QUANTUM
Series and features of the energy-efficient chiller series

Optimal use of energies.

engie-refrigeration.de
For chilling: QUANTUM

It starts smoothly, then runs quietly and with low vibration. It features excellent energy efficiency and its oil-free system operates without any difficulties.

It is low maintenance and reliable. It sets standards in chiller technology: the QUANTUM from ENGIE Refrigeration.

After years of continuous development, the QUANTUM is now a chiller that provides an astonishingly broad range of services. The different series offer impressive solutions for each chilling situation and they can each be individually tailored to ensure that every customer gets exactly the refrigeration they need.

Our expert Service department supervises each QUANTUM chiller, from planning, through installation, operation and maintenance, to checking whether the chiller complies perfectly with requirements – or whether it needs to be adjusted. After all, genuinely energy-efficient refrigeration depends on two factors: a chiller from the QUANTUM product family and the technical expertise of the refrigeration specialists at ENGIE Refrigeration.

Impressive performance: QUANTUM

High-efficiency compressors > no friction losses thanks to magnetic bearings
Each compressor is fitted with a frequency converter > maximum efficiency during partial load
Heat exchangers with high-performance ribbed pipes > optimum heat transfer with minimum pressure loss
Minimum overheating of refrigerant

It is the underlying concept of an oil-free compressor and contact-free magnetic bearings that make QUANTUM so powerful and efficient. There is no material wear, significantly lower maintenance costs and all the regulations and precautionary measures associated with oil operation simply do not apply. Another advantage of oil-free operation is the more efficient heat transfer (in the condenser and the evaporator), which is not impaired by oil. This increases efficiency and helps to save on operating costs.

However, it is not just QUANTUM’s long-lasting refrigeration and its environmental credentials, with drastically reduced energy costs, that impress. It is also exceptionally easy to handle. It begins with a staggered start-up of the individual compressors, thereby resulting in low start-up currents, among other things. Then it switches over to quiet and low-vibration operation. QUANTUM’s continuous power control eliminates inefficient pulsing behaviour in the compressors, ensuring highly constant temperatures.

Result: The network of consumers does not experience negative temperature fluctuations and remains thermally stable; there is no need to take measures to regulate and store cold water.

Save operating costs:

- 50%
What’s in every QUANTUM

**Turbo compressor**
The compressor design enables a high full load and part load EER. The turbo machine operates with minimum internal losses. This results in excellent energy efficiency.

**Oil-free system**
As no components are required for oil return, there are fewer malfunctions and/or leaks – and any leaks that do occur do not involve flammable oil, which is also hazardous to the groundwater. There is no need for oil changes. The EER is increased because the heat transfer in the refrigeration circuit is not impaired by oil.

**Frequency converter on every compressor**
Particularly efficient during part load thanks to continuous power control. In general: the QUANTUM controller has an impressively high quality of control.

**Open-Flash-Economizer**
Built-in Open-Flash-Economizers ensure high EER values. They optimise the entire refrigeration process without increasing the machine’s space requirements.

**Multiple compressor design (up to 8 parallel)**
Better to be safe: other compressors take over in case of failure. The redundant design also makes it possible to replace a compressor during live operation.

**Flooded tube bundle evaporator**
Low temperatures difference between the chilled medium and refrigerant improve efficiency. High-performance ribbed tubes for optimum heat transfer during evaporation result in low temperature differences between the refrigerant and the chilled medium. The design of the condenser allows minimal refrigerant overheating. These two effects make QUANTUM so efficient.

**Durable, high-quality fittings and sensors**
Built to last: the excellent quality of all components guarantees a low susceptibility to errors or failures. It is also easy and efficient to replace a component.

**Start-up current of compressors under 5 amp**
When a compressor starts up, there are none of the dreaded current peaks. In addition, a staggered start-up is possible.

**Control with PLC**
It all depends on the setting. PLC offers more control and regulation possibilities than standard solutions and sets a high level industry standard.

**EMC class B**
Complies with EMC guidelines on electromagnetic compatibility DIN EN 61000-6-2 and DIN EN 61000-6-4.

**Protection class IP54**
For secure refrigeration: QUANTUM machines have protection against physical contact and protection against spray water.

**Large range of electrical options**
Each QUANTUM can be equipped with a variety of options to customise it. These include surge protection, integration of pump performance parts, a universal measuring device, a remote access option and various BUS connections.

