

# **Hitachi Highly**

## **Rollkolbenverdichter**

## **Rotary Compressors**

### **Spezifikation**

### **Installation Manual**

# **WHP01100PSV-H3EUN**

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1. SCOPE

This specification is applied to SHANGHAI HITACHI Heat pump water heater compressor.

2. SPECIFICATION OF COMPRESSOR

2.1 Model

WHP01100PSV-H3EUN

2.2 Rated Voltage/Frequency/Phase 220V~240V/50Hz/single

2.3 Application Heat pump water heater

2.4 Refrigerant R-290

2.5 Compressor Cooling Forced air

2.6 Displacement 5.86ml/rev

2.7 Performance

Performance (Voltage 220~240V)				
Item	Standard Condition	Summer Condition	Winter Condition	Rated Condition
Nominal Heating Capacity	1173W/1200W	1347W/1384W	872W/910W	1128W/1164W
Motor input	307W/332W	307W/334W	300W/330W	303W/332W
Current	1.45A/1.47A	1.45A/1.45A	1.4A/1.43A	1.43A/1.45A
COP(see*)	3.82/3.61	4.39/4.14	2.91/2.76	3.72/3.51
Test Conditions				
Evaporating temp.	10℃	15℃	0℃	7.2℃
Condensing temp.	55℃	55℃	55℃	54.4℃
Liquid temp. entering expansion valve.	46.7℃	46.7℃	46.7℃	46.1℃
Return gas temp.	20℃	25℃	10℃	35℃
Ambient temp.	35℃	35℃	15℃	35℃
Wind speed	2m/s	2m/s	2m/s	2m/s

SUBJECT	Model WHP01100PSV-H3EUN SPECIFICATION	PAGE: 2/23
* COP=	$\frac{\text{Heating capacity (W)}}{\text{Motor input}}$	
2.8 Allowable amount of	refrigerant charge	
2.9 Amount of oil charge	150 g	
	152±5 ml (Initial)	
2.10 Oil	5GSD-TB or equivalent	
2.11 Space volume of inner case	380 ml	
	5.62 kg incl. oil	
2.12 Net weight		
2.13 Hermetic Terminal	1/4" quick connect type	
2.14 Motor Type	Permanent Split Capacitor	
Capacitor	12MFD/450 Volts	
Locked rotor amps	6.1A (240V/50Hz)	
Approved voltage range	Rated Voltage (-10%, +10%)	
Winding resistance (M/S)	14.09/19.37 Ω (at 20°C)	
2.15 Starting performance		
(1) The starting voltage should be as follows.		
(2) The starting pressure should be balanced	between the suction and	
	discharge of the compressor and should be adjusted to the	
	following table.	
(3) The temperatures of the compressor enclosure should be more than 20°C continuously		
	at the following table.	

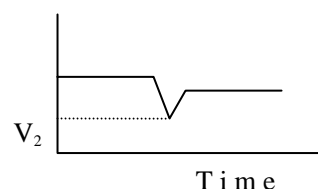
- Starting Performance
- (1) Starting voltage shown in Table 1.
  - (2) Starting pressure level must be between the suction pressure and discharge pressure Scale, and the table to be adjusted.
  - (3) in the starting condition, the ambient temperature of the compressor to be maintained at above 20 °C.

Table 1

Starting Conditions		Spec
Motor temperature	Pressure MPa {kgf/ cm <sup>2</sup> G}	Starting voltage (V <sub>2</sub> )**
Cold-Starting Cold state (room temperature)	1.027 {9.44}	Below 85% of rated voltage
Hot-Starting(Standard) Hot state after operated under standard load condition	0.984 {9.01}	Below 85% of rated voltage
Hot-starting(Overload) Hot state after operated under overload condition	1.286 {12.08}	Below 90% of rated voltage

\* Nominal heating capacity equals refrigerant capacity adding motor input. Refrigerant capacity and motor input are measured by secondary Refrigerant calorimeter Methods of GB5773 by Shanghai Hitachi Electrical Appliances Co.,Ltd. Allowable heating capacity should be more than 95% of the nominal heating capacity and allowable motor input should be less than 107% of nominal motor input.

\*\* V<sub>2</sub> means minimum voltage measured between pins of hermetic terminal at the compressor starts.



\*\*\*. The suction pressure is measured on the position above the filter of accumulator.

	<p>SUBJECT</p> <p>Model WHP01100PSV-H3EUN SPECIFICATION</p>	PAGE: 4/23
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3. PARTS AND DRAWING LIST

WHP01100PSV-H3EUN	Drawing code	Q'ty	Remarks
Outline dwg.	4CYCA0096	—	Dimensioned sketch
Wiring diagram	4CYC01069	—	
Electrical components			
Running capacitor	4CYC00173	*	12μF-450V
Terminal parts accessories			
Terminal cover	4CYC01067	1	
Packing	4CYC01068	1	
Flange nut	SC01D430	1	
Rubber washer	SC01DA63	1	
Mounting accessories			
Mount Assy	SC01DB16	-	
Rubber mount	SC01DB17	3	

\*, Out of supply, for reference.

