LENNOX®

INSTALLATION
OPERATION
MAINTENANCE MANUAL

PROVIDING GLOBAL SYSTEM SOLUTIONS

ROOFTOP
SMART
LINEA™

ENGLISH
JUNE 01

IOM MANUAL

Ref. IOM-RT SL-0601-E

This manual applies to the following ROOFTOP versions :

SCA 010 - SCA 013 - SCA 015
SHA 010 - SHA 013 - SHA 015

LCA 020 - LCA 025 - LCA 030 - LCA 035 - LCA 040 - LCA 045 - LCA 055 - LCA 065 - LCA 075 - LCA 090
LCK 020 - LCK 025 - LCK 030 - LCK 035 - LCK 040 - LCK 045 - LCK 055 - LCK 065 - LCK090
LGA 020 - LGA 025 - LGA 030 - LGA 035 - LGA 040 - LGA 045 - LGA 055 - LGA 065 - LGA 075 - LGA 090
LGK 020 - LGK 025 - LGK 030 - LGK 035 - LGK 040 - LGK045 - LGK 055 - LGK 065 - LGK 090
LHA 020 - LHA 025 - LHA 030 - LHA 035 - LHA 040 - LHA 045 - LHA 055 - LHA 065 - LHA 075
LHK 020 - LHK025 - LHK 030 - LHK 035 - LHK 040 - LHK 045 - LHK 055 - LHK 065
LDA 020 - LDA 025 - LDA 030 - LDA 035 - LDA 040 - LDA 045 - LDA 055 - LDA 065 - LDA 075
LDK 020 - LDK 025 - LDK 030 - LDK 035 - LDK 040 - LDK 045 - LDK 055 - LDK 065

CONTENTS

DELIVERY CHECKS

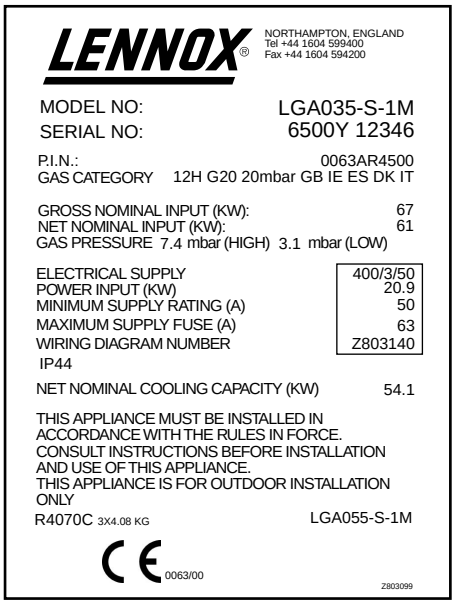
The equipment is shipped at the customers risk, and whose responsiblity it is to ensure that the products are in good working order on receipt by checking the following :

- 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 herein.
- Accessories ordered for on site installation have been delivered and are in good working order.
- The equipment supplied corresponds with 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 with the required volume capacity of each compressor circuit.


LENNOX®
NORTHAMPTON, ENGLAND
Tel +44 1604 599400
Fax +44 1604 594200

MODEL NO: LGA035-S-1M
SERIAL NO: 6500Y 12346

P.I.N.: 0063AR4500
GAS CATEGORY 12H G20 20mbar GB IE ES DK IT

GROSS NOMINAL INPUT (KW): 67
NET NOMINAL INPUT (KW): 61
GAS PRESSURE 7.4 mbar (HIGH) 3.1 mbar (LOW)

ELECTRICAL SUPPLY 400/3/50
POWER INPUT (KW) 20.9
MINIMUM SUPPLY RATING (A) 50
MAXIMUM SUPPLY FUSE (A) 63
WIRING DIAGRAM NUMBER Z803140
IP44

NET NOMINAL COOLING CAPACITY (KW) 54.1

THIS APPLIANCE MUST BE INSTALLED IN ACCORDANCE WITH THE RULES IN FORCE.
CONSULT INSTRUCTIONS BEFORE INSTALLATION AND USE OF THIS APPLIANCE.
THIS APPLIANCE IS FOR OUTDOOR INSTALLATION ONLY

R4070C 3X4.08 KG LGA055-S-1M

CE 0063/00

Z803099

Figure 1

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 (AKILUX 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 (LINEA™ ONLY)

