

Himod



Product Documentation

English

cod. 272064 – rev. 10.04.2001

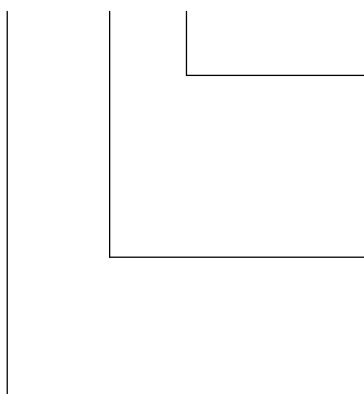
Issued by TDS

1 – The series

HIMOD is the series of air conditioners developed to meet the requirements of data processing centres, for fixed telephone networks, Internet and other technological rooms with medium and high capacity by applying the most advanced technologies. This series includes units with a rated cooling capacity ranging from 20 to 85 kW.

A mark with four alphanumeric characters identifies the model.

20UA



Version

- A Direct expansion unit with external air cooled condenser
- C Chilled water unit
- D Dualfluid unit (direct expansion + chilled water) with external air cooled condenser
- F Freecooler unit with water cooled condenser
- H Dualfluid unit (direct expansion + chilled water) with water cooled condenser
- W Direct expansion unit with water cooled condenser

Air distribution

- U Underfloor air flow (Under)
- O Upward air flow (Over)

Model

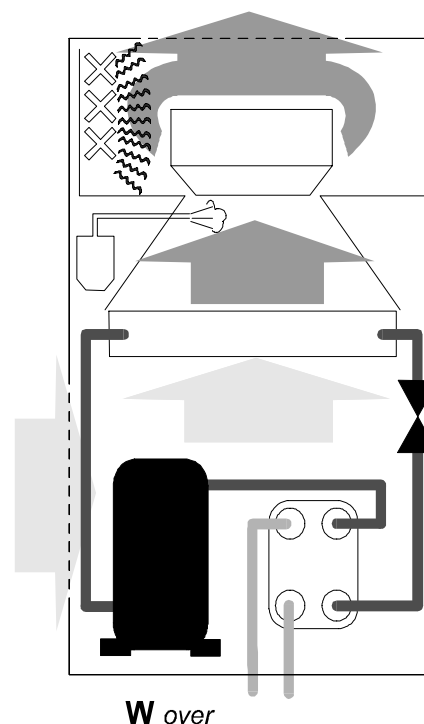
1.1 – Main features and advantages

- ✓ New **ventilating section** with single suction centrifugal fans and impeller with backward curved blades; variable speed motor with external rotor.
- ✓ High sensible cooling capacity; **high SHR (Sensible Heat Ratio)**
- ✓ Very high energy efficiency thanks to the innovative motor fan and scroll compressors with high COP (Coefficient Of Performance)
- ✓ Available power supply as follows: 400 V / 3 ph / 50 Hz, 208 ÷ 230 V / 3ph / 60 Hz, 380 V / 3ph / 60 Hz, 460 V / 3ph / 60 Hz.
- ✓ Low absorbed power in the humidification and dehumidification processes
- ✓ Low energy consumption (35% lower than conventional models); **high EER (Energy Efficiency Ratio)**
- ✓ Low operating cost
- ✓ Lower impact on the environment: all materials used are fully recyclable.
- ✓ Low internal air–side pressure drop
- ✓ Available static pressure up to 350 Pa, standard configuration
- ✓ Noise level and available static pressure adjustable by means of a transformer supplied as standard.
- ✓ Filters up to F5 available, frame made in cardboard; filters with higher efficiency up to F9 located externally.
- ✓ All cooling capacities available both for freecooler units and for dualfluid units
- ✓ Modular construction permits upgrading and extension
- ✓ Modular and standard optional accessories
- ✓ Sandwich construction with non–flammable – Class 0 (ISO 1182.2)
- ✓ Short delivery times
- ✓ Reduced cost of spare parts due to common components throughout the range modularity (e.g. one fan for the whole machine range).

