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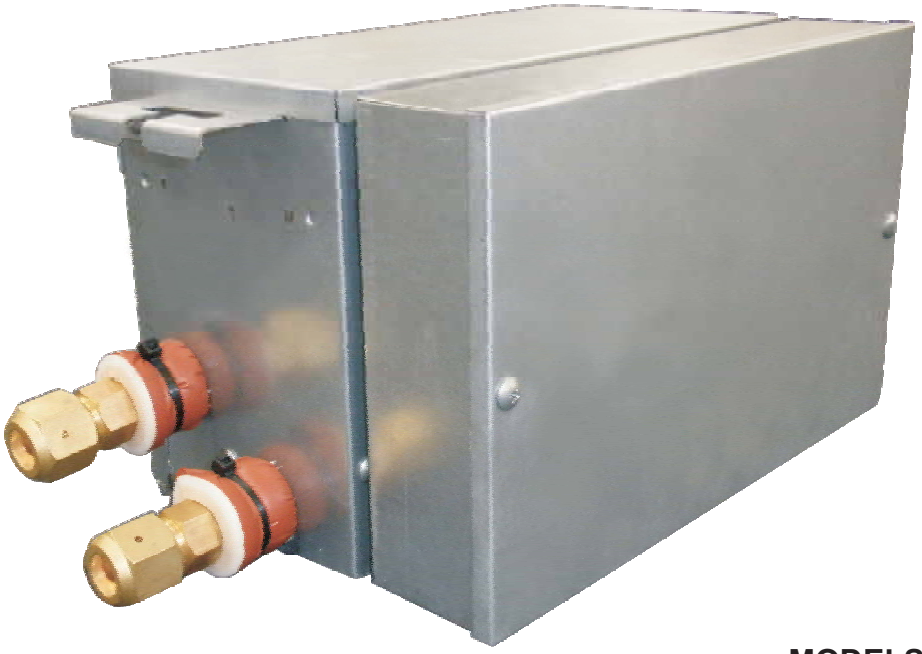
CH-UNIT

INSTALLATION AND OPERATION MANUAL
MANUAL DE INSTALACIÓN Y FUNCIONAMIENTO
INSTALLATIONS- UND BETRIEBSHANDBUCH
MANUEL D'INSTALLATION ET DE FUNCTIONNEMENT
MANUALE D'INSTALLAZIONE E D'USO

MANUAL DE INSTALAÇÃO E DE FUNCIONAMENTO
BRUGER- OG MONTERINGSVEJLEDNING
INSTALLATIE- EN BEDIENINGSHANDLEIDING
HANDBOK FÖR INSTALLATION OCH ANVÄNDING
ΕΓΧΕΙΡΙΔΙΟΕΓΚΑΤΑΣΤΑΣΗΣΚΑΙΛΕΙΤΟΥΡΓΙΑΣ



MODELS:

CH-6.0N1
CH-10.0N1

- Read and understand this manual before performing any operation with the unit. Keep this manual for future reference.
- Lea detenidamente este manual antes de realizar ninguna operación con la unidad. Guarde el manual para futuras consultas.
- Lesen Sie dieses Handbuch gründlich durch, bevor Sie das Gerät in Betrieb nehmen. Bewahren Sie dieses Handbuch für in der Zukunft eventuell auftretende Fragen oder Probleme auf.
- Lisez avec attention le contenu de ce manuel avant de réaliser toute opération avec l'unité. Conservez-le afin de pouvoir vous y référer ultérieurement.
- Leggere e comprendere il presente manuale prima di eseguire eventuali operazioni con l'unità. Conservare il presente manuale per una consultazione futura.
- Leia e compreenda este manual antes de executar qualquer operação com a unidade. Guarde este manual para referência futura.
- Læs denne vejledning grundigt igennem, inden du anvender enheden. Gem denne vejledning til fremtidig brug.
- Lees deze handleiding zorgvuldig door voordat u een handeling uitvoert met het apparaat. Bewaar deze handleiding voor naslag.
- Läs noga igenom den här handboken innan du börjar använda enheten. Spara handboken för framtida bruk.
- Διαβάστε προσεκτικά αυτό το εγχειρίδιο πριν εκτελέσετε οποιαδήποτε λειτουργία με αυτήν την μονάδα. Κρατήστε το εγχειρίδιο για μελλοντική αναφορά.

ENGLISH ESPAÑOL DEUTSCH FRANÇAIS ITALIANO PORTUGUÊS DANSK NEDERLANDS SVENSKA ΕΛΛΗΝΙΚΑ

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Specifications in this manual are subject to change without notice in order that HITACHI may bring the latest innovations to their customers.

Whilst every effort is made to ensure that all specifications are correct, printing errors are beyond Hitachi's control; Hitachi cannot be held responsible for these errors.

ATTENTION:

This product shall not be mixed with general house waste at the end of its life and it shall be retired according to the appropriated local or national regulations in a environmentally correct way.

Due to the refrigerant, oil and other components contained in Air Conditioner, its dismantling must be done by a professional installer according to the applicable regulations.

Contact to the corresponding authorities for more information.

ATENCIÓN:

Éste producto no se debe eliminar con la basura doméstica al final de su vida útil y se debe desechar de manera respetuosa con el medio ambiente de acuerdo con los reglamentos locales o nacionales aplicables.

Debido al refrigerante, el aceite y otros componentes contenidos en el sistema de aire acondicionado, su desmontaje debe realizarlo un instalador profesional de acuerdo con la normativa aplicable.

Para obtener más información, póngase en contacto con las autoridades competentes.

ACHTUNG:

Dass Ihr Produkt am Ende seiner Betriebsdauer nicht in den allgemeinen Hausmüll geworfen werden darf, sondern entsprechend den geltenden örtlichen und nationalen Bestimmungen auf umweltfreundliche Weise entsorgt werden muss.

Aufgrund des Kältemittels, des Öls und anderer in der Klimaanlage enthaltener Komponenten muss die Demontage von einem Fachmann entsprechend den geltenden Vorschriften durchgeführt werden.

Für weitere Informationen setzen Sie sich bitte mit den entsprechenden Behörden in Verbindung.

ATTENTION:

Ne doit pas être mélangé aux ordures ménagères ordinaires à la fin de sa vie utile et qu'il doit être éliminé conformément à la réglementation locale ou nationale, dans le plus strict respect de l'environnement.

En raison du frigorigène, de l'huile et des autres composants que le climatiseur contient, son démontage doit être réalisé par un installateur professionnel conformément aux réglementations en vigueur.

ATTENZIONE:

Indicazioni per il corretto smaltimento del prodotto ai sensi della Direttiva Europea 2002/96/EC e Dlgs 25 luglio 2005 n.151

Il simbolo del cassonetto barrato riportato sull' apparecchiatura indica che il prodotto alla fine della propria vita utile deve essere raccolto separatamente dagli altri rifiuti.

L'utente dovrà, pertanto, conferire l'apparecchiatura giunta a fine vita agli idonei centri di raccolta differenziata dei rifiuti elettronici ed elettrotecnici, oppure riconsegnarla al rivenditore al momento dell' acquisto di una nuova apparecchiatura di tipo equivalente.

L'adeguata raccolta differenziata delle apparecchiature dismesse, per il loro avvio al riciclaggio, al trattamento ed allo smaltimento ambientalmente compatibile, contribuisce ad evitare possibili effetti negativi sull' ambiente e sulla salute e favorisce il riciclo dei materiali di cui è composta l' apparecchiatura.

Non tentate di smontare il sistema o l'unità da soli poichè ciò potrebbe causare effetti dannosi sulla vostra salute o sull' ambiente.

Vogliate contattare l' installatore, il rivenditore, o le autorità locali per ulteriori informazioni.

Lo smaltimento abusivo del prodotto da parte dell'utente può comportare l'applicazione delle sanzioni amministrative di cui all'articolo 50 e seguenti del D.Lgs. n. 22/1997.

ATENÇÃO:

O seu produto não deve ser misturado com os desperdícios domésticos de carácter geral no final da sua duração e que deve ser eliminado de acordo com os regulamentos locais ou nacionais adequados de uma forma correcta para o meio ambiente.

Devido ao refrigerante, ao óleo e a outros componentes contidos no Ar condicionado, a desmontagem deve ser realizada por um instalador profissional de acordo com os regulamentos aplicáveis.

Contacte as autoridades correspondentes para obter mais informações.

