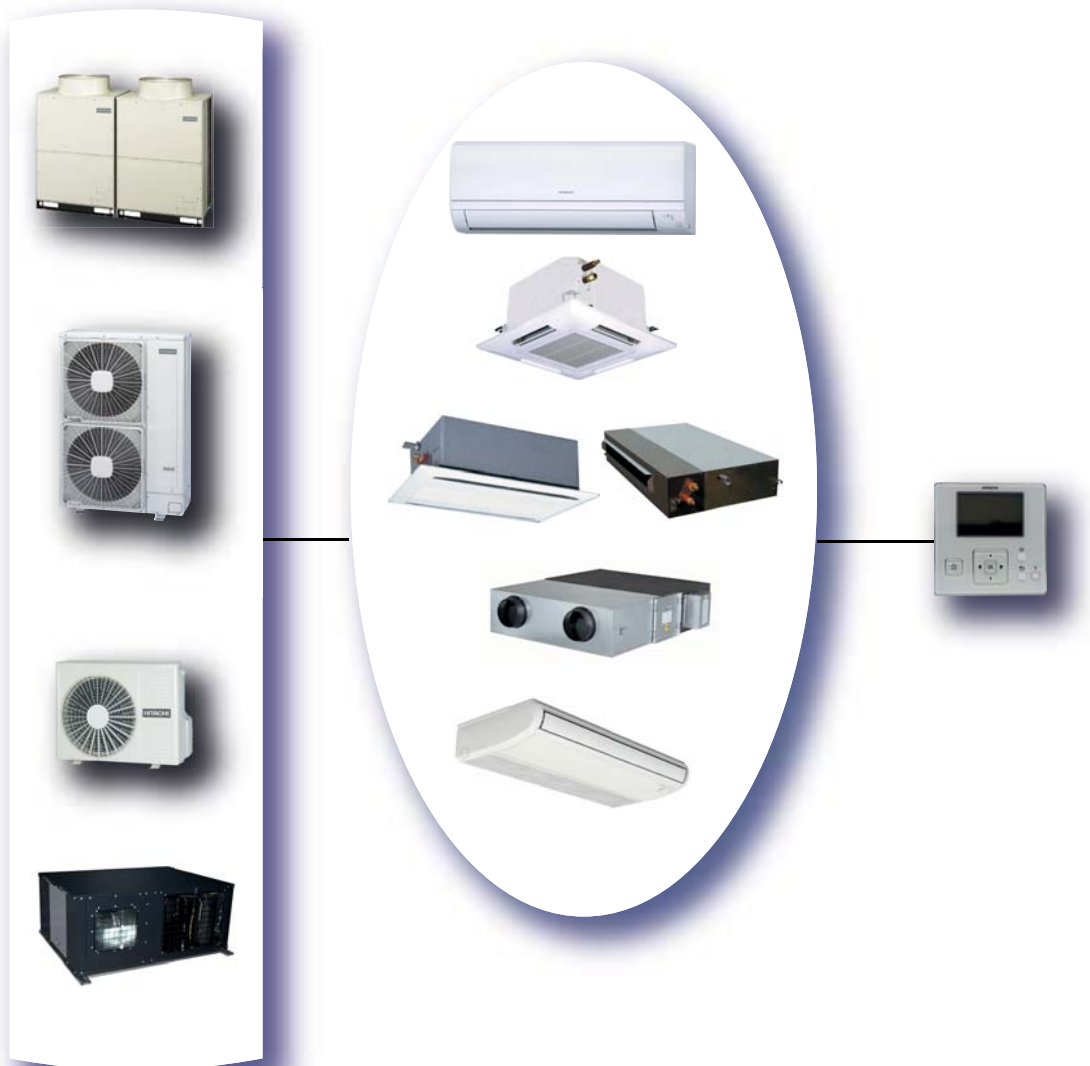


- EN **INSTALLATION AND OPERATION MANUAL**
- ES MANUAL DE INSTALACIÓN Y FUNCIONAMIENTO
- DE INSTALLATIONS- UND BETRIEBSHANDBUCH
- FR MANUEL D'INSTALLATION ET DE FONCTIONNEMENT
- IT MANUALE D'INSTALLAZIONE E D'USO

- PT MANUAL DE INSTALAÇÃO E DE FUNCIONAMENTO
- DA INSTALLATIONS- OG BETJENINGSVEJLEDNING
- NL INSTALLATIE- EN BEDIENINGSHANDLEIDING
- SV INSTALLATION- OCH DRIFTHANDBOK
- EL ΕΓΧΕΙΡΙΔΙΟ ΕΓΚΑΤΑΣΤΑΣΗΣ ΚΑΙ ΛΕΙΤΟΥΡΓΙΑΣ

SYSTEM INFORMATION FOR HITACHI PACKAGE PRODUCTS



English

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.

Español

Las especificaciones de este manual están sujetas a cambios sin previo aviso a fin de que HITACHI pueda ofrecer las últimas innovaciones a sus clientes.

A pesar de que se hacen todos los esfuerzos posibles para asegurarse de que las especificaciones sean correctas, los errores de impresión están fuera del control de HITACHI, a quien no se hará responsable de ellos.

Deutsch

Bei den technischen Angaben in diesem Handbuch sind Änderungen vorbehalten, damit HITACHI seinen Kunden die jeweils neuesten Innovationen präsentieren kann.

Sämtliche Anstrengungen wurden unternommen, um sicherzustellen, dass alle technischen Informationen ohne Fehler veröffentlicht worden sind. Für Druckfehler kann HITACHI jedoch keine Verantwortung übernehmen, da sie außerhalb ihrer Kontrolle liegen.

Français

Les caractéristiques publiées dans ce manuel peuvent être modifiées sans préavis, HITACHI souhaitant pouvoir toujours offrir à ses clients les dernières innovations.

Bien que tous les efforts sont faits pour assurer l'exactitude des caractéristiques, les erreurs d'impression sont hors du contrôle de HITACHI qui ne pourrait en être tenu responsable.

Italiano

Le specifiche di questo manuale sono soggette a modifica senza preavviso affinché HITACHI possa offrire ai propri clienti le ultime novità.

Sebbene sia stata posta la massima cura nel garantire la correttezza dei dati, HITACHI non è responsabile per eventuali errori di stampa che esulano dal proprio controllo.

Português

As especificações apresentadas neste manual estão sujeitas a alterações sem aviso prévio, de modo a que a HITACHI possa oferecer aos seus clientes, da forma mais expedita possível, as inovações mais recentes.

Apesar de serem feitos todos os esforços para assegurar que todas as especificações apresentadas são correctas, quaisquer erros de impressão estão fora do controlo da HITACHI, que não pode ser responsabilizada por estes erros eventuais.

Dansk

Specifikationerne i denne vejledning kan ændres uden varsel, for at HITACHI kan bringe de nyeste innovationer ud til kunderne.

På trods af alle anstrengelser for at sikre at alle specifikationerne er korrekte, har HITACHI ikke kontrol over trykfejl, og HITACHI kan ikke holdes ansvarlig herfor.

Nederlands

De specificaties in deze handleiding kunnen worden gewijzigd zonder verdere kennisgeving zodat HITACHI zijn klanten kan voorzien van de nieuwste innovaties.

Iedere poging wordt ondernomen om te zorgen dat alle specificaties juist zijn. Voorkomende drukfouten kunnen echter niet door HITACHI worden gecontroleerd, waardoor HITACHI niet aansprakelijk kan worden gesteld voor deze fouten.

Svenska

Specifikationerna i den här handboken kan ändras utan föregående meddelande för att HITACHI ska kunna leverera de senaste innovationerna till kunderna.

Vi på HITACHI gör allt vi kan för att se till att alla specifikationer stämmer, men vi har ingen kontroll över tryckfel och kan därför inte hållas ansvariga för den typen av fel.

Ελληνικά

Οι προδιαγραφές του εγχειριδίου μπορούν να αλλάξουν χωρίς προειδοποίηση, προκειμένου η HITACHI να παρέχει τις τελευταίες καινοτομίες στους πελάτες της.

Αν και έχει γίνει κάθε προσπάθεια προκειμένου να εξασφαλιστεί ότι οι προδιαγραφές είναι σωστές, η HITACHI δεν μπορεί να ελέγξει τα τυπογραφικά λάθη και, ως εκ τούτου, δεν φέρει καμία ευθύνη για αυτά τα λάθη.



CAUTION

- 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.
- Contact to the corresponding authorities for more information.

PRECAUCIÓN

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

VORSICHT

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

ADVERTISSEMENT

- 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.
- Contactez les autorités correspondantes pour plus d'information..

AVVERTENZE

- 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.

CUIDADO

- 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.
- Contacte as autoridades correspondentes para obter mais informações.

ADVASEL!

- 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.
- Kontakt de pågældende myndigheder for at få yderligere oplysninger.

VOORZICHTIG

- 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.
- Neem contact op met de betreffende overheidssdienst voor meer informatie.

FÖRSIKTIGHET

- 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.
- 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.
- Για περισσότερες λεπτομέρειες, επικοινωνήστε με τις αντίστοιχες αρχές.



English

Following Regulation EU No. 517/2014 on Certain Fluorinated Greenhouse gases, it is mandatory to fill in the label attached to the unit with the total amount of refrigerant charged on the installation.

Do not vent R410A into the atmosphere: R410A are fluorinated greenhouse gases covered by the Kyoto protocol global warming potential (GWP) R410A = 2088.

Tn of CO₂ equivalent of fluorinated greenhouse gases contained is calculated by indicated GWP * Total Charge (in kg) indicated in the product label and divided by 1000.

Español

De acuerdo con el reglamento UE N° 517/2014 sobre determinados gases fluorados de efecto invernadero, es obligatorio rellenar la etiqueta suministrada con la unidad con la cantidad total de refrigerante con que se ha cargado la instalación.

No descargue el R410A en la atmósfera: R410A son gases fluorados cubiertos por el protocolo de Kyoto con un potencial de calentamiento global (GWP) = 2088.

Las Tn de CO₂ equivalente de gases fluorados de efecto invernadero contenidos se calcula por el PCA indicado * Carga Total (en kg) indicada en la etiqueta del producto y dividida por 1000.

Deutsch

Folgende Verordnung EG Nr. 517/2014 Bestimmte fluorierte Treibhausgase, auf dem Schild, das sich am Gerät befindet, muss die Gesamtkältemittelmenge verzeichnet sein, die bei der Installation eingefüllt wird.

Lassen sie R410A nicht in die luft entweichen: R410A sind fluorierte treibhausgase, die durch das Kyoto-protokoll erfasst sind. Sie besitzen folgendes treibhauspotential (GWP) R410A = 2088.

Die Menge an CO₂-Äquivalent fluorierte Treibhausgase enthalten (in Tn) wird von GWP * die auf dem Produktetikett angegebenen Gesamtfüllmenge (in kg) und durch 1000 geteilt berechnet.

Français

En fonction de la Réglementation CE N° 517/2014 concernant certains gaz à effet de serre fluorés, il est obligatoire de remplir l'étiquette attachée à l'unité en indiquant la quantité de fluide frigorigène qui a été chargée à l'installation.

Ne laissez pas le R410A se répandre dans l'atmosphère: le R410A sont des gaz à effet de serre fluorés, couverts par le protocole de Kyoto avec un potentiel de réchauffement global (PRG) R410A = 2088.

Les Tn d'équivalent-CO₂ de gaz à effet de serre fluorés contenus est calculé par le PRG * Charge Totale (en kg) indiquée dans l'étiquette du produit et divisé par 1,000.

Italiano

In base alla Normativa EC N° 517/2014 su determinati gas fluorurati ad effetto serra, è obbligatorio compilare l'etichetta che si trova sull'unità inserendo la quantità totale di refrigerante caricato nell'installazione.

Non scaricare R410A nell'atmosfera: R410A sono gas fluorurati ad effetto serra che in base al protocollo di Kyoto presentano un potenziale riscaldamento globale (GWP) R410A = 2088.

Le Tn di CO₂ equivalente di gas fluorurati ad effetto serra contenuti si calcola dal GWP indicato * Carica Totale (in kg) indicato nella etichetta del prodotto e diviso per 1000.

Português

Em conformidade com a Regulamentação da UE N° 517/2014 sobre determinados gases fluorados com efeito de estufa, é obrigatório preencher a etiqueta afixada na unidade com a quantidade total de refrigerante carregada na instalação.

Não ventilar R410A para a atmosfera: o R410A são gases fluorados com efeito de estufa abrangidos pelo potencial de aquecimento global (GWP) do protocolo de Quioto = 2088.

Tn de CO₂ equivalente de gases fluorados com efeito de estufa é calculado pelo GWP indicado * Carga Total (em kg) indicado no rótulo de produto e dividido por 1000.

Dansk

Henhold til Rådets forordning (EF) nr. 517/2014 om visse fluorholdige drivhusgasser, skal installationens samlede mængde kølevæske fremgå af den etiket, der er klæbet fast på enheden.

Slip ikke R410A ud i atmosfæren: R410A er fluorholdige drivhus-gasser, der er omfattet af Kyoto-protokollens globale opvarmningspotentiale (GWP) R410A = 2088.

Tn af CO₂-ækvivalent af fluorholdige drivhusgasser er beregnet ved angivet GWP * Samlet Charge (i kg) er angivet i produktets etiket og divideret med 1000.

Nederlands

Conform richtlijn EC N° 517/2014 voor bepaalde fluorbroeikasgassen, dient u de tabel in te vullen op de unit met het totale koelmiddelvolume in de installatie.

Laat geen R410A ontsnappen in de atmosfeer: R410A zijn fluorbroeikasgassen die vallen onder het protocol van Kyoto inzake klimaatverandering global warming potential (GWP) R410A = 2088.

Tn van CO₂-equivalent van fluorbroeikasgassen wordt berekend door het aangegeven GWP * Totale Hoeveelheid (in kg) aangegeven in het product label en gedeeld door 1000.

Svenska

Enligt reglering EC N° 517/2014 om vissa fluorhaltiga växthusgaser, måste etiketten som sitter på enheten fyllas i med sammanlagd mängd kylmedium som fyllts på under installationen.

Släpp inte ut R410A i atmosfären: R410A är fluorhaltiga växthus-gaser som omfattas av Kyotoprotokollet om global uppvärmnings-potential (GWP) R410A = 2088.

Tn av CO₂-ekvivalenter fluorhaltiga växthusgaser beräknas genom indikeras GWP * Total Påfyllning (i kg) som anges i produktetiketten och divideras med 1000.

Ελληνικά

Σύμφωνα με τον Κανονισμό 517/2014/EK για για ορισμένα φθοριούχα αέρια θερμοκηπίου, είναι υποχρεωτική η συμπλήρωση της επισήμανσης που επισυνάπτεται στη μονάδα με το συνολικό ποσό ψυκτικού που εισήχθη κατά την εγκατάσταση.

Μην απελευθερώνετε R410A στην ατμόσφαιρα. Τα R410A είναι φθοριούχα αέρια του θερμοκηπίου που εμπίπτουν στο πρωτοκολλο του κυοτο δυναμικο θερμανση του πλανητη (GWP) R410A = 2088.

Τη ισοδύναμου CO₂ φθοριούχων αερίων θερμοκηπίου που περιέχονται υπολογίζεται από υποδεικνύεται GWP * Συνολική πλήρωση (σε kg) που αναφέρεται στην ετικέτα του προϊόντος και χωρίζονται από το 1000.

(EN) This equipment contains fluorinated greenhouse gases covered by the Kyoto protocol.
 (ES) Este equipo contiene gases fluorados de efecto invernadero contemplados en el protocolo de Kyoto.
 (DE) Diese Anlage enthält im Rahmen des Kyoto-Protokolls genutzte, fluorierte Treibhausgase.
 (FR) Cet appareil contient des gaz fluorés à effet de serre visés par le protocole de Kyoto.
 (IT) Questa apparecchiatura contiene gas fluorurati ad effetto serra che rientrano nel protocollo di Kyoto.
 (PT) Este equipamento contém gases fluorados que provocam efeito de estufa, segundo o protocolo de Kyoto.
 (DA) Dette udstyr indeholder fluorholdige drivhusgasser, der er omfattet af Kyoto-protokollen.
 (NL) Deze apparatuur bevat gefluoreerde broeikasgassen die vallen onder het protocol van Kyoto.
 (SV) Denna anläggning innehåller fluorhaltiga växthusgaser som regleras av Kyoto-protokollet.
 (EL) Ο παρών εξοπλισμός περιέχει φθορογόνα αέρια θερμοκηπίου τα οποία αναφέρονται στο πρωτόκολλο του Κιότο.

Do not vent R410A into the atmosphere.
 No descargue el R410A en la atmósfera.
 Lassen sie R410A nicht in die Luft entweichen.
 Ne laissez pas le R410A se répandre dans l'atmosphère.
 Non scaricare R410A nell'atmosfera.
 Não efectue a ventilação do R410A para a atmosfera.
 Slip ikke R410A ud i atmosfæren.
 Laat geen R410A ontsnappen in de atmosfeer.
 Släpp inte ut R410A i atmosfären.
 Μην ελευθερώσετε το R410A στην ατμόσφαιρα.

REFRIGERANT INFORMATION - INFORMACIÓN SOBRE EL REFRIGERANTE - KÜHLMITTELINFORMATION
 INFORMATION CONCERNANT LE FLUIDE FRIGORIGÈNE - INFORMAZIONI RELATIVE AL REFRIGERANTE
 INFORMAÇÕES SOBRE O REFRIGERANTE - OPLYSNINGER OM KØLEMIDDEL - INFORMATIE OVER KOELSTOF
 KYLININGSINFORMATION - ΣΤΟΙΧΕΙΑ ΨΥΚΤΙΚΟΥ ΜΕΣΟΥ

Refrigerant - Refrigérant - Kühlmittel - Fluide frigorigène - Køllemiddel - Koelstof - Kylnings - Μέσου
 t CO₂ ■ (1) x (2) / 1000 (1) GWP, PCA, PRP, GWP, GWP, PAG, GWP, GWP, GWP, GWP

Factory Charge - Carga de fábrica - Werksbefüllung - Charge en usine
 (Påfabrik) (Zusatz) (Se Manual) (Πρόσθετη πλήρωση) (Se εγχειρίδιο) (Se εγχειρίδιο)
 Quantity already loaded - Carga de fábrica - Påfyldt fra fabrikken - In fabriek gevuld
 (Påfabrik) (Zusatz) (Se Manual) (Πρόσθετη πλήρωση) (Se εγχειρίδιο) (Se εγχειρίδιο)
 Påfyldning från fabriken - Εργοστασιακή πλήρωση
 (Se påbærket) (Από το εργοστάσιο παραγωγής)

Additional Charge - Carga adicional - Zusätzliche Füllmenge - Charge supplémentaire
 Carica aggiuntiva - Carga adicional - Ekstra påfyldning - Extra vulling - tillägare påfyllning
 Πρόσθετη πλήρωση

(2) Total Charge - Carga Total - Gesamtfüllmenge - Charge totale - Carica totale
 Carga total - Samlet påfyldning - Totale vulling - Total påfyllning - Συνολική πλήρωση

R410A
 2088

kg

kg

kg

Figure 1. F-Gas Label with Protection Plastic Film

Protection Plastic Film

Peel-off Paper

Adhesive Surface

Figure 2. Protection Plastic Film

English

Instructions to fill in the "F-Gas Label":

- 1.- Fill in the Label with indelible ink the refrigerant amounts: ① - Factory Charge, ② - Additional Charge & ③ - Total Charge.
- 2.- Stick the Protection Plastic Film on the F-Gas Label (delivered in a plastic bag with the Manual). To see Figure n° 2.

Español

Instrucciones para rellenar la etiqueta "F-Gas Label":

- 1.- Añote las cantidades en la etiqueta con tinta indeleble: ① - Carga de Fábrica, ② - Carga Adicional y ③ - Carga Total.
- 2.- Coloque el adhesivo plástico de protección (entregado adjunto al Manual). Ver Figura n° 2.

Deutsch

Anleitung zum Ausfüllen des Etiketts "F-Gas Label":

- 1.- Schreiben Sie die Mengen mit wischfester Tinte auf das Etikett: ① - Werksbefüllung, ② - Zusätzliche Befüllung & ③ - Gesamtfüllmenge.
- 2.- Bringen Sie den Schutzaufkleb an (zusammen mit dem Handbuch geliefert). Siehe Abbildung Nr. 2.

Français

Instructions pour remplir l'Étiquette "F-Gas Label":

- 1.- Annotez les quantités sur l'Étiquette avec de l'encre indélébile: ① - Charge en usine, ② - Charge supplémentaire et ③ - Charge totale.
- 2.- Placez le plastique autocollant de protection (remis avec le Manual). Voir Figure n° 2.

Italiano

Istruzioni per compilare l'Etichetta "F-Gas Label":

- 1.- Annotare le quantità sull'etichetta con inchiostro indelebile: ① - Quantità già caricata, ② - Carica aggiuntiva e ③ - Carica totale.
- 2.- Collocare l'adesivo plastico di protezione (consegnato assieme al Manuale). Vedere Figura n. 2.

Português

Instruções para preencher a etiqueta "F-Gas Label":

- 1.- Añote as quantidades na etiqueta com tinta indelével: ① - Carga de fábrica, ② - Carga adicional e ③ - Carga total.
- 2.- Coloque o adesivo plástico de protecção (fornecido com o Manual). Ver Figura n° 2.

Dansk

Instruktioner til udfyldning af etiketten "F-Gas Label":

- 1.- Angiv mængderne på etiketten med uudsletteligt blæk: ① - Fabrikspåfyldning, ② - Ekstrapåfyldning & ③ - Samletpåfyldning.
- 2.- Sæt det beskyttende klæbemærke (der leveres sammen med brugervejledningen) på. Se fig. 2.

Nederlands

Instructies voor het invullen van het label "F-Gas Label":

- 1.- Noteer de hoeveelheden met onuitwisbare inkt op het label: ① - Fabrieksvulling, ② - Extra vulling & ③ - Totale vulling.
- 2.- Plaats de plastic beschermband (met de handleiding meegeleverd). Zie Figuur nr. 2.

Svenska

Instruktioner för påfyllning, etiketten "F-Gas Label":

- 1.- Anteckna kvantiteterna på etiketten med permanent bläck: ① - Fabrikspåfyllning, ② - Ytterligare påfyllning & ③ - Total påfyllning.
- 2.- Klistra på skyddsfilm i plast (finns i pärmen till handboken). Se bild nr. 2.

Ελληνικά

Τρόπος συμπλήρωσης της ετικέτας "F-Gas Label":

- 1.- Σημειώστε στην ετικέτα τις ποσότητες με ανεξίτηλο μελάνι: ① - Εργοστασιακή πλήρωση, ② - Πρόσθετη πλήρωση & ③ - Συνολική πλήρωση.
- 2.- Τοποθετήστε το πλαστικό, προστατευτικό αυτοκόλλητο (που έχει παραδοθεί με το Εγχειρίδιο). Ανατρέξτε στην εικόνα 2

MODEL CODIFICATION

Important note: Please check the type of air conditioning system based on model name codification and related abbreviations which are used in documentation. This document only covers the combinations of HITACHI indoor units with HITACHI outdoor units.

CODIFICACIÓN DE MODELOS

Nota importante: Por favor, compruebe el tipo de sistema de aire acondicionado según la codificación de nombres de modelo y las abreviaturas relacionadas que se utilizan en la documentación. Este documento solo trata las combinaciones de unidades interiores HITACHI con unidades exteriores HITACHI.

MODELLCODES

Wichtiger Hinweis: Bitte stellen Sie anhand der Modellbezeichnung den Klimaanlageagentyp und das entsprechende, in diesem Technischen Handbuch verwendete Kürzel fest. Dieses Installations- und Betriebshandbuch bezieht sich nur auf -Innengeräte in Kombination mit-Außengeräten und.

CODIFICATION DES MODÈLES

Note importante : Veuillez déterminer, d'après le nom du modèle, quel est votre type de climatiseur et quelle est son abréviation et référence dans le présent manuel d'instruction. Ce manuel d'installation et de fonctionnement ne concernent que les unités intérieures combinées à des groupes extérieurs.

CODIFICAZIONE DEI MODELLI

Nota importante: in base al nome del modello, verificare il tipo di climatizzatore in possesso nonché il tipo di abbreviazione e di riferimento utilizzati in questo manuale di istruzioni. Questo manuale di installazione e di funzionamento fa riferimento alla sola combinazione di unità interne e unità esterne.

CODIFICAÇÃO DE MODELOS

Nota Importante: por favor, verifique, de acordo com o nome do modelo, qual é o seu tipo de ar condicionado, e como este é abreviado e mencionado neste manual de instruções. Este manual de instalação e de funcionamento só está relacionado com a unidade interior FSN(H)(2/3/4)(E)(i)(k)(M) combinada com as unidades exteriores.

MODELKODIFICERING

Vigtig information: Kontroller modelnavnet på dit klimaanlæg for at se, hvilken type klimaanlæg du har, hvordan det forkortes, og hvordan der henvises til det i denne vejledning. Denne bruger- og monteringsvejledning gælder kun -indendørsenheder kombineret med.-udendørsenheder.

CODERING VAN DE MODELLEN

Belangrijke opmerking: Controleer aan de hand van de modelnaam welk type airconditioner u heeft, hoe de naam wordt afgekort en hoe ernaar wordt verwezen in deze instructie-handleiding. Deze Installatie- en bedieningshandleiding heeft alleen betrekking op binnenunits gecombineerd met buitenunits.

MODELLER

Viktigt! Kontrollera med modellnamnet vilken typ av luftkonditionering du har, hur den förkortas och hur den anges i den här handboken. Denna handbok för installation och användning gäller endast för inomhusenheter kombinerade med utomhusenheter .

ΚΩΔΙΚΟΠΟΙΗΣΗ ΜΟΝΤΕΛΩΝ

Σημαντική σημείωση: Ελέγξτε, σύμφωνα με το όνομα μοντέλου, τον τύπο του δικού σας κλιματιστικού και με ποια σύντμηση δηλώνεται και αναφέρεται σε αυτό το εγχειρίδιο. Αυτό το εγχειρίδιο εγκατάστασης και λειτουργίας αφορά μόνο τις Εσωτερικές Μονάδες(E)(i)(k)(M) σε συνδυασμό με Εξωτερικές Μονάδες.

EN	English	Original version
ES	Español	Versión traducida
DE	Deutsch	Übersetzte Version
FR	Français	Version traduite
IT	Italiano	Versione tradotta
PT	Português	Versão traduzida
DA	Dansk	Oversat version
NL	Nederlands	Vertaalde versie
SV	Svenska	Översatt version
EL	ΕΛΛΗΝΙΚΑ	Μεταφρασμένη έκδοση

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1 GENERAL INFORMATION

1.1 GENERAL NOTES

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As a result, some of the images or data used to illustrate this document may not refer to specific models. No claims will be accepted based on the data, illustrations and descriptions included in this manual.

2 SAFETY

2.1 APPLIED SYMBOLS

During normal air conditioning system design work or unit installation, greater attention must be paid in certain situations requiring particular care in order to avoid injuries an damage to the unit, the installation or the building or property.

Situations that jeopardise the safety of those in the surrounding area or that put the unit itself a risk will be clearly indicated in this manual.

To indicate these situations, a series of special symbols will be used to clearly identify these situations.

Pay close attention to these symbols and to the messages following them, as your safety and that of others depends on it.

In the text following the danger symbol you can also find information on safe procedures during unit installation.

CAUTION

- *The text following this symbol contains information and instructions relating directly to your safety and physical wellbeing.*
- *Not taking these instructions into account could lead to minor injuries to you and others in the proximities of the unit.*
- *Not taking these instructions into account could lead to unit damage.*

In the text following the caution symbol you can also find information on safe procedures during unit installation.

DANGER

- *The text following this symbol contains information and instructions relating directly to your safety and physical wellbeing.*
- *Not taking these instructions into account could lead to serious, very serious or even fatal injuries to you and others in the proximities of the unit.*

NOTE

- *The text following this symbol contains information or instructions that may be of use or that require a more thorough explanation.*
- *Instructions regarding inspections to be made on unit parts or systems may also be included.*

3 PRODUCT GUIDE

3.1 PRODUCT LINE-UP: OUTDOOR UNITS

3.1.1 UTOPIA IVX Premium series

 				
1~ 230V 50Hz			3N~ 400V 50Hz	
				
Unit	Unit	Unit	Unit	Unit
RAS-2HVNP1				
RAS-2.5HVNP1				
	RAS-3(X)HVNP1E			
		RAS-4(X)HVNP1E	RAS-4(X)HNP1E	
		RAS-5(X)HVNP1E	RAS-5(X)HNP1E	
		RAS-6(X)HVNP1E	RAS-6(X)HNP1E	
			RAS-8(X)HNPE	
			RAS-10(X)HNPE	
				RAS-12HNP

NOTE

RAS-XH(V)NP1E series must be used only in combination with Dx-Interface series 2 and only in 1-to-1 combination

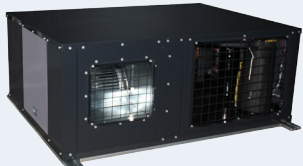
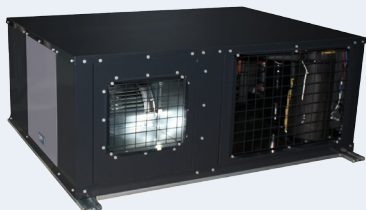
3.1.2 UTOPIA IVX Standard series

 				
1~ 230V 50Hz			3N~ 400V 50Hz	
				
Unit	Unit	Unit	Unit	Unit
RAS-3HVNC1				
	RAS-4HVNC1E	RAS-4HNC1E		
	RAS-5HVNC1E	RAS-5HNC1E		
	RAS-6HVNC1E	RAS-6HNC1E		
			RAS-8HNC	
			RAS-10HNC	
				RAS-12HNC

3.1.3 UTOPIA ES series

 					
1~ 230V 50Hz			3N~ 400V 50Hz		
					
Unit	Unit	Unit	Unit	Unit	Unit
RAS-3HVRNS3			RAS-4HRNS3E		
	RAS-4HVRNS3E			RAS-5HRNS3E	
		RAS-5HVRNS3E		RAS-6HRNS3E	
		RAS-6HVRNS3E			
					RAS-8HRNSE
					RAS-10HRNSE

3.1.4 UTOPIA RASC series

 	
3N~ 400V 50Hz	
	
Unit	Unit
RASC-4HNPE	
RASC-5HNPE	
RASC-6HNPE	
	RASC-8HNPE
	RASC-10HNPE

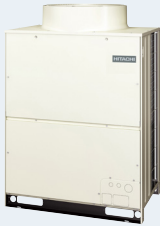
3.1.5 Set Free Mini series

 	
1~ 230V 50Hz	3N~
FSVN3E	FSNY3E
	
Unit	Unit
RAS-4FSVN3E	RAS-4FSNY3E
RAS-5FSVN3E	RAS-5FSNY3E
RAS-6FSVN3E	RAS-6FSNY3E

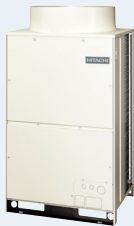
3.1.6 Set Free Side Flow series

 	
3N~ 400V 50Hz	
	
Unit	
RAS-8FSNM	
RAS-10FSNM	
RAS-12FSNM	

3.1.7 Set Free Standard FSXN1E series

 	
3N~ 400V 50Hz	
	
Unit	Unit
RAS-8FSXN1E	RAS-14FSXN1E
RAS-10FSXN1E	RAS-16FSXN1E
RAS-12FSXN1E	

3.1.8 Set Free High Efficiency FSXNH series

 	
3N~ 400V 50Hz	
	
Unit	Unit
RAS-5FSXNH(E)	RAS-8FSXNH(E)
RAS-6FSXNH(E)	RAS-10FSXNH(E)
	RAS-12FSXNH(E)

3.1.9 Set Free FSN3E series

 	
3N~ 400V 50Hz	
	
Unit	Unit
RAS-8FSN3E	RAS-14FSN3E
RAS-10FSN3E	RAS-16FSN3E
RAS-12FSN3E	

3.2 CLASSIFICATION OF UTOPIA OUTDOOR UNIT MODELS

◆ IVX series

Unit type (Outdoor unit): RAS									
Position-separating hyphen (fixed)									
Capacity (HP): 2, 2.5, 3, 4, 5, 6, 8, 10, 12									
X = Only for combination with DX-Interface series 2 (1-to-1)									
H = Heat pump									
V = Single phase unit (1~ 230V 50Hz)									
- = Three phase unit (3N~ 400V 50Hz)									
N = R410A refrigerant									
P: Premium series									
C: Standard series									
- = series 0									
1 = series 1									
E = Made in Europe									
- = Made in Japan									
RAS	-	XX	(X)	H	(X)	N	X	(X)	(X)

◆ ES series

Unit type (outdoor unit): RAS									
Position-separating hyphen (fixed)									
Compressor power (HP): 3, 4, 5, 6, 8, 10									
H = Heat pump									
V = Single phase unit (1~ 230V 50Hz)									
- = Three phase unit (3N~ 400V 50Hz)									
R = Inverter system									
N = R410A refrigerant									
S = ES series									
Series									
E = Made in Europe									
- = Made in Japan									
RAS	-	XX	H	X	R	N	S	X	X

◆ RASC series

Unit type (RASC unit - Built in horizontal)							
Position-separating hyphen (fixed)							
Compressor power (HP): 4, 5, 6, 8, 10.							
H = Heat pump							
N = R410A refrigerant							
P = Premium series							
E = Made in Europe							
RASC	-	XX	H	N	P	E	

3.3 CLASSIFICATION OF SET FREE OUTDOOR UNIT MODELS AND CH MODULES

◆ Set Free Mini series

Unit type (Outdoor unit):									
Position-separating hyphen (fixed)									
Compressor power (HP): 4, 5, 6									
FS = SET-FREE system									
V = Single phase unit (1~ 230V 50Hz)									
N = R410A refrigerant									
Y = Three phase unit (3N~ 400V 50Hz)									
Series									
E = Made in Europe									
RAS	-	X	FS	(V)	N	(Y)	3	E	

◆ Set Free Side Flow series

Unit type (outdoor unit): RAS						
Position-separating hyphen (fixed)						
Capacity (HP): 8/10/12 HP						
FS: SET FREE series						
N: R410A refrigerant						
M1: Series						
RAS	-	XX	FS	N		M1

◆ Standard FSXN1E series (*)

Unit type (outdoor unit): RAS								
Position-separating hyphen (fixed)								
Capacity (HP): (8-54)								
FSX: SET FREE series								
N: R410A refrigerant								
1: Series								
E= Made in Europe								
-P: Special type								
RAS	-	XX	FSX	N	1	E	(-P)	

◆ High Efficiency FSXNHE series (*)

Unit type (outdoor unit): RAS								
Position-separating hyphen (fixed)								
Capacity (HP): (5-36)								
FSX: SET FREE series								
N: R410A refrigerant								
H: High efficiency type								
E = Made in Europe								
-P: Special type								
RAS	-	XX	FSX	N	H	E	(-P)	

◆ FSN3E series

Unit type (outdoor unit): RAS							
		Position-separating hyphen (fixed)					
		Capacity (HP): (8-54)					
		FS: SET FREE series					
		N: R410A refrigerant					
		3: Series					
		E= Made in Europe					
RAS	-	XX	FS	N	3	E	

◆ CH units

Type of unit: CH (Cooling/Heating Changeover unit)							
		Position-separating hyphen (fixed)					
		Maximum capacity of connectable indoor units (HP)					
		6.0: 6.0 HP					
		10.0: 6.1 to 10.0 HP					
		N: R410A refrigerant					
		Generation: 1 or 2					
CH	-	XX	N	(X)			

i NOTE

- (*)Special models RAS-(16/32)FSXN1E-P and RAS-(12/24)FSXNH(E)-P
- The special models RAS-(16/32)FSXN1E-P and RAS-(12/24)FSXNH(E)-P are aimed for installations where high performance is required.
 - Specific data for these units, like capacities and efficiency, is shown in the [General Data](#) chapter in the Technical Catalogue, and the selection data, like nominal capacity tables and the capacity tables according to the total power of combined indoor units, is available in chapter [Capacities and selection data](#) in the Technical Catalogue.
 - The instructions for installation, piping, commissioning, maintenance and other works are the same for each pair of models shown below.
 - RAS-16FSXN1E-P → RAS-18FSXN1E
 - RAS-32FSXN1E-P → RAS-34FSXN1E
 - RAS-12FSXNH(E)-P → RAS-14FSXNH(E)
 - RAS-24FSXNH(E)-P → RAS-26FSXNH(E)
 - Therefore there are no specific instructions shown for these special models.

3.4 CLASSIFICATION OF INDOOR UNITS MODEL

The following information is only for reference. Indoor Unit information are not included in this technical document.

Unit type (indoor unit): RCI, RCIM, RCD, RPC, RPI, RPIM, RPK, RPF, RPF1											
		Position-separating hyphen (fixed)									
		Capacity (HP): 0.6, 0.8, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 6.0, 8.0, 10.0, 16.0, 20.0									
		FS = SYSTEM FREE									
		N = R410A refrigerant									
		H = Hotel (RPK-(0.6-1.5) only)									
		2/3/4 = series									
		P= Pair									
		E = Made in Europe									
		M = Made in Malaysia									
		-- = Made in Japan									
		i = Version up (RCI only)									
		k = Version up RCI for P-AP160NA(1/E) panel only									
		(-DU) = Drain Up (RPIM only)									
		(-f) = Non-flammable insulation (RPI-(8.0-20.0)FSN3E-f only									
XXX	-	X.X	FS	N	(H)	X	(P)	(X)	(x)	(-xx)	

4 WORKING POWER SUPPLY RANGE

Nominal power supply

- Single phase: 1~ 230V 50Hz
- Three phase: 3N~ 400V 50Hz

Operating voltage

Between 90 and 110% of the nominal voltage.

Voltage imbalance for nominal power supply 3N~

400V 50Hz

Within a 3% of each phase, measured at the main terminal of the outdoor unit.

Starting voltage

Always higher than 85% and lower than 115% of the nominal voltage.

5 WORKING TEMPERATURE RANGE

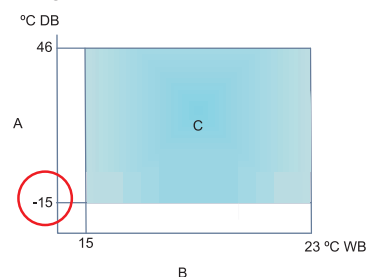
i NOTE

DB: Dry Bulb; WB: Wet Bulb.

5.1 UTOPIA IVX SERIES

		Cooling mode	Heating mode
Indoor side air inlet temperature	Minimum	21 °C DB / 15 °C WB	15 °C DB
	Maximum	32 °C DB / 23 °C WB	27 °C DB
Outdoor side air inlet temperature	Minimum	-5 °C DB	-20 °C WB
	Maximum	46°C DB	15 °C WB

The outdoor ambient temperature limit is extended down to -15°C under this configuration.



i NOTE

For RAS-XH(V)NP1E series check the Dx-Interface series 2 working range and design conditions.

◆ Special configuration for low ambient temperature (-15°C)

Only when		Mandatory setting (OU)
Cooling mode operation and Simultaneous operation (individual operation not allowed)	➔	DSW2 PIN 3 = ON and DSW6 PIN1 = OFF

i NOTE

Capacity and efficiency can vary depending on ambient conditions, working settings, control and protections, etc.

5.2 UTOPIA ES SERIES

		Cooling mode	Heating mode
Indoor air inlet temperature	Minimum	21 °C DB / 15 °C WB	15 °C DB
	Maximum	32 °C DB / 23 °C WB	27 °C DB
Outdoor air inlet temperature	Minimum	-5 °C DB	-10 °C WB
	Maximum	43 °C DB	15 °C WB

5.3 UTOPIA RASC SERIES

		Cooling mode	Heating mode
Indoor unit inlet air temperature	Minimum	21°C DB / 15°C WB	15°C DB
	Maximum	32°C DB / 23°C WB	27°C DB
RASC unit inlet air temperature	Minimum	-5°C DB	-15°C WB
	Maximum	46°C DB	15.5°C WB

DB: dry bulb; WB: wet bulb

5.4 SET FREE MINI SERIES

		Cooling mode	Heating mode
Indoor air inlet temperature	Minimum	21 °C DB / 15 °C WB	15 °C DB
	Maximum	32 °C DB / 23 °C WB	27 °C DB
Outdoor air inlet temperature	Minimum	-5 °C DB	-20 °C WB (*)
	Maximum	46 °C DB	15 °C WB

NOTE

- (*): (-15 – -20)°C WB, operation control range.

5.5 SET FREE SIDE FLOW SERIES

		Cooling mode	Heating mode
Indoor temperature	Minimum	21 °C DB/15 °C WB	15 °C DB
	Maximum	32 °C DB/25 °C WB	27 °C DB
Outdoor temperature	Minimum	-5 °C DB (*)	-20 °C WB (**)
	Maximum	43°C DB	15 °C WB

NOTE

- (*) 10 °C DB ~ -5 °C DB, Operation Control Range
- (**) -12 °C WB ~ -20 °C WB, Operation Control Range

5.6 SET FREE MODULAR FSXN1E-FSXNHE SERIES

This heat pump and heat recovery system has been designed for the following temperatures:

Operation		Cooling	Heating
Indoor temperature	Min.	21 °C DB / 15 °C WB	15 °C DB
	Max.	32 °C DB / 23 °C WB	27 °C DB
Outdoor temperature	Min.	-5 °C DB ⁽¹⁾	-20 °C WB ⁽²⁾
	Max.	43 °C DB	15 °C WB

⁽¹⁾ (10 – -5) °C DB, operation control range.

⁽²⁾ (-15 – -20) °C WB, operation control range.

NOTE

()In the operation control range some control restriction or protection can be activated. This activation do not means abnormality operation of the unit.*

5.7 SET FREE MODULAR FSN3E

Operation		Cooling	Heating
Indoor temperature	Min.	21 °C DB / 15 °C WB	15 °C DB
	Max.	32 °C DB / 23 °C WB	27 °C DB
Outdoor temperature	Min.	-5 °C DB ⁽¹⁾	-20 °C WB ⁽²⁾
	Max.	43 °C DB	15 °C WB

⁽¹⁾ (10 – -5) °C DB, operation control range.

⁽²⁾ (-12 – -20) °C WB, operation control range.

NOTE

()In the operation control range some control restriction or protection can be activated. This activation do not means abnormality operation of the unit.*

6 REMOTE CONTROLLER

HITACHI air conditioning systems are complemented by a range of individual remote controls covering the main customer needs.

It is recommended to always install an individual remote control for the local control of each unit. Up to a maximum of 160 indoor units can be controlled in simultaneous operation by grouping them in one remote control group.

Both wired and wireless remote controls are available. It is advisable to use an (optional) wired remote control PC-ARFPE. For more information about their installation and operation, please refer to their corresponding Installation and Operation Manuals.

The PC-ARFPE Installation and Operation manual is also included in this CD-ROM.

7 AUTOMATIC CONTROLS

The system is equipped with the following functions.

◆ Three minute guard (enforced stoppage)

The compressor remains off for at least 3 minutes once it has stopped. If the system is started within approximately 3 minutes after it has stopped, the RUN indicator is activated. However, the cooling operation or the heating operation remains off and does not start until after 3 minutes has elapsed.

Operation may stop for 6 minutes maximum to protect compressor.

◆ Three minute guard (enforced operation)

If all indoor units of the system are Thermo-OFF within approximately 3 minutes after compressor has started, compressor is operated during 3 minutes continuously.

However, if all indoor units of the system are stopped by remote control switch, compressor is stopped.

◆ Oil return operation

If the indoor unit is stopped more than 2 hours continuously, this function is operated during a few minutes.

It has this function to prevent to accumulate in the heat exchanger of stoppage indoor unit at cooling operation.

◆ Frost prevention during cooling operation

When the system is operated in a low temperature room, the cooling operation may be changed to fan operation (the compressor is stopped.) for a while to avoid frost formation on the indoor heat exchanger.

◆ Self-Cleaning expansion valve

It is for self cleaning the expansion valve when the operation is stopped at cooling.

The sound which the refrigerant flows may be heard from the indoor unit during the selfcleaning. However it is not abnormal.

◆ Automatic restart after power failure

If the power supply is interrupted for short periods of time (up to 2 seconds) the Remote Control switch will retain the settings and the unit will restart when the power is restored. If Automatic Restart is required after periods of lost power supply in excess of 2 seconds please contact your distributor (optional function).

◆ Slow air control during heating operation

When the compressor is stopped while the thermostat is OFF, or the system is performing the automatic defrosting operation, the fan speed is set at the slow position.

◆ Automatic defrosting cycle

When the heating operation is stopped by pressing RUN/STOP switch, frosting on the outdoor unit is checked and the defrosting operation may be performed for the maximum of 10 minutes.

◆ Prevention of overload operation

When the outdoor temperature is too high during heating operation, heating operation is stopped due to activation of the outdoor thermistor until the temperature becomes low.

◆ Hot start during heating operation

To prevent cold air discharge, the fan speed is controlled from the slow position to the set position according to the discharge air temperature. At this time the louver is fixed horizontally.

At this time, "HOT-ST" is displayed on LCD when the indoor unit is connected to the wired remote control switch PC-ARFPE, and the louver is fixed horizontally. After this control is completed, the setting is returned to the set fan speed and the fixed louver is released.

◆ During defrosting operation

When the outdoor unit is performing the automatic defrosting operation, the indoor fan is stopped and the louver is fixed horizontally.

◆ Cooling of indoor unit (after heat exclusion)

When the heating operation is stopped, the indoor fan operation may be maintained at the slow position for the maximum of 2 minutes to lower temperature of the inside unit.



NOTE

- If the system is stopped due to a power failure, it will not automatically start again although power is restored. Repeat the start-up procedure to start the system. In the event of a very brief power failure (2 seconds maximum), the settings are memorized. Therefore, the system starts automatically after approximately 3 minutes.
- This air conditioner is used hot air circulation system for the heating operation. If the air conditioning room is large or the room temperature is excessively low, it takes time to warm the whole room. "HOT-ST" will be turned OFF after heating the room.
- "HOT-ST" may be displayed during or right after the defrosting operation. It is activated to prevent the cold draft. It is NOT abnormal.

8 REFRIGERANT CYCLE

8.1 UTOPIA IVX SERIES

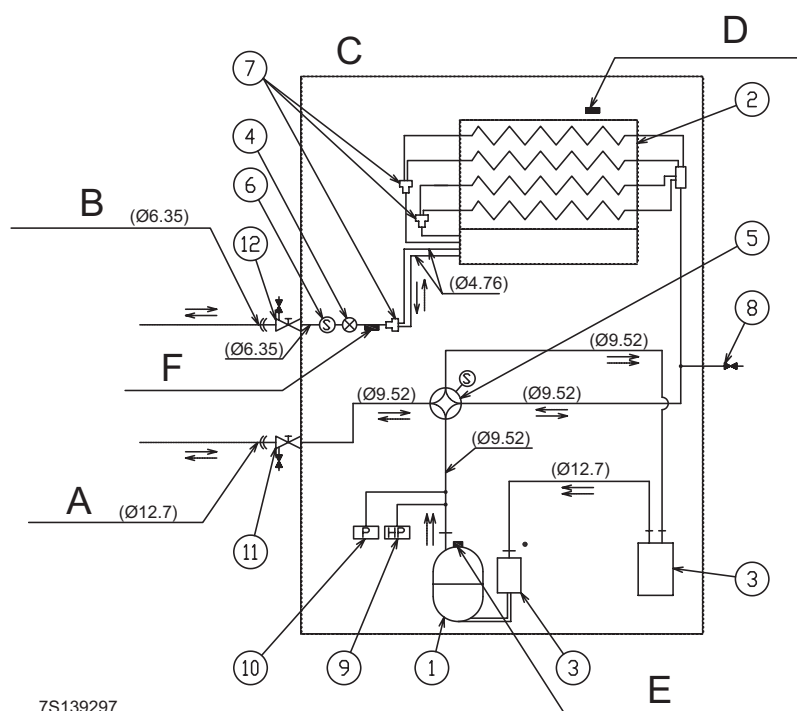
8.1.1 General notes

Mark	Part name
A	Gas line refrigerant piping connection
B	Liquid line refrigerant piping connection
C	Outdoor unit
D	Ambient thermistor
E	Discharge gas thermistor
F	Pipe thermistor

←	←---	— —	— —	R410A	4.15 MPa
Refrigerant flow for cooling	Refrigerant flow for heating	Connection by flare nut	Connection by welding	Gas refrigerant	Leakage test pressure

8.1.2 IVX Premium series

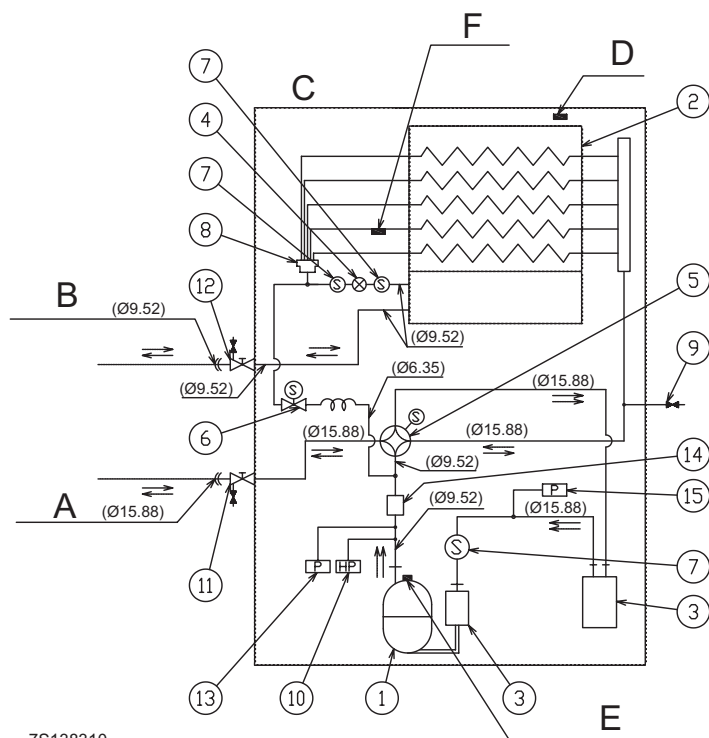
◆ RAS-(2/2.5)HVNP1



7S139297

N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Micro-computer control expansion valve
5	Reversing valve
6	Strainer
7	Distributor
8	Check joint
9	High pressure switch for protection
10	Pressure switch for control
11	Stop valve for gas line
12	Stop valve for liquid line

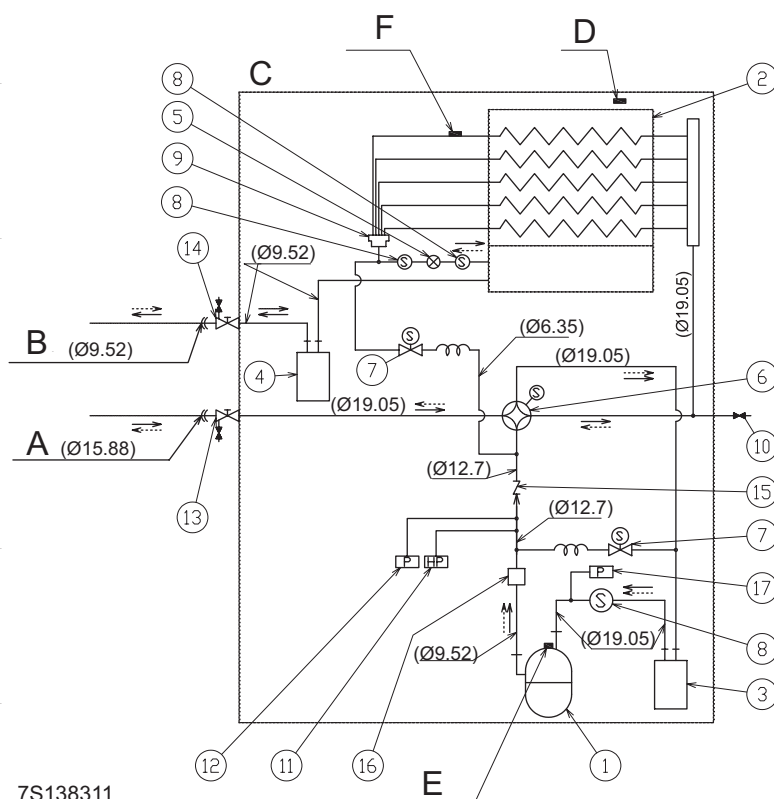
◆ RAS-3(X)HVNP1E



7S138310

N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Micro-computer control expansion valve
5	Reversing valve
6	Solenoid valve for gas bypass
7	Strainer
8	Distributor
9	Check joint
10	High pressure switch for protection
11	Stop valve for gas line
12	Stop valve for liquid line
13	Sensor for refrigerant pressure
14	Silencer
15	Pressure switch for control

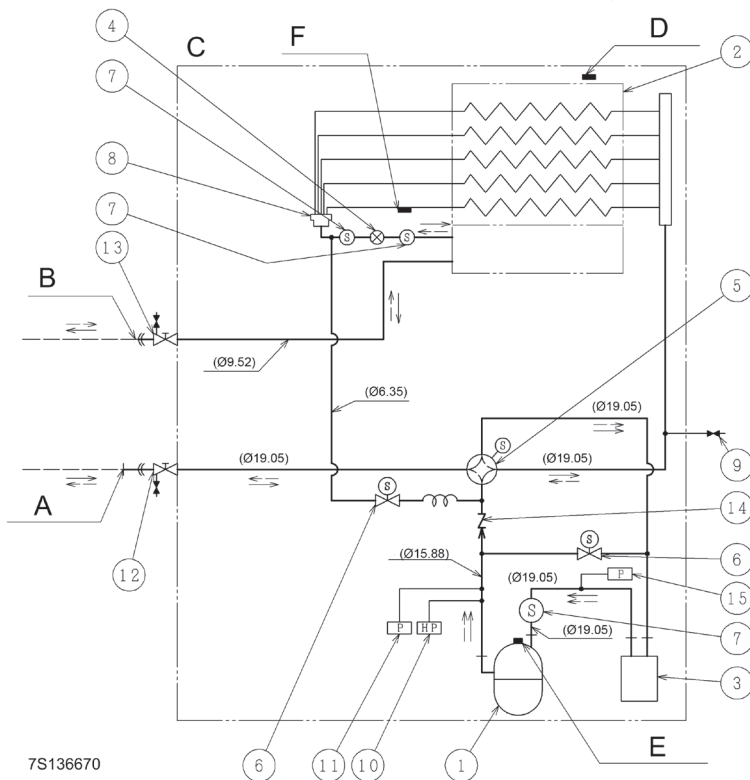
◆ RAS-(4-6)(X)H(V)NP1E



7S138311

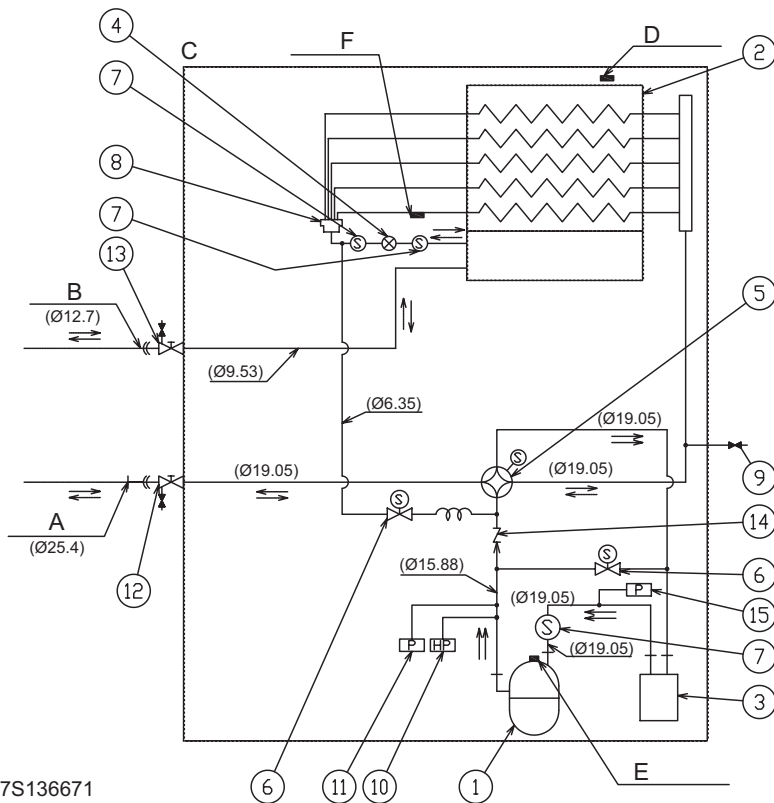
N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Receiver
5	Micro-computer control expansion valve
6	Reversing valve
7	Solenoid valve for gas bypass
8	Strainer
9	Distributor
10	Check joint
11	High pressure switch for protection
12	Sensor for refrigerant pressure
13	Stop valve for gas line
14	Stop valve for liquid line
15	Check valve
16	Silencer
17	Pressure switch for control

