

Specifications No.

C-2529

13-Jun-2018

CUSTOMER : HAWCO

RoHS Compliant

COMPRESSOR SPECIFICATIONS

Compressor type : Scroll Compressor (Involute type)

Refrigerant : R404A, R449A, R1270

Power source : 1PH, 220-240V, 50Hz

Motor type : CSR

Model Name	Nominal Capacity [W]			Motor Rated Output [W] ([HP])	Remark
	R404A	R449A	R1270		
ZS4084S1	815	765	—	400 (0.5)	with CE
ZS6013S1	1180	1165	—	600 (0.8)	
ZS7516S1	1550	1480	1510	750 (1.0)	
ZS1120S1	1995	1925	1925	1100 (1.5)	

Packing	Check
Gathered Packing	<input type="checkbox"/>
Separated Packing	<input checked="" type="checkbox"/>

We acknowledge the receipt of this copy.

Please return this compressor specifications after confirming the contents. If you do not return this copy by the above date, we will assume that you have checked the contents.

Hitachi-Johnson Controls Air Conditioning, Inc.

500 Tomita, Ohira-machi, Tochigi-shi, Tochigi-ken 329-4404, Japan

APPD.	CHKD.	DWN.
<i>M. Onoguchi</i>	<i>T. Ishiyama</i>	<i>K. Echigaya</i>



NOTE

The Specifications in this bulletin are subject to change without notice, in order that HITACHI may bring the latest innovations to our customers.





SAFETY PRECAUTION

Read and understand all of the safety precautions in this manual before operating the product. These precautions are intended to ensure safe and correct operation of the product and to prevent injury to the operator and other persons and damage to the product. Observe these precautions strictly.

The following symbols indicate the presence of potentially hazardous conditions.

 WARNING	This symbol indicates a potentially hazardous situation which, if not avoided, <u>could result in</u> death or serious injury.
 CAUTION	This symbol indicates a potentially hazardous situation which, if not avoided, <u>may result in</u> minor or moderate injury or property damage accidents to the product. It may also be used to alert against unsafe practices.

The meanings of the graphic symbols in text are shown bellow.

	<u>Be sure to perform</u> the operation.
	<u>Disconnect</u> the power cable from the electrical outlet.
	<u>Connect</u> the grounding wire.
	<u>Prohibit</u> .

WARNING



Provide the refrigerating cycle unit with adequate electrical grounding. Incomplete grounding could result in electrical shock hazards in the event of troubles and current leakage.



Connect a fuse or a leak circuit breaker to the main circuit to avoid electrical shock hazards or fire in the event of troubles and current leakage.



Check to see that the main power is turned off, before repairing, to avoid electrical shock hazards in case of touching the terminals.



Measure the temperature of the hermetic terminals of the compressor and then connect the appropriate lead wires. Lead wire insulation deterioration (thermal deterioration) could result in electrical shock hazards, short-circuiting, or fire.



Keep the lead wires away from the surface of the compressor or the piping. Lead wire insulation deterioration (thermal deterioration) could result in electrical shock hazards, short-circuiting, or fire.



Keep the lead wires away from any rotational parts like fans or any vibrational parts like piping.

Lead wire insulation deterioration due to vibration or friction could result in electrical shock hazards, short-circuiting, or fire.



Do NOT make the compressor self-evacuated during operation, which avoids overheating the compressor that could cause burns or fire.



Do NOT touch the surface of the compressor with empty hands, which avoids burns. The surface is very hot during operation and immediately after it has stopped.



Do NOT use this compressor for air compression, which avoids overheating of the compressor that could cause burns or fire.



Do NOT view the inspection window of the compressor for internal observation directly. Use a video camera or other suitable equipment to avoid serious injury owing to explosion of the inspection window or blowout of the refrigerant.



Wear protective goggles during repairs to avoid serious injury owing to explosion of piping or blowout of the refrigerant.

CAUTION



Do NOT install the compressor in a humid place or locations exposed to water. Do NOT dip it into water or spray it with water. In case of using the sound insulation material to enclose the compressor, which is highly hygroscopic, that material must NOT absorb water. Insulation deterioration causes electrical shock hazards, current leakage, short-circuiting, or explosion owing to corrosion.



Attach the specified cover to the hermetic terminals of the compressor by the specified method to prevent entry of dirt.

Incomplete electrical conduction of the hermetic terminals may cause troubles or fire.



Do NOT apply electrical pulse to the compressor while its inside is maintained in a vacuum. It avoids insulation failure inside the compressor, which may result in electrical shock hazards, current leakage, or fire.



Store the compressor in clean and dry environment. Insulation failure of the hermetic terminals of the compressor may result in electrical shock hazards or current leakage. Corrosion of the compressor surface may result in explosion. Blowout of the refrigerant may result in burns.



In case of attaching cluster terminals, the PTC starter, receptacle terminals, or other electrical parts to the hermetic terminals of the compressor, those parts must NOT be obliquely connected or twisted after connections, which avoids reducing fastening force of the terminals. Incomplete electrical conduction of the hermetic terminals may cause troubles or fire.

1. GENERAL SPECIFICATIONS

Model		ZS4084S1	ZS6013S1	ZS7516S1	ZS1120S1
Nominal Output	HP	0.5	0.8	1.0	1.5
	W	400	600	750	1,100
Power Supply	-	1 PH, 220-240V, 50 Hz			
Refrigerant	-	R404A, R449A	R404A, R449A	R404A, R449A R1270	R404A, R449A R1270
Allowable amount of Refrigerant Charge	g	1500	1600	1700 750	2000 880
Refrigerant Oil	-	POE (VG68)			
Oil Charge	liter	0.55	0.55	0.55	0.65
Displacement	cm ³ /rev	8.4	12.5	15.9	20.1
	m ³ /h	1.45	2.16	2.75	3.47
Rated Revolution	rpm	2,880			
Performance ⁽¹⁾		R404A	R449A	R404A R449A	R404A R449A R1270
Voltage	V	230	230	230 230	230 230 230
Cooling Capacity	W	815	765	1,180 1,165	1,550 1,480 1,510 1,995 1,925 1,925
Power Input	W	580	565	740 675	890 860 865 1,145 1,115 1,115
COP	-	1.41	1.35	1.59 1.73	1.74 1.72 1.75 1.74 1.73 1.73
Sound Level and Vibration Level ⁽²⁾		R404A	R449A	R404A R449A	R404A R449A R1270
Sound Level ⁽³⁾ MAX.	dBA	65	61	65 61	65 61 61 65 62 62
Vibration Level ⁽⁴⁾ MAX.	µm	40	35	40 40	40 35 35 50 50 50
Net Weight (Including Oil)	kg	12.4	12.6	12.9	13.6
Piping ⁽⁵⁾ Connection	Suction	- φ 13.0 I.D. (BR)			
	Discharge	- φ 8.2 I.D. (BR)			
	Injection	- φ 6.2 I.D. (BR)			
Motor	Type	- Capacitor Start and Run (CSR) Permanent Split Motor			
	Poles	- 2			
	Voltage	V	230	230	230 230
	Starting Current	A	11.8	17.4	22.0 27.8
	Winding resistance (at20°C)		Main	Aux	Main
Ohm		6.882	3.111	4.730 5.350	3.810 4.670 3.051 3.934
Capacitor	Starting Capacitor	-	30µF/400V	40µF / 400V	40µF/400V 40µF / 450V
	Running Capacitor	-	30µF/400V	25µF / 400V	30µF/450V 40µF / 450V
Starting Relay	-	AMVL-145V1	AMVL-240V1	AMVL-240V1	AMVL-240V1

[notes]

(1)Above performance is based on the following conditions 【EN12900-MT】

Refrigerant		R404A	R449A	R1270
Evaporating Temperature °C		-10	-10	-10
(dew point) MPa[abs]		(0.429)	(0.360)	(0.428)
Condensing Temperature °C		45	45	45
(dew point) MPa[abs]		(2.040)	(1.882)	(1.843)
Return gas Temperature °C		20		
Subcooling K		0		
Ambient Temperature °C		32		
Compressor Cooling		Fan Cooling + Liquid Injection		

Rated capacity and Rated input are measured by using the equipment including the calorimeter met to JIS B8606. Minimum allowable capacity is 90% of rated capacity, maximum allowable input is 110% of reted ii

(2)Measurement condition for Sound and Vibration Level.

Model		ZS4084S1	ZS6013S1	ZS7516S1	ZS1120S1
Refrigerant		R404A R449A	R404A R449A	R404A R449A R1270	R404A R449A R1270
Suction Pressure MPa[abs]		0.429 0.360	0.267 0.360	0.429 0.360 0.428	0.429 0.360 0.428
Discharge Pressure MPa[abs]		2.040 1.882	2.532 1.882	2.040 1.882 1.843	2.040 1.882 1.843
Return gas temp. °C		20	32.2 20	20	20
Noise of soundproof room dBA		under 40			
Vibration of soundproof rooi µm		under 5			
Liquid refrigerant back		No liquid back			
Draft		No draft			

(3)Sound level is measured at the point 30cm away from the compressor surface in a sound measuring room.

- (4)Vibration level is measured on the compressor surface.
- (5)Connection Type
BR : Brazing, RL : Rotalock, FL : Flange, FR : Flare
- (6)Scope of Supply
 - 1) Compressor Assembly Charged with Refrigerant Oil and Nitrogen Gas.
 - 2) The companion connections shall be provided by others.

The other specifications

- 1. Hermetic terminal : 1/4"quick connect type
- 2. Space volume of inner shell : 1600 mL
- 3. Motor Insulation grade : E
- 4. Approval voltage range rated voltage $\pm 10\%$
- 5. Starting performance
 - The minimum starting voltage shall be as Table 1. (see note 7) under the following conditions.
 - (1) The starting pressure should be between the suction and discharge of the compressor was balanced and adjusted as shown in the Table 1.
 - (2) The temperature of compressor case was adjusted to 20 °C or higher at the starting conditions.

Table 1

Starting conditions Motor temperature	Ambient temp.	Pressure 「abs」			Minimum starting voltage {V2}
		R404A	R449A	R1270	
Cold-starting Cold state (Room temperature)	20 °C	1.35 MPa	1.21 MPa	1.25 MPa	85% of rated voltage
Hot-starting<Standard> Hot state after operated under standard condition	32 °C	1.29 MPa	1.16 MPa	1.20 MPa	85% of rated voltage
Hot-Starting<Overload> Hot state after operated overload condition.	43 °C	1.42 MPa	1.28 MPa	1.31 MPa	90% of rated voltage

[note 7]

The starting voltage (V2) is measured by Hitachi starting test apparatus. It means the accelerable minimum voltage by the accelerating torque between the motor starting torque and the stalling torque, and it is different with the continuous operable voltage (V4) after the reach of maximum speed of motor. (see Fig 1)
As the starting voltage of the product depend on the structure and design of the product, you should measure the starting voltage of the product and you should confirm it is no problem.

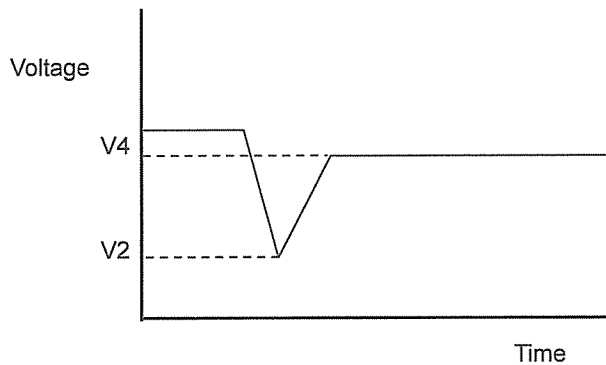


Fig 1

2. PARTS AND DRAWING LIST

Item	Q'ty/Compressor				Drawing No.	Remarks	Supply					
	ZS4084S1	ZS6013S1	ZS7516S1	ZS1120S1			Pat.1	Pat.2	Pat.3	Pat.4		
Dimension sketch	X	X	-	-	3CYCA2368							
Dimension sketch	-	-	X	-	NN0010269							
Dimension sketch	-	-	-	X	NN0010270							
Circuit diagram	X	X	X	X	BB0041918							
Refrigeration system	X	X	X	X	3CYCA6131							
Connecting sketch of accumulator	X	X	X	X	3CYCA1588							
Compressor packing sketch	Gathered Packing	X	X	X	BB0001805							
	Individual Packing	X	X	X	BB0044221							
OVER LOAD PROTECTOR	X	X	X	X	-	Internal OLP				YES		
PARTS SET	1	1	1	1	3CYCA2874					YES		
Mounting Parts	BRACKET	1	1	1	1	3CYCA1589	2CFD49318A					
	HOLDER	1	1	1	1	4CYC11184	NN0001048A					
	RUBBER GROMMET	4	4	4	4	BB0014618	3TMWA3762A					
	PIPE	4	4	4	4	4CYC11191	3PFH28256C					
	WASHER	4	4	4	4	4CYC11192	3SPA16746B					
Terminal and cover	OLR-COVER	1	1	1	1	3CYCA1824	2TRR58845C					
	GASKET	1	1	1	1	3CYCA4295	3TKEA4173A					
	NUT	1	1	1	1	4CYC11177	RSMG1082					
	BUSH	1	1	1	1	3CYCA4296	3TVBA4172A					
Earth parts	TOOTHED LOCK WASHER	1	1	1	1	4CYC11206	40BARWAA2					
	CROSS RECESSED HEAD SCREW	1	1	1	1	4CYC11207	40+10NAA2					
Electrical parts												
E-BOX	A	B	C	D	BB0000406	BB0000405						
START CAPACITOR	1	-	-	-	3CYCA2092	30µF/400V	YES	NO				
	-	1	1	-	3CYCA1949	40µF/400V						
	-	-	-	1	3CYCA4128	40µF/450V						
	1	-	-	-	3CYCA2340	30µF/400V						
RUNNING CAPACITOR	-	1	-	-	3CYCA2720	25µF/400V						
	-	-	1	-	3CYCA2679	30µF/450V						
	-	-	-	1	3CYCA4129	40µF/450V						
DISCHARGE RESISTANCE	1	1	1	1	[note 8]	68kΩ/2W						
STARTING RELAY	1	-	-	-	3CYCA3074	AMVL-145V1						
	[note 10]	-	1	1	1	NN0010273			AMVL-240V1			
START CAPACITOR	1	-	-	-	3CYCA2092	30µF/400V	-		YES			
	-	1	1	-	3CYCA1949	40µF/400V	-		YES			
	-	-	-	1	3CYCA4128	40µF/450V	-		YES			
RUNNING CAPACITOR	1	-	-	-	3CYCA2340	30µF/400V	-		YES			
	-	1	-	-	3CYCA2720	25µF/400V	-		YES			
	-	-	1	-	3CYCA2679	30µF/450V	-		YES			
	-	-	-	1	3CYCA4129	40µF/450V	-		YES			
DISCHARGE RESISTANCE	1	1	1	1	[note 8]	68kΩ/2W	-		YES			
STARTING RELAY	1	-	-	-	3CYCA3074	AMVL-145V1	-		YES			
	[note 10]	-	1	1	1	NN0010273	AMVL-240V1	-		YES		
Cycle parts												
CAPILLARY FOR REQUID INJECTION	1	-	-	-	BB0032682D	Resistance value 53.3kPa				YES		
	-	1	-	-	BB0032682C	Resistance value 26.6kPa				YES		
	[note 9]	-	-	1	-	BB0032682B	Resistance value 13.3kPa			YES		
	-	-	-	1	3CYCA4165	Resistance value 2.67kPa				YES		
ACCUMULATOR	1	1	1	-	3CYCA1592	2PDP47489A valid volume 307mL	YES	NO	YES	NO		
	-	-	-	1	3CYCA4166	2PDP56828C valid volume 650mL						

[note 8] A discharge resistance has been attached to the starting capacitor.

[note 9] The recommended resistance value for the injection capillary is the result of the matching trial using our calorimeter. Since proper capillary specification will depend on refrigeration cycle, please conduct a matching test installed in your product subject to the following conditions.

- (1) To satisfy the over load coil temperature: 115°C or lower. (preferably about 100°C max)
- (2) To apply the Injection capillary resistance value considering the appropriate amount of injection resulting in the best performance in the cooling capacity and input value.

[note 10] You must REPLACE with RELAY of the following characteristics when use flammable refrigerant.

Necessary characteristics

- Comforming to the ATEX directiv
- PICK-UP VOLTAGE (OPERATING VOLTAGE) : 130V TO 153V
- DROP-OUT VOLTAGE (RECOVERY VOLTAGE) : 90V MAX
- CONTACT RATING (CONTACT CAPACITY) : 20A BREAK 200,000 OPERATIONS

3. APPLICATION RANGE

1. Scope

This specification is applied to HITACHI scroll compressor.

2. Common specification of compressor

2.1 Appearance

The surface of compressor shall be painted black and has no cracks, dents, peeling, or significant rust.

2.2 Marking

Model name and production date should be shown on the surface of compressor. The compressor containing refrigeration oil and dried N₂ gas has one white circle mark and one yellow circle mark.

2.3 Insulation distances

IEC C60335-2-34 are applied.

2.4 Insulation resistance

Measurement should be above 10 MΩ between charged parts and non-charged parts by 500 V insulation resistance meter at normal temperature and normal humidity.

2.5 Dielectric Withstand Voltage Test

After 2.4 test, 1500 V A/C 50 Hz or 60 Hz is applied between live parts and dead metal parts continuously for one minute by gradual rise of voltage. In case of 1800 V, duration is one second instead of one minute.

2.6 Maximum allowable pressure and Test Pressure

Table 2. Test Pressure

Maximum allowable pressure				Tightness test pressure	Strength test Pressure (type-test)
Refrigerant	R404A	R449A	R1270	3.24MPa「abs」	15.79MPa「abs」
pressure	3.13MPa「abs」	3.09MPa「abs」	2.28MPa「abs」		

2.7 Dryness

Residual water content is below 0.18mL by the cold trap method described below:

Table 3. Cold trap method

Item	Condition
Furnace	146 ± 3 °C
Pre-heat hour	No pre-heat
Hour of taking water (Preheating time excluded)	6 hours
Degree of vacuum (Continuous vacuum)	Below 133 Pa「abs」
Solvent for cold bath	Methanol
Coolant for cold bath	Dry ice

2.8 Cleanliness

Drain the refrigerant oil. Pour washing liquid into the compressor. Lay down and roll the compressor and drain washing liquid. Filtrate by filter paper. The trapped particles should be under 70 mg.

2.9 Airtight test pressure

3.24 MPa「abs」

3. System design limitations [Requirement for using our compressor]

3.1 Complying with requirements of EN378

For safety use of our compressor with flammable refrigerant (R1270), assembler (or system manufacturer) should comply with EN378 series (European Standard).

EN378: Refrigerating systems and heat pumps- Safety and environmental requirements

EN378-1: Basic requirements, definitions, classification and selection criteria

EN378-2: Design, construction, testing, marking and documentation

EN378-3: Installation site and personal protection

EN378-4: Operation, maintenance, repair and recovery

3.2 Observance of the specification

The compressor should always be operated under the condition set forth in this specification and it should not be operated under any other specifications. Accessories should also be used as specified. In addition, the specified parts should be used during servicing. Fuse or circuit breaker should be connected to main electric circuit.

3.3 Power source voltage

Voltage applied to the hermetic terminal should be within the range mentioned in this specification.

In the case of 3 phases electric power source, the unequilibrium of the voltage between each phase must be used within 3%.

$$\text{Unequilibrium} = \frac{\text{Max.deviation voltage} - \text{Ave.voltage}}{\text{Average voltage}} \times 100(\%)$$

Furthermore, in the case of 3 phases electric power source, the wiring for reverse rotating

caused by two phases replacement must not be used. The damage of the compressor caused by the reverse rotating is out of warranty. If wiring may cause reverse rotating, the direction relay listed on the list of equipment and materials must be connected.

3.4 Operating temperatures and pressures

Suction pressure and discharge pressure should be within the range of Fig.4~9. (page 16~21)

The difference between discharge pressure and suction pressure must be more than the pressure of Table 4. [Oil supply system in compressor doesn't work without this pressure difference.]

Table 4

Model	ZS4084S1, ZS6013S1 ZS7516S1	ZS1120S1
Discharge pressure—Suction pressure (MPa)	more than 0.46	more than 0.59

The operating temperatures and pressures of a compressor should be within the range shown in the following section 3.5 - 3.8.

3.5 Compressor case bottom temp

6 degrees higher then condensing temperature. (Refer to Fig attached with 3.11.)

3.6 Motor winding temp. (Measured by the resistance method)

(1) Standard load condition

Rated voltage ; 105°C MAX

Rated voltage $\pm 10\%$; 115°C MAX

(2) Overload condition^[10]

Rated voltage $\pm 7.5\%$; 115°C MAX.

Winding temperature being lower than 115°C by liquid injection-cooling in any kind of environment.

