

LG Electronics Inc.

SPECIFICATION SHEET for REFERENCE  
(Preliminary)

MODEL : AR055VAA

CUSTOMER : EMBRITAL

Purchasing Manager : \_\_\_\_\_

Engineering Manager : \_\_\_\_\_

LG Electronics Inc.

Sales Manager : \_\_\_\_\_

Engineering Manager : \_\_\_\_\_

Air Conditioning Compressor Divisions , LG Electronics Inc.

Tel : (55) 269 - 3868

Fax : (55) 268 - 4897

Ref. No.	-
Date	May.23.2005
Rev. No.	REV. 0
Rev. Date	-

# 1.Specification

## 1.1 Compressor

1	Compressor Model Name	AR055VAA
2	Compressor Type	Hermetic Motor Compressor
3	Compression Type	Scroll Type
4	Displacement	55.42 cm <sup>3</sup> / rev
5	Refrigerant	R410A
6	Oil / Oil Charging Amount	FVC68D(PVE) 2,325 ± 10 cc
7	Nitrogen Gas Holding Pressure	0.8 ± 0.2 kg/cm <sup>2</sup> G
8	Painting	Black Color Paint
9	Net Weight ( Including Oil )	39.80±1 kg ( 87.74 ±2.2 lb )
10	Suction Tube I.D	∅ 22.4 ± 0.1 mm
11	Discharge Tube I.D	∅ 12.9 ± 0.1 mm

## 1.2 Motor

Motor Type	Inverter 3-PH induction motor		
Pole / Rated Output	2 Pole / 4,285 watts		
Power Source	Refer to VF Pattern( attachment A-2)		
Rated Revolution	3,477 rpm (at 60Hz)		
Insulation Class	E		
Winding Resistance ( at 75 °C )	U-V	1.29	± 7% ohm
	V-W	1.31	± 7% ohm
	W-U	1.33	± 7% ohm

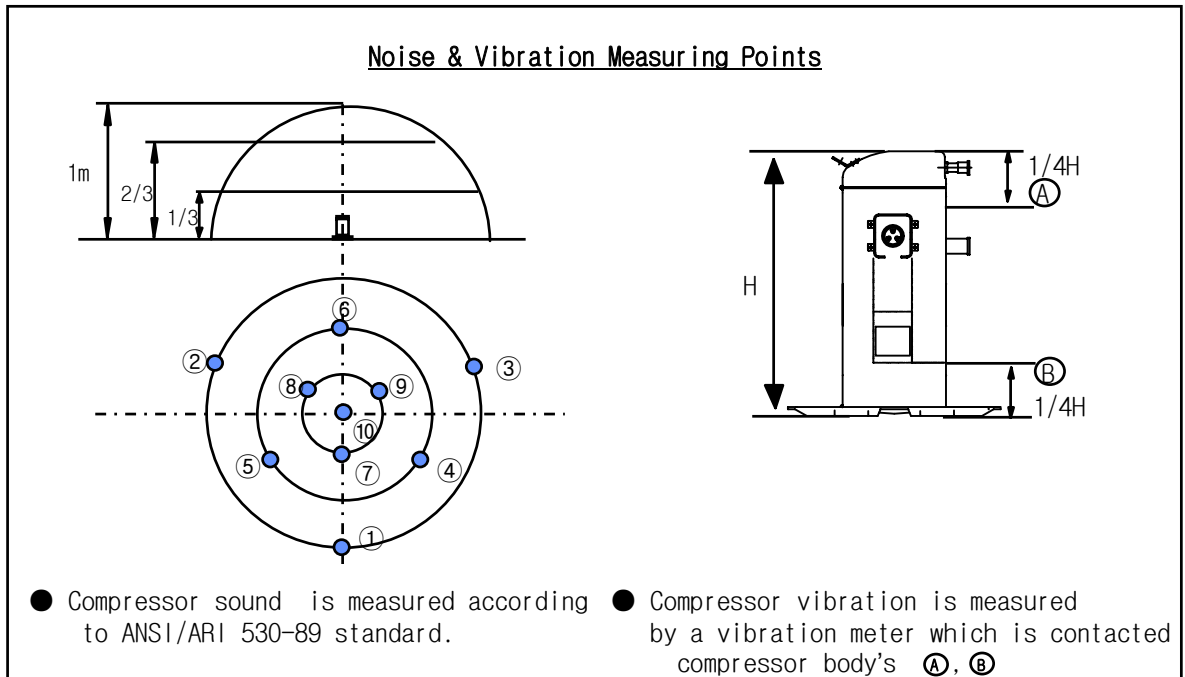
Ref. No.	-
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### 1.3 Performance(※)

Frequency[Hz] / Voltage [V]	60 / 274	90 / 364
Cooling Capacity (±5%) [BTU/h] [kcal/h]	55,500	82,000
	13,986	20,664
Power Input (±5%) [watts]	5,780	9,010
EER (±5%) [Btu/wh]	9.6	9.1
Running Current [A]	13.5	15.5
Sound Level [dB(A)]	75±2	82±2
Vibration [ $\mu\text{m}$ ]	50	

#### (※) Rating Conditions

Cond. Temp.: 54.4 °C (130 °F)    Return Gas Temp. : 18.3 °C ( 65 °F )  
 Evap. Temp.: 7.2 °C ( 45 °F)    Liquid Temp. : 46.1 °C (115 °F )  
 Ambient Temp. : 35.0 °C ( 95 °F )



Ref. No.	-
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## 1.4 Others

Leak Tight Pressure	Air Pressure	40 kg/cm <sup>2</sup> G
Hydrostatic Strength Pressure	High Pressure Side	170 kg/cm <sup>2</sup> G
	Lower Pressure Side	80 kg/cm <sup>2</sup> G
Insulation Resistance with 500V D.C Mega Tester (Nitrogen Gas is filled in Compressor)		50 MΩ Min.
Withstand Voltage (Nitrogen Gas is filled in Compressor)		2,200 V- 1 sec. Leakage Current is less than 5mA. Capacitance is less than 6.1nF
Residual Moisture / Residual Impurities		200 mg Max. / 80 mg Max.

