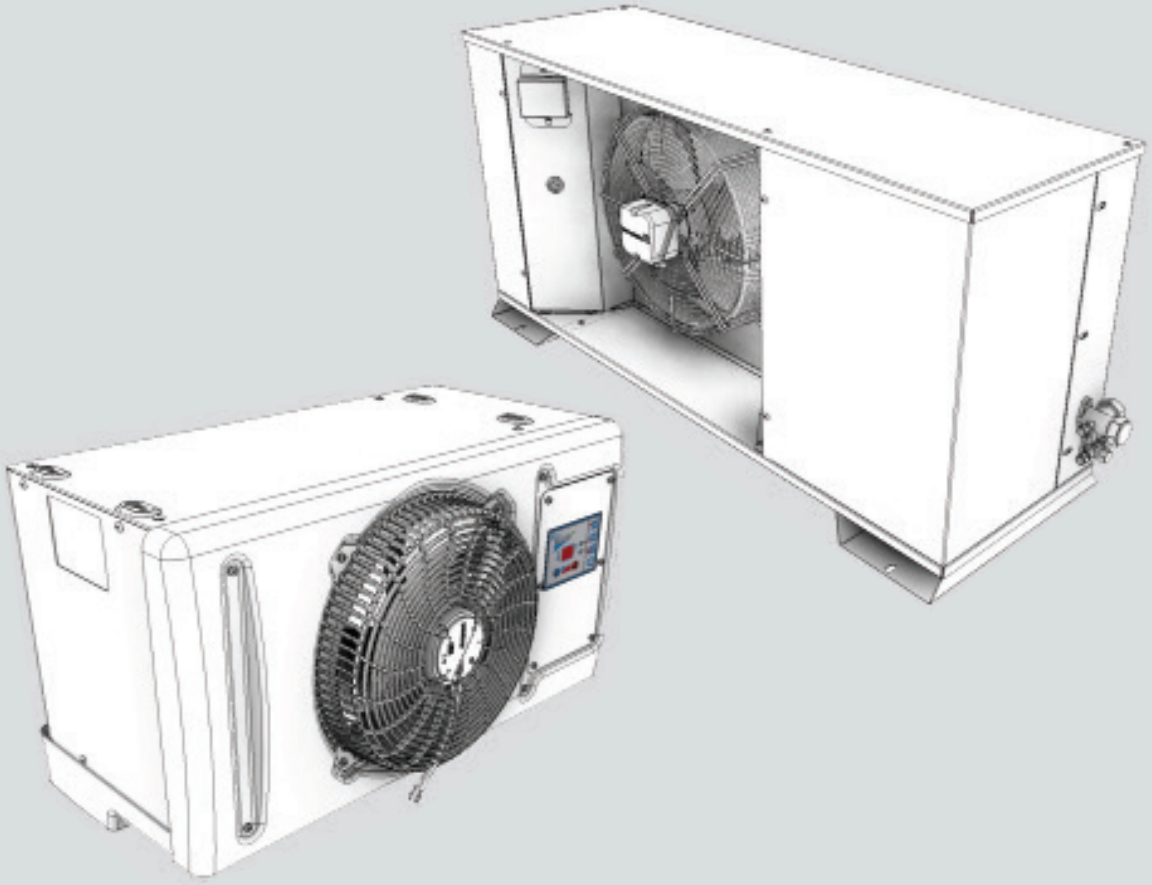
wolseley.co.uk/climate



Installation and maintenance instructions

Beermaster Plus Cooling Range

Beer MASTER plus

WOLSELEY

CLIMATE

Installation and maintenance instructions

1. Introduction

Glossary of terms

The following abbreviations and terms are used thorough the document and refer to the following:

BFC	Beermaster Free Cooler
BMIEP	Beermaster Indoor Evaporator Plus (also referred to as the evaporator)
BMOP	Beermaster Outdoor Plus (also referred to as the Condensing Unit
FLC	Full Load Current
HP	High Pressure
LP	Low Pressure
LRA	Locked Rotor Amps
MCB	Motor Circuit Breaker
PCB	Printed Circuit Board
PPE	Personal Protective Equipment
PRV	Pressure Relief Valve
SWA	Steel Wire Armoured (used to refer to steel wire armored cable)
TD	Temperature Difference
TEV	Thermal Expansion Valve

Health and safety

This document has been designed to help you and make the installation easier. Please read the points below to be familiar with the units and the installation. This manual contains information on hazards that may be encountered when installing and maintaining the equipment. It is therefore important that these instructions are followed. Upon receipt, the units should be visually inspected, and the supplier notified of any damage or shortages within seven days from receipt of the unit. Care must be taken when removing the packaging and during installation, to prevent the finished surfaces being damaged. Units are not portable and are only for permanent installation.

CAUTION
All work on the unit must be carried out by qualified personnel only. The installation and maintenance manual must always be kept with the unit. Ensure that the instruction manual is understood before installation. Ensure working environment is suitable and any additional hazards caused or increased by the environment are given appropriate consideration.

Use suitable PPE as per site regulations and as appropriate for the task. It is the responsibility of the person performing the task and their employer to ensure that all necessary PPE is provided and worn. Detailed below is some of the suggested PPE that may be required during installation and commissioning of the unit.


Head protection


Foot protection


Hand protection


Eye protection

Before installation

Ensure that:

1. The voltage, working fluid and the maximum working pressures stated on the product nameplates are suitable for the proposed working environment.
2. The units are to be operated solely for cellar type cooling applications and will be put into operation as per this manual.
3. The proposed method of mounting is adequate to support the total operational weight of the unit (including refrigerant charge), which can be found on the unit nameplate.
4. The working environment is safe and suitable for the work required to install the product.

During installation & maintenance

Ensure that:

1. The units are installed and maintained by qualified personnel only.
2. The electrical supply is isolated and secured from accidental re-connection whilst work is carried out on the equipment.
3. Electrical connections to the unit should be made in accordance with IET regulations as well as local laws and legislation.

Interconnecting pipework

Interconnecting refrigerant lines installed between the condensing unit and evaporator must be purged through with oxygen-free nitrogen to remove any particles of dirt, debris or moisture, in accordance with good refrigeration practice. Failure to do so could cause clogging or damage to the solenoid valve and expansion valve during operation.
Care should be taken when completing this to avoid any personal injury. Please note that Nitrogen is an asphyxiant and should only be used in well-ventilated areas with appropriate procedures and mitigation measures in place to prevent harm.

Refrigerant

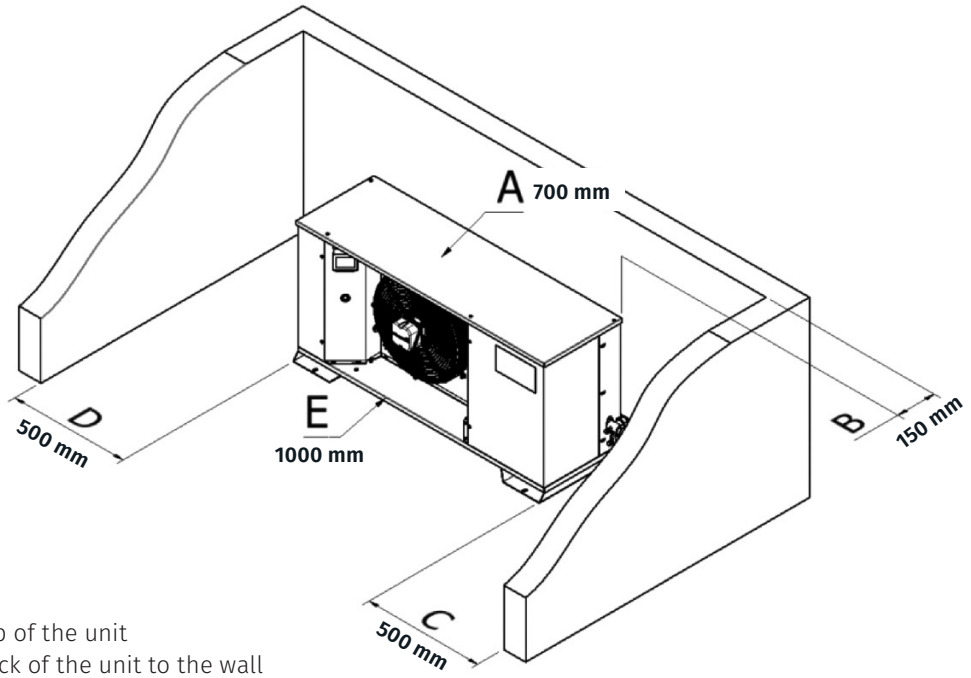
The system has been designed and certified when charged with R448a. Charging with R449a is also acceptable. Do not mix these refrigerants in the same system.

2. Planning the installation

Positioning the condensing unit

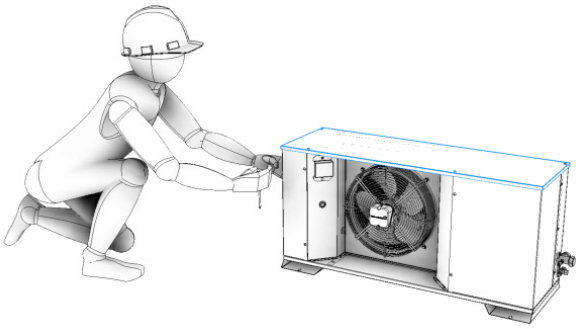
To ensure optimum performance, the condensing unit should be situated to give uniform air distribution across the coil.

- Obstructions to airflow should be minimized.
- Coils should ideally be shaded from the sun.
- Consideration should also be given to servicing and airflow. Please see the diagram below.
- If units are roof mounted it is recommended that isolation material is used between the feet of the unit and the roof itself. The unit should also be installed level and on a firm platform that is able to support the full weight of the unit, including refrigerant.
- The location of the unit should take into account the minimum clearances, as detailed below.



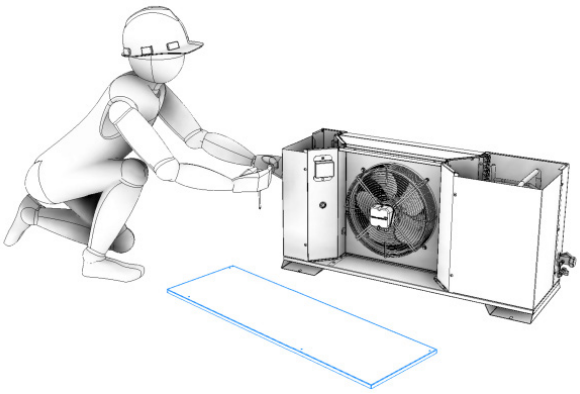
A Clearance from the top of the unit
B Clearance from the back of the unit to the wall
C Clearance from the RHS of the unit to the wall
D Clearance from the LHS of the unit to the wall
E Clearance from the front of the unit to any other object

How to gain access to the condensing units

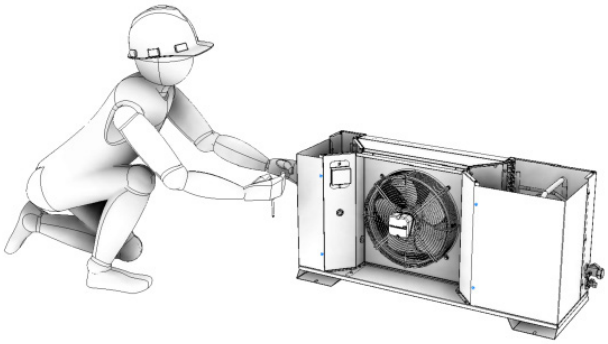


Loosen and remove all screws on the roof of the unit. Remove and put aside the roof panel.

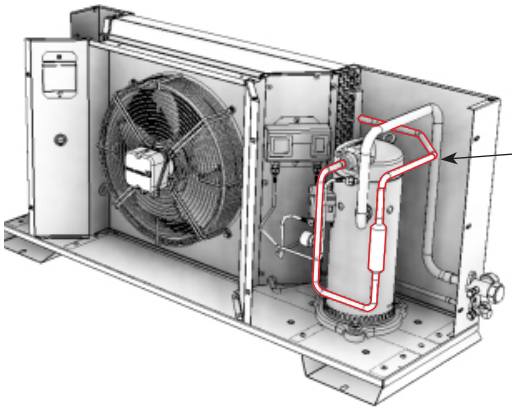
Loosen and remove all screws on the front two access panels. Remove the front panel.



Rotate and slide the two side covers off the unit. The covers will slide out of the from latches on the side of the unit and can then be set to one side



CAUTION
The discharge line will be hot when the unit has been running. This is indicated by a label. The unit should be allowed to cool before accessing.

