CELLAR COOLER RANGE
TECHNICAL MANUAL

R448A/R449A

CELLAR PLUS CELLAR COOLER RANGE

ISSUE: 01.06.2023

UK CA CE

J&E Hall International

IMPORTANT!

READ BEFORE PROCEED!

GENERAL SAFETY GUIDELINES

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

This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to refrigerants, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

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!

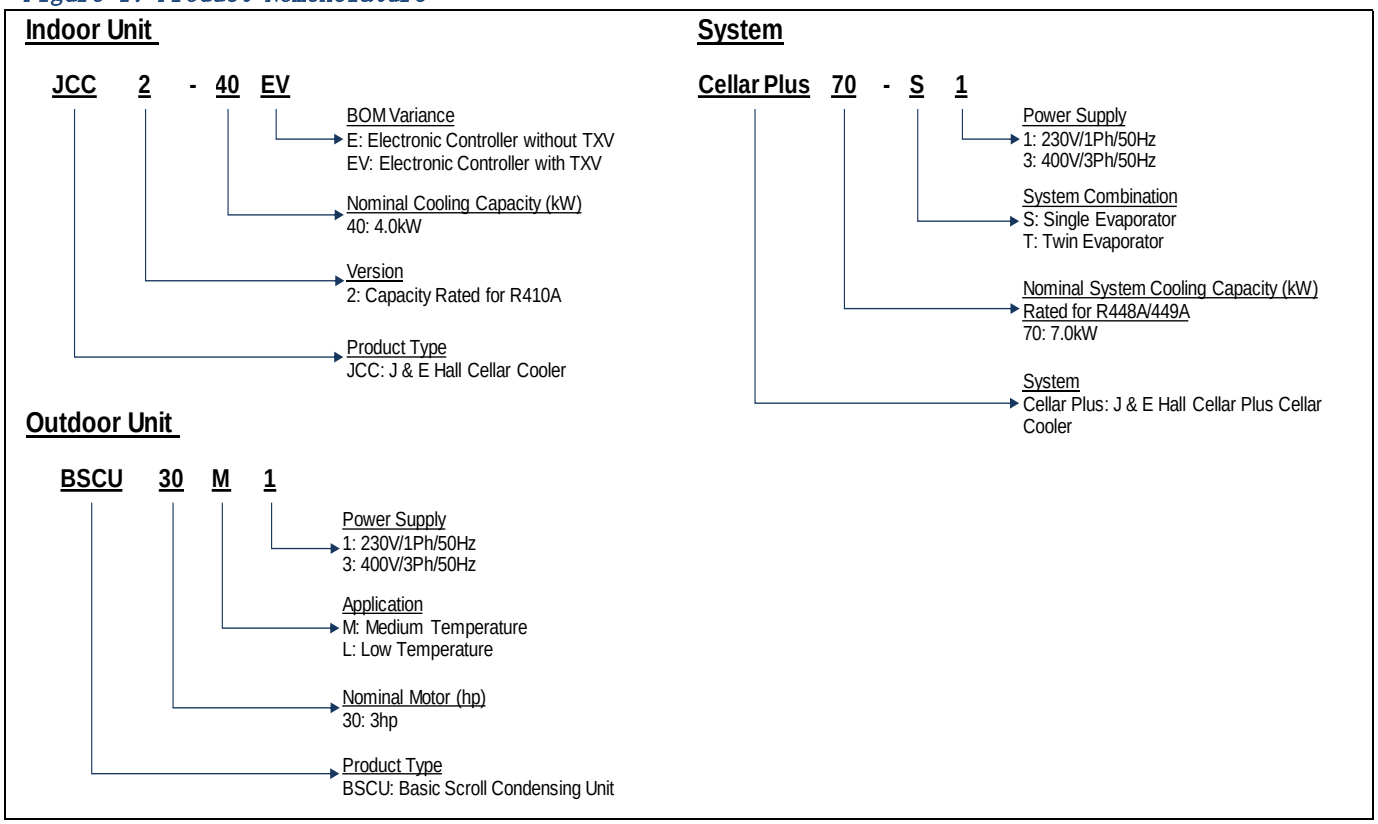
NOTICE
Disposal requirement

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.

Contents

Nomenclature

Figure 1: Product Nomenclature



Product Features

J & E Hall Cellar Plus Cellar Cooler is a split R448A/R449A refrigeration equipment where an outdoor unit coupled to single/twin indoor. All the indoor units come pre-fitted with a thermostatic expansion valve. Connecting pipe is required from indoor to outdoor unit, to cool and maintain a storage space temperature range down to +4°C and up to +16°C. This range of temperature makes it suitable for preservation of beers, wines, flowers, fruit, vegetables etc.

Main features of the indoor and outdoor listed below:

The indoor unit consist of:

- Brewery specification 6 fins/inch Al-Cu evaporator coil
- AC axial fan integrated with run capacitor
- Digital thermostat with off cycle defrost
- Thermostatic expansion valve
- Polyester powder coated steel casing
- Accessories: 1”-14UNF drain pipe fitting

And the outdoor unit consist of:

- Single or three phase scroll compressor
- AC axial fan with run capacitor
- Al – Cu condenser with inner groove 10mm
- Adjustable dual pressure switch
- Filter drier and liquid sight glass
- Basic module control box
- Service valves with braze connection
- Acoustic panel insulation

Product Range

Single Evaporator Systems:

- Cellar Plus 70-S1/S3
- Cellar Plus 80-S1/S3

Twin Evaporator Systems:

- Cellar Plus 70-T1/T3
- Cellar Plus 80-T1/T3
- Cellar Plus 90-T1/T3

Specifications

Table 1: Capacity Data

System	Ta (°C)	Cooling Capacities in kW (R448A/R449A)						
		Troom (°C)						
		4	6	8	10	12	14	16
CellarPlus 70-S1/S3	27	5.78	6.26	6.73	7.21	7.69	8.17	8.64
	32	5.53	5.99	6.44	**6.90**	7.35	7.81	8.26
	38	5.16	5.61	6.05	6.50	6.95	7.40	7.85
CellarPlus 80-S1/S3	27	6.81	7.27	7.73	8.18	8.64	9.10	9.55
	32	6.75	7.10	7.52	**7.94**	8.35	8.77	9.19
	38	6.71	7.01	7.32	7.62	7.93	8.23	8.53
CellarPlus 70-T1/T3	27	6.55	6.87	7.18	7.50	7.82	8.13	8.45
	32	6.27	6.57	6.87	**7.17**	7.47	7.78	8.08
	38	5.23	5.64	6.06	6.47	6.88	7.29	7.71
CellarPlus 80-T1/T3	27	6.70	7.19	7.68	8.17	8.67	9.16	9.65
	32	6.57	7.02	7.47	**7.93**	8.38	8.83	9.28
	38	6.62	6.94	7.26	7.57	7.89	8.20	8.52
CellarPlus 90-T1/T3	27	8.40	8.80	9.20	9.61	10.01	10.41	10.81
	32	8.01	8.40	8.80	**9.19**	9.59	9.98	10.38
	38	7.53	7.92	8.31	8.70	9.08	9.47	9.86

Notes:

(1) Cooling capacity rated at standard pipe length 7.6m.

Table 2: System Data

System	Nominal Capacity (1) (kW)	Outdoor Units				Indoor Units						System COP	Max. Pipe Run (m)
		Unit Model	Pipe Connections		Air Flow (m^3/h)	Unit Model	Pipe Connections		Air Flow (m^3/h)	Air Throw(3) (m)	Noise(2) dB(A)		
			Suction	Liquid			Inlet	Outlet					
CellarPlus 70-S1/S3	6.90	BSCU-30-M1 BSCU-30-M3	3/4"	3/8"	2765	1x JCC2-80EV	1/2"	3/4"	4070	10	50	2.21	50
CellarPlus 80-S1/S3	7.94	BSCU-35-M1 BSCU-35-M3	3/4"	1/2"	3350	1x JCC2-80EV	1/2"	3/4"	4070	10	50	2.27	50
CellarPlus 70-T1/T3	7.17	BSCU-30-M1 BSCU-30-M3	3/4"	3/8"	2765	2x JCC2-40EV	1/2"	5/8"	(2x) 2270	10	(2x) 48	2.14	50
CellarPlus 80-T1/T3	7.93	BSCU-35-M1 BSCU-35-M3	3/4"	1/2"	3350	2x JCC2-50EV	1/2"	5/8"	(2x) 2680	10	(2x) 47	2.20	50
CellarPlus 90-T1/T3	9.19	BSCU-40-M1 BSCU-40-M3	7/8"	1/2"	4250	2x JCC2-60EV	1/2"	3/4"	(2x) 2560	10	(2x) 47	2.25	50

Notes:

(1) Cooling capacities are nominal duties @ 10°C DB / 8°C WB and 32°C ambient.

(2) Noise levels are sound pressure levels @ 10m free field

(3) Indoor unit air throw distance is based on final air velocity of 0.4m/s.

NOTICE

For applications where:

- Back-to-back installation, at least 3meter pipe run with loop (to damp vibration) is required to avoid sound of outdoor unit transferred to indoor unit via connecting pipe.

Table 3: Unit Dimensions and Weights

System	Outdoor Units				Indoor Units				
	Unit Model	W x D x H (mm)	Fixing Ctrs. (mm)	Weight (kgs)	Unit Model	W x D x H (mm)	Fixing Ctrs. Top (mm)	Fixing Ctrs. Rear (mm)	Weight (kgs)
CellarPlus 70-S1/S3	BSCU-30-M1	1108 x 478 x 649	703 x 448	77	1x JCC2-80EV	1437 x 505 x 557	1173 x 324	1173 x 310	63
	BSCU-30-M3			76					
CellarPlus 80-S1/S3	BSCU-35-M1	1334 x 530 x 864	946 x 500	97	1x JCC2-80EV	1437 x 505 x 557	1173 x 324	1173 x 310	63
	BSCU-35-M3			96					
CellarPlus 70-T1/T3	BSCU-30-M1	1108 x 478 x 649	703 x 448	77	2x JCC2-40EV	865 x 505 x 489	745 x 122	745	(2x) 33
	BSCU-30-M3			76					
CellarPlus 80-T1/T3	BSCU-35-M1	1334 x 530 x 864	946 x 500	97	2x JCC2-50EV	904 x 504 x 546	826 x 122	826	(2x) 36
	BSCU-35-M3			96					
CellarPlus 90-T1/T3	BSCU-40-M1	1351 x 530 x 864	946 x 500	107	2x JCC2-60EV	904 x 504 x 546	826 x 122	826	(2x) 38
	BSCU-40-M3			107					

Table 4: Electrical Data and Requirements

System	Outdoor Units							Indoor Units				
	Unit Model	Power Supply (V/ph/Hz)	Power (kW)	MCC (2) (A)	LRA (2) (A)	RRC (1) (A)	SFR (3) (A)	Unit Model	Power Supply (V/ph/Hz)	Power (kW)	RRC (1) (A)	SFR (3) (A)
CellarPlus 70-S1/S3	BSCU-30-M1	230/1/50	2.70	21.5	82.0	12.2	25	1x JCC2-80EV	230/1/50	0.43	1.9	6
	BSCU-30-M3	400/3/50		10.3	40.0	5.1	16					
CellarPlus 80-S1/S3	BSCU-35-M1	230/1/50	3.08	25.0	97.0	14.0	32	1x JCC2-80EV	230/1/50	0.43	1.9	6
	BSCU-35-M3	400/3/50		9.0	46.0	5.7	20					
CellarPlus 70-T1/T3	BSCU-30-M1	230/1/50	2.90	21.5	82.0	13.3	25	2x JCC2-40EV	230/1/50	0.45	2.0	6
	BSCU-30-M3	400/3/50		10.3	40.0	5.4	16					
CellarPlus 80-T1/T3	BSCU-35-M1	230/1/50	3.17	25.0	97.0	14.3	32	2x JCC2-50EV	230/1/50	0.44	2.0	6
	BSCU-35-M3	400/3/50		9.0	46.0	5.8	20					
CellarPlus 90-T1/T3	BSCU-40-M1	230/1/50	3.65	28.0	114.0	17.4	40	2x JCC2-60EV	230/1/50	0.44	2.0	6
	BSCU-40-M3	400/3/50		11.0	50.0	6.8	20					

Notes:

(1) RRC: Rated Run Current (RRC) and power consumption of outdoor unit, rated at 10°C DB / 8°C WB and 32°C ambient.

(2) MCC: Maximum Continuous Current; LRA: Locked Rotor Amps. Both values are for the unit compressor only.

(3) SFR: Suggested Fuse Rating (Motor Rated for Outdoor Unit)

Table 5: Outdoor Unit Sound Spectrums

Model	1/1 Octave Sound Pressure Levels @ 1 meter from front of the unit								Noise Levels (10m)
	Frequency								
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	A (dBA)	A (dBA)
BSCU-30-M1/M3	62.1	56.7	51.3	48.2	43.1	38.3	31.3	54.1	34
BSCU-35-M1/M3	63.5	62.7	53.1	48.6	43.9	38.8	32.4	56.3	36
BSCU-40-M1/M3	61.4	61.7	58.6	55.2	51.7	48.3	43.1	60.7	41

Health and Safety

CAUTION

Only a qualified refrigeration engineer, who is familiar with refrigeration systems and components including all controls, should perform the installation and start-up of the system. To avoid potential injury, use care when working around coil surfaces or sharp edges of metal cabinets. All piping and electrical wiring should be installed in accordance with all applicable codes, ordinances, and local by-laws.

General Information

Before Installation

- Ensure the units received are the correct models for the intended application.
- Ensure the refrigerant, voltage and maximum working pressure are all suitable for the proposed application.
- Check there is no damage to the units. Any damage should be reported to the supplier immediately.
- Check that the proposed equipment locations are suitable and provide adequate support for the weight of the units.

Offloading and Lifting

- Whenever the outdoor or indoor unit is lifted, it should be from the base and, where possible, all packing and protection is kept in position.
- If lifting equipment is required, ensure that it is suitable, certificated, and that the operators are qualified to use it.
- When using a fork-lift or pallet truck to lift the outdoor unit, the two support points should be sufficiently apart to give stability when lifting and suitably placed to distribute the load on the forks.
- When using a pallet truck to lift the unpacked indoor unit, protect the casing surface with cushion to avoid damage on the drain pan. Two support points must be sufficiently apart to give stability when lifting.
- If slings are used, care should be taken to ensure that the slings do not crush the casework or coil.
- Do not drop the unit. Should this inadvertently happen, it should be immediately unpacked and inspected for damage.