## 1.5 Electrical Component

Part Name		Specification
Running Capacitor		-
Overload Protector		Not OLP (Follow A-8)
RUN	Open.Temp.	-
	Close Temp.	-
	Amps/Time To Trip(at 25°C)	-
U/T	Amps/Time To Trip(at 70°C)	-

## 2.Delivered Parts List

Parts Name	Type ( Model )	EA	Parts' Dwg. NO.		Supply	
			LG		YES	NO
Compressor	AR055VAA	1	2520UBCV1BA		YES	NO
O.L.P	-		-		YES	NO
Cover, Terminal	-	1	3550U - E002A		YES	NO
Gasket	-	1	4986U - L003A		YES	NO
Grommet	-	4	4022U - L004A		YES	NO
Grommet,Sleeve		4	4816U - L001B		YES	NO

※ ) Refer to Attachments ( Accessory Parts Drawings. )

Ref. No.	-
Date	May.23.2005
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Rev. Date	-

### 3.Operating Limit

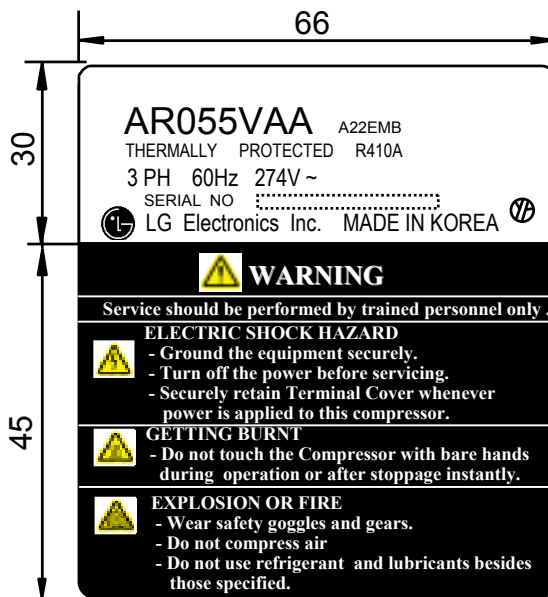
Discharge Pressure [ kg / cm <sup>2</sup> G ]	※ refer to A9
Suction Pressure [ kg / cm <sup>2</sup> G ]	
Motor Coil Temp. [ °C ]	120 Max.
Discharge Temp. [ °C ]	135 Max.
Running Current [ A ]	27 Max.

Refrigerant Charge Limit	5,400g Max.
Continuous Flood Back	Continuous Flood Back before the compressor should not be more than 10% of the total circulation quantity of refrigerant.
On/Off Interval	On / Off =3 Minutes / 3 Minutes
Voltage Range	Rated Voltage ± 10 % (refer to A-2)
VariableFrequency Range	30 Hz~120 Hz
Compression Ratio in Operating	The Compression ratio in operating shall be 6.7 or less except 3 minutes starting period.
Pressure Difference at Starting	When starting,discharge pressure is balanced with suction pressure.
Tilt in Operation	The allowable tilt of the compressor in operation shall be 3 ° or less

#### \* Effective Period of This Document \*

This document will be effective after LG's receipt with your authorized signature.  
When design modification is approved by the customer,  
the current document is unavailable.

#### \* LABEL \*

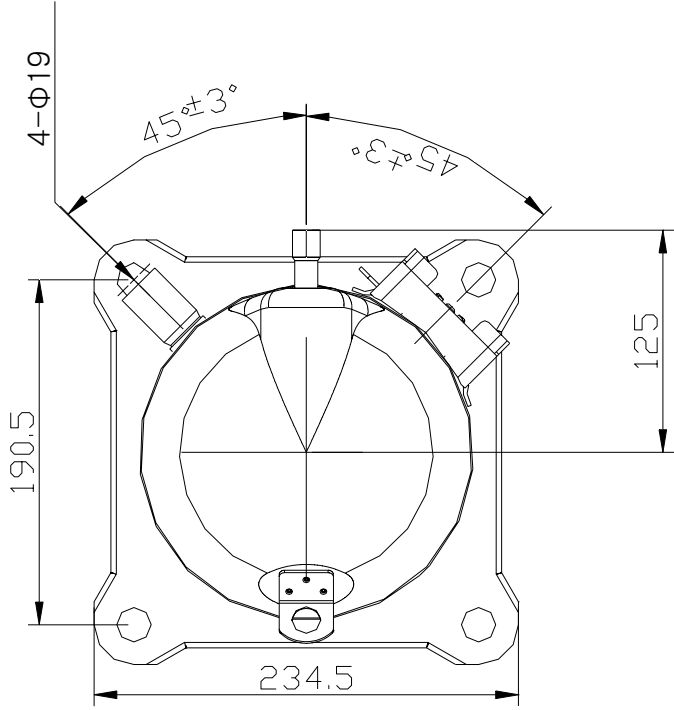
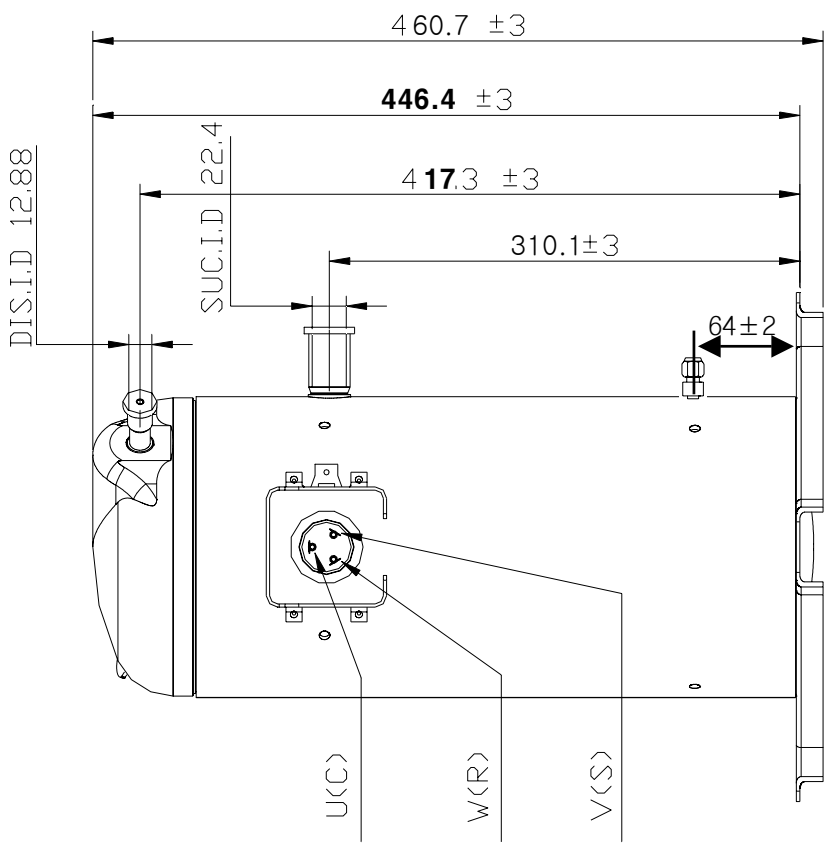


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# Attachment

	PAGE
1. Compressor Drawing	: A-1
2. Standard V/F Characteristic	: A-2
3. Accessory Fitting	: A-3
4. Part Drawings	: A-4 ~ A-7
5. Application Considerations	: A-8 ~ A-9
6. Performance curve,data	: A-10~A-16

Ref. No.	-
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Rev. Date	-



- NOTES
1. PAINTING : BLACK PAINT ( ELECTRO DEPOSITION )
  2. OIL : FVC68D(PVE) OR EQUIVALENT 2,325 cc CHARGED
  3. NITROGEN CHARGED AFTER DEHYDRATION

