MITSUBISHI ELECTRIC

SPLIT-TYPE AIR CONDITIONERS

Revision A:
- MUZ-HX09/12NL-U1 have been added.

OBH953 is void.

OUTDOOR UNIT

HFC utilized R454B

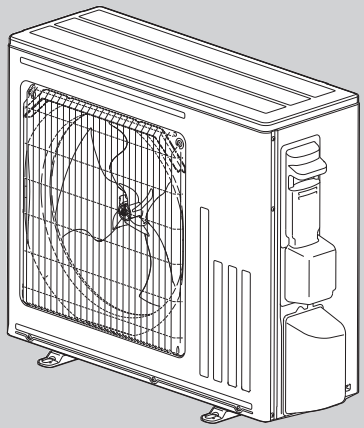
No. OBH953
REVISED EDITION-A

SERVICE MANUAL

Models

MUZ-HX09NL - U1
MUZ-HX12NL - U1
MUZ-HX18NL - U1
MUZ-HX24NL - U1

Indoor unit service manual
MSZ-HX•NL Series (OBH952)



MUZ-HX18NL

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PARTS CATALOG (OBB953)

Use the specified refrigerant only

Never use any refrigerant other than that specified.

Doing so may cause a burst, an explosion, or fire when the unit is being used, serviced, or disposed of.
Correct refrigerant is specified in the manuals and on the spec labels provided with our products.
We will not be held responsible for mechanical failure, system malfunction, unit breakdown or accidents caused by failure to follow the instructions.

<Preparation before the repair service>

- Prepare the proper tools.
- Prepare the proper protectors.
- Provide adequate ventilation.
- After stopping the operation of the air conditioner, turn off the power-supply breaker and pull the power plug.
- Discharge the capacitor before the work involving the electric parts.

<Precautions during the repair service>

- Do not perform the work involving the electric parts with wet hands.
- Do not pour water into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold areas in the refrigeration cycle.
- When the repair or the inspection of the circuit needs to be done without turning off the power, exercise great caution not to touch the live parts.

⚠ WARNING

- **When the refrigerant circuit has a leak, do not execute pump down with the compressor.**
- **When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst if air etc. get into it.**
- **When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.**

Revision A:

• MUZ-HX09/12NL-U1 have been added.

1 TECHNICAL CHANGES

MUZ-HX09NL-U1
MUZ-HX12NL-U1
MUZ-HX18NL-U1
MUZ-HX24NL-U1

1. New model

2 SERVICING PRECAUTIONS FOR UNITS USING REFRIGERANT R454B

Servicing precautions for units using refrigerant R454B

Refrigerant Safety Group A2L **WARNING**

This unit uses a flammable refrigerant.
If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
The appliance should not be stored in a room with continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).
Do not pierce or burn.
Be aware that refrigerants may not contain an odor.
- Maintenance, service and repair operations shall be performed by authorized technician with required qualification.
- Servicing shall be performed only by methods recommended by the manufacturer.
- Refrigerant piping shall be protected from physical damage.
- Field installed piping should be kept to a minimum.
- Compliance with national gas regulations shall be observed.
- All field joints shall be accessible for inspection prior to being covered or enclosed.

WARNING

- The mounting height of indoor unit shall be 5.9 ft (1.8 m) or more from the floor. Up to 7.5 ft (2.3 m) is recommended.
- The unit shall be installed in rooms exceed the minimum room area (A_{min}) determined by total refrigerant amount (M).

M			A_{min}	
[kg]	[lbs, oz]		[m²]	[ft²]
0.5	1	1	1.9	21
0.6	1	5	2.3	25
0.7	1	8	2.6	28
0.8	1	12	3.0	33
0.9	1	15	3.4	37
1.0	2	3	3.8	41
1.1	2	6	4.1	45
1.2	2	10	4.5	49
1.3	2	13	4.9	53
1.4	3	1	5.2	56
1.5	3	4	5.6	61
1.6	3	8	6.0	65

M			A_{min}	
[kg]	[lbs, oz]		[m²]	[ft²]
1.7	3	11	6.3	68
1.8	3	15	6.8	74
1.9	4	3	7.2	78
2.0	4	6	7.6	82
2.1	4	10	7.9	86
2.2	4	13	8.3	90
2.3	5	1	8.7	94
2.4	5	4	9.1	98
2.5	5	8	9.4	102
2.6	5	11	9.8	106
2.7	5	15	10.2	110
2.8	6	2	10.6	115

1. REFRIGERANT PIPE NITROGEN PRESSURE TEST METHOD

(1) Connect the testing tools.
- Make sure the stop valves are closed and do not open them.
- Add pressure to the refrigerant lines through the service port of the stop valve for GAS.

(2) Do not add pressure to the specified pressure all at once; add pressure little by little.
1. Pressurize to 0.5 MPa (73 psig, 5 kgf/cm²G), wait 5 minutes, and make sure the pressure does not decrease.
2. Pressurize to 1.5 MPa (218 psig, 15 kgf/cm²G), wait 5 minutes, and make sure the pressure does not decrease.
3. Pressurize to 4.15 MPa (601 psig, 41.5 kgf/cm²G) and measure the surrounding temperature and refrigerant pressure.

(3) If the specified pressure holds for 24 Hours and does not decrease, the pipes have passed the test and there are no leaks.
- If the surrounding temperature changes by 1°F (0.5°C), the pressure will change by about 1 psig (0.007 MPa). 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.

2. Additional refrigerant charge

Additional refrigerant charge

Refrigerant for the indoor units and the extended piping is not included in the outdoor unit when the unit is shipped from the factory. Therefore, charge each refrigerant piping system with additional refrigerant at the installation site. In addition, in order to carry out service, enter the size and length of each liquid pipe and additional refrigerant charge amounts in the spaces provided on the “Refrigerant amount” plate on the outdoor unit.

NOTE:

- When the unit is stopped, charge the unit with the additional refrigerant through the liquid stop valve after the pipe extensions and indoor units have been vacuumized.
- When the unit is operating, add refrigerant to the gas check valve using a safety charger. Do not add liquid refrigerant directly to the check valve.

Refrigerant adjustment

Model	**MSZ-HX09/12/18NL**	**MSZ-HX24NL**
Chargeless pipe length A	25 ft (7.5 m)	50 ft (15 m)
Refrigerant adjustment B	0.22 oz/ft (20 g/m)	
Additional refrigerant	Pipe length up to A : No need Pipe length exceeds A : B×(pipe length - A)	

3. Cautions for the unit using R454B refrigerant

Basic work procedures are the same as those for conventional units using refrigerant R410A. However, pay careful attention to the following points.

■ Information on servicing

1. Checks to the area
Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, 2 to 6 below shall be completed prior to conducting work on the system.

2. Work procedure
Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapour being present while the work is being performed.

3. General work area
All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out.
Work in confined spaces shall be avoided.

4. Checking for presence of refrigerant
The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

5. Presence of fire extinguisher
If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

6. No ignition sources
No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

7. Ventilated area
Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

8. Checks to the refrigerating equipment
Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:
- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

9. Checks to electrical devices
Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.
Initial safety checks shall include:
- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

■ **Repairs to sealed components**
Sealed electrical components shall be replaced.

■ **Repair to intrinsically safe components**
Intrinsically safe components must be replaced.

■ **Cabling**
Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

■ **Detection of flammable refrigerants**
Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
The following leak detection methods are deemed acceptable for all refrigerant systems.
Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.
Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
If a leak is suspected, all naked flames shall be removed/extinguished.
If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

■ **Removal and evacuation**
When breaking into the refrigerant circuit to make repairs - or for any other purpose -conventional procedures shall be used.
However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration.
The following procedure shall be adhered to:
• safely remove refrigerant following local and national regulations;
• evacuate;
• purge the circuit with inert gas;
• evacuate;
• continuously flush or purge with inert gas when using flame to open circuit; and
• open the circuit.
The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes.
For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times.
Compressed air or oxygen shall not be used for purging refrigerant systems.
For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

■ **Charging procedures**
In addition to conventional charging procedures, the following requirements shall be followed.
• Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
• Cylinders shall be kept in an appropriate position according to the instructions.
• Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
• Label the system when charging is complete (if not already).
• Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.
Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

■ Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- Become familiar with the equipment and its operation.
- Isolate system electrically.
- Before attempting the procedure, ensure that:
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - all personal protective equipment is available and being used correctly;
  - the recovery process is supervised at all times by a competent person;
  - recovery equipment and cylinders conform to the appropriate standards.
- Pump down refrigerant system, if possible.
- If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- Make sure that cylinder is situated on the scales before recovery takes place.
- Start the recovery machine and operate in accordance with instructions.
- Do not overfill cylinders (no more than 80 % volume liquid charge).
- Do not exceed the maximum working pressure of the cylinder, even temporarily.
- When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

■ Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

■ Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available.

All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order.

Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant.

If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

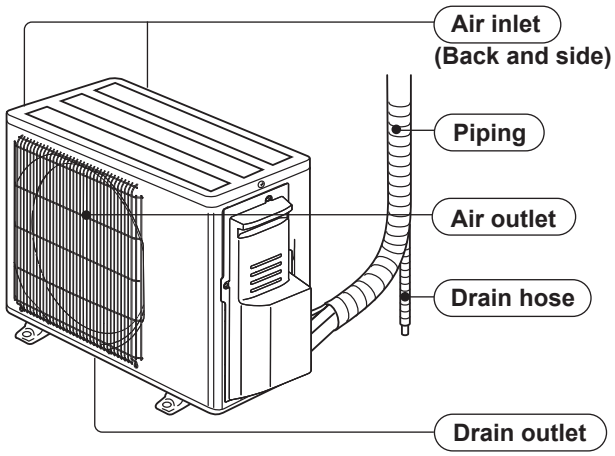
The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant.

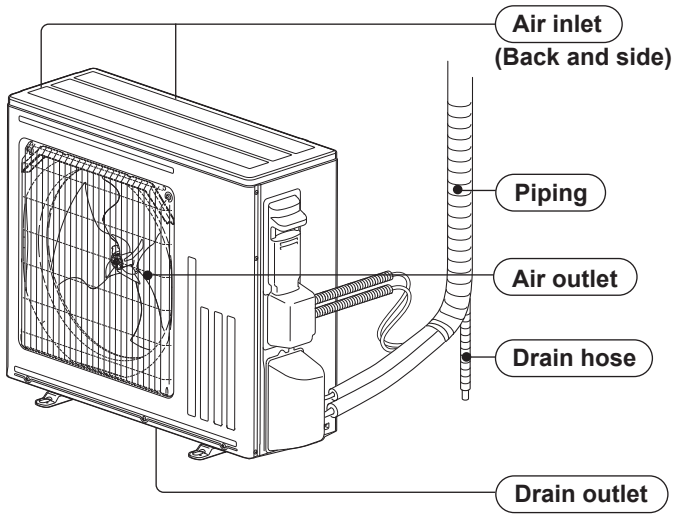
The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

3 PART NAMES AND FUNCTIONS

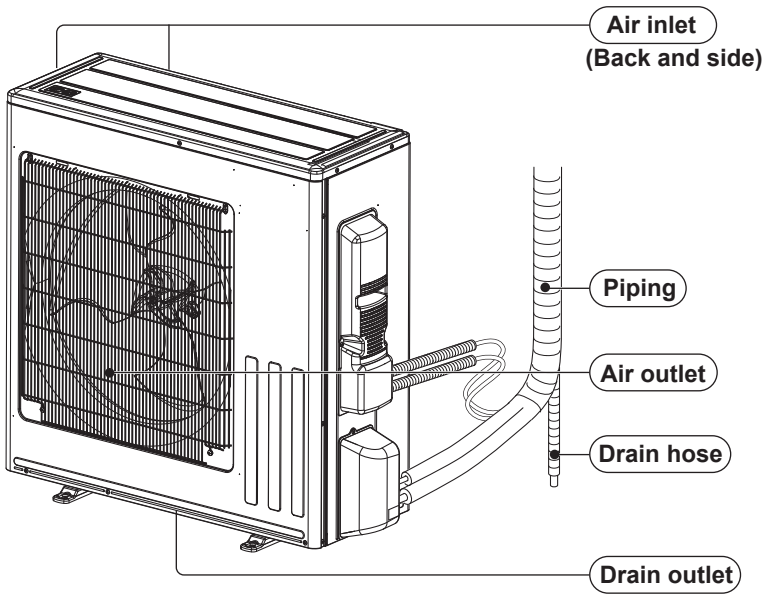
MUZ-HX09NL
MUZ-HX12NL



MUZ-HX18NL



MUZ-HX24NL



4 SPECIFICATION

Outdoor unit model			MUZ-HX09NL	MUZ-HX12NL	MUZ-HX18NL
Capacity Rated (Minimum – Maximum)	Cooling *1	Btu/h	9,000 (3,600 – 11,000)	12,000 (3,600 – 13,400)	17,200 (5,800 – 18,000)
	Heating 47 *1	Btu/h	10,900 (4,000 – 13,000)	12,200 (4,500 – 15,500)	18,000 (5,400 – 20,800)
Capacity Rated (Maximum)	Heating 17 *2	Btu/h	6,800 (7,200)	7,800 (9,000)	11,400 (15,000)
Power consumption Rated (Minimum – Maximum)	Cooling *1	W	720 (240 – 1,100)	960 (230 – 1,430)	1,370 (350 – 2,330)
	Heating 47 *1	W	900 (280 – 1,400)	990 (250 – 2,140)	1,590 (330 – 2,630)
Power consumption Rated (Maximum)	Heating 17 *2	W	820 (1,230)	900 (1,670)	1,260 (1,980)
EER2 *1 [SEER2] *3	Cooling		12.50 [20.0]	12.50 [20.0]	12.55 [20.0]
HSPF2 Region IV *4	Heating		10.0	10.0	9.5
COP	Heating		3.55	3.61	3.32
Power factor	Cooling	%	89	94	97
	Heating	%	91	95	97
Power supply	V, phase, Hz		208/230, 1, 60	208/230, 1, 60	208/230, 1, 60
Max. fuse size (time delay)		A	15	20	20
Min. circuit ampacity		A	10	16	16
Fan motor	F.L.A	A	0.71	0.71	0.74
Compressor	Model		KRB073FATMC	SRB140FQHMC SRB140FQHMT	SRB140FQHMC SRB140FQHMT
	R.L.A	A	5.6	9.4	9.8
	L.R.A	A	7	11.7	12.2
	Refrigeration oil	fl oz. (L) (Model)	9.1 (0.27)/(RM68EH)	11.8 (0.35)/(RM68EH)	11.8 (0.35)/(RM68EH)
Refrigerant control			Linear expansion valve	Linear expansion valve	Linear expansion valve
Sound level *1	Cooling	dB(A)	46	49	49
	Heating	dB(A)	50	51	51
Airflow High – Med. – Low	Cooling	CFM	1,141 – 1,031 – 1,031	1,166 – 1,166 – 469	1,816 – 1,321 – 626
	Heating	CFM	1,196 – 1,141 – 794	1,152 – 1,152 – 739	1,415 – 1,321 – 553
Fan speed High – Med. – Low	Cooling	rpm	850 – 770 – 770	910 – 910 – 410	1,060 – 790 – 420
	Heating	rpm	890 – 850 – 600	900 – 900 – 600	840 – 790 – 380
Defrost method			Reverse cycle	Reverse cycle	Reverse cycle
Dimensions	W	in.	31-1/2	31-1/2	31-1/2
	D	in.	11-1/4	11-1/4	11-1/4
	H	in.	21-5/8	21-5/8	28-1/8
Weight		lb.	65	81	90
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1
Remote controller			Wireless type	Wireless type	Wireless type
Control voltage (by built-in transformer)		V DC	12 – 24	12 – 24	12 – 24
Refrigerant piping			Not supplied	Not supplied	Not supplied
Refrigerant pipe size (Min. wall thickness)	Liquid	in.	1/4 (0.0315)	1/4 (0.0315)	1/4 (0.0315)
	Gas	in.	3/8 (0.0315)	3/8 (0.0315)	1/2 (0.0315)
Connection method	Indoor		Flared	Flared	Flared
	Outdoor		Flared	Flared	Flared
Between the indoor & outdoor units	Height difference	ft.	40	40	40
	Piping length	ft.	65	65	65
Refrigerant charge (R454B)			1 lbs. 6 oz	2 lbs. 2 oz	2 lbs. 8 oz

NOTE: Test conditions are based on AHRI 210/240.

*1: Rating conditions (Cooling) — Indoor: 80˚FDB, 67˚FWB, Outdoor: 95˚FDB, (75˚FWB)
(Heating) — Indoor: 70˚FDB, 60˚FWB, Outdoor: 47˚FDB, 43˚FWB

*2: Rating conditions (Heating) — Indoor: 70˚FDB, 60˚FWB, Outdoor: 17˚FDB, 15˚FWB

*3: Test condition (Refer to page 11.)

*4: Test condition (Refer to page 11.)

Outdoor unit model			MUZ-HX24NL
Capacity Rated (Minimum – Maximum)	Cooling *1	Btu/h	22,400 (5,800 – 22,400)
	Heating 47 *1	Btu/h	26,000 (6,200 – 26,000)
Capacity Rated (Maximum)	Heating 17 *2	Btu/h	17,200 (18,500)
Power consumption Rated (Minimum – Maximum)	Cooling *1	W	1,910 (380 – 2,200)
	Heating 47 *1	W	2,500 (370 – 2,500)
Power consumption Rated (Maximum)	Heating 17 *2	W	1,900 (3,060)
EER2 *1 [SEER2] *3	Cooling		11.75 [20.0]
HSPF2 Region IV *4	Heating		9.5
COP	Heating		3.05
Power factor	Cooling	%	95
	Heating	%	97
Power supply	V, phase, Hz		208/230, 1, 60
Max. fuse size (time delay)		A	25
Min. circuit ampacity		A	23
Fan motor	F.L.A	A	0.74
Compressor	Model		SRB172FQHMC SRB172FQHMT
	R.L.A	A	13.8
	L.R.A	A	17.2
	Refrigeration oil	fl oz. (L) (Model)	14.5 (0.43)/(RM68EH)
Refrigerant control			Linear expansion valve
Sound level *1	Cooling	dB(A)	54
	Heating	dB(A)	55
Airflow High – Med. – Low	Cooling	CFM	2,202 – 1,934 – 838
	Heating	CFM	1,934 – 1,934 – 1,281
Fan speed High – Med. – Low	Cooling	rpm	900 – 800 – 400
	Heating	rpm	800 – 800 – 560
Defrost method			Reverse cycle
Dimensions	W	in.	33-1/16
	D	in.	13
	H	in.	34-5/8
Weight		lb.	115
External finish			Munsell 3Y 7.8/1.1
Remote controller			Wireless type
Control voltage (by built-in transformer)		V DC	12 – 24
Refrigerant piping			Not supplied
Refrigerant pipe size (Min. wall thickness)	Liquid	in.	1/4 (0.0315)
	Gas	in.	1/2 (0.0315)
Connection method	Indoor		Flared
	Outdoor		Flared
Between the indoor & outdoor units	Height difference	ft.	50
	Piping length	ft.	100
Refrigerant charge (R454B)			3 lbs.

NOTE: Test conditions are based on AHRI 210/240.

*1: Rating conditions (Cooling) — Indoor: 80˚FDB, 67˚FWB, Outdoor: 95˚FDB, (75˚FWB)
(Heating) — Indoor: 70˚FDB, 60˚FWB, Outdoor: 47˚FDB, 43˚FWB

*2: Rating conditions (Heating) — Indoor: 70˚FDB, 60˚FWB, Outdoor: 17˚FDB, 15˚FWB

*3: Test condition (Refer to page 11.)

*4: Test condition (Refer to page 11.)

Test condition

*3, *4

AHRI 210/240	Mode	Test	Indoor air condition (°F)		Outdoor air condition (°F)	
			Dry bulb	Wet bulb	Dry bulb	Wet bulb
	SEER (Cooling)	"A-Full" Cooling Steady State at rated compressor speed	80	67	95	75
		"B-Full" Cooling Steady State at rated compressor speed	80	67	82	65
		"B-Low" Cooling Steady State at minimum compressor speed	80	67	82	65
		"F-Low" Cooling Steady State at minimum compressor speed	80	67	67	53.5
		"E-Int" Cooling Steady State at intermediate compressor speed *5	80	67	87	69
	HSPF (Heating)	"H1-Nom" Heating Steady State at rated compressor speed	70	60	47	43
		"H3-Full" Heating at rated compressor speed	70	60	17	15
		"H0-Low" Heating Steady State at minimum compressor speed	70	60	62	56.5
		"H1-Low" Heating Steady State at minimum compressor speed	70	60	47	43
		"H2-Int" Heating at intermediate compressor speed *5	70	60	35	33

*5: At intermediate compressor speed
= ("Rated compressor speed" - "minimum compressor speed") / 3 + "minimum compressor speed".

OPERATING RANGE

(1) POWER SUPPLY

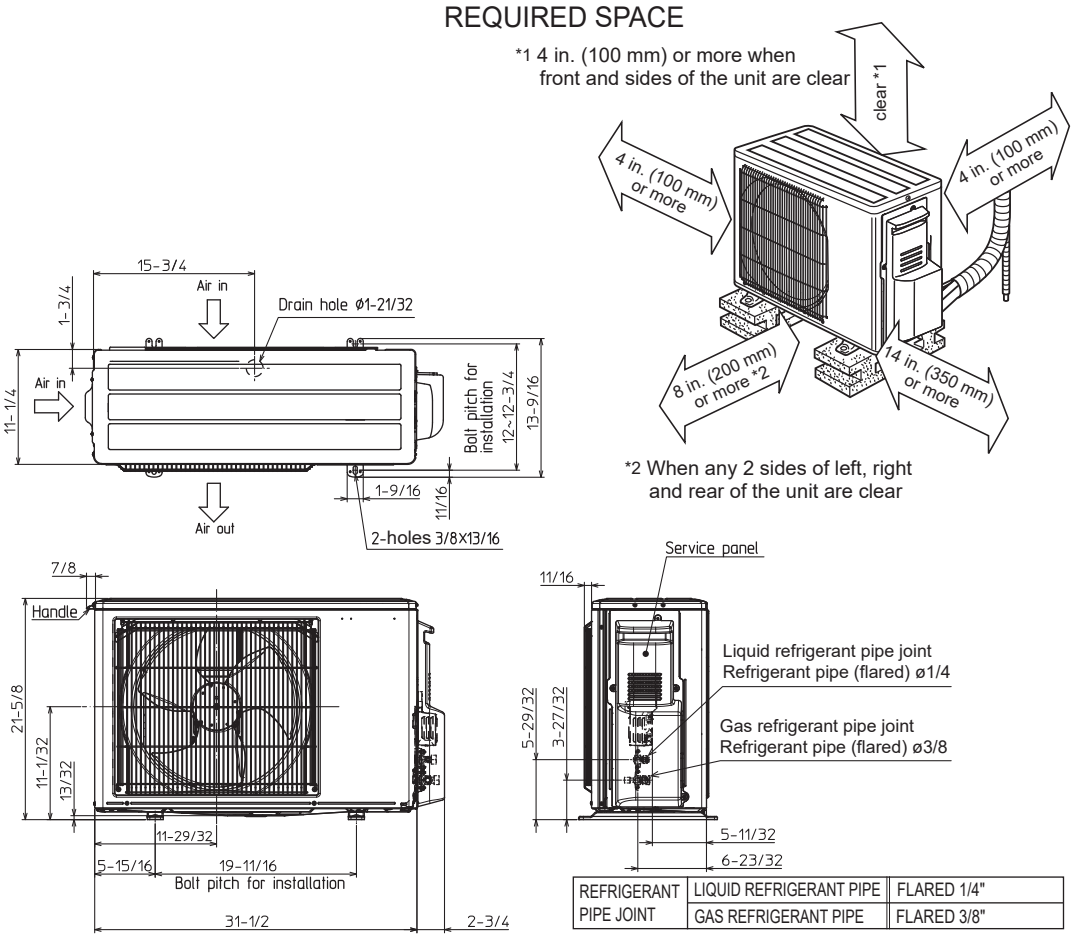
	Rated voltage	Guaranteed voltage (V)
Outdoor unit	208/230 V 1 phase 60 Hz	Min. 187 208 230 Max. 253

(2) OPERATION

Mode	Condition	Intake air temperature (°F)	
		Outdoor	
		DB	WB
Cooling	Standard temperature	95	—
	Maximum temperature	115	—
	Minimum temperature	14	—
	Maximum humidity	—	
Heating	Standard temperature	47	43
	Maximum temperature	75	65
	Minimum temperature	-5	-6

5 OUTLINES AND DIMENSIONS

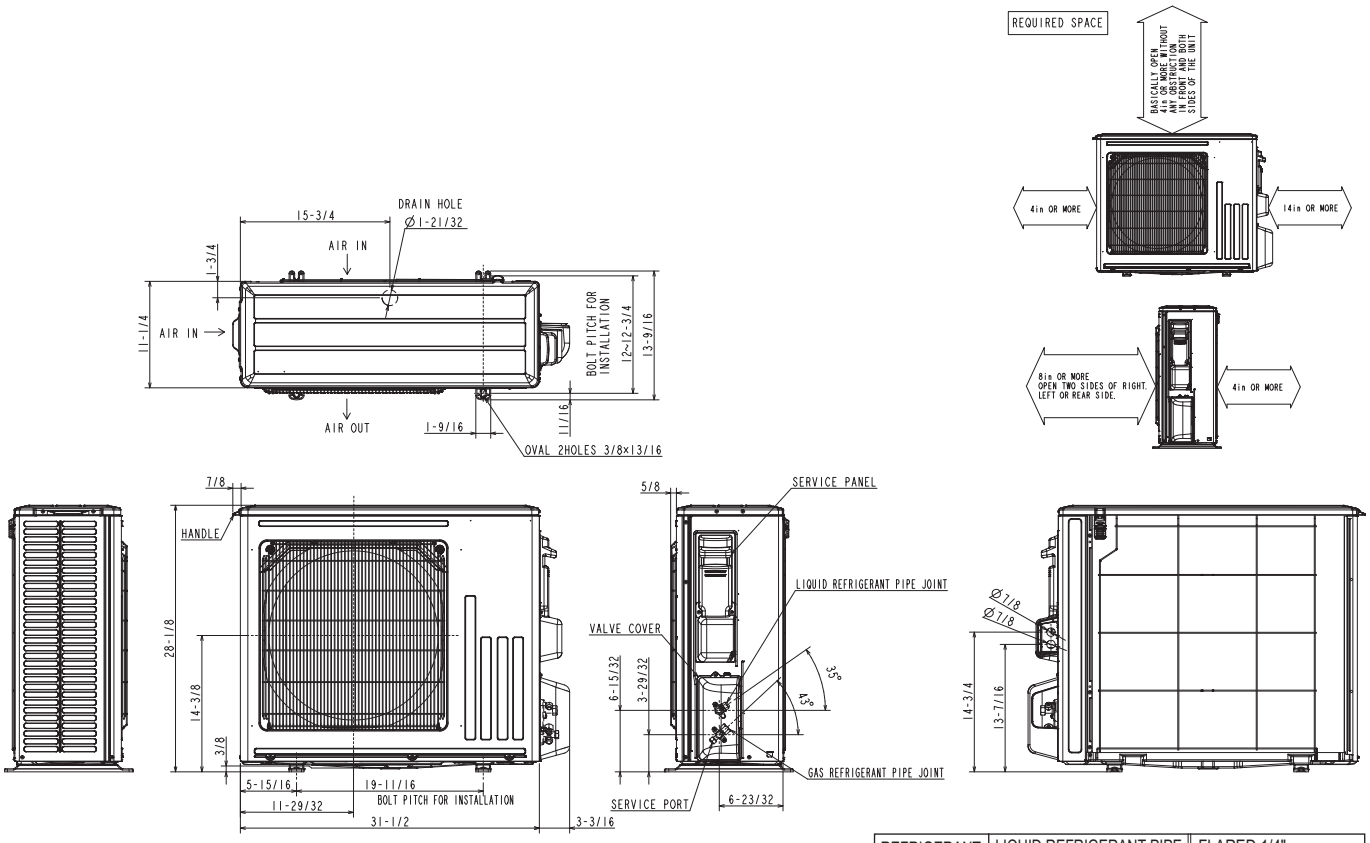
MUZ-HX09NL MUZ-HX12NL **Unit: inch**



REFRIGERANT PIPE JOINT	LIQUID REFRIGERANT PIPE	FLARED 1/4"
	GAS REFRIGERANT PIPE	FLARED 3/8"

MUZ-HX18NL

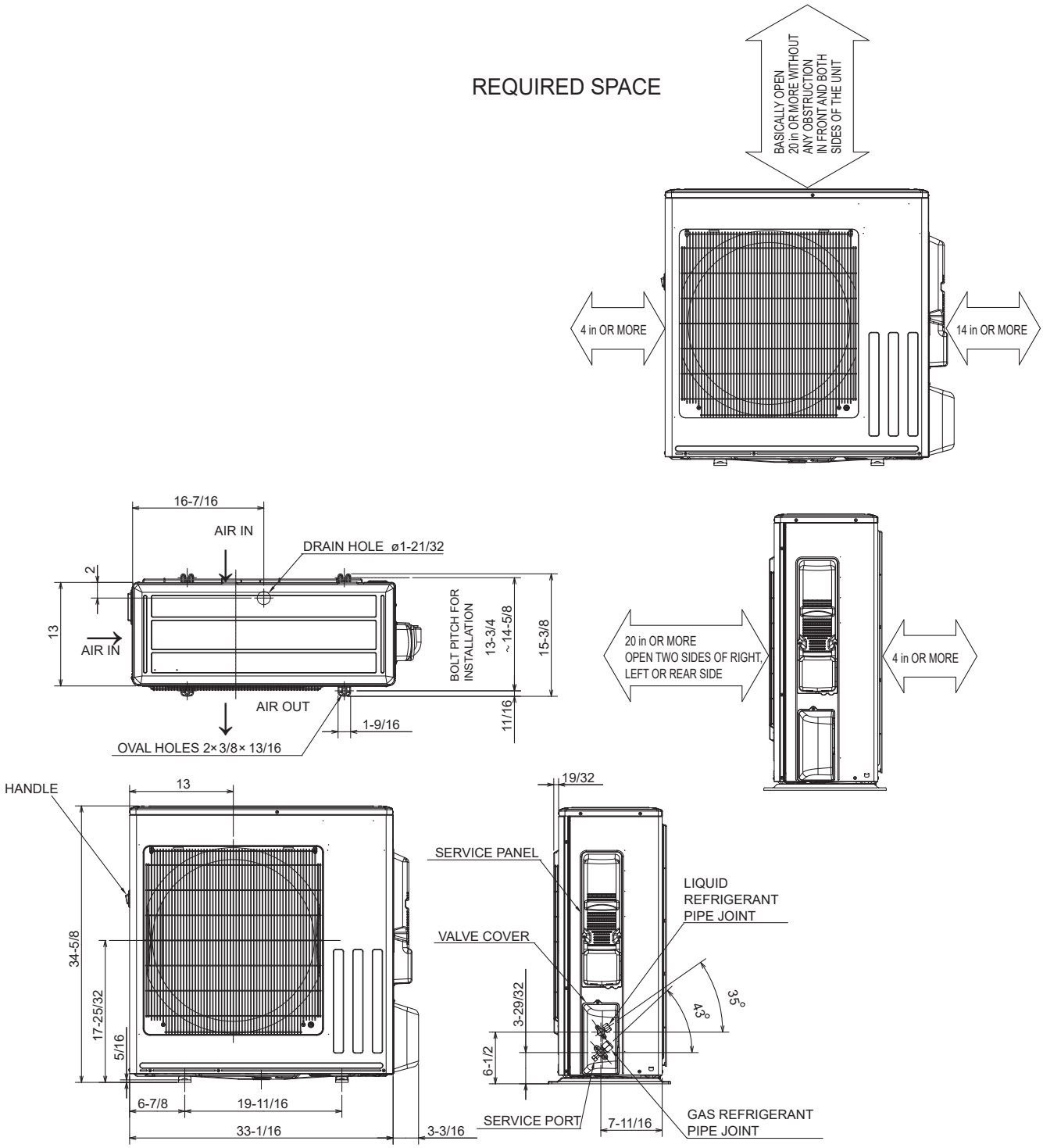
Unit: inch



REFRIGERANT PIPE JOINT	LIQUID REFRIGERANT PIPE	FLARED 1/4"
	GAS REFRIGERANT PIPE	FLARED 1/2"

