

## TECHNICAL MANUAL



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## GENERAL

1. TEV Ltd recommend that personnel working on this equipment be skilled and fully conversant with the appropriate Air Conditioning, Refrigeration and Electrical practices and have sound knowledge of current Industrial Safe Working practices.
2. CX(E) models are electromechanical / Electronic control units that use R407C refrigerant; they provide cooling within the range of 2.8 – 6.8 kW. These units are matched with CKC and CKR outdoor units to complete a system.  
  
CX(E) units are fitted with an expansion assembly, allowing the use of a liquid line. This can be transferred to the outdoor unit (CKC only), when an expansion line is required to accommodate longer pipe runs.
3. These units contain live electrical components, moving parts and refrigerant under pressure. Always site out of reach of children and protect from vandalism.
4. The data plate only gives information for the CX(E) unit. For system details add input power and current of indoor and outdoor unit, including any heater load.

## PART NUMBERS

<b>MODEL</b>	CX 30	CX 40	CX 50	CX 70
<b>PART NUMBER</b>	55900001	55900002	55900003	55900004
<b>MODEL</b>	CXE 30	CXE 40	CXE 50	CXE 70
<b>PART NUMBER</b>	55900017	55900016	55900015	55900014

<b>MODEL</b>	CKC 20 1ph	CKC 30 1ph	CKC 50 1ph	CKC 80 1ph	CKC 80 3ph
<b>PART NUMBER</b>	55023720	55023730	55023722	55023723	55023724

<b>MODEL</b>	CKR 30 1ph	CKR 50 1ph	CKR 80 1ph
<b>PART NUMBER</b>	56000001	56000002	56000003

## UNIT COMBINATIONS

INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT
CX(E) 30	CKC 20	CX(E) 30	CKR 30
CX(E) 40	CKC 30	CX(E) 50	CKR 50
CX(E) 50	CKC 50	CX(E) 70	CKR 80
CX(E) 70	CKC 80		

## CX(E) OPTIONS

OPTIONAL KITS	
PART NUMBER	DESCRIPTION
55900700	3kW heater (CX only)
55900701	Digital temperature display (CX only) std on CXE
55900702	De-ice thermostat (CX only)
55900709*	Extended pipe run CX 30/40/50 only
55900710*	Extended pipe run CX 70 only
55900715	3kW heater (CXE only)

\* When matched with CKC outdoor units

## DIMENSIONS & WEIGHTS

MODEL	UNPACKED				PACKED			
	CX(E)	HEIGHT	WIDTH	DEPTH	WEIGHT	HEIGHT	WIDTH	DEPTH
30	483	845	320	18	530	950	370	21
40	483	845	320	20	530	950	370	23
50	483	845	320	20	530	950	370	23
70	483	845	320	23	530	950	370	26

CKC	HEIGHT	WIDTH	DEPTH	WEIGHT		HEIGHT	WIDTH	DEPTH	WEIGHT	
				1Ph	3Ph				1Ph	3Ph
20	560	900	300	46	-	625	980	340	48	-
30	560	900	300	53	-	625	980	340	55	-
50	560	1000	300	64	-	730	1080	340	66	-
80	560	1000	300	66	64	730	1080	340	68	66

CKR	HEIGHT	WIDTH	DEPTH	WEIGHT	HEIGHT	WIDTH	DEPTH	WEIGHT
50	585	850	295	48	680	990	410	50
80	680	870	310	62	680	990	415	64

## PERFORMANCE DATA (kW)

MODEL	RATING CONDITIONS (ROOM 12.7°C / 10°C) (AMBIENT 27°C / 19°C)			OPTIONAL ELECTRIC HEATER	
	TOTAL	SHR	SENSIBLE	240V	230V
<b>CX(E) 30 + CKC 20</b>	2.80	0.75	2.10	3.25	3.0
<b>CX(E) 40 + CKC 30</b>	3.30	0.68	2.24	3.25	3.0
<b>CX(E) 50 + CKC 50</b>	4.60	0.66	3.02	3.25	3.0
<b>CX(E) 70 + CKC 80</b>	6.80	0.63	4.30	3.25	3.0

MODEL	RATING CONDITIONS (ROOM 12.7°C / 10°C) (AMBIENT 35°C / 19°C)			OPTIONAL ELECTRIC HEATER	
	TOTAL	SHR	SENSIBLE	240V	230V
<b>CX(E) 30 + CKC 20</b>	2.38	0.75	1.79	3.25	3.0
<b>CX(E) 40 + CKC 30</b>	2.81	0.68	1.90	3.25	3.0
<b>CX(E) 50 + CKC 50</b>	3.91	0.66	2.57	3.25	3.0
<b>CX(E) 70 + CKC 80</b>	5.78	0.63	3.66	3.25	3.0

MODEL	RATING CONDITIONS (ROOM 12.7°C / 10°C) (AMBIENT 27°C / 19°C)			OPTIONAL ELECTRIC HEATER	
	TOTAL	SHR	SENSIBLE	240V	230V
<b>CX(E) 30 + CKR 30</b>	3.0	0.77	2.30	3.25	3.0
<b>CX(E) 50 + CKR 50</b>	4.6	0.76	3.50	3.25	3.0
<b>CX(E) 70 + CKR 80</b>	5.7	0.67	3.80	3.25	3.0

MODEL	RATING CONDITIONS (ROOM 12.7°C / 10°C) (AMBIENT 35°C / 19°C)			OPTIONAL ELECTRIC HEATER	
	TOTAL	SHR	SENSIBLE	240V	230V
<b>CX(E) 30 + CKR 30</b>	2.55	0.77	1.96	3.25	3.0
<b>CX(E) 50 + CKR 50</b>	3.91	0.66	3.02	3.25	3.0
<b>CX(E) 70 + CKR 80</b>	4.85	0.66	3.23	3.25	3.0

## AIR FLOWS

MODEL	m <sup>3</sup> /s
<b>CX(E) 30</b>	0.61
<b>CX(E) 40</b>	0.61
<b>CX(E) 50</b>	0.66
<b>CX(E) 70</b>	0.58

MODEL	m <sup>3</sup> /s
<b>CKC 20</b>	0.81
<b>CKC 30</b>	0.81
<b>CKC 50</b>	0.78
<b>CKC 80</b>	0.78

MODEL	m <sup>3</sup> /s
<b>CKR 30</b>	0.56
<b>CKR 50</b>	0.60
<b>CKR 80</b>	1.01

# SOUND POWER AND SOUND PRESSURE LEVELS

## INDOOR UNIT

MAXIMUM SPEED	SOUND POWER LEVELS						SOUND PRESSURE LEVELS	
	Frequency Hz						dB(A)	NC
	125	250	500	1K	2K	4K		
<b>CX(E) 30</b>	69.1	67.7	67.6	65.6	62.2	56.0	55	48
<b>CX(E) 40</b>	69.1	67.7	67.6	65.6	62.2	56.0	55	48
<b>CX(E) 50</b>	71.7	69.2	69.1	67.1	63.2	58.5	56	50
<b>CX(E) 70</b>	70.1	68.2	68.6	66.1	63.2	57.5	56	49

Sound Power Levels were obtained in full accordance with the direct method of BS EN ISO3174:2000. Levels are shown in dB with a standard reference of 1 pW.  
 Sound Pressure Levels in dB(A) refer to semi-hemispherical radiation (wall or ceiling mounted) at a distance of 1.5m from the front of the unit, with the fan operating at full speed.

## OUTDOOR UNIT

MAXIMUM SPEED	SOUND POWER LEVELS						SOUND PRESSURE LEVELS	
	Frequency Hz						dB(A)	NC
	125	250	500	1K	2K	4K		
<b>CKC 20</b>	77	67	69	65	60	54	49	44
<b>CKC 30</b>	77	68	69	65	60	54	50	44
<b>CKC 50</b>	74	68	67	66	61	54	49	44
<b>CKC 80</b>	71	69	68	65	60	54	49	43

MAXIMUM SPEED	SOUND POWER LEVELS						SOUND PRESSURE LEVELS	
	Frequency Hz						dB(A)	NC
	125	250	500	1K	2K	4K		
<b>CKR 30</b>	65.1	67.7	61.6	58.1	53.7	49	47	42
<b>CKR 50</b>	65.1	64.7	63.6	59.1	53.7	48	47	42
<b>CKR 80</b>	63.6	63.2	62.6	61.1	56.2	50	49	44

Sound Power Levels were obtained in full accordance with the direct method of ISO 3741: 1988. Levels are shown in dB with a standard reference of 1 pW.  
 Sound Pressure Levels in dB(A) refer to semi-hemispherical radiation (wall or floor mounted) at a distance of 3m from the front of the unit, with the fan operating at full speed; (add 3dBA or 3NC for units at an intersection of a wall, add 1dBA or 1NC for high level wall mounted units).