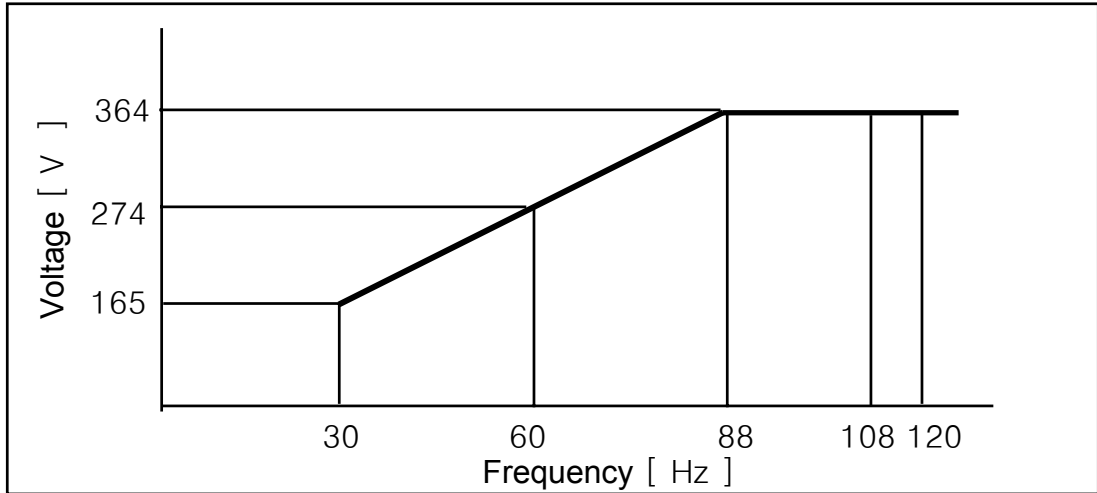
UNIT	mm	SCALE	N / S
DES. ENGR.	K.N.UM	CHF. ENGR.	W.H. JEONG
May. 23. 2005		May. 23. 2005	
LG Electronics Inc.	ACC. Divisions	CUSTOMER	Embrital

COMP. OUT LINE

AR055VAA

# Standard V/F Characteristic

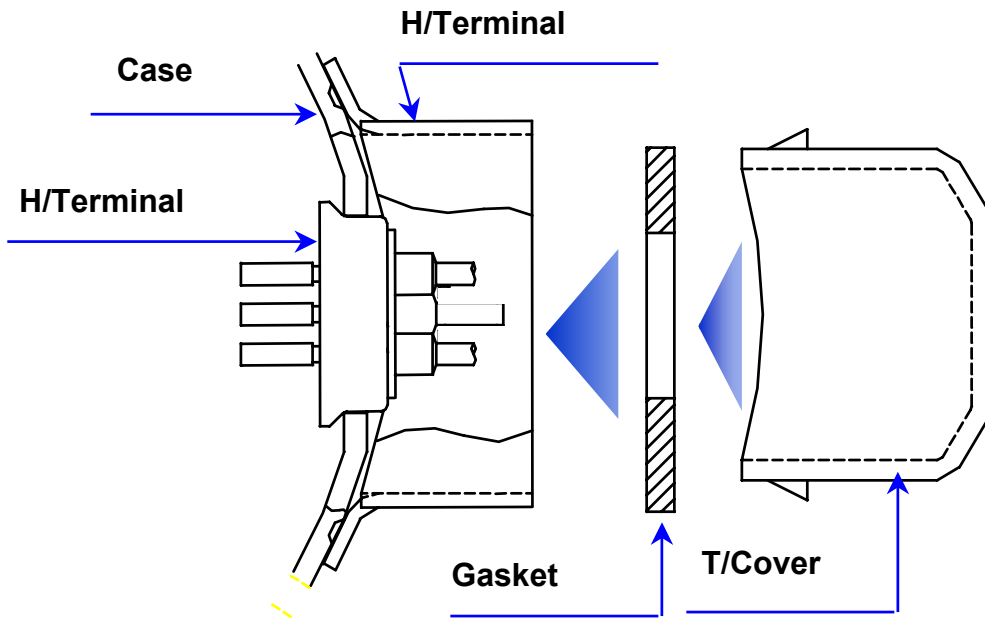
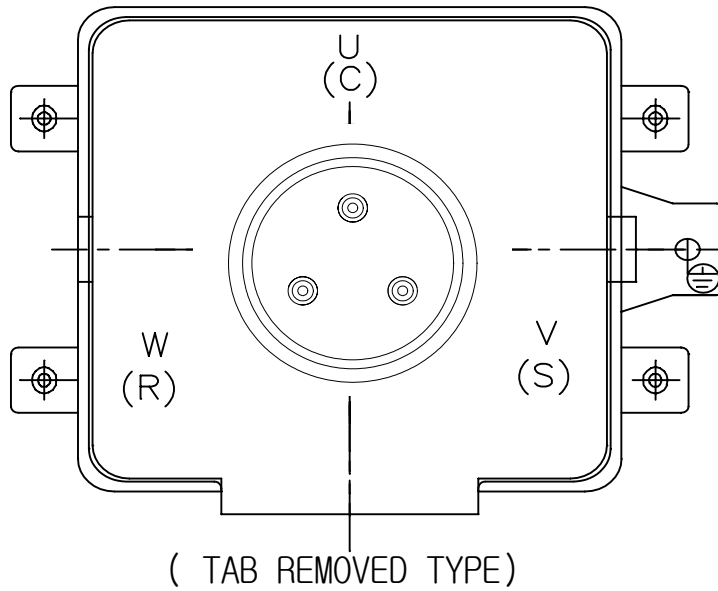
$$V = 3.63 \cdot \text{Hz} + 56.0$$



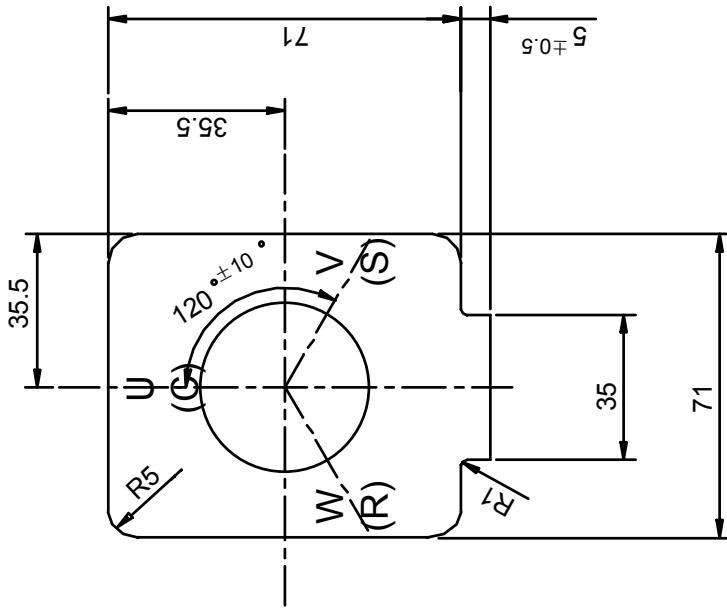
Starting Frequency	5 Hz (Min.)
Accelerating Level	0~ 30Hz : 6 Hz / Sec (Min.) 30~120Hz : 2 Hz/ Sec (Min.)
Running Current	27 A(Max.)
Starting Control	Compressor should be operated at 45~75Hz for one minute before it reach to the target frequency.
Defrost Control	Compressor should be run over 45Hz during defrost cycle operation
ON/OFF Cycle	Compressor should not be started for 3 minutes after compressor stop or airconditioner plug in.
Compressor Heater	Be equipped with heater in the lower case [ Min.capacity : 68W ]



