EUROVENT CERTIFIED PERFORMANCE
Programme échangeur

HRup TAC4

high efficiency ventilation

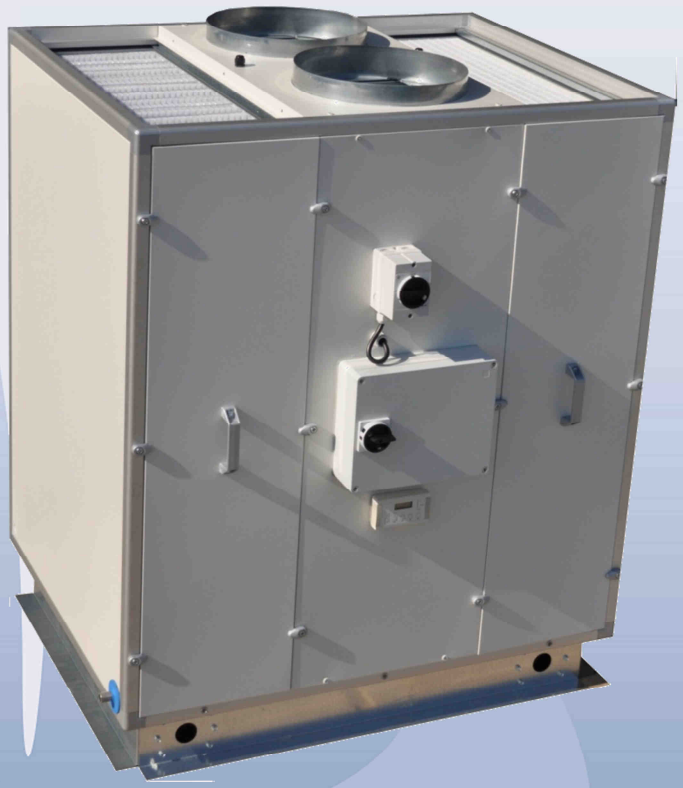
P.LEMMENS
AIR MOVEMENT COMPANY

Installation and maintenance manual

HRup high efficiency ventilation TAC4

High efficiency double flow ventilation unit with high efficiency heat recovery

Installation and maintenance manual



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1. GENERAL MAINTENANCE INSTRUCTIONS

1.1 Construction characteristics

The structure is made out of omega shaped anodized aluminum profiles connected by reinforced polypropylene auto-extinguishable (M1) corner pieces. The panels are 30mm double skin steel plates insulated. The outside panels are 0,8mm thick pre-painted (5µm primer + 20µm polyester)-gray RAL 9002 color, covered with a plastic protection (to be removed after installation). The inside panel is 0,8mm galvanized steel. This combination allows the exposure of the panels to outdoors conditions, and forms a rigid structure. Thermal insulation is carried out by EPS panels (density 30 g/l), self-extinguishing (M1 class), in conformity with the European environment standards, inserted between layers. The HRup is mounted on a steel frame and is mono-structured. All the access doors to the ventilators and filters are equipped with handles.

Air tightness:

Internal: Class 1 as per EN 13141-7.

External: Class 2 as per EN 13141-7.

1.2 TAC technology fans

The HRup series is equipped with TAC technology centrifugal ventilators. The TAC4 DG control is specifically developed to take advantage of this technology. Verify that the supplied voltage corresponds to the specification of the ventilators and that the connection is made according to the supplied wiring instructions. See www.lemmens.com for more information on the advantages of the TAC technology.

Warning! : The starting up / stopping of the unit must be activated by using the softstop function on K1/K2/K3 or via the RC/GRC/MODBUS, and not by shutting off the power supply.

Always check the following electrical specifications:

Power supply voltage: 230VAC (210V<V<250V).

Power supply frequency: 50/60 Hz.

Grounding the unit is compulsory

The motor is self-protected against overloading. It is thus NOT necessary to install an electrical overload protection device. See section 3.2 for detailed wiring instructions.

