

# ITSUBISH **LECTRIC**

#### **INSTALLATION MANUAL**

- 1. THE FOLLOWING SHOULD ALWAYS BE **OBSERVED FOR SAFETY**
- Please provide an exclusive circuit for the air conditioner and do not connect other electrical appliances to it.
- Be sure to read "THE FOLLOWING SHOULD ALWAYS BE OBSERVED FOR SAFETY" before installing the air conditione • Be sure to observe the cautions specified here as they include important items related to safety.

#### • The indications and meanings are as follows.

#### Could lead to death, serious injury, etc.

- Could lead to serious injury in particular environments when operated incorrectly. • After reading this manual, be sure to keep it together with the OPERATING INSTRUCTIONS in a handy place on the customer's site.

#### 

- Do not install the unit by yourself (customer) Incomplete installation could cause injury due to fire, electric shock, the unit falling or leakage of water. Consult the dealer from whom you purchased the unit or special installer
- Install the unit securely in a place which can bear the weight of the unit. When installed in an insufficient strong place, the unit could fall causing injury. Use the specified wires to connect the indoor and outdoor units securely
- and attach the wires firmly to the terminal block connecting sections so the stress of the wires is not applied to the sections. Incomplete connecting and fixing could cause fire. Do not use intermediate connection of the power cord or the extension
- cord and do not connect many devices to one AC outlet. It could cause a fire or an electric shock due to defective contact, defective insulation, exceeding the permissible current, etc.
- Check that the refrigerant gas do not leak after installation has com-If refrigerant gas leaks indoors, and comes into contact with the fire of a fan
- heater, space heater, stove, etc., harmful substances will be generated. ■ Perform the installation securely referring to the installation manual. Incomplete installation could cause a personal injury due to fire, electric shock, the unit falling or leakage of water.
- Perform electrical work according to the installation manual and be sure to use an exclusive circuit. If the capacity of the power circuit is insufficient or there is incomplete
- electrical work, it could result in a fire or an electric shock. Attach the electrical cover to the indoor unit and the service panel to the outdoor unit securely. If the electrical cover in the indoor unit and/or the service panel in the outdoor
- unit are not attached securely, it could result in a fire or an electric shock due to dust, water, etc. Be sure to use the part provided or specified parts for the installation
- The use of defective parts could cause an injury or leakage of water due to a fire, an electric shock, the unit falling, etc. Be sure to cut off the main power in case of setting up the indoor
- electronic control P.C. board or wiring works. It could cause an electric shock.
- The appliance shall be installed in accordance with national wiring regulations. When installing or relocating the unit, make sure that no substance
- other than the specified refrigerant (R410A) enters the refrigerant circuit. Any presence of foreign substance such as air can cause abnormal pressure rise or an explosion.

#### 3. INSTALLATION DIAGRAM & ACCESSORIES **FLARED CONNECTIONS**

This unit has flared connections on both indoor and outdoor sides

• Remove the outdoor units valve cover, then connect the pipe. • Refrigerant pipes are used to connect the indoor and outdoor units. • Be careful not to crush or bend the pipe in pipe bending.

#### Limits 20/25 type 20 m max.

Pipe length 35 type 25 m max. Height difference 10 m max.

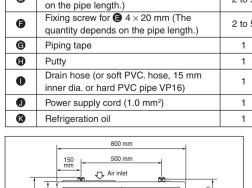
# No. of bends

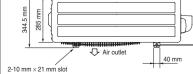
#### 10 max. • Refrigerant adjustment ... If pipe length exceeds 7 m, additional refrigerant (R410A) charge is required

(The outdoor unit is charged with refrigerant for pipe length up to 7 m.) No additional charge is required Up to 7 m Pipe length Exceeding 7 m Refrigerant to be adde

#### ACCESSORIES

Check the following parts before installation Indoor unit> Installation plate 1 **2** Installation plate fixing screw  $4 \times 25$  mm 5 Remote controller holder 1 4 Fixing screw for  $33.5 \times 16$  mm (Black) 2 6 Battery (AAA) for remote controller 2 6 Wireless remote controller 1 Felt tape (Used for left or left-rear piping) <Outdoor unit: MUH type B Drain socket 1 Ø Drain cap PART TO BE PROVIDED AT YOUR SITE Indoor/outdoor unit connecting wire (2-core 1.0 mm<sup>2</sup>) Extension pipe Wall hole sleeve Wall hole cover Pipe fixing band (The quantity depends 2 to 5 on the pipe length.)





