

# OPERATING INSTRUCTIONS

BITZER AUSTRALIA

BA0-105-2 AUS

## Evolution Series 1-8 Basic, Advanced and Premium models

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### 1. Important Recommendations



- BITZER Refrigeration Equipment is intended for installation only by **Qualified, Accredited Refrigeration Personnel** and is to be installed in accordance with the guidelines mentioned in this manual.
- All electrical work is to be carried out by **Qualified Electrical Personnel** and is to be in accordance with local electrical regulations.
- Wiring in accordance with AS/NZS 3000 standard.

### 2. Safety Recommendations



- BITZER Refrigeration Equipment is supplied with a **Nitrogen Holding Charge. (Release fully before system connection).**
- Electrical power to be **isolated** prior to the commencement of any electrical work.
- During normal operation Pressurised Refrigerant is contained within the refrigeration system. Extreme care should be taken to avoid leakage, as personal injury may occur. **(Avoid the use of sharp objects in close proximity to refrigeration piping).**
- Extensive gas loss in enclosed area may result in asphyxiation.
- Contact with refrigerant may cause personal injury. (Freeze Burns).
- Normal operating conditions involve **Hot and Cold** surfaces throughout the refrigeration system. Extreme care should be taken to avoid contact.



## DANGER!



- Risk of electric shock. Lethal voltages remain at fan connection cables even after the voltage supply has been interrupted! Wait at least 5 minutes after disconnecting voltage at all poles before working on electr(on)ics.
- Risk of injury from rotating fan blades! Only carry out work at the fan with the power isolated and the fan at standstill! Clothing can be caught and pulled into fan grill causing injury to body parts and/or bone fractures!

### 3. Application Ranges

- Refer to EVOLUTION Product Brochure for general application guidelines.
- Further compressor detail is available from the BITZER selection software available from the BITZER website.

Permitted refrigerants (1)	R134a, R404A, R407A, R407C, R407F, R507A, R22
Oil Charge (2)	BITZER BSE32 (Operating at less than 70°C)
Maximum allowable pressure (PS)	LP: 19 bar HP: 32 bar

(1) Further refrigerants upon request

(2) For alternative oils see Technical Information KT-500 and KT-510

- MANDATORY only for refrigerants within Safety group A1 only. (Also suitable for CFCs) refer BITZER documentation and selection software for further details.
- Refrigerants with a safety group category of A2, A2L, A3 and B2 **MUST NOT BE USED** in this equipment.
- Not to be installed in hazardous, combustible or corrosive environments.

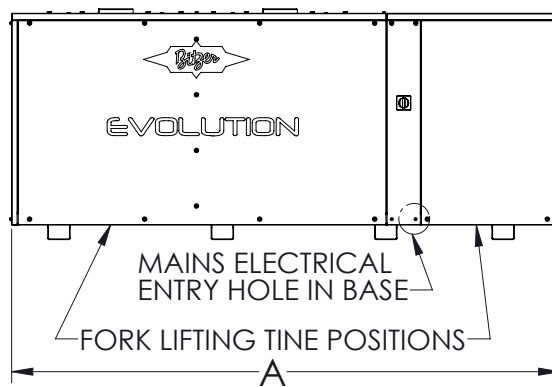
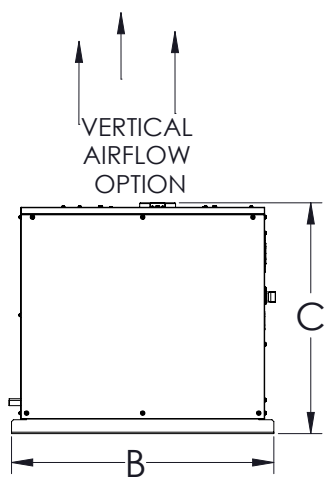
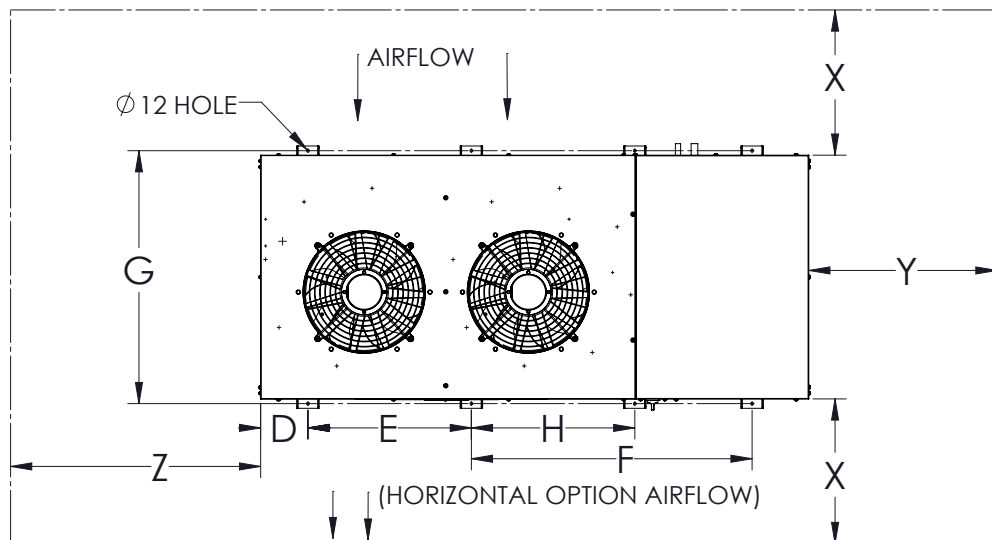
### 4. Plant Design