Insulation class

Fans/HRup: IP44.
Nominal temperatures: -10℃/+55℃.
Conformy: CE (motors are also UL approved).

Before starting the unit

- If the fan wheel is rotating properly, without resistance?
- Verify if the installation and the connections are made according to the applicable European standards.
- Are the precautionary measures to avoid an accident taken? (Wiring, rotating parts, security measures,)

Operating conditions

The temperature over the fan motor cannot be lower than -10℃, or superior to 55℃. The unit is not de signed to operate in an aggressive or an explosive environment. It is strongly not advised to stop and start the unit more often than every 5 minutes.

1.3 About the counterflow AIR/AIR heat exchanger

Protect the heat exchanger by regularly cleaning or replacing the filters.

To protect from frosting, the TAC4 DG control is as standard delivered with an inbuilt heat exchanger antifreeze system (by unbalancing the in and out airflows). There is also the KWin pre-heater option available (except for the HRup 450) to accomplish this if deemed necessary.

The HRup units are specified not to exceed a frontal air speed on the heat exchanger of 2,2m/s.

1.4 Filters

HRup units are delivered with G4 filters for the air 'out' flow and F7 filters for the air 'in' flow. Filters are the protectors of the heat exchanger, but also of the quality of the air you breathe. Check regularly (once a month) the state of the filters. Vacuum the filters if necessary, and replace them when they are too dirty. Clogged filters can create the following failures:

- Insufficient ventilation
- Excessive increase of the rotation speed of the fan creating excessive noise and power consumption
- A damaged filter allows 'dirty' air to enter the heat exchanger which will eventually clog the heat exchanger

Filter identification for replacement:

Unit type	Filter(s) air "out"	Filter(s) air "in"
HRup 450	1 x G4 (415x200x50) – cid 125061	1 x F7 (415x200x50) – cid 125068
HRup 800	1 x G4 (470x287x50) – cid 125054	1 x F7 (470x287x50) – cid 125056
HRup 1200	1 x G4 (830x287x50) – cid 125055	1 x F7 (830x287x50) – cid 125057
HRup 2000	2 x G4 (503x370x50) – cid 125063	2 x F7 (503x370x50) – cid 125062

1.5 Installation control datasheet (see appendix)

When the installation is completed and running, we strongly advise that the installer fills in the installation datatsheet recapitulating all the data useful for maintenance of the installation. Please keep a copy of this datasheet closeby as it may come handy for many reasons:

- make a clear communication in case of discussion with the manufacturer
- information if you need to change parameters when necessary,
- this document can become an important factor in case of guarantee issues.

1.6 Warranty

The warranty of the manufacturer begins at the date of invoicing of PLC to the installer. The warranty is of 2 years, except on the mobile parts where it is of 1 year.

The warranty is limited to the replacement of the defective parts, and does not include labor and traveling expenses. The warranty becomes void if:

- The installation is not accomplished according to the prescriptions described in this above.
- Repairs were carried out by unqualified staff.
- The startup control datasheet (see appendix) is not filled in properly and not made available when claiming

1.7 Conformity

CE, under formal condition that the final product integration is made in conformity with the applicable standards.

2. INSTALLATION INSTRUCTIONS

2.1. Installing the unit

- The HRup series is delivered with a base frame and in one piece (no assembly required).
  The frame must not be removed, it is important for the rigidity of the unit. The base frame is designed to allow manipulation of the unit.
- Make sure the unit is installed on a flat surface
- Fan removal requires a minimum clearance of 80 cm on both sides of the HRup. Single side access makes this operation impracticable. This 80 cm clearance allows easy access to all other components (controller, filter, heat exchanger), except for model HRup 1200 where a clearance of 95 cm is necessary to replace the filters.
- Special care has been taken to deliver an airtight unit. Make sure the ductwork is also very airtight, specially at the connections with the unit on the supply air side.

