

# TK Accessories

**ThermoKey®**  
Heat Exchange Solutions

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# Electrical accessories for AC fan

## Wiring

### E – WIRING IN JUNCTION BOX



In compliance with EC regulations.  
Junction box in plastic UV resistant material with protection class IP54.  
Working temperature -25°C ÷ 40°C.  
Power terminals of the fan motors connected.  
Thermocontacts of the fans connected to junction box.  
Electrical cables suitable for outdoor installation, resistant to UV.

### Q - WIRING WITH ELECTRICAL AC PANEL



Box in plastic UV resistant material with protection class IP55.  
Working temperature -25°C ÷ 40°C.  
In compliance with EC regulations.

#### TECHNICAL DATA

Power supply: 3~ 400V / 50Hz + PE. (optional 60 Hz).  
Current sizes: 16A, 40A, 63A.  
Main switch.  
Green warning light to signal system is powered.  
Fuse protector for main power line.  
Thermocontacts connection for 8 fans.  
Power connection for 8 fans.  
N°1 input for ON/OFF control of the fans.  
N°1 contact for general alarm.  
Terminal block for connection of controllers R + P + Z + G.  
Execution in compliance with CE regulations.

### W1A - WIRING IN JUNCTION BOX WITH CONTROLLER (VALID UP TO MAX 20A)



In compliance with EC regulations.  
Junction box in plastic UV resistant material with protection class IP54.  
Working temperature -25°C ÷ 40°C.  
Power terminals of the fan motors connected.  
Thermocontacts of the fans connected to junction box.  
Electrical cables suitable for outdoor installation, resistant to UV.  
Power supply to be made by customer with singular cable.  
Available only with controller.

### W2A - WIRING IN JUNCTION BOX WITHOUT CONTROLLER (FOR LOW TEMPERATURE UP TO -40°C)



In compliance with EC regulations.  
Junction box in plastic UV resistant material with protection class IP54.  
Working temperature -40°C ÷ 40°C.  
Power terminals of the fan motors connected.  
Thermocontacts of the fans connected to junction box.  
Electrical cables suitable for outdoor installation, resistant to UV.  
Power supply to be made by customer with singular cable.  
Available only without controller.

W - WIRING WITH SPECIAL ELECTRICAL PANEL

- Voltage and frequency upon request.
- Main switch.
- General protection with fuses for fans and speed controller.
- Contactors for each fans or groups of fans.
- Switches for each fan upon request.
- Box in plastic or metallic material.
- Protection class IP6X (upon request).
- Door lock with key.
- Suitable for corrosive environments, ATEX, etc.
- Wider working temperature (-50°C, +80°C, etc.).
- Variable number of fans following the installation field.
- Cables suitable for outdoor use, UV resistant.
- In compliance with EC regulations.



# Repair switch

## I – REPAIR SWITCH



- 220-690V 20A – 3 poles.
- Switch mounted and wired near to the fan.
- Working temperatures -25°C ÷ 40°C.
- Locked in the open position with padlock(OPTIONAL).
- Red handle (black only in presence of mainswitch).
- Protection class IP65.
- N°4 inlets Ø M20.
- Execution in compliance with CE regulations.

# Speed controller with probe

## R - PHASE CUT SPEED CONTROLLER



- It is a regulator that works as a voltage controller according to the cut phase principle (control over the three phases) in order to continuously increase and reduce the value of voltage supplied to three-phase AC motors mounted on heat exchangers.
- TECHNICAL DATA**
- Three-phases power supply: 3ph+PE 400Vac ± 20 % - 50/60Hz (other voltages upon request).
  - Available controller sizes: 12A, 20A, 26A, 40A, 60A.
  - Operating temperatures -20°C ÷ 50°C.
  - Junction box in thermoplastic UV protected material with protection class IP55.
  - Input by external signal or transducer: 0-20mA, 4-20mA, 0-5V, 0-10V.
  - RS485 Interface for MODBUS networking optional.
  - Possibility of connection for temperature probes (default) or pressure probes.
  - Auxiliary contacts available:
    - S1: mode direct (default with contact NO) – reverse (contact NC);
    - SP: Selection setpoint 1 or 2 (default SP1 with contact NO,SP2 with contact NC);
    - S5: Night speed limitation (default OFF with contact NO, ON with contact NC);
    - S2: ON - OFF speed control (default ON with contact NO, OFF with contact NC);
    - TK: contact for the connection of the thermal motor protection (default FANS ON with contact NC, FANS OFF with contact NO).
  - RL1 programmable contact relay of general alarm.
  - Principle of PID regulation. Optional Proportional mode.
  - Setting Min and Max fan-velocity.
  - Possibility to exclude 3 different fan speed fields, excluding areas with high acoustic disturb.
  - Display for main working parameters.
  - Led for power supply fault.
  - Led for motor anomalies.
  - Led for controller faults.
  - Led for indicating special functions.

SINGLE-PHASE  
R – PHASE CUT SPEED CONTROLLER



It is a tension speed controller used with asynchronous single-phase motors mounted on heat exchangers.

TECHNICAL DATA

Single-phase power supply: 1ph+N+PE 230V ± 20 % - 50/60Hz.

Available controller sizes: 8A.

Working temperatures: -10°C ÷ 50°C.

Junction box in thermoplastic UV protected material with protection class IP55.

Input by external signal or transducer:

- 0-20mA;
- 4-20mA;
- 0-5V;
- 0-10V;
- NTC 10KOhm 25°C;
- PWM 3-30V not polarized; max frequency 120Hz;

RS485 Interface for MODBUS SLAVE networking optional.

Possibility of connection for temperature probes (default) or pressure probes.

Auxiliary contacts available:

- S1: mode direct (default with contact NO) – reverse (contact NC);
- SP: Selection setpoint 1 or 2 (default SP1 with contact NO, SP2 with contact NC);
- S5: Night speed limitation (default OFF with contact NO, ON with contact NC);
- S2: ON - OFF speed controller (default ON with contact NO, OFF with contact NC);
- S6: Enabling max velocity spray;
- TK: contact for the thermal motor protection (default FANS ON with contact NC, FANS OFF with contact NO).

N°3 logic inputs ON/OFF.

N°1 output for relay.

N°1 programmable output for relay.

N°1 output PWM for slave unit.

N°1 programmable output for analogic signal.

Principle of PID regulation. Optional Proportional mode.

Setting Min and Max fan speed.

Display for main working parameters.

Led for power supply fault.

Led for motor anomalies.

Led for controller faults.

Outputs for auxiliary supply:

- 5,0 Volt (Vrr) stable;
- 10,0 Volt (Vrr) stable;
- 20-24 Volt ±10%.

