DATE: 25/10/17	IM-018A	ISSUE: A	ENG NO: 55729	PREPARED: SS	APPROVED: DU

Kirby® Nullabor Condensing Units

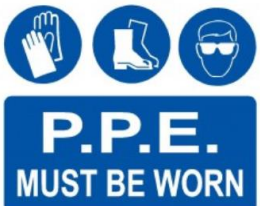
Installation Manual

KIRBY

Thank you for purchasing the Kirby Nullabor Condensing unit from Heatcraft. For information on installation, maintenance and operation please refer to the contents of this handbook.

IMPORTANT INFORMATION

REFER TO ALL SECTIONS IN THE INSTALLATION MANUAL BEFORE ATTEMPTING TO COMMISSION THIS CONDENSING UNIT



HUMAN DEATH, PROPERTY DAMAGE POSSIBLE IF OPERATED/COMMISSIONED INCORRECTLY

Keep this document in a secure location on the premises for future reference for the life of the product. Should this product be sold on and/or moved to another location, this document must be included with the product when relocating

TABLE OF CONTENTS

1. INTRODUCTION:

Kirby Nullabor Condensing units fall under the requirements for commercial electrical equipment as per Australia guidelines. Installation and service of this unit must be carried out by a licenced contractor in accordance with local regulatory guidelines.

Explanations of system warranty, inspection, installation, operation and maintenance will be found in the following pages and detail on individual components can be found in the separate component installation manual. This document is intended to provide guidance where customers do not have a specified process guideline. Customer specifications and local codes may take precedence over directions contained in this document. Any practices contrary to those outlined in this document may lead to poor performance or reliability of the system. Any damage or impact of noncompliance with these procedures is the responsibility of the customer and/or refrigeration technician.

Heatcraft Australia is very conscious of safety issues when designing and manufacturing these products, but it is essential that the end user, installer or service personnel also exercises care when working with the units.

2. IMPORTANT INFORMATION:

Kirby Nullabor Condensing units are NOT supplied with an isolation switch in the unit. To ensure safety, an external isolation switch must be fitted within the reach of the unit. The switch shuld be pad lockable in the OFF position.

NOTE: TIGHTEN ALL ELECTRICAL CONNECTIONS AS THEY MIGHT HAVE COME LOOSE IN TRANSPORTATION.

Kirby Nullabor Condensing units have been designed for indoor and weather protected outdoor environment and most models may be installed within other equipment cabinets. The unit is not suitable for mobile or explosion proof applications. All controls are 230/240V AC.

All units are pressurised with dry air ot nitrogen gas. Care must be taken to discharge the pressurised gas prior to installing or commissioning the equipment.

WARNING: Disconnect/Isolate all power supplies before attempting to install/service/diagnose the unit. Do not operate unit with access panels removed.
All pertinent electrical codes must be followed by the installer
The unit may start automatically without warning.

CAUTION: Avoid contact with sharp edges and coil surfaces.

Unit Pressurized: This unit is pressurized with dy air or Nitrogen gas. Care must be taken to discharge the pressurized gas prior to installing or commissioning the equipment.

Refrigerant Type: This unit is designed to work effectively with R404A, R507, R22, R407C & R134a refrigerants. Under no circumstances can a refrigerant such as Ammonia, Water, Glycol or Hydrocarbon be used in this product.

Under no circumstances can a refrigerant such as Ammonia, Hydrocarbon, Water or Glycol be used in this product. Refrigerant can be harmful if it is inhaled and/or makes contact with exposed skin. Refrigerant must be used and recovered responsibly. Extreme care must be taken when handling refrigerant, as personnel injury or death may occur.

Do not operate compressors in DEEP VACUUM as this can cause electrical failure and other damage. Compressors should never be used to evacuate the system. Do not insert any object into operating fans. Ignoring the warning may result in personal injury and/or severe equipment damage and cosequences

The compressor and most fan motors, are fitted with inherent internal inline break motor protection. After opening, the protector may not reset for several hours, until the motor cools down sufficiently. Do not assume that the motor has suffered an open circuit failure without forst allowing it to cool.

Some hermetic compressors include an IPR valve. The IPR valve will open when the discharge pressure exceeds the suction pressure by a certain value which is set by the compressor manufacturer. When it has opened, the compressor sump will become warm and the compressor will trip out on the motor protector. The unit may take 2 to 3 hours to reset and restart automatically if this happens. **Kulthorn Kirby "AW" compressors have an IPR valve.**

DO NOT ASSUME THAT A COMPRESSOR THAT IS RUNNING BUT NOT PUMPING IS FAULTY. STOP THE COMPRESSOR AND ALLOW THE PRESSURE TO BALANCE, THEN START THE COMPRESSOR AGAIN.

Compressor housing and discharge line temperatures can be very high (may exceed 100°C) and can cause severe burns. Wiring and other materials that could be damaged by these temperatures should not come into contact with the housing or discharge line. The unit can also generate low temperature surfaces that might make the moisture in the air condense if the relative humidity is high enough, and result in slippery surface conditions. Special caution must be taken when working around the unit.

3. ROUTINE MAINTENANCE:

	TIME INTERVAL			
CHECK POINT	**MONTHLY**	**3 MONTHLY**	**6 MONTHLY**	**YEARLY**
Compressor Oil Level	CHECK			REPLACE
Fan motors		CHECK		
Gas Charge		CHECK		
Electrical Connections			CHECK	
Filters- Liquid		CHECK		REPLACE
Filters- Suction		CHECK		
Filters- Oil		CHECK		

Suction Filter/Drier: Suction Filter/Drier cores should be replaced after the first initial 48 to 72 hours of operation of the unit.

Liquid Filter/Drier: Liquid filter/drier should be checked and replaced if needed regularly.

Lubrication Oil: Check the chemical characteristics of the lubrication oil every 12 months. Change the oil if necessary. For more information please refer to compressor technical information.

Leak Testing: Test all connection points as per code of practice.

Lubricant Oil Type: The compressor is charged with Polyol Ester (POE) oil. POE can be used with HFC/HCFC refrigerants. Use only POE oil. **DO NOT MIX** different brands of oil together.

4. LIFTING & HANDLING:

The compressor is the heaviest part of the unit. The location of the compressor depends on the model. Particularly on 2 fan units.