2.2 Connecting the drain pan

- To insure a good flow of the condensates the unit should be slightly inclined (2°) in the direction of the water flow. This also avoids water stagnation in the drainpan.
- The siphon must be properly installed to allow good water flow :

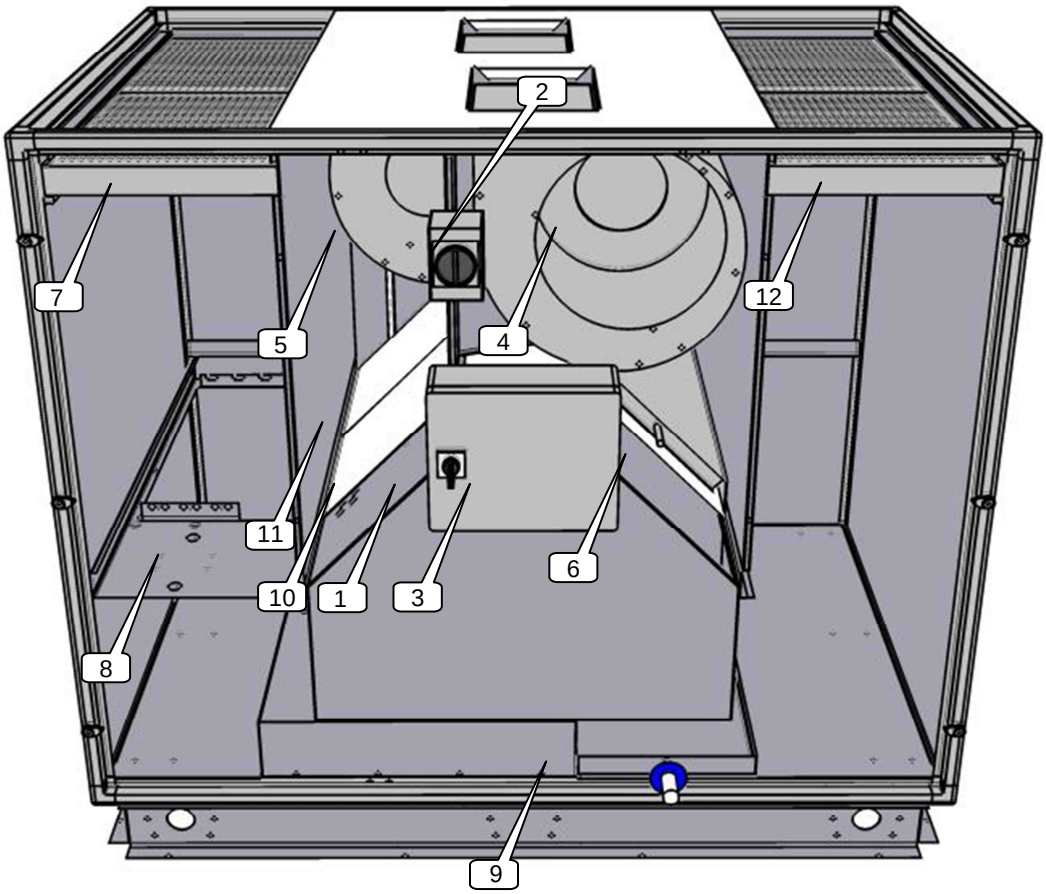
Before starting, control the following points:
- if the drain pan is watertight;
- the connection between the drain pan and the evacuation pipe is airtight;
- the height of the siphon is at least of 120 mm;
- the pressure difference between outside and inside the unit cannot exceed 350 Pa;
- check for the presence of a ventilation downstream of the siphon;
- the slope of the evacuation pipes is at least 1 cm/m;
- the siphon is accessible to allow cleaning

- In case of frost risk a wire heating coil should be installed (not delivered)
- Once drainage system is in place make a water flow test, adjust inclination if necessary.

