

ROTEX HPSU compact – Heating with air, solar energy and ROTEX.



# **ROTEX HPSU compact –** The compact air-to-water heat pump.



**ROTEX**  
The heating!

# Your first step into the renewable heating age:

## Heating with air and solar energy.

### An inexhaustible source of heat right outside your door

The sun is our natural energy supplier. Take advantage of this free heat source for your house.

If you use environmental heat from the air and solar heat for heating your home, then this source of energy is free and also inexhaustible. The ROTEX HPSU (HeatPumpSolarUnit) is a heat pump installation which exploits the environmental heat available to supply heat to your house with maximum efficiency. Combined with a ROTEX solar installation, ROTEX air-to-water heat pumps provide unbeatable solar heating.

When it is incorporated into the ROTEX EcoHybrid® complete heating system, you will have a heating system which provides the highest levels of heating and hot water comfort, which is adaptable and future-proof and which will reduce your heating costs to a minimum.

### ROTEX HPSU compact

- Regenerative air-to-water heat pump
- Use free environmental energy from sunlight and air
- For hot water and heating
- Without expensive drilling and excavation work
- Direct combination with solar
- Particularly compact and quiet
- Optimum water hygiene
- Heating and cooling
- Bivalent option

### The functional principle – tried and tested a million times

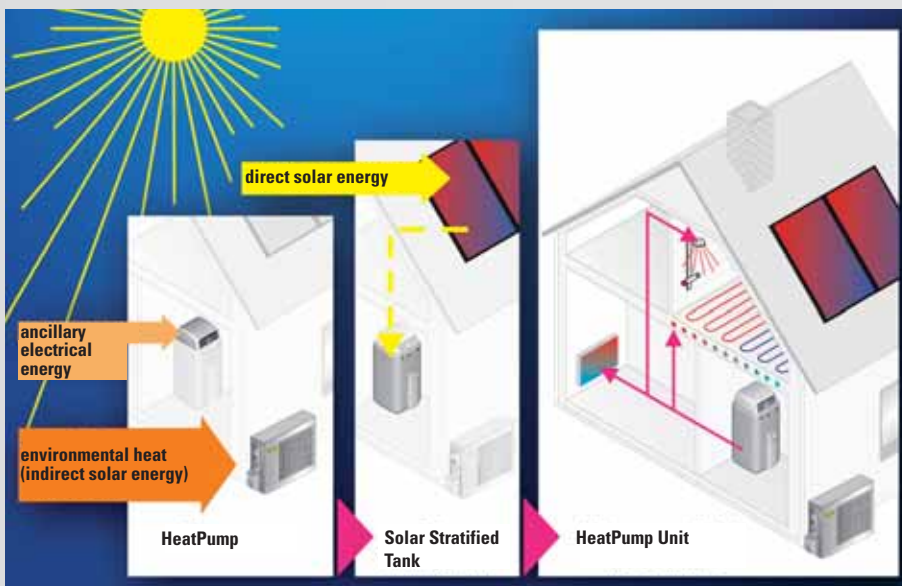
In an air/water heat pump, auxiliary electrical energy is used to transfer heat from the ambient air into the heating system. This principle has been used millions of times in reverse in air-conditioning units and fridges.



A fridge extracts heat from its contents and dissipates it into the environment. A heat pump extracts heat from the environment and dissipates it into the heating system.

We use the ambient air as our heat source, which ultimately takes its heat from the sun.

We have therefore called our air/water heat pump: the **HeatPumpSolarUnit**



The name **HPSU** comes from **HeatPumpSolarUnit**. In other words, a heat pump unit which can be directly combined with solar panels.



### **Climate change and its causes**

Everybody's talking about climate protection. Investigations have shown that heating makes up more than 60 % of the energy consumption in domestic households. In comparison, we use just 31 % for our motor vehicles. Your heating system therefore consumes more energy than your car.

