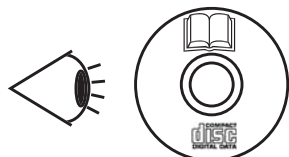


EN INSTRUCTION MANUAL
ES MANUAL DE INSTRUCCIONES
DE BEDIENUNGSANLEITUNG
FR MANUEL D'UTILISATION
IT MANUALE DI ISTRUZIONI

PT MANUAL DE INSTRUÇÕES
DA BRUGSANVISNING
NL INSTALLATIEHANDLEIDING
SV INSTALLATIONSHANDBOK
EL ΕΓΧΕΙΡΙΔΙΟ ΟΔΗΓΙΩΝ

SET FREE SERIES RAS-(8-54)FSXN1E(-P) RAS-(5-36)FSXNHE(-P)



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 appropriate local or national regulations in an environmentally correct way.

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

PRECAUCIÓN

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

Debido al refrigerante, el aceite y otros componentes contenidos en el sistema de aire acondicionado, su desmontaje debe realizarlo un instalador profesional de acuerdo con la normativa aplicable. Para obtener más información, póngase en contacto con las autoridades competentes.

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.

Aufgrund des Kältemittels, des Öls und anderer in der Klimaanlage enthaltener Komponenten muss die Demontage von einem Fachmann entsprechend den geltenden Vorschriften durchgeführt werden. Für weitere Informationen setzen Sie sich bitte mit den entsprechenden Behörden in Verbindung.

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.

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

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 poiché 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.

Devido ao refrigerante, ao óleo e a outros componentes contidos no Ar condicionado, a desmontagem deve ser realizada por um instalador profissional de acordo com os regulamentos aplicáveis. Contacte as autoridades correspondentes para obter mais informações.

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.

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

Kontakt de pågældende myndigheder for at få yderligere oplysninger.

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.

Vanwege het koelmiddel, de olie en andere onderdelen in de airconditioner moet het apparaat volgens de geldige regulering door een professionele installateur uit elkaar gehaald worden. Neem contact op met de betreffende overheidsdienst voor meer informatie.

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.

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

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

ΠΡΟΣΟΧΗ

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

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

Για περισσότερες λεπτομέρειες, επικοινωνήστε με τις αντίστοιχες αρχές.



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 genannte, 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 gefluorineerde broeikasgassen die vallen onder het protocol van Kyoto.
 (SV) Denna anläggning innehåller fluorhaltiga växthusgaser som regleras av Kyoto-protokollet.
 (EL) Ο παρών εξοπλισμός περιέχει φθοριούχα 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 ελευθερώνετε 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 - Refrigerante - Kühlmittel - Fluide frigorigène - Køllemiddel - Kølestof - Kylinings - Μέσου
 1 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
 (Refer to Specification Label) (Consulte etiqueta de especificaciones) (Siehe Typenschild) (Reportez-vous à l'étiquette des spécifications)
 Quantità già caricata - Carga de fábrica - Påfyllt fra fabrikken - In fabriek gevuld
 (Quantità già caricata) (Carga de fábrica) (Påfyllt fra fabrikken) (In fabriek gevuld)
 Páfylning frá fabrikin - Εργοστασιακή πλήρωση
 (Páfylning frá fabrikin) (Εργοστασιακή πλήρωση) (Páfylning frá fabrikin) (Εργοστασιακή πλήρωση)

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

Figure 1. F-Gas Label with Protection Plastic Film

Protection Plastic Film

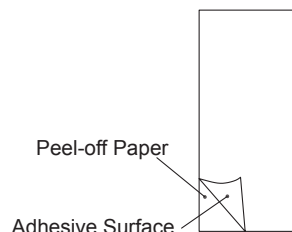


Figure 2. Protection Plastic Film

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.- Klister på skyddsfilm i plast (finns i pärm 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

MODELS CODIFICATION	Important note: Please, check, according to the model name, which is your air conditioner type, how it is abbreviated and referred to in this instruction manual. This Installation and Operation Manual is only related to the RAS units FSXN(1/H)E(-P) combined with the HITACHI indoor units System Free.
CODIFICACIÓN DE MODELOS	Nota importante: compruebe, de acuerdo con el nombre del modelo, el tipo de sistema de aire acondicionado del que dispone, su abreviatura y su referencia en el presente manual de instrucciones. Este Manual de instalación y funcionamiento se ocupa solo de las unidades RAS FSXN(1/H)E(-P) combinadas con las unidades interiores System Free de HITACHI.
MODELLCODES	Wichtiger Hinweis: Bitte stellen Sie anhand der Modellbezeichnung den Klimaanlage-typ und das entsprechende, in diesem Technischen Handbuch verwendete Kürzel fest. Dieses Installations- und Bedienungshandbuch bezieht sich nur auf die RAS-Geräte FSXN(1/H)E(-P) kombiniert mit den HITACHI-Innengeräten System Free.
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 concerne que les groupes RAS FSXN(1/H)E(-P) combinés à des unités intérieures System Free d'HITACHI.
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 d'uso fa riferimento alla sola combinazione di unità RAS FSXN(1/H)E(-P) e unità interne HITACHI System Free.
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 funcionamento refere-se apenas às unidades RAS FSXN(1/H)E(-P) em combinação com as unidades interiores da série System Free da HITACHI.
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 installations- og betjeningsvejledning gælder kun RAS FSXN(1/H)E(-P) -enheder kombineret med HITACHI System Free indendørsenheder.
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 is alleen van toepassing voor RAS-eenheden FSXN(1/H)E(-P) in combinatie met de HITACHI-binnenunits System Free.
MODELLER	Viktigt! Kontrollera med modellnamnet vilken typ av luftkonditionering du har, hur den förkortas och hur den anges i den här handboken. Denna Installations- och drifthandbok gäller endast RAS-enheterna FSXN(1/H)E(-P) kombinerade med HITACHI inomhuse-nheter System Free.
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 είναι μονό για τις μονάδες RAS τύπου FSXN(1/H)E(-P) για συνδυασμό με τις εσωτερικές μονάδες της System Free της HI-TACHI.

OUTDOOR UNIT · UNIDAD EXTERIOR · GROUPE EXTÉRIEUR · AUßENGERÄT · UNITÀ ESTERNA · UNIDADE EXTERIOR ·
UTOMHUSENHET · BUITENUNIT · UDENDØRSENHED · ΕΞΩΤΕΡΙΚΗ ΜΟΝΑΔΑ



RAS-FSXXN1E

				
RAS-8FSXXN1E				
RAS-10FSXXN1E				
RAS-12FSXXN1E				
	RAS-14FSXXN1E			
	RAS-16FSXXN1E	RAS-16FSXXN1E-P		
		RAS-18FSXXN1E		
		RAS-20FSXXN1E		
			RAS-22FSXXN1E	
			RAS-24FSXXN1E	
			RAS-26FSXXN1E	
				RAS-28FSXXN1E
				RAS-30FSXXN1E
				RAS-32FSXXN1E

OUTDOOR UNIT · UNIDAD EXTERIOR · GROUPE EXTÉRIEUR · AUßENGERÄT · UNITÀ ESTERNA · UNIDADE EXTERIOR ·
UTOMHUSENHET · BUITENUNIT · UDENDØRSENHED · ΕΞΩΤΕΡΙΚΗ ΜΟΝΑΔΑ



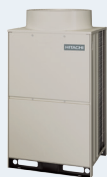
RAS-FSXXN1E

				
RAS-32FSXXN1E-P				
RAS-34FSXXN1E				
RAS-36FSXXN1E				
	RAS-38FSXXN1E			
	RAS-40FSXXN1E			
		RAS-42FSXXN1E		
		RAS-44FSXXN1E		
			RAS-46FSXXN1E	
			RAS-48FSXXN1E	
				RAS-50FSXXN1E
				RAS-52FSXXN1E
				RAS-54FSXXN1E

OUTDOOR UNIT · UNIDAD EXTERIOR · GROUPE EXTÉRIEUR · AUßENGERÄT · UNITÀ ESTERNA · UNIDADE EXTERIOR · UTMHUSEN-
HET · BUITENUNIT · UDENDØRSENHED · ΕΞΩΤΕΡΙΚΗ ΜΟΝΑΔΑ



RAS-FSXNHE



RAS-5FSXNHE

RAS-6FSXNHE

RAS-8FSXNHE

RAS-10FSXNHE

RAS-12FSXNHE

RAS-12FSXNHE-P

RAS-14FSXNHE

RAS-16FSXNHE

RAS-18FSXNHE

RAS-20FSXNHE

RAS-22FSXNHE

RAS-24FSXNHE

RAS-24FSXNHE-P

RAS-26FSXNHE

RAS-28FSXNHE

RAS-30FSXNHE

RAS-32FSXNHE

RAS-34FSXNHE

RAS-36FSXNHE

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	Ελληνικά	Μεταφρασμένη έκδοση

INDEX

- 1 GENERAL INFORMATION
- 2 SAFETY
- 3 COMBINATION OF OUTDOOR UNITS
- 4 IMPORTANT NOTICE
- 5 TRANSPORT, LIFTING AND HANDLING OF THE UNITS
- 6 NAME OF PARTS
- 7 UNIT INSTALLATION
- 8 PIPING WORK AND REFRIGERANT CHARGE
- 9 DRAIN PIPING
- 10 ELECTRIC WIRING
- 11 COMMISSIONING
- 12 MAIN SAFETY DEVICES

INDEX

- 1 INFORMACIÓN GENERAL
- 2 SEGURIDAD
- 3 COMBINACIÓN DE UNIDADES EXTERIORES
- 4 AVISO IMPORTANTE
- 5 TRANSPORTE, IZADO Y MANIPULACIÓN DE LAS UNIDADES
- 6 NOMBRE DE LOS COMPONENTES
- 7 INSTALACIÓN DE LA UNIDAD
- 8 INSTALACIÓN DE LAS TUBERÍAS Y CARGA DE REFRIGERANTE
- 9 TUBERÍA DE DESAGÜE
- 10 CABLEADO ELÉCTRICO
- 11 PUESTA EN MARCHA
- 12 PRINCIPALES DISPOSITIVOS DE SEGURIDAD

INDEX

- 1 ALLGEMEINE INFORMATIONEN
- 2 SICHERHEIT
- 3 KOMBINATION VON AUSSENGERÄTEN
- 4 WICHTIGER HINWEIS
- 5 TRANSPORT, ANHEBEN UND BEDIENUNG DER GERÄTE
- 6 TEILEBEZEICHNUNGEN
- 7 GERÄTEINSTALLATION
- 8 ROHRLEITUNGEN UND KÄLTEMITTELMENGE
- 9 ABFLUSSLEITUNGEN
- 10 KABELANSCHLUSS
- 11 INBETRIEBNAHME
- 12 GRUNDLEGENDE SICHERHEITSVORRICHTUNGEN

INDEX

- 1 INFORMATIONS GÉNÉRALES
- 2 SÉCURITÉ
- 3 COMBINAISON DE GROUPES EXTÉRIEURS
- 4 REMARQUE IMPORTANTE
- 5 TRANSPORT, LEVAGE ET MANIPULATION DES UNITÉS
- 6 NOMENCLATURE DES PIÈCES
- 7 INSTALLATION DES UNITÉS
- 8 INSTALLATION DES TUYAUTERIES ET CHARGE DE FLUIDE FRIGORIGÈNE
- 9 TUYAUTERIE D'ÉVACUATION
- 10 CÂBLAGE ÉLECTRIQUE
- 11 MISE EN SERVICE
- 12 PRINCIPAUX DISPOSITIFS DE SÉCURITÉ

INDEX

- 1 INFORMAZIONI GENERALI
- 2 SICUREZZA
- 3 COMBINAZIONE DI UNITÀ ESTERNE
- 4 NOTA IMPORTANTE
- 5 TRASPORTO, SOLLEVAMENTO E MOVIMENTAZIONE DELLE UNITÀ
- 6 NOME DEI COMPONENTI
- 7 INSTALLAZIONE DELL'UNITÀ
- 8 POSA DEI TUBI E CARICA DI REFRIGERANTE
- 9 LINEA DI DRENAGGIO
- 10 COLLEGAMENTI ELETTRICI
- 11 MESSA IN ESERCIZIO
- 12 PRINCIPALI DISPOSITIVI DI SICUREZZA

INDEX

- 1 INFORMAÇÃO GERAL
- 2 SEGURANÇA
- 3 COMBINAÇÃO DE UNIDADES EXTERIORES
- 4 NOTA IMPORTANTE
- 5 TRANSPORTE, SUSPENSÃO E MANUSEAMENTO DAS UNIDADES
- 6 NOME DAS PEÇAS
- 7 INSTALAÇÃO DA UNIDADE
- 8 TUBAGEM DE REFRIGERANTE E CARGA DE REFRIGERANTE
- 9 TUBAGEM DE DESCARGA
- 10 LIGAÇÕES ELÉTRICAS
- 11 ENTRADA EM SERVIÇO
- 12 DISPOSITIVOS DE SEGURANÇA PRINCIPAIS

INDEX

- 1 GENEREL INFORMATION
- 2 SIKKERHED
- 3 KOMBINATION AF UDENDØRSENHEDER
- 4 VIGTIG INFORMATION
- 5 TRANSPORT, LØFT OG HÅNDTERING AF ENHEDERNE
- 6 NAVN PÅ DELE
- 7 MONTERING AF ENHEDEN
- 8 RØRARBEJDE OG PÅFYLDNING AF KØLEMIDDEL
- 9 AFLØBSRØR
- 10 ELEKTRISKE LEDNINGER
- 11 IDRIFTSÆTTELSE
- 12 PRIMÆRE SIKKERHEDSANORDNINGER

INDEX

- 1 ALGEMENE INFORMATIE
- 2 VEILIGHEID
- 3 COMBINATIE VAN BUITENUNITS
- 4 BELANGRIJKE MEDEDELING
- 5 DE UNITS TRANSPORTEREN, HIJSEN EN VERPLAATSEN
- 6 NAAM VAN ONDERDELEN
- 7 DE UNIT INSTALLEREN
- 8 DE LEIDINGEN EN KOUEMIDDELLEIDING LEGGEN
- 9 AFVOERLEIDING
- 10 ELEKTRISCHE BEDRADING
- 11 INBEDRIJFSSTELLING
- 12 BELANGRIJKSTE VEILIGHEIDSVORZIENINGEN

INDEX

- 1 ALLMÄN INFORMATION
- 2 SÄKERHET
- 3 KOMBINATION AV UTOMHUSENHETER
- 4 VIKTIGT MEDDELANDE
- 5 TRANSPORT, LYFT OCH HANTERING AV ENHETERNA
- 6 DELARNAS NAMN
- 7 INSTALLATION
- 8 RÖRDRAGNINGARBETE OCH PÅFYLNING AV KYLMEDIUM
- 9 DRÄNERINGSRÖR
- 10 ELEKTRISK ANSLUTNING
- 11 DRIFTSÄTTNING
- 12 HUVUDSAKLIGA SÄKERHETSANORDNINGAR

INDEX

- 1 ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ
- 2 ΑΦΑΛΕΙΑ
- 3 ΣΥΝΔΥΑΣΜΟΣ ΕΞΩΤΕΡΙΚΩΝ ΜΟΝΑΔΩΝ
- 4 ΣΗΜΑΝΤΙΚΗ ΠΑΡΑΤΗΡΗΣΗ
- 5 ΜΕΤΑΦΟΡΑ, ΑΝΥΨΩΣΗ ΚΑΙ ΧΕΙΡΙΣΜΟΣ ΤΩΝ ΜΟΝΑΔΩΝ
- 6 ΟΝΟΜΑΤΑ ΕΞΑΡΤΗΜΑΤΩΝ
- 7 ΕΓΚΑΤΑΣΤΑΣΗ ΜΟΝΑΔΑΣ
- 8 ΕΡΓΑΣΙΕΣ ΣΩΛΗΝΩΣΗΣ ΚΑΙ ΠΛΗΡΩΣΗΣ ΨΥΚΤΙΚΟΥ ΜΕΣΟΥ
- 9 ΣΩΛΗΝΩΣΗ ΑΠΟΧΕΤΕΥΣΗΣ
- 10 ΗΛΕΚΤΡΙΚΗ ΚΑΛΩΔΙΩΣΗ
- 11 ΕΝΑΡΞΗ ΛΕΙΤΟΥΡΓΙΑΣ
- 12 ΣΥΣΚΕΥΕΣ ΑΣΦΑΛΕΙΑΣ

1 GENERAL INFORMATION

1.1 GENERAL NOTES

No part of this publication may be reproduced, copied, filed or transmitted in any shape or form without the permission of Johnson Controls-Hitachi Air Conditioning Spain, S.A.U.

Within the policy of continuous improvement of its products, Johnson Controls-Hitachi Air Conditioning Spain, S.A.U. reserves the right to make changes at any time without prior notification and without being compelled to introducing them into products subsequently sold. This document may therefore have been subject to amendments during the life of the product.

HITACHI makes every effort to offer correct, up-to-date documentation. Despite this, printing errors cannot be controlled by HITACHI and are not its responsibility.

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.

No type of modification must be made to the equipment without prior, written authorisation from the manufacturer.

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.

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.*

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.

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 COMBINATION OF OUTDOOR UNITS

3.1.1 Combination of outdoor units FSXNH

The power range of the RAS-(8-54)FSXN1E outdoor units is obtained by applying one unit (RAS-(8-16)FSXN1E) or by the combination of two or three outdoor units (RAS-(18-54)FSXN1E), depending on the instructions in the following tables.

This outdoor unit series FSXN1E can build the capacity from 8 to 54HP by combining maximum 4 outdoor units from 8 to 16HP.

