



Exterior unit RP71/RP125

Installation Instructions
Date 21/09/2009

Heat Pump System

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1.1 Safety

- Before installing the system, please read the complete safety instructions in the "Safety" chapter carefully.
- Before connecting the system, please report to your power supply provider or obtain approval for connection.
- The system complies with standard IEC/EN 61000-3-12 (PUHZ-RP125/140 VHA2)



WARNING!

... alerts to a potentially hazardous situation which can result in death or serious injury if not avoided.



CAUTION!

... alerts to a potentially hazardous situation which can result in property damage if not avoided.



NOTE!

... highlights useful advice and recommendations as well as information on how to operate the system efficiently and how to avoid disturbances.

After the installation has been completed, brief the customer on the safety instructions as well as on the operation and maintenance of the system according to the information in the operation instruction manual and perform a test run to ensure the system is functioning properly. Hand over the installation manual as well as the operation manual to the user, to keep in a safe place for reference. The instruction manuals must always accompany the system and must be passed on to any subsequent users.



Indicates a part of the system which must be earthed.



WARNING!

Read the labels affixed to the main system carefully.



WARNING!

- The device must not be installed by the user. Contact your specialist supplier or a certified professional technician to have them carry out the installation of the system. An incorrectly installed system can cause water leakage, electric shocks or fire.
- Follow the installation instructions carefully throughout the installation process and deploy tools and pipeline components which are specifically designed for use with R410A refrigerant. In the HFC-System the R410A refrigerant is exposed to 1.6 times higher pressure than conventional refrigerants. Deployment of pipeline components, which are not specifically designed for use with R410A refrigerant, can result in bursting pipes which may lead to injuries or property damage. Other potential hazards that can result are: water leakage, electric shocks or fire.
- The system must be correctly installed according to instructions in order to minimise risk of damage resulting from earthquakes, storms, or wind. An incorrectly installed system can fall causing injuries or property damage.
- The system must be securely mounted to a structure capable of sustaining its weight. A system mounted to a weak structure can fall causing injuries or property damage.
- If the heat pump is installed in a small room, measures must be implemented to ensure that refrigerant concentration does not exceed the safety limit in the event of refrigerant leakage. Consult your specialist supplier about appropriate measures to prevent refrigerant concentration exceeding the permitted concentration. Imminent danger through lack of oxygen in the room can occur if refrigerant concentration exceeds the safety limit.
- Ventilate the room in case refrigerant leaks while the system is operating. If refrigerant comes into contact with a flame, dangerous gases are released.

**WARNING!**

- All electrical work must be carried out by qualified electricians in compliance with local regulations and the instructions given in this manual. The systems must be attached to their own respective circuit, and the correct operating voltage and circuit breaker must be deployed. Power lines with insufficient capacity or electrical work carried out incorrectly can cause electric shocks or fire.
- To connect the refrigerant pipelines use copper phosphor C1220 for seamless pipes copper pipes and copper alloys. If the pipes are not connected correctly, the system is not properly earthed, which can cause electric shocks.
- For wiring, use exclusively the cables indicated. The connections must be fixed and secured without exerting tensile load on the terminals. Incorrectly installed or connected cables can cause overheating or result in fire.
- The covering panel of the exterior unit's strip terminal must be mounted securely. An incorrectly mounted covering panel which allows dust and humidity to penetrate the system can cause electric shocks or result in fire.
- After installing or transporting the heat pump system, use exclusively the indicated refrigerant (R410A) in order to fill the refrigerant lines. Do not combine with other refrigerants and do not let any air remain in the lines. Air in the lines can cause pressure peaks leading to tears and breaks as well as other damages.
- Use exclusively equipment approved by MHG heating technologies and have your specialist supplier or an authorised workshop carry out the installation. Incorrectly installed equipment can cause water leakage, electric shocks or result in fire.

**WARNING!**

- Do not make any changes to the system. Contact your specialist supplier for repairs. Incorrect changes or repairs can cause water leakage, electric shocks or result in fire.
- The user must under no circumstances attempt to repair or relocate the system. An incorrectly installed system can cause water leakage, electric shocks or result in fire. If the heat pump system needs to be repaired or relocated, contact your specialist supplier or a certified professional technician.
- After installation has been completed, check the system for refrigerant leakage. If refrigerant comes into contact with a flame (.i.e. from a radiator or a gasstove), dangerous gases are released.

1.2 Before the installation

**CAUTION!**

- Do not implement the system in unusual/hazardous areas. Installation of the heat pump system in environments exposed to smoke, oil leakages (including machine oil), sulphur fumes or high salt content in the air (in vicinity of the ocean), or in areas in which the system is exposed to snow, can cause severe impairment of performance and damage of the device components in the interior unit.
- Do not install the system in areas in which flammable gases leak or escape, in which they are produced, or where they can be accumulated. Flammable gases accumulating in the system area can result in fire or an explosion.
- During heating process, water condensates on the exterior unit. If water condensation can cause damage, ensure that the exterior unit is surrounded by a water outflow base.



CAUTION!

- For system installation in hospitals or communication centres noise pollution and electronic disturbances must be taken into account. Inverters, home appliances, high-frequency medical devices, and telecommunication instruments, can cause malfunctions or outages of the heat pump system. The heat pump system can also affect medical devices, causing malfunctions to medical supply and communication centres due to the impairment of display screens.

1.3 Before the installation (transport)



CAUTION!

- Extreme caution is required when transporting the system. A minimum of two persons is required to transport the device, as it weighs 20 kg or more. Do not carry the system by its packaging straps. Wear protective gloves while unpacking or transporting the system in order to avoid injuries to hands through cooling fins or other system components.
- Ensure proper disposal of packaging materials. Packaging materials such as nails or other metal or wooden components can cause injuries.
- The floor panel and the mounting components of the exterior unit must be inspected for fixedness, tears and other damages on a regular basis. If such damages remain unrepaired the system can fall causing injuries or property damage.
- Do not use water to clean the heat pump system. Using water to clean the system can cause electric shocks.
- All conical nuts must be fastened using a torque-controlled spanner in compliance with the technical instructions. Fastening the nuts too tightly can result in the conical nut breaking, leading to refrigerant leakage.

1.4 Before electrical work



CAUTION!

- Circuit breakers must be installed under all circumstances. Non-compliance leads to risk of electric shocks.
- Deploy cables with sufficient capacity commercially available for the power lines. Non-compliance leads to risk of short circuits, overheating, and fire.
- Pay attention during the power line installation to avoid tensile tension on the cables. Loose connections can result in cables slipping or breaking from terminals; this can lead to overheating or fire.
- The system must be earthed. Do not connect the earthwire to gas or water lines, lightning conductors, or telephone earthwires. An incorrectly earthed system leads to risk of electric shocks.
- Deploy circuit breakers (short-circuit-to-earth breaker, disconnecting switch (+B-fuse) and metal-clad circuit breaker) with the indicated capacity. Deployment of a circuit breaker capacity higher than the capacity indicated can lead to outage of the exterior unit or can result in fire.

1.5 Before the test run



CAUTION!

- Switch on the circuit breaker more than 12 hours before startup of operation. Starting operation directly after switching on the circuit breaker can lead to severe damage of the systems internal components. Leave the circuit breaker switched on while the system is operating.
- Before operating the system check whether all panels, fuses, and other safety devices are correctly installed. Rotating, hot, or high-voltage components can cause injuries.
- Do not touch the switch with wet hands. Doing so leads to risk of electric shocks.



CAUTION!

- Avoid contact with refrigerant pipelines while the system is operating. Refrigerant pipelines are either hot or cold depending on the state of the refrigerant flowing through. Contact with the pipes can result in burns or frostbite.
- After operation has been completed, wait at least five minutes before switching off the main switch. Non-compliance leads to risk of water leakage or system outage.