### **What you can do to counteract this**

You can use your bicycle for short journeys instead of taking the car. This will save fuel. With a conventional heating system it is virtually impossible to reduce energy consumption without compromising on comfort. The only answer is to use high-efficiency heating technology.

### **Intelligent heating and saving costs**

What is high-efficiency heating technology? It enables the best possible utilisation of renewable energies and also ensures that the remaining residue of primary energy required is used to maximum efficiency.

**My heating system uses air, solar energy and ROTEX.**



# Flexible handling an easy to install.



## **ROTEX HPSU compact – The indoor unit**

ROTEX is now offering an especially compact and innovative comprehensive solution in the form of the new heat pump unit.

The HPSU compact is a space-saving solution that incorporates the indoor unit of the heat pump into the solar stratified storage tank. The indoor unit has a footprint of just 79 x 79 cm; the entire heating control station is accommodated in the HPSU compact in this area of only 0.62 m<sup>2</sup>.

This indoor unit transfers the heat contained in the heat transfer medium (refrigerant) to the heating and hot water system.

The compact unit can be installed in any suitable location. You do not need a separate utility room.



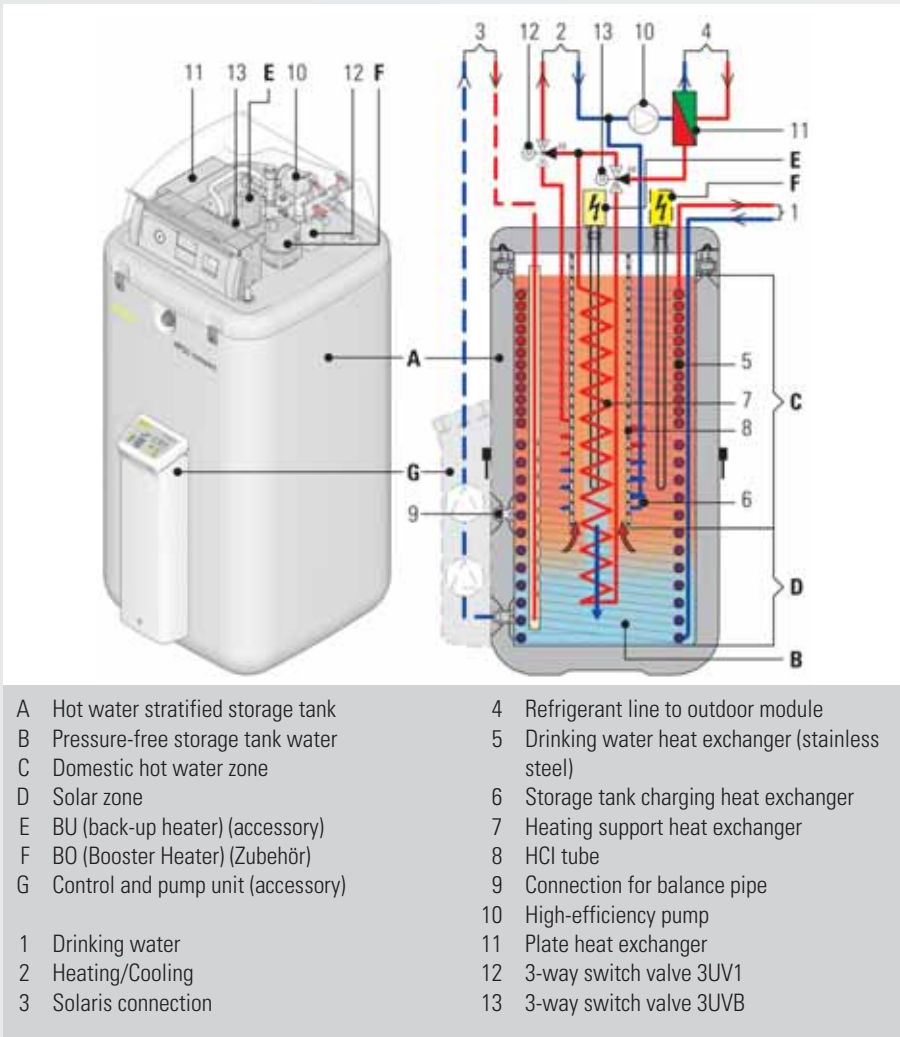
## **The outdoor unit**

The outdoor unit extracts heat from the ambient air which is absorbed by the heat transfer medium (refrigerant) and transferred to the indoor unit. The compact outdoor unit can be placed inconspicuously outside new buildings or ex-isting residential buildings. No expensive drilling or excavation work is required. Your garden remains intact.

