PANASONIC SCROLL COMPRESSORS

Model : C-SBS235H38B

Aproveed for R407C, R448A, R449A, R134a, R513A, R404A

Panasonic Appliances Compressor (Dalian) Co.,Ltd.

Section 1. General Specifications

Model	C-SBS235H38B	**Electrical**	380-415 Volts 3 Phase 50Hz
Refrigerant	R407C		440 Volts 3 Phase 60Hz

Nominal Performance at ARI

Power Source		50Hz-380V	60Hz-440V
Capacity	(W)	19500	23400
Power	(W)	6300	7550
Current	(A)	11.2	11.3
COP	(W/W)	3.10	3.10
Mass Flow	(kg/h)	470	565

Rating Conditions (R407C MID Point)

Condensing Temperature(℃)	54.4
Evaporating Temperature(℃)	7.2
Return Gas temperature(℃)	18.3
Liquid Temperature(℃)	43.8
Ambient Temperature(℃)	35

Motor

	50Hz	60Hz
Voltage Range(V)	342-456	396-484
RLA (A)	12.5	
MCC (A)	17.5	
LRA (A)	73	76
RPM (min^{-1})	2900	3450

Compressor

Maximum Discharge Temp(℃)	130
Displacement (cm^3/rev)	110.2
Weight (with oil kg)	40

Oil

Oil Type	FV68S
Initial Charge (ml)	1700
Re-charge (ml)	1600

Electrical Components

Motor Protector Type	Internal
Run Capacitor Rating (MFD/Volts)	n/a

Winding Resistance
at 25ºC

U-V	-
U-W	-
V-W	-

Sound level

	50Hz/380V	60Hz/440V
(db)	-	-

Nominal performance values +/-5% with 1 hr run-in.
Ratings with air over compressor.
Sound level is an average sound pressure level in fou directions. MIC location is the distance of 1m from the compressor Specifications subject to change without notice.

Minimum Starting Voltage

Power Source (3PH)	Hz	50	60
Minimum Starting Voltage	V	304	352

Conditions

Compressor Temp.	°C (°F)	10~60(50~140)
Ambient Temp.	°C (°F)	10~40(50~105)
High Pressure	MPa(G)/psig	2(290)
Low Pressure	MPa(G)/psig	0.5(72)

Inernal Motor Protector (in compressor)

Parts Name	Specification	
Inernal Motor Protector	TripTemp.	–
	Reset Temp.	–
	Trip Current	-

Others

Content		Unit	Specification
Design Pressure	L.P. S.	MPa(G)/psig	1.6(232)
	H. P. S.	MPa(G)/psig	3.3(479)
Insulation Resistance		MΩ	100 (without refrigerant)
Dielectric Strength		V	2400 (1 second)
Residual Moisture		mg	300

Note:

1. The insulation resistance be measured with a DC500V megohm test

Accessories List

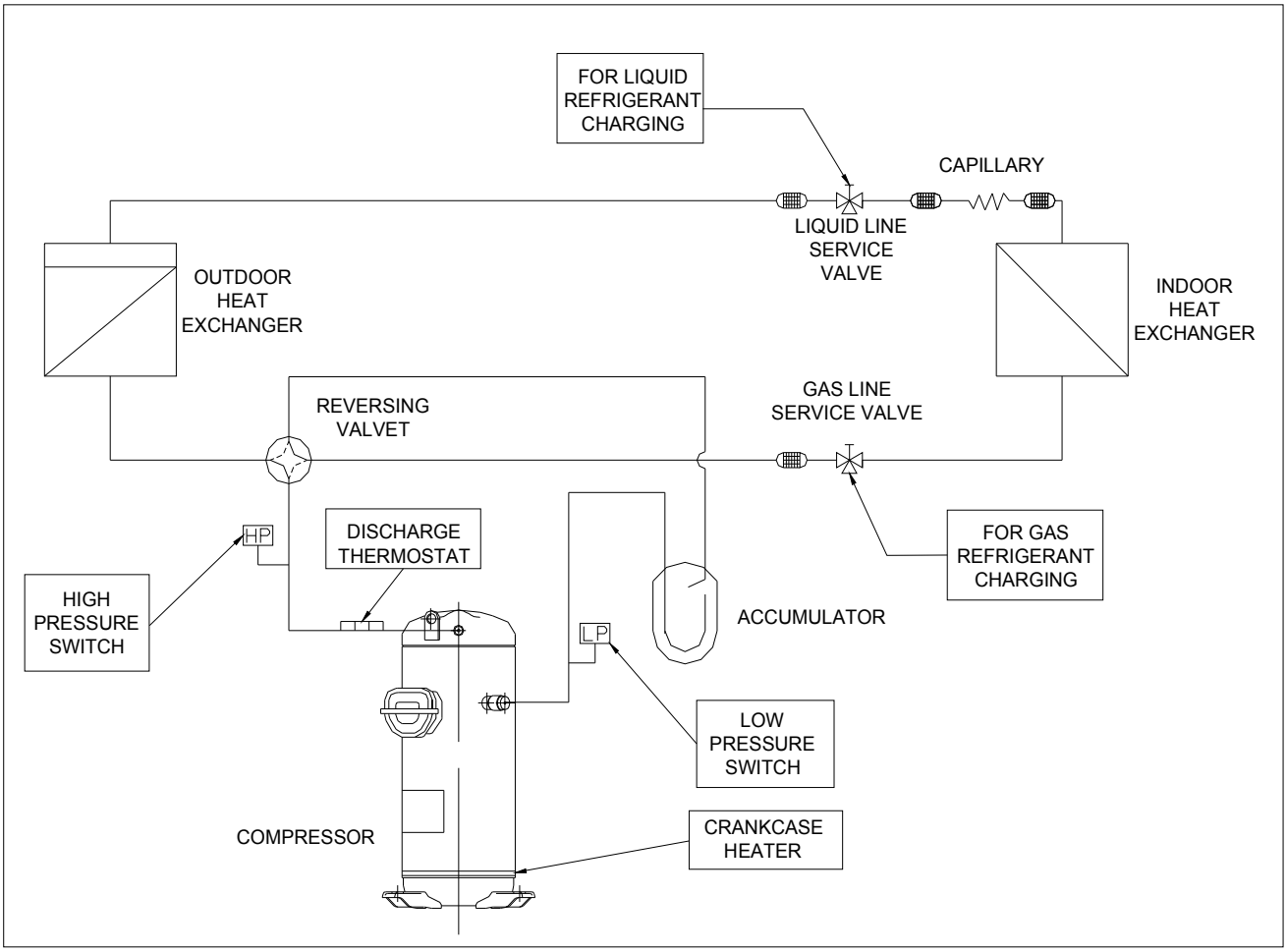
Parts Name	Qty	Parts code	Revision No.	Note
Terminal Box Cover	1	A-0101-DSB	0	Installed on Compressor
Terminal Box Clip	1	A-0201-DSB	0	Installed on Compressor
Insulating Grommet	1	A-0301-DSB	0	Installed on Compressor
Mounting Grommet	4	M-0101-DSB	0	Included with Compressor
Mounting Sleeve	4	M-0201-DSB	0	Included with Compressor
Screw Special	1	B-0101-DSB	0	Installed on Compressor