## ELECTRICAL DATA

MODEL INDOOR/OUTDOOR	1 PH 230V 50Hz				
	INPUT POWER		FULL LOADS AMPS		SYSTEM MAX. STARTING CURRENT
	COOLING	HEATING	COOLING	HEATING	
	kW	kW	AMPS	AMPS	AMPS
CX(E) 30 + CKC 20	1.3	2.9	7.7	13.8	30
CX(E) 40 + CKC 30	1.6	2.9	8.2	13.8	38
CX(E) 50 + CKC 50	2.2	2.9	9.7	13.8	60
CX(E) 70 + CKC 80	3.2	2.9	12.3	13.8	78

MODEL INDOOR/OUTDOOR	3 PH 400V 50Hz				
	INPUT POWER		FULL LOADS AMPS		SYSTEM MAX. STARTING CURRENT
	COOLING	HEATING	COOLING	HEATING	
	kW	kW	AMPS	AMPS	AMPS
CX(E) 70 + CKC 80	3.2	2.9	5.7	13.8	42

MODEL INDOOR/OUTDOOR	1 PH 230V 50Hz				
	INPUT POWER		FULL LOADS AMPS		SYSTEM MAX. STARTING CURRENT
	COOLING	HEATING	COOLING	HEATING	
	kW	kW	AMPS	AMPS	AMPS
CX(E) 30 + CKR 30	1.35	2.9	5.84	13.8	33
CX(E) 50 + CKR 50	2.0	2.9	8.39	13.8	46
CX(E) 70 + CKR 80	2.3	2.9	10.0	13.8	58

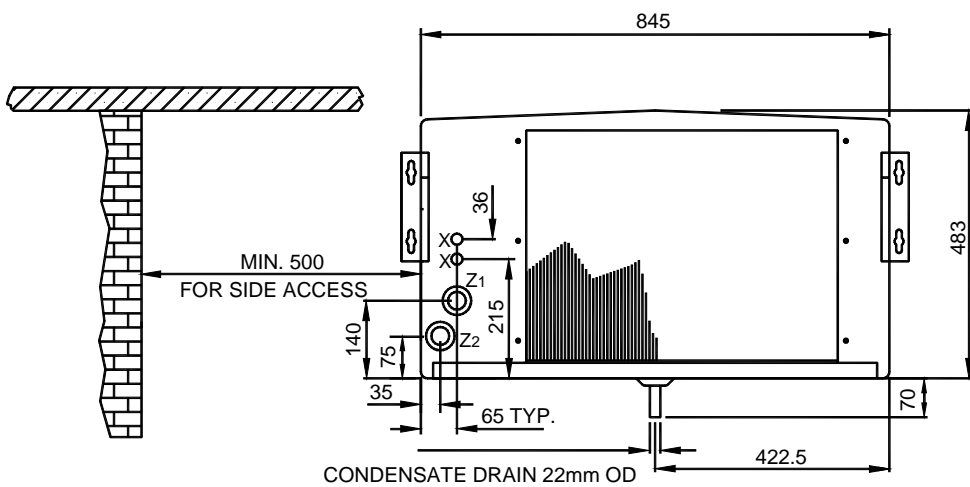
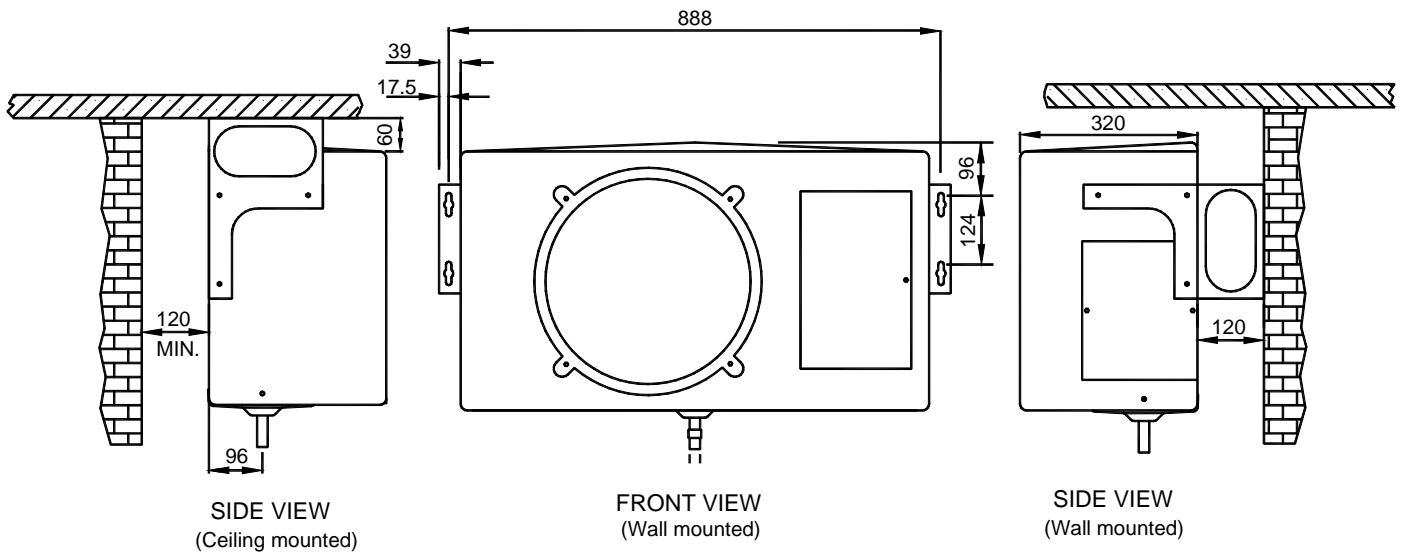
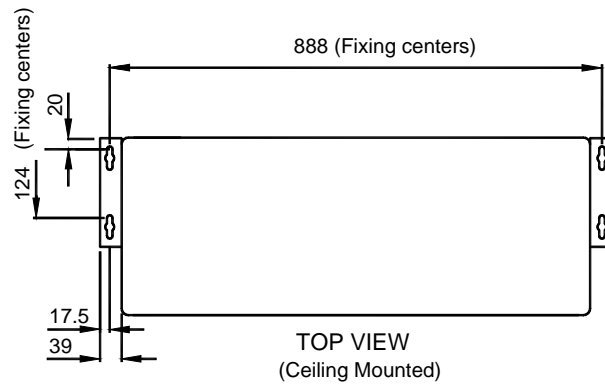
### UNIT ELECTRICAL LOADS [230V 50Hz 1Ph (A) or 400V 50Hz 3Ph (A/Ph)]

MODEL	FAN MOTOR	HEATER
CX(E) 30	0.8	13.0
CX(E) 40	0.8	13.0
CX(E) 50	0.8	13.0
CX(E) 70	0.8	13.0

CKC	20	30	50	80
Fan motor	0.6	0.6	0.6	0.6
R407C compressor (1 Ph) nominal FLA	6.0	10.4	8.3	10.9
R407C compressor (3 Ph) nominal FLA	-	-	-	4.3
Crankcase heater	0.25	0.25	-	-

CKR	30	50	80
Fan motor	0.8	0.8	0.8
R407C compressor (1 Ph) nominal FLA	5.1	7.8	9.2

# CX(E) DIMENSIONS



X = Interconnecting Wiring  
 Z<sub>1</sub> = Suction  
 Z<sub>2</sub> = Liquid / Expansion

## CX(E) INSTALLATION

CONTENTS	
PARTS DESCRIPTION	ACTION
Envelope containing operating instructions and Declaration of Conformity	Pass to the end user.
Drain Stub/Nut/Gasket	Fitted by installer.
Drain stub adaptor	Convert to 3/4" drain if required.
Mounting brackets plus fixings	Use to hang unit.
0.037" restrictor (CX(E) 30 only)	Use with CKR 30 outdoor unit

The unit may be mounted on a wall or solid ceiling using brackets supplied. It should be matched with the appropriately sized outdoor unit; this instruction should be used in conjunction with the outdoor unit installation instructions.

1. Fit all kits prior to installing the unit. (Heater kit is easier to fit when unit has been mounted).
2. Ensure that the mounting surface will support the operating weight of the unit (see table below).
3. Mark out the mounting positions and drill holes to suit 6mm rawlbolt shields or equivalent strength fasteners (ensure that the unit is positioned to give sufficient access (min 0.5m) to the electrics access side).
4. Fix the mounting brackets to the unit in the correct position for wall or ceiling mounting.
5. Raise the unit into position and secure the fixings, ensuring that it is square and level.
6. Remove the drain tray then fit the drain stub, nut & gasket (Fig.1). Refit the drain tray.

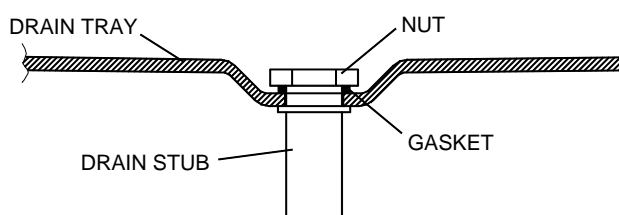


Fig.1

## CX(E) PIPEWORK

### NITROGEN CHARGE

The unit contains a small charge of dry nitrogen, which should be discharged into the atmosphere. This is a non-toxic, non-ozone depleting gas with no global warming potential.

### PIPE CONNECTIONS

Pipework is terminated with 2 flare nuts & bonnets. Access is via the rear right hand side. Pipes exit the unit through holes in the back panel.

INDOOR UNIT	CX(E) 30	CX(E) 40	CX(E) 50	CX(E) 70
LIQUID / EXPANSION	3/8"	3/8"	3/8"	1/2"
SUCTION	1/2 "	1/2 "	1/2 "	5/8"

### CONDENSATE DRAIN

Push fit connections are widely available for the 7/8" (22mm) OD condensate drain and 3/4"(19mm) ID drain stub adaptor. Alternatively 7/8" (22mm) bore plastic tubing may be fitted directly to the stub/adaptor with a hose clamp. Take care not to overtighten hose clamps as this could damage the stub pipe.

