

# ROTARY COMPRESSOR SPECIFICATION



<b>MODEL : UX0T011FNAE5</b>	SPEC. NO : <b>SS - 00705</b>		
	DRAFT	CHECK	APPROVE
	Approved by internal system		

## APPLICATION

Type	Cooling & Heating Type with Inverter System
Refrigerant	R-134a
Electrics Source	Inverter for BLDC motor

## RATED PERFORMANCE

Conditions	HBP	LBP	Note
Revolution (rps)	3,480	3,480	
Capacity (Btu/h)	1,100	275	±7%
Input (W)	110	73	±7%
Current (A)	0.52	0.37	±7%
EER (Btu/Wh)	10.0	3.8	COP : HBP 2.93, LBP : 1.11
Noise (dBA)	Less than 42dB(A)		Max. Noise of 4 Point measurement with 90cm from compressor surface
Vibration (µm)	Less than 20 µm		Max. tangential vibration displacement

## RATING CONDITION

	<b>HBP</b>	<b>LBP</b>
Condensing Temperature .....	130 °F (54.4 °C)	130 °F (54.4 °C)
Evaporating Temperature .....	45 °F (7.2 °C)	-10 °F (-23.3 °C)
Return Gas Temperature .....	95 °F (35.0 °C)	90 °F (32.2 °C)
Liquid Temperature .....	115 °F (46.1 °C)	90 °F (32.2 °C)
Ambient Temperature .....	95 °F (35.0 °C)	90 °F (32.2 °C)
Compressor Cooling .....	1 m/s air cooling	
Controller .....	Samsung Inverter	

## COMPRESSOR

Type	Hermetic motor compressor
Compression Type	Rotary type (Rolling 2 piston type)
Displacement	2.40 cc/rev
Oil Type	POE
Oil Charg Amount	50 cc
Painting	Black Color
Net Weight	1.2 kg (Including Oil)
Suction Tube I.D	6.54 mm
Discharge Tube I.D	4.95 mm

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## MOTOR TYPE

Motor Type	DC Brushless Motor
Starting Type	DC Inverter Starting
Pole Number, Phase Number	6 Pole 3 Phase
Insulation Class	E Class
Winding Resistance	37.6Ω ± 7%
Winding Type	-

## ELECTRICAL COMPONENTS

Protective Device	N/A
Operation Inverter	Driver, D.C. voltage 310V (refer.)

## POWER SUPPLY OF DRVIER

Rated Voltage	1Ph, 220V (Driver input)
Rated Frequency	50/60Hz (Driver input)

## CHARACTERISTICS

Hydrostatic Strength Pressure (No Leakage)	High Pressure Side : 16.2MPa (165 kg/cm <sup>2</sup> ) Low Pressure Side : 7.45MPa (76 kg/cm <sup>2</sup> )
Residual moisture / Residual impurities	80mg Max / 50mg Max
Insulation Resistance	50 MΩ min. (with 500V D.C mega tester)
Withstand Voltage	at 1800 V/sec (1250 V/min) Leakage current is less than 2.5 mA

# ROTARY COMPRESSOR APPLICATION



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No	Item	Operational standards and limits
1	Rated frequency range	20 ~ 100 rps
2	Refrigerant charging amount	Max. 100 g (Need to discuss with engineer in case of the additional refrigerant charging)
3	Operating range at standards condition	Discharge Pressure : Less than 1.37MPa (13.96 kg/cm <sup>2</sup> ) Discharge Temp. : Less than 100 °C Motor Winding Temp. : Less than 100 °C
4	Operating range at overload condition	Discharge pressure : Less than 4.25MPa (42.3 kg/cm <sup>2</sup> ) Discharge Temp. : Less than 115 °C Motor Winding Temp. : Less than 130 °C
5	ΔT(Comp bottom Temp. - Cond middle Temp.)	Continuous Running : more than 5 °C Intermittent Running(On/Off) : more than 0 °C When the outdoor temp is below 0 °C, compressor should be operated at revolution over about 26rps.
6	On-Off operating cycle	Over 30rps : Operating more than 5 min. for each cycle (On : 2minutes Min. Off : 2minutes Min.) Under 30rps : Operating more than 8 min. for each cycle (On : 5minutes Min. Off : 2minutes Min.)
7	Liquid flood back (Suction Gas Temp.)	No liquid refrigerant back and strange noise (Superheat 1 °C min.)
8	Vibration of tubing	Tubing vibration displacement : 0.8mm Max
9	Tube Stress (Operation)	Less than 15MPa (1.5 kg f/mm <sup>2</sup> )
10	Tube Stress (Starting & Stop)	Less than 29.5MPa (3 kg f/mm <sup>2</sup> )
11	The allowable tilt of compressor in operation	Less than 30°
12	Length of tubing	2.0m Max. between indoor and outdoor unit
13	Height difference of tubing	1.0m Max. between indoor and outdoor unit
14	Residual moisture in the system	100ppm Max.
15	Residual air in the system	0.1% Max for the internal volume of unit
16	Refrigerant charging	Inject from the outlet of condenser
17	Impact at the time of transportation	Do not impact over 60G during transportation
18	Storage	Do not open Compressor plugs more than 10 minutes before use Maximum allowable storage period : 1 year from production date
19	Terminal Cover & Nut Fasten Torque	15±5 kgf-cm
20	Pressure at start-up	Pressure should be balanced between high & low pressure side
21	(Recommend) defrost revolution	Less than 80 rps when defrosting
22	Pump Down	Running time when temperature of compressor middle body is over 130 °C: Max. 3min Temperature of compressor middle body : Max 135 °C