BEMÆRK:

At produktet ikke må smides ud sammen med almindeligt husholdningsaffald, men skal bortskaffes i overensstemmelse med de gældende lokale eller nationale regler på en miljømæssig korrekt måde.

Da klimaanlægget indeholder kølemiddel, olie samt andre komponenter, skal afmontering foretages af en fagmand i overensstemmelse med de gældende bestemmelser.

Kontakt de pågældende myndigheder for at få yderligere oplysninger.

ATTENTIE:

Dit houdt in dat uw product niet wordt gemengd met gewoon huisvuil wanneer u het weg doet en dat het wordt gescheiden op een milieuvriendelijke manier volgens de geldige plaatselijke en landelijke reguleringen.

Vanwege het koelmiddel, de olie en andere onderdelen in de airconditioner moet het apparaat volgens de geldige regulering door een professionele installateur uit elkaar gehaald worden.

Neem contact op met de betreffende overheidsdienst voor meer informatie.

OBS!:

Det innebär att produkten inte ska slängas tillsammans med vanligt hushållsavfall utan kasseras på ett miljövänligt sätt i enlighet med gällande lokal eller nationell lagstiftning.

Luftkonditioneringsaggregatet innehåller kylmedium, olja och andra komponenter, vilket gör att det måste demonteras av en fackman i enlighet med tillämpliga regelverk.

Ta kontakt med ansvarig myndighet om du vill ha mer information.

ΠΡΟΣΟΧΗ:

Σημαίνει ότι το προϊόν δεν θα πρέπει να αναμιχθεί με τα διάφορα οικιακά απορρίμματα στο τέλος του κύκλου ζωής του και θα πρέπει να αποσυρθεί σύμφωνα με τους κατάλληλους τοπικούς ή εθνικούς κανονισμούς και με τρόπο φιλικό προς το περιβάλλον.

Λόγω του ψυκτικού, του λαδιού και άλλων στοιχείων που περιέχονται στο κλιματιστικό, η αποσυναρμολόγησή του πρέπει να γίνει από επαγγελματία τεχνικό και σύμφωνα με τους ισχύοντες κανονισμούς.

Για περισσότερες λεπτομέρειες, επικοινωνήστε με τις αντίστοιχες αρχές.

DANGER – Immediate hazard which WILL result in severe injury or death.
PELIGRO – Riesgos inmediatos que PRODUCIRÁN lesiones personales graves e incluso la muerte.
GEFAHR – Unmittelbare Gefahrenquellen, die zu schweren Verletzungen oder zum Tod führen.
DANGER – Dangers instantanés de blessures corporelles sévères ou de mort.
PERICOLO – Pericolo immediato che PRODURRÀ ferite gravi o la morte.
PERIGO – Problemas imediatos que IRÃO resultar em graves ferimentos pessoais ou morte.
FARE – Overhængende fare, som VIL resultere i alvorlig personskade eller dødsfald.
GEVAAR – Onmiddellijke risico's die ernstige persoonlijke verwondingen of de dood ten gevolge kunnen hebben.
FARA – Omedelbar risk som medför svår personskada eller död.
KINAYNO – Άμεσος κίνδυνος που ΘΑ έχει ως αποτέλεσμα σοβαρές σωματικές βλάβες ή θάνατο.

WARNING – Hazards or unsafe practices which COULD result in severe personal injuries or death.
AVISO – Riesgos o prácticas poco seguras que PODRÍAN producir lesiones personales e incluso la muerte.
WARNUNG – Gefährliche oder unsichere Anwendung, die zu schweren Körperverletzungen oder zum Tod führen kann.
ATTENTION – Utilisation dangereuse ou sans garantie de sécurité qui PEUT provoquer de sévères blessures personnelles ou la mort.
AVVISO – Pericoli o azioni pericolose che POTREBBERO avere come esito lesioni fisiche gravi o il decesso.
AVISO – Riesgos o prácticas poco seguras que PUEDEN producir lesiones personales e incluso la muerte
ADVARSEL – Farer eller farlig brug, som KAN resultere i alvorlig personskade eller dødsfald.
WAARSCHUWING – Gevaren of onveilige praktijken die ernstig persoonlijk letsel of de dood tot gevolg KUNNEN hebben.
VARNING – Risker eller osäkra tillvägagångssätt som KAN leda till svåra personskador eller dödsfall.
ΠΡΟΕΙΔΟΠΟΙΗΣΗ – Κίνδυνοι ή επικίνδυνες πρακτικές, οι οποίες ΜΠΟΡΕΙ να έχουν ως αποτέλεσμα σοβαρές σωματικές βλάβες ή θάνατο.

CAUTION – Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.
PRECAUCIÓN – Riesgos o prácticas poco seguras que PODRÍAN provocar lesiones personales de menor importancia o daños en el producto u otros bienes.
VORSICHT – Gefährliche oder unsichere Anwendung, die geringfügigen Personen-, Produkt- oder Sachschaden verursachen kann.
PRECAUTION – Utilisation dangereuse ou sans garantie de sécurité qui PEUT provoquer des blessures mineures ou des dommages au produit ou aux biens.
ATTENZIONE – Pericoli o azioni pericolose che POTREBBERO avere come esito lesioni fisiche minori o danni al prodotto o ad altri beni.
CUIDADO – Perigos e procedimentos perigosos que PODERÃO PROVOCAR danos pessoais ligeiros ou danos em produtos e bens.
FORSIGTIG – Farer eller farlig brug, som KAN resultere i mindre skade på personer, produkt eller ejendom.
LET OP – Gevaren of onveilige praktijken die licht persoonlijk letsel of beschadiging van het product of eigendommen tot gevolg KUNNEN hebben.
VARSAMHET – Risker eller farliga tillvägagångssätt som KAN leda till mindre personskador eller skador på produkten eller på egendom.
ΠΡΟΣΟΧΗ – Κίνδυνοι ή επικίνδυνες πρακτικές, οι οποίες ΜΠΟΡΕΙ να έχουν ως αποτέλεσμα την πρόκληση ελαφρών σωματικών βλαβών ή καταστροφή περιουσίας.

NOTE – When installing the AquaFREE module, use only the manuals that appear inside the AquaFREE box. Do not use the manual inside the Outdoor Unit.
NOTA – Cuando instale el módulo AquaFREE, use sólo los manuales que se incluyen en la caja del AquaFREE. No emplee los manuales de la unidad exterior.
HINWEIS – Benutzen Sie beim Installieren des AquaFREE Moduls nur die in der Verpackung des AquaFREE mitgelieferten Handbücher. Verwenden Sie nicht das Handbuch des Außengeräts.
REMARQUE – Lors de l'installation du module AquaFREE, n'utilisez que les manuels qui se trouvent dans sa boîte. N'utilisez pas le manuel qui se trouve dans le Groupe Extérieur.
NOTA – Per l'installazione del modulo AquaFREE utilizzare solo i manuali inclusi nella confezione di AquaFREE. Non utilizzare il manuale incluso nella confezione dell'unità esterna.
NOTA – Ao instalar o módulo AquaFREE, utilize apenas os manuais fornecidos no interior da caixa do AquaFREE. Não utilize o manual fornecido no interior da caixa da unidade exterior.
BEMÆRK – Anvend kun de manualer, som findes inde i AquaFREE-kassen, ved montering af AquaFREE-modulet. Anvend ikke manualen inde i udendørsenheden.
OPMERKING – Maak bij de installatie van de AquaFREE-module alleen gebruik van de handleidingen in de AquaFREEdoos. Gebruik niet de handleiding in de buitenunit.
ANM – När du installerar AquaFREE-modulen ska du endast använda handböckerna i AquaFREE-paketet. Använd inte handboken för utomhusenheten.
ΣΗΜΕΙΩΣΗ – Όταν εγκαθιστάτε τη μονάδα AquaFREE, χρησιμοποιήστε μόνο τα εγχειρίδια που περιλαμβάνονται στο κουτί AquaFREE. Μην χρησιμοποιήσετε το εγχειρίδιο εντός της εξωτερικής μονάδας.

