



48UH / 50UH

Packaged Rooftop Heat Pump and Gas Heating Units

Advanced Instruction Operation and maintenance instructions

PRO-DIALOG



Advanced Instruction Operation and maintenance instructions



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The drawings in this document are for illustrative purposes only and is not part of any offer for sale or contract.

NOTES FOR 48 SERIES UNITS FITTED WITH GAS BURNER

THE APPLIANCE MUST BE INSTALLED IN ACCORDANCE WITH LOCAL SAFETY CODES AND REGULATIONS AND IS INTENDED FOR OUTDOOR USE ONLY.

PLEASE READ CAREFULLY THE MANUFACTURER'S INSTRUCTIONS BEFORE STARTING THIS UNIT.

BEFORE INSTALLATION, CHECK THAT THE LOCAL DISTRIBUTION CONDITIONS, TYPE OF GAS AND AVAILABLE PRESSURE, AND THE POWER SUPPLY AND ADJUSTMENTS OF THE APPLIANCE ARE CORRECT .

1 - INTRODUCTION

Prior to the initial start-up of the 50/48UH units, the people involved should be thoroughly familiar with these instructions and the specific project data for the installation site.

The 50/48UH packaged rooftop units are designed to provide a very high level of safety and reliability making installation, start-up, operation and maintenance easier and more secure.

Unit will provide safe and reliable service when operated within their application range. The procedures in this manual are arranged in the sequence required for machine installation, start-up, operation and maintenance.

Be sure you understand and follow the procedures and safety precautions contained in the instructions supplied with the machine, as well as those listed in this guide, such as: protective clothing, gloves, safety glasses, safety shoes and appropriate tools, and suitable qualifications (electrical, air conditioning, local certification).

To find out, if these products comply with European directives (machine safety, low voltage, electromagnetic compatibility, equipment under pressure, etc.) check the declarations of conformity for these products.

1.1 - Check equipment received

- Inspect the unit for damage or missing parts. If damage is detected, or if shipment is incomplete, immediately file a claim with the shipping company.
- Confirm that the unit received is the one ordered. Compare the name plate data with the order.
- The name plate is attached to the unit on the outside on one of the unit sides, showing the following information:
 - Model number - size
 - CE marking
 - Serial number
 - Year of manufacture
 - Pressure and leak tightness test date
 - Refrigerant used
 - Refrigerant charge per circuit
 - PS: Min./max. allowable pressure (high and low pressure side) See Section 11
 - TS: Min./max. allowable temperature (high and low pressure side) See Section 11
 - Pressure switch cut-out pressure
 - Unit leak test pressure
 - Voltage, frequency, number of phases
 - Maximum current drawn
 - Maximum power input

- Unit net weight
- Confirm that all accessories ordered for on-site installation have been delivered, and are complete and undamaged.

The unit must be checked periodically for possible damage of insulation (thermal or acoustic), due to operation, shocks (handling accessories, tools, etc.). If necessary, the damaged insulation parts must be repaired or replaced. See also chapter "Maintenance".

1.2 - Installation safety considerations

After the unit has been received and when it is ready to be installed or reinstalled, it must be inspected for damage. Check that the refrigerant circuits are intact, especially that no components or pipes have shifted or been damaged (e.g. following a shock). If in doubt, carry out a leak tightness check. If damage is detected upon receipt, immediately file a claim with the shipping company or repair.

This machine must be installed in a location that is not accessible to the public and protected against access by non-authorised people.

This machine should not be installed in an explosive atmosphere.

Do not remove the skid or the packaging until the unit is in its final position. These units can be moved with a fork lift truck, as long as the forks are positioned in the right place and direction on the unit.

The units can also be lifted with slings, using only the designated lifting points marked on the unit (labels on the chassis and a label with all unit handling instructions are attached to the unit).

Use slings with the correct capacity, and always follow the lifting instructions on the certified drawings supplied for the unit.

This unit is designed for ducted installation (indoor air discharge). If ducts are not used the installer must place a protection grille in the discharge.

Safety is only guaranteed, if these instructions are carefully followed. If this is not the case, there is a risk of material deterioration and injuries to personnel. These units are not designed to be lifted from above.

All precautions concerning handling of refrigerant *must be observed in accordance with local regulations.*

Accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation or explosions.

Inhalation of high concentrations of vapour is harmful and may cause heart irregularities, unconsciousness, or death. Vapour is heavier than air and reduces the amount of oxygen available for breathing. These products cause eye and skin irritation. Decomposition products can be hazardous.

1.3 - Equipment and components under pressure

These products incorporate equipment or components under pressure, manufactured by Carrier or other manufacturers.

We recommend that you consult your appropriate national trade association or the owner of the equipment or components under pressure (declaration, re-qualification, retesting, etc.). The characteristics of this equipment/these components are given on the nameplate or in the required documentation, supplied with the products.

Do not introduce high static and dynamic pressure compared with the existing operating pressures - either service or test pressures in the refrigerant circuit.

1.4 - Maintenance safety considerations

Engineers working on the electric or refrigeration or gas heating components must be authorized, trained and fully qualified to do so (e.g. electricians trained and qualified in accordance with IEC 60364 Classification BA4).

All refrigerant circuit work must be carried out by a trained person, fully qualified to work on these units. He must have been trained and be familiar with the equipment and the installation. All welding operations must be carried out by qualified specialists.

These units use high-pressure R-410A refrigerant (the unit operating pressure is above 40 bar). Special equipment must be used when working on the refrigerant circuit (pressure gauge, charge transfer, etc.).

Any manipulation of a refrigerant recovery valve must be carried out by a qualified and authorised engineer, observing applicable standards (e.g. during refrigerant removal). The unit must be switched off while this is done.

During any handling, maintenance and service operations the engineers working on the unit must be equipped with safety gloves, glasses, shoes and protective clothing. Never work on a unit that is still energized. Never work

on any of the electrical components, until the general power supply to the unit has been cut.

If any maintenance operations are carried out on the unit, lock the power supply circuit in the open position and secure the machine upstream with a padlock.

If the work is interrupted, always ensure that all circuits are still deenergized before resuming the work.

ATTENTION: Even if the unit has been switched off, the power circuit remains energized, unless the unit or circuit disconnect switch is open. Refer to the wiring diagram for further details. Attach appropriate safety labels.

If any work is carried out in the fan area, specifically if the grilles or casings have to be removed, cut the power supply to the fans to prevent their operation.

OPERATING CHECKS:

• IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED:

This product contains fluorinated greenhouse gas covered by the Kyoto protocol.

Refrigerant type: R-410A

Global Warming Potential (GWP): 1975

Periodic inspections for refrigerant leaks may be required depending on European or local legislation. Please contact your local dealer for more information.

• During the life-time of the system, inspection and tests must be carried out in accordance with national regulations.

Safety device checks (annex D – EN 378-4):

• If there are no local regulations, the safety devices must be checked on site once a year (high-pressure switches)

At least once a year thoroughly inspect the protection devices. If the machine operates in a corrosive environment, inspect the protection devices more frequently.

Regularly carry out leak tests and immediately repair any leaks.

Ensure regularly that the vibration levels remain acceptable and close to those at the initial unit start-up.

Before opening a refrigerant circuit, transfer the refrigerant to bottles specifically provided for this purpose and consult the pressure gauges.

Change the refrigerant after equipment failure or carry out a refrigerant analysis in a specialist laboratory.

If the refrigerant circuit remains open for longer than an hour after an intervention (such as a component replacement), the openings must be plugged and the circuit must be charged with nitrogen (inertia principle). The objective is to prevent penetration of atmospheric humidity and the resulting corrosion on the internal walls and on non-protected steel surfaces.

1.5 - Repair safety considerations

All installation parts must be maintained by the personnel in charge, in order to avoid deterioration and injury. Faults and leaks must be repaired immediately. The authorized technician must have the responsibility to repair the fault immediately. Each time repairs have been carried out to the unit, the operation of the safety devices must be re-checked.

Comply with the regulations and recommendations in unit and HVAC installation safety standards, such as: EN 378, ISO 5149, etc.

Do not use oxygen to purge lines or to pressurize a machine for any purpose. Oxygen gas reacts violently with oil, grease, and other common substances.

Never exceed the specified maximum operating pressures. Verify the allowable maximum high- and low-side test pressures by checking the instructions in this manual and the pressures given on the unit name plate.

Do not use air for leak testing. Use only refrigerant or dry nitrogen.

Do not unweld or flamecut the refrigerant lines or any refrigerant circuit component until all refrigerant (liquid and vapour) has been removed from the circuit. Traces of vapour should be displaced with dry air nitrogen. Refrigerant in contact with an open flame can produce toxic gases.

The necessary protection equipment must be available, the appropriate fire extinguishers for the system and the refrigerant type used must be within easy reach.

Do not siphon refrigerant.

Avoid spilling liquid refrigerant on skin or splashing it into the eyes. Use safety goggles. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, immediately and abundantly flush the eyes with water and consult a doctor.

Never apply an open flame (blowlamp) or overheated steam (high-pressure cleaner) to the refrigerant circuit. Dangerous overpressure can result.

During refrigerant removal and storage operations follow applicable regulations. These regulations, permitting conditioning and recovery under optimum quality conditions and safety conditions for people, property and the environment are described in related standards.

Refer to the certified dimensional drawings for the units.

It is dangerous and illegal to re-use disposable (non-returnable) reclaim bottles or attempt to refill them. When reclaim bottles are empty, evacuate the remaining gas pressure, and move them to a designated place for recovery. Do not incinerate.

Do not attempt to remove refrigerant circuit components or fittings, while the machine is under pressure or while it is running. Be sure pressure is at 0 kPa before removing components or opening a circuit.

Do not attempt to repair or recondition any safety devices when corrosion or build-up of foreign material (rust, dirt, scale, etc.) is found. If necessary, replace the device.

ATTENTION: No part of the unit may be used as a walkway, rack or support. Periodically check and repair or if necessary replace any component or piping that shows signs of damage.

Do not step on refrigerant lines. The lines can break under the weight and release refrigerant, causing personal injury.

Do not climb on a machine. Use a platform, or staging to work at higher levels.

Use mechanical lifting equipment (crane, hoist, winch, etc.) to lift or move heavy components. For lighter components, use lifting equipment when there is a risk of slipping or losing your balance.

Use only original replacement parts for any repair or component replacement. Consult the list of replacement parts that corresponds to the specification of the original equipment.

Periodically inspect all valves, fittings and pipes of the refrigerant circuits to ensure that they do not show any corrosion or any signs of leaks.

It is recommended to wear ear defenders, when working near the unit and the unit is in operation.

Always ensure you are using the correct refrigerant type before recharging the unit.

Charging any refrigerant other than the original charge type (R-410A) will impair machine operation and can even lead to a destruction of the compressors. The compressors operating with R-410A are charged with a synthetic polyolester oil.

Before any intervention on the refrigerant circuit, the complete refrigerant charge must be recovered.

2 - MOVING AND SITING THE UNIT

2.1 – Moving

See chapter “Installation safety considerations”.

2.2 - Siting the unit

Always refer to the chapter “Dimensions and clearances” to confirm that there is adequate space for all connections and service operations. For the centre of gravity coordinates, the position of the unit mounting holes, and the weight distribution points, refer to the certified dimensional drawing supplied with the unit.

Typical applications of these units do not require earthquake resistance. Earthquake resistance has not been verified.

CAUTION: Only use slings at the designated lifting points which are marked on the unit.

Before siting the unit check that:

- The permitted loading at the site is adequate or that appropriate strengthening measures have been taken.
- The unit is installed level on an even surface (maximum tolerance is 5 mm in both axes).
- There is adequate space above the unit for air flow and to ensure access to the components (see dimensional drawings).
- The number of support points is adequate and that they are in the right places.
- The location is not subject to flooding.
- If heavy snowfall is likely and long periods of sub-zero temperatures are normal, provision has to be made to prevent snow accumulating by raising the unit above the height of drifts normally experienced. Baffles may be necessary to deflect strong winds but must not restrict air flow into the unit.

CAUTION: Before lifting the unit, check that all casing panels are securely fixed in place. Lift and set down the unit with great care. Tilting and jarring can damage the unit and impair unit operation.

If units are hoisted with rigging, it is advisable to protect

coils against crushing while a unit is being moved. Use struts or a lifting beam to spread the slings above the unit. Do not tilt a unit more than 15°.

WARNING: Never push or use a lever on any of the enclosure panels of the unit. Only the base of the unit frame is designed to withstand such stresses.

2.3 - Checks before system start-up

Before the start-up of the refrigeration system, the complete installation, including the refrigeration system must be verified against the installation drawings, dimensional drawings, system piping and instrumentation diagrams and the wiring diagrams.

During these verifications observe all national regulations. If no national regulations exist, please refer to annex G of standard EN378-2, specifically:

External visual installation checks:

- Compare the complete installation with the refrigeration system and power circuit diagrams.
- Check that all components comply with the design specifications.
- Check that all safety documents and equipments that are required by current European standards are present.
- Verify that all safety and environmental protection devices and arrangements are in place and comply with the current European standard.
- Verify that all document for pressure containers, certificates, name plates, files, instruction manuals that are required documents required by the current European standards are present.
- Verify the free passage of access and safety routes.
- Verify the instructions and directives to prevent the deliberate removal of refrigerant gases.
- Verify the installation of connections.
- Verify the supports and fixing elements (materials, routing and connection).
- Verify the quality of welds and other joints.
- Check the protection against mechanical damage.
- Check the protection against heat.
- Check the protection of moving parts.
- Verify the accessibility for maintenance or repair and to check the piping.
- Verify the status of the valves.
- Verify the quality of the thermal insulation and of the vapour barriers.
- Ensure that the ventilation in the machine room is sufficient.
- Check with the refrigerant detectors.

3 - INSTALLATION

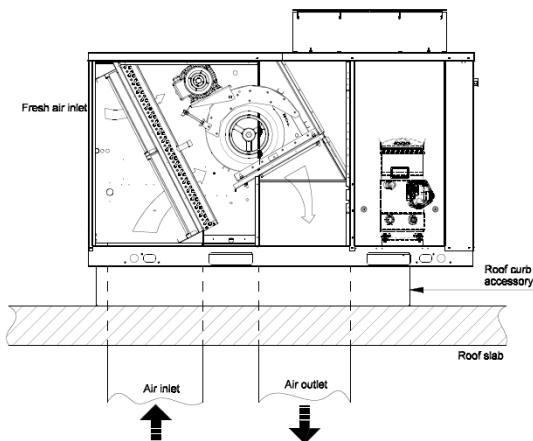
3.1 - Unit base frame

This appliance is for connection to a ducted air system only. It shall not be used without ductwork connected to the air out or discharge side of the appliance. It is possible to provide fresh air to the appliance inlet air side without the use of duct work via an optional kit containing a louver system, and protective hood and grilles. Consult the appliance supplier or distributor for more information.

Due to the size and weight of the units the base frame must be on some kind of support which fulfils the following requirements:

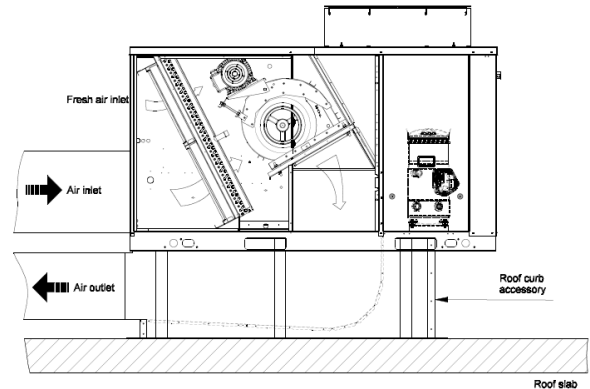
- The surface area must be sufficient for distributing the unit weight over the building structure.
- Sufficient drainholes should be provided to avoid the accumulation of rainwater.
- The unit should be firmly fixed to the floor.
- The structure should be capable of supporting the unit weight during installation and operation.
- The standard unit leaves the factory with the air discharge and return openings in the lower section (See fig.1) and the corresponding holes on the roof must be made.
-
- **Refer to the certified dimensional drawings for the discharge and return openings.**

Fig. 1 – Roofcub accessory - Standard vertical discharge and return



The unit air discharge and return can be horizontal (see Fig. 2). In this case, the roof curb accessory may be used after placing the panels covering the return area in the lower section.

Fig. 2 – Roofcurb accessory - Horizontal discharge / return



It is necessary to use adequate sealants and joints to ensure correct fitting and water-tightness between the ducts and the support so that air and moisture do not enter the building.

WARNING: Do not drill any holes in the indoor coil area as this might damage the condensate drain pan.

WARNING: Rooftop unit min. height from ground shall be 500 mm for horizontal discharge application for 48 series unit (with gas burners)

IMPORTANT: The unit should be correctly leveled to avoid drainage problems.

3.2 - Sensors connection and location

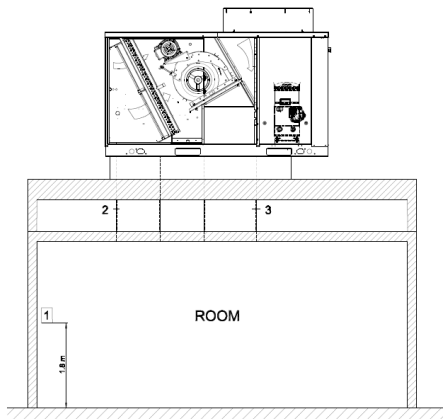
Room temperature sensor and supply temperature sensor are given in the electrical box together with their connectors. Please refer to the wiring diagrams for required connection and suitable cable diameters criteria for selecting sensor locations will vary with system and building specifics.

Recommended sensor locations are shown in Fig. 3.

1. Room temperature sensor
2. Return duct temperature sensor (option)
3. Supply duct temperature sensor

Note: Return duct sensor or Room sensor can be used.

Fig. 3 - Sensor location



3.3 - Ductwork

The ductwork dimensions should be determined in accordance with the air flow to be carried, and the available static pressure of the unit. The different air flows and static pressures which each unit can supply, are shown in the fan performance tables.

It is recommended to observe the following considerations:

Whatever type of ductwork is used, it should not be made of materials which are flammable, or which give off toxic gases in the event of a fire. The internal surfaces should be smooth, and not contaminate the air which passes through. It is recommended to use sheet metal ducts which are adequately insulated to avoid condensation and thermal leakage.

At the points where the ducts join the unit, it is recommended to use flexible connections which absorb vibrations, prevent noise inside the ductwork and allow access to the unit.

Bends near the unit outlet should be avoided as much as possible. If unavoidable, they should be as slight as possible, and internal deflectors should be used when the duct has large dimensions.

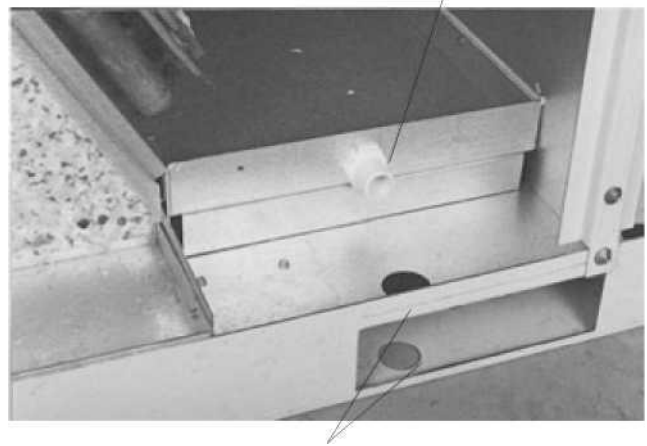
NOTE: All duct sizing and design work should be carried out by qualified technicians.

3.4 - Condensate and rainwater drainage

The units incorporate drill holes in the base near the outdoor coils to drain rainwater and condensation. The indoor heat exchanger area incorporates a condensate pan with an outside drain pipe diameter of 23 mm, and a 35 mm diameter drill hole must be made in the support (see Fig. 4).

Fig. 4 - Condensate drain details

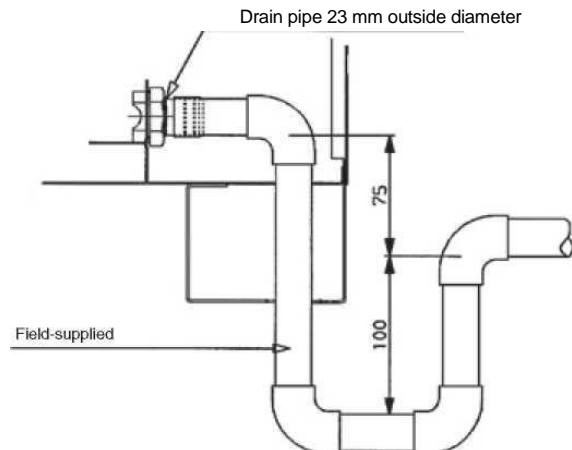
Drain pipe 23 mm outside diameter (OD)



A drain pipe for evacuating condensate must be incorporated taking into account the following recommendations:

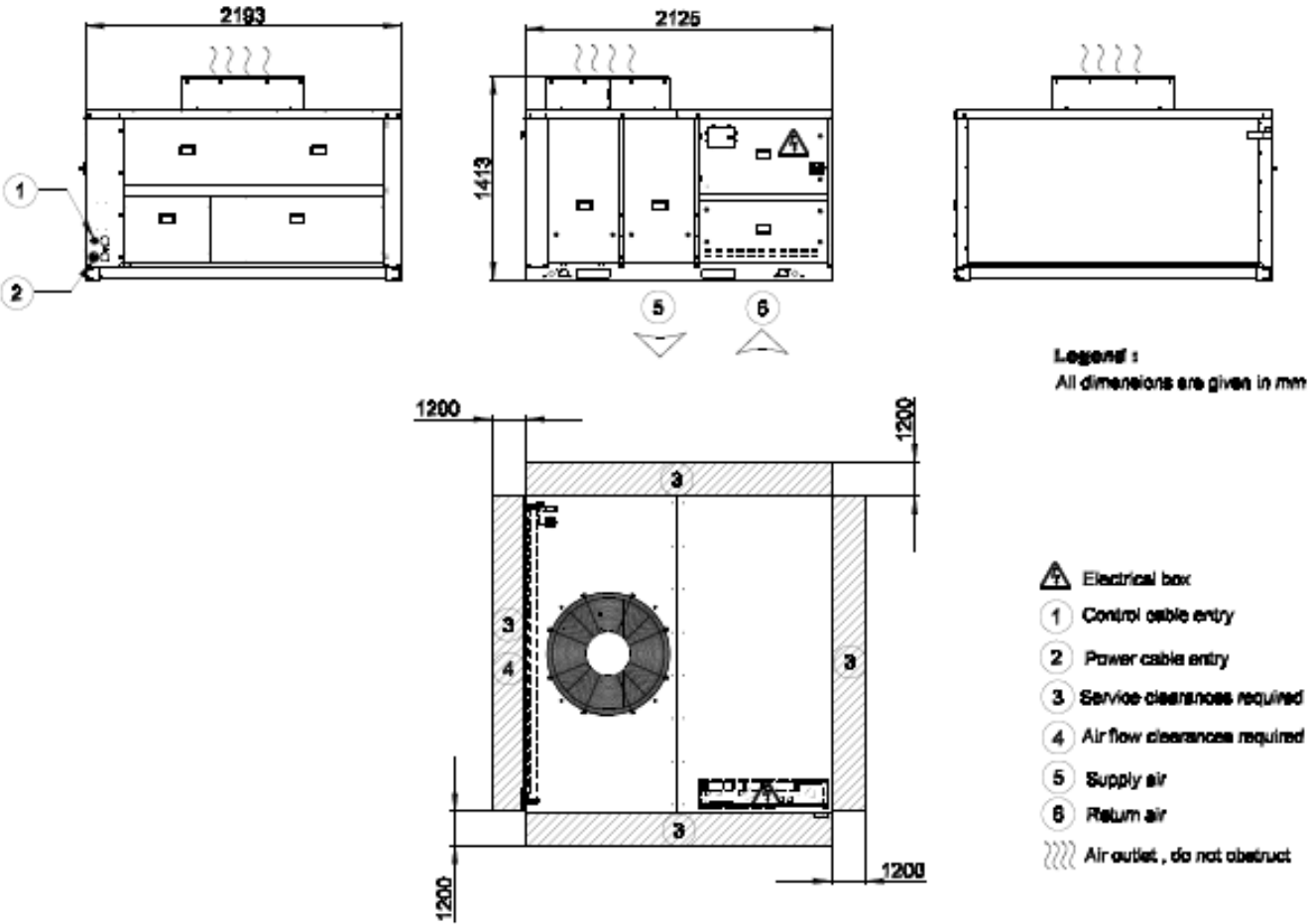
Use galvanized steel, copper or plastic piping. Do not use ordinary garden hose material. If a rigid material has been used for the drain pipe, it is necessary to provide an elastic coupling in the drainage line to absorb possible vibrations. It is recommended to incorporate a trap of the appropriate dimensions (see Fig. 5). The drain pipe should always be below the connection itself, and should slope to facilitate drainage.

Fig. 5 - Condensate drain pipe details



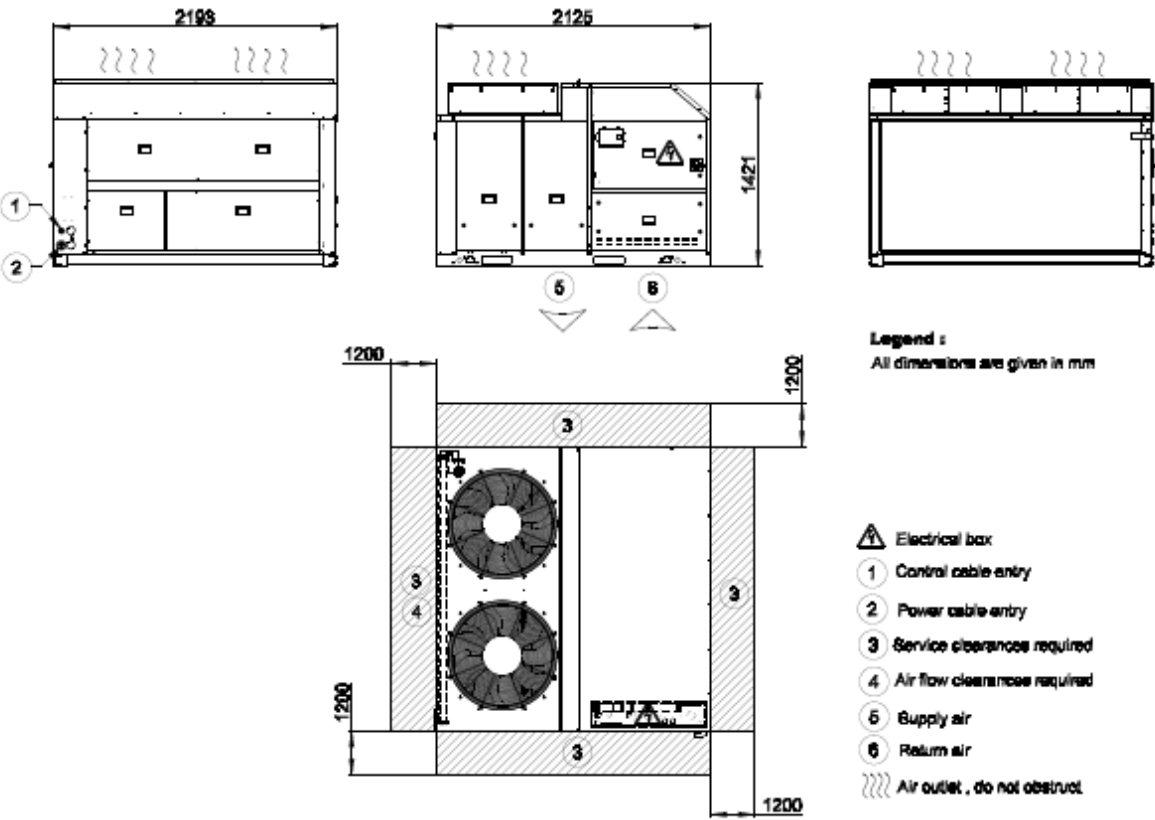
4 – DIMENSIONS, CLEARANCES

4.1 – 50UH045



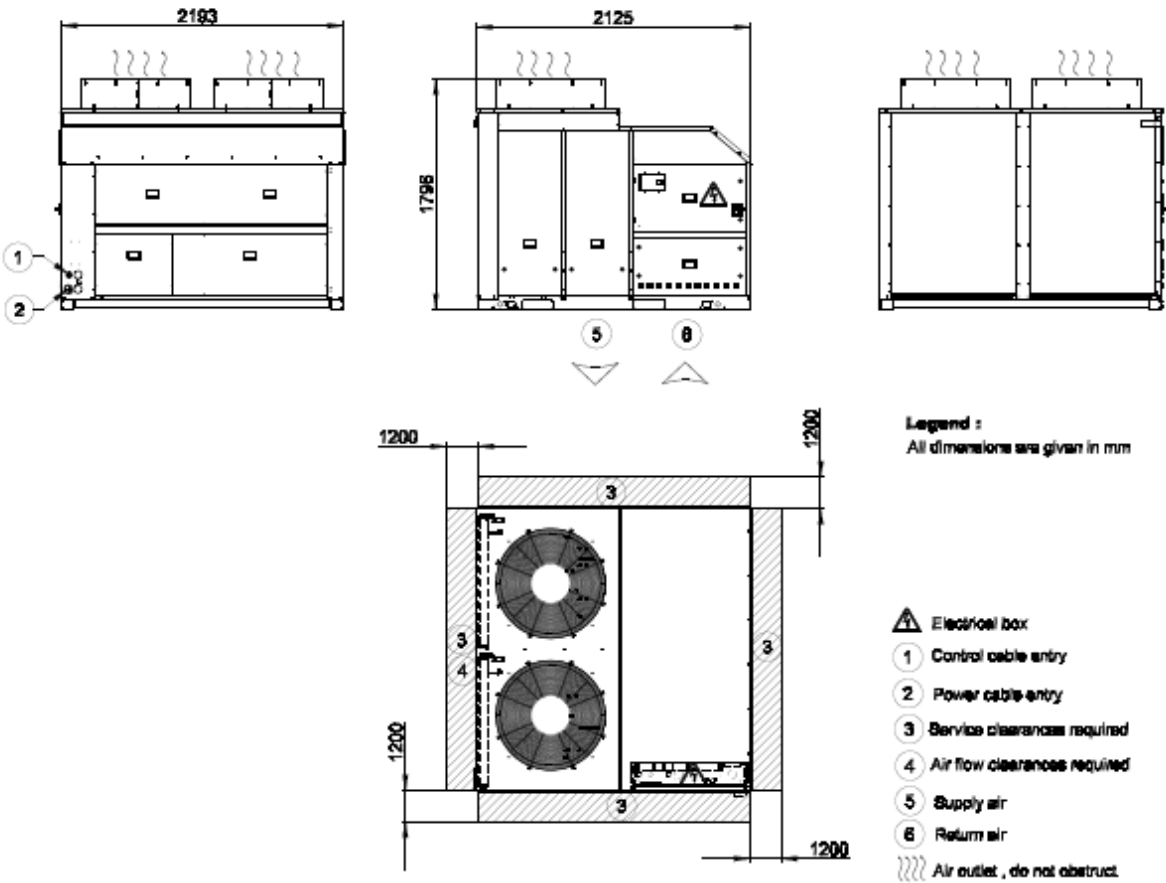
When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.2 – 50UH055



