temperzone
QUALITY AIR CONDITIONING

Modular Air Cooled Condensers

Technical Data
ACN Series

Extra Long Life
Epoxy Coated Outdoor Coil

Nominal Cooling Capacity
68 kW – 155 kW

MARCH 2010

ACN SERIES MODULAR AIR COOLED CONDENSERS

GENERAL

The ACN Series of modular air cooled condensers provide condensing liquid for commercial and industrial refrigeration applications.

APPLICATIONS

The ACN Series is designed to be used for industrial applications, rack refrigeration, and remote condenser application.

The ACN range of air-cooled condensers Total Heat of Rejection (THR) value is based on condensing R404A at 50°C with a 15K temperature difference (TD) between surrounding ambient and condensing temperature of refrigerant).

The ACN range is useable with a variety of different refrigerants including:
R404A, R22, R134A, R407C, R507 and R410A.

CAPACITIES

The ACN Series is available in nominal capacities of 68 kW to 155 kW Total Heat of Rejection (THR) over 28 models.

Multiple ACN units can be installed where greater capacity is required, or alternatively ask about the larger capacity models available.

The capacities specified in this pamphlet relate to a specified range of conditions. Capacities at other conditions could vary considerably. To obtain the optimum unit selection for other conditions, contact your nearest **temperzone** office.

FEATURES

Casing. Made from the highest grade galvanised steel construction, powder coated inside and out for maximum moisture protection and utilising rust free stainless steel fasteners throughout.

Heat Exchange Element (Coil). Die formed plate type aluminium fins mechanically bonded to high efficiency inner grooved (rifled) copper tube. Tested at 2068 kPa air pressure under water, the coils are suitable for 1600 kPa working pressure. Higher test pressures are available if requested. Coil fins are epoxy coated aluminium fins for added protection in salt laden or polluted atmospheres.

Fans. Propeller fans are 630 mm or 710 mm diameter with a fixed pitch and five blades.

They are individually partioned for maximum airflow and coil thermal performance.

Fans are axial flow Ziehl-Abegg from the range FB and FE. The 710 diameter fan is from the FE range and is sickle-shaped die-cast aluminium blades. The 630 diameter fan is from the FB range and 4 blade stamped aluminium impeller.

Fan motors are asynchronous (AC motors) 100% speed controllable.

Fan motor speed high/low delta/star switching may be applied if required, via a change-over switch.

The fans assemblies are rated for 60°C maximum ambient temperature.

Fan motors are 3 phase 400V +/-10%, 50 Hz and two speed and protected to IP54.

Motor terminal boxes are made from impact-proof and weather-proof plastic.

The motors are protected from over-temperature with bimetal switch embedded in motor winding.

Construction:
Vertically up air discharge, horizontal tube/fin heat exchange coil with sheetmetal casing. Coil circuits are free draining to liquid header thus avoiding poor system operation due to transient condensing pressures.

Construction facilitates the adjacent placing and bolting together of separate units thus optimizing real-estate space.

Electrical terminal box may be optimally positioned to minimze power cable run length.

Coil tubesheets are aluminium and only semi-restrained so as to eliminate tube to tubesheet wear resulting from expansion and contraction of tube bundle during normal operation.

STANDARD EQUIPMENT

1. Heat transfer coil (epoxy coated).
2. Propeller fans with three phase motors.
3. Fan guards.
4. Copper swage connections.
5. Stainless steel nuts and bolts.

ELECTRICAL

The electrical supply required (including voltage fluctuation limits) is:
3 phase 360 - 440 a.c. 50 Hz with neutral and earth..
Fan motors are pre-wired to a common terminal block in the electrical box.

LOCATION & INSTALLATION

To ensure maximum efficiency of operation, the following points need to be addressed prior to installation:

1. Locate pipework away from the ACN unit so that it is not an obstruction to the unit's air flow and does not provide a heat source to the air entering the coil.
2. Other plant adjacent to the unit must not be so close that it effects the air flow of the unit.
3. Colour of the mounting surface can create high solar gains that adversely affect (raise) the air entering temperature.
4. Adjacent buildings, plant and prevailing winds can cause down drafts, reducing air flow to the coils, thereby causing higher air entering temperatures and loss of performance.
5. Do not locate the unit near a parapet wall. If this can not be avoided then the unit should be raised on extended legs or installed on a plinth.