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1. SAFETY SUMMARY

WARNING:

- *Do not perform installation work, refrigerant piping work and electrical wiring connection without referring to our installation manual.*
- *Check that the ground wire is securely connected.*
- *Connect a fuse of specified capacity.*

CAUTION:

- *Do not install the CH unit and cable within approximately 3 meters from strong electromagnetic wave radiators such as medical equipment.*

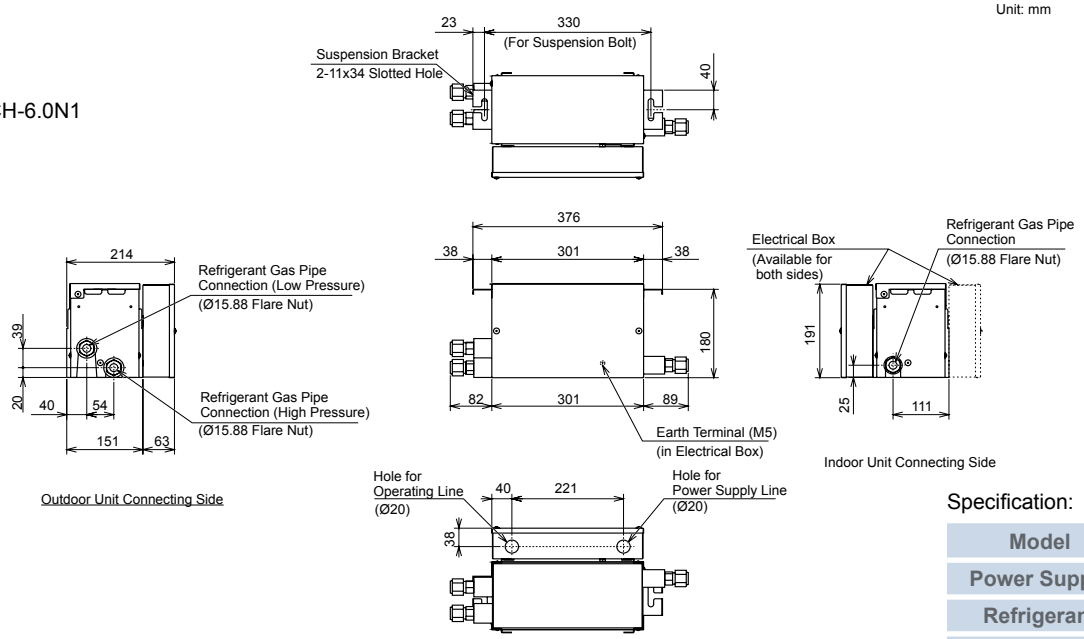
2. STRUCTURE

2.1 DIMENSIONS

2.1.1. MODEL: CH UNIT – CH-(6.0/10.0)N1

Unit: mm

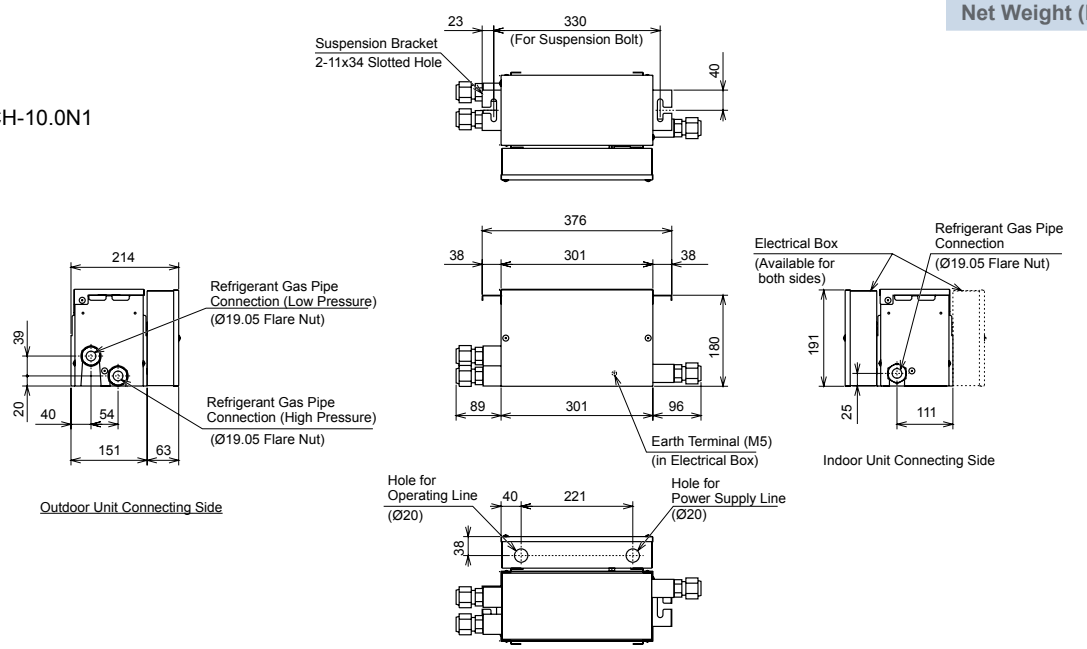
CH-6.0N1



Specification:

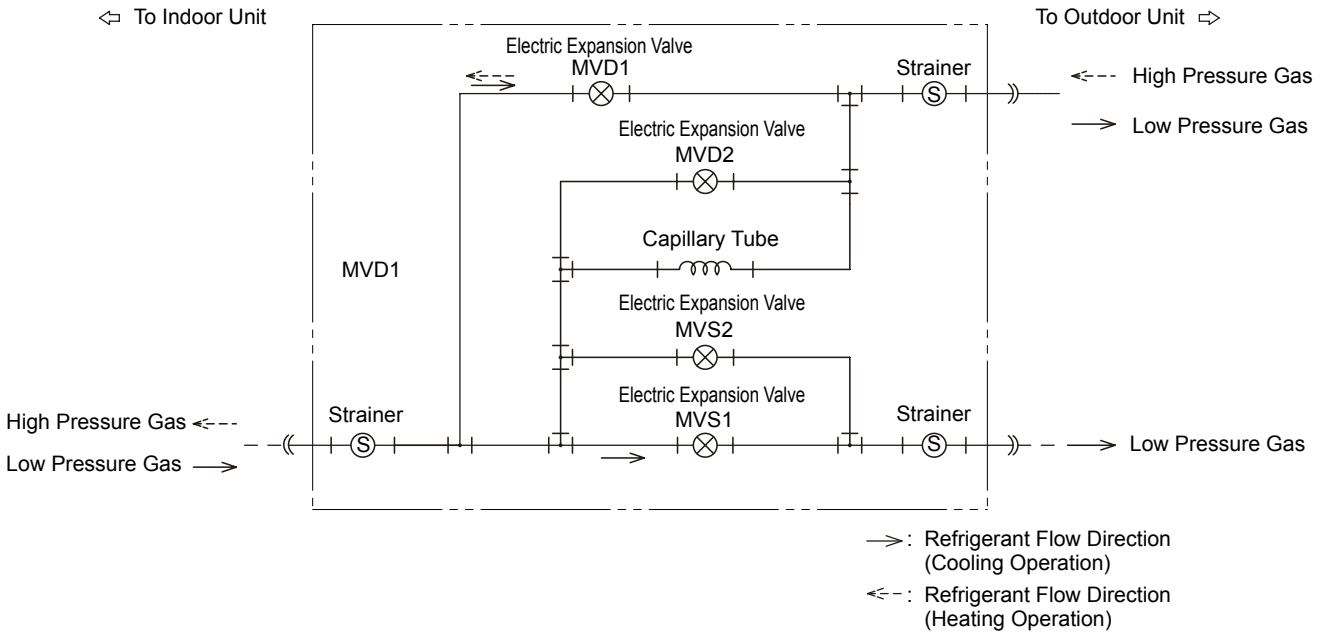
Model	CH-6.0N1	CH-10.0N1
Power Supply	AC 1~ 220-240V 50Hz	
Refrigerant	R410A	
Input (W)	20	
Net Weight (kg)	7	

CH-10.0N1



2.2. REFRIGERANT CYCLE

2.2.1. CH UNIT - CH-(6.0/10.0)N1



2.3. NECESSARY TOOLS AND INSTRUMENT LIST FOR INSTALLATION

No.	Tool	No.	Tool
1	Handsaw	11	Spanner
2	Phillips Screwdriver	12	Charging Cylinder
3	Vacuum Pump	13	Gauge Manifold
4	Refrigerant Gas Hose	14	Cutter for Wires
5	Megohmmeter	15	Gas Leak Detector
6	Copper Pipe Bender	16	Leveller
7	Manual Water Pump	17	Clamper for Solderless Terminals
8	Pipe Cutter	18	Hoist (for Indoor Unit)
9	Brazing Kit	19	Ammeter
10	Hexagon Wrench	20	Voltage Meter

3. TRANSPORTATION AND HANDLING

Transport the product as close to the installation location as practical before unpacking

WARNING:

- *Do not put any foreign material into the CH Unit and check to ensure that none exists in the outdoor unit before the installation and test run. Otherwise, a fire or failure, etc. may occur.*

CAUTION:

- *Do not put any material on the product.*
- *Be careful not to damage on insulation materials of unit's surface when lifting.*

3.1. COMBINATION CH UNIT AND INDOOR UNIT

The CH Unit is Installed indoors for the SET-FREE FSXN system, between the outdoor unit and Indoor unit. The combination of the CH Unit and indoor Unit is as follows.

