Product Catalog

Koolman Air-Cooled Chiller and Heat Pump

CGAK cooling only /CGAR heat pump

Model:030~200

R410A, 50Hz

March 2020

PKGP-PRC006B-EN

Contents

Features and Benefits

Introduction
Using the leading high-efficiency ermetic scroll compressor and evaporator technology, Koolman provides you a stable, reliable and highly efficient operation. Matched with a large variety of fan coils of different sizes it can be widely used in top grade apartments, luxury villas, office buildings, small-sized restaurants, retail stores and hotels to create a comfortable and delightful indoor environment.

State-of-the-art appearance
Koolman boasts of its state-of-the-art appearance. The contemporary appearance, designed by expert designers, will be naturally integrated with the surrounding environment and will definitely display your prominent taste.

Small footprint
As a result of the particular slim design (standard type is 500mm thick while mini type is only 393mm thick), the unit can be installed directly on the veranda, rooftop or ground without the need to have a plant room.

Available options
Unit with pressurized water tank is available to meet various requirements.

Easy installation
Each chiller has factory charged oil and refrigerant for reducing field labor and materials costs. All units are factory run tested. Only power supply and water piping are required to be connected on the jobsite.

Environmentally friendly refrigerant
All models are charged with R410A refrigerant.

Free of Cooling Tower
Heat dissipation in the way of air cycle eliminates the need for cooling water tower. Thus, not only does it save the cost and space for cooling tower it also eliminates water shortage concerns.

Mechanical Specifications

General

Koolman air-cooled liquid chiller is designed to couple with fan coil units and air handling units for residential and light commercial air conditioning applications. Units are composed of scroll compressor (s), plate type evaporator, finned-coppertube and aluminum condenser, axial fan assembly, expansion valve, four-way reversal valve (heat pump only), indoor Cooling/Heating control switch, water flow switch, filter dryer, sight-glass, built-in water pump, galvanized sheet metal housing with powder paint and factory mounted controls. Optional fittings include pressurized water tank system.

Compressor

Depending on capacity range, units come with single or double scroll compressors to cater for changing demand and efficient part load operations.

Evaporator

Evaporator is a compact brazed plate heat exchanger with AISI 316 stainless plates and adapters. A 20-mesh strainer is installed at the water inlet to protect the evaporator and unit against fouling. The strainer (factory provided, field installed) can be removed for cleaning.

Housing

All parts are fabricated to precision by state-of-the-art CNC machines. The frame design allows all panels to be removed for service without affecting the structure of the unit. The panels are made of galvanized steel plate with powder paint. All panels are internally insulated with single layer foam cell in order to reduce noise and vibration.

Water pump

Pump is Rotodynamic pumps and adopts a mechanical shaft seal. Motor is fan cooled (TEFC), 2-pole induction type. Pump is installed in the unit to save installation space and also to reduce noise level.

Controls and protection devices

The controller contains all the basic electrical protection devices including electromagnetic switches, relays and current overload protectors. The automatic control devices consist of high and low pressure switches, thermostatic and anti-freeze cutouts, which improve and protect the unit's normal operation. In addition, the preset low temperature protection command can start the machine automatically to protect the water pipes from freezing.

LCD microprocessor-based controller

Precise temperature control of inlet chilled water, operation modes and system protection are provided by the long-range controller. In addition, the password can be set and any abnormal condition will be monitored and captured to facilitate quick repair and normal operation. In addition, the interlocking function of the two-way valve is available.

Air-cooled condenser

The unit comes with air-cooled fin-tube U or V shaped condensers. Copper tubes are of the 3/8" diameter, seamless type. Fins are aluminum with efficient Wavy fin. Copper tubes are expanded mechanically to bond with the fins for effective heat transfer. Light-weight axial flow fan(s) is (are) driven by high efficiency, low speed, low noise motor(s) to ensure quiet and reliable operations.

Operating limits

	Cooling mode	Heating mode
mini	21℃	-7℃
max	43℃	21℃
Leaving water temperature		
	Cooling mode	Heating mode
mini	5℃	40℃
max	15℃	50℃

Model Nomenclatures

C	G	A	R	0	5	0	5	R	B	N	B	R	R	N	B
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Digit 1,2,3 CGA = Air-Cooled Chiller and Heat Pump

Digit 4 Model

K = Cooling Only

R = Heat Pump

Digit 5,6,7 Model

030 100

050 120

060 150

075 200

Digit 8 Power Supply

5 = 380V/50Hz/3ph (For Model 030,050,060,075,100,120,150,200)

6 = 220V/50Hz/1ph (For 030 with single compressor and 060 with double compressors)

Digit 9 Manufacturing Code (Defaulted by factory)

R = R410A

Digit 10 Controller

B = Microprocessor-based adjustable water temperature controller

Digit 11 Water Side Electric Heater

N = None

Digit 12 Service Sequence

A = The first time (For Model 1505,2005)

B = The second time (For Model 0305,0306,0505,0605,0755,CGAK1205)

C = The third time (For Model 0606,1005,CGAR1205)

Digit 13 Water Pump for Unit

R = With Pump inside (Standard)

N = Without Pump

Digit 14 Applicable Ambient Temperature

R = Standard ambient temperature/Blue-fin

Digit 15 Fitting Options

N = None (Standard Unit)