MUZ-HX24NL

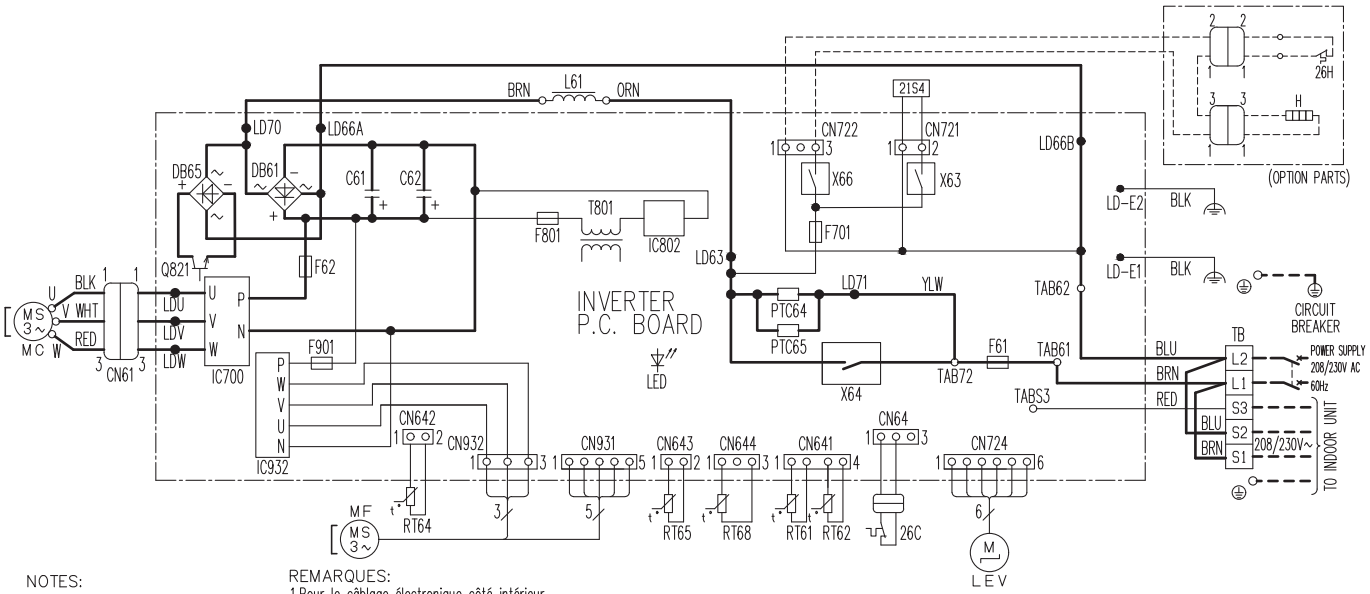
Unit: inch



REFRIGERANT PIPE JOINT	LIQUID REFRIGERANT PIPE	FLARED 1/4″
	GAS REFRIGERANT PIPE	FLARED 1/2″

6 WIRING DIAGRAM

MUZ-HX09NL MUZ-HX12NL

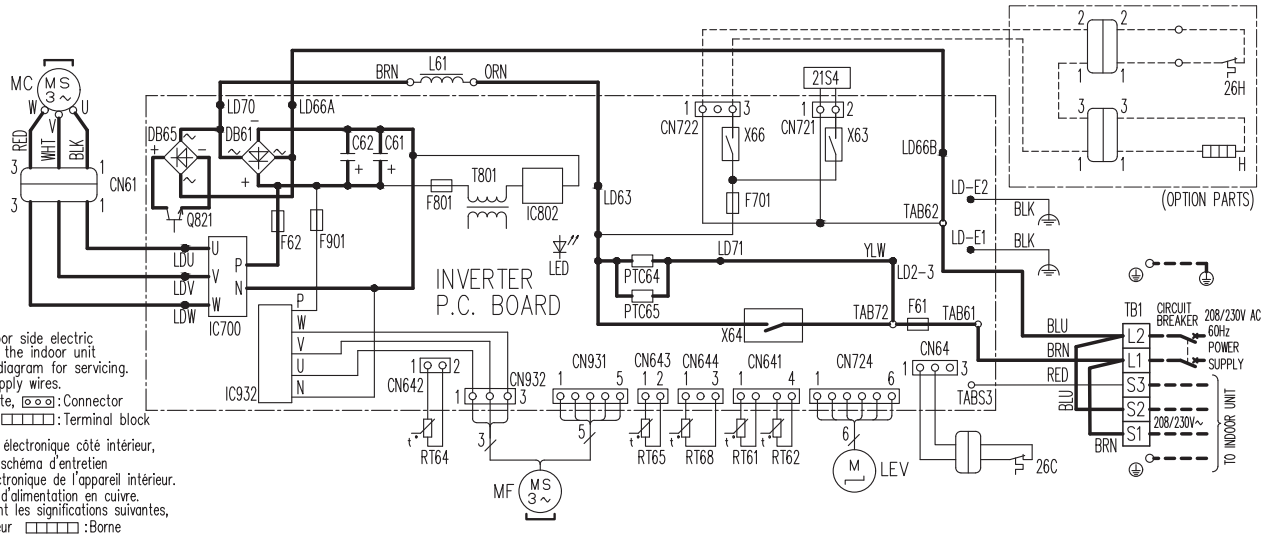


NOTES:
1. About the indoor side electric wiring, refer to the indoor unit electric wiring diagram for servicing.
2. Use copper supply wires.
3. Symbols indicate, ☐☐☐ : Terminal block
   ⊙⊙⊙ : Connector

REMARQUES:
1. Pour le câblage électronique côté intérieur, se reporter au schéma d'entretien du câblage électronique de l'appareil interieur.
2. Utiliser des fils d'alimentation en cuivre.
3. Les symboles ont les significations suivantes, ☐☐☐ : Borne
   ⊙⊙⊙ : Connecteur

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CN61	CONNECTOR	LEV	EXPANSION VALVE COIL	RT68	OUTDOOR HEAT EXCHANGER TEMP. THERMISTOR
C61,C62	SMOOTHING CAPACITOR	L61	REACTOR		
DB61,DB65	DIODE MODULE	MC	COMPRESSOR	TB	TERMINAL BLOCK
F61	FUSE (25A 250V)	MF	FAN MOTOR	T801	TRANSFORMER
F62	FUSE (15A 250V)	PTC64,PTC65	CIRCUIT PROTECTION	X63,X64,X66	RELAY
F701,F801,F901	FUSE (T3.15AL250V)	Q821	SWITCHING POWER TRANSISTOR	21S4	REVERSING VALVE COIL
H	DEFROST HEATER (OPTION PARTS)	RT61	DEFROST THERMISTOR	26C	COMPRESSOR PROTECTOR
IC700,IC932	POWER MODULE	RT62	DISCHARGE TEMP. THERMISTOR	26H	HEATER PROTECTOR (OPTION PARTS)
IC802	POWER DEVICE	RT64	FIN TEMP. THERMISTOR		
LED	LED	RT65	AMBIENT TEMP. THERMISTOR		

MUZ-HX18NL

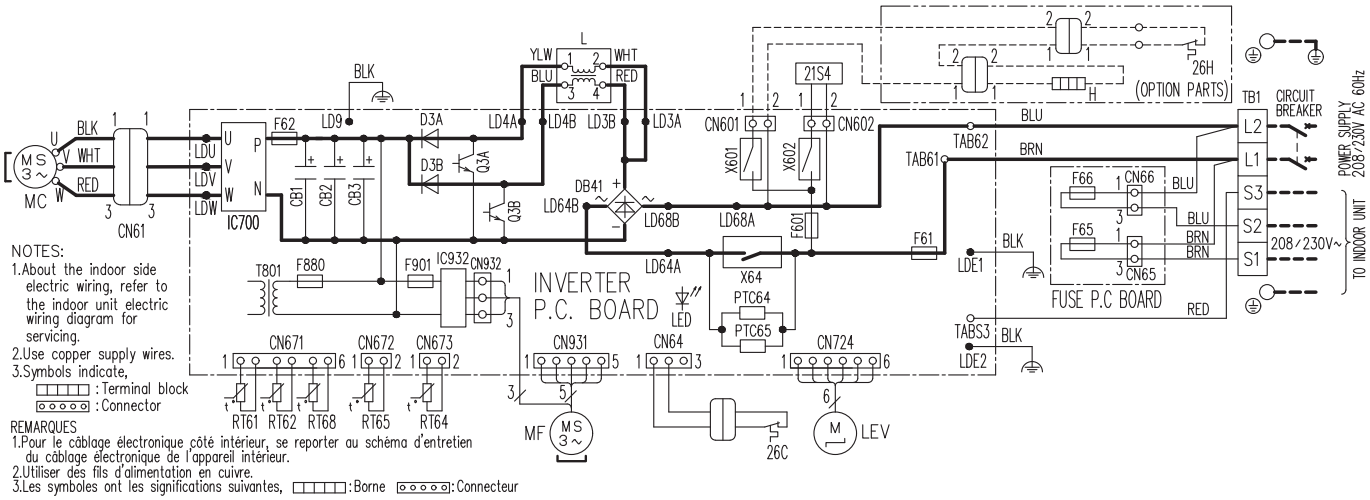


NOTES
1.About the indoor side electric wiring, refer to the indoor unit electric wiring diagram for servicing.
2.Use copper supply wires.
3.Symbols indicate, ▭▭▭ : Connector
▭▭▭▭ : Terminal block

REMARQUES
1.Pour le câblage électronique côté intérieur, se reporter au schéma d'entretien du câblage électronique de l'appareil intérieur.
2.Utiliser des fils d'alimentation en cuivre.
3.Les symboles ont les significations suivantes,
▭▭▭ : Connecteur ▭▭▭▭ : Borne

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CN61	CONNECTOR	LEV	EXPANSION VALVE COIL	RT68	OUTDOOR HEAT EXCHANGER TEMP. THERMISTOR
C61, C62	SMOOTHING CAPACITOR	L61	REACTOR		
DB61, DB65	DIODE MODULE	MC	COMPRESSOR	TB1	TERMINAL BLOCK
F61	FUSE (25A 250V)	MF	FAN MOTOR	T801	TRANSFORMER
F62	FUSE (15A 250V)	PTC64, PTC65	CIRCUIT PROTECTION	X63, X64, X66	RELAY
F701, F801, F901	FUSE (T3.15AL250V)	Q821	SWITCHING POWER TRANSISTOR	21S4	REVERSING VALVE COIL
H	DEFROST HEATER (OPTION PARTS)	RT61	DEFROST THERMISTOR	26C	COMPRESSOR PROTECTOR
IC700, IC932	POWER MODULE	RT62	DISCHARGE TEMP. THERMISTOR	26H	HEATER PROTECTOR (OPTION PARTS)
IC802	POWER DEVICE	RT64	FIN TEMP. THERMISTOR		
LED	LED	RT65	AMBIENT TEMP. THERMISTOR		

MUZ-HX24NL

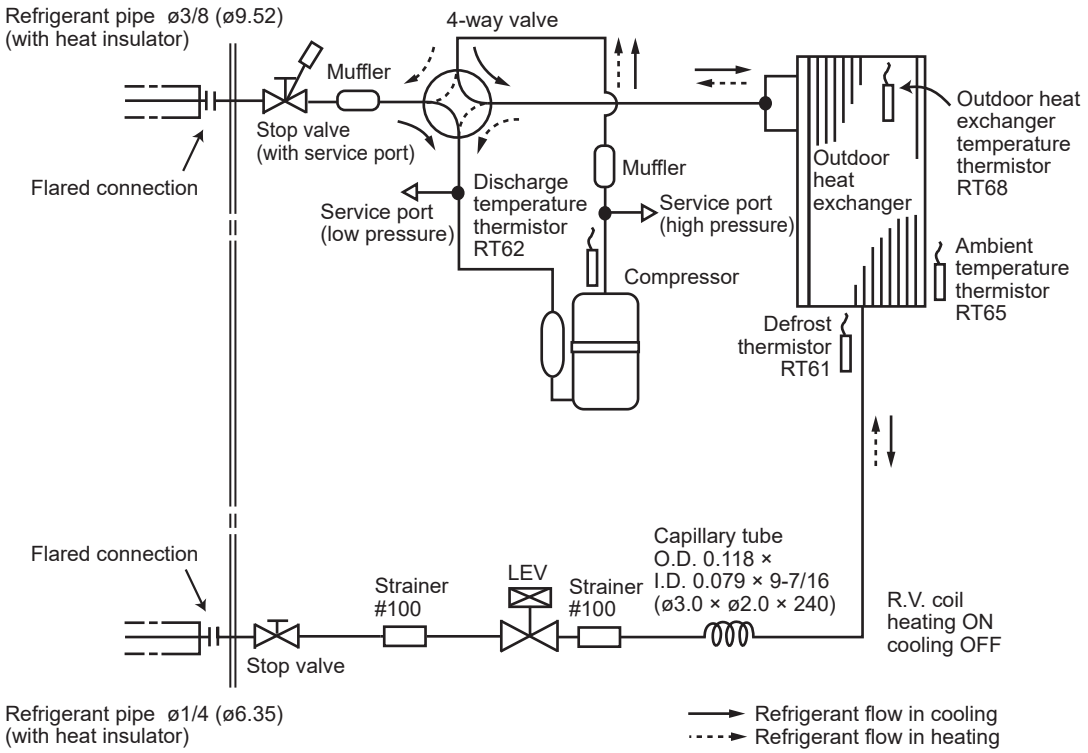


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CB1,CB2,CB3	SMOOTHING CAPACITOR	L	REACTOR	RT65	AMBIENT TEMP. THERMISTOR
CN61	CONNECTOR	LED	LED	RT68	OUTDOOR HEAT EXCHANGER TEMP. THERMISTOR
DB41	DIODE MODULE	LEV	EXPANSION VALVE COIL		
D3A,D3B	DIODE	MC	COMPRESSOR	TB1	TERMINAL BLOCK
F61	FUSE (25A 250V)	MF	FAN MOTOR	T801	TRANSFORMER
F62	FUSE (15A 250V)	PTC64,PTC65	CIRCUIT PROTECTION	X64,X601,X602	RELAY
F65,F66	FUSE (T6.3AL250V)	Q3A,Q3B	SWITCHING POWER TRANSISTOR	21S4	REVERSING VALVE COIL
F601,F880,F901	FUSE (T3.15AL250V)	RT61	DEFROST TEMP. THERMISTOR	26C	COMPRESSOR PROTECTOR
H	DEFROST HEATER (OPTION PARTS)	RT62	DISCHARGE TEMP. THERMISTOR	26H	HEATER PROTECTOR (OPTION PARTS)
IC700,IC932	POWER MODULE	RT64	FIN TEMP. THERMISTOR		

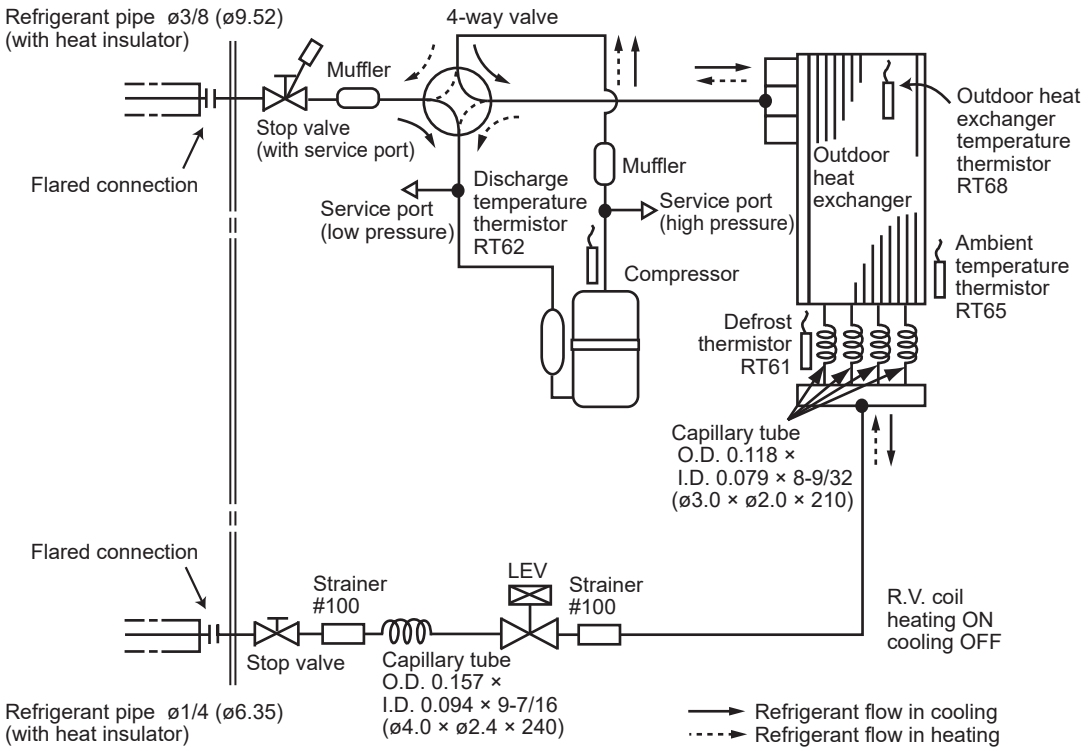
7 REFRIGERANT SYSTEM DIAGRAM

MUZ-HX09NL

Unit: Inch (mm)

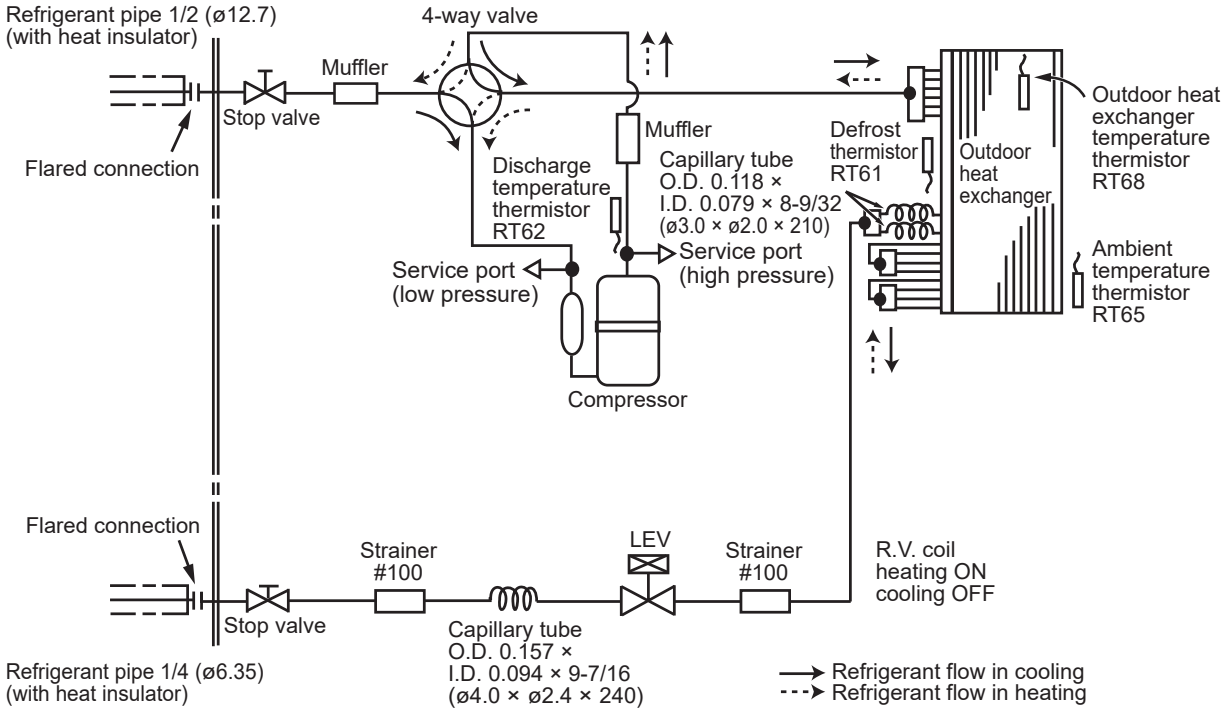


MUZ-HX12NL

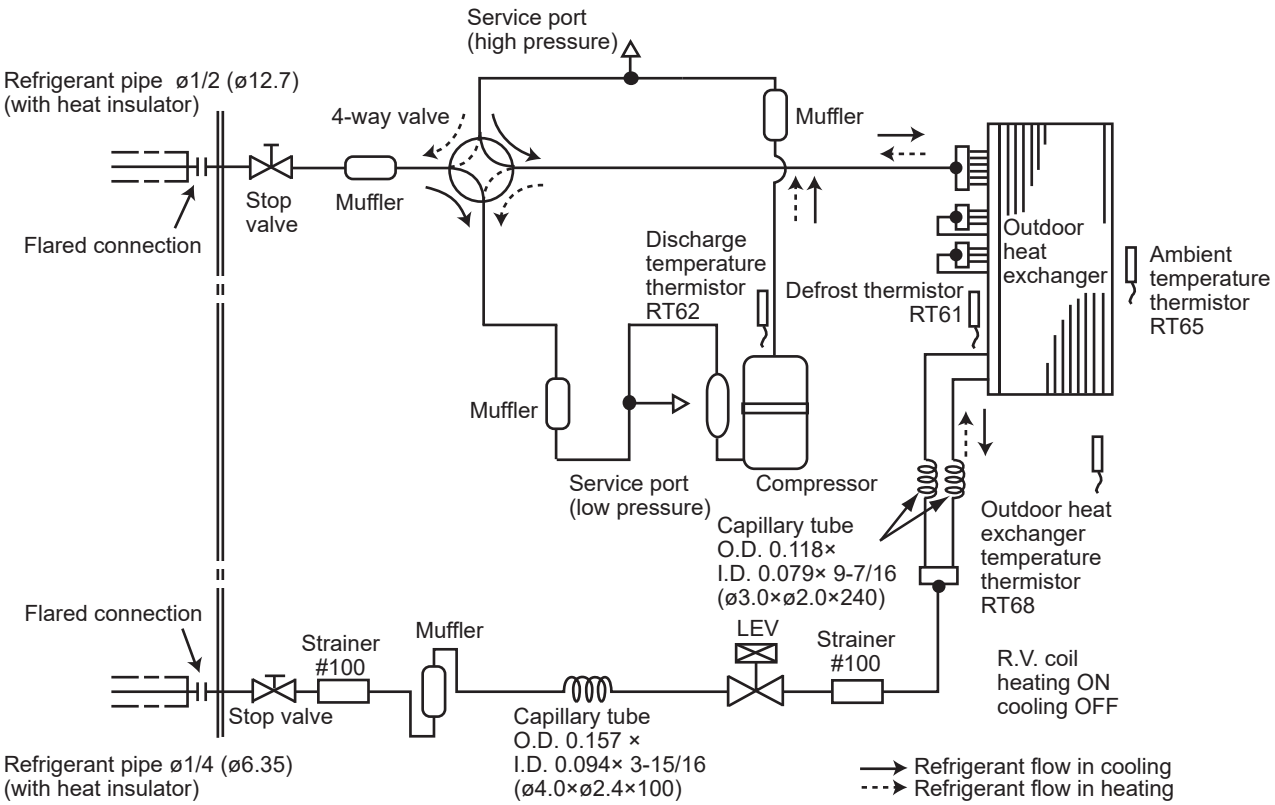


MUZ-HX18NL

Unit: Inch (mm)

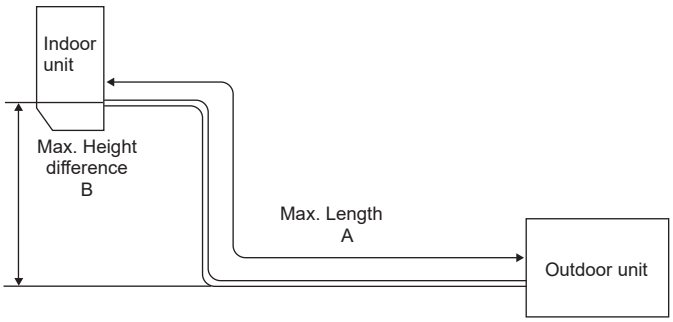


MUZ-HX24NL



MAX. REFRIGERANT PIPING LENGTH and MAX. HEIGHT DIFFERENCE

Model	Refrigerant piping: ft.		Piping size O.D: in.	
	Max. Length A	Max. Height difference B	Gas	Liquid
MUZ-HX09NL **MUZ-HX12NL**	65	40	3/8	1/4
MUZ-HX18NL	65	40	1/2	1/4
MUZ-HX24NL	100	50	1/2	1/4



MUZ-HX09NL MUZ-HX12NL MUZ-HX18NL MUZ-HX24NL

8-1. PERFORMANCE DATA

1) COOLING CAPACITY

Model	Indoor air IWB (˚F)	Outdoor intake air DB temperature (˚F) 75 TC	75 SHC	75 SHF	75 TPC	85 TC	85 SHC	85 SHF	85 TPC	95 TC	95 SHC	95 SHF	95 TPC
MUZ-HX09NL	71	11.0	7.4	0.67	0.64	10.3	6.9	0.67	0.70	9.7	6.5	0.67	0.76
	67	10.4	8.4	0.80	0.60	9.7	7.8	0.80	0.67	9.0	7.2	0.80	0.72
	63	9.8	9.2	0.93	0.58	9.1	8.5	0.93	0.64	8.5	7.9	0.93	0.69
MUZ-HX12NL	71	14.7	9.2	0.63	0.85	13.7	8.6	0.63	0.94	12.9	8.1	0.63	1.01
	67	13.9	10.6	0.76	0.81	13.0	9.8	0.76	0.89	12.0	9.1	0.76	0.96
	63	13.1	11.7	0.89	0.77	12.1	10.8	0.89	0.85	11.3	10.1	0.89	0.92
MUZ-HX18NL	71	21.1	13.6	0.65	1.22	19.7	12.7	0.65	1.34	18.5	12.0	0.65	1.44
	67	20.0	15.6	0.78	1.15	18.6	14.5	0.78	1.27	17.2	13.4	0.78	1.37
	63	18.7	17.1	0.91	1.10	17.4	15.9	0.91	1.21	16.2	14.8	0.91	1.31
MUZ-HX24NL	71	27.4	16.4	0.60	1.70	25.6	15.3	0.60	1.86	24.1	14.4	0.60	2.01
	67	26.0	19.0	0.73	1.60	24.2	17.7	0.73	1.77	22.4	16.4	0.73	1.91
	63	24.4	21.1	0.86	1.53	22.6	19.5	0.86	1.69	21.1	18.2	0.86	1.82

Model	Indoor air IWB (˚F)	Outdoor intake air DB temperature (˚F) 105 TC	105 SHC	105 SHF	105 TPC	115 TC	115 SHC	115 SHF	115 TPC
MUZ-HX09NL	71	9.0	6.0	0.67	0.80	8.3	5.5	0.67	0.83
	67	8.4	6.7	0.80	0.76	7.7	6.2	0.80	0.80
	63	7.7	7.2	0.93	0.73	7.0	6.6	0.93	0.76
MUZ-HX12NL	71	12.0	7.5	0.63	1.06	11.0	6.9	0.63	1.10
	67	11.2	8.5	0.76	1.02	10.3	7.8	0.76	1.07
	63	10.3	9.2	0.89	0.98	9.4	8.4	0.89	1.02
MUZ-HX18NL	71	17.2	11.1	0.65	1.51	15.8	10.2	0.65	1.58
	67	16.0	12.5	0.78	1.45	14.7	11.5	0.78	1.52
	63	14.7	13.4	0.91	1.40	13.4	12.3	0.91	1.45
MUZ-HX24NL	71	22.4	13.4	0.60	2.11	20.6	12.3	0.60	2.20
	67	20.8	15.2	0.73	2.02	19.2	14.0	0.73	2.12
	63	19.2	16.5	0.86	1.95	17.5	15.1	0.86	2.02

NOTE: 1. IWB : Intake air wet-bulb temperature TC : Total Capacity (×10³ Btu/h)
SHC : Sensible Heat Capacity (×10³ Btu/h) SHF : Sensible Heat Factor
TPC : Total Power Consumption (kW)
2. SHC is based on 80˚F of indoor Intake air DB temperature.
3. Data shown are estimated value. Performance may vary depending on operating conditions.

