Koolman

Air-Cooled Water Chiller With Heat Pump Option

CGAK/R 030-200

9.8~50 kW

PKGP-PRC006-EN

Contents

Features and Benefits

Introduction

Using the leading high-efficiency hermetic 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.

standard-type

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.

Space Saving

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

Either 220V or 380V is available for the mini-type and either 380V or 415V is available for some models of the standard type. In addition, pressurized water tank and blue fin are available to meet various requirements.

Noise Level

Koolman uses low noise fans and components to achieve its low noise level.

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.

Easy Installation

Each chiller is charged with full factory refrigerant and oil charge further reduces field labor, materials, and installation cost. All units are factory run tested. Only power supply and water piping are required to be connected on the jobsite.

mini-type

Mechanical Specifications

General

Koolman air-cooled liquid chiller is designed to couple with fan coil units and air handling units for residential or small commercial air conditioning application.

Units are composed of scroll compressor(s), plate type evaporator, finned-copper-tube and aluminum condenser, axial fan assembly, expansion valve, four-way reversal valve (heat pump only), indoor cold/ warm control switch, water flow switch, filter dryer, sight-glass, integral water pump, galvanized sheet metal housing with powder paint and factory mounted controls.

Optional fittings include pressurized water tank system, and blue fins.

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 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 centrifugal type 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 Adjustable Water Temperature Control

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 operation.

Model Nomenclature

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

Digit1,2,3	CGA=Air-cooled Water Chiller
Digit 4	K=Cooling Only
	R=Heat Pump
Digit 5,6,7	Model
	030
	050
	060
	075
	100
	120
	150
	175
	200
Digit 8	Power Supply
	5=380V/50Hz/3PH (for 030,050,060,075,100, 120,150,175,200)
	6=220V/50Hz/1PH (for 030 with single compressor and 060 with double compressors)
Digit 9	Manufacturing Code (defaulted by factory)
	B=060 with double compressors
	C=030,050,060,075 mini casing
	D=175 and 200 with double compressors
	F=120 with double compressors
	G=100 and 150 with double compressors
Digit 10	Controller
	B=Microprocessor-based adjustable water temperature controller
Digit 11	Supplement Water and Electric Heater
	N=None
Digit 12	Service Sequence
	A=The first time
	B=The second time (for 0606B model)
Digit 13	Chiller Water Pump
	R=With internal Pump (standard)
	N=Without internal Pump
Digit 14	Applicable Ambient Temperature/Fin Options
	F=Standard ambinent temperature/Al-fin (standard)
	E=Standard ambinent temperature/Blue-fin
Digit 15	Fitting Options
	N=None
	B=5 liters pressurized water tank (WTANK-5)
	C=12 liters pressurized water tank (WTANK-12)
	Note: Digit 15 is indicated as "N" prior to shipment, When the pressurized water tank is required, it shall be packed individually and the model number in the bracket shall be used.
Digit 16	Other option
	A=Standard configeration (except 0505, 1755 and 2005)
	B=1755 and 2005
	V=0505

Performance Data

Heat pump/cooling only(R22)