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.
- Safe working methods are identified, and operators should have suitable Personal Protection Equipment.
- Ensure the working area has adequate ventilation during brazing procedures.
- The units contain moving machinery and electrical power hazards, which may cause severe injury or death. Disconnect and shut off power before installation or service of the equipment.
- Refrigerant release into the atmosphere is illegal. Proper evacuation, recovery, handling, and leak testing procedures must always be observed.
- Units must be **grounded to the screw** terminal labelled
- No maintenance work should be attempted prior to disconnecting the electrical supply.
- The electrical covers and fan guards must remain always fitted.
- 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.

Installation

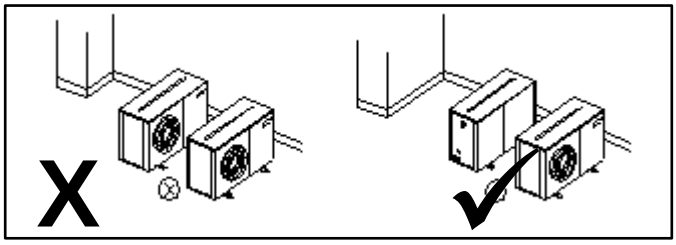
Unit location and Fixing

Both indoor and outdoor units must be level in all directions.

Outdoor

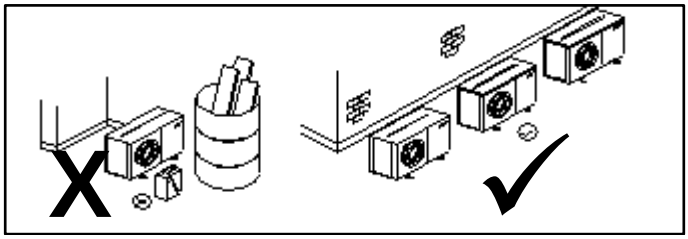
- The installer must fix the unit securely on installation using the M8 bolt holes in the unit feet to prevent instability from accidental contact.
- It is recommended to install the outdoor unit on rubber grommet or vibration dampers.
- The units are not designed to withstand loads or stress from other equipment or personnel. Such extraneous loads or stress may cause failure/leak/injury.
- The units are not designed to operate with any restrictions such as heavy snowfall around them. Additional measures (such as shielding of the units) shall be implemented as required.
- To achieve maximum cooling capacity, the installation location for the condensing unit should be carefully selected.
- Install the outdoor unit in such a way so that hot air ejected by the unit cannot be drawn in again (short circuit of hot discharge air). Refer ***Figure 2***.

Figure 2: Positioning of Condensing Unit



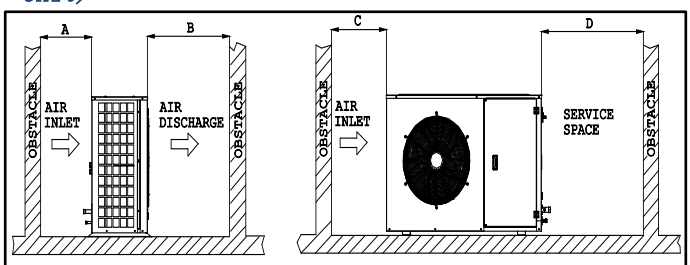
- Ensure that there is no obstruction to air flow into or out of the unit. Remove obstacles which block air intake or discharge. Refer ***Figure 3***.

Figure 3: Air Circulation for Condenser



- Allow sufficient space for maintenance around the unit. Refer ***Figure 4***.

Figure 4: Installation Clearance (Outdoor Unit)



Indicator	A	B	C	D
Minimum Distance	300 mm	1000 mm	300 mm	500 mm

- The location must be well ventilated, so the unit can draw in and distribute plenty of air thus lowering the condensing temperature.
- To optimize the unit running conditions, the condenser coil must be cleaned at regular intervals.

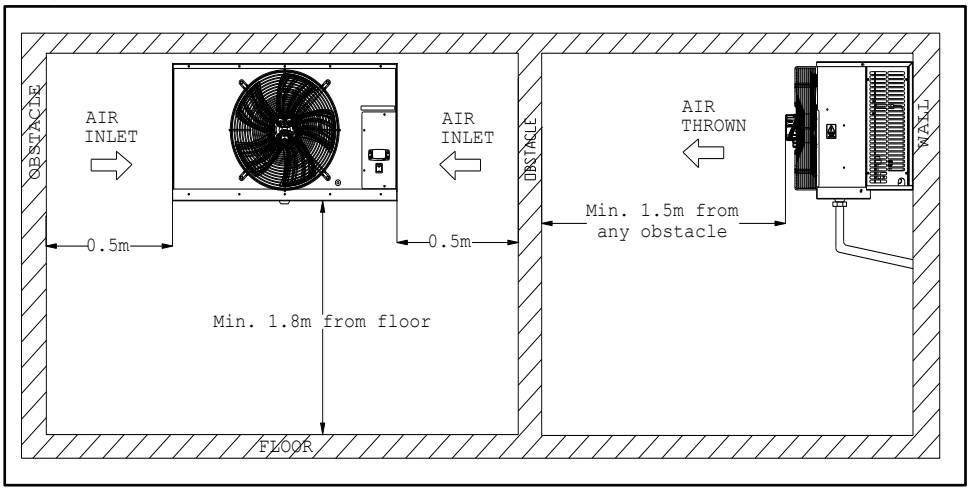
NOTICE

Special attention should be given to an outdoor unit installed near to the sea as this can reduce unit lifespan due to corrosion of metal parts.

Indoor

- The indoor units can be mounted directly to a wall or to the ceiling utilizing the fixing holes on the rear of the unit or on the top of the unit. No additional brackets are required.
- A minimum 10mm rawl bolt type fixing is required with a large steel washer to bear the indoor unit weight. It is important to ensure that the wall/ceiling can withstand the unit weight and that all fixings are secure.
- Position the indoor unit where the optimum airflow can be achieved. Avoid locating in corners or in alcoves which may restrict airflows.
- Avoid mounting indoor directly over door openings. It is recommended to locate the indoor opposite door openings to reduce infiltration and the amount of warm, humid air drawn into the cold room. Also, to locate indoors so that the distance to the opposite wall does not exceed the unit's rated air throw distance.
- The installation location should allow sufficient space for air flow and maintenance around the units. Refer ***Figure 5***.
- **Twin systems, both evaporators need to be in the same room/controlled space. It is not possible to put evaporators in separate rooms.**

Figure 5: Installation Clearance (Indoor Unit)



Field Piping

NOTICE

Line sizing should be done according to section: Pipe Sizing. Correct line sizing will minimize the pressure drop and maintain sufficient gas velocity for proper oil return. All applicable standards must be observed in the installation of refrigerant piping.

NOTICE

The system should be installed to utilize a pump down configuration.

To ensure satisfactory operation and performance, the following points should be noted:

- Pipework routes must be as simple and as short as possible.
- Use of incorrect pipe sizes can affect system pressures/temperatures and gas velocity for proper oil return.
- Use only clean, dehydrated refrigeration grade copper tube with long radius bends.
- When brazing use brazing filler alloys containing phosphorus such as BCuP-7 without flux for joining copper tubes.
- Run braze without over filling to ensure there is no leakage into the tube.
- To prevent oxidation, blow oxygen free nitrogen through pipework when brazing.
- Protect the casing of the unit when brazing connections.
- To prevent condensation on pipe surface, install insulation with a minimum wall thickness 1/2" on all suction lines and on all pipes penetrating walls or passing through hot areas.
- Adequately support all pipe work at a maximum of 2-meter intervals.
- Pump down control is done by adding solenoid valve along the liquid line. By closing a liquid line solenoid valve, the refrigerant can be pumped into the condenser and receiver, and the compressor operation controlled by means of a low-pressure control. The refrigerant can thus be isolated during periods when the compressor is not in operation, and migration of refrigerant to the compressor crankcase is prevented. Therefore, there is no need for any interconnecting wiring between the evaporator and condensing unit.
- Avoid low points on pipework where oil can accumulate.
- Suction gas velocity must be more than 4m/s for horizontal pipe and 8~12m/s for vertical pipe, to ensure good oil return.
- For the outdoor unit located above the indoor unit, the use of U-trap and double suction risers is often required. These suction risers must always be fitted with a U-trap at the bottom and a P-trap at the top and never be higher than 4m unless a second U-trap system is fitted (***Figure 6***).
- Liquid lines should be sized to ensure a full supply of liquid refrigerant to the expansion device.
- For the outdoor unit located below the indoor unit, attention should be paid to the sizing of liquid lines on vertical riser by limiting the maximum rise to 6m (***Figure 7***).
- For the outdoor unit located below indoor unit: Inverted P-trap is necessary when pump down is not used. To prevent refrigerant from draining into the compressor during off-cycle (***Figure 7***).

- Suction pipework should slope gently back towards the unit to assist oil return to the compressor. A fall of approximately 2cm per meter of pipework is acceptable.
- The maximum recommended pipe length is 50m.
- Additional oil may be required if piping length exceeds 20m or multiple oil traps are fitted. Check the oil level closely during commissioning and add oil, as necessary. Add oil in small amounts. **Do not overfill the compressor!**
- It is recommended to install Pressure Relief Valve on the liquid receiver if there is a risk of fire incidence. Increasing temperature will lead to pressure increase in receiver.
- No valves and detachable joints shall be in areas accessible to the public except when they comply with EN 16084.

Figure 6 Piping Layout for Outdoor Above Indoor

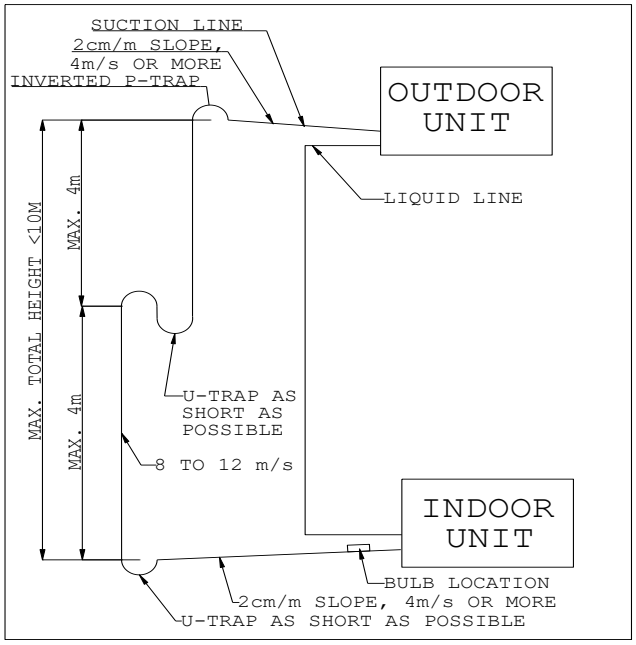
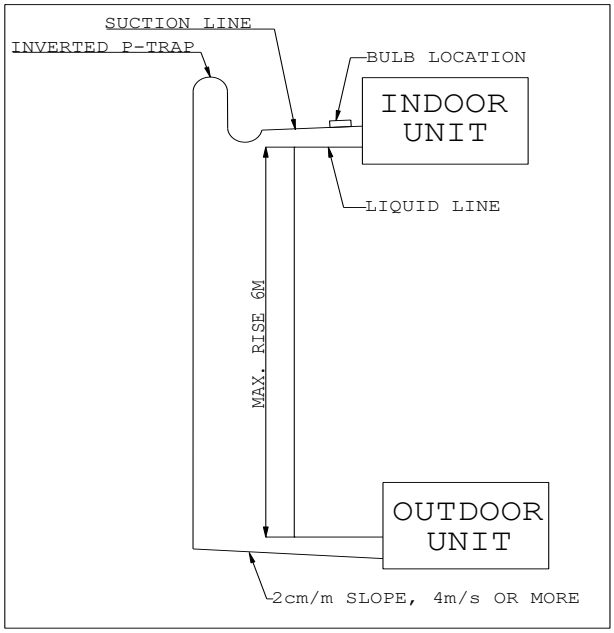


Figure 7: Piping Layout for Outdoor Below Indoor



NOTICE

One of the main factors affecting equipment reliability and compressor service life is refrigeration circuit contamination.

During installation, circuit contamination could cause by:
- Brazing and Welding Oxides
- Filings and Particles from de-burring pipework
- Brazing Flux
- Moisture & Air

Pipe Sizing

When refer ***Table 6*** for selecting the connecting pipe size, the total equivalent length must include elbows and other components that would increase the equivalent length.

Table 6: Total Equivalent Length

System	Condensing Unit Model	Evaporator Models	TEV Model	Pipe Sizing: 10°C Cellar R448A/R449A					
				10m		20m		30m	
				Liquid	Suction	Liquid	Suction	Liquid	Suction
CellarPlus 70-S1/S3	BSCU-30-M1/M3	1x JCC2-80EV	1x TE2-03	3/8"	3/4"	3/8"	7/8"	3/8"	7/8"
CellarPlus 80-S1/S3	BSCU-35-M1/M3	1x JCC2-80EV	1x TE2-04	1/2"	7/8"	1/2"	7/8"	1/2"	7/8"
CellarPlus 70-T1/T3	BSCU-30-M1/M3	2x JCC2-40EV	2x TE2-02	**3/8"** (2x 3/8")	**3/4"** (2x 5/8")	**3/8"** (2x 3/8")	**7/8"** (2x 5/8")	**3/8"** (2x 3/8")	**7/8"** (2x 5/8")
CellarPlus 80-T1/T3	BSCU-35-M1/M3	2x JCC2-50EV	2x TE2-02	**1/2"** (2x 3/8")	**7/8"** (2x 5/8")	**1/2"** (2x 3/8")	**7/8"** (2x 5/8")	**1/2"** (2x 3/8")	**7/8"** (2x 5/8")
CellarPlus 90-T1/T3	BSCU-40-M1/M3	2x JCC2-60EV	2x TE2-02	**1/2"** (2x 3/8")	**7/8"** (2x 3/4")	**1/2"** (2x 3/8")	**7/8"** (2x 3/4")	**1/2"** (2x 3/8")	**1 1/8"** (2x 3/4")

Notes:
(1) The pipe sizes indicated in bold are from condensing unit to 'T' piece.
(2) The pipe sizes indicated in brackets are from 'T' piece to each evaporator.
(3) Pipework should be selected on the total equivalent length of run between units.
(4) For pipe sizing on runs longer than 30m, please contact J & E Hall.