CAUTION!

- Use refrigerant R410A exclusively. Refrain from using any other refrigerant oil. The chlorine in any other refrigerant oil will cause oil decomposition.
- Deploy the following tools which are specifically designed for use with refrigerant R410A. The following tools are required when using refrigerant R410A. Contact your specialist supplier should you have any further questions.

Tool (for R410A)
Pipe gauge
Filling hose
Gas leak detector
Torque-controlled spanner
Flare tools
Gauge for size adjustment
Vacuum pump power supply unit
Electronic refrigerant filling level indicator

1.6 Deployment of heat pump system with refrigerant R410A



CAUTION!

- To connect the refrigerant pipelines use copper phosphor C1220 for seamless copper pipes and copper alloys. Check that the pipes are clean inside and that they do not contain any hazardous contamination, such as: sulphur, oxidising agents, debris or dust. Deploy pipes of the strength indicated. (see page 14) Pay attention to the following directions, if you reuse existing pipes which were previously deployed to transport R22 refrigerant:
 - Replace the existing conical nuts and flare the sections specified for flaring again.
 - Do not deploy thin pipes (see 4.2 "Pipe connections").
 - Store the pipes required for installation in a closed area and leave both ends of the pipes sealed up until immediately prior to hard-soldering. (Leave the elbow connectors, etc. in their packaging.) Dust, debris, or humidity penetrating the refrigerant pipelines leads to risk of oil decomposition or compressor outages.
 - Apply a small amount of ester oil/ether oil or alkyl benzyl as a refrigerant oil onto the conical connections. Combining refrigerant oil with mineral oil leads to risk of oil decomposition.

- Use the correct equipment under all circumstances. Dust, debris, or humidity penetrating the refrigerant pipelines leads to risk of refrigerant oil decomposition.
- Do not use a cylinder for filling of refrigerant. Using a cylinder for filling of refrigerant alters its composition and minimises its level of efficiency.

2.1 Pipelines for refrigerant

- Ensure that the difference in elevation between the interior and the exterior unit, the length of the refrigerant pipelines, and the number of elbows in the pipeline, all comply with the limit values specified in the table below.

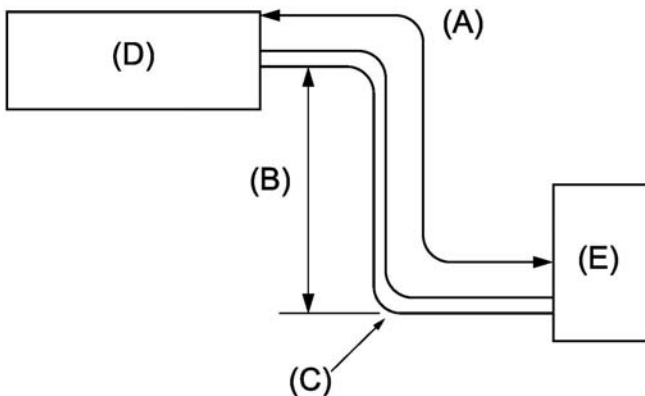


Fig. 1: Pipelines for refrigerant

Legend for:

Ab- brevia- tion	Meaning	Model	
		71	125
(A)	Length of pipeline (one direction)	Max. 50 m	Max. 75 m
(B)	Difference in elevation	Max. 30 m	
(C)	Number of elbows (one direction)	Max. 15	
(D)	Interior unit		
(E)	Exterior unit		

The limit of the difference in elevation is mandatory, no matter whether it is the interior or the exterior unit which is in elevated position.

2.2 Selecting the installation location for the exterior unit

- Avoid installation locations exposed to direct sunlight or other sources of heat.
- Select the location of the installation so that the system noise generated does not inconvenience the neighbours.
- Select the location of the installation so that connection to the power supply and the laying of the interior unit's pipes can be carried out without problems.

- Avoid installation locations in which combustible gases leak or escape, in which they are produced, or where they can be accumulated.
- Note that water can drip from the system during operating.
- Select a level location for installation that is stable enough to withstand the system weight as well as its vibrations.
- Avoid installation locations in which the system is exposed to snow. In areas in which the system is exposed to heavy snow, special measures must be taken to prevent snow from either blocking or being blown into the air inlet. Such measures include: selecting a location of higher elevation or mounting a protective hood to cover the air inlet. An air inlet blockage can impair the airstream and cause system malfunctions.
- Avoid installation locations exposed to oil, vapour or sulphur gases.
- Use the four carrying handles to transport the exterior unit. Holding underneath the system to carry it can lead to risk of crushing or injuring hands of fingers.

2.3 External measurements (of exterior unit)

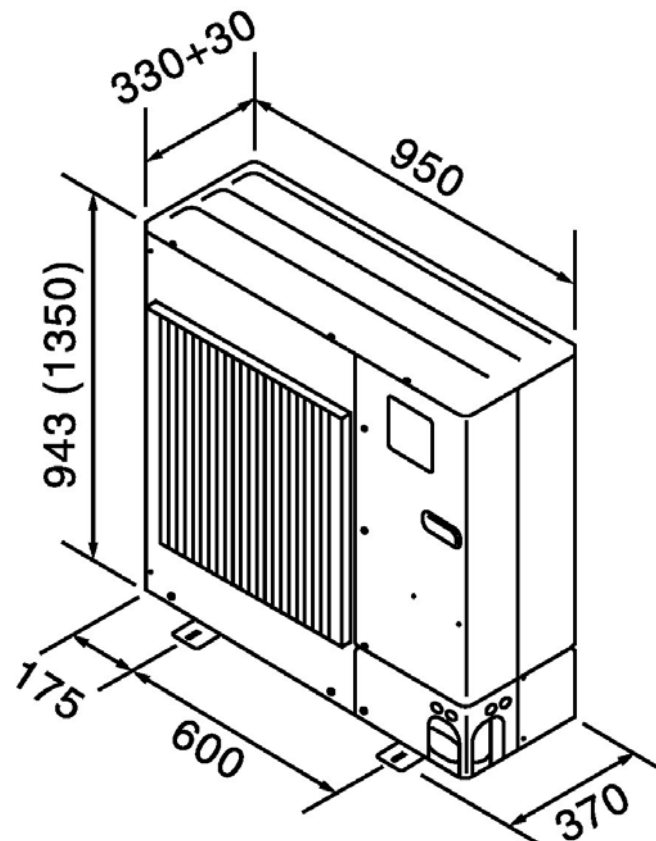


Fig. 2: External measurements (of exterior unit)
The number in brackets refers to the model RP125

2.4 Ventilation and operation zone

Installation in locations exposed to wind

Location: position the air outlet in such a way that it is not exposed directly to strong winds. Strong winds blown directly into the air outlet can impair the regular airstream and cause system malfunctions.

The following three figures illustrate examples of precautions to take in order to avoid the effect of strong winds.

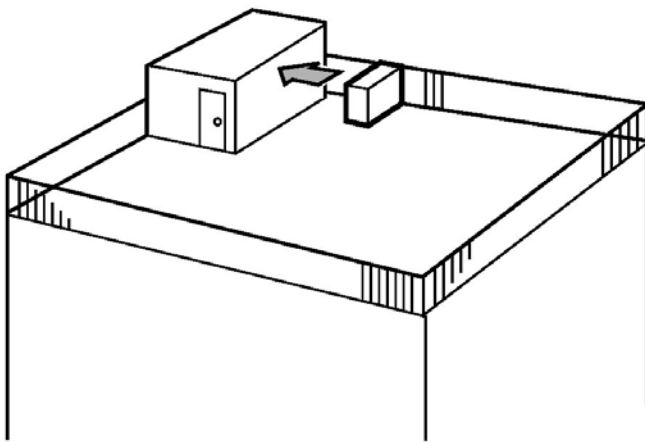


Fig. 3: Position the air inlet at a distance of approx 50 cm from the next wall.

