

RELACION TEKNIK

PROJEKTI I KONDICIONIMIT DHE VENTILIMIT

**OBJEKTI: “Zhvillimi i dizajnit të detajuar të brendshëm për zyrat e reja
të Qendrës për Shërbime Arsimore”**

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Ne kete relacion pershkruhen karakteristikat kryesore te impianteve mekanike te parashikuara ne objektin **“Zhvillimi i dizajnit të detajuar të brendshëm për zyrat e reja të Qendrës për Shërbime Arsimore”**

1. Përshkrimi i sistemit të ajrit të kondicionuar dhe ventilimit.

Impianti i kondicionimit është projektuar që të garantojë parametrat më të mira të mikroklimës në ambientet e brendshme të godinës në kushtet e temperaturave të jashtme ekstreme regjistruar në qytetin e Tiranës gjatë 20 viteve të fundit.

Parametrat klimatike qe perdoren ne llogaritjet termike per Tiranen :

Vere	temperatura : +38°C, lageshtia relative 55 %
Dimer	temperatura : 0°C, lageshtia relative 90 %
Vendndodhja	41°21'46.6"N 19°45'55.0"E

Për llogaritjen e ngarkesave termike, projekti bazohet gjithashtu në karakteristikat termohigrometrike të strukturave të ndërtesës dhe në Normat Teknike sipas ASHRAE të cilat sipas destinacionit të përdorimit, përcaktojnë parametrat klimatike të brendshëm dhe të dhënat e tjera (ndricimi, ngarkesat elektrike, nevojat për ajër të pastër) të domosdoshme për përcaktimin e nevojave për energji termike të secilit ambient të godinës sipas shembullit të mëposhtem për klasën e parë majtas të katit 0. Nderkohe në tabelën nr.2 shfaqen të gjitha ngarkesat termike të kërkuara për secilin ambient. Për të realizuar një komfort ambiental sa më cilësor janë respektuar parametra të tjerë si shpejtësia e lëvizjes së ajrit në ambiente, niveli i zhurmave etj.

LOAD CALCULATION ASHRAE FUNDAMENTALS									
Progetti:				Perfuesi:				Data:	
TE DHENAT PER AMBIENTIN:				Zona:				Ambienti: Klase majtas - K0	
Siperfaqja: m² 120.0 Lartesia: m 2.73 Volumi: mc 328				Persona te pranishem 30 mc/h per person 35 Kerk./h minimo 0.7				Ajri i rinov. 229 mc/h Kerk./h efe. 0.70 Vol/h Infiltrim: 0 mc/h	
TE DHENA TE PROJEKTIT:				KORRIK ora 15.00 22.40				DIMER Legge10	
Kushtet Klimaterike MASCHERA DATI ZONA Te Jashtme Te Brendshme Diferenca				B.S. ° U.R.% X g/kg 38 55.00 19.90 26 50.00 10.65 12 5.00 9.25				B.S. ° U.R.% X g/kg 0 90.00 3.17 23 55.00 7.85 23 35.00 4.68	
Denominazione sip./ koef. sasi				rad.ni/ dT parziali W totali W				dT parziali W totali W	
CALORE SENSIBILE AMBIENTE									
RADIAZIONI SOLARI : Finestre				W/m²					
Finestre N m² 0.00 0.40				40.60 0				---	
Finestre E m² 33.00 0.40				40.60 536				---	
Finestre S m² 0.00 0.40				160.08 0				---	
Finestre W m² 33.00 0.40				455.88 6,018				---	
Lucernari m² 0.00 1.00				353.22 0				---	
RADIAZIONI E TRASM.: Pareti e Tetto W/m²				dT				dT	
Parete N m² 0.00 0.65				6.70 0				23.00 0	
Parete E m² 16.00 0.65				7.20 75				23.00 239	
Parete S m² 0.00 0.65				13.90 0				23.00 0	
Parete W m² 16.00 0.65				10.60 110				23.00 239	
Tetto m² 0.00 1.40				17.20 0				23.00 0	
TRASMISSIONI W/m²				dT				dT	
Finestre e Lucernari m² 66.00 2.70				12.00 2,138				23.00 4,099	
Pareti interne m² 36.00 0.80				4.80 138				9.20 265	
Soffitto non lastrico m² 0.00 1.40				7.20 0				13.80 0	
Pavimento m² 120.00 1.40				6.00 1,008				11.50 1,932	
Infiltrazioni mc/h 0.00 0.34				12.00 0				23.00 0	
PONTI TERMICI W/m				dT				dT	
Ponti termici verticali ml 13.00 0.75				12.00 117				23.00 224	
Ponti termici orizzontali ml 49.00 0.45				12.00 265				23.00 507	
Mazz. ed arch. porte/fin ml 33.00 0.87				12.00 345				23.00 680	
Altri ml 0.00 0.00				12.00 0				23.00 0	
CALORE INTERNO W				m²					
Persone n° 30 63				---				---	
Illuminazione W/m² 25.00 1.00				120 3,000				---	
Forza motrice o altre kW 0.00 1,000				---				---	
Totale parziale				15,639				8,166	
Margine sicurez. 0.05				782				408	
CALORE SENSIBILE AMBIENTE CALCOLATO				16,421 16,421				8,574 8,574	
CALORE LATENTE AMBIENTE									
Infiltrazioni mc/h 0 0.82				9.25 0				4.68 0	

Persone	n°	30	68	---	2,053	---	2,053
Vapore	kg/h	0.00	696	---	0	---	---
Altro							
	Totale parziale				2,053		2,053
	Margine sicurez.	0.05			103		103
CALORE LATENTE AMBIENTE CALCOLATO					2,156	2,156	2,156

CALORE ARIA ESTERNA							
Sensibile	mc/h	229	0.35	12.00	958	23.00	1,835
Latente	mc/h	229	0.82	9.25	1,747	4.68	884
	Totale parziale				2,705		2,719
	Margine sicurez.	0.05			135		136
CALORE ARIA ESTERNA CALCOLATO					2,840	2,840	2,855

Totale generale		W	21,417		W	13,585
Calore Ambiente	Sensibile	W	16,421	Sensibile	W	8,574
	Latente	W	2,156	Latente	W	2,156
	Totale amb. W		18,577	Totale amb. W		10,730
Aria Esterna	Sensibile	W	1,006	Sensibile	W	1,927
	Latente	W	1,834	Latente	W	928
	Totale a.e. W		2,840	Totale a.e. W		2,855
Totale generale	Tot. Generale W		21,417	Tot. Generale W		13,585
	indice w / mc		65.38			41.47

FABBISOGNO TERMICO IN DIFFERENTI PERIODI

FABBISOGNO TERMICO		Inverno	Ottobre ore 12	Giugno ore 8	Giugno ore 12	Luglio ore 10	Luglio ore 15	Agosto ore 15	Settembre ore 16
Sensibile ambiente	W	8,574	9,048	15,451	9,943	12,750	16,421	16,409	16,199
Latente ambiente	W	2,156	2,156	2,156	2,156	2,156	2,156	2,156	2,156
Totale Ambiente	W	10,730	11,204	17,607	12,099	14,906	18,577	18,565	18,355
Aria Esterna sensibile	W	1,927	645	612	813	812	1,006	1,006	955
Aria Esterna Latente	W	928	297	516	595	565	1,834	1,408	992
Totale Aria Esterna	W	2,855	943	1,127	1,408	1,177	2,840	2,414	1,947
Totale Sensibile	W	10,501	9,693	16,063	10,756	13,362	17,427	17,415	17,154
Totale Latente	W	3,084	2,453	2,671	2,751	2,721	3,990	3,564	3,147
Totale Generale	W	13,585	12,147	18,734	13,506	16,083	21,417	20,979	20,301

Valori di progetto: consigliati dal calcolo		Fabbisogno termico stimato			Fabbisogno termico di progetto		
		Ambiente	Aria est.	FT tot.	Ambiente	Aria est.	FT tot.
INVERNO	W	10,730	2,855	13,585	10,800	2,900	13,700
ESTATE max	W	18,577	2,840	21,417	17,800	2,500	20,300
ESTATE med.	W	15,902	1,694	17,595			

Calcolo Unità di Trattamento Aria		Regime estivo			Regime Invernale		
Giorno più critico Luglio ore 15.00	Condizioni Climatiche	B.S. °C	U.R. %	X g/kg	B.S. °C	U.R. %	X g/kg
	Esterna	38	55.00	19.90	0	90.00	3.17
	Interna	26	50.00	10.65	23	55.00	7.85
	Differenze	12	5.00	9.25	23	35.00	-4.68
	Fabbisogni termici	Potenza termica	W		Potenza termica	W	
	Calore Ambiente	Sensibile	16,421		Sensibile	8,574	

Aria Esterna	Latente	2,156	Latente	2,156	
	Totale ambiente	18,577	Totale ambiente	10,730	
	Sensibile	1,006	Sensibile	1,927	
	Latente	1,834	Latente	928	
	Totale aria est.	2,840	Totale aria est.	2,855	
Totale generale		21,417	13,585		
Fattore by-pass batterie		0.10			
Fabbisogni effettivi	Calore	W			
	Calore ambiente	Sensibile effettivo	16,522	8,767	
		Latente effettivo	2,339	2,249	
		Effettivo ambiente	18,861	11,015	
Calore Aria Esterna		2,556	2,855		
Totale generale		21,417	13,871		
Fattore termico amb. eff.		0.88			
Calcolo Unità Trattamento Aria	Punto di saturazione: Tps	13.50 °C	Ta - Tps	12.50	35.00
	dTe : (Ta-Tub)	11.25 °C	dTe/(Ta-Tps)	0.90	10.80
	Portata aria da deumidificare	4,319 mc/h			2,387
	dT* : (Ta-Tm)	11.18 °C			10.56
	dT : (Ta-Tm) desiderato	10.00 °C			9.00
	Portata di mandata	5,130 mc/h		100.00%	2,802
Portata aria esterna	229 mc/h	%le portata totale	4.47%	8%	
	Portata di ricircolo	4,900 mc/h	%le portata totale	95.53%	92%
	Portata specifica	43 mc/h mq			
	Movimentazioni V/h	15.66 Vol.am/h			
Miscela e Mandata	B.S. °	X g/kg	B.S. °	X g/kg	
	Miscela esterna+ricircolo	26.54	11.06	21.97	7.64
	Mandata aria	16.00	10.00	32.00	5.20
	Differenze	10.54	1.06	10.03	2.44