- Forks should be placed underneath the compressor location when lifting.
- Slings may be placed under the unit, but care must be taken to adjust the lengths appropriately to account for the weight distribution to prevent slipping. If lifting manually (smaller units), use proper lifting techniques and ensure sufficient personal are involved to limit individual loading to safe levels
- Make sure that the lifting equipment DOES NOT INTERFERE with any component of the unit or its accessories.
- Keep the unit in horizontal position during the lifting process. Place unit on a levelled surface before attempting to lift the unit.

5. PURPOSE:

- Kirby Nullabor condensing units are standard OEM products of Heatcraft Australia including both “MEDIUM” and “LOW” temperature application ranges. They are designed for continuously supplying and receiving the refrigerant to and from the evaporator(s), and rejecting the heat extracted from the cold space to surrounding atmosphere where the units are installed.
- Kirby Nullabor condensing units are intended for installing in a typical ventilated indoor or weather protected outdoor environment, or within suitable enclosures internal to other equipment, (refer to the General Arrangement Drawing section for details) with the condensing temperature no greater than 60°C and compressor return vapour temperature no greater than 20°C.
- Standard systems are not intended for environments that may have harmful, corrosive or flammable atmospheres. Marine environments are considered corrosive; please consult Heatcraft before installing in this environment.

6. STANDARD DESIGN CONDITIONS:

- **Medium temperature** range units are typically designed for primary refrigerant R404A, to be used in commercial applications ranging from -20°C to +10°C saturated suction temperature for M & MH units. R507/R404A/R134A are recommended refrigerants.
- **Low temperature** range units are designed, for primary refrigerant R404A, to be used in commercial freezer room applications ranging from -35°C to -5°C saturated suction temperature.
- For special design requirements (non-standard conditions and/or refrigerants), please contact **13 23 50** or your nearest Heatcraft branch.

7. INSTALLATION INSTRUCTIONS:

When unpacking, check for any damage to packing material or the unit itself which may affect the unit's performance. If any such damage is evident, please contact your local Heatcraft branch.

Installation location:

- If the unit is to be located in close proximity to a wall or similar obstruction, the minimum maintenance distance for the major components of the unit shall be complied with. For more information please refer to the component manufacturer's instructions. The unit must be mounted on a level horizontal surface.
- Ensure minimal airflow obstruction when mointing within other equipment cabinets.
- Sufficient room should be allowed to view the sight glass during operation. The location of sight glass varies depending on the model.
- Allow sufficient unobstructed air discharge space around the unit to prevent warm air circulation to the condenser. Within equipment cabinets, air inlet and outlet must be suitably separated and isolated.
- Make sure that the installation is far enough away from high heat sources to prevent temperature increases due to heat radiation.
- Refrigeration units may not be installed within 3.5 m of a LPG in-situ fill or 1.5 m of an exchange cylinder, and vice versa. For more information, please refer to relevant standard.

Refrigeration Piping:

- Refrigeration piping work shall be carried out professionally by qualified refrigeration mechanics in accordance with applicable national and local regulations and in conformance with good engineering practices required for the proper operation of the refrigeration system.
- This unit is supplied clean and internally charged with dry air or nitrogen to prevent oxidation and ingress of moisture or foreign matter. Care shall be taken during installation of the piping to prevent entrance of foreign matter or moisture by minimising the time that the piping is uncapped.
- The interconnecting refrigeration pipe size is not necessarily the same size as the inlet and outlet on the unit. The pipe sizes shall be selected/calculated based on the best compromise of minimizing refrigerant pressure drop and refrigerant velocity to ensure efficient oil return. Suction line piping shall be insulated to minimise the superheat at the compressor.
- Horizontal suction lines shall slope towards the units to allow oil return freely to the compressor by gravity. A 1:100 slope is considered sufficient. The use of oil trap and double risers may be necessary on vetical sections. Maximum piping lengths may apply, contact Heatcraft representative for more details.

Electrical Connection:

All electrical connections must be carried out by a licensed electrical contractor and in accordance with the relevant regulations. Double check all field wiring connections and factory terminations and tighten all connections. Mains supply cabling must be in accordance with relevant standards and/or codes. Mains supply should be separate from control cables. Control cables. may be brought into the electrical box section from the side using suitable glands or bushes. For more information please refer to the wiring diagram supplied with the units.

Oil:

- Use only PolyolEster (POE) oil. Do not mix POE with other oils.
- Kirby Nullabor reciprocating hermetic compressors may not have oil sight glasses fitted. Oil levels on these compressors can only be checked upon removal of the compressor.

Compressor Starting:

- All Kirby Nullabor condensing units use Direct-On-Line starting compressors, in single and/or three phase, depending on size. Care should be taken to establish starting requirements for the larger compressors due to high in-rush current.

Maximum compressor starts per hour
Kulthorn Kirby reciprocating hermetic compressors = 10

System Holding Charge:

- The unit as supplied is pressurized with dry air or nitrogen. If the system is not pressurized on delivery, please contact your nearest Heatcraft branch. Care must be taken to release the pressure before attempting to gain access to any part of the refrigeration system.
- The unit should be evacuated to a pressure of 500 microns (μmHg) prior to commissioning.

Pressure settings:

Kirby Nullabor Condensings units are equipped with High/Low Pressure Switch as standard. The switch is either a universal selectable auto or manual reset ot fixed auto/auto reset type on both high and low sides. If universal switch is used, then it is set to auto/auto at the factory. Check unit for the type of switch. It is recommended to use the LP switch only as a safety protection device. Do not use the LP switch for pumpdow, use a separate LP for pumpdown application

Kirby Nullabor condensing units have a maximum operating pressure of 31 bar(abs) determined on pressure vessels (such as liquid receivers). Thus any pressure relief device setting must be 31 bar(abs) or lower. Pressure limiting device settings such as the HP control must be 28 Bar(abs) or lower in accordance with ***AS/NZS 5149.2*** *(from Nov 2017)* that the pressure limiting device setting is no greater than 0.9 times the maximum operating pressure.

In general, Heatcraft Australia recommends 60°C condensing temperature as the maximum operating condition, The corresponding saturation pressures from respective refrigerants shall be regarded as HP cut-out points for safety protection purpose. For example, approximately 28 bar(g) for R404A.