Digit 16 Other option

B = Export

Performance Data

Model			CGAR/K0305R	CGAR/K0306R	CGAR/K0505R	CGAR/K0605R	CGAR/K0606R
Cooling Capacity		Kal/Hr	9471	10332	12054	14809	19114
		kW	11.0	12.0	14.0	17.2	22.2
Cooling Rated Power			3.5	3.8	4.4	5.4	7.9
Heating Capacity		Kal/Hr	9902	11193	12915	15584	21353
		kW	11.5	13.0	15.0	18.1	24.8
Heating Rated Power			3.6	4.0	4.5	5.3	8.1
Power Supply		V	380-415V/50HZ/3	220-240V/50HZ/1	380-415V/50HZ/3	380-415V/50HZ/3	220-240V/50HZ/1
Compressor	Number		1	1	1	1	2
	Rated Current(C/H)	A	6.01/6.39	18.78/20.40	7.97/8.35	10.02/9.93	20.00/20.95
	Locked Rotor Current	A	60	130	82	100	130
	Power Input(C/H)	kW	3.38/3.49	3.71/3.91	4.26/4.34	5.27/5.18	3.63/3.75
	Type		Hermetic Scroll Compressor				
Fan	Number		2	2	2	2	1
	Rated Current	A	0.4	0.4	0.7	0.7	4.8
	Power Input	kW	0.035	0.035	0.06	0.06	0.60
Water Pump	Number		1				
	Rated Current	A	1.45	3.65	1.45	1.45	3.65
	Power Input	kW	0.55				
	Discharge Head	m	25.05	24.65	23.55	17.89	22.05
Evaporator	Type		Plate Type Heat Exchanger				
	Water Flow (C/H)	m3/h	31.53/32.96	34.39/37.26	40.13/42.99	49.31/51.89	63.63/69.08
Protective Device			Overheat Protection, High and Low Pressure Protection				
Lubricant	Type		PVE68	PVE68	PVE68	PVE68	PVE68
	Charge	L	1.57	1.57	1.57	1.57	1.57
Refrigerant	Type		R410A				
	Charge	kg	2.9	3.0	3.4	3.6	2.8+2.8
Unit Dimensions		mm	950*393*1285				1290*500*1900
Rated Water Pressure Drop		kPa	25	25	24	52	25
Water Connection (FPT)		inch	1"	1"	1"	1"	1-1/4"
Direction of Connection			Right	Right	Right	Right	Back
Operation Weight		kg	130	131	141	149	320
Sound Level - High Speed		dB(A)	55	55	57	57	57
Sound Level - Low Speed		dB(A)	53	53	55	55	-
EER		W/W	3.14	3.16	3.18	3.19	2.81
IPLV		W/W	3.50	3.49	3.51	3.51	3.10
Efficiency Grade - EER			2	2	2	2	3
Efficiency Grade - IPLV			2	2	2	2	3

Note:
1.Cooling Mode Conditions (Evap. 12℃/7℃ - Air. 35℃).
2.Heating Mode Condition (Evap. 40℃/45℃ - Air. DB/WB 7℃/6℃).
3.The unit is tested under GB18430.1and GB18430.2.