item \ model			CGAK/R-0306C	CGAK/R-0305C	CGAK/R-0505C	CGAK/R-0605C	CGAK/R-0755C
cooling capacity		kcal/hr	8,428	8,428	11,000	14,450	18,490
		kW	9.8	9.8	12.8	16.8	21.5
heating capacity		kcal/hr	9,976	9,976	12,470	16,170	19,780
		kW	11.6	11.6	14.5	18.8	23.0
voltage			220-240V/50Hz/1 ¢	380-415V/50Hz/3 ¢			
compressor	type		high-efficiency hermetic scroll				
	number		1	1	1	1	1
	power input (Cooling/Heating)	kW	3.08/3.2	3.08/3.2	4.1/4.0	5.42/5.4	6.9/6.5
	running current (Cooling/Heating)	A	15.2/16.0	5.6/6.2	8.1/8.0	11.9/11.8	14/13
fan (axile flow type)	diameter	mm	420				
	number		2	2	2	2	3
	power input	kW	0.2	0.2	0.2	0.2	0.3
	speed	RPM	850	850	850	850	950
	air flow	CMH	4,600	4,600	4,600	4,600	7,000
chilled water pump	type		multi-stage close couple centrifugal				
	power input	kW	0.49	0.46	0.46	0.46	0.72
	discharge head	mH_2O	21	21	19	16	20
evaporator	type		Stainless steel plate				
	water flow (Cooling/Heating)	L/min	28/33.2	28/33.2	36.7/41.6	48.16/53.89	61.6/65.9
protective device			overheat protection, high and low pressure protection				
lubricant	type		SONTEX 200LT				
	charge	L	1.242	1.36	1.952	1.774	3.25
refrigerant	type		R22				
	charge	kg	2.75	2.75	3.55	4.8	4.65
dimensions	height	mm	1285				1590
	width	mm	950				
	depth	mm	393				
water connection ¢		PT	1"				1-1/4"
direction of connection			right				
operation weight		kg	131	130	141	149	202

Note:
1. Cooling capacity is based on 35℃ ambient temperature, 7℃ outlet water temperature and 12℃ inlet water temperature.
   Heating capacity is based on 7℃ ambient temperature, 45℃ outlet water temperature and 40℃ inlet water temperature.

Performance Data

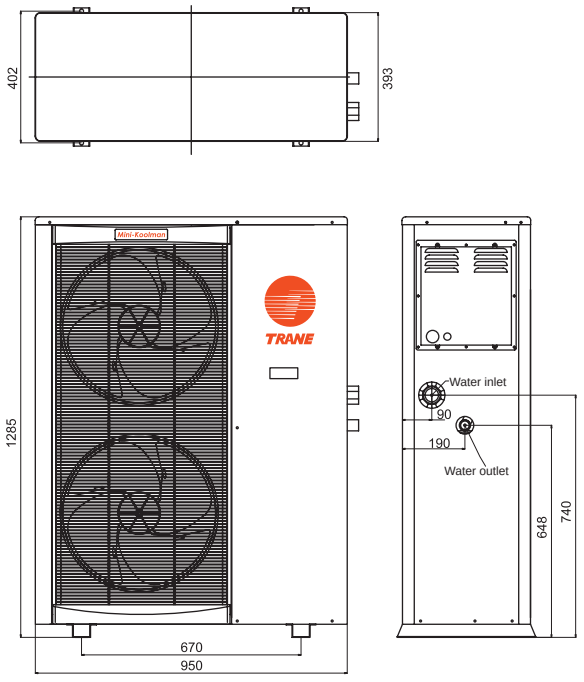
Heat pump/cooling only(R22)

item \ model			CGAK/ R-0606B	CGAK/ R-1005G	CGAK/ R-1205F	CGAK/ R-1505G	CGAK/ R-1755D	CGAK/ R-2005D
cooling capacity		kcal/hr	15,310	22,532	27,176	34,916	37,410	43,000
		kW	17.8	26.2	31.6	40.6	43.5	50
heating capacity		kcal/hr	15,996	27,090	31,390	36,636	44,720	51,600
		kW	18.6	31.5	36.5	42.6	52	60
voltage			220/50Hz/1 ¢	380/50Hz/3 ¢ or 415V/50Hz/3 ¢				
compressor	type		high-efficiency hermetic scroll					
	number		2	2	2	2	2	2
	power input (Cooling/Heating)	kW	5.8/5.3	8.8/8.5	10.8/10	13.4/12	14/12.9	15/15
	running current (Cooling/Heating)	A	27.2/25.2	19.4/18.41	21.4/21.2	25.1/24.4	26/25	26.6/26.6
fan (axile flow type)	diameter	mm	762					
	number		1	1	1	2	2	2
	power input	kW	0.6	0.6	0.6	1.2	1.6	3
	speed	RPM	550	550	550	550	550	720
	air flow	CMH	7,000	7,000	7,000	14,500	18,000	22,000
chilled water pump	type		multi-stage close couple centrifugal					
	power input	kW	0.49	0.72	0.72	1.16	1.29	1.55
	discharge head	mH_2O	13	16	15	18	22	25
evaporator	type		Stainless steel plate					
	water flow (Cooling/Heating)	L/min	53.3/53.3	75.1/90.3	90.6/104.6	116.4/122.1	124.7/149.1	143.3/172
protective device			overheat protection, high and low pressure protection					
lubricant	type		SONTEX 200LT					
	charge	L	1.242+1.242	1.36+1.242	1.774+1.774	2.514+3.25	3.25+3.25	3.25+3.25
refrigerant	type		R22					
	charge	kg	2.2+2.4	3.1+3.3	3.8+3.8	4.5+4.5	5.7+5.7	5.7+5.7
dimensions	height	mm	1900					
	width	mm	1290			1990		
	depth	mm	500					
water connection ¢		PT	1-1/4"					1-1/2"
direction of connection			left or right				rear	
operation weight		kg	295	404	413	490	505	515

