

TK Accessories

Index

ELECTRICAL ACCESSORIES FOR AC FAN

p. 02

- WIRING
- REPAIR SWITCH
- SPEED CONTROLLER WITH PROBE

ELECTRICAL ACCESSORIES FOR EC FAN

p. 10

- WIRING
- REPAIR SWITCH
- SPEED CONTROLLER WITH PROBE

MECHANICAL ACCESSORIES

p. 19

- SHOCK ABSORBERS
- FLANGES

ADIABATIC SYSTEMS

p. 20

OTHER OPTIONS

p. 24

- SPRAY J CLEANING SYSTEM
- EXPANSION TANK
- INSPECTIONABLE FANS
- CONTAINERIZABLE VERSION
- CASING PAINTING
- TYPE OF FINS
- ADDITIONAL TREATMENTS AND COATINGS FOR FINNED PACK HEAT EXCHANGER

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

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

Q - WIRING WITH ELECTRICAL EC 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.

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 (Plug-in on demand)
 - 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



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



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

SINGLE-PHASE
P – SPECIAL CUT PHASE FAN SPEED CONTROLLER



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

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

TECHNICAL DATA

- ingle-phase power supply: 1ph+N+PE 230V -15% / +10%, 50/60Hz
- Available controller sizes: 9A
- Working temperature up to 40°C
- Junction box in thermoplastic UV protected material with protection class IP54
- Input from external signal or transducer: 4-20mA, 0-10V
- Connection MODBUS RS485
- Possibility to connect temperature probe and pressure probe
- 1 analogic output 0–10V programmable
- Display for main working parameters

Electrical accessories for EC Fan

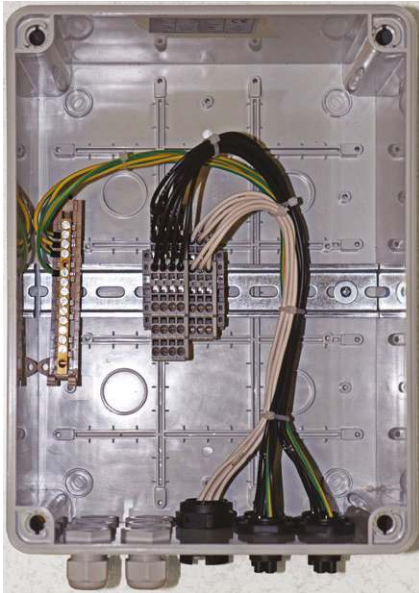
	EC BASIC	EC PLUS	REP SWITCHES	AFS - WFS
W1E				
W2E(*)				
W3E				
Q1E				
Q2E				
Q3E				
Q4E(*)				

Available on Archimede

(*) Available only on double fan-rows

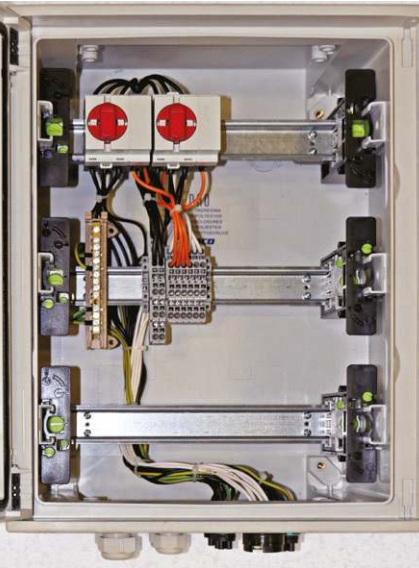
Wiring

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)