Section 2. Compressor Protection

2.1 Protection Required but not Included with compressor

Protection Device	Items	Specifications
Reversal Defensible Relay	Features	To protect the compressor from reverse rotation
	Rated Voltage	AC380V
Crankcase Heater	Rated Power	35 Watts
Discharge Thermostat	Mounting Position	Located within 100mm(4 in)from the compressor shell
	Trip Temperature	130±5℃(266 ±10 °F)
	Reset Temperature	95±11℃ (205 ± 20 °F)
High Pressure Switch	Setting	Cut-out seting no higher than 3.2MPa(G)
Low Pressure Switch	Setting	Cut-out seting no lower than 0.05MPa(G)

2.2 Position of the Protection and Refrigerant Charging



Section 3. Performance data

PERFORMANCE DATA

Compressor Model	**C-SBS235H38B 3PH**
Power Source	**50Hz 380-415V 9**
Suction Gas Superheat(K)	**8.3**
Sub Cooling(K)	**Natural Cooling**
Compressor Cooling	**R407C**
Refrigerant	

CAPACITY(W)

Condensing	Evaporating Temperature(℃)							
Temperature(℃)	-15	-10	-6.7	0	4.4	7.2	10	12
35.0	10,890	13,070	14,750	18,840	22,130	24,520	27,160	29,220
40.5	10,220	12,270	13,840	17,670	20,750	22,990	25,460	27,390
45.0	9,700	11,640	13,130	16,760	19,680	21,800	24,140	25,970
50.0	9,150	10,980	12,380	15,800	18,550	20,540	22,750	24,470
54.4		10,420	11,750	15,000	17,610	19,500	21,590	23,220
60.0			11,010	14,040	16,480	18,250	20,210	21,730
65.0				13,250	15,540	17,210	19,050	20,490

POWER(W)

Condensing	Evaporating Temperature(℃)							
Temperature(℃)	-15	-10	-6.7	0	4.4	7.2	10	12
35.0	3,930	3,970	4,010	4,100	4,180	4,230	4,290	4,330
40.5	4,340	4,410	4,460	4,580	4,660	4,720	4,780	4,820
45.0	4,710	4,820	4,880	5,020	5,120	5,180	5,240	5,280
50.0	5,170	5,310	5,400	5,580	5,680	5,750	5,810	5,850
54.4		5,800	5,910	6,110	6,230	6,300	6,360	6,400
60.0			6,620	6,870	7,000	7,070	7,140	7,180
65.0				7,610	7,760	7,830	7,900	7,930