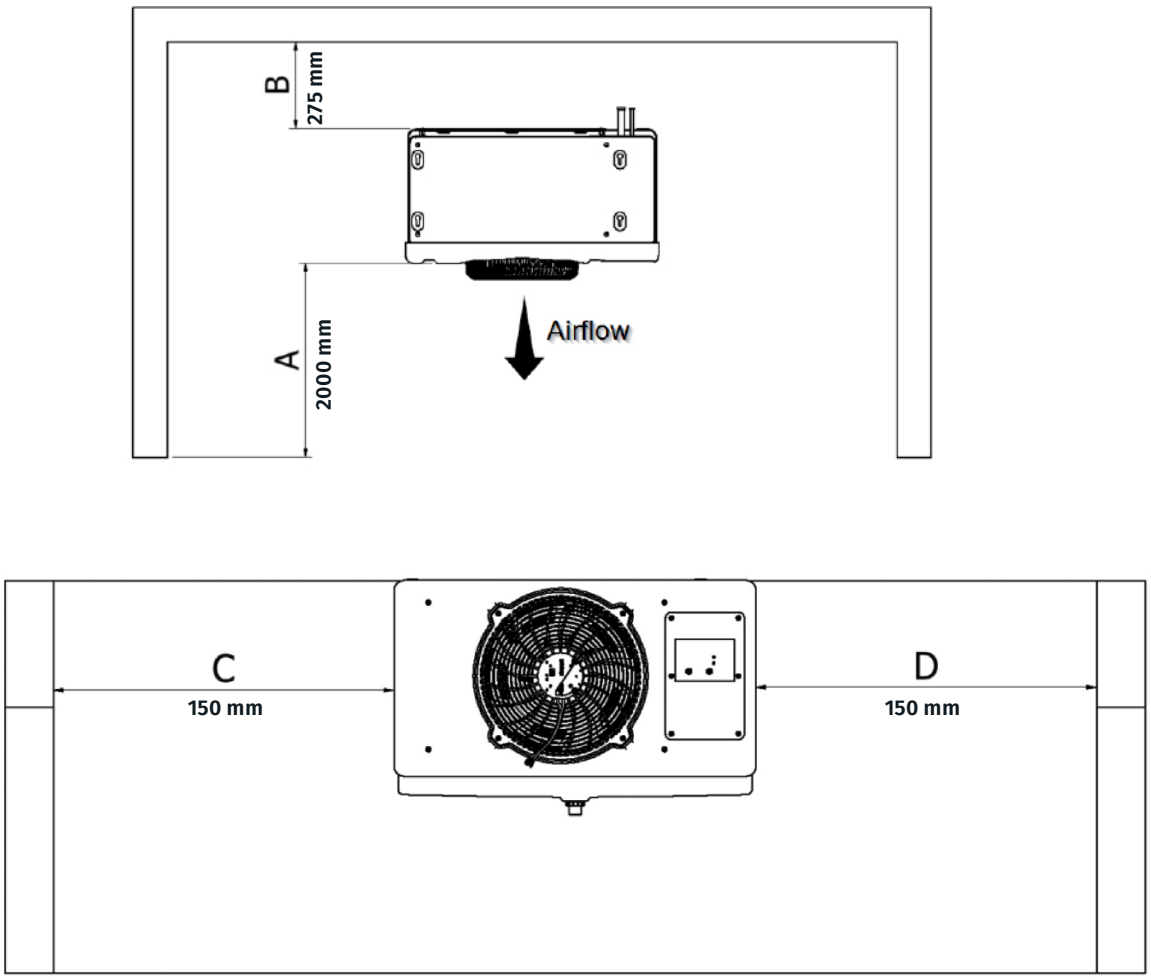


Possible Hot Discharge Pipe

Positioning the evaporator

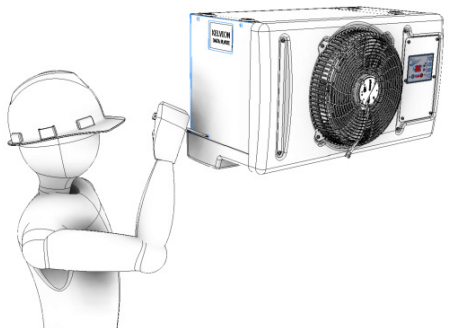
The evaporator has a “draw-through” airflow direction and is designed for either ceiling mounting or wall mounting. For wall mounting, the wall mounting kit (optional) must be used and is supplied as a separate order.

Locate the evaporator in accordance with the minimum clearances as detailed below:

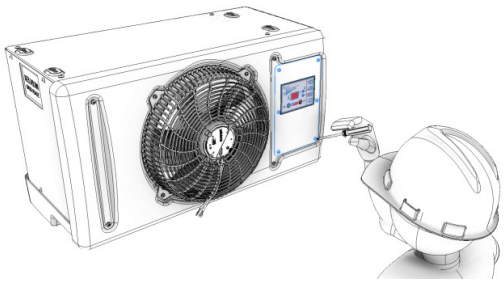


A Air Clearance
B Rear Clearance
C Left Hand Clearance
D Right Hand Clearance

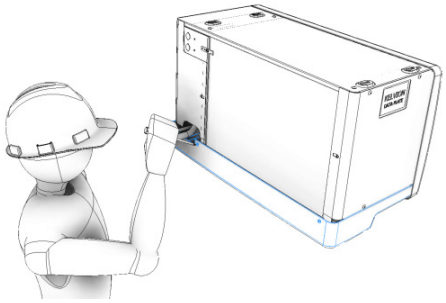
How to gain access to the condensing units



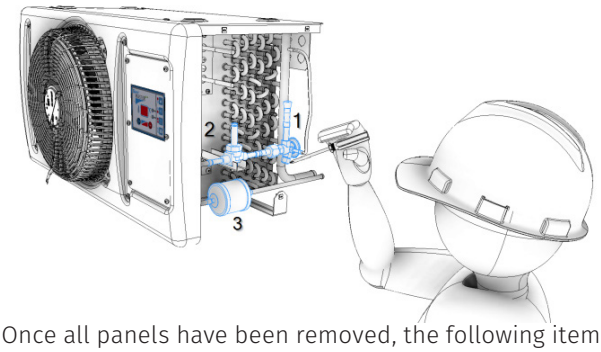
To gain access to the solenoid, filter and TEV, the end covers will need to be removed. This can be done by loosening and removing the screws. The end covers then slide out from unit.



To gain access to the controls and enable the installation of the mains cable. The front controls facia will need to be removed.



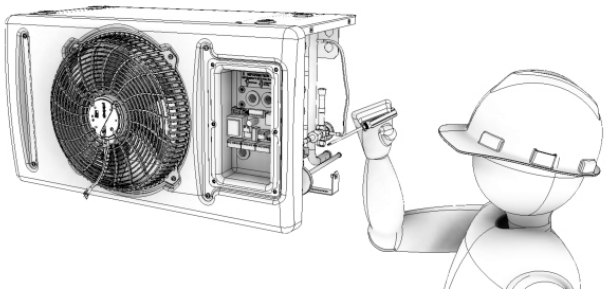
CAUTION
The plastic drain tray will need to be removed before any brazing is carried out the pipework. This can be done by removing the rear screws and sliding the drain tray off the unit.



Once all panels have been removed, the following items:

1. TEV
2. Solenoid
3. Filter Drier

Can be accessed for servicing, maintenance and superheat adjustment.

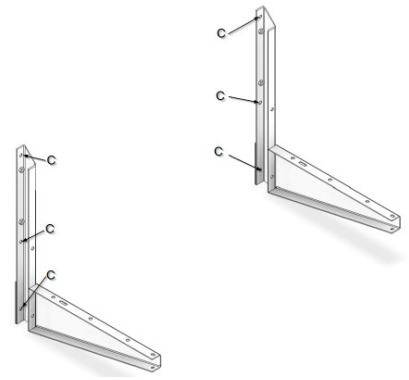


With the controls cover removed, the PCB board can be accessed.

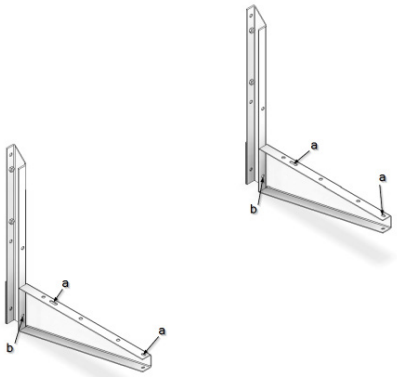
3. Installing the units

Mounting the condensing unit on a wall bracket

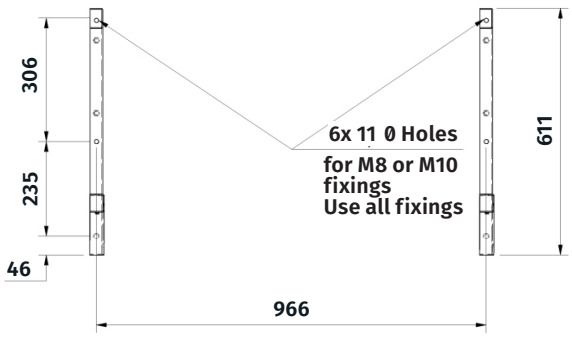
(Wolseley pt. no. 684222)



- Check the intended wall is strong enough to support the total operational weight of the unit, including the refrigerant charge.
- Use the straight upright rails to mark out the drilling positions on the wall (c). Ensure the rails are vertically aligned, parallel to each other and horizontally level to each other. Space the rails at 966mm apart.
- Drill all holes for M8 or M10 fixings as appropriate.

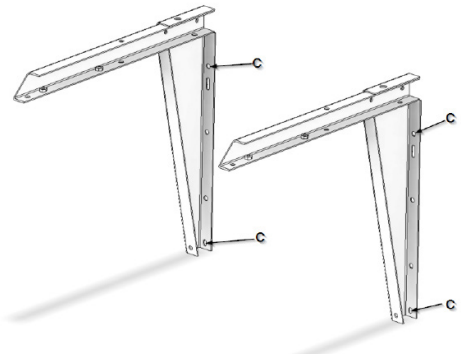


Assemble the angle brackets to the uprights using the M8 fixings provided and fix securely to the wall using suitable wall fixings. (b) Lift the unit into position and fix at all 4 feet positions with M8 fixings provided. (a)

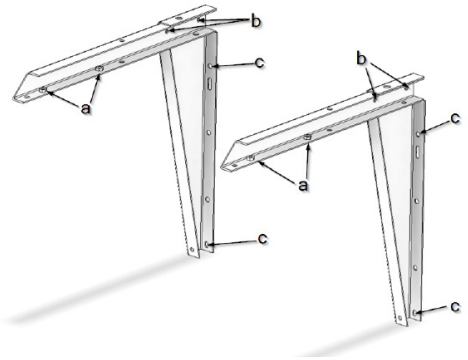


Mounting the evaporator unit on a wall bracket

(Wolseley pt. no. 684222)

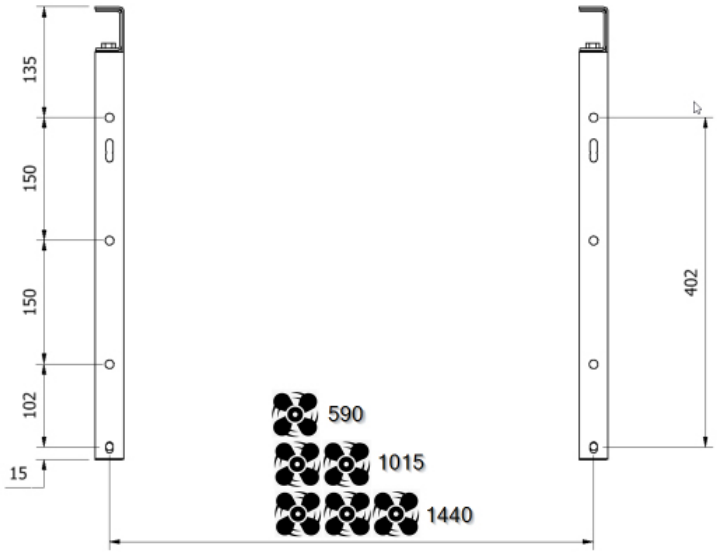


- Check the intended wall is strong enough to support the total operational weight of the unit, including the refrigerant charge.
- The two brackets should be spaced according to the unit size (e.g. 590mm for 1 fan unit). Please see the diagram at the end of this section for the spacing requirements.
- Use the angled bracket with straight side against the wall, to mark out the drilling positions. Ensure that the rails are installed as Drill all holes for M8 or M10 fixings. (c) below such that unit is mounted horizontally.
- Drill all holes for M8 or M10 fixings. (c)



- Use suitable wall fixings to securely fix the angle brackets to the wall.
- Fix the rails to the angle brackets with the M8 fixings provided. Fix at all 4 positions & tighten securely. (b)
- Screw in the M8 fittings into the rails leaving a gap between the bolt and the bracket, so that the keyhole fastenings can be positioned before tightening fully.
- Lift the evaporator unit into position with the 4 fixings protruding through the keyhole slots. (a)
- Push the evaporator back so the fixings are firmly located in the small end of the keyhole slots and tighten securely at all 4 positions.
- Use a spirit level to ensure the unit is level in both directions. Use spacers as required to ensure the fall of the drain pan is maintained to the rear of the unit.

Evaporator bracket centres



4. Pipe sizing

Pipework runs up to a maximum of 30m (total equivalent length) are recommend between the BMOP and BMIEP units. Each installation must be evaluated for the total equivalent pipe run length, including equivalent lengths for bends, additional fittings and vertical lifts etc. Please refer to the appropriate interconnecting pipe sizing chart (tables below) for a full selection.

Using interconnecting pipe sizing charts

The pipework sizes below are based on the nominal duty of the BMIEP and BMOP combination, as shown in the tables. Pipework should be selected based on the total equivalent run length of the interconnecting pipework between the two units, and not just the dimensional length. Equivalent lengths for all bends, piping components and vertical rises should be added to the basic run lengths to achieve the total equivalent run lengths. When using the tables to determine pipe length, round up the equivalent length and do not interpolate between values. For example, if the pipe run is between 10m and 20m, always use the 20m values.