- When operating the air conditioner in low outside temperature be sure to follow the instructions described below Never install the outdoor unit in a place where its air inlet/
- outlet side may be exposed directly to wind. To prevent exposure to wind, install the outdoor unit with it
- air inlet side facing the wall. To prevent exposure to wind, it is recommended to install a baffle board on the air outlet side of the outdoor unit.



of MS type and MSH type.)

MSH-GA20/25/35VB

[FLARE CONNECTION TYPE]

MS-GA20/25/35VB

**HFC** utilized (Indoor unit MSC type is the common specifications

# R410A

When installing an MUX or MXZ series outdoor unit, refer to the MSC type manual for indoor unit set up.

#### 

- Earth the unit. Do not connect the earth to a gas pipe, water pipe, lightning rod or telephone earth. Defective earthing could cause an electric shock Do not install the unit in a place where an inflammable gas leaks.
- If gas leak and accumulate in the area surrounding the unit, it could cause an
- Install an earth leakage breaker depending on the installation place (Where it is humid). If an earth leakage breaker is not installed, it could cause an electric shock.
- Perform the drainage/piping work securely according to the installation manual. If there is a defect in the drainage/piping work, water could drop from the unit
- and household goods could be wet and damaged Fasten a flare nut with a torque wrench as specified in this manual. When fastened too tight, a flare nut may broken after a long period and cause

#### a leakage of refrigerant. 2. SELECTING THE INSTALLATION LOCATION

#### 2-1 INDOOR UNIT

- Where airflow is not blocked Where cool air spreads over the entire room.
- Maximum refrigerant piping length between indoor unit and outdoor unit is 20 m (20/25 type), 25 m (35 type) and the difference of height of both units is 10 m. Rigid wall without vibratio
- Where it is not exposed to direct sunshine Where easily drained. • At a distance 1 m or more away from your TV and radio. Operation of the air
- conditioner may interfere with radio or TV reception in areas where reception is weak. An amplifier may be required for the affected device. In a place as far away as possible from fluorescent and incandescent lights (so the infrared remote control can operate the air conditioner normally).

## • Where the air filter can be removed and replaced easily.

- 2-2 OUTDOOR UNIT • Where it is not exposed to strong wind.
- Where airflow is good and dustless.
- Where it is not exposed to rain and direct sunshine. Where neighbours are not annoved by operation sound or hot air. • Where rigid wall or support is available to prevent the increase of operation sound
- Where there is no risk of combustible gas leakage
- When installing the unit at a high level, be sure to fix the unit legs. • Where it is at least 3 m away from the antenna of TV set or radio. Operation of the air conditioner may interfere with radio or TV reception in areas where reception is weak. An amplifier may be required for the affected device.
- Install the unit horizontally. Please install it in an area not affected by snowfall or blowing snow. In areas with
- heavy snow, please install a canopy, a pedestal and/or some baffle boards. It is advisable to make a piping loop near outdoor unit so as to reduce vibration
- transmitted from there.

Avoid the following places for installation where air conditioner trouble is liable to

- Where flammable gas could leal
- Where there is much machine oil. Salty places such as the seaside.
- Where sulfide gas is generated such as a hot spring.
  Where there is high-frequency or wireless equipment
- 2-3 WIRELESS REMOTE CONTROLLER MOUNTING
- Place of mounting
- Where children can not touch.
- Mounting Select a position about 1.2 m above the floor, check that signals from the remote controller are surely received by the indoor unit from that position ('beep' or 'beepbeep' receiving tone sounds). After that, attach remote controller holder 3 to a pillar or wall and set the wireless remote controller 6. In rooms where inverter type fluorescent lamps are used, the signal from the wireless remote controller may not be received.