## CX(E) ELECTRICAL CONNECTIONS

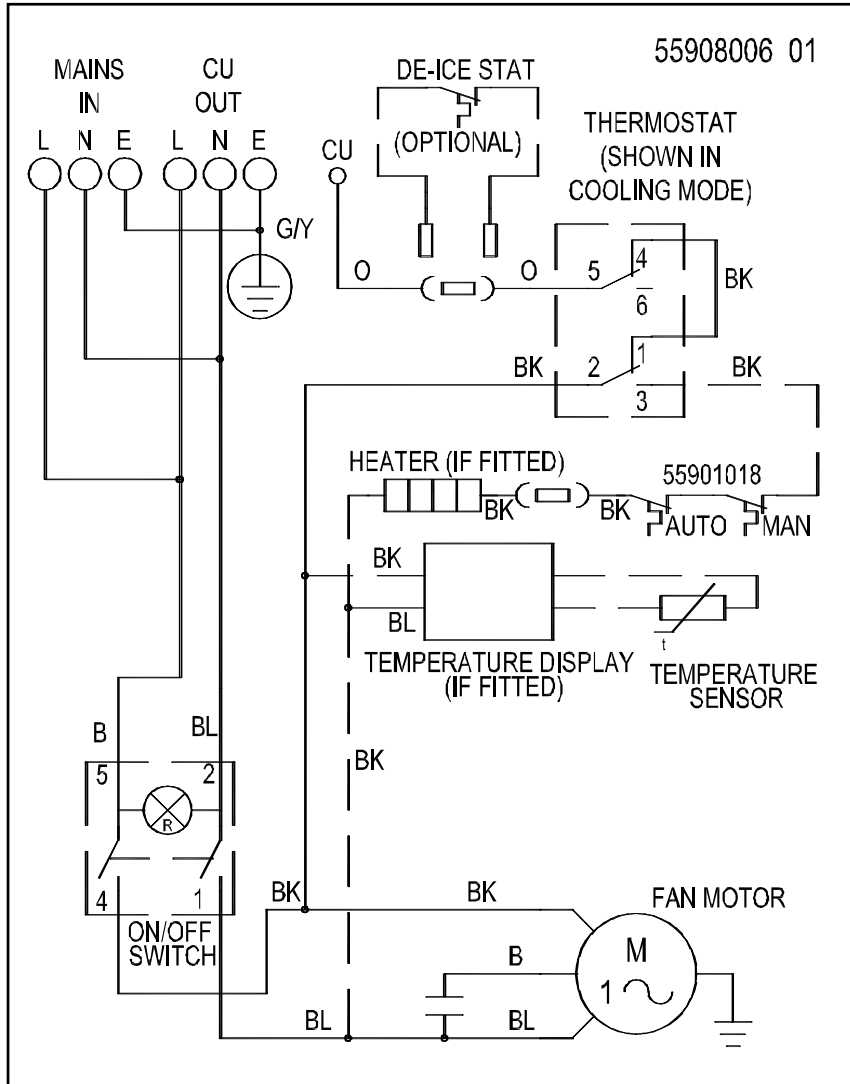
- Cables are routed to the terminal block via the cable cord grips at the rear of the unit and then through the back of the electrics box (see page 2).
- Cables **MUST** be size compatible with the recommended system fuse.

## FUSES

SYSTEM	COOL ONLY		WITH ELECTRIC HEATER	
	1PH	3PH	1PH	3PH
CX(E) 30	16A	-	16A	-
CX(E) 40	20A	-	20A	-
CX(E) 50	20A	-	20A	-
CX(E) 70	20A	20A/PH	32A	20A/PH

**Note:** On 3 ph systems the supply must go to the CKC outdoor unit and then to the CX(E) indoor unit.

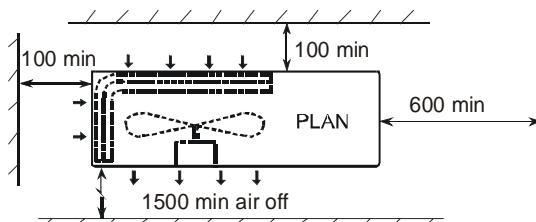
## WIRING DIAGRAM



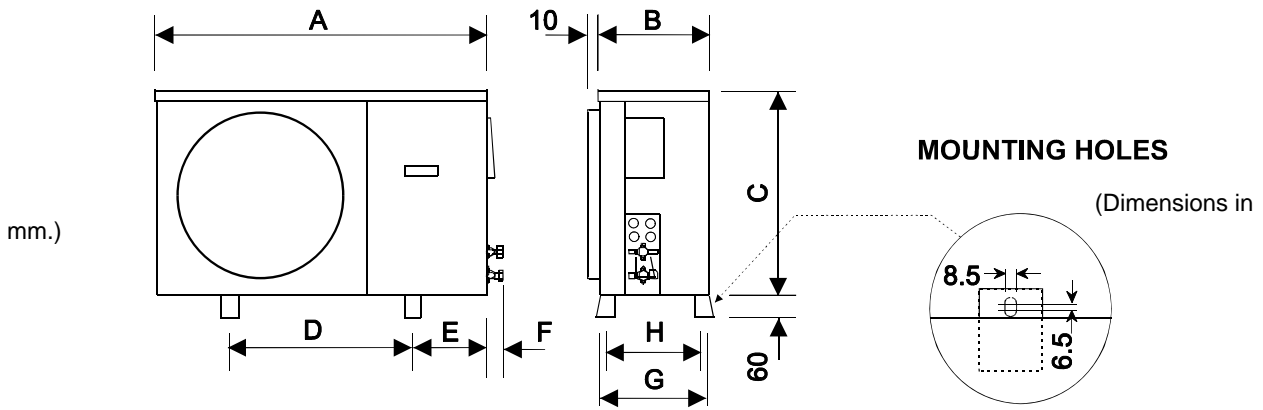
## CKC INSTALLATION

### MOUNTING

Whether floor or wall mounted, it is essential that the mounting surface is capable of supporting the unit weight. Leave space around the unit for air circulation and access for installation and maintenance.



Dimensions in mm.



MODEL	A	B	C	D	E	F	G	H
<b>CKC 20</b>	900	300	560	525	185	60	333	308
<b>CKC 30</b>	900	300	560	525	185	60	333	308
<b>CKC 50</b>	1000	300	660	570	213	60	333	308
<b>CKC 80</b>	1000	300	660	570	213	60	333	308

## CKC DIMENSIONS

- Individual pipe runs to a maximum of 20m, including 7.5m lift, are permissible with liquid lines, 80m with expansion lines, provided good refrigeration practice is followed. Performance is based on 7.5m pipe runs. Correctly sized pipes for each installation will result in no significant loss of capacity on extended pipe runs.
  - Pipe sizes are based on:-
    - Minimum of 3.8 m/s (750 fpm) suction gas velocity for horizontal or downflow.
    - Minimum of 7.6 m/s (1500 fpm) suction gas velocity for upflow.
    - Maximum of 15.2 m/s (3000 fpm) suction gas.
  - Where vertical risers exceed 3m, oil traps must be formed in the pipe. This will help ensure that oil returns to the compressor. Typically fit an oil trap every 3m with a trap at the bottom of the riser.
- In calculating equivalent lengths of pipe runs, the effect of bends and fittings must be taken into account. The table below covers the fittings most likely to be encountered in this installation.
 

The equivalent lengths of all the fittings in a pipe run should be added together and the total added to the actual pipe length in order to calculate the total equivalent length.
- Use the shortest possible route, avoiding sharp bends.
- Completely insulate the suction line, fully over the indoor unit drain tray.

## CKC PIPEWORK

**FITTING LOSSES, in equivalent straight lengths of pipe (m).**

FITTING	Pipe Size OD					To calculate the total equivalent length, the equivalent lengths of all fittings in a pipe run must be added to the actual length of pipe in the run: these are the fittings most likely to be used.  R = Radius of bend d = Diameter of tube C = Centres of bend
	3/8"	1/2"	5/8"	3/4"	7/8"	
45° Bend	0.12	0.15	0.18	0.21	0.24	
90° Bend R/d = 1	0.37	0.43	0.49	0.55	0.61	
90° Bend R/d = 1.5	0.24	0.27	0.3	0.37	0.43	
180° Bend R/d = 1.5	0.73	0.91	1.1	1.28	1.46	
180° Bend C/d = 2.5	0.46	0.55	0.64	0.76	0.85	
90° Elbow	0.67	0.85	1.04	1.25	1.46	

### A. USING SUCTION AND LIQUID LINES:

With the expansion device connected to the indoor unit, the equivalent pipe run should be 20m maximum, including a maximum lift of 7.5m. Fully insulate the suction line. Ensure the suction pipe is insulated well over the drain tray at the indoor unit. Liquid lines should be routed to avoid hot areas. This prevents flash gas forming, which may result in erratic control of liquid refrigerant to the evaporator.

SYSTEM	MAXIMUM EQUIVALENT LENGTH OF SUCTION LINE PIPE SIZES (m)				LIQUID LINE	
	3/8"	1/2"	5/8"	3/4"	1/4"	3/8"
CX(E)30 + CKC20	7.5	20	-	-	20	-
CX(E)40 + CKC30	-	15	20	-	-	20
CX(E)50 + CKC50	-	7.5	18	-	-	20
CX(E)70 + CKC80	-	-	11	20	-	20

## B. USING SUCTION AND EXPANSION LINES

The expansion assembly must be removed from the indoor unit and connected to the outdoor unit allowing a pipe run of up to 80m, including a maximum lift of 20m (CKC20 maximum 50m with 7.5m lift).

CX(E) units only, remove the right hand panel cover plate from the indoor unit and remove the expansion assembly. [Make good the gap using Extended Pipe Run Kit 55900709 (30,40,50), 55900710 (70).]

