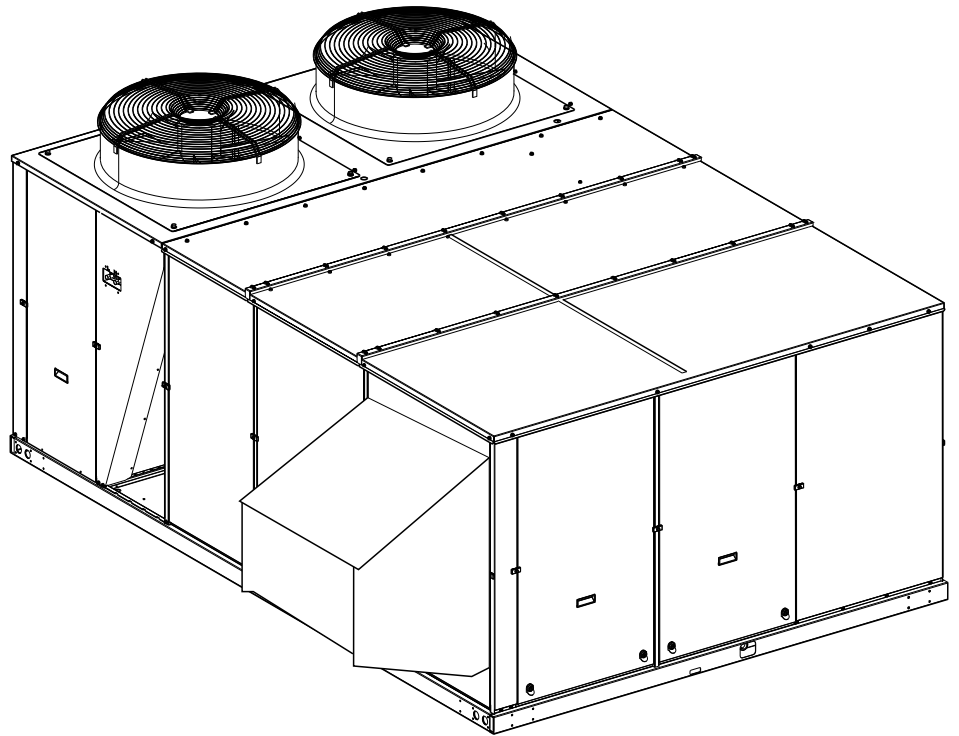




BY JOHNSON CONTROLS

# Economiser (Free cooling) for Roof Top ACTIVA 045-090



**Options and Accessories, Installation manual**

Ref.: N-40300\_EN 1215



## Index

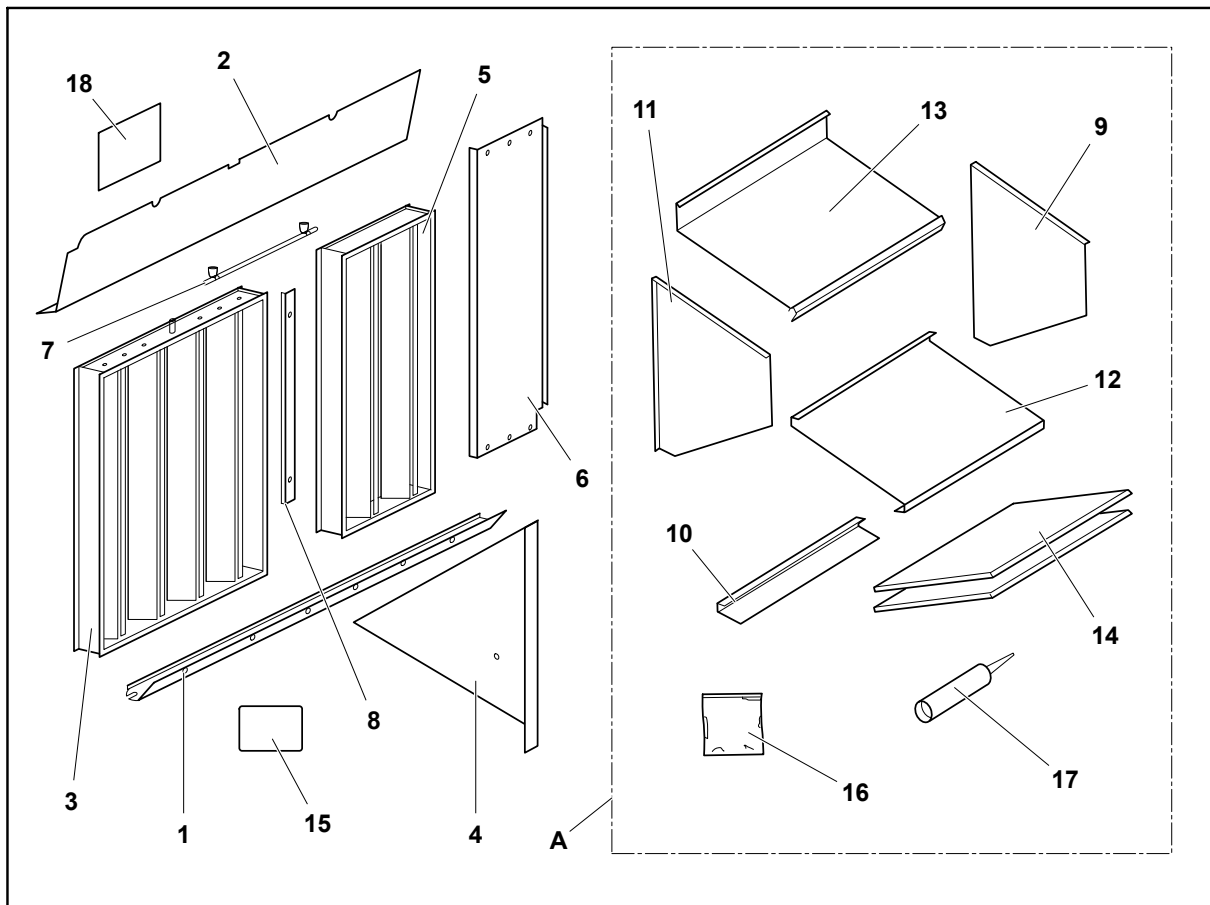
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**Economiser (Free cooling) for Roof Top  
ACTIVA 045-090**