Example for Suction Pipe Selection:
Cellar Plus 70-S3, outdoor unit mounted above indoor unit with vertical riser 4.5m and horizontal pipe run 7.4m, the suction line ¾" OD is composed of 5pcs elbow 90⁰ long radius and 1pcs 180⁰ std radius.

Read equivalent length from ***Table 7***.

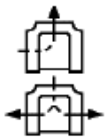
- Elbow 90⁰ long radius; 5 x 0.4 = 2.0m
- Elbow 180⁰ std radius; 1 x 1.0 = 1.0m
- Total pipe run = 7.4 + 4.5 = 11.9m

Total equivalent length = 2.0 +1.0 +11.9 = 14.9m

Read from ***Table 6***,
With total equivalent length 14.9m, the horizontal suction pipe selected based on column 20m, which is 7/8" OD to minimize the capacity drop.

In this example, if the outdoor unit is installed **above** the indoor (this is the most severe condition for oil return especially at low ambient and low room temperature). Suction riser must be selected based on column 10m, which is ¾" OD to ensure sufficient gas velocity to return oil to compressor.
Note: If the outdoor unit installed below the indoor unit, the vertical pipe size follows the size of the horizontal pipe.

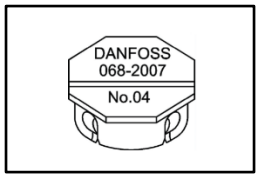
Table 7: Equivalent Length for Fittings and Valve (in meter)

Nominal Pipe or Tube Size (inch)	Smooth Elbows				Smooth Bend Tee Connections				Globe or Solenoid Valve	Gate Valve
	90⁰ Std	90⁰ Long Radius	45⁰ Std	180⁰ Std	Flow Through Branch	Straight Through Flow				
						No Reduction	Reduced 25%	Reduced 50%		
										
3/8	0.4	0.3	0.2	0.7	0.8	0.3	0.4	0.4	5.2	0.2
1/2	0.4	0.3	0.2	0.7	0.8	0.3	0.4	0.4	5.2	0.2
5/8	0.5	0.3	0.2	0.8	0.9	0.3	0.4	0.5	5.5	0.2
3/4	0.5	0.3	0.2	0.8	0.9	0.3	0.4	0.5	5.5	0.2
7/8	0.6	0.4	0.3	1.0	1.2	0.4	0.6	0.6	6.7	0.3
1 1/8	0.8	0.5	0.4	1.2	1.5	0.5	0.7	0.8	8.8	0.3
1 3/8	1.0	0.7	0.5	1.7	2.1	0.7	0.9	1.0	12	0.5

Expansion Valve

- All evaporator models are pre-fitted with expansion valve TE2-02 in the piping, except JCC2-80EV which is supplied with two sizes of orifice as standard. Orifice size -03 is installed in the piping, and the orifice size -04 was supplied loose (packed in a polybag tagged to the expansion valve body).
- The capillary tube label, which is in green color fastened around the capillary of expansion valve indicates the pre-fit orifice size (Example: ***Figure 8*** indicates orifice size (04).

Figure 8: Capillary Tube Label



- Refer ***Table 6*** to change the orifice size in JCC2-80EV to match the coupled condensing unit. Follow ***Figure 9*** to install the orifice.
- Installer is recommended to change the capillary tube label accordingly if orifice had been changed.
- Incorrect positioning of the sensing bulb will lead to the malfunctioning of the expansion valve. Refer ***Figure 10*** for the correct sensing bulb orientation to suit different pipe diameters.
- **Never mount the sensing bulb on the bottom side** of the horizontal piping due to oil returning to the compressor may give false signal to the expansion valve.
- It is recommended to mount the sensing bulb on the horizontal pipe. If mount the sensing bulb at vertical pipe, the capillary tube must be pointing upwards to avoid malfunctioning of the expansion valve.
- Make sure the sensing bulb is far from the brazing or remove the sensing bulb before brazing.

Figure 9: Orifice Installation in TE2

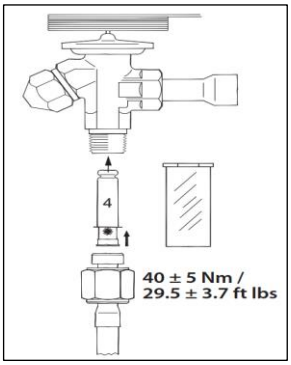
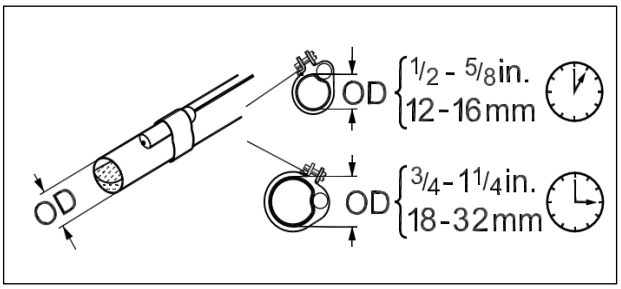


Figure 10: Sensing Bulb Installation Position



Solenoid Valve

A suitably sized solenoid valve needs to be installed in the liquid line just before the expansion valve on single evaporator system and just before the 'T' piece in the main liquid line on Twin systems. The liquid line solenoid valve is **not supplied** in both Single and Twin system.

Figure 11: Position of Liquid Solenoid Valve in Single System

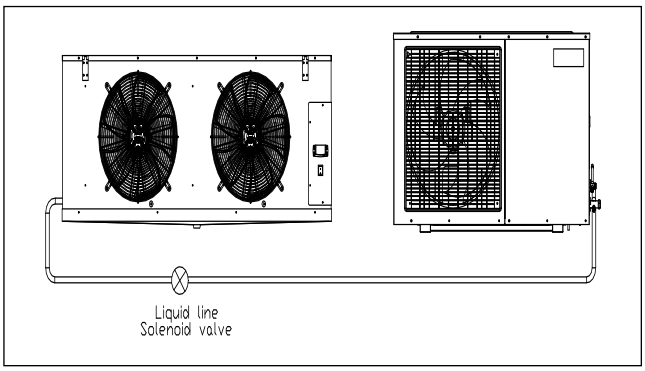
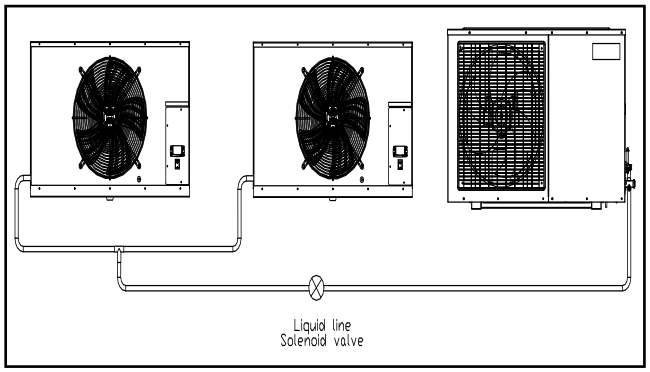


Figure 12: Position of Liquid Solenoid Valve in Twin System



Pressure Testing

CAUTION

Never use oxygen, dry air, or acetylene for pressure testing of the system as these may form an inflammable mixture.

NOTICE

Do not open the service valves on the condensing unit until pressure testing procedures have been carried out.

- Both the indoor and outdoor units have been pressure tested in the factory prior to dispatch. All units come with a holding charge of oxygen free nitrogen ~2barg. Remove the holding charge and indication tag prior to pipework installation using the service valve or regulator with pressure gauges and hoses.
- Once the pipework installation is complete, it should be pressure tested for leak prior to evacuation.
- A pressure leak test should be carried out using oxygen free nitrogen (OFN). A calibrated nitrogen pressure regulator must always be used. Before starting any pressure testing, ensure the area surrounding the system is safe, inform relevant personnel and fit warning signs indicating high pressure testing. Also, use correct Personal Protection Equipment (PPE) as required.
- Always pressurize the system slowly, preferably in stages up to the maximum required pressure. Never exceed maximum test pressures shown in ***Table 8***. Failure to obey the limit will cause premature failure on the pressure safety device.

Table 8: Maximum Working Pressure

High Side, barg (psig)	Low Side, barg (psig)
28 (405)	19 (275)

- Listen for any possible leaks and check all joints with bubble spray. If any leaks are discovered, release pressure slowly from both suction and liquid line of system until empty, repair leak and then repeat pressure testing procedure. Never attempt to repair a leak on a pressurized system.
- A strength test should also be incorporated (to the installed pipework only) according to applicable standards.
- Once testing has been completed satisfactorily, release the pressure from the system gradually and safely to external atmosphere.

Evacuation & Charging

NOTICE

Moisture prevents proper functioning of the compressor and the refrigeration system. Ensure that a good quality vacuum pump is used to pull a minimum vacuum of 250 microns (0.25 torr) measured at refrigeration system, and not at the vacuum pump gauge.

Once pressure testing has been completed, the system needs to be evacuated to remove any moisture from the piping. This can be done as follows:

- Ensure any nitrogen charge is safely released from the system.
- Connect a gauge manifold to the connections on the service valves on the condensing unit.

- Connect a vacuum pump and vacuum gauge to the system.
- Ensure all gauge manifold and service valves are in an open position.
- Evacuate the system until vacuum is below 250 microns (0.25 torr).

Note: A triple evacuation procedure is recommended for all new systems or where moisture is suspected.

- Once the system is isolated and the vacuum pump is switched off, any rise in pressure indicates that either there may be a leak in the system or moisture is still present. In this case, recheck the system for leaks, repair as necessary, and then repeat the evacuation procedure.
- Once evacuation is completed satisfactorily, the vacuum pump and vacuum gauge can be removed. At this point, the refrigerant charge can be added to the system as required. Refrigerant R448A and R449A must be charged in liquid form to avoid change of chemical properties.
- Ensure an adequate liquid charge (4~5barg) has been introduced to the high side of the system before starting the compressor.
- The remaining charge is slowly throttled into suction side until the installation has reached a level of stable nominal condition during operation. **Charging liquid into the suction side of the system should ONLY be done with a metering device.** Ensure a minimum operating pressure 0.5barg is maintained when adding refrigerant to the suction side, otherwise overheating of the compressor may occur. Use calibrated weighing scales to record the amount of refrigerant added to the system.
- Stop the filling once obtain sufficient suction superheat and liquid subcooling, remove the cylinder from circuit.

NOTICE

Refrigerant charge by judging the liquid sight glass does not guarantee as 100% correct way.

Drainage

NOTICE

The evaporator drain pan fitting is supplied loose and must be fitted on site.

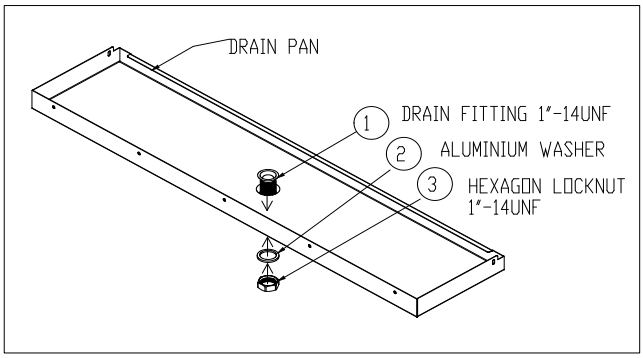
Correct fitting is vital to ensure leak – free operation. The lock nut and the aluminium washer on the drain fitting **MUST** be fitted the right way around; otherwise, it will not tighten against the drip tray. One side of the nut has an angled recess – this must be facing towards the drip tray. The fitting does not require any sealant, but a small amount of silicon sealant can be applied between the flared face of the fitting and the drip tray if so desired.

The accessories bag is tied to the indoor unit's fan guard and consists of:

- instruction manual,
- 1pcs aluminum alloy drain fitting 1"-14UNF male thread,
- 1pcs hexagon locknut and
- 1pcs aluminium washer

To install the drain fitting, firstly unscrew the drain pan from the indoor unit. Locate the drain fitting into drain pan, insert washer and followed with locknut to secure the drain fitting to the drain pan. Then refit the drain pan to the unit. Follow ***Figure 13*** to install the drain fitting in the correct way.

Figure 13: Drain Fitting Assembly



The locknut only requires hand tightening and then pinching up with a spanner. Do not over tighten, else the threads may strip from the nut and damage the tray.

Recommended minimum drainpipe diameter is 25mm or 1". The drainpipe material could be either copper or plastic. It is not recommended to use flexible hose as it tends to kink easily which might cause blockage and water to back up in the unit.

Electrical

NOTICE

The mains electrical supply to the outdoor unit must be via a suitable motor rated circuit breaker or fuse. A mains isolator is NOT fitted to all units. Therefore, an additional isolator is required.

CAUTION

3phase condensing unit comes with scroll compressor: live wires need correctly terminated at terminal block for the compressor to rotate in correct direction (compression).

The rocker switch on the front of the indoor units is for isolating power to the indoor fan and electronic controller only.

J & E Hall cellar systems require a 230V/1/50 supply to the indoor units and either a 230V/1/50 or a 400V/3/50 supply to the outdoor unit (depending on outdoor unit model chosen). They are not suitable for any other supply voltages (other than a deviation of +/- 10% of the above values) and are not suitable for 60 Hz supplies.

- Refer ***Table 4: Electrical Data and Requirements***, to size the power supply cable. Cable types need to be selected to suit the application and the electrical installation should conform to the current local standards.
- Cables to the indoor units should be routed through the 'U' shaped cut-out in the bottom of the removable air grille at the side of the units and into the rear of the electric box.
- Cables to the outdoor unit should be routed through the cable glands on the rear of the unit.
- Connect the mains supplies as per the wiring diagrams.