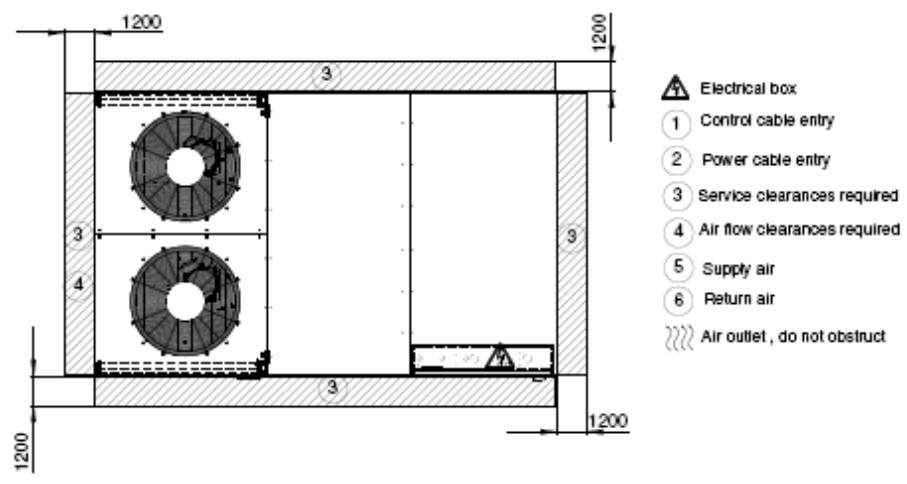
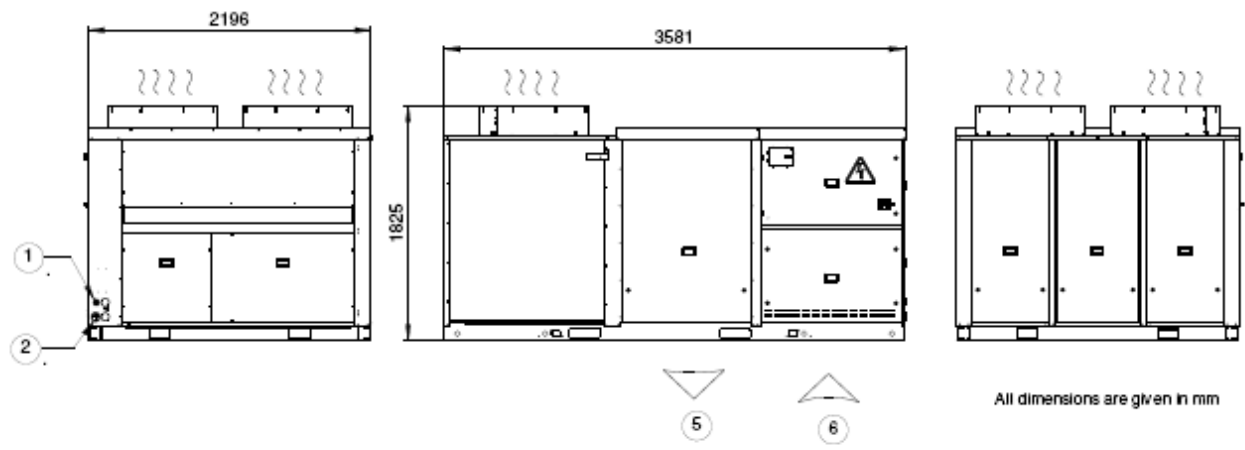
When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.3 – 50UH065-075



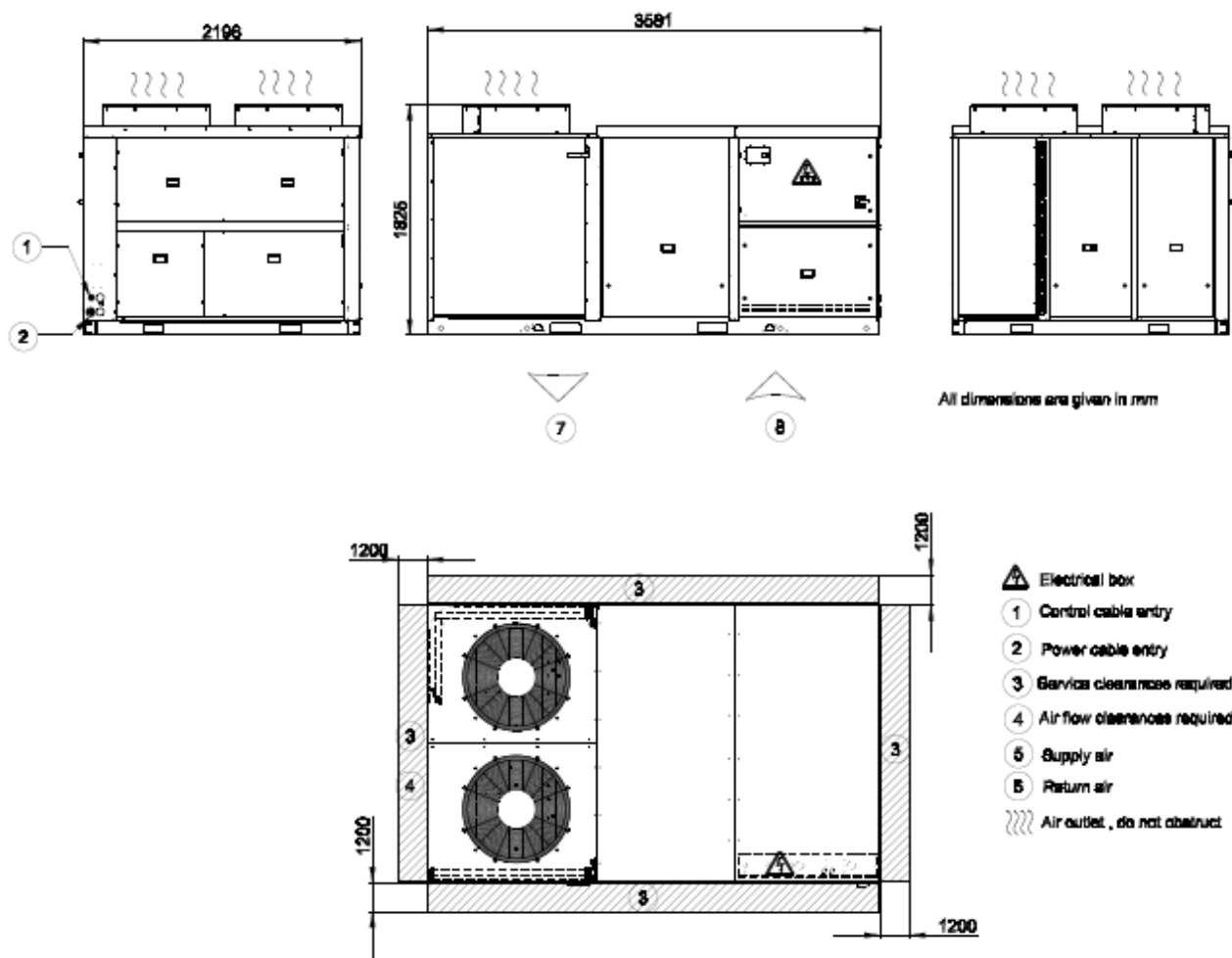
When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.4 – 50UH085



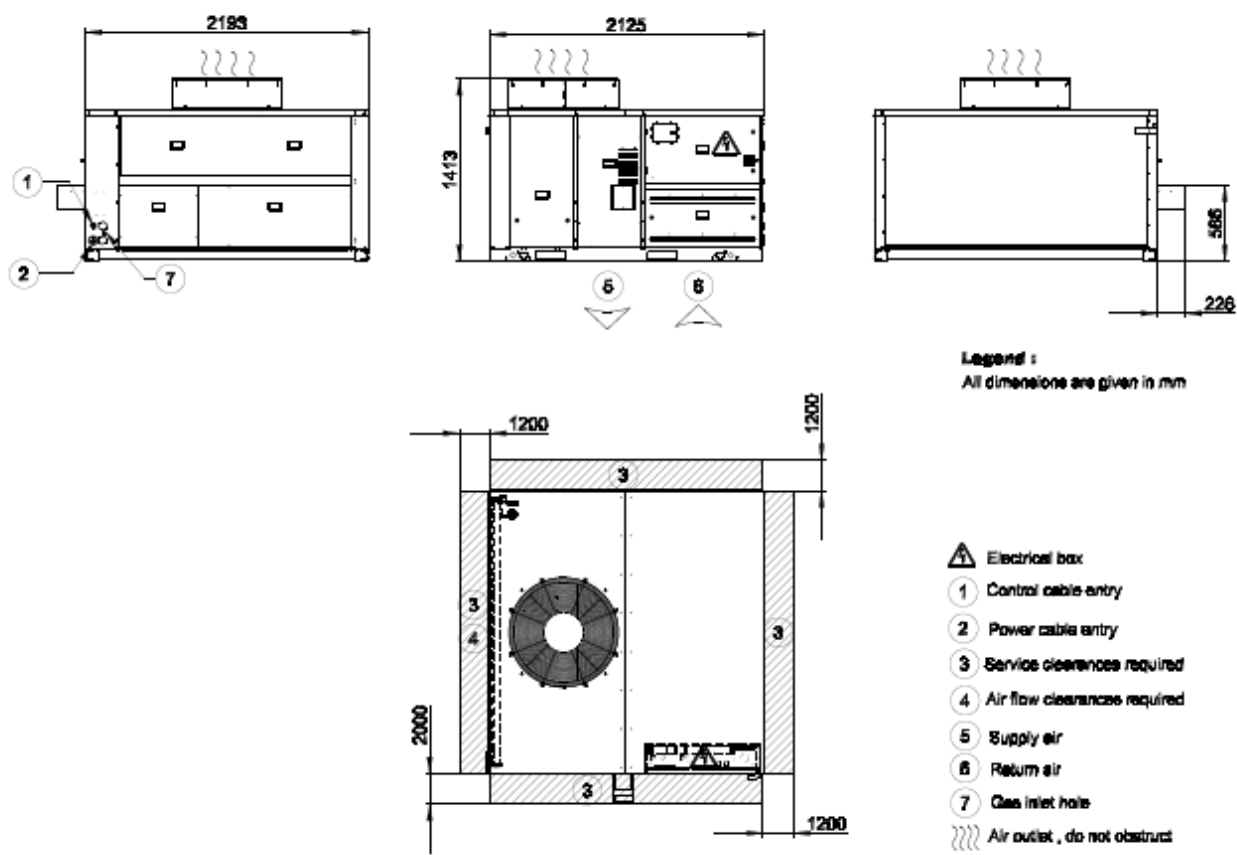
When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.5 – 50UH0100



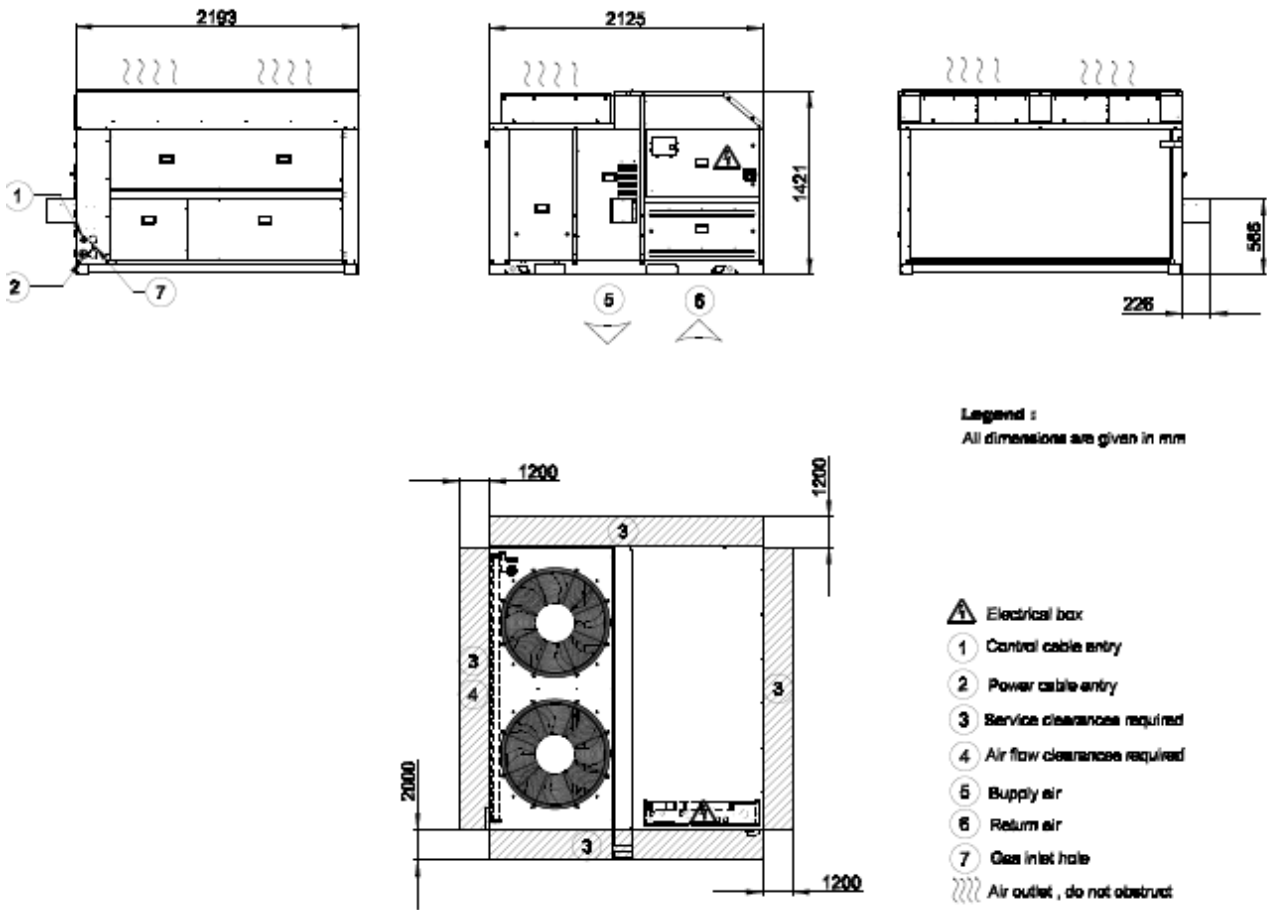
When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.6 – 48UH045



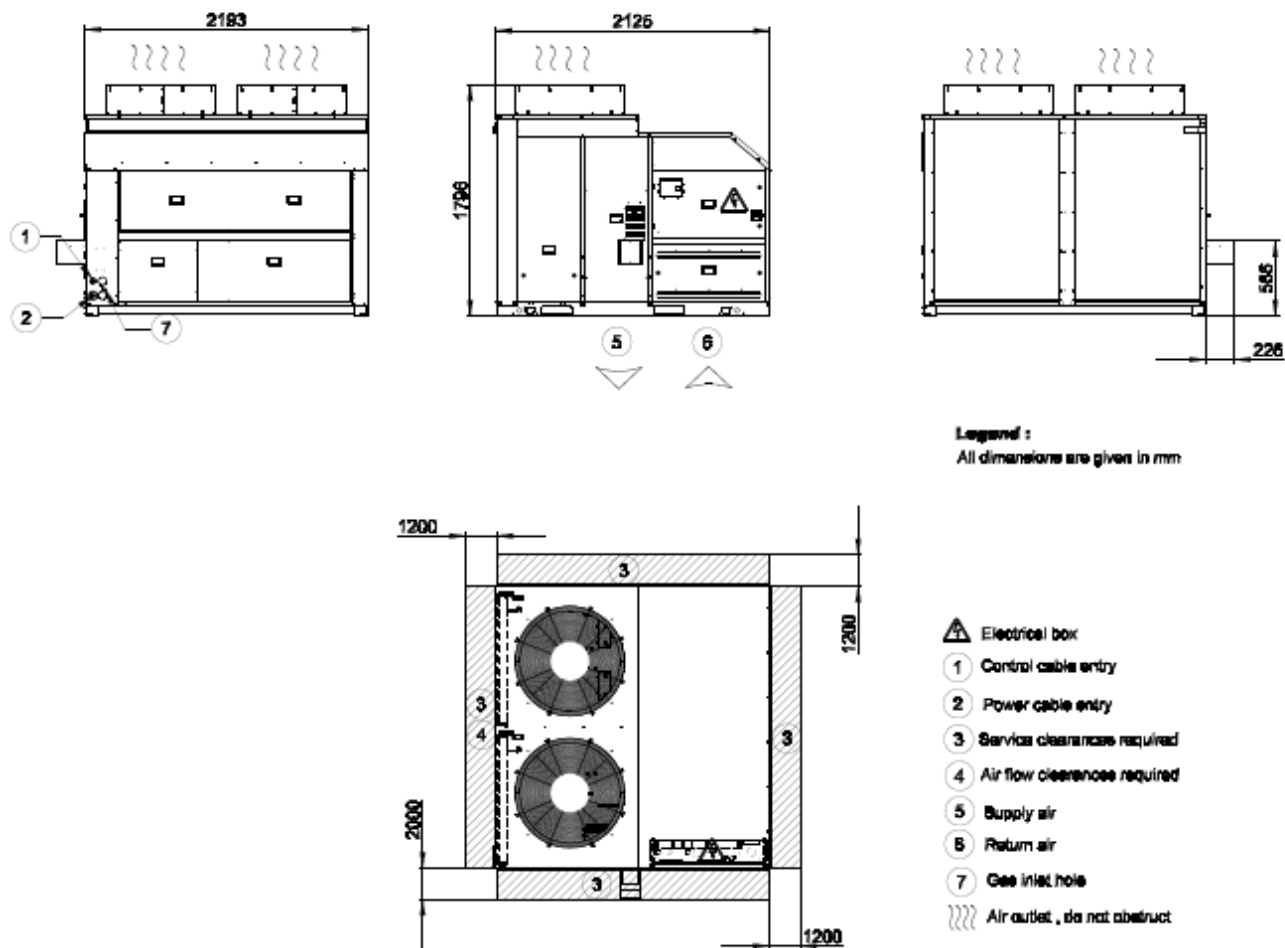
When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.7 – 48UH055



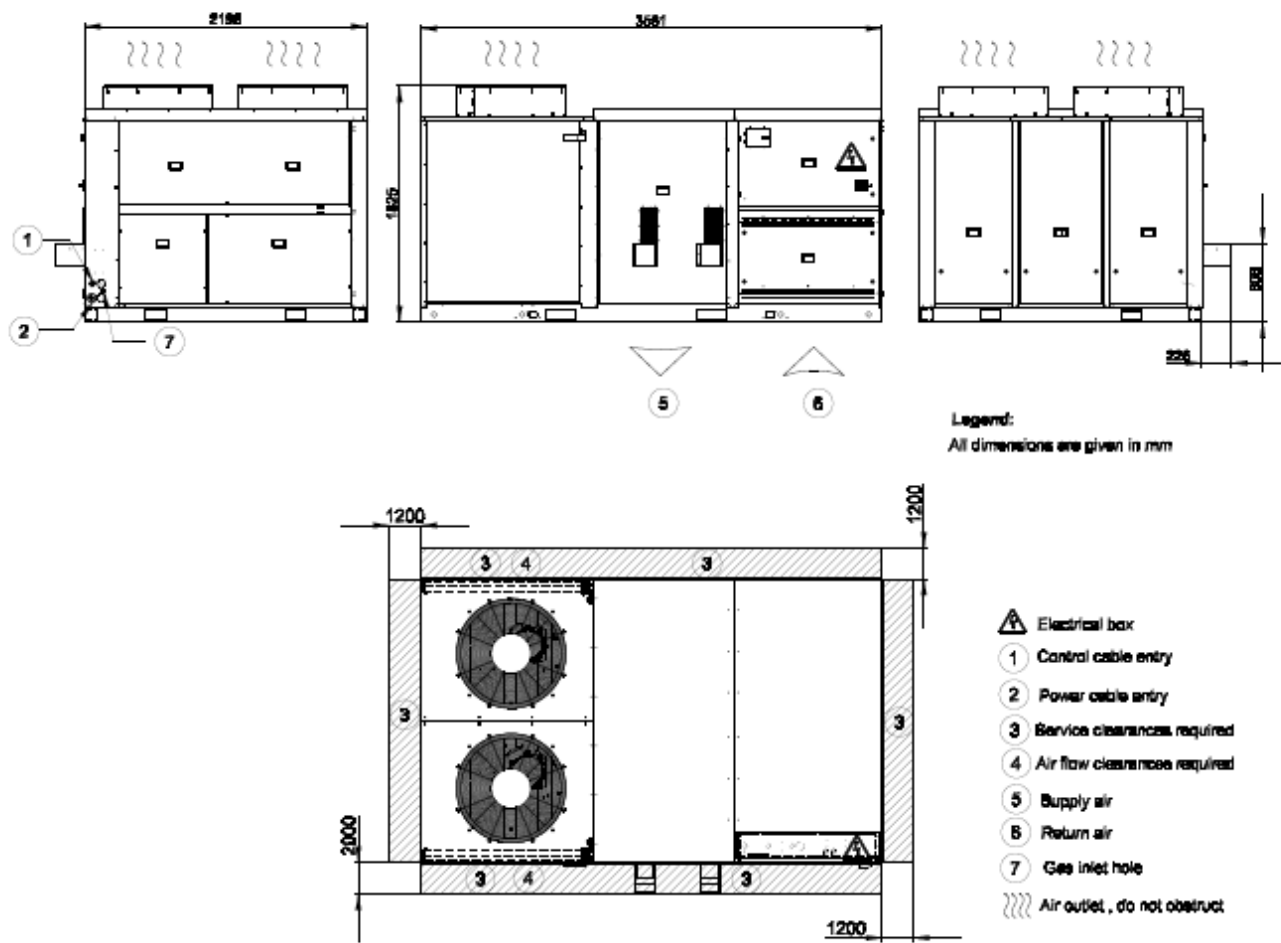
When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.8 – 48UH065-075



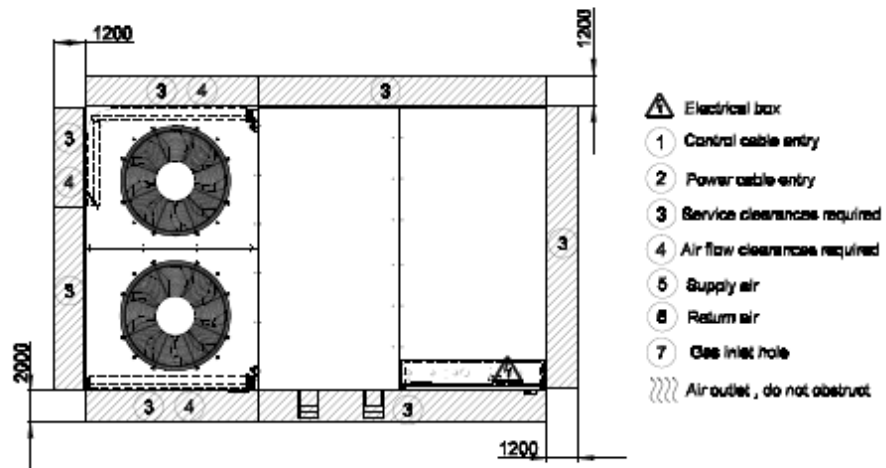
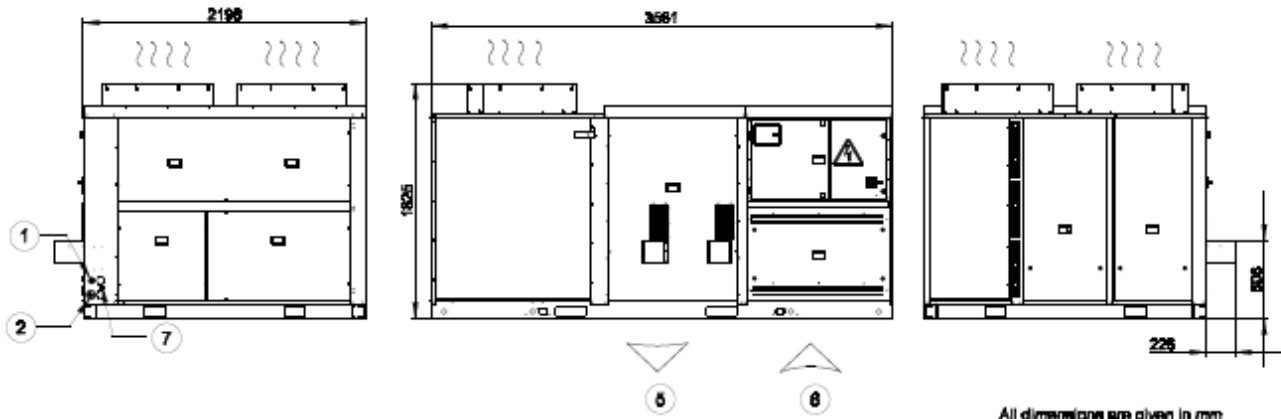
When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.9 – 48UH085



When designing an installation, always use up-to-date drawings, available from your local Carrier office.

4.10 – 48UH100



When designing an installation, always use up-to-date drawings, available from your local Carrier office.

- Please refer to the certified dimensional drawings for the units with options such as economizer, power exhaust, air return fan, etc..

5 – PHYSICAL DATA, 50/48UH UNITS

50/48UH		045	055	065	075	085	100
Operating Weight*	kg	755	900	970	980	1430	1520
Sound levels							
Sound power level 10-12 W**	dB(A)	86.5	84.4	90.6	90.6	90.7	91
Sound pressure level at 10 m***	dB(A)	55	53	59	59	59	59
Compressor type				Hermetic Scroll			
Circuit A		1	2	1	1	1	2
Circuit B				1	1	1	1
No. of capacity steps		1	2	2	2	2	3
Oil charge / type				POE 160SZ			
Circuit A	kg	3.6	6.6	3.3	3.3	3.3	6.6
Circuit B	kg			3.3	3.3	3.6	3.6
Refrigerant charge				R410A			
Circuit A	kg	14	14	9	8.7	12	14.7
Circuit B	kg			10	9.7	13	13
Control Type				PRO-DIALOG +			
Min. Capacity	%	100	50	50	50	46	28
Indoor Coil		Grooved copper tubes, aluminium fins					
Face Area	m²	1.69	1.69	1.69	1.69	2.56	2.56
Rows... Fin spacing		3 ... 1,81	3 ... 1,81	4 ... 1,81	4 ... 1,81	4 ... 1.7	4 ... 1.7
Outdoor Coil		Grooved copper tubes, aluminium fins					
Face Area	m²	2.06	2.06	2.78	2.78	3.46	4.28
Rows... Fin spacing		3 ... 1,7	3 ... 1,7	3 ... 1,7	3 ... 1,7	4 ... 1.7	4 ... 1.7
Indoor Fan		Centrifugal					
Quantity		1	1	1	1	1	1
Nominal airflow							
	l/s	2528	3444	3472	3944	5550	5550
	m³/h	9100	12400	12500	14200	20000	20000
Fan Speed	r/s	16.07	18.48	19.13	20.13	13.18	13.18
Nominal power input	kW	2.2	4	5.5	5.5	7.5	7.5
Nominal external static pressure	Pa	225	241	252	254	211	220
Outdoor Fan		Axial Flying Bird 4 fans with rotating shroud					
Quantity		1	2	2	2	2	2
Total Air Flow							
	l/s	5400	6700	10100	10100	10300	10600
	m³/h	19400	24100	36400	36400	37100	38200
Fan Speed (high speed)	r/s	16.25	12.00	16.25	16.17	16.17	16.17
Motor power input (each)	kW	1.72	0.84	1.83	2.03	1.87	1.76
Air Filter							
Quantity		6	6	6	6	9	9
Width x Height	mm	595x495	595x495	595x495	595x495	595x495	595x495
Thickness	mm	50	50	50	50	50	50

* Weight shown is a guideline only.

** In accordance with ISO 9614-1 and certified by Eurovent. The values have been rounded and are for information only

*** For information, calculated from the sound power level Lw(A)

HEATING MODULES		5 cells	6 cells	7 cells	5+5 cells	6+6 cells	7+7 cells
Natural Gas Heating		OP90	OP91	OP92	OP93	OP94	OP95
Net Heat Input (Min / Max)	kW	35.4 / 52.6	48.6 / 69.4	56.7 / 81.0	35.4 / 105.2	48.6 / 138.8	56.7 / 162.0
Heat Output (Min / Max)	kW	30.8 / 46.8	41.8 / 61.8	49.9 / 72.9	30.8 / 93.6	42.8 / 125.0	50.5 / 147.4
Natural Gas (G20) Rate1	m³/h	3.74 / 5.57	5.14 / 7.34	6.00 / 8.57	3.74 / 11.13	5.14 / 14.7	6.00 / 17.14
Natural Gas (G25) Rate	m³/h	4.36 / 6.47	5.98 / 8.54	6.98 / 9.97	4.36 / 12.95	5.98 / 17.08	6.97 / 19.94
Natural Gas (G25.1) Rate	m³/h	4.34 / 6.46	5.97 / 8.53	5.97 / 9.96	4.34 / 12.94	5.97 / 17.07	6.96 / 19.93
Injectors							
Quantity		5	6	7	10	12	14
Size	mm	3.26	3.45	3.45	3.26	3.45	3.45
Propane Gas Heating		OP100	OP101	OP102	OP103	OP104	OP105
Net Heat Input (Min / Max)	kW	- / 59.1	- / 71.0	- / 82.8	59.1 / 118.2	71.0 / 142.0	82.8 / 165.6
Heat Output (Min / Max)	KW	- / 53.2	- / 63.9	- / 74.5	52.6 / 105.2	63.9 / 127.8	75.3 / 150.7
Propane Gas (G31) Rate1							
	kg/h	- / 4.59	- / 5.51	- / 6.43	4.59 / 9.18	5.51 / 11.03	6.43 / 12.86
	m³/h	- / 2.42	- / 2.90	- / 3.39	2.42 / 4.83	2.90 / 5.81	3.39 / 6.77
Injectors							
Quantity		5	6	7	10	12	14
Size	mm	1.9	1.9	1.9	1.9	1.9	1.9
Weight	kg	65	73	80	135	150	165
Electrical Consumption							
(400V 3 PH 50 Hz)	kW	0.22	0.22	0.22	0.44	0.44	0.44
Gas connection		Rp 3/4 " F	Rp 3/4 " F	Rp 3/4 " F	Rp 3/4 " F	Rp 3/4 " F	Rp 3/4 " F

1 (Hi) Natural gas G20 net calorific value 34.02 MJ/m³ @ 15°C, 1013.25 mbar

(Hi) Natural gas G25 net calorific value 29.25 MJ/m³ @ 15°C, 1013.25 mbar

(Hi) Natural gas G25.1 net calorific value 29.3 MJ/m³ @ 15°C, 1013.25 mbar

(Hi) Propane gas G31 net calorific value 46.34 MJ/kg @ 15°C, 1013.25 mbar

(Hi) Propane gas G31 net calorific value 88.0 MJ/m³ @ 15°C, 1013.25 mbar

6 – ELECTRICAL DATA, 50/48UH UNITS

50-48UH†		045	055	065	075	085	100
Power circuit							
Nominal power supply	V-ph-Hz	400-3-50					
Voltage range	V	360-440					
Control circuit supply		24 V, via internal transformer					
Maximum start-up current*	A	206	173	183	204	246	261
Unit power factor at maximum capacity**		0,82	0,81	0,81	0,84	0,84	0,83
Maximum unit power input**	kW	21,68	27,41	33,52	40,50	44,58	52,98
Nominal unit current draw***	A	28,74	36,51	42,13	51,39	54,08	65,93
Maximum unit current draw****	A	38,20	49,10	60,10	69,80	77,00	92,20
Customer-side unit power reserve	kW	Customer reserve at the 24 V control power circuit					

* Maximum instantaneous start-up current at operating limit values (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).