CURRENT(A) @380V

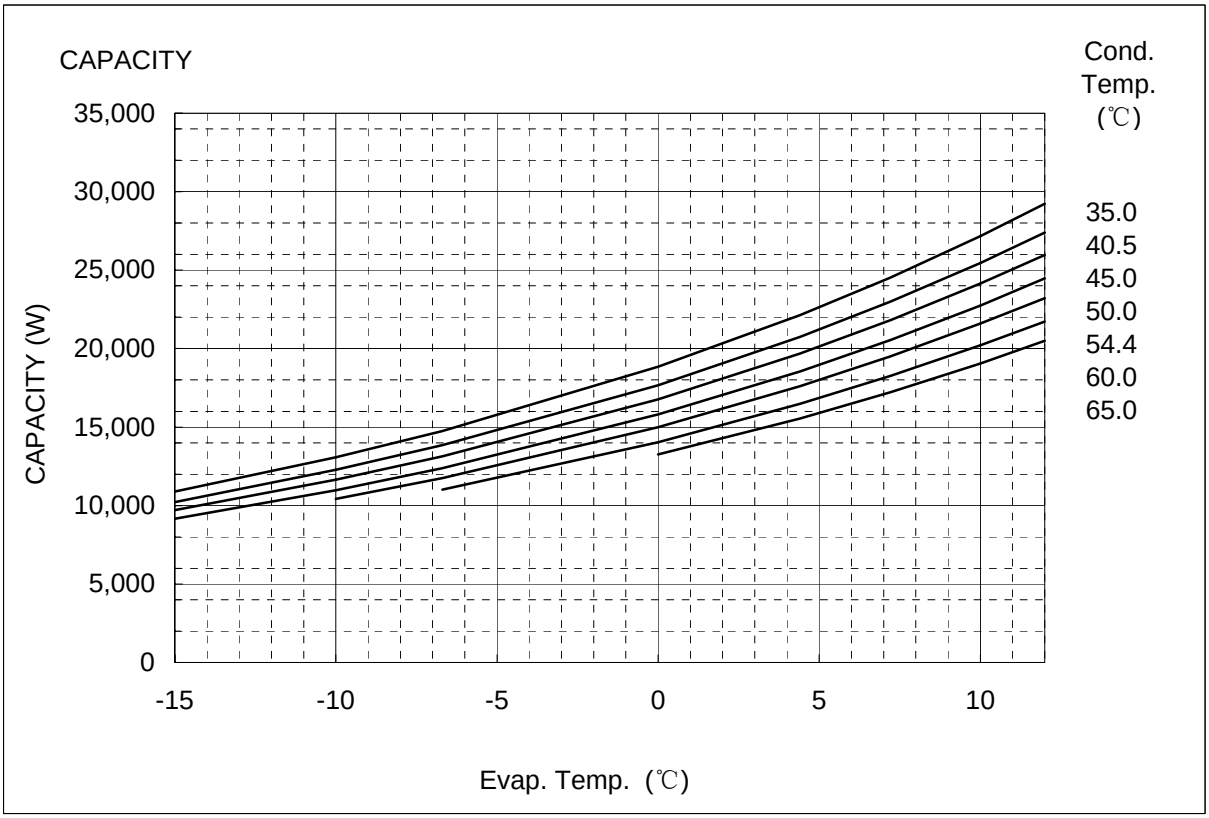
Condensing	Evaporating Temperature(℃)							
Temperature(℃)	-15	-10	-6.7	0	4.4	7.2	10	12
35.0	7.8	7.8	7.8	7.9	8.0	8.1	8.2	8.3
40.5	8.4	8.5	8.5	8.7	8.8	8.9	9.0	9.0
45.0	8.9	9.1	9.2	9.3	9.5	9.6	9.7	9.7
50.0	9.6	9.8	9.9	10.2	10.3	10.4	10.5	10.6
54.4		10.4	10.6	10.9	11.1	11.2	11.3	11.4
60.0			11.6	12.0	12.2	12.3	12.4	12.5
65.0				13.0	13.2	13.4	13.5	13.5

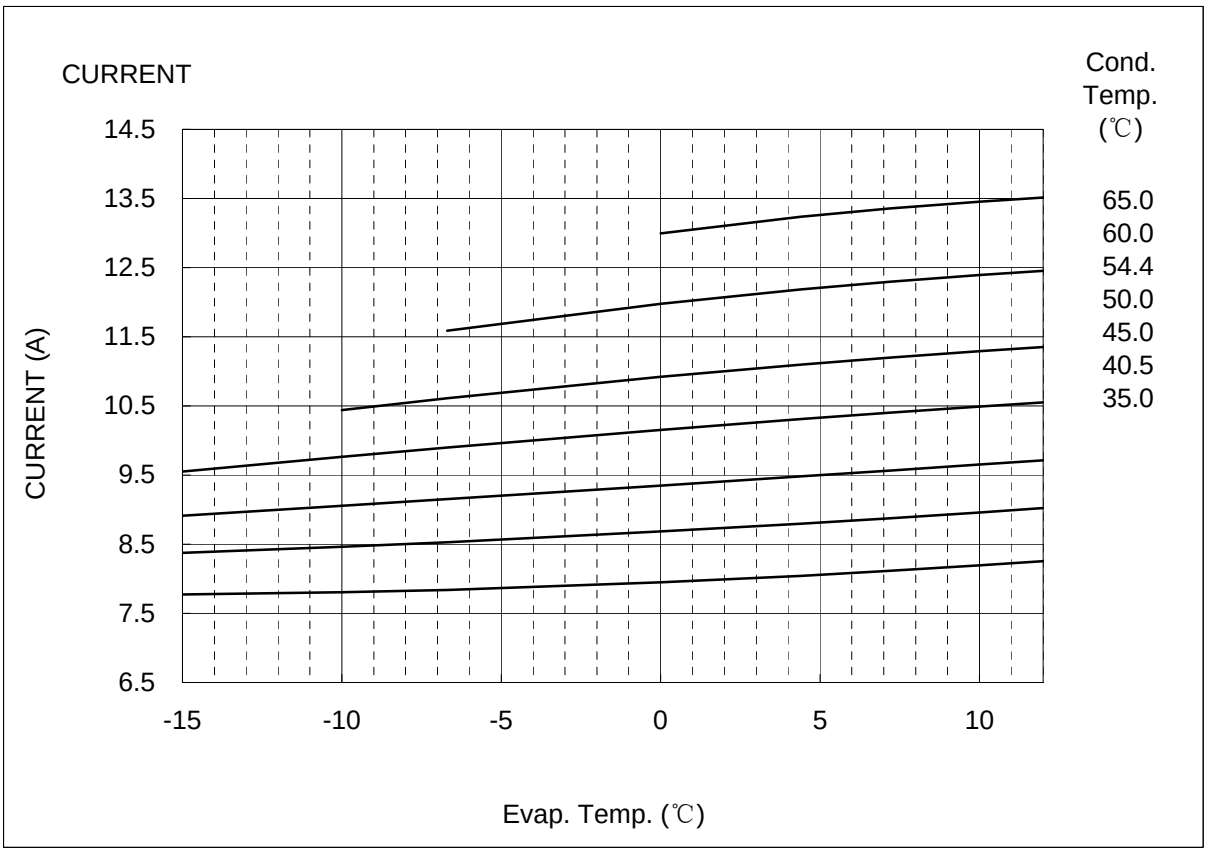
NOTE:

*** The performance values subject to change without notice.**

Compressor Model **C-SBS235H38B 3PH**

Power Source **50Hz 380-415V**





COEFFICIENTS OF PERFORMANCE CURVES

Compressor Model	**C-SBS235H38B 3PH**
Power Source	**50Hz 380-415V**
Suction Gas Superheat (K)	**9**
Sub Cooling (K)	**8.3**
Compressor Cooling	**Natural Cooling**
Refrigerant	**R407C**

X=C1+C2*(S)+C3*D+C4*(S2)+C5*(S*D)+C6*(D2)+C7*(S3)+C8*(D*S2)+C9*(S*D2) +C10*(D3)

X——CAPACITY(W) OR POWER(W) OR CURRENT(A) OR FLOW(kg/h)

S——EVAPORATING TEMP, °C

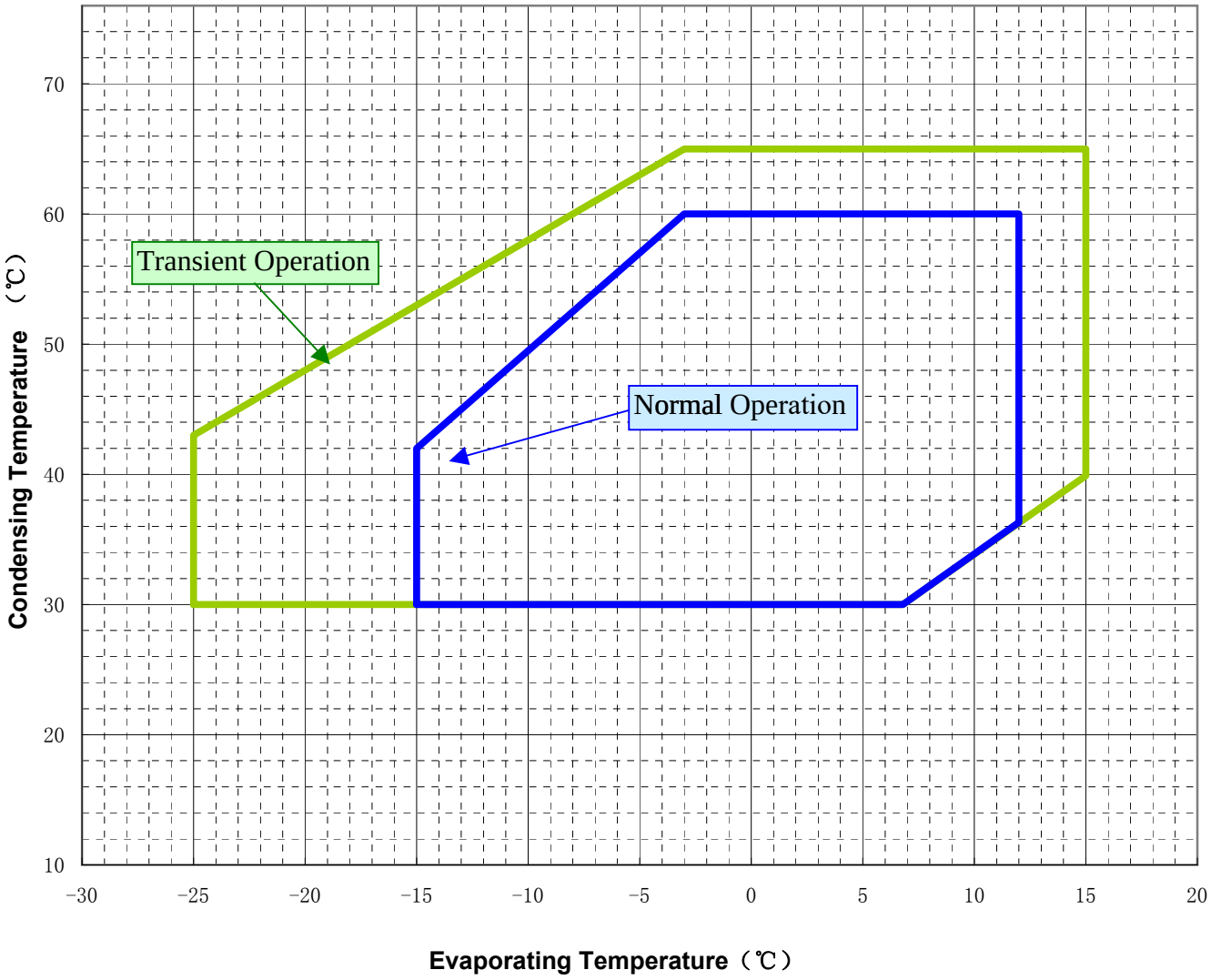
D——CONDENSING TEMP, °C

380V-50Hz	CAPACITY (W)	POWER (W)	CURRENT (A)
C1	2.785714E+04	2.760579E+03	5.150769E+00
C2	1.047761E+03	7.714436E+00	6.212155E-03
C3	-2.961493E+02	-4.054090E+00	3.211921E-02
C4	1.761241E+01	1.533474E+00	2.690169E-03
C5	-1.186673E+01	-4.897943E-03	-1.037790E-04
C6	1.098713E+00	1.208405E+00	1.360911E-03
C7	1.327423E-01	-3.056640E-03	-2.925073E-06
C8	-1.378937E-01	-3.450038E-02	-6.008830E-05
C9	4.829365E-02	7.012657E-03	1.419595E-05
C10	5.986822E-09	1.371784E-08	1.013548E-11

Note:The polynomial coefficients subject to change without notice.