◆ RAS-8(X)HNPE



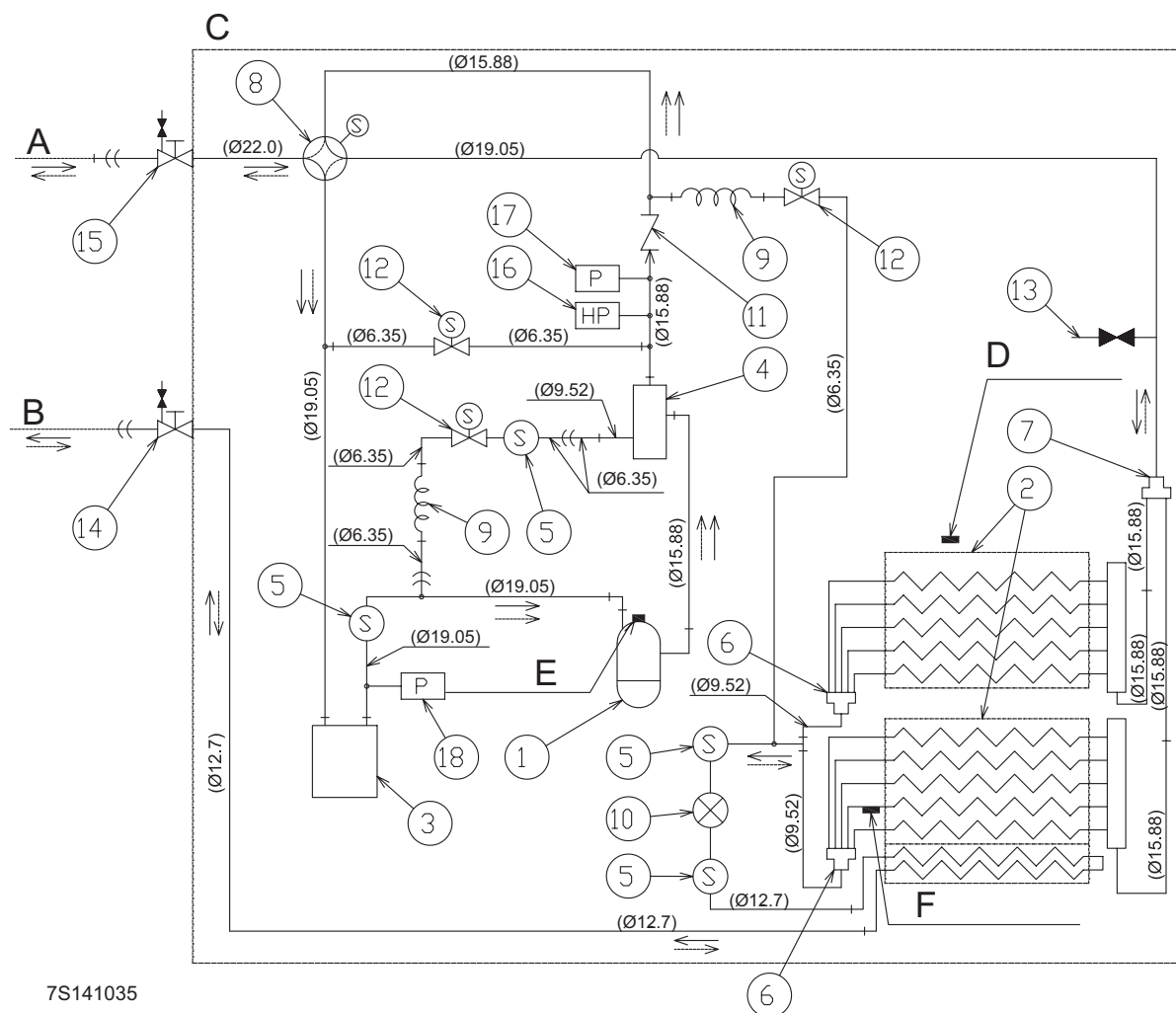
N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Micro-computer control expansion valve
5	Reversing valve
6	Solenoid valve for gas bypass
7	Strainer
8	Distributor
9	Check joint
10	High pressure switch for protection
11	Sensor for refrigerant pressure
12	Stop valve for gas line
13	Stop valve for liquid line
14	Check valve
15	Pressure switch for control

◆ RAS-10(X)HNPE



N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Micro-computer control expansion valve
5	Reversing valve
6	Solenoid valve for gas bypass
7	Strainer
8	Distributor
9	Check joint
10	High pressure switch for protection
11	Sensor for refrigerant pressure
12	Stop valve for gas line
13	Stop valve for liquid line
14	Check valve
15	Pressure switch for control

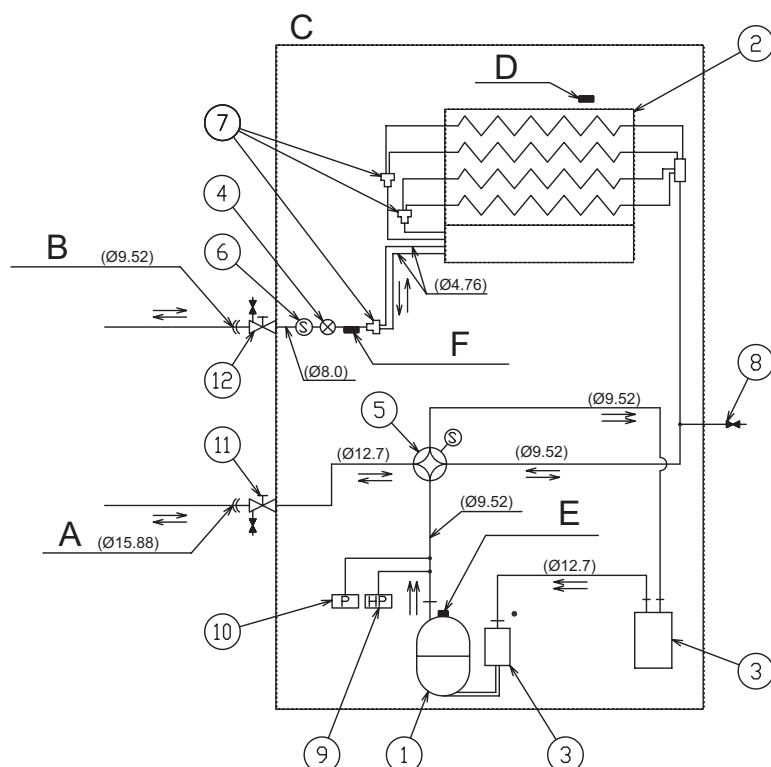
◆ RAS-12HNP



N.	Part name	N.	Part name
1	Compressor	10	Expansion valve
2	Heat exchanger	11	Check valve
3	Accumulator	12	Solenoid valve for gas bypass
4	Oil separator	13	Check joint
5	Strainer	14	Stop valve for liquid line
6	Distributor	15	Stop valve for gas line
7	Distributor	16	High pressure switch for protection
8	Reversing valve	17	Sensor for refrigerant pressure
9	Capillary tube	18	Pressure switch for control

8.1.3 IVX Standard series

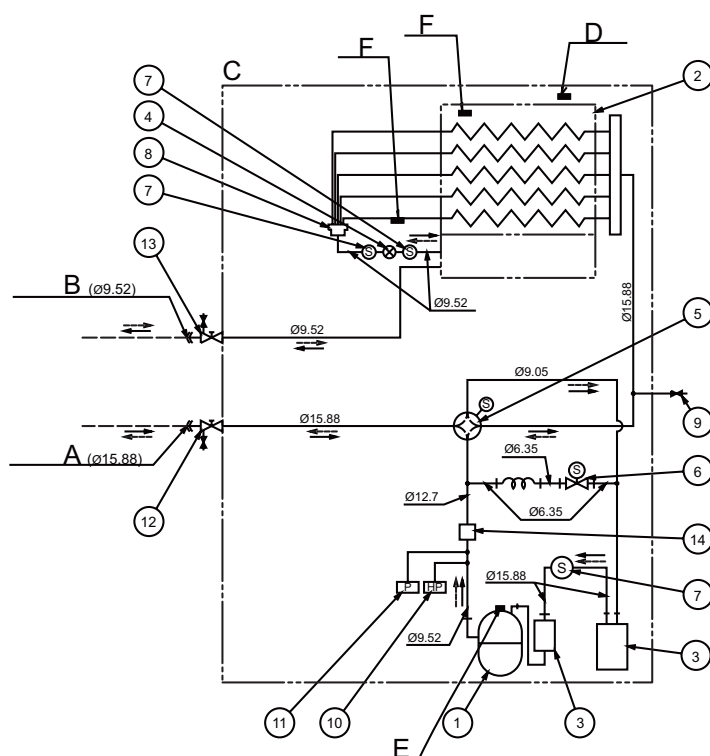
◆ RAS-3HVNC1



7S139296

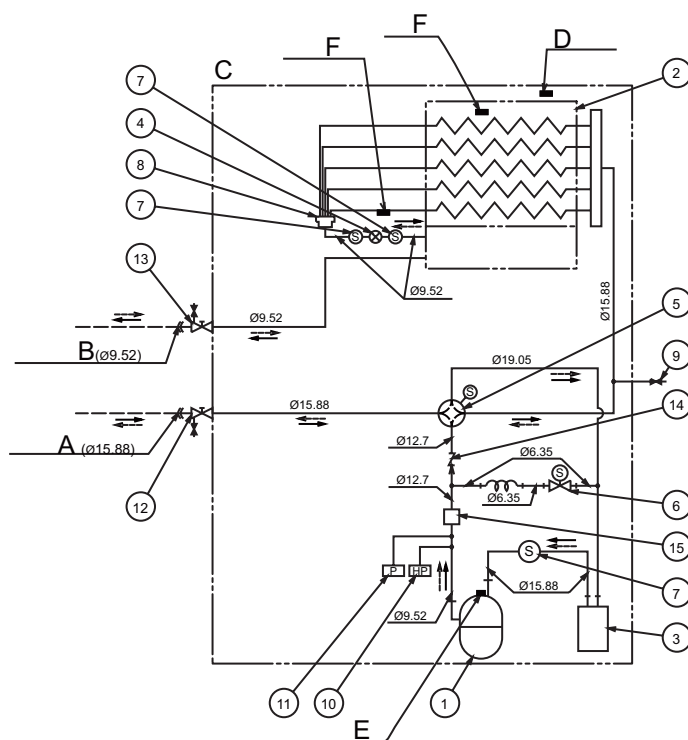
N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Micro-computer control expansion valve
5	Reversing valve
6	Strainer
7	Distributor
8	Check joint
9	High pressure switch for protection
10	Pressure switch for control
11	Stop valve for gas line
12	Stop valve for liquid line

◆ RAS-4H(V)NC1E



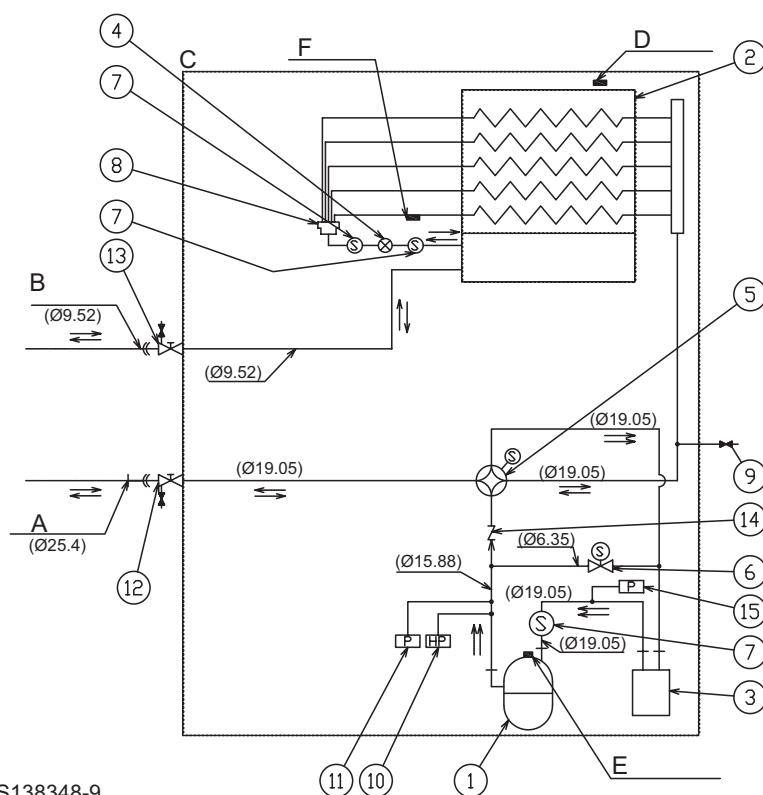
N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Micro-Computer controlled expansion valve
5	Reversing valve
6	Solenoid valve for gas bypass
7	Strainer
8	Distributor
9	Check joint
10	High pressure switch for protection
11	Pressure switch for control
12	Stop valve for gas line
13	Stop valve for liquid line
14	Silencer

◆ RAS-(5/6)H(V)NC1E



N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Micro-Computer controlled expansion valve
5	Reversing valve
6	Solenoid valve for gas bypass
7	Strainer
8	Distributor
9	Check Joint
10	High pressure switch for protection
11	Pressure switch for control
12	Stop valve for gas line
13	Stop valve for liquid line
14	Check valve
15	Silencer

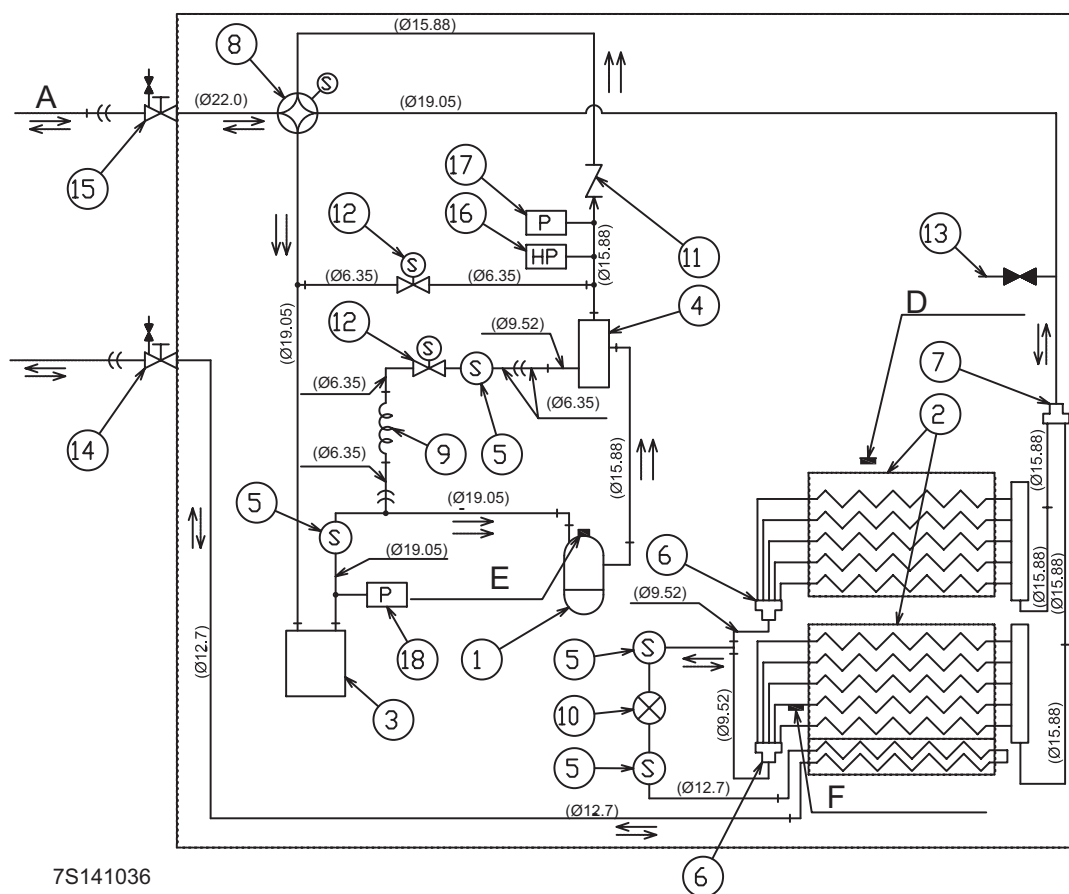
◆ RAS-(8/10)HNCE



N.	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Micro-computer control expansion valve
5	Reversing valve
6	Solenoid valve for gas bypass
7	Strainer
8	Distributor
9	Check joint
10	High pressure switch for protection
11	Pressure switch for control
12	Stop valve for gas line
13	Stop valve for liquid line
14	Check valve
15	Pressure switch for control

7S138348-9

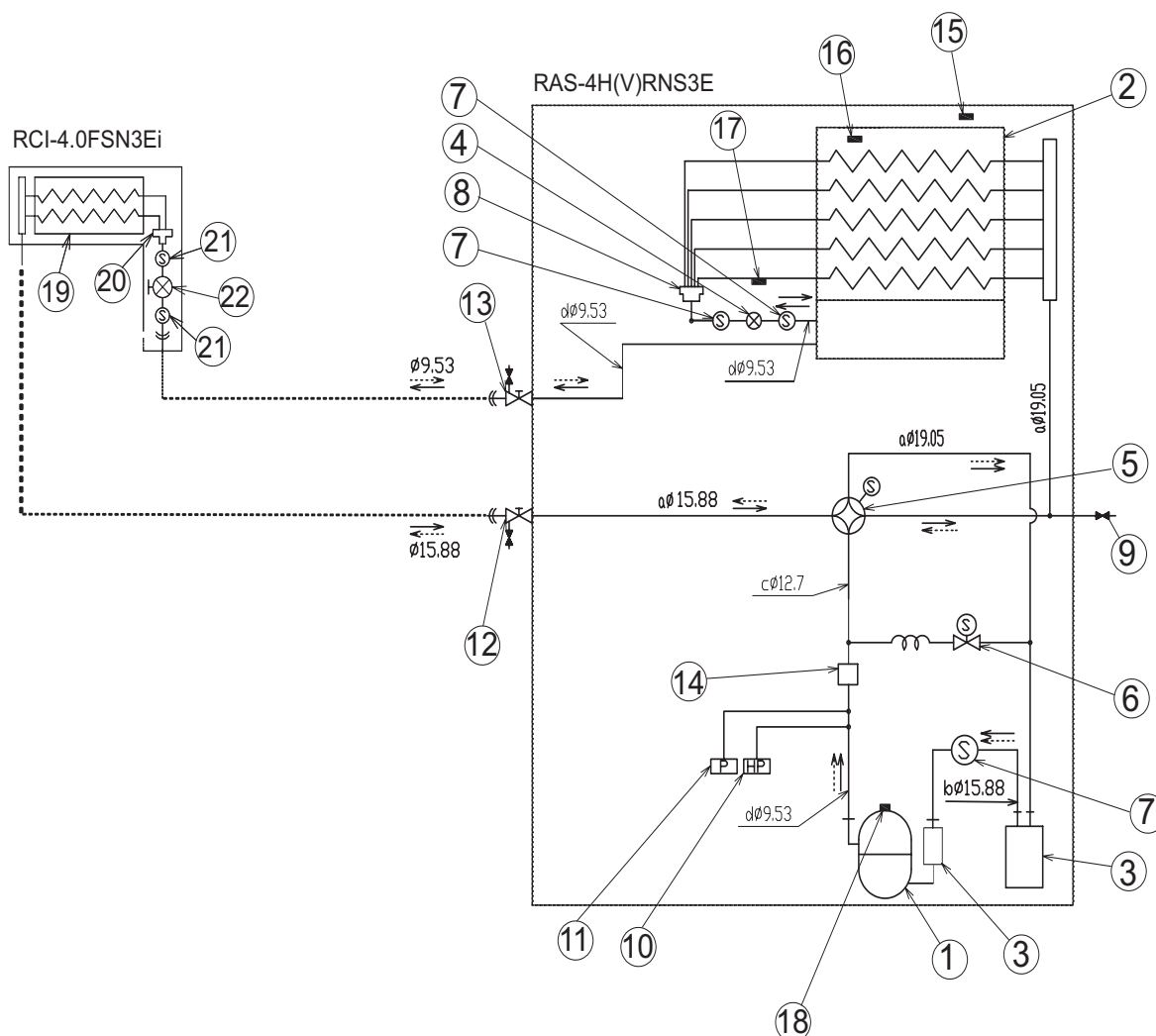
◆ RAS-12HNC



N.	Part name	N.	Part name
1	Compressor	10	Expansion valve
2	Heat exchanger	11	Check valve
3	Accumulator	12	Solenoid valve for gas bypass
4	Oil separator	13	Check joint
5	Strainer	14	Stop valve for liquid line
6	Distributor	15	Stop valve for gas line
7	Distributor	16	High pressure switch for protection
8	Reversing valve	17	Sensor for refrigerant pressure
9	Capillary tube	18	Pressure switch for control

8.2 UTOPIA ES SERIES

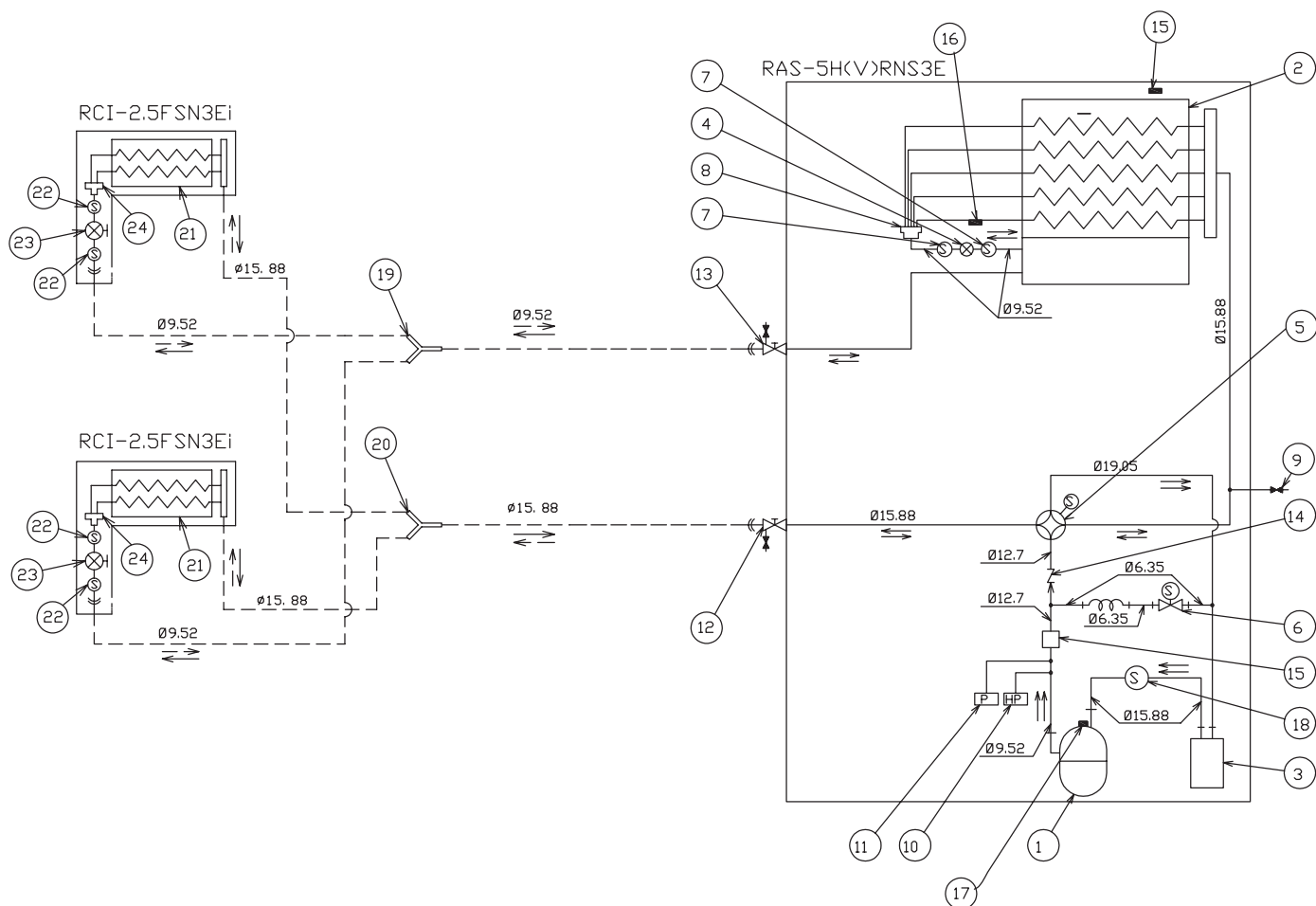
8.2.1 Example of single combination



$\rightarrow$	$\leftarrow \cdots$	$\cdots$	$\text{---}\text{ }\text{---}$	$\text{---}\text{+}\text{---}$	R410A	4.15 MPa
Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigeration pipe	Connection by flare nut	Connection by welding	Gas refrigerant	Leakage test pressure

N°	Part name	N°	Part name	N°	Part name
1	Compressor	9	Check joint	17	Evaporator pipe thermistor
2	Outdoor unit Heat exchanger	10	High pressure switch (protection)	18	Gas discharge thermistor
3	Accumulator	11	Pressure switch (control)	19	Indoor unit Heat exchanger
4	Micro-computer control expansion valve	12	Stop valve for gas line	20	Distributor
5	Reversing valve	13	Stop valve for liquid line	21	Strainer
6	Solenoid valve for gas bypass	14	Silencer	22	Expansion valve
7	Strainer	15	Ambient thermistor		
8	Distributor	16	Thermistor		

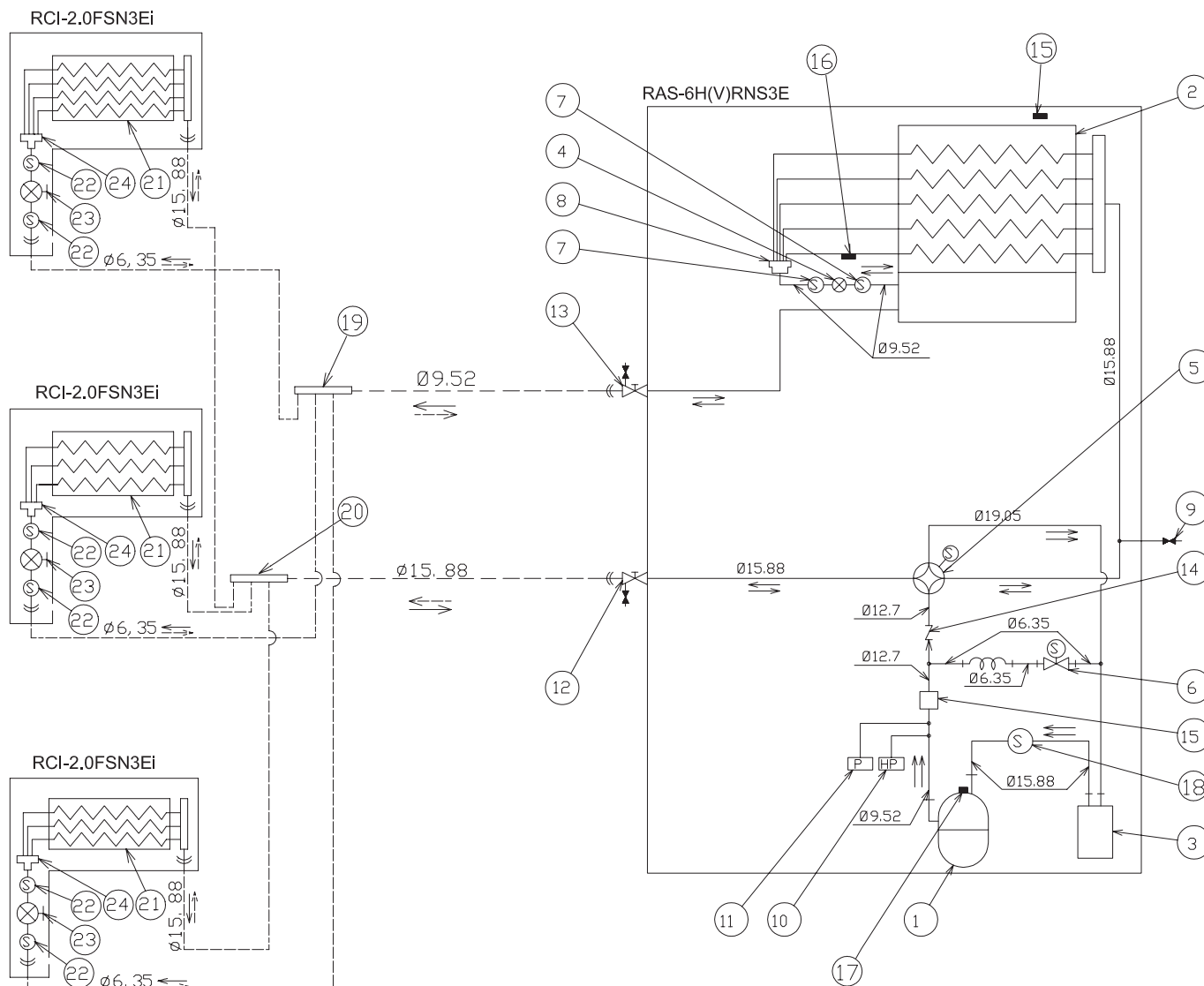
8.2.2 Example of twin combination



→	←---	-----	— —	— —	R410A	4.15 MPa
Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigeration pipe	Connection by flare nut	Connection by welding	Gas refrigerant	Leakage test pressure

N°	Part name	N°	Part name	N°	Part name
1	Compressor	10	Gas pipe stop valve	19	Branch pipe (liquid)
2	Outdoor unit Heat exchanger	11	Liquid pipe stop valve	20	Branch pipe (gas)
3	Accumulator	12	Pressure switch (control)	21	Indoor unit Heat exchanger
4	Expansion valve	13	Check joint	22	Strainer
5	Reversing valve	14	Check valve	23	Expansion valve
6	Solenoid valve	15	Ambient thermistor	24	Distributor
7	Strainer	16	Evaporator pipe thermistor	25	Silencer
8	Distributor	17	Gas discharge thermistor	26	Capillary tube
9	High pressure switch (protection)	18	Strainer		

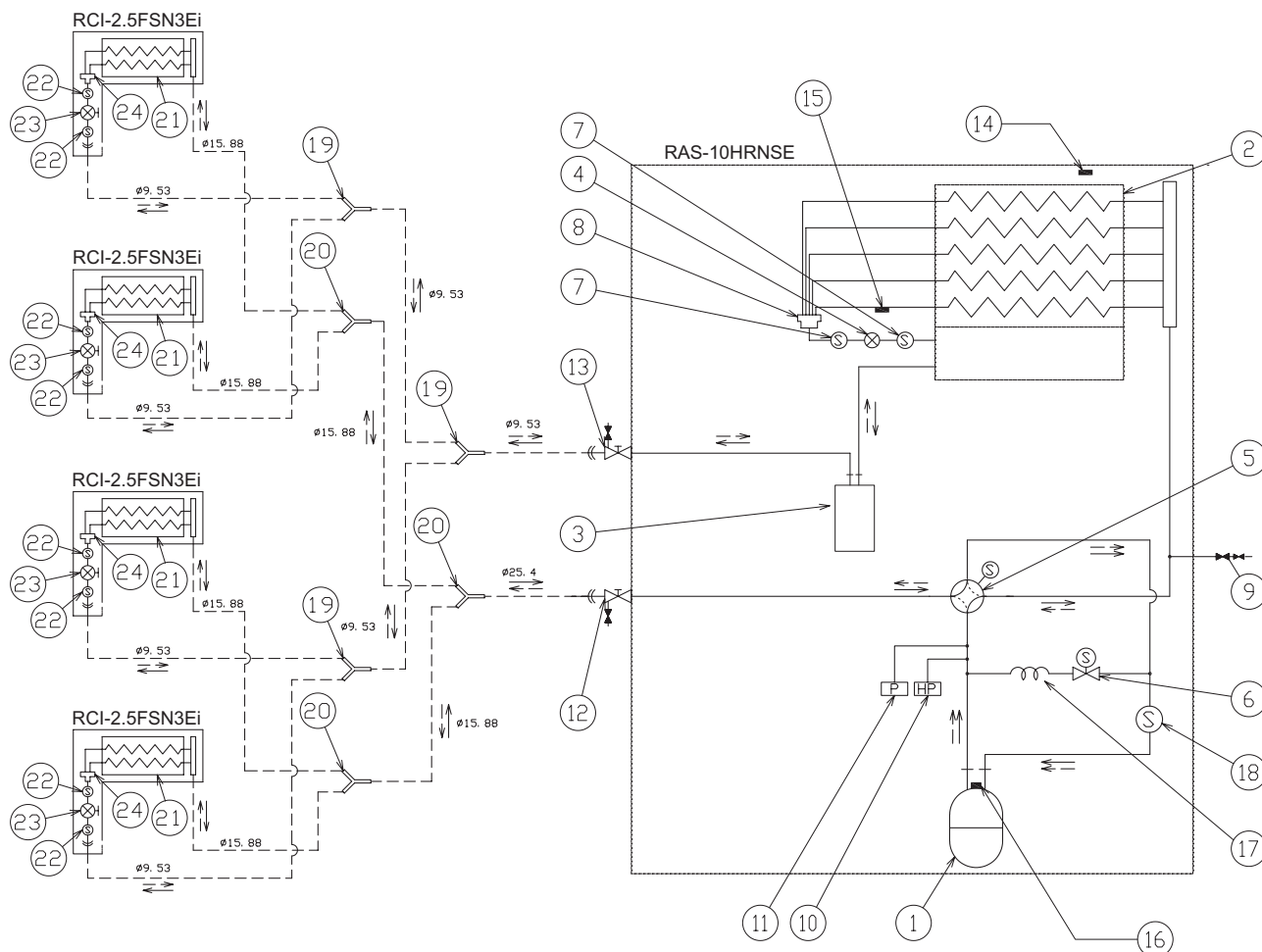
8.2.3 Example of triple combination (only 6 and 8 HP)



$\rightarrow$	$\leftarrow$	----	$\text{---}\text{---}$	$\text{---}\text{---}$	R410A	4.15 MPa
Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigeration pipe	Connection by flare nut	Connection by welding	Gas refrigerant	Leakage test pressure

No.	Part name	No.	Part name	No.	Part name
1	Compressor	10	Gas pipe stop valve	19	Branch pipe (liquid)
2	Outdoor unit Heat exchanger	11	Liquid pipe stop valve	20	Branch pipe (gas)
3	Accumulator	12	Pressure switch (control)	21	Indoor unit Heat exchanger
4	Expansion valve	13	Check joint	22	Silencer
5	Reversing valve	14	Check valve	23	Expansion valve
6	Solenoid valve	15	Ambient thermistor	24	Distributor
7	Strainer	16	Evaporator pipe thermistor	25	Silencer
8	Distributor	17	Gas discharge thermistor	26	Capillary tube
9	High pressure switch for protection	18	Strainer		

8.2.4 Example of quad combination (only 8 and 10 HP)

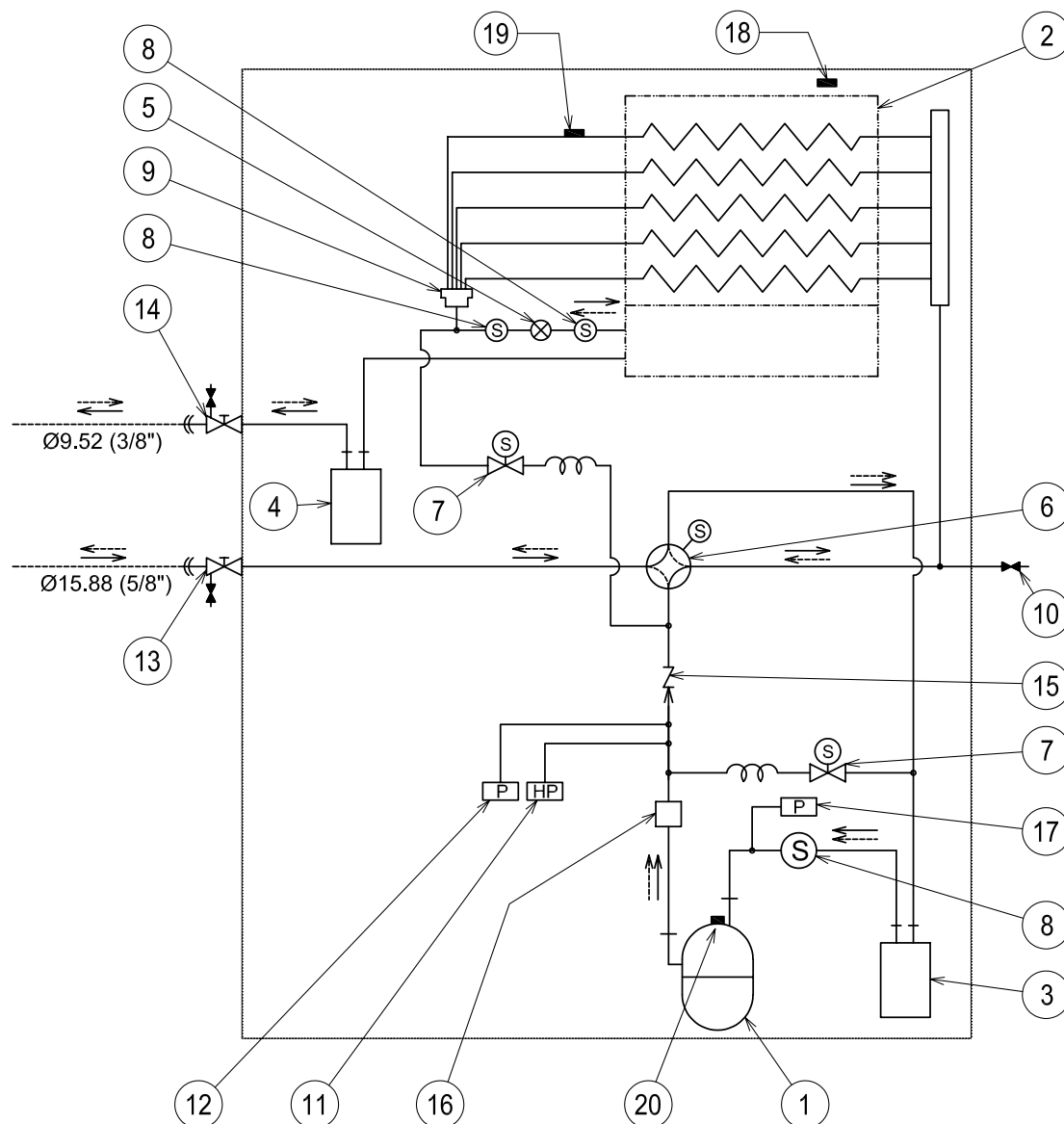


					R410A	4.15 MPa
Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigeration pipe	Connection by flare nut	Connection by welding	Gas refrigerant	Leakage test pressure

No.	Part name	No.	Part name	No.	Part name
1	Compressor	9	Check joint	17	Capillary tube
2	Outdoor unit Heat exchanger	10	High pressure switch for protection	18	Strainer
3	Liquid tank	11	Pressure switch (control)	19	Branch pipe (liquid)
4	Expansion valve	12	Gas pipe stop valve	20	Branch pipe (gas)
5	Reversing valve	13	Liquid pipe stop valve	21	Indoor unit Heat exchanger
6	Solenoid valve	14	Ambient thermistor	22	Strainer
7	Strainer	15	Evaporator pipe thermistor	23	Expansion valve
8	Distributor	16	Gas discharge thermistor	24	Distributor

8.3 CENTRIFUGAL VRF SERIES

8.3.1 RASC-(4-6)HNPE

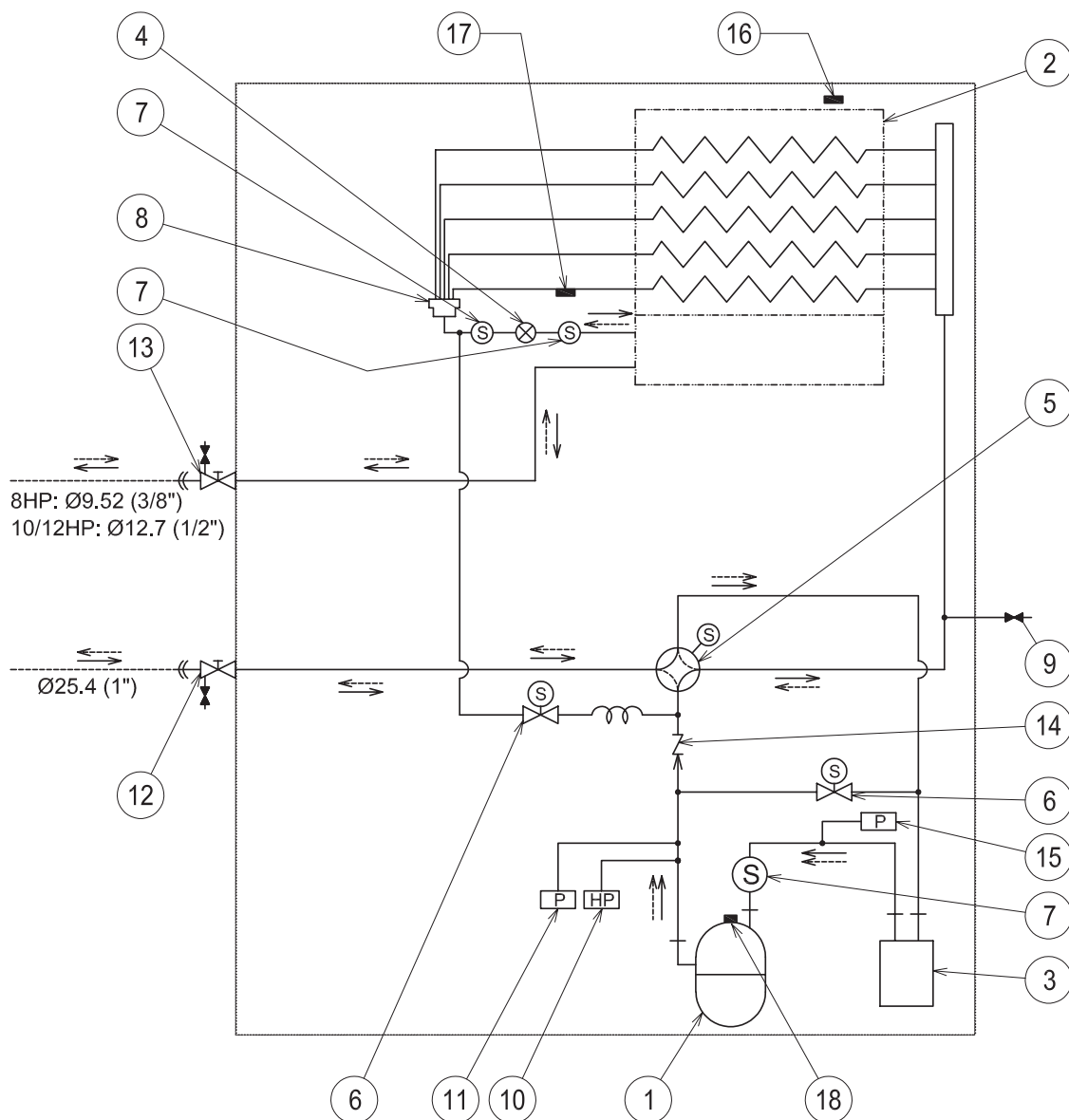


Cooling refrigerant flow or defrost	Heating refrigerant flow	Field refrigerant piping	Flare nut connection	Brazing connection

N°	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Liquid tank
5	Electronic expansion valve
6	Reversing valve
7	Solenoid valve for gas by-pass
8	Strainer
9	Distributor
10	Check joint

N°	Part name
11	High pressure switch for protection
12	High pressure sensor for refrigerant
13	Stop valve for gas line
14	Stop valve for liquid line
15	Check valve
16	Silencer
17	Pressure switch for control
18	Ambient thermistor
19	Evaporator pipe thermistor
20	Discharge gas thermistor

8.3.2 RASC-(8/10)HNPE



Cooling refrigerant flow or defrost	Heating refrigerant flow	Field refrigerant piping	Flare nut connection	Brazing connection

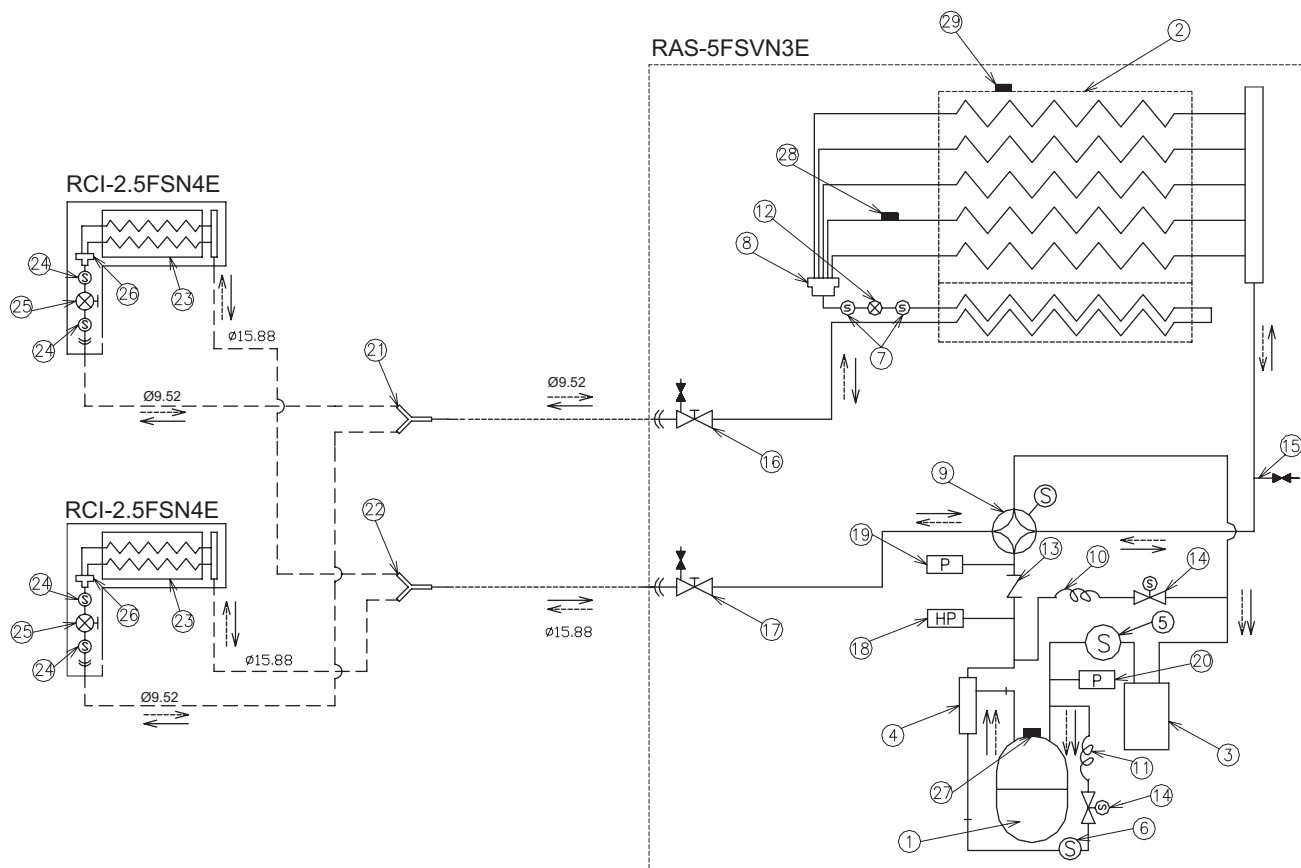
N°	Part name
1	Compressor
2	Heat exchanger
3	Accumulator
4	Electronic expansion valve
5	Reversing valve
6	Solenoid valve for gas by-pass
7	Strainer
8	Distributor
9	Check joint

N°	Part name
10	High pressure switch for protection
11	High pressure sensor for refrigerant
12	Stop valve for gas line
13	Stop valve for liquid line
14	Check valve
15	Pressure switch for control
16	Ambient thermistor
17	Evaporator pipe thermistor
18	Discharge gas thermistor

8.4 SET FREE MINI SERIES

8.4.1 RAS-(4-6)FS(V)N(Y)3E

Example of twin combination:

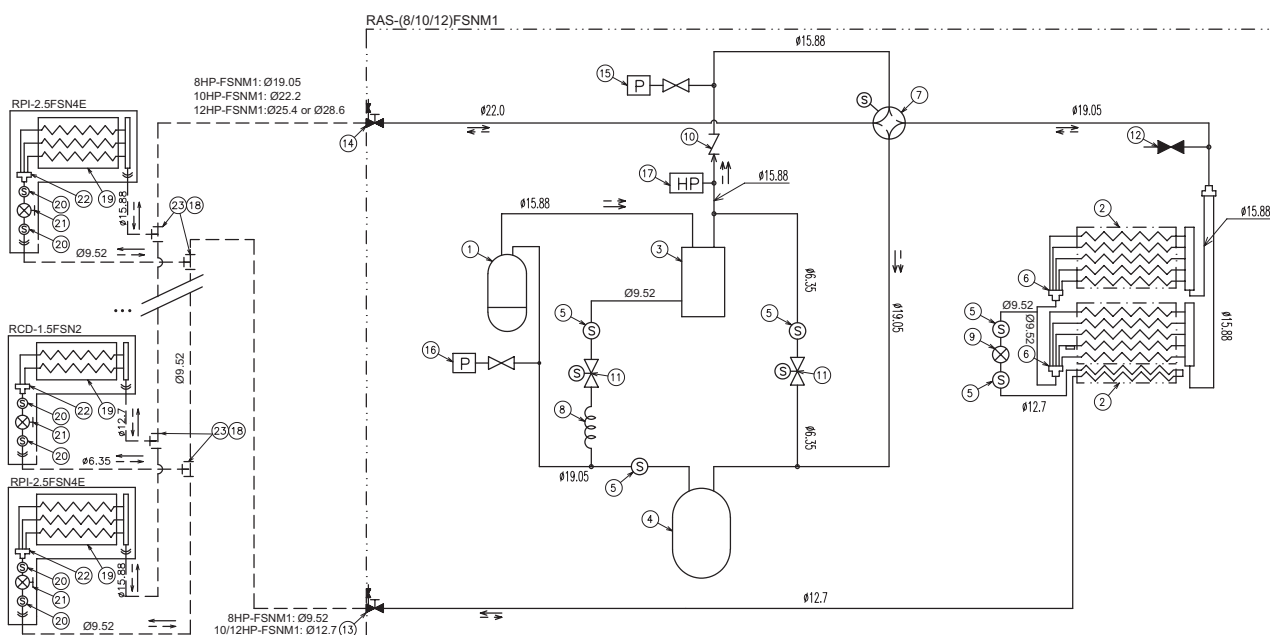


←	←---	---	—))—	— —	— —	R410A	4.15 MPa
Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigeration pipe	Connection by flare nut	Connection by flange	Connection by welding	Gas refrigerant	Leakage test pressure

No.	Part name	No.	Part name	No.	Part name
1	Compressor	11	Capillary tube	21	Branch pipe (liquid)
2	Outdoor unit heat exchanger	12	Micro computer control expansion valve	22	Branch pipe (gas)
3	Accumulator	13	Check valve	23	Indoor unit heat exchanger
4	Oil separator	14	Solenoid valve	24	Strainer
5	Strainer	15	Check joint	25	Expansion valve
6	Strainer	16	Stop valve for liquid line	26	Distributor
7	Strainer	17	Stop valve for gas line	27	Gas discharge thermistor
8	Distributor	18	High pressure switch for protection	28	Condenser pipe thermistor
9	Reversing valve	19	High pressure sensor	29	Ambient thermistor
10	Capillary tube	20	Low pressure sensor		-

8.5 SET FREE SIDE FLOW SERIES

8.5.1 RAS-(8-12)FSNM1

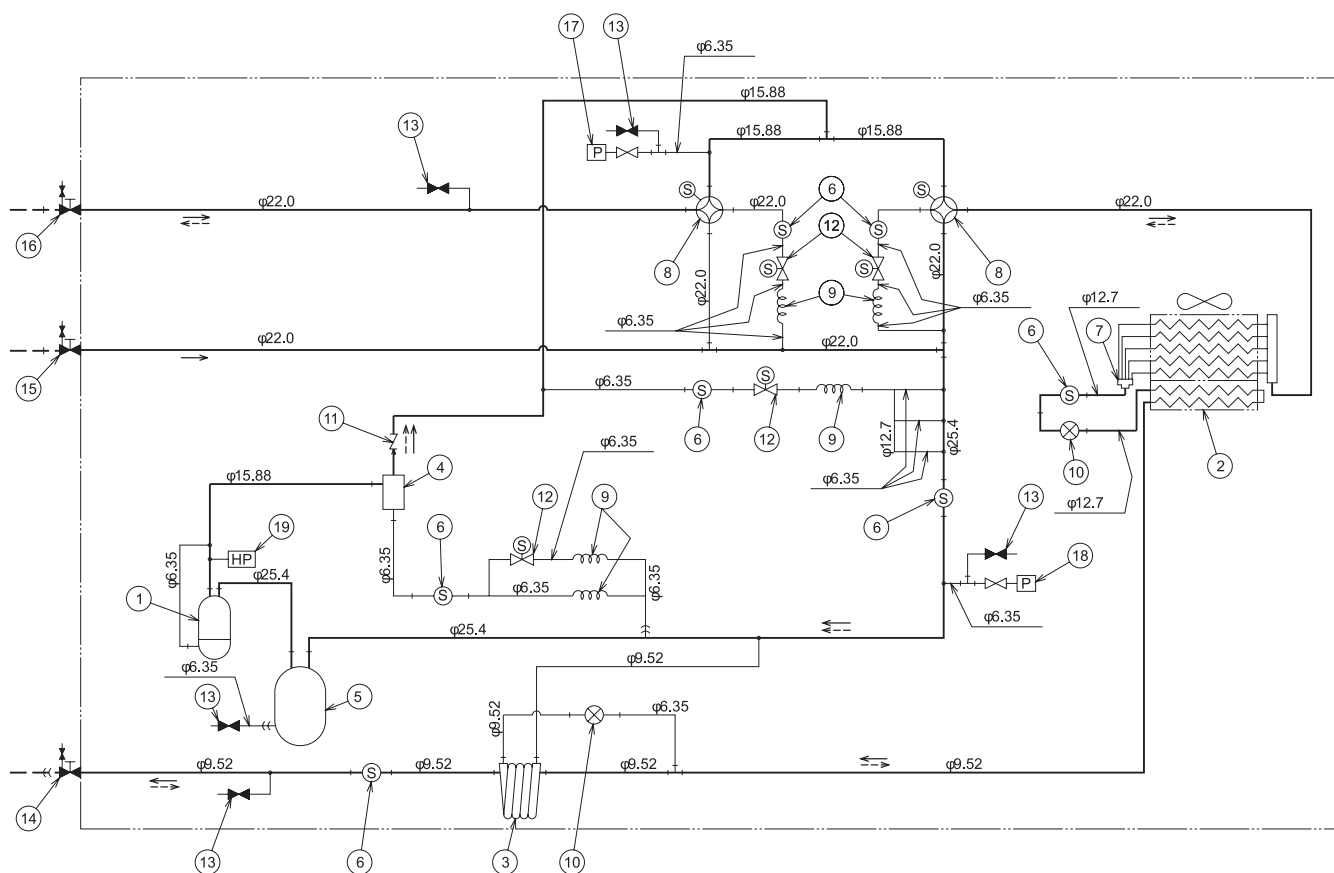


						R410A	4.15 MPa
Refrigerant flow for cooling	Refrigerant flow for heating	Refrigerant piping in the installation	Connection with flare nut	Flange connection	Brazing connection	Refrigerant	Airtight test pressure

No.	Item	No.	Item	No.	Item
1	Compressor	9	Micro-computer control expansion valve	16	Sensor for Refrigerant Pressure (Low pressure sensor)
2	Heat exchanger	10	Check valve	17	High pressure switch for protection
3	Oil separator	11	Solenoid valve	18	Multi-Kit E-162SN4
4	Accumulator	12	Check joint	19	Heat exchanger indoor
5	Strainer	13	Stop Valve for liquid line	20	Strainer indoor
6	Distributor	14	Stop Valve for gas line	21	Expansion valve indoor
7	Reversing valve	14	Stop Valve for gas line	22	Distributor indoor
8	Capillary tube	15	Sensor for Refrigerant Pressure (High pressure sensor)	23	Multi-Kit E-102SN4

