CELLAR COOLER RANGE
TECHNICAL MANUAL

JABC-1
AMBIENT BEVERAGE COOLER

ISSUE: 01.11.2023

J&E Hall International

IMPORTANT!

READ BEFORE PROCEEDING!

GENERAL SAFETY GUIDELINES

This guideline is intended for users to ensure safe installation, operation, and maintenance of J & E Hall Ambient Beverage Cooler. This guideline is not intended to replace the system expertise available from the system manufacturers.

Only qualified and authorized personnel, who are familiar with refrigeration systems and components including all controls, should perform the installation and start-up of this equipment. To avoid potential injury, use care when working around sharp edges of metal cabinets. All electrical wiring should be installed in accordance with all applicable codes, ordinances, and local by-laws. No work should be undertaken on any equipment without first ensuring all electrical supplies are isolated.

Please be aware that during operation, even if the JABC unit is electrically isolated at its own supply, there may be terminals within it which are still LIVE. Ensure that the source of the supply is also isolated before attempting any service or maintenance operations.

SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to specific situations:

 WARNING	Warning! Risk of serious injury or death to person!
 CAUTION	Caution! Danger which can lead to serious damages!
 NOTICE	Notice! Risk of damage to equipment!

NOTICE

Disposal requirement:

Your refrigeration product is marked with this symbol. This means that electrical and electronic products shall not be mixed with unsorted household waste. Do not try to dismantle the system yourself: the dismantling of the refrigeration system, treatment of the refrigerant, of oil and of other parts must be done by a qualified installer in accordance with relevant local and national legislation. Refrigeration equipment must be treated at a specialized treatment facility for re-use, recycling, and recovery.

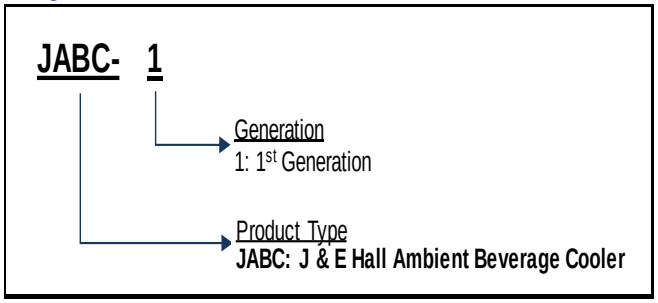
By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and human health. Please contact J & E Hall for more information.

Batteries must be removed from the controller if applicable and disposed of separately in accordance with relevant local and national legislation.

Contents

Nomenclature

Figure 1: Product Nomenclature



Product Features

The JABC-1 is primarily used for cooling beer cellars. Cold air is drawn from outside by the fan through the washable air filter and distributed into the cellar space. The unit consists of a fan motor, washable filter, controllers, air damper, and a pre-wired electrical control box all housed within a powder coated steel casing.

Operation is via two electronic temperature controls – one an ambient controller and the other a cellar controller. Each controller has one temperature probe – the ambient probe being positioned outside by the air intake grille and the cellar probe being positioned in a suitable position within the cellar space (ideally by the main cellar cooler temperature sensor).

Details of the product:

- Refrigerant free – environmentally conscious
- Washable/reusable air filter
- EBM fan motor with multi-speed capability – can be adjusted to suit room size
- Interchangeable air inlet damper location – either rear or base mounting
- Uses standard 150mm diameter ducting
- Fully pre-set controllers
- Inbuilt timer to allow cellar cooler to run for 1 hour per day (winter operation)
- Switching relay allows operation with all types of cellar coolers

Specifications

Table 1: Unit Performance Data

Fan Speed	Air Flow (m^3/h)	Current Drawn (A)	Power Input (W)	Sound dB(A) @ 1m
4	684	0.99	231	69.8
3	576	0.87	200	65.0
2	468	0.80	178	56.4
1	252	0.65	147	43.8

- Above data are rated at 230Vac/1phase/50Hz.
- For fan speed setting, refer to section air flow calculation.