ALTERNATIVE MODELS

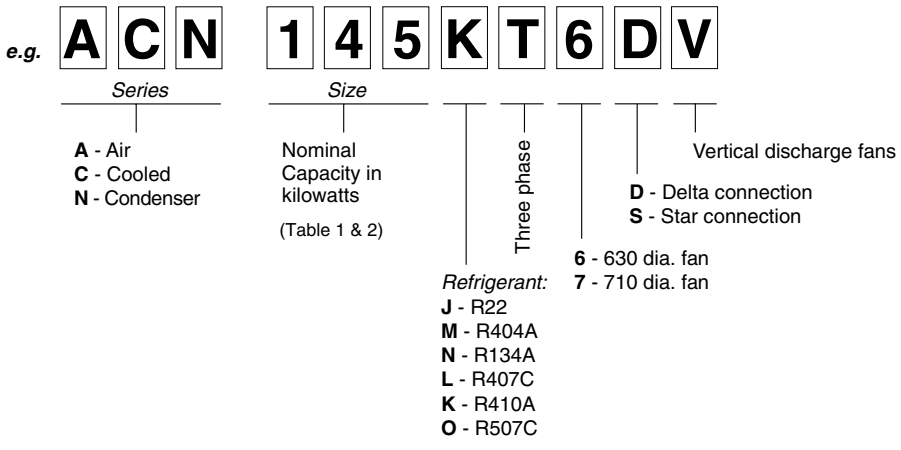
Standard models have been developed to meet the needs of typical commercial applications. Should you have any special requirements, such as larger capacities or horizontal air discharge, contact your nearest **temperzone** sales office; **temperzone** engineers have over 35 years experience in designing air conditioning equipment for special applications.

NOTE

Materials and specifications subject to change without notice due to the manufacturer's ongoing research and development programme.

The manufacturer operates a quality management system that conforms to AS/NZS **ISO 9001**:2000.

NOMENCLATURE



PERFORMANCE DATA

Table 1 **630 Dia. Fan 4 Pole Motor**

MODEL	Δ Delta Connection =1300RPM			Y Star Connection = 910 RPM		
	Heat of Rejection* kW (THR)	Total Air Flow l/s	Sound Power (SWL) dB(A)	Heat of Rejection kW (THR)	Total Air Flow l/s	Sound Power (SWL) dB(A)
ACN 90-2	81.9	6050	88	68.2	4580	83
ACN 91-2	92.7	5830	88	72.9	4220	83
ACN 100-3	121.8	8500	90	98.9	6250	84
ACN 125-3	126.5	8250	90	100.3	5950	84
ACN 135-3	132.9	8830	90	109.9	6750	84
ACN 136-3	138.5	8750	90	110.4	6330	84
ACN 145-3	144.0	8600	90	120.0	6660	84

*Heat of Rejection kW (THR) rating at 15°C TD

Table 2 **710 Dia. Fan 6 Pole Motor**

MODEL	Δ Delta Connection = 900RPM			Y Star Connection = 680 RPM		
	Heat of Rejection* kW (THR)	Total Air Flow l/s	Sound Power (SWL) dB(A)	Heat of Rejection kW (THR)	Total Air Flow l/s	Sound Power (SWL) dB(A)
ACN 90-2	86.9	6660	80	73.9	5160	74
ACN 91-2	96.8	6160	80	81.7	4890	74
ACN 100-3	125.0	8750	82	104.1	6750	75
ACN 125-3	129.1	8500	82	109.9	6660	75
ACN 135-3	141.0	9580	82	118.9	7540	75
ACN 136-3	146.8	9400	82	122.9	7330	75
ACN 145-3	155.2	9100	82	131.2	7330	75

*Heat of Rejection kW (THR) rating at 15°C TD

Table 3 **Correction Factors for Different Refrigerants**

R404A	R22	R134A	R407C	R507	R410A
1	0.96	0.93	0.87	1	1

SELECTION EXAMPLE

Required data:	Required Total Heat of Rejection (THR)	75 kW
	Refrigerant	R22
	Design Dry Bulb Ambient Temperature	35 °C
	Desired Condensing Temperature	45 °C
	Temperature Difference (TD)	10 °C

1) Correct for Refrigerant

$$\frac{\textbf{Required}\ \text{Total Heat of Rejection}}{\text{Correction Factor (Table 3)}} = \frac{75}{0.96}$$

Corrected Total Heat of Rejection = 78.1 kW (A)

Table equivalent Total Heat of Rejection = Corrected THR $\times \frac{\text{Rating TD}}{\text{Required TD}} = 78.1 \times \frac{15°C\ \text{TD}}{10°C\ \text{TD}}$

= 117.15 kW **i.e. required THR (B)**

2) Identify Options available from Tables 1 & 2 that meet required THR (B)

Option	Unit	Fan Dia.	Motor Conn.	Fan Speed	THR	Sound Power (SWL) dB(A)
1	ACN135-3	710 mm	Y	680 RPM	118.9 kW	75
2	ACN136-3	710 mm	Y	680 RPM	122.9 kW	75
3	ACN100-3	710 mm	Δ	680 RPM	125.0 kW	82
4	ACN145-3	630 mm	Y	910 RPM	120.0 kW	84
5	ACN100-3	630 mm	Δ	1300 RPM	121.8 kW	90

