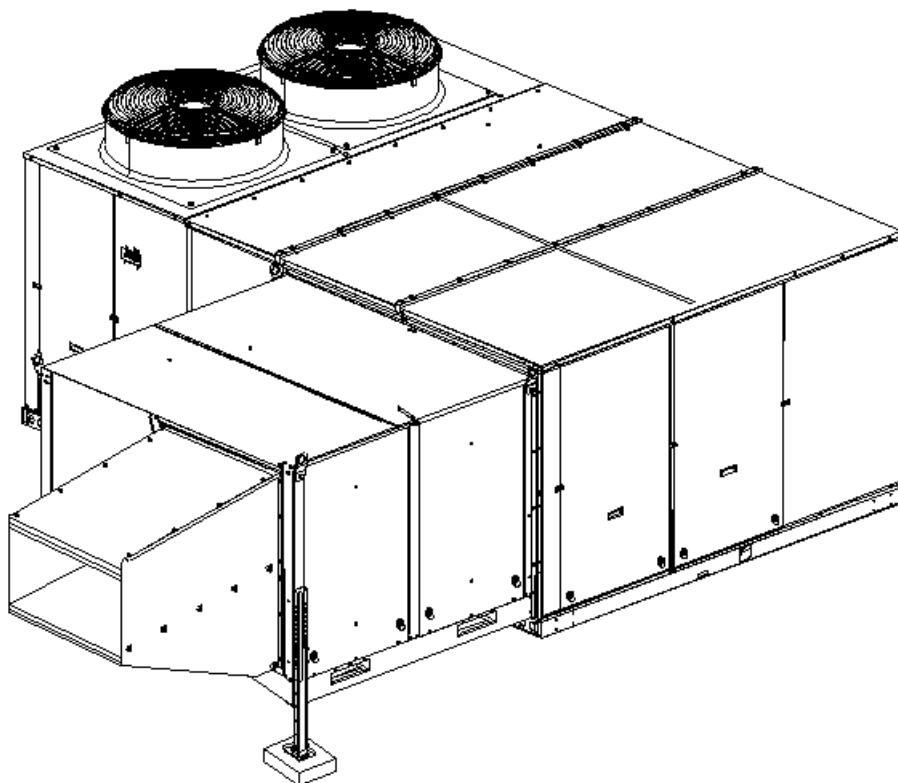




BY JOHNSON CONTROLS

## Energy recovery system for ROOFTOP ACTIVA 045/090



Options and accessories, Installation manual

Ref.: N-40337\_EN 0910



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**Energy recovery system for Roof Top AC-  
TIVA 045/090**

## 1.1 General Description

There are four models of energy recovery system, depending on the size of the Rooftop unit and the renewal air flow required:

Energy recovery system model	ROOFTOP Model	Renewal air flow [m <sup>3</sup> /h]
045 / 060 Q3000	045 / 060	3000
045 / 060 Q6000	045 / 060	6000
075 / 090 Q4500	075 / 090	4500
075 / 090 Q9000	075 / 090	9000

The energy recovery system is connected directly to the side of the Rooftop Activa units and always includes the Economiser and Indoor air quality sensor options.



### NOTE

*Only the vertical air duct can be connected, at the bottom of the Rooftop unit*

Features:

- Rotating sectorised enthalpy wheel recovery system,
- centrifugal fan, belt and pulley transmission on both the air inlet and outlet side,
- Rainhood with drip filters on the air inlet,
- barometric damper on the air outlet,
- G4 air filters as standard on both sides of the enthalpy wheel. F6 and F7 optional,
- height-adjustable support legs,
- all cabinet panels are fitted with heat insulation on the inside.

The enthalpy wheel provides substantial savings by reducing the demand for energy. It is ideal for areas with high or low temperatures and areas with a high level of humidity. Also for areas with a very low level of humidity, in buildings with a humidifying system, as the humidity is recovered from the extraction air and re-introduced into the building.

