



Description of learning activity

Title of learning activity

Energy recovering with a heat recovery LGH- 100RVX-E. Analysis of installations before and after its installation.

IDENTIFICATION

The Learning activity takes place in:

CIPF Universidad Laboral Culleredo

Course/subject:

HE-VET in Energy Efficiency and Solar Thermal Energy/Energy Certification of Buildings

Topic

Comparison between installations with or without a Heat recovery energy system

Duration (hours):

12

Description of students:

The target students are enrolled in the second course of the Higher Education VET Cou

Learning goals: **(learning outcomes?)**

To learn the installation process of a heat recovery.
 To do the regular maintenance.
 To measure appropriate and analyze the results in order to quantify the energy recovered with a heat recovery.
 To interpret technical datasheets and diagrams. (Attached to the instructions of the activity as Appendix I)

Content:

- 1.Measurement of the existing installation parameters so they can be compared with the after heat recovery installation parameters.
- 2.Installation of a heat recovery equipment and its connection to the air admission and air exhausting grids.
- 3.Measurements of physical parameters: temperatures, flow and humidity to be compared with the current state of the installation.
- 4.Analysis of the installation efficiency before and after the heat recovery was installed.
- 5.Checking filters and electrical connections as in an ordinary regular maintenance.
- 6.Disassembly of the installation in order to this practice can be make again by other students in further courses.

SDG's :

4. Quality Education
5. Gender Equality
7. Affordable and clean energy
12. Responsible consumption and production
13. Climate action

How are SDG's visible and implemented in learning activity?

4. Quality Education
 Learning by doing is a better experience in the learning process than having the learning goals explained only by theory or media

Learning goals explained only by theory or media.

5. Gender Equality

In our college, 15 out of 54 students are female this year in this course. This activity has no trouble being made for either male or female students.

7. Affordable and clean energy

The heat recovery will provide free energy recovered from the exhausting flow that would have to be consumed again to properly climate the building.

12. Responsible consumption

This activity will help to conscious the students, future professionals, to implement the better possible installations that make the energy consumption the less the better.

Principles

Energy recovering methods.

HVAC parameters measures.

Energy efficiency.

Energy analysis and energy certification.

Methods:

HVAC systems installation.

Temperature measurements.

Air flow measurements.

Electrical measurements (current, voltage and power)

Teacher's role:

The teacher will introduce the activity, giving the main guidelines and supporting those students in need of assistance throughout the process.

Student's role:

The students will follow the instructions given and will develop a plot for the whole activity that will help them succeed.

FORM

Organising:

The students will be organized into five member groups. One of them will be the coordinator, whom will be the responsible to collect the work of the members of the group and handle it to the teacher to be qualified.

Learning environment:

The first part of this activity will take place in the HVAC workshop of our college CIFP Universidad Laboral de Culleredo.

The second part, in which the measurements will be analyzed, will take part in the 1.11 class where the students have the software to do it.

The third part, where the students must disassembly the heat recovery will take part again in the HVAC workshop.

Feedback and evaluation:

Once all the groups have handled their activities, they will be discussed in the classroom by the whole class; therefore, every group can learn about the difficulties found by other students, as they can happen to them in the future.

The students will make a self-evaluation of the activity, comparing the cost of the installation with the cost of the energy saved to demonstrate the utility of this kind of device.

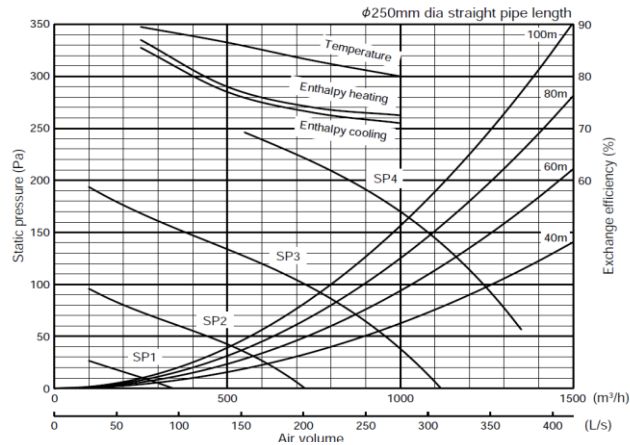
Model		LGH-100RVX-E							
Electrical power supply		220-240V/50Hz, 220V/60Hz							
Ventilation mode		Heat recovery mode				Bypass mode			
Fan speed		SP4	SP3	SP2	SP1	SP4	SP3	SP2	SP1
Running current (A)		2.50	1.20	0.50	0.17	2.50	1.20	0.51	0.19
Input power (W)		420	200	75	21	420	200	75	23
Air volume	(m ³ /h)	1000	750	500	250	1000	750	500	250
	(L/s)	278	208	139	69	278	208	139	69
External static pressure (Pa)		170	96	43	11	170	96	43	11
Temperature exchange efficiency (%)		80.0	83.0	86.5	89.5	—	—	—	—
Enthalpy exchange efficiency (%)	Heating	72.5	74.0	78.0	87.0	—	—	—	—
	Cooling	71.0	73.0	77.0	85.5	—	—	—	—
Noise (dB) (Measured at 1.5m under the center of unit in an anechoic chamber)		37.0	31.0	23.0	18.0	38.0	32.0	24.0	18.0
Weight (kg)		54							