3) Calculate Actual Condensing Temperature

Actual Condensing Temperature (°C) = $\frac{\text{15K TD}}{\textbf{Selected Table} \text{ Total Heat of Rejection}}$ x **Corrected** Total Heat of Rejection (**A**)

Option 1

ACN 135-3, 710 Dia., 680 RPM-Y

$\frac{15}{118.9}$ x 78.1 = 9.8K TD

add

Design ambient °C d.b. 35.0

Actual Cond. Temp.°C **44.8**

Option 2

ACN 136-3, 710 Dia., 680 RPM-Y

$\frac{15}{122.9}$ x 78.1 = 9.9K TD

add

Design ambient °C d.b. 35.0

Actual Cond. Temp.°C **44.5**

Option 3

ACN 100-3, 710 Dia., 900 RPM-Δ

$\frac{15}{125.0}$ x 78.1 = 9.4K TD

add

Design ambient °C d.b. 35.0

Actual Cond. Temp.°C **44.4**

Option 4

ACN 145-3, 630 Dia., 910 RPM-Y

$\frac{15}{120.0}$ x 78.1 = 9.6K TD

add

Design ambient °C d.b. 35.0

Actual Cond. Temp.°C **44.6**

Option 5

ACN 100-3, 630 Dia., 1300 RPM-Δ

$\frac{15}{121.8}$ x 78.1 = 9.6K TD

add

Design ambient °C d.b. 35.0

Actual Cond. Temp.°C **44.6**

PHYSICAL DATA

Table 4 **630 Dia. Fan 4 Pole Motor**

MODEL	Δ = 1300 RPM			Y = 910 RPM			FAN DETAILS			COIL DETAILS		CONNECTION		PUMP-DOWN	OPERATING MASS *
	THR Δ kW (THR)	Air Flow Δ l/s	SWL Δ dB(A)	THR Y kW (THR)	Air Flow Y l/s	SWL Y dB(A)	No. Fans	Total Start amps(A)	Total Run amps(A)	R/Deep	FPM	Gas mm	Liquid mm	Charge kg -R404a	kg
ACN 90-2	81.9	6050	88	68.2	4580	83	2	14	3.96	3	560	42	35	21.43	274
ACN 91-2	92.7	5830	88	72.9	4220	83	2	14	3.96	4	560	42	35	27.98	310
ACN 100-3	121.8	8500	90	98.9	6250	84	3	21	5.94	4	480	54	41	35.49	368
ACN 125-3	126.5	8250	90	100.3	5950	84	3	21	5.94	4	560	54	41	35.49	378
ACN 135-3	132.9	8830	90	109.9	6750	84	3	21	5.94	4	480	54	41	42.03	485
ACN 136-3	138.5	8750	90	110.4	6330	84	3	21	5.94	4	560	54	41	42.03	496
ACN 145-3	147.9	8600	90	121.8	6660	84	3	21	5.94	5	480	54	41	51.86	537

*Based on 80% full / +35° SCT

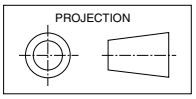
Table 5 **710 Dia. Fan 6 Pole Motor**

MODEL	Δ = 900RPM			Y = 680RPM			FAN DETAILS			COIL DETAILS		CONNECTION		PUMP-DOWN	OPERATING MASS *
	THR Δ kW (THR)	Air Flow Δ l/s	SWL Δ dB(A)	THR Y kW (THR)	Air Flow Y l/s	SWL Y dB(A)	No. Fans	Total Start amps(A)	Total Run amps(A)	R/Deep	FPM	Gas mm	Liquid mm	Charge kg R404a	kg
ACN 90-2	86.9	6660	80	73.9	5160	74	2	12.4	3.15	3	560	42	35	21.43	274
ACN 91-2	96.8	6160	80	81.7	4890	74	2	12.4	3.15	4	560	42	35	27.98	310
ACN 100-3	125.0	8750	82	104.1	6750	75	3	18.6	4.73	4	480	54	41	35.49	368
ACN 125-3	129.1	8500	82	109.9	6660	75	3	18.6	4.73	4	560	54	41	35.49	378
ACN 135-3	141.0	9580	82	118.9	7540	75	3	18.6	4.73	4	480	54	41	42.03	485
ACN 136-3	146.8	9400	82	122.9	7330	75	3	18.6	4.73	4	560	54	41	42.03	496
ACN 145-3	155.2	9100	82	131.3	7330	75	3	18.6	4.73	5	480	54	41	51.86	537