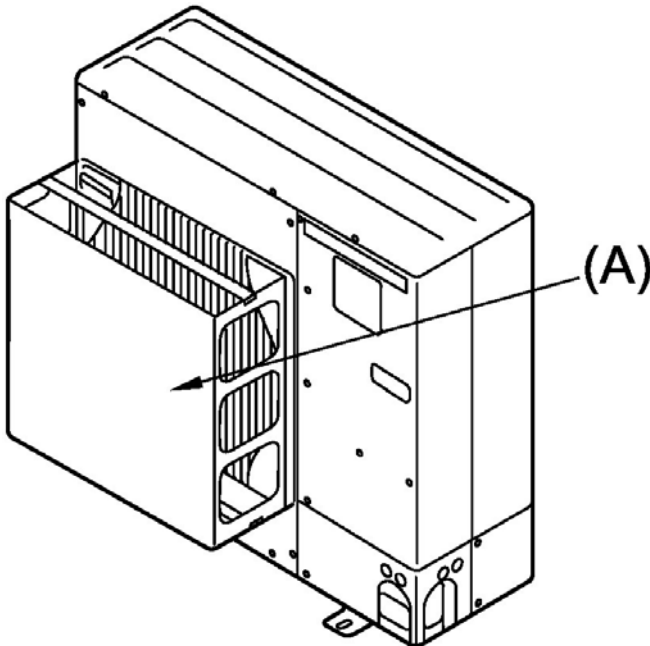


Fig. 4: Install an optional air guide (A) if the unit is installed in a location where strong winds may directly enter the air outlet. The air guide (A) is available as an optional accessory.

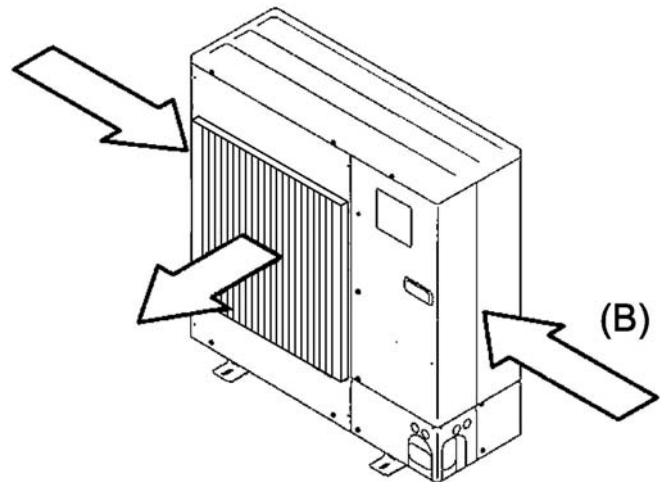


Fig. 5: Wind direction (B)

Position the system in such a way that the exhaust air from the air outlet is at a right angle to the direction from which strong seasonal winds blow.

Installation of a single exterior unit

The following minimum measurements apply, except for Max., which indicates the maximum measurement, as illustrated below.

The numbers in brackets refer to the model RP125. Note the corresponding numbers indicated in each individual case.