## 1.1 Economiser installation



- |                                          |                                      |
|------------------------------------------|--------------------------------------|
| 1. Lower guide                           | 11. Left protection panel            |
| 2. Front shutter                         | 12. Central protection panel         |
| 3. Return Air (RA) damper                | 13. Upper protection panel           |
| 4. Return air/outside air separator      | 14. Aluminium mesh filters           |
| 5. Outside air (OA) damper with actuator | 15. Electronics and hardware package |
| 6. Side shutter                          | 16. Bag of nuts and bolts            |
| 7. Actuator                              | 17. Silicone container               |
| 8. Mounting counterweight                | 18. Rubber sealing strips            |
| 9. Right protection panel                | A. Rain protection assembly          |
| 10. Lower filter support                 |                                      |

## 1.2 General Information

These instructions provide the necessary information for correct on-site installation of the economiser dampers and the rain protection assembly.

The economiser is located on the inside of the unit's return section.

## 1.3 Technical specifications

This accessory includes the return and outdoor air dampers, the actuator motor with modulating return spring for temperature control (enthalpy sensor optional) and rain protection for the outdoor air intake.

The accessory is formed by:

- Damper assembly with actuator motor and connection kit.
- Temperature sensors for return and outdoor air.
- Control board, plastic separators and protective cover.
- Cable assembly prepared to connect the unit wiring.
- Return/outdoor air zone separator panel (with heat insulation).
- Rain protection assembly, including aluminium mesh filters supplied separately in their own packaging box together with specific instructions for their on-site installation.

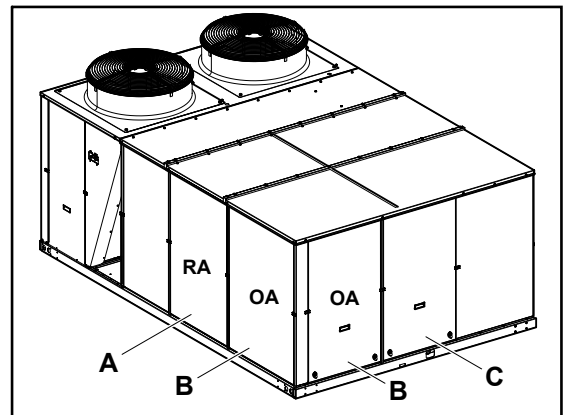
## 1.4 Installation

### CAUTION

*Make sure the filters and the coils inside the adjoining compartment are not damaged when installing the dampers.*

Disconnect the power supply to the unit using the main switch **-Q3-** (See Installation Manual).

Remove the return air (RA) panel **-A-**, the outside air (OA) panels **-B-** and the filter access panel **-C-**.



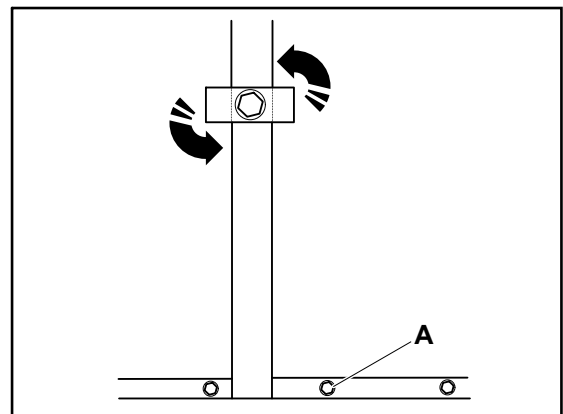
To remove panels not fitted with 1/4 turn snaplocks, remove the screws **-A-** from the bottom of each panel using an 8 mm hexagonal socket screwdriver.

### NOTE

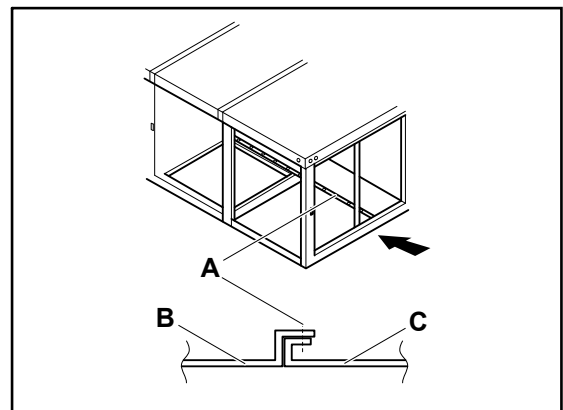
*Keep the O-rings that provide the seal between the panel and the bottom of the unit.*

### DANGER

*If the lower return air duct cover has been removed, cover the opening to avoid personal accidents or damage to the unit.*



Fit the lower guide. To do so, remove the screws **-A-** connecting the outside base **-B-** and the coil side base **-C-**. Save the screws for subsequent refitting.