- Ensure that the power supply corresponds to the unit and that the power supply is stable.
- Connect power supply according to the present norm and legal requirement. Ensure that the unit is properly connected to the ground.
- Access to the electrical terminals and components on the indoor unit is via the removable cover plate on the front of the unit. Removal of the cover plate gives access to the contactor, the terminal block as well as the electronic controller and rocker switch connections.
- To gain access to the electrical box on the outdoor unit, remove the screws of the panel located on the right-hand side of the unit and remove the panel. The electrical box is located behind the panel.
- 3phase scroll compressor: **incoming live wires need correctly terminated at condensing unit's terminal block** for the compressor to rotate in correct direction (compression).
- The outdoor unit is equipped with an overload relay to protect compressor from overheating. It was preset from factory and never set value higher than set current on wiring diagram.

Commissioning

To gain access to the electrical box on the indoor and outdoor unit, isolate the power supply to the outdoor unit and indoor unit by turning the remote motor rated circuit breaker to the OFF position.

To access the electrical box on the outdoor unit: Loosen the screws from the right-side panel.

To access electrical box on the indoor unit: Loosen the screws from the L shaped window panel.

Pre startup checks

Before starting the system, the following checks should be carried out as a minimum:

- Check electrical supply is correct and all connections are sound.
- All moving parts are free, and guards are fitted.
- Compressor oil level satisfactory.
- Initial settings for safety switches.
- Overload set correctly.
- All valves are in correct operating position.
- Initial refrigerant charge.
- Gauge manifold connected to both low and high sides of system.

NOTICE

Before starting the system, ensure that all electrical connections are correctly made and tight, service ports are in the correct position and all covers and guards are fitted.

Unit startup

- Switch on the power of the main isolator and then switch on the rocker switch on the front of the indoor unit.
- Set the required room temperature on the electronic controller (Lead controller on Twin Systems) and check the system parameters in the controller as required (the controllers are pre-programmed in the factory to the suggested settings).
- Run the system to the required temperature and check system pressures and temperatures, gas charge and running currents of motors to ensure correct operation.
- Check compressor suction superheat. This should be between 10~20K at normal operating conditions.
- Final adjustment of safety switch settings.
- Allow the system to run for 3 – 4 hours. Check compressor oil level and top up with the correct oil type as required (RL32-3MAF). Recheck the compressor oil level again after 24 hours operation.
- Carry out final leak test and ensure all panels/covers are fitted and screws tightened.
- Log all information along with the system model and serial numbers for future reference.
- Ensure that the customer / responsible person is provided with basic operating instructions and where electrical isolators are situated in case of emergency.

NOTICE

An anti-short cycle timer is built into the indoor controller to prevent the compressor from stop/starting too quickly, which can result in the compressor tripping on its internal overload. If the overload trips, please allow time for it to cool down and auto reset before restarting.

Compressor Operation

Scroll compressor motors are designed to run only in one direction. This is not an issue with single phase compressors as they will always run in the correct direction. The correct rotation of a three-phase compressor motor depends on the connection of the three incoming phases to the unit. Correct rotation can be determined by a drop in suction pressure and a rise in discharge pressure when the compressor is energized. Running the compressor for a short period of time in reverse direction will have no negative impact but prolonged running in reverse direction may cause premature failure. ***To reverse the rotation of a three-phase scroll compressor, shut off the incoming power supply to the unit, swap connection of any two of the three incoming phases at the unit's terminal block, reapply power to the unit and following compressor restart, recheck operating pressures.***

The condensing unit does not include phase protector. Thus, it is necessary to ensure correct scroll compressor rotation and incoming line voltage variance within +/-2% during commissioning.

CAUTION

- **3 phase scroll compressors require proper phase sequence to secure right rotation and therefore compression.**
- **Do not use a megohmmeter nor apply power to the compressor while the system under vacuum as this may cause internal damage to the compressor.**
- **Never start the compressor under vacuum (do not operate the compressor with the low-pressure cut-out bypassing), as this will cause the rotating part to overheat very quickly causing premature failure.**

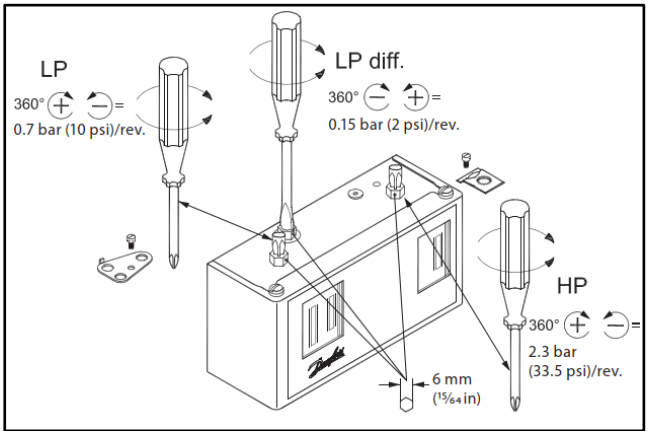
CAUTION

Ensure an adequate liquid charge has been introduced to the high side of the system before starting to ensure a minimum operating pressure on the suction side of 0.5 bar is maintained, otherwise overheating of the scrolls and subsequent damage may occur.

Dual Pressure Switch

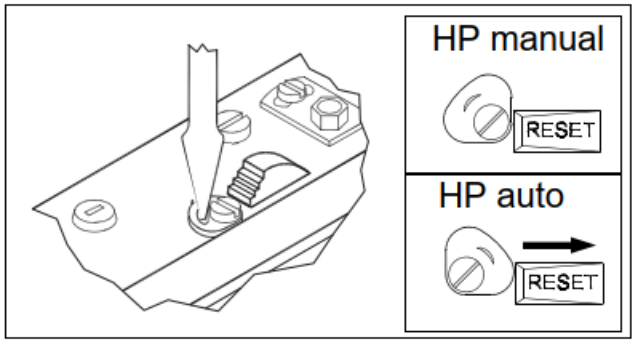
The dual pressure switch fitted to condensing units is auto reset for low pressure side and manual reset for high pressure (fixed differential) are **NOT factory preset for application.**

Figure 14: Adjustment on **Danfoss KP17WB**



KP17WB has high pressure convertible reset feature. Insert screwdriver into the slot on the lock disc and turn it to the desired reset configuration as shown in ***Figure 15***.
Do not turn the screw on the lock disc as it may damage the convertible reset mechanism.

Figure 15: **KP17WB:** *High Pressure Reset Option*



When high pressure trip is changed to auto reset on KP17WB, the compressor is ready to turn ON when discharge pressure drops below the setting value of (Cut Out – Fixed Differential).

NOTICE

When HP switch cut out mode is changed from Manual to Auto operation, the fitting of an ART (anti-recycle timer) is recommended to protect the compressor.

Table 9: Dual Pressure Switch Manufacturer Setting

Model	High (barg)		Low (barg)	
	Cut Out	Diff. (Fixed)	Cut In	Diff (adj)
KP17WB	18	4	3	2

Pressure Switch Settings

Both the LP and HP switch settings must be adjusted to suit application before starting the unit. Ensure that the setting should be kept within the working pressure range shown in ***Table 10***.

High pressure safety

- The high-pressure safety switch is required to stop the compressor should the discharge pressure exceed the compressor's high side operating pressure.
- The high-pressure switch can be set to lower values depending on the application and ambient conditions.

Low pressure protection

- The low-pressure protection cut out switch protects the compressor against deep vacuum operation, a potential cause of failure due to internal arcing and operating outside the compressor limits.
- The low-pressure protection cut-out should never be set lower than the min. Low Pressure Cut Out value in ***Table 10***. If the unit fails to pump down, the pump down pressure should be reset to a higher value.
- Care should be taken because the scroll sets will unload at a pressure ratio of approximately 10:1. Thus, system operating pressures should be kept within the range shown in ***Table 10***.

Table 10: Working Pressure (R448A/R449A)

Description	Pressure (barg)
Min. Low Pressure Cut Out	2.0
Max. High Pressure Cut Out	27.7
Low Pressure Operating Range	2.0~7.1
High Pressure Operating Range	7.1~27.7

Service & Maintenance

WARNING

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

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:

1. **Indoor and Outdoor units – Inspect at regular intervals.**

- Check for refrigerant leaks on all joints and fittings.
- Check mountings for tightness and wear.
- Inspect pipework for any damage.
- Check all electrical connections.
- Ensure that no abnormal noise or vibration is detected during the test run.

2. **Condenser and Evaporator Fan Motors & Blades – Clean and inspect at regular intervals.**

- Check for abnormal noise, vibration, and fan imbalance.
- Ensure that the fan motors are clean and spin freely.
- Check that the fan blades are clean and free from restriction and damage/imbalance.

- **Note:** The Fan Motors are pre-lubricated, and factory sealed so no maintenance is necessary.

3. **Condenser & Evaporator Coils – Clean and inspect at regular intervals.**

- Check and remove the dirt and debris between the fins using a soft brush and/or a suitable chemical coil cleaner then rinse with clean water.
- Check and remove any obstacles that may hinder the airflow through the coils.
- Repair any damage to fins and ensure any guards are fitted correctly.
- **Do not use high pressure washers on coils** – They damage the fins.

4. **Controls**

- Check controller settings and operation.
- Check calibration of temperature probe reading.

5. **Power Supply – Inspect at regular intervals.**

- Check the running current and voltage for the units.
- Check the electrical wiring and tighten the if necessary.

6. **Refrigerant Charge**

- Check the refrigerant charge by ensuring that the system is operating correctly, and the system pressures are as expected.
- Carry out a full leak test.

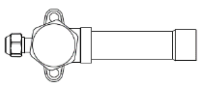
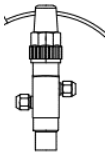
7. **Unit decommissioning and disposal**

- At the end of the system's useful life, a suitably qualified engineer should decommission it. The refrigerant and compressor oil are classed as hazardous waste and as such must be reclaimed and disposed of in the correct manner, including completion of waste transfer paperwork. The system components must be disposed of or recycled as appropriate in the correct manner.

8. **Component replacement (connections tightening torque value)**

- Refer ***Table 11*** for the recommended torque tightening of all the components in outdoor unit.

Table 11: Torque Tightening

Model	Tightening Torque (Nm)			
	Service Valve (Cap)		Liquid Receiver	Schrader Valve; Charging Port
	Suction	Liquid		
BSCU-30-M1	M25*1.0mm (42-47Nm)	M16*1.0mm (20-25Nm)	Brazed Connection Plug 3/8"NPT (18-22Nm)	7/16" - 20UNF (14-16 Nm)
BSCU-30-M3				
BSCU-35-M1		M18*1.0mm (25-30Nm)		
BSCU-35-M3				
BSCU-40-M1	M33*1.5mm (42-47Nm)			
BSCU-40-M4				
Graphic Presentation				N/A

9. **Warranty**

- The warranty as provided by J & E Hall on its products is subject to correct application, siting, and installation procedures together with subsequent recorded maintenance/servicing carried out in accordance with our recommendations. Failure to do so could result in the withdrawal of our warranty. Please go to our website for our detailed warranty terms and conditions: **www.jehall.co.uk**

F-Gas Requirement

The equipment covered in this Technical Manual relies on fluorinated greenhouse gases **R448A (GWP: 1387)** and **R449A (GWP: 1397)** for their functioning.

All unit models come from the factory pressurized with OFN (Oxygen Free Nitrogen) only.

F-Gas Regulation EU 517/2014 requires leak testing is based on the charge size in tonnes of CO_2 equivalent specified in below table. Starting 1st January 2017, the requirement for leak detection and maintaining system logs changes from 3kg HFC to 5 tonnes CO2 equivalent.

Table 12: Leak Inspection Frequency

System Charge (Tonnes CO_2 Equivalent)	Leak Inspection Frequency
3.6 to 36 kg R448A 3.6 to 35.8 kg R449A (5 to < 50 TCO_2 eq)	• At least once every year. • At least once every 2 years if a fixed leak detection system is fitted.

- $To\ calculate\ TCO_2\ Eq\ value = \frac{Refrigerant\ Charge\ (kgs) \times Refrigerant\ GWP}{1000}$

A refrigerant charge label is supplied with each unit (inside the electrical box). The total refrigerant charge for the system and the TCO_2 Eq value must be entered on the label with indelible ink and must be adhered in the proximity of the product charging port. The label supplied will represent the refrigerants approved for use with that unit.

