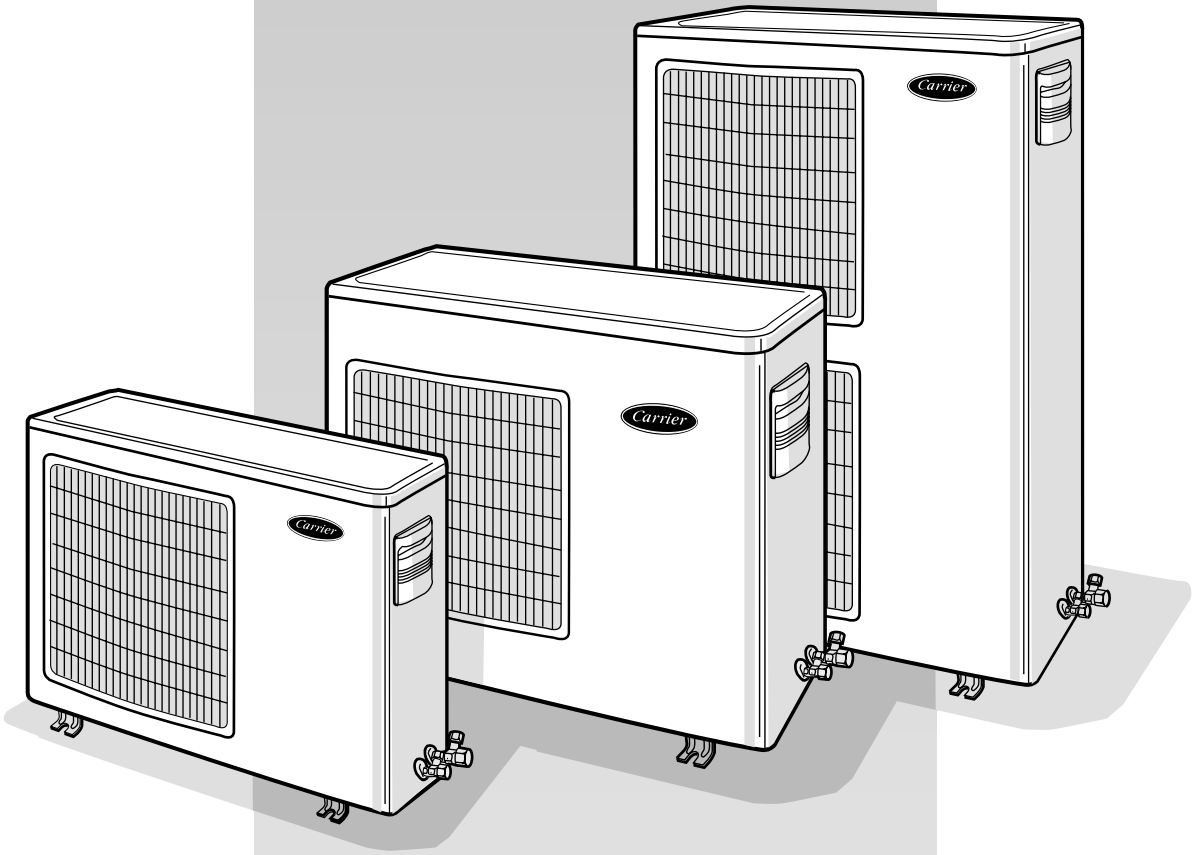
Carrier

Quality Management Systems

38GL...G9
38YY...G9 / 38YYS...G9



R-410A

INSTALLATION MANUAL

38GL...G9 / 38YY...G9 / 38YYS...G9 R-410A
Cooling only and heat pump split system outdoor units

ENGLISH

For operation and maintenance instructions of this unit as well as installation instructions of the indoor unit, refer to the relevant manuals.

Contents

ATTENTION INSTALLERS AND SERVICE TECHNICIANS!
AIR CONDITIONER WITH R-410A–QUICK REFERENCE GUIDE

- R-410A refrigerant operates at 50%-70% higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with R-410A.
- R-410A refrigerant cylinders have a dip tube which allows liquid to flow out with the cylinder in a vertical position with the valve at the top.
- R-410A systems should be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose in order to vaporize the liquid refrigerant before it enters in the unit.
- R-410A, as other HFCs, is only compatible with oils selected by the compressor manufacturer.
- A vacuum pump is not enough to remove moisture from oil.
- Oils absorb moisture rapidly. Do not expose oil to atmosphere.
- Never open system to atmosphere while it is under vacuum.
- When the system must be opened for service, break vacuum with dry nitrogen and replace filter driers.
- Do not vent R-410A into the atmosphere.
- Use only Carrier matching indoor units (Table I).

Unit size	Oil type	Quantity cc	Drier already installed on liquid line of the unit
018 - 024	POE	1120	YES
028 - 036 - 048	POE	1250	YES
052	POE	1660	YES
060	POE	1950	YES

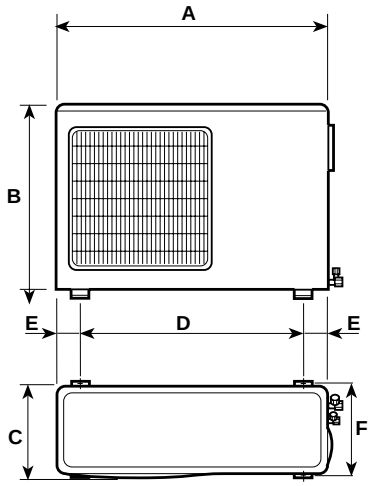
Table I

Cooling only (A/C)	Heat pump (H/P)	Hi-Wall		Console	Cassette	Satellite		Power supply
38GL018G9	—	42PHQ018N	42PHQ018P	42VMC018(A)*N	40KMC018N	40SMC018N	40DMC018	400V 3N~50Hz
38GL024G9	—	42PHQ024N	42PHQ024P	42VMC024(A)*N	40KMC024N	40SMC024N	40DMC024	
38GL028G9	38YY(S)28G9	—	—	42VMC028	40KMC028N	40SMC028N	40DMC028	
38GL036G9	38YY(S)36G9	—	—	42VMC036	40KMC036N	40SMC036N	40DMC036	
38GL048G9	38YY(S)48G9	—	—	—	—	40SMC048N		
38GL052G9	38YY-052G9	—	—	—	—		40DMC052	
38GL060G9	38YY(S)060G9	—	—	42VMC048	40KMC048N	40SMC048N	40DMC048	

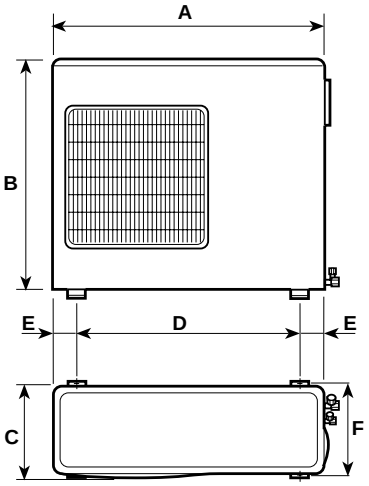
***(A)= Aluminium version**

38GL...G9 / 38YY...G9 / 38YYS...G9 R-410A

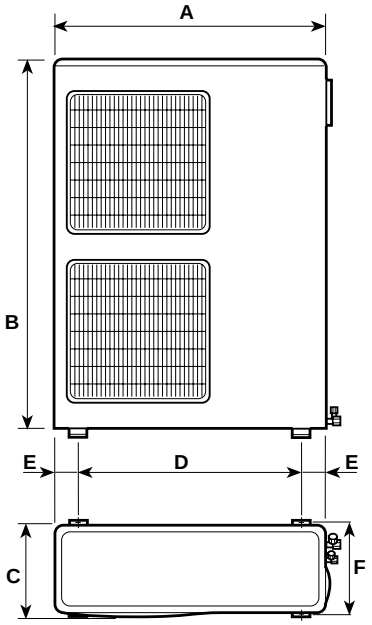
Dimensions and weight



Mod. 38GL018G9, 024G9



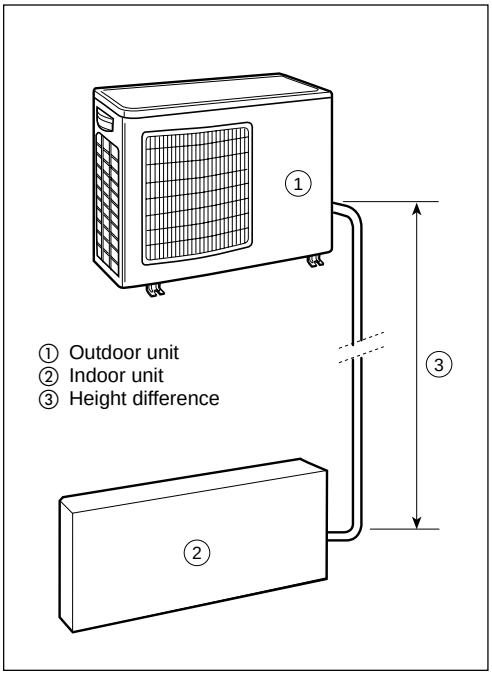
Mod. 38GL028G, 036G
Mod. 38YY-028G9, 036G9