Tabela 1: Tabela e llogaritjeve termike per klasen majtas kati 0

Zona	Ngarkesa ne ftohje (WATT)	Ngarkesa ne ngrohje (WATT)
Klase majtas - K0	13,700	20,300
Monitorim - K0	2,000	2,200
Bar kafe - K0	7,400	11,200
Bar kafe 2- K0	5,700	8,200
Recepsioni - K0	10,600	14,200
Klase djathtas - K0	14,600	21,100
Monitorim djathtas - K0	2,800	3,400
Printerat - K0	21,400	25,300
Klase majtas - K1	20,000	30,500
Zyra poshte majtas - K1	1,800	1,800
Administrata poshte - K1	11,900	15,400
Zyra e drejtorit - K1	2,900	3,900
Salle pritjeje poshte K1	5,800	8,500
Klase djathtas K1	15,400	22,400
Klasa lart - K1	19,700	26,200
Monitorim 1 lart - K1	2,700	2,700
Monitorim 2 lart - K1	3,900	4,900
Z.e drejtorit te prgjith. K2	3,200	4,300
Zyrat e vogla - K2	2,500	3,200
Koridori - K2	6,400	10,000
Salla e vogel e mblidh. K2	5,400	7,400
Salle mblidh e madhe K2	7,600	11,600
Z. drejtorit poshte - K2	2,900	4,000
Specialistet K2	12,200	15,400
Zyra e protokollit - K2	2,700	2,700
Kuzhina - K2	6,700	9,000
Zyra open space K2	21,400	28,800
Z. e drejtorit djathtas K2	2,900	4,000

Tabela 2: Tabela e ngarkesave termike per te gjitha zonat

Niveli i zhurmave

Nivelet e zhurmave maksimale të lejuara brenda ambienteve janë përcaktuar nga norma UNI 8199 dhe janë 35 dB(A). Sipas ASHRAE nivelet maksimale të zhurmave të lejuara variojnë në bazë të tipit të lokalit.

Lageshtia relative

Vlera optimale e lageshtise relative është rreth 50% me shmangie $\pm 10\%$. Në të vërtetë për arsye kursimi në vlerën e investimit dhe të përdorimit për ambiente E2 evitohet një kontroll i saktë i saj, dhe për këtë arsye lejohet që të kemi shmangie në kufijtë 10% në dimër. Mbajtja e lageshtirës në zyra do të jetë e kontrolluar ndërsa në ambientet e tjerë parametra normale do të bëhet në rrugë natyrale nëpërmjet futjes së ajrit të jashtëm. Kjo përfshihet brënda kufirit të konfortit termik sipas ASHRAE standard 55-1992 dhe UNI-EN-ISO 27730-96.

Humbjet e nxehtësisë

Për të analizuar në menyrë të kujdesshme humbjet e nxehtësisë janë konsideruar të gjithë faktorët që influencojnë për shkak të orientimit me horizontin, afërsia me ambientet, karakteristikat termofizike të mureve rrethues, dritareve, dyshemesë, tavanit, etj.

Humbja e nxehtësisë influencohet edhe nga popullimi i ambienteve, ndriçimi, ventilimi natyral i ajrit etj. Ngarkesat termike në bazë të natyrës së faktorit dhe influencës në bilancin termik përlllogariten si humbje ose si shtesë termike, por gjithsesi ato që influencojnë në mënyrë të drejtpërdrejt janë:

- numri i personave prezent;
- aktiviteti i tyre fizik;
- niveli i ndricimit dhe aparatet elektrike të instaluar;
- niveli i rrezatimit diellor;
- infiltrimet e ajrit nga dyer-dritare (ventilimi natyral).

Ngarkesat në impiantin e kondicionimit kanë një specifikë të cilat varen nga fakti që jo të gjithë ambientet janë të ngarkuara ose të përdorura në mënyrë konstante. Kështu ky fakt kërkon ndërtimin e grafikut të përqëndrimit ose grafikun e veprimit të impiantit të kondicionimit i cili ka të bëjë me tipologjinë e impiantit dhe shkallën e automatizimit, të kontrollit dhe komandimit të tij. Të gjithë këto faktorë siç kuptohet jo gjithnjë paraqiten në të njejtën vlerë dhe me të njëjtën influencë prandaj konsiderohen si ngarkesa (humbje) termike variable. Ndërsa në funksion të ndërtesës nga pikëpamja arkitektonike, materialeve ndërtimore etj, rezultojnë humbje termike konstante (humbjet nga muret, dritaret, dyert, dyshemeja, soleta e tavanit, etj.)

Këto faktorë kanë influencë konstante në ngarkesat (humbjet) termike dhe si të tilla zgjidhen me mjaft kujdes në mënyrë që kostoja e ndërtimit të impiantit mos kalojë qëllimin e kursimit të humbjeve energjitike, si dhe nga ana tjetër të mos mbi dimensionohet impianti i kondicionimit.

Nga pikpamja e kapacitetit termik të pajisjeve nënvizojmë se kapacitet për pikun e ngarkesës variojnë në mënyrë të konsiderueshme gjatë ditës bazuar në variacionin e okupimit të ambienteve. Për të shmangur super dimensionimin e kapaciteteve të pajisjeve është analizuar paraprakisht profili i okupimit të zonave si dhe parashikimi paraprak i konsumit energjetik.

Përshtatshmëria dhe fleksibiliteti i sistemit

Karakteristikat e sistemit të përzgjedhur janë parashikuar në varësi të kriterëve të mëposhtëm:

- Fleksibilitet gjatë gjithë kohës së shfrytëzimit që do të thotë që kapacitet e sistemit të sigurojnë performancë variable gjatë ditës dhe në sezone të ndryshme;
- Fleksibilitet në kapacitet e terminaleve në ambientet e destinuara;
- Të jetë i aftë të sigurojë kondita në përputhje me ato të parshikuara në kriteret e projektimit për të siguruar një mirëqenie fiziologjike të kënaqshme;
- Kosto të ulët përdorimi dhe mirëmbajtje.

Përshkrimi i Sistemeve të Perzgjedhura

1. Tipi i impiantit: Impiant VRF (Variable Refrigerant Flow)

Kondicionimi i objektit është përzgjedhur të bëhet me sistem mini VRF, si sistem optimal duke marrë parasysh funksionin dhe sipërfaqen e objektit.

Sistemi i kondicionimit VRF është projektuar të bëjë ngrohjen e ambienteve gjatë stinës së ftohtë dhe ftohjen e tyre gjatë stinës së nxehtë.

Pajisjet e brendshme të kondicionimit janë zgjedhur pajisje tavanore të tipit kaset me 4 drejtime fryrje dhe pajisje të brendshme dysheme (për ambientet me sipërfaqe të vogël).

Sipas kushteve të projektimit për sistemet VRF pajisjet e brendshme lidhen me një pajisje të jashtme VRF me kapacitet total në ftohje dhe ngrohje në bazë të kërkesës totale të nxehtësisë për ambientet që do të ngrohen dhe ftohen.

Rrjeti hidraulik do të formohet nga tubacione bakri të veshura me karakteristika teknike dhe dimensione në përputhje me Normën Europiane Teknike UNI EN 1057 me rakorderi me saldim të termoizoluar në fabrikë me tuba fleksibël me polietilen me qeliza të mbyllura.

Tubat do të jenë sipas diametrave të përcaktuar në projekt nga njësia e jashtme tek njësia e brendshme.

Impianti i kondicionimit për objektin do të bëhet me 3 sisteme VRF. Ndaj në 3 sisteme të ndryshme VRF është bërë për arsye sipërfaqeje dhe funksionaliteti. Sistemet do të funksionojnë të ndara për secilin nga katet e marra në shqyrtim në këtë projekt.

Sic është treguar dhe në projektin e kondicionimit secili kat do të ketë grupin e vet të pajisjeve të jashtme të pozicionuar jashtë objektit në nivelin e sistemimeve të jashtme.



Figura 1: Pajisje e brendshme tavanore tipi kaset me 4 drejtime fryrje



Figura 2: Pajisje e brendshme dysheme



Figura 3: Pajisje e jashtme VRF

Lidhja e pajisjeve të brendshme me ato të jashtme do të bëhet me anë të tubacioneve të bakrit si dhe degeve të bakrit. I gjithë sistemi i tubacioneve shpërndarese dhe degezimeve do të vishet me shtrese termoizoluese për të minimizuar humbjet termike të fluideve në rrjet.

Tubacionet shpërndarese pasi dalin nga njësia e jashtme do të ngjiten në shaftin e përcaktuar si në projekt për të shkuar në katet respektive. Shpërndarja e rrjetit në brendësi të katit nga kolona deri në pajisjet e kondicionimit do të bëhet nga tavanin e katit. Kalimi i tubacioneve në tavanin e katit është zgjedhur për arsye sigurie si dhe lehtësi ndërhyrjeje në rast të avarive të mundshme të sistemit.

Tubacione bakri me $\delta = 0.8 \text{ mm}$, për R410A, dhe termoizolim me spesor $\delta = 10\sim 13\text{mm}$ të prodhuara me teknologjinë pa saldime, dimensione sipas normës teknike EN 1057



Figure 4: Tub bakri



Figure 5: Dege bakri

Rrjetet e nxjerrjes jashtë në kondensave

Për të gjitha sistemet e kondicionimit, rrjeti i nxjerrjes së kondensave jashtë do të realizohet me tubacione plastike PP me diametër $\varnothing 32$. Tubacionet e kondensatit sipas normave ekzistuese për një mirëfunksionim kalojnë me një pjerresi jo më pak se 1% dhe do të drejtohen ose në piletat mbledhëse ballkoneve, ose në kolonat vertikale të shkarkimit të ujrave të shiut.