Cellar temperature 10°C

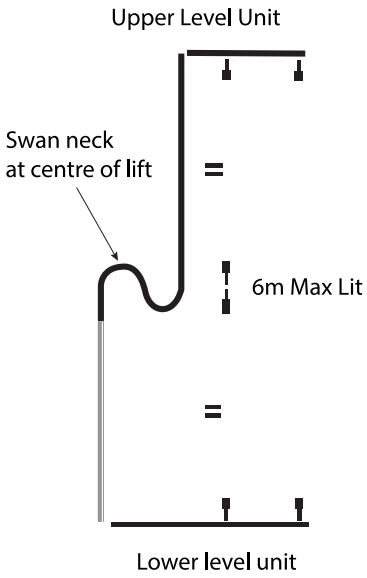
CONDENSING UNIT			EVAPORATOR UNIT	CELLAR TEMPERATURE 10°C					
MODEL	UNIT CONN		MODEL	10m		20m		30m	
	SUCTION	LIQUID		SUCTION	LIQUID	SUCTION	LIQUID	SUCTION	LIQUID
BMOP-130-1	3/4“	3/8“	BMIEP-448-37	5/8"	3/8"	5/8"	3/8"	3/4"	3/8"
BMOP-150-1	3/4“	3/8“	BMIEP-448-48	5/8"	3/8"	3/4"	3/8"	3/4"	3/8"
BMOP-190-1	3/4“	3/8“	BMIEP-448-48	5/8"	3/8"	3/4"	3/8"	3/4"	3/8"
BMOP-210-1	7/8“	1/2“	BMIEP-448-48	5/8"	3/8"	3/4"	3/8"	7/8"	3/8"
BMOP-210-1	7/8“	1/2“	BMIE-448-69	5/8"	3/8"	3/4"	3/8"	7/8"	3/8"
BMOP-210-1	7/8“	1/2“	BMIEP-448-89	3/4"	3/8"	3/4"	3/8"	7/8"	1/2"
BMOP-250 -1/3	7/8“	1/2“	BMIEP-448-89	3/4"	3/8"	3/4"	3/8"	7/8"	1/2"
BMOP-320-1/3	7/8“	1/2“	BMIEP-448-89	3/4"	3/8"	7/8"	1/2"	1.1/8"	1/2"
BMOP-350-3	7/8“	1/2“	BMIEP-448-89	7/8"	3/8"	7/8"	1/2"	1.1/8"	1/2"
BMOP-360-3	7/8“	1/2“	BMIEP-448-133	7/8"	1/2"	1.1/8"	1/2"	1.1/8"	1/2"

5. Pipework installation - supports and routing

Pipework to and from the units should be selected to suit the application and not the connection size of the unit. Pipework should be supported independently from the condensing unit and evaporator in a way that prevents the transmission of vibration between the units. The suction line must be insulated.

At the installer's discretion, liquid and suction lines may be run and clamped resting against each other and insulated within the same insulation tube. This would increase sub-cooling and improve Evaporator performance. A maximum of 6m vertical lift is allowed in the pipework. Any vertical lift of the suction line must be accommodated with a 'Swan Neck' in the pipe work to assist in oil return and prevent liquid flood back during off cycle. Please refer to the diagram to the right.

A refrigerant filter drier is fitted in the BMIEP unit's inlet pipework. During installation, it is important that the pipework is not left open to atmosphere for any longer than necessary. This causes moisture to be absorbed by the drier and reduces its normal system drying capacity. The pipework bungs should only be removed just before brazing of the pipework.



6. Brazing

A suitably qualified engineer should carry out brazing to a high standard of refrigeration practice.The Engineer should ensure that:

- The working area is adequately ventilated.
- Appropriate PPE is worn throughout the process.
- The evaporator drain tray is removed before brazing.
- Care should be taken to avoid any direct flames being applied to the casework, controls or any area away from that being brazed.
- Care should be taken when using nitrogen. Nitrogen is an asphyxiant and should only be used in well-ventilated areas with appropriate procedures and mitigation measures in place, to prevent harm.

As well as following the above and adhering to best health and safety practices, the engineer should ensure that the following is carried out:

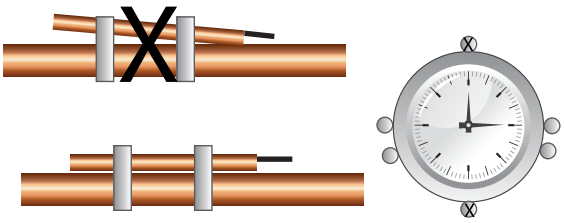
- All pipe cuts are clean, and any swarf is removed
- Dry nitrogen is purged through system during brazing to minimize oxidization.
- Wet rags are used on all components close to brazing operations, and heat shields are used to protect the units.

7. Expansion valve phial location

A suitably sized thermostatic expansion valve (TEV) is fitted to the evaporator with an external equalizing line fitted to the suction header. The expansion valve capillary line must be coiled but must not be clamped to the suction line pipework. The expansion valve should be fitted to the suction stub once the interconnecting pipework has been installed.

Ensure the phial is positioned as per instructions below:

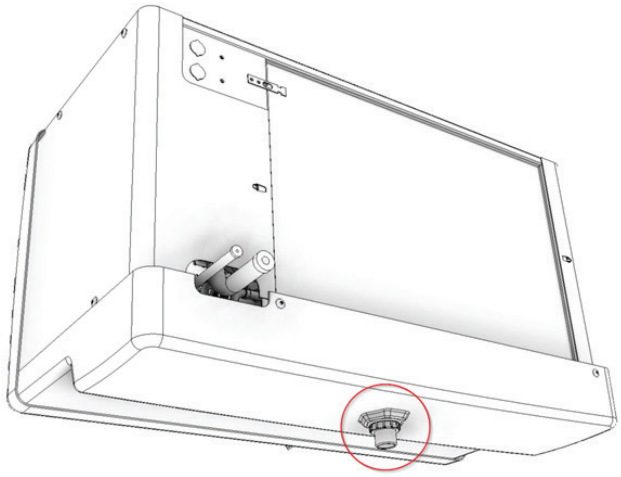
- 3 or 9 o'clock position for 1/2" & 5/8" pipe.
- 4 or 8 o'clock position for 3/4"size pipe and above.
- Do not mount the phial on the top or bottom of the pipe and ensure the full length of the phial is in contact with the pipe. It should not mounted across any uneven area such as where the pipe has been swaged or brazed.



The diagram to the right illustrates this for clarity.

8. Drainage

The evaporator drain tray is fitted with a 3/4" BSP condensate connection. This MUST be connected to a trapped drain line system. It is not acceptable to allow the condensate to drain directly to the cellar floor, due to the potential health and safety hazard.



9. Electrical supply & function

CAUTION:
Both the condensing unit and evaporator should be fed from the same electrical supply. If this is not possible, it is important to ensure that the electrical supplies are from the same phase. Failure to do so will result in a potential of 415 Volts between the units. Always ensure that the electrical supply to the unit is isolated before opening any panel or carrying out any work on electrical equipment.

Cable sizing

Cable sizes should be selected to suit the application, adhering to the latest IET 18th Addition BS7671:2018 Wiring Regulations. It is recommended that SWA cable is used with the armor braiding suitably secured in the gland. The cable must also be terminated and earthed correctly at its point of entry into the units. The BMIEP and BMOP unit power connections are suitable for cables up to 4mm. For cables larger than this it is recommended that the larger incoming cable is terminated at a wall mounted junction box or isolator close to the unit, and a reduced size cable is used to connect the junction box/isolator to the unit.

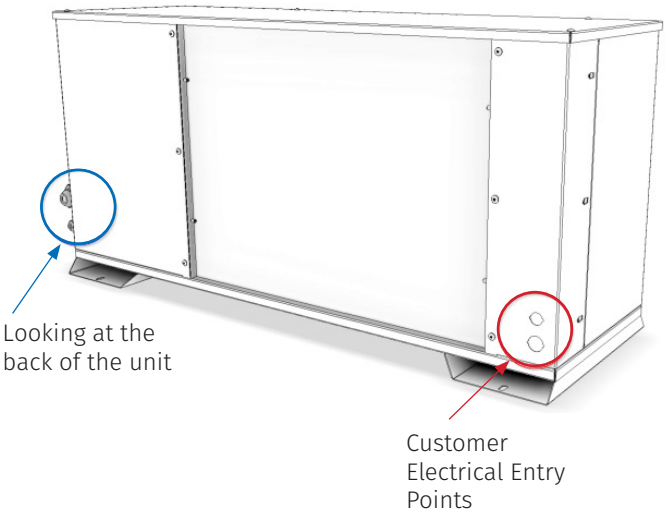
Cable connection / termination

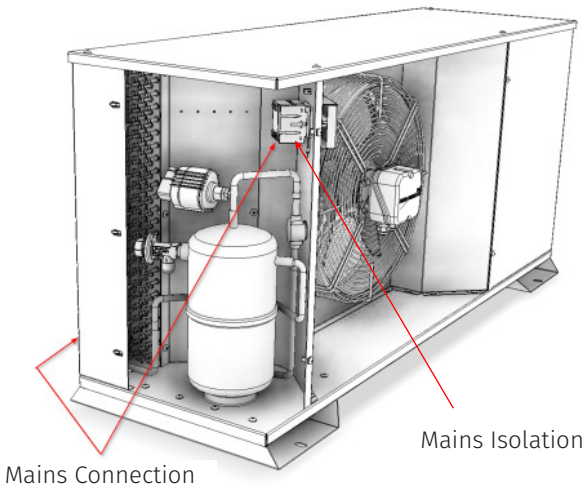
There is no interconnecting wiring between the evaporator and condensing unit. They operate independently on a pump down control system. All Evaporators and Single-phase Condensing units require a Live, Neutral and Earth supply. Three-phase condensing units require a Three-Phase, Neutral and Earth supply. The electrical supply to the unit must be taken from correctly sized main circuit breakers (motor rated) or fuse boxes, which correspond to the condensing unit, evaporator and evaporator heater currents. Additional information can be found within this manual under the electrical section of this document.

10. Power entry to the condensing units

There are two power entry points marked by the **RED** circle. The **BLUE** circle shows the pipe connections.
Ensure any cables are routed clear of the compressor, pipework and crankcase heater to the mains isolator.

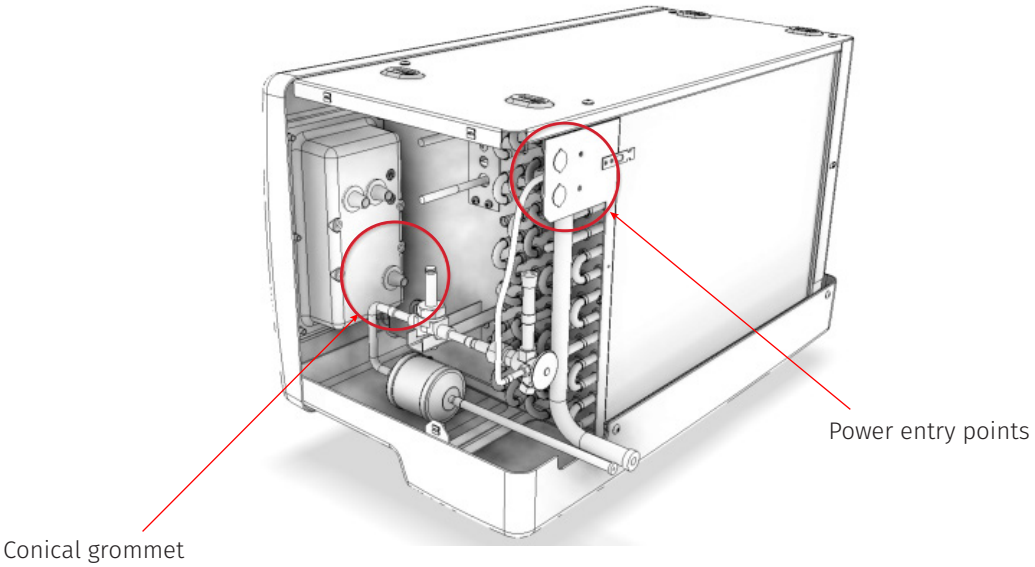
Rear of unit

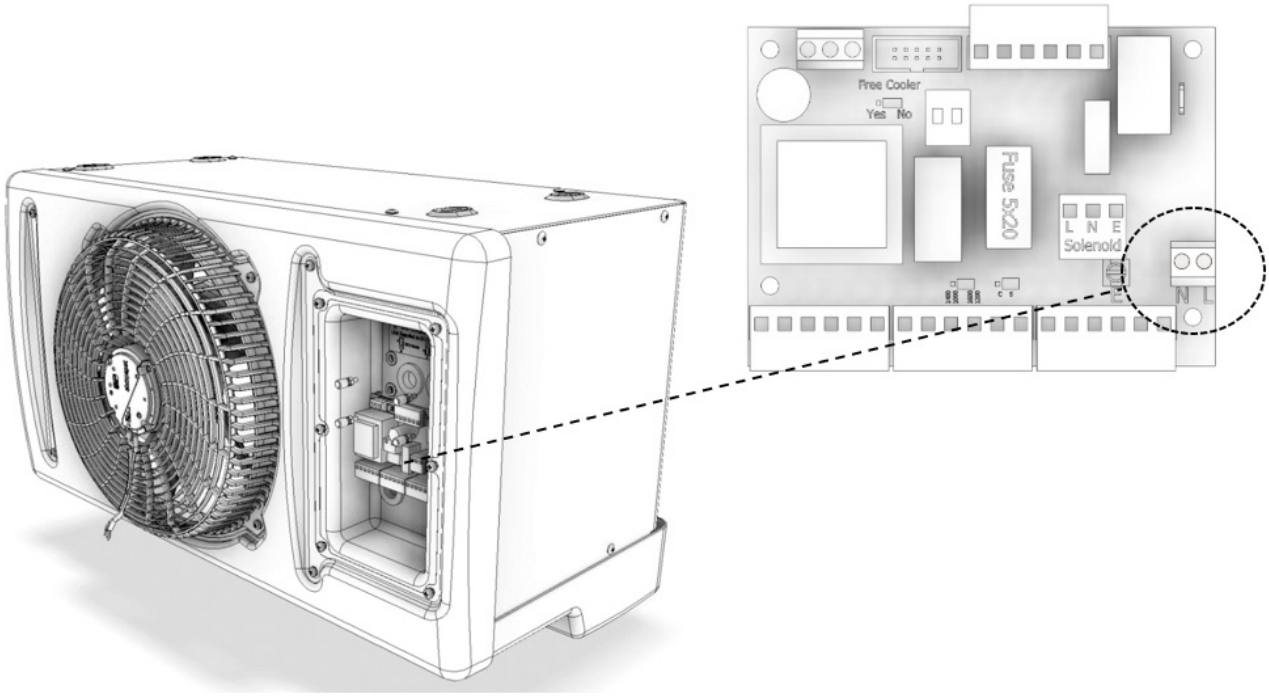




11. Power entry to the evaporators

The power entry points are on the back-left hand side of the evaporator, as shown circled below. The cable should be suitably secured in a gland and earthed to the stud provided. The supply L & N cable cores should be routed into the control box via the conical grommet, as shown circled below.