3. WIRING INSTRUCTIONS

3.1 General information

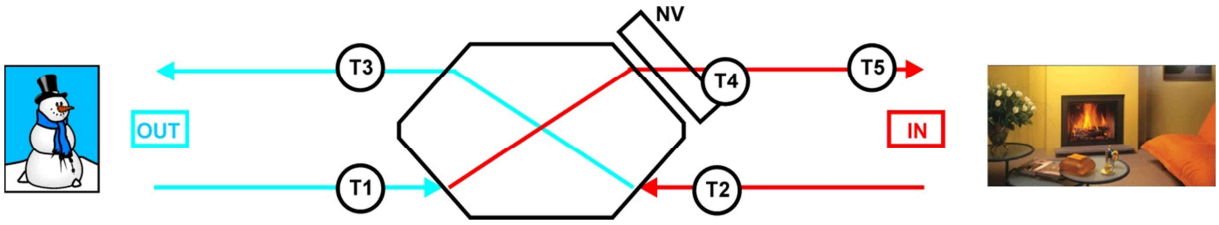
3.1.1 General schematic of the HRup units



1. Main switch for power supply fans and control
2. Main switch for power supply to pre (Kwin) and/or post (Kwout) heating coils (options)
3. Centralized wiring box of the CB4 TAC4 DG circuit (factory pre-wired)
4. Supply fan(s)
5. Exhaust fan(s)
6. Post-heating water or electrical coil (NV ou KWout option)
7. F7 class filter at fresh air inlet
8. Pre-heating electrical antifreeze coil (KWin option)
9. Drain pan and drain
10. By-pass 100%
11. Air/Air heat exchanger
12. G4 filter on exhaust air

Only electrical connections made by the installer are in 1/2/3.

3.1.2 Schematic of the T° sensors positioning in th e HRup unit



To allow easier identification of the temperature sensors 4 different wire colors are used:

- T1 : black wire
- T2 : white wire
- T3 : blue wire
- T4 & T5 : green wire

3.2 Power supply to the fans and the control devices

All the internal cables (fans, controls, sensors,…) to the main switch are factory pre-wired. All the power supply wiring that remains is the main power supply to the main switch.

Wiring specifications:

Unit type	Supply Voltage (1)	Maximum amps	Protection type (2)	Protection caliber
HRup 450	1 x 230V	3,1 A	D – 10.000A – AC3	8A
HRup 800	1 x 230V	5,5 A	D – 10.000A – AC3	8A
HRup 1200	1 x 230V	7,0 A	D – 10.000A – AC3	8A
HRup 2000	1 x 230V	14,3 A	D – 10.000A – AC3	16A

(1) Grounding is compulsory
(2) D type “slow” reaction curves - shutoff power 10.000A - AC3.

3.3 Power supply for the electrical antifreeze protection coil KWin (option)

All the internal cables of the KWin coil to the main switch are factory wired. All that needs to be wired is the main power supply to the main switch.

Wiring specifications:

Unit type	Supply voltage	KWin heating capacity	Maximum amps
HRup 450	Not available		
HRup 800	3 x 400V + N	3 kW	4,3 A
HRup 1200	3 x 400V + N	4,5 kW	6,5 A
HRup 2000	3 x 400V + N	6 kW	8,7 A

3.4 Power supply and connections for the electrical post heating coil KWout (option)

All the internal cables of the KWout coil to the main switch are factory wired. All that needs to be wired is the main power supply to the main switch.

Wiring specifications:

Unit type	Supply voltage	KWoutn heating capacity	Maximum amps
HRup 450	Non disponible		
HRup 800	3 x 400V + N	3 kW	4,3 A
HRup 1200	3 x 400V + N	4,5 kW	6,5 A
HRup 2000	3 x 400V + N	6 kW	8,7 A

3.5 Connecting the post heating water coil (option)

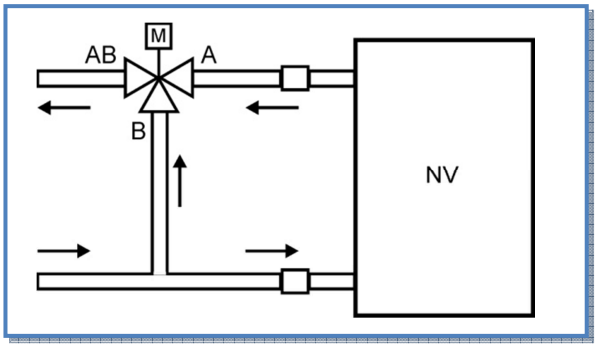
The post-heating water coil is delivered with a motorized 3-way valve (non-mounted).