4. CHARACTERISTICS

4.1 Residual moisture                      200mg    MAX

4.2 Residual impurities                      100mg    MAX

## 1. SYSTEM DESIGN LIMITATIONS

## 1.1 Power source and Voltage

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

In the case of three phase, the phase imbalance should be within 3% among the compressor terminals. The phase imbalance should be calculated according to the follow formula.

$$\text{the phase imbalance} = \frac{(V)_{\text{max}} - (V)_{\text{mean}}}{(V)_{\text{mean}}} \times 100\%$$

(V)max:Maximum voltage among the three terminals. (V)

(V)mean:average voltage among the three terminals. (V)

## 1.2 Operating Temperatures and Pressures

The operating temperatures and pressures of the compressor should be within the range shown in the table 2 and graph 1.

## 1.3 Operating and Shut-off Period

The compressor should be operated continuously at least for 5 minutes after being turned ON.

3 minutes shut-off time should be ensured at least until restarting.

## 1.4 Oil Back and height of the oil level

Oil should be returned continuously to the compressor and not kept in the refrigeration system.

Oil level of compressor should be higher than 7.5 mm from the lubricating piece fixed on the end of the crankshaft.

Compressor must not be started operated under a dual-layer separate status.

However, in case of foaming situation, the height of this foam does not mean the height of the oil level.

If you do not keep the oil level, the oil shortage will occur, and influence the reliability of compressor.

(Please check the oil level in the compressor with the sight glass we supply.)

Refrigerating machine oil should be continuing to return to the compressor, but can not remain in the refrigeration system.

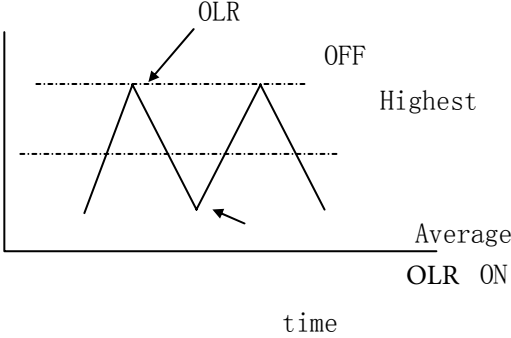
A compressor oil should be higher than the height of 7.5mm above the fuel supply port. Compressor operation, not to allow the two layers were separated oil and refrigerant. However, when the foam state, becomes liquid foam, which is not part of the oil level.

If you can not meet the oil level will result in supply shortage sliding portion, seriously affecting reliability.

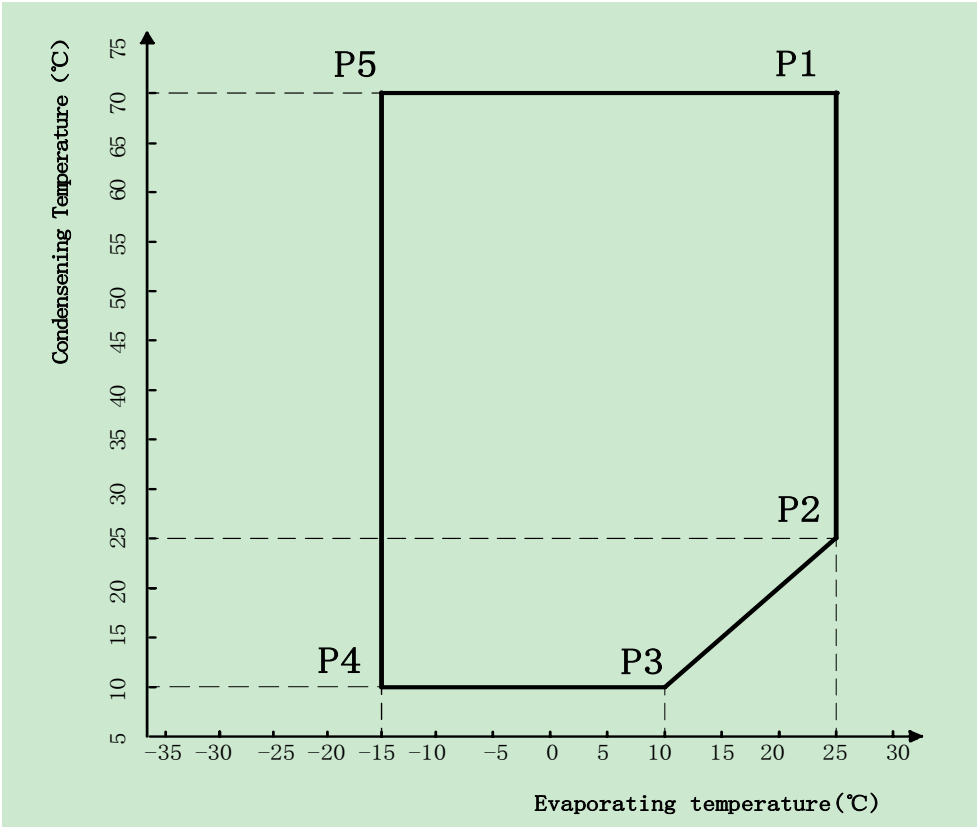
(Available to observe the oil used in the compressor with a sight glass for confirmation)