Refrigerating circuit

Models 20/24/28/34/40 are provided with a **single refrigerating circuit**. Models 26/32/42/46 are provided with a **double refrigerating circuit**. The refrigerating circuit includes the compressor and an externally equalised thermostatic expansion valve controlling the refrigerant flow to the evaporator so as to keep superheat stable. Before the thermal expansion valve there is a **sight glass** permitting a visual check of the refrigerant charge. A **dryer filter** is installed in the liquid line in order to obtain better cleaning and less humidity in the circuit. On–off valves are installed as standard to assist in maintenance of the circuits.

A suitably sized safety valve is installed after the condenser; the valve is equipped with flanged connections to allow the refrigerant to be discharged outside through suitable pipes. All low temperature parts of the refrigerating circuit are insulated. The refrigerating circuit is also provided with a maximum pressure switch and a minimum pressure switch. The minimum pressure switch has automatic resetting, whereas – for safety reasons due to possible high pressure in the compressor – the maximum pressure switch has manual resetting. The pressure switch calibration values are shown in the installation manual supplied with the machine.

**Condenser**

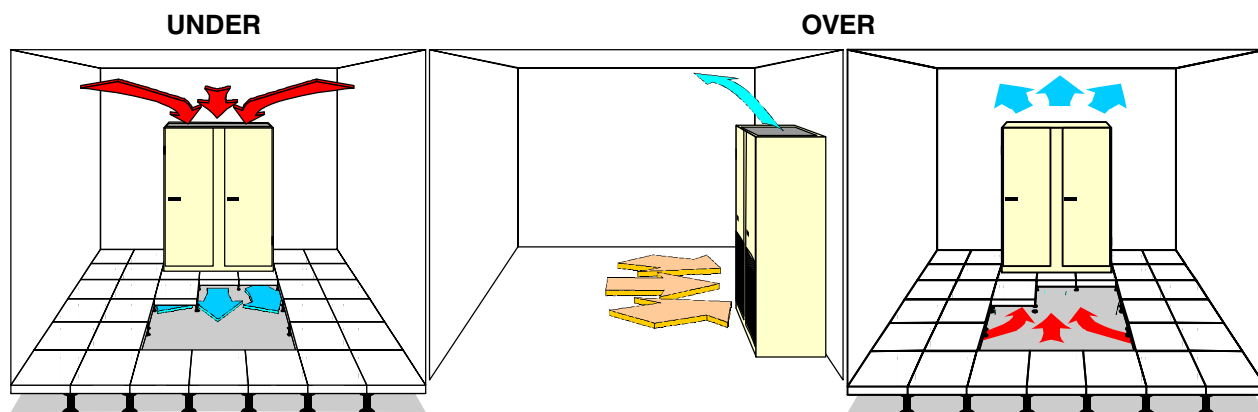
The units are provided with one (single refrigerating circuit) or two (double refrigerating circuit) stainless steel water condenser with braze–welded plates, each condenser has one pressostatic valve for the condensation temperature control; this advanced exchanger type gives the highest efficiency in heat exchange. In addition, a certain oversizing of the exchanger has been provided so as to reduce pressure drops (and energy consumption of the water pump) as much as possible and thus to allow the unit to operate with the external chiller in closed circuit, even at high outdoor temperatures.

The units operate with **mains water, tower water or water in closed circuit with an external cooler**. When operating in a closed circuit, the water is cooled by outdoor air in a heat exchanger; in this case, to avoid unwanted ice formation during winter, it is advisable to use a water/glycol mixture (refer to the installation manual for suitable percentages). The circulation of the water–glycol mixture is forced (the pump is not supplied). If mains water or tower water is used, when installing the unit, fit a **mechanical filter** on the water line to protect the condenser against possible impurities contained in the water (for condenser cleaning see the installation manual).

The 55U W and 65U W units are provided with two shell tube heat condensers easy for internal cleaning.

2.7 – Air control

All units are available in the three configurations shown below.



3 – Operating limits

All versions

Himod units are suitable for operating within the following working ranges (the limits apply to new units on which correct installation and maintenance has been carried out):

Ambient conditions:

from 18.0°C, 45% R.H. at 27.0°C, 55% R.H.