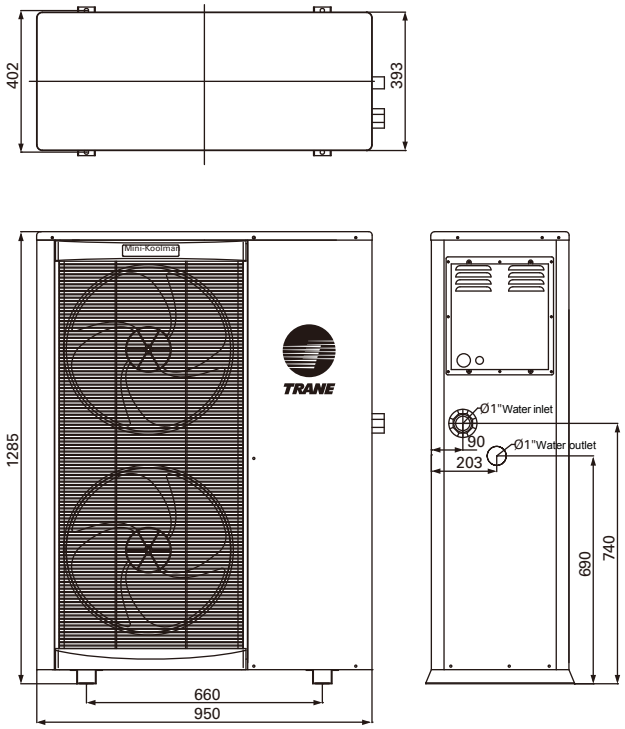
Model			CGAR/K0755R	CGAR/K1005R	CGAR/K1205R	CGAR/K1505R	CGAR/K2005R
Cooling Capacity		Kal/Hr	20406	24280	33149	42275	47355
		kW	23.7	28.2	38.5	49.1	55.0
Cooling Rated Power			7.5	9.5	12.9	15.4	18.5
Heating Capacity		Kal/Hr	21267	25572	34871	46064	51488
		kW	24.7	29.7	40.5	53.5	59.8
Heating Rated Power			7.2	9.1	12.6	15.9	17.8
Power Supply		V	380-415V/50HZ/3	380-415V/50HZ/3	380-415V/50HZ/3	380-415V/50HZ/3	380-415V/50HZ/3
Compressor	Number		1	2	2	2	2
	Rated Current(C/H)	A	13.77/13.43	8.20/8.30	11.20/11.10	14.90/15.20	17.00/17.10
	Locked Rotor Current	A	110	82	100	110	140
	Power Input(C/H)	kW	7.27/7.02	4.43/4.25	5.85/5.70	6.95/7.20	8.48/8.15
	Type		Hermetic Scroll Compressor				
Fan	Number		3	1	2	2	2
	Rated Current	A	0.7	1.6	1.6	4.2	4.2
	Power Input	kW	0.06	0.60	0.60	0.80	1.50
Water Pump	Number		1				
	Rated Current	A	1.45	1.45	2.60	2.60	3.70
	Power Input	kW	0.55	0.55	1.10	1.10	1.50
	Discharge Head	m	18.99	16.07	18.05	16.28	26.18
Evaporator	Type		Plate Type Heat Exchanger				
	Water Flow (C/H)	m^3/h	67.94/70.81	80.80/85.10	110.30/116.00	140.80/153.40	157.70/171.40
Protective Device			Overheat Protection, High and Low Pressure Protection				
Lubricant	Type		PVE68	PVE68	PVE68	PVE68	PVE68
	Charge	L	1.57	1.57	1.57	2.66	2.66
Refrigerant	Type		R410A				
	Charge	kg	4.4	3.0+3.0	3.8+3.8	4.8+4.8	5.0+5.0
Unit Dimensions		m m	950*393*1590	1290*500*1900		1990*500*1900	
Rated Water Pressure Drop		kPa	55	63	90	110	155
Water Connection (FPT)		inch	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/2"
Direction of Connection			Right	Back	Back	Back	Back
Operation Weight		kg	202	449	530	540	540
Sound Level - High Speed		dB(A)	58	58	64	69.5	74.5
Sound Level - Low Speed		dB(A)	56	-	-	-	-
EER		W/W	3.16	2.97	2.98	3.19	2.97
IPLV		W/W	3.50	3.28	3.28	3.51	3.28
Efficiency Grade - EER			2	3	3	2	3
Efficiency Grade - IPLV			2	3	3	2	3

Note:
1.Cooling Mode Conditions (Evap. 12℃/7℃ - Air. 35℃).
2.Heating Mode Condition (Evap. 40℃/45℃ - Air. DB/WB 7℃/6℃).
3.The unit is tested under GB18430.1and GB18430.2.
4.Direction of connection for CGAK1205R is Left or Right.

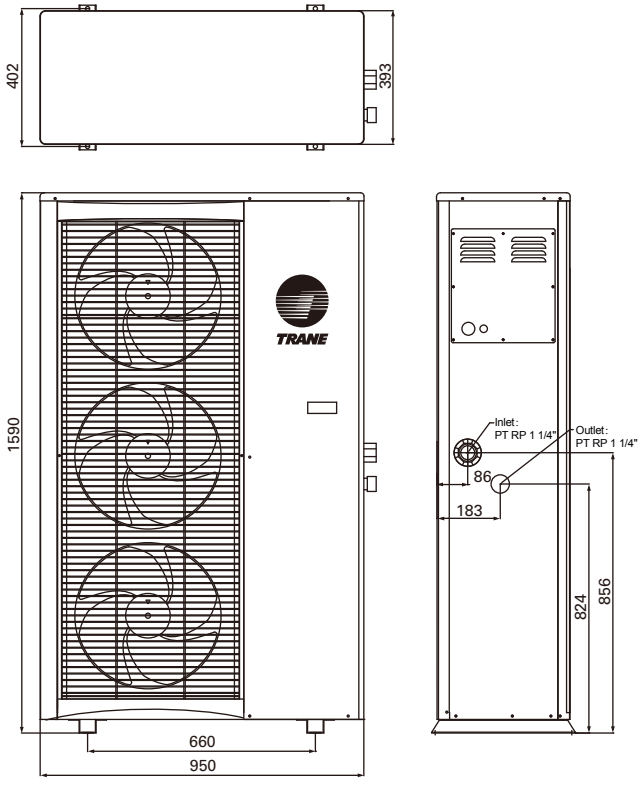
Dimensions

Mini casing

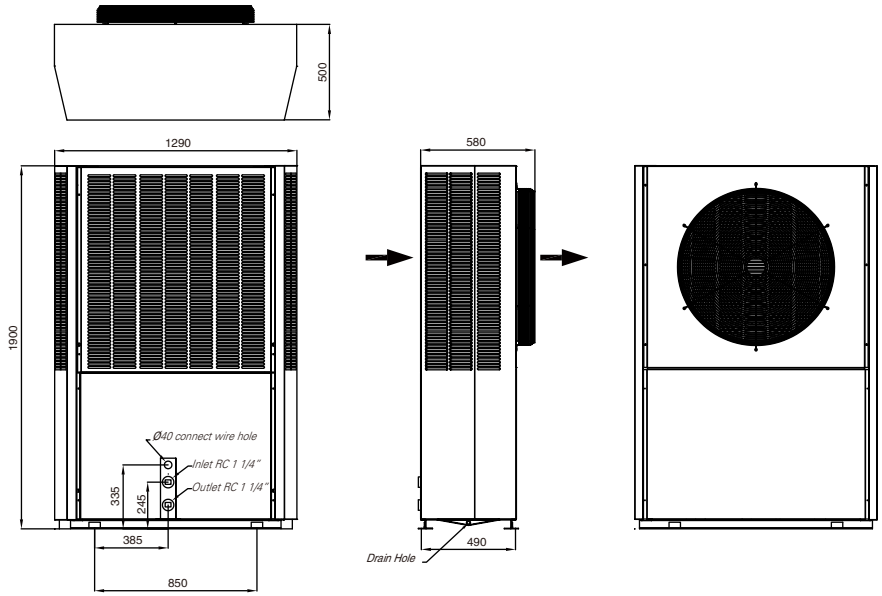
CGAK/R-0305R/0306R/0505R/0605R (Unit: mm)