For access to the control box, the 6 fascia display screws should be removed and the connecting lead to the fascia display should be carefully disconnected. The supply L & N cores should be connected to the 2-way power terminal on the larger PCB, as shown.

12. Pressure testing

Pressure leak test

Both condenser and evaporator units have been strength & leak tested, dehydrated and filled with a holding charge of “dry air” during manufacture. After installation, the entire system should be leak tested before evacuation as follows:

- Pressurize the high-pressure side of the system with Nitrogen to the maximum R448A HP pressure of 25 barg.

CAUTION:
A PRV (set pressure of 27.5 Barg) is fitted and if over pressurized this will blow and will need replacement*

- Check the whole system for leaks, if a leak is found, release the test pressure and repair the leak, then repeat test from the start.

Warning: wear safety goggles when performing the leak testing, and ensure all unnecessary personnel are excluded from the area

***Warning: when leak testing with nitrogen, ensure that appropriate procedures and effective nitrogen detection precautions are in place to prevent asphyxiation if nitrogen is released ***

13. Evacuation

The entire system should be evacuated prior to charging as follows:

- Connect a gauge manifold to the 1/4” flare connections on each service valve. Check the service valves are fully back seated to ensure the pipe and service connection is fully open.
- Connect a vacuum pump to the service port on the gauge manifold, and ensure all paths are open.
- Evacuate the system to below 225 microns (0.3 mbar). The pump should be isolated, and the system pressure monitored. A rapid continuous rise in pressure would indicate a leak in the system.
- During the evacuation process, the crankcase heater should be turned on, by energizing the power supply to the unit.

Warning: do not megger test or start the compressor whilst under a vacuum

14. Refrigerant charging

It is good practice to charge the system immediately after evacuation. This system is designed for use with R448A as the refrigerant and should only be used with R448A. As R448A is a blend, the system MUST always be charged with liquid and never as a gas. While the unit is under vacuum, liquid can be charged into the liquid line via the Schrader point. The main charging process should be completed during commissioning.

Depending on ambient conditions, it may not be possible to fully charge the system from vacuum. If necessary, additional charge can be added whilst running the system close to normal operating conditions (as shown in the table below). The remaining charge is added via the suction service Schroeder. The refrigerant must be added as a liquid to maintain the R448A composition, but no liquid should be present in the suction line of the, compressor. Therefore, an additional pressure drop is required to ensure that the liquid flashes into gas. This is achieved using a liquid expansion charging device, connected via a gauge set.

HIGH SIDE		LOW SIDE	
Condensing	43°	Evaporating	2°C Dew
Air On	32°	Air On	10°C
TD	11K	TD	8K

When the system is correctly charged, the sight glass should be almost free of bubbles and there should be an adequate (5-6K) superheat at the compressor suction. Once the system is fully charged, check for stable conditions. The superheat for the BMIEP evaporator expansion valve is factory set to 5K (approx.). After running for an hour, the superheat should be checked. If adjustment is necessary, remove cap from expansion valve and adjust using small flathead screwdriver. Turning anticlockwise will reduce the superheat. Changes should be made in maximum increments of ½ turns, with the system being allowed to settle for at least 10 minutes after each adjustment has been made.

Once charged, if the unit is left with the power supply turned off, the crankcase heater should be switched on for a minimum of 3 hours before the system is run. This will ensure that the compressor pump is free from liquid refrigerant.

If a leak occurs in the system, the R448A blend may be altered and no longer to suitable for use, as a change in composition can result in undesirable operation of the evaporator TEV. As a result, it is important to determine how much of the refrigerant charge remains in the system. If more than two thirds (2/3) of the original charge remains, the system can be topped up with additional R448A liquid refrigerant once the leak has been repaired. However, if less than thirds (2/3) of the original charge remains, the remaining refrigerant must be removed from the system and is no longer suitable for use as R448A. This refrigerant should not be reused and once the leak has been repaired, the system should be recharged with new R448A refrigerant.

15. Approximate refrigeration charge

The approximate recommended refrigerant charge is shown in the table below. This is calculated from the nominal pipe diameters and standard conditions, this should be used as a guide only.

CONDENSING UNIT	EVAPORATOR UNIT	PIPE RUN - CHARGE IN KG		
MODEL	MODEL	10m	20m	30m
BMOP-130-1	BMIEP-448-37	2.1	2.7	3.3
BMOP-150-1	BMIEP-448-48	2.9	3.5	4.1
BMOP-190-1	BMIEP-448-48	3.0	3.6	4.2
BMOP-210-1	BMIEP-448-48	3.0	3.6	4.3
BMOP-210-1	BMIEP-448-69	2.9	3.5	4.2
BMOP-210-1	BMIEP-448-89	3.8	4.4	6.4
BMOP-250 -1/3	BMIEP-448-89	3.8	4.4	6.4
BMOP-320 -1/3	BMIEP-448-89	4.0	5.5	6.8
BMOP-350-3	BMIEP-448-89	4.2	5.7	7.0
BMOP-360-3	BMIEP-448-133	5.6	6.7	7.9

16. Commissioning

Final checks

Prior to starting the system, final checks should be made to the wiring, ensuring all connections are correct and tight. Before operating the units, check that all guards, motors, mountings and electrical covers are secure, and that all necessary terminal block links are added/removed and that fans rotate freely.

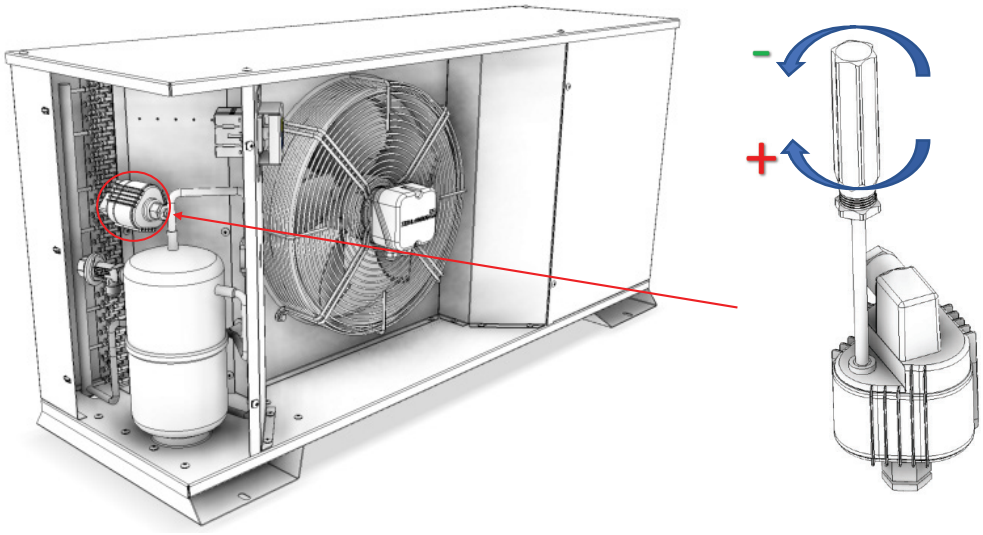
Compressor rotation

Important: Scroll compressors will only compress in one rotational direction.

Three-phase compressors will rotate in either direction depending upon phasing of the power to T1, T2 and T3. Verify that the compressor rotation is correct by checking the suction pressure drops and the discharge pressure rises when the compressor is running. If the compressor rotation is incorrect, the compressor will be very noisy and current draw substantially reduced. Correct the rotation by swapping over any two of the supply phases, if required.

17. BMOP functions

Fan speed controller BMOP

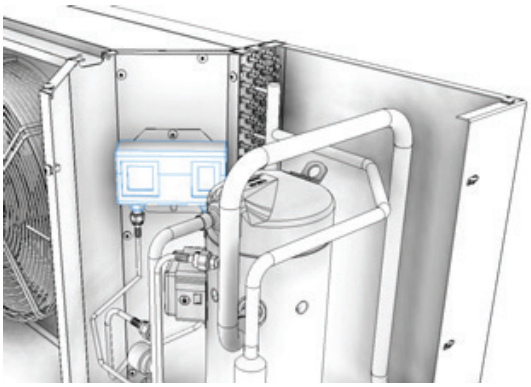


The Series P315PR Controllers are pressure-actuated controllers for electronically commutated motors, suitable for direct mount applications. The P315PR Controllers are suitable for noncorrosive refrigerants under normal environmental conditions.
The Series P315PR is mounted directly to the Liquid line and controls the EC Fan based on the condensing pressure. It comes pre-set at 14barg for optimal performance, but can be adjusted if need via the screw on the back of the device.

- Turning in the **Clockwise** direction will increase the condensing pressure
- Turing in the **Anit-Clockwise** direction will reduce the condensing pressure

HP/LP switches

The condensing unit HP and LP switches are located in the right-hand end of the housing. The device has been pre-set to the conditions specified below.



Low pressure setting

On the suction side of the compressor, the low pressure settings stop the compressor when the pressure gets too low (lower set-point) and restarts the compressor once the pressure has risen back to the upper set-point. These are managed by the mechanical switch as an upper set-point and a differential setting, as below.

Lower set-point (cut-out pressure) = Upper set point (cut-in pressure) – differential.

The default settings are as below:

- Upper set-point = 5 barg
- Differential = 3 barg

This gives a default lower set-point of 2 barg.

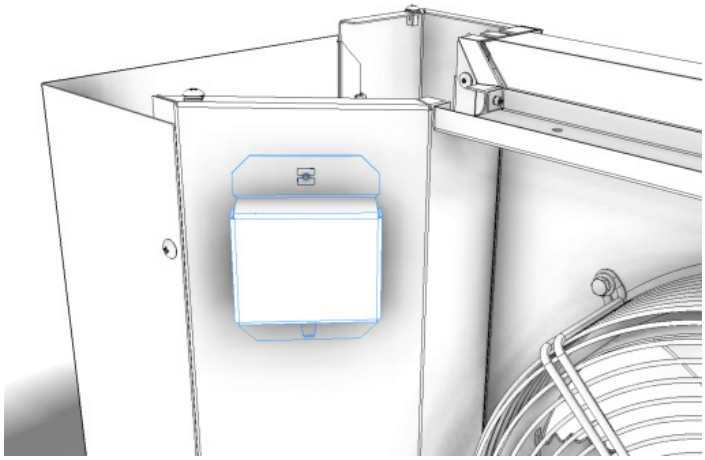
High pressure setting

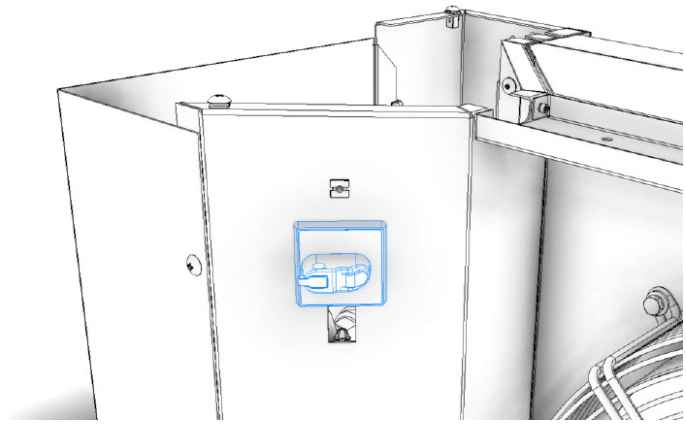
On the discharge side of the compressor, there is a high pressure trip which prevents the compressor from over-pressuring the system. This will stop the compressor if the pressure gets too high and is set to the below set-point by default:

- High pressure trip setting = 25 barg

The high pressure switch has an automatic reset, which is set to restart the compressor at 4 barg below the trip pressure. This differential is not adjustable.