Appendix

Table 13: Trouble Shooting

FAULT	POSSIBLE CAUSE	CHECK	SOLUTION
COMPRESSOR			
Compressor will not start	Power supply	Is power switched on?	If not - switch on
		Phase and neutral present?	Check/rectify
		Voltage within tolerance?	Check/rectify
	Compressor contactor not pulled in (contactor in outdoor unit)	Is there correct voltage to contactor coil? (Terminals A1 & A2)	If yes - coil faulty. Replace contactor
		Is the controller calling for cooling? (Cooling LED lit)	If yes - check for break in control circuit
		Is the controller on defrost? (Defrost LED lit	If yes - wait for defrost to finish or terminate defrost and check operation
		Is there an alarm condition shown on the controller display?	Refer to manual for alarm identification and resolution
		Has a safety switch tripped out?	Check cause and rectify
	Compressor contactor pulled in but compressor not running	Is voltage being switched across contactor? (Terminals L & T)	If yes - check voltage present at compressor terminals. If correct - compressor may have tripped internal overload or be faulty
			If no. Replace faulty contactor
	LP switch tripped (on outdoor unit)	Low pressure condition	Low refrigerant charge/icing of evaporator coil/evaporator fan failure/blockage in piping. Check & rectify cause
	Compressor internal overload tripped	Is the correct voltage at compressor terminals?	Compressor has overheated - allow time for reset (up to 3 hours) and rectify cause
	Faulty compressor run capacitor	Check visual condition of capacitor and check uF reading with capacitor meter.	Replace capacitor as required
	Motor windings faulty	Check resistances of windings	Windings that show open circuit could be due to internal overload trip. Wait for reset and recheck. If continually open circuit - motor faulty. Replace compressor.
	Compressor seized	Does compressor attempt to start but does not run correctly (makes humming sound)? Are amps equivalent to LRC rating?	If all electrical checks on components as above are OK - Change compressor
Compressor runs but no effect on suction/discharge pressures	Mechanical failure within compressor	Are compressor motor amps lower than expected? If so - potentially valve damage or other internal wear/damage	Try pump test on compressor. If test fails - replace compressor.
Compressor starts and stops too quickly	Operating on safety controls	Check LP switch and compressor internal overload	Rectify cause and recheck
	Refrigerant levels	Is there too little refrigerant in the system causing LP switch tripping?	Check refrigerant level and adjust accordingly
	Faulty contactor (if fitted)	Are the contacts chattering on the contactor?	Contacts may be dirty or worn. Check and replace contactor as necessary
	Anti short cycle time in controller is set too low	Anti short cycle time should be set for minimum of 3 minutes	Check and rectify
	Temperature differential in controller set too low	Differential should be set for minimum of 2°C	Check and rectify
	Room temperature rising too quickly	Are doors open to room?	Check and rectify

FAULT	POSSIBLE CAUSE	CHECK	SOLUTION
	Loose / broken wiring connection		Make sure all electrical connections are sound
Compressor is noisy	Vibration	Rubber feet mountings worn or bolts are loose/missing	Replace mountings and tighten/replace bolts as necessary
	Liquid refrigerant	Does compressor 'knock' when starting up or running? Liquid refrigerant may be present in oil and compression chambers	Identify cause of liquid return to compressor and rectify
	Overloaded	Are suction and discharge pressures too high? There may be too much load on the compressor.	Identify cause of increased load and rectify
	High discharge pressure	Blocked condenser / faulty condenser fan	Check and rectify
		Refrigerant overcharge	Check and rectify
		Non-condensable in system	Reclaim refrigerant, evacuate & recharge
	Internal wear / damage	Noise is always present even if all operating conditions are OK?	Replace compressor
Compressor body too hot	System load too high	Are suction and discharge pressures high?	Reduce load at evaporator
	High discharge pressure	Blocked condenser / faulty condenser fan / airflow around unit restricted	Check and rectify
	Lack of compressor cooling	Suction superheat too high	Check refrigerant charge is correct
			Too much heat load at evaporator - reduce
			Are refrigerant lines correctly insulated?
	Compressor starting too frequently	Refer section above ' Compressor starts and stops too quickly'	Refer section above ' Compressor starts and stops too quickly'
	Discharge gas bleeding into suction side	Does suction pressure rise abnormally quickly when compressor stops	Compressor valves may be damaged - replace compressor
CONDENSER FAN			
Condenser fan not running	Power supply	See compressor will not start section	See compressor will not start section
	Compressor contactor not pulled in	See compressor will not start section	See compressor will not start section
	Compressor contactor pulled in	Is voltage being switched across contactor? (Terminals L1 & T1)	If yes - check voltage to fan motor. If correct voltage present at motor - fan faulty. Replace fan motor
			If no. Replace faulty contactor
	Fan being controlled by Fan Speed Controller (if fitted)	Is system operating pressure below FSC setting?	If yes - all OK (check fan operates when pressure rises)
	Fan capacitor fault	Check visual condition of capacitor and check uF reading with capacitor meter.	Replace capacitor as required
	Motor fault	If FSC fitted - bypass FSC to test motor. If motor still does not run - motor is faulty	Replace fan motor
Condenser fan runs but only slowly	Fan capacitor or motor fault	See above	See above
	Is fan being controlled by a FSC?	Adjust FSC setting - does fan speed up?	If yes - all OK
	FSC faulty	If fan runs slowly even after adjusting FSC with head pressure rising - FSC may be faulty	Replace FSC
INDOOR UNIT			
	Power supply	Is power switched on?	If not - switch on

FAULT	POSSIBLE CAUSE	CHECK	SOLUTION
Indoor Fan not running		Is rocker switch on unit switched on?	If not - switch on
	Motor fault	Is there correct voltage at motor terminals?	If yes - motor faulty. Replace motor
			If no - check supply / wiring connections
		Check fan capacitor	Replace as required
No display on controller	Power supply	Is power switched on?	If not - switch on
		Is rocker switch on unit switched on?	If not - switch on
		Is there correct voltage at controller	If yes - controller faulty. Replace controller
			If no - check supply / wiring connections
Power to controller but no cooling from unit	Is unit in defrost mode?	Check if defrost LED is displayed	If yes - all OK. Wait for defrost to end
			If no - further checks required
	Is unit in cooling mode (cooling LED displayed)	Is room at required temperature?	All OK
		Room above required temperature?	Further checks required
Reduced airflow	Fan motor	Is fan rotating slowly?	Further checks required on fan (see above)
	Air inlets blocked	Is anything blocking air inlet grilles at side of unit	Clear items from around unit
	Evaporator coil dirty	Check condition of coil	Clean as necessary
	Evaporator coil iced up	Switch off unit and allow to defrost	Checks required to determine cause of icing
SYSTEM			
Insufficient cooling	Lack of refrigerant	Is sight glass flashing continuously?	Leak test system and top up with refrigerant
	Condenser coil dirty	Visual check of coil condition	Clean condenser coil
	Lack of ventilation to unit	Any obstructions around unit?	Clear same to ensure good ventilation
	Evaporator coil dirty	Visual check of coil condition	Clean evaporator coil
	System settings	Controls (inc thermostat) set correctly?	Adjust as necessary
		T.E.V. Superheat	Adjust as necessary
	Service valves not open correctly	Are valves fully open?	Adjust as necessary
	Restriction in piping/component	Is the filter drier blocked? Sweating/frosting on outlet of drier indicates a blockage	Replace filter drier
		Damage to piping	Replace piping as required
Head pressure too high	Condenser coil dirty	Visual check of coil condition	Clean condenser coil
	System overcharged with refrigerant	Is head pressure high but liquid line cool to touch?	Reclaim refrigerant/recharge correctly
	Condenser fan not running	See above (fan will not run)	See above
	Lack of ventilation to unit	Any obstructions around unit?	Clear same to ensure good ventilation
	System load too high (overstocked, door open on coldroom)		Reduce loading