◆ Base units

HP	8	10	12	14	16
Model	RAS-8FSXN1E	RAS-10FSXN1E	RAS-12FSXN1E	RAS-14FSXN1E	RAS-16FSXN1E

◆ Combination of base units

HP	16-P / 18	20	22	24	26
Model	RAS-16FSXN1E-P RAS-18FSXN1E	RAS-20FSXN1E	RAS-22FSXN1E	RAS-24FSXN1E	RAS-26FSXN1E
Combination	RAS-8FSXN1E	RAS-8FSXN1E	RAS-8FSXN1E	RAS-10FSXN1E	RAS-12FSXN1E
	RAS-10FSXN1E	RAS-12FSXN1E	RAS-14FSXN1E	RAS-14FSXN1E	RAS-14FSXN1E

HP	28	30	32	32-P / 34	36
Model	RAS-28FSXN1E	RAS-30FSXN1E	RAS-32FSXN1E	RAS-32FSXN1E-P RAS-34FSXN1E	RAS-36FSXN1E
Combination	RAS-14FSXN1E	RAS-14FSXN1E	RAS-16FSXN1E	RAS-10FSXN1E	RAS-12FSXN1E
	RAS-14FSXN1E	RAS-16FSXN1E	RAS-16FSXN1E	RAS-12FSXN1E	RAS-12FSXN1E
	-	-	-	RAS-12FSXN1E	RAS-12FSXN1E

HP	38	40	42	44	46
Model	RAS-38FSXN1E	RAS-40FSXN1E	RAS-42FSXN1E	RAS-44FSXN1E	RAS-46FSXN1E
Combination	RAS-12FSXN1E	RAS-12FSXN1E	RAS-12FSXN1E	RAS-12FSXN1E	RAS-14FSXN1E
	RAS-12FSXN1E	RAS-12FSXN1E	RAS-14FSXN1E	RAS-16FSXN1E	RAS-16FSXN1E
	RAS-14FSXN1E	RAS-16FSXN1E	RAS-16FSXN1E	RAS-16FSXN1E	RAS-16FSXN1E

HP	48	50	52	54
Model	RAS-48FSXN1E	RAS-50FSXN1E	RAS-52FSXN1E	RAS-54FSXN1E
Combination	RAS-16FSXN1E	RAS-10FSXN1E	RAS-12FSXN1E	RAS-12FSXN1E
	RAS-16FSXN1E	RAS-12FSXN1E	RAS-12FSXN1E	RAS-12FSXN1E
	RAS-16FSXN1E	RAS-14FSXN1E	RAS-14FSXN1E	RAS-14FSXN1E
	-	RAS-14FSXN1E	RAS-14FSXN1E	RAS-16FSXN1E

3.1.2 Combination of outdoor units FSXNH

The power range of the RAS-(5-36)FSXNHE(-P) outdoor units is obtained by applying one unit (RAS-(5-12)FSXNHE) or by the combination of two or three outdoor units (RAS-(14-36)FSXNHE), depending on the instructions in the following tables.

This outdoor unit series FSXNHE (high efficiency type) can build the capacity from 5 to 36HP by combining maximum 3 outdoor units from 5 to 12HP.

◆ Base units

HP	5	6	8	10	12
Model	RAS-5FSXNHE	RAS-6FSXNHE	RAS-8FSXNHE	RAS-10FSXNHE	RAS-12FSXNHE

◆ Combination of base units

HP	12-P / 14	16	18	20
Model	RAS-12FSXNHE-P RAS-14FSXNHE	RAS-16FSXNHE	RAS-18FSXNHE	RAS-20FSXNHE
Combination	RAS-6FSXNHE	RAS-8FSXNHE	RAS-8FSXNHE	RAS-8FSXNHE
	RAS-8FSXNHE	RAS-8FSXNHE	RAS-10FSXNHE	RAS-12FSXNHE

HP	22	24	24-P / 26	28
Model	RAS-22FSXNHE	RAS-24FSXNHE	RAS-24FSXNHE-P RAS-26FSXNHE	RAS-28FSXNHE
Combination	RAS-10FSXNHE	RAS-12FSXNHE	RAS-8FSXNHE	RAS-8FSXNHE
	RAS-12FSXNHE	RAS-12FSXNHE	RAS-8FSXNHE	RAS-8FSXNHE
	-	-	RAS-10FSXNHE	RAS-12FSXNHE

HP	30	32	34	36
Model	RAS-30FSXNHE	RAS-32FSXNHE	RAS-34FSXNHE	RAS-36FSXNHE
Combination	RAS-8FSXNHE	RAS-8FSXNHE	RAS-10FSXNHE	RAS-12FSXNHE
	RAS-10FSXNHE	RAS-12FSXNHE	RAS-12FSXNHE	RAS-12FSXNHE
	RAS-12FSXNHE	RAS-12FSXNHE	RAS-12FSXNHE	RAS-12FSXNHE



NOTE

The combinations are not available except the above tables for FSXN1E and FSXNHE.

◆ Special models RAS-(16/32)FSXN1E-P and RAS-(12/24)FSXNHE-P

The special models RAS-(16/32)FSXN1E-P and RAS-(12/24)FSXNHE-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-12FSXNHE-P → RAS-14FSXNHE

RAS-24FSXNHE-P → RAS-26FSXNHE

Therefore there are no specific instructions shown for these special models.

3.1 ADDITIONAL INFORMATION ABOUT SAFETY

DANGER

- **HITACHI is not able to foresee all the circumstances which may result in a potential danger.**
- **Do not pour water in the indoor or outdoor unit. These products are fitted with electric components. If water comes into contact with electric components, this will cause a serious electric shock.**
- **Do not handle or adjust the safety devices inside the indoor and outdoor units. The handling or adjustment of these devices may result in serious accident.**
- **Do not open the service cover or access panel of the indoor and outdoor units without disconnecting the main power supply.**
- **In the event of fire, switch off the mains, put out the fire immediately and contact your service supplier.**
- **Check that the earth cable is correctly connected.**
- **Connect the unit to a circuit breaker of the specified capacity.**
- Do not use sprays, such as insecticides, varnishes or enamels or any other inflammable gas within a metre of the system.
- If the circuit breaker or supply fuse of the unit comes on frequently, stop the system and contact the service supplier.
- Do not carry out maintenance or inspection work yourself. This work must be carried out by qualified service personnel with suitable tools and resources for the work.
- Do not place any foreign material (branches, sticks, etc.) in the air inlet or outlet of the unit. These units are fitted with high speed fans and contact with any object is dangerous.
- This appliance must be used only by adult and capable people, having received the technical information or instructions to handle this appliance properly and safely.
- Children should be supervised to ensure that they do not play with the appliance.

CAUTION

- RAS-(8-54)FSXN1E(-P) and RAS-(5-36)FSXNHE(-P) outdoor units are designed for commercial use and for light industrial application. If installed in house hold appliance, it could cause electromagnetic interference..
- Refrigerant leaks may hinder respiration as the gas displaces the air in the room.
- Fit the indoor unit, the outdoor unit, the remote control and the cable at a minimum of 3 metres away from sources of strong radiation from electromagnetic waves, such as medical equipment.

NOTE

- The air in the room should be renewed and the room ventilated every 3 or 4 hours.
- The system fitter and specialist shall provide anti-leak safety in accordance with local regulations.
- This air conditioner has been designed for standard air conditioning for human beings. For use in other applications, please contact your HITACHI dealer or service contractor.

4 IMPORTANT NOTICE

- The supplementary information about the purchased products is supplied in a CD-ROM, which can be found bundled with the outdoor unit. In case that the CD-ROM is missing or it is not readable, please contact your HITACHI dealer or distributor.
- **PLEASE READ THE MANUAL AND THE FILES ON THE CD-ROM CAREFULLY BEFORE STARTING WORK ON THE INSTALLATION OF THE AIR CONDITIONING SYSTEM.** Failure to observe the instructions for installation, use and operation described in this documentation may result in operating failure including potentially serious faults, or even the destruction of the air conditioning system
- Verify, in accordance with the manuals which appear in the outdoor and indoor units, that all the information required for the correct installation of the system is included. If this is not the case, contact your distributor.
- HITACHI pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- HITACHI cannot anticipate every possible circumstance that might involve a potential hazard.
- This air conditioner has been designed for standard air conditioning for human beings. For use in other applications, please contact your HITACHI dealer or service contractor.
- No part of this manual may be reproduced without written permission.
- If you have any questions, contact your service contractor of HITACHI.
- This manual gives a common description and information for this air conditioner which you operate as well as for other models.
- Check and make sure that the explanations of each part of this manual correspond to your air conditioner model.
- Refer to the models codification to confirm the main characteristics of your system.
- Signal words (NOTE, DANGER and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.
- These operations modes are controlled by the remote control switch.
- This manual should be considered as a permanent part of the air conditioner. This manual gives a common description and information for this air conditioner which you operate as well as for other models.
- The air conditioning system should only be installed by qualified personnel, with the necessary resources, tools and equipment, who are familiar with the safety procedures required to successfully carry out the installation.

⚠ DANGER

Pressure Vessel and Safety Device: This air conditioner is equipped with a high pressure vessel under PED (Pressure Equipment Directive). The pressure vessel has been designed and tested before shipment according to PED. Also, in order to prevent the system from an abnormal pressure, a high pressure switch, which needs no field adjustment, is utilized in the refrigeration system. Therefore, this air conditioner is protected from abnormal pressures. However, if abnormally high pressure is applied to the refrigeration cycle including the high pressure vessel(s), it will result in serious injury or death due to explosion of the pressure vessel. Do not apply a pressure higher than the following pressure to the system, by modifying or changing the high pressure switch.

Start-up and Operation: Check to ensure that all the stop valves are fully opened and no obstacle exists at the inlet/outlet sides before start-up and during the operation.

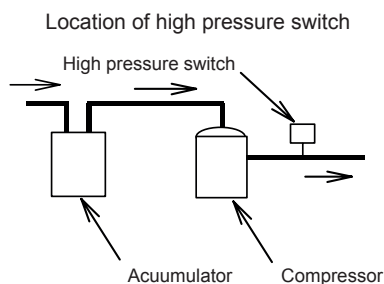
Maintenance: Periodically check the high pressure side pressure. If the pressure is higher than the maximum allowable pressure, stop the system and clean the heat exchanger or remove the cause.

Maximum Allowable Pressure and High Pressure Cut-out Value:

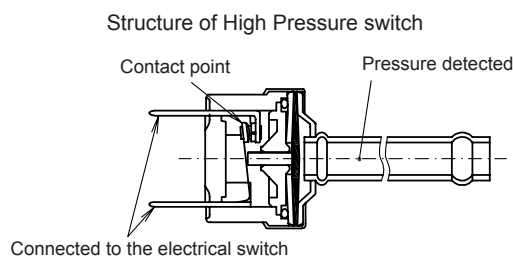
Refrigerant	Maximum Allowable Pressure (MPa)	High Pressure Switch Cut-out Value (MPa)
R410A	4.15	4.00 ~ 4.10

i NOTE

The label indicating compliance with the directive on pressure equipment, the vessel category and capacity is located on the vessel itself.

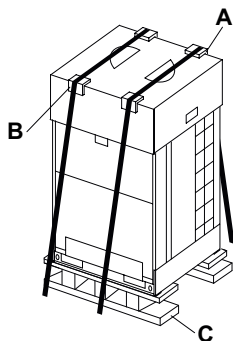
**i NOTE**

The high pressure switch is marked on the electric circuit diagrams of the outdoor unit as PSH and is connected to the printed circuit board PCB1 of the unit.



5 TRANSPORT, LIFTING AND HANDLING OF THE UNITS

5.1 TRANSPORT OF OUTDOOR UNIT

**⚠ CAUTION**

Do not place other material on top of the outdoor units during transport and storage.

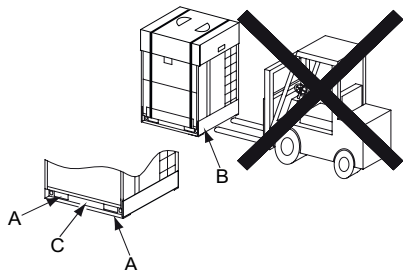
If the unit is not installed immediately, it should be stored in a suitable location, protected from the elements, especially in saline atmospheres and from rodents. The unit must be stored with all the transport protection with which it was supplied and with the wooden base -C- fitted.

When transporting the unit, make sure that it is securely and correctly fastened to the vehicle to avoid damage. To avoid damage, use appropriate textile slings -A- and cardboard protection -B- to ensure that the unit is immobilised without damaging it.

Use a suitable crane with the required loading capacity on flat ground when loading and unloading the unit.

5.2 HANDLING

When handling loads with fork-lift trucks, special care should be taken to prevent injury to individuals in the vicinity or damage to the unit itself.



CAUTION

National and local legislation must be observed with respect to driving and the handling of loads with fork-lift trucks.

The only places in which the forks of the fork-lift truck can be inserted are through the openings -A- of the unit base.

Do not apply excessive force to these openings, with either the forks or other tools. This could damage the base of the unit.

Do not move the unit by pushing it on side -B- of the base with the forks of the fork-lift truck or by applying force on zone -C-.

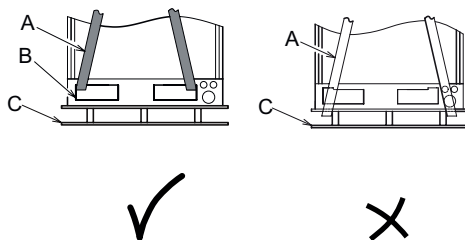
Do not use wheelbarrows to move the unit.

5.3 LIFTING METHOD

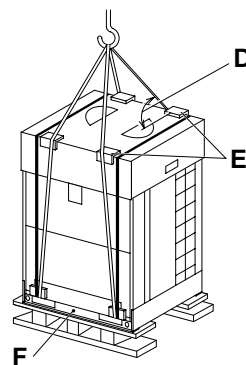
Do not remove any of the protective packaging from the unit to protect it during handling and lifting.

The unit should only be lifted from the base.

Fit the hoisting slings -A- through the openings -B- on the base of the unit.



Slightly tighten the two hoisting slings.



Insert protection -E- between where the slings touch the upper protective cardboard packaging of the unit. The slings must not touch the unit.

The slings should form an angle of more than 60° -D- with the upper part of the unit. The unit should be kept horizontal throughout the lifting operation. If necessary, tie guide ropes on to prevent the unit from swinging freely during the lifting process.

Do not apply force to zone -F-.

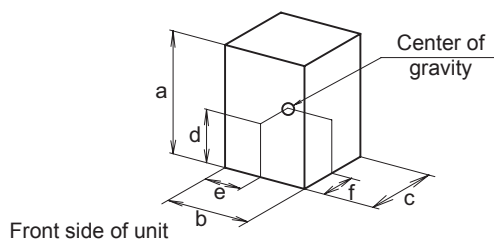
CAUTION

No-one should remain in the radius of action of the crane during the lifting process.

! DANGER

- Always use textile slings in good condition, without cuts or wear, and with the correct capacity for lifting the outdoor unit.
- Do not fit the slings on the wooden base -C- of the unit. The wooden base is only designed to protect the base of the unit during transportation; it will not withstand the strain of lifting the unit.
- Do not use metal cables to lift the unit. Metal cables may slip on the wooden base supporting the unit and could cause the unit to tilt or fall during the lifting operation.

5.4 CENTER OF GRAVITY

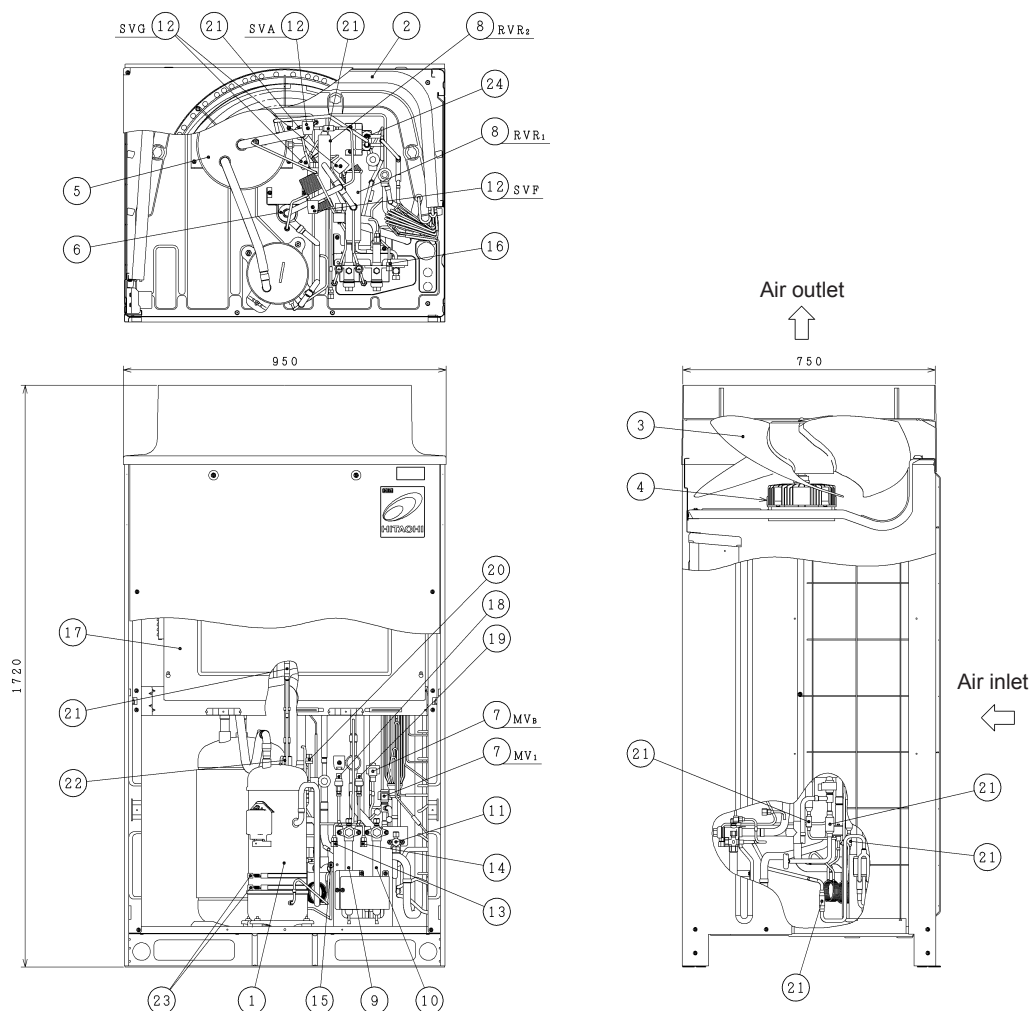


HP	RAS-FSXN1E			RAS-FSXNHE	
	8	10/12	14/16	5/6	8-12
Net weight (kg)	215	230	310	206	249
Gross weight (kg)	230	245	325	229	275