[note 11] Overload condition should not be continuous.

3.7 Suction pipe temp.

Higher than outlet pipe of evaporator

3.8 Temperature and pressure at blocked fan condition

Don't operate compressor at blocked fan condition. To avoid problem of fire, discharge pressure should be under 4.22MPa「abs」. Under stable condition, Confirm the motor winding temperature should be not more than 165°C (average) or 190°C MAX (highest).

3.9 Compressor ambient temperature

The compressor should be operated within the ambient temperature range that satisfies the motor winding temperature requirements shown previously Section 3.3. This compressor should be used in the place that the ambient temperature is above $-10\text{ }^{\circ}\text{C}$. Please confirm the starting of compressor, when the temperature of compressor surface is $-10\text{ }^{\circ}\text{C}$.

Under $-10\text{ }^{\circ}\text{C}$ ambient temperature, in the case that the temperature of compressor surface is above $-10\text{ }^{\circ}\text{C}$ by the crankcase beating etc, you can use the compressor if the starting is possible.

3.10 Operating and Shut-off interval

The compressor should not be started/stopped more than 6 times per hour. The compressor should be operated continuously at least for 5 minutes after being turned on. Allow a minimum of 3 minutes shut-off time before restarting.

Compressor should be started on the condition that pressure status of high/low pressure sides is balanced.

3.11 Oil back and oil level of compressor

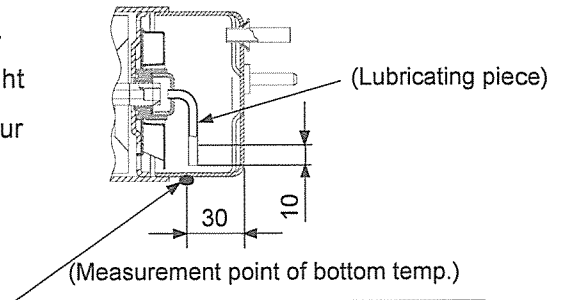
Oil level of compressor should be higher than 10 mm from the lubricating piece fixed on the end of the crankshaft.

We recommend to check oil level using compressor with sight glass. We can supply the compressor with sight glass by your order. (In case of foaming situation, the height of this foam does not mean the height of the oil level.)

If the oil level is not kept, the oil shortage will occur, and influence the reliability of compressor.

To keep oil level, following points are important.

- 1) Oil should be returned continuously to the compressor.
- 2) The compressor should be operated continuously at least for 5 minutes after being turned on.
(see Clause 3.10)
- 3) Liquid refrigerant must not flood back to the compressor.
Oil may flow out of the compressor if liquid refrigerant back.
- 4) The pressure difference between discharge and suction is shown in Table 4. (see Clause 3.4)



3.12 Liquid refrigerant back and Accumulator

There should be superheated gas returned to the compressor under all normal operating conditions.

Liquid refrigerant must not flood back to the compressor. Liquid back damages the compressor.

We recommend to use the accumulator to prevent liquid back to the compressor.

When knocking noise, current increase and undesirable vibration are caused, another accumulator should be equipped to the compressor and/or refrigerant charge should be reduced to prevent liquid refrigerant flood back.

Liquid level in the accumulator should be maintained smaller than the valid volume of accumulator.

(see Fig 2)

We recommend to check liquid level in the accumulator using accumulator with sight glass.

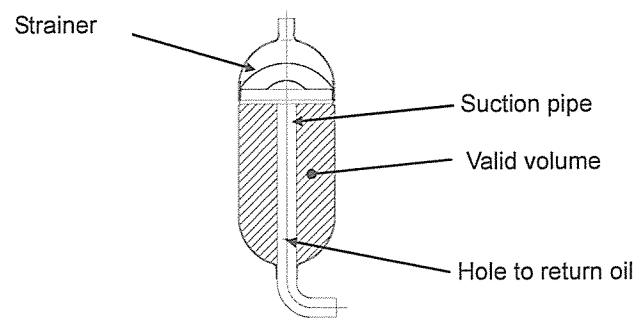


Fig 2

The accumulator must have a hole to return oil. If you use a non-specified accumulator, to prevent harm to oil return, please check size and location of oil return hole. Please refer to the drawing of accumulator.

3.13 Strainer

Strainer should be equipped to avoid insert foreign bodies.

We can supply the accumulator with a strainer by your order.

In case of using an accumulator without a strainer, a strainer should be added to a tube on suction side.

3.14 Allowable incline

Compressor should be operating in the horizontal rotating shaft. But the inclination of shaft is within 3 deg in every direction. In case of the hermetic terminal side in the shaft direction is higher than horizontal, it should be kept up to 5 deg.

3.15 Pipe vibration

The displacement of the pipes, which connect from the compressor to other parts of the refrigeration systems, should be less than 0.8 mm (1/32") when the compressor is operating at rated frequency +10 / -10 and voltage range of rate $\pm 10\%$.

Displacement in excess of 0.8 mm (1/32") will require changing tube length and/or routing.

3.16 Connecting tube design

in designing and routing tubing that connects the compressor to the other parts of the air conditioner, the following should be considered.

Moving tubes to the moving parts;
 minimum clearance 12.7 mm (1/2")

Moving tubes to non-moving parts ;
 minimum clearance 9.5 mm (3/8")

Moving tubes never touch the electrical lead wires.

3.17 Dust of hermetic terminal

Hermetic terminal area should be covered with the electrical cover by the designated method to prevent the entering of dust.

3.18 Rotation direction of compressor

Connect compressor terminals as specified in circuit diagram. Reverse operation will result pump breakdown.

3.19 Internal over load protector (OLP).

Although an OLP that Hitachi selected is installed in this compressor, the current and temperature may not be appropriated for the structure or design of the unit in which the compressor will be mounted.

Unit-mounting matching tests should therefore be conducted and checks should be performed to ensure that the requirements listed as item (1) and (2) below are satisfied.

If the OLP could not satisfy the requirements in the unit test, this should be notified to Hitachi and then after reselection through mutual discussions on the optimum OLP for the unit, unit-mounting test should be performed again.

(1) OLP non-operating test:

The provisions of section 3.3 should be satisfied.

(2) OLP operating test (trouble-assuming test):

When the compressor ambient temperature is $23 \pm 2 \text{ }^\circ\text{C}$, the winding temperature should not exceed $190 \text{ }^\circ\text{C}$ at rated voltage $\pm 6\%$, and when the compressor ambient temperature is $0 \pm 2 \text{ }^\circ\text{C}$, the winding temperature should not exceed $240 \text{ }^\circ\text{C}$ at rated voltage -15% .

Supplementary description;

[1] Exception for the value in transitional states.

[2] The motor winding temperature should be measured using the resistance method.

[3] The tests should be terminated when the total number of OLP operations or the total OLP operating time reaches 10,000 (time) or 15 days, which ever comes first.

But OLP is equipped in order to avoid the problem of fire.

It's not for a restriction of coil temperature, 115°C MAX.

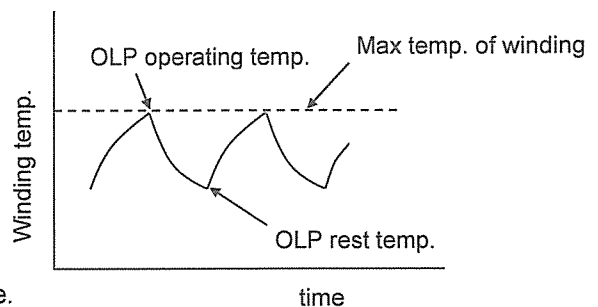


Fig 3

4. Process limitations

4.1 The degree of vacuum in the refrigerating system should be less than 133 Pa 「abs」 at room temperature just before charging refrigerant.

The reference quantity of water in the refrigerating system is less than 200mg.

The quantity of water the cycle in operation is to make to the 40 ppm following in the refrigerating cycle by using the suitable dryer that does not contain ACTIVATED ALUMINA.

4.2 The structure of cycle constitution or drier should be done so that the powder of the drying material does not come out throughout the cycle.

4.3 The weight of foreign particles on the inside surface of the heat exchange tubes should be less than 0.05 g/m². This value means the weight of foreign particles filtered after washing inside surface of the heat exchange tubes with alkali.

Metallic dust should not be permitted to enter the refrigerating system.

4.4 Eliminate all system contaminates such as trichloroethane, alkalis, soaps, acids, oil and washing fluid used in machining the heat exchanger.

4.5 Always purge the compressor with dry nitrogen during assembly of the system.

4.6 The quantity and kind of contamination (the process materials) in the cycle should be grasped and managed. Carry on reliability test that Input contamination a lot than anticipated contamination quantity.

4.7 The motor winding temperatures should be less than 149 °C in process of manufacturing the refrigerating system. The temperature of the hermetic terminal body should be less than 177 °C.

4.8 The compressor should be operated for more than 20 seconds within 15 minutes after refrigerant is put into the system so that proper lubrication of the pump can occur.

5. Miscellaneous

5.1 The pipe and hermetic pins, which are attached to the compressor, should not be bent.

5.2 The compressor should never be operated while under vacuum; otherwise, internal arcing can damage parts.

5.3 The compressor should not be operated in a method that forms a vacuum and absorbs air.

5.4 The compressor should not be left open to the atmosphere for more than 15 minutes.

5.5 The electric pulse should not be applied to the hermetic terminals when the compressor is under vacuum.

5.6 The compressor should be kept in a clean place with low-moisture.

5.7 The compressor must not be applied for transportation equipment such as automobiles, trains, ships, and the others.

5.8 The compressor should not be splashed intentionally with water.

5.9 Refrigerant should be charged from the condenser end of the refrigeration system. Never charge refrigerant to the compressor directly.

5.10 Temperatures within systems during stable compressor operation should not be less than -45 °C because oil is hard to return to the compressor.

5.11 The compressor, if dropped, should not be used.

5.12 Compressor mounting

Rubber grommets are designed soft to provide noise isolation and to lessen vibration energy transmission. Stud bolt should be designed to provide sufficient clearance for noise and vibration isolation and to prevent compressor from coming off its mount.

5.13 The first starting voltage supplied to the refrigerating system should be more than the starting voltage mentioned Table 1. (page 4)

Because the viscosity of the oil may be high at first starting until the refrigerant dissolves in the oil.

5.14 The compressor should be kept out of a corrosive atmosphere, such as a chemicals storage area.

5.15 The lead wires should be connected to the hermetic terminals without touching the surface of the compressor.

5.16 The compressor should be used within one year of receipt.

5.17 The failure of refrigeration system components such as the reversing valve, solenoid valve, defrost mechanism, refrigerant control parts, fan motor, etc. may cause failure of the compressor. Reliability of those components should be checked.

A design that insures no leakage during manufacturing and usage should be applied.

5.18 The refrigerating cycle should be grounded.

5.19 The failure of accessory parts (ex. Capacitor) utilized by the customer is not related to Hitachi -Johnson Controls Air Conditioning, Inc.

5.20 The person who is directly in charge of setting up the product or repair of the product should be well instructed to prevent contamination of this product by water or other foreign matters.

When recharging refrigerator, dryer must be changed. And water value should be less than 40 ppm.

5.21 When connecting terminals of the unit to the hermetically sealed terminals of the compressor, the parts must not be obliquely connected or twisted after connection, fastening force of the terminals would be reduced.

5.22 Modifications and additions

If modifications or additions are to be made to the items provided for in this specification, both companies shall immediately report the details of those modifications or additions, together with the reasons for them, in writing before performing the modifications or additions.

5.23 Occurrence of problems

If problems occur after delivery, both companies shall immediately list those problems. After reporting, a solution to these problems will be sought and reported.

Hitachi -Johnson Controls Air Conditioning, Inc. has no obligation duty for the problem in the case that the user didn't obey this compressor using specification & criteria.

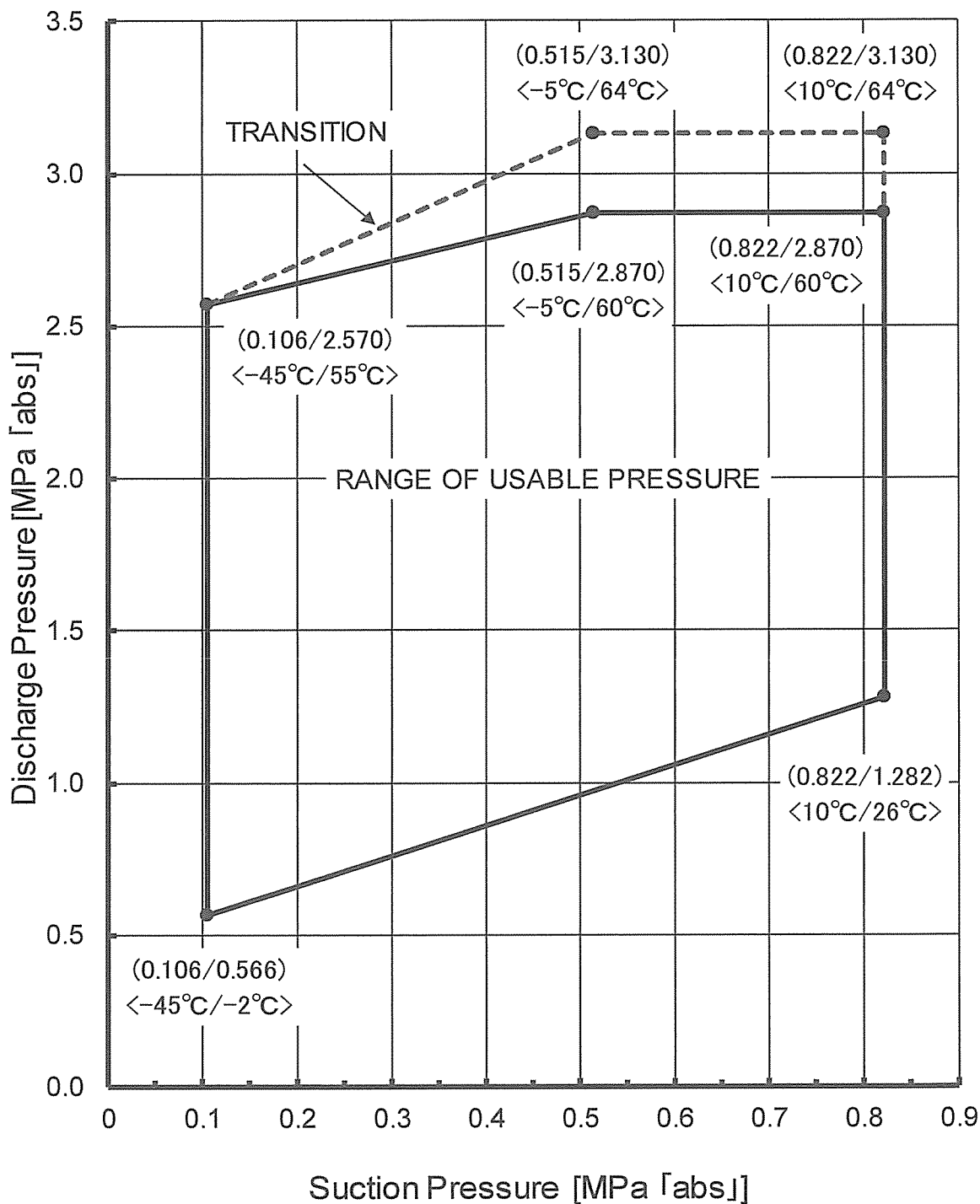
5.24 Term of Validity

This specification shall go into effect from the date that the user signs the specification.

4. RANGE OF USABLE PRESSURE

REFRIGERANT : R404A

MODEL : ZS4084S1, ZS6013S1, ZS7516S1

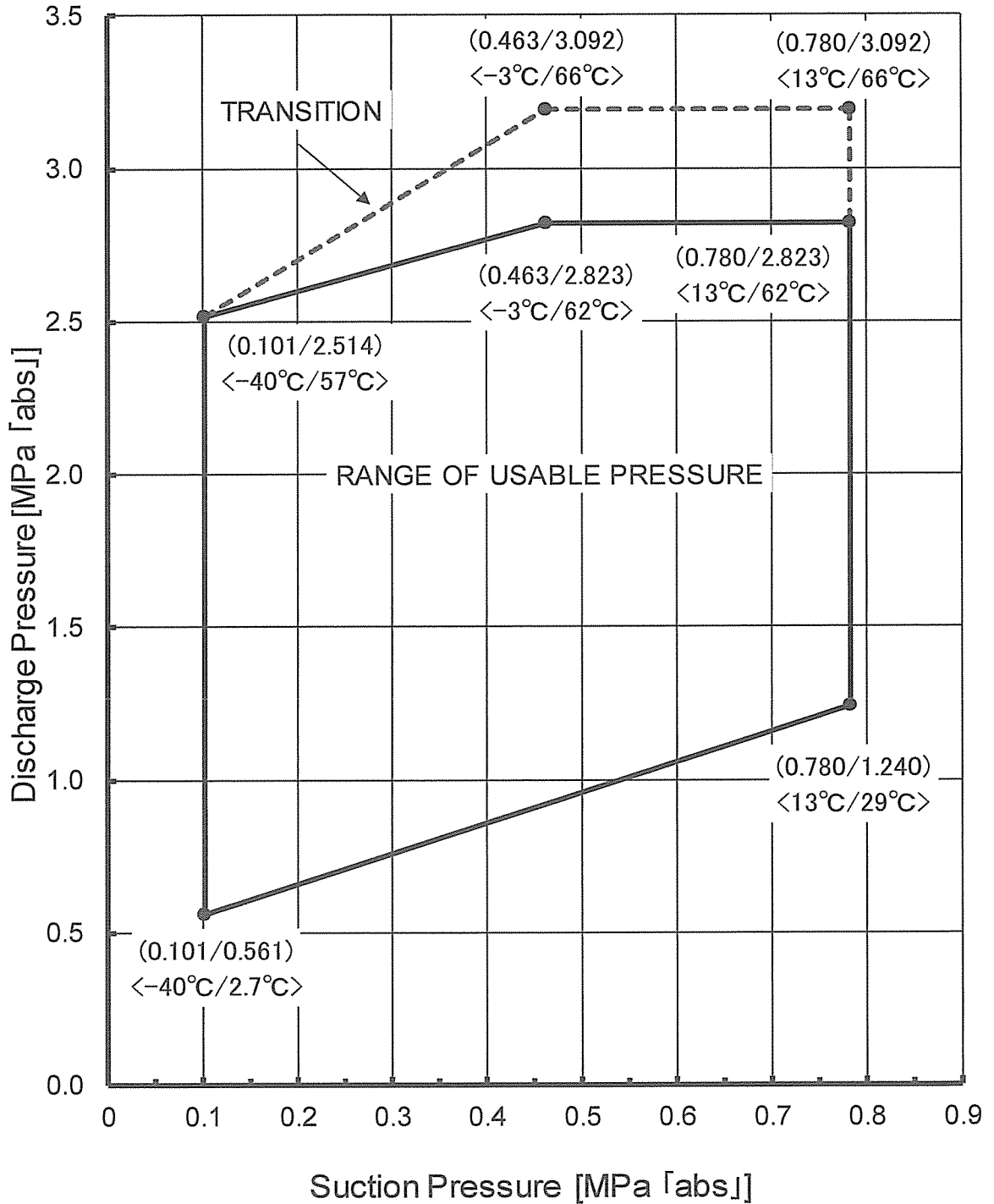


(Suction pressure / Discharge pressure [MPa])

