LENNOX®

# INSTALLATION OPERATING & MAINTENANCE MANUAL

PROVIDING GLOBAL SYSTEM SOLUTIONS

ROOFTOP
FLEXY™

English
July 2004

# INSTALLATION
# OPERATION
# MAINTENANCE MANUAL

Ref. FLEXY_IOM/0704-E

The present manual applies to the following ROOFTOP versions :

FCA 85 - FCA 100 - FCA 120 - FCA 140 - FCA 160 - FCA 190
FCK 85 - FCK 100 - FCK 120 - FCK 140 - FCK 160 - FCK 190
FHA 85 - FHA 100 - FHA 120 - FHA 140 - FHA 160 - FHA 190
FHK 85 - FHK 100 - FHK 120 - FHK 140 - FHK 160 - FHK 190
FDA 85 - FDA 100 - FDA 120 - FDA 140 - FDA 160 - FDA 190
FDK 85 - FDK 100 - FDK 120 - FDK 140 - FDK 160 - FDK 190
FGA 85 - FGA 100 - FGA 120 - FGA 140 - FGA 160 - FGA 190
FGK 85 - FGK 100 - FGK 120 - FGK 140 - FGK 160 - FGK 190

FXA 25 - FXA 30 - FXA 35 - FXA 40 - FXA 55 - FXA 70 - FXA 85 - FXA 100 - FXA 110 - FXA 140 - FXA 170
FXK 25 - FXK 30 - FXK 35 - FXK 40 - FXK 55 - FXK 70 - FXK 85 - FXK 100 - FXK 110 - FXK 140 - FXK 170

***NOTES FOR UNIT FITTED WITH GAS BURNER :***

THE UNIT MUST BE INSTALLED IN ACCORDANCE WITH LOCAL SAFETY CODES AND REGULATIONS AND CAN ONLY BE USED IN WELL VENTILLATED AREA.

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

THIS MANUAL IS ONLY VALID FOR UNITS DISPLAYING THE FOLLOWING CODES: GB IR GR DA NO FI IS

In case these symbols are not displayed on the unit, please refer to the technical documentation which will eventually detail any modifications required to the installation of the unit in a particular country.

# CONTENTS

# IMPORTANT NOTICE

***All work on the unit must be carried out by a qualified and authorised employee.***

Non-compliance with the following instructions may result in injury or serious accidents.

***Work on the unit:***

- The unit shall be isolated from the electrical supply by disconnection and locking using the main isolating switch.
- Workers shall wear the appropriate personal protective equipment (helmet, gloves, glasses, etc.).

***Work on the electrical system:***

- Work on electric components shall be performed with the power off (see below) by employees having valid electrical qualification and authorisation.

***Work on the refrigerating circuit(s):***

- Monitoring of the pressures, draining and filling of the system under pressure shall be carried out using connections provided for this purpose and suitable equipment.
- To prevent the risk of explosion due to spraying of coolant and oil, the **relevant circuit shall be drained and at zero pressure** before any disassembly or unbrazing of the refrigerating parts takes place.
- There is a residual risk of pressure build-up by degassing the oil or by heating the exchangers after the circuit has been drained. **Zero pressure shall be maintained** by venting the drain connection to the atmosphere on the low pressure side.
- The brazing shall be carried out by a qualified brazer. The brazing shall comply with standard NF EN1044 (minimum 30% silver).

***Replacing components:***

- In order to maintain CE marking compliance, replacement of components shall be carried out using spare parts, or using parts approved by Lennox.
- Only the coolant shown on the manufacturer's nameplate shall be used, to the exclusion of all other products (mix of coolants, hydrocarbons, etc.).

## CAUTION:

In the event of fire, refrigerating circuits can cause an explosion and spray coolant gas and oil.



| **Site details / Informations site** | | **Controller/ Contrôleur** | …… |
|---|---|---|---|
| **Site / Site** | …… | **Model/Model** | …… |
| **Unit Ref/ N° Affaire** | ……... | **Serial No/ No Série** | …… |
| **Installer/ Installateur** | …… | **Refrigerant / Réfrigérant** | …… |

## (1) ROOF INSTALLATION / INSTALLATION SUR LE TOIT

| Sufficient Access OK / Accès Suffisants<br>Yes/Oui ☐ No/ Non ☐ | Condensate drain fitted / Drainage condensats<br>Installé Yes/Oui ☐ No/ Non ☐ | Roofcurb / Costière<br>OK ☐ Not OK/PasOK ☐ |
|---|---|---|

## (2) CONNECTIONS CHECK / VERIFICATIONS DE RACCORDEMENTS

| Phase check/ Vérification des Phases<br>Yes / Oui ☐ No / Non ☐ | Voltage between Phases<br>Tension entre Phases | 1 / 2<br>…… | 2 / 3<br>…… | 1 / 3<br>…… |
|---|---|---|---|---|

## (3)CLIMATIC CONFIGURATION CHECK / VERIFIER LA CONFIGURATION CLIMATIC

CLIMATIC 50 Configured according to the Options and Specifications / CLIMATIC 50 configuré en fonction des options et des spécifications: Yes/Oui ☐ No/ Non ☐

## (4) SUPPLY BLOWER SECTION / VENTILATION TRAITEMENT

| | | **N°1** | **N°2** |
|---|---|---|---|
| Type / Type: | | | |
| Power displayed on plate / Puissance affichée sur la plaque: | KW | …… | …… |
| Voltage displayed on plate / Tension affichée sur la plaque: | V | …… | …… |
| Current displayed on plate / Intensité affichée sur la plaque: | A | …… | …… |
| Fan Type / Type de Ventilateur: | | Forward / Action ☐<br>Backward / Réaction ☐ | Forward / Action ☐<br>Backward / Réaction ☐ |
| Displayed Belt Length **/** Longueur Courroie affichée: | mm | …… | …… |
| Tension Checked/ Tension Vérifiée: | | Yes/Oui ☐ No/ Non ☐ | Yes/Oui ☐ No/ Non ☐ |
| Alignment Checked / Alignement Vérifié: | | Yes/Oui ☐ No/ Non ☐ | Yes/Oui ☐ No/ Non ☐ |
| Motor Pulley Dia/ Poulie Moteur Dia: $D_M$ | mm | …… | …… |
| Fan Pulley Dia/ Poulie Ventilateur Dia: $D_P$ | mm | …… | …… |
| Fan Speed / Vitesse rotation Ventilateur = Motor rpm x $D_M$ / $D_P$ | rpm | …… | …… |
| Averaged Measured Amps / Intensité Mesurée moyenne: | A | …… | …… |
| Shaft Mechanical Power (Refer to airflow balancing)<br>Puissance Mécanique à l'Arbre (Voir section réglage débit) | W | …… | …… |
| Operating point checked / Vérif. Point de fonctionnement: | | Yes/Oui ☐ No/ Non ☐ | Yes/Oui ☐ No/ Non ☐ |
| Estimated Airflow / Estimation Débit d'Air | $m^3/h$ | …… | …… |

## (5) AIRFLOW PRESS. SENSOR CHECK / VERIF. DES SECURITES PRESSOSTATS D'AIR

| Measured pressure drop / Pertes de charge au pressostat<br>…… mbar | Set Points Adjusted / Changement des consignes:<br>Yes/Oui ☐ No/ Non ☐<br>If Yes enter new values/ Si oui noter les nouvelles consignes:<br>**3410**: …… **3411**: …… **3412**: …… |
|---|---|

## (6) EXTERNAL SENSOR CHECKS / VERIFICATION DES CAPTEURS EXTERNES

| Check electrical connections / Vérification des connections électriques: Yes/Oui ☐ No/ Non ☐ | Check and record temp. in menu **2110** / Vérifier et mesurer les températures. Dans menu **2110**: Yes/Oui ☐ No/ Non ☐ | |
|---|---|---|
| | 100% Fresh Air / 100% Air neuf | 100% return Air / 100% Air repris |
| Supply Temperature / Température Soufflage | ……..°C | ……..°C |
| Return Temperature / Température reprise | ……..°C | ……..°C |
| Outdoor Temperature / Température extérieure | ……..°C | ……..°C |

## (7) MIXING AIR DAMPERS CHECKS / VERIFICATIONS VOLETS DE MELANGE

| Dampers open & close freely/<br>Volets s'ouvrent et se ferment OK<br>Yes/Oui ☐ No/ Non ☐ | % Minimum FA:<br>%minimum Air Neuf:<br>……..% | Power exhaust checked/<br>Ventilateur extraction<br>Yes/Oui ☐ No/ Non ☐ | Enthalpy sensor(s) checked/<br>Control enthalpie installé<br>Yes/Oui ☐ No/ Non ☐ |
|---|---|---|---|

## (8) REFRIGERATION SECTION / SECTION REFRIGERATION

| Outdoor Fan Motor Current / Intensité Moteurs Batterie externe: | | | | Check Rotation | Compressor Voltage/ Tension Compresseur. |
|---|---|---|---|---|---|
| Motor 1 / Moteur 1 | L1 ……..A | L2 ……..A | L3 ……A | Yes/Oui ☐ No/ Non ☐ | |
| Motor 2 / Moteur 2 | L1 ……..A | L2 ……..A | L3 ……A | Yes/Oui ☐ No/ Non ☐ | |
| Motor 3 / Moteur 3 | L1 ……..A | L2 ……..A | L3 ……A | Yes/Oui ☐ No/ Non ☐ | Comp1: …….. V |
| Motor 4 / Moteur 4 | L1 ……..A | L2 ……..A | L3 ……A | Yes/Oui ☐ No/ Non ☐ | Comp2: …….. V |
| Motor 5 / Moteur 5 | L1 ……..A | L2 ……..A | L3 ……A | Yes/Oui ☐ No/ Non ☐ | Comp3: …….. V |
| Motor 6 / Moteur 6 | L1 ……..A | L2 ……..A | L3 ……A | Yes/Oui ☐ No/ Non ☐ | Comp4: …….. V |

| Compressor Amps COOLING / Intensité Compresseur MODE FROID | | | | Pressures & Temperatures / Pressions & températures | | | |
|---|---|---|---|---|---|---|---|
| | | | | Temperatures / Temperatures | | Pressures / Pressions | |
| | Phase **1** | Phase **2** | Phase **3** | ***Suction/ Asp*** | Disch / refoul | ***LP/ BP*** | HP / HP |
| Comp 1 | …….. A | …….. A | …….. A | …….. °C | …….. °C | …….. Bar | …….. Bar |
| Comp 2 | …….. A | …….. A | …….. A | …….. °C | …….. °C | …….. Bar | …….. Bar |
| Comp 3 | …….. A | …….. A | …….. A | …….. °C | …….. °C | …….. Bar | …….. Bar |
| Comp 4 | …….. A | …….. A | …….. A | …….. °C | …….. °C | …….. Bar | …….. Bar |

**Check Reversing valves./** Valve1/Vanne1: Yes/Oui ☐ No/ Non ☐ Valve3/Vanne3: Yes/Oui ☐ No/ Non ☐
**Vérifier vannes d'inversion**: Valve2/Vanne2: Yes/Oui ☐ No/ Non ☐ Valve4/Vanne4: Yes/Oui ☐ No/ Non ☐

| **Compressor Amps HEATING / Intensité Compresseur en Pompe à Chaleur** | | | | **Pressures & Temperatures / Pressions & températures** | | | |
|---|---|---|---|---|---|---|---|
| | | | | Temperatures / Temperatures | | Pressures / Pressions | |
| | Phase **1** | Phase **2** | Phase **3** | ***Suction/ Asp*** | Disch / refoul | ***LP/ BP*** | HP / HP |
| Comp 1 | …….. A | …….. A | …….. A | …….. °C | …….. °C | …….. Bar | …….. Bar |
| Comp 2 | …….. A | …….. A | …….. A | …….. °C | …….. °C | …….. Bar | …….. Bar |
| Comp 3 | …….. A | …….. A | …….. A | …….. °C | …….. °C | …….. Bar | …….. Bar |
| Comp 4 | …….. A | …….. A | …….. A | …….. °C | …….. °C | …….. Bar | …….. Bar |
| HP cut out / Coupure HP ……Bar | | | | LP cut out / Coupure sécurité BP …….. Bar | | | |
| Refrigerant charge / Charge réfrigérant | | | | C1 : ……..kg | C2 : ……kg | C3 : ……..kg | C4 : ……..kg |

## (8)ELECTRIC HEATER SECTION / SECTION RECHAUFFEUR ELECTRIQUE

| Type / Type: …… | | | Serial No/ No Série.:…….. | | |
|---|---|---|---|---|---|
| AMPS 1st stage (Baltic) / Intensité 1er étage (Baltic) | | | AMPS 2nd stage (Baltic) / Intensité 2e étage (Baltic) | | |
| 1 …… | 2 …… | 3 …… | 1 …… | 2 …… | 3 …… |

## (9) HOT WATER COIL SECTION / SECTION BATTERIE EAU CHAUDE

Check Three Way Valve Movement / Vérification Mouvement Vanne trois voies: Yes/Oui ☐ No/ Non ☐

## (10) GAS HEATING SECTION / RAMPE GAZ

| Gas Burner N°1 / Brûleur gaz N°1 | | Gas Burner N°2 / Brûleur gaz N°2 | |
|---|---|---|---|
| Size / Taille: …… | Valve type / Type vanne: …… | Size / Taille: …… | Valve type / Type vanne: …… |
| Pipe size/ tuyauterie: | Gas type / Type gas : **G**……. | Pipe size/ tuyauterie | Gas type / Type gas : **G**……. |
| Line press./ press. ligne : …… | Drop test / test pression Yes/Oui ☐ No/ Non ☐ | line press./ press. ligne : …… | Drop test / test pression Yes/Oui ☐ No/ Non ☐ |
| Check manifold pressure/ Pression injection: High fire/Grande allure…….Low fire/Petite allure…….. | | Check manifold pressure/ Pression injection: High fire/Grande allure…….. Low fire/Petite allure…….. | |
| Pressure cut out airflow press switch / Pression coupure pressostat débit d'air : ……mbar /Pa | | Pressure cut out airflow press switch / Pression coupure pressostat débit d'air : ……mbar /Pa | |

| Motor amps I moteur: | Flue temp / temp fumées | CO2 %: | CO ppm: | Motor Amps I Moteur: | Flue temp / temp fumées | CO2 %: | CO ppm: |
|---|---|---|---|---|---|---|---|
| ……..A | …… °C | ……% | ……% | ……..A | …… °C | ……% | ……% |

## (11) REMOTE CONTROL BMS CHECK / VERIFICATIONS BMS CONTROL A DISTANCE

| Type / Type: …… | Sensor type / Type Capteur …… | KP07 KP/17 checked/ vérifiées: Yes/Oui ☐ No/ Non☐ | Interconnect wiring checked: Yes/Oui ☐ No/ Non☐ |
|---|---|---|---|

It is recommended that you fill the two tables below before transferring the zone settings to the Climatic controller.
Il est recommandé de remplir les deux tableaux ci-dessous avant de transférer les consignes de zones vers le contrôleur Climatic50.

***Refer to control section page 55 / Se référer à la section régulation page 55***

***Time Zones / Zones Horaires***

| Hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Example* | **UNO** | | | | | | | | 7h15 | **ZA** | | 11h00 | | **ZB** | 14h00 | | | **ZC** | | 19h00 | | | **UNO** | |
| Monday | | | | | | | | | | | | | | | | | | | | | | | | |
| Tuesday | | | | | | | | | | | | | | | | | | | | | | | | |
| Wednesday | | | | | | | | | | | | | | | | | | | | | | | | |
| Thursday | | | | | | | | | | | | | | | | | | | | | | | | |
| Friday | | | | | | | | | | | | | | | | | | | | | | | | |
| Saturday | | | | | | | | | | | | | | | | | | | | | | | | |
| Sunday | | | | | | | | | | | | | | | | | | | | | | | | |

***Variables to adjust for each time zone / Consignes à renseigner pour chaque zone horaire***

| | **Start z.A** | | **Start z.B** | | **Start z.C** | | **Start UNO** | |
|---|---|---|---|---|---|---|---|---|
| | hour (3211) | min (3212) | hour (3213) | min (3214) | hour (3215) | min (3216) | hour (3217) | min (3218) |
| Monday | | | | | | | | |
| Tuesday | | | | | | | | |
| Wednesday | | | | | | | | |
| Thursday | | | | | | | | |
| Friday | | | | | | | | |
| Saturday | | | | | | | | |
| Sunday | | | | | | | | |

| **Description** | **Unit** | **Menu** | **Min** | **Max** | **Zone A** | **Zone B** | **Zone C** | **UNOC** |
|---|---|---|---|---|---|---|---|---|
| Sp Room | °C | 3311 | 8 | 35 | | | | |
| Mini.Air | % | 3312 | 0 | 100 | | | | |
| Sp Dyna | °C | 3321 | 0 | 99.9 | | | | |
| Sp Cool | °C | 3322 | 8 | 35 | | | | |
| Sp Heat | °C | 3323 | 8 | 35 | | | | |
| Swap Heater | On/Off | 3324 | ~ | ~ | | | | |
| Activation | On/Off | 3331 | ~ | ~ | | | | |
| Swap Heater | On/Off | 3332 | ~ | ~ | | | | |
| Sp.Dehu | % | 3341 | 0 | 100 | | | | |
| Sp.Humi | % | 3342 | 0 | 100 | | | | |
| Fan On/Off | On/Off | 3351 | ~ | ~ | | | | |
| Fan Dead | On/Off | 3352 | ~ | ~ | | | | |
| F.Air | On/Off | 3353 | ~ | ~ | | | | |
| CO2 | On/Off | 3354 | ~ | ~ | | | | |
| Comp.Cool. | On/Off | 3355 | ~ | ~ | | | | |
| Comp.Heat. | On/Off | 3356 | ~ | ~ | | | | |
| AuxHeat | On/Off | 3357 | ~ | ~ | | | | |
| Humidif. | On/Off | 3358 | ~ | ~ | | | | |
| Low Noise | On/Off | 3359 | ~ | ~ | N/A | N/A | N/A | |

COMMENTS .....

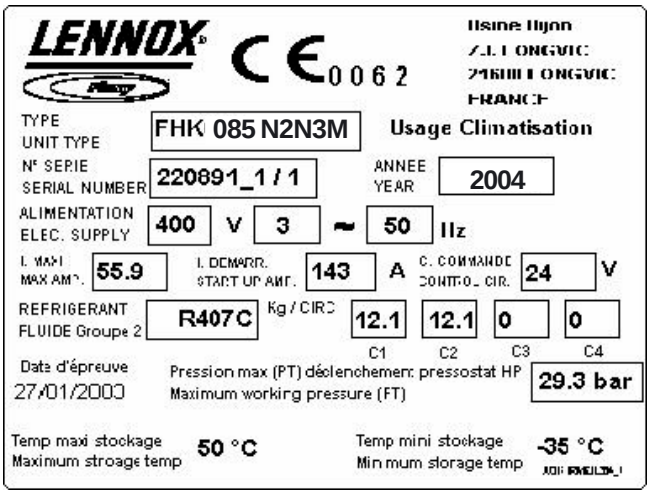
## DELIVERY CHECKS

On receipt of a new equipment please check the following points. It is the customer's responsibility to ensure that the products are in good working order:
- The exterior has not been damaged in any way.
- The lifting and handling equipment are suitable for the equipment and comply with the specifications of the handling instructions enclosed here-in.
- Accessories ordered for on site installation have been delivered and are in good working order.
- The equipment supplied corresponds to the order and matches the delivery note.

If the product is damaged, exact details must be confirmed in writing by registered post to the shipping company within 48 hours of delivery (working days). A copy of the letter must be addressed to Lennox and the supplier or distributor for information purposes. Failure to comply will invalidate any claim against the shipping company.

### RATING PLATE

The rating plate provides a complete reference for the model and ensures that the unit corresponds to the model ordered. It states the electrical power consumption of the unit on start-up, its rated power and its supply voltage. The supply voltage must not deviate beyond +10/-15 %. The start-up power is the maximum value likely to be achieved for the specified operational voltage. The customer must have a suitable electrical supply. It is therefore important to check whether the supply voltage stated on the unit's rating plate is compatible with that of the mains electrical supply. The rating plate also states the year of manufacture as well as the type of refrigerant used and the required charge for each compressor circuit.




### STORAGE

When units are delivered on site they are not always required immediately and are sometimes put into storage. In the event of medium to long-term storage, we recommend the following procedures :
- Ensure that there is no water in the hydraulic systems.
- Keep the heat exchanger covers in position (AQUILUX cover).
- Keep protective plastic film in position.
- Ensure the electrical panels are closed.
- Keep all items and options supplied in a dry and clean place for future assembly before using the equipment.

### MAINTENANCE KEY

On delivery we recommend that you keep the key which is attached to an eyebolt in a safe and accessible place. This allows you to open the panels for maintenance and installation work.
The locks are ¼ turn + then tighter (figure 2).

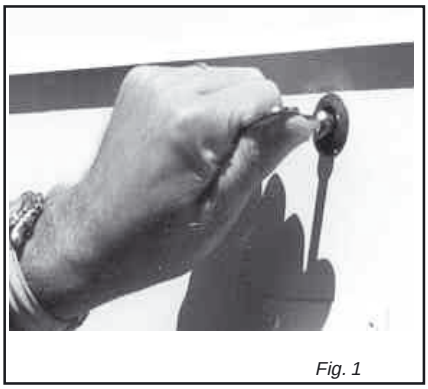


*Fig. 1*

### CONDENSATE DRAINS

The condensate drains are not assembled when delivered and are stored
in the electrical panel with their clamping collars.
To assemble them, insert them on the condensate tray outlets and use a screwdriver to tighten the collars (Figure 3).

*Figure 2*

## DIMENSIONS AND WEIGHTS

| Condensation | | Airflow configuration | | | | | | | | LENGTH (mm) | WIDTH (mm) | HEIGHT (mm) | HOOD (mm) | WEIGHT (kg) | | | SLING | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard | Centrifugal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | std | std gas | high gas | 1 | 2 | 3 |
| ***FC/FH 085 - Cooling only and heat pump*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 3785 | 2255 | 1495 | 630 | 1220 | - | - | 2830 | 2330 | - |
| X | - | - | - | - | X | - | - | X | - | 3785 | 2255 | 1495 | 630 | 1270 | - | - | 2830 | 2330 | - |
| X | - | - | X | X | - | X | X | - | - | 3785 | 2285 | 1495 | 630 | 1275 | - | - | 2830 | 2330 | - |
| - | X | X | - | - | - | - | - | - | X | 3835 | 2255 | 2080 | 630 | 1435 | - | - | 3230 | 2430 | 1870 |
| - | X | - | - | - | X | - | - | X | - | 3835 | 2255 | 2080 | 630 | 1485 | - | - | 3230 | 2430 | 1870 |
| - | X | - | X | X | - | X | X | - | - | 3835 | 2285 | 2080 | 630 | 1490 | - | - | 3230 | 2430 | 1870 |
| ***FC/FH 085 - GAS*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 3785 | 2255 | 1495 | 630 | - | 1320 | 1390 | 2830 | 2330 | - |
| - | X | X | - | - | - | - | - | - | X | 3835 | 2255 | 2080 | 630 | - | 1535 | 1605 | 3230 | 2430 | 1870 |
| ***FC/FH 100 - Cooling only and heat pump*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 3785 | 2255 | 1495 | 630 | 1280 | - | - | 2830 | 2330 | - |
| X | - | - | - | - | X | - | - | X | - | 3785 | 2255 | 1495 | 630 | 1320 | - | - | 2830 | 2330 | - |
| X | - | - | X | X | - | X | X | - | - | 3785 | 2285 | 1495 | 630 | 1320 | - | - | 2830 | 2330 | - |
| - | X | X | - | - | - | - | - | - | X | 3835 | 2255 | 2080 | 630 | 1495 | - | - | 3230 | 2430 | 1870 |
| - | X | - | - | - | X | - | - | X | - | 3835 | 2255 | 2080 | 630 | 1545 | - | - | 3230 | 2430 | 1870 |
| - | X | - | X | X | - | X | X | - | - | 3835 | 2285 | 2080 | 630 | 1545 | - | - | 3230 | 2430 | 1870 |
| ***FC/FH 100 -*** **GAS** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 3785 | 2255 | 1495 | 630 | - | 1380 | 1450 | 2830 | 2330 | - |
| - | X | X | - | - | - | - | - | - | X | 3835 | 2255 | 2080 | 630 | - | 1595 | 1665 | 3230 | 2430 | 1870 |

## DIMENSIONS AND WEIGHTS

| Condensation | | Airflow configuration | | | | | | | | LENGTH (mm) | WIDTH (mm) | HEIGHT (mm) | CASQUETTE (mm) | WEIGHT (kg) | | | SLING | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard | Centrifugal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | std | std gas | high gas | 1 | 2 | 3 |
| ***FC/FH 120 - Cooling only and heat pump*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 3585 | 2255 | 1470 | 630 | 1530 | - | - | 2700 | - | 2080 |
| X | - | - | - | - | X | - | - | X | - | 3585 | 2255 | 1470 | 630 | 1580 | - | - | 2700 | - | 2080 |
| X | - | - | X | X | - | X | X | - | - | 3585 | 2285 | 1470 | 630 | 1600 | - | - | 2700 | - | 2080 |
| - | X | X | - | - | - | - | - | - | X | 3635 | 2255 | 1930 | 630 | 1805 | - | - | 3000 | 2410 | 1880 |
| - | X | - | - | - | X | - | - | X | - | 3635 | 2255 | 1930 | 630 | 1855 | - | - | 3000 | 2410 | 1880 |
| - | X | - | X | X | - | X | X | - | - | 3635 | 2285 | 1930 | 630 | 1875 | - | - | 3000 | 2410 | 1880 |
| **FG 120 - *GAS*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 4035 | 2255 | 1470 | 630 | - | 1840 | 1890 | 3000 | - | 2310 |
| - | X | X | - | - | - | - | - | - | X | 4085 | 2255 | 1930 | 630 | - | 2115 | 2165 | 3300 | 2700 | 2080 |
| ***FC/FH 140 - Cooling only and heat pump*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 3585 | 2255 | 1470 | 630 | 1630 | - | - | 2700 | - | 2080 |
| X | - | - | - | - | X | - | - | X | - | 3585 | 2255 | 1470 | 630 | 1680 | - | - | 2700 | - | 2080 |
| X | - | - | X | X | - | X | X | - | - | 3585 | 2285 | 1470 | 630 | 1700 | - | - | 2700 | - | 2080 |
| - | X | X | - | - | - | - | - | - | X | 3635 | 2255 | 1930 | 630 | 1905 | - | - | 3000 | 2410 | 1880 |
| - | X | - | - | - | X | - | - | X | - | 3635 | 2255 | 1930 | 630 | 1955 | - | - | 3000 | 2410 | 1880 |
| - | X | - | X | X | - | X | X | - | - | 3635 | 2285 | 1930 | 630 | 1975 | - | - | 3000 | 2410 | 1880 |
| ***FG 140 - GAS*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 4035 | 2255 | 1470 | 630 | - | 1920 | 1970 | 3000 | - | 2310 |
| - | X | X | - | - | - | - | - | - | X | 4085 | 2255 | 1930 | 630 | - | 2000 | 2050 | 3300 | 2700 | 2080 |
| ***FC/FH 160 - Cooling only and heat pump*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 3595 | 2255 | 2070 | 900 | 2050 | - | - | 2700 | - | 2090 |
| X | - | - | - | - | X | - | - | X | - | 3595 | 2255 | 2070 | 900 | 2120 | - | - | 2700 | - | 2090 |
| X | - | - | X | X | - | X | X | - | - | 3595 | 2285 | 2070 | 900 | 2140 | - | - | 2700 | - | 2090 |
| - | X | X | - | - | - | - | - | - | X | 3645 | 2255 | 2070 | 900 | 2275 | - | - | 2700 | - | 2090 |
| - | X | - | - | - | X | - | - | X | - | 3645 | 2255 | 2070 | 900 | 2345 | - | - | 2700 | - | 2090 |
| - | X | - | X | X | - | X | X | - | - | 3645 | 2285 | 2070 | 900 | 2365 | - | - | 2700 | - | 2090 |
| **FG 160 - *GAS*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 4045 | 2255 | 2070 | 900 | - | 2410 | 2460 | 3000 | - | 2320 |
| - | X | X | - | - | - | - | - | - | X | 4095 | 2255 | 2070 | 900 | - | 2635 | 2685 | 3000 | - | 2320 |
| ***FC/FH 190 - Cooling only and heat pump*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 3595 | 2255 | 2070 | 900 | 2175 | - | - | 2700 | - | 2090 |
| X | - | - | - | - | X | - | - | X | - | 3595 | 2255 | 2070 | 900 | 2245 | - | - | 2700 | - | 2090 |
| X | - | - | X | X | - | X | X | - | - | 3595 | 2285 | 2070 | 900 | 2265 | - | - | 2700 | - | 2090 |
| - | X | X | - | - | - | - | - | - | X | 3645 | 2255 | 2070 | 900 | 2400 | - | - | 2700 | - | 2090 |
| - | X | - | - | - | X | - | - | X | - | 3645 | 2255 | 2070 | 900 | 2470 | - | - | 2700 | - | 2090 |
| - | X | - | X | X | - | X | X | - | - | 3645 | 2285 | 2070 | 900 | 2490 | - | - | 2700 | - | 2090 |
| ***FG 190 - GAS*** | | | | | | | | | | | | | | | | | | | |
| X | - | X | - | - | - | - | - | - | X | 4045 | 2255 | 2070 | 900 | - | 2540 | 2600 | 3000 | - | 2320 |
| - | X | X | - | - | - | - | - | - | X | 4095 | 2255 | 2070 | 900 | - | 2765 | 2825 | 3000 | - | 2320 |

## DIMENSIONS AND WEIGHTS

| MODELS | LENGTH mm | HEIGHT mm | WIDTH mm | AUVENT lateral mm | AUVENT ventil mm | WEIGHT (kg) standard kg |
|---|---|---|---|---|---|---|
| FX 025 | 4070 | 1635 | 1055 | 490 | 600 | 950 |
| FX 030 | 4070 | 1635 | 1055 | 490 | 600 | 980 |
| FX 035 | 4750 | 2255 | 1290 | 490 | 600 | 1400 |
| FX 040 | 4750 | 2255 | 1290 | 490 | 600 | 1450 |
| FX 055 | 4750 | 2255 | 1290 | 490 | 600 | 1600 |
| FX 070 | 5050 | 2255 | 1725 | 890 | 600 | 1800 |
| FX 085 | 5050 | 2255 | 1725 | 890 | 600 | 1900 |
| FX 100 | 5050 | 2255 | 1725 | 890 | 600 | 2000 |
| FX 110 | 5650 | 2255 | 2000 | 860 | - | 2620 |
| FX 140 | 5650 | 2255 | 2000 | 860 | - | 2620 |
| FX 170 | 5650 | 2255 | 2000 | 860 | - | 2650 |

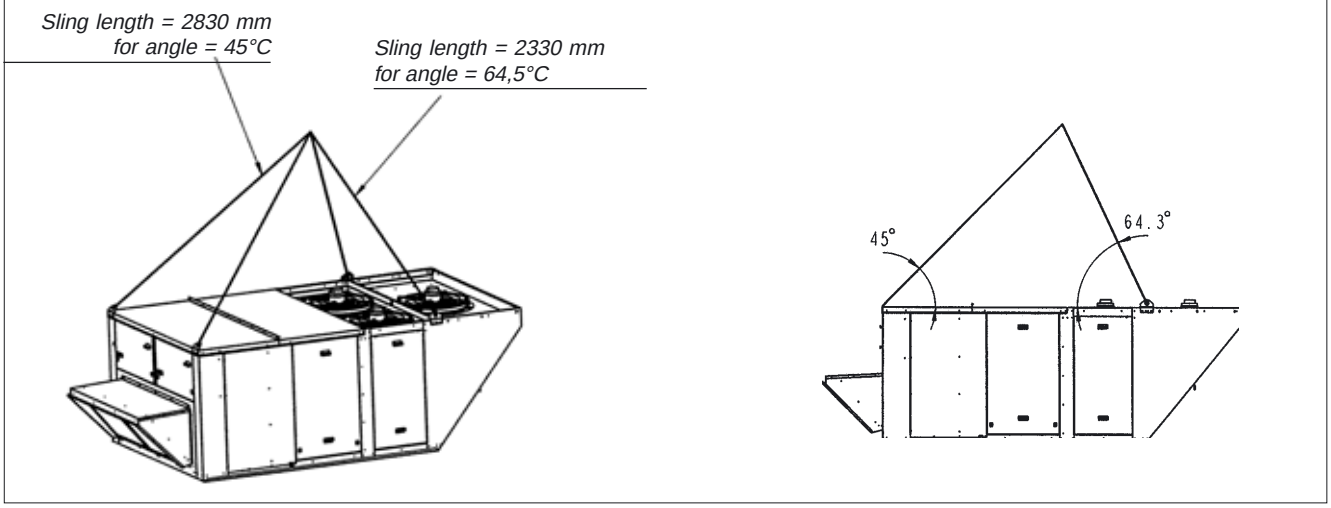
## HANDLING

The equipment can be moved using the lifting holes on the top of the unit.
The "sling" length is the value that we recommend for safe handling of the equipment.

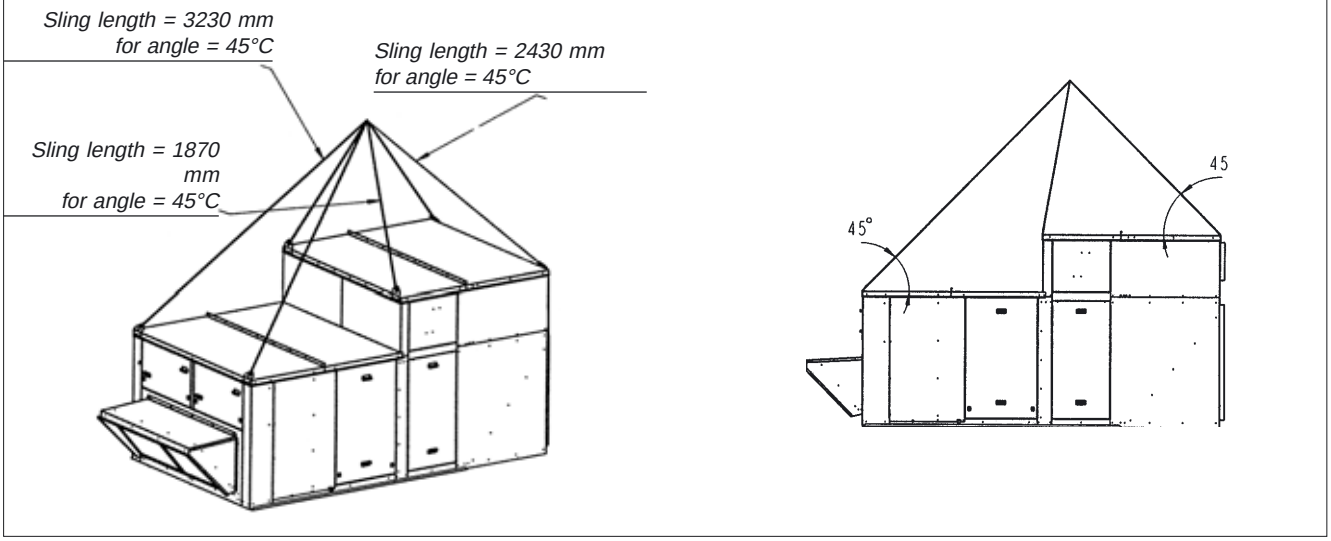
Some units can only be supported by four slings at right-angles. Others require different lengths (see figures 4).
It is essential that all lifting holes are used and that the slings are all of the same size to avoid damaging the equipment.

*Figure for all handling drawings*

**FC.../FH.../FD.../FG... 085 & 100**



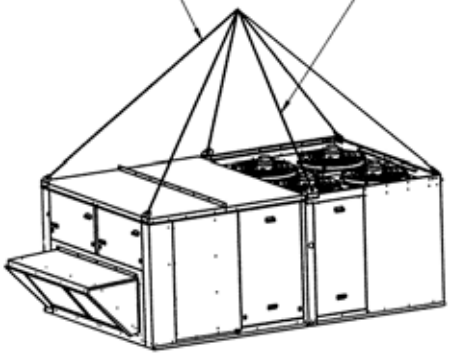

**FC.../FH.../FD.../FG... 085 & 100 with centrifugal fans**

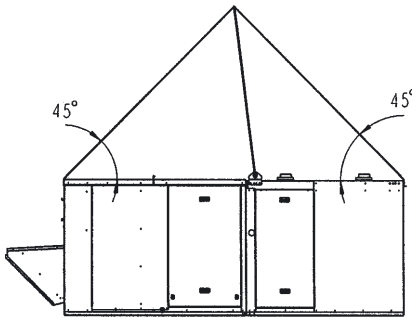


**FC.../FH.../FD... 120 & 140**

*Sling length = 2700 mm*
*for angle = 45°C*

*Sling length = 2080 mm*
*for angle = 45°C*

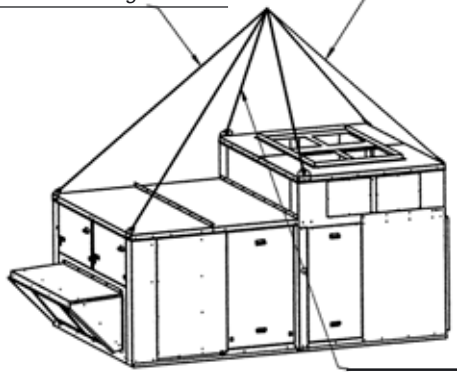




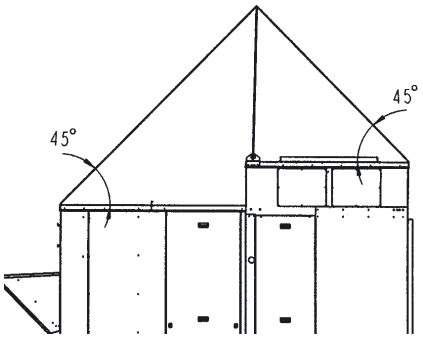

**FC.../FH.../FD... 120 & 140 with centrifugal fans**

*Sling length = 3000 mm*
*for angle = 45°C*

*Sling length = 2410 mm*
*for angle = 45°C*



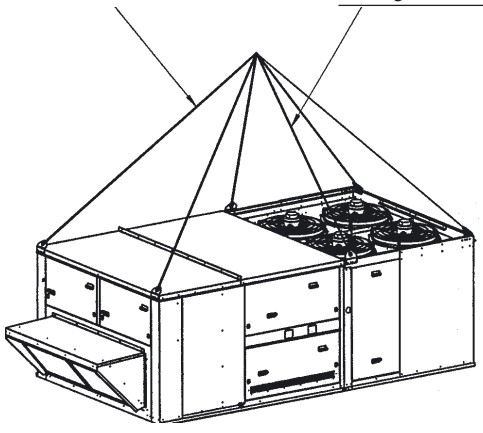
*Sling length = 1880 mm*
*for angle = 45°C*

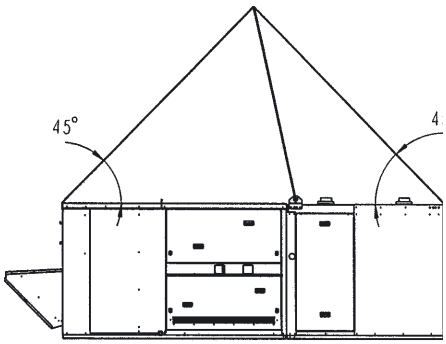



**FG... 120 & 140 with gas burner**

*Sling length = 2700 mm*
*for angle = 45°C*

*Sling length = 2080 mm*
*for angle = 45°C*

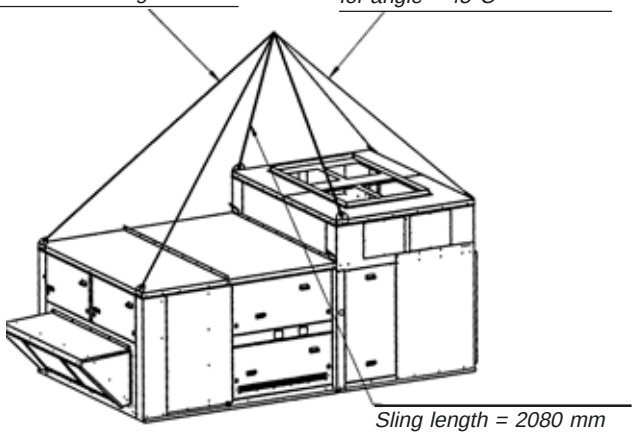




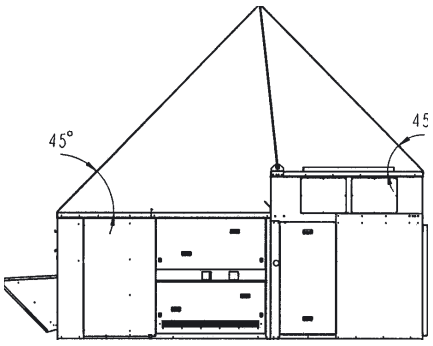
**FG... 120 & 140 with gas burner and centrifugal fans**

*Sling length = 3300 mm for angle = 45°C*

*Sling length = 2700 mm for angle = 45°C*



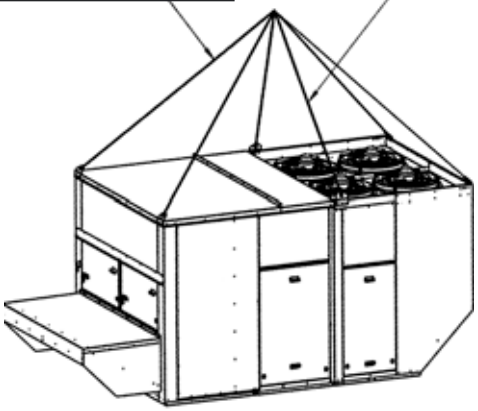
*Sling length = 2080 mm for angle = 45°C*

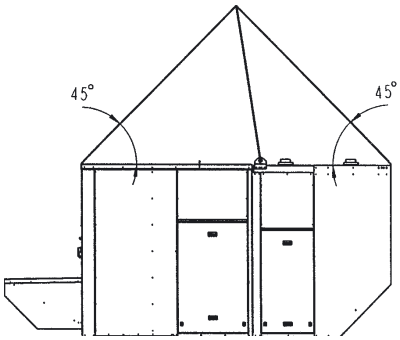



**FC.../FH.../FD... 160 & 190**
**FC.../FH.../FD... 160 & 190 with centrifugal fans**

*Sling length = 2700 mm for angle = 45°C*

*Sling length = 2090 mm for angle = 45°C*

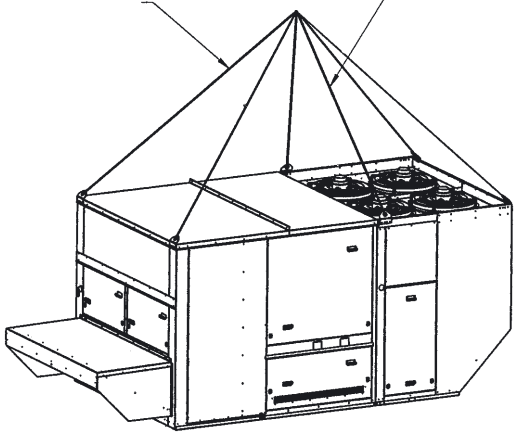


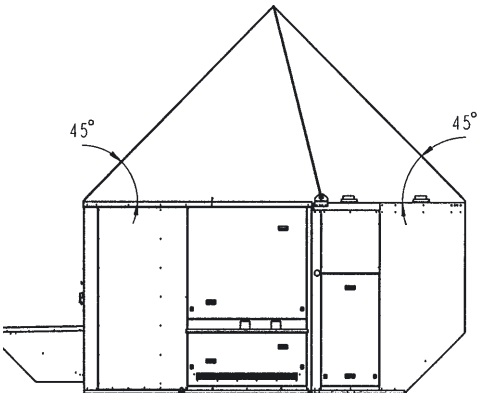



**FG... 160 & 190**
**FG... 160 & 190 with centrifugal fans**

*Sling length = 3000 mm for angle = 45°C*

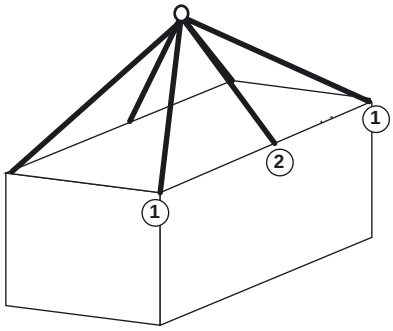
*Sling length = 2320 mm for angle = 45°C*





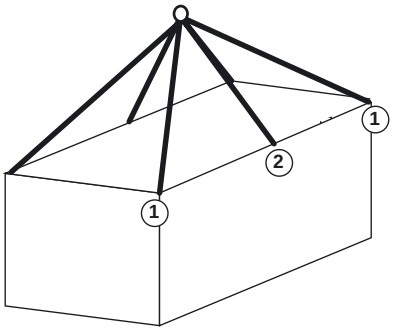
**FX 25 & 30**

*Sling length 1 = 3000 mm*
*Sling length 2 = 2350 mm*



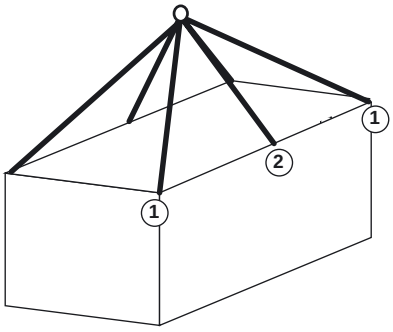

**FX 35 - 40 - 55**

*Sling length 1 = 3700 mm*
*Sling length 2 = 2850 mm*



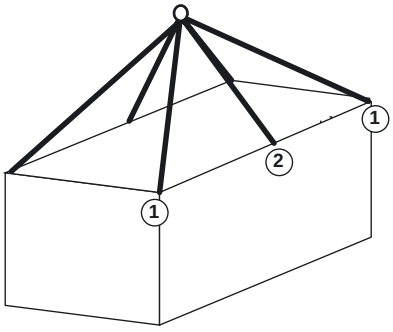

**FX 70 - 85 - 100**

*Sling length 1 = 3900 mm*
*Sling length 2 = 3000 mm*




**FX 110 - 140 - 170**

*Sling length 1 = 4300 mm*
*Sling length 2 = 3250 mm*



## PRELIMINARY CHECK

Before installing the equipment, the following points MUST be checked :

-Have the forklift protections been removed ?
-Is there sufficient space for the equipment?
-Is the surface on which the equipment is to be installed sufficiently solid to withstand its weight? A detailed study of the frame must be made beforehand.
-Do the supply and return ductwork openings excessively weaken the structure?
-Are there any obstructing items which could hinder the operation of the equipment?
-Does the electrical power available correspond to the equipment's electrical specifications?
-Is drainage provided for the condensate?
-Is there sufficient access for maintenance?
-Installation of the equipment could require different lifting methods which may vary with each installation (helicopter or crane). Have these been evaluated ?
-Ensure that the unit is installed in accordance with the installation instructions and local applicable codes.
-Check to ensure that the refrigerant lines do not rub against the cabinet or against other refrigerant lines.

In general, make sure no obstacles (walls, trees or roof ledges) are obstructing the duct connections or hindering assembly and maintenance access.

## INSTALLATION REQUIREMENTS

The surface on which the equipment is to be installed must be clean and free of any obstacles which could hinder the flow of air to the condensers:

-Avoid uneven surfaces
-Avoid installing two units side by side or close to each other as this may restrict the airflow to the condensers.

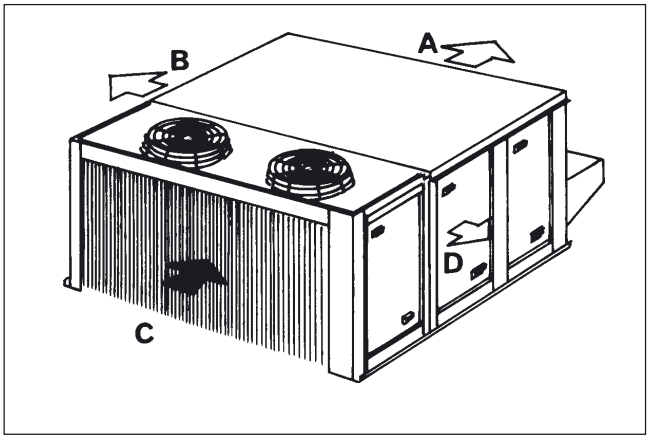
Before installing a packaged Rooftop unit it is important to understand :

-The direction of prevailing winds.
-The direction and position of air flows.
-The external dimensions of the unit and the dimensions of the supply and return air connections.
-The arrangement of the doors and the space required to open them to access the various components.

## CONNECTIONS

-Ensure that all the pipe-work crossing walls or roofs are secured, sealed and insulated.
-To avoid condensation problems, make sure that all pipes are insulated according to the temperatures of fluids and type of rooms.

NOTE: The AQUILUX protection sheets fitted to the finned surfaces must be removed prior to start up.




| MODELS | A | B | C | D |
|---|---|---|---|---|
| **FC/FH/FG/FD** | | | | |
| **85 ➔ 140** | 1400 | 2000 | 1400 | 2300 |
| **160 & 190** | 2000 | 2000 | 2000 | 2300 |
| **FX** | | | | |
| **25 & 30** | * | 1100 | * | 1700 |
| **35 ➔ 55** | * | 1300 | * | 2300 |
| **70 ➔ 100** | * | 1700 | * | 2300 |
| **110 ➔ 170** | * | 2000 | * | 2300 |

* : according to connection

As levels are adjustable, observe the following recommendations for correct installation of the equipment.

Above all, ensure that all the adjustable returns are facing outward (1-figure 3). They are usually turned inside-out for transport.

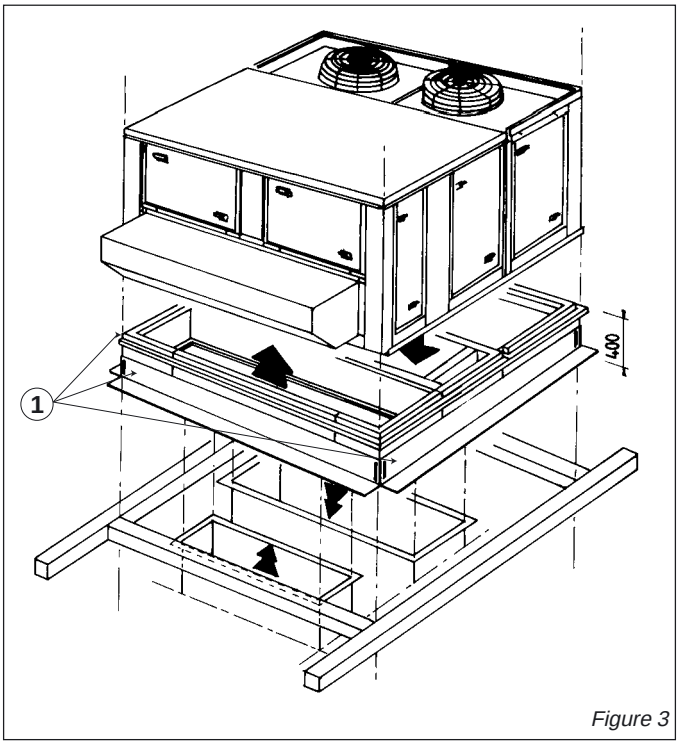



*Figure 3*

Place the roof mounting frame on the trimmer beam by first lining up the inlet and then the outlet. (2 - figure 4).

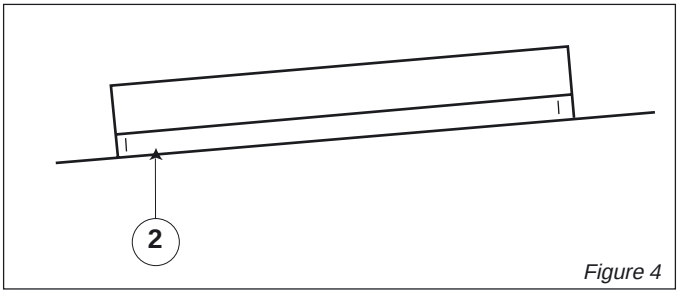



*Figure 4*

After levelling the frame, fix the surface flaps onto the trimmer.( figure 5).

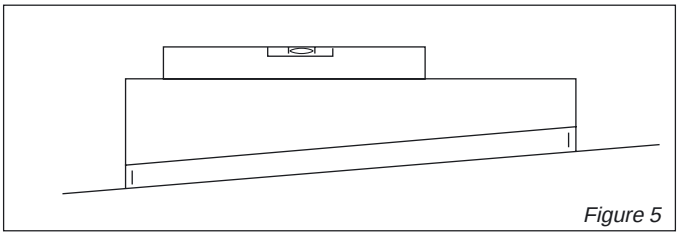


*Figure 5*

When the frame is correctly positioned, it is essential to secure the assembly with welding seam (20 to 30 mm for every 200 mm) along the outside, or by using an alternative method (1 - figure 6).

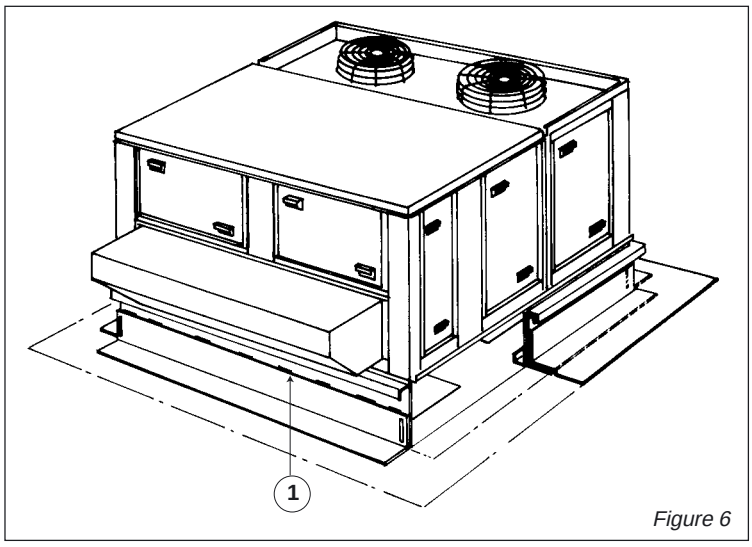


*Figure 6*

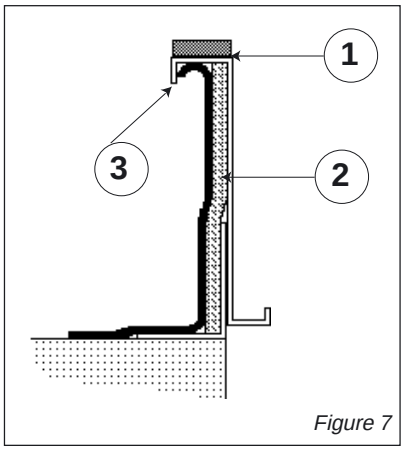


*Figure 7*

Assembly joint (1 - figure 7)

Insulate the frame before installation. We recommend the minimum application of 25 mm thick insulation.
Check that the covering is continuous and watertight (2 - figure 7).

CAUTION : To be effective, it must finsh behind the lip (3 - figure 7)

Before installing the equipment, make sure that the assembly seal is not damaged.
Once in position, the bottom of the equipment must be horizontal and against the roofcurb as shown on figure 8.

The installer must comply to local authority standards and specifications.

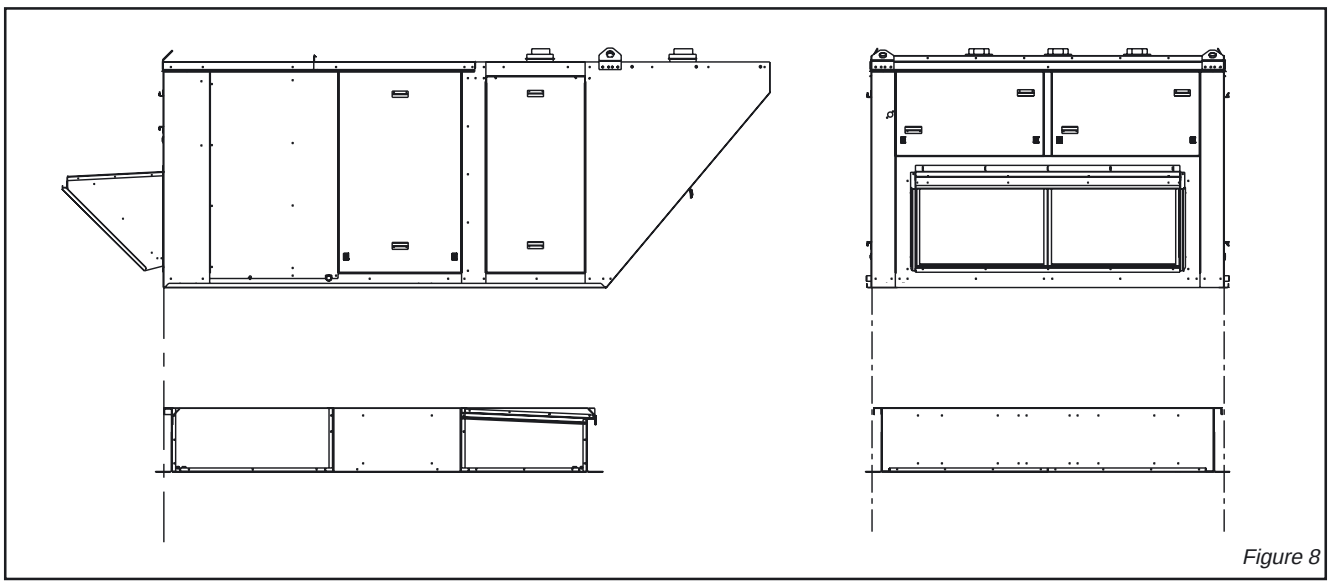
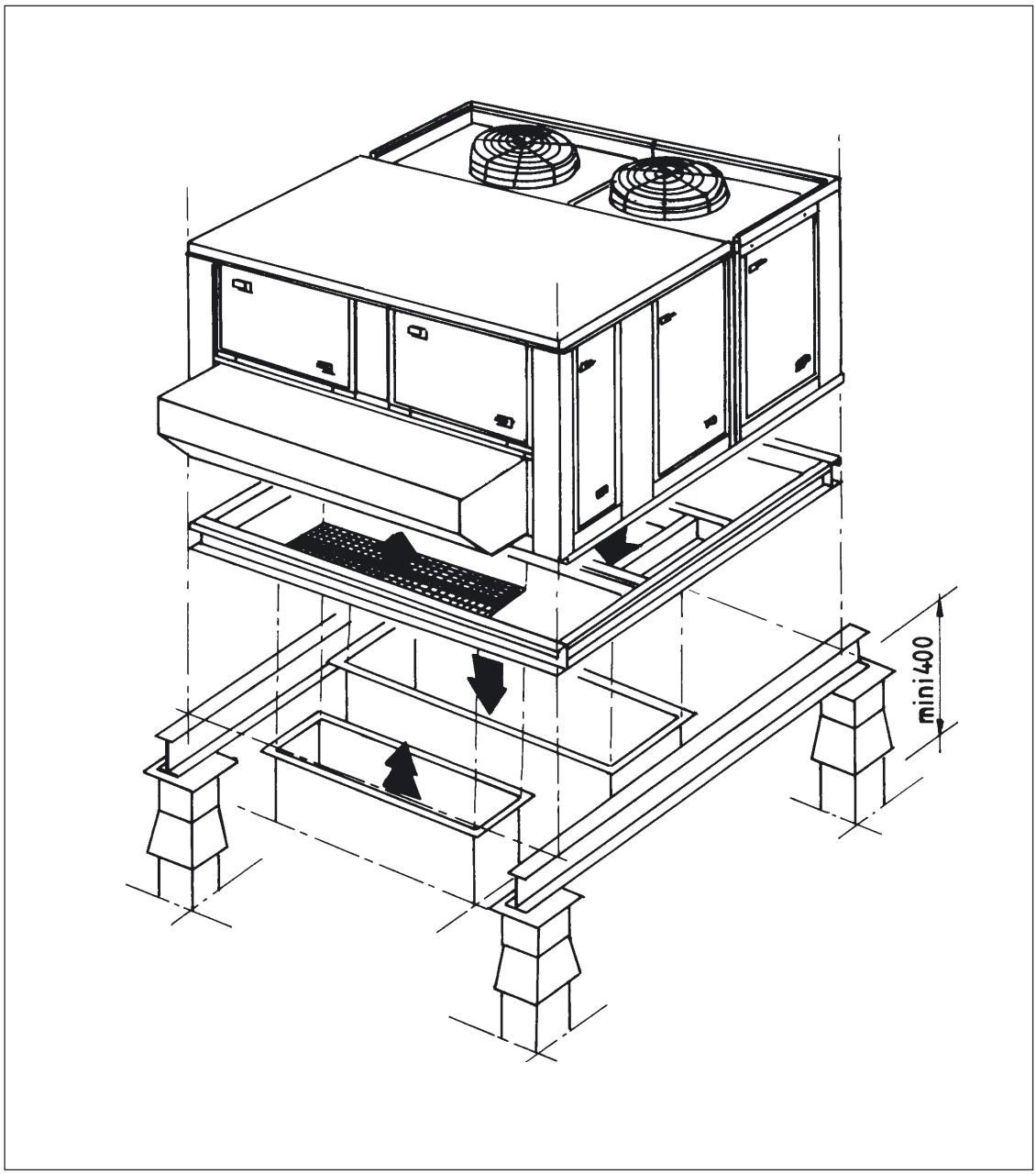


*Figure 8*

The unit can be fitted on corner posts using the frame provided. The minimum height of the posts should be 400mm.



***THIS WORK MUST ONLY BE CARRIED OUT BY TRAINED REFRIGERATION ENGINEERS***

FILL THE COMMISSIONNING SHEET AS YOU GO ALONG

## BEFORE CONNECTING THE POWER:

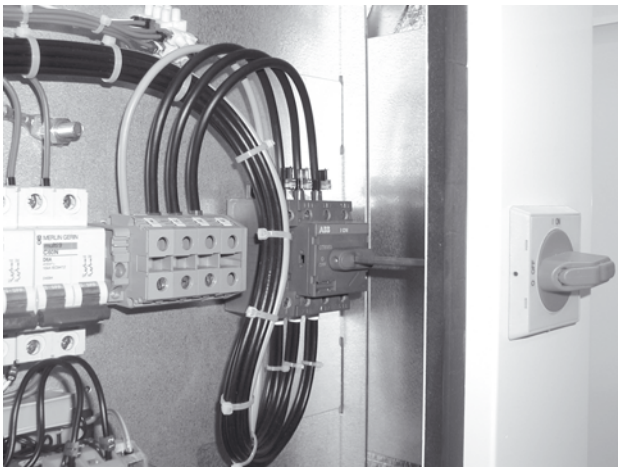
- Ensure that the power supply between the building and the unit meets local authority standards and that the cable specification satisfies the start-up and operating conditions.

**ENSURE THAT THE POWER SUPPLY INCLUDES 3 PHASES + NEUTRAL IF THE UNIT IS EQUIPPED WITH A POWER EXHAUST FAN**

- Check the following wire connections for tightness: Main switch connections, mains wires linked to the contactors and circuit breakers and the cables in the 24V control supply circuit.

**PRELIMINARY CHECKS**

- Ensure that all drive motors are secure.
- Ensure that the adjustable pulley blocks are secure and that the belt is tensioned with the transmission correctly aligned. Refer to the next section foe details.
- Using the electrical wiring diagram, check the conformity of the electrical safety devices (circuit breaker settings, presence and rating of fuses).
- Check the temperature probe connections.

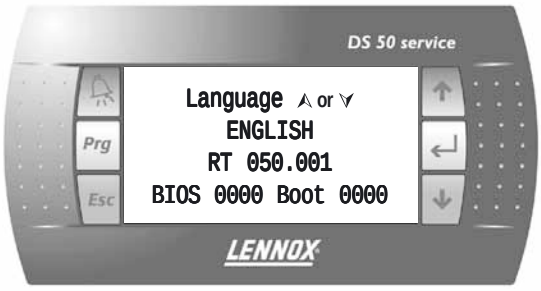


**STARTING THE UNIT**

At this point the unit circuit breakers should be open

You will need a **DS50** maintenance controller or Climalook with appropriate Interface.

