



Reliable and sustainable cooling

The new generation of air-cooled
PENSUM chillers



PENSUM Air: **Our** **interpretation** **of modern** **cooling**

Compact, reliable and efficient: PENSUM chillers have been an integral part of the ENGIE Refrigeration portfolio for more than seven years. Since then, they have been continuously developed and optimised. The result is the new air-cooled PENSUM Air, whose strengths become particularly apparent when used in public institutions and office buildings of medium size. With a new eco-friendly refrigerant and four practical basic configurations, the PENSUM Air from ENGIE Refrigeration sends a clear message about contemporary future-proof refrigeration.

Eco-friendly cooling: PENSUM Air combines responsibility with reliability

The most important task of a chiller is to generate the specified temperature reliably and with maximum efficiency. Sustainability has also become an important aspect. That is why an eco-friendly refrigerant is an essential step on the way to “zero carbon”.

The PENSUM Air uses R-454B, a refrigerant with good thermodynamic properties that, with a low GWP value of 466, already fulfills the objectives of the HFC Phase Down of the F-Gas Regulation in 2030. R-454B thus, has a 78 % lower GWP value in comparison to R410A and is in safety class A2L (non-toxic and difficult to ignite) classified.

By combining a new scroll compressor with innovative IDV technology with the new refrigerant, the PENSUM Air achieves an outstanding seasonal efficiency ratio (ESEER) of up to 4.67. As well as reducing energy costs, these excellent efficiency values also make the appliance future-proof: the new PENSUM AIR already complies with the Tier 2 Ecodesign Directive, which will come into force on 1 January 2021.

Always the right choice: The four PENSUM Air product lines

Whether as a heat pump, with free cooling, super silent or just reliably cold: With four product lines, each with up to 18 models, the PENSUM Air meets practically any refrigeration need up to a refrigeration capacity of 400 kW.

4 sophisticated designs and intelligent configurations

PENSUM Air BASIC COOL

Start cooling immediately with a PENSUM AIR from the low-cost ready-to-use BASIC COOL line. For the capacity range of 60 to 270 kW, the PENSUM Air BASIC COOL is equipped with two compressors (tandem) on a single circuit - for maximum efficiency under partial loads. For the refrigeration capacity range of 290 to 390 kW, four compressors (double tandem) on two circuits are used. The result is a redundant and efficient system under reduced loads. The noise level is in line with the market standard.

PENSUM Air SUPER SILENT

Highly efficient and quiet as a whisper: the PENSUM Air models from the SUPER SILENT line meet strict requirements for low noise emissions and are particularly suited to use in especially noise-sensitive areas. The SUPER SILENT line begins at 50 kW; from a refrigeration capacity of 90 kW, the machines are equipped with four compressors on two circuits - for a redundant, efficient system under partial loads.

The technical solution behind SUPER SILENT: speed control for the fans, vibration dampers in the refrigeration circuit, a soundproofed box for the compressors and pump unit.

PENSUM Air FREE COOL

An opportunity to lower energy consumption! Free cooling lowers power costs and is climate-friendly. Chillers from the FREE COOL line are soundproofed and therefore also suitable for use in noise-sensitive areas.

PENSUM Air REVERSIBLE HEAT

An intelligent 2-in-1 solution for pleasant coolness in summer and cosy warmth in winter: PENSUM Air REVERSIBLE HEAT heat pumps use heat from the ambient air as an energy source. All models in this line are especially cost-efficient and quiet. The high-performance version of the PENSUM Air REVERSIBLE HEAT with a COP of 3.2 achieves energy efficiency category A++ (as per EU 811/2013).