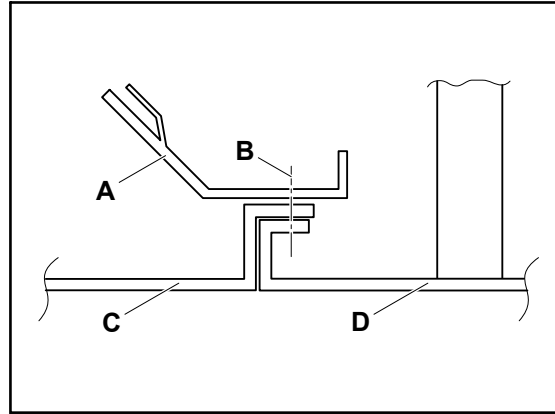


1.4 Installation

Fit the lower guide **-A-** so that the holes in the bottom for the screws **-B-** are facing those in the outside base **-C-** and the coil side base **-D-**.

Use the previously removed screws to secure the lower guide to the tab on the base.

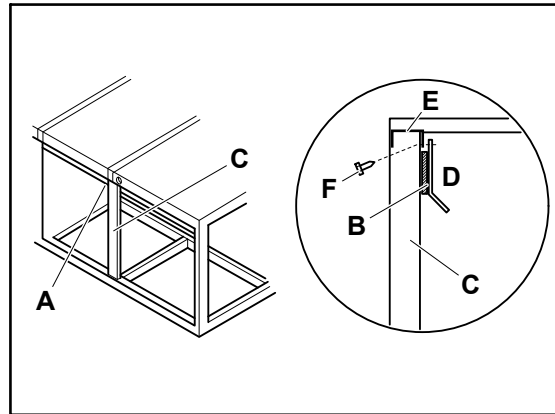
Unpack the RA (Return air) damper and upper front shutter.



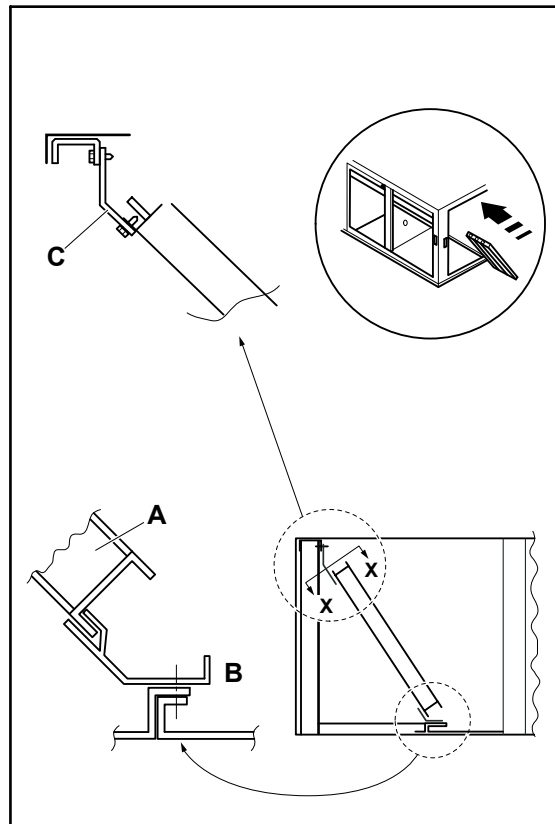
Fit the front shutter **-A-**. To do so, fit the 25 x 3 rubber strip **-B-** supplied to the inside of the post **-C-**.

Inside the unit, line up the holes on the front shutter **-D-** with the holes on the upper rail **-E-**.

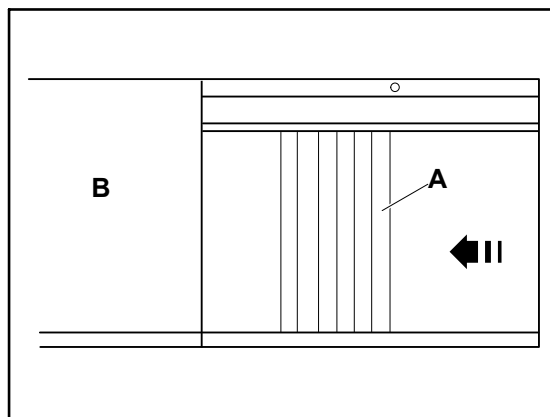
Use the self-threading screws **-F-** supplied from the outside of the unit.



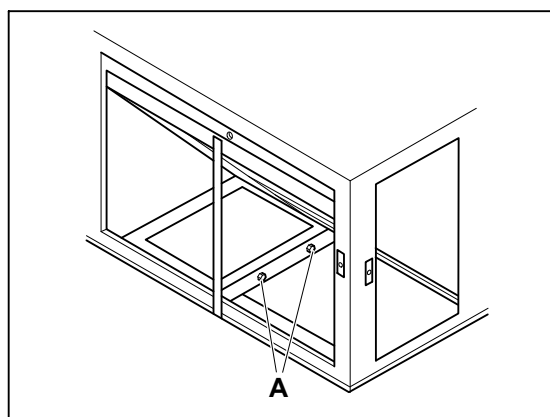
Fit the return air damper. To do so, fit the lower damper frame **-A-** onto the lower guide **-B-** and rest the upper frame on the front shutter **-C-**.