Table 2: Unit Dimension

Overall Dimension (mm)			Mounting Dimension (mm)		Dry Weight (kg)
W	D	H	W	D	
349	381	484	Refer ***Figure 5***		12

Table 3: Packing List

Item	**Quantity**
Ambient Cooler	1 pcs
Supply Cable 3C0.75 (Without Plug) 2m	1 pcs
Bracket Support L- shaped (Painted)	2 pcs
M5x10 Hex. Philip Flange Thread Rolling Screw	2 pcs
M5 Nylon Flat Washer	2 pcs
Cable Glands M12	3 pcs
Fixing Hole Template	1 pcs
Technical Manual	1 pcs

NOTICE

An installation kit is available separately.

Table 4: Installation Kit

Item	**Quantity**
Plastic Ducting OD150mm, length 500mm	1 pcs
External Air Grille	1 pcs
Internal Door Grille	2 pcs
Air Filter for Spare	1 pcs

Operation

The JABC unit is designed to operate when the external ambient temperature is 8°C or below and the cellar temperature rises above its setpoint of 10°C. The JABC fan motor will draw external cool air into the cellar – passing through the air filter and cooling the space until the set temperature of 10°C is reached. If the cellar temperature continues to rise with the JABC unit running, at 13°C the main cellar cooler unit will cut in and run along with the JABC to provide additional cooling until the setpoint temperature is reached. At this point, both the JABC and the main cellar cooler will cut off. The JABC unit will not operate if the external ambient temperature is above 8°C. At external ambient temperatures of above 8°C, only the main cellar cooler system will operate.

The JABC unit is designed to be the main control for the cellar temperature, utilizing both external air when available and the main cellar cooler as required. The main cellar cooler controller should be set to the same operating temperature as the JABC unit.

- An inbuilt timer within the controller allows the main cellar cooler to run for one hour every 24 hours. This ensures that the main cellar cooler will still run during winter periods.

Health and Safety

General information

Before Installation

- On receipt of the product, all items should be visually inspected, and any damage or shortage should be advised to the supplier immediately.
- Ensure that the correct voltage supply is available for the unit requirement. Damage to electrical components within the unit will occur if this is not observed.
- Check that the proposed equipment location is suitable and provides adequate support for the weight of the unit.
- Check the proposed equipment location for mains services (gas, electric water etc.) before drilling holes for ventilation duct and unit fixings.
- If using external ducting arrangement, ensure ducting route will fall within the limitation of pressure resistance as listed in *Table 5*.

During Installation and subsequent maintenance

- Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and experienced with this type of equipment.
- If lifting equipment is required, ensure that it is suitable for purpose, certificated and that the operatives are qualified to use it.
- Safe working methods are identified, and operators have suitable Personal Protective Equipment (PPE).
- Ensure the working area is clear of obstructions.
- The units contain moving parts and electrical power hazards, which may cause severe injury or death. Disconnect and shut off power before installation or service of the equipment.
- Units must be earthed.
- The electrical covers and fan guards must remain fitted all the time.
- Use of the units outside of the design conditions and the application for which the units were intended may be unsafe and be detrimental to the units, regardless of short- or long-term operation.
- The units are not designed to withstand loads or stress from other equipment or personnel. Such extraneous loads or stress may cause failure or injury.

Air Flow Calculations

For effective operation, the cellar will require between 6 to 10 air changes per hour. To calculate the fan speed setting needed to achieve the required air change:

- Calculate room volume in m^3 (L x W x H)
- Multiply the resulting room volume by a value between 6 and 10 (air changes/hour) to achieve a required figure in m^3/h.
- Check the figure against the airflow values (m^3/h) for the fan given in *Table 1* and select the fan speed which best matches this.

The JABC unit comes with a rear entry air inlet connection for direct attachment to an external facing wall (through-wall installation). If an external facing wall is unavailable, the JABC unit can be mounted in a suitable location, with the air inlet connection changed to bottom entry. This is done by exchanging the rear inlet spigot with the bottom entry sealing plate for ducting purpose. Refer ***Page 3*** for instructions on how to change the inlet spigot position.