G – STEP FAN SPEED CONTROLLER (ON DEMAND)



Controller G is an electronic three-phase control unit designed according to the voltage step technology for accurate regulation, totally free of sound, electrical and electromagnetic disturbance.

Thanks to this type of controller, effective voltage fed to the motor fitted in the fan varies according to fixed values that are determined by the steps featured in the auto-transformer and in the asynchronous motor.

In this way, regulation is perfectly sinusoidal (constant frequency) and can be applied to motors without requiring shielded cables and EMC or LHC filters for motor protection against microwaves.

There are 6 voltage steps (400-265-190-140-95-65 VAC to the fans).

This regulator allows a substantial energy saving using up to 60% of the fan air flow (mc/h) only with 30% of power consumption of the motor.

TECHNICAL DATA

Three-phases power supply: 3ph+PE 400Vac ± 10 % - 50 / 60Hz normalized.

Available controller-sizes: 8A, 16A, 20A, 30A.

Working temperatures -10°C ÷ 50°C.

Junction box in thermoplastic UV protected material with protection class IP55.

No sound level increase while regulator is working.

4 or 6 default steps with external transformer.

Input by external signal or transducer: 0-20mA, 4-20mA, 0-5V, 0-10V.

RS485 Interface for MODBUS networking.

Possibility of connection for temperature probes (default) or pressure probes.

Auxiliary contacts available:

- S1: direct function (default with contact NO) – reverse (contact NC);
- SP: Selection set point 1 o 2 (default SP1 with contact NO, SP2 with contact NC);
- S5: Night speed limitation (default OFF with contact NO, ON with contact NC);
- S2: ON - OFF speed control (default ON with contact NO, OFF with contact NC);
- TK: contact for the connection of the thermal motor protection (default FANS ON with contact NC, FANS OFF with contact NO).

RL1 relay contact of general alarm programmable.

Principle of PID regulation. Optional Proportional mode.

Setting Min and Max fan-speed.

Display for main working parameters.

Led for power supply fault.

Led for motor anomalies.

Led for controller faults.

Led for indicating special functions.

Z - INVERTER SPEED CONTROLLER  
WITH SINUSOIDAL FILTERS INSTALLED



Inverter Z guarantees a remarkable energy saving and reduces the noise produced by the fans during the regulation phase.

This is why it is ideal in environments with very limiting noise level restrictions. It is designed for the regulation of three-phase asynchronous motors mounted on heat exchangers.

Suitable when low sound levels are required.

TECHNICAL DATA

- Three-phases power supply: 3ph+PE 208-480V (-15/+10%), 50–60Hz.
- Sinusoidal integrated filter between phase and phase and phase and ground.
- Shielded cable not required.
- Working temperature -20°C ÷ 40°C.
- Junction box in thermoplastic UV protected material with protection class IP54.
- Remote control: 0-20mA, 4-20mA, 0-5V, 0-10V.
- Connection MODBUS RS485.
- Possibility to add card plug-in for connection LON (Plug-in on demand).
- Possibility to connect temperature probe and pressure probe.
- 2 programmable digital inputs (Setpoint 1 o Setpoint 2, mode direct/reverse, ON/OFF speed controller).
- 2 programmable relays for general alarms.
- 1 programmable analogic output 0 – 10V.
- PID regulation mode.
- Setting Max and Min fan velocity.
- Display for main working parameters.

P - SPECIAL CUT PHASE FAN SPEED CONTROLLER (ON DEMAND)



Controller P is a multifunction and multiple-input unit for the regulation of speed of asynchronous three-phase motors installed on axial fans.

This device works as a voltage controller according to the cut phase principle (control over the three phases) in order to continuously increase and reduce the value of voltage supplied to three-phase AC motors mounted on the fan units.

TECHNICAL DATA

- Three-phases power supply: 3ph+PE 280-415V (-10%/+6%), 50/60Hz.
- Available controller sizes: 6A, 10A, 12A, 15A, 20A, 25A, 35A, 50AQ, 80AQ.
- Working temperature -20°C ÷ 40°C.
- Junction box in thermoplastic UV protected material with protection class IP54.
- Remote control: 0-20mA, 4-20mA, 0-5V, 0-10V(default).
- Connection MODBUS RS485.
- Possibility to add card plug-in for connection LON (Plug-in on demand).
- Possibility to connect temperature probe and pressure probe.
- 2 programmable digital inputs D1-D1 / D2-D2 (Setpoint 1 o Setpoint 2, mode direct/reverse, ON/OFF speed controller, ON/OFF motor heating).
- 2 programmable relays for general allarms.
- 1 programmable analogic output 0 – 10V.
- PID regulation mode.
- Setting Max and Min fan velocity.
- Display for main working parameters.

# Electrical accessories for EC Fan

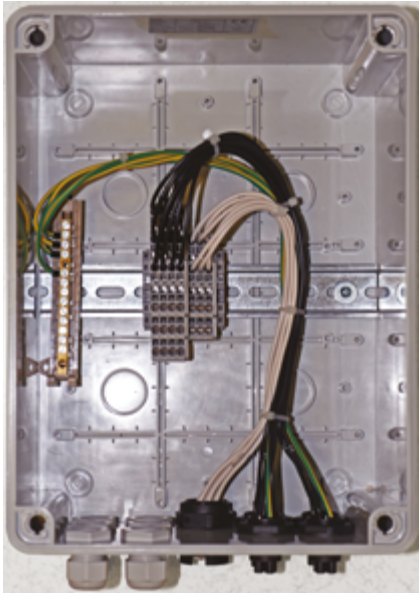
	EC BASIC	EC PLUS	REP SWITCHES	AFS - WFS
W1E				
W2E(*)				
W3E				
W4E				
Q1E				
Q2E				
Q3E				
Q4E(*)				