Mod. 38GL048G9, 052G9, 060G9
Mod. 38YY-048G9, 052G9, 060G9

	38GL018G9	38GL024G9	38GL028G9, 036G9 38YY-028G9, 036G9		38GL048G9 38YY-048G9	38GL052G9 38YY-052G9	38GL060G9 38YY-060G9
	18	**24**	**28**	**36**	**48**	**52**	**60**
A mm	800	800	800	800	800	800	800
B mm	590	803	803	803	1264	1264	1264
C mm	300	300	300	300	300	300	300
D mm	508	508	508	508	508	508	508
E mm	146	146	146	146	146	146	146
F mm	330	330	330	330	330	330	330
kg	45	51	66	68	94	96	96

Connections



① Outdoor unit
② Indoor unit
③ Height difference

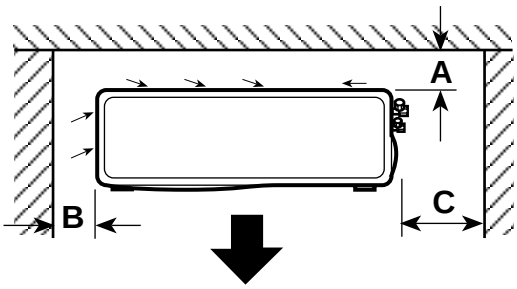
Table II: Connections

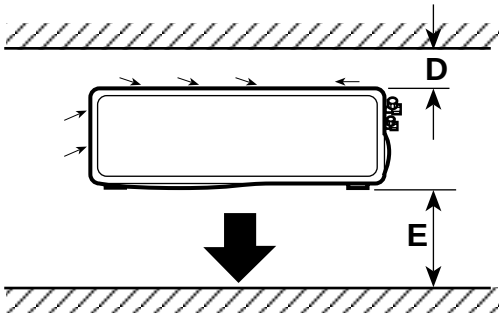
	Model						
	18	**24**	**28**	**36**	**48**	**52**	**60**
Max. pipe length	30 m	40 m	40 m	50 m	50 m	50 m	50 m
Max. height difference	10 m	15 m	25 m	30 m	30 m	30 m	30 m

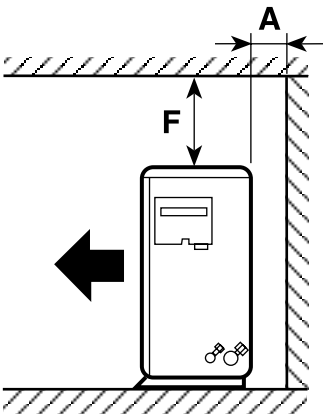
All fittings are flare type.
Use only refrigeration grade pipes, (Cu DHP type according to ISO 1337), seamless, degreased, deoxidized and suitable for operating pressures of at least 4200 kPa and with a burst pressure of 20700 kPa.
Under no circumstances must sanitary type copper pipe be used.

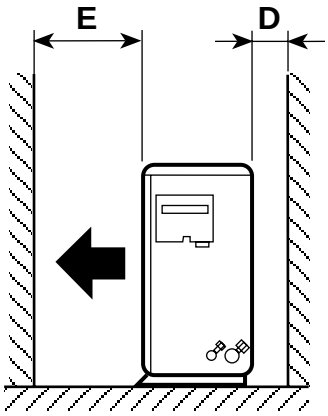
Mod.	Pipe diameter mm		Pipe diameter inches	
	Gas (Suction)	Liquid (Liquid)	Gas (Suction)	Liquid (Liquid)
18 **24**	12.70	6.35	1/2”	1/4”
28	15.87	6.35	5/8”	1/4”
36 **48** **52** **60**	19.05	9.52	3/4”	3/8”

Minimum clearances









Mod.		18	24	28	36	48	52	60
A	mm	100	100	100	100	100	100	100
B	mm	250	250	250	250	250	250	250
C	mm	500	500	500	500	500	500	500
D	mm	50	50	100	100	100	100	100
E	mm	470	470	670	670	670	670	670
F	mm	400	400	400	400	400	400	400

Table III: Operating limits (1)

Cooling (2)	Maximum conditions	Outdoor temperature 43°C
		Indoor temperature 32°C d.b.; 23°C w.b.
	Minimum conditions	Outdoor temperature 15°C
		Outdoor temperature -15°C for units equipped with head pressure controller (38YYS...G9)
		Indoor temperature 21°C d.b.; 15°C w.b.
Heating (3)	Maximum conditions	Outdoor temperature 24°C d.b.; 18°C w.b.
		Indoor temperature 27°C d.b.
	Minimum conditions	Outdoor temperature –15°C d.b.; –17°C w.b.
Mains power supply	Nominal three-phase voltage	400V 3N~ 50Hz
	Operating voltage limits	**min. 342V – max. 462V**

Notes: 1. Data referred to the outdoor unit only.
2. According to ISO 5151.2/T1.
3. According to ISO 5151.2/High+.

d.b. - dry bulb **w.b.** - wet bulb

WARNING:
During heat pump operation unit will undergo several defrost cycles to eliminate ice that might possibly collect on the outdoor unit in very low ambient temperatures.
In these cycles, fan speed will automatically reduce and cannot be varied until defrost cycle is completed.

General information

Unit installation

Read this instruction manual thoroughly before starting the installation.

R-410A systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.

- **This unit complies with low-voltage (EEC/73/23) and electro-magnetic compatibility (EEC/89/336) directives.**
- **Check that the impedance of the mains power supply is in conformance with the unit power input indicated in the electric data table IV, (EN 61000-3-11).**
- The installation must be carried out by a qualified installer.
- Follow all current national safety code requirements. In particular ensure that a properly sized and connected ground wire is in place.
- Check that voltage and frequency of the mains power supply are those required; the available power must be adequate to operate any other possible appliances connected to the same line. Also ensure that national safety code requirements have been followed for the mains supply circuit.
- The mains supply must be connected to the outdoor unit.
- Connect indoor and outdoor units with field-supplied copper pipes by means of flare connections. Use insulated seamless refrigeration grade pipe only, (Cu DHP type according to ISO1337), degreased and deoxidized, suitable for operating pressures of at least 4200 kPa and for burst pressure of at least 20700 kPa. Under no circumstances must sanitary type copper pipe be used.
- After installation thoroughly test the system operation and explain all system functions to the owner.
- Leave this manual with the owner for consultation during future periodic maintenance.
- Use this unit only for factory approved applications.
- This installation manual describes the installation procedures of the outdoor unit of a residential split system consisting of two units manufactured by Carrier. Consult factory or a qualified system engineer prior to connecting this unit to any other manufacturer's indoor unit. Coupling units which have different control systems, may cause irreversible damage and void the warranty protection. The manufacturer declines any liability for system malfunction resulting from unapproved coupling.

IMPORTANT:
During the unit installation make first refrigerant connections and then electrical connections. If unit is uninstalled first disconnect electrical cables, then refrigerant connections.

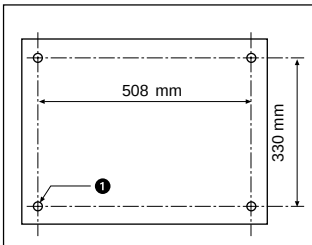
WARNING:
Disconnect the mains power supply switch before servicing the system or handling any internal parts of the unit.

- The manufacturer declines any liability for damage resulting from modifications or errors in the electrical or refrigerant connections.
- Failure to observe the installation instructions or use of the unit under conditions other than those indicated in Table III “Operating limits”, will immediately void the unit warranty.
- Failure to observe electric safety codes may cause a fire hazard in case of short circuits.
- Inspect equipment for damage due to improper transportation or handling: file an immediate claim with the shipping company. Do not install or use damaged units.
- In case of any malfunctioning turn the unit off, disconnect the mains power supply and contact a qualified service engineer.
- This equipment contains R-410A refrigerant, a substance that is not depleting the ozone layer.
- **All of the manufacturing and packaging materials used for your new appliance are compatible with the environment and can be recycled.**
- Dispose of the packaging material in accordance with local requirements.
- This equipment contains refrigerant that must be disposed of in a proper manner.
  When disposing of the unit after its operational life, remove it carefully.
  The unit must then be delivered to an appropriate disposal center or to the original equipment dealer.
- When lifting the unit, absolutely do not use hooks inserted in the side handles, use special equipment (e.g. lifting devices, trolleys, etc.).
- Carefully recover refrigerant within this unit before final disposal or when servicing. Never vent refrigerant to atmosphere. Use approved recovery equipment for R-410A refrigerant. Do not use R-22 equipment.

Choosing the installation site

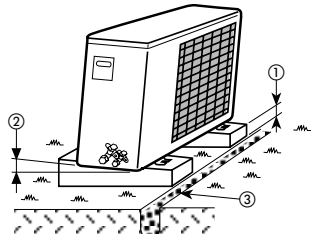
Positions to avoid:
- Exposed to direct sun.
- Too close to sources of heat radiation, vapour or flammable gas.
- Particularly dusty areas.

Recommendations:
- Choose a position protected from opposing winds.
- Choose a position sheltered from direct sun.
- Choose an area where air outlet and unit noise will not bother your neighbours.
- Choose a position that allows for the clearances required.
- Floor structure should be adequately strong to support unit weight and minimize vibration transmission.
- Consider a position which will not obstruct passageways or doors.



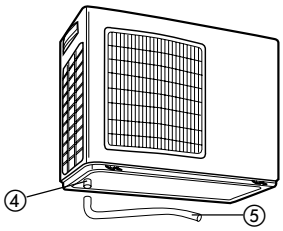
❶ No. 4 Ø 8 mm pins.
❷ Protrusion height from the support surface max. 20 mm.

- Fix the unit with locally purchased bolts buried in the block to prevent overturning due to strong gusts of wind.