When connecting ducting to the JABC unit, it is recommended that any increase in pressure resistance should be limited as follows:

Table 5: Maximum Air Pressure Resistance

Fan Speed	Fan Wire Colour (Terminal)	Maximum Pressure Resistance (Pascals)
4 (max)	Black (S4)	90
3	Grey (S3)	118
2	Red (S2)	114
1(min)	White (S1)	60

The fan is terminated at "S4" (maximum speed) from factory as shown in ***Figure 8: Wiring Diagram***.
To change the fan speed, it is required to change the wire from K1R 42(4) to be terminated at the required "Sx"

For 150mm nominal diameter lightweight ducting, the following standard industry values could be used to calculate the pressure resistance for the proposed ducting run:

Table 6: Pressure Resistance for Ducting

150mm Circular Duct	Pressure Resistance (Pascals)
1 metre straight length	7
1no. 90^0 bends	15
1no. 45^0 bends	7.5

Example calculation:

Room volume is 6m x 5m x 2.4m ($72m^3$). Multiply this figure by 8 (air changes/hour). This gives a required figure of $576m^3/h$.

Refer ***Table 1***, either fan speed 3 or 4 will give the required airflow to achieve 8 air changes per hour.

Installation requires: 6m of straight ducting, 2no. 90^0 bends and 2no. 45^0 bends

Calculation : (6 x 7 Pascals) + (2 x 15 Pascals) + (2 x 7.5 Pascals) = 87 Pascals

Assessment: Refer ***Table 5***, 87 Pascals resistance is within the limits of the fan at either fan speed 3 or fan speed 4.

Room Air Balance

As the unit can provide up to approximately $700m^3/h$ of airflow into the cellar, this will need to be balanced by allowing air outlet from the room. This can be done by fitting an air grille in the cellar door (provided in the optional installation kit) or by other means.

NOTICE

Fan speed 1 should only be used for through-wall applications with small room sizes. For extended ducting application, we do not recommend using the unit with fan speed 1. **Regardless of room size, please select either fan speed 2, 3 or 4 only.**

Installation

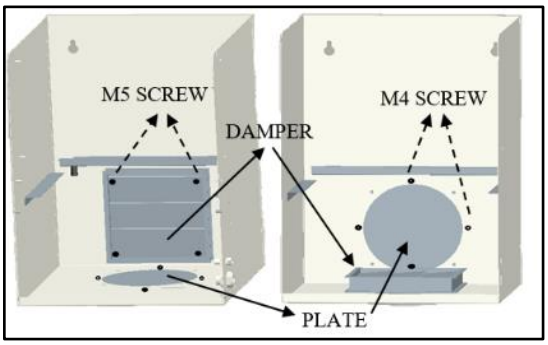
1. Ensure that the outside wall is clear of any obstructions.
2. Ensure that the selected wall is strong enough to support the unit.
3. Ensure that no other exhausts will blow directly into the air inlet duct.
4. Ensure that all hidden cabling/pipework are checked before any drilling commences.
5. Ensure that fixings are suitable for the application.
6. Do not position the unit directly opposite the airflow from the main cellar cooler.

Changing Air Spigot Position

Before installation of the unit, follow these steps to change the position of the air spigot.

1. Remove blanking plate from the bottom of the unit.
2. Unscrew the damper and interchange the damper from rear to bottom of unit from inside.
3. Screw the damper to bottom panel using existing M5 screws.

Figure 2: Diagram for Changing Air Spigot



Cover the hole in rear panel using plate and fix using the existing M4 screw.