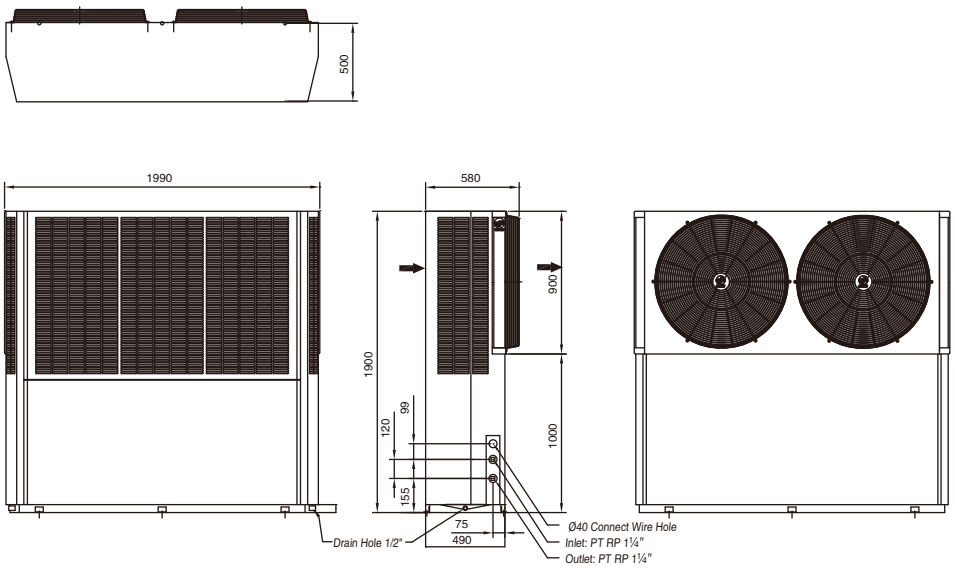
CGAK/R-0755R (Unit: mm)



CGAK/R-0606R/1005R (Unit: mm)

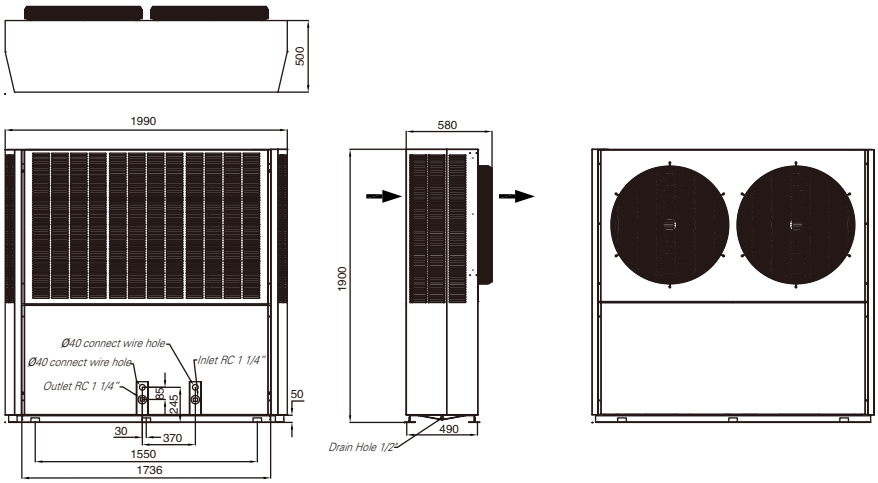


CGAK-1205R (Unit: mm)