## **Perfect climate: Heating in the winter – cooling in the summer**

The HPSU compact can not only provide heating but, as an option, can also cool.





## The Hybrid central unit – open for all energy types

Heat from other sources can also be efficiently stored in the HPSU compact indoor unit. The indoor unit can also be supported by other sources of heat apart from a solar system; oil and gas-fired boilers, pellet-fired boilers or wood-fired stoves with back-boilers can easily be connected. The heat fed in supports the heating as well as the production of hot water, all with the highest level of energy efficiency. The entire control system management is already incorporated into HPSU compact.



This means you can quickly and easily convert your heat pump into a Hybrid central unit.

## Hot water and solar storage tank

The heart of the HPSU system is the heat storage tank. It stores the heat

obtained and then transfers it to the heating system at the required time. The integrated plastic hot water storage tank is fully corrosion resistant and features a stainless steel corrugated pipe heat exchanger which transfers the heat that is recovered particularly effectively.



It is a combination of hot water storage tank and instantaneous hot water heater with outstanding water hygiene for you and your family.

## Our experience – for your health

As a matter of principle, the integrated storage tank is optimised from a water-hygiene point of view by virtue of its design. ROTEX has been building hot water storage tanks according to this principle for 25 years with the aim of maximising water hygiene. With all storage generations the construction has been selected so that the heated domestic water only stays in the storage tank for a very short period of time. This design prevents deposits (scale, sludge or rust) in the domestic hot water, which means the storage tank of the HPSU compact does not provide a breeding ground for germs. The outstanding water hygiene advantages of this type of hot water storage tank were confirmed by extensive research carried out by the Hygiene Institute of Tübingen university.

# Two items which belong together: the heat pump + solar energy.

## Low expenditure - big yield

At its peak, 80 % of solar energy can be converted into usable heat. The extremely high efficiency of ROTEX flat solar panels makes this possible.

Solar energy and heat pumps complement each other ideally in this application.

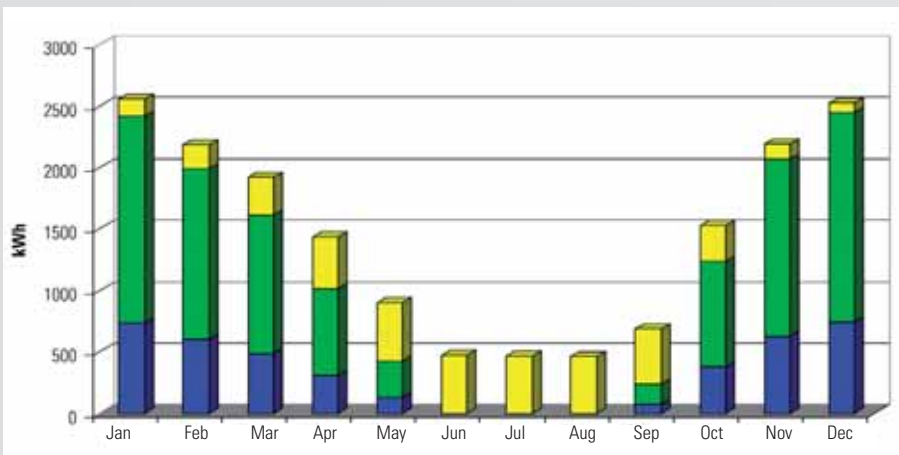
The heat pump adds the required amount of heat to the heating system to meet the demand.