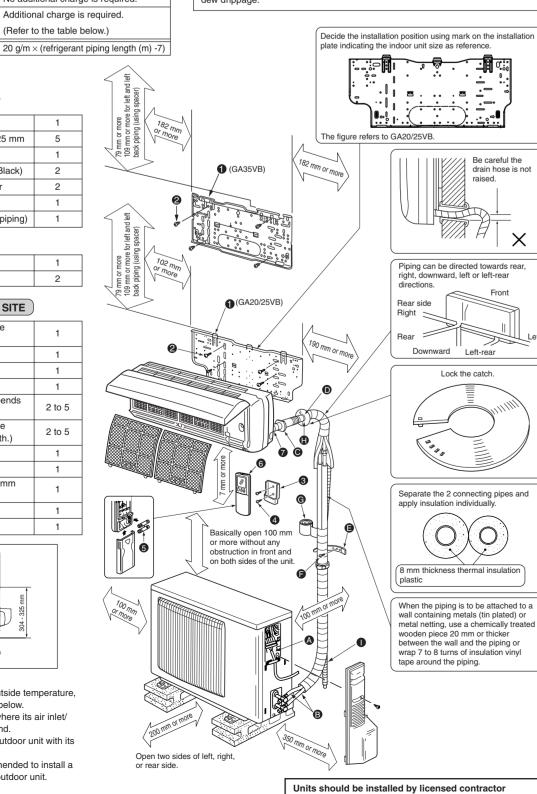
PIPING PREPARATION

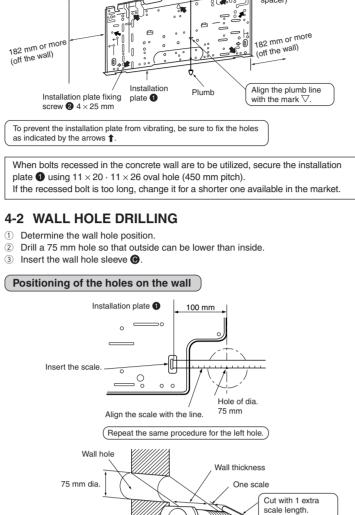
<ol> <li>Specificatio</li> <li>Use the refr</li> </ol>		et the following speci	fications.
Dine	Outside diameter	Insulation thickness	Insulation material
Pipe	mm	mm	Insulation material
For liquid	6.35	8	Heat resisting foam plast
For das	9.52	9	0.045 specific gravity

-	3		•		0	,
•	Use a coppe	er pipe or a copper-allo	by seamless pipe with	a thickness	of 0.8	mm.
	Never use ar	ny pipe with a thicknes	ss less than 0.8 mm, a	as the press	ure res	sistance
	is insufficient	t.				
3	Ensure that	the O refrigerent pine	a are inculated to pro-	vent eenden	action	

3) Refrigerant pipe bending radius must be 100 mm or more.

cause incorrect installation of the indoor unit and lack of thickness may cause





4. INDOOR UNIT INSTALLATION

• Find a structural material (such as a stud) in the wall and fix installation plate

Installation plate 1

79 mm or more

with the mark 🔨

79 mm or more

09 mm or more for lef

and left back piping (using

and left back piping (using

4-1 FIXING OF INSTALLATION PLATE

Bind the line to the center hole

Bind the line to the center ho

horizontally

screw 2 4 × 25 mm

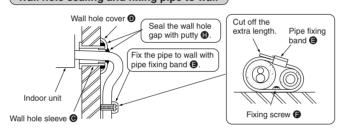
GA20/25VE

GA35VB

(Indoor side) (Wall hole cross section) /all hole sleeve 🕻

Be sure to use wall hole sleeve () to prevent the outdoor connecting wires from contacting with metal part in the wall and to prevent damage by rat in case the wall is hollow.