Fit the expansion assembly onto the outdoor unit liquid line service valve. Fully insulate both the suction and expansion lines, including the expansion device: ensure the pipes are insulated well over the drain tray at the indoor unit.

SYSTEM	MAXIMUM EQUIVALENT LENGTH OF SUCTION LINE PIPE SIZES (m)					EXPANSION LINES			CHARGE (kgs) AT 7.5m
	3/8"	1/2"	5/8"	3/4"	7/8"	3/8"	1/2"	5/8"	
CX(E)30 + CKC20	7.5	23	50	-	-	50	-	-	1.05
CX(E)40 + CKC30	-	10	36	80	-	7.5	80	-	1.10
CX(E)50 + CKC50	-	7.5	18	50	80	7.5	50	80	1.98
CX(E)70 + CKC80	-	-	11	30	80	-	50	80	2.94

## PIPE CONNECTIONS

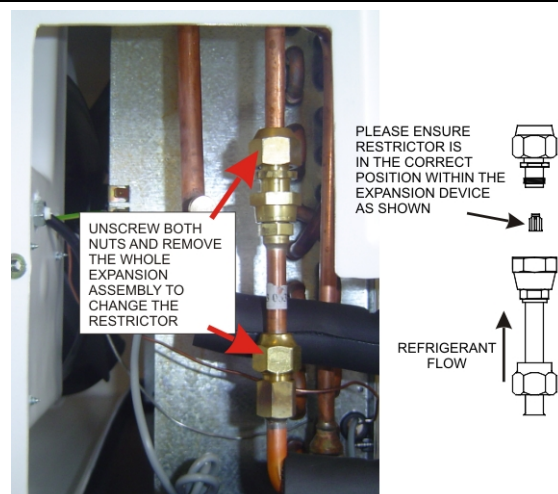
Units are supplied with the following male flare connections (sizes in inches):

OUTDOOR UNIT	CKC20	CKC30	CKC50	CKC80
LIQUID / EXPANSION	3/8"	3/8"	3/8"	1/2"
SUCTION	1/2"	1/2"	1/2"	5/8"

## RESTRICTORS

Indoor units are supplied with restrictors fitted.

**NOTE**  
When the CX(E)30 is matched with a CKR 30. The restrictor in the indoor unit must be changed to 0.037"



## INTERCONNECTING PIPEWORK

1. Indoor and outdoor units have a low pressure charge of N<sub>2</sub>, which may be safely released into the atmosphere before connection. The service valves on the outdoor unit should remain closed (IN, fully clockwise) until pipework has been fitted, to avoid unnecessary moisture ingress.
2. Connecting the pipework
  - a. Remove the flare nuts from the suction and liquid service valves.
  - b. Ensure that the suction line is fully insulated: if an expansion line is used this should also be fully insulated.
  - c. Place the flare nuts over the incoming pipework and flare the pipe ends. The use of a little refrigeration oil on the flaring tool will help.
  - d. Connect the pipework between the units. Do not leave pipe ends, valves etc. open to the atmosphere.  
R407C is very hygroscopic, and will absorb damaging levels of moisture if left open. Always use two spanners when tightening the flare nuts to avoid twisting the pipes. Use a small amount of refrigerant oil on the mating surfaces.
  - e. Sight glasses and filter driers are not necessary, but if required should be fitted between the outdoor unit liquid shut off valve and the expansion device.

## EVACUATING

1. Release the nitrogen holding charge in the indoor and outdoor units to atmosphere. Open the valves (hex drive fully out) using a 5mm Allen key. Connect a vacuum pump to the service ports on the outdoor unit valves and evacuate the system to 1000 microns (1 Torr) or better and allow to be held for a minimum of 15 minutes.
2. Replace the caps on the service ports, (torque to 25NM).

## CKC ELECTRICAL

- ❑ The installer supplies mains, control and interconnecting cables: equipment must be earthed.
- ❑ Wiring must be carried out in accordance with local and national codes.
- ❑ Mains supply cables must be size compatible with the recommended fuse (see indoor unit instruction for system fuse size).
- ❑ An all pole isolator switch should be positioned within easy reach of the indoor/outdoor unit dependant on which receives the fuse supply.
- ❑ Cable clamps for use with stranded cables are supplied and should be used to secure incoming/outgoing cables. Installers must supply a method of securing solid sheathed cables.

### 3PH CKC 80

On 3 PH CKC 80 it is possible for the scroll compressor to run backwards. This becomes obvious on start up - the compressor will not develop a normal running pressure differential and the top will not become warm: it may be excessively noisy. If this happens, switch off the mains power and exchange the two supply phases **not** connected to the indoor unit. This will correct the rotation.

### ISOLATOR SWITCHES

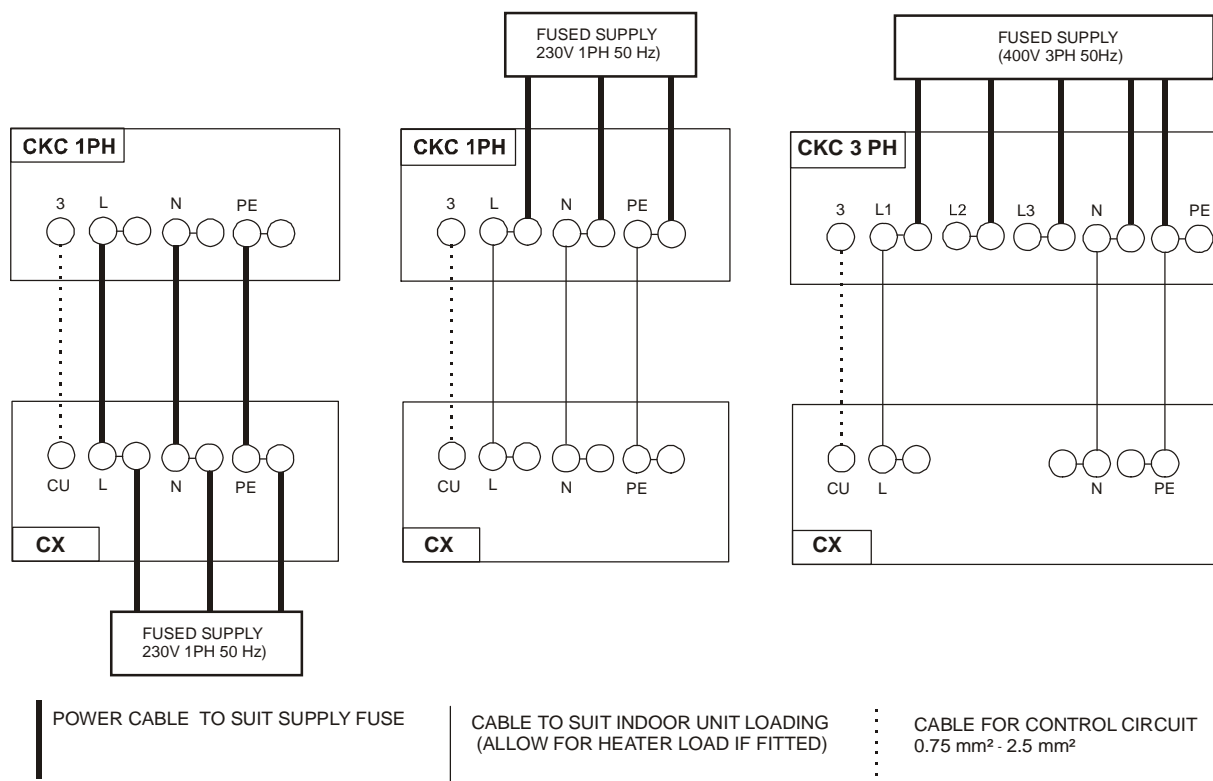
On a 3 phase system, ensure that the neutral contact of the isolator switch is an early make, late break type. This applies to all switches in the supply line. If in doubt, do not switch the neutral but connect it solidly.

### WIRING

- ❑ Cable entry for the outdoor unit electrics is through the cabinet to a terminal block.
- ❑ Ensure that all connections are secure and that both units are earthed.
- ❑ CKC fan motors have a single speed and are ready for use at all outdoor temperatures.

**NOTE:** The CKC wiring diagram can be found on the inside of the front panel.

### INTERCONNECTING WIRING

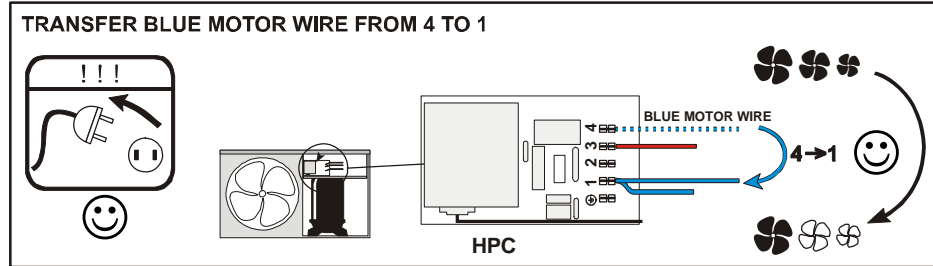


**FUSES:** Refer to indoor unit installation instructions.

## CKC REFRIGERANT

### ADDING REFRIGERANT

- The unit is fitted with head pressure control; before charging, isolate the outdoor unit and transfer the motor wire on the head pressure control from terminal 4 to terminal 1. **(Don't forget to transfer it back after charging).**



- If a manual HP cutout is fitted, ensure that the reset button is depressed.
- A 3 minute delay occurs between successive compressor operations.
- R407C should be introduced through the Schrader valve on the indoor unit, or the service port on the suction service valve on the outdoor unit. **No other refrigerant must be used.**

**NOTE: LABEL R407C POE (supplied loose) TO BE FIXED ABOVE SERVICE VALVES.  
CHARGE (g)**

		LIQUID LINE (m)			
		5	10	15	20
R407C	CX(E)30 + CKC20	1025	1140	1255	1370
	CX(E)40 + CKC30	1230	1530	1830	2130
	CX(E)50 + CKC50	1980	2280	2580	2880
	CX(E)70 + CKC80	2220	2520	2820	3120

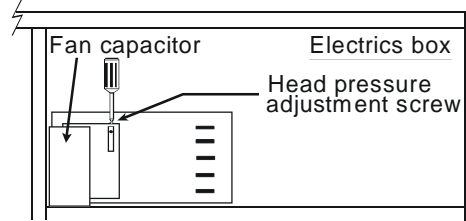
No extra POE oil needed with liquid lines.  
Charges shown are for guidance: actual charge will depend on the individual application. It is recommended that you charge to a sweat line on the outlet of the evaporator and/or a full sight glass if fitted.