**PRESSURE GUARANTEE RANGE  
ACCORDING TO ROTATION NUMBER**

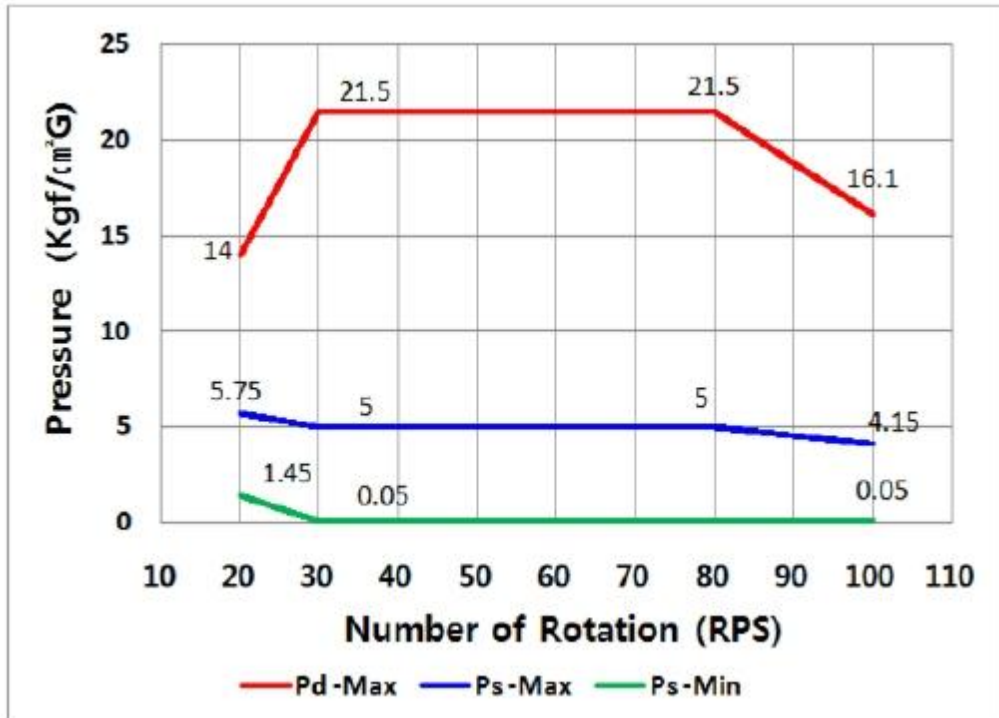


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Rotation Number (rps)	20	30	80	100
High Pressure (Kgf/cm²·G)	Max 14	Max 21.5	Max 21.5	Max 16.1
Low Pressure (Kgf/cm²·G)	1.45~5.75	0.05~5.0	0.05~5.0	0.05~4.15
Compression Rate	Min 1.5	2 ~ 13	2 ~ 13	2 ~ 13



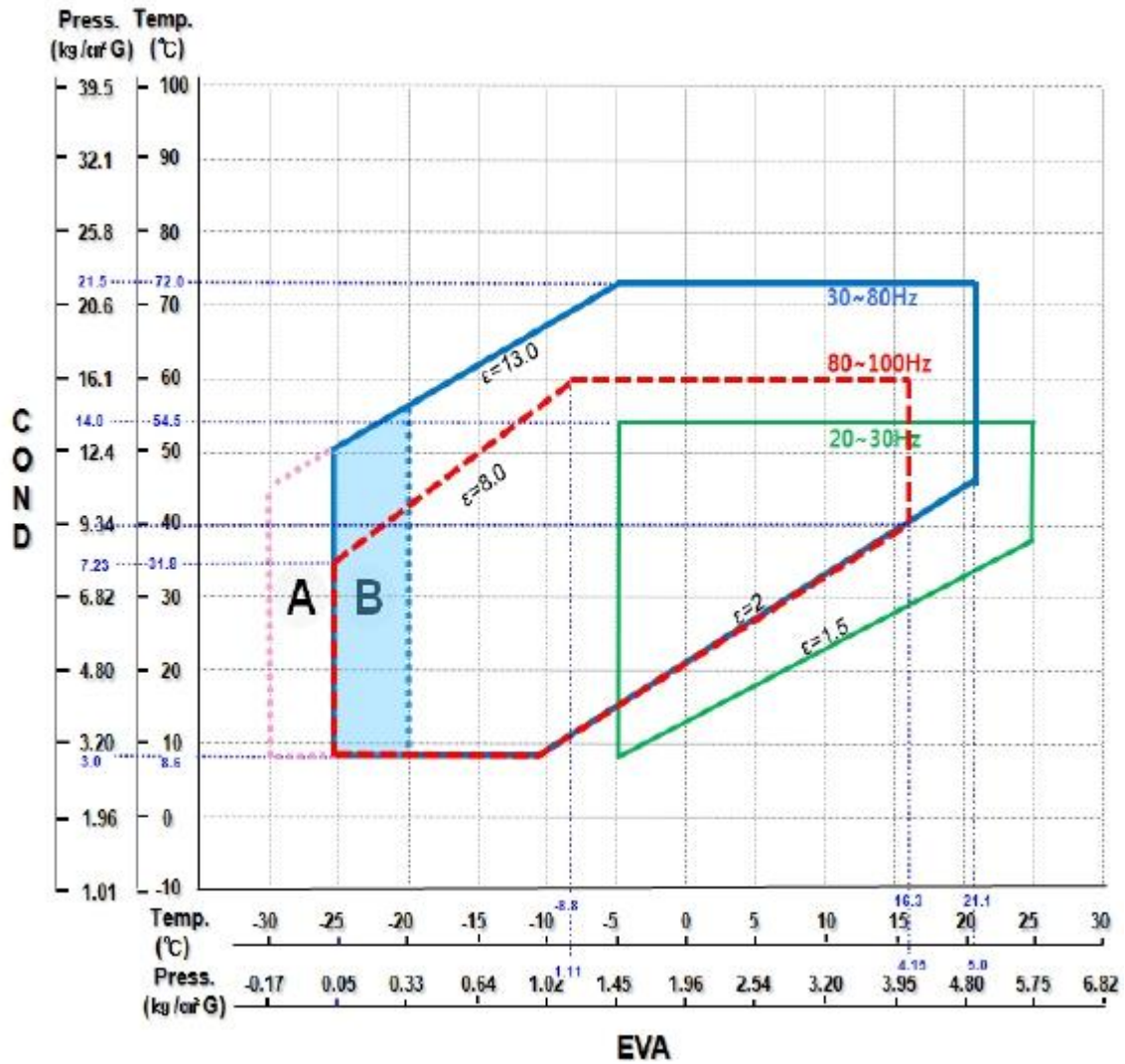
# ROTARY COMPRESSOR APPLICATION ENVELOPE