- The place of installation must be of solid ground or platform. Fitting of anti-vibration mounts to the unit feet is recommended for all situations.
- Maximum allowable operating pressure must take into consideration the entire system so the maximum pressure (PS) cannot be exceeded (see nameplate indications)
- Pressure relief valves are essential for receivers if it is expected that the maximum allowable pressure will be exceeded due to external heat sources (e.g. fire), or if the entire refrigerant charge of the system is more than 80% of the receiver volume.
- Safety switches are to be in conformance of the local regulations, pressure limiting safety switching devices must be provided for.

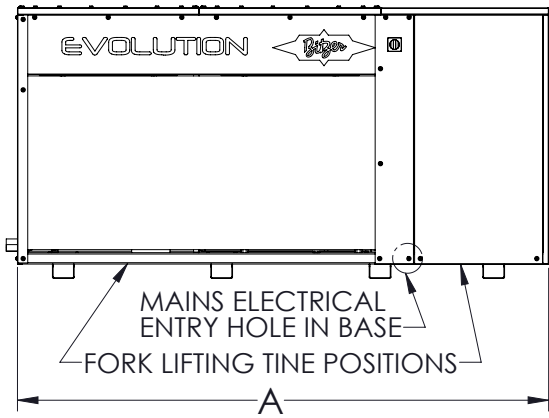
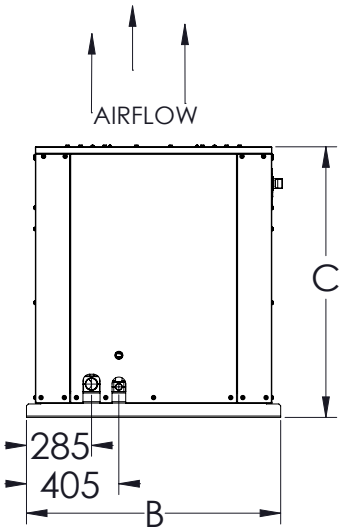
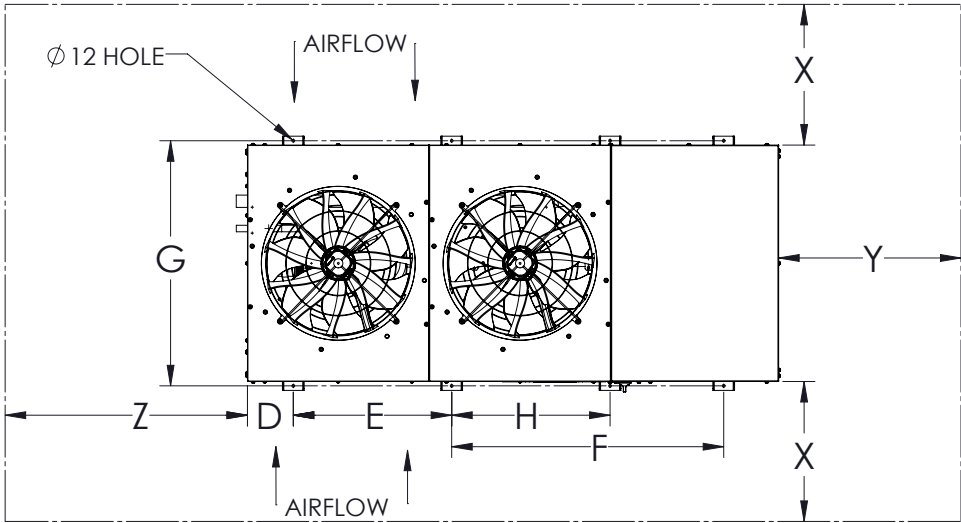
### 5. Mounting