Slide the damper **-A-** towards the inside of the unit until it touches the supply compartment wall **-B-**.



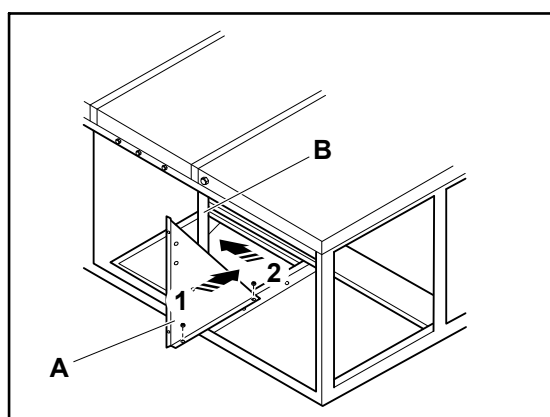
Fit the return air (RA)/ outside air (OA). separating panel. To do so, use an 8 mm hexagonal socket screwdriver to loosen the 2 screws **-A-** on the tab on the base between the return air and outside air compartments. Save the screws for subsequent refitting.



Slide the separator **-A-** to its correct position (flush against the return air damper).

Use the previously removed screws to secure the separator to the tab on the base.

Use three self-threading screws to secure the separator to the inside of the vertical post **-B-**.

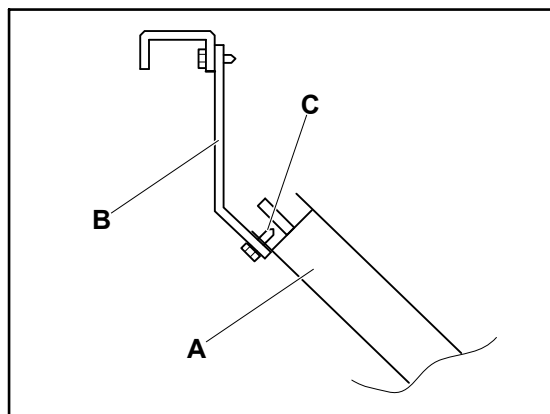


Secure the return air damper **-A-**. To do so, secure the damper to the front shutter **-B-** using the three self-tapping screws **-C-** supplied.



**NOTE**

*The damper does not have to be secured to the lower guide.*



1.4 Installation

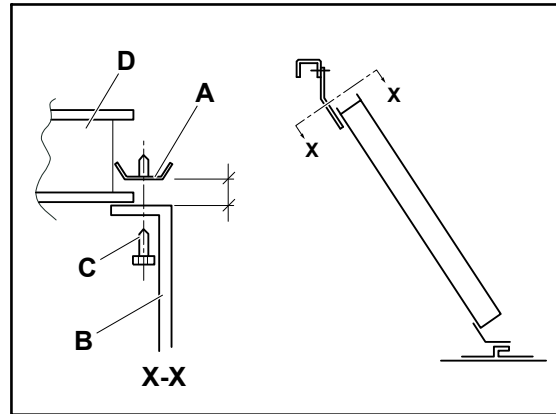
Fit the damper mounting counterweight. To do so, fit the counterweight **-A-**, which includes three riveted nuts, in position as shown in the diagram.

Ensure the riveted nuts coincide with the holes in the separator panel tab **-B-** and fit the M6 screws **-C-** supplied, without tightening.



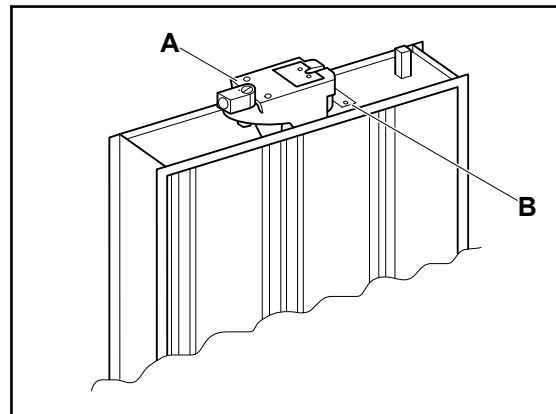
**NOTE**

*The counterweight **-A-** must be loose enough for the subsequent fitting of the outside air damper **-D-**.*



Fit the outside air damper. To do so, place the actuator motor **-A-** on the support plate secured by two screws to the damper frame **-B-**, as shown in the diagram.

