

HV unit
Air-to-water heat pump
Ventilation unit

The purest air to breathe
and **natural heat**

Just feel good...



Effiziento



Fresh air - is life

Modern building standards enhance living with higher living comfort at lower energy consumption.

Nevertheless, there is "bad air" in many new buildings. This results in fatigue, headaches and general discomfort.

Ventilation is a subject that is often underestimated. The advantages of proper ventilation are, in addition to a high air quality, the prevention of mould, a healthy living climate, the preservation of the building structure and heating cost savings. When it has been planned correctly and the residents act as they should, there is a savings potential of up to 40 percent in heating alone.

Fresh air in your home...

Better air - with the latest technology

Opening the windows to renew the air as is done customarily is random ventilation and does not suffice. It cancels out every clever energy concept and unnecessarily increases your heating expenses.

With the system solutions by *Effiziento*, all factors for optimal living comfort and the lowest energy consumption are combined. A healthy and modern indoor climate is thus always guaranteed.

Turn your home into a health resort!

Your benefits

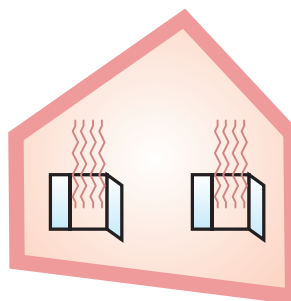
- ✓ **Economical and ecological**
up to 40% savings on heating costs
- ✓ **Quiet and undisturbed**
no noise from outside - noise causes illness
- ✓ **Healthy room climate**
constant supply of fresh air enhances your sense of well being
- ✓ **Pollen and mosquitoes**
stay outside - recommended for allergy sufferers
- ✓ **Mould formation**
is prevented - moisture is continuously being removed
- ✓ **Active environmental protection**
we owe it to our children

How it works

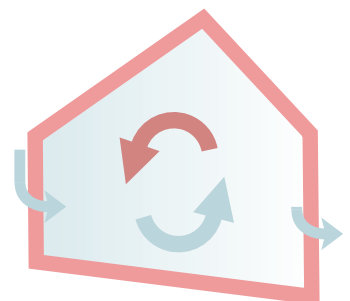
The building is divided into three ventilation areas: exhaust air areas (kitchen, bathroom), supply air areas (bedrooms and living room) and overflow areas (hallway, corridor).

The most odours and moisture develop in the kitchen, the bathroom and the toilet. The used air is sucked off there while the same amount of fresh air flows into the living rooms. Through an extremely effective heat recovery system, the heat of the exhaust air is transferred without contact to the supply air via a heat exchanger.

This way, the air stays always pure and the energy conservation balance is significantly improved.



Building without ventilation system. Uncontrolled ventilation through windows leads to high heating costs.



Building with ventilation system. Controlled ventilation of living spaces leads to savings in heating costs.



Energy savings - rethinking makes sense

In view of energy resources becoming ever more scarce, the growing threat of global warming and continuously rising energy prices, it is important to produce heat that is easy on the environment.

For we do not only use up our money but also the energy reserves of our children.

With the latest standard heat pump technology by *Effiziento*, the energy that is available abundantly in the air can be transformed into heat. Energy that is produced on-site without emissions - no carbon dioxide, no sulphur to pollute the air we breathe.

Only nature offers low-cost heating

The principle - turning one into four

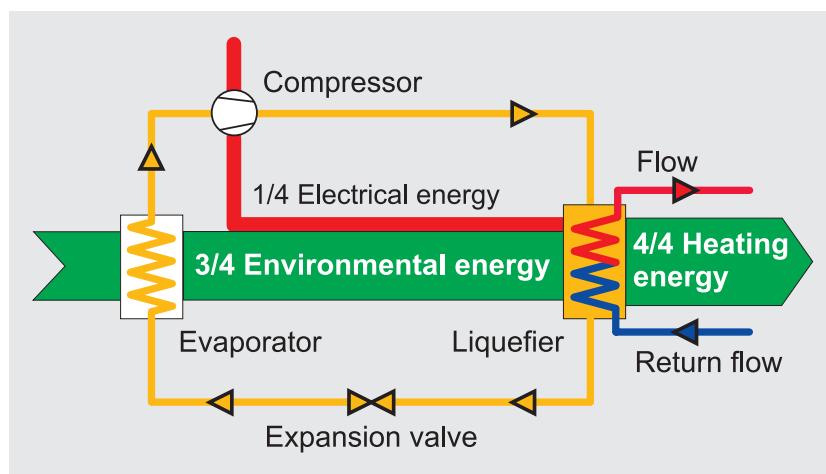
75% of the energy for heating comes from environmental energy or solar energy and only 25% from electrical energy.