3.5.1 Power supply:

Refer to installation and setup of post heating control manual (delivered with NV option).

3.5.2 Water connection (to be made by the installer):

- Connection schematic:



- These are the specifications for the water coil connection:

Unit type	Diameter on the coil	Diameter on the valve	Coil Capacity (*)	Water flow (*)	Pressure loss (*)
HRup 800	1/2''	G 1B	4,5 kW	199 l/h	1,4 kPa
HRup 1200	1/2''	G 1B	7,7 kW	339 l/h	11,3 kPa
HRup 2000	1/2''	G 1B	12,5 kW	553 l/h	13,5 kPa

(*) Nominal values for following selection conditions: air in T°: 18°C, water in/out T: 90/70°C. For o ther conditions refer to the HRup selection software or provided data sheet for the project.

4. TAC4 CONTROL SYSTEM

The TAC4 control device manages the following features :

- Fan airflow management (accurate knowledge of fan's working point)
- Management of time slots
- Automatic bypass control (freecooling)
- Heat exchanger anti-freeze protection control
- Automatic motorized inlet and exhaust damper control (option)
- Electrical pre-heater control (option)
- Water or electrical Post-heater (option)
- Control of external post-coil (option)
- RTU or TCP/IP MODBUS Communication (option)

The TAC4 control circuit is factory pre-wired.

There are 4 ways to 'communicate' with the TAC4 control :

- RC TAC4 (LCD remote control)
- GRC TAC4 (graphic touchscreen display, can control up 247 units)
- MODBUS RTU network (usually to connect to a BMS)
- MODBUS TCP/IP network for a webserver type application, also allows GPRS communication

The following options can be combined with TAC4 control :

- RC TAC4 Option : remote control to setup, control and visualize the parameters.
  Please refer to TAC4 DG – RC TAC4 installation and user's manual for detailed information

- GRC TAC4 Option : graphic remote touchscreen to setup, control and visualize the parameters.
  Please refer to TAC4 DG – GRC TAC4 installation and user's manual for detailed information

- SAT TAC4 BA/KW Option:
  regulation of 2 external heat exchangers (electrical/water,hot and/or cold)
  please refer to SAT TAC4 BA/KW installation and user's manual for detailed information

- The SAT3 Option is a Circuit with 2 relays (2 SAT3 can be plugged)
  - When plugged in position OR1/OR2: status of "Fan On" warning and of "Pressure alarm" warning and/or
  - When plugged in position OR3/OR4 : status of NV option circulator and of «bypass»

  please refer to SAT3 installation and user's manual for detailed information

- SAT TAC4 MODBUS Option : MODBUS RTU communication
  please refer to SAT TAC4 MODBUS installation and user's manual for detailed information

- TCP/IP TAC4 MODULE Option:
  MODBUS TCP/IP communication.
  please refer to TAC4 DG - TCP/IP installation and user's manual for detailed information

- GPRS TAC4 MODULE Option:
  GPRS Communication. Please refer to TAC4 DG - GPRS installation and user's manual for detailed information

Each one of these communication configuration is fully described in a separate installation manual

5. MAINTENANCE

Attention: before handling and/or opening the access panels it is compulsory to shut down the power supply using the general switch located on the front panel. Iif options KWin and\or KWout are installed, then shut down the corresponding general switches.

Regular maintenance of the HRup unit is essential to guarantee a good operation of the device and a long life expectancy. The maintenance frequency will depend on the application and on the actual environment conditions but in a general way the following controls are advised :

5.1 Every 3 months

1. Check for any alarm indicated on the control device. In case of alarm refer to control manual.

2. Check the state of filter clogging. The control device allows to set a pre-defined 'filter clogging' threshold (refer to installation manual). If need be replace filters. Filters that are too clogged can generate the following problems :

   - Insufficient ventilation
   - Excessive increase of fan rotation speed, creating excessive sound level
   - Excessive power consumption (power consumption will increase exponentially to an increase in pressure drop, for a constant airflow)
   - A damaged filter allows unfiltered air to enter heat exchanger (risk of clogging) and into ventilated room.

