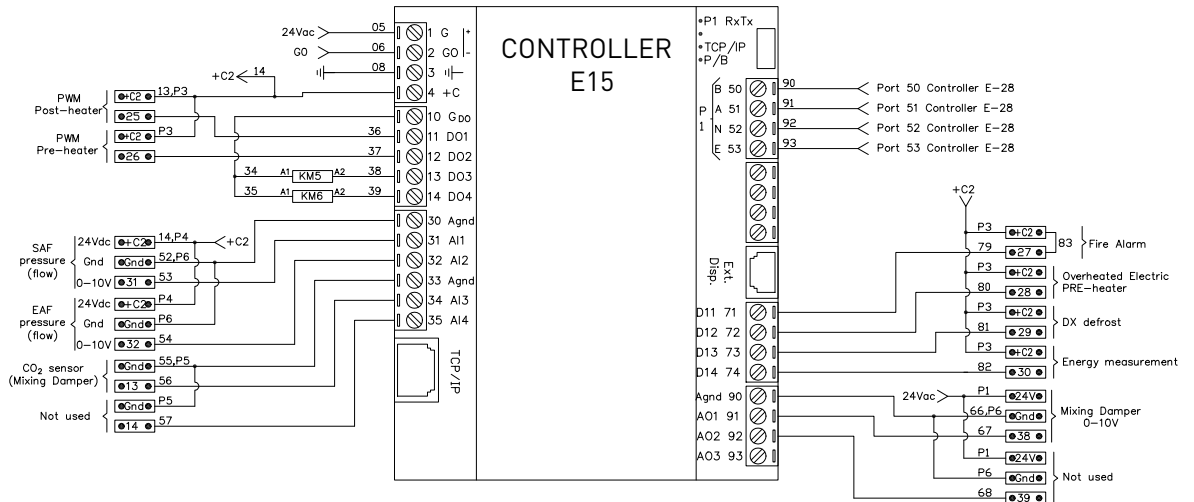


14.3.2. SLIM 1600 & SLIM 2000 without preheater

CONTROLLER 1 (E28)

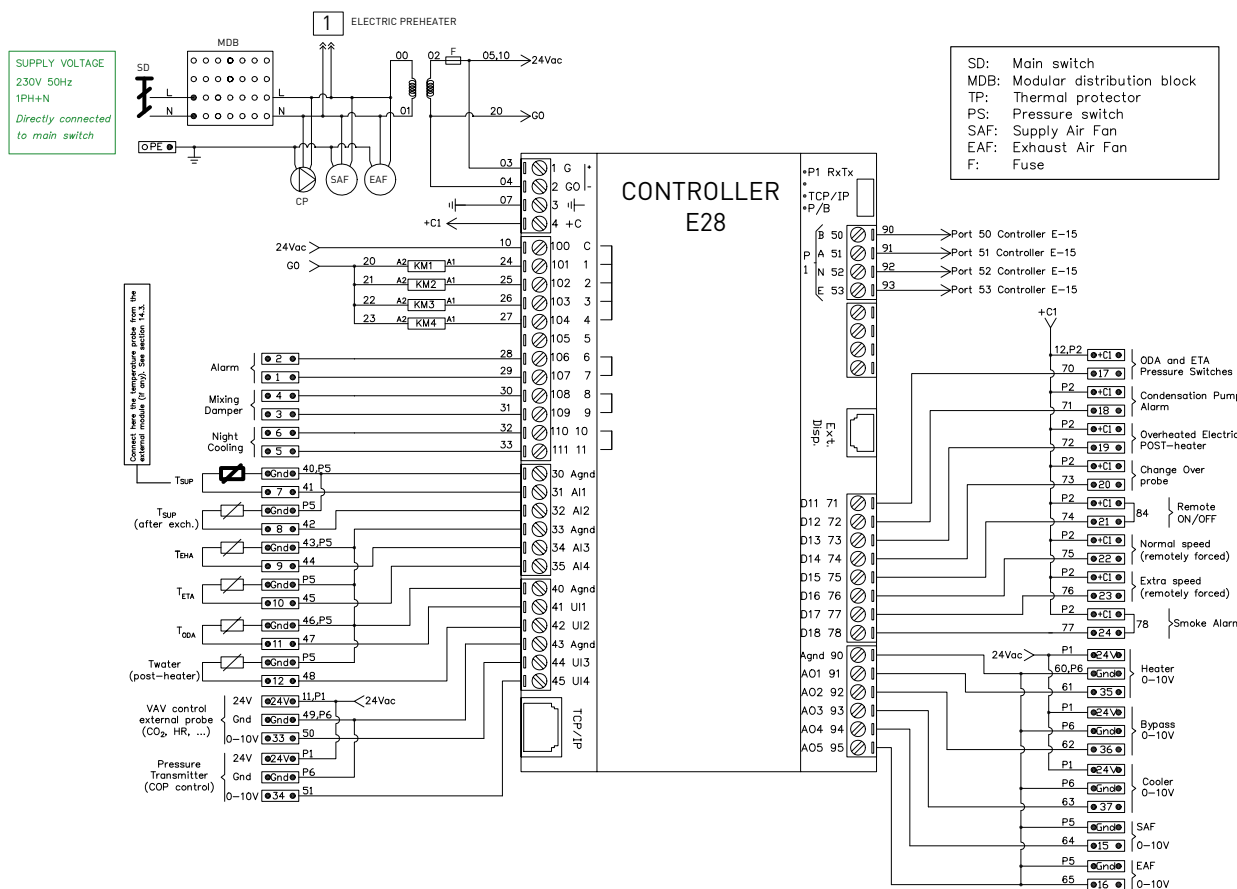


CONTROLLER 2 (E15)

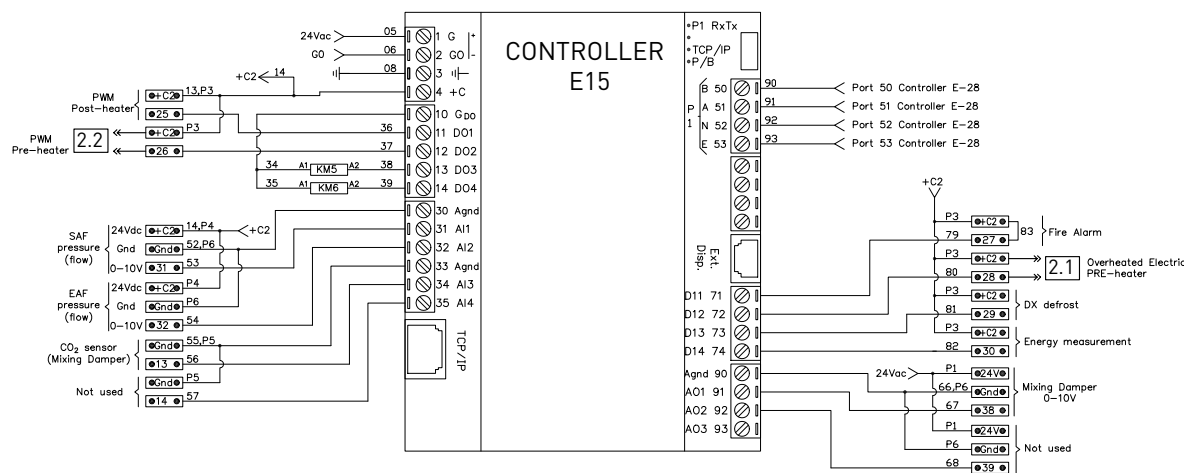


14.3.3. SLIM 800 & SLIM 1200 with preheater

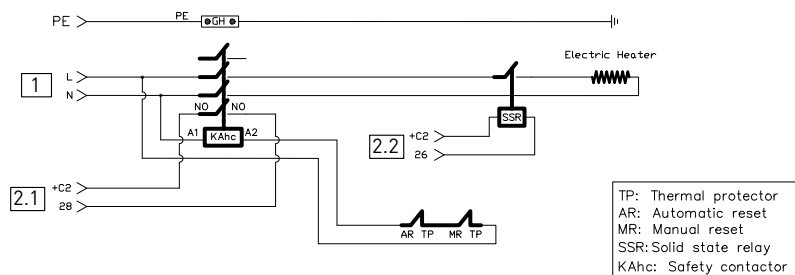
CONTROLLER 1 (E28)



CONTROLLER 2 (E15)

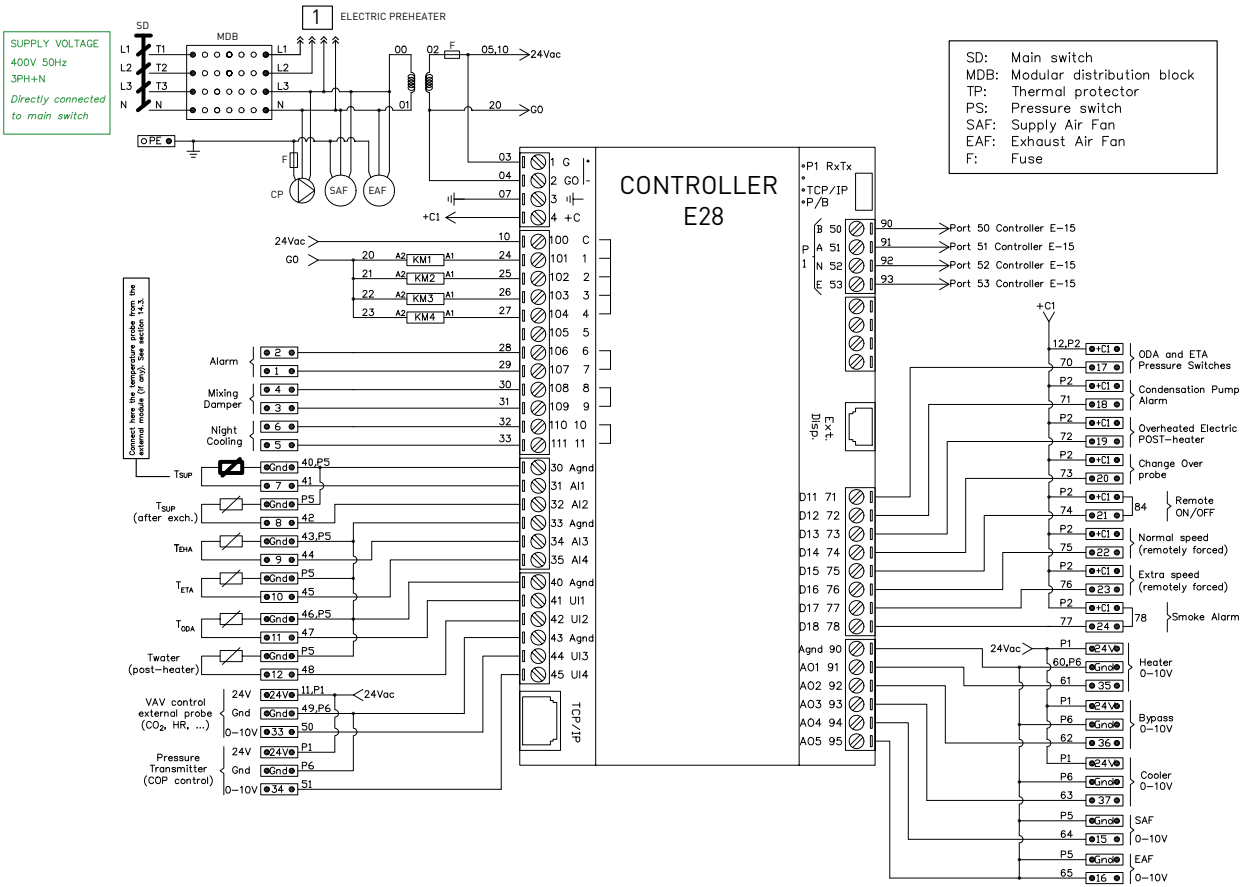


ELECTRIC PREHEATER

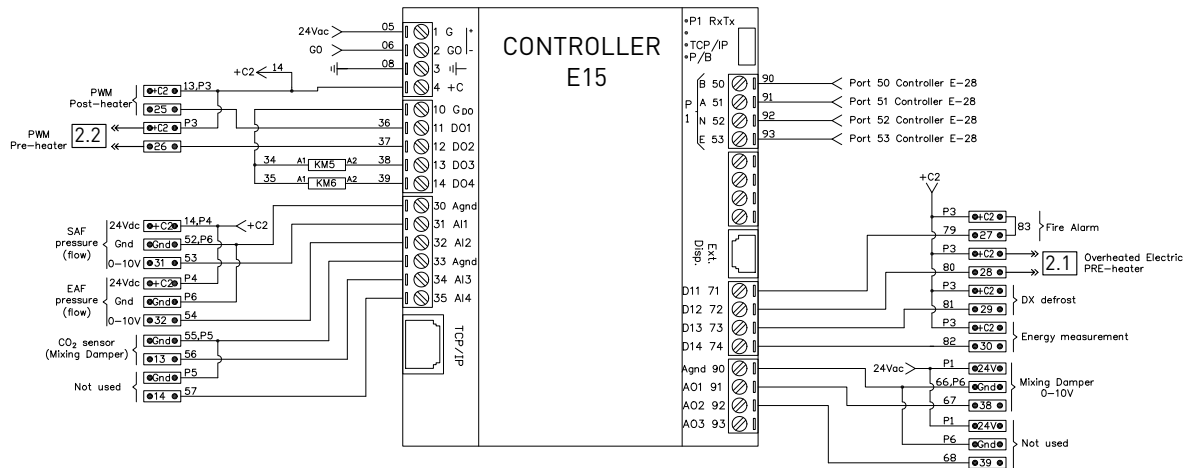


14.3.4. SLIM 1600 & SLIM 2000 with preheater

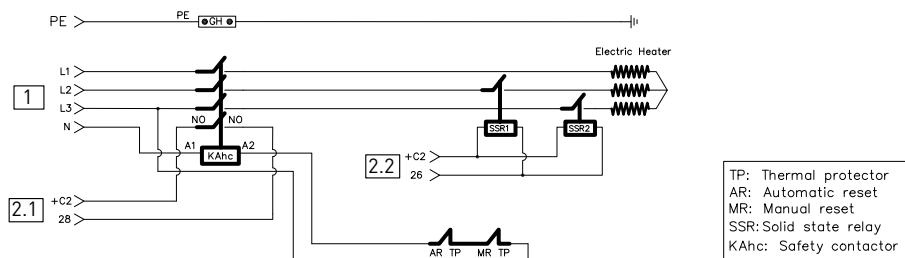
CONTROLLER 1 (E28)



CONTROLLER 2 (E15)



ELECTRIC PREHEATER



14.3.5. Inputs & Outputs

Terminal blocks (see 14.2.1)		Relays (see 14.2.1)	
Alarm	1 ○	-KM1	11 ○ 12 ○
Mixing Damper	3 ○	Start/Stop SAF	14 ○
Night Cooling	5 ○	-KM2	11 ○ 12 ○
Supply Air Temperature Sensor	7 ○	Start/Stop EAF	14 ○
Supply Air Temperature Sensor after exchanger	8 ○	Heating	11 ○ 12 ○
Exhaust Air Temperature Sensor	9 ○	Cooling	14 ○
Extract Air Temperature Sensor	10 ○	Outdoor Air Damper	11 ○ 12 ○
Outdoor Air Temperature Sensor	11 ○	Unit Status	14 ○
Water heater frost protection sensor	12 ○		
CO ₂ sensor (Mixing Damper)	13 ○		
Not used	14 ○		
SAF control	15 ○		
EAF control	16 ○		
Pressure Switches ODA and ETA filters Condensate pump alarm	+C1 ○ 17 ○		
Overheated Electric POST heater	+C1 ○ 18 ○		
Change Over probe	+C1 ○ 19 ○		
Remote On/Off	+C1 ○ 20 ○		
Remote Normal Speed	+C1 ○ 21 ○		
Remote Extra Speed	+C1 ○ 22 ○		
Smoke alarm	+C1 ○ 23 ○		
PWM Post heater control	+C1 ○ 24 ○		
PWM Pre heater control	+C2 ○ 25 ○		
Fire Alarm	+C2 ○ 26 ○		
Overheated Electric PRE heater	+C2 ○ 27 ○		
DX group defrost	+C2 ○ 28 ○		
Energy measurement	+C2 ○ 29 ○		
SAF pressure transmitter for measuring flow	+C2 ○ 30 ○		
EAF pressure transmitter for measuring flow	Gnd ○ 31 ○		
VAV control external probe (CO ₂ , HR,...)	Gnd ○ 32 ○		
Pressure transmitter for controlling pressure	24V ○ 33 ○		
Heater control or reversible system (heater/cooler)	24V ○ 34 ○		
Bypass control	24V ○ 35 ○		
Cooler control	24V ○ 36 ○		
Mixing Damper control	24V ○ 37 ○		
Not used	24V ○ 38 ○		
	24V ○ 39 ○		

Important

The external supply of the relays or 1-6 outputs, in case 24V is desired, can not be taken from the transformer of the electrical box in any case.



DIGITAL OUTPUTS (actuators and 24V outputs)

Terminals	Signal	Variable	Name	Description
2 - 1	24V	DO6 (1)	Sum Alarm	An alarm has appeared
4 - 3	24V	DO7 (1)	Mixing Damper	Activation for mixing damper
6 - 5	24V	DO8 (1)	Night Cooling	ON when night cooling is active
25 - +C2	PWM	DO1 (2)	POST-heater PWM	PWM signal for POST-heater control
26 - +C2	PWM	DO2 (2)	PRE-heater PWM	PWM signal for PRE-heater control
KM1: 11 - 12 - 14	Relay (dry contact)*	KM1	SAF on/off	Status of the supply air fan
KM2: 11 - 12 - 14	Relay (dry contact)*	KM2	EAF on/off	Status of the extract air fan
KM3: 11 - 12 - 14	Relay (dry contact)*	KM3	Heating	Relay active when heating is required
KM4: 11 - 12 - 14	Relay (dry contact)*	KM4	Cooling	Relay active when cooling is required
KM5: 11 - 12 - 14	Relay (dry contact)*	KM5	Outdoor air damper	Relay for the activation of the isolation damper
KM6: 11 - 12 - 14	Relay (dry contact)*	KM6	Unit status (on/off)	Status of the unit

*The external supply of the relays, in case 24V is desired, cannot be taken from the transformer of the electrical box in any case

ANALOGICAL INPUTS (SENSORS)

Terminals	Signal	Variable	Name	Description
7 - GND	PT1000	AI1 (1)	T.SUP2	Supply air temperature sensor (after external module)
8 - GND	PT1000	AI2 (1)	T.SUP1	Supply air temperature sensor (after heat exchanger and before external module if any)
9 - GND	PT1000	AI3 (1)	T.EHA	Exhaust air temperature sensor
10 - GND	PT1000	AI4 (1)	T.ETA	Extract air temperature sensor
11 - GND	PT1000	UI1 (1)	T.ODA	Outdoor air temperature sensor
12 - GND	PT1000	UI2 (1)	T.WATER	Temperature sensor for water heater frost protection (if there is a hot water coil as external module)
13 - GND	0-10V	AI 3 (2)	MD CO2	Connection for CO2 sensor (accessory) to control the mixing damper, if any
14 - GND	Not assigned	AI4 (2)	Free	Analogical input not assigned
31 - +C2 - GND	0-10V	AI1 (2)	SAF pressure	SAF pressure transmitter for measuring flow
32 - +C2 - GND	0-10V	AI2 (2)	EAF pressure	EAF pressure transmitter for measuring flow
33 - 24V - GND	0-10V	UI3 (1)	VAV control	External probe connection for VAV control (CO2, HR,...)
34 - 24V - GND	0-10V	UI4 (1)	COP control	Pressure transmitter connection for COP control

ANALOGICAL OUTPUTS (CONTROL)

Terminals	Signal	Variable	Name	Description
15 - GND	0-10V	AO4 (1)	SAF control	0-10V proportional control of the supply air fan
16 - GND	0-10V	AO5 (1)	EAF control	0-10V proportional control of the extract air fan
35 - 24V - GND	0-10V	AO1 (1)	Heating signal	0-10V proportional control of the post heater or reversible system (heater/cooler)
36 - 24V - GND	0-10V	AO2 (1)	Bypass control	0-10V proportional control of the bypass damper
37 - 24V - GND	0-10V	AO3 (1)	Cooling signal	0-10V proportional control of the post cooler
38 - 24V - GND	0-10V	AO1 (2)	Mixing damper signal	0-10V proportional control of the mixing damper
39 - 24V - GND	Not assigned	AO2 (2)	Free	Analogical output not assigned

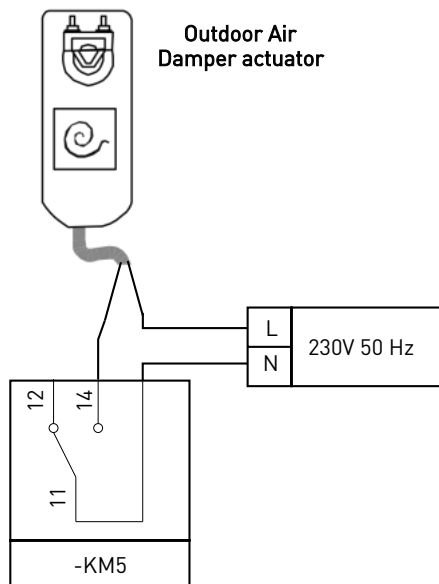
DIGITAL INPUTS

Terminals	Signal	Variable	Name	Description
17 - +C1	NC contact	DI1 (1)	Filters pressure guards	Monitoring of filters clogging
18 - +C1	NC contact	DI2 (1)	Condensate pump fail	Monitoring of the condensate pump status
19 - +C1	NC contact	DI3 (1)	Overheating electric POST-heater	Monitoring of the electric post-heater overheating
20 - +C1	NC contact	DI4(1)	Change-over probe	Summer/winter switch
21 - +C1	NO contact	DI5 (1)	Remote ON/OFF	Remote ON/OFF
22 - +C1	NO contact	DI6 (1)	Remote Normal Speed	Activation of the normal speed
23 - +C1	NO contact	DI7 (1)	Remote Extra Speed	Activation of the "extra" speed. "Extra speed" can be configured over or below the normal speed
24 - +C1	NC contact	DI8 (1)	Smoke alarm	Smoke alarm function activation
27 - +C2	NC contact	DI1 (2)	Fire alarm	Fire alarm function activation
28 - +C2	NC contact	DI2 (2)	Overheating electric PRE-heater	Monitoring of the electric pre-heater overheating
29 - +C2	NO contact	DI3 (2)	DX defrost	Input to inform whether the defrost mode is active in the DX group or not

14.4. EXTERNAL COMPONENTS CONNECTION DRAWINGS (EXAMPLES)

14.4.1. Isolation dampers

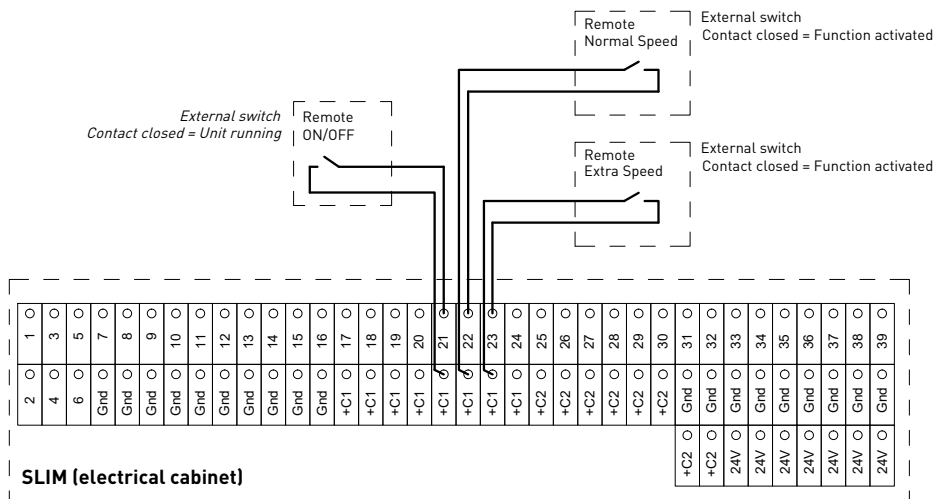
Connect the actuator for the isolation damper (see section "13.1.2. Isolation dampers (accessory)") to the KM5 relay as follows:



Model	Isolation damper	Actuator (spring return)
SLIM 800 L	5416743800 IJK-200	5416762900 LF-230 S
SLIM 800 R		
SLIM 1200 L	5416743900 IJK-225	5416762900 LF-230 S
SLIM 1200 R		
SLIM 1600 L	5416744100 IJK-285	5416762900 LF-230 S
SLIM 1600 R		
SLIM 2000 L	5416744200 IJK-315	5416762900 LF-230 S
SLIM 2000 R		

14.4.2. CAV wiring diagram

See section "11.3. Electrical preheaters (delivered as accessories)", for detailed information regarding CAV mode.