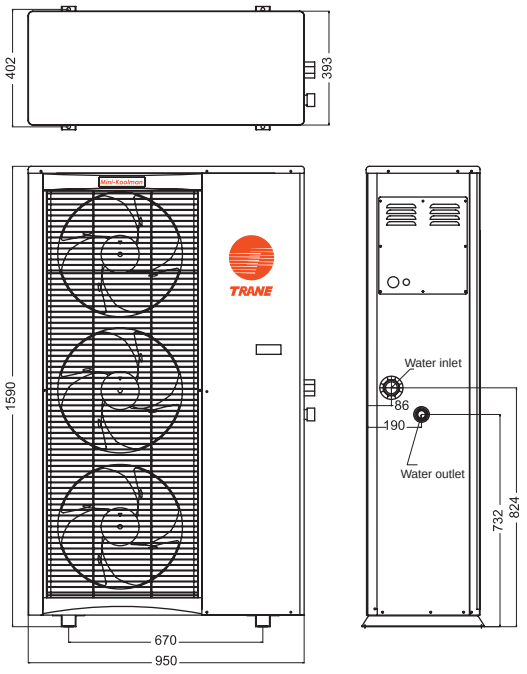
Note:
1. Cooling capacity is based on 35℃ ambient temperature, 7℃ outlet water temperature and 12℃ inlet water temperature.
   Heating capacity is based on 7℃ ambient temperature, 45℃ outlet water temperature and 40℃ inlet water temperature.

Dimensions

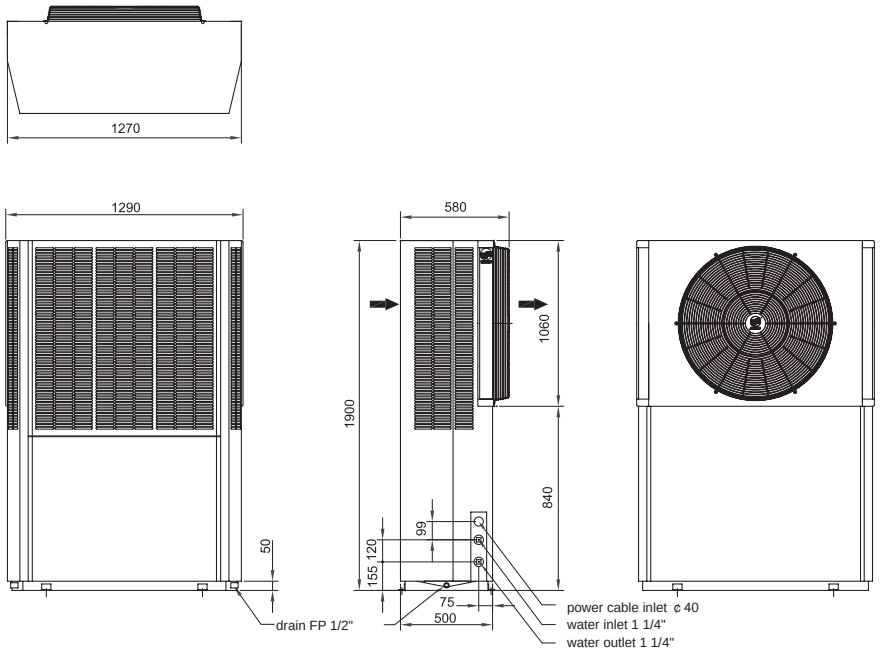
Mini-type
CGAK/R-0305C/0306C/0505C/0605C (unit: mm)