Figure 3: Front View Inside Cellar Room

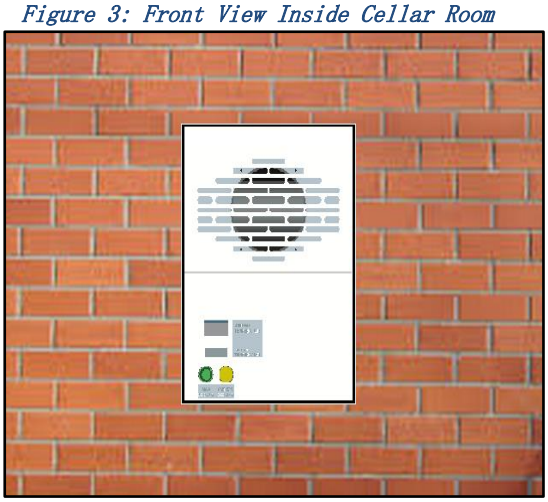
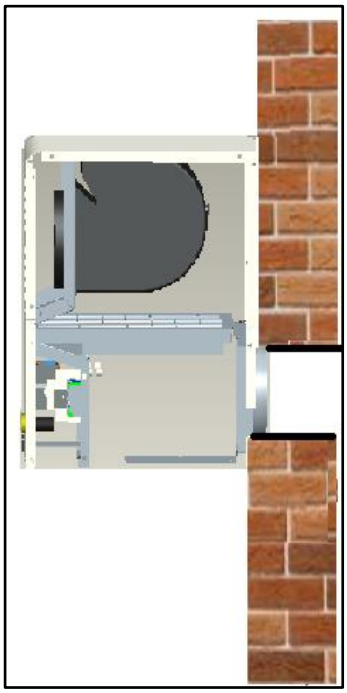


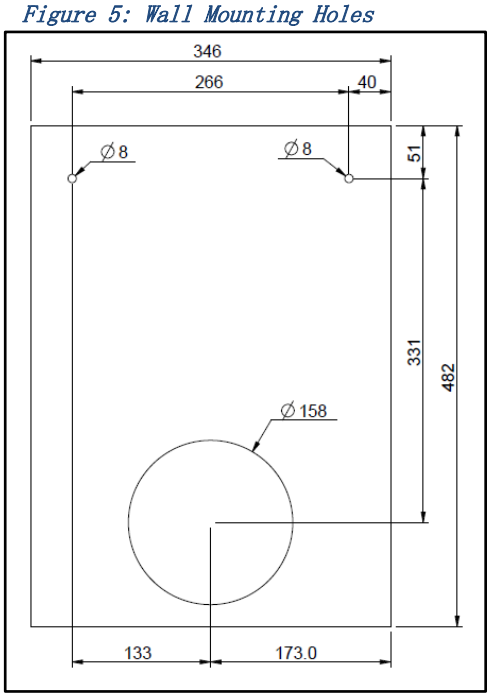
Figure 4: Side View – Air Inlet Hole Through Wall



Wall drillings for direct ducting of unit

1. Drill the wall fixing points and the hole for the air inlet duct, following the dimensions as shown on below or follow template supplied.
2. Recommended drill dimension is 157mm diameter for the air inlet duct.
3. Attach required length of 150mm Ø ducting to air spigot and seal joint with duct tape or silicon.
4. Pass ambient air probe down inside of ducting. Coil and cable tie excess cable neatly.
5. Remove the top cover of unit for access to fixing holes and fix to wall.
6. Fix the 2 brackets, one each side of unit using M5 screws and fix to wall.
7. Seal ducting to hole and fix external air grille to ducting.
8. Position ambient air sensor.

Figure 5: Wall Mounting Holes

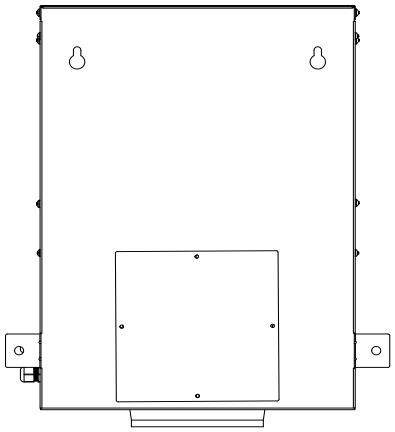


Alternative mounting arrangement for ambient cooler

Spigot can be placed at bottom of unit to enable external ducting to be used. This is the alternative arrangement of the unit where the rear hole is blanked by plate.
Note:

1. The hole through wall can be drilled in another location.
2. Ducting is not provided.

Figure 6: Spigot Positions



Electrical Connection

CAUTION

The mains electrical supply to the JABC-1 unit must be via a suitably rated isolator and circuit breaker or fuse. There is no isolator fitted to the unit. It requires a 230 volt / 1 phase / 50Hz supply which must include a Neutral and Earth. It is not suitable for any other supply voltages (other than a deviation of +/- 10% of the above values) and is not suitable for 60 Hz supplies.