** Power input, compressors and fans, at the their operating limits and nominal voltage of 400 V (data given on the unit nameplate).

*** Standardised Eurovent conditions: indoor air wet bulb 19°C, outside air temperature 35°C with standard fan performance

**** Maximum unit operating current at maximum unit power input and 400 V (values given on the unit nameplate).

† Standard unit (without any options and accessories)

Electrical data notes:

- 50/48UH units have a single power connection point located at the main switch.
- The control box includes the following standard features:
a main disconnect switch, starter and motor protection devices for each compressor, fans and the control devices
- Field connections:**
All connections to the system and the electrical installations must be in full accordance with all applicable local codes.
- The Carrier 50/48UH rooftop units are designed and built to ensure conformance with these codes. The recommendations of European standard EN 60204-1 (machine safety - electrical machine components - part 1: general regulations - corresponds to IEC 60204-1) are specifically taken into account, when designing the electrical equipment.

NOTES:

- Generally the recommendations of IEC 60364 are accepted as compliance with the requirements of the installation directives. Conformance with EN 60204 is the best means of ensuring compliance with the Machines Directive §1.5.1.
- Annex B of EN 60204-1 describes the electrical characteristics used for the operation of the machines.

- The operating environment is specified below:
 - Environment* - Environment as classified in EN 60721 (corresponds to IEC 60721):
 - outdoor installation (IP43)
 - ambient temperature range: -10°C to +48°C
 - altitude: < 2000 m
 - Competence of personnel, class BA4 (trained personnel - IEC 60364)
- Power supply frequency variation: ± 2 Hz.
- The neutral (N) conductor must not be connected directly to the unit (if necessary use a transformer).
- Overcurrent protection of the power supply conductors is not provided with the unit.
- The factory-installed disconnect switch(es)/circuit breaker(s) is (are) of a type suitable for power interruption in accordance with EN 60947.
- The units are designed for connection to TN networks (IEC 60364). For IT networks the earth connection must not be at the network earth. Provide a local earth, consult competent local organisations to complete the electrical installation.

Caution: If particular aspects of an actual installation do not conform to the conditions described above, or if there are other conditions which should be considered, always contact your local Carrier representative.

7- APPLICATION DATA

7.1 – Belt tension

On delivery, the drive belts are new and correctly tensioned.
After letting it run under full load for up to 24 hours, or at least a few hours.
After the belts have run-in, stop the belt drive and check the belt tension.
Running the belts under full load for an extended period of time will seat the V-belts into the sheave grooves.
V-belt tension will drop after the initial run-in and seating process. This is normal. Adjust the belt tension as necessary.
Since tension in V-belts will drop after the initial run-in and seating process, failure to check and retension the belt will result in low belt tension and belt slippage.
This slippage will result in premature belt failure.

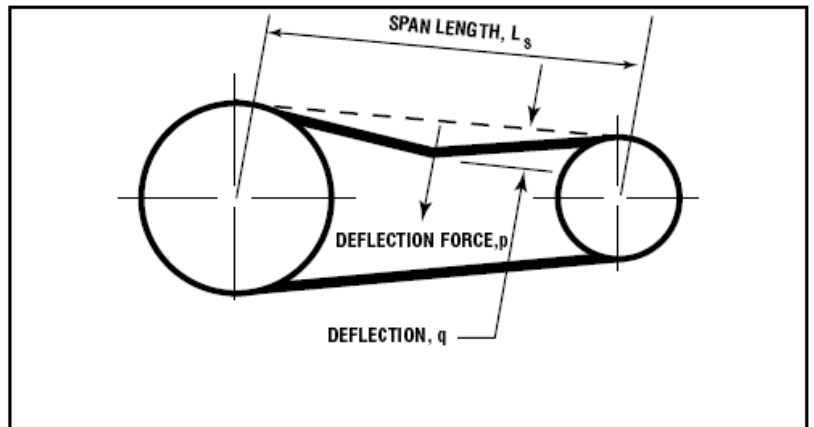
Before adjusting the tension, make sure that the pulleys are correctly aligned.

BELT TENSION ADJUSTMENT(see fig.8)

1. Measure the span length, (L_s)
2. Measure the deflection force(p) from the middle of the span in order to have a deflection(q) of 1 mm per 100 mm of span length from its normal position.
3. Measured deflection force shall be between 19 N and 28 N. If less than 19 N, tighten the belt. If more than 28 N, loosen the belt

See Section 7.15 for indoor fan airflow adjustment for further information.

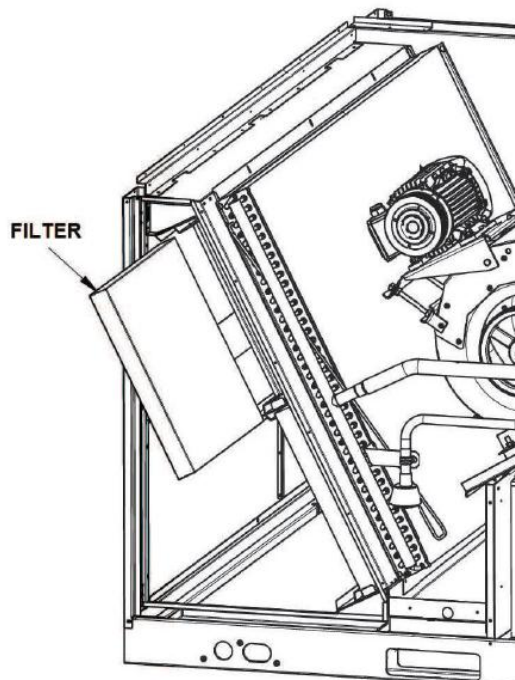
Fig. 6 – Belt tension



7.2 – Air Filter Replacement

Open the filter access panel, then remove and replace the filters easily by sliding rails. Check the filters' fire classification according to the local regulations. Standard filter is a G4 class cartoon filter.

Fig. 7 – Filter replacement



7.3 – Supply Fan performances, 50/48UH045

SUPPLY FAN PERFORMANCES												Undersize Drive											
50/48UH045												Standard Drive											
												Oversizes Drive											
Unit 50-48UH 045 Standard static																							
l/s	Unit External Static Pressure (Pa)																						
	50		75		100		125		150		175		200		225		250		275				
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW			
2000	-	-	-	-	674	0,758	726	0,851	776	0,948	824	1,050	871	1,155	916	1,262	960	1,372	1002	1,485			
2100	-	-	642	0,755	693	0,848	742	0,944	791	1,045	838	1,149	884	1,256	928	1,368	970	1,481	1012	1,597			
2200	-	-	663	0,849	712	0,944	760	1,044	806	1,148	852	1,255	896	1,366	939	1,480	981	1,596	1022	1,715			
2300	636	0,856	683	0,949	730	1,048	777	1,151	822	1,258	866	1,369	909	1,482	951	1,599	992	1,719	1032	1,841			
2400	660	0,963	706	1,062	751	1,164	796	1,269	839	1,379	882	1,493	924	1,610	965	1,730	1005	1,853	1044	1,978			
2500	684	1,081	728	1,182	772	1,287	815	1,396	857	1,510	898	1,627	939	1,746	979	1,870	1018	1,995	1056	2,124			
2600	710	1,210	752	1,315	794	1,424	835	1,536	876	1,652	916	1,773	956	1,896	995	2,021	1033	2,150	1070	2,283			
2700	733	1,344	774	1,451	814	1,564	854	1,680	894	1,799	933	1,922	971	2,047	1009	2,178	1046	2,309	1082	2,445			
2800	758	1,489	797	1,602	836	1,718	875	1,836	913	1,959	951	2,086	988	2,215	1025	2,348	1061	2,483	1096	2,620			
2900	782	1,646	820	1,761	858	1,880	895	2,002	932	2,129	969	2,258	1005	2,391	1041	2,526	1076	2,665	1111	2,806			
3000	808	1,816	844	1,935	881	2,057	917	2,184	953	2,313	989	2,446	1024	2,581	1059	2,720	1093	2,862	1127	3,005			
3100	833	1,996	868	2,119	904	2,245	939	2,374	974	2,507	1008	2,643	1042	2,782	1076	2,924	1110	3,069	1143	3,216			
Unit 50-48UH 045 High static-1																							
l/s	Unit External Static Pressure (Pa)																						
	175		200		225		250		275		300		325		350		375		400				
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW			
2000	824	1,042	871	1,147	916	1,253	960	1,363	1002	1,474	1043	1,589	1082	1,706	1120	1,826	1157	1,947	1192	2,069			
2100	838	1,141	884	1,247	928	1,358	970	1,471	1012	1,586	1052	1,703	1090	1,823	1128	1,945	1164	2,070	1200	2,197			
2200	852	1,246	896	1,357	939	1,469	981	1,585	1022	1,703	1061	1,824	1099	1,948	1136	2,072	1172	2,201	1207	2,330			
2300	866	1,359	909	1,472	951	1,588	992	1,707	1032	1,828	1070	1,951	1108	2,078	1145	2,207	1180	2,337	1215	2,470			
2400	882	1,483	924	1,599	965	1,718	1005	1,840	1044	1,964	1082	2,091	1119	2,221	1155	2,353	1190	2,487	1224	2,623			
2500	898	1,615	939	1,734	979	1,856	1018	1,981	1056	2,109	1093	2,240	1129	2,372	1165	2,507	1199	2,643	1233	2,783			
2600	916	1,760	956	1,883	995	2,007	1033	2,135	1070	2,267	1106	2,400	1142	2,535	1176	2,674	1210	2,814	1244	2,957			
2700	933	1,909	971	2,033	1009	2,163	1046	2,293	1082	2,427	1118	2,564	1153	2,703	1187	2,844	1220	2,988	1253	3,132			
2800	951	2,071	988	2,199	1025	2,331	1061	2,465	1096	2,602	1131	2,742	1165	2,883	1199	3,028	1232	3,174	1264	3,322			
2900	969	2,242	1005	2,374	1041	2,508	1076	2,646	1111	2,786	1145	2,928	1178	3,073	1211	3,220	1244	3,370	1275	3,522			
3000	989	2,429	1024	2,563	1059	2,700	1093	2,842	1127	2,984	1160	3,130	1193	3,278	1225	3,429	1257	3,581	1288	3,737			
3100	1008	2,624	1042	2,762	1076	2,903	1110	3,047	1143	3,193	1175	3,341	1207	3,493	1239	3,646	1270	3,802	1301	3,961			
Unit 50-48UH 045 High static-2																							
l/s	Unit External Static Pressure (Pa)																						
	275		300		325		350		375		400		425		450		475		500				
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW			
2000	987	1,515	1023	1,609	1058	1,704	1092	1,802	1126	1,901	1158	2,002	1191	2,103	1222	2,205	1253	2,310	1284	2,415			
2100	1001	1,653	1036	1,751	1070	1,849	1104	1,949	1136	2,050	1169	2,154	1200	2,259	1231	2,365	1262	2,472	1291	2,581			
2200	1016	1,802	1050	1,901	1083	2,003	1116	2,106	1148	2,211	1179	2,317	1210	2,424	1240	2,533	1270	2,644	1300	2,754			
2300	1032	1,961	1065	2,063	1097	2,168	1128	2,273	1160	2,381	1190	2,490	1221	2,600	1250	2,712	1280	2,825	1309	2,939			
2400	1049	2,134	1081	2,239	1112	2,346	1143	2,456	1173	2,565	1203	2,677	1233	2,791	1262	2,906	1291	3,021	1319	3,139			
2500	1067	2,320	1098	2,428	1128	2,537	1158	2,649	1188	2,762	1217	2,877	1246	2,993	1274	3,111	1303	3,230	1330	3,350			
2600	1086	2,520	1116	2,632	1146	2,745	1175	2,859	1204	2,976	1232	3,092	1260	3,212	1288	3,332	1316	3,453	1343	3,577			
2700	1105	2,729	1134	2,843	1162	2,959	1191	3,077	1219	3,196	1247	3,316	1274	3,437	1302	3,560	1328	3,685	1355	3,811			
2800	1125	2,955	1153	3,072	1181	3,191	1208	3,311	1236	3,433	1263	3,556	1290	3,680	1316	3,807	1343	3,934	1369	4,063			
2900	1145	3,195	1172	3,315	1199	3,436	1226	3,559	1253	3,684	1280	3,810	1306	3,938	1332	4,066	1357	4,197	1383	4,328			
3000	1167	3,452	1193	3,574	1220	3,699	1246	3,826	1272	3,953	1297	4,082	1323	4,213	1348	4,344	1373	4,477	1393	4,612			
3100	1188	3,724	1214	3,849	1240	3,977	1265	4,107	1291	4,237	1316	4,369	1341	4,502	1365	4,637	1390	4,773	1414	4,911			
Unit 50-48UH 045 High static-3																							
l/s	Unit External Static Pressure (Pa)																						
	375		405		435		465		495		525		555		585		615		645				
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW			
2000	1126	1,901	1165	2,021	1203	2,144	1241	2,268	1278	2,394	1313	2,522	1349	2,652	1383	2,783	1417	2,916	1449	3,050			
2100	1136	2,050	1175	2,175	1213	2,301	1249	2,429	1286	2,558	1321	2,690	1355	2,823	1389	2,958	1423	3,094	1455	3,232			
2200	1148	2,211	1185	2,338	1222	2,468	1259	2,599	1294	2,732	1329	2,867	1363	3,004	1396	3,142	1429	3,282	1461	3,424			
2300	1160	2,381	1196	2,512	1233	2,645	1268	2,780	1303	2,916	1337	3,055	1371	3,195	1404	3,337	1436	3,480	1468	3,626			
2400	1173	2,565	1209	2,701	1245	2,837	1279	2,974	1314	3,115	1347	3,257	1380	3,401	1413	3,546	1445	3,693	1476	3,842			
2500	1188	2,762	1223	2,900	1257	3,040	1291	3,182	1325	3,325	1358	3,471	1390	3,617	1422	3,767	1453	3,917	1484	4,070			
2600	1204	2,976	1238	3,117	1272	3,260	1305	3,404	1338	3,552	1370	3,700	1402	3,852	1433	4,004	1464	4,158	1494	4,314			
2700	1219	3,196	1252	3,340	1285	3,487	1318	3,635	1350	3,785	1381	3,938	1413	4,092	1443	4,248	1474	4,405	1504	4,565			
2800	1236	3,433	1268	3,581	1300	3,730	1332	3,883	1364	4,037	1394	4,193	1425	4,350	1455	4,510	1485	4,671	1514	4,834			
2900	1253	3,684	1285	3,835	1316	3,989	1347	4,144	1378	4,301	1408	4,461	1438	4,622	1468	4,785	1497	4,949	1526	5,115			
3000	1272	3,953	1303	4,108	1333	4,265	1363	4,424	1393	4,584	1423	4,748	1452	4,912	1481	5,078	1510	5,246	1538	5,455			
3100	1291	4,237	1321	4,396	1351	4,555	1380	4,718	1409	4,883	1438	5,049	1467	5,217	1496	5,386	1524	5,557	1552	5,731			

7.5 – Supply Fan performances, 50/48UH055

SUPPLY FAN PERFORMANCES																
Undersize Drive																
50/48UH055																
Standard Drive																
Oversizes Drive																
Unit 50/48UH 055 Standard static:																
l/s	Unit External Static Pressure (Pa)															
	50		80		110		140		170		200		230		260	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
2700	733	1,310	782	1,437	830	1,569	878	1,707	925	1,849	971	1,996	1016	2,147	1060	2,303
2850	770	1,527	816	1,660	862	1,799	908	1,942	953	2,090	997	2,243	1040	2,400	1083	2,561
3000	808	1,770	852	1,910	895	2,054	939	2,203	982	2,357	1024	2,515	1065	2,678	1106	2,845
3150	844	2,034	886	2,181	928	2,331	970	2,486	1010	2,646	1051	2,810	1091	2,978	1130	3,149
3300	882	2,327	922	2,479	962	2,637	1001	2,797	1041	2,963	1080	3,132	1118	3,305	1156	3,484
3450	919	2,644	957	2,802	995	2,965	1033	3,132	1071	3,303	1108	3,479	1145	3,657	1182	3,840
3600	956	2,991	993	3,155	1029	3,324	1066	3,497	1102	3,675	1138	3,855	1174	4,039	1209	4,228
3750	993	3,362	1028	3,534	1063	3,708	1098	3,888	1133	4,071	1168	4,257	1202	4,448	1236	4,642
3900	1029	3,762	1063	3,939	1096	4,121	1130	4,306	1164	4,495	1197	4,687	1230	4,883	1263	5,082
4050	1065	4,195	1098	4,379	1131	4,566	1163	4,757	1196	4,951	1228	5,150	1260	5,351	1292	5,556
4200	1101	4,658	1133	4,847	1164	5,040	1196	5,237	1227	5,438	1258	5,642	1289	5,850	1320	6,059
4350	1138	5,155	1169	5,351	1199	5,551	1229	5,754	1260	5,960	1290	6,170	1320	6,383	1350	6,600
Unit 50/48UH 055 High static-1																
l/s	Unit External Static Pressure (Pa)															
	100		150		200		250		300		350		400		450	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
2700	660	1,327	729	1,552	795	1,787	857	2,032	917	2,284	973	2,542	1027	2,807	1079	3,077
2850	686	1,522	752	1,756	815	2,000	876	2,256	933	2,517	988	2,786	1041	3,061	1092	3,341
3000	713	1,737	776	1,982	836	2,237	895	2,500	951	2,773	1005	3,051	1056	3,337	1106	3,627
3150	739	1,971	799	2,225	858	2,490	914	2,764	969	3,045	1021	3,334	1072	3,629	1120	3,930
3300	766	2,229	824	2,492	880	2,767	935	3,050	988	3,343	1039	3,641	1088	3,946	1136	4,256
3450	793	2,506	848	2,780	902	3,063	955	3,357	1006	3,658	1056	3,966	1104	4,282	1151	4,602
3600	820	2,809	873	3,092	926	3,386	977	3,689	1026	4,000	1075	4,318	1122	4,643	1168	4,974
3750	847	3,134	898	3,426	949	3,730	998	4,043	1047	4,363	1094	4,691	1139	5,025	1184	5,366
3900	874	3,480	923	3,899	972	4,095	1020	4,418	1067	4,748	1112	5,085	1157	5,429	1201	5,779
4050	901	3,855	949	4,167	996	4,490	1042	4,821	1088	5,161	1132	5,508	1176	5,861	1219	6,221
4200	928	4,255	974	4,576	1020	4,908	1065	5,250	1109	5,598	1152	5,955	1195	6,318	1236	6,687
4350	955	4,685	1000	5,016	1044	5,358	1088	5,708	1131	6,066	1173	6,432	1214	6,805	1255	7,185
Unit 50/48UH 055 High static-2																
l/s	Unit External Static Pressure (Pa)															
	330		360		390		420		450		480		510		540	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
2700	951	2,437	984	2,595	1017	2,753	1048	2,914	1079	3,077	1108	3,241	1137	3,408	1166	3,577
2850	967	2,677	939	2,840	1031	3,005	1062	3,172	1092	3,341	1121	3,511	1150	3,684	1178	3,859
3000	983	2,939	1015	3,107	1046	3,278	1076	3,452	1106	3,627	1135	3,804	1163	3,982	1191	4,163
3150	1000	3,218	1031	3,393	1062	3,570	1091	3,748	1120	3,930	1149	4,113	1176	4,297	1204	4,484
3300	1018	3,521	1049	3,701	1078	3,884	1107	4,070	1136	4,256	1163	4,446	1191	4,636	1217	4,829
3450	1036	3,842	1066	4,029	1095	4,217	1123	4,409	1151	4,602	1178	4,797	1205	4,993	1231	5,193
3600	1056	4,190	1084	4,383	1113	4,577	1140	4,774	1168	4,974	1194	5,174	1221	5,378	1246	5,582
3750	1075	4,559	1103	4,757	1130	4,957	1157	5,161	1184	5,366	1210	5,572	1236	5,781	1262	5,992
3900	1094	4,949	1121	5,153	1148	5,359	1175	5,568	1201	5,779	1227	5,992	1252	6,206	1277	6,423
4050	1115	5,369	1141	5,578	1167	5,790	1193	6,005	1219	6,221	1244	6,440	1268	6,661	1293	6,883
4200	1135	5,811	1161	6,027	1186	6,245	1211	6,465	1236	6,687	1261	6,912	1285	7,138	1309	7,367
4350	1156	6,285	1181	6,507	1206	6,731	1231	6,957	1255	7,185	1279	7,414	1303	7,647	1326	7,882
Unit 50/48UH 055 High static-3																
l/s	Unit External Static Pressure (Pa)															
	400		440		480		520		560		600		640		680	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
2700	1027	2,730	1068	2,940	1108	3,153	1144	3,353	1184	3,589	1220	3,811	1256	4,036	1290	4,265
2850	1041	2,977	1082	3,195	1121	3,416	1159	3,640	1196	3,867	1232	4,097	1267	4,331	1301	4,566
3000	1056	3,245	1096	3,471	1135	3,700	1172	3,932	1209	4,167	1244	4,405	1279	4,646	1312	4,890
3150	1072	3,530	1111	3,764	1149	4,001	1185	4,241	1221	4,484	1256	4,730	1290	4,978	1324	5,230
3300	1088	3,839	1126	4,079	1163	4,324	1200	4,572	1235	4,824	1269	5,077	1303	5,334	1336	5,594
3450	1104	4,165	1142	4,413	1178	4,666	1214	4,922	1249	5,181	1283	5,443	1316	5,707	1348	5,974
3600	1122	4,517	1158	4,774	1194	5,033	1229	5,298	1263	5,564	1297	5,834	1330	6,106	1362	6,381
3750	1139	4,888	1175	5,154	1210	5,421	1245	5,692	1278	5,967	1311	6,244	1343	6,524	1375	6,808
3900	1157	5,282	1192	5,554	1227	5,829	1260	6,108	1293	6,391	1326	6,675	1357	6,963	1388	7,254
4050	1176	5,702	1210	5,982	1244	6,266	1277	6,553	1309	6,842	1341	7,135	1372	7,430	1403	7,729
4200	1195	6,147	1228	6,434	1261	6,724	1293	7,019	1325	7,316	1356	7,616	1387	7,920	1417	8,226
4350	1214	6,621	1247	6,915	1279	7,214	1311	7,515	1342	7,820	1373	8,128	1403	8,439	1432	8,753

7.6 – Fan rpm at motor pulley settings, 50/48UH055*

Drive	MOTOR PULLEY TURNS OPEN										
	0	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5
Standard	1.165	1.151	1.137	1.123	1.109	1.095	1.081	1.067	1.053	1.039	1.024
HS1	1.166	1.154	1.141	1.129	1.116	1.103	1.090	1.078	1.065	1.053	1.040
HS2	1.238	1.223	1.208	1.193	1.178	1.163	1.148	1.133	1.118	1.103	1.088
HS3	1.377	1.362	1.347	1.332	1.317	1.302	1.287	1.273	1.258	1.243	1.228

*Approximate fan rpm shown.

Note: Factory setting values given as bold

7.7 – Supply Fan performances, 50/48UH065

SUPPLY FAN PERFORMANCES 50/48UH065

Undersize Drive

Standard Drive

Oversizes Drive

Unit 50/48UH 065 Standard static																		
l/s	Unit External Static Pressure (Pa)																	
	50		85		120		155		190		225		260		295		330	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
2700	689	1,200	746	1,342	803	1,494	859	1,651	914	1,815	968	1,986	1021	2,164	1072	2,345	1122	2,533
2850	709	1,362	787	1,575	841	1,734	894	1,899	947	2,070	998	2,249	1049	2,431	1098	2,621	1146	2,815
3000	775	1,671	827	1,830	878	1,996	929	2,168	979	2,346	1028	2,532	1076	2,723	1124	2,918	1170	3,119
3150	819	1,949	868	2,117	917	2,290	965	2,471	1013	2,656	1060	2,849	1107	3,047	1153	3,248	1197	3,457
3300	862	2,253	909	2,428	955	2,610	1001	2,797	1047	2,991	1092	3,190	1137	3,394	1181	3,604	1224	3,818
3450	903	2,582	948	2,765	993	2,953	1037	3,149	1081	3,350	1024	3,556	1167	3,767	1210	3,983	1251	4,204
3600	944	2,936	987	3,127	1029	3,324	1072	3,527	1114	3,734	1156	3,947	1197	4,165	1238	4,388	1278	4,616
3750	984	3,324	1026	3,522	1067	3,727	1107	3,937	1148	4,151	1188	4,371	1228	4,596	1268	4,826	1307	5,061
3900	1024	3,739	1064	3,945	1103	4,157	1143	4,375	1182	4,596	1220	4,823	1259	5,055	1297	5,292	1335	5,533
4050	1062	4,177	1100	4,391	1138	4,610	1176	4,835	1214	5,063	1251	5,297	1289	5,536	1325	5,779	1362	6,027
4200	1100	4,651	1137	4,872	1174	5,099	1210	5,330	1247	5,567	1283	5,808	1319	6,052	1355	6,303	1390	6,557
4350	1138	5,155	1174	5,385	1209	5,619	1244	5,857	1280	6,100	1315	6,348	1322	6,397	1384	6,856	1419	7,117

Unit 50/48UH 065 High static-1																		
l/s	Unit External Static Pressure (Pa)																	
	180		220		260		300		340		380		420		460		500	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
2700	733	1,566	786	1,753	837	1,947	885	2,146	932	2,350	977	2,557	1020	2,769	1061	2,985	1101	3,203
2850	760	1,785	810	1,981	859	2,183	906	2,391	951	2,603	995	2,818	1037	3,038	1078	3,262	1117	3,489
3000	785	2,021	834	2,226	881	2,436	927	2,652	971	2,872	1013	3,097	1054	3,325	1094	3,557	1133	3,792
3150	813	2,288	860	2,500	905	2,719	949	2,943	992	3,171	1033	3,404	1074	3,641	1113	3,881	1150	4,124
3300	841	2,574	886	2,795	929	3,022	972	3,254	1013	3,490	1054	3,732	1093	3,976	1131	4,224	1168	4,477
3450	868	2,881	911	3,110	953	3,345	994	3,585	1034	3,830	1074	4,079	1112	4,332	1149	4,589	1186	4,849
3600	894	3,209	936	3,446	977	3,689	1017	3,937	1056	4,190	1094	4,447	1131	4,708	1168	4,974	1203	5,242
3750	922	3,565	962	3,811	1001	4,061	1040	4,318	1078	4,579	1115	4,844	1151	5,113	1187	5,386	1222	5,663
3900	949	3,944	987	4,198	1025	4,456	1063	4,721	1100	4,990	1136	5,263	1171	5,540	1206	5,822	1240	6,106
4050	974	4,341	1012	4,602	1049	4,869	1085	5,140	1121	5,417	1156	5,698	1191	5,984	1224	6,273	1258	6,565
4200	1000	4,767	1037	5,037	1073	5,311	1108	5,591	1143	5,875	1177	6,164	1211	6,458	1244	6,755	1276	7,056
4350	1027	5,219	1062	5,497	1096	5,779	1131	6,066	1165	6,359	1198	6,656	1231	6,957	1263	7,261	1295	7,569

Unit 50/48UH 065 High static-2																		
l/s	Unit External Static Pressure (Pa)																	
	260		300		340		380		420		460		500		540		580	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
2700	837	1,947	885	2,146	932	2,350	977	2,557	1020	2,769	1061	2,985	1101	3,203	1140	3,425	1178	3,650
2850	859	2,183	906	2,391	951	2,603	995	2,818	1037	3,038	1078	3,262	1117	3,489	1155	3,719	1192	3,952
3000	881	2,436	927	2,652	971	2,872	1013	3,097	1054	3,325	1094	3,557	1133	3,792	1170	4,030	1207	4,272
3150	905	2,719	949	2,943	992	3,171	1033	3,404	1074	3,641	1113	3,881	1150	4,124	1187	4,371	1223	4,622
3300	929	3,022	972	3,254	1013	3,490	1054	3,732	1093	3,976	1131	4,224	1168	4,477	1204	4,732	1239	4,991
3450	953	3,345	994	3,585	1034	3,830	1074	4,079	1112	4,332	1149	4,589	1186	4,849	1221	5,112	1256	5,379
3600	977	3,689	1017	3,937	1056	4,190	1094	4,447	1131	4,708	1168	4,974	1203	5,242	1238	5,514	1272	5,789
3750	1001	4,061	1040	4,318	1078	4,579	1115	4,844	1151	5,113	1187	5,386	1222	5,663	1256	5,943	1289	6,226
3900	1025	4,456	1063	4,721	1100	4,990	1136	5,263	1171	5,540	1206	5,822	1240	6,106	1273	6,394	1306	6,685
4050	1049	4,869	1085	5,140	1121	5,417	1156	5,698	1191	5,984	1224	6,273	1258	6,565	1290	6,861	1323	7,160
4200	1073	5,311	1108	5,591	1143	5,875	1177	6,164	1211	6,458	1244	6,755	1276	7,056	1308	7,358	1340	7,666
4350	1096	5,779	1131	6,066	1165	6,359	1198	6,656	1231	6,957	1263	7,261	1295	7,569	1326	7,882	1357	8,196

Unit 50/48UH 065 High static-3																		
l/s	Unit External Static Pressure (Pa)																	
	420		460		500		540		580		620		660		700		740	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
2700	1020	2,694	1061	2,903	1101	3,115	1140	3,332	1178	3,551	1214	3,772	1250	3,996	1284	4,224	1317	4,454
2850	1037	2,955	1078	3,173	1117	3,393	1155	3,618	1192	3,844	1228	4,074	1263	4,307	1297	4,543	1330	4,781
3000	1054	3,234	1094	3,460	1133	3,688	1170	3,920	1207	4,155	1242	4,393	1277	4,634	1310	4,878	1343	5,124
3150	1074	3,542	1113	3,775	1150	4,012	1187	4,252	1223	4,496	1258	4,742	1292	4,990	1325	5,242	1358	5,497
3300	1093	3,868	1131	4,110	1168	4,356	1204	4,604	1239	4,854	1274	5,109	1307	5,366	1340	5,626	1372	5,888
3450	1112	4,214	1149	4,464	1186	4,717	1221	4,973	1256	5,233	1289	5,495	1322	5,760	1355	6,029	1386	6,299
3600	1131	4,580	1168	4,839	1203	5,099	1238	5,363	1272	5,631	1305	5,902	1338	6,175	1370	6,451	1401	6,729
3750	1151	4,975	1187	5,240	1222	5,509	1256	5,782	1289	6,057	1322	6,335	1354	6,616	1385	6,901	1416	7,186
3900	1171	5,389	1206	5,664	1240	5,940	1273	6,220	1306	6,504	1338	6,791	1370	7,080	1401	7,371	1431	7,666
4050	1191	5,821	1224	6,103	1258	6,387	1290	6,675	1323	6,966	1354	7,260	1385	7,557	1416	7,856	1445	8,159
4200	1211	6,283	1244	6,571	1276	6,863	1308	7,159	1340	7,458	1371	7,760	1401	8,065	1431	8,372	1461	8,683
4350	1231	6,767	1263	7,064	1295	7,364	1326	7,667	1357	7,974	1388	8,284	1418	8,595	1447	8,912	1476	9,229