8.6 SET FREE MODULAR FSXN1E - FSXNHE SERIES

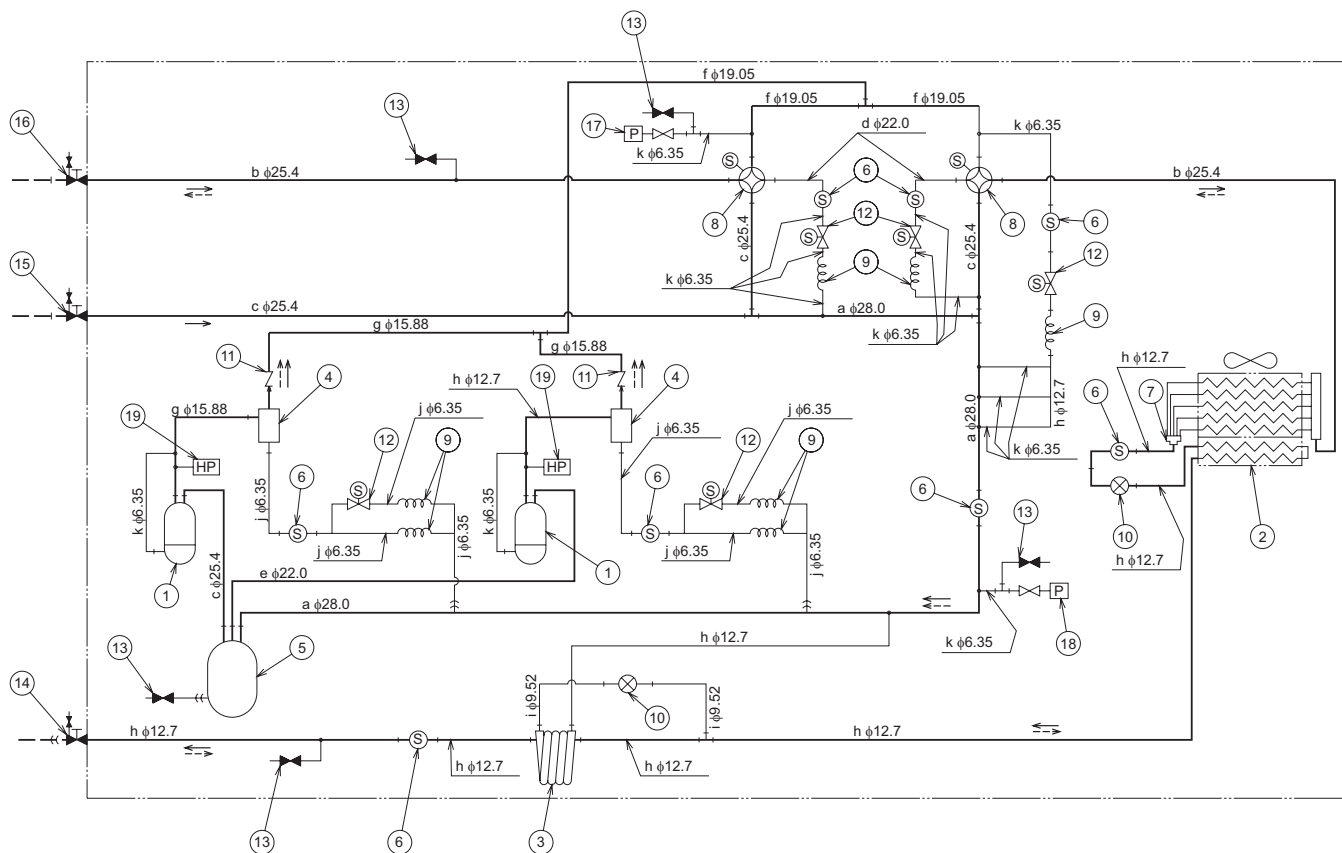
8.6.1 RAS-(8-12)FSXN1E and RAS-(5/6)FSXNHE



Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigerant pipe	Connection by flare nut	Connection by brazing

No.	Part	No.	Part
1	Compressor	11	Check valve
2	Heat exchanger	12	Solenoid valve
3	Dual-tube heat exchanger	13	Check joint
4	Oil separator	14	Stop valve (liquid)
5	Accumulator	15	Stop valve (gas, low pressure)
6	Strainer	16	Stop valve (gas, high pressure)
7	Distributor	17	Refrigerant pressure sensor (high pressure)
8	Reversing valve	18	Refrigerant pressure sensor (low pressure)
9	Capillary tube	19	Protection pressure switch
10	Electronic expansion valve		

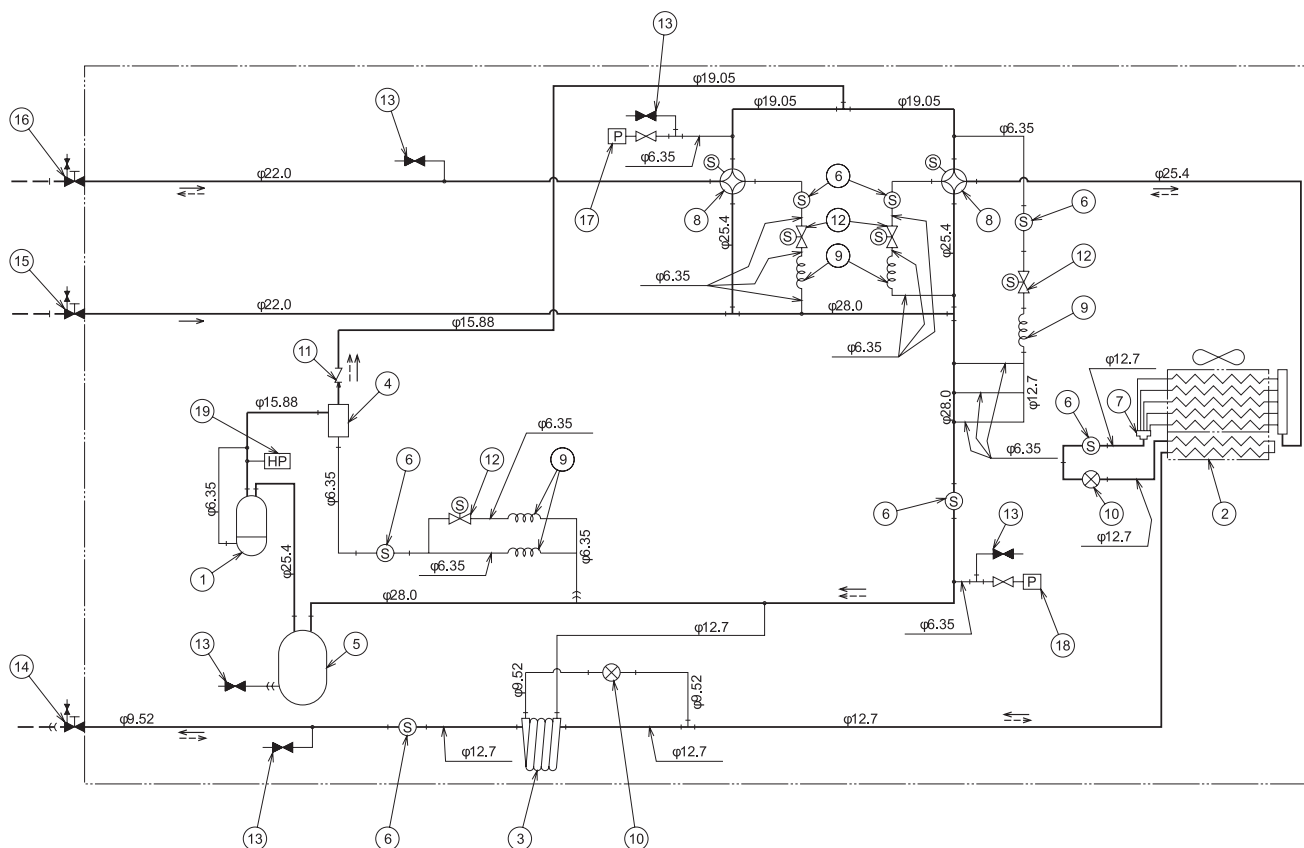
8.6.2 RAS-(14/16)FSXN1E



Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigerant pipe	Connection by flare nut	Connection by brazing

No.	Part	No.	Part
1	Compressor	11	Check valve
2	Heat exchanger	12	Solenoid valve
3	Dual-tube heat exchanger	13	Check joint
4	Oil separator	14	Stop valve (liquid)
5	Accumulator	15	Stop valve (gas, low pressure)
6	Strainer	16	Stop valve (gas, high pressure)
7	Distributor	17	Refrigerant pressure sensor (high pressure)
8	Reversing valve	18	Refrigerant pressure sensor (low pressure)
9	Capillary tube	19	Protection high pressure switch
10	Electronic expansion valve		

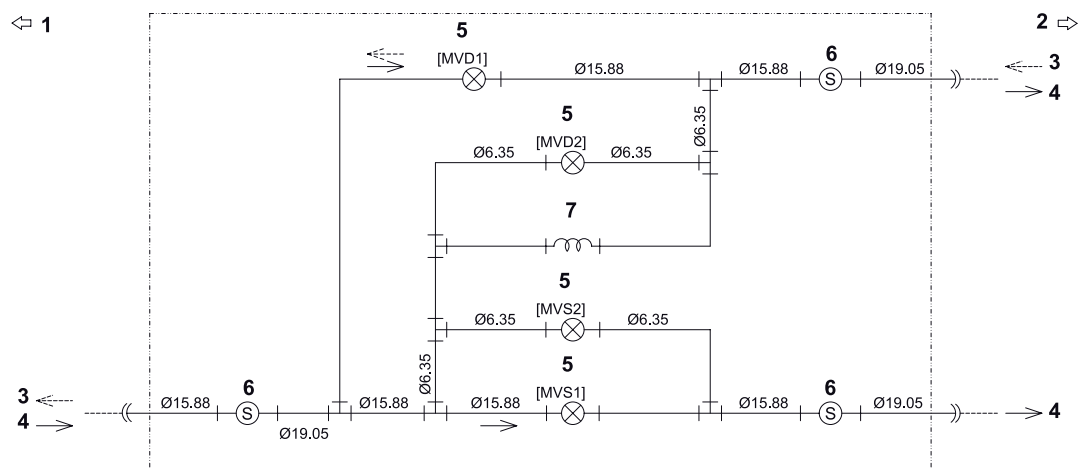
8.6.3 RAS-(8-12)FSXNHE



Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigerant pipe	Connection by flare nut	Connection by brazing

No.	Part	No.	Part
1	Compressor	11	Check valve
2	Heat exchanger	12	Solenoid valve
3	Dual-tube heat exchanger	13	Check joint
4	Oil separator	14	Stop valve (liquid)
5	Accumulator	15	Stop valve (gas, low pressure)
6	Strainer	16	Stop valve (gas, high pressure)
7	Distributor	17	Refrigerant pressure sensor (high pressure)
8	Reversing valve	18	Refrigerant pressure sensor (low pressure)
9	Capillary tube	19	Protection high pressure switch
10	Electronic expansion valve		

8.6.4 CH-(6.0-10.0)N2

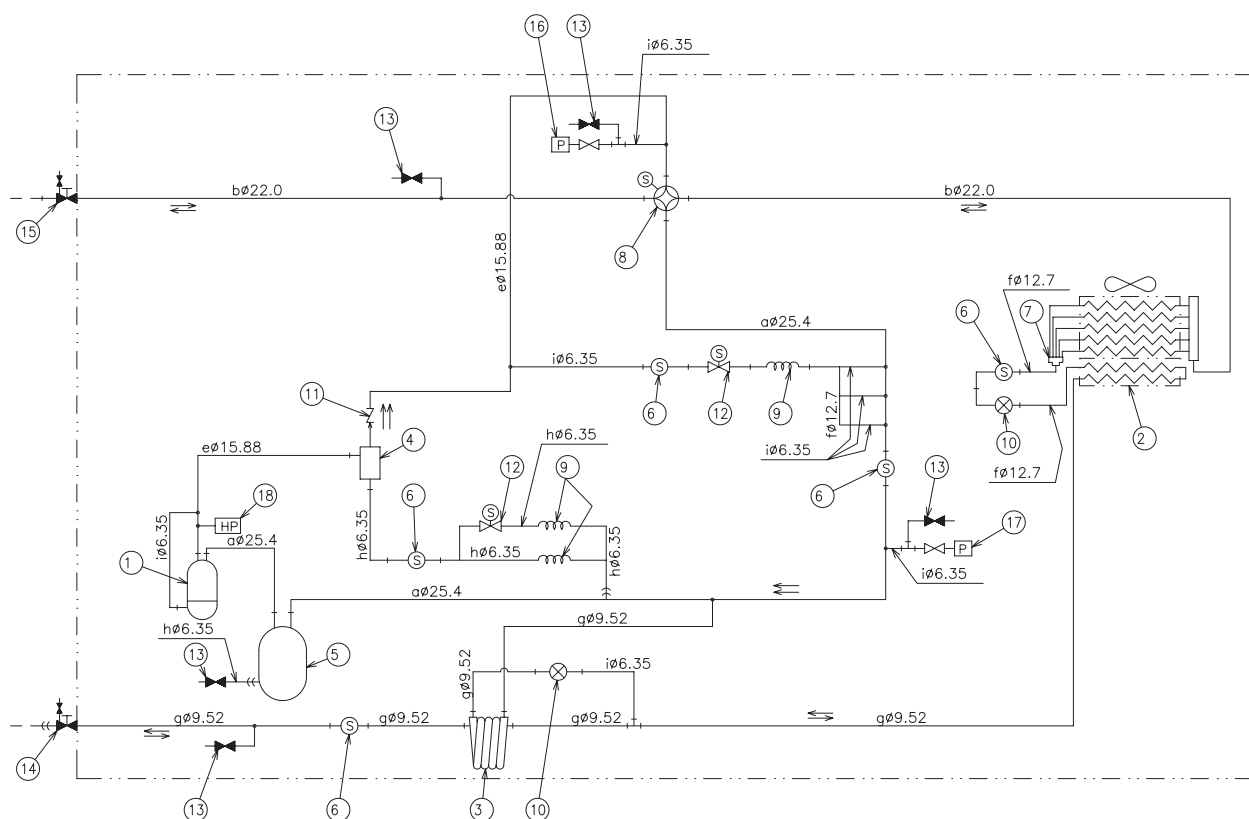


Refrigerant flow for cooling	Refrigerant flow for heating	Installation refrigerant pipe	Connection by flare nut	Connection by brazing

No.	Part	No.	Part
1	Toward indoor unit	5	Electronic expansion valve
2	Toward outdoor unit	6	Strainer
3	Gas, high pressure	7	Capillary tube
4	Gas, low pressure		

8.7 SET FREE MODULAR FSN3E

8.7.1 RAS-(8-12)FSN3E

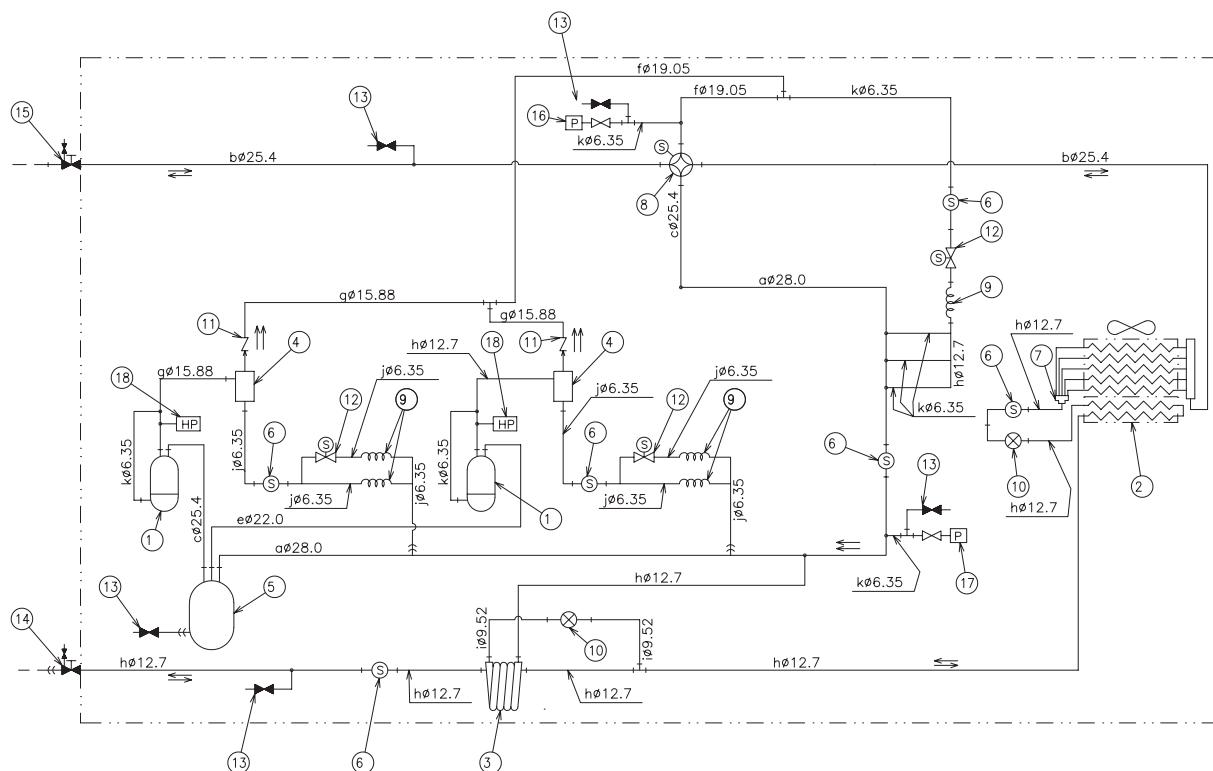


Refrigerant flow direction for cooling	Refrigerant flow direction for heating	Field refrigerant piping	Flare connection	Brazing connection

N°.	Part	N°.	Part
1	Compressor	10	Micro computer control expansion valve
2	Heat exchanger	11	Check valve
3	Double tube type heat exchanger	12	Solenoid valve
4	Oil separator	13	Check joint
5	Accumulator	14	Stop valve for liquid line
6	Strainer	15	Stop valve for gas line
7	Distributor	16	Sensor for refrigerant pressure (high pressure sensor)
8	Reversing valve	17	Sensor for refrigerant pressure (low pressure sensor)
9	Capillary tube	18	High pressure switch for protection

Mark	ODxT	Material
a	25.4 x 1.2	C1220T-0
b	22.0 x 1.5	
c	22.0 x 1.2	
d	19.05 x 1.42	
e	15.88 x 1.2	
f	12.7 x 1.0	
g	9.52 x 0.8	
h	6.35 x 1.07	
i	6.35 x 0.7	

8.7.2 RAS-(14/16)FSN3E



Refrigerant flow direction for cooling	Refrigerant flow direction for heating	Field refrigerant piping	Flare connection	Brazing connection

Nº.	Part	Nº.	Part
1	Compressor	10	Micro computer control expansion valve
2	Heat exchanger	11	Check valve
3	Double tube type heat exchanger	12	Solenoid valve
4	Oil separator	13	Check joint
5	Accumulator	14	Stop valve for liquid line
6	Strainer	15	Stop valve for gas line
7	Distributor	16	Sensor for refrigerant pressure (high pressure sensor)
8	Reversing valve	17	Sensor for refrigerant pressure (low pressure sensor)
9	Capillary tube	18	High pressure switch for protection

Mark	ODxT	Material
a	28.0 x 1.6	C1220T-0
b	25.4 x 1.8	
c	25.4 x 1.2	
d	22.0 x 1.5	
e	22.0 x 1.2	
f	19.05 x 1.42	
g	15.88 x 1.2	
h	12.7 x 1.0	
i	9.52 x 0.8	
j	6.35 x 1.07	
k	6.35 x 0.7	

9 OPTIONAL PARTS AND INSTALLATION

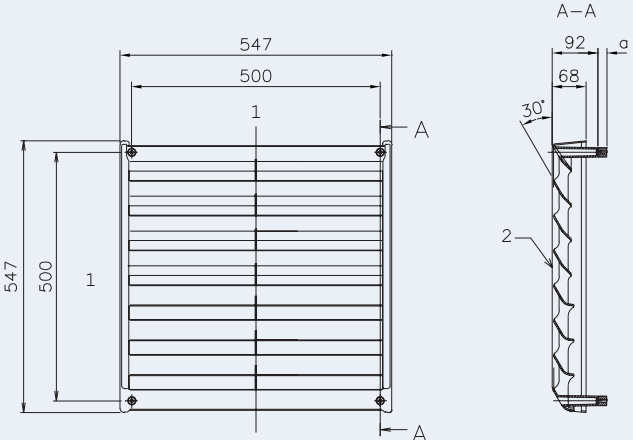
9.1 OPTIONAL PARTS AND INSTALLATION FOR RAS-(2-2.5)HVNP1 / RAS-3HVNC1

◆ Air flow guide wind guard and snow protection hood

Optional parts			Model		
Air flow guide			AG-264	1	2
Wind guard			WSP-264		
Snow protection hood	Zinc Plate	Air outlet	ASG-NP80F	3	
		Air inlet of rear side	ASG-NP56B		
		Air inlet of side face	ASG-NP56L		
	Stainless plate (NSSC180)	Air outlet	ASG-NP80FS2		
		Air inlet of rear side	ASG-NP63B52		
		Air inlet of side face	ASG-NP63LS2		

- 1 Air flow guide
2 Wind Guard
3 Snow protection hood

9.1.1 Air flow guide

Model	AG-264		
Quantity	1 per unit		
Air discharge direction	Upward (downward) left & right		
Material	Weather proof polypropylene resin		
Color	Gray		
Weight	1.4 kg		
Accessories	Fixing screw 4x [M5 (SUS) x 12]+4x [M5 (SUS) x 30] Installation manual Self-screw 2x [M4 x 13]	1 Mounting dimension 2 Air flow guide	
Installation restriction	"Wind Guard" or "Snow protection hood" is not available to install with air flow guide. ("Guard net" is available to be installed together.)		

Attaching example of air flow guide

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

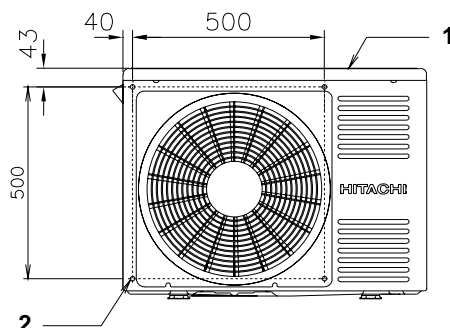
⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

Locations of fixing holes

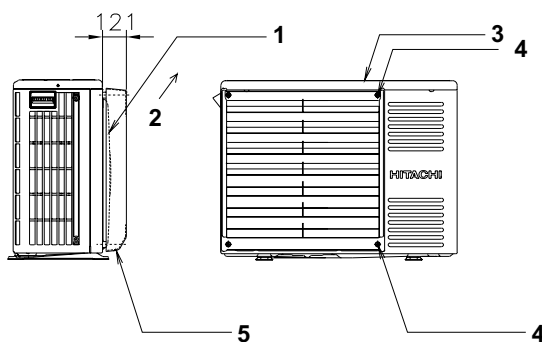
The holes Location shall be made by using self-screws (M4x13) and later shall be used SUS screw (M5x12) for fixing air flow guide.

- 1.Outdoor Unit
- 2.Hole (4 locations)



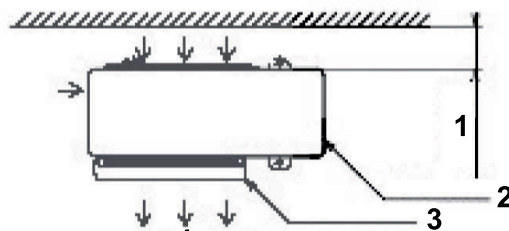
One flow guide installation

- 1.Air discharge grille
- 2.Air flow
- 3.Outdoor unit
- 4.M5 fixing screw x4 (Accessories)
- 5.Air flow guide



Service space (In case of upward air discharge)

- In case of right and left sides air discharge enough space for air discharge is required.
- The downward air discharge is also available. In such case install the base under the unit to secure enough space for air discharge.
- In case of serial units installation air discharge should be upward.

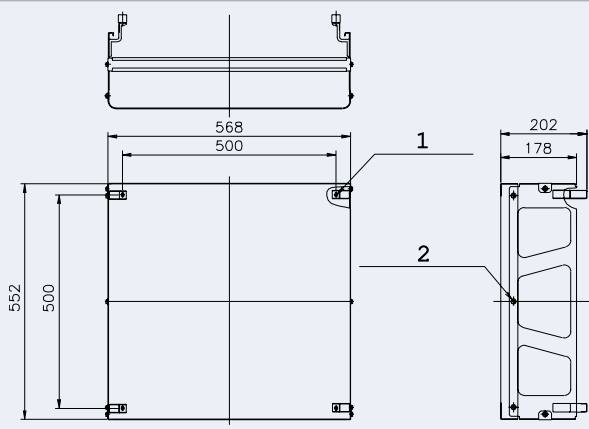


- 1.Min.150 mm
- 2.Outdoor unit
- 3.Air flow guide
- 4.Passage side

9.1.2 Wind guard

Specifications

Model	WSP-264	
Quantity	1 per unit	
Material	Galvanized sheet metal + baked painting	
Color	UTOPIA Beige	
Weight	4.0 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 30]- Unit Fixing Screw x 10 [M5 (SUS) x 12]- Wind Ward Installation manual	
Installation restriction	"Guard net" "Air flow guide" or "Snow protection hood" is not available to install with Wind guard	



1 4-6x10 Long Hole

2 5 (Both Sides) - M5 Screw (attachement)

Attaching example of air wind guard

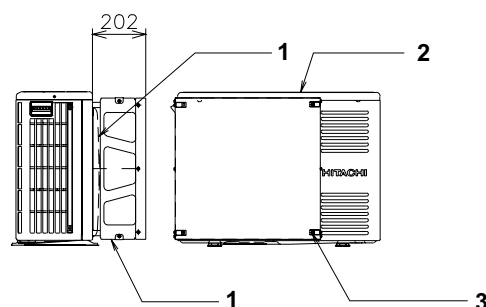
- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

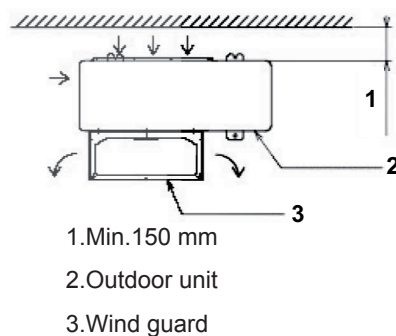
Two windguard covers installation

1. Air discharge grille
2. Outdoor unit
3. M5 fixing screw x4 (Accessories)



Service space

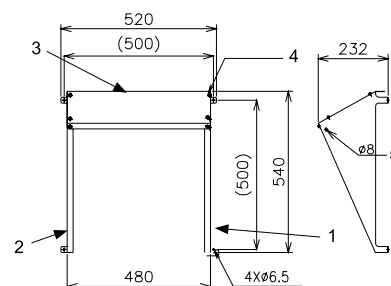
- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.



9.1.3 Snow protection hood

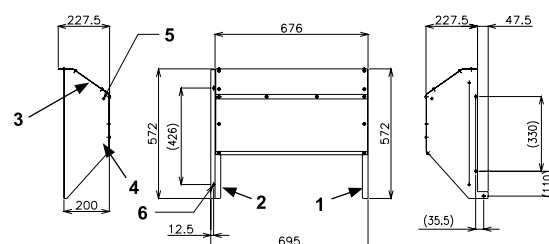
Air discharge hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel	1
4	Fixing screw (Accessories)	
5	Hole for safety wire rope to prevent overturning	



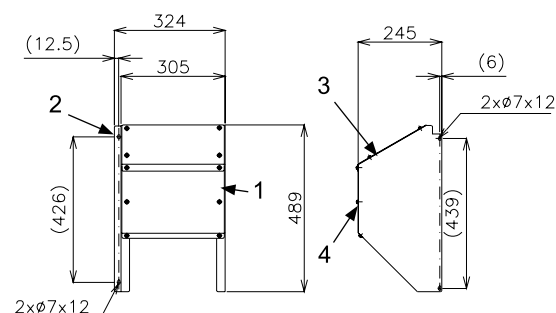
Rear suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Upper front panel (Upside)	1
4	Upper front panel (Downside).	1
5	Hole for safety wire rope to prevent overturning	
6	Fixing screw (Accessories)	

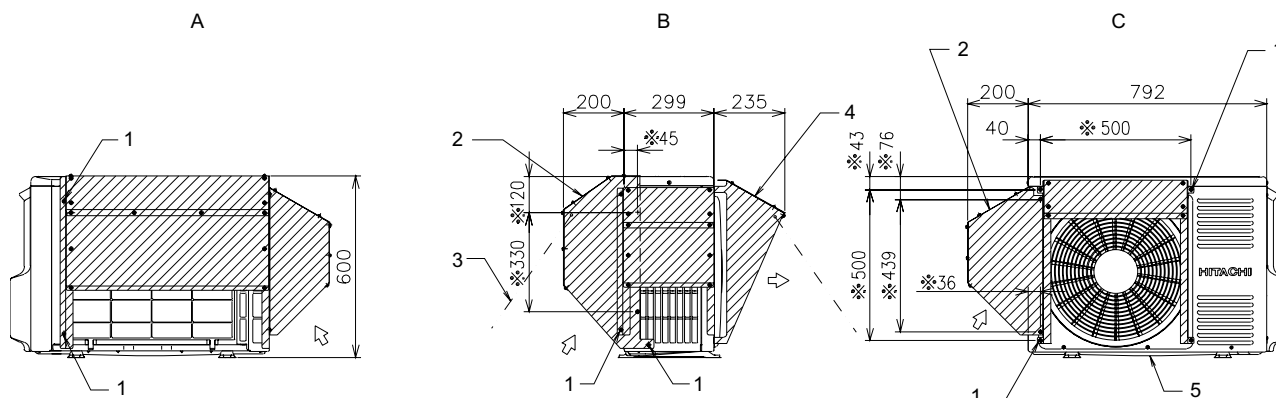


Left suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Upper front panel (Upside)	1
4	Upper front panel (Downside).	1



Attaching example of snow protection hood



- 1. Fixing screw (accessories)
- 2. Air inlet hood
- 3. Wire rope (optional for over turning protection)
- 4. Air discharge hood
- 5. Outdoor unit
- A. Rear side
- B. Left side
- C Front side

i NOTE

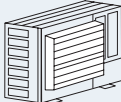
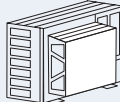
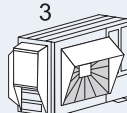
The holes locations marked with a mark shall be made by using sel screw (M4X13) and later shall be used SUS Screw for fixing protection hood.

Specifications of snow protection hood

Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP80F	ASG-NP80FS	ASG-NP56B	ASG-NP63BS2	ASG-NP56L	ASG-NP63LS2
Quantity		1 per unit					
Material		Bonderized steel sheet Iron	Stainless (NSSC180)	Bonderized steel sheet Iron	Stainless (NSSC180)	Bonderized steel sheet Iron	Stainless (NSSC180)
Color		Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—
Weight		3 kg		6 kg		3 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discharge part x 1		For rear side air intake x 1		For left side air intake x 1	
	Unit Fixing screw	4 (M5x12 tapping screw)		5 (M5x12 tapping screw)		4 (M5x12 tapping screw)	
	Hood Fixing screw (SUS)	6 (M5x12 tapping screw)	6 (M5x14)	14 (M5x12 tapping screw)	14 (M5x14)	10 (M5x12 tapping screw)	10 (M5x14)
	Self-screw	2 (M4x13)		2 (M4x13)		2 (M4x13)	
		Installation manual					
Installation restriction		Installation with “Guard net” “Wind guard” or is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (optional parts)		ASG-SW20A					

9.2 OPTIONAL PARTS AND INSTALLATION FOR RAS-3(X)HVNP1E

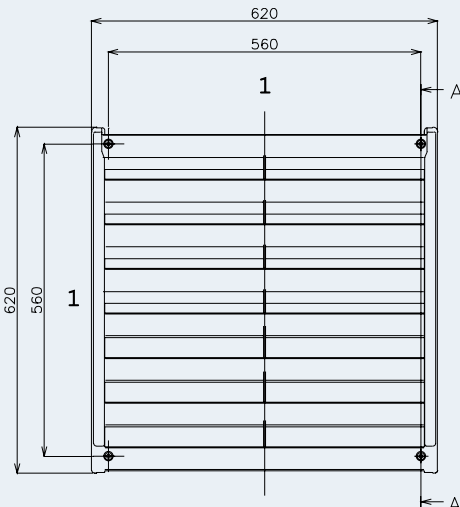
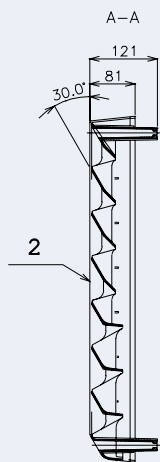
◆ Air flow guide wind guard and snow protection hood

Optional parts			Model		
Air flow guide			AG-335A	 	
Wind guard			WSP-335A		
Snow protection hood	Zinc plate	Air outlet	ASG-NP335F		
		Air inlet of rear side	ASG-NP80B		
		Air inlet of side face	ASG-NP80L		
	Stainless plate (SUS304)	Air outlet	ASG-NP335F52		
		Air inlet of rear side	ASG-NP160BS2		
		Air inlet of side face	ASG-NP160LS2		

- 1** Air flow guide
2 Wind Guard
3 Snow protection hood

9.2.1 Air flow guide

Specifications

Model	AG-335A		
Quantity	1 per unit	 	
Air discharge direction	Upward (downward) left & right		
Material	Weather proof polypropylene resin		
Color	Gray		
Weight	1.9 kg		
Accessories	Fixing screw x 4 [M5 (SUS) x 20] Installation manual		
Installation restriction	“Wind Guard” or “Snow protection hood” is not available to install with air flow guide. (“Guard net” is available to be installed together.)	1 Mounting dimension 2 Air flow guide	

Attaching example of air flow guide

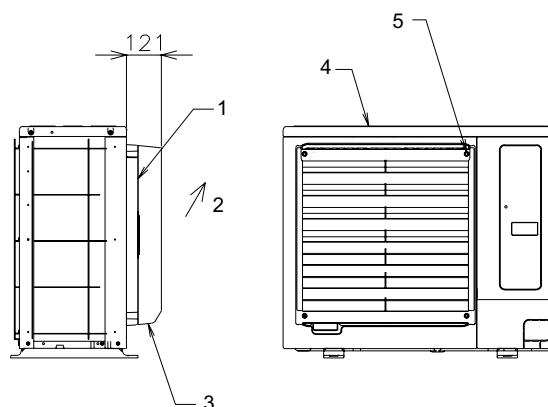
- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

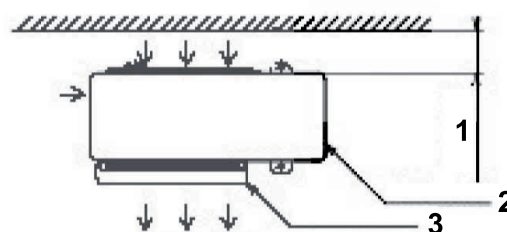
One flow guide installation

1. Air discharge grille
2. Air flow
3. Air flow guide
4. Outdoor unit
5. M5 fixing screw x4 (Accessories)



Service space (In case of upward air discharge)

- In case of right and left sides air discharge enough space for air discharge is required.
- The downward air discharge is also available. In such case install the base under the unit to secure enough space for air discharge.
- In case of serial units installation air discharge should be upward.



1. Min. 200 mm
2. Outdoor unit
3. Air flow guide
4. Passage side

9.2.2 Wind guard

Specifications

Model	WSP-335A	
Quantity	1 per unit	
Material	Galvanized sheet metal + baked painting	
Color	Gray (1.0Y8.5/0.5)	
Weight	5.5 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 12] Installation manual	
Installation restriction	"Guard net" "Air flow guide" or "Snow protection hood" is not available to install with Wind guard	1 Mounting dimension 2 Air flow 3 3 4xØ7

Attaching example of air wind guard

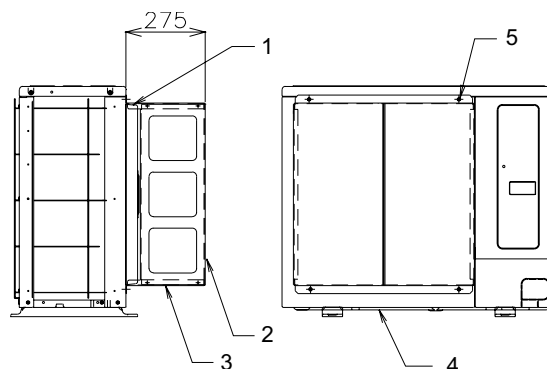
- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

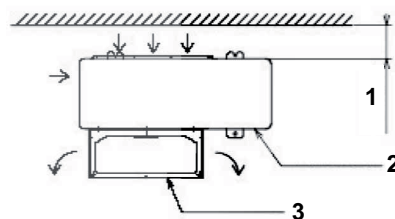
One windguard cover installation

1. Air discharge grille
2. Wind guard
3. Air discharge grille
4. Outdoor unit
5. M5 fixing screw x4 (Accessories)



Service space

- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.

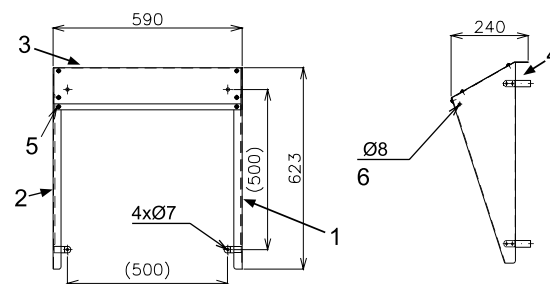


1. Min. 200 mm
2. Outdoor unit
3. Wind guard

9.2.3 Snow protection hood

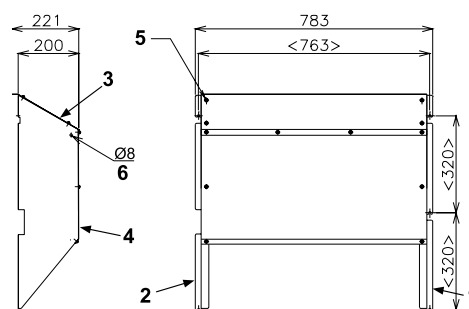
Air discharge hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel	1
4	Stay	4
5	Fixing screw (Accessories)	
6	Hole for safety wire rope to prevent overturning	



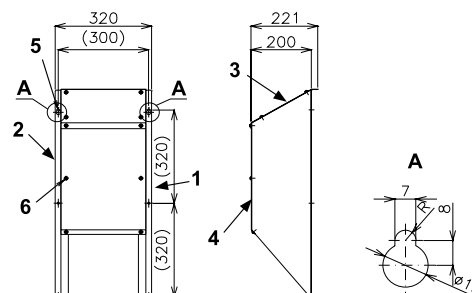
Rear suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Upper front panel (Upside)	1
4	Upper front panel (Downside)	1
5	Fixing screw (Accessories)	
6	Hole for safety wire rope to prevent overturning	



Left suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel (Upside)	1
4	Front panel (Downside)	1
5	Fixing hole x 2	
6	Fixing screw (Accessories)	
A	Enlarged view of A (Fixing Hole)	



Attaching example of snow protection hood

1. Fixing screw (Accessories).

2. Rear suction hood

3. Wire rope (Optional. For overturning protection)

4. Air discharge grille

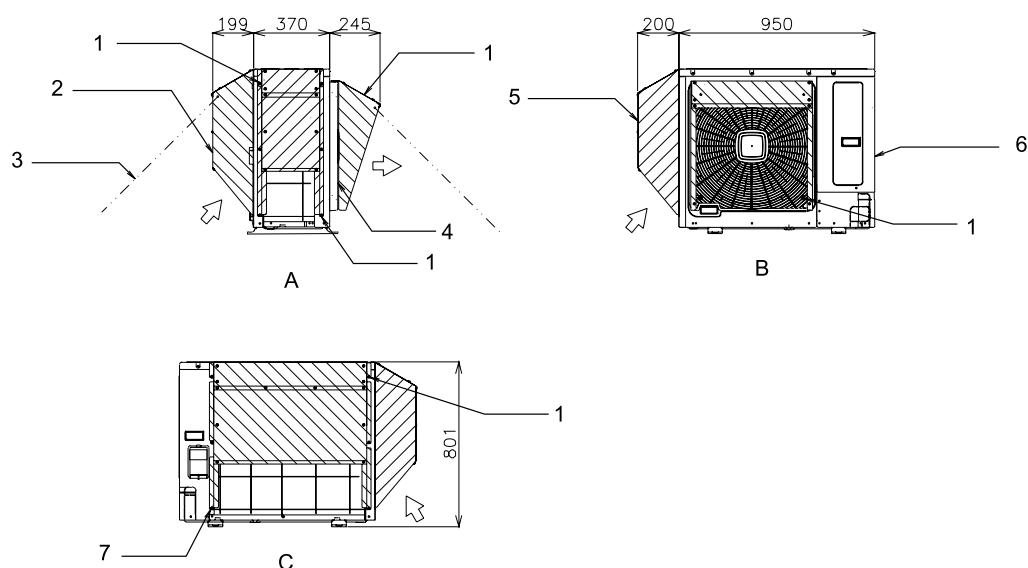
5. Left suction hood

6. Air discharge hood

A. Left side

B. Front side

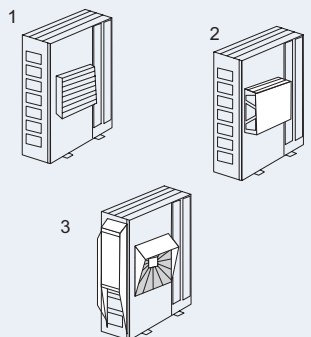
C. Rear side

**Specifications of snow protection hood**

Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP335F	ASG-NP335FS2	ASG-NP80B	ASG-NP160BS2	ASG-NP80L	ASG-NP160LS2
Quantity		2 per unit		1 per unit			
Material		Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)
Color		Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—
Weight		3 kg		14 kg		8 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discharge part x 1		For rear side air intake x 1 (Upper side x 1 lowe side x 1)		For left side air intake x 1	
	Unit Fixing screw	4 (M5x12 tapping screw)		5 (M5x14 tapping screw)		6 (M5x12 tapping screw)	
	Unit Fixing screw (SUS)	6 (M5x12 tapping screw)	6 (M5x14)	12 (M5x12 tapping screw)	12 (M5x14)	10 (M5x12 tapping screw)	10 (M5x14)
		Installation manual					
Installation restriction		Installation with “Guard net” or “Wind guard” is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (optional parts)		ASG-SW20A					

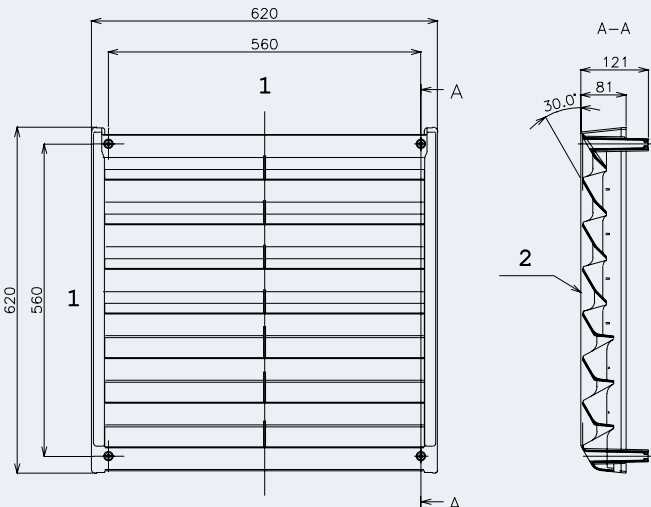
9.3 OPTIONAL PARTS AND INSTALLATION FOR RAS-(4-6)H(V)NC1E / RAS-(5/6)H(V)RNS3E

◆ Air flow guide wind guard and snow protection hood

Optional parts			Model	
Air flow guide			AG-335A	
Wind guard			WSP-335A	
Snow protection hood	Zinc plate	Air outlet	ASG-NP335F	
		Air inlet of rear side	ASG-NP80B	
		Air inlet of side face	ASG-NP80L	
	Stainless plate (SUS304)	Air outlet	ASG-NP335F52	
		Air inlet of rear side	ASG-NP160BS2	
		Air inlet of side face	ASG-NP160LS2	1 Air flow guide 2 Wind Guard 3 Snow protection hood

9.3.1 Air flow guide

Specifications

Model	AG-335A	
Quantity	1 per unit	
Air discharge direction	Upward (downward) left & right	
Material	Weather proof polypropylene resin	
Color	Gray	
Weight	1.9 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 20] Installation manual	
Installation restriction	"Wind Guard" or "Snow protection hood" is not available to install with air flow guide. ("Guard net" is available to be installed together.)	1 Mounting dimension 2 Air flow guide

Attaching example of air flow guide

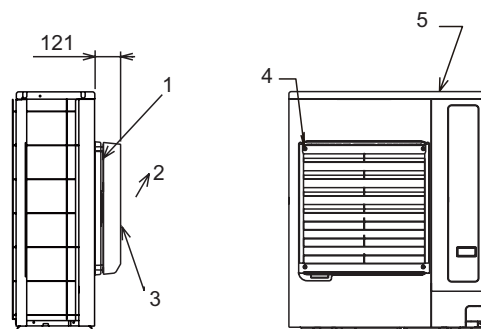
- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

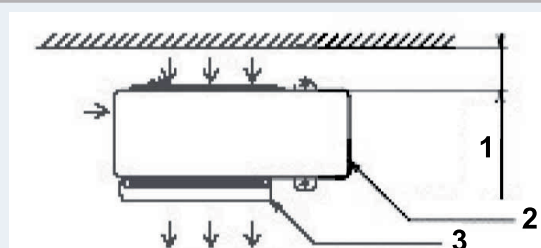
One flow guide installation

1. Air discharge grille
2. Air flow
3. Air flow guide
4. Outdoor unit
5. M5 fixing screw x4 (Accessories)



Service space (In case of upward air discharge)

- In case of right and left sides air discharge enough space for air discharge is required.
- The downward air discharge is also available. In such case install the base under the unit to secure enough space for air discharge.
- In case of serial units installation air discharge should be upward.



- 1.Min. 200 mm
- 2.Outdoor unit
- 3.Air flow guide
- 4.Passage side

9.3.2 Wind guard

Specifications

Model	WSP-335A	
Quantity	1 per unit	
Material	Galvanized sheet metal + baked painting	
Color	Gray (1.0Y8.5/0.5)	
Weight	5.5 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 12] Installation manual	
Installation restriction	"Guard net" "Air flow guide" or "Snow protection hood" is not available to install with Wind guard	1 Mounting dimension 2 Air flow 3 3 x Ø7

Attaching example of air wind guard

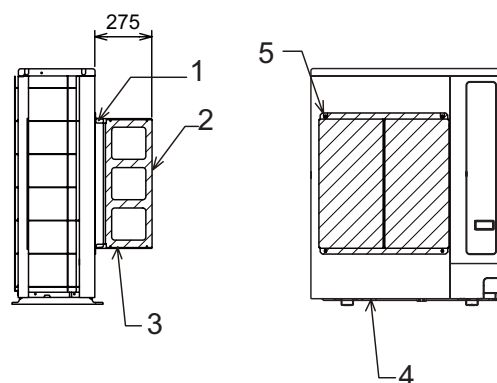
- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

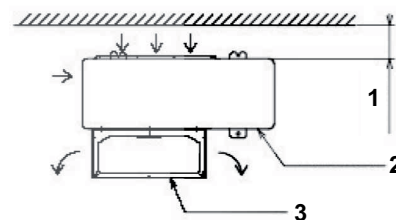
One windguard cover installation

1. Air discharge grille
2. Wind guard
3. Air discharge grille
4. Outdoor unit
5. M5 fixing screw x4 (Accessories)



Service space

- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.

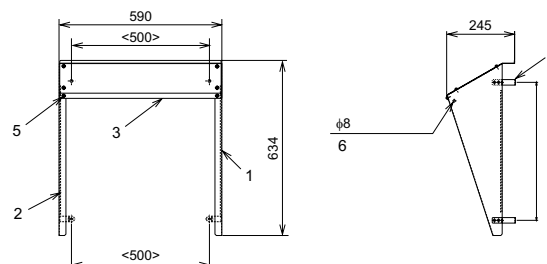


1. Min. 200 mm
2. Outdoor unit
3. Wind guard

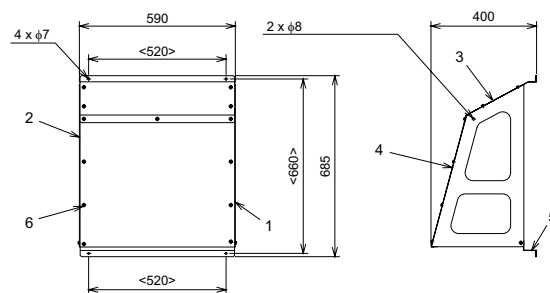
9.3.3 Snow protection hood

Air discharge hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel	1
4	Stay	4
5	Fixing screw (Accessories)	6
6	Hole for safety wire rope to prevent overturning	

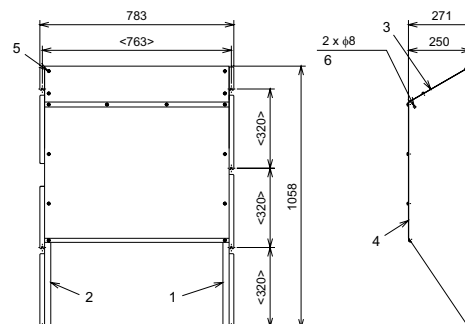


N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front plate (Upper)	1
4	Front Plate (Lower)	4
5	Fixing Plate	1
6	Assembling Screw (Accessory)	15

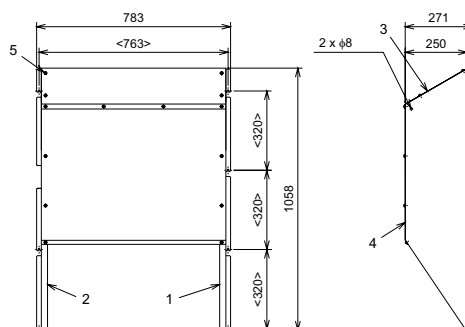


Rear suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Upper front panel (Upside)	1
4	Upper front panel (Downside)	1
5	Fixing screw (Accessories)	14
6	Hole for safety wire rope to prevent overturning	

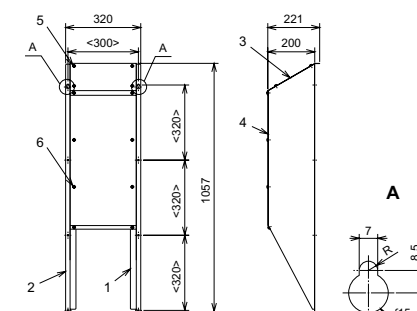


N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front plate (Upper)	1
4	Front Plate (Lower)	4
5	Assembling Screw (Accessory)	14

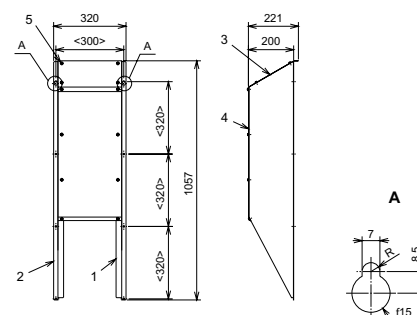


Left suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel (Upside)	1
4	Front panel (Downside)	1
5	Fixing hole x 2	
6	Fixing screw (Accessories)	12
A	Enlarged view of A (Fixing Hole)	

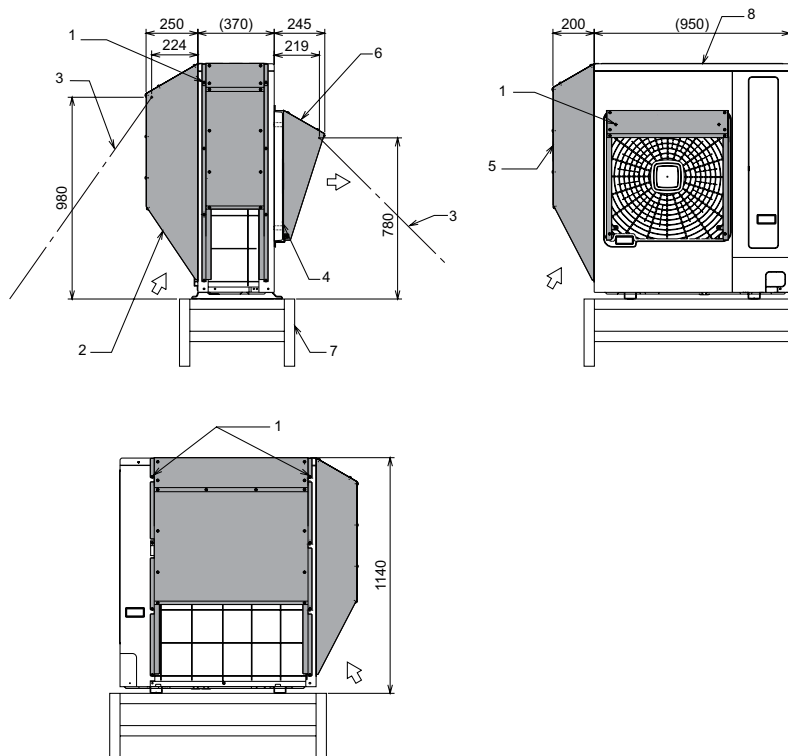


N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel (Upside)	1
4	Front panel (Downside)	1
5	Fixing screw (Accessories)	12
A	Enlarged view of A (Fixing Hole)	



Attaching example of snow protection hood

1. Fixing screw (Accessories).
 2. Rear suction hood
 3. Wire rope (Optional. For overturning protection)
 4. Air discharge grille
 5. Left suction hood
 6. Air discharge hood
 7. Foundation
 8. Outdoor Unit
- A. Left side
B. Front side
C. Rear side



Specifications of snow protection hood

Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP335F1 ASG-SP11FB	ASG-NP335FS3 ASG-SP11FBS	ASG-SP10BE	ASG-SP10BES	ASG-5P10LE	ASG-SP10LES
Quantity		1 unit					
Material		Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)
Color		Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—
Weight		3 kg		10 kg		6 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discharge part x 1		For rear side air intake x 1 (Upper side x 1 lowe side x 1)		For left side air intake x 1	
	Unit Fixing screw	6 (M5x12 tapping screw)		9 (M5x12 tapping screw)		10 (M5x12 tapping screw)	
	Unit Fixing screw (SUS)	6 (M5x12 tapping screw)	8 (M5x14)	14 (M5x12 tapping screw)	16 (M5x14)	12 (M5x12 tapping screw)	14 (M5x14)
		Installation manual					
Installation restriction		Installation with “Guard net” or “Wind guard” is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (optional parts)		ASG-SW20A					

9.4 OPTIONAL PARTS AND INSTALLATION FOR RAS-(4-6)(X)H(V)NPE / RAS-(8-10)(X)HN(P/C)E

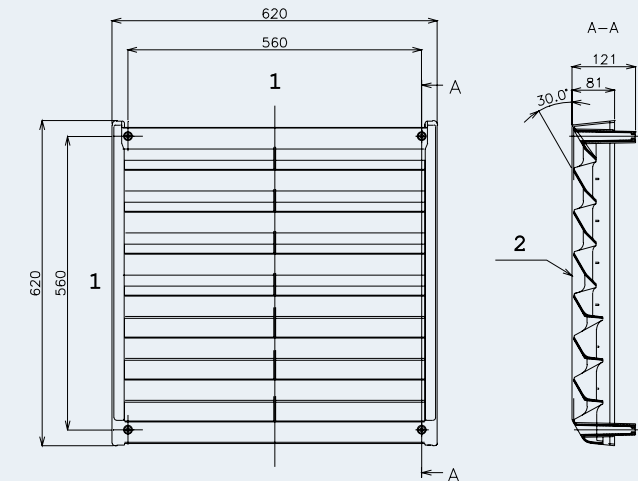
◆ Air flow guide wind guard and snow protection hood

Optional parts			Model		
Air flow guide			AG-335A X 2	1	2
Wind guard			WSP-335A X 2		
Snow protection hood	Zinc plate	Air outlet	ASG-NP335F X 2	3	
		Air inlet of rear side	ASG-NP280B		
		Air inlet of side face	ASG-NP280L		
	Stainless plate (NSSC 180)	Air outlet	ASG-NP335FS 2X 2		
		Air inlet of rear side	ASG-280BS2		
		Air inlet of side face	ASG-NP280LS2		

- 1 Air flow guide
2 Wind Guard
3 Snow protection hood

9.4.1 Air flow guide

Specifications

Model	AG-335A	Image
Quantity	2 per unit	
Air discharge direction	Upward (downward) left & right	
Material	Weather proof polypropylene resin	
Color	Gray	
Weight	1.9 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 20] Installation manual	
Installation restriction	“Wind Guard” or “Snow protection hood” is not available to install with air flow guide. (“Guard net” is available to be installed together.)	