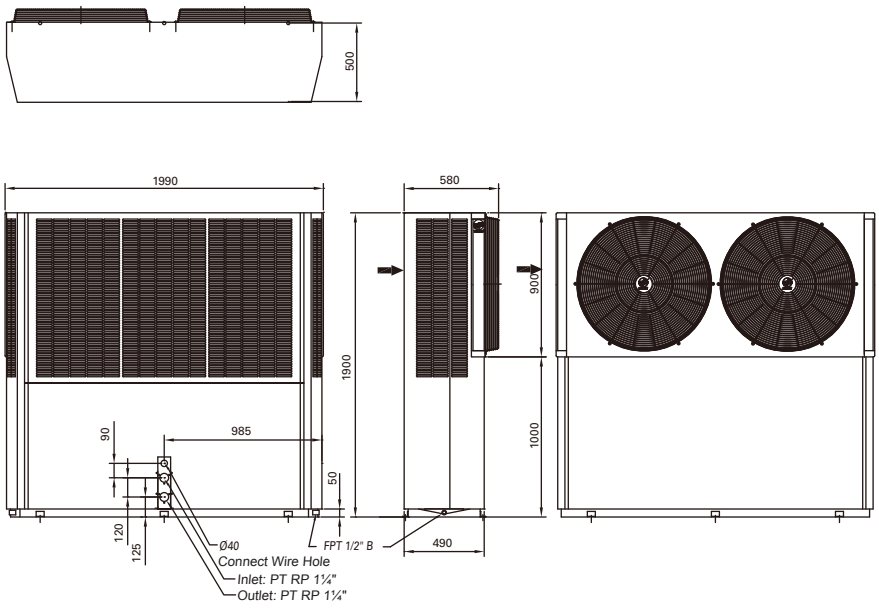


Dimensions

CGAR-1205R (Unit: mm)



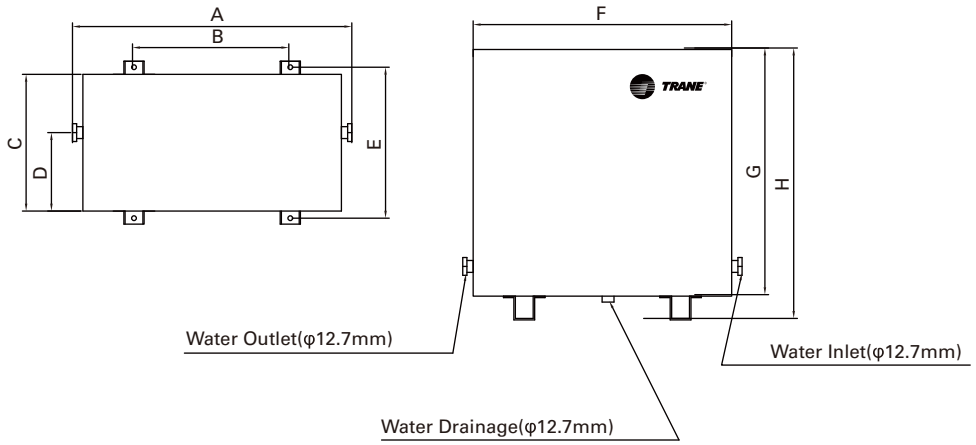
CGAR/K-1505R/2005R (Unit: mm)



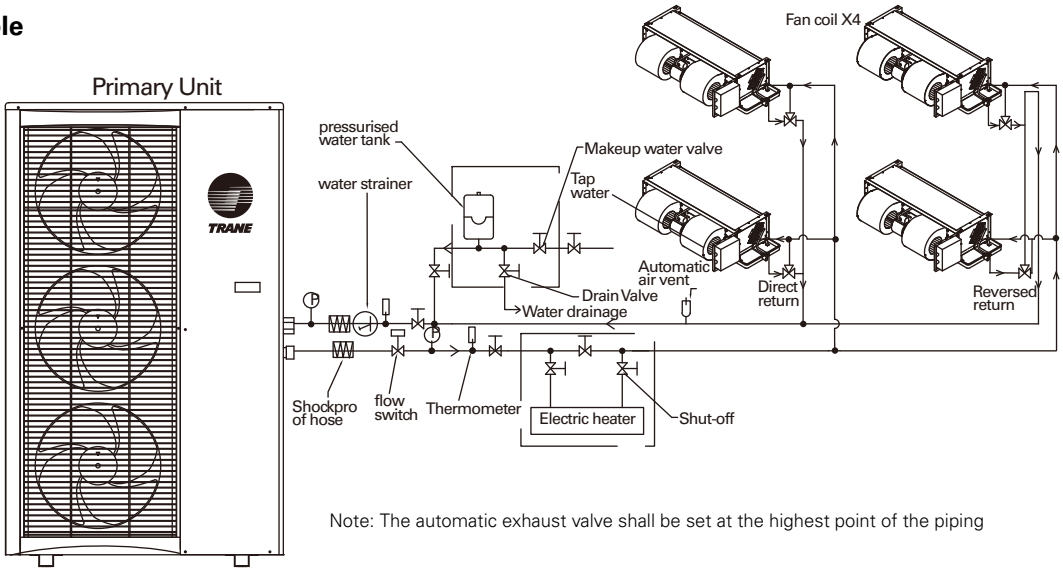
Note:Water Connection (FPT) for CGAR/K2005R is PT RP 1-1/2".

Pressure water tank (Option Unit:mm)

Model \ Size	A	B	C	D	E	F	G	H
WTANK-5	470	263	230	182	254	435	415	455
WTANK-12	620	400	324	162	356	569	440	475



Installation example



Note: The automatic exhaust valve shall be set at the highest point of the piping