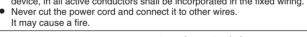
#### Wall hole sealing and fixing pipe to wall

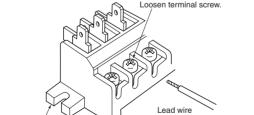


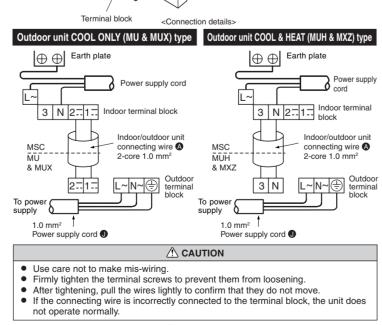
## 5. OUTDOOR UNIT INSTALLATION INDOOR/OUTDOOR UNIT CONNECTING WIRE CONNECTION

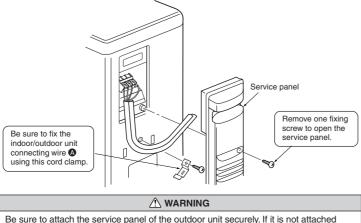
AND OUTDOOR POWER SUPPLY CORD CONNECTION • Connect the indoor/outdoor unit connecting wire (a) from the indoor unit correctly on

<ul> <li>For future service</li> </ul>		ngth to connecting wire.
Rated Voltage	Breaker capacity	Connect to the supply terminals and leave a contact separation of at least 3 mm at each pole to disconnect
230 V	10 A	the source power pole. (when the power switch is shut off, it must disconnect all poles.)
When too long, off power supp Be careful not	, or connected by ly wire to the size to contact conne	wire (extension wire). cutting off the middle, peel as shown in the right. cting wire with piping. an others (more than 35 mm)
<ul><li>use the ones in</li><li>Be sure to push</li></ul>	compliance with the core until it is	e indoor/outdoor unit connecting wires, be sure to the standards. hidden and pull each cable to make sure that it is no y cause a risk of burning the terminal blocks.
Power supply cor	d Specification	Cable 3-core 1.0 mm <sup>2</sup> , in conformity with Design 245 IEC 57.
Indoor and Outdo wire Specification		Cable 2-core 1.0 mm <sup>2</sup> , in conformity with Design 245 IEC 57.
		e supply with an isolation switch, or similar shall be incorporated in the fixed wiring.









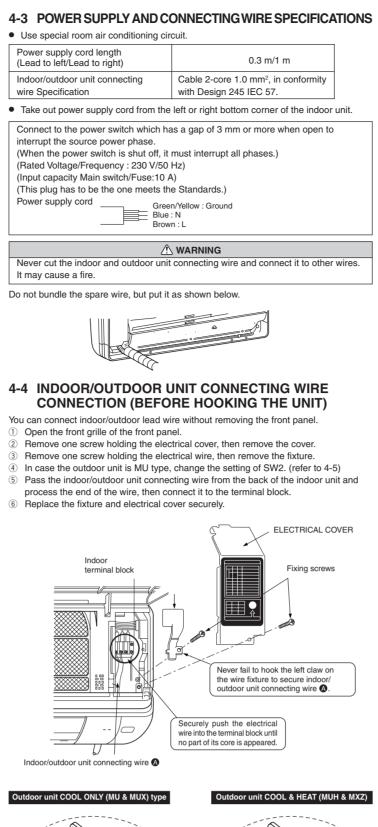
correctly, it could result in a fire or an electric shock due to dust, water, etc

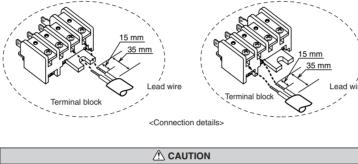
Be sure to use the insulation of specified thickness. Excessive thickness may dew drippage.