Air flow

The minimum and maximum values are shown in the tables of the available static pressure. However, safety devices are provided as standard to protect the various components from any damages due to operation outside the indicated limits.

Voltage tolerances

400 V ± 10%	⇒ Frequency: 50 Hz ± 2 Hz
208 ÷ 230 V ± 10%	⇒ Frequency: 60 Hz ± 2 Hz
380 V ± 10%	⇒ Frequency: 60 Hz ± 2 Hz
460 V ± 10%	⇒ Frequency: 60 Hz ± 2 Hz

Versions A and D

Outdoor conditions:

low limit = 10°C (from 9°C to –20°C with Variex accessory installed on the condenser)

high limit determined by the size of the coupled condenser. Exceeding these limits causes the compressor to trip due to the safety pressure switch, which can only be reset manually.

Condenser installation:

Max. distance between ambient unit and external air condenser:
30 m equivalent length.

Max. geodetic height difference between condenser and unit:
3 m (if the condenser is placed underneath the ambient unit).

4 – Component features

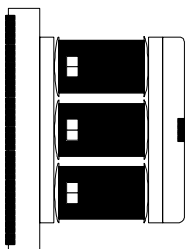
4.1 – Fan

Innovative application of single suction centrifugal fans incorporating an impeller with backward curved blades in treated and painted steel.

High efficiency.

The motor is three-phase with protection degree IP54; provided with internal thermal protection.

The fan wheel is statically and dynamically balanced; the bearings are self-lubricating.



The fan is mounted on vibration-damping rubber supports to reduce the mechanical contact with the frame and, thus, to minimize the vibration.

Available head up to 350 Pa.

Modularity.

Variable speed: autotransformer with several different settings; possibility to optimize air flow, available head, dehumidification operation.

4.2 – Compressor

Hermetic SCROLL compressors

High COP.

High MTBF (Minimum Time Between Failures)

Low sound level.

Insulated against vibration.

Protection degree IP54.

Provided with internal thermal protection.

Low start current (equalization of the internal pressures).



4.3 – Coils

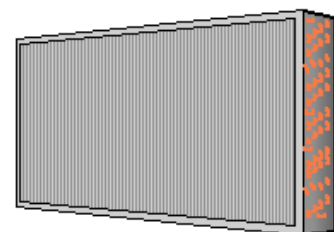
Large face area.

Comprising copper pipes and aluminium fins.

Fins treated to withstand corrosive atmospheres.

Low pressure drop.

High SHR (Sensible Heat Ratio).



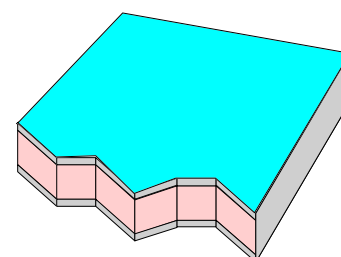
4.4 – Frame and panels

Made of sheet steel.

Sandwich panels lined with non-flammable insulation material Class 0 (ISO 1182.2).

All surfaces in the air flow are washable in order to reduce the formation of bacteria.

All materials are CFC-free and may be recycled.



4.5 – Filters

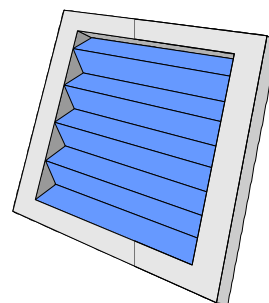
Removable filters.

Filtration from G4 to F9 (CEN EN779 – resp. corresponding to EU4 and EU9 according to Eurovent EU4/5).

The folded structure of the filters gives high filtration efficiency and low pressure drop.

The filter media used consists of synthetic fibre cells. The frame is made of cardboard.

Pre-filtration system for Over models.



4.6 – Refrigerants

The units are designed for use with refrigerant R22 or, as option, R407C.

4.7 – Electrical panel

Manufactured in accordance with IEC204–1 standard.