- 1 Mounting dimension
2 Air flow guide

Attaching example of air flow guide

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

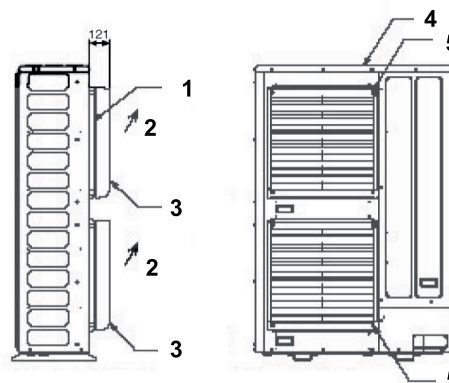
If the air guide is installed without discharge grille it may cause injury due to rotating fan.

Two flow guides installation

- 1.Air discharge grille
- 2.Air flow
- 3.Air flow guide (see the note)
- 4.Outdoor Unit
- 5.M5 fixing screw x4 (Accessories)

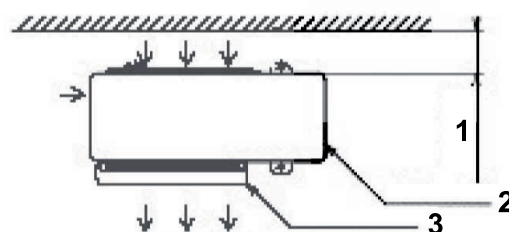
NOTE

Air flow direction of both air flow guides should be the same.



Service space (In case of upward air discharge)

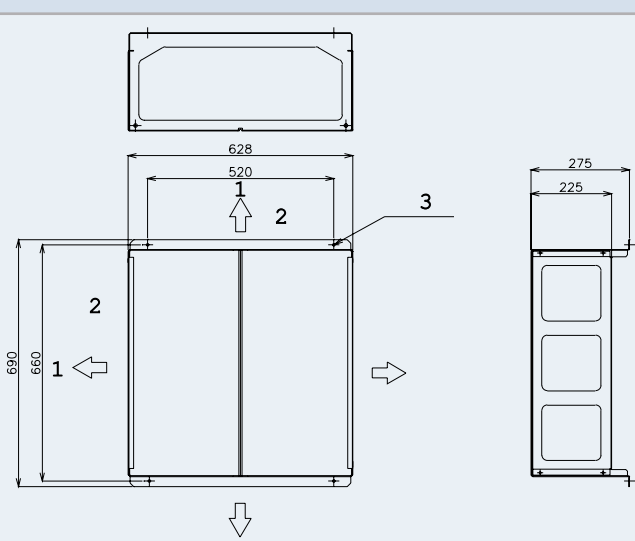
- In case of right and left sides air discharge enough space for air discharge is required.
- The downward air discharge is also available. In such case install the base under the unit to secure enough space for air discharge.
- In case of serial units installation air discharge should be upward.



- 1.Min. 200 mm
- 2.Outdoor unit
- 3.Air flow guide
- 4.Passage side

9.4.2 Wind guard

Specifications

Model	WSP-335A	
Quantity	2 per unit	
Material	Galvanized sheet metal + baked painting	
Color	Gray (1.0Y8.5/0.5)	
Weight	5.5 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 12] Installation manual	
Installation restriction	"Guard net" "Air flow guide" or "Snow protection hood" is not available to install with Wind guard	 1 Mounting dimension 2 Air flow

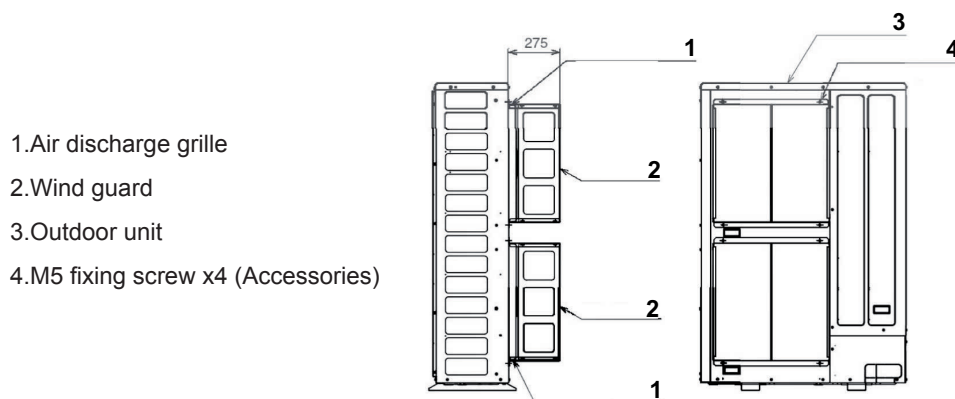
Attaching example of air wind guard

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

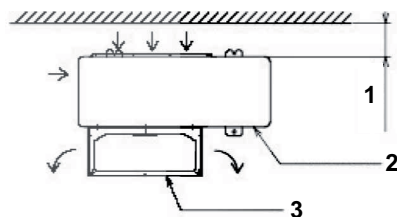
If the air guide is installed without discharge grille it may cause injury due to rotating fan.

Two windguard covers installation



Service space

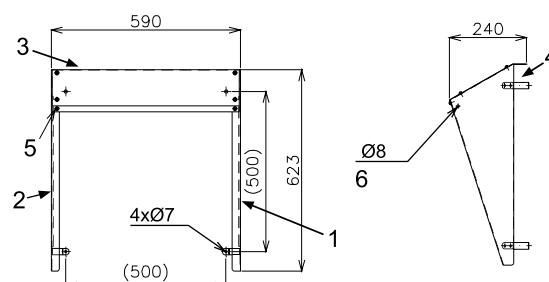
- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.



9.4.3 Snow protection hood

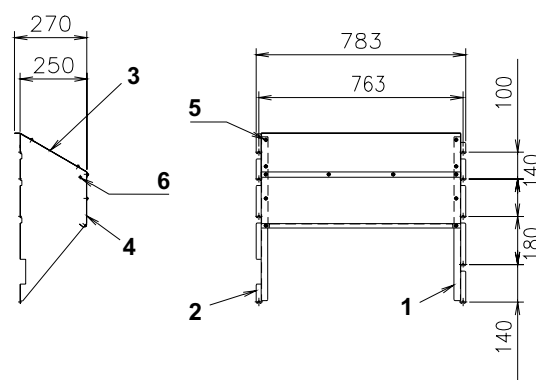
Air discharge hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel	1
4	Stay	4
5	Fixing screw (Accessories)	
6	Hole for safety wire rope to prevent overturning	



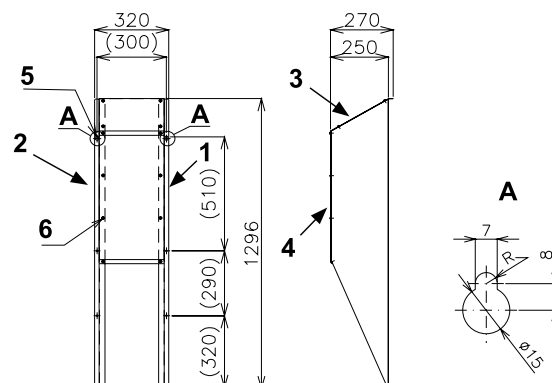
Rear suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Upper front panel (Upside)	1
4	Upper front panel (Downside)	1
5	Fixing screw (Accessories)	
6	Hole for safety wire rope to prevent overturning	

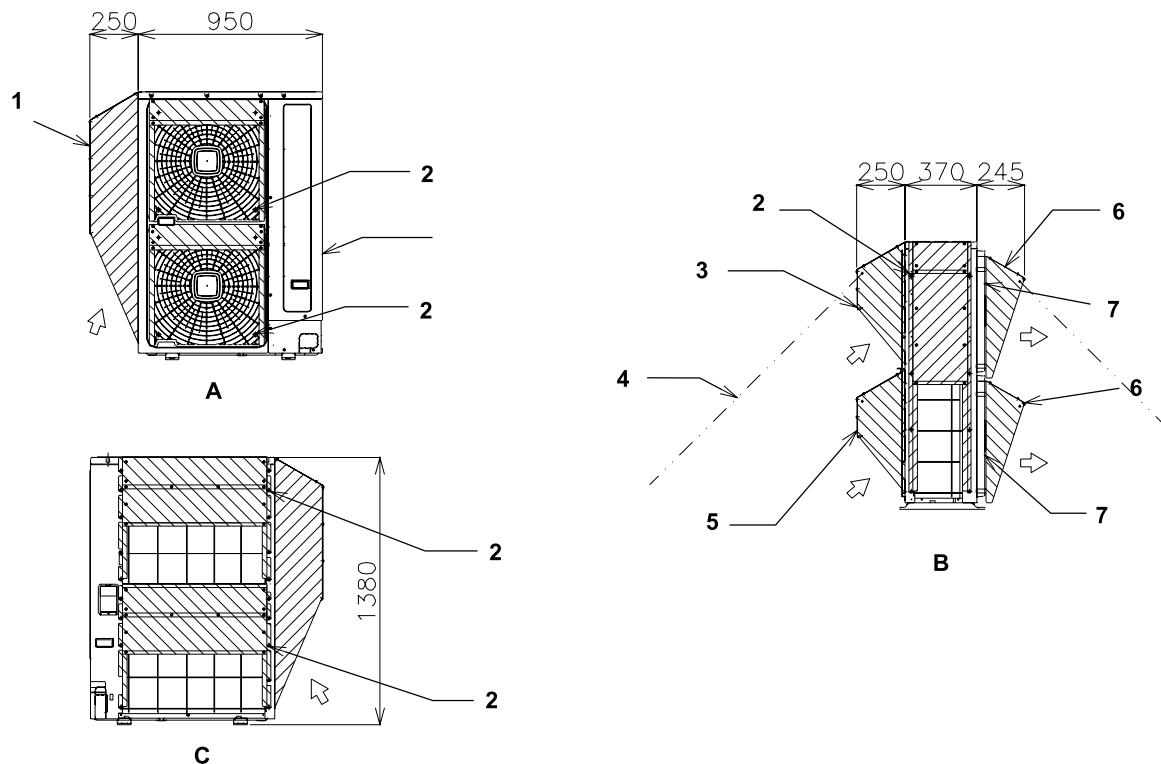


Left suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel (Upside)	1
4	Front panel (Downside)	1
5	Fixing hole x 2	
6	Fixing screw (Accessories)	
A	Enlarged view of A (Fixing Hole)	



Attaching example of snow protection hood



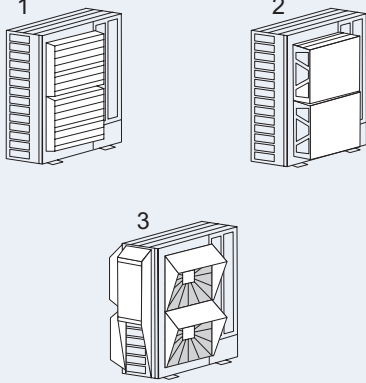
- | | |
|---|-------------------------|
| 1. Left suction hood | 7. Air discharge grille |
| 2. Fixing screw (Accessories) | 8. Air discharge grille |
| 3. Rear suction hood Upper side | A. Front side |
| 4. Wire rope (Optional. For overturning protection) | B. Left side |
| 5. Rear suction hood Lower side | C. Rear side |
| 6. Air discharge hood | |

Specifications of snow protection hood

Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP335F	ASG-NP335FS2	ASG-NP280B	ASG-NP280BS2	ASG-NP280L	ASG-NP280LS2
Quantity		2 per unit		1 per unit			
Material		Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)
Color		Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—
Weight		3 kg		14 kg		8 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discharge part x 1		For rear side air intake x 1 (Upper side x 1 lowe side x 1)		For left side air intake x 1	
	Fixing screw	4 (M5x12 tapping screw)		11 (M5x14 tapping screw)		8 (M5x12 tapping screw)	
	Fixing screw (SUS)	6 (M5x14 tapping screw)	6 (M5x14)	24 (M5x14 tapping screw)	24 (M5x14)	12 (M5x12 tapping screw)	12 (M5x14)
		Installation manual					
Installation restriction		Installation with “Guard net” “Wind guard” or “Air flow guide” is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (optional parts)		ASG-SW20A					

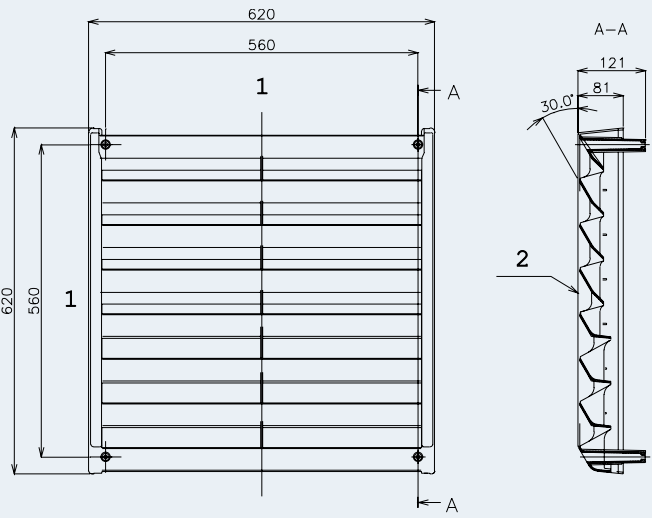
9.5 OPTIONAL PARTS AND INSTALLATION FOR RAS-12HN(P/C)

◆ Air flow guide wind guard and snow protection hood

Optional parts			Model	
Air flow guide			AG-335A X 2	
Wind guard			WSP-335A X 2	
Snow protection hood	Zinc plate	Air outlet	ASG-NP335F X 2	
		Air inlet of rear side	ASG-NP335B	
		Air inlet of side face	ASG-NP335L	
	Strainless plate(NSSC 180)	Air outlet	ASG-NP335FS2 X 2	
		Air inlet of rear side	ASG-335BS2	
	Strainless plate(NSSC 180)	Air inlet of side face	ASG-NP335LS2	1 Air flow guide 2 Wind Guard 3 Snow protection hood

9.5.1 Air flow guide

Specifications

Model	AG-335A	
Quantity	2 per unit	
Air discharge direction	Upward (downward) left & right	
Material	Weather proof polypropylene resin	
Color	Gray	
Weight	1.9 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 20] Installation manual	
Installation restriction	"Wind Guard" or "Snow protection hood" is not available to install with air flow guide. ("Guard net" is available to be installed together.)	1 Mounting dimension 2 Air flow guide

Attaching example of air flow guide

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

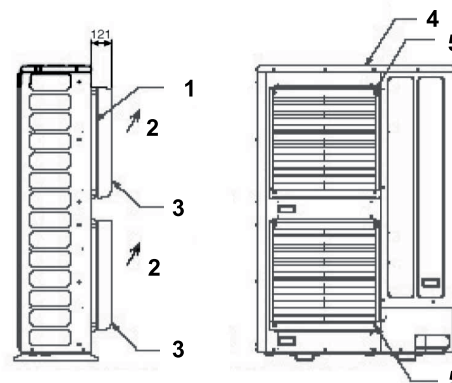
Two flow guides installation

1. Air discharge grille
2. Air flow
3. Air flow guide (see the note)
4. Outdoor Unit
5. M5 fixing screw x4 (Accessories)



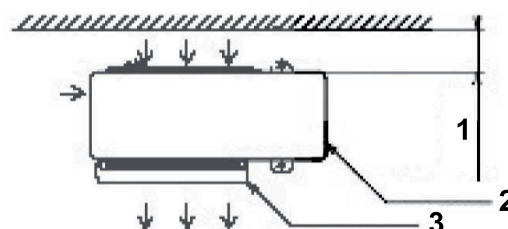
NOTE

Air flow direction of both air flow guides should be the same.



Service space (In case of upward air discharge)

- In case of right and left sides air discharge enough space for air discharge is required.
- The downward air discharge is also available. In such case install the base under the unit to secure enough space for air discharge.
- In case of serial units installation air discharge should be upward.



1. Min. 200 mm
2. Outdoor unit
3. Air flow guide
4. Passage side

9.5.2 Wind guard

Specifications

Model	WSP-335A	
Quantity	2 per unit	
Material	Galvanized sheet metal + baked painting	
Color	Gray (1.0Y8.5/0.5)	
Weight	5.5 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 12] Installation manual	
Installation restriction	"Guard net" "Air flow guide" or "Snow protection hood" is not available to install with Wind guard	1 Mounting dimension 2 Air flow

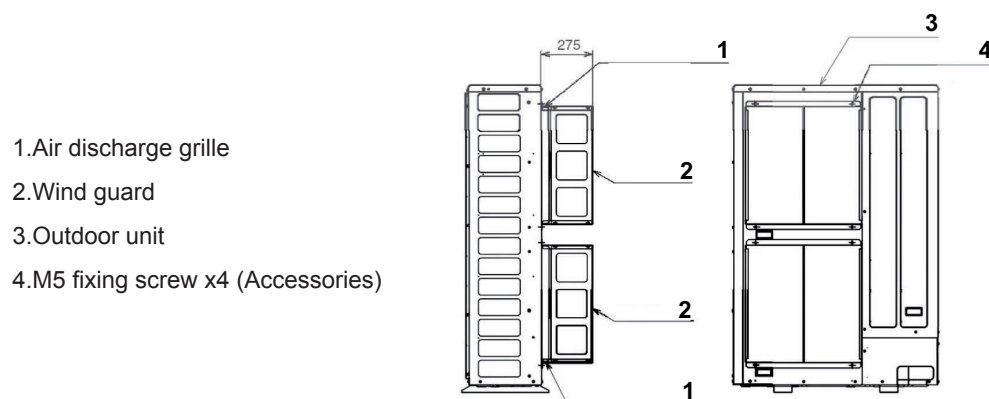
Attaching example of air wind guard

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m)
- Do not remove the air discharge grille for air flow guide installation.

CAUTION

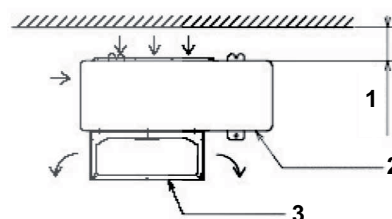
If the air guide is installed without discharge grille it may cause injury due to rotating fan.

Two windguard covers installation



Service space

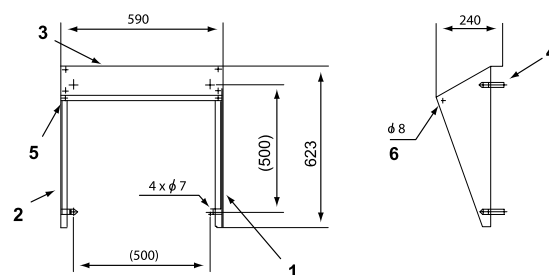
- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.



9.5.3 Snow protection hood

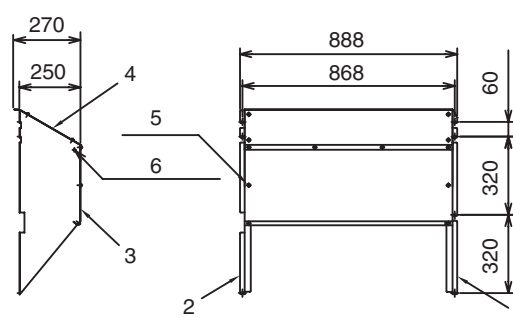
Air discharge hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel	1
4	Stay	4
5	Fixing screw (Accessories)	
6	Hole for safety wire rope to prevent overturning	



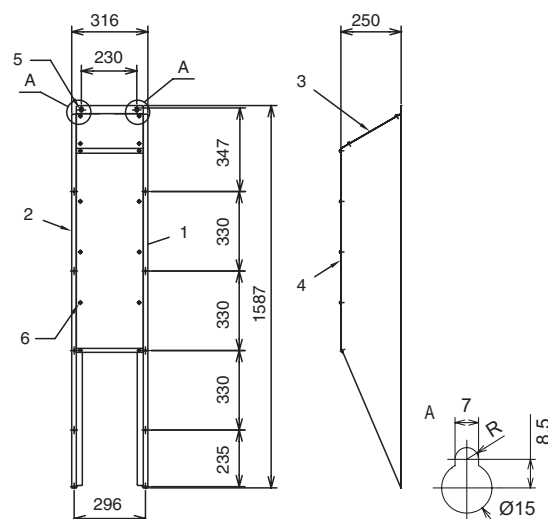
Rear suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Upper front panel (Downside)	1
4	Upper front panel (Upside)	1
5	Fixing screw (Accessories)	
6	Hole for safety wire rope to prevent overturning	

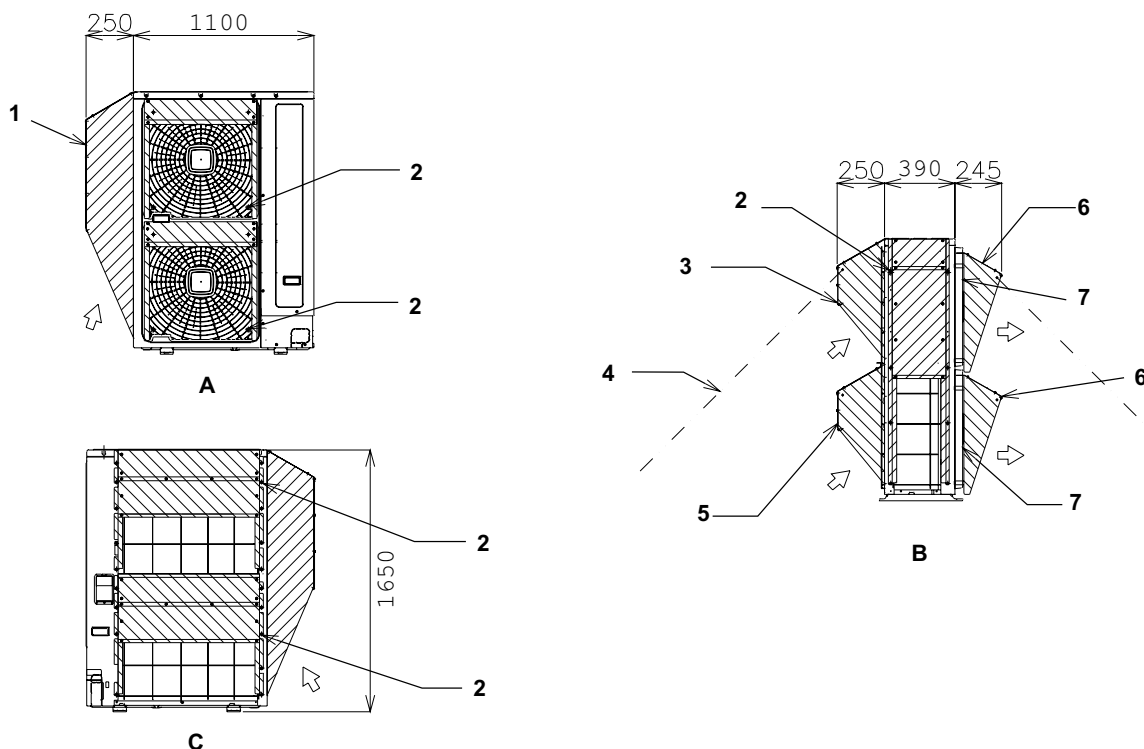


Left suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel (upside)	1
4	Front side (downside)	1
5	Fixing hole x 2	
6	Fixing screw (Accessories)	



Attaching example of snow protection hood



1. Left suction hood
2. Fixing screw (Accessories)
3. Rear suction hood Upper side
4. Wire rope (Optional. For overturning protection)
5. Air discharge hood
6. Air discharge grille

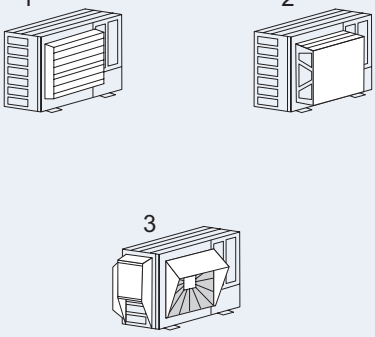
7. Rear suction hood Lower side
8. Outdoor unit
- A. Front side
- B. Left side
- C. Rear side

Specifications of snow protection hood

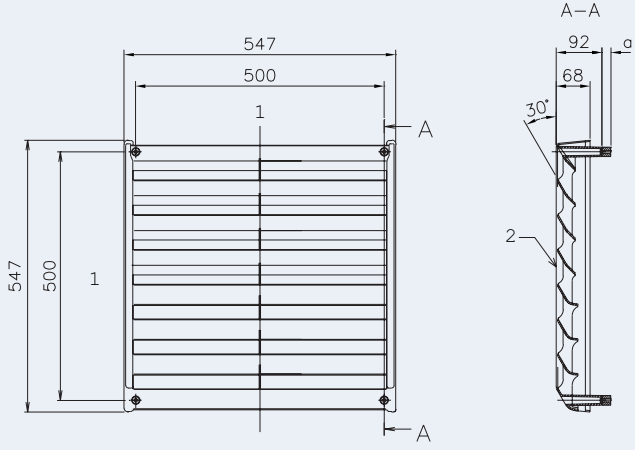
Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP335F	ASG-NP335FS2	ASG-NP335B	ASG-NP335BS2	ASG-NP335L	ASG-NP335LS2
Quantity		2 per unit		1 per unit			
Material		Bonderized steel sheet Iron	Stainless (NSSC180)	Bonderized steel sheet Iron	Stainless (NSSC180)	Bonderized steel sheet Iron	Stainless (NSSC180)
Color		Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—
Weight		3 kg		14 kg		8 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discharge part x 1		For rear side air intake x 1 (Upper side x 1 lowe side x 1)		For left side air intake x 1	
	Fixing screw	4x(M5x12 l tapping screw)		10x (M5x14 l tapping screw)		8x (M5x12 l tapping screw)	
	Fixing screw (SUS)	6x (M5x12 l tapping screw)	6x (M5x14 l)	24x (M5x14 l tapping screw)	24x (M5x14l)	14x (M5x12 tapping screw)	14x (M5x14)
		Installation manual					
Installation restriction		Installation with “Guard net” “Wind guard” or “Air flow guide” is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (optional parts)		ASG-SW20A					

9.6 OPTIONAL PARTS AND INSTALLATION FOR RAS-3HVRNS3

◆ Air flow guide wind guard and snow protection hood

Optional parts			Model	
Air flow guide			AG-264	
Wind guard			WSP-264	
Snow protection hood	Zinc Plate	Air outlet	ASG-NP80F	
		Air inlet of rear side	ASG-NP56B	
		Air inlet of side face	ASG-NP56L	
	Stainless plate (NSSC180)	Air outlet	ASG-NP80FS2	
		Air inlet of rear side	ASG-NP63B52	
		Air inlet of side face	ASG-NP63LS2	

9.6.1 Air flow guide

Model	AG-264	(mm)
Quantity	1 per unit	
Air discharge direction	Upward (downward) left & right	
Material	Weather proof polypropylene resin	
Color	Gray	
Weight	1.4 kg	
Accessories	Fixing screw 4x [M5 (SUS) x 12]+4x [M5 (SUS) x 30] Installation manual Self-screw 2x [M4 x 13]	
Installation restriction	"Wind Guard" or "Snow protection hood" is not available to install with air flow guide. ("Guard net" is available to be installed together.)	

Attaching example of air flow guide

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4 3.1 N.m).
- Do not remove the air discharge grille for air flow guide installation.

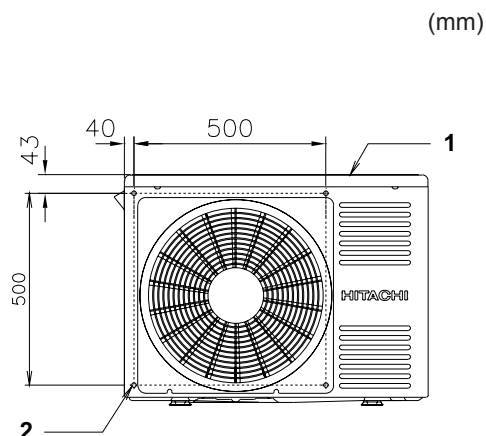
⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

Locations of fixing holes

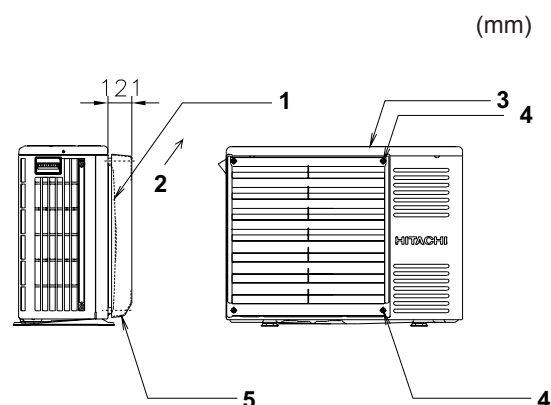
The holes Location shall be made by using self-screws (M4x13) and later shall be used SUS screw (M5x12) for fixing air flow guide.

- 1 Outdoor Unit.
- 2 Hole (4 locations).



One flow guide installation

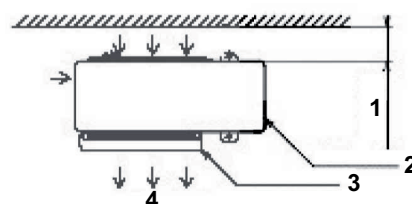
- 1 Air discharge grille.
- 2 Air flow.
- 3 Outdoor unit.
- 4 M5 fixing screw x4 (Accessories).
- 5 Air flow guide.



Service space (In case of upward air discharge)

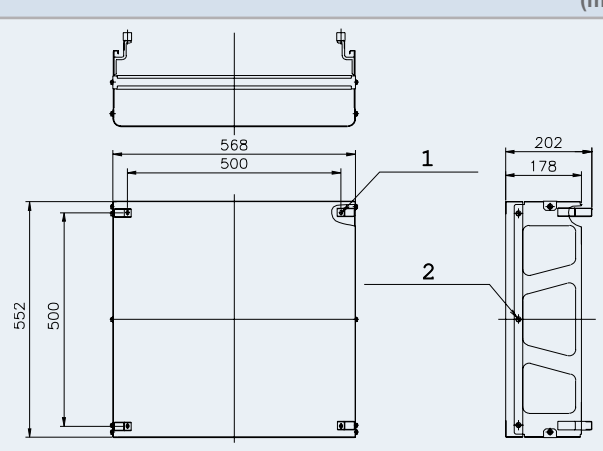
- In case of right and left sides air discharge enough space for air discharge is required.
- The downward air discharge is also available. In such case install the base under the unit to secure enough space for air discharge.
- In case of serial units installation air discharge should be upward.

- 1 Min.150 mm.
- 2 Outdoor unit.
- 3 Air flow guide.
- 4 Passage side.



9.6.2 Wind guard

Specifications

Model	WSP-264	(mm)
Quantity	1 per unit	 1. 4-6x10 Long hole. 2. 5 (both sides) - M5 screw (attachement).
Material	Galvanized sheet metal + baked painting	
Color	UTOPIA Beige	
Weight	4.0 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 30]- Unit Fixing Screw x 10 [M5 (SUS) x 12]- Wind Ward Installation manual	
Installation restriction	"Guard net" "Air flow guide" or "Snow protection hood" is not available to install with Wind guard	

Attaching example of air wind guard

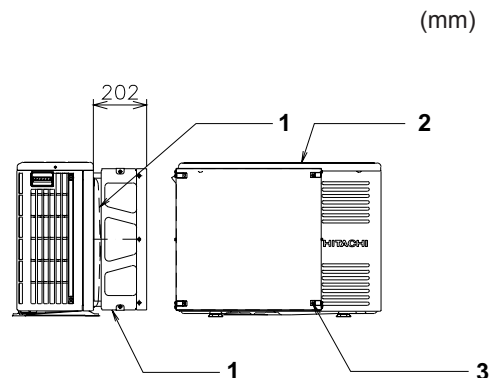
- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4~3.1 N.m).
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

Two windguard covers installation

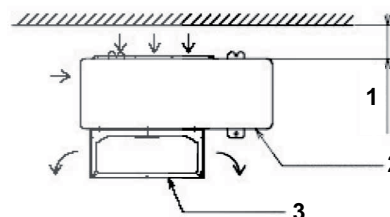
- 1 Air discharge grille.
- 2 Outdoor unit.
- 3 M5 fixing screw x4 (Accessories).



Service space

- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.

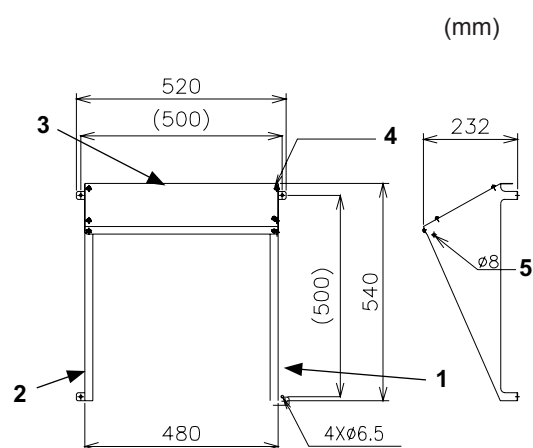
- 1 Min.150 mm.
- 2 Outdoor unit.
- 3 Wind guard.



9.6.3 Snow protection hood

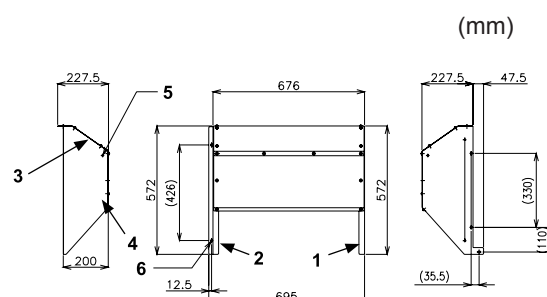
Air discharge hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel	1
4	Fixing screw (Accessories)	
5	Hole for safety wire rope to prevent overturning	



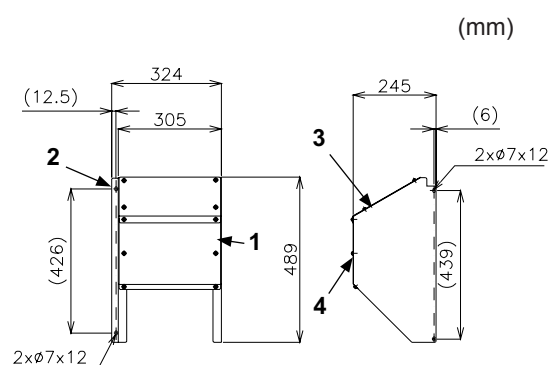
Rear suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Upper front panel (Upside)	1
4	Upper front panel (Downside)	1
5	Hole for safety wire rope to prevent overturning	
6	Fixing screw (Accessories)	

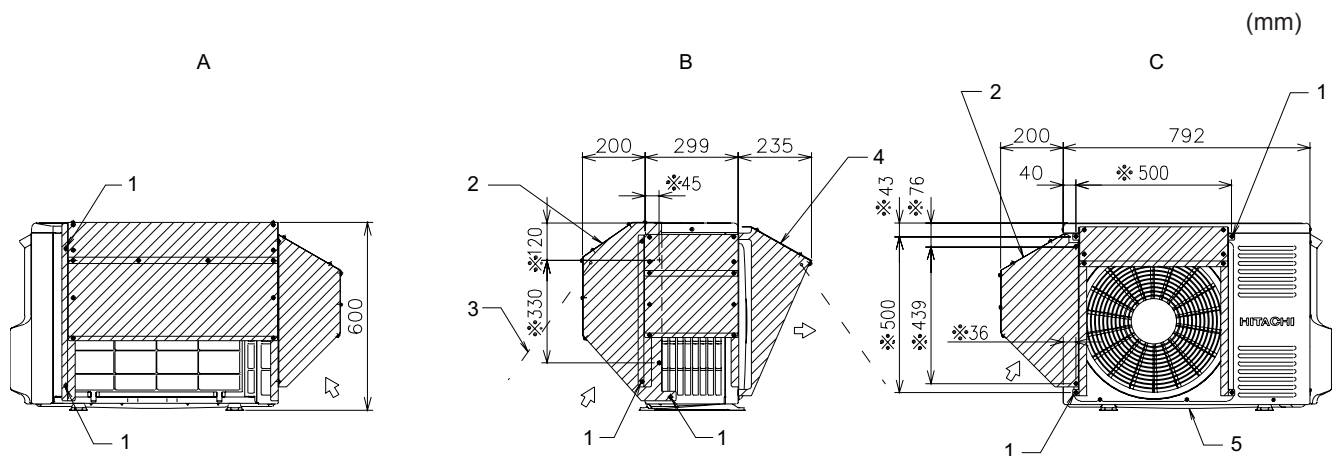


Left suction hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Upper front panel (Upside)	1
4	Upper front panel (Downside).	1



Attaching example of snow protection hood



1. Fixing screw (accessories).

2. Air inlet hood.

3. Wire rope (optional for over turning protection).

4. Air discharge hood.

5. Outdoor unit.

A. Rear side.

B. Left side.

C. Front side.

i NOTE

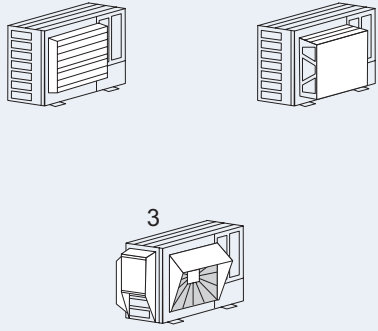
The holes locations marked with a mark shall be made by using sel screw (M4X13) and later shall be used SUS Screw for fixing protection hood.

Specifications of snow protection hood

Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP80F	ASG-NP80FS2	ASG-NP56B	ASG-NP63BS2	ASG-NP56L	ASG-NP63LS2
Quantity		1 per unit					
Material		Bonderized steel sheet Iron	Stainless (NSSC180)	Bonderized steel sheet Iron	Stainless (NSSC180)	Bonderized steel sheet Iron	Stainless (NSSC180)
Color		Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—
Weight		3 kg		6 kg		3 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discharge part x 1		For rear side air intake x 1		For left side air intake x 1	
	Unit Fixing screw	4 (M5x12 tapping screw)		5 (M5x12 tapping screw)		4 (M5x12 tapping screw)	
	Hood Fixing screw (SUS)	6 (M5x12 tapping screw)	6 (M5x14)	14 (M5x12 tapping screw)	14 (M5x14)	10 (M5x12 tapping screw)	10 (M5x14)
	Self-screw	2 (M4x13)		2 (M4x13)		2 (M4x13)	
		Installation manual					
Installation restriction		Installation with “Guard net” “Wind guard” or is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (optional parts)		ASG-SW20A					

9.7 OPTIONAL PARTS AND INSTALLATION FOR RAS-4H(V)RNS3E

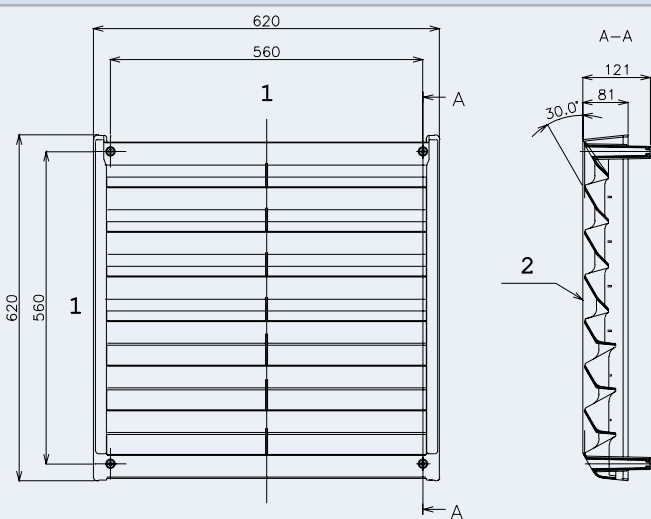
◆ Air flow guide wind guard and snow protection hood

Optional parts			Model	
Air flow guide			AG-335A	
Wind guard			WSP-335A	
Snow protection hood	Zinc plate	Air outlet	ASG-NP335F	
		Air inlet of rear side	ASG-NP80B	
		Air inlet of side face	ASG-NP80L	
	Stainless plate (SUS304)	Air outlet	ASG-NP335F52	
		Air inlet of rear side	ASG-NP160BS2	
		Air inlet of side face	ASG-NP160LS2	

1. Air flow guide
2. Wind Guard
3. Snow protection hood

9.7.1 Air flow guide

Specifications

Model	AG-335A	(mm)	
Quantity	1 per unit		
Air discharge direction	Upward (downward) left & right		
Material	Weather proof polypropylene resin		
Color	Gray		
Weight	1.9 kg		
Accessories	Fixing screw x 4 [M5 (SUS) x 20] Installation manual		
Installation restriction	“Wind Guard” or “Snow protection hood” is not available to install with air flow guide. (“Guard net” is available to be installed together.)		1. Mounting dimension 2. Air flow guide

1. Mounting dimension
2. Air flow guide

Attaching example of air flow guide

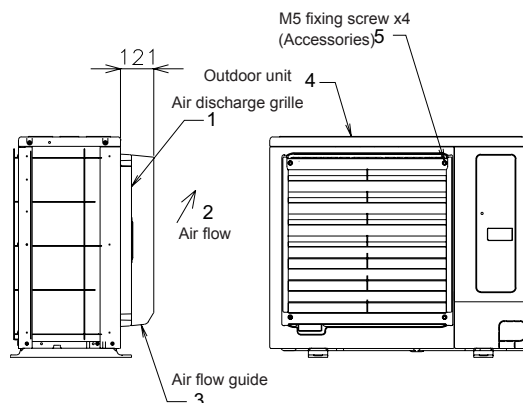
- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4~3.1 N.m).
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

One flow guide installation

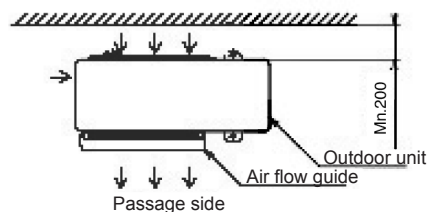
(mm)



Service space (In case of upward air discharge)

(mm)

- In case of right and left sides air discharge enough space for air discharge is required.
- The downward air discharge is also available. In such case install the base under the unit to secure enough space for air discharge.
- In case of serial units installation air discharge should be upward.



9.7.2 Wind guard

Specifications

Model	WSP-335A	(mm)
Quantity	1 per unit	
Material	Galvanized sheet metal + baked painting	
Color	Gray (1.0Y8.5/0.5)	
Weight	5.5 kg	
Accessories	Fixing screw x 4 [M5 (SUS) x 12] Installation manual	
Installation restriction	"Guard net" "Air flow guide" or "Snow protection hood" is not available to install with Wind guard	The diagram shows the dimensions of the wind guard. The top view has a width of 628 mm and a mounting dimension of 520 mm. The side view has a height of 690 mm and a mounting dimension of 660 mm. The air flow direction is indicated by arrows. The dimensions 275 mm and 225 mm are shown for the side view. The 4xØ7 dimension is indicated for the mounting holes.

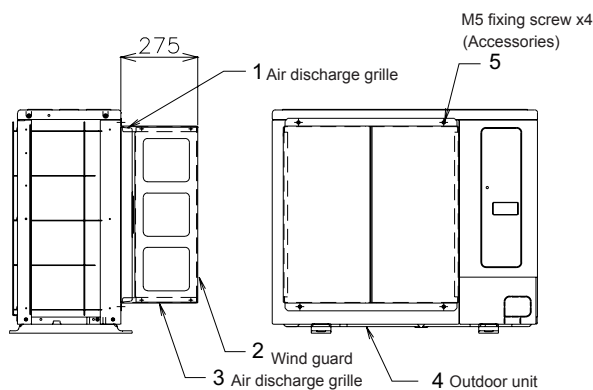
Attaching example of air wind guard

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4~3.1 N.m).
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

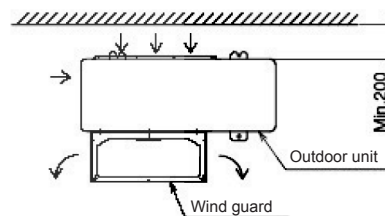
One windguard cover installation



(mm)

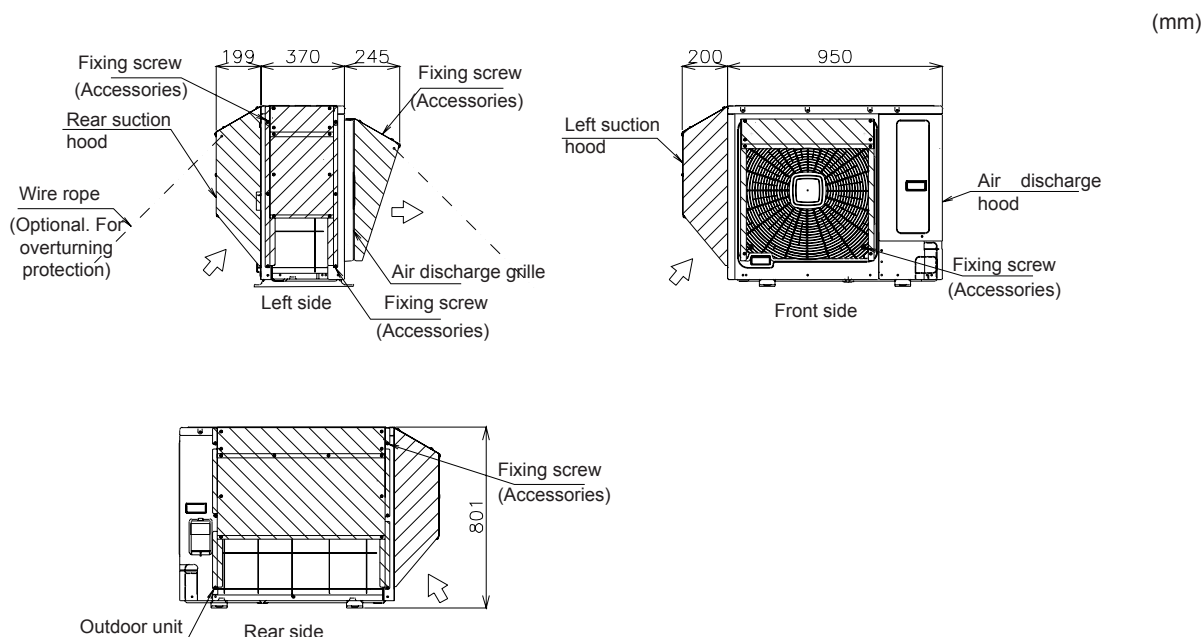
Service space

- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.



(mm)

Attaching example of snow protection hood

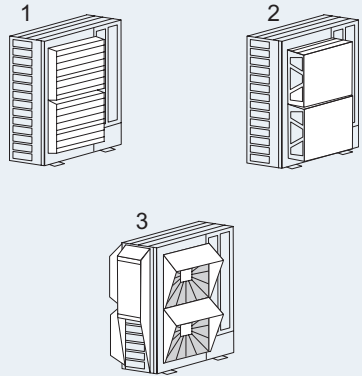


Specifications of snow protection hood

Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP335F	ASG-NP335FS2	ASG-NP80B	ASG-NP160BS2	ASG-NP80L	ASG-NP160LS2
Quantity		2 per unit		1 per unit			
Material		Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)
Color		Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—
Weight		3 kg		14 kg		8 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discharge part x 1		For rear side air intake x 1 (Upper side x 1 lowe side x 1)		For left side air intake x 1	
	Unit Fixing screw	4 (M5x12 tapping screw)		5 (M5x14 tapping screw)		6 (M5x12 tapping screw)	
	Unit Fixing screw (SUS)	6 (M5x12 tapping screw)	6 (M5x14)	12 (M5x12 tapping screw)	12 (M5x14)	10 (M5x12 tapping screw)	10 (M5x14)
		Installation manual					
Installation restriction		Installation with “Guard net” or “Wind guard” is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (optional parts)		ASG-SW20A					

9.8 OPTIONAL PARTS AND INSTALLATION FOR RAS-(8/10)HRNSE

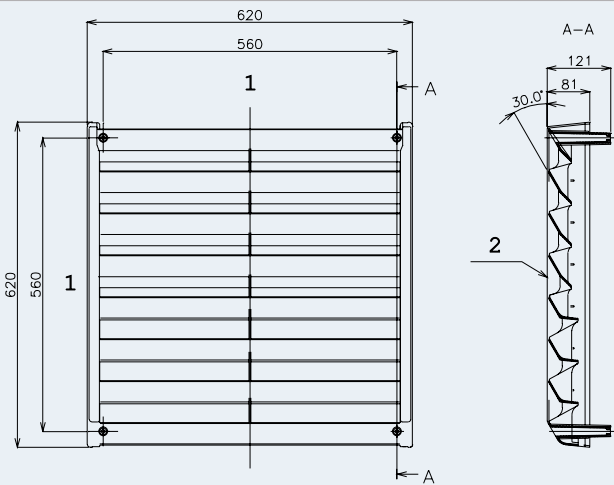
◆ Air flow guide wind guard and snow protection hood

Optional parts			Model	
Air flow guide			AG-335A X 2	
Wind guard			WSP-335A X 2	
Snow protection hood	Zinc plate	Air outlet	ASG-NP335F X 2	
		Air inlet of rear side	ASG-NP280B	
		Air inlet of side face	ASG-NP280L	
	Stainless plate (NSSC 180)	Air outlet	ASG-NP335FS2 X 2	
		Air inlet of rear side	ASG-280BS2	
		Air inlet of side face	ASG-NP280LS2	

1. Air flow guide
2. Wind Guard
3. Snow protection hood

9.8.1 Air flow guide

Specifications

Model	AG-335A	(mm)	
Quantity	2 per unit		
Air discharge direction	Upward (downward) left & right		
Material	Weather proof polypropylene resin		
Color	Gray		
Weight	1.9 kg		
Accessories	Fixing screw x 4 [M5 (SUS) x 20] Installation manual		
Installation restriction	“Wind Guard” or “Snow protection hood” is not available to install with air flow guide. (“Guard net” is available to be installed together.)		

1. Mounting dimension

2. Air flow guide

Attaching example of air flow guide

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4~3.1 N.m).
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

Attaching example of air wind guard

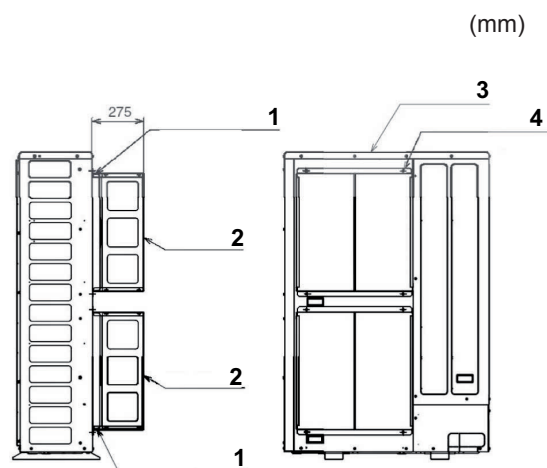
- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes are located at 4 positions on the grille. (Screw tightening torque 2.4~3.1 N.m).
- Do not remove the air discharge grille for air flow guide installation.

⚠ CAUTION

If the air guide is installed without discharge grille it may cause injury due to rotating fan.

Two windguard covers installation

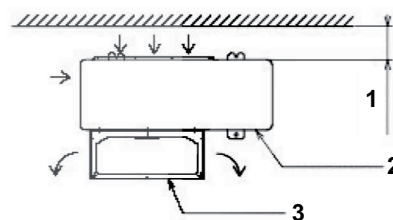
- 1 Air discharge grille.
- 2 Wind guard.
- 3 Outdoor unit.
- 4 M5 fixing screw x4 (Accessories).



Service space

- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.

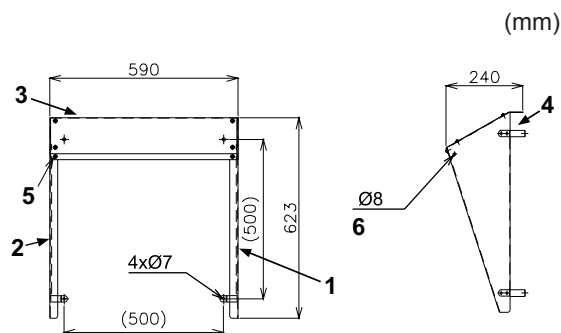
- 1 Min. 200 mm.
- 2 Outdoor unit.
- 3 Wind guard.



9.8.3 Snow protection hood

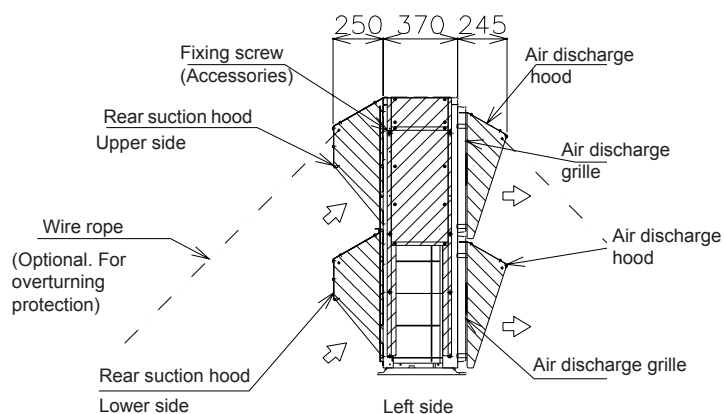
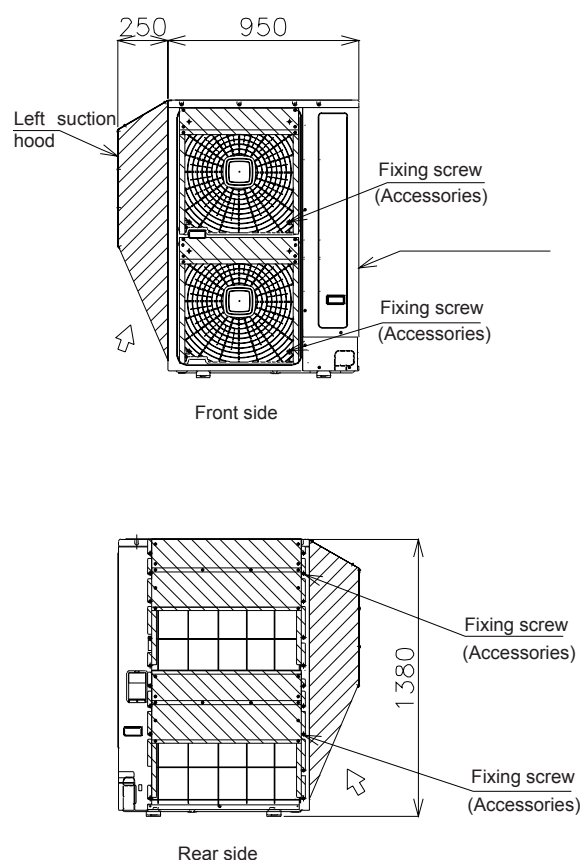
Air discharge hood

N°	Part name	Quantity
1	Right side plate	1
2	Left side plate	1
3	Front panel	1
4	Stay	4
5	Fixing screw (Accessories)	
6	Hole for safety wire rope to prevent overturning	



Attaching example of snow protection hood

(mm)



Specifications of snow protection hood

Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP335F	ASG-NP335FS2	ASG-NP280B	ASG-NP280BS2	ASG-NP280L	ASG-NP280LS2
Quantity		2 per unit		1 per unit			
Material		Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)	Bonderized steel sheet Iron	Stainless (NSSC 180)
Color		Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—	Gray (1.0Y8.5/0.5 or approximation)	—
Weight		3 kg		14 kg		8 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discharge part x 1		For rear side air intake x 1 (Upper side x 1 lowe side x 1)		For left side air intake x 1	
	Fixing screw	4 (M5x12 tapping screw)		11 (M5x14 tapping screw)		8 (M5x12 tapping screw)	
	Fixing screw (SUS)	6 (M5x14 tapping screw)	6 (M5x14)	24 (M5x14 tapping screw)	24 (M5x14)	12 (M5x12 tapping screw)	12 (M5x14)
		Installation manual					
Installation restriction		Installation with “Guard net” “Wind guard” or “Air flow guide” is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (optional parts)		ASG-SW20A					

10 REFRIGERANT PIPING & REFRIGERANT CHARGE

10.1 COPPER PIPES

⚠ CAUTION

- The copper pipe used in the refrigeration installations is different to the copper pipe used in installations carrying domestic or heating water.
- The copper pipe for refrigeration installations is especially treated for outdoors and indoors. The interior surface finish makes it easier for the refrigerant to circulate and withstands the action of the lubricant oil used in outdoor units.