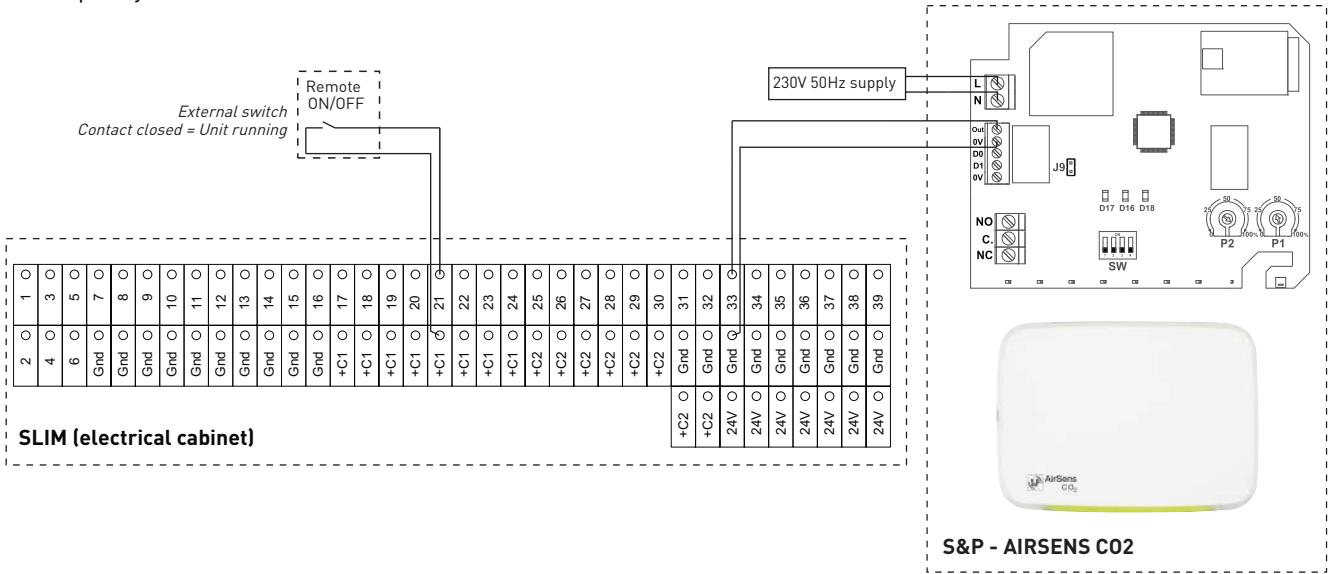




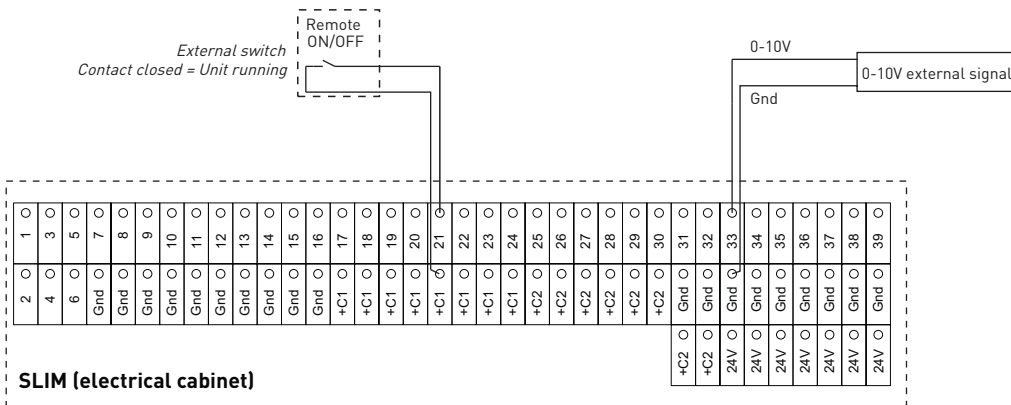
14.4.3. VAV wiring diagram

See section "11.3. Electrical preheaters (delivered as accessories)", for detailed information regarding VAV mode.

a) Air quality sensor (S&P - 5416845300 AIRSENS CO2)

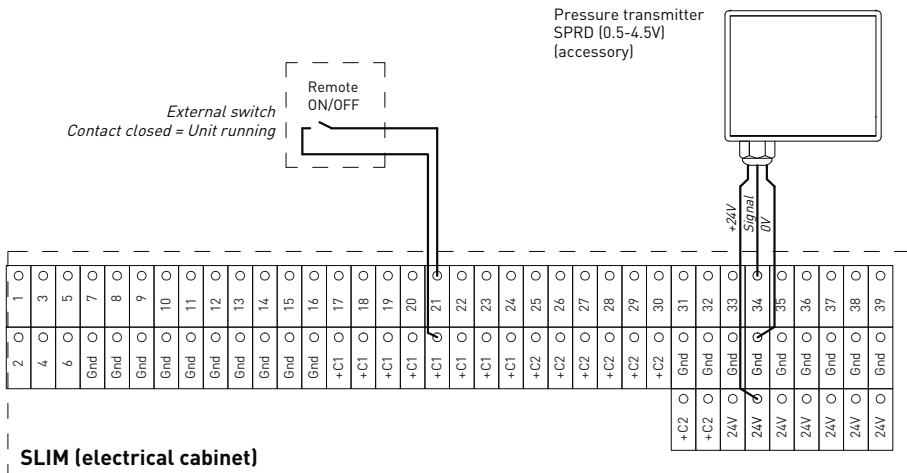


b) 0-10V external signal



14.4.4. COP wiring diagram

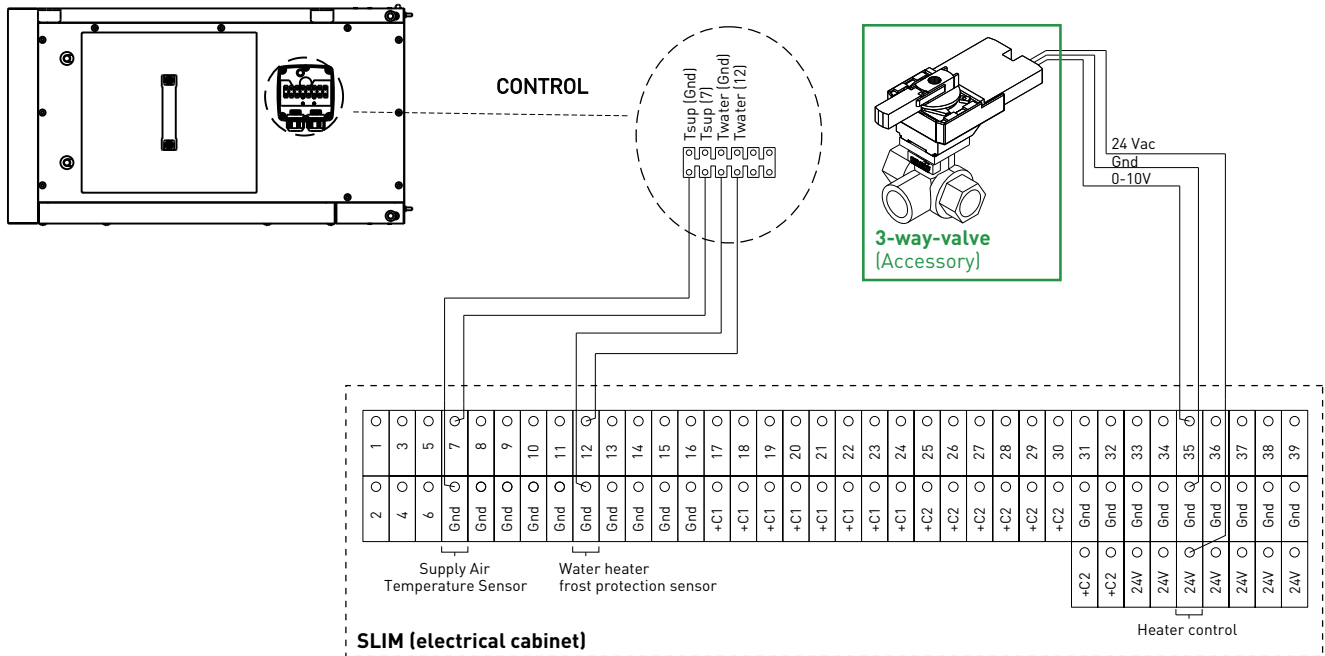
See section "11.3. Electrical preheaters (delivered as accessories)", for detailed information regarding COP mode.



14.4.6. Wiring of hot water coil delivered as an external module (SL-DC)

Inside the external module there are temperature sensors that must be connected to the SLIM electrical cabinet. The external module is delivered with a terminal box to easy the connection.

Connect the terminals from the CONTROL TERMINAL BOX (hot water coil) and from the 3-way-valve (accessory) to the main electrical cabinet of the unit as shown in the following wiring diagram:

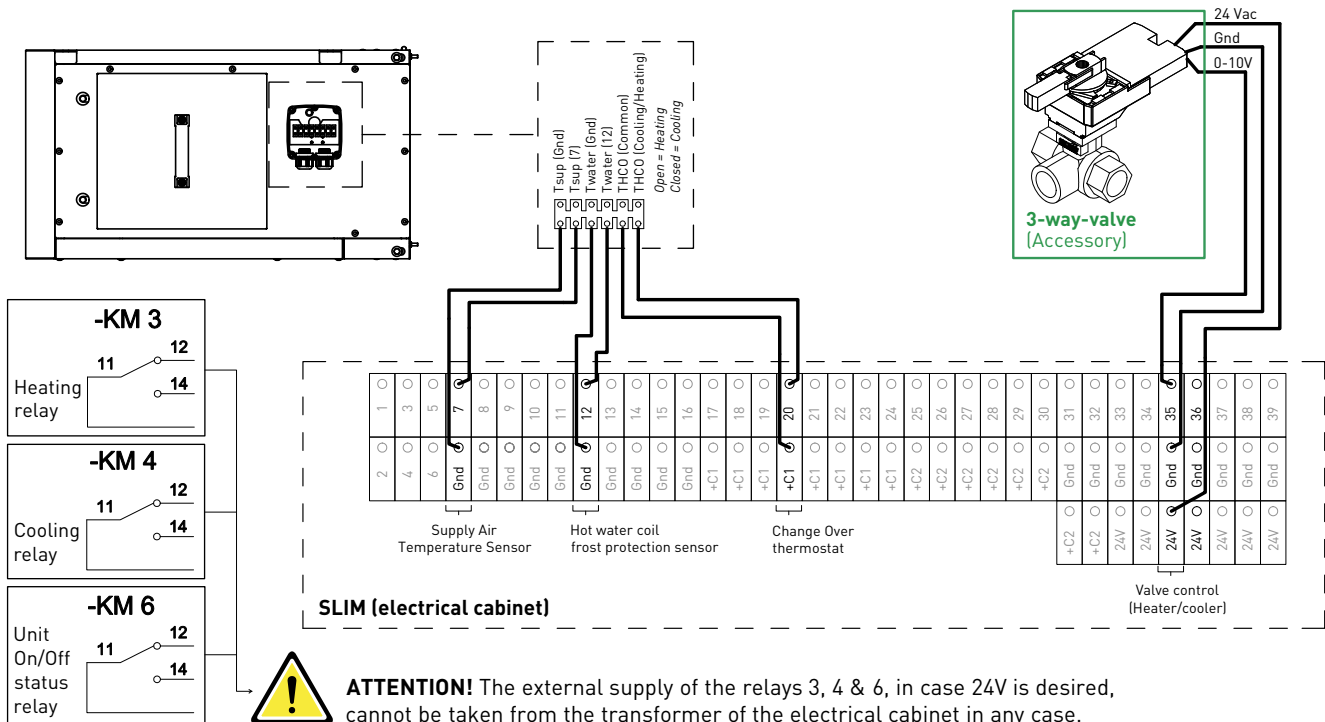


14.4.7. Wiring of reversible water coil delivered as an external module (SL-DFR)

Inside the external module there are temperature sensors and a change-over thermostat, that must be connected to the SLIM electrical cabinet. The external module is delivered with a terminal box to easy the connection.

Connect the terminals from the CONTROL TERMINAL BOX (water coil) and the 3-way-valve (accessory) to the main electrical cabinet of the unit as shown in the below wiring diagram.

The change-over thermostat allows to detect when the received water is cool or hot (summer or winter mode).

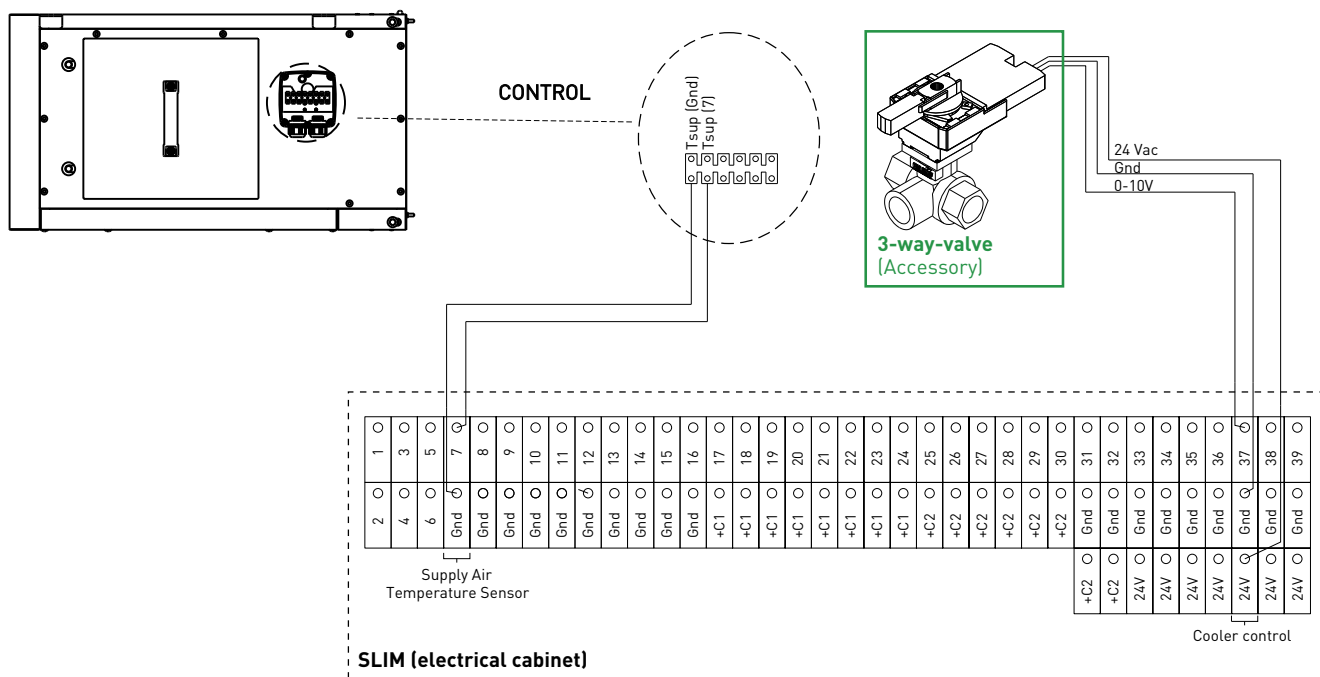


ATTENTION! The external supply of the relays 3, 4 & 6, in case 24V is desired, cannot be taken from the transformer of the electrical cabinet in any case.

14.4.8. Wiring of chilled water coil delivered as an external module (SL-DF)

Inside the external module there is a temperature sensor that must be connected to the SLIM electrical cabinet. The external module is delivered with a terminal box to easy the connection.

Connect the terminals from the CONTROL TERMINAL BOX (chilled water coil) and from the 3-way-valve (accessory) to the main electrical cabinet of the unit as shown in the following wiring diagram:

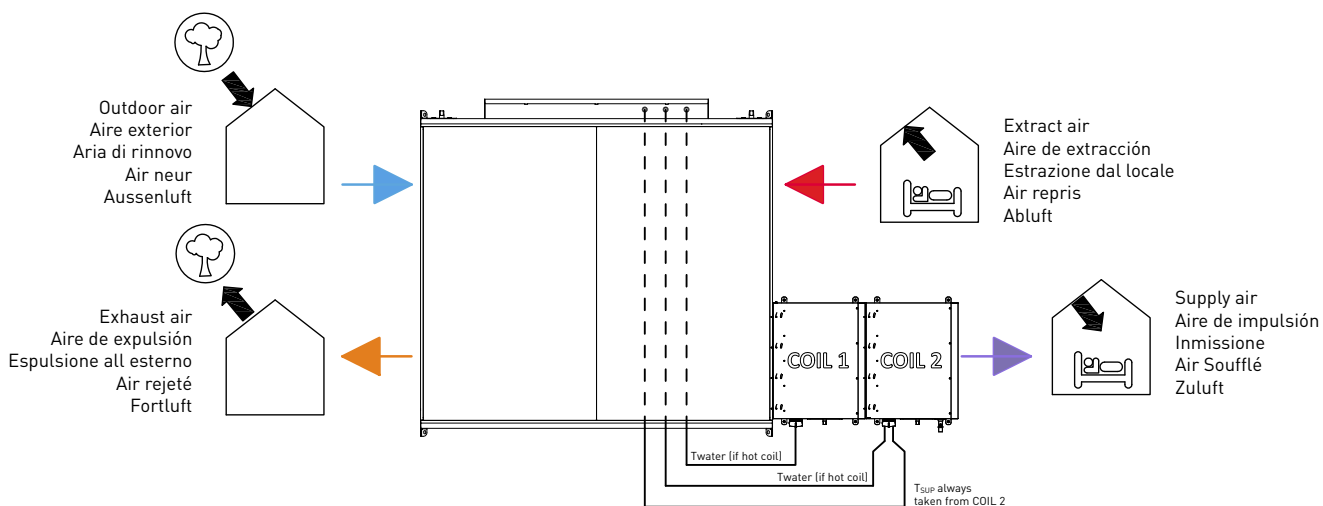


14.4.9. Wiring of hot water coil + chilled water coil (4 pipes system) delivered as external modules (SL-DC + SL-DF)

The two water coils will be installed in a row. The system is designed to perform heating or cooling independently, but not at the same time. There is not possibility to dehumidify either.

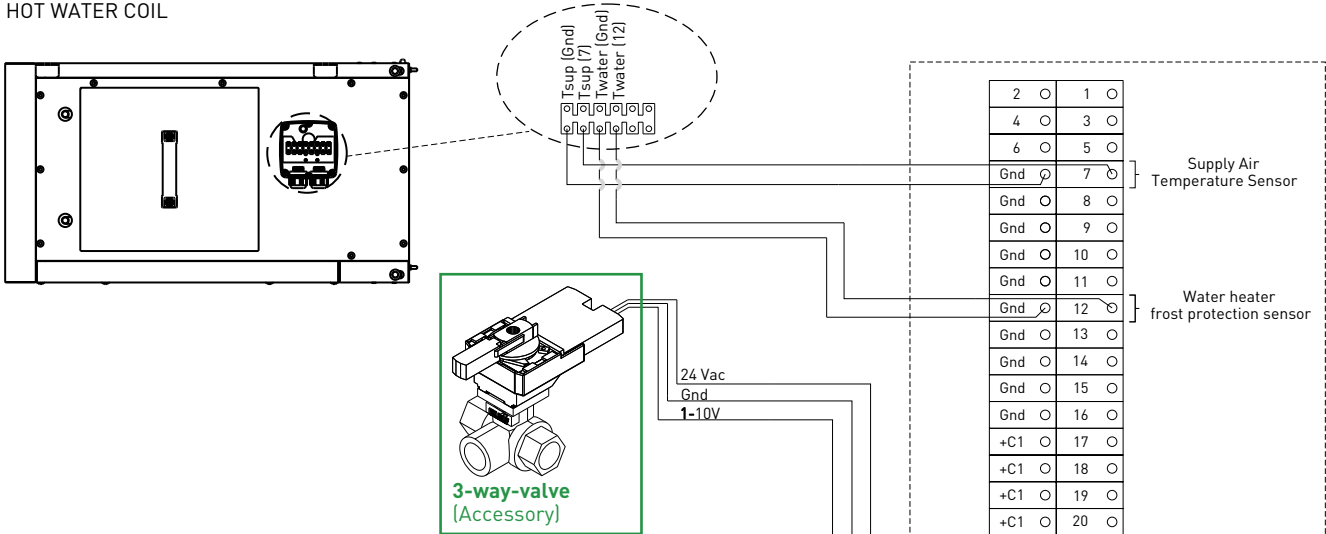
Connect the terminals from the CONTROL TERMINAL BOXES (water coils) and the 3-way-valves (accessories) to the main electrical cabinet of the unit as shown in the following wiring diagram.

Pay attention to the terminals Tsup (GND) and Tsup(7). In the wiring example, the hot water coil will be installed downstream the chilled water coil and so that the Tsup terminals are connected to the electrical cabinet. If it was on the contrary (chilled water coil installed downstream the hot one), then installer should connect the Tsup terminals from the chilled water coil instead.

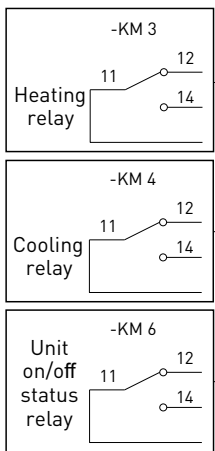
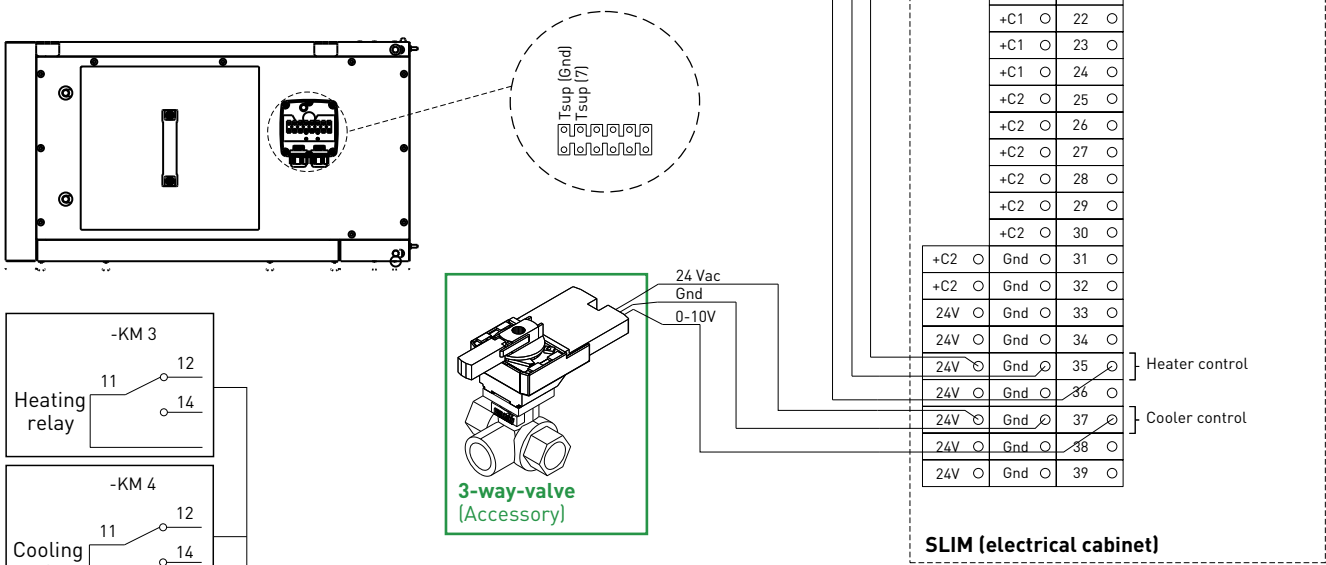


Example: SLIM + coils - Left handed

HOT WATER COIL



CHILLED WATER COIL



The external supply of the relays 3, 4 & 6, in case 24V is desired, cannot be taken from the transformer of the electrical cabinet in any case.

14.4.10. Wiring of direct expansion coil delivered as an external module (SL-DX)

See section "12. INTEGRATION IN "DX" DIRECT EXPANSION SYSTEMS".