2) COOLING CAPACITY CORRECTIONS

Model	Refrigerant piping length (one way: ft.) 25 (std.)	40	65	100
MUZ-HX09NL	1.0	0.993	0.981	—
MUZ-HX12NL	1.0	0.987	0.967	—
MUZ-HX18NL	1.0	0.994	0.983	—
MUZ-HX24NL	1.0	0.996	0.990	0.982

3) HEATING CAPACITY CORRECTIONS

Model	Refrigerant piping length (one way: ft.) 25 (std.)	40	65	100
MUZ-HX09NL MUZ-HX12NL MUZ-HX18NL	1.0	0.997	0.993	—
MUZ-HX24NL	1.0	0.997	0.993	0.987

4) HEATING CAPACITY

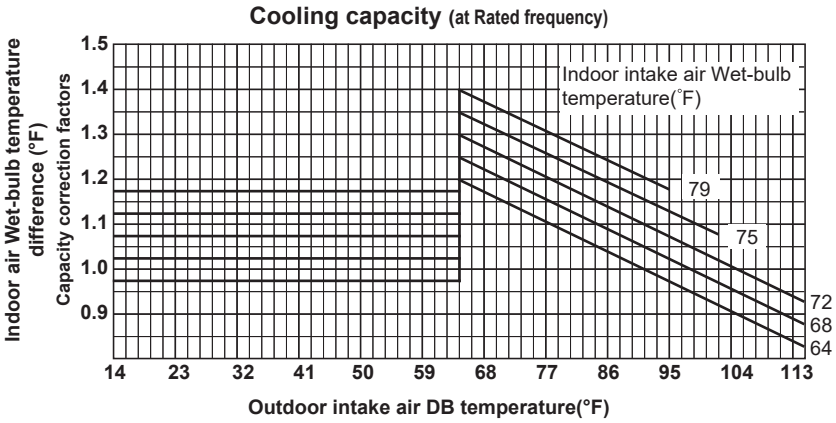
Model	Indoor air IDB (˚F)	Outdoor intake air WB temperature (˚F)													
		5		15		25		35		43		45		55	
		TC	TPC	TC	TPC	TC	TPC	TC	TPC	TC	TPC	TC	TPC	TC	TPC
MUZ-HX09NL	75	4.8	0.53	6.3	0.67	7.9	0.79	9.4	0.88	10.6	0.92	11.0	0.94	12.4	0.97
	70	5.2	0.51	6.7	0.65	8.2	0.77	9.6	0.86	10.9	0.90	11.2	0.92	12.7	0.95
	65	5.5	0.49	6.9	0.62	8.6	0.74	10.0	0.83	11.2	0.88	11.6	0.89	13.0	0.94
MUZ-HX12NL	75	5.4	0.58	7.1	0.74	8.8	0.87	10.6	0.97	11.9	1.01	12.3	1.03	13.9	1.07
	70	5.8	0.56	7.5	0.71	9.2	0.85	10.8	0.94	12.2	0.99	12.6	1.01	14.2	1.05
	65	6.1	0.53	7.7	0.68	9.6	0.82	11.2	0.92	12.6	0.97	12.9	0.98	14.5	1.03
MUZ-HX18NL	75	7.9	0.94	10.4	1.18	13.1	1.39	15.6	1.55	17.6	1.63	18.1	1.65	20.5	1.72
	70	8.6	0.90	11.1	1.14	13.5	1.36	15.9	1.51	18.0	1.59	18.5	1.62	21.0	1.69
	65	9.0	0.86	11.3	1.10	14.1	1.31	16.5	1.47	18.5	1.55	19.1	1.57	21.4	1.65
MUZ-HX24NL	75	11.4	1.48	15.1	1.86	18.9	2.19	22.5	2.44	25.4	2.56	26.1	2.60	29.6	2.70
	70	12.4	1.41	16.0	1.80	19.5	2.14	23.0	2.38	26.0	2.50	26.8	2.55	30.3	2.65
	65	13.0	1.35	16.4	1.73	20.4	2.06	23.8	2.31	26.8	2.44	27.6	2.48	30.9	2.60

NOTE: 1. IDB : Intake air dry-bulb temperature
TC : Total Capacity (x10^3 Btu/h) TPC : Total Power Consumption (kW)
2. Above data is for heating operation without any frost.
3. Data shown are estimated value. Performance may vary depending on operating conditions.

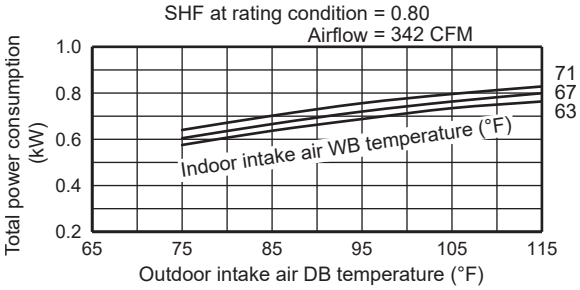
How to operate with fixed operational frequency of the compressor.

1. Press the emergency operation switch on the front of the indoor unit, and select either EMERGENCY COOL mode or EMERGENCY HEAT mode before starting to operate the air conditioner.
2. The compressor starts with operational frequency.
3. The fan speed of the indoor unit is High.
4. This operation continues for 30 minutes.
5. In order to release this operation, press the emergency operation switch twice or once, or press any button on the remote controller.

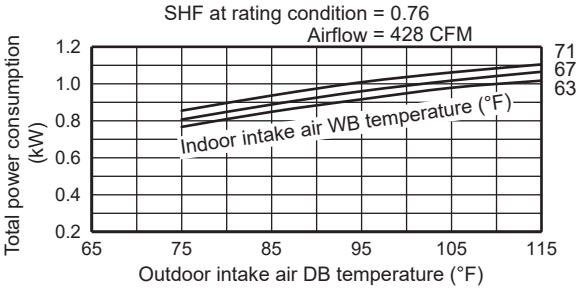
8-2. PERFORMANCE CURVE
Cooling (at Rated frequency)



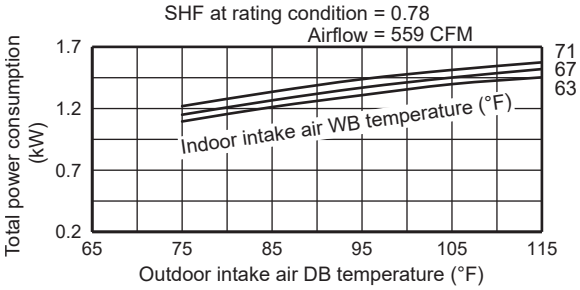
MUZ-HX09NL



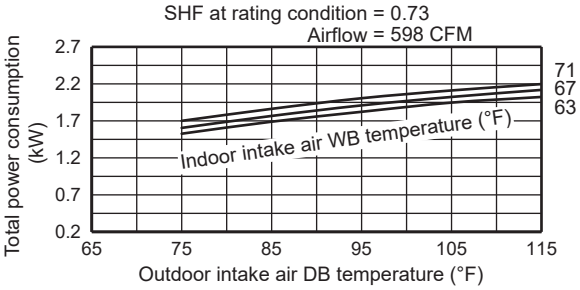
MUZ-HX12NL



MUZ-HX18NL



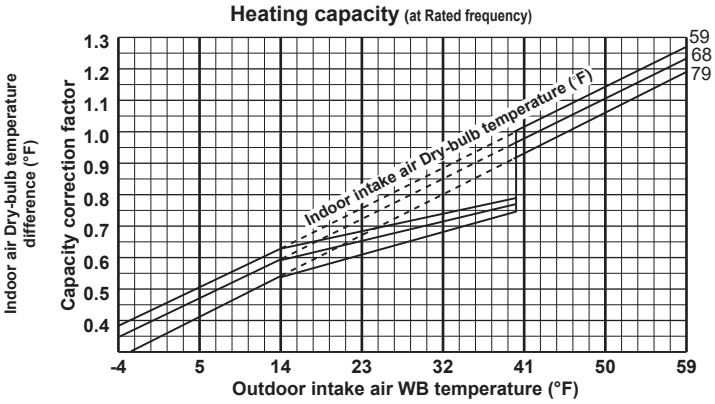
MUZ-HX24NL



This value of frequency is not the same as the actual frequency in operating. Refer to 8-5 and 8-6 for the relationships between frequency and capacity.

NOTE: Data shown are estimated value. Performance may vary depending on operating conditions.

Heating (at Rated frequency)



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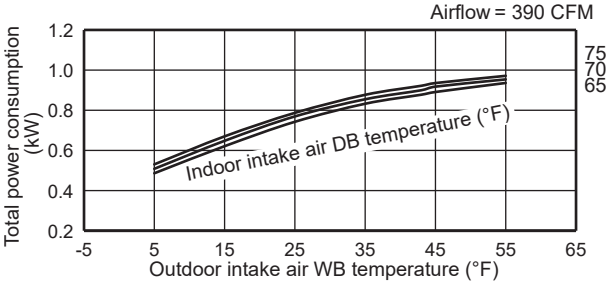
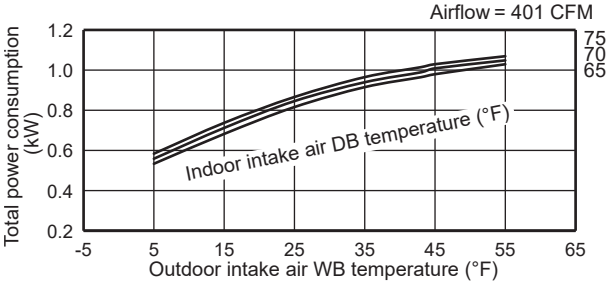
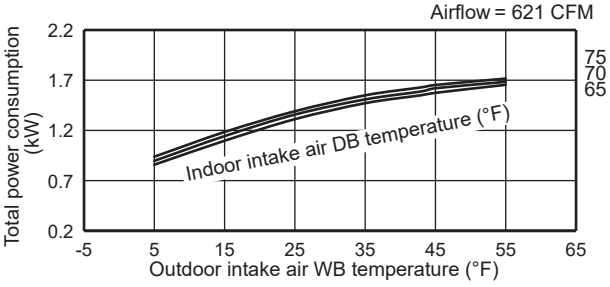


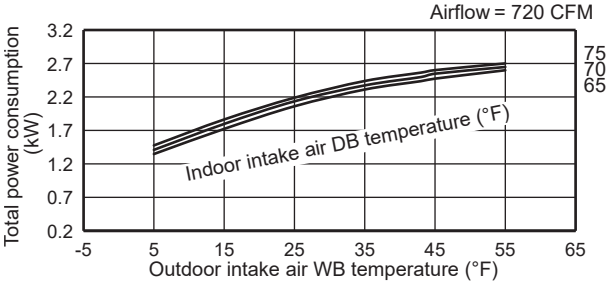
MUZ-HX12NL



MUZ-HX18NL



MUZ-HX24NL



This value of frequency is not the same as the actual frequency in operating. Refer to 8-5 and 8-6 for the relationships between frequency and capacity.

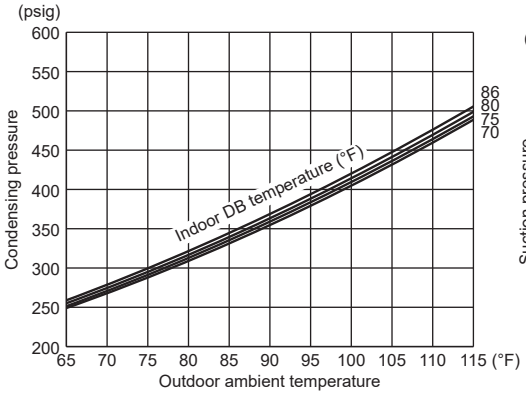
NOTE: Data shown are estimated value. Performance may vary depending on operating conditions.

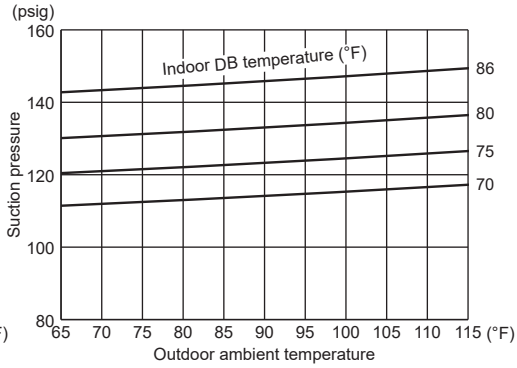
8-3. CONDENSING PRESSURE

Cooling

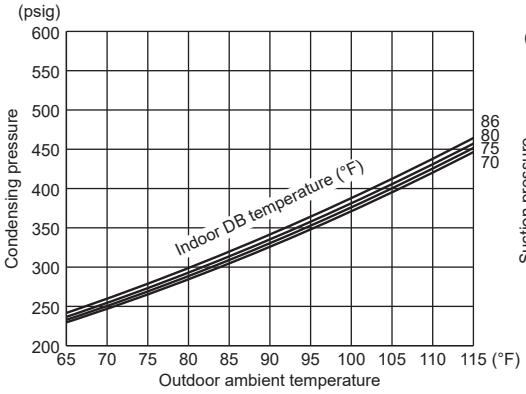
Data are based on the condition of indoor humidity 50 %.
Air flow should be set to High speed.

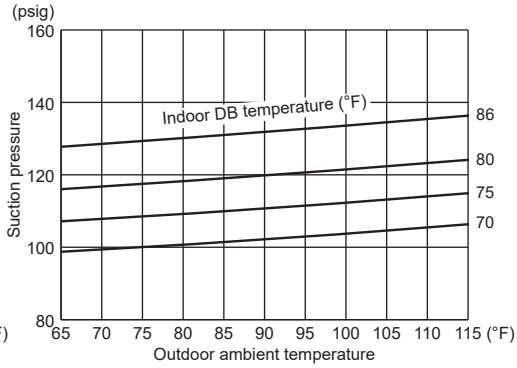
MUZ-HX09NL



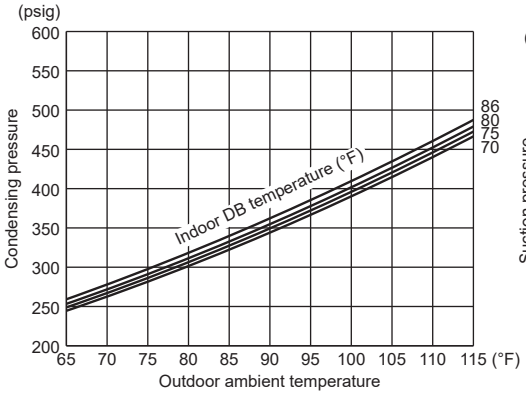


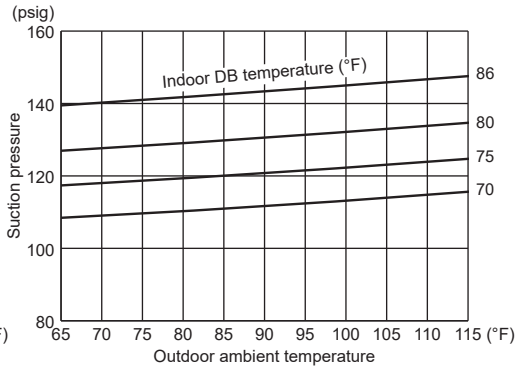
MUZ-HX12NL



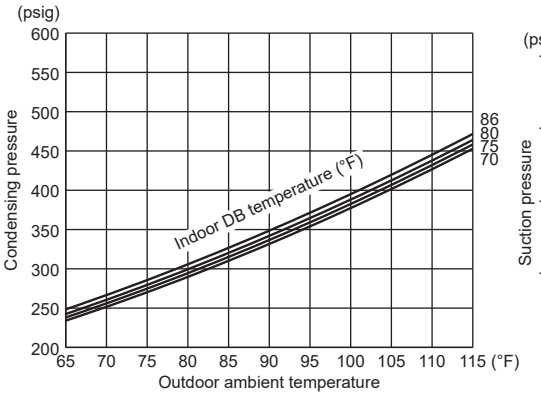


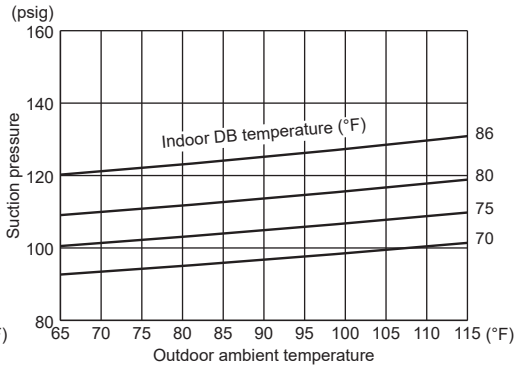
MUZ-HX18NL





MUZ-HX24NL



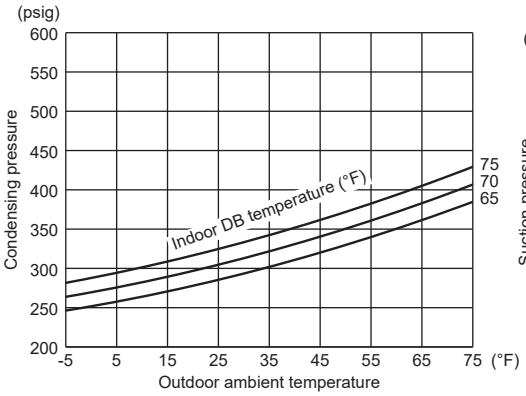


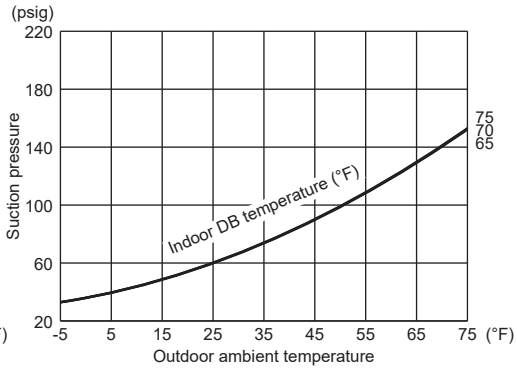
NOTE: Data shown are estimated value. Performance may vary depending on operating conditions.

Heating

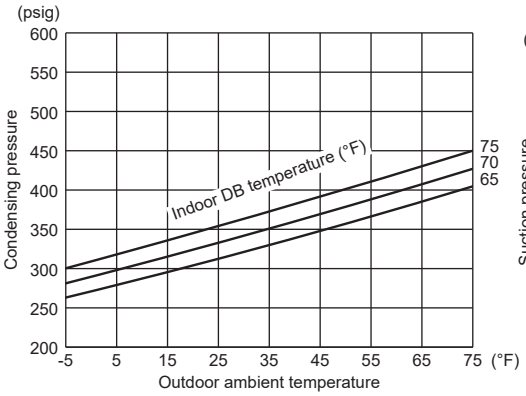
Data are based on the condition of outdoor humidity 75%.
Air flow should be set to High speed.
Data are for heating operation without any frost.

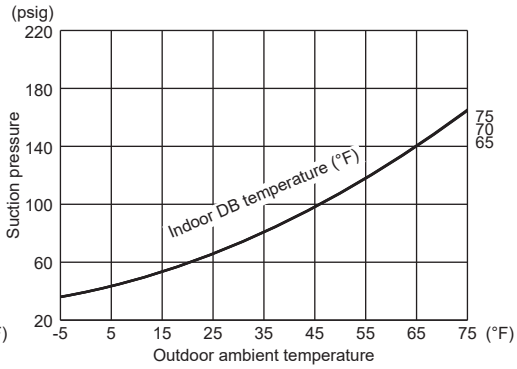
MUZ-HX09NL



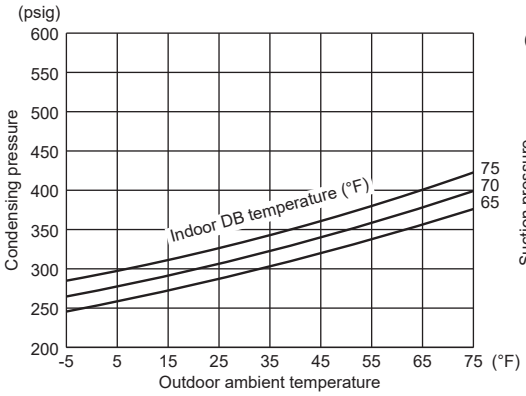


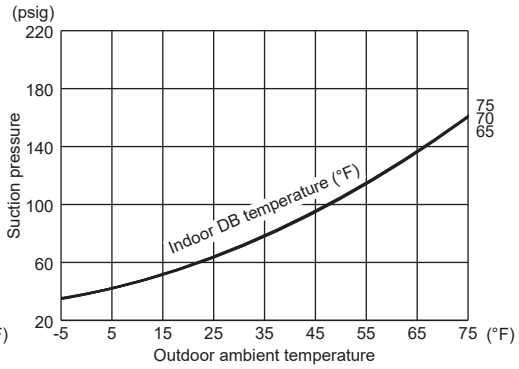
MUZ-HX12NL



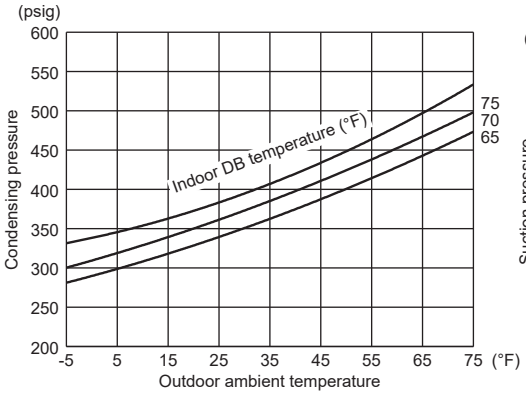


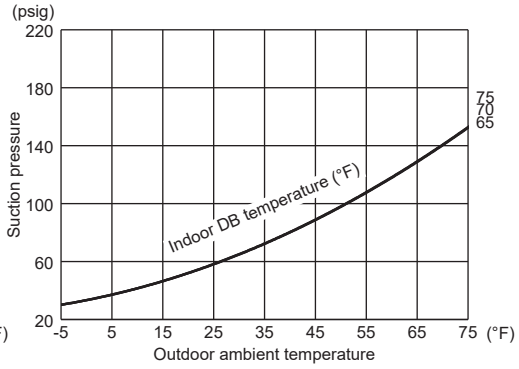
MUZ-HX18NL





MUZ-HX24NL





NOTE: 1. Press the emergency operation switch on the front of the indoor unit, and select either EMERGENCY COOL mode or EMERGENCY HEAT mode before starting to operate the air conditioner.
2. The compressor starts with operational frequency.
3. The fan speed of the indoor unit is High.
4. This operation continues for 30 minutes.
5. In order to release this operation, press the emergency operation switch twice or once, or press any button on the remote controller.
6. Data shown are estimated value. Performance may vary depending on operating conditions.

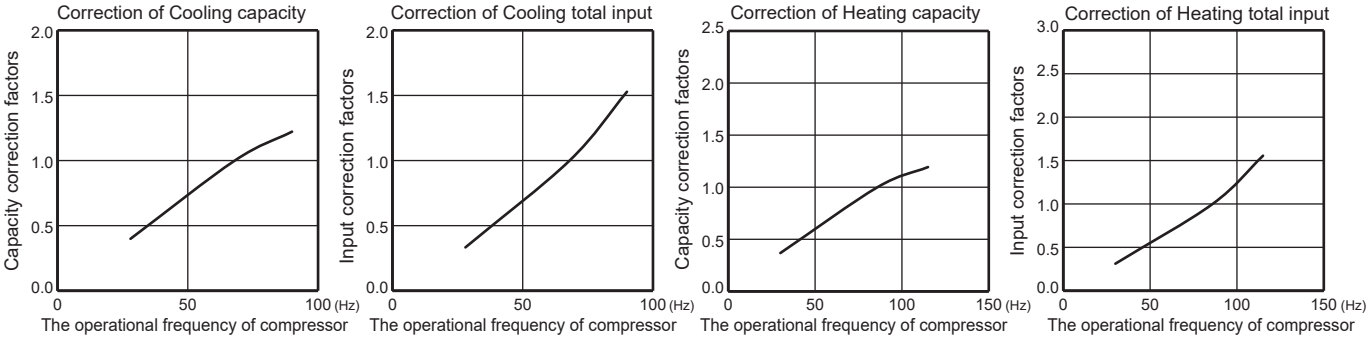
8-4. STANDARD OPERATION DATA

Model				MSZ-HX09NL		MSZ-HX12NL	
Item			Unit	COOL	HEAT	COOL	HEAT
Total	Capacity		Btu/h	9,000	10,900	12,000	12,200
	SHF		—	0.8	—	0.76	—
	Input		kW	0.72	0.9	0.96	0.99
	Rated frequency		Hz	68	86	50	48
Electrical circuit	Indoor unit			**MSZ-HX09NL**		**MSZ-HX12NL**	
	Power supply		V, phase, Hz	208/230, 1, 60		208/230, 1, 60	
	Input		kW	0.018	0.019	0.031	0.020
	Fan motor current		A	0.20/0.18	0.21/0.19	0.33/0.30	0.23/0.20
	Outdoor unit			**MUZ-HX09NL**		**MUZ-HX12NL**	
	Power supply		V, phase, Hz	208/230, 1, 60		208/230, 1, 60	
	Input		kW	0.702	0.881	0.929	0.970
	Comp. current		A	3.45/3.12	3.97/3.59	4.17/3.77	4.12/3.73
	Fan motor current		A	0.22/0.20	0.27/0.24	0.33/0.30	0.32/0.29
Refrigerant circuit	Condensing pressure		psig	390	342	360	373
	Suction pressure		psig	134	93	123	102
	Discharge temperature		°F	175	179	168	174
	Condensing temperature		°F	121	111	115	118
	Suction temperature		°F	58	40	51	36
	Comp. shell bottom temperature		°F	173	184	154	158
	Ref. pipe length		ft.	25		25	
	Refrigerant charge (R454B)			1 lbs. 6 oz		2 lbs. 2 oz	
Indoor unit	Intake air temperature	DB	°F	80	70	80	70
		WB	°F	67	60	67	60
	Discharge air temperature	DB	°F	59	99	62	99
		WB	°F	58	—	61	—
	Fan speed		rpm	980	1,000	1,160	1,020
	Airflow		CFM	342 (wet)	390	428 (wet)	401
Outdoor unit	Intake air temperature	DB	°F	95	47	95	47
		WB	°F	—	43	—	43
	Fan speed		rpm	770	850	910	900
	Airflow		CFM	1,031	1,141	1,166	1,152

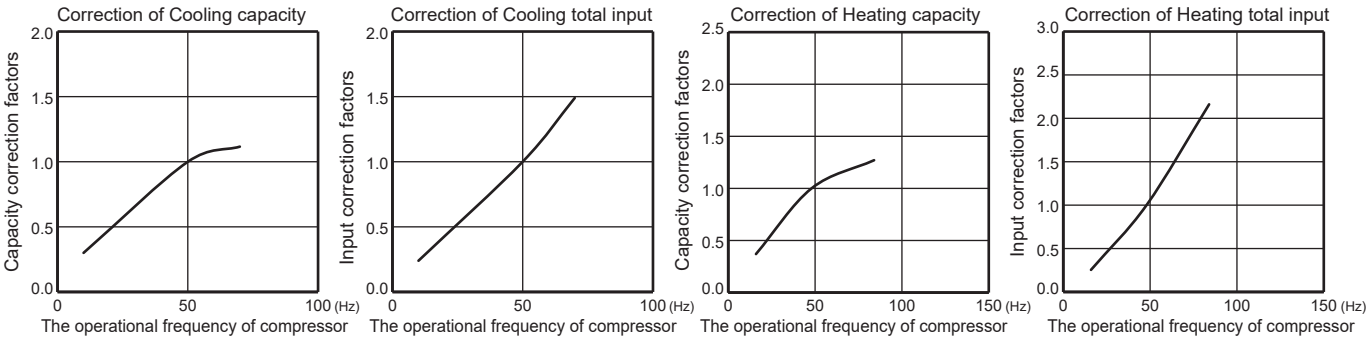
Model				MSZ-HX18NL		MSZ-HX24NL	
Item			Unit	COOL	HEAT	COOL	HEAT
Total	Capacity		Btu/h	17,200	18,000	22,400	26,000
	SHF		—	0.78	—	0.73	—
	Input		kW	1.37	1.59	1.91	2.50
	Rated frequency		Hz	67	71	77	84
Electrical circuit	Indoor unit			**MSZ-HX18NL**		**MSZ-HX24NL**	
	Power supply		V, phase, Hz	208/230, 1, 60		208/230, 1, 60	
	Input		kW	0.038	0.038	0.046	0.058
	Fan motor current		A	0.38/0.34	0.38/0.34	0.44/0.40	0.54/0.49
	Outdoor unit			**MUZ-HX18NL**		**MUZ-HX24NL**	
	Power supply		V, phase, Hz	208/230, 1, 60		208/230, 1, 60	
	Input		kW	1.332	1.552	1.864	2.442
	Comp. current		A	5.77/5.22	5.62/5.08	7.96/7.20	9.77/8.84
	Fan motor current		A	0.25/0.23	0.25/0.23	0.93/0.84	0.93/0.84
Refrigerant circuit	Condensing pressure		psig	376	339	361	412
	Suction pressure		psig	131	99	116	91
	Discharge temperature		°F	169	169	169	204
	Condensing temperature		°F	118	111	115	125
	Suction temperature		°F	54	38	46	40
	Comp. shell bottom temperature		°F	156	153	159	188
	Ref. pipe length		ft.	25		25	
	Refrigerant charge (R454B)			2 lbs. 8 oz		3 lbs.	
Indoor unit	Intake air temperature	DB	°F	80	70	80	70
		WB	°F	67	60	67	60
	Discharge air temperature	DB	°F	59	100	56	110
		WB	°F	58	—	55	—
	Fan speed		rpm	1,110	1,110	1,170	1,250
	Airflow		CFM	559 (wet)	621	597 (wet)	720
Outdoor unit	Intake air temperature	DB	°F	95	47	95	47
		WB	°F	—	43	—	43
	Fan speed		rpm	790	790	800	800
	Airflow		CFM	1,321	1,321	1,934	1,934

8-5. CAPACITY AND INPUT CORRECTION BY INVERTER OUTPUT FREQUENCY

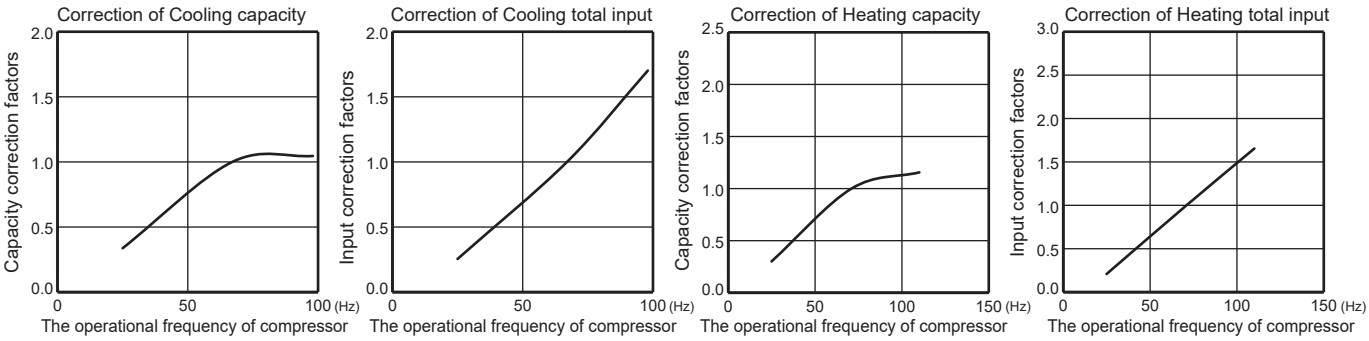
MUZ-HX09NL



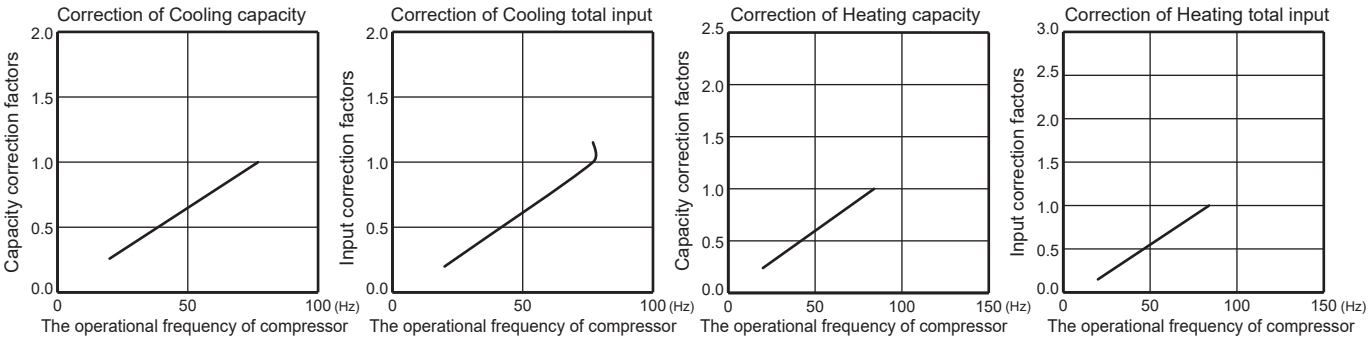
MUZ-HX12NL



MUZ-HX18NL



MUZ-HX24NL



NOTE: 1. Data shown are estimated value. Performance may vary depending on operating conditions.
2. Conditions are based on AHRI 210/240.
Rating conditions (Cooling) — Indoor: 80˚FDB, 67˚FWB, Outdoor: 95˚FDB, (75˚FWB)
(Heating) — Indoor: 70˚FDB, 60˚FWB, Outdoor: 47˚FDB, 43˚FWB

8-6. HOW TO OPERATE FIXED-FREQUENCY OPERATION (Test run operation)

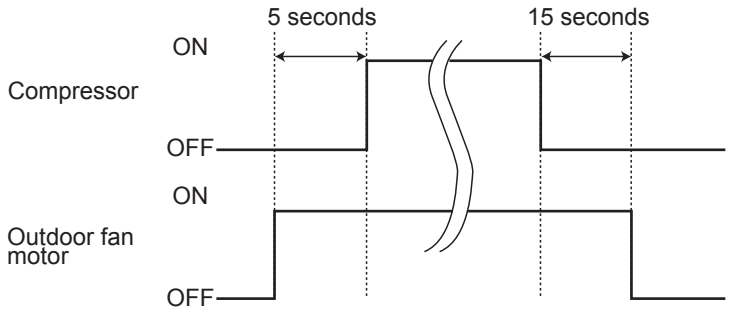
1. Press the emergency operation switch to start COOL or HEAT mode (COOL: Press once, HEAT: Press twice).
2. Test run operation starts and continues to operate for 30 minutes.
3. Compressor operates at rated frequency in COOL mode or 58 Hz **(HX09/12/24)**/55Hz **(HX18)** in HEAT mode.
4. Indoor fan operates at High speed.
5. After 30 minutes, test run operation finishes and EMERGENCY OPERATION starts (operation frequency of compressor varies).
6. To cancel test run operation (EMERGENCY OPERATION), press the emergency operation switch or any button on remote controller.