Section 4. Operating Envelope

Suction Gas
Superheat :9K
Refrigerant : R407C



Section 5. Application Standard & Limit

The following requirements apply to vertical type hermetic scroll compressors:

Standard: Applicable to ordinary conditions in Japan JIS B8616 or standards relative to JIS B8616, such as standard rating conditions, maximum operating conditions, low temperature conditions, etc.

Limit: Applicable to transitional brief period of time, such as start-up and beginning of defrost mode.

No.	Item	Standard	Limit	Remark
1	Refrigerant	R407C(Refrigerant must meet a criterion)		
2 2	Average Evap. Temp.	-15~12℃(5～54 ° F) 0.20~0.65MPa(G)(29～94psig)	-25~15℃(-13～59 ° F) 0.07~0.73MPa(G)(10～106psig)	Average temp. of evaperator Inlet and outlet.
3	Average Cond.Temp.	30~60℃(86～140 ° F) 1.17~2.56MPa(G)(170～371psig)	65℃(149 ° F) 2.88MPa(G)(418psig)	Average temp. of condensor Inlet and outlet.
4	Compression Ratio	2 ~ 6	10	
5	Winding Temp.	115℃(240 °F) Max.	125℃(257 °F)	
6	Shell Bottom Temp.	90℃(194 °F) Max.		
		Evaporating Temp.+12℃(21 °F) Min.		Operating
		Ambient Temp.+11℃(20 °F) Min.		Not Operating
7	Discharge Gas Temp.	115℃(240 °F) Max.	C-SB:130℃(266°F) Max.	Temp. within 10cm of the discharge fitting.
			C-SC:135℃(275°F) Max.	Temp. inside of the copper pipe on the top of compressor
8	Suction Gas Temp.	Superheat: 5K(10 °F)Min.	No excessive noise.	It should meet the requirement of item 5, 6, 7 and 14 within 30cm of the suction fitting.
9	Running Voltage	Within ±10% of the rated voltage		Voltage at compressor terminals.
10	Starting Voltage	Three Phase Models: 85% of the rated voltage min.		Voltage at compressor terminals.
		Single Phase Models: 90% of the rated voltage min.		
11	On/Off Cycling	On Period: Until the oil level returns to the center of the lower bearing Off Period: Until balance of high and low pressure is obtained		For at least 7 minutes - on/3 minutes-off is recommended.
12	Refrigerant Charge	Oil/Refrigerant(wt.)≥0.35.		Specific gravity of the Oil:0.94.
13	Life Time	200,000 cycle		
14	Minimum Oil Level	C-SB:Center of the lower bearing	C-SB:Bottom of the lower bearing	
		C-SC:No less than 70% of the initial oil charge		
15	Abnormal Pressure Rise/Drop	Pressure Rise: 3.20MPa(G) (464psig) Max.		By high pressure switch
		Pressure Drop: 0.05MPa(G) (7.3psig) Min.		By low pressure switch
16	System Moisture Level	200ppm Max.		
17	System Uncondensable Gas Level	1 Vol.% Max. Residual Oxygen 0.1 Vol.% Max.		24 hrs. after vacuuming: 1.01kPa Max.
18	Tilt	5Deg.Max.		

(G): Gauge Pressure

Notes

1 Installation should be completed within 15 minutes after removing the rubber plugs.

2 Do not use the compressor to compress air.

3 Do not energize the compressor under vacuumed conditon.

4 Evacuation and Refrigerant charge ： Evacuate internal section in the refrigeration system from high and low pressure sides and charge liquid refrigerant from condenser outlet side. Additional charge shall be done with gas condition from low side.

5 Do not tilt over the compressor while carrying it.

6 Do not remove the paint.

7 Crankcase heater is required when the oil sump temperature is too low to meet the requirement of item 6 on page7.

8 Voltage fluctuation between compressor terminals, during operation, shall be within 2% of the rated voltage.

9 Do not operate compressor in reverse rotational direction.

10 Suction strainers are recommended for all applications.

11 Copper Piping Stress	Start/Shutdown	34.32 N/mm^2 Max.
	Run	12.26 N/mm^2 Max.

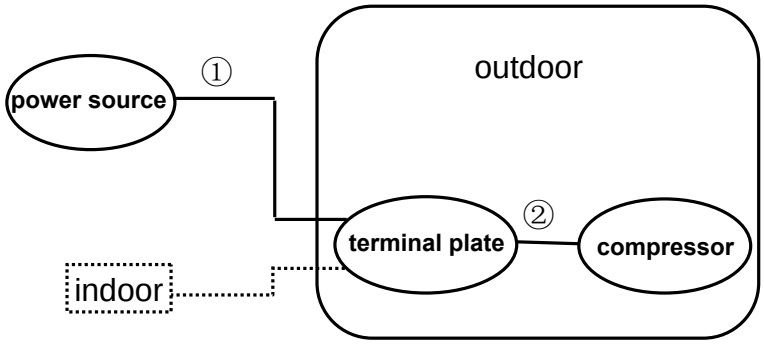
Section 6. Selection of Electrical Wire

Voltage drop may occur due to the large current draw during compressor starting.