0.045 specific gravity Ensure that the 2 refrigerant pipes are insulated to prevent condensation.

ccording to local code requirement

# Where it is easy to operate and easily visible.





- Be careful not to make mis-wiring. • Firmly tighten the terminal screws to prevent them from loosening.
- After tightening, pull the wires lightly to confirm that they do not move. • If the connecting wire is incorrectly connected to the terminal block, the unit does not operate normally.
- If an earth is incorrect, it may cause an electric shock. Make earth wire a little longer than the others. (more than 35 mm)

## 6. INDOOR/OUTDOOR UNIT CONNECTION FINISHING AND TEST RUN

#### INSTALLATION INFORMATION FOR THE AIR CONDITIONER WITH R410A REFRIGERANT • This room air conditioner adopts an HFC refrigerant (R410A) which will never destroy

- the ozone layer. • Pay particular attention to the following points, though the basic installation procedure is same as that for R22 air conditioners.
- ① As R410A has a working pressure approx. 1.6 times as high as that of R22, some special tools and piping parts / materials are required. (Refer to the table below.) Take sufficient care not to allow water and other contaminations to enter the R410A refrigerant during storage and installation, since it is more susceptible to contaminations
- ③ For refrigerant piping, use clean, pressure-proof parts / materials specifically
- designed for R410A. (Refer to 2. Refrigerant piping.) ④ Composition change may occur in R410A since it is a mixed refrigerant. When charging, charge liquid refrigerant to prevent composition change.

#### 6-1 Tools dedicated for the air conditioner with R410A refrigerant

The following tools are required for R410A refrigerant. Some R22 tools can be ubstituted for R410A tools. The diameter of the service port on the stop valve in outdoor unit has been changed to prevent any other refrigerant being charged into the unit. (Cap size has been changed from 7/16 UNF with 20 threads to 1/2 UNF with 20 threads.)

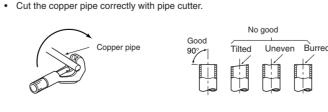
R410A tools	Can R22 tools be used?	Description
Gauge manifold	No	R410A has high pressures beyond the meas- urement range of existing gauges. Port diameters have been changed to prevent any other refrigerant from being charged into the unit.
Charge hose	No	Hose material and cap size have been changed to improve the pressure resistance.
Gas leak detector	No	Dedicated for HFC refrigerant.
Torque wrench	Yes	1/4 and 3/8
Flare tool	Yes	Clamp bar hole has been enlarged to reinforce the spring strength in the tool.
Flare gauge	New	Provided for flaring work (to be used with R22 flare tool).
Vacuum pump adaptor	New	Provided to prevent the back flow of oil. This adapter enables you to use existing vacuum pumps.
Electronic scale for refrigerant charging	New	It is difficult to measure R410A with a charging cylinder because the refrigerant bubbles due to high pressure and high-speed vaporization.

# 6-2 FLARING WORK

# Main cause of gas leakage is defect in flaring work.

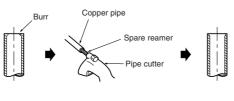
Carry out correct flaring work in the following procedure

# Pipe cutting



2 Burrs removal

 Completely remove all burrs from the cut cross section of pipe. Put the end of the copper pipe to downward direction as you remove burrs in order to avoid to let burrs drop in the piping.



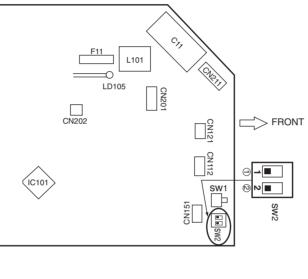
Outdoor unit COOL ONLY (MU & MUX) type	Outdoor unit COOL & HEAT (MUH & MXZ) type
Earth plate	Earth plate
L~ 3 N 21 Indoor terminal block	Cord Cord Cord Cord L~ Indoor terminal block
MSC MU & MUX MUX MU MUX MUX MUX MUX MUX	MSC MUH & MXZ
	To power Contraction of the supply Contracti
1.0 mm <sup>2</sup> Power supply cord <b>()</b>	1.0 mm² Power supply cord <b>①</b>
🛆 CAU	TION
<ul> <li>Common specifications for MS type and M unit and the remote controller. They are set from the factory. In order to switch over the SLIDE SWITCH as following figures. (Ref</li> </ul>	et up for MSH type when they are shipped e setting to MS type, change SW2-2 and fer to 4-5 in detail.)
<pre>MSH type (Outdoor unit MUH &amp; MXZ type) <indoor board="" control="" electronic="" p.c.=""></indoor></pre>	MS type (Outdoor unit MU & MUX type)
<remote controller=""></remote>	
<ul> <li>If the terminal block is connected incorre</li> <li>If a ground is incorrect, it may cause an</li> </ul>	
A WAR	NING
Use the indoor/outdoor unit connecting wire	