Normally the cooling/heating demand is managed by the refrigeration unit controller (not the heat recovery unit controller). The control kit supplied by the manufacturer of the DX group includes the gas valve, the temperature probes and the electronic board that perform the operation management; in these cases our SLIM units will act as slave units and it will be enough with the basic control signals:

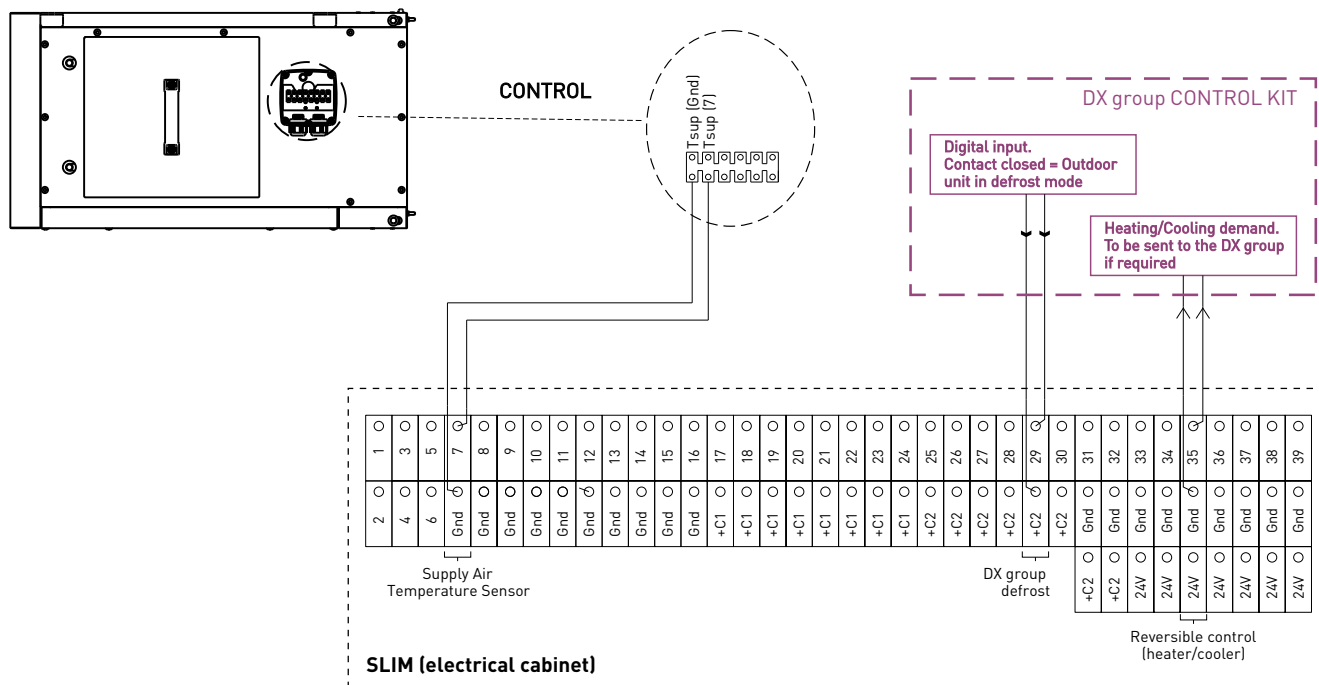
- Digital Input 1: Remote on/off (see "14.3.5. Inputs & Outputs", look for remote on/off)
- Digital Input 2: Switch fan to reduced speed (see "14.3.5. Inputs & Outputs", look for DX defrost)
- Digital Output 1: Fan status (see "14.3.5. Inputs & Outputs", look for KM1)

However, some DX manufacturers include in their kits functionalities that allow the cooling/heating demand being managed by the heat recovery unit. Therefore these kits have an specific terminal with 0-10V input.

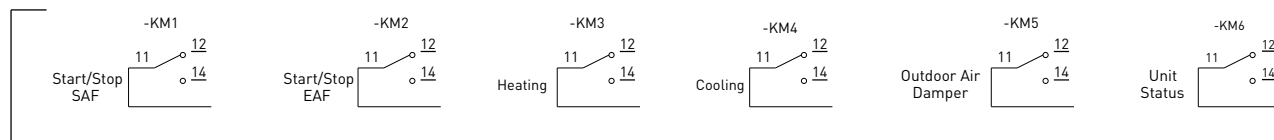
If the SLIM controller is going to control the supply air temperature, inside the external module there is a temperature sensor that must be connected to the SLIM electrical cabinet. The external module is delivered with a terminal box to easy the connection. See wiring diagram below.

The SLIM controller will calculate the cooling/heating demand and will supply a 0-10V signal in accordance to this demand. Other digital inputs/outputs like the fan status or the heating/cooling output may be interesting for this type of controls: Check the KM relays below).

Installer can use the following wiring diagram as a reference for connecting the SLIM electrical cabinet to the DX group CONTROL KIT (if any). In such scenario, the SLIM unit will manage the control of the supply air temperature.



Relays (see 14.2.1)

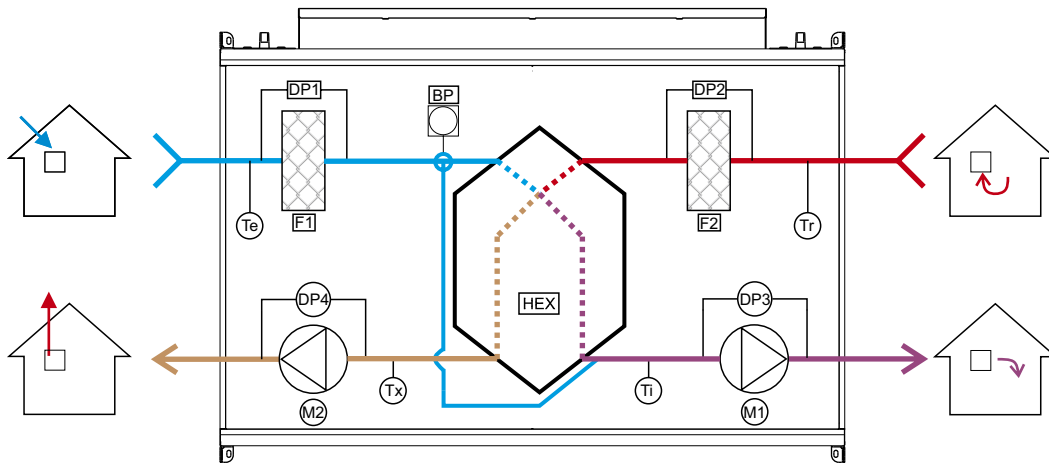


15. SYNOPTIC INSTALLATION DIAGRAMS (EXAMPLES)

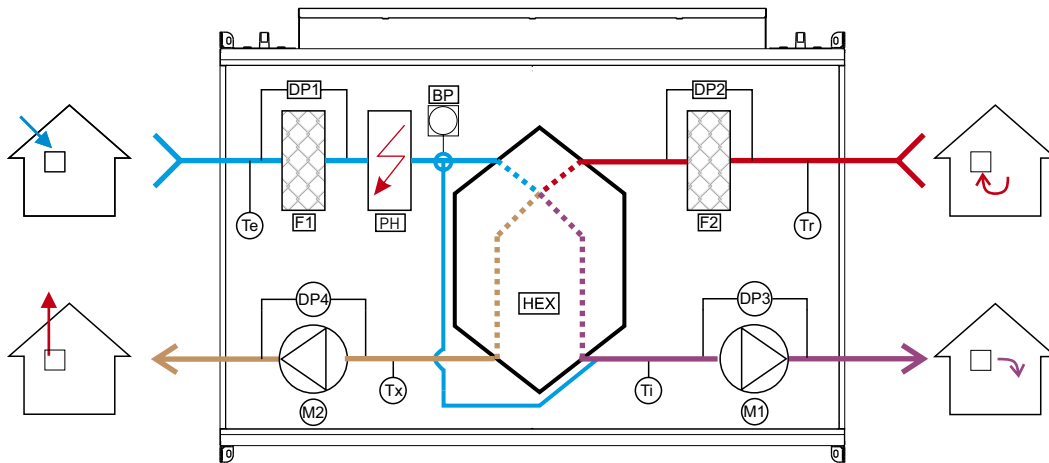
F1	Supply filter	DC	Hot water coil
F2	Extract filter	DFR	Reversible water coil
BP	Bypass damper	DF	Chilled water coil
M1	Supply motor	DX	Direct expansion coil
M2	Extract motor		
HEX	Heat Exchanger		
DP1	Pressure switch		
DP2	Pressure switch		
DP3	Pressure transmitter		
DP4	Pressure transmitter		

Ti	Temperature probe (T sup)
Tr	Temperature probe (T indoor)
Te	Temperature probe (T out)
Tx	Temperature probe (T exha)
PH	Electrical preheater
DI	Electrical postheater

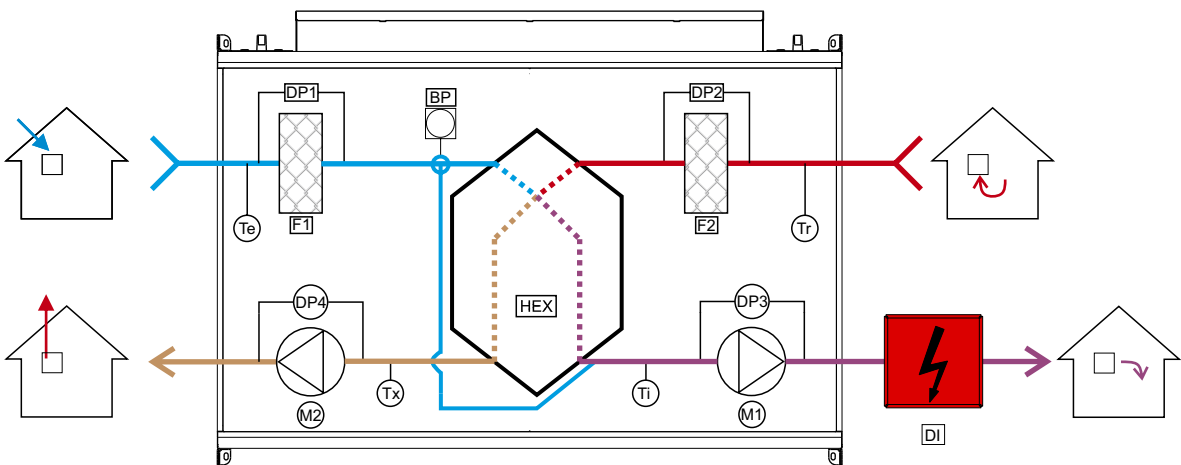
15.1. STANDARD UNIT



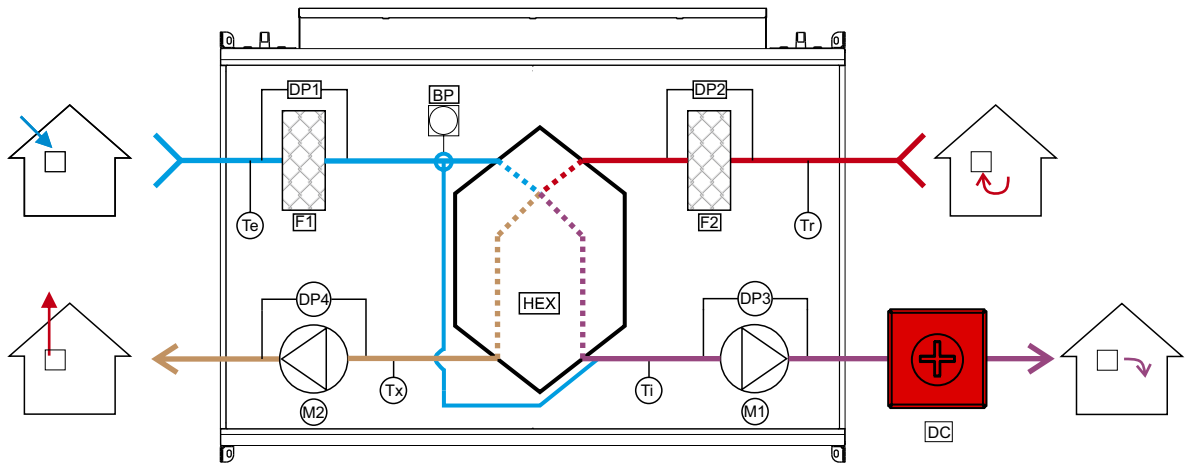
15.2. SLIM PH. WITH ELECTRICAL PREHEATER



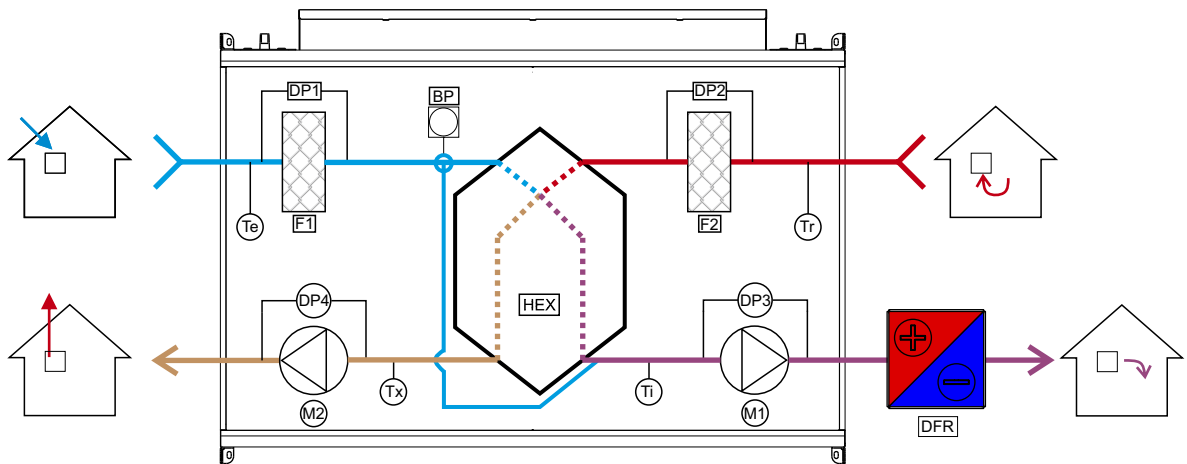
15.3. STANDARD UNIT + ELECTRICAL BATTERY (POST HEATING)



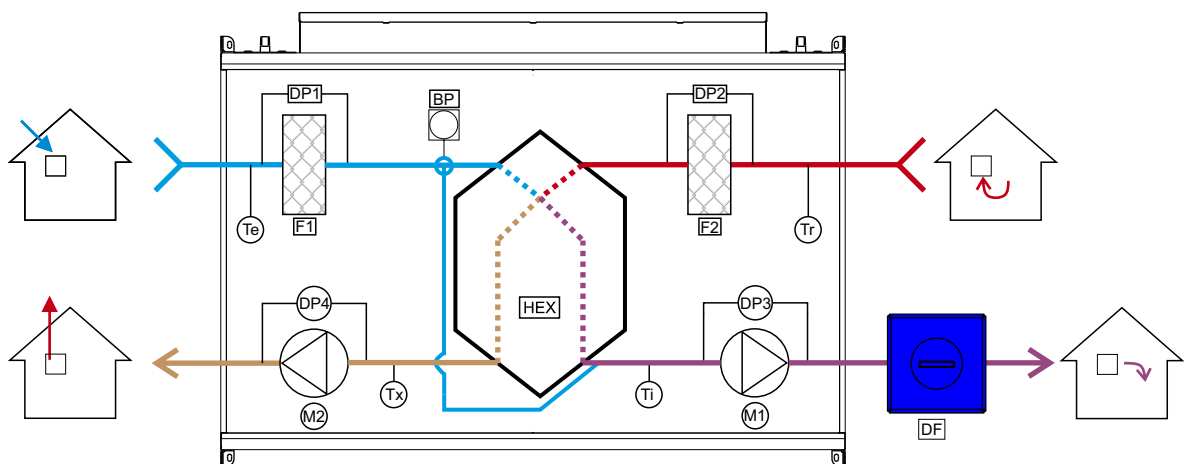
15.4. STANDARD UNIT + HOT WATER COIL (POST HEATING)



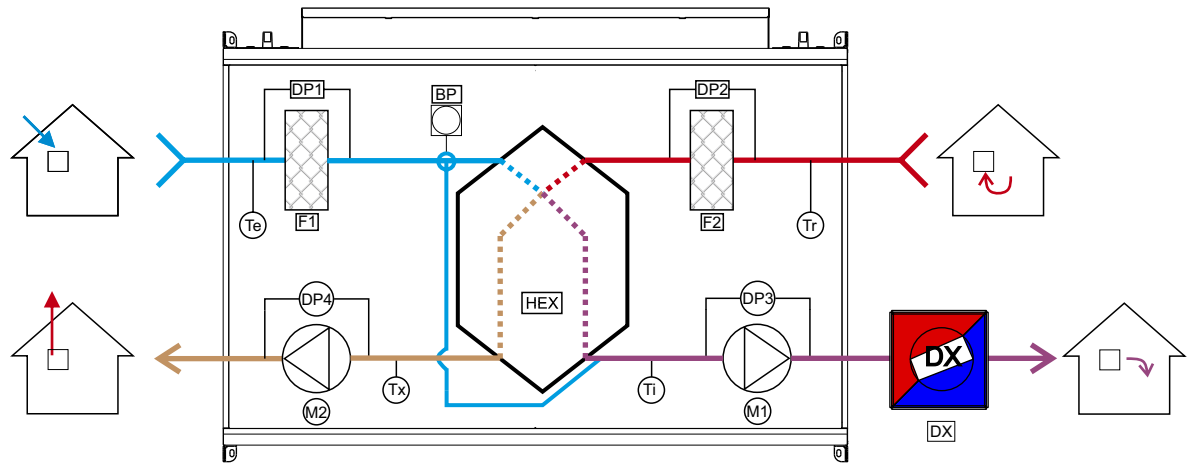
15.5. STANDARD UNIT + REVERSIBLE WATER COIL (POST TREATMENT)



15.6. STANDARD UNIT + CHILLED WATER COIL (POST REFRIGERATION)



15.7. STANDARD UNIT + DIRECT EXPANSION COIL (POST TREATMENT)



16. CONTROL FUNCTIONS

FUNCTIONS

AIRFLOW CONTROL

Three adjustable speeds

Reduced speed, normal speed, extra speed

Three adjustable working modes

CAV constant air volume:

Fan speed is adjusted in dependency of the pressure loss of the filter in order to maintain the adjusted airflow

Each fan is connected to a pressure transmitter which allows to enter different set points to each fan

VAV variable air volume:

Fan speed is adjusted in dependency of an external 0-10V signal (p.e. AIRSENS CO2, Humidity sensor, etc.)

COP constant pressure:

Fan speed is adjusted in dependency of a signal which comes from an external pressure sensor (model: TDP-S, accessory)

The fans maintain the adjusted pressure in the duct, increasing the speed when pressure falls or decreasing speed when pressure rise

Time programming

Weekly timer, holiday periods

"Remote Normal Speed" and "Remote Extra Speed"

Via external potential free contacts

Remote ON/OFF

Contact to connect an external ON/OFF switch

TEMPERATURE CONTROL

Sensors

Outdoor air temperature sensor (ODA)

Supply air temperature sensor (SUP1)

Extract air temperature sensor (EXT)

Exhaust air temperature sensor (EHA)

Clamp-on sensor for frost protection of hot/reversible water coils (SL-DC, SL-DFR)

Supply air temperature sensor (SUP2) already integrated in all the post-treatment modules

Change over thermostat THCO already integrated in reversible water coil module SL-DFR

Frost protection of the heat exchanger

Electric pre-heater (optional), speed reduction of the supply fan, bypass activation

Bypass

100% automatic proportional bypass used for free-cooling in summer time and defrost in wintertime

Four temperature control modes

Supply air temperature control

Extract air temperature control

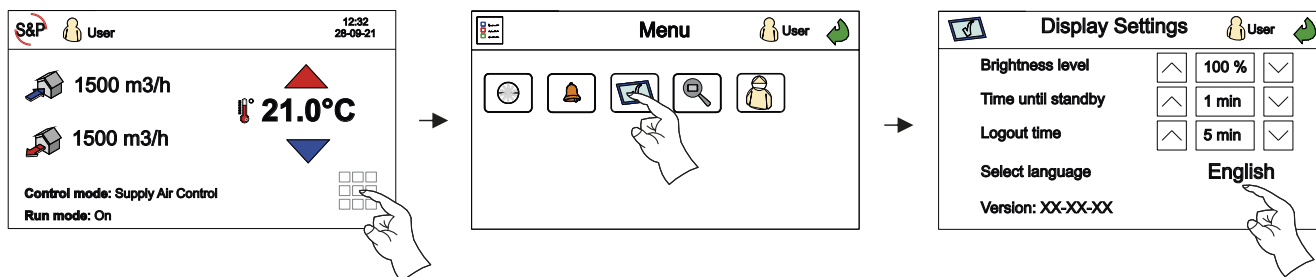
Outdoor compensated supply air temperature control

Summer/winter control

FUNCTIONS	
UNIT MONITORING & PROTECTION	
Filter clogging Malfunction of connected sensor Malfunction of fan Malfunction of condensation pump Heat exchanger Fire alarm Smoke alarm Frost protection for hot/reversible water coils Overheating electric battery Energy consumption counter Heat exchanger efficiency Alarm history	
COMMUNICATION	
Remote touch screen panel MODBUS RTU (RS 485) BACNET TCP/IP Webserver	

17. REMOTE CONTROL OPERATION

17.1. CHANGE LANGUAGE



17.2. SIMPLIFIED MENUS/ACCESSES

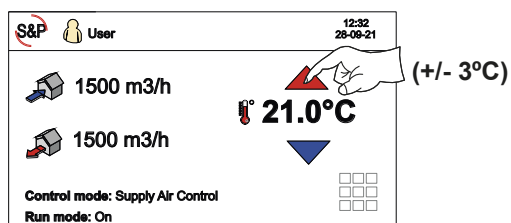
There are 3 access levels to the controller:

- User level (no password): Access to the start/stop function. Change the speed and modify the set point temperature (+/- 3°C).
- Installer level (password): Access to read and write the adjustments parameters but no access to the system configuration.
- Master level (password): Access to read and write the adjustments and parameters, as well as access to the system configuration.

18. USER LEVEL

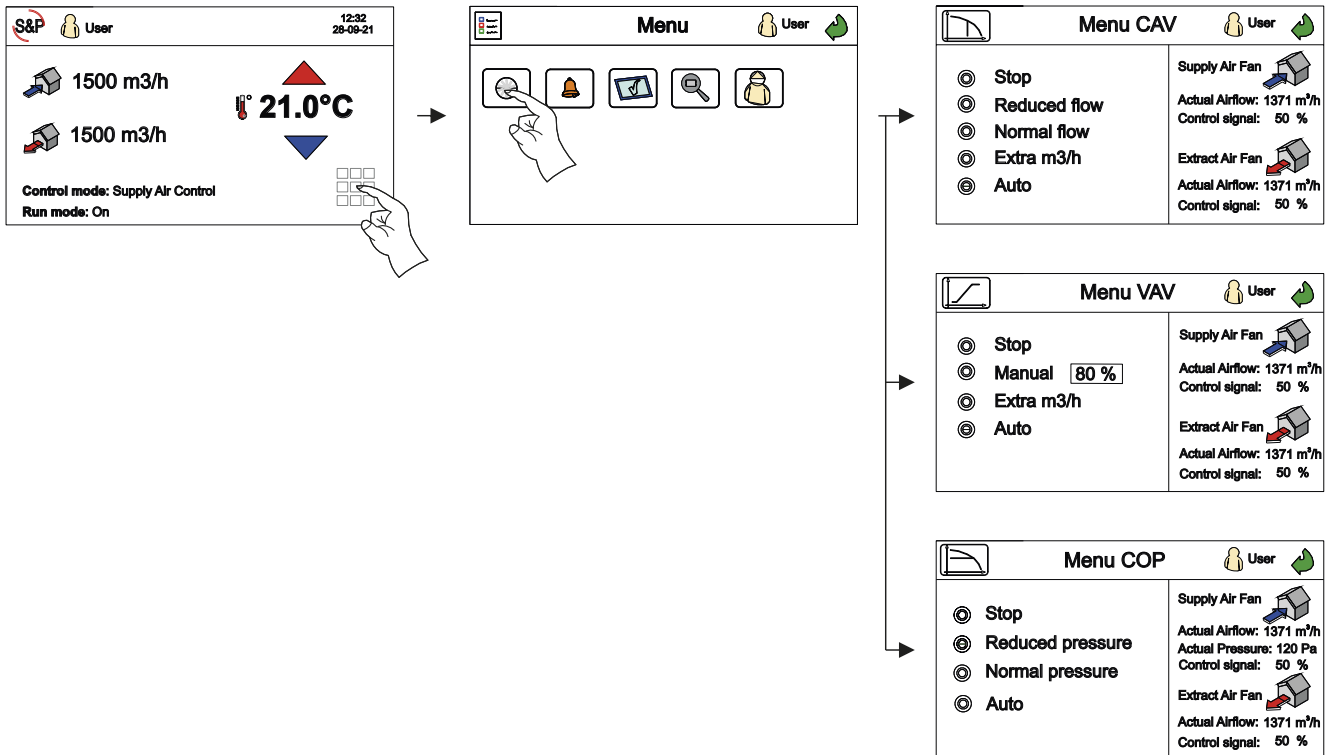
Adjust the temperature set point and control the operation (use of the time program/auto, stop or speed adjustment).