Model	Indoor Unit Quantity	Total Indoor Capacity (HP)
CH-6.0N1	1 to 7	Less than 6.0
CH-10.0N1	1 to 8	6.1~10.0

NOTE:

- *The excess of the total capacity may cause insufficient performance and abnormal sound. Be sure to connect within the allowable total capacity.*
- *In case that the indoor unit total capacity is 10.0HP for CH-10.0N1, the performance may decrease approximately 5% in cooling and 10% in heating.*

4. CH UNIT INSTALLATION

DANGER:

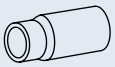
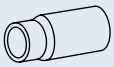
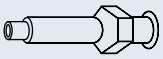
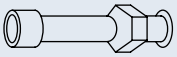
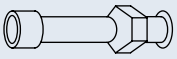
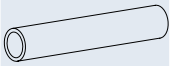
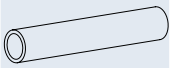
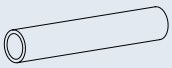
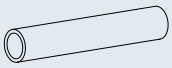
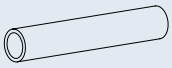
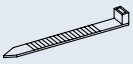
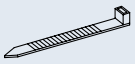
- Do not install the Indoor Unit in a flammable environment to avoid fire or an explosion.

WARNING:

- Check to ensure that the ceiling slab is strong enough.
- Do not install the CH Unit outside. If installed outdoors, an electric hazard electric leakage will occur.

4.1. FACTORY-SUPPLIED ACCESSORIES

Check to ensure that the following accessories are packed with the CH Unit.

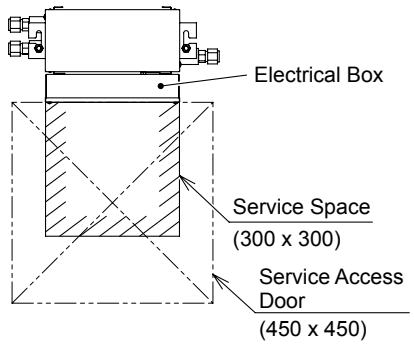
Accessory \ Model		CH-6.0N1			Qty	CH-10.0N1			Qty
Reducer		ID15.88		ID19.05	1	ID15.88		ID19.05	1
Accessory Pipe (for Flare Nut)		ID12.7		ID15.88	2		-		-
			-		-	ID22.2		ID19.05	2
			-		-	ID19.05		ID19.05	2
Insulation Material	ID16				2		-		-
	ID38				3		-		-
	ID20		-		-				1
	ID22		-		-				2
	ID43		-		-				3
Clamp					6				6

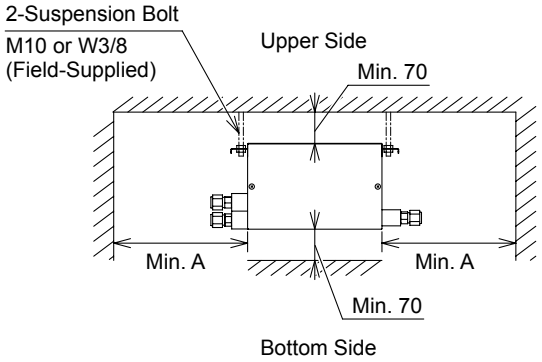
ID: Inner Diameter

4.2 INITIAL CHECK

- Install the CH unit with a proper clearance around it for maintenance working space, as shown in next figure.

Unit: mm





Size / Model	A
CH-6.0N1	300
CH-10.0N1	400

- Check to ensure that the ceiling is sufficiently strong to sustain the CH unit. If the ceiling is weak, abnormal sound and vibration may occur.
- The refrigerant flow sound may be heard from the CH unit when the electric expansion valve in the CH unit is activated. Therefore, take the following action to minimize the sound.

  a) Install the CH unit inside the ceiling. As for the ceiling material, select a material like a plaster board (at least 9mm) which minimizes operation sound.

  b) Do not install the CH unit in a place near bed rooms or hospital rooms.
- The refrigerant flow sound may be head from the CH unit when the operation is changed to cooling/heating mode. Therefore install the CH unit in the ceiling of corridor so that refrigerant flowing sound may not be heard in the room.
- Do not install the CH unit in a hot or humid place like kitchen to prevent dew condensation on the outer surface of the CH unit.
  When installing the CH unit in such places, apply additional insulation.
- Pay attention to the following points when the CH unit is installed in a hospital or other facilities where there are electronic waves from medical equipment.

  a) Do not install the CH unit where the electromagnetic wave is directly radiated to the electrical box or intermediate wiring. (Operating Line)

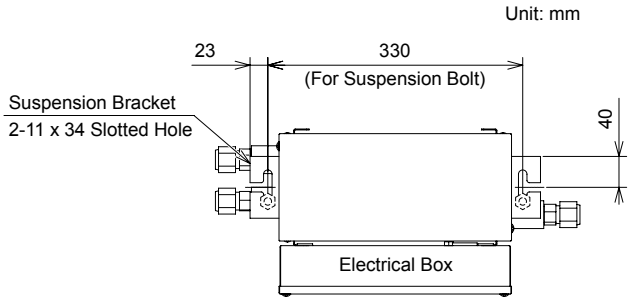
  b) Install the CH unit and components as far as practical or at least 3 meters from the electromagnetic wave radiator.

  c) Install a noise filter when the power supply emits harmful noises.
- The installation place should be convenient for the refrigerant piping or electrical wiring connection.
- Do not install the CH unit in the place with organic solvent atmospheres, such as painting and cleaning factories. Synthetic resin material may be damaged.
- Do not install the CH unit in the place where flammable gas may generate, drift or accumulate. Also avoid the place where the carbon fabric may float.

4.3 SUSPENSION BOLTS

Step 1

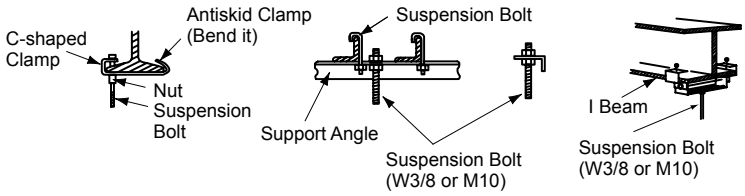
1. Select a final location and installation direction of the CH unit paying careful attention to the space for the piping, wiring and maintenance.
2. Mount suspension bolts after selecting the final location of the CH unit.
3. Mount the suspension bolts in the slotted hole on the electrical box side as shown beside
4. Contact the qualified constructor or carpenter for the ceiling treatment.



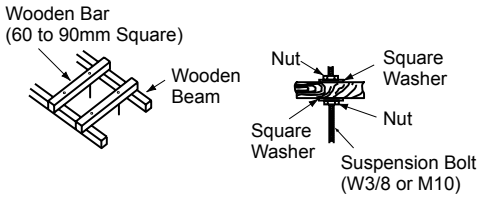
Step 2

Mount suspension bolts, as shown in next figures.