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

Table 2

Item	Operating Envelope	
Discharge pressure MPa {kgf/cm <sup>2</sup> G}	2.59 {25.39} MAX (condensing temperature : 70℃)	(see graph 1)
Suction Pressure MPa {kgf/cm <sup>2</sup> G}	0.29~0.95 {1.94~8.67} (Evaporation Temperature : -15℃~25℃)	
Compressor case bottom temp	99℃or below and 6 degrees higher than condensing temperature	
Motor winding temp.	Voltage±10%      127℃MAX	
Motor winding temp. under locked-rotor condition	<div>under stable condition:</div> <div><div>Average 165℃MAX</div><div>Highest 190℃ MAX</div><div></div><div>time</div></div>	
Accumulator temp	Higher than outlet pipe of evaporator	





Graph 1 图 1

	P1	P2	P3	P4	P5
Condensing temperature	70℃	25℃	10℃	10℃	70℃
Evaporation Temperature	25℃	25℃	10℃	-15℃	-15℃

1.5 Discharge pipe temperature

Discharge pipe temperature is measured at a distance 300mm from the surface of compressor and should be less than 110℃. The tip of the thermocouple is fixed by soldering when measuring discharge pipe temperature .Furthermore, soldering point is covered with urethane foam to prevent the effect of wind.

### 1.6 Temperature of Shell Bottom

The Temperature of compressor shell Bottom must be 6 degrees higher than the corresponding saturated temperature of discharge pressure under normal operating conditions.

### 1.7 Avoid refrigerant migration

The refrigerant migration to compressor shell should be avoided during the heat pump water heater system shut down periods, It's suggested that the electric heating belt should be used around the shell bottom when necessary.

### 1.8 Allowable Incline

The allowable incline should be less than 5° during operation.

### 1.9 Pipe Vibration

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

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

径。

### 1.10 Connecting Tube Design

In designing and routing tubing that connect from the compressor to the other parts of the air conditioner, following should be considered.

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

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

Moving tubes never touch to lead wire.

## 2. PROCESS LIMITATIONS

2.1 The degree of vacuum in the refrigerating system should be less than 20Pa  
{  $150 \times 10^{-3}$  mmHg } at room temperature just before charging refrigerant.

The quantity of water should be less than 0.2ml..

2.2 Prevent moisture from entering into the enclosed unit system . When the moisture entered into the unit, the refrigerant oil and the organic compound material presented in the hermetic motor will possibly decompose on the affecting of water . It will result in the capillary depositing and the reducing of insulation resistance.

It is necessary to install a dryer to dehumidify the residual moisture mixed in the refrigerant in the cycling system . The specially defined device for drying and filtering of R-290 is advised.

2.3 The weight of foreign particles on the inside surface of the heat exchanger tubes should be less than  $0.05\text{g/m}^2$ .

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

This value means the weight of foreign particles filtered after washing inside surface of the heat exchanger tubes with R-11.

Prevent the impurities from entering into the enclosed unit system . When the impurities entered into the enclosed system , it will damage the moving mechanism parts and result in the capillary depositing.

2.4 Eliminate all system contaminants such as trichlorethylene, alkalies, soap ,acid ,oil & washing fluid used at machining the heat exchanger tubes.

2.5 Purge parts with dry nitrogen or dry air to remove remains in parts (dust, detergent, etc.) before assembly of system.. Time for purging :over one second for pipe ;over three seconds for heat exchanger . Purging pressure:  $0.9 \pm 0.1\text{MPaG}$ . Dew point of dry air: Below  $-20^{\circ}\text{C}$ .

Dry nitrogen should be charged in compressor before assembly of system.

Welding should be finished within one minute after charge of nitrogen. Dry nitrogen needs to be charged again and weld if over one minute. Always purge the compressor with dry nitrogen during assembly of system .

2.6 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 .

2.7 The compressor should be operated for more than 20 seconds within 15 minutes after charging refrigerant into the system so proper lubrication results.

2.8 The manufacturing process of refrigerating system must comply with the regulations related to flammable refrigerants, since R290 is flammable refrigerant.

2.9 Explosion-proof unit should be used in the system.

2.10 Refrigerant R-290 99.9% in purity should be used for apparatus. 99.95% is recommended, if possible.

### 3. MISCELLANY

3.1 The pipe and hermetic pins attached to the compressor should not be bent.

3.2 The compressor should never be operated while under vacuum; otherwise, internal arcing can cause damaging parts.

3.3 The compressor should not be operated to form a vacuum and to absorb air.

3.4 The compressor should not be left opened in the atmosphere for more than 5 minutes .

When the air entered into the unit system , it will expedite the deterioration of the oil and result in the capillary depositing and the reducing of insulation resistance.

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

3.6 The compressor should be kept in the clean place with low-moisture.

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

3.8 The compressor should not be splashed with water intentionally.

3.9 Use the refrigerant of specified brand. When the refrigerant not specified used, it will possibly cause trouble of the performance and reliability of the compressor by the impurities in the refrigerant.