Temperature set point (+/- 3 °C)

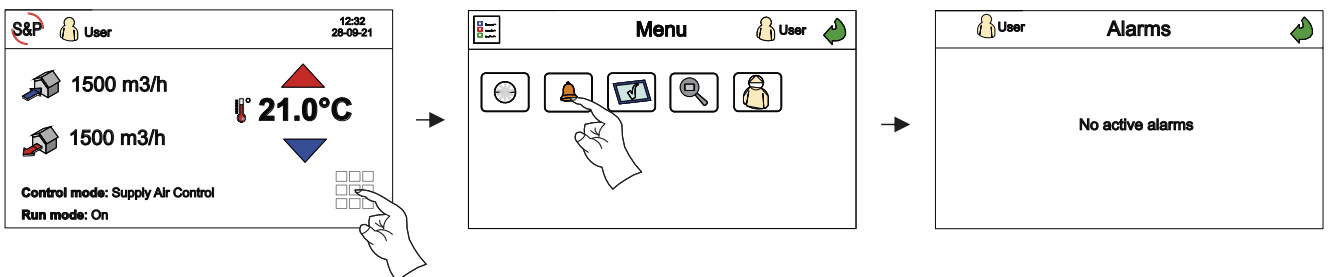




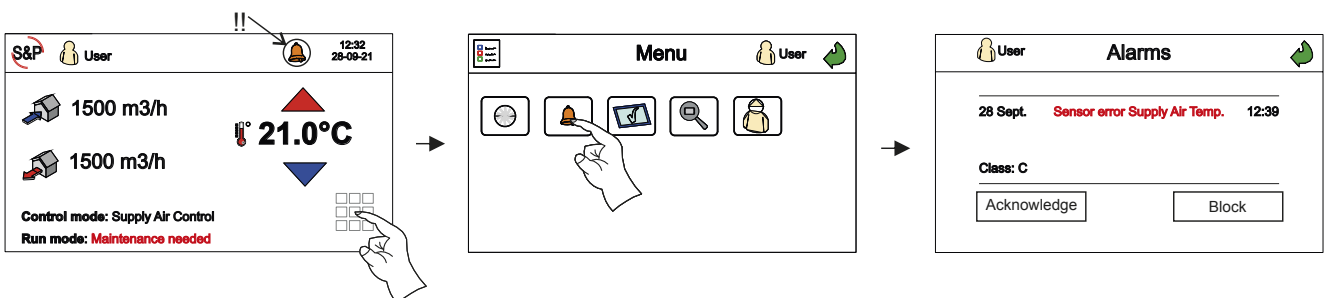
Start/Stop



Check alarm list



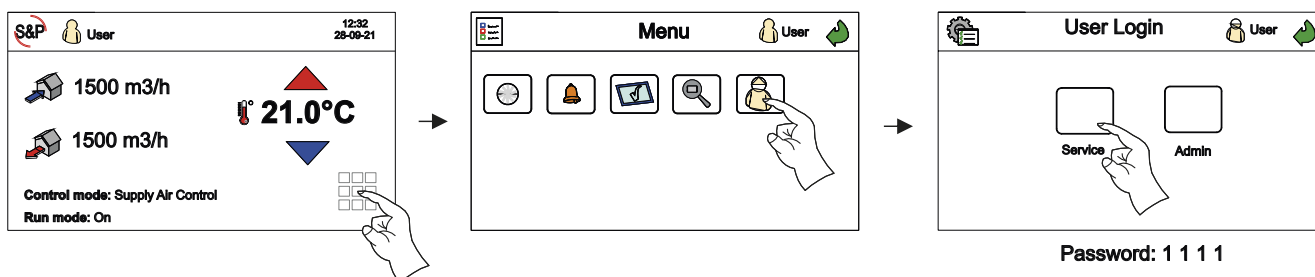
In case an alarm occurs, a bell icon appears on the main screen. The error is clearly identified on the “Alarms” screen. Contact with the installer/maintainer to solve the issue.



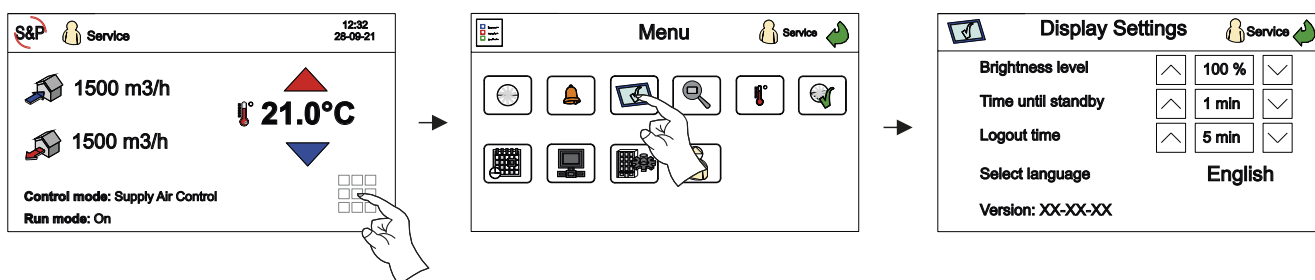
ATTENTION. Never block an alarm, otherwise the unit will not be protected against this event.

19. INSTALLER LEVEL

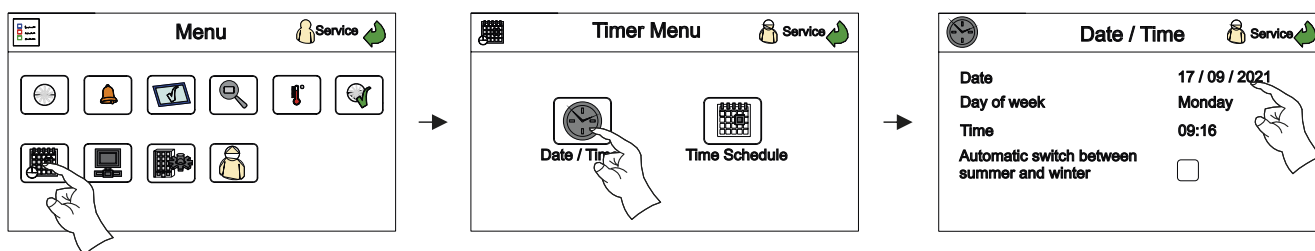
In this level is possible to adjust the operating parameters of the unit. In order to access the installer (service) level, look for the login menu and enter the password: 1 1 1 1:



Screen display settings (brightness, backlight, etc. and language)

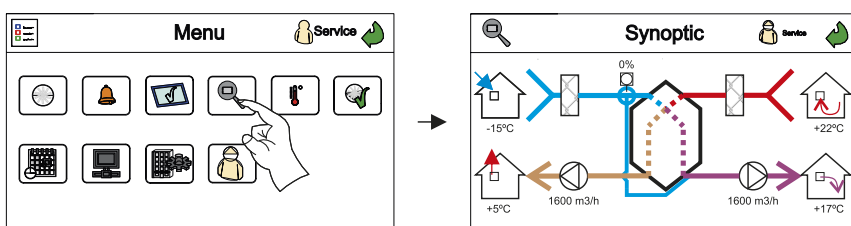


Time settings (change date)



Synoptic installation

Useful menu to check the general view of the heat recovery system.

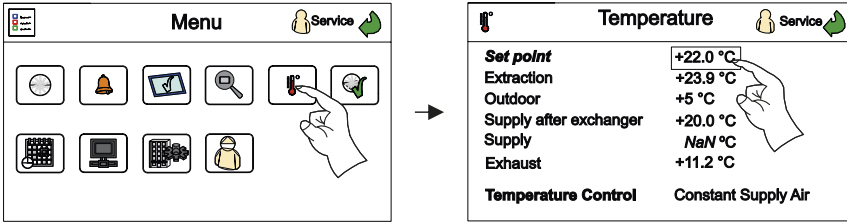


Temperature settings

Within the heat recovery unit, four temperature sensors are supplied (installed from factory): Extract, Supply after exchanger, Exhaust and Outdoor.

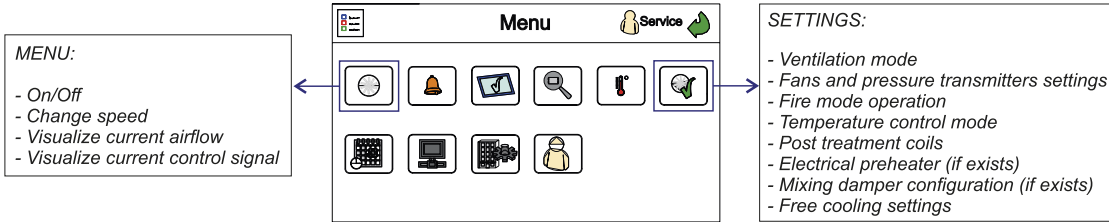
If a post treatment module is installed, the temperature of the air stream after the external module is shown on the "supply" line. (for more details, see section "14.4. External components connection drawings (examples)").

By touching the "set point" line, installer will be able to set the temperature set point as desired.



19.1. COMMISSIONING

The commissioning/starting up of the unit is based on two menus: Fan settings and Fan menu:



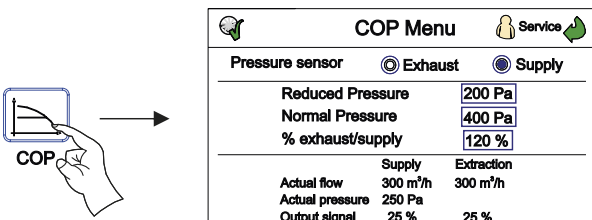
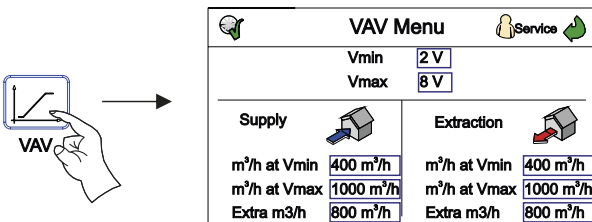
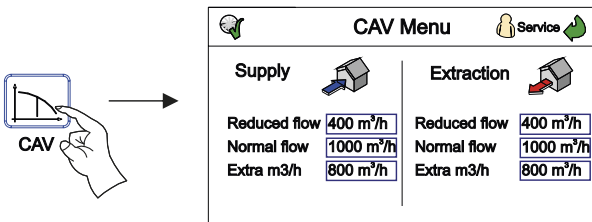
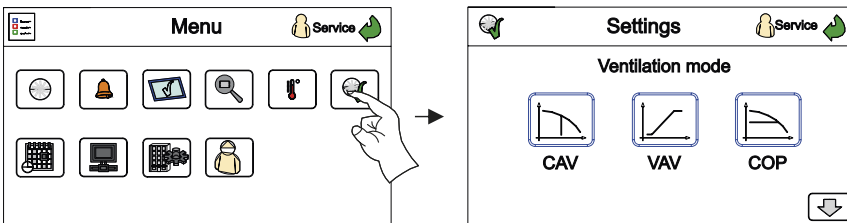
Ventilation modes

The first step is to select the ventilation mode:

- CAV: Standard operation. Operation at constant flow.
- VAV: Variable flow operation. Manually or according to an external 0-10V sensor (accessory).
- COP: Operation at constant pressure by means of an external accessory (TDP-S).

After a change in the selected operation mode, the fans stop and re-start in the new selected mode.

In units with electrical pre/post heating, if the operation mode is changed while the fans are running, the unit will stop sequentially: first switching off the electrical heater and after 2 minutes, switching off the fans. Finally, the unit will re-start at the selected working mode.



19.1.1. Constant airflow operation (CAV)

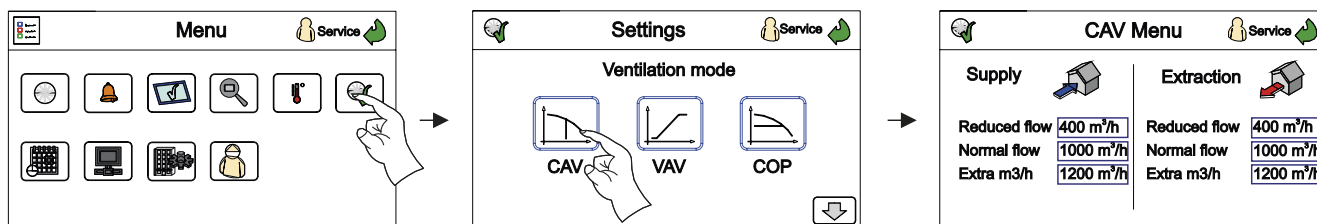
Mode recommended in installations where it is necessary to maintain a constant airflow

The speed of the fans is continuously regulated in order to maintain the setted airflow. The control is performed by means of pressure transmitters assembled and wired from factory.

CAV control mode selection

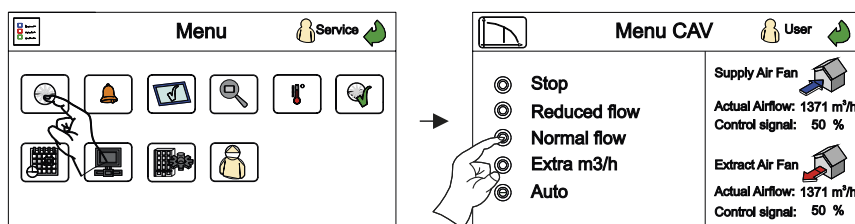
The access to the simplified parameter setting menu allows to set:

- Reduced flow, Normal flow and Extra flow for each fan. Extra flow can be configured over or below the Normal flow, so that it can be a “boost” or a “min. speed”.



The choice between speeds/flows can be done:

- Automatically by timer (see section “24. TIME PROGRAMMING”)
- Remotely, by external digital contacts (see section “14.4.2. CAV wiring diagram”).
- Manually (see below).



Stop: Stop the unit.

Reduced flow, Normal flow, Extra m³/h: Set point manually selected.

Auto: Selection of the set point is done according to the time programming.

Advanced level

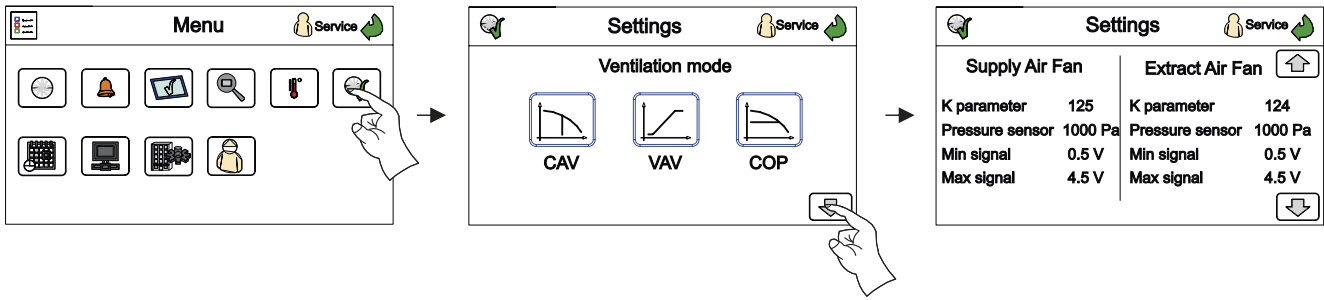
Independent SAF and EAF flow control: SAF and EAF are controlled each one by its respective pressure transmitter signal. The pressure transmitters are supplied from factory assembled and wired. The controller performs the conversion of the signal received from the pressure transmitter to flow using the relation:

$$Airflow = K \cdot \sqrt{\Delta P}$$

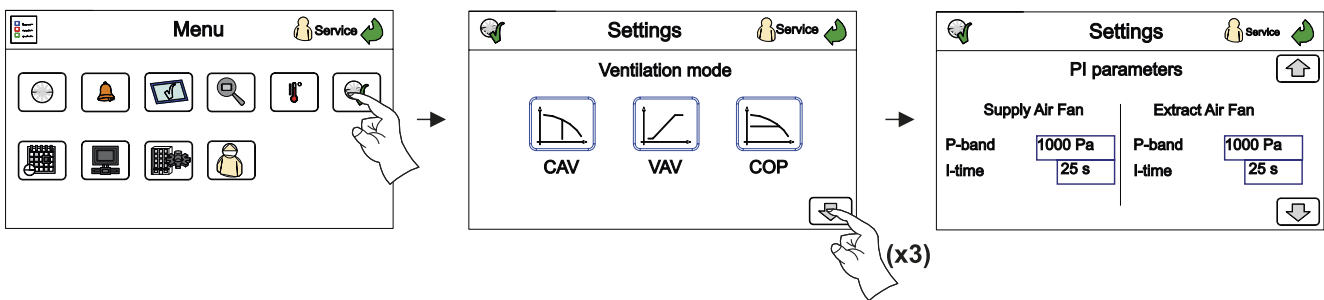
K parameter depends on the fan construction and is different for each model. This value is already set at factory so it should not be modified:

Heat Recovery Unit	K parameter Supply Air Fan	K parameter Extract Air Fan	Pressure range (Pressure transmitter)	Min/Max Signal (Pressure transmitter)
SLIM 800	60	57	0-1000 Pa	0,5V / 4,5V
SLIM 1200	64	67		
SLIM 1600	72	67		
SLIM 2000	125	124		

Follow this sequence to check the sensors settings:



! Occasionally, depending on the characteristics of the ductwork and the regulating elements, it may be necessary to modify the Proportional and Integral Bands of the fan speed control output. To modify the Proportional and Integral Bands, follow the next sequence:



Regulation problem	Behaviour	Settings
Unstable regulation	It is not possible to maintain an stable airflow owing to the fans speeds being pumping and dumping constantly	Increase P-Band Reduce I -time
Slow regulation	Airflow set point is not achieved. While the fans do not reach their maximum speed, the increase in its speed is low.	Reduce P -Band Increase I -time

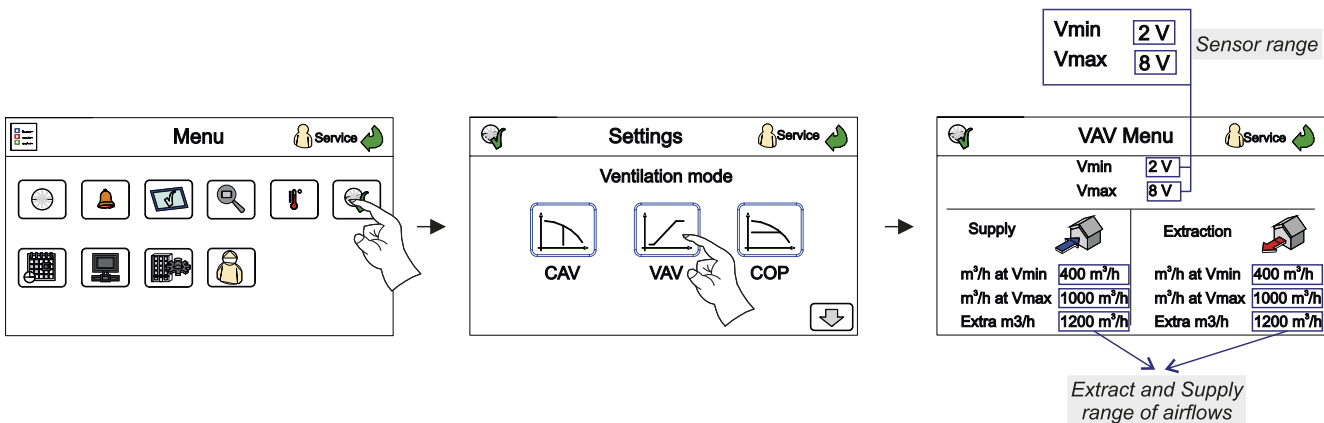
19.1.2. Variable airflow operation (VAV)

Mode recommended for variable airflow applications depending on an analogue signal (0-10V).

The set point value depends on an external 0-10V signal (sensor, BMS, etc.) connected as shown in section "14.4.3. VAV wiring diagram".

The access to the simplified parameter setting menu allows to set:

- The selection of the useful range of the signal 0-10V (see example below).
- The range of the supply and extract airflow.

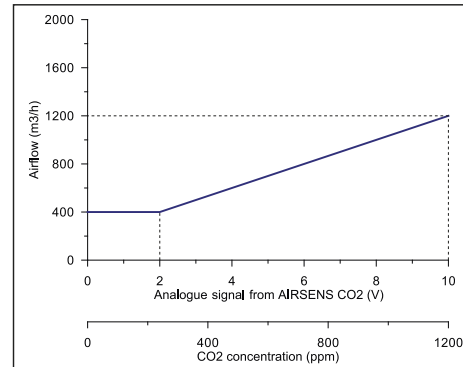


Examples:

The proportional ramp settings of the VAV mode will depend on the used sensor:

a) **S&P AIRSENS CO2** have already been programmed to control a ventilation system. In case an AIRSENS CO2 is installed within the SLIM unit, the recommended configuration would be as follows (example for SLIM 1200; nominal airflow = 1200 m³/h):

VAV Menu	
Vmin	2 V
Vmax	10 V
Supply	Extraction
m ³ /h at Vmin	400 m ³ /h
m ³ /h at Vmax	1200 m ³ /h
Extra m ³ /h	1400 m ³ /h

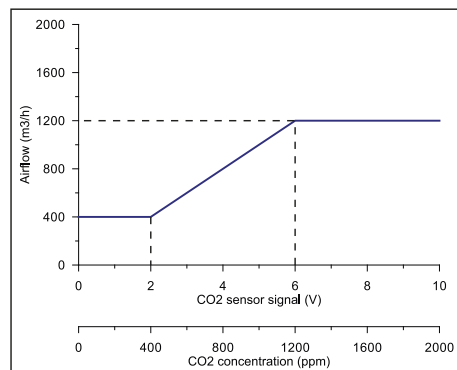


b) Standard CO2 sensors have a measure range of 0-2000 ppm and a 0-10V output.

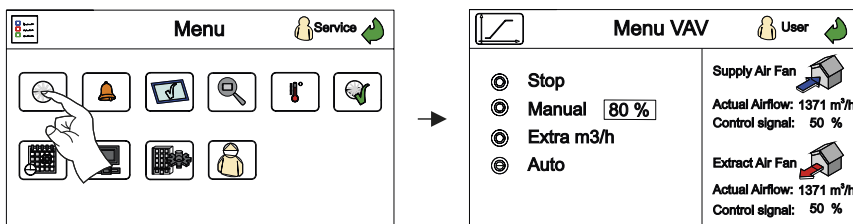
Given the fact that our interest is to keep the CO2 concentration below 1200 ppm (good Indoor Air Quality), we need to set the fans at high speed when the CO2 sensor supplies 6V. (6V = 1200 ppm).

In such a case, the recommended configuration would be (example for SLIM 1200; nominal airflow 1200 m³/h):

VAV Menu	
Vmin	2 V
Vmax	6 V
Supply	Extraction
m ³ /h at Vmin	400 m ³ /h
m ³ /h at Vmax	1200 m ³ /h
Extra m ³ /h	1400 m ³ /h



The selection of the VAV mode automatically configures the FAN MENU screen, adapting it to the VAV mode:



Stop: the unit stop.

Manual: Manually selection of airflow setpoint by percentage. If "Manual" is selected, unit won't follow the 0-10V input.

Auto: Automatic control according to 0-10V input and the time programming (if configured).

19.1.3. Constant pressure operation (COP)

Recommended mode in multi-room installations, in which regulation of airflow is done through dampers in each zone/room.

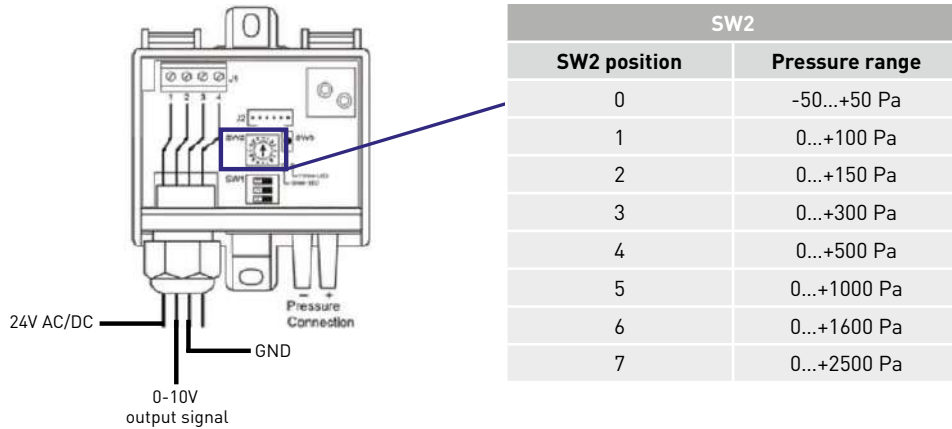
Airflows automatically modulated to maintain a constant pressure value measured by a pressure transmitter installed in the duct.

By default the controller is configured to use external pressure transmitter SPRD 0 10 B, with pressure range 0-800Pa and output 0,5-4,5V.

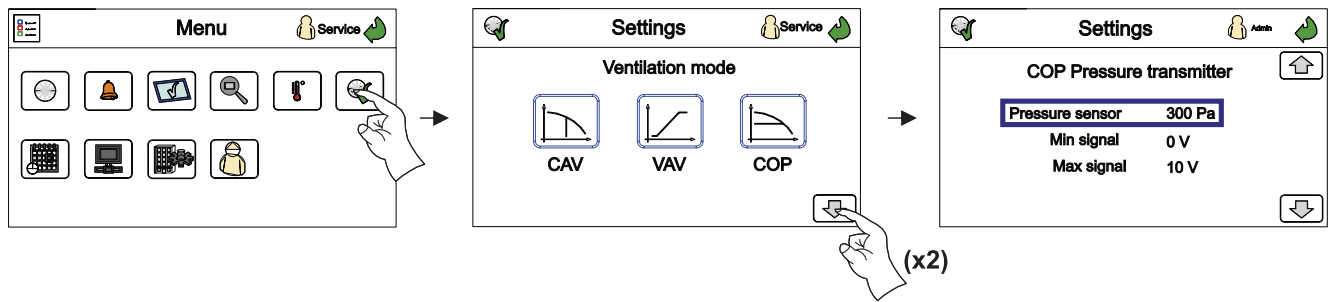
In case of using a different pressure transmitter, as TDP-S, it would be necessary to modify the "COP Pressure transmitter" initial settings according to the pressure transmitter characteristics:



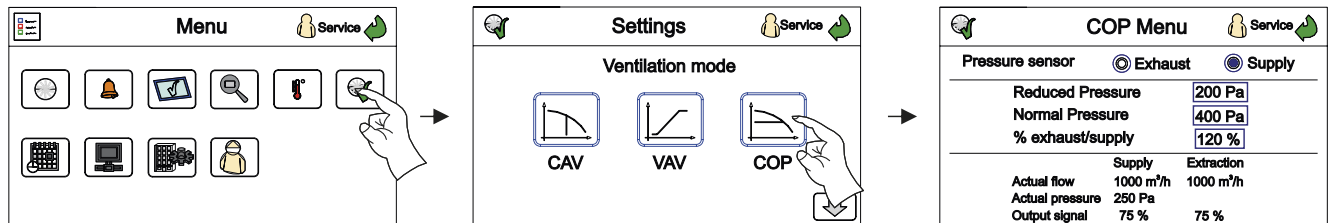
Example: If customer wants to maintain 150 Pa in the duct, TDP-S must be configured at SW2 = 3 (Pressure range 300 Pa). The setted pressure range must be as minimum twice of the set point.