# Accessory Fitting

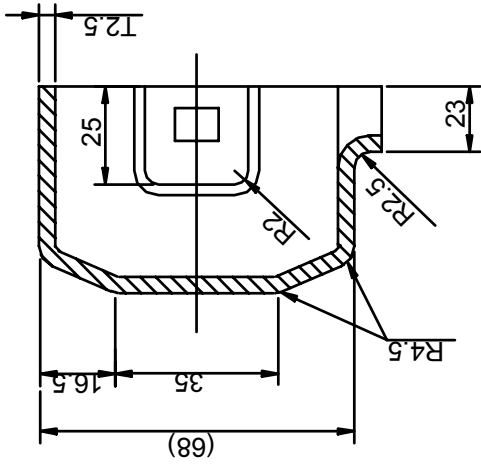
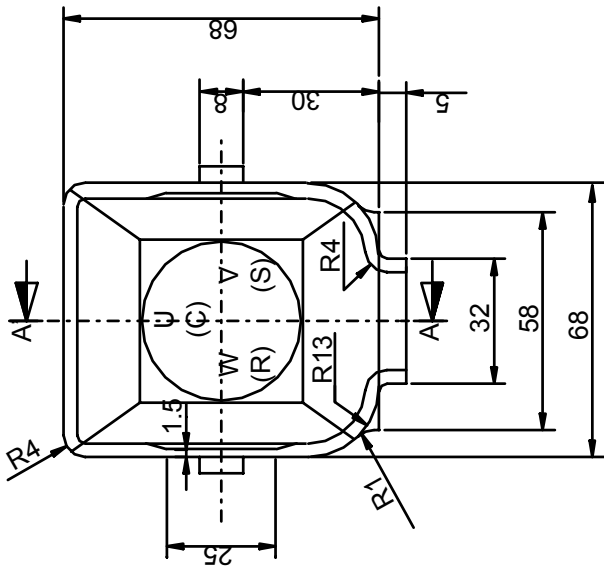


U,V,W Mark Embossed on Cover Terminal

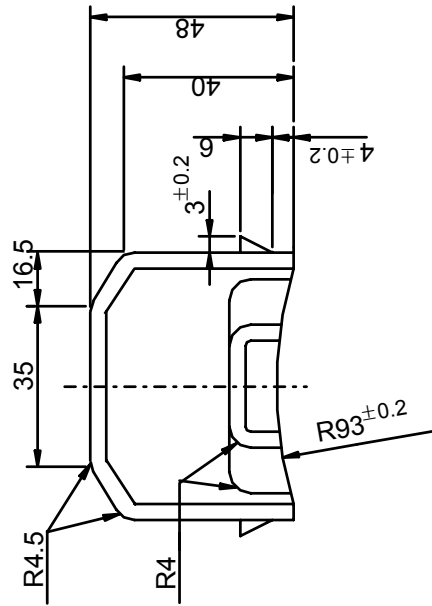


- \* MATERIAL : EPDM SPONGE
- \* COLOR : BLACK
- \* LIMITED TEMPERATURE FOR COMMON USE : 135 °C

UNIT	mm	SCALE	N / S	GASKET	
DES. ENGR.		CHF. ENGR.			
March. 04. 2005 K.N.UJ		March. 04. 2005 W.H. JEONG			
LG Electronics Inc. A/C COMP. DIVISION		CUSTOMER Embrital		4986U-L003A	

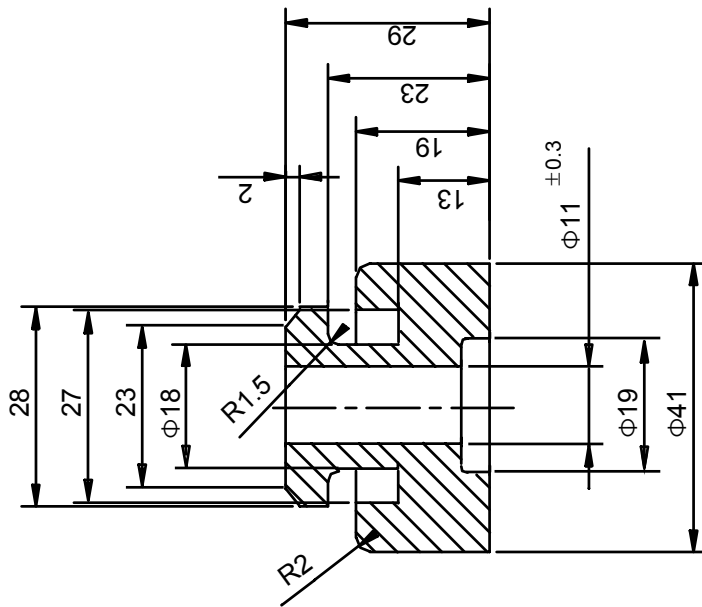
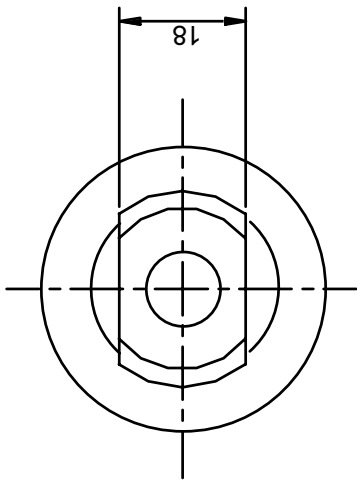


SECTION A-A'



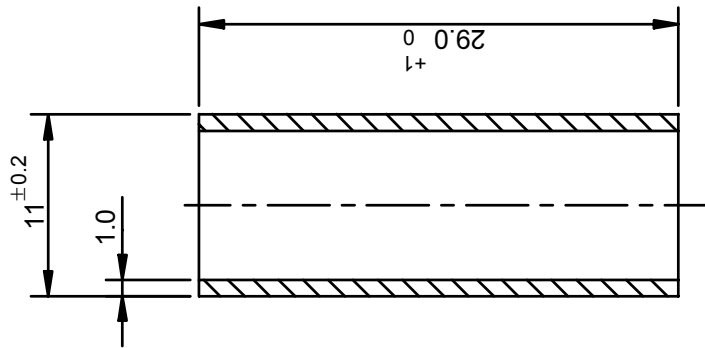
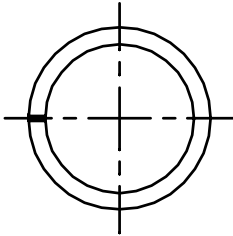
\* MATERIAL : LUCKY LUMAX 5106F1  
 \* COLOR : BLACK

<b>COVER, TERMINAL</b>			UNIT	mm	SCALE	N / S
			DES. ENGR.	CHF. ENGR		
March. 04. 2005			K.N.U.M		March. 04. 2005	
W.H. JEONG			LG Electronics Inc.		CUSTOMER	
A/C COMP. DIVISION			Embrital		Embrital	
<b>3550U-E002A</b>						