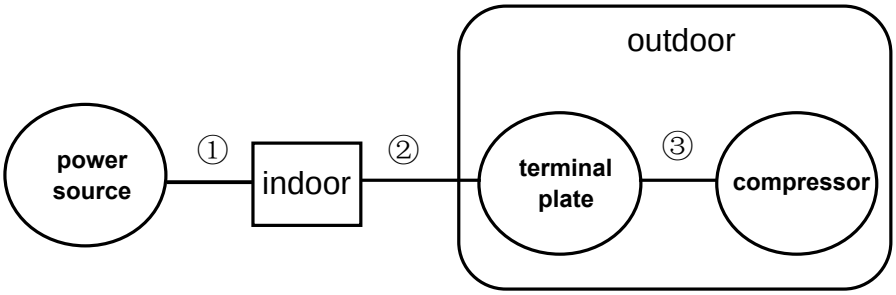
We recommend selecting the wire size from the table below.

6.1 Type of Unit

6.1.1 Window & Commercial Type Unit



6.1.2 Split Type(Separate Type)



6.2 Size Table of Electrical Wire

Starting current (A)	Size of electrical wire (mm^2)						
	Remark ① or Remark ①+② (heat-resistance Temperature: 60°C(140°F) min.)						Remark③ (heat-resistance Temperature: 120°C(248°F) min.)
	5m max.	10m max.	15m max.	20m max.	30m max.	50m max.	1m max.
20max.	2.0	2.0	2.0	3.5	5.5	8.0	2.0
30max.	↑	↑	3.5	5.5	↑	14.0	↑
40max.	↑	3.5	5.5	↑	8.0	↑	↑
50max.	↑	↑		8.0	14.0	22.0	↑
60max.	↑	5.5	↑	↑			↑
70max.	3.5	↑	8.0	14.0	↑	↑	3.5
80max.	↑	↑			22.0	30.0	↑
90max.	↑	↑	14.0	↑	↑		↑
100max.	↑	8.0	↑	↑		38.0	↑
110max.	↑	↑					↑
120max.	5.5	↑	↑	22.0	30.0	↑	↑
140max.	↑	14.0	↑	↑		50.0	5.5
160max.	↑	↑	22.0	↑	↑		↑
180max.	↑	↑			38.0	60.0	8.0
200max.	8.0	↑	↑	30.0	↑	↑	↑
220max.	↑	↑			50.0	80.0	↑
240max.	↑	↑					14.0

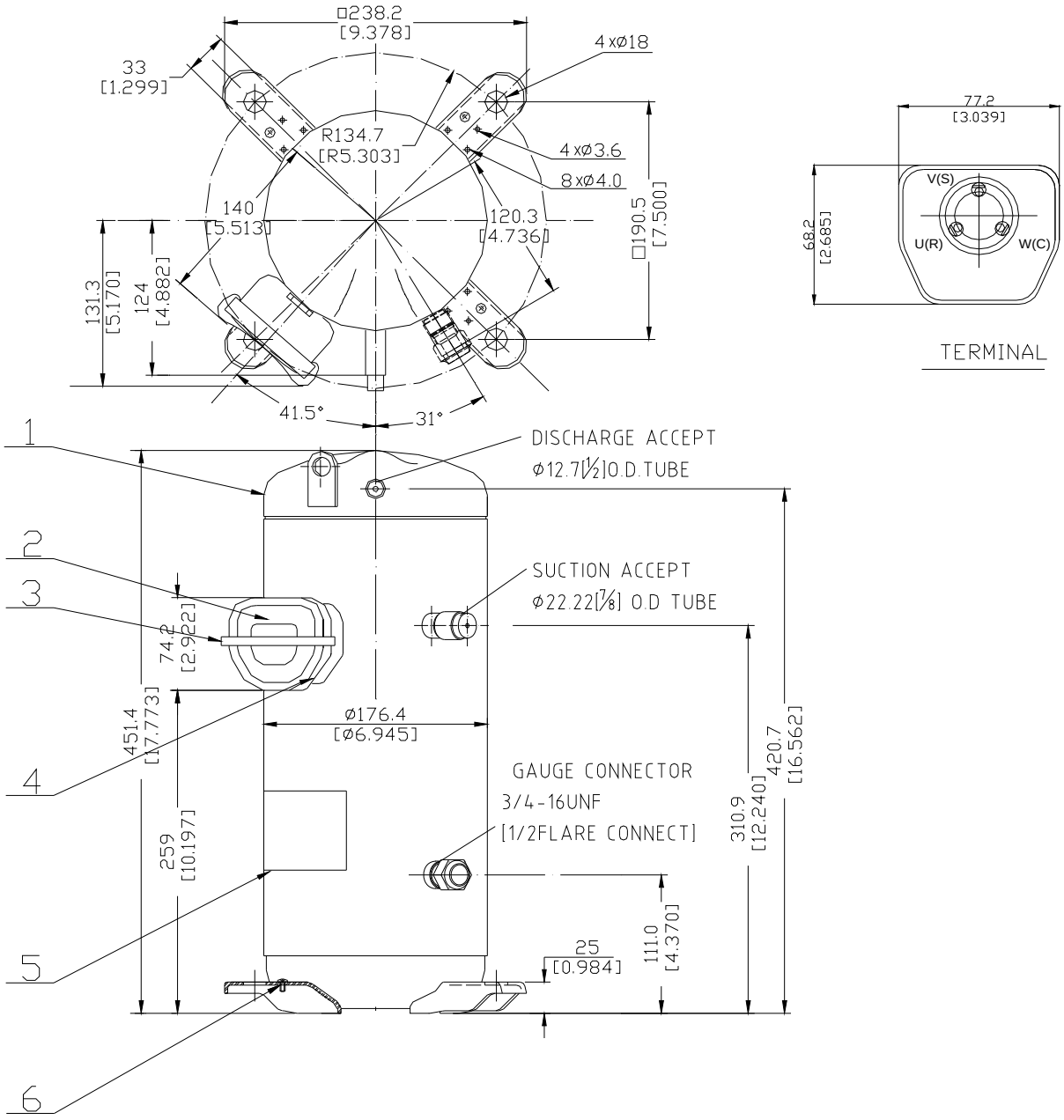
The internal motor protector does not protect the compressor against all possible conditions.

