Doc. No.	LGETA-190704-2330
Rev. No.	Rev.1
Date	Jan 17. 2020

Rotary Compressor
SPECIFICATION for APPROVAL

MODEL: DKT240MAA

LG Electronics	
Designed	Approved
Sign	
Date	

SCORP	
APPROVAL	
Sign	
Date	

Please return one copy on your approval.
Please read this specification thoroughly before installation or operating.

Revision History

Data	Rev. No	Rev. description	Write
2020.01.17	Rev.1	1. Change Performance Spec - Cooling Capacity : 26,900(95%↑) → 26,200(98%↑) - Power Input : 2,467(105%↓) → 2,472(102%↓) - EER : 10.9(95%↑) → 10.6(98%↑) 2. Change Noise Spec : 72+2 → 70+2 3. Reason for change. - As the development site change there is a difference in calorimeter. (Pre Test : KOREA → Development : CHINA) - Currently, There is no difference between KOREA and CHINA. It has modified KOREA calorimeter to be like CHINA.	X.Y.BU

Safety Precaution

IMPORTANT SAFTY INSTRUCTIONS
The following precautions is to prevent unexpected hazard.

⚠ WARNING You can be killed or seriously injured if you don't follow instructions.

Service should be performed by trained personnel only.

Install the refrigerant, lubricant oil and electrical component (OLP, Capacitor, Terminal Cover, etc) specified by compressor manufacturer.
It can cause fire or electrical shock.

Connect the electrical wiring correctly in accordance with manufacturer's instruction.
It can cause fire or electrical shock.

Compressor must be grounded whenever power is supplied.
Do not use earth screw, except for ground.
It can cause electrical shock.

Before servicing, always remove the power plug from outlet.
It can cause electrical shock.

Before welding, always remove refrigerant in the compressor.
Do not operate compressor in the air or vacuum status.
It can cause explosion

Do not touch the compressor with bare hands during operation or after stoppage instantly.
It can cause get burnt.

1. Specification

1.1 Compressor

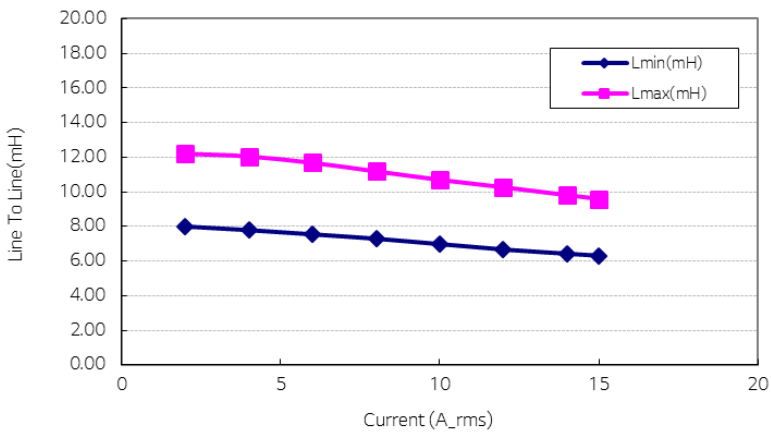
1	Application	Cooling and Heating with BLDC Inverter System
2	Compressor Type	Hermetic Motor Compressor
3	Pump Type	Twin Rotary (Two Cylinder Rolling Piston Type)
4	Displacement	24.0 ㎤ / rev
5	Refrigerant	R32
6	Oil / Oil Charging Amount	PVE / 670cc
7	Painting	Black Color Paint
8	Net Weight (Including Oil)	11.9kg
9	Suction Tube I.D	Φ 16.0 $^{+0.15}_{0}$ mm
10	Discharge Tube I.D	Φ 9.7 $^{+0.1}_{0}$ mm

1.2 Motor

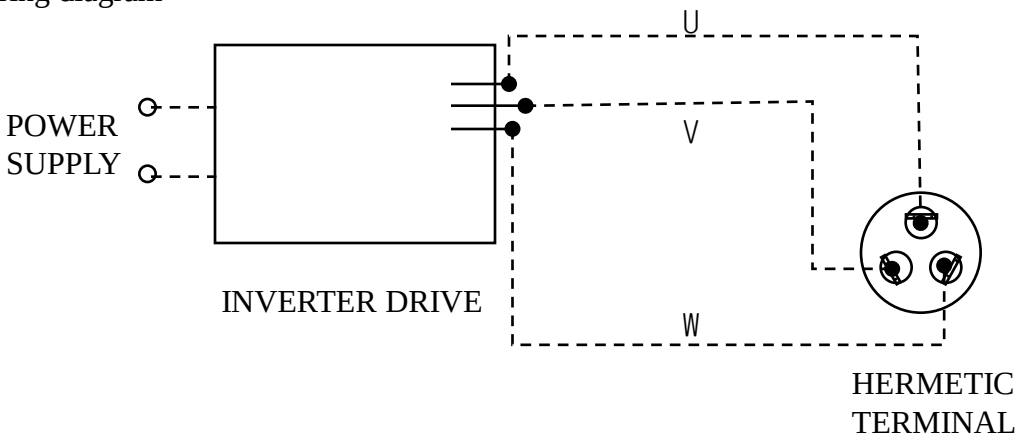
Motor Type / Starting Type	BLDC Motor / DC Inverter Starting	
Pole / Rated Output	6 Pole / 1,500 Watts(@60Hz)	
Power Source	Sensorless Brushless Inverter	
CTQ-S Winding type	Concentrated Winding	
CTQ-S Insulation Class	E Class	
Windings Resistance (at 25 ℃)	U-V	0.734 ±7 % Ohms
	V-W	0.734 ±7 % Ohms
	W-U	0.734 ±7 % Ohms

	A (Arms)	Lmin(mH)	Lmax(mH)
Inductance (Line to Line) (mH)	2.0	8.00	12.20
	4.0	7.79	12.05
	6.0	7.55	11.68
	8.0	7.29	11.19
	10.0	6.98	10.70
	12.0	6.67	10.27
	14.0	6.43	9.82
	15.0	6.32	9.60

Inductance characteristic curve



1.3 Wiring diagram



※ Make Sure to connect right way same with the wiring diagram.

