

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)A models are electromechanical / Electronic control units that use R410A refrigerant; they provide cooling within the range of 2.8 – 5.6 kW. These units are matched with CKA outdoor units to complete a system.
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)A unit. For system details add input power and current of indoor and outdoor unit, including any heater load.

PART NUMBERS

MODEL	CXA 30	CXA 50	CXA 70
PART NUMBER	56400004	56400005	56400005
MODEL	CX(E)A 30	CX(E)A 50	CX(E)A 70
PART NUMBER	56400002	56400003	56400006

MODEL	CKA 35 1ph	CKA 50 1ph	CKA 70 1ph
PART NUMBER	56500002	56500003	56500004

UNIT COMBINATIONS

INDOOR UNIT	OUTDOOR UNIT
CX(E)A 30	CKA 35
CX(E)A 50	CKA 35
CX(E)A 50	CKA 50
CX(E)A 70	CKA 70

CX(E)A OPTIONS

OPTIONAL KITS	
PART NUMBER	DESCRIPTION
55900700	3kW heater (CXA only)
55900701	Digital temperature display (CXA only) STD on CX(E)A
55900702	De-ice thermostat (CXA only) STD on CX(E)A
55900715	3kW heater (CX(E)A only)

DIMENSIONS & WEIGHTS

MODEL	UNPACKED			
CX(E)A	HEIGHT	WIDTH	DEPTH	WEIGHT
30	483	845	320	18
50	483	845	320	20
70	483	845	320	23

PACKED			
HEIGHT	WIDTH	DEPTH	WEIGHT
530	950	370	21
530	950	370	23
530	950	370	26

CKA	HEIGHT	WIDTH	DEPTH	WEIGHT 1Ph
35	552	760	256	35
50	552	760	256	42
70	660	860	307	56

HEIGHT	WIDTH	DEPTH	WEIGHT 1Ph
620	863	376	38
620	863	376	46
730	990	415	63

PERFORMANCE DATA (kW)

MODEL	RATING CONDITIONS (ROOM 12.7°C / 10°C) (AMBIENT 27°C / 19°C)		OPTIONAL ELECTRIC HEATER	
	TOTAL	SENSIBLE	240V	230V
CX(E)A 30 + CKA 35	2.28	1.98	3.25	3.0
CX(E)A 50 + CKA 35	3.25	2.48	3.25	3.0
CX(E)A 50 + CKA 50	4.25	2.90	3.25	3.0
CX(E)A 70 + CKA 70	5.60	3.83	3.25	3.0

MODEL	RATING CONDITIONS (ROOM 12.7°C / 10°C) (AMBIENT 35°C / 19°C)		OPTIONAL ELECTRIC HEATER	
	TOTAL	SENSIBLE	240V	230V
CX(E)A 30 + CKA 35	2.20	1.77	3.25	3.0
CX(E)A 50 + CKA 35	2.83	2.15	3.25	3.0
CX(E)A 50 + CKA 50	3.50	2.45	3.25	3.0
CX(E)A 70 + CKA 70	4.62	3.24	3.25	3.0

AIR FLOWS

MODEL	m³/s
CX(E)A 30	0.61
CX(E)A 50	0.66
CX(E)A 70	0.58

MODEL	m³/s
CKA 35	0.81
CKA 50	0.78
CKA 70	0.70

SOUND POWER AND SOUND PRESSURE LEVELS

INDOOR UNIT

MAXIMUM SPEED	SOUND PRESSURE LEVELS	
	dB(A)	NC
CX(E)A 30	55	48
CX(E)A 50	56	50
CX(E)A 70	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 PRESSURE LEVELS	
	dB(A)	NC
CKA 35	55	44
CKA 50	58	44
CKA 70	58	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

Indoor CX(E)A	30	50	50	70
Outdoor CKA	35	35	50	70
Rated Current Cooling A	5.2	5.2	8.0	11.0
Maximum Running Current A	7.3	7.3	10.8	14.2
Starting Current A	26.0	26.0	40.0	61.0

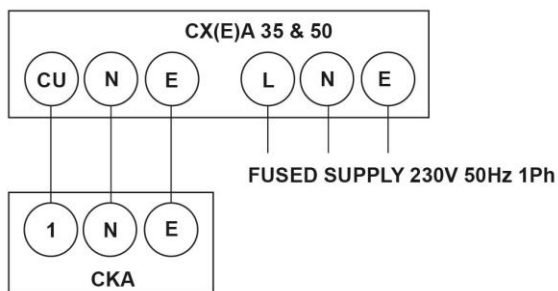
UNIT ELECTRICAL LOADS [230V 50Hz 1Ph (A) or 400V 50Hz 3Ph (A/Ph)]