## A measure of the situation: SCOP

It describes how many more times you are gaining on heat energy over the year with respect to the auxiliary energy expended.

The higher the annual work index, the higher the efficiency of the heat pump. The ROTEX heat pump in combination with our solar installation achieves an SCOP of up to 4,3. That means that you are getting 4 times more heat energy for heating and hot water than you expend in auxiliary energy.

The ROTEX HPSU sets completely new standards in the field of air/water heat pumps.



## Practically unbeatable: heat pump + solar energy!

In the example shown the energy contribution is sub-divided as follows:

Solar energy: approx. 20 %  
Heat pump (Environmental heat) approx. 55 %  
Auxiliary energy approx. 25 %

The SCOP is: **SCOP** = 4.0  
(SCOP = **S**easonal **C**oefficient of **P**erformance)

The diagram shows the monthly energy consumption of an average single occupancy family house.

■ Solar energy utilisation for hot water and heating  
■ Heat pump (Environmental heat)  
■ Auxiliary energy



# Direct solar energy use simply included.



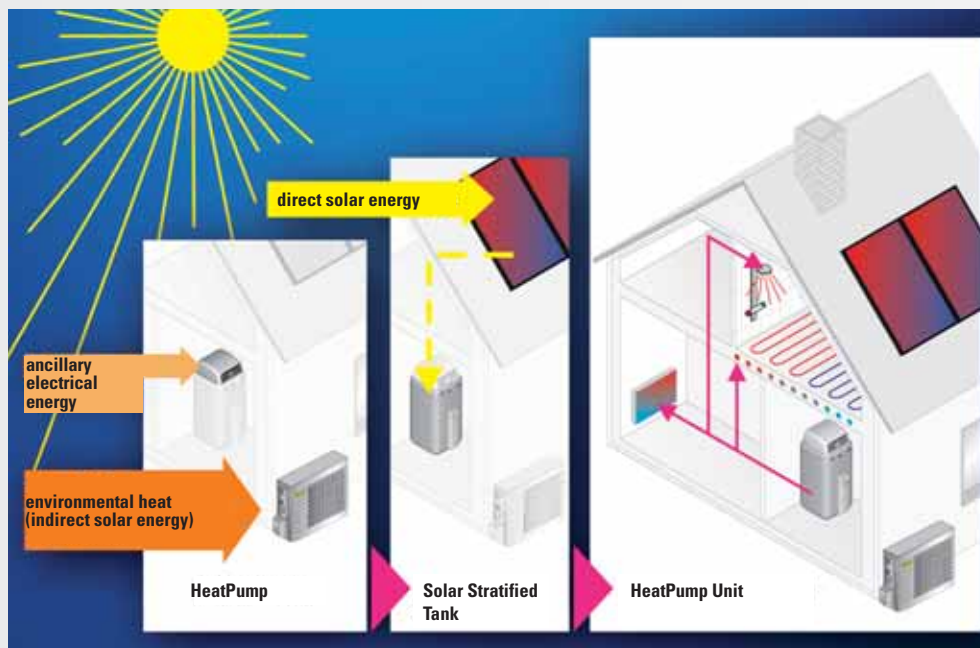
## A strong team:

The ROTEX HPSU compact comes ideally equipped for use with solar energy.

If you want to delay installation of a solar energy installation, this can be rapidly and simply retrofitted.

## ROTEX Solaris – Solar energy for heating and hot water

- Solar energy utilisation for hot water and heating assistance
- Highest level of energy utilisation by an optimised complete system
- High performing flat solar panels (flexible application in three sizes)
- High level of solar utilisation by optimum temperature stratification in the hot water storage tank
- Doubly environmentally friendly by the omission of antifreeze and the avoidance of environmentally damaging materials
- The storage tank and solar installation are virtually maintenance-free



# The output modulating heat pump.

## The compressor – the heart of the heat pump

What the engine is to the automobile, the compressor is to the heat pump. This has a decisive role in the energy efficiency of the entire heat pump.