3.10 Refrigerant should be charged from the end of condenser of refrigerating systems. Never charge refrigerant to the compressor directly.

#### 3.11 Compressor mounting

Rubber grommets are designed soft to provide the 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.

3.12 The first starting voltage supplied to the refrigerating system should be more than the starting voltage mentioned TABLE 1 (page 3).

The refrigerant can not dissolve in the oil at the beginning because of the high viscosity of the oil.

3.13 The compressor should be kept out of the corrosive atmosphere such as in a chemicals storage, beside a hot spring and so on.

3.14 The lead wires should be connected to hermetic terminals without being touched on the surface of the compressor.

3.15 The fuse or/and breaker should be equipped in the main circuit.

3.16 The oil should be returned continuously to the compressor and not stayed in the refrigerating system.

3.17 There should be adequate clearance between the OD26-under-surface of Bolt -Head and the upper surface of rubber grommets.

3.18 To avoid water and impurity into the refrigeration system and make sure no leakage of refrigerant during the operating course. It's required to direct the erector and maintenance man of heat pump water heater.

#### 1. Basis for Checking upon Delivery

The Performance test will be carried out in accordance with this “compressor specification”.

The Safety Performance in accordance with GB4706.1 Safety of household and similar electrical appliances General requirements and GB 4706.17 Safety of household and similar electrical appliances Particular requirements for motor-compressor.

#### 2. Rule for Checking upon Delivery

If come across any quality problem, please notify the company in written form within 30 days after the arrival of the cargo, the company shall exchange exactly the number of the products, otherwise they shall be regarded as being up to standard.

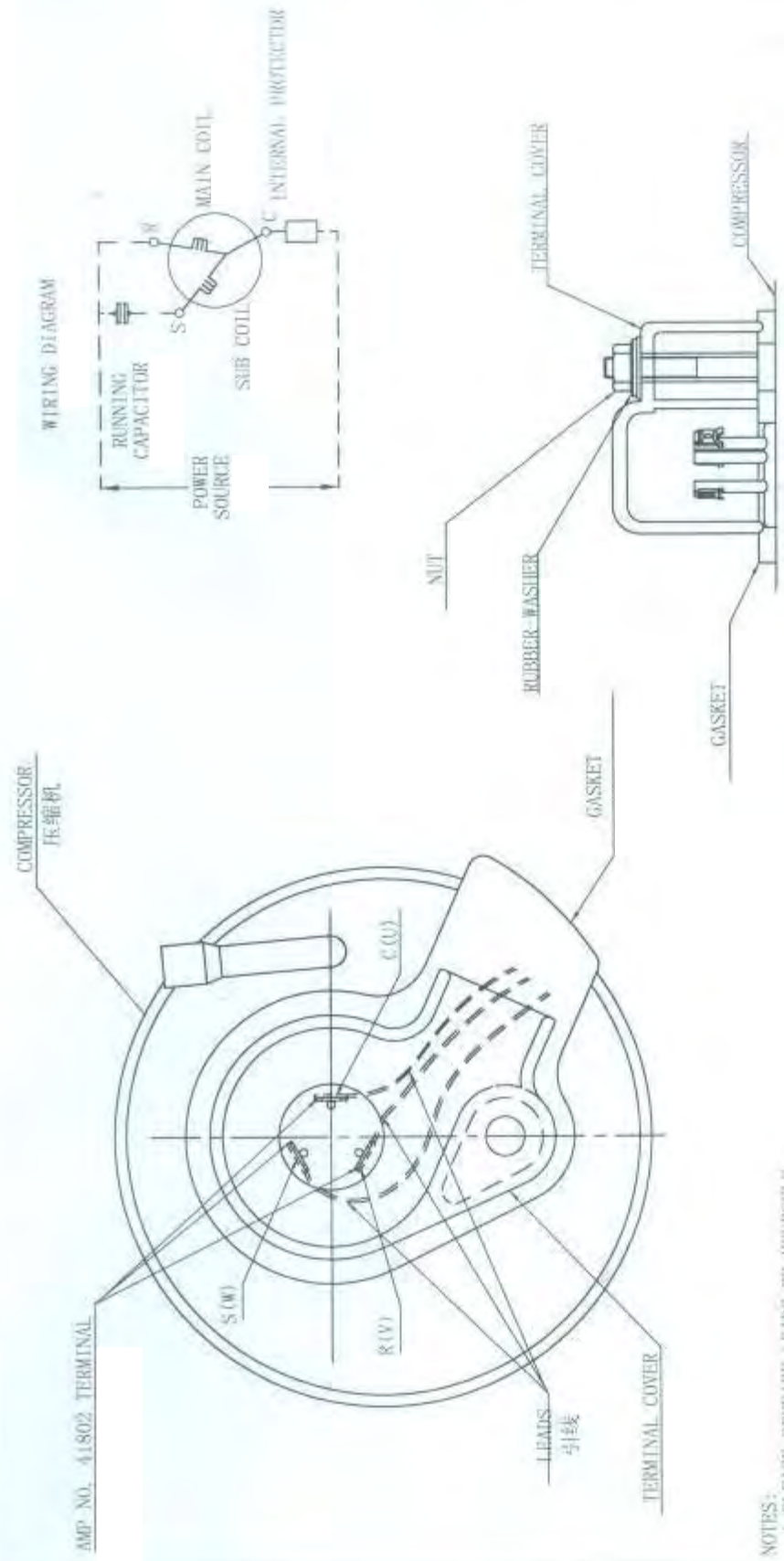




4CYC01069

版本控制

A



NOTES:  
1. PLEASE PREPARE LEADS BY YOURSELF.  
2. THE LETTER C, R OR S STANDS FOR EACH TERMINAL.  
3. TABS FOR HERMETIC TERMINAL ARE AMP #230.