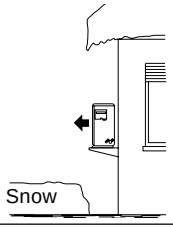
① 100 mm min.
② 20 mm gradient.
③ Gravel-filled trench.

- For heat pump models, unit must be adequately raised above floor surface.



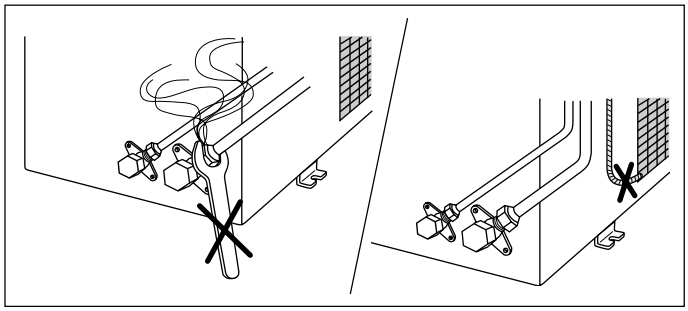
④ Drain fitting
⑤ Vinyl pipe

- To drain the condensate water to a drain while operating in heating mode, insert the drain fitting into the hole underneath on the left of the base and use a vinyl pipe with a 16 mm internal diameter. It must not be used at temperatures lower than 0°C. (not supplied for low temperature versions).

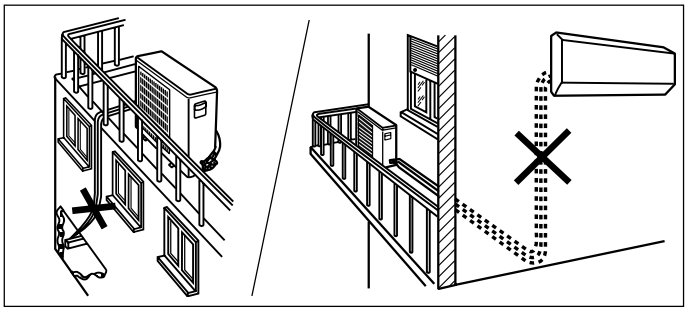


- If the unit is installed in areas where heavy snowfalls may occur, it is necessary to raise its level at least 200 mm above the usual snow level or alternatively to use the outdoor unit bracket kit.

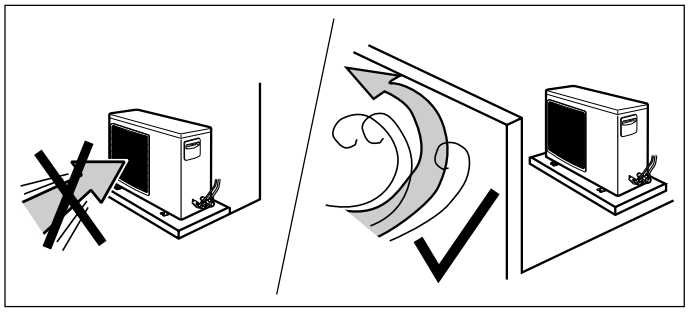
Warnings: avoid....



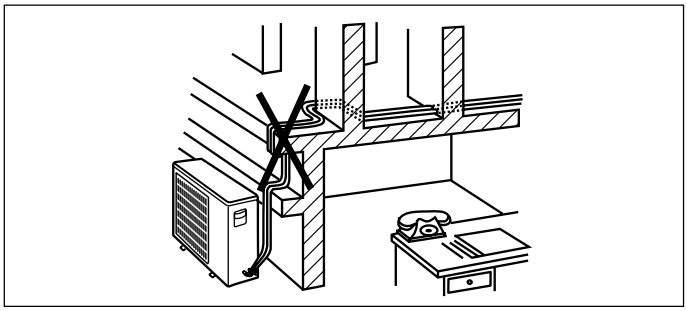
Disconnecting the refrigerant connections after installation: this will cause refrigerant leaks.
Connecting the condensate drain pipe to the outdoor unit.



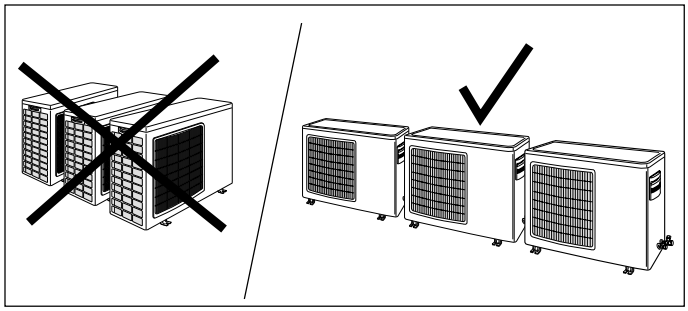
Excessive height difference between indoor and outdoor unit (see Table II "Connections"). Excessive distance between indoor and outdoor units. (see Table II "Connections").



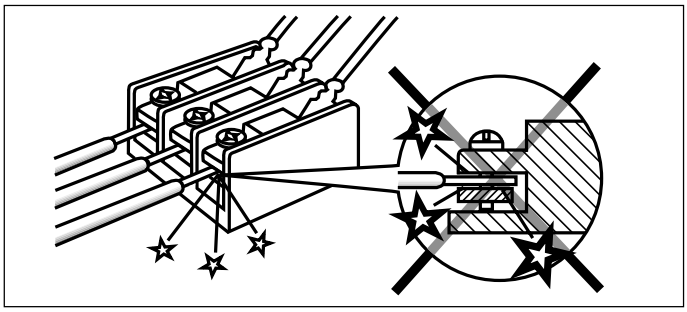
Predominant head winds.



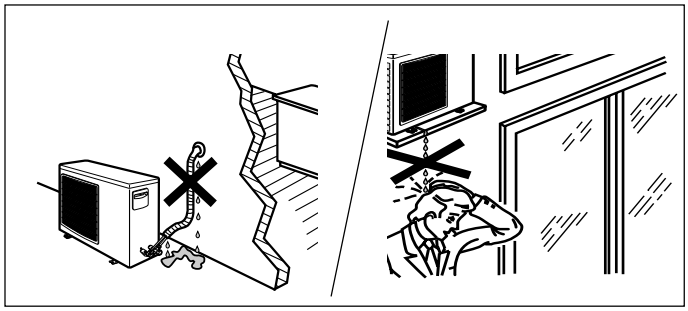
Unnecessary turns and bends in the connecting pipes.



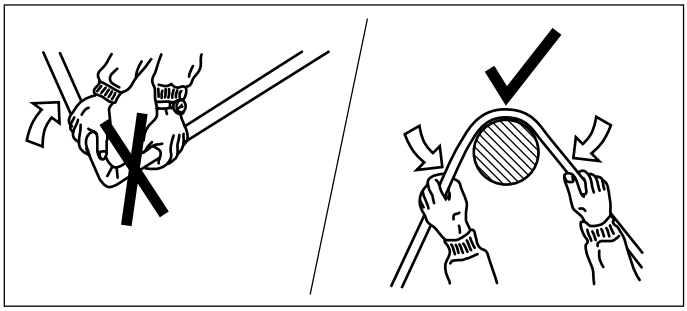
Multiple unit installation with units facing each other.



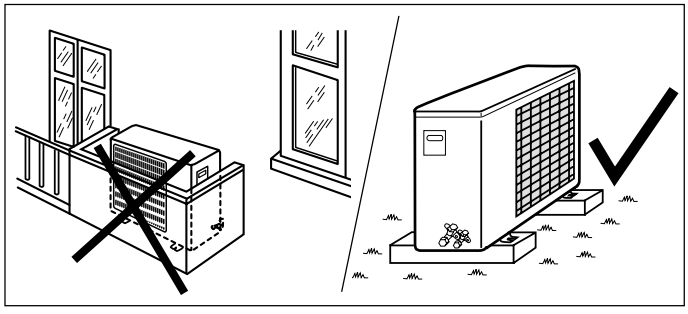
Any slack in the electrical connections.



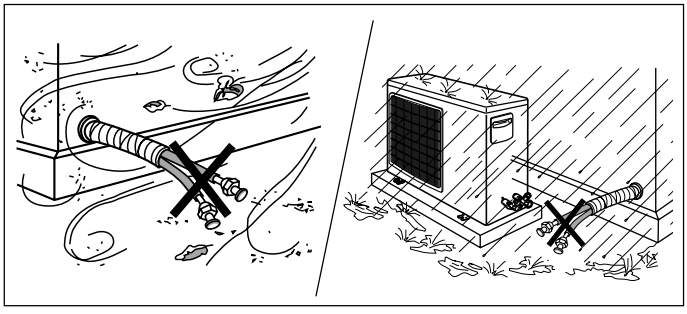
Insulating the connecting pipes only partially, which will cause dripping.
Dripping into passageways.



Flattening or kinking of refrigerant or condensate pipes.

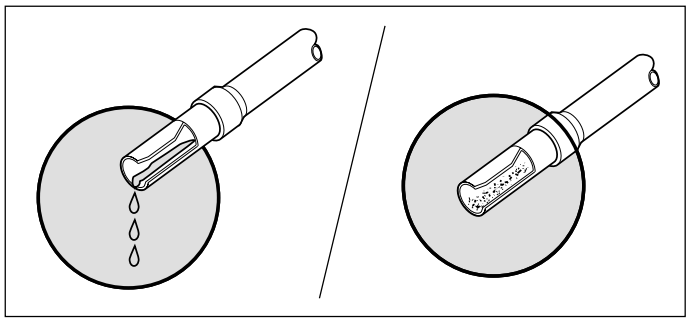


Any obstruction of the unit air outlet and intake or any obstacle that is too close (see minimum clearances required). Installation on grassy ground or soft surfaces (in these cases a solid foundation must be included).