\* MATERIAL : NATUAL RUBBER  
 \* COLOR : BLACK

UNIT	mm	SCALE	N / S	GROMMET	
DES. ENGR.	K.N.UJ	CHF. ENGR.	W.H. JEONG	4022U-L004A	
March. 04. 2005		March. 04. 2005		LG Electronics Inc.	CUSTOMER
				ACC. Divisions	Embrital



\* MATERIAL : SCP-1  
 \* SURFACE TREATMENT : FZMY-2

UNIT	mm	SCALE	N / S	SLEEVE,GROMMET	
DES. ENGR.	K.N.UM	CHF. ENGR.	H. C. JEONG	4816U-L001B	
03/03/2003		03/03/2003			
LG Electronics Inc.		CUSTOMER			
ACC. Divisions		Embrital			

# Application Considerations

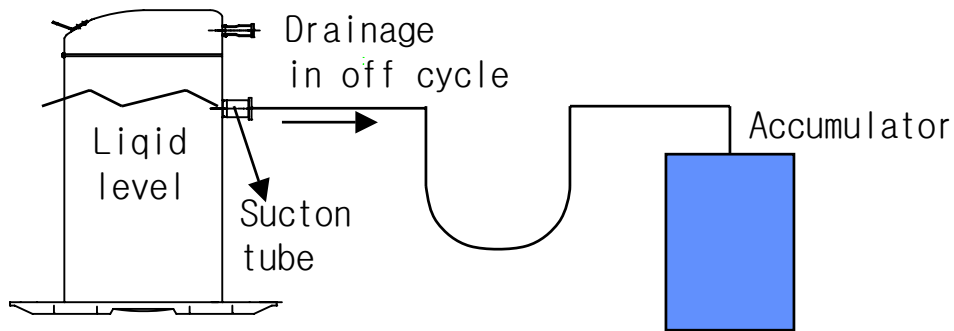
## 1. Accumulators

Durability is ensured by the Scroll's inherent ability to handle liquid refrigerant in flooded start and defrost cycle operation, and an accumulator is normally not required.

However, large volumes of liquid refrigerant which repeatedly flood back to the compressor during normal off cycles or excessive liquid refrigerant flood-back during steady operation can dilute the oil in any compressor to the point where bearing become inadequately lubricated and wear may occur.

When Liquid refrigerant level is above suction tube, to prevent flooded start damage on 3 phase Scrolls due to off cycle migration, the accumulator may be configured on some systems to allow free drainage from the compressor to the accumulator during the off cycle.

When below configuration is not possible, a crankcase heater is required.



## 2. Crankcase Heaters

Be equipped with heater in the lower case  
[ Min.capacity : 68W]

## 3. Pump .Down

For scroll compressors pump.down is not recommended.  
Deep-vacuum operation break down compressor.

## 4. OIL EQUALIZATION PORT (refer to A1)

This compressor have a oil equalization Port .  
In case compressor running , Must be connected to another compressor  
with removed nut of oil equalization Port

## 5. OIL RETURN TUBE PORT(refer to A1)

This compressor have a oil equalization Port .  
IN CASE OF OIL SEPARATOR USE ,Oil Return Tube Must be connected to Oil Return Port

## 6. A PERMITTED OIL DENSITY

Must be More than 70wt%

## 7. Must be equipped with safety device

Compressor protection should be done by air conditioner controller include inverter controller and compressor should not be run in open air.

1) High Temp. Protector

Attach high temp. protector for the purpose of controlling discharge temp. below 130°C

2) High Pressure Protector

Attach high pressure protector for the purpose of controlling discharge pressure below 43kg/cm<sup>2</sup>G

3) Lower Pressure Protector

Attach lower pressure protector for the purpose of controlling lower pressure over 0 Kg/cm<sup>2</sup>G