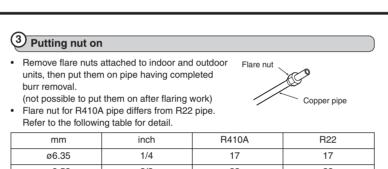
ncomplete connection or fixing of the wire could result in a fire. Attach the electrical cover securely. If it is attached incorrectly, it could result in a fire or an electric shock due to dust, water, etc. 4-5 HOW TO SWITCH OVER MS TYPE/MSH TYPE AND AUTO

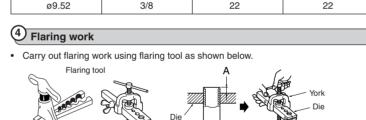
indoor and outdoor units and fix the wire to the terminal block securely so that no

external force is conveyed to the connecting section of the terminal block.

- RESTART FUNCTION <INDOOR ELECTRONIC CONTROL P.C. BOARD> The details of SW2
- SW2-① sets up AUTO RESTART FUNCTION ON/OFF.
- SW2-2 switches over MS type/MSH type. When the units are shipped from the factory, SW2 is set up as following.
- SW2-11: AUTO RESTART FUNCTION ON (downside) SW2-2: MSH type (downside)



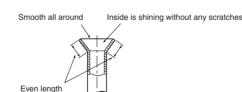


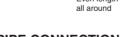


Clutch type	Copp Wing nut type	per pipe Flare nut	Copper pipe
		A (mm)	
Outside diameter	Flare tool for R410A	Convention	al flare tool
	clutch type	Clutch type	Wing nut type
ø6.35 mm	0 to 0.5	1.0 to 1.5	1.5 to 2.0
ø9.52 mm	0 to 0.5	1.0 to 1.5	1.5 to 2.0
Firmly hold copper	r pipe in a die in the din	nension shown in the t	able above.

#### 5 Check

· Compare the flared work with figure below · If flare is noted to be defective, cut off the flared section and do flaring work agai





## 6-3 PIPE CONNECTION

Fasten a flare nut with a torque wrench as specified in the table below. When fastened too tight, a flare nut may broken after a long period and cause a leakage of refrigerant.

## Indoor unit connectio

Connect both liquid and gas pipings to indoor unit. For connection first align the center, then tighten the first 3 to 4 turns of flare nut. • Use tightening torque table below as a guideline for indoor unit side union joint

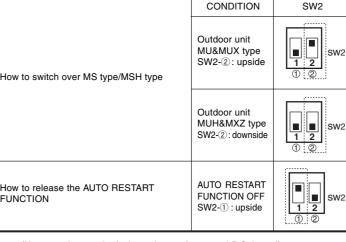
section, and tigh section.	nten using two w	renches. Exces	sive tightening damages the flare
Pipe diameter	Tighten	ing torque	
mm	N⋅m	kgf⋅cm	
ø6.35	13.7 to 17.7	140 to 180	
ø9.52	34.3 to 41.2	350 to 420	
<ol> <li>Outdoor unit co</li> </ol>	onnection		- e - ) A

#### Connect pipes to stop valve pipe joint of the outdoor unit in the same manner applied for ndoor unit.

• For tightening, use a torque wrench or spanner and use the same tightening torque applied for indoor unit.

## **INSULATION AND TAPING**

- Cover piping joints with pipe cover.
- For outdoor unit side, surely insulate every piping including valves. Using piping tape **6**, apply taping starting from the entry of outdoor unit.
- Stop the end of piping tape G with tape (with adhesive agent attached). • When piping have to be arranged through above ceiling, closet or where the temperature and humidity are high, wind additional commercially sold insulation for prevention of condensation



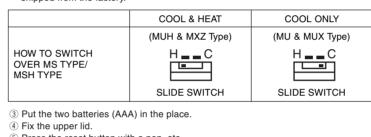
Notes: (How to take out the indoor electronic control P.C. board) 1) Remove the front panel.