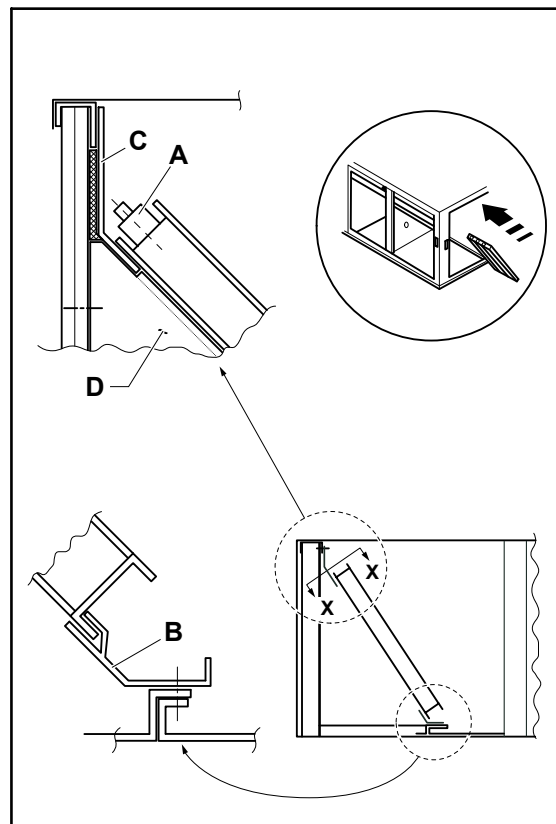
Fully close the louvres and adjust by hand to their opening start point. At this point, secure the actuator motor to the damper shaft and to the frame using its support plate.



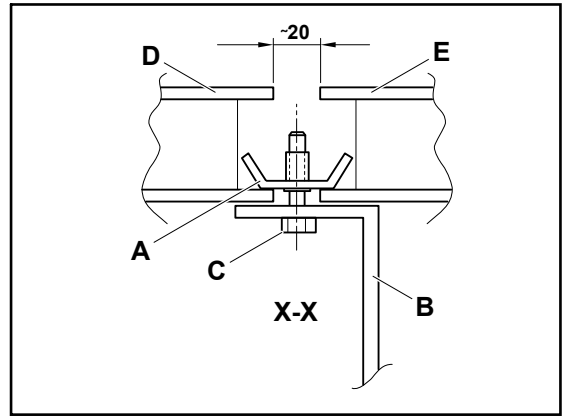
Place the damper assembly inside the outside air zone with the actuator motor **-A-** at the top.

Fit the lower damper frame onto the lower guide and rest the upper frame on the front shutter **-C-**.

Slide towards the inside of the unit until the side frame fits between the mounting counterweight and the supporting side of the separator panel **-D-**.



- A. Mounting counterweight.
- B. Separator panel.
- C. M6 screws.
- D. Return air damper.
- E. Outside air damper.

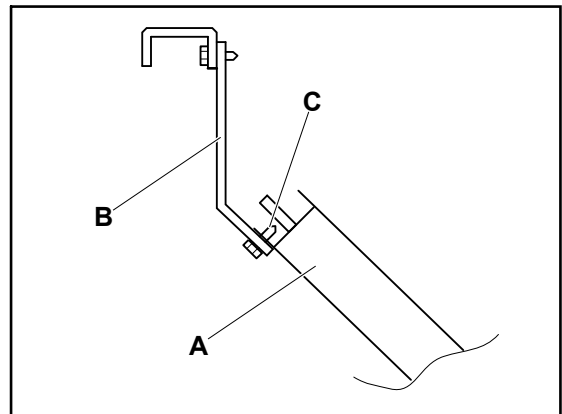


Secure the damper -A- to the upper shutter -B- using the two self-tapping screws supplied -C-.



**NOTE**

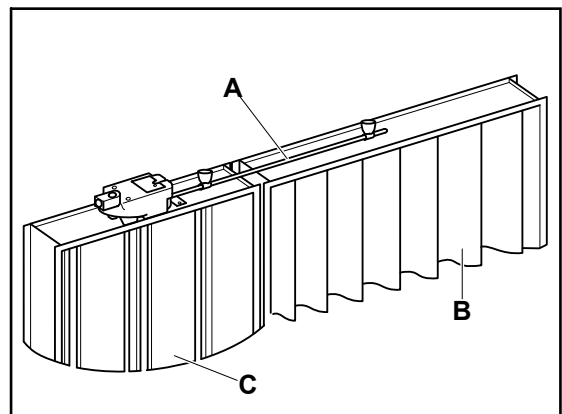
*The damper does not have to be secured to the lower guide.*



Fit the return/outside drive connection. With the actuator on standby and the outside air damper -C- louvres closed, fully open the louvres on the return air damper -B-.

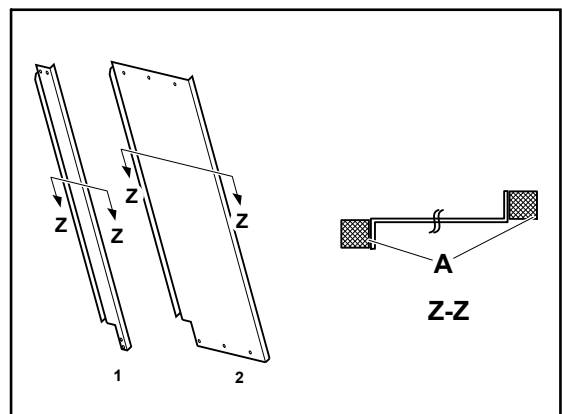
In this position, fit the rods and ball joints to the end of the shaft on both dampers and secure using the existing stud.

Finally fit the connecting rod -A- between both ball joints and firmly secure in position to make sure the louvres work properly.



Fit the side shutter. Before installation, fit a continuous rubber strip measuring 24 x 24 mm -A- along each side of the tabs.