Prepare the copper pipes provided by the supplier.

Select the pipe with the appropriate diameter and thickness. Use the table below to select the most appropriate pipe:

Nominal diameter		Thickness mm	Supply
mm	Inches		
Ø6.35	1/4	0.80	Coil
Ø9.52	3/8	0.80	Coil
Ø12.7	1/2	0.80	Coil
Ø15.88	5/8	1.00	Coil
Ø19.05	3/4	1.00	Straight lengths
Ø22.2	7/8	1.00	Straight lengths
Ø25.4	1	1.00	Straight lengths
Ø28.6	1-1/8	1.00	Straight lengths
Ø31.75	1-1/4	1.10	Straight lengths
Ø38.1	1-1/2	1.35	Straight lengths
Ø41.3	1-5/8	1.45	Straight lengths
Ø44.45	1-3/4	1.55	Straight lengths

Always use clean copper pipes with no signs of knocks or cracks. Make sure there is no dust or dampness on the inside. Before you install the pipes, clean the inside with oxygen-free nitrogen gas to eliminate any remains of dust or other substances.

⚠ CAUTION

- Do not use hand saws, circular saws, abrasive grinders or other tools that generate shavings.
- Strictly follow national or local regulations regarding occupational health and safety.
- Wear appropriate means of protection during cutting or brazing operations and installation (gloves, eye protection, etc).

◆ Pipe connection

Cover the end of the pipe appropriately when it is to be inserted through holes in walls and roofs, etc.

Keep the ends of the pipes covered while other installation work is being carried out to avoid the entry of dampness or dirt.

Do not place the pipes directly on the ground without appropriate protection or adhesive vinyl tape to cover the ends.

Where the pipe installation is not completed for a certain amount of time, braze the ends of the pipe to seal. Then fill it with oxygen-free nitrogen gas through a Schrader valve to avoid the accumulation of humidity and/or contamination through dirt.



i NOTE

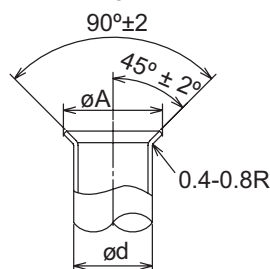
- Where polyethylene foam insulation is used, a 10 mm thick layer should be used for the liquid pipe and between 15 and 20 mm for the gas pipe.
- Install the insulation after the pipe surface temperature has dropped to the same temperature as that of the room, otherwise the insulation may melt.
- Do not use insulating material that contains NH_3 (ammonium), as it could damage the copper in the pipe and subsequently cause leaks.
- Where the fitter has supplied his own branches, these should be appropriately insulated to avoid decreases in capacity in line with to environmental conditions and dew on the surface of the piping due to low pressure.

10.2 DIMENSIONS OF FLARED PIPE

Perform the widening operations in accordance with the measurements shown below.

⁽¹⁾ Not possible to perform the widening using pipe. In this case, use a connection with flare fitting.

Diameters (mm)	A ^{±0} _{-0.4} (mm)
Ø6.35	9.1
Ø9.52	13.2
Ø12.7	16.6
Ø15.88	19.7
Ø19.05	— ⁽¹⁾

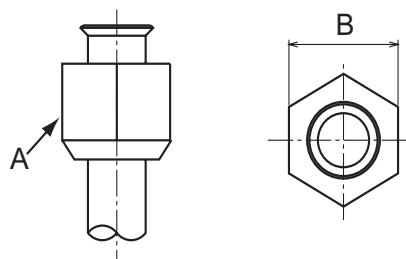


10.3 SELECTION OF THE CONNECTION WITH FLARE FITTING

It is not possible to perform the widening operation, if copper is used in pipes. In this case, use a connection with flare fitting.

Minimum thickness of the connection (mm)	
Diameters (mm)	R410A
ø6.35	0.5
ø9.52	0.6
ø12.7	0.7
ø15.88	0.8
ø19.05	0.8
ø22.2	0.9
ø25.4	0.95
ø28.6	1.0
ø31.75	1.1
ø38.1	1.35
ø43.3	1.45
ø44.5	1.55

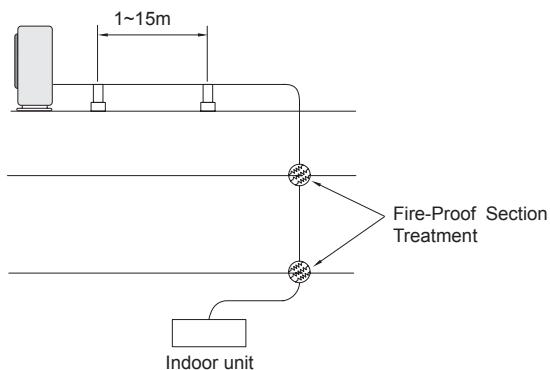
Distance between sides -B- of the nut -A-	
Diameters (mm)	-B- (mm)
ø6.35	17
ø9.52	22
ø12.7	26
ø15.88	29
ø19.05	36



10.4 SUSPENSION OF REFRIGERANT PIPING

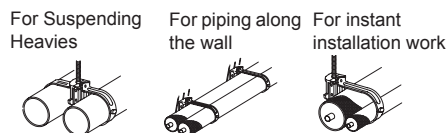
Suspend the refrigerant piping at certain points and prevent the refrigerant piping from touching the weak part of the building such as wall, ceiling, etc...

(If touched, abnormal sound may occur due to the vibration of the piping. Pay special attention in case of short piping length).



Do not fix the refrigerant piping directly with the metal fittings (The refrigerant piping may expand and contract).

Some examples for suspension method are shown below.

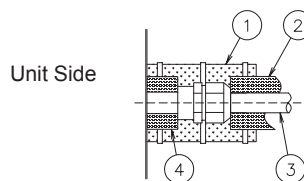


When connect the field supplied refrigerant pipes to the indoor unit and outdoor unit, apply the oil thinly at the seat flare nut and pipe before tightening.

The required tightening torque to apply at the flare nut used for connection of the pipes is as follows:

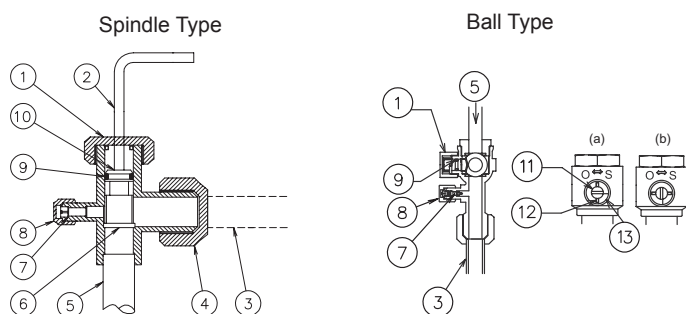
Pipe Size	Tightening Torque (Nm)
Ø 6.35 mm (1/4)	20
Ø 9.52 mm (3/8)	40
Ø 12.70 mm (1/2)	60
Ø 15.88 mm (5/8)	80
Ø 19.05 mm (3/4)	100

After connecting the refrigerant piping, seal the open space between knockout hole and refrigerant pipes by using insulation material.



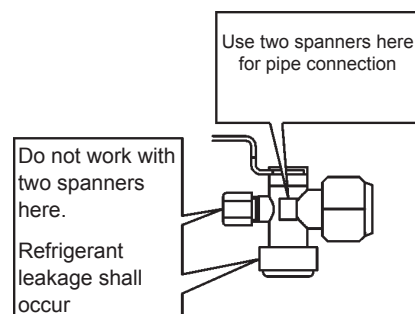
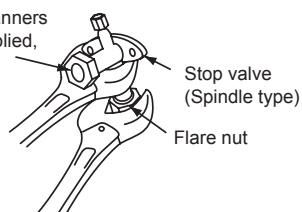
Nº	Description
①	Insulation Material
②	Insulation Material
③	Field Supplied
④	Insulation Material

◆ Stop valves

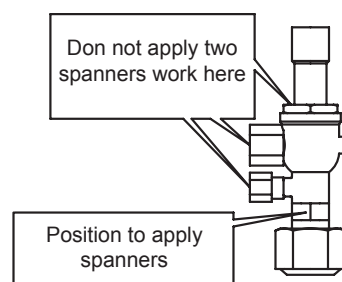


N°	Description	Remarks
①	Cap	
②	Allen wrench	Hex (4/5) mm
③	Refrigerant Piping	Field Supplied
④	Flare nut	
⑤	Refrigerant Pressure	To Outdoor Unit
⑥	Seat Surface	Fully closed position
⑦	Check Joint	Only the charging those can be connected
⑧	Charge port cap	
⑨	O-Ring	Rubber
⑩	Spindle valve	Open – Counterclockwise Close – Clockwise
⑪	Shaft	
⑫	Pin	
⑬	Stopper	
(a)	Closed	This valve is opened or closed with rotating 90 degrees at the ball valve part. Rotate the shaft until the pin touches the stopper. Do not apply the extra force. Use a slotted screwdriver to control the shaft. Do not leave the ball valve partly open
(b)	Opened	

Do not apply two spanners at this position. If applied, leakage will occur.



Spindle type



Ball type

⚠ CAUTION

- At the test run, fully open the spindle and ball stop valve.
- If not fully opened, the devices will be damaged.
- Do not attempt to turn service valve rod beyond its stop.
- Do not loosen the stop ring. If the stop ring is loosened, it is dangerous since the spindle will hop out.
- An excess or a shortage of refrigerant is the main cause of trouble to the units. Charge the correct refrigerant quantity according to the description of label at the inside of service cover.
- Check for refrigerant leakage in detail. If a large refrigerant leakage occurs, it will cause difficulty with breathing or harmful gases would occur if a fire was being used in the room.

11 REFRIGERANT PIPING LENGTH

The refrigerant piping between the indoor unit and the outdoor unit should be designed using the following specifications.

11.1 UTOPIA IVX SERIES

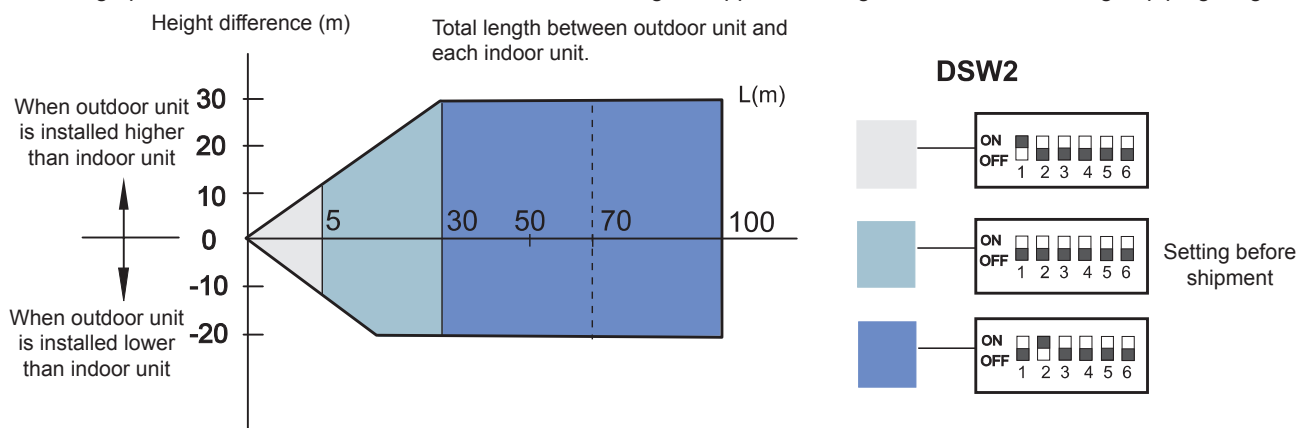
i NOTE

The following information is not applicable to the RAS-XH(V)NP1E series.

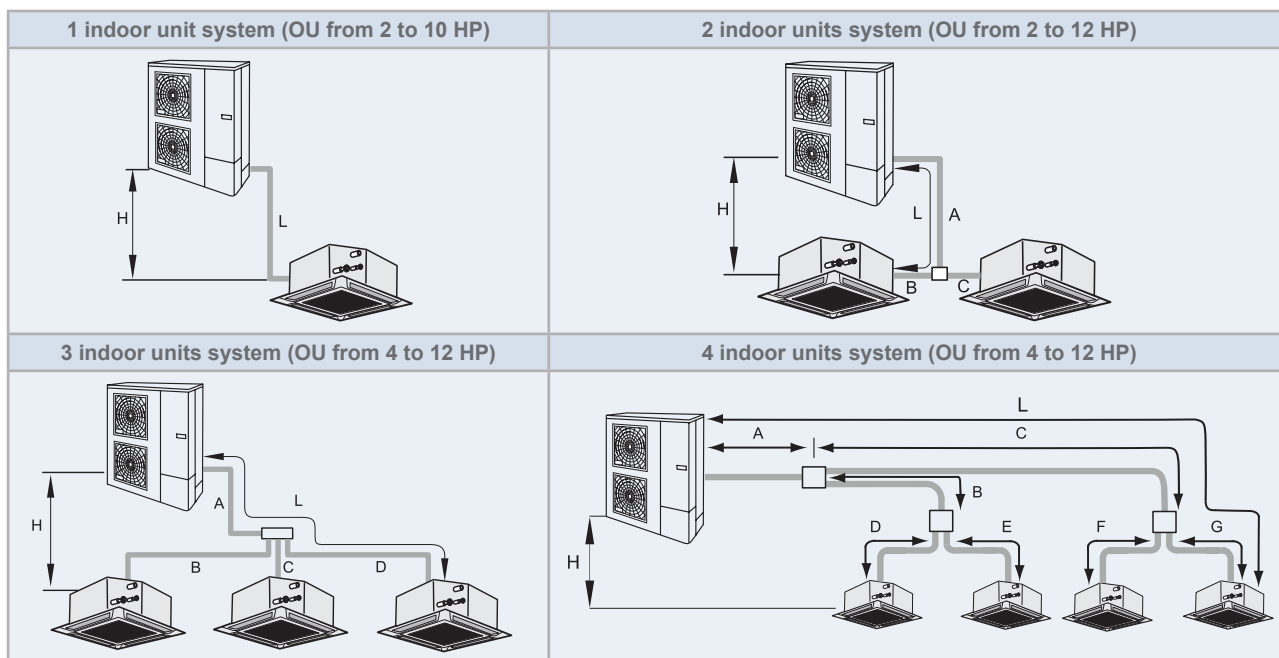
11.1.1 Refrigerant piping length

The refrigerant piping between the indoor unit and the outdoor unit should be designed using the following chart.

Keep the design point within the area of the chart, which is showing the applicable height difference according to piping length.



11.1.2 Piping system for header branch



(pictures are as example)

◆ Maximum refrigerant piping length

IVX Premium series

(m)

Outdoor unit		2 HP	2.5 HP	3HP	4HP	5HP	6HP	8HP	10HP	12HP
Maximum piping length between the outdoor unit and the farthest indoor unit	Actual length (L)	50			75			100		
	Equivalent length (EL)	70			95			125		
Total piping length	2 units (A+B+C)	50		60	85			100	115	
	3 units (A+B+C+D)	--			95			100	130	
	4 units (A+B+C+D+E+F+G+)	--			95			100	145	
Maximum piping line after first branch	2 and 3 units (B, C, D)	10						15		
	4 units (B+D, B+E, C+F, C+G)	--			10			15		
Main piping length A		A > B, C, D, E, F, G								
Maximum height difference, Outdoor / Indoor (H) (Outdoor unit is higher / lower)		30 / 20								
Maximum height difference Indoor / Indoor		3		10						
Maximum height difference: branch pipe/indoor (2,3 and 4 indoor units system) branch pipe/branch pipe (4 indoor units system)		3								
Maximum length difference of the several branches: (B-C) (2 and 3 unit system) (B-D) (3 unit system) (C-D) (3 unit system) (C+G)-(C+F) (4 unit system) (B+E)-(B+D) (4 unit system) (C+G)-(B+E) (4 unit system) (C+G)-(B+D) (4 unit system) (C+F)-(B+E) (4 unit system) (C+F)-(B+D) (4 unit system)		< 8								

IVX Standard series

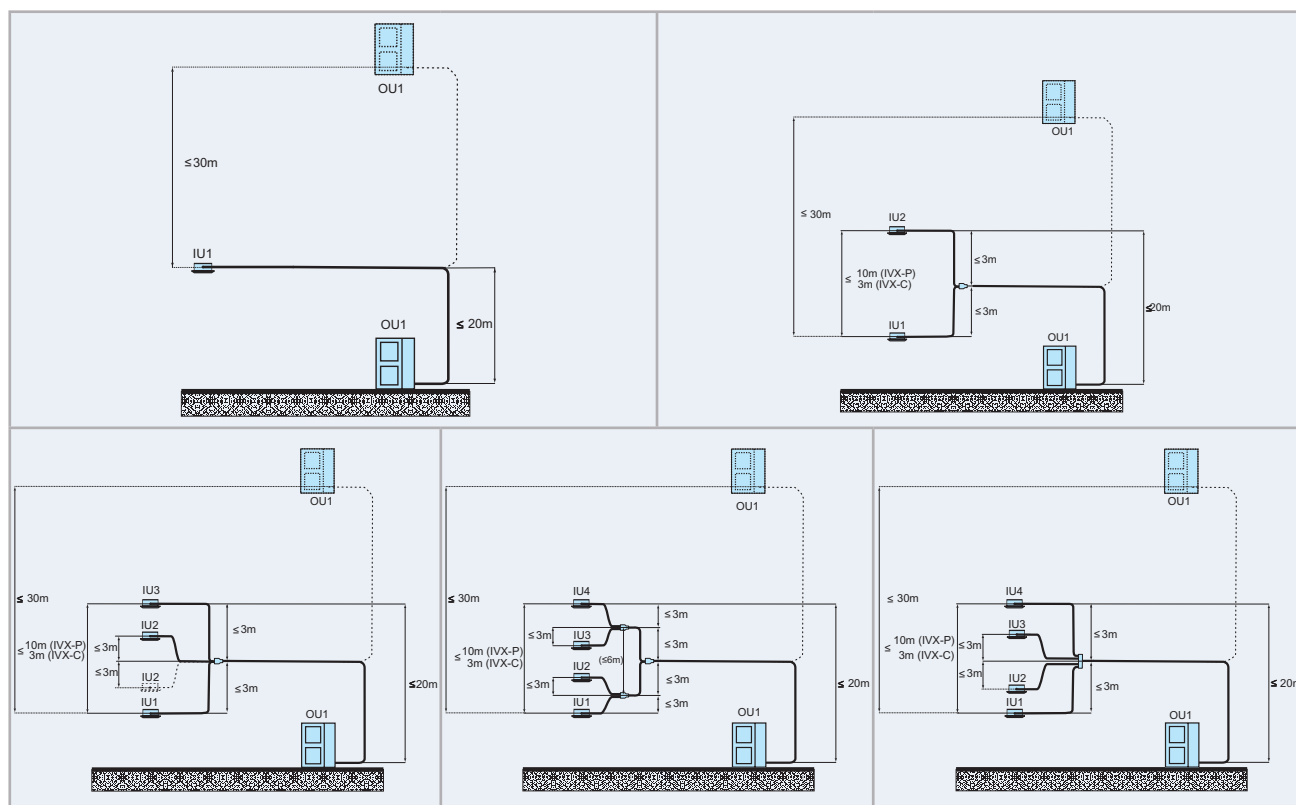
(m)

Outdoor Unit		3HP	4HP	5HP	6HP	8HP	10HP	12HP
Maximum piping length between the outdoor unit and the farthest indoor unit	Actual length (L)	50	70	75		100		
	Equivalent length (EL)	70	90	95		125		
Total piping length	2 units (A+B+C)	60	80	85		100	115	
	3 units (A+B+C+D)	--	90	95		100	130	
	4 units (A+B+C+D+E+F+G+)	--	90	95		100	145	
Maximum piping line after first branch	2 and 3 units (B, C, D)	10				15		
	4 units (B+D, B+E, C+F, C+G)	--	10			15		
Main piping length A		A > B, C, D, E, F, G						
Maximum height difference, Outdoor / Indoor (H) (Outdoor Unit is higher / lower)		30 / 20						
Maximum height difference Indoor / Indoor		3						
Maximum height difference: branch pipe/indoor (2,3 and 4 indoor units system) branch pipe/branch pipe (4 indoor units system)		3						
Maximum length difference of the several branches: (B-C) (2 and 3 unit system) (B-D) (3 unit system) (C-D) (3 unit system) (C+G)-(C+F) (4 unit system) (B+E)-(B+D) (4 unit system) (C+G)-(B+E) (4 unit system) (C+G)-(B+D) (4 unit system) (C+F)-(B+E) (4 unit system) (C+F)-(B+D) (4 unit system)		< 8						

i NOTE

- The liquid piping and the gas piping must be of the same piping length and run along the same route.
- Install the branch piping as much as possible near the indoor units.
- Install Multikits at the same horizontal level.

◆ Maximum height difference (clarification)

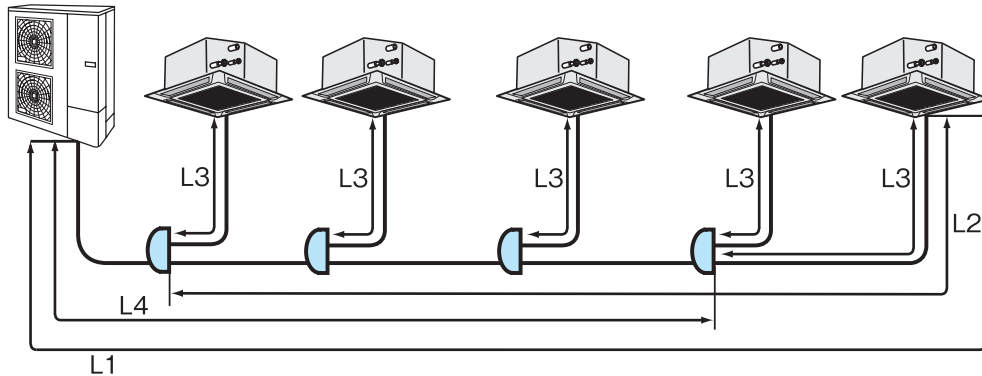


i NOTE

All pictures are as example. Branch and headers are not showed as real sizes or real picture, for the installation of this components follow the technical documentation.

11.1.3 Piping system for line branch

Outdoor unit		3 HP	4 HP	5 HP	6 HP	8 HP	10 HP	12 HP
IU quantity allowed	IVX Premium	2 -3	2 - 5	2 - 6		2 - 8		
	IVX Standard	--	2 - 4					



(picture is as example)

◆ Maximum refrigerant piping length (Line branch system)

IVX Premium series

(m)

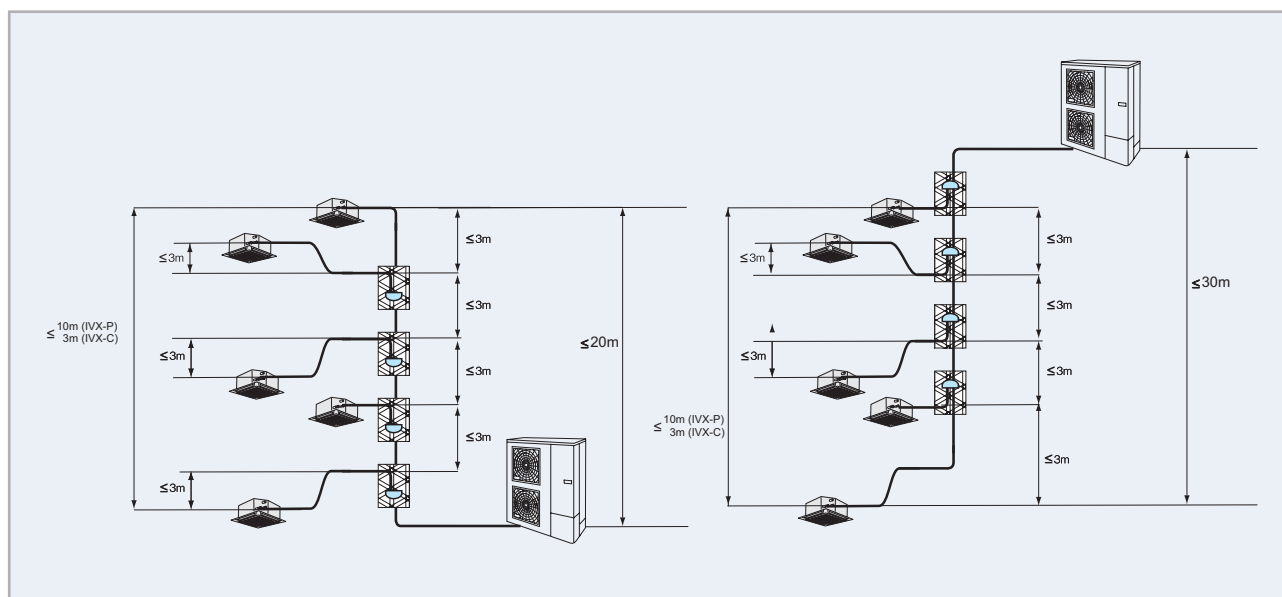
Outdoor Unit		3HP	4HP	5HP	6HP	8HP	10HP	12HP
Maximum piping length between the outdoor unit and the farthest indoor unit	Actual Length (L1)	50	75			100		
	Equivalent Length (EL)	70	95			125		
Maximum piping length from first branch to each indoor unit (L2)		20	30			40		
Maximum piping length from branch to indoor unit (L3)		10				15		
Total piping length L4 + (L31+L32+L33....)		60	95			100	145	
Maximum height difference, Outdoor / Indoor (H) (Outdoor unit is higher / lower)		30 / 20						
Maximum height Difference Indoor / Indoor		10						
Maximum height difference: Branch pipe/Indoor Branch pipe/branch pipe		3						

IVX Standard series

(m)

Outdoor Unit		4HP	5HP	6HP	8HP	10HP	12HP
Maximum piping length between the outdoor unit and the farthest indoor unit	Actual Length (L1)	70	75		100		
	Equivalent Length (EL)	90	95		125		
Maximum piping length from first branch to each indoor unit (L2)		20			25		
Maximum piping length from branch to indoor unit (L3)		10			15		
Total piping length L4 + (L31+L32+L33....)		70	75		100	145	
Maximum height difference, outdoor / indoor (H) (Outdoor unit is higher / lower)		30 / 20					
Maximum height Difference Indoor / Indoor		3					
Maximum height difference: Branch pipe/Indoor Branch pipe/branch pipe		3					

◆ Maximum height difference



i NOTE

All pictures are as example. Branch and headers are not showed as real sizes or real picture, for the installation of this components follow the technical documentation.

11.1.4 Combinations of piping size and piping length

IVX Premium series

Liquid	Ø6.35				Ø9.52					Ø12.70					Ø15.88			
Gas	Ø9.52	Ø12.70	Ø15.88	Ø19.05	Ø12.70	Ø15.88	Ø19.05	Ø22.20	Ø25.40	Ø15.88	Ø19.05	Ø22.20	Ø25.40	Ø28.58	Ø22.20	Ø25.40	Ø28.58	
Performance capacity	(m)																	
2 HP	15 ⁽¹⁾	50	30	-	15 ⁽³⁾	15 ⁽³⁾	-	-	-	-	-	-	-	-	-	-	-	
2.5 HP	-	50	30	-	20 ⁽³⁾	20 ⁽³⁾	-	-	-	-	-	-	-	-	-	-	-	
3 HP	-	30 ^{(1) (2)}	30 ⁽²⁾	-	30 ⁽¹⁾	50	-	-	-	-	-	-	-	-	-	-	-	
4 - 5 - 6 HP	-	-	5 ⁽²⁾	5 ⁽²⁾	40 ⁽¹⁾	75	50 ⁽⁴⁾	-	-	30 ⁽³⁾	30 ^{(3) (4)}	-	-	-	-	-	-	
8 HP	-	-	-	-	-	-	50 ^{(1) (4) (6)}	50 ^{(1) (6)}	70 ^{(5) (6)}	-	50 ^{(1) (3) (4)}	50 ^{(1) (3)}	100	-	50 ^{(1) (3)}	50 ⁽³⁾	-	
10 - 12 HP	-	-	-	-	-	-	-	-	-	-	-	50 ⁽¹⁾	100	50	50 ^{(1) (3)}	50 ⁽³⁾	50 ⁽³⁾	

(1). Reducing gas pipe size will lower cooling capacity due to larger pressure loss in gas piping and narrow operation range.

(2). Reducing liquid pipe size will narrow operation range due to indoor unit relation with expansion valve capacity.

(3). Increasing liquid pipe size will require additional refrigerant charge.

(4). When using Ø19.05 gas pipe (soft-annealed), please switch ON DSW2-4# in the Outdoor Unit PCB.

(5). In case that pipe length exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe.

(6). In case of exceeding the recommended number of connected Indoor Units of 8 HP (more than 5 Units), please use a Ø12.7 pipe as a liquid

Standard

IVX Standard series

Liquid	Ø6.35				Ø9.52					Ø12.70					Ø15.88		
Gas	Ø9.52	Ø12.70	Ø15.88	Ø19.05	Ø12.70	Ø15.88	Ø19.05	Ø22.20	Ø25.40	Ø15.88	Ø19.05	Ø22.20	Ø25.40	Ø28.58	Ø22.20	Ø25.40	Ø28.58
Performance capacity	(m)																
3 HP	-	30 ^{(1) (2)}	30 ⁽²⁾	-	30 ⁽¹⁾	50	-	-	-	-	-	-	-	-	-	-	-
4 HP	-	-	5 ⁽²⁾	5 ⁽²⁾	40 ⁽¹⁾	70	50 ⁽⁴⁾	-	-	30 ⁽³⁾	30 ^{(3) (4)}	-	-	-	-	-	-
5 - 6 HP	-	-	5 ⁽²⁾	5 ⁽²⁾	40 ⁽¹⁾	75	50 ⁽⁴⁾	-	-	30 ⁽³⁾	30 ^{(3) (4)}	-	-	-	-	-	-
8 HP	-	-	-	-	-	-	50 ^{(1) (4)}	50 ⁽¹⁾	70 ^{(5) (6)}	-	50 ^{(1) (3) (4)}	50 ^{(1) (3)}	100	-	50 ^{(1) (3)}	50 ⁽³⁾	-
10 - 12 HP	-	-	-	-	-	-	-	-	-	-	-	50 ⁽¹⁾	100	50	50 ^{(1) (3)}	50 ⁽³⁾	50 ⁽³⁾

(1) Reducing gas pipe size will lower cooling capacity due to larger pressure loss in gas piping and narrow operation range.

(2) Reducing liquid pipe size will narrow operation range due to indoor unit relation with expansion valve capacity.

(3) Increasing liquid pipe size will require additional refrigerant charge.

(4) When using Ø 19.05 gas pipe (soft-annealed), please switch ON DSW2-4# in the Outdoor Unit PCB.

(5) In case that pipe length exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe.

(6) In case of exceeding the recommended number of connected Indoor Units of 8 HP (more than 5 Units), please use a Ø12.7 pipe as a liquid

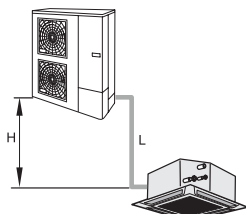
Standard

11.1.5 Refrigerant piping size and multikit/distributor

Select the piping connection sizes according to the following procedures

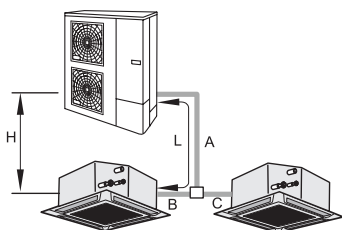
- Between outdoor unit and branch pipe: Select the same pipe connection size as the pipe size of the outdoor unit.
- Between branch pipe and indoor unit: Select the same pipe connection size as the pipe size of the indoor unit.

1 indoor unit system



Outdoor Unit HP	Pipe Size (L)	
	Gas	Liquid
2 / 2.5	Ø12.70	Ø6.35
3 - 6	Ø15.88	Ø9.52
8	Ø25.40	Ø9.52
10/12	Ø25.40	Ø12.70

2 indoor units system



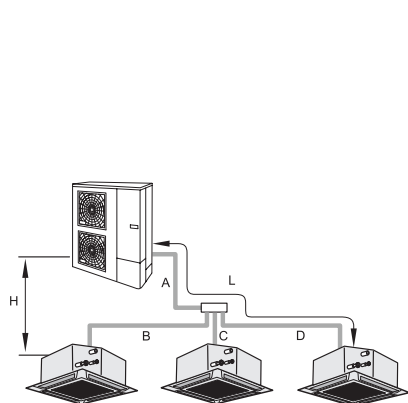
Outdoor Unit HP	Pipe Size (A)		Branch pipe
	Gas	Liquid	
2 / 2.5	Ø12.70	Ø6.35	E-102SN4
3 / 4	Ø15.88	Ø9.52	E-102SN4
5 / 6	Ø15.88	Ø9.52	E-102SN4
8	Ø25.40	Ø9.52 (1)	E-162SN4
10 / 12	Ø25.40	Ø12.70	E-162SN4

(1) In case that pipe length exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe.

Indoor unit capacity	Pipe Size (B, C)	
	Gas	Liquid
≤ 1.5 HP	Ø12.70	Ø6.35
1.8/2.0HP	Ø15.88	Ø6.35
≥ 2.3 HP	Ø15.88	Ø9.52

Connections including Indoor Units 8 and 10 HP are not possible

3 indoor units system



(mm)

Outdoor Unit HP	Pipe Size (A)		Header Branch
	Gas	Liquid	
4 / 5 / 6	Ø15.88	Ø9.52	MH-84AN1
8	Ø25.40	Ø9.52(1)	MH-84AN1
10 / 12	Ø25.40	Ø12.70	MH-84AN1

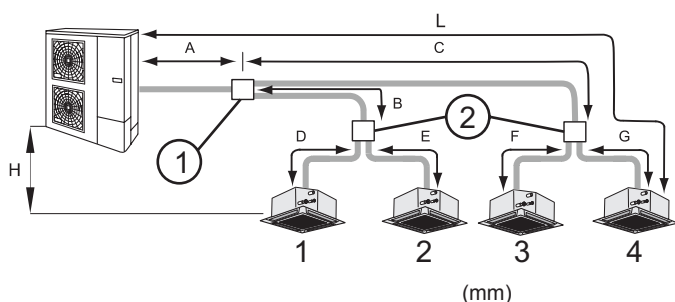
(1) In case that pipe length (A+B or A+C or A+D) exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe.

(mm)

Indoor unit capacity	Pipe Size (B, C, D)	
	Gas	Liquid
≤ 1.5 HP	Ø12.70	Ø6.35
1.8/2.0HP	Ø15.88	Ø6.35
≥ 2.3 HP	Ø15.88	Ø9.52

Connections including Indoor Units 8 and 10 HP are not possible

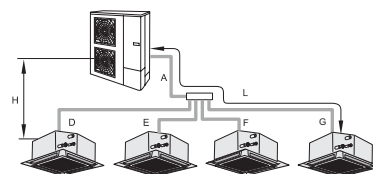
4 indoor units system



NOTE

(1) In case that total pipe length (A+B+D or A+B+E or A+C+F or A+C+G) exceeds of 70m in 8 HP unit, please use a Ø12.7 pipe as a liquid pipe.

(2) When is used Multi-kit model MH-84AN1 it is not necessary the multi.kit 2.



(mm)

Outdoor Unit HP	Pipe Size (A)		Branch line ①
	Gas	Liquid	
4 / 5 / 6	Ø15.88	Ø9.52	E-102SN4
8	Ø25.40	Ø9.52 ⁽¹⁾	E-162SN4 MH-84AN1(2)
10 / 12	Ø25.40	Ø12.70	E-162SN4 MH-84AN1(2)

(mm)

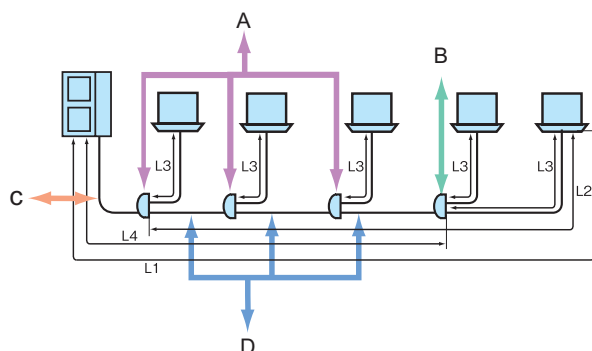
Total Indoor Unit capacity after branch pipe 1+2 or 3+4	Pipe Size (B, C)		Branch line ②
	Gas	Liquid	
≤ 1.5 HP	Ø12.70	Ø6.35	E-102SN4
from 1.8 to 2.0 HP	Ø15.88	Ø6.35	E-102SN4
≥ 2.3 HP	Ø15.88	Ø9.52	E-102SN4

(mm)

Indoor Unit capacity	Pipe Size (D, E, F, G)	
	Gas	Liquid
≤ 1.5 HP	Ø12.70	Ø6.35
1.8/2.0HP	Ø15.88	Ø6.35
≥ 2.3 HP	Ø15.88	Ø9.52
Connections including indoor units 8 and 10 HP are not possible		

If the capacity ratio between IU group 1+2 and 3+4 is higher than 60/40% please install a line branch system or contact with your HITACHI Dealer.

Line branch system



(mm)

Outdoor Unit HP	Pipe Size (C,D) (L4)		Multi-kit model A	Multi-kit model B
	Gas	Liquid		
3/4/5/6	Ø15.88	Ø9.52	E-102SN4	
8	Ø25.40	Ø9.52 ⁽¹⁾	E-162SN4	E-102SN4
10 /12	Ø25.40	Ø12.70	E-162SN4	E-102SN4

⁽¹⁾ In case that total pipe length from the outdoor to the farthest indoor unit exceeds of 70m in 8 HP unit, please use a Ø12.7 pipe as a liquid pipe.

(mm)

Indoor unit capacity	Pipe Size (L3)	
	Gas	Liquid
≤ 1.5 HP	Ø12.70	Ø6.35
1.8/2.0HP	Ø15.88	Ø6.35
≥ 2.3 HP	Ø15.88	Ø9.52

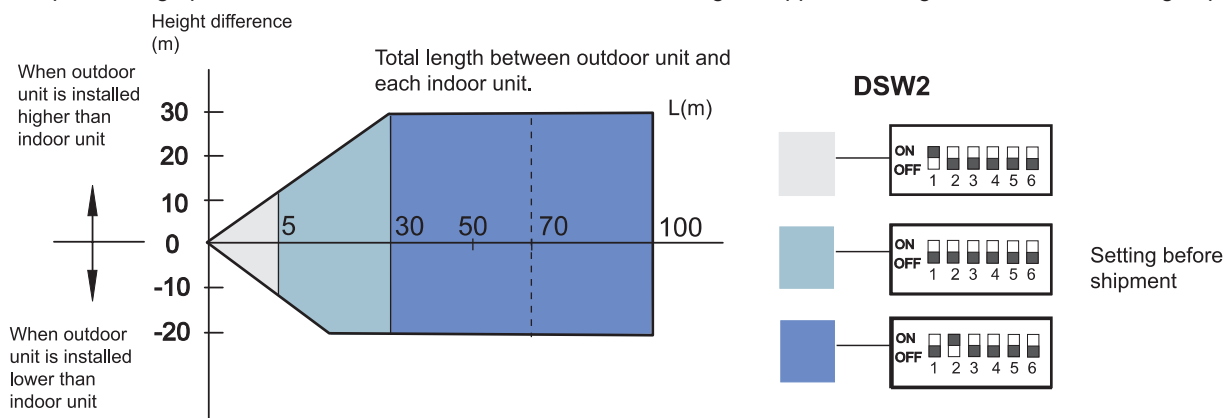
Connections including Indoor Units 8 and 10 HP are not possible

11.2 UTOPIA ES SERIES

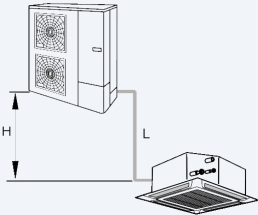
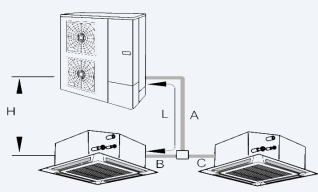
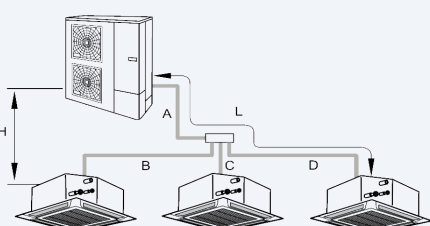
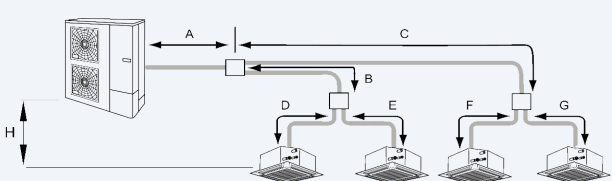
11.2.1 Refrigerant piping length

The refrigerant piping between the indoor unit and the outdoor unit should be designed using the following chart.

Keep the design point within the area of the chart, which is showing the applicable height difference according to piping length.



Piping system (illustration as examples)

Single system (O.U. from 3 to 10 HP)	Twin system (O.U. from 3 to 10 HP)
	
	$L = A + \text{the longest of B \& C}$
Triple system (O.U. 6 and 8 HP)	Quad system (O.U. 8 and 10 HP)
	
$L = A + \text{the longest of B, C \& D}$	$L = A + \text{the longest of (B + the longest of D \& E) \& (C + the longest of F \& G)}$

i NOTE

L and H are the length and height indicated in the above chart. For twin, triple and quad systems, the length is the distance between the outdoor unit and the farthest indoor unit.

i NOTE

- The liquid piping and the gas piping must be of the same length and run along the same route.
- Multikits for multiple connections (optional accessory as system parts) must be used to install the branch pipe to the indoor unit.
- Install Multikits at the same horizontal level.

◆ Maximum refrigerant piping length

		(m)			
Item		3HP	4 HP	(5/6) HP	(8/10) HP
Maximum piping length between the outdoor unit and the farthest indoor unit	Actual piping length (L)	50	50	50	50
	Equivalent piping length	70	70	70	70 (*)
Maximum height difference between indoor and outdoor units (H)	Outdoor unit higher than the indoor unit	30	30	30	30
	Indoor unit higher than outdoor unit	20	20	20	20
	Height difference between indoor units	0.5	0.5	0.5	0.5
Maximum total piping length	Twin (A + B + C)	60	60	60	60
	Triple (A + B + C + D)	—	—	70	70
	Quad (A + B + C + D + E + F + G)	—	—	—	80

i NOTE

(*) Quad: 75 m.

The refrigerant piping length from the outdoor unit to the first branch must be higher than the piping length from the first branch to the farthest indoor unit.

◆ Piping length after branches

Piping length after branch pipe (B, C, D, E, F or G):

- 1 After branch pipe, the pipe length should be shorter than the values shown in the following table:

(m)

		3, 4 and 5 HP	6 HP	(8-10) HP
Twin	B, C	10	10	10
Triple	B, C, D	—	10	10
Quad	B + D, B + E, C + F, C + G	—	—	10

- 2 All branch piping should be balanced, and the difference between these sections cannot be greater than indicated in the tables below:

(m)

		3, 4 and 5 HP	6 HP	(8/10) HP
Twin	Difference between B and C	8	8	8
Triple	Difference between B, C and D	—	8	8
Quad	Difference between B + (D/E) and C + (F/G); Between D and E; Between F and G	—	—	8

◆ Piping length specifications

Performance capacity	Liquid	Ø6.35				Ø9.52				
	Gas	Ø9.52	Ø12.7	Ø15.88	Ø19.05	Ø12.7	Ø15.88	Ø19.05	Ø22.2	Ø25.4
RAS-3HVRNS3		—	30 ^{1*2*}	30 ^{2*}	—	30 ^{1*}	50	—	—	—
RAS-4H(V)RNS3E		—	—	5 ^{2*}	5 ^{2*}	40 ^{1*}	50	50 ^{4*}	—	—
RAS-5H(V)RNS3E		—	—	5 ^{2*}	5 ^{2*}	40 ^{1*}	50	50 ^{4*}	—	—
RAS-6H(V)RNS3E		—	—	5 ^{2*}	5 ^{2*}	40 ^{1*}	50	50 ^{4*}	—	—
RAS-8HRNSE		—	—	—	—	—	—	30 ^{1*4*}	30 ^{1*}	50
RAS-10HRNSE		—	—	—	—	—	—	—	—	30 ^{5*}

Performance Capacity	Liquid	Ø12.7					Ø15.88 ^{5*}		
	Gas	Ø15.88	Ø19.05	Ø22.2	Ø25.4	Ø28.6	Ø25.4	Ø28.6	
RAS-3HVRNS3		—	—	—	—	—	—	—	—
RAS-4H(V)RNS3E		30 ^{3*}	30 ^{3*4*}	—	—	—	—	—	—
RAS-5H(V)RNS3E		30 ^{3*}	30 ^{3*4*}	—	—	—	—	—	—
RAS-6H(V)RNS3E		30 ^{3*}	30 ^{3*4*}	—	—	—	—	—	—
RAS-8HRNSE		—	30 ^{1*3*4*}	30 ^{1*3*}	30 ^{3*}	—	—	—	—
RAS-10HRNSE		—	—	30 ^{1*3*}	50 ^{3*5*}	50 ^{3*}	20 ^{3*}	20 ^{3*}	

NOTE

- (1*) If the gas pipe is smaller, the cooling performance drops, and the operating range is reduced because the pressure loss in the gas pipe increases.
- (2*) If the liquid pipe is smaller the expansion valve capacity of the indoor unit is reduced.
- (3*) If the liquid pipe is larger refrigerant has to be added.
- (4*) If the gas line is Ø19.05:
Switch ON DSW2-4# in the outdoor unit PCB (for RAS-3HVRNS3 and RAS-4H(V)RNS3E).
Cut the JP6 jumper of the outdoor unit PCB (For RAS-(5/6)H(V)RNS3E and RAS-(8/10)HRNSE).
- (5*) If the liquid pipe is larger (Ø12,70), 120 g/m of refrigerant should be added.

 Standard specification.

11.2.2 Refrigerant piping size

Select the piping connection sizes according to the following procedures:

- Between outdoor unit and branch pipe: Select the same pipe connection size as the pipe size of the outdoor unit.
- Between first and second branch pipe (for RAS-(8/10)HRNSE), see table below.
- Between branch pipe and indoor unit: Select the same pipe connection size as the pipe size of the indoor unit.

Piping connection size of outdoor units and multikit/distributor

(mm)

Outdoor Unit	Pipe Size (*1)		Multikit & Distributor		
	Liquid Piping	Gas Piping	Twin	Triple	Quad
RAS-3HVRNS3	Ø9.52	Ø15.88	E-102SN4	—	—
RAS-4H(V)RNS3E	Ø9.52	Ø15.88	E-102SN4	—	—
RAS-5H(V)RNS3E	Ø9.52	Ø15.88	E-102SN4	—	—
RAS-6H(V)RNS3E	Ø9.52	Ø15.88	E-102SN4	MH-84AN1	—
RAS-8HRNSE	Ø9.52	Ø25.4	E-162SN4	MH-84AN1	E-162SN4 + E-102SN4 + E-102SN4
RAS-10HRNSE	Ø9.52 ⁽¹⁾	Ø25.4	E-162SN4	—	E-162SN4 + E-102SN4 + E-102SN4

NOTE

- (*1): The sizes of the indoor and outdoor units are different. Adjust the flare adapter (accessories) to the joint part of the indoor piping.
- (1): Select the piping size Ø12.7 when the length is over 30 m (only for RAS-10HRNSE).

◆ Piping connection size between first and second branch pipe (For RAS-(8/10)HRNSE)

Total Indoor unit Capacity after connecting Second Branch Pipe	Pipe Size (Ø mm) (First ~ Second Branch Pipe)	
	Gas	Liquid
≤ 2.3 HP	Ø12.7	Ø6.35
≤ 6.0 HP	Ø15.88	Ø9.52

◆ Piping connection size of indoor units

Indoor unit	Gas piping size	Liquid piping size
1.5 HP	Ø12.7	Ø6.35
2 HP	Ø15.88	Ø6.35
2.5 - 6 HP	Ø15.88	Ø9.52
8 HP	Ø19.05 → Ø25.4 (*1)	Ø9.52
10 HP	Ø22.2 → Ø25.4 (*1)	Ø9.52 (*2)

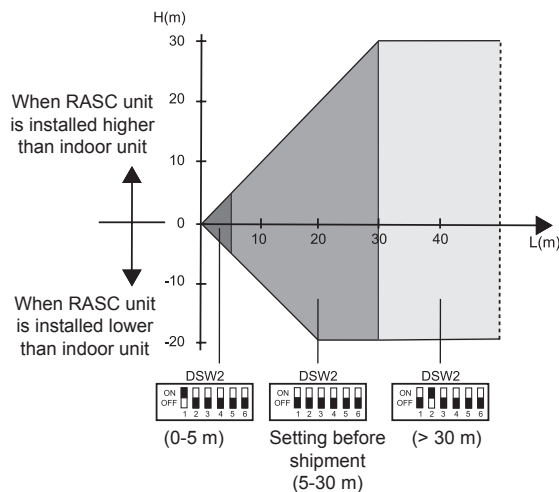
NOTE

- If using different piping from the standard values, piping reducers will be supplied by the installer.
- (*1) Ø19.05 → Ø25.4 and Ø22.2 → Ø25.4 indoor pipe adapters are factory supplied with the indoor unit.
- (*2) Change the liquid piping size to Ø12.7 when the piping length is more than 30 m. Indoor unit pipe adapter is factory supplied with the indoor unit.

11.3 UTOPIA CENTRIFUGAL VRF SERIES

11.3.1 Refrigerant piping length

The refrigerant piping between the indoor unit and the RASC unit should be designed using the following instructions. Keep the design point within the area of the chart, which shows the applicable height difference according to piping length.



11.3.2 Piping system (Header branch installation)

1 indoor unit system	2 indoor units system	3 indoor units system
-	$L = A + \text{the longest of B \& C}$	$L = A + \text{the longest of B, C \& D}$

4 indoor units system	
Case a)	Case b) Only for (8/10)HP
$L = A + \text{the longest of (B + the longest of D \& E) \& (C + the longest of F \& G)}$	$L = A + \text{the longest of B, C, D \& E}$

i NOTE

- *L and H are the length and height indicated in the above chart. For 1, 2 or 3 indoor unit systems, the length is the distance between the RASC unit and the farthest indoor unit.*
- *The liquid piping and the gas piping must be of the same length and run along the same route.*
- *Multi-kits for multiple connections (optional accessory as system parts) must be used to install the branch pipe to the indoor unit. Install them at the same horizontal level.*
- *Install the branch piping as close as possible to the indoor units.*

◆ **Maximum refrigerant piping length (Header branch installation)**

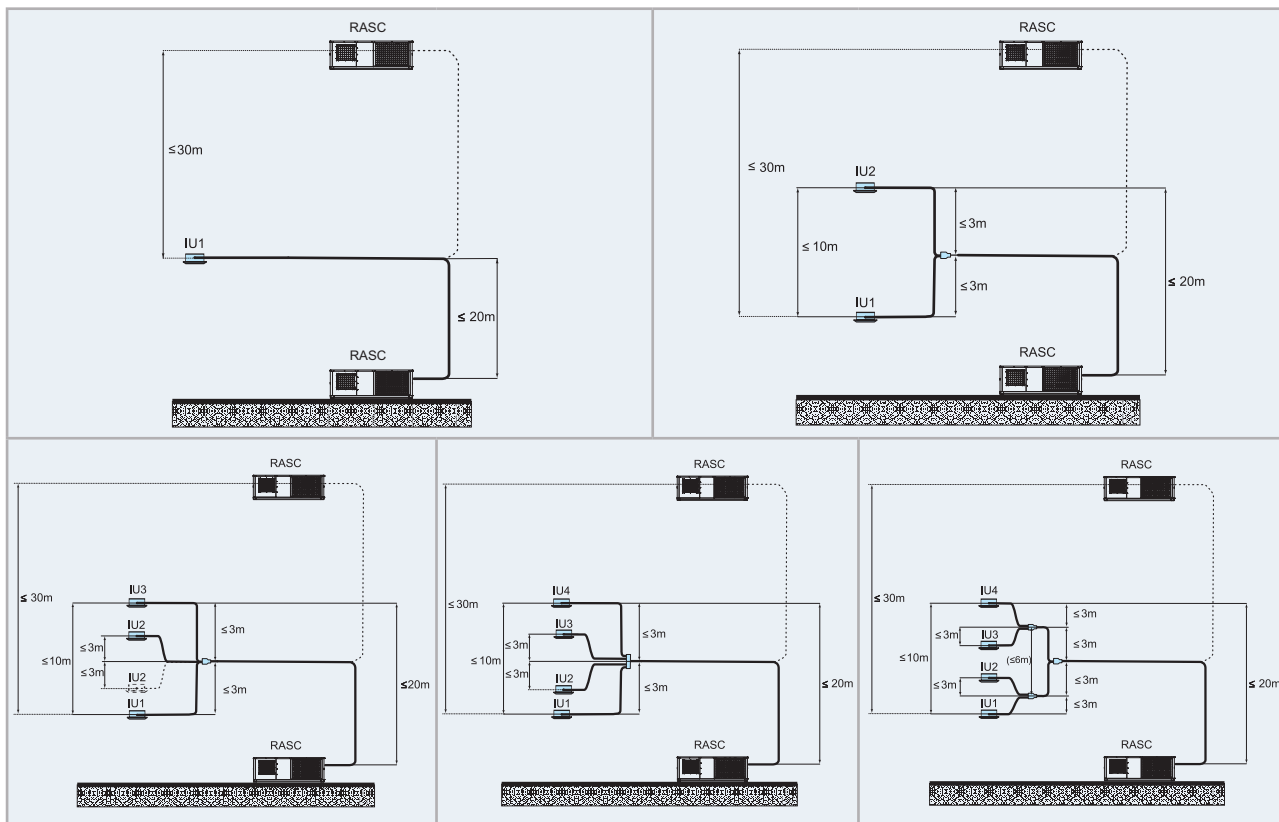
							(m)
Item			4HP	5HP	6HP	8HP	10HP
Maximum piping length between the RASC unit and the farthest indoor unit	Actual piping length (L)		75			100	
	Equivalent piping length (EL)		95			125	
Maximum total piping length	2 indoor units (A + B + C)		85			100	115
	3 indoor units (A + B + C + D)		95			100	130
	4 indoor units	Case a) (A + B + C + D + E + F + G)	95			100	145
		Case b) (A + B + C + D + E)	-			100	145
Maximum piping length between multikit and indoor unit	2 indoor units (B, C)		10			15	
	3 indoor units (B, C, D)		10			15	
	4 indoor units	Case a) B + D, B + E, C + F, C + G	10			15	
		Case b) B, C, D, E	-			15	
Maximum height difference between RASC unit and indoor unit (H)	RASC unit higher than indoor unit		30				
	Indoor unit higher than RASC unit		20				
Maximum height difference between indoor units			10				
Maximum height difference between multikits and between multikit and indoor unit			3				

i NOTE

- The refrigerant piping length from the RASC unit to the first branch (A) must be higher than the piping length from the first branch to the farthest indoor unit.
- All branch piping should be balanced, and the difference between these sections cannot be greater than indicated in the tables below:

			(m)
			(4/10)HP
2 indoor units		(B-C)	8
3 indoor units		(B-C, B-D, C-D)	
4 indoor units	Case a)	(B+(D or E)) - (C+(F or G))	
		(D-E)	
		(F-G)	
	Case b) Only for (8/10)HP	(B-C, B-D, B-E, C-D, C-E, D-E)	

◆ Maximum height difference (clarification)



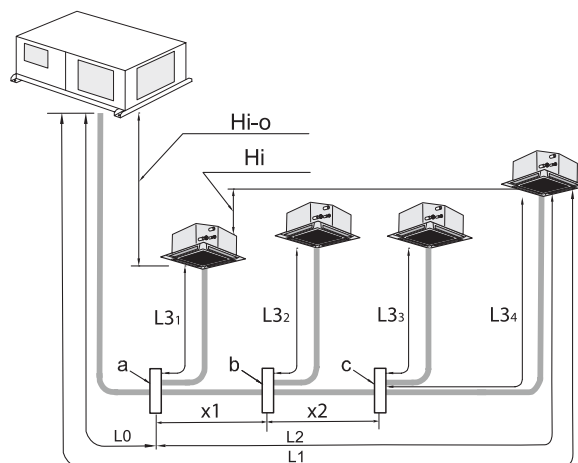
i NOTE

All pictures are shown as an example.