SPEC. NO : SS - 00705

## MODEL : UX0T011FNAE5

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- ☞ Range "A" : Starting at soaking out. (limit 5 min)
- ☞ Range "B" : Pressure range at transient condition like as starting, defrost running etc.
- ☞ Surface temperature of the compressor necessarily must be maintained below 115 degrees.
- ☞ When applied to the freezing and refrigerating systems of using the evaporation temperature of -5 degrees or less, compressor suction temperature is kept below 20 degrees out.

# ROTARY COMPRESSOR PERFORMANCE CURVE



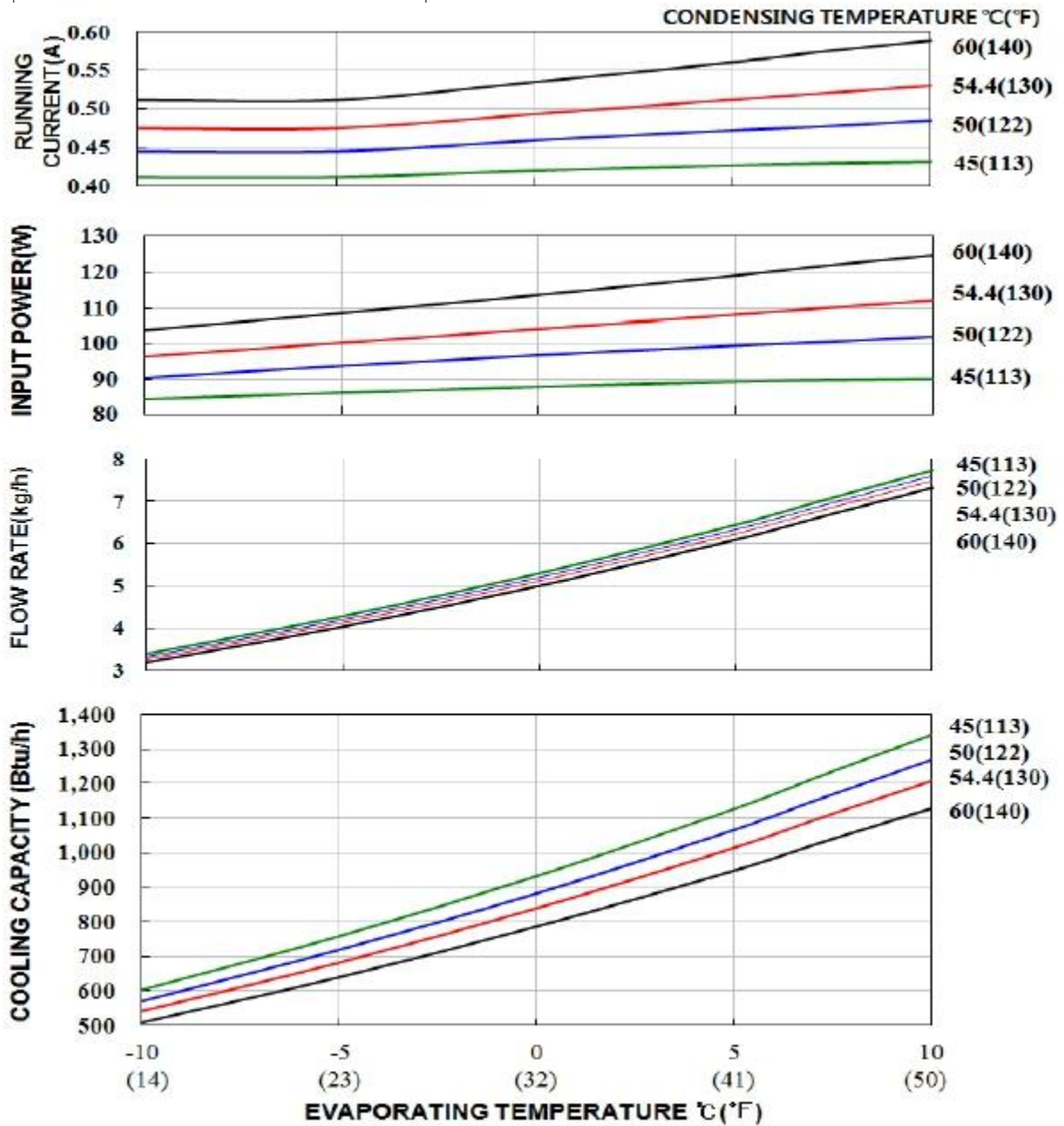
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BASED ON	
SUPER HEAT TEMP	27.8°C
SUB COOL TEMP.	8.3°C
REVOLUTION	220V, 3480 rpm