◆ **For Steel Beam**

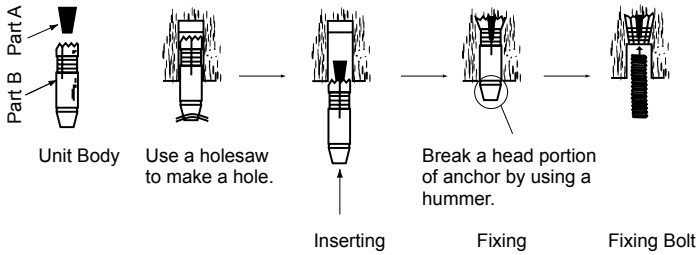


◆ **For Wooden Beam Suspension**

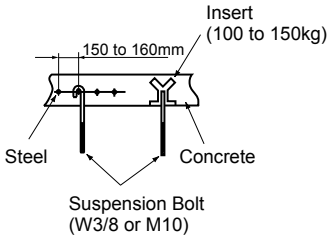


◆ **For Concrete Slab**

1. Hole-In Anchor

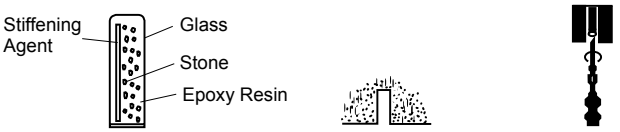


◆ **For Reinforcing Steel**



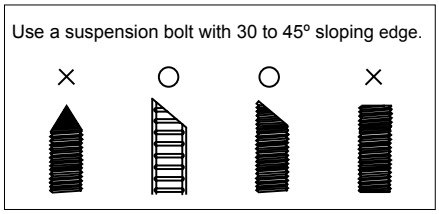
2. Resin Capsule

Use the resin capsule within a warranty period.
It effects for 6 months from the manufacturing date.



Resin Capsule | Use a holesaw to make a hole. | Inserting (with impulse rotation)

After inserting, do not rotate or put any force until resin is hardened.
Required time is as shown in the right table.



Ambient Temp. (ºC)	Time
20	Min. 30min.
15	Min. 1hr.
10	Min. 2hr.
5	Min. 4hr.
0	Min. 8hr.

NOTE:

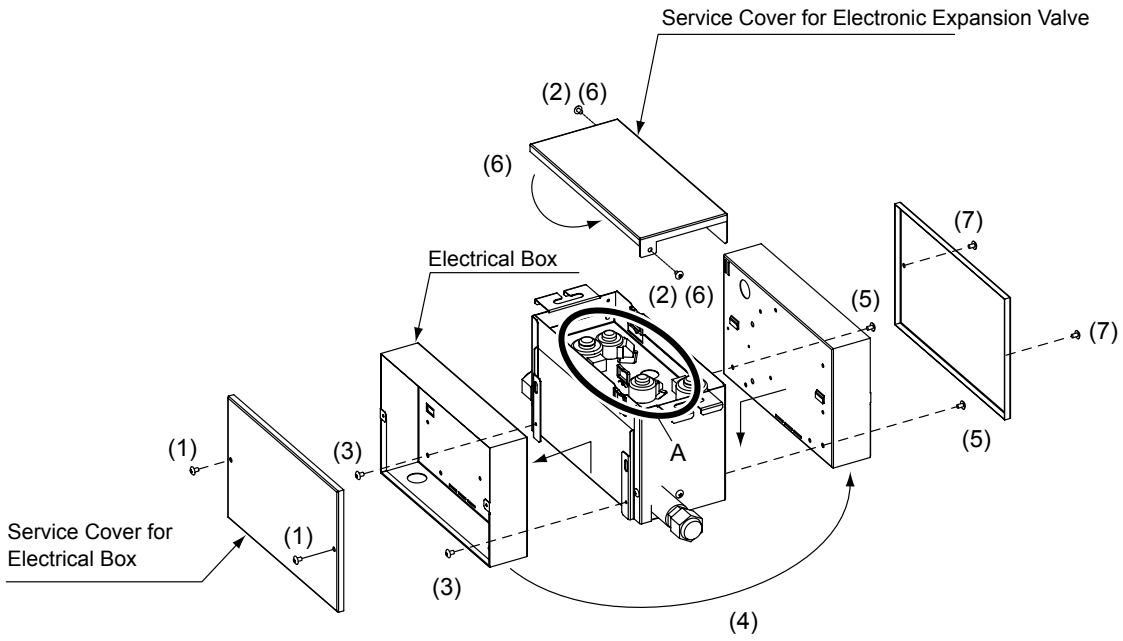
- *Use a suspension bolt (W3/8, Metric screw thread: M10).*
- *Prepare suitable washer and nut.*

4.4 INSTALLATION

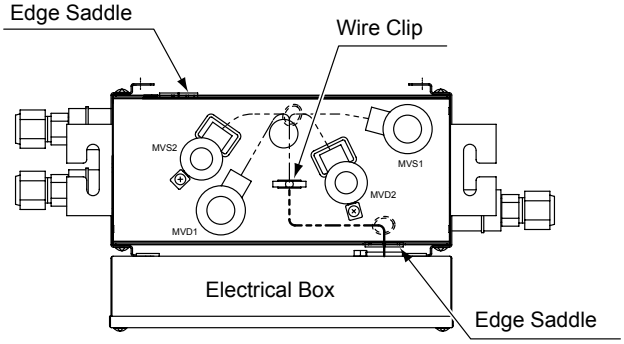
4.4.1 CHANGING THE LOCATION OF ELECTRICAL BOX

Depending on the installation space, changing the location of electrical box is available.
In case of changing the location of electrical box, follow the procedure below.

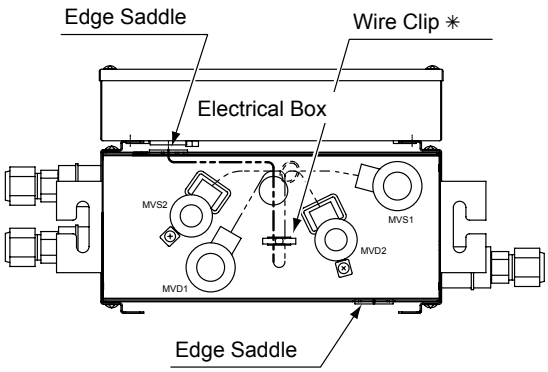
1. Remove the service cover for the electrical box.
2. Remove the service cover for the electronic expansion valve.
3. Remove the electrical box.
4. Remove the wiring from the wire clip and edge saddle, and move the electrical box.
   After moving the electrical box, the wiring should be put into the edge saddle and bounded with the wire clip. (Refer to "Enlarged View of A" below.)
5. Mount the electrical box.
6. Rotate the service cover for the electronic expansion valve 180 degrees and mount it.
7. Mount the service cover for the electrical box.



– Enlarged View of A



(Before Change)



(After Change)

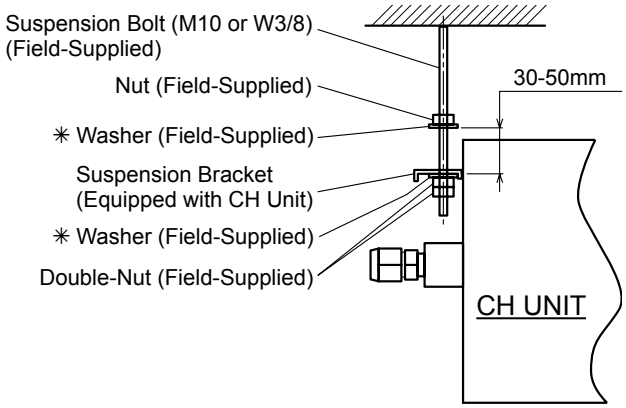
✳: Make sure that the wirings are bounded with the wire clips in order to prevent the electrical box from entering water.

4.4.2 MARKING OF THE POSITIONS OF THE SUSPENSION BOLTS AND WIRING CONNECTIONS

1. Mark the positions of the suspension bolts, refrigerant piping connections and wiring connection.
2. Installation dimensions are shown in chapter 2 “Structure”.

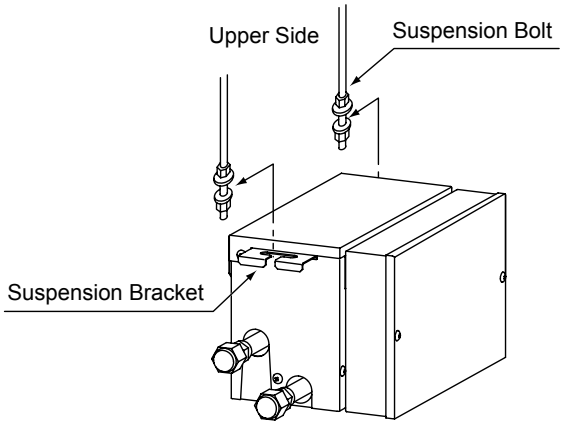
4.4.3 MOUNTING THE CH UNIT

1. How to put Nuts
   Put nuts on each of the two suspension bolts before hanging the CH unit, as shown in next figure.
   ✳: Mounting washers are required in order to fix the suspension bracket to the suspension bolt.