1. Models 045/090.
2. Models 075/090.



1.4 Installation

Fit a continuous rubber strip measuring 25 x 3 **-A-** on the contact area on the front shutter **-B-** and the lower guide **-C-**.

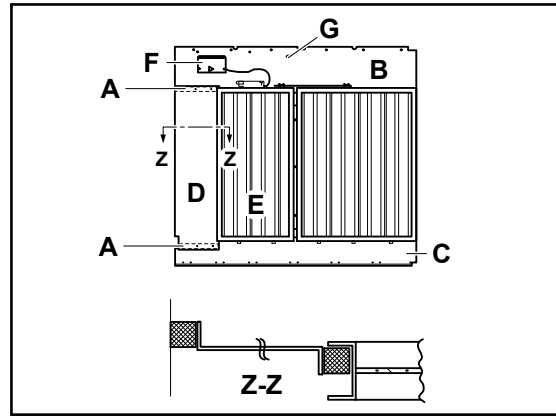
Place the side shutter **-D-** inside the outside air compartment **-E-**, covering the space between the outside air damper and the side of the unit. Secure it using the self-threading screws supplied.

Install the bushing **-G-**.



**NOTE**

*The diagram shows a view from the inside of the unit.*

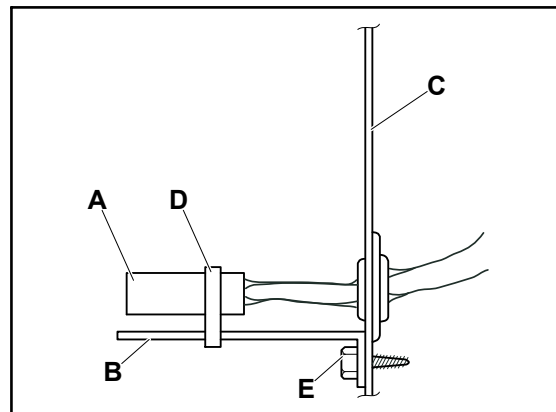


Fit the A4 economiser control board **-F-** to the front shutter at the top of the motor using the four plastic separators supplied.

Connect the economiser cable wires as indicated in the wiring diagram *Wiring diagram*, see on page 12.

- Power cables (J17, 580 and 581),
- accessory communication cable (J16, 700),
- motor cables (R: red, C: black, 0-10 V: grey),
- return sensor (J13: black),
- outside sensor (J3: White).

Fit the return and outside air temperature sensor. Pass the return and outside air temperature sensor **-A-** through the plastic bushing and fit the supports **-B-** for the sensors to the return/outside air separator panel **-C-**, one on each side of its corresponding sensor, using the screws **-E-** and flanges **-D-**.



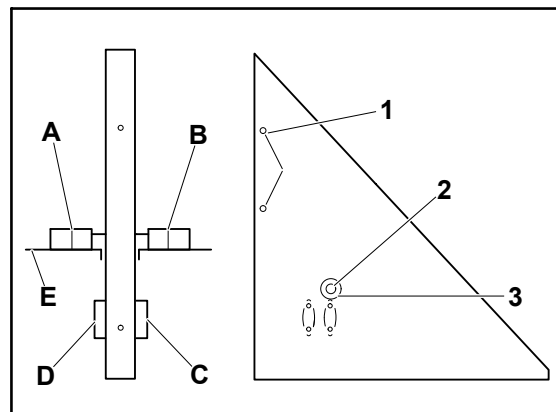
**Installation of the enthalpy sensors, Ref. C7400A (Optional).**

The enthalpy sensors are an optional accessory.

Fit one enthalpy sensor in the holes made on the return side and another on the outside air side using the screws supplied.

Pass the red and white wires from the economiser control board to the sensors and connect them according to the wiring diagram.

- A. Return temperature sensor.
- B. Outside temperature sensor.
- C. Enthalpy sensor OA optional.
- D. Enthalpy sensor RA optional.
- E. Support.



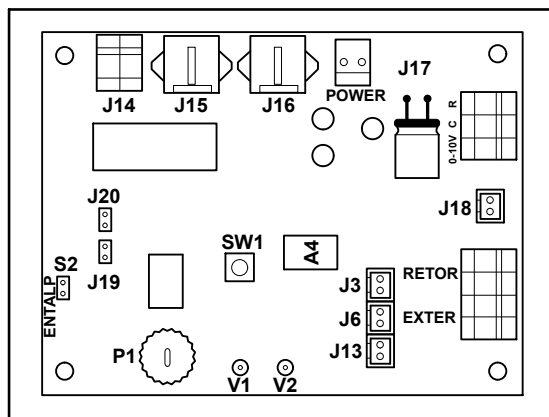
Fit the ENTALP bridge to control board A4.

Disconnect outside sensor B17 (connector J3) and keep return sensor B15 connected (connector J13).



**NOTE**

*The enthalpy sensors must be placed so that their terminals (T: red wire) and (S: white wire) are on the right and the two small sensor deflectors are at the top.*



**Bridge position selection:**

- Bridge J19, open by default: economiser operating. if closed, motorised damper operating.
- Bridge J20, open by default: outside damper closed with high temperature-smoke alarm. If closed, outside damper open with high temperature-smoke alarm.
- ENTALP bridge S2, open by default: operating without enthalpy sensor.

**Configuration of the economiser control board and minimum opening adjustment.**

Once the accessory has been fitted together with the necessary parts, connect the power supply for the unit through main switch Q3 (See Installation Manual).

Check that the green LED (V1) on the economiser control board (A4) remains lit.

To search for and configure accessories, press the test button on the YKN2 Open board (A1) for more than three seconds 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 (V1) on the economiser control board is flashing to indicate that the accessory has been configured.

The potentiometer P1 on the economiser board allows for the damper to be modulated by hand to check its correct working order. The damper will return to its operating position after 30 sec.

Whenever the inside fan is activated, the damper will be open by a certain percentage to renew the air in the room. The factory-set default value is 10%. This minimum percentage can be set using potentiometer P1 or via the communications network. To set it using the potentiometer, set it until the minimum opening required is obtained and then press configuration button SW1 for 3 seconds to save the value.

**Air quality sensor (optional).**

The air quality sensor has a VOC (volatile organic compounds) sensor that compares their concentrations in the air with the setting selected on the sensor. Where the value is higher than the setting, the sensor triggers output Y1 using a relay.

The 230 V AC output signal between Y1 and N is connected to the 230 VAC to 5 VDC conversion board. This board is fitted alongside the economiser control board. The 5 V DC signal cable must be connected when connecting J18 on the economiser board.

Where the thermostat setting temperature of the room is met and there is an air quality request signal, the damper is opened to the programmed renewal minimum and the inside fan starts up. The damper then opens further, bearing in mind the maximum (30 °C) and minimum (12 °C) supply temperatures.

In the following cases:

- Disappearance of the air quality request signal,
- the thermostat makes a cold or heat request

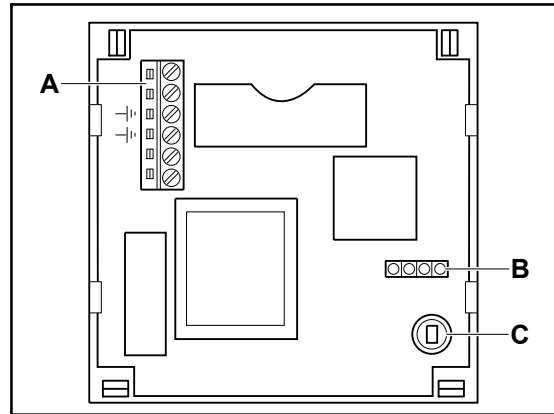
The damper returns to the renewal minimum. Where there is no request from the thermostat and the inside fan is in automatic mode, the fan will stop and the dampers will close.

## 1.5 Operations

- A. Connection terminals.
- B. Air quality level selection.
- C. VOC sensor.

Three air quality levels can be selected on the sensor according to the bridge positions:

- 0: Normal, default position.
- : Acceptable.
- +: Very good.

**Exhaust fan (optional).**

The function of the return exhaust fan is to increase the air extraction capacity of the room. When the outside air damper is open more than 30%, the output of relay K1 on the economiser control board, connector J14, cables 582 and 583, is activated.

See the wiring diagram for details on connections and motor trip switch adjustment.

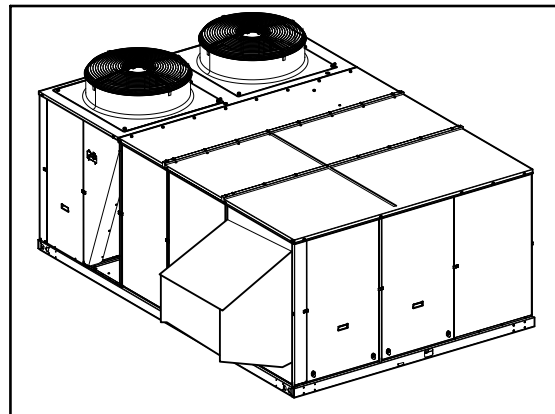
**DANGER**

- *Loose connection terminals produce overheating of cables and terminals.*
- *The unit is working incorrectly and there is a risk of fire. Check that the cables are firmly secured to their connection terminals.*

**Rain protection installation.**

The rain protection must be fitted on the outside air intake when the economiser accessory is fitted.

Consult the instructions included in the rain protection packaging.



## 1.5 Operations

Allows for cold to be generated by modulating the outdoor air inlet damper.

Where conditions are favourable, the yellow V2 LED will be lit up and the damper will be modulated to ensure the supply temperature is 12 °C.