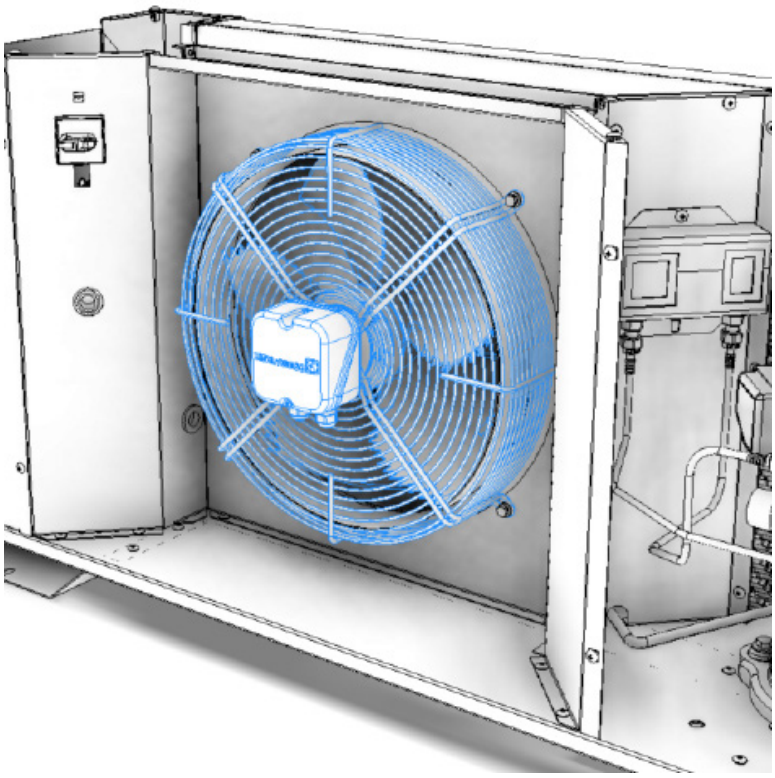
Isolation





The isolator for the BMOP can be found behide the isolator cover. Note this will only isolate the condensing unit, not the evaporator. It is the installer‘s responsibility to decide to fit the cover or leave uncovered. If the isolation cover is used then potentially an auxiliary emergency stop may need to be incorporated as part of the installation.

BMOP fan



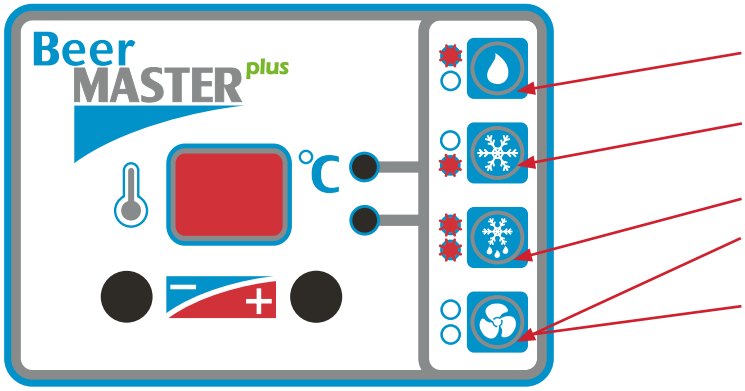
The BMOP fan has an EC fan set and will vary its speed depending on the ambient temperature.
This is controlled via the fan speed controller.

18. BMIEP functions

Electronic controller

The BMIEP controller has a setpoint operating range of 4 to 32°C (Normal operation range 10-13°C.) For operating temperatures below 8°C, a defrost sensor should be fitted (Wolseley pt. no. 684226). For more information on this, please see the section below on defrost.

The controller has two LEDS that indicate controller state, as described below.



- Cooling is switched on when the cellar temperature is 2°C above the set point. (Top LED on)
- Heating is switched on when the cellar temperature is 3°C below the set-point. (Bottom LED on)
- Defrost enabled (Two LEDs on)
- Cooling is switched off when the cellar temperature is 1°C below the set point. (No LEDs on)
- Heating is switched off when the cellar temperature is at the set-point temperature (No LEDs on)

There is a 5-minute anti-cycle timer that is used to protect the compressor from excessive starting/stopping. The anti-cycle timer is operational immediately on power up and prevents the compressor from starting within the first 5 minutes of the unit being turned on.

Controller set-point adjustment

There are two buttons for operating the controller. To adjust the set point,

- Press both left and right button simultaneously for 5 seconds to enter “set” mode. The 2 LEDs should illuminate, and the display should flash when in “set” mode.
- Left button is used to reduce the set point.
- Right button is used to increase the set point.

Controller operation

- In “set” mode, cooling and heater are disabled and the anti-cycle timer is reset inhibiting cooling for 5 minutes.
- “Control” mode is re-established if no button is pressed for 3 seconds and revised set point is accepted.
- In “control” mode, the display shows the actual cellar temperature.
- The temperature set point is the only adjustable parameter.

Defrost

Important: ensure that energy saving mode is disabled in order to use defrost. As per below on evaporator energy saving this means that the relevant jumper must be in the ‘C’ position. Please see on evaporator energy saving for instructions on how to change this.

To enable cooling below 8°C, an additional sensor is required to sense the evaporator coil temperature. With this additional defrost sensor in place the setpoint can be lowered below 8°C.

The secondary sensor should be fitted into the bottom part of the evaporator coil (defrost sensor). It should be inserted between two fins on the air-on side and pushed firmly into the coil. The two fins should be closed around the sensor to keep it in position. When this second sensor is fitted, the controller will initiate an off cycle defrost every 60 minutes. During defrost, cooling is stopped and all the fans are running. The controller will indicate this by both LEDs being on. Defrost is terminated after 30 minutes or if the defrost sensor temperature rises above “set point +1°C”. The evaporator coil should be inspected after initially running for 12 to 24 hours. If any ice has built up, the defrost sensor should be relocated to (or near to) where the ice formed. The coil should be fully defrosted before continuing. The defrost regime is not adjustable.

Controller alarm output & fault signals

If the cellar temperature is outside the acceptable range of -1 or +2°C from the set point temperature for 30 minutes, the alarm will be initiated. The alarm will automatically reset once the cellar temperature is back within this acceptable control band. A 12 vdc relay can be connected between the Alarm signal and the '+12 vdc' connections on the top 6-way connector to energise alarm sirens and/or lamps. The relay-operating coil must be rated at 12 vdc with a maximum current of 50mA.
If either the air or defrost sensor fails, the display will flash a fault signal alternating with the cellar temperature.
The signal will latch and will not reset until the power is reset. Fault signals are: -

- P1/OC = Air sensor Open Circuit,
- P1/SC = Air sensor Short Circuit,
- P2/OC = Defrost sensor Open Circuit,
- P2/SC = Defrost sensor Short Circuit,

If a defrost sensor fault occurs, the setpoint will be limited to a minimum of 8°C until the fault is resolved, even if it has been set lower. If an air sensor fault occurs, the heating and cooling functions are disabled.

Evaporator energy saving

The BMIEP controller, when supplied, is set to energy saving mode. This means that the controller is set to run only the first fan when off cycle or in heating mode. As a result, this significantly reduces energy consumption (where there are multiple fans). In order for the controller to allow multiple fans to run in the off cycle mode, energy saving mode must be disabled.

NOTE: This will increase energy consumption

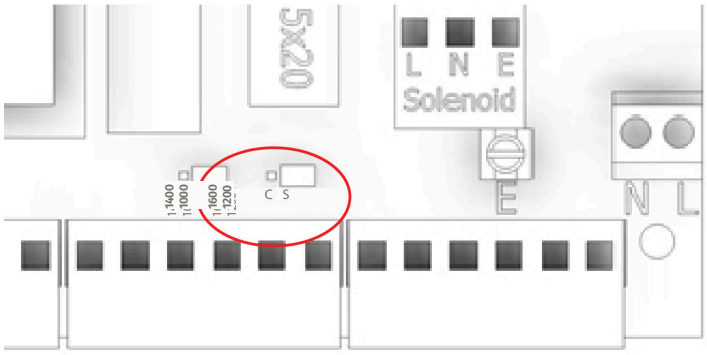
Energy saving mode is enabled/disabled by moving the relevant jumper between 'S' and 'C' options, as below.

- Having the jumper in the S position (right-hand position) means that energy saving is enabled
- Having the jumper in the C position (left-hand position) means that energy saving is disabled

Note: Energy saving mode should not be used in conjunction with off cycle defrost

The controller can be set to have both fans running in the off-cycle mode if required by following the steps below to disable energy saving mode.

- Turn off and isolate the power to the BMIEP unit.
- Remove the front cover from the control's facia.
- Find the small jumper labelled C and S. It is located to the left of the earth screw, as per the diagram below.
- Move the jumper to the left-hand two pins marked 'C'.
- Replace the front cover of the control's facia.



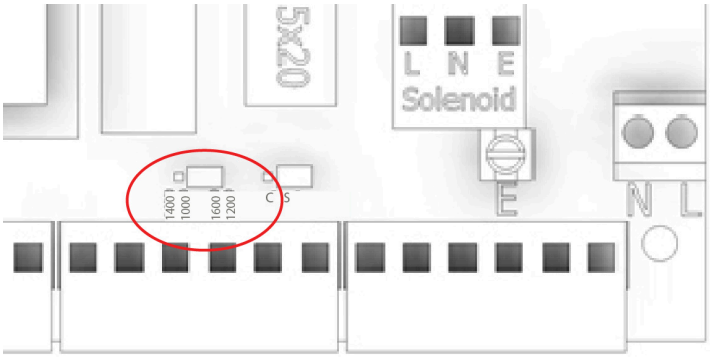
Please note that these modes are only applicable on units with multiple fans. If the unit only has one fan, changing the jumper between S and C settings will not impact operation or the energy consumption.

Operation modes

As well as energy saving mode, the BMIEP controller has two different speed options. This means that the fan can be set at lower speeds to reduce the noise, if necessary. The default speed option has a fan speed of 1600rpm when cooling is on and 1200rpm when cooling is off. The reduced noise option reduces these speeds to 1400 rpm and 1000rpm respectively.

The speed modes can be changed to the reduced noise option by following the instructions below:

- Turn off and isolate the power to the BMIEP unit.
- Remove the front cover from the control's facia.
- Find the small jumper labelled '1400/1000' and '1600/1200'. This is located to the left of the energy saving mode jumper, as in the Evaporator energy saving sectionand is shown circled in the diagram below.
- Move the jumper to the upper two pins marked '1400/1000' position.
- Replace the front cover of the control's facia.

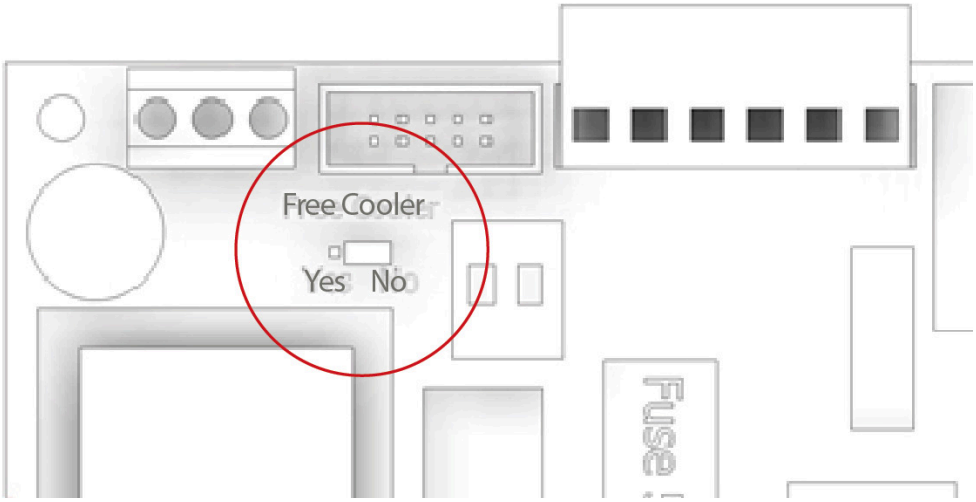


Note: Capacity will drop and run time may increase when running at the reduced fan speeds.

Note: Reducing the fan speed will lower the cooling performance by approximatively 6%. This however does lower the noise level on the unit and can be seen in Section 21

Free cooler

There is an additional option to use a free air cooler (BFC) to reduce energy consumptions. If a BFC is to be installed as part of the system, the free option mode needs to be enabled. This is achieved by moving the free cooler jumper to the YES position (left hand position). This jumper is located as per the diagram below. Once the jumper has been set to yes, a two-core cable will need to be connected from the terminal block to the terminals on the BFC unit.



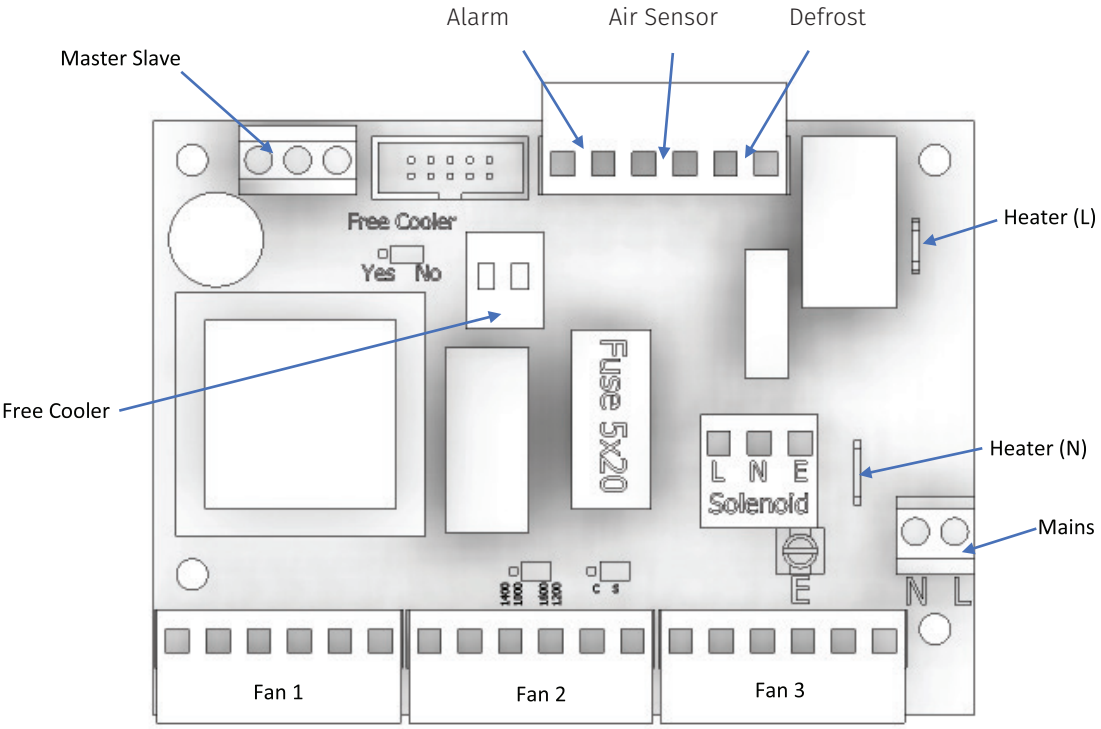
Master / Slave wiring

When using two BMIEP evaporators connected to the same BMOP condensing unit, the controllers MUST be linked together to run in unison as follows.

