

JATL Performance test manual for Room air conditioners

(Balanced ambient room-type calorimeter)

(Tunnel air enthalpy test method)

December, 2013

JATL

Japan Air Conditioning and Refrigeration Testing Laboratory

"Room Air Conditioners" JATL Testing Manual

Table of Contents

1. Scope	2
2. Checking UUT.....	2
2.1 Checking packaging.....	2
2.2 Checking appearance.....	2
2.3 Measuring outdoor unit weight.....	2
3. Balanced ambient room-type calorimeter (RAC2).....	3
3.1 Installing UUT.....	3
3.2 Window-type air conditioners (self-contained).....	3
3.3 Split-type UUT.....	4
3.4 Air sampler installation method.....	11
3.5 Cooling and heating performance testing method.....	18
3.6 Test conditions and adjustments for each part.....	20
3.7 Measuring temperature and humidity.....	21
3.8 Stability checking.....	26
4. Tunnel type air enthalpy test method (RAC3).....	27
4.1 Installing UUT (Indoor units).....	27
4.2 Installing UUT (outdoor units).....	28
4.3 How to connect airflow measuring devices.....	29
4.4 Pipe connection method.....	30
4.5 How to measure temperature and humidity.....	30
4.6 Air sampler installation.....	31
4.7 Temperature and humidity measuring boxes.....	32
4.8 How to measure airflow.....	33
4.9 How to select nozzles.....	33
4.10 Temperature and humidity conditions.....	34
4.11 Power supply conditions.....	35
4.12 Air receiving chamber static pressure conditions.....	35
4.13 Testing method.....	35
5. Removing the UUT.....	39

*UUT : Unit Under Test [=Room air conditioner (indoor/outdoor unit)]

Preface

This JATL testing manual was compiled as a testing manual based on testing regulations devised and set forth via committees, etc. by the Japan Refrigeration and Air Conditioning Industry Association (hereinafter "JRAIA") and the Japan Air Conditioning and Refrigeration Testing Laboratory (hereinafter "JATL") in conformance with JIS B 8615-1 (Air Conditioners Section 1 Non-ducted Air Conditioners and Heat Pumps - Testing method for Rating and Operation Performance). This manual has been issued in English, Chinese, Thai, Vietnamese, and Indonesian for use overseas. (As of August 2013)

This manual describes the JATL testing procedures and serves as a reference for non-JATL testing rooms.

1. Scope

This manual discusses the performance testing method for air conditioners with a rated cooling capacity of 10.0 kW or less.

2. Checking UUT

2.1 Checking packaging

Upon receiving the unit under testing (UUT), immediately check that there is no damage on either the wooden box or packaging materials.

2.2 Checking appearance

Remove the packaging, then check the UUT's appearance as below.

1. Are there conspicuous scratches, deformations, dirt, discolorations, torn areas, etc. on the heat exchanger fin?
2. Are there any broken areas, conspicuous deformations, or fans contacting the indoor/outdoor blower fan or indoor/outdoor structures?
3. Are there any parts missing from those stated in the Installation and Usage Manual?
4. Are there any damage to pipes, etc.?
5. Are there any missing or damaged plastic or metal caps for the flare nuts on sections that connect to indoor/outdoor piping?
6. Are any of the threads on flares connecting to indoor/outdoor piping deformed or crushed?
7. Are any of the stem caps for outdoor 2 or 3 way valves loosened (can be removed without tools, etc.)?
8. Are there any damage to the packaging case due to water adhesion, etc.?

* When conducting international round robin testing, etc., give sufficient consideration to strength and use a wooden box for the outer packaging, and new piping for each testing laboratory.

2.3 Measuring outdoor unit weight

Measure the weight of the outdoor unit before and after the testing to make sure that there are no refrigerant leaks during the testing.

3. Balanced ambient room-type calorimeter (RAC2)

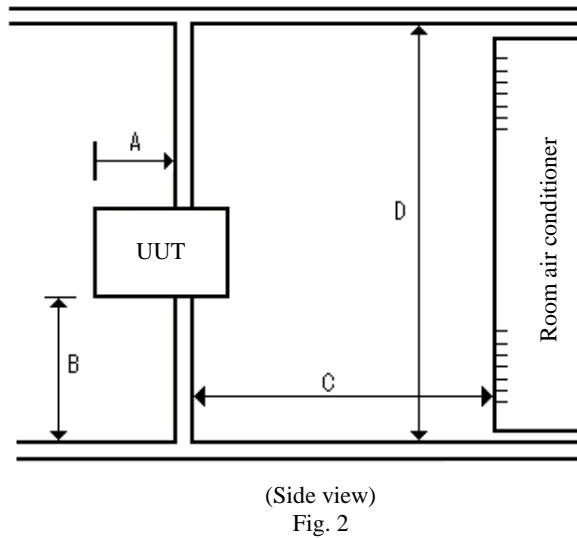
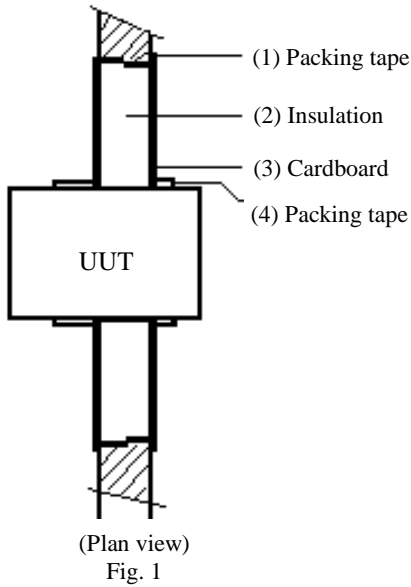
3.1 Installing UUT

As a rule, UUTs are installed as per instructions on the unit, the installation manual, etc., and no modification related to performance quality shall be performed.

3.2 Window-type air conditioners (self-contained)

All precautions and instructions from the manufacturer regarding installation must be followed. If there are none, follow the items below.

- (1) Install the UUT on a level plane, matching the UUT's nozzle center to the center of the central partition wall.
- (2) As a rule, the UUT's front-back direction must be level.
- (3) The extrusion distance on the indoor/outdoor sides from the central partition wall (Fig. 2) must be in a position that does not affect the intake or outlet of air indoors or outdoors.
- (4) How to partition insulation for the central partition wall
 - (a) For the insulating material, use materials with the below specifications, and ensure that the width of the partition do not affect the room air conditioner's air intake or outlet. Wrap both the indoor side and outdoor side of the insulation partition with cardboard and seal the space between the wall and the room air conditioner. (Fig. 1)
 - (b) When changing insulating material, re-measure the heat leak coefficient for the central partition wall.
 - (c) Insulating material
Urethane foam { Density: $0.057 \pm 0.005 \text{ g / cm}^3$, cell count: $55 \pm 10 \text{ cells / inch}$ (MTP standard)
Thickness: 120, 100, 75, 50 (mm) }
- (5) Fig. 2 shows standard install dimensions.
- (6) If there is a ventilation damper on the UUT, ensure that it is closed.



Unit: mm

A	Manufacturer-recommended dimensions
B	About 1000
C	About 3400
D	About 3000

3.3 Split-type UUT

3.3.1 General Information

All precautions and instructions from the manufacturer regarding installation must be followed.

If there are none, follow the below.

- (1) Install the UUT on a level plane, matching the UUT's nozzle center to the center of the central partition wall.
- (2) As a rule, the UUT's front-back direction must be level.
- (3) Figures 4-11 show standard dimensions for installing the UUT, but take temperature distribution of testing equipment into account.
- (4) How to partition insulation for the central partition wall

For the piping holes in the central partition wall, after piping work is completed, ensure airtight insulation with insulating material and use adhesive tape, etc. to create a seal.

3.3.2 How to connect refrigerant pipes

(1) Refrigerant pipes connection

- As a rule, use the refrigerant pipes supplied by the manufacturer.
- When reusing refrigerant pipes, use pipes no more than twice to prevent leaks from flares.
- Indicate on the piping how many times flares were used.
- When welding piping, after taking measures to ensure that conducted heat, etc. does not affect others, run nitrogen gas through pipes being welded and prevent the formation of oxide films on the inside of pipes.

- Seal the gap between the piping material and the nitrogen injection pipe, and securely run nitrogen gas through. When work is finished, let the nitrogen gas flow until the piping cools down to a certain degree.

(2) Leak checking

After connecting work and welding work is completed, apply gas pressure using nitrogen and use soapsuds, etc. to ensure there are no leaks from service valves, connecting piping flare nut sections, or welded sections.

(3) Vacuum drawing (Fig. 3)

- Use copper piping to connect the UUT, vacuum pump, and vacuum meter.
- Attach a vacuum pump and vacuum gauge to the port for vacuum drawing (including the V1 & service port) on the UUT.
- Close the valve (V1) on the port for vacuum drawing, make sure only the vacuum pump and vacuum gauge are connected, and verify how well the pump draws. After verifying, open the valve and conduct thorough vacuum drawing.
- Close the valve (V2) on the vacuum pump side, make sure only the UUT and the vacuum gauge are connected, and look at the degree of vacuum after pressure stabilizes. This degree must satisfy the value described below.

*266 Pa (2.0 Torr) or lower achieved pressure

Read the degree of vacuum 10 minutes later. This degree must meet the values below.

*Change after 10 minutes: within 133 Pa (1.0 Torr)

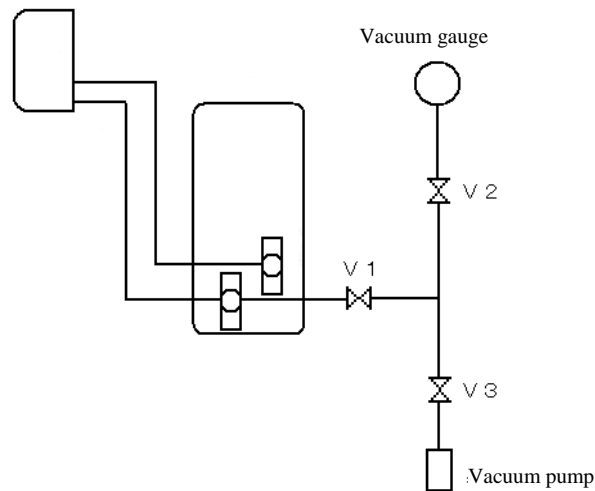


Fig. 3