CGAK/R-0755C (unit: mm)

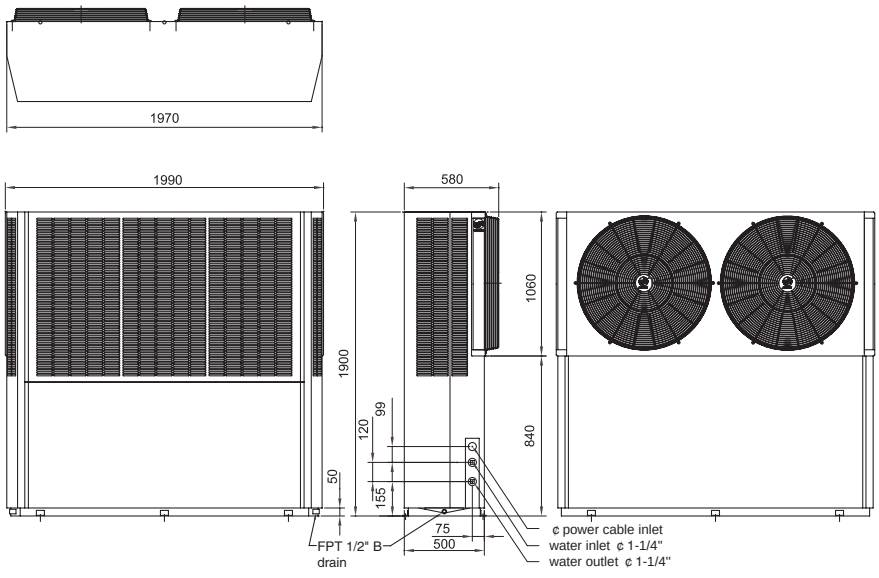


Standard-type
CGAK/R-0606B/1005G/1205F (unit: mm)

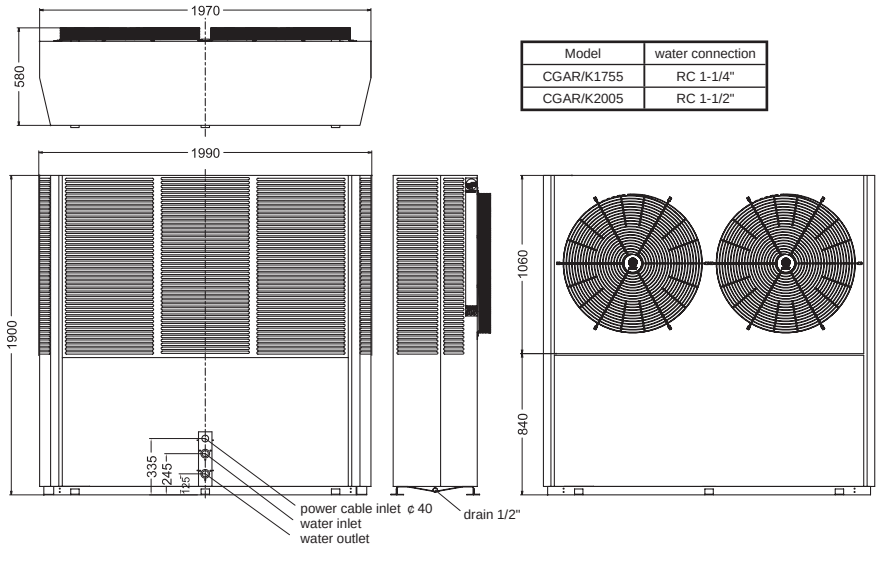


Dimensions

Standard-type
CGAK/R-1505G (unit: mm)