1. One BMIEP evaporator must be selected to be the master unit and the other BMIEP the slave unit.
2. Isolate the electrical supply to all units.
3. Open the slave BMIEP controller front fascia and remove the display lead plug from the power PCB board.
4. Connect a 3-core cable to the Master/Slave connection on the top left corner of the board, and route out the back of the unit.
5. Open the master BMIEP controller front fascia and connect the 3-core cable to the Master/Slave connection, ensuring the cores are matched to the same terminals on both boards.
6. Leave the display lead connected on the Master BMIEP.
7. Re-assemble the controller fascias.
8. When running the master BMIEP display will operate as normal, with the slave BMIEP running in unison. The slave BMIEP controller will remain blank and the setpoint will be managed through the master BMIEP.

Note: See Page 34 for Wiring

PCB Connections



19. Maintenance

Warning: the unit must be electrically isolated before maintenance work is undertaken

The following routine maintenance is required:

Every 3-6 months

The condenser should be cleaned to ensure correct operation of the condensing unit. If the condenser coil is obstructed by dirt or rubbish, the unit will experience high condensing temperatures which will result in higher running costs, loss of compressor efficiency and, ultimately, overheating of the compressor and/or condenser fans.

Every 12 months

- Check security of fixings, especially the fan and motor mountings.
- Check refrigerant pipeline for damage and leaks.
- Check evaporator and condenser motors (fans should rotate freely).
- Check the tightness of the liquid and suction service valves.

When necessary

- For both the evaporator and condenser, clean the fins, guard and general casework. Care must be taken when cleaning the fins to prevent damage. It is recommended that a soft brush and mild detergent solution be used.
- High-pressure spray washing of the unit must not be undertaken, as damage to fins, fin coatings and other components will occur. Low pressure spray washing using specialist coil cleaning solutions is recommended.

20. Standards applied to the product range

Pressure equipment directive (PED) 2014/68/EU & Pressure Equipment (Safety) Regulations 2016

- BS EN 14276-1:2006+A1:2011 - Pressure equipment for refrigerating systems and heat pumps. Vessels. General requirements
- Maximum System PED category assessment CAT I

Machinery directive 2006/42/EC & Supply of Machinery (Safety) Regulations 2008

- BS EN 378-2:2016 - Refrigerating systems and heat pumps. Safety and environmental requirements. Design, construction, testing, marking and documentation
- BS EN ISO 12100:2010 – Safety of machinery. Basic Concepts. General principles for design. Risk assessment and risk reduction

Low voltage directive 2014/35/EU & Electrical Equipment (Safety) Regulations 2016

- BS EN 60335-1:2012+A13:2017 Household and similar electrical appliances – Safety-Part 1: General Requirements
- BS EN 60335-2-24:2010+A2:2019 Household and similar electrical appliances-Safety-Part 2-24: Requirements for refrigerating appliances, ice cream appliances and ice makers
- EN 60529:1991- Degrees of protection provided by enclosures (IP Code)

EMC Directive 2014/30/EU & Electromagnetic Compatibility Regulations 2016

- EN 61000-6-1:2007 - Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments
- EN61000-6-3:2007 A1:2011 - Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments (inclusive of EN 55014-2:2015 performance criteria in regard to Voltage dips and interruptions, as applicable)

Other relevant directives / standards

- BS EN 378-1:2016 - Refrigerating systems and heat pumps. Safety and environmental requirements. Basic requirements, definitions, classification and selection criteria
- RoHS Directive 2011/65/EU
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
- REACH Directive 1907/2006
- WEEE Directive 2012/65/EU

21. Noise levels

All noise levels are in free field conditions, Condensing unit is at 10m, and the Evaporators 3m

BMOP

CONDENSING UNIT	SOUND PRESSURE LEVELS		AIR VOLUMES	
MODEL	AIR ON 20°C	AIR ON 32°C	AIR ON 20°C	AIR ON 32°C
	dB(A) @10m	dB(A) @10m	m^3/s	m^3/s
BMOP-130-1	34.8	39.7	0.7	0.8
BMOP-150-1	34.8	39.7	0.6	0.8
BMOP-190-1	34.8	39.7	0.5	0.7
BMOP-210-1	35.3	39.9	0.5	0.7
BMOP-250 -1/3	35.3	39.9	0.5	0.7
BMOP-320 -1/3	36.9	42.4	1.3	1.6
BMOP-350-3	36.9	42.4	1.2	1.6
BMOP-360-3	36.9	42.4	1.1	1.5

BMEIP

EVAPORATOR MODEL	SINGLE FAN OFF CYCLE (DEFAULT)				ALL FANS OFF CYCLE			
	DEFAULT SET UP		OPTIONAL - LOW NOISE		DEFAULT SET UP		OPTIONAL - LOW NOISE	
	ON CYCLE (1600rpm)	OFF CYCLE (1200rpm)	ON CYCLE (1400rpm)	OFF CYCLE (1000rpm)	ON CYCLE (1600rpm)	OFF CYCLE (1200rpm)	ON CYCLE (1400rpm)	OFF CYCLE (1000rpm)
BMIEP - 448-37 BMIEP - 448-48	52	45	50	44	52	45	50	44
BMIEP - 448-69 BMIEP - 448-89	55	45	54	44	55	49	54	47
BMIEP - 448-133	57	45	55	44	57	51	55	49

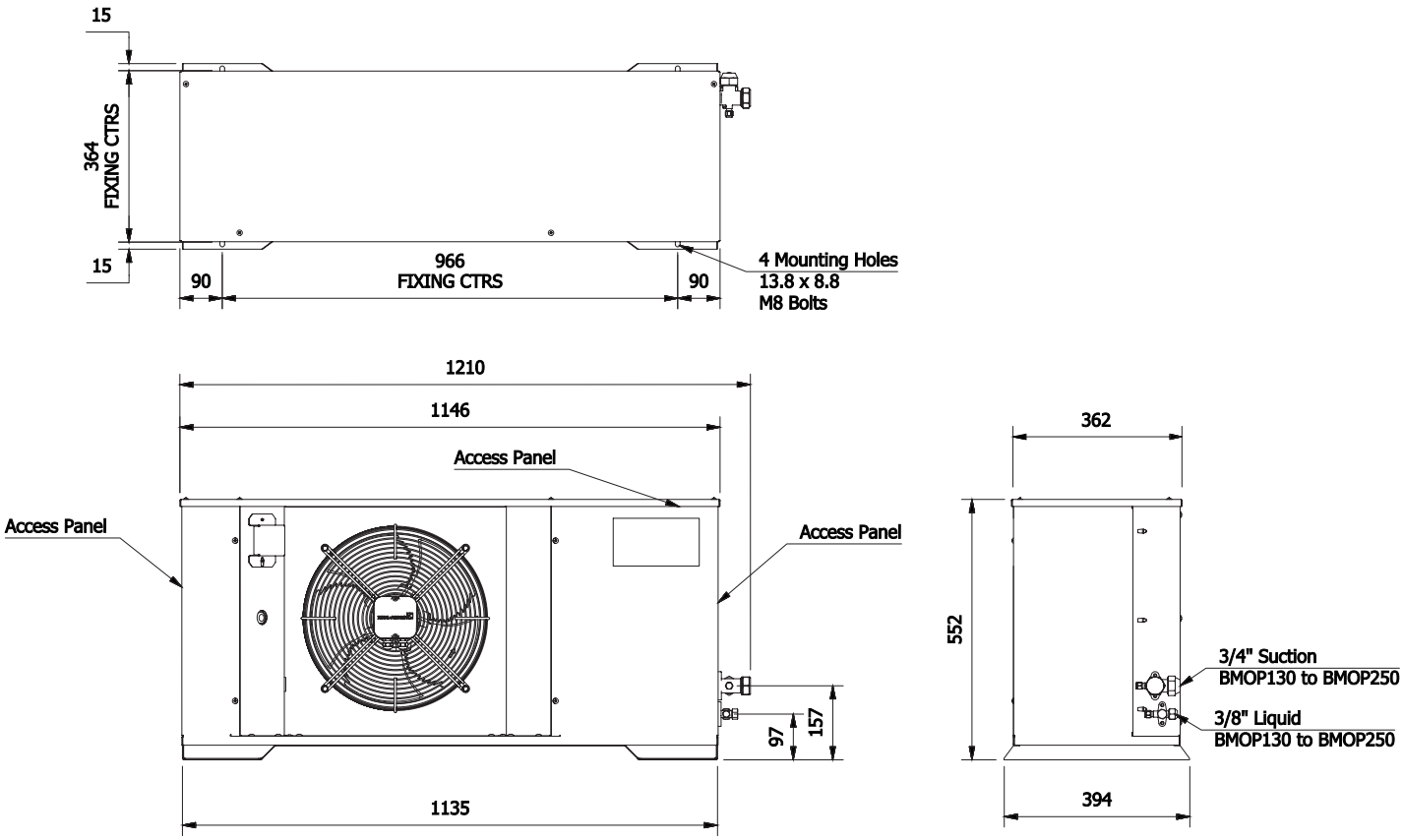
SOUND PRESSURE db(A) @ 3m

22. Weights

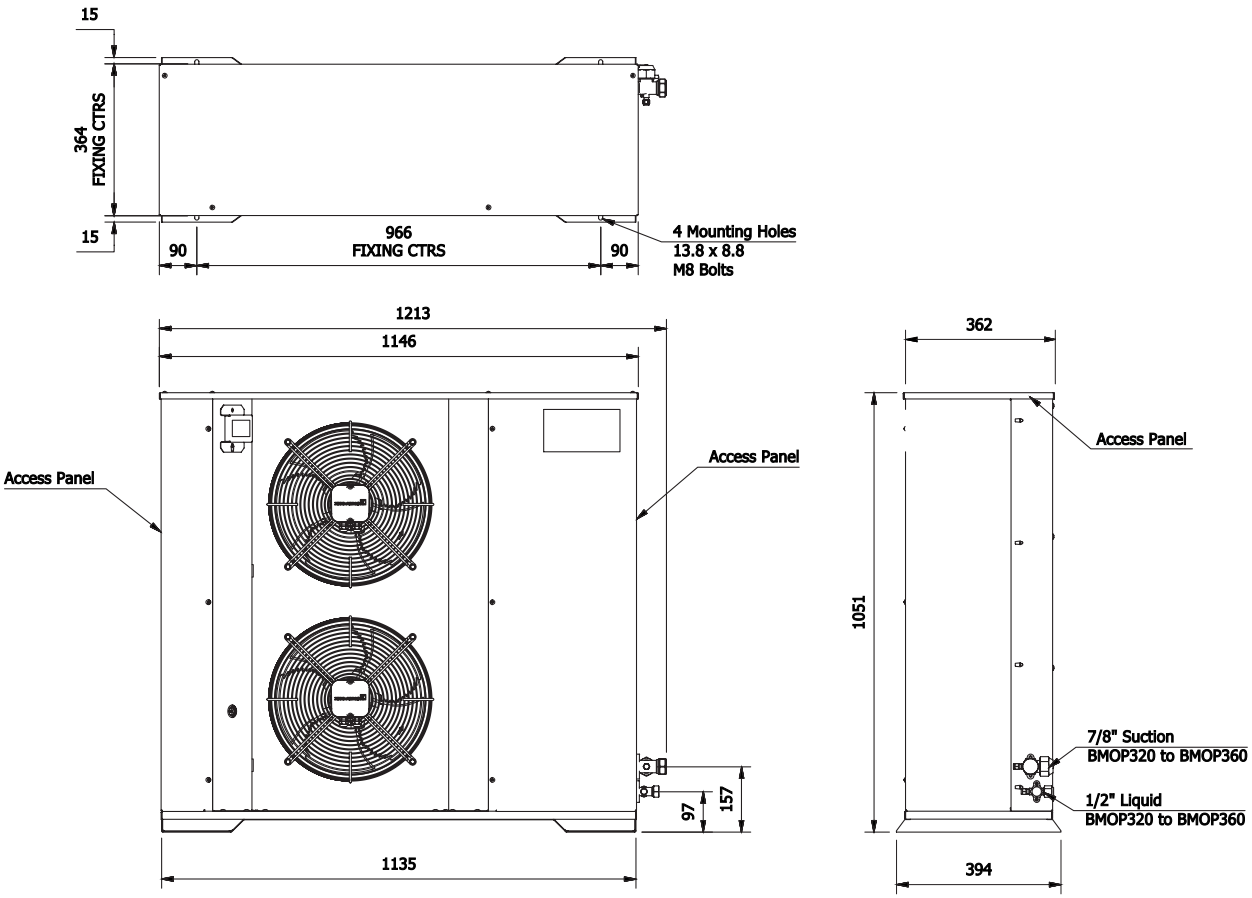
MODEL	CONDENSING UNIT	MODEL	EVAPORATOR
	EMPTY WEIGHT		EMPTY WEIGHT
	KG		KG
BMOP130	62	BMIEP - 448-37	25
BMOP150	64	BMIEP - 448-48	29
BMOP190	65	BMIEP - 448-69	38
BMOP210	66	BMIEP - 448-89	46
BMOP210	66	BMIEP - 448-133	62
BMOP250	67		
BMOP350	96		
BMOP360	96		