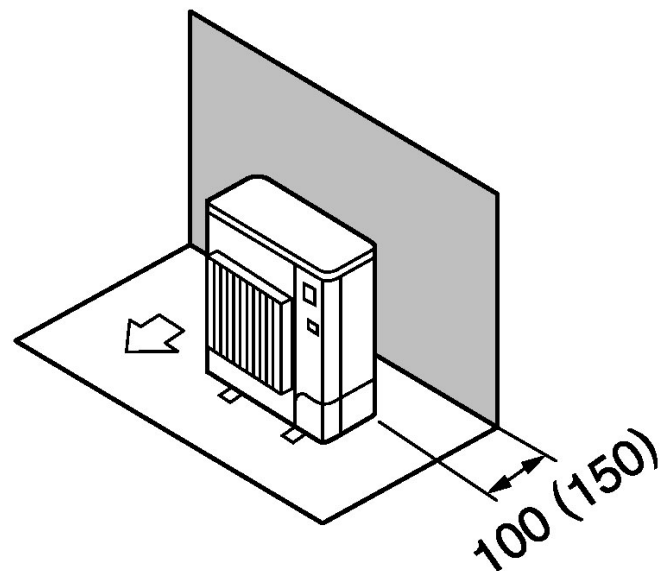


Fig. 6: Obstacles only at the back side

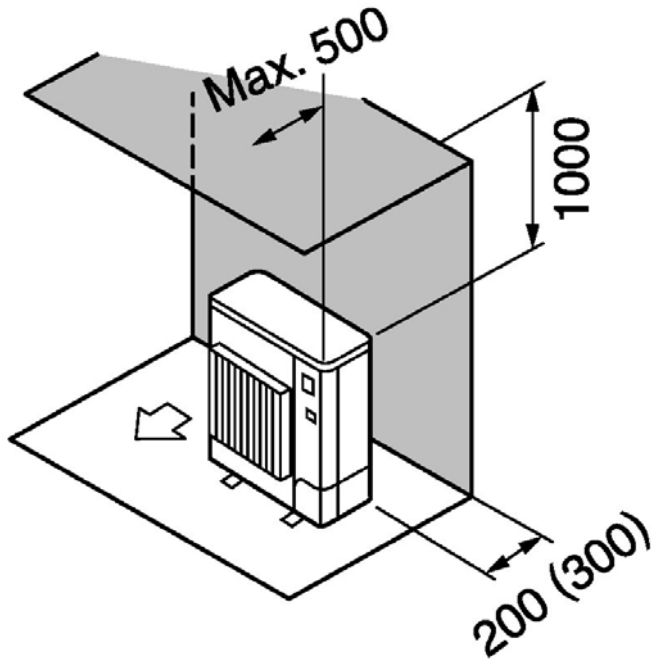


Fig. 7: Obstacles only at the back and upper sides

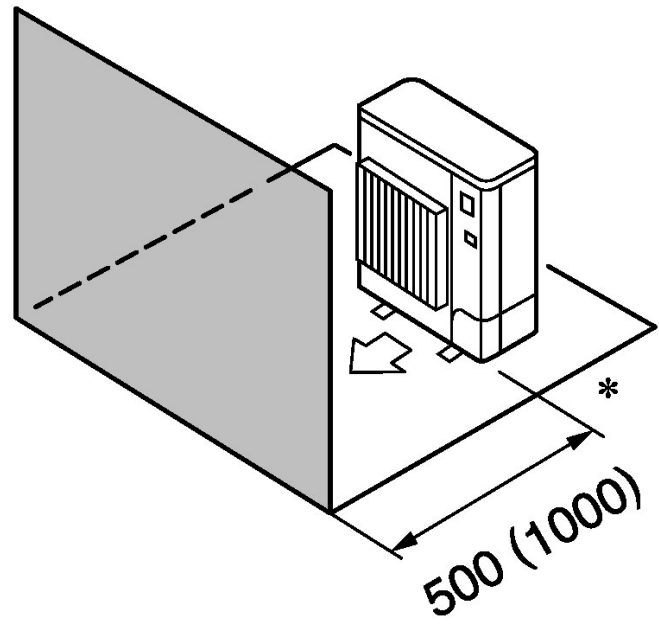


Fig. 9: Obstacles only at the front side

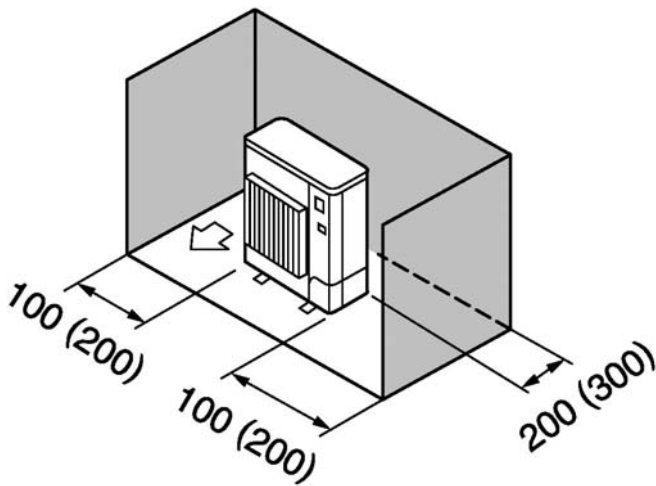


Fig. 8: Obstacles only at the back side and on either side

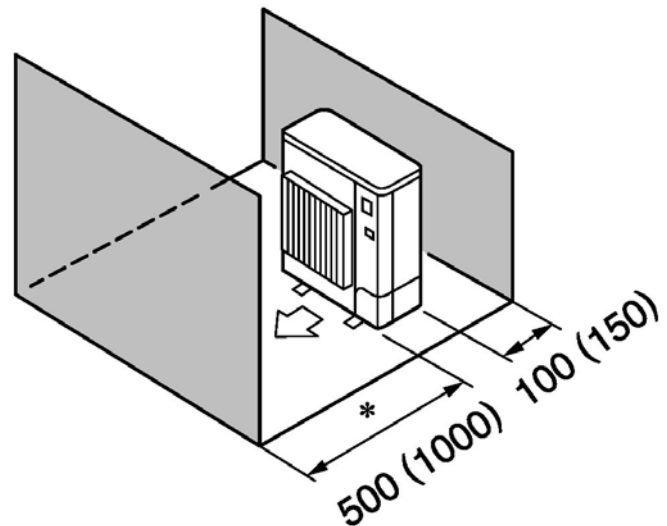


Fig. 10: Obstacles only at the front and back sides

* When deploying the guide (available as an optional accessory) the free space zone must constitute 500 mm or more for the RP125 model.

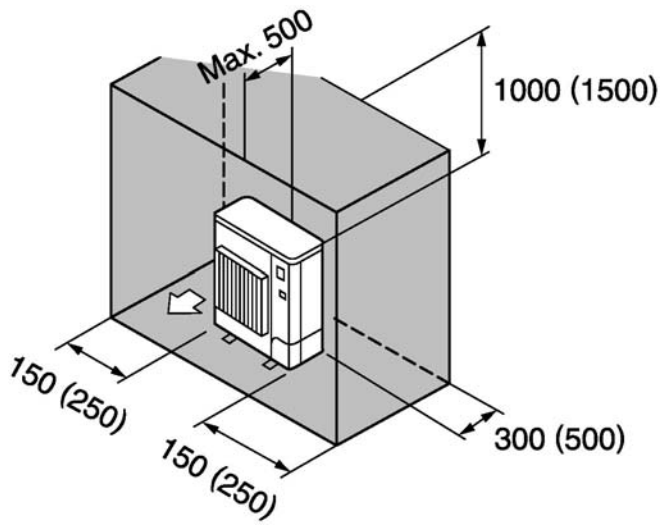
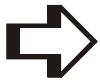


Fig. 11: Obstacles only at the back side, at either side, and the upper side



NOTE!

Do not deploy the air guide (available as an optional accessory) in order to divert the airstream upwards.

3.1 Installation of the exterior unit

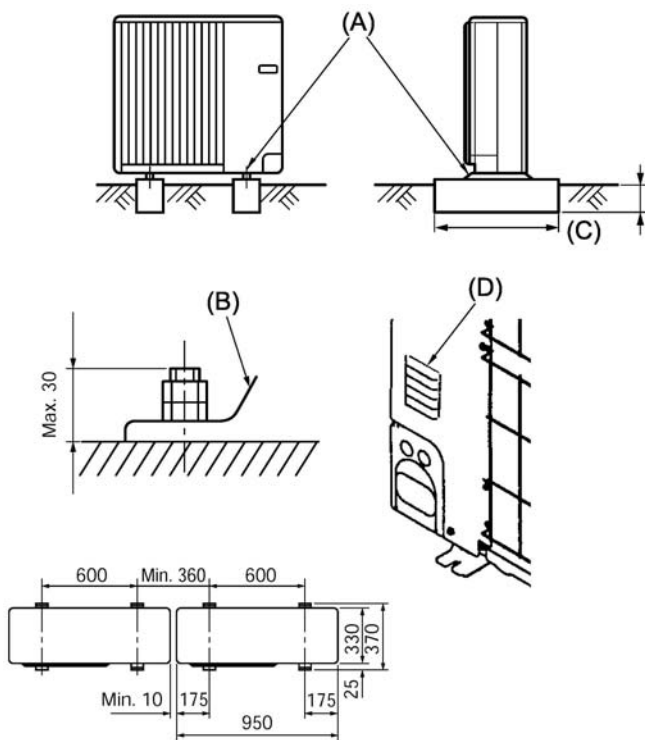


Fig. 12: Always install the system on a stable, level surface, in order to avoid rattling noises during operation.

Legend for Fig. 12:

Abbreviation	Meaning
(A)	M10 (3/8 inch) bolt
(B)	Floor panel
(C)	As long as possible.
(D)	Air outlet opening

Foundation specifications	
Foundation bolt	M10 (3/8 inch)
Thickness of concrete	120 mm
Length of bolts	70 mm
Load capacity	320 kg

- Ensure that the length of the foundation anchor bolt is within 30 mm from the lower side of the floor panel.
- Secure the system floor panel at stable points using 4 M10 foundation anchor bolts.

Installation of the exterior unit

- The air outlet opening must not be blocked. Blocking the air outlet opening can obstruct operation and lead to risk of system outage.
- During the installation, use the installation opening on the back side of the system in addition to the system floor panel, if needed, to fasten electric lines. For installation on site use sheet-metal bolts of (Ø5×15 mm or larger).



WARNING!

- The system must be securely mounted to a structure of the building which is capable of carrying the weight of the system. A system mounted to a weak structure of the building can fall, causing injuries or property damage.
- The system must be correctly installed according to instructions in order to minimise damage resulting from earthquakes, storms, or strong winds. A system which is not correctly installed according to instructions can fall, causing injuries or property damage.

4.1 Safety precautions for devices using refrigerant R410A

- Any safety measures for the use of heat pump systems using refrigerant R410A, which are not listed below, can be found in chapter 1.6 "Deployment of heat pump system with refrigerant R410A".
- Apply a small amount of ester oil/ether oil or alkyl benzyl as a refrigerant oil, onto the conical connections.
- To connect the refrigerant pipelines use copper phosphor C1220 for seamless copper pipes and copper alloys. Use the refrigerant pipelines of the strength indicated in the following table. Check that the pipes are clean inside and that they do not contain any hazardous contamination, such as: sulphur, oxidising agents, debris or dust.



WARNING!

- For installation or after transporting the heat pump system, use exclusively the indicated refrigerant (R410A) in order to fill the refrigerant lines. Do not combine with other refrigerants and do not let any air remain in the lines. Air in the lines can cause pressure peaks leading to tears and breaks as well as other damages.

Pipes to install	
Pipes carrying liquids	Ø 10, strength of 0.8 mm
Pipes carrying gas	Ø 16, strength of 1.0 mm



NOTE!

Do not deploy any pipes thinner than those indicated above.