ROTEX is one of the leading global companies in the field of air-conditioning and heat pump technology. The compressors in the ROTEX heat pump are developed and manufactured within the group.

This means that we can draw upon the know-how provided by many millions of compressors produced by the leader in the field of this technology.

They are precisely designed for this application and are optimised for energy consumption.

## Economical and quiet as a result of output-modulating operation

The heat demand in a building will fluctuate greatly depending on the prevailing weather and the behaviour of the user.

All ROTEX heat pumps use so-called inverter technology. This is used to operate the compressor in an output range variable between 50 and 100 %, and this means that the output of

the heat pump is continuously matched to the

demand. In the HPSU<sup>hitemp</sup> two stage heat pump, this modern inverter technology is actually used twice.

This power output is managed for you by the internal digital control electronics automatically without requiring human intervention. It all depends on the correct mixture.

This significantly increases the energy efficiency of ROTEX heat pumps, in the same way as you will be familiar with

from your car when you back off the accelerator. This output management leads to whisper-quiet operation.

## Convenient control system

The digital control system in the internal unit is particularly simple to operate.

It can be used to control the heating system and (if fitted) the cooling system to match your requirements.

The heating water temperature is controlled depending on the outside temperature. The control system itself detects winter and summer automatically and switches the heating system on and off in accordance with the demand.

The integrated digital timer provides individually adjustable daily and weekly programmes for all applications. In this way the temperature is automatically reduced at night or when you are away on holiday, and when you get up or come back home the house will be pleasantly warm again.

The system achieves maximum efficiency by keeping the water temperature as low as possible. The heat pump can even be controlled from your living room using the convenient remote control.



# Heating systems.



## **ROTEX EcoHybrid® – The complete heating system.**

The word "hybrid" originates from Greek and means "mixed, from two origins". A hybrid heating system is a heating system which uses several types of energy.

EcoHybrid® is the heating system you would want today: Consistent utilisation of renewable energies and virtually unsurpassable efficiency.



In the ROTEX EcoHybrid® system, heat distribution is also taken into account. The preferred room heating surface in conjunction with the heat pump is the ROTEX underfloor heating system. There is also a facility for incorporation of radiators.

## **Heat pump + underfloor heating**

As the entire floor area acts as a heating surface, the underfloor heating system can operate with a much lower surface temperature than radiators. This makes it the ideal partner for the heat pump.

The consistent mild heat radiation provides balanced temperature distribution. Underfloor heating systems transfer most of their heat via thermal radiation.

As a result, the air temperature in rooms heated using underfloor heating systems can be maintained at a significantly lower temperature than rooms heated by conventional heating systems while delivering the same perceived temperature.

## **Perfect climate: Heating in the winter - Cooling in the summer**

The single stage HPSU heat pump does not only heat, but, as an option, it can cool as well. The underfloor heating system is suitable for both heating and cooling. Its use means that your house is at a pleasant temperature all year round.

## **Ready for the future**

### **HPSU + EcoHybrid® – variable and extendable**

No matter how you enter the world of hybrid technology: the good thing about EcoHybrid® is that you can always extend the system at any time. The ROTEX heat storage tank is at the heart of the system. It permits the interaction of various different types of energy, such as a heat pump and solar energy, and also the integration of other types of energy, such as oil-fired condensing technology, gas-fired condensing technology, pellet or wood boilers. You will be equipped and ready for the future.

### **Manufacturer's expertise**

ROTEX is the sole manufacturer of all the major system components of the EcoHybrid® heating system. You can therefore rest assured that all components are optimally matched to each other, thus ensuring the highest levels of energy efficiency and comfort.

ROTEX, as the system manufacturer, stands for know-how in development and manufacture and for decades of system experience.

Your heating is our profession!