Model	a	b	c	d	e	f
RAS-8FSXN1E	1,720	950	765	645	465	335
RAS-10FSXN1E	1,720	950	765	650	465	350
RAS-12FSXN1E	1,720	1,210	765	615	600	320
RAS-14FSXN1E	1,720	1,210	765	615	600	320
RAS-16FSXN1E	1,720	1,210	765	615	600	320
RAS-5FSXNHE	1,720	950	765	645	465	335
RAS-6FSXNHE	1,720	950	765	645	465	335
RAS-8FSXNHE	1,720	1,210	765	660	580	350
RAS-10FSXNHE	1,720	1,210	765	660	580	350
RAS-12FSXNHE	1,720	1,210	765	660	580	350

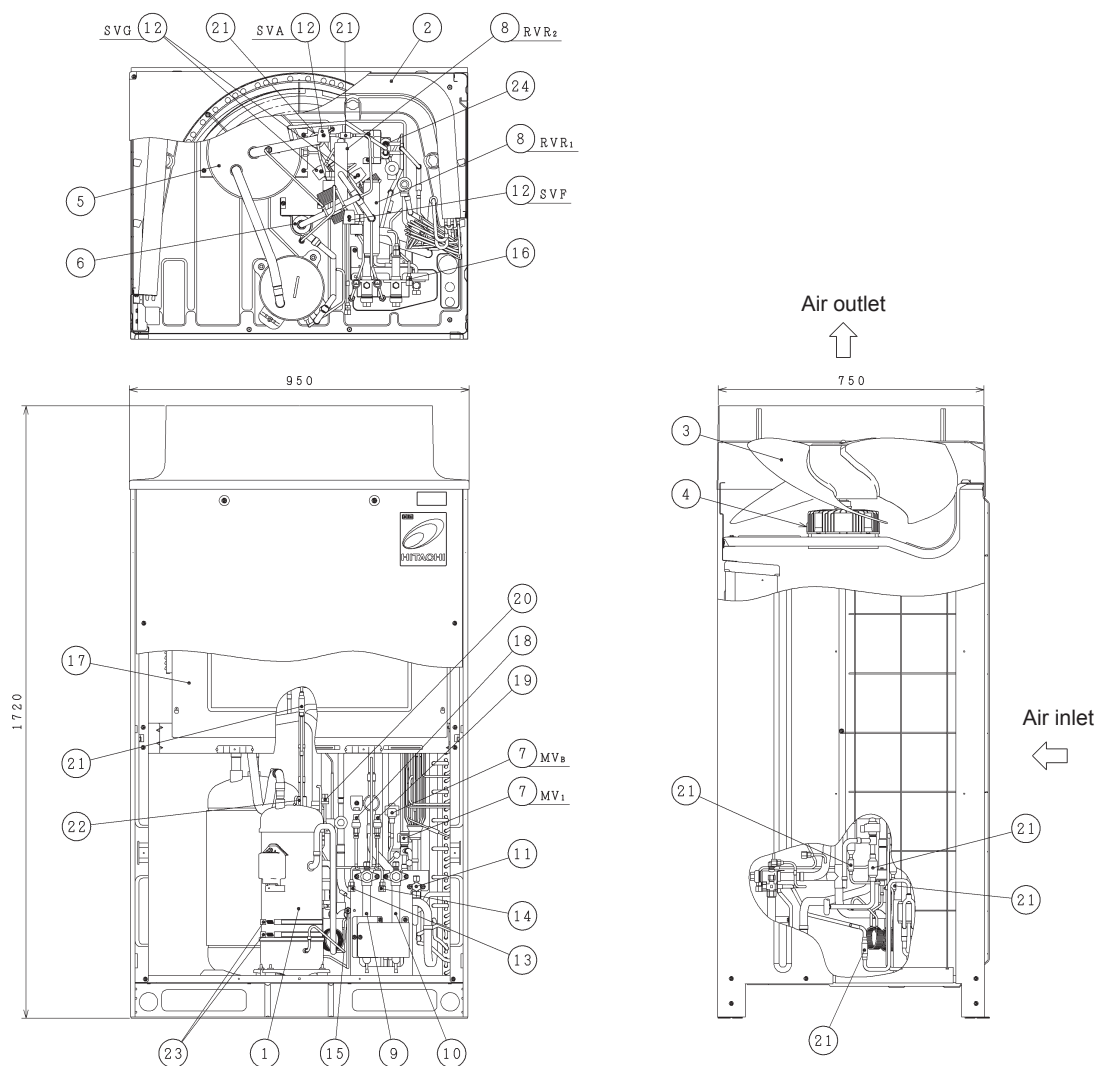
6 NAME OF PARTS

6.1 RAS-8FSXN1E



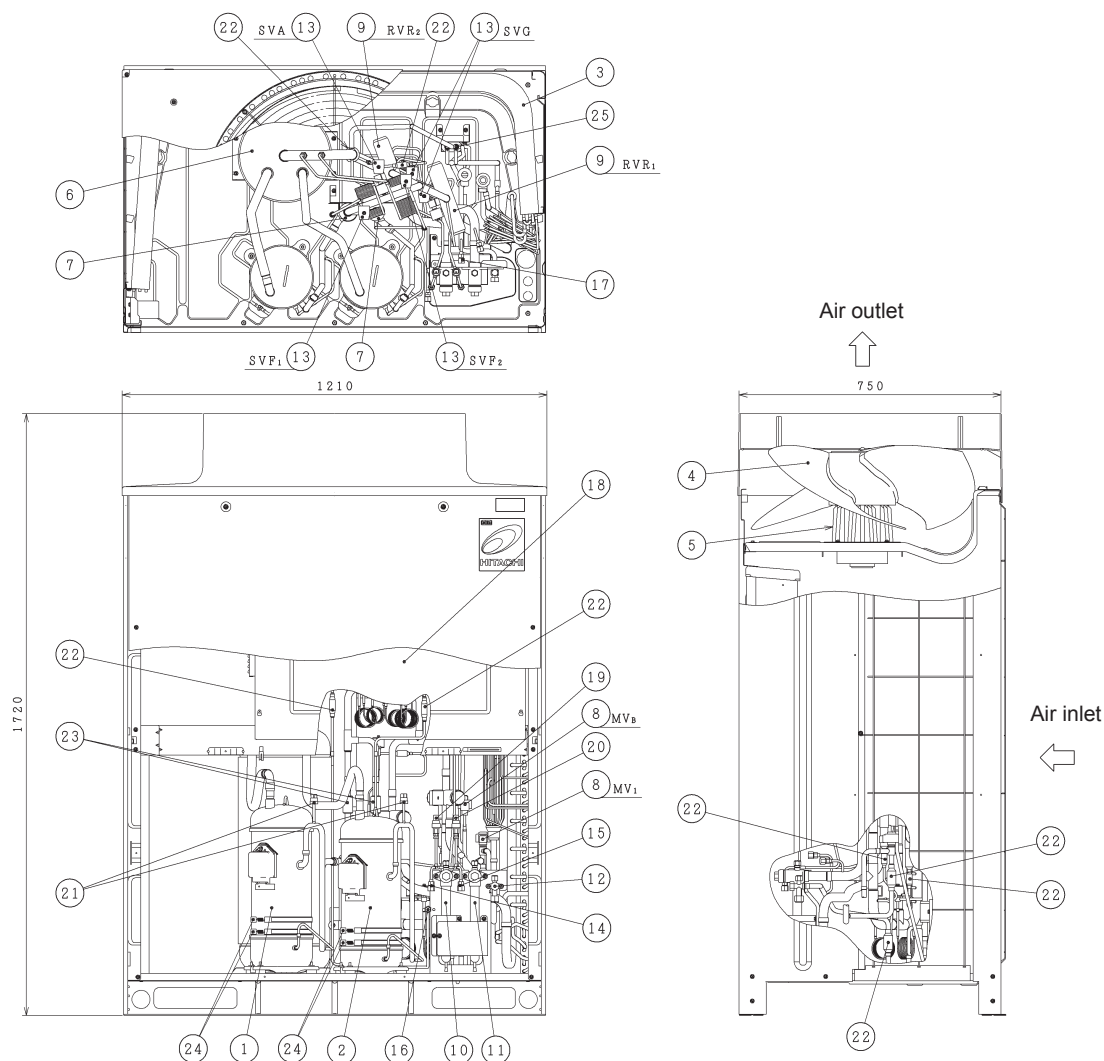
N°	Part	N°	Part
1	Compressor (Inverter)	13	Check joint (low)
2	Heat exchanger	14	Check joint (high)
3	Propeller fan	15	Check joint (for oil)
4	Fan motor	16	Check joint (for refrigerant)
5	Accumulator	17	Electrical control box
6	Oil separator	18	Low pressure sensor
7	Micro-computer control expansion valve (2 pcs.)	19	High pressure sensor
8	Reversing valve (2 pcs.)	20	High pressure switch for protection
9	Stop valve (low pressure gas)	21	Strainer
10	Stop valve (high/low pressure gas)	22	Check valve
11	Stop valve (liquid)	23	Crankcase heater (2 pcs.)
12	Solenoid valve (4 pcs.)	24	Double tube type heat exchanger

6.2 RAS-(10/12)FSXN1E



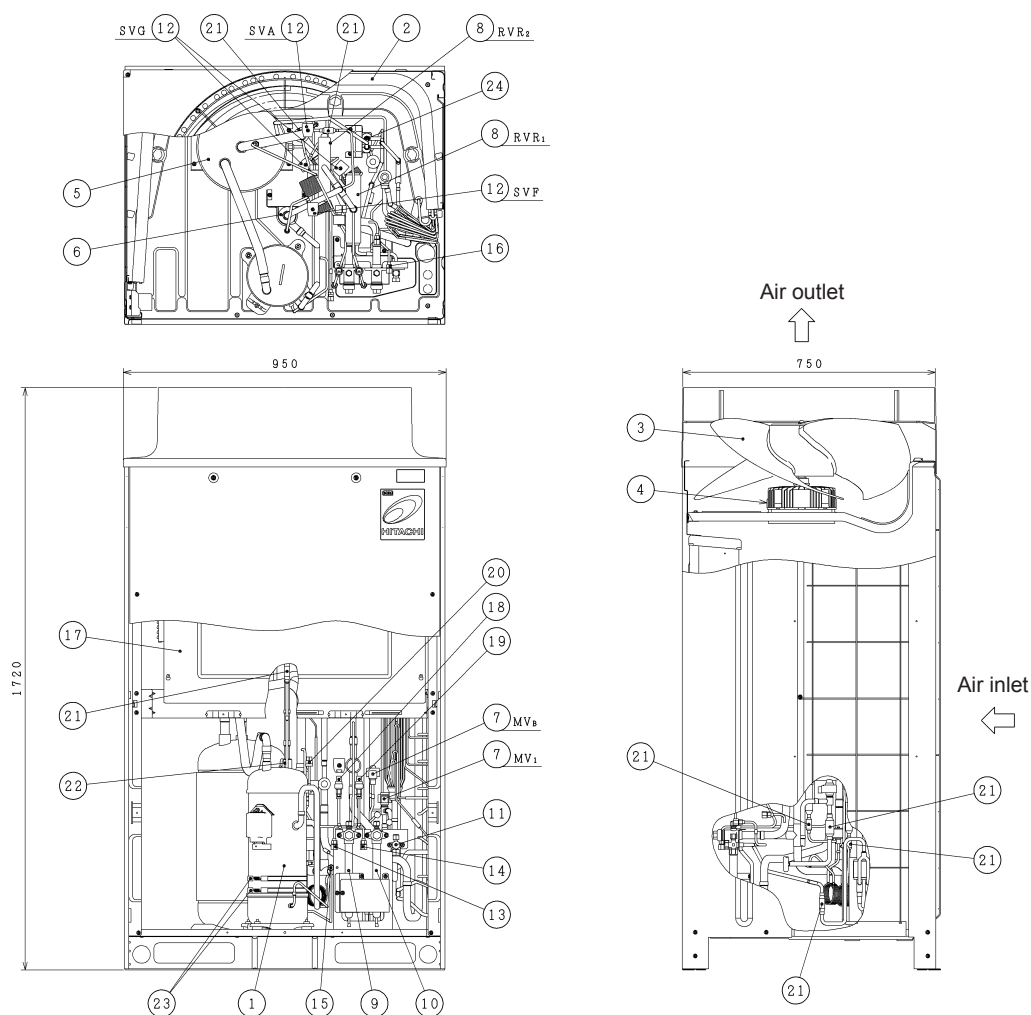
N°	Part	N°	Part
1	Compressor (Inverter)	13	Check joint (low)
2	Heat exchanger	14	Check joint (high)
3	Propeller fan	15	Check joint (for oil)
4	Fan motor	16	Check joint (for refrigerant)
5	Accumulator	17	Electrical control box
6	Oil separator	18	Low pressure sensor
7	Micro-computer control expansion valve (2 pcs.)	19	High pressure sensor
8	Reversing valve (2 pcs.)	20	High pressure switch for protection
9	Stop valve (low pressure gas)	21	Strainer
10	Stop valve (high/low pressure gas)	22	Check valve
11	Stop valve (liquid)	23	Crankcase heater (2 pcs.)
12	Solenoid valve (4 pcs.)	24	Double tube type heat exchanger

6.3 RAS-(14/16)FSXN1E



N°	Part	N°	Part
1	Compressor (Inverter)	14	Check joint (low)
2	Compressor (Constant speed)	15	Check joint (high)
3	Heat exchanger	16	Check joint (for oil)
4	Propeller fan	17	Check joint (for refrigerant)
5	Fan motor	18	Electrical control box
6	Accumulator	19	Low pressure sensor
7	Oil separator	20	High pressure sensor
8	Micro-computer control expansion valve (2 pcs.)	21	High pressure switch for protection (2pcs.)
9	Reversing valve (2 pcs.)	22	Strainer
10	Stop valve (low pressure gas)	23	Check valve
11	Stop valve (high/low pressure gas)	24	Crankcase heater (4 pcs.)
12	Stop valve (liquid)	25	Double tube type heat exchanger
13	Solenoid valve (4 pcs.)		

6.4 RAS-(5/6)FSXNHE



N°	Part	N°	Part
1	Compressor (Inverter)	13	Check joint (low)
2	Heat exchanger	14	Check joint (high)
3	Propeller fan	15	Check joint (for oil)
4	Fan motor	16	Check joint (for refrigerant)
5	Accumulator	17	Electrical control box
6	Oil separator	18	Low pressure sensor
7	Micro-computer control expansion valve (2 pcs.)	19	High pressure sensor
8	Reversing valve (2 pcs.)	20	High pressure switch for protection
9	Stop valve (low pressure gas)	21	Strainer
10	Stop valve (high/low pressure gas)	22	Check valve
11	Stop valve (liquid)	23	Crankcase heater (2 pcs.)
12	Solenoid valve (4 pcs.)	24	Double tube type heat exchanger

7 UNIT INSTALLATION

7.1 PRELIMINARY CONDITIONS FOR POSITIONING OF OUTDOOR UNIT

Mount the outdoor unit in a shady location or where it will not be exposed to direct sunlight, or to high temperatures. It should also be a well-ventilated spot.

Mount the outdoor unit so that noises and the discharge of air from the unit will not bother neighbours or the surrounding environment.

Install the outdoor unit in an area of limited access to the general public.

In cold climates, ice may form on the unit. When installing the unit, make sure that ice falling off the unit could not pose a risk to passers-by.

When installing the outdoor unit in areas covered by snow, mount the covers supplied by the fitter on the top of the unit and on the heat exchanger inlet side.

Do not install the outdoor unit in zones where dust or contamination could block the outside heat exchanger.

Do not install the outdoor unit in areas with a high air content of oil, saline atmospheres or aggressive gases such as sulphur.

Do not install the outdoor unit close to sources of strong electromagnetic radiation or in areas where electromagnetic waves radiate directly towards the electrical box and the components of the unit. Install the unit as far as possible from these sources (minimum 3 metres); electronic noise may result in the incorrect operation of the unit.

CAUTION

In areas with high electromagnetic turbulence, a fuse may blow or the unit stop or an alarm may be triggered. In this case, stop the system and restart it to remove the alarm.

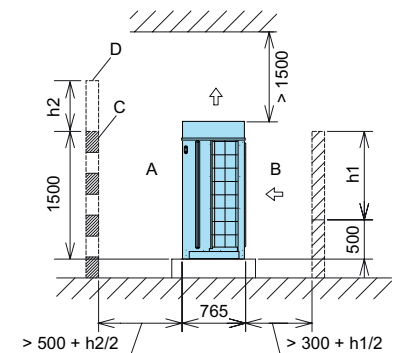
Make sure that the base of the foundations is flat and strong enough to bear the weight of the unit.

Install the outdoor unit in an area with enough space around the unit to permit service and maintenance tasks.

CAUTION

- The aluminium fins have sharp edges. Take special care to avoid injury.
- The outdoor unit must be installed on rooftops or in areas not accessible by the user. Only service technicians and maintenance personnel are permitted access to the unit.

7.2 INSTALLATION SPACE



Calculate the service space required during the installation of the unit, based on the following:

- If there are no walls in front of or behind the unit, a space of 500 mm is necessary in front -A- and 300 mm behind -B-.
- If the front wall is higher than 1500 mm, a space of $(500 + h2/2)$ mm is required at the front -A-.
- If the rear wall is higher than 500 mm, a space of $(300 + h1/2)$ mm is required at the back -B-.
- If a wall -D- is installed in front of the unit, a ventilation hole -C- should be made in the wall.
- When the space over the unit is less than 1500 mm, or the space around the unit is closed, a duct is required to prevent short-circuits between the inlet air and the discharge air.
- If there are any obstacles in the space over the unit, the four sides of the unit should be left open.

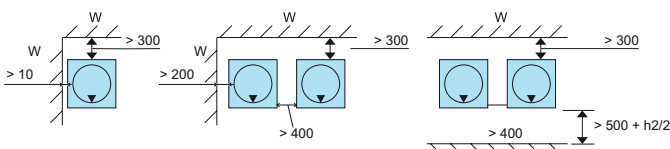
NOTE

Side view. All measurements are in mm.