< Evaporation Temp (dew point) / Condensing Temp (dew point) [°C] >

Fig.4

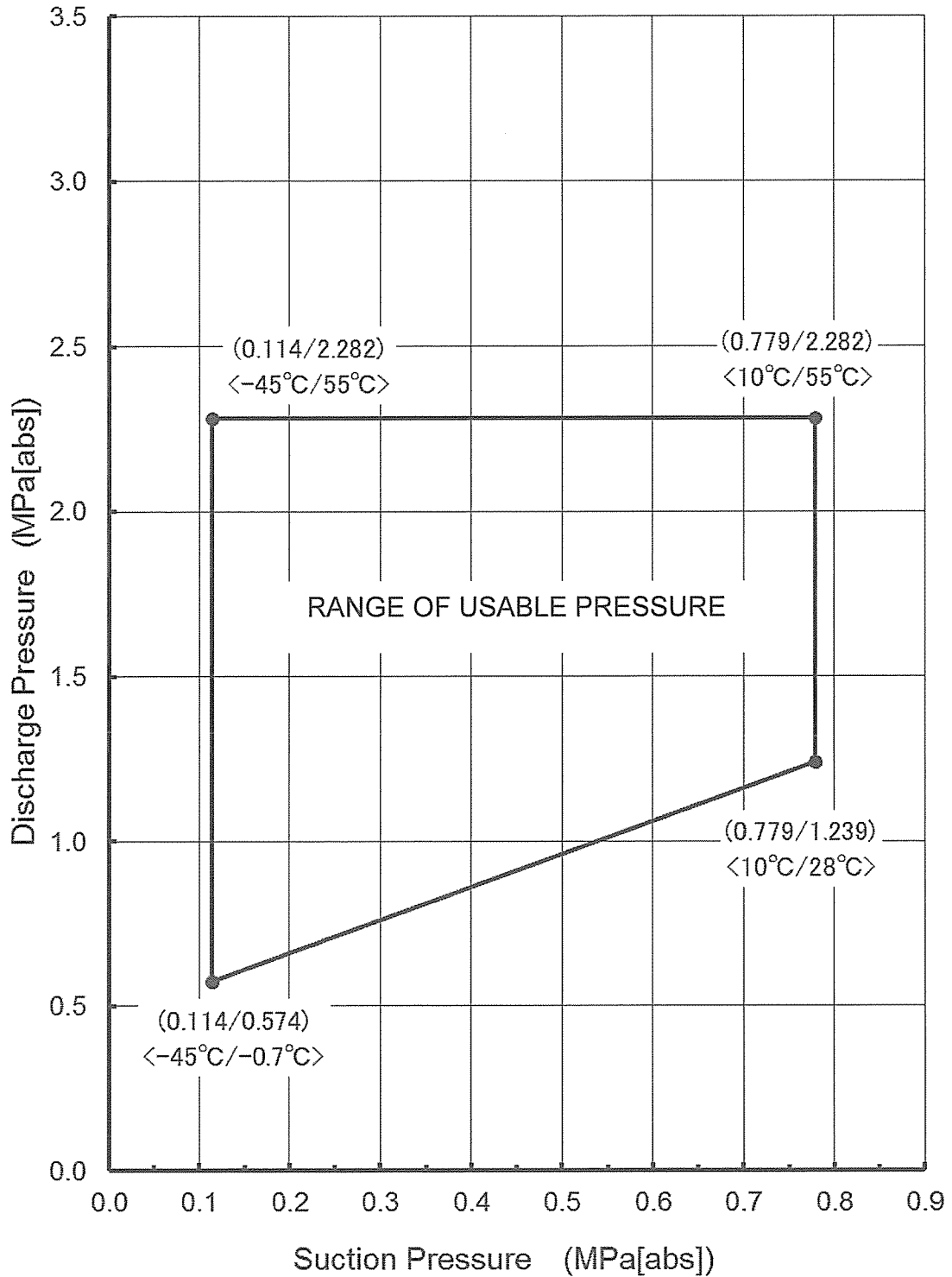
REFRIGERANT : R449A
 MODEL : ZS4084S1, ZS6013S1, ZS7516S1



(Suction pressure / Discharge pressure [MPa])
 < Evaporation Temp (dew point) / Condensing Temp (dew point) [°C] >

Fig.5

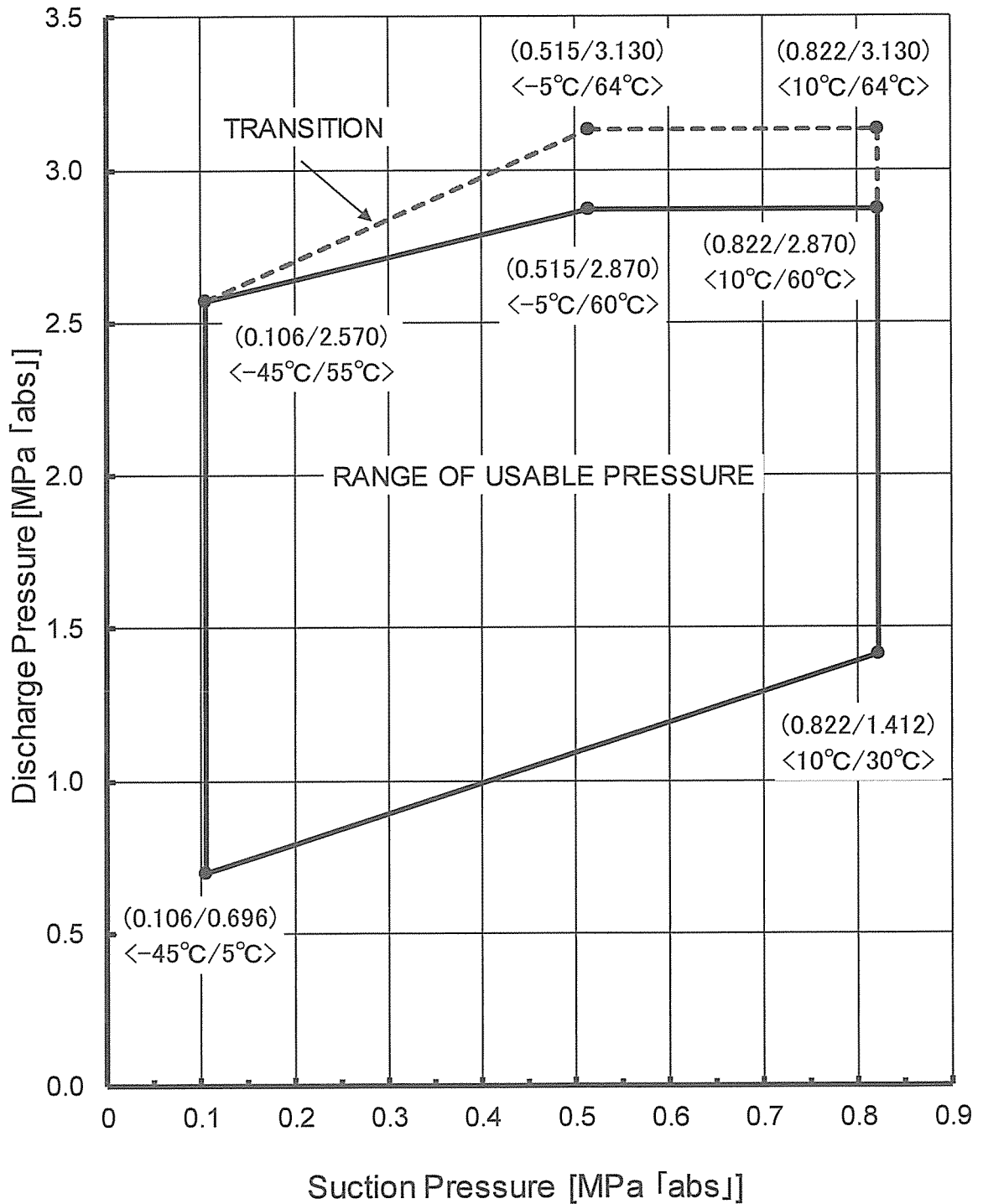
REFRIGERANT : R1270
 MODEL : ZS7516S1



(Suction pressure / Discharge pressure [MPa])
 < Evaporation Temp (dew point) / Condensing Temp (dew point) [°C] >

Fig.6

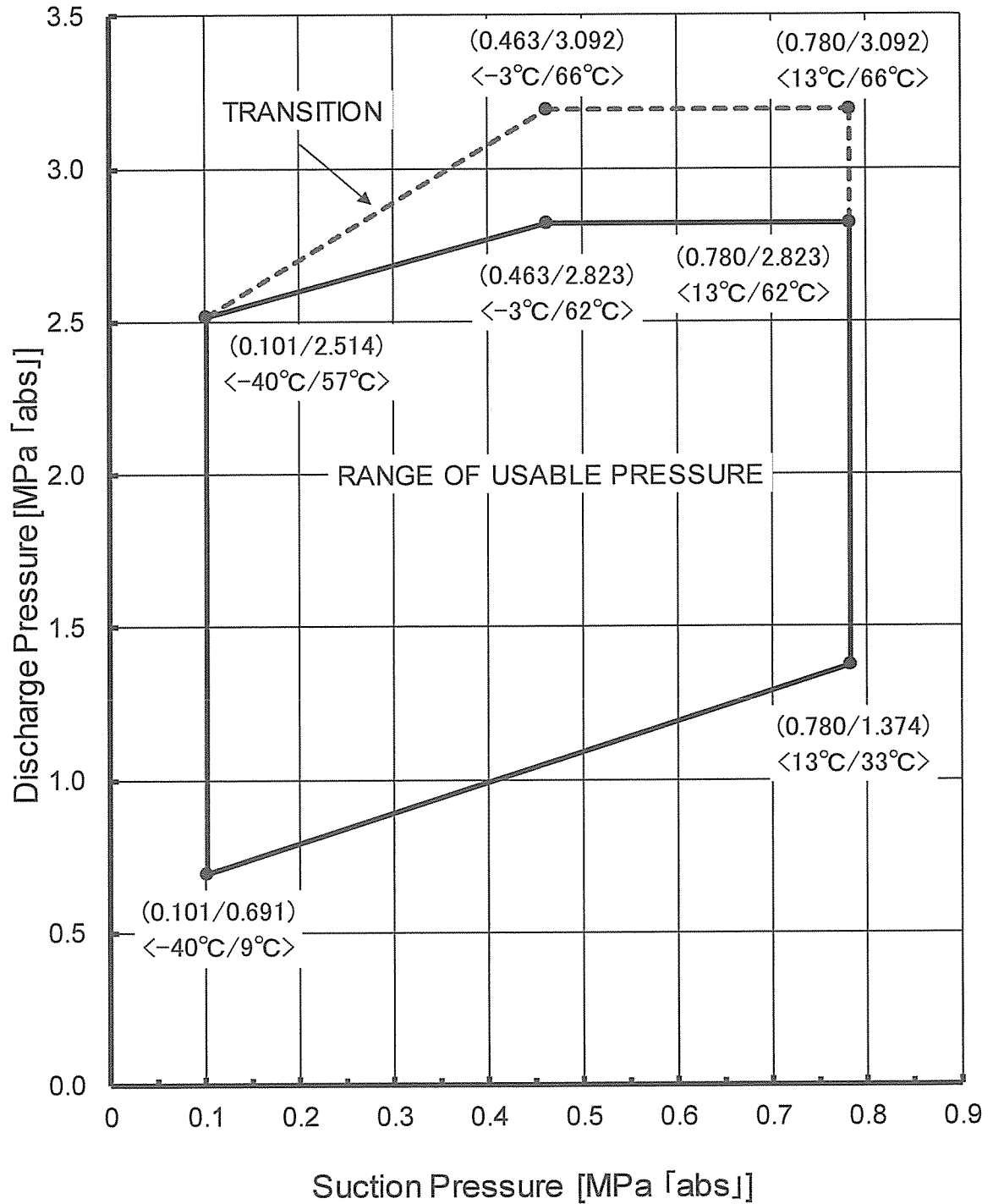
REFRIGERANT : R404A
 MODEL : ZS1120S1



(Suction pressure / Discharge pressure [MPa])
 < Evaporation Temp (dew point) / Condensing Temp (dew point) [°C] >

Fig.7

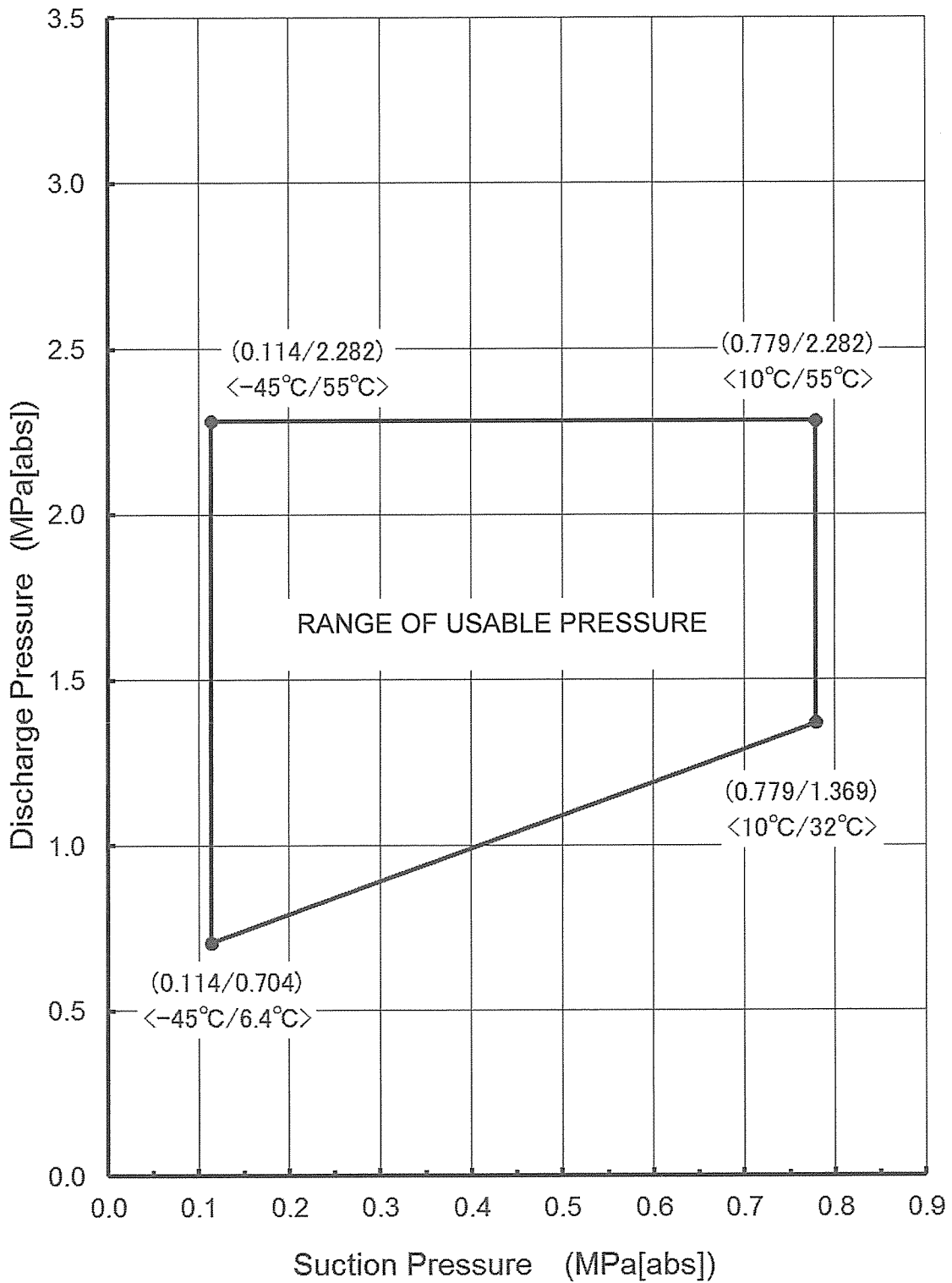
REFRIGERANT : R449A
 MODEL : ZS1120S1



(Suction pressure / Discharge pressure [MPa])
 < Evaporation Temp (dew point) / Condensing Temp (dew point) [°C] >

Fig.8

REFRIGERANT : R1270
 MODEL : ZS1120S1



(Suction pressure / Discharge pressure [MPa])

< Evaporation Temp (dew point) / Condensing Temp (dew point) [°C] >

Fig.9

Model : ZS6013S1

REFRIGERANT : R449A

Refrigerant	R449A
Power Supply	1PH/220-240V/50Hz
Sub Cooling	0 K
Return Gas Temp.	18 °C
Cooling	Fan Cooling+Liquid Injection

Cooling capacity[W]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp.°C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	263	344	443	564	708	880	1,083	1,318	1,591	1,903	2,257	2,658
	240V-50Hz	263	344	445	567	714	888	1,093	1,333	1,609	1,926	2,286	2,692
40	220V-50Hz	241	317	410	523	660	821	1,011	1,233	1,488	1,780	2,112	2,486
	240V-50Hz	242	318	412	527	664	828	1,020	1,244	1,503	1,799	2,136	2,516
45	220V-50Hz	220	290	377	483	611	762	940	1,147	1,386	1,658	1,967	2,315
	240V-50Hz	220	292	380	487	615	768	947	1,156	1,397	1,673	1,986	2,341
50	220V-50Hz	199	264	345	443	562	703	868	1,058	1,277	1,526	1,807	2,122
	240V-50Hz	198	264	346	446	564	705	870	1,062	1,282	1,534	1,820	2,143
55	220V-50Hz	178	238	312	404	514	644	796	970	1,170	1,395	1,648	1,930
	240V-50Hz	175	237	313	405	514	643	794	968	1,169	1,397	1,655	1,947

Motor Input[W]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp.°C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	560	562	563	564	565	566	566	566	566	566	566	567
	240V-50Hz	613	613	613	612	612	612	613	613	613	614	615	617
40	220V-50Hz	615	616	617	618	618	618	619	619	620	620	621	622
	240V-50Hz	665	664	664	663	663	662	662	662	663	664	665	667
45	220V-50Hz	672	672	672	672	672	672	672	673	674	674	676	678
	240V-50Hz	718	716	715	714	713	712	712	712	713	714	715	718
50	220V-50Hz	750	747	745	743	742	742	742	743	744	746	750	754
	240V-50Hz	782	780	778	777	776	776	775	776	777	778	781	784
55	220V-50Hz	827	822	818	815	813	812	811	813	815	818	823	830
	240V-50Hz	848	846	843	842	840	840	840	840	842	844	847	851

Current[A]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp.°C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	240V-50Hz	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
40	220V-50Hz	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
	240V-50Hz	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
45	220V-50Hz	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	240V-50Hz	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
50	220V-50Hz	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.5	3.5
	240V-50Hz	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
55	220V-50Hz	3.8	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.7	3.8	3.8	3.8
	240V-50Hz	3.7	3.7	3.7	3.7	3.7	3.6	3.6	3.7	3.7	3.7	3.7	3.7

Model : ZS7516S1

REFRIGERANT : R1270

Refrigerant	R1270
Power Supply	1PH/220-240V/50Hz
Sub Cooling	0 K
Return Gas Temp.	18 °C
Cooling	Fan Cooling+Liquid Injection

Cooling capacity[W]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp. °C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	412	522	651	804	983	1,190	1,428	1,699	2,005	2,349	2,731	3,154
	240V-50Hz	410	519	649	803	983	1,192	1,432	1,704	2,013	2,358	2,742	3,167
40	220V-50Hz	381	484	607	752	922	1,118	1,344	1,600	1,890	2,215	2,577	2,977
	240V-50Hz	380	484	608	754	924	1,122	1,349	1,607	1,898	2,225	2,589	2,991
45	220V-50Hz	348	445	560	697	857	1,043	1,255	1,497	1,769	2,074	2,413	2,788
	240V-50Hz	350	447	564	701	862	1,048	1,261	1,504	1,777	2,084	2,426	2,804
50	220V-50Hz	319	409	518	647	799	973	1,173	1,398	1,652	1,934	2,248	2,594
	240V-50Hz	319	412	522	653	804	979	1,178	1,404	1,659	1,945	2,262	2,615
55	220V-50Hz	288	371	473	594	735	898	1,083	1,291	1,524	1,782	2,067	2,380
	240V-50Hz	285	374	478	600	741	903	1,088	1,296	1,531	1,792	2,083	2,406

Motor Input[W]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp. °C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	777	765	754	743	732	721	711	700	690	679	668	657
	240V-50Hz	857	841	826	813	800	788	776	765	754	744	734	724
40	220V-50Hz	854	839	826	813	801	789	778	767	756	745	734	723
	240V-50Hz	932	914	898	882	868	854	842	830	818	807	797	787
45	220V-50Hz	931	914	898	884	870	857	845	833	822	811	800	790
	240V-50Hz	1,008	988	969	952	936	921	908	895	883	871	861	850
50	220V-50Hz	1,037	1,015	995	977	960	945	932	920	908	898	889	881
	240V-50Hz	1,101	1,078	1,058	1,039	1,021	1,006	991	977	965	954	943	933
55	220V-50Hz	1,144	1,116	1,092	1,070	1,051	1,034	1,019	1,006	995	986	978	972
	240V-50Hz	1,195	1,169	1,146	1,126	1,107	1,090	1,075	1,061	1,048	1,036	1,026	1,017

Current[A]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp. °C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	3.7	3.6	3.6	3.5	3.5	3.4	3.4	3.3	3.3	3.2	3.2	3.1
	240V-50Hz	3.9	3.8	3.7	3.7	3.6	3.6	3.6	3.5	3.5	3.4	3.4	3.4
40	220V-50Hz	4.0	4.0	3.9	3.9	3.8	3.7	3.7	3.6	3.6	3.5	3.5	3.4
	240V-50Hz	4.1	4.1	4.0	4.0	3.9	3.8	3.8	3.8	3.7	3.7	3.6	3.6
45	220V-50Hz	4.4	4.3	4.2	4.2	4.1	4.1	4.0	3.9	3.9	3.8	3.8	3.7
	240V-50Hz	4.4	4.4	4.3	4.2	4.2	4.1	4.1	4.0	4.0	3.9	3.9	3.8
50	220V-50Hz	4.9	4.8	4.7	4.6	4.5	4.4	4.4	4.3	4.3	4.2	4.2	4.2
	240V-50Hz	4.8	4.7	4.6	4.6	4.5	4.4	4.4	4.3	4.3	4.2	4.2	4.1
55	220V-50Hz	5.3	5.2	5.1	5.0	4.9	4.8	4.8	4.7	4.7	4.6	4.6	4.6
	240V-50Hz	5.1	5.0	5.0	4.9	4.8	4.7	4.7	4.6	4.6	4.5	4.5	4.5