Once the pressure range on the TDP-S has been configured, the same pressure range has to be setted in the SLIM touch display following the procedure shown below:

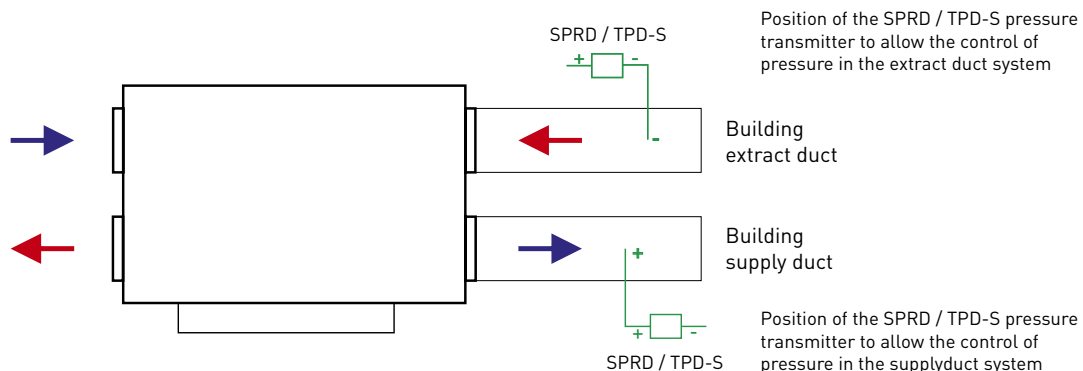


The access to the configuration menu of the COP mode is performed following the sequence:



Depending on the circuit in which the regulation elements are located, it is possible to choose among two COP control modes:

- Pressure control in supply fan (SAF), while extract fan (EAF) works as slave: SAF is controlled by the pressure transmitter signal and EAF follows SAF by a balance factor (parameter "%exhaust/supply"). One pressure transmitter (SPRD / TPD-S accessory) is needed at supply.
- Pressure control in extract fan (EAF), while supply fan (SAF) works as slave: EAF is controlled by the pressure transmitter signal and SAF follows EAF by a balance factor (parameter "%supply/exhaust"). One pressure transmitter (SPRD / TPD-S accessory) is needed at extraction.

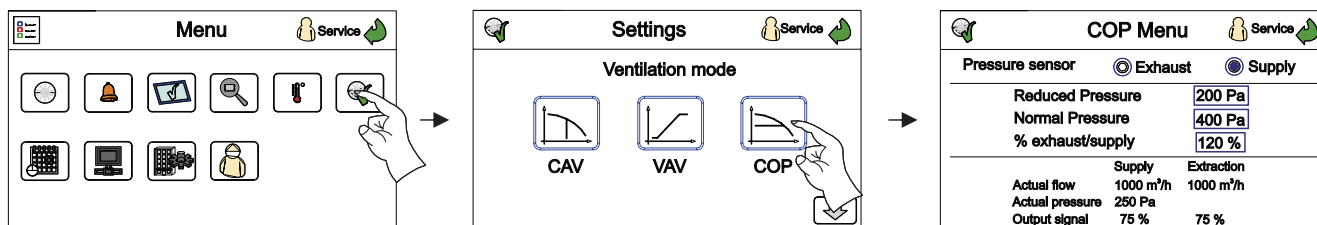


The access to the simplified parameter setting menu (see procedure below) allows:

- The selection of Normal pressure and Reduced pressure of each fan.
- The unbalance factor between supply and extract fan speed.

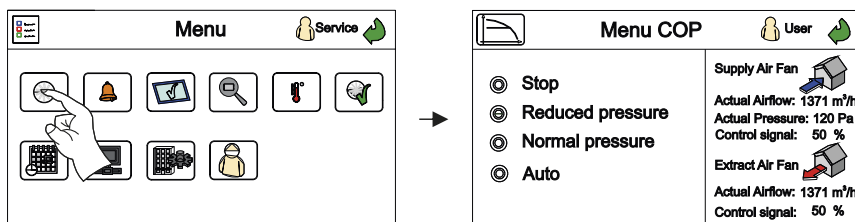
Moreover, in this screen the following information is shown:

- Current pressure (Pa) in the ductwork
- Supply and extract airflow



The selection of the COP mode automatically configures the FAN MENU screen, adapting it to the COP mode. The choice between normal or reduced airflow can be performed:

- manually (see below)
- automatically with programme schedule (see section "24. TIME PROGRAMMING")
- remotely, by external digital contact (see section "14.4.4. COP wiring diagram")



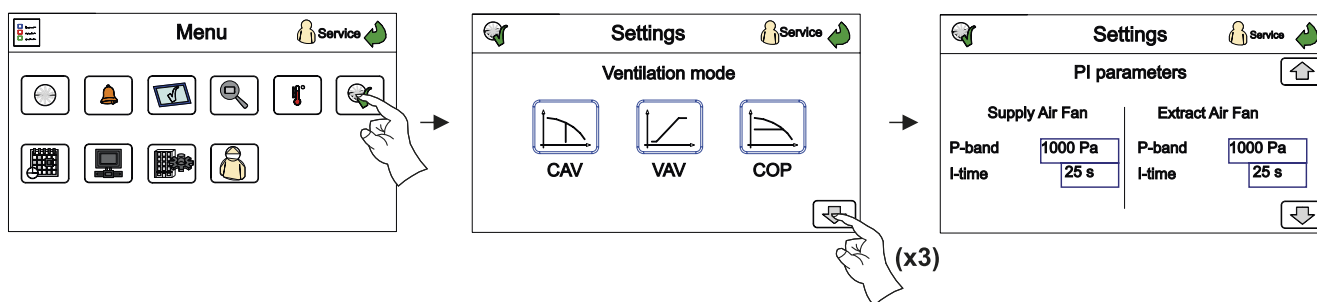
Stop: Stop de unit.

Reduced pressure / Normal pressure: Manually selection of the pressure.

Auto: Selection of set point is done according to time programming (see section "24. TIME PROGRAMMING").

Advanced level

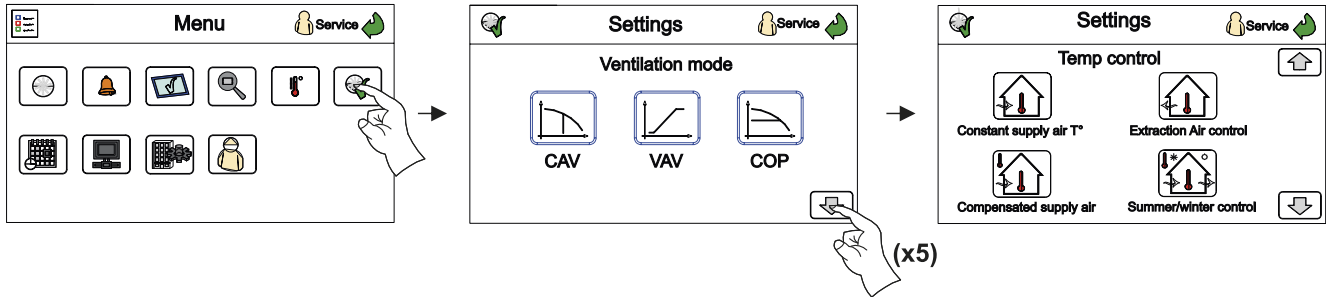
Occasionally, depending on the characteristics of the ductwork and the regulating elements, it may be necessary to modify the Proportional and Integral Bands of the fan speed control output. To modify the Proportional and Integral Bands, follow the next sequence:



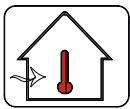
Regulation problem	Behaviour	Settings
Unstable regulation	It is not possible to maintain an stable airflow owing to the fans speeds being pumping and dumping constantly	Reduce P-Band Increase I-time
Slow regulation	Airflow set point is not achieved. While the fans do not reach their maximum speed, the increase in its speed is low.	Increase P-Band Reduce I-time

19.2. TEMPERATURE CONTROL

It is possible to select between 4 different types of postheating control. To select it, follow the next sequence:



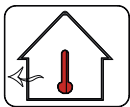
19.2.1. Constant supply air temperature



Constant supply air T°

Temperature controller works comparing supply air temperature with set point defined by console.

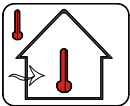
19.2.2. Supply temperature depending on extract air temperature



Extraction air control

Supply air temperature is controlled in cascade with ambient temperature. Supply air temperature is defined depending on difference between ambient temperature and set point. The controller tries to keep ambient temperature limiting duct temperature, which is maintained around 12 and 30°C, at same time.

19.2.3. Compensated supply air

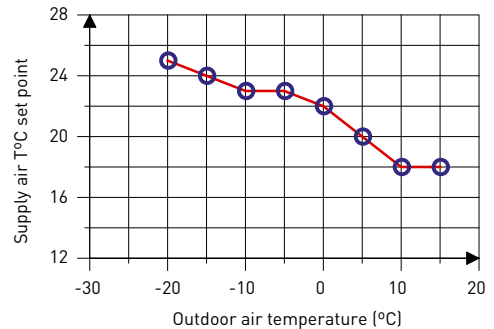


Compensated supply air

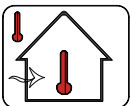
Controller operation is similar to first case. Main difference is a compensation curve defined from factory with 8 set points instead of fixing a single temperature set point.

Compensation curve

The supply set point is automatically adapted with regards to this curve. However, you can manually change the set point from the main screen (+/- 3°C).



19.2.4. Summer/winter control



Summer/winter control

Depending on the outdoor air temperature the controller select the most suitable temperature control mode, between "Supply temperature depending on extract air temperature" if outdoor temperature is higher than 13°C or "Compensated supply air" for the rest of cases.

20. REMOTE ON/OFF

It is possible to start-stop the unit remotely by means of an external digital contact (see electric diagrams). The contact opening between +C1 and 21 (named as "Remote ON/OFF" in the wiring diagrams), will produce the unit stop even if the timer or one of the signals "Remote Normal Speed" or "Remote Extra Speed" says it should stay in running mode.



When the equipment is stopped remotely the touch display will show an alarm message warning that it is possible that the unit will be startep up from remote at any time.

21. REMOTE NORMAL SPEED

By closing an external digital contact (see electric diagram), it is possible to force the fan operation at "Normal Speed" for a setted time. (30 mins. by default)

This function can be activated, only when the unit is not within a timer period of normal speed or extra speed.

If this function is activated while the unit is in an "normal speed" or "extra speed" time period, the counter will start counting after the time period has expired.

22. REMOTE EXTRA SPEED (not available in COP mode)

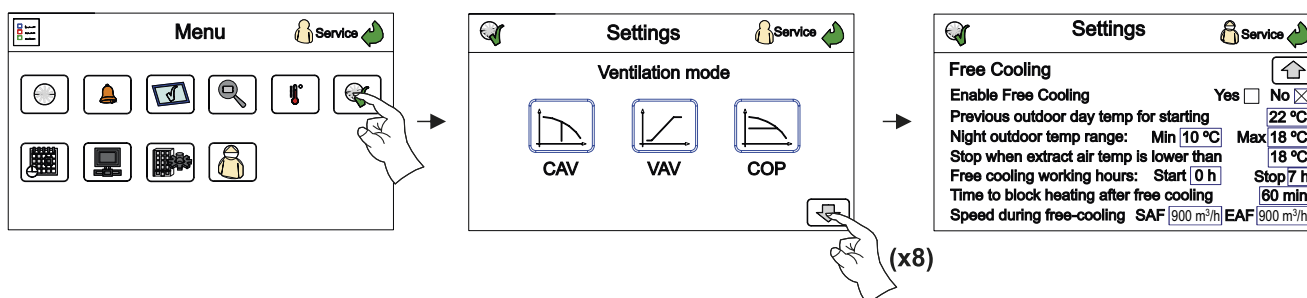
By closing an external digital contact (see electric diagram), it is possible to force the fan operation at extra speed for a setted time. (30 mins. by default)

If this function is activated while the unit is in an "extra speed" time period, the counter will start counting after the time period has expired.

23. FREE COOLING BY NIGHT

By default, this feature is disabled. To enable it is necessary to access to Fan Settings. This function is used during the summer to cool off buildings during the night by using fresh outdoor air. This allows reducing the need to resort to air conditioning during the day.

To use the free cooling by night function, the information received from the outdoor probe (fresh air) and from the extract temperature probe is used. These two probes are present and integrated in the unit.



As you can see above, some of the start conditions can be modified. By default, the conditions for free-cooling activation to occur are as follows. (ALL the conditions must be satisfied):

Start conditions:

- Less than 4 days have elapsed since the last start of the installation.
- The outdoor temperature during the previous operation period exceeded the force limit of 22°C.
- It is between midnight 0:00 am and 7:00 am in the morning.
- The timer outputs for "Normal flow", and "Extra flow" are off.
- The "Remote Normal Speed" is not activated (external switch).
- The unit is not remotely stopped by means of the external switch" (see section "20. REMOTE ON/OFF").
- A time program will be activated ("Start") within the next 24 h.

Once activated, it runs for 3 minutes to make sure that the temperature measurements are representative (by creating air movement in the ducts). After three minutes, the controller checks the stop conditions:

Stop conditions:

- The outdoor temperature is above 18°C or below 10°C (risk of condensation).
- The extract temperature is less than the stop value (18°C).
- The time programs for the "Normal flow" or "Extra flow" are set to "Start".
- The "Remote Normal speed" is activated (external switch).
- The unit is remotely switched off by means of the external switch (see section "20. REMOTE ON/OFF").
- It is later than 7:00 am in the morning.

If at least one of these conditions is satisfied after the first three minutes of operation, then the unit is stopped again.

When the free cooling function is active, the fans run at the speed of the fans is set depending on the selected mode:

- Fans in CAV mode: Normal airflow + Offset.
- Fans in COV mode: Normal pressure + Offset.
- Fans in VAV auto: Airflow corresponding to the CO2 level + Offset.
- Fans in VAV manual: Freecooling is not compatible with this mode.

24. TIME PROGRAMMING

The controller has several clocks which allow the individual programming of: Normal Speed, Reduced Speed, Extra Speed and Stop.

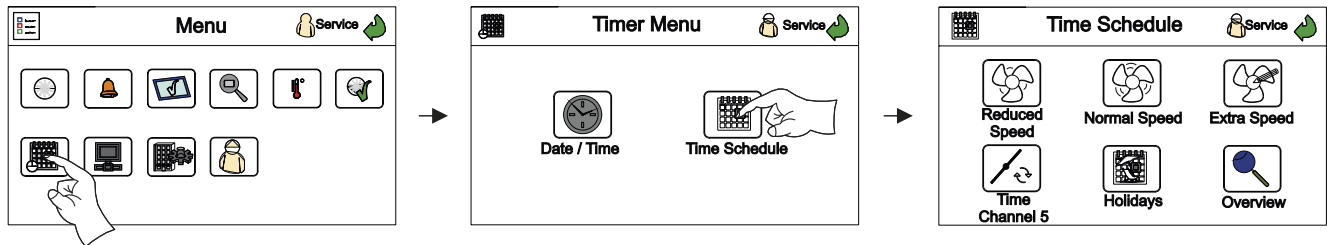
- Normal speed corresponds to normal pressure in COP mode and normal flow in CAV mode.
- Reduced speed corresponds to reduced pressure in COP mode and reduced flow in CAV mode.
- Extra speed corresponds to extra flow in CAV and VAV.

The programmer works for intervals (outside these intervals the fans are stopped). The installer can define up to 4 operation intervals per day in each speed. Find the procedure to set the time schedule below.

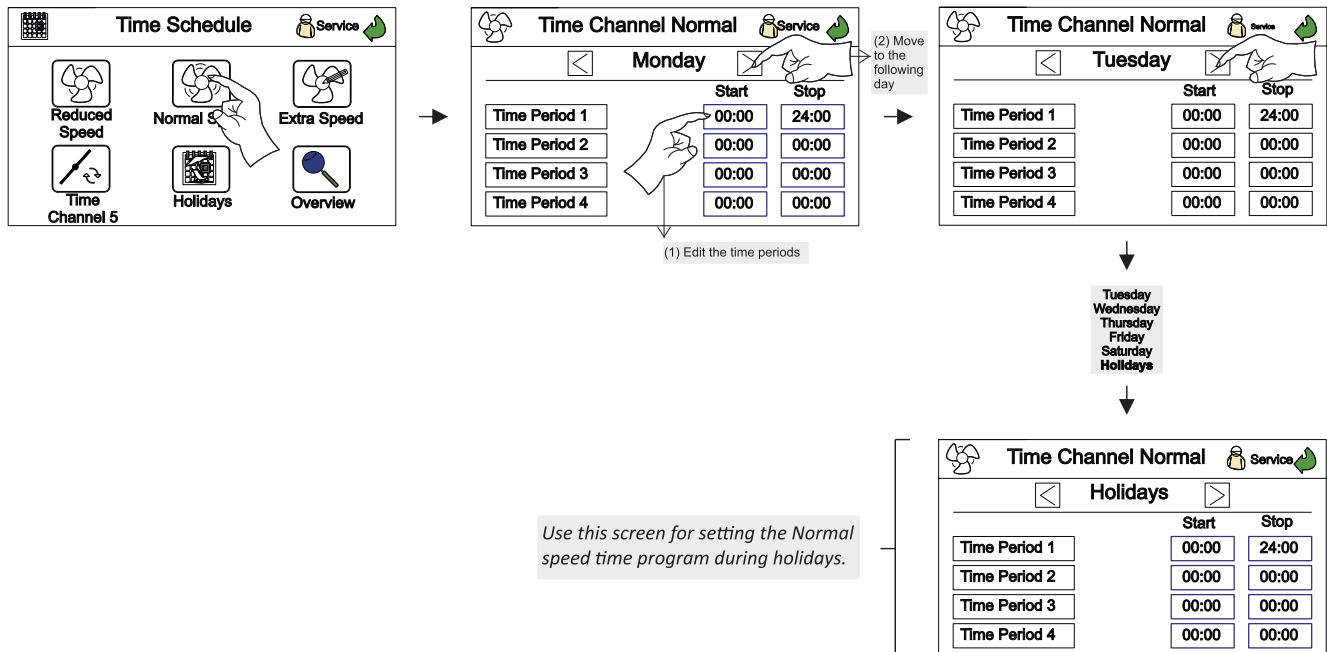
Particularities of the mode VAV Auto

When VAV Auto mode is selected and a time program is set in "Normal speed" or "Reduced speed", the unit will manage the fans speed according to the 0-10V input from an external sensor. If the time program is set in Extra speed the fans will run at maximum speed.

24.1. CONFIGURE A TIME PROGRAM

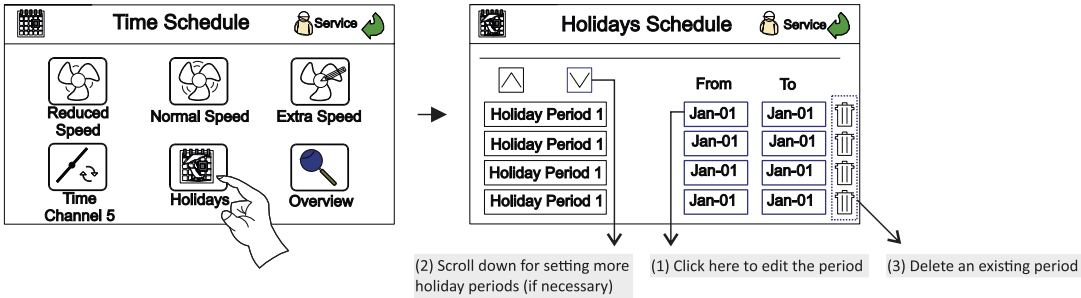


Configuring the Normal Speed time program:
Same procedure as for configuring the Reduced Speed & Extra Speed time programs.



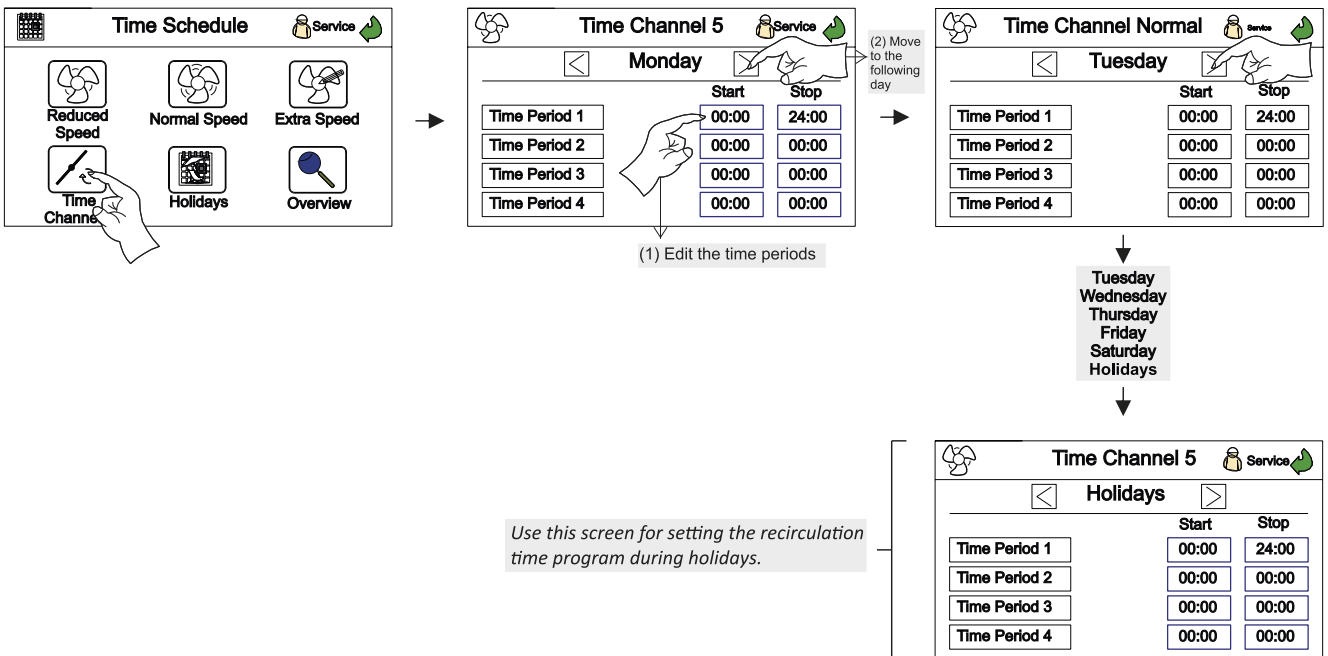
24.2. DEFINE HOLIDAYS

In order to define the holiday periods, installer must follow these steps:



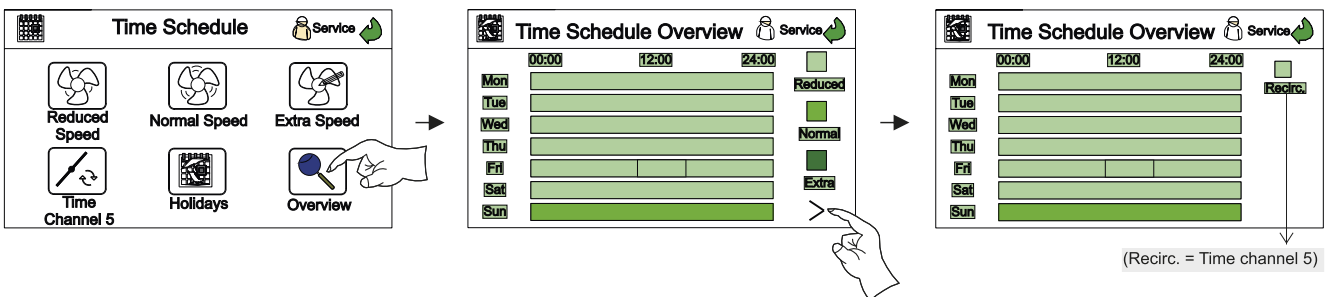
24.3. DEFINE INTERVALS FOR RECIRCULATION

In case a mixing damper is installed, it is possible to define intervals for recirculation:



24.4. TIME PROGRAMMING OVERVIEW

Finally, the overview menu will allow installer to double check the time programming settings:



25. FIRE MODE

It is possible to assign a digital input to the FIRE function. After receiving the signal from an external fire control unit, a predetermined behavior of the heat recovery unit fans will be forced .