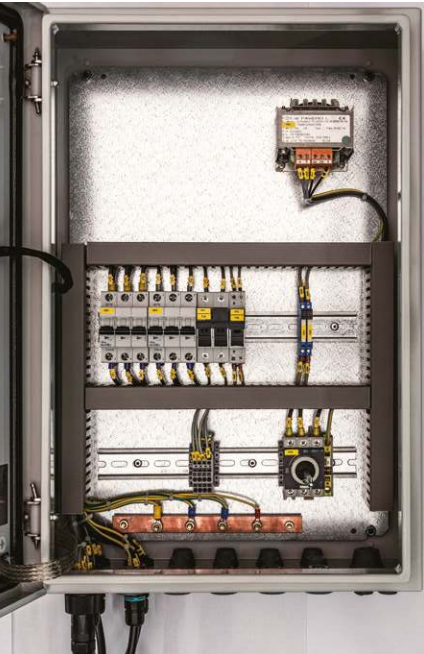
Plastic UV-resistant box,
Protection class IP65.
Box-mounted switches (1 switch every 2 fans).
Contacts for switch status indication.
Working temperatures: -20°C/40°C.
Power supply: 3~ 400V / 50Hz +PE.
Fan speed regulation control with 0-10V signal.
Free fan alarm contact.
MODBUS communication RS485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



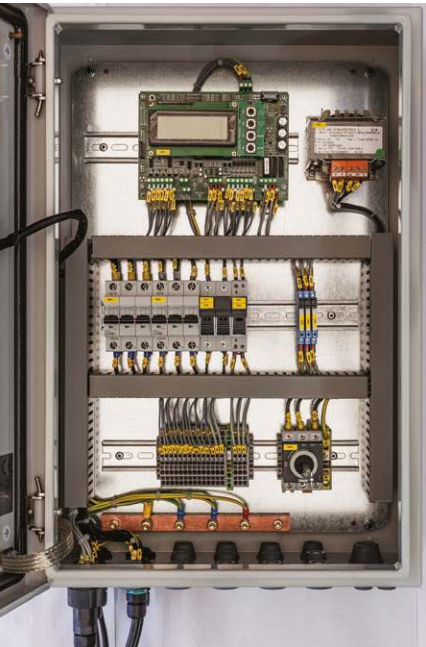
Plastic UV-resistant box
Protection class IP55.
Working temperatures: -20°C/40°C.
Power supply: 3~ 400V / 50Hz +PE.
Main switch.
Fuse protection for groups of fans.
Suitable to connect J + EN + EB + EP + EM controllers (to be mounted outside this panel)
Fan speed regulation control with 0-10V signal.
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.

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:

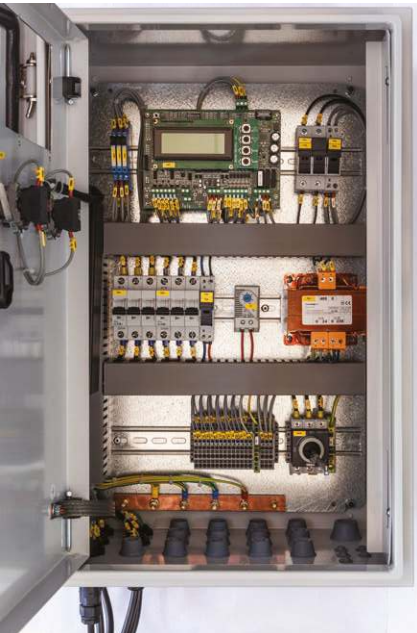
- S1 - direct mode (by default with NO contact) - reverse (with NC contact);
- SP - selection of setpoints 1 or 2 (SP1 by default with NO contact; SP2 with NC contact);
- S5 - night speed limitation (by default OFF with NO contact; ON with NC contact);
- S2 - controller ON-OFF (by default ON with NO 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.

Master 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 ±10% (other voltages upon request)
Working temperatures: -20°C ÷ 50°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°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

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.