7.3 INSTALLATION

7.3.1 Installation with walls in two directions

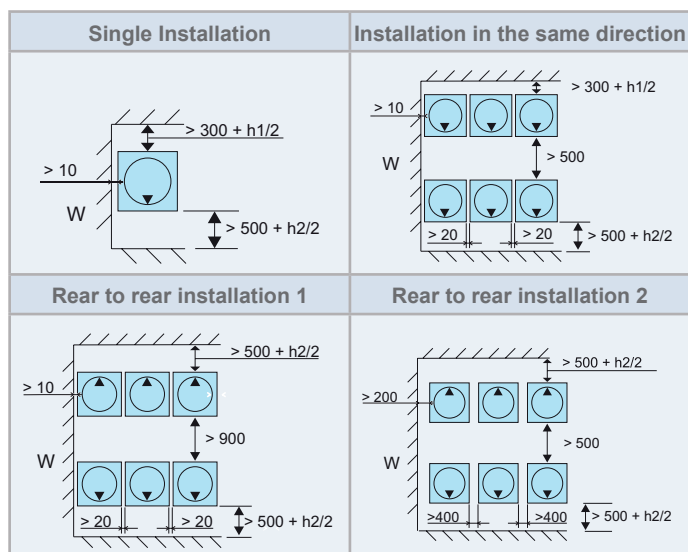
If the units installed are adjacent to high buildings, without walls in two directions, a space of 300 mm is required at the rear side of the unit.



NOTE

- All measurements are in mm.
- Top view. The arrow ▼ indicates the front of the unit.
- W: No limit for side wall height.

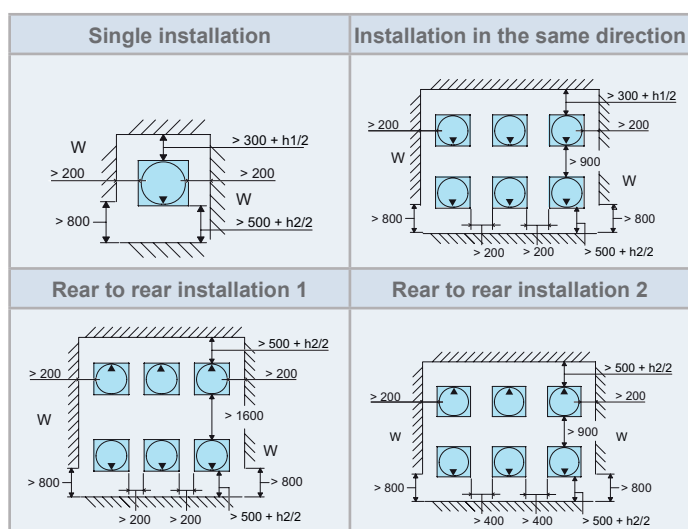
7.3.2 Installation with walls in three directions



i NOTE

- All measurements are in mm.
- Top view. The arrow ▼ indicates the front of the unit.
- W: No limit for side wall height.

7.3.3 Installation with walls in four directions



i NOTE

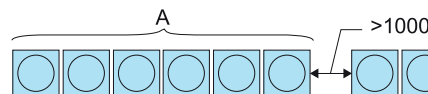
- All measurements are in mm.
- Top view. The arrow ▼ indicates the front of the unit.
- W: No limit for side wall height.

7.3.4 Considerations

- The dimensions considered in the figures include the space necessary for typical installation, and maintenance work for operation in refrigeration mode at an outdoor temperature of 35 °C.

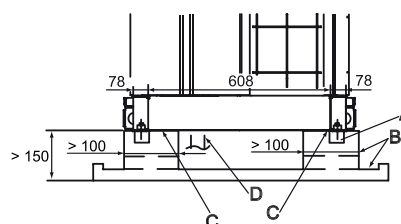
If the outdoor temperature is higher and if there is a possibility of a short circuit between the inlet and outlet air, locate the most suitable dimensions by calculating the air flow current in comparison with the dimensions given.

- For installation in several groups, a maximum of six units (A) one metre apart can be grouped.



- If the unit is surrounded by walls on all four sides, keep one of the walls partially open.
- Keep the upper side open to prevent mutual interference of inlet and outlet air for each outdoor unit.

7.3.5 Foundations



i NOTE

All measurements are in mm.

A	Mortar housing $\varnothing 100 \times 150$
B	Drainage 100x20
C	Anti-vibration insulation material
D	Refrigerant pipes

The foundations for the installation of the outdoor unit must be more than 150 mm above ground level.

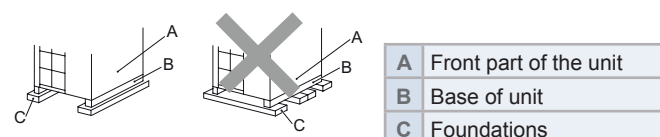
The foundations require perimeter drainage to help drain condensation.

When a system of condensation drainage pipes is required for the outdoor unit, the genuine accessory DBS-TP10A should be used. Do not fit drainage pipes or collection trays in cold climates, as they could freeze and break.

! DANGER

Drainage must not take place in areas frequented by pedestrians. In low temperatures, the drainage water could freeze and lead to falls.

The foundations must be able to bear the weight of the whole of the base of the unit and should be laid as shown in the diagram.

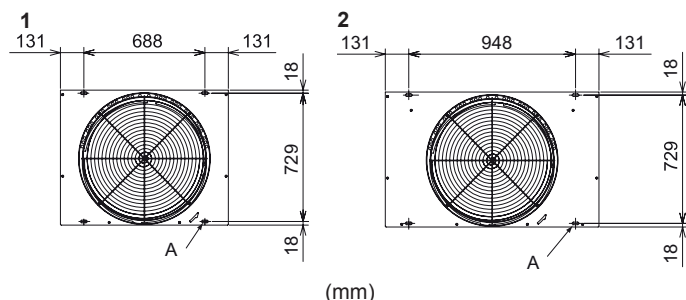


Check the front-rear line and the sides of the unit are level: there should not be more than 10 mm difference between each side.

The foundation must be sufficiently strong to ensure that the outdoor unit:

- Is not tilted.
- Does not produce strange noises.
- Remains secure in the event of strong winds or earthquakes.

7.3.6 Position of anchorage bolts



1 Outdoor unit SET FREE RAS-(8-12)FSXN1E and RAS-(5/6)FSXNHE
 2 Outdoor unit SET FREE RAS-(14/16)FSXN1E and RAS-(8-12)FSXNHE
 A Openings for the anchorage bolts (4x) 38x15.

Secure the outdoor unit using the field-supplied anchorage bolts.

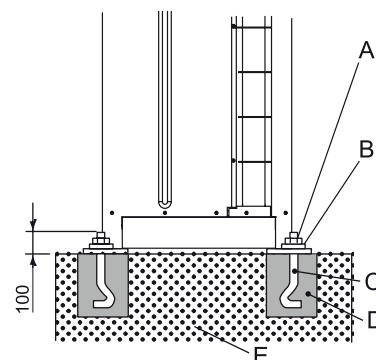


Diagram of fastening of outdoor unit using field-supplied anchorage bolts.

A	Nut
B	Washer
C	M12 anchorage bolt
D	Mortar fill
E	Concrete

8 PIPING WORK AND REFRIGERANT CHARGE

8.1 REFRIGERANT PIPE SELECTION

8.1.1 Refrigerant pipe selection

The RAS-(8-54)FSXN1E(-P) and RAS-(5-36)FSXNHE(-P) outdoor units can work as a heat pump system, by means of a two-pipe system (gas pipe and liquid pipe), or they can work as a heat recovery system by means of a three-pipe system (high and low pressure pipes and liquid pipe), requiring in addition the CH units supplied as accessories.

There is an optional specific pipe connection kit available according to the power of the outdoor unit:

Operating mode	Outdoor unit		N° of outdoor units	Connection kit	Indications
Heat pump system	FSXN1E	(16-P)(18-24)	2	MC-20AN1	2 pipes type • for high/low pressure gas • for liquid
		(26-32)	2	MC-21AN1	
		(32-P)(34-48)	3	MC-30AN1	
		(50-54)	4	MC-40AN1	
	FSXNHE	(12-P) (14-24)	2	MC-20AN1	
		(24-P) (26-36)	3	MC-30AN1	
Heat recovery system	FSXN1E	(16-P)(18-24)	2	MC-20XN1	3 pipes type • for high/low pressure gas • for low pressure gas • for liquid
		(26-32)	2	MC-21XN1	
		(32-P)(34-48)	3	MC-30XN1	
		(50-54)	4	MC-40XN1	
	FSXNHE	(12-P) (14-24)	2	MC-20XN1	
		(24-P) (26-36)	3	MC-30XN1	

◆ Pipe size selection

Select the pipe size in line with the following instructions:

- 1 Between the outdoor unit and the branch pipe (multikit): select the same pipe connection size as for the outdoor unit.
- 2 Between the branch pipe (multikit) and the indoor unit: select the same pipe connection size as for the indoor unit.

⚠ CAUTION

- Do not use refrigerant pipe sizes other than those indicated in the technical information. The diameter of the refrigerant pipes depends directly on the power of the outdoor unit.
- If larger diameter refrigerant pipes are used, the circuit lubrication oil tends to separate from the gas carrying it. The compressor will be seriously damaged due to a lack of lubrication.
- If smaller diameter refrigerant pipes are used, the gas or liquid refrigerant will have serious difficulties in circulating. System performance will be affected. The compressor will run under more severe conditions than foreseen and will be damaged in a short space of time.

⚠ CAUTION

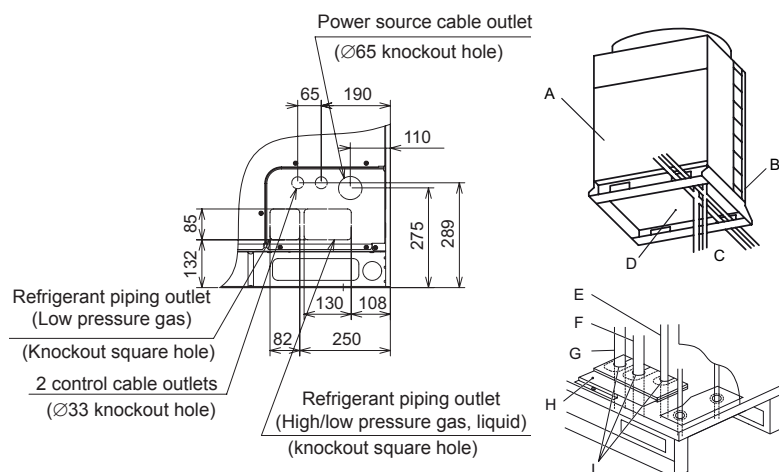
- The copper pipe used in the refrigeration installations is different to the copper pipe used in installations carrying domestic or heating water.
- The copper pipe for refrigeration installations is especially treated for outdoors and indoors. The interior surface finish makes it easier for the refrigerant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

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.

◆ Connection position of outdoor unit pipes



- Wear appropriate means of protection during cutting or brazing operations and installation (gloves, eye protection, etc).

On completing the installation of the refrigerant pipes, insulate them appropriately using suitable insulating material and seal the open space between the holes made and the pipe.

◆ 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.

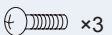
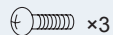
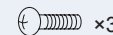
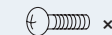
Fit and secure refrigerant pipes correctly to prevent vibrations and strain on the stop valves.

The pipes may be fitted in three directions (front, rear or inferior) from the base of the unit.

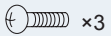
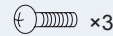
Remove the cover of the gas and liquid pipes -H- and connect using the accessories factory-supplied with the unit.

Fit the cover on the pipes and completely seal around them and the cover to prevent the entrance of water, rodents and dirt.

◆ Accessories factory-supplied with FSXN1E units

Accessory			8HP	10HP	12HP	14HP	16HP	Remarks
Accessory pipe	(A)	Connection for refrigerant gas (high/low) pipe	 ø22.2→ø15.88	 ø22.2→ø19.05	-	 ø25.4→ø22.2	 ø25.4→ø22.2	Only for heat recovery system
	(B)	Connection for refrigerant gas (high/low) pipe	 ø22.2→ø19.05	-	 ø22.2→ø25.4	-	 ø25.4→ø28.58	* Low for heat recovery system * High/Low for heat pump system
	(C)	Connection for refrigerant liquid pipe	-	-	 ø9.52→ø12.7	-	-	
Cord clamp	For fixing power source cable							
Rubber bush	For power source cable outlet (bottom base, feet)		 ×2	 ×2	 ×2	 ×2	 ×2	ø58
	For power source cable outlet (piping cover)		 ×2	 ×2	 ×2	 ×2	 ×2	ø32
	For transition wire outlet (bottom base, feet)		 ×1	 ×1	 ×1	 ×1	 ×1	ø70
	For transition wire outlet (piping cover)		 ×2	 ×2	 ×2	 ×2	 ×2	ø38
Screw (1 for fixing cord clamp, 2 for spare)			 ×3	 ×3	 ×3	 ×3	 ×3	
Combination unit model label	For identifying combination unit model							

◆ Accessories factory-supplied with FSXNHE units

Accessory			5HP	6HP	8HP	10HP	12HP	Remarks
Accessory pipe	(A)	Connection for refrigerant gas (high/low) pipe	 ø22.2→ø12.7	 ø22.2→ø15.88	 ø22.2→ø15.88	 ø22.2→ø19.05	-	Only for heat recovery system
	(B)	Connection for refrigerant gas (high/low) pipe	 ø22.2→ø15.88	 ø22.2→ø19.05	 ø22.2→ø19.05	-	 ø22.2→ø25.4	* Low for heat recovery system * High/Low for heat pump system
	(C)	Connection for refrigerant liquid pipe	-	-	-	-	 ø9.52→ø12.7	
Cord clamp	For fixing power source cable							
Rubber bush	For power source cable outlet (bottom base, feet)		 ×2	 ×2	 ×2	 ×2	 ×2	ø58
	For power source cable outlet (piping cover)		 ×1	 ×1	 ×1	 ×1	 ×1	ø32
	For transition wire outlet (bottom base, feet)		 ×2	 ×2	 ×2	 ×2	 ×2	ø70
	For transition wire outlet (piping cover)		 ×2	 ×2	 ×2	 ×2	 ×2	ø38
Screw (1 for fixing cord clamp, 2 for spare)			 ×3	 ×3	 ×3	 ×3	 ×3	
Combination unit model label	For identifying combination unit model		-					

NOTE

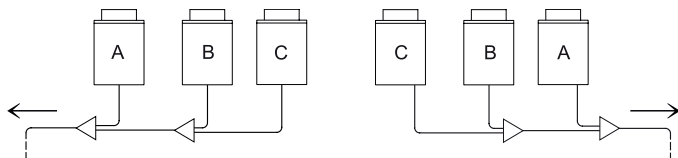
Please contact your HITACHI distributor if any of the accessories has not been supplied with the unit.

Precautions for the installation of the outdoor unit

◆ Order of installation of the units

The outdoor units must be installed in decreasing order of capacity: Capacity of unit A $\geq$ capacity of unit B $\geq$ capacity of unit C.

Unit -A-, with the highest capacity, must be closest the indoor units.

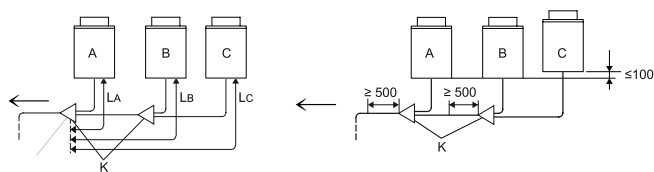


◆ Refrigerant pipe installation between outdoor units

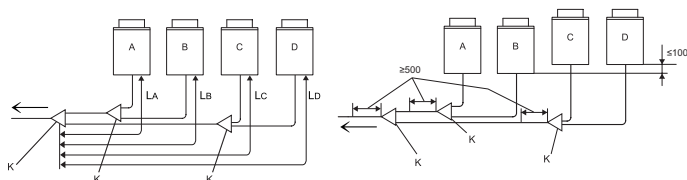
- The length between the connection kit -K- (on the side of the outdoor unit) and the outside unit, must be

$$L_A \leq L_B \leq L_C \leq 10 \text{ m.}$$

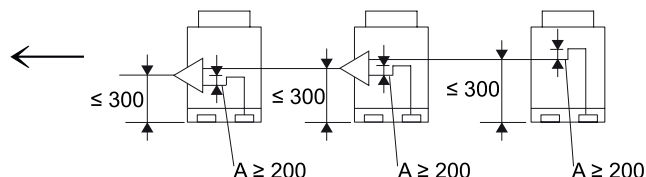
- For FSXN1E and FSXNHE



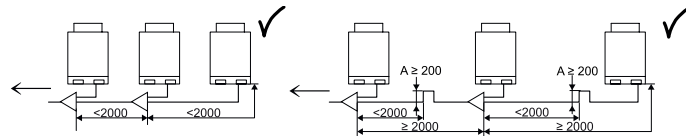
- For FSXN1E only



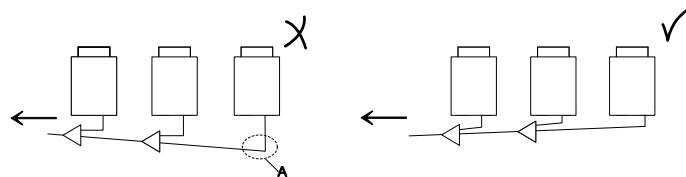
- Place the connection kit at a lower level with respect to the connection of the refrigerant pipes of the outdoor unit. If the connection kit is placed above the refrigerant pipe connection of the outdoor unit, keep a maximum of 300 mm between the connection kit and the base of the outdoor unit. In addition, an oil recovery unit -A- (minimum 200 mm) should be fitted between the connection kit and the outdoor unit.



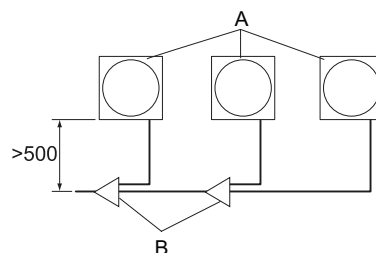
- If the length of the refrigerant gas and liquid pipes between outdoor units is greater than two metres, the oil recovery unit should be fitted on the gas pipe to prevent the build-up of refrigerant oil.



- Place the refrigerant pipes of the outdoor units horizontally, or slightly tilted towards the side of the indoor units to prevent the build-up of refrigerant oil at the lowest point -A-.