1.4 Performance

※ Electric source
DC Link Voltage : 380 V , 180° Sine Wave Current Charge (Designed by LGE)

		60rps
Cooling Capacity(98%↑)	[Btu/h]	1 26,200
	[W]	7,677
Power Input(102%↓)	[W]	2,472
EER(98%↑)	[Btu/W・h]	10.60
Running Current	[A]	8.2

☞ ARI Condition

Cond. Temp. : 54.4℃ (130 ℉)
Evap. Temp. : 7.2℃ (45℉)

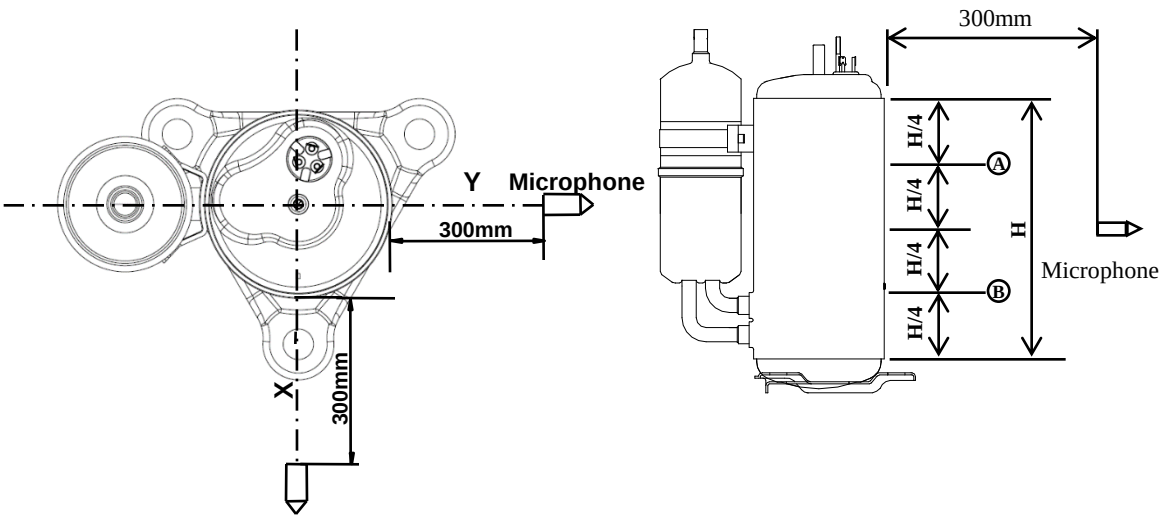
Return Gas Temp. : 18.3℃ (65℉)
Liquid Temp. : 46.1℃ (115℉)
Ambient Temp. : 35.0℃ (95 ℉)

1.5 Noise , Vibration

※ Electric source
DC Link Voltage : 380 V , 180° Sine Wave Current Charge (Designed by LGE)

Sound Level [dB(A)]	ARI 60rps
	1 70+2
Vibration Standard Condition [G]	0.8 ↓

Noise & Vibration Measuring Points



● Measuring points for specification approval
- Noise : 2 points (X , Y)
- Vibration : 2 points (A , B)

● Compressor vibration is measured by a vibration meter which is contacted compressor A ~ B

● Test Condition :
ARI 60rps (Ps/Pd = 9.35 / 34.38 kg/cm^{2}G)
(Return Gas: 18.3℃)

1.6 Others

Leak Tight Pressure	High Pressure Side	43 ㎏f / ㎠ G
	Low Pressure Side	-
Hydrostatic Strength Pressure	High Pressure Side	175 ㎏f / ㎠ G
	Low Pressure Side	80 ㎏f / ㎠ G
Insulation Resistance (with 500V D.C Mega Tester)		50 ㏁ Min.
Withstand Voltage		At 2,200 V / 1 Sec. Leakage Current is less than 5 ㎃
Residual Moisture (Karl Fisher Method)		150 mg Max.
* Residual Impurities		70 mg Max

*) Each part was measured separately

1.7 Revolution Range (By standard DC Inverter)

Operating Range	10 ~ 120 rps
Rated Condition	30 ~ 80 rps
Max Load Condition	35 ~ 70 rps

* Condition

	Rated Condition	Max Load Condition
Con. Temp(℃)	55	65
Eva. Temp(℃)	7	12
Return Gas. Temp(℃)	18.3	25
Ambient Temp(℃)	35	35

2. Delivered Parts List

Parts Name	Type (Model)	EA	Parts Dwg. NO.	Supply	
			LG		
Compressor	DKT240MAA	1	-	(Yes)	No
Cover ,Terminal	-	1	3550U-L005B	(Yes)	No
Gasket	-	1	4986UTL004A	(Yes)	No
Nut, Hexagon Flange	-	1	1NZZUTL001A	(Yes)	No
Washer, Plain Cover	-	1	1WZZUTL001A	(Yes)	No
Grommet	-	3	4022UTL002K	(Yes)	No
Sleeve, Grommet	-	0	-	Yes	(No)
Bolt, Stud	-	0	-	Yes	(No)
Washer, Plain	-	0	-	Yes	(No)
Nut, Hexagon	-	0	-	Yes	(No)
Taptite Screw, Earth	-	0	-	Yes	(No)

※) Refer to Attachments (Accessory Parts Drawings.)