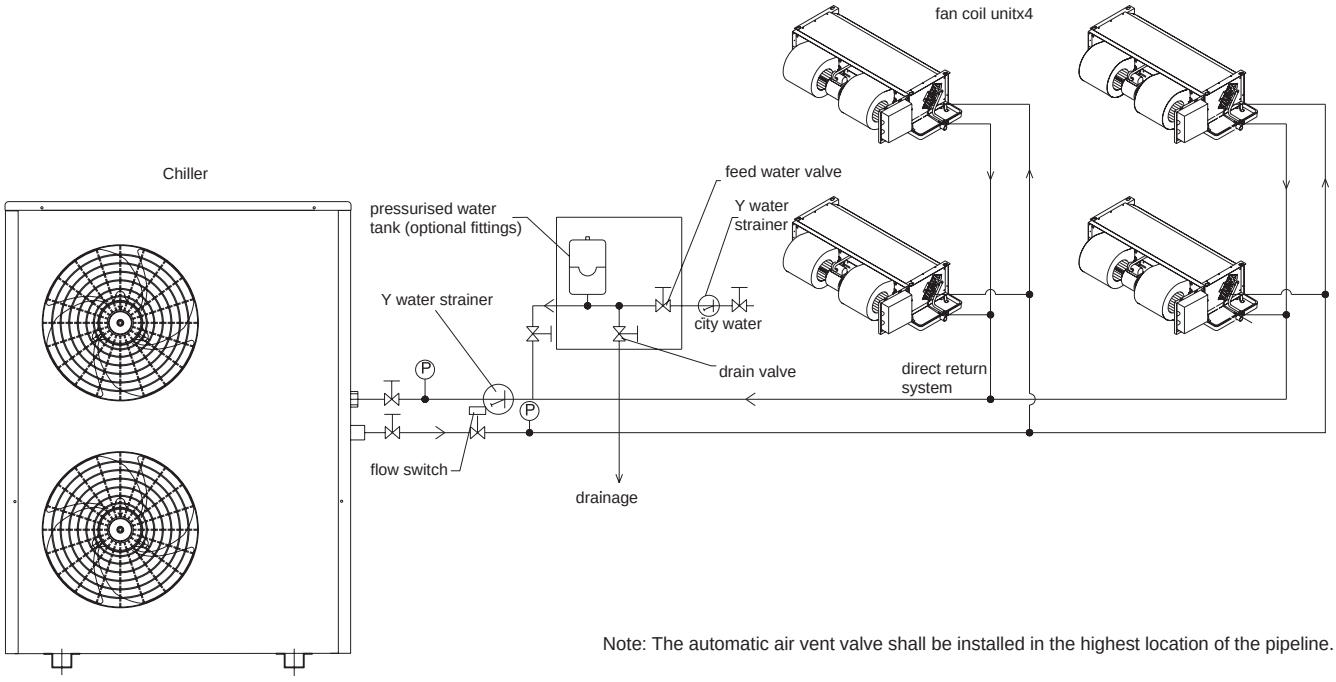


Standard-type
CGAK/R-1755D/2005D



Model	water connection
CGAR/K1755	RC 1-1/4"
CGAR/K2005	RC 1-1/2"