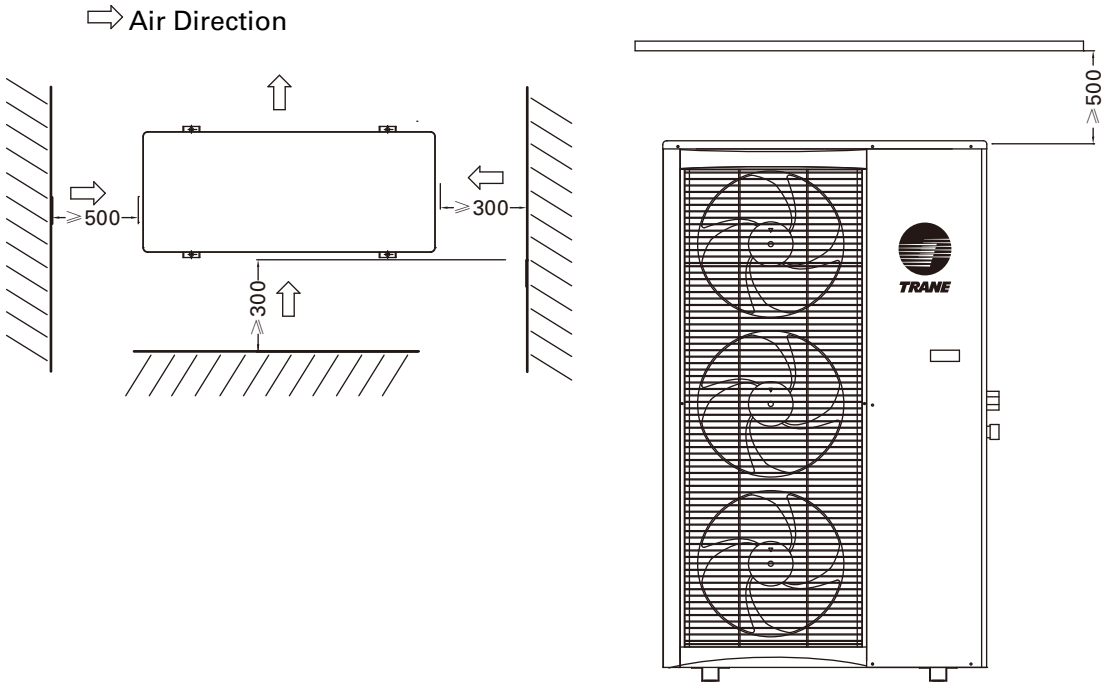
Principle description:

1. A pressure water tank shall be added in the piping system to avoid pipe rupture resulting from overpressure of piping due to ambient temperature fluctuation and to prevent air hammer generated in the pipe.

2. To avoid overpressure or underpressure in the pipe, a makeup water valve and a drainage valve shall be added; when the pressure is lower than 0.6bar, the makeup water valve will open to make up water automatically; and the drainage valve will open to drain water automatically while the pressure is more than 5bar.

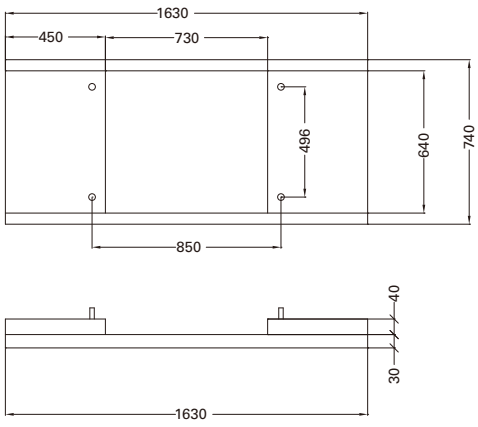
Service and Maintenance Space Requirement

Unit: mm

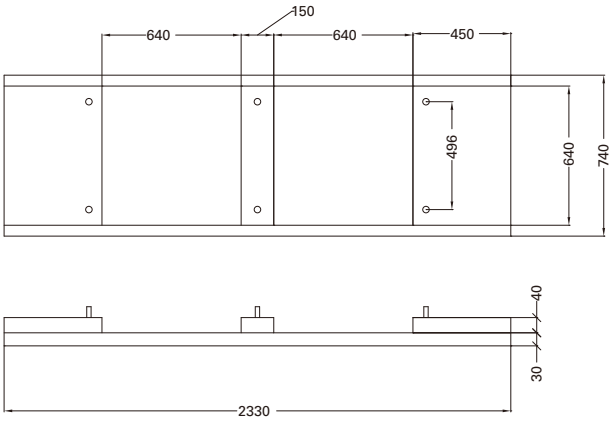


Installation dimensions

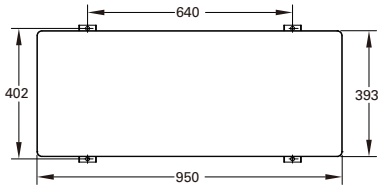
CGAR(K)0606R/1005R



CGAR(K)1205R/1505R/2005R



CGAR(K)0305R/0306R/0505R/0605R/0755R



Electrical Specifications

A:Mini type

MODEL	Power supply (V/Hz/Ph)	Full load current of water pump FLA(A)	Rated current of the compressor RLA(A)	Rated current of the fan RLA(A)	Minimum current of the water unit circuit MCA(A)	Recommended fuse specification REC(A)	Recommended circuit breaker specification (A)	specification of the power supply copper core wire diameter (mm^2)
0305R	380-415/50/3	1.45	6.01	0.4*2	12.85	16	16	2.5
0306R	220/50/1	3.65	18.78	0.4*2	35.40	50	50	6
0505R	380-415/50/3	1.45	7.97	0.7*2	14.10	20	20	2.5
0605R	380-415/50/3	1.45	10.02	0.7*2	18.85	25	25	4
0755R	380-415/50/3	1.45	13.77	0.7*3	20.40	25	25	4