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

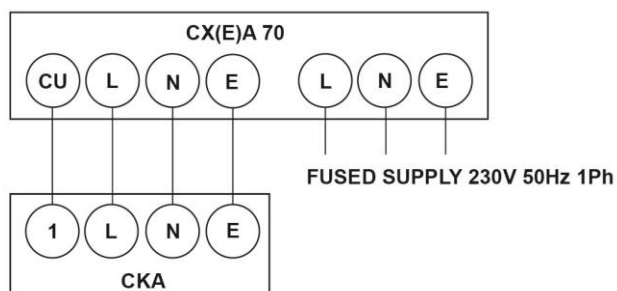
INTERCONNECTING INSTRUCTIONS FOR CX(E)A AND CKA SYSTEMS

INTERCONNECTING WIRING

2 CORE + EARTH 1.5mm



3 CORE + EARTH 1.5mm



REMOTE DI ENABLE SETTINGS INSTRUCTION

CXE and CX(A)E remote enable function.

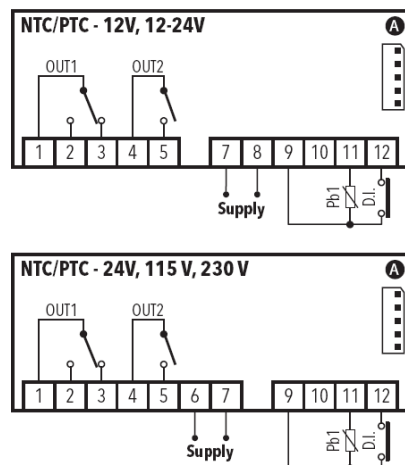


Fig 1.. ICPlus 915 controller wiring.

CXE and CX(A)E units with Eliwell ICPlus915 controller have Digital Input, which may be used to Enable controller or put in Standby Mode remotely. Fig 1. shows how to use Volt-free Digital Input. After wiring input you should change parameters H11 and H13, so controller know how it should operate in accordance with DI status. We recommend to set H11 – **3** (Outputs stopped); H13 – **noP**(2) or **ncP**(3) dependant on operation logic you want.

H11	Digital Input Configuration. 0 = disabled; 1 = SOFT START; 2 = Offset setpoint; 3 = Outputs stopped; 4 = Periodic cycle; 5 = AUX; 6 = Stand-by; 7 = Not used; 8 = External alarm; 9 = External alarm to lock regulators.	NTC/PTC	0..9	0	num	Inst
		PT100-Tc	0...9	0	num	
		V/I				
H13	Polarity and priority of Digital Inputs (D.I.). no (0) = normally open; nc (1) = normally closed; noP (2) = normally open with priority; ncP (3) = normally closed with priority.	NTC/PTC	no/nc/noP/ncP	no	num	Inst
		PT100-Tc	no/nc/noP/ncP	no	num	
		V/I				

Fig 2. ICPlus 915 controller parameters.

NOTE: Even if controller switch Outdoor unit OFF, Indoor fan will still run.

PROGRAMMING MENU

To access the 'Programming' menu, press the **SET** key for more than 5 seconds. If specified, an access PASSWORD will be requested: 'PA1' for User parameters and 'PA2' for Installer parameters (see 'PASSWORD' paragraph).