9 ACTUATOR CONTROL

MUZ-HX09NL MUZ-HX12NL MUZ-HX18NL MUZ-HX24NL

9-1. OUTDOOR FAN MOTOR CONTROL

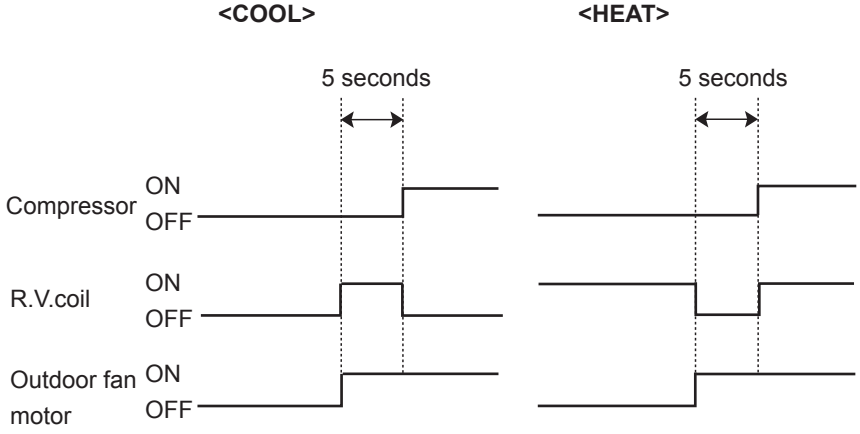
The fan motor turns ON/OFF, interlocking with the compressor.
[ON] The fan motor turns ON 5 seconds before the compressor starts up.
[OFF] The fan motor turns OFF 15 seconds after the compressor has stopped running.



9-2. R.V. COIL CONTROL

Heating · · · · · · · · · · · · · · · · · ON
Cooling · · · · · · · · · · · · · · · · · OFF
Dry · OFF

NOTE: The 4-way valve reverses for 5 seconds right before startup of the compressor.



9-3. RELATION BETWEEN MAIN SENSOR AND ACTUATOR

Sensor	Purpose	Actuator				
		Compressor	LEV	Outdoor fan motor	R.V.coil	Indoor fan motor
Discharge temperature thermistor	Protection	○	○			
Indoor coil temperature thermistor	Cooling: Coil frost prevention	○				
	Heating: High pressure protection	○	○			
Defrost thermistor	Heating: Defrosting	○	○	○	○	○
Fin temperature thermistor	Protection	○		○		
Ambient temperature thermistor	Cooling: Low ambient temperature operation	○	○	○		
Outdoor heat exchanger temperature thermistor	Cooling: Low ambient temperature operation	○	○	○		
	Cooling: High pressure protection	○	○	○		

10 SERVICE FUNCTIONS

MUZ-HX09NL MUZ-HX12NL MUZ-HX18NL MUZ-HX24NL

10-1. CHANGE IN DEFROST SETTING

Changing defrost finish temperature

<JS> To change the defrost finish temperature, cut/solder the JS wire of the outdoor inverter P.C. board (Refer to 11-6.1.).

Jumper		Defrost finish temperature	
		MUZ-HX09/12/18NL	**MUZ-HX24NL**
JS	Soldered (Initial setting)	46°F (8°C)	50°F (10°C)
	None (Cut)	55°F (13°C)	59°F (15°C)

10-2. PRE-HEAT CONTROL SETTING

Prolonged low load operation, in which the thermostat is OFF for a long time, at low outside temperature [32°F (0°C) or less] may cause the following troubles. To prevent those troubles, activate the pre-heat control.

1) If moisture gets into the refrigerant cycle and freezes, it may interfere the startup of the compressor.
2) If liquid refrigerant collects in the compressor, a failure in the compressor may occur.

The pre-heat control turns ON when the compressor temperature is 68°F (20°C) or below. When the pre-heat control turns ON, the compressor is energized. (About 70 W)

Pre-heat control setting

<JK>

ON: To activate the pre-heat control, cut JK wire of the inverter P.C. board.

OFF: To deactivate the pre-heat control, solder JK wire of the inverter P.C. board.

(Refer to 11-6.1)

Jumper		Pre-heat control setting
JK	Soldered	Deactivated (Initial setting)
	Cut	Activated

NOTE: When the inverter P.C. board is replaced, check the jumper wires, and cut/solder them if necessary.

11 TROUBLESHOOTING

MUZ-HX09NL MUZ-HX12NL MUZ-HX18NL MUZ-HX24NL

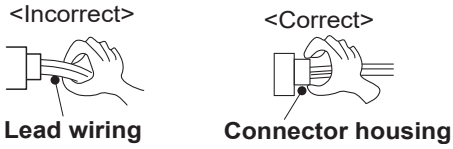
11-1. CAUTIONS ON TROUBLESHOOTING

1. Before troubleshooting, check the following

1) Check the power supply voltage.
2) Check the indoor/outdoor connecting wire for miswiring.

2. Take care of the following during servicing

1) Before servicing the air conditioner, be sure to turn OFF the main unit first with the remote controller, then after confirming the horizontal vane is closed, turn off the breaker and/or disconnect the power plug.
2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
3) When removing the electrical parts, be careful of the residual voltage of smoothing capacitor.
4) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
5) When connecting or disconnecting the connectors, hold the connector housing. DO NOT pull the lead wires.



3. Troubleshooting procedure

1) Check if the OPERATION INDICATOR lamp on the indoor unit is blinking on and off to indicate an abnormality.
   To make sure, check how many times the OPERATION INDICATOR lamp is blinking on and off before starting service work.
2) Before servicing, verify that all connectors and terminals are connected properly.
3) When the electronic control P.C. board seems to be defective, check for disconnection of the copper foil pattern and burnt or discolored components.
4) Refer to 11-2 and 11-3.

11-2. FAILURE MODE RECALL FUNCTION AND ERROR CODE DISPLAY MODE

Outline of the function

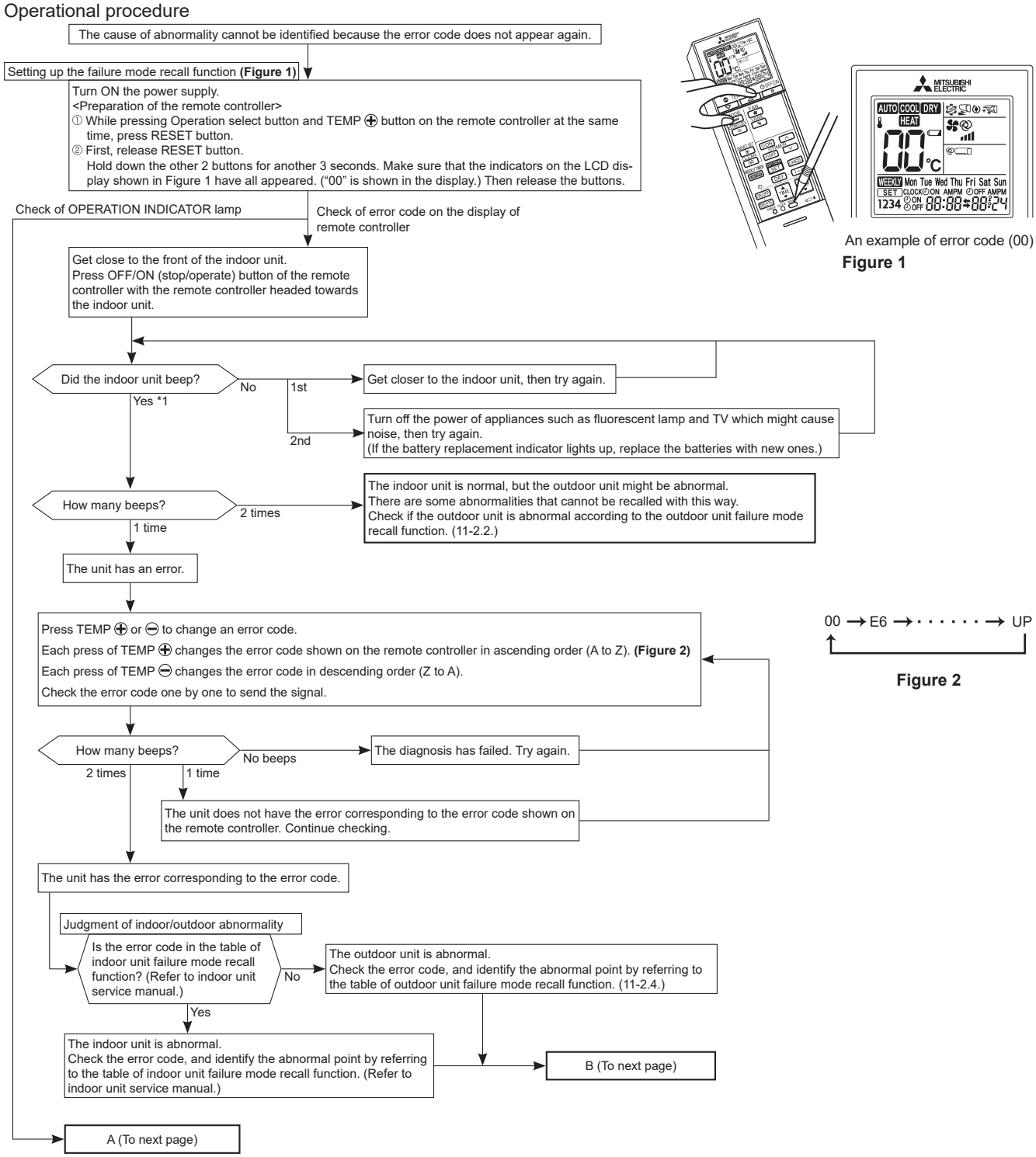
This air conditioner can memorize the failure which has occurred last time.

Even though LED indication listed on the troubleshooting check table (11-3.) disappears, the memorized failure can be recalled.

Also, error code can be checked on the display of remote controller while the left/upper operation indicator lamp on the indoor unit is blinking.

1. Flow chart of failure mode recall function for the indoor/outdoor unit

Operational procedure



An example of error code (00)

Figure 1

Figure 2

A (From previous page)

Press OFF/ON (stop/operate) button of the remote controller with the remote controller headed towards the indoor unit. *1.

Does the left/upper OPERATION INDICATOR lamp on the indoor unit blink at the interval of 0.5 seconds?

No (OFF) → The indoor unit is normal, but the outdoor unit might be abnormal. There are some abnormalities that cannot be recalled with this way. Check if the outdoor unit is abnormal according to the outdoor unit failure mode recall function. (11-2-2.)

NOTE: It takes up to 1 minute to indicate the outdoor unit abnormality. Even if the OPERATION INDICATOR lamp is not blinking, keep checking at least 1 minute or longer.

Yes (Blinks)

Judgment of indoor/outdoor abnormality

Before blinking, does the left/upper OPERATION INDICATOR lamp stay ON for 3 seconds?

Yes → The outdoor unit is abnormal. Check the blinking pattern, and identify the abnormal point by referring to the table of outdoor unit failure mode recall function. (11-2-4.) Make sure to check at least 2 consecutive blinking cycles. *3

No → The indoor unit is abnormal. Check the blinking pattern, and identify the abnormal point by referring to the table of indoor unit failure mode recall function. (Refer to the indoor unit service manual.) Make sure to check at least 2 consecutive blinking cycles. *2

B (From previous page)

Releasing the failure mode recall function

Release the failure mode recall function by the following procedures.
Turn OFF the power supply and turn it ON again.
Press RESET button of the remote controller.

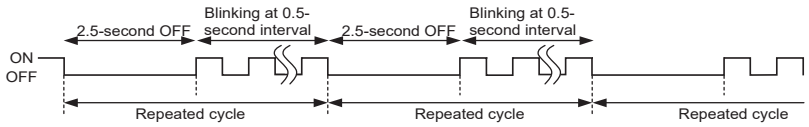
Repair the failure parts.

Deleting the memorized abnormal condition

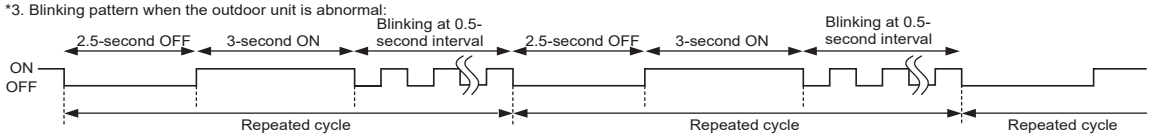
① After repairing the unit, recall the failure mode again according to “Setting up the failure mode recall function” mentioned above.
② Press OFF/ON (stop/operate) button of the remote controller with the remote controller headed towards the indoor unit.
③ Press the emergency operation switch so that the memorized abnormal condition is deleted.
④ Release the failure mode recall function according to “Releasing the failure mode recall function” mentioned above.

NOTE: 1. Make sure to release the failure mode recall function after it is set up, otherwise the unit cannot operate properly.
2. If the abnormal condition is not deleted from the memory, the last abnormal condition is kept memorized.

*1. Regardless of normal or abnormal condition, 2 short beeps are emitted once the signal is received.
*2. Blinking pattern when the indoor unit is abnormal:



*3. Blinking pattern when the outdoor unit is abnormal:



2. Flow chart of the outdoor unit failure mode recall function

Operational procedure

The outdoor unit might be abnormal.
Check if the outdoor unit is abnormal according to the following procedures.

Make sure that the remote controller is set to the failure mode recall function.

Get close to the front of the indoor unit. With the remote controller headed towards the indoor unit, press button to set the indicator shown in Figure 1 to 25. *1 **(Figure 1)**

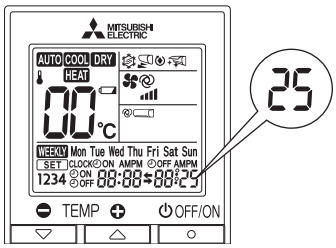


Figure 1

Check of OPERATION INDICATOR lamp

Check of error code on the display of remote controller

"00" is shown in the display. **(Figure 1)**

How many beeps?

- 2 times → Does the left/upper OPERATION INDICATOR lamp on the indoor unit blink at the interval of 0.5 seconds? *2
- 1 time → The outdoor unit has an error.

00 → E8 → · · · · · · → UP

Figure 2

Press TEMP ⊕ or ⊖ to change an error code.
Each press of TEMP ⊕ changes the error code shown on the remote controller in ascending order (A to Z). **(Figure 2)**
Each press of TEMP ⊖ changes the error code in descending order (Z to A).
Check the error code one by one to send the signal.

How many beeps?

- No beeps → The diagnosis has failed. Try again.
- 1 time → The unit does not have the error corresponding to the error code shown on the remote controller. Continue checking.
- 2 times → The unit has the error corresponding to the error code.

The unit has the error corresponding to the error code.

The outdoor unit is abnormal.
Check the error code, and identify the abnormal point by referring to the table of outdoor unit failure mode recall function (11-2.4.).

→ A (To next page)

Does the left/upper OPERATION INDICATOR lamp on the indoor unit blink at the interval of 0.5 seconds? *2

- No (OFF) → The outdoor unit is normal.
- Yes (Blinks) →

The outdoor unit is abnormal.
Check the blinking pattern, and identify the abnormal point by referring to the table of outdoor unit failure mode recall function (11-2.4.).
Make sure to check at least 2 consecutive blinking cycles. *2

A (To next page)

A (From previous page)

Releasing the failure mode recall function

Release the failure mode recall function by the following procedures.
Turn OFF the power supply and turn it ON again.
Press RESET button of the remote controller.

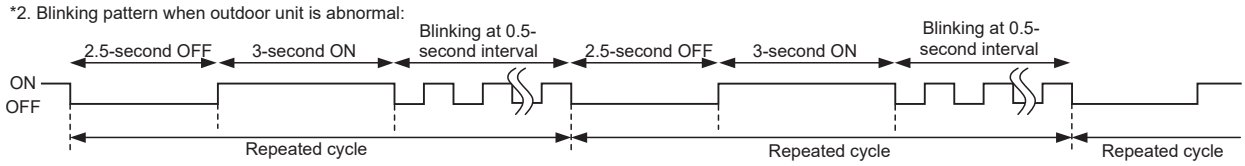
Repair the failure parts.

Deleting the memorized abnormal condition

① After repairing the unit, recall the failure mode again according to “Setting up the failure mode recall function” (11-2.1.).
② Press STOP/OPERATE (OFF/ON) button of the remote controller with the remote controller headed towards the indoor unit.
③ Press EMERGENCY OPERATION switch so that the memorized abnormal condition is deleted.
④ Release the failure mode recall function according to “Releasing the failure mode recall function” mentioned above.

NOTE: 1. Make sure to release the failure mode recall function after it is set up, otherwise the unit cannot operate properly.
2. If the abnormal condition is not deleted from the memory, the last abnormal condition is kept memorized.

*1. Regardless of normal or abnormal condition, 2 short beeps are emitted once the signal is received.
*2. Blinking pattern when outdoor unit is abnormal:



3. Flow chart of error code display mode

This explains how customers can check the error code on their own.
This is included in OPERATING INSTRUCTIONS.

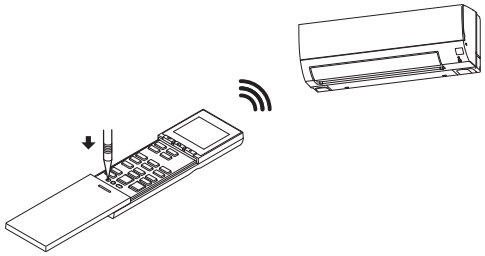


Figure 1

Operational procedure

The remote controller is powered OFF.

Get close to the front of the indoor unit. Point the remote controller at the receiving section of the indoor unit, and keep pressing CHECK with a fine-tipped object unil the beeps. **(Figure 1)**
"00" is shown in the display. **(Figure 2)**

Did the indoor unit beep?

- No, 1st → Get closer to the indoor unit, then try again.
- No, 2nd → Turn off the power of appliances such as fluorescent lamp and TV which might cause noise, then try again.
(If the battery replacement indicator lights up, replace the batteries with new ones.)
- Yes ↓

How many beeps?

- 2 times → The indoor unit is normal, but the outdoor unit might be abnormal. There are some abnormalities that cannot be recalled with this way. Check if the outdoor unit is abnormal according to the outdoor unit failure mode recall function. (11-2.2.)
- 1 time ↓

The unit has an error.

Press TEMP ⊕ or ⊖ to change an error code.
Each press of TEMP ⊕ changes the error code shown on the remote controller in ascending order (A to Z).
(Figure 3)
Each press of TEMP ⊖ changes the error code in descending order (Z to A).
Check the error code one by one to send the signal.

How many beeps?

- No beeps → The diagnosis has failed. Try again.
- 1 time → The unit does not have the error corresponding to the error code shown on the remote controller. Continue checking.
- 2 times ↓

The unit has the error corresponding to the error code.

Refer to the error code on the table of indoor unit failure mode recall function (refer to indoor unit service manual) or the table of outdoor unit failure mode recall function (11-2.4).

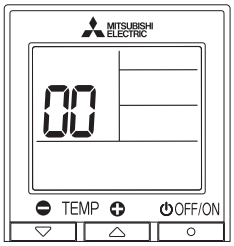


Figure 2

NOTE: Even though the air conditioner operates normally, the memorized indication for the last error appears if it has not been deleted.

00 → E6 → · · · · · · → UP

Figure 3

4. Table of outdoor unit failure mode recall function

OPERATION INDICATOR lamp (Indoor unit)	Error code	Abnormal point (Failure mode/protection)	LED indication (Outdoor P.C. board)	Condition	Remedy	Indoor/outdoor unit failure mode recall function	Outdoor unit failure mode recall function
Not blink	00	None (Normal)	—	—	—	—	—
1-time blink 2.5 seconds OFF	E8	Indoor/outdoor communication, receiving error	—	Any signals from the inverter P.C. board cannot be received normally for 3 minutes.	• Refer to 11-5.Ⓜ "How to check miswiring and serial signal error".	○	○
	E9	Indoor/outdoor communication, receiving error	—	Although the inverter P.C. board sends signal "0", signal "1" has been received 30 consecutive times.	• Refer to 11-5.Ⓜ "How to check miswiring and serial signal error".		
	EC	Indoor/outdoor communication, start-up process abnormality	—	The start-up process of the outdoor unit does not complete for 4 minutes.	• Replace the indoor electronic control P.C. board.		
2-time blink 2.5 seconds OFF	UP	Outdoor power system	—	Overcurrent protection cut-out operates 3 consecutive times within 1 minute after the compressor gets started.	• Reconnect connectors. • Refer to 11-5.Ⓐ "How to check inverter/ compressor". • Check stop valve.	○	○
3-time blink 2.5 seconds OFF	U3	Discharge temperature thermistor	1-time blink every 2.5 seconds	Thermistor shorts or opens during compressor running.	• Refer to 11-5.Ⓖ "Check of outdoor thermistors". Defective outdoor thermistors can be identified by checking the blinking pattern of LED.	○	○
	U4	Defrost thermistor					
		Ambient temperature	2-time blink 2.5 seconds OFF				
		Fin temperature thermistor	3-time blink 2.5 seconds OFF				
		Outdoor heat exchanger temperature thermistor	—				
		P.C. board temperature thermistor	4-time blink 2.5 seconds OFF		• Replace the inverter P.C. board.		
4-time blink 2.5 seconds OFF	UF	Overcurrent	11-time blink 2.5 seconds OFF	Large current flows into power module (IC700).	• Reconnect compressor connector. • Refer to 11-5.Ⓐ "How to check inverter/ compressor". • Check stop valve.	—	○
		Compressor synchronous abnormality	12-time blink 2.5 seconds OFF	Waveform of compressor current is distorted.	• Reconnect compressor connector. • Refer to 11-5.Ⓐ "How to check inverter/ compressor".	—	○
		Compressor start-up failure protection	13-time blink 2.5 seconds OFF	Overcurrent cutoff within 10 seconds after activating the compressor.		—	○
5-time blink 2.5 seconds OFF	U2	Discharge temperature	—	Temperature of discharge temperature thermistor exceeds 116°C, compressor stops. Compressor can restart if discharge temperature thermistor reads 100°C or less 3 minutes later.	• Check refrigerant circuit and refrigerant amount. • Refer to 11-5.Ⓚ "Check of LEV".	—	○
6-time blink 2.5 seconds OFF	Ud	High pressure	—	Temperature of outdoor heat exchanger temperature thermistor exceeds 70°C in COOL mode.	• Check refrigerant circuit and refrigerant amount. • Check stop valve.	—	○
7-time blink 2.5 seconds OFF	U5	Fin temperature	7-time blink 2.5 seconds OFF	Temperature of fin temperature thermistor on the inverter P.C. board exceeds 75 – 86°C, or temperature of P.C. board temperature thermistor on the inverter P.C. board exceeds 72 – 85°C.	• Check around outdoor unit. • Check outdoor unit air passage. • Refer to 11-5.Ⓘ "Check of outdoor fan motor".	—	○
	Ub	P.C. board temperature					
8-time blink 2.5 seconds OFF	U8	Outdoor fan motor	—	Outdoor fan has stopped 3 times in a row within 30 seconds after outdoor fan start-up.	• Refer to 11-5.Ⓘ "Check of outdoor fan motor". Refer to 11-5.Ⓛ "Check of inverter P.C. board".	—	○

NOTE: Blinking patterns of this mode differ from the ones of TROUBLESHOOTING CHECK TABLE (11-3.).

NOTE: Blinking patterns of this mode differ from the ones of TROUBLESHOOTING CHECK TABLE (11-3.).

OPERATION INDICATOR lamp (Indoor unit)	Error code	Abnormal point (Failure mode/protection)	LED indication (Outdoor P.C. board)	Condition	Remedy	Indoor/outdoor unit failure mode recall function	Outdoor unit failure mode recall function
9-time blink 2.5 seconds OFF	FC	Nonvolatile memory data	5-time blink 2.5 seconds OFF	Nonvolatile memory data cannot be read properly.	• Replace the inverter P.C. board.	○	○
	U6	Power module (IC700)	6-time blink 2.5 seconds OFF	The interface short circuit occurs in the output of the power module (IC700). The compressor winding shorts circuit.	• Refer to 11-5.Ⓐ "How to check inverter/ compressor".	—	○
10-time blink 2.5 seconds OFF	U7	Discharge temperature	—	Temperature of discharge temperature thermistor has been 50°C or less for 20 minutes.	• Refer to 11-5.Ⓚ "Check of LEV". • Check refrigerant circuit and refrigerant amount.	—	○
11-time blink 2.5 seconds OFF	UJ	Bus-bar voltage (DC)	8-time blink 2.5 seconds OFF	Bus-bar voltage of inverter cannot be detected normally.	• Refer to 11-5.Ⓐ "How to check inverter/ compressor".	—	○
	UH	Each phase current of compressor	9-time blink 2.5 seconds OFF	Each phase current of compressor cannot be detected normally.			
13-time blink 2.5 seconds OFF	Fd	Abnormal of wrong voltage power supply connected.	—	When 100 V power supply is connected to 200 V model.	• Check power supply voltage	○	○
14-time blink 2.5 seconds OFF *1	UE	Stop valve (Closed valve)	14-time blink 2.5 seconds OFF	• Closed valve is detected by compressor current. • An abnormality of the indoor thermistors is detected.	• Check stop valve. • Refer to "TEST POINT DIAGRAM AND VOLTAGE" on the service manual of indoor unit for the characteristics of the thermistors. (Do not start the operation again without repair to prevent hazards.)	○	○
	P8	Pipe temperature	16-time blink 2.5 seconds OFF	• The indoor coil thermistor detects an abnormal temperature. • An abnormality of the indoor thermistors is detected.	• Replace the inverter P.C. board. • Refer to "TEST POINT DIAGRAM AND VOLTAGE" on the service manual of indoor unit for the characteristics of the thermistors. (Do not start the operation again without repair to prevent hazards.)	○	○
16-time blink 2.5 seconds OFF *1	PL	Outdoor refrigerant system abnormality	1-time blink 2.5 seconds OFF	• A closed valve and air trapped in the refrigerant circuit are detected based on the temperature sensed by the indoor and outdoor thermistors and the current of the compressor. • An abnormality of the indoor thermistors is detected.	• Check for a gas leak in a connecting piping etc. • Check the stop valve. • Refer to 11-5.Ⓞ "Check of outdoor refrigerant circuit". • Refer to "TEST POINT DIAGRAM AND VOLTAGE" on the service manual of indoor unit for the characteristics of the thermistors. (Do not start the operation again without repair to prevent hazards.)	○	○

*1 There is possibility that diesel explosion may occur due to the air mixed in the refrigerant circuit.
First, ensure that there are no leakage points on the valves, flare connections, etc. that allow the air to flow into the refrigerant circuit, or no blockage points (e.g. clogged or closed valves) in the refrigerant circuit that cause an increase in pressure.
If there is no abnormal point like above and the system operates cooling mode normally, the indoor thermistor might have a problem, resulting in false detection. Check both the indoor coil thermistor and the room temperature thermistor, and replace faulty thermistor(s), if any.
NOTE: Do not start the operation again without repair to prevent hazards.