3. Operating Limit

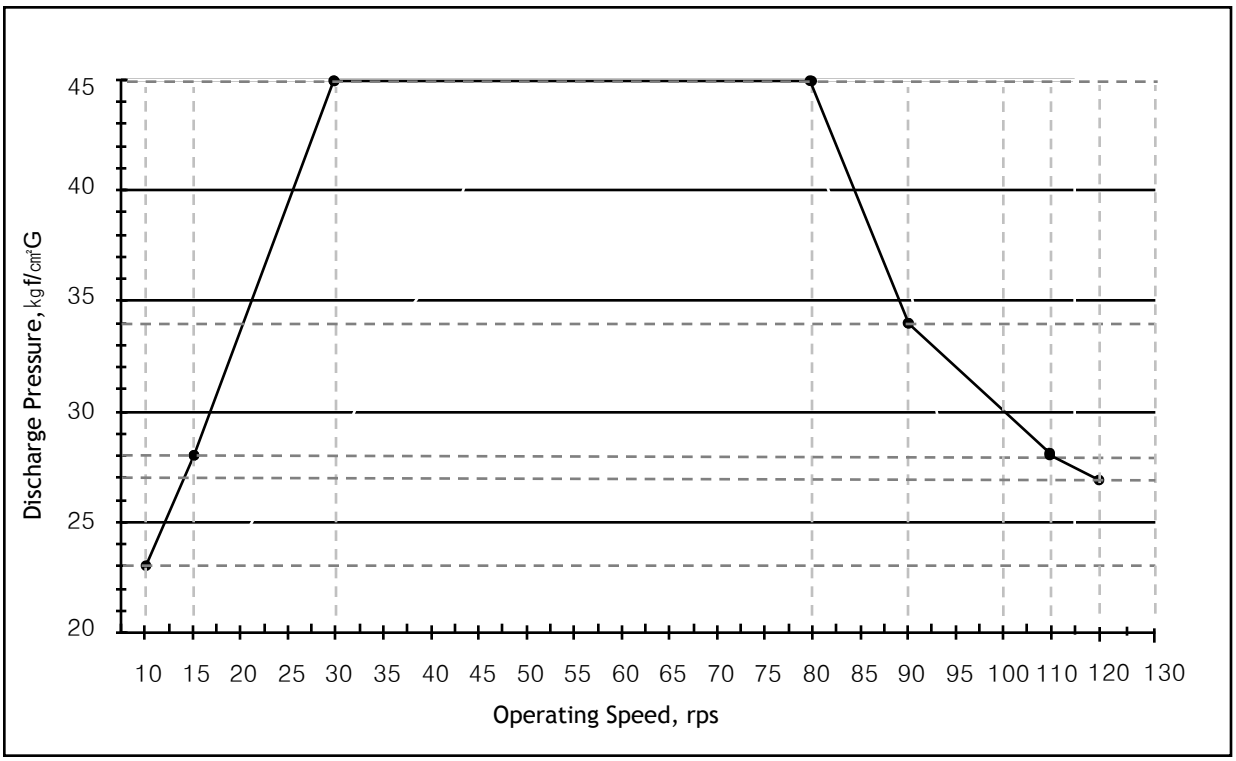
Application Limit

Discharge Pressure	[kgf/㎠G]	45 Max.
Suction Pressure	[kgf/㎠G]	2.4 ~ 14.0
Discharge Pipe Temp.	[℃]	115 Max.
Motor Coil Temp.	[℃]	130 Max.
Max load current	[A][rms]	14 Max.

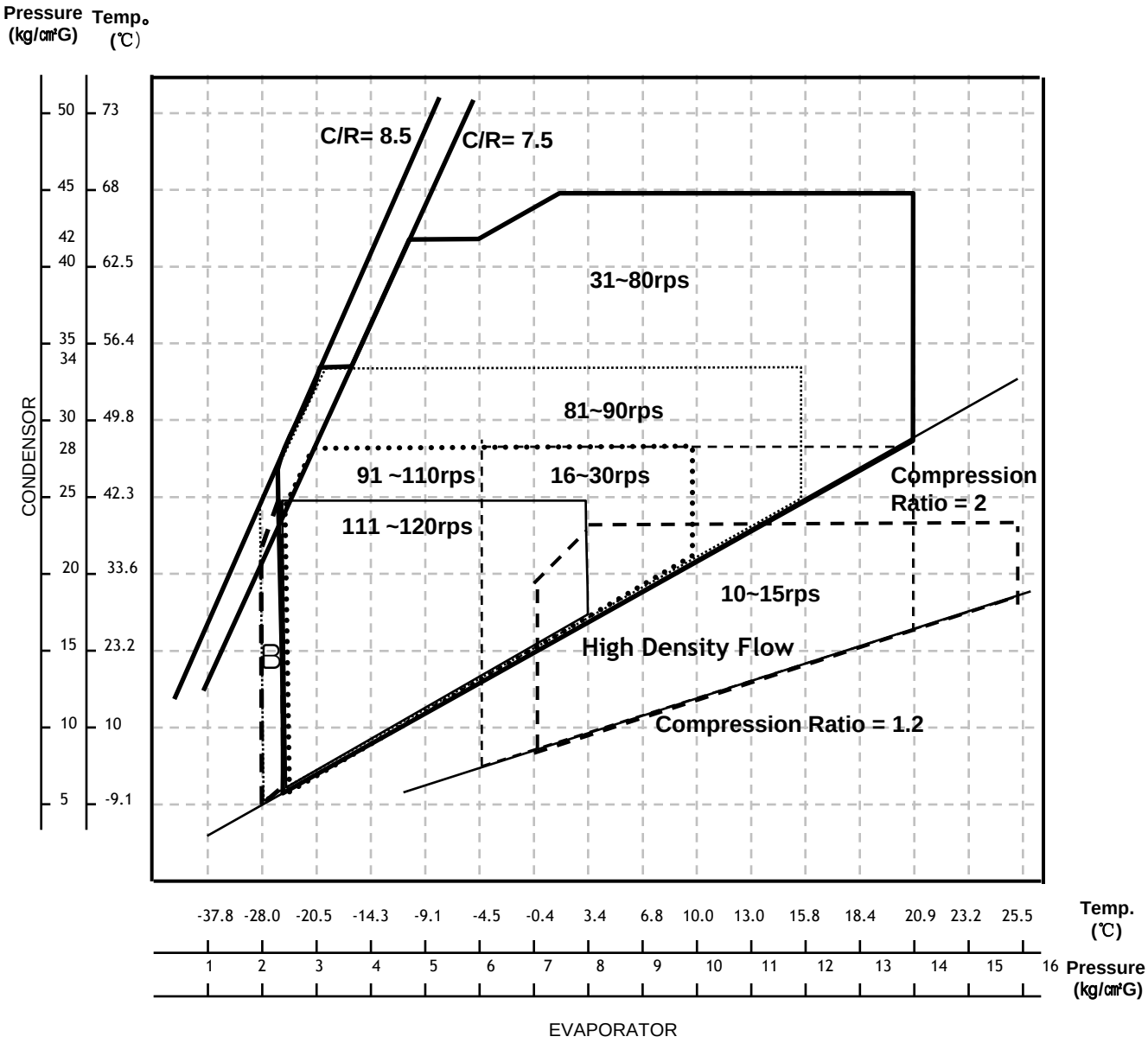
Pressure Limit

Operating Speed (rps)	Discharge Pressure (kgf/㎠G)
10 ~ under 15 rps	23 Max.
16 ~ under 30 rps	28 Max.
31 ~ under 80 rps	45 Max.
81 ~ under 90 rps	34 Max.
91 ~ under 110 rps	28 Max.
111 ~ under 120 rps	27 Max.