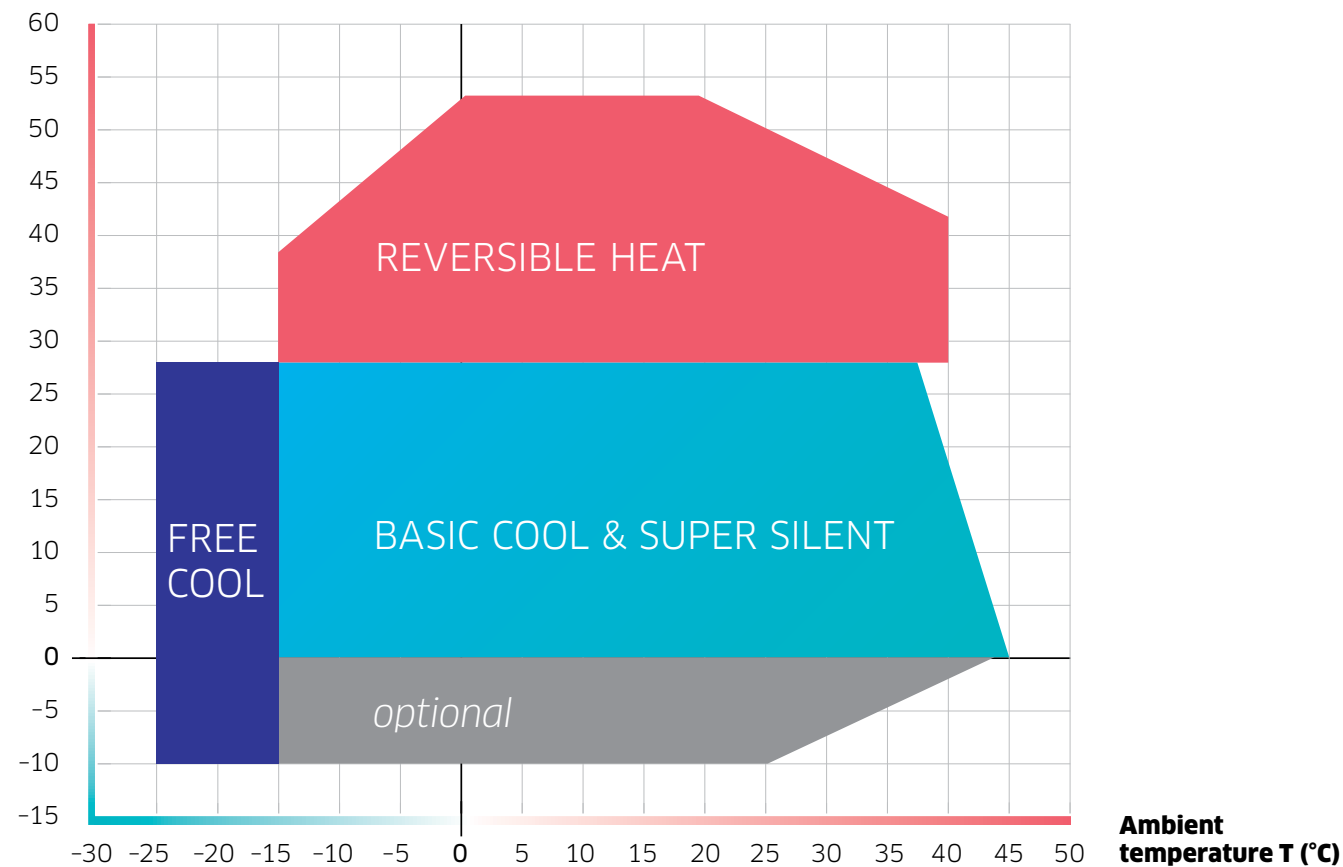
Special options become standard

All new PENSUM Air models are fitted ex-works with equipment that was optional in older models. Among other things, the new standard includes:

- Preparations and measures for safety during operation with a class A2L refrigerant.
- Optimised process measuring and control technology: improved master/slave operation and power limitation
- Improved housing: protective grille in front of fin-type heat exchanger to protect against mechanical influences

Operating limits

Working temperature (°C)



Less noise, more efficiency: PENSUM SUPER SILENT and BASIC COOL in comparison

The PENSUM Air SUPER SILENT beats the BASIC COOL variant not only in terms of the sound level, which is up to 13 dB(A) lower, but also in terms of power consumption and carbon emissions.

+4%
SEER

-2.856 €



Energy savings per year from process cooling

-13 dB(A)
Sound power level



-7 t
Carbon footprint Emissions per year from process cooling



15,032 kWh x 0.19 €/kWh = €2,856 energy savings per year when SUPER SILENT is compared to BASIC COOL
15,032 kWh x 0.475 g CO₂/kWh = 7,140 kg CO₂/a

Sophistication down to the smallest detail: The innovative design principle of the new PENSUM Air

ELECTRONIC EXPANSION VALVE

- Precise control
- Reduced power losses
- Improved operation under partial loads

CONDENSERS

- Copper pipes, aluminium fins
- **Optional:** Cataphoresis (cataphoretic painting)

PLATE HEAT EXCHANGERS

- AISI 316 stainless steel plates, with copper solder
- Low refrigerant filling capacity

HOUSING

- Outer appliance housing in complex design
- Slat protection grille as standard
- Easy access thanks to optimised interior design
- Standard colour design: silverline RAL 7031 & RAL 9002
- **Optionally** available in blackline design



FANS

- AC fans with phase shift control
- Optimal routing of airflow to improve efficiency
- **Optional** fans with EC motor to increase ESEER by up to 4 %.