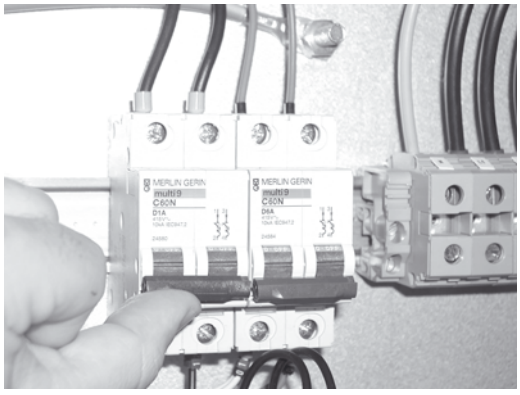
The jumpers are factory set and the configuration switches




are adjusted depending on the option the type of unit.

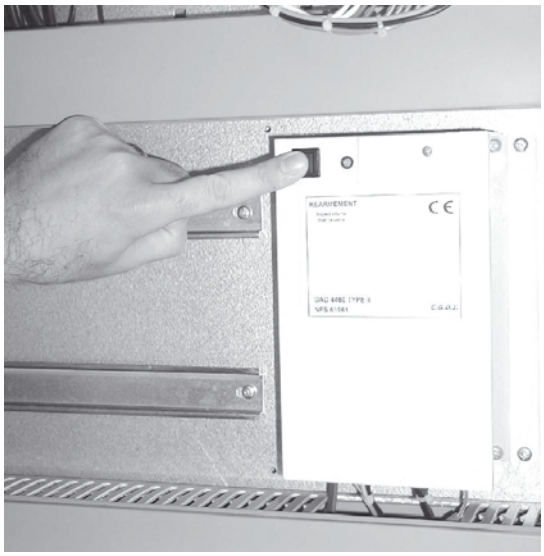
**Connecting the CLIMATIC diplays.**

Close the 24V Control Circuit breakers.



The CLIMATIC 50 starts after 30s

Reset the DAD photo (If fitted)



**Check and adjust the control settings.**

Refer to the control section in this manual to adjust the different parameters

**POWERING THE UNIT**

- Power up the unit by closing the isolator switch (if fitted). - At this point the blower should start unless the climatic does not energise the contactor. In this particular case the blower can be forced by bridging the port NO7 and C7 on connector J14 on the Climatic. Once the fan is running, check the rotation direction. Refer to the rotation arrow located on the fan.

- The fans and compressors direction of rotation is checked during the end of line test. They should therefore all turn in either the right or wrong direction.

**NOTE :** A compressor rotating in the wrong direction will fail.

- If the fan turns in the wrong direction (the right direction is shown on figure n° 9), disconnect the main power supply to the machine at the building's mains switch, reverse two phases and repeat the above procedure.

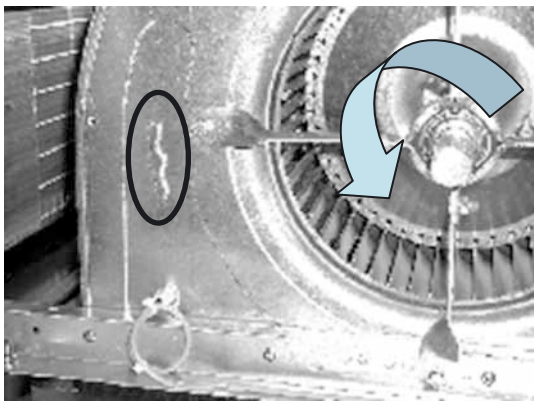


*Fig. 9*

- Close all circuit breakers and power up the unit, remove the bridge on connector J14 if fitted.

- If now only one of the components rotates in the wrong direction, disconnect the power supply at the machine's isolator switch (if fitted) and reverse two of the component's phases on the terminal within the electrical panel.

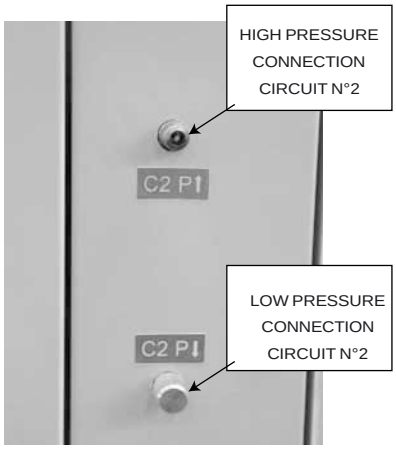
- Check the current drawn against the rated values, in particular on the supply fan (ref. page 24).

- If the readings on the fan are outside the specified limits, this usually indicates excessive air flow which will affect the life expectancy and the thermodynamic performances of the unit. This will also increase the risks of water ingress into the unit. Refer to the "Air Flow Balancing" section to correct the problem.

At this point attach the manometers to the refrigerant circuit

**RUN TEST**

Start unit in cooling mode




Thermodynamic readings using manometers and prevailing environmental conditions

No rated values are given here. These depend on the climatic conditions both outside and inside the building during operation. However, an experienced refrigeration engineer will be able to detect any abnormal machine operation.

**Safety test**

- Check Air pressure switch (if fitted) "Dirty filter" detection test: vary the set-point value (menu page 3413 on DS50) in respect to the air pressure value. Observe the response of the CLIMATIC™.

- Same procedure for detecting "Missing Filter" (page menu 3412) or "Air Flow Detection" (page menu 3411).

- Check the smoke detection function (if fitted).

- Check the Firestart by pressing the test button (if fitted).

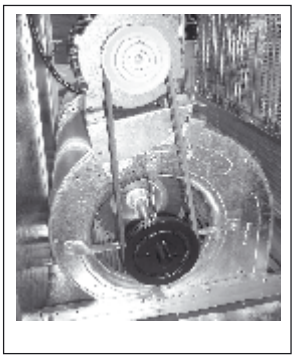
- Disconnect the circuit breakers of the capacitor fans and check the high pressure cut-out points on different refrigerant circuits.

**Reverse cycle test**

This test is designed to check the good operation of the 4-way reversing valves on heat pump reversible systems. Start the reverse cycle by adjusting the cold or hot temperature threshold data according to the indoor and outdoor conditions at the time of test (menu 3320)

## BELT TENSION

On delivery, the drive belts are new and correctly tensioned. After the first 50 operating hours check and adjust the tension. 80% of the total elongation of belts is generally produced during the first 15 hours of operation.



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

To tension the belt, set the height of motor support plate by moving the plate adjustment screws.

This recommended deflection is 16 mm per metre from centre to centre.

Check that according to the diagram below (figure 10), the following ratio remains the same.

$$\frac{A\ (mm)}{P\ (m)} = 20$$

The belts should always be replaced when :

- the disk is set to maximum,
- the belt rubber is worn or the wire is visible.

Replacement belts must have the same rated size as the ones they are replacing. If a transmission system has several belts, they must all be from the same manufacturing batch (compare serial numbers).

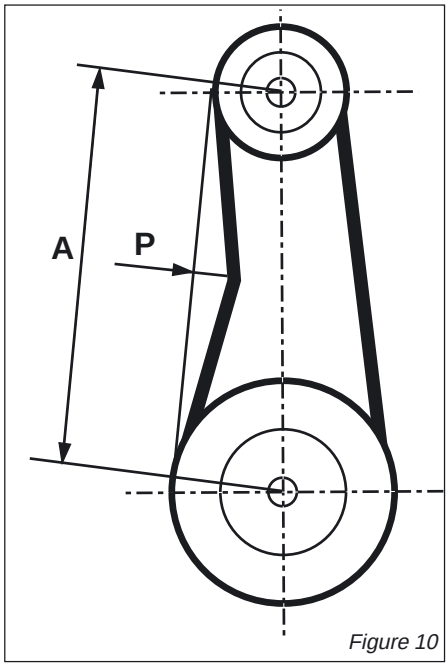


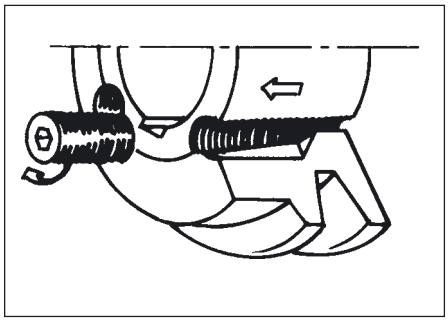

*Figure 10*

**NOTE :**
An under-tensioned belt will slip, heat and wear prematurely. On the other hand, if a belt is over-tensioned, the pressure on the bearings will cause them to over-heat and wear prematurely. Incorrect alignment will also cause the belts to wear prematurely.

## MOUNTING AND ADJUSTING PULLEYS

### *Fan pulley removal*

Remove the 2 screws and put one of them in the extraction threaded screw.

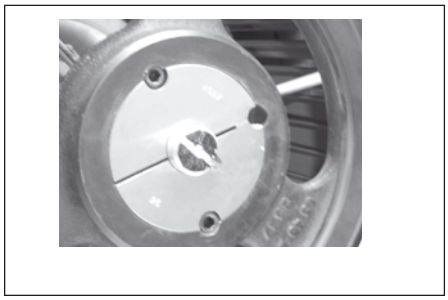


Screw in fully. The hub and the pulley will separate from each other.

Remove the hub and the pulley by hand without damaging the machine.

### *Fan pulley installation*

Clean and de-grease the shaft, hub and conical bore of the pulley. Lubricate the screws and install the hub and pulley. Position the screws without turning them.



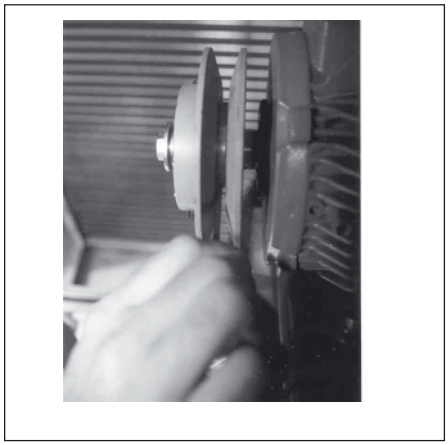
Place the assembly on the shaft and screw in the screws alternatively and evenly. Using a mallet or a hammer with a wooden wedge, tap on the face of the hub to keep the assembly in place. Torque the screws to 30 Nm.

Take the pulley in both hands and shake it vigorously to make sure everything is in place.
Fill the holes with grease for protection.

**NOTE** : During installation, the key should never protrude out of its groove.
After 50 operating hours, check that the screws are still in place.

### *Motor pulley installation and removal*

The pulley is held in position by the key and a screw located in the groove. After unlocking, removing this screw by pulling against the shaft spindle (if necessary, use a mallet and tap uniformly on the hub to remove it).
To assemble, proceed in the reverse order after having cleaned and de-greased the motor shaft and the pulley bore.



### *Pulleys alignment*

After adjusting one or both of the pulleys, check the transmission alignment using a ruler placed on the inner face of the two pulleys.

**NOTE** : The warranty may be affected if any major modification is made to the transmission without obtaining our agreement beforehand.

The actual resistance of ductwork systems is not always identical to the calculated theoretical values. To rectify this, it may be necessary to modify the pulley and belt setting. To this effect, the motors are fitted with variable pulleys.

### *Measure the absorbed amps*

If the absorbed amps are greater than the rated values, the ventilation system has a lower pressure drop than anticipated. Reduce the flow by reducing the rpm. If the system resistance is significantly lower than design, there is a risk that the motor will overheat resulting in an emergency cut out.

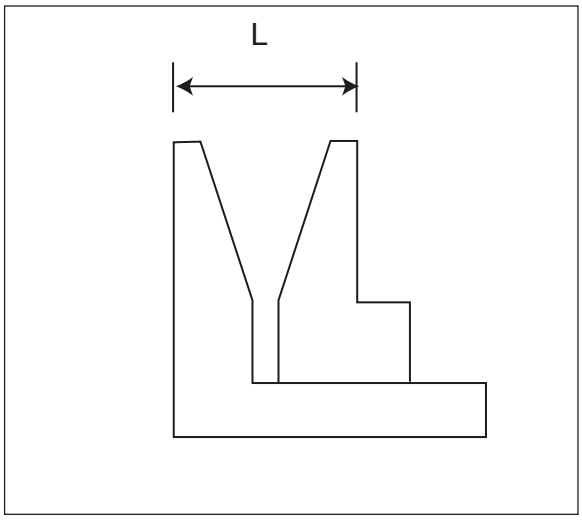
If the absorbed amps are lower than the rated values, your system has a higher pressure drop than anticipated. Increase the flow by increasing the rpm. At the same time you will increase the absorbed power which may result in having to increase the motor size.

To carry out the adjustment and to avoid a time-consuming re-start, stop the machine and if necessary lock the main switch. First unscrew the 4 Allen screw(s) on the pulley (see figure 11).

| Pulley type | Pulley external Ø | Min Ø / Min dist. | Max Ø / Max dist. | nr of turns from fully closed to fully open | Actual Ø (DM) or distance between faces for a given number of turns from fully closed with SPA belt in (mm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0,5 | 1 | 1,5 | 2 | 2,5 | 3 | 3,5 | 4 | 4,5 | 5,0 | 5,5 |
| 8450 / | 120 | 95 | 116 | 5 | 113,9 | 111,8 | 109,7 | 107,6 | 105,5 | 103,4 | 101,3 | 99,2 | 97,1 | 95,0 | - |
| D8450 | | 20,2 | 28,0 | 5 | 21,0 | 21,8 | 22,5 | 23,3 | 24,1 | 24,9 | 25,7 | 26,4 | 27,2 | 28,0 | - |
| 8550 / | 136 | 110 | 131 | 5 | 128,9 | 126,8 | 124,7 | 122,6 | 120,5 | 118,4 | 116,3 | 114,2 | 112,1 | 110,0 | |
| D8550 | | 20,6 | 31,2 | 5 | 21,6 | 22,7 | 23,8 | 24,8 | 25,9 | 26,9 | 28,0 | 29,1 | 30,1 | 31,2 | - |
| 8670 | 171 | 145 | 166 | 5 | 163,9 | 161,8 | 159,7 | 157,6 | 155,5 | 153,4 | 151,3 | 149,2 | 147,1 | 145,0 | - |
| D8670 | | 20,5 | 31,1 | 5 | 21,5 | 22,7 | 23,8 | 24,8 | 25,7 | 26,9 | 27,9 | 29,0 | 30,0 | 31,1 | - |

The easiest way to determine the fan rotation speed is to use a tachometer. If not available the fan rpm can be estimated using the following two methods.

### *1st Method with the pulley secured in place :*




Measure the distance between the two outside faces of the pulley.

Using table 1 the motor pulley actual diameter can be estimated


*Figure 11*

### *2nd method when adjusting the pulley :*

- Close the pulley fully and count the number of turns from fully closed position. Using table 2 determine the motor pulley actual diameter.
- Record the fix fan pulley diameter.(DF)
- Determine the fan speed using the following formula:

$$rpm_{FAN} = rpm_{MOTOR} \times D_M / D_F$$

Where :

$rpm_{MOTOR}$ : ..... from the motor plate or table 2

$D_M$ : ..... from table 2

$D_F$: ..... from machine

Once the pulleys are adjusted and the belt checked and tensioned, start the fan motor and record the Amps and Voltage between the phases :

Using the measured data and table 2

- Theoretical mechanical power at the fan shaft :

$$P_{meca\ fan} = P_{meca\ Motor} \times \eta_{Transmission}$$

$$P_{meca\ fan} = P_{elec} \times \eta_{meca\ motor} \times \eta_{Transmission}$$

$$P_{meca\ fan} = V \times I \times \sqrt{3} \times \cos\varphi \times \eta_{meca\ motor} \times \eta_{Transmission}$$

This formula can be approximated in this way

$$P_{meca\ fan} = V \times I \times 1.73 \times 0.85 \times 0.76 \times 0.9$$

With the fan "rpm" and the mechanical power at the fan shaft an operating point and the supplied airflow can be estimated using the fan curves.

## CHECKING AIRFLOW AND ESP

Using the fan curves on page 25, 26, 27, the airflow, the total pressure available ($P_{TOT}$) and the corresponding dynamic pressure (Pd) can now be estimated, for a specific operating point;

The next step consist in estimating the pressure losses across the unit.

This can be achieved using the "dirty filter pressure sensor" and the accessories pressure drop table:

Also the pressure drop due to the duct inlet into the roof-top unit can be taken as 20 to 30 Pa.

$$\Delta P_{INT} = \Delta P_{filter} + coil + P_{Inlet} + \Delta P_{Options}$$

using the results from above, the external static pressure (ESP) can then be estimated:

$$ESP = P_{TOT} - Pd - \Delta P_{INT}$$

*Table 3 -* **Motor information**

| Motor Size | Nom. Speed | Cos | meca motor |
|---|---|---|---|
| 0,75 kW | 1400 rpm | 0,77 | 0,70 |
| 1,1 kW | 1425 rpm | 0,82 | 0,77 |
| 1,5 kW | 1430 rpm | 0,81 | 0,75 |
| 2,2 kW | 1430 rpm | 0,81 | 0,76 |
| 3,0 kW | 1425 rpm | 0,78 | 0,77 |
| 4 kW | 1425 rpm | 0,79 | 0,80 |
| 5,5 kW | 1430 rpm | 0,82 | 0,82 |

*Table 4 -* **Accessories Pressure drops**

| | | Economiser | EU7 | Hot water coil | | Electric heater | | Roofcurb | Horizontal | Gaz |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 100% open | Filter | S | H | S | H | Base frame | Roofcurb | H |
| ***SIZE*** | Air flow (m³/h) | (Pa) | (Pa) | (Pa) | (Pa) | (Pa) | (Pa) | (Pa) | (Pa) | (Pa) |
| | Min. 14 000 | 8 | 73 | 8 | 16 | 5 | 8 | 18 | 44 | 7 |
| *85* | Nom. 16 000 | 10 | 113 | 13 | 25 | 8 | 8 | 26 | 57 | 10 |
| | Max. 22 000 | 16 | 159 | 18 | 36 | 8 | 10 | 32 | 109 | 12 |
| | Min. 16 000 | 10 | 93 | 10 | 20 | 8 | 10 | 26 | 57 | 10 |
| *100* | Nom. 20 000 | 14 | 135 | 15 | 30 | 10 | 13 | 32 | 90 | 12 |
| | Max. 22 000 | 16 | 159 | 18 | 36 | 13 | 15 | 38 | 109 | 15 |
| | Min. 18 000 | 12 | 113 | 13 | 25 | 10 | 13 | 32 | 33 | 29 |
| *120* | Nom. 22 000 | 16 | 159 | 18 | 36 | 13 | 15 | 38 | 49 | 35 |
| | Max. 24 000 | 18 | 184 | 21 | 41 | 15 | 18 | 44 | 58 | 40 |
| | Min. 20 000 | 14 | 135 | 15 | 30 | 10 | 15 | 35 | 40 | 31 |
| *140* | Nom. 24 000 | 18 | 184 | 21 | 41 | 15 | 18 | 46 | 58 | 40 |
| | Max. 25 000 | 19 | 197 | 22 | 44 | 15 | 20 | 50 | 63 | 43 |
| | Min. 22 000 | 16 | 87 | 9 | 18 | 8 | 8 | 24 | 49 | 45 |
| *160* | Nom. 28 000 | 22 | 132 | 13 | 27 | 8 | 10 | 30 | 79 | 56 |
| | Max. 32 000 | 26 | 165 | 17 | 34 | 13 | 13 | 34 | 103 | 64 |
| | Min. 24 000 | 18 | 101 | 10 | 20 | 10 | 10 | 34 | 58 | 64 |
| *190* | Nom. 33 000 | 27 | 174 | 18 | 36 | 13 | 13 | 41 | 109 | 77 |
| | Max. 36 000 | 30 | 201 | 21 | 41 | 13 | 15 | 48 | 130 | 89 |

**EXAMPLE**

The unit used for this example is a **FHK 120N** with standard supply and return airflow configuration. It is also fitted with an economiser and an electric heater type H.

It is fitted with 2 **AT 18-18** fans which curve is shown on page 35 and 2x 2.2 kW motors.

For each motor we have :

- Motor rpm : 1430 rpm
- cos φ = 0.81
- Voltage = 400 V
- Current = 4,68A

$$P_{mech\ fan} = V \times I \times \sqrt{3} \times \cos\varphi \times \eta_{mech\ motor} \times \eta_{Transmission}$$

$$= 400 \times 4.68 \times \sqrt{3} \times 0.81 \times 0.76 \times 0.9 = \underline{\mathbf{1,79\ kW}}$$

The unit is also fitted with 2 transmission kits 1

- Fixed Fan pulley : 250 mm
- Motor adjustable pulley type "8450" opened 1 turn from fully closed or measured distance between pulley end plates is 21,8 mm: from table xxx it can be determined that the motor pulley has a diameter of 111,8 mm

$$rpm_{FAN} = rpm_{MOTOR} \times D_M / D_F = 1430 \times 118,2 / 250 = \underline{\mathbf{640\ rpm}}$$

Using the fan curve below the operating point can be located.

In order to facilitate the calculation, you won't make any mistake by considering that the external static pressure available is the one fan providing the half of the nominal flow (here 11 000 m3/h)

It can be determined that each fan is providing approximately **11 000 m3/h** with a total pressure $P^{TOT}$ = **400 Pa**

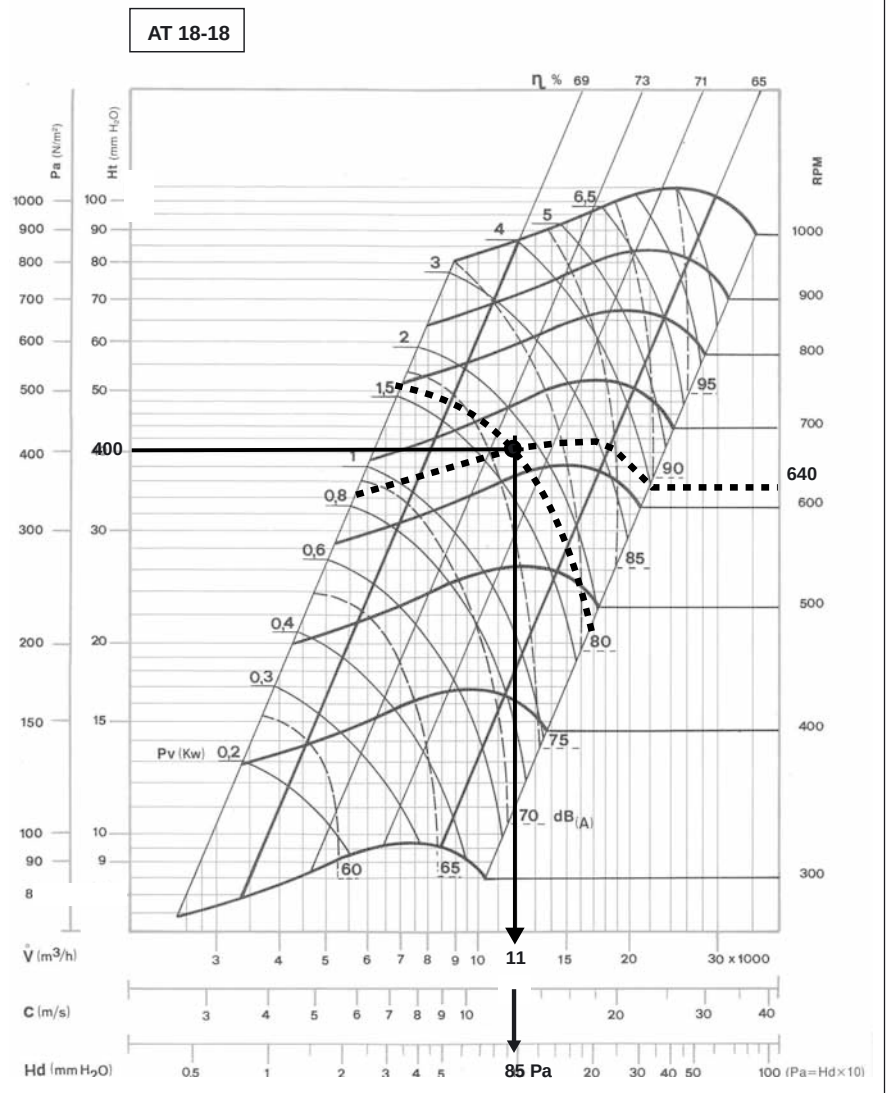



*Figure 24*

The pressure losses in the unit are the sum of all pressure drops across the different parts of a unit :

- Coil and filter (measured) = 105 Pa
- Inlet into the unit = 30 Pa
- Options = 16 Pa for economiser and 13 Pa for electric heater H

$\Delta P$ = 105 + 16 + 13 + 30 = **163 Pa**

The dynamic pressure at 11000m³/h is given at the bottom of the fan curve (page 26)

Pd = **85 Pa**

The external static pressure available is therefore

ESP = $P_{TOT}$ - Pd - $\Delta PI_{NT}$

= 400 - 85 - 163 = **152 Pa**

| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FC/FH/FD... 085 - Standard** | | | |
| **K1** | AT 15-15 G2L | - | 33(*) |
| **K2** | AT 15-15 G2L | - | 33(*) |
| **K3** | AT 15-15 G2L | - | 33(*) |
| **K4** | AT 15-15 G2L | - | 33(*) |
| **K5** | AT 15-15 G2L | - | 33(*) |
| **K6** | AT 15-15 G2L | - | 33(*) |
| **K7** | AT 15-15 G2L | - | 33(*) |
| **K8** | AT 15-15 G2L | - | 33(*) |
| **K9** | - | AT 15-15 S | 33 |
| **K10** | AT 15-15 G2L | - | 33(*) |
| **K11** | - | AT 15-15 S | 33 |
| **K12** | AT 15-15 G2L | - | 33(*) |
| **K13** | - | AT 15-15 S | 33 |
| **FC/FH/FD... 100 - Standard** | | | |
| **K1** | AT 15-15 G2L | - | 33(*) |
| **K2** | AT 15-15 G2L | - | 33(*) |
| **K3** | AT 15-15 G2L | - | 33(*) |
| **K4** | AT 15-15 G2L | - | 33(*) |
| **K5** | AT 15-15 G2L | - | 33(*) |
| **K6** | - | AT 15-15 S | 33 |
| **K7** | AT 15-15 G2L | - | 33(*) |
| **K8** | - | AT 15-15 S | 33(*) |
| **K9** | AT 15-15 G2L | - | 33(*) |

| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FC/FH/FD... 120 - Standard** | | | |
| **K1** | - | AT 18-18 S | 35 |
| **K2** | - | AT 18-18 S | 35 |
| **K3** | - | AT 18-18 S | 35 |
| **K4** | - | AT 18-18 S | 35 |
| **K5** | - | AT 18-18 S | 35 |
| **K6** | - | AT 18-18 S | 35 |
| **K7** | - | AT 18-18 S | 35 |
| **K8** | - | AT 18-18 S | 35 |
| **K9** | - | AT 18-18 S | 35 |
| **FC/FH/FD... 140 - Standard** | | | |
| **K1** | - | AT 18-18 S | 35 |
| **K2** | - | AT 18-18 S | 35 |
| **K3** | - | AT 18-18 S | 35 |
| **K4** | - | AT 18-18 S | 35 |
| **K5** | - | AT 18-18 S | 35 |
| **K6** | - | AT 18-18 S | 35 |
| **K7** | - | AT 18-18 S | 35 |
| **K8** | - | AT 18-18 S | 35 |
| **K9** | - | AT 18-18 S | 35 |
| **FC/FH/FD... 160 - Standard** | | | |
| **K1** | - | AT 18-18 S | 35 |
| **K2** | - | AT 18-18 S | 35 |
| **K3** | - | AT 18-18 S | 35 |
| **K4** | - | AT 18-18 S | 35 |
| **K5** | - | AT 18-18 S | 35 |
| **K6** | - | AT 18-18 S | 35 |
| **K7** | - | AT 18-18 S | 35 |
| **K8** | - | AT 18-18 S | 35 |
| **K9** | - | AT 18-18 S | 35 |
| **K10** | - | AT 18-18 S | 35 |
| **FC/FH/FD... 190 - Standard** | | | |
| **K1** | - | AT 18-18 S | 35 |
| **K2** | - | AT 18-18 S | 35 |
| **K3** | - | AT 18-18 S | 35 |
| **K4** | - | AT 18-18 S | 35 |
| **K5** | - | AT 18-18 S | 35 |
| **K6** | - | AT 18-18 S | 35 |
| **K7** | - | AT 18-18 S | 35 |
| **K8** | - | AT 18-18 S | 35 |
| **K9** | - | AT 18-18 S | 35 |
| **K10** | - | AT 18-18 S | 35 |

**(*)** The performances of twin fan units can be calculated starting from the corresponding operation point for a single fan (see the figure behind) by applying the formulas below.

- pressure : PTwin = P x 1
- volume flow rate : Qb = Q x 2
- impeller power: Wb = W x 2,15
- fan speed : Nb = N x 1,05
- Lws : Lwsb = Lws + 3 dB

| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FC/FH/FD... 085 - Side discharge** | | | |
| **K14** | - | AT 15-15 S | 33 |
| **K15** | - | AT 15-15 S | 33 |
| **K16** | - | AT 15-15 S | 33 |
| **K17** | - | AT 15-15 S | 33 |
| **K18** | - | AT 15-15 S | 33 |
| **K19** | - | AT 15-15 S | 33 |
| **K20** | - | AT 15-15 S | 33 |
| **K21** | - | AT 15-15 S | 33 |
| **FC/FH/FD... 100 - Side discharge** | | | |
| **K10** | - | AT 15-15 S | 33 |
| **K11** | - | AT 15-15 S | 33 |
| **K12** | - | AT 15-15 S | 33 |
| **K13** | - | AT 15-15 S | 33 |
| **K14** | - | AT 15-15 S | 33 |
| **K15** | - | AT 15-15 S | 33 |
| **K16** | - | AT 15-15 S | 33 |
| **K17** | - | AT 15-15 S | 33 |
| **K18** | - | AT 15-15 S | 33 |
| **K19** | - | AT 15-15 S | 33 |
| **FC/FH/FD... 120 - Side discharge** | | | |
| **K10** | - | AT 18-13 S | 34 |
| **K11** | - | AT 18-13 S | 34 |
| **K12** | - | AT 18-13 S | 34 |
| **K13** | - | AT 18-13 S | 34 |
| **K14** | - | AT 18-13 S | 34 |
| **K15** | - | AT 18-13 S | 34 |
| **K16** | - | AT 18-13 S | 34 |
| **K17** | - | AT 18-13 S | 34 |
| **K18** | - | AT 18-13 S | 34 |
| **FC/FH/FD... 140 - Side discharge** | | | |
| **K10** | - | AT 18-13 S | 34 |
| **K11** | - | AT 18-13 S | 34 |
| **K12** | - | AT 18-13 S | 34 |
| **K13** | - | AT 18-13 S | 34 |
| **K14** | - | AT 18-13 S | 34 |
| **K15** | - | AT 18-13 S | 34 |
| **K16** | - | AT 18-13 S | 34 |
| **K17** | - | AT 18-13 S | 34 |

| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FG... 085 - Gas** | | | |
| **K1** | - | AT 15-15 S | 33 |
| **K2** | - | AT 15-15 S | 33 |
| **K3** | - | AT 15-15 S | 33 |
| **K4** | - | AT 15-15 S | 33 |
| **K5** | - | ADN 355L | 37 |
| **K6** | - | AT 15-15 S | 33 |
| **K7** | - | ADN 355L | 37 |
| **K8** | - | AT 15-15 S | 33 |
| **K9** | - | AT 15-15 S | 33 |
| **K10** | - | ADN 355L | 37 |
| **K11** | - | ADN 355L | 37 |
| **FG... 100 - Gas** | | | |
| **K1** | - | AT 15-15 S | 33 |
| **K2** | - | AT 15-15 S | 33 |
| **K3** | - | AT 15-15 S | 33 |
| **K4** | - | AT 15-15 S | 33 |
| **K5** | - | ADN 355L | 37 |
| **K6** | - | AT 15-15 S | 33 |
| **K7** | - | AT 15-15 S | 33 |
| **K8** | - | ADN 355L | 37 |
| **K9** | - | AT 15-15 S | 33 |
| **K10** | - | ADN 355L | 37 |

| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FG... 120 - Gas** | | | |
| **K1** | - | ADN 400 | 38 |
| **K2** | - | ADN 400 | 38 |
| **K3** | - | ADN 400 | 38 |
| **K4** | - | ADN 400 | 38 |
| **K5** | - | ADN 400 | 38 |
| **K6** | - | ADN 400 | 38 |
| **K7** | - | ADN 400 | 38 |
| **K8** | - | ADN 400 | 38 |
| **FG... 138 - Gas** | | | |
| **K1** | - | ADN 400 | 38 |
| **K2** | - | ADN 400 | 38 |
| **K3** | - | ADN 400 | 38 |
| **K4** | - | ADN 400 | 38 |
| **K5** | - | ADN 400 | 38 |
| **FG... 160 - Gas** | | | |
| **K1** | - | ADN 450 L | 39 |
| **K2** | - | ADN 450 L | 39 |
| **K3** | - | ADN 450 L | 39 |
| **K4** | - | ADN 450 L | 39 |
| **K5** | - | ADN 450 L | 39 |
| **K6** | - | ADN 450 L | 39 |
| **K7** | - | ADN 450 L | 39 |
| **K8** | - | ADN 450 L | 39 |
| **K9** | - | ADN 450 L | 39 |
| **K10** | - | ADN 450 L | 39 |
| **FG... 190 - Gas** | | | |
| **K1** | - | ADN 450 L | 39 |
| **K2** | - | ADN 450 L | 39 |
| **K3** | - | ADN 450 L | 39 |
| **K4** | - | ADN 450 L | 39 |
| **K5** | - | ADN 450 L | 39 |
| **K6** | - | ADN 450 L | 39 |
| **K7** | - | ADN 450 L | 39 |
| **K8** | - | ADN 450 L | 39 |
| **K9** | - | ADN 450 L | 39 |
| **K10** | - | RDN 450 K | 36 |

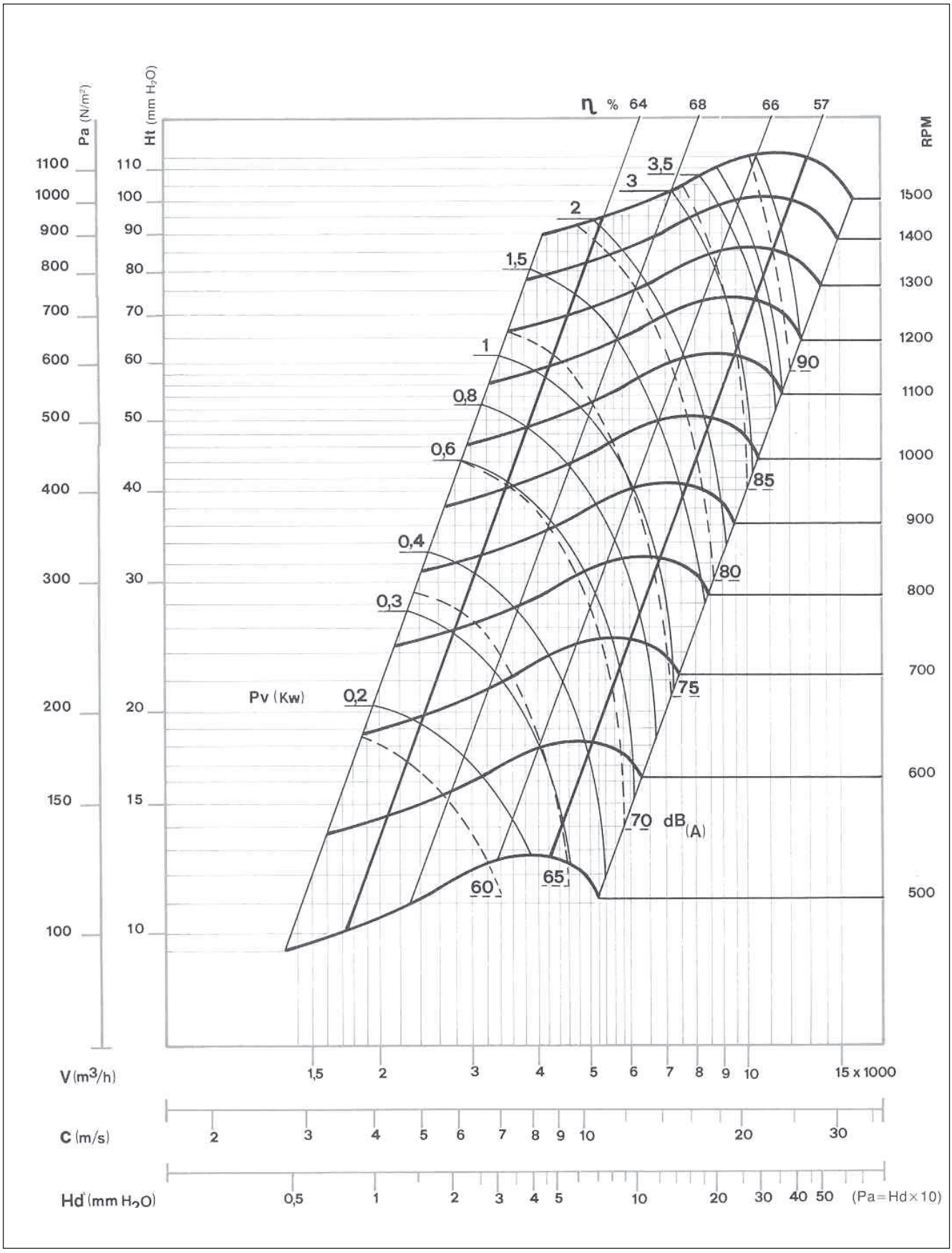
| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FX... 025 Indoor** | | | |
| **K1** | AT 12-12 S | - | 32 |
| **K2** | AT 12-12 S | - | 32 |
| **K3** | AT 12-12 S | - | 32 |
| **K4** | AT 12-12 S | - | 32 |
| **K5** | AT 12-12 S | - | 32 |
| **K6** | AT 12-12 S | - | 32 |
| **K7** | AT 12-12 S | - | 32 |
| **K8** | AT 12-12 S | - | 32 |
| **K9** | AT 12-12 S | - | 32 |
| **K10** | AT 12-12 S | - | 32 |
| **FX.. 030 Indoor** | | | |
| **K1** | AT 12-12 S | - | 32 |
| **K2** | AT 12-12 S | - | 32 |
| **K3** | AT 12-12 S | - | 32 |
| **K4** | AT 12-12 S | - | 32 |
| **K5** | AT 12-12 S | - | 32 |
| **K6** | AT 12-12 S | - | 32 |
| **K7** | AT 12-12 S | - | 32 |
| **K8** | AT 12-12 S | - | 32 |
| **K9** | AT 12-12 S | - | 32 |
| **K10** | AT 12-12 S | - | 32 |
| **FX... 035 Indoor** | | | |
| **K1** | AT 15-15 S | - | 33 |
| **K2** | AT 15-15 S | - | 33 |
| **K3** | AT 15-15 S | - | 33 |
| **K4** | AT 15-15 S | - | 33 |
| **K5** | AT 15-15 S | - | 33 |
| **K6** | AT 15-15 S | - | 33 |
| **K7** | AT 15-15 S | - | 33 |
| **K8** | AT 15-15 S | - | 33 |
| **FX... 040 Indoor** | | | |
| **K1** | AT 15-15 S | - | 33 |
| **K2** | AT 15-15 S | - | 33 |
| **K3** | AT 15-15 S | - | 33 |
| **K4** | AT 15-15 S | - | 33 |
| **K5** | AT 15-15 S | - | 33 |
| **K6** | AT 15-15 S | - | 33 |
| **K7** | AT 15-15 S | - | 33 |
| **K8** | AT 15-15 S | - | 33 |
| **K9** | AT 15-15 S | - | 33 |
| **K10** | AT 15-15 S | - | 33 |
| **FX... 055 Indoor** | | | |
| **K1** | AT 15-15 S | - | 33 |
| **K2** | AT 15-15 S | - | 33 |
| **K3** | AT 15-15 S | - | 33 |
| **K4** | AT 15-15 S | - | 33 |
| **K5** | AT 15-15 S | - | 33 |
| **K6** | AT 15-15 S | - | 33 |
| **K7** | AT 15-15 S | - | 33 |
| **K8** | AT 15-15 S | - | 33 |
| **K9** | AT 15-15 S | - | 33 |
| **K10** | AT 15-15 S | - | 33 |

| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FX... 070 Indoor** | | | |
| **K1** | AT 18-18 S | - | 35 |
| **K2** | AT 18-18 S | - | 35 |
| **K3** | AT 18-18 S | - | 35 |
| **K4** | AT 18-18 S | - | 35 |
| **K5** | AT 18-18 S | - | 35 |
| **K6** | AT 18-18 S | - | 35 |
| **K7** | AT 18-18 S | - | 35 |
| **K8** | AT 18-18 S | - | 35 |
| **K9** | AT 18-18 S | - | 35 |
| **K10** | AT 18-18 S | - | 35 |
| **K11** | AT 18-18 S | - | 35 |
| **FX... 085 Indoor** | | | |
| **K1** | AT 18-18 S | - | 35 |
| **K2** | AT 18-18 S | - | 35 |
| **K3** | AT 18-18 S | - | 35 |
| **K4** | AT 18-18 S | - | 35 |
| **K5** | AT 18-18 S | - | 35 |
| **K6** | AT 18-18 S | - | 35 |
| **K7** | AT 18-18 S | - | 35 |
| **K8** | AT 18-18 S | - | 35 |
| **K9** | AT 18-18 S | - | 35 |
| **FX... 0100 Indoor** | | | |
| **K1** | AT 18-18 S | - | 35 |
| **K2** | AT 18-18 S | - | 35 |
| **K3** | AT 18-18 S | - | 35 |
| **K4** | AT 18-18 S | - | 35 |
| **K5** | AT 18-18 S | - | 35 |
| **K6** | AT 18-18 S | - | 35 |
| **K7** | AT 18-18 S | - | 35 |
| **FX... 110 Indoor** | | | |
| **K1** | - | AT 18-18 S | 35 |
| **K2** | - | AT 18-18 S | 35 |
| **K3** | - | AT 18-18 S | 35 |
| **K4** | - | AT 18-18 S | 35 |
| **K5** | - | AT 18-18 S | 35 |
| **K6** | - | AT 18-18 S | 35 |
| **K7** | - | AT 18-18 S | 35 |
| **FX... 140 Indoor** | | | |
| **K1** | - | AT 18-18 S | 35 |
| **K2** | - | AT 18-18 S | 35 |
| **K3** | - | AT 18-18 S | 35 |
| **K4** | - | AT 18-18 S | 35 |
| **K5** | - | AT 18-18 S | 35 |
| **K6** | - | AT 18-18 S | 35 |
| **K7** | - | AT 18-18 S | 35 |
| **K8** | - | AT 18-18 S | 35 |
| **FX... 170 Indoor** | | | |
| **K1** | - | AT 18-18 S | 35 |
| **K2** | - | AT 18-18 S | 35 |
| **K3** | - | AT 18-18 S | 35 |
| **K4** | - | AT 18-18 S | 35 |
| **K5** | - | AT 18-18 S | 35 |
| **K6** | - | AT 18-18 S | 35 |
| **K7** | - | AT 18-18 S | 35 |

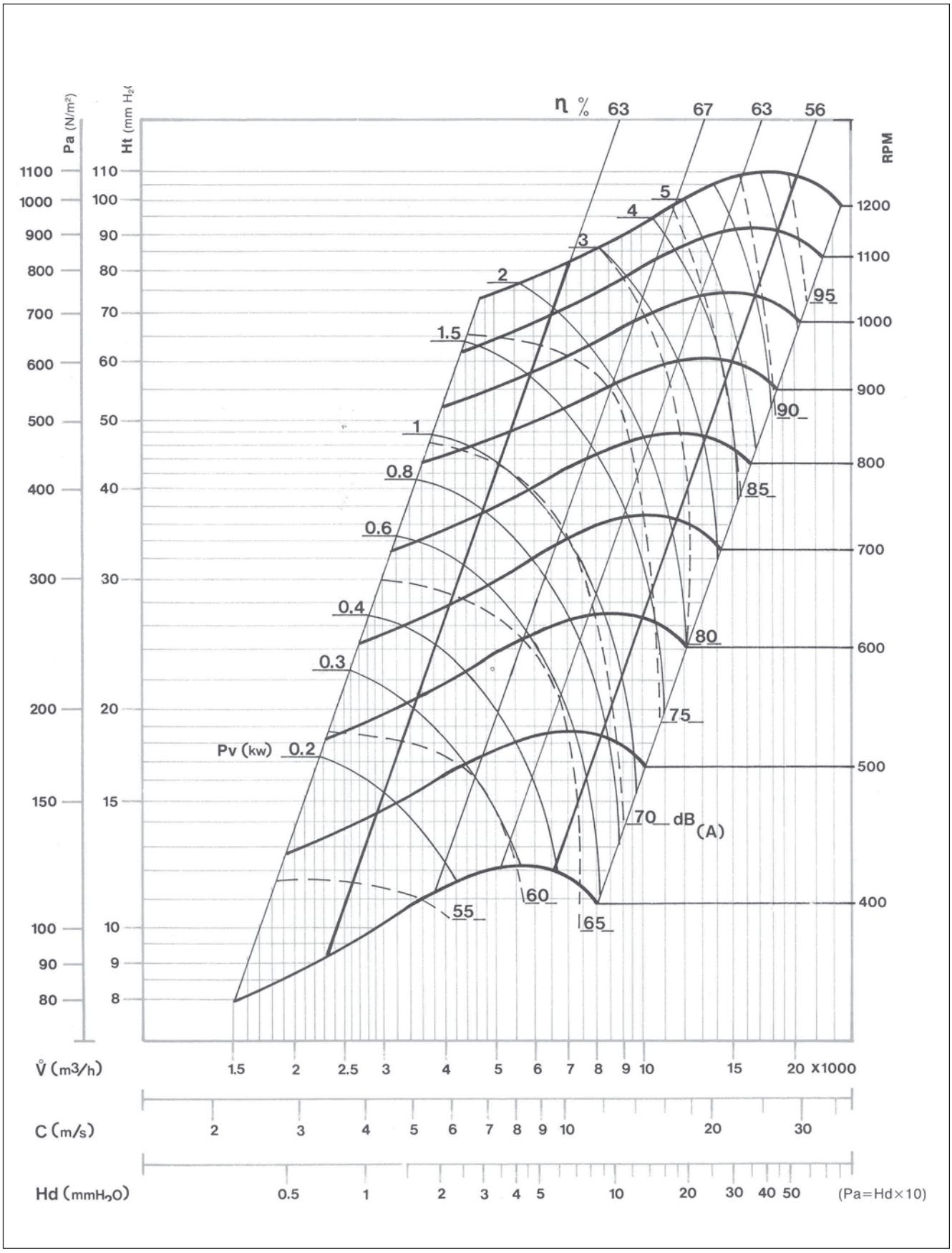
| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FX... 025 Outdoor** | | | |
| **K1** | AT 12-12 S | - | 32 |
| **K2** | AT 12-12 S | - | 32 |
| **K3** | AT 12-12 S | - | 32 |
| **K4** | AT 12-12 S | - | 32 |
| **K5** | AT 12-12 S | - | 32 |
| **K6** | AT 12-12 S | - | 32 |
| **FX... 030 Outdoor** | | | |
| **K1** | AT 12-12 S | - | 32 |
| **K2** | AT 12-12 S | - | 32 |
| **K3** | AT 12-12 S | - | 32 |
| **K4** | AT 12-12 S | - | 32 |
| **K5** | AT 12-12 S | - | 32 |
| **FX... 035 Outdoor** | | | |
| **K1** | AT 15-15 S | - | 33 |
| **K2** | AT 15-15 S | - | 33 |
| **K3** | AT 15-15 S | - | 33 |
| **K4** | AT 15-15 S | - | 33 |
| **K5** | AT 15-15 S | - | 33 |
| **K6** | AT 15-15 S | - | 33 |
| **K7** | AT 15-15 S | - | 33 |
| **FX... 040 Outdoor** | | | |
| **K1** | AT 15-15 S | - | 33 |
| **K2** | AT 15-15 S | - | 33 |
| **K3** | AT 15-15 S | - | 33 |
| **K4** | AT 15-15 S | - | 33 |
| **K5** | AT 15-15 S | - | 33 |
| **K6** | AT 15-15 S | - | 33 |
| **K7** | AT 15-15 S | - | 33 |
| **FX... 055 Outdoor** | | | |
| **K1** | AT 15-15 S | - | 33 |
| **K2** | AT 15-15 S | - | 33 |
| **K3** | AT 15-15 S | - | 33 |
| **K4** | AT 15-15 S | - | 33 |
| **K5** | AT 15-15 S | - | 33 |
| **FX... 070 Outdoor** | | | |
| **K1** | AT 18-18 S | - | 35 |
| **K2** | AT 18-18 S | - | 35 |
| **K3** | AT 18-18 S | - | 35 |
| **K4** | AT 18-18 S | - | 35 |
| **K5** | AT 18-18 S | - | 35 |
| **K6** | AT 18-18 S | - | 35 |

| KIT NR | FAN TYPE | | CURVE PICTURE ON PAGE |
|---|---|---|---|
| | SINGLE | TWIN | |
| **FX... 085 Outdoor** | | | |
| **K1** | AT 18-18 S | - | 35 |
| **K2** | AT 18-18 S | - | 35 |
| **K3** | AT 18-18 S | - | 35 |
| **K4** | AT 18-18 S | - | 35 |
| **K5** | AT 18-18 S | - | 35 |
| **FX... 100 Outdoor** | | | |
| **K1** | - | AT 15-15 S | 33 |
| **K2** | - | AT 15-15 S | 33 |
| **K3** | - | AT 15-15 S | 33 |
| **K4** | - | AT 15-15 S | 33 |
| **K5** | - | AT 15-15 S | 33 |
| **FX... 110 Outdoor** | | | |
| **K1** | AT 18-18 S | - | 35 |
| **K2** | AT 18-18 S | - | 35 |
| **K3** | AT 18-18 S | - | 35 |
| **K4** | AT 18-18 S | - | 35 |
| **K5** | AT 18-18 S | - | 35 |
| **K6** | AT 18-18 S | - | 35 |
| **FX... 140 Outdoor** | | | |
| **K1** | AT 18-18 S | - | 35 |
| **K2** | AT 18-18 S | - | 35 |
| **K3** | AT 18-18 S | - | 35 |
| **K4** | AT 18-18 S | - | 35 |
| **K5** | AT 18-18 S | - | 35 |
| **FX... 170 Outdoor** | | | |
| **K1** | AT 18-18 S | - | 35 |
| **K2** | AT 18-18 S | - | 35 |
| **K3** | AT 18-18 S | - | 35 |
| **K4** | AT 18-18 S | - | 35 |
| **K5** | AT 18-18 S | - | 35 |

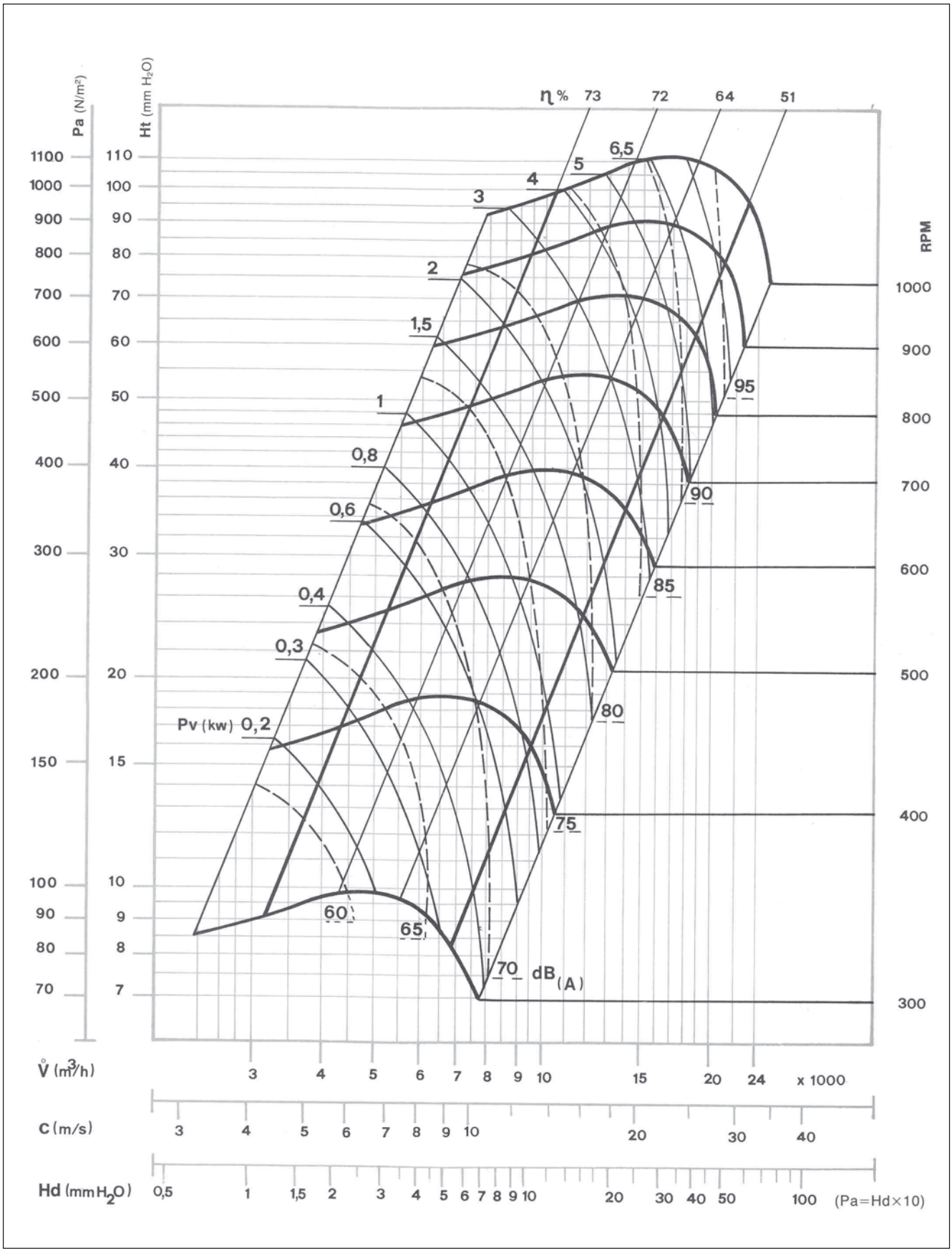
## AT 12-12 FAN


η % 64 68 66 57
RPM
Pa (N/m²)
Ht (mm H₂O)
Pv (Kw)
0,2
0,3
0,4
0,6
0,8
1
1,5
2
3
3,5
60
65
70 dB(A)
75
80
85
90
V (m³/h)
C (m/s)
Hd (mm H₂O)
(Pa = Hd × 10)

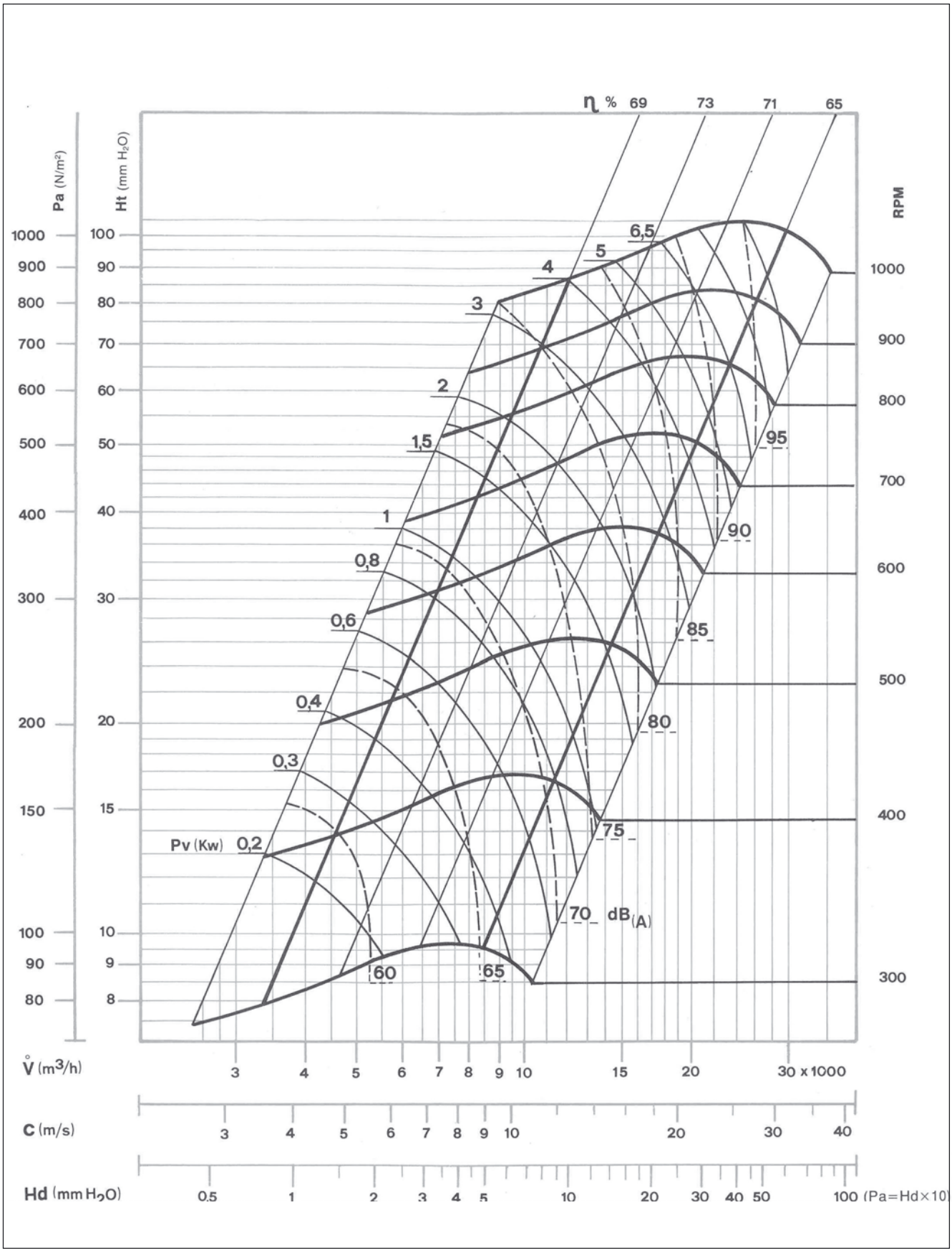
## AT 15-15 FAN


η % 63 67 63 56
RPM
Pa (N/m²)
Ht (mm H₂O)
Pv (kw)
0.2
0.3
0.4
0.6
0.8
1
1.5
2
3
4
5
55
60
65
70 dB (A)
75
80
85
90
95
V̊ (m3/h)
1.5 2 2.5 3 4 5 6 7 8 9 10 15 20 X1000
C (m/s)
2 3 4 5 6 7 8 9 10 20 30
Hd (mmH₂O)
0.5 1 2 3 4 5 10 20 30 40 50
(Pa=Hd×10)

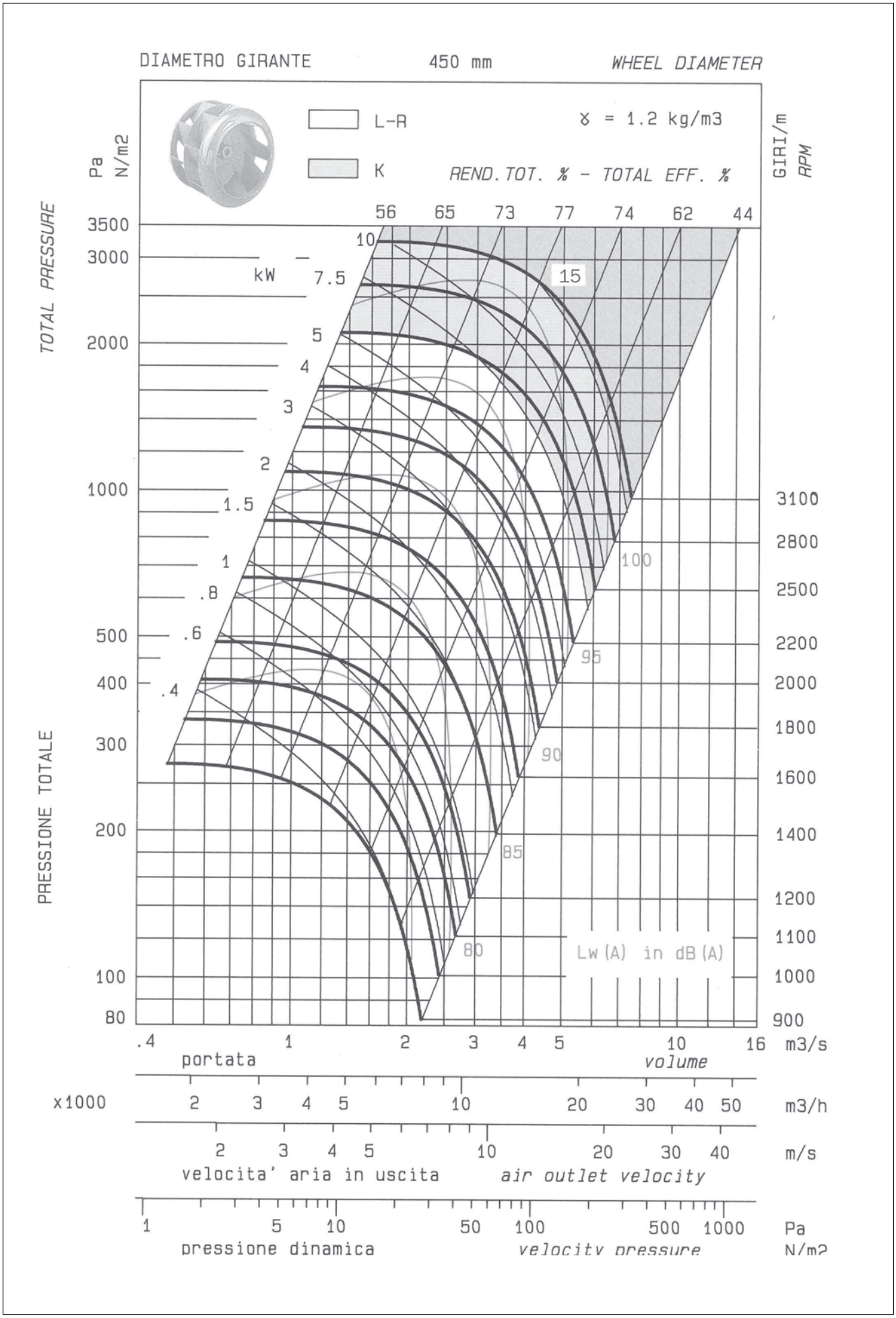
## AT 18-13


Pa (N/m²)
Ht (mm H₂O)
η %
73
72
64
51
RPM
1100
1000
900
800
700
600
500
400
300
200
150
100
90
80
70
110
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6,5
5
4
3
2
1,5
1
0,8
0,6
0,4
0,3
0,2
Pv (kw)
95
90
85
80
75
70
65
60
dB (A)
1000
900
800
700
600
500
400
300
V̊ (m³/h)
3 4 5 6 7 8 9 10 15 20 24 x 1000
c (m/s)
3 4 5 6 7 8 9 10 20 30 40
Hd (mm H₂O)
0,5 1 1,5 2 3 4 5 6 7 8 9 10 20 30 40 50 100 (Pa=Hd×10)