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What this means for you

- **Low operating costs**
- **Low noise emissions**
- **Low vibration**
- **Clear, compact machine design**
- **Low operating costs**
- **High level of operational reliability**
- **Low operation costs**
- **Low investment costs in system periphery**
- **Steady chilled medium temperature**
- **Fewer peripherals in the cold water network**
- **Adaptation to individual customer requirements**
- **High level of electrical compatibility**
- **Easy to integrate in existing refrigeration systems**
- **Strong adherence to electrical compatibility DIN EN 61000-6-4**
- **Safe operation in public distribution networks**
- **Avoidance of malfunctions in electrical equipment**
- **High level of operational reliability**
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Green, sustainable, efficient: QUANTUM G uses the environmentally friendly refrigerant R-1234ze with a GWP value (Global Warming Potential) of less than 1.

Sustainability is a legal requirement: the new Fluorinated Gases Ordinance from the EU prescribes a reduction in the use of environmentally harmful gases. One solution: the latest generation of the synthetic refrigerant (HFO).

QUANTUM G uses R-1234ze as a refrigerant, which persists just 18 days in the Earth’s atmosphere and achieves an impressively low GWP value of less than 1.

By the way: QUANTUM G also proves with ease that environmental friendliness does not need to come at the expense of performance. Like the QUANTUM X, it takes up little space and has a wide variety of uses, with a capacity range of 200 to 3,000 kW.

QUANTUM X

Packs a lot into its small frame: the QUANTUM X is compact and has a variety of uses.

For dry and wet cooling, for heat recovery or even as a heat pump, this all-rounder operates reliably and efficiently in a capacity range of 300 to 3,000 kW.

Thanks to the twin tubed condenser technology, simultaneous refrigeration and heat utilisation are possible, e.g. for heating buildings or pre-warming the hot water system. Unused waste heat can be transferred out through a separate re-cooling circuit.

If the QUANTUM is used as a heat pump, it is controlled in accordance with the desired heating medium temperature.

The QUANTUM X profile
• Water-cooled compact machine for installation in a machine room
• Capacity range 300–3,000 kW with high re-cooling temperatures
• Flexible application:
  • Dry or wet cooling
  • Heat recovery
  • Heat pump
  • Optionally with R-513A or R-134a
• Optional refrigerant:
  • R-513A or R-134a

QUANTUM X
The all-rounder with a broad range of uses.

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QUANTUM X
Green refrigeration with a sustainable refrigerant.

QUANTUM G

The QUANTUM G profile
• Water-cooled compact machine for installation in a machine room
• Capacity range 200–3,000 kW with high re-cooling temperatures, sustainable and environmentally friendly:
  • Very small ecological footprint
  • Refrigerant R-1234ze with GWP < 1

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If no cooling water is available, a QUANTUM can also be operated with air.

The QUANTUM A is air-cooled, has a capacity range of 300 to 1,800 kW, and is a refrigeration solution for outside installation. Its quiet running characteristics also fulfill strict requirements for low-noise operation.

Like all machines in the product family, the QUANTUM A is also produced using as few components as possible, in an exceptionally high quality. Long-lasting fittings and sensors ensure secure operation and significantly reduce maintenance and servicing costs in the long run.

Options such as compressor sound-reducing capsules and low-noise fans ensure quiet operation. Other options help ensure safe installation in any weather conditions, e.g., down to -20 °C.

End of QUANTUM A.

The QUANTUM A profile
- Air-cooled compact machine for outside installation
- Capacity range of 300–1,800 kW
- Space-saving refrigeration solution:
  - No re-cooling system necessary
  - No heating medium circuit necessary
  - No machine room necessary
- Optionally with R-513A or R-134a

Optional refrigerant: R-513A or R-134a

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Can we do even better? This is a question that the refrigeration experts at ENGIE Refrigeration ask themselves all the time.

And with the QUANTUM W, they’ve provided an impressive answer: Yes, they can – once again, efficiency has been increased. Turbo compressors with frequency converter, Open-Flash-Economizers and the completely oil-free machine design are key components of this improvement. Although the operating range is smaller than with the QUANTUM X, the refrigeration capacity and energy efficiency are better. The overall improvement in efficiency under full and part load plays an important role in ensuring that operating costs are reduced to a minimum, when calculated over the machine’s service life. A QUANTUM W always provides maximum full load and part load EER values, and the ratio between the power input (electricity consumption) and power output (refrigeration capacity) is excellent.