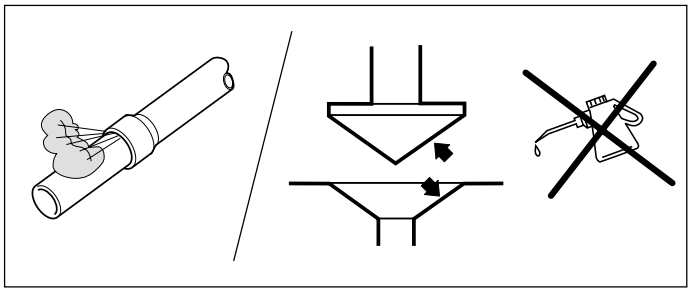


Soiling of pipe ends.
Allowing piping to get wet before connection.

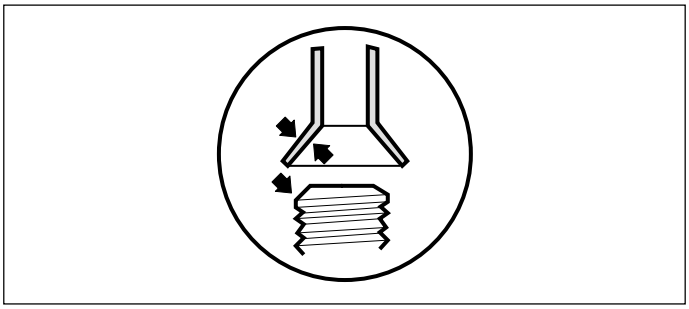
Refrigerant connections



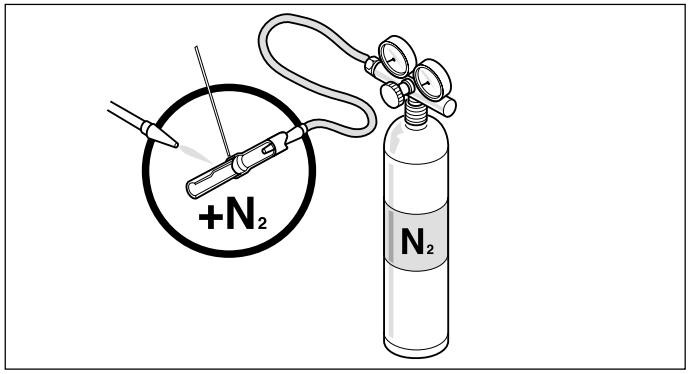
No moisture.
No dust.



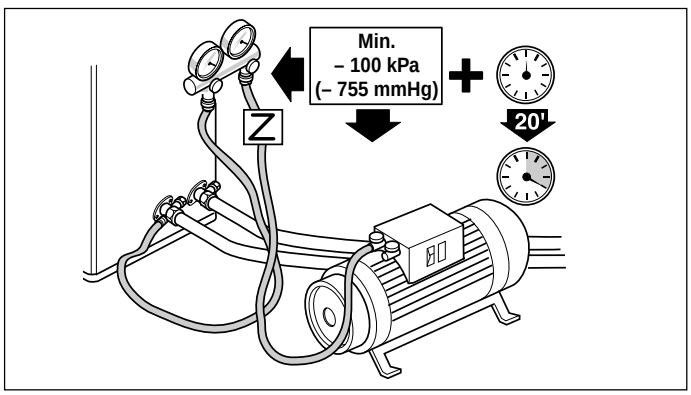
No leak.
No mineral oil.



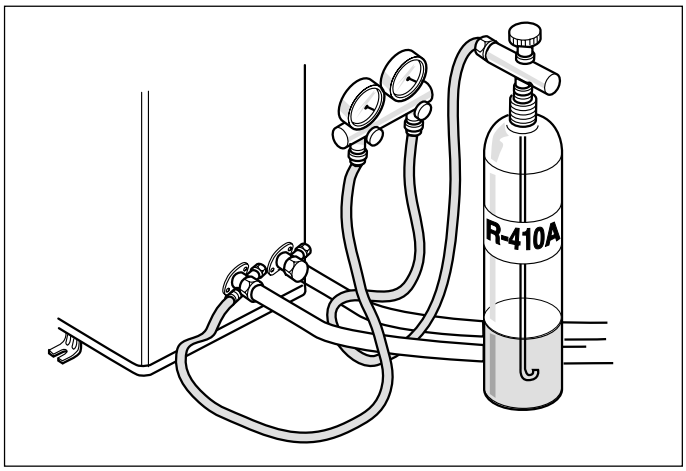
Neat.



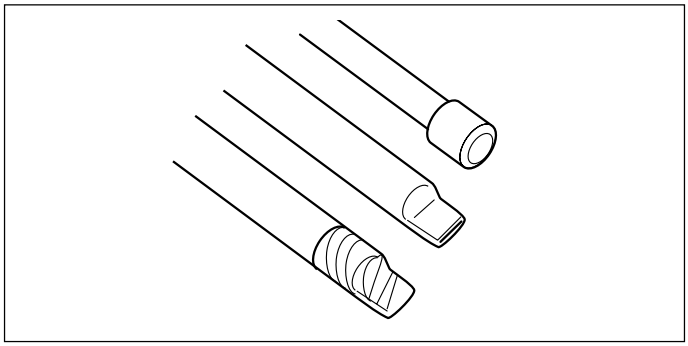
Dry nitrogen brazing.



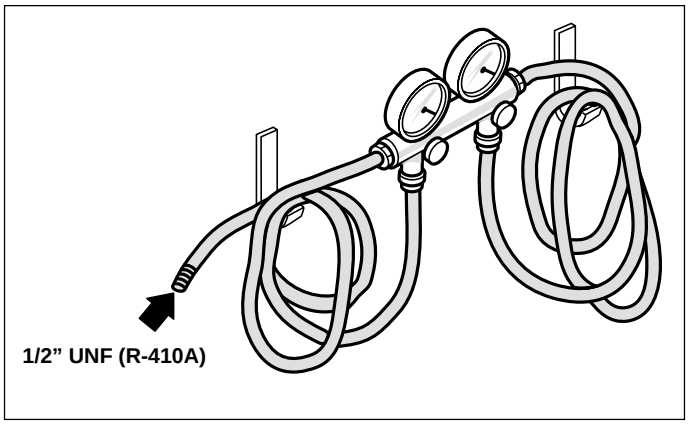
Vacuum.



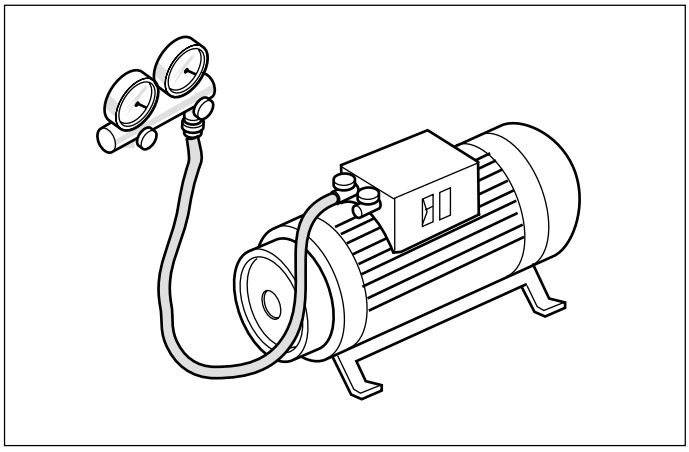
Charge liquid-no gas.



Copper tubes during storage.



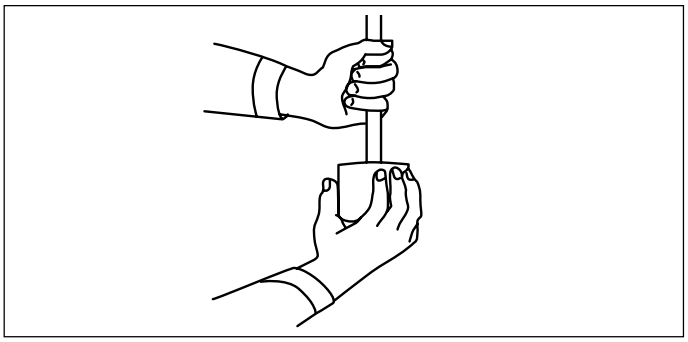
Use tools designed for R-410A higher pressure.
Keep inside clean.



2-stage vacuum pump. Replace oil regularly.