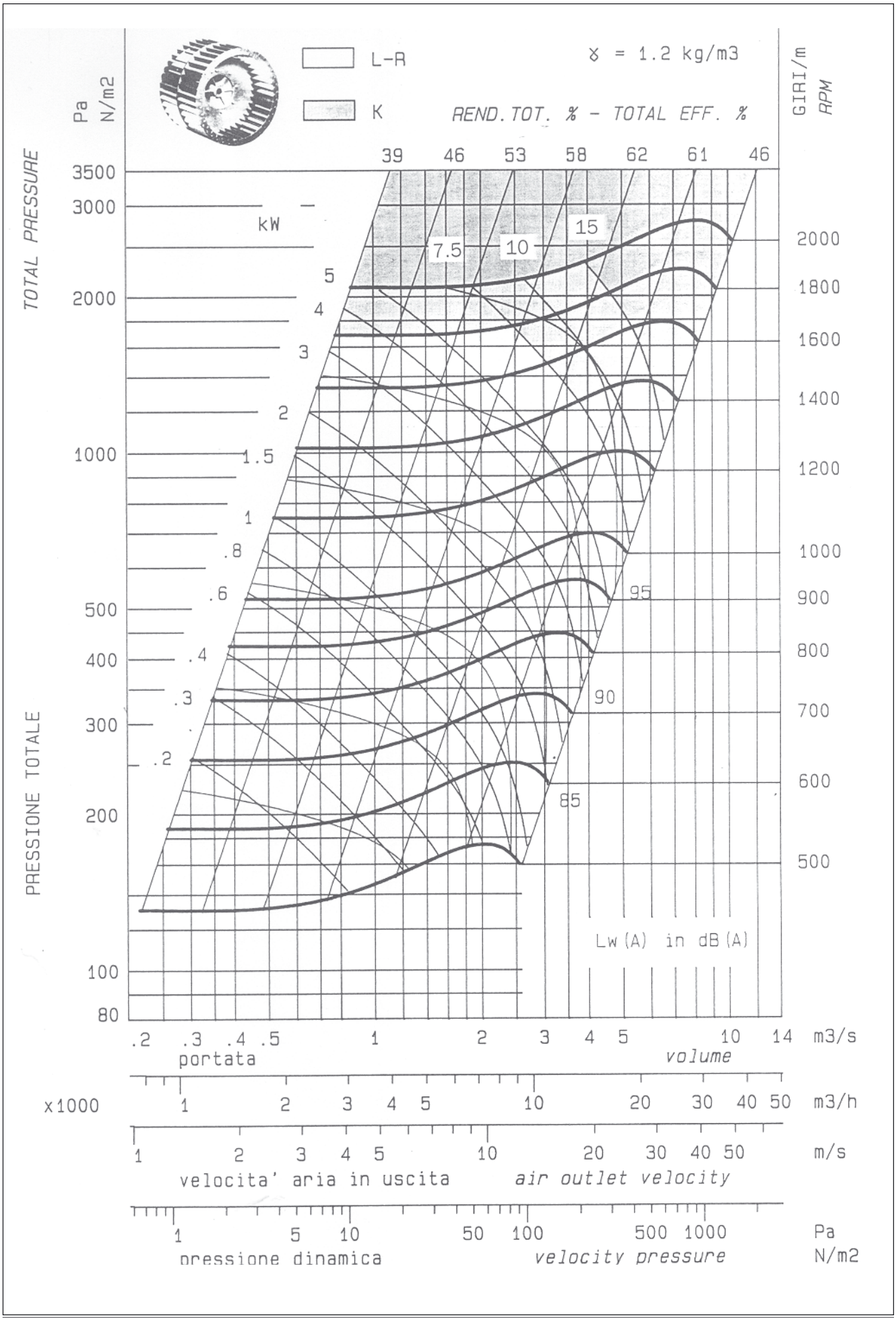
## AT 18-18 FAN


η % 69 73 71 65
Pa (N/m²)
Ht (mm H₂O)
RPM
1000 900 800 700 600 500 400 300 200 150 100 90 80
100 90 80 70 60 50 40 30 20 15 10 9 8
1000 900 800 700 600 500 400 300
6,5 5 4 3 2 1,5 1 0,8 0,6 0,4 0,3 0,2
Pv (Kw)
95 90 85 80 75 70 dB(A) 65 60
V̊ (m³/h)
3 4 5 6 7 8 9 10 15 20 30 x 1000
C (m/s)
3 4 5 6 7 8 9 10 20 30 40
Hd (mm H₂O)
0.5 1 2 3 4 5 10 20 30 40 50 100 (Pa=Hd×10)

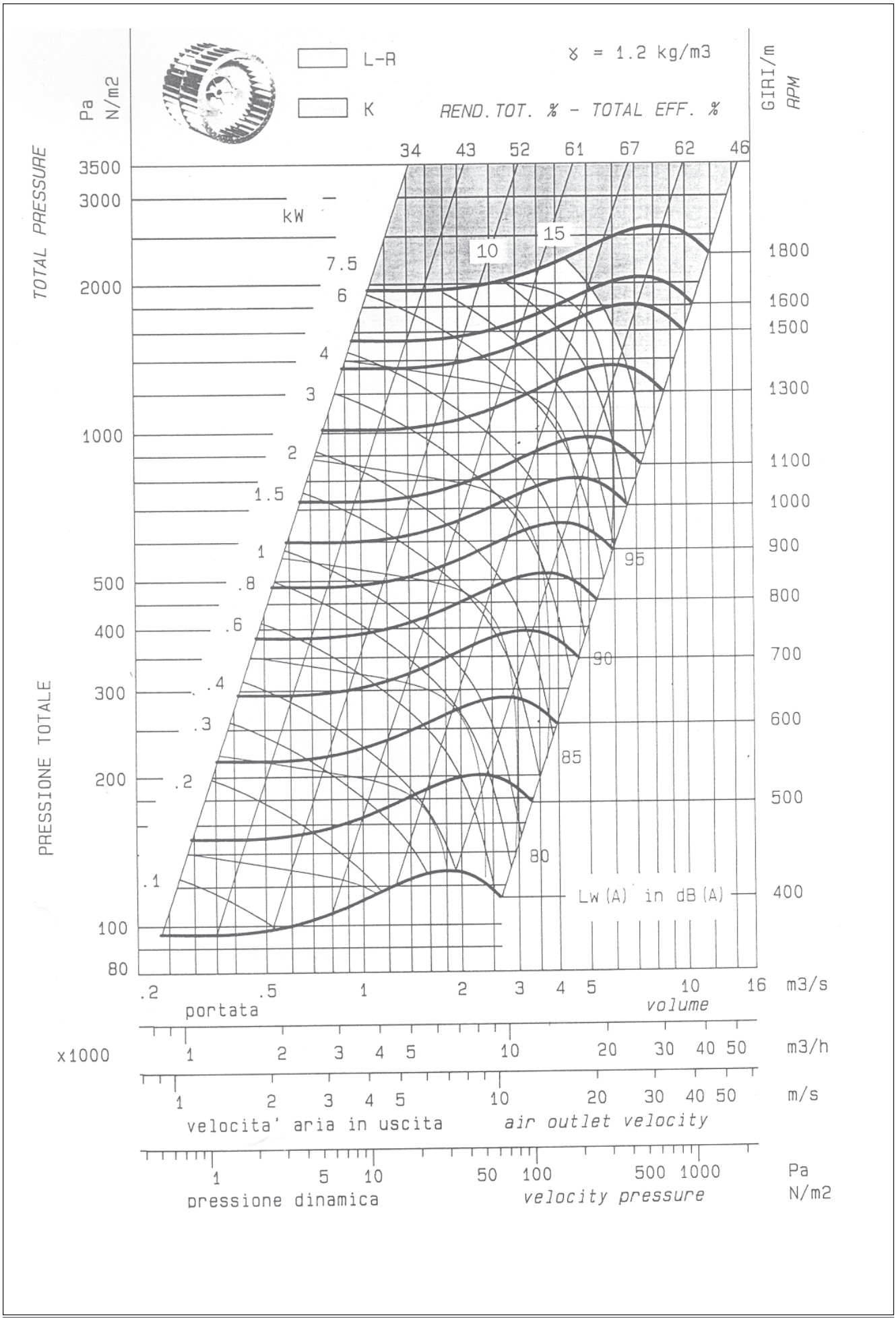
## RDN 450 FAN


DIAMETRO GIRANTE 450 mm WHEEL DIAMETER
L-R
K
ϰ = 1.2 kg/m3
REND. TOT. % - TOTAL EFF. %
56 65 73 77 74 62 44
Pa N/m2
GIRI/m RPM
TOTAL PRESSURE
PRESSIONE TOTALE
kW
10
7.5
5
4
3
2
1.5
1
.8
.6
.4
15
100
95
90
85
80
Lw (A) in dB (A)
3500
3000
2000
1000
500
400
300
200
100
80
3100
2800
2500
2200
2000
1800
1600
1400
1200
1100
1000
900
.4 1 2 3 4 5 10 16 m3/s
portata
volume
x1000 2 3 4 5 10 20 30 40 50 m3/h
2 3 4 5 10 20 30 40 m/s
velocita' aria in uscita
air outlet velocity
1 5 10 50 100 500 1000 Pa
pressione dinamica
velocity pressure
N/m2

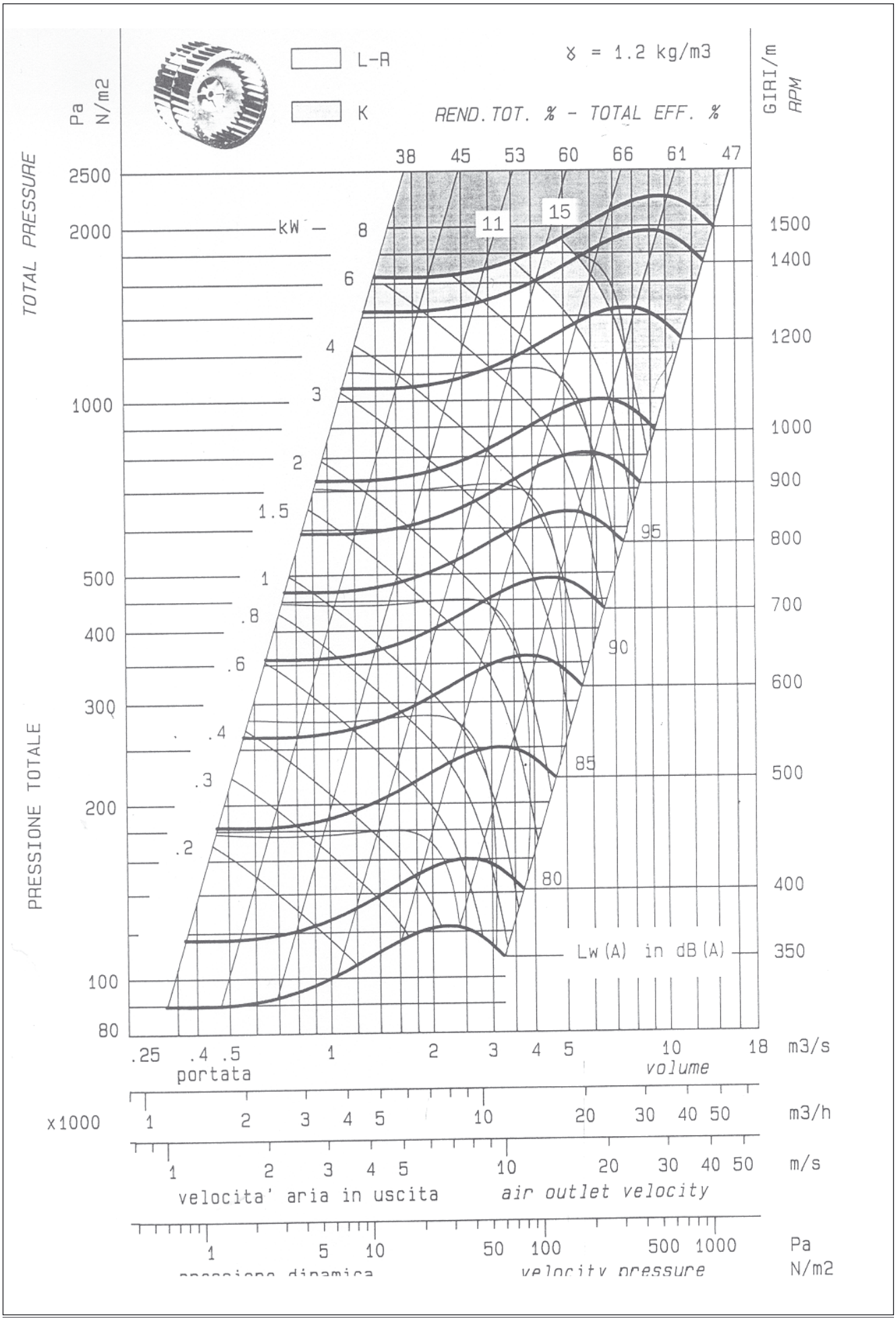
**ADN 355 FAN**


L-R
K
ϰ = 1.2 kg/m3
REND. TOT. % - TOTAL EFF. %
39 46 53 58 62 61 46
Pa N/m2
TOTAL PRESSURE
PRESSIONE TOTALE
3500
3000
2000
1000
500
400
300
200
100
80
kW
7.5
10
15
5
4
3
2
1.5
1
.8
.6
.4
.3
.2
95
90
85
Lw(A) in dB(A)
GIRI/m
RPM
2000
1800
1600
1400
1200
1000
900
800
700
600
500
.2 .3 .4 .5 1 2 3 4 5 10 14 m3/s
portata
volume
x1000 1 2 3 4 5 10 20 30 40 50 m3/h
1 2 3 4 5 10 20 30 40 50 m/s
velocita' aria in uscita
air outlet velocity
1 5 10 50 100 500 1000 Pa
pressione dinamica
velocity pressure
N/m2

## ADN 400 FAN


L-R
K
ϒ = 1.2 kg/m3
REND. TOT. % - TOTAL EFF. %
34 43 52 61 67 62 46
Pa N/m2
TOTAL PRESSURE
PRESSIONE TOTALE
3500
3000
2000
1000
500
400
300
200
100
80
kW
7.5
6
4
3
2
1.5
1
.8
.6
.4
.3
.2
.1
10
15
95
90
85
80
Lw (A) in dB (A)
GIRI/m
RPM
1800
1600
1500
1300
1100
1000
900
800
700
600
500
400
.2 .5 1 2 3 4 5 10 16 m3/s
portata
volume
x1000
1 2 3 4 5 10 20 30 40 50 m3/h
1 2 3 4 5 10 20 30 40 50 m/s
velocita' aria in uscita
air outlet velocity
1 5 10 50 100 500 1000 Pa N/m2
pressione dinamica
velocity pressure

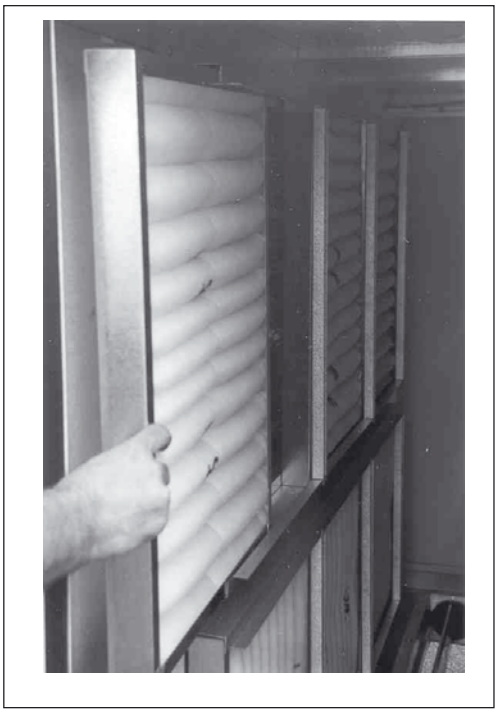
## ADN 450 FAN


L-R
K
ϒ = 1.2 kg/m3
REND. TOT. % - TOTAL EFF. %
38 45 53 60 66 61 47
GIRI/m
RPM
Pa
N/m2
TOTAL PRESSURE
PRESSIONE TOTALE
kW
8
6
4
3
2
1.5
1
.8
.6
.4
.3
.2
11
15
95
90
85
80
Lw (A) in dB (A)
2500
2000
1000
500
400
300
200
100
80
1500
1400
1200
1000
900
800
700
600
500
400
350
.25 .4 .5 1 2 3 4 5 10 18 m3/s
portata
volume
x1000 1 2 3 4 5 10 20 30 40 50 m3/h
1 2 3 4 5 10 20 30 40 50 m/s
velocita' aria in uscita
air outlet velocity
1 5 10 50 100 500 1000 Pa
N/m2
velocity pressure

**FILTER REPLACEMENT**

After opening the filter access panel, lift the filter retaining log.

The filters can then be removed and replaced easily by sliding the dirty filters out and clean ones in.



The CLIMATIC controller can monitor the pressure drop across the filter (If option fitted)

The following set points can be adjusted depeding on the installation.

"Airflow" in page 3411 = 25Pa by default

"No filter " in page 3412 = 50Pa by default

"Dirty Filter" in page 3413 = 250Pa by default

The actual pressure drop measured accross the coil can be read on the Climatic Display DS50 in menu 2131.

The following faults may be identified

-Fault code 0001 AIRFLOW FAILURE, if measured ΔP across the filter and coil is below the value set in page 3411

-Fault code 0004 DIRTY FILTERS, if measured ΔP across the filter and coil is above the value set in page 3413

-Fault code 0005 MISSING FILTERS, if measured ΔP across the filter and coil is below the value set in page 3412

# AIR SOCK CONTROL

### FANSTART Operation

The use of air socks for space conditioning allows high air volumes to be distributed at low velocity and is becoming a common feature in many applications. To accommodate this trend, Air-sock control is offered which allows the air socks to be progressively filled with air on start up. BALTIC has been enhanced with an electronic device to soft start the fan. It takes up to 1 minute to go from 0% of air to full air flow.

## START - UP

### Phase rotation check

If the phase rotation is incorrect the FANSTART Control will display a fault ( Red LED). Two of the phases must then be inverted and start again the start up cycle.

The FANSTART control can also display a fixed red LED in two cases:

- Motor absent (6s)
- A phase is missing (6s)

Any adjustment of the FANSTART has to be done power stopped.

This time is divided in several stages:

- The aim of this first voltage input is to "take off belts from the pulleys": 0.5s ("BOOST")
- The second stage is to inflate the air sock: during 30s with approximately half nominal speed
- Finally the air sock is gradually pressurised during the last 30s. The motor reaches nominal speed and the controller is shunted, the motor being fed on line by the tension of the electrical network.

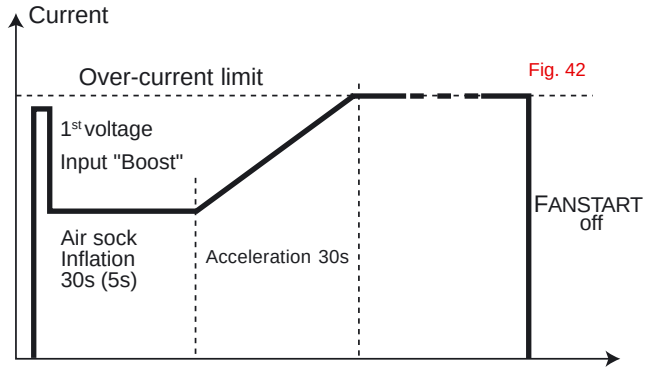



Fig. 42

The motor speed control is achieve through a variation of the supply voltage of each phase at constant frequency.

The thermal overload limit on the motor imposes a current limitation during the acceleration stage. Hence if the selected slope is to steep, the predefined current limit can be reached: flashing red LED, adjust the potentiometer P3 and the controller will automatically reduce the voltage set-point accordingly. Then once the current is back under the high current limit it carries on with the start up cycle.

**The green LED switches off itself at the end of the FANSTART operation.**

### Safety

*Excessive "slow down" limit*

In the engine's acceleration phase, the red led flashing; the motor slows down in an excessive way and stops after 80s at fault (led red fixed).

*Current protection of the Thyristor*

The FANSTART will display a fault (red LED) if the current exceeds the thyristor current limits:

125A during 0.4s

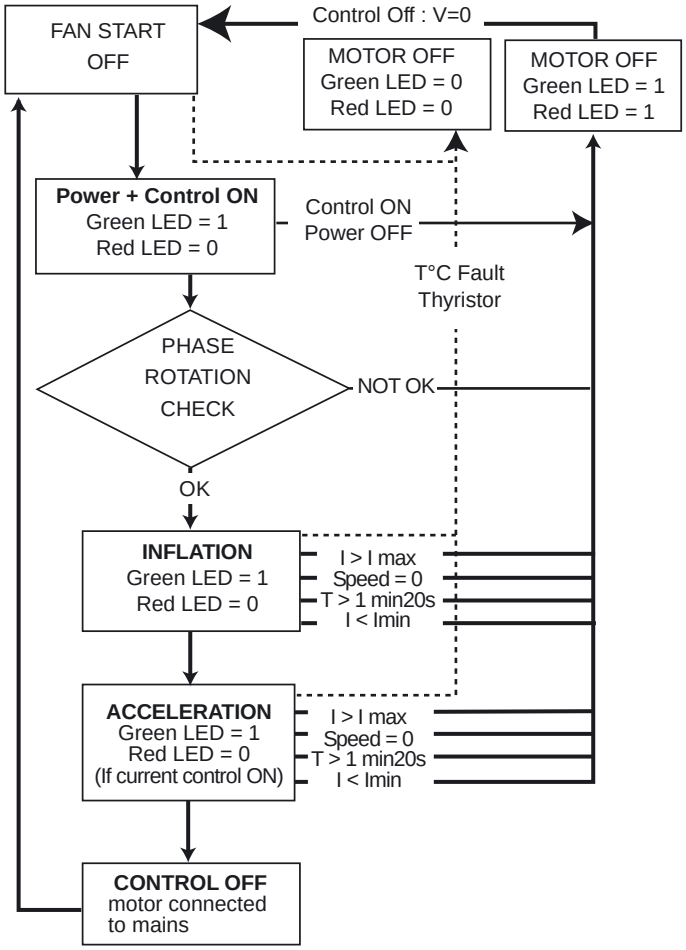
87.4A during 2s

75A during 6s.

62.5A during 20s.

*Start up sequence too long*

If at the end of 80s the fanstart did not commutate the motor on the electrical network, the motor stops: fixed red led.
***Nota :*** In the case of a resistant air sock, one can reduce the phase of pre-inflation to 5 seconds (thanks to the switch, fig. 12)



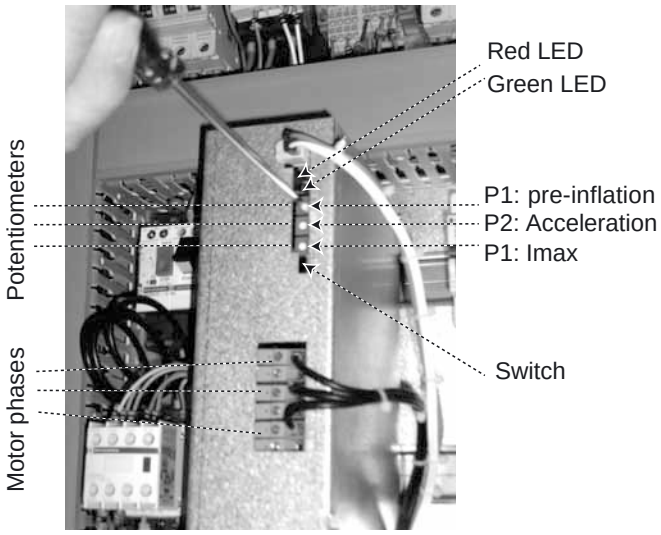




Fig. 12

## HYDRAULIC CONNECTIONS

The heating coil is connected to the isolating valves. Two keys must be used to tighten the connections, one of the keys maintains the valve body. Failure to use two keys may damage the pipes and invalidates the warranty.

Proceed as follows :

- Open the stop valves and set the 3-way valve to the intermediate position (manual position and turn the thumbwheel to a mid position).
- Fill the hydraulic system and bleed the battery using the air vent (figure 13).
- Check the connections for possible leaks.
- Reset the 3-way valve to automatic.

*Figure 13*

## PROTECTION AGAINST FREEZING

1) Use glycol water

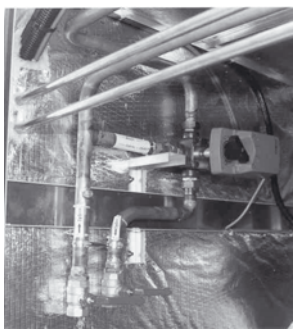
**GLYCOL IS THE ONLY EFFECTIVE PROTECTION AGAINST FREEZING**

The antifreeze must protect the unit and avoid icing under winter conditions.
Warning : monoethylene glycol-based antifreeze may produce corrosive agents when mixed with air.

2) Drain the installation

You must ensure that the manual or automatic air vents have been installed on all high points in the system. In order to drain the system check that all the drain cocks have been installed on all low points of the system.
To drain, open all the valves and remember to place the unit in air.

**A HEATING COIL FROZEN DUE TO LOW AMBIENT CONDITIONS IS NOT COVERED BY THE WARRANTY.**



## ELECTROLYTIC CORROSION

Attention is drawn to the corrosion problems resulting from electrolytic reaction created from unbalanced earth connections.

**ANY COIL DAMAGED BY ELECTRONIC REACTION IS NOT COVERED BY THE WARRANTY.**

## 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 VENTILLATED AREA.

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

BEFORE COMMISSIONING A UNIT WITH GAZ BURNER, IT IS MANDATORY TO ENSURE THAT THE GAZ DISTRIBUTION SYSTEM (type of gas, available pressure…) IS COMPATIBLE WITH THE ADJUSTMENT AND SETTINGS OF THE UNIT.

**Check access and clearance around the unit**

- Make sure one can move freely around the unit.
- A minimum one-meter clearance must be left in front of the burnt gas exhaust flue.
- Combustion air inlet and burnt gas exhaust(s) must NOT be obstructed in any way.

**Supply Network Pipe Sizing**

MALE THREADED CONNECTION FOR GAZ BURNER: 3/4"

Check that the gas supply line can provide the burners with the pressure and the gas flow rate necessary to provide the heating nominal output .

**Male threaded connection for Gaz Burner: 3/4"**

| UNIT SIZE | 85 | 100 | 120 | 140 | 160 | 190 |
|---|---|---|---|---|---|---|
| S POWER | 1 | 1 | 2 | 2 | 2 | 2 |
| H POWER | 2 | 2 | 4 | 4 | 4 | 4 |

**GAS FLOW (for G20 at 20 mbar and 15°C) m³/h**

| UNIT SIZE | 85 | 100 | 120 | 140 | 160 | 190 |
|---|---|---|---|---|---|---|
| S POWER | 5,7 | 5,7 | 11,5 | 11,5 | 11,5 | 11,5 |
| H POWER | 11,5 | 11,5 | 17,2 | 17,2 | 17,2 | 17,2 |

For modulating gas we have just H power for C, D & E-box

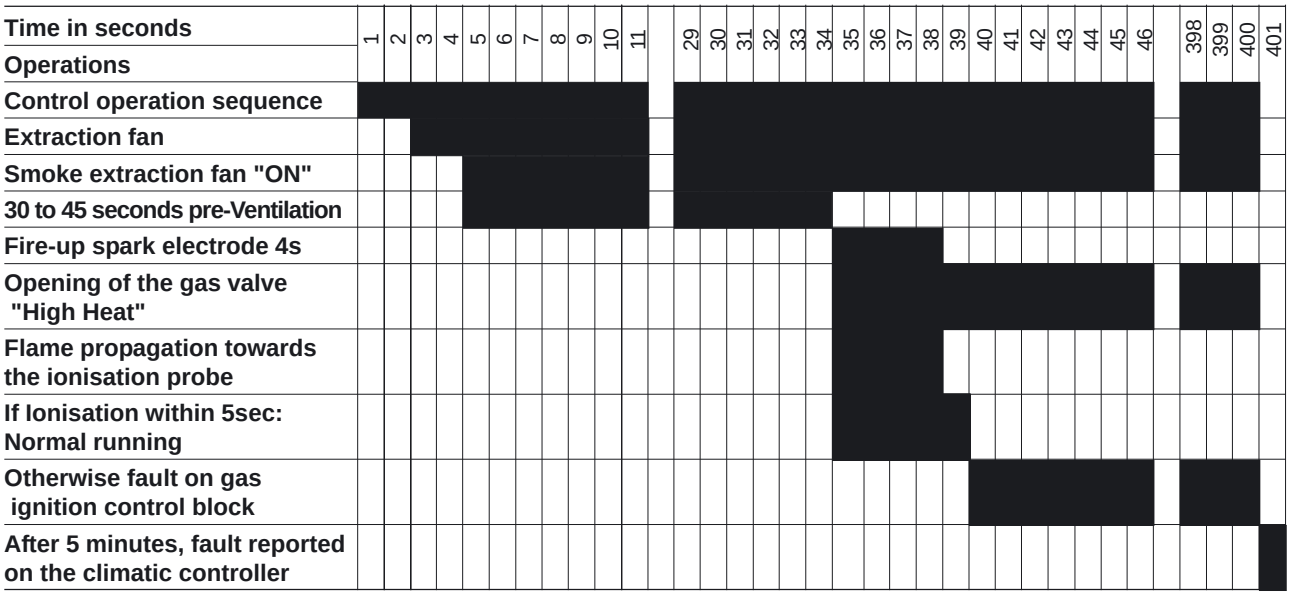
- The gas supply to a Rooftop gas unit must be realized according to Sound Engineering Practice and the local safety codes and rules.
- In any case the diameter of pipe-work connected to each Rooftop must not be smaller than the diameter of the connection on the Rooftop unit.
- Make sure that a shut-off isolation valve has been installed before EACH Rooftop.
- Check the supply voltage to the exit of the power supply's transformer T3 of the burner: it must be between 220 and 240V.

**STARTING UP THE GAS BURNER**

Purge the pipe-work near the connection on the ignition control Valve for a few seconds.

- Check that the unit's treatment "Fan" blower is running.
- Set the control to "ON" This will priorities the gas burner.
- Increase the set temperature (room set point temperature) to a temperature higher than the actual room temperature.

*Table 4 -* **Standard start-up Chronology**




If incorrect sequence refer to the fault analysis table to identify the problem.

**PRESSURE ADJUSTMENTS ON HONEYWELL**

**PRESSURE REGULATING VALVE TYPE VK 4105**

**Pressure regulator adjustment with 300mbar gas supply:**

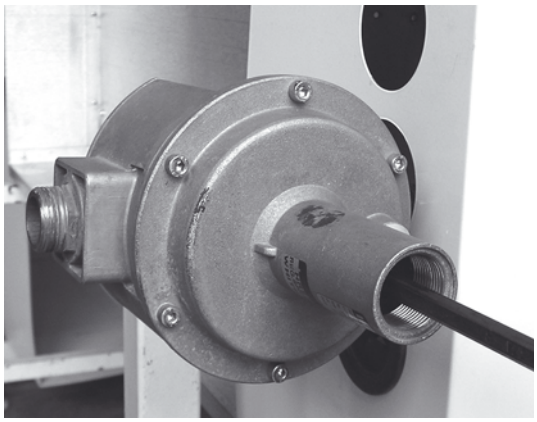


*Fig. 14*

- The Burner must run in High Heat mode for this check.
- Place the tube of the "accurate" manometer on the **Inlet** pressure port (figure 14) of the Gas Regulating Valve after having loosened the screw by one turn.

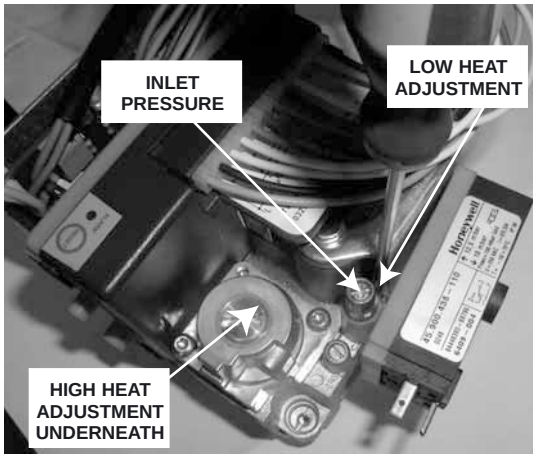



*Fig. 15*

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

(figure 15)

**High Heat Injection Pressure Checks**

- Place the tube of the "accurate" Manometer to the **OUT** port on the Gas injector support bar after having loosened the screw by one turn.

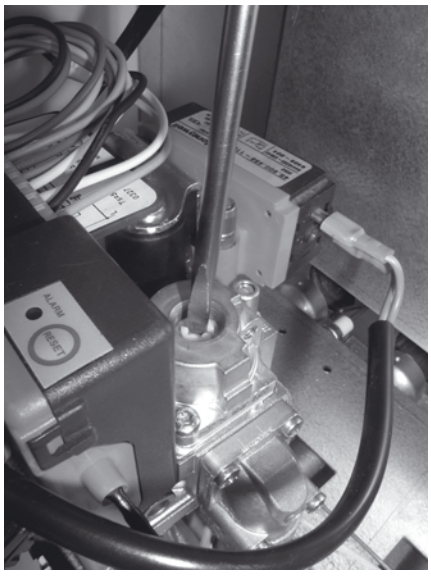
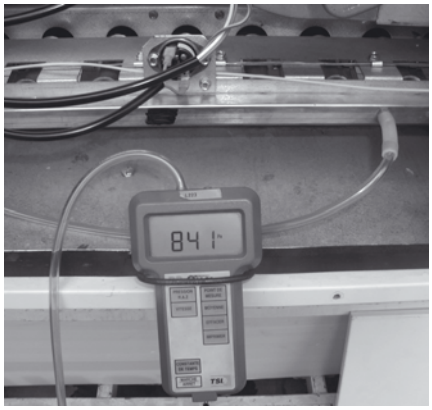


*Fig. 16*

Check and adjust if necessary the valve **OUTLET** pressure to 8.4 mbar (G 20) / 12.3mbar for Groningue (G25) and 31.4 mbar for propane (G31)(figure 16).

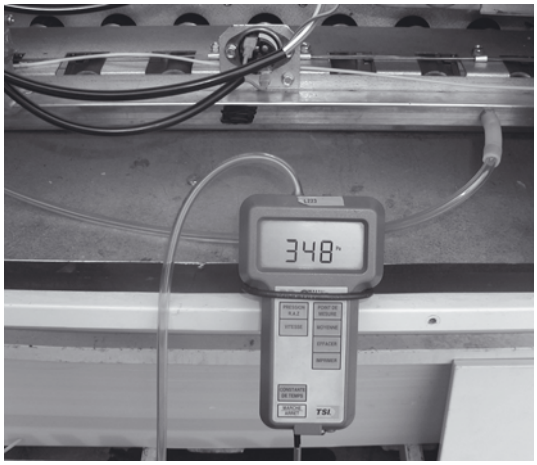


**Low Heat Injection Pressure Checks**

- Switch the control to Low Heat

- Check and adjust if necessary the **Outlet** pressure to 3.5 mbar (G20) and 5 mbar for Groningue(G25) or 14 mbar for propane (G31)(figure 17).

*Fig. 17*




- After the adjustment of the low heat, re-verify the high heat
- re-position the stoppers and close the pressure ports.

**Pressure adjustments table for each type of gas**

| Category | Supply pressure | Low Heat injection | High Heat Injection |
|---|---|---|---|
| G20 | 20.0 +/-1 | 3.5 +/-0.1 | 8.4 +/-0.2 |
| G25 (Groningue) | 25.0 +/-1.3 | 5.0 +/-0.1 | 12.3 +/-0.2 |
| G31 (GPL) | 37.0 +/-1.9 | 14.0 +/-0.3 | 31.4 +/-0.6 |

**Valve electrical control**

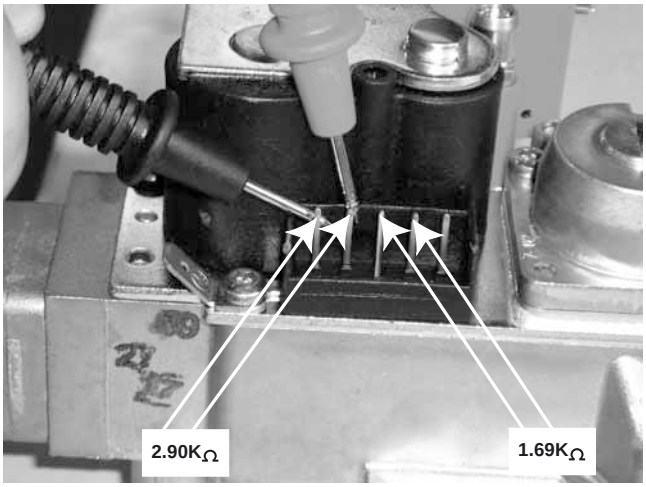



*Fig. 18*

- Check these values with an Ohmmeter.

## BURNER SAFETY CHECKS

**Smoke extractor pressure switch Test.**

- With the gas burner running, disconnect the flexible tube fitted to the pressure taping on the pressure switch (fig. 19)

- The Flame must disappear and the extraction fan must carry on running.

- However, NO fault will be displayed (Gas ignition control block or CLIMATIC).

*Fig. 19*

- After reconnecting the tube, the Burner will restart after a period of 30 to 45 seconds pre-ventilation.

**Gas pressure switch test**

-With the gas burner running, close the shut off valve located before the rooftop (fig. 20).

*Fig. 20*

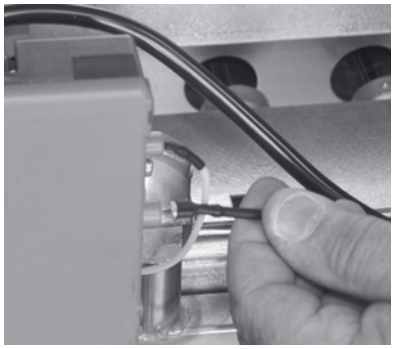
-The burner stops completely.

-However, No fault light will be displayed on the Gas ignition control block.. After 6 Minutes, the CLIMATIC will display a fault.

-Reset the CLIMATIC.

**Ionisation Probe test**

-With the gas burner running, disconnect the terminal plug coming from the ionisation probe to the gas ignition control box.



-The flame disappears

-The fan is still running and attempting to restart the burner (restart cycle 30 to 45 seconds).

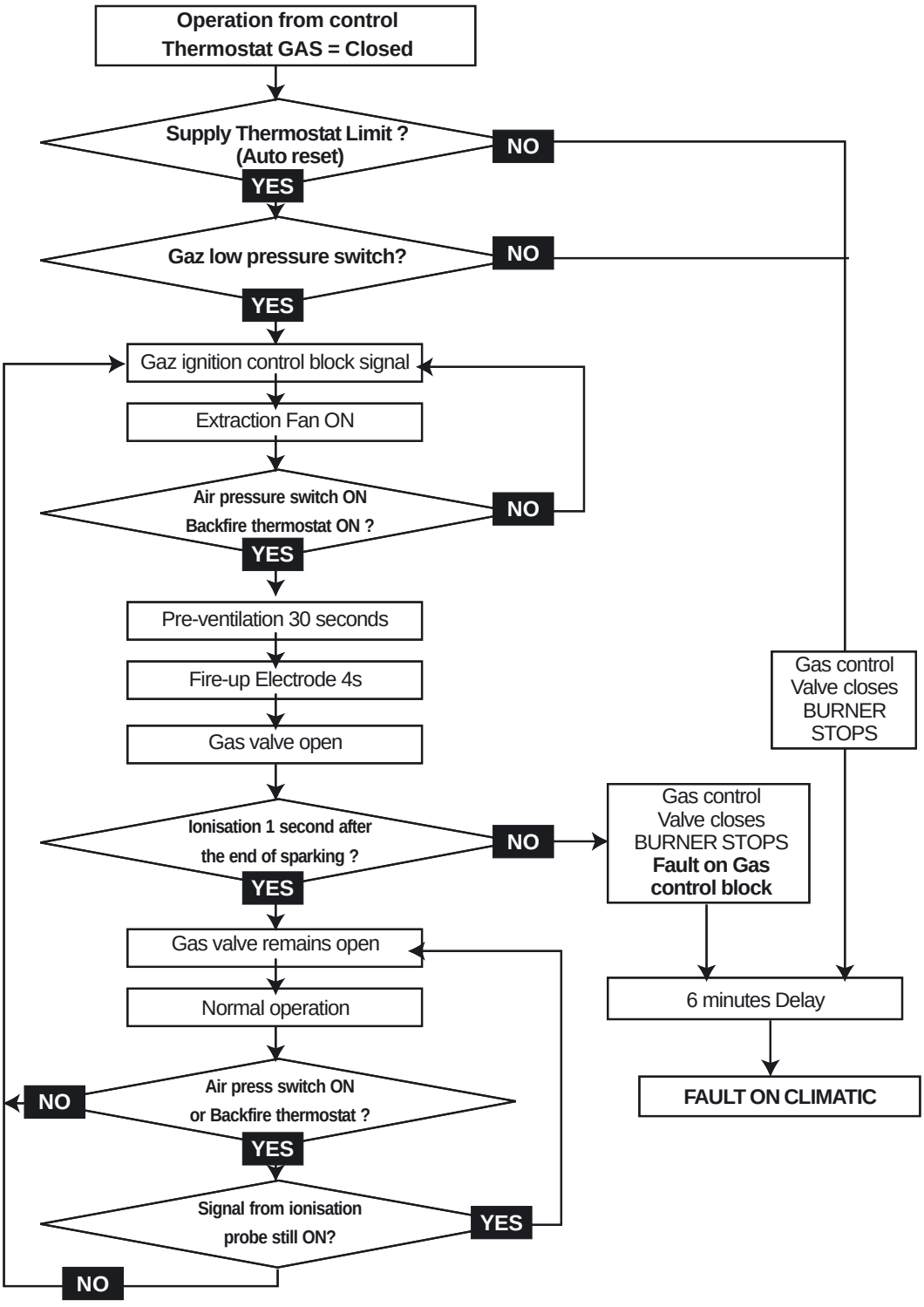
-if the ignition probe is not reconnected at the end of the ignition sequence the burner will stop completely.

-The fault light on the gas ignition control block is ON.

-Manually reset the gas ignition control block to eliminate the fault.

**IN CASE OF PROBLEMS REFER TO THE START UP SEQUENCE FLOWCHART NEXT PAGE**

**GAS BURNER FIRE-UP SEQUENCE**



**GAS BURNER TROUBLESHOUTING**
**If faults reported on CLIMATIC**

-Reset the CLIMATIC.

-Check voltage: 230V after circuit breaker.

-Check GAS isolation shut-off valves are open.

-Check GAS pressure at the inlet of the GAS valves. It must be >20 mbar when the Burners shut down.

-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.

*Table 6*

| STAGE | NORMAL OPERATION | POSSIBLE FAULT | ACTION | POSSIBLE SOLUTION |
|---|---|---|---|---|
| Heating Requested | Green, yellow & red L.E.D. ON | All L.E.D. OFF = fault on the blower thermostat | + Check connections on the blower thermostat | + Replace thermostat |
| | | Yellow & red L.E.D. OFF = lack of gas supply | + Check valve's opening & supply pressure | + Restore gas supply |
| | | Red L.E.D.OFF = fault on the superheat thermostat on the gas burner support bar | + Check thermostat's operation after manual reset | + Replace thermostat |
| L.E.D ON | Extraction Fans | After 10 seconds safety shutdown are running by the ignition control block | + Check connections of the control block on the gas valve<br>+ Check impedance of electro valve's coils:<br>(1) = 2.90k$_{\Omega}$;<br>(2) = 1.69k$_{\Omega}$ (fig. n° 18, p 46) | + Repositioning of the control block on the valve<br>+ Replace valve |
| | | Nothing happens | + Check the free movement of the fan wheel<br>+ Check Electrical connection on the Gas Ignition Control Block and on EF connection Board<br>+ Check the Fan supply voltage | + Replace fan<br>+ Replace **EF connection board** If necessary |
| Extraction Fan is ON | After 30 to 45 seconds : pre-ventilation the fire-up electrode should spark | Continuous Ventilation without sparks from fire-up electrode | + Check the fire-up electrode<br>+ Check the pressure drop at the pressure switch:<br>It must be higher than **165 Pa**<br>+Check the good operation of the pressure switch using an Ohmmeter and by artificially creating a depression in the tube | + Re-position the pressure switch tube<br>+ Change the pressure switch |
| Continuous ventilation and sparks from fire up electrode | After a few seconds the gas burner fires-up | After 4 seconds the GAS Burner still not operating and safety shutdown by the Ignition Control Block | + Check injection pressure during start-up (Value for High Heat)<br>+Remove the control box from the gas block | + Remove the air from the Gas pipe-work<br>+ Adjust the injection pressure to high heat value<br>+ Change the Control Box if the Gas valve is OK |
| | | Within 4 seconds the gas Burner fires-up BUT safety shutdown from the Ignition Control Block | + Check the Position and connection of the Ionisation Probe. It must not be Earthed (230V)<br>+ Check that R.C circuit of the gas burner's transformer is well connected to the neutral polarity<br>+ Measure the Ionisation Current : It must be higher than 1.5 microAmps.<br>+ Check the Type of GAS | +Check the whole electrical supply<br>+ Adjust the supply and injection pressure if gas is different from natural gas G20 :( G25 Gas of Groningue for example) |

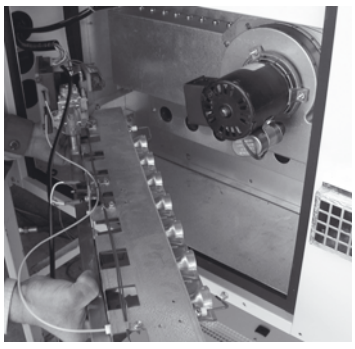
**DISASSEMBLING THE GAS BURNER FOR MAINTENANCE PURPOSES**

**Preliminary Safety Recommendations**

- Isolate the unit using the main isolator switch.
- Close off the isolating gas valve located before the unit.
- Disconnect the Pipe-work. Do not discard the seals.

**Disassembling the gas "burner support bar"**

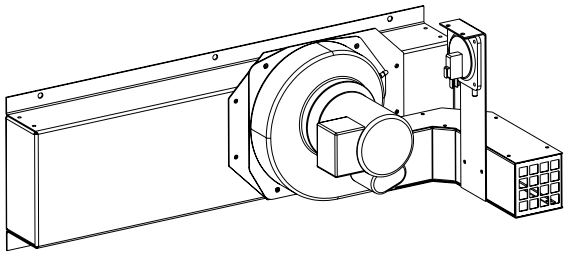
- Disconnect the Electrical Connector on the electric connection board EF 49
- Remove the two screws which hold the gas Bar in Place
-Carefully remove the gas " burner support bar " avoiding any damages to the electrodes.



**Disassembling the flue**

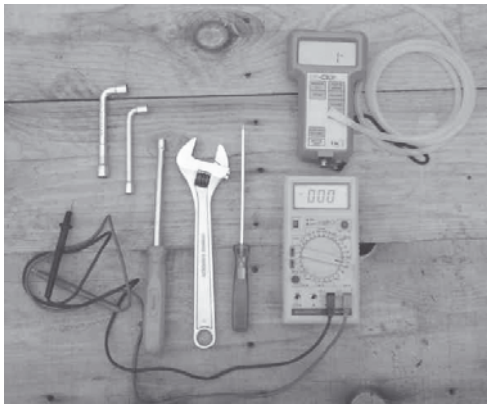
- Electrically disconnect the fan and remove the screws holding it in place.
-Take care not to loose any cage nuts in the smoke box.

ATTENTION: Check the correct position of the pressure tube used by the extraction pressure switch.

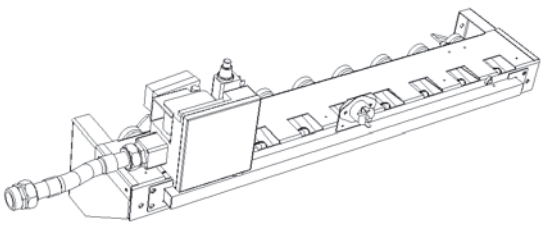


**Required Equipment List for maintenance Adjustment and Start-up**

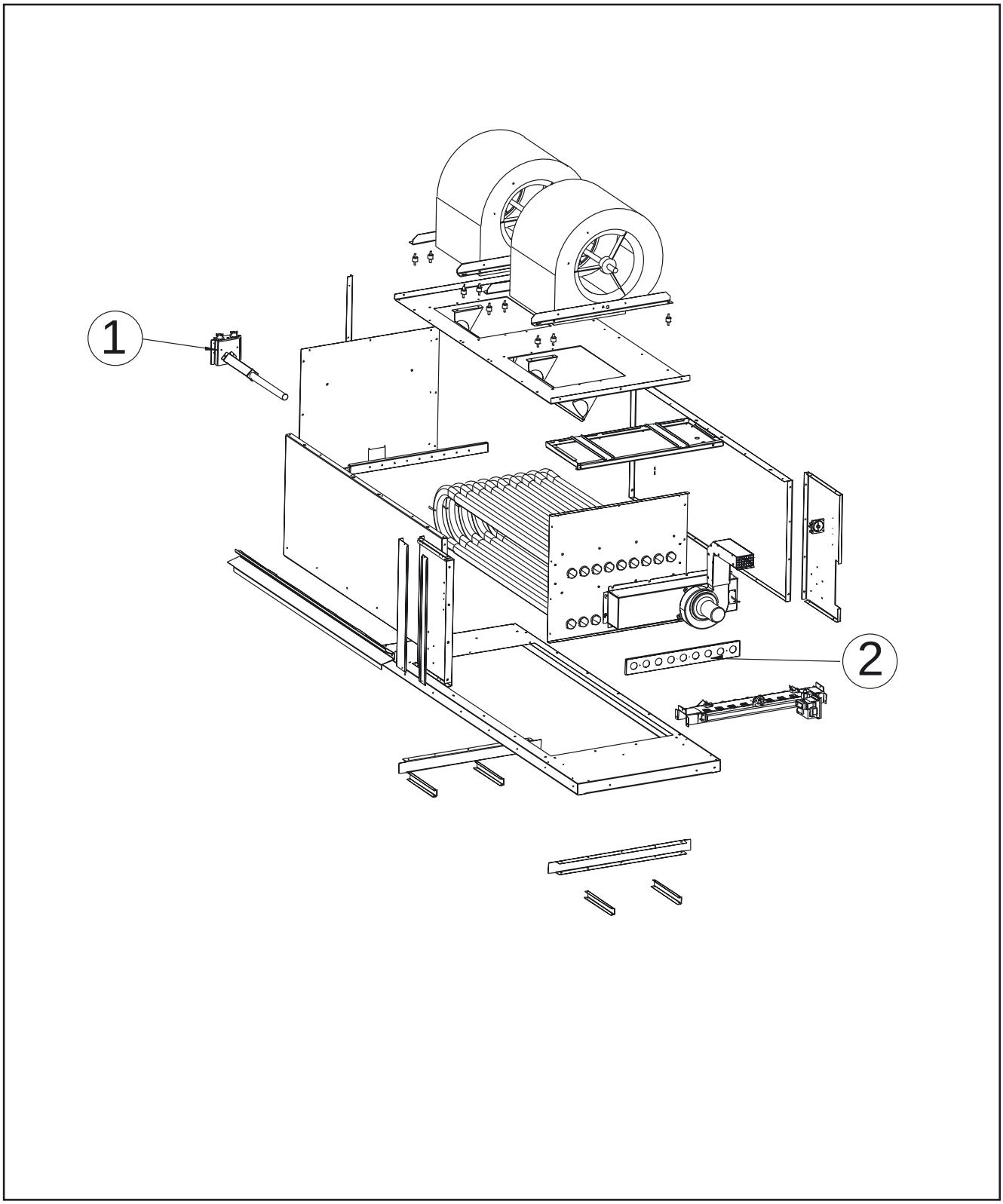
- An accurate manometer from 0 to 3500 Pa (0 to 350 mbar): 0.1% full scale.
- A Multimeter with Ohmmeter and Micro-amps scale
- An Adjustable Spanner
- Tube Spanner Set: 8, 9, 10, and 13.
- Flat Screwdrivers diameter 3 and 4, Fillips n°1
- Vacuum cleaner
- Paint brush



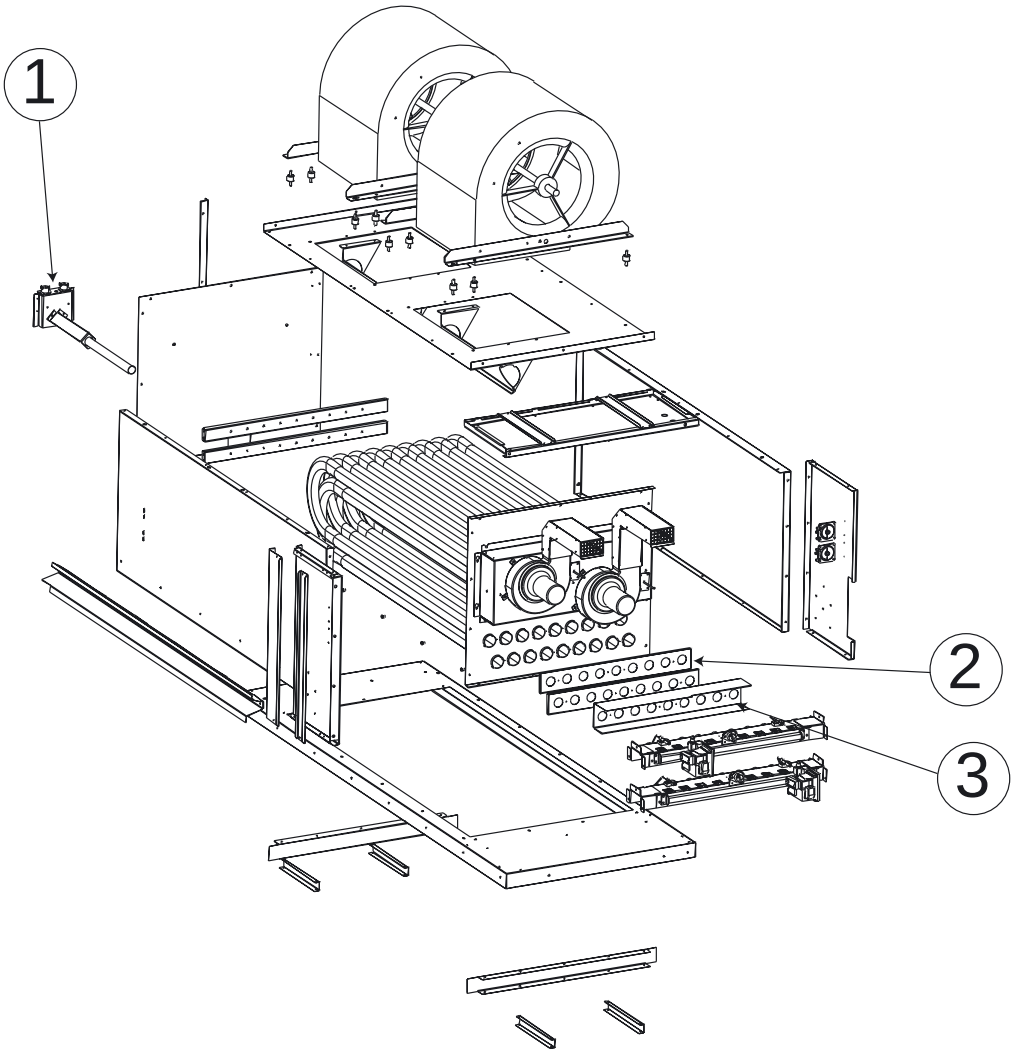
**GAS INJECTORS SUPPORT BAR**



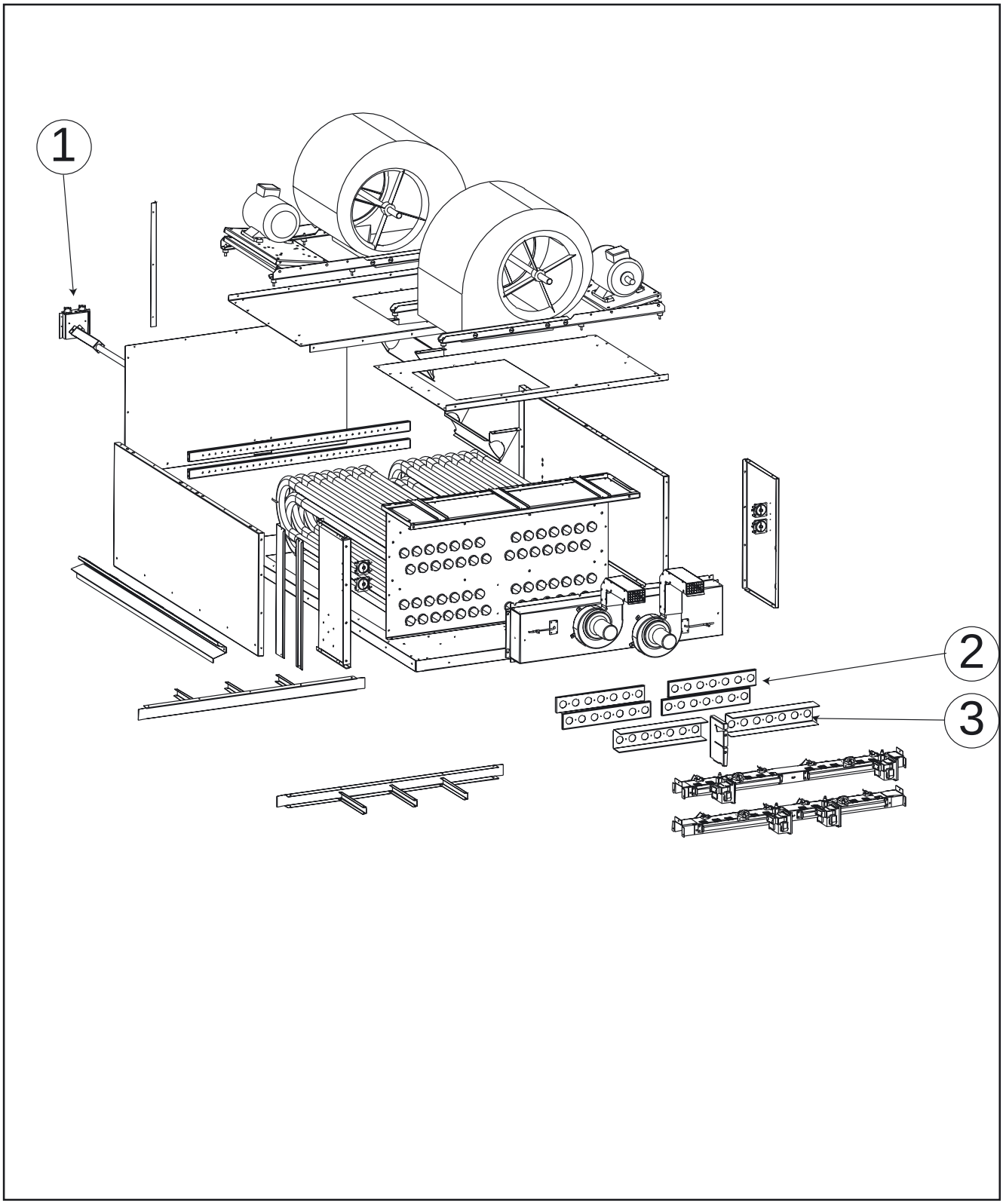
## 60 KW BURNER FOR FGX 85 AND 100 MODELS



## 120 KW BURNER FOR FGX 85,100,120,140,160 & 190 MODELS



## 180 KW BURNER FOR FGX 120,140,160 & 190 MODELS



**CLIMATIC 50 SOFTWARE FEATURES AND LOGIC**

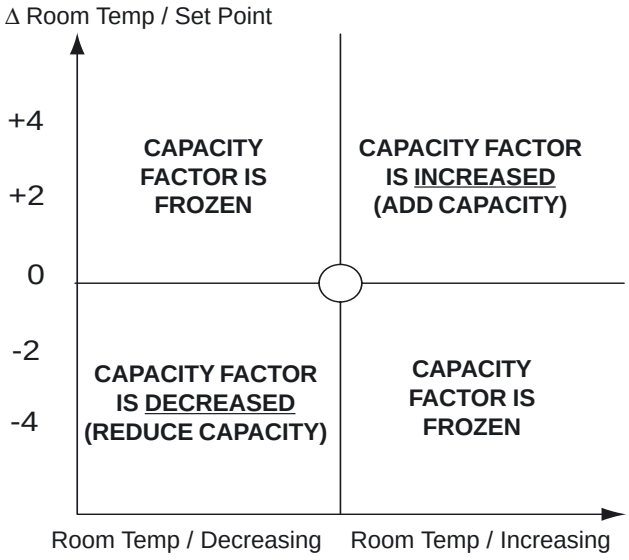
As a standard feature, CLIMATIC™50 provides 4 scheduling time zones per day on 7 days. On each of the 4 time zones, heating set point, cooling set point, minimum fresh air, humidity set point high and up, and even the different authorisations for cooling and heating can be adjusted. CLIMATIC™ 50 provides a choice of different remote displays depending on customer requirement and application of the system. As a standard feature, it is possible to set alarms (adjustable value low and high) on room temperature and humidity.

**CONTROL SOFTWARE LOGIC**
With the CLIMATIC™ 50 Lennox is going away from the traditional step control

**Capacity factor**
It is used to determine the exact capacity required at any time in order to react quicker and more accurately to any change in demand.
The capacity factor is a percentage of the total cooling or heating capacity.

Example:
On a three circuit rooftop unit with two compressors running out of three has a capacity factor of 66%
In the same way, a three circuit rooftop with a modulating electric heater running at 20% of its full capacity has a CF:
CF = 25%+25%+25%+5% = 80%

The Capacity factor will increase, decrease, or freeze depending on the temperature difference between the set point and the room temperature but also on the way this room temperature is changing:




Example:
The room set point is 25°C with a 3 compressor unit.

| Delta vs room set point | Room Temp. | Cap. factor | COMP 1 | COMP 2 | COMP 3 |
|---|---|---|---|---|---|
| +0 | Increasing | 0% | OFF | OFF | OFF |
| +1 | Increasing | 35% | ON | OFF | OFF |
| +2 | Increasing | 70% | ON | ON | OFF |
| +3 | Increasing | 100% | ON | ON | ON |
| +2 | Decreasing | 100% | ON | ON | ON |
| +1 | Decreasing | 100% | ON | ON | ON |
| 0 | Decreasing | 100% | ON | ON | ON |
| -1 | Decreasing | 60% | ON | ON | OFF |
| 0 | Increasing | 60% | ON | ON | OFF |

**Reactivity.**

The reactivity determines how fast the capacity factor should vary.
It is given in: Percentage of capacity / Degree °C ( Room Temp. VS Set Point) / minute

Example :
If the reactivity is set to 3 % / °C / min
Then:
Capacity factor can go from 0 to 30% in 10 minutes if **Delta** Room Temp. VS Set Point is 1°C
Or capacity factor will go from 0 to 60 % in 4 minutes if **Delta** Room Temp. VS Set Point is 5°C

The reactivity can be adjusted with the CLIMATIC™ 50 The larger the reactivity the faster the rooftop will react to a change.

The next table shows the effect of a change of the reactivity on the capacity factor: This shows that by increasing the reactivity, the unit reaches the set point quicker but the energy consumption (capacity factor) is larger.

**REACTIVITY : 3**

| | | | |
|---|---|---|---|
| DELTA +5 | *15%* | 75% | 100% |
| DELTA +3 | *9%* | 45% | 90% |
| DELTA +1 | *1%* | *15%* | *30%* |
| | 1MIN | 5MIN | 10MIN |

**REACTIVITY : 6**

| | | | |
|---|---|---|---|
| DELTA +5 | *30%* | 100% | 100% |
| DELTA +3 | *18%* | 90% | 100% |
| DELTA +1 | *2%* | *30%* | 60% |
| | 1MIN | 5MIN | 10MIN |

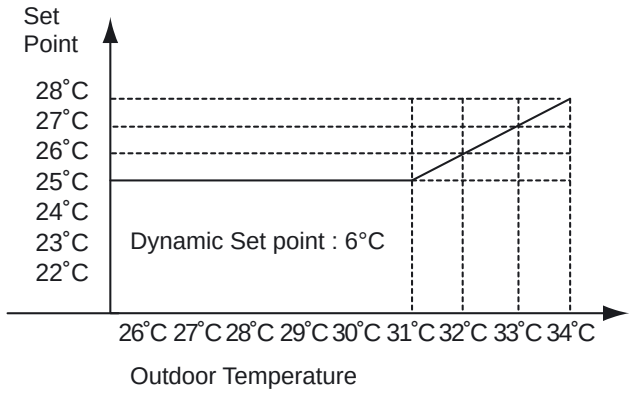
## OTHER FEATURES

### Dynamic Set Point

This feature allows the set point to change according to the outside temperature.

Example:
If the set point is 25°C
And the dynamic set point is set to 6°C

Then, when the outdoor temperature reaches: 31°C (25°C + 6°C) the set point will follow the outdoor temperature with a 6°C temperature difference.