Depending on the application and compressor, LP cut-in and differential points should be set with the following considerations:

- Set the cut-out points at 3–5 K below the respective minimum design saturated suction temperatures (Refer to the Standard Design Conditions section for saturated suction temperature ranges). Set the differential to no more than 2 Bar.
- The cut-out pressure shall be in the positive pressure region.
- When the unit is installed in a cold ambient, the cut-out pressure shall be lower than the pressure corresponding to the ambient temperature.

Access points for gauges are located on the compressor rotolock valve, base valve, discharge and suction lines depending on the model of the unit. They may be accessed from the front of the unit only.

8. COMMISSIONING:

INSTALLATION / COMMISSIONING / DECOMMISSIONING MUST BE CARRIED OUT BY A QUALIFIED REFRIGERATION MECHANIC, INACCORDANCE WITH LOCAL REGULATORY REQUIREMENTS

Prestart Check:

ITEMS	STATUS & STANDARD VALUES
Sump heater	Turn on the oil heater at least 12 hours before starting
Valves	All the valves should be opened
Refrigerant piping system	Fixed and Supported firmly
Leakage test	No leakage
Bolts to fix the	Fix the compressor/unit firmly
Insulation	Shall be protected from UV exposure, if used
Vacuum	Connect vacuum pump to high and low side service valve or port to evauate the entire system
Electrical system	Check connection tightness before commissioning
	Voltage should be kept within 5% to the rated voltage
	Maximum momentary voltage drop during start < 10% of rated
	Insulation resistance value should be above 5 MΩ
	Power terminals are firmly fixed on terminal block and well
	Keep cables away from heat sources and sharp edges
	Comply with local standards, Refer to system specific wiring

Refrigerant charging shall be in liquid form at the high-pressure side of the system such as condenser or liquid receiver. If the refrigerant charging must be carried out through the suction side of the compressor, charge in vapour form only.

After successful start up of the system, generally check:

- Current draw and voltage levels.
- Suction superheat settings and discharge temperatures.
- Abnormal refrigeration piping vibrations.
- Oil level and refrigerant charge- after 8-10 hours running. Stop the compressors and wait 30 seconds before checking
- Correct fan rotation
- Check evaporator expansion valves for correct setting and operation
- Oil Filter

9. DECOMMISSIONING:

INSTALLATION / COMMISSIONING / DECOMMISSIONING MUST BE CARRIED OUT BY A QUALIFIED REFRIGERATION MECHANIC, INACCORDANCE WITH LOCAL REGULATORY REQUIREMENTS

DISCHARGE OF REFRIGERANT TO ATMOSPHERE IS ILLEGAL AND MAY RESULT IN HEAVY FINES

- Pump down the entire refrigerant charge into the liquid receiver or appropriate container such as reclaim cylinder, and shut related valves. All reclaimed refrigerant that is not re-used must be taken to an approved refrigerant recycling or destruction facility. Heatcraft Branches will accept the used refrigerant.
- Disconnect the power supply. Remove all necessary field electrical wiring and related components, leaving the earth wire to the last.
- Care must be taken when disconnecting the refrigeration piping because of unbalanced pressure between the unit and ambient. There may be a small amount of refrigerant trapped in the oil, the pressure rise in the system will boil and vaporise the refrigerant resulting in a potential personal injury hazard.
- Cut and solder seal the refrigeration liquid line and suction line pipe connections.
- Remove the unit from its mounting place. Adequate equipment must be provided as per lifting notes.

10. MATERIAL SAFETY DATA SHEETS (M.S.D.S):

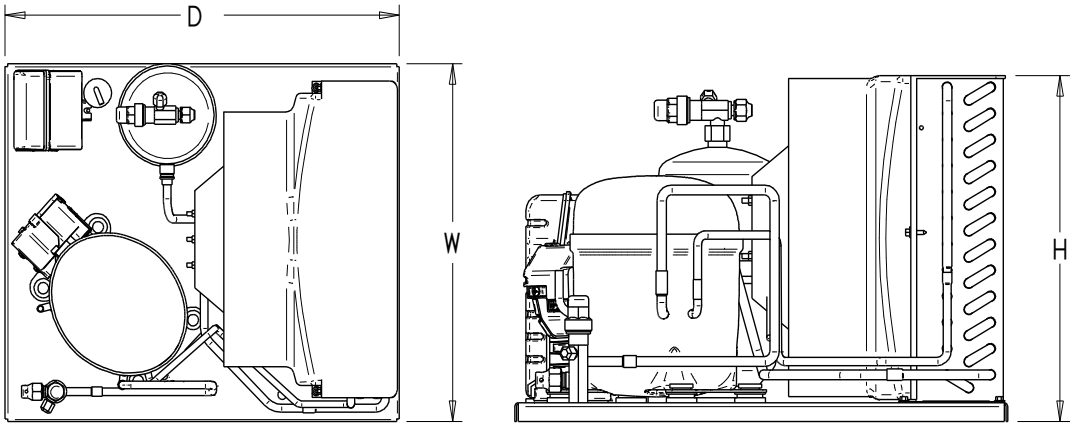
Please contact your nearest Heatcraft outlet or 13 23 50 for more information.

11. NOTES:

- To ensure efficient operation and long working life always use only genuine replacement parts and parts specified by Heatcraft. Refer to the Standard Terms & Conditions of Sale in the Price Guide for warranty statements.
- Continuous product improvement is our company policy. Heatcraft Australia reserves the right to make changes in product specifications and/or this instruction manual without notice.

Heatcraft Australia is dedicated to providing safe products and protecting the environment by complying with all applicable national laws and regulations governing environmental protection. New and used refrigerants cannot be vented into atmosphere. Ensure your refrigerant handling procedure complies with the relevant regulations.