In a closed refrigeration cycle, solar energy is removed from the environment and added to the refrigerant. The compressor in the heat pump compresses the refrigerant, thus increasing the temperature to a higher level that can be used by the heating system. The electrical energy used for compresses is available in the refrigerant and does not get lost. With a minimal energy requirement of 1 kW for the operating current, it is possible to produce 4 kW of heating energy by using energy available in nature and free of charge, such as in the air.

This corresponds to a coefficient of performance of 4.

Your benefits

- ✓ **Economical and ecological**
up to 50% savings compared to oil/gas heating
- ✓ **Independence from commodity prices**
finally independent
- ✓ **Minimal maintenance costs**
no more chimney sweeper
- ✓ **State subsidies**
Heat pumps are subsidised
- ✓ **Emission-free on-site**
- ✓ **No risk of fire, explosions and dangers to the environment**
- ✓ **Innovative and future-proof**



The principle of the heat pump

HV unit



Heating, cooling, ventilation and domestic hot water - only with one system

The HV unit efficiently and economically meets all the requirements of the technical installations in the building in monovalent (sole) operation.

Heating, cooling, ventilation and domestic hot water in the smallest space.

Highly efficient heat recovery and extremely low energy consumption result in a maximum of living comfort.

The future is today...

Investing in the future

The powerful unit withdraws up to 95% of the thermal energy from the exhaust air via the highly efficient counterflow duct heat exchanger and submits it to the supply air without contact.

The efficient air-to-water heat pump uses the remaining residual heat of the exhaust air and, with additional outside air, produces sufficient heat energy for heating and domestic hot water.

An investment that pays off!



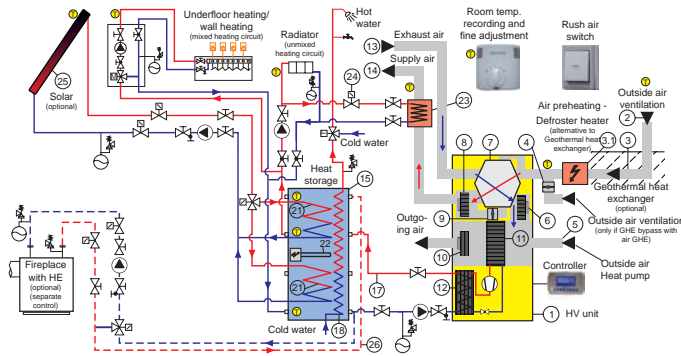
Your benefits

- ✓ **Economical and ecological**
up to 50% savings compared to oil/gas heating
- ✓ **Heating, cooling, ventilation and domestic hot water - only with one system**
- ✓ **5,42 COP/coefficient of performance** (at A7/W35)
Optimally aligned system
- ✓ **95% heat recovery**
with counterflow duct heat exchanger
- ✓ **Summer-Bypass** fully automated
- ✓ **geothermal heat exchanger -Bypass**
fully automated
- ✓ **Supply/exhaust air stepless**
- ✓ **Constant volume flow ventilation**
no imbalance between supply and exhaust air
- ✓ **Compact and quiet in operation**

Technical data - Type		HTZ 4	HTZ 8	HTZ 11	HTZ 15	HTZ 20
Recommended for building with heating capacity at -14°C outside temperature	kW max.	1 bis 4	8	11	15	22
Air flow rate supply air/exhaust air	m³/h	70-350	70-350	70-350	70-1150	70-1150
Heat recovery from exhaust air with reverse flow duct heat exchanger	%	95	95	95	95	95
Operating limit air temperature	°C	-16 bis +35	-20 bis +35	-25 bis +35	-25 bis +35	-20 bis +35
Max./min. Heat pump flow temperature	°C	55 / 25	55 / 25	55 / 25	55 / 25	55 / 25
Nominal heating capacity/coefficient of performance A7/W35	kW/COP	5,40 / 4,91	10,40 / 5,20	14,00 / 5,38	17,50 / 5,30	24,40 / 5,42
Nominal heating capacity/coefficient of performance A2/W35	kW/COP	4,50 / 4,09	8,90 / 4,45	12,00 / 4,62	15,00 / 4,55	20,90 / 4,64
Refrigerant	Typ	R134a	R404a	R404a	R404a	R404a
Dimensions HxWxD	cm	160x65x75	191x65x75	191x65x95	191x87x136	191x87x136
Weight	kg	ca. 200	ca. 230	ca. 250	ca. 270	ca. 300
Noise emission housing at distance of 1 m	dB(A)	52	53	54	55	57