1. Ensure that all power supplies have been isolated before starting any electrical work.
2. Only a qualified electrician should carry out any electrical work.
3. **Ensure that indoor cellar unit is fully isolated before carrying out this section.**
4. Make sure that the supply to the JABC-1 unit and the control circuit from the main cellar cooler are using the same electrical phase, otherwise there is potential for 400V at the JABC-1 unit.
5. Where the main cellar evaporator has only one fan, this should be wired to run continuously (whether the JABC-1 unit is running or not) to maintain proper air circulation within the cellar. For evaporators fitted with multiple fans, it is possible to leave one fan running and switch additional fans off for energy saving when not required (cellar at desired temperature) through relay K2R on the JABC-1 unit. This may require a wiring change to the fans on the evaporator.
6. **Maximum allowable load to relay K2R is 1250VA (Resistive: 5A/250VAC; Inductive 1.5A/250Vac).**

Probe Positioning

- Cable glands are provided for the mains supply cable and the cellar temperature probe cable on the right-hand side of the unit. Use the provided M12 cable gland for the mains supply cable and the cellar temperature probe.
- **The cellar temperature probe** is coiled up in the control box. Remove the front lower panel on the unit to gain access to the control box.
- **The ambient temperature probe** is coiled and stored behind the air damper on the rear of the unit.
- Connect the mains supply cable (provided) to the unit as per the *Figure 8: Wiring Diagram*. **Do not switch on the supply yet.**
- Isolate the main cellar cooler supply and break the control circuit as per the wiring diagram. Using a 2-core cable, connect the control circuit from the main cellar cooler to terminal A on the JABC unit and return via terminal B to feed either the main cellar cooler contactor coil or the solenoid valve.
- Position the JABC cellar temperature probe unit in a suitable position within the cellar (ideally next to the temperature sensor for the main cellar cooler). The probe cable length is 3m, but this can be extended with 2 x AWG22 if required.
- Position the JABC ambient temperature probe. This can be run down the inside of the air inlet ducting and secured within the external air inlet grille. Ensure sensor is protected from direct sunlight which may affect the temperature reading and the operation of the unit.

Commissioning

NOTICE

- **Ensure that all covers are fitted on the unit.**
- **Ensure that all electrical connections have been made as per** *Figure 8: Wiring Diagram*
- **The controllers are fully preset and the settings should not be altered.**

1. Switch on power supply to both main cellar unit and JABC-1.
2. The JABC-1 unit should now display outside ambient temperature on the Ambient controller (top) and the cellar temperature on the Cellar controller located below.
3. The cellar temperature set point of the JABC-1 unit is preset to 10°C. **This must not be altered.**
4. The temperature set point of the main cooling should be set at 10°C to match the JABC controller or it can be set 1°C lower than JABC-1 setting if required. The set point of the main cellar cooler should not be set above 10°C.
5. Allow the system to run and ensure that the unit is functioning correctly.

There are 2 external status lights on the front of the JABC-1 unit giving a clear visual display of current operating condition of unit.