# ROTARY COMPRESSOR OIL LEVEL IN OPERATION



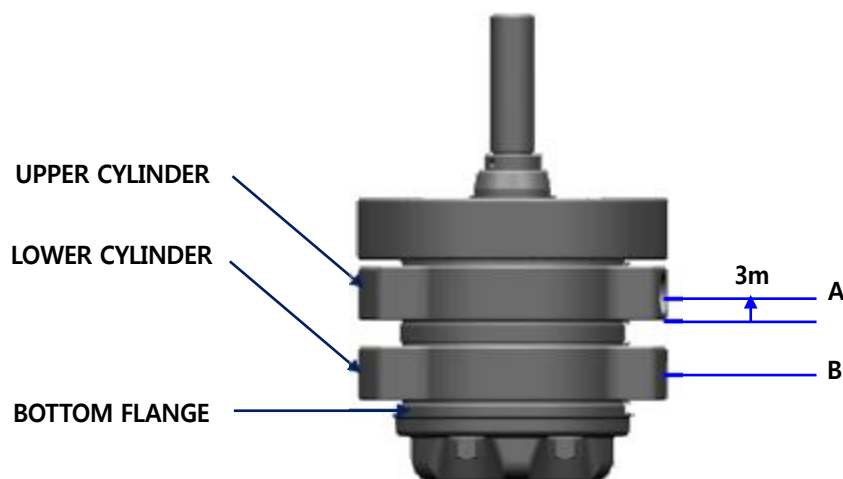
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Oil level test should be checked about abnormal conditions through sight glass which is installed on compressor  
(Overload & Low load running, refrigerant soaking starting, defrost starting, long line reliability test)



A : Above 3 mm from the bottom plane of a upper cylinder

B : The center of a lower cylinder

1. Normal operating condition : Oil level should be higher than A line.
2. Within 5min. after starting under soaking-out condition : Oil level should be higher than B line.
3. Within 3min. On defrosting and after change from defrosting to heating mode : Oil level should be higher than B line
4. Operating below 30 rps : Oil level should be higher than A line

# ROTARY COMPRESSOR INVERTER AND CONTROL RELATION (1)



**MODEL : UX0T011FNAE5**

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## 1. Variation of speed

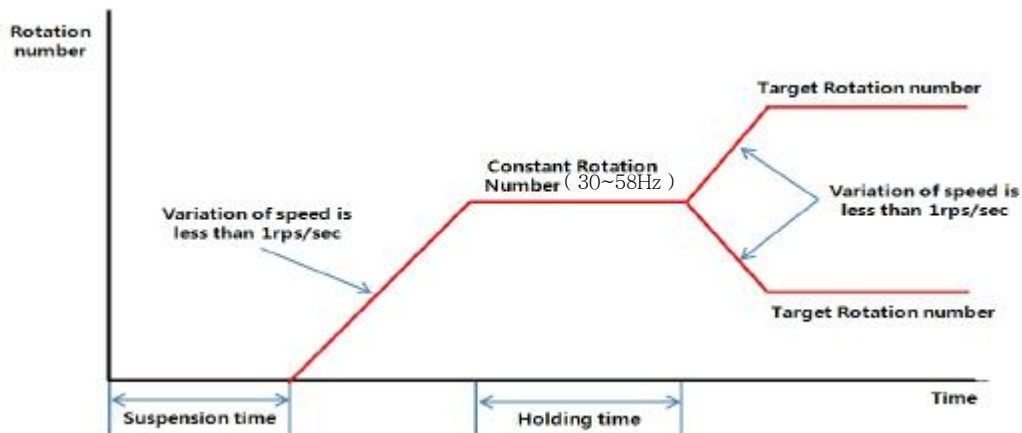
Rising speed of the number of rotations must be 1 rps/s or more slowly  
 In case the rising speed is fast, a lubricating part will be not good.  
 Descend speed of the number of rotations must be 1 rps/s or more slowly.  
 In case the descend speed is fast, it can be easily an excess current, then the compressor is stopped.

## 2. Low rotation frequency

The vibration of compressor is so large at low rps operation, that we recommend the device of vibration protector like torque control.

## 3. Start control

- ① If it reaches the target number of rotations, it must keep the 30~58 rps , number of rotation over 1 minute.(see below graph)
- ② After operation, restarting needs over 1 minutes for pressure balance between high and low side
- ③ Try to start over 3 times.



## 4. Stand-by control

In case an small electric current flows to motor and heat compressor, it must consider the following points.

- ① Don't make a rotation in the compressor.
- ② Keep below 80°C at shell and below 100°C at coil in compressor.



# ROTARY COMPRESSOR INVERTER AND CONTROL RELATION (2)



**MODEL : UX0T011FNAE5**

SPEC. NO : SS - 00705

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## 5. Carrier frequency

Carrier frequency and resonance frequency of compressor part must be differently controlled each other, that is, both of them have different value of frequency.

## 6. Excessive current control

Motor coil temperature must be set below 130°C by the electricity current control.  
(Phase current or total current control)

## 7. Reduction of magnetic intensity

It can be reduction magnet current if the current flow is over 27A at the high temperature (130°C, 3% Demagnetized Level).  
It must protect against momentary heavy current. (DC Peak current control)

# MOTOR SPECIFICATION



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ITEM	MODEL	UX0T011FNAE5
		DC rink V
Resistance (L-L)	$\Omega$ (at 20 °C)	35.8
Winding Spec	Turn	-
Flux	MMx.t	30
Ke	Vps/rad/s	0.087
Kt	N·m/Arms	-
	Line to Neutral(Vrms)	19.2
B-EMF (At 1,000rpm)	Line to Line (Vrms)	-
Inductance [Ld / Lq]	60Hz 0.5A (mH)	29.9/37.5
Demagnetized Current	At 130 °C, 3%	(27.1)

- . Resistance & Inductance : Measured by U-V phase (line to line) at 20 °C
- . Number of motor Poles : 6, Direction of Rotation : Clockwise
- . Demagnetized current is measured at -10 °C