### Air leakage and bleed sector

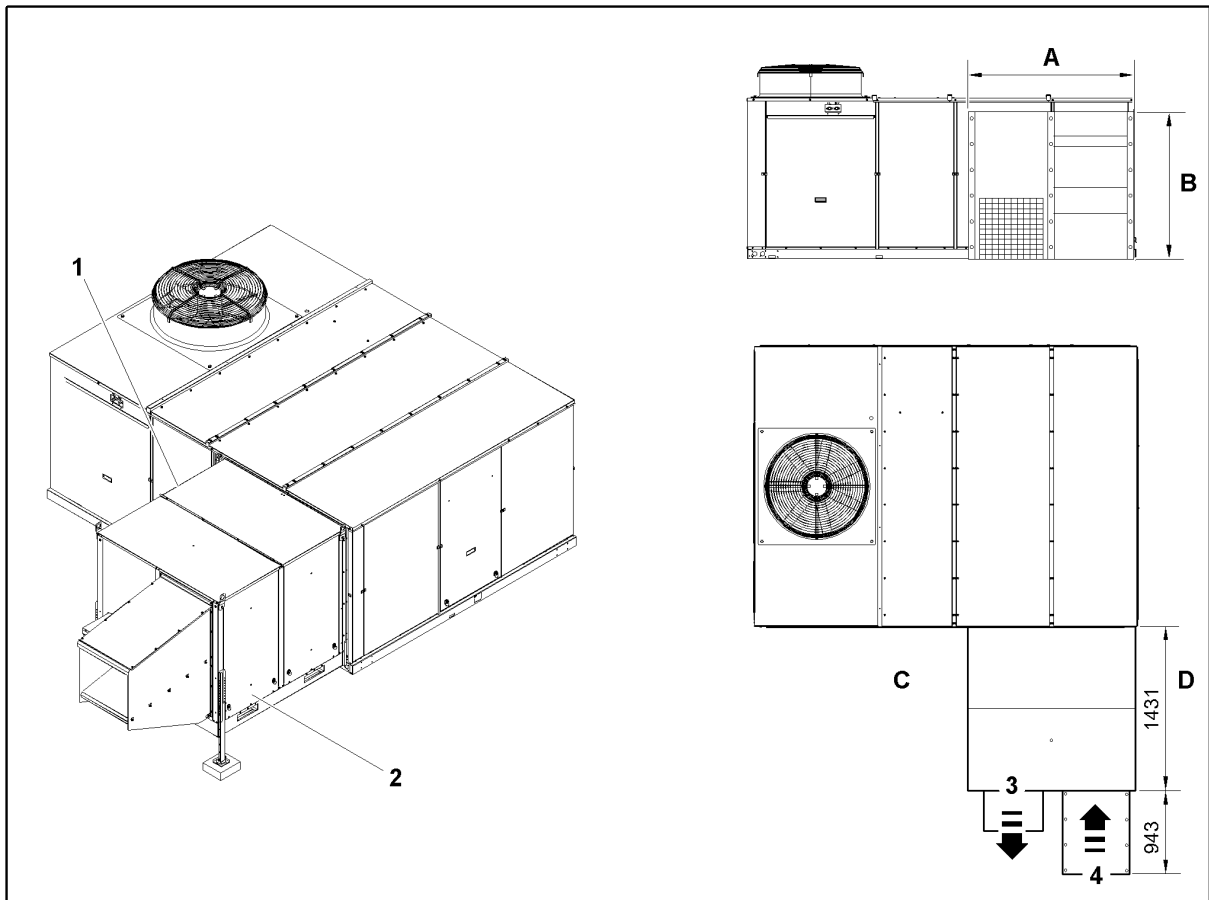
Many rotating recovery systems are fitted with a bleed sector when this is often not necessary. The bleed sector minimises leaks between the extraction air flow to that of the intake air flow by diverting a portion of the latter to the extraction flow through the separator between the two.

This is only necessary in cases of industrial applications where the exhaust air carries contaminants. As a result, the air volume to be moved is 15-20% higher to ensure the required renewal flow, with the subsequent increase in power required in the fan motor.

In residential air conditioning, the renewal air maintains an acceptable air quality and there are no concentrated contaminants to be taken into account.

The leakage of extraction air to the intake air in this energy recovery system is at a value of less than 5%. The resulting cost of moving this volume of air is much lower than in the case of a bleed sector. Do not use this energy recovery system in industrial applications with concentrated contaminants.

## 1.2 General dimensions



1. Extraction side filter access
2. Intake side filter access
3. Extraction
4. Intake

- A. See table
- B. See table
- C. 900 mm clearance
- D. 1525 mm clearance

Model	A	B	Weight [kg]
045 / 060	1365	1324	610
075 / 090	1522	1456	580

## 1.3 Operation

## 1.3 Operation

The enthalpy wheel is centred between the outdoor intake air flow and the extraction air flow. It is the only truly self-cleaning system, as during rotation the air flow moves in opposite directions over each half of the wheel surface.