4.2 Pipe connections

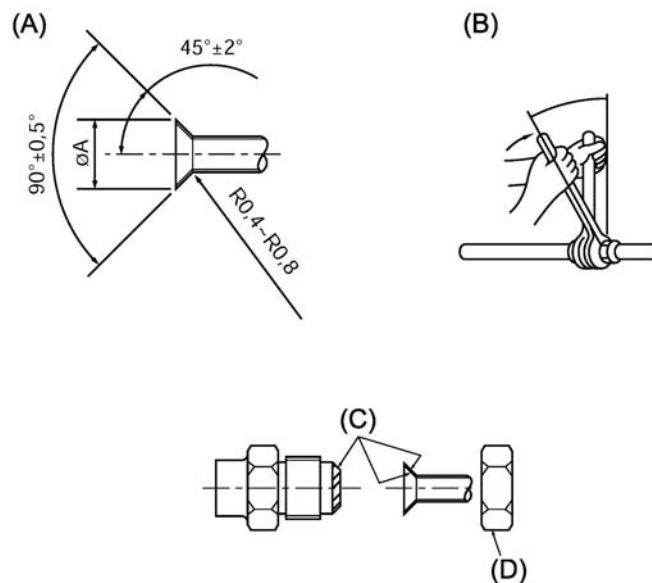


Fig. 13: Pipe connections

Legend for Fig. 13:

Abbreviation	Meaning
(A)	Flare cutting dimensions
(B)	Starting torque for the conical nut
(C)	Conical seating
(D)	Conical nut

Measurements for (A)	
Copper pipe O.D. (mm)	Flare dimensions ØA Measurements (mm)
10	12,8-13,2
16	19,3-19,7

Measurements for (B)		
Copper pipe O.D. (mm)	Conical nut O.D. (mm)	Starting torque (N·m)
10	22	34-42
16	29	68-82
16	36	100-120

- If commercially available copper pipes are deployed, wrap pipes carrying liquids or gas with insulation material (heat-resistant up to 100°C or more, strength of 12 mm or more), available at commercial retailer.
- The system components of the outlet pipe should be wrapped in insulation material made of foam (specific weight 0.03-9 mm or stronger).

4. Installation of the refrigerant pipeline Exterior unit RP71/RP125

- Before tightening the conical nut, apply a thin layer of refrigerant oil to the pipe and the surface of the joint interface. (A)
- Tighten the pipeline connectors firmly using two spanners. (B)
- After installation is completed, check for gas leaks using a leak-detector or soapy water.
- Apply refrigerant machine oil to the entire conical seating area. (C)
- Deploy the conical nuts for the following pipe sizes. (D)

	Pipe size (mm)
Gas side	Ø 16
Liquid side	Ø 10

- Pay close attention that pipes do not break during the bending process. A bend radius between 100 mm and 150 is sufficient.
- Pay close attention that the pipes do not come in contact with the compressor. Otherwise an unusual amount of noise and vibration can be emitted.

- 1) The pipes must be connected to each other from the interior unit. The conical nuts must be tightened using a spanner.
- 2) Expand the liquid and gas pipes and apply a small amount of refrigerant oil (to be applied on site).

- If regular pipe sealants are implemented, refer to the following table for flaring of R410A refrigerant pipes.
- For adjustment of the size, the measurements in A can be checked using a measuring device.

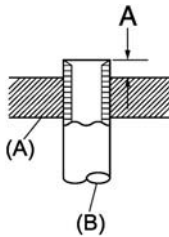


Fig. 14: (A) Cutting tools
(B) Copper pipe

Table for Fig. 14:

Copper pipe O.D. (mm)	A (mm) Flare tool for R410A Clutch type
10	1,0-1,5
16	1,0-1,5

4.3 Refrigerant pipelines

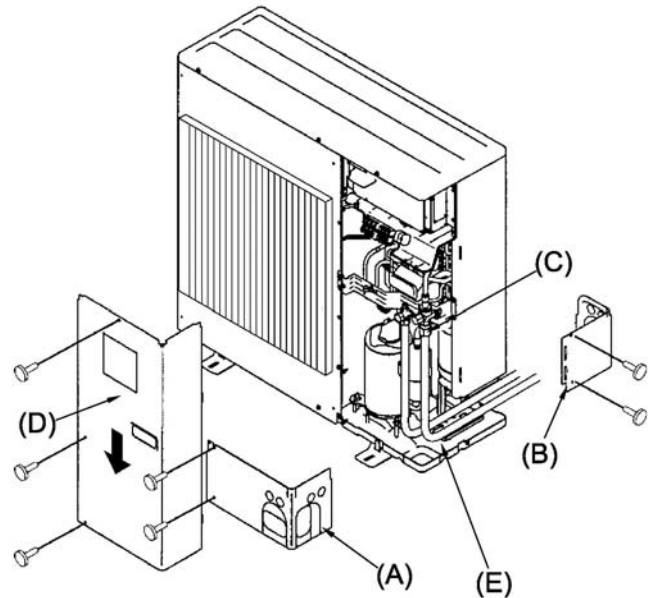


Fig. 15:

Legend for Fig. 15:

Abbreviation	Meaning
(A)	Frontal line cover
(B)	Line cover
(C)	Stop valve
(D)	Service panel
(E)	Bend radius: 100-150 mm

Remove the service panel (D) (three screws) and the frontal line cover (A) (two screws) and rear line cover (B) (two screws).

- 1) Perform refrigerant pipeline connections for the interior/exterior unit when the exterior unit's stop valve is completely closed.
- 2) Vacuum-purge air from the interior unit and the pipeline connection.
- 3) After connecting the refrigerant pipelines, check the connected pipes and the interior unit for gas leaks. (see chapter 4.4 Refrigerant pipe airtight testing method.)
- 4) A high-performance vacuum pump is implemented at the stop valve service unit in order to hold a vacuum for an appropriate amount of time (at least one hour after -101 kPa (5 Torr) has been achieved). This procedure is used to vacuum-dry the inside of the pipe. Always check the vacuum pressure at the pipe gauge. If any moisture remains in the pipe the necessary vacuum pressure may not be reached for shorter vacuum procedures.

After the vacuum-dry procedure, open the stop valves of the exterior unit completely (for both the liquid and gas stop valves). This will completely connect the refrigerant lines of the interior and exterior units.

- If the vacuum-dry procedure is not carried out adequately, air and water vapour remain in the cooling circuit which can lead to: an abnormal increase in overpressure, an abnormal decrease in low pressure, decomposition of the refrigerant machine oil due to moisture, etc.
 - If the stop valves are left closed and the unit is operated, the compressor and control valves will be damaged.
 - After connecting the lines, use a gas-leak detector or soapy water to check for gas leaks at the pipe connection sections of the exterior unit.
 - Do not use the refrigerant from the system to purge air from the refrigerant lines.
 - After the valve work is completed, tighten the valve caps to the correct torque: 20 to 25 N·m (200 to 250 kgf·cm).
Failure to replace and tighten the caps may result in refrigerant leakage. In addition, do not damage the insides of the valve caps as they act as a seal to prevent refrigerant leakage.
- 5) Use sealant to seal the ends of the thermal insulation around the line connectors in order to prevent water from entering the thermal insulation.

4.4 Refrigerant pipe airtight testing method

- 1) Connect the testing tools.
 - Make sure the stop valves (A) (B) are closed and do not open them.
 - Add pressure to the refrigerant pipelines through the service unit (C) of the liquid stop valve (D).
- 2) Do not build up to the specified pressure all at once; but add pressure gradually, little by little, instead.
 - a) Pressurize to 0.5 MPa (5 kgf/cm²G), wait five minutes, and make sure the pressure does not decrease.
 - b) Pressurize to 1.5 MPa (15 kgf/cm²G), wait five minutes, and make sure the pressure does not decrease.
 - c) Pressurize to 4.15 MPa (41.5 kgf/cm²G), and measure the surrounding temperature and refrigerant pressure.
- 3) If the specified pressure is held for one day without decreasing, the pipes have passed the test and there are no air leaks.
 - If the surrounding temperature changes by 1 °C, the pressure will change by approx 0.01 MPa (0.1 kgf/cm²G). Make the necessary corrections.
- 4) If the pressure decreases in steps (2) or (3), there is a gas leak. Look for the source of the gas leak.