A=outside air temperature W=flow temperature of heat pump

Functional Description



Ventilation Module

The HV unit (1) provides the building with supply air and exhausts the contaminated exhaust air. Via the ventilation outside air connection (2) and by means of the supply air fan (8), outside air is sucked into the building via a geothermal heat exchanger (3) laid in the ground. Via the geothermal heat exchanger the outside air is preheated in winter and precooled in summer. As an alternative to the geothermal heat exchanger an electric defroster heater (3.1) can be used that preheats the outside air in winter.

The fresh air is conducted through the reverse flow duct heat exchanger (7) and draws heat from the counterflowing exhaust air (13). Via the supply-air duct system the fresh air enters the living areas as supply air (14). In summer the fresh air can be channelled past the reverse flow duct heat exchanger. For this purpose the summer bypass flap (9) in the supply-air bypass duct is repositioned. With the optional geothermal heat exchanger bypass (4) the fresh air supply can be switched over. The fresh air can thus be supplied via the geothermal heat exchanger or directly via the outside air connection. In this way the fresh air is always aspirated at the optimum temperature.

Heat Pump

The exhaust air is conducted through the evaporator (11) (air-to-refrigerant heat exchanger) of the heat pump by means of the exhaust-air fan (6). In the evaporator the exhaust air delivers the residual heat still contained within it to the refrigerant circuit heat pump. The heat pump draws heat energy from the exhaust air in the evaporator and delivers it directly to the thermal storage water (17) in the condenser (12) (refrigerant-to-water heat exchanger) of the heat pump. In order to cover the complete heat requirement for the heating mode and domestic water needs, additional outside air (5) is directly aspirated and also conducted through the evaporator. Thereby the additional outside air delivers heat energy to the refrigerant circuit heat pump. In the case where the supply air and exhaust air fan motors are not in operation, the volume flow required to operate the heat pump is aspirated by the heat pump outer air fan motor (10) alone. By this means the optimum volume flow is always conducted through the evaporator of the heat pump. In this way an optimum coefficient

of performance of the heat pump for each operating state of the HV unit is ensured.

Heat Storage Tank

The storage tank (15) is heated via the heat pump and, where a solar thermal system (25) or water-conducting fireplace. If the energy recovered from the heat pump and solar thermal system is not sufficient, the electric heating element (22) is switched on automatically. The energy recovered from the heat pump is supplied directly to the thermal storage water (17) in the condenser (12) (refrigerant-to-water heat exchanger) of the heat pump. The energy recovered from the solar thermal system is supplied via the heat exchanger (21). Via the domestic hot water heat exchanger (18) energy is removed and supplied to the tap connections in the building. The static heating surfaces and/or the hot water duct heater (23) in the supply air are connected directly to the storage tank.

Legend:

- 1 HV unit
- 2 Outside air intake ventilation
- 3 Geothermal heat exchanger (GHE)
- 3.1 Defroster heater (alternative to GHE)
- 4 Geothermal heat exchanger bypass ventilation
- 5 Outside air for heat pump
- 6 Ventilator exhaust air
- 7 Reverse flow duct heat exchanger
- 8 Ventilator supply air
- 9 Summer bypass supply air
- 10 Fan heat pump
- 11 Evaporator heat pump
- 12 Condenser heat pump
- 13 Exhaust air from room
- 14 Supply air into room
- 15 Heat storage tank KS-PWS 500-2, 500 L
- 17 Storage water supply
- 18 Hot water heat exchanger
- 21 Solar heat exchanger
- 22 Electric heating element
- 23 Supply-air heater (optional)
- 24 Supply air temperature limiter (optional)
- 25 Solar thermal system (optional)
- 26 Fireplace supply (optional)

Air-to-water heat pump



Efficiently heating and domestic hot water

The air-to-water heat pump solves efficiently and economically in monovalent operating (alone) the central heating and domestic hot water supply.

Heating and domestic hot water in a small space through the use of modern technology. Maximum living comfort at extremely low levels of energy consumption.

A heating system that is equally beneficial to home owners and the environment.

Really a strong technology...

Ecology and economy are united

Environmentally friendly heating systems are the future. Heat pumps as the new LI from *Effiziento* achieves excellent results. Because they use the natural heat from the environment.

The efficient air-to-water heat pump uses the energy contained in the outside air and generates heat energy for heating and domestic hot water.