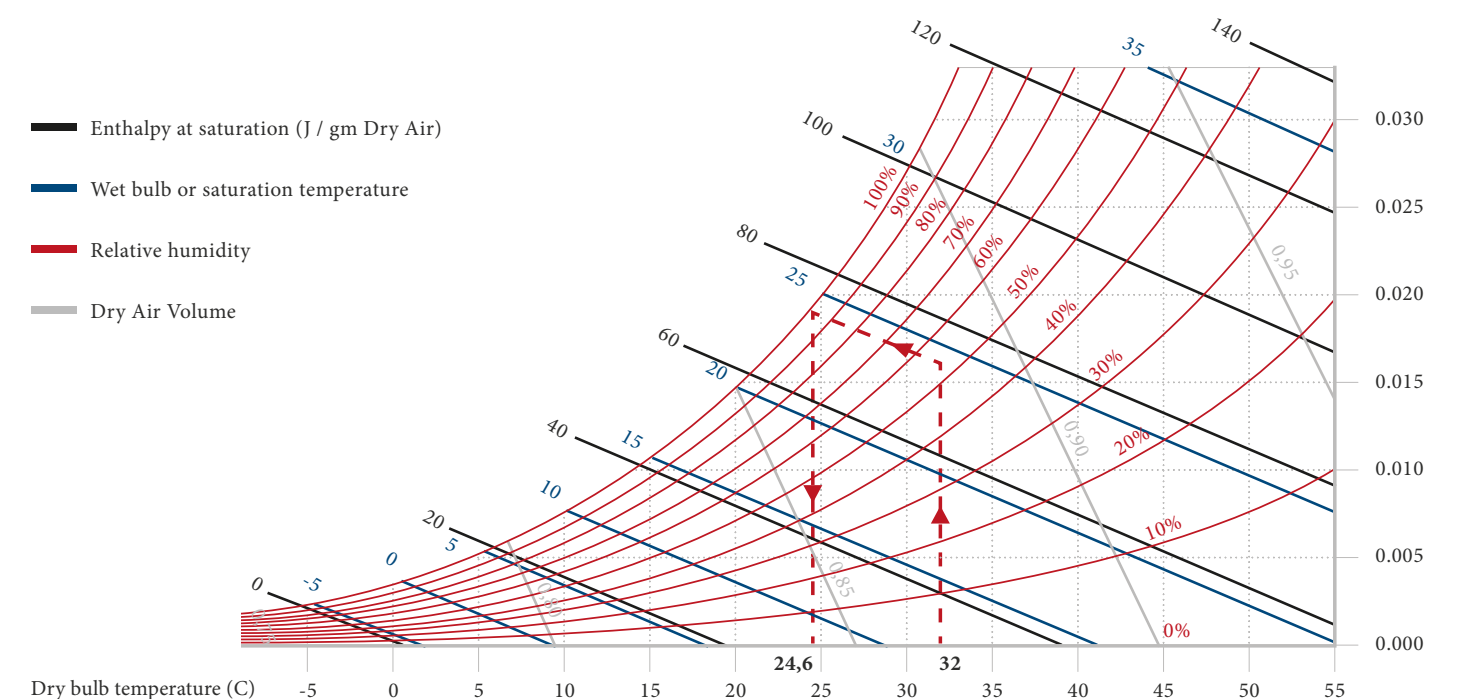
Adiabatic systems

Theory

The physical phenomenon of adiabatic cooling system consists in creating a uniform diffusion of micro-drops of water (MISTING effect). The air which blows through these drops is cooled thanks to the evaporation of the water. The air cooling (effectiveness) will be as greater as the difference between the dry bulb temperature and the wet bulb temperature increases (the user can also use the value of the corresponding relative humidity).

Therefore, the volume of air absorbs from the evaporated water the required energy (evaporating latent heat), reducing the dry-bulb temperature and increasing the relative humidity up to the maximum value of air saturation. This adiabatic cooling happens without any energy input (excluding pump consumption) and can be seen on a psychrometric chart of air on the constant temperature line of the wet bulb.

The humidification efficiency will never be 100% due to the wind and to the external environmental factors of dispersion. Therefore it will reach 80% for the AFS and 95% for the WFS.



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 150 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.

The AFS has been approved by TUV laboratories in Munich also obtaining the declaration which grants that AFS is a Legionella-free system.