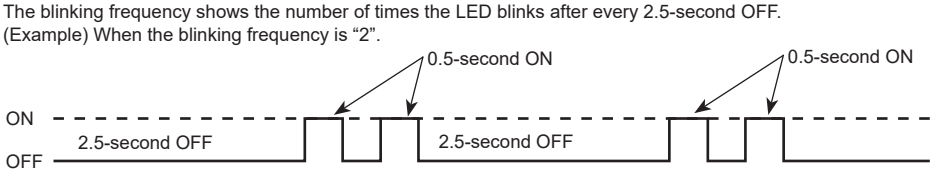
11-3. TROUBLESHOOTING CHECK TABLE

No.	Symptom	LED indication	Abnormal point/ Condition	Condition	Remedy
1	Outdoor unit does not operate.	1-time blink every 2.5 seconds	Outdoor power system	Overcurrent protection cut-out operates 3 consecutive times within 1 minute after the compressor gets started.	• Reconnect connector of compressor. • Refer to 11-5.Ⓐ “How to check inverter/compressor”. • Check stop valve.
2			Outdoor thermistors	Discharge temperature thermistor, fin temperature thermistor, defrost thermistor, outdoor heat exchanger temperature thermistor or ambient temperature thermistor shorts or opens during compressor running.	• Refer to 11-5.Ⓖ “Check of outdoor thermistors”.
				P.C. board temperature thermistor shorts or opens during compressor running.	• Replace inverter P.C. board.
3			Outdoor control system	Nonvolatile memory data cannot be read properly. (The left/upper lamp of the OPERATION INDICATOR lamp on the indoor unit lights up or blinks 7-time.)	• Replace inverter P.C. board.
4		6-time blink 2.5 seconds OFF	Serial signal	The communication fails between the indoor and outdoor unit for 3 minutes.	• Refer to 11-5.Ⓜ “How to check miswiring and serial signal error.
5		11-time blink 2.5 seconds OFF	Stop valve/ Closed valve	Closed valve is detected by compressor current.	• Check stop valve.
6		14-time blink 2.5 seconds OFF	Outdoor unit (Other abnormality)	Outdoor unit is defective.	• Refer to 11-2.2. “Flow chart of the detailed outdoor unit failure mode recall function”.
7		16-time blink 2.5 seconds OFF	4-way valve/ Pipe temperature	The 4-way valve does not work properly. The indoor coil thermistor detects an abnormal temperature.	• Refer to 11-5.Ⓗ “Check of R.V. coil”. • Replace the inverter P.C. board.
8		17-time blink 2.5 seconds OFF	Outdoor refrigerant system abnormality	A closed valve and air trapped in the refrigerant circuit are detected based on the temperature sensed by the indoor and outdoor thermistors and the current of the compressor.	• Check for a gas leak in a connecting piping etc. • Check the stop valve. • Refer to 11-5.Ⓞ “Check of outdoor refrigerant circuit”.
9	‘Outdoor unit stops and restarts 3 minutes later’ is repeated.	2-time blink 2.5 seconds OFF	Overcurrent protection	Large current flows into the power module (IC700).	• Reconnect connector of compressor. • Refer to 11-5.Ⓐ “How to check inverter/compressor”. • Check stop valve.
10		3-time blink 2.5 seconds OFF	Discharge temperature overheat protection	Temperature of discharge temperature thermistor exceeds 241°F (116°C), compressor stops. Compressor can restart if discharge temperature thermistor reads 212°F (100°C) or less 3 minutes later.	• Check refrigerant circuit and refrigerant amount. • Refer to 11-5.Ⓚ “Check of LEV”.
11		4-time blink 2.5 seconds OFF	Fin temperature /P.C. board temperature thermistor overheat protection	Temperature of the fin temperature thermistor on the heat sink exceeds 167 – 187°F (75 – 86°C) or temperature of P.C. board temperature thermistor on the inverter P.C.board exceeds 162 – 185°F (72 – 85°C).	• Check around outdoor unit. • Check outdoor unit air passage. • Refer to 11-5.Ⓘ “Check of outdoor fan motor”.
12		5-time blink 2.5 seconds OFF	High pressure protection	Indoor coil thermistor exceeds 158°F (70°C) in HEAT mode. Defrost thermistor exceeds 158°F (70°C) in COOL mode.	• Check refrigerant circuit and refrigerant amount. • Check stop valve.
13		8-time blink 2.5 seconds OFF	Compressor synchronous abnormality	The waveform of compressor current is distorted.	• Reconnect connector of compressor. • Refer to 11-5.Ⓐ “How to check inverter/compressor”.
14		10-time blink 2.5 seconds OFF	Outdoor fan motor	Outdoor fan has stopped 3 times in a row within 30 seconds after outdoor fan startup.	• Refer to 11-5.Ⓘ “Check of outdoor fan motor. • Refer to 11-5.Ⓛ “Check of inverter P.C. board.
15		12-time blink 2.5 seconds OFF	Each phase current of compressor	Each phase current of compressor cannot be detected normally.	• Refer to 11-5.Ⓐ “How to check inverter/compressor”.
16		13-time blink 2.5 seconds OFF	Bus-bar voltage (DC)	Bus-bar voltage of inverter cannot be detected normally.	• It occurs with following case. • Instantaneous power voltage drop. (Short time power failure) • Refer to 11-5.Ⓙ “Check of power supply”. • Refer to 11-5.Ⓐ “How to check inverter/compressor”.

No.	Symptom	LED indication	Abnormal point/ Condition	Condition	Remedy
17	Outdoor unit operates.	1-time blink 2.5 seconds OFF	Deceleration of the operational frequency of the compressor by the current protection control	When the input current exceeds approximately 10A, compressor frequency lowers.	The unit is normal, but check the following. • Check if indoor filters are clogged. • Check if refrigerant is short. • Check if indoor/outdoor unit air circulation is short cycled.
18		3-time blink 2.5 seconds OFF	Deceleration of the operational frequency of the compressor by the high pressure protection	Temperature of indoor coil thermistor exceeds 131°F (55°C) in HEAT mode, compressor frequency lowers.	
			Deceleration of the operational frequency of the compressor by the overcooling prevention of the indoor heat exchanger	Indoor coil thermistor reads 46°F (8°C) or less in COOL mode, compressor frequency lowers.	
19		4-time blink 2.5 seconds OFF	Deceleration of the operational frequency of the compressor by the discharge temperature protection	Temperature of discharge temperature thermistor exceeds 232°F (111°C), compressor frequency lowers.	• Check refrigerant circuit and refrigerant amount. • Refer to 11-5.Ⓚ “Check of LEV”. • Refer to 11-5.Ⓖ “Check of outdoor thermistors”.
20		5-time blink 2.5 seconds OFF	Outside temperature thermistor protection	When the outside temperature thermistor shorts or opens, protective operation without that thermistor is performed.	• Refer to 11-5.Ⓖ “Check of outdoor thermistors”.
21	Outdoor unit operates.	7-time blink 2.5 seconds OFF	Low discharge temperature protection	Temperature of discharge temperature thermistor has been 122°F (50°C) or less for 20 minutes.	• Refer to 11-5.Ⓚ “Check of LEV”. • Check refrigerant circuit and refrigerant amount.
22		8-time blink 2.5 seconds OFF	PAM protection PAM: Pulse Amplitude Modulation	The overcurrent flows into IGBT(Q821) or the bus-bar voltage reaches 394 V or more, PAM stops and restarts.	This is not malfunction. PAM protection will be activated in the following cases: 1 Instantaneous power voltage drop. (Short time power failure) 2 When the power supply voltage is high.
23		9-time blink 2.5 seconds OFF	Inverter check mode	The connector of compressor is disconnected, inverter check mode starts.	• Check if the connector of the compressor is correctly connected. Refer to 11-5.Ⓐ “How to check inverter/compressor”.

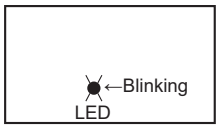
NOTE: 1. The location of LED is illustrated at the right figure. Refer to 11-6.1.
2. LED is lit during normal operation.

The blinking frequency shows the number of times the LED blinks after every 2.5-second OFF.
(Example) When the blinking frequency is “2”.

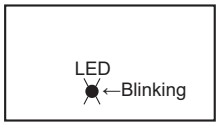


Inverter P.C. board

MUZ-HX09/12/18NL



MUZ-HX24NL

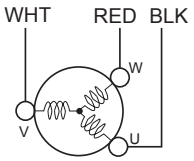
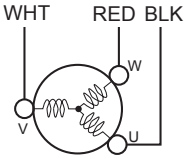
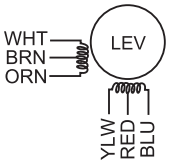


11-4. TROUBLESHOOTING CRITERION OF MAIN PARTS

MUZ-HX09NL MUZ-HX12NL MUZ-HX18NL MUZ-HX24NL

<table>
<tr><th>Part name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Defrost thermistor (RT61)
Fin temperature thermistor (RT64)
Ambient temperature thermistor (RT65)
Outdoor heat exchanger temperature thermistor (RT68)</td><td>Measure the resistance with a multimeter.

Refer to 11-6. “Test point diagram and voltage”, 1. “Inverter P.C. board”, for the chart of thermistor.</td><td></td></tr>
<tr><td>Discharge temperature thermistor (RT62)</td><td>Measure the resistance with a multimeter. Before measurement, hold the thermistor with your hands to warm it up.

Refer to 11-6. “Test point diagram and voltage”, 1. “Inverter P.C. board”, for the chart of thermistor.</td><td></td></tr>
<tr><td>Compressor</td><td>Measure the resistance between terminals using a multimeter.
[Temperature: 14 – 104°F (-10 – 40°C)]
<table>
<tr><th></th><th colspan="2">Normal (Ω)</th></tr>
<tr><th></th><th>MUZ-HX09NL</th><th>MUZ-HX12/18/24NL</th></tr>
<tr><td>U-V
U-W
V-W</td><td>2.21 – 2.99</td><td>1.30 – 1.77</td></tr>
</table></td><td> 
</td></tr>
<tr><td>Outdoor fan motor</td><td>Measure the resistance between lead wires using a multimeter.
[Temperature: 14 – 104°F (-10 – 40°C)]
<table>
<tr><th rowspan="2">Color of lead wire</th><th colspan="2">Normal (Ω)</th></tr>
<tr><th>MUZ-HX09/12NL</th><th>MUZ-HX18/24NL</th></tr>
<tr><td>RED – BLK
BLK – WHT
WHT – RED</td><td>26 – 40</td><td>30 – 46</td></tr>
</table></td><td> 
</td></tr>
<tr><td>R. V. coil (21S4)</td><td>Measure the resistance using a multimeter.
[Temperature: 14 – 104°F (-10 – 40°C)]
<table>
<tr><th>Normal (kΩ)</th></tr>
<tr><td>1.65 – 2.48</td></tr>
</table></td><td></td></tr>
<tr><td>Expansion valve coil (LEV)</td><td>Measure the resistance using a multimeter.
[Temperature: 14 – 104°F (-10 – 40°C)]
<table>
<tr><th>Color of lead wire</th><th>Normal (Ω)</th></tr>
<tr><td>BRN – ORN</td><td rowspan="4">37 – 54</td></tr>
<tr><td>BRN – WHT</td></tr>
<tr><td>RED – BLU</td></tr>
<tr><td>RED – YLW</td></tr>
</table></td><td> 
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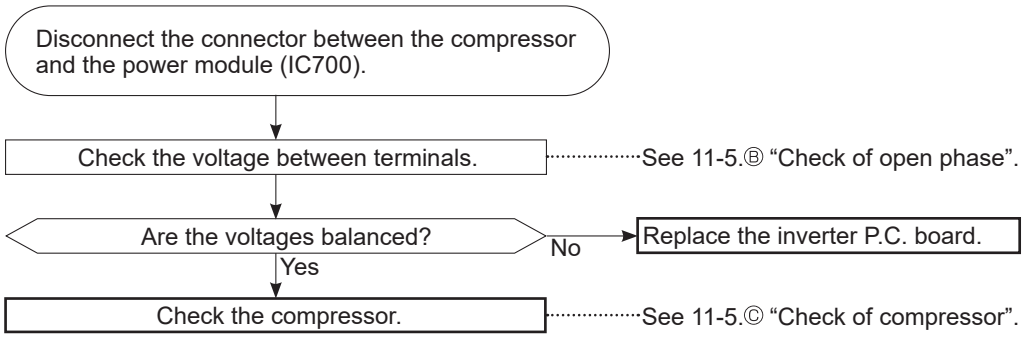
11-5. TROUBLESHOOTING FLOW

Ⓐ How to check inverter/compressor



Ⓑ Check of open phase

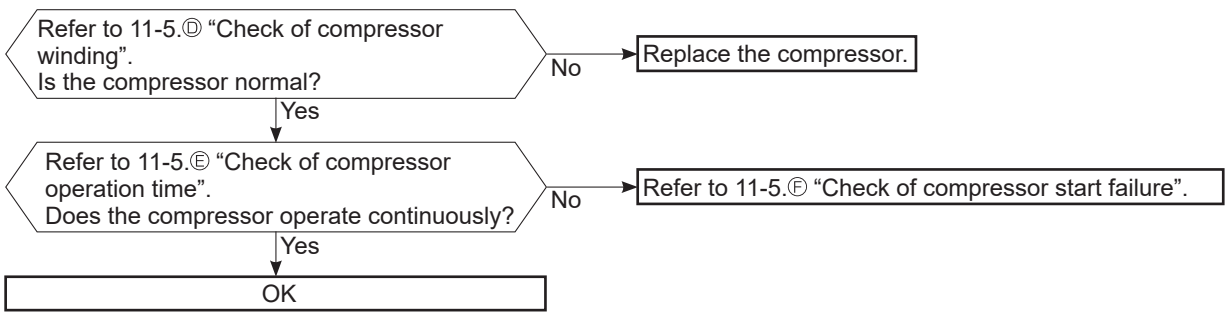
- With the connector between the compressor and the power module (IC700) disconnected, activate the inverter and check if the inverter is normal by measuring **the voltage balance** between the terminals.

Output voltage is 50 – 130 V. (The voltage may differ according to the multimeter.)

<< Operation method>>
Start cooling or heating operation by pressing the emergency operation switch on the indoor unit. (TEST RUN OPERATION: Refer to 8-6.)
<<Measurement point>>
At 3 points *Measure AC voltage between the lead wires at 3 points.
BLK (U)-WHT (V)
BLK (U)-RED (W)
WHT(V)-RED (W)

NOTE: 1. Output voltage varies according to power supply voltage.
2. Measure the voltage by analog type multimeter.
3. During this check, LED of the inverter P.C. board blinks 9 times. (Refer to 11-6.1.)

Ⓒ Check of compressor



Ⓓ Check of compressor winding

●Disconnect the connector between the compressor and the power module (IC700), and measure the resistance between the compressor terminals.

<<Measurement point>>

At 3 points *Measure the resistance between the lead wires at 3 points.
BLK-WHT
BLK-RED
WHT-RED

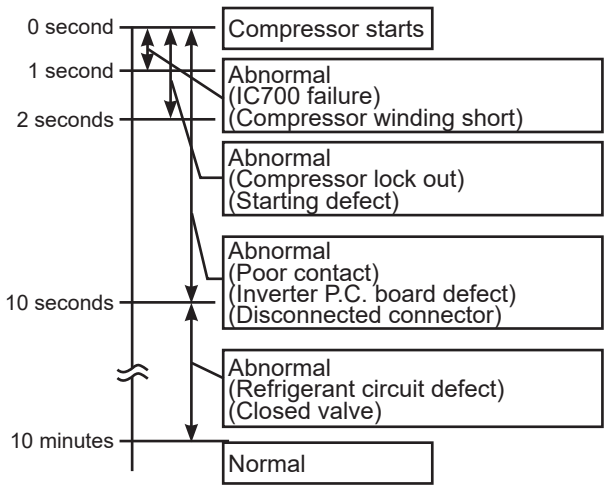
<<Judgement>>

Refer to 11-4.
0 [Ω] ·····Abnormal [short]
Infinite [Ω] ·····Abnormal [open]
NOTE: Be sure to zero the ohmmeter before measurement.

Ⓔ Check of compressor operation time

● Connect the compressor and activate the inverter. Then measure the time until the inverter stops due to overcurrent.
<<Operation method>>
Start heating or cooling operation by pressing the emergency operation switch on the indoor unit. (TEST RUN OPERATION: Refer to 8-6.)
<<Measurement>>
Measure the time from the start of compressor to the stop of compressor due to overcurrent.

<<Judgement>>



Ⓕ Check of compressor start failure

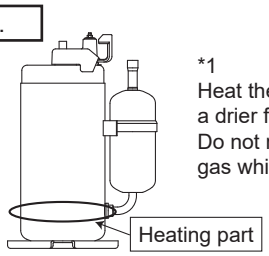
Confirm that ①~④ is normal.
•Electrical circuit check
①. Contact of the compressor connector
②. Output voltage of inverter P.C. board and balance of them (See 11-5.Ⓑ)
③. Direct current voltage between DB61(+) and (-) **(HX09/12/18)**/IC700(P) and (N) **(HX24)** on the inverter P.C. board
④. Voltage between outdoor terminal block S1-S2

↓

Does the compressor run for 10 seconds or more after it starts?
- Yes → Check the refrigerant circuit. Check the stop valve.
- No ↓

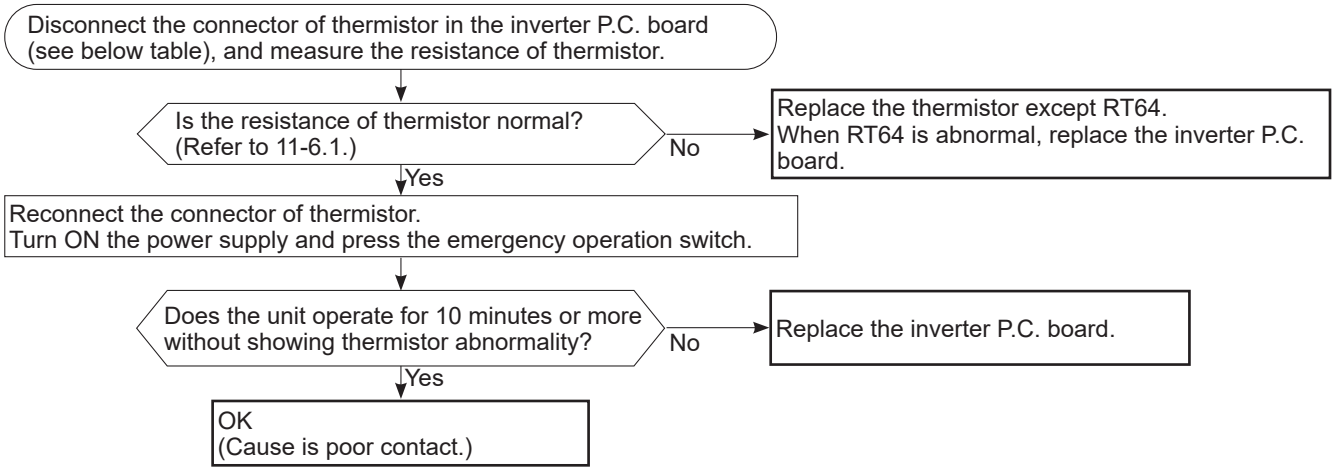
After the compressor is heated with a drier, does the compressor start? *1
- No → Replace the compressor.
- Yes ↓

Compressor start failure. Activate pre-heat control. (Refer to 10-2. “PRE-HEAT CONTROL SETTING”)



*1
Heat the compressor with a drier for about 20 minutes. Do not recover refrigerant gas while heating.

Ⓖ Check of outdoor thermistors



MUZ-HX09/12/18

Thermistor	Symbol	Connector, Pin No.	Board
Defrost	RT61	Between CN641 pin1 and pin2	Inverter P.C. board
Discharge temperature	RT62	Between CN641 pin3 and pin4	
Fin temperature	RT64	Between CN642 pin1 and pin2	
Ambient temperature	RT65	Between CN643 pin1 and pin2	
Outdoor heat exchanger temperature	RT68	Between CN644 pin1 and pin3	

MUZ-HX24

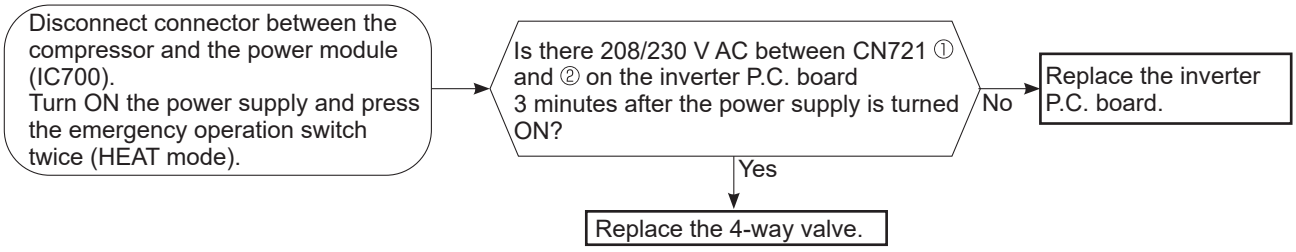
Thermistor	Symbol	Connector, Pin No.	Board
Defrost	RT61	Between CN671 pin1 and pin2	Inverter P.C. board
Discharge temperature	RT62	Between CN671 pin3 and pin4	
Fin temperature	RT64	Between CN673 pin1 and pin2	
Ambient temperature	RT65	Between CN672 pin1 and pin2	
Outdoor heat exchanger temperature	RT68	Between CN671 pin5 and pin6	

Ⓗ Check of R.V. coil

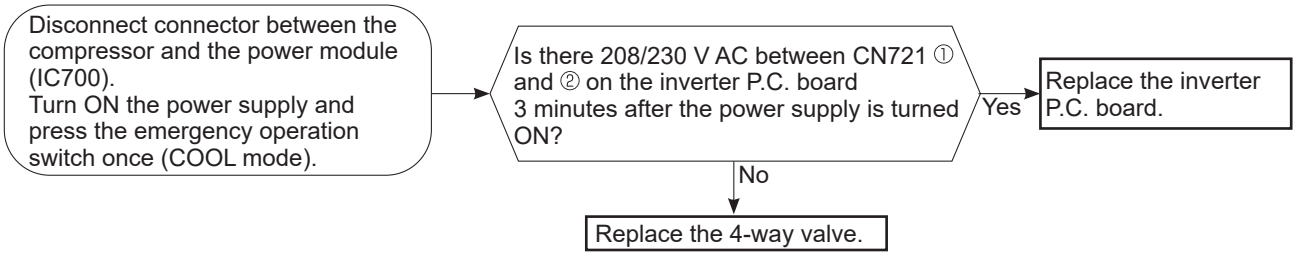
MUZ-HX09/12/18

* First of all, measure the resistance of R.V. coil to check if the coil is defective. Refer to 11-4.
* In case CN721 is disconnected or R.V. coil is open, voltage is generated between the terminal pins of the connector although no signal is being transmitted to R.V. coil.
  Check if CN721 is connected.

Unit operates in COOL mode even if it is set to HEAT mode.



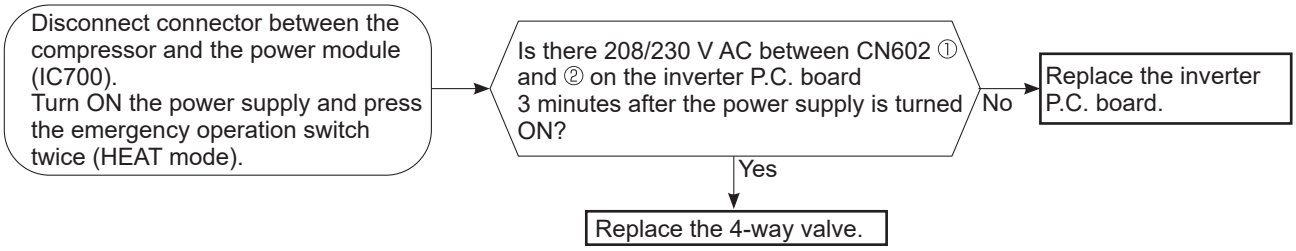
Unit operates in HEAT mode even if it is set to COOL mode.



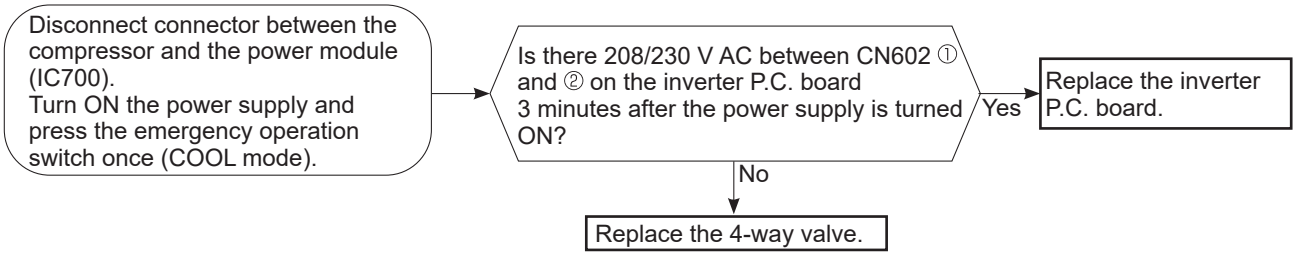
MUZ-HX24

* First of all, measure the resistance of R.V. coil to check if the coil is defective. Refer to 10-4.
* In case CN602 is disconnected or R.V. coil is open, voltage is generated between the terminal pins of the connector although no signal is being transmitted to R.V. coil.
  Check if CN602 is connected.

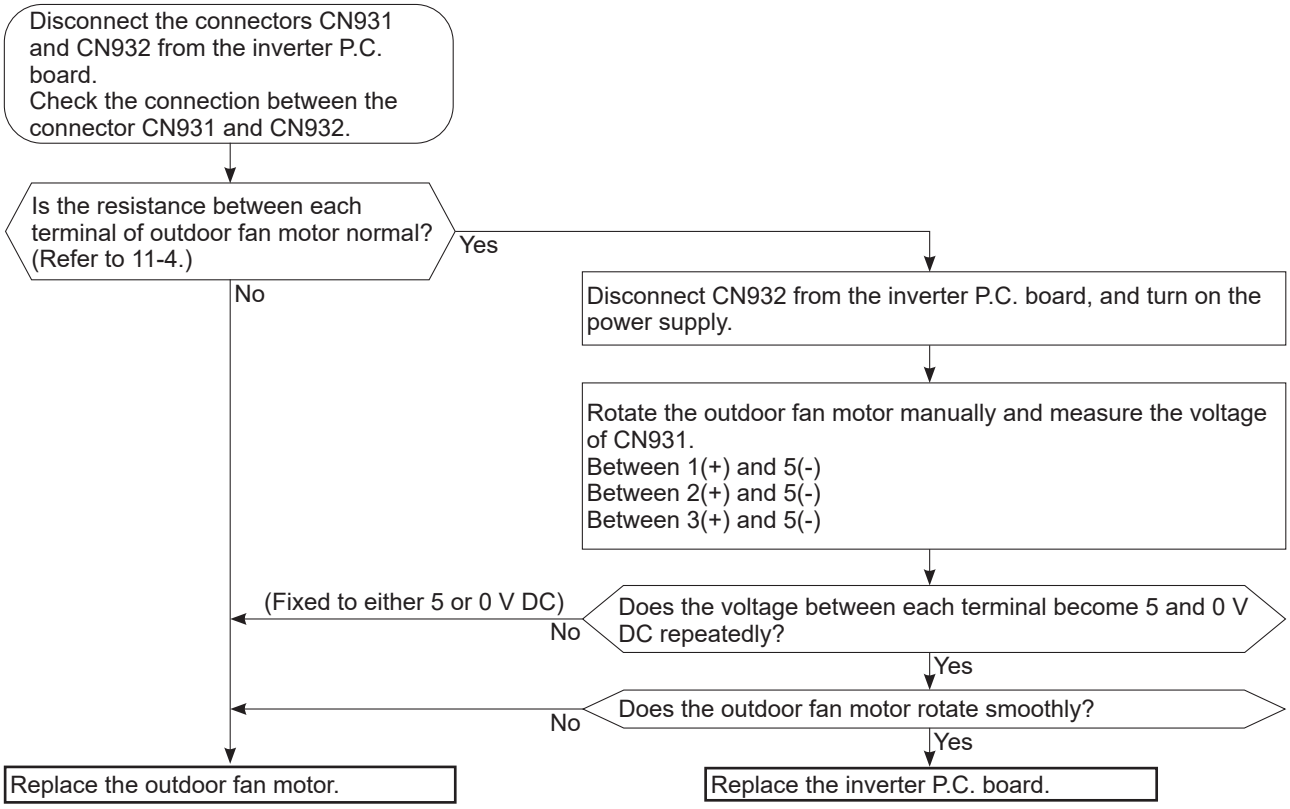
Unit operates in COOL mode even if it is set to HEAT mode.



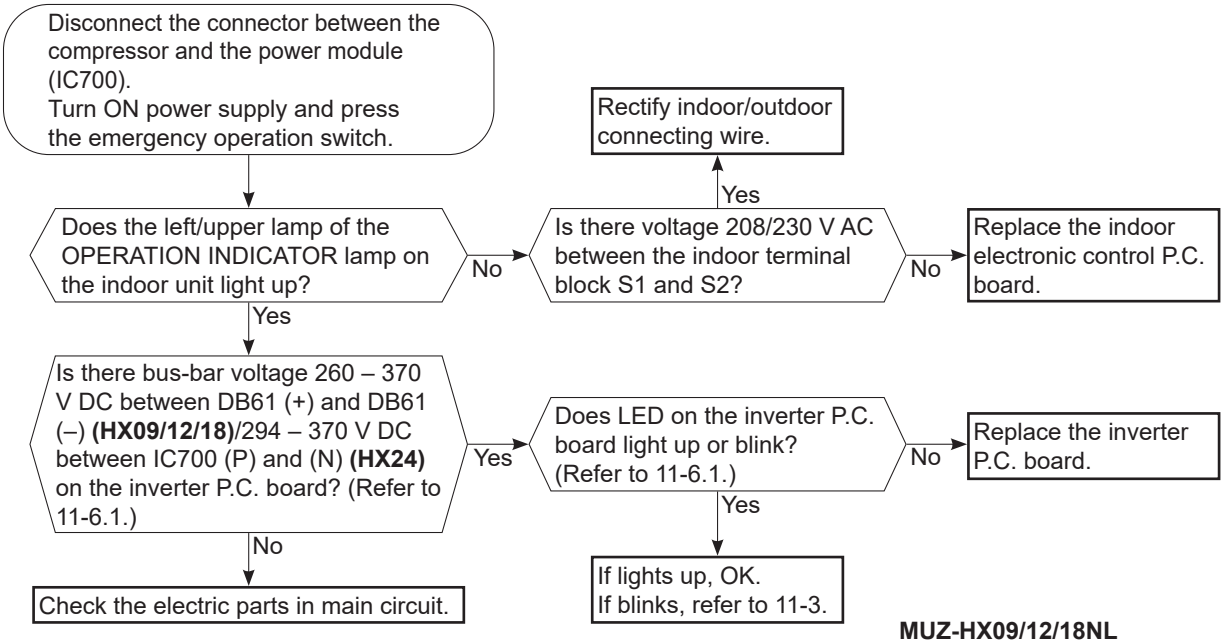
Unit operates in HEAT mode even if it is set to COOL mode.



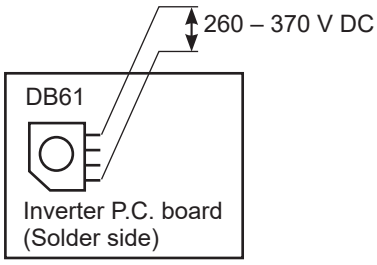
Ⓘ Check of outdoor fan motor



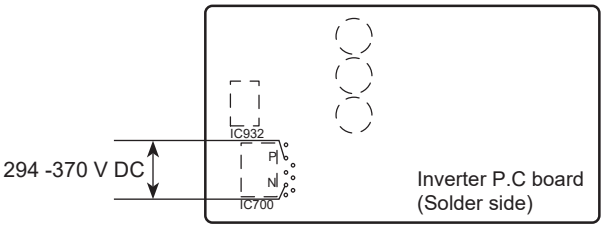
Ⓙ Check of power supply



MUZ-HX09/12/18NL

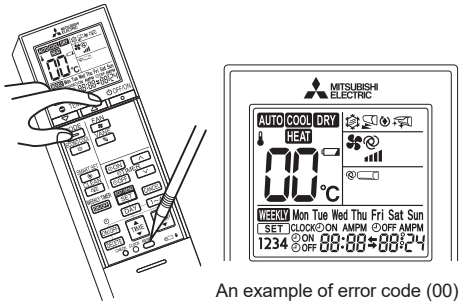


MUZ-HX24NL



Ⓚ Check of LEV (Expansion valve)

Turn ON the power supply.
<Preparation of the remote controller>
① While pressing both Operation select button and TEMP ⊕ button on the remote controller at the same time, press RESET button.
② First, release RESET button.
Hold down the other 2 buttons for another 3 seconds. Make sure that the indicators on the LCD screen shown in the right figure are all displayed. Then release the buttons.



An example of error code (00)

Press OFF/ON (stop/operate) button of the remote controller (the set temperature is displayed) with the remote controller headed towards the indoor unit. *1

Expansion valve operates in full-opening direction.

*1. Regardless of normal or abnormal condition, a short beep is emitted once the signal is received.