Figura 6: Tuba PP per kondensen

Termoizolimi i te gjithë tubacioneve me material polietileni ose gome elastomerike me qeliza te mbyllura dhe spesore te tille qe te reduktojne ne minimum humbjet e energjise dhe te eliminojne kondensimin gjate stines se veres. Me saktesisht spesoret dhe percaktime te tjera do ti gjeni ne fletet perkatese te vizatimit.

2. Sistemi i ventilimit

Sistemi i ventilimit te ajrit ne objekt do te behet me ane te rekuperatoreve te ajrit. Keto pajisje rekuperatore jane te perbera nga dy ventilatore qe fusin dhe nxjerrin ajer nga sistemi. Per te ulur humbjet termike gjate procesit te ventilimit dy rrymat e ajrit qe kalojne neper pajisje kryqezohen ne shkembyesin e nxehtesise. Gjate kalimit te ajrit ne pajisjen rekuperatore behet e mundur kalimi i nxehtesise nga ajri qe del nga ambienti te ajri qe futet ne objekt, gjate ketij procesi rrymat e ajrit nuk perzihen me njera tjetren.

Te gjitha ambientet jane te pajisura me dritrare nepermjet te cilave mund te kryhet ventilimi natyral i cili do te jete ne te gjitha rastet ventilimi primar. Ventilimi mekanik eshte pare i arsyeshem si ventilim sekondar, per te shmangur humbjet termike ne periudhat e pikut dhe faktit qe per disa periudha kohore (gjate provimeve) per arsye sigurie nuk do te jete e mundur te hapen disa nga dritaret.

Ventilimi i zyrave bazohet ne rekomandimet nderkombetare per 4-6 nderrime ne ore ajer i fresket dhe per klasat 2-4 nderrime ne ore. Grilat jane perzgjedhur te tilla qe shpejtesia dhe zhurma, te mos kalojne kufijte e rekomanduar 2-2.2 m/s dhe zhurma me pak sesa 40 NR.

LOCALI PREMISES	RICAMBI ARIA/ORA RECIPROCATIONS AIR/HOUR
Ambienti per animali / <i>Animal environments</i>	20 - 30
Abitazioni / <i>Houses</i>	2 - 4
Auditori / <i>Auditoriums</i>	10 - 12
Aule scolastiche / <i>School classrooms</i>	2 - 4
Stabilimenti (polverosi) / <i>Plants (dusts)</i>	10 - 20
Stabilimenti (in genere) / <i>Plants (in general)</i>	6 - 10
Stabilimenti tessili / <i>Textile plants</i>	8 - 12
Stive (di navi in genere) / <i>Holds (of boats in general)</i>	6 - 10
Stive (per frutta) / <i>Holds (for fruits)</i>	6 - 10
Stive (per carne, uova, ecc.) / <i>Holds (for meats, eggs, etc.)</i>	6 - 10
Supermercati / <i>Supermarkets</i>	9 - 12
Taverne / <i>Taverns</i>	20 - 30
Teatri / <i>Theatres</i>	10 - 15
Tintorie / <i>Dry cleaners</i>	20 - 30
Tipografie / <i>Typographies</i>	15 - 25
Toelette / <i>Toilets</i>	10 - 20
Uffici / <i>Offices</i>	4 - 6
Uffici tecnici / <i>Technical offices</i>	4 - 8

Figura 7: Rekomandime nderkombetare si ASHRAE per ventilimin e ambienteve te ndryshme

Per sistemin e ventilimit te ambjenteve te brendshme si ne projekt eshte zgjedhur te perdoren 11 pajisje rekuperatore ajri, te cilat do te pozicionohen ne tavanin e tualeteve.

Pajisjet e perdorura per ventilimin e ajrit:

- 2 Rekuperator ajri:
 - Volumi i ajrit: 1500 m³/h
 - Presioni statik: 100 Pa
 - Kapaciteti rikuperues : 73%-80%
 - Dimensionet HxWxD: 525x1800x1130 mm

- 7 Rekuperator ajri:
 - Volumi i ajrit: 2000 m³/h
 - Presioni statik: 120 Pa
 - Kapaciteti rikuperues ne ngrohje: 76%-80%
 - Dimensionet HxWxD: 525x1800x1430 mm
 -



Figura 8: Njesi rikuperimi ajri 1500-2000 m³/h

- 1 Rekuperator ajri:
 - Volumi i ajrit: 2500 m³/h
 - Presioni statik: 100 Pa
 - Kapaciteti rikuperues: 91%
 - Dimensionet HxWxD: 500x2000x2000 mm
- 1 Rekuperator ajri:
 - Volumi i ajrit: 3000 m³/h
 - Presioni statik: 100 Pa
 - Kapaciteti rikuperues: 90%
 - Dimensionet HxWxD: 500x2000x2000 mm

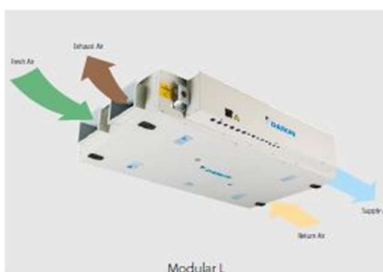


Figura 9: Njesi rikuperimi ajri 2500-3000 m³/h

Per largimin dhe futjen e ajrit ne ambjente do te perdoren kanalet e ajrit te pozicionuar ne tavanin e katit.

Kanale ajri prej paneli poliuretani i veshur me shtrese alumini nga te dyja anet per aplikime ne ambjente te brendshme. Spesori 20mm, densiteti 52 kg/m³, trashesia e aluminit 80/80 mikron, shtresa e brendshme e lemuar.

Te gjithë kanalet e ajrit duhet te ndertohen dhe instalohen ne perputhje me vizatimet si dhe standarteve perkatese EN dhe DIN. Shtrirja e kanaleve duhet te behet ne vije te drejte, duhet te jene te lemuar nga brenda, nuk duhet te kene vibrime nen te gjitha kushtet e punes dhe pa humbje presioni. I gjithë sistemi i kanaleve te ajrit perfshire ketu kapeset, mbajteset, izolimin, guarnicionet, kanalet, duhet te zgjidhen, te prodhohen dhe instalohen per nje jetegjatesi mbi 10 vjecare.

Te gjitha kanalet e ajrit duhet te prodhohen me permasat e treguara ne vizatim. Permasat e kanaleve jane permasat aktuale te rrugeve te ajrit. Ndryshimet ne permasat e kanaleve (reduktimet) dhe ne formen e tyre duhet te behen ne menyre graduale.

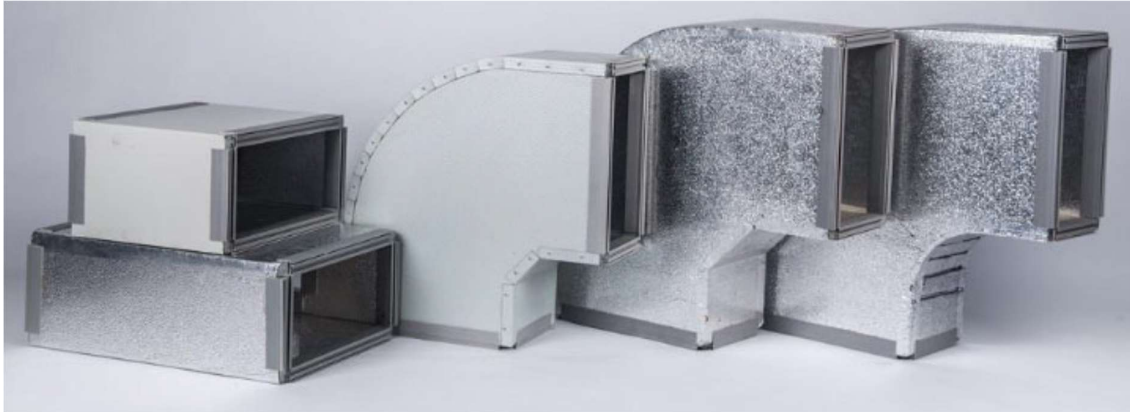


Figura 10: Kanale poliuretani

Grilat e dhenies dhe te thithjes, jane terminalet finale te shperndarjes se ajrit. Ne varesi te vendit ku do te montohen dhe funksionit qe ato kane, ato ndahen sipas disa kategorive. Ne projekt jane perdorur grila fryrjeje dhe thithje te pozicionuara dhe dimensionuara si ne projekt.

Dimensionet e te cilave do te varen nga sasia e ajrit qe do te shperndaje kjo grille, ne perputhje me normativat e lejuara te shpejtesise se kalimit te ajrit ne grille si dhe nivelit te zhurmave. Grilat jane prej alumini te anodizuar. Menyra e kapjes dhe fiksimit i tyre behet me vida ose me

aksesore te posatshem, ne varesi te pozicionit te montimit. Grilat dhe cdo element perberes i tyre duhet te jete i mbrojtur nga korrozioni.

Per te mbajtur humbjet e presionit sa me minimale ne grilat e fryrjes, do te perdoren grila fryrjeje me largesi te fletave jo me te vogel se 12.5 mm nga njera-tjetra.



Figura 11: Grila dergimi dhe thithje

Per barin e pozicionuar ne katin 0 te objektit, fryrja e ajrit te paster ne ambient do te behet me ane te grilave tip Slot linear me dy kanale per te shperndar sasine e ajrit duke ulur shpejtesin e daljes se ajrit nga grila.



Figura 12: Grila tip Slot me dy kanale

Punime qe rekomandohen të kryhen pas futjes se sistemit në punë:

- Kontroll i pergjithshem i funksionimit te sistemeve.
- Pastrim i pjatës së kondesatit ne njesite e brendshme
- Kontroll i tubacioneve te shkarkimit te ujerave te kondesatit.
- Kontoll i termoizolimeve.