- Remove the screws of the electrical cover. Remove the electrical cover
- Remove the terminal cover. Remove the screw of the terminal block.
- ④ Remove the cord clamp. 5 Disconnect all the connectors on the electronic control P.C. board
- 6 Remove the screw of the earth cable.
- ⑦ Disconnect all the lead wires from TAB12 (8) Remove the indoor electronic control P.C. board and the display P.C. board from the electrical box.
- Notes: (AUTO RESTART FUNCTION)
- When the units of these models are shipped from the factory, auto restart function is set to ON.
- When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor electronic control P.C board. The auto restart function sets to work the moment the power has restored after power failure, then, the unit will restart automatically. If the unit is operated in "I FEEL CONTROL" mode before power failure, the operation is not memorized. In "I FEEL CONTROL" mode, the operation is decided by the initial room temperature at (re)start.
- If the main power (230V AC) has been cut, the operation settings remain. · When three minutes have passed after power was restored, the unit will restart automatically according to the memory.
- The operation settings are memorized when 10 seconds have passed after the remote controller was operated. If the main power is turned off or a power failure occurs while AUTO START/STOP
- timer is active, the timer setting is cancelled. As this model is equipped with the auto restart function, the air conditioner should start operating at the same time that a power has restored. If the unit has been off with the remote controller before power failure, the auto
- restart function does not work as the power button of the remote controller is off. • To prevent breaker off due to the rush of starting current, systematize other home appliance not to turn on at the same time

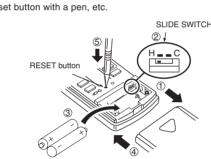
#### 4-6 HOW TO SWITCH OVER MS TYPE/MSH TYPE <REMOTE CONTROLLER>

#### The details of SLIDE SWITCH 1) Pull out the upper lid.

② Set the SLIDE SWITCH in the battery place with a pen tip as shown in the table below. The switch is set up for "COOL & HEAT (Left side)", when the units are shipped from the factory.



## (5) Press the reset button with a pen, etc



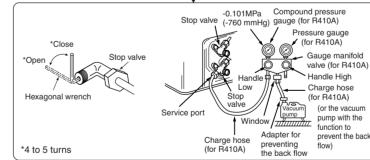
# 6-4 PURGING PROCEDURES-LEAK TEST

#### PURGING PROCEDURES Connect the refrigerant pipes (both liquid pipe and the gas pipe) between the indoo and the outdoor unit. Remove the service port cap of the stop valve on the side of the outdoor unit gas pipe

- (The stop valve will not work in it initial state fresh out of the factory (totally closed with cap on).) Connect the gauge manifold valve and the vacuum pump to the service port of the
- stop valve on the gas pipe side of the outdoor unit.
- Run the vacuum pump. (Vacuumize for more than 15 minutes.)

#### Check the vacuum with the gauge manifold valve, then close the gauge manifold valve, and stop the vacuum pump.

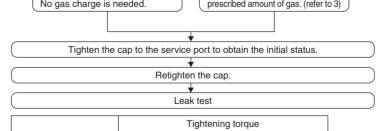
eave as it is for one or two minutes. Make sure the pointer gauge manifold valve remains in the same position. Confirm that the pressure gauge shows -0.101 Mpa [Gauge] (-760 mmHg).