4.5 Stop valve opening method

The method used for the opening of the stop valve varies depending on the type of exterior unit. Use the corresponding method for the opening of the stop valves.

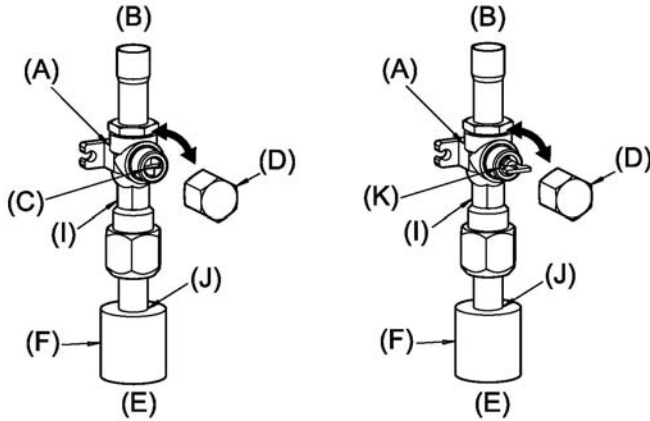


Fig. 16: Gas side of RP125

Legend for Fig. 16 and Fig. 17:

Abbreviation	Meaning
(A)	Valve
(B)	System side
(C)	Handle
(D)	Cap
(E)	Local pipe side
(F)	Pipe insulation
(G)	Service unit exit
(H)	Spanner opening
(I)	Jaw spanner area (The jaw spanner may be applied in this area exclusively. Applying the jaw spanner in other areas can cause refrigerant leaks.)
(J)	Sealant area (Use an appropriate material to seal the end of the thermal pipe insulation around the pipe connector area, in order to prevent water from entering the thermal insulation.)
(K)	Handle

- 1) Remove the cap, and use a slot screwdriver to rotate 1/4 turn in a counter clockwise direction, in order to open the valve completely.
- 2) Make sure that the stop valve is open completely, and if so, replace the cap and tighten it firmly.

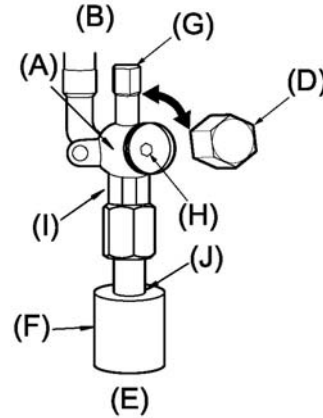


Fig. 17: Liquid side of RP125 and Gas/Liquid side of RP71

- 1) Remove the cap and turn the valve rod counter clockwise as far as it will go using of a 4 mm hexagonal spanner. Stop turning when the stopper is hit (Ø10: approx. 10 rotations).
- 2) Make sure that the stop valve is open completely, push in the handle and rotate the cap back to its original position.

For RP71/125 the refrigerant pipes are wrapped for protection.

- Before or after the pipe connection, the pipes can be wrapped into a protective wrapping of up to Ø90 in diameter. Cut out the hole to break away in the pipe cover, following the indentation. Then wrap the pipes.

Pipe inlet opening for RP71/125

- Use putty or sealant to seal the pipe inlet around the pipes so that no gaps remain.
(If the gaps are not closed, the system will have insufficient soundproofing; or water and dust may enter the system which can lead to system outages.)

4.6 Adding refrigerant

- There is no need to fill additional refrigerant into this system, if the piping length does not exceed 30 m.
- If the total piping length exceeds 30 m, fill additional R410A refrigerant into the system corresponding to the piping length indicated in the table below.

- The system must be switched off and a vacuum must be applied to the pipe extensions and the interior unit. The system can be filled with additional refrigerant into the liquid stop valve.

If the system is operating, use a safety-filler-device to add refrigerant into the stop valve. Do not fill refrigerant directly into the stop valve.

- After adding refrigerant to the system, record the amount of refrigerant on the maintenance sticker (attached on the system).

Further information can be found in chapter 1.6 "Deployment of heat pump system with refrigerant R410A".

- • Take special care when installing multiple systems. A connection to the incorrect interior system can lead to abnormally high pressure and severely impair the system performance.

Model	Permitted pipe length	Permitted vertical difference	Permitted refrigerant dosage			
			31-40 m	41-50 m	51-60 m	61-75 m
RP71	-50 m	-30 m	0.6 kg	1.2 kg	--	--
RP125	-75 m		1.8 kg	2.4 kg		

5.1 Exterior unit drainage pipe connection

If drain piping is necessary, use the drain socket or the drain pan (accessory).

Drain Socket	PAC-SG61DS-E
Drain Pan	PAC-SG64DP-E

6.1 Exterior unit

- 1) Die Bedienungsplatte abnehmen.
- 2) Connect up the cables according to Fig. 18 and Fig. 19.

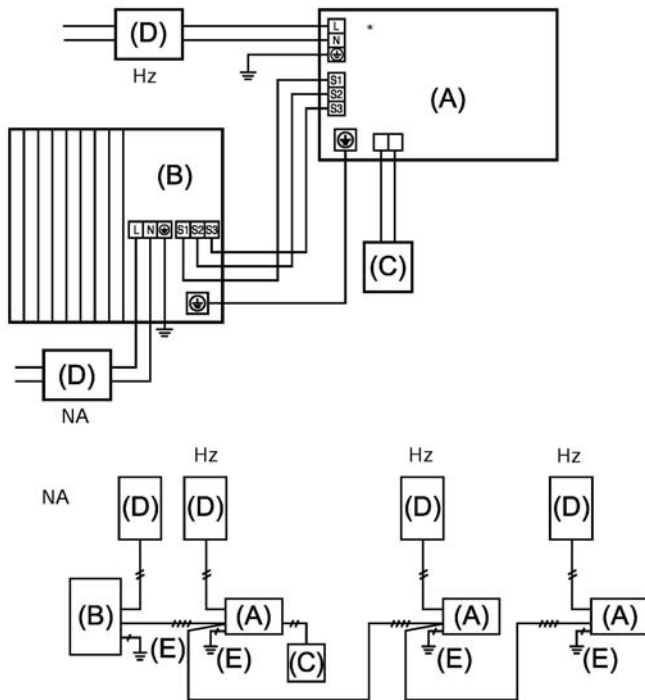


Fig. 18:

Legend for Fig. 18:

Abbreviation	Meaning
(A)	Interior unit
(B)	Exterior unit
(C)	Remote controller
(D)	Main switch/fuse (circuit breaker)
(E)	Earthing
RA	For the radiator
PS	For power supply
*	Only for models containing radiator

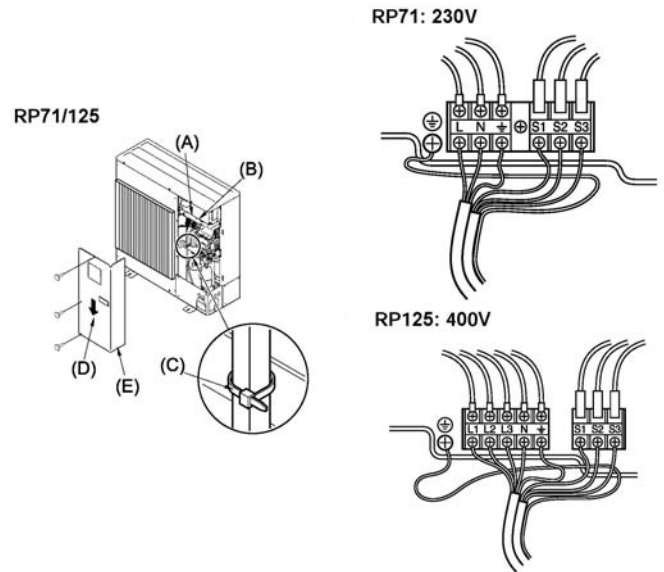


Fig. 19:

Legend for Fig. 19:

Abbreviation	Meaning
(A)	Earthing terminal
(B)	Strip terminal
(C)	Terminal
(D)	Controller panel
(E)	Connect up the cables in such a way that they do not come in contact with the centre of the controller panel or the gas fittings.