Refrigerant connections

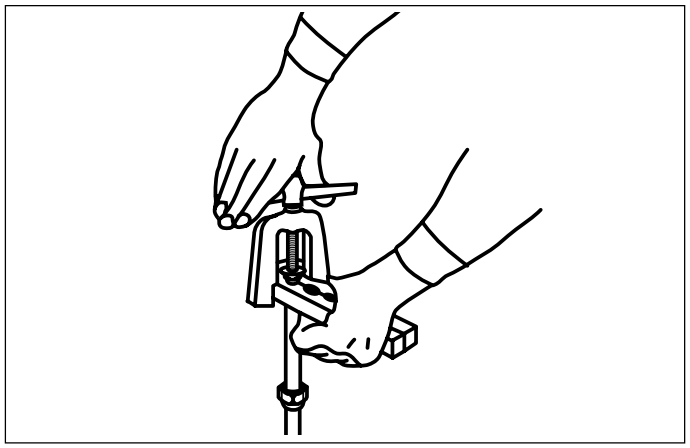
Flaring the ends of the tubing



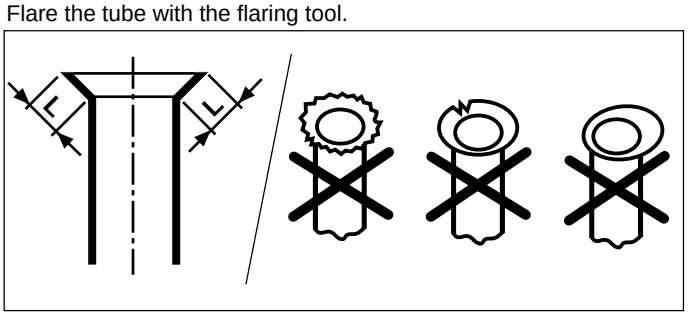
Remove protective caps from copper tube ends.
Position tube end downward, cut the tube to the requested length and remove the burrs with a reamer.

Do not leave system open to atmosphere any longer than minimum required for installation.
Oil in the compressor is extremely susceptible to moisture absorption.
Always keep ends of tubing sealed during installation.

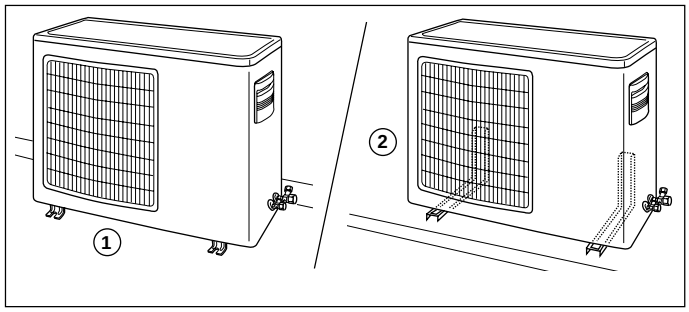
The maximum residual quantity of oil used for tubing is 40 mg/10 m.



Remove flare nuts from the unit connections and place them on the tube end.
Flare the tube with the flaring tool.

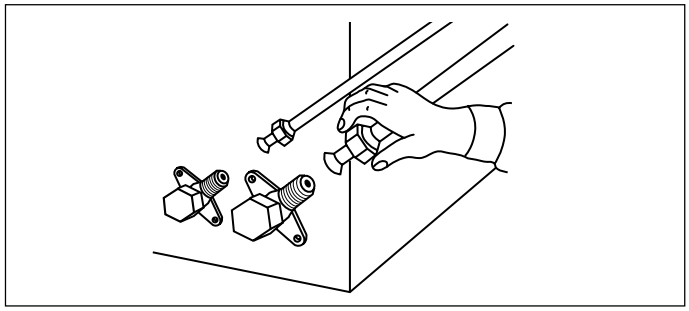


Flare end must not have any burrs or imperfections.
The length of the flared walls must be uniform.



The unit can be installed:
① on the floor;
② on the wall using the bracket kit.

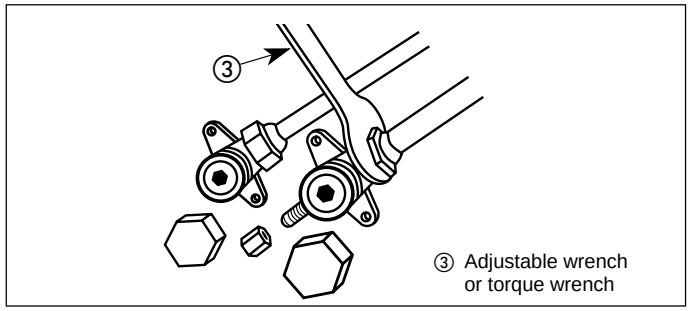
Connect tubing in accordance with the limits shown on Table II (Connections).
Finger-tighten the fitting several turns, then tighten it with a wrench by applying the tightening torque indicated in the table.



Where required, the unit must be charged with additional refrigerant.
Additional charge must be added using electronic scales and the service port (5/16") on the suction line.

Charge refrigerant only in liquid phase (bottle turned upside down or using the specific connection on bottle; see page 1).

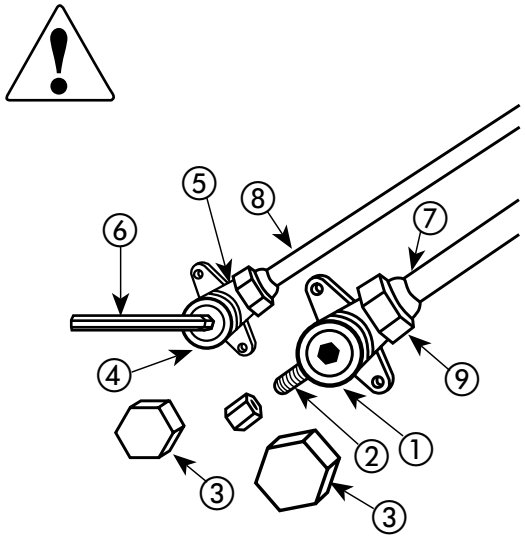
Connection to unit

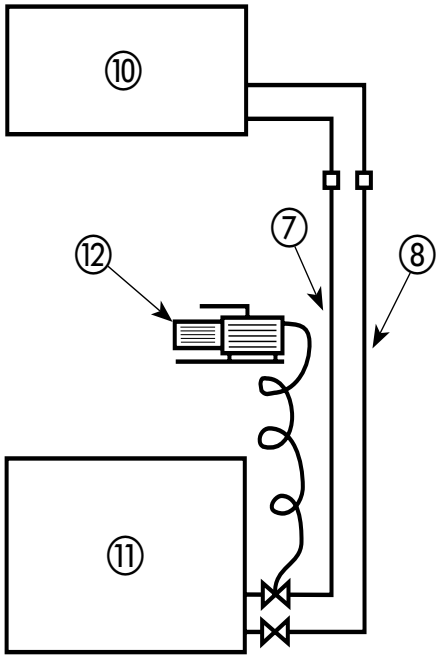


Insufficient tightening torque will cause gas leaks.
Overtightening the fittings will damage the tube flaring and cause gas leaks.

Tightening torque					
Valve / Pipe diameter	Flare nut Nm	Valve cap Nm	Pressure port cap Nm	Valve needle Nm	Pressure port Nm
1/4" / 6.35 mm	18	20	-	9	-
3/8" / 9.52 mm	42	20	-	9	-
1/2" / 12.70 mm	55	40	16 - 18	13	0.34
5/8" / 15.87 mm	65	40	16 - 18	13	0.34
3/4" / 19.05 mm	100	40	16 - 18	13	0.34

Refrigerant connections





① Three-way valve
② Needle valve
③ Valve cap
④ Valve needle
⑤ Two-way valve
⑥ Allen (hex. head) wrench
⑦ Gas line (large diameter)
⑧ Liquid line (small diameter)
⑨ Flare nut
⑩ Indoor unit
⑪ Outdoor unit
⑫ Vacuum pump

Air purging

Use only a vacuum pump to purge air from the piping.

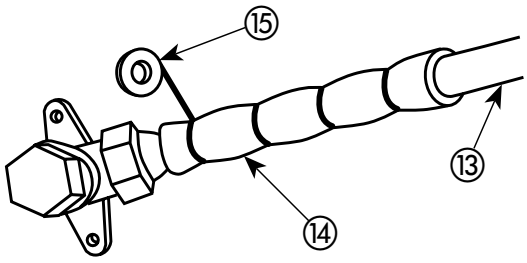
NEVER use the system compressor as a vacuum pump.

NEVER use the unit refrigerant gas to purge the connecting pipes.

No additional refrigerant has been provided in the unit for this purpose.
Remove the caps from the two and three-way valves.
Create a vacuum with a vacuum pump connected to the service connection of the suction shut-off valve, as shown, keeping the shut-off valves completely shut until a 50 Pa (0.5 mbar) vacuum has been reached.
Now open the two-way valve for 3 sec., then quickly shut it to check for possible leaks.

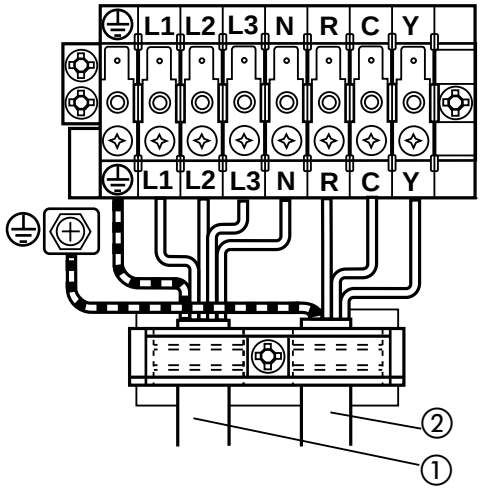
After the leak check, fully open the two and three-way valves. Do not go beyond the valve stop limit.

Replace caps and check for leaks.
Once all connections have been completed, check for leaks by using a leak detector specific for HFC refrigerants.
Finally wrap the valves and pipes with anti-condensate insulation and tighten this with tape, without exerting too much pressure on the insulation.
Repair and cover any possible cracks in the insulation.
Fix the pipes to the wall with hooks or conduits.