VRF System Selection Report

Project Name :QSHA VRF KATI 0

Region :ALB

Selection Mode :Cooling+Heating

Sales Engineer :

Company:

Address:

Phone No:

Order Date : 25/02/2026

Delivery required date : 25/02/2026

Client Name :

Post Code :

Tel :

Mail :

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Appendix –Equipment list for KATI 013

Field Providing.....13

LIMITS OF LIABILITY

License Contract

By using the Global VRF Selection Software, you agree to abide by the terms of this End User License Agreement.

This software is not intended to provide highly accurate or certifiable results taking into account all the factors involved in complex or sophisticated installations.

Hitachi makes no warranties regarding the accuracy of the results obtained from the use of this software.

In fact, this software is not able to take into account all the site-specific factors that may influence the proper functioning of the selected device (e.g. piping or wiring lengths on site, third party AHU, geometry of the piping network, operating temperatures...).

It may also contain technical inaccuracies or errors, and improvements or modifications may be made to the software by Hitachi at any time without prior notice.

This software is not intended to replace a thorough evaluation by a professional of the HVAC field.

Accordingly, you are advised not to rely solely on the reports produced by the software to select the appropriate equipment.

Reports

The report is the result of the information transferred and input by the User of the Global VRF Selection Software.

HITACHI assumes no kind of liability regarding the pre-existing data and information in the Software, as well as the data and information input by the User, and in particular in relation to:

1. The static part of the Software including the information required to carry out the calculations corresponding to each project through preset parameters; this information merely includes the parameters for the preparation of the report in line with the model designed by and with the knowledge of Hitachi, without this implying any kind of guarantee for the user regarding the precision and reliability of the results of the report.
2. The dynamic part of the Software, which is the result of the information input by the User in correspondence with the said parameters; the User is on all accounts exclusively liable for the accuracy of the information being input in the Software.
3. The failure to include any legal aspects that may correspond or be required according to current laws.

The Software and the issuing of this report are merely informative tools to assist the User in the planning and implementation of a project.

SYSTEM SELECTION

Outdoor Units

Pictures	Model Identification	Description	Quantity	Components
	RAS-46FSXNSE	Commercial VRF HP, FSXNSE	1	RAS-24FSXNSE RAS-22FSXNSE - -

RAS-46FSXNSE Specifications		
Power supply		400V/3Ph/50Hz
Nominal capacity	Cooling	128.0kW
	Heating	145.0kW
EER		3.00
COP		3.30
SEER		6.45
SCOP		4.43
Sound power		88.00dB(A)
Dimensions	Height	1,725mm
	Width	3,238mm
	Depth	784mm
Net Weight		797kg

Indoor Units

No Room

Picture	Indoor Unit		Nominal Cap. (kW)		Accessories	Control		
	Ident.	Description - Model	Cool	Heat		Picture	Model	Gp
	KL.1 PJ.1	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	KL.1 PJ.2	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	KL.1 PJ.3	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE	5.6	6.3	Air panel P-AP56NAM		PC-ARFG-E	
	KL.1 PJ.4	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	KL.1 PJ.5	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	MON.1	Floor Mounted Cased RPF-1.0FSN2E	2.8	3.2			PC-ARFG-E	
	BAR1 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	BAR1 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	BAR2 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	

Picture	Indoor Unit		Nominal Cap. (kW)		Accessories	Control	
	Ident.	Description - Model	Cool	Heat		Picture	Model
	BAR2 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	REC.1 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	REC.1 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	REC.1 PJ.3	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	PRINT. 1 PJ.5	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	PRINT. 1 PJ.4	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	PRINT. 1 PJ.3	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	PRINT. 1 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	PRINT. 1 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	MONI. 2	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E
	KL.2 PJ.4	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	KL.2 PJ.3	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	KL.2 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E
	KL.2 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E

SYSTEM DESIGN

KATI 0

Working Condition	Outdoor (Air)	Indoor (Air)
Cooling	38.0 °C DB	26.0 °C DB 18.8 °C WB (50% RH)
Heating	0.0 °C DB -2.7 °C WB (51% RH)	22.0 °C DB

Note:

- Actual capacity takes into account all correction factors, including defrosting in heating mode.
- Each Indoor unit's temperature condition might be different. Software uses minimum wet bulb temperature of indoor for system cooling process and uses maximum dry bulb temperature of indoor for system heating process.

Outdoor Units of the system

Outdoor Unit (KATI 0)		Connect. Rate (%)		Cooling Capacity (kW)			Heating Capacity (kW)		
Ref + Description	Ident.	Actual	Max	Nominal	Actual	Required	Nominal	Actual	Required
Commercial VRF HP, FSXNSE RAS-46FSXNSE		92	100	-	98.2	-	-	88.1	-
Total				-	98.2	-	-	88.1	-

Indoor Units of the system

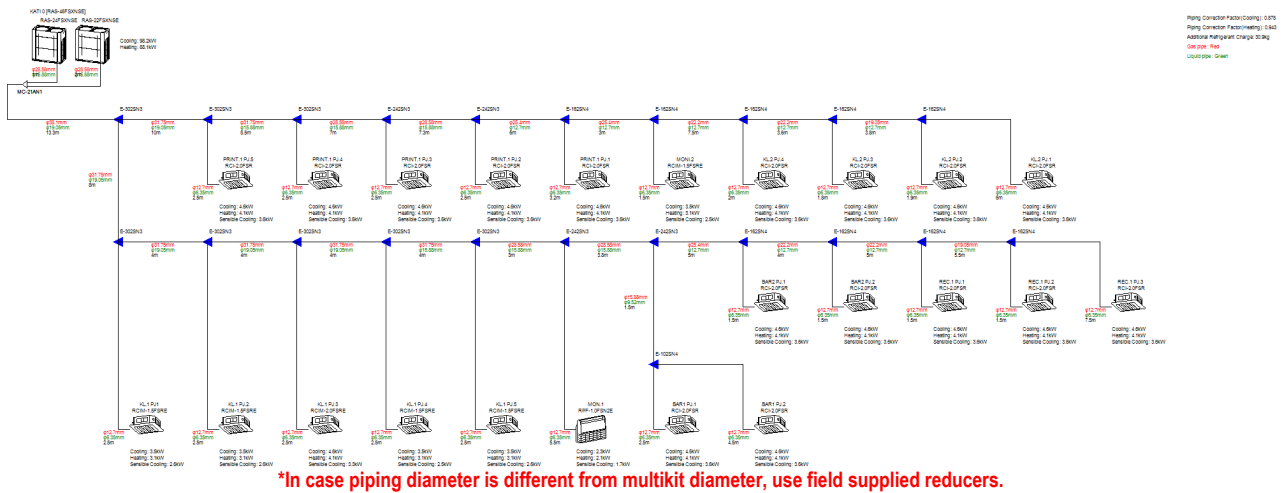
Indoor Unit (KATI 0)		Sound Pressure dB(A)	Air Flow		Cooling Capacity (kW)			Heating Capacity (kW)	
Ref + Description	Ident.		Speed	m³/min	Actual	Sensible	Required	Actual	Required
Total					98.2	75.6	0.0	88.1	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	KL.1 PJ1	41	High2	13.0	3.5	2.6	0.0	3.1	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	KL.1 PJ.2	41	High2	13.0	3.5	2.6	0.0	3.1	0.0
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE	KL.1 PJ.3	39	High	12.0	4.6	3.3	0.0	4.1	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	KL.1 PJ.4	37	High	11.0	3.5	2.5	0.0	3.1	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	KL.1 PJ.5	41	High2	13.0	3.5	2.6	0.0	3.1	0.0
Floor Mounted Cased RPF-1.0FSN2E	MON.1	35	High	8.5	2.3	1.7	0.0	2.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	BAR1 PJ.1	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	BAR1 PJ.2	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	BAR2 PJ.1	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	BAR2 PJ.2	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	REC.1 PJ.1	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	REC.1 PJ.2	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	REC.1 PJ.3	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	PRINT. 1 PJ.5	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	PRINT. 1 PJ.4	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	PRINT. 1 PJ.3	32	High	17.0	4.6	3.6	0.0	4.1	0.0

Indoor Unit (KATI 0)		Sound Pressure dB(A)	Air Flow		Cooling Capacity (kW)			Heating Capacity (kW)	
Ref + Description	Ident.		Speed	m³/min	Actual	Sensible	Required	Actual	Required
4-Way Cassette(FSR) RCI-2.0FSR	PRINT. 1 PJ.2	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	PRINT. 1 PJ.1	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	MONI.2	37	High	11.0	3.5	2.5	0.0	3.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.2 PJ.4	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.2 PJ.3	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.2 PJ.2	32	High	17.0	4.6	3.6	0.0	4.1	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.2 PJ.1	32	High	17.0	4.6	3.6	0.0	4.1	0.0

PIPING DESIGN

KATI 0

Piping Diagram



KATI 0

Piping Rules

Commercial VRF HP, FSXNSE RAS-46FSXNSE		Project m	Max m	OK
Length	Total pipe length	194	1,000	✓
	Maximum piping length (Actual length)	76	165	✓
	Maximum piping length (Equivalent length)	81	190	✓
	Maximum Piping Length between Multi-kit of 1st Branch and Each Indoor Unit	63	90	✓
	Maximum Piping Length between Each Multi-kit and Each Indoor Unit	8	40	✓
	Piping Length between Piping Connection Kit 1 and Each Outdoor Unit	2	10	✓
Height	Height Difference between (O.U. is Upper)	0	110	✓
	Height Difference between (O.U. is Lower)	0	40	✓
	Height Difference between Indoor Units	0	30	✓
IU connectable (Min / recommended / Max)		23	1 / 38 / 64	✓
Connected Cap. (Min-Max)		92%	50% - 130%	✓

