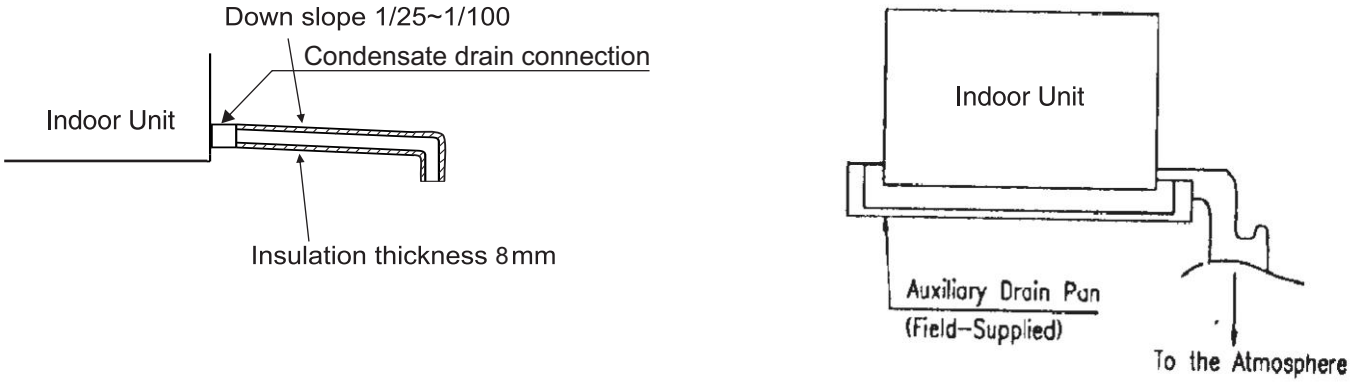
Condensate Drain Piping

Tools and Instruments - General Piping Tools

Trap - A female piping thread screw connection is provided. A downward slope is to be maintained as shown below



Condensate Drain Connection

Notes :

When the relative humidity of inlet air or ambient air exceeds 80%, apply an auxiliary drain pan (field-supplied) beneath the cooling unit, as shown in Figure.

Electrical Wiring

Tools & Instruments :- One set of wiring tools, electrical tester, clamp meter.

Schedule check :- Confirm that the electrical components for field wiring are as per following table.

Recommended Wires

CABLE	TR	WIRE SPECS	END CONNECTION	LENGTH
(1) Power supply for Indoor unit	1.5	3 Core Cable - 1 Nos. Red : 2.5 mm^2, Black : 2.5 mm^2, Green : 2.5 mm^2	Red, Black : 2.5 mm^2 Lug (□▭) Green : 2.5 mm^2 Earthing pin on one side (⏚)	Depending on distance between Mains supply & Indoor Unit location.
	2.0	3 Core Cable - 1 Nos. Red : 3 mm^2, Black : 3 mm^2, Green : 3 mm^2	Red, Black : 4 mm^2 Lug (□▭) Green : 2.5 mm^2 Earthing pin on one side (⏚)	
	3.0	3 Core Cable - 2 Nos. Red : 2.5 mm^2, Black : 2.5 mm^2, Green : 2.5 mm^2	Red, Black : 2.5 mm^2 Lug (□▭) Green : 2.5 mm^2 Earthing pin on one side (⏚)	
	4.0	3 Core Cable - 2 Nos. Red : 3 mm^2, Black : 3 mm^2, Green : 3 mm^2	Red, Black : 4 mm^2 Lug (□▭) Green : 2.5 mm^2 Earthing pin on one side (⏚)	

(2) Compressor output from IDU to ODU	1.5	3 Core Cable - 1 Nos. Red : 2.5 mm^2, Black : 2.5 mm^2, Green : 2.5 mm^2	Red, Black : 2.5 mm^2 Lug () Green : 2.5 mm^2 Earthing pin on one side ()	Depending on distance between Indoor unit and Outdoor unit.
	2.0	3 Core Cable - 1 Nos. Red : 3 mm^2, Black : 3 mm^2, Green : 3 mm^2	Red, Black : 2.5 mm^2 Lug () Green : 2.5 mm^2 Earthing pin on one side ()	
	3.0	3 Core Cable - 2 Nos. Red : 2.5 mm^2, Black : 2.5 mm^2, Green : 2.5 mm^2	Red, Black : 2.5 mm^2 Lug () Green : 2.5 mm^2 Earthing pin on one side ()	
	4.0	3 Core Cable - 2 Nos. Red : 3 mm^2, Black : 3 mm^2, Green : 3 mm^2	Red, Black : 2.5 mm^2 Lug () Green : 2.5 mm^2 Earthing pin on one side ()	

Notes: The colours of wires in Mains cords are recommended in accordance with the following code :

(1) Green - Earth
Red, Yellow & Blue - R Y & B Phase respectively
Black - Neutral

(2) Installation work shall be complied with local codes and regulation.

(3) Provide glands of suitable size for unit mains supply cable.

Electrical Wiring

Recommended MCB

Model No.	1.5TR	2.0TR	3.0TR	4.0TR
MCB(Amp.)	16A	20A	16A-2 Nos.	20A-2 Nos.
Part No. (SIEMENS)	5SQ21107YA16	5SQ21107YA20	5SQ21107YA16	5SQ21107YA20

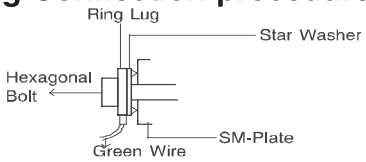
⚠ WARNING

1. The mains power switch should be locked on the OFF position to prevent against accidental supply of power during unit servicing.
2. This Appliance must be properly earthed.
3. Be sure to use specified wire for airconditioner.
4. Confirm that electrical power is not being supplied to the installation location prior to completion of any electrical installation work.

Unit power supply wiring procedure :-

1. Install the MCB of recommended rating near the outdoor unit installation protected from dust, water etc.
2. Connect the main cord as recommended in previous table through the connector in Outdoor Unit to the screw terminal for main power and earthing in the unit. (refer field wiring diagram)

Unit Earthing Connection procedure :-



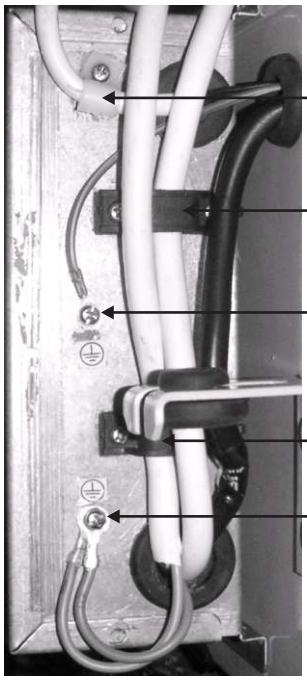
Note :

Put ring lug followed by star washer in Hexagonal Bolt and then fix it on the SM-Plate as shown in the figure.