Model : ZS1120S1

REFRIGERANT : R1270

Refrigerant	R1270
Power Supply	1PH/220-240V/50Hz
Sub Cooling	0 K
Return Gas Temp.	18 °C
Cooling	Fan Cooling+Liquid Injection

Cooling capacity[W]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp.°C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	524	669	836	1,029	1,253	1,513	1,812	2,154	2,543	2,982	3,475	4,023
	240V-50Hz	529	672	838	1,032	1,256	1,516	1,816	2,159	2,548	2,988	3,481	4,030
40	220V-50Hz	492	626	783	966	1,179	1,426	1,710	2,034	2,402	2,817	3,281	3,798
	240V-50Hz	492	628	786	970	1,184	1,431	1,716	2,041	2,410	2,827	3,293	3,813
45	220V-50Hz	458	581	727	900	1,101	1,334	1,602	1,908	2,254	2,643	3,077	3,559
	240V-50Hz	454	582	731	905	1,108	1,342	1,610	1,917	2,265	2,656	3,095	3,583
50	220V-50Hz	412	528	666	828	1,017	1,236	1,487	1,773	2,096	2,459	2,864	3,314
	240V-50Hz	412	530	670	834	1,024	1,244	1,497	1,784	2,109	2,475	2,885	3,340
55	220V-50Hz	364	471	600	751	927	1,130	1,362	1,626	1,924	2,258	2,631	3,045
	240V-50Hz	366	475	604	757	934	1,139	1,374	1,640	1,941	2,278	2,655	3,074

Motor Input[W]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp.°C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	1,014	996	979	962	946	929	912	895	878	861	843	824
	240V-50Hz	1,128	1,108	1,089	1,070	1,052	1,034	1,016	997	979	960	941	922
40	220V-50Hz	1,105	1,085	1,067	1,048	1,031	1,014	997	980	964	948	931	915
	240V-50Hz	1,206	1,186	1,167	1,149	1,131	1,114	1,096	1,079	1,062	1,045	1,028	1,011
45	220V-50Hz	1,197	1,175	1,154	1,135	1,116	1,099	1,082	1,066	1,050	1,035	1,020	1,006
	240V-50Hz	1,285	1,265	1,246	1,228	1,211	1,194	1,178	1,162	1,147	1,131	1,116	1,100
50	220V-50Hz	1,315	1,290	1,268	1,246	1,227	1,209	1,192	1,176	1,160	1,146	1,133	1,120
	240V-50Hz	1,400	1,378	1,358	1,338	1,320	1,302	1,285	1,269	1,253	1,237	1,221	1,205
55	220V-50Hz	1,434	1,406	1,381	1,358	1,338	1,319	1,302	1,286	1,271	1,258	1,246	1,235
	240V-50Hz	1,516	1,492	1,470	1,449	1,430	1,411	1,393	1,376	1,359	1,343	1,327	1,311

Current[A]

Calculated values

Condensing Temp. °C	Power Supply	Evaporating Temp.°C											
		-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
35	220V-50Hz	4.8	4.7	4.6	4.6	4.5	4.4	4.3	4.3	4.2	4.1	4.0	3.9
	240V-50Hz	5.2	5.1	5.0	4.9	4.9	4.8	4.7	4.6	4.6	4.5	4.4	4.3
40	220V-50Hz	5.2	5.1	5.0	5.0	4.9	4.8	4.7	4.6	4.6	4.5	4.4	4.4
	240V-50Hz	5.5	5.4	5.3	5.2	5.2	5.1	5.0	5.0	4.9	4.8	4.8	4.7
45	220V-50Hz	5.6	5.5	5.4	5.3	5.3	5.2	5.1	5.0	5.0	4.9	4.8	4.8
	240V-50Hz	5.8	5.7	5.6	5.6	5.5	5.4	5.4	5.3	5.2	5.2	5.1	5.0
50	220V-50Hz	6.2	6.0	5.9	5.8	5.8	5.7	5.6	5.5	5.5	5.4	5.3	5.3
	240V-50Hz	6.2	6.2	6.1	6.0	5.9	5.9	5.8	5.7	5.7	5.6	5.5	5.5
55	220V-50Hz	6.7	6.6	6.5	6.4	6.3	6.2	6.1	6.0	6.0	5.9	5.8	5.8
	240V-50Hz	6.7	6.6	6.5	6.4	6.4	6.3	6.2	6.1	6.1	6.0	6.0	5.9

69Z0100NN

ZS7516S1
COMPRESSOR MODEL

MODEL NAME: ZS7516S1
PART NO.: ZS7516S1
OIL CODE: ZS7516S1

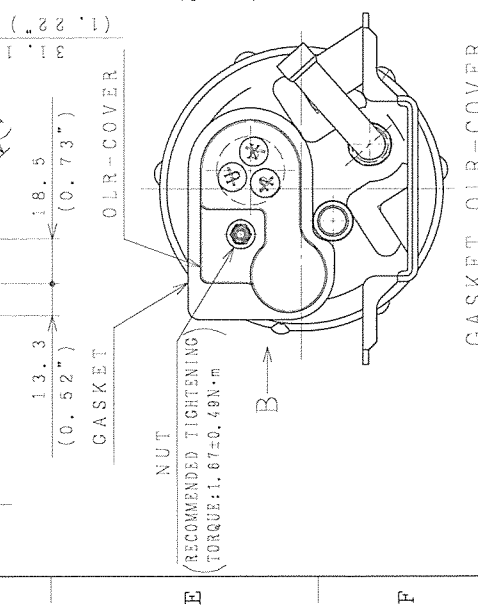
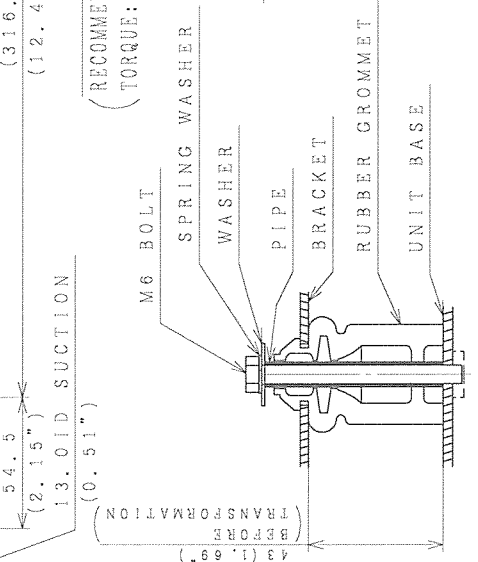
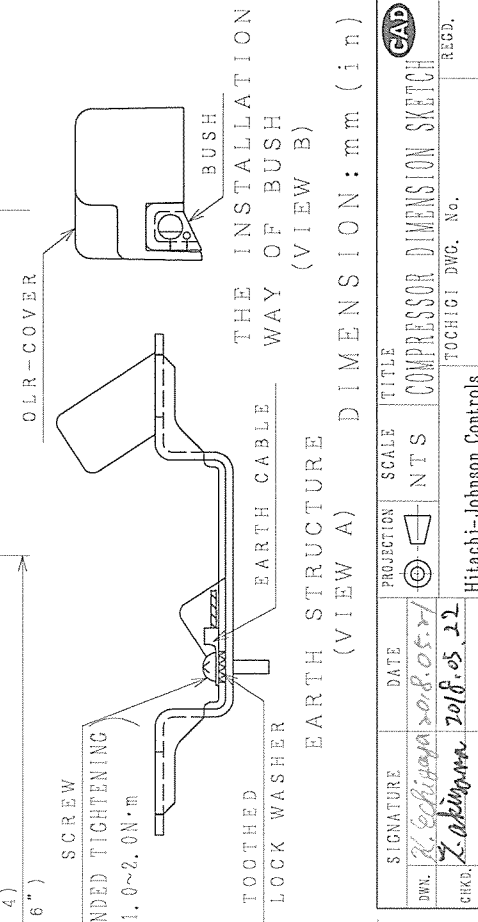
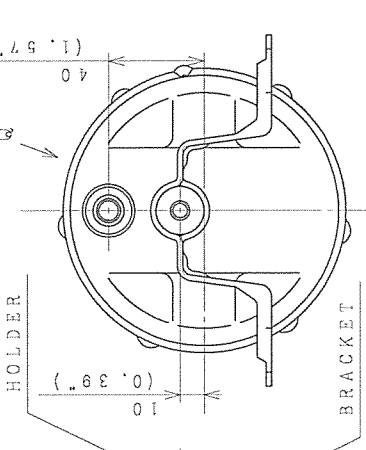
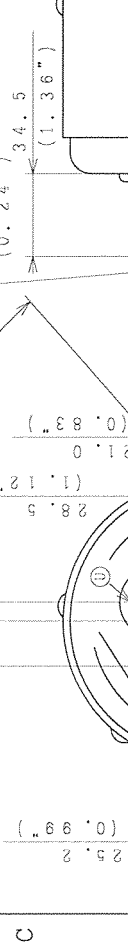
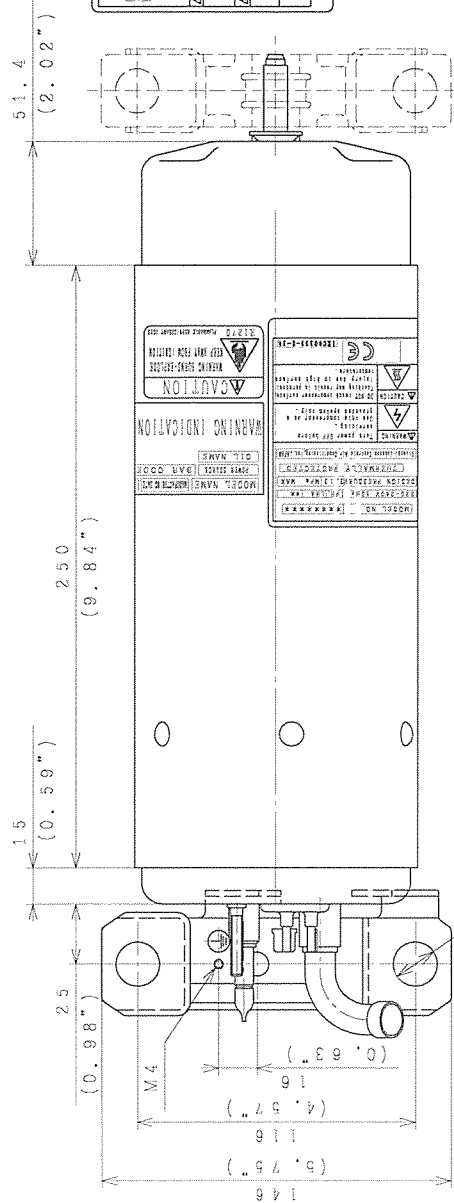
WARNING INDICATION

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN THE UNIT
COVER

CE

REPAIRING INSTRUCTIONS
FOR THE REPAIR OF THE UNIT
PLEASE REFER TO THE
REPAIRING INSTRUCTIONS
FOR THE REPAIR OF THE UNIT
PLEASE REFER TO THE
REPAIRING INSTRUCTIONS

LABEL CONTENTS
(VIEW Q)



THE INSTALLATION WAY OF BUSH (VIEW B)

EARTH STRUCTURE (VIEW A) DIMENSION: mm (in)

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWG. <i>R. Saito</i>	2018.05.22	①	NTS	COMPRESSOR DIMENSION SKETCH
CHKD. <i>K. Akimura</i>	2018.05.22			
APPL. <i>M. Ogasawara</i>	2018.05.22			

Hitachi-Johnson Controls
Air Conditioning, Inc. 3CYC NN0010269

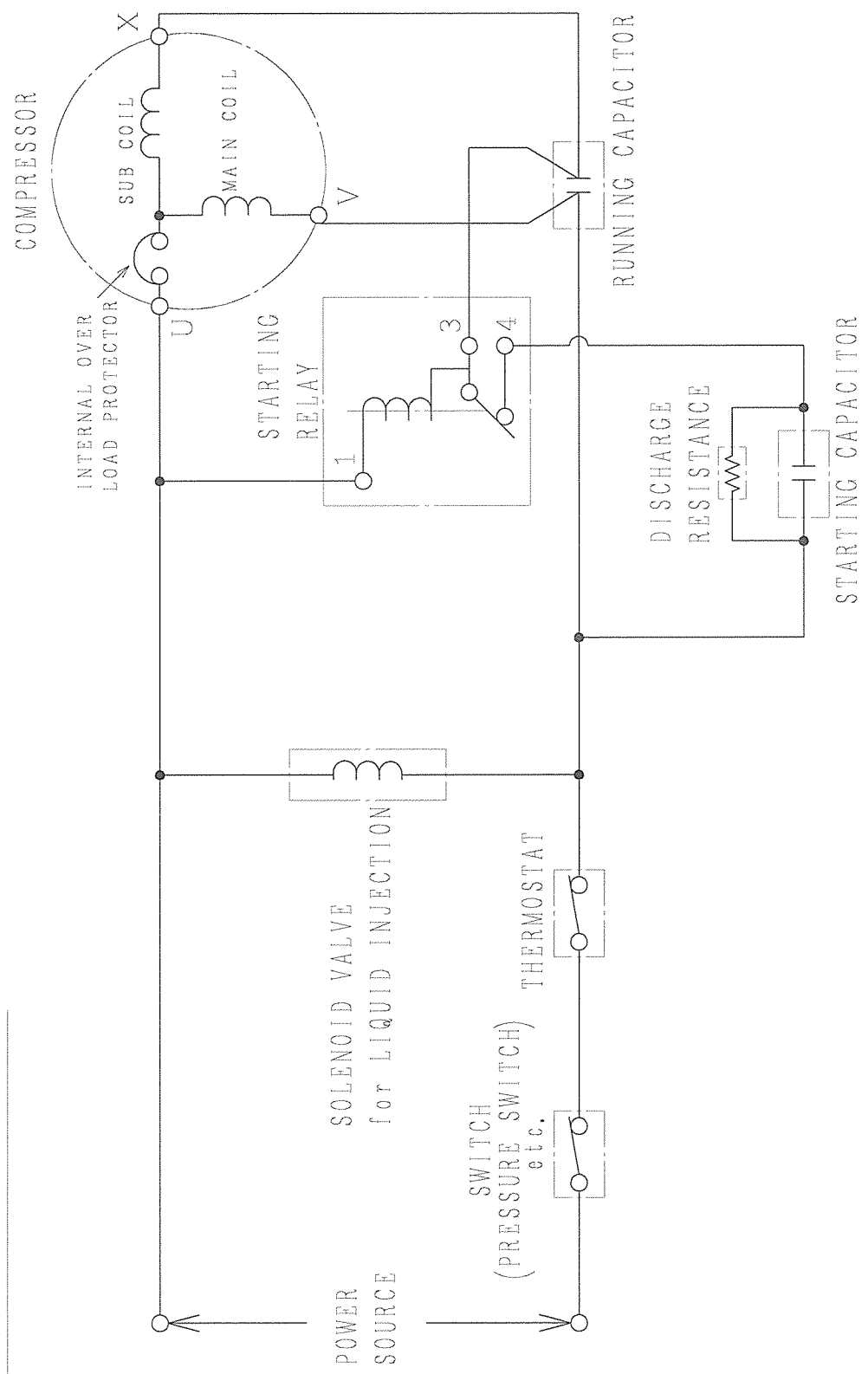
TOCHIGI DWG. No. _____

REC'D. _____

GASKET, OLR-COVER
SETTING

8161700BB

SINGLE-PHASE POWER



SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWN. K. HAYU	2013-11-28	①	NTS	CIRCUIT DIAGRAM
CHKD. K. MALSTRONG	2013-11-28			
APPD. M. ONOGUCHI	2013-11-28			

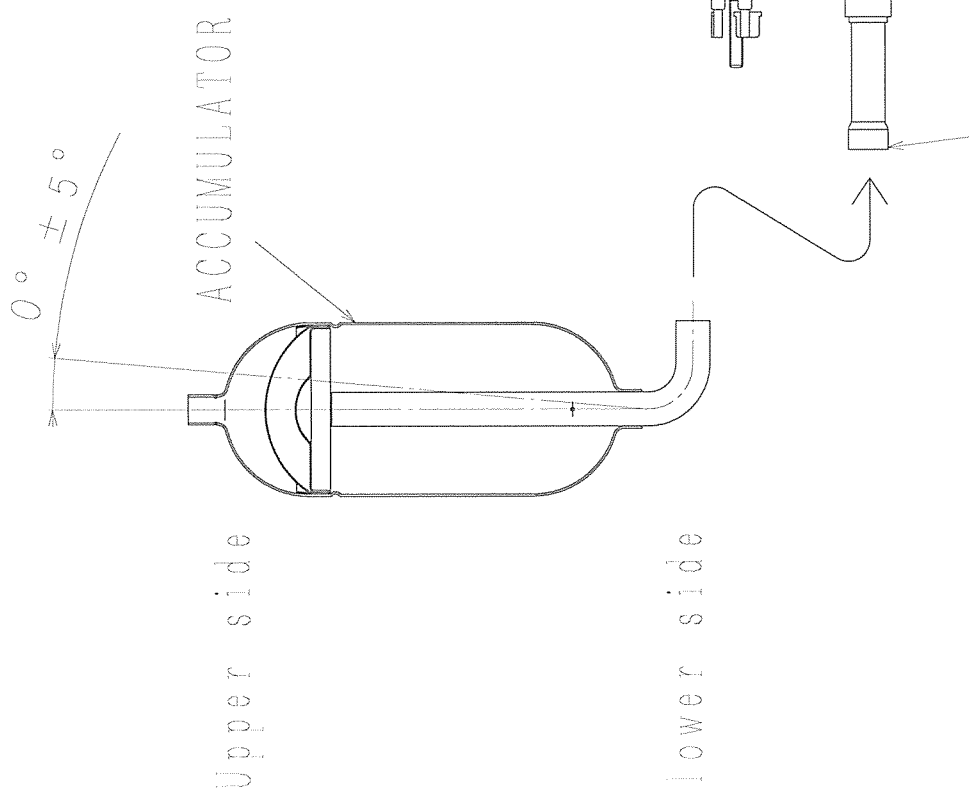
TOCHIGI DWG. No. **3CYC BB0041918**

Hitachi-Johnson Controls
Air Conditioning, Inc.

A B C D E F

8851V0103

A B C D E F



The accumulator should be connected between discharge pipe of evaporator and suction pipe of compressor. The allowable incline should be less than 5°.