Figure 16: Drawing Outline JCC2- 40EV

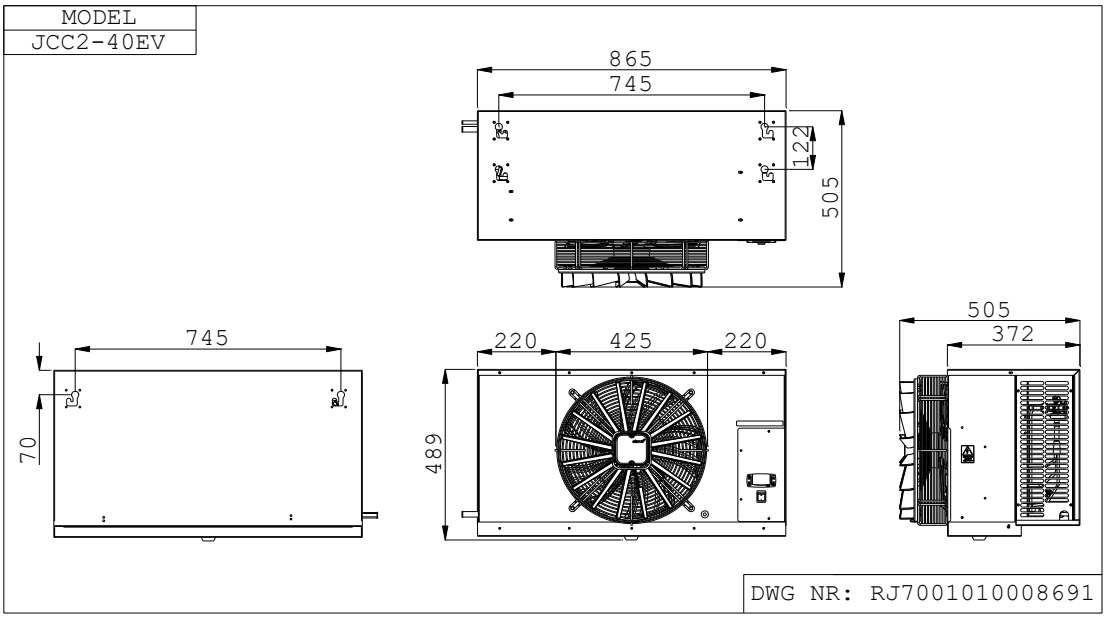


Figure 17: Drawing Outline JCC2-50EV; JCC2-60EV

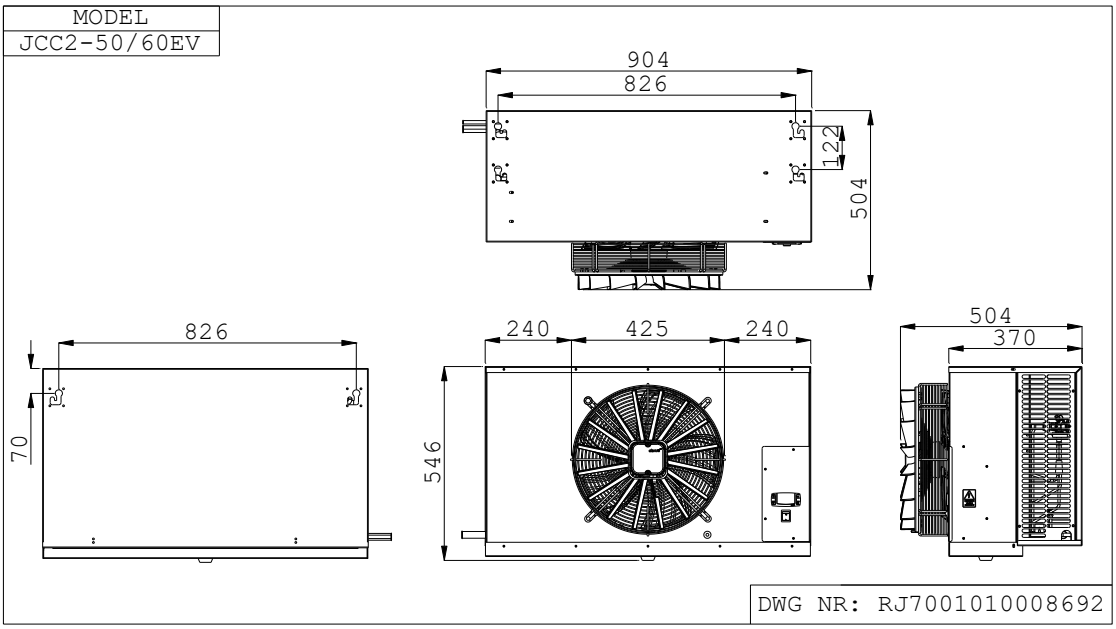


Figure 18: Drawing Outline JCC2-80EV

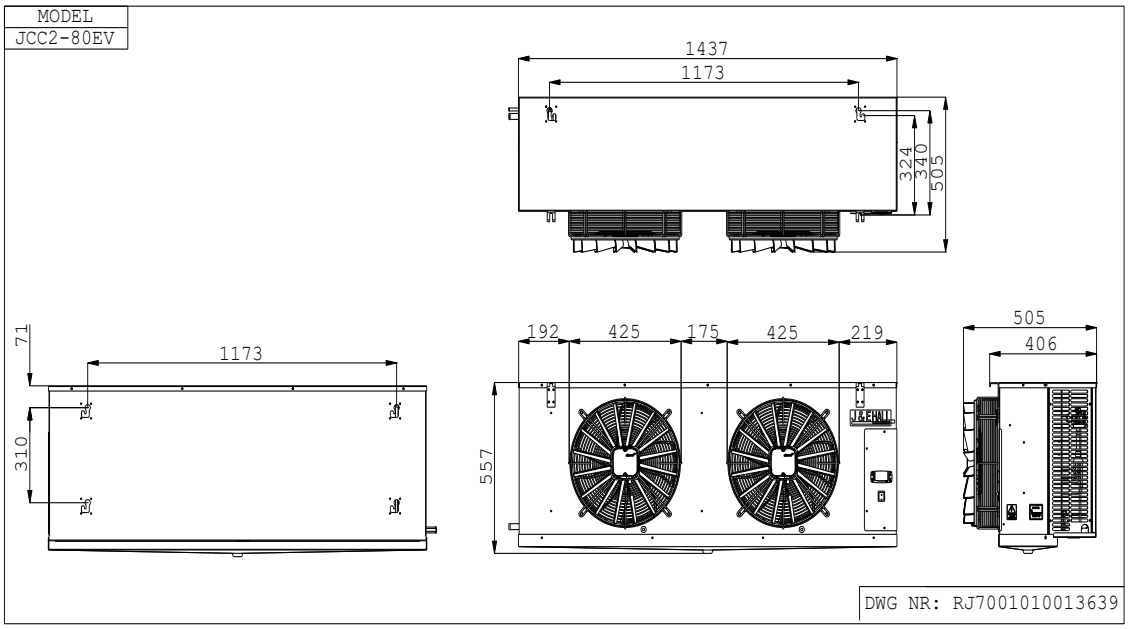


Figure 19: Drawing Outline BSCU-30-M1/M3

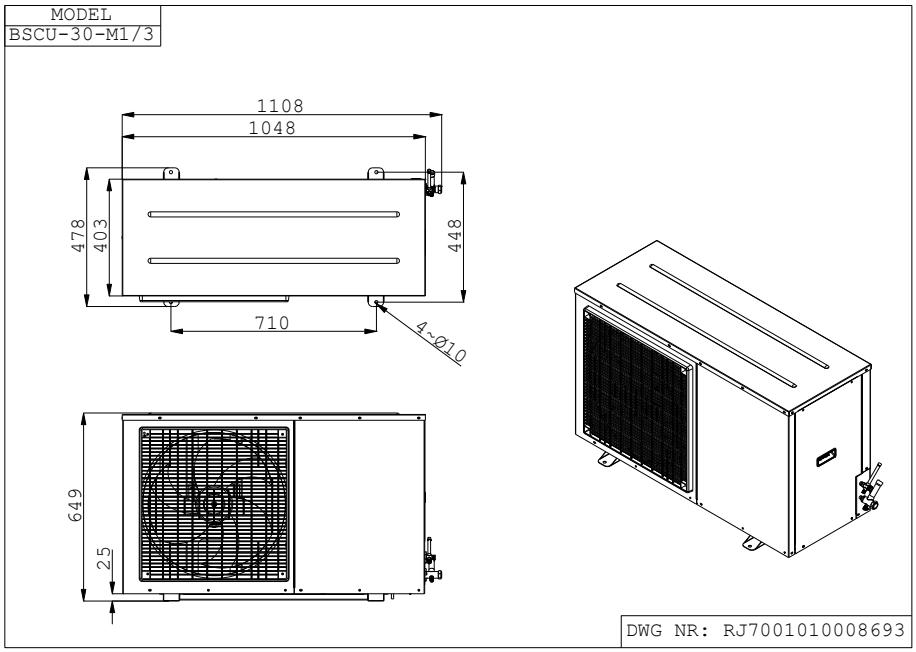


Figure 20: Drawing Outline BSCU-35-M1/M3

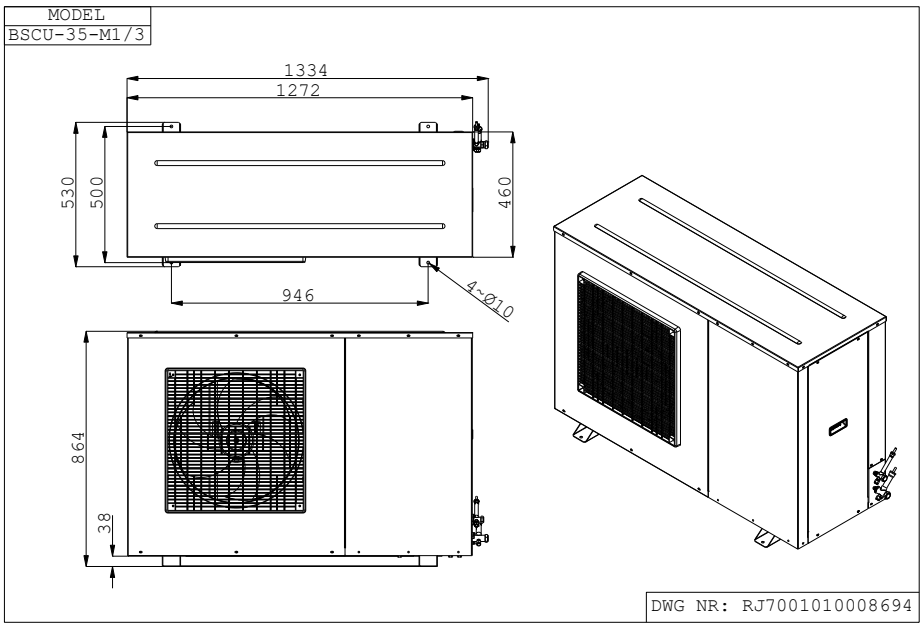


Figure 21: Drawing Outline BSCU-40-M1/M3

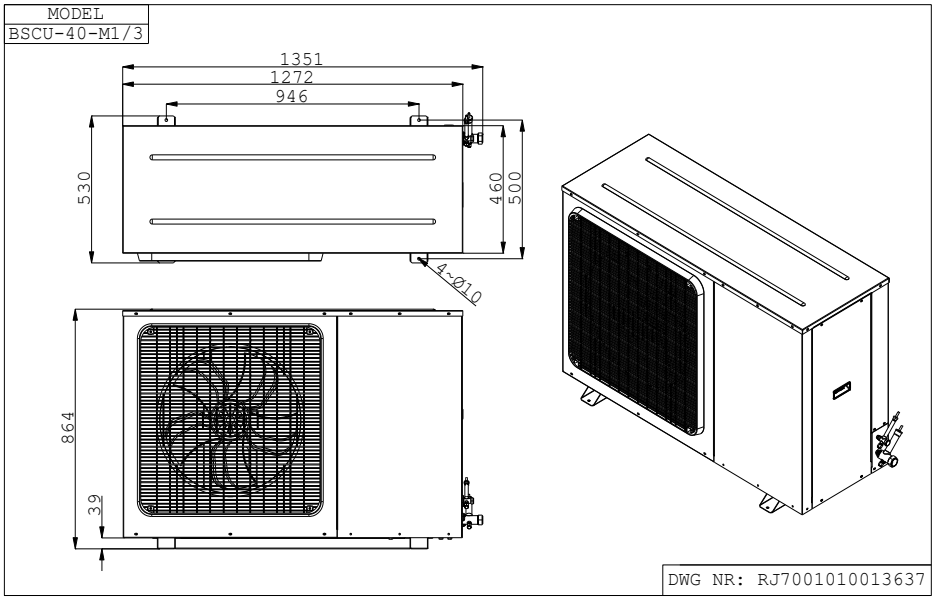


Figure 22: Wiring Diagram JCC2-40EV/50EV/60EV

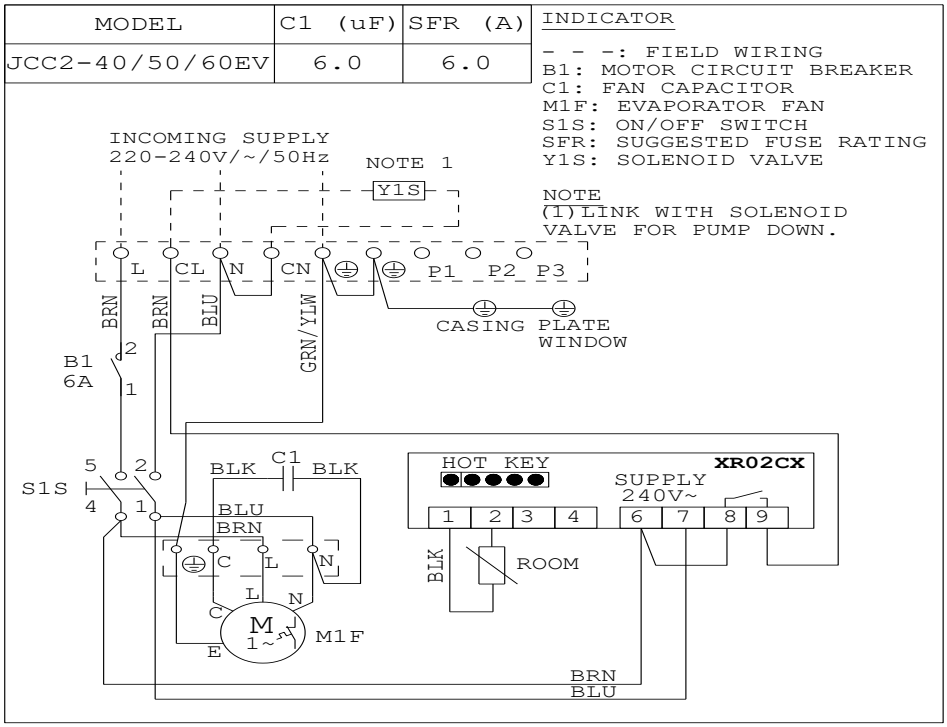
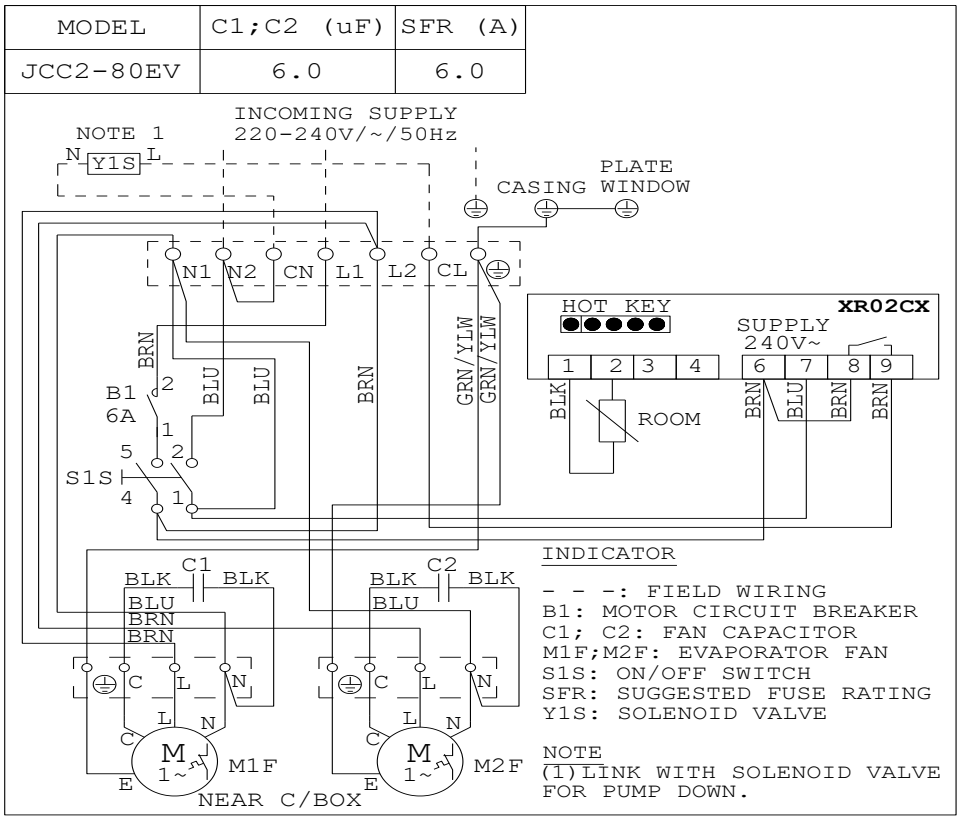


Figure 23: Wiring Diagram JCC2-80EV



Lead/Lag Connection (Twin)

For Twin Systems, both evaporators can be connected to a single mains supply. Separate mains supplies can be installed if required but it is desirable for them to be taken from the same supply phase.

The JCC evaporators come pre-fitted with an electronic controller as standard. For the Twin system, one of the evaporators needs to be designated as the Lead Unit with the other being the Lag Unit. The Lead Unit controls the cellar temperature by operation of the liquid line solenoid valve. The Lag Unit has no control over system operation and will just provide cellar temperature indication.