REV	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD
1									

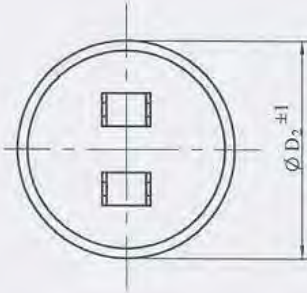
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PROJECTION	SCALE	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD

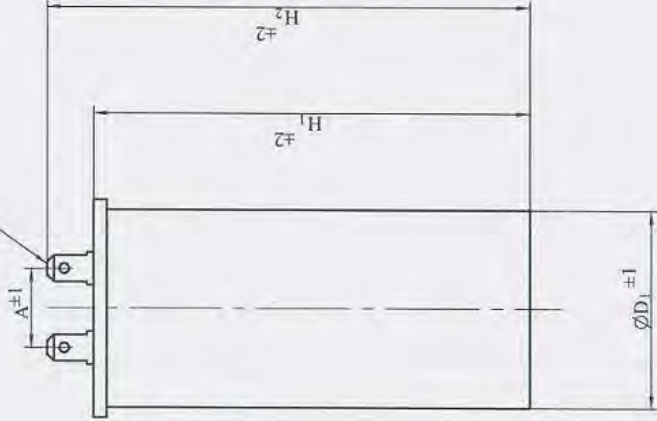
TITLE	4CYC01069
LEAD ROUTING WIRING DIAGRAM	

4CYC00173

B



AMP#250 SERIES TAB

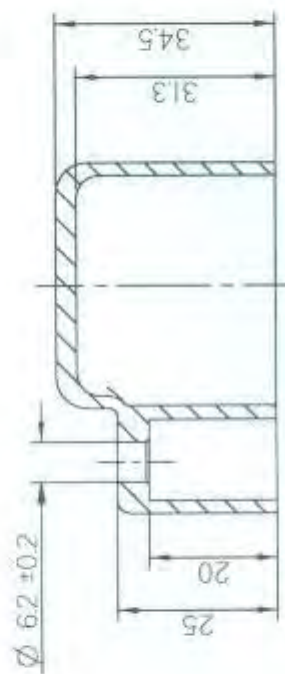
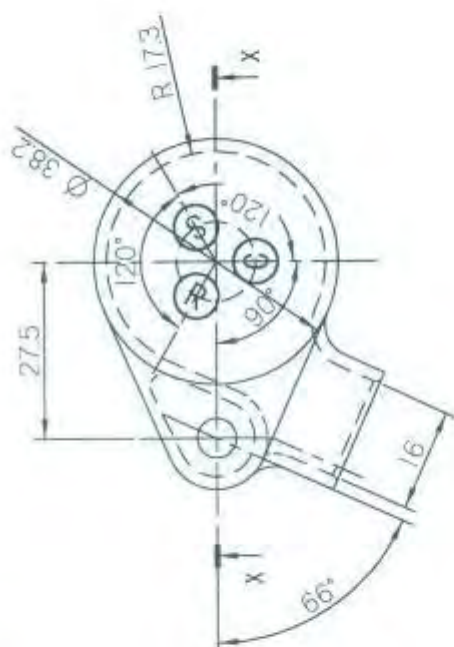


SPECIFICATION

NO	RATING		DIMENSIONS						MFG. NO.
	CAPACITANCE MFD	VOLTAGE VAC	FREQUENCY Hz	ΦD <sub>1</sub>	ΦD <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	A	
1	25	330	50/60	44.5	48	95	106	18	RRCG1492
2	30	230	50/60	44.5	48	80	88	18	RRCG1239
3	30	400	50/60	44.5	48	130	138	18	RRCG1281
4	35	400	50/60	50	54	130	138	20	RRCG1282
5	40	230	50/60	44.5	48	80	88	20	RRCG1240
6	40	400	50/60	50	54	130	138	20	RRCG1283
7	45	230	50/60	44.5	48	80	88	18	RRCG1241
8	50	230	50/60	44.5	48	80	88	18	RRCG1242
9	55	230	50/60	44.5	48	95	103	18	RRCG1148
10	60	230	50/60	44.5	48	95	103	18	RRCG1150
11	25	400	50/60	44.5	48	130	138	18	RRCG1456
12	14	230	50/60	40.5	44	80	88	16	RRCF1502
13	23	230	50/60	40.5	44	80	88	16	RRCF1491
14	50	400	50/60	60	64	130	138	20	RRCG1284
15	60	400	50/60	40.5	44	80	88	16	RRCF1496
16	35	450	50/60	60	64	130	138	20	RRCF1517
17	45	250	50/60	44.5	48	95	103	18	RRCG1661
18	60	250	50/60	44.5	48	130	138	18	RRCG1676
19	25	450	50/60	50	54	130	138	20	RRCG1537
20	50	270	50/60	44.5	48	130	138	18	RRCG1288
21	50	250	50/60	44.5	48	130	138	18	
22	50	450	50/60	44.5	48	130	138	18	
23	15	420	50/60	45	48	100	113	20	
24	45	450	50/60	44.5	48	120	138	18	
25	40	450	50/60	44.5	48	130	138	18	
26	50	450	50/60	44.5	48	120	138	18	
27	45	450	50/60	44.5	48	120	138	18	
28	70	450	50/60	44.5	48	130	138	18	
29	15	400	50/60	44.5	48	130	138	18	
30	17	450	50/60	44.5	48	130	138	18	
31	12	450	50/60	44.5	48	130	138	18	