B:Standard type

MODEL	Power supply (V/Hz/Ph)	Full load current of water pump FLA(A)	Rated current of the compressor RLA(A)	Rated current of the fan RLA(A)	Minimum current of the water unit circuit MCA(A)	Recommended fuse specification REC(A)	Recommended circuit breaker specification (A)	Minimum specification of the power supply copper core wire diameter (mm^2)
0606R	220/50/1	3.65	20*2	4.8	60.00	80	80	16
1005R	380-415/50/3	1.45	8.2*2	1.6	23.50	32	32	6
1205R	380-415/50/3	2.6	11.2*2	1.6*2	34.36	50	50	10
1505R	380-415/50/3	2.6	14.9*2	4.2*2	36.60	50	50	10
2005R	380-415/50/3	3.7	17*2	4.2*2	42.10	63	63	16

- The difference between the power voltage and the standard voltage shall not exceed 10 percent of the standard value.
- Rated current(RLA)=the current of the machine under the ARI or UL standard conditions
- Minimum circuit current(MCA)=maximum loadx1.25+sum of the extra load (to decide the diameter of the wire)
- Recommended fuse specification(REC)=maximum loadx1.5+sum of the extra load (to select the fuse closest in specification)

LCD microprocessor-based controller

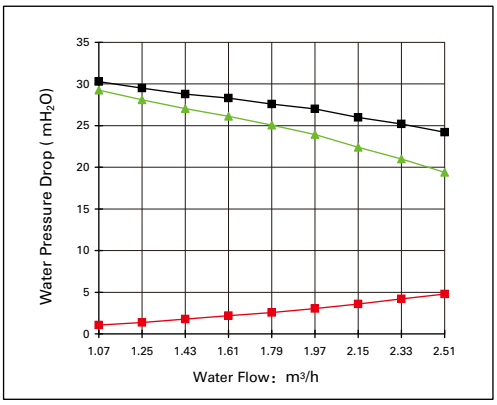
1. System function

- Cooling/heating switch
- Compressor and pump protection
- Two-way valve interlock
- Refrigerant high pressure protection for the plate heat exchanger
- EWT display/setting
- Timing on/off time
- Refrigerant system high/low pressure protection
- Anti-freeze protection of water system and plate heat exchanger in winter
- Malfunction alarm
- System operating statuse
- Defrosting interval/operation time setting

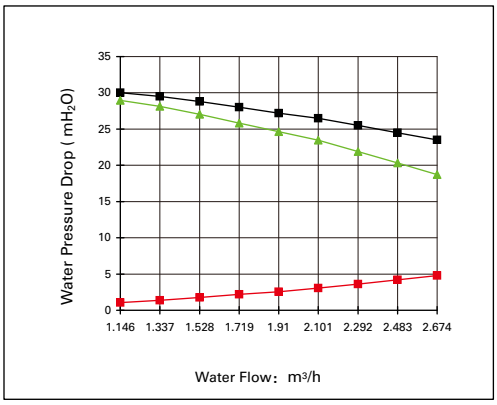
2. The factory provides standard length of 10 meters for the LCD controller.