   List of replacement filters :

Unit type	Filter(s) air "out"	Filter(s) air "in"
HRup 450	1 x G4 (415x200x50) – cid 125061	1 x F7 (415x200x50) – cid 125068
HRup 800	1 x G4 (470x287x50) – cid 125054	1 x F7 (470x287x50) – cid 125056
HRup 1200	1 x G4 (830x287x50) – cid 125055	1 x F7 (830x287x50) – cid 125057
HRup 2000	2 x G4 (503x370x50) – cid 125063	2 x F7 (503x370x50) – cid 125062

3. Inspection and cleaning of the inside of the unit:
   - Vacuum clean any accumulation of dust in the unit.
   - Inspect and gently vacuum clean if need be the heat exchanger. Use brush accessory to protect fins.
   - Clean the possible condensation marks and possible accumulations in the drainpan.

5.2 Every 12 months

1. Check for any alarm indicated on the control device. In case of alarm refer to installation manual.

2. Check the state of filter clogging. The control device allows to set a pre-defined 'filter clogging' threshold (refer to installation manual). If need be replace filters. Filters that are too clogged can generate the following problems :

   - Insufficient ventilation
   - Excessive increase of fan rotation speed, creating excessive sound level
   - Excessive power consumption (power consumption will increase exponentially to an increase in pressure drop, for a constant airflow)
   - A damaged filter allows unfiltered air to enter heat exchanger (risk of clogging) and into ventilated room.

   See above for list of replacement filters

3. Inspection and cleaning of the inside of the unit:
   - Vacuum clean any accumulation of dust in the unit.
   - Inspect and gently vacuum clean if need be the heat exchanger. Use brush accessory to protect fins.
   - Clean the possible condensation marks and possible accumulations in the drainpan.
   - Clean drainpan
   - Clean the inside of the bypass. To access interior of bypass it is necessary to force-open it, proceed as follows: jump terminals IN4 and +12V on the CB4 TAC4 DG circuit board. The bypass is now open, independently of temperature conditions.

   - Remember to remove jump between terminals IN4 and +12V once cleaning of bypass is done

4. Fan maintenance:
   Check again if power supply is shut down and fans are not running.
   Check cleanness of fan. Clean if necessary, be careful not to alter balancing of the fan wheel (do not remove balancing clips). Dismount fans if necessary.

5. Check airtightness of unit:
   Particularly check that side access panels are well closed and that airtightness seals are in a good state. Replace if necessary.

Appendix: Installation control datasheet (to be filled in after starting the installation)

Installed by:

Installer's name: _____

Company name:_____

Address:_____

Telephone: _____

Installation date: ___/___/___

CONFIGURATION PARAMETERS :

1	HRup model	
2	Working mode	CA LS CPs Other
3	If CA mode:	m³h K1 = m³h K2 = m³h K3 =
4	If LS mode:	Vmin = Vmax = m³h≡Vmin = m³h≡Vmax = % on K3 =
5	If CPs mode:	Assignment Pa= V (or Pa) % on K3 =
6	% EXT/PUL	%
7	Pressure alarm (modes CA / LS only)	Activated ? yes / no If yes: Automatic / Manual setup Initialisation: Supply: m³h Pa Exhaust: m³h Pa
8	If KWin option :	T°KWin = ℃
9	If KWout option	T°KWout = ℃
10	If NV option :	T°NV = ℃

Indicate here all changes made in the advanced setup, if any:

VALUES READ OFF DISPLAY WHEN HRup in OPERATION:

1	Supply Aiflow	m³/h
2	Supply pressure	Pa
3	Exhaust airflow	m³/h
4	Exhaust pressure	Pa

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