Figure 24: Wiring Connection for Twin System

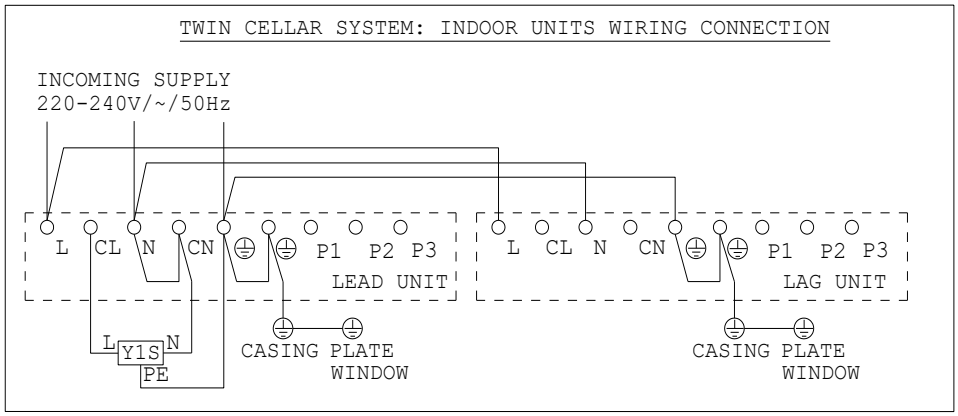


Figure 25: Wiring Diagram BSCU-30-M1, BSCU-35-M1

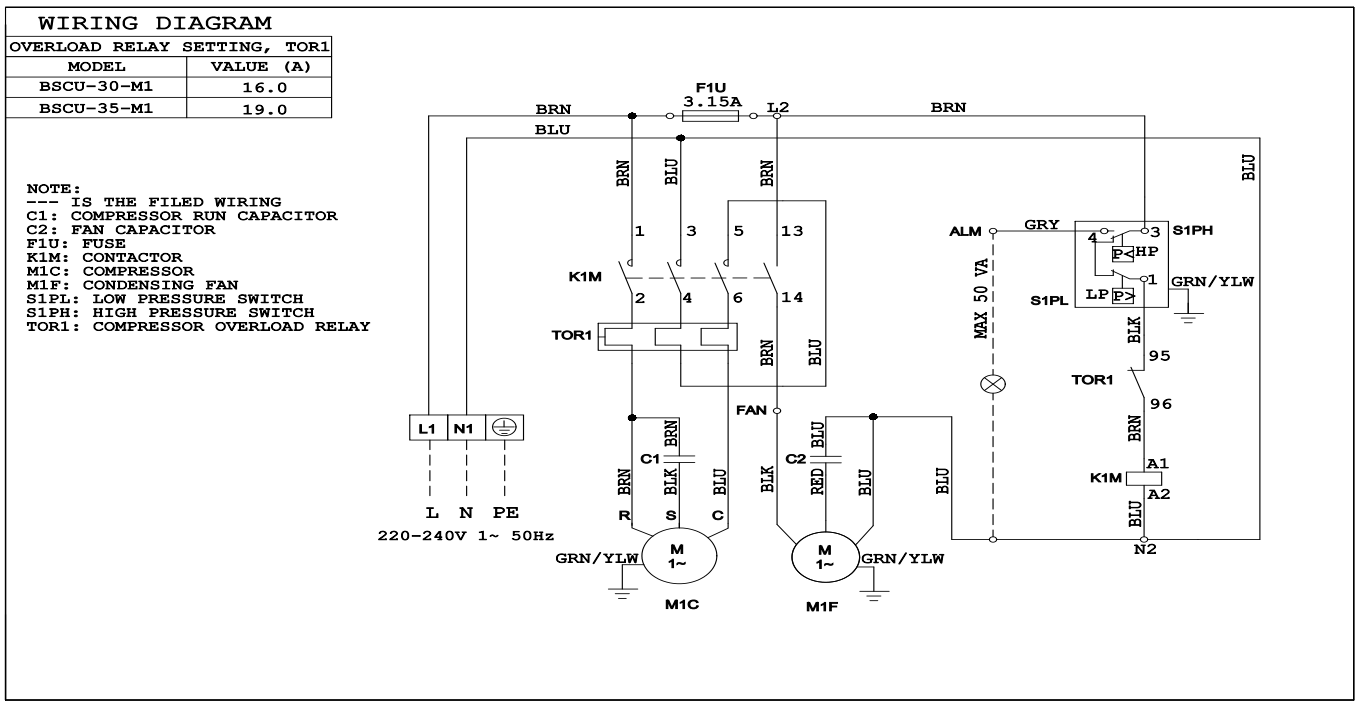


Figure 26: Wiring Diagram BSCU-40-M1

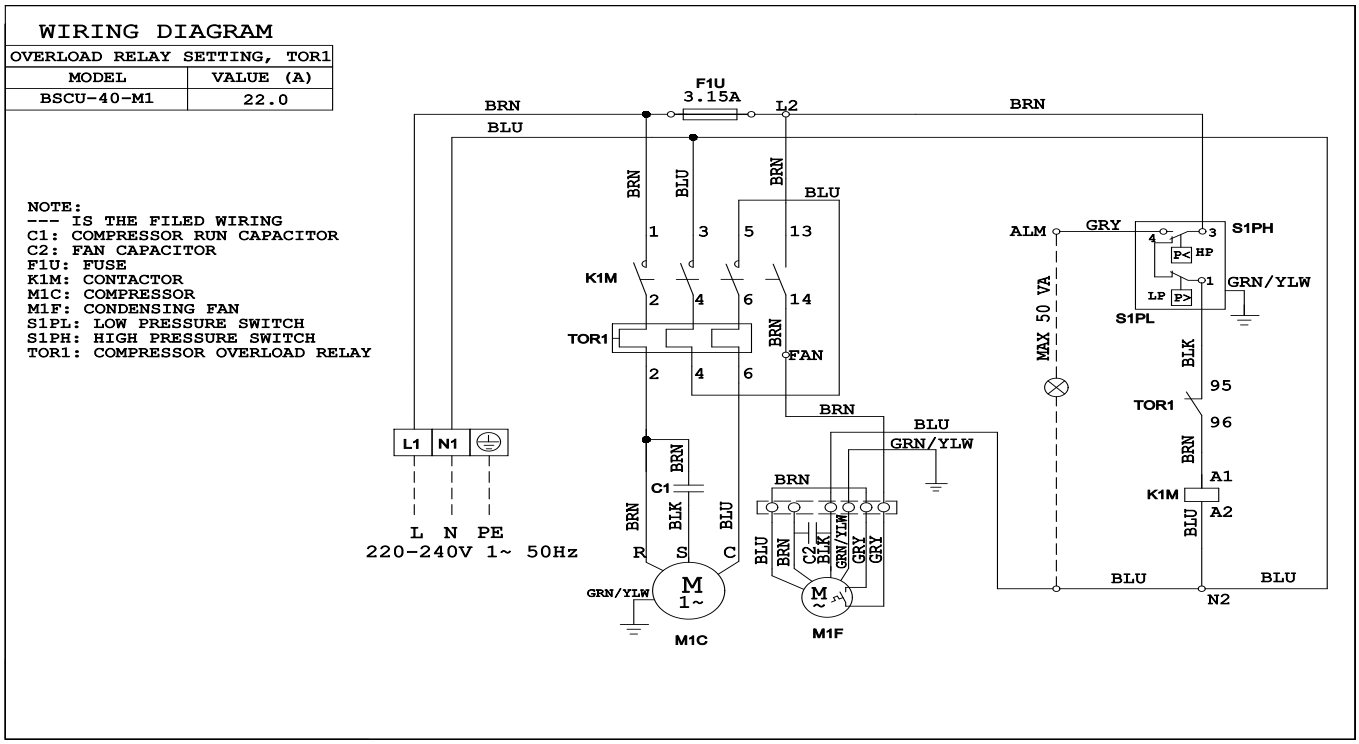


Figure 27: Wiring Diagram BSCU-30-M3, BSCU-35-M3

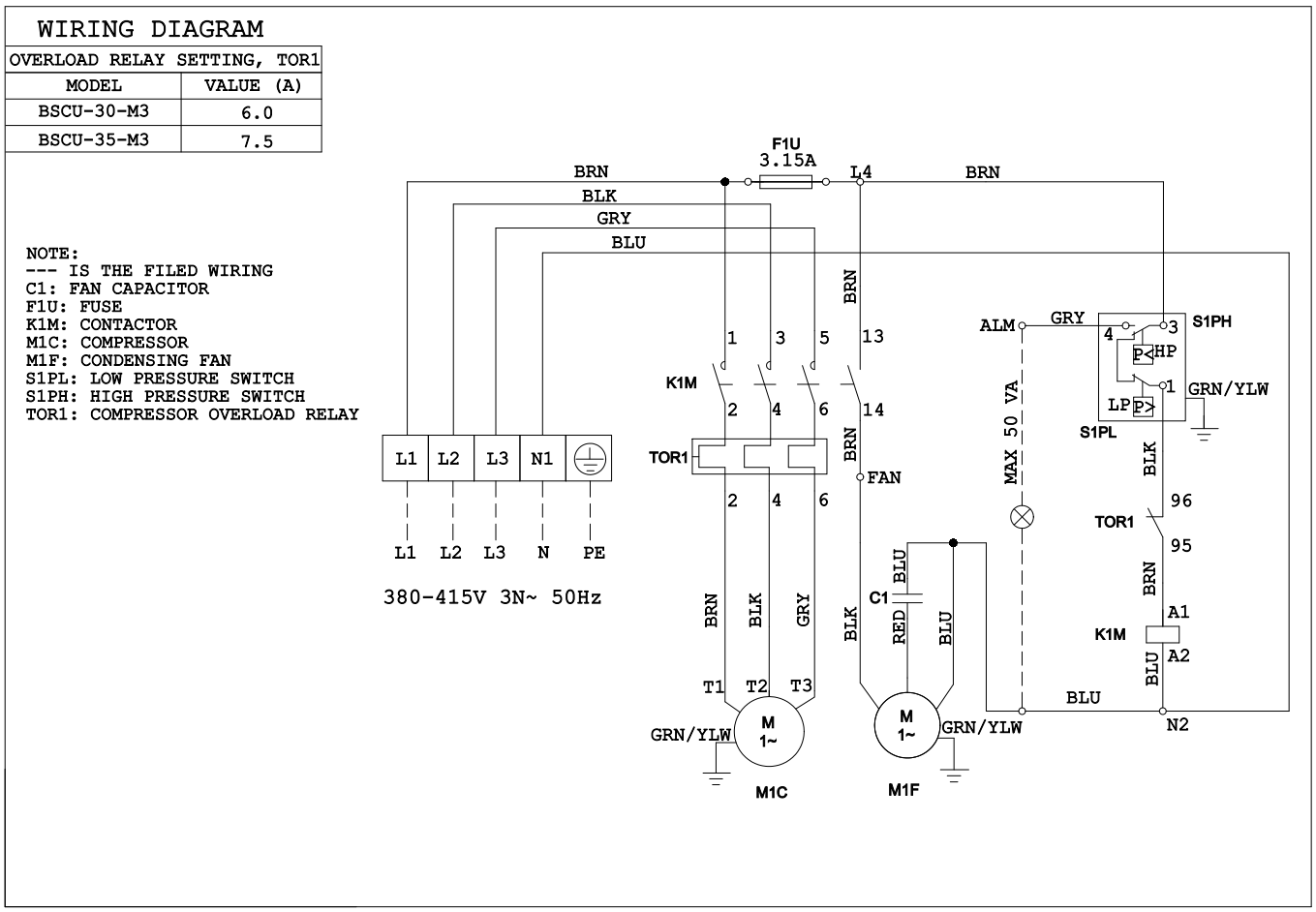


Figure 28: Wiring Diagram BSCU-40-M3

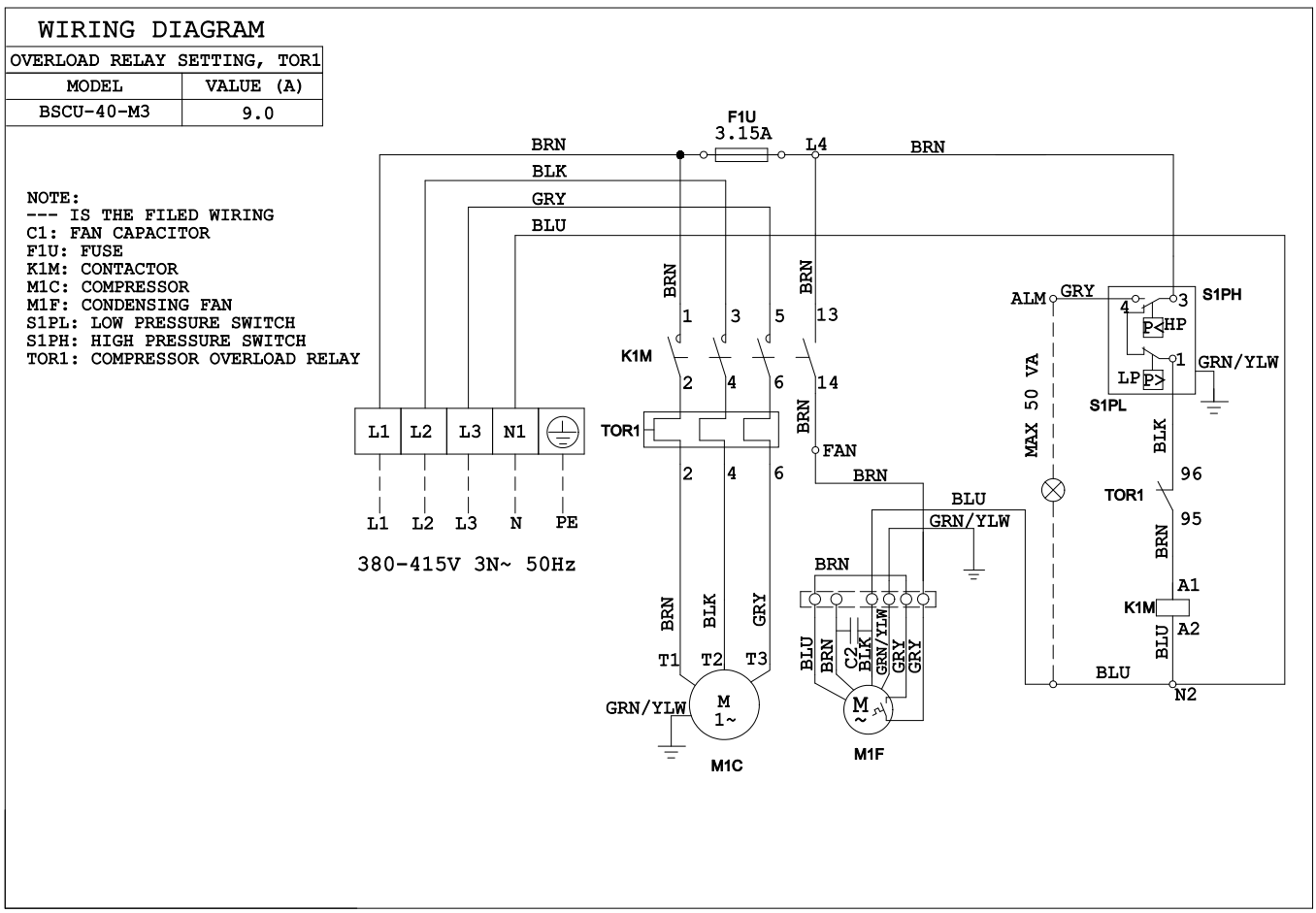
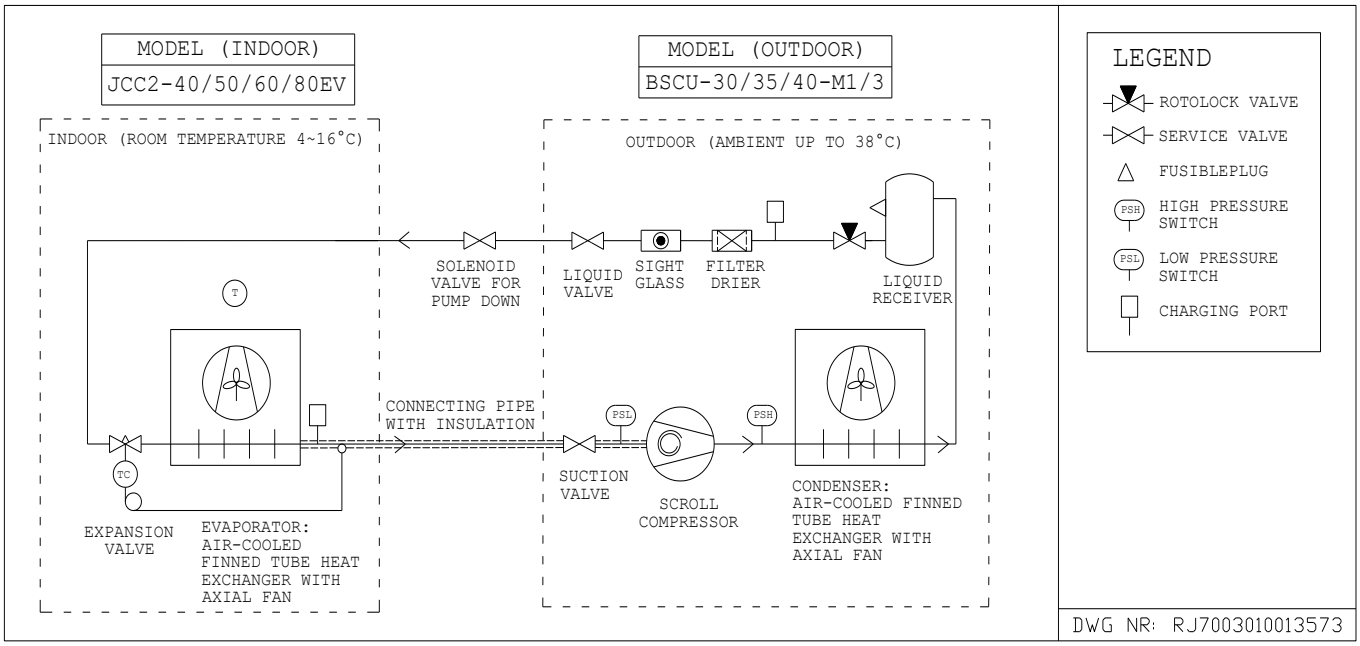
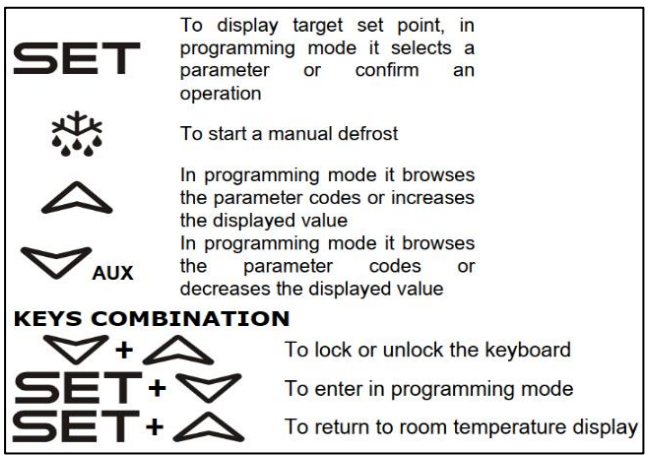


Figure 29: P&I Diagram



Electronic Controller (Dixell XR02CX)



To check the setpoint temperature:

- Press and release the SET button.