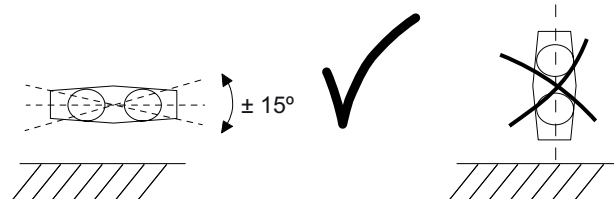
- If the refrigerant pipes are opposite the outdoor unit, there should be a minimum of 500 mm between the outdoor units and the connection kits -B- for maintenance operations.



NOTE

The 500 mm space is required when replacing the unit compressor.

- Install the connection kits parallel to the floor ($\pm 15^\circ$).

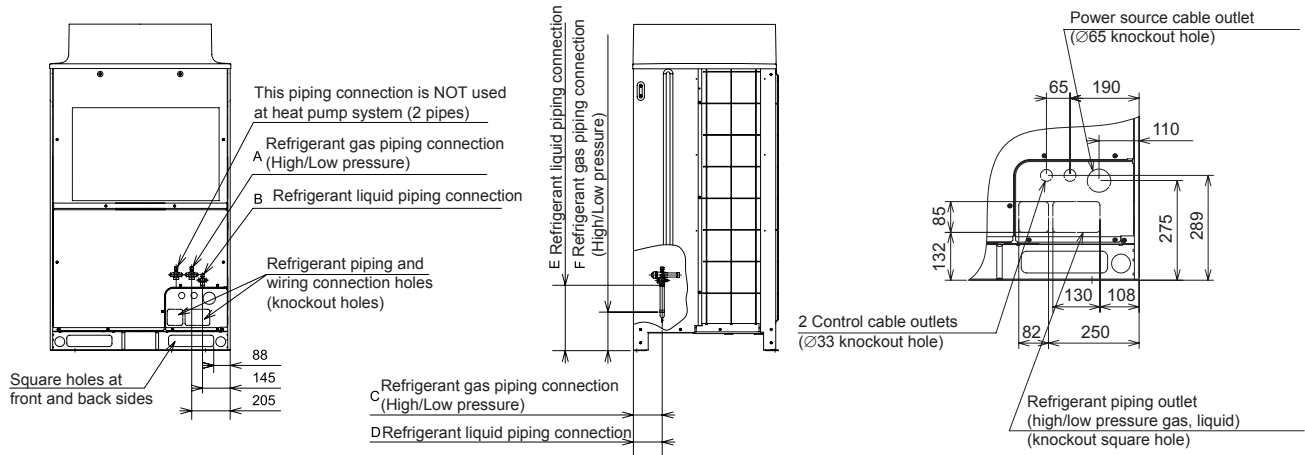


8.1.2 Refrigerant pipe connection

Perform the piping connection work for each outdoor unit. Prepare the refrigerant pipe in the field for the piping work.

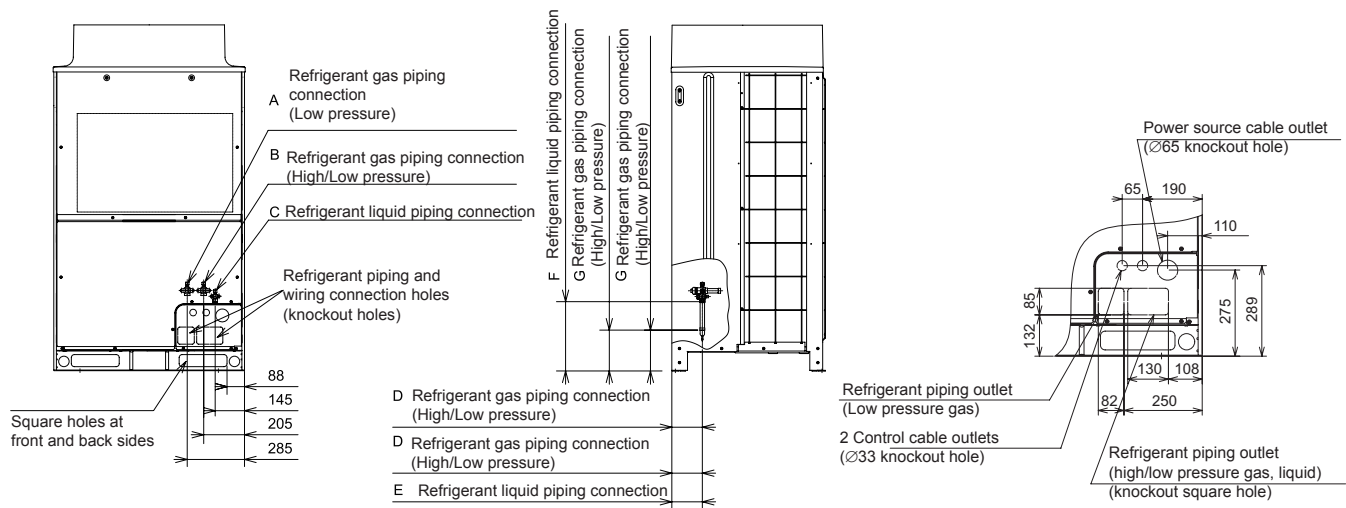
Heat pump systems (2 pipes)

(All measurements are in mm)



Model	A	B	C	D	E	F	Model	A	B	C	D	E	F
RAS-8FSXN1E	Ø19.05	Ø9.52	150	150	340	205	RAS-5FSXNHE	Ø15.88	Ø9.52	150	150	340	205
RAS-10FSXN1E	Ø22.2	Ø9.52					RAS-6FSXNHE	Ø19.05	Ø9.52				
RAS-12FSXN1E	Ø25.4	Ø12.7					RAS-8FSXNHE	Ø19.05	Ø9.52	170	170		
RAS-14FSXN1E	Ø25.4	Ø12.7	RAS-10FSXNHE	Ø22.2	Ø9.52								
RAS-16FSXN1E	Ø28.58	Ø12.7	RAS-12FSXNHE	Ø25.4	Ø12.7								

Heat recovery systems (3 pipes)

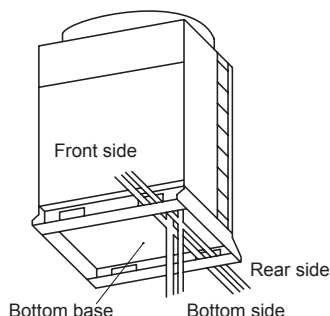


Model	A	B	C	D	E	F	G	Model	A	B	C	D	E	F	G
RAS-8FSXN1E	Ø19.05	Ø15.88	Ø9.52	150	150	340	205	RAS-5FSXNHE	Ø15.88	Ø12.70	Ø9.52	150	150	340	205
RAS-10FSXN1E	Ø22.2	Ø19.05	Ø9.52					RAS-6FSXNHE	Ø19.05	Ø15.88	Ø9.52				
RAS-12FSXN1E	Ø25.4	Ø22.20	Ø12.70	170	170	325	200	RAS-8FSXNHE	Ø19.05	Ø15.88	Ø9.52	170	170		
RAS-14FSXN1E	Ø25.4	Ø22.20	Ø12.70					RAS-10FSXNHE	Ø22.2	Ø19.05	Ø9.52				
RAS-16FSXN1E	Ø28.58	Ø22.20	Ø12.70					RAS-12FSXNHE	Ø25.4	Ø22.20	Ø12.70				

Piping direction

Fix the pipes adequately in order to avoid vibration and excessive force to the valve.

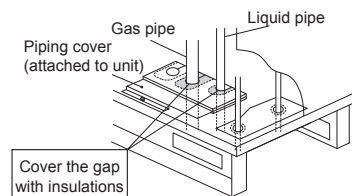
- 1 The pipes can be installed in three directions (front, rear or bottom side) from the bottom base. For vibration protection, properly fix the piping connection and check that no excessive force is applied to the stop valve.



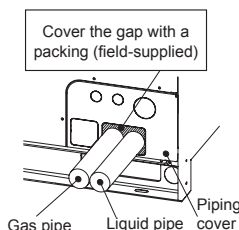
- 2 Operation of the stop valve should be performed according to the specified in this manual.
- 3 Connect the pipes according to the tables.
- 4 Completely seal the penetration part at the bottom of the pipes with insulation in order to prevent rain water from entering the conduit.

For heat pump systems (2 pipes)

For piping from bottom base

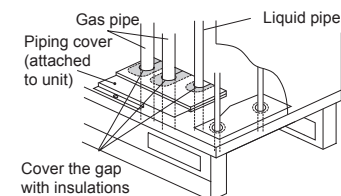


For piping from front or rear side piping cover

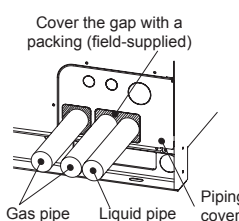


For heat recovery systems (3 pipes)

For piping from bottom base



For piping from front or rear side piping cover



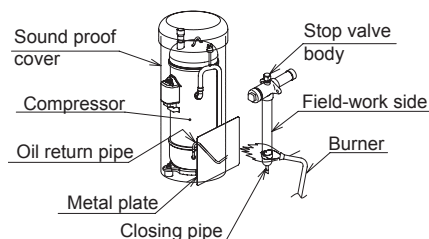
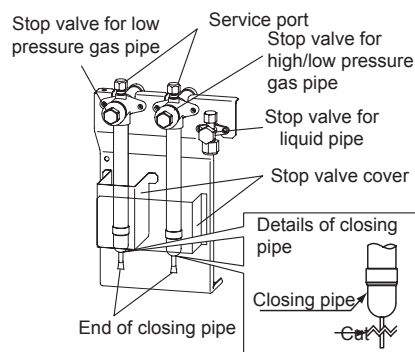
Stop valve

Follow the restrictions for refrigerant piping (permissible length, height difference). If not, the outdoor unit may be damaged or fail.

The stop valves shall be closed completely (factory setting) when the refrigerant piping connection is performed. Do not open the stop valves until all the refrigerant piping connections, air-tight test and vacuuming have been completed.

Gas valve

- 1 Make sure that all the spindles are closed completely.
- 2 Connect the charging hose to the service port and release the gas inside the piping from the high/low and low pressure gas pipes.
- 3 Cut the end of the closing pipes and check that no gas exists inside the high/low and low pressure gas pipes.
- 4 Remove the stop valve cover.
- 5 Remove the closing pipe from the brazing portion with a burner. Pay attention to the flame from the burner not to burn the stop valve body.



CAUTION

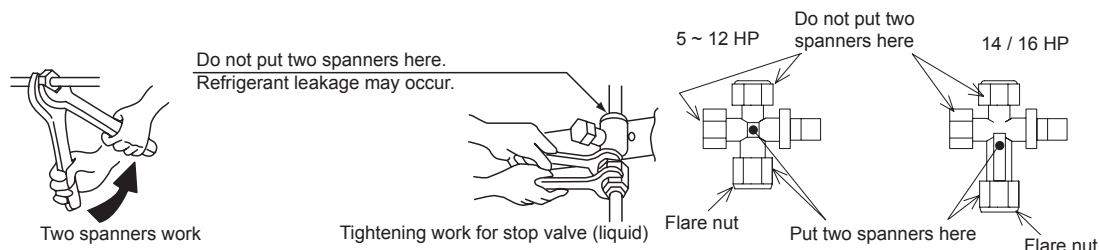
- Ensure that there is no gas inside the pipe when removing the closing pipe. Otherwise, the pipe may be blown out and it may lead to injury.
- Protect the return oil pipe and vibration proof of the compressor with a metal plate when using a burner.

Liquid valve

Tighten the flare nut for liquid stop valve according to the following torque. If an excessive force is applied to the flare nut, the refrigerant leakage may occur from the spindle part.

Details of stop valves

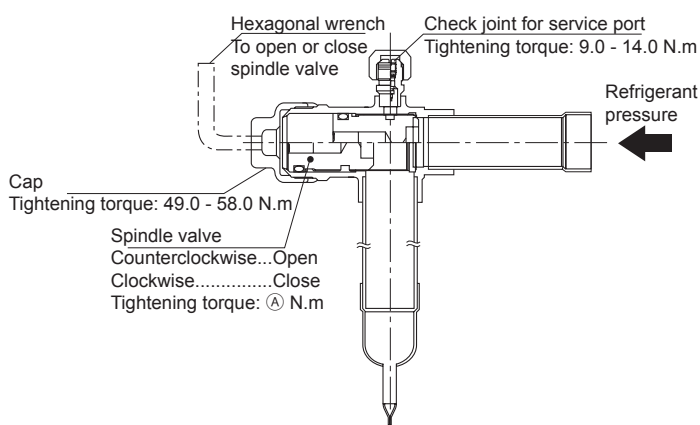
(Put two spanners as shown in the right figure when the piping is removed and attached. If not, the refrigerant leakage may occur.)



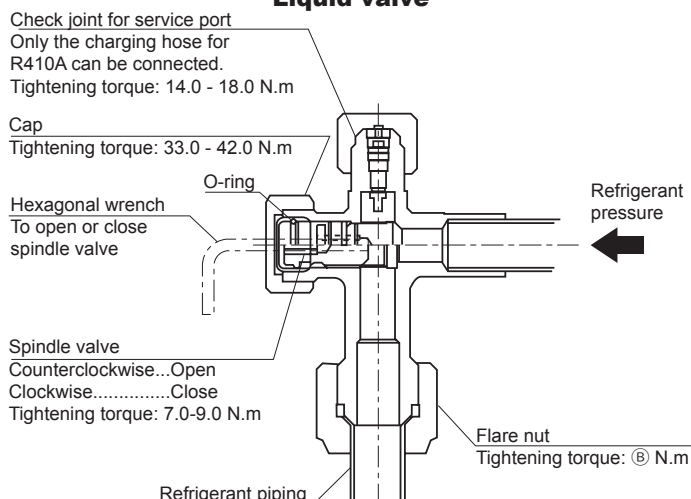
CAUTION

- Do not apply an excessive force to the spindle valve after fully opening the spindle. The back seat construction is not provided.
- At the test run, fully open the spindle. If it is not fully opened, the devices will be damaged.

Gas valve



Liquid valve



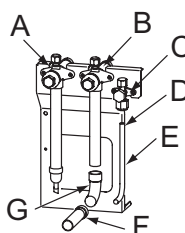
Closed upon factory shipping

Model	Tightening Torque (N.m)	
	A	B
RAS-(8-12)FSXN1E RAS-(5-8)FSXNHE	18.0 - 22.0	33.0 - 42.0
RAS-(14/16)FSXN1E	25.0 - 31.0	50.0 - 62.0

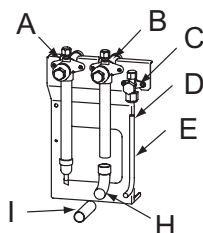
Refrigerant pipe connection

For heat pump systems (2 pipes)

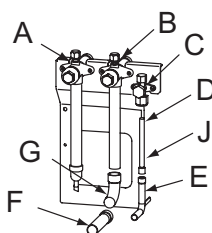
RAS-(8/16)FSXN1E
RAS-(5-8)FSXNHE



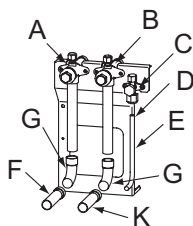
RAS-(10/14)FSXN1E
RAS-10FSXNHE



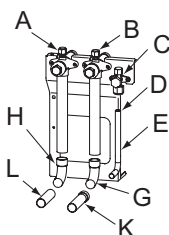
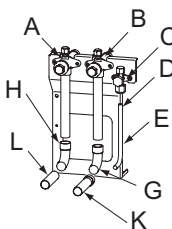
RAS-12FSXN1E
RAS-12FSXNHE



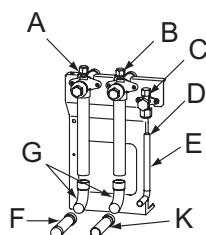
A	Stop valve (Low pressure gas)
B	Stop valve (High/low pressure gas)
C	Stop valve (Liquid)
D	Flaring
E	Liquid pipe (field-supplied)
F	Accessory pipe (B)
G	90° Elbow B (field-supplied)
H	90° Elbow A (field-supplied)
I	High/low pressure gas pipe (field-supplied)
J	Accessory pipe (C)

For heat recovery systems (3 pipes)RAS-8FSXN1E
RAS-(5-8)FSXNHE

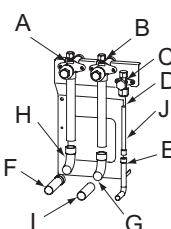
RAS-14FSXN1E

RAS-10FSXN1E
RAS-10FSXNHE

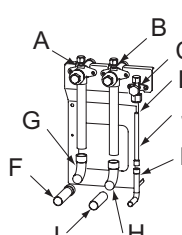
RAS-16FSXN1E



RAS-12FSXN1E



RAS-12FSXNHE



A	Stop valve (Low pressure gas).
B	Stop valve (High/low pressure gas)
C	Stop valve (Liquid)
D	Flaring
E	Liquid pipe (field-supplied)
F	Accessory pipe (B)
G	90° Elbow B (field-supplied)
H	90° Elbow A (field-supplied)
I	High/low pressure gas pipe (field-supplied)
J	Accessory pipe (C)
K	Accessory pipe (A)
L	Low pressure gas pipe (Field supplied)

⚠ DANGER

- Check that the gas and liquid stop valves are fully closed.
- Check that there is no gas inside the pipe before removing the stop pipe. Otherwise, the pipe may explode when heated with the blow torch.

Special care should be taken to ensure that the flame from the blow torch does not fall on the body of the stop valve, on the compressor and cover or on the insulation bushings; insert a metal plate in front of the oil return pipe: see on section ["Stop valve"](#).

Connect the indoor units to the outdoor units using copper pipes specifically for use with refrigerant. When laying the pipes make sure that they do not directly rest on or touch walls or other parts of the building (when the refrigerant is flowing through the pipes, this could cause strange noises).

Specific torques for the flared connections: see on section ["Details of stop valves"](#).

While welding, apply a flow of nitrogen gas inside the pipe.

Fully insulate the refrigerant pipes.

⚠ CAUTION

Fit the pipe protection provided with the outdoor unit on completion of the installation work. Otherwise, the unit may be damaged by the entrance of snow, water or rodents

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

Refer to the [Accessories factory-supplied](#) for the details of the accessory pipes (B) and (C).