- Condensing units are delivered on a pallet. Remove pallet and other packaging, then use forklift from the side indicated in the following figure.
- The installation location must be sufficiently stable, horizontal, vibration resistant, and it must also have sufficient space above and around to ensure non-recirculated air from the condenser exhaust from this or adjacent units does not influence the operation of the unit.

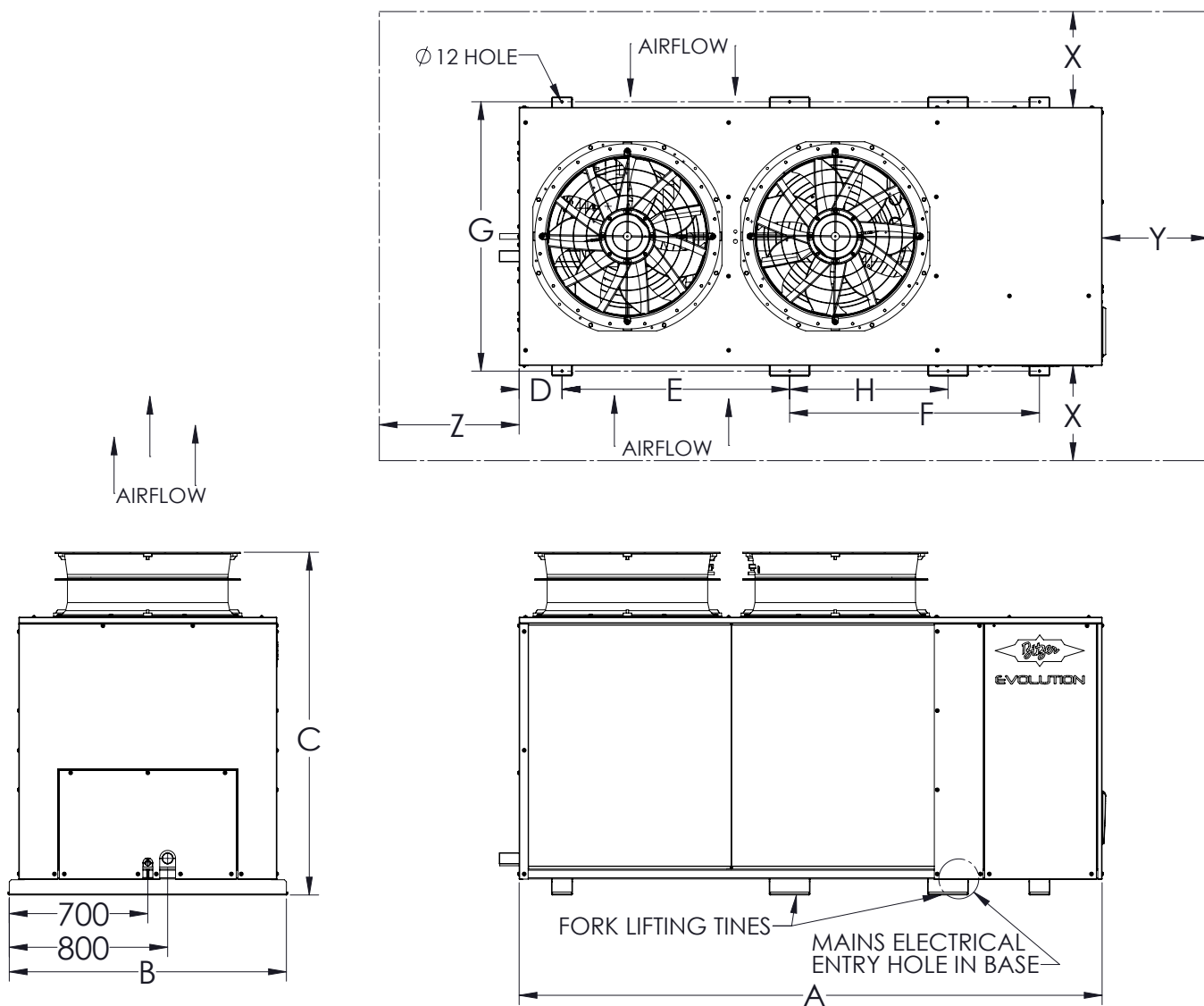
## Evolution 1 - 4



Evolution 5 - 6

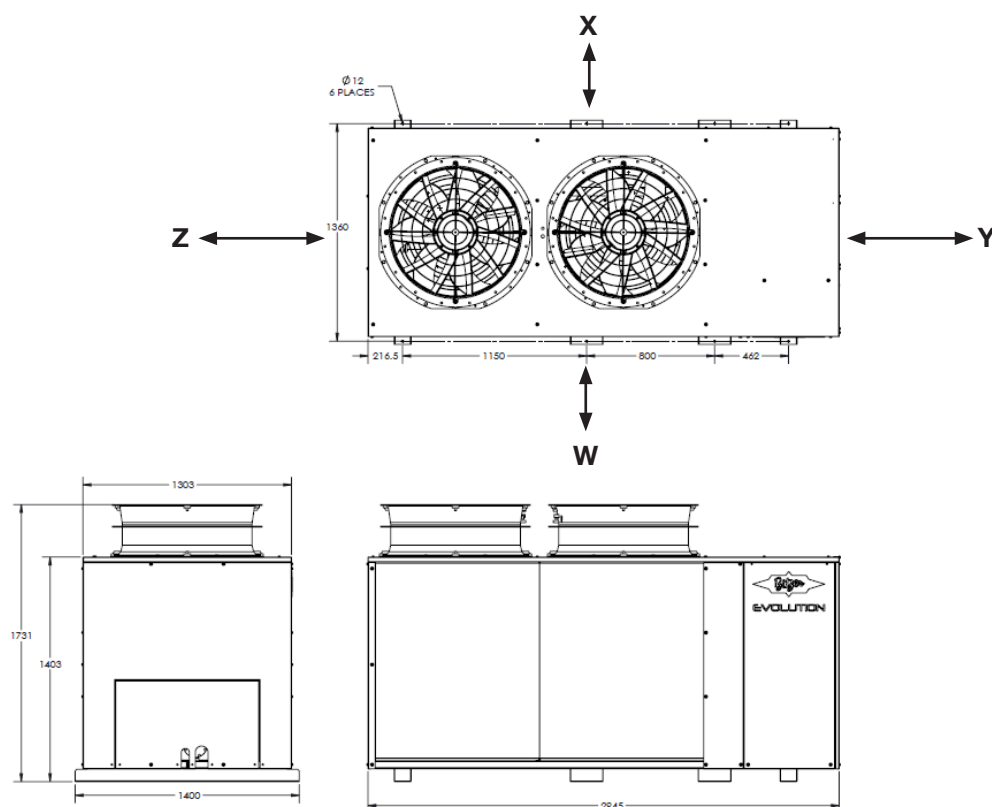


## Evolution 7 - 8



## Dimension Table

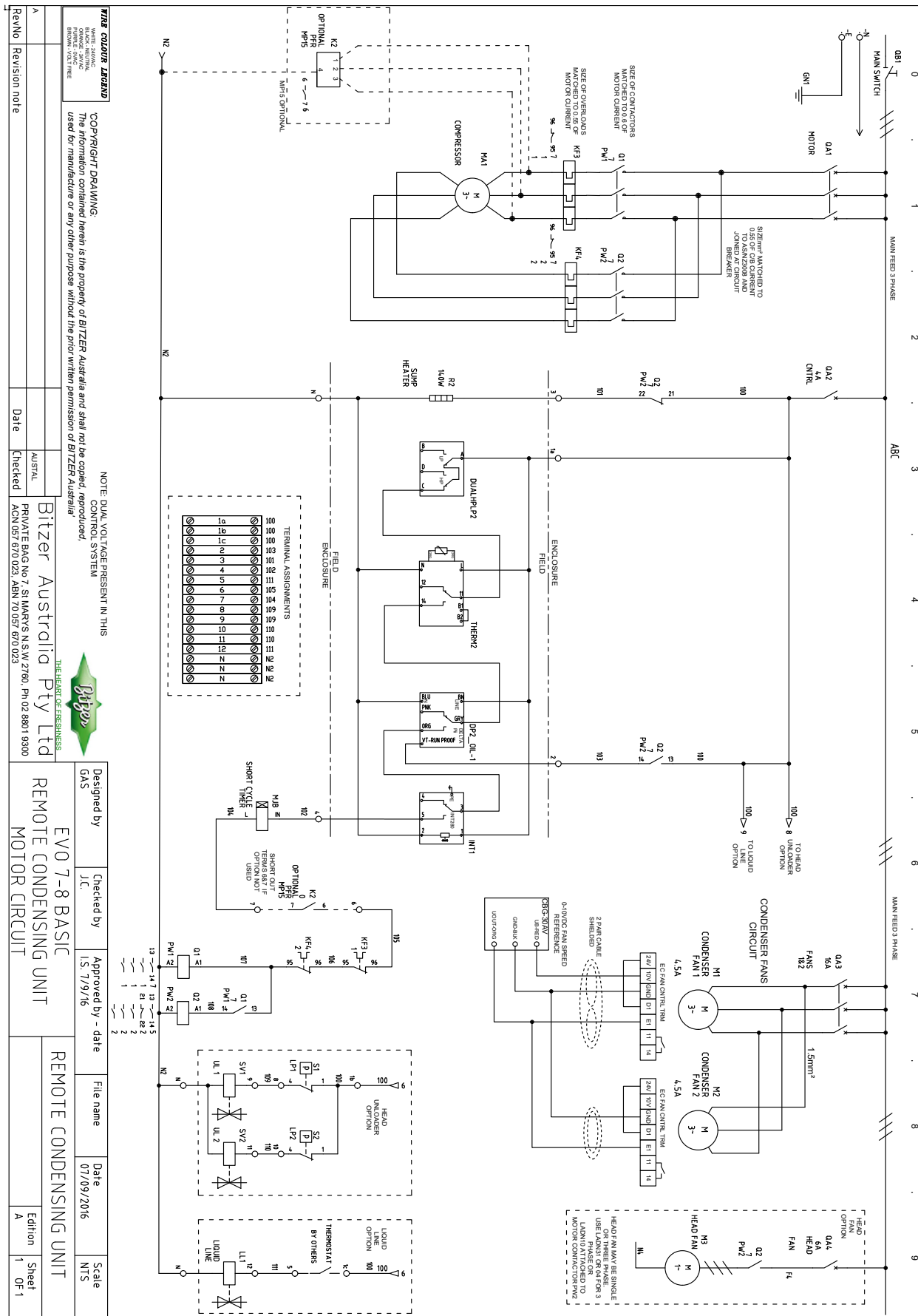
Model	A	B	C	D	E	F	G	H
EVOLUTION 1	1460	755	837	215	600	388	715	N/A
EVOLUTION 2	1840	755	837	201	691	691	715	N/A
EVOLUTION 3	1840	905	980	201	691	691	865	N/A
EVOLUTION 4	2330	1115	980	201	695	1193	1075	695
EVOLUTION 5	2330	1115	1186	201	695	1193	1075	695
EVOLUTION 6	2330	1115	1186	201	695	1193	1075	695
EVOLUTION 7	2945	1400	1731	217	1150	1262	1360	800
EVOLUTION 8	2945	1400	1731	217	1150	1262	1360	800
Minimum UNIT space off (m)								
	W	X (cond side)	Y (service panel)	Z (other)				
EVO 1	1.0	0.5	1.0	0.3				
EVO 2	1.0	0.5	1.0	0.3				
EVO 3	1.0	0.8	1.0	0.3				
EVO 4	1.0	0.8	1.0	0.3				
EVO 5	1.0	0.8	1.0	0.3				
EVO 6	1.0	0.8	1.0	0.3				
EVO 7	1.1	1.1	1.1	0.6				
EVO 8	1.1	1.1	1.1	0.6				