If you do not want to use this feature, set the dynamic set point to **99**

### Time Zones and scheduling

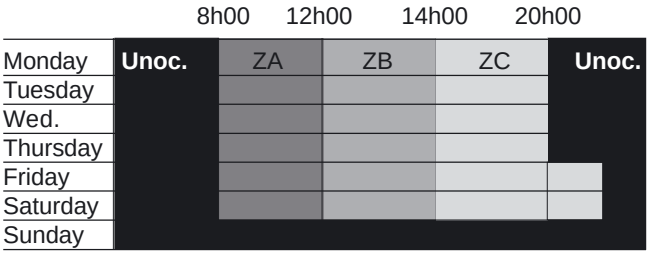
With the Climatic50 the scheduling has been completely reviewed:

* The first day of the week is Monday.
* Automatic switch from winter time to summer time.
* Unoccupied mode from one to seven days
* Three occupied and one unoccupied zone per day

For each zone a series of set points and feature can be adjusted or selected, depending on the type of display which is being used.

| LIST OF SET POINTS PER ZONE | CODE | CONFORT DISPLAY | SERVICE DISPLAY |
|---|---|---|---|
| **AMBIANT TEMPERATURE** | | | |
| Average set point | 3311 | Yes | Yes |
| Dynamic Set Point | 3321 | Yes | Yes |
| Cooling Set Point | 3322 | 0 | Yes |
| Heating Set point | 3323 | 0 | Yes |
| Heating Priority | 3324 | 0 | Yes |
| **FRESH AIR REHEAT** | | | |
| activated | 3331 | 0 | Yes |
| Heating priority | 3332 | 0 | Yes |
| **HUMIDITY** | | | |
| Dehumidification | 3341 | 0 | Yes |
| Humidification | 3342 | 0 | Yes |
| **AUTHORIZATION** | | | |
| Free Cooling | | 0 | Yes |
| Fresh Air by CO2 | 3354 | 0 | Yes |
| Mechanical cooling | 3355 | 0 | Yes |
| Mechanical heating | 3356 | 0 | Yes |
| Auxiliary heating | 3357 | 0 | Yes |
| Humidification: ON/OFF | 3358 | 0 | Yes |
| Low Noise | 3359 | 0 | Yes |
| **OTHER** | | | |
| Fan Mode :On / Off | 3351 | 0 | Yes |
| Fan dead | 3352 | 0 | Yes |
| Minimum fresh air (%) | 3353 | Yes | Yes |
| **SCHEDULING** | | | |
| Beginning of the zone for each day | | Yes | Yes |
| Start Uno | 3211 | Yes | Yes |
| Start.Uno | 3212 | Yes | Yes |
| Start z.A | 3213 | Yes | Yes |
| Start.z.A | 3214 | Yes | Yes |
| Start z.B | 3215 | Yes | Yes |
| Start.z.B | 3216 | Yes | Yes |
| Start z.C | 3217 | Yes | Yes |
| Start.z.C | 3218 | Yes | Yes |

*Example of Zone setting :*




Each zone is determined by its starting time.

### Forced modes

*3 hours Override*
A three hours override period can be forced on the CLIMATIC™50:
With this feature, a new room temperature set point and fresh air requirement can be imposed for a three hour period; It will then revert to the original setting at the end of the override period or earlier by pressing "esc".

Forced unoccupied zone (or ZA, ZB, ZC)
The unoccupied zone (or ZA, ZB, ZC) settings can be forced for a period of up to seven days. It will then revert to the original settings at the end of the defined period or earlier by pressing "esc".

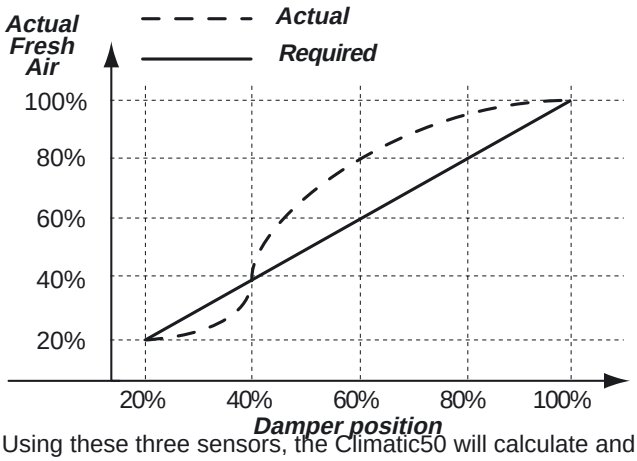
**Heating priorities**
It is possible to set heating priorities depending on the outdoor temperature.
For compressors: refer to the instructions 3611, 3612, 3613.
For electrical heater: refer to the instruction 3721.

Example:
It could be decided based on energy costs, that on a dual fuel unit, it should run in heat pump mode when the temperature is above 0°C and switch to gas burner below that point.

**Staggered start**
After a power cut, the units can be made to restart one after the other to prevent any current surge.
There is no need for a link between the units, they just have to be given an address during commissioning and they will restart 10 seconds x their "address number" after the power is switched back on.

Example:
If a unit is given the address N°3 it will be switched-on 30 seconds (3 x 10sec) after the power is switched back on.

**Fresh air adjustment and calibration on Economiser**
The actual fresh air volume brought into the system is not always proportional to the percentage of opening of the fresh air damper. That is particularly true when the return air duct system has been sized to produce excessive pressure drop.
This often results in bringing into the system an excessive amount of fresh air, hence increasing the running cost of the system.
The control of fresh air is now achieved through the use of three temperature sensors : One in the supply air flow, one in the return air and one for the outdoor temperature.

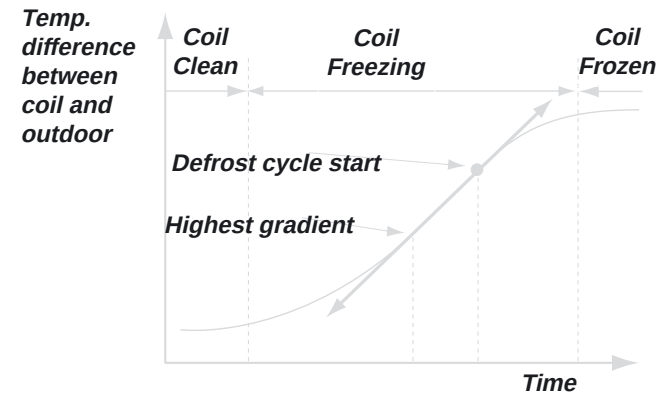



Using these three sensors, the Climatic50 will calculate and memorise the exact percentage of fresh air for each position of the damper.

$$T_{supply\ air} = T_{return\ air} \times \%_{Return\ air} + T_{fresh\ air} \times \%_{fresh\ air}$$

The calibration sequence will take place periodically when all cooling or heating inputs are off. The instruction 3516 permits us to avoid the calibration.

**Dynamic Defrost**




This new feature patented under INPI 91.033.063 allows the unit to start the defrost cycle only when required.
This is achieved through the measurement of the temperature difference between the coil and the outdoor.

The defrost will be initiated shortly after the Climatic50 has located the largest gradient in the curve.

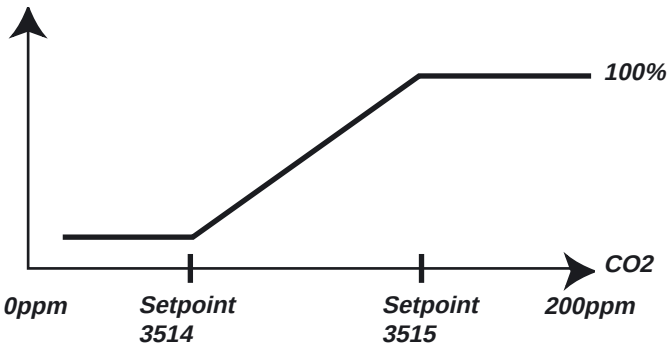
The defrost cycle ends when one of these two condition is completed whichever comes first :
+ Three defrost cycles.
+ 6 minutes.

**Alternate defrost**

All dual circuits Baltic units have "Alternate Defrost" as a standard feature.
When one circuit is going through a defrost cycle the second circuit is running in heat pump mode. This reduces the need for costly electric heater to maintain the supply air temperature to an acceptable level of comfort during the defrost cycles.

**$CO^2$ Sensor**

Where a $CO^2$ sensor is connected to the unit, the value of the fresh air minimum is calculated according to the $CO^2$ ratio. The value measured by the sensor can be read in variable 2132.
Setpoint 3514 defines the number of ppm up to which the fresh air minimum is still achieved.
Setpoint 3515 defines the number of ppm from which 100% fresh air is used.



## CONTROL INTERFACES AND DISPLAYS

### DC50 COMFORT DISPLAY

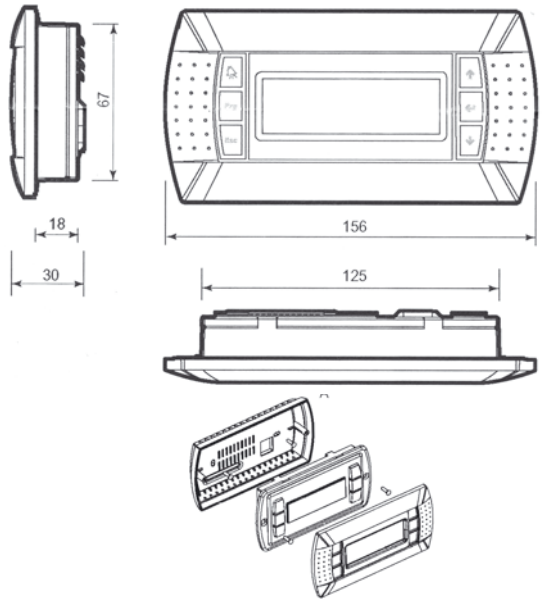
This is a remote controller for non-technical customer. This display gives information such as running mode status of the fan, set point, % of fresh air and outside air temperature.
It can be used to set or change the scheduling of the different time zones, the temperature set point, and the % of fresh air for each zone. It also has the capacity to set a 3 hours override and to force the unoccupied mode for up to 7 days. It displays the real time clock and different faults signals.

**Display**

Type FSTN graphic
Back light: Green LEDs
**Resolution 120x32 pixels**
**Power Supply**
Voltage from main Climatic board.
Max power: 0.8W
**Installation**

The DC50 is designed to be mounted on the wall.
* Fit the cable from the DT50 board through the back piece
* Fasten the back piece to the wall using the rounded head screws supplied in the packaging
* Connect the cable from the main board on the **RJ12** plug on the back of the DC50 display
* Fasten the front panel on the back piece using the flush head screws supplied

Finally fit the click-on frame




**Terminal connection Board installation guide DT50**

The board is fitted with three "telephone" RJ12 plugs.
Ensure the board is correctly connected.
Standard connection is:
* Climatic on connector C
* DC50 on connector A
* DS50 on connector B

**Jumpers:**

"Displays" are supplied directly by the Climatic board with 30Vdc. Take particular care at the path this 30V is taking when several boards are being used.

J14 and J15 can switch on or off the direct current from the power supply:

***J14 and J15 set between1-2***

Connectors A, B, C and screw connector SC are in parallel. Power supply available to all connectors.

***J14 and J15 set between2-3***

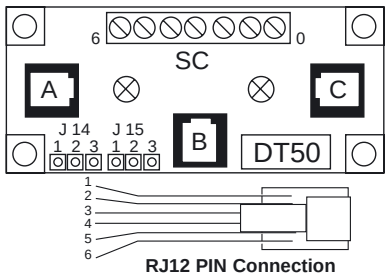
Connectors B and C are in parallel but line 1 and 6 don't reach connector A and screw connector SC.

"Displays" connected to these ports will not be powered.

If J14 and J15 are set in different positions the "terminal connection board" DT50 DOES NOT WORK.

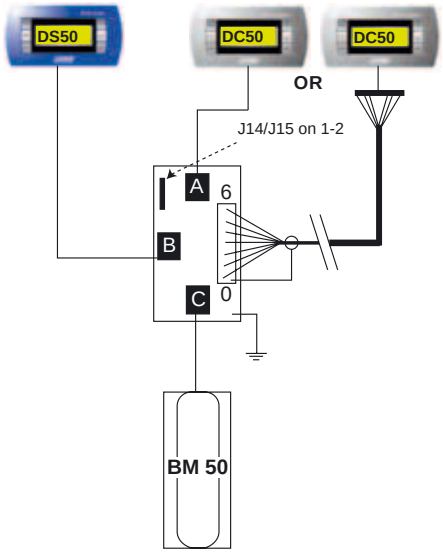
**NOTE:**

When a shielded wire is used the metallic case of the "Terminal connection box" DT50 must be earthed.




RJ12 PIN Connection

| SC Terminals | RJ12 Pin conn | Description |
|---|---|---|
| 0 | + | shield / earth |
| 1 | 1 | +VRL=30V |
| 2 | 2 | GND |
| 3 | 3 | Rx- / Tx- |
| 4 | 4 | Rx+ / Tx+ |
| 5 | 5 | GND |
| 6 | 6 | +VRL=30V |



**Terminal display address configuration**

The address of the terminal must be checked after having powered the board.
- To access the configuration mode, press ↑↓↵ together and old them for at least 5 seconds.
- The screen shown in ***Fig21*** will be displayed with the cursor flashing in the top left hand corner.
- To change the address of the terminal display press the ↵ key once.
- Use the ↑↓ keys to select the desired value and confirm by pressing ↵.
- If the address was changed it will display the screen shown in ***Fig22***.


*Fig. 21*


*Fig. 22*

**Assigning Terminal displays to control boards.**

- Access the configuration mode by pressing ↑↓↵for at least 5 seconds.

**NOTE :** To access the board address menu you must go directly to the bottom of the first screen (shown in ***Fig23***) without changing the terminal address as explained above.
- Press the ↵ key until the cursor moves to the field "I/O Board address :XX". ***Fig 23***
- Use the ↑↓key to select the correct Climatic board.(N° of Unit)
- Pressing ↵ again will display the screen shown in ***Fig 24***.
- Pressing ↵ again will display the screen shown in ***Fig 25***.

- The field "P:XX " shows the address of the selected board. In the example the value "12" has been selected.
- The filed under the "Adr" column represents the addresses of the terminal displays associated with the board that has the address "12", while the column under "Priv/Shared " indicate the type of terminal selected.
  Ph: Private
  Sh :Shared
  Sp : Shared Printer (N/A)
- To exit the configuration procedure and save the data, select the filed "OK?NO", choose "Yes" using the ↑↓ keys and confirm by pressing ↵ .

If the terminal remains inactive (no button is pressed) for 30 seconds, the configuration procedure is aborted automatically.


*Fig. 23*


*Fig. 24*

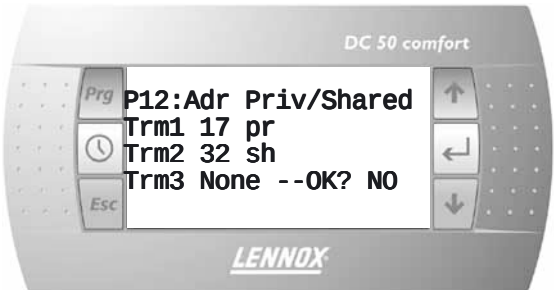
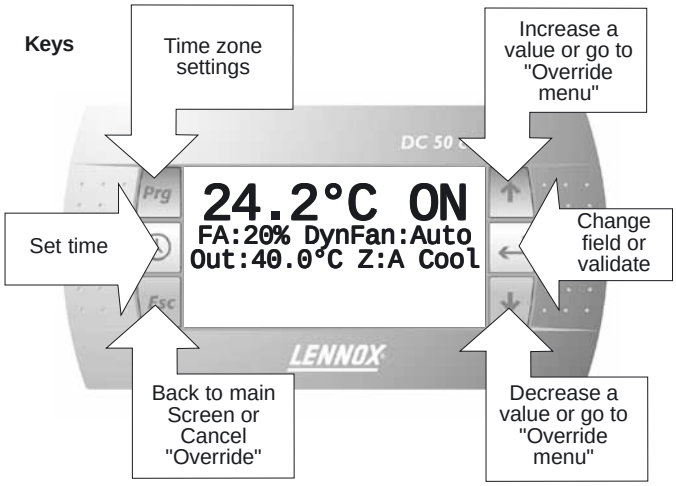
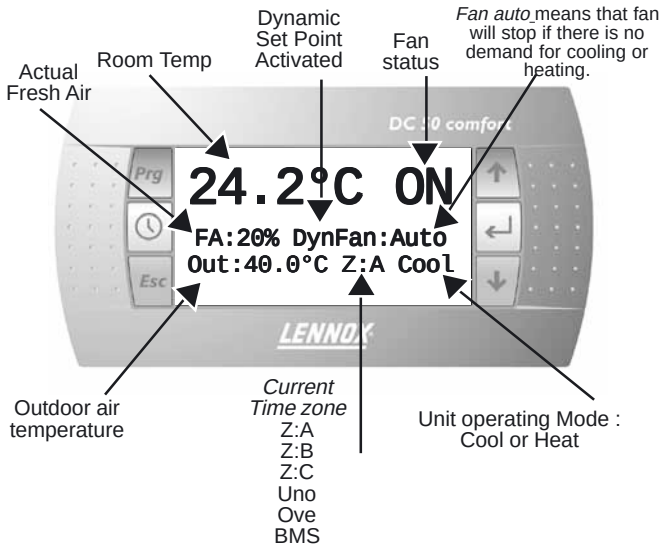



*Fig. 25*



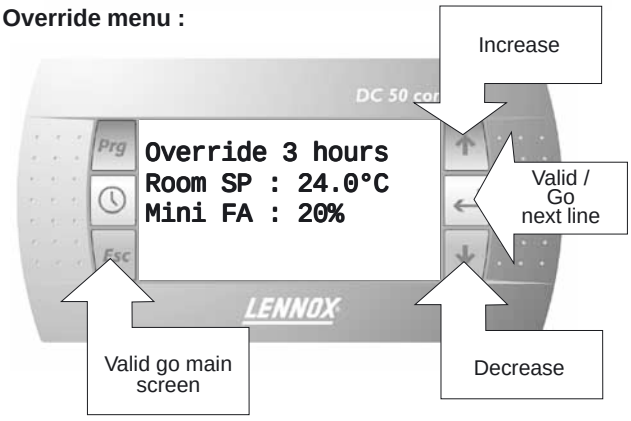



**Override 3 hours :**

From main screen press any of the two arrow keys as shown bellow:

**Main screen :**

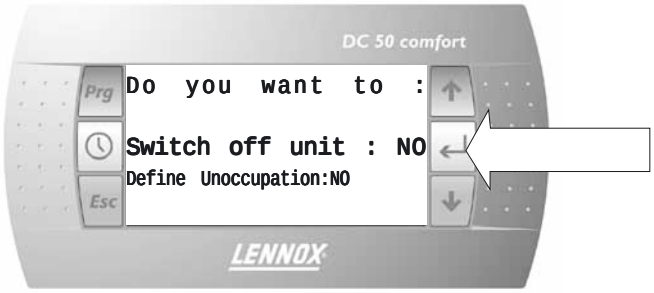

**Override menu :**




It will revert back to main screen after 15 seconds, if no activity

**Switching ON or OFF the unit or forcing a selected time zone for a period of up to 7 days**


Pressing the return key on the main screen will display the following message:




Pressing the return KEY validates the choice and move to the next field

Up and down arrows gives you the choice between different things

If you choose "YES" to the first question the unit is **SWITCHED OFF** and you can not access the override menu.

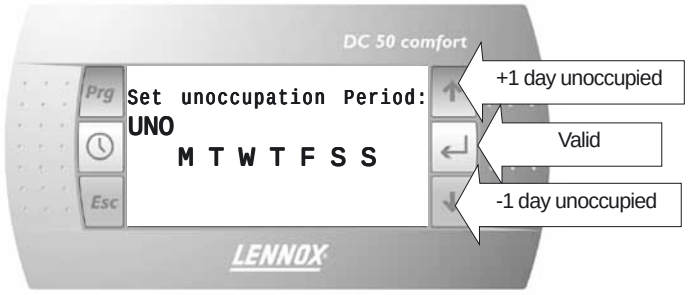
**WARNING : Switching Off the unit disable all safety Protections**

If you choose to stop the Machine number **12** in the previous screen the following screen will then appear.


The unit can then be switched back **ON** by pressing the return key once more.

If the first choose is "**NO**" then the override screen can be accessed a particular time zone can be forced for up to 7 days starting from the day "**TODAY**".

In this menu you can choose the number of days you want the selected time zone to override.
Increase the number of days by pressing the Up or Down keys.

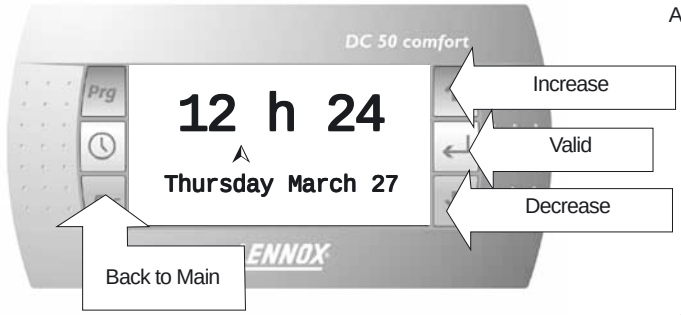



**Clock Menu :**

From main screen press the clock key, the following menu appears :

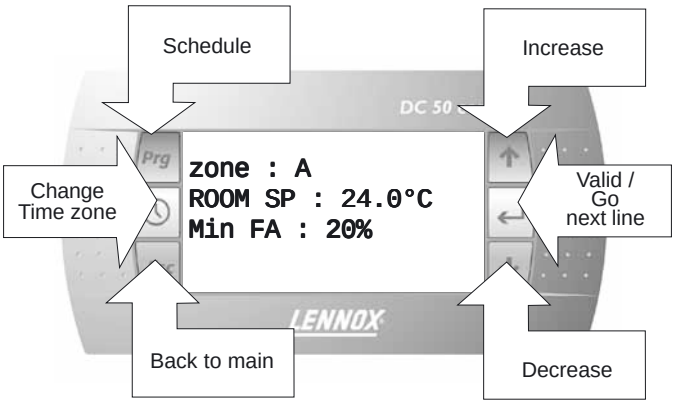
**Clock Menu :**

From main screen press the clock key, the following menu




**"Time Zone" Menu**

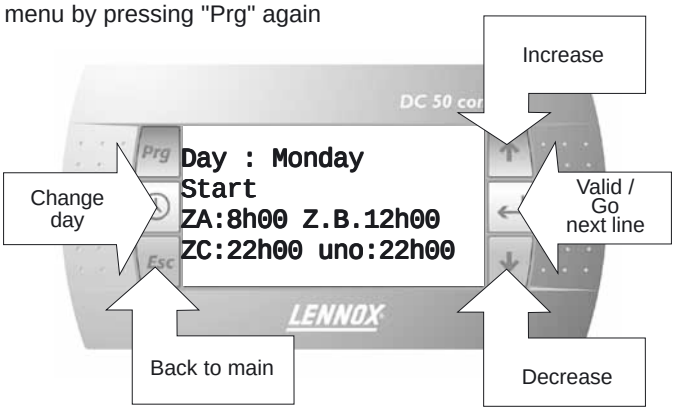
From main screen press the "Prg" key, the following menu appears:




It will reverts back to main screen after 15 seconds if no activity.

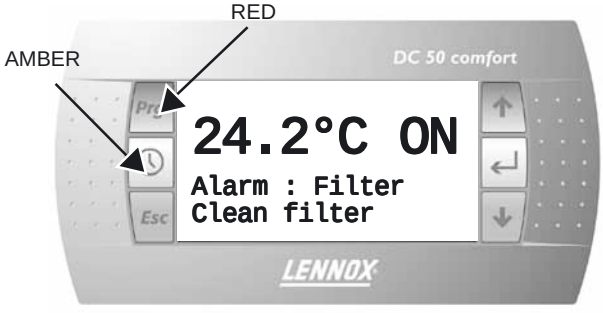
**"Scheduling" Menu**

The scheduling menu can be accessed from the "time zone" menu by pressing "Prg" again

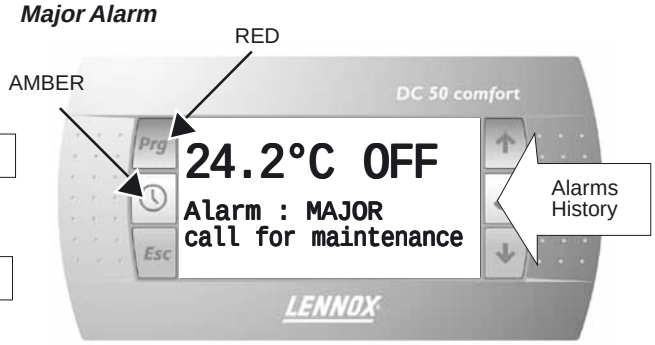



**Alarm screen**

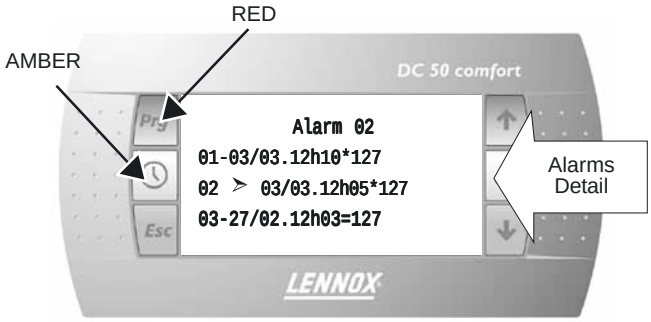
*Filter Alarm :* All keys are locked, the only way to escape this screen is to clean the filter




***Major Alarm***



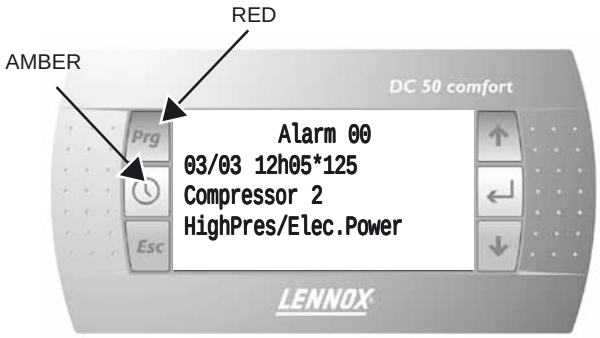

**Alarm History Menu**




You can scroll down this menu using the arrow keys and select one of the alarm message by pressing the return key.

**Alarm details**

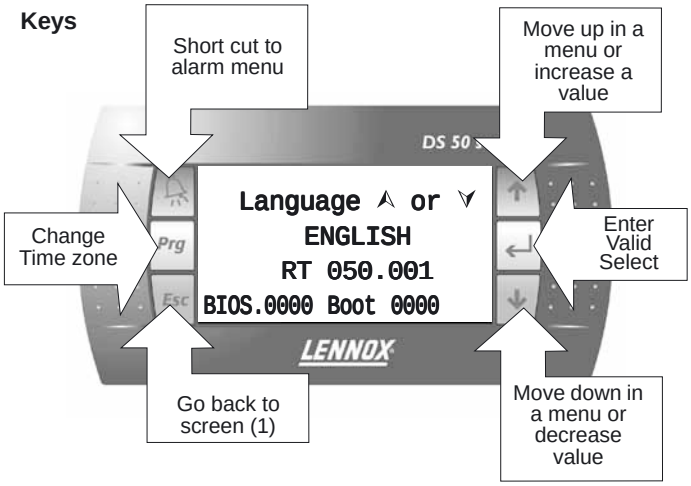
This menu allows you to view details on the selected fault as shown below:



**DS50 SERVICE DISPLAY**

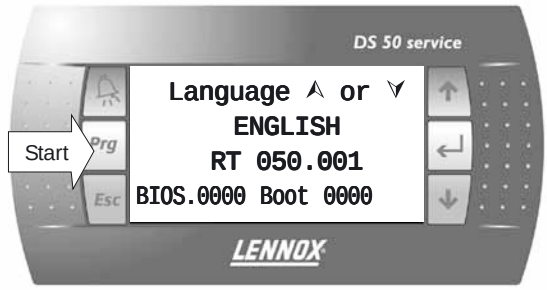
This new service display controller is a plug and play feature but it can also be remotely installed.
Plugging the DS50 will freeze a DC50

**Keys**



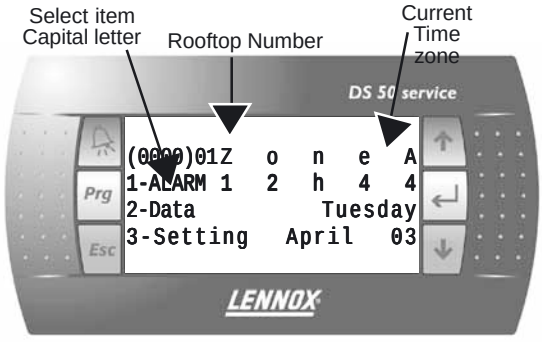

**Start up screen or Screen(1)**


**Screen (2) language selection**



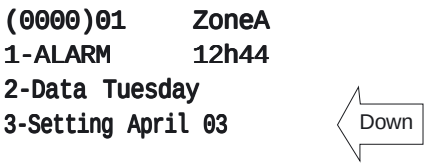

Five languages are available in addition to English. The required language must be specified at the time of order. In this menu the specified language can be selected using the up and down keys. The "prg" key validates the choice and start the controller.

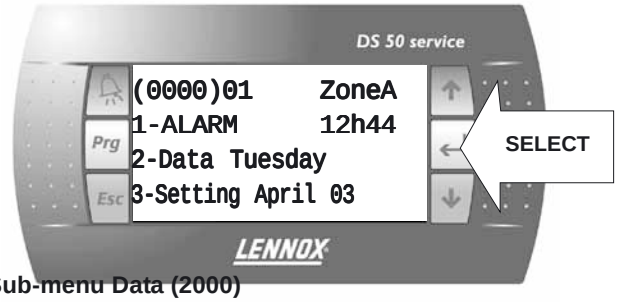
**Main menu (0000)**



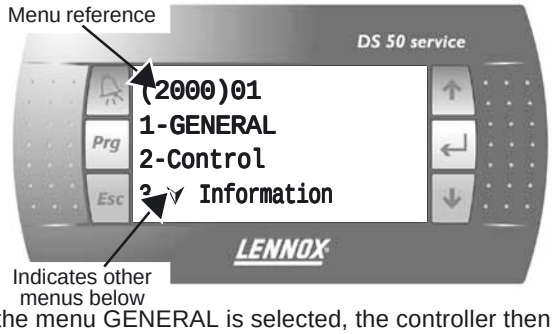

**Moving down the menus**

Pressing the arrow keys allows you to move up and down the menu tree. The selected item changes to CAPITAL letter. It can then be selected by pressing the "return" or "select" key.



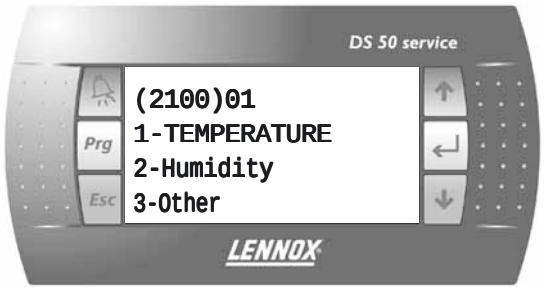



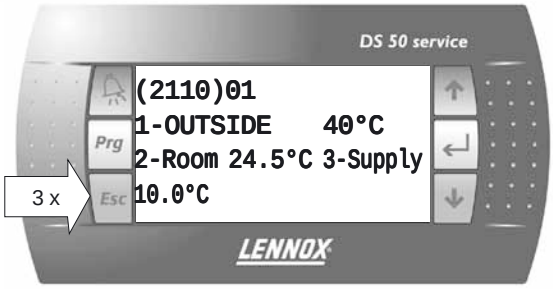

**Sub-menu Data (2000)**




If the menu GENERAL is selected, the controller then displays a second level sub-menu.

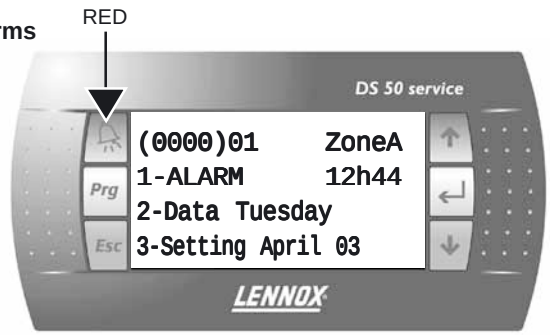
By selecting the item TEMPERATURE and pressing return, a third level page is displayed as shown bellow:



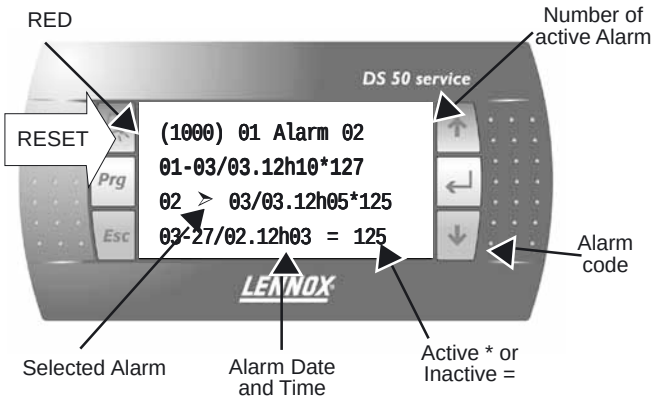



Pressing "ESC" at any time sends you back one level up the menu tree. In the example shown above "ESC" must be pressed 3 times to go back to the main menu (0000)
Pressing "ESC" will invalidate any changes made to a value in a setting page.

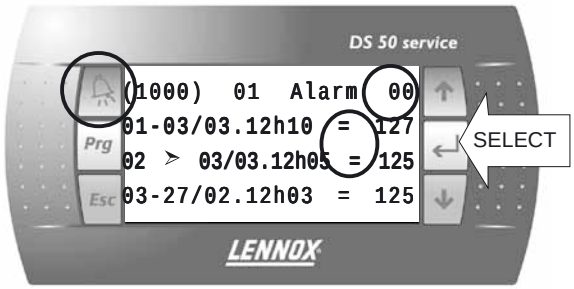
**Alarms**



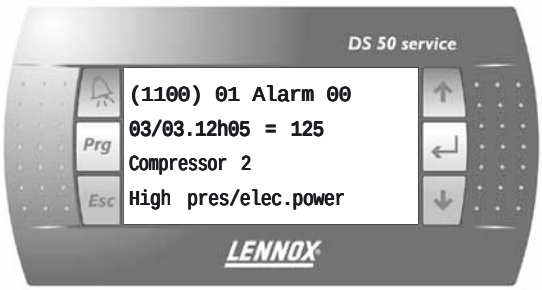

Select the alarm menu using the arrow keys and press return.
The faults history is then displayed in the page (1000):



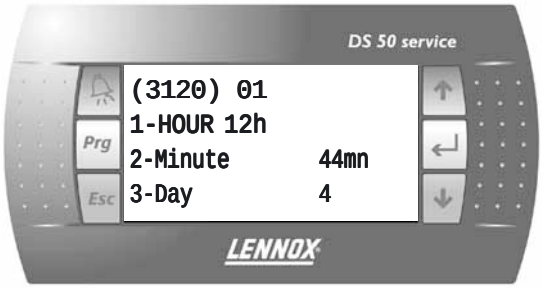

Pressing the "ALARM" key resets all the alarms
The number of active alarms goes to 0, no active alarm shown in the menu, the "bell" key is switched off.



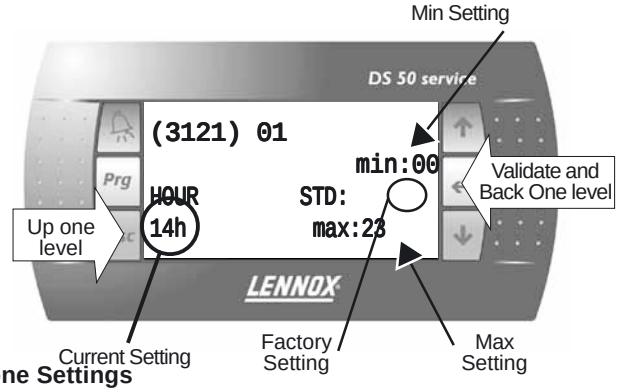

Pressing the "return" key will display details of the selected alarm



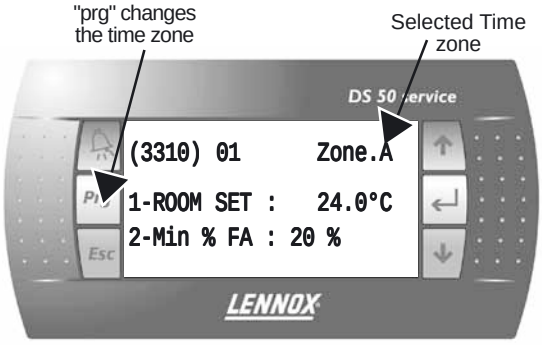

**Clock settings**
The clock setting menu can be accessed from the main menu by selecting the menu "SETTING" and then navigating down through the sub-menus until page (3120).



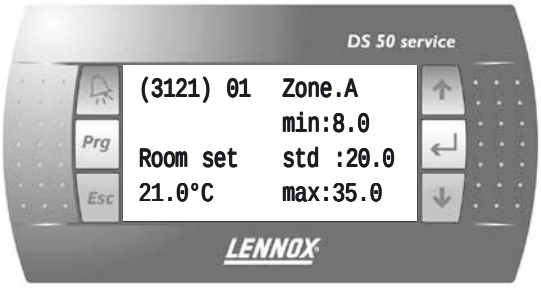

Selecting the HOUR for displays the page 3121 shown bellow:




**Zone Settings**
From Main menu (0000) navigate down to sub-menu "SETTINGS", zone settings (3310).




In this particular page, pressing the "prg" key, changes the time zone. If "ROOM SET" is selected, this displays the room set point for the specific time zone shown in the top corner.

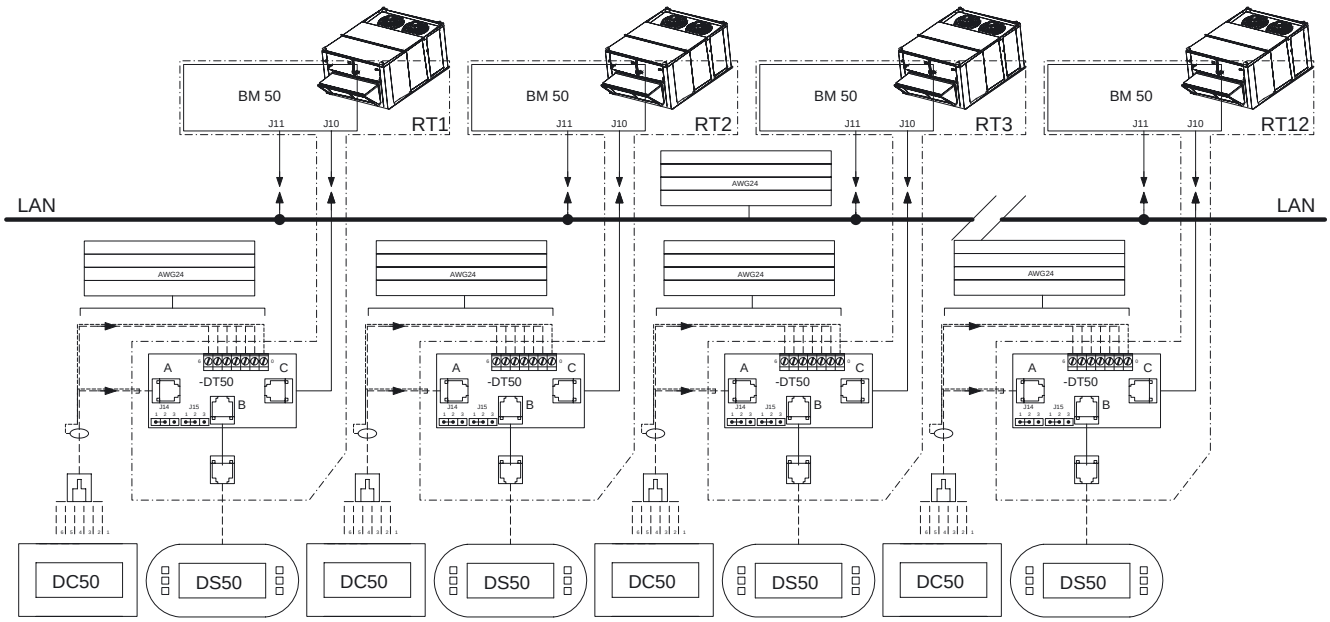



Pressing the "prg" validates any changes made, and move to the next time zone. "ESC" does not validate the changes and move back one step in the menu tree.

## COMMUNICATION LINKS

### Master / Slave

Rooftop can now be connected together (up to 12) via a double shielded pair of wire (0.75mm2 not supplied by Lennox) and use different running modes, as explained bellow, with no cost increase.




| | FAN | SET POINT | ROOM TEMP | COOLING HEAT MODE |
|---|---|---|---|---|
| 1. DC50 | MASTER | MASTER | N/A | N/A |
| 2. DC50 Temperature | MASTER | STAND ALONE | MASTER | N/A |
| 3 DC50 Average | MASTER | STAND ALONE | AVERAGE | N/A |
| 4. Master/Slave Temperature | STAND ALONE | STAND ALONE | MASTER | N/A |
| 5. Master/Slave Average. | STAND ALONE | STAND ALONE | AVERAGE | N/A |
| 6. Master/Slave Cooling/Heating | STAND ALONE | STAND ALONE | STAND ALONE | MASTER |
| 7. Back-up | All units are stand alone, one unit is waiting for a failure to start | | | |
| 8 Rolling Back-up | All units are stand alone; one unit is waiting for a failure to start. This back-up unit changes every Tuesday | | | |

_ **1 : DC50** : Master slave mode "total"

The master gives the ventilation order, and its set point to all other rooftops.

_ **2 : DC50 Temperature** : Master slave mode "temperature"

The master gives the ventilation order and its room temperature/humidity to all other rooftops, but they have their own set point.

_ **3 : DC50 Average** : Master slave mode "average"

The master gives the ventilation order and the room temperature/humidity used by all rooftop is the average of all rooftop. Each rooftop has its own set point.

_ **4 : Master/Slave Temperature** : Master slave mode "temperature"

The master gives its room temperature/humidity to all other rooftops, but they have their own ventilation order & set point.

_ **5 : Master / Slave Average** : Master slave mode "average"

The room temperature/humidity used by all rooftop is the average of all rooftop. Each rooftop has its own ventilation order & set point.

_ **6 : Master / Slave Cooling / Heating** : Master slave mode "cooling/heating"

All rooftop are stand-alone but the slaves have to have the same running mode as the master (Cooling or heating).

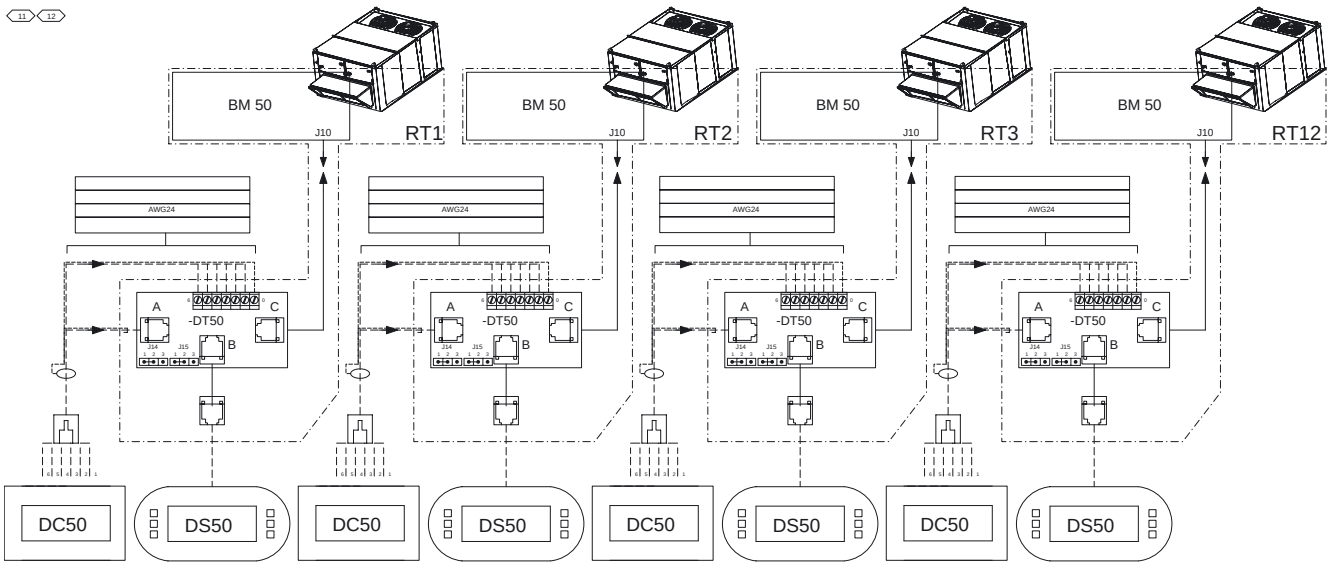
_ **7 : Back-up mode**

One rooftop is the back-up unit and will operate if any of the other rooftop has a failure.

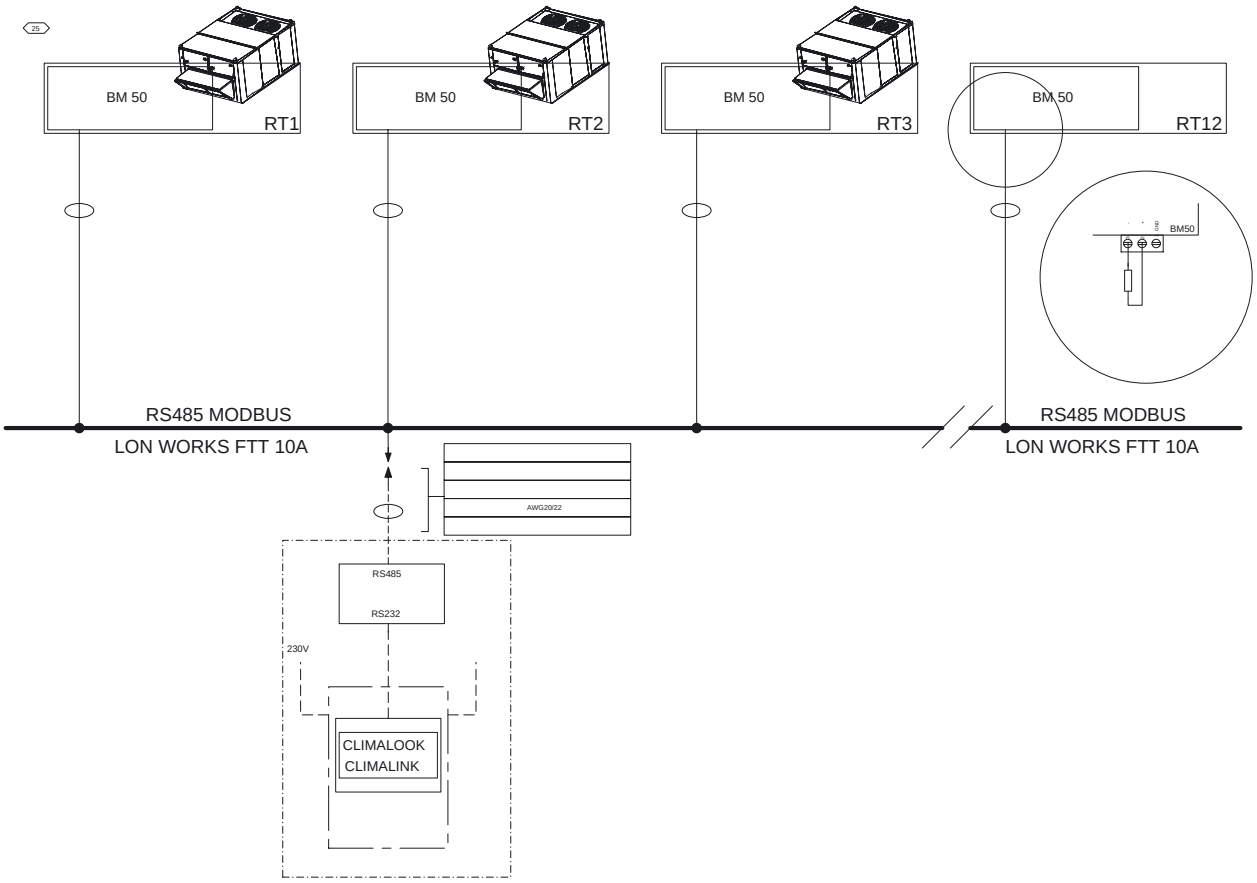
_ **8 : Rolling Back-up mode**

Same as above, except the "back-up" unit will be different each Tuesday. On top of that, the outside temperature/ humidity given to all rooftop can either be the average of rooftop or be the external humidity/temperature of the master, making possible the use of a single "weather station" for the whole site.DS50 Comfort Display / DC50 Service Display

DS 50 : SERVICE DISPLAY / DC 50 : COMFORT DISPLAY




CLIMALINK / CLIMALOOK



| Main Screen | Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-Alarm | 1000 | # | 1100 | # | 1110 | # | 1111 | | | | |
| 2-Data | 2000 | 1-General | 2100 | 1-Temperature | 2110 | Outside | 2111 | °c | | | |
| | | | | | | Room | 2112 | °c | | | |
| | | | | | | Supply | 2113 | °c | | | |
| | | | | | | Return | 2114 | °c | | | |
| | | | | 2-Humidity | 2120 | Outside | 2121 | %. | | | |
| | | | | | | Room | 2122 | %. | | | |
| | | | | | | Outside | 2123 | g/Kg | | | |
| | | | | | | Room | 2124 | g/Kg | | | |
| | | | | 3-Other | 2130 | Air Pres. | 2131 | pa | | | |
| | | | | | | CO2 | 2132 | ppm | | | |
| | | | | | | Sw On/Off | 2133 | On/Off | | | |
| | | | | | | Sw Reset | 2134 | On/Off | | | |
| | | | | | | Sw Unoc. | 2135 | On/Off | | | |
| | | | | 4-Out. Custom. | 2140 | BM50.1 | 2141 | On/Off | | | |
| | | | | | | BE50.1 | 2142 | On/Off | | | |
| | | | | | | BE50.2 | 2143 | On/Off | | | |
| | | | | | | BE50.3 | 2144 | On/Off | | | |
| | | | | | | BE50.4 | 2145 | On/Off | | | |
| | | | | 5-In. Custom. | 2150 | BM50.1 | 2151 | On/Off | | | |
| | | | | | | BM50.2 | 2152 | On/Off | | | |
| | | | | | | BE50.1 | 2153 | On/Off | | | |
| | | | | | | BE50.2 | 2154 | On/Off | | | |
| | | | | | | BE50.3 | 2155 | On/Off | | | |
| | | | | | | BE50.4 | 2156 | On/Off | | | |
| | | | | 6-In.% Custom. | 2160 | BE50.1 | 2161 | °c | | | |
| | | | | | | BE50.2 | 2162 | °c | | | |
| | | | | | | BE50.3 | 2163 | °c | | | |
| | | | | | | BE50.4 | 2164 | °c | | | |
| | | | | | | BE50.1 | 2165 | %. | | | |
| | | | | | | BE50.2 | 2166 | %. | | | |
| | | | | | | BE50.3 | 2167 | %. | | | |
| | | | | | | BE50.4 | 2168 | %. | | | |
| | | 2-Control | 2200 | 1-Room | 2210 | Sp Cool | 2211 | °c | | | |
| | | | | | | Sp Heat | 2212 | °c | | | |
| | | | | | | Capa Cool | 2213 | % | | | |
| | | | | | | Capa Heat | 2214 | % | | | |
| | | | | | | Sw Dis.Cool | 2215 | On/Off | | | |
| | | | | | | Sw Dis.Heat | 2216 | On/Off | | | |
| | | | | 2-Reheat | 2220 | Set Point | 2221 | °c | | | |
| | | | | | | Capacity | 2222 | % | | | |
| | | | | 3-Humidity | 2230 | Sp Dehu | 2231 | % | | | |
| | | | | | | Sp Humi | 2232 | % | | | |
| | | | | | | Capa Dehu | 2233 | % | | | |
| | | | | | | Capa Humi | 2234 | % | | | |
| | | | | 4-TCB | 2240 | Sw G | 2241 | On/Off | | | |
| | | | | | | Sw Y1 | 2242 | On/Off | | | |
| | | | | | | Sw Y2 | 2243 | On/Off | | | |
| | | | | | | Sw W1 | 2244 | On/Off | | | |
| | | | | | | Sw W2 | 2245 | On/Off | | | |
| | | | | | | Sw B | 2246 | On/Off | | | |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3-Fan | | 2300 | 1-Ventilation | 2310 | Config. | 2311 | List | | | | [No / 500pa / 100pa] |
| | | | | | State | 2312 | List | | | | [Stopped / Schedule / Fault / Start] |
| | | | | | Sw State | 2313 | On/Off | | | | |
| | | | | | Fire/Smoke | 2314 | On/Off | | | | |
| | | | | | Relay | 2315 | On/Off | | | | |
| | | | | | Low Speed | 2316 | On/Off | | | | |
| | | | | | Sw Speed | 2317 | On/Off | | | | |
| | | | 2-Extraction | 2320 | State | 2321 | List | | | | [Stopped / Schedule / Fault / Start] |
| | | | | | Relay | 2322 | On/Off | | | | |
| | | | 3-Condenser 1 | 2330 | Config. | 2331 | List | | | | [No / Yes] |
| | | | | | State | 2332 | List | | | | [Stopped / Schedule / Fault / Start] |
| | | | | | Sw State | 2333 | On/Off | | | | |
| | | | | | Relay | 2334 | On/Off | | | | |
| | | | 4-Condenser 2 | 2340 | Config. | 2341 | List | | | | [No / Yes] |
| | | | | | State | 2342 | List | | | | [Stopped / Schedule / Fault / Start] |
| | | | | | Sw State | 2343 | On/Off | | | | |
| | | | | | Relay | 2344 | On/Off | | | | |
| | | | 5-Condenser 3 | 2350 | Config. | 2351 | List | | | | [No / Yes] |
| | | | | | State | 2352 | List | | | | [Stopped / Schedule / Fault / Start] |
| | | | | | Sw State | 2353 | On/Off | | | | |
| | | | | | Relay | 2354 | On/Off | | | | |
| | | | 6-Condenser 4 | 2360 | Config. | 2361 | List | | | | [No / Yes] |
| | | | | | State | 2362 | List | | | | [Stopped / Schedule / Fault / Start] |
| | | | | | Sw State | 2363 | On/Off | | | | |
| | | | | | Relay | 2364 | On/Off | | | | |
| 4-Cooler | | 2400 | 1-Fresh Air | 2410 | Config. | 2411 | List | | | | [No / 0%-50% / Modulation / 100%] |
| | | | | | State | 2412 | List | | | | [Stopped / Air Flow / Start / Enthalpy / Outside T. / Schedule / Defrost] |
| | | | | | Mini.Air | 2413 | % | | | | |
| | | | | | Modulat. | 2414 | % | | | | |
| | | | | | Opening | 2415 | % | | | | |
| | | | | | Calib. | 2416 | Yes/No | | | | |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2-Cold W/Coil | 2420 | Config. | 2421 | List | | | | [No / Modulation] |
| | | | | | State | 2422 | List | | | | [Stopped / Air Flow / Start] |
| | | | | | Opening | 2423 | % | | | | |
| | 5-Compressor | 2500 | 1-Compressor 1 | 2510 | Config. | 2511 | List | | | | [No / C. only / H.only] |
| | | | | | State | 2512 | List | | | | [Stopped / Air Flow / Outside T. / Schedule / Switch / Fault (2) / Fault (1) / Ant-Sho-Cy / Start / Start Heat / Defrost] |
| | | | | | Defrost T | 2513 | °c | | | | |
| | | | | | Sw State | 2514 | On/Off | | | | |
| | | | | | Sw Low P. | 2515 | On/Off | | | | |
| | | | | | Relay | 2516 | On/Off | | | | |
| | | | | | H.Pump | 2517 | On/Off | | | | |
| | | | | | Sw Disable | 2518 | On/Off | | | | |
| | | | | | Run Time | 2519 | h | | | | |
| | | | 2-Compressor 2 | 2520 | Config. | 2521 | List | | | | |
| | | | | | State | 2522 | List | | | | |
| | | | | | Defrost T. | 2523 | °c | | | | |
| | | | | | Sw State | 2524 | On/Off | | | | |
| | | | | | Sw Low P. | 2525 | On/Off | | | | |
| | | | | | Relay | 2526 | On/Off | | | | |
| | | | | | H.Pump | 2527 | On/Off | | | | |
| | | | | | Sw Disable | 2528 | On/Off | | | | |
| | | | | | Run Time | 2529 | h | | | | |
| | | | 3-Compressor 3 | 2530 | Config. | 2531 | List | | | | |
| | | | | | State | 2532 | List | | | | |
| | | | | | Defrost T. | 2533 | °c | | | | |
| | | | | | Sw State | 2534 | On/Off | | | | |
| | | | | | Sw Low P. | 2535 | On/Off | | | | |
| | | | | | Relay | 2536 | On/Off | | | | |
| | | | | | H.Pump | 2537 | On/Off | | | | |
| | | | | | Sw Disable | 2538 | On/Off | | | | |
| | | | | | Run Time | 2539 | h | | | | |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 4-Compressor 4 | 2540 | Config. | 2541 | List | | | | |
| | | | | | State | 2542 | List | | | | |
| | | | | | Defrost T. | 2543 | °c | | | | |
| | | | | | Sw State | 2544 | On/Off | | | | |
| | | | | | Sw Low P. | 2545 | On/Off | | | | |
| | | | | | Relay | 2546 | On/Off | | | | |
| | | | | | H.Pump | 2547 | On/Off | | | | |
| | | | | | Sw Disable | 2548 | On/Off | | | | |
| | | | | | Run Time | 2549 | h | | | | |
| | | | 5-Other | 2550 | Low Amb. | 2551 | On/Off | | | | |
| | | | | | W/Cond.1 | 2552 | °c | | | | |
| | | | | | W/Cond.2 | 2553 | °c | | | | |
| | 6-Heater | 2600 | 1-Gas | 2610 | Config. | 2611 | List | [No / 2 steps / 4steps / Modulation] | | | |
| | | | | | State | 2612 | List | | | | [Stopped / Air Flow / Schedule / Switch / Fault (1) / Fault (2)] |
| | | | | | Sw State 1 | 2613 | On/Off | | | | |
| | | | | | Sw State 2 | 2614 | On/Off | | | | |
| | | | | | Relay 1 | 2615 | On/Off | | | | |
| | | | | | Relay 2 | 2616 | On/Off | | | | |
| | | | | | High | 2617 | On/Off | | | | |
| | | | | | Modulat. | 2618 | % | | | | |
| | | | | | Sw Disable | 2619 | On/Off | | | | |
| | | | 2-Elec. H. | 2620 | Config. | 2621 | List | | | | [No / Yes / 2 steps / Modulation] |
| | | | | | State | 2622 | List | | | | [Stopped / Air Flow / Outside T. / Schedule / Switch / Fault (1) / Start] |
| | | | | | Sw State 1 | 2623 | On/Off | | | | |
| | | | | | Sw State 2 | 2624 | On/Off | | | | |
| | | | | | Relay 1 | 2625 | On/Off | | | | |
| | | | | | Relay 2 | 2626 | On/Off | | | | |
| | | | | | Modulat. | 2627 | % | | | | |
| | | | | | Sw Disable | 2628 | On/Off | | | | |

| Main Screen | Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3-Hot W/Coil | | 2630 | Config. | 2631 | List | | | | [No / Modulation] |
| | | | | | | State | 2632 | List | | | | [Stopped / Air Flow / Start / Schedule / Switch / Fault (1) / Fault (2)] |
| | | | | | | Opening | 2633 | % | | | | |
| | | | | | | Sw Freeze | 2634 | On/Off | | | | |
| | | | | | | Sw Disable | 2635 | On/Off | | | | |
| | | | 4-Pump | | 2640 | Config. | 2641 | List | | | | [No / Yes] |
| | | | | | | State | 2642 | List | | | | [Stopped / Air Flow / Fault (1) / Start] |
| | | | | | | Sw State | 2643 | On/Off | | | | |
| | | | | | | Relay | 2644 | On/Off | | | | |
| | 7-Humidif. | | 2700 | | 2710 | Config. | 2711 | List | | | | [No / Modulation] |
| | | | | | | State | 2712 | List | | | | [Stopped / Air Flow / Schedule / Fault (1) / Start] |
| | | | | | | Sw State | 2713 | On/Off | | | | |
| | | | | | | Modulat. | 2714 | % | | | | |
| | 8-Com. | 2800 | 1-Outside | | 2810 | Value | 2811 | °c | | | | |
| | | | | | | Sensor | 2812 | °c | | | | |
| | | | | | | Link | 2813 | °c | | | | |
| | | | | | | BMS | 2814 | °c | | | | |
| | | | | | | Value | 2815 | %. | | | | |
| | | | | | | Sensor | 2816 | %. | | | | |
| | | | | | | Link | 2817 | %. | | | | |
| | | | | | | BMS | 2818 | %. | | | | |
| | | | 2-Room | | 2820 | Value | 2821 | °c | | | | |
| | | | | | | Sensor | 2822 | °c | | | | |
| | | | | | | Link | 2823 | °c | | | | |
| | | | | | | BMS | 2824 | °c | | | | |
| | | | | | | Value | 2825 | %. | | | | |
| | | | | | | Sensor | 2826 | %. | | | | |
| | | | | | | Link | 2827 | %. | | | | |
| | | | | | | BMS | 2828 | %. | | | | |