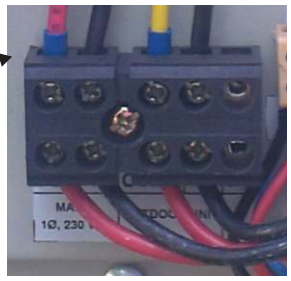
INSTALLATION

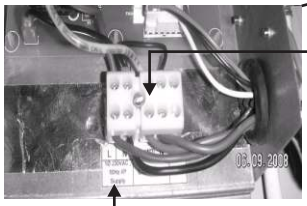
Electrical Wiring

Connection of Mains Cord & Connecting Cord



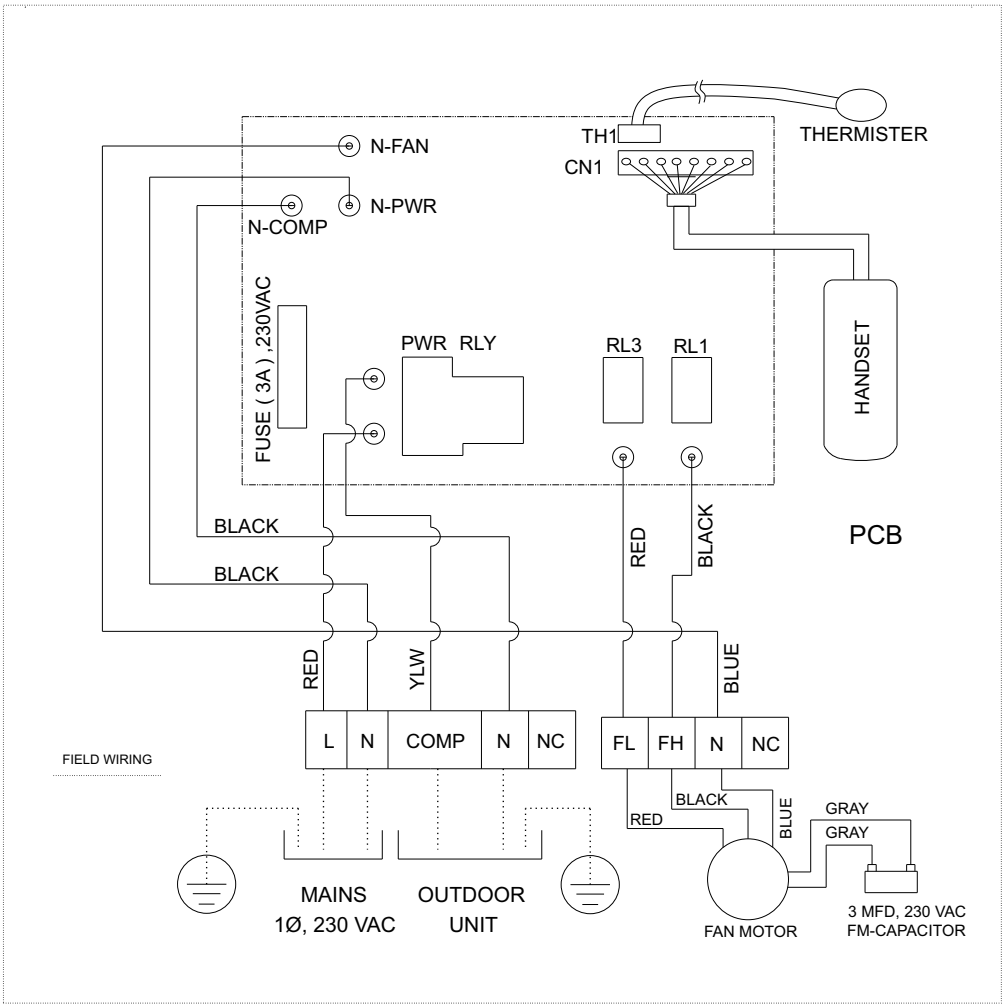
1 Cut off the receptacles of mains cord & connecting cord and strip by insulation of wire.
2 Crimp 2.5mm sq.straight lug to Line & neutral and ring lug to earth wire of mains cord and connecting cord.
3 Connect line & neutral wire of mains cord & comp cord to Terminal Block inside Wiring box as per Sticker shown in the Fig.
4 Connect Earth wire of mains & comp cord to earthing screw as shown in fig.
5 Fix Mains cord & comp cord to respective clamp band as shown in fig.