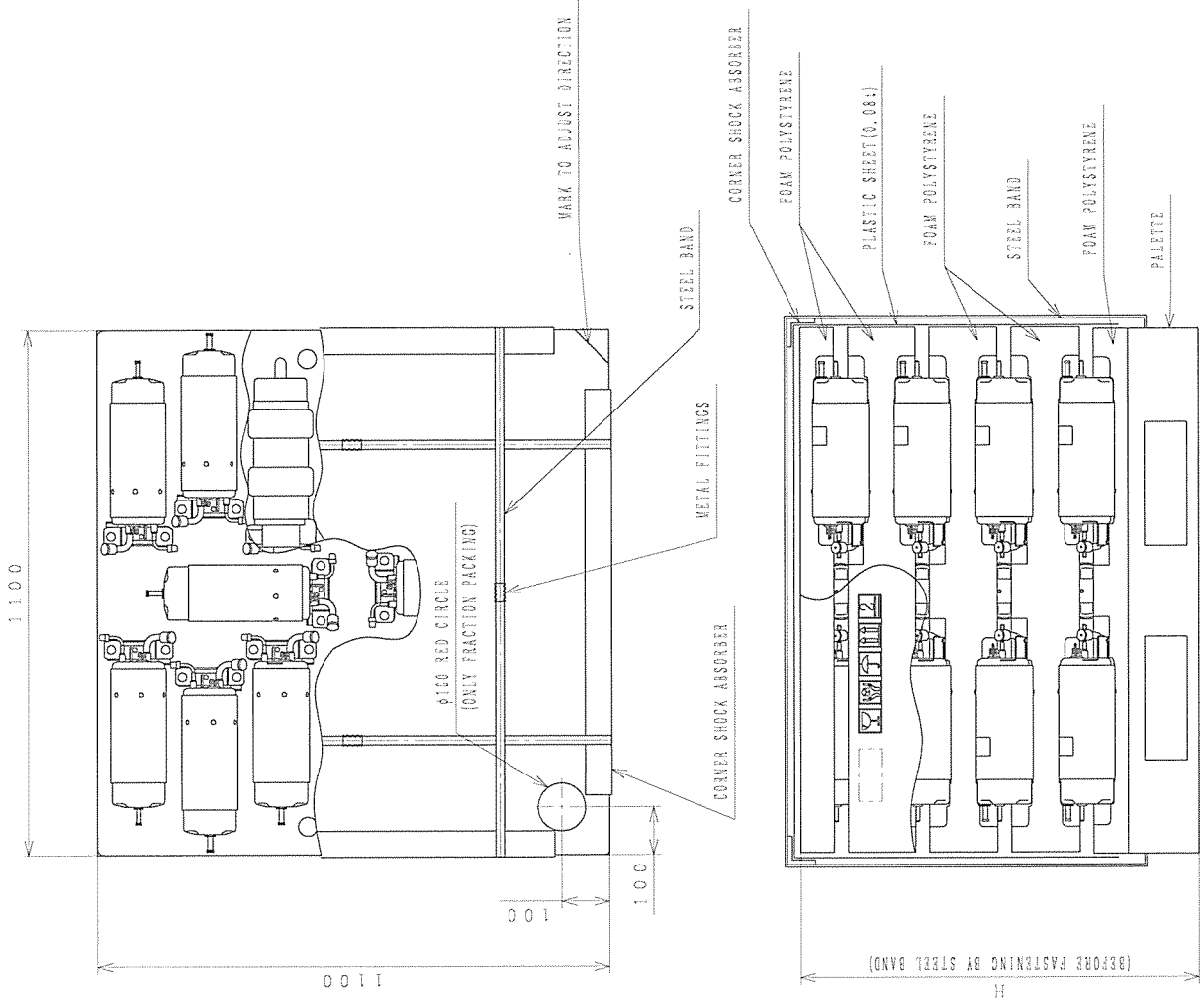
Suction pipe of compressor

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DRN. A. Ojima	2001-08-29	①	1 : 2	CONNECTING SKETCH OF ACCUMULATOR
CHKD. A. Simada	2001-08-29			
APPD. Y. Saeki	2001-08-29			

Hitachi-Johnson Controls Air Conditioning, Inc.
TOCHIGI DWG. No. 3CYCA1588

REC'D
2001
6830

BB0001805



INCLUDED NUMBER	H(STEP PILE)	GROSS WEIGHT(kg)
A 49~64	814 (4STEP)	857
B 33~48	641 (3STEP)	646
C 17~32	468 (2STEP)	436
D 6~16	296 (1STEP)	225

Do not pile them up more than two packages when keeping. The package should not be exposed to rain after delivery. Please dispose of the packing parts on your responsibility.

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWN. A. Murakami	2005-11-11	◎	NTS	COMPRESSOR PACKING SKETCH
CHKD. M. Ogasachi	2005-11-11			
APPD. A. Simada	2005-11-11			

Hitachi-Johnson Controls
Air Conditioning, Inc. TOCHIGI DWG. No. 3CYCBB0001805

RECD 2005 11 14

3CYCA2874

BUSH

GASKET

RUBBER GROMMET

PIPE

WASHER

SCREW

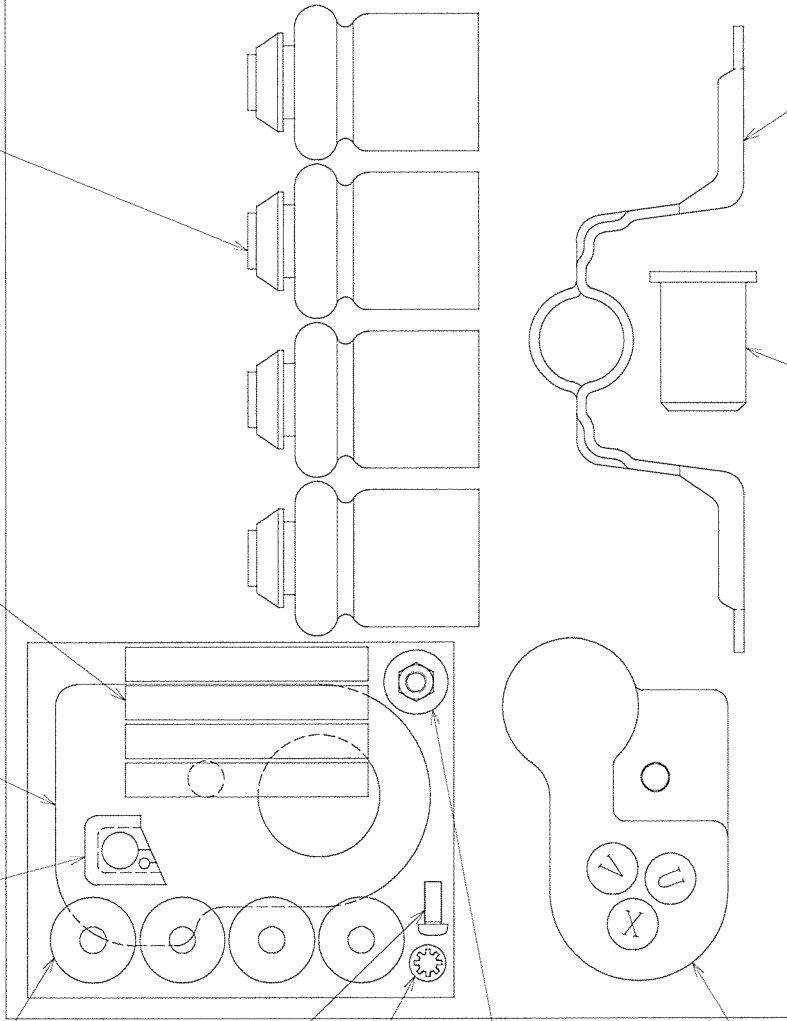
TOOTHED LOCK WASHER

NUT

CLR-COVER

HOLDER

BRACKET

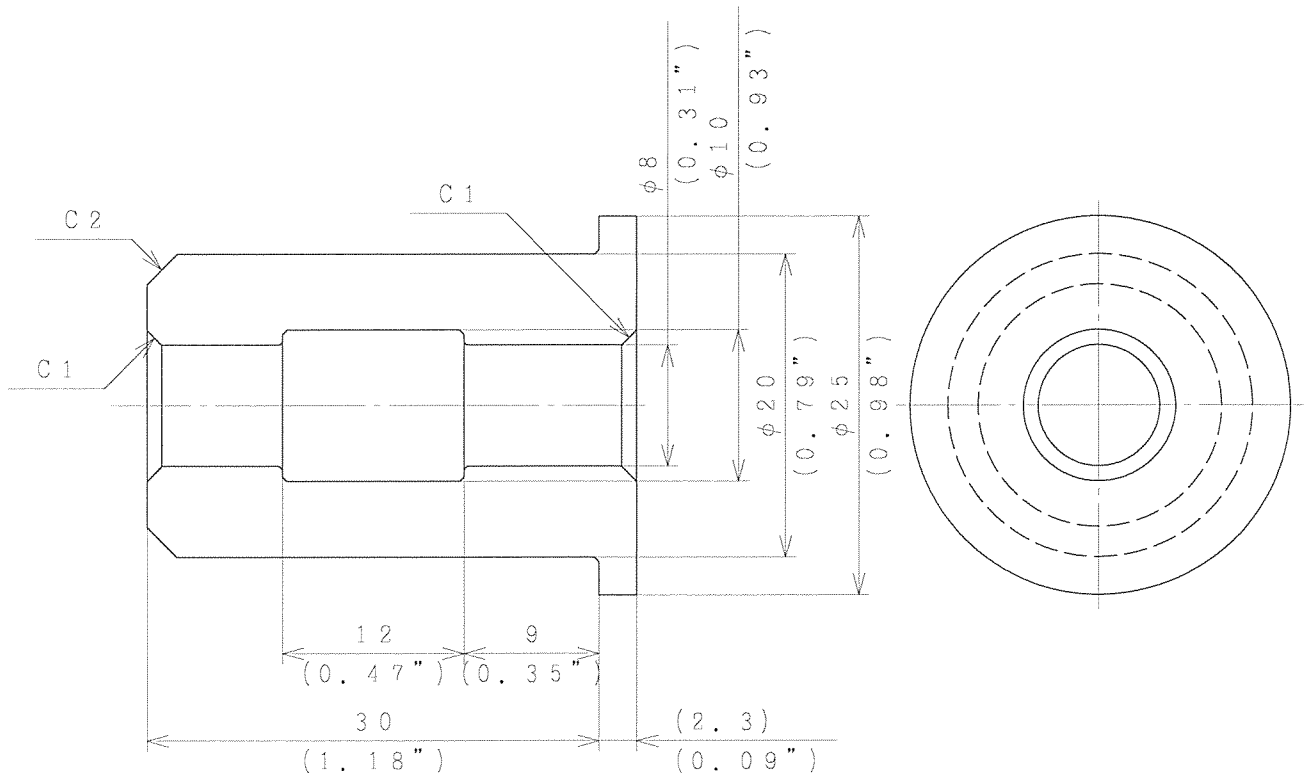


SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWN. M. Goto	2002-09-26	⊙	NTS	PARTS SET
CHFD. M. Onoguchi	2002-09-26			TOCHIGI DWG. No.
APPD. A. Shirai	2002-09-26			Hitachi-Johnson Controls Air Conditioning, Inc.

REC'D
2002
0930

3CYCA2874

4CYC11184

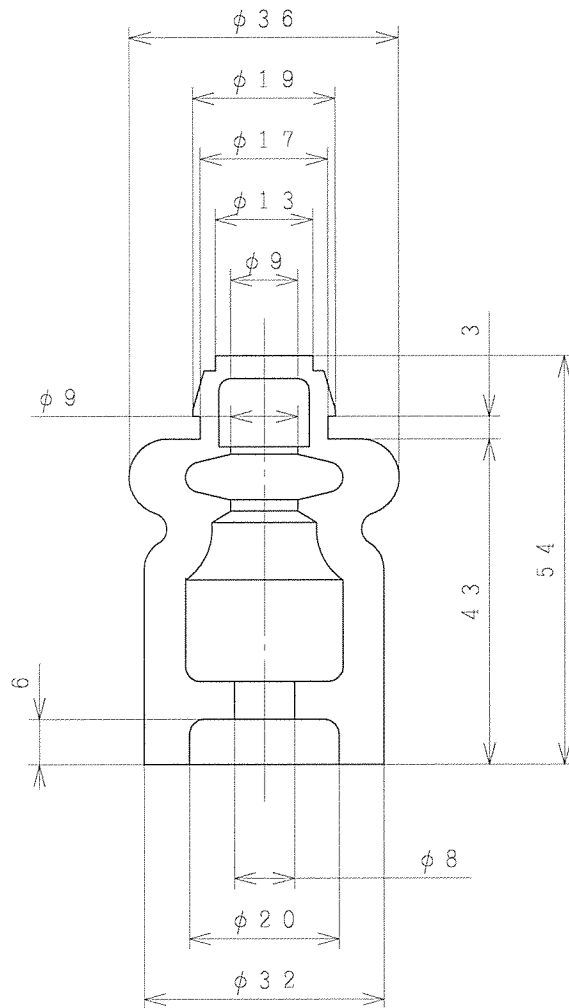


MATERIAL: EPDM

DIMENSION : mm (in)

SIGNATURE		DATE	PROJECTION	SCALE	TITLE
DWN.	A. Onuma	2001-08-29		2 : 1	HOLDER TOCHIGI DWG. No. 4CYC11184
CHKD.	A. Simada	2001-08-29			
APPD.	Y. Sasaki	2001-08-29			
			Hitachi-Johnson Controls Air Conditioning, Inc.		
					RECD 2001 0830

BB0014618



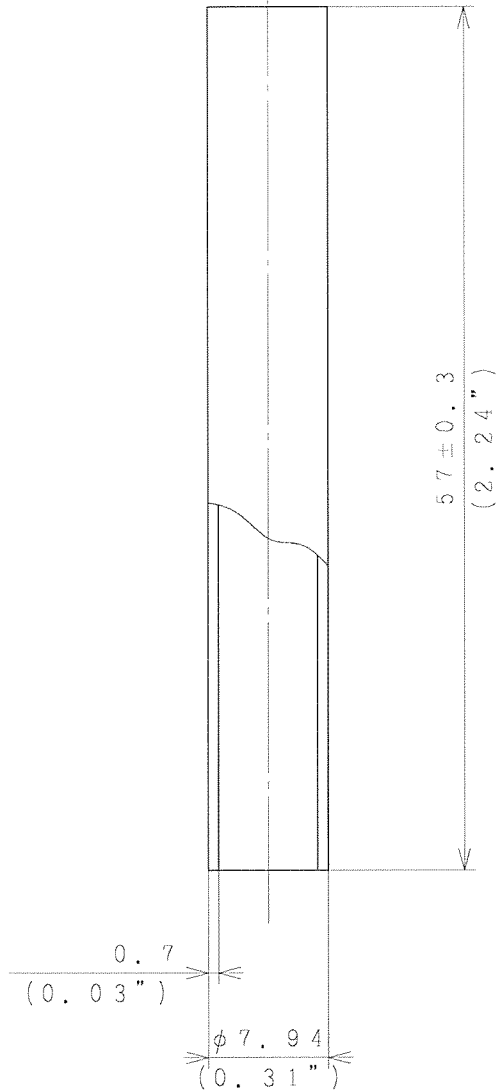
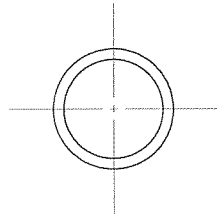
D I M E N S I O N : m m

M A T E R I A L : N A T U R A L R U B B E R


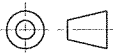
H A R D N E S S : H S 4 0 ± 5

SIGNATURE		DATE	PROJECTION	SCALE	TITLE	GAD
DWN.	W. Sugawara	2008-08-06		1 : 1	RUBBER GROMMET	
CHKD.	M. Onoguchi	2008-08-06				
APPD.	A. Simada	2008-08-08				
			Hitachi-Johnson Controls Air Conditioning, Inc.		TOCHIGI DWG. No.	REGD. REGD 2008 0808
					4CYC BB0014618	

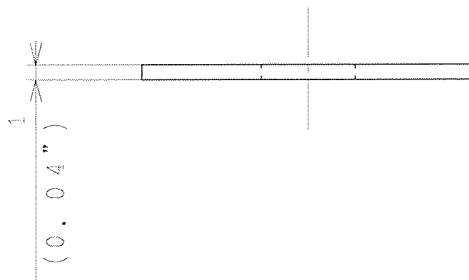
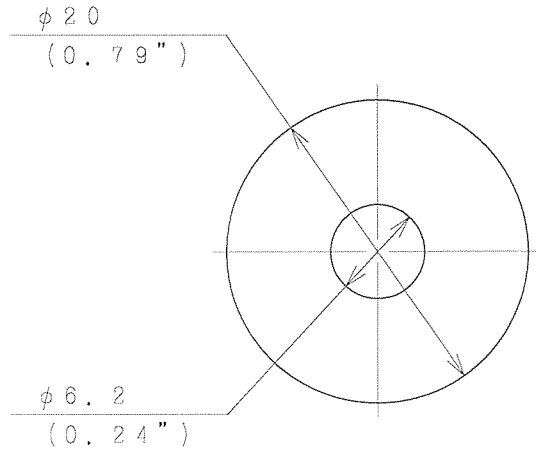
4CYC11191



MATERIAL : STEEL PIPE
 DIMENSION : mm (in)


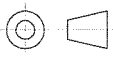

SIGNATURE		DATE	PROJECTION	SCALE	TITLE	 REGD. REGD. 2002 0116
DWN.	M. Goto	2002-01-11		2 : 1	PIPE	
CHKD.	K. Ishigami	2002-01-11	Hitachi-Johnson Controls Air Conditioning, Inc.		TOCHIGI DWG. No. 4CYC11191	
APPD.	Y. Sasaki	2002-01-11				

4CYC11192

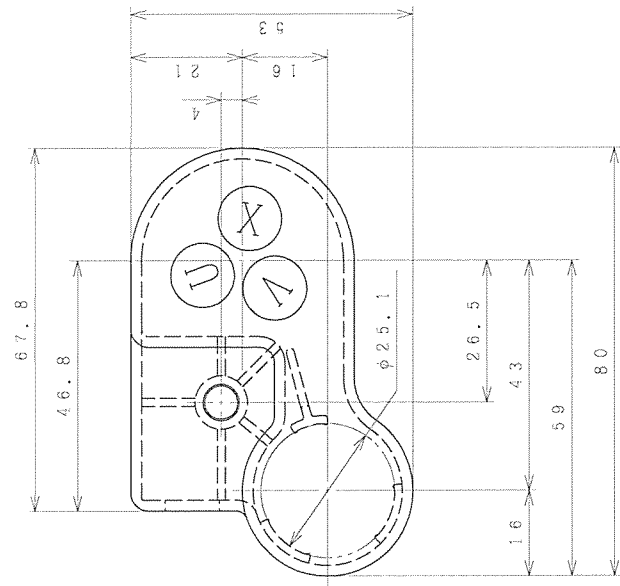
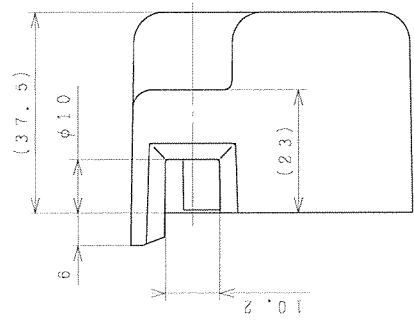
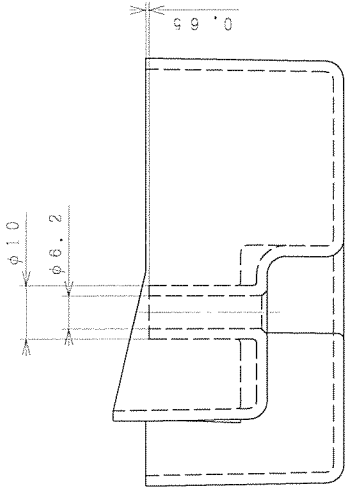


NOTES

MATERIAL: COLD ROLLED CARBON STEEL SHEETS
AND STRIP
SURFACE : ZINC-COATED
DIMENSION: mm (in)

SIGNATURE		DATE	PROJECTION	SCALE	TITLE	
DWN.	M. Goto	2002-01-17		2 : 1	WASHER	
CHKD.	K. Ishigami	2002-01-17	Hitachi-Johnson Controls Air Conditioning, Inc.		TOCHIGI DWG. No. 4CYC11192	
APPD.	Y. Sasaki	2002-01-17				

3CYCA1824



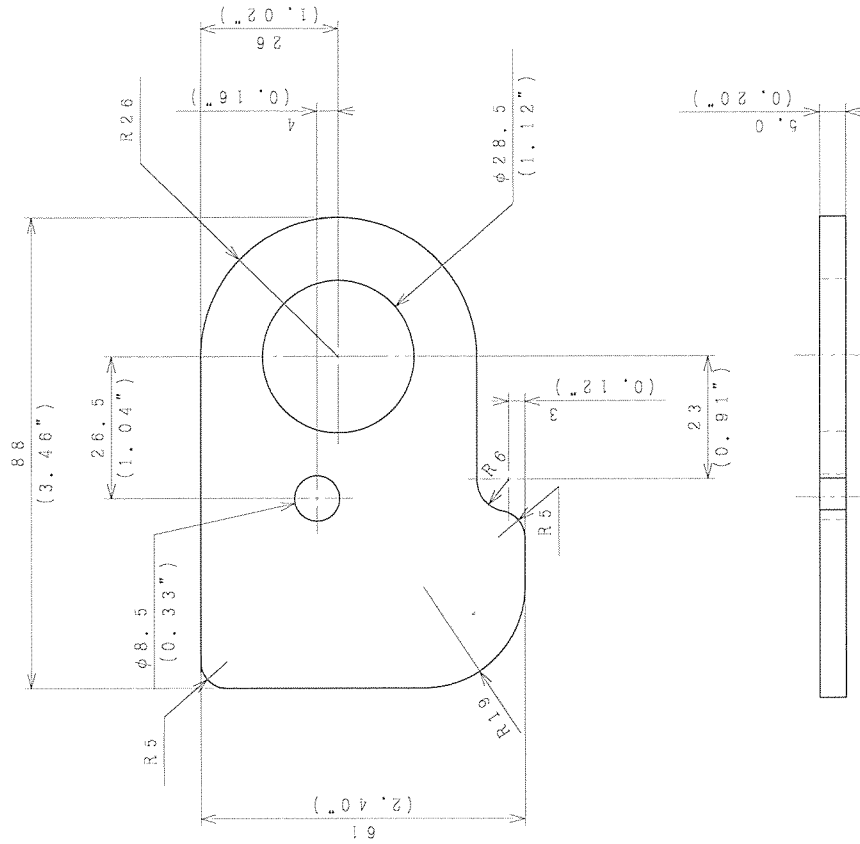
UL Flame Class of Material: 94-V0
 Material: PA-66 or MPPE
 (This molding part was tested to
 comply with the UL flame class of
 94-5V by us.)