ALL CODES SHOWING (1) CAN BE ADJUSTED FOR EACH TIME ZONE

| Main Screen | Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3-Setting | 3000 | 1-General | 3100 | 1-Order | 3110 | On/Off | 3111 | On/Off | ~ | No | ~ | [On / Off] Unit |
| | | | | | | Reset Al. | 3112 | Yes/No | ~ | No | ~ | [Reset] Discharges the safety measures of the unit |
| | | | | | | Resume | 3113 | Yes/No | ~ | No | ~ | [Override] Cancel any override action set with the DC50 |
| | | | | | | Test | 3114 | List | 0 | 0 | 6 | [Quickly / Defrost / Gas 1 Low / Gas 1 High / Gas 2 / 24/24 7/7 / Lennox] Test Point Lennox |
| | | | 2-Clock | | 3120 | Hour | 3121 | h | 0 | ~ | 23 | [Clock] Clock setting "Hour" |
| | | | | | | Minute | 3122 | m | 0 | ~ | 59 | [Clock] Clock setting "Minute" |
| | | | | | | Day | 3123 | ~ | 1 | ~ | 31 | [Clock] Clock setting "Day" |
| | | | | | | Month | 3124 | ~ | 1 | ~ | 12 | [Clock] Clock setting "Month" |
| | | | | | | Year | 3125 | ~ | 2 | ~ | 99 | [Clock] Clock setting "Year" |
| | | | | | | Win/Sum | 3126 | Yes/No | ~ | Yes | ~ | Automatical control of Winter & Summer zone or Not |
| | 2-Schedule | | 3200 | 1-Time | 3210 | Start Uno | 3211 | h | 0 | 22 | 23 | [Zone Setting] Starting time "Hour" for "Unoccupied" zone |
| | | | | | | Start.Uno | 3212 | m | 0 | 0 | 59 | [Zone Setting] Starting time "Minutes" for "Unoccupied" zone |
| | | | | | | Start z.A | 3213 | h | 0 | 6 | 23 | [Zone Setting] Starting time "Hour" for "Zone A" |
| | | | | | | Start.z.A | 3214 | m | 0 | 0 | 59 | [Zone Setting] Starting time "Minutes" for "Zone A" |
| | | | | | | Start z.B | 3215 | h | 0 | 22 | 23 | [Zone Setting] Starting time "Hour" for "Zone B" |
| | | | | | | Start.z.B | 3216 | m | 0 | 0 | 59 | [Zone Setting] Starting time "Minutes" for "Zone B" |
| | | | | | | Start z.C | 3217 | h | 0 | 22 | 23 | [Zone Setting] Starting time "Hour" for "Zone C" |
| | | | | | | Start.z.C | 3218 | m | 0 | 0 | 59 | [Zone Setting] Starting time "Minutes" for "Zone C" |
| | | | 2-Anticipation | | 3220 | Foot | 3221 | °c | -10 | 10 | 20 | [Anticipation Function] bottom of the slope in °C. Limit of activation of the function. This allows an anticipated startup in the morning depending on the outdoor temperature. Only for the "Zone-A" |
| | | | | | | Gradient | 3222 | m/°c | 0 | 0 | 100 | [Anticipation Function] Slope in "Minutes of anticipation per degrees". This allows an anticipated startup in the morning depending on the outdoor temperature. Only for the "Zone-A" |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3-Control | 3300 | 1-Customer | 3310 | Sp Room | 3311 | °c | 8 | 20 | 35 | [Room SP] Required room temperature set point in °C. Middle of the dead zone. |
| | | | | | Mini.Air | 3312 | % | 0 | 20 | 100 | [Room SP] Required room minimum fresh air rate in % Middle of the dead zone. |
| | | | 2-Room | 3320 | Sp Dyna | 3321 | °c | 0 | 99.9 | 99.9 | [Room SP] Required value for the Dynamic Set Point. Allows the room set point to change according to outdoor temperature |
| | | | | | Sp Cool | 3322 | °c | 8 | 21 | 35 | [Room SP] Required maximum room emperature in °C. Cooling set point |
| | | | | | Sp Heat | 3323 | °c | 8 | 19 | 35 | [Room SP] Required minimum room temperature in °C. Heating set point |
| | | | | | Swap Heater | 3324 | Yes/No | ~ | No | ~ | [OFF] Heat Pump and then Heater [ON] Heater and then Heat Pump |
| | | | 3-Reheat | 3330 | Activation | 3331 | Yes/No | ~ | No | ~ | [F-Air Reheat] Activate reheating of the fresh air in the dead zone to maintain supply temperature. |
| | | | | | Swap Heater | 3332 | Yes/No | ~ | No | ~ | [F-Air Reheat] Prioritise the heating mode for fresh air reheat. [OFF] Heat Pump and then Heater [ON] Heater and then Heat Pump |
| | | | 4-Humidity | 3340 | Sp Dehu | 3341 | % | 0 | 100 | 100 | [Humidity] Desired Maximum relative humidity in Room (in %). - Dehumidification set point. |
| | | | | | Sp Humi | 3342 | % | 0 | 0 | 100 | [Humidity] Desired Minimum relative humidity in Room (in %). - Humidification set point. |
| | | | 5-Enable | 3350 | Fan On/Off | 3351 | Yes/No | ~ | Yes | ~ | [Enable] Stopping and running of the Fan Blower.[OFF] the blower is stopped, [ON] the blower is running. |
| | | | | | Fan Dead | 3352 | Yes/No | ~ | Yes | ~ | [Enable] Stopping and running of the fan in the "Control Dead Zone". [OFF] the blower is stopped, [ON] the blower is running. |
| | | | | | F.Air | 3353 | Yes/No | ~ | Yes | ~ | [Enable] Run eco: [ON] the Economiser is running, [OFF] the Economiser if stopped. |
| | | | | | CO2 | 3354 | Yes/No | ~ | Yes | ~ | [Enable] Run CO2 Sensor: [ON] Switch-on the CO2 on a Zone, [OFF]Stop the CO2 sensor on a zone. |
| | | | | | Comp.Cool. | 3355 | Yes/No | ~ | Yes | ~ | [Enable] [OFF] Force the unloading of compressors in cooling mode. |
| | | | | | Comp.Heat. | 3356 | Yes/No | ~ | Yes | ~ | [Enable] [OFF] Force the unloading of compressors in heating mode. |
| | | | | | AuxHeat | 3357 | Yes/No | ~ | Yes | ~ | [Enable] [OFF] Force the unloading of heating module (electric, gas or heat water coil) |
| | | | | | Humidif. | 3358 | Yes/No | ~ | Yes | ~ | [Enable] [OFF] Force the unloading of humidity control. |
| | | | | | Low Noise | 3359 | Yes/No | ~ | No | ~ | [Enable] Force the noise reduction mode. [ON] 50% of the compressors are unloaded in "Unoccupied" zone |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 6-Capacity | 3360 | Room | 3361 | ~ | 1 | 4 | 50 | [Capacity Factor] Reactivity : Refer to "Control Software Features" p 54 |
| | | | | | Reheat | 3362 | ~ | 1 | 4 | 50 | [Capacity Factor] Reactivity: Refer to "Control Software Features" p 54 |
| | | | | | Dehu. | 3363 | ~ | 1 | 4 | 50 | [Capacity Factor] Reactivity: Refer to "Control Software Features" p 54 |
| | | | | | Humi. | 3364 | ~ | 1 | 4 | 50 | [Capacity Factor] Reactivity: Refer to "Control Software Features" p 54 |
| | | | 7-Safety | 3370 | Room Low | 3371 | °c | 5 | 5 | 20 | [Safety Limit] Room temperature "Low Limit" in °C Threshold of activation of an alarm |
| | | | | | Room High | 3372 | °c | 20 | 40 | 40 | [Safety Limit] Room temperature "High Limit" in °C Threshold of activation of an alarm |
| | | | | | Sup.Lo.1 | 3373 | °c | 9or5 | 10or8 | 19 | [Safety Limit] Supply temperature low Limit(in °c) - Threshold of activation of the 1° level of security: Reduce the Capacity Factor by one stage of compressor and switch to minimum Fresh Air. |
| | | | | | Sup.Lo.2 | 3374 | °c | 7 or 3 | 8 or 6 | 17 | [Safety Limit] Supply temperature low Limit (in °c) - Threshold of activation of the 2° level of security: Reduce the Capacity Factor to zero and switch to 0% Fresh Air, open the HWC valve. |
| | | | | | Sup.Lo.3 | 3375 | °c | 5 or 1 | 6 or 2 | 15 | [Safety Limit] Supply temperature low Limit (in °c) - Threshold of activation of the 3° level of security. - Alarm threshold, the unit is switched off. |
| | | | | | Sup.Hi.1 | 3376 | °c | 20 | 40 | 70 | [Safety Limit] Supply temperature high Limit (in °c) Threshold of activation of the 1° level of security: reduce the capacity factor by one stage of compressor. Close the HWC valve. |
| | | | | | Sup.Hi.2 | 3377 | °c | 20 | 60 | 70 | [Safety Limit] Supply temperature high Limit (in °c) - Threshold of activation of the 2° level of security: Alarm threshold: Reduce the capacity factor to 0 |
| | | | | | Room Low | 3378 | % | 0 | 0 | 1000 | [Safety Limit] Room relative humidity low Limit (in %) - Threshold of activation of the alarm |
| | | | | | Room High | 3379 | % | 0 | 1000 | 1000 | [Safety Limit] Room humidity high Limit (in %) - Threshold of activation of the alarm |
| | 4-Ventilation | 3400 | | 3410 | Air Flow | 3411 | pa | 0 | 25 | 1000 | [Safety Limit] Airflow Detection Threshold of pressure difference in Pa indicating Low Airflow Rate. If the pressure difference across the filter is lower than this threshold the safety is activated. |
| | | . | | | No Filter | 3412 | pa | 0 | 50 | 1000 | [Safety Limit] Missing Filters. Threshold of pressure difference in Pa indicating absence of filters. If the pressure difference across the filter is lower than this threshold the safety is activated. |
| | | . | | | Dirty Fil. | 3413 | pa | 0 | 250 | 1000 | [Safety Limit] Dirty Filters. Threshold of pressure difference in Pa indicating Filters are Dirty. If the pressure difference across the filter is Higher than this threshold the safety is activated. |

| Main Screen | Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5-Fresh Air | 3500 | .. | 3510 | Out.Limit | 3511 | °c | -20 | -20 | 40 | [Fresh air Damper] minimum outdoor temperature limit in °C. If the outdoor temperature is lower than this limit the control in free cooling is not allowed. The fresh air damper is then set to the minimum setting. |
| | | | | .. | | Maximum | 3512 | % | 0 | 100 | 100 | [Fresh air Damper] Maximum allowable opening of the fresh air damper in % |
| | | | | .. | | Start Ext | 3513 | % | 0 | 30 | 100 | [Extraction] Threshold of activation of the power exhaust fan according to the position of the economiser damper in %. |
| | | | | .. | | Mini.Co2 | 3514 | ppm | 0 | 1000 | 2000 | [CO2] Fresh air damper minimum opening threshold in ppm |
| | | | | .. | | Maxi.Co2 | 3515 | ppm | 0 | 1500 | 2000 | [CO2] Fresh air damper maximum opening limit in ppm |
| | | | | .. | | Calib. | 3516 | Yes/No | ~ | Yes | ~ | Allow the calibration of the minimum fresh air. |
| | | | | .. | | Recovery | 3517 | Yes/No | ~ | No | ~ | [NO/YES] Heat recovery |
| | | 6-Compressor | 3600 | 1-Out.Limit | 3610 | Cool. 50 | 3611 | °c | -10 or 10 | 20 | 40 | [ Limit of Regulation ] * 1° If Option Regulation all seasons - Reduction speed of the fans condenser - Threshold of outside temperature (in °c). - If the outside temperature is lower than this threshold the fans condenser function in low speed<br>* 2° If not - Unloading 50% of the Compressors in Cooling - Threshold of outside temperature (in °c). - If the outside temperature is lower than this threshold 50% of the compressors are used by the Regulation |
| | | | | | | Cool.100 | 3612 | °c | -10 or 10 | 12 | 40 | [ Limit of Regulation ] * 1° If Option Regulation all seasons - Stopping of the fans condenser - threshold of outside temperature (in °c). - If the outside temperature is lower than this threshold the fans condenser are stopped<br>* 2° If not - Unloading 100% of the Compressors in Cold - Threshold of outside temperature (in °c). - If the outside temperature is lower than this threshold the compressors are not used by the Regulation |
| | | | | | | Heat.100 | 3613 | °c | -50 | -20 | 40 | [ Limit of Regulation ] Unloading 100% of the Compressors in Heating - Threshold of outside temperature (in °c). - If the outside temperature is lower than this threshold the compressors are not used by the Regulation. |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2-Defrost | 3620 | Type | 3621 | List | 0 | 0 | 1 | [ Function Defrost ] Choice of defrost: 1 = "cycling" or 0 = dynamic |
| | | | | | Outside | 3622 | °c | 8 | 10 | 20 | [ Function Defrost ] Authorization of defrost - Threshold of outside temperature (in °c) |
| | | | | | Coil | 3623 | °c | -10 | -2 | 10 | [ Function Defrost ] Authorization of defrost - Threshold of coil temperature (in °c) |
| | | | | | Time Limit | 3624 | m | 30 | 45 | 90 | [ Function Defrost ] Time limit for icing (in minute) -For the dynamic defrost the unit will run this minimum amount of time. If cycling defrost this is the time delay to start the defrost once the temperature conditions are met. |
| | | | | | Time Fc | 3625 | ~ | 1 | 3 | 5 | [ Function Defrost ] Number of condenser fan start-ups to end defrost. If the number of start-ups can not be achieved within 4min the defrost will end. |
| | | | 3-Safety | 3630 | W/Cd Mini | 3631 | °c | 4 | 5 | 20 | [Safety limit] Low Temperature Limit for water heat exchanger output (in °c) - Threshold of activation of the safety limit. |
| | | | | | W/Cd Maxi | 3632 | °c | 20 | 45 | 46 | [safety limit] High Temperature Limit for water heat exchanger output (in °c) - Threshold of activation of the safety limit. |
| 7-Heater | | 3700 | 1-Gas | 3710 | . | 3711 | | | | | |
| | | | 2-Elec. H. | 3720 | Out.Limit | 3721 | °c | -20 | 10 | 40 | [ Limit of Regulation ] Unloading 100% of heaters - Threshold of outside temperature (in °c). If the outside temperature is higher than this threshold Heaters are switched off. |
| | | | | | Sp Mixing | 3722 | °c | 0 | 5 | 10 | [ Electrical heater ] Regulation all seasons of FLEXY FX - Threshold of temperature of mixture (in °c) - If the temperature of mixture is lower than this threshold Electrical Heaters are activated |
| | | | | | Maximum | 3723 | % | 0 | 100 | 100 | [ Electrical heater ] For Electric Heater with Triac: Maximum power of use of Electrical heater (in %) |
| | | | 3-Hot W/Coil | 3730 | Out.Limit | 3731 | °c | -20 | 10 | 40 | Authorise a leak-flow |
| | | | | | Opening | 3732 | % | 0 | 0 | 50 | |
| | | | | | A.Freeze | 3733 | List | 0 | 0 | ? | [0% / 100%] Open or close the V3V |
| | | | 4-Pump | 3740 | Mode | 3741 | List | 0 | 0 | ? | [No/Frost.Al./Start heat/Start] Choose startup mode for the pump |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8-Config. | 3800 | 1-Unit | 3810 | Range | 3811 | List | 0 | 6 | ? | Type of unit: BC, BH, BGN, BG, BD, FC, FH, FGN, FG, FD, FX or FW |
| | | | | | Size | 3812 | List | 0 | 0 | ? | See table n° 5 |
| | | | | | Hu. Pack | 3813 | Yes/No | ~ | No | ~ | [ Configuration ] Activation of the Humidity Management Option |
| | | | | | TCB | 3814 | Yes/No | ~ | No | ~ | [Configuration] Configuration of the Thermostat Control Board. |
| | | | 2-Compressor | 3820 | LAK | 3821 | Yes/No | ~ | No | ~ | [ Configuration ] Low Ambient Kit "all season control" |
| | | | | | Wat/Cond | 3822 | Yes/No | ~ | No | ~ | |
| | | | | | 085/100 + | 3823 | Yes/No | ~ | No | ~ | [ Configuration ] Activation of the "Optimized Defrost" Option. Only for Flexy 85_100 with split airflow. |
| | | | 3-Option | 3830 | AuxHeat | 3831 | List | 0 | 0 | 6 | [ Configuration ] Configuration of the Heating Input: HWC; Electric Heater S/M/H or Gas 2/4/2 pro. /4 pro. For 20kW ' 60kW choose "gas 2"; for 120kW ' 180kW choose "gas 4"; "pro." means modulating gas |
| | | | | | F.Air | 3832 | List | 0 | 0 | 3 | [ Configuration ] Configuration of the Fresh Air / Economiser: NO, 100% fixed or 0-50% or 0-100% Modulating. |
| | | | | | P. Air | 3833 | List | 0 | 0 | 2 | [ Configuration ] Configuration of the differential pressure sensor: 0Pa; 500Pa; 1000Pa |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 4-Out. Custom. | 3840 | BM50.1 | 3841 | List | 0 | 0 | 6 | [Configuration] Free output to be customised on the BM50 |
| | | | | | BE50.1 | 3842 | List | 0 | 0 | 6 | [Configuration] Free output to be customised (first output of the extension board BE50) |
| | | | | | BE50.2 | 3843 | List | 0 | 0 | 6 | [Configuration] Free output to be customised (Second output of the extension board BE50) |
| | | | | | BE50.3 | 3844 | List | 0 | 0 | 6 | [Configuration] Free output to be customised (Third output of the extension board BE50) |
| | | | | | BE50.4 | 3845 | List | 0 | 0 | 6 | [Configuration] Free output to be customised (Fourth output of the extension board BE50) |
| | | | 5-In. Custom. | 3850 | BM50.1 | 3851 | List | 0 | 0 | 8 | [Configuration] Free input to be customised on the BM50 |
| | | | | | BM50.2 | 3852 | List | 0 | 0 | 8 | [Configuration] Free input to be customised on the BM50 |
| | | | | | BE50.1 | 3853 | List | 0 | 0 | 8 | [Configuration] Free input to be customised (input on the extension board BE50) |
| | | | | | BE50.2 | 3854 | List | 0 | 0 | 8 | [Configuration] Free input to be customised (input on the extension board BE50) |
| | | | | | BE50.3 | 3855 | List | 0 | 0 | 8 | [Configuration] Free input to be customised (input on the extension board BE50) |
| | | | | | BE50.4 | 3856 | List | 0 | 0 | 8 | [Configuration] Free input to be customised (input on the extension board BE50) |
| | | | 6-In.% Custom. | 3860 | BE50.1 | 3861 | List | 0 | 0 | 4 | [Configuration] Free input to be customised on the BM50 |
| | | | | | BE50.2 | 3862 | List | 0 | 0 | 4 | [Configuration] Free input to be customised on the BM50 |
| | | | | | BE50.3 | 3863 | List | 0 | 0 | 4 | [Configuration] Free input to be customised (input on the extension board BE50) |
| | | | | | BE50.4 | 3864 | List | 0 | 0 | 4 | [Configuration] Free input to be customised (input on the extension board BE50) |

| Main Screen Code | Description | Code | Description | Code | Description | Code | UNIT | Min | Factory | Max | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9-Com. | 3900 | 1-Display | 3910 | Sp Mini. | 3911 | °c | 8 | 17 | 21 | [ Mode] Minimum temperature for the required room temperature set point at the middle of the dead zone. |
| | | | | | Sp Maxi. | 3912 | °c | 21 | 27 | 35 | [ Mode] Maximum temperature for the required room temperature set point at the middle of the dead zone. |
| | | | | | Offset | 3913 | °c | -5 | 0 | 5 | Offset of the value measured by the ambient temperature sensor |
| | | | | | Standard Sp | 3914 | Yes/No | ~ | No | ~ | Allows a reset of ALL set point to standard factory settings (when available).No possible for configurations. And clock as there is no factor settings for these. |
| | | | 2-Link | 3920 | ID | 3921 | ~ | 1 | 1 | 12 | [ Configuration ] Identification address for the unit from 1 to 12. |
| | | | | | Number | 3922 | ~ | 1 | 1 | 12 | [ Configuration ] Number of units on the BUS. Unit with address N°1 is always the master. |
| | | | | | Type. | 3923 | List | 0 | 0 | 6 | Master / Slave relationship: refer to "Control Communication Links" p 63 |
| | | | | | Type | 3924 | List | 0 | 0 | 2 | Configuration of the sharing of the Outdoor humidity and temperature. |
| | | | 3-BMS | 3930 | ID | 3931 | ~ | 1 | 1 | 200 | [ Configuration ] Identification number on the 485 Bus |
| | | | | | Type | 3932 | List | 0 | 2 | | Climatic, ModBus or LonWorks |
| | | | | | Baud | 3933 | List | 3 | 4 | | 1200, 2400, 4800, 9600 or 19200 |
| | | | | | Watchdog | 3934 | ~ | 0 | 0 | 1000 | [ BMS ] Activation of the control by a computer or an automat - mode BMS is activated if this value is different from zero, This value is decreased every second |
| | | | | | BMS Unoc. | 3935 | On/Off | ~ | Off | ~ | [BMS] Cancel the override unoccupied mode |
| | | | | | Speed | 3936 | On/Off | ~ | Off | ~ | Blower Speed Control in the dead zone: [ON] the unit runs in Low Speed mode [OFF] the unit runs in High Speed mode |

| BALTIC | | | | | FLEXY | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BCK | BHK | BGK | BDK | BGN | FCK | FHK | FGK | FDK | FXK | FGN | FWN |
| BCK020NS | BHK020NS | BGK020SS | BDK020SS | BGN001S | FCK085 | FHK085 | FGK085S | FDK085S | FXK025 | FGN002S | FWN002S |
| BCK025NS | BHK025NS | BGK025SS | BDK025SS | BGN001H | FCK100 | FHK100 | FGK100S | FDK100S | FXK030 | FGN003S | FWN003S |
| BCK030NS | BHK030NS | BGK030SS | BDK030SS | | FCK120 | FHK120 | FGK120S | FDK120S | FXK035 | FGN004S | FWN004S |
| BCK035NS | BHK035NS | BGK035SS | BDK035SS | | FCK140 | FHK140 | FGK140S | FDK140S | FXK040 | FGN005S | FXN005S |
| BCK040NS | BHK040NS | BGK040SS | BDK040SS | | FCK160 | FHK160 | FGK160S | FDK160S | FXK055 | FGN002H | FWN002H |
| BCK045NS | BHK045NS | BGK045SS | BDK045SS | | FCK190 | FHK190 | FGK190S | FDK190S | FXK070 | FGN003H | FWN003H |
| BCK030ND | BHK030ND | BGK030SD | BDK030SD | | | | FGK085H | FDK085H | FXK085 | FGN004H | FWN004H |
| BCK035ND | BHK035ND | BGK035SD | BDK035SD | | | | FGK100H | FDK100H | FXK100 | FGN005H | FWN005H |
| BCK040ND | BHK040ND | BGK040SD | BDK040SD | | | | FGK120H | FDK120H | FXK110 | | |
| BCK045ND | BHK045ND | BGK045SD | BDK045SD | | | | FGK140H | FDK140H | FXK140 | | |
| BCK050ND | BHK050ND | BGK050SD | BDK050SD | | | | FGK160H | FDK160H | FXK170 | | |
| BCK060ND | BHK060ND | BGK060SD | BDK060SD | | | | FGK190H | FDK190H | | | |
| BCK070ND | BHK070ND | BGK070SD | BDK070SD | | | | | | | | |
| | | BGK020HS | BDK020HS | | | | | | | | |
| | | BGK025HS | BDK025HS | | | | | | | | |
| | | BGK030HS | BDK030HS | | | | | | | | |
| | | BGK035HS | BDK035HS | | | | | | | | |
| | | BGK040HS | BDK040HS | | | | | | | | |
| | | BGK045HS | BDK045HS | | | | | | | | |
| | | BGK030HD | BDK030HD | | | | | | | | |
| | | BGK035HD | BDK035HD | | | | | | | | |
| | | BGK040HD | BDK040HD | | | | | | | | |
| | | BGK045HD | BDK045HD | | | | | | | | |
| | | BGK050HD | BDK050HD | | | | | | | | |
| | | BGK060HD | BDK060HD | | | | | | | | |
| | | BGK070HD | BDK070HD | | | | | | | | |

# MODBUS
## Settings and Readings

| @ (hexa) | @ (deci) | | | | DS50 |
|---|---|---|---|---|---|
| 01H | 1 | R/W | L | [On / Off] Unit | 3111 |
| 02H | 2 | R/W | L | [Reset] Discharges the safety measures of the unit | 3112 |
| 03H | 3 | R/W | L | [Enable] Stopping and running of the Fan Blower.[Off] the blower is stopped, | 3351 |
| | | | | [On] the blower is running. | (BMS) |
| 04H | 4 | R/W | L | [Enable] Stopping and running of the fan in the "Control Dead Zone". | 3352 |
| | | | | [Off] the blower is stopped, [On] the blower is running. | (BMS) |
| 05H | 5 | R/W | L | [BMS] Activation of the Inoccupation mode [Off] occupation mode - | 3933 |
| | | | | [On] inoccupation mode | |
| 06H | 6 | R/W | L | [Room regulation] Choices of the priority of regulation in Heating - | |
| | | | | [Off] Heat Pump then Hot water coil or Electric or Gas | 3324 |
| | | | | [On] Hot water coil or Electric or Gas then Heat Pump | (BMS) |
| 07H | 7 | R/W | L | [F-Air Reheat] Activate reheating of the fresh air in the dead zone | 3331 |
| | | | | to maintain supply temperature. | (BMS) |
| 08H | 8 | R/W | L | [F-Air Reheat] Choices of the priority of regulation in Heating - | |
| | | | | [Off] Heat Pump then Hot water coil or Electric or Gas | 3332 |
| | | | | [On] Hot water coil or Electric or Gas then Heat Pump | (BMS) |
| 09H | 9 | R/W | L | [Enable] Run eco: [On] the Economiser is running, [Off] the Economiser if stopped. | 3353 |
| | | | | | (BMS) |
| 0AH | 10 | R/W | L | [Enable] Run CO2 Sensor: [On] Switch-on the CO2 control on a Zone, | 3354 |
| | | | | [Off] Stop the CO2 control on a zone. | (BMS) |
| 0BH | 11 | R/W | L | [Enable] [OFF] Force the unloading of compressors in cooling mode. | 3355 |
| | | | | | (BMS) |
| 0CH | 12 | R/W | L | [Enable] [OFF] Force the unloading of compressors in heating mode. | 3356 |
| | | | | | (BMS) |
| 0DH | 13 | R/W | L | [Enable] [OFF] Force the unloading of heating module (electric, gas or heat water coil) | 3357 |
| | | | | | (BMS) |
| 0EH | 14 | R/W | L | [Enable] [OFF] Force the unloading of humidity control. | 3358 |
| | | | | | (BMS) |
| 0FH | 15 | R/W | L | not used | |
| 10H | 16 | R/W | L | [Clock] [OFF] read hour & minute [ON] write hour & minute | ... |

**R = Read**
**W = Write**
**L = Logical**

## MODBUS
## Settings and Readings

| @ (hexa) | @ (deci) | | | | DC50 |
|---|---|---|---|---|---|
| 11H | 17 | R/W | L | [Dry contact] Digital Output, Free 1, BM50-J17-NO12 | 2141 |
| 12H | 18 | R/W | L | [Dry contact] Digital Output, Free 2, BE50-J5-NO1 | 2142 |
| 13H | 19 | R/W | L | [Dry contact] Digital Output, Free 3, BE50-J6-NO2 | 2143 |
| 14H | 20 | R/W | L | [Dry contact] Digital Output, Free 4, BE50-J7-NO3 | 2144 |
| 15H | 21 | R/W | L | [Dry contact] Digital Output, Free 5, BE50-J8-NO4 | 2145 |
| 16H | 22 | R/W | L | not used | |
| 17H | 23 | R/W | L | not used | |
| 18H | 24 | R/W | L | not used | |
| 19H | 25 | R/W | L | not used | |
| 1AH | 26 | R/W | L | not used | |
| 1BH | 27 | R/W | L | not used | |
| 1CH | 28 | R/W | L | not used | |
| 1DH | 29 | R/W | L | not used | |
| 1EH | 30 | R/W | L | not used | |
| 1FH | 31 | R/W | L | not used | |
| 20H | 32 | R/W | L | not used | |
| 21H | 33 | R | L | [Alarm] General | 1000 |
| 22H | 34 | R | L | [On/Off] Fan, Blower | 2315 |
| 23H | 35 | R | L | [On/Off] Fan, Extraction | 2321 |
| 24H | 36 | R | L | [On/Off] Compressor, 1 | 2516 |
| 25H | 37 | R | L | [On/Off] Compressor, Heat pump, 1 | 2517 |
| 26H | 38 | R | L | [On/Off] Compressor, 2 | 2526 |
| 27H | 39 | R | L | [On/Off] Compressor, Heat pump, 2 | 2527 |
| 28H | 40 | R | L | [On/Off] Compressor, 3 | 2536 |
| 29H | 41 | R | L | [On/Off] Compressor, Heat pump, 3 | 2537 |
| 2AH | 42 | R | L | [On/Off] Compressor, 4 | 2546 |
| 2BH | 43 | R | L | [On/Off] Compressor, Heat pump, 4 | 2547 |
| 2CH | 44 | R | L | [On/Off] Gas, Burner, 1 | 2615 |
| 2DH | 45 | R | L | [On/Off] Gas, Burner, 2 | 2616 |
| 2EH | 46 | R | L | [On/Off] Gas, Burner, High power, 1 | 2617 |
| 2FH | 47 | R | L | [On/Off] Electrical heaters, 1 | 2625 |
| 30H | 48 | R | L | [On/Off] Electrical heaters, 2 | 2626 |
| 31H | 49 | R | L | [Dry contact] Digital Input, Free 1, BM50-J8-ID13 | 2151 |
| 32H | 50 | R | L | [Dry contact] Digital Input, Free 2, BM50-J8-ID14 | 2152 |
| 33H | 51 | R | L | [Dry contact] Digital Input, Free 3, BE50-J4-ID1 | 2153 |
| 34H | 52 | R | L | [Dry contact] Digital Input, Free 4, BE50-J4-ID2 | 2154 |
| 35H | 53 | R | L | [Dry contact] Digital Input, Free 5, BE50-J4-ID3 | 2155 |
| 36H | 54 | R | L | [Dry contact] Digital Input, Free 6, BE50-J4-ID4 | 2156 |
| 37H | 55 | R | L | not used | |
| 38H | 56 | R | L | not used | |
| 39H | 57 | R | L | not used | |
| 3AH | 58 | R | L | not used | |
| 3BH | 59 | R | L | not used | |
| 3CH | 60 | R | L | not used | |
| 3DH | 61 | R | L | not used | |
| 3EH | 62 | R | L | not used | |
| 3FH | 63 | R | L | not used | |
| 40H | 64 | R | L | not used | |

## MODBUS
## Settings and Readings

| @ (hexa) | @ (deci) | | | | DS50 |
|---|---|---|---|---|---|
| 01H | 1 | R/W | 1 = 1 s | [ BMS ] Activation of the control by a computer or an automat - mode BMS is activated if this value is different from zero, This value is decreased every second | 3932 |
| 02H | 2 | R/W | 10 = 1.0°c | [Occupation][Room SP] Required maximum room temperature in °C. Cooling set point | 3322 (BMS) |
| 03H | 3 | R/W | 10 = 1.0°c | [Occupation][Room SP] Required minimum room temperature in °C. Heating set point | 3323 (BMS) |
| 04H | 4 | R/W | 1 = 1% | [Room SP] Required room minimum fresh air rate in % Middle of the dead zone. | 3312 (BMS) |
| 05H | 5 | R/W | 10 = 1.0°c | [Inoccupation][Room SP] Required maximum room temperature in °C. Cooling set point | 3322 (Uno) |
| 06H | 6 | R/W | 10 = 1.0°c | [Inoccupation][Room SP] Required minimum room temperature in °C. Heating set point | 3323 (Uno) |
| 07H | 7 | R/W | 1 = 1% | [Humidity] Desired Maximum relative humidity in Room (in %). – Dehumidification set point. | 3341 (BMS) |
| 08H | 8 | R/W | 1 = 1% | [Humidity] Desired Minimum relative humidity in Room (in %). – Humidification set point. | 3342 (BMS) |
| 09H | 9 | R/W | | not used | |
| 0AH | 10 | R/W | | not used | |
| 0BH | 11 | R/W | | not used | |
| 0CH | 12 | R/W | 1 = 1h | [Clock] Hour | 3121 |
| 0DH | 13 | R/W | 1 = 1m | [Clock] Minute | 3122 |
| 0EH | 14 | R/W | 1 = 1 | [Clock] Day of the month | 3123 |
| 0FH | 15 | R/W | 1 = 1 | [Clock] Month | 3124 |
| 10H | 16 | R/W | 1 = 2001 | [Clock] Year | 3125 |
| 11H | 17 | R/W | 10 = 1.0°c | [BMS] Room temperature coming from the BMS | 2824 |
| 12H | 18 | R/W | 10 = 1.0% | [BMS] Room humidity coming from the BMS | 2828 |
| 13H | 19 | R/W | 10 = 1.0°c | [BMS] Outdoor temperature coming from the BMS | 2814 |
| 14H | 20 | R/W | 10 = 1.0% | [BMS] Outdoor humidity coming from the BMS | 2818 |
| 15H | 21 | R/W | | not used | |
| 16H | 22 | R/W | | not used | |
| 17H | 23 | R/W | | not used | |
| 18H | 24 | R/W | | not used | |
| 19H | 25 | R/W | | not used | |
| 1AH | 26 | R/W | | not used | |
| 1BH | 27 | R/W | | not used | |
| 1CH | 28 | R/W | | not used | |
| 1DH | 29 | R/W | | not used | |
| 1EH | 30 | R/W | | not used | |
| 1FH | 31 | R/W | | not used | |

## MODBUS
## Settings and Readings

| @ (hexa) | @ (deci) | | | | DS50 |
|---|---|---|---|---|---|
| 20H | 32 | R/W | | not used | |
| 21H | 33 | R | 1 = 1 | [Alarm] Code Error | 1000 |
| 22H | 34 | R | 10 = 1.0°c | [Temperature] Room | 2112 |
| 23H | 35 | R | 10 = 1.0°c | [Temperature] Outdoor | 2111 |
| 24H | 36 | R | 10 = 1.0°c | [Temperature] Supply | 2113 |
| 25H | 37 | R | 10 = 1.0°c | [Temperature] Return | 2114 |
| 26H | 38 | R | 10 = 1.0% | [Relative Humidity] Room | 2122 |
| 27H | 39 | R | 10 = 1.0 g/Kg | [Absolute Humidity] Room | 2124 |
| 28H | 40 | R | 10 = 1.0% | [Relative Humidity] Outdoor | 2121 |
| 29H | 41 | R | 10 = 1.0 g/Kg | [Absolute Humidity] Outdoor | 2123 |
| 2AH | 42 | R | 1 = 1 pa | [Flow] Differential pressure on the air, in pascal | 2131 |
| 2BH | 43 | R | 1 = 1 ppm | [$CO^2$] Level in ppm | 2132 |
| 2CH | 44 | R | 1 = 1% | [% of opening] Register of fresh air | 2413 |
| 2DH | 45 | R | 1 = 1% | [% of opening] Valve gas | 2618 |
| 2EH | 46 | R | 1 = 1% | [% of opening] Electrical heaters (Triac) | 2627 |
| 2FH | 47 | R | 1 = 1% | [% of opening] Hot water coil | 2633 |
| 30H | 48 | R | 1 = 1% | [% of opening] Humidifier | 2714 |
| 31H | 49 | R | 10 = 1.0°c | [Dry contact] Temperature, Free 1, BE50-J9-B1 | 2161 |
| 32H | 50 | R | 10 = 1.0°c | [Dry contact] Temperature, Free 2, BE50-J9-B2 | 2162 |
| 33H | 51 | R | 10 = 1.0°c | [Dry contact] Temperature, Free 3, BE50-J10-B3 | 2163 |
| 34H | 52 | R | 10 = 1.0°c | [Dry contact] Temperature, Free 4, BE50-J10-B4 | 2164 |
| 35H | 53 | R | 10 = 1.0% | [Dry contact] Humidity, Free 1, BE50-J9-B1 | 2165 |
| 36H | 54 | R | 10 = 1.0% | [Dry contact] Humidity, Free 2, BE50-J9-B2 | 2166 |
| 37H | 55 | R | 10 = 1.0% | [Dry contact] Humidity, Free 3, BE50-J10-B3 | 2167 |
| 38H | 56 | R | 10 = 1.0% | [Dry contact] Humidity, Free 4, BE50-J10-B4 | 2168 |
| 39H | 57 | R | | not used | |
| 3AH | 58 | R | | not used | |
| 3BH | 59 | R | | not used | |
| 3CH | 60 | R | | not used | |
| 3DH | 61 | R | | not used | |
| 3EH | 62 | R | | not used | |
| 3FH | 63 | R | | not used | |
| 40H | 64 | R | | not used | |

## LONWORKS
## Settings and Readings

| | | | DS50 |
|---|---|---|---|
| R/W | L | [On / Off] Unit | 3111 |
| R/W | L | [Reset] Discharges the safety measures of the unit | 3112 |
| R/W | L | [BMS] Activation of the Inoccupation mode [Off] occupation mode - [On] inoccupation mode | 3933 |
| R/W | L | [Clock] [OFF] read hour & minute [ON] write hour & minute | … |
| R | L | [Alarm] General | 1000 |
| R | L | [On/Off] Fan, Blower | 2315 |
| R | L | [On/Off] Compressor, 1 | 2516 |
| R | L | [On/Off] Compressor, Heat pump, 1 | 2517 |
| R | L | [On/Off] Compressor, 2 | 2526 |
| R | L | [On/Off] Compressor, Heat pump, 2 | 2527 |
| R | L | [On/Off] Compressor, 3 | 2536 |
| R | L | [On/Off] Compressor, Heat pump, 3 | 2537 |
| R | L | [On/Off] Compressor, 4 | 2546 |
| R | L | [On/Off] Compressor, Heat pump, 4 | 2547 |
| R | L | [On/Off] Gas, Burner, 1 | 2615 |
| R | L | [On/Off] Gas, Burner, 2 | 2616 |
| R | L | [On/Off] Gas, Burner, High power, 1 | 2617 |
| R | L | [On/Off] Electrical heaters, 1 | 2625 |
| R | L | [On/Off] Electrical heaters, 2 | 2626 |

| | | | DS50 |
|---|---|---|---|
| R/W | 1 = 1 s | [ BMS ] Activation of the control by a computer or an automat - mode BMS is activated if this value is different from zero, This value is decreased every second | 3932 |
| R/W | 10 = 1.0°c | [Occupation][Room SP] Required maximum room temperature in °C. Cooling set point | 3322 (BMS) |
| R/W | 10 = 1.0°c | [Occupation][Room SP] Required minimum room temperature in °C. Heating set point | 3323 (BMS) |
| R/W | 1 = 1% | [Room SP] Required room minimum fresh air rate in %. Middle of the dead zone | 3312 (BMS) |
| R/W | 10 = 1.0°c | [Inoccupation][Room SP] Required maximum room temperature in °C. Cooling set point | 3322 (Uno) |
| R/W | 10 = 1.0°c | [Inoccupation][Room SP] Required minimum room temperature in °C. Heating set point | 3323 (Uno) |
| R/W | 1 = 1% | [Humidity] Desired Maximum relative humidity in Room (in %). – Dehumidification set point. | 3341 (BMS) |
| R/W | 1 = 1% | [Humidity] Desired Minimum relative humidity in Room (in %). – Humidification set point. | 3342 (BMS) |
| R/W | 1 = 1h | [Clock] Hour | 3121 |
| R/W | 1 = 1m | [Clock] Minute | 3122 |
| R/W | 1 = 1 | [Clock] Day of the month | 3123 |
| R/W | 1 = 1 | [Clock] Month | 3124 |
| R | 1 = 1 | [Alarm] Code Error | 1000 |
| R | 10 = 1.0°c | [Temperature] Room | 2112 |
| R | 10 = 1.0°c | [Temperature] Outdoor | 2111 |
| R | 10 = 1.0°c | [Temperature] Supply | 2113 |
| R | 10 = 1.0% | [Relative Humidity] Outdoor | 2121 |
| R | 10 = 1.0 g/Kg | [Absolute Humidity] Outdoor | 2123 |
| R | 10 = 1.0% | [Relative Humidity] Room | 2122 |
| R | 10 = 1.0 g/Kg | [Absolute Humidity] Room | 2124 |
| R | 1 = 1% | [% of opening] Register of fresh air | 2413 |
| R | 1 = 1% | [% of opening] Valve gas | 2618 |
| R | 1 = 1% | [% of opening] Electrical heaters (Triac) | 2627 |
| R | 1 = 1% | [% of opening] Hot water coil | 2633 |

| CODE | DESCRIPTION LIGNE1 | DESCRIPTION LIGNE2 |
|---|---|---|
| 1 | Flow | Failure |
| 4 | Filters | Dirty |
| 5 | Filters | Missing |
| 11 | Electrical Heater | Faulty |
| 12 | Outlet or Supply T. | Over Temp. |
| 13 | Inlet or Room T. | Temp. Too Low |
| 14 | Gas Burner, 1 | Faulty |
| 15 | Gas Burner, 2 | Faulty |
| 22 | Outlet or Supply T. | Temp. To Below |
| 23 | Inlet or Room T. | Temp. Too High |
| 31 | Humidifier | Faulty |
| 32 | Room Humidity | Humidity Too Low |
| 33 | Room Humidity | Humidity Too High |
| 40 | Flow, Pump | Failure |
| 41 | Pump, 1 | Faulty |
| 42 | Pump, 2 | Faulty |
| 70 | Real Time Clock | Faulty |
| 71 | BE50, 1 | Faulty |
| 72 | BE50, 2 | Faulty |
| 73 | BE50, 3 | Faulty |
| 74 | BE50, 4 | Faulty |
| 75 | BE50, 5 | Faulty |
| 80 | Remote S.Point | Faulty |
| 81 | Inlet or Room T. | Faulty Sensor |
| 82 | Room Humidity | Faulty Sensor |
| 83 | Outside Temperature | Faulty Sensor |
| 84 | Outside Humidity | Faulty Sensor |
| 85 | Outlet or Supply T. | Faulty Sensor |
| 86 | Inlet, Recovery | Faulty Sensor |
| 87 | Outlet, Recovery | Faulty Sensor |
| 88 | Return or Mixing T. | Faulty Sensor |
| 90 | Air, Condenser | Faulty |
| 91 | Blower, Fan | Faulty |
| 92 | Air, Condenser | Faulty, System 1 |
| 93 | Air, Condenser | Faulty, System 2 |
| 94 | Air, Condenser | Faulty, System 3 |
| 95 | Air, Condenser | Faulty, System 4 |
| 96 | Water, Condenser | Temp. To Below |
| 97 | Water, Condenser | Temp. Too High |
| 98 | Water, Condenser | Faulty, Flow |
| 99 | Fire / Smoke | Faulty |
| 111 | Condenser | Faulty Sensor, 1 |
| 112 | Suction | Faulty Sensor, 1 |
| 114 | Circuit 1 | Elec. power |
| 115 | Circuit 1 | Cut High Pressure |
| 117 | Circuit 1 | Cut Low Pressure |

| CODE | DESCRIPTION LIGNE1 | DESCRIPTION LIGNE2 |
|---|---|---|
| 118 | Circuit 1 | Risk of Frosting |
| 121 | Condenser | Faulty Sensor, 2 |
| 122 | Suction | Faulty Sensor, 2 |
| 124 | Circuit 2 | Elec. power |
| 125 | Circuit 2 | Cut High Pressure |
| 127 | Circuit 2 | Cut Low Pressure |
| 128 | Circuit 2 | Risk of Frosting |
| 131 | Condenser | Faulty Sensor, 3 |
| 134 | Circuit 3 | Elec. power |
| 135 | Circuit 3 | Cut High Pressure |
| 137 | Circuit 3 | Cut Low Pressure |
| 141 | Condenser | Faulty Sensor, 4 |
| 144 | Circuit 4 | Elec. power |
| 145 | Circuit 4 | Cut High Pressure |
| 147 | Circuit 4 | Cut Low Pressure |
| 210 | P.Lan | EEV 1, Error |
| 211 | Low Superheat | EEV 1, Error |
| 212 | High Suction T. | EEV 1, Error |
| 213 | MOP | EEV 1, Error |
| 214 | LOP | EEV 1, Error |
| 215 | Valve Not Closed | EEV 1, Error |
| 216 | Probe | EEV 1, Error |
| 217 | Motor | EEV 1, Error |
| 218 | EEPROM | EEV 1, Error |
| 219 | Battery | EEV 1, Error |
| 220 | P.Lan | EEV 2, Error |
| 221 | Low Superheat | EEV 2, Error |
| 222 | High Suction T. | EEV 2, Error |
| 223 | MOP | EEV 2, Error |
| 224 | LOP | EEV 2, Error |
| 225 | Valve Not Closed | EEV 2, Error |
| 226 | Probe | EEV 2, Error |
| 227 | Motor | EEV 2, Error |
| 228 | EEPROM | EEV 2, Error |
| 229 | Battery | EEV 2, Error |

It is possible to connect up to 12 CLIMATIC50 with Climalook2 or 8 rooftops equipped with CLIMATIC2 and 12 with CLIMATIC 50 when Climalook 3 or Climalink is installed.

## CLIMALINK 2

This product consist in a central unit and a communication interface.
This unit is designed to be connected to a maximum of 12 rooftops fitted with CLIMATIC 50 controllers via a RS485 interface. A connection diagram is provided in the box.
The central unit must be installed in a dry, secured location. Once the unit is connected and powered up, it is entirely automatic and does not require a screen a
keyboard or a mouse. After a power failure, the central unit must be restarted using the ON/OFF button.
To avoid this Lennox recommend to connect the central unit to a pulsating current power outlet or "UPS". Lennox cannot be held responsible in the event this recommendation is not acted upon.

## CLIMALOOK 2

This product is identical to the CLIMALINK 2 but it is equipped with a 15inch TFT flat screen, a mouse and a numeric keypad to have a local display of the installation. It can be connected to up to 12 CL50 controller via a RS485 interface.

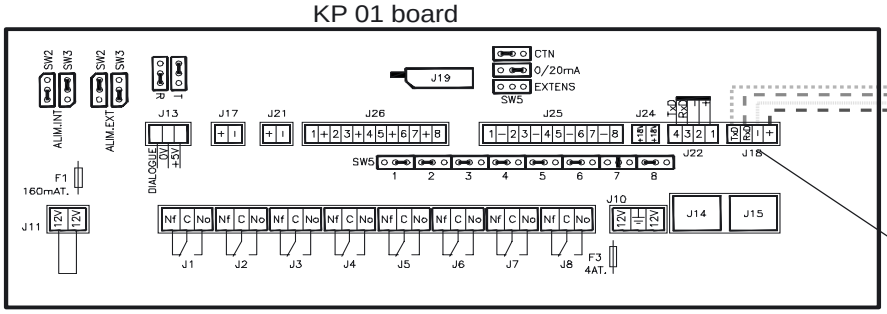
## CLIMALOOK 3

Climalook 3 provides the same features as Climalook 2 as it can be connected to 12 rooftops equipped with CLIMATIC 50 controller but it can also be connected to 8 rooftops fitted with CLIMATIC2 controller and KP01 board (Flexy and Linea already on site).

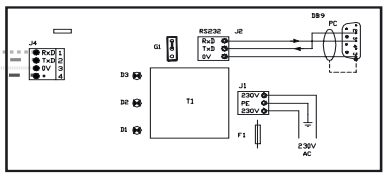
NOTE: In order to connect a unit fitted with CLIMATIC2 you must ensure that the program version is at least LF20. Otherwise it must be upgraded to LF20 before connection to Climalook 3

Climalook uses the internet explorer interface for local operation. The local operating mode is completely automatic and does not require any configuration. Like Climalink, Climalook can receive remote queries thanks to its internal modem and an analogue telephone line.
Climalook and Climalink do not work with ISDN telephone lines.

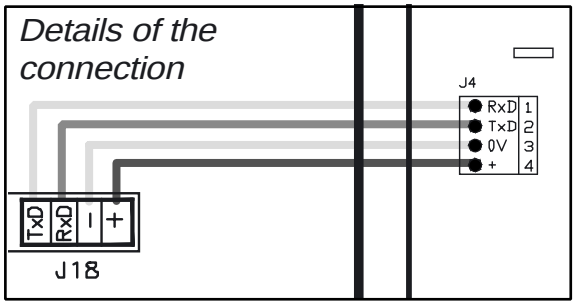
KP 01 board




KP 14 interface




Led flashing during dialogue with the PC



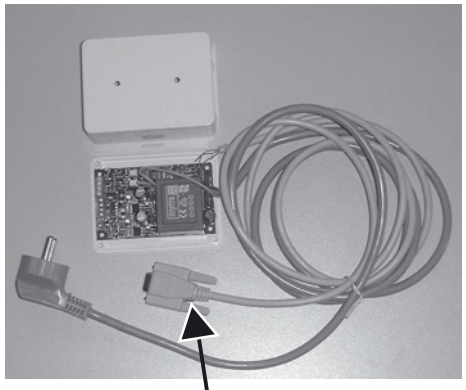

NOTE : To function correctly each RTU requires an address to be set using a KP02 (setpoint 91).
To register in the climatic the power to the climatic must be switched off twice after entering the value.

**Whenever the power is switched on it is necessary to wait 5 minutes after the welcome page is displayed to allow the software to fully update.**

## CONNECTION TO CLIMATIC2 AND KP01 BOARD

The connections between the units and the Climalink/ Climalook must be done using a double shielded pair of wire (not supplied by Lennox) This cable must have external metal braiding, and its cross-section must be at least 0.5mm2 with a maximum of 1mm2

Each cable will be connected to the COM B port on the KP01 Board, and particular attention must be taken to the order of connections. The cable coming out of the KP14 with a BD9 plug at the end will be connected to the SERIAL Port at the back of the central unit.



The cable coming out of the KP14 with a BD9 plug at the end will be connected to the SERIAL Port at the back of the central unit.

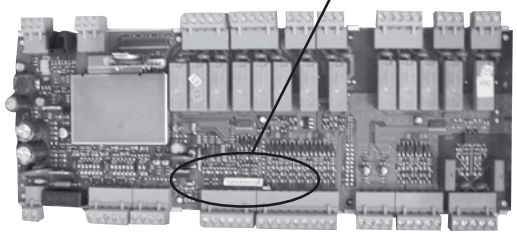
Plug for telephone link RJ11. Cable supplied with the unit.

After the starting procedure of the Climalook 3 central unit, the LED next to the B PORT on the CLIMATIC KP01 board will start to flash. The CPU connects to the boards one after the other , and so it is normal for the LED to stop flashing occasionally.

When all the connections are established, press the on/off button. The programs are launched automatically, and the LED located to the right of the Com B on the CLIMATIC KP01 board should flash.
Note the site telephone number in order to make the remote query.

## CONNECTION TO CLIMATICTM 50 USING INTERFACE 435/232

RS 485 daughter-board



It is possible to connect up to 12 rooftops fitted with CLIMATIC 50 when using a Climalook 3.
The connections between the units and the Climalink/ Climalook must be done using a double shielded pair of wire (not supplied by Lennox) This cable must have external metal braiding, and its cross-section must be at least 0.5mm2 with a maximum of 1mm2

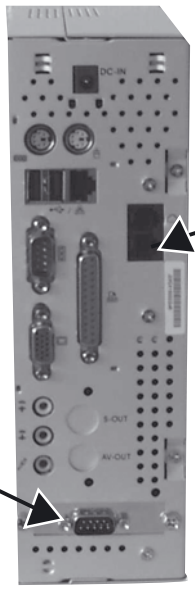
The wires will be connected to each CLIMATIC50 485 ports You must ensure the connection order is correct :

+ on +,

- on -

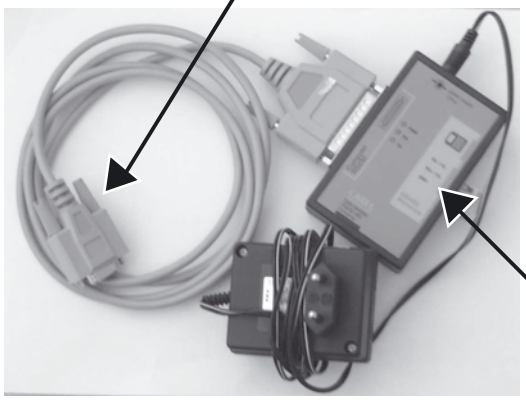
and gnd on gnd.

Note the site telephone number in order to make the remote query



Plug for telephone link RJ11. Cable supplied with the unit.

The cable terminated by a DB9 plug, coming out of the 485/232 interface will be connected to the SERIAL port on the Climalook central unit



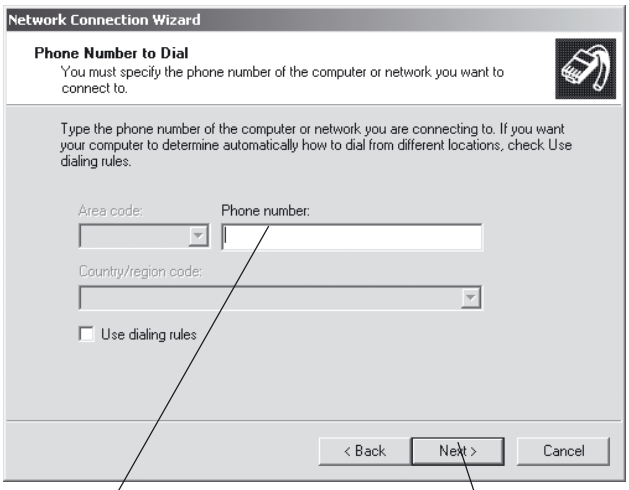
After the starting up procedure is completed the LED on the INTERFACE will start flashing.

## SETTINGS FOR THE CONNECTIONS

Depending on the version of Windows you are running, access the « Make new connection» function.

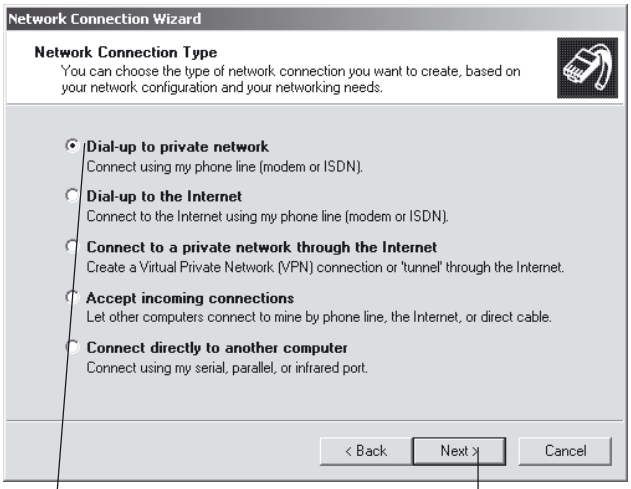


Click on next



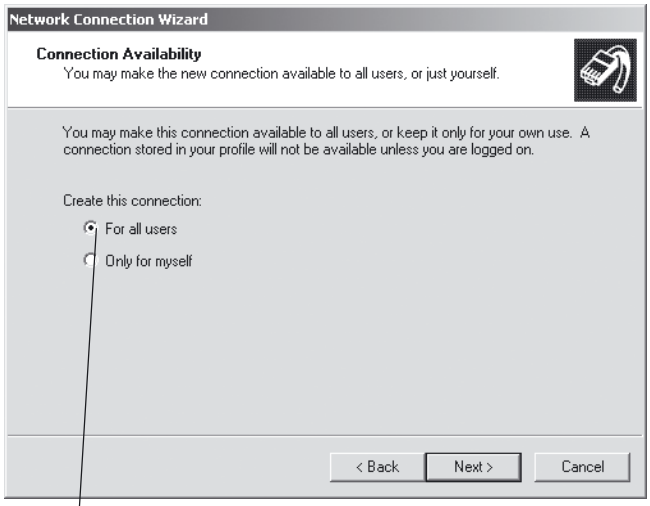

Enter the telephone number to which your ClimaLook's modem is connected.

Click

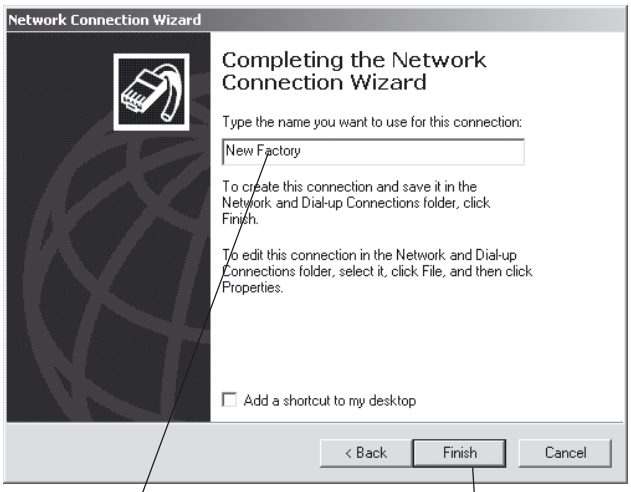



Click

Click on next



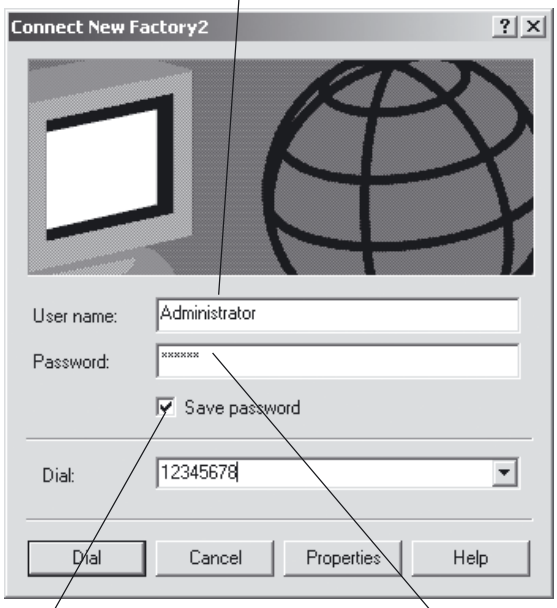

Click




Enter the site name

Click on Finish

Type “Administrateur”




Click

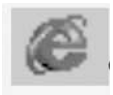
Type “VISION”

The modem dials the number, and then the two modems hook up.
In the task bar next to the time display you should see the symbol indicating connection with the remote computer.


On some versions of Windows, a dialogue box may ask you to enter the password again. In this case :

- for User enter Administrateur
- for password enter VISION
- leave the workgroup field empty.

You can now start Internet Explorer.




Type “http:// Lennox” in the Address field

The first time you log in, Windows asks you to confirm your login identifiers:

- for User enter
  **Administrateur**
- for password enter
  **VISION**
- leave the workgroup field empty.

After this formality, you gain access to:

## THE WELCOME PAGE

***First of all you must lower the virtual keyboard window, before choosing the language***.
NOTE : To operate the program it is necessary to minimise the virtual keyboard.
Then click on the flag corresponding to the language you want to use.

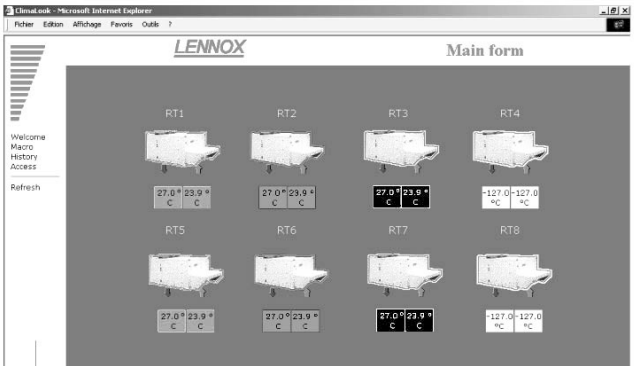

Enter your access code and confirm. The access code **999** serves as a temporary code until you have configured your own security code.
If your code is valid you will access the next menu. Otherwise you remain on the same page.

There are three access levels :

| | |
|---|---|
| 1st level : | use of the User, Schedule, Macro and History pages. |
| 2nd level : | ditto, plus the Service page. |
| 3rd level : | ditto, plus the Access page. |

If the local application is not functioning, it is possible you may remain on the same page, even if your access code is valid. In this case, it is necessary to first restart the local central unit before continuing.

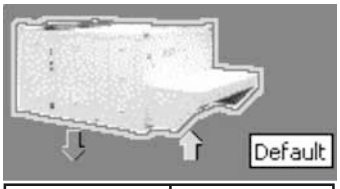
## THE MAIN PAGE




The colour outline around the roof-top unit and the operating temperatures indicate the unit's status:

| | |
|---|---|
| Green : | Operating mode, |
| White : | Stop mode, |
| Orange | Night mode, |
| Red: | Fault mode, |

This page gives you the basic information about how your installation functions. The roof-top unit's number corresponds to its EPROM number.




| Discharge temperature | Ambient temperature |
|---|---|

Position the mouse on one of the units to obtain information indicating this unit's status.
If the unit does not exist, is not powered up, or if communication with it is impossible, its icon disappears from the screen. The program attemps to communicate with absent units every ten minutes.
To access a unit's operating details, just click on it once.
20 seconds automatic refresh on this screen.

## THE USER PAGE

This is the page used most frequently. It enables you to display and modify a number of settings on your unit.

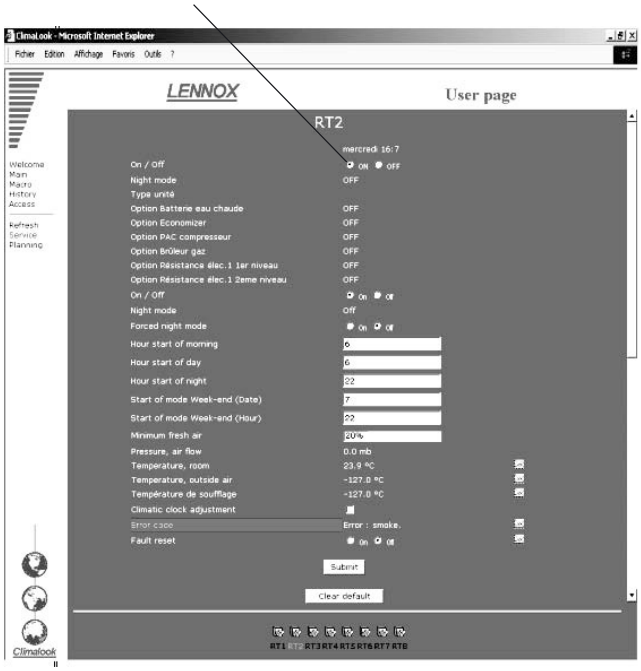
Use the refresh function to update the values read.

Some settings are read-only, others can be modified.

Read-only setting :


Modifiable setting :


Unit's day and time



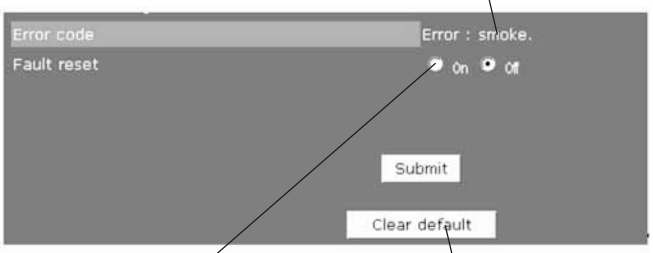


The bottom of the page displays the unit currently being queried, and can also be used to change the unit by clicking. This takes you to the user page for the new machine.
If the unit does not exist, is not powered up, or if communication with it is impossible, its icon disappears from the screen. The program attemps to communicate with absent units every ten minutes.

It is possible modify several settings at the same time.
The settings will only be modified if the «submit» function is confirmed.


If your unit has - or had - a fault, it is outlined in red on the main page. You can use the fault module to trouble-shoot:

If the fault is still present, it is displayed here :



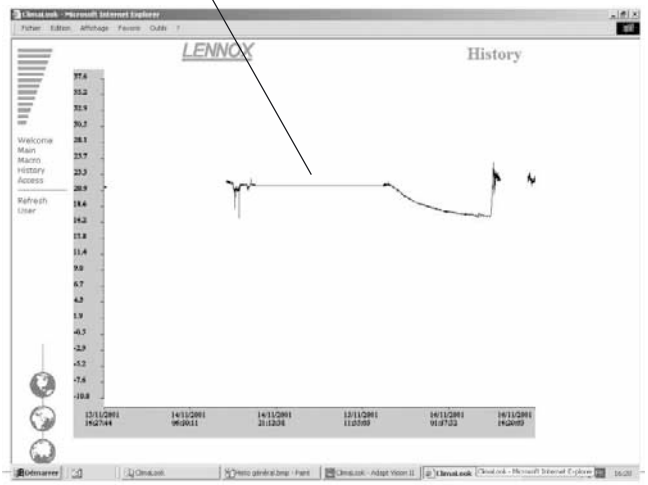

The fault reset function is used to clear the unit's errors if this is possible. If the error persists, the fault returns.

The clear default function is used to reset the software memory of defaults. It does not erase the unit's faults.

For some settings, a small icon is displayed at the end of the line

Click on it to get a history of this setting.

The empty fields correspond to occasions when the CLIMALOOK / CLIMALINK unit has stopped




+ Supply temperature / Room temperature / Outdoor air temperature + Faults (last 10 days)

The menus :

| | |
|---|---|
| Welcome | Welcome page |
| Main | Main page |
| Macro | Macro page |
| History | General History page |
| Access | Access codes page |
| Refresh | To refresh the values |
| Service | Service page or experienced user |
| Planning | Schedule page which shows all the set points for the different modes. |

## THE SERVICE PAGE

The Service page is for technical users who know exactly how to adjust air-conditioning units. It is protected by a second level password.

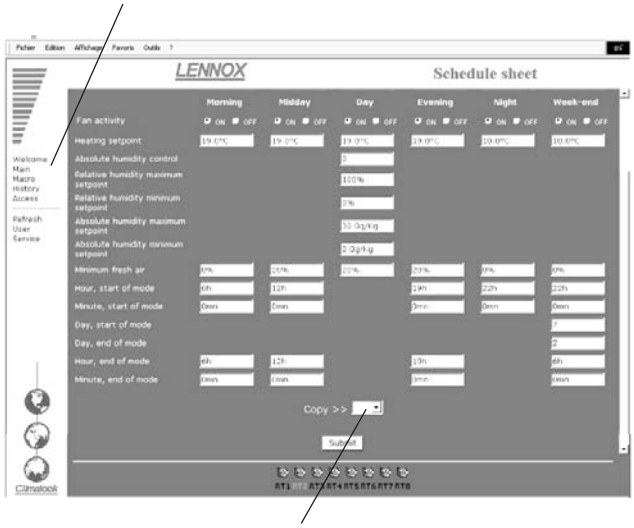
The units are presented in groups, and it is possible to display and modify several settings, as in the User page.
The settings will only be modified if the «submit» function is confirmed.