Additional charge based on:-	Liquid line		Expansion line		
	1/4"	3/8"	3/8"	1/2"	5/8"
	25 g/m	60 g/m	16 g/m	30 g/m	48 g/m

		EXPANSION LINE (m)															
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
R407C	CX(E)30 + CKC20	990	1070	1150	1230	1310	1390	1470	1550	1630	1710	-	-	-	-	-	-
	CX(E)40 + CKC30	1000	1220	1370	1520	1670	1820	1970	2120	2270	2420	2570	2720	2870	3020	3170	3320
	CX(E)50 + CKC50	1940	2055	2205	2355	2505	2655	2805	2955	3105	3255	3495	3735	3975	4215	4455	4695
	CX(E)70 + CKC80	2865	3015	3165	3315	3465	3615	3765	3915	4065	4215	4455	4695	4935	5175	5415	5655

POE OIL (EXP. LINE)	CX(E)30 + CKC20	0	0	0	0	25	25	25	50	50	50	-	-	-	-	-	-
	CX(E)40 + CKC30	0	0	0	0	50	50	50	50	100	100	100	100	100	150	150	150
	CX(E)50 + CKC50	0	0	0	0	50	50	50	50	100	150	150	150	200	200	200	250
	CX(E)70 + CKC80	0	0	0	0	50	50	100	100	100	150	150	150	200	200	200	250

5. Run the system for a few minutes to allow it to stabilize. Where possible, charge to a sweat line on the evaporator. Typical suction pressure on short lines at UK conditions should be approx. **3.8bar (55 psig)**.
6. Transfer the motor wire back from terminal 1 to 4 on the HPC pcb.
7. **Head pressure controller**  
The HPC is factory set to suit R407C refrigerant. It may be necessary to adjust this to suit site conditions, to raise or lower the nominal head pressure.
  - I. With the system switched off, connect a high pressure gauge to the liquid line service valve.
  - II. Switch on the system, indoor fan set to high speed and run for a few minutes to stabilise.
  - III. The head pressure should be approximately **275-280 psig (18.9-19.6 barg)**. To achieve this adjust the screw clockwise to increase the pressure by approx 5 psig (0.5barg)

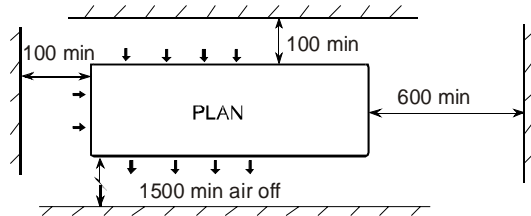


**NOTE:** Min fan speed (0 rpm) and fan cut in pressure (230psig / 15.6 barg) are factory set and not adjustable.

## CKR INSTALLATION

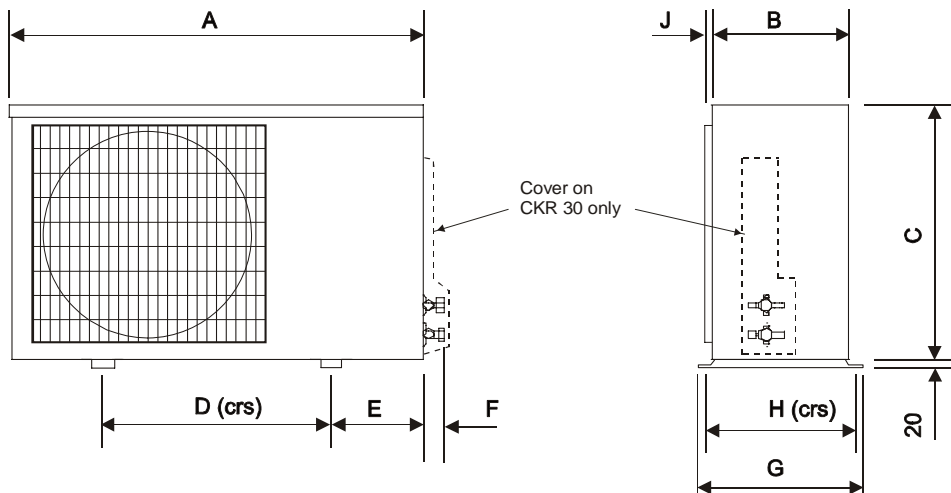
### MOUNTING

Whether floor or wall mounted, it is essential that the mounting surface is capable of supporting the unit weight. Leave space around the unit for air circulation and access for installation and maintenance.



Dimensions in mm

## CKR DIMENSIONS & WEIGHTS



Dimensions in mm

MODEL	A	B	C	D	E	F	G	H	J	Operating Weight (kg)
CKR 30	795	255	525	510	145	50	320	295	20	39
CKR 50	850	295	585	505	170	65	345	310	25	48
CKR 80	870	310	680	590	140	55	360	335	6	62

# CKR PIPEWORK

## MAXIMUM EQUIVALENT PIPE LENGTHS 15m

1. Performance is based on 7.5m pipe runs. Correctly sized pipes for each installation will result in no significant loss of capacity on extended pipe runs up to 15m.
  - a) Pipe sizes are based on: -  
 Minimum of 3.8 m/s (750 fpm) suction gas velocity for horizontal or downflow.  
 Minimum of 7.6 m/s (1500 fpm) suction gas velocity for upflow.  
 Maximum of 15.2 m/s (3000 fpm) suction gas.
  - b) Where vertical risers exceed 3m, oil traps must be formed in the pipe. This will help ensure that oil returns to the compressor. Typically fit an oil trap every 3m with a trap at the bottom of the riser.
2. In calculating equivalent lengths of pipe runs, the effect of bends and fittings must be taken into account. The table below covers the fittings most likely to be encountered in this installation.  
  
 The equivalent lengths of all the fittings in a pipe run should be added together and the total added to the actual pipe length in order to calculate the total equivalent length.
3. Use the shortest possible route, avoiding sharp bends.
4. Completely insulate the suction line, fully over the indoor unit drain tray.

### FITTING LOSSES, in equivalent straight lengths of pipe (m).

FITTING	Pipe Size OD			To calculate the total equivalent length, the equivalent lengths of all fittings in a pipe run must be added to the actual length of pipe in the run: these are the fittings most likely to be used.  <b>R = Radius of bend</b> <b>d = Diameter of tube</b> <b>C = Centres of bend</b>
	3/8"	1/2"	5/8"	
45° Bend	0.12	0.15	0.18	
90° Bend R/d = 1	0.37	0.43	0.49	
90° Bend R/d = 1.5	0.24	0.27	0.30	
180° Bend R/d = 1.5	0.73	0.91	1.10	
180° Bend C/d = 2.5	0.46	0.55	0.64	
90° Elbow	0.67	0.85	1.04	

### A. SUCTION AND LIQUID LINES:

The expansion device is connected to the indoor unit and the equivalent pipe run is 15m maximum, including a maximum lift of 7.5m. Fully insulate the suction line. Ensure the suction pipe is insulated well over the drain tray at the indoor unit. Liquid lines should be routed to avoid hot areas. This prevents flash gas forming, which may result in erratic control of liquid refrigerant to the evaporator.

SYSTEM	MAXIMUM EQUIVALENT LENGTH OF SUCTION LINE PIPE SIZES (m)			LIQUID LINE			CHARGE (kgs) AT 7.5m
	3/8"	1/2"	5/8"	1/4"	3/8"	1/2"	
CX(E)30 + CKR 30	-	15	-	7.5	15	-	1.32
CX(E)50 + CKR 50	-	15	-	-	15	-	1.80
CX(E)70 + CKR 80	-	-	15	-	-	15	2.40

### PIPE CONNECTIONS

Units are supplied with the following male flare connections (sizes in inches):

OUTDOOR UNIT	CKR30	CKR50	CKR80
LIQUID	3/8"	3/8"	1/2"
SUCTION	1/2"	1/2"	5/8"

## RESTRICTORS

**NOTE: When the CX(E)30 is matched with a CKR30. The restrictor in the indoor unit must be changed to 0.037".**

The restrictor factory fitted to the CX(E)50 and CX(E)70 do not need changing.