Refrigerant Load & Pipe size

Commercial VRF HP, FSXNSE RAS-46FSXNSE	Refrigerant Type: R410A kg
OU refrigerant load (Charge before shipment)	22.9
Installation Additional refrigerant load (OU + Piping)	30.9
Total	53.8

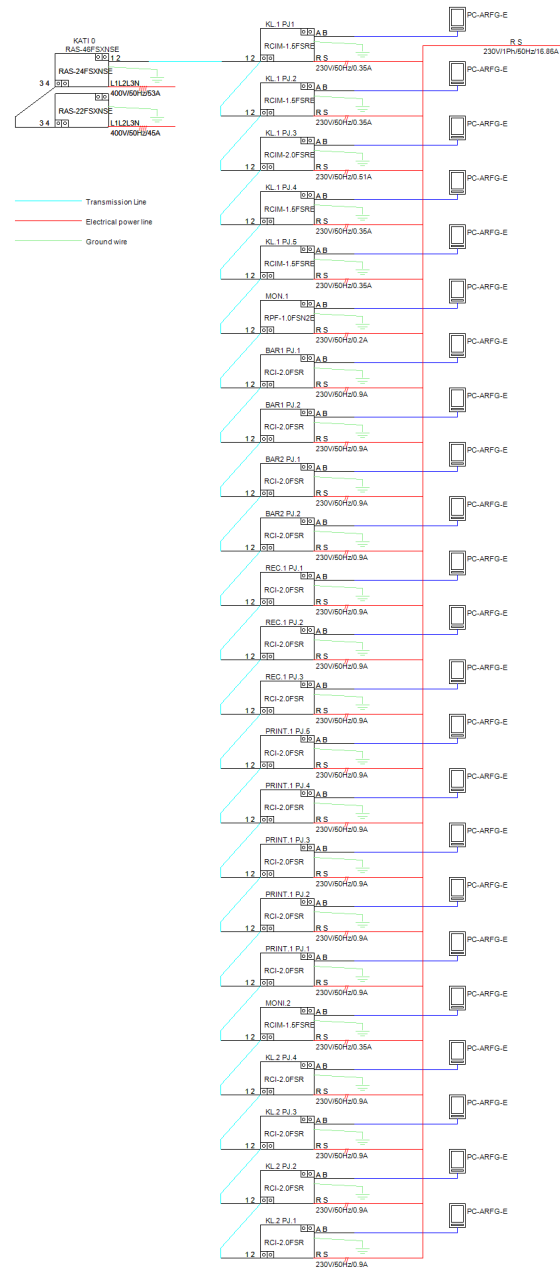
Recommendation

- If pipe size 1" is not available in your country, please use 1"1/8 as replacement.

WIRING DESIGN

KATI 0

Wiring Diagram



KATI 0

Power Supply

	Model	Power supply	Input power kW	Max current A
	RAS-46FSXNSE (RAS-24FSXNSE + RAS-22FSXNSE)	400V/3Ph/50Hz	22.01+19.84	53+45
	RCIM-1.5FSRE	230V/1Ph/50Hz	0.07	0.35
	RCIM-2.0FSRE	230V/1Ph/50Hz	0.1	0.51
	RPF-1.0FSN2E	230V/1Ph/50Hz	0.05	0.2
	RCI-2.0FSR	230V/1Ph/50Hz	0.09	0.9

RCS link description

- Minimum recommended section (up to 500 m): 2 x 0.75 mm² connected to earth at one point.
- Cable characteristics: non polar, twisted shielded pair of cable.
- One Remote Control Switch can control up to 16 Indoor Units as a maximum.
- Two Remote Control Switch can be connected in the same unit or unit group.
- The second one is a subsidiary remote control switch.

Central Controller

H-Link2 communication line description

- Minimum recommended section: 2 x 0.75 mm² connected to earth at one point. Shielding must be renewed every 300m.
- Transmitting wires: non polar, twisted shielded pair of cable.
- Maximum H-Link2 communication line length is 1000 m but can be increased until 5.000m using optional relay PSC-5HR.
- Several refrigerant systems can be connected together on a bus with H-LINK2 wiring using an open loop
- Maximum number of Outdoor Units is 64.
- Maximum number of Indoor Units is 160.
- Number of central controller: 0

EQUIPMENT LIST AND INFORMATION

Outdoor Units

Model & Components	System Name	Description	Quantity
RAS-46FSXNSE	KATI 0	Commercial VRF HP, FSXNSE	1
RAS-24FSXNSE	-	Components	1
RAS-22FSXNSE	-	Components	1

Indoor Units

Model	Description	Quantity
RCIM-1.5FSRE	4-Way Cassette Mini(FSRE)	5
RCIM-2.0FSRE	4-Way Cassette Mini(FSRE)	1
RCI-2.0FSR	4-Way Cassette(FSR)	16
RPF-1.0FSN2E	Floor Mounted Cased	1

Accessories

Model	Description	Quantity
P-AP56NAM	Air panel	6
P-N23NA2	Air Panel w/o motion sensor	16
PC-ARFG-E	Remote control with timer	23

Branch Kit

Pipe connection kit

Model	Description	Quantity
MC-21AN1	Outdoor units piping connection kit	1

Multikit

Model	Description	Quantity
E-302SN3	Line branch kit	8
E-242SN3	Line branch kit	4
E-102SN4	Line branch kit	1

Model	Description	Quantity
E-162SN4	Line branch kit	9

CH Box

Field Providing

Piping Materials

Pipe size(mm)	Length m
6.35	64.9
9.52	1.5
12.7	108.3
15.88	38.1
19.05	52.6
22.2	20.1
25.4	14
28.58	24.1
31.75	42.5
38.1	13.3

Refrigerant

Refrigerant Type	Quantity to be provided kg
R410A	30.9

Appendix –Equipment list for KATI 0

Category	Model	Description	Quantity
Outdoor Units	RAS-46FSXNSE	Commercial VRF HP, FSXNSE	1
	RAS-24FSXNSE	component	1
	RAS-22FSXNSE	component	1
Indoor Units	RCIM-1.5FSRE	4-Way Cassette Mini(FSRE)	5
	RCIM-2.0FSRE	4-Way Cassette Mini(FSRE)	1
	RCI-2.0FSR	4-Way Cassette(FSR)	16
	RPF-1.0FSN2E	Floor Mounted Cased	1
Accessory	P-AP56NAM	Air panel	6
	P-N23NA2	Air Panel w/o motion sensor	16
	PC-ARFG-E	Remote control with timer	23
Piping Connection Kit	MC-21AN1	Outdoor units piping connection kit	1
MultiKit	E-302SN3	Line branch kit	8
	E-242SN3	Line branch kit	4
	E-102SN4	Line branch kit	1
	E-162SN4	Line branch kit	9

Field Providing

Pipe size(mm)	Length
6.35	64.9
9.52	1.5
12.7	108.3
15.88	38.1
19.05	52.6
22.2	20.1
25.4	14
28.58	24.1
31.75	42.5
38.1	13.3

Refrigerant Type	Quantity to be provided kg
R410A	30.9



VRF System Selection Report

Project Name :QSHA VRF KATI 1

Region :ALB

Selection Mode :Cooling+Heating

Sales Engineer :

Company:

Address:

Phone No:

Order Date : 25/02/2026

Delivery required date : 25/02/2026

Client Name :

Post Code :

Tel :

Mail :

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LIMITS OF LIABILITY

License Contract

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This software is not intended to provide highly accurate or certifiable results taking into account all the factors involved in complex or sophisticated installations.

Hitachi makes no warranties regarding the accuracy of the results obtained from the use of this software.

In fact, this software is not able to take into account all the site-specific factors that may influence the proper functioning of the selected device (e.g. piping or wiring lengths on site, third party AHU, geometry of the piping network, operating temperatures...).

It may also contain technical inaccuracies or errors, and improvements or modifications may be made to the software by Hitachi at any time without prior notice.

This software is not intended to replace a thorough evaluation by a professional of the HVAC field.

Accordingly, you are advised not to rely solely on the reports produced by the software to select the appropriate equipment.

Reports

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1. The static part of the Software including the information required to carry out the calculations corresponding to each project through preset parameters; this information merely includes the parameters for the preparation of the report in line with the model designed by and with the knowledge of Hitachi, without this implying any kind of guarantee for the user regarding the precision and reliability of the results of the report.
2. The dynamic part of the Software, which is the result of the information input by the User in correspondence with the said parameters; the User is on all accounts exclusively liable for the accuracy of the information being input in the Software.
3. The failure to include any legal aspects that may correspond or be required according to current laws.

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SYSTEM SELECTION

Outdoor Units

Pictures	Model Identification	Description	Quantity	Components
	RAS-48FSXNSE	Commercial VRF HP, FSXNSE	1	RAS-24FSXNSE RAS-24FSXNSE - -

RAS-48FSXNSE Specifications		
Power supply		400V/3Ph/50Hz
Nominal capacity	Cooling	136.0kW
	Heating	150.0kW
EER		2.99
COP		3.40
SEER		6.19
SCOP		4.43
Sound power		89.00dB(A)
Dimensions	Height	1,725mm
	Width	3,238mm
	Depth	784mm
Net Weight		798kg

Indoor Units

No Room

Picture	Indoor Unit		Nominal Cap. (kW)		Accessories	Control		
	Ident.	Description - Model	Cool	Heat		Picture	Model	Gp
	KL.3 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.3 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.3 PJ.3	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.3 PJ.4	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.3 PJ.5	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.3 PJ.6	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	ZYRE 1	Floor Mounted Cased RPF-1.0FSN2E	2.8	3.2			PC-ARFG-E	
	ADM.1 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	ADM.1 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	