Use the refresh function to update the values read


- To access the Service page for another unit, simply click on this unit.
- To return to the User page, click on the User menu.
- To access the Schedule page, click on the Schedule menu.

## THE SCHEDULE PAGE

This page is used to display and modify all the configuration settings for each zone of a unit's operating schedule.
Use the refresh function to update the values read.

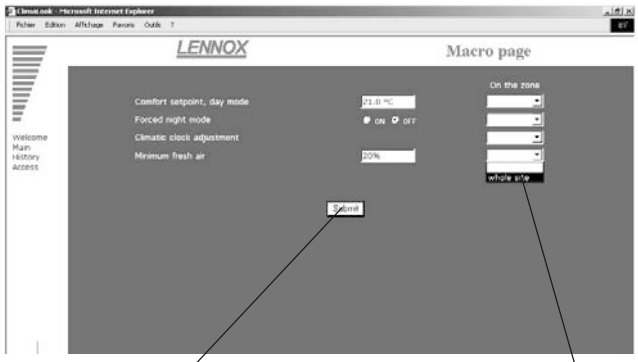



In addition it is possible to copy all the displayed settings and then paste them in another unit you have chosen.

The settings will only be modified if the «submit» function is confirmed.

## THE MACRO PAGE

This page enables you to modify all the units on your site in one action.
You can choose to perform one or more actions.
Modify the value or values you want to submit.




Click on “Submit”

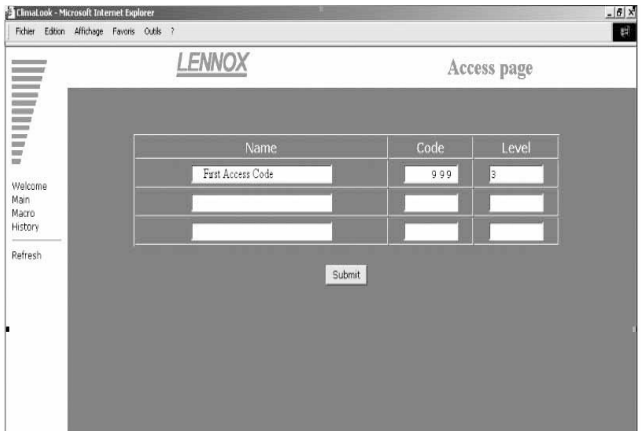
Select “Entire site”

The standard Macros are :

- Adjust the Comfort thermostat
- Set to Night mode
- Set fresh air to the minimum
- Set the time on the Climatic boards.

## THE ACCESS PAGE

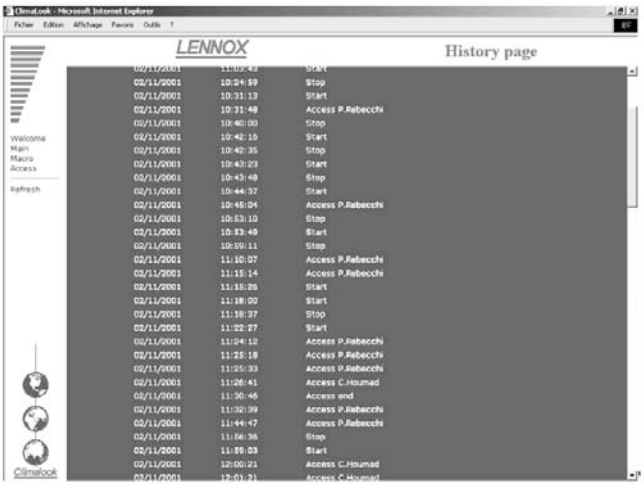
This page enables users who have a third level access code to attribute access codes to other users.
The acccess code 999 is your first access code. Remember to delete it once you have created your own access codes.




To create a new user : Click on name

## THE HISTORY PAGE

This page is provided in addition to the individual history you’ve already seen in the User page. It tells you when local communication starts and stops, and gives you the users’ access codes.




This is a read-only page. The history is automatically cleared to ensure refreshment doesn’t take too long.
This page will also show units faults.


Use the virtual keyboard on the task bar

Use the keyboard to enter the name, password (maximum of 4 digits) and the access level.

1 = use of the User, Schedule, Macro and History pages.
2 = same level, plus the Service page.
3 = same level, plus the Access page.

Reposition the keyboard in the task bar by clicking on the minus sign in the top right-hand part of the keyboard.


Confirm by clicking on «Submit»

## PROBLEM SOLVING

### Impossible to enter your access code, you remain on the welcome page.

Local communication has been interrupted. You must restart the local unit.
After restarting, you must wait for 5 to 10 minutes until the unit is ready to be queried once more.

### The values read do not seem to move.

The values are not in fact refreshed automatically, and for all the pages you must use the Refresh function to be sure you are reading the latest values.

The keyboard has disappeared from the task bar.
Click on Start / Programs / StartUp


The local unit is not answering the phone.
The local unit is - or was - powered down, and you must press the On/off button.
See recommendations at the beginning of the document.
The unit is not connected to a direct analogue phone line.

How to check the ClimaLink is functioning correctly after installation :
Connect up the unit and the KP14
Connect the cables to the J18 inputs on the Climatic boards.
After a few minutes, the central unit should start its dialogue.
The LED on the Climatic board to the right of the J18 input should flash.

If this does not happen, check the wiring.
The only way to examine the problem in more detail is to obtain a monitor and a mouse and contact the Lennox services.

After installing a ClimaLook or ClimaLink central unit, it is vital to perform the telephone communication tests.

Take a test telephone set and make sure you have a connection.
Note the telephone number to which the central unit is connected.

Connect the central unit and ask a person on the remote site to test communication.

Obviously the central unit must be the only device installed on the phone line. It cannot share the line with a fax or another modem.

The power cable should be connected to the main isolating switch and is fed from the underside of the unit into the electrical panel.
Refer to the general arrangement drawings in the documentation to locate the exact entry position.

The power cable sizes must be calculated with reference to the electrical characteristics of your machine.
We are unable to state the cross sectional area of the cable as it is directly related to the type of cable you are using, the distance separating the equipment from the source but also various factors relating to the cable fitting.

In the following pages you will find references to electrical diagrams which will allow you to select the wiring for your equipment.
As the diagrams are valid for the entire range, they will refer to items not included in your scope of supply.

| | FC Type : | Fh Type : | Fx Type : |
|---|---|---|---|
| 01 | - | Heat Pump | Heat Pump (standard) |
| 02 | Modulating electric heater | Modulating electric heater | Modulating electric heater |
| 03 | Hot water coil | - | Hot water coil |
| 04.1 | - | - | - |
| 05 | Economiser | Economiser | Economiser |
| 06 | - | - | - |
| 07 | Exhaust Roofcurb | Exhaust Roofcurb | Exhaust Roofcurb |
| 08 | Firestart | Firestart | Firestart |
| 09 | Smoke Detector | Smoke Detector | Smoke Detector |
| 10 | Advanced Control Pack | Advanced Control Pack | Advanced Control Pack |
| 11 | DS50 | DS50 | DS50 |
| 12 | DC50 | DC50 | DC50 |
| 13 | Hygiene Probe | Hygiene Probe | Hygiene Probe |
| 14 | Air Sock Control | Air Sock Control | Air Sock Control |
| 15 | - | - | - |
| 16 | 100% Fresh Air | 100% Fresh Air | - |
| 17 | LP-HP Pressure Gauge | LP-HP Pressure Gauge | LP-HP Pressure Gauge |
| 18 | - | - | - |
| 19 | - | - | - |
| 20 | Low Ambiant Kit | Low Ambiant Kit | - |
| 21 | - | - | - |
| 22 | - | - | 100% Fresh Air |
| 23 | Water Cooled Condenser | Water Cooled Condenser | - |
| 24 | TCB | TCB | TCB |
| 25 | Climalook/Climalink | Climalook/Climalink | Climalook/Climalink |
| 26 | Centrifugal Condensing Fan | Centrifugal Condensing Fan | - |
| 27 | - | - | - |
| 28 | - | - | - |

| | FG Type : | Fd Type : |
|---|---|---|
| 01 | - | - |
| 02 | - | - |
| 03 | - | - |
| 04.1 | Gas Burner 33/60kW | Gas Burner 33/60kW |
| 04.2 | Gas Burner 120kW | Gas Burner 120kW |
| 04.3 | Gas Burner 180kW | Gas Burner 180kW |
| 05 | Economiser | Economiser |
| 06 | - | - |
| 07 | Exhaust Roofcurb | Exhaust Roofcurb |
| 08 | Firestart | Firestart |
| 09 | Smoke detector | Smoke detector |
| 10 | Advanced Control Pack | Advanced Control Pack |
| 11 | DS 50 | DS 50 |
| 12 | DC 50 | DC 50 |
| 13 | Hygiene Probe | Hygiene Probe |
| 14 | Air Sock Control | Air Sock Control |
| 15 | - | - |
| 16 | 100% Fresh Air | 100% Fresh Air |
| 17 | LP-HP Pressure Gauge | LP-HP Pressure Gauge |
| 18 | - | - |
| 19 | - | - |
| 20 | Low Ambiant Kit | Low Ambiant Kit |
| 21 | - | Dynamic Defrost |
| 22 | - | - |
| 23 | Water Cooled Condenser | Water Cooled Condenser |
| 24 | TCB | TCB |
| 25 | Climalook/Climalink | Climalook/Climalink |
| 26 | Centrifugal Condensing Fan | Centrifugal Condensing Fan |
| 27 | | |
| 28 | | |

| | FGN Type : | Fwn Type : |
|---|---|---|
| 01 | - | - |
| 02 | - | - |
| 03 | - | - |
| 04.1 | Gas Burner 33/60kW | Gas Burner 33/60kW |
| 04.2 | Gas Burner 120kW | Gas Burner 120kW |
| 04.3 | Gas Burner 180kW | Gas Burner 180kW |
| 05 | Economiser | Economiser |
| 06 | - | - |
| 07 | - | Exhaust Roofcurb |
| 08 | Firestart | Firestart |
| 09 | Smoke detector | Smoke detector |
| 10 | - | Advanced Control Pack |
| 11 | DS 50 | DS 50 |
| 12 | DC 50 | DC 50 |
| 13 | Hygiene Probe | Hygiene Probe |
| 14 | Air Sock Control | Air Sock Control |
| 15 | - | - |
| 16 | - | 100% Fresh Air |
| 17 | - | LP-HP Pressure Gauge |
| 18 | - | - |
| 19 | - | - |
| 20 | - | Low Ambiant Kit |
| 21 | - | Dynamic Defrost |
| 22 | - | - |
| 23 | - | Water Cooled Condenser |
| 24 | TCB | TCB |
| 25 | Climalook/Climalink | Climalook/Climalink |
| 26 | - | Centrifugal Condensing Fan |
| 27 | - | - |
| 28 | - | - |

*FXA / FXK* = Heat pump rooftop

01 Heat pump
02 Electric heater TRIAC
03 Hot water coil
04.1 -
05 Economiser
06 -
07 -
08 Firestat
09 Smoke detector
10FH Advanced control pack (FC : cooling- FH : heat pump)
11 Digital console KP02
12 Consoles KP17
13 Hygiene probe
14 Air sock control
15 Dry contact kit (KP12.2)
16 RS232 KP14
17 CL06
18 KP07
19 -
20 -
21 -
22 All fresh air
23 Remote set point (KP05)
24 KP12.3 (TCB)
25 KP12.4 (Adaptvision)
26 Climalink/Climalook

## DIAGRAM REFERENCE LEGEND

| | |
|---|---|
| -A1-A2 | Air SSock Control |
| -B1 | External air thermostat |
| -B2 | Smoke detection head |
| -B4-B5 | Gas manifold ionisation probe |
| -B6-B7 | Gas manifold ignition electrode |
| -B11 | Water flow rate controller |
| -B13 | Clogged air filter pressure switch / air flow rate |
| -B14 | Hot water battery antifreeze thermostat |
| -B15 | Hot water battery antifreeze thermostat |
| -B16 | Fire thermostat |
| -B17-B18 | Gas manifold smoke minimum gas pressure switch |
| -B19-B20 | Blower fan motor -MS1-MS2 stoptherme |
| -B21-B22 | Gas manifold extraction air pressure switch |
| -B23-B24 | Extraction fan motor -ME1-ME2 stoptherme |
| -B25-B26 | Electric battery -E1-E2 safety klixon |
| -B27 | Electric battery -E3 safety klixon |
| -B29-B30 | Gas manifold air flow rate safety klixon |
| -B32-B33 | Gas manifold flashback safety klixon |
| -B41-B42 | Compressor -MG1-MG2 high pressure safety switch |
| -B43-B44 | Compressor -MG3-MG4 high pressure safety switch |
| -B45-B46 | Gas manifold 1 / gas manifold 2 regulation klixon |
| -B51-B52 | Compressor -MG1-MG2 low pressure safety switch |
| -B53-B54 | Compressor-MG3-MG4 low pressure safety switch |
| -B61-B62 | Compressor -MG1-MG2 high pressure control switch |
| -B63-B64 | Compressor -MG3-MG4 high pressure control switch |
| -B71-B72 | Condenser -MC1-MC2 fan motor stoptherme |
| -B73-B74 | Condenser -MC3-MC4 fan motor stoptherme |
| -B81-B82 | Scroll compressor -MG1-MG2 protection module |
| -B83-B84 | Scroll compressor -MG3-MG4 protection module |
| | |
| -BE50 | Extension Board |
| -BG10 | Hygiene Probe |
| -BH10 | Regulation Hygrometry Probe |
| | |
| -BH11 | External hygrometry probe |
| -BM50 | Climatic 50 |
| | |
| -BT10 | Regulation temperature probe |
| -BT11 | External temperature probe |
| -BT12 | Blower temperature probe |
| | |
| -BT16-BT18 | Heat exchanger water outlet probe |
| -BT17 | Return Temperature Sensor |
| | |
| -BT91-BT92 | Defrost temperature sensor compressor 1-2 |
| -BT93-BT94 | Defrost temperature sensor compressor 3-4 |
| | |
| -BX50.1.2 | Multiplexer Climatic 50 |
| -DT 50 | Connection Board |
| | |
| -E1-E2-E3 | Heater -E1-E2-E3 |
| -E4 | Vapor humidifier |
| -E9-E10 | Antifreeze heater cords |
| -E11 | Smoke detector printed circuit |
| -E14 | Burner control box |
| | |
| -EF49 | Gas Burner Board |
| | |
| -E51-E52 | Compressor -MG1-MG2 housing resistance |
| -E53-E54 | Compressor -MG3-MG4 housing resistance |
| | |
| -KE1-KE2 | Heater -E1-E2 contactor |
| -KE3 | Heater -E3 contactor |
| | |
| -KM1-KM2 | Blower fan motor -MS1-MS2 contactor |
| -KM5-KM6 | Extraction fan motor -ME1-ME2 contactor |
| | |
| -KM9-KM10 | Condenser 1 / condenser 2 fan motor contactor |
| -KM11-KM12 | Compressor -MG1-MG2 contactor |
| -KM13-KM14 | Compressor -MG3-MG4 contactor |
| | |
| -MC1,2 | Condenser -MC1-MC2 fan motor |
| -MC3,4 | Condenser -MC3-MC4 fan motor |
| -ME1-ME2 | Extraction fan motor -ME1-ME2 contactor |
| | |
| -MG1-MG2 | Compressor -MG1-MG2 contactor |

| | |
|---|---|
| -MG3-MG4 | Compressor -MG3-MG4 contactor |
| | |
| -MR1 | Economiser damper motor |
| -MR3 | Fresh air damper motor |
| -MR4 | Extraction damper motor |
| | |
| -MS1-MS2 | Blower fan motor -MS1-MS2 |
| | |
| -Q1-Q2 | Blower fan motor -MS1-MS2 protection |
| -Q5-Q6 | Extraction fan motor -ME1-ME2 protection |
| -Q9 | Condenser -MC1-MC2 fan motor protection |
| -Q10 | Condenser -MC3-MC4 fan motor protection |
| -Q11-Q12 | Compressor -MG1-MG2 protection |
| -Q13-Q14 | Compressor -MG3-MG4 protection |
| | |
| -Q25 | Housing resistance protection |
| | |
| -QF1 | Primary circuit protection -T1 |
| -QF2 | Primary circuit protection -T3 |
| -QF4 | Secondary circuit protection - T1 |
| -QG | Main switch |
| | |
| -QE1-QE2 | Heater -E1-E2 protection |
| -QE3 | Heater -E3 protection |
| | |
| -T1 | Control circuit transformer 400v / 24v |
| -T3 | Burner power supply transformer 400 / 230v |
| -TCB | control thermostat |
| | |
| UF | Cooling unit |
| UT | Air treatment unit |
| | |
| -V1.2.3 | Electric battery static contactor |
| -YV2 | Hot water 3-way valve |
| -YV11-YV12 | Compressor -MG1-MG2 cycle reversal valve |
| -YV13-YV14 | Compressor -MG3-MG4 cycle reversal valve |
| | |
| -YV31-YV32 | Burner gas solenoid valve |
| -YV41-YV42 | Gas manifold safety solenoid valve |
| -YV51-YV52 | Gas manifold main solenoid valve |
| | |
| -Z* | Capacity resistance circuit |

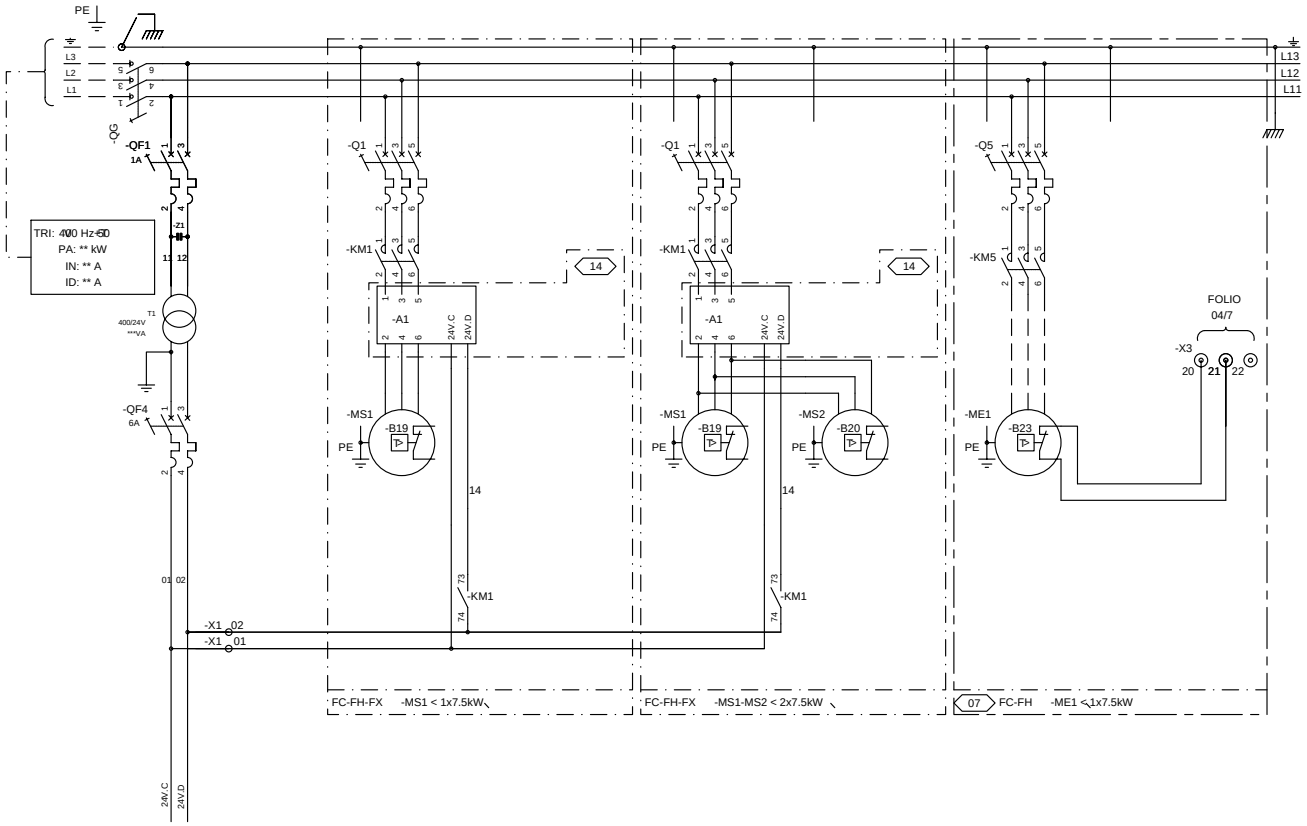
| | |
|---|---|
| -BCD1.2 | Condenser Coil |
| -BEC | Hot Water Coil |
| -CA 1.2.3.4 | Check Valve |
| | |
| -DT1.2.3.4 | Thermostatic Expannsion Valve |
| | |
| -FD 1.2.3.4 | Filter Drier |
| | |
| -B14-B15 | Hot Water Battery Antifreeze Thermostat |
| -BT12 | Blower Temperature Probe |
| -BT17 | Return Regulation Temperature Sensor |
| -B41-B42 | Compressor -MG1-MG2 high pressure safety switch |
| -B43-B44 | Compressor -MG3-MG4 high pressure safety switch |
| -B51-B52 | Compressor -MG1-MG2 low pressure safety switch |
| -B53-B54 | Compressor -MG1-MG2 low pressure safety switch |
| -B61-B62 | Compressor -MG1-MG2 high pressure control switch |
| -B63-B64 | Compressor -MG1-MG2 high pressure control switch |
| | |
| -EE1.2 | Water Heat Exchanger |
| -MC1-MC2 | Condenser MC1 / condenser MC2 fan motor |
| -MC3-MC4 | Condenser MC3 / condenser MC4 fan motor |
| | |
| -MG1-MG2 | Condenser MG1 - MG2 |
| -MG3-MG4 | Condenser MG3 - MG4 |
| | |
| -MS1 | Blower Fan Motor -MS1 |
| VAM1.2 | Manual Check Valve |
| VRM | Adjustable Manual Valve |

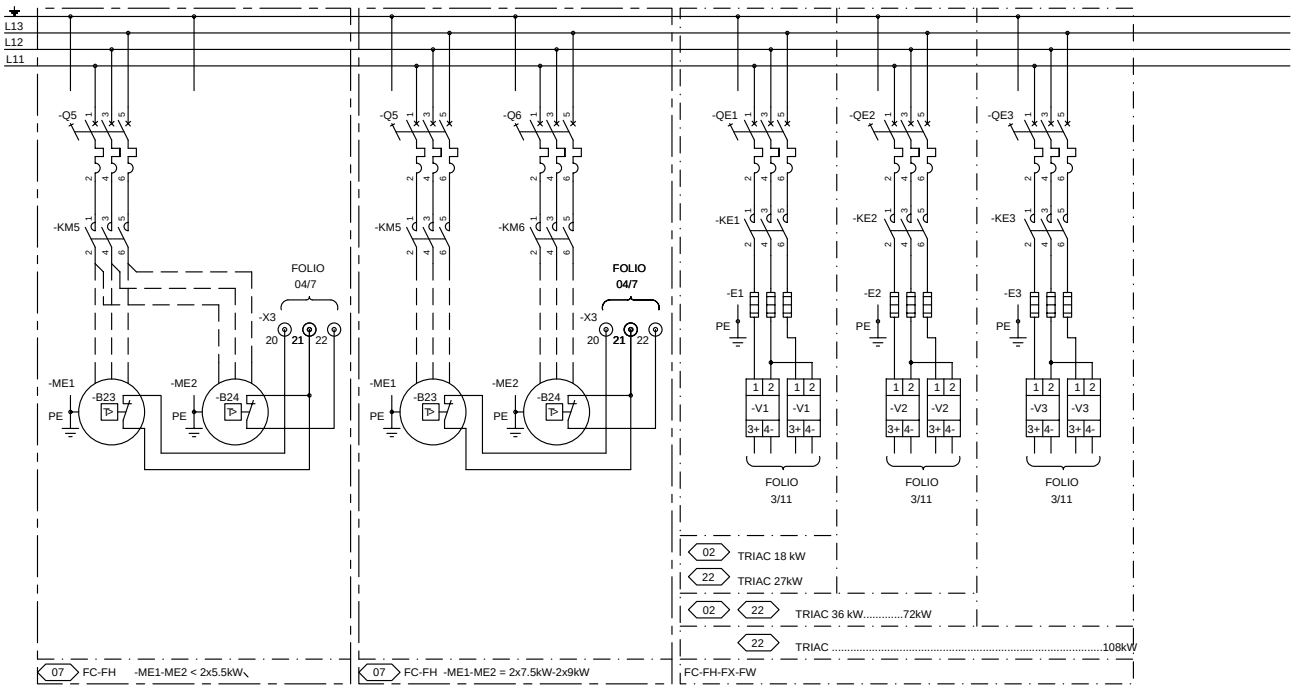
| | |
|---|---|
| BCD1.2 | Condenser Coil |
| -BEC | Hot Water Coil |
| | |
| -BEV 1.2 | Evaporator Coil |
| -CA 1.2.3.4 | Check Valve |
| -DT 1.2.3.4 | Thermostatic Expansion Valve |
| -FD 1.2.3.4 | Filter Drier |
| -B14-B15 | Hot water battery antifreeze thermostat |
| -BT12 | Blower Temperature Probe |
| -BT17 | Return Regulation Temperature Sensor |
| -B41-B42 | Compressor -MG1-MG2 high pressure safety switch |
| -B43-B44 | Compressor -MG3-MG4 high pressure safety switch |
| -B51-B52 | Compressor -MG1-MG2 low pressure safety switch |
| -B53-B54 | Compressor -MG1-MG2 low pressure safety switch |
| -B61-B62 | Compressor -MG1-MG2 high pressure control switch |
| -B63-B64 | Compressor -MG1-MG2 high pressure control switch |
| -EE1.2 | Water Heat Exchanger |
| | |
| -MC1-MC2 | Condenser MC1 / condenser MC2 fan motor |
| -MC3-MC4 | Condenser MC3 / condenser MC4 fan motor |
| | |
| -MG1-MG2 | Condenser MG1 - MG2 |
| -MG3-MG4 | Condenser MG3 - MG4 |
| | |
| -MS1 | Blower Fan Motor -MS1 |
| VAM1.2 | Manual Check Valve |
| VRM | Adjustable Manual Valve |
| -YV2 | Hot water 3-way valve |
| -YV11-YV12 | Compressor -MG1-MG2 cycle reversal valve |
| -YV13-YV14 | Compressor -MG3-MG4 cycle reversal valve |

*FCA / FCK* = Cooling only unit
*FXA/FXK* = Heat recovery unit

*FHA / FHK* = Heat pump rooftop

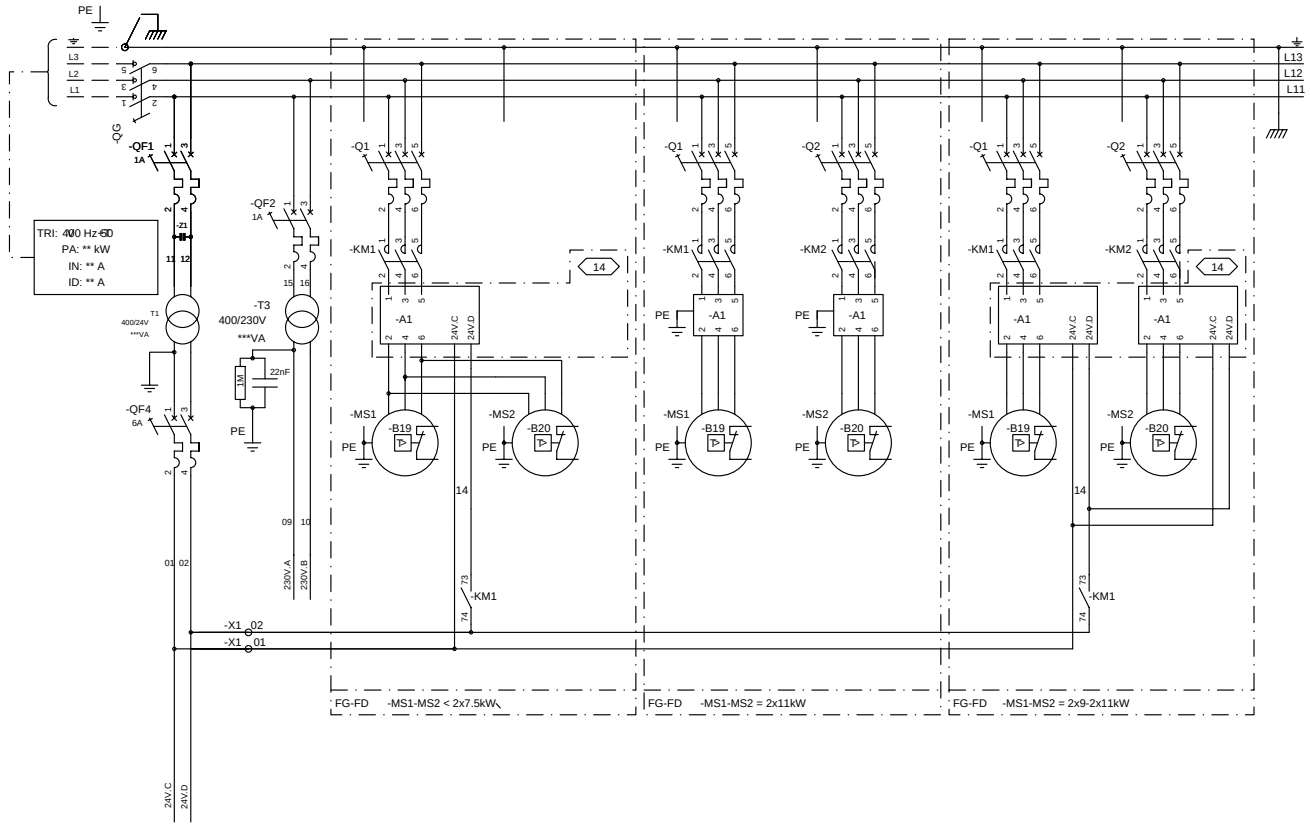
MAIN CURRENT DIAGRAM

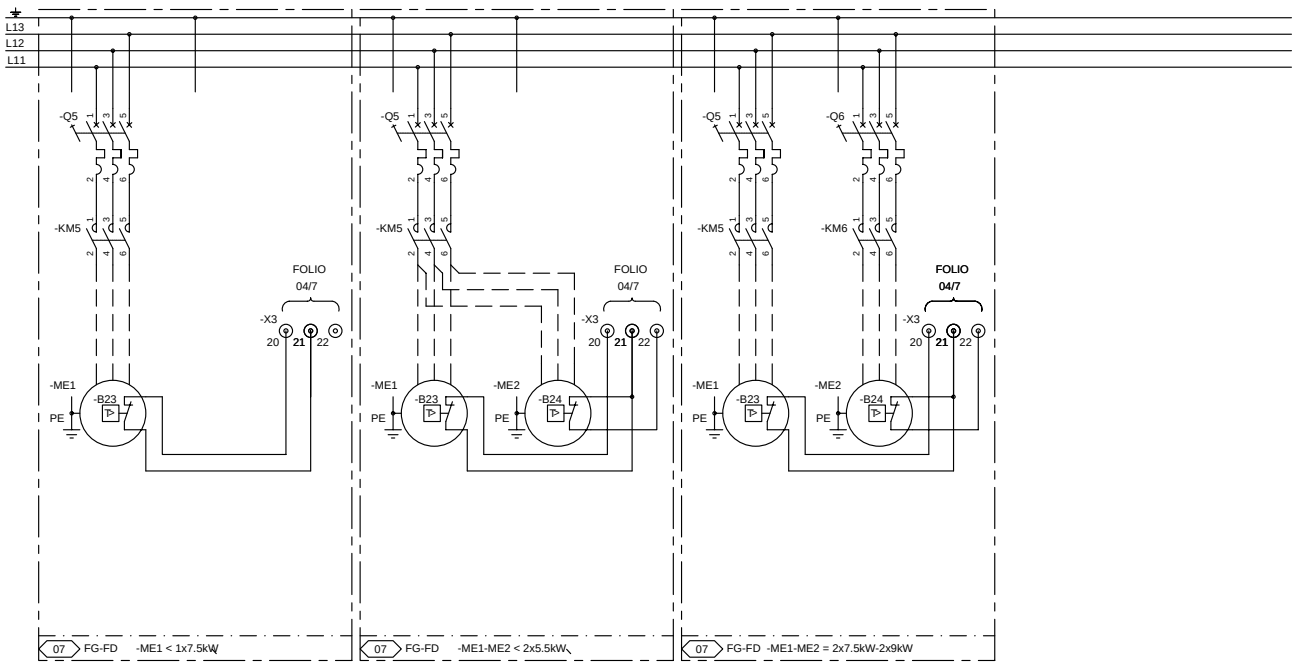


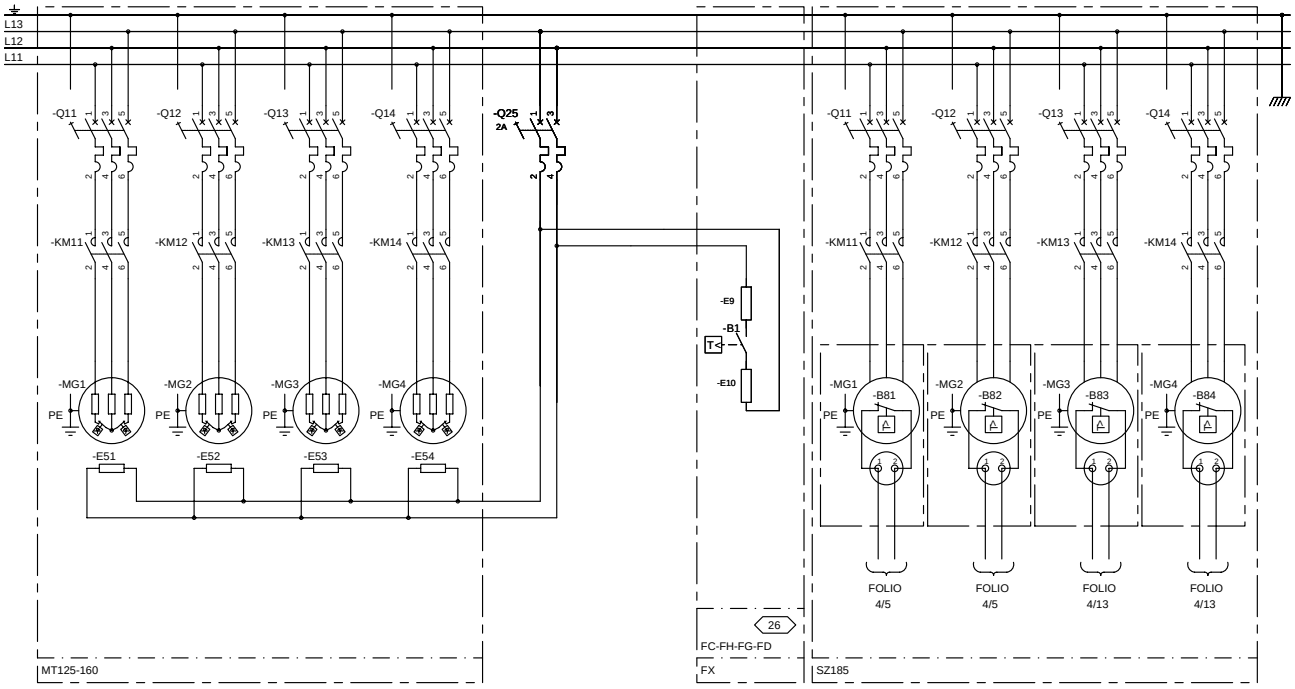
*FGA / FGK* = Cooling only unit with gas firesd heating
*FDA / FDK* = Heat pump rooftopwith gas firesd heating