## INTERCONNECTING PIPEWORK

1. Indoor and outdoor units have a low pressure charge of N<sub>2</sub>, which may be safely released into the atmosphere before connection. The service valves on the outdoor unit should remain closed (IN, fully clockwise) until pipework has been fitted, to avoid unnecessary moisture ingress.
2. Connecting the pipework
  - a. Remove the flare nuts from the suction and liquid service valves.
  - b. Ensure that the suction line is fully insulated.
  - c. Place the flare nuts over the incoming pipework and flare the pipe ends. The use of a little refrigeration oil on the flaring tool will help.
  - d. Connect the pipework between the units. Do not leave pipe ends, valves etc. open to the atmosphere.  
R407C is very hygroscopic, and will absorb damaging levels of moisture if left open.  
Always use two spanners when tightening the flare nuts to avoid twisting the pipes. Use a small amount of refrigerant oil on the mating surfaces.
  - e. Sight glasses and filter driers are not necessary, but if required should be fitted between the outdoor unit liquid shut off valve and the expansion device.

## EVACUATING

1. Release the nitrogen holding charge in the indoor and outdoor units to atmosphere. Open the valves (hex drive fully out) using a 5mm Allen key. Connect a vacuum pump to the service ports on the outdoor unit valves and evacuate the system to 1000 microns (1 Torr) or better and allow to be held for a minimum of 15 minutes.
2. Replace the caps on the service ports, (torque to 25NM).

# CKR ELECTRICAL

## ELECTRICAL CONNECTIONS

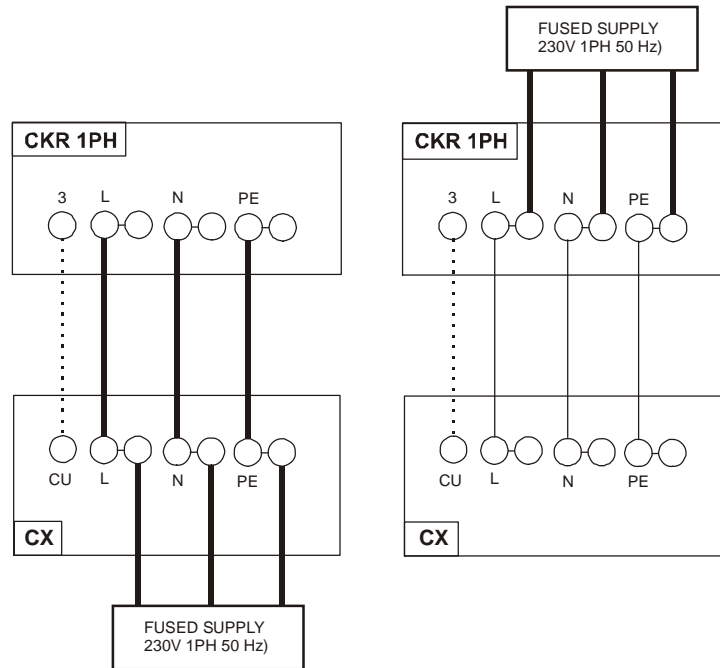
- ❑ The installer supplies mains, control and interconnecting cables: equipment must be earthed.
- ❑ Wiring must be carried out in accordance with local and national codes.
- ❑ Mains supply cables must be size compatible with the recommended fuse (see indoor unit instruction for system fuse size).
- ❑ An all pole isolator switch should be positioned within easy reach of the indoor/outdoor unit dependant on which receives the fused supply.
- ❑ Cable clamps for use with stranded cables are supplied and should be used to secure incoming/outgoing cables.

## WIRING

- ❑ Cable entry for the outdoor unit electrics is through the cabinet to a terminal block.
- ❑ Ensure that all connections are secure and that both units are earthed.
- ❑ CKR fan motors have a single speed and are ready for use at all outdoor temperatures.

**NOTE:** The CKR wiring diagram can be found on the inside of the lid.

## INTERCONNECTING WIRING



POWER CABLE TO SUIT SUPPLY FUSE

CABLE TO SUIT INDOOR UNIT LOADING  
(ALLOW FOR HEATER LOAD IF FITTED)

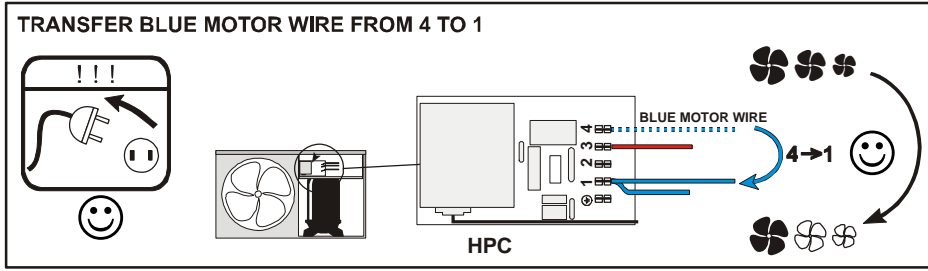
CABLE FOR CONTROL CIRCUIT  
0.75 mm<sup>2</sup> - 2.5 mm<sup>2</sup>

**FUSES:** Refer to indoor unit installation instructions.

# CKR REFRIGERANT

## ADDING REFRIGERANT

- The unit is fitted with head pressure control; before charging, isolate the outdoor unit and transfer the motor wire on the head pressure control from terminal 4 to terminal 1. (Don't forget to transfer it back after charging).



- If a manual HP cutout is fitted, ensure that the reset button is depressed.
- A 3 minute delay occurs between successive compressor operations.
- R407C should be introduced through the Schrader valve on the indoor unit, or the service port on the suction service valve on the outdoor unit. **No other refrigerant must be used.**

**NOTE: LABEL R407C POE (supplied loose) TO BE FIXED ABOVE SERVICE VALVES.**

SYSTEM	LIQUID LINE (m)		
	5	10	15
CX(E) 30 + CKR 30	1.17	1.47	1.77
CX(E) 50 + CKR 50	1.65	1.95	2.25
CX(E) 70 + CKR 80	2.25	2.55	2.85

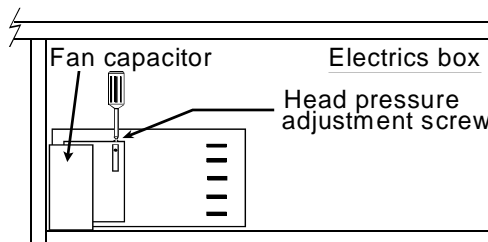
No extra POE oil needed with liquid lines. Charges shown are for guidance: actual charge will depend on the individual application. It is recommended that you charge to a sweat line on the outlet of the evaporator and/or a full sight glass if fitted		
Additional charge based on:	LIQUID LINE	
	1/4"	3/8"
	25 g/m	60 g/m

- Run the system for a few minutes to allow it to stabilize. Where possible, charge to a sweat line on the evaporator. Typical suction pressure on short lines at UK conditions should be approx. **3.8bar (55 psig)**.
- Transfer the motor wire back from terminal 1 to 4 on the HPC pcb.
- Head pressure controller**

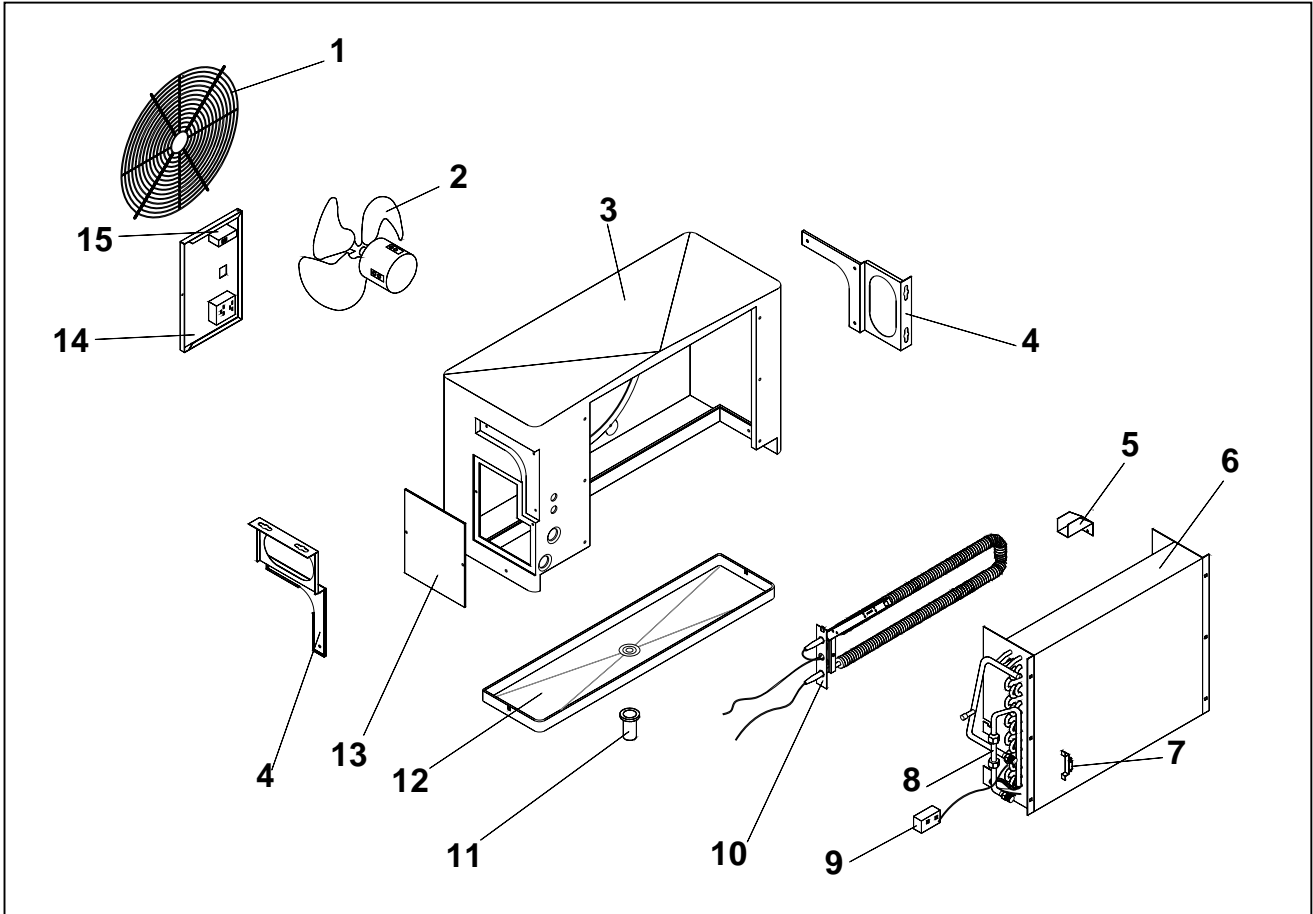
The HPC is factory set to suit R407C refrigerant. It may be necessary to adjust this to suit site conditions, to raise or lower the nominal head pressure.