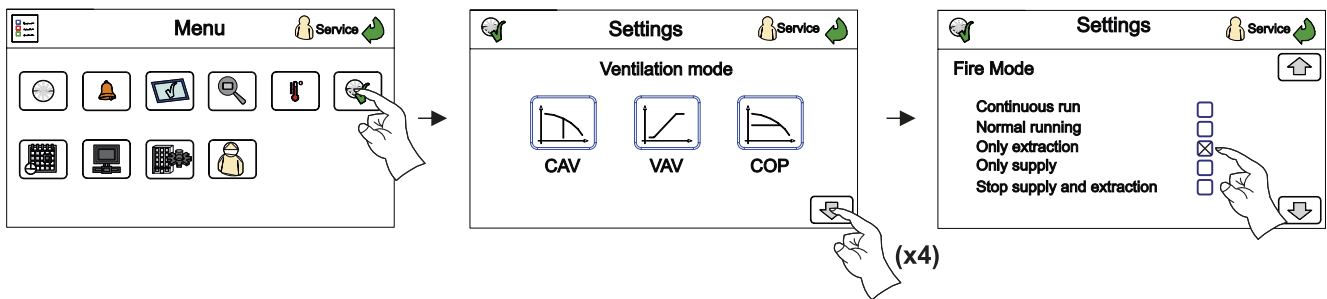
Input signal type: Voltage-free contact.

SLIM control panel is supplied with a bridge to avoid the appearance of the alarm (contact open = Alarm) See section "14.2. Corrigo controllers", and check "CONTROLLER 2" wiring diagram for details. As you can see, Fire Alarm input is placed in terminals +C2 & 27. It is possible to look for this information in section "14.3.5. Inputs & Outputs", too.

Regarding the Fire Mode function, it is possible to assign the following fire alarm strategies:

Strategy	Description
Continuous run	Supply air fan will run at maximum speed while the extract air fan will: a) follow the "normal" set point if the unit was running at "normal speed" or "reduced speed" before the activation of the fire function b) follow the "extra" set point if the unit was running at "extra speed" before the activation of the fire function <ul style="list-style-type: none"> The unit will continue running no matter any other alarm appears (no unit autoprotection). The unit will not respond to "OFF order". The unit will stop only by switching off the supply.
Normal running	Similar to <i>Continuous run</i> but the unit will respond to "OFF order". <ul style="list-style-type: none"> The unit will continue running as long as no type-A alarms appear (see section "34.3. Failure list", for details about type A alarms).
Only extraction	<i>Continuous run</i> with the supply air fan being stopped while the extract air fan will: a) follow the "normal" set point if the unit was running at "normal speed" or "reduced speed" before the activation of the fire function b) follow the "extra" set point if the unit was running at "extra speed" before the activation of the fire function <ul style="list-style-type: none"> The unit will continue running no matter any other alarm appears (no unit autoprotection).
Only supply (by default)	<i>Continuous run</i> with the supply air fan running at 100% and the extract air fan being stopped. <ul style="list-style-type: none"> The unit will continue running no matter any other alarm appears (no unit autoprotection).
Stop extraction and supply	Unit stopped.

In all cases, upon activation of the alarm, the display shows ALARM message. Here's, how to configure the fire mode function:



26. SMOKE MODE

It is possible to assign a digital input to the SMOKE MODE function. After receiving the signal from an external smoke control unit, a predetermined behavior of the heat recovery unit fans will be forced.

Input signal type: Voltage-free contact.

SLIM control panel is supplied with a bridge to avoid the appearance of the alarm (contact open = Alarm) See section "14.2. Corrigo controllers", and check "CONTROLLER 1" wiring diagram for details. As you can see, Smoke Alarm input is placed in terminals +C1 & 24. It is possible to look for this information in section "14.3.5. Inputs & Outputs", too.

When the alarm is activated (contact open), the unit will follow the only extraction strategie (see section "25. FIRE MODE", for further details). This strategie will be active as long as the contact remains open, no matter if any alarm is active (no unit autoprotection).

27. WATER HEATER FROST PROTECTION

In models equipped with hot/reversible water coil (see section "29. INSTALLATION AND CONTROL OF EXTERNAL BATTERIES"), the temperature of the water return is continually supervised by a probe, in order to prevent it from freeze.

Depending on the unit status, the controller will activate 2 different strategies.

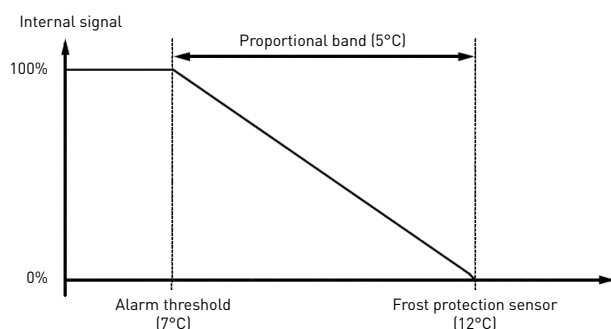
Unit stopped:

The controller will automatically go into standby when the operating mode is changed to "Off".

In this configuration, in order to give antifreeze protection to the water coil, the controller manage the heating valve maintaining a constant water temperature (25°C by default).

Unit running:

The analogic output for opening the heating valve increases when the frost protection temperature drops below the "Frost protection alarm threshold (7°C) + Prop. (5°C)" to reach 100% when the temperature is equal to the frost protection alarm threshold. In this case the unit is stopped and the isolation dampers (if exist) closed .



It is possible to complete this strategy of frost protection by adding glycol to the water, to ensure protection in case of failure in the hot water production system.

28. PROTECTION OF HEAT EXCHANGER

This functionality prevents freezing of the condensates existing inside the heat exchanger (on the side of expulsion of air to the outside).

In order to protect the heat exchanger, the SLIM controller implemented 4 different strategies:

Function	Strategy
Preheater control	A preheater is needed as an accessory. See section "30. INSTALLATION AND CONTROL OF AN ELECTRICAL PREHEATER", for details. The preheater will be activated when the exhaust air temperature descends 6°C . The preheater heats the external air entering in the unit before it reaches the heat exchanger.
Fans unbalancing	If the exhaust air temperature descends 4°C , the unit comes into DEFROST MODE: The supply air fan is set at 50% of its set point while the extract air fan continues following the same set point. This function will be active during 30 minutes, when this time expires the exhaust air temperature is checked again during 1 minute.
By-pass opening	This function is active when the exhaust air temperature descends 2°C . At that moment the by-pass damper opens sending the outdoor air directly into the building. The extract air is used to defrost the heat exchanger. This function is active during at least 5 minutes. In this situation, the alarm <i>Analogue de-icing</i> is activated.
Supply air temperature supervision	Regardless of the protection strategies activated, if the supply air temperature falls below 11°C , after a time delay of 5 minutes the unit will stop and restart again after 1 hour.

29. INSTALLATION AND CONTROL OF EXTERNAL BATTERIES

The SLIM heat recovery units are complemented by a complete range of air treatment accessories consisting of:

- Electrical postheater module
- Hot water coil module.
- Reversible water coil module.
- Chilled water coil module.
- Direct expansion coil module

For more information about the external modules, see sections "7.2. External modules dimensions", and "11.2. External batteries".

List of external modules by models:

Heat recovery unit model		Electrical postheater module	Hot water coil module	Reversible water coil module	Chilled water coil module	Direct expansion coil module
SLIM 800	R	5800040900 SL-DI 800 3 M R	5800038500 SL-DC 800 2 R	5800041700 SL-DFR 800 3 R	5800039300 SL-DF 800 5 R	5800040100 SL-DX 800 4 R
	L	5800040800 SL-DI 800 3 M L	5800038400 SL-DC 800 2 L	5800041600 SL-DFR 800 3 L	5800039200 SL-DF 800 5 L	5800040000 SL-DX 800 4 L
SLIM 1200	R	5800041100 SL-DI 1200 4 M R	5800038700 SL-DC 1200 2 R	5800041900 SL-DFR 1200 3 R	5800039500 SL-DF 1200 5 R	5800040300 SL-DX 1200 4 R
	L	5800041000 SL-DI 1200 4 M L	5800038600 SL-DC 1200 2 L	5800041800 SL-DFR 1200 3 L	5800039400 SL-DF 1200 5 L	5800040200 SL-DX 1200 4 L
SLIM 1600	R	5800041300 SL-DI 1600 7,5 T R	5800038900 SL-DC 1600 2 R	5800042100 SL-DFR 1600 3 R	5800039700 SL-DF 1600 5 R	5800040500 SL-DX 1600 4 R
	L	5800041200 SL-DI 1600 7,5 T L	5800038800 SL-DC 1600 2 L	5800042000 SL-DFR 1600 3 L	5800039600 SL-DF 1600 5 L	5800040400 SL-DX 1600 4 L
SLIM 2000	R	5800041500 SL-DI 2000 9 T R	5800039100 SL-DC 2000 2 R	5800042300 SL-DFR 2000 3 R	5800039900 SL-DF 2000 5 R	5800040700 SL-DX 2000 4 R
	L	5800041400 SL-DI 2000 9 T L	5800039000 SL-DC 2000 2 L	5800042200 SL-DFR 2000 3 L	5800039800 SL-DF 2000 5 L	5800040600 SL-DX 2000 4 L

29.1. ACCESSORIES ASSEMBLY

Accessories are installed on the supply air outlet:



The assembly can be done with the unit standing on the floor or once the unit has been hanged against ceiling. The quick mounting system and its perfect integration with the heat recovery unit provides a considerable saving in the mounting time comparing them with the conventional accesories.

Before getting started...

- It is required to add a sealing strip (rubber seal - not delibered from factory) all along the supply flange perimeter to ensure the tightness of the assembling unit-external module.



Note 1: A external module is designed to allow the fitting of another external module in a row, creating a "tra-in- system". **No more than 2 external modules can be installed in a row.**



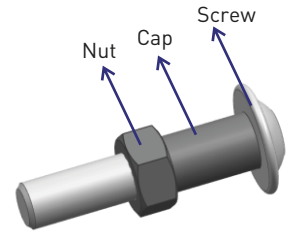
Note 2: **The external modules must be hanging against ceiling.** The assembling system won't support the weight of the external modules.

Note 3: There are air-sense stickers in all the external modules. Check them to install the modules in the correct position.

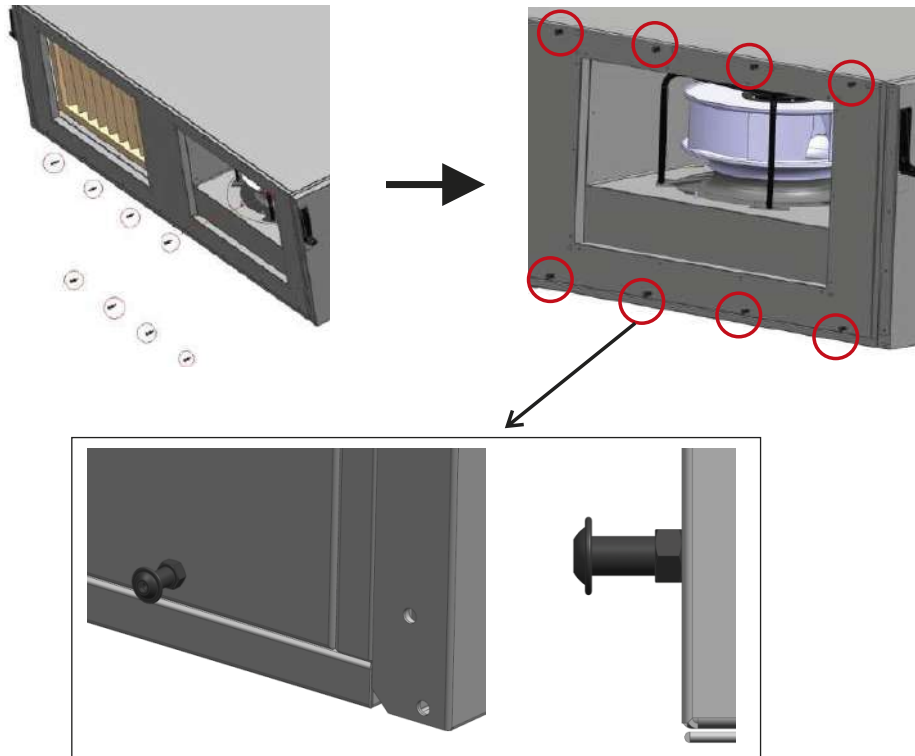
In order to proceed with the assembly, follow the next steps:

1. Install the cap-screws over the main unit

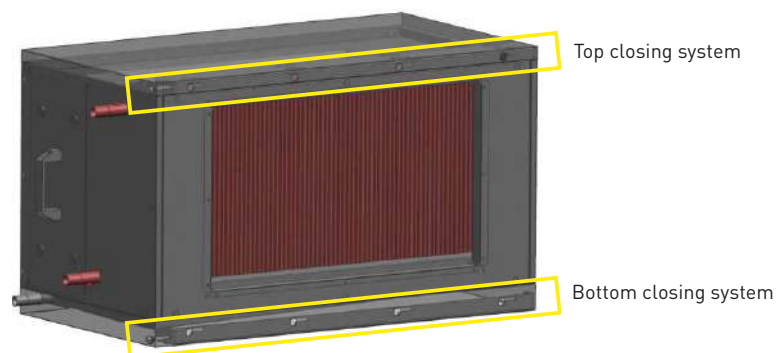
The cap-screws are built from a screw, a cap and a nut and they are supplied assembled when purchasing an external module, like in the following picture:



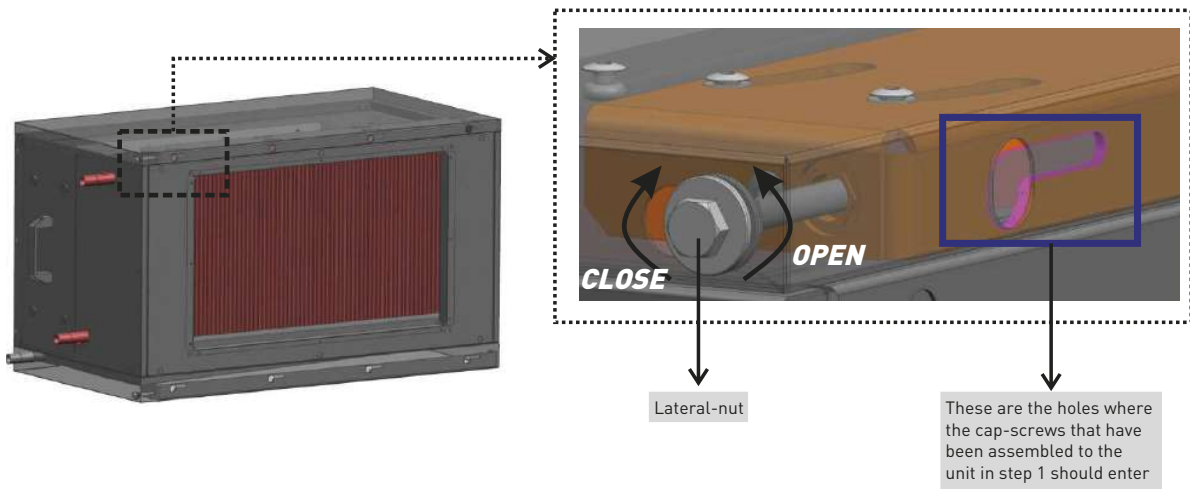
Screw the cap-screws until the nut touches the unit:



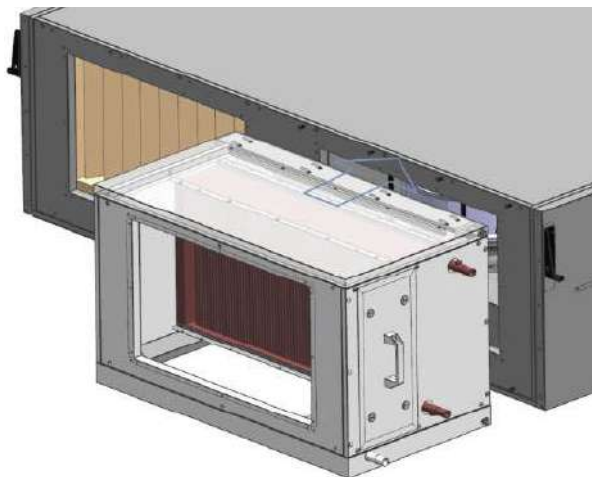
2. Once the cap-screws have been screwed on the SLIM unit, double check that the “closing systems” of the **external module** are in open position:



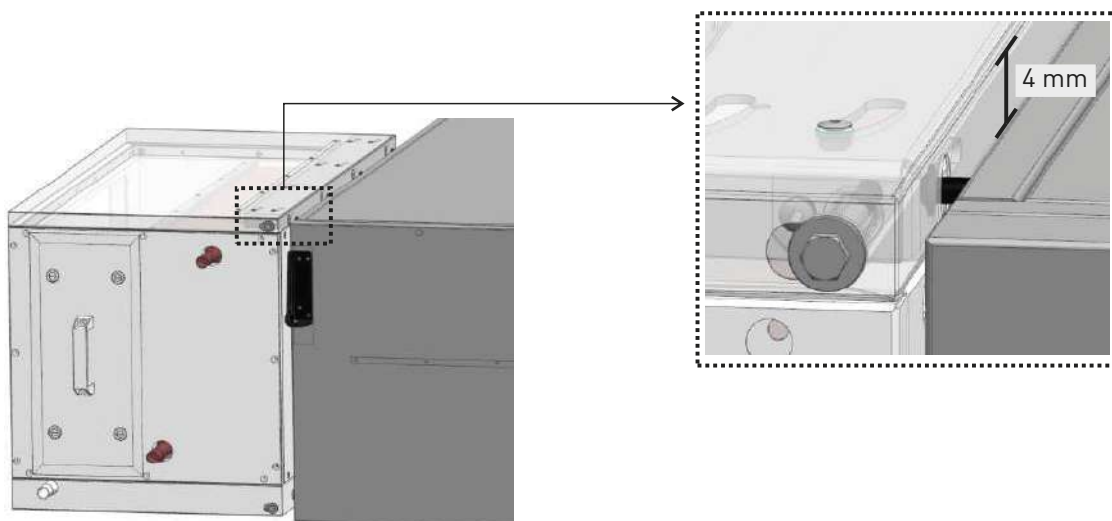
If the system is in open position, it will be possible to introduce a screw in the highlighted hole in the picture below. Use the lateral- nut to open the system if necessary:



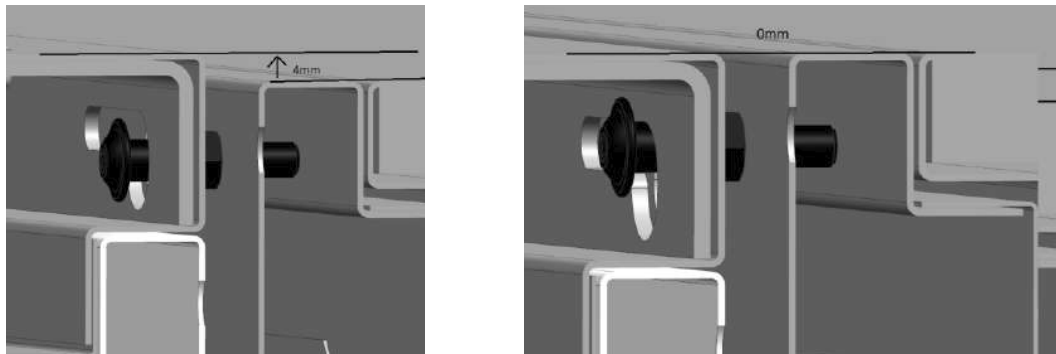
3. Approach the external module to the main unit until the cap-screws are into the closing system.



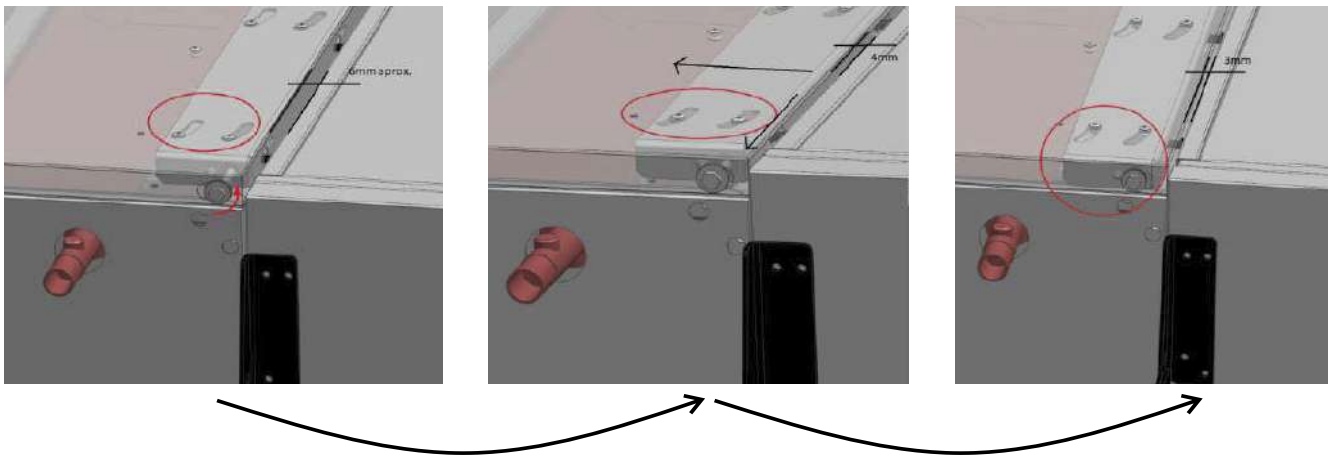
When approaching the external module to the main unit, it is necessary to raise slightly (4mm aprox.) the module with regards to the main unit in order to allow the head of the cap-screws entering in the external module:



Once the cap-screws are inside the closing system, (inside the external module), let the external module “fall” so that it will be resting in the desired position:



4. Tight the closing system to fit the external module and ensure the tightness of the complete assemble by means of the lateral- nut:

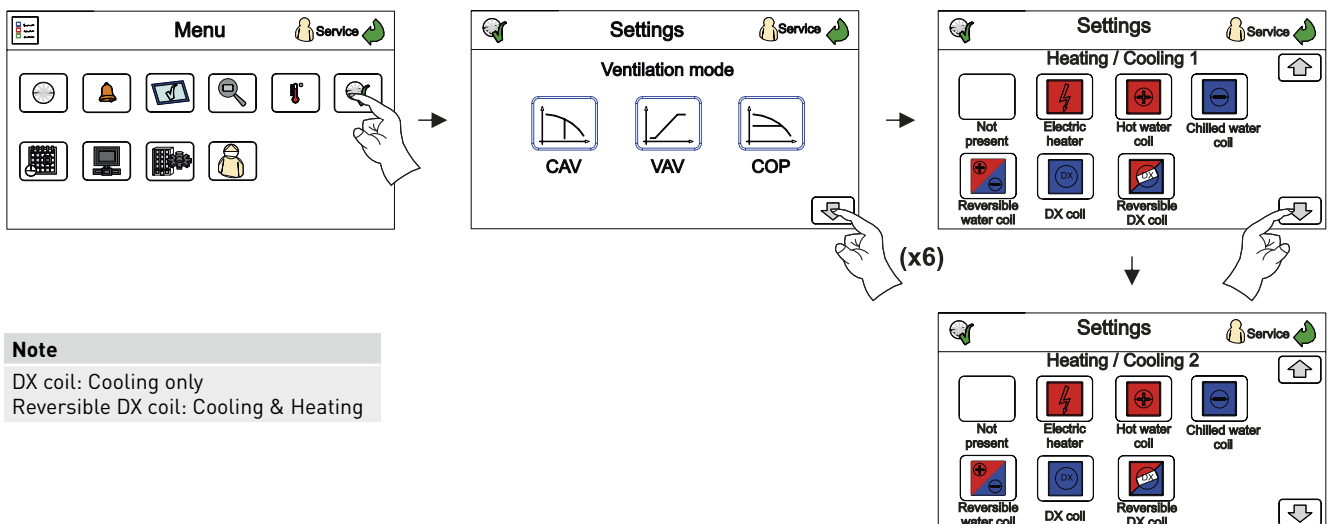


As a result, we get a 3 mm distance between the main unit and the module. Taking into account that there will be a rubber seal between the unit and the external module, we can conclude that tightness is properly ensured.

29.2. CONFIGURATION OF EXTERNAL MODULES OF REFRIGERATION/HEATING BATTERIES

Once the corresponding wiring has been done (see section “14.4. External components connection drawings (examples)”), it will be necessary to reconfigure the SLIM controller from the SETTINGS menu.