Available on Archimede

(\*) Available only on double fan-rows

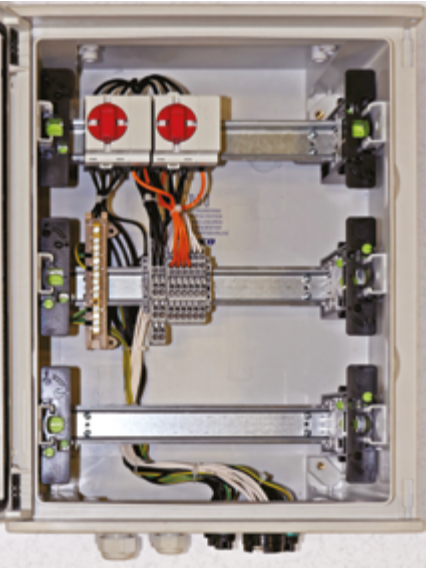
## Wiring

### W1E – ELECTRIC BOX FOR EC FANS WITH PLASTIC CASING



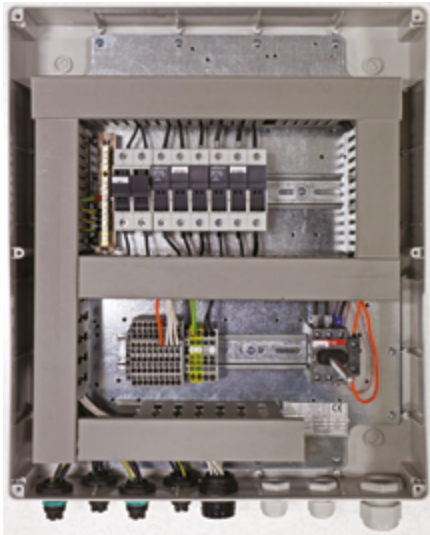
Plastic UV-resistant box.  
Protection class IP55.  
Working temperatures: -25°C/40°C.  
Power supply: 3~ 400V / 50Hz +PE.  
Fan speed regulation control with 0-10V signal.  
Free fan alarm contact.  
MODBUS communication RS485 (fans-side).  
Quick power connectors for fans directly on panel.  
Quick signal connector for fans directly on panel.  
Execution in compliance with CE regulations.

### W2E – ELECTRIC BOX FOR EC FANS WITH PLASTIC CASING AND FAN SWITCHES (1X2)



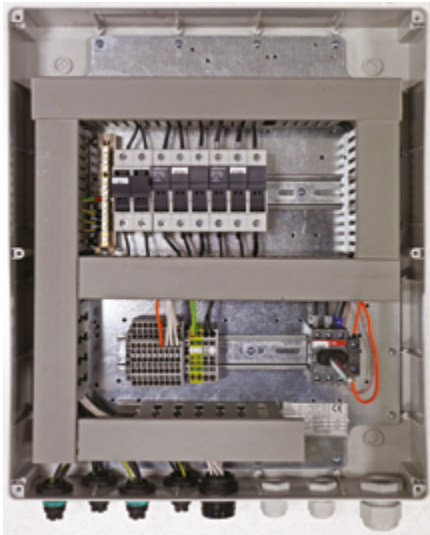
Plastic UV-resistant box.  
Protection class IP65.  
Box-mounted switches (1 switch every 2 fans).  
Contacts for switch status indication.  
Working temperatures: -20°C/40°C.  
Power supply: 3~ 400V / 50Hz +PE.  
Fan speed regulation control with 0-10V signal.  
Free fan alarm contact.  
MODBUS communication RS485 (fans-side).  
Quick power connectors for fans directly on panel.  
Quick signal connector for fans directly on panel.  
Execution in compliance with CE regulations.

**W3E – ELECTRICAL PANEL FOR EC FANS WITH PLASTIC CASING, FUSE PROTECTION FOR GROUPS OF FANS AND EXTERNAL CONTROL 0-10V**



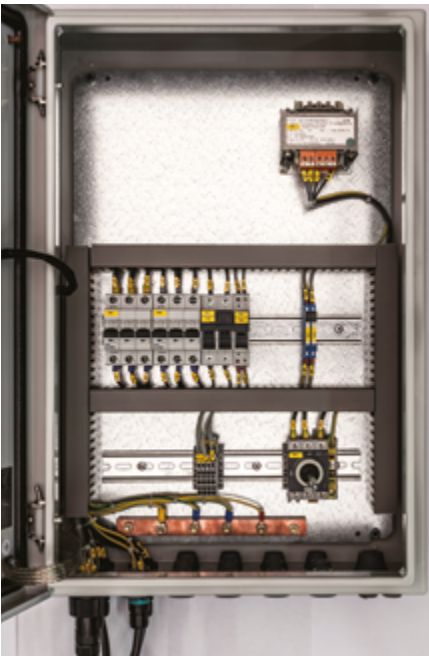
- Plastic UV-resistant box.
- Protection class IP55.
- Working temperatures: -20°C/40°C.
- Power supply: 3~ 400V / 50Hz +PE.
- Main switch.
- Fuse protection for groups of fans.
- Suitable to connect J + EN + EB + EP + EM controllers (to be mounted outside this panel).
- Fan speed regulation control with 0-10V signal.
- Free contact on main switch for ON/OFF indicator.
- Free fan alarm contact.
- MODBUS communication RS485 (fans-side).
- Quick power connectors for fans directly on panel.
- Quick signal connector for fans directly on panel.
- Execution in compliance with CE regulations.

**W4E – ELECTRICAL PANEL FOR EC FANS WITH PLASTIC CASING, PROTECTED BY AUTOMATIC SWITCHES (CIRCUIT BREAKERS) CONNECTED TO GROUPS OF FANS AND EXTERNAL CONTROL 0-10V**



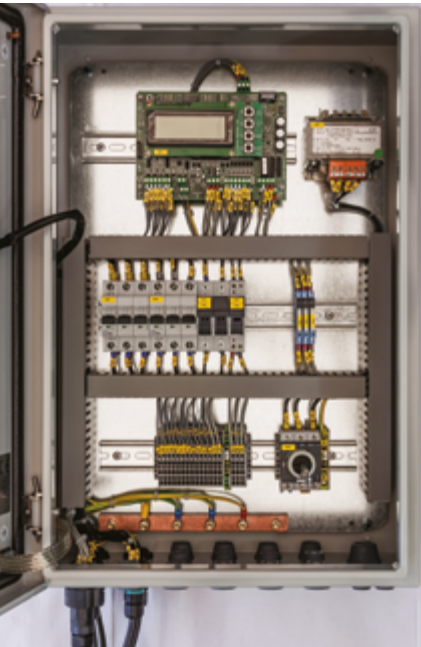
- Plastic UV-resistant box.
- Protection class IP55.
- Working temperatures: -20°C/40°C.
- Power supply: 3~ 400V / 50Hz +PE.
- Main switch.
- Protected by automatic switches (circuit breakers) connected to group of fans.
- Suitable to connect J + EN + EB + EP + EM controllers (to be mounted outside this panel).
- Fan speed regulation control with 0-10V signal.
- Free contact on main switch for ON/OFF indicator.
- Free fan alarm contact.
- MODBUS communication RS485 (fans-side).
- Quick power connectors for fans directly on panel.
- Quick signal connector for fans directly on panel.
- Execution in compliance with CE regulations.