## Wiring Diagram - Evolution 7 - 8





## 7. Commissioning

- Evolution Condensing Units are designed to operate in outdoor locations and are supplied with protective panels, which will prevent rain, airborne debris etc from damaging the working parts of the machine. The compressor cover panels and lid can be removed for service and installation, but should always be replaced if the Condensing Unit is left unattended. Power must be isolated when removing the panel protecting the electrical compartment.
- Prior to charging, leak test the entire system using dry Nitrogen, this should be carried out in accordance with the current **Refrigerant Handling Code of Practice**. Each part of the system should be pressurized to the maximum pressure which that part of the system will have to operate at.
- Following leak testing, the entire system should be evacuated, this should be carried out in accordance with the current **Refrigerant Handling Code of Practice**. Evacuate the system with connections on the high and low side of the system, with all shut off valves open. Crankcase heaters should be energized during evacuation. A standing vacuum of  $< 1.5$  mbar is required.



**IMPORTANT: Do not attempt to start the compressor under vacuum.**

- Before charging the system with refrigerant, ensure Personal Protective Equipment is worn.
- Check the oil level in the compressor and oil separator if applicable.
- Refrigerant charging should be (with the compressor off) in liquid form directly into the liquid receiver outlet valve or refrigerant access valve (on liquid drier) if applicable. Additional refrigerant can be charged directly into the liquid line via the refrigerant access valve (if applicable) or charged in gas form or as necessary for blends - in liquid form into the suction side (preferably at the evaporator inlet).
- Charging refrigerant liquid into the dry suction side is to be avoided, this exposes the compressor to "wet operation" and the risk of damaging the compressor.

Prior to starting:

- Ensure oil level is within range (indicated by level next to sight glass).
- Check the oil temperature in compressor is (approx 15-20K above ambient temperature or evaporative saturated temperature).
- Check the setting and function of safety devices.
- Check all electrical connections for tightness. Check all electrical components of correct setting.
- Check the pressures settings of the high, low pressure controls are suitable for the application and refrigerant.  
**The setting of the High Pressure switch must not exceed 90% of the maximum operating pressure of the compressor.**
- Check operation of Oil level control and safety devices if applicable.

Starting:

- Once compressor is started the oil level must be monitored closely for the first hours of operation. Oil level should also be monitored at varying speeds compressor operation (if applicable). The oil level should be between 1/4 to 3/4 height of the sight glass. Oil pump pressure should be checked on models fitted with oil pumps.



**IMPORTANT:** if larger quantities of oil need to be added during start up, a future danger of slugging exists once the system reaches equilibrium; consequently the oil return must be checked and excess oil removed as part of the commissioning process.

Once running check the following operating conditions:

- Evaporating and Condensing pressures
- Suction and discharge gas temperatures
- Compressor supply voltage and running amps
- It is recommended to record such data in a log
- Check for system abnormal vibrations. The pulsation frequency in the discharge line and the excitation frequency at the compressor feet and in the piping system depend on compressor speed. This can result in resonance effects in pipelines and other system components. Therefore, the entire system especially the pipe lines and flexible tube must be checked for abnormal vibrations throughout the operational speed of the compressor (if applicable). Whenever powerful vibrations occur, protective measures must be taken to prevent future line component failure.