① ② ③ ④

RE. MARKS	PROJECTION	SCALE
REGD	Shanghai Hitachi, Ltd.	NTS
TITLE	RUNNING CAPACITOR	DWN. NO.
DWN.		4CYC00173
CHKD.		
CHKD.		
APPR.		



1. PBT  
2. 1.6mm

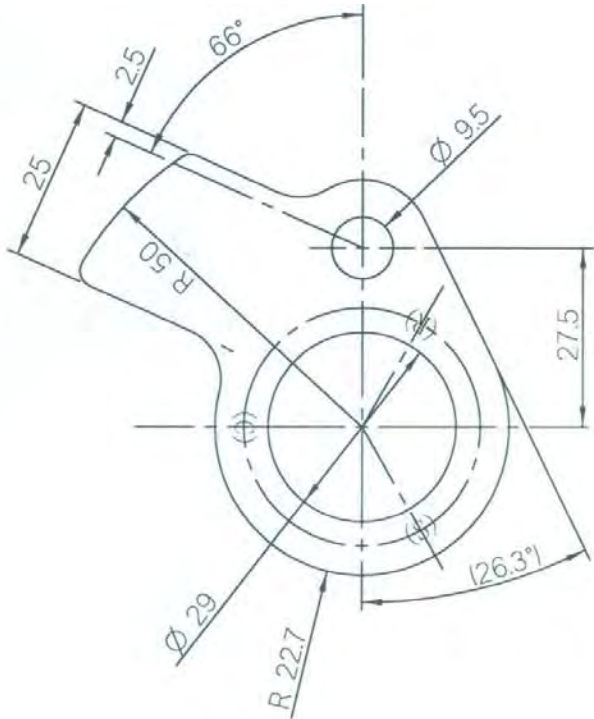
## NOTES

1. MATERIAL: PBT
2. MINIMAL THICKNESS ABOVE: 1.6mm