COMPONENTS:

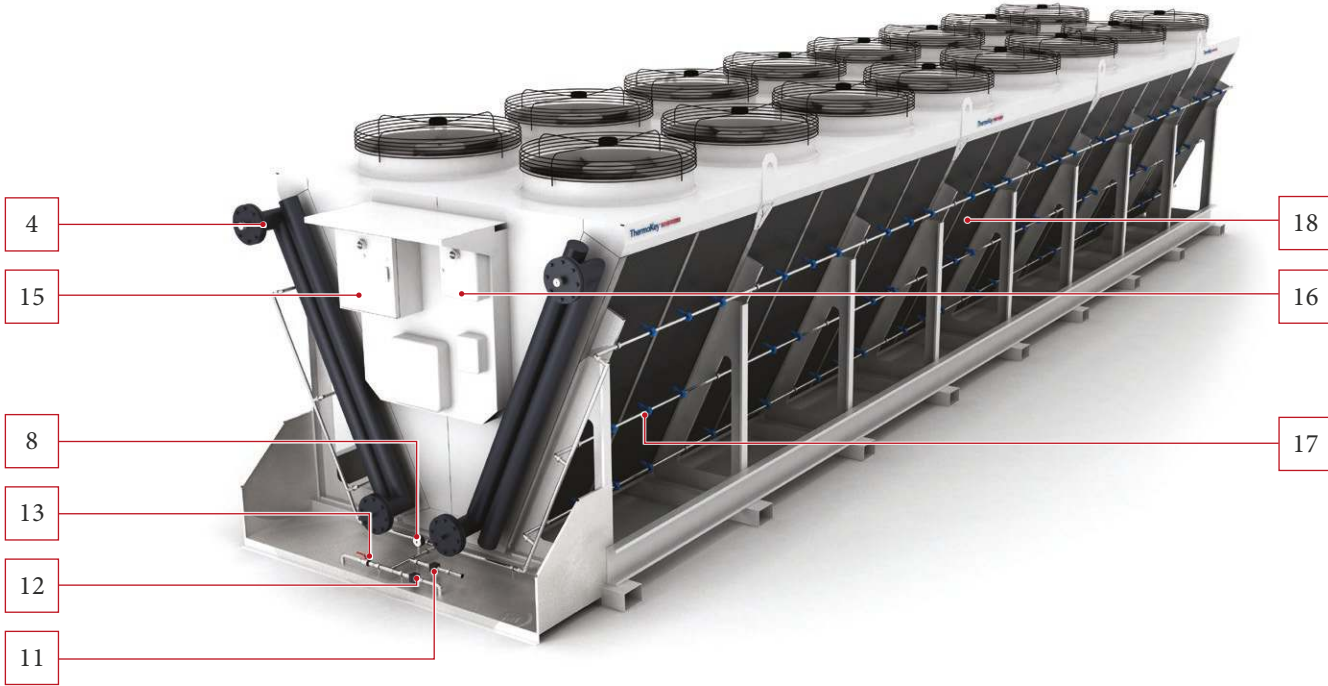
- 1 - Power panel.
- 2 - Speed controller (cut phase, step or inverter).
- 3 - Electrical panel On/Off (Alternative to point 1).
- 4 - Detection probes.
- 5 - AFS power panel.
- 6 - Electronic control card, specially designed for the AFS management.
- 7 - High pressure water pump (10/20 bars), powered by 400V - 3 - 50Hz, complete with the manual setting of operating pressure (to be supplied loose).
- 8 - Manometer.
- 9 - Optimized sets of nozzles for single-fan row units and 6 sets of nozzles for a double-fan row units (2 sets of single row).
- 10 - Copper connection pipe for the complete discharge of the ramps while the AFS is not activated.

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 wether to privilege 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.