23. Sales outlines

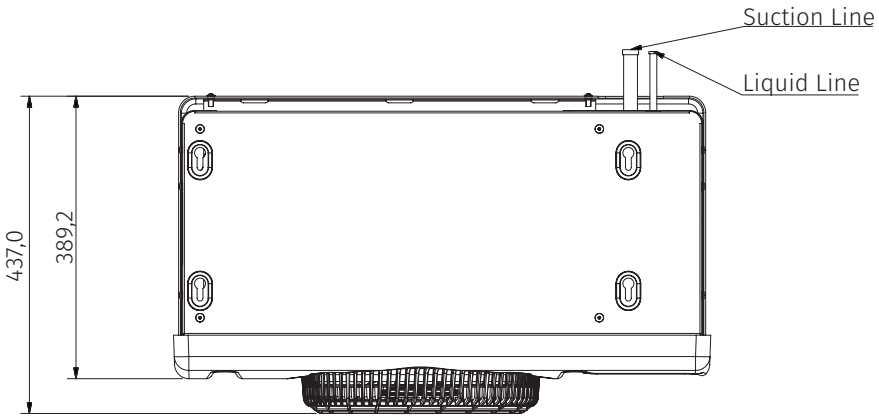
BMOP130 - BMOP250

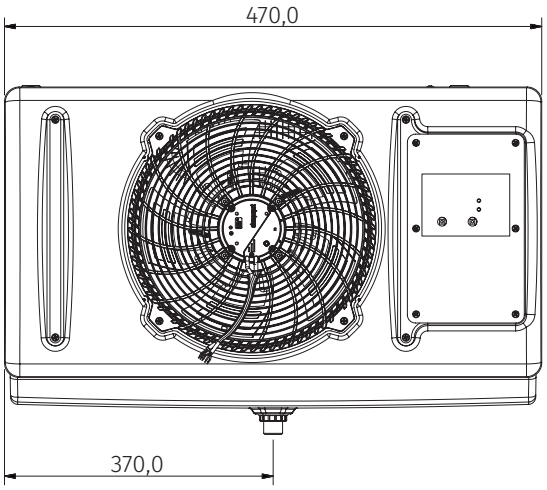


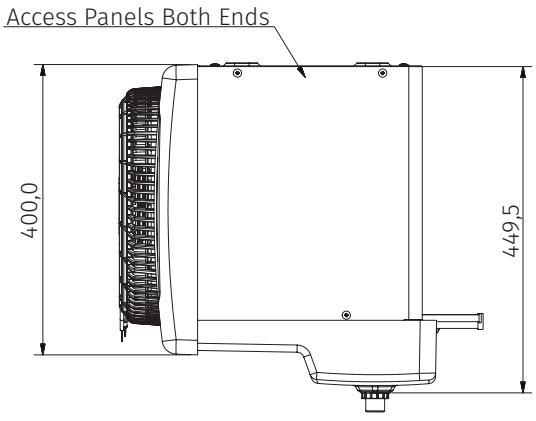
BMOP 320 350 360



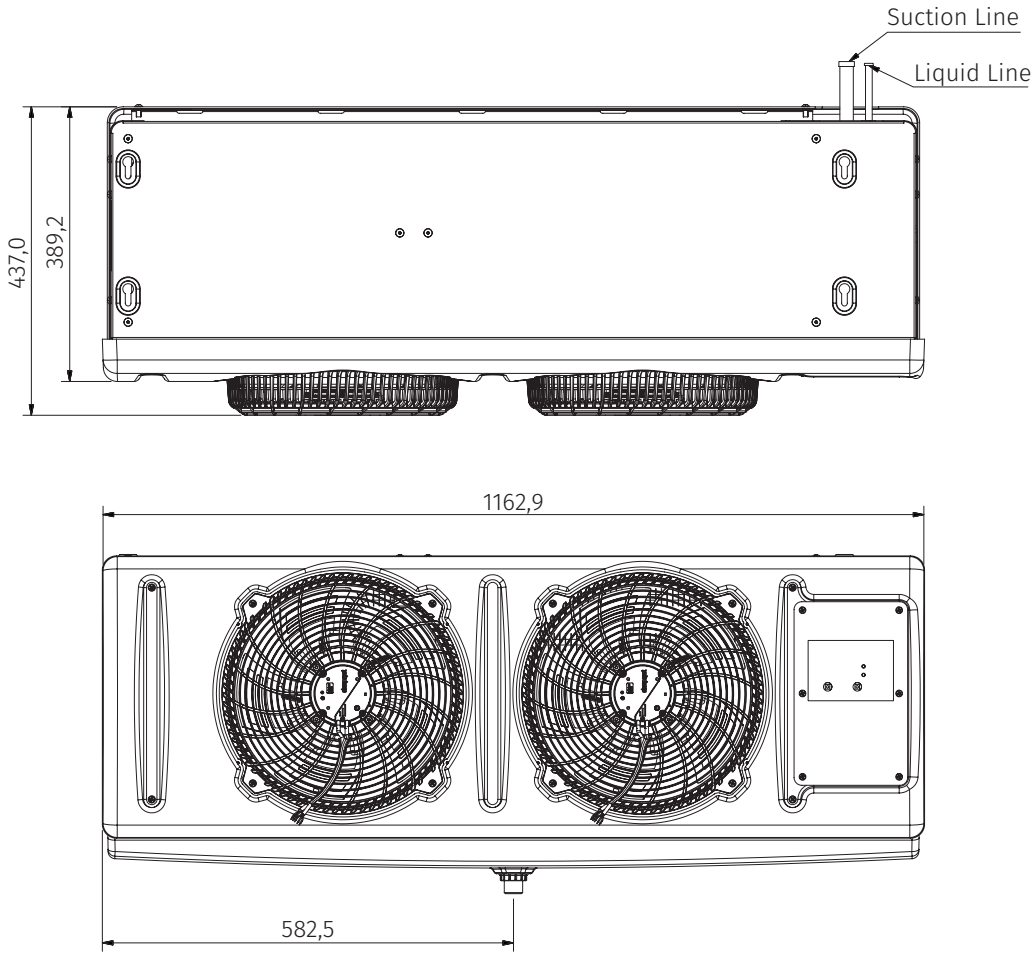
BMIEP-37 & 48


Suction Line
Liquid Line
437,0
389,2

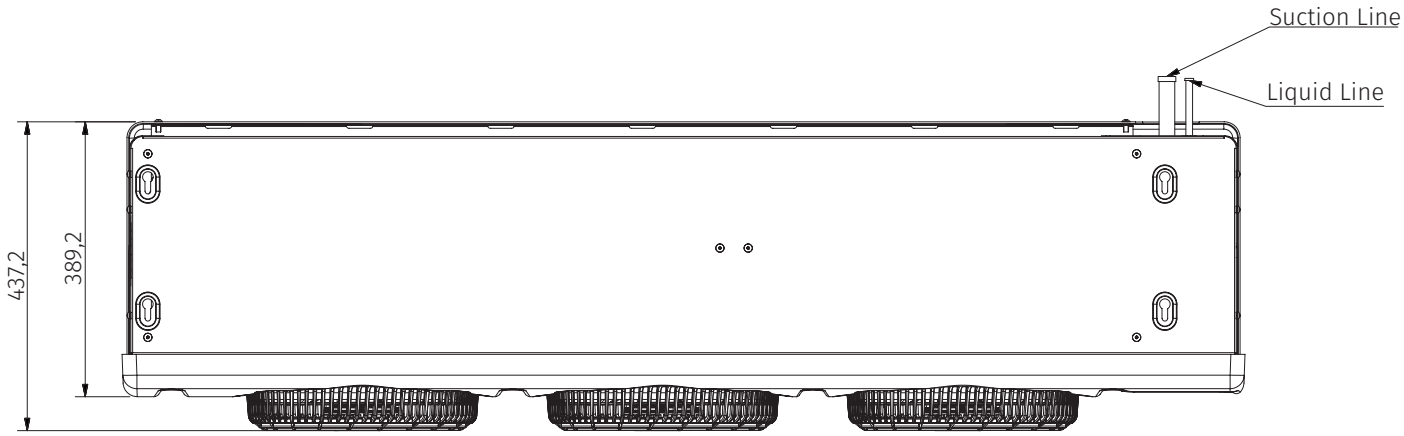

470,0
370,0


Access Panels Both Ends
400,0
449,5

BMIEP-69 & 89


Suction Line
Liquid Line
437,0
389,2
1162,9
582,5
Access Panels Both Ends
400,0
450,5

BMIEP-133


Suction Line
Liquid Line
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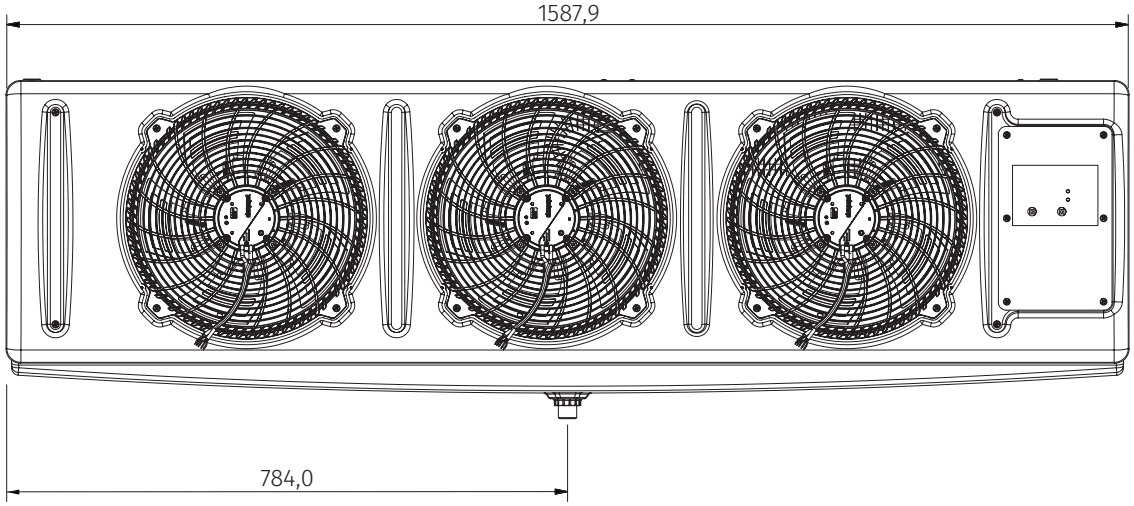
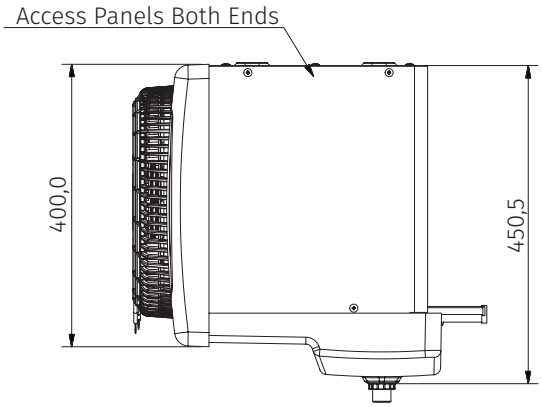
389,2