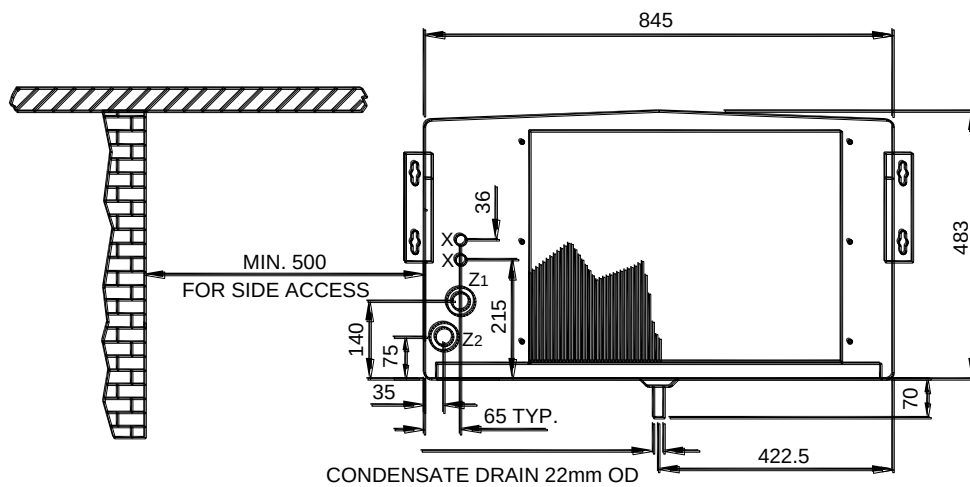
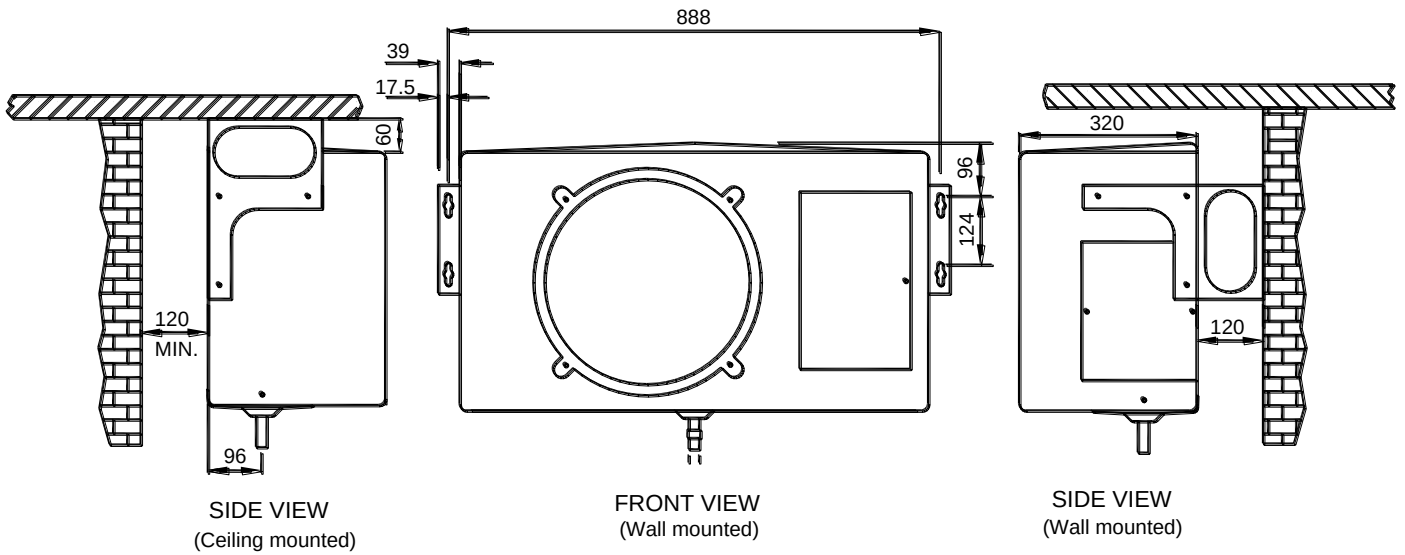
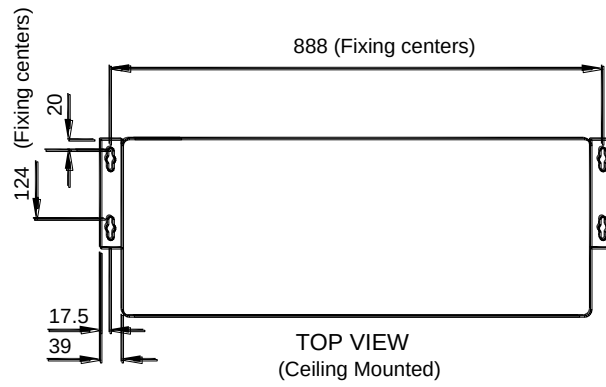
User Parameter: When accessed, the display will show the first parameter (e.g. 'diF'). Press **⬆** and **⬇** to scroll through all the parameters on the current level. Select the desired parameter by pressing **SET**. Press **⬆** and **⬇** to modify it and **SET** to save the changes.