6.2 Electrical field wiring

Exterior unit model		RP71	RP125
Electrical power supply for exterior unit		~N (one), 50 Hz, 230 V	3N ~ (3 phases), 50 Hz, 400 V
Input capacitance of the exterior unit ¹ Main switch (circuit breaker)		25 A	16 A
Wiring Number of lines x strength (mm ²)	Electrical power supply for exterior unit	2 × Min. 2.5	4 × Min. 1.5
	Power supply earthing line of the exterior unit	1 × Min. 2.5	1 × Min. 1.5
	Interior Unit - Exterior Unit ²	3 × 1.5 (polar)	
	Earthing line of the Interior/Exterior Unit ²	1 × Min. 1.5	
	Remote controller - Interior Unit ³	2 × 0.3 (not polar)	
Electric circuit nominal voltage	Exterior Unit L-N (one Exterior length L1-N, L2-N, L3-N (3 phases) ⁴	AC 230 V	
	Interior Unit - Exterior Unit S1-S2 ⁴	AC 230 V	
	Interior Unit - Exterior Unit S1-S2 ⁴	DC 24 V	
	Remote controller - Interior Unit ⁴	DC 12 V	

¹ Implement a short-circuit to earth fuse (NV) at each pole at a contact distance of at least 3.0 mm.

² Max. 45 m
For use of 2.5 mm², max. 50 m

For use of 2.5 mm², and sperate S3, max. 80 m

³ The remote controller equipment comes with an electrical line of 10 m.

⁴ The information provided does NOT apply for the earth lead.

TTerminal S3 has 24 V direct current to terminal S2. Between terminals S3 and S1 there is no electrical insulation through the transformer or any other electrical mechanism.



NOTE!
The size of the electrical line must comply with local and national laws, rules and regulations.



NOTE!
For the power supply cable and the cable which connects the interior and exterior unit, at least a flexible cable with poly-chloroprene sheath (design 60245 IEC 57) must be selected.



NOTE!
Install an earth lead which is longer than the remaining cables.

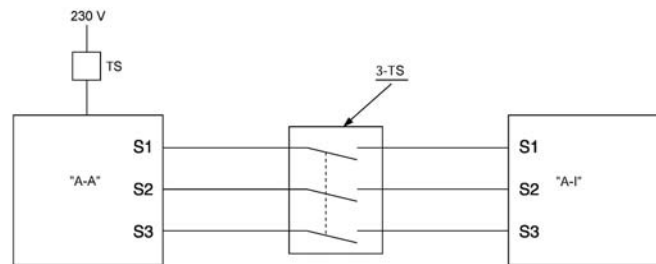


Fig. 20:

Legend for Fig. 20:

Abbreviation	Meaning
230 V	230 V single-phase
"A-A"	Exterior Unit "A-Control"
"A-I"	Interior Unit "A-Control"
TS	Circuit breaker
3-TS	3-pole circuit breaker



WARNING!

- Control line A has a potential of high voltage at terminal S3. This is due to the design of the electric circuit, which has no insulation between the mains and transmission line. Therefore: **switch off power during maintenance. Do not touch terminals S1, S2, or S3 when the system is powered on. If a circuit breaker is to implemented between the interior and exterior unit, use a 3-pole circuit breaker.**

7.1 Before the test run



NOTE!

After installation, electrical wiring work and piping work of the interior and exterior units, check and ensure that there is no refrigerant leakage, that the power supply and control lines are not loose, that there is no incorrect polarity and that no single connection is broken.



NOTE!

Use a 500 Volt megohmmeter to check and ensure that the resistance between the power supply terminals and earth measure a min. of 1.0 MΩ.



NOTE!

Do not perform this test on the control line terminals (low voltage electrical circuit).



WARNING!

- Do not use the heat pump system if the insulation resistance is less than 1.0 MΩ.

Insulation resistance

After installation or after the power source to the system has been cut for an extended period, the insulation resistance will drop below 1 MΩ due to refrigerant accumulating in the compressor. This is not a malfunction. Perform the following procedures.

- 1) Remove the power lines from the compressor and measure the insulation resistance of the compressor.
- 2) If the insulation resistance is below 1 MΩ, the compressor is either defective or the resistance dropped due the accumulation of refrigerant in the compressor.

3) After connecting the power lines and switching on the power supply the compressor will begin to run warm. Measure the insulation resistance according to the runtimes listed below.

- The insulation resistance drops due to accumulation of refrigerant in the compressor. The insulation resistance rises to 1 MΩ after the compressor has run warm for 4 hours (The time it takes for the compressor to warm up depends on weather conditions and accumulation of refrigerant).
- To operate the compressor despite accumulation of refrigerant, the compressor needs to run warm for at least 12 hours in order to avoid a system outage.

4) If the insulation resistance rises above 1 MΩ, the compressor is not defective.



CAUTION!

- The compressor will not operate unless the power supply phase connection is correct.
- Switch on power at least 12 hours before operating the system.
- Starting operation directly after switching on the circuit breaker can lead to severe damage of the systems internal components. Keep power supply on during the operational season.

• The following items must be checked.

- The exterior unit is not defective. LED1 and LED2 on the control board of the exterior unit flash if the exterior unit is defective.
- The gas and the liquid stop valves are completely opened.
- On the control board of the exterior unit, the DIP control board is covered by a protective shield. Remove the protective shield so that the DIP control switch can be easily operated.

7.2 System replacement procedure



NOTE!
When reusing existing pipes that carried R22 refrigerant, replacement procedure must be performed before performing a test run.

- If new pipes are used, these procedures are not necessary.

Replacement procedure steps

- 1) Switch on the system.
 - 2) Set DIP switch SW8-2 on the control board of the exterior unit to ON to start replacement procedure.
 - The replacement procedure is performed using the cooling system. Cool air will flow from the interior unit during the replacement procedure.
 - During the replacement procedure the display on the remote controller is active, and LED1 and LED2 on the control board of the exterior unit flash together.
 - 3) The duration of the replacement procedure is dependant on the length of the piping. Always perform the replacement procedure for longer than the stipulated time.
 - Use one of the following methods to complete the replacement procedure.
When the replacement procedure is completed, the unit will automatically switch itself off.
- a) Set SW8-2 from ON/EIN to OFF/AUS (when ending a replacement procedure of less than 2 hours).
- Due to the fact that the replacement procedure restarts each time SW8-2 is set from OFF/AUS to ON/EIN, always perform the replacement operation for longer than the stipulated time.

Required replacement procedure times

Pipe Length	Replacement procedure times
0-20 m	30 min. or more
21-30 m	45 min. or more
31-50 m	60 min. or more

- b) Allow the replacement procedure to automatically stop after 2 hours (operation stops while SW8-2 is still in the ON/EIN position).
- When the replacement procedure has ended automatically after 2 hours, there is no need to set SW8-2 from ON/EIN to OFF/AUS; operation of the heat pump system as usual is possible with SW8-2 set to ON/EIN. However, to repeat the replacement procedure, SW8-2 first needs to be set to OFF/AUS and then to ON/EIN.
- If the indoor temperature is less than 15°C, the compressor operation will be interrupted from time to time, however, this is not a system fault.