REC'D	DATE TIME CHECKED BY	REVISIONS	PROJECT CODE 	SCALE N.T.S.	
	TITLE TERMINAL COVER				NO. 1067 4CYC011067

CYC01068

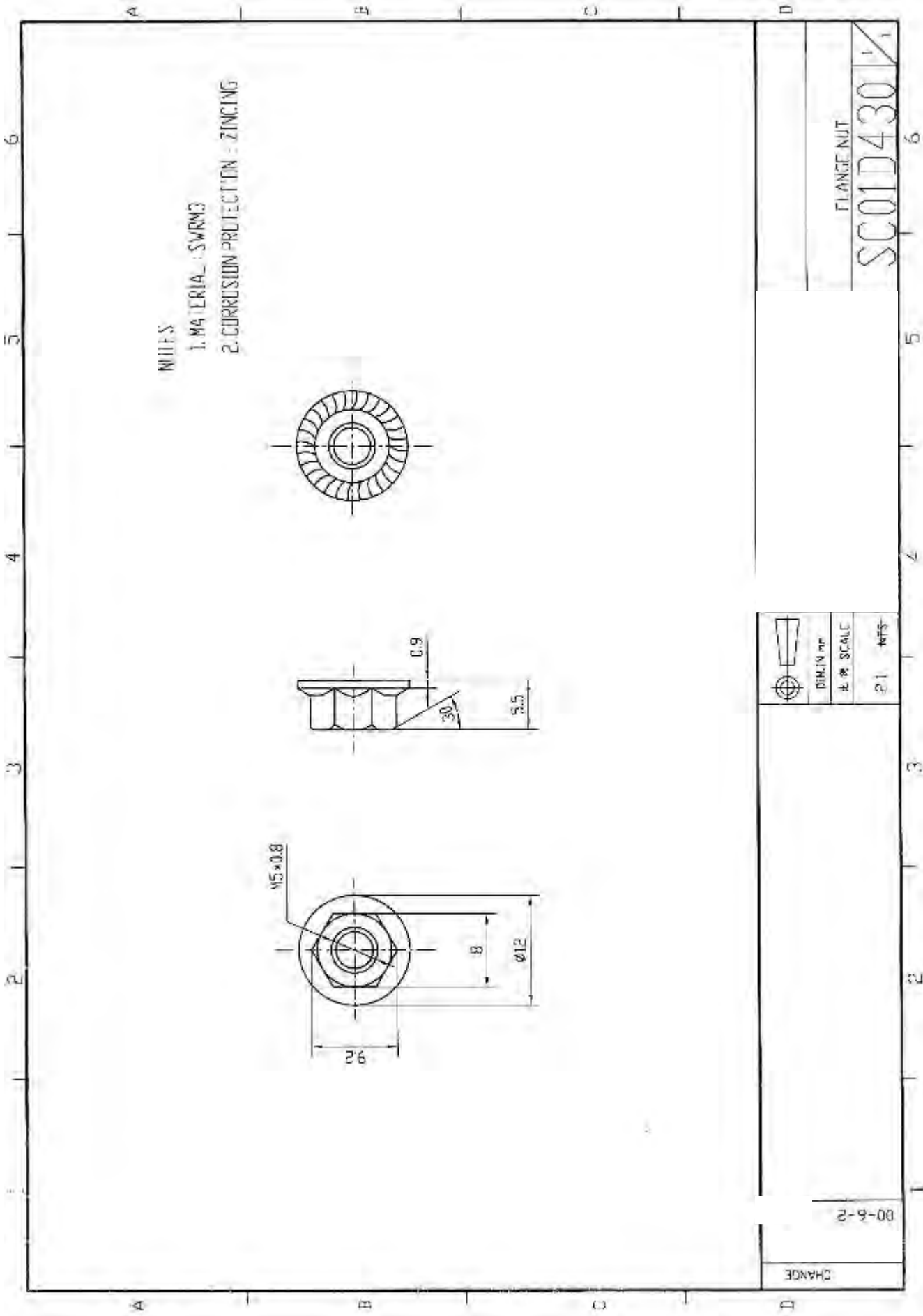
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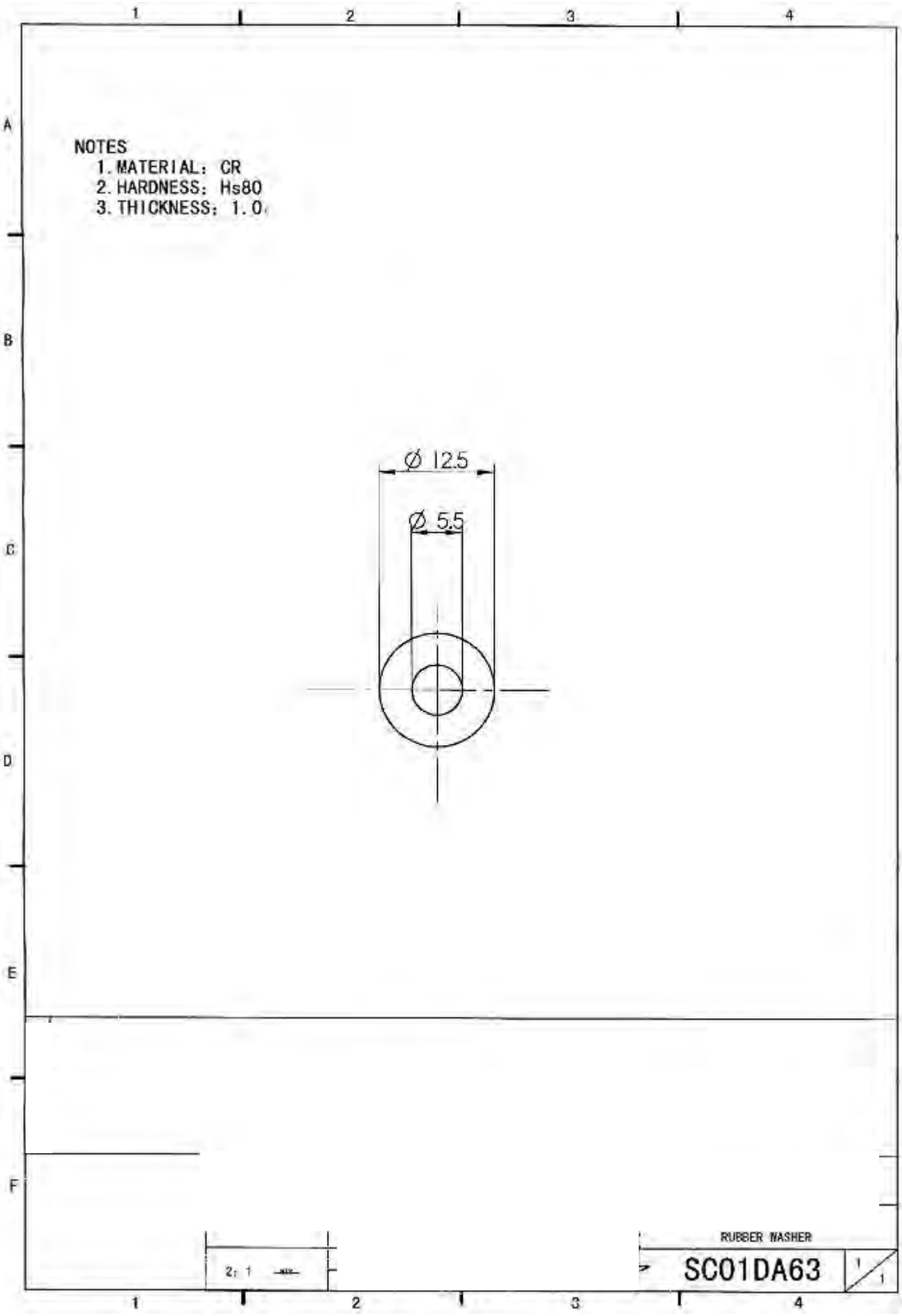