- With the system switched off, connect a high pressure gauge to the liquid line service valve.
- Switch on the system and run for a few minutes to stabilise.
- The head pressure should be approximately **275-280 psig (18.9-19.6 barg)**. To achieve this adjust the screw clockwise to increase the pressure by approx 5 psig (0.5barg)

**NOTE:** Min fan speed (0 rpm) and fan cut in pressure (230psig / 15.6 barg) are factory set and not adjustable.

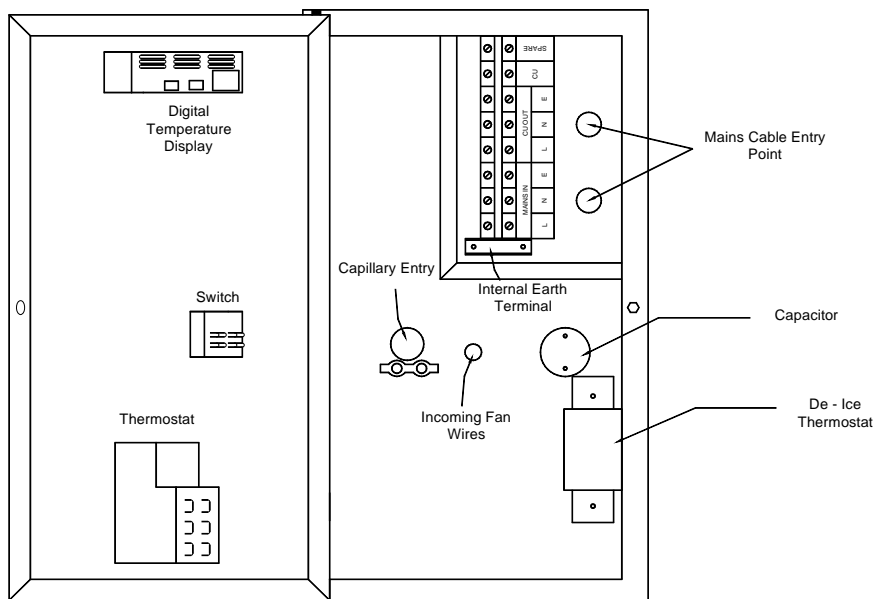


# CX(E) INDOOR UNIT COMPONENT IDENTIFICATION

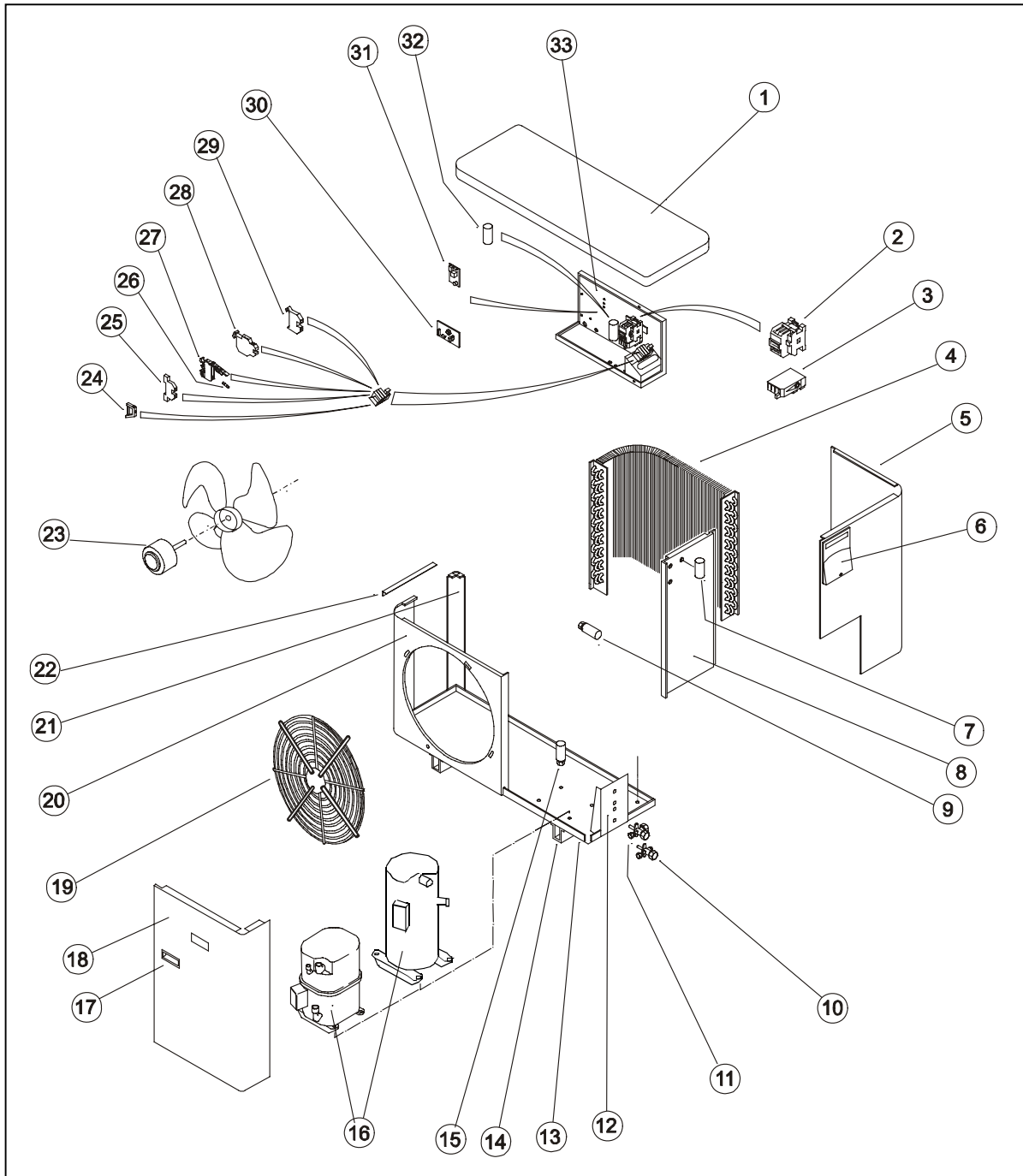


1	Grille	9	De-ice stat (option)
2	Fan / motor	10	Heater assembly (option)
3	Case	11	Drain stub adaptor
4	Wall / ceiling mounting brackets	12	Drain tray
5	Heater bracket	13	Side access panel
6	Coil assembly	14	Electrics box door
7	Thermostat bulb & bracket	15	Digital display (option)
8	Restrictor assembly / extended pipe (option)		