# ROTARY COMPRESSOR WINDING DIAGRAM

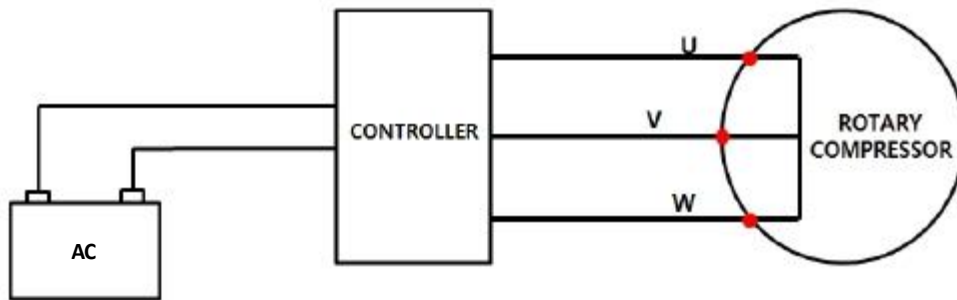


**MODEL : UX0T011FNAE5**

SPEC. NO : SS - 00705

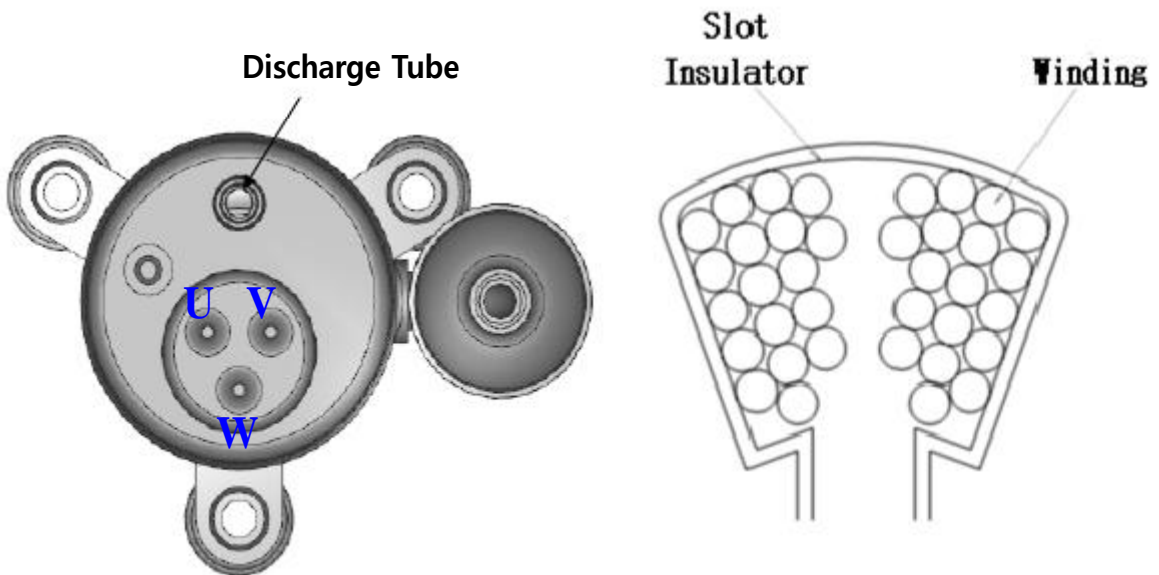
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[ CIRCUIT DIAGRAM ]

※ The controller is available upon the customer's request.



[ A plane figure of comp top ]

[ Insulation and winding drawing of stator slot ]

# ROTARY COMPRESSOR OUTLINE DRAWING

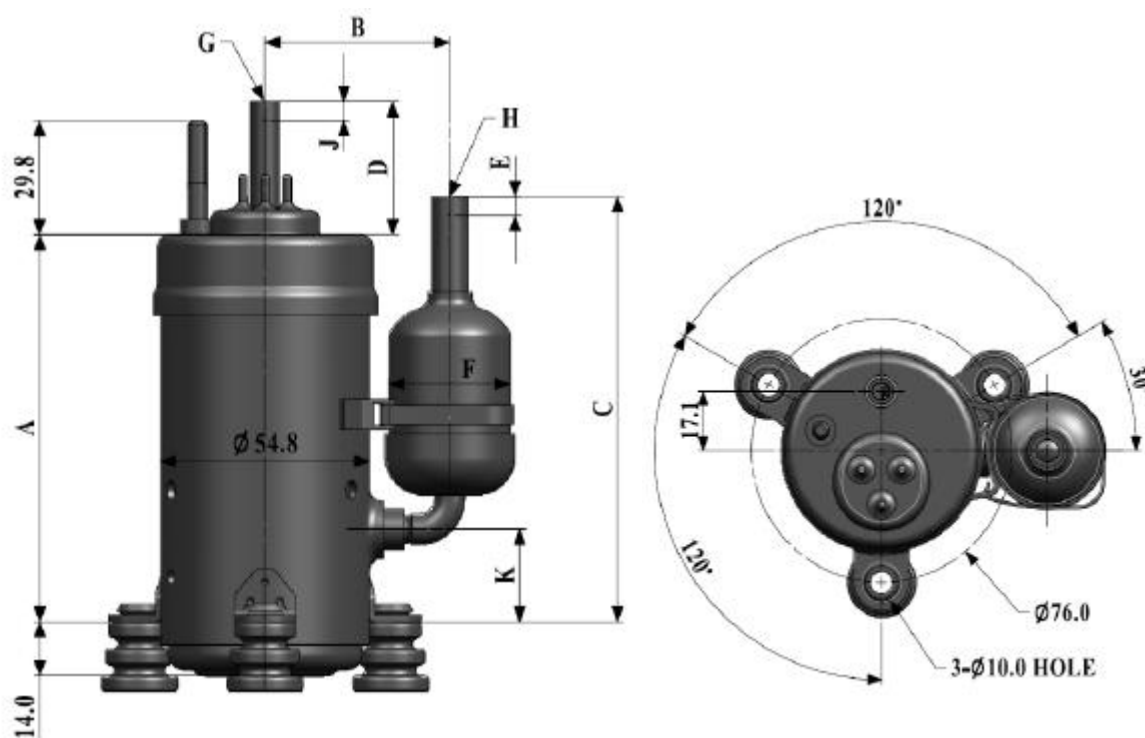


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UNIT: mm

MODEL NO.	DIMENSIONS							Accum (O.D)	TUBE (I.D)	
	A	B(±3.0)	C	D	E	J	K	F	G(±0.15)	H(±0.15)
UX0T011FNAE5	101.3	48.4	111.3	34.8	5.0	5.0	24.3	31.8	4.95	6.54