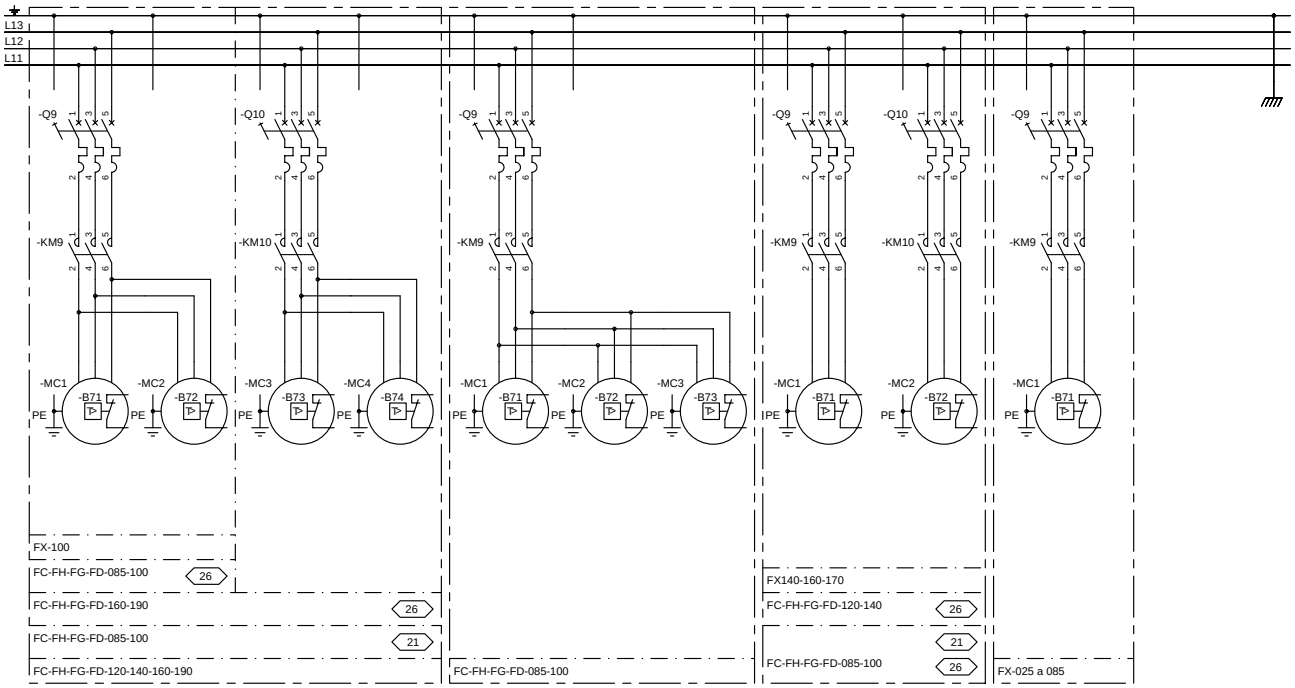
## MAIN CURRENT DIAGRAM



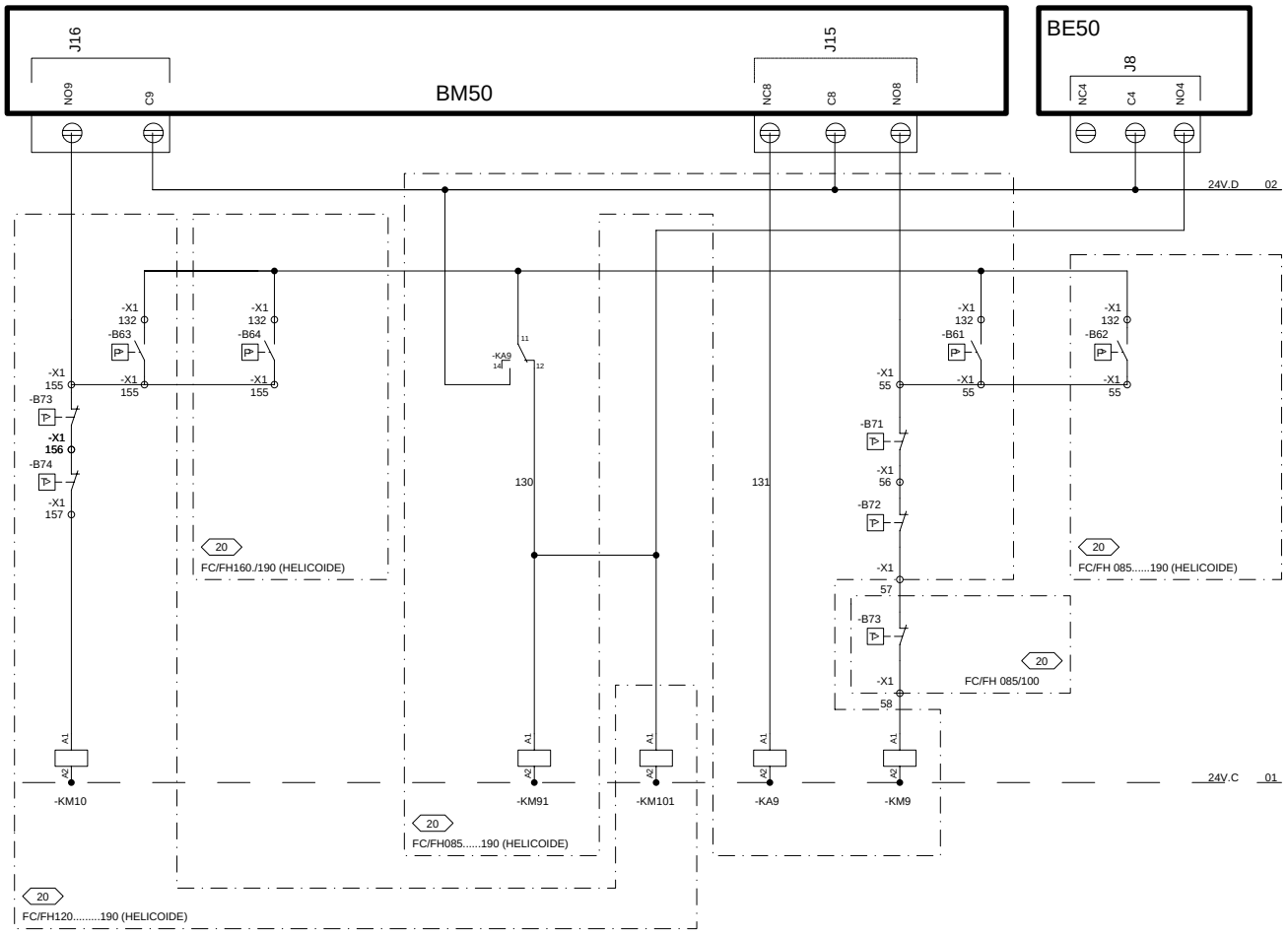



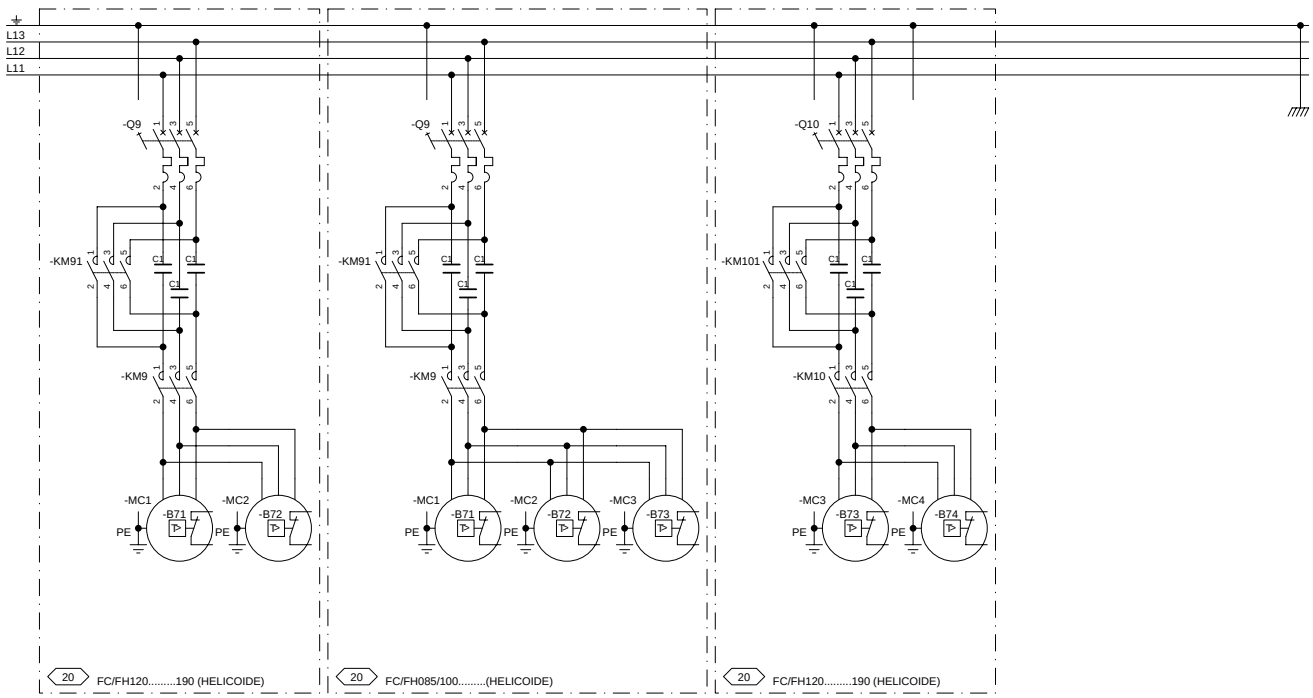
MAIN CURRENT DIAGRAM



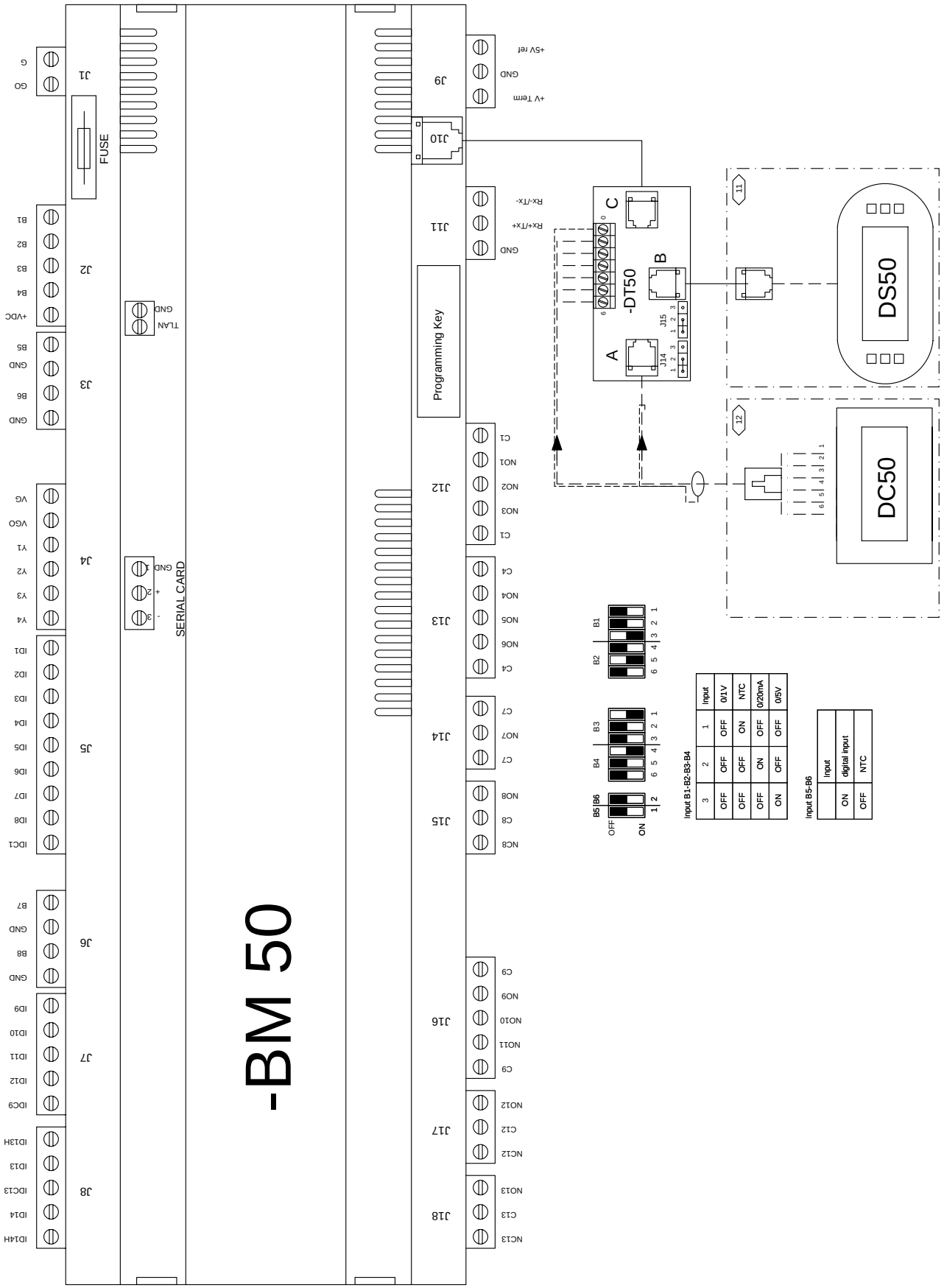



MAIN CURRENT DIAGRAM

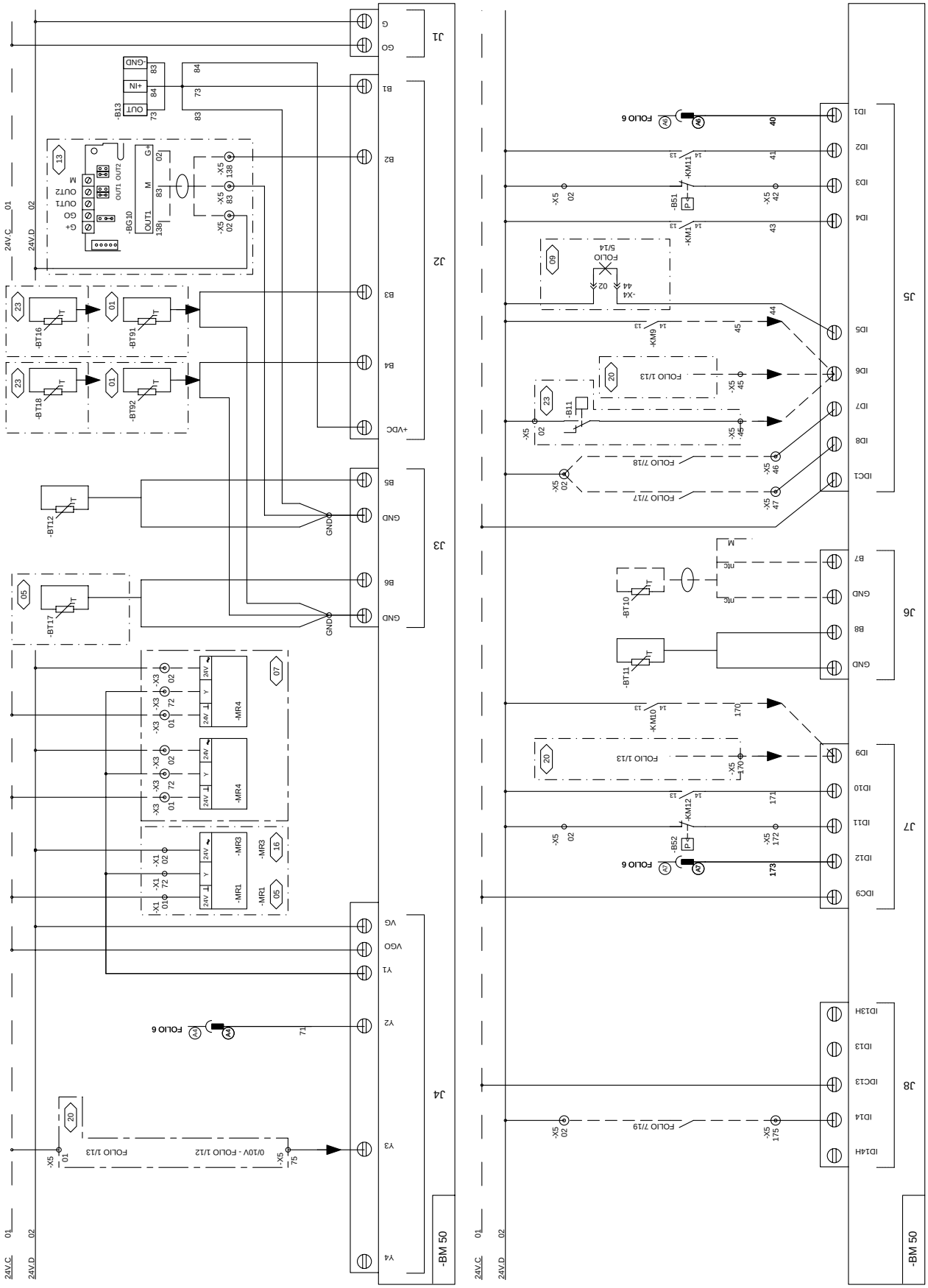


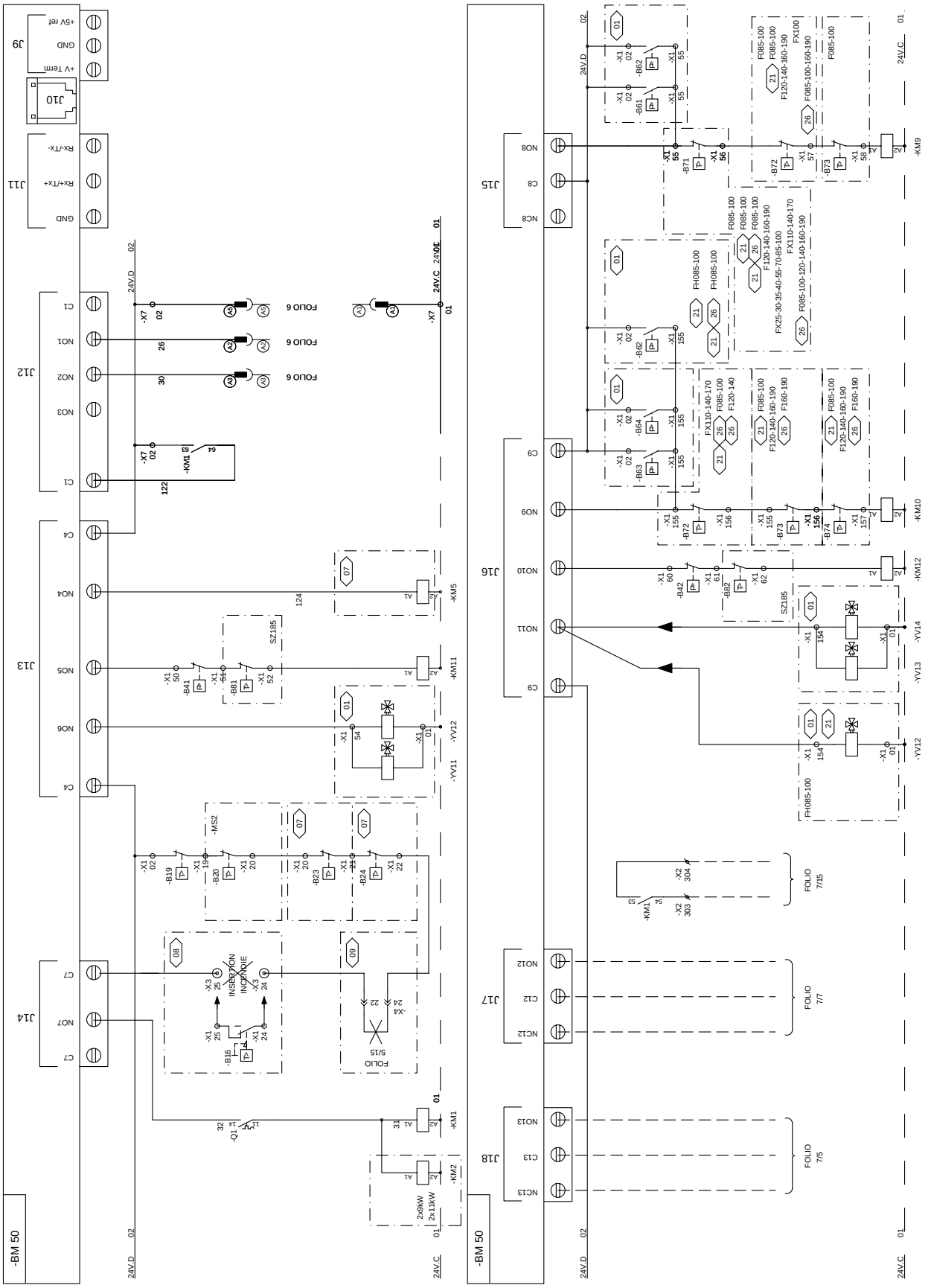
CLIMATIC 50 CONTROLLER



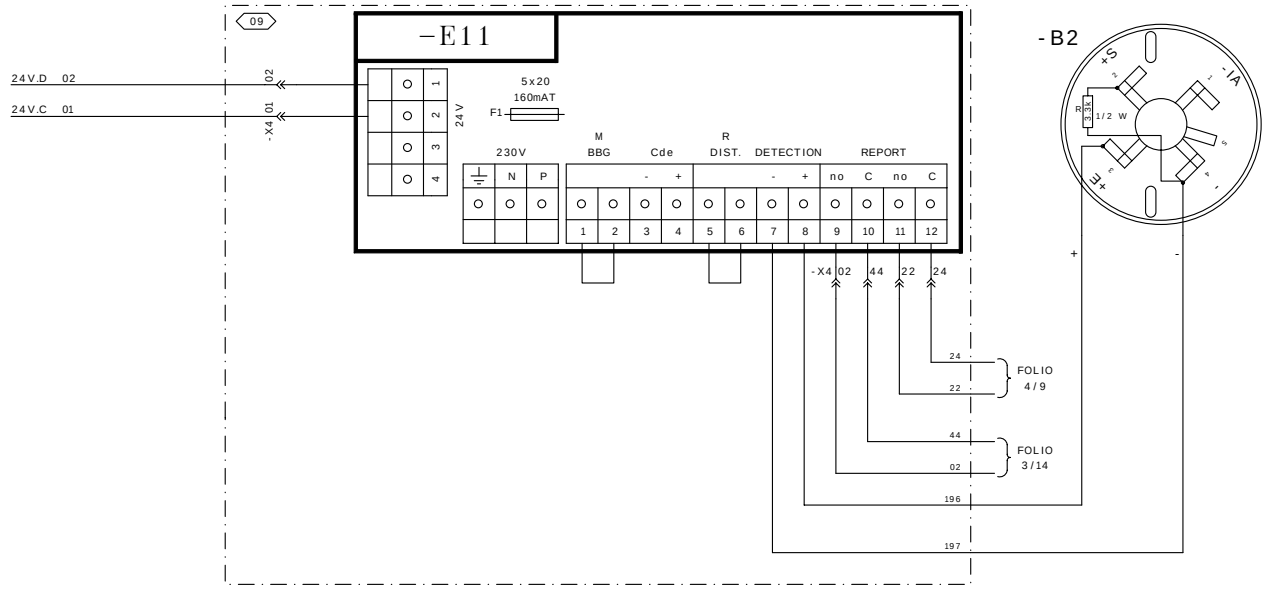
CLIMATIC 50 INPUT

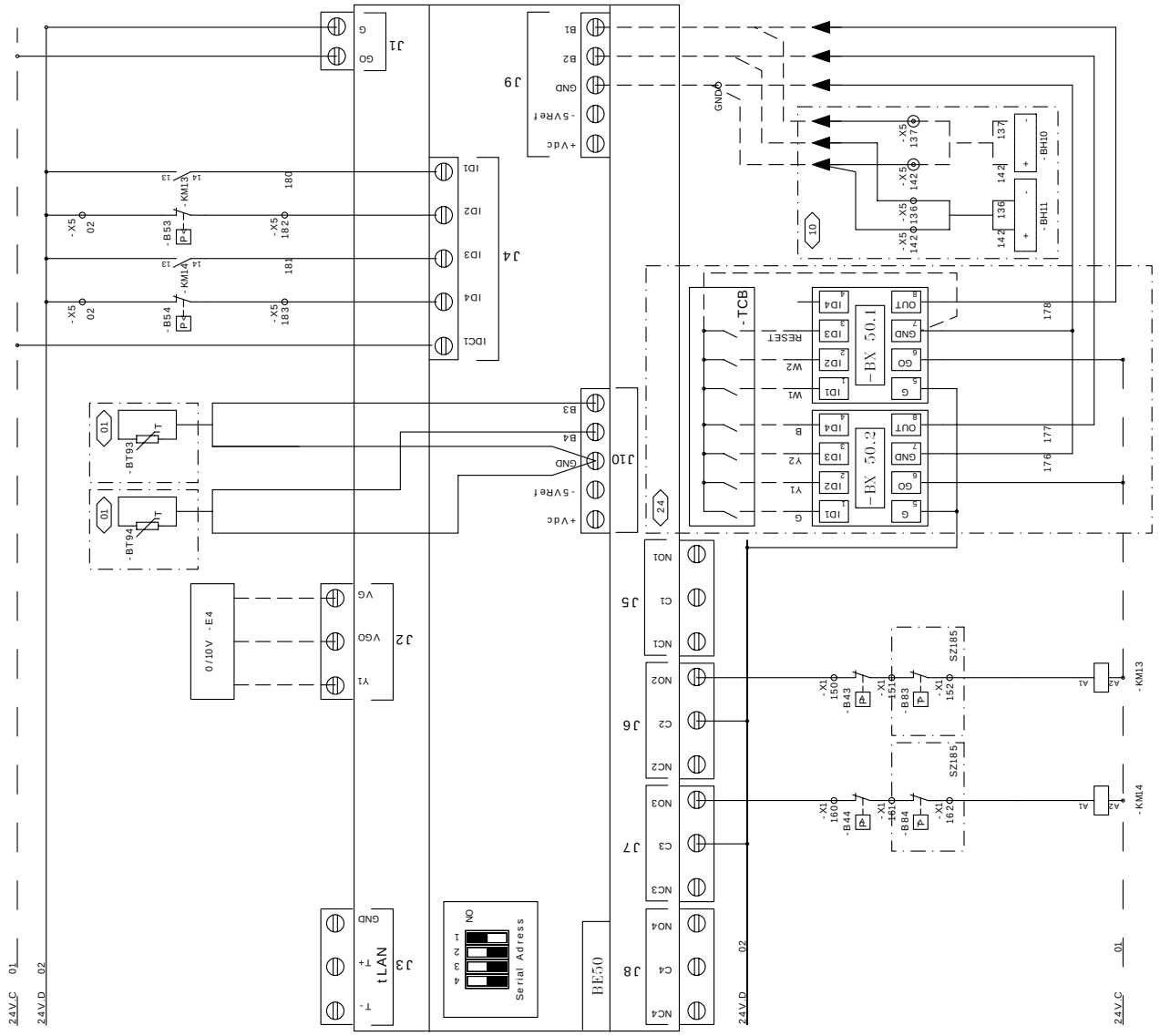


CLIMATIC 50 OUTPUT

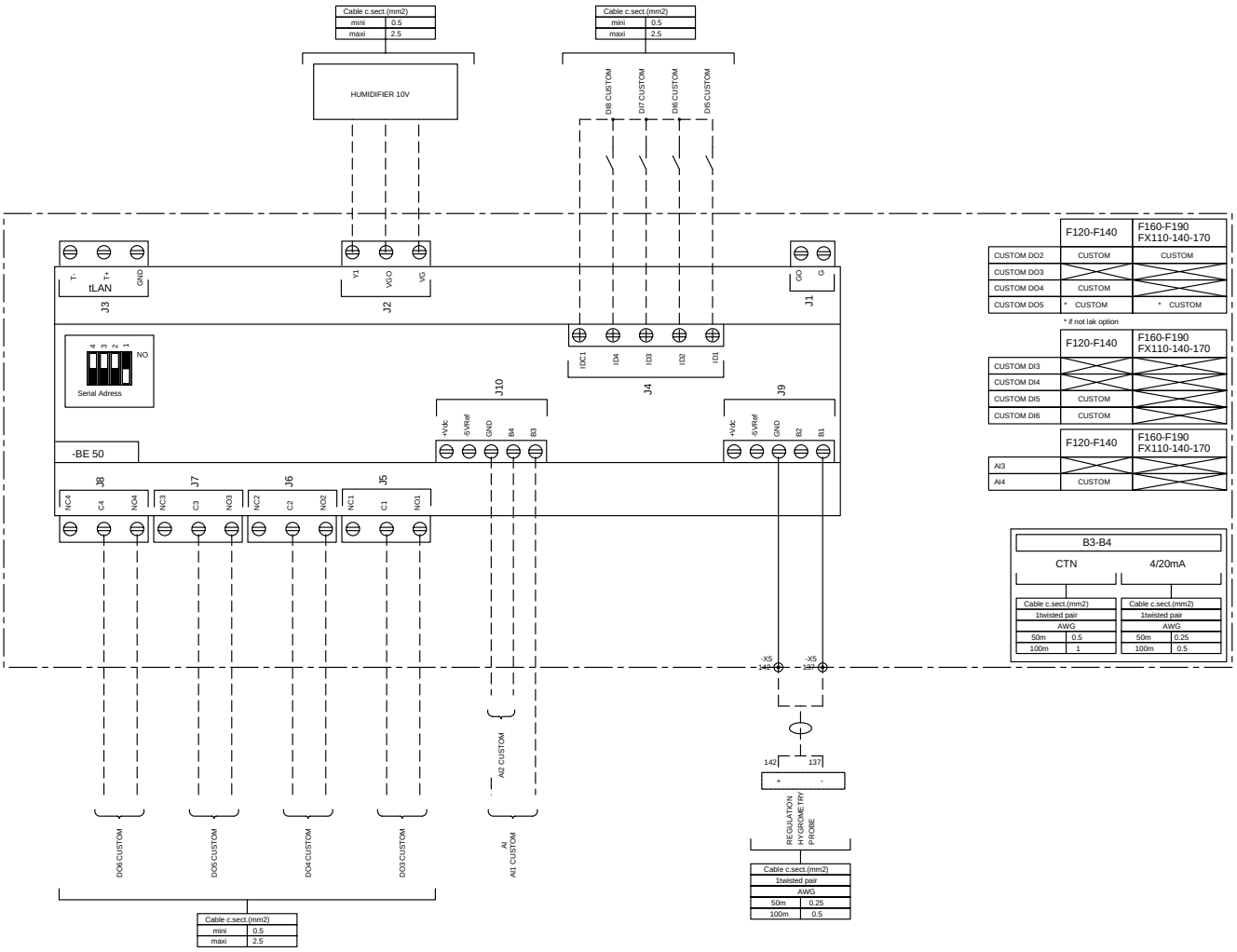


DAD SMOKE DETECTOR

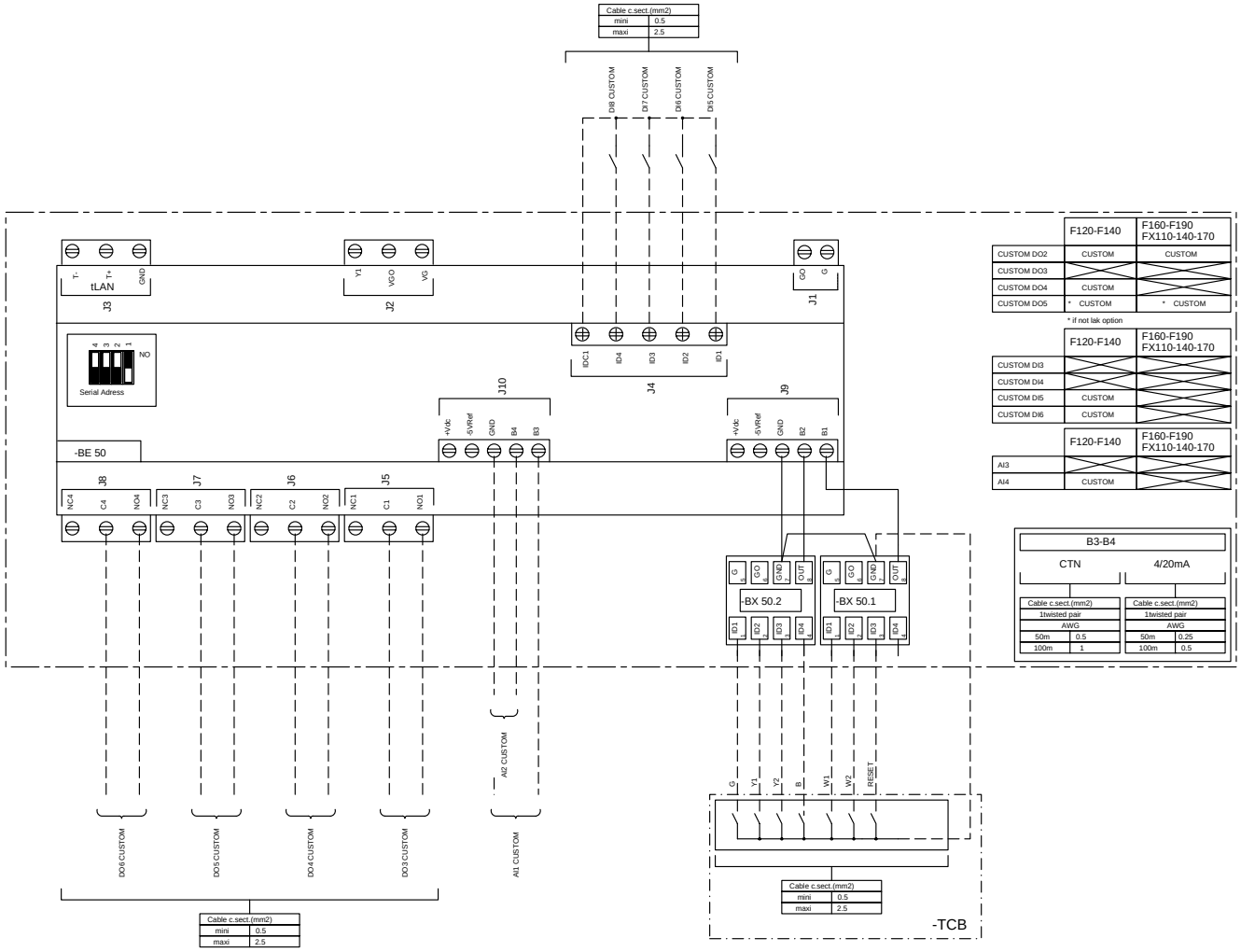


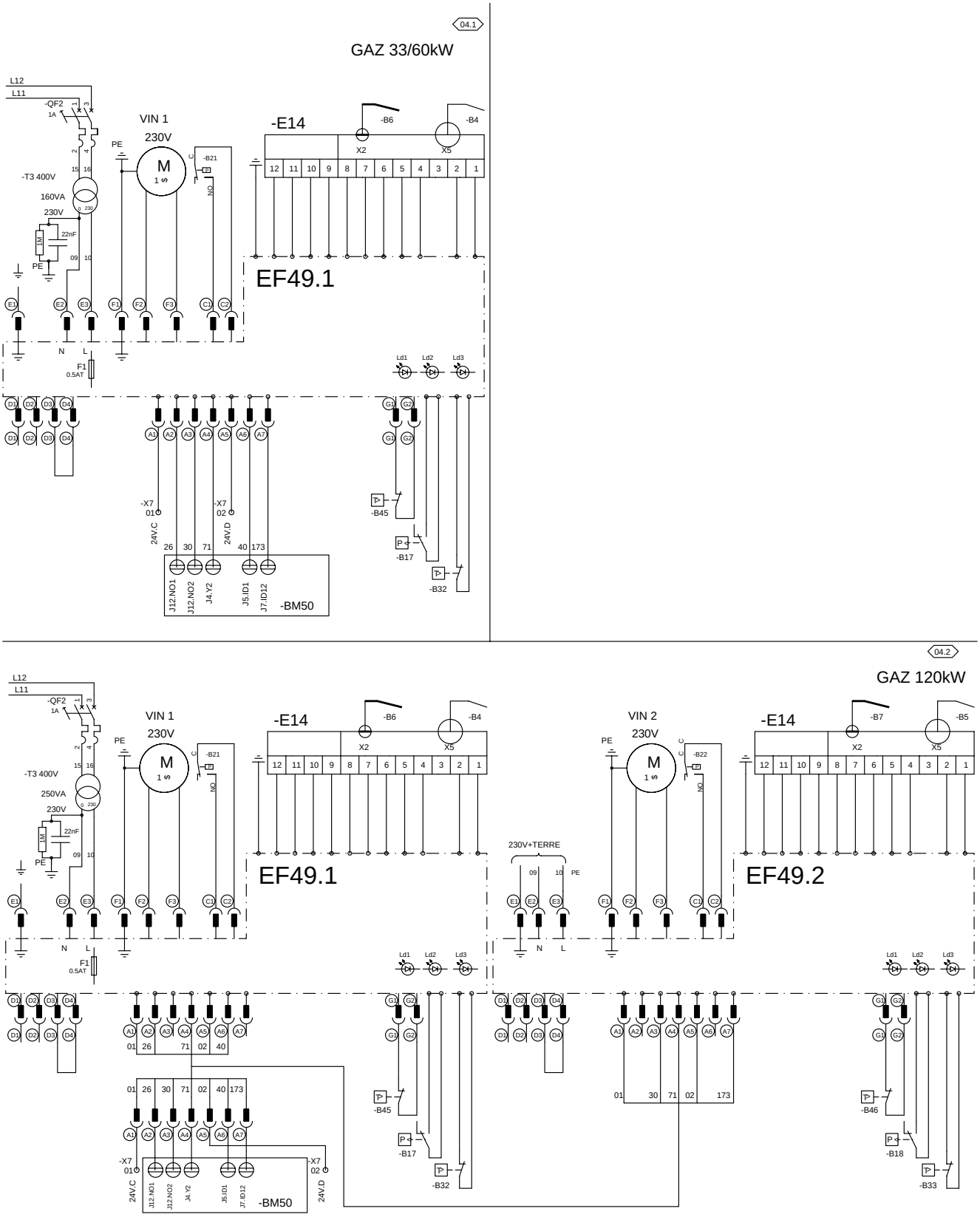
## INPUT OUTPUT EXTENSION BOARD - ADC



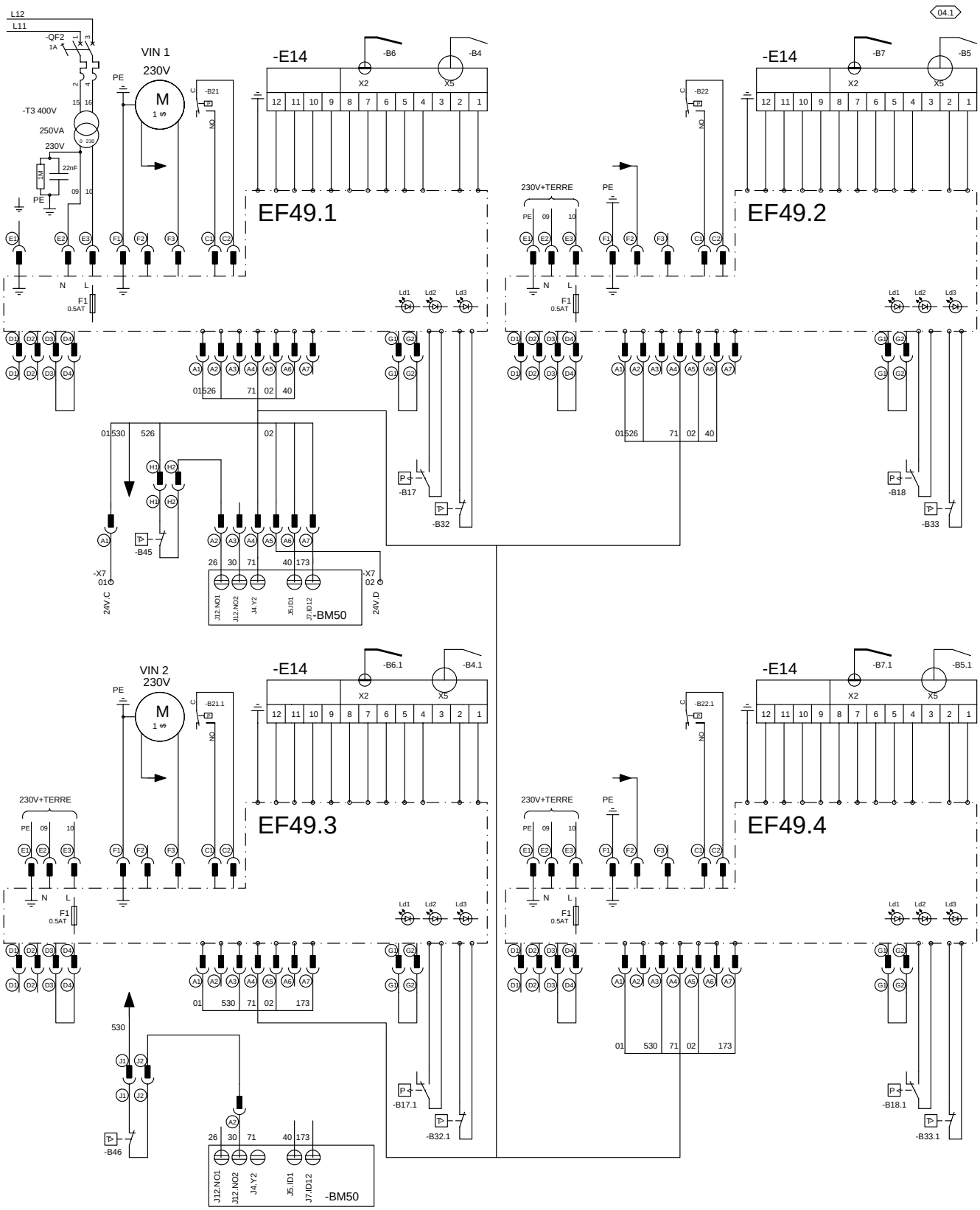
## INPUT OUTPUT EXTENSION BOARD - TCB



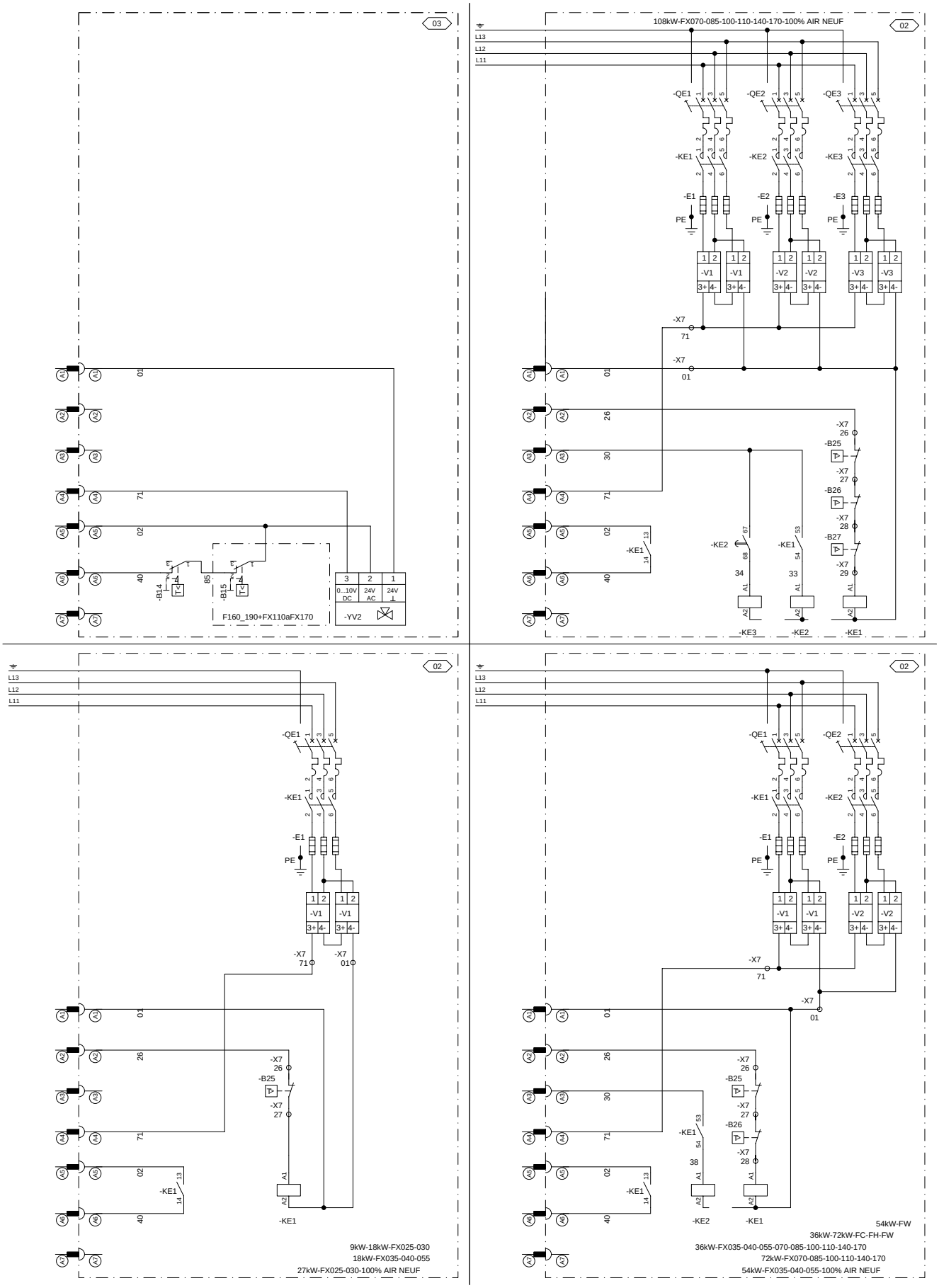
GAS BURNER 33 / 60 / 120 Kw



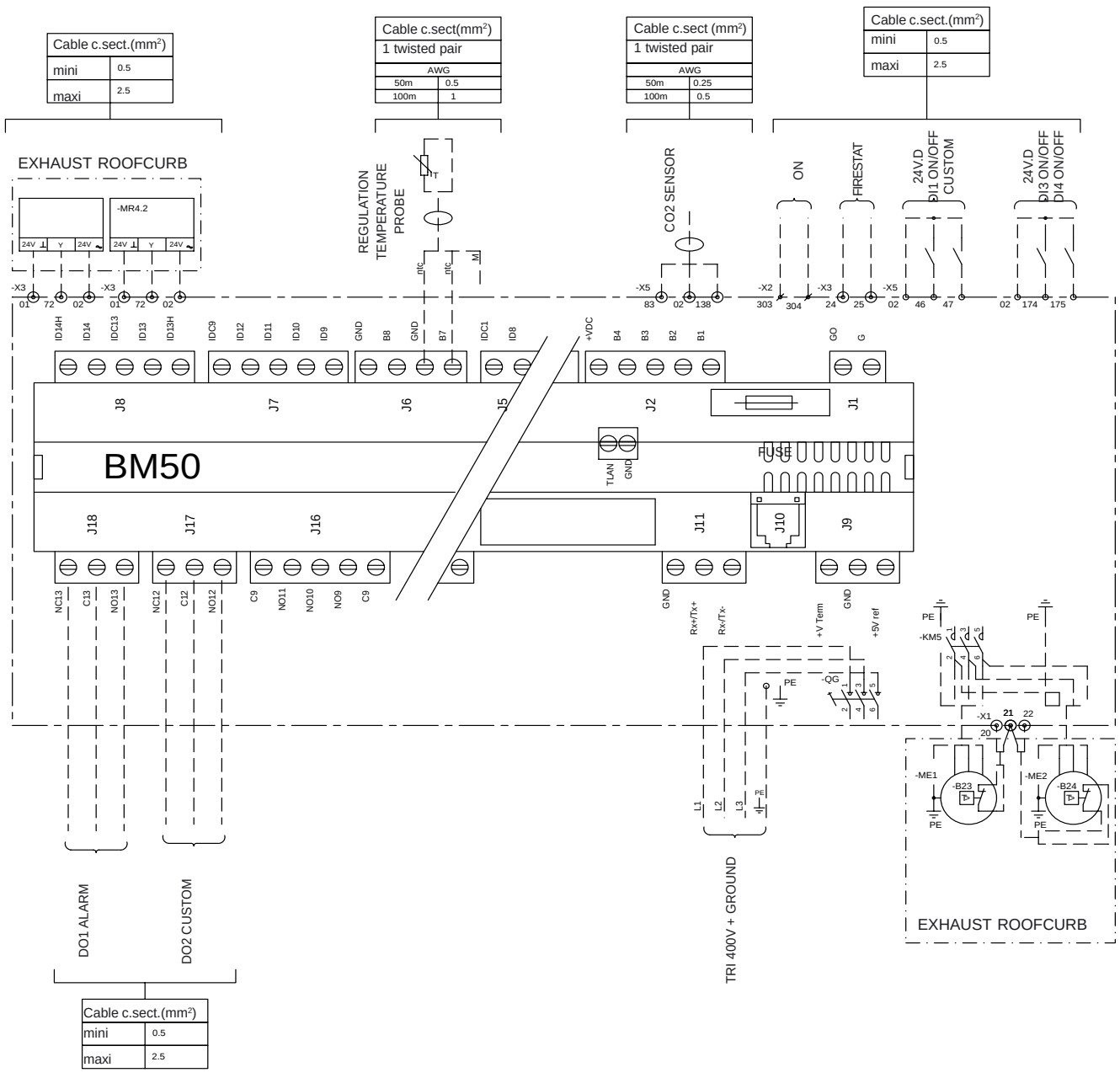
GAS BURNER 180 kW



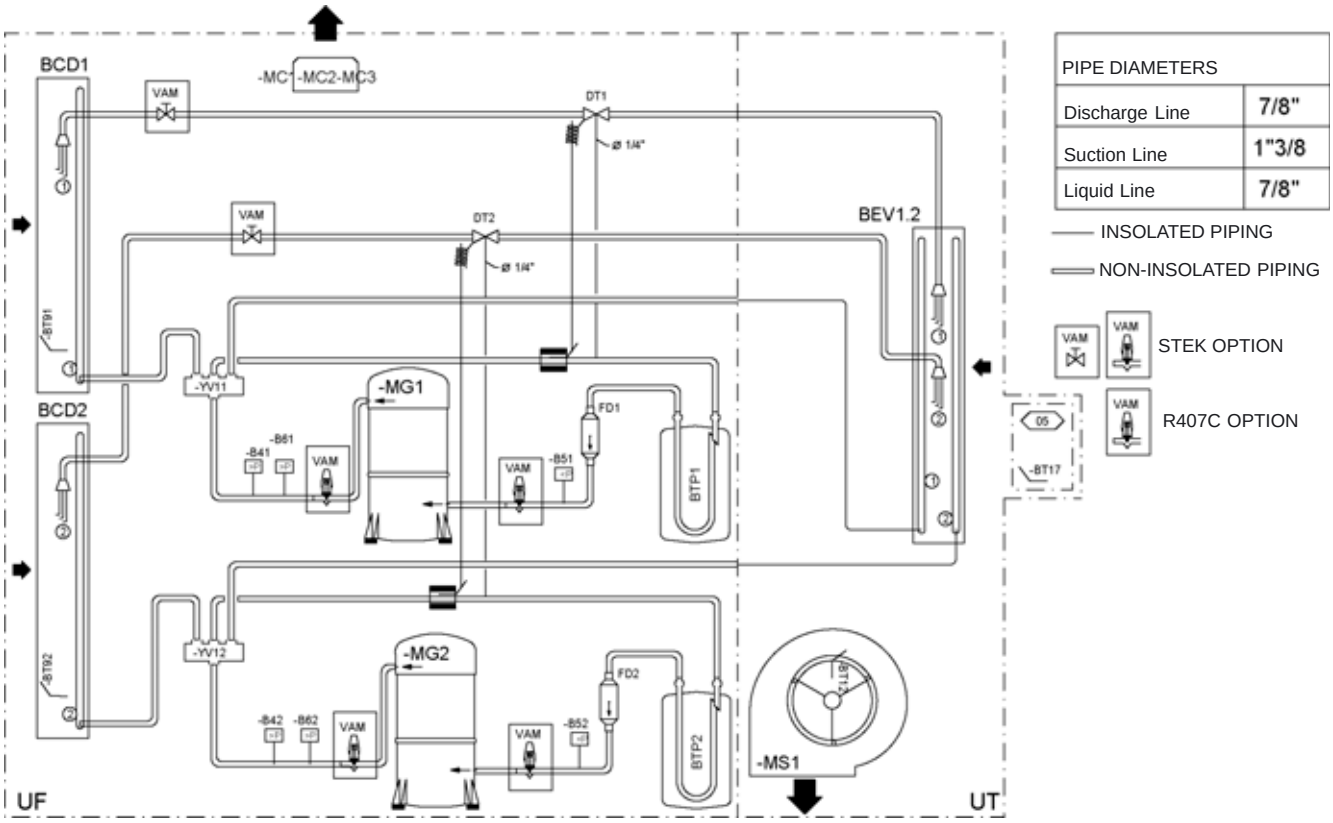
## FULLY MODULATING ELECTRIC HEATER



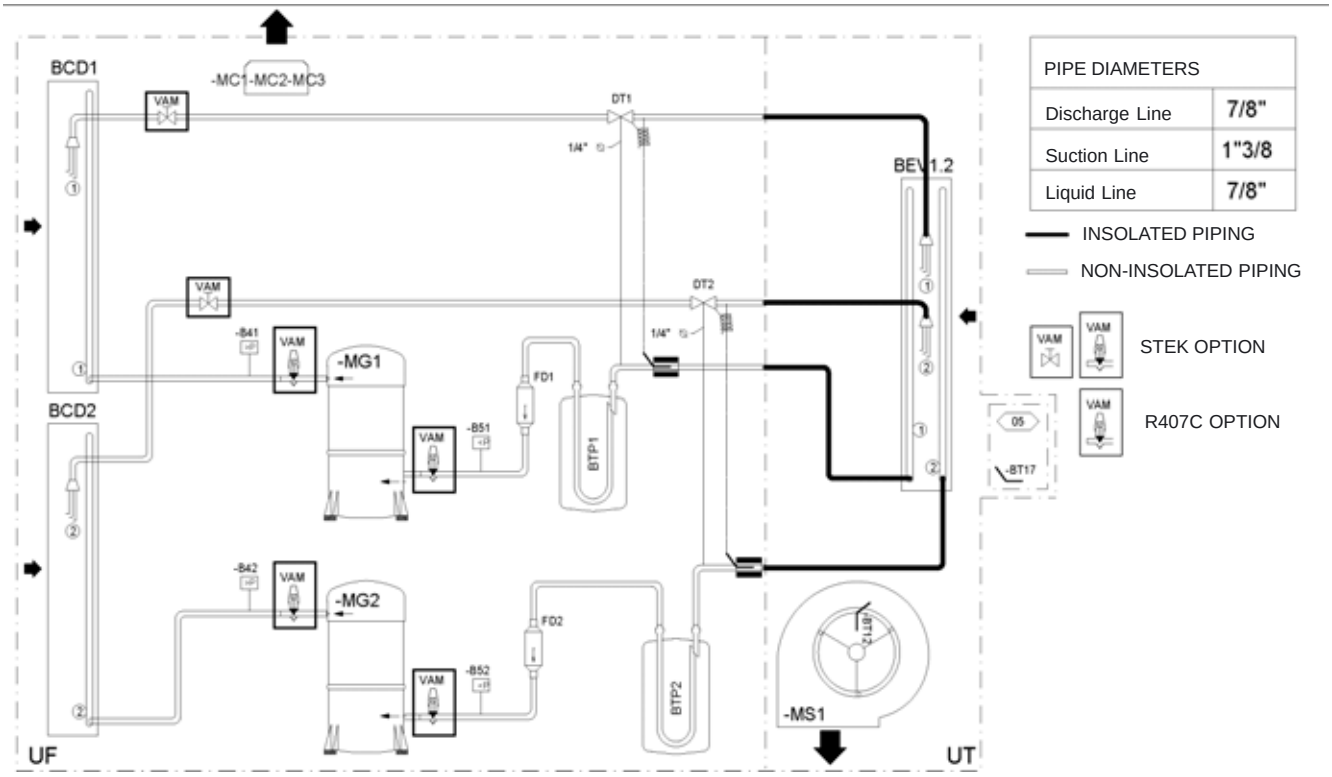
## GENERAL CUSTOMER CONNECTION DIAGRAM



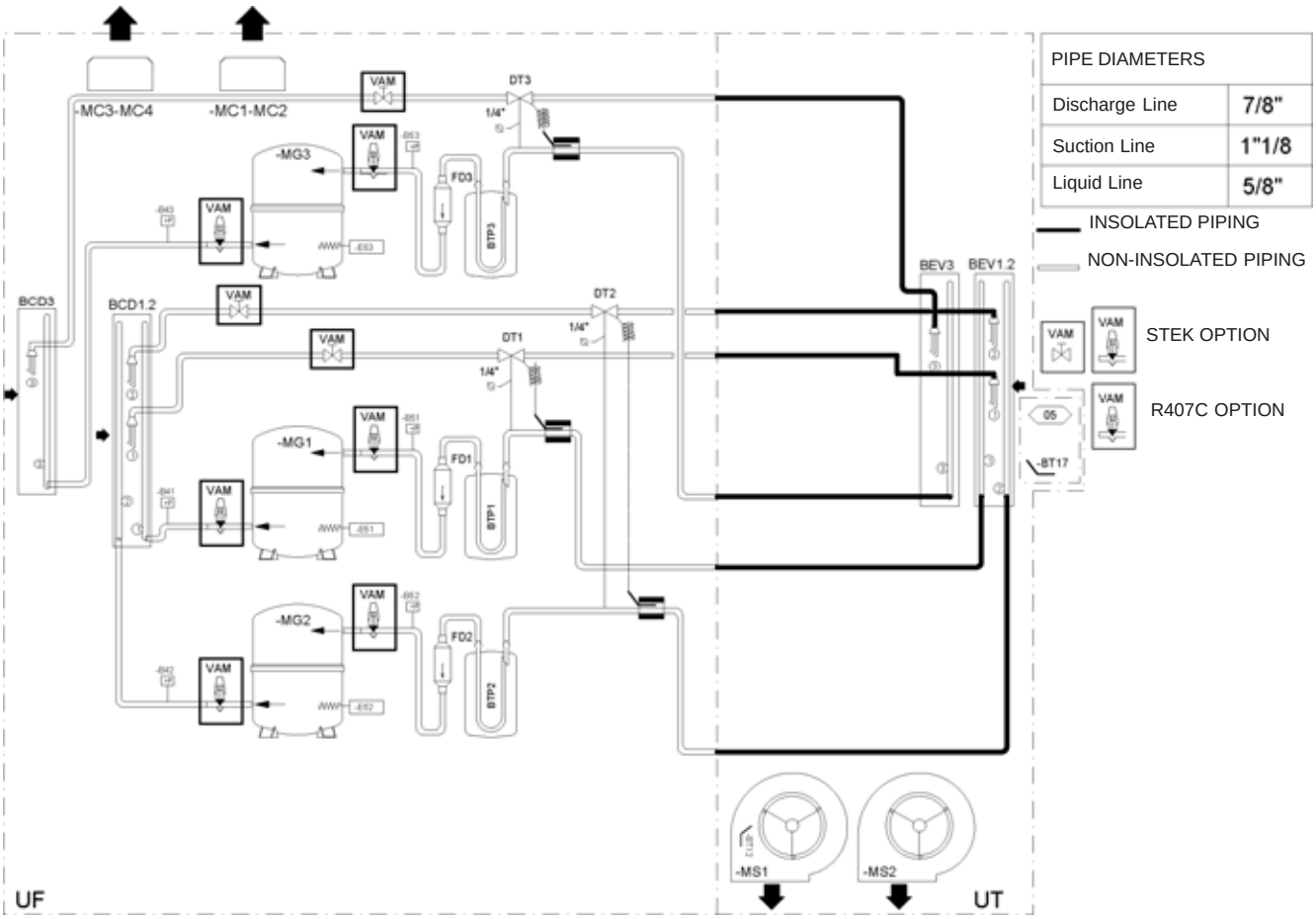
FC 085


BCD1
-MC1-MC2-MC3
VAM
DT1
Ø 1/4"
BEV1.2
DT2
BTP1
-YV11
-MG1
FD1
-B61
-B41
-B51
BCD2
-YV12
-MG2
FD2
-B42
-B62
-B52
BTP2
-MS1
UF
UT
PIPE DIAMETERS
Discharge Line 7/8"
Suction Line 1"3/8
Liquid Line 7/8"
INSOLATED PIPING
NON-INSOLATED PIPING
STEK OPTION
R407C OPTION
05
-BT17

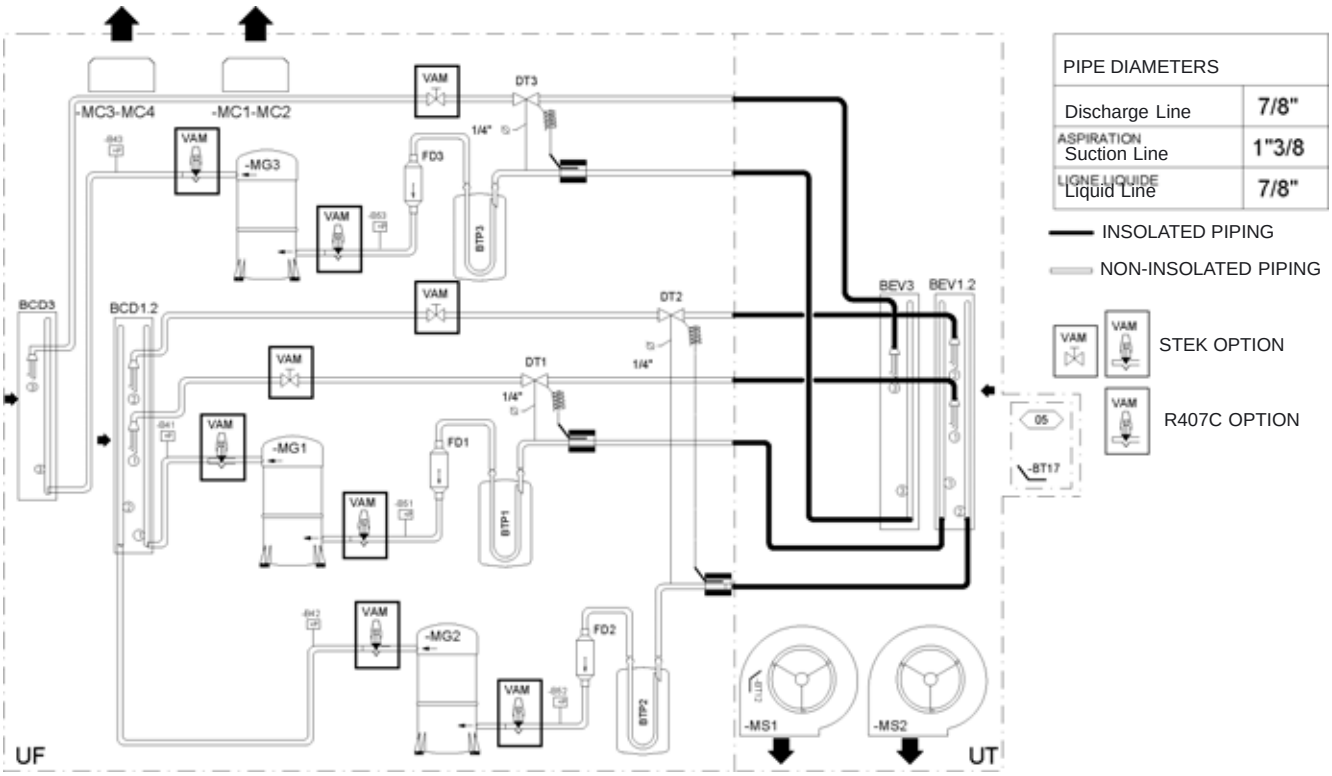
FC 100


BCD1
-MC1-MC2-MC3
VAM
DT1
1/4"
BEV1.2
DT2
BTP1
-MG1
FD1
-B41
-B51
BCD2
-MG2
FD2
-B42
-B52
BTP2
-MS1
UF
UT
PIPE DIAMETERS
Discharge Line 7/8"
Suction Line 1"3/8
Liquid Line 7/8"
INSOLATED PIPING
NON-INSOLATED PIPING
STEK OPTION
R407C OPTION
05
-BT17

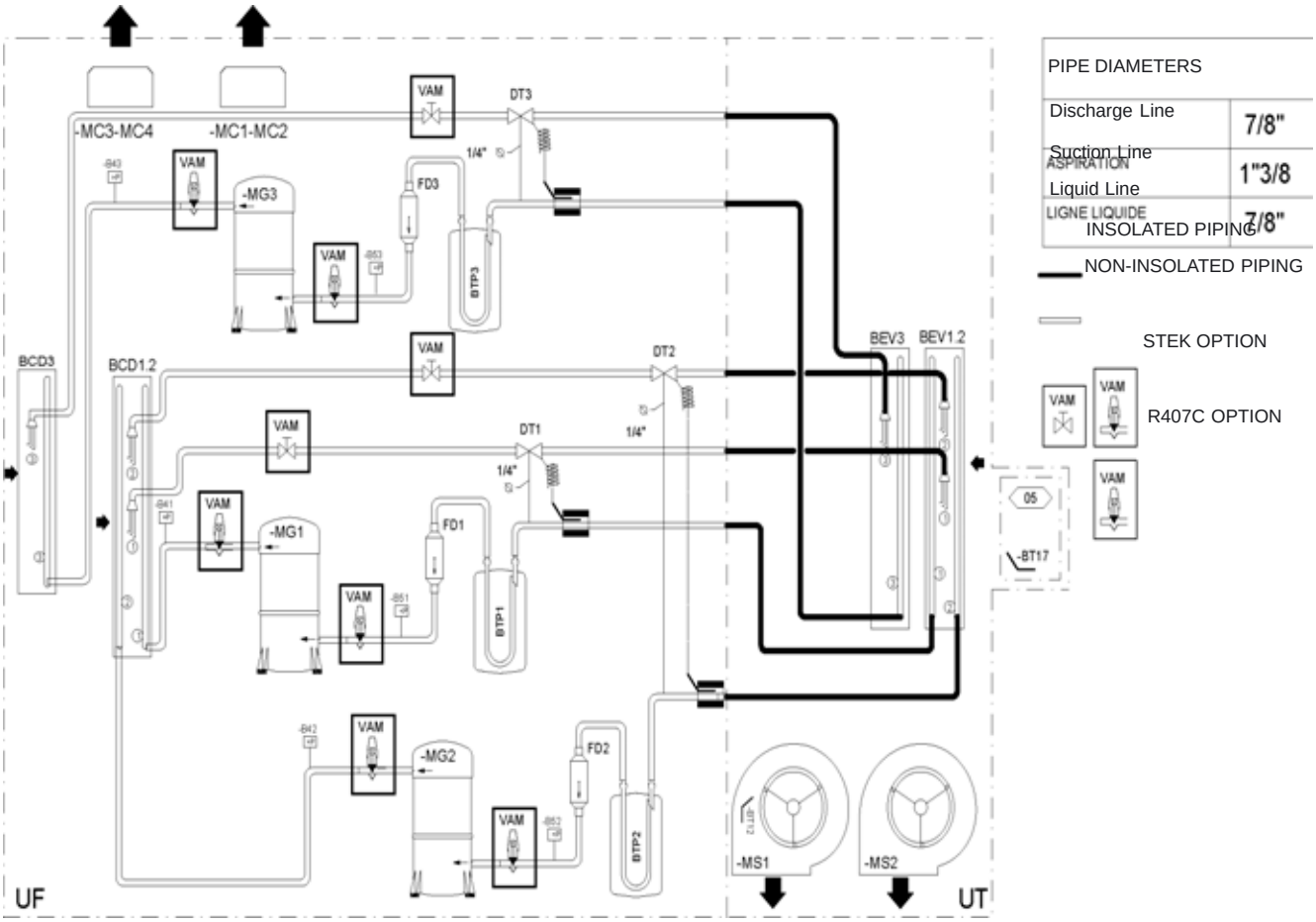
FC 120


-MC3-MC4
-MC1-MC2
VAM
DT3
1/4"
-MG3
FD3
BTP3
BCD3
BCD1.2
DT2
DT1
-MG1
FD1
BTP1
-MG2
FD2
BTP2
BEV3
BEV1.2
05
-BT17
-MS1
-MS2
UF
UT
PIPE DIAMETERS
Discharge Line 7/8"
Suction Line 1"1/8
Liquid Line 5/8"
INSOLATED PIPING
NON-INSOLATED PIPING
STEK OPTION
R407C OPTION

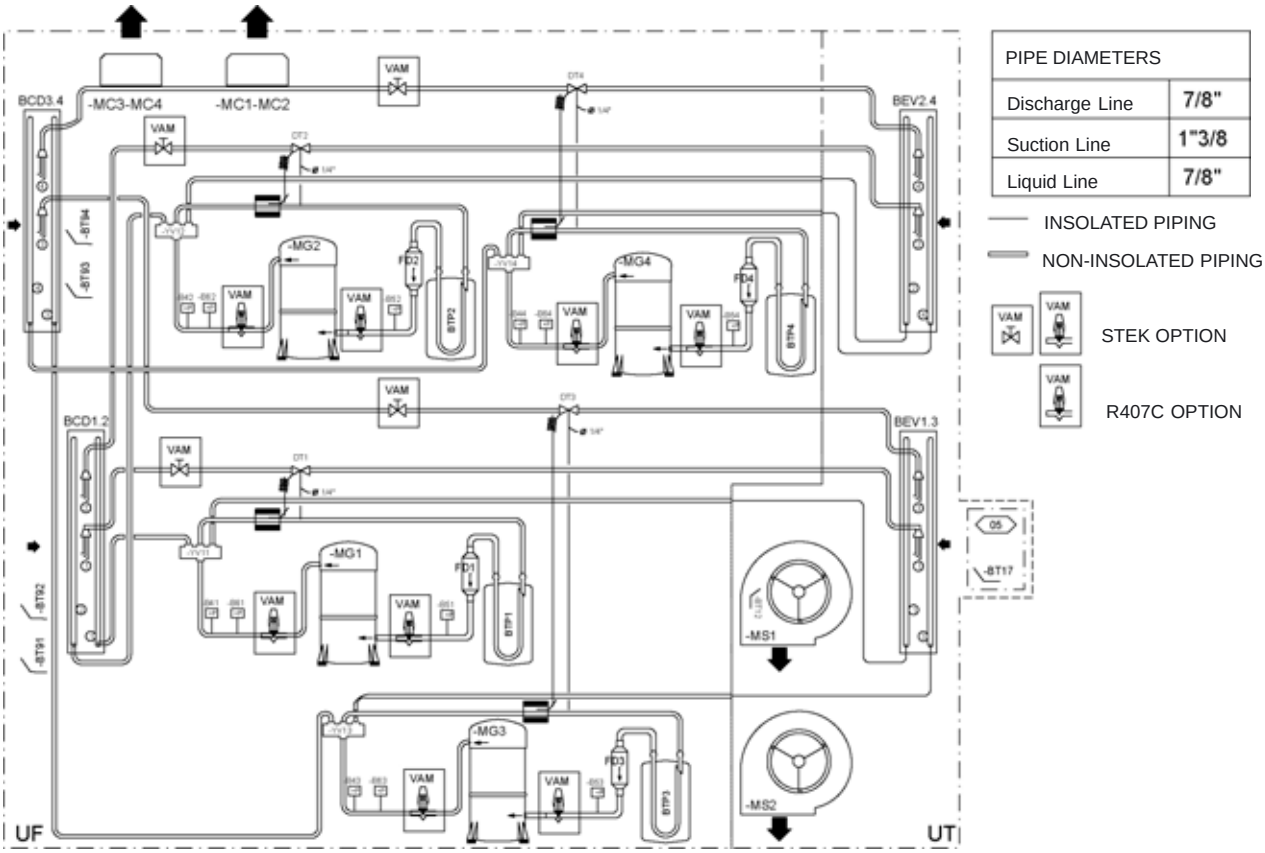
FC 140


-MC3-MC4
-MC1-MC2
VAM
DT3
1/4"
-MG3
FD3
BTP3
BCD3
BCD1.2
DT2
DT1
-MG1
FD1
BTP1
-MG2
FD2
BTP2
BEV3
BEV1.2
05
-BT17
-MS1
-MS2
UF
UT
PIPE DIAMETERS
Discharge Line 7/8"
ASPIRATION
Suction Line 1"3/8
LIGNE LIQUIDE
Liquid Line 7/8"
INSOLATED PIPING
NON-INSOLATED PIPING
STEK OPTION
R407C OPTION

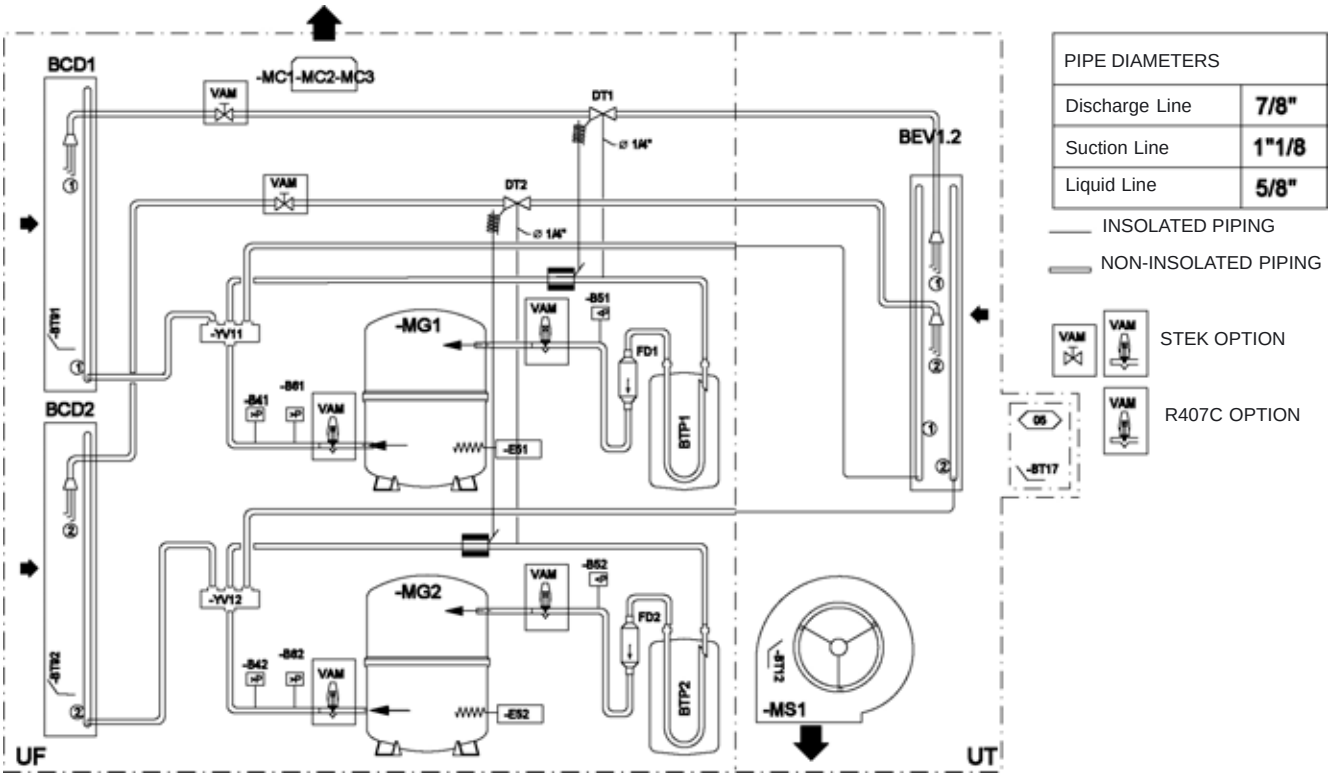
FC 160


-MC3-MC4
-MC1-MC2
VAM
DT3
DT2
DT1
1/4"
FD3
FD1
FD2
-MG3
-MG1
-MG2
BTP3
BTP1
BTP2
BCD3
BCD1.2
BEV3
BEV1.2
-MS1
-MS2
-BT17
05
UF
UT
PIPE DIAMETERS
Discharge Line 7/8"
Suction Line ASPIRATION 1"3/8
Liquid Line LIGNE LIQUIDE 7/8"
INSOLATED PIPING
NON-INSOLATED PIPING
STEK OPTION
R407C OPTION

FC 190


-MC3-MC4
-MC1-MC2
VAM
DT4
DT2
DT3
DT1
FD2
FD4
FD3
FD1
-MG2
-MG4
-MG1
-MG3
BTP2
BTP4
BTP3
BTP1
BCD3.4
BCD1.2
BEV2.4
BEV1.3
-MS1
-MS2
-BT17
05
UF
UT
PIPE DIAMETERS
Discharge Line 7/8"
Suction Line 1"3/8
Liquid Line 7/8"
INSOLATED PIPING
NON-INSOLATED PIPING
STEK OPTION
R407C OPTION

FH 085




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"1/8 |
| Liquid Line | 5/8" |

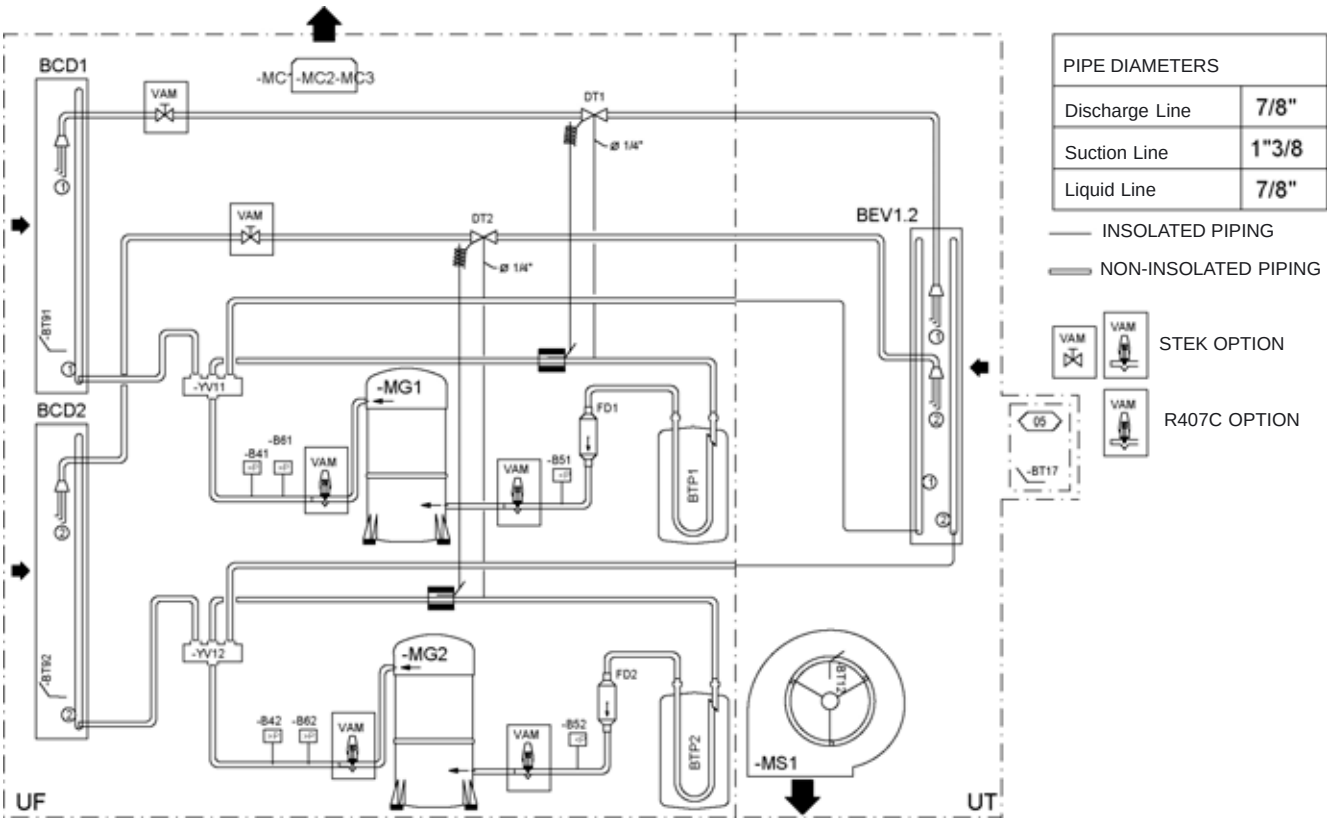
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FH 100




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"3/8 |
| Liquid Line | 7/8" |

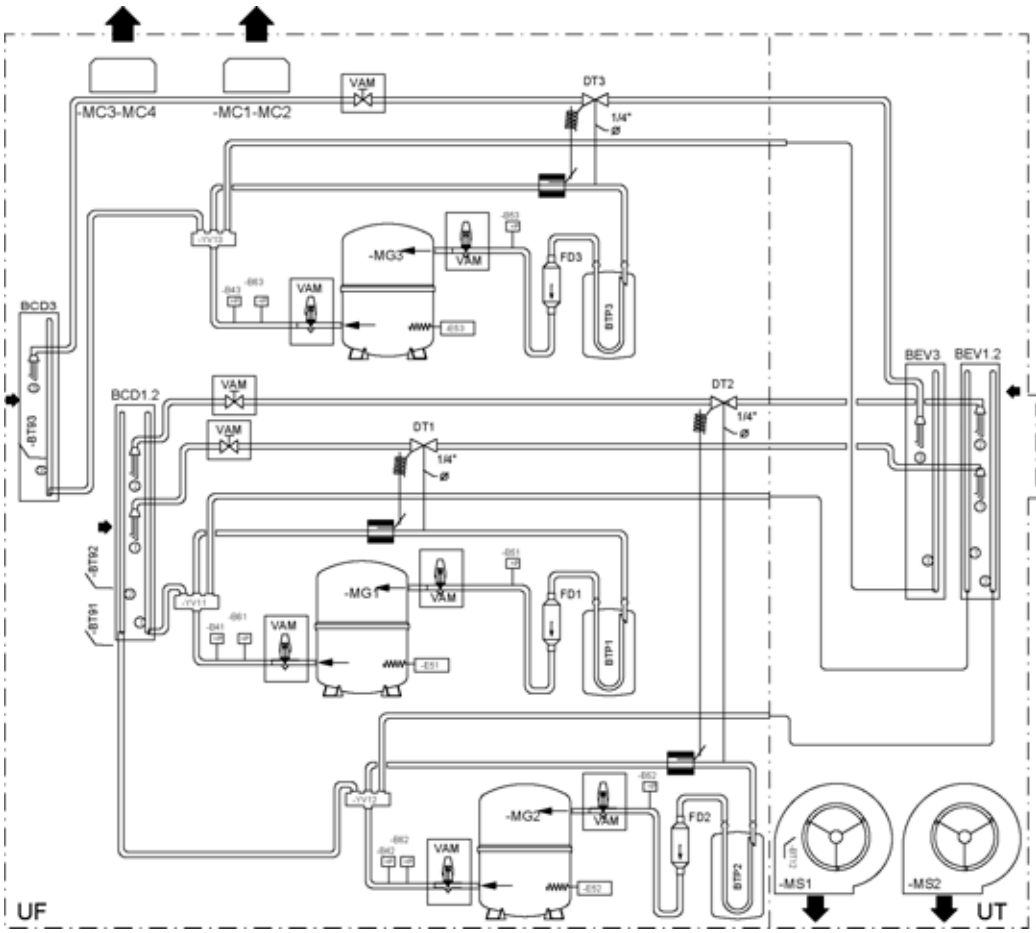
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FH 120




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"1/8 |
| Liquid Line | 5/8" |

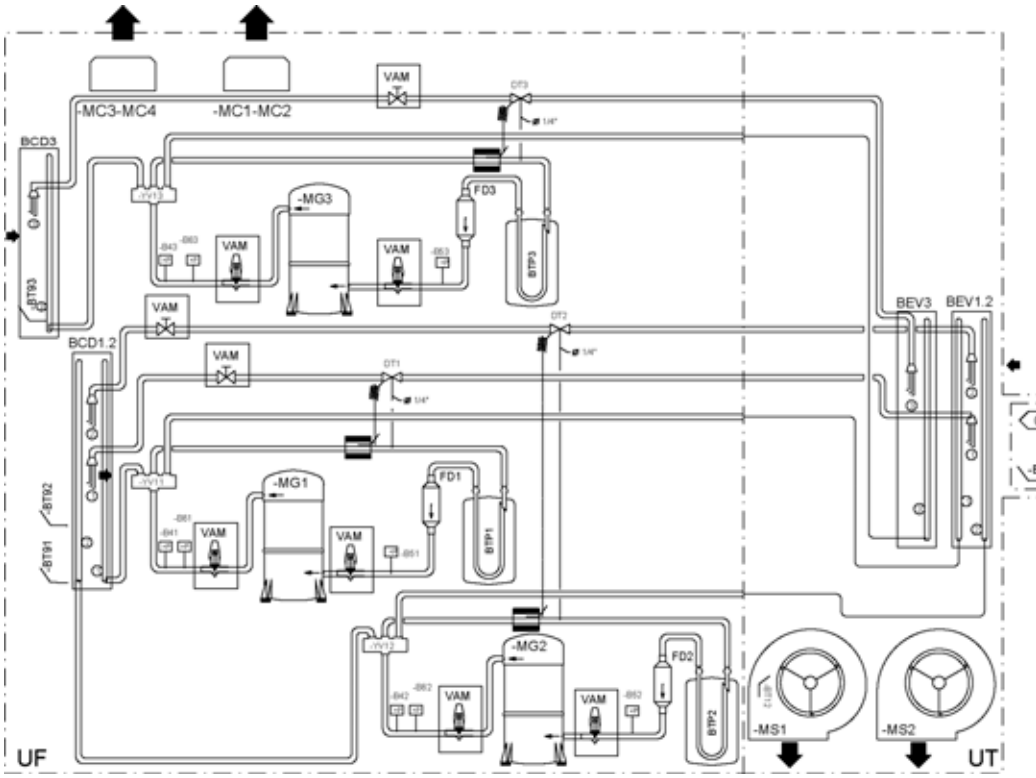
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FH 140




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"3/8 |
| Liquid Line | 7/8" |

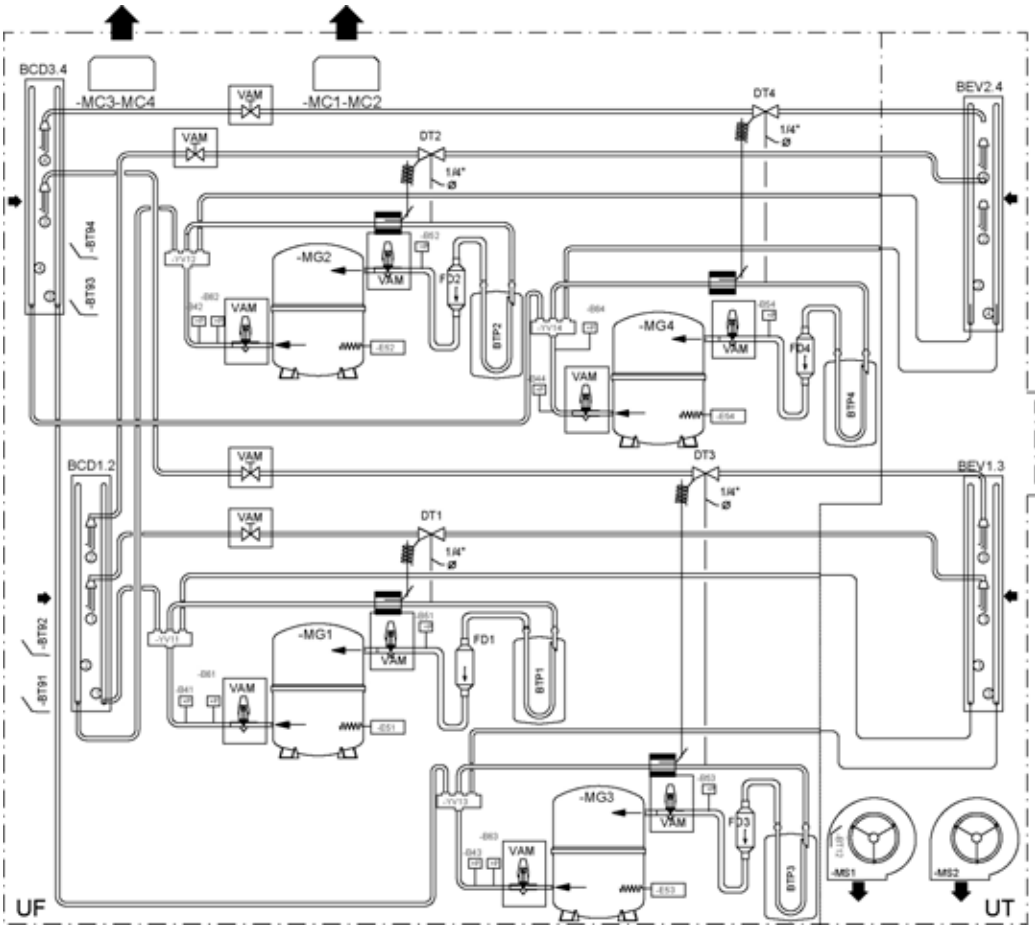
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FH 160




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"1/8 |
| Liquid Line | 5/8" |

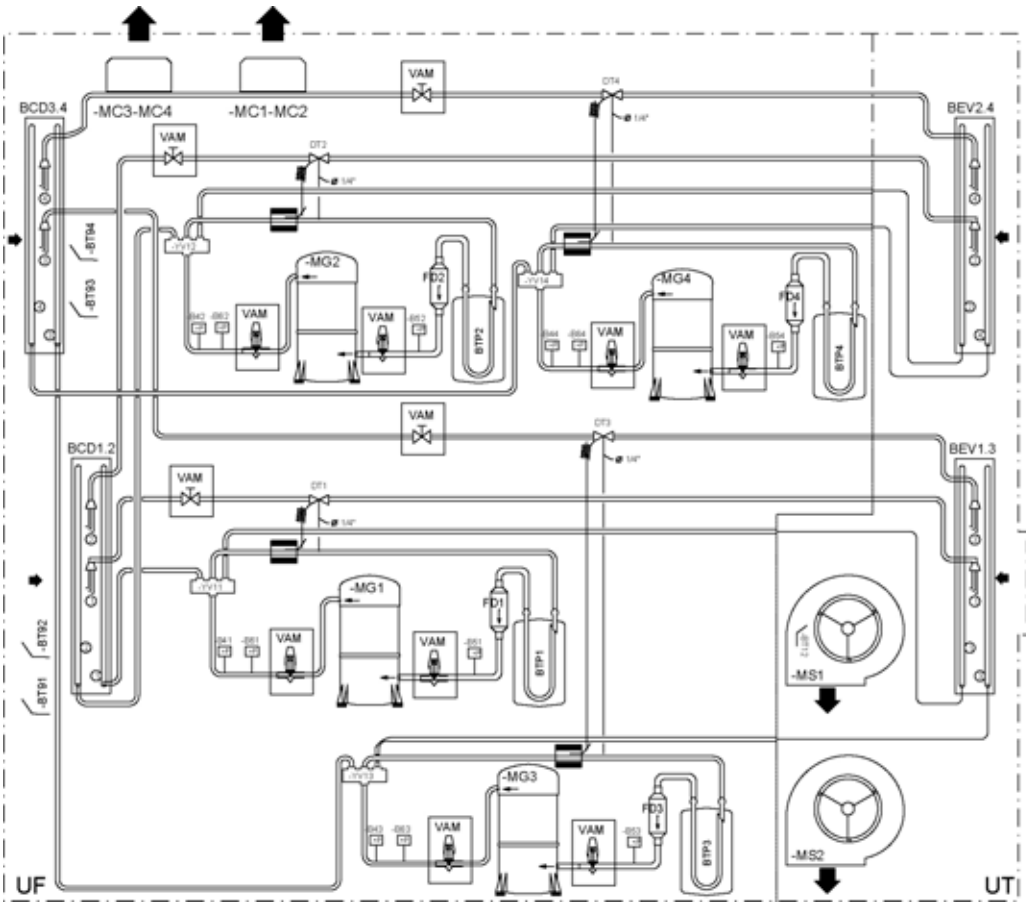
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FH 190