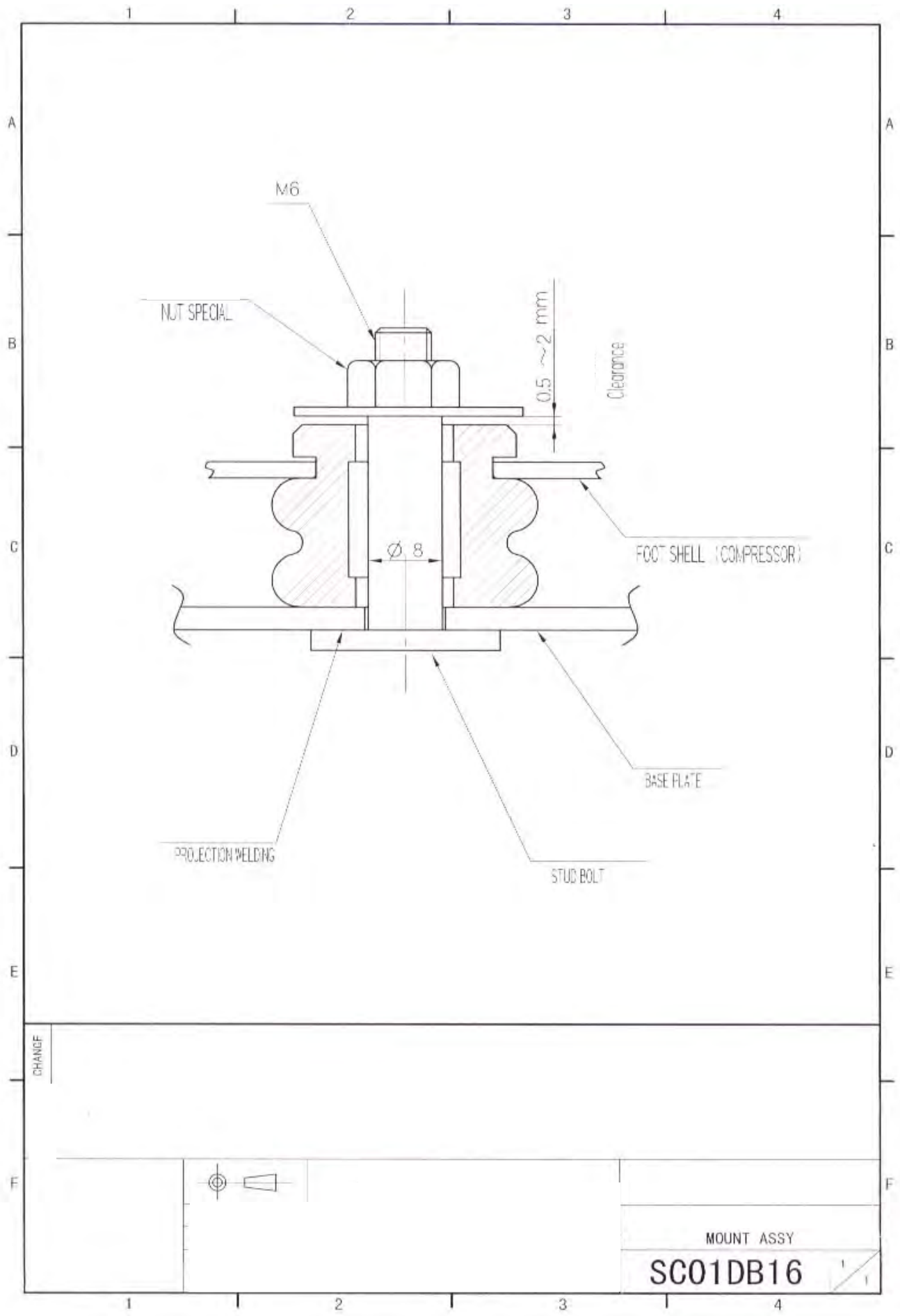
NOTES  
1. MATERIAL: EPTR(ETHYLENE PROPYL  
TRIPOLYMER PUBBER)

REGD	APPROV	CHKD	DESIGN	DATE	SCALE	PROJECTION	TITLE	4CYC01068
					NTS	First Angle Projection	GASKET	













Specification Revision Record				
No.	Date	Page in Spec	Revision Reason	Conclusion Date
A				
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