# ROTARY COMPRESSOR ACCESSORIES



## MODEL : UX0T011FNAE5

SPEC. NO : SS - 00705

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ITEM	COVER TERMINAL	PART NO.	DB63-03584A	Q'TY	1	REMARK
<ul style="list-style-type: none"> <li>- Material : SABIC N1250</li> <li>- Color : Black</li> <li>- UL 94, 5VA</li> </ul>						

# ROTARY COMPRESSOR ACCESSORIES



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ITEM	NUT	PART NO.	6021-001142	Q'TY	1	REMARK
<p>-Material : SWCH10A Trichrom-Chromate</p>						

ITEM	GASKET	PART NO.	DB63-03580A	Q'TY	1	REMARK
<p>- Material : EPDM - Hardness : 80~85 - Thickness : 0.8 ± 0.2</p>						

**ROTARY COMPRESSOR  
ACCESSORIES**



<b>MODEL : UX0T011FNAE5</b>	SPEC. NO : SS - 00705		
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ITEM	GROMMET ISOLATOR	PART NO.	DB63-03589A	Q'TY	3	REMARK	
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- Material : RUBBER CB  
- Hardness : 35/50±4°

ITEM	MOUNTING TYPE	PART NO.		Q'TY	1	REMARK	
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A	18.0 mm
B	0.5 ~ 1.5 mm
C	23.7 mm
D	6.6 mm

# AC CONTROLLER SPECIFICATION



<b>MODEL : SBMC2</b>	SPEC. NO : SS - 00705		
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Sort	Unit		Specification
Power Supply	Rated Voltage	V	230Vac
	Voltage Range	+30% -15%	195.5 - 299Vac
	Frequency	Hz	50~60Hz
Inverter Control	Position Sensing	-	Sensorless & Estimation
	Current Sensing	-	1-Shunt Sensing
	Carrier Frequency	kHz	16
	Max. Input Power	W	230
	Operating Range	rps	20 ~ 100
Dimension	Case type	Length	107.7
		Width	62.4
		Height	47.5
	Weight	g	232.5
Interface	Square-wave pulse frequency	Input	40Hz ~ 200Hz
	Variable Resistor input	Input	Not Applicable(only for SBMC1)
	Open Collector Output	Output	Fault indicator(Refer to 3. CONNECTION & INTERFACE DIAGRAM)
Protection	-	-	Restart after 1min



# AC CONTROLLER OUTLINE DRAWING



**MODEL : SBMC2**

SPEC. NO : SS - 00705

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ITEM	PBA CASE	PART NO.	DB61-06153A	Q'TY	1	REMARK

# AC CONTROLLER CONNECTION & INTERFACE DIAGRAM



SPEC. NO : SS - 00705

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## MODEL : SBMC2

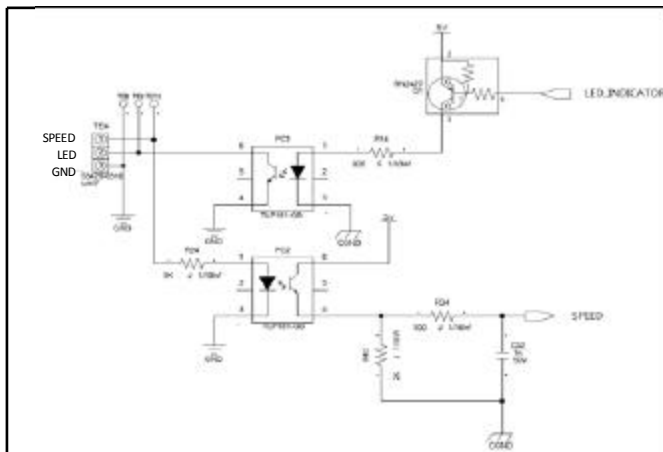
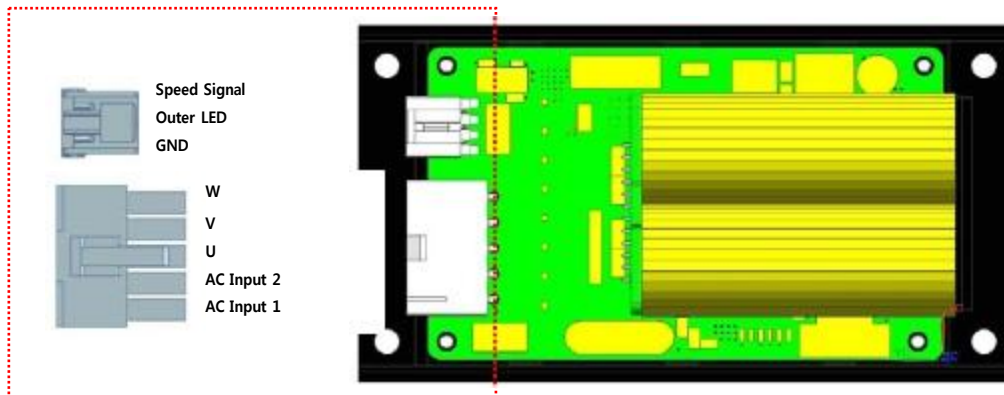
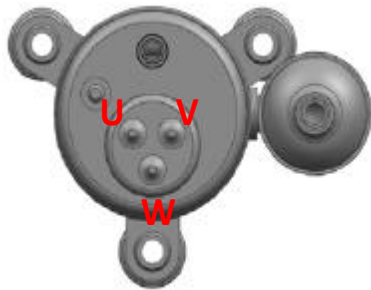


Table 1

Target RPS	Speed Signal Hz
20	40
26	52
32	64
38	76
44	88
50	100
56	112
62	124
68	136
74	148
80	160
100	200

Refer to "SPECIFICATION SHEET" for Supply volatge.