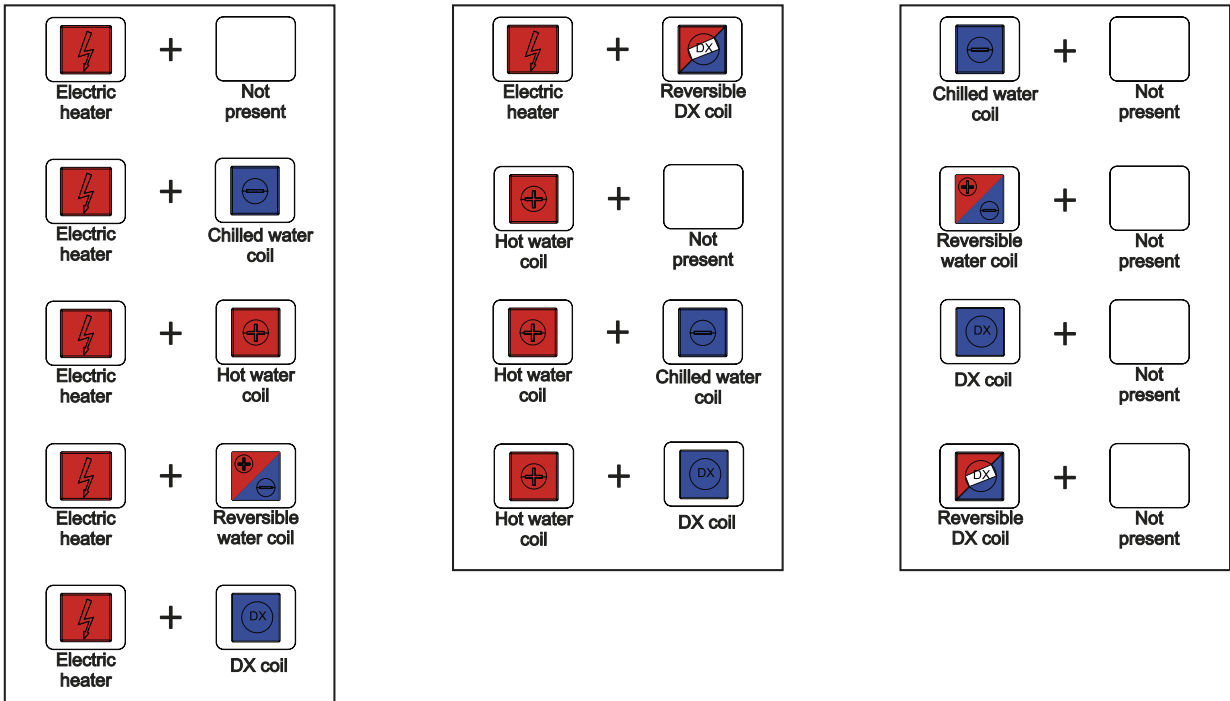
It is possible to configure up to 2 different external modules in a row: “Heating/Cooling 1” & “Heating/Cooling 2”. Coil module reconfiguration is included at **Settings** menu.



Note

DX coil: Cooling only
 Reversible DX coil: Cooling & Heating

List of possible coils combinations:



Note

DX coil: Cooling only
 Reversible DX coil: Cooling & Heating

Note 2

Do not set combinations out of this list

30. INSTALLATION AND CONTROL OF AN ELECTRICAL PREHEATER

Indicated for ventilation installations located in cold zones where the outside temperatures are usually below -10°C.

There is a version of SLIM with integrated pre-heating coil, SLIM-PH (factory mounted). It is also possible to add the preheating coil later, on a unit that was ordered without preheating. The SLIM heat recovery units can be complemented by an electrical preheater. In cold zones it is advisable to provide preheating electric batteries located in the outside air intake of the heat recovery unit. The preheater increases the temperature of the outdoor air, avoiding the continued activation of heat exchanger protection functions like *Fans unbalancing* or *By-pass opening* and the discomfort that these situations can cause. See section "28. PROTECTION OF HEAT EXCHANGER", for further details.

Electrical preheaters are delivered as accessories. See the table of electrical preheater by model below:

Heat recovery unit		Electrical preheater
SLIM 800	R	5800036300 SL-PH 800 2,2 M R
	L	5800036400 SL-PH 800 2,2 M L
SLIM 1200	R	5800036500 SL-PH 1200 3 M R
	L	5800036600 SL-PH 1200 3 M L
SLIM 1600	R	5800036700 SL-PH 1600 6 T R
	L	5800036800 SL-PH 1600 6 T L
SLIM 2000	R	5800036900 SL-PH 2000 7,5 T R
	L	5800037000 SL-PH 2000 7,5 T L

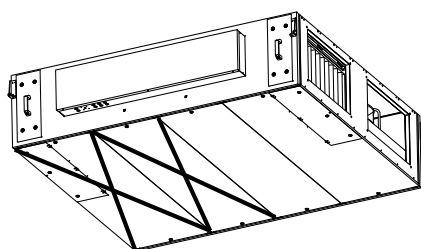
30.1. INSTALLATION OF AN ELECTRICAL PREHEATER

Not necessary in case of SLIM-PH with preheater factory mounted.

SLIM electrical preheaters have been designed to be installed on site, integrated inside the heat recovery unit. Find the procedure to install the electrical preheater below (example for SLIM-R):

a) Open the two sliding doors marked in the following image.

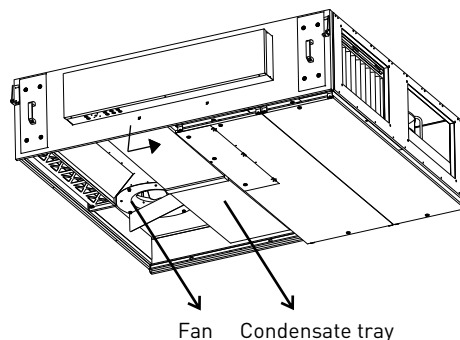
Outdoor duct connections



Indoor duct connections

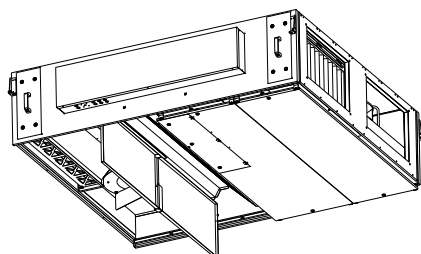


b) Move the panels. Fan and condensate tray will be visible.



Fan Condensate tray

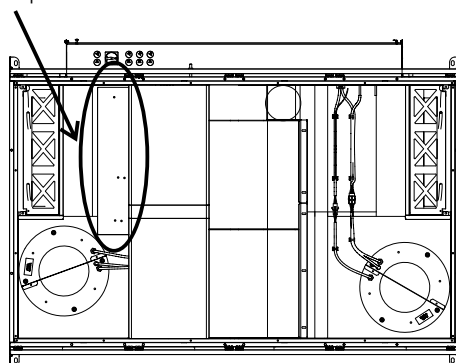
c) Turn the condensate tray over itself.



d) Remove the specific panel for electrical preheater location

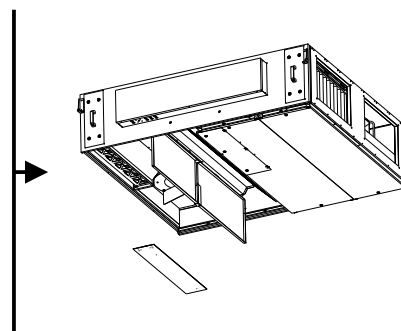
Remove this panel

Outdoor duct connections

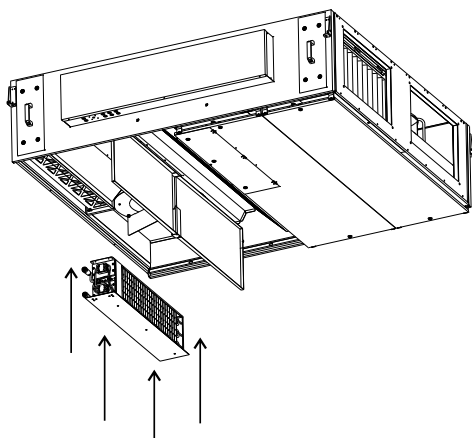


SLIM-R (Bottom view)

Indoor duct connections

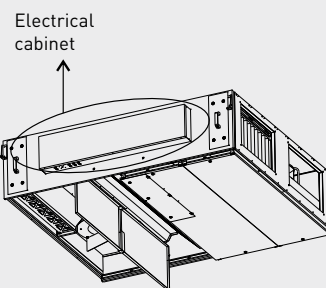
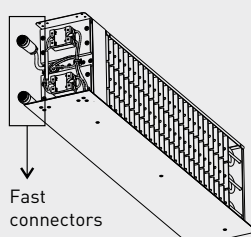


e) Place the electrical preheater inside the unit.



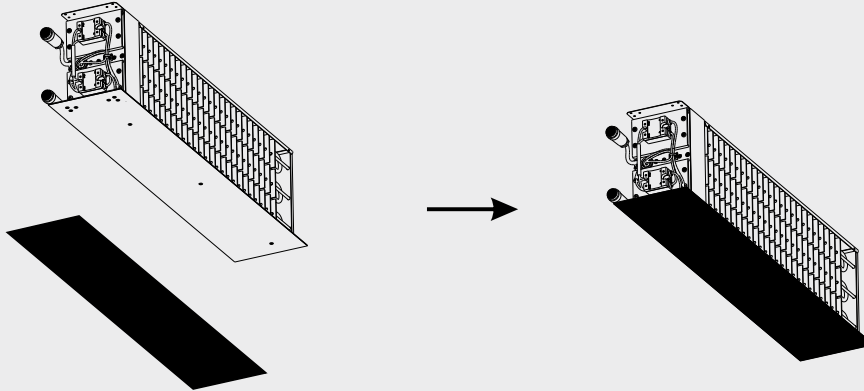
IMPORTANT

Please note that the electrical preheater is supplied within 2 fast-connectors. Place the electrical preheater in a way that these fast-connectors are facing the electrical cabinet of the slim unit.



ATTENTION

Within the electrical preheater, an isolation cover made from rubber seal is delivered. **Once the preheater is placed inside the unit**, use moisture-resistant glue to attach the isolation cover to the preheater panel. It is recommended to carry out with this attachment after making the electrical connection and double checking that the electrical preheater works properly.

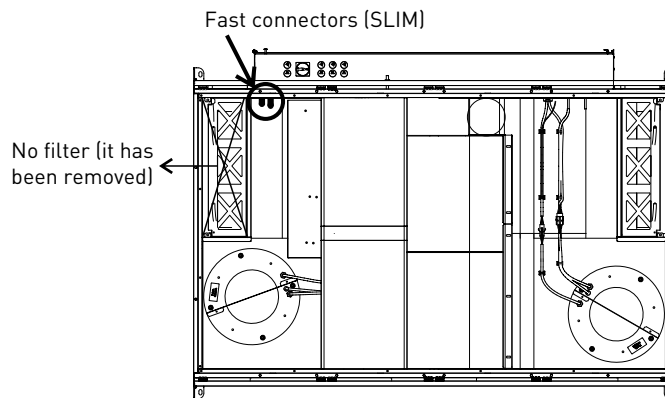


f) Connection of the fast-connectors

Before connecting...

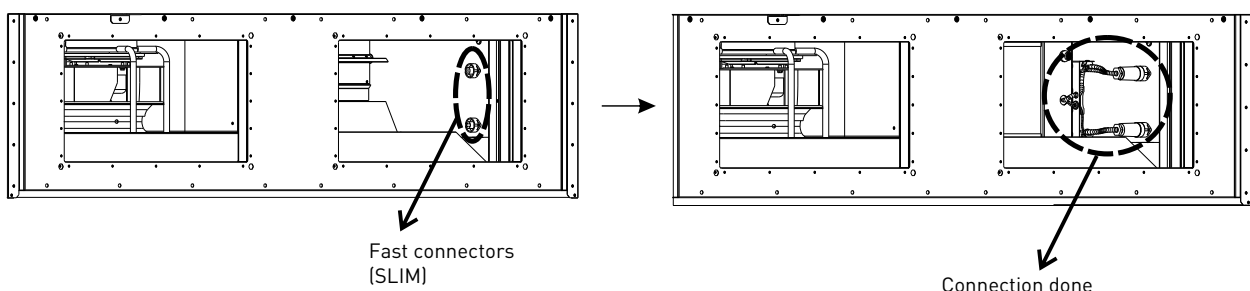
Put the condensate tray back in the original position (step "c" of this procedure) and remove the filter through the bottom (see section "10.1. Removing the filter through the bottom").

Taking a view across the filtering section, it is possible to see the fast connectors of the SLIM unit.



Connect the fast connectors from the electrical preheater with the fast connectors of the SLIM unit. Fast connectors in the SLIM unit are protected with taps that have to be unscrewed first.

The two type of connectors are different so it is not possible to connect them incorrectly.

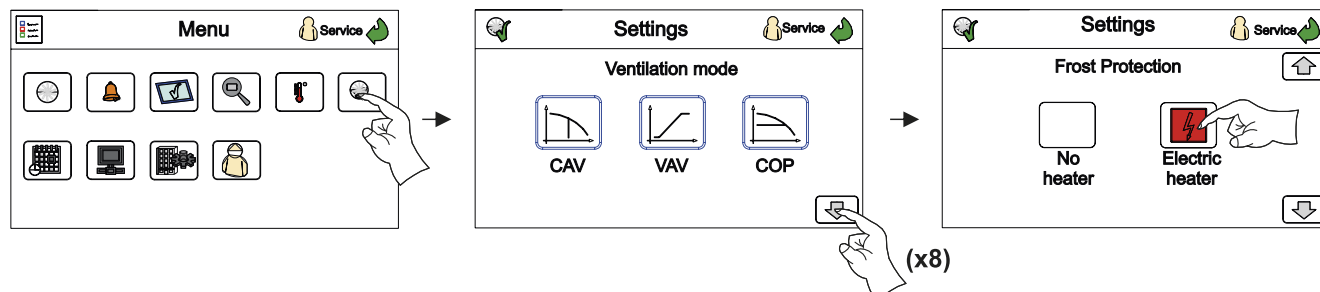


Reminder: Put the filter back inside the unit.

30.2. CONFIGURATION OF AN ELECTRICAL PREHEATER

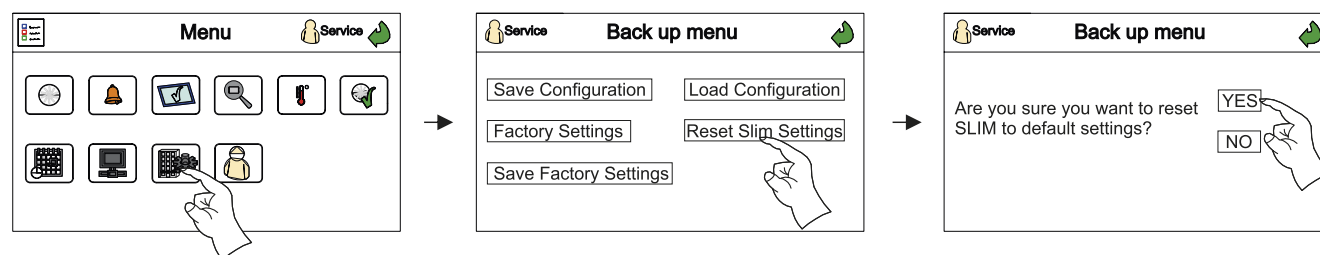
Not necessary in case of SLIM-PH with preheater factory mounted.

Once the preheater installation has been done, it will be necessary to reconfigure the SLIM controller from the SETTINGS menu:



31. RESET THE CORRIGO CONTROLLER

In some cases, after several adjustments or due to a bad working, it could be necessary to reset the controller. In such a case, perform the following sequence of operations:



The ventilation mode of the system (see section "19.1. Commissioning") should now be re-set-up, together with ensuring that the additional parameters (Language, K-Constant, heater type etc.) are correct. For further details check section "19. INSTALLER LEVEL".

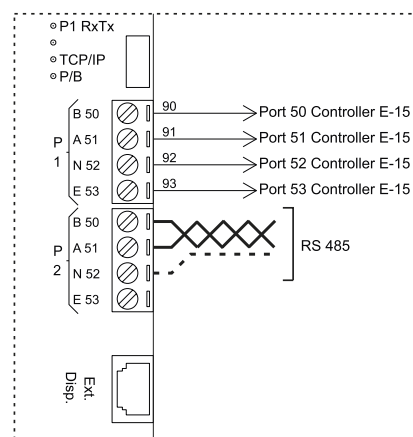
The same way, all those advanced parameters that were configured before the reset was performed, must be reconfigured after the reset (Night free-cooling, time settings, Modbus/Bacnet communication, fire alarm strategy).

32. INTEGRATION IN BUILDING MANagements SYSTEMS (BMS)

32.1. CONNECTION TO BMS - MODBUS

32.1.1. MODBUS RTU on port 2 - RS 485

Controller number 1 (see section "14.2.1. External electrical box - composition") has a RS485 communication port (P2) that can be dedicated to Modbus RTU communication.





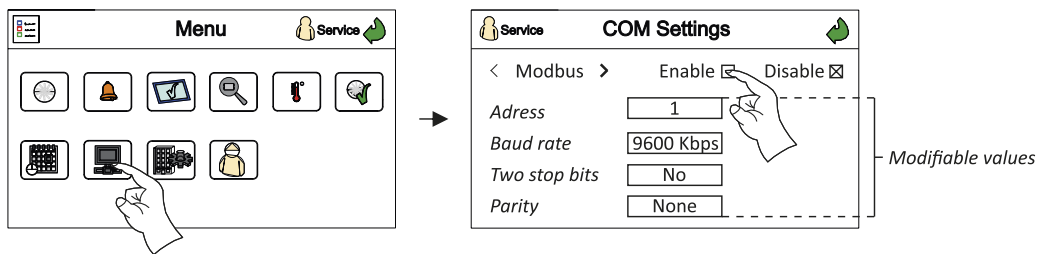
The default configuration values of a Corrigo controller are shown in the table below.

Default Modbus communication values	
Slave Address	1
Baud rate	9600
Word Length	8
Parity	NONE
Stop bits	1

If few units are connected, the address of each one must be different from the others, possible address from 1 to 254. The Slave Address can be set using the external display. The communication parameters must be the same for all the units connected on the same network.

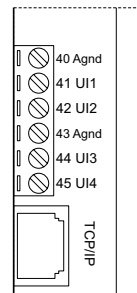
Speeds available: 9600 (default), 19200, 38400 or 76800. Modbus communication takes place using 1 stop bit, it is possible to activate 2 bits stop. Parity could be modified as well.

The modbus communication must be activated. Find the procedure of how to enable modbus communication and modify communication parameters below. It is needed to be logged in as service (see section "19. INSTALLER LEVEL"):

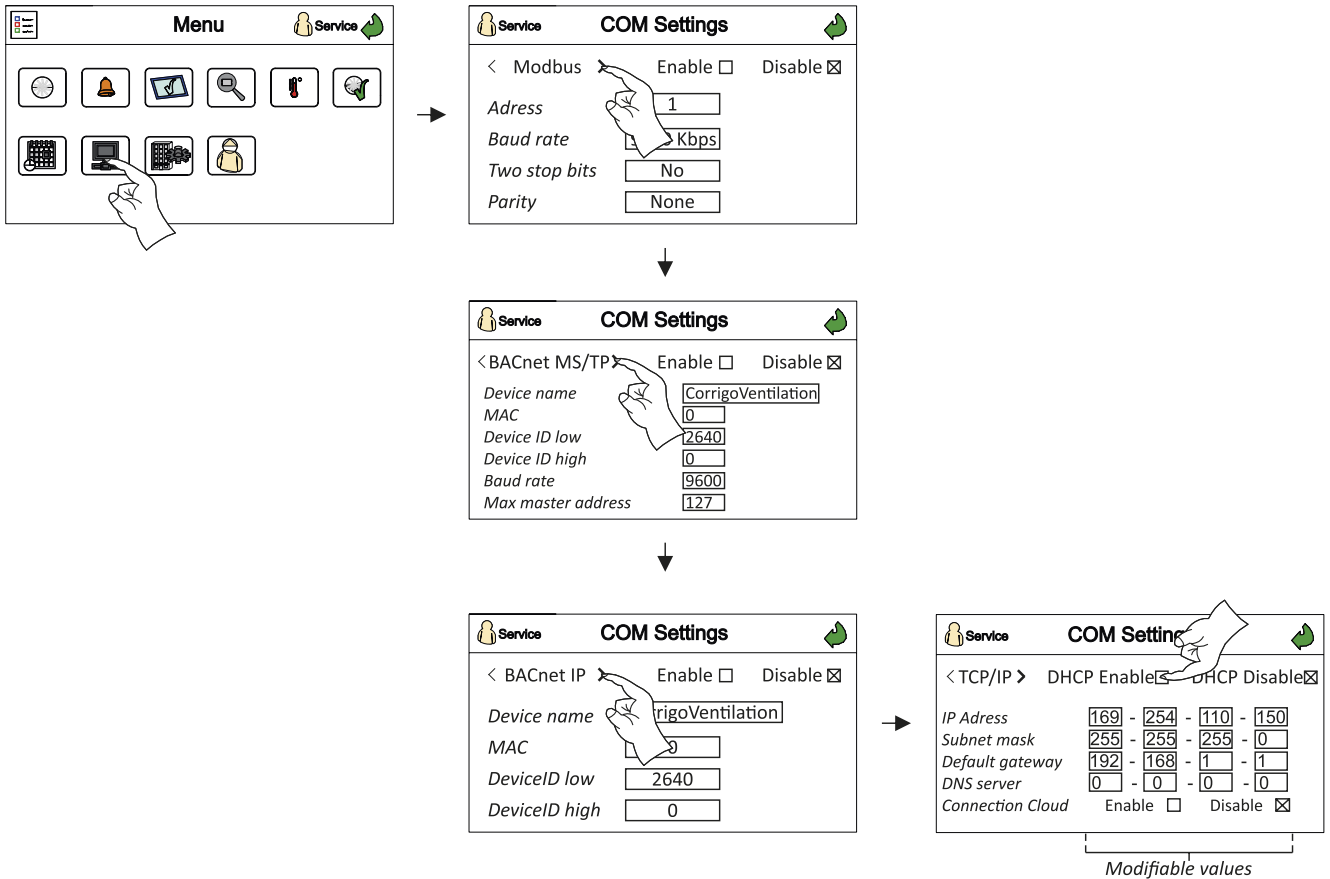


32.1.2. MODBUS IP on port TCP/IP

Controller number 1 (see section "14.2.1. External electrical box - composition") is equipped with one TCP/IP communication port (RJ45 connector).



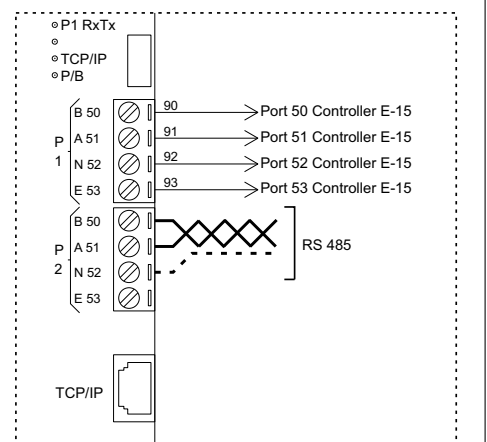
This functionality must be activated to be able to work. Find the procedure below (reminder: it is needed to be logged in as service, see section "19. INSTALLER LEVEL").



32.2. CONNECTION TO BMS - BACNET COMMUNICATION PROTOCOL

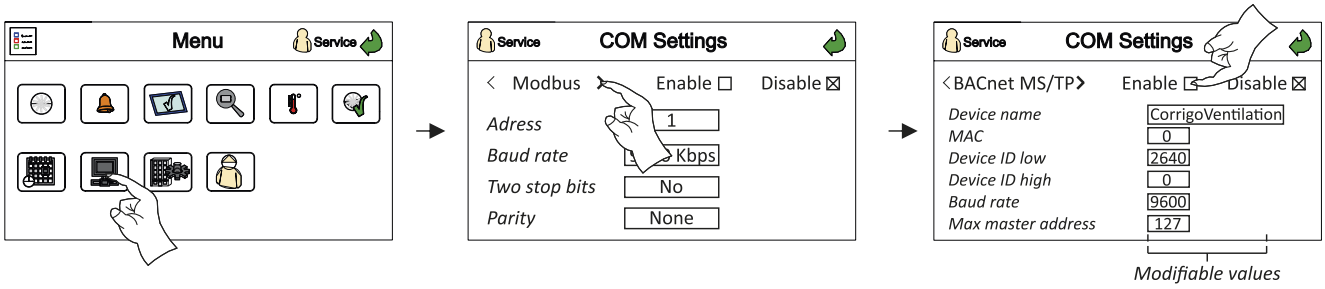
32.2.1. BACnet MS/TP on port 1 - RS485

Controller number 1 (see section "14.2.1. External electrical box - composition") has a RS485 communication port (P2) that can be dedicated to BACnet MS/TP communication.





This functionality must be activated to be able to work. Find the procedure below (reminder: it is needed to be logged in as service, see section "19. INSTALLER LEVEL").