Ensure that the closing pipes of the high/low and low pressure gas stop valves (2 parts) are removed firstly.

For heat recovery systems (3 pipes)

Refer to the [Accessories factory-supplied](#) for the details of the accessory pipes (A), (B) and (C).

Ensure that the closing pipes of the high/low and low pressure gas stop valves (1 parts) are removed firstly.

8.2 REFRIGERANT CHARGE

8.2.1 Air-Tight Test

Check to ensure that spindles of the stop valves for High/Low pressure gas, Low pressure gas and Liquid pipes are closed completely before air-tight test.

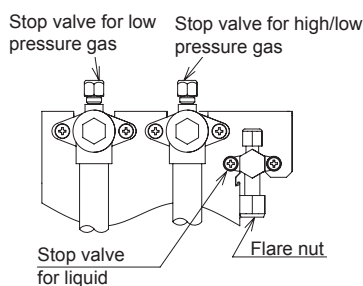
The refrigerant used for this outdoor unit is R410A only. Use the manifold gauge and the charging hose for exclusive use of R410A.

◆ Tightening check of stop valves

After connecting the pipe, remove the caps of stop valves for high/low pressure gas, low pressure gas (for heat recovery system only) and liquid. Tighten the open-close spindle in the closing direction according to the following tightening torque.

Caution for operation of stop valves

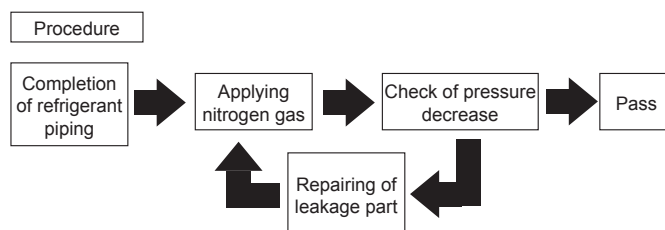
- Remove the stop valve caps before performing the air-tight test after connecting the refrigerant piping. Tighten the spindle (valve) in clockwise direction according to the following tightening torque.
- Perform the work after warming the spindle part with a dryer etc. when controlling the stop valve in a cold area. (O-ring of the spindle part will harden at the low temperature and the refrigerant leakage may occur.)
- Do not apply an excessive force after fully opening the spindle. (Tightening Torque: < 5.0N.m) (The back seat is not provided.)
- When each valve is opened, remove tags "Close" (Accessories) and attach tags "Open" instead.
- Tighten securely the caps according to the following tightening torque after each spindle valve is opened.



◆ Air-tight test method

Connect the manifold gauge to the check joints of the liquid line and the gas line stop valves using charging hoses with a vacuum pump or a nitrogen cylinder. Perform the air-tight test. Do not open the stop valves. Apply nitrogen gas pressure of 4.15MPa for FSXN1E and FSXNHE series. For checking gas leakage, use the leak detector or forming agent. If there is any leakage, fix the leaking part.

For checking gas leakage, do not use a forming agent which generates ammonia. Additionally, do NOT use a household detergent as forming agent whose components are not clear. The recommended foaming agent for checking gas leakage is shown below.



Recommended forming agent	Manufacturer
Guproflex	Yokogawa & CO.,Ltd

⚠ DANGER

Be sure to use Nitrogen Gas for air-tight test. If other gases such as oxygen gas, acetylene gas or fluorocarbon gas are accidentally used, it may cause an explosion or gas intoxication.

◆ Insulation work

- Securely insulate high/low pressure and low pressure (for heat recovery system only) gas piping side and liquid piping side individually. Make sure to insulate the union flare nut for the piping connection as well.
- Mount the piping cover equipped with the outdoor unit after connecting the pipe. Completely seal the penetration part at the bottom of the pipes with insulation in order to prevent rain water from entering the conduit.
- Cover the gap between the piping cover and pipes with a packing (field-supplied) after the insulation work is completed.

i NOTE

If the gap is not covered, the unit may be damaged if snow, rain water or animals enter the unit.

8.3 VACUUMING

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

8.4 ADDITIONAL REFRIGERANT CHARGE CALCULATION

Although refrigerant has been charged into this unit in advance, additional refrigerant charge is required according to piping length.

Determine the additional refrigerant quantity according to the following procedure, and charge the system with it.

Record the additional refrigerant quantity to facilitate maintenance and servicing activities thereafter.

Calculating method of additional refrigerant charge (W kg)

N°	Symbol	Contents	Additional charge (kg)																																
1	W1	Additional refrigerant charge calculation for liquid piping (W1 kg)	kg																																
		<table><tr><th>Pipe diameter (mm)</th><th>Total piping length (m)</th><th>Refrigerant amount for 1m pipe (kg/m)</th><th>Additional charge (kg)</th></tr><tr><td>Ø22.2</td><td>m</td><td>× 0.36 =</td><td></td></tr><tr><td>Ø19.05</td><td>m</td><td>× 0.26 =</td><td></td></tr><tr><td>Ø15.88</td><td>m</td><td>× 0.17 =</td><td></td></tr><tr><td>Ø12.7</td><td>m</td><td>× 0.11 =</td><td></td></tr><tr><td>Ø9.52</td><td>m</td><td>× 0.056 =</td><td></td></tr><tr><td>Ø6.35</td><td>m</td><td>× 0.024 =</td><td></td></tr><tr><td colspan="3">Total additional charge for liquid piping =</td><td></td></tr></table>		Pipe diameter (mm)	Total piping length (m)	Refrigerant amount for 1m pipe (kg/m)	Additional charge (kg)	Ø22.2	m	× 0.36 =		Ø19.05	m	× 0.26 =		Ø15.88	m	× 0.17 =		Ø12.7	m	× 0.11 =		Ø9.52	m	× 0.056 =		Ø6.35	m	× 0.024 =		Total additional charge for liquid piping =			
		Pipe diameter (mm)		Total piping length (m)	Refrigerant amount for 1m pipe (kg/m)	Additional charge (kg)																													
		Ø22.2		m	× 0.36 =																														
		Ø19.05		m	× 0.26 =																														
		Ø15.88		m	× 0.17 =																														
		Ø12.7		m	× 0.11 =																														
		Ø9.52		m	× 0.056 =																														
		Ø6.35		m	× 0.024 =																														
		Total additional charge for liquid piping =																																	
 NOTE <i>In the case that the quantity calculated above is less than the minimum quantity indicated in the table below, adopt the quantity in the table below as the additional refrigerant quantity for piping liquid, regardless of the piping length.</i> <table><tr><th>HP</th><td>5</td><td>6</td><td>8</td><td>10</td><td>12</td><td>14</td><td>16</td></tr><tr><th>Minimum additional charge of base unit (kg)</th><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>3.0</td><td>3.0</td><td>3.0</td></tr></table> For combination of the units, adopt the total minimum quantity of each base unit as the minimum additional refrigerant quantity.	HP	5	6	8	10	12	14	16	Minimum additional charge of base unit (kg)	2.0	2.0	2.0	2.0	3.0	3.0	3.0																			
HP	5	6	8	10	12	14	16																												
Minimum additional charge of base unit (kg)	2.0	2.0	2.0	2.0	3.0	3.0	3.0																												
2	W2	Additional refrigerant charge quantity for indoor unit (only for heat pump system) (W2 kg)	kg																																
		The additional refrigerant charge is required depending on the number of connected indoor units. Select the refrigerant quantity from the following table.																																	
		Additional refrigerant charge quantity (kg)																																	
		<table><tr><th colspan="2">System</th><th colspan="3">Heat Pump</th><th>Heat Recovery</th></tr><tr><th>Model</th><th>RCI-2.0FSN3</th><th>RCI-2.5FSN3</th><th>RCI-3.0-6.0FSN3</th><th>RCI-2.0-6.0FSN3</th></tr><tr><td rowspan="4">Connectable number</td><td>1</td><td>0.0</td><td>0.0</td><td>0.5</td><td>0.0</td></tr><tr><td>2</td><td>0.5</td><td>0.5</td><td>1.0</td><td>0.0</td></tr><tr><td>3</td><td>0.5</td><td>1.0</td><td>1.5</td><td>0.0</td></tr><tr><td>4 or more</td><td>1.0</td><td>1.5</td><td>2.0</td><td>0.0</td></tr></table>		System		Heat Pump			Heat Recovery	Model	RCI-2.0FSN3	RCI-2.5FSN3	RCI-3.0-6.0FSN3	RCI-2.0-6.0FSN3	Connectable number	1	0.0	0.0	0.5	0.0	2	0.5	0.5	1.0	0.0	3	0.5	1.0	1.5	0.0	4 or more	1.0	1.5	2.0	0.0
		System		Heat Pump			Heat Recovery																												
		Model		RCI-2.0FSN3	RCI-2.5FSN3	RCI-3.0-6.0FSN3	RCI-2.0-6.0FSN3																												
		Connectable number		1	0.0	0.0	0.5	0.0																											
				2	0.5	0.5	1.0	0.0																											
				3	0.5	1.0	1.5	0.0																											
				4 or more	1.0	1.5	2.0	0.0																											

i NOTE

◆ **Maximum additional refrigerant charge quantity**

	HP				
	(5-10)	12	(12/16-P) (14/16)	(18-24)	(24/32-P) (26-54)
Maximum additional refrigerant charge quantity (kg)	28.0	36.0	40.0	51.0	63.0

◆ **Refrigerant charge amount of outdoor unit before shipment (W0) kg**

i NOTE

- *In case of the combination of the base units, calculate the total refrigerant charge before shipment of the outdoor units to be combined.*
- *Regarding the fluorocarbon, follow the specification label or refrigerant label attached to the product. After the additional refrigerant charge, record the total refrigerant (= refrigerant before shipment + additional refrigerant in the field) in the refrigerant label. In case of the combination of base units, record the total refrigerant in the main unit label.*
- *When the refrigerant is recovered or charged because of repairing, operating or adjusting the unit, record the refrigerant quantity again.*
- *Emissions of the fluorocarbons are prohibited.*
- *For disposal and maintenance of this product, collection of fluorocarbons is required.*

8.5 CHARGING WORK

Insulate the liquid piping and gas piping completely to avoid decreasing of performance and dewing on the surface of the pipe.

Insulate the flare nut and union of the piping connection with insulation.

Check to ensure that there is no gas leakage. 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.

NOTE

The gas staying at O-ring or screw part may make sound when removing the cap of the spindle. However, it is not gas leakage.

CAUTION

Do not apply an excessive force to the spindle valve after fully opening the spindle. Otherwise, the spindle valve flies out due to refrigerant pressure. At the test run, open fully the spindle valve, otherwise, the devices will be damaged. (It is closed before shipment).

Caution for opening stop valve

- 1 Do not apply an excessive force after fully opening the spindle. (Tightening Torque: < 5.0N.m).
- 2 Tighten securely the caps according to the properly tightening torque each spindle valve is opened.
 - a. Operate the compressor in the cooling mode and charge the additional refrigerant from the check joint of the liquid stop valve (acceptable error must be within 0.5 kg). At this time, keep the liquid stop valve slightly opened
 - b. After the refrigerant is charged, fully open the liquid stop valve and the gas stop valve.
 - c. Calculate securely the additional refrigerant quantity for charging. If the quantity of additional refrigerant is not correct, it may cause compressor failure. The additional refrigerant must be charged in a liquid condition.
 - d. Refrigerant charge from check joint of gas stop valve may lead to compressor failure. Be sure to charge refrigerant from the check joint of liquid stop valve.

8.6 AUTOMATIC SIMPLE JUDGEMENT SYSTEM FOR REFRIGERANT AMOUNT

Perform the refrigerant amount check operation according to the automatic judgement function after the refrigerant charging work.

When the judgement result is excessive refrigerant, insufficient refrigerant or abnormal termination, find out the cause of abnormality and perform the refrigerant amount check operation again.

◆ Procedure of refrigerant amount check operation

- 1 Reassemble all the cover except for the electrical control box cover and service cover of No.1 unit.
- 2 Turn ON the power supply of indoor unit and outdoor unit in the refrigerant cycle to perform the refrigerant amount check operation. (Supply electrical power to the system 12 hours before starting this check operation to warm the compressor oil.)
- 3 Turn number 4 of DSW5 (PCB1) ON. The 7-segment display will be indicated as follows:



- 4 Check the 7-segment display and press PSW1. The outdoor fan and compressor will be in standby state and the 7-segment display will be indicated as follows:



The outdoor fan and compressor will be activated and the 7-segment display will be indicated as follows:



The judgement takes 30 to 40 minutes. Refer to the table below for the result indication.

When the judgement result is excessive refrigerant, insufficient refrigerant or abnormal termination, find out the cause of abnormality and perform the refrigerant amount check operation again.

- 5 Turn OFF number 4 pin of DSW5 when the refrigerant amount is sufficient. Wait for at least 3 minutes after turning OFF number 4 pin of DSW5 OFF and then the outdoor unit is ready to operate.

NOTE

- This function is applicable when outdoor air temperature is 0 to 43°C DB and indoor air temperature is 10 to 32°C DB.
- Operation check or condition check shall be performed by checking the PCB1 for the outdoor unit. During the checking, do not remove the front cover. Otherwise, the checking will not be conducted normally due to pressure increase. For combination outdoor unit, the checking shall be conducted at the unit A and so service covers for the other unit (B, C or D) must be closed.

Judgement result indication

7-segment Indication	Result	Remarks
	Sufficient refrigerant	The refrigerant amount is sufficient. • Turn the pin number 4 of DSW5 OFF and perform the test run.
	Excessive refrigerant	The refrigerant amount is excessive. • Calculate the additional refrigerant amount according to the piping length. Collect the refrigerant using a collector and charge the correct refrigerant amount.
	Insufficient refrigerant	The refrigerant amount is insufficient. • Check if the additional refrigerant has been charged. • Calculate the additional refrigerant amount according to the piping length and charge the refrigerant.
	Abnormal termination	Find out the cause of abnormal termination as shown below. After resolved the cause of abnormal termination, restart the check operation. 1 Is number 4 pin of DSW5 ON before turning on the power supply? 2 Are all indoor units ready and waiting, before turned ON number 4 pin of DSW5? 3 Is the outdoor ambient temperature within the applicable range (0 to 43°C DB). (In some cases, when the connected indoor unit number exceeds the recommended number and the outdoor ambient temperature exceeds 35°C DB, this check operation cannot be performed.) 4 Is the total indoor units operation capacity 30% (indoor units capacity ratio) or less? 5 Is the pin number 4 of DSW4 (compressor forced stoppage) OFF?

i NOTE

The 7-segment indication during the check operation may be changed to the protection control code by the activation of protection control. However, it is normal. As for the protection control code, refer to the sheet attached to the inside of the outdoor unit service cover.

8.6.1 Maximum permitted concentration of hydrofluorcarbon (HFC) refrigerant**⚠ DANGER**

- *Fitters and the designers of the installations must strictly observe local and national legislation, and local codes regarding safety requirements in the event of refrigerant leaks.*
- *In the event of a leak, the gas will spread around the room, displacing the air, and could therefore result in asphyxia.*
- *Special attention should be given to areas where the refrigerant may be deposited and stay in the room, such as basements or similar, as it is heavier than air.*

The R410A refrigerant gas, used in the equipment, is fireproof and not toxic.

The maximum permitted concentration of HFC R410A gas in the air is 0.44 kg/m³, in accordance with standard EN378-1. Therefore, efficient measures should be adopted to ensure the concentration of R410A gas in the air is kept below 0.44 kg/m³ in the event of a leak.

◆ Calculation of the refrigerant concentration

- 1 Calculate the total quantity of refrigerant *R* (kg) charged in the system; to do so, connect all the indoor units of the rooms in which you wish to have air conditioning.
- 2 Calculate the volume *V* (m³) of each room.
- 3 Calculate the refrigerant concentration *C* (kg/m³) of the room according to the following formula:

$$R / V = C$$

R: Total quantity of refrigerant charged (kg).

V: volume of the room (m³).

C: concentration of refrigerant (= 0.44 kg/m³ for R410A gas).

◆ Countermeasures in the event of refrigerant leaks

Pay attention to the critical gas concentration to avoid accidental refrigerant gas leakage before installing air conditioning systems.

In the case that the calculated critical concentration is higher than the maximum permissible concentration of HFC gas (R410A) in air, take the following actions.

- 1 Provide each effective opening at the wall or door for ventilation to next door so that the critical gas concentration can be maintained lower than the above value. (Provide an opening more than 0.15% of floor surface at the lower part of a door.)
- 2 Opening without shutter to permit the circulation of fresh air in the room.
- 3 A fan with a capacity of at least 0.4 m³/minute per tonne of Japanese refrigerant (= volume displaced by the compressor / 5.7 m³/h) or greater, connected to a gas sensor (gas leakage detector) in the air conditioning system which uses the refrigerant.

9 DRAIN PIPING

9.1 CONDENSATION DRAINAGE SYSTEM

When the outdoor unit operates in refrigeration or heating mode, there is a build-up of condensation of the ambient humidity which, together with rain water, requires draining.

Select a location for the unit which permits adequate drainage. If necessary, mount an installation suitable for the drainage of condensation.

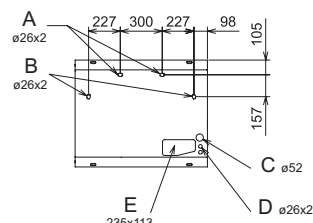
DANGER

- **Drainage must not take place in areas frequented by pedestrians. In low temperatures, the drainage water could freeze and lead to falls. If it is necessary to install the outdoor unit in an area frequented by pedestrians, an additional drainage tray should be fitted.**
- **Do not fit drainage pipes or collection trays in cold climates, as they could freeze and break.**

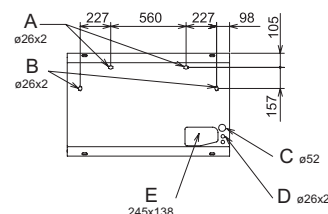
If a condensation drainage kit is required for the outdoor unit, use the optional drainage kit DBS-TP10A.