**Q1E – ELECTRICAL PANEL FOR EC FANS WITH PAINT COATED METAL CASING. PROTECTED BY AUTOMATIC SWITCHES (CIRCUIT BREAKERS) CONNECTED TO GROUPS OF FANS, EXTERNAL CONTROL 0-10V.**



- Metal casing painted RAL7035, 120 micron thickness, suitable for outdoor installation.
- Protection class IP65.
- Working temperatures: -20°C/40°C.
- Power supply: 3~ 400V / 50Hz +PE.
- Main switch.
- Protected by automatic switches (circuit breakers) connected to groups of fans.
- Suitable to connect J + EN + EB + EP + EM controllers (to be mounted outside this panel).
- Fan speed regulation control with 0-10V signal.
- Free contact for unit live indicator.
- Free general fan alarm contact.
- MODBUS communication RS485 (fans-side).
- Warning light to signal system is powered.
- General alarm warning light.
- Quick power connectors for fans directly on panel.
- Quick signal connector for fans directly on panel.
- Execution in compliance with CE regulations.

**Q2E – ELECTRICAL PANEL FOR EC FANS WITH PAINT COATED METAL CASING, CONTROLLER MOUNTED INSIDE THE BOX, PROTECTED BY AUTOMATIC SWITCHES (CIRCUIT BREAKERS) CONNECTED TO GROUPS OF FANS, FAN REGULATION CONTROL MODBUS RS485**



Metal casing painted RAL7035, 120 micron thickness, suitable for outdoor installation.

Protection class IP65.

Working temperatures: -20°C/40°C.

Power supply: 3~ 400V / 50Hz +PE.

Main switch.

Protected by automatic switches (circuit breakers) connected to groups of fans.

Controller mounted inside the box.

Fan speed regulation controlled by MODBUS.

Free contact for unit powered indicator.

Free general fan alarm contact.

Warning light to signal system is powered.

General alarm warning light.

Quick power connectors for fans directly on panel.

Quick signal connector for fans directly on panel.

Execution in compliance with CE regulations.

CONTROLLER Em - EC-MANAGER:

- 2 MODBUS RS485 connections (COM 0 on PC side & COM 1 on fan side);
- Possibility to connect temperature probes (by default) or pressure probes;
- Min. and Max. fan speed setting.

Auxiliary contacts - available contacts:

- S1 - direct mode (by default with NO contact) - reverse (with NC contact);
- SP - selection of setpoints 1 or 2 (SP1 by default with NO contact; SP2 with NC contact);
- S5 - night speed limitation (by default OFF with NO contact; ON with NC contact);
- S2 - controller ON-OFF (by default ON with NO contact; OFF with NC contact);
- S6 - max. spray speed enable;
- TK - contact for connection of the thermal motor protection (by default FANS ON with NC contact; FANS OFF with NO contact).

3 programmable relays: RL1 - general controller alarm; RL2 - fan alarm; RL3 - relay for heat exchanger cleaning start.2 programmable analog outputs (for fan regulation or spray activation).

Advanced functions:

- Emergency fan speed - fan rotation speed in the case of a control system fault;
- Overspeed - possibility to increase the speed setpoint above the max. fan speed value (by-pass MAX RPM limit);
- Speed-off - possibility to reduce the speed setpoint below the min. fan speed value (by-pass MIN RPM limit); Low capacity - is used to switch off groups of fans in the case of low temperatures, high temperature variations between day and night;
- Anti-lock - is used to start the fans if they are supposed not to operate for a long time;
- Washing - is used to program a washing cycle of the heat exchanger (start, frequency, duration), including reverse fan rotation and activation of the RL3 relay for washing system start-up;
- Cleaning - is used to program a washing cycle of the heat exchanger (start, frequency, duration, rotation speed), including reverse fan rotation;
- Separate regulation of 2 fan groups - possibility to manage two different rows of fans having different setup/regulation parameters; reverse fan rotation - possibility to operate the fans in reverse rotation.

**Q3E – ELECTRICAL PANEL FOR EC FANS WITH PAINT COATED METAL CASING,CONTROLLER MOUNTED INSIDE THE BOX, PROTECTED BY AUTOMATIC SWITCHES (CIRCUIT BREAKERS) CONNECTED TO GROUPS OF FANS, FAN REGULATION CONTROL MODBUS RS485, INTERNAL ANTI CONDENSATE HEATING ELEMENT**



Metal casing painted with RAL7035, 120 micron thickness, suitable for outdoors installation.

Protection class IP65.

Working temperatures: -40°C/40°C.

Power supply: 3~ 400V / 50Hz +PE.

Main switch.

Protected by automatic switches (circuit breakers) connected to groups of fans.

Controller mounted inside the box.

Fan speed regulation controlled by MODBUS.

Free contact for unit powered indicator.

Free general fan alarm contact.

Warning light to signal system is powered.

General alarm warning light.

Quick power connectors for fans directly on panel.

Quick signal connector for fans directly on panel.

Execution in compliance with CE regulations.

Internal heating element suitably sized for ambient temperatures up to -40°C.

Execution in compliance with CE regulations.

CONTROLLER Em - EC-MANAGER:

- 2 MODBUS RS485 connections (COM 0 on PC side & COM 1 on fan side);
- Possibility to connect temperature probes (by default) or pressure probes;
- Min. and Max. fan speed setting.

Auxiliary contacts - available contacts:

- S1 - direct mode (by default with NO contact) - reverse (with NC contact);
- SP - selection of setpoints 1 or 2 (SP1 by default with NO contact; SP2 with NC contact);
- S5 - night speed limitation (by default OFF with NO contact; ON with NC contact);
- S2 - controller ON-OFF (by default ON with NO contact; OFF with NC contact);
- S6: max. spray speed enable;
- TK - contact for connection of the thermal motor protection (by default FANS ON with NC contact; FANS OFF with NO contact).

3 programmable relays: RL1 - general controller alarm; RL2 - fan alarm; RL3 - relay for heat exchanger cleaning start.2 programmable analog outputs (for fan regulation or spray activation).

Advanced functions:

- Emergency fan speed - fan rotation speed in the case of a control system fault;
- Overspeed - possibility to increase the speed setpoint above the max. fan speed value (by-pass MAX RPM limit);
- Speed-off - possibility to reduce the speed setpoint below the min. fan speed value (by-pass MIN RPM limit); Low capacity - is used to switch off groups of fans in the case of low temperatures, high temperature variations between day and night;
- Anti-lock - is used to start the fans if they are supposed not to operate for a long time;
- Washing - is used to program a washing cycle of the heat exchanger (start, frequency, duration), including reverse fan rotation and activation of the RL3 relay for washing system start-up;
- Cleaning - is used to program a washing cycle of the heat exchanger (start, frequency, duration, rotation speed), including reverse fan rotation;
- Separate regulation of 2 fan groups - possibility to manage two different rows of fans having different setup/regulation parameters; reverse fan rotation - possibility to operate the fans in reverse rotation.