32.2.2. BACnet IP on port TCP/IP

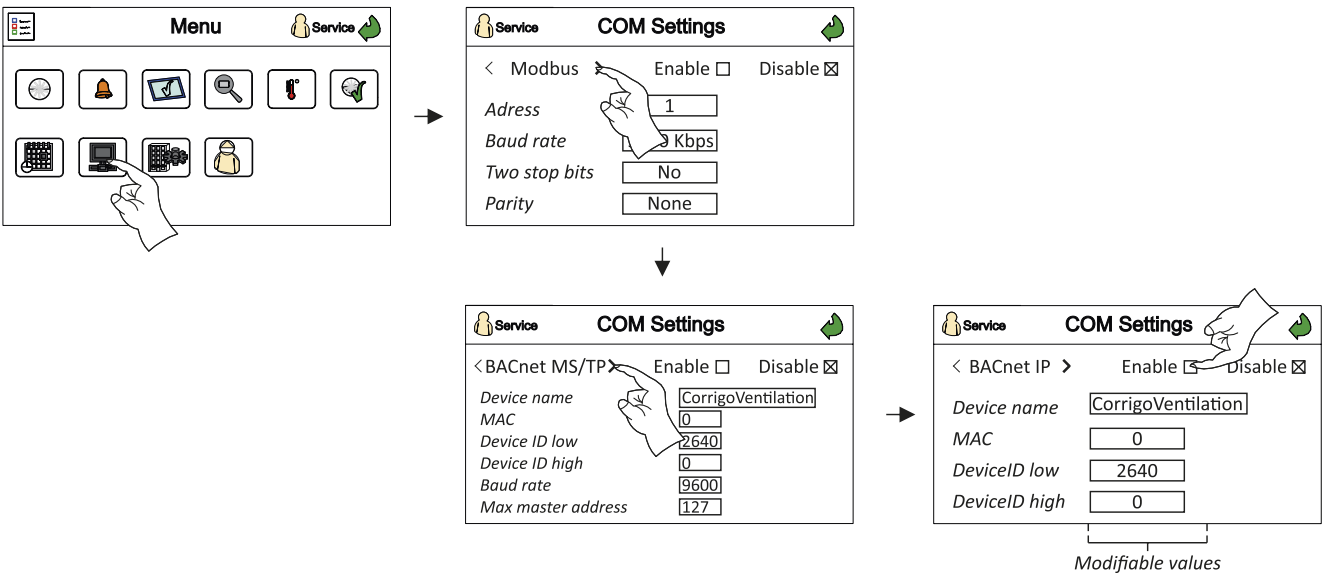
Controller number 1 (see section "14.2.1. External electrical box - composition") is equipped with one TCP/IP communication port (RJ45 connector).

The diagram shows a terminal block with the following connections:

- 40 Agnd
- 41 UI1
- 42 UI2
- 43 Agnd
- 44 UI3
- 45 UI4

Below the terminal block is a label 'dIPOL' pointing to a specific port.

This functionality must be activated to be able to work. Find the procedure below (reminder: it is needed to be logged in as service, see section "19. INSTALLER LEVEL").



32.3. REDUCED LIST OF PARAMETERS FOR BMS INTEGRATION

	Modbus Type	Type	Modbus Address	Bacnet Address NA: Not available	Default Value	Modbus Value	Description
FAN CONTROL							
CAV parameters							
Setpoint full speed supply air fan flow. Scale factor = 1	HR	R/W	28	AV, 30028	4500 m ³ /h	4500	SAF Manual normal flow (m ³ /h). Scale factor = 1
Setpoint reduced speed supply air fan flow. Scale factor = 1	HR	R/W	29	AV, 30029	2000 m ³ /h	2000	SAF Manual reduced flow (m ³ /h). Scale factor = 1
Setpoint full speed extract air fan flow. Scale factor = 1	HR	R/W	30	AV, 30030	4500 m ³ /h	4500	EAF Manual normal flow (m ³ /h). Scale factor = 1
Setpoint reduced speed extract air fan flow. Scale factor = 1	HR	R/W	31	AV, 30031	2000 m ³ /h	2000	EAF Manual reduced flow (m ³ /h). Scale factor = 1
Running mode air unit (in CAV or COP mode)	HR	R/W	368	MSV, 30368			Modbus: 0=Manual off 1=Manual reduced speed (COP and CAV modes) 2=Manual normal speed (COP and CAV modes) 3=Auto BACnet: 1=Manual off 2=Manual reduced speed 3=Manual normal speed 4=Auto
COP parameters							
Setpoint full speed supply air fan pressure	HR	R/W	24	AV, 30024	500 Pa	5000	SAF Manual normal pressure (Pa)
Setpoint reduced speed supply air fan pressure	HR	R/W	25	AV, 30025	300 Pa	3000	SAF Manual reduced pressure (Pa)
Setpoint full speed extract air fan pressure	HR	R/W	26	AV, 30026	500 Pa	5000	EAF Manual normal pressure (Pa)
Setpoint reduced speed extract air fan pressure	HR	R/W	27	AV, 30027	300 Pa	3000	EAF Manual reduced pressure (Pa)
SAF/EAF factor	HR	R/W	447	NA	1	10	Exhaust factor if COP Supply mode is selected Supply factor if COP Exhaust mode is selected
VAV parameters							
Running mode air unit (in VAV mode)	HR	R/W	516	MSV, 30516			VAV working mode Modbus: 0=Off 1=Manual 2=Auto BACnet: 1=Off 2=Manual 3=Auto
Speed in VAV manual mode	HR	R/W	517	NA			Percentage of the speed in Manual mode (0-100%)
SAF/EAF factor	HR	R/W	447	NA	1	10	Exhaust factor
FANS SUPERVISION							
Unit Status	IR	R	3	MSV, 40003			0=Stopped 1=Starting up 2=Starting reduced speed 3=Starting full speed 4=Starting normal run 5=Normal run 9=Free cooling 10=Full speed stop 11=Stopping fan
Unit run mode status	IR	R	284	MSV, 40284			0=Off 1=Reduced speed 2=Normal speed 3=Stop because of alarm



	Modbus Type	Type	Modbus Address	Bacnet Address NA: Not available	Default Value	Modbus Value	Description
Supply air fan flow (m3/h). Scale factor = 1	IR	R	15	AV, 40015			SAF Flow
Extract air fan flow (m3/h). Scale factor = 1	IR	R	16	AV, 40016			EAF Flow
VAV sensor input	IR	R	151	AV, 40151			Control signal from external sensor (VAV mode) (e.g.: 8 V = 80)
TEMPERATURE CONTROL							
Constant Supply Air							
Supply Air Temp Setpoint (Constant Supply Air Temp. mode)	HR	R/W	1	AV, 30001	21 °C	210	Temp Setpoint when Constant Supply Air mode is selected
Temperature Supervision							
Outdoor Air Temperature	IR	R	1	AV, 40001			Outdoor Air Temperature
Supply Air Temperature	IR	R	7	AV, 40007			Supply Air Temperature
Extract Air Temperature	IR	R	9	AV, 40009			Extract Air Temperature
Frost Protection Temperature	IR	R	19	AV, 40019			Water Temperature. Just for units with water post-heater
Exhaust Air Temperature (De-icing temp)	IR	R	21	AV, 40021			Exhaust Air Temperature
Supply Air Setpoint	IR	R	8	AV, 40008			Supply Air Setpoint
Post-heater supervision							
Heating control signal output	IR	R	119	AV, 40119			Control signal heating Y1 (0-10 V)
Cooling control signal output	IR	R	121	AV, 40121			Control signal cooling Y3 (0-10V)
BY-PASS							
By-pass control							
By-pass running mode	HR	R/W	379	NA			0=Off 1=Manual 2=Auto
By-pass output if manual mode	HR	R/W	380	NA			(0-100%) 0 = Open by-pass, 100 = Close by-pass
Bypass supervision							
By-pass control signal	IR	R	120	AV, 40120			By-pass control signal 0 = By-pass opened, 100 = By-pass closed
FUNCTIONS							
Exchanger antifrost							
Exchanger antifrost function status	ISR	R	13	BV, 20013			Set to 1 when Exchanger antifrost is active
ALARMS							
Alarm type							
Alarm	ISR	R	184	BV, 20184	0	0/1	Set if any alarm is active 0=No alarm 1=Alarm
SAF Error	ISR	R	33	BV, 20033	0	0/1	Run Error Supply Air Fan
EAF error	ISR	R	34	BV, 20034	0	0/1	Run Error Extract Air Fan
ODA Filter	ISR	R	38	BV, 20038	0	0/1	Outdoor Air Filter needs replacement
Fire alarm	ISR	R	42	BV, 20042	0	0/1	Fire alarm is active (the functionality has to be previously enabled)
Remote On/Off	ISR	R	43	BV, 20043	0	0/1	Remote Off is active
Electric heating is overheated	ISR	R	55	BV, 20055	0	0/1	Electric Heater Thermal protectors activated
Frost risk	ISR	R	56	BV, 20056	0	0/1	Frost protection function overrides the control of the water heater output

	Modbus Type	Type	Modbus Address	Bacnet Address NA: Not available	Default Value	Modbus Value	Description
Water temp too low, system off	ISR	R	57	BV, 20057	0	0/1	Water temperature below frost limit value (<7°C)
Sensor error outdoor temp	ISR	R	59	BV, 20059	0	0/1	Malfunction of outdoor air temperature sensor
Exchanger frost risk	ISR	R	60	BV, 20060	0	0/1	Exchanger deicing activated
Manual Heater Control	ISR	R	73	BV, 20073	0	0/1	The electric heater is in manual mode
Manual exchanger control	ISR	R	74	BV, 20074	0	0/1	Heat exchanger in manual control
Internal battery error	ISR	R	80	BV, 20080	0	0/1	Internal battery needs replacing
Sensor error Supply Air temp	ISR	R	90	BV, 20090	0	0/1	Malfunction of supply air temperature sensor
Sensor error Extract Air temp	ISR	R	91	BV, 20091	0	0/1	Malfunction of extraction air temperature sensor
Sensor error SAF pressure	ISR	R	96	BV, 20096	0	0/1	Malfunction of supply air pressure sensor
Sensor error EAF pressure	ISR	R	97	BV, 20097	0	0/1	Malfunction of exhaust air pressure sensor
Sensor error Exhaust air temp	ISR	R	98	BV, 20098	0	0/1	Malfunction of exhaust air temperature sensor
Sensor error Frost Protection temp	ISR	R	99	BV, 20099	0	0/1	Malfunction of water temperature sensor
ETA Filter	ISR	R	131	BV, 20131	0	0/1	Extraction Air Filter needs replacement
Alarm Acknowledgement							
Acknowledgement of individual alarms	HR	R/W	400	NA	To acknowledge an alarm set this signal its alarm number: 1 = Malfunction of supply air fan 2 = Malfunction of extract air fan 6 = Outdoor Air Filter needs replacement 10 = Fire alarm 11 = Remote On/Off active 23 = Electric Heater Thermal protectors activated 24 = Frost protection function is overriding the control of the water 25 = Water temperature below frost limit value (<7°C) 27 = Malfunction of outdoor air temperature sensor 28 = Exchanger deicing activated 41 = The electric heater is in manual mode 42 = Heat exchanger output in manual control 48 = Internal battery needs replacing 49 = Malfunction of supply air temperature sensor 50 = Malfunction of extraction air temperature sensor 55 = Malfunction of supply air pressure sensor 56 = Malfunction of exhaust air pressure sensor 57 = Malfunction of exhaust air temperature sensor 58 = Malfunction of water temperature sensor 90 = Extraction Air Filter needs replacement		
Acknowledgement of all alarms	CSR	R/W	3	BV, 10003	Command to acknowledge all activated alarms		
INPUTS / OUTPUTS							
DI5	ISR	R	18	NA	Value of DI5: Remote normal speed (Closed: Active Normal speed forced, Open: Normal speed disabled)		
DI6	ISR	R	19	AV, 40019	Value of DI6: Remote ON/OFF		
DI8	ISR	R	21	BV, 20021	Value of DI8: Fire alarm (if previously enabled)		
DO5	ISR	R	30	BV, 20030	Value of DO5: PWM Electric Heater		

33. INSPECTION, MAINTENANCE AND CLEANING

33.1. REPLACEMENT OF THE BATTERY FROM THE CORRIGO PROGRAMMABLE LOGIC CONTROLLER

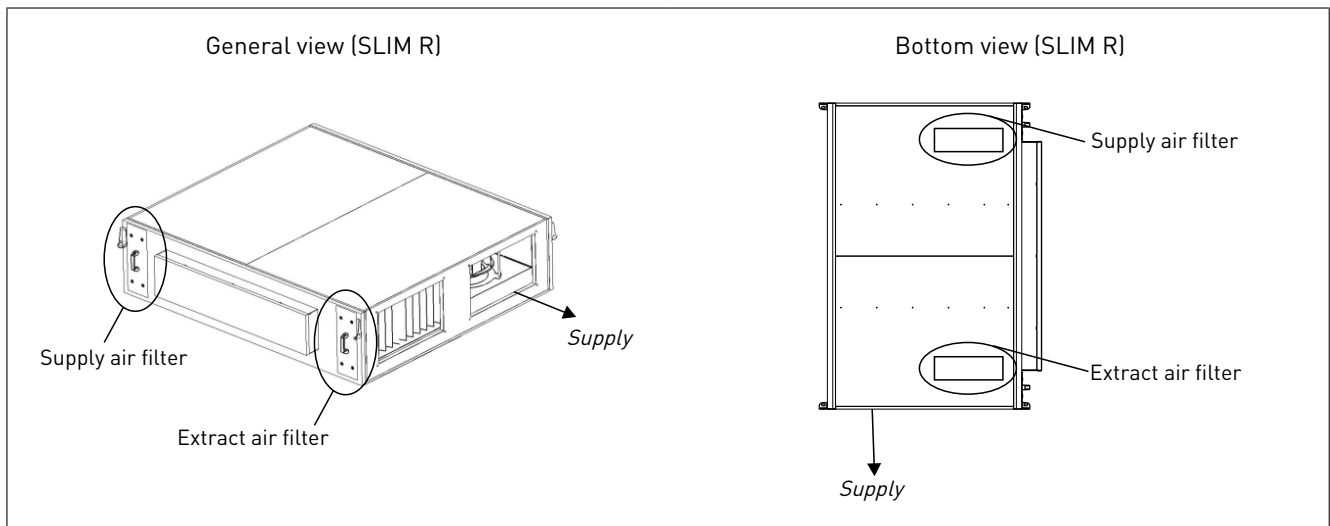
When the “battery low” alarm appears, it means that the backup battery to save the memory and the real time clock is too low. The procedure to change the battery is described below. A capacitor allows backing up the memory and running the clock for approximately 10 minutes after the power is switched off. If the battery can be changed in less than 10 minutes, the program does not have to be reloaded and the clock will continue to run normally.

The spare battery is type Cr2032.

- Using a small screwdriver, pry up the clips on each side of the controller case to release the cover from the base.
- Hold the base and remove the cover.
- Grasp the battery and pull up gently until the battery exits from its holder.
- Replace the battery with a new. Warning: be sure to respect the polarity when inserting the battery.

33.2. REPLACEMENT OF FILTERS

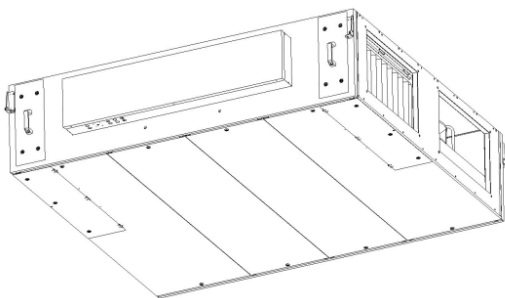
The SLIM control incorporates a function of supervision of the filters clogging. When the filter replacement is required, the display shows an alarm message. The exact ubication of the filters is shown in the image below. Within each filter there is a label that indicates the type of filter and its characteristics. Find the procedure of how to replace the filters in section “10. FILTER REPLACEMENT”.



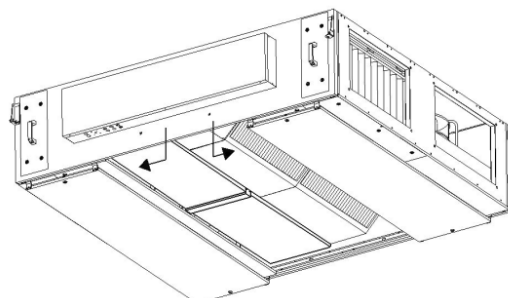
33.3. HEAT EXCHANGER

To perform the heat exchangers cleaning it is necessary to remove it from the unit. The disassembly can be easily done from the sliding doors:

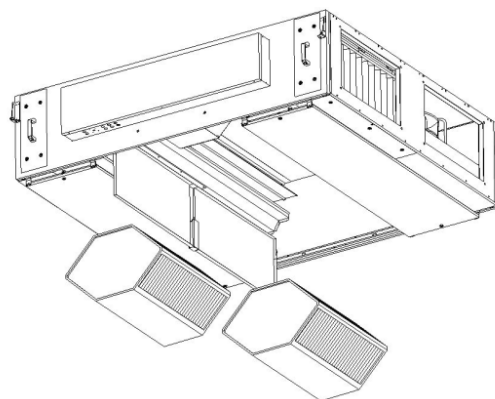
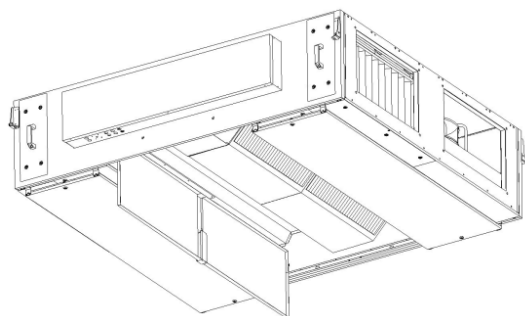
1. Open the two central sliding doors:



2. Turn the condensate tray over itself



3. Push from the handgrips to disassembly the heat exchangers



Soak the heat exchanger in a mixture of water and soft detergent, rinse with clear water and allow all water to drain. After drying, installation is carried out in the reverse sequence.

33.4. CONDENSATION DRAINPIPE

Inspect the drainpipe regularly and make sure it is not blocked, if this is the case, remove the obstruction.

34. OPERATION ANOMALIES

34.1. GENERAL ANOMALIES

Anomaly	Cause	Solution
The unit no longer works, control panel does not work.	The supply voltage is interrupted.	Set up the main voltage again.
	A fuse has burned out in the ventilation system.	Check the fuse and replace it.
Difficulty for starting up	Reduced power supply voltage.	Check the supply voltage. Change the motors if necessary. Contact S&P after sales service.
Insufficient performance	Blocked inlet/outlet points.	Inspect and clean inlet/outlet ductwork.
	Fan obstructed.	Clean fan.
	Filter overloaded.	Replace filter.
	Insufficient rotation speed.	Check power supply voltage.
Reduction in performance after a period of acceptable operation.	Exchanger blocked.	Clean the exchanger
	Leaks in the circuit before and/or after the fan.	Check the circuit and restore original
Supply air temperature too cold	Fan damaged.	Check the fan and replace with an original part if necessary. Contact S&P after sales service.
	Outside air -5°C or less.	Insertion of a post-heater or preheater
	Supply air fan and extract air fan are not properly balanced.	Check the fans balancing (ratio between supply and extract air fan).
Unstable airflow	The air cools down in the ducts.	Check insulation of extract and supply air lines.
	Obstruction or bad duct connection.	Inspect and clean the ductwork. Modify "PI parameters", see section "19.1. Commissioning". Contact with S&P after sales service.
The electrical postheater does not start up.	Electric heater thermal protectors activated	Push the manual reset of the electrical heater. See section "14.4.5. Wiring of electrical coil delivered as an external module [SL-DI]".



34.2. SPARE PARTS LIST

Spare code	Description	Type	Notes	Units inside the spare code
5800011200	AFR-SLIM 800-F7	F7 Filter - SLIM 800	Spare filters	1
5800015500	AFR-SLIM 1200-F7	F7 Filter - SLIM 1200		1
5800017200	AFR-SLIM 1600-F7	F7 Filter - SLIM 1600		1
5800011400	AFR-SLIM 2000-F7	F7 Filter - SLIM 2000		1
5800011100	AFR-SLIM 800-M5	M5 Filter - SLIM 800		1
5800015400	AFR-SLIM 1200-M5	M5 Filter - SLIM 1200		1
5800017100	AFR-SLIM 1600-M5	M5 Filter - SLIM 1600		1
5800011300	AFR-SLIM 2000-M5	M5 Filter - SLIM 2000		1
5800059300	AFR SLIM 800-F9	F9 Filter - SLIM 800	Accessory to replace the F7 filter on the supply side	1
5800059400	AFR SLIM 1200-F9	F9 Filter - SLIM 1200		1
5800061300	AFR SLIM 1600-F9	F9 Filter - SLIM 1600		1
5800061400	AFR SLIM 2000-F9	F9 Filter - SLIM 2000		1
R153667101	HEX KIT SLIM 800	Heat exchanger - SLIM 800	KIT composed of 2 heat exchangers	2
R153667102	HEX KIT SLIM 1200	Heat exchanger - SLIM 1200	KIT composed of 3 heat exchangers	3
R153667103	HEX KIT SLIM 1600	Heat exchanger - SLIM 1600	KIT composed of 3 heat exchangers	2 + 1
R153667204	HEX KIT SLIM 2000	Heat exchanger - SLIM 2000	KIT composed of 2 heat exchangers	2
R153667113	CONDENSATE PUMP	Condensate pump	Same pump is used on all 4 sizes (800, 1200, 1600 & 2000)	1
R153821050	TRANSMISOR PRESION 0-1000 PA	Pressure transmitter	Same pressure transmitters are used on all 4 sizes (800, 1200, 1600 & 2000)	1
R153667114	PRESSURE SWITCH	Pressure switch (filter clogging)	Same pressure switches are used on all 4 sizes (800, 1200, 1600 & 2000)	1
R153667115	BYPASS ACTUATOR	By-pass actuator	Same actuator is used on all 4 sizes (800, 1200, 1600 & 2000)	1
R160160142	SONDA PT1000 PLANA C/FUNDA 4M PRO-REG	Temperature probe	Same temperature probes are used on all the 4 sizes (800, 1200, 1600 & 2000)	
R153626136	SLIM EXTERNAL TOUCH DISPLAY	Touch panel		1
R153626236	SLIM CONTROLLERS KITS	Kit of Controllers	Composed by 2 controllers (28+15 I/O's)	
R153626336	CONTROLADOR CORRIGO TCP/IP	Master controller Corrigo 28 I/O's		1
R153626436	CONTROLADOR CORRIGO 15 I/O	Slave controller Corrigo 15 I/O's		1

SLIM version	Supply air side		Exhaust air side	
	Code	Description	Code	Description
SLIM 800 L	R153667205	MOTOR 1 SLIM 800	R153667206	MOTOR 2 SLIM 800
SLIM 800 R	R153667205	MOTOR 1 SLIM 800	R153667206	MOTOR 2 SLIM 800
SLIM 1200 L	R153667108	MOTOR 2 SLIM 1200	R153667107	MOTOR 1 SLIM 1200
SLIM 1200 R	R153667107	MOTOR 1 SLIM 1200	R153667108	MOTOR 2 SLIM 1200
SLIM 1600 L	R153667110	MOTOR 2 SLIM 1600	R153667109	MOTOR 1 SLIM 1600
SLIM 1600 R	R153667109	MOTOR 1 SLIM 1600	R153667110	MOTOR 2 SLIM 1600
SLIM 2000 L	R153667112	MOTOR 2 SLIM 2000	R153667111	MOTOR 1 SLIM 2000
SLIM 2000 R	R153667111	MOTOR 1 SLIM 2000	R153667112	MOTOR 2 SLIM 2000

34.3. FAILURE LIST

In case an alarm occurs, a bell icon appears blinking on the main screen. The alarm can then be consulted in the menu, see section "18. USER LEVEL".

There are two types of alarm:

- Alarms type A: they have to be acknowledged once the error has been solved to return to normal operation.
- Alarms type C: once the error has disappeared, the unit comes back to normal operation automatically (acknowledge is not needed)

Alarm text	Description	Type
Supply air fan malfunction	Run error in supply air fan	A
Extract air fan malfunction	Run error in extract air fan	A
Filter guard 1	Outdoor air filter needs replacement	C
Filter guard 2	Extract air filter needs replacement	C
Fire alarm	Input for fire alarm has been activated	C
External switch	Remote on/off has been used to stop the unit. Unit may be re-started remotely.	C
Electric heating is overheated	Electric heater thermal protectors activated.	A
Frost risk	(Water heater) frost protection function is overriding the control of water heater output.	C
Low frost guard temp	Water temperature below frost limit value (<7°C). Unit off.	C
Sensor error outdoor temp	Malfunction of outdoor air temperature sensor	A
Analogue deicing	The by-pass damper opens in order to prevent the exchanger from freezing.	C
Internal battery error	The backup battery inside the controller needs to be replaced.	A
Sensor error supply air temp	Malfunction of supply air temperature sensor	C
Sensor error extract air temp	Malfunction of extract air temperature sensor	C
Sensor error SAF pressure	Malfunction of supply air pressure sensor	A
Sensor error EAF pressure	Malfunction of extract air pressure sensor	A
Sensor error deicing temp	Malfunction of exhaust air temperature sensor	A
Sensor error frost protection temp	Malfunction of water temperature sensor	A



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