Please be sure that the system utilizes the ground connection when installed in the field.

Section 7. Drawings

7.1. Dimensional Sketch

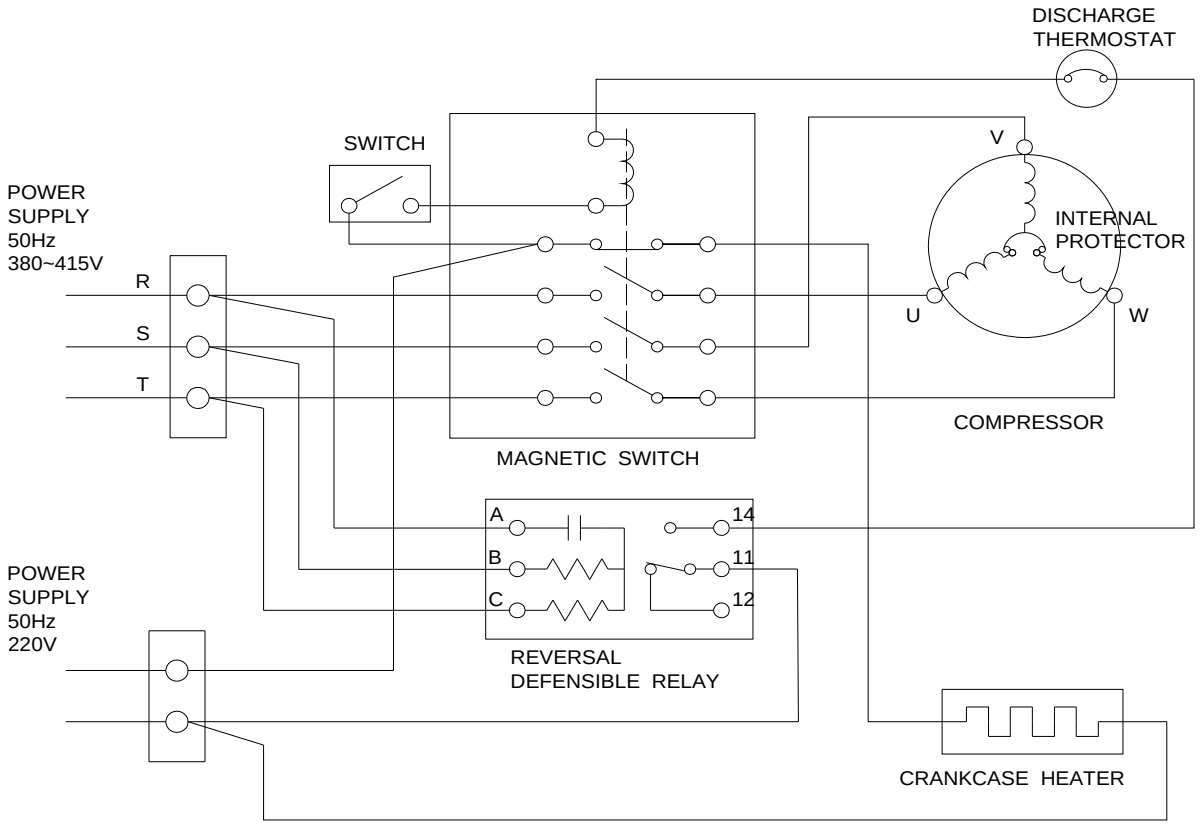
C-SB Series



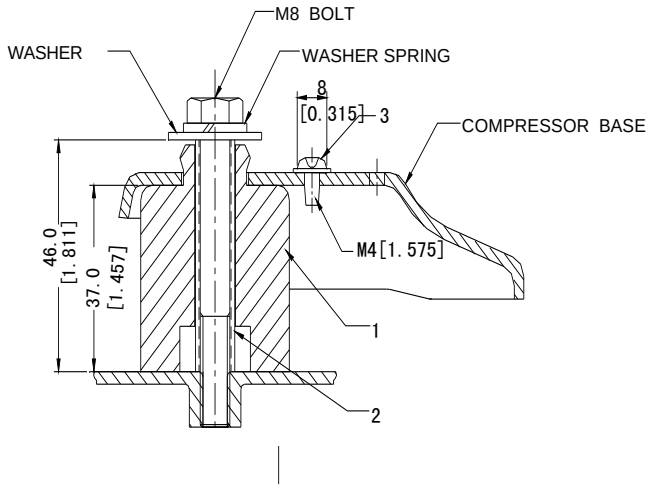
No.	Qty	Name
1	1	Compressor
2	1	Terminal Box Cover
3	1	Terminal Box Clip
4	1	Insulating Grommet
5	1	Nameplate
6	1	Screw Special