**Q4E – ELECTRICAL PANEL FOR EC FANS WITH PAINT COATED METAL CASING, INTERNALLY MOUNTED CONTROLLER, PROTECTED BY AUTOMATIC SWITCHES (CIRCUIT BREAKERS) CONNECTED TO GROUPS OF FANS, FAN REGULATION CONTROL MODBUS RS485. PANEL-MOUNTED SWITCHES (1 SWITCH EVERY 2 FANS) (1X2).**



Metal casing painted RAL7035, 120 micron thickness, suitable for outdoor installation.

Protection class IP65.

Working temperatures: -20°C/40°C.

Power supply: 3~ 400V / 50Hz +PE.

Main switch.

Box-mounted switches (1 switch every 2 fans).

Contacts for switch status indication.

Protected by automatic switches (circuit breakers) connected to groups of fans.

Controller mounted inside the box.

Fan speed regulation controlled by MODBUS.

Free contact for unit powered indicator.

Free general fan alarm contact.

Warning light to signal system is powered.

General alarm warning light.

Quick power connectors for fans directly on panel.

Quick signal connector for fans directly on panel.

Execution in compliance with CE regulations.

CONTROLLER Em - EC-MANAGER:

- 2 MODBUS RS485 connections (COM 0 on PC side & COM 1 on fan side);
- Possibility to connect temperature probes (by default) or pressure probes;
- Min. and Max. fan speed setting.

Auxiliary contacts - available contacts:

- S1 - direct mode (by default with NO contact) - reverse (with NC contact);
- SP - selection of setpoints 1 or 2 (SP1 by default with NO contact; SP2 with NC contact);
- S5 - night speed limitation (by default OFF with NO contact; ON with NC contact);
- S2 - controller ON-OFF (by default ON with NO contact; OFF with NC contact);
- S6: max. spray speed enable;
- TK - contact for connection of the thermal motor protection (by default FANS ON with NC contact; FANS OFF with NO contact).

3 programmable relays: RL1 - general controller alarm; RL2 - fan alarm; RL3 - relay for heat exchanger cleaning start.2 programmable analog outputs (for fan regulation or spray activation).

Advanced functions:

- Emergency fan speed - fan rotation speed in the case of a control system fault;
- Overspeed - possibility to increase the speed setpoint above the max. fan speed value (by-pass MAX RPM limit);
- Speed-off - possibility to reduce the speed setpoint below the min. fan speed value (by-pass MIN RPM limit); Low capacity - is used to switch off groups of fans in the case of low temperatures, high temperature variations between day and night;
- Anti-lock - is used to start the fans if they are supposed not to operate for a long time;
- Washing - is used to program a washing cycle of the heat exchanger (start, frequency, duration), including reverse fan rotation and activation of the RL3 relay for washing system start-up;
- Cleaning - is used to program a washing cycle of the heat exchanger (start, frequency, duration, rotation speed), including reverse fan rotation;
- Separate regulation of 2 fan groups - possibility to manage two different rows of fans having different setup/regulation parameters; reverse fan rotation - possibility to operate the fans in reverse rotation.

# Repair switch

## I – REPAIR SWITCH



220-690V 20A – 3 poles.

Switch mounted and wired near to the fan.

Working temperatures -25°C ÷ 40°C.

Locked in the open position with padlock(OPTIONAL).

Red handle (black only in presence of mainswitch).

Protection class IP65.

N°4 inlets Ø M20.

Execution in compliance with CE regulations.

# Speed controller with probe

## EB - EC BASIC SPEED CONTROLLER



The EC BASIC Eb is a multifunction and multiple-input unit for the regulation of speed of three-phase electronically commutated motors installed on axial fans, which is designed to regulate different EC motors, in a simultaneous and coordinated way, using programmable input signals..

### TECHNICAL DATA

- Power supply: 2ph+PE 400Vac  $\pm 10\%$  (other voltages upon request).
- Working temperatures:  $-20^{\circ}\text{C} \div 50^{\circ}\text{C}$ .
- Junction box in thermoplastic UV protected material with protection class IP55.
- Regulation mode MASTER or SLAVE.
- Principle of PID regulation. Optional Proportional mode.
- Regulation by 13 grades detents and dip-switch.
- Setting Min and Max fan velocity.
- Setting Max fan velocity at night mode.
- External or transducer Input: 0-20mA, 4-20mA, 0-5V, 0-10V,NTC 10KOhm  $25^{\circ}\text{C}$ .
- Possibility of connection for temperature probes (default) or pressure probes.
- Auxiliary contacts available:
- S1: mode direct (default with contact NO) – reverse (contact NC);
  - SP: Selection setpoint 1 or 2 (default SP1 with contact NO, SP2 with contact NC);
  - S3: Night speed limitation (default OFF with contact NO, ON with contact NC);
  - S2: ON - OFF speed control (default ON with contact NO, OFF with contact NC).
- N° 1 programmable relay output:
- RL1 contact relay of general alarm.
- N° 1 analogic output 0-10V (fan speed regulation).
- N° 1 auxiliary output.
- Led for signalling faults.

## EP - EC PLUS SPEED CONTROLLER



The EC PLUS Ep is a multifunction and multiple-input unit for the regulation of speed of three-phase electronically commutated motors installed on axial fans, which is designed to regulate different EC motors, in a simultaneous and coordinated way, using programmable input signals. Power supply: IP55: 2ph+PE 400Vac  $\pm 20\%$  (other voltages upon request)

### TECHNICAL DATA

- Power supply: 2ph+PE 400Vac  $\pm 20\%$  (other voltages upon request).
- Operating temperatures:  $-20^{\circ}\text{C} \div 50^{\circ}\text{C}$ .
- Junction box in thermoplastic material resistant to UV rays and with protection class IP55.
- Regulation mode MASTER or SLAVE.
- Principle of PID regulation. Optional Proportional mode.
- Setting Min and Max fan speed.
- Possibility to exclude different fan speed fields, excluding areas with high acoustic disturb.
- Input by external signal or transducer: 0-20mA, 4-20mA, 0-5V, 0-10V.
- RS485 Interface for MODBUS networking optional.
- Possibility of connection for temperature probes (default) or pressure probes.
- Auxiliary contacts available:
- S1: mode direct(default with contact NO) – reverse (contact NC);
  - SP: Selection setpoint 1 or 2 (default SP1 with contact NO, SP2 with contact NC);
  - S5: Night speed limitation (default OFF with contact NO, ON with contact NC);
  - S2: ON - OFF speed control (default ON with contact NO, OFF with contact NC);
  - TK: contact for the connection of the thermal motor protection (default FANS ON with contact NC, FANS OFF with contact NO).
- N° 1 programmable relay output:
- RL1: contact relay of general alarm.
- N° 1 analogic output 0-10V (fan speed regulation).
- Display for main working parameters.
- Led for power supply fault.
- Led for motor anomalies.
- Outputs for external supply
- 5,0 Volt (Vrr) stable;
  - 10,0 Volt (Vrr) stable;
  - 20 Volt  $\pm 10\%$ .