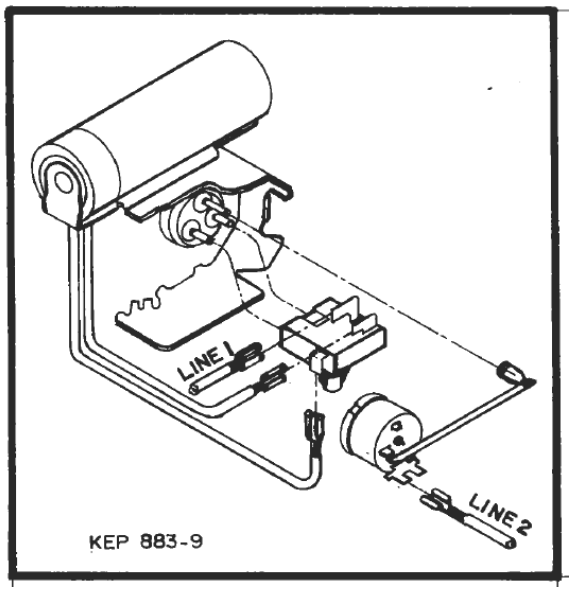
12. DIMENSIONAL DRAWING:

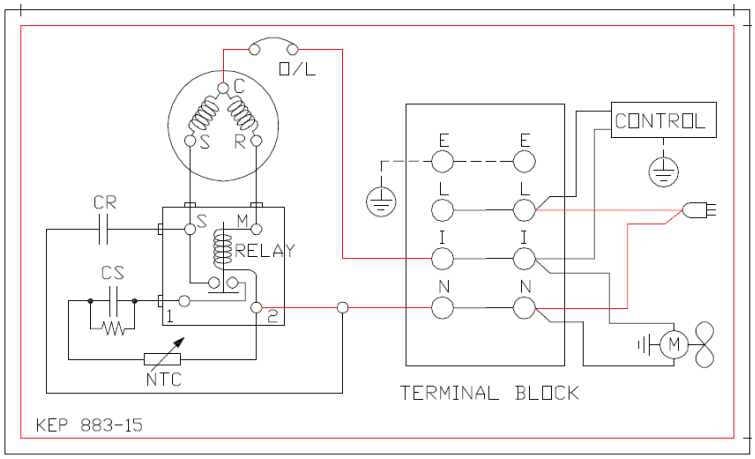


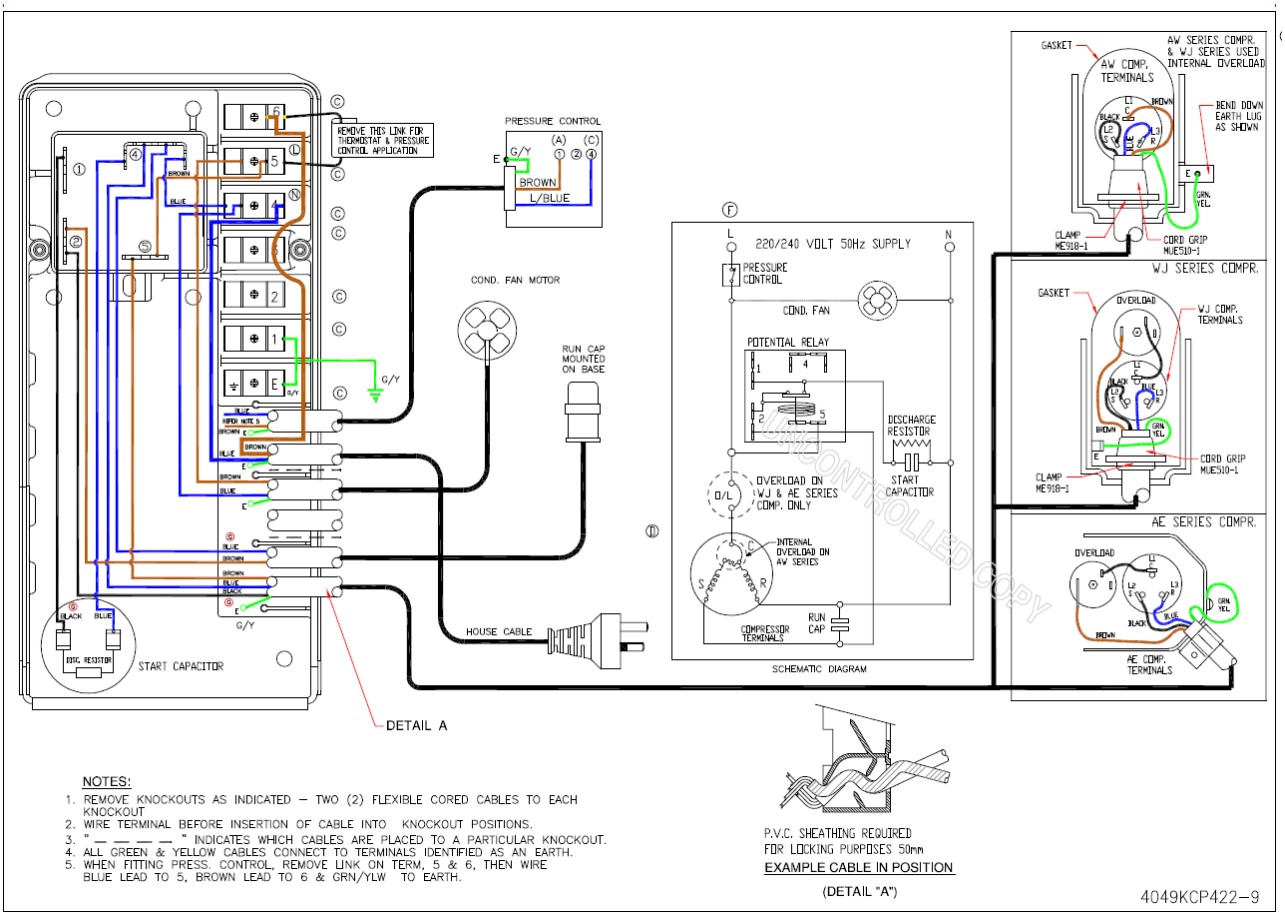
Product Number	Connections (in.)		Dimensions (mm)			Net Weight (kg)	Wiring Schematic	Page No
	Suction	Liquid	Depth	Width	Height			
BA6MHGB1	3/8 S.T.	1/4 S.V.	470	330	235	17	KEP883-9	10
BA6MHGBC1							TBA	
BA8LMYA	3/8 S.T.	1/4 S.V.	470	330	235	15	TBA	
BA8MGB1	3/8 S.T.	1/4 S.V.	470	330	235	17	KEP883-9	10
BA8MGB5							KEP883-9	10
BA8MGBC1							TBA	
BA9MGB1	3/8 S.T.	1/4 S.V.	470	330	276	21	KEP883-9	10
BA9MGBC1							TBA	
BA9MHYA	3/8 S.T.	1/4 S.V.	470	330	276	16	KEP883-9	10
BA9MHYB	3/8 S.T.	1/4 S.V.	470	330	276	18	KEP883-9	10
BA12LMYA	3/8 S.T.	1/4 S.V.	470	330	276	19	TBA	
BA12LMYB	3/8 S.T.	1/4 S.V.	470	330	276	21	TBA	
BA12MGB1	3/8 S.T.	1/4 S.V.	550	435	338	32	TBA	
BA12MGB2							TBA	
BA12MGB51							KEP883-15	10
BA12MGBC1							TBA	
BA14LMYA	3/8 S.T.	1/4 S.V.	470	330	276	20	TBA	
BA14LMYB	3/8 S.T.	1/4 S.V.	470	330	276	22	TBA	
BA14MGB	3/8 S.T.	1/4 S.V.	550	435	338	34	KCP422-10	11
BA16LMYA	3/8 S.T.	1/4 S.V.	550	435	338	30	TBA	
BA16LMYB	3/8 S.T.	1/4 S.V.	550	435	338	32	TBA	
BA16MGB	3/8 S.T.	1/4 S.V.	550	435	338	35	KCP422-9	11
BA18LZB	3/8 S.T.	3/8 S.V.	550	435	338	34	KCP422-9	11
BA18MGB	3/8 S.T.	3/8 S.V.	620	520	395	35	KCP422-9	11
KN014MH1	1/2 S.T.	3/8 S.T.	550	435	338	37	KCP422-9	11
KN024MH1	1/2 S.T.	3/8 S.T.	620	520	395	41	KCP422-9	11
KN017MH1	1/2 S.T.	3/8 S.T.	550	435	338	38	KCP422-9	11
KN028MH1	1/2 S.T.	3/8 S.T.	620	520	446	42	KCP422-15	12