It is housed at the front of the unit, isolated from the air flow and enclosed by a plastic cover to protect the parts which are supplied with a voltage higher than 24 V.

The units are designed for operating at 400V/3ph/50Hz; 208–230V/3ph/60Hz; 380V/3ph/60Hz; 460V/3ph/60Hz.



4.8 – Accessibility

Access to the compressor is possible even when the unit is operating by removing the front panel.

Ordinary maintenance is easier thanks to the front access enabling the replacement of the air filters, the intervention on the components of the refrigerating circuit – such as compressor, liquid receiver, thermal expansion valve, refrigerant sight glass, drying filter – or on the fan, the humidifier, the electric board, the electronic control, the heating elements.



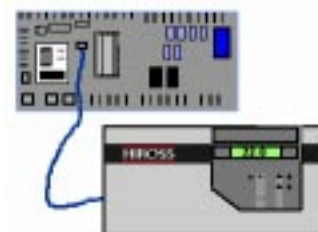
4.9 – Control system (Microface and Hiromatic G)

Very simple user interface.

Easily understandable LCD display for immediate operation of the control system.

Net connectivity of several units with standard control.

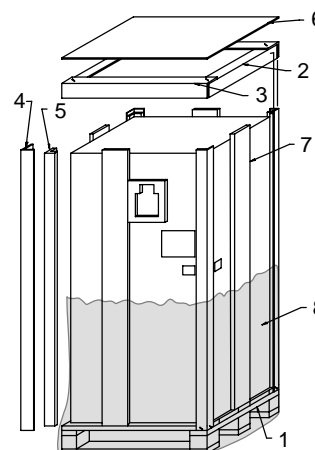
Compatible with our Hiromatic graphic display.



4.10 – Packing

The air conditioners are usually packed with wooden pallet (1), shockproof angulars in pressed cardboard (2, 3, 4)/polystyrene (5), panels in cardboard (6)/polystyrene (7) and extensible polythene film (8).

On request, wooden crates or cases can be supplied for the sea transport.



4.11 – Product quality and safety

The product conforms to European Union directives 98/37/CE (89/392/CEE; 91/368/CEE; 93/68/CEE), 89/336/CEE; 73/23/CEE.

Further, the Company Quality System of Air Conditioning Division is approved by LRQA according to the standards UNI EN ISO 9001: 1994 and the product is the result of activities performed in compliance with the provisions contained in the Quality procedures and plans.

Units are supplied complete with a test certificate and conformity declaration and control component list.



Himod units are marked as they comply with the European directives concerning mechanical, electrical and electromagnetic safety.

Il Sistema Garanzia Qualità della Divisione Air Conditioning è certificato da Lloyd's Register Quality Assurance conforme alla norma ISO 9001:1994.