11.3.3 Piping system (Line branch installation)

RASC unit	4 HP	5 HP	6 HP	8 HP	10 HP
Allowed quantity of indoor units	2 - 5 (*)			2 - 6 (*)	

(*): In case of more than 4 indoor units, please respect the restrictions shown in chapter [Combinability](#).

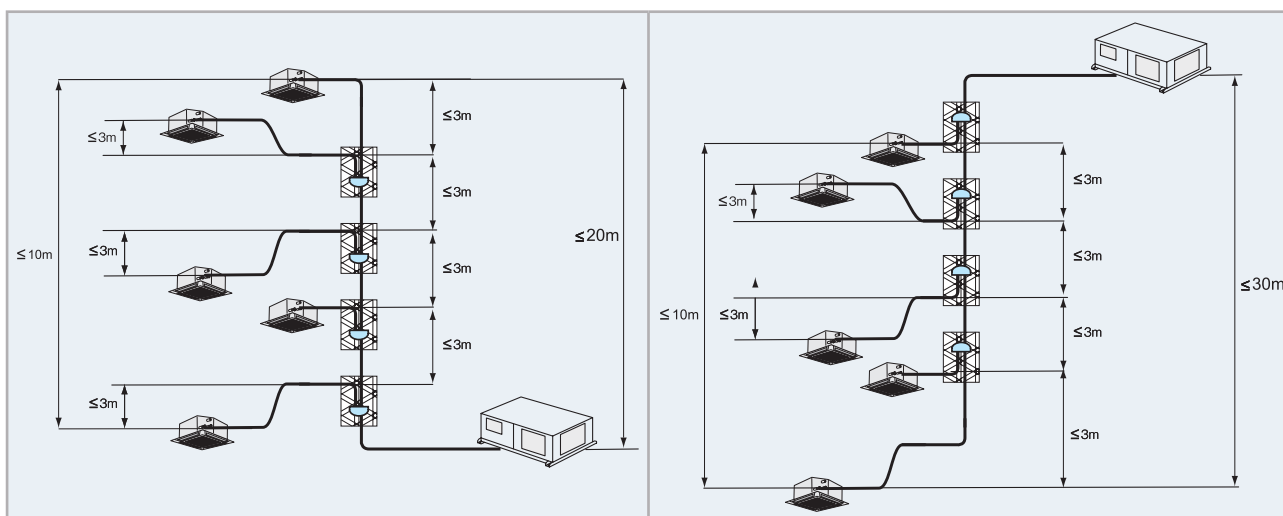


◆ Maximum refrigerant piping length (Line branch installation)

(m)						
Item		4HP	5HP	6HP	8HP	10HP
Maximum piping length between the RASC unit and the farthest indoor unit	Actual piping length (L1)	75			100	
	Equivalent piping length (EL)	95			125	
Maximum total piping length (L1+ L3 ₁ + L3 ₂ + ... + L3 _{n-1})		95			100	145
Maximum piping length from the 1st multikit to the furthest indoor unit (L2)		30			40	
Maximum piping length between multikit and indoor unit (L3 ₁ , L3 ₂ , L3 ₃ , ..., L3 _n)		10			15	
Maximum height difference between RASC unit and indoor unit (Hi-o)	RASC unit higher than indoor unit	30				
	Indoor unit higher than RASC unit	20				
Maximum height difference between indoor units (Hi)		10				
Maximum height difference between multikits and between multikit and indoor unit		3				

(m)

◆ Maximum height difference (clarification)



i NOTE

All pictures are shown as an example.

11.3.4 Combinations of piping size and piping length

	Refrigerant piping length between RASC unit and the farthest indoor unit (m)														
Liquid	Ø6.35		Ø9.52					Ø12.70					Ø15.88		
Gas	Ø15.88	Ø19.05	Ø12.70	Ø15.88	Ø19.05	Ø22.20	Ø25.40	Ø15.88	Ø19.05	Ø22.20	Ø25.40	Ø28.58	Ø22.20	Ø25.40	Ø28.58
(4-6) HP	5 ⁽²⁾	5 ⁽²⁾	40 ⁽¹⁾	75	50 ⁽⁴⁾	-	-	30 ⁽³⁾	30 ^{(3) (4)}	-	-	-	-	-	-
8 HP	-	-	-	-	50 ^{(1) (4) (6)}	50 ^{(1) (6)}	70 ^{(5) (6)}	-	50 ^{(1) (3) (4)}	50 ^{(1) (3)}	100	-	50 ^{(1) (3)}	50 ⁽³⁾	-
10 HP	-	-	-	-	-	-	-	-	-	50 ⁽¹⁾	100	50	50 ^{(1) (3)}	50 ⁽³⁾	50 ⁽³⁾

(1). Reducing gas pipe size will reduce cooling capacity due to larger pressure loss in gas piping and narrow operation range.

(2). Reducing liquid pipe size will narrow operation range due to the indoor unit relation with expansion valve capacity. In these cases, set the DSW2-1 to ON position.

(3). Increasing liquid pipe size will require additional refrigerant charge.

(4). When using Ø19.05 gas pipe (soft-annealed), please switch ON DSW2-4# in the RASC Unit PCB.

(5). In case that pipe length exceeds 70m in 8HP, please use a Ø12.7 pipe as a liquid pipe.

Standard

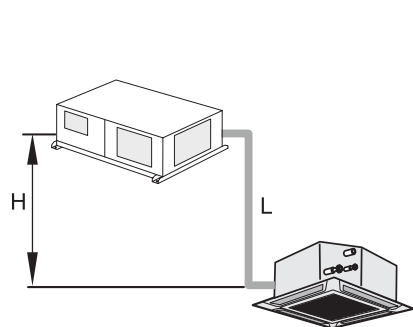
11.3.5 Refrigerant piping size and multikit/distributor selection

Select the piping connection sizes according to the following procedures:

- Between RASC unit and branch pipe: Select the same pipe connection size as the pipe size of the RASC unit.
- Between branch pipe and indoor unit: Select the same pipe connection size as the pipe size of the indoor unit.

◆ Header branch installation

1 indoor unit system



RASC unit	Pipe size (L)	
	Gas	Liquid
(4-6) HP	Ø15.88	Ø9.52
8 HP (*)	Ø25.4	Ø9.52
10 HP (**)	Ø25.4	Ø12.7

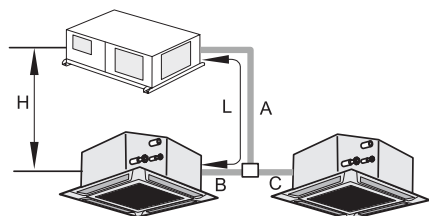
(*) Indoor unit RPI-8.0HP supplied with one adapter:

- Gas pipe adapter: Ø19.05 to Ø25.4

(**) Indoor unit RPI-10.0HP supplied with two adapters:

- Gas pipe adapter: Ø22.2 to Ø25.4
- Liquid pipe adapter: Ø9.52 to Ø12.7

2 indoor units system

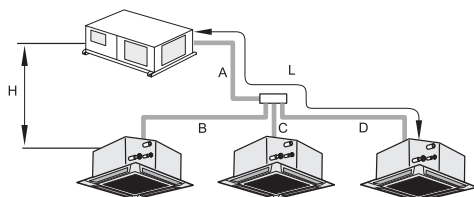


RASC unit	Pipe size (A)		Multi-kit (**)
	Gas	Liquid	
4 HP	Ø15.88	Ø9.52	E-102SN4
(5/6) HP	Ø15.88	Ø9.52	E-102SN4
8 HP	Ø25.4	Ø9.52 (*)	E-162SN4 (***)
10 HP	Ø25.4	Ø12.7	E-162SN4

- (*): In case that pipe length exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe, with its respective multi-kit.
- (**): In case of combinations with 8.0HP or 10.0HP indoor units, install a line branch system with multi-kit E-162SN4.
- (***): In combinations with indoor units of 2.0HP or less, use the multi-kits E-102SN4 for the liquid refrigerant pipe.

Indoor unit capacity after branch	Pipe size (B, C)	
	Gas	Liquid
(0.8-1.5) HP	Ø12.7	Ø6.35
(1.8/2.0) HP	Ø15.88	Ø6.35
(2.3-6.0) HP	Ø15.88	Ø9.52
8.0 HP	Ø19.05	Ø9.52
10.0 HP	Ø22.20	Ø9.52

3 indoor units system



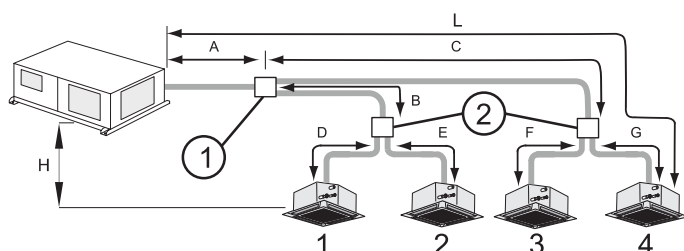
RASC unit	Pipe Size (A)		Multi-kit (**)
	Gas	Liquid	
(4-6) HP	Ø15.88	Ø9.52	MH-84AN1
8 HP	Ø25.4	Ø9.52 (*)	MH-84AN1
10 HP	Ø25.4	Ø12.7	MH-84AN1(**)

• (*): In case that pipe length (A+B or A+C or A+D) exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe.
 • (**): In case of combinations with 8.0HP or 10.0HP indoor units, install a line branch system with multi-kits E-162SN4 and E-102SN4.

Indoor unit capacity after branch	Pipe size (B, C)	
	Gas	Liquid
(0.8-1.5) HP	Ø12.7	Ø6.35
(1.8/2.0) HP	Ø15.88	Ø6.35
(2.3-6.0) HP	Ø15.88	Ø9.52
8.0 HP	Ø19.05	Ø9.52
10.0 HP	Ø22.20	Ø9.52

4 indoor units system

• Case a)



NOTE

If the capacity ratio between IU group 1+2 and 3+4 is higher than 60/40%, install a line branch system or contact with your HITACHI dealer.

RASC unit	Pipe Size (A)		Multi-kit ①
	Gas	Liquid	
4 HP	Ø15.88	Ø9.52	E-102SN4
(5/6) HP	Ø15.88	Ø9.52	E-102SN4
8 HP	Ø25.4	Ø9.52 (*)	E-162SN4
10 HP	Ø25.4	Ø12.7	E-162SN4

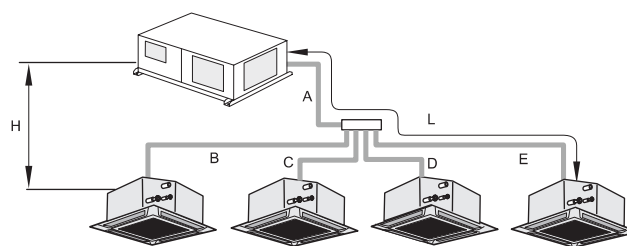
(*): In case that pipe length (A+B+(C or D) or A+C+(F or G)) exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe.

Indoor unit capacity	Pipe Size (D,E,F,G)	
	Gas	Liquid
(0.8-1.5) HP	Ø12.7	Ø6.35
(1.8/2.0) HP	Ø15.88	Ø6.35
≥ 2.3HP	Ø9.52	Ø6.35

Connections including 8.0HP or 10.0HP indoor units are not possible.

Total indoor unit capacity after first branch (1+2) or (3+4)	Pipe Size (B,C)		Multi-kit ②
	Gas	Liquid	
(0.8-1.5) HP	Ø12.7	Ø6.35	E-102SN4
(1.8/2.0) HP	Ø15.88	Ø6.35	E-102SN4
≥ 2.3 HP	Ø15.88	Ø9.52	E-102SN4

• Case b)



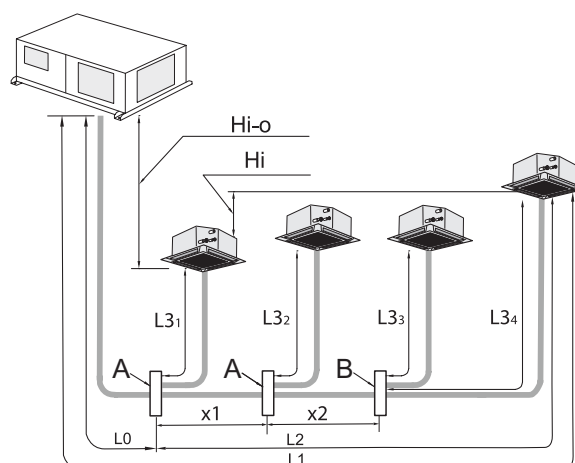
RASC unit	Pipe Size (A)		Multi-kit
	Gas	Liquid	
8 HP	Ø25.4	Ø9.52 (*)	MH-84AN1
10 HP	Ø25.4	Ø12.7	

(*) : In case that pipe length (A+B or A+C or A+D or A+E) exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe.

Indoor unit capacity	Pipe Size (B,C,D,E)	
	Gas	Liquid
(0.8-1.5) HP	Ø12.7	Ø6.35
(1.8/2.0) HP	Ø15.88	Ø6.35
≥ 2.3HP	Ø15.88	Ø9.52

Connections including 8.0HP or 10.0HP indoor units are not possible.

◆ Line branch installation



RASC unit	Pipe Size (L0,x1,x2)		Multi-kit model A	Multi-kit model B
	Gas	Liquid		
(4-6) HP	Ø15.88	Ø9.52	E-102SN4	E-102SN4
8 HP	Ø25.4	Ø9.52 (*)	E-162SN4	E-102SN4
10 HP	Ø25.4	Ø12.7	E-162SN4	E-102SN4

(*) : In case that pipe length between RASC unit and the farthest indoor unit exceeds 70m in 8 HP, please use a Ø12.7 pipe as a liquid pipe.

Indoor unit capacity	Pipe Size (L3)	
	Gas	Liquid
(0.8-1.5) HP	Ø12.7	Ø6.35
(1.8/2.0) HP	Ø15.88	Ø6.35
(2.3-6.0) HP	Ø15.88	Ø9.52
8.0 HP	Ø19.05	Ø9.52
10.0 HP (*)	Ø22.20	Ø9.52



NOTE

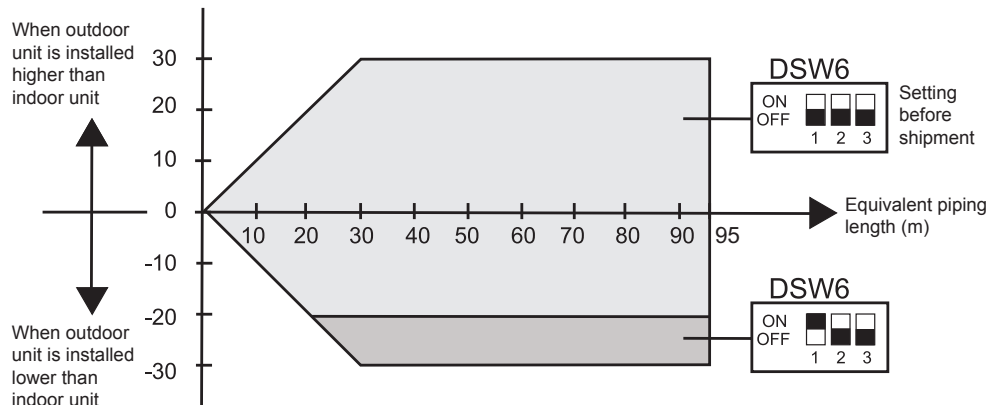
(*) : In combinations with 10.0HP indoor units, only one of the two connections of the E-102SN4 multi-kit admits the Ø22.20 mm diameter corresponding to the gas pipe of the 10.0HP indoor unit. Please take this restriction into account in case that the installation requires the connection of gas piping of 10.0HP indoor units.

11.4 SET FREE MINI SERIES

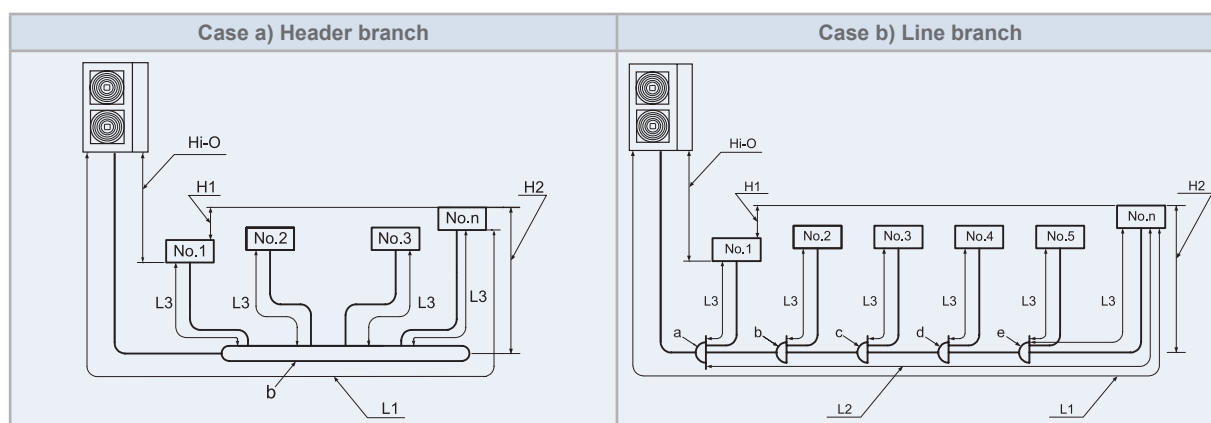
11.4.1 Refrigerant piping length

The refrigerant piping between the indoor unit and the outdoor unit should be designed using the following chart.

Keep the design point within the area of the chart, which is showing the applicable height difference according to piping length



◆ Piping system



i NOTE

- The liquid piping and the gas piping must be of the same length and run along the same route.
- Multi-kits for multiple connections (optional accessory as system parts) must be used to install the branch pipe to the indoor unit.
- Install Multi-kits at the same horizontal level.

Specific considerations of combinability

Outdoor unit	Combinability						
	Minimum nominal combination capacity (HP)	Nominal combination capacity (HP)	Maximum nominal combination capacity (HP)	Minimum combination quantity of indoor units	Minimum single operation capacity (HP)	Maximum combination quantity of indoor units (The sum of the installed RPK and all other indoor units)	RPK restrictions Maximum number of combinable RPK indoor units (This number of units is the sum of the installed RPK-FSN3M and RPK-FSNH3M with its expansion valve kit EV-1.5N1)
RAS-4FS(V)N(Y)3E	2.0	4.0	5.2	1	0.6 (*)	8	6
RAS-5FS(V)N(Y)3E	2.5	5.0	6.5	1	0.6 (*)	10	7
RAS-6FS(V)N(Y)3E	3.0	6.0	7.8	1	0.6 (*)	12	7

i NOTE

(*): Indoor unit of 0.8HP set as 0.6HP by specific DSW setting only for combinations with Set Free Mini Series 3.

Maximum refrigerant piping length

		(m)	
Item		4HP	(5/6)HP
Maximum length from the outdoor unit to the furthest indoor unit (L1)	Actual length	≤ 75	
	Equivalent length	≤ 95	
Maximum length from the 1st Multi-kit to the furthest indoor unit (L2)		≤ 40	
Maximum length between Multi-kit and indoor unit (L3)	Case a) Header branch	≤ 15	
	Case b) Line branch	≤ 10	
Maximum height difference between outdoor and indoor unit (Hi-O)	If the outdoor unit is higher than the indoor unit	≤ 30	
	If the outdoor unit is lower than the indoor unit	≤ 30	
Maximum height difference between each indoor unit (H1)		≤ 15	
Maximum height difference between Multi-kit and indoor unit (H2)		≤ 5	
Total piping length (L1+L3 ₁ +L3 ₂ +...+L3 _{n-1})		≤ 125	≤ 135
Choice of each Multi-kit	Case a) Header branch	MH-84AN1 (4 branches) MH-108AN (8 branches)	
	Case b) Line branch	E-102SN4	

- Considerations by maximum quantity of combined indoor units**

All the following points should be taken in consideration when the quantity of indoor units is over the value shown in the following table:

Outdoor unit	Quantity of combined indoor units
RAS-4FS(V)N(Y)3E	> 6
RAS-5FS(V)N(Y)3E	> 8
RAS-6FS(V)N(Y)3E	> 9

a. The total piping length should be reduced as follows:

Outdoor unit	Quantity of combined indoor units						
	≤ 6	7	8	9	10	11	12
RAS-4FS(V)N(Y)3E	125	113	101	-	-	-	-
RAS-5FS(V)N(Y)3E	135	135	135	123	111	-	-
RAS-6FS(V)N(Y)3E	135	135	135	135	123	111	99

b. In these cases HITACHI recommends using header branch as distribution system than line branch.

c. For **Line branch** reduce the maximum length between Multi-kit and indoor unit (L3) as follows:

(m)	
Maximum length between Multi-kit and indoor unit (L3)	≤ 10 → ≤ 5

d. The following considerations must be taken into account:

- Divide the installation into many branches as possible and equilibrate the length and the ratio of total indoor unit connected capacity of each part.
- Reduce as much as possible the following lengths:
 - Height difference between outdoor and indoor unit (Hi-O)
 - Height difference between each indoor unit (H1)
- The installation position of big capacity indoor unit should be as far away as possible from the first branch.

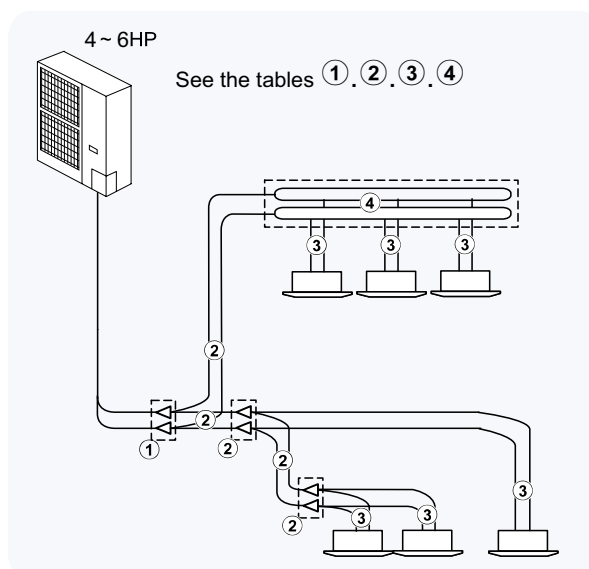
i NOTE

In case of installations not following the above considerations, please contact with your HITACHI dealer for advice.

! CAUTION

In case of exceeding the quantity of indoor units shown before, and in some extreme conditions in terms of piping length and temperature, when all indoor units are in simultaneous operation, performance can decrease and discharge temperature of some indoor units can be lower than comfort temperature.

11.4.2 Refrigerant piping size



◆ **Table ①: Outdoor unit to first multi-kit**

Outdoor unit	Pipe size (Ø mm)		Multi-kit
	Gas	Liquid	
RAS-(4-6)FS(V)N(Y)3E	15.88	9.52	E-102SN4

◆ **Table ②: First multi-kit to last branch**

Total indoor units capacity	Pipe size (Ø mm)		Multi-kit
	Gas	Liquid	
≤2.3HP	12.7	6.35	E-102SN4
2.3≤HP<7.0	15.88	9.52	E-102SN4

◆ **Table ③: Multi-kit to indoor unit**

Indoor unit capacity (HP)	Pipe size (Ø mm)	
	Gas	Liquid
0.8 to 1.5	12.70	6.35 (*)
2.0	15.88	6.35 (*)
2.5 to 6.0	15.88	9.52

i NOTE

- (*): The pipe size must be the same size of the piping connection hole of the I.U.
- The pipe shown in the above table is applicable for both: the line branch and the header branch.

◆ **Table ④: Header branch**

Applicable model	Pipe size (Ø mm)		Multi-kit model	
	Gas	Liquid	2~4 Branches	2~8 Branches
RAS-(4-6)FS(V)N(Y)3E	15.88	9.52	MH-84AN1	MH-108AN

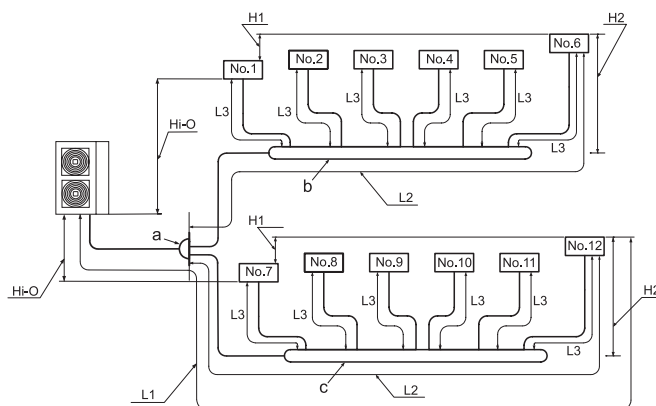
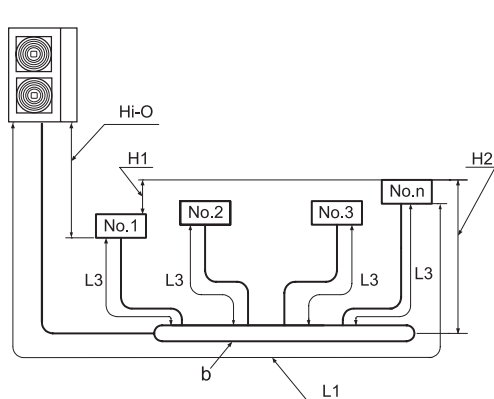
◆ Distribution method

i NOTE

For the following installation types, when the installation is divided into two or more parts, equilibrate the length and the ratio of total indoor unit connected capacity of each part.

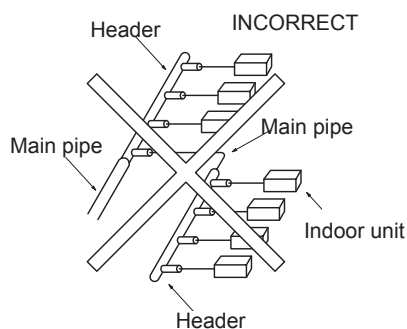
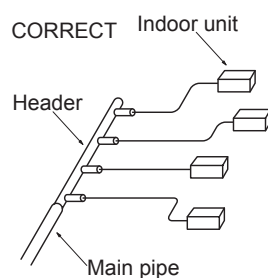
11.4.3 Header branch piping system

◆ Installation types



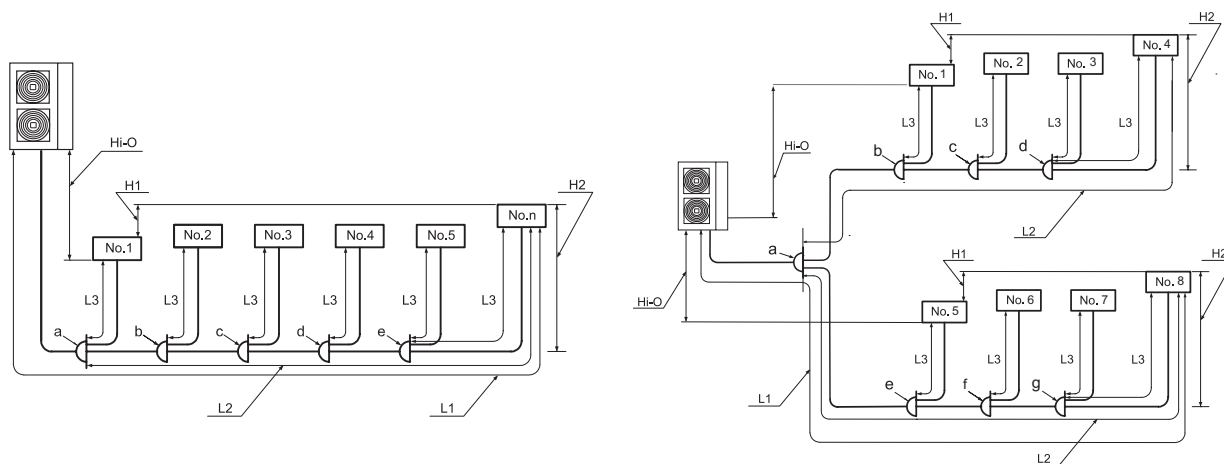
◆ Considerations

Do not connect two header branches consecutively.



11.4.4 Line branch piping system

◆ Installation types



i NOTE

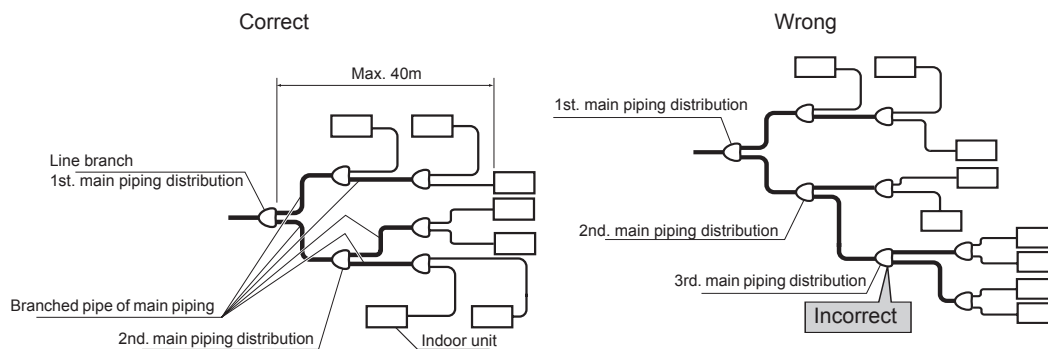
Distribution system not recommended for installations with more indoor units than:

- 6 units for RAS-4FS(V)N(Y)3E
- 8 units for RAS-5FS(V)N(Y)3E
- 9 units for RAS-6FS(V)N(Y)3E

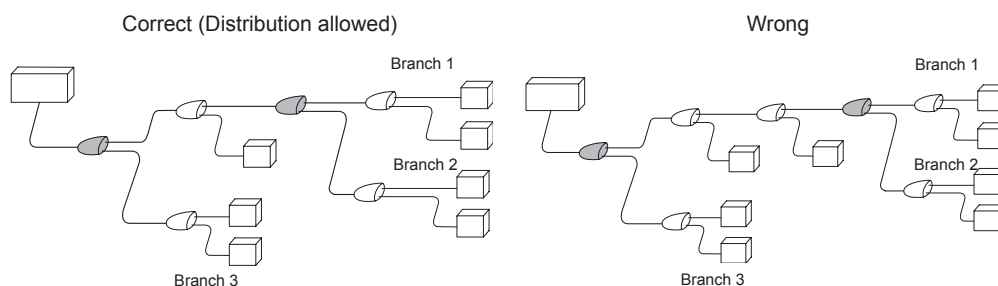
◆ Considerations

With line distribution method, it is possible to make the first or the second main pipe distribution within the third branch. And do not make the main pipe distribution, at or after the fourth branch.

Branch method



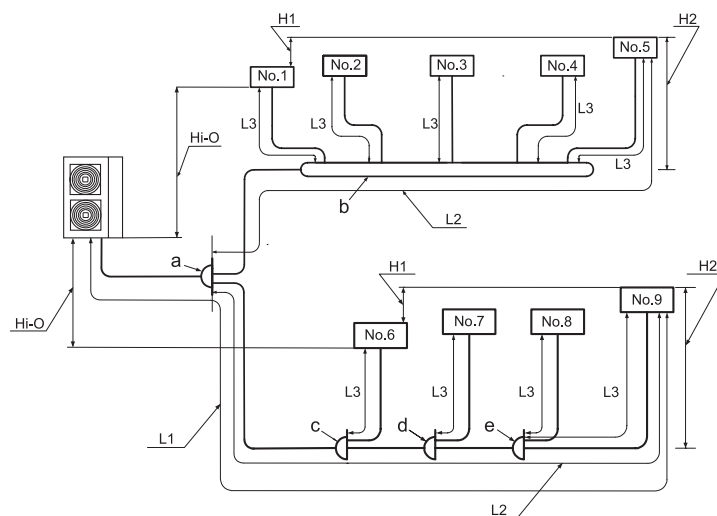
Branch method in 3rd multi-kit



(Main pipe distribution: Distribution from one multi-kit to two multi-kits)

11.4.5 Combination branch piping system

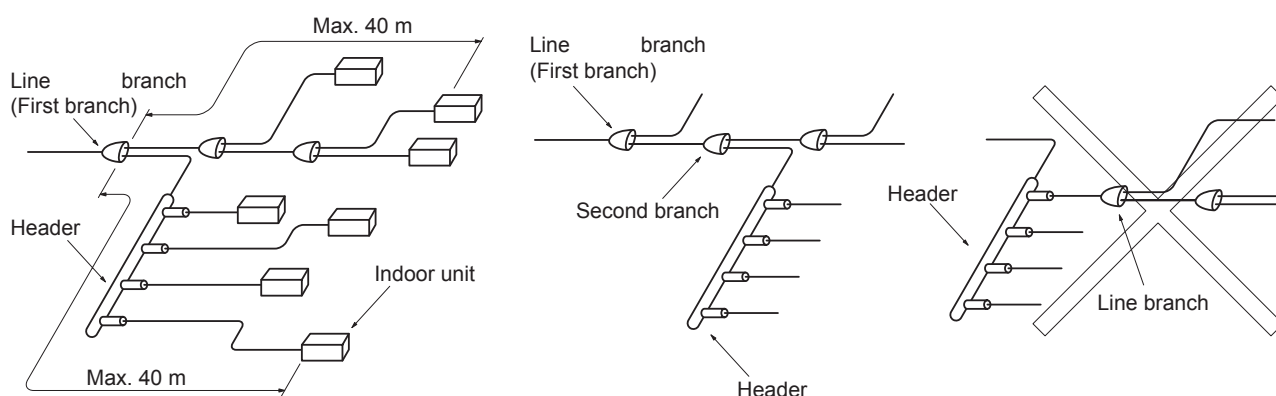
◆ Installation type



◆ Considerations

It is possible to connect the header to the second branch, when the first branch is also the line branch.

Do not connect a line branch to a header branch.

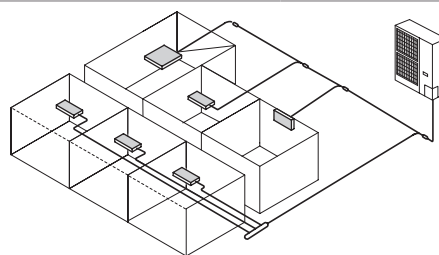
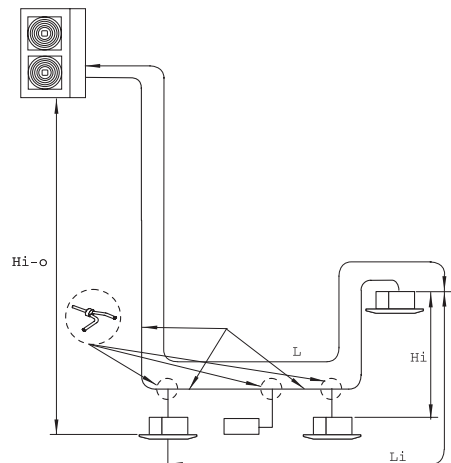


11.5 SET FREE SIDE FLOW SERIES

11.5.1 Refrigerant piping range

The piping selection and the distribution must be designed according to the following specifications:

Item		Applicable range
Length between OU and the farthest IU: L (m)	Actual	100
	Equivalent	120
Total piping length (m)		250
Piping length from 1st branch to the farthest IU: Li (m)		40
Piping length from each IU (m)		40
Lift between IU and OU: Hi-o (m)	OU is higher	40
	OU is lower	30
Lift between IU: Hi (m)		15



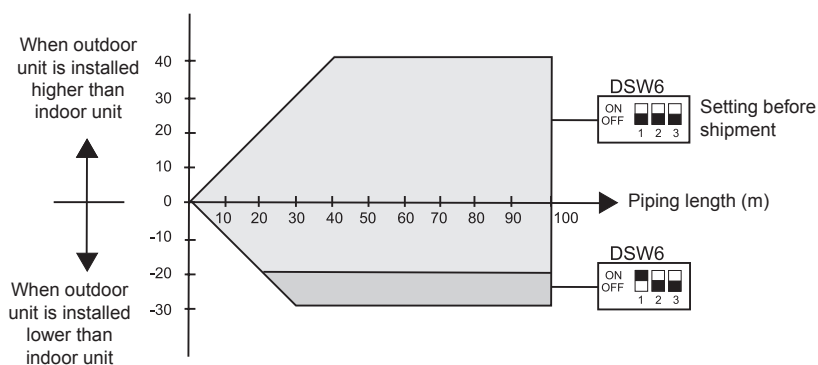
i NOTE

The liquid piping and the gas piping must be of the same length and run along the same route.

11.5.2 Refrigerant piping length by dip switch setting

The refrigerant piping length between indoor units and outdoor units must be designed using the following chart.

Maintain the design point within the dark area of the chart, which shows the height difference according to the piping length.

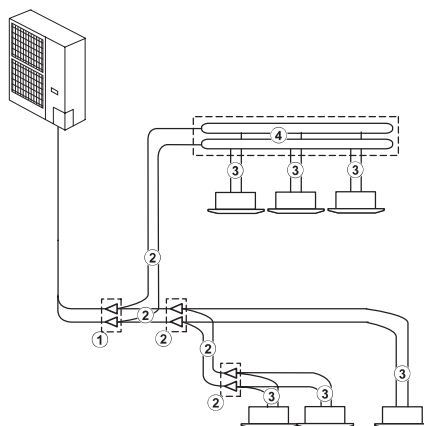


11.5.3 Piping size and multiple connections kit

In addition to the epoch-making “Uni-piping” system, where the same pipe size as the main refrigerant pipe can be used, the “Down-pipe” system is also available for piping cost reduction.

As shown in the following table, the “Uni-piping” system is available for 8 HP units.

Unit	Piping systems	
	Uni-piping	Down-size
RAS-(8-12)FSNM1		



NOTE

- In case of Uni-piping system, the pipe size and the multi-kit from the outdoor unit to the last multi-kit is the same.
- If the size of the multi-kit positioned after the 2nd kit is bigger than the 1st, use a kit of the same size as the 1st.
- If the pipe size after the 1st branch is bigger than the pipe size between outdoor unit and the 1st kit, use the pipe of the same size as the 1st kit.
- If you want to use “Uni-piping” system for other configurations that are not shown in the table, consult with your distributor.

◆ Outdoor Unit First Branch

Outdoor Unit Capacity	Gas/Liquid (Ømm)
8HP	19.05 / 9.52 *1
10HP	22.2 / 12.7
12HP	25.4 - 28.6 / 12.7

*1) When the refrigerant piping length is longer than 70m, use Ø12.7 liquid pipe instead Ø9.52. (In this case, use E-162SN4)

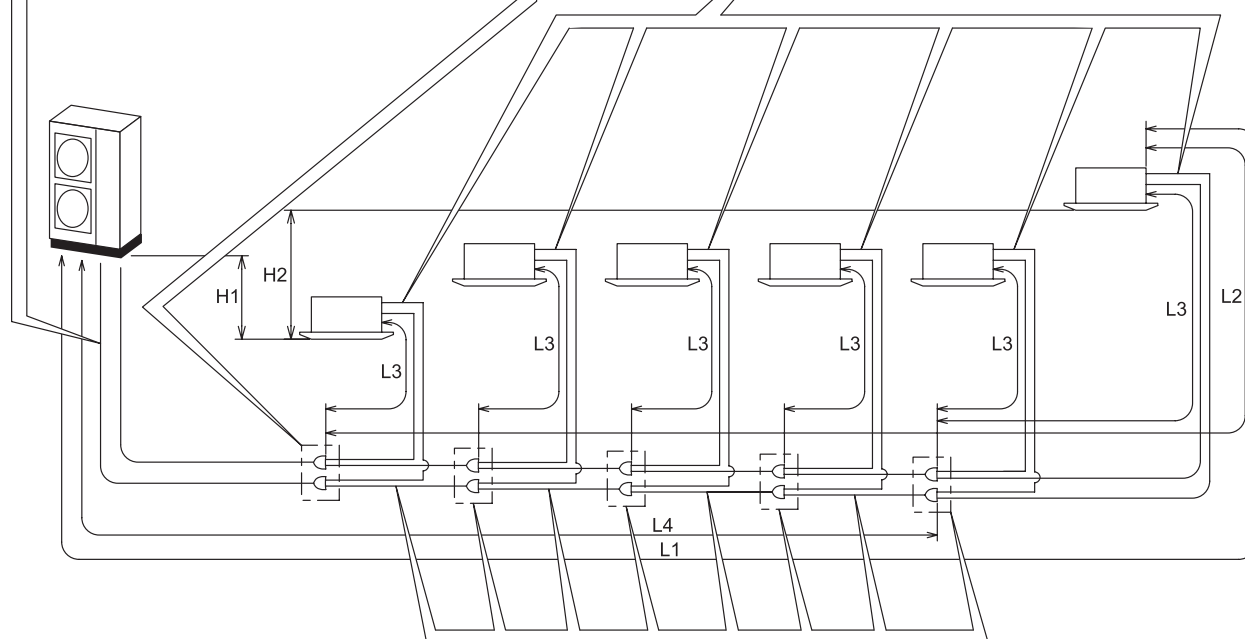
◆ First Branch

Outdoor Unit Capacity	Multi-Kit
8HP	E-102SN4
10 and 12HP	E-162SN4

◆ Multi-Kit to Indoor Unit

The size of multi-kit piping should be same that of indoor unit piping

Indoor Unit Capacity	Gas/Liquid (Ømm)	Max. Length of Liquid Pipe
0.8 to 2HP	12.7 / 6.35	15m
2.5 to 6HP	15.88 / 9.52	15m
8HP	19.05 / 9.52	15m
10HP	22.2 / 9.52	15m



◆ Piping size and Multi-kit after First Branch

Select the multi-kit and the pipe size after the first branch according to the following table.

If the multi-kit size is larger than the first branch, adjust the multi-kit size to the first branch. In case that the selected pipe size after the first branch is larger than the pipe size before the first branch, use the same pipe size as before the branch.

Total IU capacity in HP	Gas/Liquid (Ømm)	Multi-kit
12 or more	25.4 - 28.6 / 12.7	E-162SN4
9~11.99	22.2 / 9.52	E-102SN4
6~8.99	19.05 / 9.52	MH-84AN1 *2)
Lower than 6	15.88 / 9.52	MH-108AN *2)

*2)

Total IU capacity in HP	Number of Branches	Multi-kit
5~10	8 branches	MH-108AN
5~8	4 branches	MH-84AN1

◆ Piping conditions

Item		Applicable range
Ref. pipe length: L1	Actual	within 100m
	Equivalent	within 120m
Piping length from 1st branch to each IU: L2		within 40m
Piping length from each Multi-kit to IU: L3		within 15m
Lift between IU and OU: H1	OU is higher	within 40m
	OU is lower	within 30m
Lift between IU: H2		within 15m
Total actual length of liquid pipes: L3+L4		within 250m

Refer to the installation & maintenance manual for details.

i NOTE

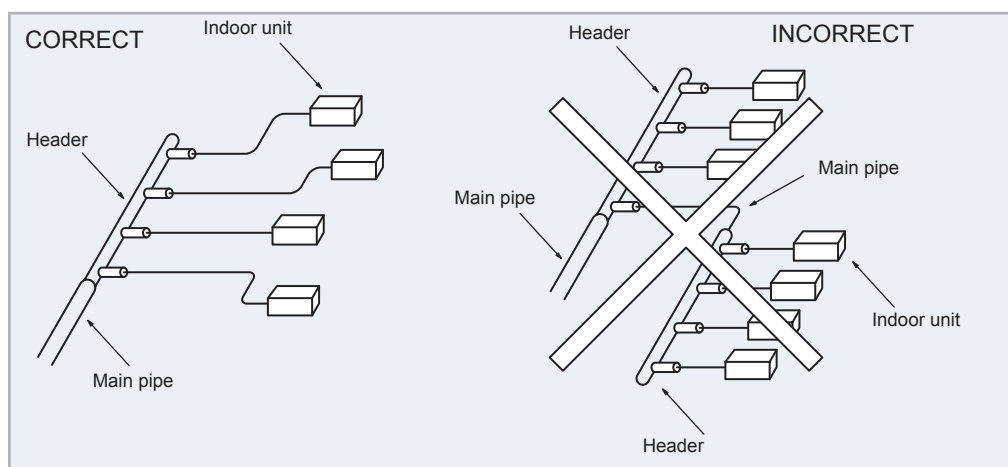
1 Gas/Liquid piping length should be the same. Gas/liquid piping should be installed in the same system.

2 Use the multi-kit for the indoor unit branch line.

◆ Header distribution

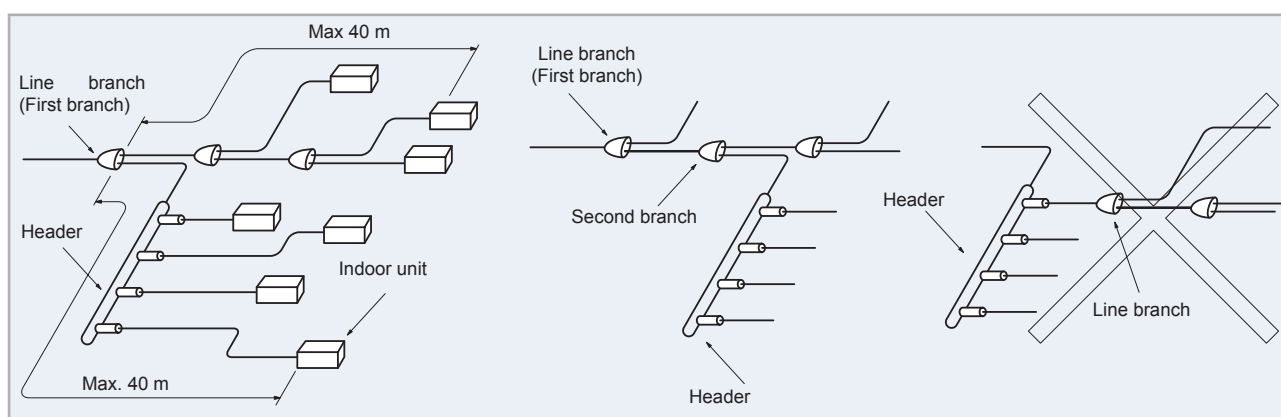
Branch method

Do not connect two header branches consecutively.



Combination branch

- It is possible to connect the header to the second branch, when the first branch is also the line branch.
- Do not connect a line branch to a header branch.

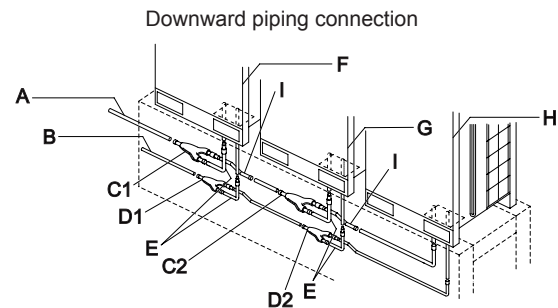
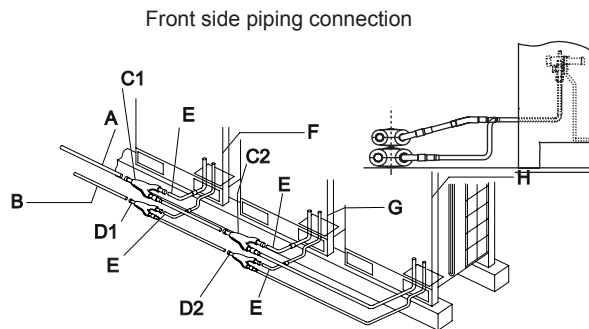


11.6 SET FREE MODULAR FSXN1E-FSXNHE SERIES

11.6.1 Example of installation

For heat pump systems (2 pipes)

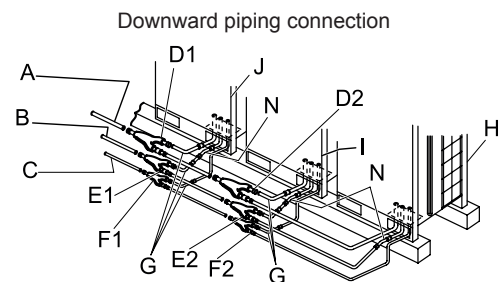
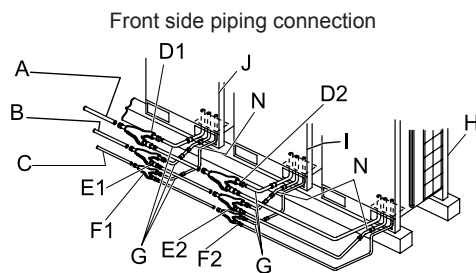
- For 3 units combination



A	Gas pipe (field-supplied)	D1	Liquid connection kit 1	G	Outdoor unit 2
B	Liquid pipe (field-supplied)	D2	Liquid connection kit 2	H	Outdoor unit 3
C1	Gas connection kit 1	E	Accessory for connection of pipes (L-shaped)	I	Accessory for connection of pipes (Z-shaped)
C2	Gas connection kit 2	F	Outdoor unit 1		

For heat recovery systems (3 pipes)

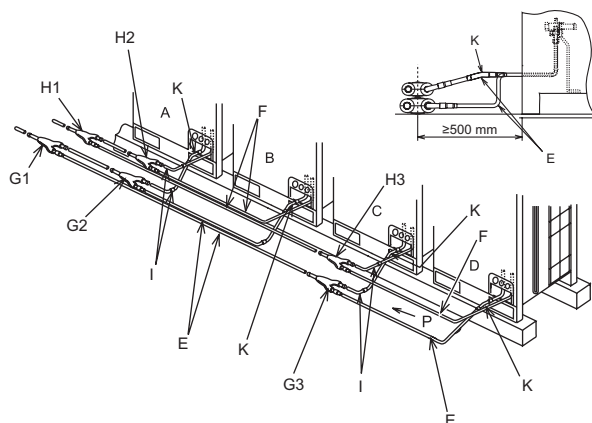
- For 3 units combination



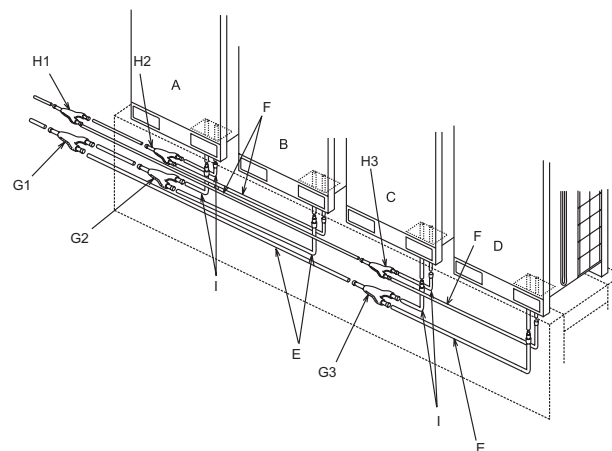
A	Gas pipe, low pressure (field-supplied)	E1	Gas connection kit, high pressure 1	H	Outdoor unit 3
B	Gas pipe, high pressure (field-supplied)	E2	Gas connection kit, high pressure 2	I	Outdoor unit 2
C	Liquid pipe (field-supplied)	F1	Liquid connection kit 1	J	Outdoor unit 1
D1	Gas connection kit, low pressure 1	F2	Liquid connection kit 2	K	Accessory for connection of pipes (Z-shaped)
D2	Gas connection kit, low pressure 2	G	Accessory for connection of pipes (L-shaped)	N	Accessory for connection of pipes

For heat pump systems (2 pipes)

Front side piping connection



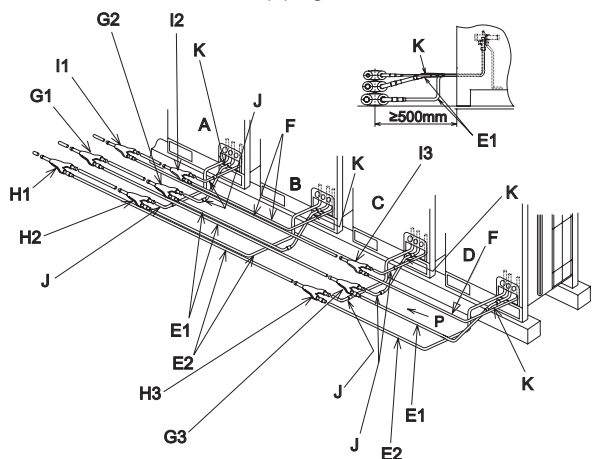
Downward piping connection



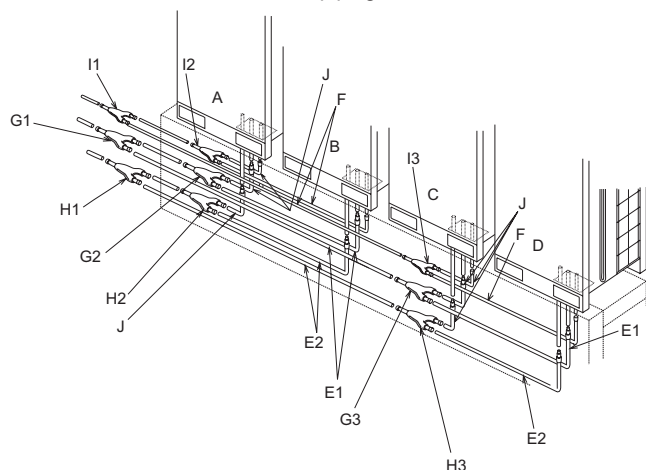
A	Outdoor unit A	F	Liquid piping (field-supplied)	H2	Piping connection kit 2 (liquid)
B	Outdoor unit B	G1	Piping connection kit 1 (high/low pressure gas)	H3	Piping connection kit 3 (liquid)
C	Outdoor unit C	G2	Piping connection kit 2 (high/low pressure gas)	I	Accessory pipe (L-shaped)
D	Outdoor unit D	G3	Piping connection kit 3 (high/low pressure gas)	J	Accessory pipe (Z-shaped)
E	High/Low pressure gas piping (field-supplied)	H1	Piping connection kit 1 (liquid)	K	Accessory pipe

For heat recovery systems (3 pipes)

Front side piping connection



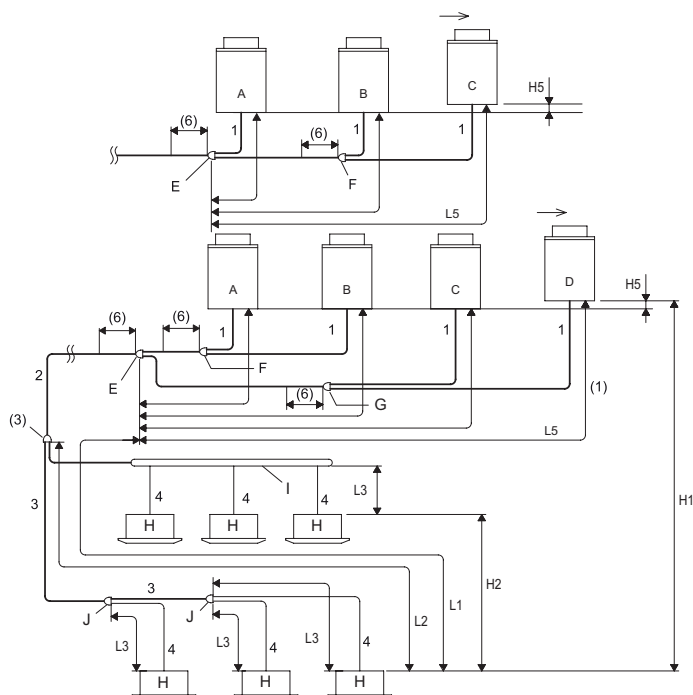
Downward piping connection



A	Outdoor unit A	F	Liquid piping (field-supplied)	H3	Piping connection kit 3 (low pressure gas)
B	Outdoor unit B	G1	Piping connection kit 1 (high/low pressure gas)	I1	Piping connection kit 1 (liquid)
C	Outdoor unit C	G2	Piping connection kit 2 (high/low pressure gas)	I2	Piping connection kit 2 (liquid)
D	Outdoor unit D	G3	Piping connection kit 3 (high/low pressure gas)	I3	Piping connection kit 3 (liquid)
E1	High/low pressure gas piping (field-supplied)	H1	Piping connection kit 1 (low pressure gas)	J	Accessory pipe (L-shaped)
E2	Low pressure gas piping (field-supplied)	H2	Piping connection kit 2 (low pressure gas)	K	Accessory pipe

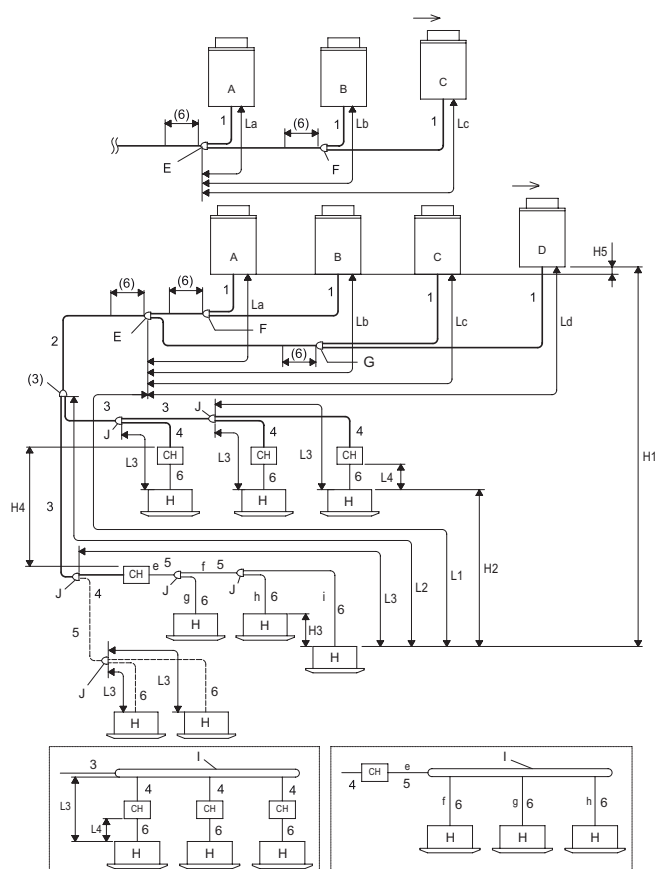
11.6.2 Size of pipes (ø mm)

For heat pump systems (2 pipes)



A	Main outdoor unit
B	Secondary outdoor units
C	
D	
E	Connection kit 1
F	Connection kit 2
G	Connection kit 3
H	Indoor units
I	Header branch
J	Multi-kit after first branch

For heat recovery systems (3 pipes)



A	Main outdoor unit
B	Secondary outdoor units
C	
D	
E	Connection kit 1
F	Connection kit 2
G	Connection kit 3
H	Indoor units
I	Header branch
J	Multi-kit after first branch

3 pipes (high and low pressure gas, liquid)

2 pipes (gas, liquid)

2 pipes (low pressure gas, liquid)

For heat pump systems (2 pipes)

- 1 Pipe diameter for the outdoor unit.
- 2 Diameter of the main pipe (from the base unit or connection kit 1 to the first branch)⁽²⁾.