Base of outdoor unit (All measurements are in mm)

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



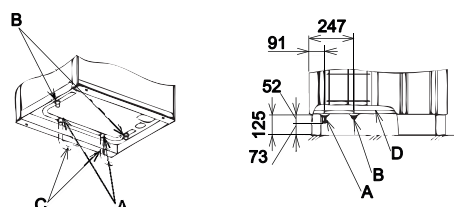
SET FREE RAS-(14-16)FSXN1E
and RAS-(8-12)FSXNHE



A	Drainage hole. Drain boss position (option). For the optional drainage kit DBS-TP10A
B	Drainage hole. Drain cap position (option). For optional drainage plug
C	Opening for power wiring feed through
D	Opening for communication wiring feed through
E	Opening for feed through of refrigerant pipes

9.1.1 Installation position of the optional drainage kit DBS-TP10A

Installation position (example: RAS-10FSXNHE, lower and side views).



A	Drain pipe	C	Drain pipes (field-supplied)
B	Optional drain plug	D	Base of unit

Drain kit components

Model	Description	Material/colour	Qty	Application
DBS-TP10A	Drain pipe	PP/black	2	Drain pipe connection
	Drain plug	PP/black	2	Drain pipe plug
	Rubber plug	CR/black	4	Pipe and plug seal

10 ELECTRIC WIRING

10.1 GENERAL INFORMATION

CAUTION

- Before any work to the electrical wiring or regular inspections, switch off the mains power supply of the indoor and outdoor units. Wait three minutes before starting installation or maintenance work.
- Make sure that the interior and exterior fans have come to a complete standstill before starting work on the electrical wiring or regular inspections.
- Protect cables, the drainage pipe, electrical components, etc. from rodents and insects; otherwise these might damage unprotected components and this could result in fire.
- Do not allow cables to come into contact with the refrigerant pipes, metal edges, printed circuit boards (PCB) or the electric components inside the unit; the cables may be damaged and this could result in fire.
- Firmly secure the cables inside the indoor unit with plastic flanges.

DANGER

- Use an earth leakage breaker with medium sensitivity, and an activation speed of 0.1 or less. If this is not fitted, there is a risk of electric shock and/or fire.
- Install an earth leakage breaker, fuse and circuit breaker for each outdoor unit power line. Not fitting it may cause an electric shock or fire.

10.2 GENERAL VERIFICATIONS

- 1 Make sure the electric components supplied by the fitter (main power switches, circuit breakers, wires, connectors and connection terminals) have been selected correctly in line with the electrical data given.
 - a. The electricity supply to the unit should be via an exclusive power control switch and protective circuit breaker, certified and installed in accordance with local or national safety regulations.
 - b. Connect the power supply wiring for each group of indoor units to its outdoor unit group (maximum capacity for each group of indoor units: 26 HP). Do not mix units of different groups.
 - c. For heat recovery systems, the CH unit and the indoor unit of the same refrigerant cycle can be supplied from the same mains power switch.
- 2 Check that the supply voltage is between 90 and 110% of the rated voltage. Where the voltage capacity is too low, it will not be possible to start the system due to the drop in voltage.
- 3 Sometimes, the refrigeration/heating system is not able to operate correctly in the following cases:
 - When the system is supplied from the same supply line as other major consumers (heavy machinery, power inverter systems, cranes, welding machinery, etc).
 - When the supply cables of the major consumers and the refrigeration/heating system are very close together. In these cases, induction in the wiring to the refrigeration/heating system may arise due to a rapid change in the electricity consumption of the above consumers and their start-up. Therefore before starting installation work, check the regulations and standards concerning adequate protection of the power supply line.

NOTE

For further information, please refer to the applicable legislation in the country in which the unit is to be fitted.

- 4 During the preliminary preparation work of the electricity supply line for the unit, the provisions in local and national legislation must never be violated.
- 5 Check that the earth cable is correctly connected.

DANGER

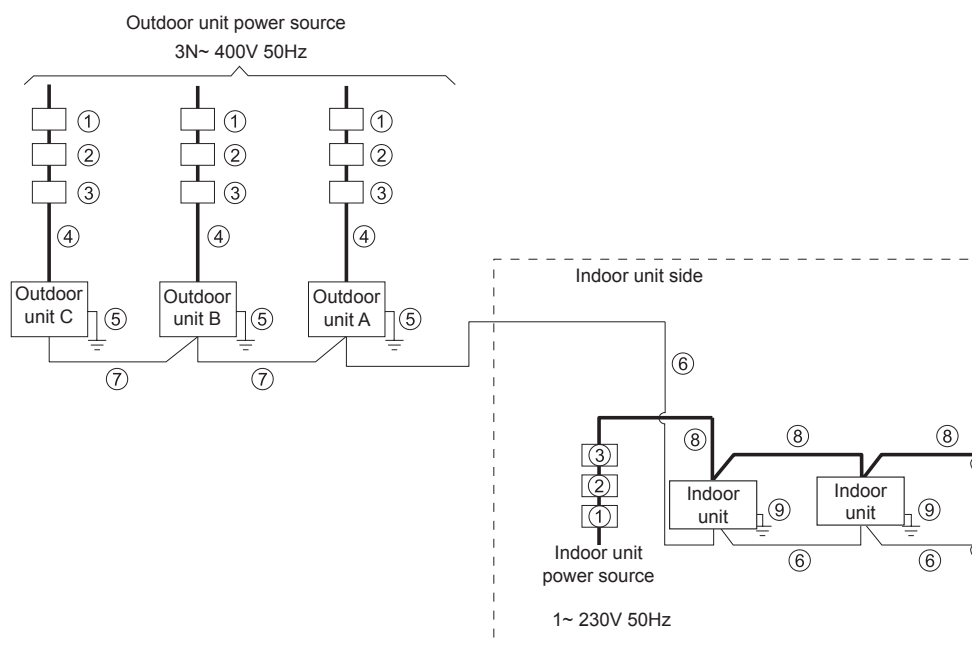
- **Never connect the earth cable to the refrigerant pipes. The gas in the pipes could cause a fire.**
- **Do not connect the earth cable to the lighting rod. The electrical potential of earth would increase abnormally.**

10.3 CONNECTION OF THE POWER SUPPLY CIRCUITS

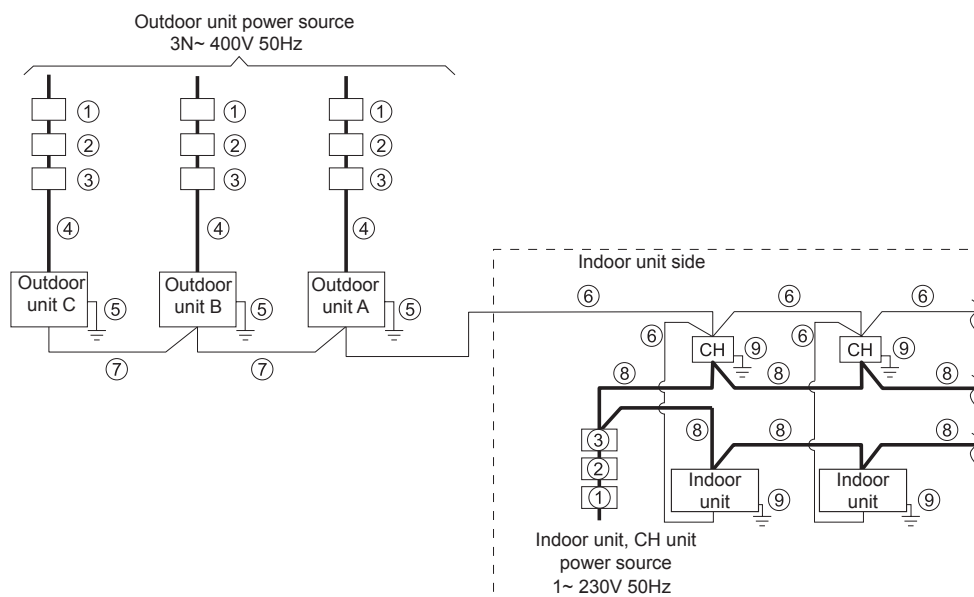
10.3.1 Power source wiring

Supply the power sources to each outdoor unit and indoor unit group respectively. Power source wiring is fundamentally according to this method (as example).

◆ Heat pump system



◆ Heat recovery system



Nº.	Part name	Nº.	Part name	Nº.	Part name
①	ELB (Earth Leakage Breaker)	④	Power source wiring (OU)	⑦	Transmission wiring (OU~OU)
②	FUSE or CB	⑤	Earth wiring (OU)	⑧	Power source wiring (IU, CH unit for Heat Recovery System)
③	S (main switch)	⑥	Transmission wiring (OU~IU)	⑨	Earth wiring (IU, CH unit for Heat Recovery System)

10.3.2 Cable sizes and main breaker switch

Field minimum recommended wire sizes for power source and transmission and minimum main switches and protections sizes.

Model	Power supply	Maximum running current (A)	④ Power source cable size	⑥ ⑦ Transmitting cable size	⑤ Earth wire size (mm ²)	① ELB		③ Main switch	② CB (A)
			EN60 335-1 ⁽¹⁾ *1 (mm ²)	EN60 335-1 ⁽¹⁾ *1 (mm ²)		Nominal current (A)	Nominal sensitive current (mA)	Nominal current (A)	
RAS-8FSXN1E	3N~400V/50Hz	15.0	4.0	0.75	4.0	40	30	20	20
RAS-10FSXN1E		20.0	6.0	0.75	6.0	40	30	30	30
RAS-12FSXN1E		26.5	6.0	0.75	6.0	40	30	40	40
RAS-14FSXN1E		29.2	10.0	0.75	10.0	63	30	40	40
RAS-16FSXN1E		33.0	10.0	0.75	10.0	63	30	50	50
RAS-5FSXNHE	3N~400V/50Hz	13.0	4.0	0.75	4.0	40	30	20	20
RAS-6FSXNHE		13.0	4.0	0.75	4.0	40	30	20	20
RAS-8FSXNHE		15.0	4.0	0.75	4.0	40	30	20	20
RAS-10FSXNHE		18.7	6.0	0.75	6.0	40	30	30	30
RAS-12FSXNHE		20.0	6.0	0.75	6.0	40	30	30	30

* Refer to the NOTES for selection of the power source cable size.

⁽¹⁾ The cross-sections of the cable should be selected for the maximum current of the unit, in accordance with European Standard EN60 335-1.

i NOTE

Do not use cables that are lighter than the normal flexible coated polychloroprene cable (code H05RN-F).

ELB: Earthleakage Breaker (field-supplied), CB: Circuit Breaker (field-supplied), MLFC: Flame Retardant Polyflex Wire. Install main switch and ELB for each system separately. Select the high response type of ELB that acts within 0.1 second and 4 poles.

◆ Electromagnetic compatibility

According to Directive 2004/108/EC (89/336/EEC) regarding electromagnetic compatibility, the following table indicates: the maximum allowed impedance $Z_{\max}$ of the system at the connection point of the user's power supply, as per EN61000-3-11.

Model	$Z_{\max}$ (Ω)
RAS-(8-10)FSXN1E	–
RAS-12FSXN1E	0.26
RAS-(14/16)FSXN1E	0.12
RAS-(5-12)FSXNHE	–

◆ Harmonics

In relation to IEC 61000-3-2 and IEC 61000-3-12, the situation of harmonics for each model is as follows:

Situation of the models in relation to IEC 61000- 3-2 and IEC 61000-3-12 Ssc "xx"	Model	
Unit compliant with IEC 61000-3-2 (professional use).	RAS-8FSXN1E	
	RAS-10FSXN1E	
	RAS-(5-10)FSXNHE	
Unit compliant with IEC 61000-3-12.	–	
This unit is in accordance with Standard IEC 61000-3-12 with the condition that the short circuit current Ssc is greater than or equal to xx (see Ssc column) at the connection point between the power supply of the user and the public grid. It is the responsibility of the installer or the user of the unit to ensure, if necessary consulting the distribution grid operator, that the unit is connected only to a power supply where the short circuit power is greater than or equal to xx (see Ssc column).	Model	Ssc "xx" (kVA)
	RAS-14FSXN1E	5089
	RAS-16FSXN1E	2493
The authorities responsible for the electrical power supply can apply restrictions relating to harmonics.	RAS-12FSXN1E	
	RAS-12FSXNHE	

10.4 ELECTRICAL WIRING FOR OUTDOOR UNIT

Connect the electrical wirings according to the following figures.



NOTE

- 1 Connect the power supply wires to L1, L2, L3, and N (for 400V) for the three phase power source on the terminal board TB1 and earth wire to the terminal in the electrical control box.
- 2 Connect the transmission wires between the outdoor and indoor units to the TB2 terminals 1 and 2 on the PCB1. As for the transmission wires between outdoor units in the same refrigerant cycle, connect them to the TB2 terminals 3 and 4 on the PCB1.

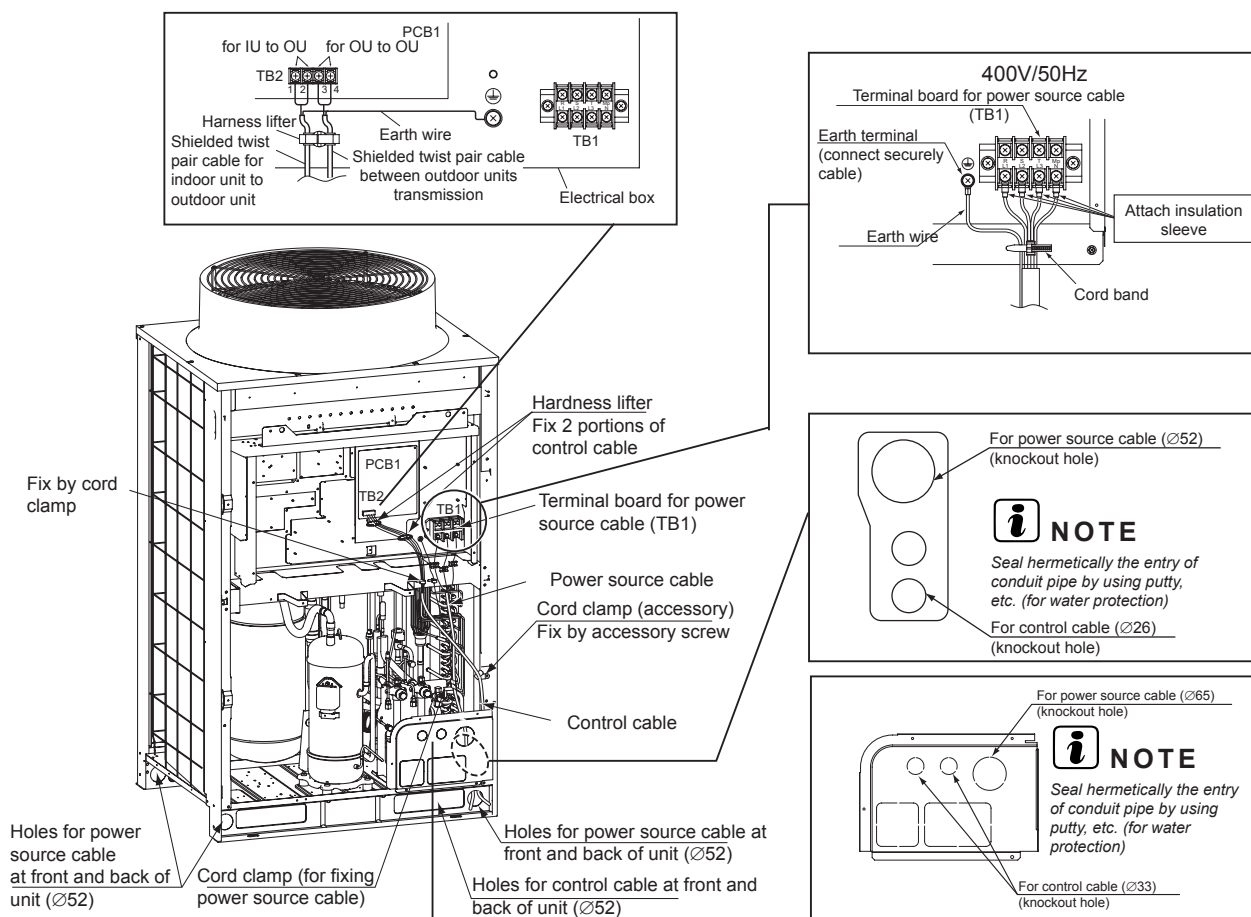
- Do not run the power supply wiring and transmission wiring through the same conduit tube. Moreover, keep at least 5cm between the power supply wiring and transmission wiring.
- Pull out each wiring from each corresponding knockout hole. Cut can "X" in rubber bush (accessory) and securely attach it to the knockout hole for cable protection. Check that the rubber bush is surely attached.
- Attach the pipe cover to prevent rats or other small animals from entering the unit.
- Prevent the wirings from touching or rub against the refrigerant pipes, plate edges and electrical parts inside the unit.
- When the power source cable (cable) whose size exceeds 38mm² is used, peel the sheath part of the cable put into the unit and run it. At this time, do not damage the coated insulating coated part.
- Completely seal the end of conduit tube with sealing materials to prevent the rain from entering the conduit tube.
- Make a drain hole at the lowest part of the conduit tube.



CAUTION

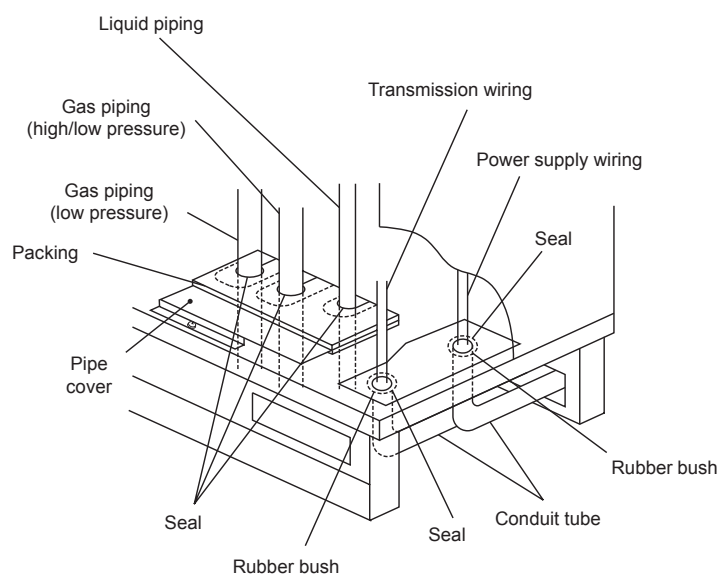
Be sure to note to run the cables under the unit using conduit tube. (The pipe cover needs to be removed before performing piping and wiring works.)