Pressure Limit



Pressure Limit



In case of B Area,

- less than 3 min. at defrosting and restarting after defrosting
- Motor wire temperature less than 130℃
- Do not occur liquid refrigerant back
- Must keep Minimum oil level

※ This guide contains many important safety messages.
Always read and obey all safety messages.

⚠ WARNING

Application Limit

Refrigerant Charge Limit (Oil Dilution rate)	If there are no oil- level -guide- line problems in applied Set Condition, Max 2,200 is allowed. ※ It must be kept following to Oil Level Guide Line *** note3
Liquid Refrigerant Back	System should be designed not to allow the liquid to go back to compressor which cause knocking noise , current increase or undesirable vibration and make short compressor life time.
Δ T : Temp. Difference ℃	Δ T = Case Bottom Temp. − Condensing Temp. It must be kept Δ T ≥ 5℃
Pressure Difference in Operating	The Pressure difference in operating shall be 5.0㎏f/㎠ or more, but 3 minutes starting excluded.
ON/OFF Operation	-In case over 30Hz : Each cycle should be at least 5 minutes (ON : at least 2 minute , OFF : at least 3 minutes) - In case below 30Hz : Each cycle should be at least 8 minutes (ON : at least 5 minute , OFF : at least 3 minutes)
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 5° or less.
System Accumulator	The Accumulator volume should be enough to cover 50% of maximum system refrigerant volume.
Protecting Reverse Operation	The Compressor must be operated by proper voltage in accordance with the frequency without reverse revolution condition. The reverse revolution condition can be avoided by just keeping right order of phase supplied power source.

⚠ WARNING

Application Limit

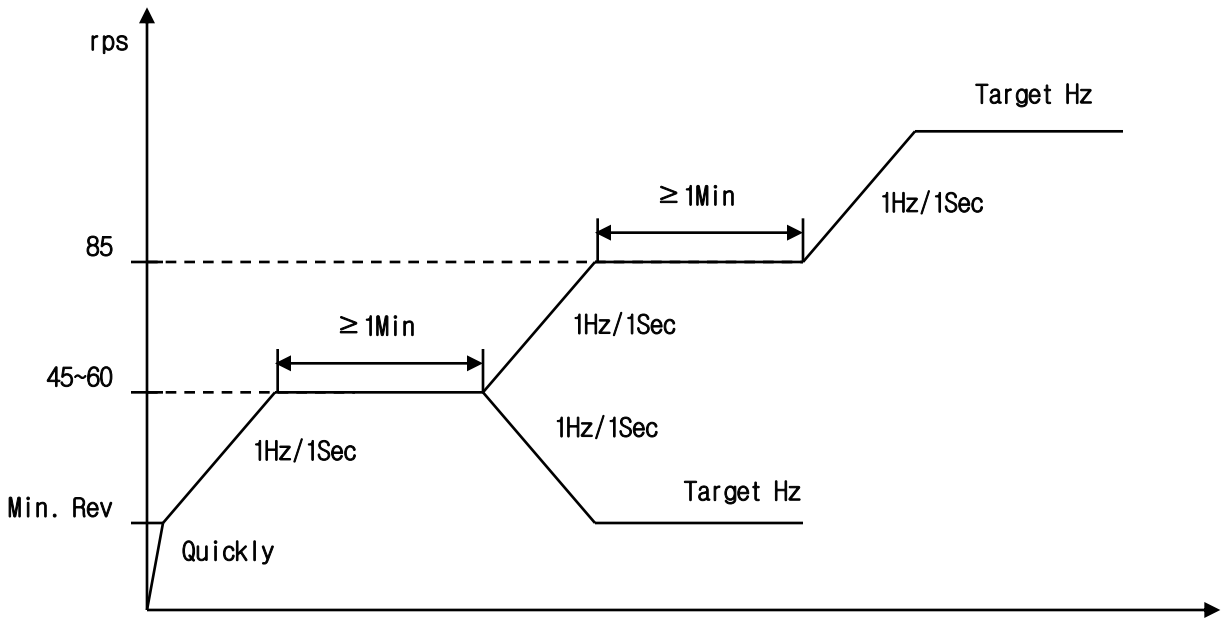
Power source voltage	The applied voltage phase of stator must be synchronized with the phase of rotor. ※ Do not apply general AC power on terminals.
Carrier Frequency	Carrier frequency must be selected so as not to resonate the Compressor & Pipe.
Acceleration rate & Deceleration	Acceleration rate & deceleration rate Refer to * note 1.
Pipe Stress	Don't allow any force on discharge & suction pipe . The piping stress must be less than 300㎏f/㎠ at starting and stopping. And less than 200㎏f/㎠ at running. (Peak to Peak)
Oil Level	It must be checked oil level by the compressor with sight glass we supply. And oil level must be kept over guide line level ***note 3. at any condition.
Protection device	Air conditioner system must has the compressor protection device like over current , high temperature, sensing locked pump in the controller. When starting & running fail by abnormal overload, controller must be able to cut off power of compressor before motor burn out.
Protection for demagnetization	Compressor should not be applied over current 43.7A(peak) under temperature of 120℃
Pump down refrigerant	If pump down time is too long, compressor can be damaged due to excessive temperature increase or poor lubrication. Guideline of pump down process. - Time : less than 30 seconds - Suction Pressure : It should not run under below 1㎏f/㎠G. And before closing a service valve, compressor running for more than 5 minutes is recommended.
Earth Connection	Use Compressor with grounded system only.