To change the setpoint temperature:

- Press the SET button for more than 3 seconds
- The setpoint value is displayed and the °C or °F led starts flashing.
- To change the setpoint value press the ▲ or ▼ button within 10 seconds.
- To retain the new setpoint press the SET button again or wait 10 seconds.

To start a manual defrost:

- Press the defrost button for more than 2 seconds.

To lock and unlock keyboard:

- Press the ▲ and ▼ buttons together for more than 3 seconds.
- When The 'OF' message displayed, the keyboard is now locked.
- When the 'ON' message is displayed, the keyboards will be unlocked.

To change a parameter value (selected parameters):

- Enter the programming mode by pressing the SET and the ▼ buttons together for more than 3 seconds (°C or °F LED starts blinking). The first parameter (Hy) is displayed.
- Press the SET button to display the parameter value.
- Use the ▲ and ▼ buttons to change the parameter value.
- Press the SET button to store the new value and move to the next parameter.
- To exit the programming mode, press the SET and ▲ buttons together or wait 15 seconds without pressing a button.

To enter the hidden parameter menu (full parameter list):

- Enter the programming mode by pressing the SET and ▼ buttons together for 3 seconds (°C or °F LED starts blinking).
- Release the buttons, and then press the SET and ▼ buttons for more than 7 seconds. L2 will be displayed followed by the first parameter (Hy). You are now in the hidden menu.
- Select the required parameter.
- Press the SET button to display the parameter value.
- Use the ▲ and ▼ buttons to change the parameter value.
- Press the SET button to store the new value and move to the next parameter.

To exit the programming mode, press the SET and ▲ buttons together or wait 15 seconds without pressing a button.

Table 14: Controller Parameters

Dixell XR02CX Parameters				
Label	Description	Range	Default setting	**JEH Setting**
Parameter Menu (selected parameters)				
Hy	Differential	0.1 ~ 25°C / 1 ~ 45°F	2.0°C / 4°F	**2.0°C**
ot	Probe calibration	-9.9 ~ 9.9°C / -18 ~ 18°F	0.0	**0.0**
AC	Anti Short Cycle Delay	0 ~ 50 minutes	1	**3**
CH	Kind of Action (Cool / Heat)	cL ~ Ht	cL	**cL**
rE	Resolution (°C only): dE = decimal between -9.9 ~ 9.9°C; in = integer	dE ~ in	dE	**in**
id	Interval between defrost cycles	0 ~ 99 hours	8	**6**
Md	Maximum defrost length	0 ~ 99 minutes	20	**30**
AU	Maximum Air Alarm Temperature (Not Applicable)	~ 99°C / ~210°F	99°C / 99°F	**99°C**
AL	Minimum Air Alarm Temperature (Not Applicable)	-55°C / -67°F	-55°C / -55°F	**-55°C**
iP	Digital input polarity: oP = activated by closing the contact; cL = activated by opening the contact	cL ~ oP	cL	**cL**
iF	Digital input configuration: EA = external alarm; EA message is displayed: bA = serious alarm; CA message is displayed: do = door switch function: dF = defrost activation: Au = not used: Hc = inversion of the kind of action	EA / bA / do / dF / Au / db / Hc	EA	**EA**
di	Digital input delay. With iF = EL or bA delay between the detection of the external alarm condition and its signalling. With iF = do it represents the delay to activate the door open alarm	0 ~ 99 minutes	5	**5**
Hidden Parameter Menu (Full list including above parameters)				
LS	Minimum Set Point	-55°C / -67°F	-55°C / -55°F	**4°C**
US	Maximum Set Point	99°C / 210°F	99°C / 99°F	**16°C**
od	Output activation delay at startup	0 ~ 99 minutes	0	**0**
Cy	Compressor on time faulty probe. Cy = 0 compressor always OFF	0 ~ 99 minutes	15	**5**
Cn	Compressor off time faulty probe. Cn = 0 compressor always active	0 ~ 99 minutes	30	**10**
CF	Measurement units: °C = Celsius; °F = Fahrenheit	°C / °F	°C	**°C**
dY	Display delay	0 ~ 15 minutes	0	**0**
dF	Display during defrost: rt = real temperature; it = start defrost temperature: St = SET POINT: dF = label dF	rt / it / St / dF	it	**it**
Ad	Temperature alarm delay	0 ~ 99 minutes	15	**15**
dA	Exclusion of temperature alarm at startup	0 ~ 99 minutes	90	**90**
dC	Compressor and fan status when door open: no = normal; Fn = Fans OFF; cP = Compressor OFF; Fc = Compressor and fans OFF	no / Fn / cP / Fc	no	**no**
rd	Regulation with door open: n = no regulation if door is opened; Y = when di is elapsed regulation restarts even if door open alarm is present	n ~ Y	Y	**Y**
Pt	Parameter code table	Read Only	-	**-**
rL	Firmware release	Read Only	-	**-**

Figure 30: Declaration of Conformity (Outdoor)

Declaration of Conformity

According to SI 2016 No. 1105 SCHEDULE 11, SI 2010 No. 2617 SCHEDULE 1

J&E Hall International

We:	J & E Hall International
of:	Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU
Declare under sole responsibility that	
The Product:	Cellar Plus Cellar Cooler
Model Designations:	BSCU-30-M1 BSCU-35-M1 BSCU-40-M1 BSCU-30-M3 BSCU-35-M3 BSCU-40-M3
Description:	Cellar Plus System Outdoor Unit
SI 2016 No. 1105 Conformity Assessment Procedure Followed:	Module A for BSCU-30-M1 / BSCU-30-M3 Module A2 for BSCU-35-M1 / BSCU-35-M3 / BSCU-40-M1 / BSCU-40-M3

Description of the pressure equipment constituting the assembly:

Part description	Conformity assessment followed
Pressure switch	Module B + D
Liquid receiver	Module H1
Filter drier	SEP
Condenser	SEP
Sight glass & Valves	SEP
Flexible hose, System piping & Pressure accessories	SEP

The object of the declaration described above is in conformity with the following statutory requirements and implementing measures:

SI 2016 No. 1105	The Pressure Equipment (Safety) Regulations

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

BS EN 60335-1	Household and similar electrical appliances. Safety. General requirements
BS EN 60335-2-89	Household and similar electrical appliances. Safety. Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant unit or compressor
DG-0001	Pressure Equipment

SI 2016 No. 1105 conformity assessment was caried out by Hartford Steam Boiler UK (Approved Body Number: 2561), 9th Floor, Chancery Place, 50 Brown Street, Manchester M2 2JT, United Kingdom with Marking Permission HSB UK-22-09-004 issued.

Signed: 

Name:	Andrew Bowden
Position:	Managing Director
Location:	J & E Hall Limited, Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU
Date:	15/12/2022

Form: JEH-C6-017d-01 Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU Page 1 of 1

Figure 31: Declaration of Incorporation (Indoor)

Declaration of Incorporation

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 for below	
Product	Cellar Plus Cellar Cooler
Model Designations:	JCC2-40EV JCC2-50EV JCC2-60EV JCC2-80EV
Description:	Cellar Plus System Indoor Unit

The following essential health and safety requirements of The Supply of Machinery (Safety) Regulations 2008 (SI 2008 No. 1597) are applied and fulfilled:

1.1.1 – 1.1.2 – 1.1.3 – 1.1.5 –1.3.2 – 1.3.3 – 1.3.4 – 1.3.7 – 1.3.8.2 – 1.4.1 – 1.4.2.1 – 1.5.1 – 1.5.2–1.5.13 –1.7.1.1 –1.7.3 – 1.7.4

The relevant technical documentation has been compiled in accordance with Annex VII (PART 7 of SCHEDULE 2) part B of SI 2008 No. 1597.

The relevant information can be transmitted in electronic form in response to a reasoned request by the national authorities.

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of these Regulations, where appropriate.

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:	15/12/2022

Figure 32: Declaration of Incorporation (Outdoor)

Declaration of Incorporation

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 for below	
Product	Cellar Plus Cellar Cooler
Model Designations:	

BSCU-30-M1	BSCU-35-M1	BSCU-40-M1
BSCU-30-M3	BSCU-35-M3	BSCU-40-M3

Description: Cellar Plus System Outdoor Unit

The following essential health and safety requirements of The Supply of Machinery (Safety) Regulations 2008 (SI 2008 No. 1597) are applied and fulfilled:

1.1.1 – 1.1.2 – 1.1.3 – 1.1.5 – 1.2.1 - 1.2.6 - 1.3.2 – 1.3.3 – 1.3.4 – 1.3.7 – 1.3.8.2 – 1.4.1 – 1.4.2.1 – 1.5.1 – 1.5.2 – 1.5.13 – 1.7.1.1 – 1.7.2 – 1.7.3 – 1.7.4

The relevant technical documentation has been compiled in accordance with Annex VII (PART 7 of SCHEDULE 2) part B of SI 2008 No. 1597.

The partly completed machinery is also in conformity with below enactments:

SI 2016 No. 1105 The Pressure Equipment (Safety) Regulations

The relevant information can be transmitted in electronic form in response to a reasoned request by the national authorities.

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of these Regulations, where appropriate.

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:	15/12/2022

Figure 33: EU Declaration of Conformity (Outdoor)

EU Declaration of Conformity

According to DIRECTIVE 2014/68/EU ANNEX IV, DIRECTIVE 2009/125/EC ANNEX VI

J&E Hall International

We:	J & E Hall International
of:	Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU
Declare under sole responsibility that	
The Product:	Cellar Plus Cellar Cooler
Model Designations:	BSCU-30-M1 BSCU-35-M1 BSCU-40-M1 BSCU-30-M3 BSCU-35-M3 BSCU-40-M3
Description:	Cellar Plus System Outdoor Unit
DIRECTIVE 2014/68/EU Conformity Assessment Procedure Followed:	Module A for BSCU-30-M1 / BSCU-30-M3 Module A2 for BSCU-35-M1 / BSCU-35-M3 / BSCU-40-M1 / BSCU-40-M3

Description of the pressure equipment constituting the assembly:

Part description	Conformity assessment followed
Pressure switch	Module B + D
Liquid receiver	Module H1
Filter drier	SEP
Condenser	SEP
Sight glass & Valves	SEP
Flexible hose, System piping & Pressure accessories	SEP

The object of the declaration described above is in conformity with the following Union harmonisation legislation:

DIRECTIVE 2014/68/EU	On the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment

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

BS EN 60335-1	Household and similar electrical appliances. Safety. General requirements
BS EN 60335-2-89	Household and similar electrical appliances. Safety. Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant unit or compressor
DG-0001	Pressure Equipment

DIRECTIVE 2014/68/EU conformity assessment was caried out by Hartford Steam Boiler UK (Notified Body number: 2833) 28 Windsor Place, Lower Pembroke Street, Dublin 2, Ireland with Marking Permission HSB IE 22-09-003 issued.

Signed: 

Name:	Andrew Bowden
Position:	Managing Director
Location:	J & E Hall Limited, Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU
Date:	15/12/2022

Form: JEH-C6-017e-01 Questor House, 191 Hawley Road, Dartford, Kent, DA1 1PU Page 1 of 1

Figure 34: EU Declaration of Incorporation (Indoor)

Declaration of Incorporation

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 for below				
Product	Cellar Plus Cellar Cooler			
Model Designations:	JCC2-40EV	JCC2-50EV	JCC2-60EV	JCC2-80EV
Description:	Cellar Plus System Indoor Unit			

The following essential health and safety requirements of the Machinery Directive (DIRECTIVE 2006/42/EC) are applied and fulfilled:

1.1.1 – 1.1.2 – 1.1.3 – 1.1.5 –1.3.2 – 1.3.3 – 1.3.4 – 1.3.7 – 1.3.8.2 – 1.4.1 – 1.4.2.1 – 1.5.1 – 1.5.2–1.5.13 –1.7.1.1 –1.7.3 – 1.7.4

The relevant technical documentation has been compiled in accordance with part B of Annex VII of DIRECTIVE 2006/42/EC.

The relevant information can be transmitted in electronic form in response to a reasoned request by the national authorities.

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of DIRECTIVE 2006/42/EC, where appropriate.

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:	15/12/2022

Figure 35: EU Declaration of Incorporation (Outdoor)

Declaration of Incorporation

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 for below	
Product	Cellar Plus Cellar Cooler
Model Designations:	

BSCU-30-M1	BSCU-35-M1	BSCU-40-M1
BSCU-30-M3	BSCU-35-M3	BSCU-40-M3

Description: Cellar Plus System Outdoor Unit

The following essential health and safety requirements of the Machinery Directive (DIRECTIVE 2006/42/EC) are applied and fulfilled:

1.1.1 – 1.1.2 – 1.1.3 – 1.1.5 – 1.2.1 - 1.2.6 - 1.3.2 – 1.3.3 – 1.3.4 – 1.3.7 – 1.3.8.2 – 1.4.1 – 1.4.2.1 – 1.5.1 – 1.5.2 – 1.5.13 – 1.7.1.1 – 1.7.2 – 1.7.3 – 1.7.4

The relevant technical documentation has been compiled in accordance with part B of Annex VII of DIRECTIVE 2006/42/EC.

The partly completed machinery is also in conformity with below Directives and Regulations:

DIRECTIVE 2014/68/EU	On the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment

The relevant information can be transmitted in electronic form in response to a reasoned request by the national authorities.

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of DIRECTIVE 2006/42/EC, where appropriate.

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: 15/12/2022

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Issue: 01.06.2023