Picture	Indoor Unit		Nominal Cap. (kW)		Accessories	Control		
	Ident.	Description - Model	Cool	Heat		Picture	Model	Gp
	MON.3	Floor Mounted Cased RPF-1.0FSN2E	2.8	3.2			PC-ARFG-E	
	ADM.1 PJ.3	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	ZYRE 2	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	PRITJ E1 PJ.1	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	5.2	5.6	Air panel P-AP56NAM		PC-ARFG-E	
	PRITJ E1 PJ.2	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	5.2	5.6	Air panel P-AP56NAM		PC-ARFG-E	
	KL.5 PJ.6	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	5.2	5.6	Air panel P-AP56NAM		PC-ARFG-E	
	KL.5 PJ.5	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	5.2	5.6	Air panel P-AP56NAM		PC-ARFG-E	
	KL.5 PJ.4	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	5.2	5.6	Air panel P-AP56NAM		PC-ARFG-E	
	KL.5 PJ.3	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	5.2	5.6	Air panel P-AP56NAM		PC-ARFG-E	
	KL.5 PJ.2	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	5.2	5.6	Air panel P-AP56NAM		PC-ARFG-E	
	KL.5 PJ.1	4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	5.2	5.6	Air panel P-AP56NAM		PC-ARFG-E	
	MON.4	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE (1.3 HP)	3.8	4.2	Air panel P-AP56NAM		PC-ARFG-E	
	MON. 5	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.4 PJ.4	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.4 PJ.3	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.4 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	KL.4 PJ.1	4-Way Cassette(FSR) RCI-2.5FSR	7.1	8.5	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	

SYSTEM DESIGN

VRF KATI 1

Working Condition	Outdoor (Air)	Indoor (Air)
Cooling	38.0 °C DB	26.0 °C DB 18.8 °C WB (50% RH)
Heating	0.0 °C DB -2.7 °C WB (51% RH)	22.0 °C DB

Note:

- Actual capacity takes into account all correction factors, including defrosting in heating mode.
- Each Indoor unit's temperature condition might be different. Software uses minimum wet bulb temperature of indoor for system cooling process and uses maximum dry bulb temperature of indoor for system heating process.

Outdoor Units of the system

Outdoor Unit (VRF KATI 1)		Connect. Rate (%)		Cooling Capacity (kW)			Heating Capacity (kW)		
Ref + Description	Ident.	Actual	Max	Nominal	Actual	Required	Nominal	Actual	Required
Commercial VRF HP, FSXNSE RAS-48FSXNSE		99	100	-	110.9	-	-	88.7	-
Total				-	110.9	-	-	88.7	-

Indoor Units of the system

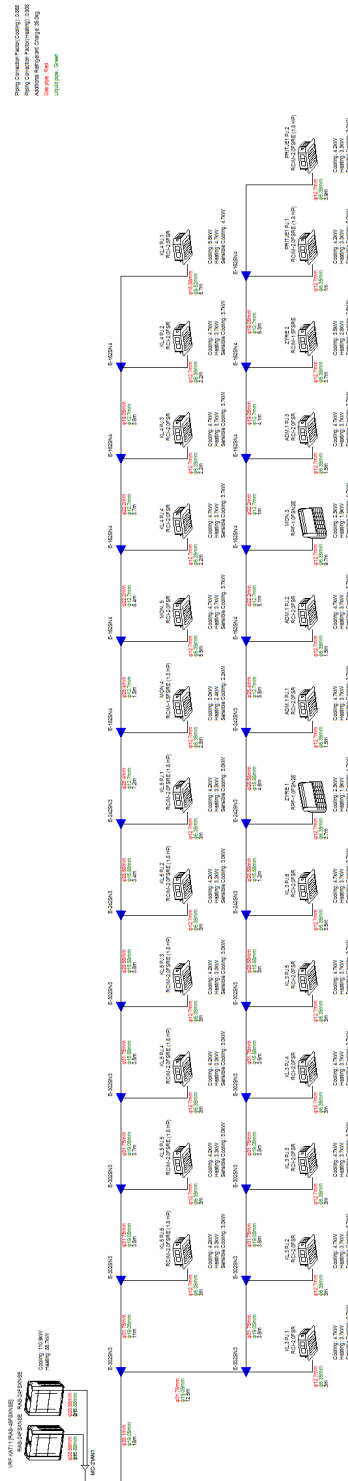
Indoor Unit (VRF KATI 1)		Sound Pressure dB(A)	Air Flow		Cooling Capacity (kW)			Heating Capacity (kW)	
Ref + Description	Ident.		Speed	m³/min	Actual	Sensible	Required	Actual	Required
Total					110.9	84.2	0.0	88.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.3 PJ.1	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.3 PJ.2	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.3 PJ.3	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.3 PJ.4	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.3 PJ.5	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.3 PJ.6	32	High	17.0	4.7	3.7	0.0	3.7	0.0
Floor Mounted Cased RPF-1.0FSN2E	ZYRE 1	35	High	8.5	2.3	1.7	0.0	1.9	0.0
4-Way Cassette(FSR) RCI-2.0FSR	ADM.1 PJ.1	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	ADM.1 PJ.2	32	High	17.0	4.7	3.7	0.0	3.7	0.0
Floor Mounted Cased RPF-1.0FSN2E	MON.3	35	High	8.5	2.3	1.7	0.0	1.9	0.0
4-Way Cassette(FSR) RCI-2.0FSR	ADM.1 PJ.3	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 2	37	High	11.0	3.5	2.5	0.0	2.8	0.0
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	PRITJE 1 PJ.1	39	High	11.4	4.2	3.0	0.0	3.3	0.0
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	PRITJE 1 PJ.2	39	High	11.4	4.2	3.0	0.0	3.3	0.0
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	KL.5 PJ.6	39	High	11.4	4.2	3.0	0.0	3.3	0.0
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	KL.5 PJ.5	39	High	11.4	4.2	3.0	0.0	3.3	0.0
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	KL.5 PJ.4	39	High	11.4	4.2	3.0	0.0	3.3	0.0

Indoor Unit (VRF KATI 1)		Sound Pressure dB(A)	Air Flow		Cooling Capacity (kW)			Heating Capacity (kW)	
Ref + Description	Ident.		Speed	m³/min	Actual	Sensible	Required	Actual	Required
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	KL.5 PJ.3	39	High	11.4	4.2	3.0	0.0	3.3	0.0
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	KL.5 PJ.2	39	High	11.4	4.2	3.0	0.0	3.3	0.0
4-Way Cassette Mini(FSRE) RCIM-2.0FSRE (1.8 HP)	KL.5 PJ.1	39	High	11.4	4.2	3.0	0.0	3.3	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE (1.3 HP)	MON.4	37	High	10.5	3.0	2.2	0.0	2.4	0.0
4-Way Cassette(FSR) RCI-2.0FSR	MON. 5	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.4 PJ.4	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.4 PJ.3	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.0FSR	KL.4 PJ.2	32	High	17.0	4.7	3.7	0.0	3.7	0.0
4-Way Cassette(FSR) RCI-2.5FSR	KL.4 PJ.1	36	High	23.0	5.8	4.7	0.0	4.7	0.0

PIPING DESIGN

VRF KATI 1

Piping Diagram



VRF KATI 1

Piping Rules

Commercial VRF HP, FSXNSE RAS-48FSXNSE		Project m	Max m	OK
Length	Total pipe length	214	1,000	✓
	Maximum piping length (Actual length)	80	165	✓
	Maximum piping length (Equivalent length)	87	190	✓
	Maximum Piping Length between Multi-kit of 1st Branch and Each Indoor Unit	62	90	✓
	Maximum Piping Length between Each Multi-kit and Each Indoor Unit	10	40	✓
	Piping Length between Piping Connection Kit 1 and Each Outdoor Unit	2	10	✓
Height	Height Difference between (O.U. is Upper)	0	110	✓
	Height Difference between (O.U. is Lower)	0	40	✓
	Height Difference between Indoor Units	0	30	✓
IU connectable (Min / recommended / Max)		26	1 / 38 / 64	✓
Connected Cap. (Min-Max)		99%	50% - 130%	✓

Refrigerant Load & Pipe size

Commercial VRF HP, FSXNSE RAS-48FSXNSE	Refrigerant Type: R410A kg
OU refrigerant load (Charge before shipment)	23.2
Installation Additional refrigerant load (OU + Piping)	35.0
Total	58.2

Recommendation

- If pipe size 1" is not available in your country, please use 1"1/8 as replacement.

VRF KATI 1

[illegible]

VRF KATI 1

Power Supply

	Model	Power supply	Input power kW	Max current A
	RAS-48FSXNSE (RAS-24FSXNSE + RAS-24FSXNSE)	400V/3Ph/50Hz	22.01+22.01	53+53
	RCI-2.0FSR	230V/1Ph/50Hz	0.09	0.9
	RPF-1.0FSN2E	230V/1Ph/50Hz	0.05	0.2
	RCIM-1.5FSRE	230V/1Ph/50Hz	0.07	0.35
	RCIM-2.0FSRE (1.8 HP)	230V/1Ph/50Hz	0.1	0.51
	RCIM-1.5FSRE (1.3 HP)	230V/1Ph/50Hz	0.07	0.35
	RCI-2.5FSR	230V/1Ph/50Hz	0.09	0.9

RCS link description

- Minimum recommended section (up to 500 m): 2 x 0.75 mm² connected to earth at one point.
- Cable characteristics: non polar, twisted shielded pair of cable.
- One Remote Control Switch can control up to 16 Indoor Units as a maximum.
- Two Remote Control Switch can be connected in the same unit or unit group.
- The second one is a subsidiary remote control switch.