⚠ WARNING

Application Limit

Use defined Refrigerant and oil	Any process in where the HCFC's Refrigerant or the different kind of oil against the defined. Compressor oil are mixed should be avoided.
Avoid Damage running	The running operation that inspection and the protector inspection that affect a damage to the function and durability of the compressor should be avoided
Running dummy indoor	When the outdoor unit is operated with the indoor dummy unit, The discharged oil should be recovered enough
Prevent oxidation in pipe	Always purge the system and the compressor with the dry Nitrogen in order to prevent oxidation of the piping
Charging Refrigerant	When charging refrigerant into the cycle, Make sure that refrigerant always be filled from the higher pressure side (condenser exit) of the cycle. If liquid refrigerant is sucked in to the compressor liquid compression occurs, The discharge valve is damaged, lubrication effectiveness degenerates and reliability drops noticeably
Avoid Vacuum running	Do not operate the compressor in a vacuum state. Furthermore do not apply high voltage to a vacuum state compressor. There is a danger that insulation could degenerate, causing electric shock
Avoid Air compression	Do not compress the air including the case of leakage in the Air conditioner cycle. If Compressors run with air mixed, inside the compressor is heated and pressurized , which may cause an explosion
Promptly Assemble compressor in line	After removing rubber plugs from compressor tubes, Promptly use the compressor. And do not leave in the atmosphere for 10 minutes over. If Air gets into the compressor , accelerating degeneration of the inside of the cycle or compressor
Wiring	Wires connected to the compressor, follow the compressor specification manual and instructions
Storage temperature	-10℃ ~ 65℃

***Note 1. Operating Pattern**



Rapid change of compressor revolution may result in lower oil level or breakdown of compressor. Revolution change rate depends on A/C system's order logic.

Basically, guide line of change rate is about 1Hz/1sec. But from compressor starting to main running revolution (state of revolution speed increasing), if compressor breakdown won't happen, the revolution change speed rate can be 2Hz/s.

If target revolution is above 60Hz, compressor should be run and last more than 1 minutes at 45~60Hz and above 85Hz, it must stay at 85Hz or so.
Above chart explain how to change revolution rate.

Most important thing is keeping stable compressor oil level, so it must be observed at all running conditions built into A/C systems and main logic of speed change must be designed to maintain stable compressor oil level.

* 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.

** Note 2 OIL Dilution rate

$$\frac{\text{Oil Weight}}{\text{Refrigerant Weight + Oil Weight}} \geq 0.22$$

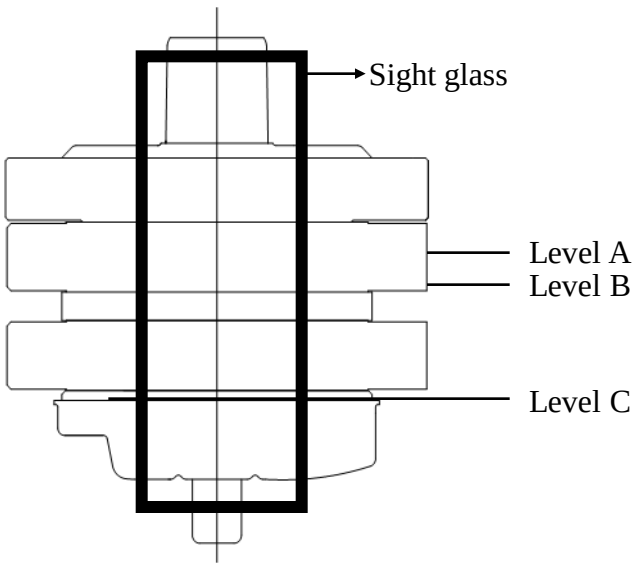
※ Specific Gravity of PVE = 0.92 (at 20℃)

[Unit]

☞ Oil Weight : [g]

☞ Refrigerant Weight : [g]

*** Note 3 Oil Level Guide Line



Level A : Operated below 30Hz

Level B : Steady state at any condition.
30~120Hz

Level C : Limit level of transition period within 3minutes.

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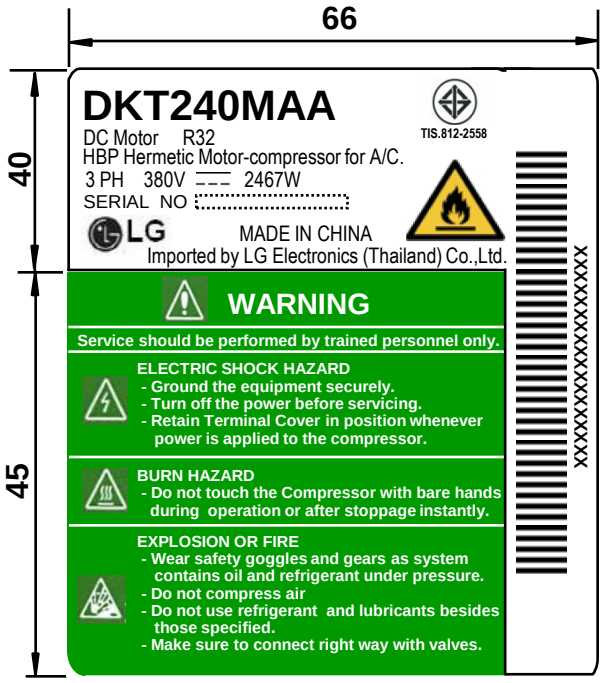
4. Label



All safety messages will identify the hazard, tell you how to reduce the chance of injury, and tell you what can happen if the instructions are not followed. You are strongly advised to follow these safety instructions.

This is the Safety alert symbol. It indicates a hazardous situation which, if not avoided, could result in death or serious injury.

This is the Electric shock hazard symbol. It indicates a hazardous situation which, if not avoided, could result in the electric shock.

This is the Getting burnt symbol. It indicates a hazardous situation which, if not avoided, could cause fire.

This is the Explosion or Fire symbol. . It indicates a hazardous situation which, if not avoided, could cause explosion or fire.