4) Protective Device Against Overload Current

Attach over load protective device at air conditioner against excessive current

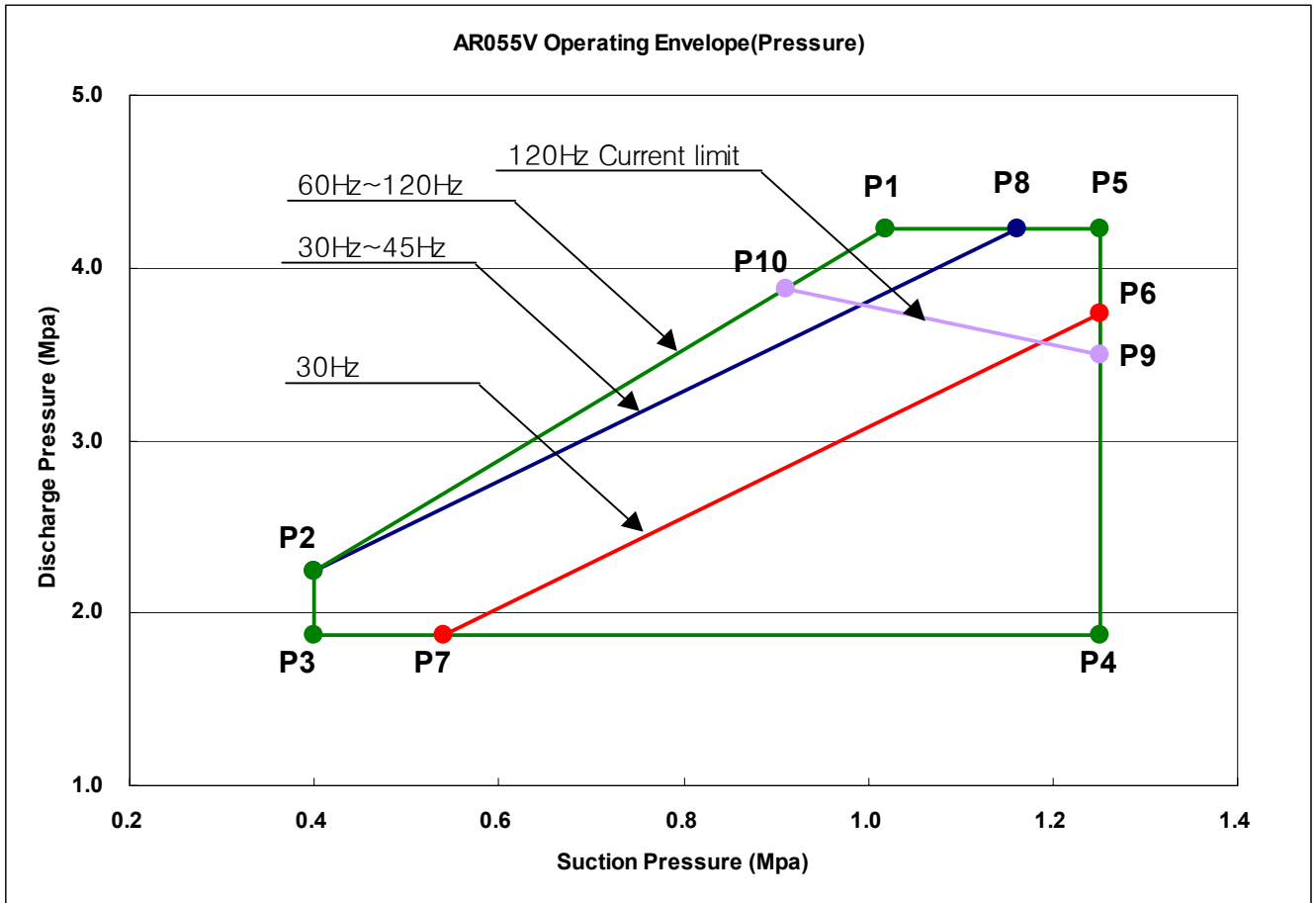
## 8. Three Phase Scroll Compressor

Scroll compressor are directional dependent, i.e., they will compress in one rotational direction. Single phase compressors will always start and run in the proper direction. Three phase compressors will rotate in either direction depending on power phasing. Since there is a 50~50 chance of connecting power causing reverse rotation, it is important to include notices and instructions in appropriate locations on the equipment to ensure proper rotational direction is achieved when the system is installed and operated.

Verification of proper rotational direction is made by observing that suction pressure drops and discharge pressure rises when the compressor energized. Reverse rotation also results in an elevated sound level over correct rotation, as well as substantially reduced current draw compared to tabulated values.

All three phase scroll compressors are wired identically internally. Therefore system must use reversal defensible relay or equipment.

## 6. Compressor Operating Envelope



※ the degree of superheat of Suction gas : 10 °C

( Mpa)

POINT	P1	P2	P3	P4	P5
PS	1.02	0.40	0.4	1.25	1.25
PD	4.22	2.24	1.18	1.88	4.22

P6	P7	P8	P9	P10
1.25	0.54	1.16	1.25	0.91
3.73	1.88	4.22	3.49	3.87



PERFORMANCE TABLE

**PERFORMANCE TABLE**

**MODEL : ARO55VA (3PH, 184V-30Hz)**

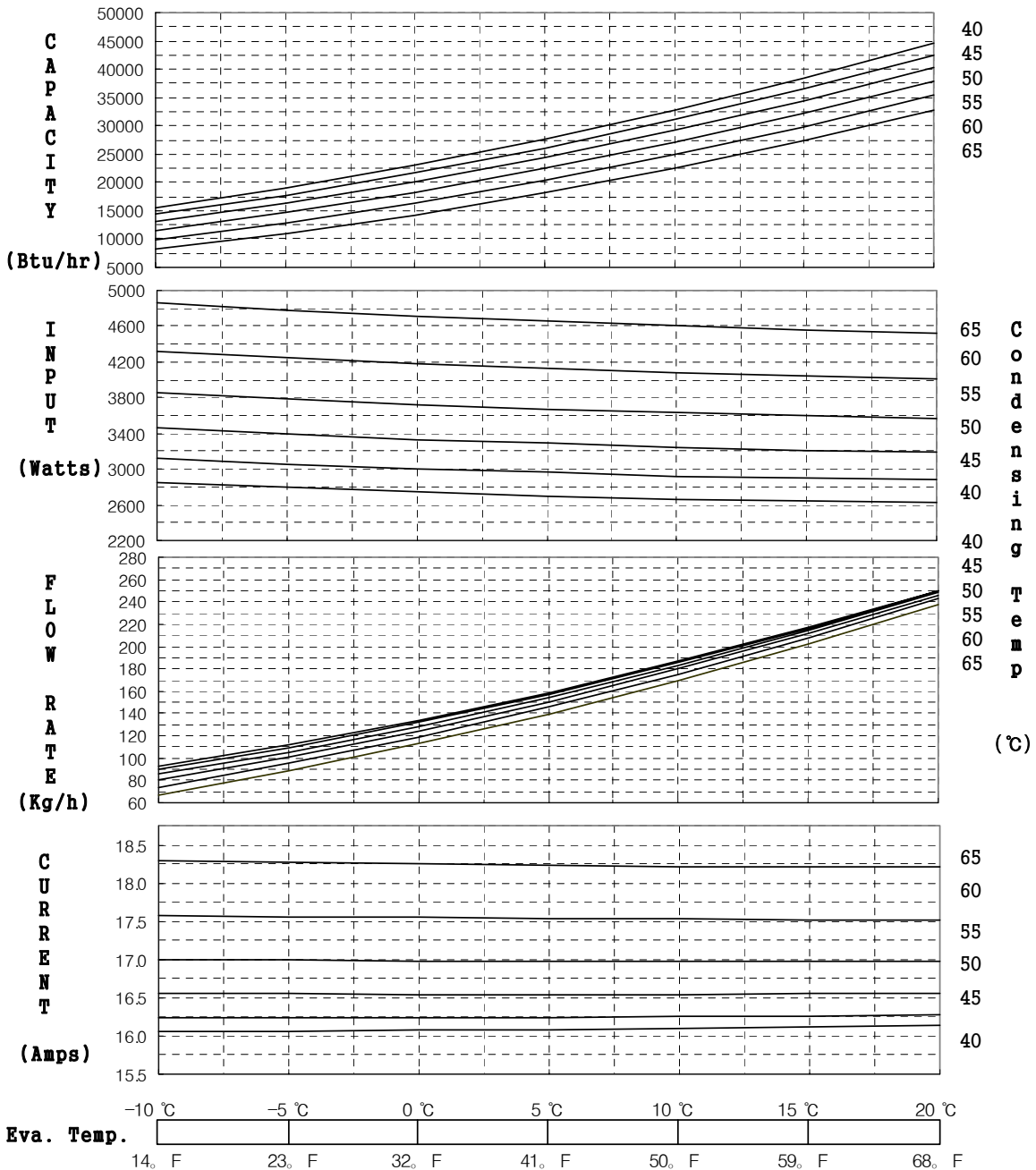
Saturated Evaporating Temperature	Items	Saturated Condensing Temperature					
		40°C (104°F)	45°C (113°F)	50°C (122°F)	55°C (131°F)	60°C (140°F)	65°C (149°F)
-10°C (14°F)	Capacity (Btu/h)	15526	14354	13027	11546	9909	8118
	Input (Watts)	2851	3120	3455	3856	4323	4856
	Flow Rate (kg/h)	92.70	89.57	85.38	80.13	73.81	66.44
	EER (Btu/W.h)	5.45	4.60	3.77	2.99	2.29	1.67
	Current (Amps)	16.07	16.24	16.56	17.00	17.58	18.29
-5°C (23°F)	Capacity (Btu/h)	19090	17771	16296	14667	12883	10944
	Input (Watts)	2792	3058	3390	3787	4251	4781
	Flow Rate (kg/h)	112.06	109.41	105.69	100.91	95.07	88.17
	EER (Btu/W.h)	6.84	5.81	4.81	3.87	3.03	2.29
	Current (Amps)	16.07	16.24	16.55	16.99	17.56	18.27
0°C (32°F)	Capacity (Btu/h)	23165	21698	20076	18299	16367	14281
	Input (Watts)	2743	3005	3333	3727	4187	4713
	Flow Rate (kg/h)	134.16	131.98	128.74	124.44	119.07	112.64
	EER (Btu/W.h)	8.45	7.22	6.02	4.91	3.91	3.03
	Current (Amps)	16.07	16.24	16.54	16.98	17.55	18.25
5°C (41°F)	Capacity (Btu/h)	27750	26135	24366	22441	20362	18128
	Input (Watts)	2701	2960	3285	3675	4132	4655
	Flow Rate (kg/h)	158.99	157.29	154.52	150.70	145.81	139.85
	EER (Btu/W.h)	10.27	8.83	7.42	6.11	4.93	3.89
	Current (Amps)	16.08	16.24	16.54	16.97	17.53	18.23
10°C (50°F)	Capacity (Btu/h)	32845	31083	29166	27094	24867	22485
	Input (Watts)	2668	2924	3245	3632	4085	4604
	Flow Rate (kg/h)	186.56	185.34	183.05	179.69	175.28	169.80
	EER (Btu/W.h)	12.31	10.63	8.99	7.46	6.09	4.88
	Current (Amps)	16.10	16.25	16.54	16.97	17.53	18.22
15°C (59°F)	Capacity (Btu/h)	38451	36542	34477	32257	29883	27353
	Input (Watts)	2644	2896	3214	3597	4047	4563
	Flow Rate (kg/h)	216.87	216.12	214.31	211.43	207.49	202.49
	EER (Btu/W.h)	14.54	12.62	10.73	8.97	7.38	5.99
	Current (Amps)	16.11	16.26	16.55	16.97	17.52	18.21
20°C (68°F)	Capacity (Btu/h)	44568	42511	40298	37931	35409	32731
	Input (Watts)	2629	2877	3191	3571	4018	4530
	Flow Rate (kg/h)	249.92	249.64	248.30	245.90	242.44	237.91
	EER (Btu/W.h)	16.95	14.78	12.63	10.62	8.81	7.23
	Current (Amps)	16.13	16.28	16.56	16.97	17.52	18.20