## 8. De-commissioning



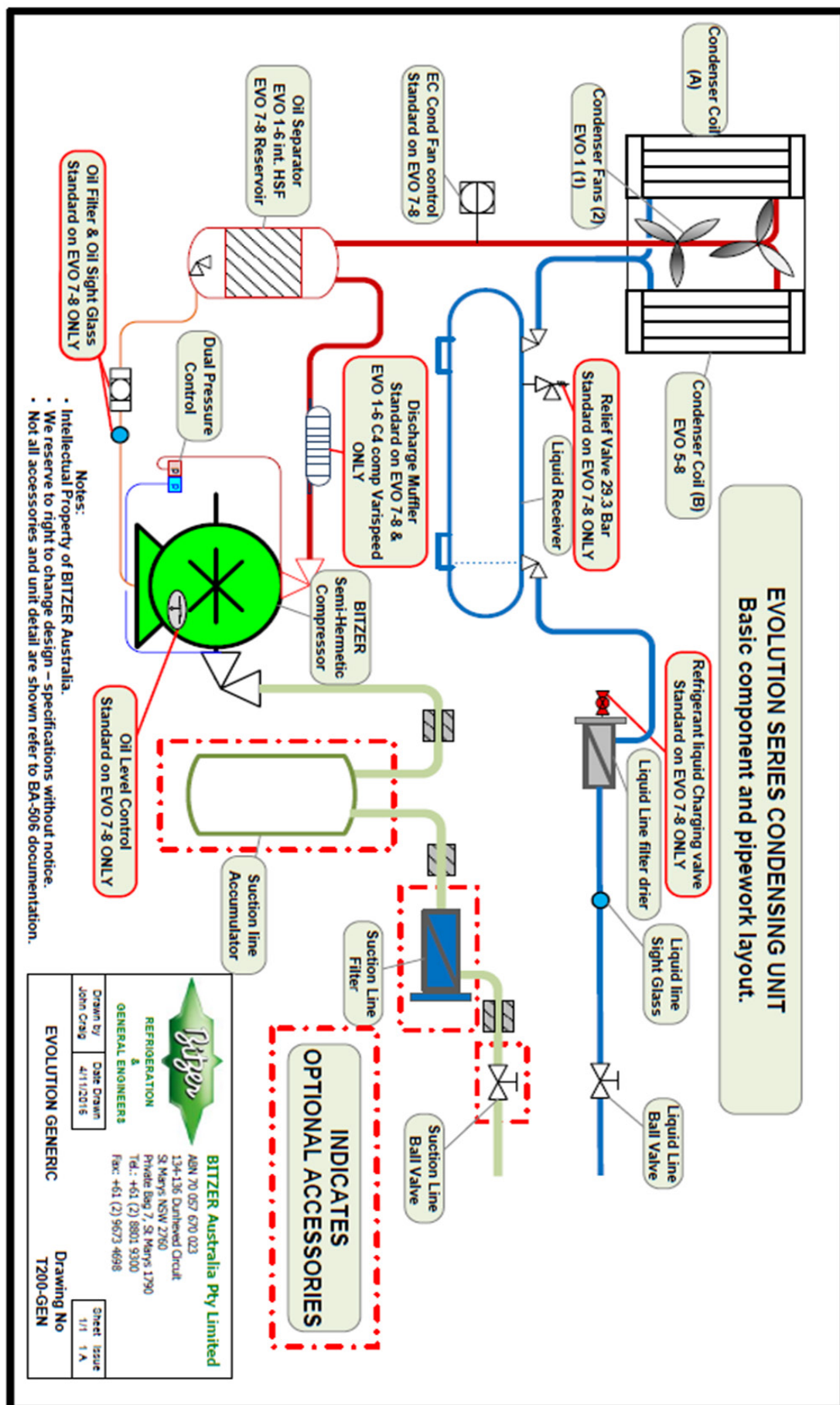
- Standstill. Compressor crankcase heater is to remain on until dismantling the compressor. This prevents increased refrigerant solution in the compressor oil.
- **WARNING** Electrical components may be live! Disconnect main supply voltage and remove fuses.
- **WARNING** Compressor and other components may be under pressure! Release pressure first and wear Personal Protective Equipment.
- Remove refrigerant as per local regulations.

## 9. Maintenance Instructions

All systems are to be regularly inspected in accordance with the **Refrigerant Handling Code of Practice**.

- Regular maintenance and monitoring of the condenser is important to the efficient operation of the Evolution condensing unit. The condenser coils must be clean and free of airborne debris. This must be carried out carefully and damage to the fins must be avoided. Cleaning of the fin face can be accomplished by the use of a soft bristle brush, compressed air and/or low water pressure. Care must be taken to avoid electrical components.
- Note Electrical power must be isolated prior to cleaning.
- The surrounding environment will need to be assessed to determine the regularity of the condenser cleaning.
- The remaining components on the Evolution condensing units are designed to require minimal maintenance; on routine inspections the following is recommended:
- Check the surrounding area is not hindering air flow to and from the condenser.
- Check conditions of electrical connections and wiring.
- Check refrigerant level in system.
- Check oil level(s) in system.
- Check for any signs of refrigerant and/or oil leaks.
- Check for unusual vibration and noises.
- Check pipework for any excessive movement, loosed supporting brackets and unusual wear marks.
- For detailed compressor maintenance refer to BITZER Technical information from the BITZER website.
- Condenser fan motors all contain sealed bearings and are therefore maintenance free.

# 10. Condensing Unit Schematic Diagram



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Note: The ISO standard only applies to the BITZER NSW and VIC branches