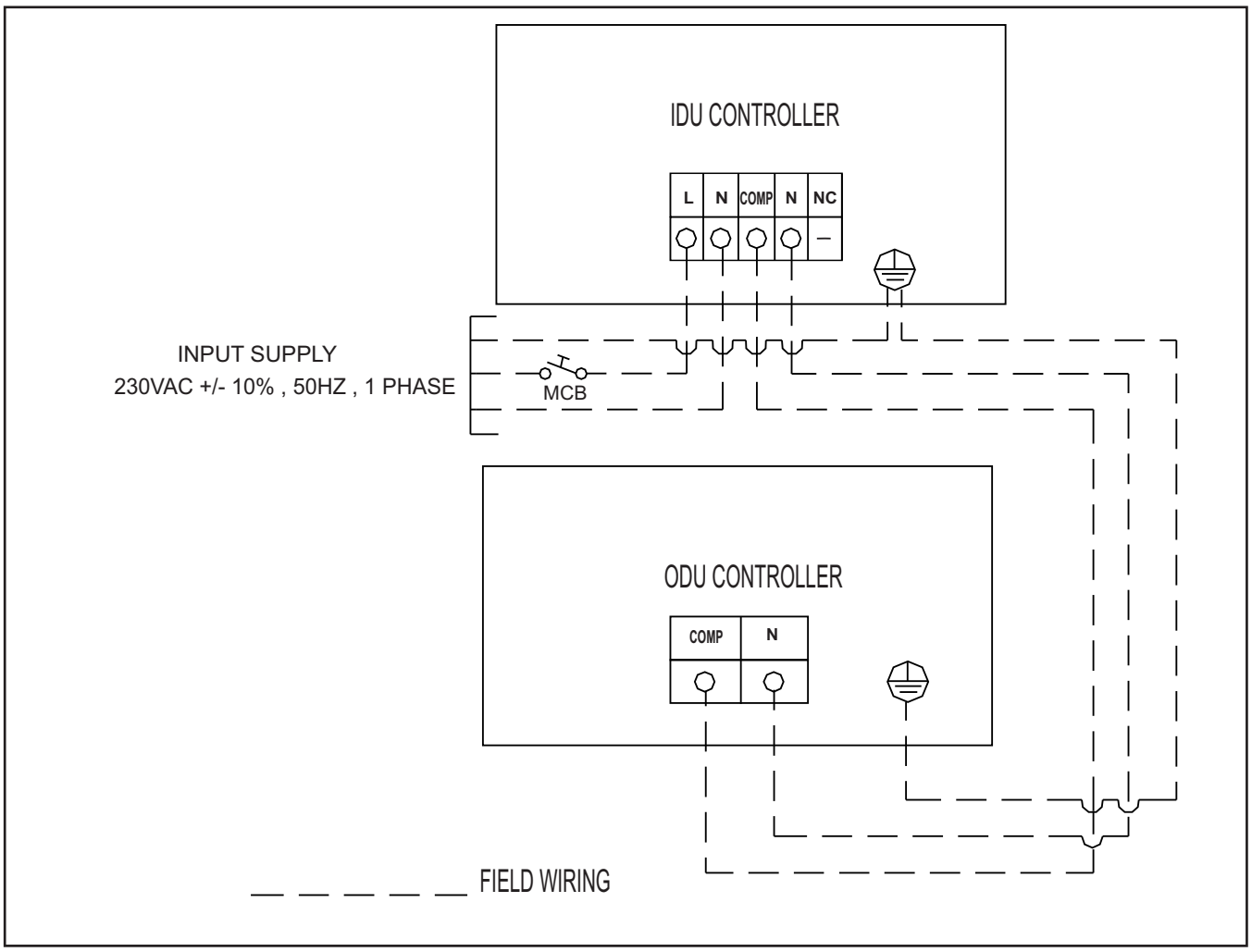
L	N	COMP	N	NC
1Ø, 230 VAC 50 Hz		OUTDOOR UNIT		--

Electrical Wiring Diagram
1.5 TR, 2.0 TR (INDOOR UNIT)



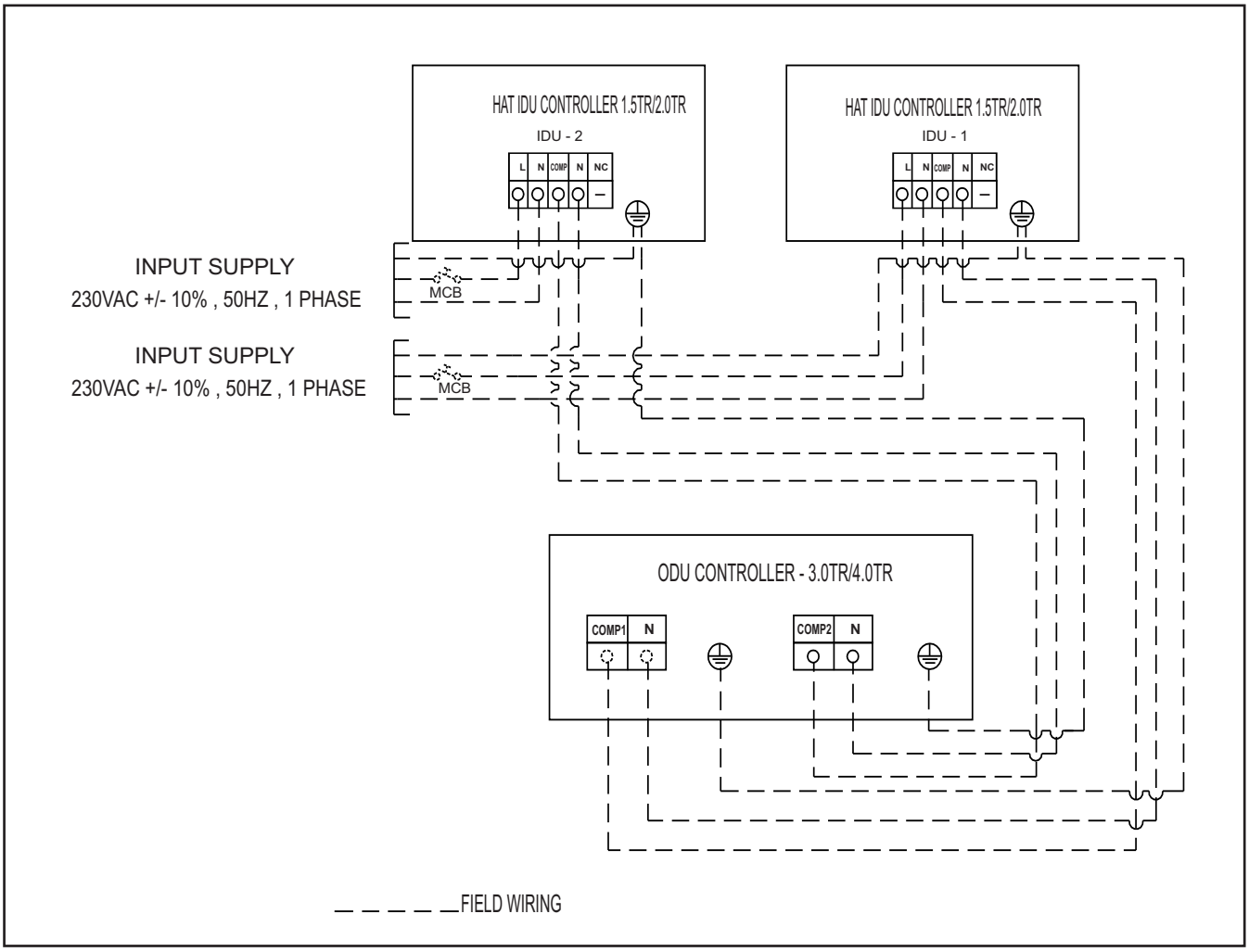
Electrical wiring

Field wiring connection diagram 1.5 TR & 2.0 TR (OUTDOOR UNIT)



Electrical wiring

Field wiring connection diagram 3.0 TR & 4.0 TR (OUTDOOR UNIT)



INSTALLATION

Refrigerant Piping

Tools and Instruments :

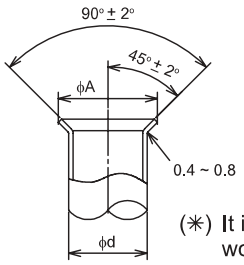
1. Vacuum pump 2. High Pressure Compound Gauge 3. Low Pressure Compound Gauge
4. Refrigerant cylinder with R410A 5. Weighing Scale 6. Nitrogen Cylinder with pressure regulator
7. Charging Hoses 8. Other General Piping Tools 9. Gas leak detector.