With the rotation movement at 60 r.p.m., the wheel surface absorbs the sensible and latent energy from the side with the highest temperature and transfers it to the side with the lowest temperature, thus making the exchange between both air flow sides. During the summer cycle, the rotation of the wheel transfers heat and outdoor air humidity (renewal) to the extraction air.

During the winter cycle, the process is the opposite, transferring heat and extraction air humidity to the renewal air.

Where there is no kind of demand (air conditioning or ventilation) and the air quality is correct, the unit is at a standstill.

If continuous ventilation mode is selected and the air renewal selected is less than 30%, only the indoor fan will run. If air renewal of over 30% is selected, the three fans (indoor, extraction and renewal) will run and the enthalpy wheel will turn. When the air quality is incorrect, air renewal will be 100%.

When there is a demand for cold (outdoor air not favourable) or a demand for heat and the air quality is correct, the compressors or the heat support and the indoor fan will start up. If air renewal of over 30% is selected, the exhaust and renewal fans and the enthalpy wheel will also run. When the air quality is incorrect, air renewal will be 100%.

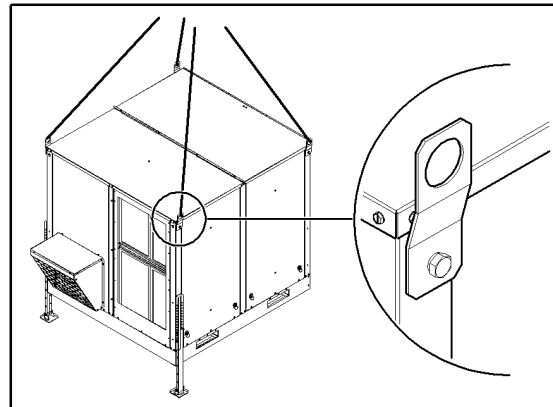
During operation in economiser mode (Free cooling), the enthalpy wheel will stop turning and there will be no exchange, the fans continuing to run to maintain the flow of renewal and exhaust air. If the outdoor air intake is insufficient to meet the demand, a compressor will start.

## 1.4 Assembly

The Rooftop unit must be installed on a Roofcurb mounting base or similar.

The energy recovery system is fitted with lugs for hoisting and handling during the fitting process. To do so:

- 1 Loosen the screw slightly.
- 2 Turn the lug to the correct position.
- 3 Tighten the screw.

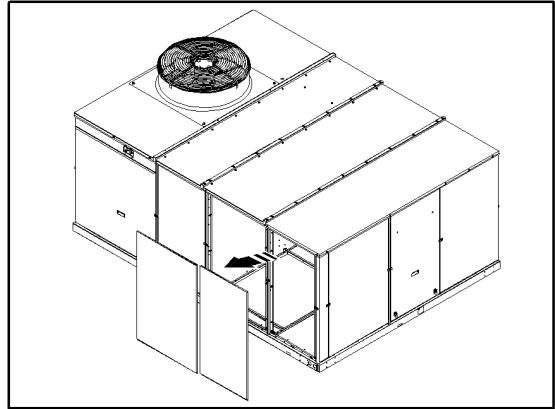


## 1.5 Installation

### Installation process

(First make sure the Economiser and air quality sensor options are installed in the Rooftop unit)

1. Disconnect the power supply to the Rooftop unit.
2. Remove the return and outdoor air side panels.
3. Remove the return air cover on the base.

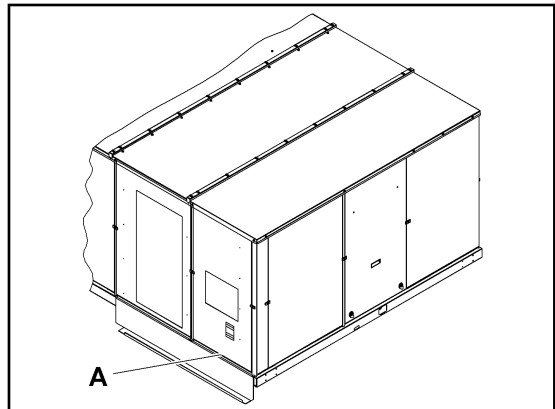


4. Place the support rail in position, aligning the mounting holes with the panel securing holes.

5. Place the return and outdoor air panels (with opening, supplied with the recovery system assembly) in their housing on the side of the Rooftop. Secure using the existing front closures to the posts and edge.

6. Secure both panels and, in turn, the supporting rail, using the bolts in the holes in the original panels of the Rooftop.