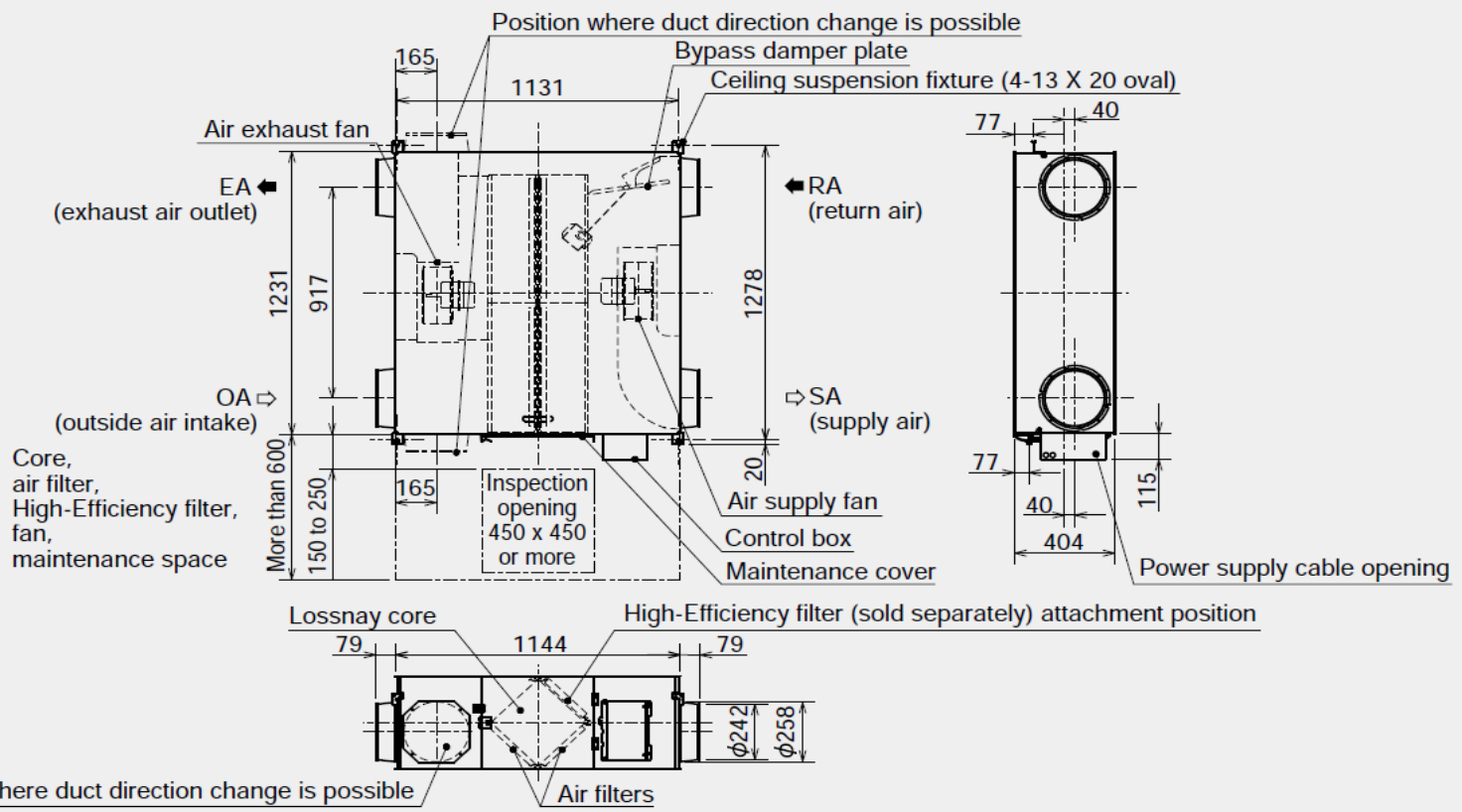
*The Air outlets noise (45° angle, 1.5meters in front of the unit) is about 21dB greater than the indicated value.(at Fan speed 4)

*The running current, the input power, the efficiency and the noise are based on the rating air volume, and 230V/50Hz.

*For the specification at the other frequency contact your dealer.

*Use this unit between static pressure 60Pa and 240Pa at Fan speed4. Otherwise the motor protection may work and reduce its output or the noise level might be larger.





TOOLS (DRAFT)





Clamp Ampmeter
 Megger
 Capacitance
 Pencil soldering iron
 Multimeter
 Thermographic camera
 Thermometer
 NH fuse extractor - Fuse
 Radio

Wrench
 Filter wrench
 Flat wrench
 Small wrench
 Glue
 Wrench
 Right-angled flat wrench
 Right-angled flat wrench for lever
 Set of socket spanners

Crow bar
 Mallet
 Teflon hammer
 Magnet
 Manual lubricator
 Flexometer
 Caliber
 Support-dial gauge
 Torque wrenches

Gear box couple
 Scissors
 Pliers
 Cutting pliers
 Parrot nose wrench pliers
 Screw drivers
 Allen wrenches
 Dial gauge