## **ROTEX EcoHybrid® – Safety and cosiness for your future!**

## Technical data of HPSU compact indoor unit

**Typ Indoor Modul**  
For Outdoor unit

**6-8 kW**  
Heating & cooling

**11-16 kW**  
Heating & cooling



<sup>1)</sup> **Reheating time** = The time needed to reheat the hot water storage tank to a temperature of 50 °C after a certain quantity of DHW has been discharged.

### Basic data

Unit dimensions H/W/D	mm	1810/790/790	1810/790/790
Unit weight	kg	124	126
Operating range, flow temperature (heating)	°C	Min: 15 / Max: 50	Min: 15 / Max: 55
Operating range, flow temperature (cooling)	°C	Min: 5 / Max: 22	Min: 5 / Max: 22

### Connection refrigerant line

Gas pipe		5/8" 15,9 mm	5/8" 15,9 mm
Liquid line		1/4" 6,4 mm	3/8" 9,5 mm

### Storage tank data

Total capacity of storage tank	litres	500	500
Max. permissible storage water temperature	°C	85	85
Standby heat consumption at 60°C	kWh/24h	1,4	1,4

### Domestic hot water

Potable water capacity	litres	29,0	29,0
Maximum operating pressure	bar	6	6
Domestic hot water heat exchanger material		stainless steel	stainless steel
Domestic hot water heat exchanger surface area	m <sup>2</sup>	6,0	6,0
Average specific thermal output	W/K	2 900	2 900

### Storage tank charging heat exchanger (stainless steel)

Water capacity heat exchanger	litres	12,6	20,7
Surface of charging heat exchanger	m <sup>2</sup>	2,5	4,3
Average specific thermal output	W/K	1 200	2 090

### Solar heating support (stainless steel)

Water capacity heat exchanger	litres	8,6	8,6
Heat exchanger surface area	m <sup>2</sup>	1,8	1,8
Average specific thermal output	W/K	870	870

### Thermal output data

Hot water volume without reheating at 8 l/min/12 l/min Draw-off rate (T <sub>KW</sub> = 10 °C/T <sub>WW</sub> = 40 °C/T <sub>SP</sub> = 50 °C)	litres	338 / 272	338 / 272
Hot water volume without reheating at 8 l/min / 12 l/min Draw-off rate (T <sub>KW</sub> = 10 °C/T <sub>WW</sub> = 40 °C/T <sub>SP</sub> = 60 °C)	litres	527 / 468	527 / 468
Hot water volume without reheating at 8 l/min / 12 l/min Draw-off rate (T <sub>KW</sub> = 10 °C/T <sub>WW</sub> = 40 °C/T <sub>SP</sub> = 65 °C)	litres	614 / 560	614 / 560
Re-heating time <sup>1)</sup>			
Draw-off volume 140 l -> 5820 Wh (bath)	min	45	25
Re-heating time <sup>1)</sup>			
Draw-off volume 90 l -> 3660 Wh (shower)	min	30	17

### Pipe connections

Cold and hot water	inches	1" outer thread	1" outer thread
Heating flow and return	inches	1" internal thread	1" internal thread

### Optional accessories: auxiliary heating

		Backupheater	Boosterheater
Output	kW	9	3
Power supply, phase		3~*	1~
Power supply, frequency	Hz	50	50
Power supply, voltage	V	400	230
Operating current	A	3 x 13,1	13,1

\* Single phase connection (3 x 230 V / 50 Hz) possible

# Single stage heat pump up to approx. 55 °C flow temperature

## Technical data for HPSU outdoor unit

	~1/230 V			~1/400 V			~3/400 V		
Type: Outdoor module	6 kW	7 kW	8 kW	11 kW	14 kW	16 kW	11 kW	14 kW	16 kW