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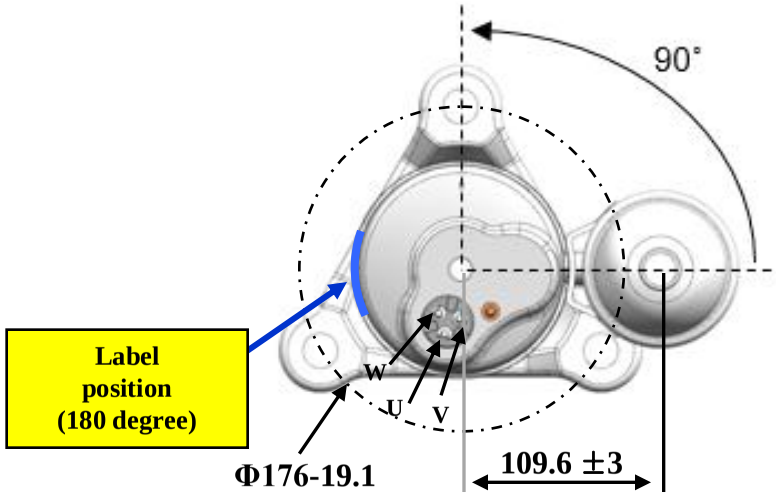
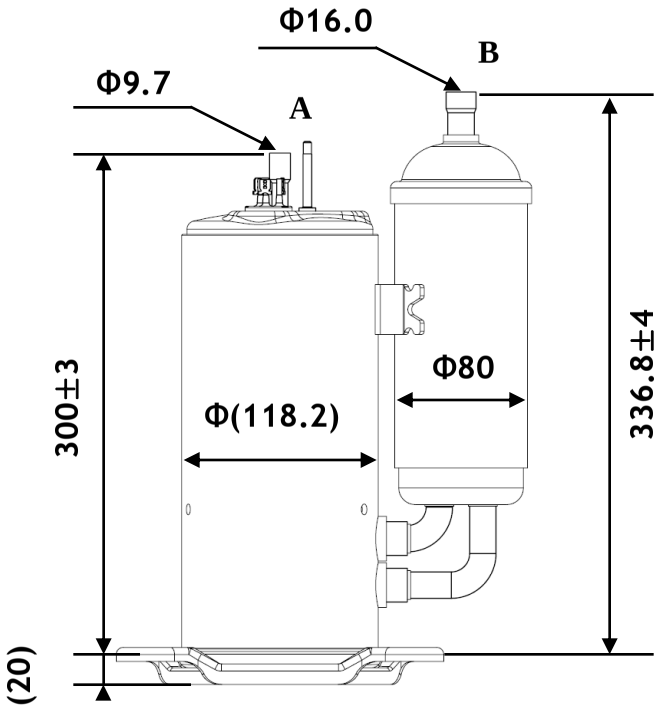
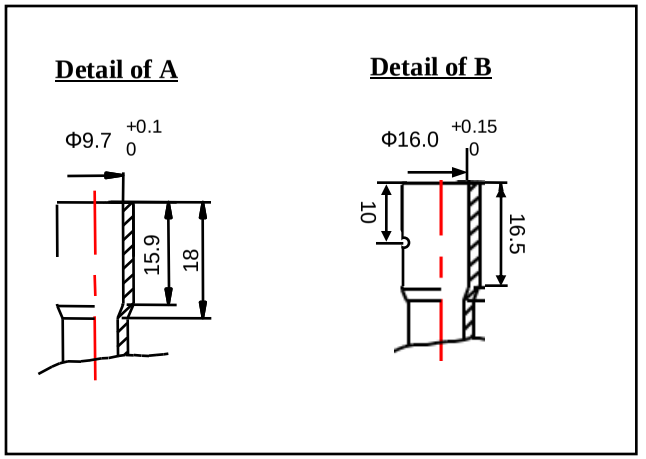
5. Attachment



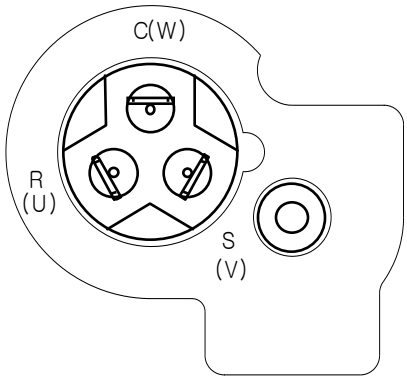


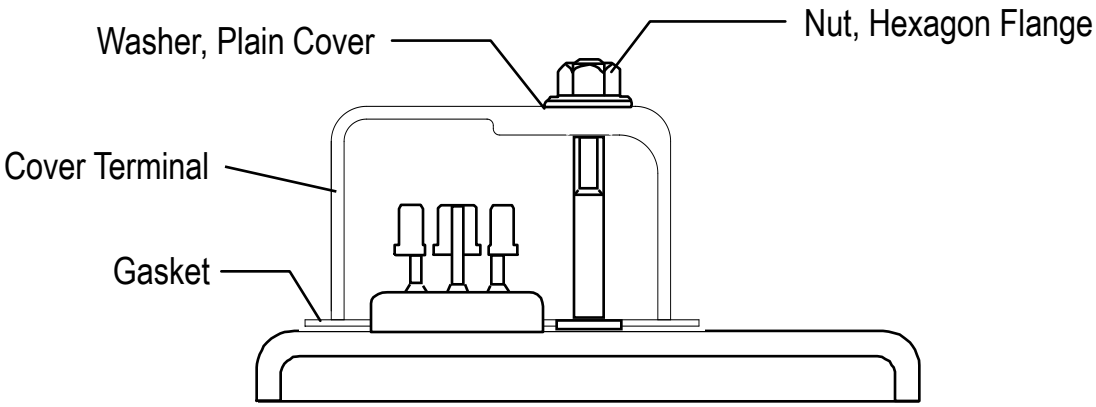


NOTES
1. PAINTING : BLACK PAINT (ELECTRO DEPOSITION)
2. OIL : PVE 670 cc CHARGED
3. NITROGEN CHARGED AFTER DEHYDRATION
4. DIMENSIONS ARE mm UNITS.