Field-Supplied Parts
* Suspension Bolt: 2-M10 or W3/8
* Nut: 6-M10 or W3/8
* Washer: 4-M10 or W3/8

2. Hanging the CH Unit
   a) To hang the CH unit hold it from the bottom of the casing.
   b) Insert the suspension bolt into the groove part of the suspension bracket as shown in the figure below. Ensure that the washers are correctly fixed to the suspension bracket.
   c) After hanging the unit, the piping and wiring connection should be done inside the ceiling. The position of the pipes has to be taken into account when selecting the location of the CH unit installation.If the CH unit has to be installed in a location where there is no piping or wiring connection, piping and wiring installation should be done before the unit is hanged.
   d) Keep the CH unit levelled to the ceiling. If the CH unit is not leveled, a malfunction may occur.
   e) Once the position of the CH unit is adjusted, tighten the nuts of the suspension bolts.



Bottom Side

5. REFRIGERANT PIPING WORK

DANGER:

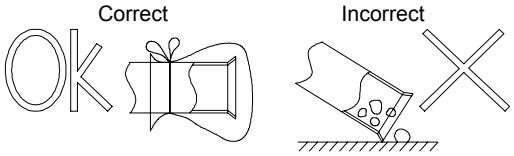
- *Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.*

5.1. PIPING MATERIALS

1. Prepare locally-supplied copper pipes.
2. Select clean copper pipes. Make sure there is no dust and moisture inside. Before connecting pipes, blow the inside of the pipes with nitrogen or dry air, to remove any dust or foreign materials.
3. Select the piping size with the correct thickness and correct material which can have sufficient pressure strength.

CAUTION

- *Cover the end of the pipe if the pipe has to be inserted through a hole.*
- *Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe.*
- *Remove all the flammable materials around the units. If not, it will cause a fire.*



5.2. CAUTIONS FOR PIPING CONNECTION WORK

a) Connect the indoor/outdoor connecting pipes. Fix the pipes and pay attention not to contact with weak materials such as ceiling. (Otherwise, abnormal sound may be heard due to the vibration of the piping.)

b) Apply refrigerant oil slightly on the sheet surface of the pipe and flare nut before the flaring work. And then tighten the flare nut with the specified tightening torque using two spanners. Perform the flaring work on the liquid piping side before the gas piping side. Check the gas leakage after the flaring work.

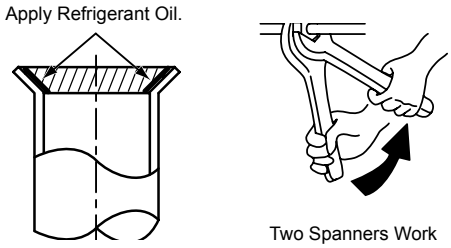
NOTE:

- Refrigerant oil is field-supplied.
- [Ethereal Oil FVC50K, FVC68D (Idemitsu Kousan Co. Ltd.)]

c) In case that temperature and humidity inside the ceiling exceed 27ºC/RH80%, apply additional insulation (approx. 10mm thickness) to the accessory insulation. It prevents dew condensation on the surface of the insulation (refrigerant pipe only).

d) Perform the air-tight test (4.15MPa for the test pressure). Refer to Technical Catalog for Outdoor Unit for more details.

e) Perform cold insulation work by insulating and taping the flare connection and reducer connection. Also insulate all the refrigerant pipes.



- Required Tightening Torque

Pipe Size		Tightening Torque
Ø6.35	(1/4)	14 ~ 18 N-m
Ø9.53	(3/8)	34 ~ 42 N-m
Ø12.7	(1/2)	49 ~ 61 N-m
Ø15.88	(5/8)	68 ~ 82 N-m
Ø19.05	(3/4)	100 ~ 120 N-m

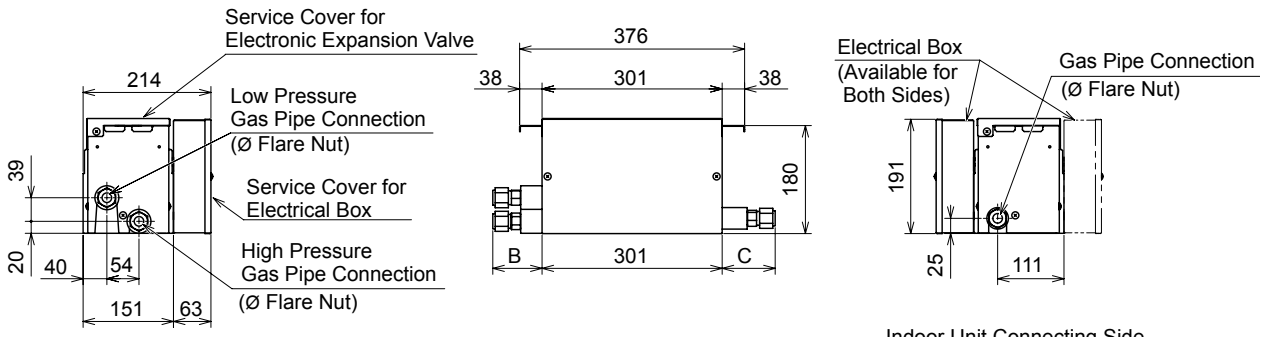
CAUTION

- *Do not apply excessive force to the flare nut when tightening. If applied, the flare nut may crack due to aged deterioration and refrigerant leakage may occur. Use the specified tightening torque.*
- *For more details of the refrigerant piping work, vacuum pumping and refrigerant charge, refer to Technical Catalog for Outdoor Unit.*

5.3 REFRIGERANT PIPING WORK

Provide the refrigerant pipe in the field.
Make sure that the refrigerant pipe should be connected to the same refrigerant cycle unit.

◆ Position of Piping Connection



Outdoor Unit Connecting Side

Indoor Unit Connecting Side

Unit: mm

Dimension / Model	A	B	C
CH-6.0N1	15.88	82	89
CH-10.0N1	19.05	89	96

◆ Selecting Piping Size

a) Select the size for the high pressure gas pipe, low pressure gas pipe and gas pipe according to the table 5.1. The size depends on the indoor unit total capacity connected downstream of the CH unit.
b) In case that the piping size from Table 5.1 and the piping connection size for CH unit from Table 5.2 are different, use an accessory pipe according to the item Piping connection (next page).
c) As for the multi-kit branch or header branch, refer to Technical Catalog for Outdoor Unit.

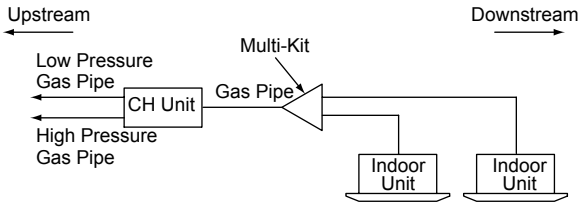
Table 5.1 Connected Indoor Unit Capacity and Piping Size

Model	Connected Indoor Unit Capacity (HP)	Low Pressure Gas Pipe (mm)	High Pressure Gas Pipe (mm)	Gas Pipe (mm)
CH-6.0N1	0.8~1.5	Ø15.88	Ø12.7	Ø12.7 *
	1.6~4.0	Ø15.88	Ø12.7	Ø15.88
	4.1~6.0	Ø19.05	Ø15.88	Ø15.88
CH-10.0N1	6.1~8.0	Ø19.05	Ø15.88	Ø19.05
	8.1~10.0	Ø22.2	Ø19.05	Ø22.2

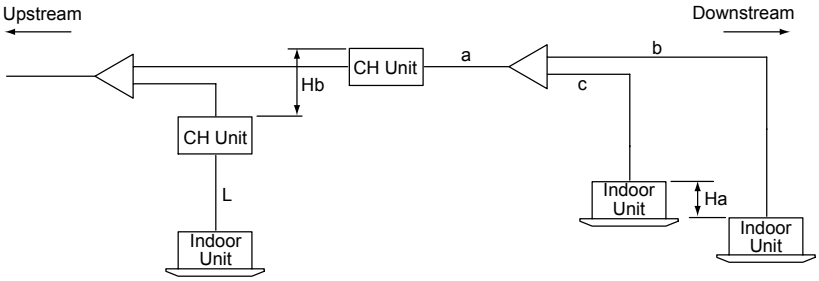
✳: *In case that a branch is located downstream of the CH unit and also the connected indoor unit capacity is 0.8~1.5HP, use Ø15.88 for the gas pipe.*

Table 5.2 Piping Connection Size for CH Unit

Model	Low Pressure Gas Pipe (mm)	High Pressure Gas Pipe (mm)	Gas Pipe (mm)
CH-6.0N1	Ø15.88	Ø15.88	Ø15.88
CH-10.0N1	Ø19.05	Ø19.05	Ø19.05