Table 7: Pilot Light Indication

Pilot Light Colour	Operating Condition
Yellow	JABC fan motor operation
Green	Main cellar cooling function is called for

* **Illumination of the Green light for main cellar cooling does not mean that the system is running, just that the main cellar cooling function has been called for.**

Appendix

Table 8: Alarm Indication

Ambient Controller	
Error Code	**Cause**
P1	Room probe failure
P2	Evaporator probe failure
HA	Maximum temperature alarm
LA	Minimum temperature alarm
Cellar Controller	
PFo	Probe broken or missing
PFc	Probe short circuited
HA	Maximum temperature alarm
LA	Minimum temperature alarm

Figure 7: Outline Drawing

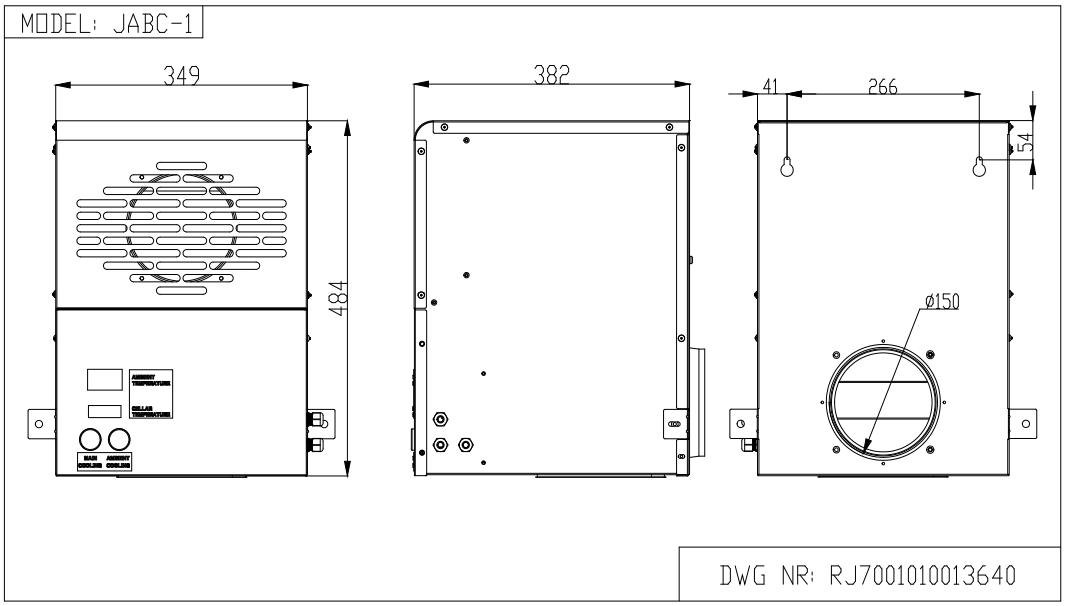
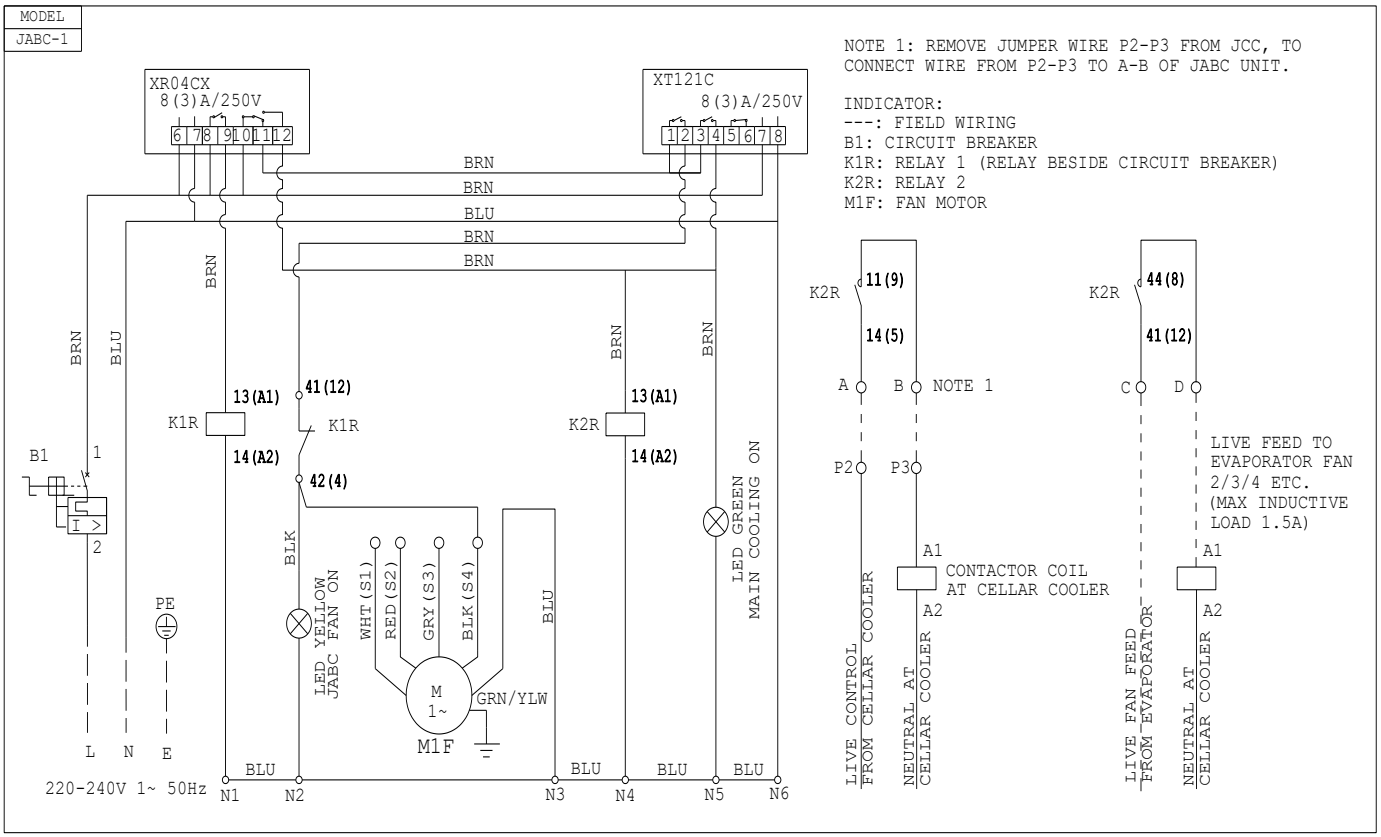


Figure 8: Wiring Diagram



Service & Maintenance

Disconnect the mains electrical supply before servicing or opening the units.

The units are designed to give long life operation with minimum maintenance. However, they should be routinely checked, and the following service schedule is recommended under normal circumstances:

The front panels and control panel need to be removed to ensure all parts / components mentioned below are accessible:

1. Fan Motor – Inspect at regular intervals.
   - Check for abnormal noise and vibration.
2. Power Supply – Inspect at regular intervals.
   - Check the running current and voltage for the unit.
   - Check the electrical wiring and retighten connections as necessary.
3. Filter – Clean and inspect at regular intervals.
   - Check and clean the filter at 3 months intervals to remove dirt and debris on filter media.
   - Check external air inlet grille for obstructions.
4. Controls
   - Check accuracy of temperature readings.

Remove this cover to access filter

Slide the filter out

Unit decommissioning and disposal

At the end of the unit's useful life, a suitably qualified person should decommission it. The unit components must be disposed of or recycled as appropriate in the correct manner.

Figure 9: View of Control Panel

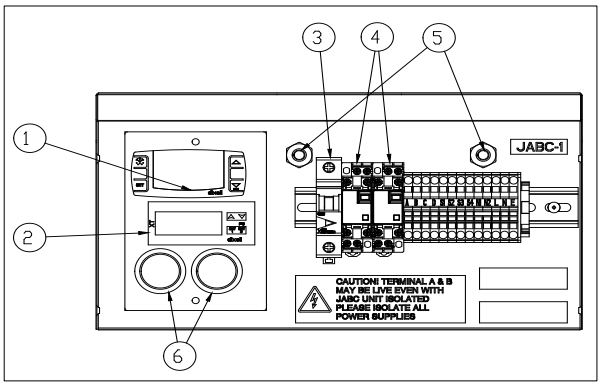


Table 9: Item List in Control Panel

ITEM	DESCRIPTION
1	Controller (AMBIENT)
2	Controller (CELLAR)
3	Motor rated circuit breaker
4	Relays
5	Cable glands
6	Pilot lamps