7.8 – Fan rpm at motor pulley settings, 50/48UH065*

Drive	MOTOR PULLEY TURNS OPEN										
	0	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5
Standard	1.238	1.223	1.208	1.193	1.178	1.163	1.148	1.133	1.118	1.103	1.088
HS1	1.166	1.154	1.141	1.129	1.116	1.103	1.090	1.078	1.065	1.053	1.040
HS2	1.238	1.223	1.208	1.193	1.178	1.163	1.148	1.133	1.118	1.103	1.088
HS3	1.377	1.362	1.347	1.332	1.317	1.302	1.287	1.273	1.258	1.243	1.228

7.9 – Supply Fan performances, 50/48UH075

SUPPLY FAN PERFORMANCES 50/48UH075

Undersize Drive

Standard Drive

Oversizes Drive

Unit 50/48UH 075 Standard static																				
l/s	Unit External Static Pressure (Pa)																			
	50		85		120		155		190		225		260		295		330		365	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
3150	819	1,949	868	2,117	917	2,290	965	2,471	1013	2,656	1060	2,849	1107	3,047	1153	3,248	1197	3,457	1241	3,669
3300	862	2,253	909	2,428	955	2,610	1001	2,797	1047	2,991	1092	3,190	1137	3,394	1181	3,604	1224	3,818	1267	4,037
3450	903	2,582	948	2,765	993	2,953	1037	3,149	1081	3,350	1124	3,556	1167	3,767	1210	3,983	1251	4,204	1293	4,430
3600	944	2,936	987	3,127	1029	3,324	1072	3,527	1114	3,734	1156	3,947	1197	4,165	1238	4,388	1278	4,616	1318	4,848
3750	984	3,324	1026	3,522	1067	3,727	1107	3,937	1148	4,151	1188	4,371	1228	4,596	1268	4,826	1307	5,061	1345	5,299
3900	1024	3,739	1064	3,945	1103	4,157	1143	4,375	1182	4,596	1220	4,823	1259	5,055	1297	5,292	1335	5,533	1372	5,779
4050	1062	4,177	1100	4,391	1138	4,610	1176	4,835	1214	5,063	1251	5,297	1289	5,536	1325	5,779	1362	6,027	1398	6,278
4200	1100	4,651	1137	4,872	1174	5,099	1210	5,330	1247	5,567	1283	5,808	1319	6,052	1355	6,303	1390	6,557	1425	6,816
4350	1138	5,155	1174	5,385	1209	5,619	1244	5,857	1280	6,100	1315	6,348	1350	6,600	1384	6,856	1419	7,117	1453	7,382
4500	1174	5,684	1209	5,921	1243	6,162	1277	6,408	1311	6,657	1345	6,912	1379	7,171	1412	7,434	1446	7,701	1479	7,972
4650	1210	6,246	1243	6,489	1276	6,738	1310	6,990	1343	7,247	1375	7,508	1408	7,773	1441	8,042	1473	8,316	1505	8,593
4800	1244	6,832	1277	7,084	1309	7,338	1341	7,597	1373	7,861	1405	8,129	1437	8,400	1468	8,676	1500	8,956	1531	9,240

Unit 50/48UH 075 High static-1																				
l/s	Unit External Static Pressure (Pa)																			
	180		220		260		300		340		380		420		460		500		540	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
3150	813	2,288	860	2,500	905	2,719	949	2,943	992	3,171	1033	3,404	1074	3,641	1113	3,881	1150	4,124	1187	4,371
3300	841	2,574	886	2,795	929	3,022	972	3,254	1013	3,490	1054	3,732	1093	3,976	1131	4,224	1168	4,477	1204	4,732
3450	868	2,881	911	3,110	953	3,345	994	3,585	1034	3,830	1074	4,079	1112	4,332	1149	4,589	1186	4,849	1221	5,112
3600	894	3,209	936	3,446	977	3,689	1017	3,937	1056	4,190	1094	4,447	1131	4,708	1168	4,974	1203	5,242	1238	5,514
3750	922	3,565	962	3,811	1001	4,061	1040	4,318	1078	4,579	1115	4,844	1151	5,113	1187	5,386	1222	5,663	1256	5,943
3900	949	3,944	987	4,198	1025	4,456	1063	4,721	1100	4,990	1136	5,263	1171	5,540	1206	5,822	1240	6,106	1273	6,394
4050	974	4,341	1012	4,602	1049	4,869	1085	5,140	1121	5,417	1156	5,698	1191	5,984	1224	6,273	1258	6,565	1290	6,861
4200	1000	4,767	1037	5,037	1073	5,311	1108	5,591	1143	5,875	1177	6,164	1211	6,458	1244	6,755	1276	7,056	1308	7,358
4350	1027	5,219	1062	5,497	1096	5,779	1131	6,066	1165	6,359	1198	6,656	1231	6,957	1263	7,261	1295	7,569	1326	7,882
4500	1051	5,690	1086	5,974	1119	6,264	1153	6,560	1186	6,860	1218	7,164	1250	7,473	1282	7,785	1313	8,101	1344	8,420
4650	1076	6,188	1109	6,479	1142	6,777	1174	7,079	1207	7,386	1238	7,698	1270	8,014	1301	8,334	1331	8,658	1361	8,985
4800	1100	6,703	1132	7,002	1164	7,307	1196	7,617	1227	7,932	1258	8,251	1288	8,574	1319	8,901	1349	9,232	1378	9,566

Unit 50/48UH 075 High static-2																				
l/s	Unit External Static Pressure (Pa)																			
	260		300		340		380		420		460		500		540		580		620	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
3150	905	2,645	949	2,863	992	3,085	1033	3,311	1074	3,542	1113	3,775	1150	4,012	1187	4,252	1223	4,496	1258	4,742
3300	929	2,940	972	3,165	1013	3,395	1054	3,630	1093	3,868	1131	4,110	1168	4,356	1204	4,604	1239	4,854	1274	5,109
3450	953	3,254	994	3,487	1034	3,725	1074	3,968	1112	4,214	1149	4,464	1186	4,717	1221	4,973	1256	5,233	1289	5,495
3600	977	3,588	1017	3,830	1056	4,076	1094	4,326	1131	4,580	1168	4,839	1203	5,099	1238	5,363	1272	5,631	1305	5,902
3750	1001	3,951	1040	4,200	1078	4,454	1115	4,713	1151	4,975	1187	5,240	1222	5,509	1256	5,782	1289	6,057	1322	6,335
3900	1025	4,335	1063	4,593	1100	4,854	1136	5,120	1171	5,389	1206	5,664	1240	5,940	1273	6,220	1306	6,504	1338	6,791
4050	1049	4,736	1085	5,001	1121	5,270	1156	5,544	1191	5,821	1224	6,103	1258	6,387	1290	6,675	1323	6,966	1354	7,260
4200	1073	5,167	1108	5,439	1143	5,716	1177	5,997	1211	6,283	1244	6,571	1276	6,863	1308	7,159	1340	7,458	1371	7,760
4350	1096	5,622	1131	5,902	1165	6,186	1198	6,474	1231	6,767	1263	7,064	1295	7,364	1326	7,667	1357	7,974	1388	8,284
4500	1119	6,095	1153	6,381	1186	6,674	1218	6,970	1250	7,269	1282	7,573	1313	7,881	1344	8,192	1374	8,506	1404	8,823
4650	1142	6,592	1174	6,887	1207	7,186	1238	7,489	1270	7,796	1301	8,108	1331	8,423	1361	8,741	1391	9,063	1420	9,387
4800	1164	7,109	1196	7,411	1227	7,716	1258	8,026	1288	8,342	1319	8,660	1349	8,982	1378	9,307	1407	9,636	1436	9,968

Unit 50/48UH 075 High static-3																				
l/s	Unit External Static Pressure (Pa)																			
	420		460		500		540		580		620		660		700		740		780	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
3150	1074	3,542	1113	3,775	1150	4,012	1187	4,252	1223	4,496	1258	4,742	1292	4,990	1325	5,242	1358	5,497	1389	5,753
3300	1093	3,868	1131	4,110	1168	4,356	1204	4,604	1239	4,854	1274	5,109	1307	5,366	1340	5,626	1372	5,888	1403	6,154
3450	1112	4,214	1149	4,464	1186	4,717	1221	4,973	1256	5,233	1289	5,495	1322	5,760	1355	6,029	1386	6,299	1417	6,572
3600	1131	4,580	1168	4,839	1203	5,099	1238	5,363	1272	5,631	1305	5,902	1338	6,175	1370	6,451	1401	6,729	1431	7,009
3750	1151	4,975	1187	5,240	1222	5,509	1256	5,782	1289	6,057	1322	6,335	1354	6,616	1385	6,901	1416	7,254	1446	7,475
3900	1171	5,389	1206	5,664	1240	5,940	1273	6,220	1306	6,504	1338	6,791	1370	7,080	1401	7,371	1431	7,666	1461	7,963
4050	1191	5,821	1224	6,103	1258	6,387	1290	6,675	1323	6,966	1354	7,260	1385	7,557	1416	7,856	1445	8,159	1475	8,464
4200	1211	6,283	1244	6,571	1276	6,863	1308	7,159	1340	7,458	1371	7,760	1401	8,065	1431	8,372	1461	8,683	1490	8,996
4350	1231	6,767	1263	7,064	1295	7,364	1326	7,667	1357	7,974	1388	8,284	1418	8,595	1447	8,912	1476	9,229	1505	9,550
4500	1250	7,269	1282	7,573	1313	7,881	1344	8,192	1374	8,506	1404	8,823	1433	9,143	1462	9,466	1491	9,792	1519	10,120
4650	1270	7,796	1301	8,108	1331	8,423	1361	8,741	1391	9,063	1420	9,387	1449	9,714	1478	10,045	1506	10,379	1533	10,714
4800	1288	8,342	1319	8,660	1349	8,982	1378	9,307	1407	9,636	1436	9,968	1464	10,303	1492	10,641	1520	10,982	1547	11,325

7.11 – Supply Fan performances, 50/48UH085-100

SUPPLY FAN PERFORMANCE

Undersize Drive

Standard Drive

Oversizes Drive

Unit 50/48UH 085-100 Standard static

l/s	Unit External Static Pressure (Pa)																			
	50		85		120		155		190		225		260		295		330		365	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
4250	497	1,832	535	2,044	573	2,262	609	2,487	644	2,717	679	2,954	712	3,196	745	3,442	776	3,692	807	3,947
4500	526	2,169	562	2,391	597	2,621	631	2,858	665	3,099	698	3,347	730	3,599	762	3,857	792	4,117	822	4,384
4750	555	2,546	589	2,781	622	3,022	655	3,270	687	3,522	719	3,781	750	4,045	780	4,312	809	4,585	838	4,861
5000	584	2,967	616	3,214	648	3,467	679	3,725	710	3,991	740	4,259	770	4,534	799	4,814	828	5,096	856	5,384
5250	613	3,434	644	3,694	674	3,958	704	4,229	734	4,504	763	4,785	791	5,071	819	5,360	847	5,655	874	5,953
5500	642	3,951	672	4,222	701	4,498	730	4,780	758	5,068	786	5,359	813	5,656	840	5,957	867	6,262	893	6,572
5750	673	4,526	701	4,809	729	5,097	757	5,392	784	5,690	811	5,994	837	6,302	863	6,615	889	6,931	914	7,251
6000	703	5,147	730	5,443	757	5,743	783	6,048	809	6,359	835	6,674	861	6,994	886	7,318	911	7,645	935	7,977
6250	733	5,834	759	6,141	785	6,454	811	6,771	836	7,093	861	7,421	885	7,752	910	8,086	934	8,425	957	8,769
6500	764	6,580	789	6,900	814	7,225	839	7,554	863	7,888	887	8,226	911	8,569	934	8,916	957	9,267	980	9,620
6750	795	7,388	819	7,720	843	8,057	867	8,398	890	8,744	913	9,094	936	9,449	959	9,807	982	10,169	1004	10,535
7000	826	8,260	849	8,605	872	8,954	895	9,307	918	9,666	940	10,027	962	10,393	984	10,763	1006	11,137	1028	11,515

Unit 50/48UH 085-100 High static-1

l/s	Unit External Static Pressure (Pa)																			
	140		175		210		245		280		315		350		385		420		455	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
4250	593	2,390	629	2,619	664	2,852	698	3,092	731	3,336	763	3,585	794	3,837	825	4,095	854	4,357	883	4,622
4500	617	2,756	651	2,995	684	3,240	717	3,491	748	3,746	779	4,005	809	4,269	839	4,537	868	4,809	896	5,085
4750	641	3,163	673	3,413	705	3,670	736	3,932	767	4,197	797	4,468	826	4,742	855	5,021	883	5,303	910	5,590
5000	666	3,614	697	3,876	727	4,144	757	4,416	787	4,693	816	4,975	844	5,260	871	5,549	899	5,843	925	6,140
5250	691	4,112	721	4,385	750	4,664	779	4,947	807	5,235	835	5,528	862	5,825	889	6,125	916	6,429	941	6,737
5500	717	4,658	746	4,944	774	5,233	802	5,528	829	5,827	856	6,131	882	6,438	908	6,750	934	7,065	959	7,385
5750	745	5,265	772	5,562	799	5,863	826	6,169	852	6,480	878	6,795	903	7,114	928	7,437	953	7,762	978	8,092
6000	772	5,917	798	6,225	824	6,539	850	6,856	875	7,178	900	7,504	925	7,834	949	8,168	973	8,506	997	8,846
6250	800	6,634	825	6,955	850	7,280	875	7,609	899	7,943	923	8,280	947	8,622	971	8,966	994	9,315	1017	9,667
6500	828	7,412	852	7,744	877	8,081	900	8,422	924	8,767	947	9,116	970	9,468	993	9,824	1016	10,185	1038	10,548
6750	857	8,252	880	8,595	903	8,944	926	9,296	949	9,653	972	10,014	994	10,378	1016	10,746	1038	11,117	1060	11,492
7000	885	9,156	908	9,512	931	9,872	953	10,236	975	10,604	997	10,976	1019	11,353	1040	11,731	1061	12,114	1082	12,500

Unit 50/48UH 085-100 High static-2

l/s	Unit External Static Pressure (Pa)																			
	220		255		290		325		360		395		430		465		500		535	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
4250	642	2,796	674	3,027	705	3,262	735	3,502	765	3,744	793	3,991	822	4,243	849	4,497	876	4,756	902	5,017
4500	660	3,171	691	3,411	721	3,656	750	3,905	779	4,159	807	4,418	834	4,679	861	4,942	887	5,212	913	5,483
4750	680	3,584	710	3,835	739	4,092	767	4,350	795	4,616	822	4,884	848	5,154	874	5,429	900	5,709	925	5,988
5000	701	4,040	729	4,301	757	4,569	784	4,840	811	5,112	837	5,392	863	5,674	888	5,958	913	6,247	937	6,538
5250	723	4,541	750	4,814	777	5,091	803	5,371	829	5,655	854	5,944	879	6,238	904	6,531	928	6,832	951	7,132
5500	745	5,089	771	5,371	797	5,660	822	5,951	847	6,247	872	6,545	896	6,848	920	7,153	943	7,463	966	7,776
5750	768	5,695	794	5,988	818	6,287	843	6,590	867	6,895	891	7,205	914	7,517	938	7,834	960	8,153	983	8,477
6000	792	6,343	816	6,648	840	6,958	864	7,270	887	7,587	910	7,906	933	8,230	956	8,558	978	8,887	1000	9,223
6250	816	7,056	840	7,370	863	7,692	886	8,016	909	8,342	931	8,673	953	9,008	975	9,346	996	9,686	1018	10,031
6500	841	7,824	864	8,151	886	8,482	909	8,817	930	9,155	952	9,498	974	9,842	995	10,192	1016	10,544	1036	10,898
6750	867	8,652	889	8,992	910	9,332	932	9,679	953	10,029	974	10,381	995	10,737	1015	11,096	1036	11,459	1056	11,823
7000	892	9,544	914	9,894	935	10,245	955	10,602	976	10,963	996	11,327	1017	11,692	1037	12,063	1056	12,436	1076	12,813

Unit 50/48UH 085-100 High static-3

l/s		Unit External Static Pressure (Pa)																			
		395		430		465		500		535		570		605		640		675		710	
		rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
4250	793	3,991	822	4,243	849	4,497	876	4,756	902	5,017	928	5,282	953	5,550	977	5,821	1001	6,093	1025	6,371	
4500	807	4,418	834	4,679	861	4,942	887	5,212	913	5,483	938	5,758	962	6,035	986	6,317	1010	6,599	1033	6,885	
4750	822	4,884	848	5,154	874	5,429	900	5,709	925	5,988	949	6,275	973	6,562	997	6,853	1020	7,146	1042	7,442	
5000	837	5,392	863	5,674	888	5,958	913	6,247	937	6,538	961	6,834	985	7,132	1008	7,433	1031	7,736	1053	8,044	
5250	854	5,944	879	6,238	904	6,531	928	6,832	951	7,132	975	7,438	998	7,748	1020	8,058	1042	8,372	1064	8,689	
5500	872	6,545	896	6,848	920	7,153	943	7,463	966	7,776	989	8,090	1011	8,409	1034	8,731	1055	9,055	1077	9,383	
5750	891	7,205	914	7,517	938	7,834	960	8,153	983	8,477	1005	8,803	1027	9,132	1048	9,463	1070	9,798	1090	10,136	
6000	910	7,906	933	8,230	956	8,558	978	8,887	1000	9,223	1021	9,558	1042	9,898	1063	10,238	1084	10,586	1105	10,933	
6250	931	8,673	953	9,008	975	9,346	996	9,686	1018	10,031	1039	10,378	1059	10,728	1080	11,080	1100	11,436	1120	11,795	
6500	952	9,498	974	9,842	995	10,192	1016	10,544	1036	10,898	1057	11,254	1077	11,616	1097	11,979	1117	12,345	1136	12,713	
6750	974	10,381	995	10,737	1015	11,096	1036	11,459	1056	11,823	1076	12,191	1095	12,564	1115	12,937	1134	13,314	1153	13,694	
7000	996	11,327	1017	11,692	1037	12,063	1056	12,436	1076	12,813	1095	13,191	1115	13,573	1134	13,957	1152	14,341	1171	14,734	

7.13- Airflow limits

Unit	Cooling/Heating	
	Minimum	Maximum
50UH 045	2022	3033
50UH 055	2755	4132
50UH 065	2777	4166
50UH 075	3155	4732
50UH 085	4440	6660
50UH 100	4440	6660

7.14- Pressure drops of options

Chassis 1 - 50/48UH 045 & 055

I/s	FIOP / Accessory static pressure adder									
	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
Opt 83 - Electric heater	16	19	23	27	32	36	41	46	51	56
Opt 84 - Electric heater	16	19	23	27	32	36	41	46	51	56
Opt 85 - Electric heater	16	19	23	27	32	36	41	46	51	56
Opt 155 - Hot water coil	58	71	85	100	115	132	150	168	188	208
Opt 37 - Hot water coil	58	71	85	100	115	132	150	168	188	208
Opt 90 - Natural gas	22	33	44	55	65	76	87	98	109	120
Opt 91 - Natural gas	23	35	47	59	71	83	95	107	119	131
Opt 100 - Propane gas	22	33	44	55	65	76	87	98	109	120
Opt 101 - Propane gas	23	35	47	59	71	83	95	107	119	131
Opt 118 - Fresh air panel	8	10	13	16	19	22	26	31	35	40
Opt 40 - Manual damper	8	10	13	16	19	22	26	31	35	40
Opt 35,36,156,157 Economizer	8	10	13	16	19	22	26	31	35	40
Opt 145 G4 filter M1	0	0	0	0	0	0	0	0	0	0
Opt 147 F7 filter M1	27	32	36	41	46	51	56	62	67	73
Opt 158 G4+F7 filter M1	59	69	80	91	103	115	127	140	153	166
Opt 159 F6+F7 filter M1	71	84	98	113	128	144	160	177	194	212

I/s	800	1100	1400	1700	2000	2300	2600	2900	3200	3500
Opt 160 Fresh air filter in ERM	16	24	34	44	56	68	82	97	114	132

Chassis 2 - 50/48UH 065 & 075

I/s	FIOP / Accessory static pressure adder									
	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
Opt 84 - Electric heater	27	32	36	41	46	51	56	62	68	74
Opt 85 - Electric heater	27	32	36	41	46	51	56	62	68	74
Opt 86 - Electric heater	27	32	36	41	46	51	56	62	68	74
Opt 37 - Hot water coil	100	115	132	150	168	188	208	229	251	273
Opt 38 - Hot water coil	100	115	132	150	168	188	208	229	251	273
Opt 91 - Natural gas	59	71	83	95	107	119	131	143	155	167
Opt 92 - Natural gas	63	77	90	103	116	129	142	155	168	181
Opt 101 - Propane gas	59	71	83	95	107	119	131	143	155	167
Opt 102 - Propane gas	63	77	90	103	116	129	142	155	168	181
Opt 118 - Fresh air panel	16	19	22	26	31	35	40	45	50	56
Opt 40 - Manual damper	16	19	22	26	31	35	40	45	50	56
Opt 35,36,156,157 Economizer	16	19	22	26	31	35	40	45	50	56
Opt 145 G4 filter M1	0	0	0	0	0	0	0	0	0	0
Opt 147 F7 filter M1	41	46	51	56	62	67	73	78	84	90
Opt 158 G4+F7 filter M1	91	103	115	127	140	153	166	180	194	208
Opt 159 F6+F7 filter M1	113	128	144	160	177	194	212	23	249	268

I/s	800	1100	1400	1700	2000	2300	2600	2900	3200	3500
Opt 160 Fresh air filter in ERM	16	24	34	44	56	68	82	97	114	132

Chassis 3 - 50/48UH 085, 100 & 120

I/s	FIOP / Accessory static pressure adder									
	4300	4600	4900	5200	5500	5800	6100	6400	6700	7000
Opt 85 - Electric heater	59	64	68	72	76	81	85	89	94	98
Opt 86 - Electric heater	59	64	68	72	76	81	85	89	94	98
Opt 87 - Electric heater	59	64	68	72	76	81	85	89	94	98
Opt 38 - Hot water coil	66	74	82	91	100	109	119	129	139	150
Opt 39 - Hot water coil	66	74	82	91	100	109	119	129	139	150
Opt 93 - Natural gas	59	72	85	97	110	123	135	148	161	174
Opt 94 - Natural gas	62	76	90	104	118	132	146	160	174	188
Opt 95 - Natural gas	65	81	96	112	127	143	158	174	190	205
Opt 103 - Propane gas	59	72	85	97	110	123	135	148	161	174
Opt 104 - Propane gas	62	76	90	104	118	132	146	160	174	188
Opt 105 - Propane gas	65	81	96	112	127	143	158	174	190	205
Opt 118 - Fresh air panel	34	40	46	54	62	71	80	90	101	113
Opt 40 - Manual damper	34	40	46	54	62	71	80	90	101	113
Opt 35,36,156,157 Economizer	34	40	46	54	62	71	80	90	101	113
Opt 145 G4 filter M1	0	0	0	0	0	0	0	0	0	0
Opt 147 F7 filter M1	44	48	52	56	60	65	69	73	78	82
Opt 158 G4+F7 filter M1	98	106	115	125	1234	143	153	163	173	183
Opt 159 F6+F7 filter M1	119	132	144	158	171	185	199	213	228	243

I/s	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
Opt 160 Fresh air filter in ERM	5	13	22	32	43	56	70	86	103	122

7.15- Indoor fan airflow adjustment

The drive is factory set in accordance with the standard

fan

performance tables. When indoor pressure and air flow requirements differ from nominal ratings, the motor pulley can be adjusted for different available static pressure values (see fan performance tables).

To change the fan speed:

1. Move the motor along its track in order to remove the belt.
2. Loosen the pulley setscrews and rotate as necessary.
3. Tighten the setscrews.
4. Replace the belt(s) in the channel of the pulley.
5. Tighten the belt(s), using the tension screw nut and washer. See maintenance section and Fig. 8. To align fan and motor pulleys:
1. Loosen fan pulley setscrews. Slide fan pulley along the pulley shaft and align with the motor using a ruler, making sure that it is parallel to the belt.
2. Tighten the fan pulley setscrews.

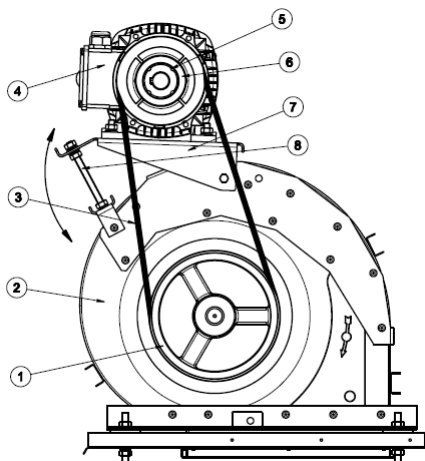
To adjust the belt tension, loosen the motor mounting plate bolts and slide the motor mounting plate until the belts are tensioned as shown in Fig.8. Please refer to section 7.1 for belt tension.

Fan and motor pulleys can be aligned as shown in Fig. 9. If the unit is equipped with adjustable pulleys, the pulley ratio and operating point can be adjusted by loosening the setscrew, arranging the moving part of the pulley to the appropriate position and then fixing the setscrew.

See fan performance tables for adjustments.

Fig. 8 - Fan speed adjustment

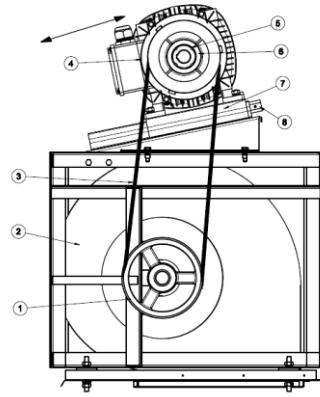
50/48UH045 standard – High static1-2-3
50/48UH 055/065 standard – High static1-2
50/48UH 075 standard – High static-1



Legend

- 1 Fan pulley
- 2 Fan scroll
- 3 Belt
- 4 Motor
- 5 Setscrew
- 6 Motor pulley
- 7 Motor plate
- 8 Tensioning screw

50/48UH 055-65 High static2 / 075 – High static3



50/48UH 085-100 standard – High static1-2-3

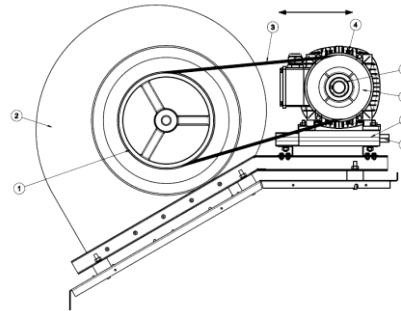
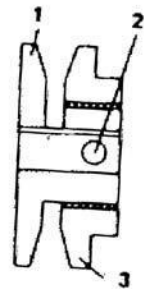
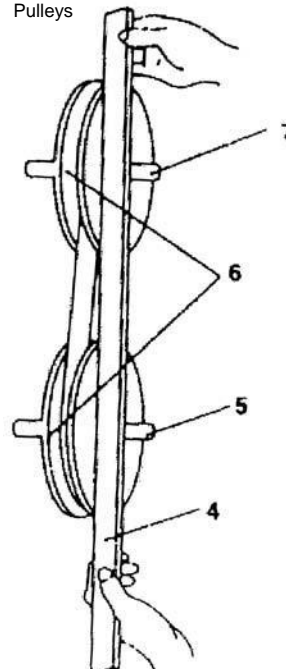


Fig. 9 - To align fan and motor pulleys

- 1 Fixed flange
- 2 Setscrew
- 3 Movable flange
- 4 Straight-edge must be parallel with belt
- 5 + 7 Motor and fan shafts must be parallel
- 6 Pulleys



8- ELECTRICAL CONNECTIONS

WARNING: To prevent electrical shock or equipment damage, make sure disconnects are open before electrical connections are made. If this action is not taken, personal injury may occur.

Field wiring must comply with all applicable codes. Take special care when making the earth connection with the main earth bar inside electrical box.

8.1 - Control box

Please refer to the certified dimensional drawings, supplied with the unit.

8.2 - Power supply

The power supply must conform to the specification on the unit nameplate. The supply voltage must be within the range specified in the electrical data table. For connections refer to the wiring diagrams and the certified dimensional drawings.

WARNING: Operation of the rooftop unit with an improper supply voltage or excessive phase imbalance constitutes abuse which will invalidate the Carrier warranty. If the phase imbalance exceeds 2% for voltage, or 10% for current, contact your local electricity supply source at once and ensure that the rooftop unit is not switched on until corrective measures have been taken.

8.3 – Voltage phase imbalance

Never operate a unit if the voltage imbalance exceeds 2%. The following formula must be used to determine the percentage of voltage imbalance.

Voltage imbalance % = $\frac{\text{Largest deviation from average voltage}}{\text{Average voltage}}$

Example:

Nominal supply: 400-3-50

AB= 404 V

BC= 399

V

AC= 394 V

Average voltage = $\frac{404 + 399 + 394}{3} = 399 \sim 400 \text{ V}$

Determine maximum deviation from average voltage:

AB= 404-400 =

4 BC = 400 - 399

= 1 AC= 400-

394=6

Largest deviation is 6 volts. Percentage voltage imbalance is therefore:

$$\frac{6}{400} \times 100 = 1.5\%$$

This is less than the permissible 2% and is therefore acceptable.

8.4- Recommended Wire Sections

Wire sizing is the responsibility of the installer, and depends on the characteristics and regulations applicable to each installation site. The following is only to be used as a guideline, and does not make Carrier in any way liable. After wire sizing has been completed, using the certified dimensional drawing, the installer must ensure easy connection and define any modifications necessary on site. The connections provided as standard for the field-supplied power entry cables to the general disconnect/ isolator switch are designed for the number and type of wires, listed in the table below.

The calculations are based on the maximum machine current (see electrical data tables) and the standard installation practises, in accordance with IEC 60364, table 52C.

-The calculation is based on

PVC Cu.

-A maximum ambient temperature of 46°C has been taken into consideration.

IMPORTANT: PHASE ROTATION CHECK

Before connection of the main power cables (L1 - L2 - L3) on the terminal block, it is imperative to check the correct order of the 3 phases before proceeding to the connection on the main disconnect/isolator switch.

The given wire length limits the voltage drop to < 5% (length L in metres - see table below).