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWN. M. Goto	2001-10-23		1:1	OLR-COVER
CHKD. K. Ishigami	2001-10-24			TOCHIGI DWG. No.
APPD. M. Onoguchi	2001-10-24			Hitachi-Johnson Controls Air Conditioning, Inc.
	2001-10-24			3CYCA1824

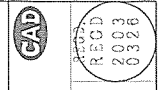
REC'D
2001
1024

3CYCA4295

MATERIAL: EPDMFOP-B
 DIMENSION: mm (in)

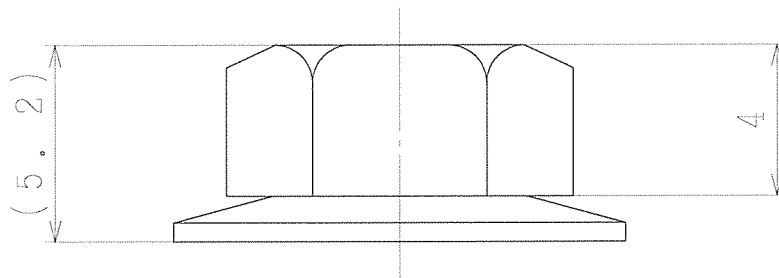
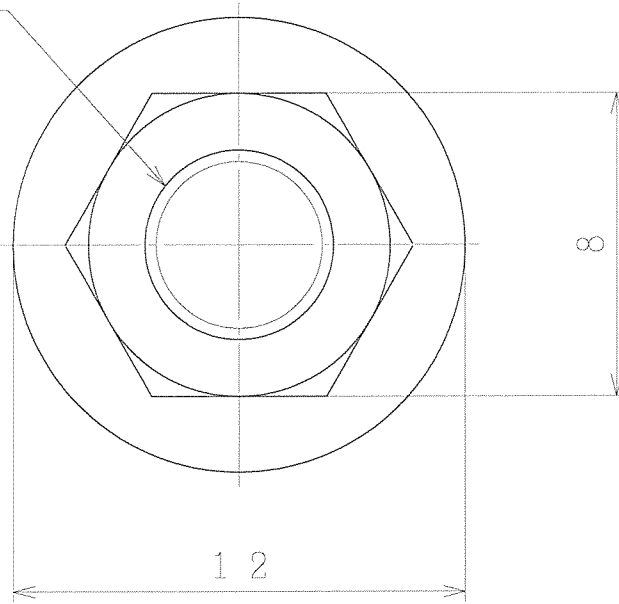


SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWL. M. Goto	2003-03-24		1 : 1	GASKET
CHKD. M. Goto	2003-03-24			
APPD. Y. Nakada	2003-03-25	Hitachi-Johnson Controls Air Conditioning, Inc.		
				TOCHIGI DWG. No. 3CYCA4295


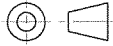



4CYC11177

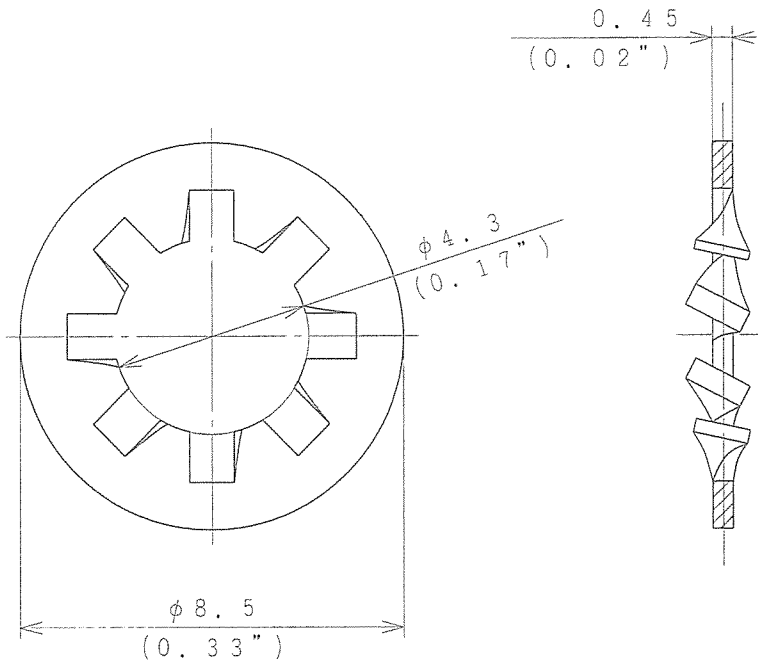
M5 × P0.8




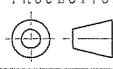

DIMENSION [mm]

SIGNATURE		DATE	PROJECTION	SCALE	TITLE		
DWN.	H. Owada	2000-07-06		5 : 1	M5-NUT		
CHKD.	K. Sekigami	2000-07-06			Hitachi-Johnson Controls Air Conditioning, Inc.	TOCHIGI DWG. No.	
APPD.	K. Sekigami	2000-07-06				4CYC11177	

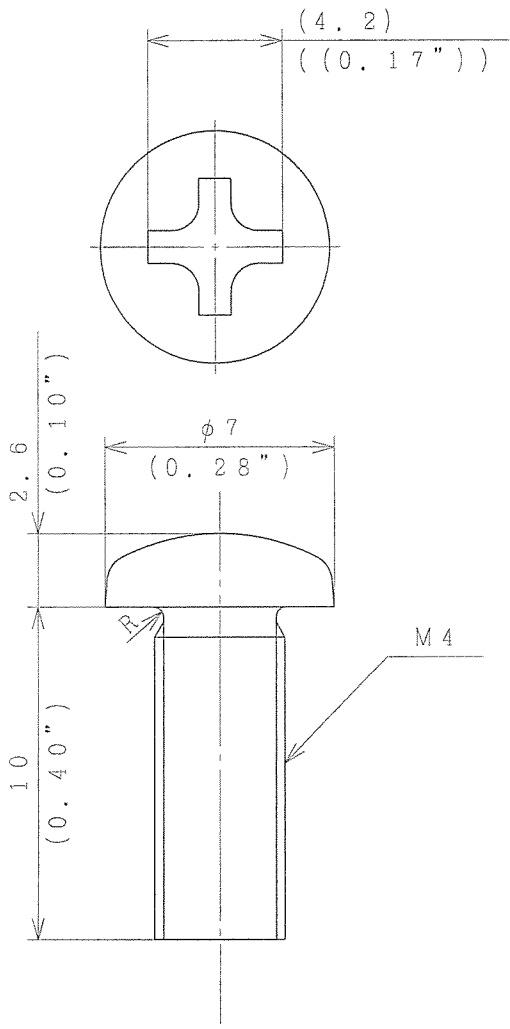
4CYC11206




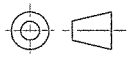
MATERIAL: COLD ROLLED SPECIAL STEEL STRIP
 SURFACE FINISHING: ELECTROPLATED COATINGS OF
 ZINC ON IRON OR STEEL
 DIMENSION: mm (in)

SIGNATURE		DATE	PROJECTION	SCALE	TITLE	 TOCHIGI DWG. No. 4CYC11206
DWN.	M. Goto	2003-04-08		NTS	TOOTHED LOCK WASHER	
CHKD.	M. Koyama	2003-04-09	Hitachi-Johnson Controls Air Conditioning, Inc.		 2003 0411	
APPD.	Y. Nakada	2003-04-09				

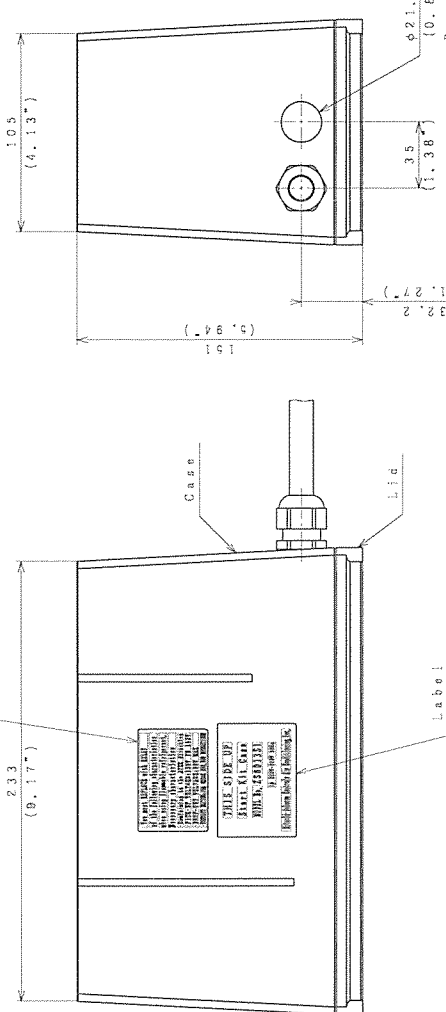
4CYC11207



MATERIAL: CARBON STEEL WIRES FOR COLD HEADING
 AND COLD FORGING
 SURFACE FINISHING: ELECTROPLATED COATINGS OF
 ZINC ON IRON OR STEEL
 DIMENSION: mm (in)

SIGNATURE		DATE	PROJECTION	SCALE	TITLE	 REGD. REGD 2003 0415
DWN.	A. Murakami	2003-04-14		N T S	CROSS RECESSED HEAD SCREW TOCHIGI DWG. No. 4CYC11207	
CHKD.	M. Koyama	2003-04-14				
APPD.	Y. Nakada	2003-04-14				
			Hitachi-Johnson Controls Air Conditioning, Inc.			

R-Label (E-BOX Type: C, D, E only)
 You must REPLACE with RELAY of the following characteristics when using flammable refrigerant. Necessary characteristics
 -Comforming to the ATEX directive
 -PICK-UP VOLTAGE: 130V TO 153V
 -DROP-OUT VOLTAGE: 90V MAX
 -CONTACT RATING: 20A BREAK 200,000 OPERATIONS



THIS SIDE UP
 Indicate compressor type number and installation direction
 Comp. Model: ZSXXXXXX
 Power source: 1 ϕ 220V-240V 50Hz

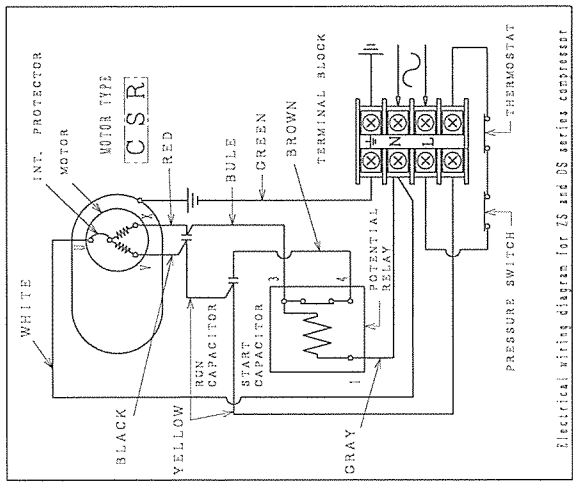
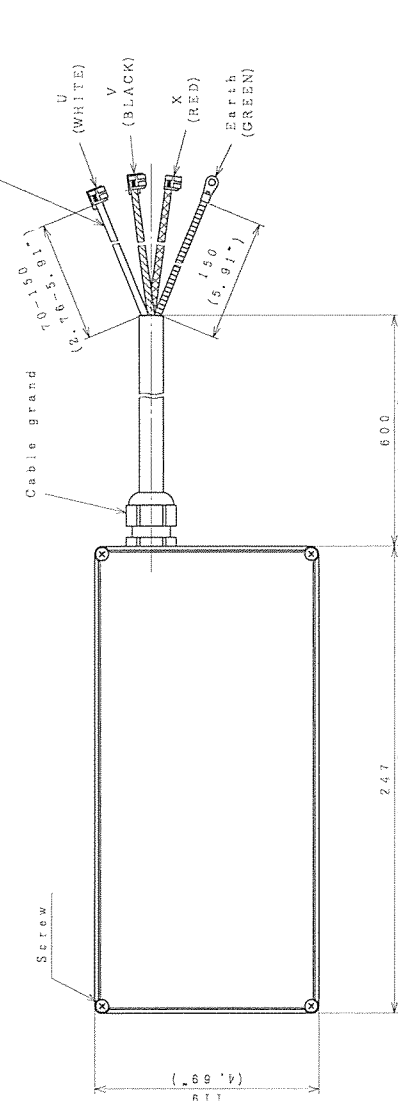


Fig. 1 Diagram

E-BOX Type	Comp. type	Power source	Potential relay	Running Capacitor	Starting Capacitor
A	ZS4084S1	1 ϕ 220-240V 50Hz	AMVL-145V1	30 μ F/400V	30 μ F/400V
B	ZS6013S1	1 ϕ 220-240V 50Hz	AMVL-240V1	25 μ F/400V	40 μ F/400V
C	ZS7516S1	1 ϕ 220-240V 50Hz	AMVL-240V1	30 μ F/450V	40 μ F/400V
D	ZS1120S1	1 ϕ 220-240V 50Hz	AMVL-240V1	40 μ F/450V	40 μ F/450V
E	ZS1120S1	1 ϕ 220-240V 50Hz	AMVL-240V1	55 μ F/450V	75 μ F/400V
F	DS1834X1	1 ϕ 220-240V 60Hz	AMVL-250V2	55 μ F/450V	75 μ F/400V
G	ZS4084P1	1 ϕ 115V 60Hz	AMVL-195V2	30 μ F/400V	60 μ F/400V
H	ZS6013P1	1 ϕ 115V 60Hz	AMVL-195V2	30 μ F/400V	60 μ F/400V
J	ZS6013X1	1 ϕ 208-230V 60Hz	AMVL-250V2	30 μ F/450V	40 μ F/450V
K	ZS7516X1	1 ϕ 208-230V 60Hz	AMVL-250V2	30 μ F/450V	40 μ F/400V
L	ZS1120X1	1 ϕ 208-230V 60Hz	AMVL-250V2	45 μ F/450V	60 μ F/450V
M	DS1529X1	1 ϕ 208-230V 60Hz	AMVL-250V2	45 μ F/450V	60 μ F/450V

Notes
 1. Material of Case and Lid: Polybutylene terephthalate
 2. Water tight label: 1P44
 3. Case and Lid Flame Resistance level: 94-5V
 4. Potential relay operation is influenced by setting direction.
 Box installing direction should comply with upward label indication.
 5. The circuit diagram of Fig. 1 is indicated inside a lid.
 6. Dimension: mm (in)

3CYCA2092

STARTING CAPACITOR and DISCHARGE RESISTANCE

始動用キャパシタと放電抵抗

1. CAPACITOR TYPE

METALLIZED FILM CAPACITOR

メタライズド フィルム コンデンサ

Please do not ALUMINUM ELECTROLYTIC CAPACITOR. Because, starting capacitor turn on continuity electrify when the contact point of the relay deposited.

電圧リレーの接点が溶着した場合、始動キャパシタに連続通電される恐れがあるため、アルミ電解コンデンサは使用しないでください。

2. You need to attach a discharge resistance to the starting capacitor

始動キャパシタには放電抵抗を取付けて下さい。

Large amount of current which was charged in the starting capacitor may go into the contact point of the relay, and the contact part might be deposited.

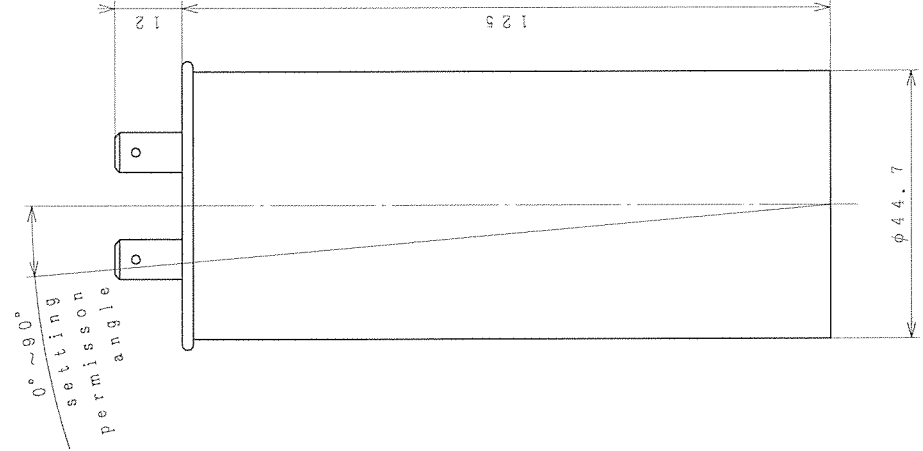
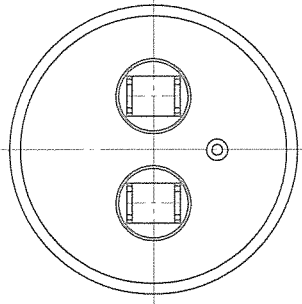
Therefore, you are required to attach a discharge resistance to the starting capacitor with the specification below.

CSに蓄えられた電荷により、リレーの接点に大電流が流れ、接点が溶着する恐れがありますので、下記仕様の放電抵抗をCSに取付けて下さい。

3. The setting permission angles of the capacitor are less than 90 degrees.

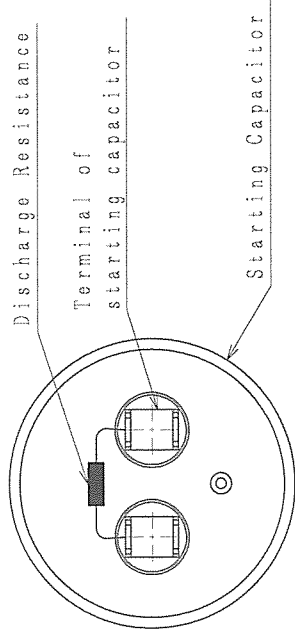
Do not use the terminal of capacitor upside down.

コンデンサの設置許容角度は90°以下のこと。端子を下向きにして使用しないで下さい。



SPECIFICATION 仕様

CAPACITOR		DISCHARGE RESISTANCE	
CAPACITANCE	VOLTAGE	FREQUENCY	NOMAL POWER RESISTANCE
容量	MFD	電圧 V, AC	周波数 Hz
30 ⁺³ _{-1.5}	400	50	2W
			68kΩ



SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWG. M. Goto	2002-01-16	◎	1:1	始動用キャパシタ
CHKD. K. Ishigami	2002-01-16			STARTING CAPACITOR
APPD. Y. Sasaki	2002-01-17			TOCHICI DWG. No.
Hitachi-Johnson Controls Air Conditioning, Inc.				3CYCA2092
				REC'D 2002 6117

A B C D E F

6761WJ03

STARTING CAPACITOR and DISCHARGE RESISTANCE

始動用キャパシタと放電抵抗

1. CAPACITOR TYPE

METALLIZED FILM CAPACITOR

メタライズド フィルム コンデンサ

Please do not ALUMINUM ELECTROLYTIC CAPACITOR. Because, starting capacitor turn on continuity electrify when the contact point of the relay deposited.

電圧リレーの接点が溶着した場合、始動キャパシタに連続通電される恐れがあるため、アルミ電解コンデンサは使用しないでください。

2. You need to attach a discharge resistance to the starting capacitor

始動キャパシタには放電抵抗を取付けて下さい。

Large amount of current which was charged in the starting capacitor may go into the contact point of the relay, and the contact part might be deposited.

Therefore, you are required to attach a discharge resistance to the starting capacitor with the specification below.