Table 10: Trouble Shooting

FAULT	POSSIBLE CAUSE	CHECK	SOLUTION
LED Yellow not lit, and fan does not operate	Power supply	Phase(s) and neutral present?	Check/rectify
		Voltage within tolerance?	Check/rectify
		Is isolator switched on?	If not - switch on
LED Yellow lit but fan does not operate/ run at low air flow	Clogged air filter	Check air filter condition	Clean the dirty air filter or replace the filter.
	Motor is terminated to run at low speed	Check the colour of motor lead terminated at port 4.	Isolate power supply before change the motor termination on terminal 4
	Fan capacitor fault	Check visual condition of capacitor and check uF reading with capacitor meter.	Replace capacitor if required
Fan run but low air flow	Air passageway is blocked/clogged	Check air filter condition	Clean the dirty air filter or replace the filter
		Check damper on the air inlet	Resolve the blockage
	Motor is terminated to run at low speed	Check wire K1R 42(4) terminated to which terminal "Sx" of the fan motor.	Isolate power supply, alter the wire K1R 42(4) from lower speed to higher speed "Sx".
	Fan capacitor fault	Check visual condition of capacitor and check uF reading with capacitor meter.	Replace capacitor if required
Error message on temperature controller. Refer section "Controller Alarm Display Information"	Probe error	Check probe termination on the controller/ check the continuity of the leads.	Correct the wiring for the probe.
	Incorrect temperature readings	Verify readings of the probe by grasping the sensor bulb.	If incorrect readings, replace faulty probe.
		Incorrect positioning of the sensors.	Correct the sensor position

Figure 10: Declaration of Conformity

Declaration of Conformity

According to SI 2008 No. 1597 Annex II

J&E Hall International

We:	J & E Hall International
of:	Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU
Declare that below	
Product:	Air Cooler Unit
Model Designations:	
	JABC-1
Description:	Ambient Beverage Cooler Unit

Fulfils all the relevant provisions of The Supply of Machinery (Safety) Regulations 2008 (SI 2008 No. 1597).

It has been designed and manufactured to the following designated standards:

BS EN 60335-1	Household and similar electrical appliances. Safety. General requirements
BS EN 60335-2-65	Household and similar electrical appliances. Safety. Particular requirements for air-cleaning appliances

The legal representative authorised to compile the relevant technical documentation is J & E Hall Limited, Questor House, 191 Hawley Road, Dartford, Kent, United Kingdom, DA1 1PU.

Signed:

Name:	Andrew Bowden
Position:	Managing Director
Location:	J & E Hall Limited, Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU
Date:	16/12/2022

Figure 11: EU Declaration of Conformity

EC Declaration of Conformity

According to DIRECTIVE 2006/42/EC Annex II

J&E Hall International

We:	J & E Hall International
of:	Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU
Declare that below	
Product	Air Cooler Unit
Model Designations:	
	JABC-1
Description:	Ambient Beverage Cooler Unit

Fulfils all the relevant provisions of The Machinery Directive (Directive 2006/42/EC).

It has been designed and manufactured to the following harmonised standards:

BS EN 60335-1	Household and similar electrical appliances. Safety. General requirements
BS EN 60335-2-65	Household and similar electrical appliances. Safety. Particular requirements for air-cleaning appliances

The legal representative authorised to compile the relevant technical documentation is TEWIS SMART SYSTEMS, S.L.U, Auguste y Louis Lumière, 26 Parque tecnológico, Paterna, Valencia, Spain.

Signed:	
Name:	Andrew Bowden
Position:	Managing Director
Location:	J & E Hall Limited, Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU
Date:	16/12/2022

Form: JEH-C6-016e-01 Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU Page 1 of 1

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