KN014L1	5/8 S.T.	3/8 S.T.	620	520	395	41	KCP422-9	11
KN036MH1	5/8 S.T.	3/8 S.T.	620	520	446	43	KCP422-9	11
KN022MH1	5/8 S.T.	3/8 S.T.	620	520	446	42	KCP422-9	11
KN035MH1	5/8 S.T.	3/8 S.T.	550	860	418	63	KCP422-24	13
KN015L1	5/8 S.T.	3/8 S.T.	550	635	345	61	KCP422-9	11
KN023MH1	5/8 S.T.	3/8 S.T.	620	520	446	60	KCP422-9	11
KN029MH1	5/8 S.T.	3/8 S.T.	550	860	345	61	KCP422-24	13
KN044MH1-1	5/8 S.T.	3/8 S.T.	550	860	418	69	KCP422-24	13
KN044MH1-2							KCP422-40	13
KN048MH1-1	5/8 S.T.	3/8 S.T.	550	860	418	71	KCP422-24	13
KN048MH1-2							KCP422-40	13
KN031MH1-1	5/8 S.T.	3/8 S.T.	550	860	418	70	KCP422-24	13
KN031MH1-2							KCP422-40	13
KN024L1	5/8 S.T.	3/8 S.T.	550	860	418	68	KCP422-24	13
KN051MH1-1	5/8 S.T.	3/8 S.T.	550	860	418	71	KCP422-20	13
KN051MH1-2							KCP422-40	13
NOTE: S.T.: SOLDER TUBE S.V. SOLDER VALVE								