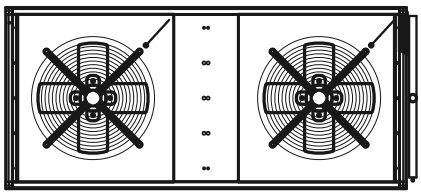
*Based on 80% full / +35° SCT

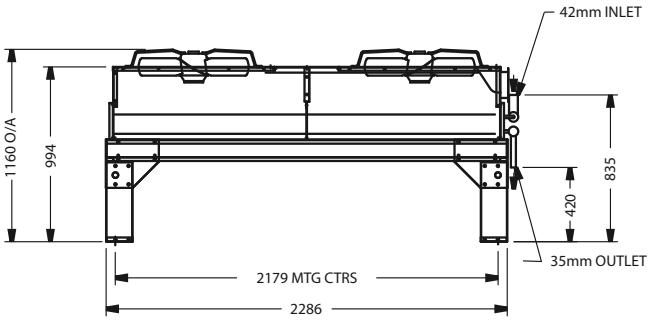
DIMENSIONS (mm)

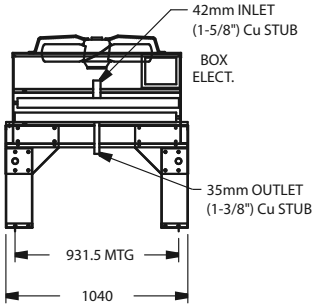
Not to Scale



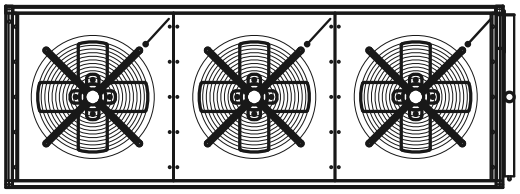
ACN 90-2
ACN 91-2

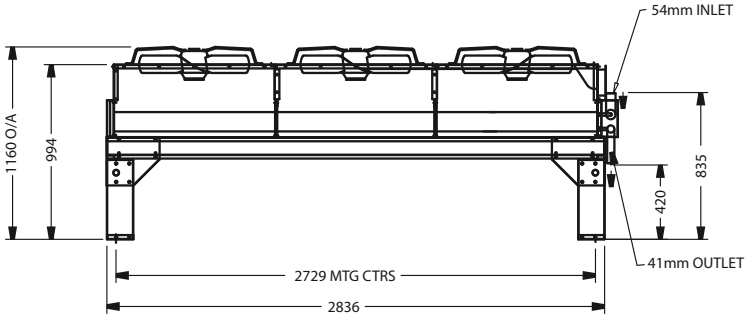


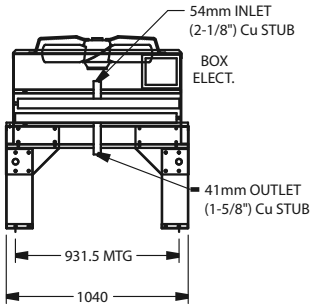




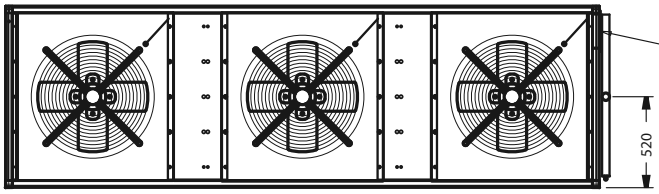
ACN 100-3
ACN 125-3

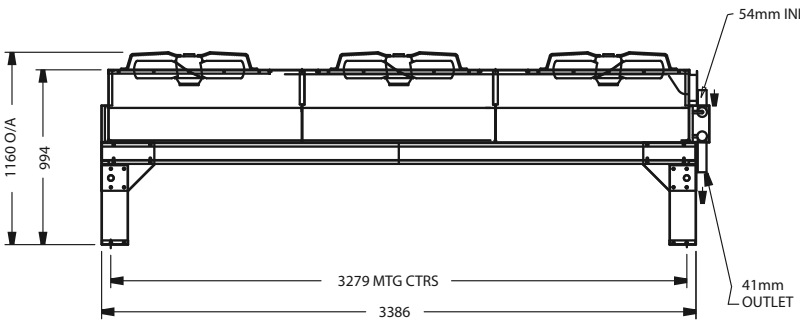


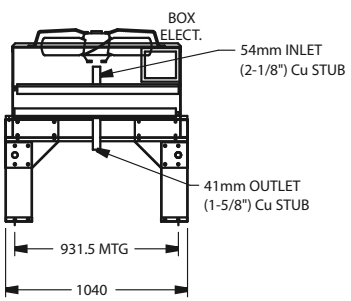




ACN 135-3
ACN 136-3
ACN 145-3







Note

Materials and specifications are subject to change without notice due to the manufacturer's ongoing research and development programme.
Certified dimensions available on request.

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