# Mechanical accessories

## UN - UNICON EC SPEED CONTROLLER



Controller Un is a multifunction and multiple-input unit for the regulation of speed of three-phase electronically commutated motors installed on axial fans, which is designed to regulate different EC motors in a simultaneous and coordinated way, using programmable input signals.

### TECHNICAL DATA

- Supply 2-400V(-10%/+10%) - 50 / 60Hz.
- Operating temperature 0 °C / +55 °C (down to -20 °C as long as equipment is connected to power source).
- Plastic UV-resistant junction box with IP54 degree of protection (EN 60529).
- Multilingual LC-Display for simple, fast programming.
- Input from external signal or transducer:0-20mA, 0-10V.
- Interface MODBUS RS485.
- Possibility to connect temperature probes (default) or pressure probes.
- Min. and Max. fan speed setting. 2 programmable analog outputs (0-10V).
- 2 Programmable digital inputs (D1/D2) (default switch setpoint 1-2 e ON/OFF by remote).
- 2 programmable digital outputs (K1/K2) alarm signal, external unit control.

## SHOCK ABSORBERS



Vibrations are generated by the rotation of the fan motors or due to the plant, from industrial or natural phenomena. The vibrations are harmful waves and may cause problems. They can also be very dangerous in the case of resonance phenomena.

The schock absorber can considerably reduce the vibratory disturbance, as well as the noise, since it is installed between the source of vibration and the mechanical anchoring.

It is possible to select this standardized accessory or require special dampers for high-seismicity environments.

## FLANGES



It is possible to select slip-on aluminium or stainless steel flanges.

The unit is supplied with a nitrogen pre-charge of about 3 bars displayed on the pre-installed manometer.

# Adiabatic systems

AFS

Air Fresh System

WFS

Wet Fin System

EPS

Evaporative Panel System

## Theory

The adiabatic system applied to Dry Coolers and large remote condensers are activated in order to increase the air relative humidity that passes through the heat exchanger so as to reduce the temperature and increase the heat exchange.

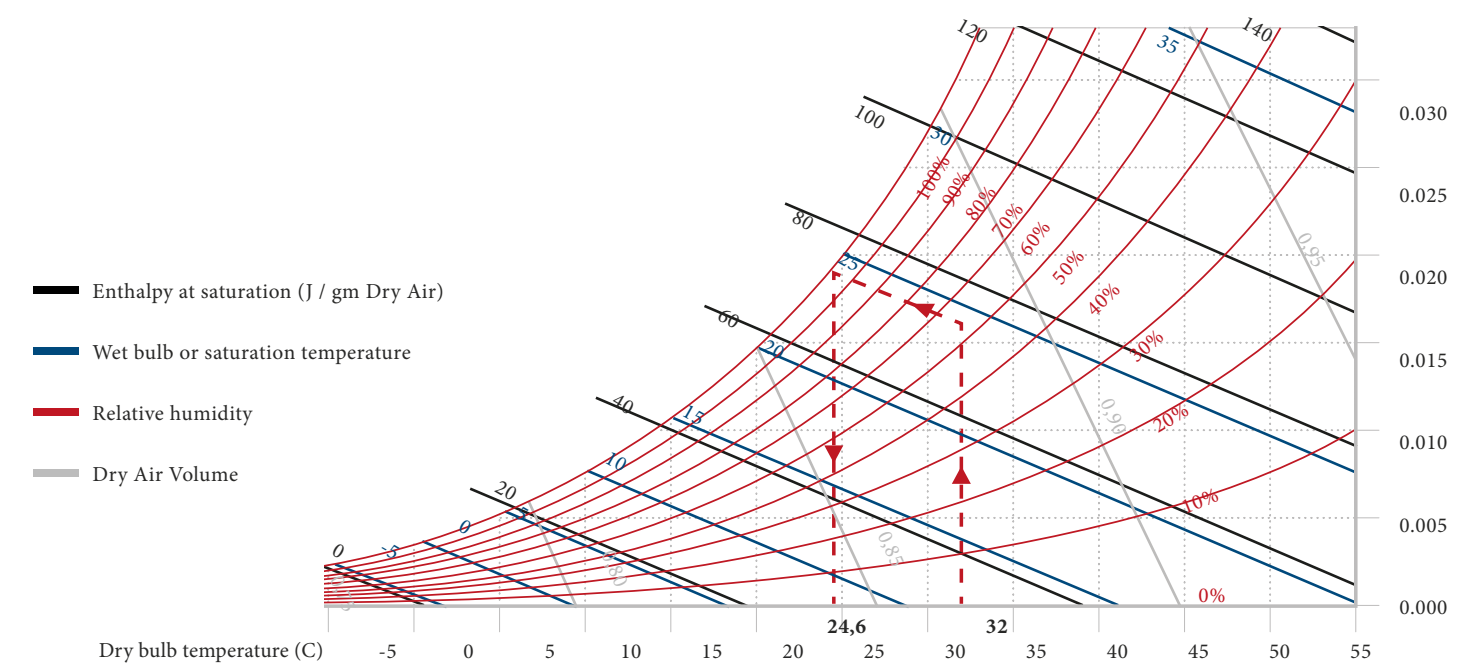
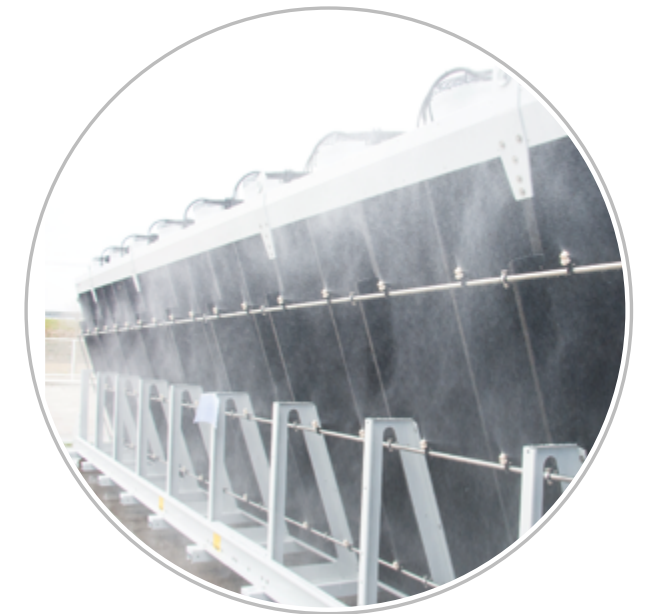
The physical principle is that of the latent heat of evaporation: by evaporating the water absorbs heat from the air entering in the heat exchanger and lowers its temperature.