Connector for communication uses Speed Signal and GND terminal pin. As Table 1 shows, it can apply the Digital signal.

If digital signal apply, duty rate is 50%.

# AC CONTROLLER SPECIFICATION UNDER OPERATION

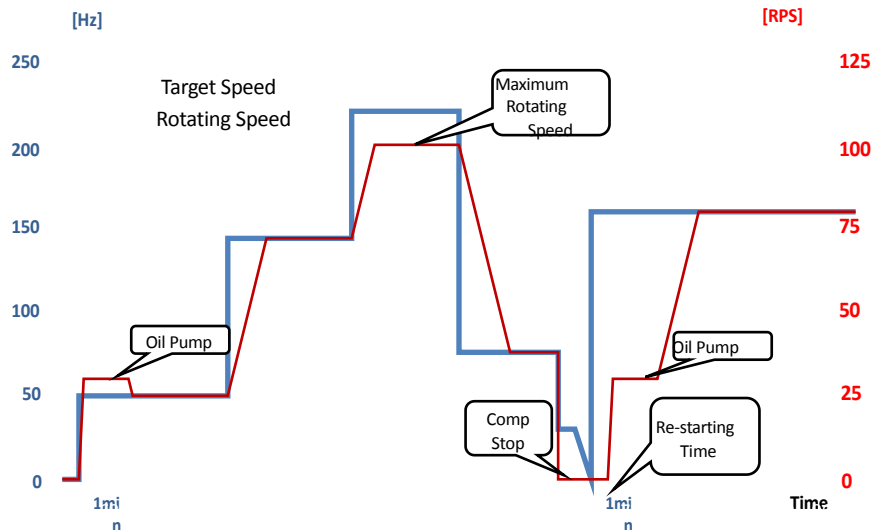


**MODEL : SBMC2**

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Reference

- ① Target Speed :  
Digital(square wave) signal over 40[Hz] need to be inserted to run compressor  
Target Speed [RPS] = Digital(square wave) Signal Frequency[Hz]×1/2
- ② Oil Flow Rate :  
When compressor start to run, compressor should run for 1 minute due to reliable oil flow.
- ③ Maximum Rotating Speed:  
Maxium rotating speed is 100[RPS]. Maximum speed is not over 100 RPS even if 220[Hz] is inserted
- ④ Decelerate/Accelerate rate :  
When new digital(square wave) signal is inserted to SBMC2 during compressor is runing, rotating speed is changed to new target speed at ± 1[RPS] per a second
- ⑤ Automatical Compressor Stop :  
Compressor will stop if the digital(square wave) signal frequency is below 34[Hz].
- ⑥ Restarting Time :  
If compressor stop, pressure balance between suction and discharge is needed for starting  
Re-starting time of SBMC2 is 1 minute

# AC CONTROLLER TYPE OF ERRORS



<b>MODEL : SBMC2</b>	SPEC. NO : SS - 00705		
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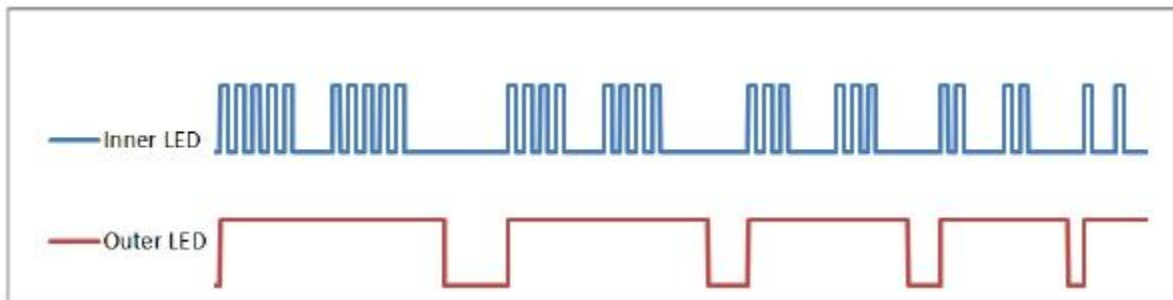
## 5. TYPE OF ERRORS



Outer LED source in  
Molex 53426-0310 #2 Pin

Counts of LED-flashes	Type of Errors
1	Comp. locking or overload
2	Disconnection of Comp. line or an error of sensing current
3	Short-circuit on motor parts or over-current
4	Abnormal DC voltage
5	Overheat of the controller

Compressor will stop if the errors occur  
 Errors can be checked up by the Counts of LED flashes  
 Through Molex Housing #2 pin, SBMC2 can supply the outer LED.