# Remove the gauge manifold valve quickly from the service port of the stop valve.

After refrigerant pipes are connected and evacuated, fully open all stop valves on both sides of gas pipe and liquid pipe. Operating without fully opening lowers the performance and this causes trouble

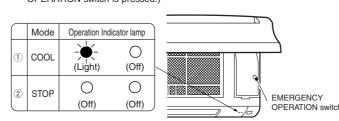
#### Pipe length up to 7 m Pipe length exceeding 7 m Charge the No gas charge is needed prescribed amount of gas. (refer to 3)

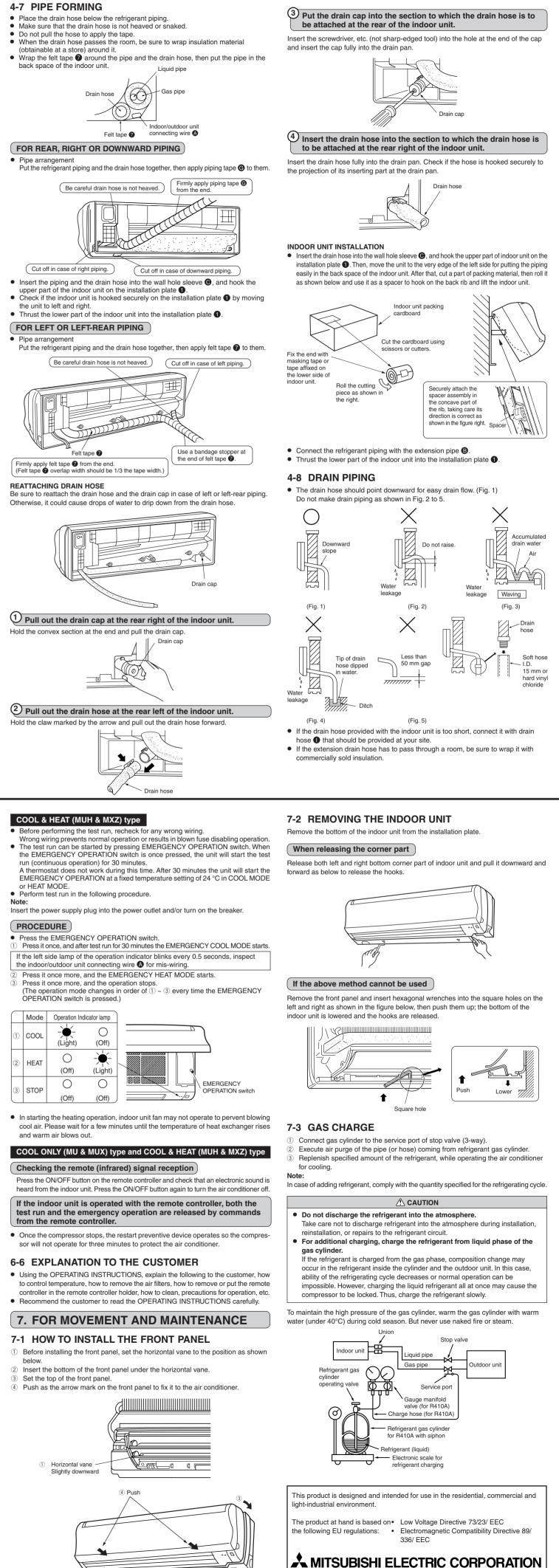


	ngniening torque	
	N⋅m	kgf⋅cm
Cap for service port	13.7 to 17.7	140 to 180
Cap for stop valve	19.6 to 29.4	200 to 300

## 6-5 TEST RUN

- COOL ONLY (MU & MUX) type
- Before performing the test run, recheck for any wrong wiring.
   Wrong wiring prevents normal operation or results in blown fuse disabling operation • The test run can be started by pressing EMERGENCY OPERATION switch. When the EMERGENCY OPERATION switch is once pressed, the unit will start the test run (continuous operation) for 30 minutes. A thermostat does not work during this time. After 30 minutes the unit will start the
- EMERGENCY OPERATION at a fixed temperature setting of 24 °C in COOL MODE. Perform test run in the following procedure.
- Insert the power supply plug into the power outlet and/or turn on the breaker.
- PROCEDURE
- Press the EMERGENCY OPERATION switch. Press it once, and after test run for 30 minutes the EMERGENCY COOL MODE starts. Press it once more, and the operation stops (The operation mode changes in order of  $1 \sim 2$  every time the EMERGENCY OPERATION switch is pressed.)





HEAD OFFICE: MITSUBISHI DENKI BLDG., 2-2-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

Horizontal vane