Tightly secure the power source wiring using a cord clamp inside the unit.



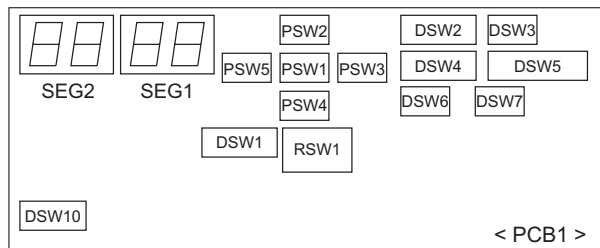
i NOTE

Fix the rubber bushes with adhesive when conduit tubes to the outdoor unit are not used.



10.5 SETTING OF THE DSW SWITCHES ON PCB1

Location of the DSW switches on PCB1.

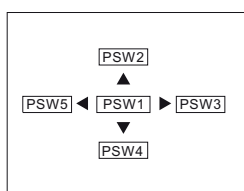


CAUTION

Before changing the settings of the DIP switches, the voltage supply should be disconnected. Otherwise, the new settings will not be valid.

NOTE

- Only the DIP DSW1, DSW2 and DSW4 switches can be set while the voltage supply is connected.
- The symbol "■" indicates the position of the DIP switches. The figures show the position of the DIP switch once the position setting has been completed.
- With the DSW4 switch, the unit starts or stops after 10 to 20 sec. of the switch being enabled.



PSW buttons on PCB1

PSW1: accept.

PSW2, 3, 4 and 5: for checking.

DSW1, RSW1: refrigerant cycle number setting	
Setting required	
Setting before RSW1 supply: 0	
Setting before DSW1 supply: 0 (digit of tens)	
Set each main outdoor unit number on each refrigerant cycle (Subs-units setting are not required)	
Outdoor and indoor units belonging to the same refrigerant cycle: setting the same cycle number in the outdoor and indoor units (indoor units: DSW5 and RSW2)	
DSW1, RSW1: setting example for refrigerant cycle number 25	
Maximum refrigerant cycle number setting: 63	

DSW2: capacity setting		
Setting not required		
RAS-FSXN1E		
8HP	10HP	12HP
14HP	16HP	

DSW2: capacity setting		
RAS-FSXNHE		
5HP	6HP	8HP
10HP	12HP	

DSW3	
Setting not required	

DSW4: test run and service settings	
Setting required	
Setting before shipment	Cooling test run

Heating test run	Forced compressor stoppage

DSW5: emergency operation /test run and service setting		
Setting not required.		
Setting before shipment	Except N° 1 compressor operation	Except N° 2 compressor operation
Monitoring of refrigerant quantity	High static pressure mode	Longer pipe >70/ ≤90 (*)

NOTE

High static pressure mode setting:

- In the case of combination of the outdoor units (RAS-18FSXN1E to RAS-54FSXN1E and RAS-14FSXNHE to RAS-36FSXNHE), set this function for all the outdoor units.
- (*) Available only for base units RAS-(5-12)FSNXH, RAS-(8-16)FSXN1E and heat pump systems (2 pipes).

DSW6: setting outdoor unit number									
Setting required									
Base unit before shipment	Combination of base unit (*)								
	<table> <tr> <th>Unit A (N° 0)</th><th>Unit B (N° 1)</th></tr> <tr> <td> </td><td> </td></tr> <tr> <th>Unit C (N° 2)</th><th>Unit D (N° 3)</th></tr> <tr> <td> </td><td> </td></tr> </table>	Unit A (N° 0)	Unit B (N° 1)			Unit C (N° 2)	Unit D (N° 3)		
Unit A (N° 0)	Unit B (N° 1)								
Unit C (N° 2)	Unit D (N° 3)								

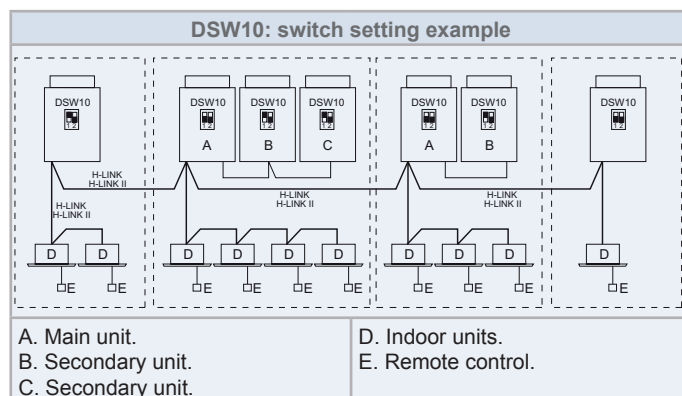
i NOTE

- The combination of outdoor units must be set.
- (*) For FSXN1E: Unit A - D. For FSXNHE: Unit A - C.

DSW7: supply voltage setting	
Setting not required	

DSW10: communication setting	
Setting required.	
• A: setting before supply: • B: cancellation of final resistance.	

(*) If the communication circuit fuse has opened, the PCB1 board can only be recovered by activating contact 2.

**i NOTE**

- Where two or more outdoor units are connected using the H-LINK or H-LINKII, DSW10 contact 1 on the master or main unit must be set to OFF from the second refrigerant group of outdoor units.
- If only one unit is installed, the setting is not necessary.

11 COMMISSIONING

11.1 PRELIMINARY CHECKS

The test run must be carried out according to the instructions given in chapter "11.2 Carry out the Test Run".

! DANGER

Do not use the system until all of the check points have been verified. As with the test run for the indoor unit, check the Installation and maintenance manual for the indoor unit and the CH unit.

Make sure the refrigerant pipes and communication cables between the outdoor and indoor units are connected to the same refrigeration cycle. Failure to do so could lead to abnormal operations or a serious accident. Check that the setting of the refrigerant cycle DSW switches (DSW1 and RSW1 on outdoor units, DSW5 and RSW2 on indoor units) and of the unit number of the indoor units is suitable for the system. Check whether the DIP switch setting specified on the printed circuit of the indoor and outdoor units is correct. Pay particular attention to the outdoor unit number, the refrigerant cycle number and the terminal resistance.

Make sure the electrical resistance is greater than 1 MΩ by measuring the resistance between the ground and the terminal of the electrical components. If not, do not use the system until the electrical leak has been detected and repaired. Do not apply voltage to the communication terminals.

Check that all cables, L1, L2, L3 and N (R, S and T) are correctly connected to the power line. If they are not correctly connected, the unit will not work and the remote control will indicate alarm code "05". When this occurs, check and change the power line phase according to the sheet attached to the rear of the service cover.

! CAUTION

Make sure the main power supply switch has been on for over 12 hours to heat up the compressor oil using the heating elements.

The FSXN1E and FSXNHE series outdoor units do not work for 4 hours after the power supply line has been connected (stoppage code d1-22). Where the unit is to be started within 4 hours, release the protection control as follows:

- 1 Switch on the power supply to the outdoor unit.
- 2 Wait 30 seconds.
- 3 Press PSW5 on the outdoor unit PCB for more than 3 seconds to release code d1-22. Where a remote control is used for releasing, press Air Flow and Auto Louver at the same time for 3 seconds.

Where several base units are combined, stick the label on the main unit in a visible place (outdoor unit 1) so that the outdoor unit A can be easily identified. Do not stick the main label on the secondary unit (outdoor units 2 and 3).

! CAUTION

Where the total insulation resistance of the unit is below 1 MΩ, the compressor insulation resistance may be low due to the refrigerant held in the compressor. This may occur if the unit is not used for long periods.

- 1 Disconnect the compressor cables and measure the insulation resistance of the compressor. If the resistance value is greater than 1 MΩ, the insulation fault has occurred in another electrical component.

- 2 if the insulation resistance is below 1 MΩ, disconnect the compressor cable on the inverter PCB. Then switch on the main power supply to apply current to the crankcase heating elements. Once current has been received for more than 3 hours, re-measure the insulation resistance. (Current may be required for longer, depending on the air conditions, the pipe length or the condition of the refrigerant) Check the insulation resistance and re-connect the compressor. Where the earth leakage breaker is tripped, check the recommended size: see in chapter "10.3.2 Cable sizes and main breaker switch".

NOTE

- Make sure the electric components in the installation (earth leakage breaker, circuit breaker, cables, connectors and cable terminals) have been selected correctly in line with the electrical data given in this Manual. Also make sure that these components are compliant with national and local codes.
- Use shielded cables (> 0.75 mm²) for communication installation wiring to avoid electromagnetic noise. (Shielded cable must be less than 1000 m in total length and its size must be compliant with local codes.)
- Check the connection of the power wiring terminals (terminals "L1" to "L1" and "N" to "N"). AC supply voltage 3N~ 400V 50Hz. If it is different, some components could be damaged.

11.2 CARRY OUT THE TEST RUN

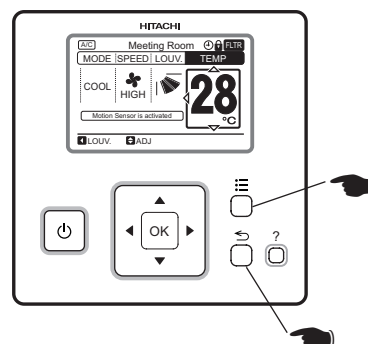
- Check that the stop valves on the outdoor unit are fully open (gas, low-pressure: only in heat recovery systems) and start the system. (Where base units are combined, check that the stop valves on all outdoor units connected are fully open).
- Carry out the test run on the indoor units in sequence, one by one. Then check the concordance of the refrigerant pipe system and the electrical wiring system. (System conformity cannot be checked if there are several indoor units operating at the same time.)
- Follow the procedure indicated below to carry out the test run. Make sure the test run is completed problem-free.

NOTE

Where there are two remote controls (main and secondary), first carry out the test run using the main remote control.

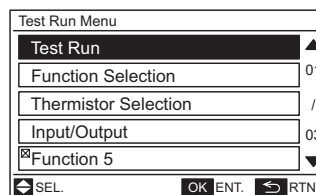
11.3 TEST RUN PROCEDURE BY REMOTE CONTROL SWITCH (PC-ARFPE EXAMPLE)

- Turn ON the power supply for all the indoor units.
- For the models with the auto-address function, wait for 3 minutes approximately. The addressing is automatically performed. (There is a case that 5 minutes is required according to the setting condition.) After that, select using language from "Menu". Refer to the operation manual for details.
- Press and hold "≡" (menu) and "↵" (return) simultaneously for at least 3 seconds.

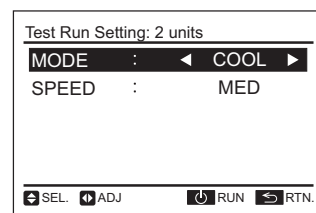


Test run screen

- a. The test run menu will be displayed.

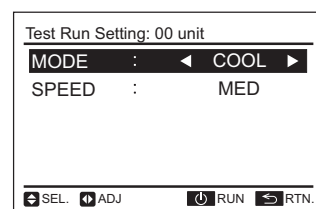


- b. Select "Test Run" and press "OK". The test run settings will be displayed.

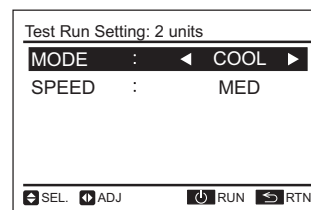


NOTE

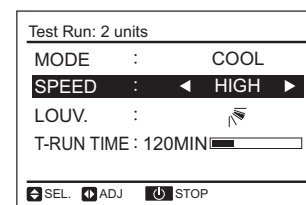
When "00" is indicated, the auto-address function may be performing. Cancel "Test Run" mode and set it again.



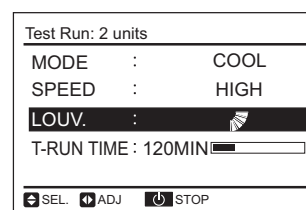
- 4 The total number of the indoor units connected is indicated on the LCD (liquid crystal display). The case of the twin combination (one (1) set with two (2) indoor units) is indicated "2 units", and the triple combination (one (1) set with three (3) indoor units) is indicated "3 units".



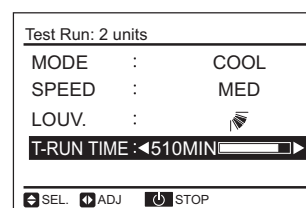
- a. If the indicated number is not equal to the actual connected number of indoor unit, the auto-address function is not performed correctly due to incorrect wiring, the electric noise or etc. Turn OFF the power supply and correct the wiring after checking the following points; (Do not repeat turning ON and OFF within 10 seconds.)
- Power supply for indoor unit is not turned ON or incorrect wiring.
 - Incorrect connection of connecting cable between indoor units or incorrect connection of controller cable.
 - Incorrect setting of rotary switch and dip switch (the setting is overlapped) on the indoor units PCB.
- b. Press "⏻" (run/stop) to start the test run.
- c. Press "Δ ∇ ◀ ▶" and set each item.
- 5 Press "⏻" (run/stop). Start the test run when indicating the air flow volume "HIGH" (default setting) and light the operation lamp. At this time, 2-hour OFF timer will be set automatically..



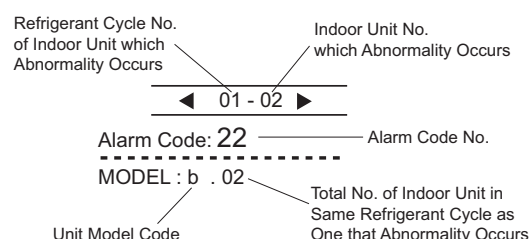
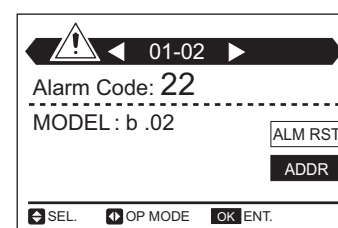
- 6 Press "Δ" or "∇", select "LOUV." and select "🌀" (auto swing) by pressing "◀" or "▶". The auto swing operation will be started. Check the operating sound at the louvers. If abnormal sound is not generated, press "◀" or "▶" again to stop the auto swing operation.



- 7 The temperature detections by the thermistors are invalid though the protection devices are valid during the test run.
- 8 For SET-FREE Series: According to the label "Checking of Outdoor Unit by 7-Segment Display on PCB1" attached to the rear side of the front cover of the outdoor unit, check temperature, pressure and the operation frequency, and connected indoor unit numbers by 7-segment displays.
- 9 To finish the test run, press "⏻" (run/stop) again or pass over the set test run time. When changing the test run time, press "Δ" or "∇" to select "T-RUN TIME". Then, set the test run time (30 to 600 minutes) by pressing "◀" or "▶"



- The RUN indicator on the remote control switch flashes when some abnormalities such as protection devices activated occur during the test run as well as the RUN indicator (orange) on the indoor unit flashes (0.5 second ON/ 0.5 second OFF). Additionally, the alarm code, the unit model code and connected number of indoor units will be displayed on the LCD as shown in the figure below. If the RUN indicator on PC-ARFPE flashes (2 seconds ON/ 2 seconds OFF), it may be a failure in the transmission between the indoor unit and the remote control switch (loosening of connector, disconnecting wiring or breaking wire, etc.). Consult to authorized service engineers if abnormality can not be recovered.



Remote Control Switch Indication	Wrong Portions	Inspection Points after Power Source OFF
No indication	The power source of Outdoor Unit is not turned ON.	1 Connecting Points of Remote Control Cable terminal board of Remote Control switch and indoor unit. 2 Contact of Terminals of Remote Control Cable
	The connection of the remote control cable is incorrect.	
	The connecting wires of power supply line are incorrect or loosened.	3 Connection Order of each Terminal Board 4 Screw Fastening of each Terminal Boards.
Counting number of connected units is incorrect	The power source of Outdoor Unit is not turned ON.	5 Dip Switch Setting on Printed Circuit Board 6 Connecting on the PCB 7 This is the same as item 1, 2 , and 3.
	The operating line wiring between indoor unit and outdoor unit is not connected.	
	The connection of control cables between each indoor units are incorrect. (When one remote control switch controls multiple units)	
Instructions fot the recovery when the fuse of the transmission circuit is blown out:		
1 Correct the wiring to the terminal board.		
2 Set the 1st pin of DSW7 on the indoor unit PCB to ON.		

12 MAIN SAFETY DEVICES

Compressor protection

The compressor is protected by the following devices and their combinations:

- 1** Pressure switch: this switch stops the compressor when the discharge pressure exceeds the set value.
- 2** Oil heater: this band-type heater protects against the formation of foam on the oil during cold starts and remains enabled when the compressor is at a standstill.

Model			RAS-8FSXN1E	RAS-10FSXN1E	RAS-12FSXN1E	RAS-14FSXN1E	RAS-16FSXN1E
For Compressor							
Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)				
High	Cut-Out	MPa	4.15				
	Cut-In	MPa	3.20				
Fuse Capacity 3N~ 400V 50Hz		A	40 x 2	40 x 2	40 x 2	40 x 2 + 32 x 3	40 x 2 + 32 x 3
Oil Heater Capacity		W	40.8 x 2	40.8 x 2	40.8 x 2	40.8 x 4	40.8 x 4
CCP Timer			Non-Adjustable				
Setting Time		min.	3				
For DC Fan Module							
Fuse Capacity 3N~ 400V 50Hz		A	20 x 1				

Model			RAS-5FSXNHE	RAS-6FSXNHE	RAS-8FSXNHE	RAS-10FSXNHE	RAS-12FSXNHE
For Compressor							
Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)				
High	Cut-Out	MPa	4.15				
	Cut-In	MPa	3.20				
Fuse Capacity 3N~ 400V 50Hz		A	40 x 2				
Oil Heater Capacity		W	40.8 x 2				
CCP Timer			Non-Adjustable				
Setting Time		min.	3				
For DC Fan Module							
Fuse Capacity 3N~ 400V 50Hz		A	20 x 1				

HITACHI

00000

Johnson Controls-Hitachi Air Conditioning Spain, S.A.U.
Ronda Shimizu, 1 - Políg. Ind. Can Torrella
08233 Vacarisses (Barcelona) Spain

© Copyright 2016 Johnson Controls-Hitachi Air Conditioning Spain, S.A.U. – All rights reserved.



PMML0392B rev.1 - 07/2016

Printed in Spain