Water condensation – up flow

W OVER R407C – 50 Hz

MODELL		200W	240W	280W	340W	400W	260W	320W	420W	460W
REFRIGERANT CIRCUIT		single	single	single	single	single	double	double	double	double
PERFORMANCES ⁽¹⁾										
air flow	m ³ /s	1.607	1.858	2.728	2.997	3.463	2.728	2.997	3.463	3.667
max available ext. static pres. ⁽²⁾	Pa	450	380	430	370	330	430	370	330	280
fan absorbed power	kW	1.12	1.42	2.38	2.84	3.12	2.38	2.84	3.12	3.42
fan absorbed current	A	4.1	4.3	2 x 4.1	2 x 4.3	2 x 4.4	2 x 4.1	2 x 4.3	2 x 4.4	2 x 4.4
sound pressure level ⁽³⁾	dB(A)	52.7	55.8	57.8	60.0	61.6	57.8	60.0	61.6	62.9
water temperature at the condenser inlet: 15°C – condensation temperature: 40°C										
total cooling capacity	kW	21.20	27.00	32.1	37.3	46.4	30.3	37.30	44.50	55.5
sensible cooling capacity	kW	19.30	24.00	30.00	34.70	43.90	28.90	33.90	41.90	47.90
total absorbed power	kW	5.04	6.65	8.54	10.07	12.20	7.92	9.70	10.98	13.90
compressor absorbed power	kW	3.92	5.23	6.16	7.23	9.08	5.54	6.86	7.86	10.48
compressor absorbed current	A	7.7	10.3	12.7	14.2	16.3	2 x 5.7	2 x 7.2	2 x 7.7	2 x 10.3
SHR (sensible/total ratio)	–	0.91	0.89	0.93	0.93	0.95	0.95	0.91	0.94	0.86
EER (output/used energy)	–	4.21	4.06	3.76	3.70	3.80	3.83	3.85	4.05	3.99
water flow	l/s	0.25	0.32	0.41	0.47	0.60	0.19	0.22	0.26	0.34
water side pressure drop	kPa	2+3	3+4	3+2	2+2	3+4	1+1	1+1	1+1	1+1
water temperature at the condenser inlet: 30°C – condensation temperature: 45°C										
total cooling capacity	kW	20.3	26.1	30.7	35.7	44.4	29.3	35.8	42.4	53.6
sensible cooling capacity	kW	18.9	23.5	29.7	34.3	43.4	28.3	33.3	41.1	46.7
total absorbed power	kW	5.5	7.3	9.3	11.0	13.2	8.6	10.5	11.9	15.1
compressor absorbed power	kW	4.39	5.83	6.89	8.12	10.04	6.22	7.62	8.78	11.68
compressor absorbed current	A	8	11.1	13.7	15.3	17.6	2 x 6.1	2 x 7.6	2 x 8	2 x 11.1
SHR (sensible/total ratio)	–	0.93	0.90	0.97	0.96	0.98	0.97	0.93	0.97	0.87
EER (output/used energy)	–	3.69	3.57	3.30	3.25	3.36	3.41	3.41	3.56	3.55
water flow	l/s	0.47	0.77	0.96	1.02	1.39	0.72	0.93	1.02	1.69
water side pressure drop	kPa	7+9	17+24	16+10	12+11	16+20	11+14	19+24	8+11	21+30
FANS										
quantity	n.	1	1	2	2	2	2	2	2	2
type	–	CENTRIFUGAL WITH BACKWARDS CURVED BLADES								
motor rated power	kW	2.5								
COMPRESSOR										
quantity	n.	1	1	1	1	1	2	2	2	2
type	–	SCROLL								
rated power	HP	6	7.8	9	10	13	2 x 4	2 x 5	2 x 6	2 x 7.8
EVAPORATIN COIL										
quantity	n.	1	1	1	1	1	1	1	1	1
pipes/fins		COPPER/TREATED ALUMINIUM								
front surface	m ²	0.74	0.74	1.49	1.49	1.49	1.49	1.49	1.49	1.49
configuration	–	INCLINED								
CONDENSER										
type	–	PLATE TYPE EXCHANGER IN AISI 316								
quantity	n.	1	1	1	1	1	2	2	2	2
water connections	inch	1"	1"	1¼"	1¼"	1¼"	1/2"	1/2"	1"	1"
DIMENSIONS										
width	mm	1000	1000	1750	1750	1750	1750	1750	1750	1750
depth	mm	890								
height	mm	1950								
footprint	m ²	0.89	0.89	1.56	1.56	1.56	1.56	1.56	1.56	1.56
WEIGHTS										
net	kg	400	405	600	605	610	600	605	610	625
gross	kg	405	410	605	610	615	605	610	615	630

1. At the following standard conditions: power supply voltage 400/3/50 [V/Ph/Hz]; ambient conditions 24°C db; 50% R.H.(17°C wb); 50 Pa available external static pressure (ESP)

2. Max. external static pressure for the indicated air flow

3. Measured at 1 m height and 2 m front distance, in free field, with working fan(s) and compressor(s); 50 Pa available external static pressure, with ducted air discharge

Cooling capacities are gross. To obtain the net cooling capacities the fan heat load must be subtracted. EER refers to the ambient unit only. The air flow of the units refers to the standard configuration with filter of the G4 class.

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