Modern technology from *Effiziento* offers the possibility to reduce the energy costs of your own home considerably.



Your benefits

- ✓ **Economical and ecological**
up to 50% savings compared to oil/gas heating
- ✓ **Heating and domestic hot water** - only with one system
- ✓ **5,42 COP/coefficient of performance** (at A7/W35)
Optimally aligned system
- ✓ **Independent from oil and gas**
- ✓ **No expensive drilling and excavation work necessary**
- ✓ **Compact and quiet in operation**
- ✓ **Minimal maintenance costs**
no more chimney sweeper
- ✓ **Emission-free on-site**

Technical data - Type		LI 4	LI 8	LI 11	LI 15	LI 20
Recommended for building with heating capacity at -14°C outside temperature	kW max.	1 bis 4	8	11	15	22
Operating limit air temperature	°C	-16 bis +35	-20 bis +35	-25 bis +35	-25 bis +35	-20 bis +35
Max./min. Heat pump flow temperature	°C	55 / 25	55 / 25	55 / 25	55 / 25	55 / 25
Nominal heating capacity/coefficient of performance A7/W35	kW/COP	5,40 / 4,91	10,40 / 5,20	14,00 / 5,38	17,50 / 5,30	24,40 / 5,42
Nominal heating capacity/coefficient of performance A2/W35	kW/COP	4,50 / 4,09	8,90 / 4,45	12,00 / 4,62	15,00 / 4,55	20,90 / 4,64
Refrigerant	Typ	R134a	R404a	R404a	R404a	R404a
Dimensions HxWxD	cm	108x65x75	139x65x75	169x65x75	169x65x96	189x65x96
Weight	kg	ca. 180	ca. 210	ca. 230	ca. 250	ca. 280
Noise emission housing at distance of 1 m	dB(A)	52	53	54	55	57

A=outside air temperature W=flow temperature of heat pump

Central domestic ventilation unit



Well-being in every room

Central domestic ventilation unit for ventilation of residential properties with up to 95% heat recovery from exhaust air.

The ventilation unit of ZL series provides the entire house with a pleasant climate - supplying temperature-controlled fresh air. The system also monitors the air quality: Finely pored filters prevent dust, pollen, and other air pollutants from entering the house. At the same time, CO₂ and dampness are extracted. This minimizes the risk of structural damage and removes dust mites and molds the habitat.

Pure air to breathe...

Long-term benefits

The ventilation unit ensures an outtake of exhaust air whilst retaining its heat. This enables you to reduce energy and heating costs considerably.

Due to filtering and extraction, the ZL series not only provides fresh air, but also a „fresh building“, as the materials are less exposed to pollutants. This enhances the comfort of your home and adds to its market value. Unnecessary costs of restoration due to mould or dust mites are thus avoided.



Your benefits

- ✓ **Economical and ecological**
up to 25% savings on heating costs
- ✓ **95% heat recovery**
with counterflow plate heat exchanger
- ✓ **Summer-Bypass** fully automated
- ✓ **Supply/exhaust air stepless**
- ✓ **Constant volume flow ventilation**
no imbalance between supply and exhaust air
- ✓ **Compact and quiet in operation**

Technical data - Type		ZL 180	ZL 300	ZL 400
Air flow rate supply air/exhaust air	m ³ /h	50 - 180	50 - 300	50 - 300
Heat recovery from exhaust (up to)	%	95	95	95
Sommer-Bypass	%	-	automatically	automatically
Externally available compression of supply air/exhaust air	Pa	150	150	150
Dimensions HxWxD	mm	560 x 600 x 315	675 x 602 x 420	675 x 602 x 420
Weight	kg	25	31	31
Air connections	mm	DN 125	DN 160	DN 160
Filter class	Typ	G3	G3/G4/F6	G3/G4/F6
Noise emission housing at distance of 1 m	dB(A)	32	33	33



Competent and innovative!

Effiziento combines the latest technology with nature to offer you a crisis-free energy supplier.

We started specialising in energy efficient heating systems years ago. With our many years of experience and considerable know-how in the area of low-energy and passive houses, we develop high-value materials and techniques for energy-efficient heating systems that guarantee high quality and durability.

We offer a tailor-made solution for each building project and will not leave you on your own!

Our support team are always on hand and ready to offer you their advice. They will offer their support in the project planning and professional designing of the system and in obtaining a quotation. Our qualified staff will be happy to give you full support for installation, start-up and operation.

We will be happy to advise you.

Effiziento
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Heat Pump - Ventilation - Heating

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