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"3/8 |
| Liquid Line | 7/8" |

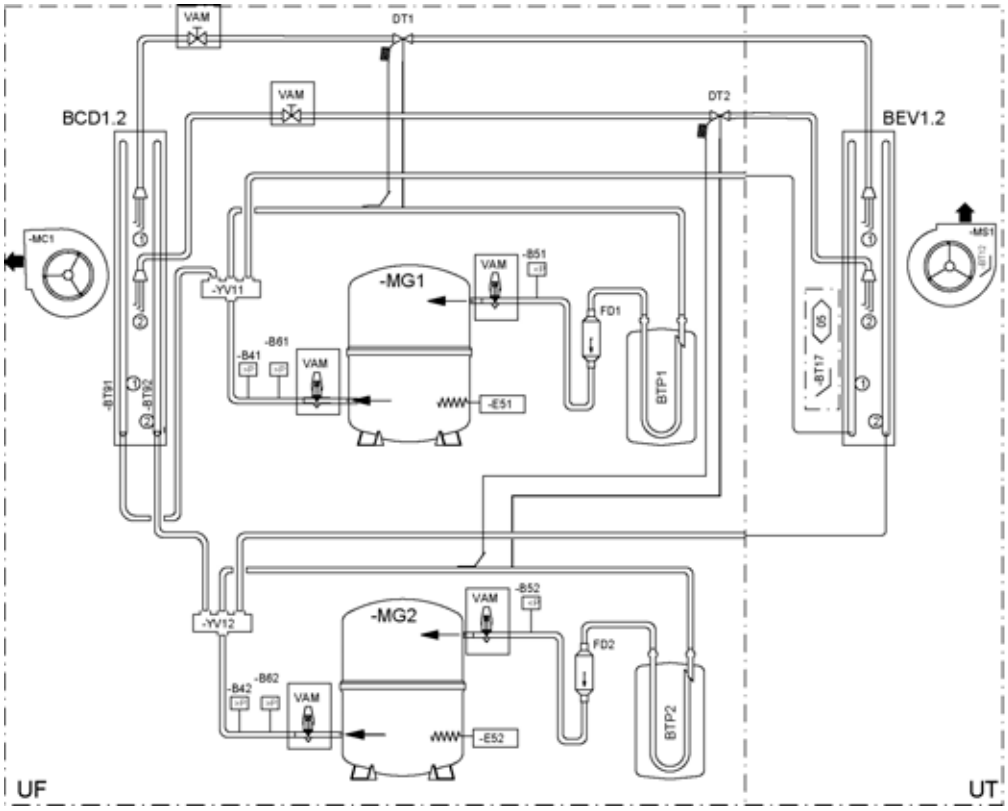
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FX 025 - FX 030




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 3/4" |
| Suction Line | 7/8" |
| Liquid Line | 5/8" |

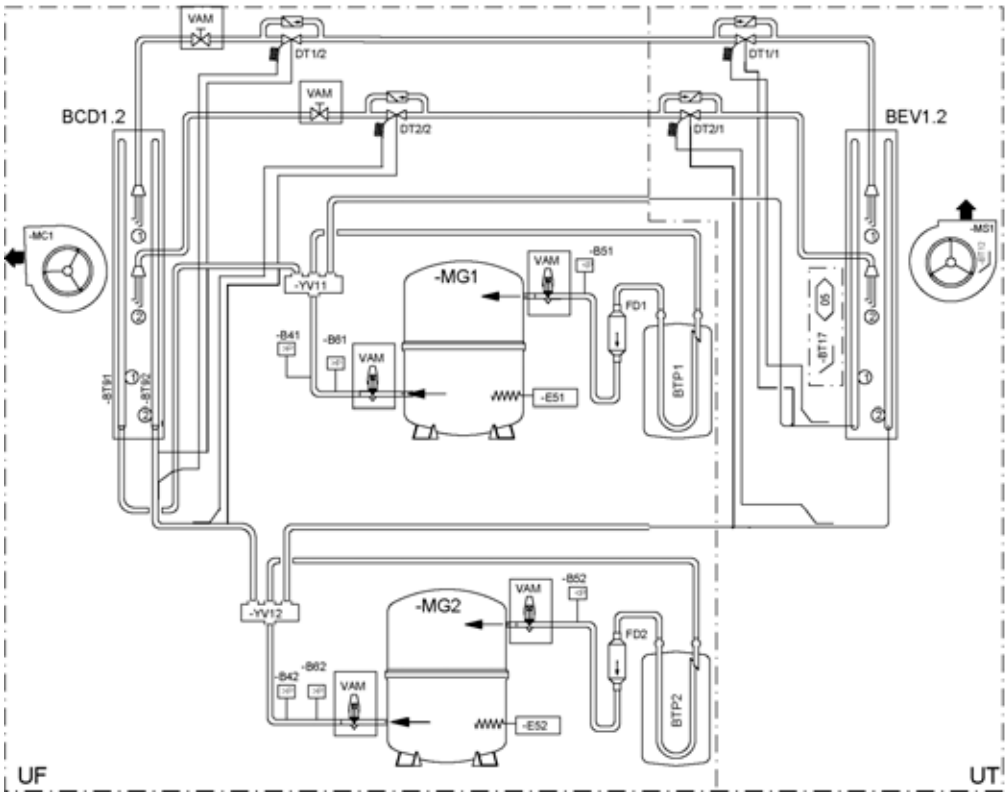
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FX 035 - FX 085




FX035-FX040

| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 3/4" |
| Suction Line | 7/8" |
| Liquid Line | 5/8" |

FX055 a FX085

| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"1/8 |
| Liquid Line | 5/8" |

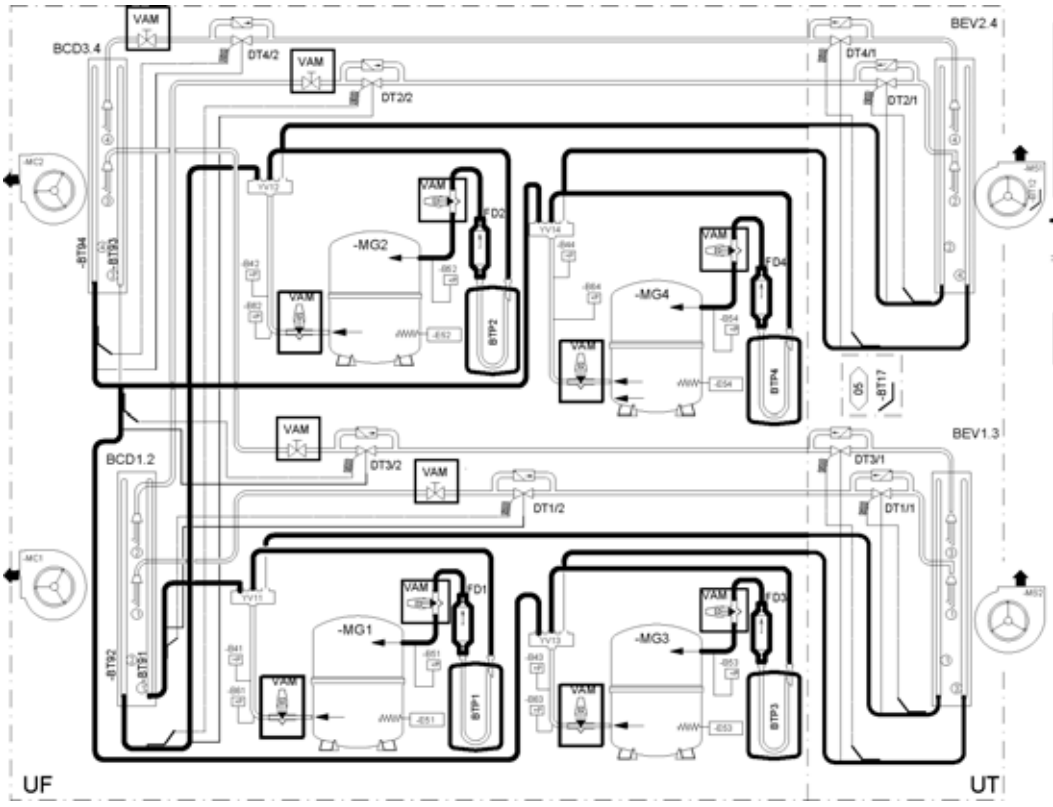
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FX 110 - FX 140 - FX 170




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"1/8 |
| Liquid Line | 5/8" |

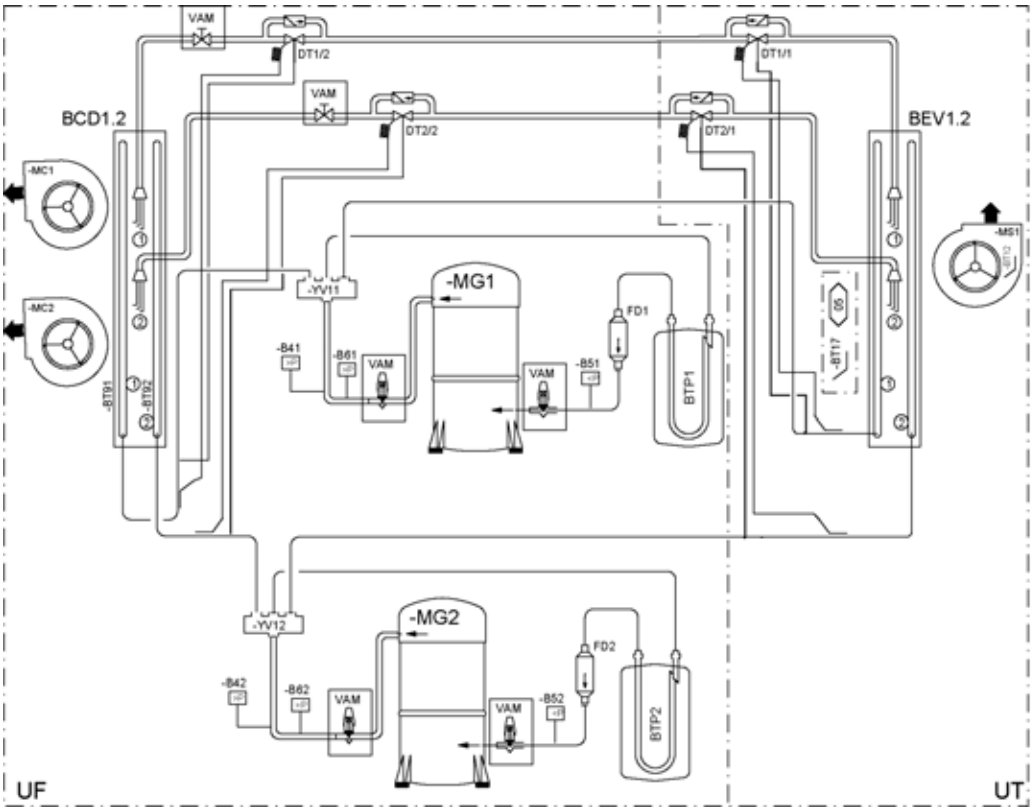
INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

FX 100




| PIPE DIAMETERS | |
|---|---|
| Discharge Line | 7/8" |
| Suction Line | 1"3/8 |
| Liquid Line | 7/8" |

INSOLATED PIPING

NON-INSOLATED PIPING

STEK OPTION

R407C OPTION

## REFRIGERATION

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **LP PROBLEMS and LP CUT OUTS** | Refrigerant charge too low | Measure the superheat and sub-cooling:<br>Good if 5°C<SC<10°C and 5°C<SH<10°C<br>Bad if SC>10°C and SH too Low<br>Check superheat adjustment and charge unit (a leak check must be carried out) |
| | In Heat Pump Mode the temperature difference between T outdoor and Tevap. (Dew) is too high<br>5°C < Delta T < 10°C excellent<br>10°C < Delta T < 15°C acceptable<br>15°C < Delta T < 25°C too high | If too high check the coils are clean or check coil internal pressure drop between the liquid line and the suction line<br>Good if < 3bar<br>Too high if > 3bar (coil blocked) |
| | Refrigeration circuit blocked in distribution | Stop the fan and create icing of the coil.<br>Check all circuits freeze evenly across the whole surface of the coil<br>If some parts of the coil do not freeze this could indicate a problem with the distribution |
| | Liquid line drier blocked. High temperature difference between inlet and outlet of the drier | Change filter drier |
| | Contaminant in the expansion valve | Attempt to free the valve adjusting element by freezing the valve and then heating the thermostatic element. Replace the valve if necessary |
| | Expansion valve not adjusted properly | Adjust the expansion valve |
| | Ice plug in the expansion valve. | Heat the main body of the valve. If the LP increases and then decreases gradually, empty the circuit and replace the drier. |
| | Incorrect insulation of the thermostatic bulb of the expansion valve | Superheat too low: adjust superheat<br>Move the thermostatic element along the pipe<br>Insulate the Thermostatic element of the valve |
| | Low Pressure Switch cut out point too high | Check the cut out pressure of the Low Pressure switch: It must be 0.7+/- 0.2bar and must closes at 2.24 +/- 0.2 bar |
| | LP cut out due to not enough defrost on heat pumps | Adjust the CLIMATIC settings to extend the defrost cycles or shorten the time between defrosts |
| **HP PROBLEMS AND HP CUT OUTS** | Incorrect Airflow rates | *Heat pump mode :*<br>Check the filter before the indoor coil measure and estimate the airflow rate increase the speed of the fan<br>*Cooling mode :*<br>Check the condenser fan (Amps) |
| | Moisture or contaminants in the system | Summer operation<br>Several hours after the unit has stopped, check the correspondance between the measured pressure and the outdoor temperature |

## REFRIGERATION

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **HP PROBLEMS AND HP CUT OUTS** | Moisture or contaminants in the system | If the circuit pressure is higher (<1bar) than the saturated pressure corresponding to the measured outdoor temperature, there is possibility that some contaminants are present in the system.<br>Reclaim the refrigerant, and vacuum the circuit (Ensure very low and slow vacuum for R407c)<br>Recharge the unit |
| | Condenser coil is obstructed | Check the condenser coil and clean is necessary |
| | Recycled Hot Air | Check clearance around the condenser |
| **Strong variations of pressure ( 2 to 3 bar) Thermostatic Expansion Valve "hunting"** | Incorrect adjustment of the expansion valve<br>Low refrigerant charge<br>Filter drier obstructed with gas bubbles at the expansion valve inlet<br>Moisture in the system | Refer to LP problems and LP cut out section |
| **Very high discharge temperature,**<br>**High amps measured at compressor** | Very high superheat, very hot compressor | Open the superheat adjustment on the expansion valve.<br>Check the pressure drop on the filter drier in the suction line |
| | Four Way reversing valve possibly blocked, abnormal noise from the valve, low LP and increasing HP | Check operation of the valve by going through cycle inversions. Change if necessary.<br>Refer to LP problems |

## INDOOR FAN BLOWER

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **High amps on action Fan motor** | Pressure drop in the ducting installation too low. | Reduce the rotation speed of the fan<br>Measure and estimate the airflow and pressure and compare with the specification from customer. |
| **High amps on reaction Fan motor** | Pressure drop in the ducting installation too high. | Reduce the rotation speed of the fan<br>Measure and estimate the airflow and pressure and compare with the specification from customer. |
| **Unstable running and high vibration** | Fan jumping from one operating point to the other. | Change rotation speed of the fan. |

## OUTDOOR AXIAL FAN

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **Heat Pump mode : Circuit breaker open** | High Amps due to a low voltage from the main supply | Check the voltage drop when all components are running.<br>Change the circuit breaker for one with a higher rating. |
| | High amps due to freezing of the coil | Check the adjustable amps on the motor starter.<br>Adjust the defrost cycle set points. |
| | Flexy : Water ingress in the motor connection box. | Change the component |

## ELECTRIC HEATER

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **High Temperature trip out on electric heater** | Low airflow rate | Measure and estimate the airflow and pressure and compare with the specification from customer. |
| | Incorrect position of the Klixon | Check that the Klixon, is positioned in the airflow, relocate Klixon if necessary<br>Check that there is no heat transfer from the Klixon support. |

## ELECTRIC HEATER

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **Water found in the ventilation section** | Cooling mode:<br>Water carried away from the coil because of excessive airflow and speed on the coil. | Estimate the airflow rate and check the speed is lower than 2.8 m/s |
| | Low air pressure in the compartment due to a high airflow rate or a high pressure drop before the fan | Check filter<br>Reduce airflow rate |
| **Water ingress in the filter compartment** | Check seals around the ventilation section. | Check the door seal<br>Check for the presence of silicone seals in the corners of the door and at the bottom of the refrigeration section bulkhead. |
| | Water ingress through a leaking fresh air hood or when running 100% fresh air | Check the seals and flanges in the fresh air hood<br>Reduce the airflow rate if necessary |

Rooftops are generally placed on the roof but can also be installed in technical rooms. These units are very robust but a minimum regular maintenance is required. Some moving parts in the units can suffer from wear and tear and must be checked regularly (belts). Other parts can get clogged by dirt carried in the air (filters) and must be cleaned or replaced.

These units are designed to produce cooled or heated air through the use of a refrigeration vapour compression system, it is therefore imperative to monitor the refrigeration circuit operating pressures and check the pipe-work for leaks.

The table below, details a possible maintenance plan, including the operations to be carried out and the periodicity at which they must be accomplished. It is recommended to follow such a plan to keep a rooftop unit in good working order. Regular maintenance of your rooftop will extend its operating life and reduce operating faults

| *Symbols and Legend :* | |
|---|---|
| **0** | Operation which can be carried out by on-site maintenance technicians. |
| **Δ** | Operation which **must** be carried out by qualified personnel, trained to operate on this type of equipment. |

***NOTE :***

- Times are given for information purpose only and may vary depending on the unit size and type of installation.
- Coil cleaning must be carried out by qualified personnel using appropriate methods that won't damage the fins or the tubes.
- It is recommended to keep a minimum stock of common replacement parts in order to be able to carry out regular maintenance operations (i.e. filters). You can contact your local Lennox representative which can assist you in establishing a parts list for each type of equipment.
- The access ports to the refrigeration circuits MUST be leak checked every time gauges are connected to the service ports.

| TASK | OPERATING MODE | MONTHLY | QUARTERLY | 6 MONTHLY | YEARLY B4 WINTER | ESTIMATED TIME (mn) |
|---|---|---|---|---|---|---|
| **Clean or replace filters: Disposable, or metal frame.** | Replace filters with new ones if disposable. Vacuum clean or blow the dirt. Wash and dry carefully. +Replace media if necessary Blocked filter will reduced the performance of the unit. THE UNIT MUST NOT OPERATE WITHOUT FILTERS | 0 | | | | 20 |
| **Visual check of the oil level** | Visually check the oil level through the sight glass on the side of the compressor casing | 0 | | | | 2 |
| **Position check of the compressor crankcase heater.** | Check the heating resistance is fitted properly and tight around the compressor body. | 0 | | | | 2 |
| **Belt tension check.** | Check belt tension (Info in IOM) Replace belt if necessary. | 0 | | | | 10 |
| **Centrifugal fan bearings check** | Isolate unit from the main power supply; Push the fan wheel manually and check for abnormal noises. Bearings are lubricated for life but may need replacement after 10000 hours | 0 | | | | 10 |
| **Check absorbed Amps** | Check absorbed Amps on all three phases; compare with the nominal value given in the electrical wiring diagram. | | Δ | | | 15 |
| **Check Smoke detector** | Start the unit. Trigger the smoke detector by moving a magnet around the detector head. Reset unit and control. | | Δ | | | 5 |
| **Check Climatic control, set-points and variables** | Refer to the commissioning sheet; Check all set points are set according to this document. | | Δ | | | 15 |
| **Check clock settings** | Check the time and date of the control | | 0 | | | 5 |
| **Check the position and tightness of refrigeration components** | Check systematically all connections and fixings on the refrigeration circuit. Check for oil traces, eventually a leak test should be conducted. Check operating pressures correspond to the ones indicated on the commissioning sheet | | Δ | | | 30 |
| **Check Airflow rate safety switch (if fitted).** | Shut down supply fan. The fault must be detected within 5 seconds. | | | 0 | | |
| **Check freeze protection on HWC** | | | | Δ | | 5 |
| **Check three way valve on HWC** | Increase room set-point 10°C above the actual room temperature. Check operation of the piston. It must move away from the valve head. Reset the control. | | | Δ | | 5 |
| **Check economiser actuator operation** | Check all fixings and transmission. Stop the unit using the control. The fresh air damper must closes. Start the unit the fresh air damper should open | | | Δ | | 5 |
| **Check refrigeration 4way valve** | With the unit running in cooling mode increase the room set-point temperature by 10°C. The unit should switch to heat pump mode. Reset the control. | | | Δ | | 5 |
| **Check tightness of all electrical connections** | Power down the unit and check and tighten all screws, terminal and electric connections, taking a particular attention to the power lines and low voltage control wires | | | Δ | | 30 |

| TASK | OPERATING MODE | MONTHLY | QUARTERLY | 6 MONTHLY | YEARLY B4 WINTER | ESTIMATED TIME (mn) |
|---|---|---|---|---|---|---|
| **Check HP / LP safety switches** | Install manifold gauges on the circuit to be checked. Shut down the axial fans and wait for the HP switch to shut down the compressor: 29bar (+1 / -0) auto-reset 22bar (+ - 0.7) Reconnect fans. Switch off the centrifugal supply fan and wait for the LP switch to cut out: 0.5bar (+ - 0.5) reset 1.5bar (+-0.5). | | | Δ | | 15 |
| **Check outdoor fans and fan guards** | Check the fan blades conditions and all fan guards and protections | | | | 0 | 5 |
| **Check position of all sensors** | Check the good positioning and operation of all sensors of all sensors. Check the values given in the control system. Replace sensor if necessary | | | | 0 | 5 |
| **Check and clean if necessary all fresh air grilles** | Check the fresh air grilles (if fitted). If dirty or damaged, remove them from unit and clean with high pressure water cleaner. Refit on unit once clean and dry. | | | | 0 | 5 |
| **Check indoor and outdoor coils, clean if necessary** | Visually check the coils for dirt. If not too dirty, cleaning with a light brush may be enough (WARNING: Fins and copper tubes are very fragile! Any damage WILL reduce the performances of the unit). If very dirty, deep industrial cleaning is required using de-greasing agents.(External contractors must be called). | | | | 0 / Δ | 1h if cleaning |
| **Check electric heater element for excessive corrosion** | Isolate the unit; Pull the electric heater out of the heater module box and check the resistances fo traces of corrosion; Replace resistance as required; | | | | 0 | 1h if replacement |
| **Check anti-vibration mountings, for wear and tear.** | Visually check anti-vibration mountings on compressors and centrifugal fan. Replace if damaged. | | | | 0 | 1h if replacement |
| **Check refrigeration circuit for traces of acid in the oil** | Take a sample of oil from the refrigeration circuit. | | | | Δ | |
| **Check Glycol concentration in the HWC circuit** | Check the glycol concentration in the pressurised water circuit. ( a concentration of 30% gives a protection down to aprox. -15°C) check the circuit pressure | | | | Δ | 30 |
| **Check defrost cycle with 4-way valve inversion.** | Switch the unit to heat pump mode. Change the set point to obtain the standard defrost mode and reduce the cycle time to the min value. Check the operation of the defrost cycle. | | | | Δ | 30 |
| **Gas burner module check for corrosion** | Pull out the burner to access the tubes (refer to Gas burner section in the IOM) | | | | Δ | 30 |
| **Sweeping and cleaning the gas burner** | Clean the in-shot burners and the blower wheel lightly with a brush. Sweep the flue and flue box. Wipe-off the dust from the housing of the motor. Clean combustion air inlet louvers Pull-out baffles from the tubes, sweep the tubes<br>CHECK FLUE BOX GASKET | | | | Δ | 30 |
| **Gas supply pressures / connections checks** | refer to Gas burner section in the IOM for details | | | | Δ | 15 |
| **Gas regulation valve settings** | refer to Gas burner section in the IOM for details | | | | Δ | 30 |
| **Check gas burner safety switches** | refer to Gas burner section in the IOM for details | | | | Δ | 30 |

## TERMS AND CONDITIONS

In the absence of any other written agreement, the guarantee shall only apply to design faults which occur within a 12 month period (warranty period).

The warranty period starts on the date of commissioning and at the latest six months after the delivery of the Rooftop.

## ANTI-CORROSION WARRANTY

**10 year warranty terms and conditions for corrosion to the Rooftop casing :**

Lennox shall guarantee the casing of its Rooftop units manufactured since May 1991 against corrosion for 10 years commencing from the date of delivery of the material.

The warranty shall not apply in the following cases :

1. If the corrosion of the casing is caused by external damage to the protective layer such as scratches, projections, abrasion, impacts etc...
2. If the casing is not kept continually clean in the course of maintenance work or by a specialist company,
3. If the casing is not cleaned and maintained in accordance with regulations,
4. If the Rooftop units are installed on a site or in an environment which is known to be corrosive, unless a special protective coating has been applied by the owner for these applications, which has been recommended by a competent body not linked to the owner and after carrying out a study of the site.
5. Nevertheless the LENNOX coating is highly resistant to corrosion, the warranty will not be applied for rooftop installed at less than 1000m away from the sea.

Note : With the exception of the casing, the rest of the machine is covered by the warranty of our general terms of sale.

## DO NOT CONFUSE THE WARRANTY WITH MAINTENANCE

The warranty will only apply if a maintenance contract has been signed, starting from the date of commissioning, and if the maintenance contract has actually been performed.

The maintenance contract must be made with a specialist, competent company.

The sole effect of any repair, modification or replacement of an item during the warranty period must be to extend the material's warranty period.

Maintenance must be carried out in accordance with regulations.

If a spare part is supplied after the expiry of the warranty period, it shall be guaranteed for a period equal to the initial warranty period and will be subject to the same conditions.

We recommend for a contract four inspections per year (every three months), before the start of each season, in order to check the operation of the equipment in the various operating modes.

## REFRIGERATION

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **LP PROBLEMS and LP CUT OUTS** | Refrigerant charge too low | Measure the superheat and sub-cooling:<br>Good if 5°C<SC<10°C and 5°C<SH<10°C<br>Bad if SC>10°C and SH too Low<br>Check superheat adjustment and charge unit (a leak check must be carried out) |
| | In Heat Pump Mode the temperature difference between T outdoor and Tevap. (Dew) is too high<br>5°C < Delta T < 10°C excellent<br>10°C < Delta T < 15°C acceptable<br>15°C < Delta T < 25°C too high | If too high check the coils are clean or check coil internal pressure drop between the liquid line and the suction line<br>Good if < 3bar<br>Too high if > 3bar (coil blocked) |
| | Refrigeration circuit blocked in distribution | Stop the fan and create icing of the coil.<br>Check all circuits freeze evenly across the whole surface of the coil<br>If some parts of the coil do not freeze this could indicate a problem with the distribution |
| | Liquid line drier blocked. High temperature difference between inlet and outlet of the drier | Change filter drier |
| | Contaminant in the expansion valve | Attempt to free the valve adjusting element by freezing the valve and then heating the thermostatic element. Replace the valve if necessary |
| | Expansion valve not adjusted properly | Adjust the expansion valve |
| | Ice plug in the expansion valve. | Heat the main body of the valve. If the LP increases and then decreases gradually, empty the circuit and replace the drier. |
| | Incorrect insulation of the thermostatic bulb of the expansion valve | Superheat too low: adjust superheat<br>Move the thermostatic element along the pipe<br>Insulate the Thermostatic element of the valve |
| | Low Pressure Switch cut out point too high | Check the cut out pressure of the Low Pressure switch: It must be 0.7+/- 0.2bar and must closes at 2.24 +/- 0.2 bar |
| | LP cut out due to not enough defrost on heat pumps | Adjust the CLIMATIC settings to extend the defrost cycles or shorten the time between defrosts |
| **HP PROBLEMS AND HP CUT OUTS** | Incorrect Airflow rates | *Heat pump mode :*<br>Check the filter before the indoor coil measure and estimate the airflow rate increase the speed of the fan<br>*Cooling mode :*<br>Check the condenser fan (Amps) |
| | Moisture or contaminants in the system | Summer operation<br>Several hours after the unit has stopped, check the correspondance between the measured pressure and the outdoor temperature |

## REFRIGERATION

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **HP PROBLEMS AND HP CUT OUTS** | Moisture or contaminants in the system | If the circuit pressure is higher (<1bar) than the saturated pressure corresponding to the measured outdoor temperature, there is possibility that some contaminants are present in the system.<br>Reclaim the refrigerant, and vacuum the circuit (Ensure very low and slow vacuum for R407c)<br>Recharge the unit |
| | Condenser coil is obstructed | Check the condenser coil and clean is necessary |
| | Recycled Hot Air | Check clearance around the condenser |
| **Strong variations of pressure ( 2 to 3 bar) Thermostatic Expansion Valve "hunting"** | Incorrect adjustment of the expansion valve<br>Low refrigerant charge<br>Filter drier obstructed with gas bubbles at the expansion valve inlet<br>Moisture in the system | Refer to LP problems and LP cut out section |
| **Very high discharge temperature,**<br>**High amps measured at compressor** | Very high superheat, very hot compressor | Open the superheat adjustment on the expansion valve.<br>Check the pressure drop on the filter drier in the suction line |
| | Four Way reversing valve possibly blocked, abnormal noise from the valve, low LP and increasing HP | Check operation of the valve by going through cycle inversions. Change if necessary.<br>Refer to LP problems |

## INDOOR FAN BLOWER

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **High amps on action Fan motor** | Pressure drop in the ducting installation too low. | Reduce the rotation speed of the fan<br>Measure and estimate the airflow and pressure and compare with the specification from customer. |
| **High amps on reaction Fan motor** | Pressure drop in the ducting installation too high. | Reduce the rotation speed of the fan<br>Measure and estimate the airflow and pressure and compare with the specification from customer. |
| **Unstable running and high vibration** | Fan jumping from one operating point to the other. | Change rotation speed of the fan. |

## OUTDOOR AXIAL FAN

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **Heat Pump mode : Circuit breaker open** | High Amps due to a low voltage from the main supply | Check the voltage drop when all components are running.<br>Change the circuit breaker for one with a higher rating. |
| | High amps due to freezing of the coil | Check the adjustable amps on the motor starter.<br>Adjust the defrost cycle set points. |
| | Flexy : Water ingress in the motor connection box. | Change the component |

## ELECTRIC HEATER

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **High Temperature trip out on electric heater** | Low airflow rate | Measure and estimate the airflow and pressure and compare with the specification from customer. |
| | Incorrect position of the Klixon | Check that the Klixon, is positioned in the airflow, relocate Klixon if necessary<br>Check that there is no heat transfer from the Klixon support. |

## ELECTRIC HEATER

| FAULT | POSSIBLE CAUSE AND SYMPTOMS | SOLUTION |
|---|---|---|
| **Water found in the ventilation section** | Cooling mode:<br>Water carried away from the coil because of excessive airflow and speed on the coil. | Estimate the airflow rate and check the speed is lower than 2.8 m/s |
| | Low air pressure in the compartment due to a high airflow rate or a high pressure drop before the fan | Check filter<br>Reduce airflow rate |
| **Water ingress in the filter compartment** | Check seals around the ventilation section. | Check the door seal<br>Check for the presence of silicone seals in the corners of the door and at the bottom of the refrigeration section bulkhead. |
| | Water ingress through a leaking fresh air hood or when running 100% fresh air | Check the seals and flanges in the fresh air hood<br>Reduce the airflow rate if necessary |

Rooftops are generally placed on the roof but can also be installed in technical rooms. These units are very robust but a minimum regular maintenance is required. Some moving parts in the units can suffer from wear and tear and must be checked regularly (belts). Other parts can get clogged by dirt carried in the air (filters) and must be cleaned or replaced.

These units are designed to produce cooled or heated air through the use of a refrigeration vapour compression system, it is therefore imperative to monitor the refrigeration circuit operating pressures and check the pipe-work for leaks.

The table below, details a possible maintenance plan, including the operations to be carried out and the periodicity at which they must be accomplished. It is recommended to follow such a plan to keep a rooftop unit in good working order. Regular maintenance of your rooftop will extend its operating life and reduce operating faults

| *Symbols and Legend :* | |
|---|---|
| **0** | Operation which can be carried out by on-site maintenance technicians. |
| **Δ** | Operation which **must** be carried out by qualified personnel, trained to operate on this type of equipment. |

***NOTE :***

- Times are given for information purpose only and may vary depending on the unit size and type of installation.
- Coil cleaning must be carried out by qualified personnel using appropriate methods that won't damage the fins or the tubes.
- It is recommended to keep a minimum stock of common replacement parts in order to be able to carry out regular maintenance operations (i.e. filters). You can contact your local Lennox representative which can assist you in establishing a parts list for each type of equipment.
- The access ports to the refrigeration circuits MUST be leak checked every time gauges are connected to the service ports.

| TASK | OPERATING MODE | MONTHLY | QUARTERLY | 6 MONTHLY | YEARLY B4 WINTER | ESTIMATED TIME (mn) |
|---|---|---|---|---|---|---|
| **Clean or replace filters: Disposable, or metal frame.** | Replace filters with new ones if disposable. Vacuum clean or blow the dirt. Wash and dry carefully. +Replace media if necessary Blocked filter will reduced the performance of the unit. THE UNIT MUST NOT OPERATE WITHOUT FILTERS | 0 | | | | 20 |
| **Visual check of the oil level** | Visually check the oil level through the sight glass on the side of the compressor casing | 0 | | | | 2 |
| **Position check of the compressor crankcase heater.** | Check the heating resistance is fitted properly and tight around the compressor body. | 0 | | | | 2 |
| **Belt tension check.** | Check belt tension (Info in IOM) Replace belt if necessary. | 0 | | | | 10 |
| **Centrifugal fan bearings check** | Isolate unit from the main power supply; Push the fan wheel manually and check for abnormal noises. Bearings are lubricated for life but may need replacement after 10000 hours | 0 | | | | 10 |
| **Check absorbed Amps** | Check absorbed Amps on all three phases; compare with the nominal value given in the electrical wiring diagram. | | Δ | | | 15 |
| **Check Smoke detector** | Start the unit. Trigger the smoke detector by moving a magnet around the detector head. Reset unit and control. | | Δ | | | 5 |
| **Check Climatic control, set-points and variables** | Refer to the commissioning sheet; Check all set points are set according to this document. | | Δ | | | 15 |
| **Check clock settings** | Check the time and date of the control | | 0 | | | 5 |
| **Check the position and tightness of refrigeration components** | Check systematically all connections and fixings on the refrigeration circuit. Check for oil traces, eventually a leak test should be conducted. Check operating pressures correspond to the ones indicated on the commissioning sheet | | Δ | | | 30 |
| **Check Airflow rate safety switch (if fitted).** | Shut down supply fan. The fault must be detected within 5 seconds. | | | 0 | | |
| **Check freeze protection on HWC** | | | | Δ | | 5 |
| **Check three way valve on HWC** | Increase room set-point 10°C above the actual room temperature. Check operation of the piston. It must move away from the valve head. Reset the control. | | | Δ | | 5 |
| **Check economiser actuator operation** | Check all fixings and transmission. Stop the unit using the control. The fresh air damper must closes. Start the unit the fresh air damper should open | | | Δ | | 5 |
| **Check refrigeration 4way valve** | With the unit running in cooling mode increase the room set-point temperature by 10°C. The unit should switch to heat pump mode. Reset the control. | | | Δ | | 5 |
| **Check tightness of all electrical connections** | Power down the unit and check and tighten all screws, terminal and electric connections, taking a particular attention to the power lines and low voltage control wires | | | Δ | | 30 |

| TASK | OPERATING MODE | MONTHLY | QUARTERLY | 6 MONTHLY | YEARLY B4 WINTER | ESTIMATED TIME (mn) |
|---|---|---|---|---|---|---|
| **Check HP / LP safety switches** | Install manifold gauges on the circuit to be checked. Shut down the axial fans and wait for the HP switch to shut down the compressor: 29bar (+1 / -0) auto-reset 22bar (+ - 0.7) Reconnect fans. Switch off the centrifugal supply fan and wait for the LP switch to cut out: 0.5bar (+ - 0.5) reset 1.5bar (+-0.5). | | | Δ | | 15 |
| **Check outdoor fans and fan guards** | Check the fan blades conditions and all fan guards and protections | | | | 0 | 5 |
| **Check position of all sensors** | Check the good positioning and operation of all sensors of all sensors. Check the values given in the control system. Replace sensor if necessary | | | | 0 | 5 |
| **Check and clean if necessary all fresh air grilles** | Check the fresh air grilles (if fitted). If dirty or damaged, remove them from unit and clean with high pressure water cleaner. Refit on unit once clean and dry. | | | | 0 | 5 |
| **Check indoor and outdoor coils, clean if necessary** | Visually check the coils for dirt. If not too dirty, cleaning with a light brush may be enough (WARNING: Fins and copper tubes are very fragile! Any damage WILL reduce the performances of the unit). If very dirty, deep industrial cleaning is required using de-greasing agents.(External contractors must be called). | | | | 0 / Δ | 1h if cleaning |
| **Check electric heater element for excessive corrosion** | Isolate the unit; Pull the electric heater out of the heater module box and check the resistances fo traces of corrosion; Replace resistance as required; | | | | 0 | 1h if replacement |
| **Check anti-vibration mountings, for wear and tear.** | Visually check anti-vibration mountings on compressors and centrifugal fan. Replace if damaged. | | | | 0 | 1h if replacement |
| **Check refrigeration circuit for traces of acid in the oil** | Take a sample of oil from the refrigeration circuit. | | | | Δ | |
| **Check Glycol concentration in the HWC circuit** | Check the glycol concentration in the pressurised water circuit. ( a concentration of 30% gives a protection down to aprox. -15°C) check the circuit pressure | | | | Δ | 30 |
| **Check defrost cycle with 4-way valve inversion.** | Switch the unit to heat pump mode. Change the set point to obtain the standard defrost mode and reduce the cycle time to the min value. Check the operation of the defrost cycle. | | | | Δ | 30 |
| **Gas burner module check for corrosion** | Pull out the burner to access the tubes (refer to Gas burner section in the IOM) | | | | Δ | 30 |
| **Sweeping and cleaning the gas burner** | Clean the in-shot burners and the blower wheel lightly with a brush. Sweep the flue and flue box. Wipe-off the dust from the housing of the motor. Clean combustion air inlet louvers Pull-out baffles from the tubes, sweep the tubes<br>CHECK FLUE BOX GASKET | | | | Δ | 30 |
| **Gas supply pressures / connections checks** | refer to Gas burner section in the IOM for details | | | | Δ | 15 |
| **Gas regulation valve settings** | refer to Gas burner section in the IOM for details | | | | Δ | 30 |
| **Check gas burner safety switches** | refer to Gas burner section in the IOM for details | | | | Δ | 30 |

## TERMS AND CONDITIONS

In the absence of any other written agreement, the guarantee shall only apply to design faults which occur within a 12 month period (warranty period).

The warranty period starts on the date of commissioning and at the latest six months after the delivery of the Rooftop.

## ANTI-CORROSION WARRANTY

**10 year warranty terms and conditions for corrosion to the Rooftop casing :**

Lennox shall guarantee the casing of its Rooftop units manufactured since May 1991 against corrosion for 10 years commencing from the date of delivery of the material.

The warranty shall not apply in the following cases :

1. If the corrosion of the casing is caused by external damage to the protective layer such as scratches, projections, abrasion, impacts etc...
2. If the casing is not kept continually clean in the course of maintenance work or by a specialist company,
3. If the casing is not cleaned and maintained in accordance with regulations,
4. If the Rooftop units are installed on a site or in an environment which is known to be corrosive, unless a special protective coating has been applied by the owner for these applications, which has been recommended by a competent body not linked to the owner and after carrying out a study of the site.
5. Nevertheless the LENNOX coating is highly resistant to corrosion, the warranty will not be applied for rooftop installed at less than 1000m away from the sea.

Note : With the exception of the casing, the rest of the machine is covered by the warranty of our general terms of sale.

## DO NOT CONFUSE THE WARRANTY WITH MAINTENANCE

The warranty will only apply if a maintenance contract has been signed, starting from the date of commissioning, and if the maintenance contract has actually been performed.

The maintenance contract must be made with a specialist, competent company.

The sole effect of any repair, modification or replacement of an item during the warranty period must be to extend the material's warranty period.

Maintenance must be carried out in accordance with regulations.

If a spare part is supplied after the expiry of the warranty period, it shall be guaranteed for a period equal to the initial warranty period and will be subject to the same conditions.

We recommend for a contract four inspections per year (every three months), before the start of each season, in order to check the operation of the equipment in the various operating modes.

# CERTIFICATION

N° QUAL/2001/15834b

## LENNOX FRANCE
## DIVISION DE LGL FRANCE

**CONCEPTION, FABRICATION ET CESSION INTERNE DE ROOF TOP ET CENTRALES DE TRAITEMENT D'AIR.**

***DESIGN, MANUFACTURING AND INTERNAL TRANSFER OF ROOF TOP AND AIR HANDLING UNITS.***

**2, rue Lavoisier ZI de Longvic BP 60 F-21602 LONGVIC CEDEX**

AFAQ certifie que pour les activités et les sites référencés ci-dessus toutes les dispositions mises en oeuvre pour répondre aux exigences requises par la norme internationale :
*AFAQ certifies that all the arrangements covering the above mentioned activities and locations are established to meet the requirements of the international standard :*

## ISO 9001 : 2000

ont été examinées et jugées conformes.
*have been examined and found conform.*

**2003-01-24**

(année/mois/jour) — Il est valable jusqu'au* / *It is valid until** — **2006-01-23** — (year/month/day)

| Le Président du Comité de certification | Le Directeur Général d'AFAQ | Le Représentant de l'Entreprise |
|---|---|---|
| *The President of the Certification Committee* | *The Managing Director of AFAQ* | *On Behalf of the Firm* |
| C. GUERIN | O. PEYRAT | E. MOUTON |

Site Industriel de LONGVIC
ZI de LONGVIC – BP 60
21602 LONGVIC – France

Téléphone : +33 (0)3 80 77 41 41
Fax : +33 (0)3 80 66 66 35

## DECLARATION DE CONFORMITE DU CONSTRUCTEUR
## Conformément
## à la Directive européenne « Equipement sous pression » 97/23/CE,

## *CE CONFORMITY DECLARATION*
## *As defined by*
## *« Pressure equipment » Directive 97/23/EC,*

**LGL France SA, ZI Les Meurières – 69780 Mions – France**

La société soussignée certifie sous sa seule responsabilité que l'ensemble de nos fabrications de roof top désignés par les types suivants :
*The company hereby declare, under its own responsibility, that the entire roof top range which designations are :*

**FCA FHA FGA FDA FCK FHK FGK FDK**
**FXA FXK**
**BCK BHK BGK BDK**

Qui contiennent des fluides frigorigènes classés en groupe 2 (R22 et R407C),
*Which are containing refrigerating fluids classified in group 2 (R22 et R407C),*

Sont conformes aux dispositions de la Directive « Equipements sous pression », 97/23/CE
*Is in compliance with the requirements of « Under pressure equipments » directive, 97/23/EC :*

Catégorie *Category :* **II**
Module d'évaluation *Evaluation Module :* **D1**
Organisme notifié *Notified body :* **Bureau VERITAS**
17 bis, place des reflets – La DEFENSE 2 – 92400 Courbevoie.

Sont conformes aux dispositions de la Directive - Are *in compliance with the requirements of*
« Machines », 98/37/CE - *« Machinery », 98/37/EC*
« Basse Tension », 73/23/CEE modifiée - *« Low voltage », 73/23/EEC amended*
« CEM», 89/336/CEE - *« EMC », 89/336/EEC*
« Appareils à gaz », 90/396/CEE modifiée - *« Gas machines », 90/396/EEC amended*

Ces produits sont fournis avec un marquage de conformité .
*The products are provided with a marking of conformity.*

Date : 10 Mai 2004 / May 10th 2004

**E. MOUTON**
**Directeur du site de Longvic**

**LENNOX France, Division climatisation de LGL France**
Siège social : LGL France – ZI « Les Meurières » - BP71 – 69780 MIONS – France
Société anonyme au capital de 309.615.120F – RCS LYON B 309 528 115 – N° IDENTIFICATION TVA FR 59 309 528 115 – APE 292F

CSTB
le futur en construction

Accréditation n° 1-0300
cofrac ESSAIS

***SÉCURITÉ FEU***
*Réaction au feu*

# PROCÈS-VERBAL DE CLASSEMENT DE RÉACTION AU FEU D'UN MATÉRIAU

**Prévu à l'article 88 de l'Arrêté du Ministère de l'Intérieur du 30 juin 1983, modifié par l'arrêté du 28 août 1991**
**Laboratoire pilote agréé du Ministère de l'Intérieur (arrêté du 05/02/59, modifié)**

## N° RA00-461

**Valable 5 ans à compter du 17 octobre 2000**

**Matériau présenté par** : La Société SAINT GOBAIN ISOVER FRANCE
Les Miroirs
18 avenue d' Alsace
92400 COURBEVOIE

**Marque commerciale** : CLIMAVER 202 - FIB-AIR ISOL

**Description sommaire** :
Feutre en laine de verre (fibres de verre liées par une résine thermodurcissable) revêtu sur une face d'une feuille d'aluminium renforcée d'une grille de verre. Le complexe aluminium est contrecollé à l'aide d'une colle polyéthylène.
Épaisseurs : 25 à 50 mm. Masse volumique nominale de la laine de verre : 30 kg/m$^3$

**Nature de l'essai** : Essai par rayonnement avec joint simulé suivant avis CECMI en date du 08 avril 1993.
Mesure du Pouvoir Calorifique Supérieur

**Classement :** **M0**

**Durabilité du classement (Annexe 22) :** Non limitée
**compte tenu des critères résultant des essais décrits dans le rapport d'essais N° RA00-461 annexé.**

**Le classement indiqué ne préjuge pas de la conformité des matériaux commercialisés aux échantillons soumis aux essais et ne saurait en aucun cas être considéré comme un certificat de qualification tel que défini par la loi. Cette conformité peut être attestée par les certificats de qualification reconnus par le ministère chargé de l'industrie, et notamment par la marque NF - Réaction au Feu.**

**Champs/Marne le :** 17 octobre 2000

**Le technicien vérificateur**
**Bruce LE MADEC**

**Le Chef du laboratoire Réaction feu responsable de l'essai**
**Martial BONHOMME**

**Sont seules autorisées les reproductions intégrales du présent procès-verbal de classement ou de l'ensemble procès-verbal de classement et rapport d'essais annexé.**

PARIS - MARNE-LA-VALLÉE - GRENOBLE - NANTES - SOPHIA ANTIPOLIS
CENTRE SCIENTIFIQUE ET TECHNIQUE DU BÂTIMENT
84, avenue Jean-Jaurès - Champs-sur-Marne - BP 2 - F-77421 Marne-la-Vallée Cedex 2
Tél. : 01 64 68 84 12 - Fax : 01 64 68 84 79 - E-mail : reaction@cstb.fr - http://www.cstb.fr/feu

# Certificat
## Certificate

CE 0049

(Directive 90/396/CEE « Appareils à gaz »)
(« Gas appliances » 90/396 EEC Directive)

**Numéro : 49AR1675** (rév. 6)

***AFNOR CERTIFICATION,*** *après examen et vérifications, certifie que l'appareil :*
*AFNOR CERTIFICATION, after examination and verifications, certifies that the appliance:*

- **Fabriqué par :** *Manufactured by* — **LENNOX FRANCE, Z.I. LONGVIC, BP 60, F-21602 LONGVIC CEDEX**
- **Marque commerciale et modèle(s) :** *Trade mark and model(s) :* — **LENNOX**
  - **GM 060/2**
- **Genre de l'appareil :** *Kind of the appliance :* — **MODULE DE CHAUFFAGE POUR CLIMATISEURS DE TOITURE** *GAS AIR HEATER UNIT FOR ROOF TOP*
- **Désignation du type :** *Type designation:* — **GM 060/2**

| Pays de destination *Destination countries* | Pressions (mbar) *Pressures (mbar)* | Catégories *Categories* |
|---|---|---|
| FR | 20/25 ; 37 | II2Er3P |
| BE | 20/25 ; 37 | I2EB ; I3P |
| PT-CH-ES-GB | 20 ; 37 | II2H3P |
| DE | 20 ; 50 | I2E ; I3P |
| IT | 20 | I2H |
| NL | 25 ; 37-50 | II2L3P |

est conforme aux exigences essentielles de la directive "Appareils à gaz" 90/396/CEE (29/06/1990).
*is in conformity with the essential requirements of the "Gas appliances" directive 90/396/EEC (29/06/1990).*

**AFNOR CERTIFICATION**
**Le Directeur Exécutif**

**Jacques BESLIN**

**Paris le : 27 mars 2002**

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CERTIFICATION PRODUITS INDUSTRIELS & SERVICES N°5-006/97

AFNOR CERTIFICATION Groupe AFNOR

**Rév. 6 : 49AR1675 du 96/09/02**

**AFNOR CERTIFICATION**
11 avenue Francis de Pressensé - 93571 Saint-Denis La Plaine Cedex - France
Tél. : +33 (0)1 41 62 76 60 - Fax : +33 (0)1 49 17 91 91
certification@afnor.fr
www.afnor.fr - www.marque-nf.com

# Certificat
## Certificate

CE 0049

**(Directive 90/396/CEE « Appareils à gaz »)**
**(« Gas appliances » 90/396 EEC Directive)**

**Numéro : 49AR1860** (rév. 6)

***AFNOR CERTIFICATION,*** *après examen et vérifications, certifie que l'appareil :*
*AFNOR CERTIFICATION, after examination and verifications, certifies that the appliance:*

- **Fabriqué par :** / *Manufactured by* — **LENNOX FRANCE, Z.I. LONGVIC, BP 60, F-21602 LONGVIC CEDEX**
- **Marque commerciale et modèle(s) :** / *Trade mark and model(s) :* — **LENNOX**
  - **GM 120/2**
- **Genre de l'appareil :** / *Kind of the appliance :* — **MODULE DE CHAUFFAGE POUR CLIMATISEURS DE TOITURE** / *GAS AIR HEATER UNIT FOR ROOF TOP*
- **Désignation du type :** / *Type designation:* — **GM 120/2**

| Pays de destination<br>*Destination countries* | Pressions (mbar)<br>*Pressures (mbar)* | Catégories<br>*Categories* |
|---|---|---|
| FR | 20/25 ; 37 | II2Er3P |
| BE | 20/25 ; 37 | I2EB ; I3P |
| PT-CH-ES-GB | 20 ; 37 | II2H3P |
| DE | 20 ; 50 | I2E ; I3P |
| IT | 20 | I2H |
| NL | 25 ; 37-50 | II2L3P |

est conforme aux exigences essentielles de la directive "Appareils à gaz" 90/396/CEE (29/06/1990).
*is in conformity with the essential requirements of the "Gas appliances" directive 90/396/EEC (29/06/1990).*

**AFNOR CERTIFICATION**
**Le Directeur Exécutif**

**Jacques BESLIN**

**Paris le : 27 mars 2002**

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CERTIFICATION PRODUITS INDUSTRIELS & SERVICES N°5-006/97

AFNOR CERTIFICATION Groupe AFNOR

**Rév. 6 : 49AR1860 du 96/09/02**

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certification@afnor.fr
www.afnor.fr - www.marque-nf.com

# Certificat
## Certificate

CE 0049

**(Directive 90/396/CEE « Appareils à gaz »)**
**(« Gas appliances » 90/396 EEC Directive)**

**Numéro : 49BL3276** (rév. 1)

***AFNOR CERTIFICATION,*** *après examen et vérifications, certifie que l'appareil :*
*AFNOR CERTIFICATION, after examination and verifications, certifies that the appliance:*

- **Fabriqué par :** *Manufactured by*
  **LENNOX FRANCE**
  **Z.I. LONGVIC**
  **BP 60**
  **F-21602 LONGVIC CEDEX**

- **Marque commerciale et modèle(s) :** *Trade mark and model(s) :*
  **LENNOX**
  ➢ **GM 180/4**

- **Genre de l'appareil :** *Kind of the appliance :*
  **MODULE DE CHAUFFAGE POUR CLIMATISEURS DE TOITURE**
  *GAS AIR HEATER UNIT FOR ROOF TOP*

- **Désignation du type :** *Type designation:*
  **GM 180/4**

| Pays de destination<br>*Destination countries* | Pressions (mbar)<br>*Pressures (mbar)* | Catégories<br>*Categories* |
|---|---|---|
| FR | 20/25 ; 37 | II2Er3P |
| BE | 20/25 ; 37 | I2EB ; I3P |
| PT-CH-ES-GB | 20 ; 37 | II2H3P |
| DE | 20 ; 50 | I2E ; I3P |
| IT | 20 | I2H |
| NL | 25 ; 37-50 | II2L3P |

est conforme aux exigences essentielles de la directive "Appareils à gaz" 90/396/CEE (29/06/1990).
*is in conformity with the essential requirements of the "Gas appliances" directive 90/396/EEC (29/06/1990).*

**AFNOR CERTIFICATION**
**Le Directeur Exécutif**

**Jacques BESLIN**

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CERTIFICATION PRODUITS INDUSTRIELS & SERVICES N°5-0006/97

**Paris le : 27 mars 2002**

AFNOR CERTIFICATION Groupe AFNOR

**Rév. 1 : 49BL3276 du 2000/06/30**

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11 avenue Francis de Pressensé - 93571 Saint-Denis La Plaine Cedex - France
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www.afnor.fr - www.marque-nf.com

AFNOR CERTIFICATION
Groupe AFNOR
Organisme certificateur
AFNOR CERTIFICATION
11, avenue Francis de Pressensé
93571 SAINT-DENIS LA PLAINE Cedex
☎ : (33) 1.47.62.76.60 - Fax : (33) 1.49.17.91.91
Site Internet : http://www.marque-nf.com

Marque NF – Matériels de Détection Incendie

Matériel d'Incendie Certifié
S.D.I.

C N MIS
LA SECURITE CERTIFIEE
Organisme mandaté
Comité National Malveillance Incendie Sécurité SAS
C.N.M.I.S. SAS - 16, avenue Hoche - 75008 PARIS
☎ : (33) 1.53.89.00.40 - Fax : (33) 1.45.63.40.63
Site Internet : http://www.cnmis.org

# CERTIFICAT DE DROIT D'USAGE DE LA MARQUE NF (LICENCE)

| N° DROIT D'USAGE | La Société : | ANELEC |
|---|---|---|
| DAD 020 B0 | Pour son usine de | 37, place de Loire SILIC 139<br>94523 RUNGIS Cedex |

| Correspondant C.N.M.I.S SAS | Date de fin de validité : |
|---|---|
| José CAMPO Tél : 01 53 89 00 48<br>Fax : 01 45 63 40 63 | 31/03/2004 |

| N° Dossier C.N.M.I.S SAS | MODIFICATIONS |
|---|---|
| 99 06 55 | |
| Conformité aux normes :<br>NF S 61-950 de Novembre 1985<br>NF S 61-961 de Septembre 1989 | |

Est autorisée à apposer la marque NF sur le matériel désigné ci-après :

| | | |
|---|---|---|
| Désignation technique du matériel | : | **Détecteur Autonome Déclencheur** |
| Désignation commerciale | : | **DAD 4480 CGDI** |
| Caractéristiques certifiées | : | **Type 2** |
| Nombre de détecteurs | : | **2**<br>*(Les autres caractéristiques sont reprises dans les rapports d'essai)* |
| Ce matériel fonctionne avec | : | **Le détecteur SIJ-EF (E4 064 B0)**<br>*(Les autres produits associés sont repris dans les certificats d'association)* |
| Références et date des rapports d'essais | : | **DH 95 01 11 du 14 Mars 1996** |
| Fonctions supplémentaires | : | **Voir rapports référencés ci-dessus** |

***N.B : Cette décision dispense le titulaire de la présentation des Procès Verbaux d'essai (incluant les rapports d'essais) de conformité aux normes du matériel ci-dessus.***

PARIS, le 14 février 2003
Par mandat d'AFNOR CERTIFICATION
Le C.N.M.I.S. S.A.S

Le Directeur Général
Denis CLUZEL

C N MIS
LA SECURITE CERTIFIEE

cofrac
CERTIFICATION PRODUITS
ACCREDITATION N° 5-0015

Ce certificat annule et remplace tout certificat antérieur, sa date de validité est confirmée sous réserve des contrôles effectués par AFNOR CERTIFICATION et/ou le C.N.M.I.S. SAS qui peuvent prendre toute sanction conformément aux Règles Générales de la marque NF et au Règlement R075. Ce certificat atteste que les produits désignés sont certifiés conformes au référentiel technique du Règlement R075 et que le système qualité de la société a été évalué selon ce même Règlement. Il n'engage en aucun cas AFNOR CERTIFICATION et le C.N.M.I.S. SAS quant à la conformité réglementaire de l'installation dans laquelle les produits objets de ce certificat seront utilisés.

13/06 2003 VEN 14:51 FAX 002/002

AFNOR CERTIFICATION
Groupe AFNOR

Organisme certificateur
AFNOR CERTIFICATION
11, avenue Francis de Pressensé
93571 SAINT-DENIS LA PLAINE Cedex
☎ : (33) 1.47.62.76.60 - Fax : (33) 1.49.17.91.91
Site Internet : http://www.marque-nf.com

**Marque NF – Matériels de Détection Incendie**

C MIS N
LA SECURITE CERTIFIEE

Organisme mandaté
Comité National Malveillance Incendie Sécurité SAS
C.N.M.I.S. SAS - 16, avenue Hoche - 75008 PARIS
☎ : (33) 1.53.89.00.40 - Fax : (33) 1.45.63.40.63
Site Internet : http://www.cnmis.org

# CERTIFICAT DE DROIT D'USAGE DE LA MARQUE NF (LICENCE)

| N° DROIT D'USAGE | |
|---|---|
| DAD 013 J0 | Le 27/05/2003 |

La Société : FINSECUR
Pour son usine de 15, rue du Général Négrier
78800 HOUILLES

| Correspondant C.N.M.I.S SAS | |
|---|---|
| José CAMPO | Tél : 01 53 89 00 48 |
| | Fax : 01 45 63 40 63 |

Date de fin de validité : **31/03/2004**

N° Dossier C.N.M.I.S SAS : **03 03 18**

Conformité aux normes : **NF S 61-961 de Septembre 2000**

MODIFICATIONS

Est autorisée à apposer la marque NF sur le matériel désigné ci-après :

| | |
|---|---|
| Désignation technique du matériel | : **Détecteur Autonome Déclencheur** |
| Désignation commerciale | : **LOTUS 1 W2C** |
| Caractéristiques certifiées | : **Type II** |
| Elément sensible | : **2 TYPE E4** *(Les autres caractéristiques sont reprises dans les rapports d'essai)* |
| Ce matériel fonctionne avec | : **Voir liste des matériels associés** |
| Références et date des rapports d'essais | : **DH 03 01 76 du 14 Mai 2003 (Fiche Technique N° 1441)** |
| Fonctions supplémentaires | : **Voir rapports référencés ci-dessus** |

***N.B : Cette décision dispense le titulaire de la présentation des Procès Verbaux d'essai (incluant les rapports d'essais) de conformité aux normes du matériel ci-dessus.***

**PARIS, le 11 juin 2003**
**Par mandat d'AFNOR CERTIFICATION**
**Le C.N.M.I.S. S.A.S**

**Le Directeur Général**
**Denis CLUZEL**

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LA SECURITE CERTIFIEE

Ce certificat annule et remplace tout certificat antérieur, sa date de validité est confirmée sous réserve des contrôles effectués par AFNOR CERTIFICATION et/ou le C.N.M.I.S. SAS qui peuvent prendre toute sanction conformément aux Règles Générales de la marque NF et au Règlement R075. Ce certificat atteste que les produits désignés sont certifiés conformes au référentiel technique du Règlement R075 et que le système qualité de la société a été évalué selon ce même Règlement. Il n'engage en aucun cas AFNOR CERTIFICATION et le C.N.M.I.S. SAS quant à la conformité réglementaire de l'installation dans laquelle les produits objets de ce certificat seront utilisés.

cofrac
ACCREDITATION N° 2-1418

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Accréditation n° 1-0300
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**SÉCURITÉ FEU**
*Réaction au feu*

# PROCÈS-VERBAL DE CLASSEMENT DE RÉACTION AU FEU D'UN MATÉRIAU

**Prévu à l'article 88 de l'Arrêté du Ministère de l'Intérieur du 30 juin 1983, modifié par l'arrêté du 28 août 1991**
**Laboratoire pilote agréé du Ministère de l'Intérieur (arrêté du 05/02/59, modifié)**

## N° RA01-279

**Valable 5 ans à compter du 26 juin 2001**

**Matériau présenté par** : La Société CAMFIL FARR
Route d'Avrigny
ZI Saint Martin Longueau
60722 PONT SAINTE MAXENCE

**Marque commerciale** : A300F1

**Description sommaire** :
Média filtrant 100% fibres polyester non ignifugé.
Masse surfacique nominale : 198 g/m². Épaisseur nominale : 20 mm. Coloris : Blanc

**Nature de l'essai** : Essai au Brûleur Électrique
Essais Complémentaires

**Classement :** **M1**

**Durabilité du classement (Annexe 22) :** Non limitée a priori (Filtre non régénérable)
**compte tenu des critères résultant des essais décrits dans le rapport d'essais N° RA01-279 annexé.**

**Le classement indiqué ne préjuge pas de la conformité des matériaux commercialisés aux échantillons soumis aux essais et ne saurait en aucun cas être considéré comme un certificat de qualification tel que défini par la loi. Cette conformité peut être attestée par les certificats de qualification reconnus par le ministère chargé de l'industrie, et notamment par la marque NF - Réaction au Feu.**

**Champs/Marne le :** 26 juin 2001

**Le technicien responsable de l'essai**
**Nicolas ROURE**

**Le chef du laboratoire Réaction au Feu**
**Martial BONHOMME**

**Sont seules autorisées les reproductions intégrales du présent procès-verbal de classement ou de l'ensemble procès-verbal de classement et rapport d'essais annexé.**

PARIS - MARNE-LA-VALLÉE - GRENOBLE - NANTES - SOPHIA ANTIPOLIS
**CENTRE SCIENTIFIQUE ET TECHNIQUE DU BÂTIMENT**
84, avenue Jean-Jaurès - Champs-sur-Marne - BP 2 - F-77421 Marne-la-Vallée Cedex 2
Tél. : 01 64 68 84 12 - Fax : 01 64 68 84 79 - E-mail : reaction@cstb.fr - http://www.cstb.fr/feu

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**SÉCURITÉ FEU**
*Réaction au feu*

# PROCÈS-VERBAL DE CLASSEMENT DE RÉACTION AU FEU D'UN MATÉRIAU

**Prévu à l'article 88 de l'Arrêté du Ministère de l'Intérieur du 30 juin 1983, modifié par l'arrêté du 28 août 1991**
**Laboratoire pilote agréé du Ministère de l'Intérieur (arrêté du 05/02/59, modifié)**

## N° RA01-065

**Valable 5 ans à compter du 25 janvier 2001**

**Matériau présenté par** : La Société HOLLINGSWORTH and VOSE Compagny LTD
Postlip mills - Winchcombe
GLOS GL54 5BB
ROYAUME UNI

**Marque commerciale** : MEDIA A100G

**Description sommaire** :
Média filtrant en fibres de verre non tissées liées par une résine acrylique.
Masse surfacique nominale : 63 g/m². Épaisseur nominale : 0,47 mm. Coloris présenté : blanc.

**Nature de l'essai** : Essai au Brûleur Électrique

**Classement :** **M3**

**Durabilité du classement (Annexe 22) :** Non limitée a priori Article non régénérable
**compte tenu des critères résultant des essais décrits dans le rapport d'essais N° RA01-065 annexé.**

**Le classement indiqué ne préjuge pas de la conformité des matériaux commercialisés aux échantillons soumis aux essais et ne saurait en aucun cas être considéré comme un certificat de qualification tel que défini par la loi. Cette conformité peut être attestée par les certificats de qualification reconnus par le ministère chargé de l'Industrie, et notamment par la marque NF - Réaction au Feu.**

**Champs/Marne le :** 25 janvier 2001

**Le technicien responsable de l'essai** — **David BETTOIA**

**Le chef du laboratoire Réaction au Feu** — **Martial BONHOMME**

**Sont seules autorisées les reproductions intégrales du présent procès-verbal de classement ou de l'ensemble procès-verbal de classement et rapport d'essais annexé.**

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