Typical System Pipeline Installation Diagram

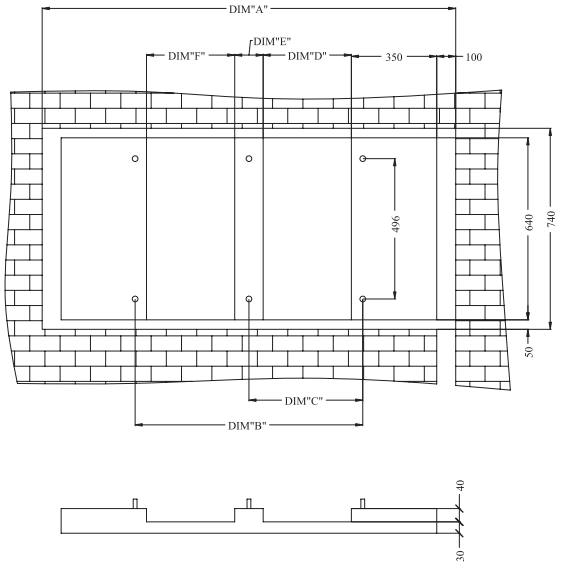


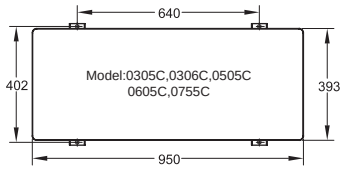
Note: The automatic air vent valve shall be installed in the highest location of the pipeline.

Description of the principle of the pressurized water tank:

1. In order to avoid the pipe cracking due to the system overpressure resulting from the change of ambient temperature and also to avoid the water hammer in the pipes, a pressurized water tank shall be added in the pipeline system.
2. In order to avoid the excessively high or low pressure in the pipe, an automatic feed water valve and an automatic drain valve are included in the pressurized water tank. The feed water pressure can be adjusted based on the field situation.
3. An open expansion tank can be installed in the highest location of the pipeline system based on the field situation.

Installation dimensions



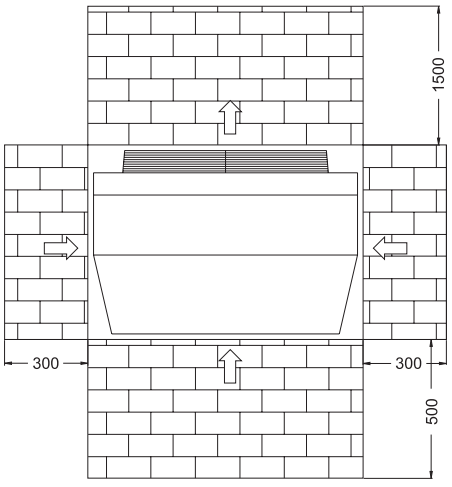


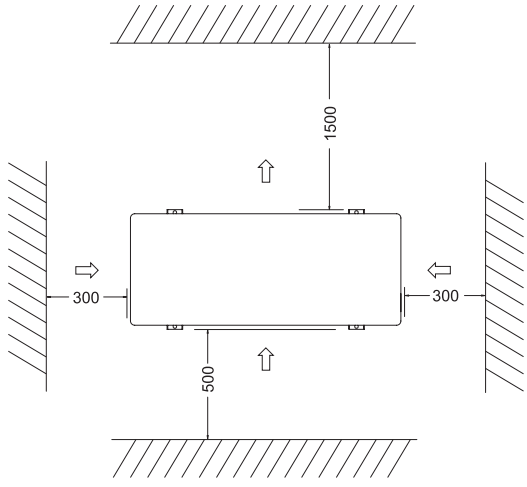
Model	A	B	C	D	E	F
0606B	1630	850	0	365	0	365
1005G	1630	850	0	365	0	365
1205F	1630	850	0	365	0	365
1505G	2330	1550	775	640	150	640
1755D	2330	1550	775	640	150	640
2005D	2330	1550	775	640	150	640

