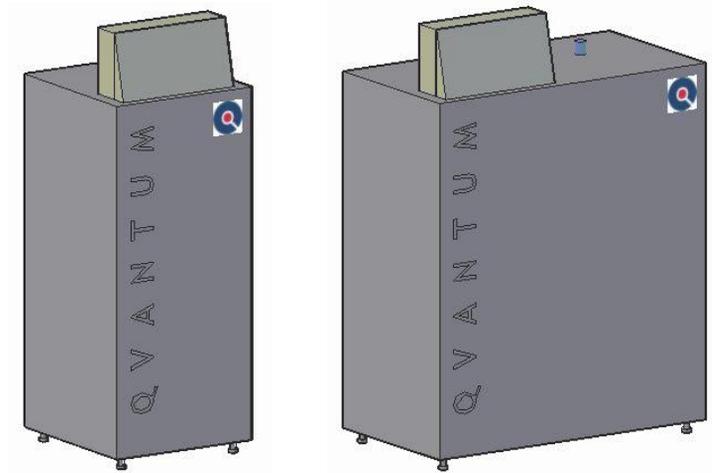




Q V A N T U M

HEAT PUMPS FOR SUSTAINABLE CITIES

Series V



Water/Water
12 – 79 kW



High efficiency
Frequency controlled
Compact design
Flexible installation

Heat pumps for liquid-based heat sources

Q25-65VK

Q25-65VS

Quantum Series V – Frequency controlled heat pumps

GENERAL

Quantum Series V is equipped with speed control, which means that the heat pump can regulate the heating effect continuously according to current needs. Depending on the power size, the power can be approximately regulated between 30% up to 100%. The unit for capacity control, the inverter, is internally mounted in the unit. Cooling is done with air.

Quantum series V is available in two different designs, VS and VK.

VS is intended for use in systems where the refrigerant consists of a mixture of water and antifreeze (eg horizontal, and vertical ground source, sea water systems, exhaust air system). VK is intended for use in refrigerant systems where antifreeze is not used.

VS is equipped with an evaporator in the form of a plate heat exchanger.

VK is equipped with an evaporator in the form of a coaxial heat exchanger. The coaxial heat exchanger is available in different material designs depending on the quality of the circulating liquid.

NOTE!

The units are equipped with an inverter that delivers "leakage current" to the mains, so a 30 mA earth fault circuit breaker can not be used. Typical levels of leakage current are 50-200mA/converter + 2mA/meter motor cable.

QVANTUM QLC-SYSTEM

The Quantum Series V is equipped with the Quantum QLC control system as standard. QLC stands for Quantum Logic Controller. The unit is controlled and operated via the principal of liquid condensation or solid/half solid condensation. All control parameters such as outdoor temperature compensated set-point curve for supply, hot water temperature, auxiliary heat is set via the self-instructing control system. Required operation, protection and safety functions are available in QLC control systems.

The system is managed via a 5,7" panel mounted in the heat pump. All parameters can be set via the panel. The panel displays a dynamic flow diagram with all temperatures and operating modes measured and controlled. The QLC system also logs temperatures and events, facilitating set-up and analysis.

The system communicates via Modbus. Modbus TCP is standard. The system has a web server which allows the QLC system to communicate with a web browser on a PC or smartphone (app may be needed).

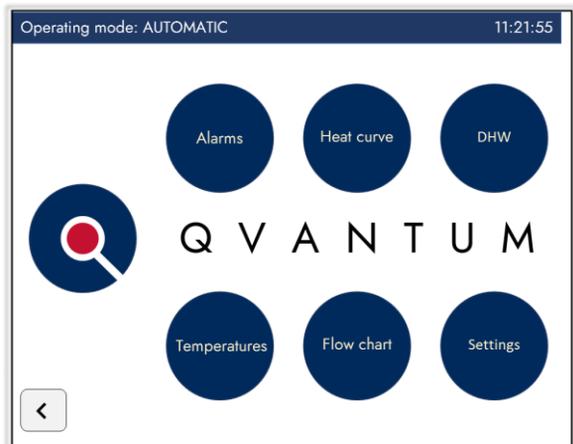


Fig 1. 5,7" panel display.

As an option, the unit can be equipped with an extended display that allows for dynamic flow images and extended network functionality.

The temperature to the heating system is controlled according to the selected outdoor temperature compensated curve. Hot water preparation, if such a function is required, takes place via a switching valve that momentarily raises the temperature in the water heater to the set point as a priority. In bivalent systems, the control system switches on additional heat when needed and after a time delay. The auxiliary heat can be chosen to "take over" the hot water preparation as a first step and thus release power from the heat pump to the heating system.

The Quantum control system can control up to 8 heat pumps in sequence with automatic operating time equalization between the different heat pumps. The control system is configured at commissioning depending on the selected system solution and the type and number of heat pumps.

The heat pump/control system can be configured for control via a higher-level external control system if required. Set points can be changed via Modbus so that the controller's regulators are set by the master controller. It is also possible to configure the system so that the heat pump is fully controlled by the master system. In this case, the heat pump control system is used only for alarm and protection functions.