# PERFORMANCE CURVE

**MODEL : ARO55VA (3PH, 184V-30Hz)**

● **Rated Condition**

Evaporating Temp.	7.2 °C	45.0 °F	Motor Type	: PSC
Condensing Temp.	54.4 °C	130.0 °F	Running Capacitor	: - μF - VAC
Suction Gas Temp.	18.3 °C	65.0 °F		
Subcooled Temp.	8.3 °C	15.0 °F		
Ambient Temp.	35.0 °C	95.0 °F		



# PERFORMANCE TABLE

**MODEL : ARO55VA (3PH, 274V-60Hz)**

Saturated Evaporating Temperature	Items	Saturated Condensing Temperature					
		40°C (104°F)	45°C (113°F)	50°C (122°F)	55°C (131°F)	60°C (140°F)	65°C (149°F)
-10°C (14°F)	Capacity (Btu/h)	35419	33558	31553	29404	27109	24670
	Input (Watts)	4344	4723	5159	5653	6205	6814
	Flow Rate (kg/h)	211.39	209.40	206.68	203.23	199.06	194.17
	EER (Btu/W.h)	8.15	7.11	6.12	5.20	4.37	3.62
	Current (Amps)	10.65	11.40	12.27	13.27	14.41	15.67
-5°C (23°F)	Capacity (Btu/h)	42754	40365	37831	35153	32329	29362
	Input (Watts)	4427	4823	5276	5787	6356	6982
	Flow Rate (kg/h)	250.88	248.55	245.49	241.71	237.20	231.97
	EER (Btu/W.h)	9.66	8.37	7.17	6.07	5.09	4.21
	Current (Amps)	10.80	11.58	12.49	13.53	14.69	15.99
0°C (32°F)	Capacity (Btu/h)	51549	48631	45569	42362	39010	35514
	Input (Watts)	4478	4891	5361	5889	6474	7117
	Flow Rate (kg/h)	298.46	295.79	292.40	288.28	283.44	277.88
	EER (Btu/W.h)	11.51	9.94	8.50	7.19	6.03	4.99
	Current (Amps)	10.89	11.70	12.65	13.72	14.92	16.25
5°C (41°F)	Capacity (Btu/h)	61805	58358	54767	51032	47151	43126
	Input (Watts)	4497	4927	5413	5958	6560	7220
	Flow Rate (kg/h)	354.14	351.14	347.41	342.96	337.78	331.88
	EER (Btu/W.h)	13.74	11.85	10.12	8.57	7.19	5.97
	Current (Amps)	10.92	11.77	12.75	13.86	15.10	16.46
10°C (50°F)	Capacity (Btu/h)	73521	69546	65426	61162	56753	52199
	Input (Watts)	4484	4930	5433	5995	6614	7290
	Flow Rate (kg/h)	417.93	414.59	410.53	405.74	400.22	393.98
	EER (Btu/W.h)	16.40	14.11	12.04	10.20	8.58	7.16
	Current (Amps)	10.90	11.79	12.80	13.94	15.21	16.61
15°C (59°F)	Capacity (Btu/h)	86697	82194	77545	72752	67815	62732
	Input (Watts)	4438	4901	5421	5999	6635	7328
	Flow Rate (kg/h)	489.81	486.14	481.74	476.61	470.76	464.19
	EER (Btu/W.h)	19.54	16.77	14.30	12.13	10.22	8.56
	Current (Amps)	10.82	11.74	12.79	13.97	15.27	16.71
20°C (68°F)	Capacity (Btu/h)	101334	96302	91125	85803	80337	74726
	Input (Watts)	4359	4839	5376	5971	6624	7334
	Flow Rate (kg/h)	569.80	565.79	561.05	555.59	549.40	542.49
	EER (Btu/W.h)	23.25	19.90	16.95	14.37	12.13	10.19
	Current (Amps)	10.69	11.64	12.73	13.94	15.28	16.75

