UP TO DATE
CHILLER SELECTION

RHOSS CREATING YOUR COMFORT

| | | | |
|---|---|---|---|
| **User** | Olivier VanderBiest (CLIMAPAC) | **Date** | 18/04/2019 |
| **Reference:** | | | |

## SELECTION

| | |
|---|---|
| **Family** | Y-Flow |
| | THHEBY 4180-4450 HT |
| **Model** | THHEBY 4450 HT |
| **Webcode** | YF031 |

The images are for reference purposes only and may not represent exactly the models or the equipment subject of this document.
The certified standard performances and the certified software tool version can be verified in www.eurovent-certification.com

## CONSTRUCTION FEATURES

**Packed reversible heat pump on the cooling circuit. Range with hermetic Scroll compressors and R410A refrigerant gas.**
**B - Standard version**

**POWER SUPPLY: 400V/3PH/50HZ**
**CONDENSING CONTROL: BSP-ANALOG.COND.CONT.OUTPUT**
**ELECTRONIC EXPANSION VALVE: EEV-ELECTRONIC EXPANSION VALVE**
**PRESSURE VISUALISATION DISPLAY: SPS-HIGH-LOW PRESSURE DISPLAY**
**PACKAGING TYPE: PROTECTIVE PACKAGING**

o Structure in galvanised and RAL 9018 painted steel plate, internally coated with sound-absorbing panels.
o Twin-circuit units.
o Hermetic, Scroll-type rotary compressors complete with internal circuit breaker protection and crankcase resistance automatically activated when the unit stops (as long as the unit is powered).
o 2 brazed plate heat-exchangers in stainless steel with closed-cell expanded polyurethane rubber insulation complete with anti-freeze resistances.
o Differential pressure switch on the primary heat exchanger for TCHEY models, on the primary heat exchanger and on the disposal unit for THHEY models to protect the unit from any water flow interruptions.
o Victaulic water connections
o Double cooling circuit, each made of annealed copper pipes (EN 12735-1-2) and welded with precious alloys. It comes with: inversion valve (THHEY), dryer filter, thermostatic valve (n° 4 for the THHEY models), for 4450 and 4 models only the electronic thermostatic valves are present (n° 4410 for THHEY models), non-return valves (THHEY), load connections, safety pressure switch on the high pressure side with manual rearm, pressure switch on the low pressure side with automatic rearm, safety valves, liquid indicator and insulation of the intake line.
o Rejection circuit realized with mild copper tube (EN 12735-1-2) and welded with silver alloy. Complete with: manual vent valve and drain valve.
o Primary circuit realized with mild copper tube (EN 12735-1-2) and welded with silver alloy. Complete with: manual vent valve, drain valves.
o Unit with IP21 protection rating.
o The unit is complete with a charge of R410A refrigerant.
o The unit is also complete with:
o clock card;
o compressor circuit breaker switches;
o cooling circuit high and low pressure display
o 0-10V analogue signal and 24Vac power supply for condensing/evaporating control operated from external device (KV2/KV3) in the case of an accessory provided separately or a modulating valve/inverter pump to be taken care of by the client).

ELECTRICAL PANEL
o Electrical panel can be accessed by opening the front panel, in compliance with IEC Standards in force, fitted with opening and closing via specific tool.
o Complete with:
 electrical wiring arranged for power supply 400V-3ph-50Hz;
 auxiliary circuit power supply 230V-1ph-50Hz drawn from a transformer;
 monitor of the phase sequence and phase failure to protect the compressor;
 main power supply switch with interlocking safety door isolator;
 automatic compressor protection switch;
 auxiliary circuit protection fuse;
 compressor power contactor;
 Automatic switch for pump protection;
 Pump compressor power contactor;
 remote machine commands and controls.


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○ Programmable microprocessor electronic board handled by the keyboard inserted in the machine.
○ This electronic board performs the following functions:
 Adjustment and control of the machine water outlet temperature set-points; of the cycle inversion (THHEY); of the safety timings; of the circulation pump; of the system pump and compressor hour-run meter; of the electronic anti-freeze protection with automatic activation if the machine is off; of the functions that regulate the intervention method of the individual parts forming the machine;
 complete protection of the unit, possible shutdown and display of all the triggered alarms;
 compressor protection phase sequence monitor (4180÷4360);
 unit protection against low or high phase power supply voltage (CMT accessory);
 display the programmed set-points via the display; the in/out water temperature via the display; the alarms via the display; the chiller or heat pump operation via the display;
 self-diagnosis with continuous monitoring of the unit functioning status.
 user interface menu;
 alarm code and description;
 alarm history management (menu protected by factory password).
○ In particular, for every alarm, the following are memorised:
 date and time of intervention;
 alarm code and description;
 in/out water temperature values as soon as the alarm was triggered;
 the condensation pressure values at the time of the alarm
○ Advanced functions:
 Pump Energy Saving management;
 water block solenoid valve (VSB) consent that allows the source side hydraulic circuit to be closed completely when the compressors are switched off with appropriate timing and controlled from the card (with water from a well or the mains);
 set-up for serial connection (SS, KFTT10, KBE, KBM, KUSBaccessory);
 possibility of having a digital input for remote management of the double set-point;
 possibility of having a discrete input to manage total recovery (RC100), the desuperheater (DS) or for production of domestic hot water by means of the 3-way diverter valve (VACS). In this case, there is the possibility of using a temperature probe instead
of the discrete input. (refer to the specific section for more details);
 possibility to have an analogue input for the shifting Set-point via a 4-20mA remote signal;
 configured to manage time slots and work parameters with the possibility of daily/weekly operation planning;
 check-up and monitoring of scheduled maintenance status;
 computer-assisted unit testing;
 self-diagnosis with continuous monitoring of the unit functioning status.
 MASTER/SLAVE management logic integrated in single systems (SIR - Sequenziatore Integrato Rhoss - Rhoss Integrated Sequencer) -Refer to the specific section for more details
○ Set-point regulation via the AdaptiveFunction Plus with two options:
 fixed set-point (Precision option);
 set-point sliding (Economy option).