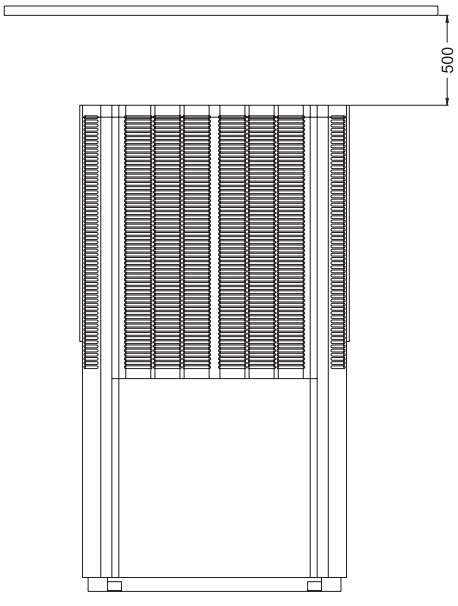
Maintenance Space Diagram

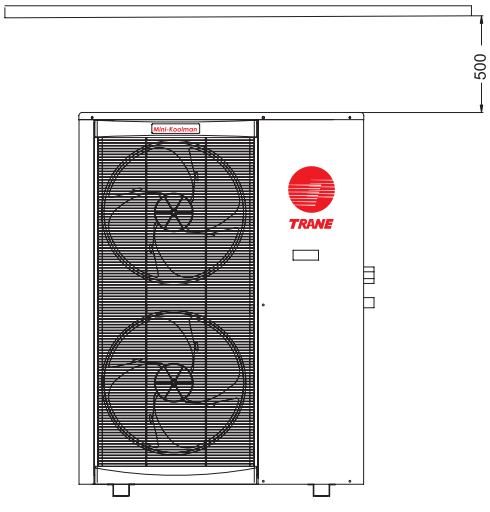
Unit: mm

represent the flow direction









Electrical Specifications

MODEL	Voltage (V/Hz/PH)	Full-load current of the pump FLA	Rated current of No.1 compressor RLA	Rated current of No.2 compressor RLA	Rated current of No.1 fan FLA	Rated current of No.2 fan FLA	Rated current of No.3 fan FLA	Minimum circuit current of the unit MCA	Recommend fuse specification REC	Maximum fuse specification MFS	Minimum diameter of the copper core of the power wire mm^2
0305C	380-415/50/3	1.1	5.6	-	0.5	0.5	-	9.1	10.5	14.7	2.5
0306C	220/50/1	2.4	15.2	-	0.5	0.5	-	22.4	26.2	37.6	6
0505C	380-415/50/3	1.1	8.1	-	0.5	0.5	-	12.2	14.3	20.3	4
0605C	380-415/50/3	1.1	11.9	-	0.5	0.5	-	15.3	20	28.9	4
0755C	380-415/50/3	1.4	14	-	0.5	0.5	0.5	20.4	23.9	34.4	6
0606B	220/50/1	2.4	11.92	15.28	4.8	-	-	41.2	48	68.4	16
1005G	380-415/50/3	1.4	9.82	9.54	1.6	-	-	27.2	32	46.6	10
1205F	380-415/50/3	1.4	10.7	10.7	1.6	-	-	29.8	35.1	51.2	10
1505G	380-415/50/3	2.6	11.98	13.12	1.6	1.6	-	37.2	43.4	62.3	10
1755D	380-415/50/3	2.6	13	13	2	2	-	39.1	45.6	65.1	10
2005D	380-415/50/3	3.2	13.3	13.3	2.8	2.8	-	42.1	48.7	68.7	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)
· Maximum fuse specification(MFS)=maximum loadx2.25+sum of the extra load (to select the fuse same or smaller in specification)

LCD microprocessor-based adjustable water temperature 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

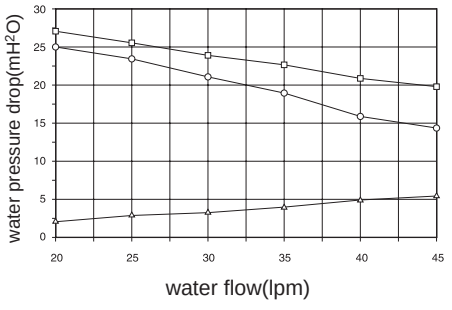
· Refrigerant system high/low pressure protection
· Anti-freeze protection of water system and plate heat exchanger in winter
· Malfunction alarm
· System operating statuse
· Defrosting interval/operation time setting