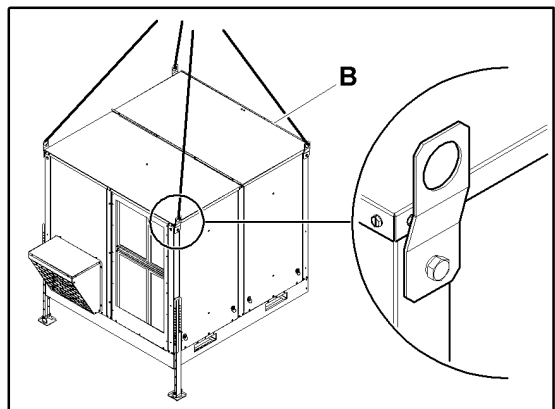
7. Apply a 25 x 25 rubber strip in the area indicated -A-, between the panels and the support rail.



8. Using the handling lugs, slightly lift the recovery system assembly and release the telescopic legs until they are flat on the ground. Replace the bolts but do not tighten.

9. Fit a 20 x 5 rubber strip on the recovery system roof fixing tab to the side panels of the Rooftop -B-.

10. Lift the recovery system assembly and rest it on the supporting rail, facing away from the side panels of the Rooftop.



11. Adjust the legs to the required height and tighten the bolts. A treated piece of wood measuring approx. 50 mm thick x 350 x 350 should be placed below each leg to avoid damaging the roof of the building.

12. Secure the upper panel of the recovery system to the side panels of the Rooftop, using bolts and a sealed washer.

13. Place the seals on both sides of the recovery system and secure using self-threading bolts to the edges of the recovery system and to the panels of the Rooftop.

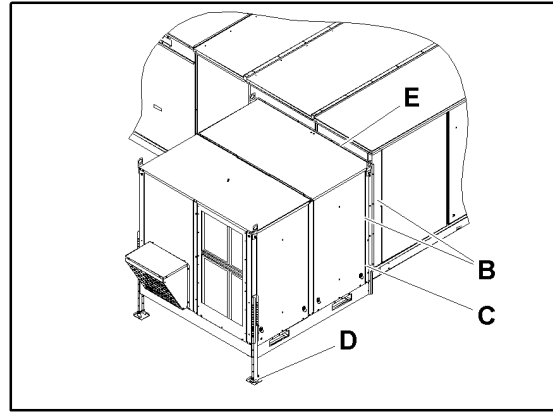
1.5 Installation

B.Silicone.

C. Seals, on both sides.

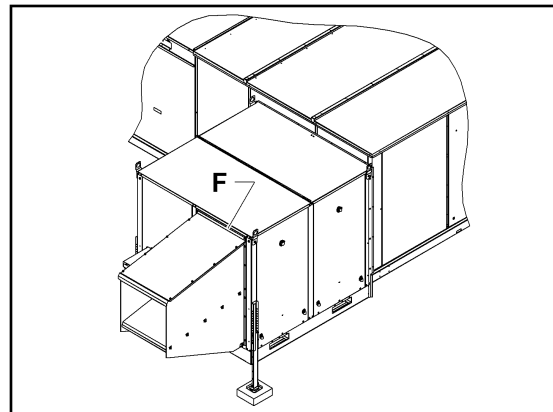
D. Support legs.

E. Silicone.



14. Using a continuous line of silicone, seal the area where the upper panel and the side seals of the recovery system touch the panels of the Rooftop.

15. Install the rain protection assembly (supplied dismantled in separate packaging) on the air inlet according to the instructions included with its packaging. Apply a continuous line of silicone to the area where the upper panel of the protector touches the side panel of the recovery system -F-.





## 1.6 Electrical connections



### CAUTION

*Loose connection terminals produce overheating of cables and terminals. The unit is working incorrectly and there is a risk of fire.*

- 1 The national regulations established must be followed in all cases.
- 2 The power supply to the energy recovery system must be independent to the general power supply to the unit and must be fitted with its own circuit breaker (not supplied).
- 3 Fit the thermal magnetic and residual current circuit breaker in the installation according to the instructions of the electrical specifications table and the wiring diagram.
- 4 Remove the side access panel to the renewal fan to access the electric box. Remove the protective cover and connect the power cable (H05 RN-F type) to terminal strip X1.
- 5 Connect the telephone cable from connector J2 or J3 on board A13 to connector J15 on economiser board A4, which is on the economiser side of the Rooftop.
- 6 Connect the 24 AV (red / white) power sleeve to connector J4 on board A13 and connect with the power cables (580 and 581) on economiser board A4.