ThermoKey has developed different adiabatic system to be effective and efficient under certain environmental conditions.

It is therefore essential to use the most correct system in relation to the installation needs.

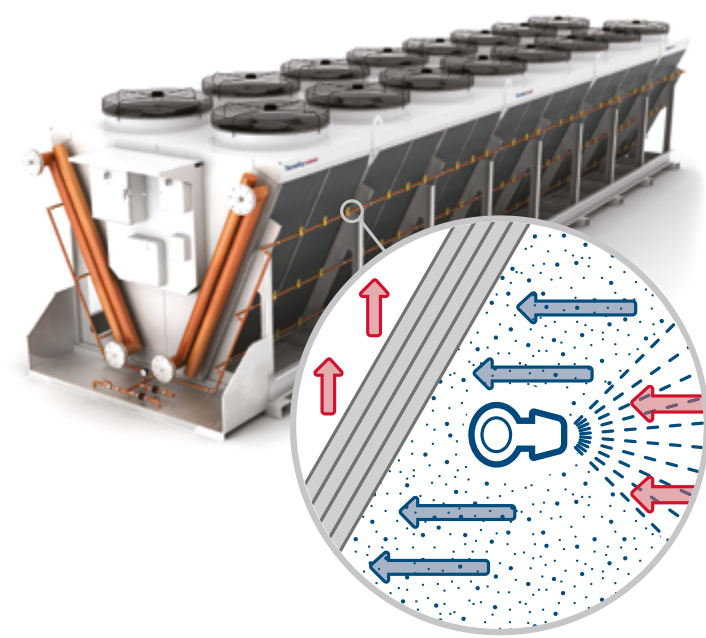
The most important parameters to be considered in the choice of the correct adiabatic systems are:

- Possible working hours per year.
- Obtainable relative humidity gap (efficiency).
- Obtainable saturation.
- Maximum difference of dry bulb temperature between ambient air temperature and suction air temperature after the adiabatic cooling.



AFS

AIR FRESH SYSTEM



ThermoKey adiabatic cooling system equipped with special high-pressure nozzles, which allows to compensate for the peaks of power to be dissipated, with minimum water consumption for a maximum of 500 hours per year.

The combination of high pressure water, the nebulization effect of nozzles (MISTING effect) and a specially designed electronic control system represent the innovative principle of AFS system. It uses only the quantity of water necessary to obtain the desired adiabatic effect.

Tüv Certificated: “No danger in correlation with the risk of legionnaires’ disease”.

WFS

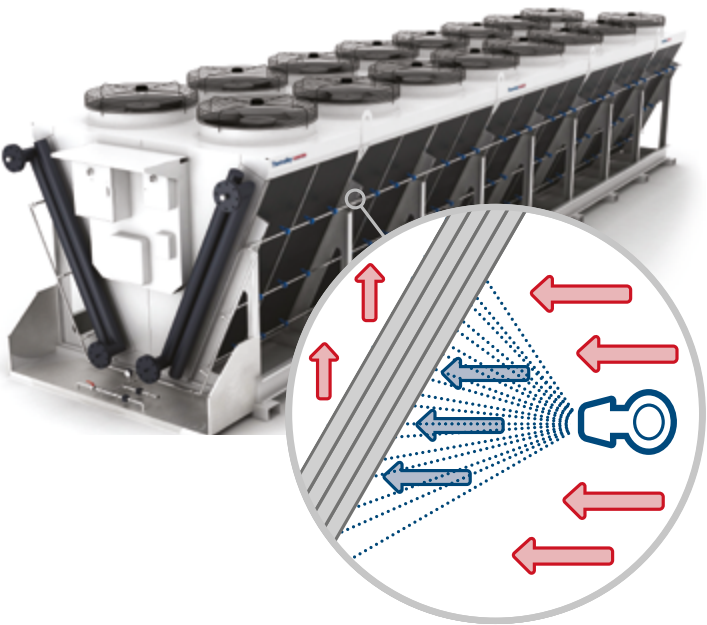
WET FIN SYSTEM

It is ThermoKey hybrid cooling system which allows a complete flexibility of operation, working at low pressure (2-3 bars) and for a very high number of hours per year (up to 1000).

The user can choose whether to prioritize the consumption of water or electricity. Thanks to the misting effect and to the increased exchange efficiency, the WFS system allows to reach higher saturation levels.

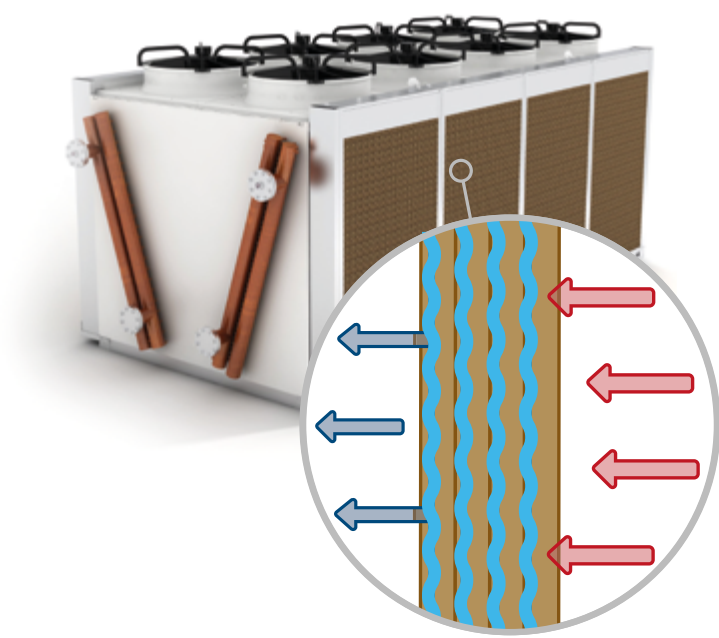
Since WFS systems use water for a high number of hours per year, a black double-layer fin is provided in order to improve the protection of the finned pack.