Central Controller

H-Link2 communication line description

- Minimum recommended section: 2 x 0.75 mm² connected to earth at one point. Shielding must be renewed every 300m.
- Transmitting wires: non polar, twisted shielded pair of cable.
- Maximum H-Link2 communication line length is 1000 m but can be increased until 5.000m using optional relay PSC-5HR.
- Several refrigerant systems can be connected together on a bus with H-LINK2 wiring using an open loop
- Maximum number of Outdoor Units is 64.
- Maximum number of Indoor Units is 160.
- Number of central controller: 0

EQUIPMENT LIST AND INFORMATION

Outdoor Units

Model & Components	System Name	Description	Quantity
RAS-48FSXNSE	VRF KATI 1	Commercial VRF HP, FSXNSE	1
RAS-24FSXNSE	-	Components	2

Indoor Units

Model	Description	Quantity
RCIM-1.5FSRE (1.3 HP)	4-Way Cassette Mini(FSRE)	1
RCIM-1.5FSRE	4-Way Cassette Mini(FSRE)	1
RCIM-2.0FSRE (1.8 HP)	4-Way Cassette Mini(FSRE)	8
RCI-2.0FSR	4-Way Cassette(FSR)	13
RCI-2.5FSR	4-Way Cassette(FSR)	1
RPF-1.0FSN2E	Floor Mounted Cased	2

Accessories

Model	Description	Quantity
P-AP56NAM	Air panel	10
P-N23NA2	Air Panel w/o motion sensor	14
PC-ARFG-E	Remote Control Switch	26

Branch Kit

Pipe connection kit

Model	Description	Quantity
MC-21AN1	Outdoor units piping connection kit	1

Multikit

Model	Description	Quantity
E-302SN3	Line branch kit	10
E-242SN3	Line branch kit	5

Model	Description	Quantity
E-162SN4	Line branch kit	10

CH Box

Field Providing

Piping Materials

Pipe size(mm)	Length m
6.35	77.9
9.52	5.7
12.7	122.3
15.88	31.8
19.05	73.4
22.2	16.2
25.4	14.2
28.58	19
31.75	48.5
38.1	18

Refrigerant

Refrigerant Type	Quantity to be provided kg
R410A	35.0

Appendix –Equipment list for VRF KATI 1

Category	Model	Description	Quantity
Outdoor Units	RAS-48FSXNSE	Commercial VRF HP, FSXNSE	1
	RAS-24FSXNSE	component	2
Indoor Units	RCIM-1.5FSRE (1.3 HP)	4-Way Cassette Mini(FSRE)	1
	RCIM-1.5FSRE	4-Way Cassette Mini(FSRE)	1
	RCIM-2.0FSRE (1.8 HP)	4-Way Cassette Mini(FSRE)	8
	RCI-2.0FSR	4-Way Cassette(FSR)	13
	RCI-2.5FSR	4-Way Cassette(FSR)	1
	RPF-1.0FSN2E	Floor Mounted Cased	2
Accessory	P-AP56NAM	Air panel	10
	P-N23NA2	Air Panel w/o motion sensor	14
	PC-ARFG-E	Remote Control Switch	26
Piping Connection Kit	MC-21AN1	Outdoor units piping connection kit	1
MultiKit	E-302SN3	Line branch kit	10
	E-242SN3	Line branch kit	5
	E-162SN4	Line branch kit	10

Field Providing

Pipe size(mm)	Length
6.35	77.9
9.52	5.7
12.7	122.3
15.88	31.8
19.05	73.4
22.2	16.2
25.4	14.2
28.58	19
31.75	48.5
38.1	18

Refrigerant Type	Quantity to be provided kg
R410A	35.0



VRF System Selection Report

Project Name :QSHA VRF KATI 2

Region :ALB

Selection Mode :Cooling+Heating

Sales Engineer :

Company:

Address:

Phone No:

Order Date : 25/02/2026

Delivery required date : 25/02/2026

Client Name :

Post Code :

Tel :

Mail :

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Refrigerant	12

Appendix –Equipment list for VRF KATI 2.....13

Field Providing.....13

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In fact, this software is not able to take into account all the site-specific factors that may influence the proper functioning of the selected device (e.g. piping or wiring lengths on site, third party AHU, geometry of the piping network, operating temperatures...).

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SYSTEM SELECTION

Outdoor Units

Pictures	Model Identification	Description	Quantity	Components
	RAS-48FSXNSE	Commercial VRF HP, FSXNSE	1	RAS-24FSXNSE RAS-24FSXNSE - -

RAS-48FSXNSE Specifications		
Power supply		400V/3Ph/50Hz
Nominal capacity	Cooling	136.0kW
	Heating	150.0kW
EER		2.99
COP		3.40
SEER		6.19
SCOP		4.43
Sound power		89.00dB(A)
Dimensions	Height	1,725mm
	Width	3,238mm
	Depth	784mm
Net Weight		798kg

Indoor Units

No Room

Picture	Indoor Unit		Nominal Cap. (kW)		Accessories	Control		
	Ident.	Description - Model	Cool	Heat		Picture	Model	Gp
	KORRI DOR1 PJ.1	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE (1.3 HP)	3.8	4.2	Air panel P-AP56NAM		PC-ARFG-E	
	ZYRE 3	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	ZYRE 4	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	KORRI DOR1 PJ.2	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE (1.3 HP)	3.8	4.2	Air panel P-AP56NAM		PC-ARFG-E	
	ZYRE 5	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	ZYRE 6	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	KORRI DOR1 PJ.3	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE (1.3 HP)	3.8	4.2	Air panel P-AP56NAM		PC-ARFG-E	
	ZYRE 7	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	MBL.1 PJ.1	4-Way Cassette(FSR) RCI-2.5FSR (2.3HP)	6.7	7.5	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	

Picture	Indoor Unit		Nominal Cap. (kW)		Accessories	Control		
	Ident.	Description - Model	Cool	Heat		Picture	Model	Gp
	MBL.1 PJ.2	4-Way Cassette(FSR) RCI-2.5FSR (2.3HP)	6.7	7.5	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	MBL.2 PJ.1	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	MBL.2 PJ.2	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	SPEC. 1 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	SPEC. 1 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	SPEC. 1 PJ.3	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	MON. 6	Floor Mounted Cased RPF-1.0FSN2E	2.8	3.2			PC-ARFG-E	
	ZYRE 8	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	ZYRE 11	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	
	BAR3 PJ.2	4-Way Cassette(FSR) RCI-2.0FSR (1.8HP)	5.2	5.6	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	BAR3 PJ.1	4-Way Cassette(FSR) RCI-2.0FSR (1.8HP)	5.2	5.6	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	ZYRE1 0 PJ.5	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	ZYRE1 0 PJ.4	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	ZYRE1 0 PJ.3	4-Way Cassette(FSR) RCI-2.0FSR	5.6	6.3	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	ZYRE1 0 PJ.2	4-Way Cassette(FSR) RCI-2.5FSR	7.1	8.5	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	ZYRE1 0 PJ.1	4-Way Cassette(FSR) RCI-2.5FSR	7.1	8.5	Air Panel w/o motion sensor P-N23NA2		PC-ARFG-E	
	MON.7	Floor Mounted Cased RPF-1.0FSN2E	2.8	3.2			PC-ARFG-E	
	ZYRE 9	4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	4.0	4.8	Air panel P-AP56NAM		PC-ARFG-E	

SYSTEM DESIGN

VRF KATI 2

Working Condition	Outdoor (Air)	Indoor (Air)
Cooling	38.0 °C DB	28.0 °C DB 20.4 °C WB (50% RH)
Heating	0.0 °C DB -2.7 °C WB (51% RH)	22.0 °C DB

Note:

- Actual capacity takes into account all correction factors, including defrosting in heating mode.
- Each Indoor unit's temperature condition might be different. Software uses minimum wet bulb temperature of indoor for system cooling process and uses maximum dry bulb temperature of indoor for system heating process.

Outdoor Units of the system

Outdoor Unit (VRF KATI 2)		Connect. Rate (%)		Cooling Capacity (kW)			Heating Capacity (kW)		
Ref + Description	Ident.	Actual	Max	Nominal	Actual	Required	Nominal	Actual	Required
Commercial VRF HP, FSXNSE RAS-48FSXNSE		96	100	-	110.0	-	-	88.1	-
Total				-	110	-	-	88.1	-

Indoor Units of the system

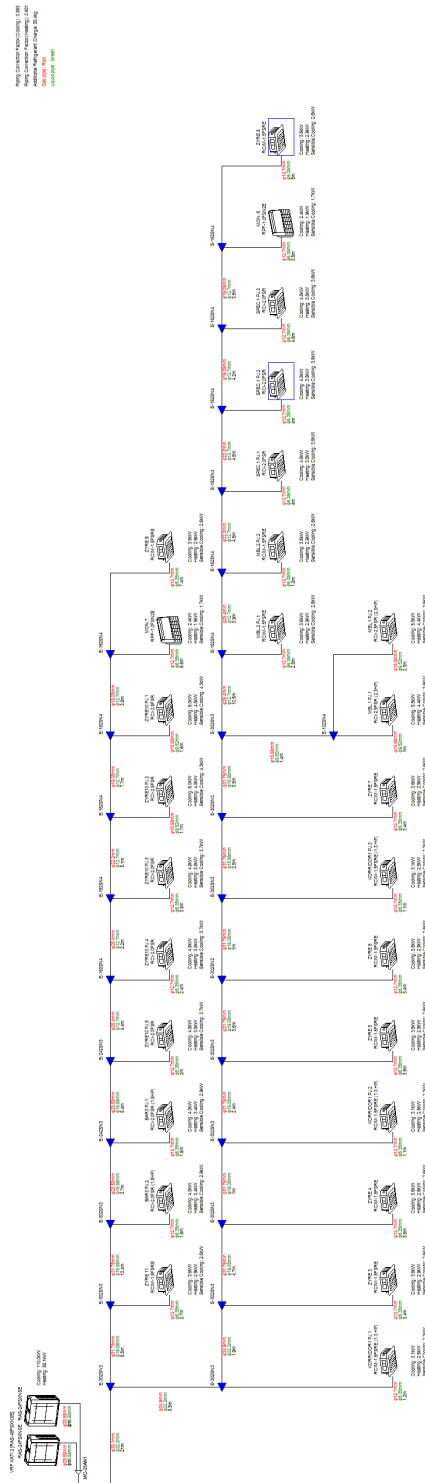
Indoor Unit (VRF KATI 2)		Sound Pressure dB(A)	Air Flow		Cooling Capacity (kW)			Heating Capacity (kW)	
Ref + Description	Ident.		Speed	m³/min	Actual	Sensible	Required	Actual	Required
Total					110.0	79.1	0.0	88.1	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE (1.3 HP)	KORRI DOR1 PJ.1	37	High	10.5	3.1	2.2	0.0	2.5	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 3	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 4	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE (1.3 HP)	KORRI DOR1 PJ.2	37	High	10.5	3.1	2.2	0.0	2.5	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 5	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 6	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE (1.3 HP)	KORRI DOR1 PJ.3	37	High	10.5	3.1	2.2	0.0	2.5	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 7	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette(FSR) RCI-2.5FSR (2.3HP)	MBL.1 PJ.1	32	Medium	18.0	5.5	3.6	0.0	4.4	0.0
4-Way Cassette(FSR) RCI-2.5FSR (2.3HP)	MBL.1 PJ.2	32	Medium	18.0	5.5	3.6	0.0	4.4	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	MBL.2 PJ.1	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	MBL.2 PJ.2	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette(FSR) RCI-2.0FSR	SPEC.1 PJ.1	32	High	17.0	4.8	3.6	0.0	3.8	0.0
4-Way Cassette(FSR) RCI-2.0FSR	SPEC.1 PJ.2	32	High	17.0	4.8	3.6	0.0	3.8	0.0
4-Way Cassette(FSR) RCI-2.0FSR	SPEC.1 PJ.3	32	High	17.0	4.8	3.6	0.0	3.8	0.0
Floor Mounted Cased RPF-1.0FSN2E	MON. 6	35	High	8.5	2.4	1.7	0.0	1.9	0.0