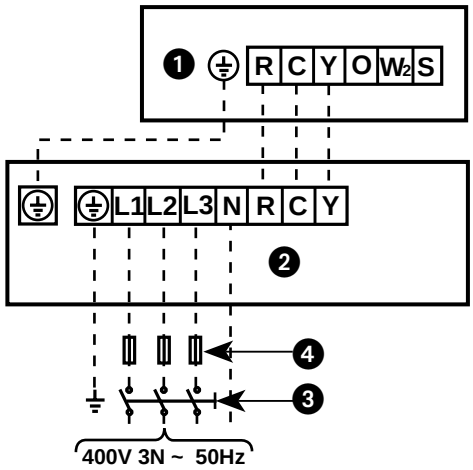


⑬ Pipe
⑭ Pipe insulation
⑮ Fastening tape

Cooling only unit

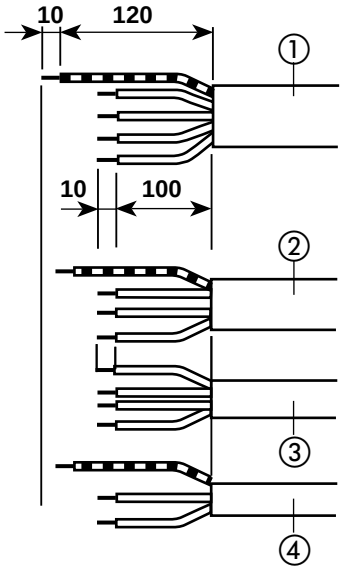


Cooling only system



Terminal box legend, all models

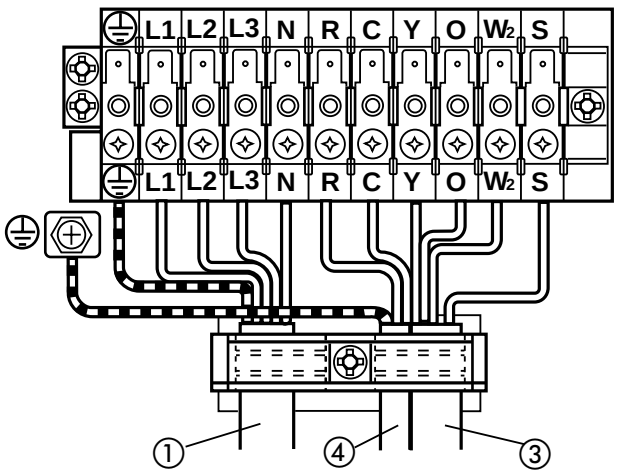
- ⏚ Earth
- **L1** Live power supply
- **L2** Live power supply
- **L3** Live power supply
- **N** Neutral power supply
- **R** Live connection indoor/outdoor unit
- **C** Neutral connection indoor/outdoor unit
- **Y** Compressor interlocking contact
- **O** Reversing valve control (Heat pump only)
- **W2** Outdoor fan signal (Heat pump only)
- **S** Defrost end signal



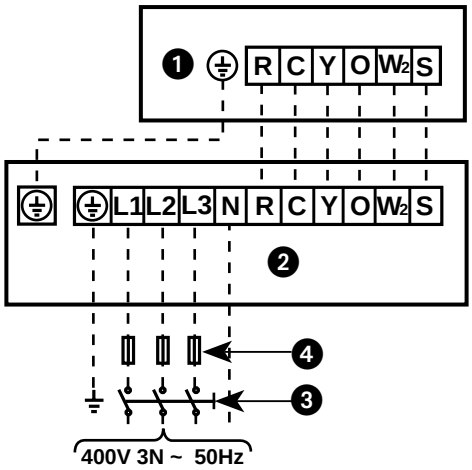
① Mains supply connecting cable (field wiring).
② Connecting cable Outdoor unit – Indoor unit (R - C - Y - ⏚) - (field wiring).
③ Connecting cable Outdoor unit – Indoor unit (Y - O - W2 - S) - (field wiring).
④ Connecting cable Outdoor unit – Indoor unit (R - C - ⏚) - (field wiring).

❶ Indoor unit
❷ Outdoor unit
❸ Main switch
❹ Time-delay fuse or circuit breaker (see table IV "Electrical data").

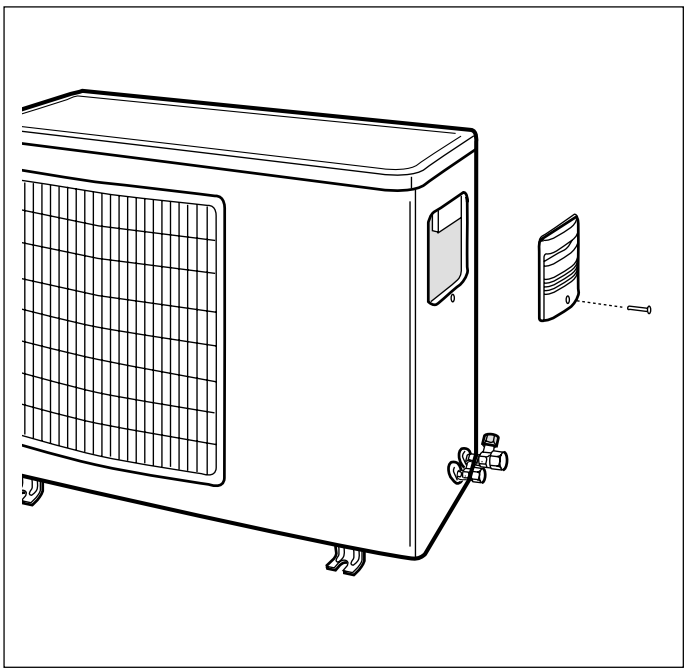
Heat pump unit



Heat pump system



Electrical connections



- **Make refrigerant connections before electrical connections.**
  When disassembling, disconnect electrical connections before refrigerant connections.

IMPORTANT:
Make ground connection prior to any other electrical connections.

- Remove electric box cover.
- Connect the wires to the terminals according to the wiring diagram and firmly tighten.
- Make electrical connections between units prior to proceeding to mains supply unit connection.
- Before proceeding with the unit connection to the mains supply locate live **L1, L2, L3** and neutral **N**, then make connections as shown in the wiring diagram.
- According to the installation instructions, the disconnecting switches from the mains power supply should have a contact gap (4 mm) such that total disconnection can be ensured under the conditions provided for by overvoltage class III.
- The mains supply indoor unit – outdoor unit connecting cable must be H07 RN-F (60245IEC66), type synthetic rubber insulation with neoprene coating.
- When the electric supply cables **L1 (R)**, **L2 (S)**, **L3 (T)** are connected inversely, a special **"PSC"** phase inversion protection device blocks the compressor to prevent the same from rotating inversely.
  In this case, switch off the electrical supply and check the correctness of the sequence of the cables of the supply line connected to the main terminal block (they are probably inverted).
  The compressor will only be allowed to work if the phase sequence is correct.
  The phase sequence protection device also continuously monitors the electrical supply line and if one of the phases is completely missing it blocks the compressor.
  The device only re-starts the compressor after the supply line is correctly restored.
  All the three phase compressors have identical internal wiring.
  For this reason when the correct phase connections for a specific system have been determined, the rotation direction will always be correct if the same connections are made to the terminal block (for the other equipment).

Note:
All field electrical connections are the responsibility of the installer.

Refer to the indoor unit installation manual for sizing the connection wires between units.

Note:
After connections have been completed, replace electric box cover.

Table IV: Electrical data

	Starting current (3)	Power input (2)								Main power connections (6)	
		Cooling				Heating					
		Nominal conditions 400V ~ 50Hz ISO 5151.2/T1 indoor 27°C d.b. 19°C w.b. outdoor 35°C d.b. 24°C w.b.		Peak conditions 342V ~ 50Hz ISO 5151.2/T1 indoor 32°C d.b. 23°C w.b. outdoor 43°C d.b. 32°C w.b.		Nominal conditions 400V ~ 50Hz ISO 5151.2/High+ indoor 20°C d.b. 15°C w.b. outdoor 7°C d.b. 6°C w.b.		Peak conditions 342V ~ 50Hz ISO 5151.2/High+ indoor 27°C outdoor 24°C d.b. 18°C w.b.		Time-delay fuse gL type	Wire size (4-5)
Unit	**A**	**A**	**W**	**A**	**W**	**A**	**W**	**A**	**W**	**A**	**mm²**
38GL018G9	24	3.8	1950	5.0	2600	–	–	–	–	10	2.5
38GL024G9	32	4.5	2270	5.9	3060	–	–	–	–	10	2.5
38GL028G9	37	4.8	2880	6.7	3450	–	–	–	–	16	2.5
38GL036G9	39	5.2	3320	7.1	3800	–	–	–	–	16	2.5
38GL048G9	54	6.8	3540	8.3	3950	–	–	–	–	16	2.5
38GL052G9	64	9.1	4300	11.1	5420	–	–	–	–	25	2.5
38GL060G9	64	8.6	4900	11.1	5480	–	–	–	–	25	2.5
38YY(S)028G9	37	5.7	3100	7.3	3700	5.2	2640	7.0	3670	16	2.5
38YY(S)036G9	39	6.6	3470	8.3	4250	5.9	2960	7.8	3890	16	2.5
38YY(S)048G9	54	7.3	3540	8.4	4060	7.2	3490	8.9	4380	16	2.5
38YY-052G9	64	9.3	4380	11.3	5300	9.5	4450	11.4	5430	25	2.5
38YY(S)060G9	64	10.5	5220	12.1	5905	9.7	4620	11.5	5630	25	2.5

Notes:
1. **Unit is suitable for outdoor installation.**
2. Data referred to the outdoor unit only.
3. Starting current duration is usually lower than 1 sec.
4. Wire size shown applies to line length up to 15 m.
5. If the indoor unit is provided with an electric heater, consult indoor unit installation manual for correct sizing of the wires.
6. The mains supply connecting cable must be H07 RN-F (60245IEC66) type, synthetic rubber insulation with Neoprene coating.