Water Pressure Drop Curve

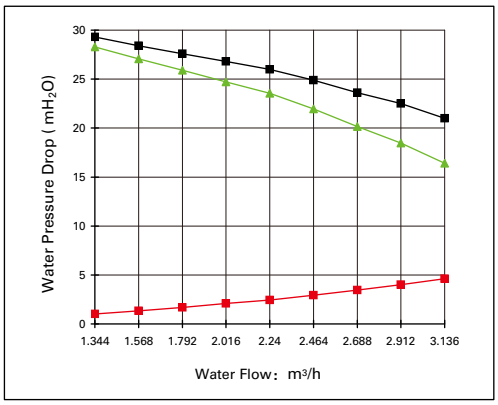
CGAR0305



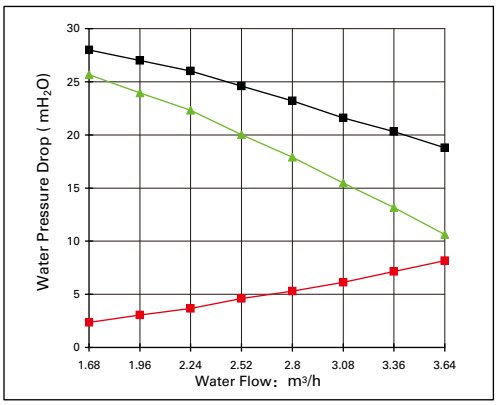
CGAR0306



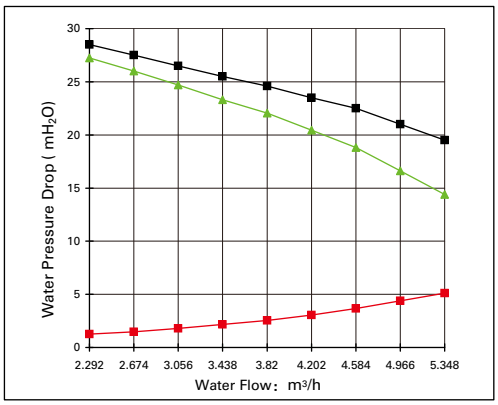
CGAR0505



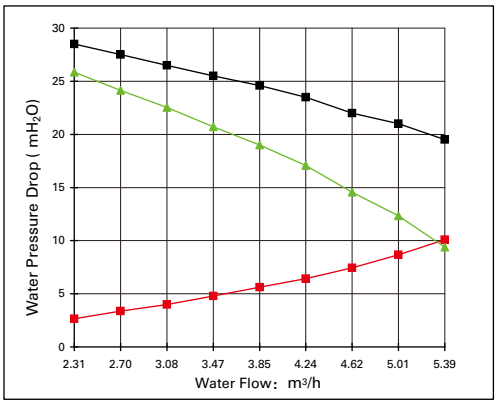
CGAR0605



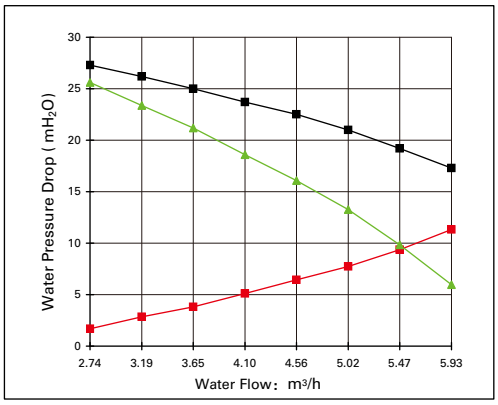
CGAR0606



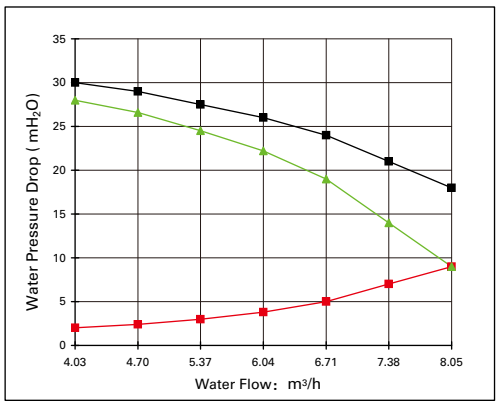
CGAR0755



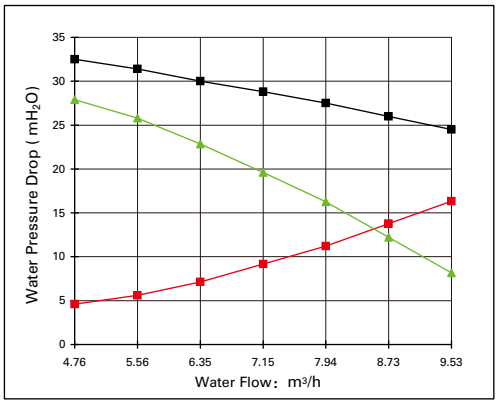
CGAR1005



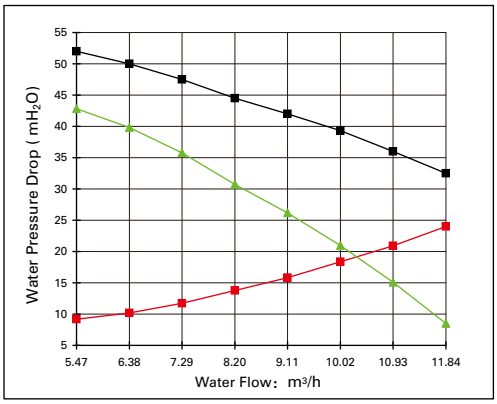
CGAR1205



CGAR1505



CGAR2005



Pump Head　Internal Pressure Drop　Allowable External Pressure Drop

Water flow

The chilled water flow through the unit shall be rated between the upper and lower limit listed in the table. If the chilled water flow is below the lower limit, the discontinuous water flow will reduce the evaporator heat transfer and make the expansion valve out of control or exceptional low-pressure shutdown. Contrarily, the inner parts of the evaporator will be eroded if the water flow is higher than the upper limit.

unit: m^3/h

Type	Lower limit of flow	Rated flow	Upper limit of flow	Connection Dimension
CGAR0305	20.5	31.5	41.0	1"
CGAR0306	22.3	34.3	44.6	1"
CGAR0505	26.0	40.0	52.0	1"
CGAR0605	32.1	49.3	64.1	1"
CGAR0755	44.2	68.0	88.4	1 1/4"
CGAR0606	41.4	63.6	82.7	1 1/4"
CGAR1005	52.5	80.8	105.1	1 1/4"
CGAR1205	71.7	110.3	143.4	1 1/4"
CGAR1505	91.5	140.8	183.1	1 1/4"
CGAR2005	102.5	157.7	205.0	1 1/2"

Note: If the actual water flow rate is less than70%*rated flow, the return water temperature of refrigeration is required being set ≥10℃; or else it is necessary to add anti-freezer into the water system (volume concentration of glycol in the water system has to be ≥15%).

Water pressure drop

To measure the water pressure difference between the water inlet and outlet of the unit (including pump), pump head at a particular water flow rate may be read off from the pump head curve. Refer to curves to design piping system for standard models with pumps.

The inner water pressure drop of the unit without a pump (the pump is installed outside of the unit) should basically follow the graphs shown in the Water pressure drop curve section. Refer to curves to design piping system for models without pumps.

Trane - by Trane Technologies (NYSE: TT), a global climate innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

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