13. WIRING SCHEMATICS:





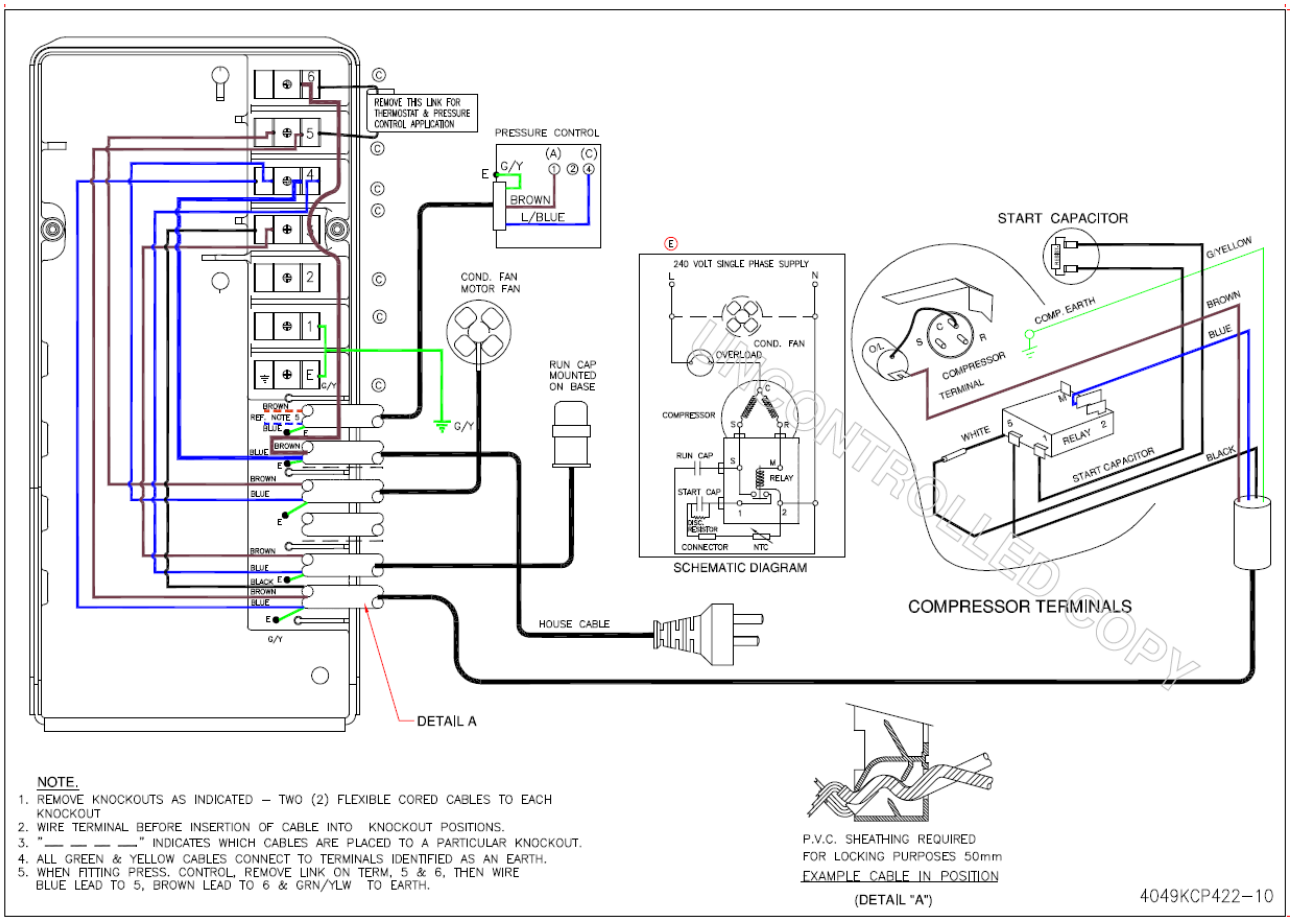


NOTES:

1. REMOVE KNOCKOUTS AS INDICATED – TWO (2) FLEXIBLE CORED CABLES TO EACH KNOCKOUT
2. WIRE TERMINAL BEFORE INSERTION OF CABLE INTO KNOCKOUT POSITIONS.
3. " — — — — " INDICATES WHICH CABLES ARE PLACED TO A PARTICULAR KNOCKOUT.
4. ALL GREEN & YELLOW CABLES CONNECT TO TERMINALS IDENTIFIED AS AN EARTH.
5. WHEN FITTING PRESS. CONTROL, REMOVE LINK ON TERM. 5 & 6, THEN WIRE BLUE LEAD TO 5, BROWN LEAD TO 6 & GRN/YLW TO EARTH.

P.V.C. SHEATHING REQUIRED FOR LOCKING PURPOSES 50mm
EXAMPLE CABLE IN POSITION
(DETAIL "A")

4049KCP422–9



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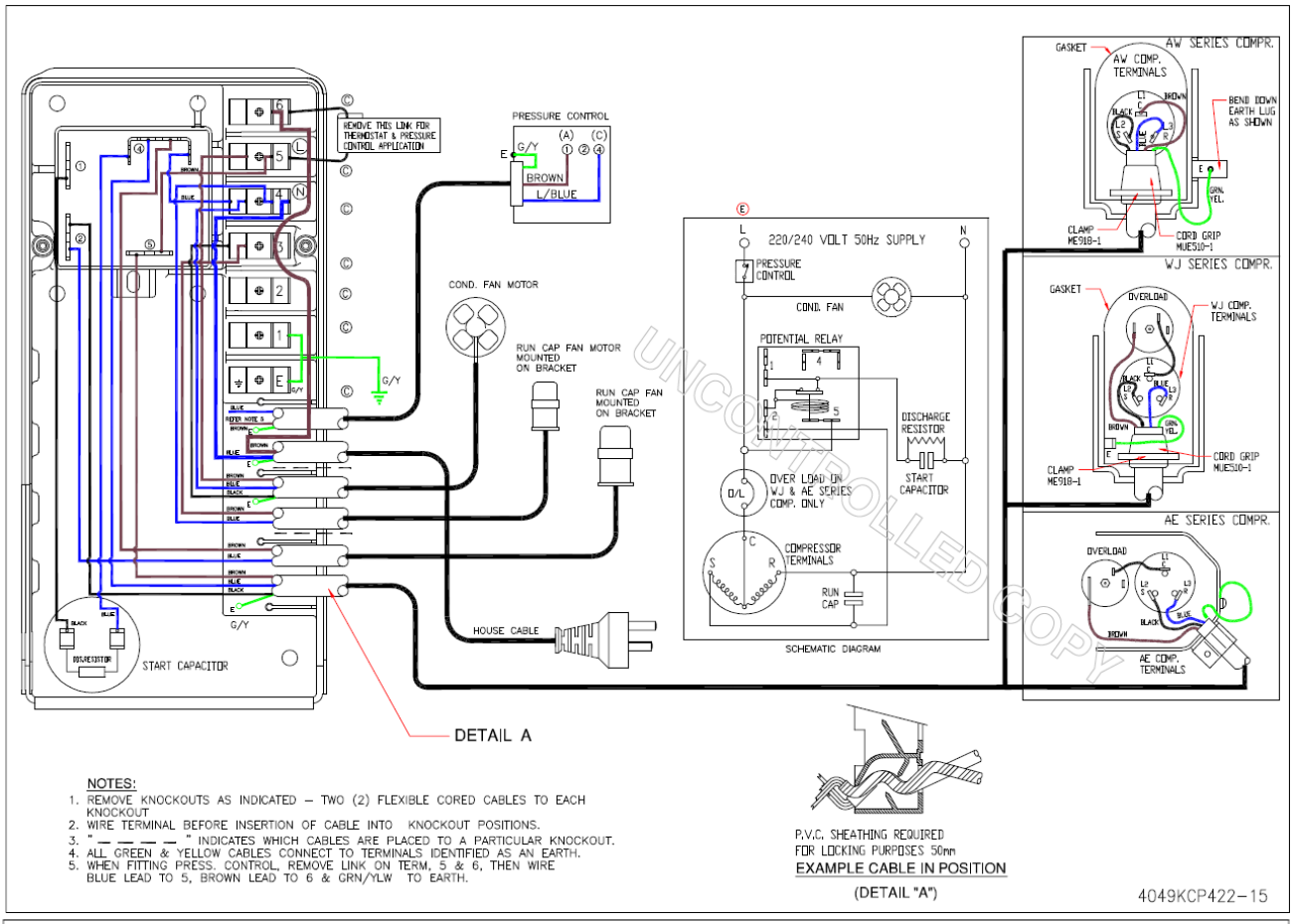
P.V.C. SHEATHING REQUIRED FOR LOCKING PURPOSES 50mm
EXAMPLE CABLE IN POSITION
(DETAIL "A")