Do you hear the expansion valve "click, click·····"?
Do you feel the expansion valve vibrate when touching it ?
- Yes → OK
- No ↓

Is LEV coil properly fixed to the expansion valve?
- No → Properly fix the LEV coil to the expansion valve.
- Yes ↓

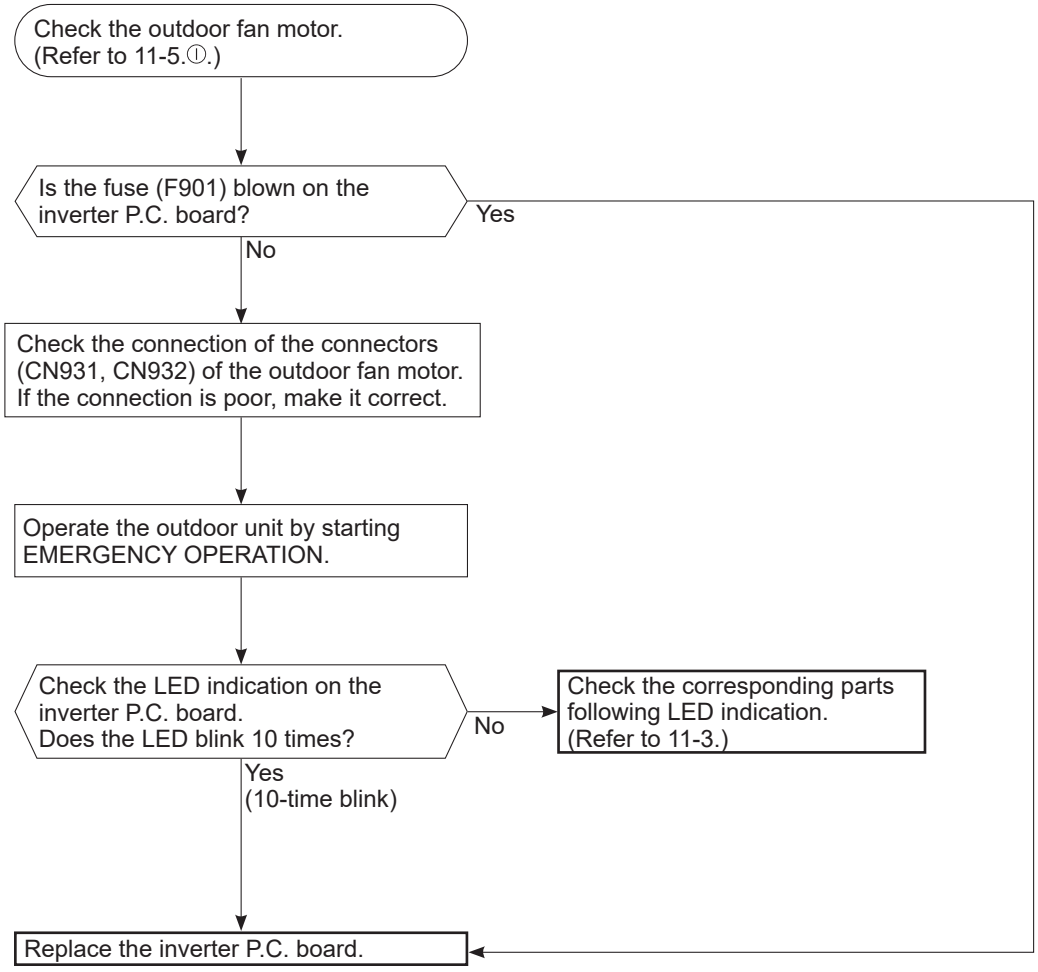
Does the resistance of LEV coil have the characteristics? (Refer to 11-4.)
- No → Replace the LEV coil.
- Yes →

Measure each voltage between connector pins of CN724 on the inverter P.C. board.
1. Pin③(-) — Pin①(+)
2. Pin④(-) — Pin①(+)
3. Pin⑤(-) — Pin①(+)
4. Pin⑥(-) — Pin①(+)

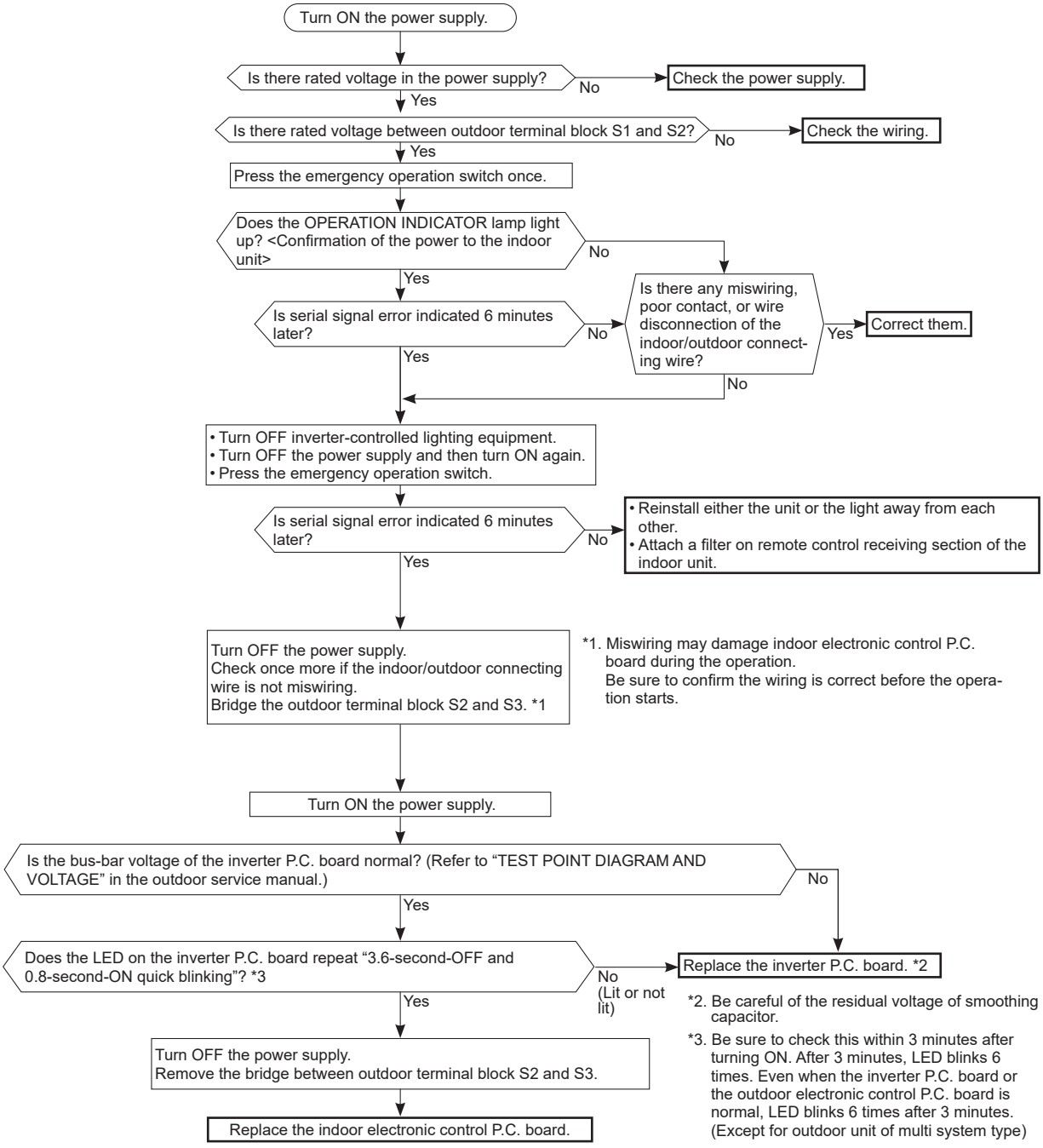
Is there about 3 – 5 V DC between each?
NOTE: Measure the voltage by an analog multimeter.
- No → Replace the inverter P.C. board.
- Yes → Replace the expansion valve.

NOTE: After check of LEV, take the following steps.
1. Turn OFF the power supply and turn it ON again.
2. Press RESET button on the remote controller.

Ⓛ Check of inverter P.C. board



Ⓜ How to check miswiring and serial signal error



Ⓝ Check of defrost heater

Check the following points before checking electric continuity.
1. Does the resistance of ambient temperature thermistor have the characteristics? Refer to 11-6.1.
2. Is the resistance of defrost heater normal? Refer to 11-4.
3. Does the heater protector remain conducted (not open)?
4. Are both ambient temperature thermistor and circuit of defrost heater securely connected to connectors?

In HEAT mode, for more than 5 minutes, let the ambient temperature thermistor continue to read 32°F (0°C) or below, and let the defrost thermistor continue to read 30°F (-1°C) or below.

NOTE: In case both thermistors are more than the above temperature, cool them with cold water etc.

Is there 208/230 V AC between CN601 ① and ② on the inverter P.C. board? Refer to 11-6.1.

Yes → Not the problem of the inverter P.C. board.

No → Replace the inverter P.C. board.

Ⓞ Check of outdoor refrigerant circuit

Has the operation stopped during pump down?

Yes → The operation has stopped to prevent the diesel explosion caused by air trapped in the refrigerant circuit. Close the stop valve, and disconnect the power plug or turn the breaker OFF.

CAUTION : Do not start the operation again to prevent hazards.

No →

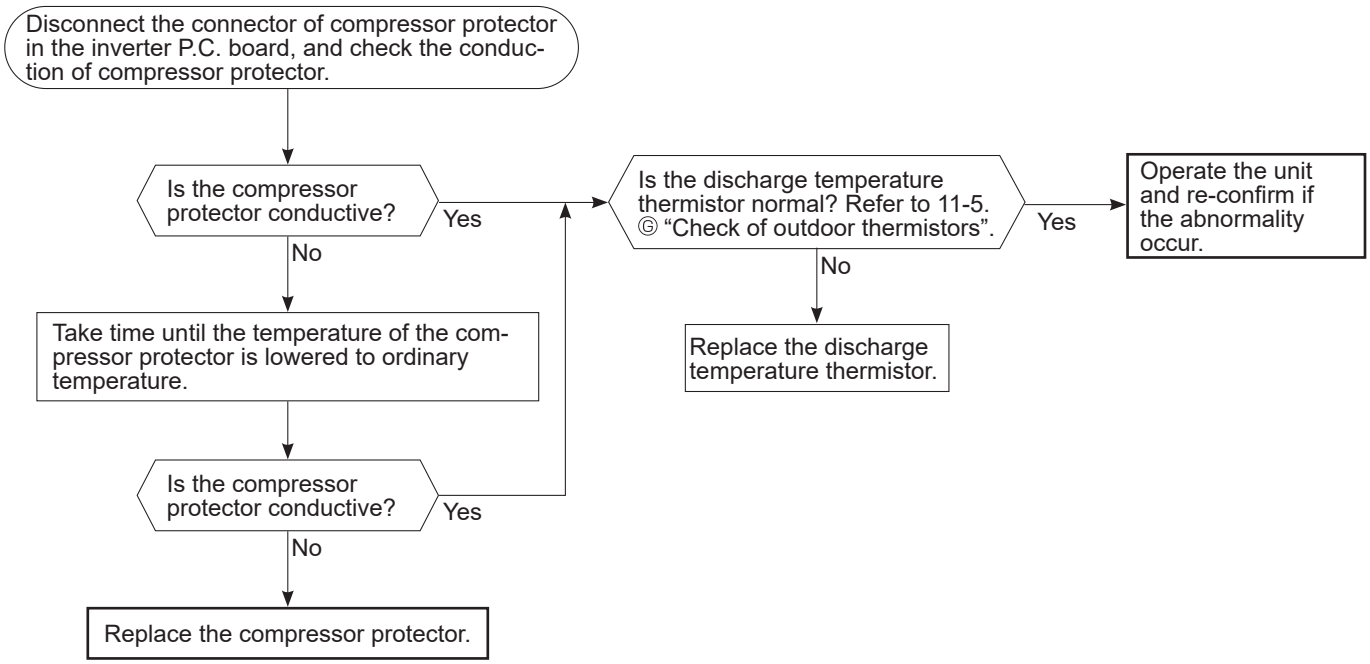
Was the operation started with the stop valve closed, and was it opened during operation?

Yes → The unit occasionally stops when the stop valve is opened or closed during operation. Open the stop valve and start the cooling operation again.

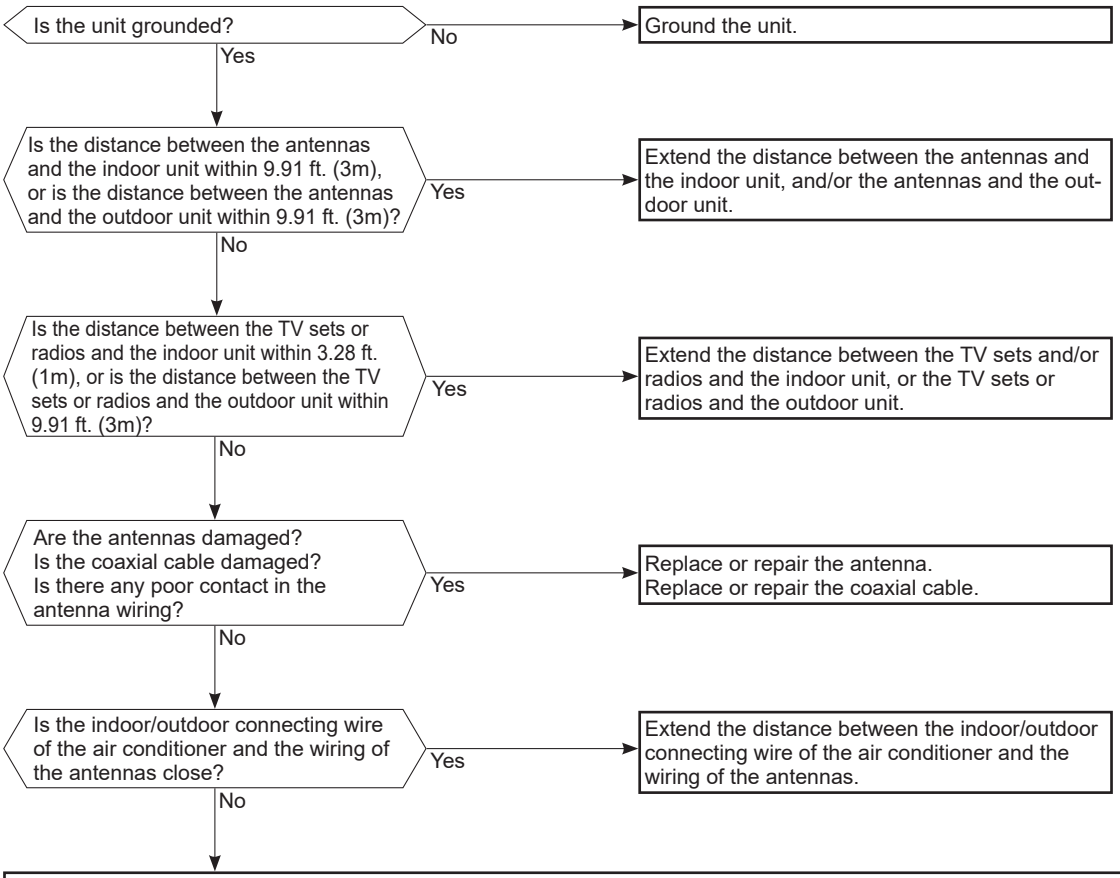
No →

The refrigerant gas amount may be 60% or less than the normal amount. Identify where the gas is leaking from, and fix the leak.

Ⓟ Check of compressor protector



Ⓠ Electromagnetic noise enters into TV sets or radios



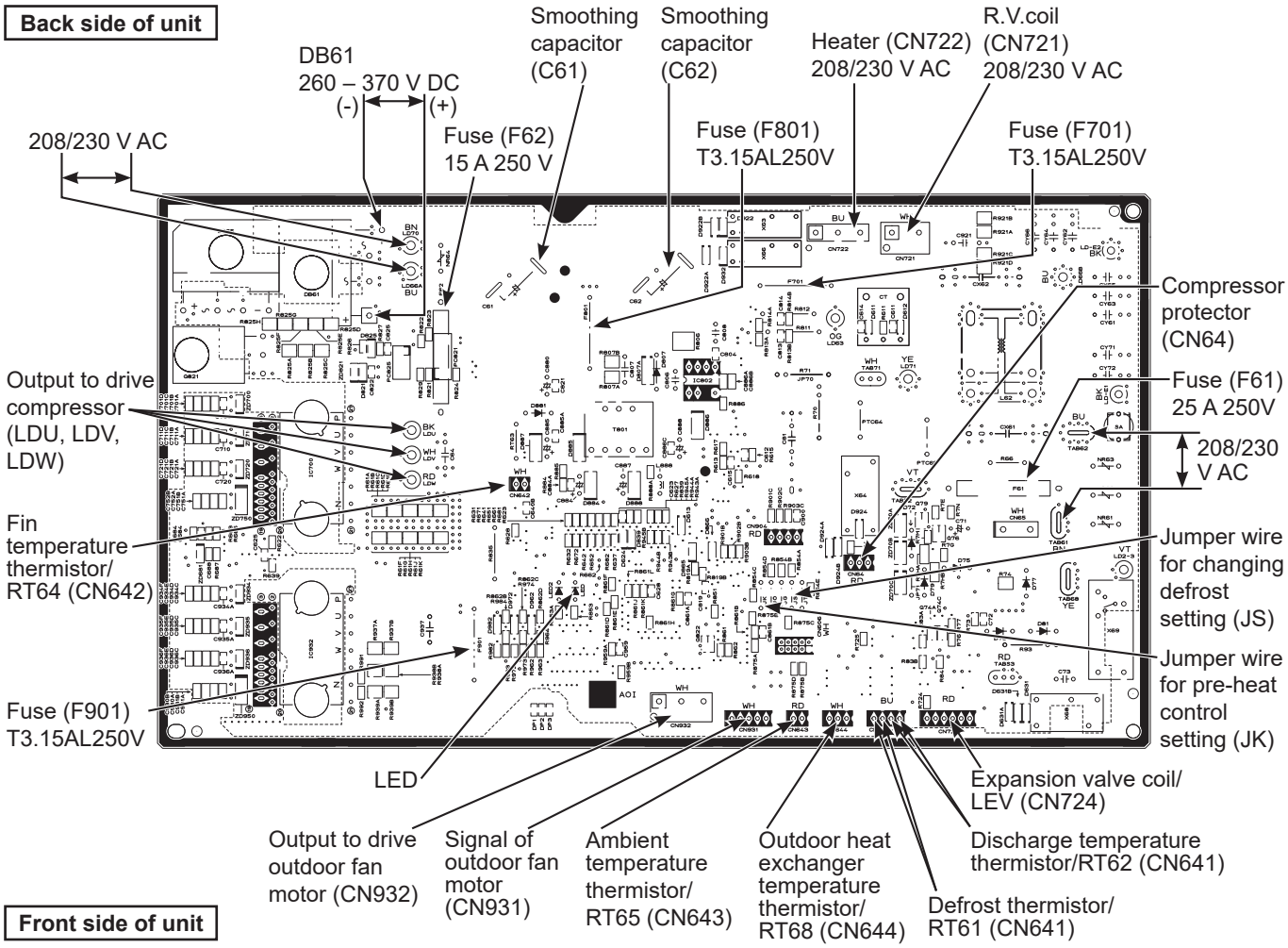
Even if all of the above conditions are fulfilled, the electromagnetic noise may enter, depending on the electric field strength or the installation condition (combination of specific conditions such as antennas or wiring).
Check the following before asking for service.

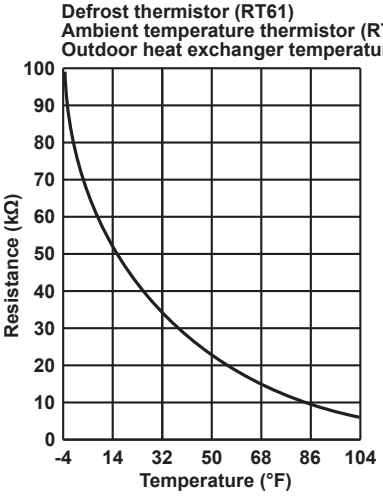
1. Devices affected by the electromagnetic noise
   TV sets, radios (FM/AM broadcast, shortwave)
2. Channel, frequency, broadcast station affected by the electromagnetic noise
3. Channel, frequency, broadcast station unaffected by the electromagnetic noise
4. Layout of:
   indoor/outdoor unit of the air conditioner, indoor/outdoor wiring, ground wire, antennas, wiring from antennas, receiver
5. Electric field intensity of the broadcast station affected by the electromagnetic noise
6. Presence or absence of amplifier such as booster
7. Operation condition of air conditioner when the electromagnetic noise enters in
   1) Turn OFF the power supply once, and then turn ON the power supply. In this situation, check for the electromagnetic noise.
   2) Within 3 minutes after turning ON the power supply, press OFF/ON (stop/operate) button on the remote controller for power ON, and check for the electromagnetic noise.
   3) After a short time (3 minutes later after turning ON), the outdoor unit starts running. During operation, check for the electromagnetic noise.
   4) Press OFF/ON (stop/operate) button on the remote controller for power OFF, when the outdoor unit stops but the indoor/outdoor communication still runs on. In this situation, check for the electromagnetic noise.

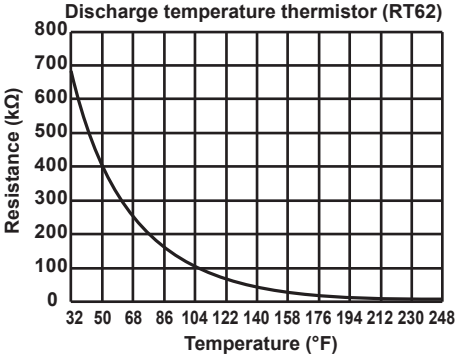
11-6. TEST POINT DIAGRAM AND VOLTAGE

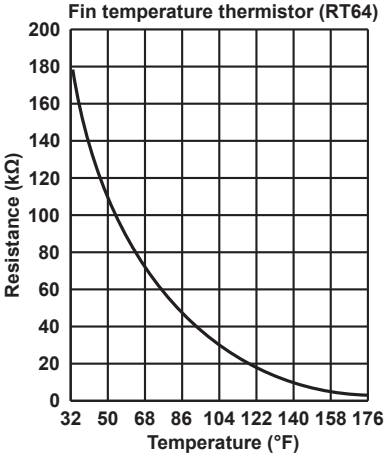
1. Inverter P.C. board

MUZ-HX09NL MUZ-HX12NL MUZ-HX18NL

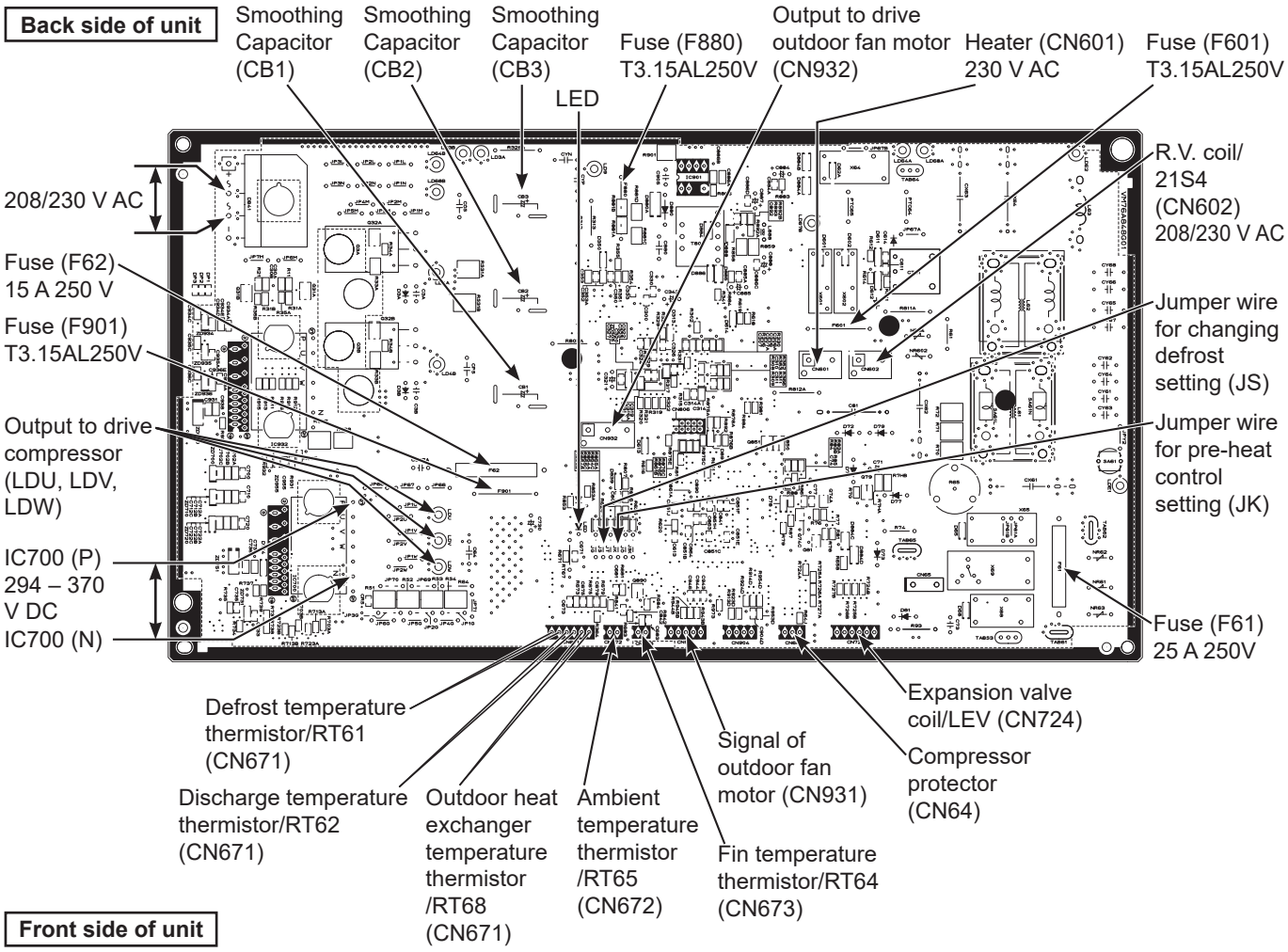


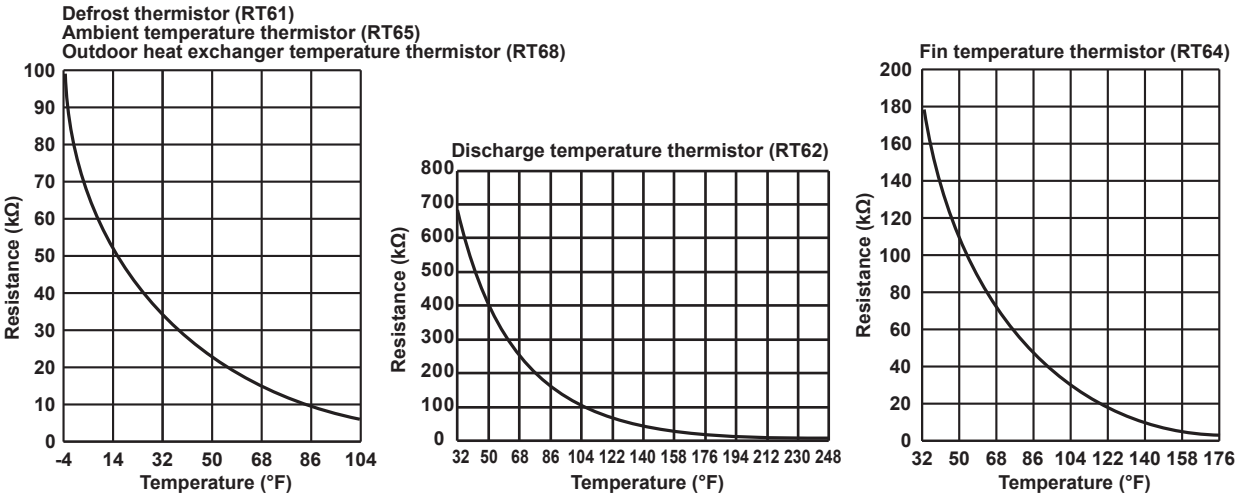




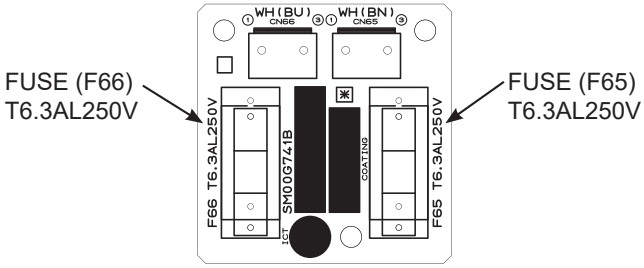


MUZ-HX24NL


Back side of unit
Smoothing Capacitor (CB1)
Smoothing Capacitor (CB2)
Smoothing Capacitor (CB3)
Fuse (F880) T3.15AL250V
Output to drive outdoor fan motor (CN932)
Heater (CN601) 230 V AC
Fuse (F601) T3.15AL250V
LED
R.V. coil/ 21S4 (CN602) 208/230 V AC
208/230 V AC
Fuse (F62) 15 A 250 V
Fuse (F901) T3.15AL250V
Jumper wire for changing defrost setting (JS)
Jumper wire for pre-heat control setting (JK)
Output to drive compressor (LDU, LDV, LDW)
IC700 (P) 294 – 370 V DC
IC700 (N)
Fuse (F61) 25 A 250V
Defrost temperature thermistor/RT61 (CN671)
Expansion valve coil/LEV (CN724)
Signal of outdoor fan motor (CN931)
Compressor protector (CN64)
Discharge temperature thermistor/RT62 (CN671)
Outdoor heat exchanger temperature thermistor /RT68 (CN671)
Ambient temperature thermistor /RT65 (CN672)
Fin temperature thermistor/RT64 (CN673)
Front side of unit


Defrost thermistor (RT61)
Ambient temperature thermistor (RT65)
Outdoor heat exchanger temperature thermistor (RT68)
Resistance (kΩ)
Temperature (°F)
Discharge temperature thermistor (RT62)
Resistance (kΩ)
Temperature (°F)
Fin temperature thermistor (RT64)
Resistance (kΩ)
Temperature (°F)

2. Fuse P.C. board
MUZ-HX24NL

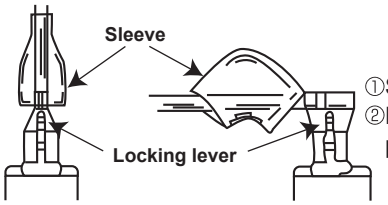


12 DISASSEMBLY INSTRUCTIONS

<Detaching method of the terminal with locking mechanism>

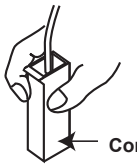
The terminal which has the locking mechanism can be detached as shown below.
There are 2 types of the terminal with locking mechanism.
The terminal without locking mechanism can be detached by pulling it out.
Check the shape of the terminal before detaching.

(1) Slide the sleeve and check if there is a locking lever or not.



①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

(2) The terminal with the connector shown below has the locking mechanism.