Outdoor unit (HP)	Equivalent pipe length < 100 m		Outdoor unit (HP)	Equivalent pipe length < 100 m	
	Gas	Liquid		Gas	Liquid
5	ø15.88	ø9.52	16	ø28.58	ø12.70
(6/8)	ø19.05	ø9.52	(18-24)	ø28.58	ø15.88
10	ø22.20	ø9.52	(26-34)(24-P)	ø31.75	ø19.05
(12/14)(12-P)	ø25.40	ø12.7	(36-54)	ø38.1	ø19.05

- 3 Pipe diameter after first branch⁽³⁾.

Total indoor unit capacity after the first branch (HP)	Gas	Liquid	Total indoor unit capacity after the first branch (HP)	Gas	Liquid
< 6	ø15.88	ø9.52	(16-17.99)	ø28.58	ø12.7
(6-8.99)	ø19.05	ø9.52	(18-25.99)	ø28.58	ø15.88
(9-11.99)	ø22.2	ø9.52	(26-35.99)	ø31.75	ø19.05
(12-15.99)	ø25.4	ø12.7	≥ 36	ø38.1	ø19.05

- 4 Pipe diameter between multikit and indoor unit⁽⁴⁾.

Indoor unit (HP)	Gas	Liquid	Indoor unit (HP)	Gas	Liquid
(0.8-1.5)	ø12.7	ø6.35 ⁽⁵⁾	10.0	ø22.2	ø9.52
2.0	ø15.88	ø6.35 ⁽⁵⁾	16.0	ø28.58	ø12.7
(2.5-6.0)	ø15.88	ø9.52	20.0	ø28.58	ø15.88
8.0	ø19.05	ø9.52			

For heat recovery systems (3 pipes)

- 1 Pipe diameter for the outdoor unit.
- 2 Diameter of the main pipe (from the base unit or connection kit 1 to the first branch) (3 pipes)⁽²⁾.

Outdoor unit (HP)	Gas, low pressure	Gas, high/low pressure	Liquid	Outdoor unit (HP)	Gas, low pressure	Gas, high/low pressure	Liquid
5	ø15.88	ø12.7	ø9.52	(22/24)	ø28.58	ø25.4	ø15.88
(6/8)	ø19.05	ø15.88	ø9.52	26	ø31.75	ø25.4	ø19.05
10	ø22.2	ø19.05	ø9.52	(28-34)	ø31.75	ø28.58	ø19.05
(12/14)	ø25.4	ø22.2	ø12.7	36	ø38.1	ø28.58	ø19.05
16	ø28.58	ø22.2	ø12.7	38-54	ø38.1	ø31.75	ø19.05
(18/20)	ø28.58	ø22.2	ø15.88				

- 3 Pipe diameter after first branch (3 pipes)⁽³⁾.

Total HP indoor unit	Gas, low pressure	Gas, high/low pressure	Liquid	Total HP indoor unit	Gas, low pressure	Gas, high/low pressure	Liquid
< 6	ø15.88	ø12.7	ø9.52	(18-21.99)	ø28.58	ø22.2	ø15.88
(6-8.99)	ø19.05	ø15.88	ø9.52	(22-25.99)	ø28.58	ø25.4	ø15.88
(9-11.99)	ø22.2	ø19.05	ø9.52	(26-35.99)	ø31.75	ø28.58	ø19.05
(12-15.99)	ø25.4	ø22.2	ø12.7	≥36	ø38.1	ø31.75	ø19.05
(16-17.99)	ø28.58	ø22.2	ø12.7				

4 Pipe diameter between the CH unit and the multikit (3 pipes and 2 pipes)⁽⁹⁾.

CH unit	Maximum combination of indoor units ⁽⁸⁾	Available combination of indoor units capacity (H)	3 pipes		
			Gas, low pressure	Gas, high/low pressure	Liquid
CH-6.0N(1/2)	7	0.8 - 4.0	ø15.88	ø12.7	ø9.52
		4.1 - 6.0	ø19.05	ø15.88	ø9.52
CH-10.0N(1/2)	8	6.1 - 8.0	ø19.05	ø15.88	ø9.52
		8.1 - 10.0	ø22.2	ø19.05	ø9.52

5 Pipe diameter for 2 pipes and multikit.

Total HP indoor unit	Gas	Liquid	Total HP indoor unit	Gas	Liquid
< 6	ø15.88	ø9.52	(12-15.99)	ø25.4	ø12.7
(6-8.99)	ø19.05	ø9.52	(16-17.99)	ø28.58	ø12.7
(9-11.99)	ø22.2	ø9.52	(18-25.99)	ø28.58	ø15.88

6 Pipe diameter between multikit and indoor unit⁽⁴⁾.

HP indoor unit	Gas	Liquid	HP indoor unit	Gas	Liquid
(0.8-1.5)	ø12.7	ø6.35 ⁽⁵⁾	8.0	ø19.05	ø9.52
2.0	ø15.88	ø6.35 ⁽⁵⁾	10.0	ø22.2	ø9.52
(2.5-6.0)	ø15.88	ø9.52			

11.6.3 Pipe working conditions

For heat pump systems (2 pipes)

Part		Make	Permitted pipe length ⁽⁷⁾	
			≤ Recommended number of connected indoor units	≥ Recommended number of connected indoor units
Total pipe length		Current total liquid pipe length	≤ 1000 m ⁽⁸⁾	≤ 300 m
Maximum pipe length	Current length	L1	≤ 165 m	≤ 165 m
	Equivalent length		≤ 190 m	≤ 190 m
Maximum pipe length between the multikit of the first branch and each indoor unit		L2	≤ 90 m	≤ 40 m
Maximum pipe length between each multikit and each indoor unit		L3	≤ 40 m	≤ 30 m
Pipe length between connection kit 1 and each outdoor unit		L5	≤ 10 m	≤ 10 m
Difference in height between outdoor and indoor units	Highest outdoor unit	H1	≤ 50 m ⁽⁹⁾	≤ 50 m ⁽⁹⁾
	Lowest outdoor unit		≤ 40 m	≤ 40 m
Difference in height between indoor units		H2	≤ 30 m	≤ 30 m
Difference in height between outdoor units		H5	≤ 0.1 m	≤ 0.1 m

For heat recovery systems (3 pipes)

Part		Make	Permitted pipe length ⁽¹³⁾	
			≤ Recommended number of connected indoor units	≥ Recommended number of connected indoor units
Total pipe length		Current total liquid pipe length	≤ 1000 m ⁽¹⁴⁾	≤ 300 m
Maximum pipe length	Current length	L1	≤ 165 m	≤ 165 m
	Equivalent length		≤ 190 m	≤ 190 m
Maximum pipe length between the multikit of the first branch and each indoor unit		L2	≤ 90 m	≤ 40 m
Maximum pipe length between each multikit and each indoor unit		L3	≤ 40 m	≤ 30 m
Total pipe length between the CH unit and each indoor unit		L4 *a+b+c+d+e	CH-6.0N(1/2): ≤ 30 m	CH-6.0N(1/2): ≤ 30 m
			CH-10.0N(1/2): ≤ 10 m	CH-10.0N(1/2): ≤ 10 m
Pipe length between connection kit 1 and each outdoor unit		L5	≤ 10 m	≤ 10 m
Difference in height between outdoor and indoor units	Highest outdoor unit	H1	≤ 50 m	≤ 50 m
	Lowest outdoor unit		≤ 40 m	≤ 40 m
Difference in height between indoor units		H2	≤ 15 m	≤ 15 m
Difference in height between indoor units using the same CH unit		H3	≤ 4 m	≤ 4 m
Difference in height between CH units		H4	≤ 15 m	≤ 15 m
Difference in height between outdoor units		H5	≤ 0.1 m	≤ 0.1 m

i NOTE**For heat pump systems (2 pipes)**

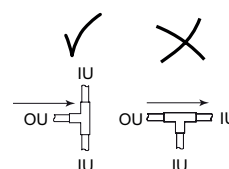
- ⁽¹⁾ The connection kit is taken into account from the side of the indoor unit (as connection kit 1).
- ⁽²⁾ When the maximum equivalent refrigerant pipe length (L1) from the outdoor unit/connection kit 1 to the indoor unit is greater than 100 m, the diameter of the gas/liquid pipe from the outdoor unit/connection kit 1 to the first branch must be increased using the reducer (field-supplied).
- ⁽³⁾ Where the refrigerant pipe length is greater than 100 m, the pipe diameter does not have to be increased after the first branch. Where the size of the multikit is greater than that of the first branch, adjust the size of the multikit to the first branch. Where the diameter of the pipe selected after the first branch is greater than the diameter of the pipe after it, use the same diameter as the inlet pipe.
- ⁽⁴⁾ The pipe diameter -4- must be the same as that of the indoor unit connection.
- ⁽⁵⁾ Where the liquid pipe length is greater than 15 m, use 9.52 mm diameter pipe and a reducer (field-supplied).
- ⁽⁶⁾ Keep a direct distance of 500 mm or greater after the connection kit.
- ⁽⁷⁾ The installation conditions for the refrigerant pipes are different depending on the number of indoor units connected.
- ⁽⁸⁾ The total pipe length permitted must be less than 1000 m due to the maximum additional refrigerant charge limitation.

HP	5 - 10	12	14 and 16	18 - 24	26 - 54
Maximum additional refrigerant charge (kg)	28	36	40	51	63

- ⁽⁹⁾ Longer piping up to 90 m is available only for base units of FSXNH(E) / FSXN1E series. (Dip switch setting required). In the case of base units of FSXN1E series: only for the maximum number of connectable indoor units: (RAS-8FSXN1E ≤ 14), (RAS-10FSXN1E ≤ 18), (RAS-12FSXN1E ≤ 21), (RAS-14FSXN1E ≤ 26), (RAS-16FSXN1E ≤ 29).

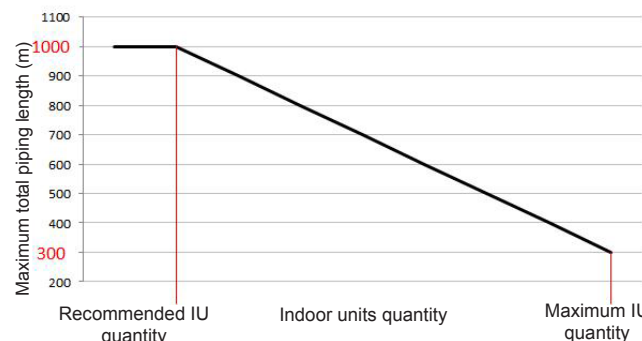
For heat recovery systems (3 pipes)

- ⁽¹⁾ The connection kit is taken into account from the side of the indoor unit (as connection kit 1).
- ⁽²⁾ When the maximum equivalent refrigerant pipe length (L1) from the outdoor unit/connection kit 1 to the indoor unit is greater than 100 m, the diameter of the liquid pipe from the outdoor unit/connection kit 1 to the first branch must be increased using the reducer (field-supplied).
- ⁽³⁾ Where the refrigerant pipe length is greater than 100 m, the pipe diameter does not have to be increased after the first branch. Where the size of the multikit is greater than that of the first branch, adjust the size of the multikit to the first branch. Where the diameter of the pipe selected after the first branch is greater than the diameter of the pipe after it, use the same diameter as the inlet pipe.
- ⁽⁴⁾ The pipe diameter -6- must be the same as that of the indoor unit connection.
- ⁽⁵⁾ Where the liquid pipe length is greater than 15 m, use 9.52 mm diameter pipe and a reducer (field-supplied).
- ⁽⁶⁾ Keep a straight distance of 500 mm or greater after the connection kit.
- ⁽⁷⁾ In the case of branches, where the pipe length between the three-pipe branch -F- and the furthest indoor unit exceeds 5 m, use a T-branch pipe for the three-branch liquid pipe (corresponding to the same diameter, as per JIS B8607).



- ⁽⁸⁾ Where the number of connectable indoor units is greater than four, the high/low-pressure gas, gas and liquid pipes, -4-, -5- and -6-, must be increased by one measurement, respectively.

- ⁽⁹⁾ The liquid pipe does not have to be connected to the CH unit. See Table 6 for the pipe diameter between the multikit and the indoor unit.
- ⁽¹⁰⁾ Where the combination of indoor unit capacities is 10 HP for the CH-10.0N(1/2) unit, performance will drop by approximately 5% in refrigeration and 10% in heating.
- ⁽¹¹⁾ The excess total capacity may lead to insufficient performance and abnormal operating noise. Check that the installation is within the total capacity values.
- ⁽¹²⁾ For operations in cooling mode only, connect the indoor units using gas and liquid pipes (without the CH unit). The total capacity in cooling mode only must be less than 50% the total capacity of the indoor units.
- ⁽¹³⁾ The installation conditions for the refrigerant pipes are different depending on the number of indoor units connected.
- ⁽¹⁴⁾ The total pipe length permitted must be less than 1000 m due to the maximum additional refrigerant charge limitation. In case "Recommended IU quantity" is exceeded, next graph restriction applies to total piping length:



Make sure to calculate a lineal proportion when working out intermediate cases. In case the total pipe length is longer than 300m, capacity may drop progressively as a result of heat loss through the pipes.

- ⁽¹⁵⁾ Where the branch is after the CH unit and the capacity of the connected indoor unit is (0.8-1.5) HP, use a 15.88 mm diameter for the gas pipe.

i NOTE

- Check that the gas pipe and the liquid pipe are equivalent in terms of length and installation system.
- Use the multikit system for branching of the indoor units and the CH unit.
- Install the indoor unit and the multikit according to the instructions given in this manual.

Where the length of pipe L3 between each multikit and each indoor unit is considerably longer than on another indoor unit, the refrigerant will not flow correctly and performance is lower in comparison with other models (recommended pipe length: up to 15 m).

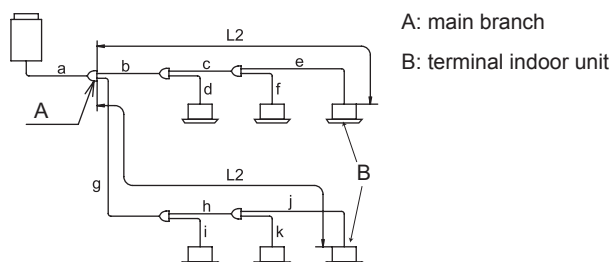
11.6.4 Pipe branching restrictions

Heat Pump Systems (2 pipes) and Heat Recovery Systems (3 pipes)

In the case that the piping length L2 from the Multi-Kit at the first branch to the farthest indoor unit is over 40m, follow the instructions below when performing the field-supplied piping work.

Example 1

Piping length from the multikit at the first branch to the terminal Indoor Units is within 40-90 m



- 1 In the case that the piping length L2 is over 40m, that size of gas and liquid lines "b and c" or "g and h" should be increased by one size with reducers (field-supplied).
- If (a) is smaller than (b, c) after increasing the size, increase the size of (a) to the same size as (b, c).
- 2 The difference between the piping length from the first branch to the farthest indoor unit and the piping length from the first branch to the closest indoor unit must be within 40m.

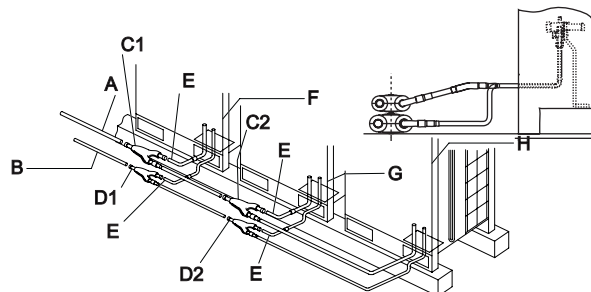
$$*(g+h+j)-(b+d) \leq 40m$$

11.7 SET FREE MODULAR FSN3E

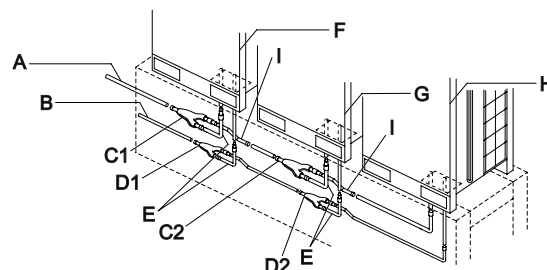
11.7.1 Example of installation

- For 3 units combination

Front side piping connection



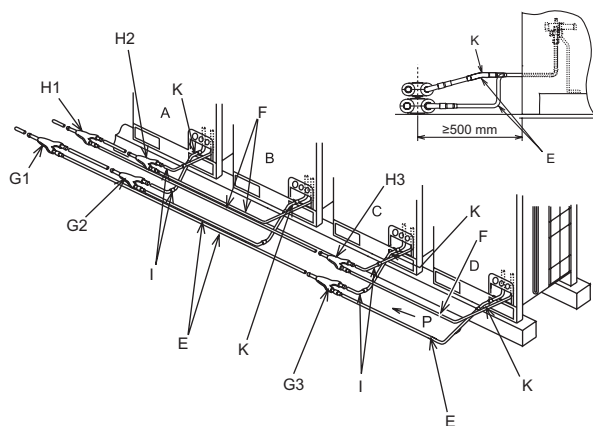
Downward piping connection



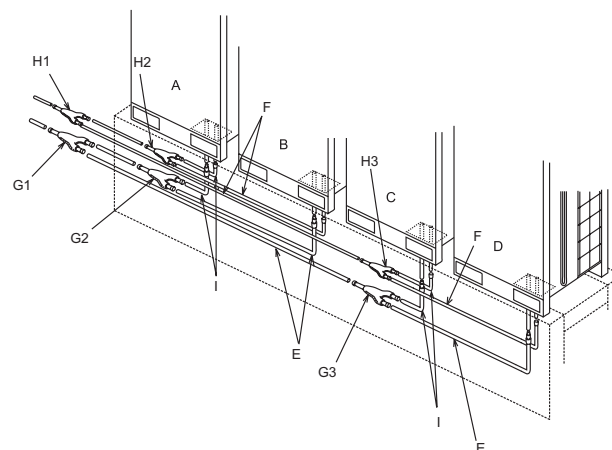
A	Gas pipe (field-supplied)	D1	Liquid connection kit 1	G	Outdoor unit 2
B	Liquid pipe (field-supplied)	D2	Liquid connection kit 2	H	Outdoor unit 3
C1	Gas connection kit 1	E	Accessory for connection of pipes (L-shaped)	I	Accessory for connection of pipes (Z-shaped)
C2	Gas connection kit 2	F	Outdoor unit 1		

- For 4 units combination

Front side piping connection

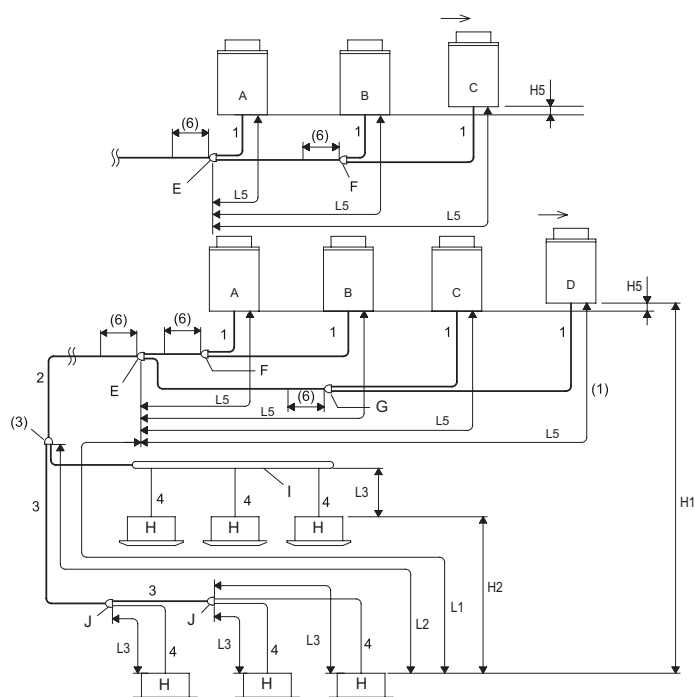


Downward piping connection



A	Outdoor unit A	F	Liquid piping (field-supplied)	H2	Piping connection kit 2 (liquid)
B	Outdoor unit B	G1	Piping connection kit 1 (Gas)	H3	Piping connection kit 3 (liquid)
C	Outdoor unit C	G2	Piping connection kit 2 (Gas)	I	Accessory pipe (L-shaped)
D	Outdoor unit D	G3	Piping connection kit 3 (Gas)	J	Accessory pipe (Z-shaped)
E	Gas piping (field-supplied)	H1	Piping connection kit 1 (liquid)	K	Accessory pipe

11.7.2 Size of pipes (Ø mm)



A	Main outdoor unit
B	Secondary outdoor units
C	
D	
E	Connection kit 1
F	Connection kit 2
G	Connection kit 3
H	Indoor units
I	Header branch
J	Multi-kit after first branch

- 1 Pipe diameter for the outdoor unit.
- 2 Diameter of the main pipe (from the base unit or connection kit 1 to the first branch)⁽²⁾.

Outdoor unit (HP)	Equivalent pipe length < 100 m	
	Gas	Liquid
(6/8)	ø19.05	ø9.52
10	ø22.20	ø9.52
(12/14)	ø25.40	ø12.7
16	ø28.58	ø12.70

Outdoor unit (HP)	Equivalent pipe length < 100 m	
	Gas	Liquid
(18-24)	ø28.58	ø15.88
(26-34)	ø31.75	ø19.05
(36-54)	ø38.1	ø19.05

- 3 Pipe diameter after first branch⁽³⁾.

Total indoor unit capacity after the first branch (HP)	Gas	Liquid
< 6	ø15.88	ø9.52
(6-8.99)	ø19.05	ø9.52
(9-11.99)	ø22.2	ø9.52
(12-15.99)	ø25.4	ø12.7

Total indoor unit capacity after the first branch (HP)	Gas	Liquid
(16-17.99)	ø28.58	ø12.7
(18-25.99)	ø28.58	ø15.88
(26-35.99)	ø31.75	ø19.05
≥ 36	ø38.1	ø19.05

- 4 Pipe diameter between multikit and indoor unit⁽⁴⁾.

Indoor unit (HP)	Gas	Liquid
(0.8-1.5)	ø12.7	ø6.35 ⁽⁵⁾
2.0	ø15.88	ø6.35 ⁽⁵⁾
(2.5-6.0)	ø15.88	ø9.52
8.0	ø19.05	ø9.52

Indoor unit (HP)	Gas	Liquid
10.0	ø22.2	ø9.52
16.0	ø28.58	ø12.7
20.0	ø28.58	ø15.88

Pipe working conditions

Part		Make	Permitted pipe length ⁽⁷⁾	
			≤ Recommended number of connected indoor units	≥ Recommended number of connected indoor units
Total pipe length		Current total liquid pipe length	≤ 1000 m ⁽⁸⁾	≤ 300 m
Maximum pipe length	Current length	L1	≤ 165 m	≤ 165 m
	Equivalent length		≤ 190 m	≤ 190 m
Maximum pipe length between the multikit of the first branch and each indoor unit		L2	≤ 90 m	≤ 40 m
Maximum pipe length between each multikit and each indoor unit		L3	≤ 40 m	≤ 30 m
Pipe length between connection kit 1 and each outdoor unit		L5	≤ 10 m	≤ 10 m
Difference in height between outdoor and indoor units	Highest outdoor unit	H1	≤ 50 m	≤ 50 m
	Lowest outdoor unit		≤ 40 m	≤ 40 m
Difference in height between indoor units		H2	≤ 15 m	≤ 15 m
Difference in height between outdoor units		H5	≤ 0.1 m	≤ 0.1 m

** NOTE**

- ⁽¹⁾ The connection kit is taken into account from the side of the indoor unit (as connection kit 1).
- ⁽²⁾ When the maximum equivalent refrigerant pipe length (L1) from the outdoor unit/connection kit 1 to the indoor unit is greater than 100 m, the diameter of the gas/liquid pipe from the outdoor unit/connection kit 1 to the first branch must be increased using the reducer (field-supplied).
- ⁽³⁾ Where the refrigerant pipe length is greater than 100 m, the pipe diameter does not have to be increased after the first branch. Where the size of the multikit is greater than that of the first branch, adjust the size of the multikit to the first branch. Where the diameter of the pipe selected after the first branch is greater than the diameter of the pipe after it, use the same diameter as the inlet pipe.
- ⁽⁴⁾ The pipe diameter -4- must be the same as that of the indoor unit connection.
- ⁽⁵⁾ Where the liquid pipe length is greater than 15 m, use 9.52 mm diameter pipe and a reducer (field-supplied).
- ⁽⁶⁾ Keep a direct distance of 500 mm or greater after the connection kit.
- ⁽⁷⁾ The installation conditions for the refrigerant pipes are different depending on the number of indoor units connected.
- ⁽⁸⁾ The total pipe length permitted must be less than 1000 m due to the maximum additional refrigerant charge limitation.

HP	8/10	12	14 and 16	18 - 24	26 - 54
Maximum additional refrigerant charge (kg)	28	36	40	51	63

- Check that the gas pipe and the liquid pipe are equivalent in terms of length and installation system.
- Use the multikit system for branching of the indoor units
- Install the indoor unit and the multikit according to the instructions given in this manual.

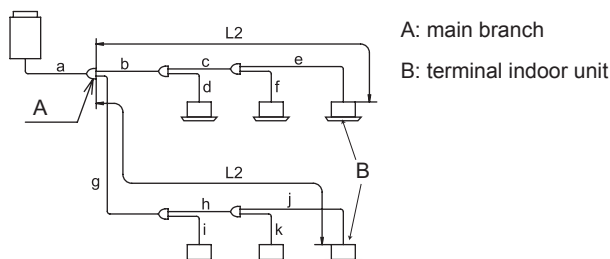
Where the length of pipe L3 between each multikit and each indoor unit is considerably longer than on another indoor unit, the refrigerant will not flow correctly and performance is lower in comparison with other models (recommended pipe length: up to 15 m).

11.7.3 Pipe branching restrictions

In the case that the piping length L2 from the Multi-Kit at the first branch to the farthest indoor unit is over 40m, follow the instructions below when performing the field-supplied piping work.

Example 1

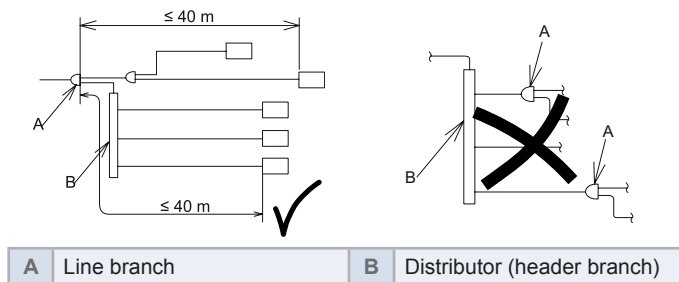
Piping length from the multikit at the first branch to the terminal Indoor Units is within 40-90 m



- 1 In the case that the piping length L2 is over 40m, that size of gas and liquid lines “b and c” or “g and h” should be increased by one size with reducers (field-supplied).
 - If (a) is smaller than (b, c) after increasing the size, increase the size of (a) to the same size as (b, c).
- 2 The difference between the piping length from the first branch to the farthest indoor unit and the piping length from the first branch to the closest indoor unit must be within 40m.

$$*(g+h+j)-(b+d) < 40m$$

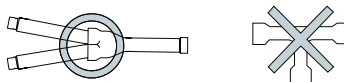
Header branch can also be used after the second branch. Do not connect a line branch to a header branch. When using header branch, make sure that the piping length L2 from the Multi-Kit at the first branch to the farthest indoor unit is within 40m.



11.8 LINE BRANCH AND HEADER BRANCH INSTALLATION

Install the Distributor supplied by HITACHI on request.

A tee can not be installed instead of a branch pipe.



Installing the distributor

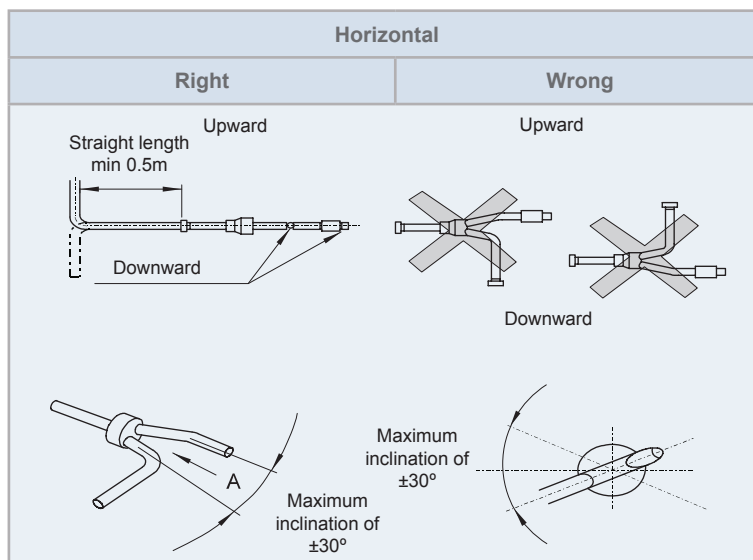
Fix the branch pipe horizontally to the pillar, wall or ceiling. Piping must not be fixed rigidly to the wall as thermal expansion and contraction can cause pipe fracture.

◆ Correct position of distributor E-SN series

- Horizontal installation

Locate the branch pipes on the same horizontal plane. (Inclination within 30°)

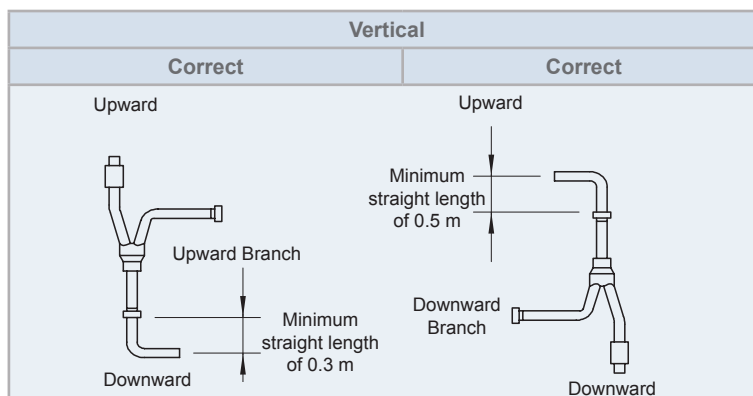
Make the straight length a minimum of 0.5m after the vertical bend.



- Vertical installation

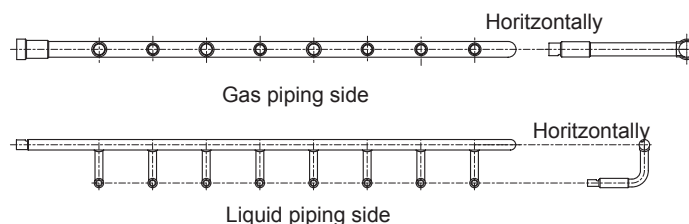
Straight length of the pipe connection on the outdoor unit side is made as follows:

- The collective pipe connection part is installed upward, the straight length must be minimum 0.5m.
- The collective pipe connection part is installed downward, the straight length must be minimum 0.3m.



◆ Correct position of distributor MH series

Perform to install horizontally always (Example.: In case of model MH-108AN)



⚠ CAUTION

Seal the end of branch pipes which are not connected, by brazing factory supplied closing pipes.

11.9 VACUUM PUMPING

- Connect the gauge manifold using charging hoses with a vacuum pump or a nitrogen cylinder to the check joints of the liquid line and the gas line stop valve.
- Check for any gas leakage at the flare nut connection, by using nitrogen gas to increase the pressure at 4.15 MPa for outdoor units inside of the field-supplied piping.
- Connect a manifold gauge and vacuum pump to the check joints*.

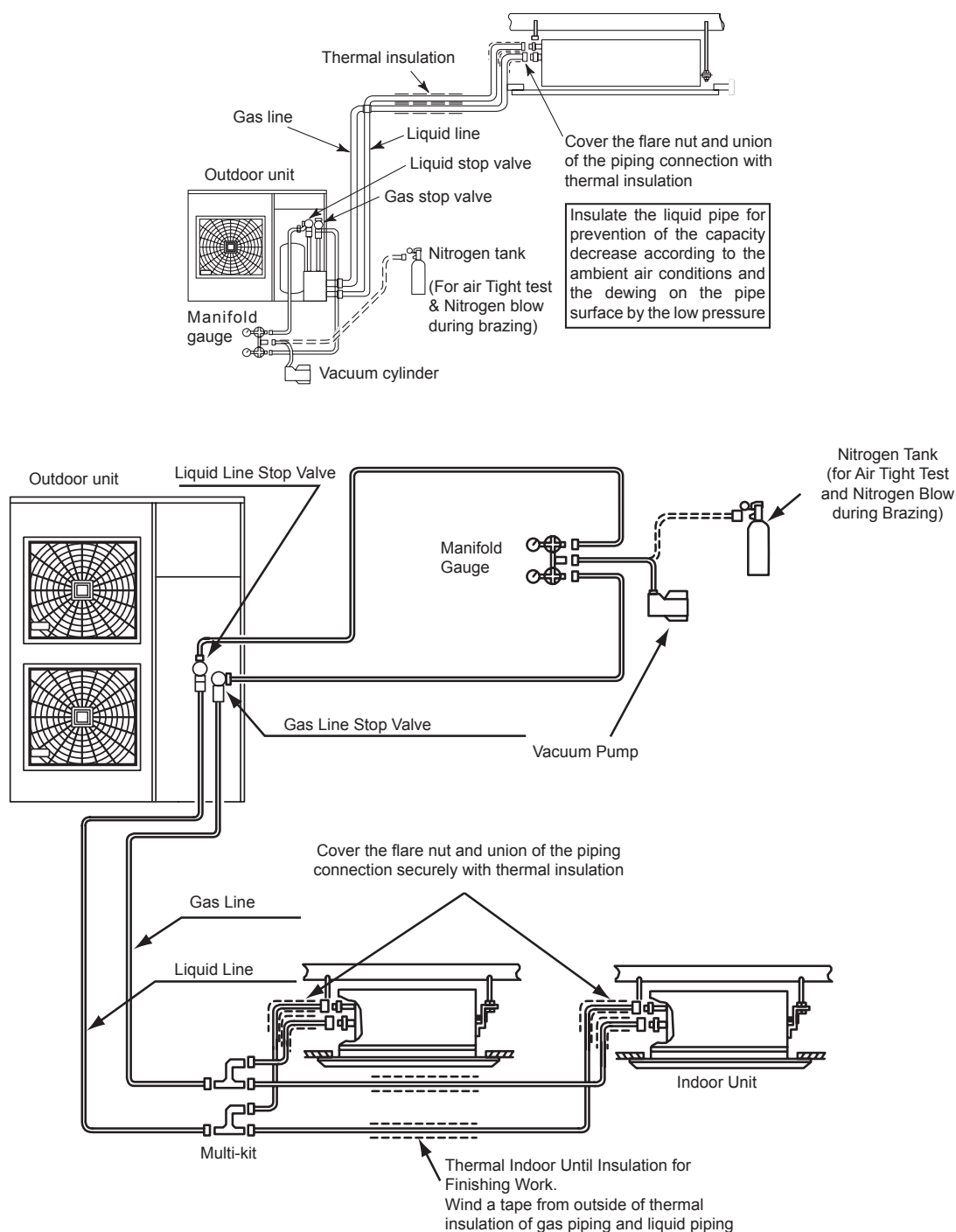
Heat pump system	High/low pressure gas stop valve
	Liquid stop valve
Heat recovery system	High/low pressure gas stop valve
	Low pressure gas stop valve
	Liquid stop valve

- Continue vacuum pumping work until the pressure reaches -0.1MPa (-756mmHg) or lower for one to two hours.
- After vacuum pumping work, stop the vacuum pumping and leave the gauge for one hour. Check to ensure that the pressure in the manifold gauge does not increase.
- If the pressure inside the gauge does not reach -0.1MPa (-756mmHg), it is considered that there is a gas leakage. Check for any gas leakage once again. If no leakage exists, operate the vacuum pumping for one to two hours. If moisture remains inside the pipes, the compressor may be damaged.
- Tighten the caps of check joint according to the specified torque after the vacuum pumping work.

i NOTE

- This system is only for the refrigerant R410A. The manifold gauge and the charging hose should be exclusive use for R410A.
- If tools or measuring instruments come into contact with the refrigerant, use the tools or the measuring instruments exclusively for R410A.
- DO NOT perform vacuuming pumping work with valves of the outdoor units open. Otherwise, the refrigerant charged before shipment may leak and it may result in failure.
- When the spindle cap for stop valve is removed, the gas accumulated at O-ring or screws is released and may make sound. This phenomenon is NOT a gas leakage.
- If vacuum degree of -0.1 MPa (-756 mmHg) is not available, it is considered of gas leakage or entering moisture. Check for any gas leakage once again. If no leakage exists, operate the vacuum pump for more than one to two hours.

Examples of vacuum layout



Insulate the liquid pipe for prevention of the capacity decrease according to the ambient air conditions and the dewing on the pipe surface by the low pressure.

Check to ensure that there is no gas leakage. When large amount of the refrigerant leaks, the troubles as follows may occur.

- 1 Oxygen Deficiency
- 2 Generation of Harmful Gas Due to Chemical Reaction with fire.

12 CHARGING 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 test.

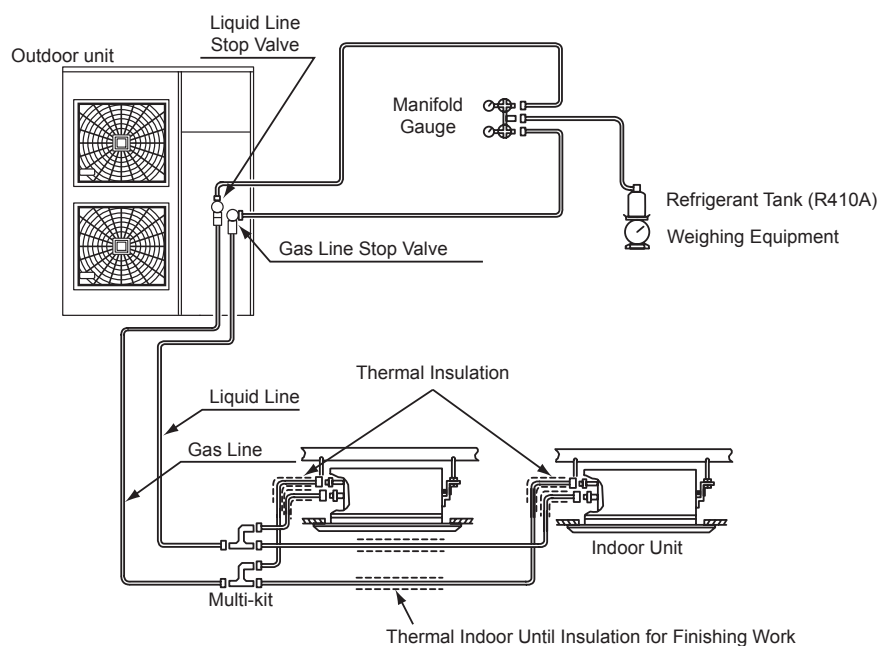
12.1 REFRIGERANT CHARGING WORK

- After vacuum pumping work, keep the gas valve and liquid valve fully closed.
- Check if the system needs an additional charge of refrigeration.
- If the total refrigerant amount of the system is insufficient, charge the additional refrigerant, which amount is calculated, from the check joint of the liquid valve. (Additional refrigerant tolerance shall be ± 0.5 kg.) according to follows:
 - Fully open the gas valve.
 - For charging refrigerant, connect the gauge manifold using charging hoses with a refrigerant charging cylinder to the check joint of the liquid line stop valve.
 - Charge the proper quantity of refrigerant according to the piping length (Calculate the quantity of the refrigerant charge). Charged quantity needs to be controlled by a weighing equipment
 - Charge refrigerant by opening the gauge manifold valve. Charge the required refrigerant by operating the system in cooling.
 - With the gas line stop valve fully open, slightly open the liquid line stop valve.
 - Operate the compressor at the cooling mode. At this time, liquid valve is slightly opened. Continue cooling operation for more than 10 minutes to circulate the refrigerant.
 - Fully open the gas valve and liquid valve.

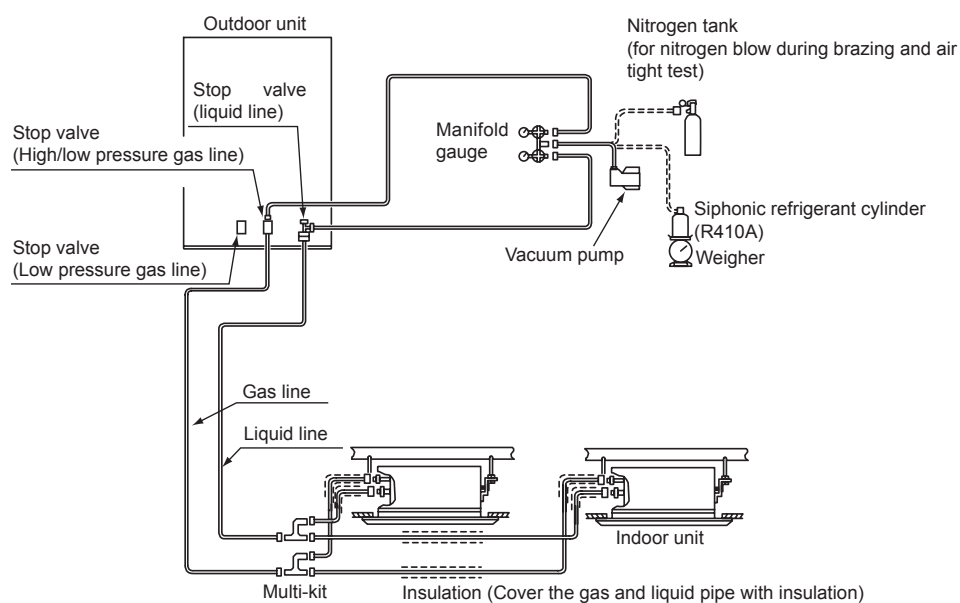
CAUTION

- *If the total refrigerant amount is excessive or insufficient, the compressor will be damaged.*
- *Be sure to charge the refrigerant in the liquid condition.*
- *The additional refrigerant charge must be performed from the check joint of the liquid valve. If the additional refrigerant is charged from the check joint of the gas valve, the compressor will be damaged.*
- *Insulate the liquid pipe for prevention of the capacity decrease according to the ambient air conditions and the dewing on the pipe surface by the low pressure. Insulate the flare nut and union of the piping connection.*
- *Check for refrigerant leakage in detail to ensure that there is no gas leakage. When large amount of the refrigerant leaks, the troubles as follows may occur.*
 - Oxygen Deficiency. it will cause difficulty with breathing or harmful gases would occur
 - Generation of Harmful Gas Due to Chemical Reaction with fire.
- *An excess or a shortage of refrigerant is the main cause of trouble to the units. Charge the correct refrigerant quantity according to the description of label at the inside of service cover.*
- *Never use the refrigerant charged in the outdoor unit for air purging. If used, insufficient refrigerant will lead to failure.*

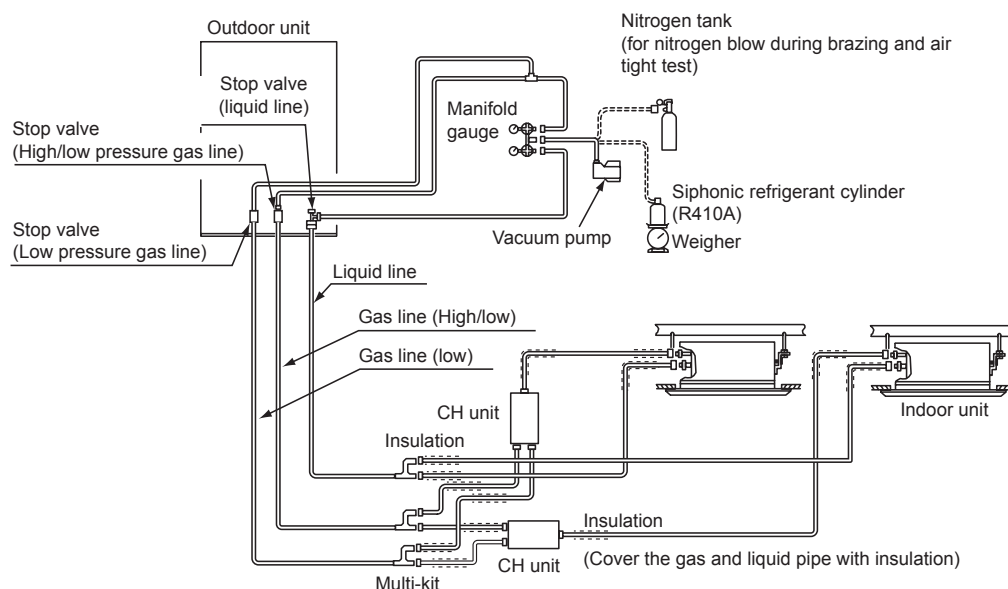
◆ Examples of vacuum layout



◆ Set free heat pump system layout example



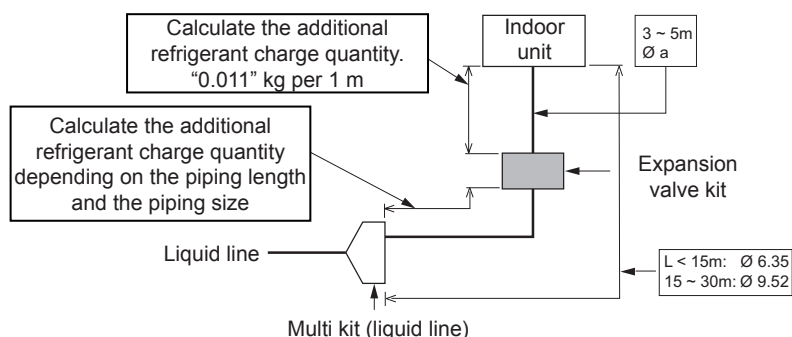
◆ Set free heat recovery system layout example



12.1.1 Additional refrigerant calculation for wall type (RPK-FSNH3M Series) with the expansion valve kit

The additional refrigerant calculation for wall type (RPK-FSNH3M Series) with the expansion valve kit is required.

Firstly calculate the additional refrigerant amount for the liquid pipe between Multi-Kit and the expansion valve kit according to the piping length and diameter. Then, calculate the additional refrigerant amount for the liquid pipe between indoor unit and the expansion valve kit (Pipe diameter: $\varnothing 6.35$ refrigerant amount for 1m pipe: 0.011kg/m).



i NOTE

Refer to the system combination in the technical documentation for the number of indoor units and the expansion valve kit connectable to the outdoor unit.

13 REFRIGERANT PUMP DOWN

When the refrigerant should be collected into the outdoor unit due to indoor/outdoor unit relocation, collect the refrigerant as follows:

- 1 Attach the manifold gauge to the gas stop valve and the liquid stop valve
- 2 Turn ON the power source
- 3 Set the DSW1-1 pin of the outdoor unit PCB at the "ON" side for cooling operation. Close the liquid stop valve and collect the refrigerant.
- 4 When the pressure at lower pressure side (gas stop valve) indicates -0.01 MPa (-100 mmHg), perform the following procedures immediately.
 - Close the gas stop valve.
 - Set the DSW1-1 pin at the "OFF" side (To stop the unit operation).
- 5 Turn OFF the power source.

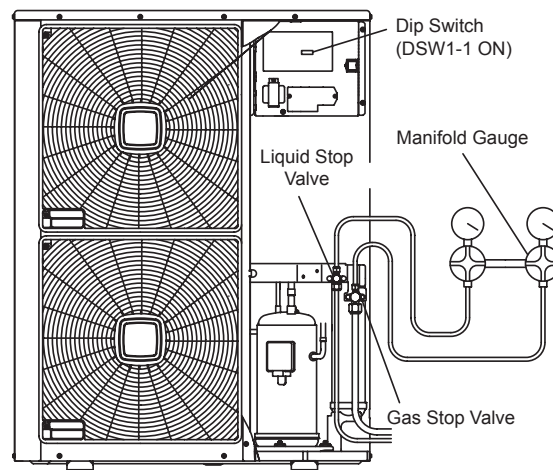
CAUTION

Measure the low pressure by the pressure gauge and keep it not to decrease than -0.01 MPa. If the pressure is lower than -0.01 MPa, the compressor may be faulty.

13.1.1 Collecting refrigerant

When the refrigerant should be collected into the outdoor unit due to indoor/outdoor unit relocation, collect the refrigerant as follows.

- 1 Attach the manifold gauge to the gas stop valve and the liquid stop valve.
- 2 Turn ON the power source.
- 3 Set the DSW1-1 pin of the outdoor unit PCB at the "ON" side for cooling operation. Close the liquid stop valve and collect the refrigerant.
- 4 When the pressure at lower pressure side (gas stop valve) indicates -0.01MPa (-100mmHg), perform the following procedures immediately.
 - a. * Close the gas stop valve.
 - b. * Set the DSW1-1 pin at the "OFF" side. (To stop the unit operation).
- 5 Turn OFF the power source.



CAUTION

- *Measure the low pressure by the pressure gauge and keep it not to decrease than -0.01 MPa.*
- *If the pressure is lower than -0.01 MPa, the compressor may be faulty.*

14 ELECTRICAL WIRING ADDITIONAL NOTES

14.1 TERMINAL BOARD TIGHTENING TORQUE

Tighten screws for the terminal board according to the following table.

Size	Tightening Torque	
M4	1,0 to 1,3	N-m
M5	2,0 to 2,4	N-m
M6	4,0 to 5,0	N-m
M8	9,0 to 11,0	N-m
M10	18,0 to 23,0	N-m

14.2 SET FREE EXTERNAL INPUT / OUTPUT AND FUNCTION SETTING

For FSXN1E, FSXNHE, FSN3 Series.

◆ Start of setting

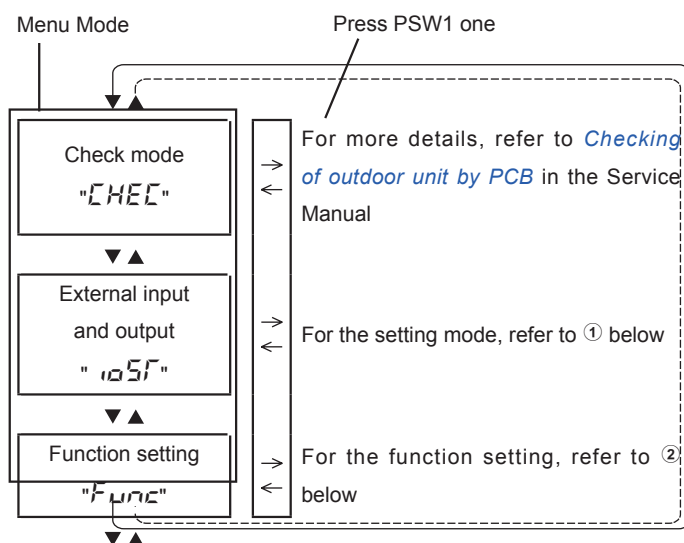
Turn ON DSW4-No.4. Press PSW1 for 3 seconds or more. "Menu Mode" will be indicated.

◆ End of setting

Press PSW1 for 3 seconds or more when "Menu Mode" is displayed. The display indication become normal. Turn OFF DSW4 number 4.



Release "Menu Mode" after the setting is completed. Otherwise, the air conditioner may not operate appropriately.



1 External input and output setting

By pressing the push-switches PSW3 (▶) and PSW5 (◀), the function number can be selected.

PSW4 (▼): forward, PSW2 (▲): backward

Fill out the selected function setting number in the space of the table as shown.

Example:

	Item	SEG2	SEG1	SET
1	Input Setting 1 CN17 (1-2 pin)	11	1	
2	Input Setting 2 CN17 (2-3 pin)	12	2	
3	Input Setting 3 CN18 (1-2 pin)	13	3	
4	Output Setting 1 CN16 (1-2 pin)	01	1	
5	Output Setting 2 CN16 (1-3 pin)	02	2	

(Setting before shipment)

Before shipping, the input/output function settings are specified to each input/output terminal according to above table. The details of function number and external input/output settings are as shown below.

Setting of external input and output function:

Function number	Input	Output
1	Fixing heating operation mode	Operation signal
2	Fixing cooling operation mode	Alarm signal
3	Demand stoppage	Compressor ON signal
4	Outdoor fan motor start/stop	Defrost signal
5	Forced stoppage	-
6	Demand current control 40%	-
7	Demand current control 60%	-
8	Demand current control 70%	-
9	Demand current control 80%	-
10	Demand current control 100%	-
11	Low noise setting 1	-
12	Low noise setting 2	-
13	Low noise setting 3	-
0	No setting	No setting

The same input/output function setting cannot be set to different becomes invalid.
input/output terminals. If set, a setting of larger function number

Example: When setting of input 1 and input 2 are same, input 2 will be invalid.

2 Function Setting

By pressing the push-switches PSW3 (▶) and PSW5 (◀), the setting can be changed.

PSW4 (▼): forward, PSW2 (▲): backward

Refer to the Service Manual for more details.

Fill out the selected function setting number in the space of the table as shown.