4049KCP422–10



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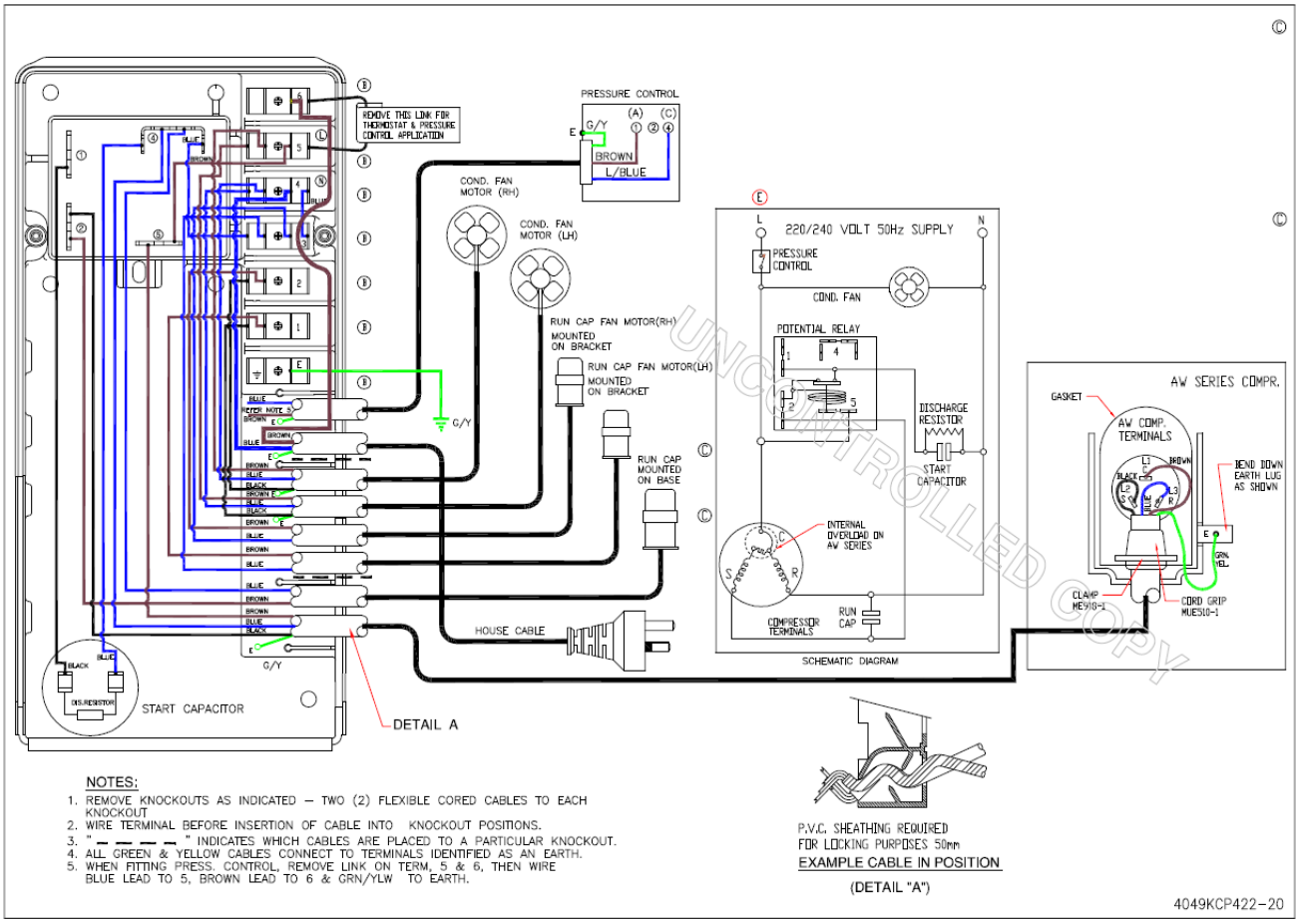

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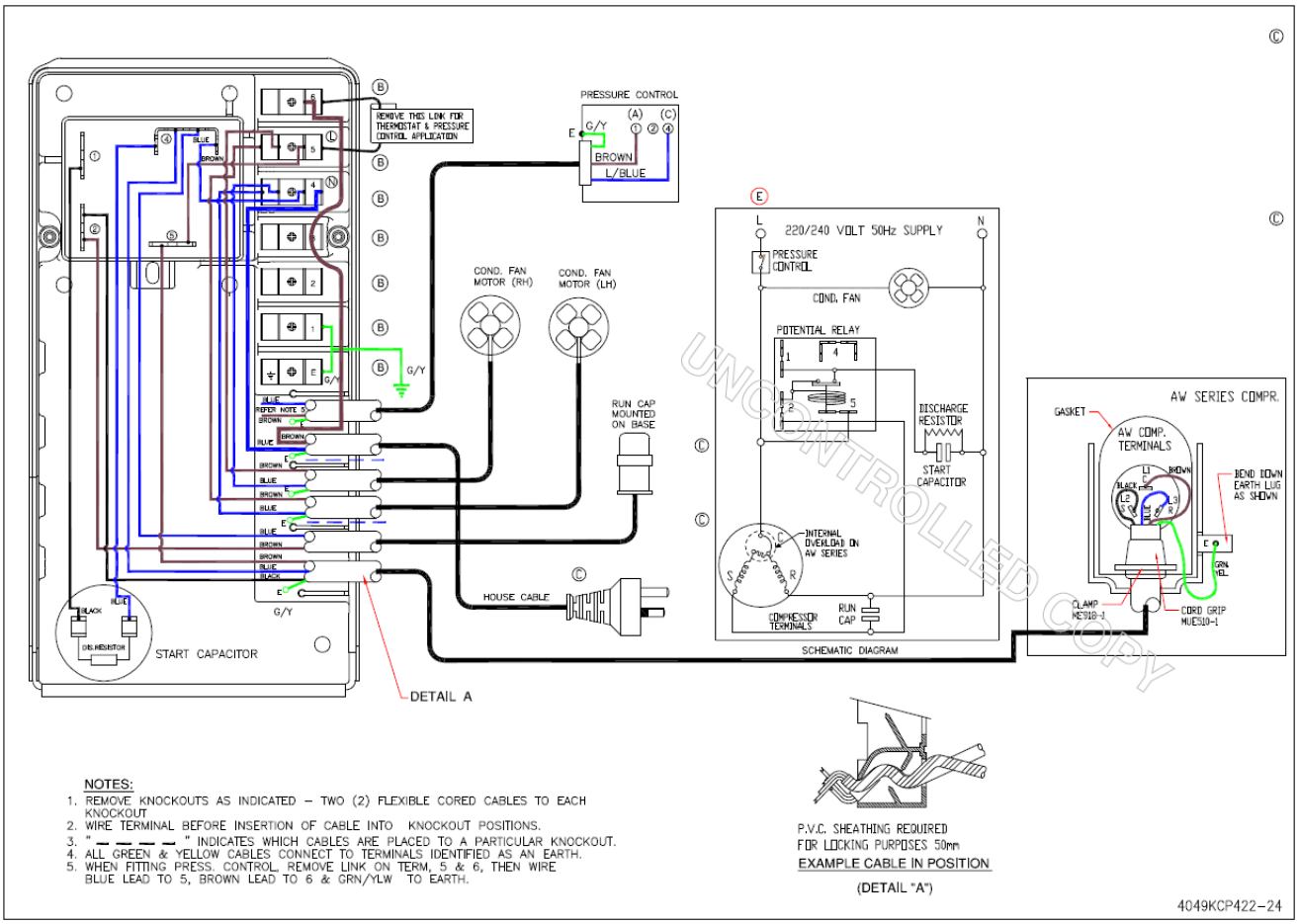