UNIT	mm	SCALE	N / S	COMP. OUT LINE
DES. ENGR.		CHF. ENGR.		
12 . APRIL . 2019 H.J. PARK		12 . APRIL . 2019 T.Y.NOH		DKT240MAA
LG Electronics Inc. C & M Division		CUSTOMER SCORP		

Accessory Fitting





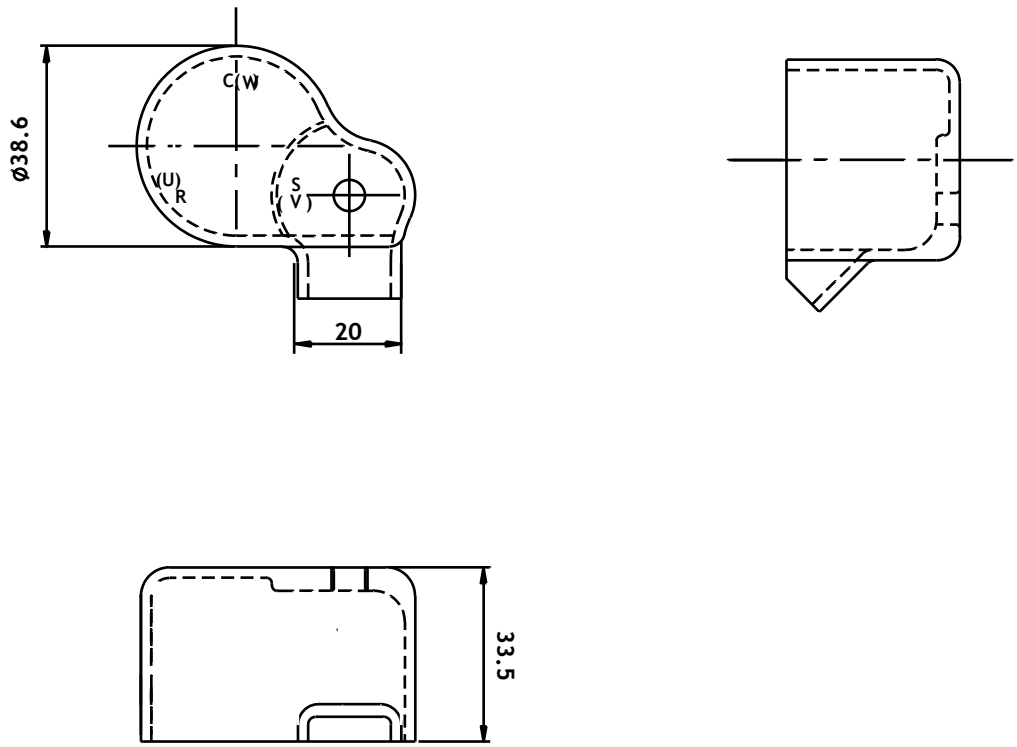
C(W),R(U),S(V) Mark Embossed on Cover Terminal

Nut assembly Should be below 20kgfcm.

Cover, Terminal

Drawing No. 3550U-L005B

(UNIT : mm)



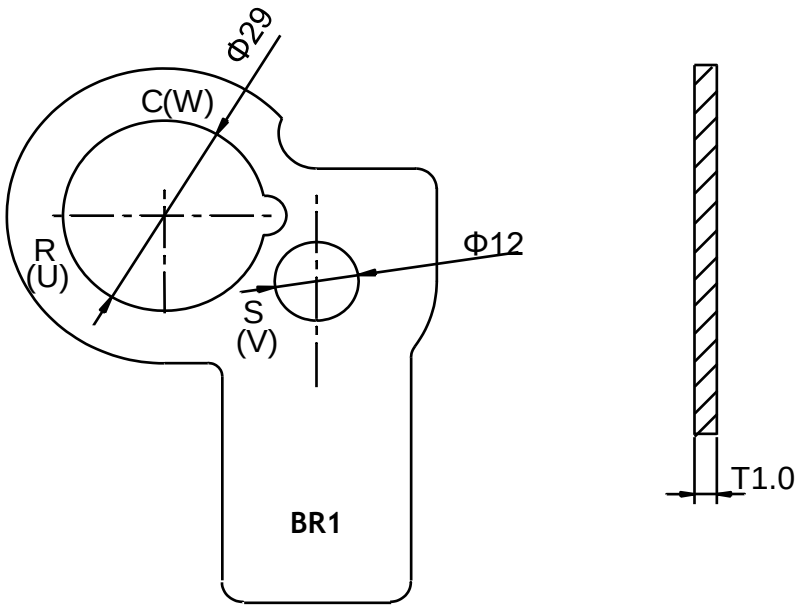
MATERIAL	COLOR	REMARK
Lupox	BLACK	MARKS(C(W),R(U),S(V))

LG Electronics Inc.

Gasket

Drawing No. 4986UTL004A

(UNIT : mm)



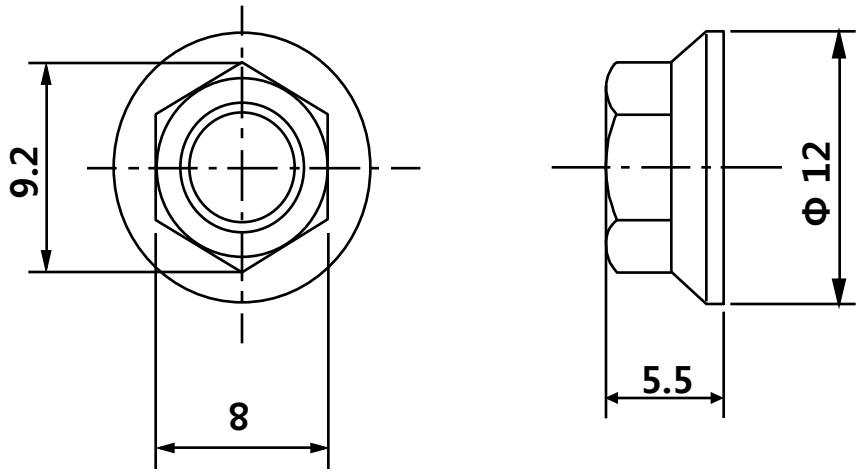
MATERIAL	REMARK
silicon	MARKS (C(W),R(U),S(V))

LG Electronics Inc.