E.g., Temperatures readable via Modbus *)

- 1: Heat pump heat carrier - in
- 2: Heat pump heat carrier - out
- 3: Heat pump hot gas temperature
- 4: Heat pump secondary refrigerant - in
- 5: Heat pump secondary refrigerant - out
- 6: Radiator circuit supply
- 7: Outdoor Temperature
- 8: Defrosting tank temperature (LB series)

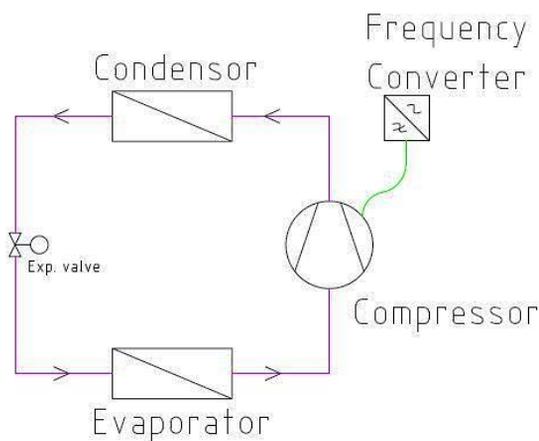
*) Modbus description for complete information

All relay outputs are also readable. It is thus possible to transmit the operating status of compressors, pumps, fans, etc. controlled by the heat pump.

Set points for hot water temperature and control curve for radiator circuit can be read and adjusted. From the expansion valve control unit, the current evaporating temperature, pressure, overheating, the degree of opening of the expansion valve can be monitored via Modbus.

ELECTRONIC EXPANSION VALVE

Quantum Series V heat pumps are equipped with an electronic expansion valve. The expansion valve has its own electronic control unit with display that shows evaporating pressure, temperature, superheat, etc. Via Modbus these variables can be transferred to a higher-level control system.



REFRIGERANT

Quantum Series V heat pumps are available in two different versions with respect to refrigerants:

- refrigerant R-407C (+55°C)
- refrigerant R-134a (+65°C).

See also separate documents "Quantum VK – Technical data" and "Quantum VS – Technical data" for more information.

BRINE CIRCUIT

Quantum Series V are as standard configured for water. As an option, however, the unit can be configured for brine with antifreeze, e.g. bioethanol.

PIPE CONNECTIONS

Q25VK – Q65VK has top connections. See drawings Q-VK-25-001 and Q-VK-32-65-001.
Q25VS – Q65VS has top connections. See drawings Q-VS-25-001 and Q-VS-32-65-001.

CONSTRUCTION

The unit is built on a robust stand of galvanized square tubes and covered with an effective sound-absorbing casing, consisting of powder-coated plates with sound-absorbing material on the inside. The top plate is made of patterned aluminum. The top and bottom are also covered with sound-absorbing material. The stand rests on adjustable rubber feet.

ACCESS

The unit is constructed so that all components inside the heat pump are easily available by removing the cover plates, both for maintenance and replacement.

OPTIONS

The following options are available:

- Bioethanol as refrigerant.
- Connecting QLC to network.
- DeSuper Heater.
- Subcooler.

EQUIPMENT

The units are equipped with a fully hermetic piston compressor designed for speed control and a refrigerant circuit.

The units are equipped with a built-in air-cooled inverter, 3-phase 400V.

Heat exchanger Quantum V

- The evaporator is a brazed plate heat exchanger in stainless steel, insulated with Armaflex insulation.
- The condenser is a brazed plate heat exchanger in stainless steel, insulated with Armaflex insulation.
- The subcooler (option) is a brazed plate heat exchanger in stainless steel, insulated with Armaflex insulation.
- DeSuper Heater exchanger (option) brazed plate heat exchanger in stainless steel, insulated with Armaflex insulation.

Heat exchanger Quantum VK

- The evaporator is a coaxial heat exchanger in copper, insulated with Armaflex insulation. The evaporator is also available in copper/nickel as an option.
- The condenser is a brazed plate heat exchanger in stainless steel, insulated with Armaflex insulation.
- The subcooler (option) is a brazed plate heat exchanger in stainless steel, insulated with Armaflex insulation.
- DeSuper Heater exchanger (option) brazed plate heat exchanger in stainless steel, insulated with Armaflex insulation.

Refrigerant circuit

- Drying filter
- Sight glass with moisture indication
- Electronic expansion valve, pressure transmitter, control equipment with display (Modbus)
- High- and low-pressure switch, manual reset
- Service valves for pressure measurement
- Rotalock valves
- Pressure protection equipment, high and low pressure

TESTING

The units are quality tested and adjusted at the factory under dimensional conditions using ClimaCheck.

TECHNICAL DATA

See separate documents "Quantum VK – Technical data" and "Quantum VS – Technical data" for more information.



Solution and Heat Pump Experts

Quantum was founded 1993 with a vision to develop innovative high quality heat pumps. Today Quantum continues on this path developing the solutions needed for decarbonization of our cities.

Quantum is also a company with leading experts in the design of the next generation (5th) district heating and cooling solutions for dense urban areas.

By combining these competence areas, Quantum can provide solutions that will make it easier for Engineering consultants, Installers, Project developers and Utilities, to decarbonize the heating and cooling of our cities.



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