Mainz Universitätsmedizin Laboratory certifies that the WFS meets the standard VDI 2047 part 2 securing hygienically sound operation.



EPS

EVAPORATIVE PANEL SYSTEM



The evaporative panel system completes ThermoKey’s offer for adiabatic cooling. Thanks to a homogeneous and adjustable distribution of water on the panels this system allows to reach a high saturation level and therefore an efficient capacity increase with low water consumption (hours per year unlimited).

EPS has been designed for seasonal working cycles without any specific time limitation and can be completely disassembled for cleaning and maintenance operations.

Thanks to the evaporation contained in the panel there is no need of any protective treatment for the heat exchanger. It is possible to use the water distributed by the common water supply network.

To guarantee the highest quality and safety of its products, ThermoKey has had its EPS system (Adiabatic Evaporative Panel System) certified by an independent institution.

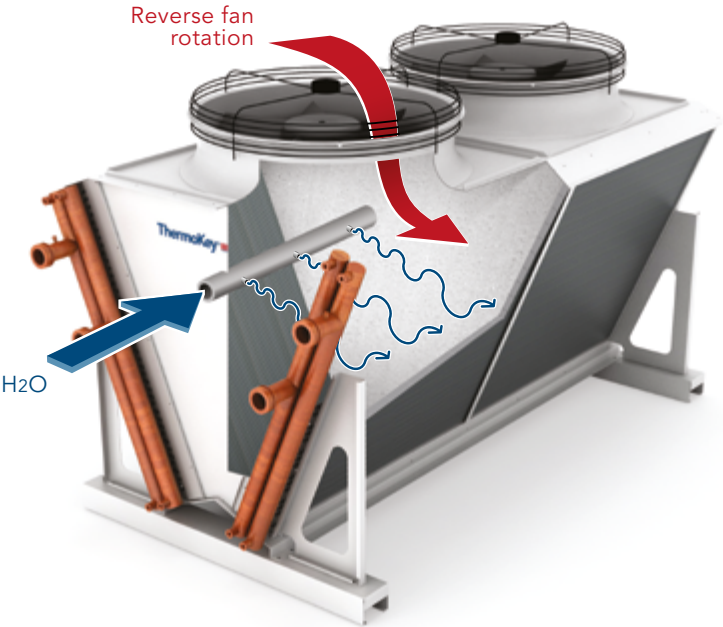
The hygienic certificate refers to VDI 2047-2 which takes into consideration the requirements set by the law and by industry standards in the main countries of use of the specific product.

COMPARISON CHART

	AFS	WFS	EPS
MOIST AIR SATURATION	80%	100%	90%
STANDARD AIR TEMPERATURE REDUCTION	7K	10K	8K
WATER CONSUMPTION	LOW	MEDIUM	LOW
WATER TREATMENT	NECESSARY	NECESSARY	NOT NECESSARY
DIRECT ENERGY CONSUMPTION	HIGH	LOW	LOW
ENVIRONMENTAL INFLUENCE	HIGH	LOW	LOW
COIL PROTECTION	HYDROPHOBIC	DOUBLE-LAYER	NOT NECESSARY
FUNCTIONING HOUR	500/Y	1000/Y	CONTINUOUS
MAINTENANCE COSTS	LOW	LOW	LOW

# Other options

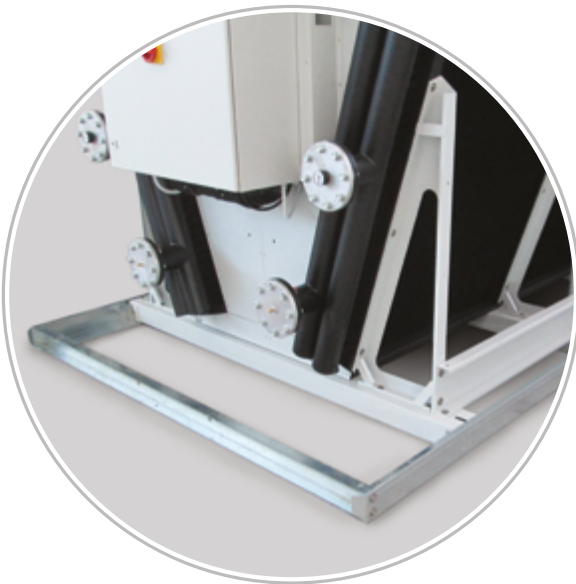
SCS SPRAY J CLEANING SYSTEM



Cleaning system with pipes placed on the front of the unit and internal nozzles, which sprays water from inside to outside, in order to clean the heat exchanger.

Through the electronics integrated in our electrical panels, it is also possible to provide and schedule the timing of the cleaning system and reversing the rotation of the fans.

CONTAINER VERSION



ThermoKey is able to supply units with dimensions suitable for container loading, with rails for the handling and protection during transport.

UNITS WITH HIGH PROTECTION-CLASS



ThermoKey is able to offer units with high protection class for aggressive environments comparable with C4,C5M coastal areas and offshore according to ISO 12944.

SPECIAL COLOURS



Upon request the units casing can be painted with a specific RAL colour.

# Type of fins

## ALUMINIUM

AlMg2,5 (A5052) / AlMg3 (A5754) ideal for installations in aggressive industrial environments, excellent resistance to corrosion (300 h test in salt fog ASTM B117 5%).

### HYDROPHOBIC

Coating  
Colour: Blue Hydrophobic Acrylic Emulsion  
Lacquer code: VAE225  
Corrosion resistance  
1000 Hours Salt fog (ASTM B 117) 5% NaCl

### PREPAINTED BLUE

Coating  
Colour: Blue  
Corrosion resistance  
1000 Hours Salt fog (ASTM B 117) 5% NaCl

### DOUBLE-LAYER

Coating  
Colour: Black  
Corrosion resistance  
1500 Hours Salt fog (ASTM B 117) 5% NaCl

## COPPER

## AISI 304 STAINLESS STEEL

## AISI 316L STAINLESS STEEL

# Additional treatments and coatings for finned pack heat exchanger

## CATAPHORESIS



## BLYGOLD



## THERMOGUARD



## HERESITE



## TINNING TREATMENT





## We design customized products to meet every need

We at ThermoKey know that specific environments require specific solutions, we are happy to help you to identify the best solution to your needs.



## Our technicians assist the customer in the choice

Our technical staff is at your complete disposal to identify the best heat exchanger for you. We individually analyze your specific needs and the environment in which the heat exchanger will be installed.for your needs.



## After sales

ThermoKey stays at your side throughout the product life cycle for spare parts replacement and technical assistance

## ThermoKey®

Heat Exchange Solutions

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