Piping Accessories

1. Required pipe size : (1) Suction pipe (Gas) (2) Liquid Pipe 2. Recommended insulation size (Nitrile Material 8mm Thick)

Model	1.5TR	2.0TR	3.0TR	4.0TR
Suction pipe	5/8"	5/8"	5/8"	5/8"
Liquid pipe	1/4"	1/4"	1/4"	1/4"
Insulation pipe	5/8" & 1/4"	5/8" & 1/4"	5/8" & 1/4"	5/8" & 1/4"

● Flaring Dimension
Perform the flaring work as shown below.



(mm)

Diameter (ϕd)	A +0 -0.4
	R410A
6.35	9.1
15.88	19.7

(✳) It is impossible to perform the flaring work with 1/2H material. In this case, use an accessory pipe (with a flare).

● Piping Thickness and Material
Use the pipe as shown below.
Do not use thinner pipes indicated in the table.

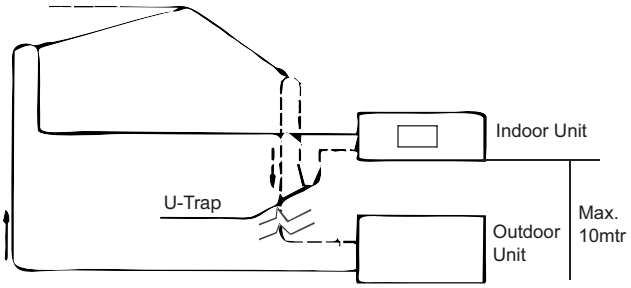
(mm)

Diameter (ϕd)	R410A	
	Thickness	Material
ϕ6.35	0.7	O material
ϕ15.88	1.0	O material

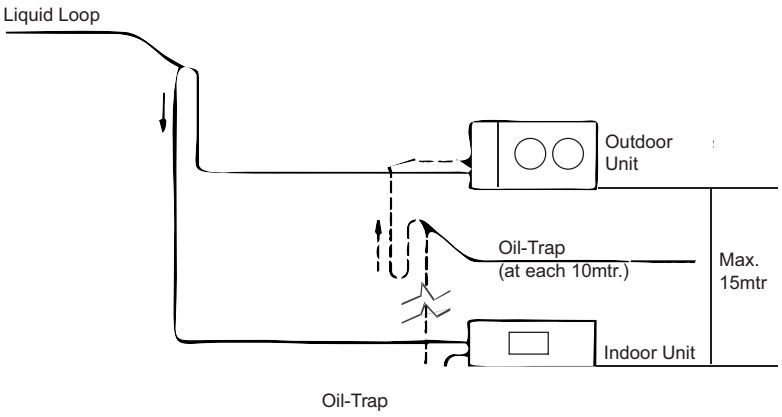
Note :
(1) Pipe must be bright annealed.
(2) Pipe must be clean from dust and oil.
(3) Clean with trichloro ethylene before installation & flush with nitrogen.
(4) Piping should not pass through the front of condensor.
(5) Insulate the suction pipe two times, one above the other.

INSTALLATION

Refrigerant Piping



A: Outdoor Unit Below



B: Outdoor Unit Above

Notes :

(1) Maximum recommended pipe length is 25 mtr. (1.5 TR, 2.0 TR, 3 TR, 4.0 TR)

(2) Maximum recommended height difference between indoor & outdoor unit is 10 mtr. (1.5 TR, 2.0 TR, 3 TR, 4.0 TR)

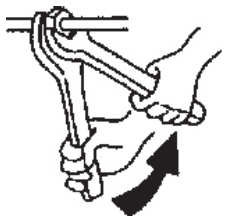
INSTALLATION

Preparation :

1. Check to ensure that the stop valves have been closed.
2. Attach the connection pipes to the stop valves.
3. Connect the indoor unit with the outdoor unit with refrigerant piping.
4. Charge dry nitrogen from the charge port of the liquid stop valve, and perform leak test.
   Test Pressure: 42kg/cm^{2}G
5. Apply a refrigerator oil in between union and flared portion of the pipe to stop micro leakages.

TIGHTENING FLARE NUT : When tightening the flare nut utilize two spanner.

Nominal diameter	Outer diameter (mm)	Tightening torque N. m (kfg. cm)
1/4"	6.35	14 to 18 (140 to 180)
5/8"	15.88	63 to 77 (630 to 770)



Evacuation Procedures :

Connect the vacuum pump to the service joint of the unit liquid stop valve. (keep stop valve in close position)

1. Operate the vacuum pump to perform evacuation of the connection piping.
2. Continue vacuum pump operation until the pressure indication on the gauges shows < 4mbar for 1 hour.
3. Stop the vacuum pump, wait for approximately 5 minutes and confirm that the vacuum pressure has not increased. Close the vacuum pump connection line.

Refrigerant Charge :

1. Change the vacuum pump with the refrigerant charging cylinder on the weighing scale.
2. Purge air from the refrigerant charging cylinder connection line.
3. Up to 5mtr. pipe length no additional refrigerant charge required in the unit.
4. After all evacuation and charging work, tighten the cap nuts for the unit stop valves.

Notes:

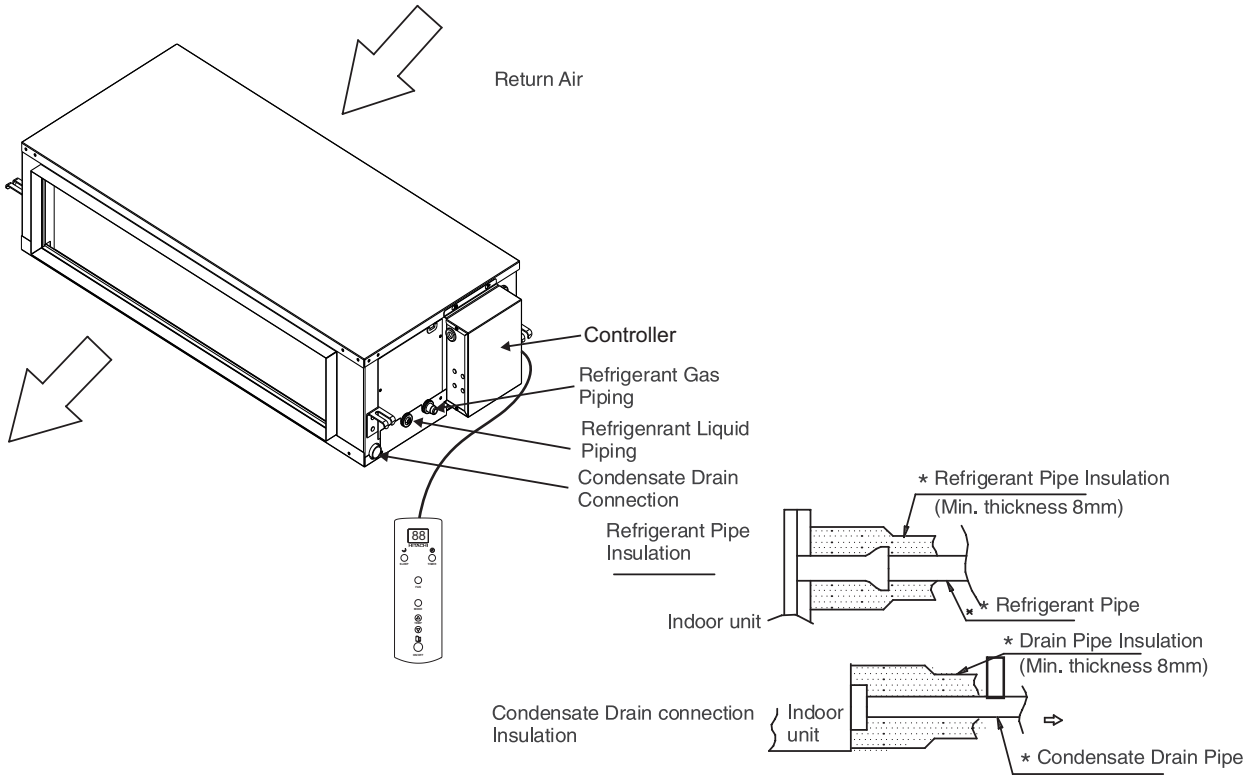
1. A gauge manifold connected with a vacuum pump and a refrigerant charging cylinder is recommended for rapid evacuation and charging work.
2. Charge 20 gms. per ckt. refrigerant per mtr. length for pipe length beyond 5 mtr. for 1.5TR 4.0 TR.

⚠ Caution :

Gauge manifold for R410A system should be different from R22 system because of pressure variance in both the syatems.

Insulation (1.5 Tr ~ 2.0 Tr)

Insulate the duct flange, the refrigerant piping connection and the condensate drain connection adequately, as shown in Figure below



*** Field Supplied**

MAINTENANCE

⚠ CAUTION

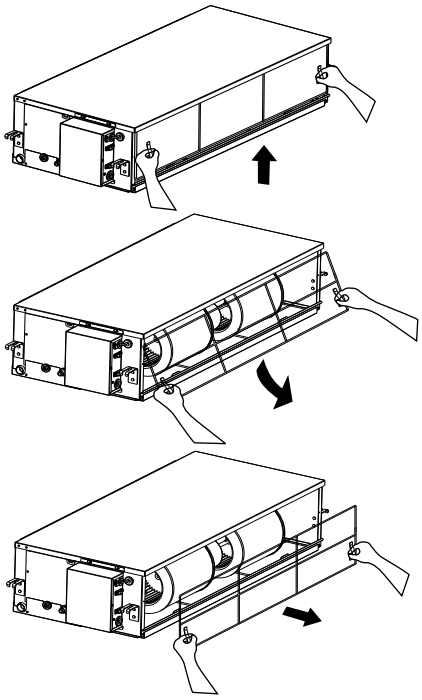
Before the cleaning of filter , stop all operations and disconnect the power supply.

AIR FILTER

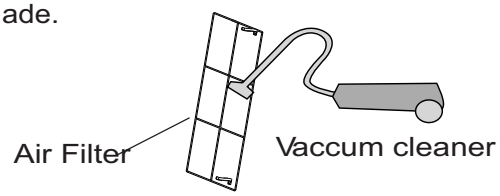
Clean the filter as it removes dust inside the room. It should also be washed once in 15 days. In case the air filter is full of dust, the air flow will decrease and the cooling capacity will be reduced. Further, noise may occur. Be sure to clean the filter following the procedure below.

Procedure

1. Remove the air filter
   - Get excess to the back side of the unit.
   - Hold the handles (provided on filter) and push the filter upward (in the direction of arrow) till the filter is released from bottom side slot.
   - Slightly lift the filter from bottom side and pull it gently in the direction of arrow to take the filter out.



2. Remove dust from the filter using a vacuum cleaner. If there is too much dust, use neutral detergent. After using neutral detergent, wash with clean water and dry it in the shade.



⚠ CAUTION

- Do not wash with hot water more than 40°C. The filter may shrink.
- After washing it, shake off moisture completely and dry it in shade; do not expose it directly to the sun. The filter may shrink.
- Do not operate the air conditioner with the filter removed. Dust may enter the air conditioner and cause trouble.

MAINTENANCE

Components
(Condensing Unit)
Compressor - No maintenance work is required for hermetic compressor, if the refrigeration cycle remains sealed. Air-Cooled Condenser - Inspect the condenser and remove any accumulated dirt from the coil at regular intervals. Other obstacles such as growing grass and pieces of paper, which might restrict air flow, should also be removed.
Electrical Equipment - Always pay careful attention to working voltage, amperage and phase balance. Check for faulty contact caused by loosened terminal connections, oxidized contacts, foreign matter and others
Safety and Control Devices - Do not readjust the setting in the field
(Cooling Unit)
Filter - Inspect for accumulated dirt on the filter, as per requirement clean or replace filter.The inspection interval may be determined by the operating for each installation site.
Condensate Drain Pan and Drain Line - Inspect and clean the condensate drain line at least twice a year.
Evaporator Fan - Check for a loosened fan belt and abnormal sounds.

Lubrication
Compressor - The compressors are charged at the factory with the correct oil listed on the compressor nameplates. It is not necessary to add oil, if the refrigeration cycle remains sealed.
Fan Motor -Bearings of the fan motor are pre-lubricated. Lubrication is not required.
Fan /shaft Bearings - The bearings have been pre-lubricated and sealed at the factory.

Refrigerant Cycle
Field-Supplied Liquid Line Sight Glass - Ensure that the sight glass is clear. Flashing seen through the sight glass indicates that the refrigerant is being charged insufficiently, or that the filter-dryer is clogged. When low charge is suspected, check the operating pressures, and then add refrigerant or repair leakage, if necessary.
Filter-Dryer - Check for clogging of drier, after specific time period.
Refrigerant Charge - When the refrigeration cycle requires recharging due to leakage or part replacement, follow the procedures given below for two cases.
1. When the refrigeration cycle is completely leaked, evacuate and recharge the cycle.
2. When the refrigeration cycle is slightly leaked, evacuation might not be required. Refrigerant addition can be perfomed by gas charging from the service joint of the unit while operation the entire system. Slowly charge refrigerant into the refrigeration cycle, checking the discharge and suction pressure. Install a jumper on the low-pressure switch, if required.

Note :

(1) Do not purge the refrigerant gas from the service joint of the liquid line stop valve, in order to protect from oil drainage from the refrigeration cycle.

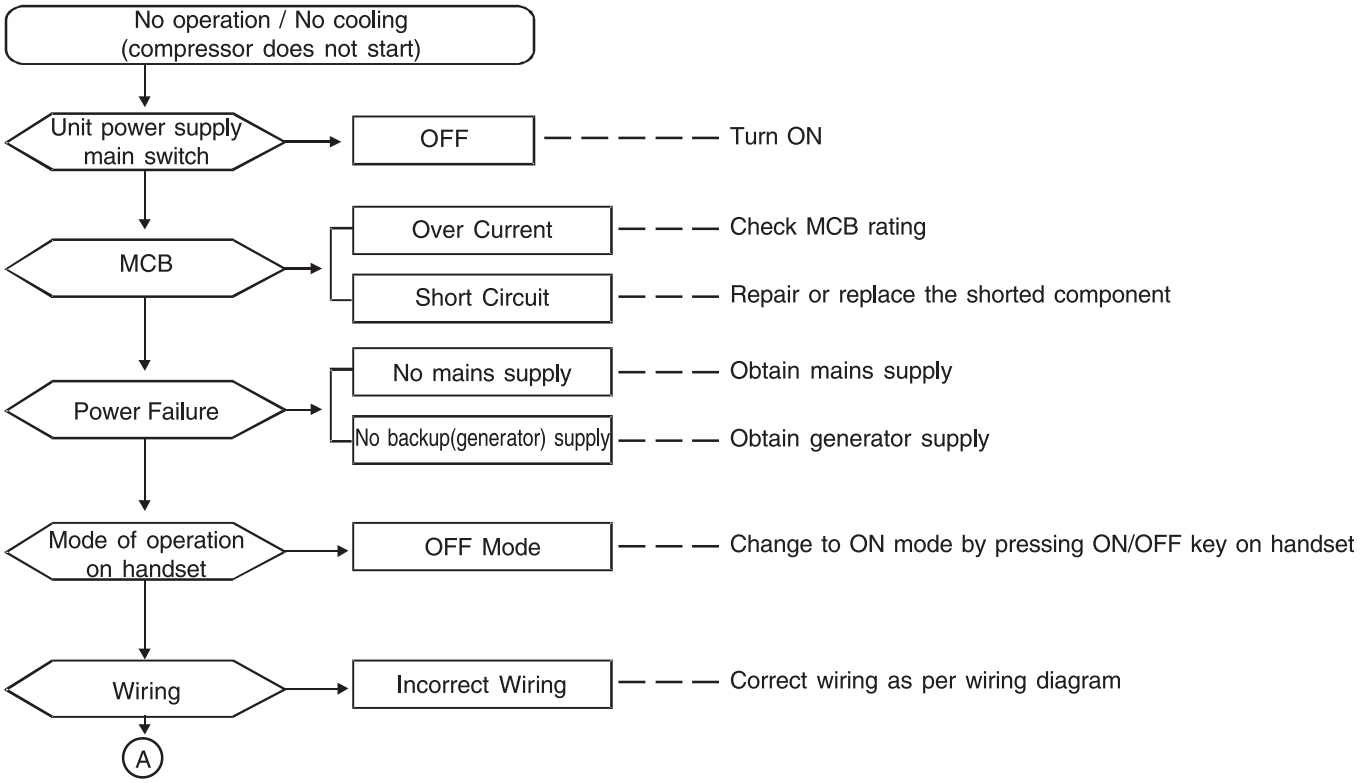
Compressor Removal
When Removing the Compressor:
1. Shut off the power supply to the unit. remove all gas from the system pump down the cooling unit.
2. Close all the unit stop valves; gas inlet and liquid outlet valves.
3. Remove all wiring connections and piping connections to the compressor.
4. Remove the bolts fastened on the compressor base.
5. Slightly lift the compressor, and pull the compressor from the unit.

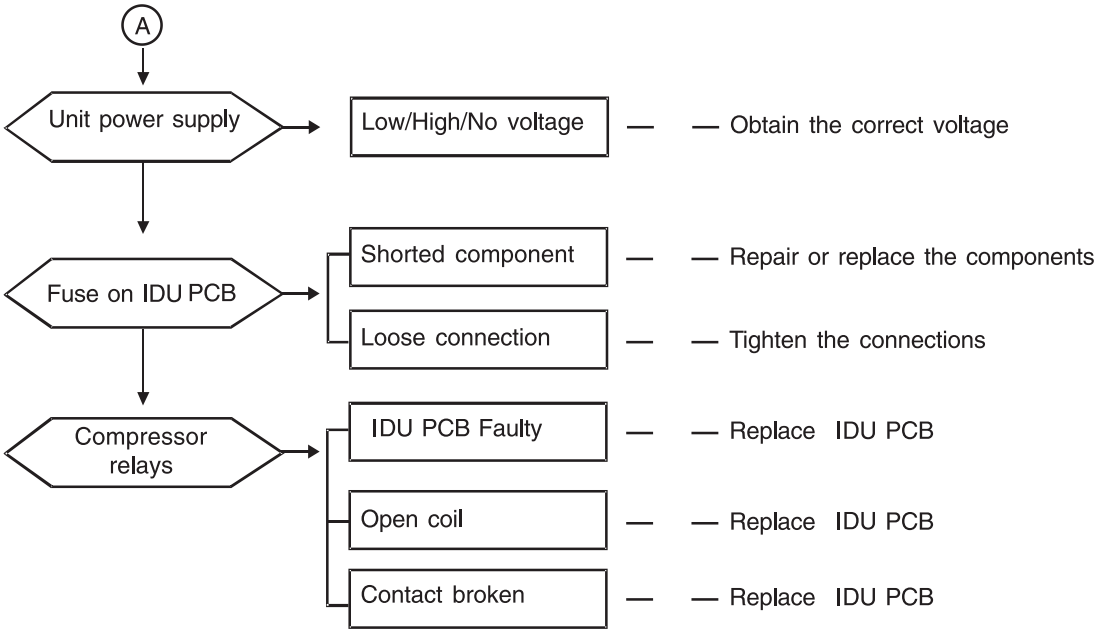
TROUBLE SHOOTING

The following charts show efficient checking procedure for trouble :