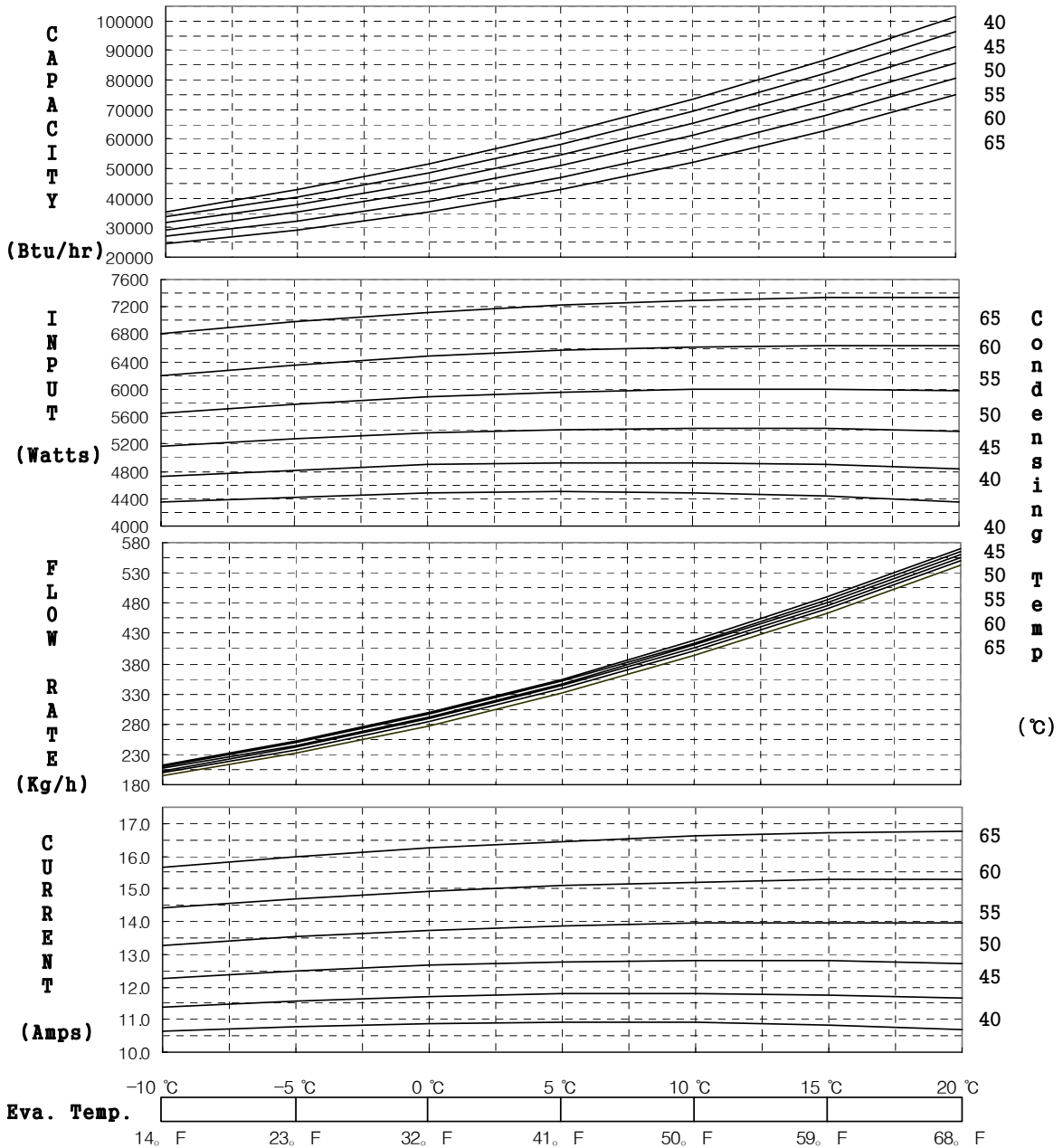
# PERFORMANCE CURVE

**MODEL : AR055VA (3PH, 274V-60Hz)**

● **Rated Condition**

Evaporating Temp.	7.2 °C	45.0. F
Condensing Temp.	54.4 °C	130.0. F
Suction Gas Temp.	18.3 °C	65.0. F
Subcooled Temp.	8.3 °C	15.0. F
Ambient Temp.	35.0 °C	95.0. F

Motor Type : PSC  
Running Capacitor : - μF - VAC



# PERFORMANCE TABLE

**MODEL : ARO55VA (3PH, 364V-90Hz)**

Saturated Evaporating Temperature	Items	Saturated Condensing Temperature					
		40°C (104°F)	45°C (113°F)	50°C (122°F)	55°C (131°F)	60°C (140°F)	65°C (149°F)
-10°C (14°F)	Capacity (Btu/h)	49866	46926	43692	40163	36339	32220
	Input (Watts)	6925	7414	7997	8674	9445	10309
	Flow Rate (kg/h)	299.18	294.61	289.69	284.40	278.75	272.74
	EER (Btu/W.h)	7.20	6.33	5.46	4.63	3.85	3.13
	Current (Amps)	12.09	12.86	13.80	14.90	16.16	17.58
-5°C (23°F)	Capacity (Btu/h)	63007	59478	55655	51536	47124	42416
	Input (Watts)	6914	7426	8033	8732	9526	10413
	Flow Rate (kg/h)	371.28	366.46	361.27	355.73	349.82	343.54
	EER (Btu/W.h)	9.11	8.01	6.93	5.90	4.95	4.07
	Current (Amps)	12.06	12.87	13.85	14.99	16.29	17.75
0°C (32°F)	Capacity (Btu/h)	77217	73099	68686	63979	58977	53680
	Input (Watts)	6919	7455	8084	8807	9623	10534
	Flow Rate (kg/h)	450.41	445.32	439.87	434.06	427.89	421.36
	EER (Btu/W.h)	11.16	9.81	8.50	7.26	6.13	5.10
	Current (Amps)	12.06	12.92	13.93	15.11	16.45	17.94
5°C (41°F)	Capacity (Btu/h)	92495	87788	82786	77489	71898	66013
	Input (Watts)	6941	7499	8152	8897	9737	10670
	Flow Rate (kg/h)	536.54	531.19	525.49	519.42	512.98	506.19
	EER (Btu/W.h)	13.33	11.71	10.16	8.71	7.38	6.19
	Current (Amps)	12.10	12.99	14.04	15.26	16.64	18.17
10°C (50°F)	Capacity (Btu/h)	108841	103545	97954	92069	85888	79414
	Input (Watts)	6979	7560	8236	9004	9867	10823
	Flow Rate (kg/h)	629.69	624.08	618.11	611.78	605.09	598.03
	EER (Btu/W.h)	15.60	13.70	11.89	10.22	8.70	7.34
	Current (Amps)	12.16	13.09	14.19	15.44	16.86	18.43
15°C (59°F)	Capacity (Btu/h)	126256	120371	114191	107716	100947	93883
	Input (Watts)	7033	7638	8336	9128	10013	10993
	Flow Rate (kg/h)	729.85	723.98	717.75	711.16	704.20	696.88
	EER (Btu/W.h)	17.95	15.76	13.70	11.80	10.08	8.54
	Current (Amps)	12.26	13.23	14.36	15.65	17.11	18.72
20°C (68°F)	Capacity (Btu/h)	144739	138265	131496	124432	117074	109421
	Input (Watts)	7104	7731	8452	9267	10176	11178
	Flow Rate (kg/h)	837.02	830.89	824.40	817.54	810.33	802.75
	EER (Btu/W.h)	20.38	17.88	15.56	13.43	11.50	9.79
	Current (Amps)	12.39	13.40	14.57	15.90	17.39	19.05

# PERFORMANCE CURVE

**MODEL : AR055VA (3PH, 364V-90Hz)**

● **Rated Condition**

Evaporating Temp.	7.2 °C	45.0 °F	Motor Type	: PSC
Condensing Temp.	54.4 °C	130.0 °F	Running Capacitor	: - μF - VAC
Suction Gas Temp.	18.3 °C	65.0 °F		
Subcooled Temp.	8.3 °C	15.0 °F		
Ambient Temp.	35.0 °C	95.0 °F		