①Hold the sleeve, and pull out the terminal slowly.

12-1. MUZ-HX09NL MUZ-HX12NL

NOTE: Turn OFF the power supply before disassembly.

→ : Indicates the visible parts in the photos/figures.
- - → : Indicates the invisible parts in the photos/figures.

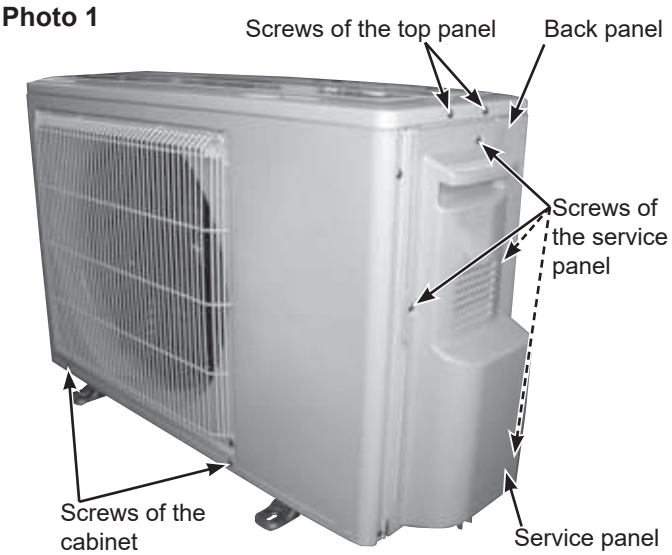
OPERATING PROCEDURE	PHOTOS/FIGURES
1. Removing the cabinet (1) Remove the screws fixing the service panel. (2) Pull down the service panel and remove it. (3) Remove the screws fixing the conduit cover. (Photo 4) (4) Remove the conduit cover. (5) Remove the screw fixing the conduit plate. (Photo 5) (6) Remove the conduit plate. (7) Disconnect the power supply wire and indoor/outdoor connecting wire. (8) Remove the screws fixing the top panel. (9) Remove the top panel. (10) Remove the screws fixing the cabinet. (11) Remove the cabinet. (12) Remove the screws fixing the back panel. (Photo 5, 6) (13) Remove the back panel. **NOTE:** If the red labels have been removed during the operation, put them back in the original position after the operation. Red labels indicate the use of flammable refrigerants. (Figure 1)	**Photo 1** 

Photo 2

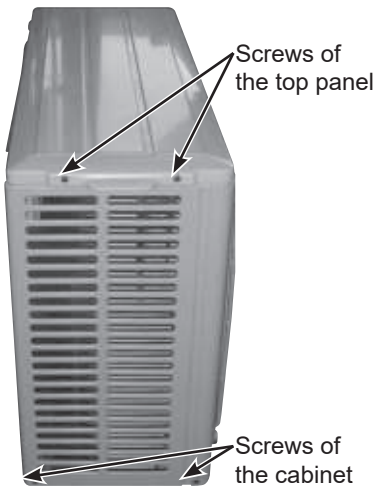


Photo 3

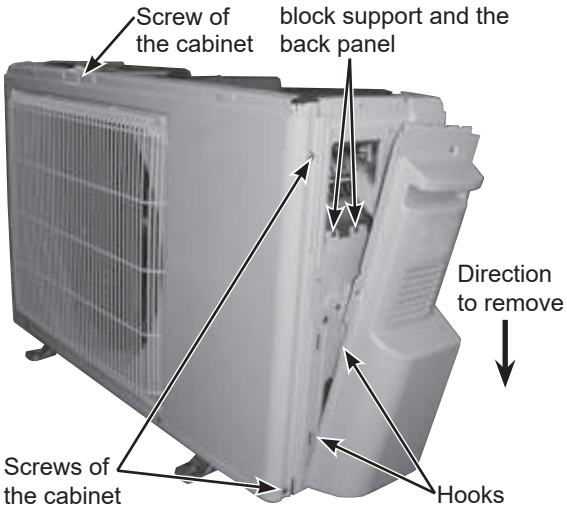
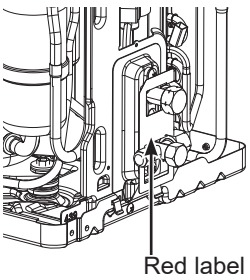
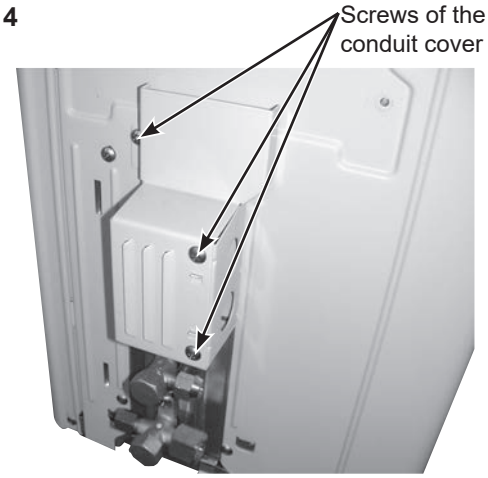
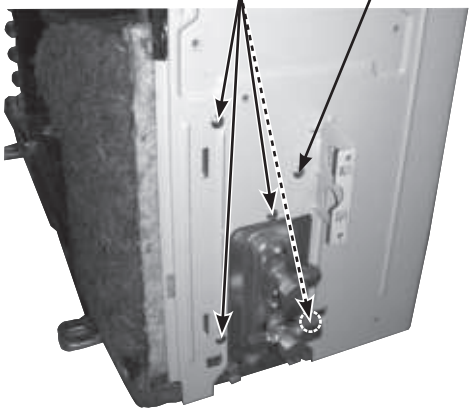
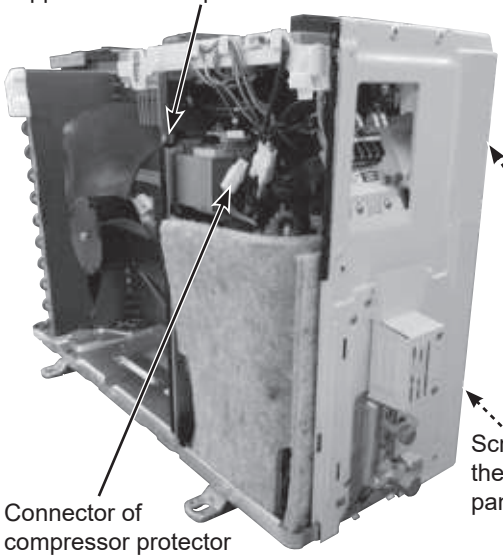


Figure 1



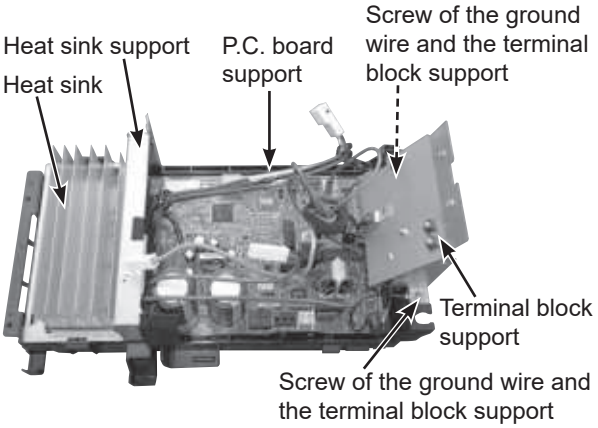
OPERATING PROCEDURE	PHOTOS/FIGURES
Photo 4 	**Photo 5** 
2. Removing the inverter assembly, inverter P.C. board (1) Remove the top panel, cabinet and service panel. (Refer to section 1.) (2) Disconnect the lead wire to the reactor and the following connectors: <Inverter P.C. board> CN721 (R.V. coil) CN931, CN932 (Fan motor) CN641 (Defrost thermistor and discharge temperature thermistor) CN643 (Ambient temperature thermistor) CN644 (Outdoor heat exchanger temperature thermistor) CN724 (Expansion valve coil) CN64 (Compressor protector) (3) Remove the compressor connector (CN61). (4) Remove the screws fixing the heat sink support and the separator. (5) Remove the fixing screws of the terminal block support and the back panel. (6) Remove the inverter assembly. (7) Remove the screws of the ground wires and the terminal block support. (Photo 7) (8) Remove the heat sink support from the P.C. board support. (9) Remove the inverter P.C. board from the P.C. board support.	**Photo 6** 

OPERATING PROCEDURE

*** Connection procedure when attaching the inverter P.C. board (Photo 8)**

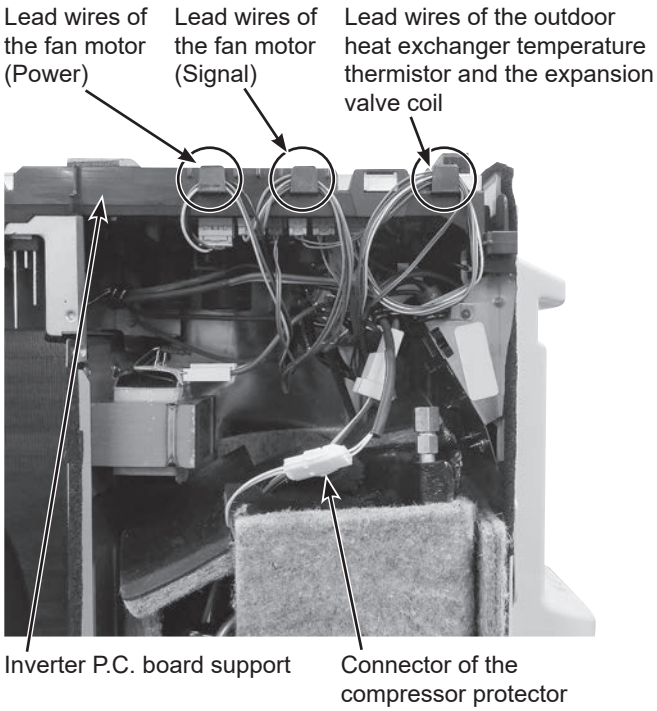
1. Connect the lead wires of the fan motor (Power) to the connector on the inverter P.C. board. Pull the lead wires toward you and put them on the left hook on the P.C. board support.
2. Connect the lead wires of the fan motor (Signal) to the connector on the inverter P.C. board. Pull the lead wires toward you and put them on the middle of the hook on the P.C. board support.
3. Connect the lead wires of the outdoor heat exchanger temperature thermistor to the connector on the inverter P.C. board. Pull the lead wires toward you and put them on the right hook on the P.C. board support.
4. Connect the lead wires of the expansion valve coil to the connector on the inverter P.C. board. Pull the lead wires toward you and put them on the right hook on the P.C. board support [so that the compressor protector lead wires are bundled up as shown in Photo 8 **(MUZ-HX12 only)]**.

Photo 7 (Inverter assembly)

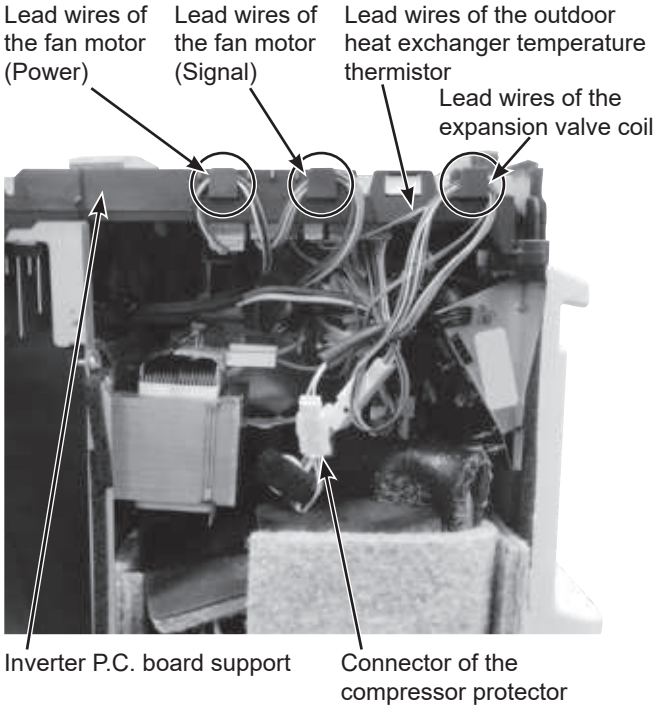


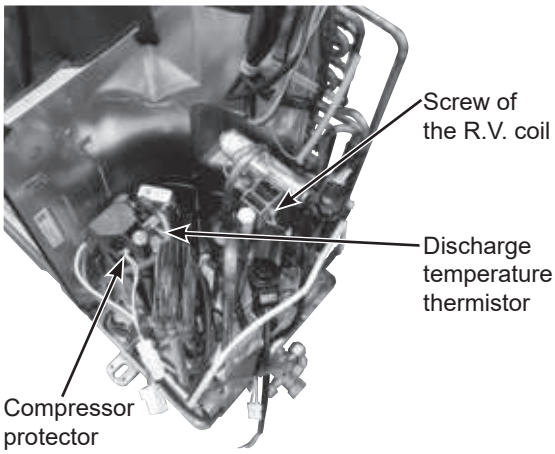
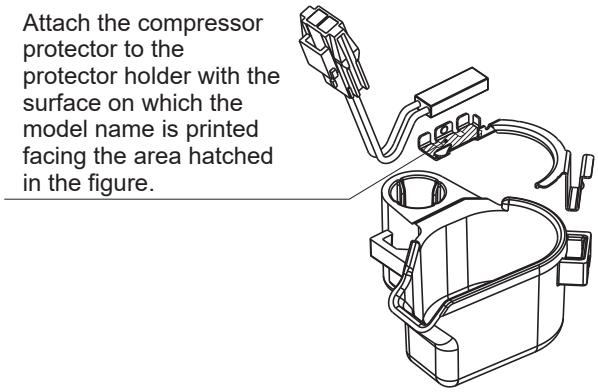
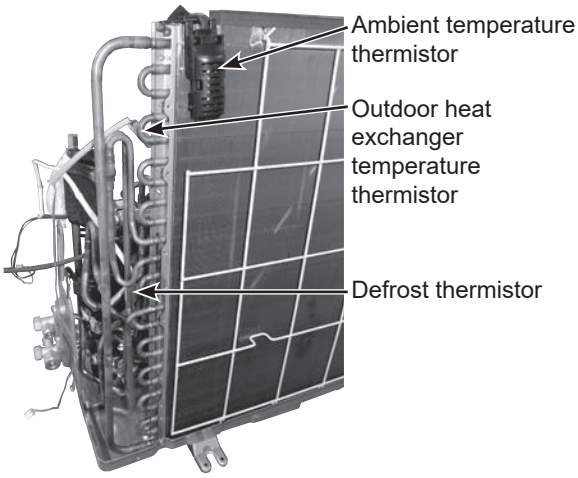
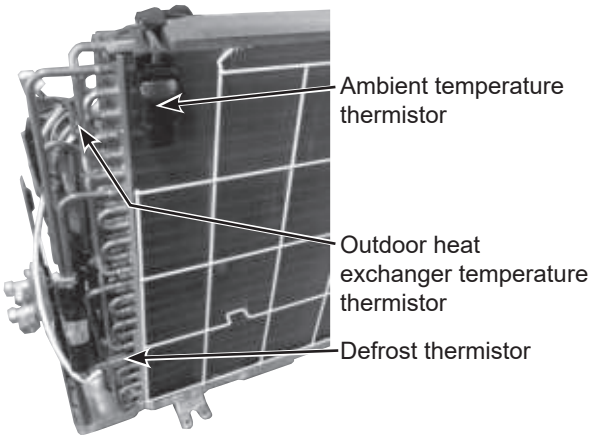
PHOTOS/FIGURES

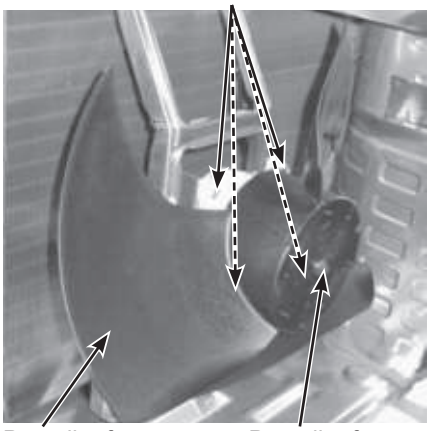
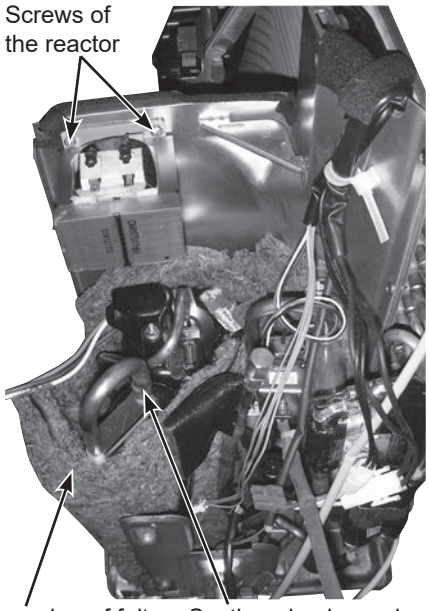
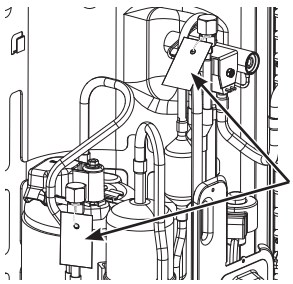
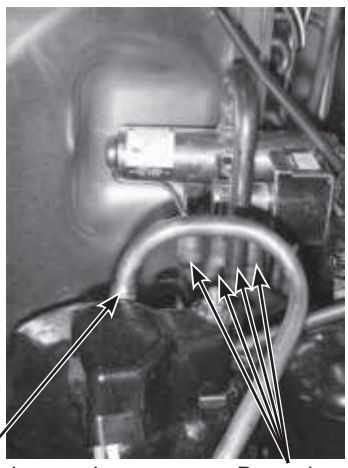
Photo 8
MUZ-HX09NL



MUZ-HX12NL



OPERATING PROCEDURE	PHOTOS/FIGURES
3. Removing R.V. coil (1) Remove the cabinet and panels. (Refer to section 1.) (2) Disconnect the following connectors: <Inverter P.C. board> CN721 (R.V. coil) (3) Remove the R.V. coil.	**Photo 9** 
4. Removing the discharge temperature thermistor, defrost thermistor, outdoor heat exchanger temperature thermistor and ambient temperature thermistor (1) Remove the top panel, cabinet and service panel. (Refer to section 1.) (2) Disconnect the lead wire to the reactor and the following connectors: <Inverter P.C. board> CN641 (Defrost thermistor and discharge temperature thermistor) CN643 (Ambient temperature thermistor) CN644 (Outdoor heat exchanger temperature thermistor) (3) Pull out the discharge temperature thermistor from its holder. (4) Pull out the defrost thermistor from its holder. (5) Pull out the outdoor heat exchanger temperature thermistor from its holder. (6) Pull out the ambient temperature thermistor from its holder. **Figure 2**  	**Photo 10** **MUZ-HX09NL**  **MUZ-HX12NL** 

OPERATING PROCEDURE	PHOTOS/FIGURES
5. Removing outdoor fan motor (1) Remove the top panel, cabinet and service panel. (Refer to section 1.) (2) Disconnect the following connectors: <Inverter P.C. board> CN931, CN932 (Fan motor) (3) Remove the propeller fan nut. (4) Remove the propeller fan. (5) Remove the screws fixing the fan motor. (6) Remove the fan motor. **NOTE**: The propeller fan nut is a reverse thread.	**Photo 11** Screws of the outdoor fan motor  Propeller fan Propeller fan nut
6. Removing the compressor and 4-way valve (1) Remove the cabinet and panels. (Refer to section 1.) (2) Remove the inverter assembly. (Refer to section 2.) (3) Remove the screws fixing the reactor. (4) Remove the reactor. (5) Remove the soundproof felt. (6) Recover gas from the refrigerant circuit. **NOTE:** Recover gas from the pipes until the pressure gauge shows 0 psig. (7) Detach the brazed part of the suction and the discharge pipe connected with compressor. (8) Remove the nuts fixing the compressor. (9) Remove the compressor. (10) Detach the brazed part of pipes connected with 4-way valve. **NOTE:** If the red labels have been removed during the operation, put them back in the original position after the operation. Red labels indicate the use of flammable refrigerants. (Figure 3)	**Photo 12** Screws of the reactor  Soundproof felt Suction pipe brazed part **Figure 3**  Red labels
Photo 13  Discharge pipe brazed part Brazed parts of 4-way valve	

12-2. MUZ-HX18NL

NOTE: Turn OFF the power supply before disassembly.

OPERATING PROCEDURE	PHOTOS/FIGURES

1. Removing the cabinet

(1) Remove the screws of the service panel.
(2) Remove the screws of the top panel.
(3) Remove the screw of the valve cover.
(4) Remove the service panel.
(5) Remove the top panel.
(6) Remove the valve cover.
(7) Remove the screws fixing the conduit cover. (Photo 5)
(8) Remove the conduit cover.
(9) Remove the screw fixing the conduit plate. (Photo 6)
(10) Remove the conduit plate.
(11) Disconnect the power supply cord and indoor/outdoor connecting wire.
(12) Remove the screws of the cabinet.
(13) Remove the cabinet.
(14) Remove the screws of the back panel.
(15) Remove the back panel.

NOTE: If the red labels have been removed during the operation, put them back in the original position after the operation. Red labels indicate the use of flammable refrigerants. (Figure 1)

Photo 1

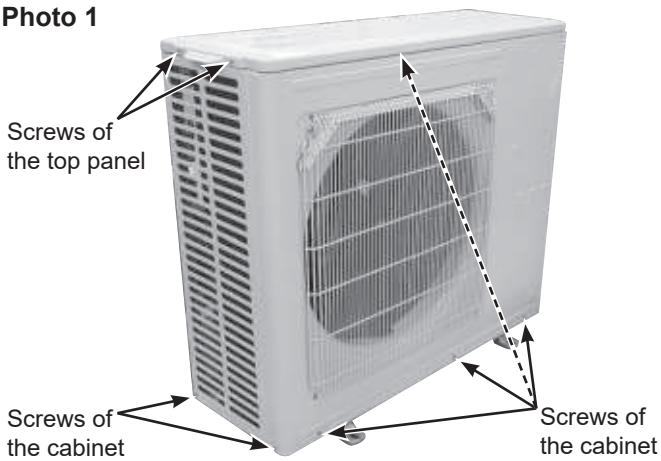


Photo 2

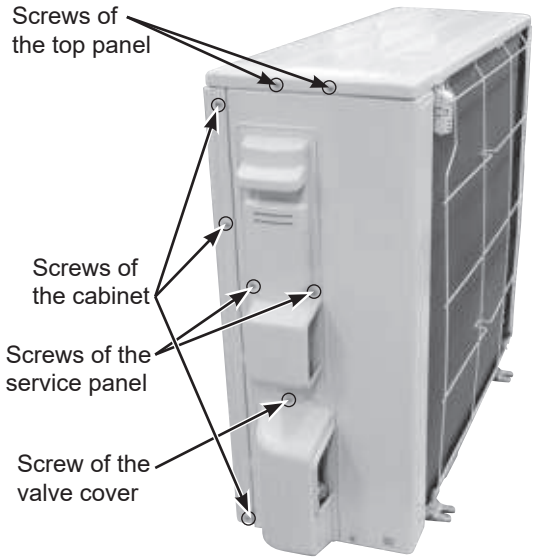


Photo 4

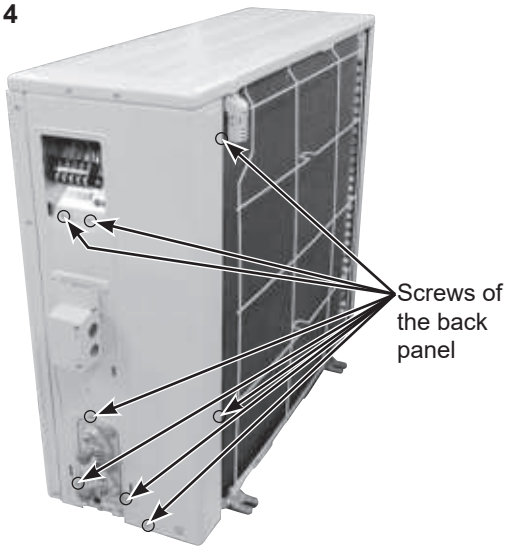


Figure 1

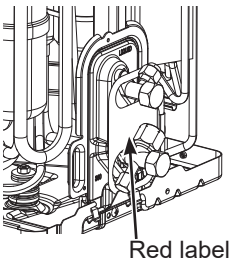
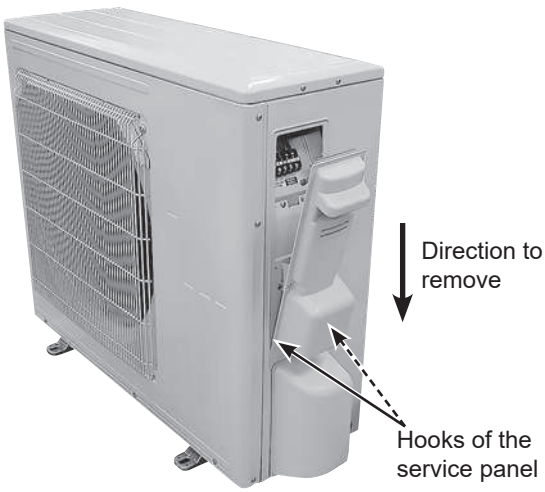
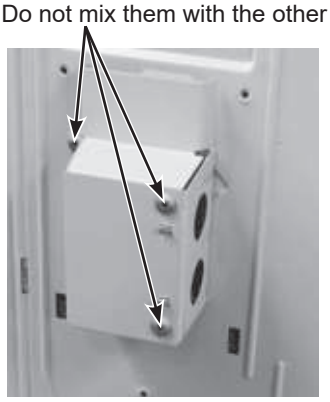
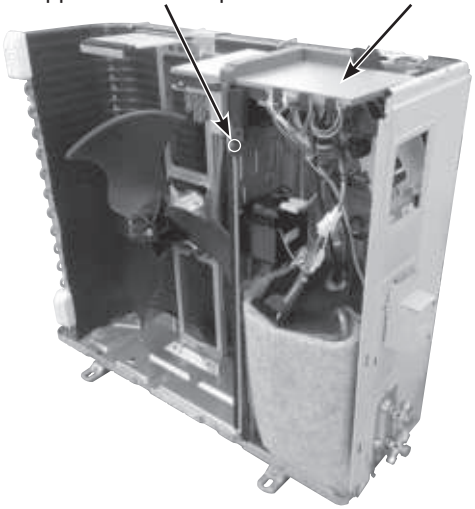


Photo 3



OPERATING PROCEDURE	PHOTOS/FIGURES
Photo 5 Screws of the conduit cover (These screws are different shape from the other screws. Do not mix them with the other screws.) 	**Photo 6** Screw of the conduit plate (This screw is different in shape from the other screws. Do not mix them with the other screws.)
2. Removing the inverter assembly and inverter P.C. board (1) Remove the cabinet and panels (refer to section 1). (2) Disconnect the lead wire to the reactor and the following connectors: <Inverter P.C. board> CN721 (R.V. coil) CN931, CN932 (Fan motor) CN641 (Defrost thermistor and discharge temperature thermistor) CN643 (Ambient temperature thermistor) CN644 (Outdoor heat exchanger temperature thermistor) CN724 (Expansion valve coil) CN64 (Compressor protector) (3) Remove the compressor connector (CN61). (4) Remove the screws fixing the heat sink support and the separator. (5) Remove the inverter assembly. (6) Remove the screws of the ground wires. (7) Remove the heat sink support from the P.C. board support. (Photo 8) (8) Remove the PB cover. (9) Remove the screw of the inverter P.C. board and remove the inverter P.C. board from the P.C. board support. (Photo 9)	**Photo 7** Screw of the heat sink support and the separator PB cover 

OPERATING PROCEDURE

*** Connection procedure when attaching the inverter P.C. board (Photo 9)**

1. Connect the lead wires of the heat exchanger temperature thermistor, the defrost thermistor and discharge temperature thermistor to the connector on the inverter P.C. board. Pull the lead wires toward you and put them on the center hook on the P.C. board support.
2. Connect the lead wires of the expansion valve coil to the connector on the inverter P.C. board. Pull the lead wires toward you and put them on the right hook on the P.C. board support.
3. Connect the lead wires of the ambient temperature thermistor to the connector on the inverter P.C. board. Pull the lead wires toward you and put them on the left hook on the P.C. board support so that the fan motor lead wires are bundled up as shown in Photo 10.