38GL...G9 / 38YY...G9 / 38YYS...G9 R-410A

Pump Down and check the refrigerant charge

GB
ENGLISH

Pump-down

Pump-down is an operation intended to collect all the system refrigerant in the outdoor unit.
This operation must be carried out before disconnecting the refrigerant tubing in order to avoid refrigerant loss to the atmosphere, if it becomes necessary to disconnect the refrigerant connections for unit repair, removal or disposal; in this case, after removal, unit must be delivered to an appropriate disposal centre or the original dealer.

Shut off the liquid valve with the Allen wrench.
Turn the system on in cooling with fan operating at high velocity. (Compressor will immediately start, provided 3 minutes have elapsed since the last stop).
After 2 minutes of operation, shut the suction valve with the same wrench.
Turn the system off and switch mains supply off.

Disconnect tubing. After disconnection, protect valves and tubing ends from dust.

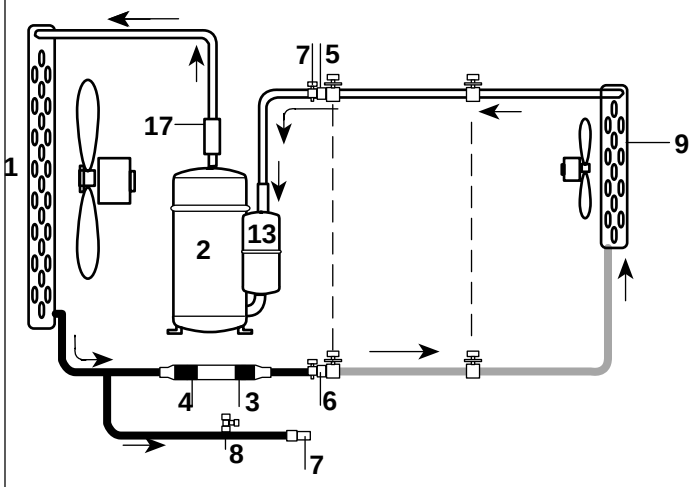
Check the refrigerant charge

- This check becomes necessary after any refrigerant leak due to incorrect connection, or after replacement of the compressor.

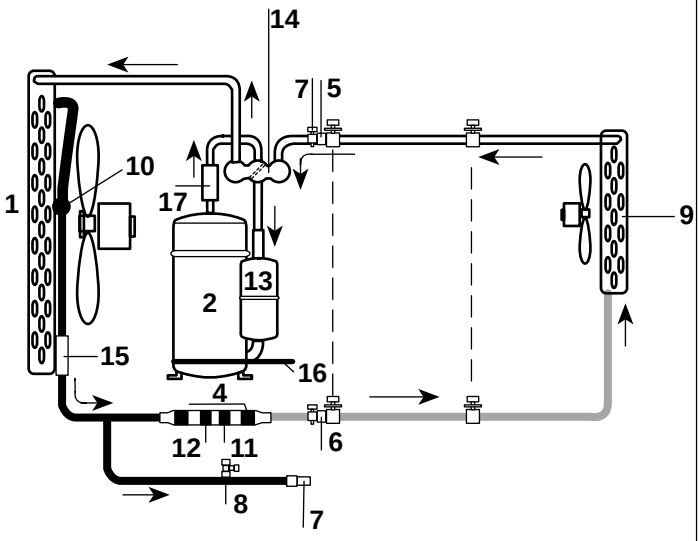
- The best method to correctly charge refrigerant is to completely empty the refrigerant circuit using refrigerant recovery equipment. Then charge the exact quantity of refrigerant according to the data shown on the unit nameplate and always considering the additional charges shown in table “System charge”.

- R-410A systems must be charged with liquid refrigerant. Charge R-410A units using a commercial-type metering device applied to the manifold hose in order to vaporize the liquid refrigerant before it enters the unit.

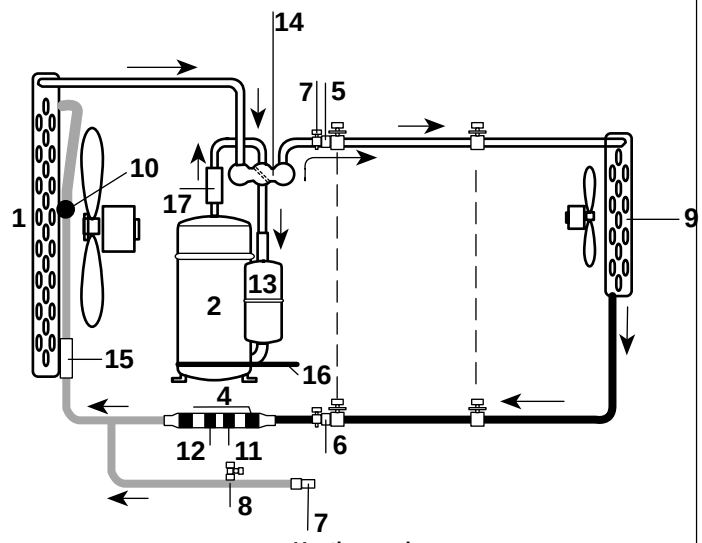
Cooling only unit



Heat pump system



Cooling cycle



Heating cycle

Legend:

① Outdoor coil
② Compressor
③ Expansion device
④ Strainer
⑤ Vapor valve
⑥ Liquid valve
⑦ Service pressure port
⑧ Additional pressure port
⑨ Indoor unit coil
⑩ Liquid distributor
⑪ Cooling expansion device
⑫ Heating expansion device
⑬ Additional suction accumulator
⑭ Reversing valve
⑮ Defrost end thermostat
⑯ Crankcase heater
⑰ Discharge muffler

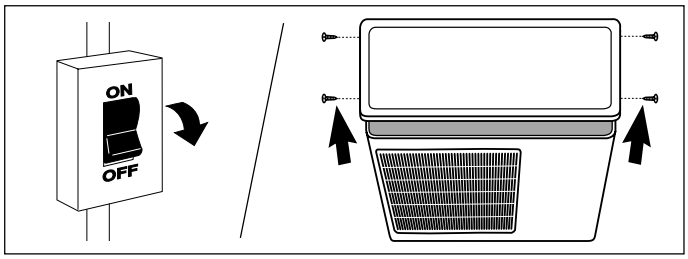
Gas
Liquid + Gas
Liquid

Unit maintenance and troubleshooting

Unit maintenance

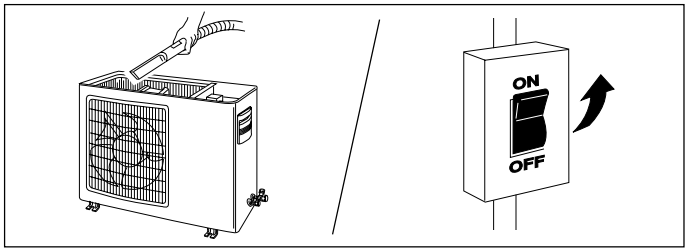
The following maintenance operations must be carried out by qualified personnel.

Cleaning the coil
When necessary, proceed as follows for more careful cleaning of the coil:



Switch the mains supply OFF.

Remove unit top cover by loosening holding screws and lifting the cover.



Carefully clean the coil with a vacuum cleaner from inside to outside.
With the same vacuum cleaner, dust the inside of the fan compartment and the fan blades. Avoid any damage to the blades which may cause future vibrations and noise.
Replace the unit cover and tighten the screws.

After long shutdown periods and at commissioning (for 38YY and 38YYS heat pump models only)
Energize the system by putting the main switch to ON without starting the unit. (Remote control must be in the OFF position). Do not disconnect the main switch during the unit operating season.

Troubleshooting

Compressor and fan of the outdoor unit will not start:
- Unit not energized; check the mains power connections.
- Main switch OFF; check and put to the ON position.
- Main switch fuses have blown; replace.
- Wait for 3 minutes; compressor cycling protection is on.
- HIP and LRPS devices opened (if any): check and eliminate the cause (refer to “Additional installation instructions”).
- Mains voltage too low.
- Electrical connections loose or wrong; check and repair.

Compressor will not start, but outdoor fan is running:
- Electrical connections of compressor loose or wrong; check and repair.
- Compressor burnt out, seized or protection device on; check for the cause and replace compressor if necessary.

Compressor starts, but stops due to its overtemperature protection (other than stops caused by the normal operation of the thermostat):
- Wrong refrigerant charge (excessive or low) or air or other non condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.
- Mains voltage wrong (too high or too low).
- Condenser coil obstructed; remove obstructions.
- Outdoor fan off; check cause and repair.
- Indoor unit thermostat faulty; replace.
- Refrigerant circuit clogged; check and remove obstructions.
- Reversing valve faulty on heat pump models; replace.
- Expansion device clogged or covered with ice; drain refrigerant (see note 1), evacuate and recharge.

Compressor runs continuously:
- Unit selected too small for actual air conditioning needs.
- Indoor temperature selection too low (if in cooling) or too high (if in heating, for heat pump models); check temperature selection.
- Refrigerant charge low; check and add refrigerant.
- Air or other non condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.
- Obstructions at air intake or dirty indoor unit filters; remove obstruction or clean filter.