: Fault : Check : Cause No brackets : Remedy

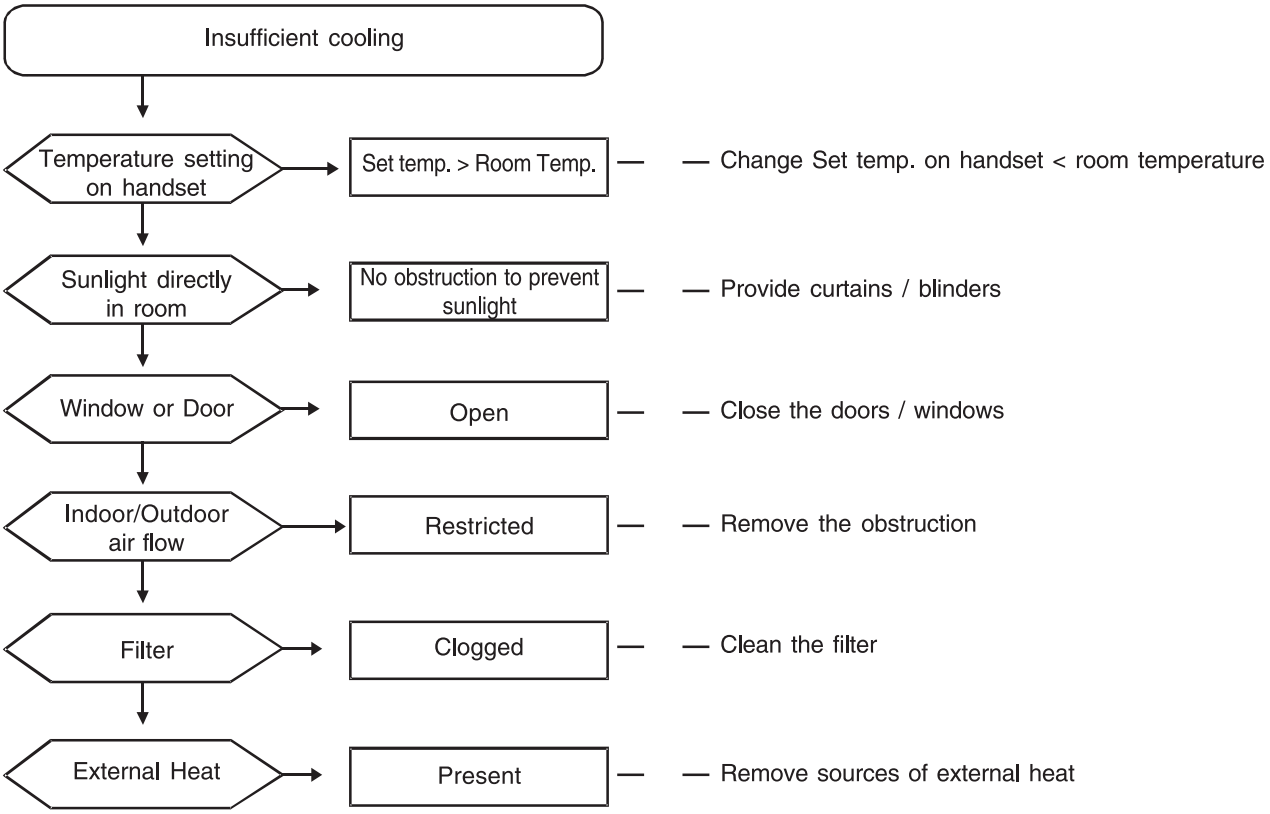
No Cooling :




A
Unit power supply
Low/High/No voltage
— Obtain the correct voltage
Fuse on IDU PCB
Shorted component
— Repair or replace the components
Loose connection
— Tighten the connections
Compressor relays
IDU PCB Faulty
— Replace IDU PCB
Open coil
— Replace IDU PCB
Contact broken
— Replace IDU PCB

TROUBLE SHOOTING

Insufficient cooling :



Warranty

Johnson Controls-Hitachi Air Conditioning India Ltd. (Formerly know as Hitachi Home and Life Solution (India) Ltd. hereinafter Referred As 'JCH-IN' undertakes that all the machines marketed by them are manufactured by them at their Kadi works and/or through their approved vendors & sold after thorough inspection by a team of experts of quality control & assurance departments. 'JCH-IN' extends this warranty only in case of defects in manufacturing and/or workmanship and undertakes to replace/repair at the sole discretion of 'JCH-IN' leading to the failure of equipment within a period of twelve calender months from the date of installation or fifteen calender months from the date of invoice, whichever occurs earlier, to the original purchaser, provided the machine is still in possession and under normal use, of all such components forming part of scope of supply of 'JCH-IN' except rubber/plastic parts (i.e. all non metallic parts.) electric & electronic components like motors, capacitors, remote control units, power stabilizers, switches, Miniature Circuit Breakers, plugs/sockets etc., items which are subject to normal wear & tear due to operation etc., which upon examination will reveal to the entire satisfaction of 'JCH-IN' to be having any manufacturing defects.

This warranty is subject to terms and conditions as mentioned below :

1.0 The decision of 'JCH-IN' with regards to the settlement of all claims under this warranty shall be final. Courts in Ahmedabad Shall have exclusive jurisdiction in the event of any dispute.

1.1.1 In case of any disputes the matter shall be settled by arbitration in accordance with provisions of arbitration and conciliation Act 1996. Venue of the arbitration shall be Ahmedabad India.

2.0 The company undertakes no liability in the matter of consequential losses and/or damages caused to the customer or third party due to failure of any component of the machine in part and/or total. 'JCH-IN's obligation under this warranty shall be limited to repairing or providing replacement of part, which proves to be defective.

3.0 The warranty becomes null & void in following cases, but not limited to:

3.1 Service/Installation/Re installations /Repair/Modification carried out by person other than those authorised by 'JCH-IN'

3.2 Failure due to erratic power supply, fluctuation beyond rated voltage ± 10% volts and 50 ±3% cycles per second frequency, A. C. power supply system.

3.2.1 To get optimum performance of the Machine it is recommended that the customer should use Voltage Stabilizer of any reputed manufacturer/Tested & recommended by 'JCH-IN' Any damage/Loss to the air-conditioner because of power fluctuations beyond the standard conditions as mentioned in 3.2, will not be covered in warranty.