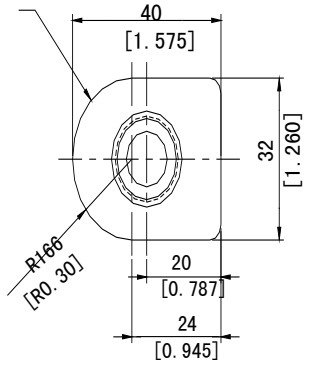
7.2. Wiring & mounting sketch

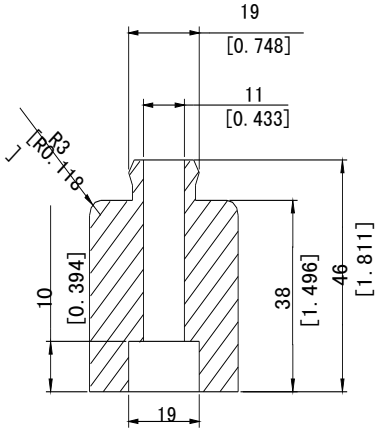
WIRING DIAGRAM
C-SB Series 3phase B8

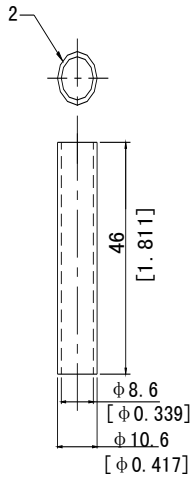


MOUNTING SKETCH



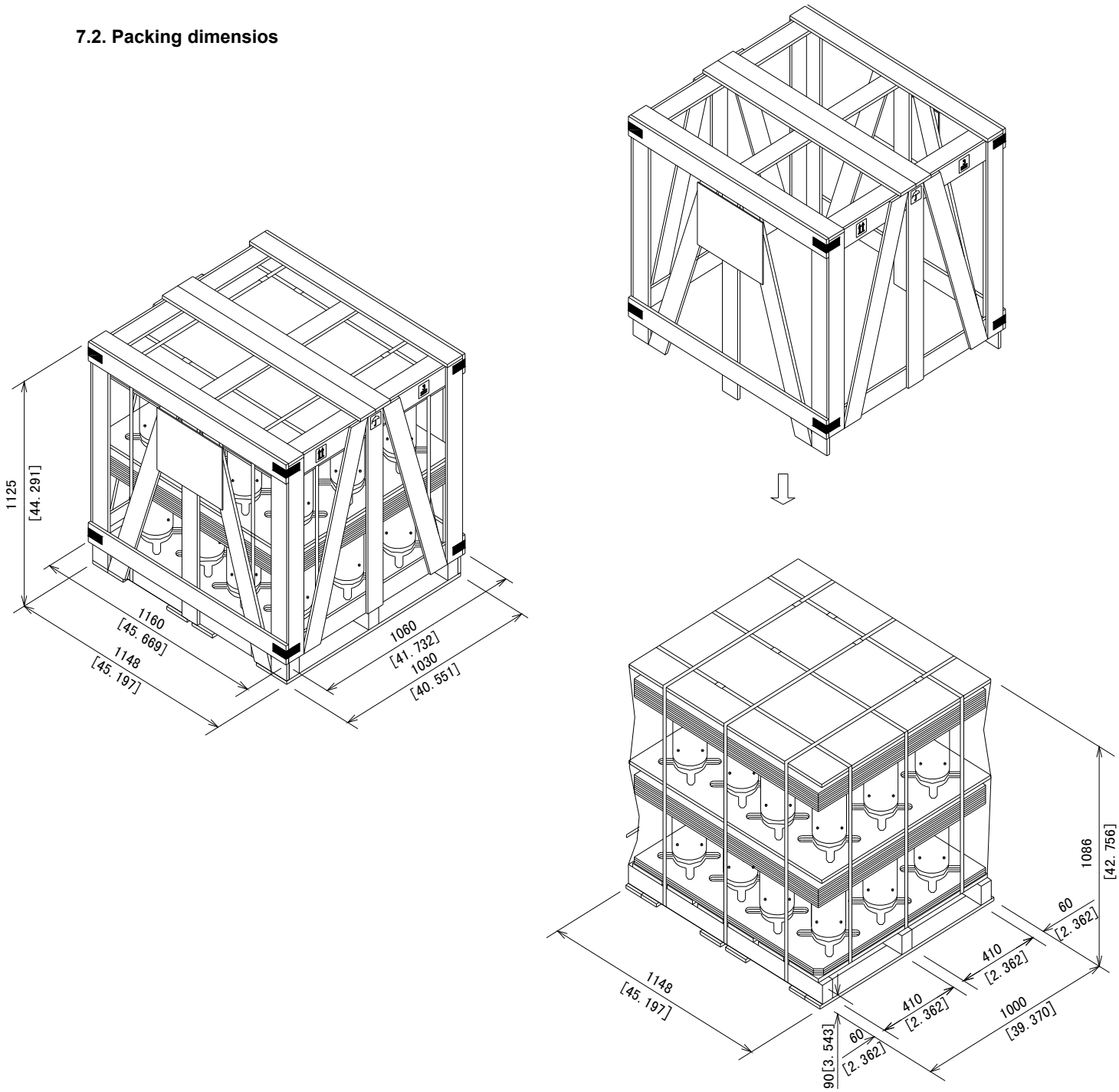






No.	Part	QTY	Name
1	**M-0101-DSB**	**4**	**Mounting Grommet**
2	**M-0201-DSB**	**4**	**Mounting sleeve**
3	**B-0101-DSB**	**1**	**Screw Special**

7.2. Packing dimensios



Part Code

D-0201-DSB

Name

Packing Dimensions