Example: 1

	Item	SEG2	SEG1	SET
1	Circulator function at heating Thermo-OFF	FA	0	
2	Night-Shift (Low noise)	n i	0	
3	Cancellation of outdoor ambient temperature limit	OS	0	
4	Defrost for cold area (change of defrost condition)	Jo	0	
5	SLo (fan speed) defrost setting	bJ	0	
6	Cancellation of hot start	Hf	0	
7	Priority capacity mode	nU	0	
8	Compressor frequency control target value for cooling	Hc	0	
9	Compressor frequency control target value for heating	Hh	0	
10	Indoor expansion valve control target value for cooling	Sc	0	
11	Indoor expansion valve control target value for heating	SH	0	
12	Indoor expansion valve opening during heating operation stoppage	S i	0	
13	Indoor expansion valve opening during heating thermo-off	So	0	
14	Indoor expansion valve initial opening during heating thermo-on	c i	0	
15	Indoor expansion valve initial opening for cooling	cb	0	
16	Outdoor expansion valve initial opening for heating	ch	0	
17	Sound reduced function	db	0	
18	Demand function setting	dE	0	
19	Wave function setting	UE	0	
20	Protection of decrease in outlet temperature for cooling	Fb	0	
21	Not prepared	Ff	0	
22	Adjustment of fan rotation (for multiple installation)	Fo	0	

	Item	SEG2	SEG1	SET
23	Not prepared	Lf	0	
24	Thermo-off setting for outdoor unit after defrosting operation	dS	0	
25	Not prepared	F1	0	
26	Not prepared	F2	0	
27	Not prepared	F3	0	
28	Intermittent operation of outdoor fan motor	F4	0	
29	Indoor expansion valve control target value for cooling (only for RCI-FSN3 series)	F5	0	
30	Not prepared	F6	0	
31	Not prepared	F7	0	
32	Not prepared	F8	0	
33	Not prepared	F9	0	

15 H-LINK II SYSTEM

NOTE

The H-LINK II system can not be applied to the cycle with the old H-LINK model.

1 Application

The new H-LINK II connecting each indoor unit and outdoor unit for up to 64 refrigerant cycles (up to 160 indoor unit per H-LINKII), and connecting wires for all indoor units and all outdoor units in series.

2 Specifications

- Transmission Wire: 2-Wire.
- Polarity of Transmission Wire: Non-Polar Wire.
- Maximum Outdoor Units To Be Connected: 64 Units per H-LINK II system.
- Maximum Indoor Units To Be Connected: 160 Units per H-LINK II system.
- Maximum Wiring Length: Total 1000m (including CS-NET). In case that the total wiring length is longer than 1000m, contact the HITACHI dealer.
- Recommended Cable: Twist Pair Cable with Shield, over 0.75mm² (Equivalent to KPEV-S).
- Voltage: 5V.

NOTE

Do not make a wiring in a loop.

3 Dip Switch Setting of Indoor PCB and Outdoor PCB.

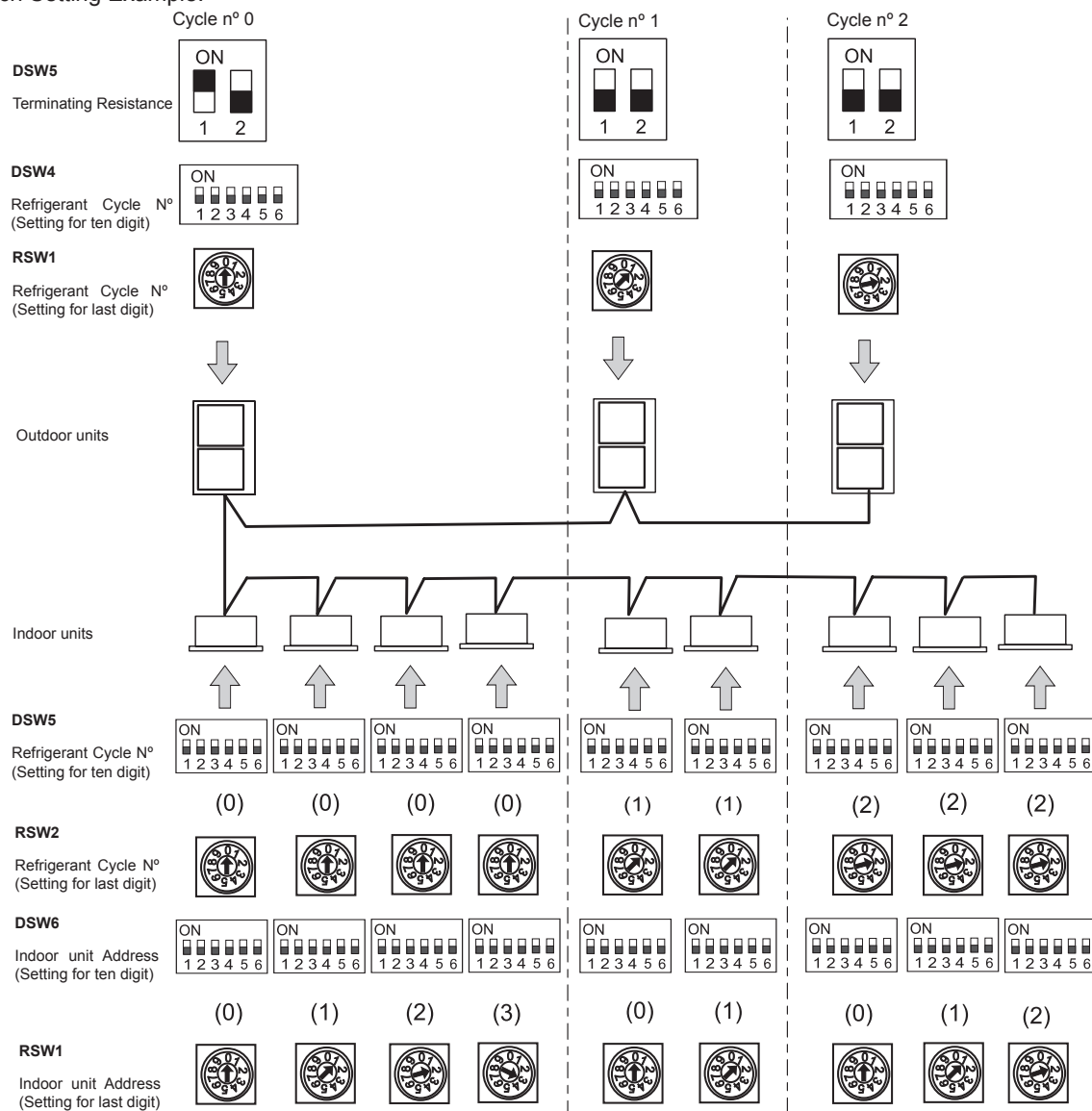
It is required to set dip switches of every indoor unit and outdoor unit.

15.2.1 System installation DIP Switch Setting

◆ Dip Switch Setting of Indoor PCB and Outdoor PCB for H-LINK II

It is required to set dip switches of every indoor unit and outdoor unit and match of the transmission circuit impedance

- Dip Switch Setting Example:

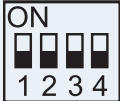


Unit	Name of Dip Switch	Mark	Setting Before Shipment	Function
Outdoor Unit	Refrigerant Cycle	DSW4 RSW1		For setting refrigerant cycle address of Outdoor Unit. Set the DSW4 and RSW1 not to overlap the setting of other Outdoor units in the same H-LINK system
	Terminating Resistance	DSW5		For matching impedance of transmission circuit, set the DSW5 according to the quantity of outdoor units in the H-LINK system.
Indoor Unit	Refrigerant Cycle	DSW5 RSW2		For setting refrigerant cycle address of indoor units. Set the DSW5 and RSW2 corresponding to the address of outdoor unit in the same refrigerant cycle.
	Indoor Unit Address	DSW6 RSW1		For setting indoor unit address. Set the DSW6 and RSW1 not to overlap the setting of other indoor units in the same refrigerant cycle. (If not set, the automatic address function is performed).

16 TEST RUN FROM OUTDOOR UNIT SIDE

The procedure of test run from outdoor unit side is indicated below. Setting of this DIP switch is available with the power source ON.

Setting of Dip Switch

DSW1	
Switch for setting of Service Operation and Function	
	1 Test Run
	2 COOL/HEAT Setting ON: Heat Operation
	3 Cooling/Heating for intermediate season
	4 Manual Compressor stop

⚠ CAUTION

- Do not touch any other electrical parts when operating switches on the PCB
- Do not attach or detach service cover when the power source for the outdoor unit is ON and the outdoor unit is operated.
- Turn all DIP switches of DSW1 OFF when the test run operation is completed.

Operation	Dip Switch Setting	Operation	Remarks
Test Run	① Setting of Operation Mode: Cooling: Set DSW1-2 OFF.  Heating: Set DSW1-2 ON.  ② Starting Test Run: Set DSW1-1 ON and the operation is started after a few ~20 seconds. Cooling Heating  	① The indoor unit automatically start to operate when the test run of the outdoor unit is set. ② The ON/OFF operation can be performed from the remote control switch or DSW1-1 of the outdoor unit. ③ Continuous operation during 2 hours is performed without Thermo-OFF. i NOTE TEST RUN operation time can be increased depressing the time switch in the Remote Control. If is setting DSW1-3 ON, cooling/heating intermediate season mode is activated.	- Take care that the indoor units start operation in accord with the test run operation of the outdoor unit. - The test run is started from the outdoor unit and stopped from the remote control switch, the test run function of the remote control switch is cancelled. However, the test run function of the outdoor unit is not cancelled - In case that the plural indoor units are connected with one remote control switch, all the units start test run operation at the same time, therefore, turn the power source OFF for the indoor units not to operate test run. In this case, the "TEST RUN" indication of the remote control switch may flicker, and this is not abnormal. - The setting of DSW1 is not required for the test run from the remote control switch.
Manual OFF of Compressor	① Setting: Compressor Manual OFF: Set DSW1-4 ON.  Compressor ON: Set DSW1-4 OFF. 	① When DSW1-4 is ON during compressor operation, the compressor stops to operate immediately and the indoor unit is under the condition of Thermo-OFF. ② When DSW1-4 is OFF, the compressor starts to operate after the cancellation of 3-minutes guard.	Do not repeat compressor ON/OFF frequently.
Manual Defrost	① Manual Defrost Operation Starts Press PSW1 for more than 3 seconds during heating operation, the defrost operation is started after 2 minutes. This function is not available within 5 minutes after starting heating operation ② Manual Defrost Operation Finishes Defrost operation is automatically ended and the heating operation is started.	① Defrost operation is available regardless of frosting condition and total time of heating operation. ② Defrost operation is not performed when the temperature of outdoor heat exchanger is higher than 10°C, high pressure is higher than 3.3 MPa (33kgf/cm²G) or Thermo-OFF.	Do not repeat defrost operation frequently.

16.1 TEST RUN CHECK LIST

MODEL:	
SERIAL NUMBER:	
COMPRESSOR MFG NUMBER:	
NAME AND CUSTOMER ADDRESS:	
DATE:	

- 1 Does the indoor unit fan rotation in the correct direction? _____
- 2 Does the outdoor unit fan rotation in the correct direction? _____
- 3 Can you hear strange noises in the compressor?
- 4 Has the unit been operating for at least twenty (20) minutes? _____
- 5 Check the temperature of the room:

Inlet:	No. 1	DB ____ °C	No. 2	DB ____ °C	No. 3	DB ____ °C	No. 4	DB ____ °C
		WB ____ °C		WB ____ °C		WB ____ °C		WB ____ °C
Outlet:		DB ____ °C		DB ____ °C		DB ____ °C		DB ____ °C
		WB ____ °C		WB ____ °C		WB ____ °C		WB ____ °C
Inlet:	No. 5	DB ____ °C	No. 6	DB ____ °C	No. 7	DB ____ °C	No. 8	DB ____ °C
		WB ____ °C		WB ____ °C		WB ____ °C		WB ____ °C
Outlet:		DB ____ °C		DB ____ °C		DB ____ °C		DB ____ °C
		WB ____ °C		WB ____ °C		WB ____ °C		WB ____ °C

- 6 Check the outdoor ambient temperature:

Inlet	DB ____ °C	WB ____ °C
Outlet	DB ____ °C	WB ____ °C

- 7 Check the temperature of the refrigerant:

Discharge gas temperature	Td = ____ °C
Liquid pipe temperature	Te = ____ °C

- 8 Check the pressure:

Discharge pressure	Pd = ____ MPa
Suction pressure	Ps = ____ MPa

- 9 Check the voltage:

Rated voltage	____ V	—	—
Operating voltage	L1-L2 ____ V	L1-L3 ____ V	L2-L3 ____ V
Starting voltage	____ V	—	—
Phase imbalance	1-(V/Vm) = ____	—	—

- 10 Check the compressor input running current:

Input	____ kW
Running current	____ A

- 11 Is the refrigerant charge OK? _____
- 12 Do the operating control devices work correctly? _____
- 13 Do the safety devices work correctly? _____
- 14 Has the unit been checked for refrigerant leaks? _____
- 15 Is the unit clean inside and outside? _____
- 16 Are all the panels of the unit fastened securely? _____
- 17 Are the panels of the cabinet fastened so that they do not make any noise? _____
- 18 Is the filter clean? _____
- 19 Is the heat exchanger clean? _____
- 20 Are the stop valves open? _____
- 21 Does the water flow freely through the drain hose? _____

17 TROUBLESHOOTING

17.1 BASIC TROUBLESHOOTING

CAUTION

- When water leakage from the indoor unit occurs, stop the operation and contact your contractor
- When you smell or white smoke occurs from the unit, stop the system and contact your contractor.

◆ This is not abnormal

- Sound from deforming Part

During system starting or stopping, and abrading sound might be heard. However, this is due to thermal deformation of plastic parts. It is not abnormal.

- Refrigerant Flow Sound

While the system is being started or stopping, sound from the refrigerant flow may be heard.

- Smells from Indoor Unit

Smell adheres on indoor unit after a long period of time. Clean the air filter and panels or make a good ventilation.

- Steam from Outdoor Heat Exchanger

During defrosting operation, ice on the outdoor heat exchanger is melted, resulting in making steam.

- Dew on Air Panel

When the cooling operation continues for a long period of time under high humidity conditions (higher than 27°C DB/80% R.H.), dew can form on the air panel.

- Dew on Cabinet

When the cooling operation continues for a long period of timer (higher than 27°C DB/80% R.H.), dew can form on the cabinet.

- Sound for the indoor unit heat exchanger

During the cooling operation, a sound may be heard from the indoor unit heat exchanger due to water freezing or melting.

◆ No operation

Check whether the SET TEMPERATURE is set at the correct temperature.

◆ Not cooling well or heating well

- Check for obstruction of air flow of the outside or inside units.
- Check if too much heat source exists in the room.
- Check if the air filter is clogged with dust.
- Check to see if the doors or windows are opened or not.
- Check if the temperature condition is not within the operating range.

◆ Abnormal swing louver's position

Check if the four louver's position at the air outlet are in same position.

◆ If trouble still remains...

If the trouble still remains even after checking the above items, contact your service contractor and inform the following data:

- Unit Model Name
- Content of Trouble
- Alarm Code no. on Liquid Crystal Display

NOTE

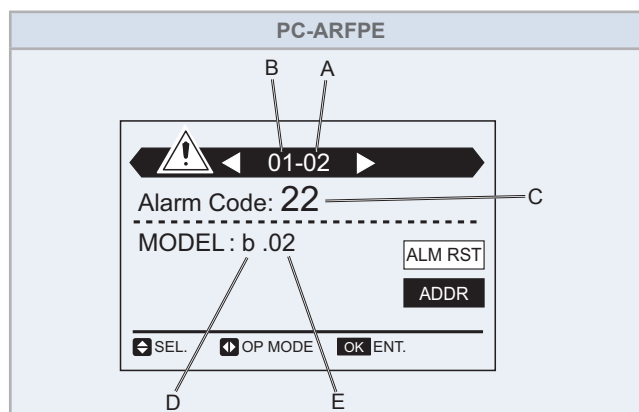
Except for a long period of shutdown, keep the main switch ON, since the oil heater is energised when the compressor is stopped.

17.2 BRIEF TROUBLESHOOTING GUIDE

Phenomenon		Cause and action
Stopped operation	All indication lamps on the remote control switch are turned OFF.	The micro-computer is activated to protect the device from electromagnetic waves. The operation can be recovered if it is started from the beginning.
	Power failure occurs.	Start the operation from the beginning. If the instantaneous power failure is within 2 seconds, the operation is restarted automatically.
White steam from indoor unit	During the heating operation.	It may occur during the defrosting operation in the heating operation.
White smoke from indoor unit	The heating operation is begun to use.	The dust attached to the heat exchanger is dried.
Mist from indoor unit	The indoor unit is used in a restaurant or a kitchen.	Oil is attached to the fins and the heat exchange efficiency may be decreased.
	During the dry operation	It may occur when the air outlet temperature becomes lower.
	The cooling operation is performed in high humidity environment.	Raise the set temperature and the air flow volume.
Odor from indoor unit	The air flow from the indoor unit has odor.	It may occur because the cigarette smoke and room odor are stuck inside the indoor unit.
		Ventilate well by the fan mode and clean the air filter, the flat panel, the air outlet and the air inlet grille. It may be effective for odor eliminating.
Sound from indoor unit	Sound is heard when starting or stopping the operation.	It is generated because the resin parts are stretched by the temperature change and rubbed with other parts.
	Sound which water flows or is boiled is heard during the operation.	It is generated because the refrigerant flows or the drain-up mechanism drains water. Especially, sound may be heard when starting the operation or stopping the compressor (for approx. 3 minutes).
	Growling sound may be heard temporarily right after the air flow volume is changed.	It is generated because the fan motor makes temporary sound by change of fan speed.
Dew on panel	Dew condensation occurs on the panel or the cabinet or dew drops.	It may occur if the operation is performed in high humidity place (relative humidity is approx. 80%.) for a long time.
Turned ON “HOT-ST” on LCD		The indications may be turned ON or flash according to the operation mode or condition.
Flashing operation mode on LCD		

Trouble		Checking point	Action
Not operated		Check that the main power source is turned ON.	Turn ON the main power source for air conditioner.
		Check that the fuse does not blow out or the circuit breaker of main power source is not tripped.	Replace the fuse or reset the circuit breaker. If the trouble recurs, contact your contractor or distributor.
Operated however, stopped soon	Cooling	Check whether the air inlet and outlet of the outdoor unit are not covered by a paper, a vinyl or other object.	Remove objects covering the air inlet and outlet.
	Heating	Check whether there are any obstacles for the air flow near the air inlet and outlet of the outdoor unit.	Remove the obstacles which prevent the air flow.
		Check whether the outlet air is short-circuited to the air inlet.	
Not cooling or heating well		Check that the operation mode is appropriate.	If the fan mode is selected, switch the operation mode to cooling (heating).
		Check that the set temperature is appropriate.	If not, change the set temperature by pressing “▲” or “▼” by the remote control switch.
		Check that the air flow direction is appropriate.	If not, change the air flow direction. In the case that the footing is not heated well during the heating operation, change the louver downward.
		Check that the air filter is not clogged.	Clean the air filter.
		Check that a window and a door are not opened.	Close the window and the door.
		Check that there are no obstacles for the air inlet and the air outlet of the outdoor unit and the indoor unit.	Remove the obstacles.

17.3 ON-SCREEN DISPLAYS DURING ABNORMAL OPERATION



Abnormal operation can be produced due to the following reasons:

◆ Malfunction

If the RUN LED flickers for 2 seconds, there is a failure in the transmission between the Indoor Unit and the Remote Control Switch.

Possible causes are:

- Broken remote cable
- Contact failure in the remote control cable
- Defective IC or defective microcomputer

In any case, ask your retailer for service

If the RUN LED flickers 5 times (5 seconds) with the unit number and the alarm code displayed, make a note of the alarm code (refer to the table below) and ask your retailer for service.

The RUN (red) indicator flashes

The ALARM indicator appears on the liquid crystal display.

The screen also displays the following items:

- A: indoor unit address (Abnormal Indoor Unit Number).
- B: Refrigerant cycle number (Abnormal Ref. Cycle Number).
- C: Alarm code.
- D: Model code.

Model code	
Indication	Model
H	Heat pump
P	Inverter
F	Multi (SET-FREE)
ℓ	Cooling only
E	Other
b	IVX, individual operation
L	KPI

- E: If there are various indoor units connected, the above mentioned information is shown for each one of them.

◆ Power supply failure

All displays disappear.

If the unit stops due to a power shortage, it will not start again, even though the power comes back on. Carry out the start-up operations again.

If the power failure lasts less than 2 seconds, the unit will start again automatically.

◆ Electrical noise

The displays can disappear from the screen and the unit can stop. This is because the microcomputer has been activated to protect the unit from electrical noise.

17.4 ALARM CODES

- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
- The unit number and the alarm code are displayed on the 7 segments of the outdoor unit PCB and Remote control Screen (if installed)

17.4.1 UTOPIA IVX outdoor and indoor units

Code number	Category	Type of abnormality	Main cause
01	Indoor unit	Activation of protection device (float switch)	Failure of fan motor, drain discharge, PCB, relay, float switch activated (High Water Level in Drain Pan, Abnormality of Drain Pipe, Float Switch or Drain Pan)
02	Outdoor unit	Activation of protection device (high pressure cut)	Activation of PSH, locked motor, abnormal operation in the power supply phase. Failure of fan motor, drain discharge, PCB, relay, float switch activated. (Pipe Clogging, Excessive Refrigerant, Insert Gas Mixing, Fan Motor Locking at Cooling Operation)
03	Transmission	Abnormal transmission between outdoor and indoor units	Incorrect wiring. Loose terminals, Failure of PCB. Tripping of fuse. Power supply OFF.
04		Abnormal transmission between inverter PCB (DIP-IPM) and outdoor unit PCB (PCB1)	Transmission failure between inverter PCBs. (Loose Connector, Wire Breaking, Blowout of Fuse)
05	Power supply	Reception of abnormal operation code for detection of power source phase	Power source with abnormal wave pattern. Main power supply phase is reversely connected or one phase is not connected. (units with power supply 3N~ 400V 50Hz only)
06	Voltage	Excessively low voltage or excessively high voltage for the inverter	Voltage drop in power supply. Incorrect wiring or insufficient capacity of power supply wiring.
07	Cycle	Decrease in discharge gas superheat	Excessive Refrigerant Charge, Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Opened Position (Disconnected Connector).
08		Excessively high discharge gas temperature at the top of compressor	Insufficient refrigerant charge, refrigerant leakage. Expansion valve closed or clogged.
11	Indoor units sensor	Air inlet thermistor	Failure of thermistor, sensor, connection. (Incorrect Wiring, Disconnected Wiring, Wire Breaking, Short Circuit).
12		Air outlet thermistor	
13		Freeze protection thermistor	
14		Gas piping thermistor	
16		Remote thermistor	
17		Thermistor of RCS	
19	Fan motor	Activation of the protection device for the indoor fan motor	Failure of fan motor

Code number	Category	Type of abnormality	Main cause
20	Outdoor unit sensor	Compressor thermistor	Incorrect wiring, disconnected wiring, broken cable, short circuit.
21		High pressure sensor	
22		Thermistor for outdoor ambient temperature (THM7)	
23		Thermistor for discharge gas temperature (THM9)	
24		Thermistor for evaporating temperature (THM8)	Incorrect Wiring, Disconnected Wiring, Wire Breaking, Short Circuit, Fan Motor Locking at Heating Operation.
29		Low pressure sensor	Incorrect wiring, disconnected wiring, broken cable, short circuit.
31	System	Incorrect capacity setting or combined capacity between outdoor and indoor units	Incorrect Capacity Code Setting, Excessive or Insufficient Indoor Unit Total Capacity Code
32		Incorrect setting signal from another Indoor Unit in same system (RPK only)	Abnormality of another Indoor Unit in the same Refrigerant Cycle (Failure of Power Source, Abnormality of PCB)
35		Incorrect indoor unit number setting	Duplication of indoor unit number , number of indoor units over specifications.
36		Incorrect of Indoor Unit Combination.	"Indoor Unit is Designed for Other Refrigerant (R22 or R407C)."
38		Abnormality of picking up circuit for protection (Outdoor unit)	Failure of indoor unit PCB, incorrect wiring, connection to PCB in indoor unit.
41	Pressure	Cooling overload (possible activation of high pressure device)	OU pipe thermistor temp. is higher than 55 °C and the compressor top temperature is higher than 95 °C, OU protection device is activated.
42		Heating overload (high-pressure device may be activated)	If IU freeze protection thermistor temperature is higher than 55 °C and compressor top temperature is higher than 95 °C, OU protection device is activated.
43		Activation of the safety device from compression ratio decrease	Abnormal compress (Compressor, Inverter damage)
44		Activation of the safety device from excessively high suction pressure	Overload during cooling, high temperature with heating, locked expansion valve
45	Protection Device	Activation of the safety device from excessively high discharge pressure	Overload (obstruction of HEX, short circuit) mixture of inert gas, Excessive Refrigerant.
47		Activation of the safety device from excessively low suction pressure (protection from vacuum operation)	Shortage or leakage of refrigerant, piping clogging, expansion valve close-locked, fan motor locked.
48		Activation of overcurrent protection	Overload, overcurrent. Failure of DIP IPM, IPM or PCB2, heat exchanger clogged, locked compressor. EVI/EVO failure.

Code number	Category	Type of abnormality	Main cause
51	Inverter	Abnormal operation of the current sensor	Incorrect wiring of current sensor. Failure of control PCB, DIP IPM, IPM or PCB2.
53		Inverter fin temperature increase	Inverter module (IPM, DIP-IPM) and PCB2 abnormality. Failure of compressor, clogging of heat exchanger.
54		Abnormality of inverter fin temperature	Heat Exchanger Clogging. Fan Motor Failure
55		Abnormality of inverter module	Failure of DIP-IPM, IPM or PCB2.
57	Outdoor fan	Fan Motor abnormality	Disconnected wire of incorrect wiring between control PCB and inverter PCB. Incorrect wiring or fan motor abnormality.
EE	Compressor	Compressor protection	"Compressor failure. This alarm code appears when the following alarms 02, 07, 08, 45, 47 occur three times within 6 hours."
b0	IU model setting	Incorrect setting of unit model	No setting of unit capacity or incorrect setting of unit capacity
b1	Number setting	Incorrect setting address or refrigerant cycle	Over 64 indoor units setting by number or indoor unit address.
b5		Incorrect setting of indoor unit number for H-LINK type	The number of indoor units connected to the H-Link II of one system is 17 or higher

17.4.2 UTOPIA ES outdoor and indoor units

Code No.	Category	Type of Abnormality	Main cause
01	Indoor unit	Activation of protection device (float switch)	Failure of fan motor, drain discharge, PCB, relay, float switch activated.
02	Outdoor unit	Activation of protection device (high pressure cut)	Activation of PSH, locked motor, abnormal operation in the power supply phase.
03	Transmission	Abnormality between indoor (or outdoor) and outdoor (or indoor) units	Incorrect wiring. Loose terminals, Failure of PCB. Tripping of fuse. Power supply OFF.
04		Abnormal operation between inverter and control PCB	Transmission failure between inverter PCBs
05	Power supply	Abnormal power supply	Power source with abnormal wave pattern.
06	Voltage drop	Voltage drop due to excessively low or high voltage in outdoor unit	Voltage drop in power supply. Incorrect wiring or insufficient capacity of power supply wiring.
07	Cycle	Drop in discharge gas overheating	Excessive refrigerant charge. Expansion valve lock open.
08		Increase in discharge gas temperature	Insufficient refrigerant charge, refrigerant leakage. Expansion valve closed or clogged.
11	Sensor in indoor unit	Inlet air thermistor	Failure of thermistor, sensor, connection.
12		Outlet air thermistor	
13		Anti-freeze thermistor	
14		Gas pipe thermistor	
16		Remote thermistor	
17		Remote control switch thermistor	
19	Outdoor unit sensor	Protection device for fan motor is triggered	Failure of fan motor
20		Compressor thermistor	Failure of thermistor, sensor, connection.
22		Outside air thermistor	
24		Evaporation thermistor	
31	System	Incorrect setting of outdoor and indoor units	Incorrect setting of capacity code.
35		Incorrect setting of indoor unit number	Duplication of indoor unit number.
38		Abnormality of protective circuit in outdoor unit	Failure of indoor unit PCB; incorrect wiring; connection to indoor unit PCB.
41	Pressure	Cooling overload (possible activation of high pressure device)	O.U. pipe thermistor temp. is higher than 55 °C and the compressor top temp. is higher than 95 °C, O.U. protection device is activated.
42		Heating overload (high-pressure device may be activated)	If I.U. freeze protection thermistor temp. is higher than 55 °C and compressor top temp. is higher than 95 °C, O.U. protection device is activated.
47		Activation of protection device for low pressure drop	Stoppage due to excessive decrease of evaporating temperature (Temp < -37 °C) is activated 3 times in one hour, motor locked in heating mode.
48	Inverter	Activation of overcurrent protection	Overload, overcurrent. Failure of DIP IPM, IPM or PCB2, heat exchanger clogged, locked compressor.
51		Abnormality in inverter current sensor	Incorrect wiring of current sensor. Failure of control PCB or Inverter PCB.
53		Activation for protection of Inverter	Inverter PCB abnormality. Compressor failure, heat exchanger clogged.
54		Abnormality of inverter fin temperature	Abnormal inverter fin thermistor Heat exchanger clogged.
55		Abnormality of inverter module	Abnormal outdoor fan. Failure of Inverter PCB.
57	Outdoor fan	Fan motor abnormality	Disconnected wire or incorrect wiring between control PCB and inverter PCB. Incorrect wiring or abnormality in fan motor.
EE	Compressor	Compressor protection alarm	Compressor failure.
b0	IU capacity setting	Incorrect setting of unit capacity	No setting of unit capacity or incorrect setting of unit capacity
b1	IU No.Setting	Incorrect unit no. setting	Over 64 indoor units, setting by no. or indoor unit address.
b5		Incorrect setting of indoor unit number for H-LINK type	Connected indoor units not supporting H-LINK II ≥ 17.

17.4.3 CENTRIFUGAL VRF outdoor and indoor units

Code number	Category	Type of abnormality	Main cause
01	Indoor unit	Activation of protection device (float switch)	Failure of fan motor, drain discharge, PCB, relay, float switch activated (High Water Level in Drain Pan, Abnormality of Drain Pipe, Float Switch or Drain Pan).
02	Protection device	Activation of protection device	Activation of the float switch (FS). Activation of the internal thermostat protection of the motor (ITO). Activation of the high pressure switch (PSH). Variable frequency driver failure (VFD).
03	Transmission	Abnormal transmission between RASC and indoor units	Incorrect wiring. Loose terminals, Failure of PCB. Tripping of fuse. Power supply OFF.
04		Abnormal transmission between inverter PCB and RASC unit PCB	Transmission failure between inverter PCBs. (Loose Connector, Wire Breaking, Blowout of Fuse).
05	Power supply	Reception of abnormal operation code for detection of power source phase	Power source with abnormal wave pattern. Main power supply phase is reversely connected or one phase is not connected.
06	Voltage	Excessively low voltage or excessively high voltage for the inverter	Voltage drop in power supply. Incorrect wiring or insufficient capacity of power supply wiring.
07	Cycle	Decrease in discharge gas superheat	Excessive Refrigerant Charge, Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Opened Position (Disconnected Connector) or faulty RASC fan motor.
08		Excessively high discharge gas temperature at the top of compressor	Insufficient refrigerant charge, refrigerant leakage. Expansion valve closed or clogged.
11	Indoor unit sensor	Air inlet thermistor	Failure of thermistor, sensor, connection. (Incorrect Wiring, Disconnected Wiring, Wire Breaking, Short Circuit).
12		Air outlet thermistor	
13		Freeze protection thermistor	
14		Gas piping thermistor	
15	Econofresh	Thermistor of fresh outdoor air	
16	Indoor unit sensor	Remote thermistor	
17		Thermistor of remote control switch	
19	Fan motor	Activation of the protection device for the indoor fan motor	Failure of fan motor.
20	RASC unit sensor	Thermistor for discharge gas temperature (THM9)	Incorrect wiring, disconnected wiring, broken cable, short circuit.
21		High pressure sensor	
22		Thermistor for outdoor ambient temperature (THM7)	
24		Thermistor for evaporating temperature (THM8)	
31	System	Incorrect capacity setting or combined capacity between RASC and indoor units	Incorrect Capacity Code Setting, Excessive or Insufficient Indoor Unit Total Capacity Code.
35		Incorrect indoor unit number setting	Duplication of indoor unit number. Number of indoor units over specifications.
36		Incorrect of Indoor Unit Combination.	"Indoor Unit is Designed for Other Refrigerant (R22 or R407C)".
38		Abnormality of picking up circuit for protection (RASC unit)	Failure of indoor unit PCB, incorrect wiring, connection to PCB in indoor unit.
45	Protection device	Activation of the safety device from excessively high discharge pressure	Overload (obstruction of HEX, short circuit) mixture of inert gas, excessive refrigerant or faulty RASC fan motor.
47		Activation of the safety device from excessively low suction pressure (protection from vacuum operation)	Shortage or leakage of refrigerant, piping clogging, expansion valve close-locked, RASC fan motor locked.
48		Activation of overcurrent protection	Overload, overcurrent. Failure of inverter PCB, heat exchanger clogged, locked compressor. EVI/EVO failure.

Code number	Category	Type of abnormality	Main cause
51	Inverter	Abnormal operation of the current sensor	Incorrect wiring of current sensor. Failure of control PCB or Inverter PCB.
53		Inverter fin temperature increase	Inverter module (IPM) and Inverter PCB abnormality. Failure of compressor, clogging of heat exchanger.
54		Abnormality of inverter fin temperature	Abnormal inverter fin thermistor or Heat exchanger clogged.
55		Abnormality of inverter PCB	Failure of inverter PCB.
EE	Compressor	Compressor protection	"Compressor failure. This alarm code appears when the following alarms 02, 07, 08, 45, 47 occur three times within 6 hours."
b0	Indoor unit model setting	Incorrect setting of unit model	No setting of unit capacity or incorrect setting of unit capacity.
b1	Number setting	Incorrect setting address or refrigerant cycle	Over 64 indoor units setting by number or indoor unit address.
b5		Incorrect setting of indoor unit number for H-LINK type	The number of indoor units connected to the H-LINK II of one system is 17 or higher.

17.4.4 SET FREE MINI outdoor and indoor units

Code number	Category	Abnormality	Cause
01	Indoor unit	Activation of the safety device	Failure of fan motor, drain discharge, PCB, relay, float switch activated
02	Outdoor unit	Activation of the safety device	Activation of PSH, locked motor, abnormal operation in the power supply phase
03	Transmission	Abnormal transmission between outdoor and indoor units	Incorrect wiring, failure of PCB, tripping of fuse, power supply OFF
04		Abnormal transmission between inverter PCB (DIP-IPM) and outdoor unit PCB (PCB1)	Abnormal transmission between PCB
05	Power supply	Abnormal operation of picking up phase signal	Main power supply phase is reversely connected or one phase is not connected.
06	Voltage	Excessively low voltage or excessively high voltage for the inverter	Incorrect wiring or insufficient capacity of power supply wiring
07	Cycle	Excessively low discharge gas superheat temperature	Discharge gas superheat less than 10 degrees is maintained for 30 minutes.
08		Excessively high discharge gas temperature at the top of compressor	Temperature of top compressor: Td Td > 132°C over 10 minutes, or Td > 140°C over 5 minutes
11	Sensor on indoor unit	Air inlet thermistor	Failure of thermistor, sensor, connection.
12		Air outlet thermistor	
13		Freeze protection thermistor	
14		Gas piping thermistor	
15	Econofresh	Abnormal operation of thermistor for fresh outdoor air	
16	Sensor on indoor unit	Remote thermistor	Failure of thermistor
17		Thermistor of RCS	Failure of thermistor
19		Activation of the protection device for the indoor fan motor	Failure of fan motor
21	Sensor on outdoor unit	High pressure sensor	Incorrect wiring, disconnected wiring, broken cable, short circuit.
22		Thermistor for outdoor ambient temperature (THM7)	Failure of thermistor, sensor, connection.
23		Thermistor for discharge gas temperature (THM9)	Incorrect wiring, disconnected wiring, broken cable, short circuit.
24		Thermistor for evaporating temperature (THM8)	Failure of thermistor, sensor, connection.
29		Low pressure sensor	Incorrect wiring, disconnected wiring, broken cable, short circuit.
31	System	Incorrect capacity setting or combined capacity between outdoor and indoor units	Incorrect setting of the capacity code.
35		Incorrect indoor unit number setting	Duplication of indoor unit number , number of indoor units over specifications.
36		Incorrect indoor unit combination	R22 indoor unit
38		Abnormality of picking up circuit for protection (Outdoor unit)	Failure of indoor unit PCB, incorrect wiring, connection to PCB in indoor unit.
43	Pressure	Activation of the safety device from compression ratio decrease	Abnormal compress (Compressor, Inverter damage)
44		Activation of the safety device from excessively high suction pressure	Overload during cooling, high temperature with heating, locked expansion valve
45		Activation of the safety device from excessively high discharge pressure	Overload (obstruction of heat exchanger, short circuit) mixture of inert gas
47		Activation of the safety device from excessively low suction pressure (protection from vacuum operation)	Shortage or leakage of refrigerant, piping clogging, expansion valve close-locked, fan motor locked.

Code number	Category	Abnormality	Cause
48	Inverter	Activation of overcurrent protection activation for inverter	Failure of DIP-IPM, heat exchanger clogged, locked compressor, EVI/EVO failure or overcharge.
51		Abnormality of current sensor for inverter	Failure of control PCB, inverter module.
53		Protection activation of inverter module	Inverter module abnormality. Failure of compressor, clogging of heat exchanger.
54		Inverter fin temperature increase	Abnormal inverter fin thermistor, clogging of heat exchanger, abnormal outdoor fan.
55		Inverter module abnormality	Failure of inverter module.
57	Outdoor fan	Fan motor abnormality	Disconnected wire of incorrect wiring between control PCB and inverter PCB. Incorrect wiring or fan motor abnormality.
b1	Indoor unit number setting	Incorrect setting of the unit and the refrigerant cycle number.	Over 64 indoor units setting by number or indoor unit address.
b5		Incorrect indoor unit connection number setting	There are more than 17 units not corresponding to H-Link II connected to one system
EE	Compressor	Compressor protection	Failure of compressor.

17.4.5 SET FREE SIDE FLOW outdoor and indoor units

Code No.	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Activation of Protection Device	Failure of Fan Motor, Drain Discharge, Clogging, PCB, Relay.
02	Outdoor Unit	Activation of Protection Device	Activation of PSH, pipe clogging, excessive refrigerant, inert gas mixing.
03	Transmission	Abnormality between Indoor (or Outdoor) and Outdoor (or Indoor)	Incorrect Wiring. Failure of PCB. Tripping of Fuse. Power Supply OFF
04		Abnormality between Inverter PCB and Outdoor PCB.	Transmission Failure (Loose Connector), If only fan controller is failed, indications are as follows:
		Abnormality between Fan Controller and Outdoor PCB	Number 1 Fan Controller Failure - F1 04 Number 2 Fan Controller Failure - F2 04
05	Supply phase	Abnormality of Power Source Wiring	Reverse Phase Incorrect Wiring.
06	Voltage	Abnormal Inverter Voltage	Outdoor Voltage Drop, Insufficient Power Capacity, If voltage drop cause by fan controller is detected, indications are as follows: N° 1 Fan Controller Failure - F1 06 N° 2 Fan Controller Failure - F2 06
07	Cycle	Decrease in Discharge Gas Superheat	Excessive Refrigerant Charge. Expansion Valve Open Lock.
08		Increase in Discharge Gas Temperature	Insufficient Refrigerant. Ref. Leakage, Clogging or Expansion Valve Close Lock
11	Sensor on Indoor Unit	Inlet Air Thermistor	Incorrect Wiring, Disconnecting Wiring.
12		Outlet Air Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
19	Fan motor	Tripping of Protection Device for Fan Motor	Failure of Fan Motor
21	Sensor on Outdoor Unit	High Pressure Sensor	Incorrect Wiring, Disconnecting Wiring
22		Outdoor Air Thermistor	
23		Discharge Gas Thermistor on Comp.	
24		Evaporating Thermistor	
29		Low Pressure Sensor	
31	System	Incorrect Setting of Outdoor and Indoor Unit	Incorrect Setting of Capacity Code.
35		Incorrect Setting in Indoor Unit Number	Existence of the same Indoor Unit No. in the same Refrigerant Cycle
38		Abnormality of Protective Circuit in Outdoor Unit	Failure of Indoor Unit PCB. Incorrect wiring. Connection to PCB in Indoor Unit.
43	Protection device	Pressure Ratio Decrease Protection Activating	Failure of Compressor, Inverter
44		Suction Pressure Increase Protection Activating	Overload to Indoor in Cooling. High Temperature of Outdoor Air In Heating Expansion Valve Open Lock
45		Discharge Pressure Increase Protection Activating	Overload Operation. Excessive Refrigerant. Clogging of Heat Exchanger
47		Suction Pressure Decrease Protection Activating	Insufficient refrigerant .
48		Activation of inverter overcurrent protection device	Overload operation, compressor failure
51	Sensor	Abnormal Current Sensor	Current sensor failure
53	Inverter	Inverter Error Signal Detection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short-Circuit)
54		Increase in Inverter Fin Temperature	Abnormal Inverter Fin Thermistor. Abnormal Outdoor Fan
55		Inverter failure	Inverter PCB failure
57	Outdoor fan motor	Abnormality of fan motor	Disconnecting Wiring or Incorrect Wiring between Control PCB (PCB1) and Fan Relay PCB (PCB3, PCB5), Failure of Fan Motor
EE	Compressor	Compressor protection alarm	Failure of compressor
b1	Outdoor unit number setting	Incorrect outdoor unit number setting	Over 64 No. is set for address of refriogerant cycle
b5	Indoor unit number setting	Incorrect indoor unit number setting	More than 17 non-corresponding to H-LINKII units are connected to one system

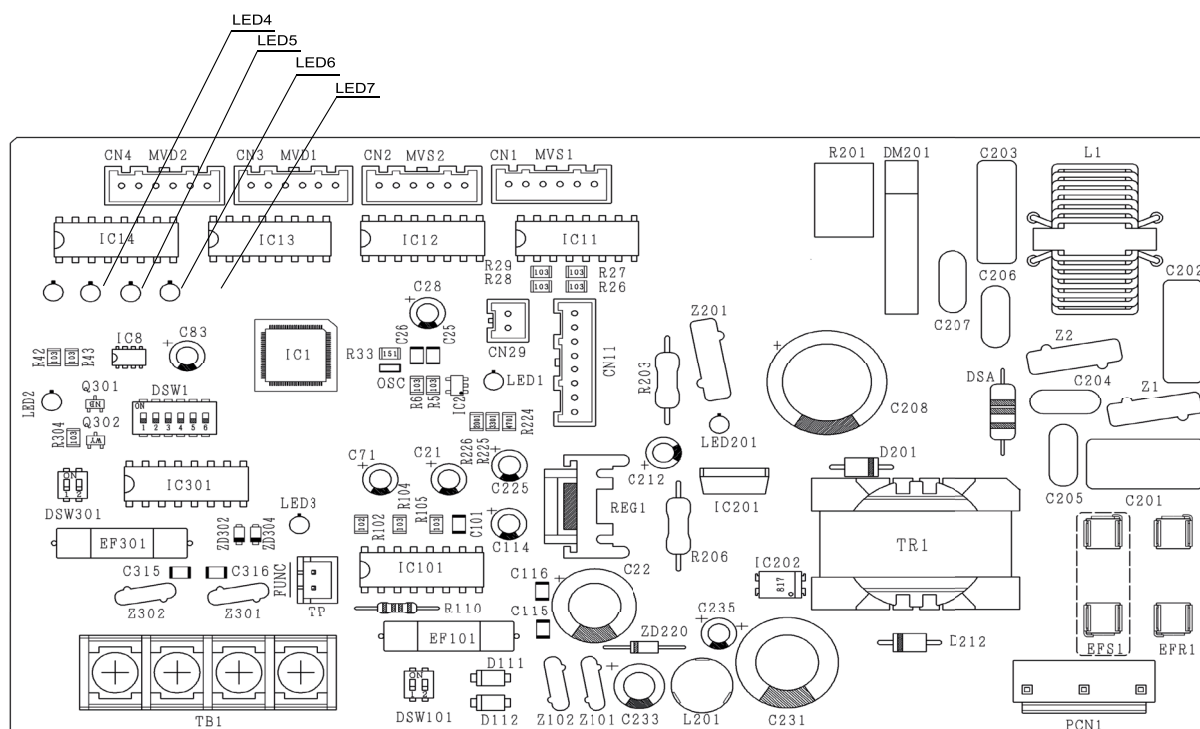
17.4.6 SET FREE MODULAR outdoor and indoor units

Code	Category	Content of abnormality	Possible cause
01	Indoor unit	Protection device activation (float switch)	Float switch activation (high water level in drain hose or abnormality in drain pipe, float switch or drain pan).
02	Outdoor unit	Protection device activation (disconnection due to high pressure)	PSH activation (pipe clogging, excess refrigerant, mixture of inert gas).
03	Transmission	Abnormality between indoor and outdoor	Incorrect wiring, loose terminals, disconnect cable, blown fuse, outdoor unit switched off.
04		Abnormality between inverter PCB and outdoor PCB	Inverter PCB - Outdoor PCB transmission fault (loose connector, broken cable, blown fuse).
04.		Abnormality between fan controller and outdoor PCB	Fan controller - Outdoor PCB transmission fault (loose connector, broken cable, blown fuse).
05	Power phase	Abnormality in the power phases	Incorrect power supply, inverted phase connection, open phase.
06	Voltage	Abnormal inverter voltage	Outdoor voltage drop, insufficient power.
06.		Abnormal fan controller voltage	Outdoor voltage drop, insufficient power.
07	Cycle	Drop in discharge gas superheat	Excessive refrigerant charge, thermistor fault, incorrect wiring, incorrect pipe connection, expansion valve locked in open position (connector disconnected).
08		Increase in discharge gas temperature	Insufficient refrigerant charge, pipe clogging, thermistor fault, incorrect wiring, incorrect pipe connection, expansion valve locked in closed position (connector disconnected).
0A	Transmission	Abnormality between outdoor and indoor	Incorrect wiring, broken cable, loose terminals.
0b	Outdoor unit	Incorrect outdoor unit address setting	Duplicate address setting of outdoor units (secondary units) in the same refrigerant cycle system.
0C		Main unit of the outdoor unit incorrectly set	Two (or more) outdoor units defined as the "main unit" in the same refrigerant cycle system.
11	Indoor unit sensor	Air inlet thermistor	Incorrect wiring, disconnected wiring, broken cable, short circuit.
12		Air outlet thermistor	
13		Frost protection thermistor	
14		Gas pipe thermistor	
19	Fan motor	Indoor fan protection device activation	Fan motor overheating, locking.
21	Outdoor unit sensor	High pressure sensor	Incorrect wiring, disconnected wiring, broken cable, short circuit.
22		Outdoor air thermistor	
23		Discharge gas thermistor at top of compressor	
24		Heat exchanger liquid pipe thermistor	
25		Heat exchanger gas pipe thermistor	
29		Low pressure sensor	
31	System	Incorrect capacity setting on outdoor and indoor units	Combination capacity incorrectly set.
		Abnormal transmitting between outdoor units	Excessive or insufficient total indoor unit capacity.
35		Indoor unit no. incorrectly set	Indoor unit no. duplicated in same reference group.
36		Incorrect of indoor unit combination	Indoor unit designed for R22.
38		Abnormality in the collection circuit for outdoor unit protection	Protection detection device fault (incorrect wiring of outdoor PCB).
39	Compressor	Abnormal running current at constant speed compressor	Overcurrent, blowout fuse, current sensor failure, instantaneous power failure, voltage drop, abnormal power supply.
3A	Outdoor unit	Abnormal outdoor unit capacity.	Outdoor unit capacity >54 HP.
3b		Voltage or combination of outdoor unit models incorrectly set	Voltage or combination of secondary and main units incorrectly set.
3d		Abnormal transmission between the main unit and the secondary unit(s)	Incorrect wiring, disconnected wiring, broken cable, PCB fault.

Code	Category	Content of abnormality	Possible cause
43	Protection device	Low-pressure decrease protection device activation	Defective compression (compressor or inverter fault, loose power supply connection).
44		Low-pressure increase protection device activation	Overload during cooling, high temperature with heating, locked expansion valve (loose connector).
45		High pressure increase protection device activation	Overload (clogging, short pitch), pipe clogging, excess refrigerant, mixture of inert gas.
47		Low-pressure decrease protection device activation (vacuum protection)	Insufficient refrigerant, refrigerant pipes, clogging, expansion valve locked in open position (loose connector).
48		Inverter overcurrent protection device activation	Overload, compressor fault.
51	Sensor	Abnormal inverter current sensor	Current sensor fault.
53	Inverter	Inverter error signal detection	Controller IC error signal detection (overcurrent, low-voltage and short-circuit protection).
54		Abnormal inverter fin temperature	Abnormal inverter fin thermistor, heat exchanger clogging, fan motor fault.
55		Inverter fault	Inverter PCB fault.
57	Fan controller	Fan controller protection activation	Controller IC error signal detection (overcurrent, low-voltage and short-circuit protection), instant overcurrent.
5A		Abnormal fan controller fin temperature	Fin thermistor fault, heat exchanger clogging, fan motor fault.
5b		Overcurrent protection activation	Fan motor fault.
5C		Abnormal fan controller sensor	Current sensor fault (instant overcurrent, increased fin temperature, low voltage, earthing fault, step-out).
EE	Compressor	Compressor protection alarm (cannot be reset from the remote controller)	This alarm code is displayed when the following alarms are triggered three times within six hours: 02, 07, 08, 39, 43 to 45, 47.
b1	Outdoor unit number setting	Unit number or address number of the outdoor unit incorrectly set	A number greater than 64 has been set for the refrigerant cycle or address.
b5	Indoor unit number setting	Connection number of the indoor unit incorrectly set	There are more than 17 units not corresponding to H-LINK II connected to one system.
C1	CH unit	Incorrect indoor unit connection	There are 2 or more CH units connected between the outdoor and indoor units.
C2		Connection number of the indoor unit incorrectly set	There are 9 or more indoor units connected to the CH unit
C3		Incorrect indoor unit connection	Indoor units from different refrigerant cycles have been connected to the CH unit.

17.4.7 SET FREE CH-Box

The alarm code is indicated by LED on the CH unit PCB:



LED				Alarm Code	Content of abnormality
4	5	6	7		
O	O	X	X	03	Abnormal transmission between CH and outdoor unit
X	X	O	O	03	Abnormal transmission between CH and indoor unit
O	O	O	O	C1	There are 2 or more CH units connected between the outdoor and indoor units.
O	O	O	X	C2	There are 9 or more indoor units connected to the CH unit
X	O	O	X	C3	Indoor units from different refrigerant cycles have been connected to the CH unit.

O: Flashing (turn ON; 0.5 sec / turn OFF; 0.5 sec).

X: Turn OFF.

17.4.8 KPI series 4 and Dx-Interface series 2

The following alarm list is specific for KPI series 4 and DX-kit series 2. The alarm number is displayed in the 7 segments display located in the KPI or DX-kit PCB, as well as in the 7 segments display located in the PCB of the Utopia Outdoor unit (the PCB of Set Free Outdoor units can display the alarm number depending on the characteristics of the system). The alarm code is always shown in the Remote Control LCD.

Code number	DX-KIT2	KPI-S3	KPI-Active	Category	Type of abnormality	Main cause
01	o	-	o	Indoor	Activation of protection device	Float switch activation (high water level in drain hose or abnormality in drain pipe, float switch or drain pan).
03	o	-	o	Transmission	Transmission error	Outdoor fuse meltdown, Indoor/outdoor connection wiring (breaking, wiring error, etc.)
11	o	o	o	Indoor	Air inlet thermistor (RA for KPI)	Loose, disconnected, broken or short-circuited connector
12	o	o	o	Indoor	Air outlet thermistor (OA for KPI)	Loose, disconnected, broken or short-circuited connector
13	o	-	o	Indoor	Liquid pipe thermistor	Loose, disconnected, broken or short-circuited connector
14	o	-	o	Indoor	Gas pipe thermistor	Loose, disconnected, broken or short-circuited connector
15	-	-	-	Indoor	Fresh outdoor air thermistor (Econofresh)	Loose, disconnected, broken or short-circuited connector
16	-	-	o	Indoor	Air inlet DX Coil thermistor (Tincoil)	Loose, disconnected, broken or short-circuited connector
17	-	-	o	Indoor	Air outlet DX Coil thermistor (Toutcoil)	Loose, disconnected, broken or short-circuited connector
18	(o)	o	o	Indoor	Indoor RA fan protection device activation for KP	Fan motor overheating, locking.
19	o	o	o	Indoor	Indoor OA fan protection device activation for KPI or DX-KIT2 Fan	Fan motor overheating, locking.
31	o	-	o	System	Incorrect setting of outdoor and indoor units	Outdoor/Indoor Unit capacity setting error, Indoor total capacity excessively large/small
35	o	-	o	System	Indoor unit number setting error	Indoor units with the same number exist in a refrigerant piping system
70	o	o	o	Indoor	Abnormal transmission between PCB1 and PCB2	Loose, disconnected
71	o	o	o	Indoor	Incorrect PCBs setting	Wrong setting are performed in PCBs
EE	o	-	o	Compressor	Compressor protection alarm (cannot be reset from the remote controller)	This alarm code is displayed when the following alarms are triggered three times within six hours: 02,07,08,39,43 to 45, 47
74	-	-	-	Indoor	Remote sensor thermistor (Trem)	Loose, disconnected, broken or short-circuited connector

18 MAINTENANCE

DANGER

- Turn OFF the power source before the maintenance work. If not, it may cause a fire or an electric shock.
- Perform the maintenance work with stable footing. If not, it may cause falling or injury.

CAUTION

When the indoor unit flat panel is opened (closed) or the air filter is attached (removed), perform the work according to the Installation and Operation Manual according to your model unit. If not, it may cause falling or injury

NOTE

Do not operate the system without the air filter to protect the indoor unit heat exchanger against being clogged.

◆ Maintenance Beginning and Ending of Use

Beginning of use

Remove obstacles for the air inlet grilles of indoor unit and outdoor unit and the air outlet.

Check that the air filter is not clogged.

Ending of use

Clean the air filter, the air inlet grille and the flat panel.

18.1 GENERAL MAINTENANCE WORK

For the indoor unit and the outdoor unit

1 Fan and fan motor

- Lubrication: All the fan motors are pre-lubricated and sealed at the factory. Therefore no lubrication maintenance is required.
- Sound and vibration: Check for abnormal sounds and vibrations.
- Insulation: Check the electrical insulation resistance.

2 Heat exchanger

- Clog: Inspect the heat exchanger at regular intervals and remove any accumulated dirt and any accumulated dust from the heat exchanger. You should also remove from the outdoor units other obstacles such as the growing grass and the pieces of paper which might restrict the airflow.

3 Piping connection

- Leakage: Check for the refrigerant leakage at the piping connection.

4 Cabinet

- Stain and lubrication: Check for any stain and any lubrication. Remove the stain and the lubrication.
- Fixing screw: Check for any loosened screw or any lost screw. Fix the loosened screws and the lost screws.
- Insulation material: Check for any peeled thermal insulator on the cabinet. Repair the thermal insulator.

5 Electrical equipment

- Activation: Check for an abnormal activation of the magnetic contactor the auxiliary relay the PCB and others.
- Line condition: Pay attention to the working voltage the working amperage and the working phase balance. Check for any faulty contact that is caused by the loosened terminal connections the oxidized contacts the foreign matter and other items. Check the electrical insulation resistance.

6 Control device and protection device

- Setting: Do not readjust the setting in the field unless the setting is maintained at a point that is different from the point listed in the service manual of the unit.

For the outdoor unit

- 1 Compressor
 - Sound and vibration: Check for abnormal sounds and vibrations.
 - Activation: Check that the voltage drop of the power supply line is within 15% at the start and within 2% during the operation.
- 2 Fan
 - Rotation: Check the counter clockwise (or Clockwise according to de outdoor unit model) rotation and the rotating speed.
- 3 Reverse valve
 - Activation: Check for any abnormal activation sound.
- 4 Strainer
 - Clog: Check that there is no temperature difference between both ends.
- 5 Ground wire
 - Ground line: Check for the continuity to earth.
- 6 Oil heater
 - Activation: You should activate the oil heater at least twelve hours before the start-up by turning ON the main switch.

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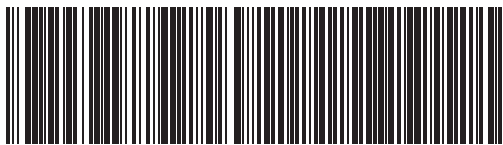
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