FLA	S min. (mm ²) by phase	Cable type	L
36.0	1 x6	PVCCu	65
50.0	1 x10	PVCCu	80
66.0	1 x16	PVCCu	95
84.0	1 x25	PVCCu	115
104.0	1 x35	PVCCu	130
123.0	1 x50	PVCCu	160
155.0	1 x70	PVCCu	175
192.0	1 x95	PVCCu	195

FLA - Full load current, A

Power&control cable entry

Refer to the certified dimensional drawing for the unit for cable entry..

8.5 - Field control wiring

Refer to the Pro-Dialog+ Controls IOM and the certified wiring diagram supplied with the unit for the field control wiring of the following features:

- Remote on/off switch
- Demand limit external switch
- Remote set point
- Alarm, alert and operation report

8.6 - Power supply

ATTENTION: After the unit has been commissioned, the power supply must only be disconnected for quick maintenance operations (one day maximum). For longer maintenance operations or when the unit is

taken out of service the power supply must be maintained

to ensure supply to the heaters (compressor oil crankcase heaters for 50-48UH heat pump models).

After all possible options have been connected, the transformer

ensures the availability of a usable 24 VA or 1 A power reserve for the control circuit on site.

9- START-UP

9.1 - Preliminary checks

Never be tempted to start the rooftop unit without reading fully, and understanding, the operating instructions and without having carried out the following pre-start checks:

- Ensure that all electrical connections are properly tightened.
- Ensure that the unit is level and well-supported.
- Check the condition of the ductwork in case damage has occurred during installation.
- The air filter should be clean and in place.
- All the panels should be fitted and firmly secured with the

corresponding screws.

- Make sure that there is sufficient space for servicing and maintenance purposes.
- Check the drain connections.
- Ensure that there are no refrigerant leaks.
- Confirm that the electrical power source agrees with the unit nameplate rating.
- Make sure that compressors float freely on the rubber isolators.

WARNING: The compressors are mounted on vibration isolators. Do not loosen or remove the support mounting bolts.

- Check if phase rotation is in the right order for supply fan, outdoor fan, and compressors.

9.2 - Actual start-up

IMPORTANT:

- **Commissioning and start-up of the rooftop unit must be supervised by a qualified refrigeration engineer.**
- **Start-up and operating tests must be carried out with a thermal load applied and proper airflow rate circulating through indoor coil.**
- **All setpoint adjustments and control tests must be carried out before the unit is started up.**
- **Please refer to the Pro-Dialog+ control manual.**

The unit should be started up in Local ON mode. Ensure that all safety devices are satisfied, especially the high

pressure switches.

Actual start-up should only be done under the supervision of a qualified refrigeration mechanic.

9.3 - Defrost cycle

When the outdoor temperature is sufficiently low, and depending on the atmospheric humidity, the water condensing on the outdoor coil freezes and this obstructs correct air flow and heat exchange rate. It is necessary to remove the ice by melting it. This will be done by changing over the reversing valve on the solenoid coil. This reverses the system cycle and injects hot gas into the outdoor heat exchanger.

Defrost will be completed when the outdoor coil reaches the end of defrost temperature set point or after a predetermined period of time from the start of the cycle.

10 - MAJOR SYSTEM COMPONENTS

10.1 - Compressors

50-48UH units use hermetic scroll compressors.

Each compressor is equipped with a crankcase oil heater, as standard for heat pump units

Each compressor is equipped with:

- Anti-vibration mountings between the unit chassis and the chassis of the compressor sub-function.
- A single pressure safety switch at the discharge.

10.2 - Lubricant

The compressors installed in these units have a specific oil charge, indicated on the name plate of each compressor. The oil level check must be done after running the unit at 100% full load for a significant time and then with the unit switched off, when suction and discharge pressures are equalised. The oil level must be visible and above the middle of the sight-glass in the oil equalisation line. If this is not the case, there is an oil leak in the circuit. Search and repair the leak, then recharge oil, so that it reaches a level between the middle and three quarters of the sight-glass (unit in vacuum).

ATTENTION: Too much oil in the circuit can cause a

unit defect. Please refer to the oil content on physical data table

NOTE: Use only oils which have been approved for the compressors. Never use oils which have been exposed to air.

Carrier ERCD reference : 7754024

CAUTION: R-22 oils are absolutely not compatible with R410A oils and vice versa.

10.3 – Condensers/Evaporators

The 50-48UH coils are condensers/evaporators with internally grooved copper tubes with aluminum fins. For 50-48UH heat pump units, to prevent ice formation at the bottom of the coils, electric heaters are installed under the sheet metal base. They are switched on based on the outside temperature and during defrost cycle.

10.4 – Outdoor Fans

The fans are axial Flying Bird™ fans equipped with rotating shroud and made of composite recyclable material. The motors are three-phase, with permanently lubricated bearings and insulation class F.

10.5 – Indoor Fans

The fans are forward bladed centrifugal fans equipped with adjustable pulleys for motor. The motors are three-phase, with efficiency class IE2 and insulation class F.

10.6 - Thermostatic expansion valve (TXV)

50-48UH units use biflow TXV with adjustable superheat setting.

10.7 - Moisture indicator

Located on the liquid line, the moisture indicator may be used during charging the unit and to indicate if there is moisture in the circuit. The presence of moisture changes the colour of the indicator paper in the sight-glass.

10.8 - Filter drier

This is a one-piece, brazed filter drier, located in the liquid line. The role of the filter drier is to keep the circuit

clean and moisture-free. The moisture indicator shows when it is necessary to change the filter drier. A difference in temperature and increase in pressure loss between the filter inlet and outlet shows that the element is dirty.

10.9 - Refrigerant

50-48UH units operate with refrigerant R-410A.

10.10 – Four-way valve

This permits reversal of the cycle for operation in cooling and heating mode and during defrost cycles.

10.11 - Sensors

The units use thermistors to measure the temperature, and pressure transducers to control and regulate system operation (see Pro-Dialog + Control IOM for a more detailed explanation).

10.12 - High-pressure safety switch

Refrigerant side		High pressure	Low pressure
Allowable pressure min/max (PS)	kPa	-100 / 4420	-100 / 3000
Allowable temperature min/max (TS)	°C	-20 / 68	-20 / 51
Pressure switch setting	kPa	4420	
Unit leak test pressure	kPa	3300	

50-48UH units are equipped with automatically reset high-pressure safety switches, calibrated to 4420 kPa relative pressure (unit alarm is manually reset).

WARNING: Alteration of factory settings other than the design setpoint, without manufacturer's authorisation, may void the warranty.

11 - OPERATING LIMITS

These units have been designed to operate within the following limits: (The pressure values are given as relative pressure.)

12-GAS HEATING (48 series only)

Cooling operation		
Zone	Air temperature	
	Dry bulb	Wet bulb
Indoor		
Maximum	+35°C	+23 °C
Minimum	+18°C	+13 °C
Outdoor		
Maximum	+48°C	
Minimum	+10°C	

IMPORTANT: Inadequate installation, adjustment, information, servicing or maintenance can cause damage, injury to staff or loss of life.

Any unauthorized modifications or adjustments to

Heat pump operation		
Zone	Air temperature	
	Dry bulb	Wet bulb
Indoor		
Maximum	+27°C	
Minimum	+10°C	
Outdoor		
Maximum	+22°C	+18°C
Minimum	-10°C	-11°C

the appliance are likely to invalidate the Certification, any warranty or guarantee and may also infringe on current Statutory requirements.

Petrol, or other inflammable, fume-emitting

products and liquids of any other application must not be stored or use in the vicinity of units.

After removing panels from the unit, keep them in a safe place to prevent them dropping from the roof

12.1 - INTRODUCTION

- The gas heating system is designed to be used as an environment friendly alternative to the hot water coil or electric heating options. The rooftop unit is available with three gas heating modules with two-step heating for natural gas and one-step heating for LPG(Liquified propane gas) in 48UH045-075 series rooftop units. In 48UH085-100 series rooftop units, two of same modules are working in series with three-step heating for Natural Gas and two-step heating for LPG.

Tubular, dimpled gas heat exchanger

- The tubular, dimpled gas heat exchangers optimize the heat transfer for improved efficiency. The tubular design permits hot gases to make multiple passes across the path of the supply air. The dimpled design creates a turbulent gas flow to maximize the heating efficiency. The extra thick Alumagard™ heat exchanger coating provides corrosion resistance and ensures long life on the heat exchanger.

Modular burner compartment

- The burner assembly consists of series of injectors. The gas-air mixture, prepared in the burners, enables excellent combustion within the heat exchanger tubes. The direct-spark ignition system saves operating expense when compared to pilot ignition systems. No crossover tube is required, therefore no sooting or pilot fouling problems can occur.

Induced draft combustion system

- The unsightly appearance of flue stacks is eliminated and the effects of wind on heating operations are diminished by the induced draft combustion system. The inducer fan draws hot combustion gas through the heat exchanger at the optimum rate for the most effective heat transfer. The heat exchanger operates under negative pressure, preventing flue gas leakage into the indoor supply air for improved efficiency.

Integrated gas unit controller

- All ignition components are contained in the compact IGC which is easily accessible for servicing. The Ignition

control

board with CE mark, provides built-in diagnostic capability. Two LEDs (light-emitting diode) simplify troubleshooting by providing visual fault notification and system status confirmation. This LED fault-notification system reduces service person trouble-shooting time and minimizes service costs.

At start-up, the control runs a self diagnostic check. Diagnostic LEDs will indicate Lockout mode due to circuit

board self-check or incorrect wiring to circuit board. If there

is a call for heating, the operating sequence is as follows:

- Combustion air blower is powered on
- Prepurge starts for 15 seconds
- Ignition spark starts for 7 seconds
- Main gas valve opens
- Flame is sensed by ionization

If a fault of any kind occurs during the ignition or operating cycles, the controller detects the fault and diagnostic LEDs will indicate the mode of failure. Please refer to Section 12-10.

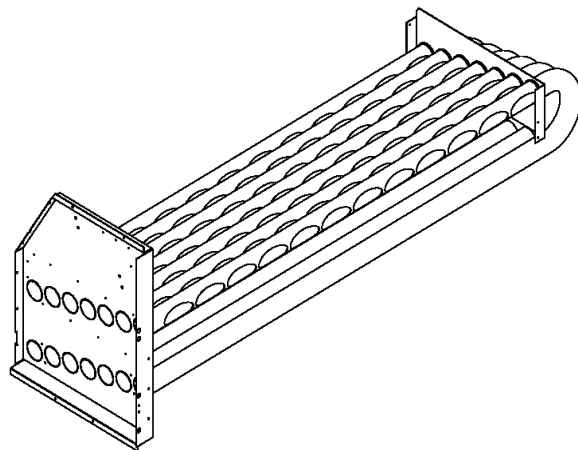


Fig. 10 – Tubular, dimpled gas heat exchanger

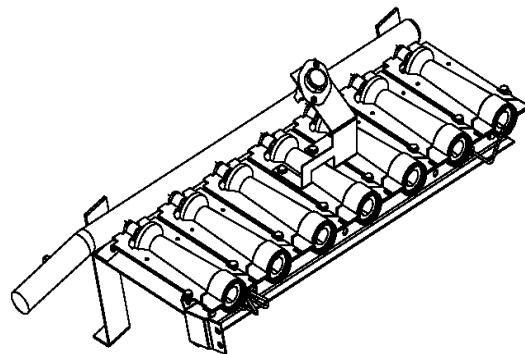


Fig. 11 – Modular burner compartment

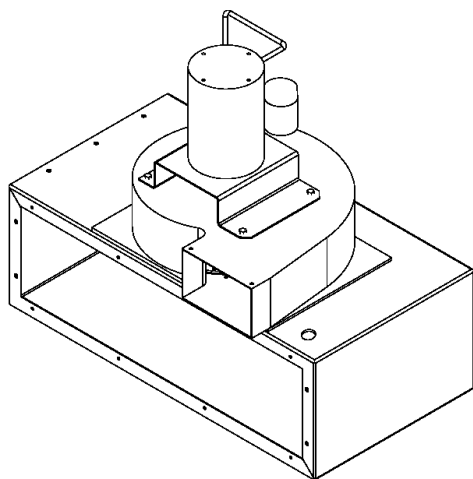


Fig. 12 – Induced draft combustion system

12.2- PRELIMINARY CHECKS BEFORE START-UP NOTE:

Any work on the gas system must be carried out by qualified personnel.
This unit must be installed in accordance with local safety codes and regulations and can only be used in well ventilated area.
Please read carefully the manufacturer's instructions before starting a unit.
Prior to dispatch, the rooftop unit was operated and tested at the factory. Gas type, electrical supplies, adjustment and settings of the unit have been factory set and sealed and are indicated on the data plate.
Before commissioning a unit with gas burner, it is mandatory to ensure that the gas distribution system (type of gas, available pressure..) is compatible with the gas type, electrical supplies, adjustment and settings of the unit.

Check access and clearance around the unit. (Refer to certified dimensional drawings)

- Make sure one can move freely around the unit.
- A minimum two-meter clearance must be left in front of the gas module side.
- Combustion air inlet and burnt gas exhausts must not be obstructed in any way.

Important Note — This appliance is suitable only for operation using the gas as stated on the identification warning label. For appliances supplied as double category appliances, i.e. for those countries marketing the gas categories of I12H3P, I12Er3P, I12E3P and I12Hs3P, it is possible to convert from natural gas to propane or vice versa. Consult local distributor or appliance manufacturer for further information. They will advise if conversion is suitable and will supply you with the correct conversion kit and suitable conversion instructions for your appliance.

WARNING: Only original manufacturers parts shall be used. Failure to fit original manufacturers parts will invalidate any warranty or guarantee and may

contravene the approval and certification of this appliance.

Any gas conversion operation shall be carried out only by qualified and authorized personnel. It is the responsibility of the authorized person to ensure the correct and safe operation of the appliance following any gas conversion procedure. The appliance must be re-commissioned following any gas conversion procedure in accordance with gas conversion instructions.

Gas Connection

- Gas fired rooftop units are designed to operate on either natural gas (G20) / (G25) / (G25.1) or propane gas (G31).
- The gas supply to a Rooftop gas unit must be realized according to Gas Safety installation and use regulations and the local safety codes and rules.
- In any case the diameter of pipe-work connected to each Rooftop must not be smaller than the diameter of the connection on the Rooftop unit.
- Make sure that a shut-off isolation valve has been installed before EACH Rooftop. The isolation valve must be connected to the main gas inlet supply pipe as close as possible to the appliance. For safety and accessibility reasons the isolation valve must not be fitted within the appliance gas valve compartment.
- Make sure that the gas service includes a filter and has been tested and purged in accordance with prescribed practice prior to commissioning and taking the appliance into service.
- Gas service pipes shall not be routed through any heated or fresh air ducts.
- Supply Network pipe sizing : Female threaded connection : ISO 7 Rp 3/4 "

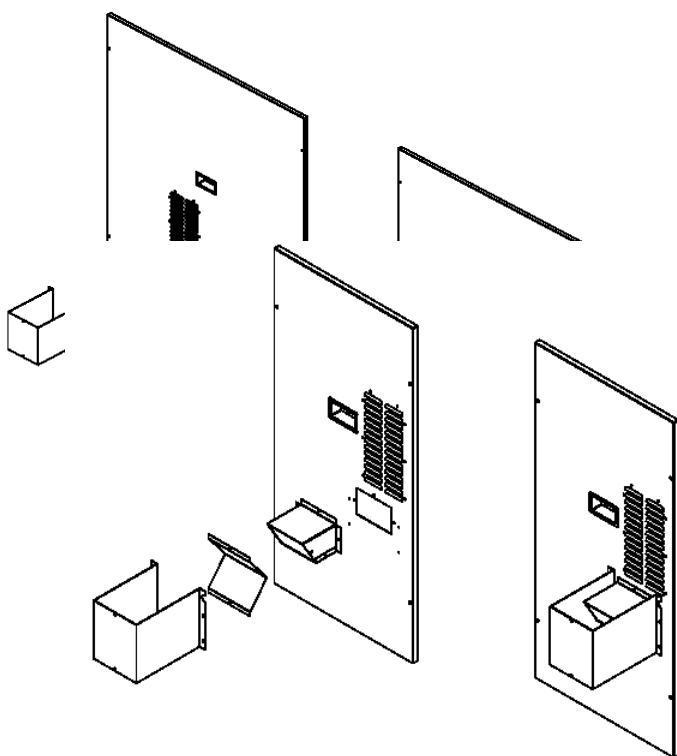
Operating limits

- Air flow limits are the min. and max. values given in table below.

Unit	Airflow(l/s)	
	Minimum	Maximum
48UH 045	2022	3033
48UH 055	2755	4132
48UH 065	2777	4166
48UH 075	3155	4732
48UH 085	4440	6660
48UH 100	4440	6660

- Min. allowable ambient (outdoor air) temperature is -15 °C
- Max. allowable ambient (outdoor air) temperature is 60 °C

Install Flue Outlet terminal guard and Wind Baffle —



The flue outlet terminal guard and wind baffle are shipped secured under main control box. To install, secure flue terminal guard to access panel. See Fig. 13 The wind baffle is then installed over the flue terminal guard. There are two flue terminal guards and wind baffles for 48UH085-100. See Fig. 14

Fig. 13 — Flue outlet terminal guard and wind baffle location for 48UH045-075

Fig. 14 — Flue outlet terminal guard and wind baffle location for 48UH085-100

12.3 - COMMISSIONING

Checks to be carried out before starting up the gas burner

Note ~ Access is required to the gas valve compartment only for commissioning checks. This requires the use of the special key tool supplied with the unit. Upon completion of any work the key tool shall not be left with the user so as to discourage inappropriate or unauthorized access.

Required Equipment List for Start-up

- An accurate manometer from 0 to 3500 Pa (0 to 350 mbar): 0.1% full scale.
- flexible pvc or similar tubing
- Suitable gas leak detection fluid
- 8 mm wrench
- 3.5 mm screwdriver

The following recommendations refer specifically to gas operation

- 1- Check that the gas used is the right type for the unit to be used.
- 2- Check that there is a shut-off isolation valve fitted at the gas inlet of the unit.
- 3- Isolate the appliance from the electrical mains supply and turn off the gas supply to the appliance at the isolation valve.
- 4- The whole of the gas service installation including the meter must be inspected, tested for soundness and purged in accordance with appropriate requirements.

Note - The soundness of gas burner pipework has been checked prior to leaving the factory. However during installation, connections may have been loosened. Check the soundness of the appliance pipework using a suitable gas leak detection solution. If any leaks are found they must be rectified immediately.

CAUTION: Never use a flame for checking gas soundness.

- 5- To check the gas supply pressure locate the pressure test point on the inlet side of the gas valve(s). Loosen, but do not remove the screw within the test point and connect a suitable pressure gauge.
- 6- Turn on the gas and electrical supplies.
- 7- Check that the gas inlet pressure is at least as indicated on the appliance identification data label (e.g. for 2H - G20 - **20 mbar**)
- 8- Operate the appliance via the prodialog control at the maximum rate: Refer to the start up procedures in SETTING UP PRO-DIALOG PLUS CONTROL section Increase the set temperature (room set point temperature) to a temperature higher than the actual room temperature.
- 9- Re-check that the appliance inlet pressure is as indicated on the appliance identification data label. If the inlet pressure is not as required, check supply pipework for adequacy or contact your gas supplier.
- 10- Turn off the appliance. Remove pressure gauge and retighten the test point screw. Check for gas tightness at the test point using suitable leak detection solution.
- 11- To check the appliance burner pressures locate the burner pressure test point on the outlet side of the gas valve(s). Loosen, but do not remove

the screw within the test point and connect a suitable pressure guage.

- 12- The appliance gas valve(s) is factory set and sealed at the correct settings for the gas type concerned according to the appliance data indication label and should not require adjustment. If adjustment is necessary, perhaps due to using G25 or G25.1 natural gases, then carry out the following items.
- 13- Again operate the appliance as detailed in item 8. Check that the maximum rate burner pressure is as stated on the data badge for the type of gas being supplied. If adjustment of the maximum rate is necessary refer to PRESSURE ADJUSTMENTS ON THE HIGH – LOW REGULATING VALVE section.
- 14- To check the minimum rate burner pressure, disconnect one of the low voltage leads from the electrical high low regulator to initiate operation at the minimum rate. If adjustment of the maximum rate is necessary refer to PRESSURE ADJUSTMENTS ON THE HIGH – LOW REGULATING VALVE section.

Important Note ~ Following any adjustment procedure of the gas valve settings, the tamperproof cap must again be sealed. A suitable method is to apply a spot of durable paint as indicated on Fig 15

- 15- Upon completion of the checking of the burner pressures, turn the appliance off , remove test equipment and retighten the pressure test point screw. Check for gas tightness at the test point following restart of the appliance.
- 16- Before leaving the installation, instruct and demonstrate the safe and efficient operation of the appliance to the user. Guide the user through the user instructions and also leave these installation instructions in their care, stressing that they will be required for future reference. Advise the user that continued safe and efficient use is dependant upon regular servicing. Recommend that the gas circuit be serviced at least annually.

12.4 - PRESSURE ADJUSTMENTS ON THE HIGH-LOW REGULATING VALVE

IMPORTANT

The appliances burner pressure settings are factory set and sealed according to the appliance data indication label.

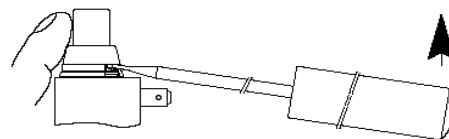
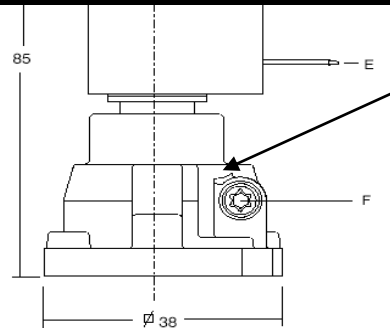
Check and adjust if necessary the valve **Inlet** pressure to 20.0 mbar (G20) or 25.0 mbar for (G25) or (G25.1) or 37.0 or 50.0 mbar for propane (G31) after gas burner ignition.

- Before commencing an adjustment connect a manometer to the burner pressure test point on gas valve.
- Lever off cover cap as indicated.
- Maximum high pressure setting must be adjusted first after which the minimum low rate setting can be adjusted. Any adjustment of the maximum setting

influences the minimum rate setting.

- Do not adjust maximum or minimum settings above or below the pressure stated on the data plate or in the following pressure setting table

Category	Supply pressure	Low Heat injection	High Heat Injection
	mbar	mbar	mbar
G20	20.0 +/-1	2.8 +/-0.2	5.8 +/-0.2
G25	25.0 +/-1	4.2 +/-0.2	8.5 +/-0.2
G25 .1	25.0 +/-1	4.8 +/-0.2	9.5 +/-0.2
G31	37.0/ 50.0 +/-1.9	25.5 +/-0.5	25.5 +/-0.5



- A Cap
- B Adjustment screw for maximum pressure setting
- C Adjustment screw for minimum pressure setting
- D 6.3 mm AMP terminals
- E Earth terminal
- F M5 pressure feedback connection

Fig. 15 – Gas valve adjustment details

ADJUSTING MAXIMUM PRESSURE

- Energise high-low regulator, set gas control in operation (light burner) and wait until an outlet pressure is recorded on pressure gauge.
- Use a 8 mm wrench to turn adjustment screw for maximum pressure setting, clockwise to increase counter clockwise to decrease pressure until the desired maximum pressure is obtained.
- Check maximum pressure several times.

ADJUSTING MINIMUM PRESSURE

- Disconnect electrical connection of high-low regulator.
- Set gas control in operation and wait until an outlet pressure is recorded on the pressure gauge.
- Use a 3,5 mm screw driver to turn adjustment screw for minimum pressure setting, clockwise to increase counter clockwise to decrease pressure until the desired minimum pressure is obtained.

Check minimum pressure several times.

- Before commencing an adjustment connect a manometer to the burner pressure test point.

Pressure setting table is given below for each type of gas

12.5 - GAS CONVERSION INSTRUCTIONS

WARNING: Only original manufacturers parts shall be used. Failure to fit original manufacturers parts will invalidate any warranty or guarantee and may contravene the approval and certification of this appliance.

Any gas conversion operation shall be carried out only by qualified and authorized personnel.

It is the responsibility of the authorized person to ensure the correct and safe operation of the appliance following any gas conversion procedure.

The appliance must be re-commissioned following any gas conversion procedure in accordance with these instructions.

For conversion from a Natural Gas appliance to a Propane appliance or a Propane appliance to a Natural gas appliance it will be necessary to obtain the correct conversion kit for your appliance. Refer to the list below and ensure the correct part number for the appliance has been supplied.

Propane Kit A (Part No. 57080020710) – for model 48UA/UH045150 / 48 UA/UH055150 – containing 5 off Ø 1.90 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Propane Kit B (Part No. 57080020720) – for models 48UA/UH045160 / 48 UA/UH055160 / 48UA/UH065160 / 48UA/UH075160 – containing 6 off Ø 1.90 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Propane Kit C (Part No. 57080020730) – for models 48UA/UH065170 / 48UA/UH075170 – containing 7 off Ø 1.90 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Propane Kit D (Part No. 57080020740) – for model 48UA/UH085255 / 48UA/UH100255 – containing 10 off Ø 1.90 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Propane Kit E (Part No. . 57080020750) – for model 48UA/UH085266 / 48UA/UH100266 / 48UA/UH075266 – containing 12 off Ø 1.90 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Propane Kit F (Part No. . 57080020760) – for model 48UA/UH120277 – containing 14 off Ø 1.90 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Natural gas Kit A (Part No. 57080020711) – for model 48UA/UH045150 / 48 UA/UH055150 – containing 5 off Ø 3.26 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Natural gas Kit B (Part No. 57080020721) – for models 48UA/UH045160 / 48 UA/UH055160 / 48UA/UH065160 / 48UA/UH075160 – containing 6 off Ø 3.45 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Natural gas Kit C (Part No. 57080020731) – for models 48UA/UH065170 / 48UA/UH075170 containing 7 off Ø 3.45 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Natural gas Kit D (Part No. 57080020741) – for 48UA/UH085255 / 48UA/UH100255 – containing 10 off Ø 3.26 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Natural gas Kit E (Part No.57080020751) – for model 48UA/UH085266 / 48UA/UH100266 / 48UA/UH075266 – containing 12 off Ø 3.45 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

Natural gas Kit F (Part No. 57080020761) – for model 48UA/UH120277 – containing 14 off Ø 3.45 mm injectors, a replacement gas type indicating sticker for the additional appliance data label

- 1- Isolate the appliance from the electrical mains supply and turn off the gas supply to the appliance at the isolation valve.
- 2- Remove the flue outlet terminal guard(s) and wind baffle(s) from the compartment panel
- 3- Remove the compartment cover to gain access to the burner assembly.
- 4- Remove the 2 screws securing the flame rollout switch to the no. 4 burner for a natural gas appliance and no.3 burner for a propane appliance and save.
- 5- Remove each individual burner tube component to gain access to the injectors. Ensure that the outer burners return to the original position when re-assembling.
- 6- Remove the injectors using a suitable 14 mm wrench.
- 7- Replace the injectors with the new injectors ensuring that the injector is tightened
- 8- Refit the burner tubes and reattach the flame rollout switch to burner no. 3 for propane conversion or burner no.4 for natural gas conversion using same screws. See Fig. 16 for Rollout switch relocation in case of propane conversion
- 9- Replace the compartment cover and the flue outlet

guard(s) and wind baffle(s). Ensure any seals are intact and correctly positioned. Replace damaged seals if necessary.

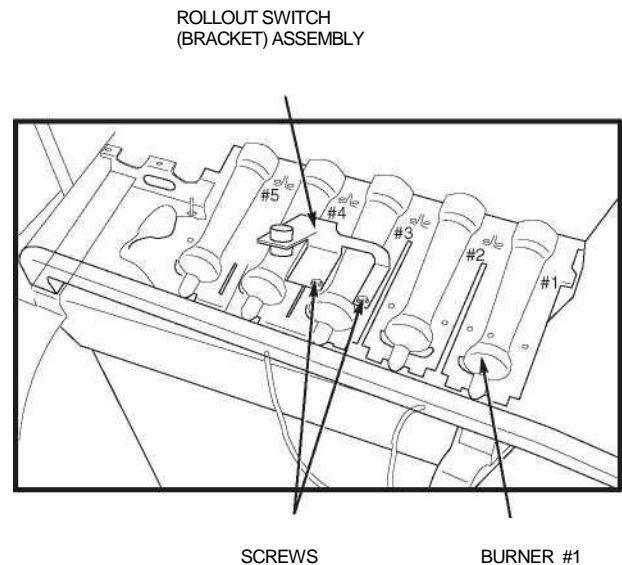
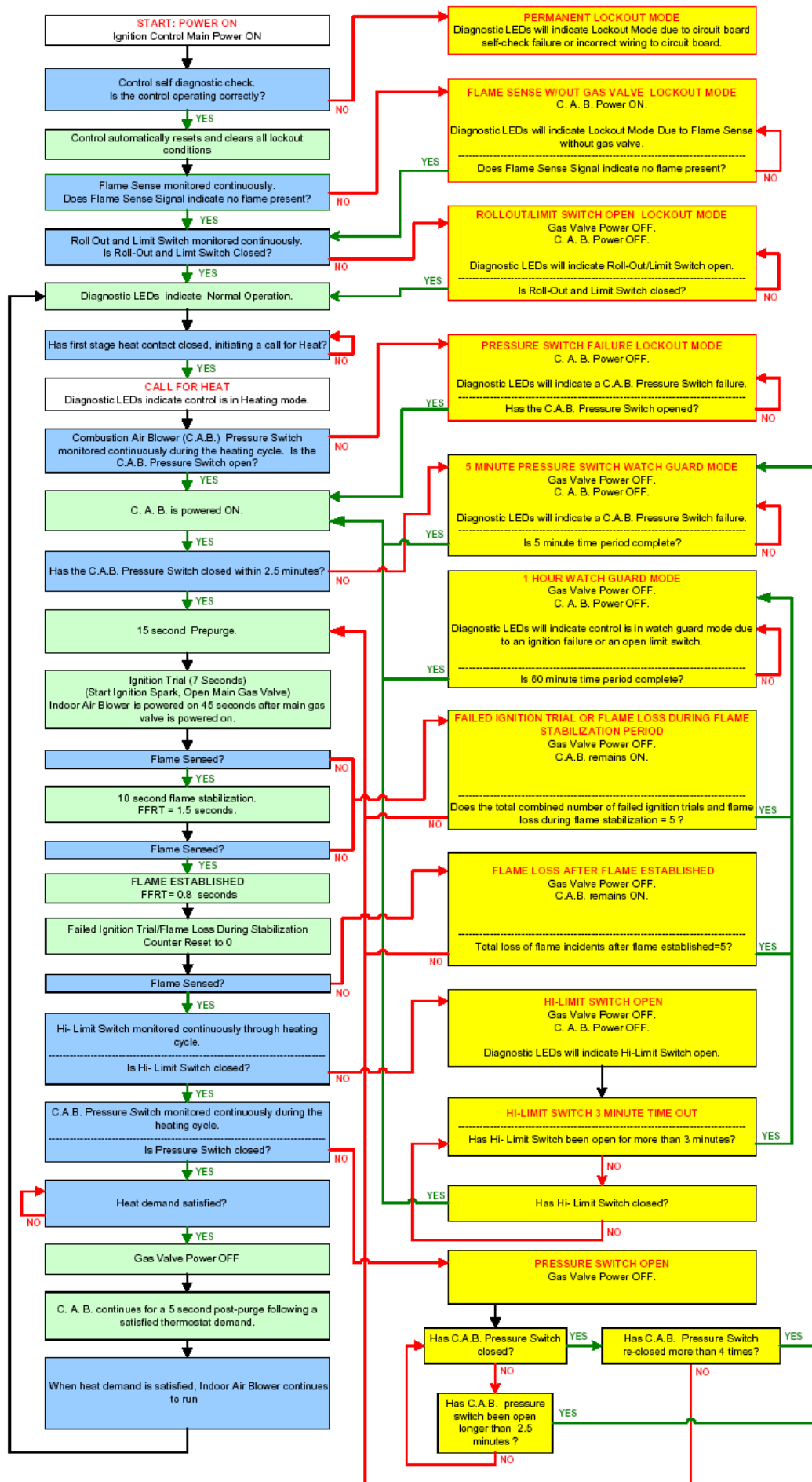


Fig. 16 Rollout Switch Relocation for Propane conversion

- 10- Commission the appliance in accordance with COMMISSIONING Section in Installation, operation and maintenance instructions.