PHOTOS/FIGURES

Photo 8 (Inverter assembly)

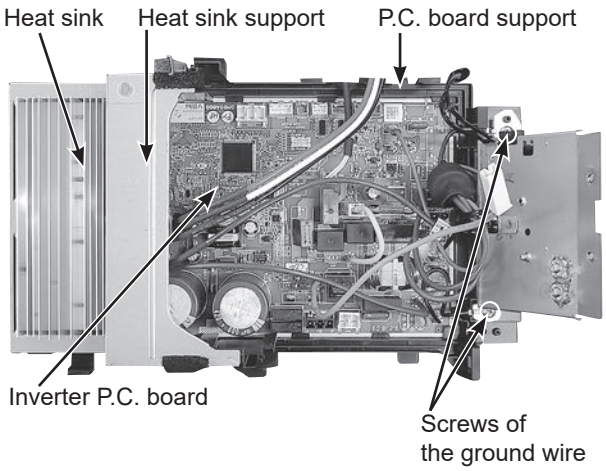


Photo 10

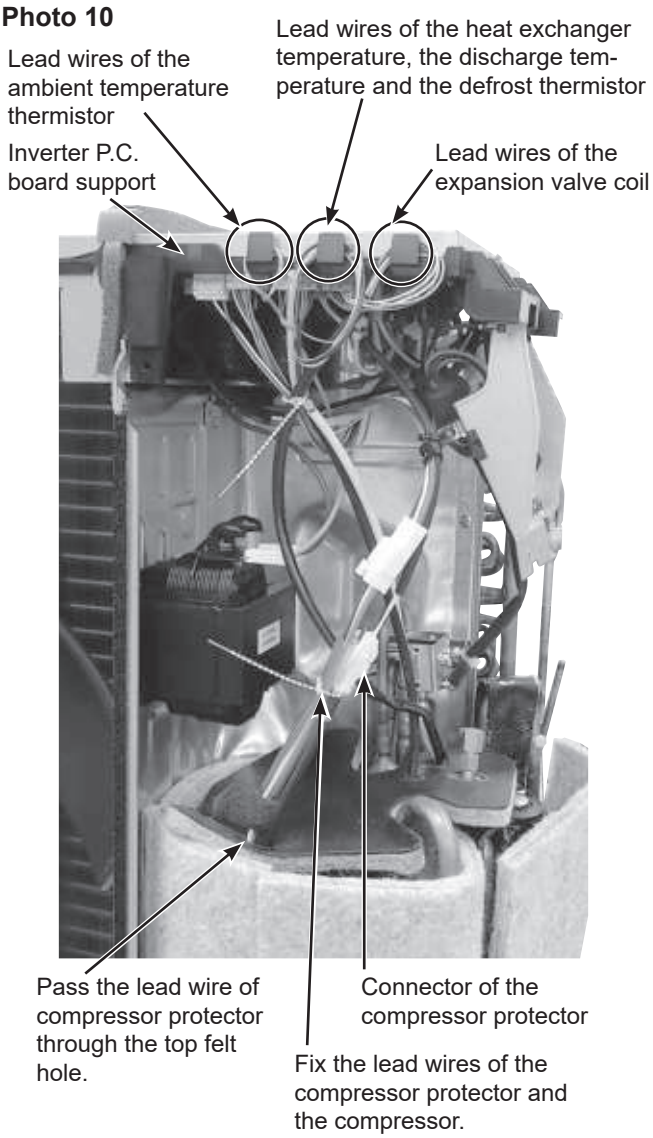
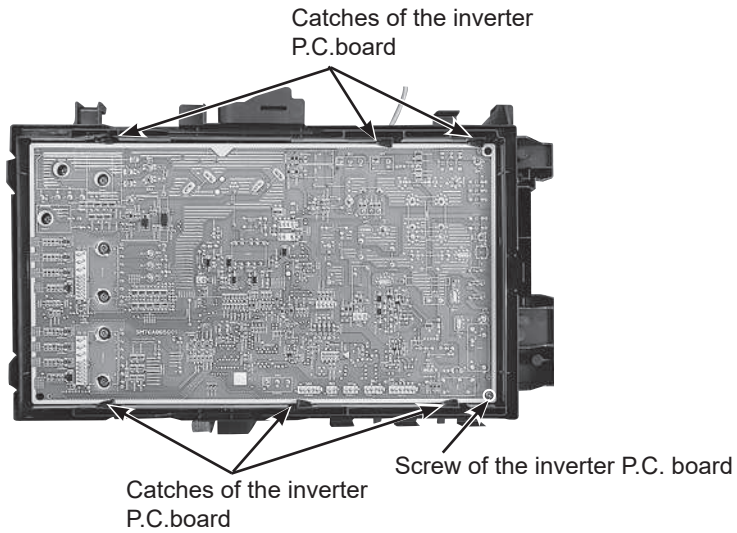
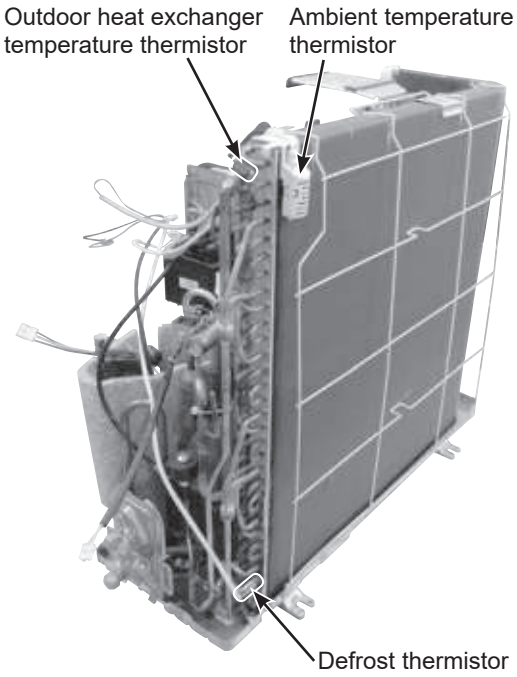
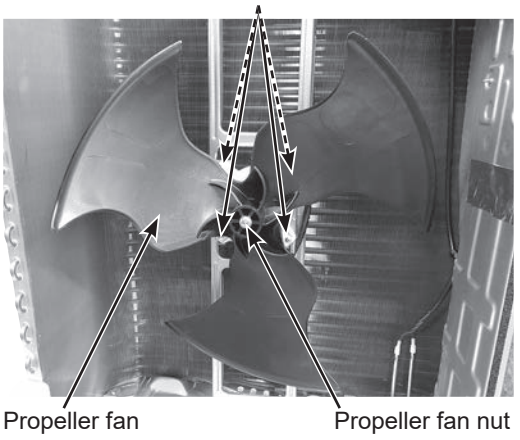


Photo 9



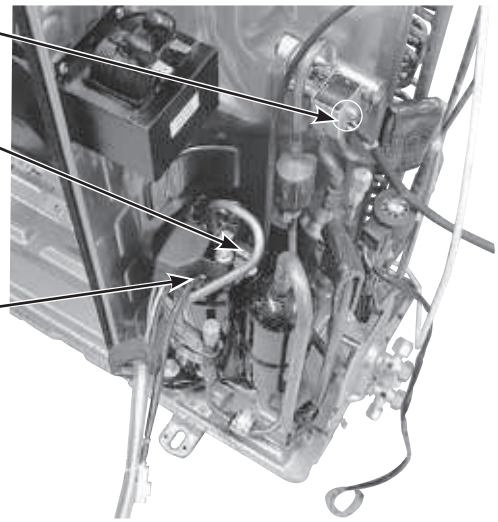
OPERATING PROCEDURE	PHOTOS/FIGURES
3. Removing the discharge temperature thermistor, defrost thermistor, outdoor heat exchanger temperature thermistor and ambient temperature thermistor (1) Remove the cabinet and panels (refer to section 1). (2) Disconnect the lead wire to the reactor and the following connectors: <Inverter P.C. board> CN641 (Defrost thermistor and discharge temperature thermistor) CN643 (Ambient temperature thermistor) CN644 (Outdoor heat exchanger temperature thermistor) (3) Pull out the discharge temperature thermistor from its holder. (Photo 14) (4) Pull out the defrost thermistor from its holder. (5) Pull out the outdoor heat exchanger temperature thermistor from its holder. (6) Pull out the ambient temperature thermistor from its holder.	**Photo 11** 
4. Removing outdoor fan motor (1) Remove the cabinet and panels (refer to section 1). (2) Disconnect the following connectors: <Inverter P.C. board> CN931, CN932 (Fan motor) (3) Remove the propeller fan nut. (4) Remove the propeller fan. (5) Remove the screws fixing the fan motor. (6) Remove the fan motor.	**Photo 12** 

OPERATING PROCEDURE	PHOTOS/FIGURES

5. Removing R. V. coil

(1) Remove the cabinet and panels (refer to section 1).
(2) Disconnect the following connectors:
<Inverter P.C. board>
CN721 (R.V. coil)
(3) Remove the R.V. coil.

Photo 13



6. Removing the compressor and 4-way valve

(1) Remove the cabinet and panels (refer to section 1).
(2) Remove the inverter assembly (refer to section 2).
(3) Remove the screws fixing the reactor.
(4) Remove the reactor.
(5) Remove the soundproof felt.
(6) Recover gas from the refrigerant circuit.
NOTE: Recover gas from the pipes until the pressure gauge shows 0 psig.
(7) Detach the brazed part of the suction and the discharge pipe connected with compressor.
(8) Remove the compressor nuts.
(9) Remove the compressor.
(10) Detach the brazed part of pipes connected with 4-way valve.

NOTE: If the red labels have been removed during the operation, put them back in the original position after the operation. Red labels indicate the use of flammable refrigerants. (Figure 3)

Figure 2

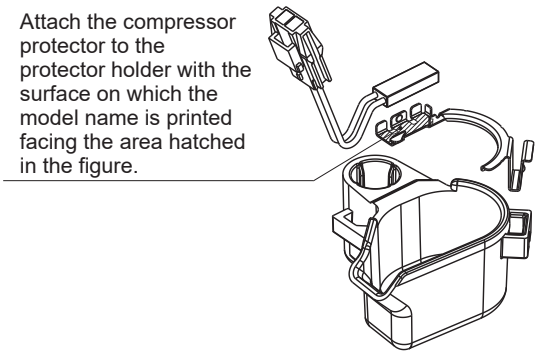


Photo 14

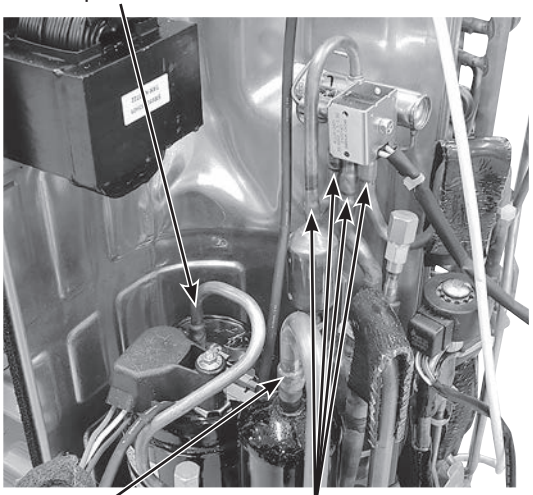
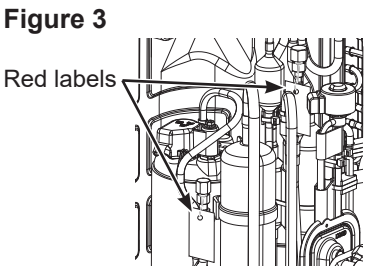


Figure 3



12-3. MUZ-HX24NL

NOTE: Turn OFF the power supply before disassembly.

OPERATING PROCEDURE	PHOTOS/FIGURES

1. Removing the cabinet

(1) Remove the screws of the service panel.
(2) Remove the screws of the top panel.
(3) Remove the screw of the valve cover.
(4) Remove the service panel.
(5) Remove the top panel.
(6) Remove the valve cover.
(7) Remove the screws fixing the conduit cover. (Photo 5)
(8) Remove the conduit cover.
(9) Remove the screw fixing the conduit plate. (Photo 6)
(10) Remove the conduit plate.
(11) Disconnect the power supply and indoor/outdoor connecting wire.
(12) Remove the screws of the cabinet.
(13) Remove the cabinet.
(14) Remove the screws of the back panel.
(15) Remove the back panel.

NOTE: If the red labels have been removed during the operation, put them back in the original position after the operation. Red labels indicate the use of flammable refrigerants. (Figure 1)

Photo 2

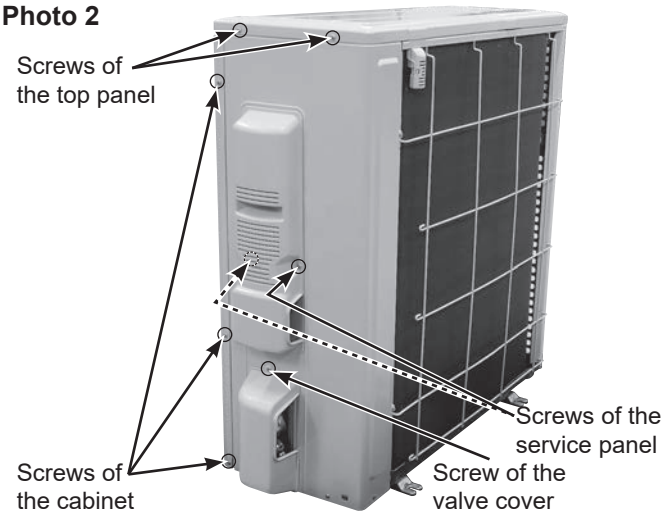


Photo 3

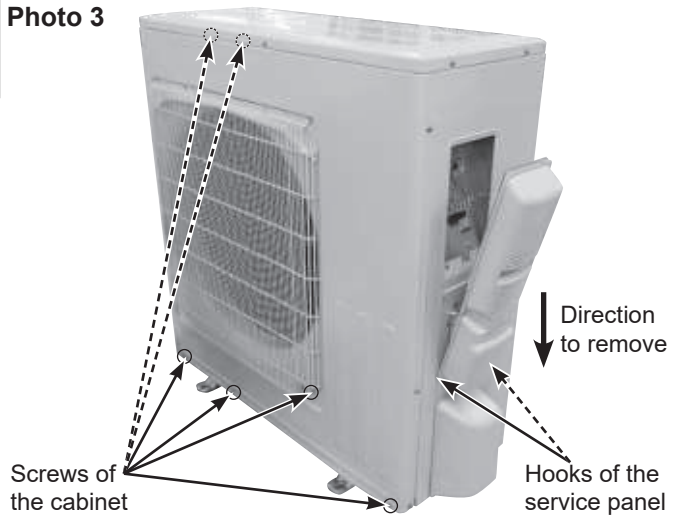


Photo 1

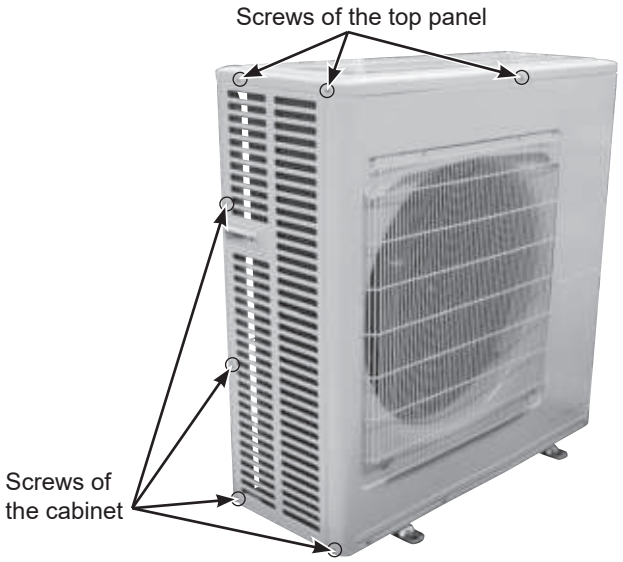


Photo 4

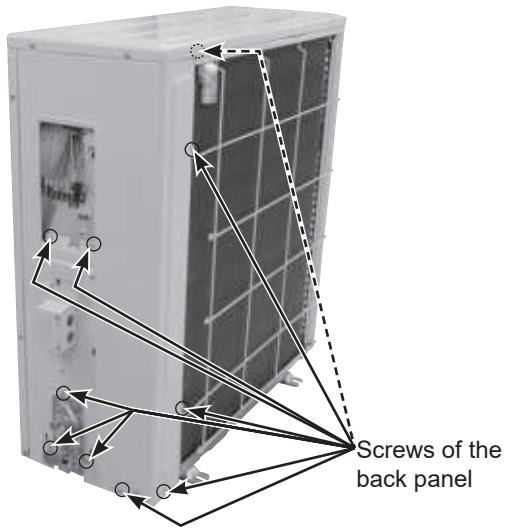
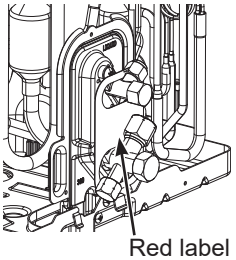
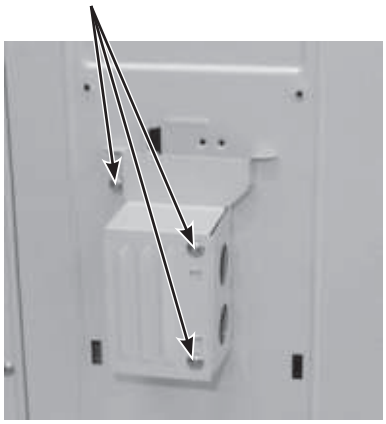
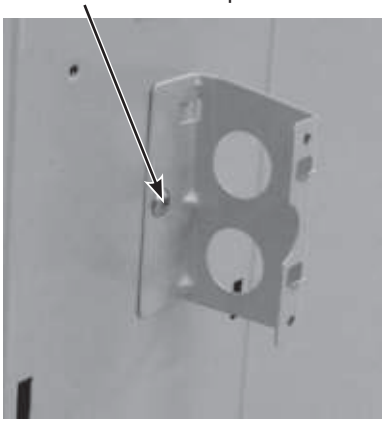
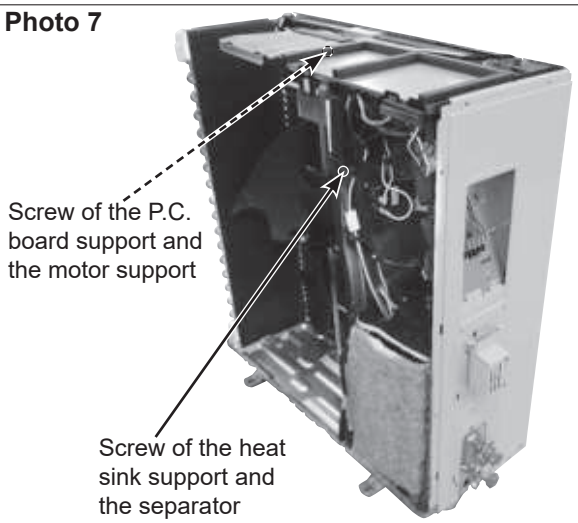
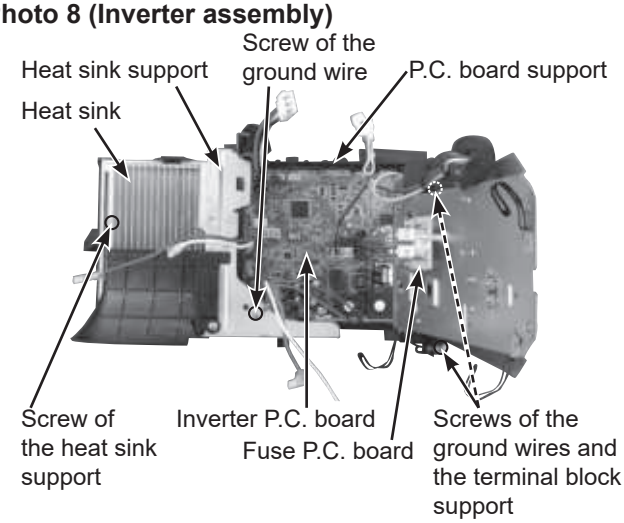


Figure 1



OPERATING PROCEDURE	PHOTOS/FIGURES
Photo 5 Screws of the conduit cover 	**Photo 6** Screw of the conduit plate 
2. Removing the inverter assembly, inverter P.C. board and fuse P.C. board **2-1. Removing the inverter assembly and inverter P.C. board** (1) Remove the top panel, cabinet and service panel. (Refer to section 1.) (2) Disconnect the lead wire to the reactor and the following connectors: <Inverter P.C. board> CN602 (R.V. coil) CN931, CN932 (Fan motor) CN671 (Defrost thermistor, discharge temperature thermistor and outdoor heat exchanger temperature thermistor) CN672 (Ambient temperature thermistor) CN724 (Expansion valve coil) CN64 (Compressor protector) (3) Remove the compressor connector (CN61). (4) Remove the screws fixing the heat sink support and the separator. (5) Remove the screws fixing the P.C. board support and the motor support. (6) Remove the inverter assembly. (7) Remove the screws of the ground wires and the terminal block support. (8) Remove the screw of the heat sink support, and the heat sink support from the P.C. board support.	**Photo 7**  **Photo 8 (Inverter assembly)** 

OPERATING PROCEDURE	PHOTOS/FIGURES

*** Connection procedure when attaching the inverter P.C. board (Photo 8, 9, 10, 11)**

1. Attach the heat sink support to the P.C. board support.
2. Hook the lead wires of the compressor, the reactor and the P.C. board to each hooks on the heat sink support as shown in Photo 10.
3. Connect the lead wires of the expansion valve coil to the connector on the inverter P.C. board. Pull the lead wires of the expansion valve coil toward you and put them on the left hook on the P.C. board support as shown in Photo 11.
4. Hook the lead wires of the compressor, fuse P.C. board, discharge temperature thermistor, defrost thermistor and expansion valve coil to each hook and tighten the wires with the fastener as shown in Photo 11.

Photo 9

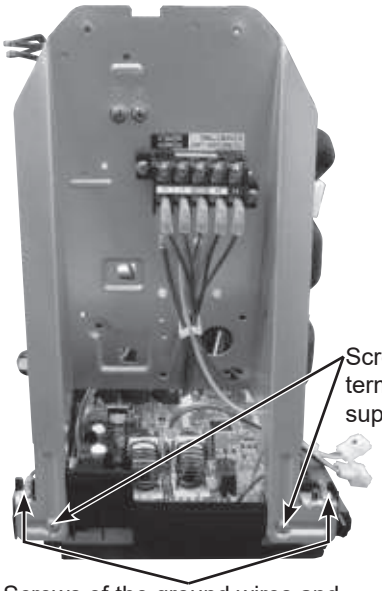


Photo 10

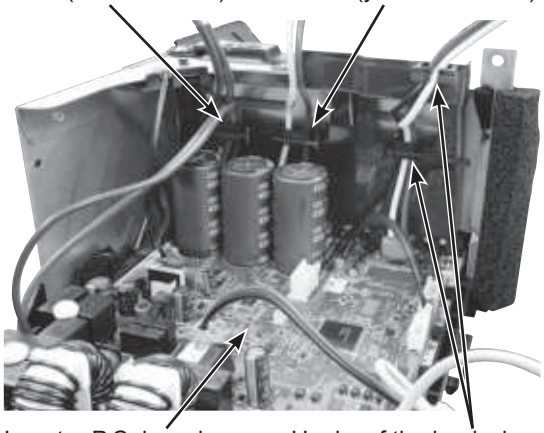
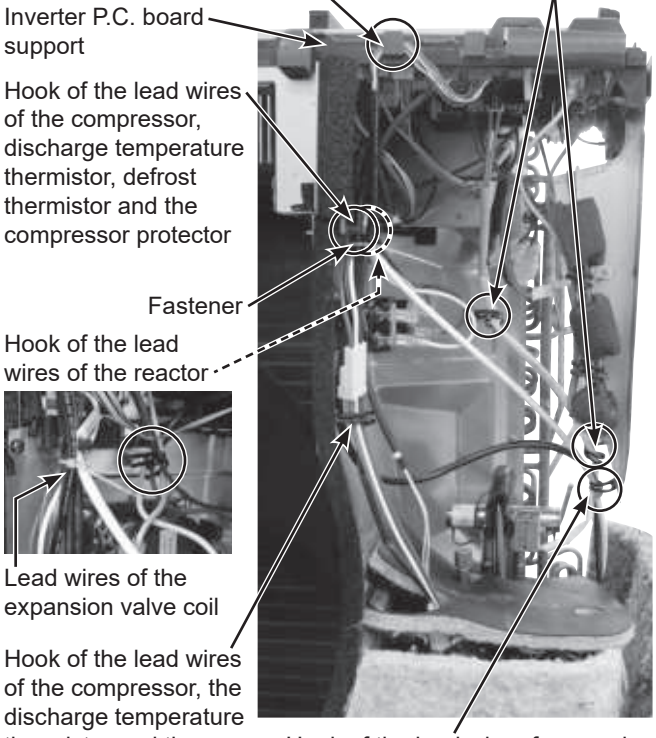
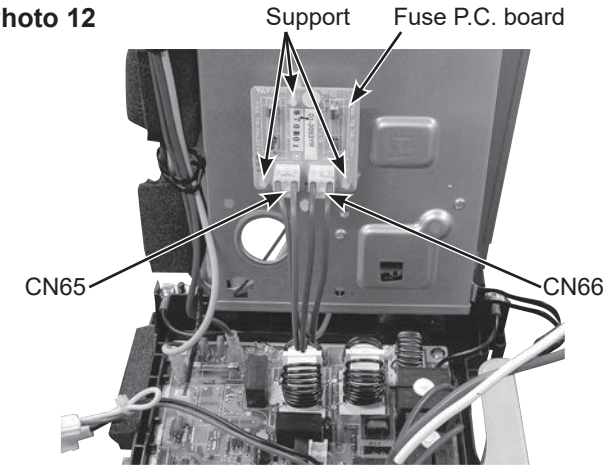
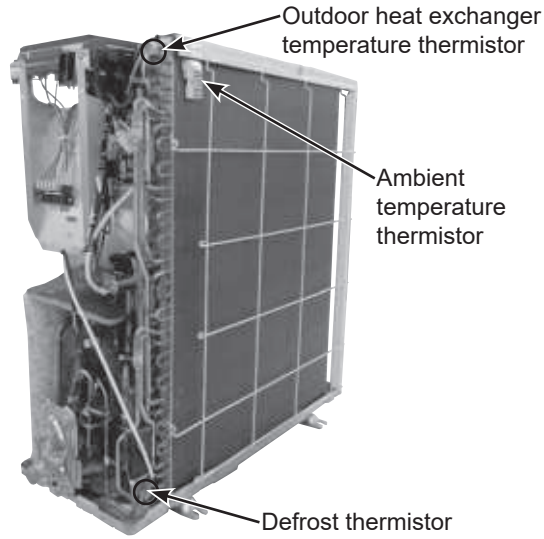
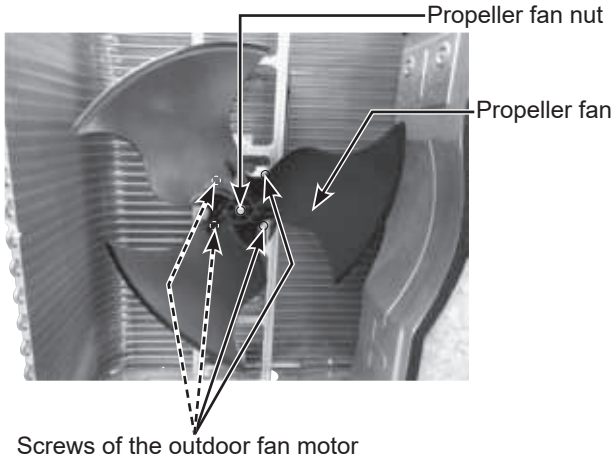
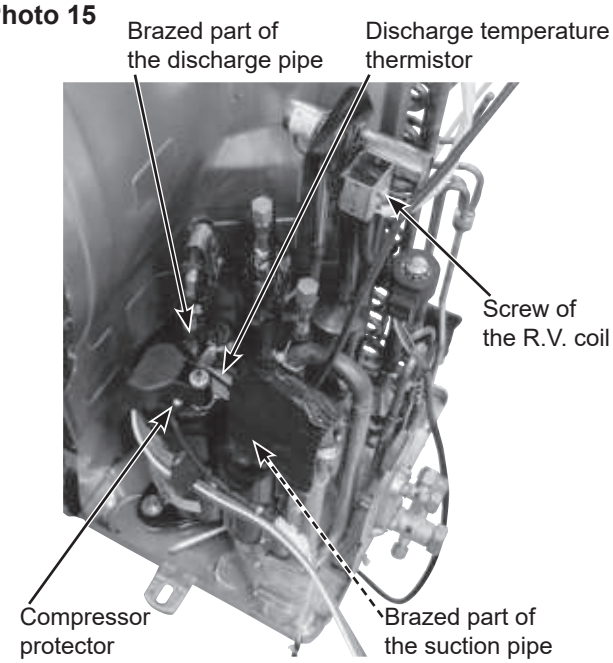


Photo 11



OPERATING PROCEDURE	PHOTOS/FIGURES
2-2. Removing the fuse P.C. board (1) Remove the top panel, cabinet and service panel. (Refer to section 1.) (2) Disconnect the lead wire to the reactor and the inverter P.C. board connectors. (Refer to section 2-1. (2)) (3) Remove the compressor connector (CN61). (4) Remove the screws fixing the heat sink support and the separator. (5) Remove the screws fixing the P.C. board support and the motor support. (6) Remove the fixing screws of the terminal block support and the back panel. (7) Remove the inverter assembly. (8) Remove the following disconnected connectors: <Fuse P.C. board> CN65, CN66 (Terminal block) (9) Remove the fuse P.C. board from the supports.	**Photo 12**  Pinch the stopper of the support, and push it into the hole to remove the fuse P.C. board.
3. Removing the discharge temperature thermistor, defrost thermistor, outdoor heat exchanger temperature thermistor and ambient temperature thermistor (1) Remove the cabinet and panels. (Refer to section 1.) (2) Disconnect the lead wire to the reactor and the following connectors: <Inverter P.C. board> CN671 (Defrost thermistor, discharge temperature thermistor and outdoor heat exchanger temperature thermistor) CN672 (Ambient temperature thermistor) (3) Pull out the discharge temperature thermistor from its holder. (Photo 15) (4) Pull out the defrost thermistor from its holder. (5) Pull out the outdoor heat exchanger temperature thermistor from its holder. (Photo 13) (6) Pull out the ambient temperature thermistor from its holder.	**Photo 13** 

OPERATING PROCEDURE	PHOTOS/FIGURES
4. Removing outdoor fan motor (1) Remove the top panel, cabinet and service panel. (Refer to section 1.) (2) Disconnect the following connectors: <Inverter P.C. board> CN931, CN932 (Fan motor) (3) Remove the propeller fan nut. (4) Remove the propeller fan. (5) Remove the screws fixing the fan motor. (6) Remove the fan motor.	**Photo 14** 
5. Removing R. V. coil (1) Remove the cabinet and panels. (Refer to section 1.) (2) Disconnect the following connectors: <Inverter P.C. board> CN602 (R.V. coil) (3) Remove the R.V. coil.	**Photo 15** 

OPERATING PROCEDURE	PHOTOS/FIGURES

6. Removing the compressor and 4-way valve

(1) Remove the cabinet and panels. (Refer to section 1.)
(2) Remove the inverter assembly. (Refer to section 2.)
(3) Remove the screws fixing the reactor.
(4) Remove the reactor.
(5) Remove the soundproof felt.
(6) Recover gas from the refrigerant circuit.
NOTE: Recover gas from the pipes until the pressure gauge shows 0 psig.
(7) Detach the brazed part of the suction and the discharge pipe connected with compressor. (Photo 15)
(8) Remove the compressor nuts.
(9) Remove the compressor.
(10) Detach the brazed parts of 4-way valve and pipe.

NOTE: If the red labels have been removed during the operation, put them back in the original position after the operation. Red labels indicate the use of flammable refrigerants. (Figure 2)

Photo 16

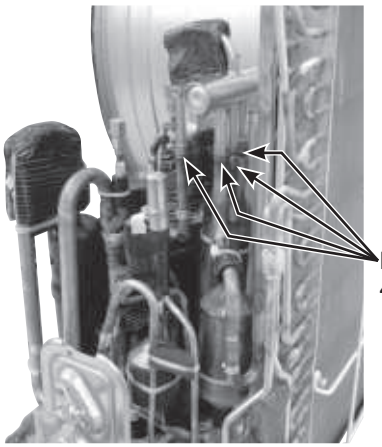


Figure 2

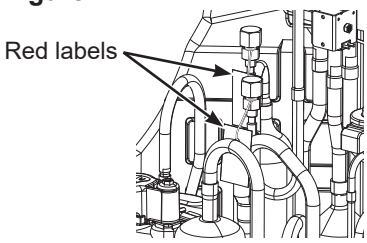
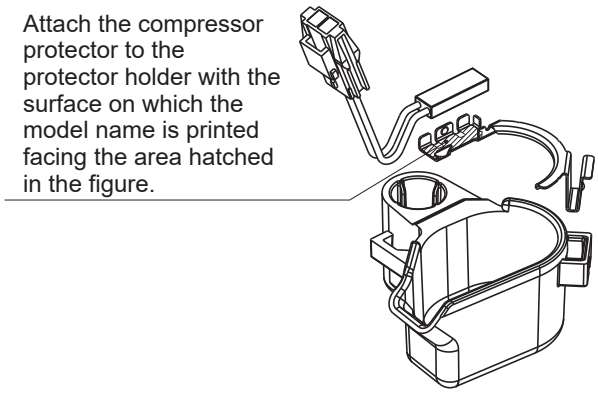


Figure 3



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