Indoor Unit (VRF KATI 2)		Sound Pressure dB(A)	Air Flow		Cooling Capacity (kW)			Heating Capacity (kW)	
Ref + Description	Ident.		Speed	m³/min	Actual	Sensible	Required	Actual	Required
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 8	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 11	37	High	11.0	3.6	2.6	0.0	2.9	0.0
4-Way Cassette(FSR) RCI-2.0FSR (1.8HP)	BAR3 PJ.2	32	High	17.0	4.3	2.9	0.0	3.4	0.0
4-Way Cassette(FSR) RCI-2.0FSR (1.8HP)	BAR3 PJ.1	32	High	17.0	4.3	2.9	0.0	3.4	0.0
4-Way Cassette(FSR) RCI-2.0FSR	ZYRE1 0 PJ.5	32	High	17.0	4.8	3.7	0.0	3.8	0.0
4-Way Cassette(FSR) RCI-2.0FSR	ZYRE1 0 PJ.4	32	High	17.0	4.8	3.7	0.0	3.8	0.0
4-Way Cassette(FSR) RCI-2.0FSR	ZYRE1 0 PJ.3	32	High	17.0	4.8	3.7	0.0	3.8	0.0
4-Way Cassette(FSR) RCI-2.5FSR	ZYRE1 0 PJ.2	32	Medium	18.0	6.0	4.3	0.0	4.8	0.0
4-Way Cassette(FSR) RCI-2.5FSR	ZYRE1 0 PJ.1	32	Medium	18.0	6.0	4.3	0.0	4.8	0.0
Floor Mounted Cased RPF-1.0FSN2E	MON.7	35	High	8.5	2.4	1.7	0.0	1.9	0.0
4-Way Cassette Mini(FSRE) RCIM-1.5FSRE	ZYRE 9	37	High	11.0	3.6	2.6	0.0	2.9	0.0

PIPING DESIGN

VRF KATI 2

Piping Diagram



*In case piping diameter is different from multikit diameter, use field supplied reducers.

VRF KATI 2

Piping Rules

Commercial VRF HP, FSXNSE RAS-48FSXNSE		Project m	Max m	OK
Length	Total pipe length	221	1,000	✓
	Maximum piping length (Actual length)	86	165	✓
	Maximum piping length (Equivalent length)	94	190	✓
	Maximum Piping Length between Multi-kit of 1st Branch and Each Indoor Unit	65	90	✓
	Maximum Piping Length between Each Multi-kit and Each Indoor Unit	7	40	✓
	Piping Length between Piping Connection Kit 1 and Each Outdoor Unit	2	10	✓
Height	Height Difference between (O.U. is Upper)	0	110	✓
	Height Difference between (O.U. is Lower)	0	40	✓
	Height Difference between Indoor Units	0	30	✓
IU connectable (Min / recommended / Max)		27	1 / 38 / 64	✓
Connected Cap. (Min-Max)		96%	50% - 130%	✓

Refrigerant Load & Pipe size

Commercial VRF HP, FSXNSE RAS-48FSXNSE	Refrigerant Type: R410A kg
OU refrigerant load (Charge before shipment)	23.2
Installation Additional refrigerant load (OU + Piping)	38.4
Total	61.6

Recommendation

- If pipe size 1" is not available in your country, please use 1"1/8 as replacement.

VRF KATI 2

[illegible]

VRF KATI 2

Power Supply

	Model	Power supply	Input power kW	Max current A
	RAS-48FSXNSE (RAS-24FSXNSE + RAS-24FSXNSE)	400V/3Ph/50Hz	22.01+22.01	53+53
	RCIM-1.5FSRE (1.3 HP)	230V/1Ph/50Hz	0.07	0.35
	RCIM-1.5FSRE	230V/1Ph/50Hz	0.07	0.35
	RCI-2.5FSR (2.3HP)	230V/1Ph/50Hz	0.09	0.9
	RCI-2.0FSR	230V/1Ph/50Hz	0.09	0.9
	RPF-1.0FSN2E	230V/1Ph/50Hz	0.05	0.2
	RCI-2.0FSR (1.8HP)	230V/1Ph/50Hz	0.09	0.9
	RCI-2.5FSR	230V/1Ph/50Hz	0.09	0.9

RCS link description

- Minimum recommended section (up to 500 m): 2 x 0.75 mm² connected to earth at one point.
- Cable characteristics: non polar, twisted shielded pair of cable.
- One Remote Control Switch can control up to 16 Indoor Units as a maximum.
- Two Remote Control Switch can be connected in the same unit or unit group.
- The second one is a subsidiary remote control switch.

Central Controller

H-Link2 communication line description

- Minimum recommended section: 2 x 0.75 mm² connected to earth at one point. Shielding must be renewed every 300m.
- Transmitting wires: non polar, twisted shielded pair of cable.
- Maximum H-Link2 communication line length is 1000 m but can be increased until 5.000m using optional relay PSC-5HR.
- Several refrigerant systems can be connected together on a bus with H-LINK2 wiring using an open loop
- Maximum number of Outdoor Units is 64.
- Maximum number of Indoor Units is 160.
- Number of central controller: 0

EQUIPMENT LIST AND INFORMATION

Outdoor Units

Model & Components	System Name	Description	Quantity
RAS-48FSXNSE	VRF KATI 2	Commercial VRF HP, FSXNSE	1
RAS-24FSXNSE	-	Components	2

Indoor Units

Model	Description	Quantity
RCIM-1.5FSRE (1.3 HP)	4-Way Cassette Mini(FSRE)	3
RCIM-1.5FSRE	4-Way Cassette Mini(FSRE)	10
RCI-2.0FSR (1.8HP)	4-Way Cassette(FSR)	2
RCI-2.0FSR	4-Way Cassette(FSR)	6
RCI-2.5FSR (2.3HP)	4-Way Cassette(FSR)	2
RCI-2.5FSR	4-Way Cassette(FSR)	2
RPF-1.0FSN2E	Floor Mounted Cased	2

Accessories

Model	Description	Quantity
P-AP56NAM	Air panel	13
P-N23NA2	Air Panel w/o motion sensor	12
PC-ARFG-E	Remote control with timer	27

Branch Kit

Pipe connection kit

Model	Description	Quantity
MC-21AN1	Outdoor units piping connection kit	1

Multikit

Model	Description	Quantity
E-302SN3	Line branch kit	12

Model	Description	Quantity
E-102SN4	Line branch kit	1
E-162SN4	Line branch kit	11
E-242SN3	Line branch kit	2

CH Box

Field Providing

Piping Materials

Pipe size(mm)	Length m
6.35	74.1
9.52	8
12.7	128.5
15.88	39.5
19.05	40.4
22.2	45.6
25.4	21
28.58	12.1
31.75	40.6
34.9	10.4
38.1	21

Refrigerant

Refrigerant Type	Quantity to be provided kg
R410A	38.4

Appendix –Equipment list for VRF KATI 2

Category	Model	Description	Quantity
Outdoor Units	RAS-48FSXNSE	Commercial VRF HP, FSXNSE	1
	RAS-24FSXNSE	component	2
Indoor Units	RCIM-1.5FSRE (1.3 HP)	4-Way Cassette Mini(FSRE)	3
	RCIM-1.5FSRE	4-Way Cassette Mini(FSRE)	10
	RCI-2.0FSR (1.8HP)	4-Way Cassette(FSR)	2
	RCI-2.0FSR	4-Way Cassette(FSR)	6
	RCI-2.5FSR (2.3HP)	4-Way Cassette(FSR)	2
	RCI-2.5FSR	4-Way Cassette(FSR)	2
	RPF-1.0FSN2E	Floor Mounted Cased	2
Accessory	P-AP56NAM	Air panel	13
	P-N23NA2	Air Panel w/o motion sensor	12
	PC-ARFG-E	Remote control with timer	27
Piping Connection Kit	MC-21AN1	Outdoor units piping connection kit	1
MultiKit	E-302SN3	Line branch kit	12
	E-102SN4	Line branch kit	1
	E-162SN4	Line branch kit	11
	E-242SN3	Line branch kit	2

Field Providing

Pipe size(mm)	Length
6.35	74.1
9.52	8
12.7	128.5
15.88	39.5
19.05	40.4
22.2	45.6
25.4	21
28.58	12.1
31.75	40.6
34.9	10.4
38.1	21

Pipe size(mm)	Length
Refrigerant Type	Quantity to be provided kg
R410A	38.4