12.6 - GAS FIRE UP SEQUENCE



12.7 - SERVICE & MAINTENANCE

Before performing service or maintenance operations on unit, turn off main power switch to unit.

Weatherproof covers are required under wet conditions.

Electrical shock could cause personal injury.

Important Note ~ During any service or maintenance operation, if parts are evidently faulty or damaged they shall be replaced. Only original manufacturers parts shall be used as detailed in the spare parts list. Failure to fit original manufacturers parts will invalidate any warranty or guarantee and may contravene the approval and certification of this appliance.

Following any operation on the appliance which has necessitated removal and replacement of any parts, the appliance shall be re-commissioned in accordance with the commissioning section of these instructions.

Cleaning — Inspect unit interior at beginning of each heating and cooling season and as operating conditions require. Remove unit side panels for access to unit interior.

MAIN BURNER — At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames. Refer to Main Burners section

FLUE GAS PASSAGEWAYS — The flue collector box and heat exchanger cells may be inspected by removing heat exchanger access panel, flue box cover, and main burner assembly (Fig. 20). Refer to MAIN BURNERS section 12.9 for burner removal sequence. If cleaning is required, remove heat exchanger baffles and clean tubes with a wire brush.

Use caution with ceramic heat exchanger baffles. When installing retaining clip, be sure the center leg of the clip extends inward toward baffle. See Fig. 17.

NOTE: One baffle and clip will be in each upper tube of the heat exchanger.

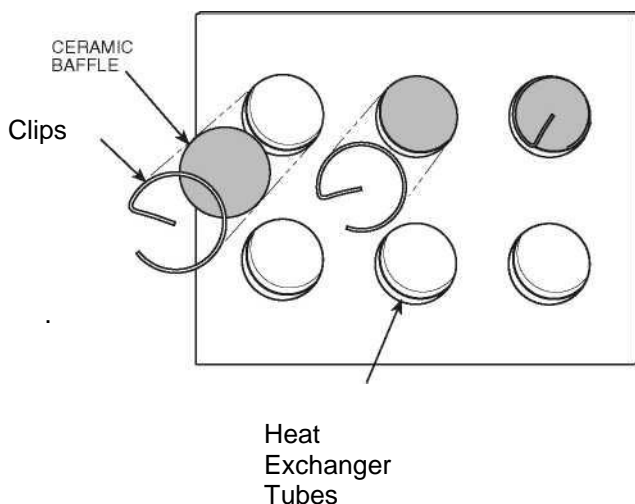


Fig. 17 — Removing Heat Exchanger Ceramic Baffles and Clips

COMBUSTION-AIR BLOWER — Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bi-monthly to determine proper cleaning frequency.

To inspect blower wheel, remove heat exchanger access panel. Shine a flashlight into opening to inspect wheel. If cleaning is required, remove motor and wheel assembly by removing screws holding motor mounting plate to top of combustion fan housing (Fig. 18). The motor and wheel assembly will slide up and out of the fan housing. Remove the blower wheel from the motor shaft and clean with a detergent or solvent. Replace motor and wheel assembly.

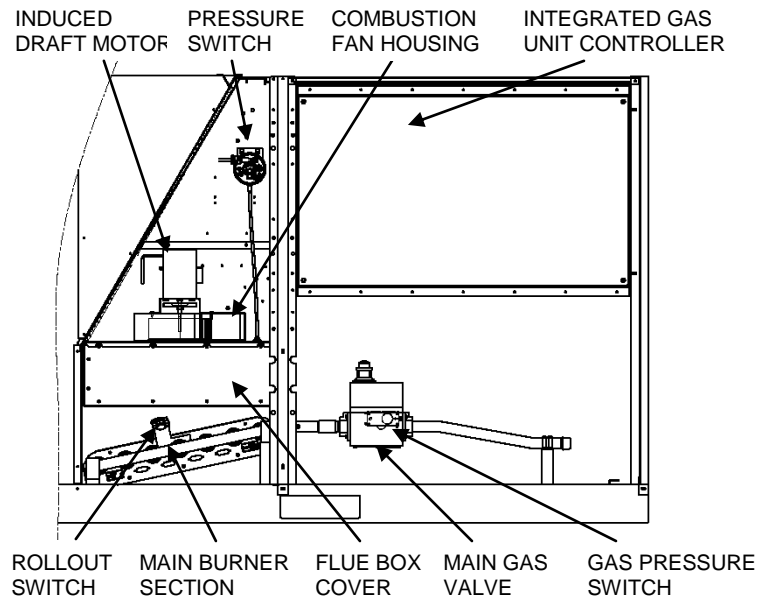


Fig.18 -Typical gas heating section for 48UH045-075

In 48UH085-100 series rooftop units, two of same modules are working in series and all the components of gas heating section are doubled.

12.8 - TEMPERATURE LIMIT SWITCHES

There are one limit switch(LS) and one high limit switch(HLS) in 48UH045-075 units and two limit switches(LS1,LS2) and two high limit switches(HLS1,HLS2) in 48UH085-100 units which are all manual reset

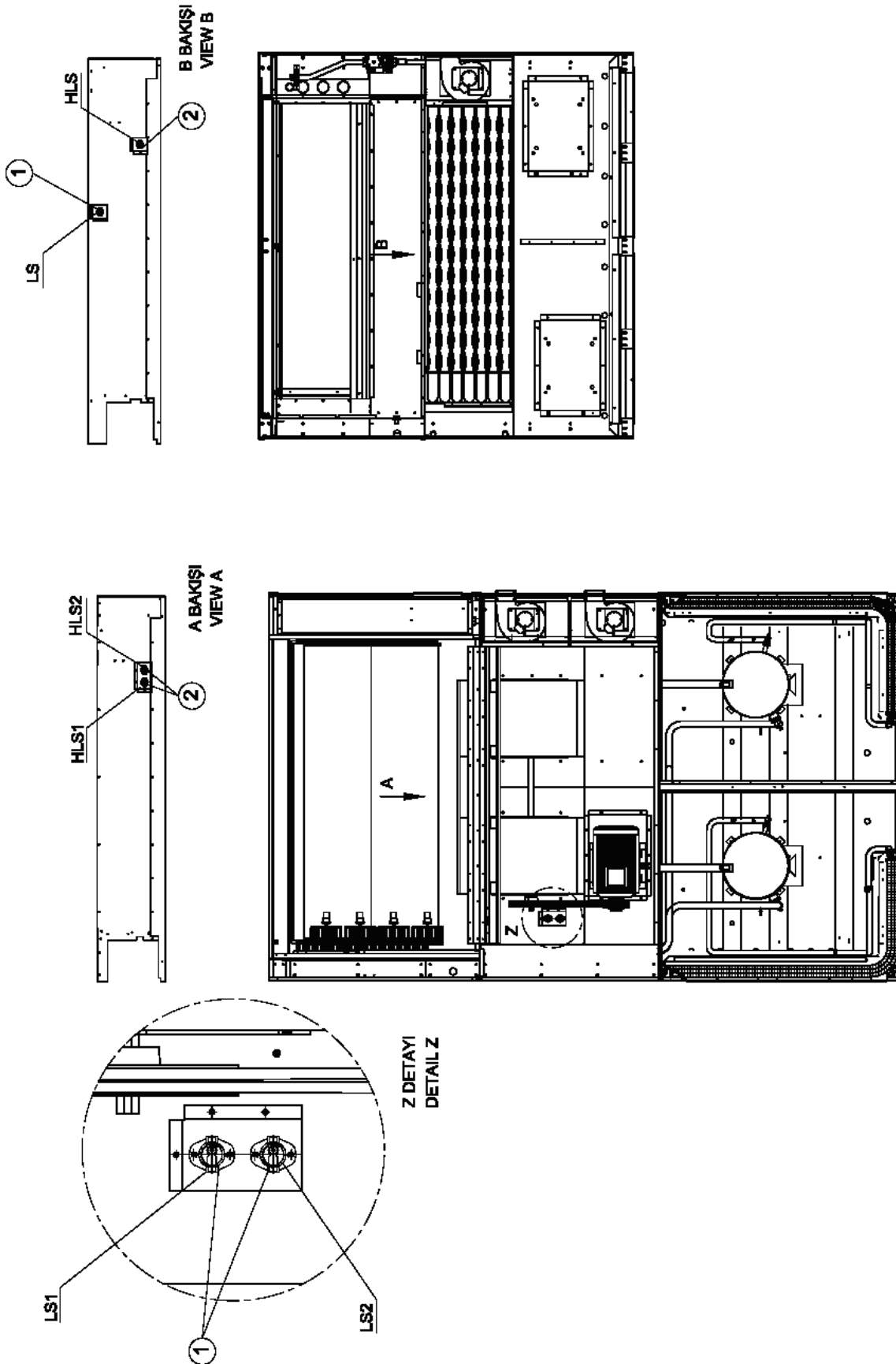


Fig. 19 Temperature Limit Switches

12.9 - MAIN BURNERS

Main Burners — For all applications, main burners are factory set and should require no adjustment.

MAIN BURNER REMOVAL

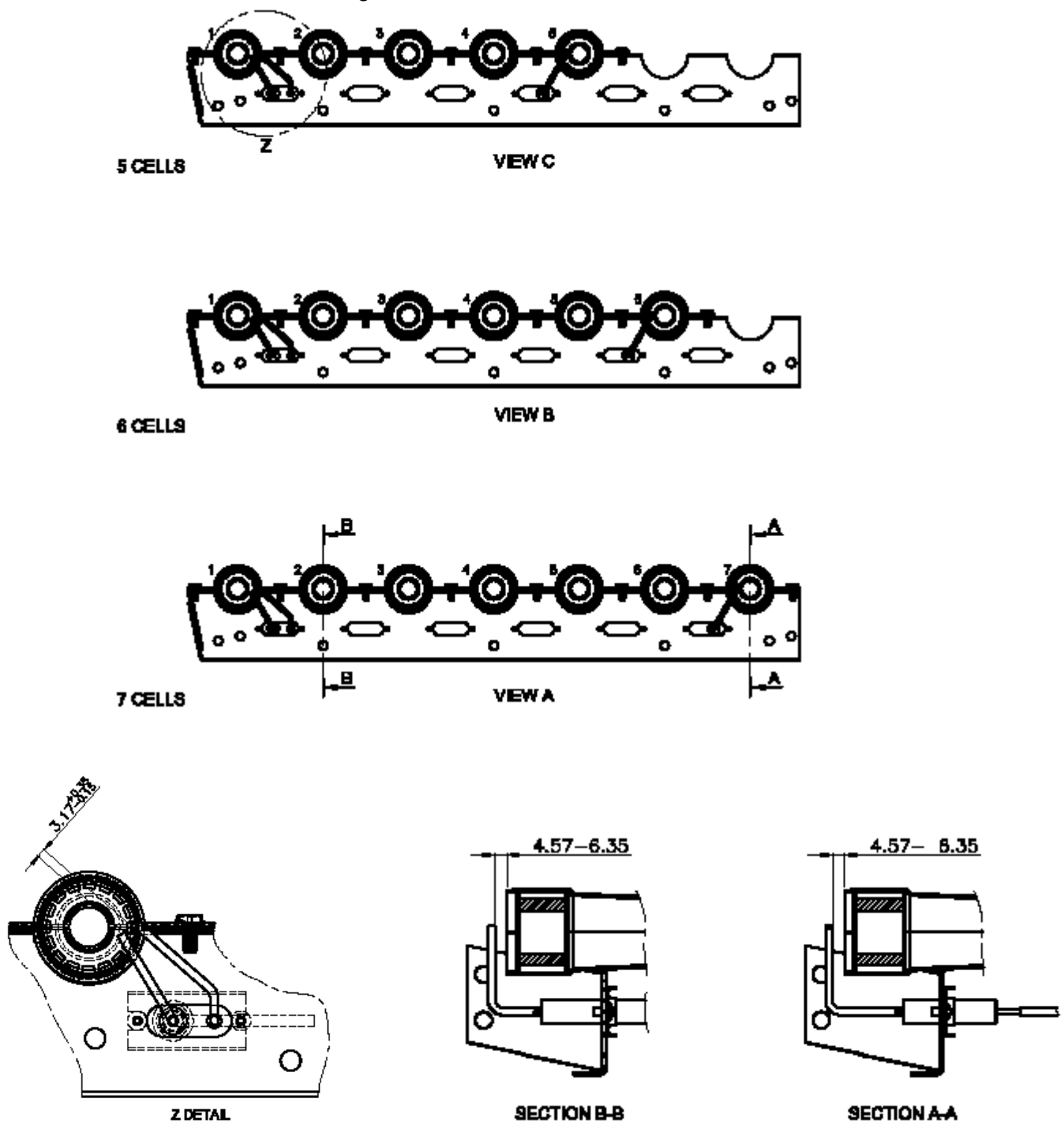
1. Shut off (field-supplied) manual main gas valve.
2. Shut off power to unit.
3. Open unit control box access panel, remove burner section access panel and center post
4. Disconnect gas piping from gas valve inlet.
5. Remove wires from gas valve.
6. Remove wires from rollout switch.
7. Remove sensor wire and ignitor cable from IGC board.
8. Remove 2 screws securing manifold bracket to basepan.

9. Remove 2 screws that hold the burner support plate flange to the vestibule plate.
10. Lift burner assembly out of unit.

CLEANING AND ADJUSTMENT

1. Remove burner rack from unit as described in Main Burner Removal section above.
2. Inspect burners, and if dirty, remove burners from rack.
3. Using a soft brush, clean burners and crossover port as required.
4. Adjust spark gap. See Fig. 20.
5. Reinstall burners on rack.
6. Reinstall burner rack as described above.

Fig. 20 Main burner details



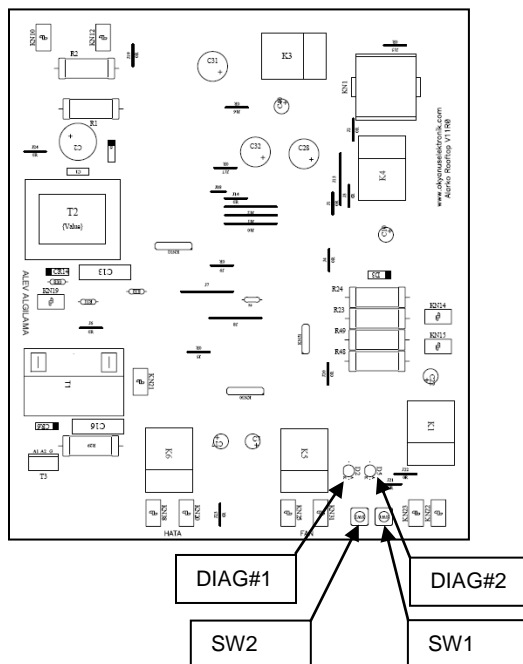
12.10 - INTEGRATED GAS UNIT CONTROLLER

All ignition components are contained in the compact IGC which is easily accessible for servicing. At start-up, the control runs a self diagnostic check.

Diagnostic LEDs will indicate Lockout mode due to circuit board self-check or incorrect wiring to circuit board. In 48UA/UH085-120 series units, each module has its own igniton board. In first heating stage, the first module is fired. In second heating stage, second module is fired and in third heating stage, high heat of both modules are running. If there is a call for heating, the operating sequence is as follows:

- Combustion air blower is powered on
- Prepurge starts for 15 seconds
- Ignition spark starts for 7 seconds
- Main gas valve opens
- Flame is sensed by ionization

If a fault of any kind occurs during the ignition or operating cycles, the controller detects the fault and diagnostic LEDs will indicate the mode of failure.



Two green LED lights are to be clearly marked as DIAG #1 and DIAG #2. The diagnostic signals for failure modes are as follows:

Safety Circuit	Monitored During	Action	DIAG# 1	DIAG# 2
High Limit switch (manual reset) Open.	Heating Demand Only.	Gas Valve "Off" Comb. Air Blower "Off"	Flash	On
Pressure Switch Open. 5_Minute Watchguard- Pressure Switch failed to close.	Heating Demand Only.	Gas Valve "Off" Comb. Air Blower "Off"	Off	Flash
Burners failed to ignite.	Heating Demand Only.	Gas Valve "Off" Comb. Air Blower "Off"	Alternate Flash	Alternate Flash
Flame Sensed Without Valve Energized.	All Times	Gas Valve "Off" Comb. Air Blower "On"	Flash	Off
Roll Out Switch or Limit Switch (manual reset) Open.	All Times	Gas Valve "Off" Comb. Air Blower "Off"	On	Flash
Circuit Board Failure or Control is Wired Incorrectly.	All Times	Gas Valve "Off" Comb. Air Blower "Off"	On	On
Power On.	All Times	Control waiting for a heating, cooling, or continuous fan signal from the thermostat. An increased flash rate indicates a call for heat.	Simultaneous Flash	Simultaneous Flash

Lockout : The safety shut-down condition of the system, such that a restart can only be accomplished by pressing the SW2 by 5 seconds. During the “Lockout” condition, the combustion blower will be “OFF” and the diagnostic will signal “Lockout” mode.

The high limit switch and limit switch must be reset manually by pressing reset buttons of switches during their faults. Control will hold the last failure code in memory . To retrieve the last failure code SW1 provided on the circuit board must be depressed. When this button is depressed and held the diagnostic LED lights will signal the last failure code held in memory.

12.11 - GAS BURNER TROUBLESHOOTING

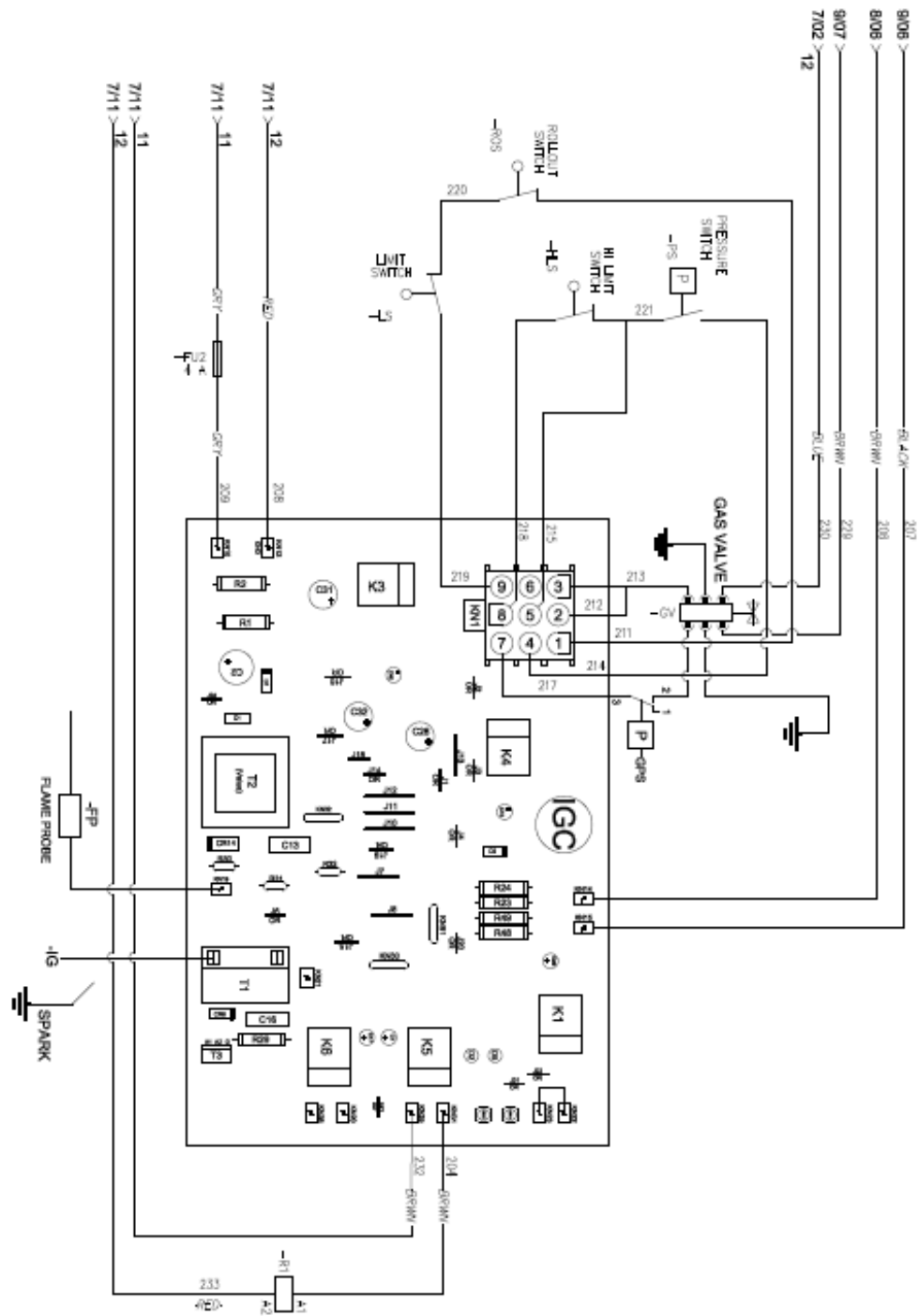
- Check GAS isolation shut-off valves are open.
- Check GAS pressure at the inlet of the GAS valves.
- Adjust the set points to priorities the burner. Increase the value of the room temperature set point to a temperature higher than actual room temperature.

Symptoms	Cause	Remedy
Burners will not ignite.	Misaligned spark electrodes.	Check flame ignition and sensor electrode positioning. Adjust as needed.
	No gas at main burners.	Check gas line for air; purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to relight unit. Check gas valve.
	Water in gas line.	Drain water and install drip leg to trap water.
	No power to unit.	Check power supply, fuses, wiring, and circuit breaker.
	No 24 v power supply to control circuit.	Check transformer. Check 24-v circuit breaker; reset if necessary.
	Miswired or loose connections.	Check all wiring and wire nut connections.
Inadequate heating.	Dirty air filter.	Clean or replace filter as necessary.
	Gas input to unit too low.	Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure or replace with correct orifices.
	Unit undersized for application.	Replace with proper unit or add additional unit.
	Restricted airflow.	Clean filter, replace filter, or remove any restrictions.
	Blower speed too low.	Install alternate motor, if applicable, or adjust pulley to increase fan speed.
	Limit switch cycles main burners.	Check rotation of blower, temperature settings, and temperature rise of unit. Adjust as needed.
Poor flame characteristics.	Incomplete combustion (lack of combustion air) results in: Aldehyde odors, CO, sooting flame, or floating flame.	Adjust minimum position. Check economizer operation.
		Check all screws around flue outlets and burner compartment. Tighten as necessary.
		Cracked heat exchanger.
		Overfired unit — reduce input, change orifices, or adjust gas line or manifold pressure.
		Check vent for restriction. Clean as necessary. Check orifice to burner alignment.

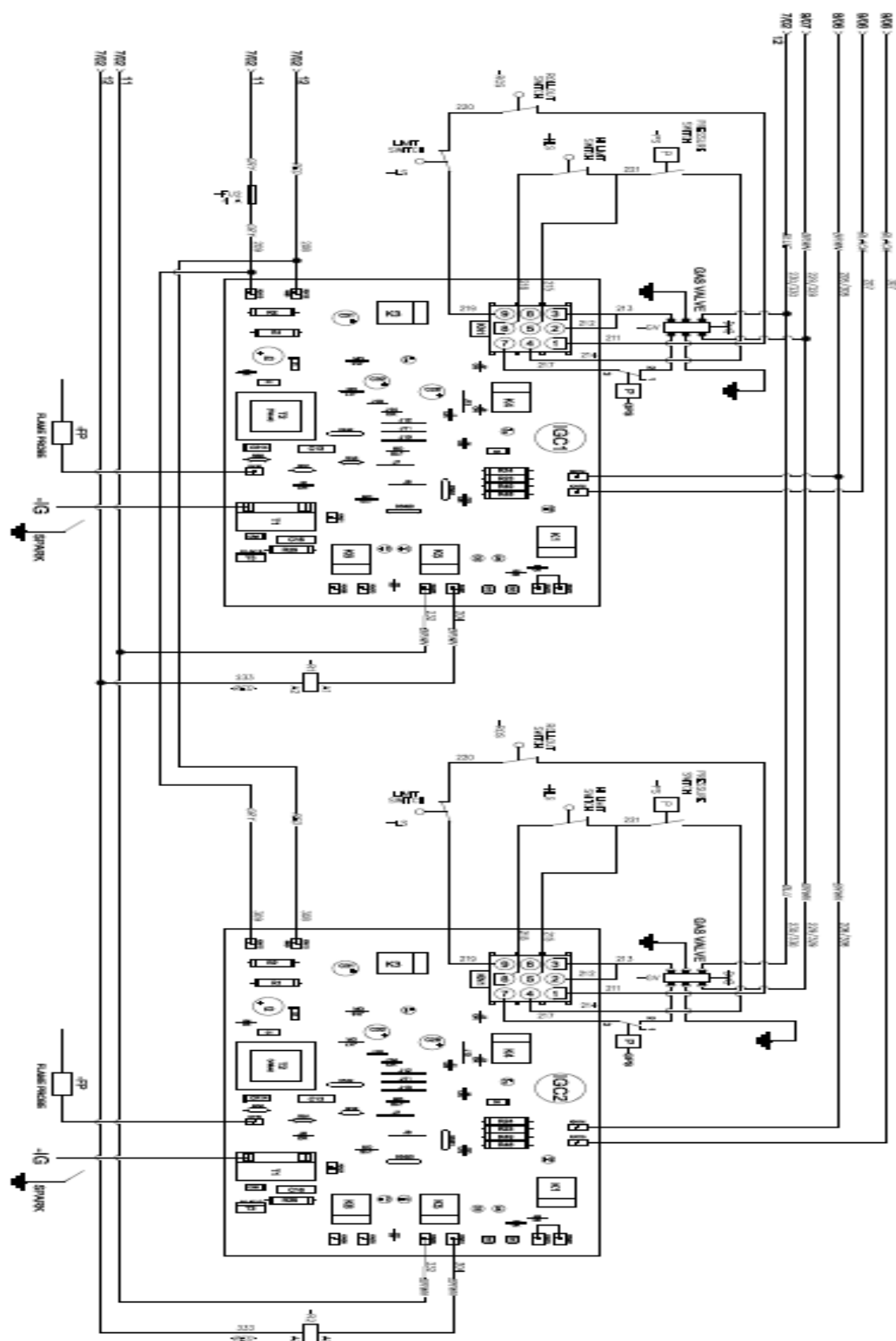
IMPORTANT –

Following any operation on the appliance which has necessitated removal and replacement of any parts, the appliance shall be re-commissioned in accordance with the commissioning section of these instructions.