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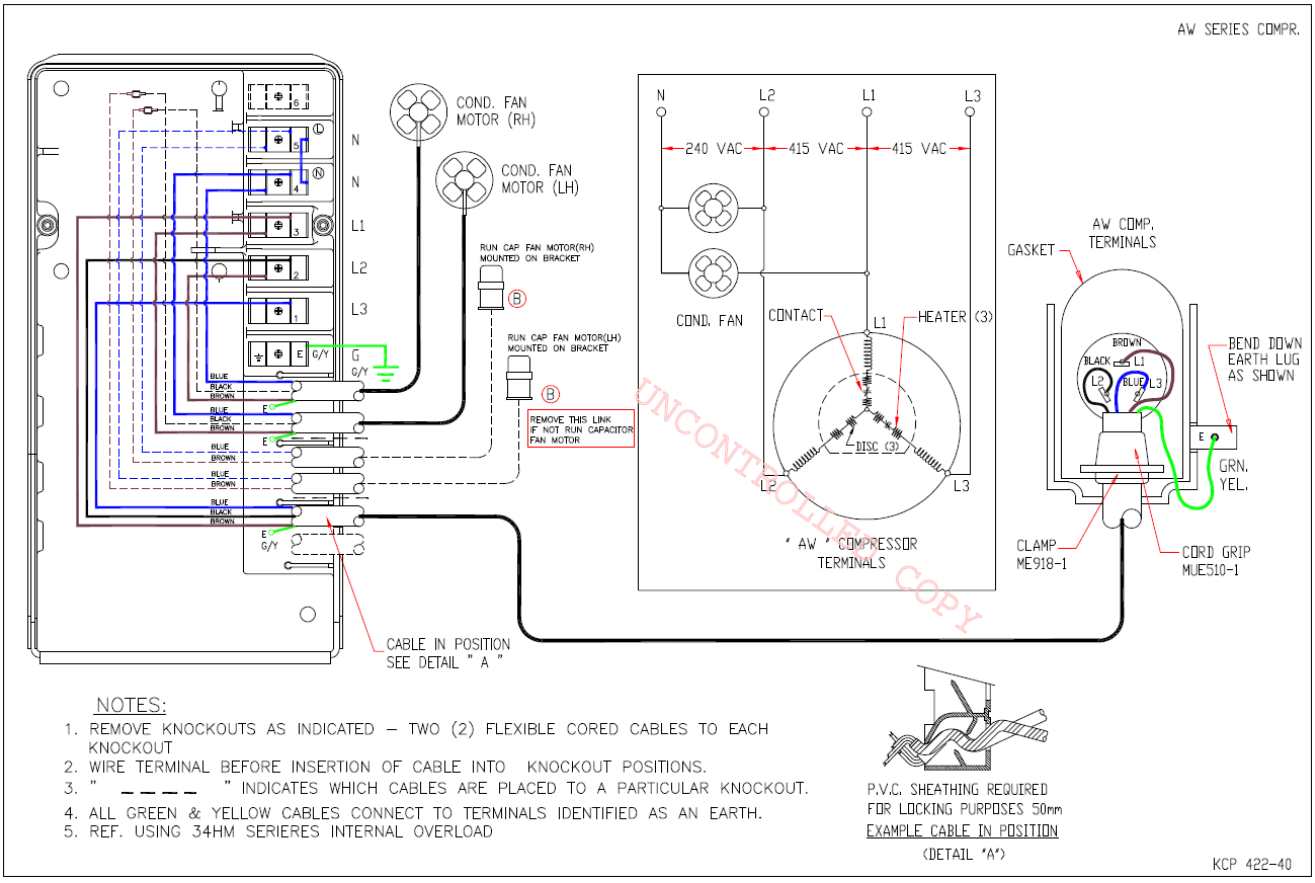
P.V.C. SHEATHING REQUIRED FOR LOCKING PURPOSES 50mm
EXAMPLE CABLE IN POSITION
(DETAIL "A")

4049KCP422-24



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5. REF. USING 34HM SERIERES INTERNAL OVERLOAD

P.V.C. SHEATHING REQUIRED FOR LOCKING PURPOSES 50mm
EXAMPLE CABLE IN POSITION
(DETAIL 'A')

KCP 422-40

14. WARRANTY:

Refer to Heatcraft Australia Warranty Policy and Terms and Conditions of Sale in the 2018 Heatcraft Product Catalogue or www.heatcraft.com.au
For complete details please visit the nearest Heatcraft branch or call Heatcraft on **13 23 50.**

15. INSTALLATION DETAILS:

Model Number		**Serial Number**	
Activity	**Notes**		**Date**
Unpacking			
Installation			
Commissioning			
Sign-off			
Maintenance			
1st Month			
3rd Month			
6th Month			
Annual			

VOLTAGE V AC	STARTUP:	AFTER 1 HR:	AFTER 3 HRS:
CURRENT A	STARTUP:	AFTER 1 HR:	AFTER 3 HRS:

Contact Us:

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