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# TECHNICAL DATA - THHEBY 4450 HT

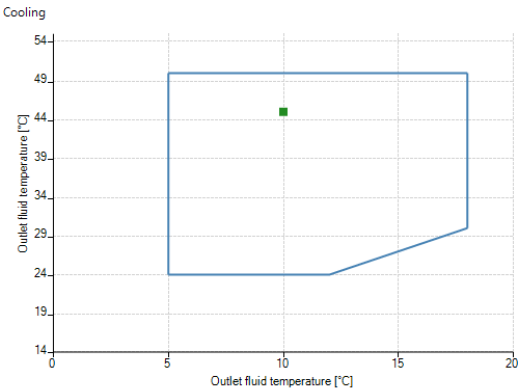
## Design parameters

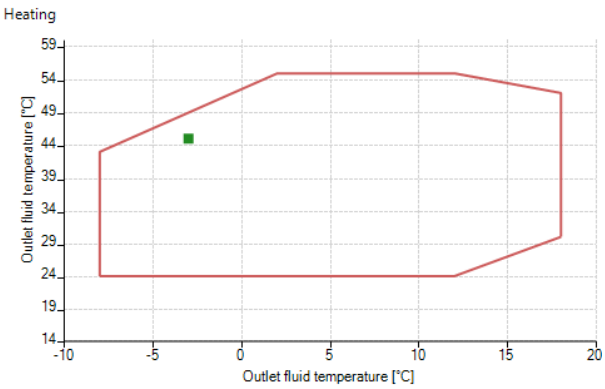
| | | Cooling | Heating |
|---|---|---|---|
| User side exchanger inlet fluid temperature | [°C] | 15 | 40 |
| User side exchanger outlet fluid temperature | [°C] | 10 | 45 |
| Source side exchanger inlet fluid temperature | [°C] | 40 | 0 |
| Source side exchanger outlet fluid temperature | [°C] | 45 | -3 |
| User side exchanger fluid | | Water | Water |
| Fouling factor | [m²°C/kW] | 0,035 | 0,035 |
| Source side exchanger fluid | | Prophylen glycole 30% | Prophylen glycole 30% |
| Fouling factor | [m²°C/kW] | 0,035 | 0,035 |

## Performances

| *At design conditions:* | | Cooling | Heating |
|---|---|---|---|
| Capacity (gross) | [kW] | 404,6 | 352,0 |
| Absorbed power (gross) | [kW] | 122,7 | 122,8 |
| Source side power (gross) | [kW] | 523,6 | 232,8 |
| EER (gross) | | 3,3 | |
| COP (gross) | | | 2,87 |
| | | | |
| Capacity (UNI EN 14511/2018) | [kW] | 403,3 | 353,0 |
| EER (UNI EN 14511/2018) | | 3,25 | |
| COP (UNI EN 14511/2018) | | | 2,85 |
| | | | |
| *At Eurovent conditions:* | | | |
| ESEER (UNI EN 14511/2018) | | 5,46 | |
| EER 100% (UNI EN 14511/2018) | | 4,03 | |
| EER 75% (UNI EN 14511/2018) | | 4,61 | |
| EER 50% (UNI EN 14511/2018) | | 5,81 | |
| EER 25% (UNI EN 14511/2018) | | 6,22 | |
| | | | |
| *Adaptive Function Plus:* | | | |
| ESEER+ | | 6,12 | |