Frequent ice build-up on outdoor coil (during heating with heat pump units):
- Outdoor fan not working or working incorrectly; check cause and repair.
- Wrong electrical connections between indoor and outdoor units; check electrical connections and repair.
- Check defrost end thermostat positioning and connection.
- Outdoor unit fan runs continuously during defrost cycles (heat pump heating): check connections.

Discharge pressure too high:
- Outdoor coil dirty or obstructed; clean or remove obstructions.
- Unit condenser fan faulty or working incorrectly; replace or check.
- Refrigerant charge too high; drain some refrigerant (see note 1).
- Air or other non-condensable gases in the circuit; drain refrigerant (see note 1), evacuate and recharge.
- If installed, the head pressure controller prevents the outdoor fan motor from reaching its maximum speed.
  Check the head pressure controller by connecting the fan directly. Replace the HPC if necessary.

Discharge pressure too low:
- Refrigerant charge too low; add refrigerant.
- Outdoor coil dirty or obstructed; clean or remove obstructions.
- Indoor unit air filter dirty; clean filter.

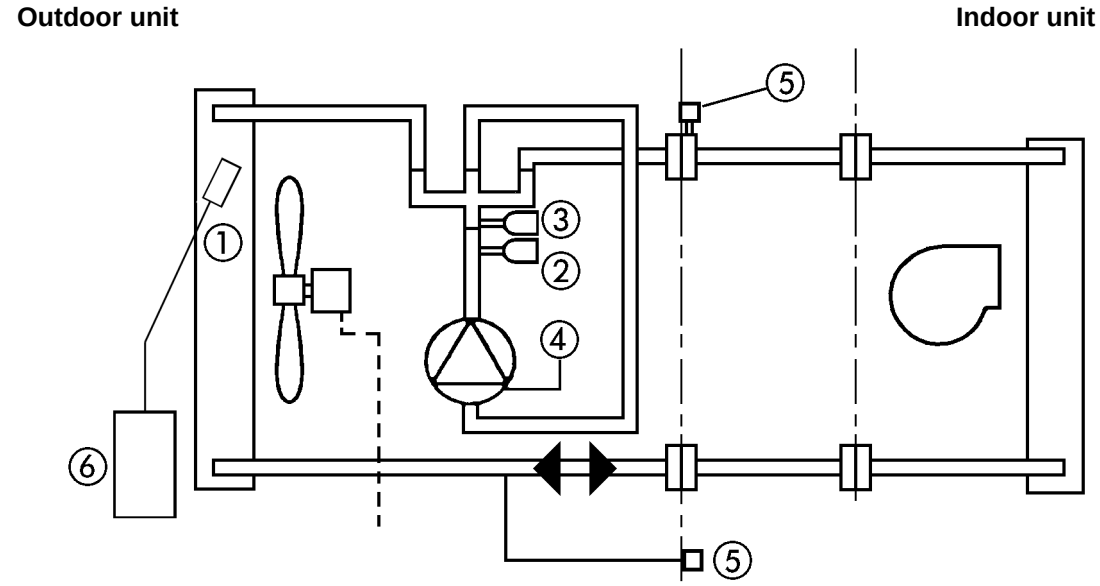
Suction pressure too high:
- Internal high pressure relief valve open; check for cause and repair.
- Refrigerant charge too high; drain some refrigerant (see note 1).
- Reversing valve faulty or internal leak; replace.

Suction pressure too low:
- Refrigerant charge too low; add refrigerant.
- Faulty contact between pipe and defrost thermostat (heat pump heating): check for cause and repair.
- Evaporator coil covered with ice; see the following points.
- Air shortage to the evaporator unit; check and repair and check indoor unit fan operation.
- Expansion device or suction line clogged: check and repair.
- The outdoor unit fan does not work according to head pressure; check the controller operation.
- Expansion device clogged or covered with ice; drain some refrigerant (see note 1), evacuate and recharge.

Outdoor fan cycling due to its overtemperature protection:
- Electrical connection loose; check connections.
- Fan motor bearings seized: check and repair.
- Fan motor burnt-out; replace.

Note 1:
Do not release refrigerant to the atmosphere; use refrigerant recovery equipment.

Heat pump unit



① Temperature sensor
② High pressure cut-out (HIP)
③ Loss of refrigerant pressure switch (LRPS)
④ Crankcase heater
⑤ Pressure service port
⑥ Head pressure controller (HPC)

38YYS...G9 units are designed to work in North European countries climates and where cooling is required, even in case of outdoor low temperatures.

They differ from the standard ones for the following factory fitted accessories: head pressure controller (HPC), the loss of refrigerant pressure switch (LRPS) and the high pressure cut-out (HIP).

Operating range

Refer to table III “Operating limits”.

Features

– **HPC** (Head pressure controller).

The “HPC” HPC device consists in two parts:
• printed circuit board with fast connection electronic components;
• temperature sensor supplied with 500 mm of cable, housed in a special box welded on the outdoor coil.

The insulated printed circuit board (PCB) is equipped with faston-type terminals and dedicated connection for heat pump units.

The head pressure controller allows operation in the cooling mode up to –15°C as the condensing temperature is kept over 41°C – 42°C.

Thanks to this device, the supply voltage to the fan motor can be reduced depending on the temperature value measured on the thermal exchange coil.
Voltage reduction means a reduction in the fan motor speed and a subsequent rise in condensing temperature.

The HPC measures the fan motor speed automatically thus allowing the fan to work at its maximum speed.

– **HIP** (remote reset by switching from OFF to ON).

High pressure cut-out welded on the compressor discharge pipe.

Set point
– open at 4200 kPa (42 bar; 610 psig) pressure
– close at 3000 kPa (30.0 bar; 420 psig) pressure

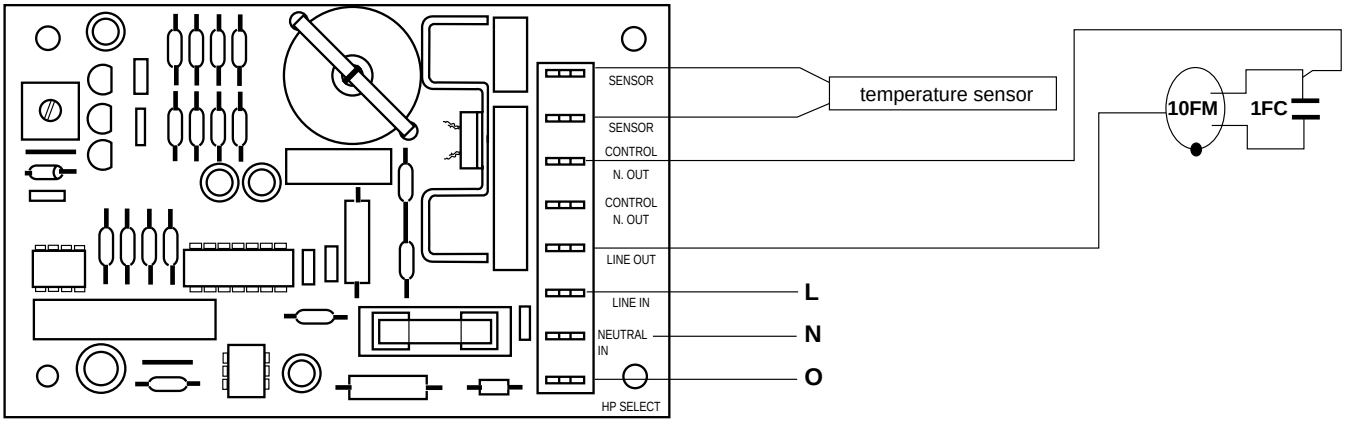
If pressure rises above 4200 kPa (42 bars; 610 psig), power supply is cut out.
If pressure drops below 3000 kPa (30 bars; 420 psig) the unit can be restarted by switching power supply off and then on.

– **LRPS** Automatic reset loss of refrigerant pressure switch, welded on the compressor discharge pipe.

Set point
– open at 345 kPa (3.45 bar; 50 psig) pressure
– close at 650 kPa (6.5 bar; 95 psig) pressure

When pressure drops below 345 kPa (3.45 bars; 50 psig) because of a refrigerant leak, power supply is cut out.
In this case, check the circuit tightness, release air with the vacuum pump and recharge.
If pressure rises above 650 kPa (6.5 bars; 95 psig) the unit can be restarted.

Condensing temperature controller: wiring diagram



1FC - Fan Capacitor
1OFM - Fan motor
L - Live power supply
N - Neutral power supply
O - Reversing valve control

Condensing temperature controller operation

Full voltage:
When the liquid line temperature is over the setpoint value plus half proportional band (factory set by supplier), the output voltage to the motor is 97% or more of supply voltage.

Low voltage:
When the liquid line temperature is below set point minus half proportional band, the output voltage to the motor is set at the minimum value available.

Proportional band:
In the temperature range set by the two above-mentioned conditions and knows as proportional band, the controller changes the output voltage to the motor in proportion to the liquid temperature; therefore, the motor can rise or decrease its speed and so maintain a constant condensing temperature.

Hard start:
At each compressor starting the full voltage output to the fan motor is provided for 3 seconds.

Temperature setting

Proportional band width set at +11 / -11°C in respect to the set point temperature.

Setting:	the head pressure controller is supplied factory set at 42°
Hard start time	3 seconds.

Troubleshooting

See paragraph “Troubleshooting”.

Note:
In case of first start after a pause of several hours at – 15°C, with low voltage supply (198V) high pressure switch HIP may trip off the unit.
In this case, reset the system by switching OFF and ON the power supply.

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