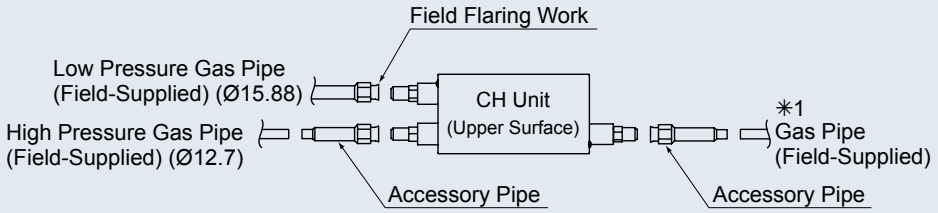
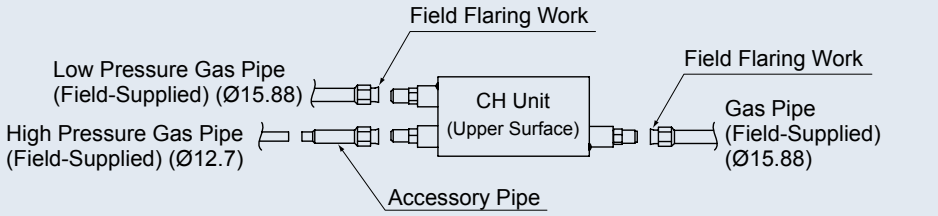
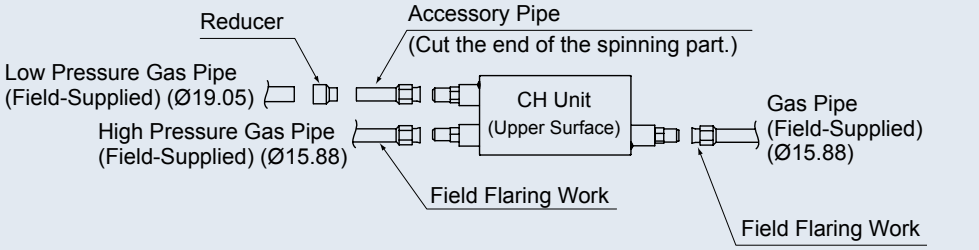
• Piping Work for CH Unit
Perform the piping work for CH unit according to the following table.



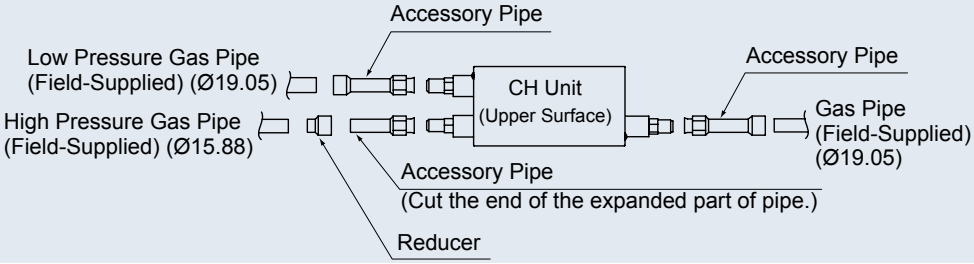
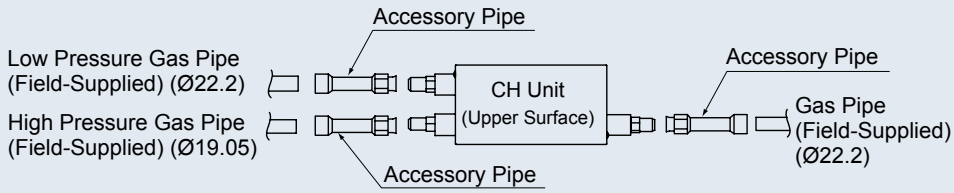
Condition of Piping Work

Item		Allowable Piping Length	
Total Piping Length between CH Unit and Indoor Unit	L a+b+c	CH-6.0N1	within 30m
		CH-10.0N1	within 10m
Height Difference between Indoor Units Connected to the Same CH Unit	Ha	within 4m	
Height Difference between CH Units	Hb	within 15m	

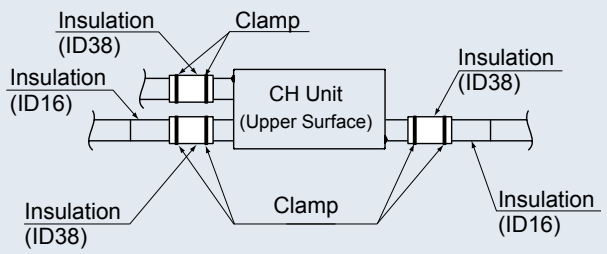
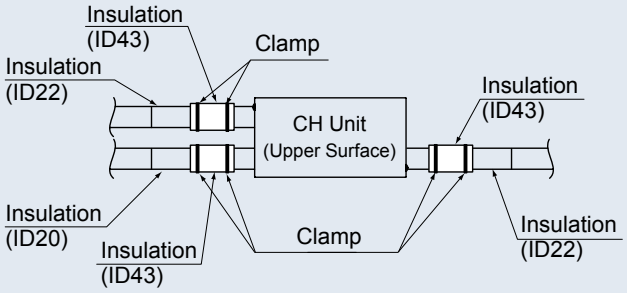
◆ Piping Connection

Connected Indoor Unit Capacity (HP)	CH-6.0N1
0.8 to 1.5	
1.6 to 4.0	
4.1 to 6.0	

✳1: In case that a branch is located downstream of the CH unit and also the connected indoor unit capacity is 0.8~1.5HP, perform the flaring work of the field gas pipe and connect it to the CH unit.

Connected Indoor Unit Capacity (HP)	CH-10.0N1
6.1 to 8.0	
8.1 to 10.0	

◆ **Piping Insulation**

CH-6.0N1	
CH-10.0N1	

ID: Inner Diameter

NOTE:

- *In case that the humidity inside the ceiling is high, apply additional insulation to the flare nut connection.*
- *Refer to the chapter initial check for more details.*

6. ELECTRICAL WIRING

WARNING:

- *Turn OFF the main power switch to the CH unit, the indoor unit and the outdoor unit before electrical wiring work or a periodical check is performed.*
- *Protect the wires, electrical parts, etc. from rats or other vermin.*
- *Use a medium sensing speed type ELB (Electric Leakage Breaker, activation speed of 0.1 sec. or less). If not used, it will cause an electric shock or a fire.*

◆ *Fix the cables securely. External forces on the terminals could lead to a fire*

CAUTION

- *Wrap the accessory packing around the wires, and plug the wiring connection hole with the seal material to protect the product from any condensate water or insects.*
- *Tightly secure the wires with the cord clamp inside the electrical box.*
- *Use twisted shielded pair cable or shield pair cable for transmission wires between the indoor and the outdoor units (Max. 1000m), and connect the shielded part to the earth screw in the electrical box of the indoor unit as shown the next page figure.*

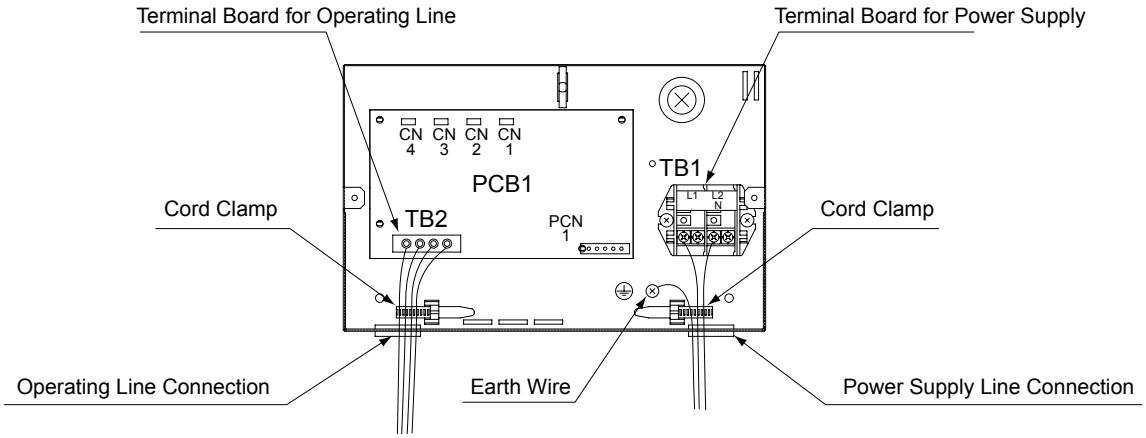
6.1. GENERAL CHECK

- Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data indicated in Technical Catalogue. Make sure that the components comply with National Electrical code (NEC)
- Check to ensure that the power supply voltage is within ±10% of rated voltage.
- Check the power source capacity is too low, the system cannot be started due to the voltage drop.
- Check to ensure that the ground wire is connected.