### ATTENTION

*If the enthalpy sensor accessory is fitted, do not connect the B17 outdoor sensor*

- 7 Connect outdoor sensor B17 to connector J3 on economiser board A4.
- 8 Recovery system control board configuration. Once the accessory has been fitted, reconnect the power to the Rooftop and the accessory. Check that the green LED (V2) on the control board (A13) remains lit. To search for and configure accessories, press the test button on the YKN2 Open board (A1) located in the electric box of the Rooftop until the red LED lights up. When the search and configuration process starts, the red LED on the board will light up and will remain on until the operation is completed. Once switched off, check that the green LED (V2) on the recovery system board is flashing to indicate that the accessory has been configured.
- 9 There is a potentiometer, P1, on the economiser board (A4) that allows for the damper to be modulated by hand. If the position is over 30%, the three fans (indoor, extraction and renewal) will run and the enthalpy wheel will turn. The economiser dampers and the motors will return to their operating position after 30 sec.

## 1.7 Maintenance

See [General dimensions](#), see on page 3 for dimensions, accesses and minimum clearances.

Check the condition of the air filters on the air inlet and outlet sides once a month.

SIZES AND QUANTITY OF G4 (STANDARD) AND F6 / F7 (OPTIONAL) FILTERS		
Model	Dimensions	Quantity
045/060 G4 Filters (Standard)	48x330x554	8
075/090 G4 Filters (Standard)	48x365x620	8
045/060 F6/F7 Filters (Optional)	97x330x554	8
075/090 F6/F7 Filters (Optional)	97x365x620	8

Check the condition of the aluminium drip protection filters inside the rain protector once a month. Wash with water and a mild detergent if required.

The motors require no maintenance.

Check the condition and tightness of the belts every two months.

1.8 Electrical specifications

### 1.7.1 Enthalpy wheel

An annual inspection of the enthalpy wheel is recommended.

To do so, disconnect the power supply and open the access panels on the air inlet side.

The wheel surface is divided into eight segments.

- 1 Wheel frame.
- 2 Segment fixture.
- 3 Segment retainer.
- 4 Segment.
- 5 Spacer.

If cleaning is required, remove the segments according to the figure and wash with water and a mild detergent.



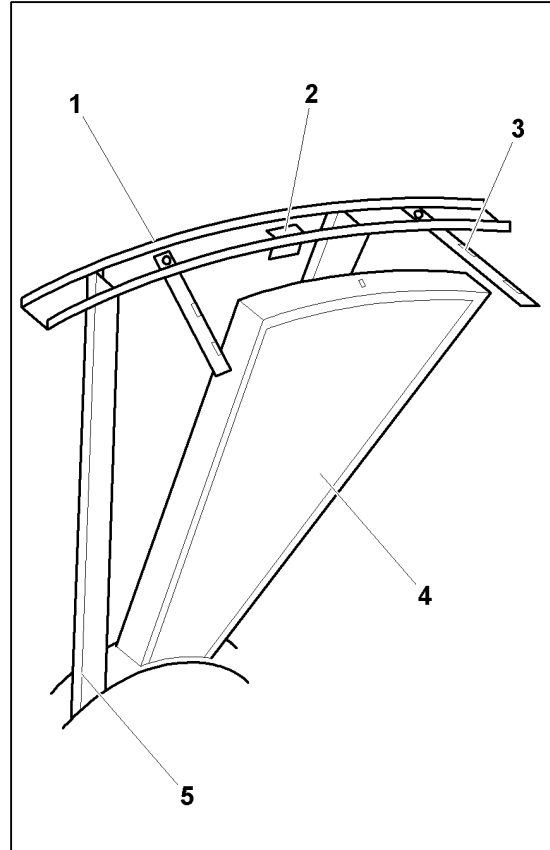
**CAUTION**

*Disconnect the power supply.*

To remove the segments:

- 1 Remove the first segment.
- 2 Turn the wheel slowly 180° by hand and remove the second.
- 3 Turn 90° and remove the third.
- 4 Turn 180° and remove the fourth.
- 5 Continue with the sequence until the eight segments have been removed.

Use the same method to refit the segments.