## INSIDE VIEW OF ELECTRICS BOX



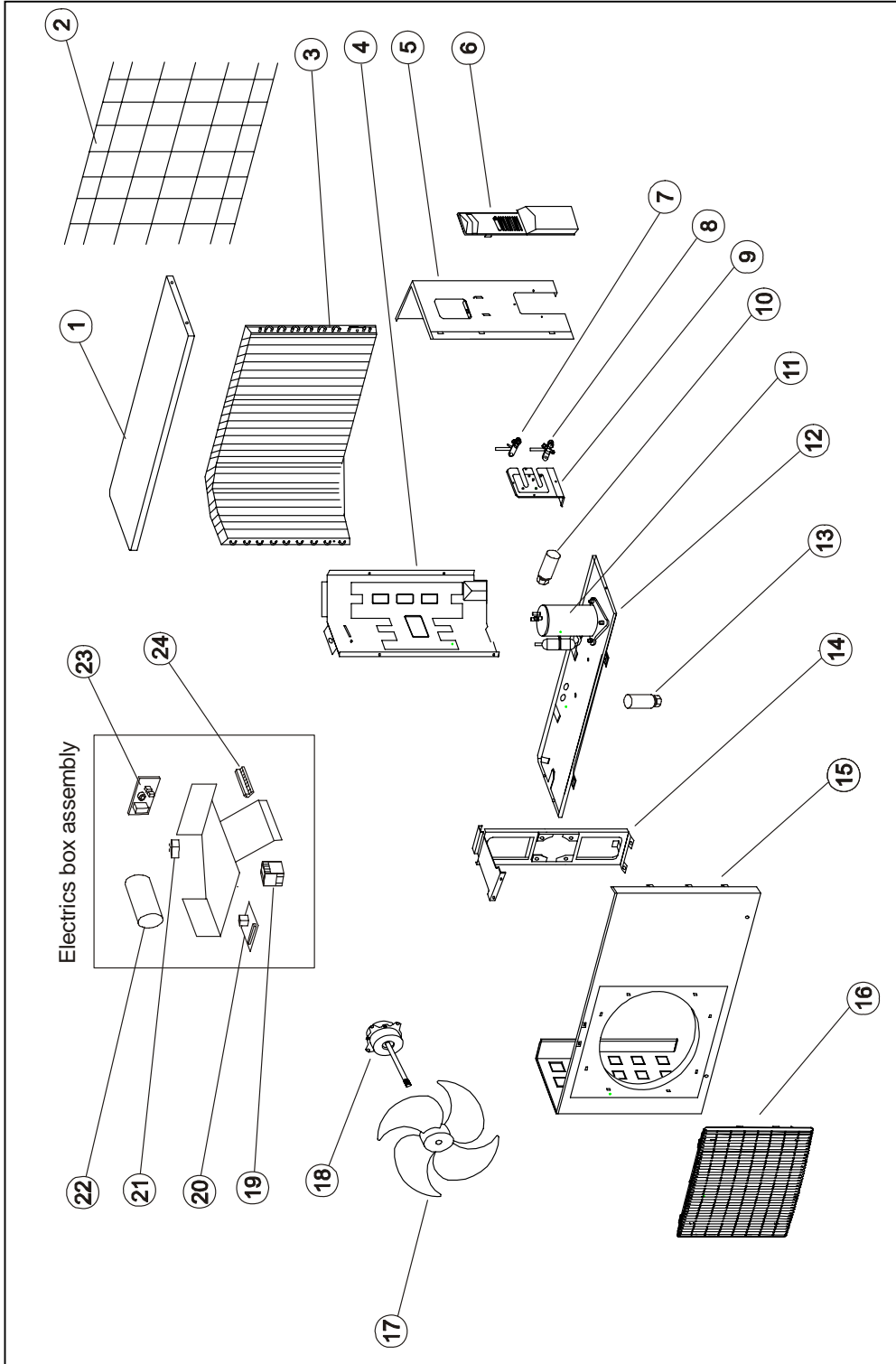
# CKC OUTDOOR UNIT COMPONENT IDENTIFICATION



1	LID	18	FRONT ACCESS
2	CONTACTOR	19	FAN GUARD
3	OVERLOAD	20	FASCIA PANEL
4	HEAT EXCHANGER COIL	21	CORNER PANEL
5	REAR ACCESS PANEL	22	SUPPORT BRACKET
6	MAINS TERMINAL COVER	23	FAN / MOTOR ASSEMBLY
7	FAN CAPACITOR	24	END CLAMP
8	BULKHEAD PANEL	25	TERMINAL
9	HP SWITCH (MANUAL, OPTION)	26	FUSE
10	SERVICE VALVE (LIQUID)	27	FUSE TERMINAL
11	SERVICE VALVE (SUCTION)	28	TERMINAL (4 WAY)
12	VALVE PANEL	29	EARTH TERMINAL
13	BASE	30	HEAD PRESSURE CONTROL pcb
14	MOUNTING FOOT	31	3 MINUTE TIMER pcb
15	LP SWITCH	32	COMPRESSOR CAPACITOR
16	COMPRESSOR	33	ELECTRICS BOX
17	HANDLE		

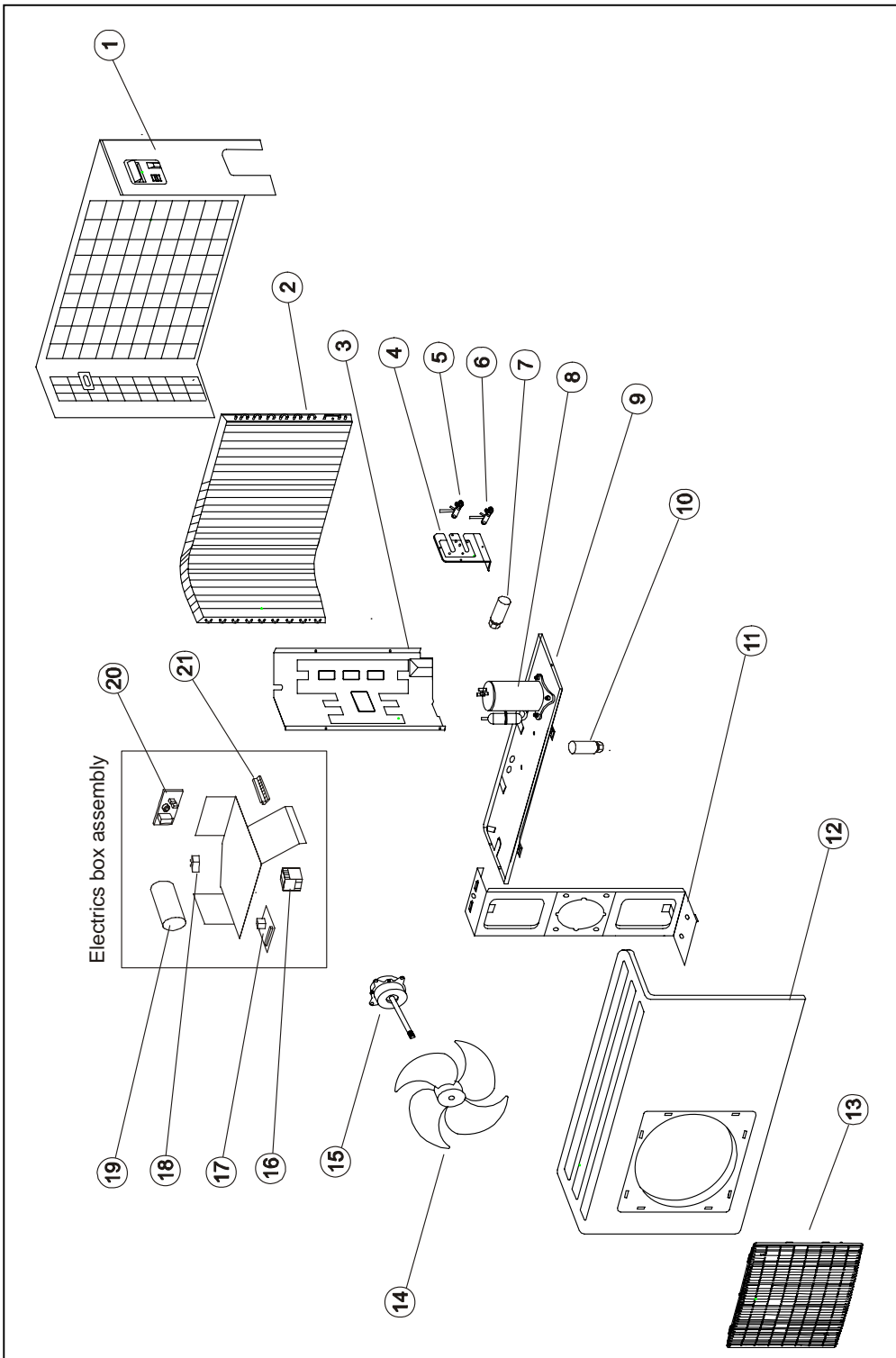
# CKR 30 OUTDOOR UNIT COMPONENT IDENTIFICATION

1	LID
2	REAR GRILL
3	HEAT EXCHANGER COIL
4	BULK HEAD PANEL
5	REAR ACCESS PANEL
6	SERVICE VALVE COVER
7	SERVICE VALVE 1/2"
8	SERVICE VALVE 3/8"
9	VALVE PANEL
10	HP SWITCH
11	COMPRESSOR
12	BASE
13	LP SWITCH
14	MOTOR SUPPORT BRACKET
15	FRONT PANEL
16	FAN GUARD
17	FAN
18	MOTOR
19	CONTACTOR
20	3 MINUTE TIMER
21	FAN CAPACITOR
22	COMPRESSOR CAPACITOR
23	FAN SPEED CONTROLLER (FSC)
24	TERMINAL BLOCK



# CKR 50 OUTDOOR UNIT COMPONENT IDENTIFICATION

1	BACK PANEL ASSY
2	HEAT EXCHANGER COIL
3	BULK HEAD PANEL
4	VALVE PANEL
5	SERVICE VALVE 1/2"
6	SERVICE VALVE 3/8"
7	HP SWITCH
8	COMPRESSOR
9	BASE
10	LP SWITCH
11	MOTOR SUPPORT BRACKET
12	FRONT PANEL
13	FAN GUARD
14	FAN
15	MOTOR
16	CONTACTOR
17	3 MINUTE TIMER
18	FAN CAPACITOR
19	COMPRESSOR CAPACITOR
20	FAN SPEED CONTROLLER (FSC)
21	TERMINAL BLOCK



# CKR 80 OUTDOOR UNIT COMPONENT IDENTIFICATION

1	LID
2	REAR GRILL
3	HEAT EXCHANGER COIL
4	REAR ACCESS PANEL
5	SERVICE VALVE 5/8"
6	SERVICE VALVE 1/2"
7	VALVE PANEL
8	BULK HEAD PANEL
9	HP SWITCH
10	COMPRESSOR
11	BASE
12	LP SWITCH
13	MOTOR SUPPORT BRACKET
14	FRONT PANEL
15	FASCIA PANEL
16	FAN GUARD
17	FAN
18	MOTOR
19	SIDE PANEL
20	CONTACTOR
21	3 MINUTE TIMER
22	FAN CAPACITOR
23	COMPRESSOR CAPACITOR
24	FAN SPEED CONTROLLER (FSC)
25	TERMINAL BLOCK