2. The factory provides standard 10 meters controller cable.

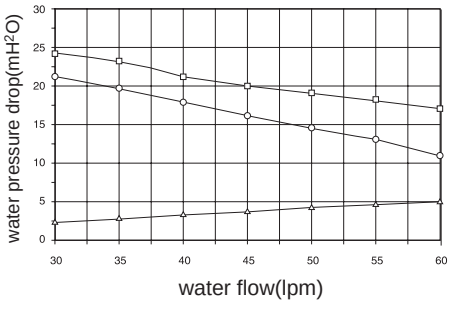
Water Pressure Drop Curve

Water pressure drop curve-50Hz

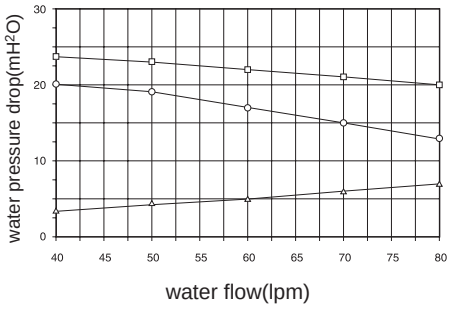
CGAK/R030



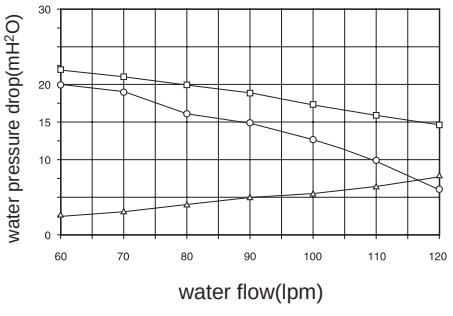
CGAK/R050,060



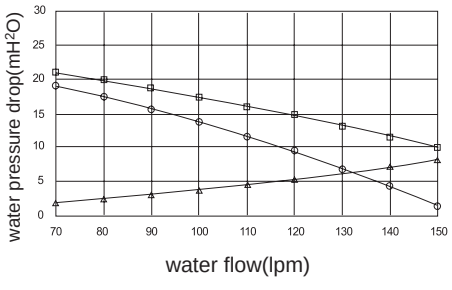
CGAK/R075



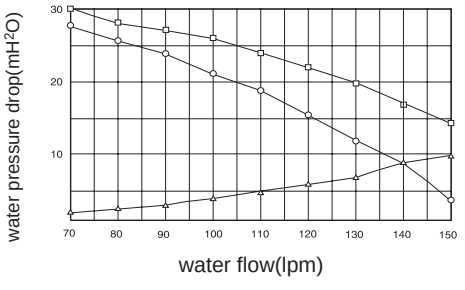
CGAK/R100



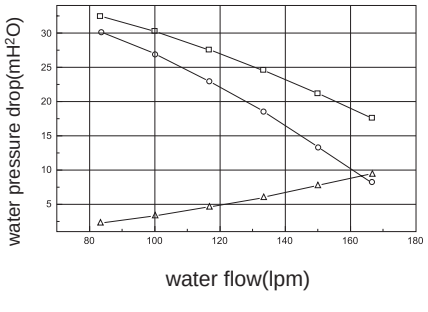
CGAK/R120



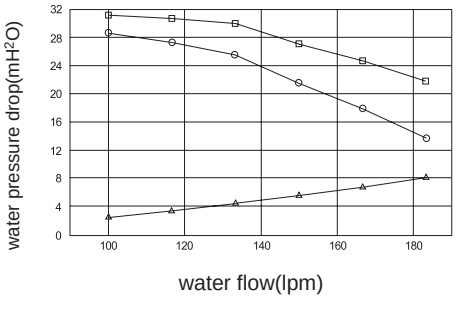
CGAK/R150



CGAK/R175



CGAK/R200



note: −□− pump head, −○− allowable external pressure loss, −△− internal pressure loss

Water Pressure Drop Curve

water flow rate unit: liter/min (LPM)

model	Lower limit of water flow	Rated water flow	Upper limit of water flow
0305,0306	18.8	28	42.4
0505	24.4	36.7	54.9
0605	31	48.16	69.9
0606	35.5	53.3	79
0755	37.8	61.6	85.2
1005	50	75.1	112.6
1205	60.9	90.6	135.9
1505	76.3	116.4	154
1755	78.6	124.7	158.4
2005	87.6	143.3	176.4

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.

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.

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Supersedes February 2008

www.trane.com

For more information, contact your local Trane office or e-mail us at comfort@trane.com