**AC CONTROLLER  
PORWE LEAD WIRE ASSY**



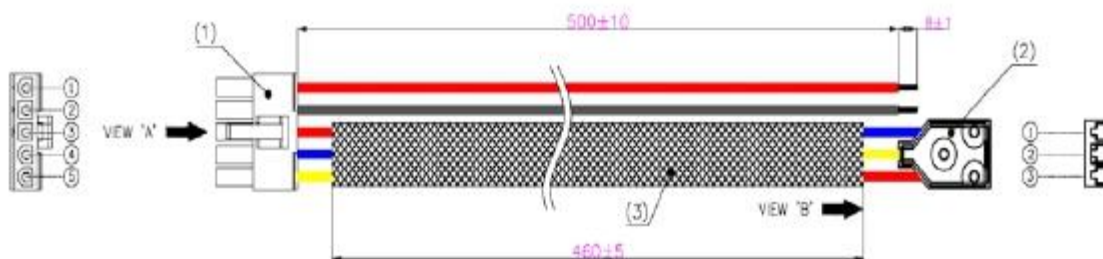
**MODEL : SBMC2**

SPEC. NO : SS - 00705

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ITEM	WIRE HARNESS-POWER	PART NO.	DB39-01351A	Q'TY	1	REMARK
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**WIRE SPECIFICATION**

Pin No.	Wire Spec.	COLOR	LENGTH	Description	Pin No.
①	UL1015 AWG#16	RED	500mm	POWER	/
②		BLACK		GROUND	/
③		RED		PHASE 'U'	③
④		BLUE		PHASE 'V'	①
⑤		YELLOW		PHASE 'W'	②

**COMPONENTS SPECIFICATION**

No.	PART NAME	PART No.	MAKER	Q'ty	COLOR
(1)	HOUSING	39-01-4051	MOLEX	1	WHITE
	TERMINAL	39-00-0079		5	-
(2)	CLUSTER BLOCK HOUSING	171370-5	AMP	1	GRAY
	RECEPTACLE	170063-2		3	-
(3)	PVC TUBE	ø11.0,105°C,L460	-	1	BLACK

**AC CONTROLLER  
SIGNAL LEAD WIRE ASSY**



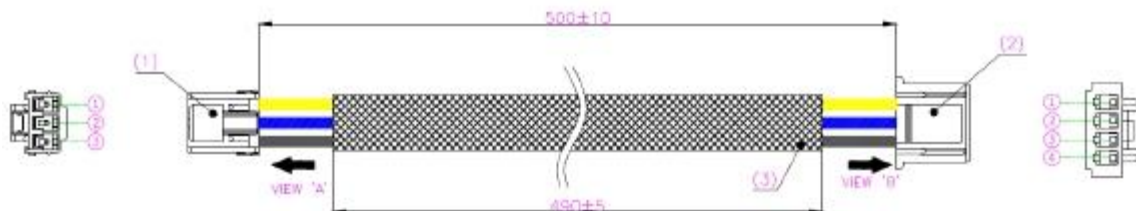
**MODEL : SBMC2**

SPEC. NO : SS - 00705

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ITEM	WIRE HARNESS-SIGNAL	PART NO.	DB39-01350A	Q'TY	1	REMARK
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WIRE SPECIFICATION

Pin No.	Wire Spec.	COLOR	LENGTH	Description	Pin No.
①	UL1007 AWG#24	YELLOW	500mm	GROUND	③
②		BLUE		LED	①
③		BLACK		SPEED	②
					④

COMPONENTS SPECIFICATION

No.	PART NAME	PART No.	MAKER	Q'ty	COLOR
(1)	HOUSING	0511630300	MOLEX	1	WHITE
	TERMINAL	0503518000		3	-
	RETAINER	0511640305		1	GRAY
(2)	HOUSING	SMH250-04L	YEONHO	1	WHITE
	TERMINAL	YST025L3		3	-
	RETAINER	SMH250-04RT		1	RED
(3)	PVC TUBE	ø5.0,105°C,L490	-	1	BLACK

# STANDARD EXPORT PACKING IN 20 FEET CONTAINER



**MODEL : UX0T011FNAE5**

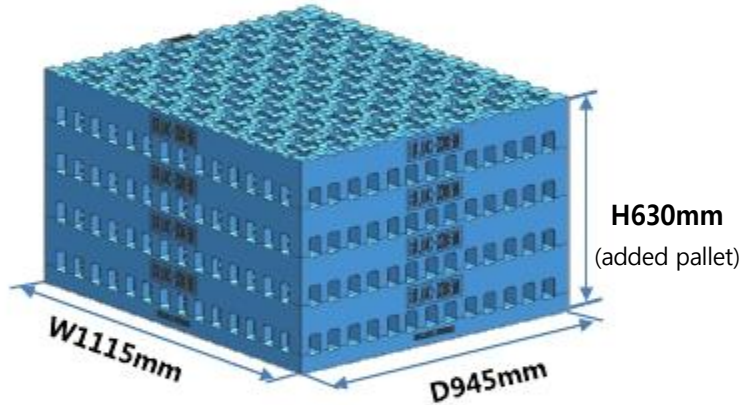
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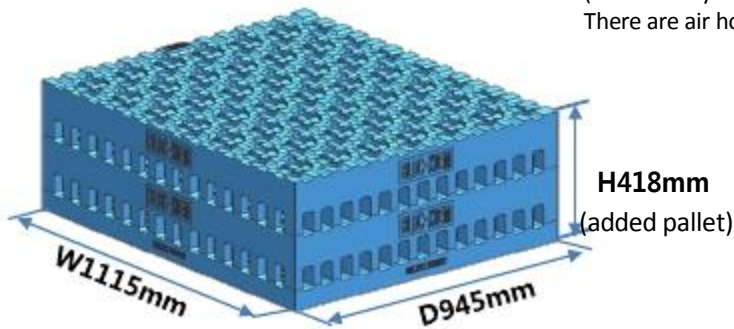
FRAME	Compressor Q'ty / Carton		Carton Q'ty (20Ft)		Accessory Box ⑤ (Carton)	Loading Quantity ⑥ (pcs)
	Type 1 ① (pcs)	Type 2 ② (pcs)	Type 1 ③ (Carton)	Type 2 ④ (Carton)		
20F	182	364	6	12	42	5,460
	182	364	1	0	2	182
Unit Packing (Included Driver)	182	364	0	1	3	364

Total Compressor Q'ty = ① \* ③ + ② \* ④ = ⑥ (5,460 pcs)



**TYPE 2 PACKING**

Pallet packing is covered with paper cover and plastic bags. (Low Density Polyethylene) There are air holes at each side.



**TYPE 1 PACKING**