CONTROL PANEL

- Multilingual user-friendly graphic LCD display
- Fast diagnostics
- Easy parameter adjustment
- **Optional** as additional control unit for installation in a separate engineering room

SWITCH CABINET

- 7 different master/slave logics for up to 6 PENSUM machines as standard
- Timer module, night mode or set point setting via 4-20 mA signal
- Programmable microprocessor control for remote access
- Output limitation as standard

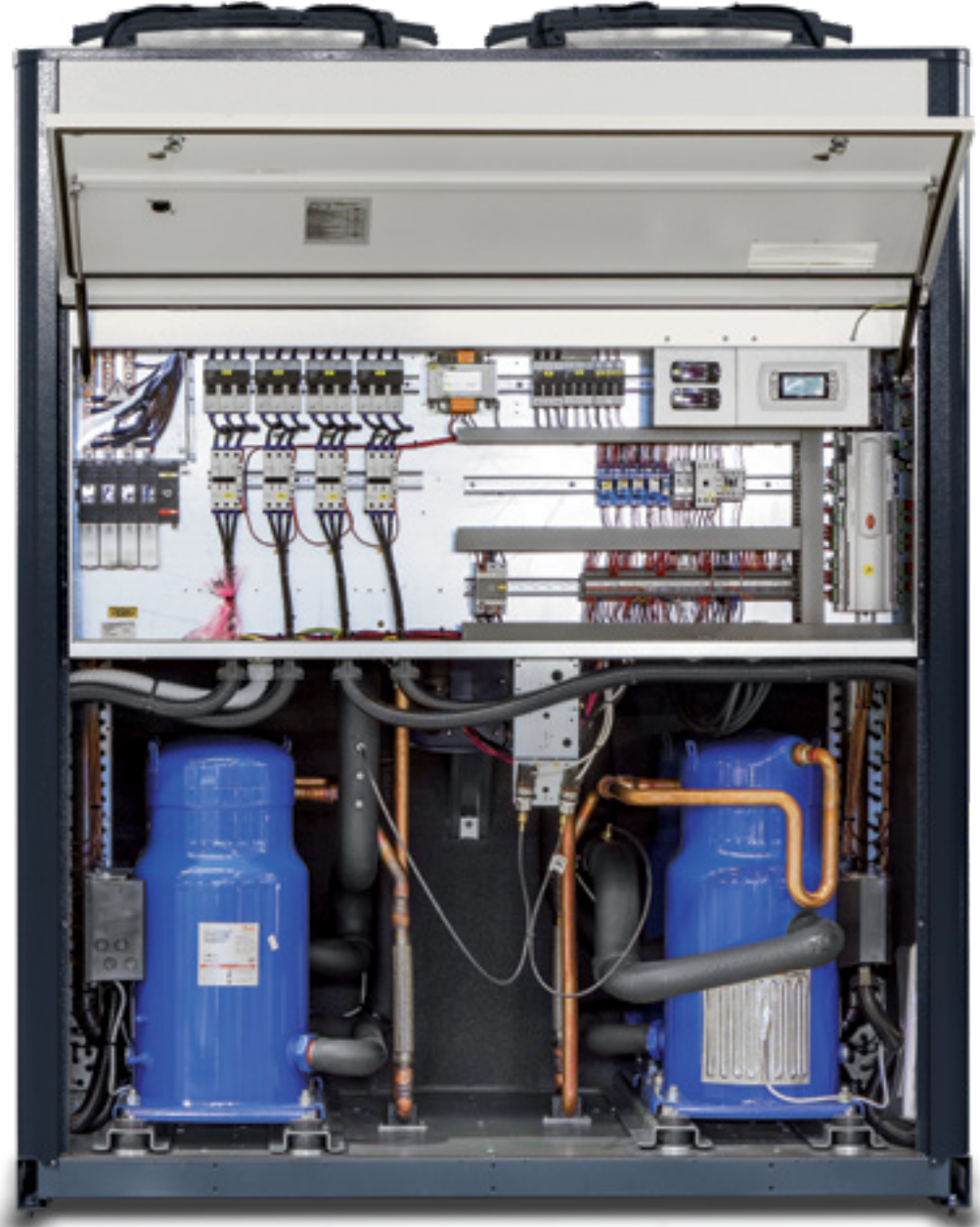
COMPRESSORS

- Two scroll compressors (tandem) on a single circuit for greater efficiency under partial loads
- Four scroll compressors (double tandem) on two circuits for a redundant and efficient system under reduced loads

Safe from the very beginning

ENGIE Refrigeration prepares the PENSUM Air for safe, trouble-free operation. As the refrigerant used is difficult to ignite, the chiller is equipped with refrigerant leakage sensors, additional switch cabinet ventilation and positive-pressure control, and software management for leak warning messages.