CSに蓄えられた電荷により、リレーの接点に大電流が流れ、接点が溶着する恐れがありますので、下記仕様の放電抵抗をCSに取付けて下さい。

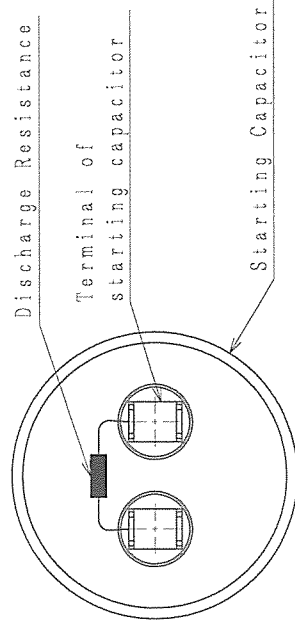
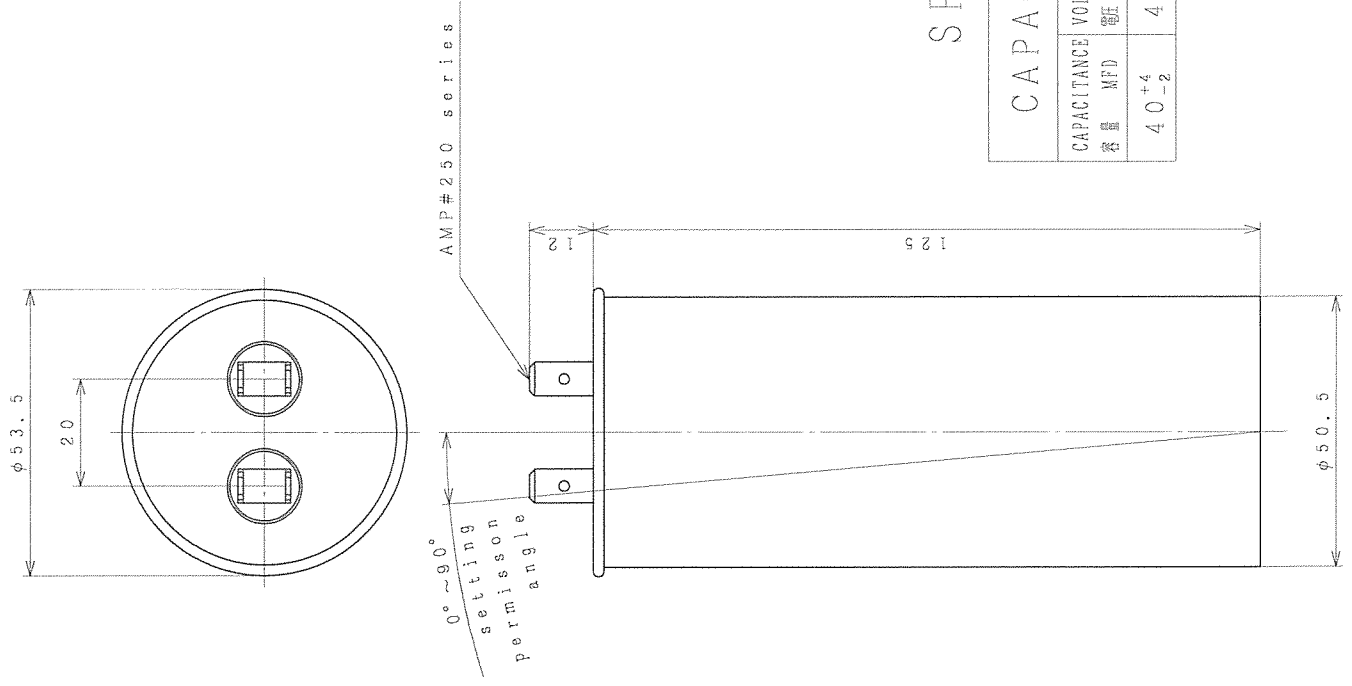
3. The setting permission angles of the capacitor are less than 90 degrees.

Do not use the terminal of capacitor upside down.

コンデンサの設置許容角度は90°以下のこと。端子を下向きにして使用しないで下さい。

SPECIFICATION 仕様

CAPACITOR		DISCHARGE RESISTANCE	
CAPACITANCE 容量	40 ⁺⁴ ₋₂ MFD	FREQUENCY 電圧 V, AC 周波数 Hz	400 50/60
NOMAL POWER RESISTANCE		2W	
		68kΩ	



SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWN. K. Morita	2001-12-05	◎	1:1	始動用キャパシタ
CHKD. M. Onoguchi	2001-12-05			STARTING CAPACITOR
APPD. Y. Sasaki	2001-12-05			TOCHIGI DWG. No.
				Hitachi-Johnson Controls Air Conditioning, Inc.
				3CYCA1949

REC'D 2001 1201

8217VCA128

STARTING CAPACITOR and DISCHARGE RESISTANCE

始動用キャパシタと放電抵抗

1. CAPACITOR TYPE
METALLIZED FILM CAPACITOR

メタライズド フィルム コンデンサ

Please do not ALUMINUM ELECTROLYTIC CAPACITOR. Because, starting capacitor turn on continuity electrify when the contact point of the relay deposited.

電圧リレーの接点が溶着した場合、始動キャパシタに連続通電される恐れがあるため、アルミ電解コンデンサは使用しないでください。

2. You need to attach a discharge resistance to the starting capacitor
始動キャパシタには放電抵抗を取付けて下さい。

Large amount of current which was charged in the starting capacitor may go into the contact point of the relay, and the contact part might be deposited.

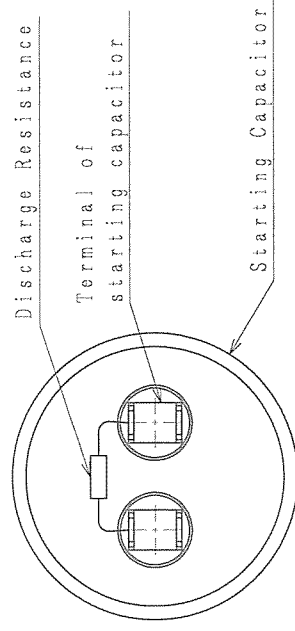
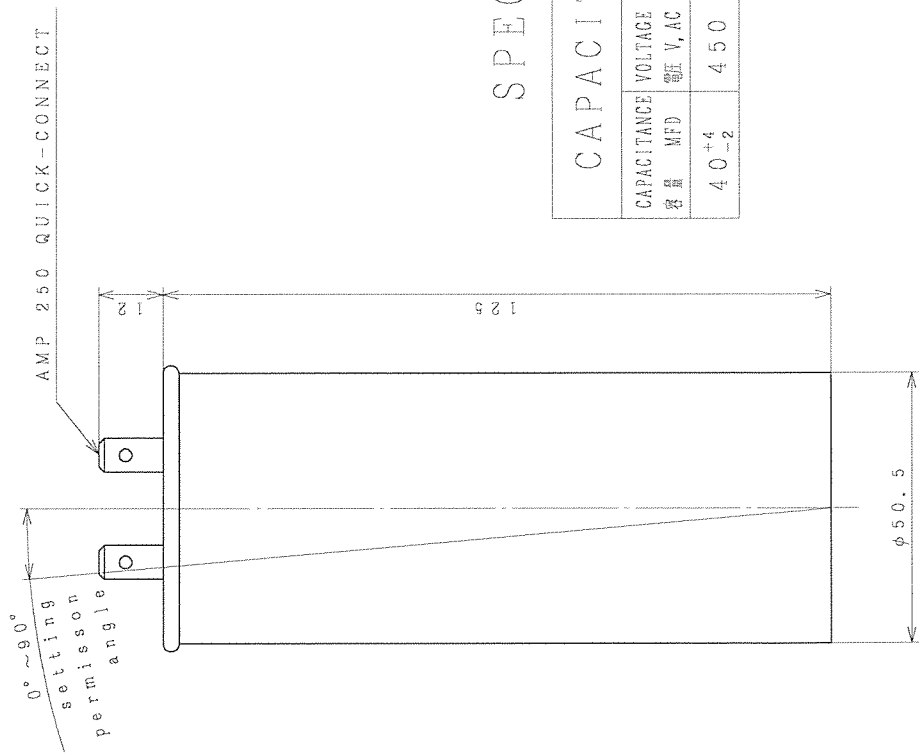
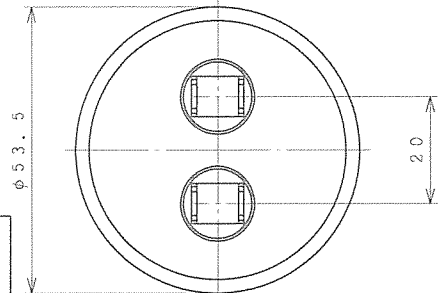
Therefore, you are required to attach a discharge resistance to the starting capacitor with the specification below.

Csに蓄えられた電荷により、リレーの接点に大電流が流れ、接点が溶着する恐れがありますので、下記仕様の放電抵抗をCsに取付けて下さい。

3. The setting permission angles of the capacitor are less than 90 degrees.

Do not use the terminal of capacitor upside down.

コンデンサの設置許容角度は90°以下のこと。端子を下向きにして使用しないで下さい。



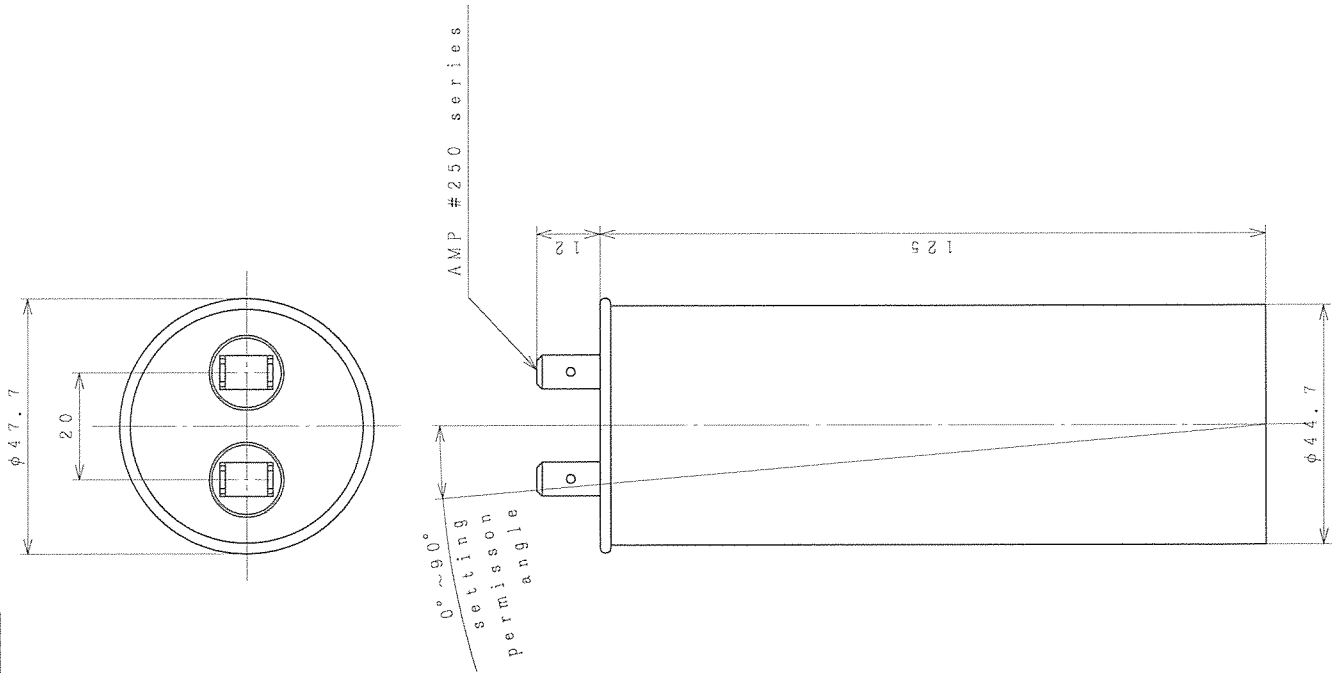
SPECIFICATION 仕様

CAPACITOR		DISCHARGE RESISTANCE	
CAPACITANCE 容量 MFD	VOLTAGE 電圧 V, AC	FREQUENCY 周波数 Hz	NORMAL POWER RESISTANCE
40 ⁺⁴ ₋₂	450	50/60	2W 68kΩ

SIGNATURE	DATE	PROJECTION	SCALE	TITLE	 始動用キャパシタ STARTING CAPACITOR TOCHIGI DWG. No.
	DWN. A. Murakami	2003-02-18	1:1		
	CHKD. M. Kojima	2003-02-18			
APPD. Y. Nakada	2003-02-19			Hitachi-Johnson Controls Air Conditioning, Inc.	3CYCA4128 REC'D 2003 0228

A B C D E F

0782V2340



RUNNING CAPACITOR 運転用キャパシタ

1. TYPE 種類
METALLIZED FILM CAPACITOR
メタライズド フィルム コンデンサ

2. SPECIFICATION 仕様

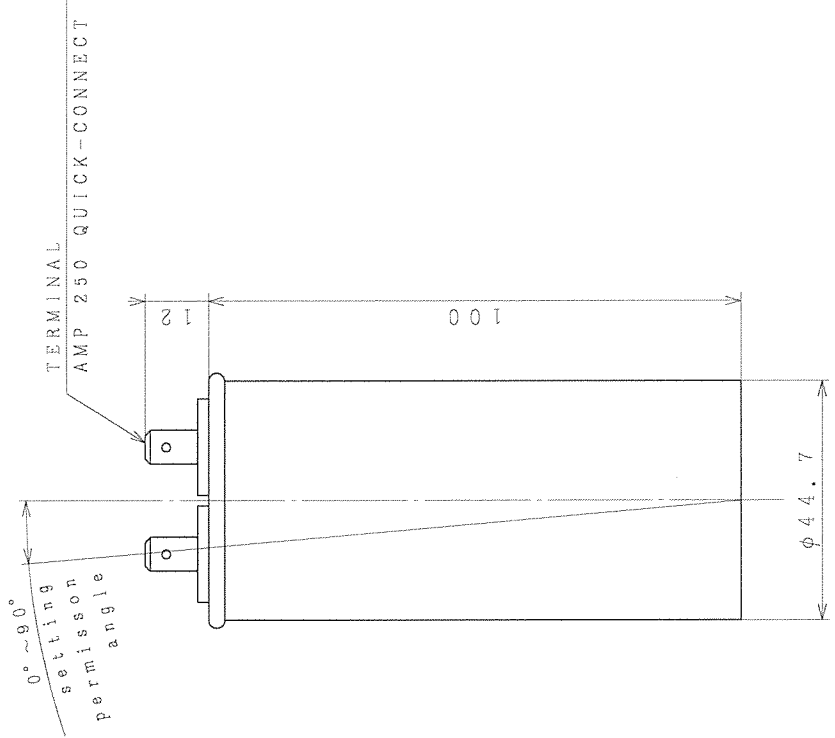
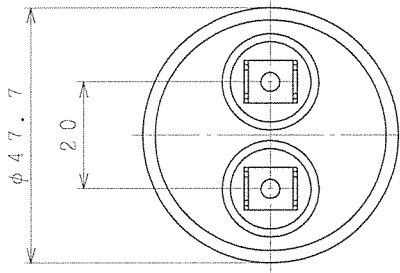
CAPACITOR		
CAPACITANCE 容量	VOLTAGE 電圧 V, AC	FREQUENCY 周波数 Hz
$30^{+3}_{-1.5}$	400	50/60

3. The setting permission angles of the capacitor are less than 90 degrees.
Do not use the terminal of capacitor upside down.
コンデンサの設置許容角度は 90° 以下のこと。
端子を下向きにして使用しないで下さい。

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWN. M. Ogino	2002-05-08	①	1:1	運転用キャパシタ
CHKD. M. Onoguchi	2002-05-13			RUNNING CAPACITOR
APPD. A. Shimada	2002-05-13			TOCHIGI DWG. No.
				Hitachi-Johnson Controls Air Conditioning, Inc.
				3CYCA2340

RECD 2002 0514
CAD

02L2V0J03



RUNNING CAPACITOR 運転用キャパシタ

1. TYPE 種類
METALLIZED FILM CAPACITOR

メタライズド フィルム コンデンサ

2. SPECIFICATION 仕様

CAPACITOR		
CAPACITANCE 容量 MFD	VOLTAGE 電圧 V, AC	FREQUENCY 周波数 Hz
25 ^{+2.5} _{-1.25}	400	50/60

3. The setting permission angles of the capacitor are less than 90 degrees.

Do not use the terminal of capacitor upside down.

コンデンサの設置許容角度は90°以下のこと。
端子を下向きにして使用しないで下さい。

SIGNATURE	DATE	PROJECTION	SCALE	TITLE	CAD
DMN. M. Goto	2002-05-08	◎	1:1	運転用キャパシタ	
CHKD. M. Otaguchi	2002-05-13			RUNNING CAPACITOR	REGD 2002 0512
APPD. A. S. Iwada	2002-05-13			TOCHIGI DWG. No.	
				Hitachi-Johnson Controls Air Conditioning, Inc.	
				3CYCA2720	

A

B

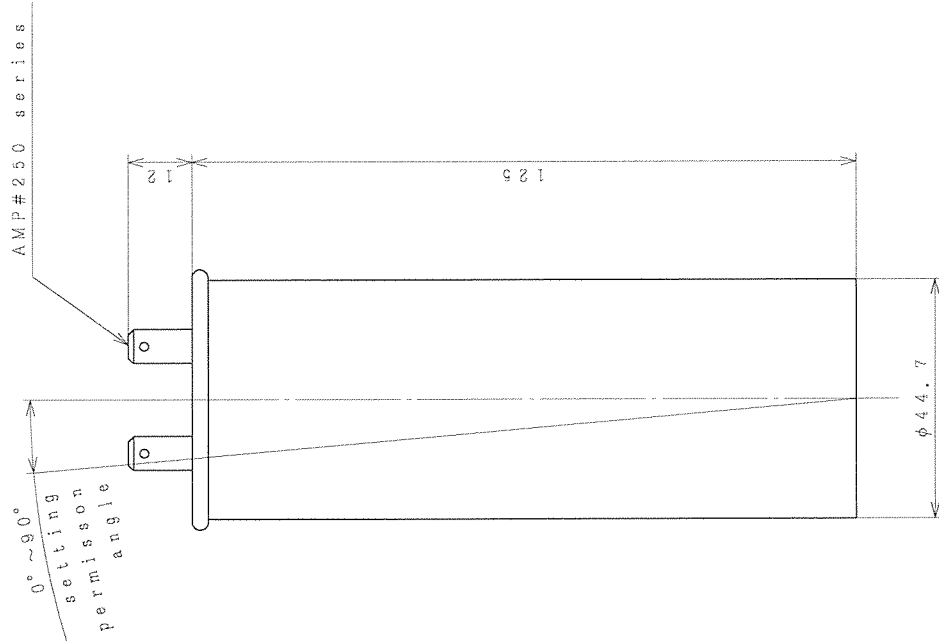
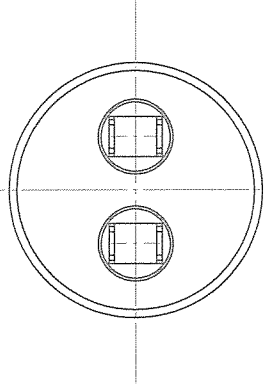
C

D

E

F

3CYCA2679



RUNNING CAPACITOR 運転用キャパシタ

1. TYPE 種類

METALLIZED FILM CAPACITOR

メタライズド フィルム コンデンサ

2. SPECIFICATION 仕様

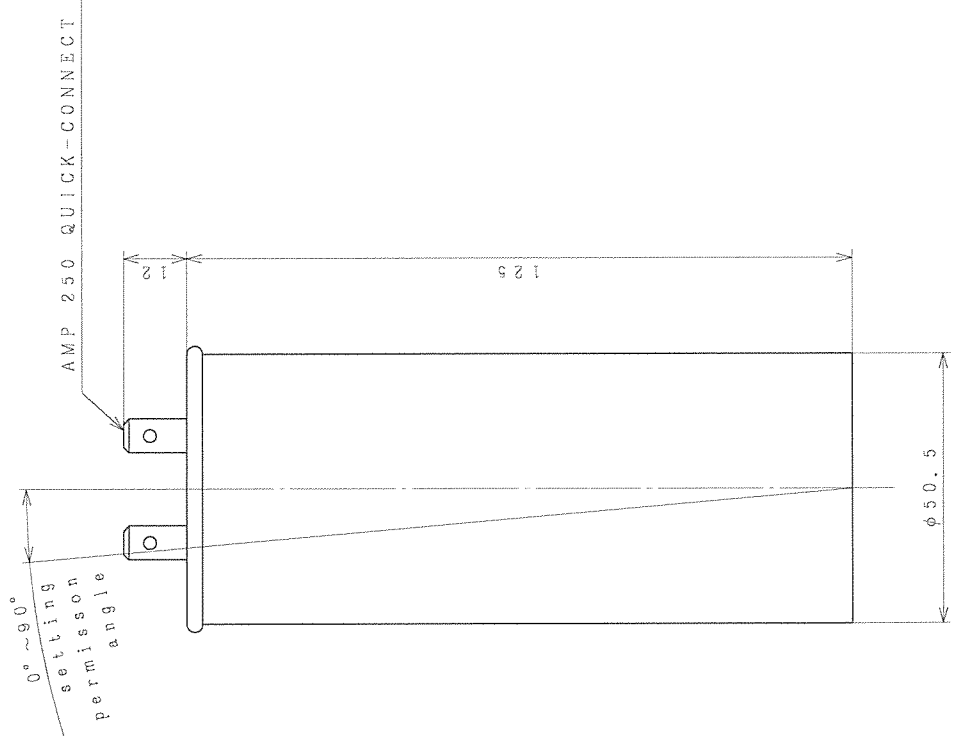
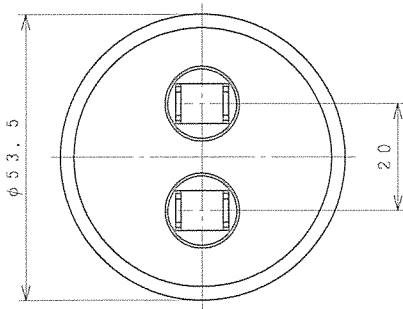
CAPACITOR		
CAPACITANCE 容量 MFD	VOLTAGE 電圧 V, AC	FREQUENCY 周波数 Hz
30 ⁺³ _{-1.5}	450	50/60

3. The setting permission angles of the capacitor are less than 90 degrees.
Do not use the terminal of capacitor upside down.
コンデンサの設置許容角度は90°以下のこと。
端子を下向きにしないで下さい。

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DRW. M. Ogino	2002-05-08	①	1:1	運転用キャパシタ
CHKD. M. Onoguchi	2002-05-13	②		RUNNING CAPACITOR
APPD. A. Sinada	2002-05-13			TOCHIGI DWG. No.
				Hitachi-Johnson Controls Air Conditioning, Inc.
				3CYCA2679



3CYCA4129



RUNNING CAPACITOR 運転用キャパシタ

1. TYPE 種類

METALLIZED FILM CAPACITOR

メタライズド フィルム コンデンサ

2. SPECIFICATION 仕様

CAPACITOR		
CAPACITANCE 容量 MFD	VOLTAGE 電圧 V, AC	FREQUENCY 周波数 Hz
40 ⁺⁴ ₋₂	450	50/60

3. The setting permission angles of the capacitor are less than 90 degrees.

Do not use the terminal of capacitor upside down.