1587,9
784,0


Access Panels Both Ends
400,0
450,5

24. Electrical

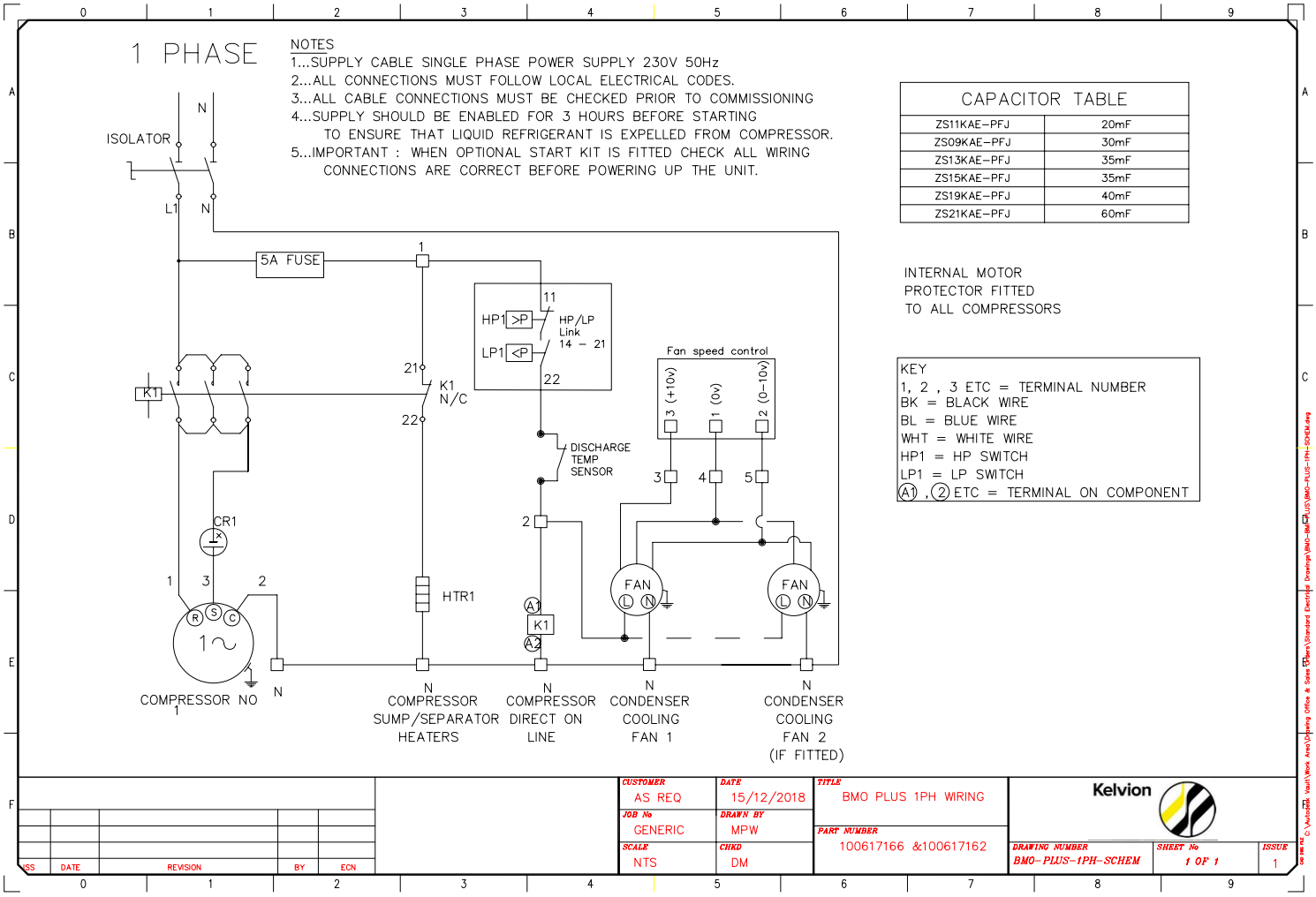
BMOP running amps

					MINIMUN CABLE SIZE	
CONDENSING UNIT	TOTAL UNIT		MOTOR RATED	MOTOR RATED	UP TO 25m	UP TO 50m
MODEL	FLC (A)	LRA (A)	FUSE SIZE (A)	MCB SIZE (A)	mm^2	mm^2
BMOP130-1	13.5	45	16	16	1.5mm²	2.5mm²
BMOP150-1	15.4	45	16	16	1.5mm²	2.5mm²
BMOP190-1	16.8	54	20	20	1.5mm²	2.5mm²
BMOP210-1	20.4	60	25	25	1.5mm²	4.0mm²
BMOP250-1	23.6	70	25	25	2.5mm²	4.0mm²
BMOP250-3	9.1	28	16	16	1.5mm²	1.5mm²
BMOP320-1	28.7	83	32	32	2.5mm²	4.0mm²
BMOP320-3	11.6	30	16	16	1.5mm²	1.5mm²
BMOP350-3	11.5	30	16	16	1.5mm²	1.5mm²
BMOP360-3	15.9	43	20	20	2.5mm²	2.5mm²

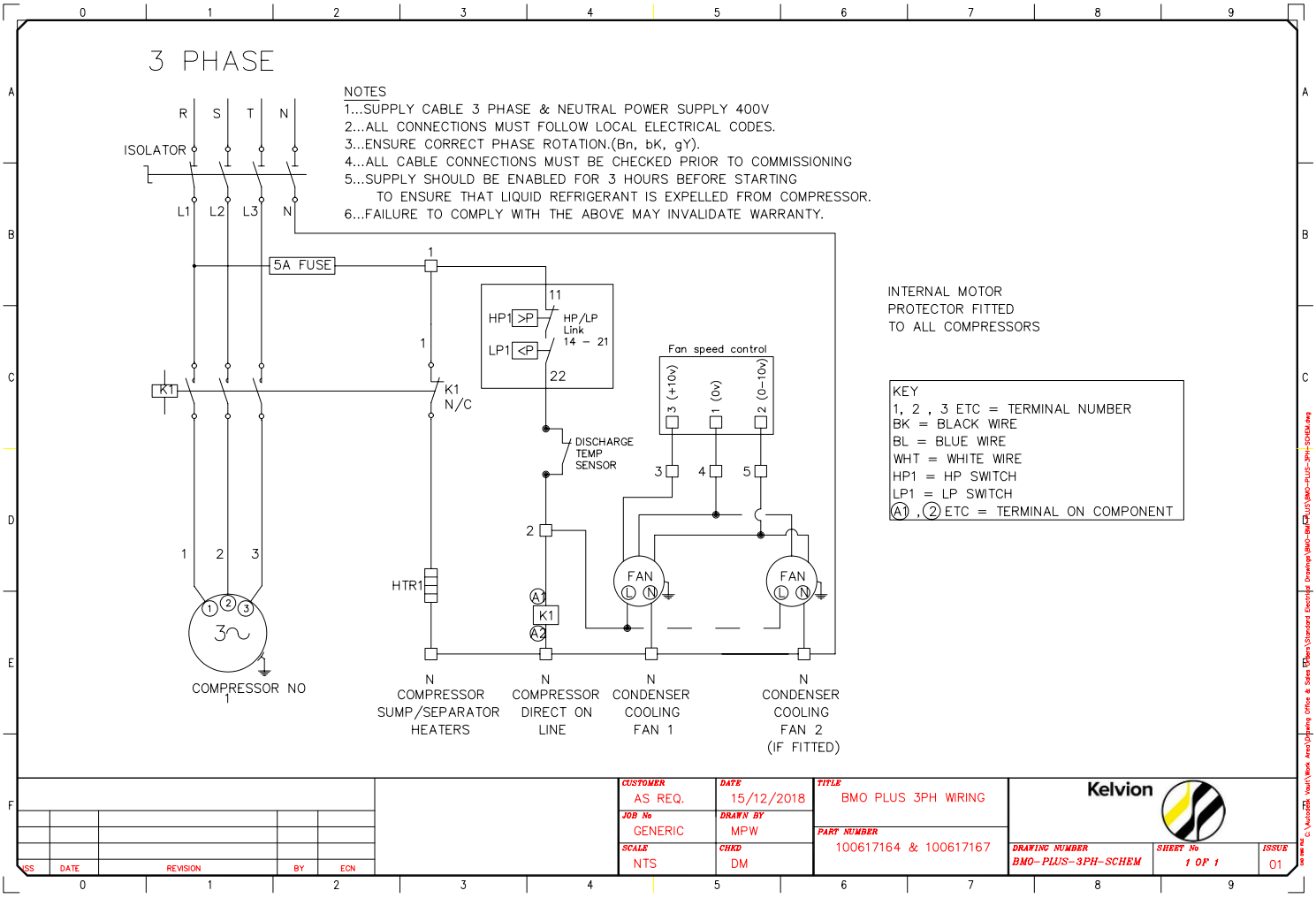
BMIEP running amps

EVAPORATOR UNIT MODEL	FAN MOTOR					HEATER		MOTOR RATED FUSE SIZE (A)	MOTOR RATED MCB SIZE (A)
	NUMBER	DIAMETER	TYPE	POWER 230V 1ph MAX	FLC (A)	POWER 230V 1ph	FLC (A)		
	FLC (A)	mm		W		W			
BMIEP - 448-37	1	300	EC	84	0.67	1100	4.8	16	16
BMIEP - 448-48	1	300	EC	88	0.68	1100	4.8	16	16
BMIEP - 448-69	2	300	EC	168	1.34	2200	9.6	20	20
BMIEP - 448-89	2	300	EC	176	1.36	2200	9.6	20	20
BMIEP - 448-133	3	300	EC	264	2.04	2200	9.6	20	20

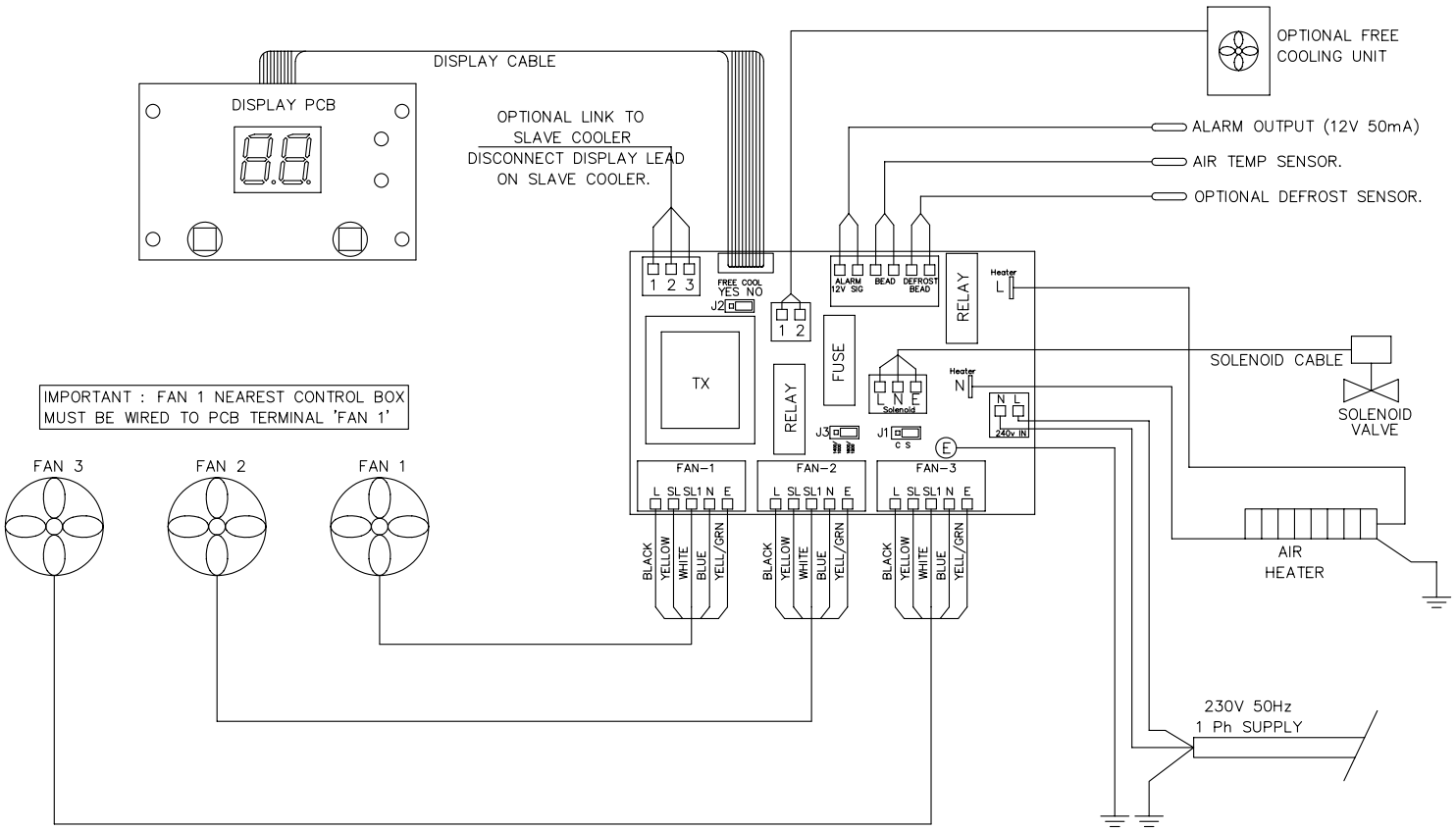
BMOP 1PH – (BMO-PLUS-1PH-Schem: Rev1)



BMOP 3PH – (BMO-PLUS-3PH-Schem: Rev1)



BMIEP All Units



25. Guarantee / warranty procedure

For products and services supplied directly by Wolseley, you should follow the procedure outlined below.
This warranty applies to all units detailed in this document and, unless otherwise stated in product literature or specific contracts, provides for a manufacturer's guarantee of twenty-four months from date of dispatch against faults in workmanship or materials.

When submitting a warranty claim the following information is required:

- Customer's original reference number job / order number.
- Wolseley job number / advice note number.
- Type of unit and serial number.
- Date of installation.
- Details of defect.

When providing details of the defect, please give as much information as possible, ie.

- Was the unit satisfactory on delivery?
- Frequency of fault (continuous / intermittent)
- Is the unit leaking? (+ location of leak)
- Items manufactured by Wolseley:

No work should be undertaken to resolve the problem either by the customer or a 3rd party until approved by Wolseley – failure to do so could invalidate the warranty.

The item may be replaced or rectified if the guarantee claim is valid.
For items that have been installed, Wolseley have the right to decide if rectification on site is suitable and who should undertake the work or whether to return / replace the unit(s). For items where Wolseley decides to replace, the original faulty item must be returned. All items which are returned will be inspected.

If the guarantee claim is not valid the customer will be advised and further instructions requested, either to return the item or to issue an official order to replace or rectify the item.

If you require a replacement product the buyer will be asked to supply a purchase order, when the unit has been returned and evaluated, the buyer will be notified by Wolseley if the claim is valid.

Sales support & technical support contact details.

Refrigeration technical support

- Selection Spares & Capital Equipment and Materials
- Contact your Regional Engineer
- Midlands 01926 705 069
- South 01179 165694
- North & Scotland 07796 993 202
- London & South East 07713 696035
- Lines open: 8.00am - 5.00pm Monday to Friday
- Mail: refrigeration.support@wolseleyuk.com

Scan the QR code for product support and technical information on this range.

WOLSELEY

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