Installer Parameter: When accessed, the display will show the first folder (e.g. 'CP'). Press **⬆** and **⬇** to scroll through the folders on the current level. Select the desired folder using **SET**. Press **⬆** and **⬇** to scroll through the parameters in the current folder and select the parameter using **SET**. Press **⬆** and **⬇** to modify it and **SET** to save the changes.

NOTE: Make sure you switch the instrument off and on again each time the parameter configuration is changed, in order to prevent malfunctioning in the configuration and/or timing in progress.

User's Password is not enabled by default – 0.
Default Installer's Password is – 15.

CX(E)A DIMENSIONS



X = Interconnecting Wiring
Z₁ = Suction
Z₂ = Liquid / Expansion

CX(E)A 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

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.

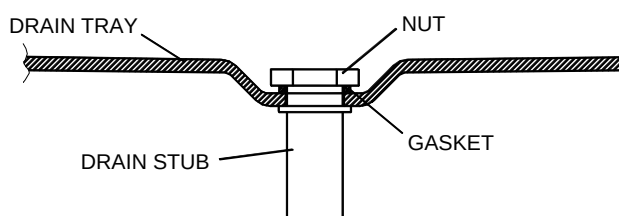


Fig.1

CX(E)A 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.

INTERCONNECTING PIPEWORK (Max 15 metres)						
System			Torque (NM)		Nut A/F (mm)	
	Liquid/Expansion	Suction	Liquid Line	Suction Line	Liquid Line	Suction Line
CX(E)A 30 + CKA35	1/4"	1/2"	17	54	17	24
CX(E)A 50 + CKA35	1/4"	1/2"	17	54	17	24
CX(E)A 50 + CKA50	1/4"	1/2"	17	54	17	24
CX(E)A 70 + CKA70	3/8"	5/8"	34	73	22	27

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 over tighten hose clamps as this could damage the stub pipe.

CX(E)A 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

Note: On 3 ph supply must go to unit and then to indoor unit.

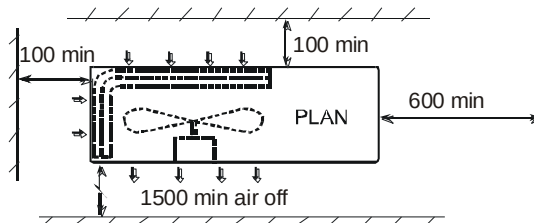
SYSTEM	COOL ONLY		WITH ELECTRIC HEATER	
	1PH	3PH	1PH	3PH
CX(E)A30 + CKA35	16A	-	16A	-
CX(E)A50 + CKA35	20A	-	20A	-
CX(E)A50 + CKA50	20A	-	20A	-
CX(E)A70 + CKA70	20A	-	32A	-

systems the
the CKA outdoor
the CX(E)A

CKA 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.



- Individual pipe runs to a maximum of 15m, including 7.5m lift, are permissible. 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.

CKA 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"	
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	0.3	
180° Bend R/d = 1.5	0.73	0.91	1.1	
180° Bend C/d = 2.5	0.46	0.55	0.64	
90° Elbow	0.67	0.85	1.04	

A. SUCTION AND LIQUID/EXPANSION LINES:

The expansion capillary is located in the outdoor unit and the equivalent pipe run is 15m maximum, including a maximum lift of 7.5m. Fully insulate the suction and liquid/expansion 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.

	MAXIMUM EQUIVALENT LENGTH OF SUCTION LINE PIPE SIZES (m)		LIQUID/EXPANSION LINE		TOTAL CHARGE (Kgs) For 7.5m
SYSTEM	1/2"	5/8"	1/4"	3/8"	-
CX(E)A30 + CKA 35	15	-	15	-	0.85
CX(E)A50 + CKA 35	15	-	15	-	1.05
CX(E)A50 + CKA 50	15	-	15	-	1.50
CX(E)A70 + CKA 70	-	15	-	15	2.25

For systems with interconnecting pipework in excess of 7.5 metre add 20gms per metre on CKA 35 & CKA 50, add 30gms per metre on CKA 70. No additional oil is required.

INTERCONNECTING PIPEWORK

- Indoor and outdoor units have a low pressure charge of N₂, 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.
- Connecting the pipework
 - Remove the flare nuts from the suction and liquid service valves.
 - Ensure that the suction line is fully insulated: if an expansion line is used this should also be fully insulated.
 - 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.
 - Connect the pipework between the units. Do not leave pipe ends, valves etc. open to the atmosphere.
R410A 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.
 - 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

- 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.
- Replace the caps on the service ports, (torque to 25NM).