コンデンサの設置許容角度は90° 以下のこと、端子を下向きにして使用しないで下さい。

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DRW. A. Murakami	2003-02-18	①	1:1	運転用キャパシタ
CHKD. M. Oyama	2003-02-18			RUNNING CAPACITOR
APPD. Y. Nakada	2003-02-19			TOCHIGI DWG. No.
				Hitachi-Johnson Controls Air Conditioning, Inc.
				3CYCA4129

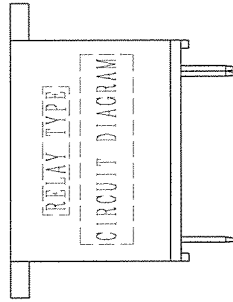
CAD
REGD
2003
6224

3CYCA3074

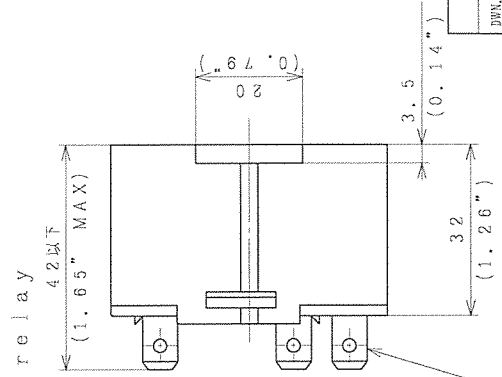
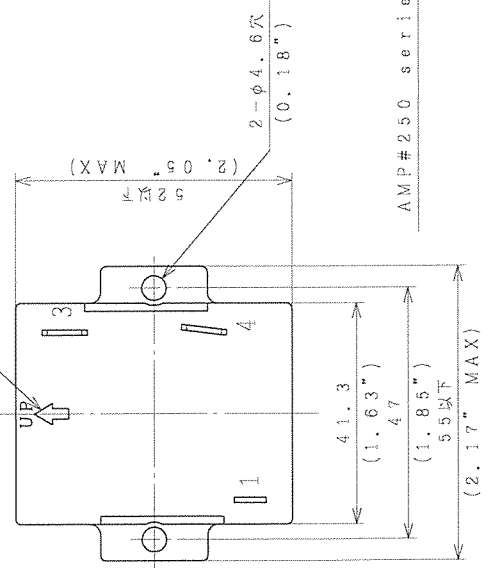
SPECIFICATION

COMPRESSOR MODEL	ZS4084S1
RELAY TYPE	AMVL-145V1
FREQUENCY	50Hz
NOMAL VOLTAGE	AC145V
OPERATING VOLTAGE	AC85±10V
RECOVERY VOLTAGE	AC45V or less
CONTACT CAPACITY	20A
CONTACT TYPE	type b

1. Please keep the direction of the installation of the relay.
 There is a case not to operate normally when installing in the direction which is different from the direction.
 リレー設置方向を守って使用下さい。
 図示方向と異なる向きに取付けると正常に作動しない恐れがあります。



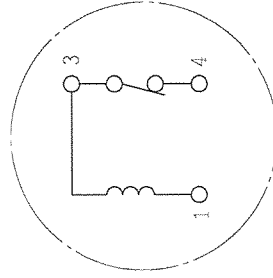
installation of the relay
 リレー設置方向



*CONTACT TYPE b (ON→OFF)



CIRCUIT DIAGRAM



SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DRW. M. Goto	2002-07-29	①	1:1	STARTING VOLTAGE CONTROL RELAY
CHKD. K. Morita	2002-07-29			
APPD. A. S. Inada	2002-08-07			
Hitachi-Johnson Controls Air Conditioning, Inc.				TOCHIGI DWG. No.
				3CYCA3074

CAD REGD 2002 6808

3L20100NN

1. Please keep the direction of the installation of the relay. There is a case not to operate normally when installing in the direction which is different from the direction.

リレー設置方向を守って使用下さい。

図示方向と異なる向きに取付けると正常に作動しない恐れがあります。

2. You must REPLACE with RELAY of the following characteristics when using flammable refrigerant.

Necessary characteristics

• Comforming to the ATEX directive

• PICK-UP VOLTAGE (OPERATING VOLTAGE) : 130V TO 153V

• DROP-OUT VOLTAGE (RECOVERY VOLTAGE) : 90V MAX

• CONTACT RATING (CONTACT CAPACITY)

: 20A BREAK 200,000 OPERATIONS

R1270等可燃性冷媒を使用する場合は、ATEX指令に適合した、下記特性の始動リレーに交換すること。

特性

動作電圧：130～153V

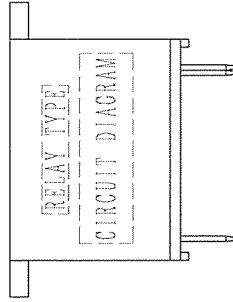
復帰電圧：90V以下

接点耐久：20A - 20万回

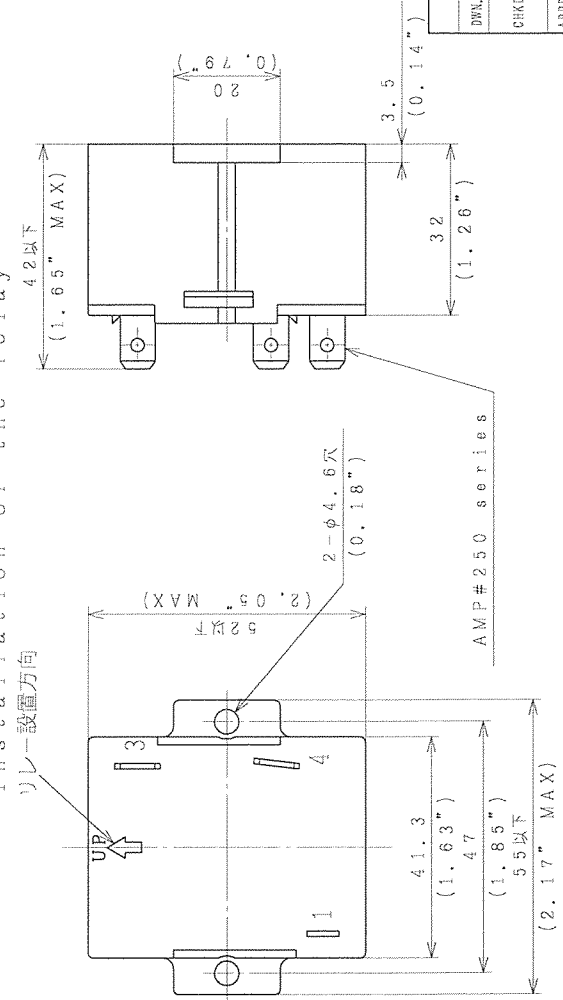
*CONTACT TYPE b (ON→OFF)

SPECIFICATION

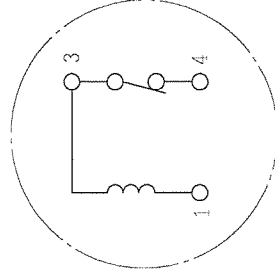
RELAY TYPE	AMVL-240V1
FREQUENCY	50Hz
NOMAL VOLTAGE	AC240V
OPERATING VOLTAGE	AC140±10V
RECOVERY VOLTAGE	AC90V or less
CONTACT CAPACITY	20A
CONTACT TYPE	type b



installation of the relay
リレー設置方向



CIRCUIT DIAGRAM



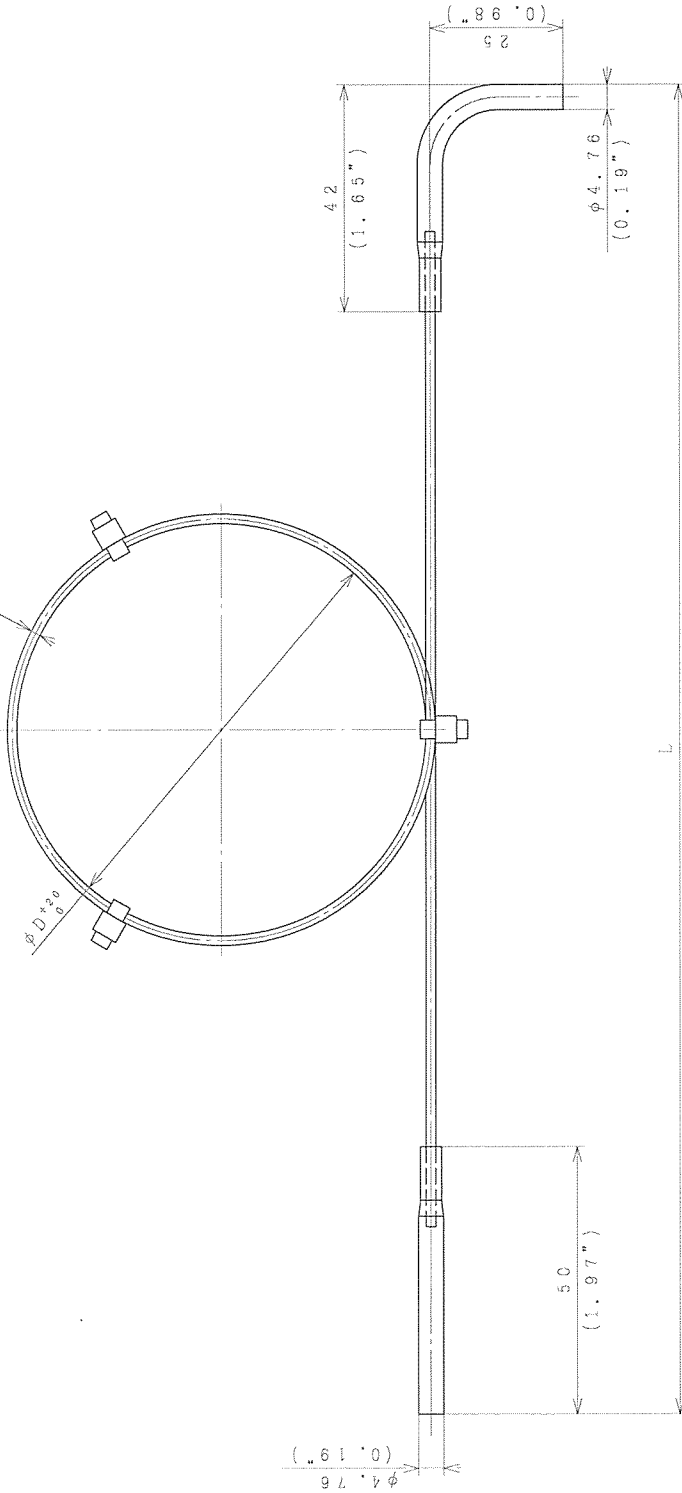
DIMENSION : mm (in)

SIGNATURE	DATE	PROJECTION	SCALE	TITLE	CAD
DRW. <i>R. Kodama</i>	2018.05.25	①	1:1	CONTROL RELAY	
CHKD. <i>T. Ohmura</i>	2018.05.25				
APPD. <i>M. Ogasawara</i>	2018.05.25				
Hitachi-Johnson Controls Air Conditioning, Inc.					TOCHIGI DWG. No.
					3CYC NN0010273

RECD.

BB0032682

$\phi 0.68 \text{ ID} \times \phi 1.80 \text{ D}$
($0.03 \text{ ID} \times 0.070 \text{ D}$)



DIMENSION : mm (in)

TYPE	RESISTANCE VALUE	L	ϕD	NUMBER OF TURNS
A	79.8 kPa	250 (9.84")	45 (1.77")	19
B	13.3 kPa	155 (6.10")	47 (1.85")	1
C	26.6 kPa	206 (8.11")	71 (2.80")	2
D	53.3 kPa	246 (9.69")	77 (3.03")	6
E	39.9 kPa	206 (8.11")	77 (3.03")	4
F	6.67 kPa	142 (5.59")	10 (0.39")	1

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DRN. K. Echigoya	2012-05-10	⊙	NTS	
CHKD. M. Onoguchi	2012-05-10			
APPD. A. Shirai	2012-05-12			
Hitachi-Johnson Controls Air Conditioning, Inc. 3CYC BB0032682				
TOCHIGI DWG. No. 3305				
REC'D 2012 0512				

3CYCA4165

A

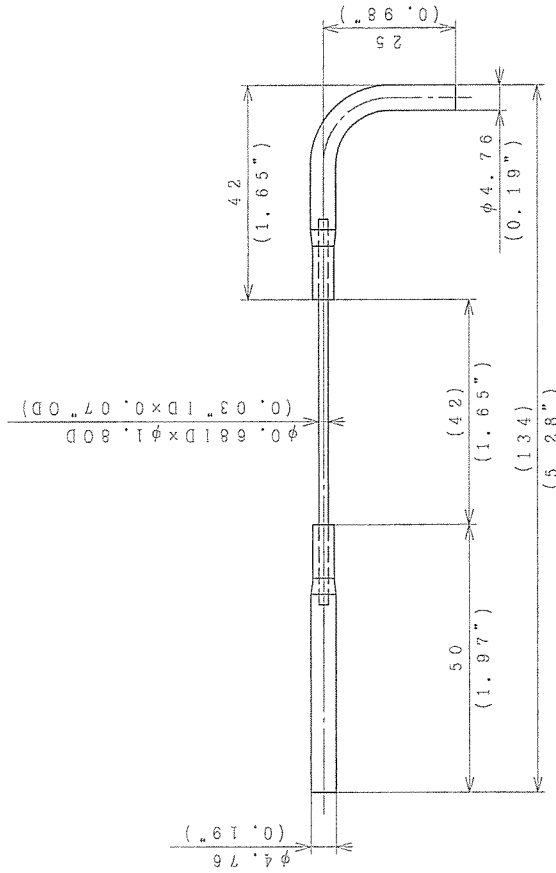
B

C

D

E

F



NOTES

1. RESISTANCE VALUE: 2.67KPa

(THE LENGTH OF THE PIPE IS APPROXIMATELY 72 (2.83") MILLIMETERS.)

D I M E N S I O N : m m (i n)

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DWN. A. Hiraiami	2003-04-14		1 : 1	CAPILLARY FOR LIQUID INJECTION
CHKD. M. Koyama	2003-04-14			TOCHIGI DWG. No.
APPD. Y. Nakata	2003-04-14			Hitachi-Johnson Controls Air Conditioning, Inc.
				3CYCA4165

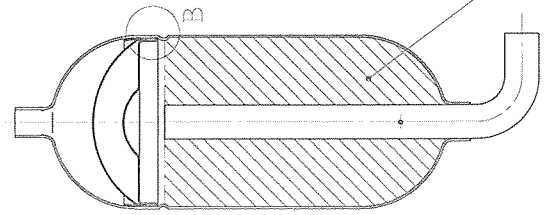
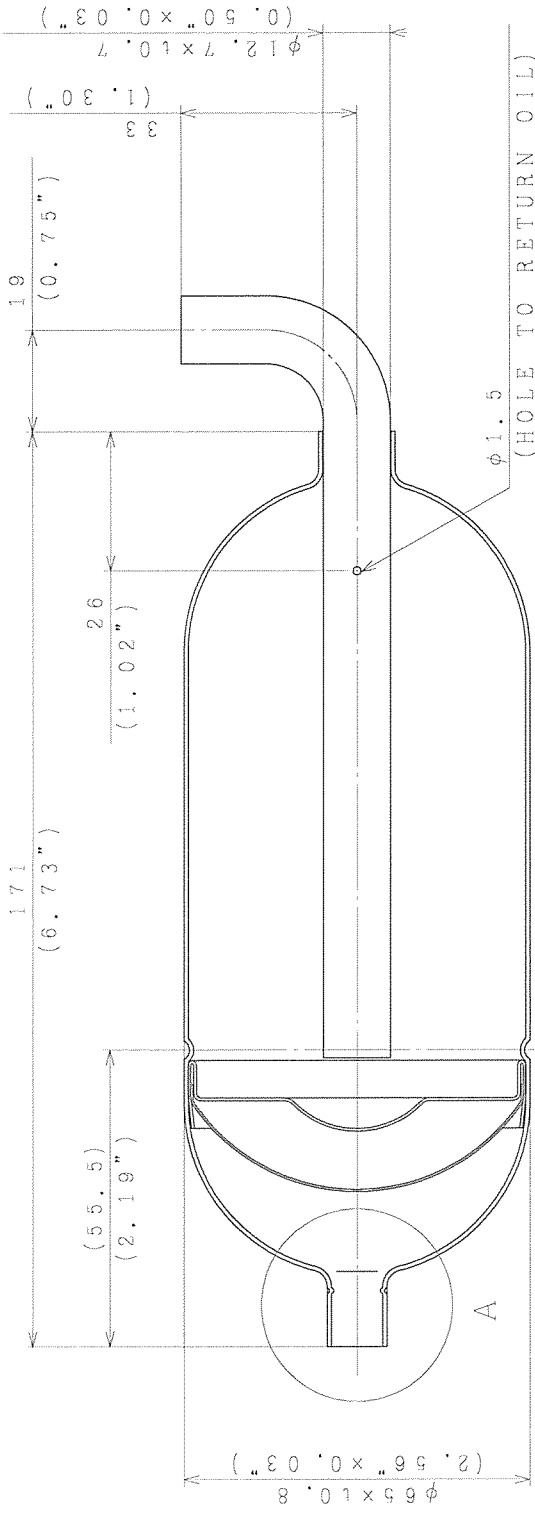
Hitachi-Johnson Controls Air Conditioning, Inc. 3CYCA4165

CAD
REGD
2003
0415

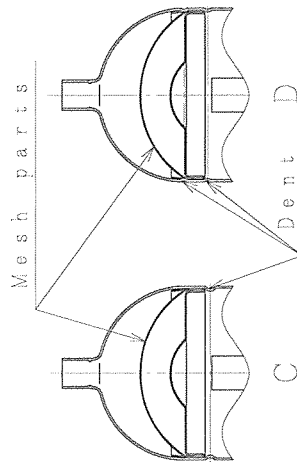
3CYCA1592

UPPER SIDE

LOWER SIDE

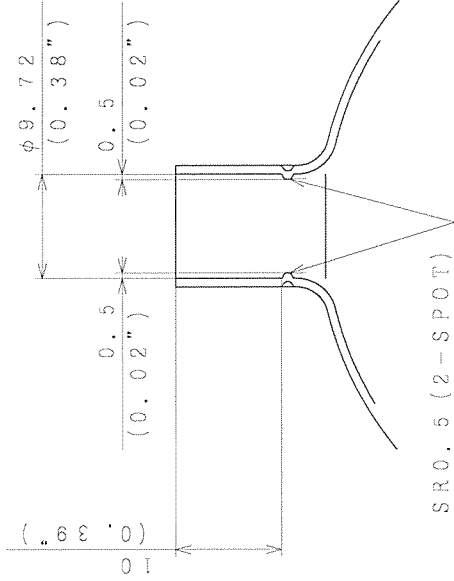


(NTS)



B (NTS)

Dent for fixing
the mesh parts (C or D)



SRO. 5 (2-SPOT)

A (2:1)

Note

1. Use to stand upper A side vertically.
2. The phosphor copper brazing be done while blowing or being full of N₂ gas.

DIMENSION: mm (in)

SIGNATURE	DATE	PROJECTION	SCALE	TITLE
DNV. A. Fujita	2001-08-29	①	1:1	ACCUMULATOR
CHKD. A. Sinda	2001-08-29			
APPD. Y. Sasaki	2001-08-29			

Hitachi-Johnson Controls
Air Conditioning, Inc.

TOCHIGI DWG. No. 3CYCA1592

REC'D 2001 0830