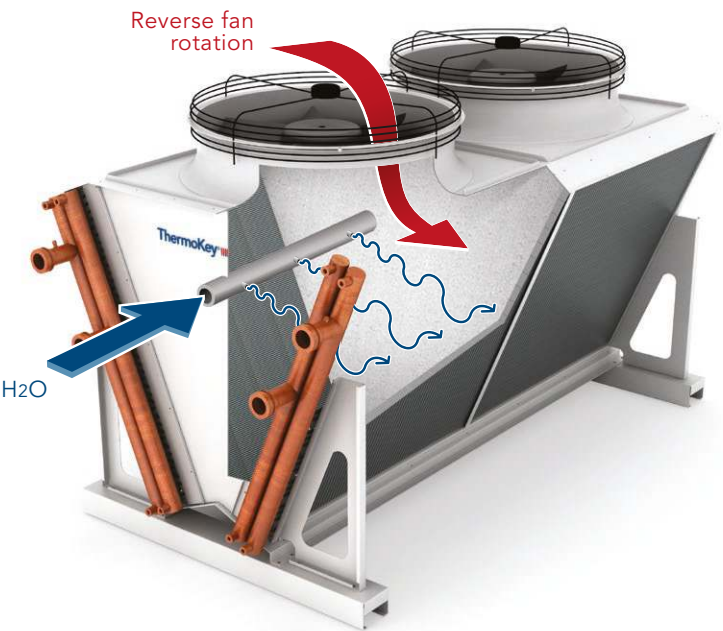
Since WFS systems use water for a high number of hours per year, a black double-layer fin is provided in order to improve the protection of the finned pack.



- 11 - Solenoid valve to control water charge.
- 12 - Solenoid valve to control water discharge.
- 13 - Emergency manual valve.
- 14 - Finned pack heat exchanger with hydrophobic fins (Blue-fins).
- 15 - Power panel + speed control system.
- 16 - WFS power panel.
- 17 - Sets of nozzles (to be defined in relation with the water consumption).
- 18 - Finned pack heat exchanger with black double-layer fins.

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.

EXPANSION TANK



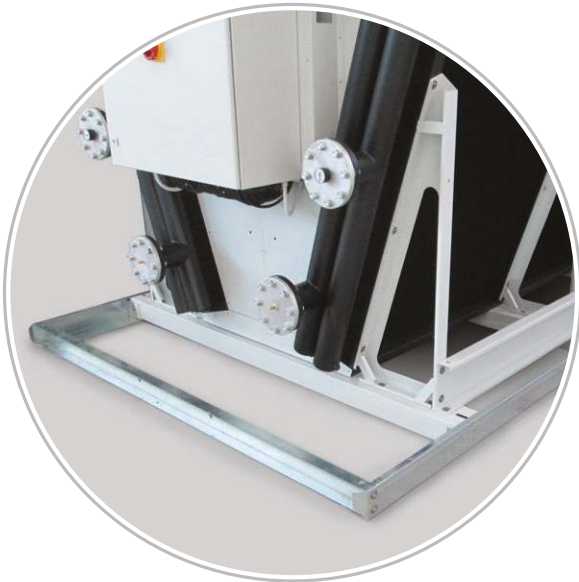
It is possible to provide the expansion tank (for ThermoKey drycoolers) properly sized for the circuit.

INSPECTIONABLE FANS



To improve the inspection and to facilitate the heat-exchanger cleaning on fans side.

CONTAINERIZABLE VERSION



Rails for loading into container are available for V-Type containerizable models.

Casing painting



CASING PAINTING WITH C5M PROTECTION-CLASS

ThermoKey is able to offer the casing painted with a thickness of 240µm to ensure greater durability in very aggressive environments. It means that the highest degree of protection (C5M coastal areas and offshore) according to ISO 12944 is available.

SPECIAL COATINGS

Upon request units can be painted with a specific RAL (different RAL colours available).

Type of fins

ALUMINIUM

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



Direction
Acrobatik

Printed in Italy by
Grafiche Filacorda

AC0116EN

ThermoKey®

Heat Exchange Solutions

ThermoKey Spa
via dell'Industria, 1 - 33061
Rivarotta di Rivignano Teor (UD) - Italy

T. +39 0432 772300
F. +39 0432 779734
info@thermokey.com
www.thermokey.com