Nut, Common

Drawing No. 1NZZUTL001A

(UNIT : ㎜)



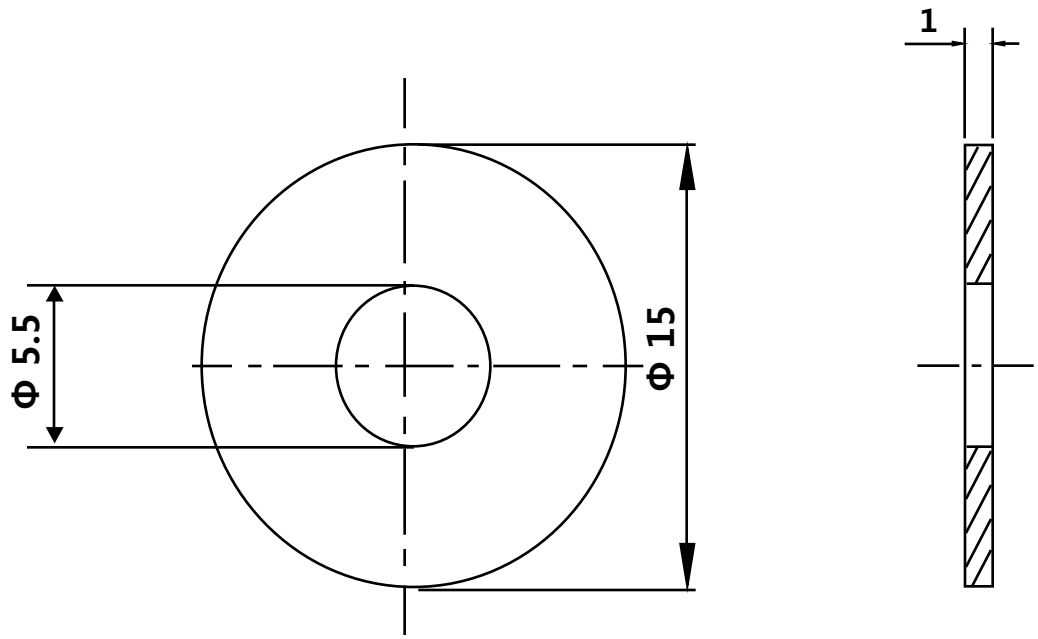
* MATERIAL : STEEL (ELECTRIC PLATING OF ZINC)

LG Electronics Inc.

Washer, Customized

Drawing No. 1WZZUTL001A

(UNIT : ㎜)



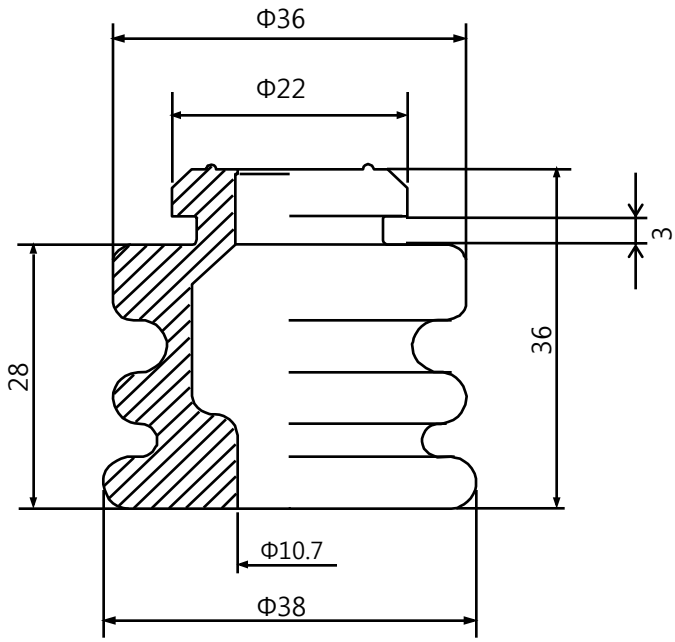
* MATERIAL : POLYAMIDE (NYLON)

LG Electronics Inc.

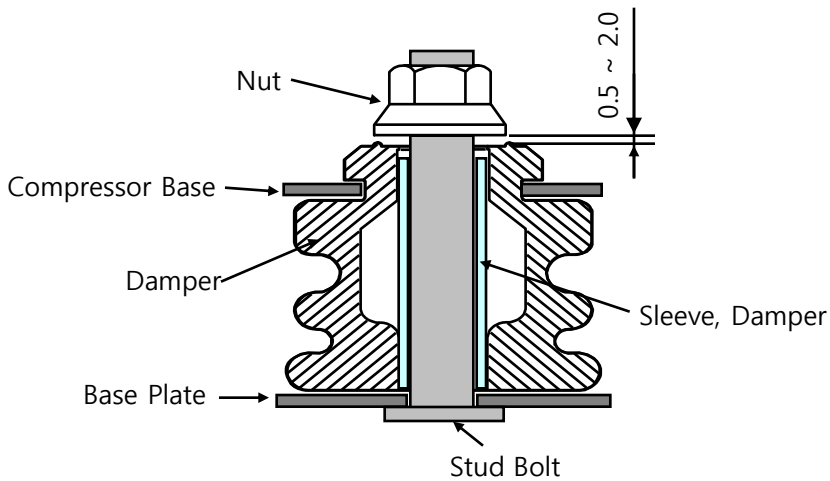
Damper, Rubber

Drawing NO. 4022UTL002K

(UNIT : ㎜)



* MATERIAL : EPDM
* HARDNESS : ABOVE 46˚±4(THE DUROMETER TYPE A)



Damper Assembly

LG Electronics Inc.

Motor Parameter (DKT240MAA)

No.	Item	Parameter	Remark
1	Compressor Model	DKT240MAA	
2	Rotor Pole	6 Pole	
3	Rated Frequency Range	10 ~ 120 Hz	
4	Magnet Material	NdFeB	
5	Demagnetizing Current	43.7 Apeak	at 120℃, -4% Demagnetizing Rate
6	Inductance-Ld (per phase)	Table	Below Table and Picture Line-to-line
7	Inductance-Lq (per phase)	Table	
8	Winding Resistance	0.734 Ω	line-to-line (at 25℃)
9	Voltage Constant	38.6 Vrms / krpm	line-to-line

Inductance characteristic curve