12.12 - Schematic of Gas Control for 48UH045-075



12.13 - Schematic of Gas Control for 48UH085-100



13- OPTIONS LIST

OPTION	OPTION N°	DESCRIPTION	ADVANTAGE	USAGE & SIZES							
				Type	045	055	065	075	085	100	
Electric Heaters											
Electric Heater 9+9 kW	83	Electric heater coil is an auxiliary heating solution on cooling only and reversible units for low mixed air temperature (high fresh air rate in winter).	Electric heater located after the main thermodynamic coil, guarantees constant and comfortable supply air temperature in winter. This option is also improving comfort while heat pump is operating defrost cycle.	50UH	X	X					
Electric Heater 18+9 kW	84				X	X	X	X			
Electric Heater 18+18 kW	85				X	X	X	X	X	X	
Electric Heater 27+27 kW	86						X	X	X	X	
Electric Heater 36+36 kW	87								X	X	
Hot Water coils											
Hot water coil 60 kW with 3 way valve	37	Hot water coil is an auxiliary heating solution on cooling only and reversible units for low mixed air temperature (high fresh air rate in winter).	Hot water coil located after the main thermodynamic coil, guarantees constant and comfortable supply air temperature in winter. It allows full modulating heating capacity through the use of 3 way valve, secured by frost protection sensor. This option allow high capacity heating solution.	50UH	X	X	X	X			
Hot water coil 100 kW with 3 way valve	38						X	X			
Hot water coil 130 kW with 3 way valve	39								X	X	
Gaz modules											
Natural Gas 46,8 kW – 2 stages - 5 cells	90	Gas burner is an auxiliary heating solution on cooling only and reversible units for low mixed air temperature (high fresh air rate in winter).	Gaz burners are located after the main thermodynamic coil, guarantees constant and comfortable supply air temperature in winter. This option allow high capacity heating solution.	48UH	X	X					
Natural Gas 61,8 kW – 2 stages - 6 cells	91				X	X	X	X			
Natural Gas 72,9 kW – 2 stages - 7 cells	92						X	X			
Natural Gas 93,6 kW – 3 stages - 5+5 cells	93								X	X	
Natural Gas 125 kW – 3 stages - 6+6 cells	94								X	X	
Natural Gas 147,4 kW – 3 stages - 7+7 cells	95	Multi-stage allow heating capacities management. Available with Natural gas or Liquified Propane gas.									
Propane Gas 53,2 kW - 5 cells	100				X	X					
Propane Gas 63,9 kW - 6 cells	101				X	X	X	X			
Propane Gas 74,5 kW - 7 cells	102						X	X			
Propane Gas 105,2 kW – 2 stages - 5+5 cells	103								X	X	
Propane Gas 127,8 kW – 2 stages - 6+6 cells	104								X	X	
Propane Gas 150,7 kW – 2 stages - 7+7 cells	105										
Coil protections options											
Outdoor Pre-Coated / Indoor Standard	154	Coils fins made of UV resistant polyurethane protection pre-treated aluminium.	Improved corrosion resistance, extending the coil life time.	ALL	X	X	X	X	X	X	
Outdoor Pre-Coated / Indoor Pre-Coated	153		Improved corrosion resistance, extending the coil life time.		X	X	X	X	X	X	
Fresh Air & Economisers Outdoor air options											
Fresh air sliding panel	118	Manual adjustment setting of permanent amount of fresh air up to 25%. Fresh air hood also supplied.	Fresh air supply in the building with constant adjustable rate.	ALL	X	X	X	X	X	X	
Manual outdoor air damper	40	Manual adjustable setting of permanent amount of fresh air up to 40%. Fresh air hood also supplied.	Fresh air supply in the building with constant adjustable rate.		X	X	X	X	X	X	
Economizer, thermostatic control	35	Direct link driven low leakage blades to control fresh air percentage up to 100 % Vs return air. Indoor & Outdoor air temperature sensors are supplied. Fresh air hood also supplied.	Fresh air supply in the building with variable rate, depending on outside air temperature temperature. Allow free cooling operation for energy saving based on temperature differential control.		X	X	X	X	X	X	
Economizer, enthalpy control	36	Direct link driven low leakage blades to control fresh air percentage up to 100 % Vs return air. Indoor & Outdoor Air enthalpy sensors are supplied. Fresh air hood also supplied.	Fresh air supply in the building with variable rate, depending on outside air entalpy (temperature & humidity level). Allow intelligent free cooling operation for energy saving based on enthalpy differential control.		X	X	X	X	X	X	
Economizer, thermostatic + CO2 sensor control	156	Direct link driven low leakage blades to control fresh air up to 100 % Vs return air. Indoor & Outdoor air temperature sensor supplied. Indoor Air Quality CO ₂ sensor supplied. Fresh air hood also supplied.	Fresh air supply in the building with variable rate, depending on outside air temperature temperature. Allow free cooling operation for energy saving based on temperature differential control. Manage CO2 concentration levels in the building.		X	X	X	X	X	X	
Economizer, enthalpy + CO2 sensor control	157	Direct gear driven low leakage blades to control fresh air percentage Vs return air. Indoor & Outdoor Air Temperature & Humidity sensors supplied. IAQ CO2 sensor supplied. Fresh air hood also supplied.	Fresh air supply in the building with variable rate, depending on outside air temperature temperature & humidity level. Allow intelligent free cooling operation for energy saving based on enthalpy differential control. Manage CO2 concentration levels in the building.		X	X	X	X	X	X	
Supply fan options											
High static pressure 1	150	Oversized fan and motors configuration	High External Static Pressure requirements up to 680Pa at nominal air flow rate (without options).	ALL	X	X	X	X	X	X	
High static pressure 2	151				X	X	X	X	X	X	
High static pressure 3	152				X	X	X	X	X	X	
Standard with soft starter	165	Gradual Supply fan motor starting.	Progressive supply fan start to reduce noise and starting current.		X	X	X	X	X	X	
High static pressure 1 with soft starter	166	Oversized fan and motors configuration + gradual supply fan motor starting time.	High External Static Pressure requirements up to 680Pa at nominal air flow rate (without). Progressive supply fan start to reduce noise and starting current.		X	X	X	X	X	X	
High static pressure 2 with soft starter	167				X	X	X	X	X	X	
High static pressure 3 with soft starter	168				X	X	X	X	X	X	
Filter options											
Standard G4 filter (not classified)		G4 filters synthetic media 50mm metallic frame with 90% gravimetric efficiency and high filtration area.	High efficiency filtration for return air and fresh air with low pressure drop. No fire classification.	ALL	X	X	X	X	X	X	
G4 Filter M1 fire class	145	G4 filters synthetic media 50mm metallic frame with 90% gravimetric efficiencyand high filtration area.	High efficiency filtration for return air and fresh air with low pressure drop with fire classification M1.		X	X	X	X	X	X	
F7 Filter M1 fire class	147	F7 filters synthetic media 50mm metallic frame with 90% opacimetric efficiency and high filtration area.	High efficiency filtration for return air and fresh air with low pressure drop with fire classification M1.		X	X	X	X	X	X	
G4 + F7 Filter M1 fire class	158	Two-stage particle filtration G4 & F7	Two stage high efficiency filtration for return air and fresh air with medium pressure drop with fire classification M1. Replaceable media G4.		X	X	X	X	X	X	
F6 + F7 Filter M1 fire class	159	Two-stage particle filtration F6 & F7	Two stage very high efficiency filtration for return air and fresh air with medium pressure drop with fire classification M1. Replaceable media F6.		X	X	X	X	X	X	
Drain pan options											
Standard		Galvanised steel drain pan with connection to a drain pipe.	Standard easy draining of condensation water.	ALL	X	X	X	X	X	X	
Stainless steel pan	72	Stainlees steel drain pan with connection to a drain pipe.	Easy cleaning drain pan for hygienic purpose & easy draining of condensation water.		X	X	X	X	X	X	

OPTION	OPTION N°	DESCRIPTION	ADVANTAGE	USAGE & SIZES						
				Type	045	055	065	075	085	100
Energy Recovery options										
Energy recovery module (delivered seperately)	160	ERM is dual-flow individual unit, equipped with a high-efficiency air-to-air EUROVENT certified heat recovery condensation wheel efficiency 63% to 88%, with integrated variable exhaust air volume plug fan and a control system for a plug & play installation and connection to the roof top electrical box.	Energy saving solution when units operates with fresh air rate in extreme outdoor temperature (winter or summer) allowing to recover energy from exhaust air and transfer it to fresh air side. Reduce installed cooling or heating unit capacity. In addition, allow 100% free cooling solution.	ALL	X	X	X	X	X	X
Return/exhaust air options										
Barometric exhaust	71	Aluminium blades closing by gravity protecting exhaust from rain.	Allow pressure relief when fresh air is introduced in a building with good airtightness.	ALL	X	X	X	X	X	X
Power exhaust 1,5 HP, airflow 8000m³/h, 80Pa	66	Exhaust centrifugal fan to provide medium exhaust air pressure, runing while fresh air inlet higher than 50% open. Fixed air flow, factory mounted on the unit.	Minimised overpressure in the building when fresh air is introduced and allow additional exhaust air pressure for return ductwork medium pressure drop.		X	X	X	X		
Power exhaust 4,0 HP, airflow 10000m³/h, 150Pa	67	Including Barometric exhaust option 71.							X	X
Return fan with manual exhaust damper 4,0 HP, 10000 m3/h (shipped loose)	68	Return centrifugal fan to provide high return air pressure, adjustable air flow rate with variable pulley.	Allow additional return air pressure for return ductwork. Minimised overpressure in the building when fresh air is introduced. Allow manual system air pressure balacing in the building		X	X	X	X		
Return fan with manual exhaust damper 5.5 HP, 13000 m3/h (shipped loose)	69	Adjustable exhaust damper with low leakage blades to adjust exhaust air flow rate.			X	X	X	X		
Return fan with manual exhaust damper 7.5 HP, 16000 m3/h (shipped loose)	70	Available only wit Options 40, 118.							X	X
Return fan with motorized exhaust damper 4,0 HP, 10000 m3/h (shipped loose)	142	Return centrifugal fan to provide high return air pressure, adjustable air flow rate with variable pulley.	Allow additional return air pressure for return ductwork. Minimised overpressure in the building when fresh air is introduced. Allow autpmatic system air pressure balacing in the building		X	X	X	X		
Return fan with motorized exhaust damper 5.5 HP, 13000 m3/h (shipped loose)	143	Motorized exhaust damper with low leakage blades to adjust exhaust air flow rate.			X	X	X	X		
Return fan with motorized exhaust damper 7.5 HP, 16000 m3/h (shipped loose)	144	Available only wit Options 35, 36, 156, 157.							X	X
Temperature sensors options										
Standard, space sensor T55		T55 sensor will monitor room temperature	Supply air temperature control based on Room temperature.	ALL	X	X	X	X	X	X
Space sensor with override & set point adjustment T56	19	T56 sensor will monitor room temperature and provide a temperature offset of 3°C maximum.	Room temperature control with override and set point adjustment.		X	X	X	X	X	X
Space sensor with display, override, ON/OFF & set point adjustment.	24	Sensor will monitor room temperature with occupied period extension time (up to 4 hours), set point adjustment and On-Off functions.	Room temperature control with scheduling override, set point adjustment and display.		X	X	X	X	X	X
Two space sensor T55 + T56	57	Twin sensors T55 & T56 supplied			X	X	X	X	X	X
Two space sensor T55 + OPT24	59	Twin sensors T55 & OPT24 supplied			X	X	X	X	X	X
Duct température sensor	18	Duct sensor will monitor air return temperature	Allow temperature control directly on air return air duct.		X	X	X	X	X	X
Communication options										
CCN/Jbus Gateway	26	Two-directional communications board, complies with Jbus communication protocol	Easy connection by communication bus to a Building Management System	ALL	X	X	X	X	X	X
CCN/Lon Gateway	27	Two-directional communications board, complies with LonTalk communication protocol	Easy connection by communication bus to a Building Management System		X	X	X	X	X	X
CCN/BACnet Gateway	161	Two-directional communications board, complies with BACnet communication protocol	Easy connection by communication bus to a Building Management System		X	X	X	X	X	X
Airflow safeties										
Dirty filter detection (pressure switch)	96	Alarm reported by adjustable differential pressure switch connected to ProDialog+ controller.	Easy maintenance of filters by indication of filters to be changed, improving energy efficiencies.	ALL	X	X	X	X	X	X
Supply Air flow detection (pressure switch)	99	Alarm reported by adjustable differential pressure switch connected to ProDialog+ controller.	checking the fan is ON		X	X	X	X	X	X
Dirty filter alarm + Supply airflow detection	162	Combination of OPT 96 & 99	Combination of OPT 96 & 99		X	X	X	X	X	X
Smoke detection										
Smoke detector	97	Generate general unit default of the unit when smoke is detected, economiser return air damper is closed, supply fan is stopped, electric heaters/hot water/gas burners are switched off. Only available with Economiser options.	Building fire security based on smoke detection.	ALL	X	X	X	X	X	X
Smoke detector + DAD (French ERP regulation)	110	Generate general unit default of the unit when smoke is detected, economiser return air damper is closed, supply fan is stopped, electric heaters/hot water/gas burners are switched off. DAD additional functions. Only available with Economiser options.	Building fire security based on smoke detection DAD security device.		X	X	X	X	X	X
Fire thermostat	121	Generate general default of the unit when thermostats detect return air temperature above adjustable temperature (factory set to 70°C) Manual reset thermostat placed in return air duct.	Building fire security based on temperature rise detection.		X	X	X	X	X	X
Duct connection										
Fixation frame	163	Metalic rigid frame on air return & supply sides	Easy air duct installation		X	X	X	X	X	X
Packaging										
Standard (plastic wrap)				ALL	X	X	X	X	X	X
Pallet + coil protection + plastic wrap	128	Packaging with pallet + coil protection + plastic wrap	Unit protection for transport		X	X	X	X	X	X
50% open crate + coil prot. + plastic wrap	126	Packaging with 50% open crate + coil protection + plastix wrap	Unit protection for long distance transport							
70% open crate + coil prot. + plastic wrap	127	Packaging with 70% open crate + coil protection + plastic wrap	Unit protection for long distance transport		X	X	X	X	X	X

13.1 – Electric heaters

Shielded electric resistance heaters are completely factory-wired and fully tested, before leaving the factory.

Each stage is protected from overload by two thermal protectors. The low limit one which is automatic reset located above the resistances and the high limit with manual reset located in the electric box of the heaters. This high temperature limit control offers overload protection and is set to 90°C and located at less than 150mm after electric heaters. Refer to the certified drawings and wiring diagrams of electric heaters and also Prodialog + Control IOM for further information.

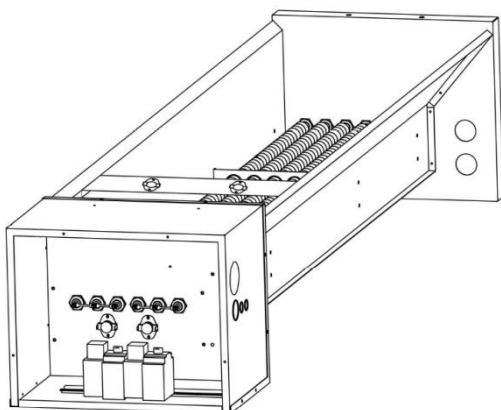
Electric heater data is as follows:

UNIT 50UH	NOMINAL VOLTAGE V-Ph-Hz	ELECTRIC HEATER	NOMINAL (kW)	APPLICATION (kW)	RATED AMPS (A)	NBR OF STEPS
045 (1-stage cool)	400-3-50	Opt 83	18.0	9.0 / 18.0	26.0	2
		Opt 84	27.0	18.0 / 27.0	39.0	2
		Opt 85	36.0	18.0 / 36.0	52.0	2
055 (1-stage cool)	400-3-50	Opt 83	18.0	9.0 / 18.0	26.0	2
		Opt 84	27.0	18.0 / 27.0	39.0	2
		Opt 85	36.0	18.0 / 36.0	52.0	2
065 (2-stages cool)	400-3-50	Opt 84	27.0	18.0 / 27.0	39.0	2
		Opt 85	36.0	18.0 / 36.0	52.0	2
		Opt 86	54.0	27.0 / 54.0	77.9	2
075 (2-stages cool)	400-3-50	Opt 84	27.0	18.0 / 27.0	39.0	2
		Opt 85	36.0	18.0 / 36.0	52.0	2
		Opt 86	54.0	27.0 / 54.0	77.9	2
085 (2-stages cool)	400-3-50	Opt 85	36.0	18.0 / 36.0	52.0	2
		Opt 86	54.0	27.0 / 54.0	77.9	2
		Opt 87	72.0	36.0 / 72.0	103.9	2
100 (3-stages cool)	400-3-50	Opt 85	36.0	18.0 / 36.0	52.0	2
		Opt 86	54.0	27.0 / 54.0	77.9	2
		Opt 87	72.0	36.0 / 72.0	103.9	2

Air flow limits are the min. and max. values given in table below:

Unit	Electric Heaters	
	Minimum	Maximum
50UH 045	2022	3033
50UH 055	2755	4132
50UH 065	2777	4166
50UH 075	3155	4732
50UH 085	4440	6660
50UH 100	4440	6660

Fig. 21 – Electric heater option



13.2 - Hot water coil

Hot water coils offer fully modulating 3 way valve with supply air temperature based control.

Frost protection is provided by frost temperature sensor

Hot water coils are factory fitted, wired and fully tested, before leaving the factory.

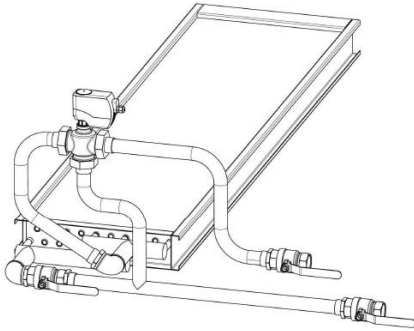
Hot water coils are equipped with purge system.

The hot water coil fitted with a three way proportional

valve also includes two isolating shut off valves. Refer to the certified drawings

and wiring diagrams of hot water coil's hydraulic and electrical connections heaters and also Prodialog + Control IOM for further information.

Fig. 22 – Hot water coil option



13.3 – Economizer options(Thermostatic or Enthalpic)

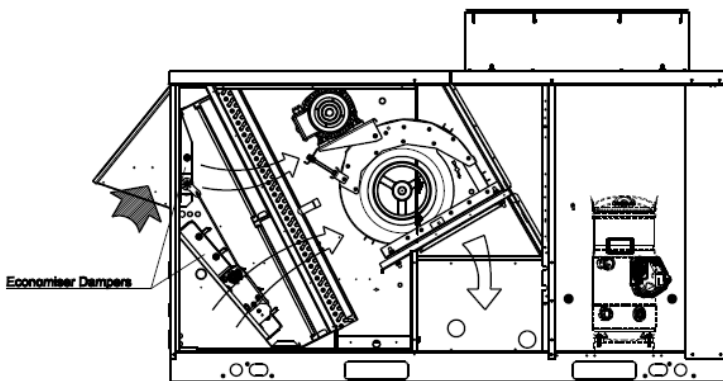
Free cooling can be provided through the use of fresh air when the outdoor conditions are maintained based on temperature or enthalpy according to the option fitted.

The economiser is factory fitted and tested before leaving the factory. (See fig.23).

The return air damper is operating from a 24V actuator, and the fresh air damper is mechanically linked to this damper in order to open/close oppositely. During start-up, the return damper is fully open, while the fresh air damper is fully closed.

It also includes a factory fitted fresh air hood. Hood is folded during transportation to limit risks of damage and must be unfolded on site. Please refer to the certified drawings and wiring diagrams of economizer's mechanical and electrical connections and also Prodialog + Control IOM for further information.

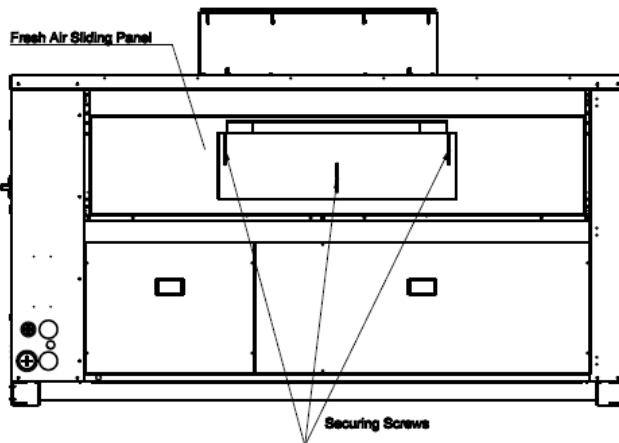
Fig. 23 – Economizer option



13.4 – Fresh air sliding panel

Sliding panel can be preset to admit up to 25% outdoor air into return-air compartment. To adjust, loosen securing screws and move panel to desired setting. Then retighten screws to secure panel. (See fig.24). It also includes a factory fitted fresh air hood.

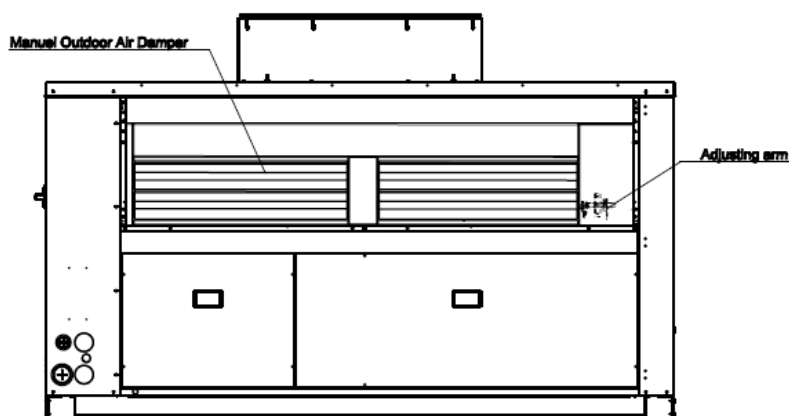
Fig. 24 –Fresh air sliding panel option without fresh air hood



13.5 – Manual outdoor air damper

Damper with direct link driven blades can be preset to admit up to 40% outdoor air into return-air compartment. To adjust, loosen securing screw and rotate the arm of the damper blades to desired setting. Then retighten screw to secure damper blades. (See fig.25). It also includes a factory fitted fresh air hood.

Fig. 25 –Manual outdoor air damper option without fresh air hood



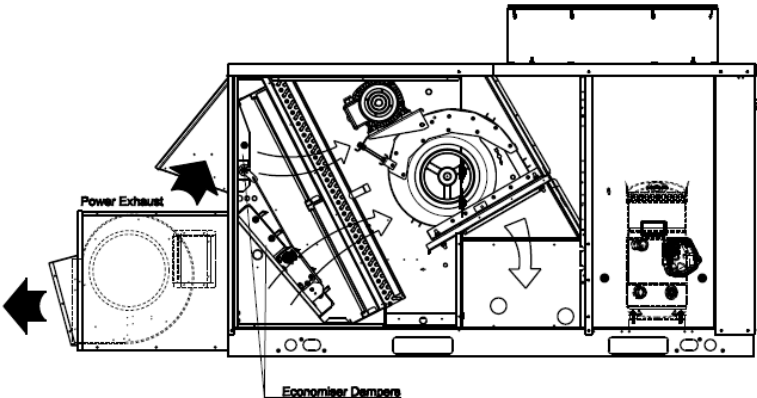
13.6 – Economizer with CO2 sensor options(Thermostatic or Enthalpic)

Indoor air quality is controlled from the Prodialog + control through the input coming from the CO2 sensor by adjusting the economizer. Please refer to the Prodialog + IOM for the control logic. The room type CO2 sensor is given in the electrical box together with their connectors. Please refer to the wiring diagrams for required connection and suitable cable diameters criteria for selecting. Sensor locations will vary with system and building specifics.

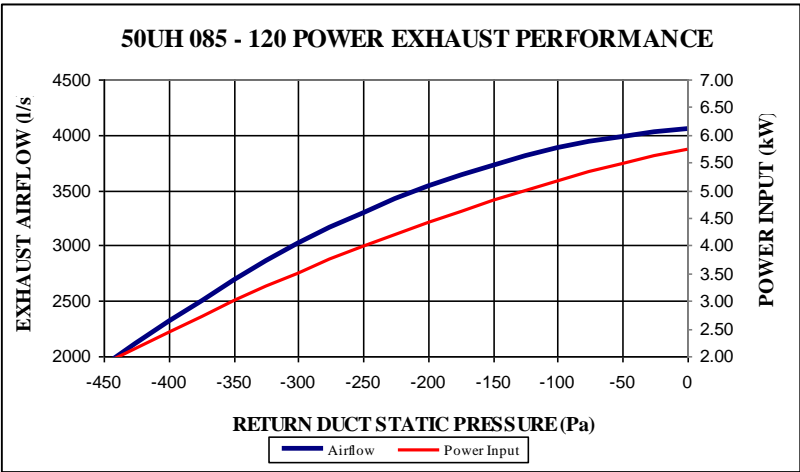
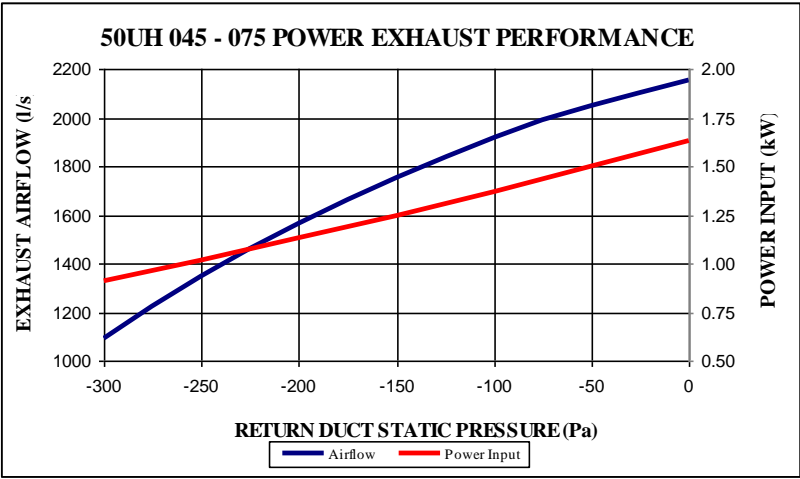
13.7 – Power exhaust option

When large amount of fresh air is introduced into the zone, power exhaust fans can be selected to exhaust excessive air. The exhaust fan runs when outdoor air dampers are at least 50% open (adjustable value). It is overload protected. The exhaust fan is factory fitted and tested before leaving the factory. (See fig.25). Refer to the certified drawings and wiring diagrams of power exhaust's mechanical and electrical connections and also Prodialog + Control IOM for further information.

Fig. 26 –Power exhaust option



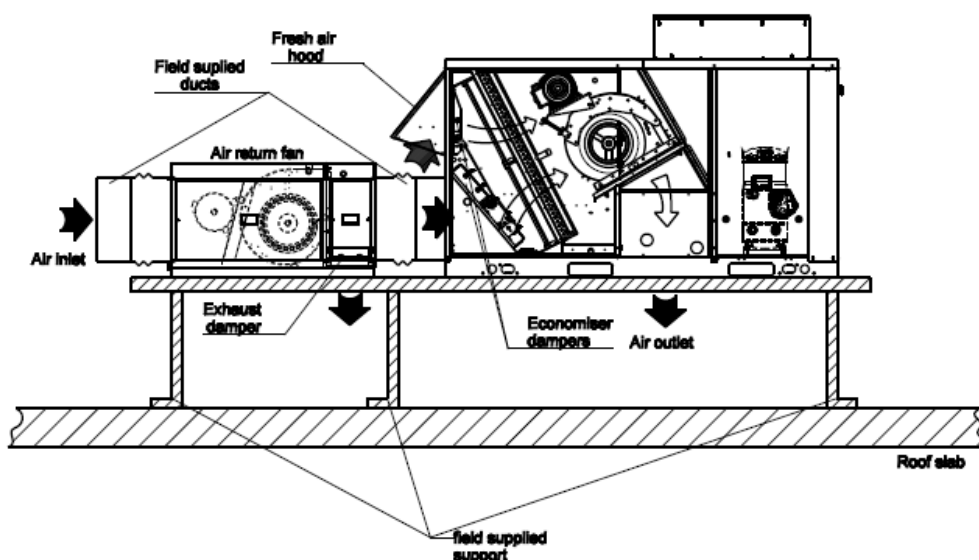
Below you will find the power exhaust performance tables:



13.8 – Air return fan options

This option assists supply fan to overcome the return side pressure drop while running in series with supply fan. It is also fitted with a damper to exhaust excessive air due to fresh air usage. The exhaust damper can be manually adjusted or automatically adjusted based on the fresh air options. The return fan is shipped loose but functional tests done separately before leaving the factory. Supporting frames, ducts, cables for mechanical and electrical connection shall be field supplied. (See fig.25) The drive is factory set in accordance with the return fan performance tables. When indoor pressure and air flow requirements differ from nominal ratings, the motor pulley can be adjusted for different available static pressure values (see Section 15.1 indoor fan airflow adjustment). Refer to the certified drawings and wiring diagrams of return fan's mechanical and electrical connections.

Fig. 27 –Air return fan option



Below you will find the return fan performance and fan Rpm At Motor Pulley Settings tables

RETURN FAN PERFORMANCES

Undersize Drive
Standard Drive
Oversize Drive

Return fan 4 HP																		
l/s	Unit External Static Pressure (Pa)																	
	40		70		100		130		160		190		220		250		280	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2250	-	-	-	-	634	0.818	692	0.931	746	1.048	805	1.173	859	1.302	911	1.436	962	1.574
2500	-	-	-	-	663	1.027	716	1.145	768	1.270	820	1.401	870	1.536	920	1.676	968	1.822
2750	-	-	647	1.155	696	1.275	744	1.401	792	1.532	840	1.670	887	1.811	933	1.958	978	2.110
3000	641	1.315	686	1.440	731	1.569	775	1.702	819	1.841	863	1.985	907	2.133	950	2.286	993	2.444
3250	685	1.639	727	1.773	768	1.910	809	2.051	850	2.197	891	2.348	931	2.503	972	2.664	1012	2.829
3500	730	2.014	768	2.158	807	2.304	845	2.453	883	2.607	921	2.766	959	2.928	997	3.094	1034	3.265
3750	774	2.445	811	2.598	847	2.753	882	2.912	918	3.073	954	3.239	989	3.409	1024	3.689	1060	3.760
4000	820	2.937	854	3.098	888	3.262	921	3.429	955	3.599	988	3.773	1021	3.950	1055	4.132	1088	4.317
4250	866	3.490	898	3.662	929	3.835	961	4.011	993	4.190	1024	4.372	1056	4.557	1087	4.747	1118	4.939

Return fan 5.5 HP																		
l/s	Fan speed (rpm)																	
	170		200		230		260		290		320		350		380		410	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2500	786	1.289	837	1.418	887	1.553	936	1.693	984	1.836	1030	1.984	1075	2.137	1119	2.292	1162	2.450
2750	808	1.548	855	1.685	902	1.826	948	1.971	993	2.122	1037	2.277	1081	2.435	1123	2.597	1164	2.762
3000	834	1.854	878	1.996	921	2.144	965	2.295	1007	2.452	1049	2.613	1090	2.777	1131	2.946	1170	3.119
3250	864	2.205	904	2.356	945	2.510	985	2.668	1025	2.831	1064	2.998	1103	3.169	1142	3.344	1180	3.523
3500	896	2.610	934	2.767	971	2.928	1009	3.093	1046	3.262	1084	3.436	1121	3.613	1157	3.795	1193	3.979
3750	930	3.070	965	3.234	1001	3.402	1036	3.574	1071	3.750	1106	3.930	1141	4.114	1176	4.301	1210	4.492
4000	966	3.590	999	3.761	1032	3.937	1066	4.116	1099	4.299	1132	4.485	1165	4.675	1197	4.870	1230	5.067
4250	1003	4.172	1035	4.351	1066	4.534	1097	4.721	1129	4.911	1160	5.105	1191	5.302	1222	5.503	1253	5.706
4500	1042	4.820	1071	5.009	1101	5.200	1131	5.394	1160	5.591	1190	5.793	1219	5.997	1249	6.204	1278	6.415
4750	1081	5.540	1110	5.737	1138	5.936	1166	6.137	1194	6.343	1222	6.551	1250	6.763	1278	6.978	1306	7.195

Return fan 7.5 HP																		
l/s	Unit External Static Pressure (Pa)																	
	20		50		80		110		140		170		200		230		260	
	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3250	-	-	-	-	527	1.102	573	1.247	619	1.399	663	1.561	706	1.731	748	1.910	789	2.094
3500	-	-	-	-	549	1.312	593	1.462	635	1.622	677	1.790	718	1.965	758	2.148	797	2.338
3750	-	-	531	1.400	573	1.551	613	1.708	653	1.873	692	2.047	731	2.228	769	2.417	807	2.613
4000	-	-	558	1.663	597	1.820	635	1.984	673	2.157	710	2.336	747	2.524	783	2.718	819	2.920
4250	547	1.798	585	1.958	622	2.123	658	2.295	693	2.473	729	2.660	764	2.853	798	3.052	832	3.260
4500	577	2.119	612	2.288	647	2.462	681	2.641	715	2.826	749	3.019	782	3.218	815	3.424	847	3.637
4750	606	2.478	640	2.655	673	2.837	706	3.024	738	3.217	770	3.416	801	3.622	833	3.834	864	4.053
5000	636	2.875	668	3.062	699	3.252	730	3.446	761	3.647	792	3.854	822	4.066	852	4.285	882	4.509
5250	665	3.315	696	3.509	726	3.707	756	3.911	785	4.118	814	4.333	843	4.552	872	4.777	901	5.007
5500	695	3.796	724	4.000	753	4.207	782	4.418	810	4.633	838	4.855	866	5.082	893	5.314	921	5.551

FAN RPM AT MOTOR PULLEY SETTINGS - RETURN FAN*

Option no	MOTOR PULLEY TURNS OPEN									
	0	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2
68/142	1,015	1,001	986	971	956	942	927	913	898	883
69/143	1,208	1,191	1,173	1,156	1,138	1,121	1,103	1,086	1,068	1,051
70/144	694	684	674	664	654	644	634	624	614	604

*Approximate fan rpm shown.

Note: Factory setting values given as bold

13.9 – Dirty filter detection option

Dirty filter detection is controlled from the Prodialog + control through the input coming from the differential pressure switch by checking the pressure drop across the filter. Factory setting is 250 Pa and it is adjustable. If the pressure drop across the filter exceeds 250 Pa, there will be an alarm on Prodialog + with necessary actions. Please refer to the certified drawings and wiring diagrams of this option for mechanical and electrical connections and also Prodialog + Control IOM for further information.