7.3 Test run

Using SW4 in the exterior unit

SW4-1	ON/EIN	Cooling operation
SW4-2	OFF/AUS	
SW4-1	ON/EIN	Heating operation
SW4-2	ON/EIN	

- After performing the test run, set SW4-1 to OFF/AUS.
- After power is supplied, a quiet clicking noise may be heard from the inside of the exterior unit. The electronic expansion valve opens and closes. The exterior unit is not defective.
- A few seconds after the compressor starts, a ringing noise may be heard from the inside of the exterior unit. This noise comes from the stop valve due to a small difference in pressure in the pipes. The exterior unit is not defective.



NOTE!
The test run mode cannot be changed using the SW4-2 DIP switch, during the test run.

To change the test run mode during the test run, first stop the test run, using the SW4-1 DIP switch. After changing the test run mode, resume the test run, using the SW4-1 switch.

8.1 Initial settings for refrigerant leakage detection function

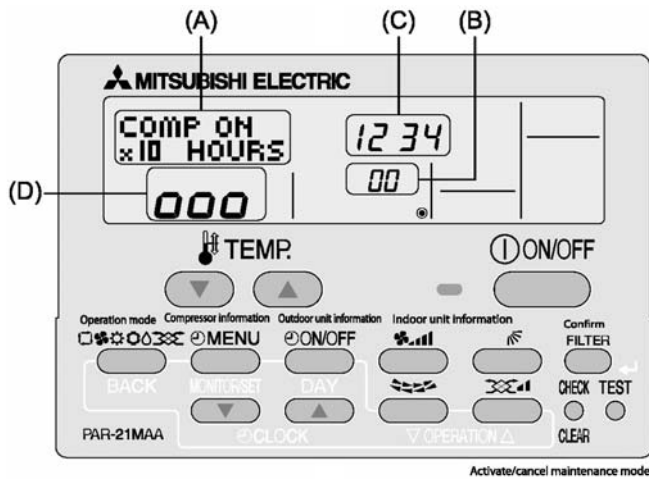


Fig. 21: Remote control button positions

This heat pump system includes a function to detect refrigerant leakage which may occur after long system usage. In order to enable this function, the following settings are required to let the system determine the initial operational status after installation. To use this function, proceed with the initial settings outlined below.



CAUTION!

- Before proceeding with the settings below, make sure to perform the “7. Test run” in order to confirm the system is operating correctly.

Switching to refrigerant-leakage detection mode.

The refrigerant-leakage detection function can be activated no matter whether the heat pump is operating or whether it is switched off.

- 1) Press the **TEST** button for more 3 seconds or longer to switch to the maintenance mode.

[Display (A)] MAINTENANCE

Refrigerant-leakage detection function (initial learning)



Fig. 22: [Display (A)]

Legend for Fig. 22:

Abbreviation	Meaning
KUS	Refrigerant-leakage detection (initial learning)
BKUS	Refrigerant-leakage detection evaluation

- 2) Press **CLOCK** button and select the [GAS LEAK TEST START] (STARTS THE GAS LEAKAGE TESTS). (see Fig. 22)

- The first operation procedure after a new installation or data reset of the initial learning data, is a setting for refrigerant leakage detection (initial learning).

- 3) Press the **FILTER** (←button to confirm the setting). (see Fig. 23)



Fig. 23: [Display (A)] Waiting for stabilisation

Ending the refrigerant-leakage detection (initial learning)

The initial learning is completed once operation has been stabilized.

- 4) Press the **TEST** button for 3 seconds or longer; or press the **ON/OFF** button; to cancel the refrigerant leakage detection (initial learning).

- Information on the the refrigerant leakage detection evaluation procedure can be found in the technical manual.

9.1 Low noise mode (on-site modification)

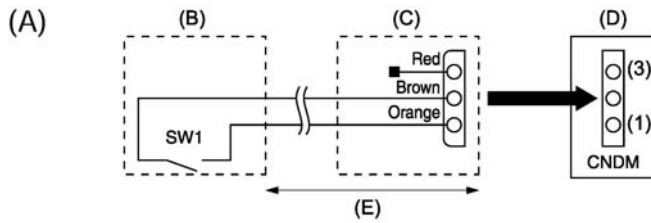


Fig. 24:

Legend for Fig. 24 and Fig. 25:

Abbreviation	Meaning
(A)	Circuit diagram example (low noise mode)
(B)	On-site arrangement
(C)	External input adapter (PAC-SC36NA)
(D)	Exterior unit control board
(E)	Max. 10 m

By performing the following modification, operation noise of the exterior unit can be reduced by approx. 3-4 dB.

The low noise mode will be activated if a commercially available timer or the contact inlet of an on/off switch is attached to the CNDM connector (optional accessory available for purchase) on the control board of the exterior unit.

- The effectiveness is dependant on outdoor temperatures and operation conditions, etc.

- Complete the circuit as illustrated, when using the external input adapter (PAC-SC36NA) (optional accessory available for purchase).
- SW1 ON/EIN: Low noise mode
SW1 OFF/AUS: Normal operation

9.2 Demand function (on-site modification)

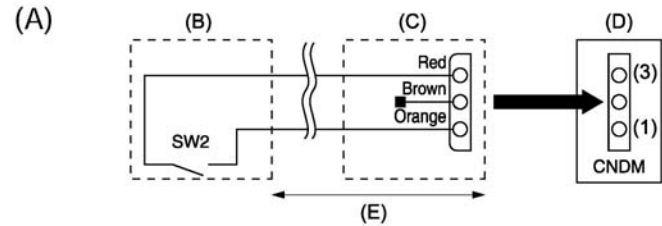


Fig. 25:

By performing the following modification, energy consumption can be reduced to 0 –100% of the normal consumption.

The demand function will be activated if a commercially available timer or the contact inlet of an on/off switch is attached to the CNDM connector (optional accessory) on the control board of the exterior unit.

- Complete the circuit as illustrated, when using the external input adapter (PAC-SC36NA) (optional accessory available for purchase).
- By setting SW7-1 and SW7-2 on the control board of the exterior unit, the energy consumption (compared to the normal consumption) can be limited as shown below.

SW7-1	SW7-2	Energy consumption (SW2 ON)
OFF	OFF	0% (Stop)
ON	OFF	50%
OFF	ON	75%

9.3 Collecting refrigerant (pump down)

Perform the following procedures for collecting refrigerant, if the interior or exterior unit is to be transported to another location.

- 1) Switch on the system (circuit breaker).
 - After switching on the system, make sure that the "CENTRALLY CONTROLLED" message is not displayed on the remote controller. If the "CENTRALLY CONTROLLED" message is displayed, the refrigerant collection (pump down) cannot be completed successfully.
- 2) After the gas stop valve is closed, set the SWP switch on the control board of the exterior unit to ON/EIN. The compressor (exterior unit) and ventilators (interior and exterior units) start operating and the refrigerant collection procedure sets in. LED1 and LED2 on the control board of the exterior unit are lit.
 - Only set the SWP switch (push-button type) to ON/EIN if the unit is switched off. However, the refrigerant collection procedure cannot be performed, if the unit is switched off and the SWP switch is set to ON/EIN less than three minutes after the compressor stops. Wait until compressor has been switched off for at least three minutes and then set the SWP switch to ON/EIN again.
- 3) The unit automatically switches itself off approximately two to three minutes after the refrigerant collection procedure (LED1 and LED2 are lit); therefore be sure to close the gas stop valve immediately. If LED1 and LED2 are lit and the exterior unit is switched off, open the liquid stop valve completely, and then repeat step (2) after three minutes have passed.
 - If the refrigerant collection procedure has been completed successfully (LED1 and LED2 are lit), the unit will remain stopped until the power supply is turned off.
- 4) Turn off the power supply (circuit breaker).

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Your heating specialist will be glad to advise you: