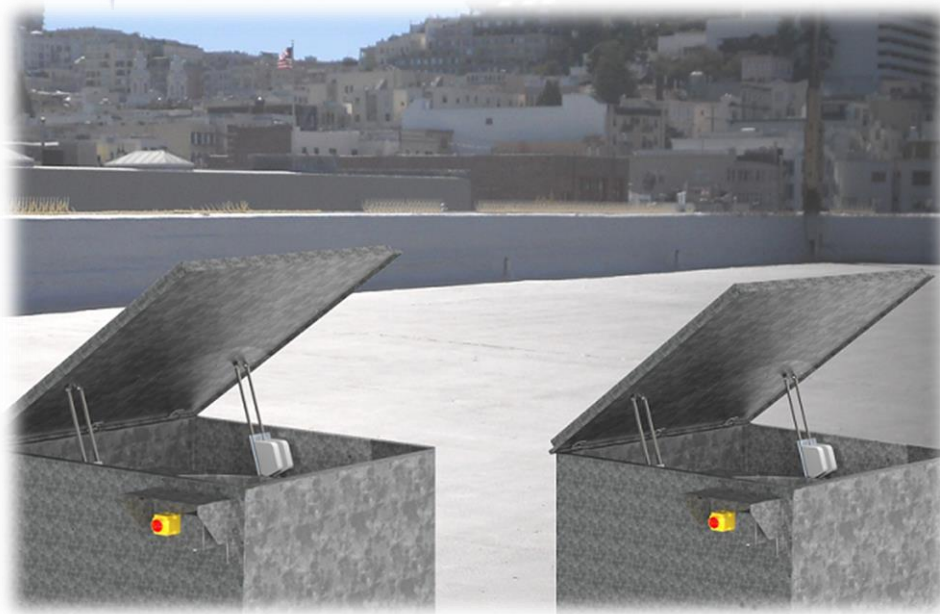


FRB - HATCH FAN

Installation and operating guide

NT-01-01-D



EC Machinery Directive 2006/42/CE
Electromagnetic Compatibility Directive 2014/30/UE

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1. General safety information

a. Definition and notes

 DANGER	Failure to comply with this warning leads directly to death or to serious bodily harm.
WARNING	Failure to comply with this warning potentially leads to death or to serious bodily harm.
IMPORTANT	Failure to comply with this warning potentially leads to moderate injuries.
NOTES	For the entire document, "NOTES" is to draw attention on useful information or of concerned elements.

b. General information

DANGER	<p>This device is using electricity for working. The non-respect of warning or instruction contained in this manual could lead to serious injuries or important material damages.</p> <p>Only trained or qualified personnel having a perfect knowledge of security and safety rules is allow to work on this device.</p> <p>The correct functioning of this device is supposed that the handling, installation, usage and maintenance with respect to the rule</p>
WARNING	This device must be used as conditions specified by AREM. All unauthorized modifications and usages of spares parts, ancillaries, which are not sold or recommended by AREM could lead to fire, failure, electric shock and its consequences.
IMPORTANT	<p>This guide must be kept with the device and permanently available at the place of use. All operating and measuring tests on the working device must be carry out with safety rules in respect to the country where this device is installed.</p> <p>It is recommended to use appropriate tool for any intervention or operation. Before the installation and using this device, please read the following safety and security instruction of the manual. Additionally, please refer to all warning labels present on the device. Warning labels must not be hidden and must be replaced when damaged or invisible.</p>
Qualified personnel	In this manual, a "qualified personnel" is a person who is familiar with the installation, the assembling, the startup and operating of the device with the risk generated.

2. Transport, handling and storage

a. Transport and unpacking

The FRB (hatch fan) is delivered on pallet. We recommend transporting the FRB to the installation site in its original packaging. All impacts or collisions must be avoided in order not to damage it. Storing or stacking on the FRB is not allowed.

In case the FRB is transferred on site, please ensure it is properly immobilized and protected of any movement before transport. Handle with care to avoid risk of accident. All handling operations have to be done with proper lifting equipment and check the stability of the pallet or crate before lifting up.

IMPORTANT:

The period of warranty of the FRB is start from the delivery date and cover the malfunctioning due to the assembling or manufacturing from factory and other material defaults.

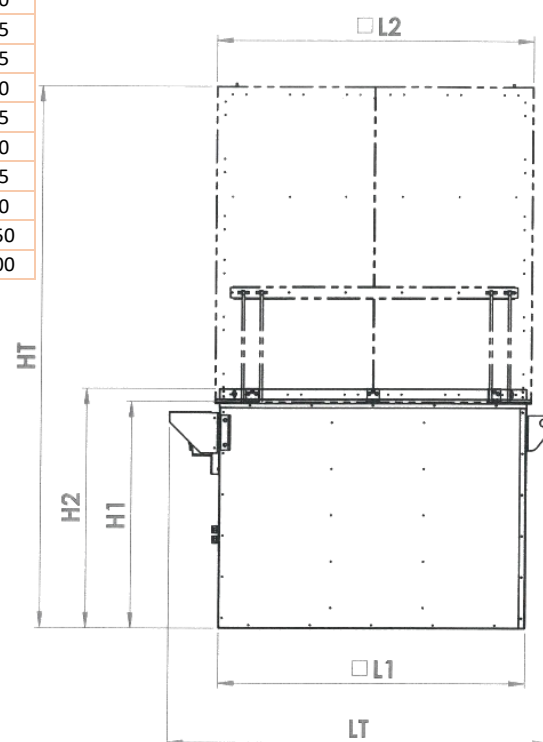
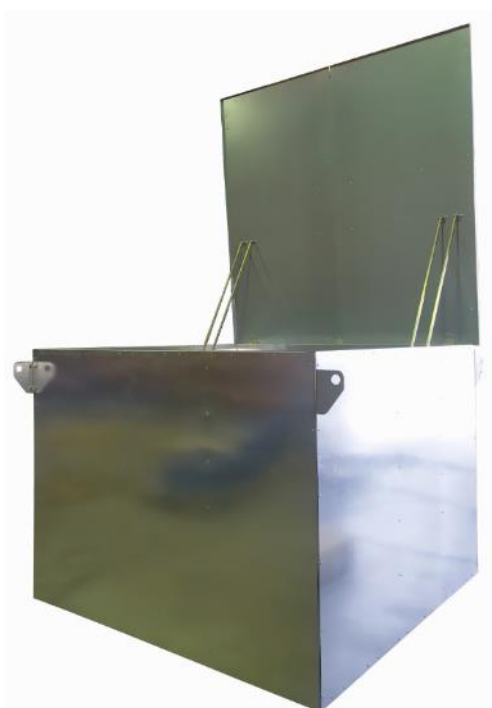
At the reception of the FRB, overall check the number, internal and external appearance. All non-conformities due to transport conditions have to be reported immediately on the transport receipt and confirm by recommended letter with prove of receipt and have to be notified to AREM.

b. Handling and storage

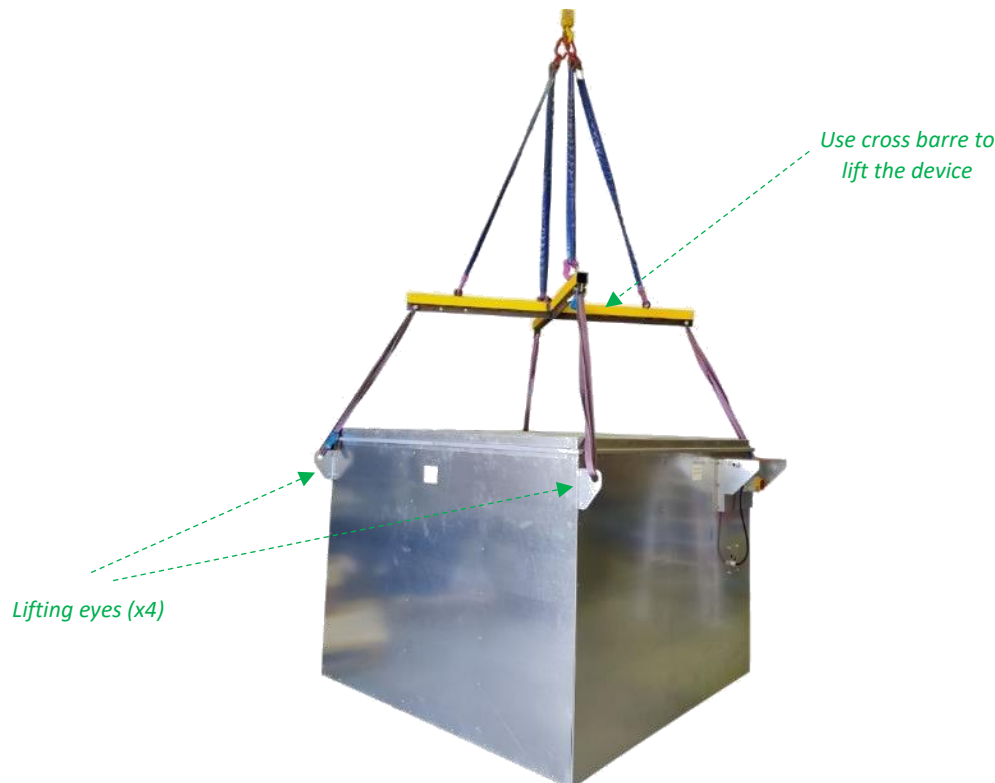
FRB models dimension and weight are as below:

Size	Hatch	D	□L1	□L2	LT	H1	H2	HT	Wt. *
Small	FRB-S0400	Ø 400	955	990	1315	900	965	1880	190
	FRB-S0450	Ø 450							200
	FRB-S0500	Ø 500							285
	FRB-S0560	Ø 560							295
Medium	FRB-M0630	Ø 630	1205	1240	1565	1100	1165	2335	360
	FRB-M0710	Ø 710							375
	FRB-M0800	Ø 800							450
Large	FRB-L0900	Ø 900	1495	1540	1855	1100	1165	2635	595
	FRB-L1000	Ø 1000							720
XLarge	FRB-X1120	Ø 1120	1805	1850	2165	1355	1415	3173	1050
	FRB-X1250	Ø 1250							1100

* Dimensions are in mm; Weight (in kg) of FRB is with fan based on possible maximum weight.



Remove all plastic films or envelops, if sharp tool is use for removal, please do with care to avoid scratch on the metal or painted surface of the device. Untighten all screws that retain the device on the pallet or wooden crate. Lifting eyes (x4) are mounted on the device and have to be used for handling operation.



Example of device lifting

WARNING:

All lifting equipment are under the responsibility of the installer. It is important to check the equipment is in good condition before lifting up the device. If there are any doubts, make it verify by an appropriate service. The device can only be lift by the lifting eyes points. All others lifting points or methods solution are not allowed.

NOTES:

The device must be store inside, keep away from dust, shock or collision, bad weather conditions and kept with its original packing.

It is recommended not to store the device close to any vibration source to preserve the motor bearings, the actuators and bolts-screws.

It is recommended to store the device at the temperature from -10 °C to +45 °C and avoid humidity superior to 90%.

In the case of long storage period, it is advised to manually open the hatch and rotate the impeller to avoid marking point on bearings.

All sharp edge of the device should be isolate to avoid potential accidents.

3. Installation and start up

WARNING:

The installation must be done by qualified personnel or technically educated person. AREM declines all responsibilities in case of non-respect of the rules and instructions.

Proceed to the checking of following points prior to installation:

- Check the roof and loading capacity to ensure it is strong enough to support the total weight of the device.
- The FRB has to be mounted on flat surface or through the roof with a support frame.
- The access and security of the roof area on site.

a. FRB Description

FRB assembling with main parts and example of installation position

1: Thermal and acoustic insulated wall

2: Pre-mounted axial fan

3: Fan case support plate

4: Motorized actuators

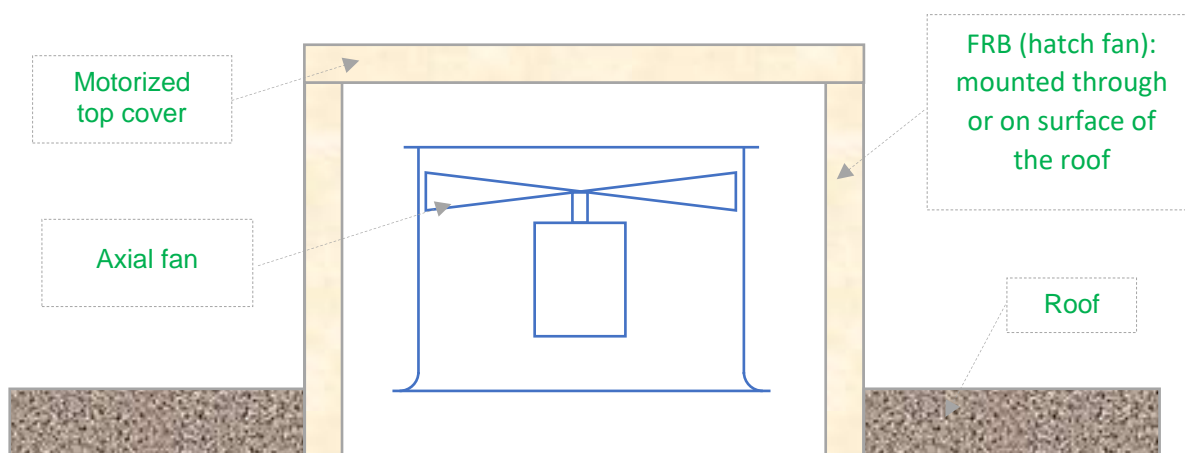
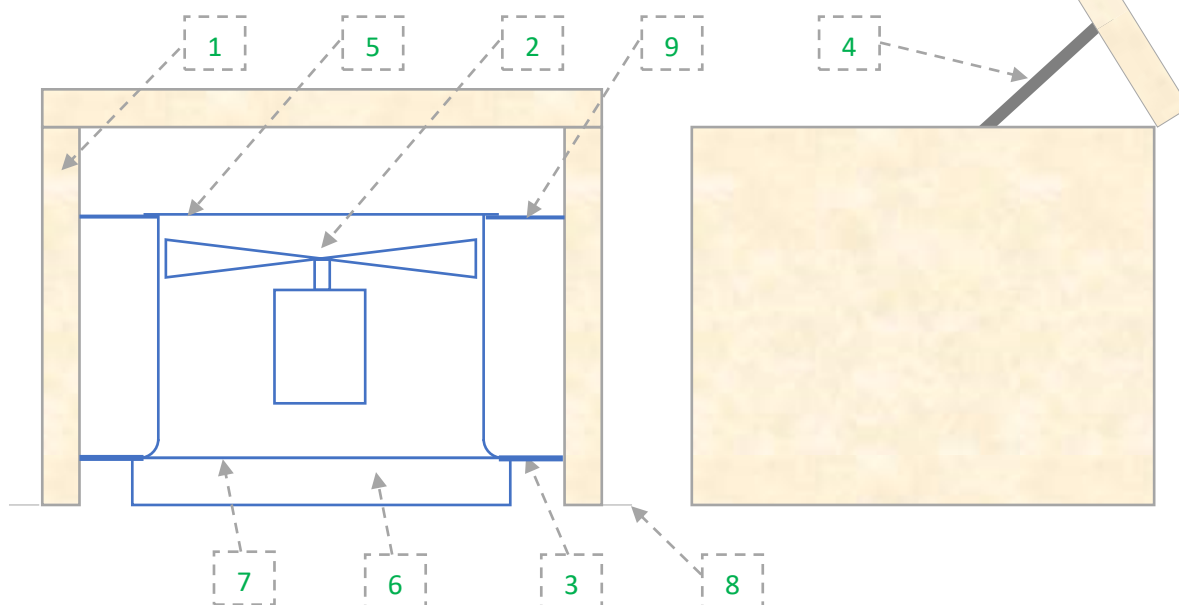
5: Outlet guard (optional)

6: Flange ring

7: Inlet guard (optional)

8: Fixing points

9: Stabilized reinforce plate



b. Installation

- Clean the mounting surface or frame where FRB will be in contact.
- Put in place the FRB and ensure the contact surface between FRB and the roof or frame is stable.
- Fix standard mounting kit provide with the FRB to the roof.
- Check all bolts are properly tighten.
- Seal around the FRB with sealing or silicon seal to stop water penetration inside (not provide with FRB).
- Connect flexible or rigid duct (not provided with FRB) to the fan inlet flange.

IMPORTANT:

FRB must be vertically installed (air stream jet is vertical). Fan configurations standard exist for type A, B, C or D.

- Type A: Free inlet / free outlet
- Type B: Free inlet / ducted at the outlet
- Type C: Ducted at the inlet / free outlet
- Type D: Ducted at the inlet and outlet

In the case of FRB, only type A and C are allowed

NOTES:

FRB has been designed for roof mounted surface. Specific cases have to be reviewed, studied and agreed with AREM in order to finding adequate solutions. Please contact the AREM's commercial team.

c. Electrical wiring

DANGER:

Power off main service switch before proceeding to wire connection and ensure that no one can power on the electrical installation without authorization of personnel service. All electrical connections are in accordance to the valid regulation and only made by trained electrician or qualified personnel.

➤ Axial fan:

FRB can be provided with a standard or customized fan for functioning to a specific duty air flow/pressure. The fan is wired to ON/OFF switch mounted on the outside of FRB. Depend on the requirement, single or double speed, ambient or high temperature working...etc., appropriate cable is wired to the switch. User will have to connect electrical supply to ON/OFF switch only, see Appendix A and B. If sensors (PTC or PTO) is available, wire it to the junction box.

WARNING:

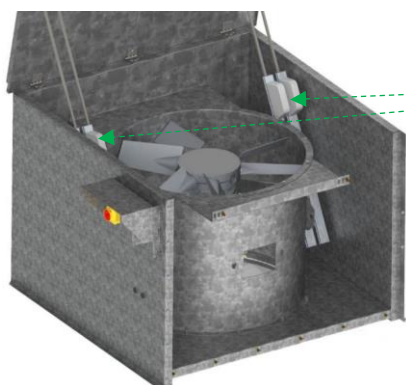
By default, fan motor electrical coupling is done for 380-400V voltage. User must not modify the coupling without consulting and reporting to AREM for authorization on proceeding to modification.

➤ Actuators:

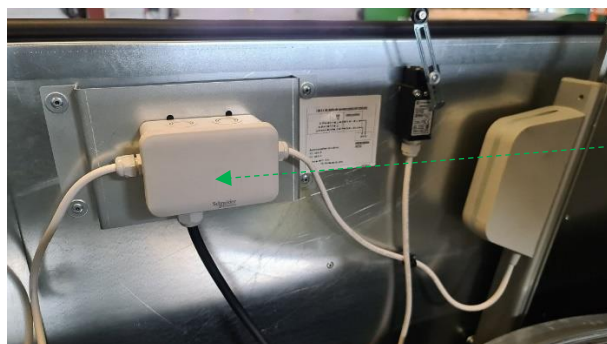
The FRB top cover is motorized with 24V DC supply to the actuators. They are synchronized each other's and wired to a junction box inside of the FRB then connected to ON/OFF switch mounted on the outside of the FRB. A label is shown on the switch for connection of 0V DC and +24DC (OPEN). Inverting 0V<->24V DC will invert to CLOSE position and respectively. User will have to connect electrical supply to ON/OFF switch and have a polarity control system to operate the hatch (out of AREM supply).

WARNING:

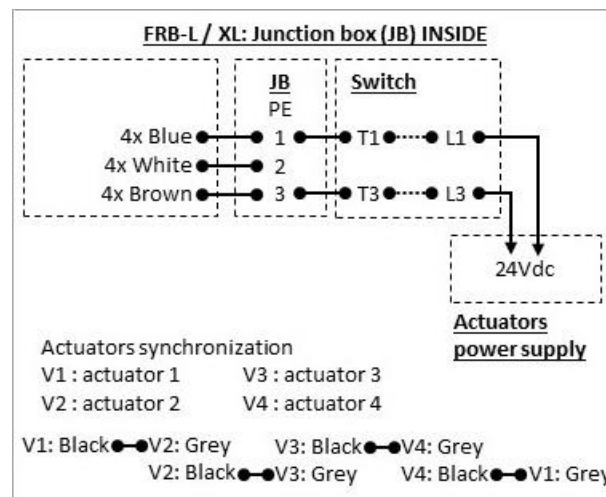
The actuators are wired in AREM factory and should not be modified whatever the reason. User must consult and report to AREM for authorization on proceeding to the modification.



FRB	Number of actuator	Max. current per actuator
S	2	1.5A (Total = 3A) / 24Vdc
M	2	1.5A (Total = 3A) / 24Vdc
L	4	1.5A (Total = 6A) / 24Vdc
XL	4	1.5A (Total = 6A) / 24Vdc

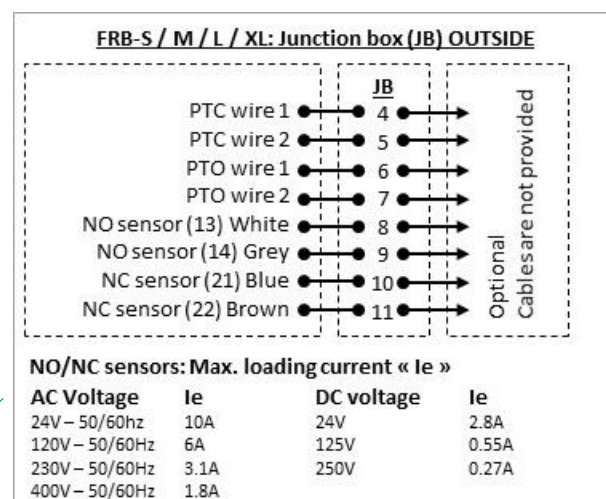


Interior junction box

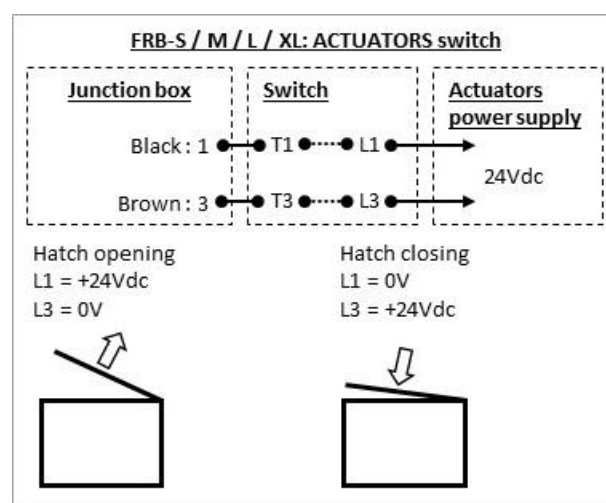


Optional ancillaries:

- PTC
- PTO
- NO/NC sensor for the opening/closing hatch position



Exterior junction box + actuators switch



d. FRB open-close control (OPTIONAL available modules)

A list of optional modules is available to be used with FRB. User has the possible configuration modes (single or multiple) with manual or monitoring open-close of the hatch. Please refer to Appendix C-1 to D-1 for configuration diagrams and contact AREM team for details.

➤ Manual open-close control



Power supply unit (4A) and push button to control the open-close of the hatch of Small or Medium size



Power supply unit (20A) and push button to control the open-close of the hatch of Large or XLarge size

➤ Monitoring open-close control



Smoke and ventilation control panel (8A, 13A, 20A) are used with accessories to monitor open-close of the hatch of FRB Small, Medium, Large and XLarge

e. Motor electrical coupling

DANGER:

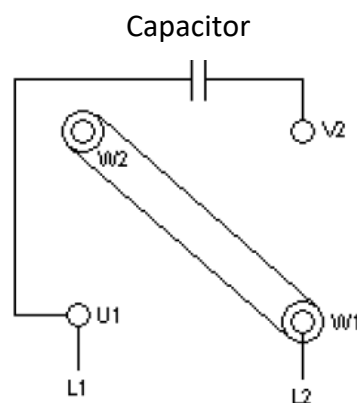
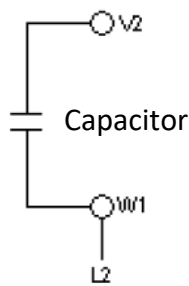


Power off main service switch before proceeding to wire connection and ensure that no one can power on the electrical installation without authorization of personnel service. All electrical connections are in accordance to the valid regulation and only made by trained electrician or qualified personnel. Below are shown the basics existing motor couplings:

- **Single phase motor 230V:**

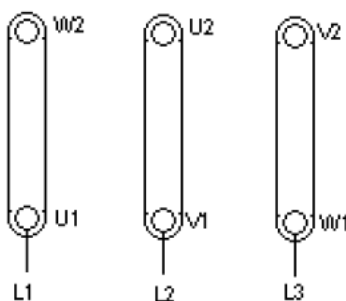
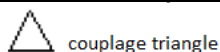


Left rotation

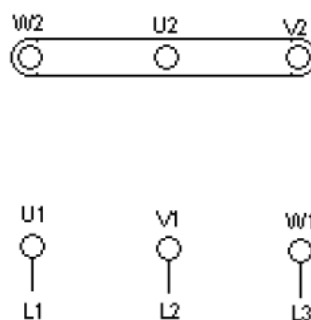
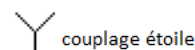


Right rotation

- **Three phase motors 230/400V - One speed (DOL, direct on line):**

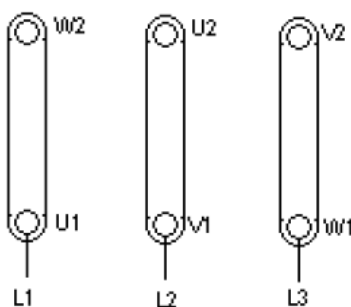
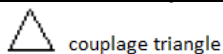


Lower voltage: 230V

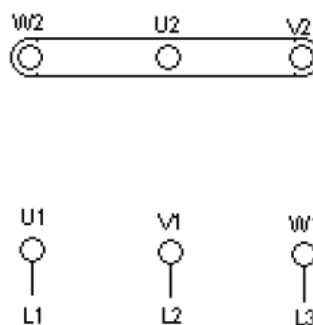
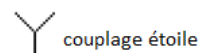


Upper voltage: 400V

- **Three phase motors 400/690V - One speed (DOL, direct on line):**

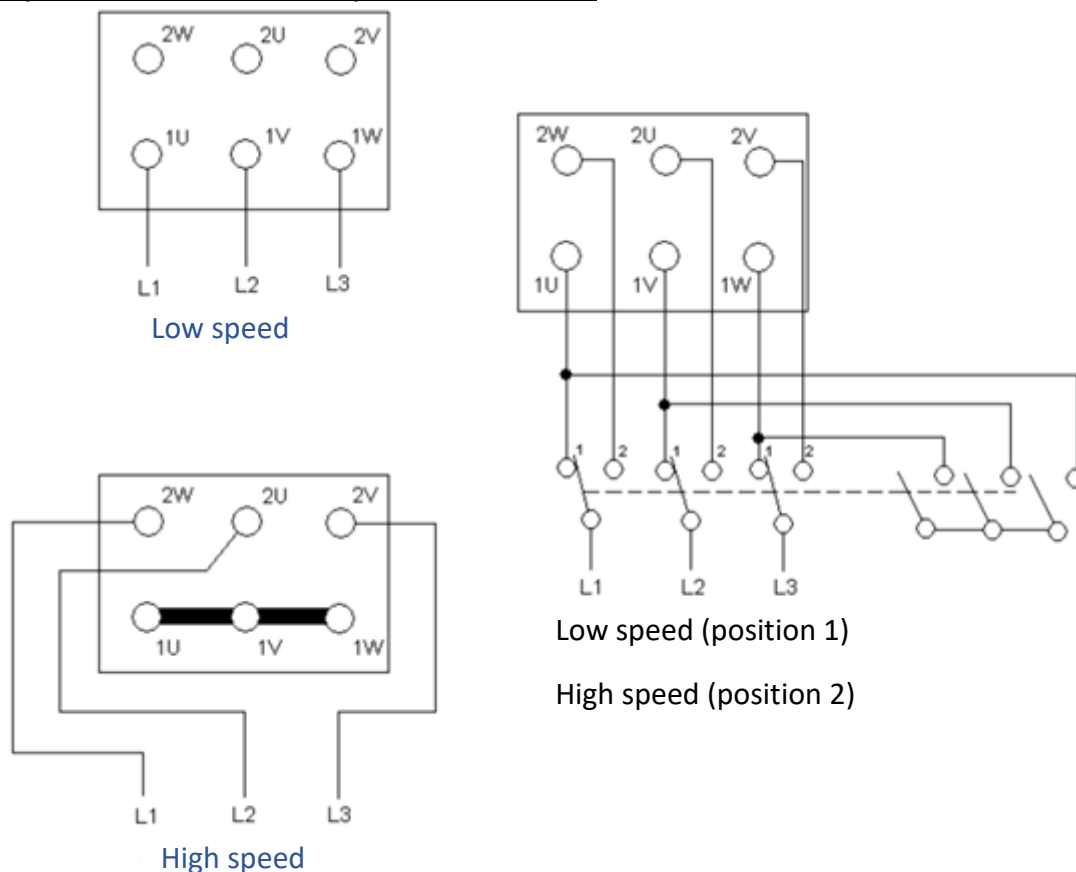


Lower voltage: 400V

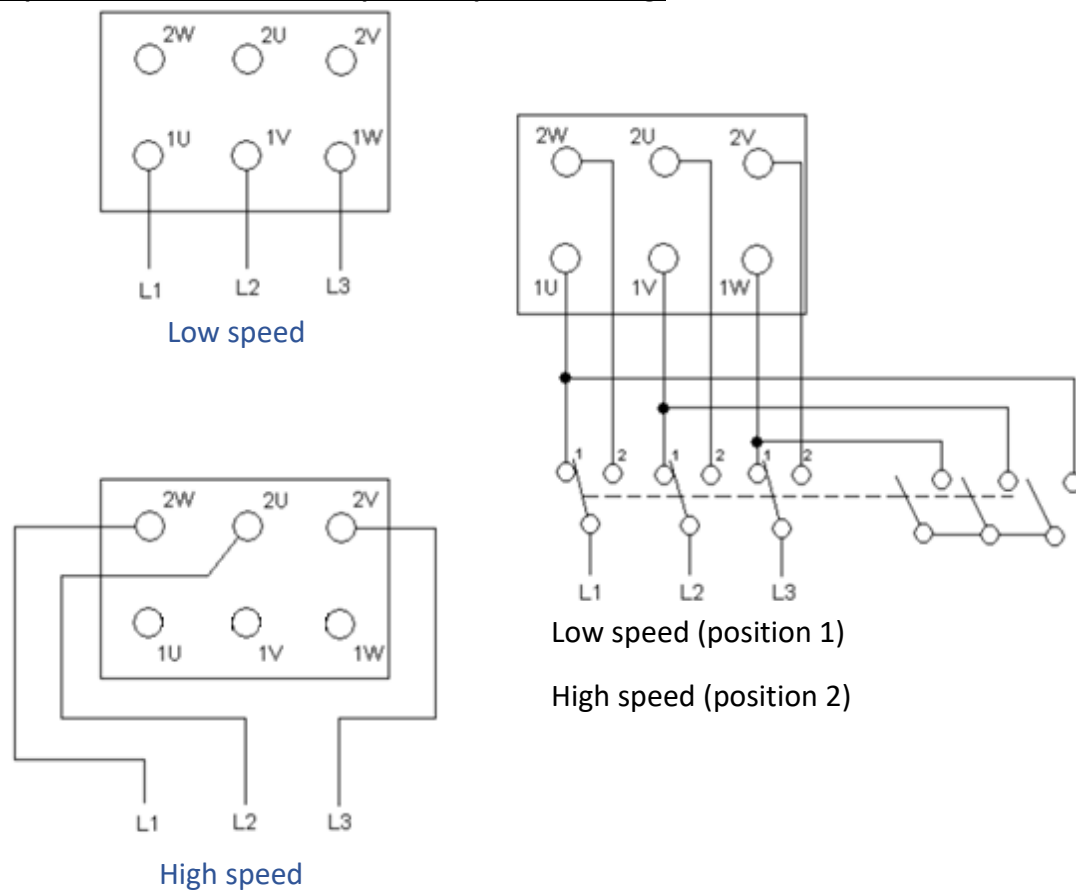


Upper voltage: 690V

- **Three phase motors 400V - Two speed - DAHLANDER:**



- **Three phase motors 400V - TWO speed - Separate winding:**



f. Commissioning

WARNING:

Ensure there are no one and no object obstructing the inlet and outlet of the fan. The commissioning must be done by a qualified person.

Open-Close the FRB top cover 2 or 3 times.

Leave the hatch in open position before running the fan.

Start the fan for 1 to 2 seconds to check the rotating direction of the impeller and air flow.

Impeller rotate in wrong direction:

- Switch off main supply then proceed to necessary modification to get the right rotating direction.

Impeller rotate in right direction, please control following points:

- Check the motor current. The current measured must not be higher than the current mention on motor or fan plate + 10% tolerance.
- Ensure there are no excessive vibration or noise during the fan running.

If the conditions are satisfied, run the fan for 30minutes then re-check the unit before permanent working cycles.

Before running the fan, make sure the hatch opening is at least 15 seconds before the start. It is the user responsibility to ensure the temporization is settled properly (mechanic or automatic). This is to avoid internal pressure of the enclosure and system resistance which will impact on fan motor loading (overload).

g. Maintenance

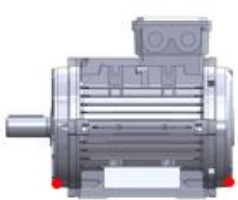
WARNING:

FRB must be maintained and kept clean for an optimum usage. Before any intervention on the FRB, please ensure that the power is off.

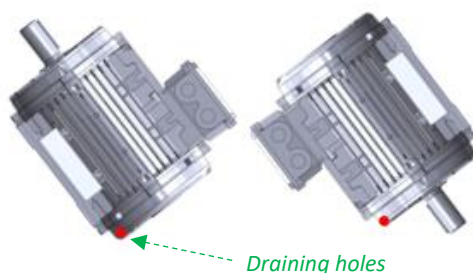
The periodicity of maintenance is the responsibility of user. Below are the recommendations of main points:

- Tightening of fix and moving part:
Check all bolts and screws are tighten and more particular the ones holding the impeller and rotating parts.
- Cleaning:
In dusty environment application, dust can build up which could impact on fan performance and impeller balancing. Attention is required for cleaning of impeller for a safe and efficient fan working condition. Use extension brush to help on difficult access location to make the operation easier to clean inside the fan case.
- Greasing:
Motors with life bearings lubrication do not need greasing. For motors that have greasing bearings, and depend on the frequency and condition of usage, it is the responsibility of user to have a greasing plan. For the actuators, it is recommended to grease the rods after 2000 cycles (1 cycle is open and close). Base on 4 cycles per day, the greasing period equivalent is about 12-16 months.
- Draining:
In general, motors are IP55 class (protection against dust and low-pressure jet). Some motors are having anti-condensation system. It is to limit condensation phenomenon, so draining holes are added to motor. If the motor is working in humid environment, draining operation have to be done to empty water retention inside the motor. Below are examples of draining holes location, for the FRB, it concerns vertical position:

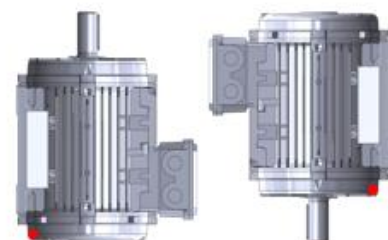
Horizontal position



Incline position



Vertical position



h. Troubleshooting

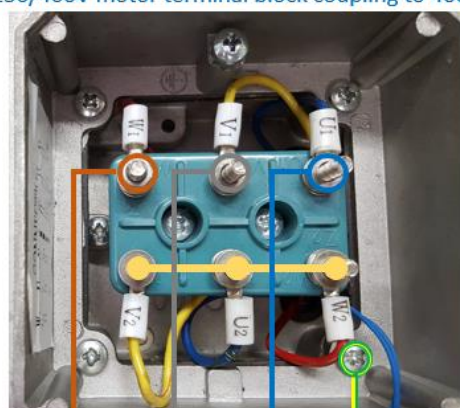
NOTES:

User is responsible of the usage of its own control material, mechanic or electric (power, accuracy, calibration, ... etc.).

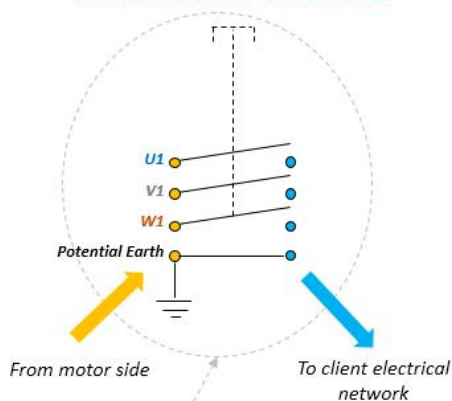
Problem	Possible reason	Checking and corrective action
The ventilator does not run	Connection to the mains fault. Thermal protection triggers. Motor fault.	Check connection to the mains and thermal protection. If ok. check electric motor (winding resistance, resistance to ground). If necessary get the electric motor repaired.
Air volume is too low	Under estimation of system pressure drop	Check global system and ensure damper are opened. If there is a reserve on motor power, increase impeller blade angle. Change fan to a higher performance model.
	Air leakage in ducting	Check leakage and correct if necessary.
	Motor speed	Check voltage and all connections.
	Wrong direction of rotation	Check the direction of rotation.
Air volume is too high	Pressure drop is over estimated	Decrease impeller blade angle. Change fan to lower performance model.
	Incorrect motor speed	Check the motor speed is correct.
Noise	Wrong impeller rotation direction	Check impeller rotation direction.
	Impeller is damaged or unbalanced	Check the impeller and balancing mass or replace the impeller.
Vibrations	Damaged bearing	Check manually by rotating the impeller, if bearings are damaged, replace the motor to a standard equivalent one.
	Impeller friction to fan casing	Check if there are any friction inside fan case.
	Inappropriate fan support or platform	Reinforce the structure. Analyze the origin of vibration and isolate the fan with anti-vibration support.
	Loose fit of bolting	Check the tightening of bolts.
The hatch does not open	Power supply	Turn the switch to ON position. Check if supply of 24V DC is available.
The hatch cover operation is opposite	Wrong actuators polarity	Invert the polarity of ON/OFF switch.

Appendix A: One speed motor

230/400V motor terminal block coupling to 400V



Connectors details of the switch

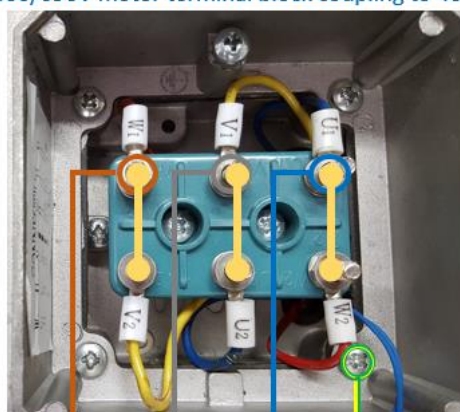


Cable 4G (4 wires)

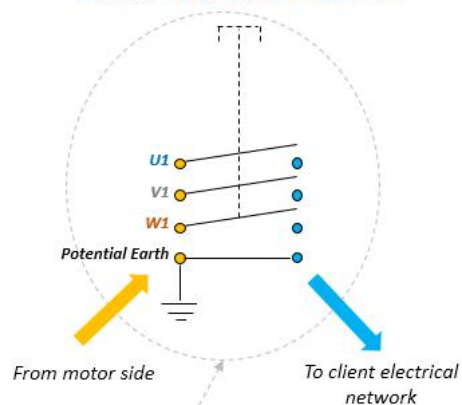


3P - ON/OFF switch

400/690V motor terminal block coupling to 400V



Connectors details of the switch



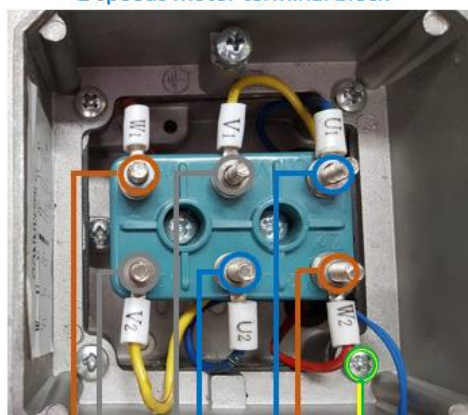
Cable 4G (4 wires)



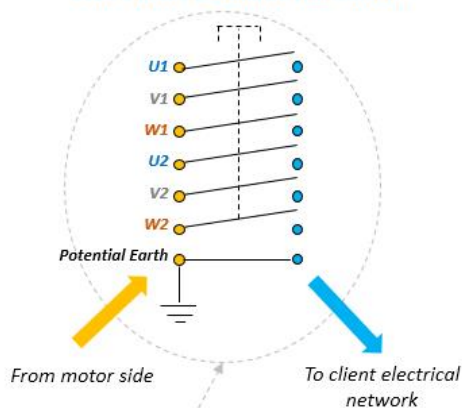
3P - ON/OFF switch

Appendix B: Two speed motor

2 speeds motor terminal block



Connectors details of the switch



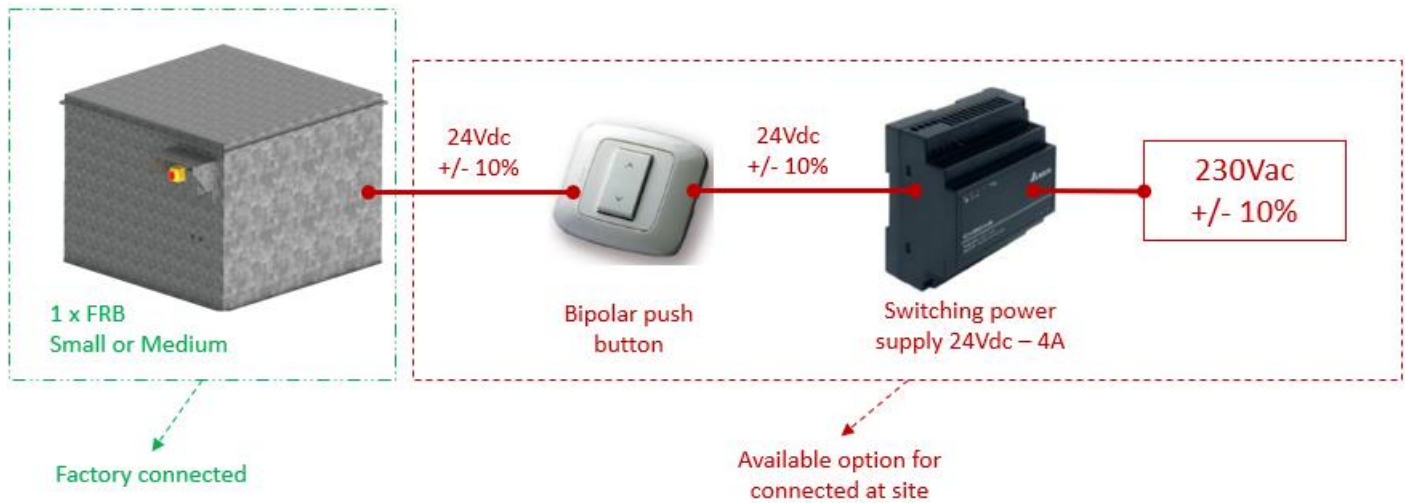
Cable 7G (7 wires)



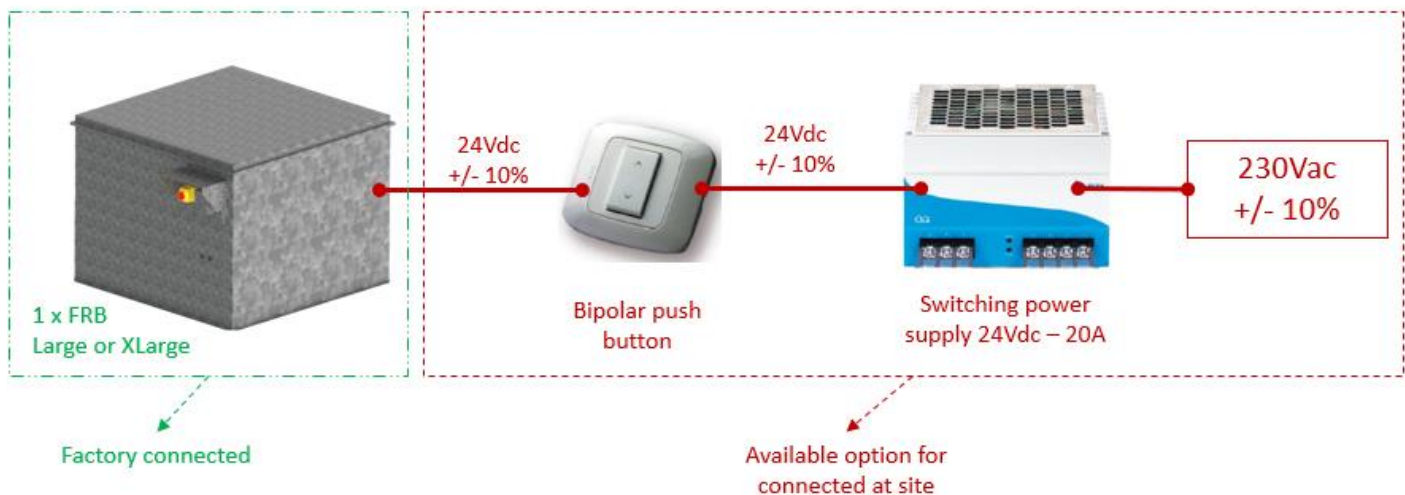
6P - ON/OFF switch

Appendix C-1: FRB manual open-close control (single mode)

➤ FRB Small or Medium size



➤ FRB Large or XLarge



NOTES:

FRB has factory connected actuators to ON/OFF switch. The optional modules or accessories require electrical wires (out of supply) to be connected at site. Modules and accessories are delivered with wiring diagram instruction.

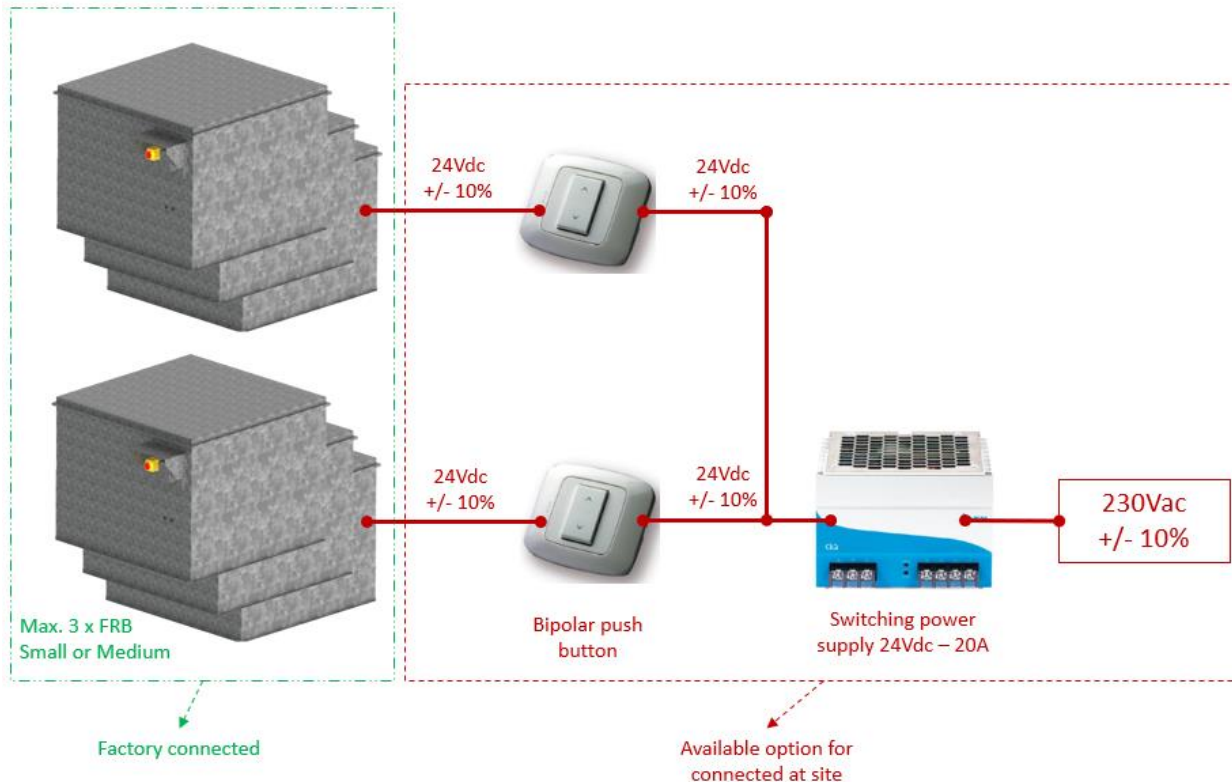
WARNING:

The installation and electrical connection must be done by qualified personnel or technically educated person. AREM declines all responsibilities in case of non-respect of the rules and instructions. Ensure electric power supply is off before the doing any electrical connection. AREM declines all responsibilities and damaged in case of non-respect of the instruction.

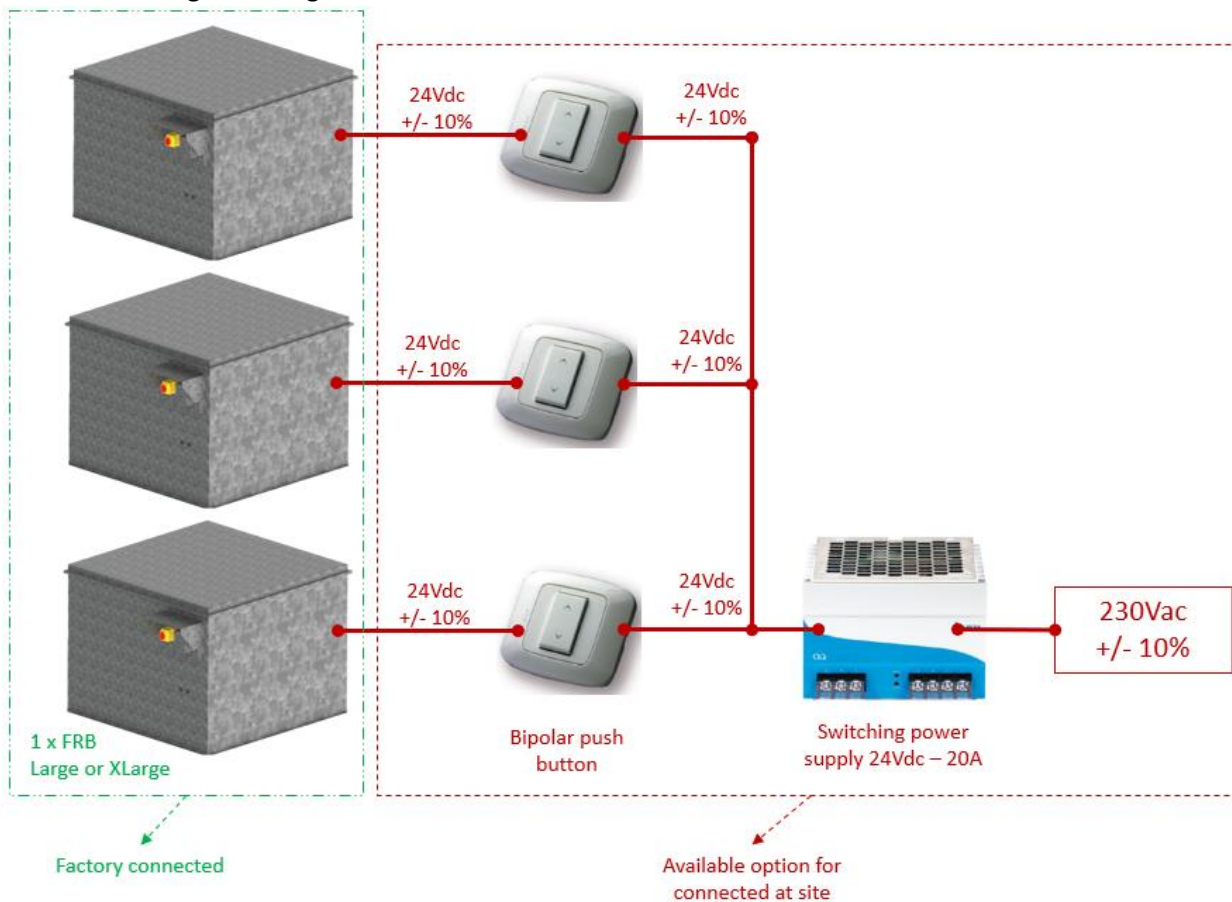
Above NOTES and WARNING in this section are applied for the entire Appendix C-1 to C-4.

Appendix C-2: FRB manual open-close control (multiple mode)

➤ FRB Small or Medium size

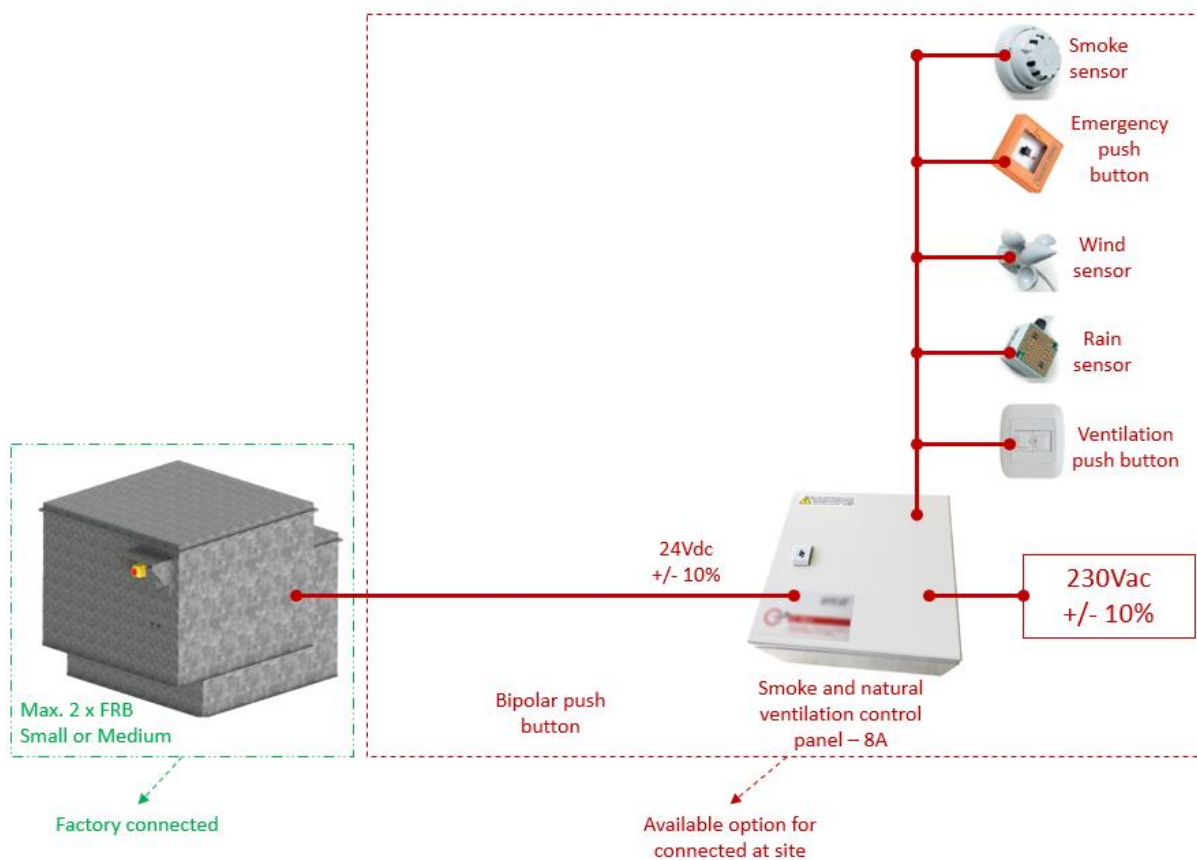


➤ FRB Large or XLarge

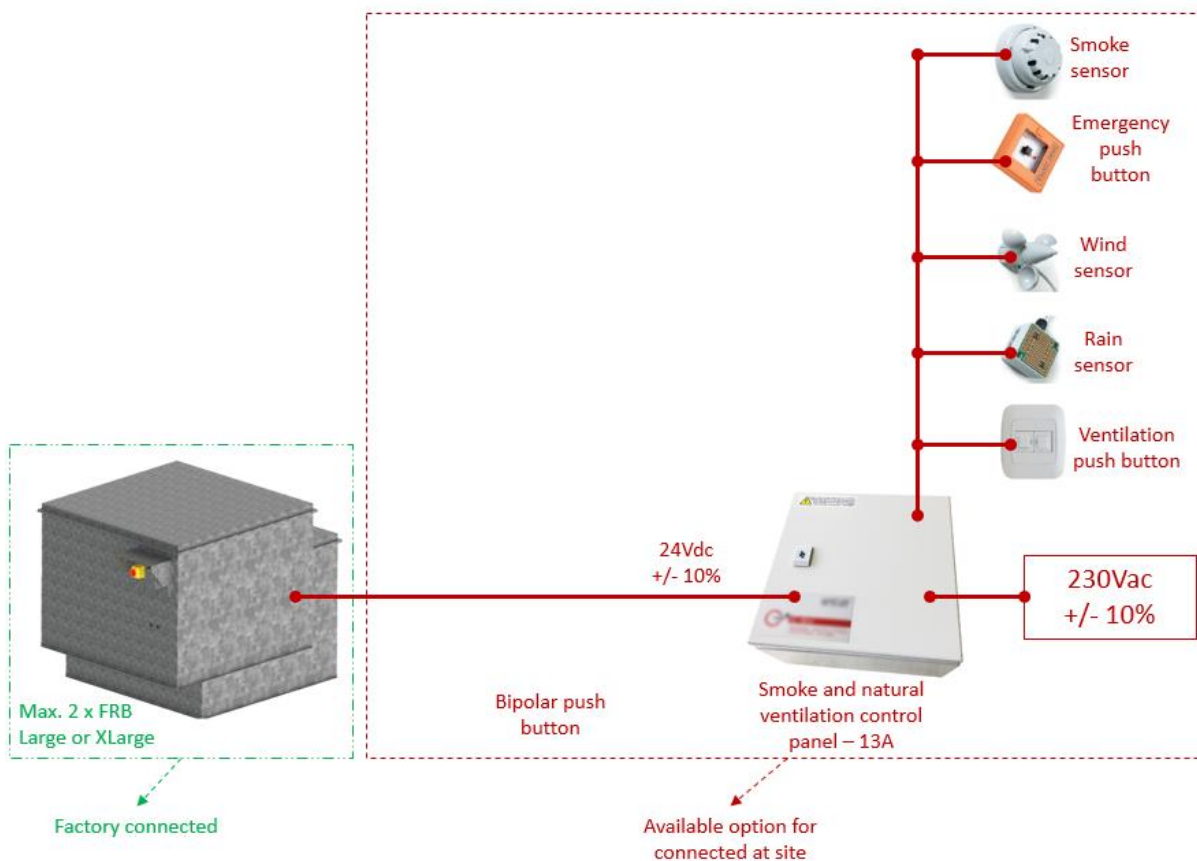


Appendix C-3: FRB monitoring open-close control (single mode)

➤ FRB Small or Medium size

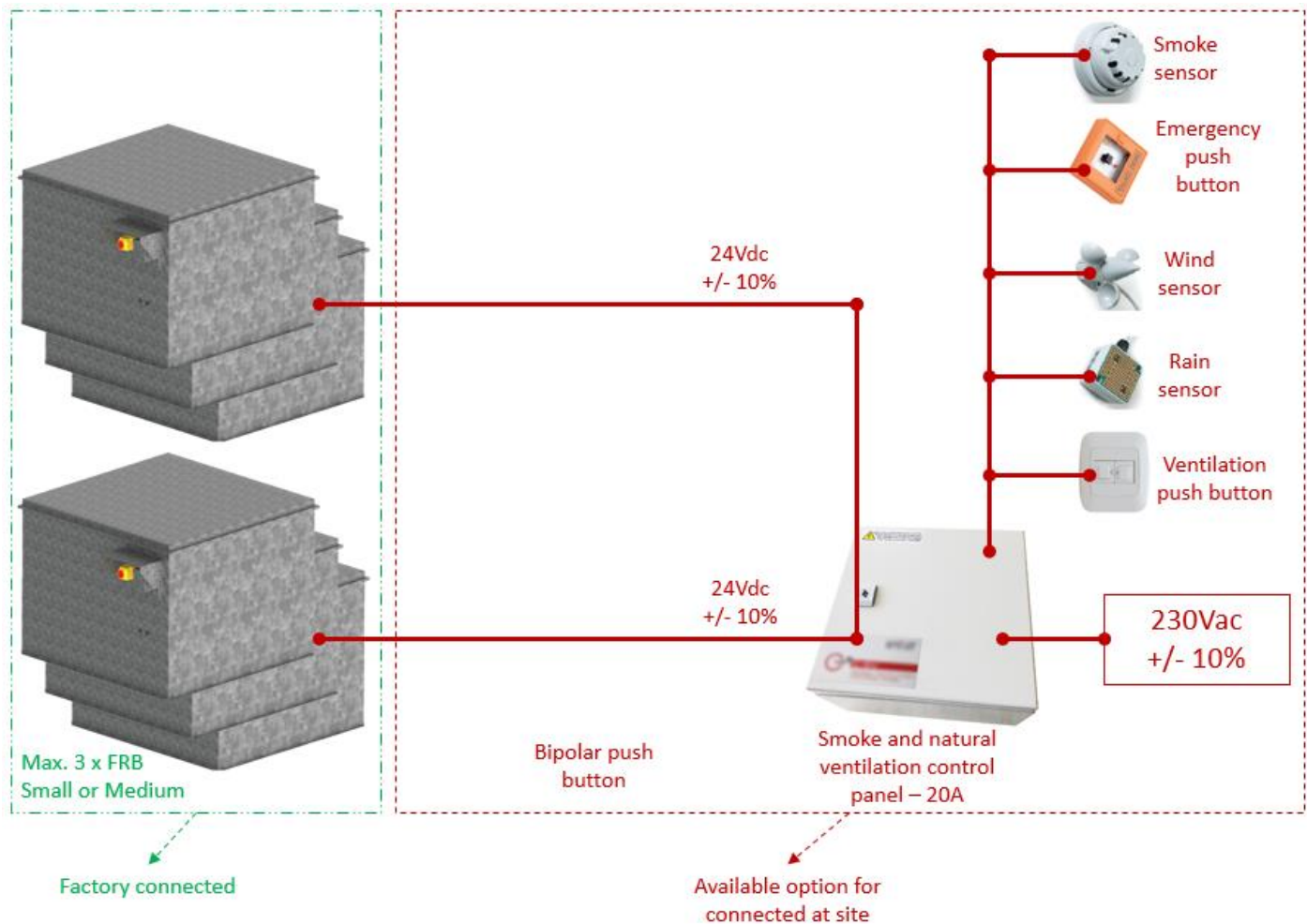


➤ FRB Large or XLarge



Appendix C-4: FRB monitoring open-close control (multiple mode)

➤ FRB Small or Medium



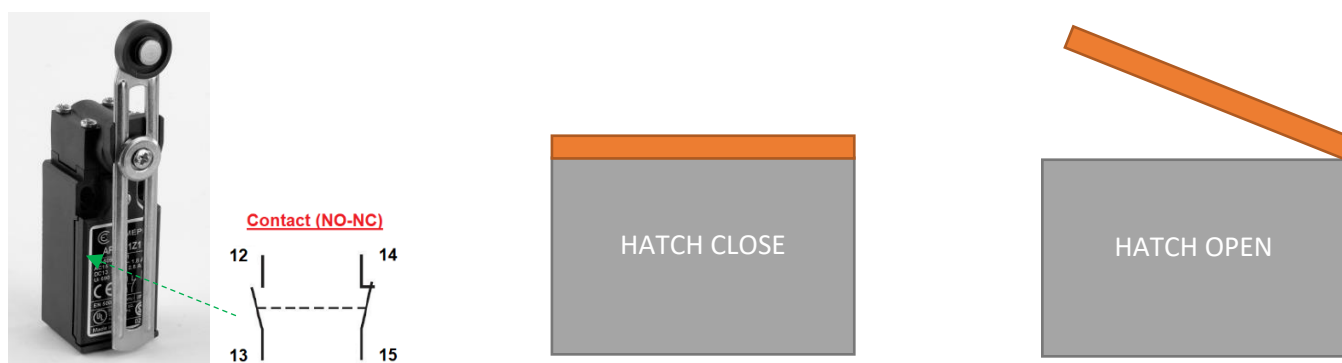
NOTES:

The available solutions of control (manual or monitoring with control panel) are non-exhaustive. For particular or specific request, please consult AREM for having adequate or customize solution.

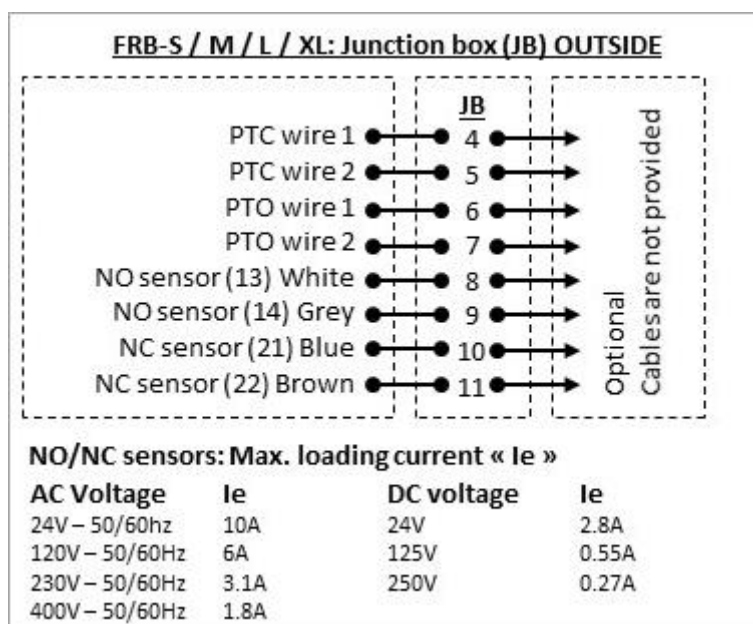
Appendix D-1: Option hatch closing position sensor (wiring)

The hatch closing position can be detected by using a snap action contact sensor (optional). This sensor works as an open-close circuit switch. It has 2 contacts so the control and management of the system are made by end-user:

- 1) Contact NO (terminals 8-9), Normally Open = correspond to the normally open position
If the Hatch is fully closed, the NO contact is armed (the contacts 12-13 are in closed circuit)
- 2) Contact NC (terminals 10-11), Normally Close = correspond to the normally close position
If the Hatch is fully closed, the NC contact is disarmed (the contacts 14-15 are in opened circuit)



The contact wiring must be done correctly to avoid electrical damage of the device. The electric terminals are available for wiring the contacts to the position 8 to 11 in the junction box.



WARNING:

The installation and electrical connection must be done by qualified personnel or technically educated person. AREM declines all responsibilities in case of non-respect of the rules and instructions. Ensure electric power supply is off before the doing any electrical connection. AREM declines all responsibilities and damaged in case of non-respect of the instruction.