**Favourable conditions.**

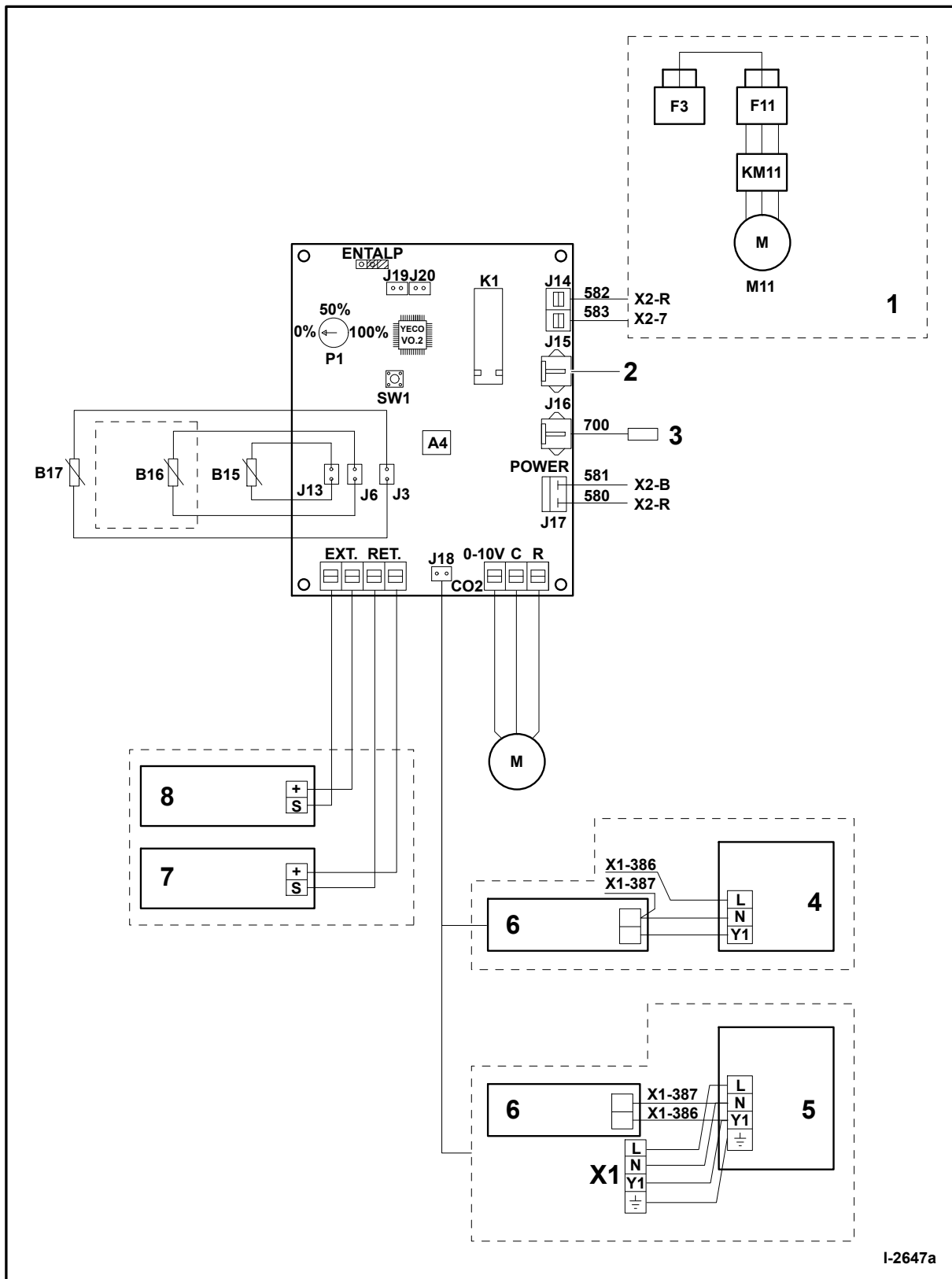
- Temperature mode. Favourable conditions in temperature mode are when the outside temperature is below 20 °C and, in turn, below the return temperature.
- Enthalpy mode. Favourable conditions in enthalpy mode are when the outside enthalpy is 5% below the return enthalpy and the outside temperature is below 20 °C. The sensors must be connected and a bridge fitted to S2 for the unit to run in enthalpy mode. Incident 4, 1, 5 is indicated if the enthalpy sensors are faulty.

The yellow LED on the board will be switched off when conditions are not favourable. Whenever the inside fan is activated, the outside damper will be open by a certain percentage to renew the air in the room (10% by default, adjustable value).

In the winter cycle, if the thermostat requests heat and no heat stage can be enabled, e.g. due to a fault, the damper will remain closed with the inside fan activated.

Where a fault is detected on the inside fan by YKN2 Open , the outside air damper is fully closed.

## 1.6 Wiring diagram



1.	F11	Optional <ul style="list-style-type: none"> <li>• Reg. 2,5 A (017, 022).</li> <li>• Reg. 5,5 A (032, 040).</li> <li>• Reg. 1,4 A (045, 060).</li> <li>• Reg. 3A (0,75, 090).</li> </ul>
	KM11	A1 to X2-7 (Cable 583) A2 to X2-B
	M11	Exhaust fan
	X2-R	24 VAC Phase-R switching
	X2-7	To A1 from KM11
2.	Accessories	
3.	Accessories	
4.	Air quality sensor, optional, fitted on return (inside machine)	
	L	Black
	N	Blue
	Y1	Brown
5.	Air quality sensor, optional, fitted on ambient (machine exterior)	
	L	Black
	N	Blue
	Y1	Brown
	$\frac{\perp}{-}$	Yellow-Green
6.	Air quality board (green)	
7.	Enthalpy sensor C7400A return, optional	
	+	Red
	S	White
8.	Enthalpy sensor C7400A outside, optional	
	+	Red
	S	White
B15	Return sensor (black)	
B16	Discharge sensor, optional depending on model (yellow)	
B17	Outside sensor (white)	
M10	Damper	
	0-10 V	Grey
	C	Black
	R	Red
X1	Cables to be installed on site (not supplied)	

Data and measurements subject to changes without prior notice.