3.3 Failure due to misuse/negligence, and/or Acts of God or reasons listed below but not limited to

3.3.1 Foreign objects in machine

3.3.2 Improper load, use of harmful chemicals.

3.3.3 Machine connected to improper power supply system.

3.3.4 Damage resulting to the machine due to operation in an abnormally corrosive alkaline/acidic environment.

3.3.5 Damage resulting due to the defect which is not immediately notified to us or the our authorised dealer.

3.3.6 Damage resulting due to the failure of the purchaser to avail our scheduled maintenance check - up.

3.4 Failure due to use of non - genuine spares.
3.5 Failure due to customer's inaction towards minor maintenance such as air filter cleaning.
3.6 Failure or Replacement necessitated through normal wear & tear.
3.7 Removal, alteration or tampering of Serial No. of the machines & its components.
3.8 Machine sold to any other person i.e. change of ownership.
3.9 For the machines installed beyond the municipal limits of the jurisdiction of the authorised dealer of 'JCH-IN' all expenses incurred in collecting the machine or parts there of from the service station as well as expenses incurred in connection with deputing of service personnel/ technician, towards to and fro travel, conveyance & other incidental charges towards loading, unloading, lodging, boarding etc., will be borne by the customer and payable in advance.
4.0 This warranty will be in force for the duration Specified in this card, irrespective of what replacement may be provided under it, and such replacement shall not attract any fresh warranty.
5.0 'JCH-IN' employees and I or authorised sales I service agents I Dealers, have no right I Authority to alter the terms of warranty, and such warranty does not create any contract between 'JCH-IN' and the purchaser, who must look to fulfillment of the obligation, from whom the machine is bought. 'JCH-IN' shall however, fulfil the terms & conditions of this warranty only.
6.0 The purchaser should preserve the original invoice for necessary verification and produce, as and when required.
7.0 This warranty holds only so long as there is correct use and maintenance of the machine.
8.0 The normal capacity of machine is at standard test condition. Any deviation in the conditions, either on outdoor or indoor side will affect the machine performance.
9.0 WARRANTY FOR COMPRESSOR
Johnson Controls Hitachi Air Conditioning India Ltd. (Formerly know as Hitachi Home and Life Solutions (India) Ltd.), Hereafter Referred As 'JCH-IN' Warrants to the Purchaser of this Ductable Split Air-conditioner, that for a period of Twelve months from date of Invoice or commissioning , 'JCH-IN' will Repair/Replace the compressor which proves upon inspection by 'JCH-IN' or any of its authorised Sales Dealers to have been defective due to manufacturing defect.
10.0 That JCH-IN or the Company shall not be liable or responsible for occurrence of any kind of fire, blast or defect to the product as well as assets, fixtures ,furniture, human body etc. at customer’s premises, if the same is caused purely due to external factors viz. overload fluctuation, short circuit, faulty or improper wiring , improper installation , natural calamity including atmospheric conditions ,etc.
11.0 In case of above incidents the customer shall be required to inform and or bring the same to the notice of the Company within 24 hours. However the Company shall not be responsible or liable for any information received by it after 24 hrs the customer has tried to remove shift the product from the said place of incident.

HITACHI

● INSTALLATION/COMMISSIONING REPORT :-

01 PERFORMANCE OF THE MACHINE :

a) ELECTRICAL POWER SUPPLY Input: .....Volts

Stabilizer Installed Yes/No. If Yes, Make :..... Output: :..... Volts

b) CURRENT DRAWN BY MACHINE : R Phase :..... Y Phase :..... B Phase :.....

Compressor Current (R - Phase) 1)..... 2)..... 3).....

c) TEMPERATURE READING : Ambient.....°C Supply Air:.....°C

(To be taken after 30 minutes) Room Temperature: .....°C

d) LENGTH OF COPPER TUBING: ..... M/ft. (Only one way pipe length)

e) OPERATING PRESSURE : Suction : 1)..... psig, 2)..... psig, 3)..... psig,

Liquid : 1)..... psig, 2)..... psig, 3)..... psig,

02 CUSTOMER'S REMARKS (IF ANY)

03 MECHANIC'S REMARKS (IF ANY);

04 A.C. MECHANIC'S SIGNATURE	**CUSTOMER'S SIGNATURE**
NAME OF DEALER	**DEALER CODE :**
	DATE :

HITACHI

● WARRANTY :-

Dear Customer, ensure this card is filled and please preserve it.

Johnson Controls-Hitachi Air Conditioning India Ltd. (Formerly know as Hitachi Home and Life Solution (India) Ltd.

A MACHINE DETAILS

MODEL

ODU SERIAL NO 1) .....

COMPRESSOR NO. 1) ..... 2) ..... 3) .....

ODU MOTOR NO. 1) ..... 2) .....

IDU SERIAL NO .....

IDU MOTOR NO. 1) .....

B CUSTOMER DETAILS

DATE OF COMMISSIONING

CUSTOMER'S NAME

ADDRESS

PHONE/FAX

C SALES DETAILS

DEALER NAME/CODE :

INVOICE NO. & DATE :

SIGNATURE & STAMP OF DEALER **DATE:**

HITACHI
Dial-a-Care
AC & R

3232 4848*
1860-258-4848
customercare@jci-hitachi.com
*Prefix local city/state capital STD code or 079.

Phone No./ Mobile No. (OF SERVICE PROVIDER / DEALER) :

Contact Person (AT SERVICE PROVIDER / DEALER):

S.No. of Machine : (Dealer to fill)

When Contacting Local Dealer / Customer Relations Cell, please quote the following No.

In case you have to change the location of this machine please refer to your nearest Branch Customer Relations Manager/Officer who would guide you in re-installing the machine. This is necessary as per our warranty terms, as it involves standard practices for removing packing/transporting/ installing.

Corporate Office :

Johnson Controls-Hitachi Air Conditioning India Limited Hitachi Complex, Karan Nagar , Kadi Dist. Mehsana. Gujarat, India
Phone: 91-2764-277571 Fax:91-2764-233425 e-mail: customercare@jci-hitachi.com website: www.jci-hitachi.in

HITACHI

For your records

Record the machine Sr. No., compressor Sr.No., fan motor no. in the space designated on the Warranty Card, and in the space provided below. Refer to the model and sr. nos. whenever you call upon your dealer for information or service of this product.

IDU No.		ODU No.	
Compressor - 1 No.		IDU Fan Motor No.	
		ODU Fan Motor-1 No.	

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