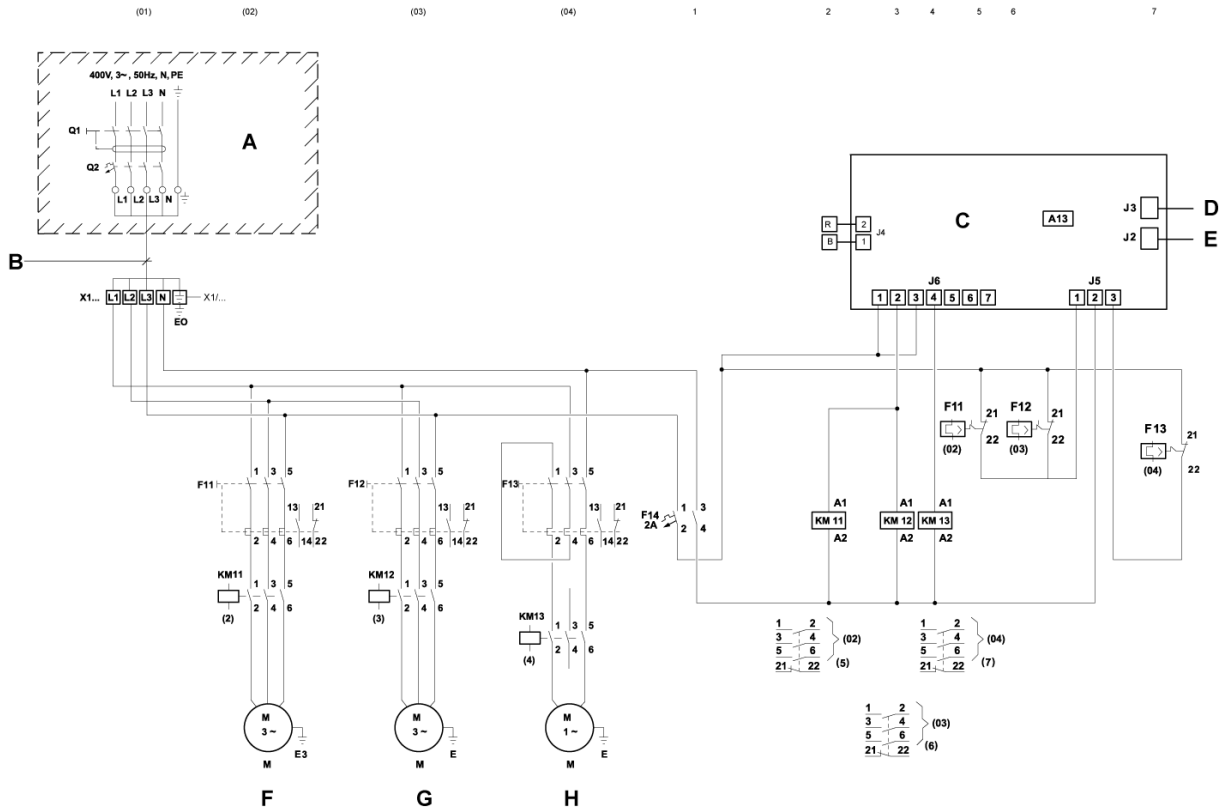
## 1.8 Electrical specifications

Model	Power supply	Standard rating	Rated current	Circuit breaker (1)	Minimum cable cross-section (2)
(Units)	(V.ph.Hz).	(kW)	(A)	(K Curve)	(mm <sup>2</sup> )
045 / 060 Q3000	400.3.50	2.4	6	10	2.5
045 / 060 Q6000	400.3.50	4.6	11.6	16	2.5
075 / 090 Q4500	400.3.50	6.2	14.6	20	4
075 / 090 Q9000	400.3.50	8.2	19.2	25	4

(1) K Curve (DIN, VDE 0660-104).

(2) Based on H05 RN-F-type copper conductors.

## 1.9 Wiring diagram



I-2633b  
045/090



### NOTE

- The components for on-site installation are not supplied by the manufacturer

A		On-site installation
B		Cross-section B [mm <sup>2</sup> ]
C		Electronic board
D	J3	
E	J2	Accessories
F	M	Exhaust fan
G	M	Renewal fan
H	M	Wheel motor

Model	Q2 [A]	Cross-section B [mm <sup>2</sup> ]	F11 [A] REG.	F12 [A] REG	F13 [A] REG
045 / 060 Q3000	10	5 x 2.5	3	3	1.4
045 / 060 Q6000	16	5 x 2.5	5.6	5.6	1.4
075 / 090 Q4500	20	5 x 4	7.3	7.3	1.4
075 / 090 Q9000	25	5 x 4	9	9	1.4