**EU environmental label for HPSU in combination with underfloor heating**



### Basic data

Nominal heat output A-7/W35	kW	4,20	5,13	5,69	6,63	7,84	8,77	6,56	8,52	9,18
Nominal heat output A2/W35	kW	5,49	6,55	7,18	7,86	9,71	10,90	8,20	10,07	10,73
Nominal heat output A10/W35	kW	8,63	10,13	11,02	12,10	15,14	17,26	11,82	14,93	16,40
Nominal COP A-7/W35		2,66	2,64	2,59	2,70	2,52	2,41	2,63	2,66	2,57
Nominal COP A2/W35		3,43	3,29	3,16	3,29	3,18	3,16	3,35	3,31	3,20
Nominal COP A10/W35		4,68	4,35	4,11	4,96	4,79	4,49	4,72	4,52	4,42
Nominal cooling output A35/W18	kW	7,20	8,16	8,37	13,90	17,30	17,80	15,05	16,06	16,76
Nominal cooling output A35/W7	kW	5,12	5,86	6,08	10,00	12,50	13,10	11,72	12,55	13,12

Dimensions H/W/T	mm	735 / 825 / 300			1170 / 900 / 320			1345 / 900 / 320		
Weight	kg	56			103			110 ( W18)		

Operating range, outside temperature (heating)	°C	Min: -20 / Max: 25			Min: -20 / Max: 35			Min: -20 / Max: 35		
Operating range, outside temperature (cooling)	°C	Min: 10 / Max: 43			Min: 10 / Max: 46			Min: 10 / Max: 46		
Operating range, outside temperature (DHW)	°C	Min: -20 / Max: 43			Min: -20 / Max: 43			Min: -20 / Max: 43		

Noise level - heating (measured at a distance of 10 m)	dB(A)	28	28	29	29	31	33	31	31	32
Noise level - cooling (measured at a distance of 10 m)	dB(A)	28	28	30	30	32	34	30	32	34

Power supply Phase		1~			1~			3~		
Power supply Frequency	Hz	50			50			50		
Power supply Voltage	V	230			230			400		
Inrush current	A	11			22,8	27,4	31,9	13,5		

Refrigerant		R 410a			R 410a			R 410a		
Volume of refrigerant		1,7 kg			3,7 kg *2			2,95 kg		

### Connection refrigerant line

Gas line		5/8" 15,9 mm			5/8" 15,9 mm			5/8" 15,9 mm		
Liquid line		1/4" 6,4 mm			3/8" 9,5 mm			3/8" 9,5 mm		

Refrigerant line length max.		30 m			75 m			75 m		
Refrigerant line length min.		3 m			5 m			5 m		
with pre-filled refrigerant volume		10 m			30 m			10 m		



Nominal heating output / Nominal COP /  
Nominal cooling output

A = Outside temperature °C

W = Outlet temperature at condenser  
(flow temperature) °C



# ROTEX EcoHybrid® – the complete heating system.

## What is EcoHybrid®?

The word "hybrid" originates from Greek and means "mixed, from two different origins". A hybrid heating system allows the different types of energy to work together, such as heat pumps and solar energy, but also allows other types of energy to be integrated, such as oil, gas, pellet, or even log burning boilers. This means you are equipped to face any contingencies in the future. Consistent use of renewable energies and efficiency that is practically impossible to surpass.

## Everything from a single source

ROTEX manufactures all the important system components for the EcoHybrid® heating system itself. This means you can rely on the fact that all components are optimally made to work together and thus guarantee the greatest energy efficiency and highest level of comfort. As a system manufacturer for know-how in development and manufacturing, ROTEX stands for decades of system experience. Your heating is our profession!

## ROTEX EcoHybrid® – variable and extendable

Regardless of the way in which you start using hybrid technology today, the good thing about the EcoHybrid® is that you can extend the system at a later date.

## ROTEX EcoHybrid® – Safety and comfort for your future!

### The entire system from a single source:

- Regenerative air / water heat pump
- Modern calorific value technology
- Thermal solar plant for heating and hot water
- Hygienic hot water storage tank
- Cosy underfloor heating system
- Odour-locked safety heating oil tank
- A plastic pipework connection system suitable for both domestic water and heating installations.

You can find additional information at [www.rotex.de](http://www.rotex.de).



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