13.10 – Supply airflow detection option

Supply airflow detection is controlled from the Prodialog + control through the input coming from the differential pressure switch by checking the pressure drop between the return side and atmosphere. Factory setting is 20 Pa. If the pressure drop between the return side and atmosphere do not reach 20 Pa, there will be an alarm on Prodialog + with necessary actions. Please refer to the certified drawings and wiring diagrams of this option for mechanical and electrical connections and also Prodialog + Control IOM for further information.

13.11 – Smoke detector option

The smoke detector is factory fitted in return air side. In case of smoke detection, there will be an alarm on Prodialog + with necessary actions. Please refer to the certified drawings and wiring diagrams of this option for mechanical and electrical connections and also Prodialog + Control IOM for further information.

13.11 – Smoke detector + DAD option

The DAD is factory fitted under the electric board and its smoke detector is located in return air side. In case of smoke detection, there will be an alarm on Prodialog + with necessary actions. This smoke detection option is complying with the French regulation on public buildings. Please refer to the certified drawings and wiring diagrams of this option for mechanical and electrical connections and also Prodialog + Control IOM for further information.

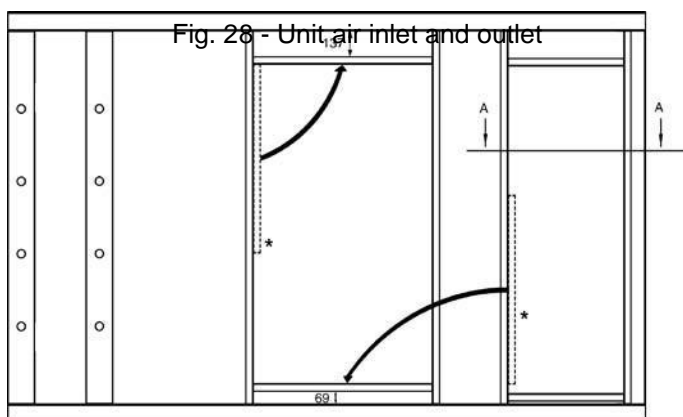
13.11 – Fire thermostat option

The fire thermostat, factory fitted in return air stream, is checking the return air temperature. Factory setting is 70°C and it is adjustable. If the return air temperature exceeds 70°C, there will be an alarm on Prodialog + with necessary actions. Please refer to the certified drawings and wiring diagrams of this option for mechanical and electrical connections and also Prodialog + Control IOM for further information.

13.12 – Fixation frame

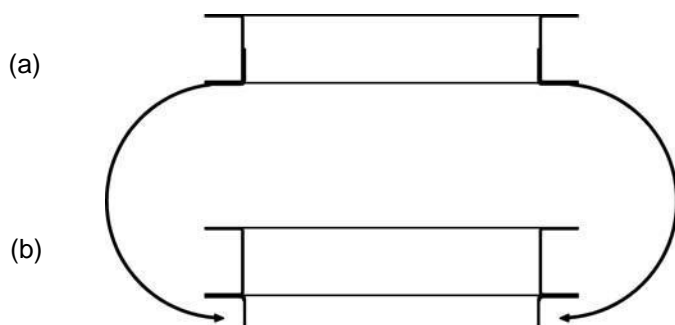
This option enables easy duct connection both for inlet and outlet ducts when the roofcurb accessories are not selected.

For 50/48UH085-100 units, Mount the parts, marked “*” in the position shown in Fig. 28 before the unit is placed on the support.



Air inlet and outlet flange parts should be mounted as shown in Fig. 29 (b) before the unit is placed on the support.

Fig. 29 - View A-A of Fig. 28



14- ACCESSORIES LIST

ACCESSORIES	PARTS N°	DESCRIPTION	ADVANTAGE	USAGE & SIZES							
				Type	45	55	65	75	85	100	120
Roofcurbs											
Vertical Supply Roofcurb	57070020010	Galvanised steel 2 mm thick frame for vertical supply & vertical return air.	Provide an easy and cost effective weatherproof sealed rooftop installation and easy connection to the air duct.	ALL	X	X	X	X			
	57070021501								X	X	X
Vertical Supply Adjustable longitudinal roof-curb	57070025510	Galvanised steel 2 mm thick frame for vertical supply & vertical return air. Adjustable longitudinal slope up to 5%.	Provide an easy and cost effective weatherproof sealed rooftop installation and easy connection to the air duct. Compatible with all roof profiles.		X	X	X	X			
	57070027101								X	X	X
Vertical Supply Adjustable transversal roof-curb	57070026310	Galvanised steel 2 mm thick frame for vertical supply & vertical return air. Adjustable transversal slope up to 5%.			X	X	X	X			
	57070027901								X	X	X
Horizontal Supply roofcurb	57070022710	Galvanised steel 2 mm thick frame for horizontal supply & vertical return air.	Provide an easy and cost effective weatherproof sealed rooftop installation and easy connection to the horizontal supply air		X	X	X	X			
	57070025210								X	X	X
Transition roof-curb (French ERP)	57070034310	Thin galvanised steel frame for gas burner RTU in France only. Standard or adjustable roofcurb is also required	Meet french regulation requirements with bas burners.		X	X	X	X			
	57070035410								X	X	X
Remote control											
Remote HMI Pro-Dialog+	57260042910	User Interface remote installation	Remote control of several units up to 300m	ALL	X	X	X	X	X	X	X

14.1 – Roofcurbs

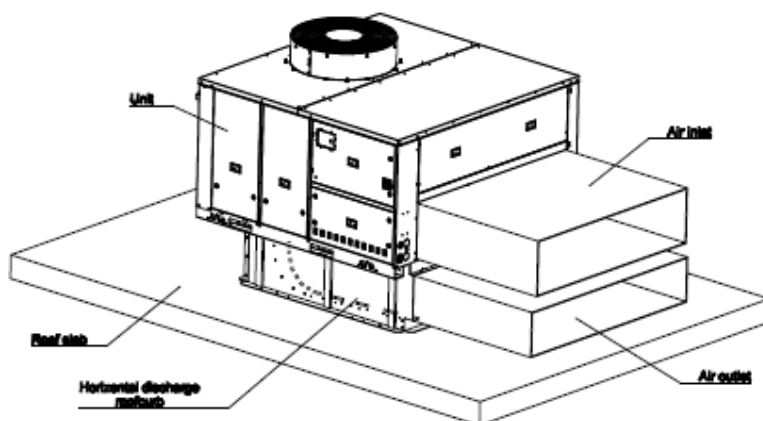
Horizontal discharge roof curb

The units leave the factory with the air discharge and return in the lower section. The horizontal discharge roof curb accessory changes the discharge and return to the horizontal direction

Installation

1. Check that the building structure is capable of supporting the unit operating weight (see certified drawings).
2. Position the roof curb accessory in the place selected for unit operation.
3. The roof curb accessory should be completely level to allow correct unit drainage.
4. The ducts can be connected to the accessory before siting.
5. Assemble the unit on top of the roof curb accessory ensuring that the unit discharge coincides with the accessory inlet. The unit and accessory assembly should be as shown in Fig. 30.

Fig. 30 – Horizontal discharge roofcurb



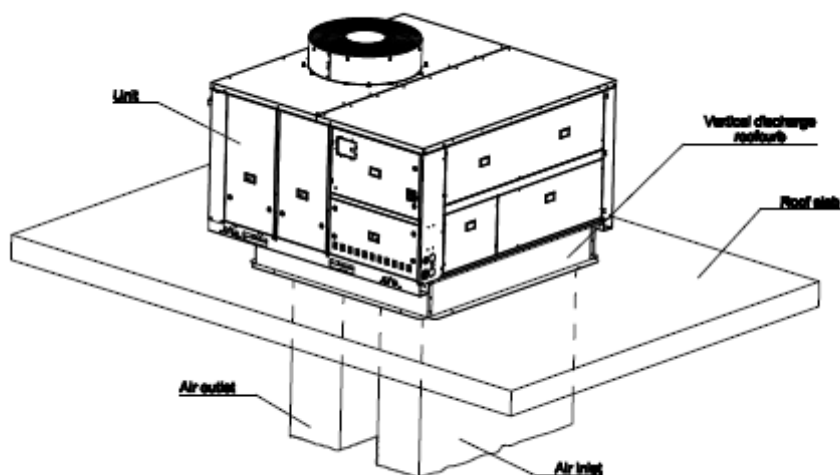
Vertical discharge roof curb

This accessory is used for improving the unit installation and facilitating vertical connection of the air discharge and return ducts.

Installation

1. Check that the building structure is capable of supporting the unit operating weight
2. Make the appropriate holes in the building ceiling so that the air discharge and return ducts can be inserted.
3. Place the roof curb accessory in the position selected for unit operation and ensure that the holes in the accessory coincide with those made in the ceiling.
4. The roof curb accessory should be perfectly levelled to allow correct unit drainage.
5. The ducts can be connected to the roof curb accessory before the unit is sited.
6. Assemble the unit on top of the roof curb accessory ensuring that the unit discharge and return air coincide with the accessory inlets. The unit and the accessory assembly should be as shown in Fig. 31.

Fig. 31 – Vertical discharge roofcurb



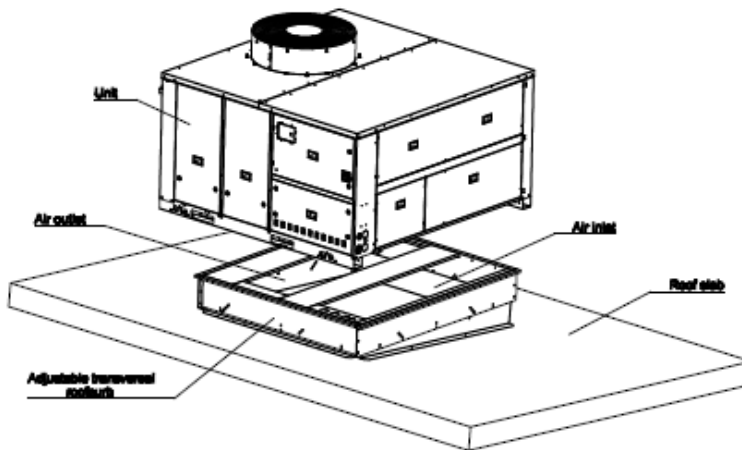
Adjustable transversal roof curb

This accessory can be installed on a roof with up to 5% slope in transversal direction and also used for improving the unit installation and facilitating vertical connection of the air discharge and return ducts.

Installation

1. Check that the building structure is capable of supporting the unit operating weight
2. Make the appropriate holes in the building ceiling so that the air discharge and return ducts can be inserted.
3. Place the roof curb accessory in the position selected for unit operation and ensure that the holes in the accessory coincide with those made in the ceiling.
4. The roof curb accessory should be perfectly levelled to allow correct unit drainage.
5. The ducts can be connected to the roof curb accessory before the unit is sited.
6. Assemble the unit on top of the roof curb accessory ensuring that the unit discharge and return air coincide with the accessory inlets. The unit and the accessory assembly should be as shown in Fig. 32.

Fig. 32 – Adjustable transversal roofcurb



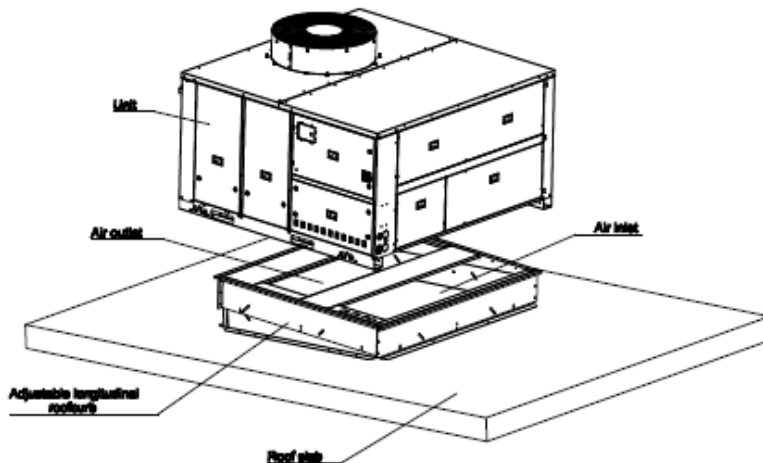
Adjustable longitudinal roof curb

This accessory can be installed on a roof with up to 5% slope in longitudinal direction and also used for improving the unit installation and facilitating vertical connection of the air discharge and return ducts.

Installation

1. Check that the building structure is capable of supporting the unit operating weight
2. Make the appropriate holes in the building ceiling so that the air discharge and return ducts can be inserted.
3. Place the roof curb accessory in the position selected for unit operation and ensure that the holes in the accessory coincide with those made in the ceiling.
4. The roof curb accessory should be perfectly levelled to allow correct unit drainage.
5. The ducts can be connected to the roof curb accessory before the unit is sited.
6. Assemble the unit on top of the roof curb accessory ensuring that the unit discharge and return air coincide with the accessory inlets. The unit and the accessory assembly should be as shown in Fig. 33.

Fig. 33 – Adjustable longitudinal roofcurb



15-STANDARD MAINTENANCE

Air conditioning equipment must be maintained by professional technicians, whilst routine checks can be carried out locally by specialised technicians.

All refrigerant charging, removal and draining operations must be carried out by a qualified technician and with the correct material for the unit. Any inappropriate handling can lead to uncontrolled fluid or pressure leaks.

WARNING: Before doing any work on the machine ensure that the power is switched off. If a refrigerant circuit is opened, it must be evacuated, recharged and tested for leaks. Before any operation on a refrigerant circuit, it is necessary to remove the complete refrigerant charge from the unit with a refrigerant charge recovery group.

In order to obtain maximum performance from the unit special attention should be paid to the following points:

- **Electrical connections:** The supply voltage should be within the limits permitted by the compressor. Ensure that no faulty contacts exist in the terminal blocks, contactor boards, etc. Make sure that all the electrical connections are properly tightened, and that all the electrical components (contactors, relays, etc) are firmly secured to the corresponding rails. Pay special attention to the condition of the connecting cables between the control elements and the electrical box, and to that of the unit power supply cable. Check the starting and running consumptions are within the limits specified in the corresponding technical information.
- **Drainage:** Frequently check that the drain is not obstructed, and that the condensate pan is clean and levelled.
- **Inlet filter:** This should be changed periodically. The frequency depends on the quality of the entering air. Dirty filter option can be used to know the right time for change. A set of filters can be ordered as spare part.
- **Refrigerant circuit:** Ensure that there is no leakage of refrigerant or oil from the compressor. Check that the high and low side operating pressures are normal. Make sure that the coils are not dirty. Check for unusual compressor noise.
- **Controls:** Check the operation of all the relays, high and low pressure transducers and the high pressure switch, etc. Use the quick test function of ProDialog + control.

15.1 - Maintenance Programme

All maintenance operations must be carried out by technicians who have been trained on Carrier products, observing all Carrier quality and safety standards. Please

contact Carrier University.

15.2 - Maintenance instructions

During the unit operating life the service checks and tests must be carried out in accordance with applicable national regulations.

If there are no similar criteria in local regulations, the information on checks during operation in annex C of standard

EN 378-2 can be used.

External visual checks: annex A and B of standard EN 378-2

Corrosion checks: annex D of standard EN 378-2. These controls must be carried out:

After an intervention that is likely to affect the resistance or a change in use or change of high-pressure refrigerant, or after a shut down of more than two years. Components that do not comply, must be changed. Test pressures above the respective component design pressure must not be applied (annex B and D).

After repair or significant modifications or significant system or component extension (annex B) After re-installation at another site (annexes A, B and D) After repair following a refrigerant leak (annex D). The frequency of refrigerant leak detection can vary from once per year for systems with less than 1% leak rate per year to once a day for systems with a leak rate of 35% per year or more. The frequency is in proportion with the leak rate.

NOTE: High leak rates are not acceptable. The necessary steps must be taken to eliminate any leak detected.

NOTE 2: Fixed refrigerant detectors are not leak detectors, as they cannot locate the leak.

15.3 - Level 1 maintenance (see note)

Simple procedures, can be carried out by the user on a weekly basis:

- Visual inspection for oil traces (sign of a refrigerant leak),
- Coil cleaning - see chapter 'Indoor/outdoor coils - level 1',
- Check for removed protection devices, and badly closed doors/covers,
- Check the unit alarm report when the unit does not work (see report in the Pro-Dialog+ control manual),
- General visual inspection for any signs of deterioration,
- Verify the unit operating parameters at 100% full load with the ones taken during start-up.

15.4 - Level 2 maintenance (see note)

This level requires specific know-how in the electrical, refrigerant and mechanical fields. It is possible that these skills are available locally: existence of a maintenance service, industrial site, specialised subcontractor.

The frequency of this maintenance level can be monthly or annually depending on the verification type.

In these conditions, the following maintenance operations are recommended.

Carry out all level 1 operations, then:

Electrical checks

- At least once a year tighten the power circuit electrical connections (see table with tightening torques).
- Check and retighten all control/command connections, if required (see table with tightening torques).
- Remove the dust and clean the interior of the control boxes, if required.
- Check the status of the fuses, contactors, disconnect switches and capacitors.
- Replace the fuses every 3 years or every 15000 hours (age-hardening).
- Check the presence and the condition of the electrical protection devices.
- Check the correct operation of all heaters.
- Check that no water has penetrated into the control box.

Mechanical checks

- Check the tightening of the fan tower, fan, compressor and control box fixing bolts.

Refrigerant circuit

- Fully clean the condensers with a low-pressure jet and a bio-degradable cleaner (counter-current cleaning - see chapter 'Indoor/outdoor coils - level 2).
- Check the unit operating parameters at 100% full load and compare them with previous values.
- Verify the tightening of the bulb with capillary tube of the thermostatic expansion valve. The bulb is best mounted in a position corresponding to 4 o'clock or 8 o'clock.
- Carry out an oil contamination test. Replace the oil, if necessary. Carrier ECRD Reference : 7754024
- Check the operation of the high-pressure switches. Replace them if there is a fault.
- Check the fouling of the filter drier in cooling mode. Replace it if necessary.
- Keep and maintain a maintenance sheet, attached to each HVAC unit.

All these operations require strict observation of adequate

safety measures: individual protection garments, compliance with all industry regulations, compliance with applicable local regulations and using common sense.

15.5 - Level 3 (or higher) maintenance (see note)

The maintenance at this level requires specific skills/approval/ tools and know-how and only the manufacturer, his representative or authorised agent are permitted to carry out these operations. These maintenance operations refer for example to:

- a major component replacement (compressor, coils),
- any intervention on the refrigerant circuit (handling refrigerant),
- changing of parameters set at the factory (application

change),

- removal or dismantling of the HVAC unit,
- any intervention due to a missed established maintenance operation,
- any intervention covered by the warranty.
- one to two leak checks per year with a certified leak detector and carried out by a qualified person.

To reduce waste, the refrigerant and the oil must be transferred in accordance with applicable regulations, using methods that limit refrigerant leaks and pressure drops and with materials that are suitable for the products.

Any detected leaks must be repaired immediately. The compressor oil that is recovered during maintenance contains refrigerant and must be treated accordingly.

Refrigerant under pressure must not be purged to the open air.

If a refrigerant circuit is opened, plug all openings, if the operation takes longer than an hour, charge the circuit with nitrogen.

Component screw type	Designation in the unit	Value (Nm)
Screw on disconnect switch		
M6		7
M8	L1/L2/L3	14
Screw PE (M5)	PE	4
Tunnel terminal screw, compressor contactor		
Contacteur 3RT101		1
Contacteur 3RT101		2.2
Contacteur 3RT101	KM_	3.7
Tunnel terminal screw, compressor fuse(3NP1123)	FU_	11
Tunnel terminal screw, control power transformer	TC	2
Tunnel terminal screw, disconnects		
Disconnect 3RV1011_		1
Disconnect 3RV1021_	QF_/QM_	2.2
Compressor phase&earth connection (4.8 mm)		3

NOT E: Any deviation or non-observation of these maintenance

criteria will render the guarantee conditions for the HVAC unit null and void, and the manufacturer, Carrier, will no longer be held responsible.

15.6 - Tightening torques for the main electrical Connections

Screw type	Used for	Value (Nm)
Compressor strut	Compressor support	30
M8 nut	Single compressor fixing	15
M10 nut	Compressor mounting	30
M12 nut	Tandem Compressor fixing	30
Oil nut	Oil equalization line	90
Taptite Screw M8	Fan motor fixing	13
M8 screw	Fan scroll fixing	18
Metal screw	Sheet metal plates	4.2

15.7 -

Tightening torques for the main bolts and screws

15.8 – Indoor/outdoor coils

We recommend, that finned coils are inspected regularly to check the degree of fouling. This depends on the environment where the unit is installed, and will be worse in urban and industrial installations and near trees that shed their leaves. For coil cleaning, two maintenance levels are used,

Level 1

- If the coils are fouled, clean them gently in a vertical direction, using a brush.
- Only work on coils with the fans switched off.
- For this type of operation switch off the HVAC unit if service considerations allow this.
- Clean coils guarantee optimal operation of your HVAC unit. This cleaning is necessary when the coils begin to become fouled. The frequency of cleaning depends on the season and location of the HVAC unit (ventilated, wooded, dusty area, etc.).

Level 2

Clean the coil, using appropriate products.

We recommend TOTALINE products for coil cleaning:

Part No. P902 DT 05EE: traditional cleaning method

Part No. P902 CL 05EE: cleaning and degreasing.

These two cleaning products can be used for any of the following coil finishes: Cu/Cu, Cu/Al, Cu/Al with Polual, Blygold and/or Heresite protection.

These products have a neutral pH value, do not contain phosphates, are not harmful to the human body, and can be disposed of through the public drainage system. Depending on the degree of fouling both products can be used diluted or undiluted.

For normal maintenance routines we recommend using 1 kg of the concentrated product, diluted to 10%, to treat a coil surface of 2 m². This process can either be carried out using a high-pressure spray gun in the low-pressure position.

With pressurised cleaning methods care should be taken not to damage the coil fins. The spraying of the coil must be done:

- in the direction of the fins
- in the opposite direction of the air flow direction
- with a large diffuser (25-30°)
- at a minimum distance of 300 mm from the coil.

It is not necessary to rinse the coil, as the products used are pH neutral. To ensure that the coil is perfectly clean, we recommend rinsing with a low water flow rate. The pH value of the water used should be between 7 and 8.

WARNING: Never use pressurised water without a large diffuser. Do not use high-pressure cleaners for Cu/Cu and Cu/Al coils.

Concentrated and/or rotating water jets are strictly forbidden. Never use a fluid with a temperature above 45°C to clean the air heat exchangers.

Correct and frequent cleaning (approximately every three

months) will prevent 2/3 of the corrosion problems. Protect the control box during cleaning operations.

15.9 - Refrigerant volume

The unit must be operated in cooling mode to find out, if the unit charge is correct, by checking the actual subcooling. Following a small refrigerant leak a loss of refrigerant, compared to the initial charge will be noticeable in the cooling mode and affect the subcooling value obtained at the air heat exchanger (condenser) outlet, but it will not be noticeable in the heating mode.

IMPORTANT: It is therefore not possible to optimise the

refrigerant charge in the heating mode after a leak. The unit must be operated in the cooling mode to check, if an additional charge is required.

15.10 - Characteristics of R-410A

Saturated temperatures (°C) based on the relative pressure (in kPa)

<u>Saturated</u>	<u>Relative</u>	<u>Saturated</u>	<u>Relative</u>
<u>temperature, °C</u>	<u>pressure, kPa</u>	<u>temperature, °C</u>	<u>pressure, kPa</u>
-20	297	25	1552
-19	312	26	1596
-18	328	27	1641
-17	345	28	1687
-16	361	29	1734
-15	379	30	1781
-14	397	31	1830
-13	415	32	1880
-12	434	33	1930
-11	453	34	1981
-10	473	35	2034
-9	493	36	2087
-8	514	37	2142
-7	535	38	2197
-6	557	39	2253
-5	579	40	2311
-4	602	41	2369
-3	626	42	2429
-2	650	43	2490
-1	674	44	2551
0	700	45	2614
1	726	46	2678
2	752	47	2744
3	779	48	2810
4	807	49	2878
5	835	50	2947
6	864	51	3017
7	894	52	3088
8	924	53	3161
9	956	54	3234
10	987	55	3310
11	1020	56	3386
12	1053	57	3464
13	1087	58	3543
14	1121	59	3624
15	1156	60	3706
16	1192	61	3789
17	1229	62	3874
18	1267	63	3961
19	1305	64	4049
20	1344	65	4138
21	1384	66	4229
22	1425	67	4322
23	1467	68	4416
24	1509	69	4512
		70	4610

50/48UH units use high-pressure R-410A refrigerant (the unit operating pressure is above 40 bar, the pressure at 35°C air temperature is 50% higher than for R-22). Special equipment must be used when working on the refrigerant circuit (pressure gauge, charge transfer, etc.)

15.11 Servicing recommendations

Before replacing any of the elements in the cooling circuit, ensure that the entire refrigerant charge is removed from both the high and low pressure sides of the unit. The control elements of the cooling system are highly sensitive. If they need to be replaced, care should be taken not to overheat them with blowlamps whilst soldering. A damp cloth should be wrapped around the component to be soldered, and the flame directed away from the component body. Silver alloy soldering rods should always be used. If the total unit gas charge has to be replaced, the quantity should be as given on the nameplate and the unit should be properly evacuated beforehand. During unit operation all panels should be in place, including the electrical box access panel. If it is necessary to cut the lines of the refrigerant circuit, tube cutters should always be used and never tools which produce burrs. All refrigerant circuit tubing should be of copper, specially made for refrigeration purposes.

15.12 FINAL RECOMMENDATIONS

The unit you have purchased has undergone strict quality control procedures before leaving the factory.

All components, including the control systems and electrical equipment, etc., are certified by our Quality Control Department, and tested under the harshest possible operating conditions in our laboratories. However, after leaving the factory, it is possible that one or more of these elements may be damaged due to causes beyond our control. In such an event, **the user should not work on any of the internal components, or subject the unit to operating conditions which are not specified in this manual**, since serious damage may result and the guarantee would be invalidated. Repair and maintenance work should always be left to the installer.

All recommendations concerning unit installation are intended to be as a guideline. The installer should carry out the installation according to the design conditions and should comply with all applicable regulations for air conditioning and refrigeration installations.

NOTE: The manufacturer does not accept responsibility for any malfunctions resulting from misuse of the equipment.

15.13 TROUBLESHOOTING CHART

A list of possible faults, as well as the probable cause and suggested solutions is shown below. In the event of a unit malfunction it is recommended to disconnect the power supply and ascertain the cause.

Troubleshooting chart

Symptoms	Cause	Remedy
Unit does not start	No power supply Main switch open Low line voltage A protection has tripped Contactor stuck open Compressor failure	Connect power supply Close main unit disconnect switch Check voltage and remedy the deficiency Reset Check and if necessary replace contactor Check and if necessary replace compressor
Unit starts and stops frequently	Defective compressor contactor Defective compressor Refrigerant losses	Check and if necessary replace contactor Check and if necessary replace compressor Check and add the necessary quantity
Unit continuously cuts out at low saturated suction temperature	Defective low pressure transducer Refrigerant losses Indoor fan does not operate	Check and if necessary replace low pressure transducer Check and add the necessary quantity Check fan motor
Unit continuously cuts out at saturated discharge temperature	Defective high pressurestat Blocked filter drier Outdoor fan does not operate	Check and if necessary replace pressurestat Check and if necessary replace filter Check fan motor
Abnormal system noise	Noisy compressor Badly fitting panels	Check and change if necessary Install correctly
Compressor loses oil	Leak in system	Repair leak
Water loss	Defective drainage connections	Check and tighten if necessary

IMPORTANT –

Following any operation on the appliance which has necessitated removal and replacement of any parts, the appliance shall be re-commissioned in accordance with the commissioning section of these instructions.

16 - START-UP CHECKLIST FOR 50/48UH ROOFTOP UNITS (USE FOR JOB FILE)

Preliminary information

Job name:

.....

Location:

.....

Installing

contractor:.....

Distributor:

.....

Start-up performed by: Date:

.....

Equipment

Model 50/48UH: S/N

Compressors

Circuit A

Circuit B

1. Model No.

1. Model No.

Serial No.

Serial No.

.....

2. Model No.

2. Model No.

Serial No.

Serial No.

.....

Additional option&accessories

.....

.....

Preliminary equipment check

Is there any shipping damage? If so, where?

.....

.....

Will this damage prevent unit start-up?

.....

- ☐ Unit is level in its installation
- ☐ Power supply agrees with the unit name plate
- ☐ Electrical circuit wiring has been sized and installed properly
- ☐ Unit ground wire has been connected
- ☐ Electrical circuit protection has been sized and installed properly
- ☐ All terminals are tight
- ☐ All cables and thermistors have been inspected for crossed wire

Unit start-up

- ☐ Oil level is correct
- ☐ Compressor crankcase heaters have been energised for 12 hours
- ☐ Unit has been leak checked (including fittings)
- ☐ Locate, repair, and report any refrigerant leaks

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Check voltage imbalance: AB AC BC.....
Average voltage = (see installation instructions)
Maximum deviation = (see installation instructions)
Voltage imbalance = (see installation instructions)

- ☐ Voltage imbalance is less than 2%

WARNING: Do not start rooftop unit if voltage imbalance is greater than 2%. contact local power company for assistance.

- ☐ All incoming power voltage is within rated voltage range

Carry out the quick test function (see 50/48UH Pro-Dialog+ control manual):

Re-enter the setpoints (see controls section)

To start up the rooftop

Once all checks have been made, start the unit in the “LOCAL ON” position.

Unit starts and operates properly

Temperatures and pressures

WARNING: Once the machine has been operating at 100% full load for a while and the temperatures and pressures have stabilized, record the following:

Entering air temperature
Leaving air temperature
Ambient temperature
Circuit A suction pressure
Circuit B suction pressure.....
Circuit A discharge pressure
Circuit B discharge pressure.....
Circuit A suction temperature
Circuit B suction temperature
Circuit A discharge temperature
Circuit B discharge temperature
Circuit A liquid line temperature
Circuit B liquid line temperature

ACCESSORIES:

GAS HEATING SECTION

Gas Burner N°1				Gas Burner N°2			
Size		Serial No		Size		Serial No	
.....		
Pipe size		Gas Type		Pipe size		Gas Type	
.....		G ..		.....		G ..	
Line Pressure				Line Pressure			
..... mbar				..... mbar			
Check burner pressure				Check burner pressure			
Min. rate		Max. rate		Min. rate		Max. rate	
..... mbar		..... mbar		..... mbar		..... mbar	
Pressure cut out airflow pressure switch				Pressure cut out airflow pressure switch			
..... Pa				..... Pa			
Motor amps	Flue Temp	CO2 %	CO ppm	Motor amps	Flue Temp	CO2 %	CO ppm
..... A	..... °C	..... %	..... %	..... A	..... °C % %

Note: Complete this start-up list at the time of installation

NOTES:
.....
.....
.....



Order No: 1-PRELIMINARY-76, 01.2012 - Supersedes order No: New.
Manufacturer reserves the right to change any product specifications without notice.



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