Quality assurance also includes a comprehensive functional test, which each PENSUM Air chiller must complete successfully before leaving the plant.



PRESSURE SWITCH AND FAN OF THE COMPRESSOR COMPARTMENT AND OF THE POWER CONTROL PANEL

A ventilation system and a pressure switch are installed in the control panel compartment, to ensure constant overpressure conditions thanks to air intake from outside the machine.

REFRIGERANT LEAK SENSOR

A refrigerant leak sensor is installed inside each independent section of the control panel and inside each separate compartment that contains one or more compressors to detect any gas leaks.

COMPRESSORS AND COMPONENTS

Compressors and components are specially designed and created to work with A2L fluids.

ALARM CONTROL AND MANAGEMENT SYSTEMS

A centralised control system constantly monitors the values detected by the sensors and pressure switches. Deviations from the safety levels are signalled as warnings if they fall within a first safety threshold (low alarm level). If the second safety threshold is also exceeded, the alarm is classified as "severe" and the control system sends a shutdown command to the components of the refrigeration circuit.

New options, new possibilities: The technological highlights in the new PENSUM Air



ENERGY-SAVING OPTIONS

- **EC fans**
The motor and electronics are perfectly coordinated and improve the ESEER value by up to 4 %.
- **Partial heat recovery**
Heat recovery is an intelligent method for increasing the overall efficiency of the system. It allows the heat discharged by the condenser to be recovered and used for other purposes. Under nominal conditions, it is possible to recover up to 40 % of the thermal output.

HYDRAULIC OPTIONS

Due to its intelligent design principle and the compact design of the plate heat exchangers and scroll compressors, the inside of the PENSUM Air provides enough space for plenty of equipment and numerous hydraulic options. Ex-works the integrated hydraulic module already contains the most important hydraulic components and is available in various configurations – which saves time and money during commissioning (plug & play). The hydraulic circuit can comprise a double shut-off pump, flow monitor, buffer tank, expansion vessel and safety valve.

- **NEW: Electronic flow monitor**
- **NEW: Safety collection system for glycol**
Companies operating facilities must obey strict rules on handling substances hazardous to water. The corresponding regulations can be found in the Federal Water Act (WHG), the Ordinance on facilities for handling substances that are hazardous to water (AwSV) as well as the EU-wide water framework and groundwater directives. One of the main legal requirements is a retention system to prevent oil or a mixture of water and glycol from escaping in the event of an accident.

The tried-and-tested safety collection system for glycol in the new PENSUM Air not only provides safety in the event of an accident, it also prevents oils and mixtures of water and glycol from being flushed out by rain, for example. The system meets all requirements and can be operated safely and in line with the law from the very beginning.

MEASURING AND CONTROL TECHNOLOGY OPTIONS

- **NEW: Electricity and heat meter**
 - > Integrated electric meter for recording the entire amount of current consumed by the chiller or the reversible heat pump
 - > Integrated heat meter for recording the full heat quantity released by the heat pump
- **NEW: Options for communication with the building technology**
 - > Serial connection to networks that use the Carel, Modbus-RTU or LonWorks protocol
 - > Ethernet interface (SNMP, Modbus-TCP or BACnet protocol) and online monitoring software
 - Access to online platforms
 - Monitoring and control of the machine at any time and any place
 - Seamless integration into the building control system
 - Log file for monitoring and service applications
 - > Additional interfaces upon request

ENGIE Refrigeration supplies the right cooling for every process: from efficient chillers, environmentally friendly heat pumps and modular re-cooling systems to turnkey solutions such as refrigeration containers or modules. Efficiency, sustainability, cost effectiveness and first-class expertise in technical solutions are hallmarks of every ENGIE Refrigeration project. Our individualised advice and our comprehensive services are centred around our customers and their requirements. As a member of the worldwide ENGIE Group, we have a global network of specialists at our disposal and can realise our refrigeration solutions both at home and abroad.



With 11 subsidiaries and some 130 service personnel nationwide we are close at hand and always on the job for you around the clock.

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