## Functioning limits





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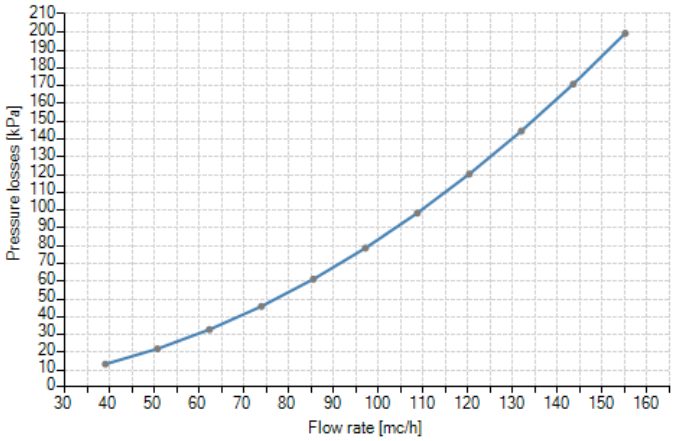
## User side exchanger

| | | | |
|---|---|---|---|
| Flow rate | [m³/h] | 69,6 | 60,5 |
| Pressure losses | [kPa] | 41 | 32 |

## Source side exchanger

| | | | |
|---|---|---|---|
| Flow rate | [m³/h] | 94,4 | 69,4 |
| Pressure losses | [kPa] | 72 | 48 |

## Pressure losses




## Technical features

| | |
|---|---|
| Refrigerant: | R410A |
| Compressors | Scroll |
| Number of compressors | 4 |
| Number of indipendent circuits | 2 |
| Number of compressor steps | 4 |

## Noise

| | | |
|---|---|---|
| Sound Power level (1) | [dBA] | 84 |

## Electrical data

| | | | |
|---|---|---|---|
| Total electrical power (2) | [kW] | 122,7 | 122,8 |
| Electrical power supply | [V-ph-Hz] | 400-3-50 | |
| Auxiliary power supply | [V-ph-Hz] | 200-1-50 | |
| Nominal current (3) | [A] | 202,3 | |
| Maximum current | [A] | 302 | |
| Starting current | [A] | 525 | |

## Size and weight

| | | |
|---|---|---|
| Length | [mm] | 2600 |
| Height | [mm] | 1860 |
| Depth | [mm] | 870 |
| Weight (4) | [kg] | 1820 |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## Partial loads

**Cooling**

| Load | % | 100 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 20 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Outlet fluid temperature | °C | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Outlet fluid temperature | °C | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| Capacity (GROSS VALUE) | kW | 404,6 | 364,2 | 323,7 | 283,2 | 242,8 | 202,3 | 161,9 | 121,4 | 80,9 | 40,5 |
| EER (GROSS VALUE) | | 3,3 | 3,33 | 3,38 | 3,54 | 3,87 | 4,37 | 4,42 | 4,51 | 4,47 | 3,98 |

Flow rate determined at full load condition

**Heating**

| Load | % | 100 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 20 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Outlet fluid temperature | °C | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| Outlet fluid temperature | °C | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| Capacity (GROSS VALUE) | kW | 352 | 316,8 | 281,6 | 246,4 | 211,2 | 176 | 140,8 | 105,6 | 70,4 | 35,2 |
| COP (GROSS VALUE) | | 2,87 | 2,86 | 2,85 | 2,85 | 2,88 | 2,93 | 2,93 | 2,91 | 2,84 | 2,55 |

Flow rate determined at full load condition

## SCOP (EN 14825)

| | Reference conditions | | |
|---|---|---|---|
| Reference heating season | **AVERAGE** | **WARMER** | **COLDER** |
| Application type | LOW | LOW | LOW |
| Application temperature [°C] | 35 | 35 | 35 |
| Tdesign [°C] | -10 | 2 | -22 |
| Water flow | FIXED | FIXED | FIXED |
| Outlet water temperature | VARIABLE | VARIABLE | VARIABLE |
| Bivalent temperature [°C] | -5 | 4 | -15 |
| Pdesign [kW] | 674 | 635 | 667 |
| Annual Heating Demand Qhe [kWh] | 236 397 | 141 191 | 268 541 |
| SCOP net | 6,05 | 6,12 | 6,25 |
| SCOP | 5,89 | 6,01 | 6,12 |
| Seasonal efficiency (Reg.813/2013 UE) [%] | - | - | - |
| Efficiency class (Reg.811/2013 UE) | - | - | - |

The SCOP values could be different from what published in the commercial documentation. This is possibly due to a different unit configuration and/or to different selected parameters

## SEER (EN 14825)

| | |
|---|---|
| Application type | LOW |
| Application temperature [°C] | 7 |
| Tdesign [°C] | 30/35 |
| Water flow | FIXED |
| Pdesignc [kW] | 410,8 |
| SEER | 5,79 |
| Seasonal efficiency (Reg.2016/2281 UE) [%] | 224 |

RHOSS reserves the right to make the changes it deems necessary to improve / update the data at any time and without prior notice.

## Note

| | |
|---|---|
| (1) | Standard reference UNI EN-ISO 9614 |
| (2) | Total absorbed power (compressors, fans if present and pumps if selected) |
| (3) | Referred to nominal conditions: Twc: 30/35°C Twe:12/7°C |
| (4) | The value is indicative and may be subject to change based on the selected accessories |


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