The QUANTUM W profile
- Water-cooled compact machine for installation in a machine room
- Capacity range of 400–4,500 kW with low re-cooling temperatures
- Reduces operating costs:
  - Efficient in full and part load
  - Highest ESEER value
  - Maximum full load and part load EER
- Optionally with R-513A or R-134a

Optional refrigerant: R-513A or R-134a

QUANTUM W.

Compact refrigeration with no compromises.

The efficient machine for minimal operating costs.

End of QUANTUM W.

The QUANTUM W profile
- Water-cooled compact machine for installation in a machine room
- Capacity range of 400–4,500 kW with low re-cooling temperatures
- Reduces operating costs:
  - Efficient in full and part load
  - Highest ESEER value
  - Maximum full load and part load EER
- Optionally with R-513A or R-134a

Optional refrigerant: R-513A or R-134a

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The QUANTUM GS profile

• Machine unit inside + condenser outside
• Capacity range of 300 - 2,000 kW
• Air-cooled
• Efficient overall system, 100% adapted to customer requirements
• Sustainable and environmentally compatible:
  > Very small ecological footprint
  > Refrigerant R-1234ze with GWP < 1

The QUANTUM GA profile

• Air-cooled compact machine for outside installation
• Capacity range or 300 - 1,400 kW
• Sustainable and environmentally compatible:
  > Very small ecological footprint
  > Refrigerant R-1234ze with GWP < 1

The QUANTUM S profile

• Machine unit inside + condenser outside
• Capacity range of 300 - 2,800 kW
• Air-cooled

At ENGIE Refrigeration, we are focussed on refrigeration solutions.

A QUANTUM S is used where re-cooling has to be implemented with air and it is not possible to set up an air-cooled compact machine (e.g. due to limited roof loads, for aesthetic reasons or due to corrosive ambient air).

The QUANTUM S can be used, for example, if condensation heat is used to heat up the inlet air for a clean air system.

Focussing individually on the requirements and needs of the customer, the refrigeration experts at ENGIE Refrigeration created the split QUANTUM S to provide efficient overall systems with a capacity range of 300 to 2,800 kW.

The QUANTUM S with 1,200 kW refrigeration capacity

Optional refrigerant:
R-513A or R-134a
It packs a punch.

The QUANTUM P provides a refrigeration capacity of up to 10,000 kW and is therefore especially suitable for use in district cooling networks. In this kind of network, multiple consumers are supplied through a pipeline system with refrigeration that is generated in a refrigeration centre. At the consumer’s site, all that is normally installed is a transfer station. This is a highly efficient, space-saving and flexible way to generate and distribute refrigeration. To sum it up: it’s forward-looking!

In a large dimensioning in the megawatt range, the QUANTUM P clearly demonstrates its energy efficiency when generating refrigeration, and operators can benefit from significantly lower energy costs, or pass these benefits on to end consumers. Another benefit for the end consumer: a district cooling network is continuously monitored, ensuring a constant supply of refrigeration.

Optional refrigerant: R-513A or R-134a

QUANTUM MARENUM

The stable chiller for use at sea.

The QUANTUM MARENUM is seaworthy and available in many variants, tailored to individual applications: for ferries, freighters or yachts, and even for use on non-civil ships. Because recooling on ships frequently involves the direct use of salty sea water, the QUANTUM MARENUM is especially corrosion-resistant and resilient. It is also stable: thanks to special shock absorbers, the chiller “withstands” acceleration and rough seas.

It is of course water-cooled, and the QUANTUM MARENUM’s refrigeration capacity starts at 300 kW – everything beyond that (capacity range, efficiency, electrics, heating medium) is adapted to the requirements of civil and non-civil shipping.

The QUANTUM MARENUM profile
- Compact machine for inside installation
- Capacity range from 300 kW
- Water-cooled (including salt water)
- Specially adapted to maritime requirements, civil and non-civil
- Seaworthy
- Top material quality (e.g. non-rusting steels)
- Redundant compressors for system stability
- Compact construction for high refrigeration power with a small footprint
- Optionally with R-513A or R-134a
- Optional refrigerant: R-513A or R-134a

QUANTUM MARENUM

The stable chiller for use at sea.
ENGIE Refrigeration – efficient refrigeration, designed in Germany – made in Germany.

We have been operating under our new brand name since 2016 and we have a new, modern headquarters – meaning we are better positioned than ever to put our expertise into practice.

Excellent refrigeration know-how
Comprehensive service, tailored to individual requirements
A clear eye for detail
Selection of the best components
An efficient refrigeration solution that is 100% tailored to you

ENGIE Refrigeration.
The home of refrigeration.
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 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.

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