6.2 ELECTRICAL WIRING CONNECTION

The electrical wiring connection for the CH unit is shown in next figure.

1. Turn OFF the main power switch and take off the electrical box cover of CH unit.
2. Connect the power supply and earth wires to the terminals in the electrical box.
3. Connect the wires of the operating line to the terminals in the electrical box.
4. Tightly clamp the wires using the cord clamp inside the electrical box.
5. Fix the electrical box cover after wiring work.



◆ **Field Minimum Wire Sizes**

1. Perform the electrical wiring work for the CH units. Determine the cable size according to the table below.
2. Pay attention to the marks on the terminal board when connecting wires for CH unit and I.U./O.U. Refer to "Example of Electrical Wiring" for the wiring connection on the next page.

Model	Power Source	Maximum Current	Power Source Cable Size		Transmitting Cable Size		Earth Wire Size
			EN60 335-1 ❶	MLFC ❷	EN60 335-1 ❶	MLFC ❷	
CH-6.0N1	1~ 220-240V/1Ø/50Hz	1A	0.75mm²	0.5mm²	0.75mm²	0.5mm²	2.0mm²
CH-10.0N1							

NOTE:

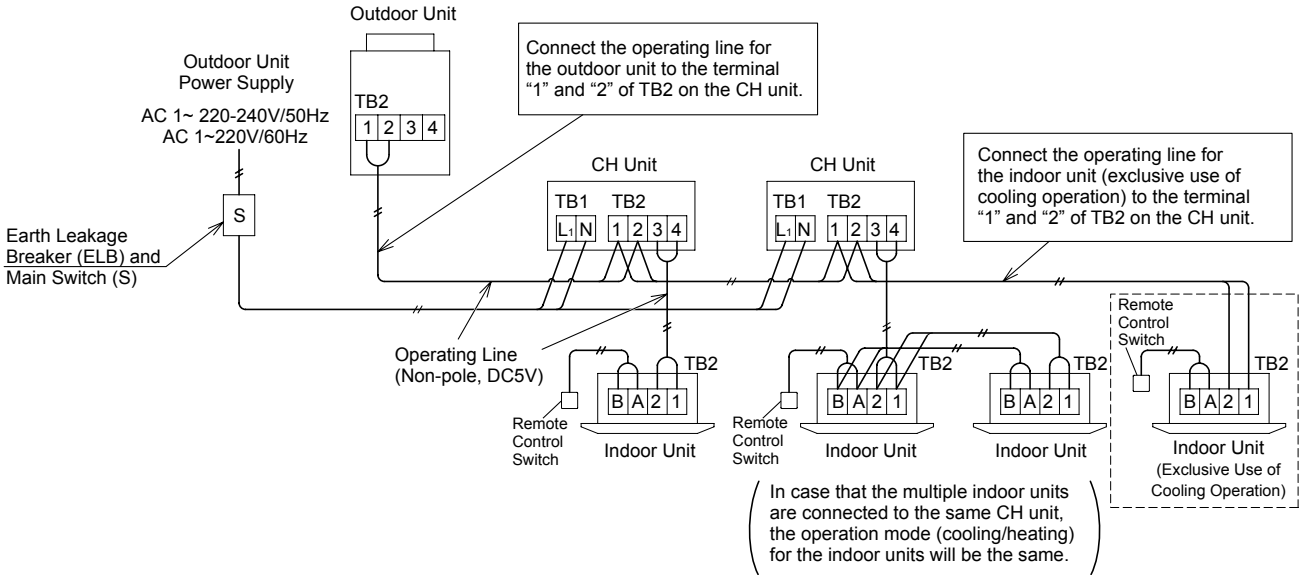
- *Follow local codes and regulations when selecting field wires.*
- *The wire sizes marked with ❶ in the above table are selected at the maximum current of the unit according to the European Standard, EN60 335-1. Use the wires which are not lighter than the ordinary tough rubber sheathed flexible cord (code designation H05RN-F) or ordinary polychloroprene sheathed flexible cord (code designation H05RN-F).*
- *The wire sizes marked with ❷ in the above table are selected at the maximum current of the unit according to the wire, MLFC (Flame Retardant Polyflex Wire) manufactured by Hitachi Cable Ltd., Japan.*
- *Use a shielded cable for the transmitting circuit and connect it to ground.*
- *In the case that power cables are connected in series, add each unit maximum current and select wires below.*

Selection According to EN60 335-1		Selection According to MLFC (at cable temperature of 60º)	
Current i (A)	Wire Size (mm²)	Current i (A)	Wire Size (mm²)
i ≤ 6	0.75	i ≤ 15	0.5
6 < i ≤ 10	1	15 < i ≤ 19	0.75
10 < i ≤ 16	1.5	19 < i ≤ 24	1.25
16 < i ≤ 25	2.5	24 < i ≤ 34	2
25 < i ≤ 32	4	34 < i ≤ 47	3.5
32 < i ≤ 40	6	47 < i ≤ 63	5.5
40 < i ≤ 63	10	63 < i ≤ 78	8
63 < i	❸	78 < i ≤ 113	14
		113 < i ≤ 148	22
		148 < i ≤ 179	30

❸: In the case that current exceeds 63A, do not connect cables in series.

◆ Example of Electrical Wiring

The following figure shows the example of electrical wiring around the CH units. Refer to the Technical Catalog for Outdoor Unit regarding the electrical wiring of the whole system.

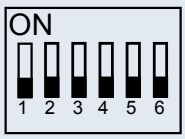
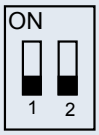
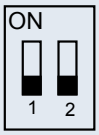


NOTE:

- *Do not apply excessive voltage to the operating line (DC5V (non-pole)) between outdoor unit and CH unit, between CH unit and indoor unit, between CH units.*
- *Use 2-Core cable for the operating line. (Do not use 3-Core cable or over.)*
- *Connect the operating line for the outdoor unit to the terminal "1" and "2" of TB2 on the CH unit.*
- *Connect the operating line for the indoor unit exclusively for cooling operation to the terminal "1" and "2" of TB2 on the CH unit.*
- *For the CH unit in the same refrigerant cycle, electrical power source can be supplied by one switch.*
- *Do not connect the power supply line (220V~240V) to the terminal board for operating line.*
- *Connect the earth wire for the outdoor/indoor units and CH unit. The ground wiring work under the condition of 100W (max.) ground resistance should be performed by the qualified electrician.*

◆ Setting of Dip Switches

Ensure that DSWs on the PCB1 are set before shipping as shown below and no setting is required.

DSW1	DSW101	SW301
		

NOTE:

- *The "■" mark indicates position of dip switches. Figures show setting before shipment.*

CAUTION:

- *The control of the temperature is only available through the room's thermostat or Aquastat. The Remote Control Switch of the indoor unit cannot be touch, if it is done the unit will be outside of warranty.*
- *Before setting dip switches, firstly turn OFF power source and set the position of the dip switches. If the switches are set without turning OFF the power source, the switches can not function.*

7. TEST RUN

NOTE:

- *Test run should be performed according to "Installation & Operation Manual" of Outdoor unit.*
- *Refrigerant piping and connecting wires should be connected to the same refrigerant cycle system.*
- *If they are connected to the dissimilar refrigerant cycle systems, a malfunction may occur.*

WARNING:

Do not operate the system until all the check points have been cleared.

- Check to ensure that the electrical resistance is more than 1 MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.
- Check to ensure that the stop valves of the outdoor unit are fully opened, and then start the system.
- Check to ensure that the switch on the main power source has been ON for more than 12 hours, to warm the compressor oil by the crankcase heater.

Pay attention to the following items while the system is running.

- Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 90ºC.
- DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES). It will cause a serious accident.

8. SAFETY AND CONTROL DEVICE SETTING

CH Unit

Model		CH-6.0N1, CH-10.0N1
For Control Circuit Fuse capacity on PCB	A	5