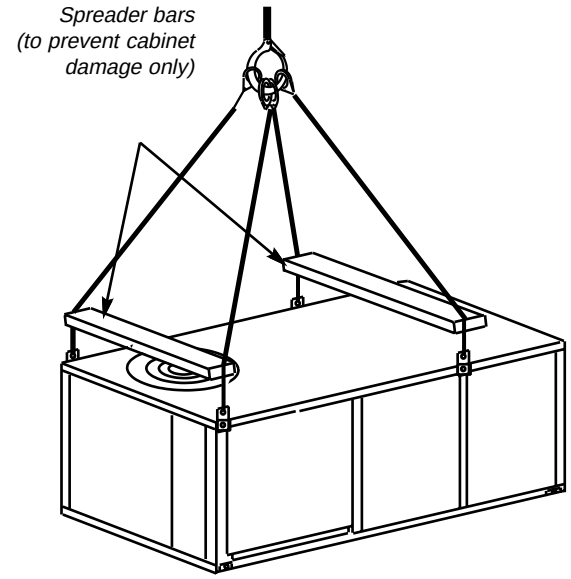
On delivery we recommend that you keep the key which is attached to an eyebolt in a safe and accesible place. This allows you to open the panels for maintenance and installation work.
The locks are ¼ turn + then tighten (figure 2).

Figure 2

HANDLING

Figure 3

SMART
010 - 013 - 015



SPREADER BARS ARE NOT SUPPLIED BY LENNOX

IMPORTANT :
ALL PANELS MUST BE
IN PLACE FOR RIGGING

CAUTION :
DO NOT WALK ON THE UNIT

Note : Lifting point should be directly above center of gravity (refer to dimension drawing - page 7)

DIMENSIONS AND WEIGHTS

MODELE - SIZE		010	013	015
SCA/SHA	kg	137	213	236
Length	mm	1524	1842	1842
Width	mm	1168	1321	1321
Height	mm	584	737	737
Downflow roofcurb	kg	34	34	39
Economiser Kit downflow	kg	22	30	30
Economiser kit horizontal	kg	50	59	59
Manual outdoor air damper	kg	5	5	5
Electric heater	kg	9	10	10

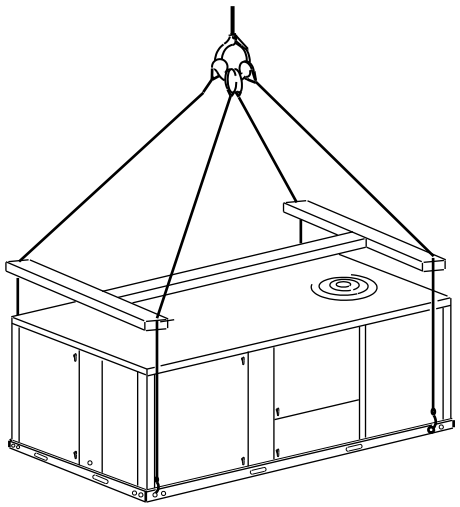
Select base unit + accessories to establish total nett weight

HANDLING

LINEA™ units :
The equipment can be moved using the lifting holes in the baseframe of the unit.
Some units can only be supported by four slings at right-angles. Others require different length.
It is essential that all lifting hooks are used and that the slings are all of the same size to avoid damaging the equipment.

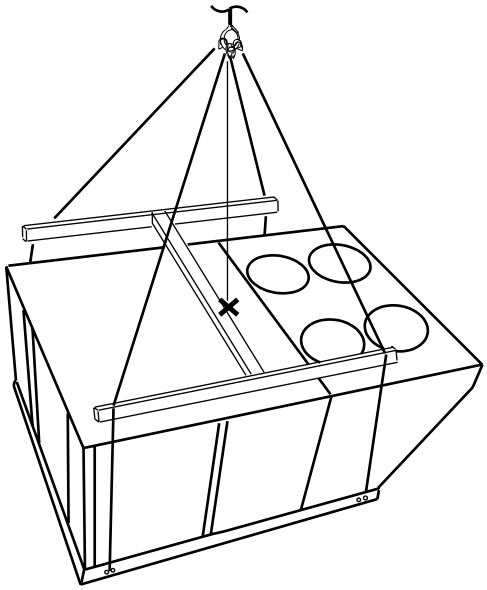
LINEA
020 - 025 - 030 - 035 - 040 - 045

Figure 4



LINEA
055 - 065 - 075 - 090

Figure 5



SPREADER BARS ARE NOT SUPPLIED BY LENNOX

IMPORTANT :
ALL PANELS MUST BE
IN PLACE FOR RIGGING

CAUTION :
DO NOT WALK ON THE UNIT

Note : Lifting point should be directly above center of gravity (refer to dimension drawing - page 10 to 12)

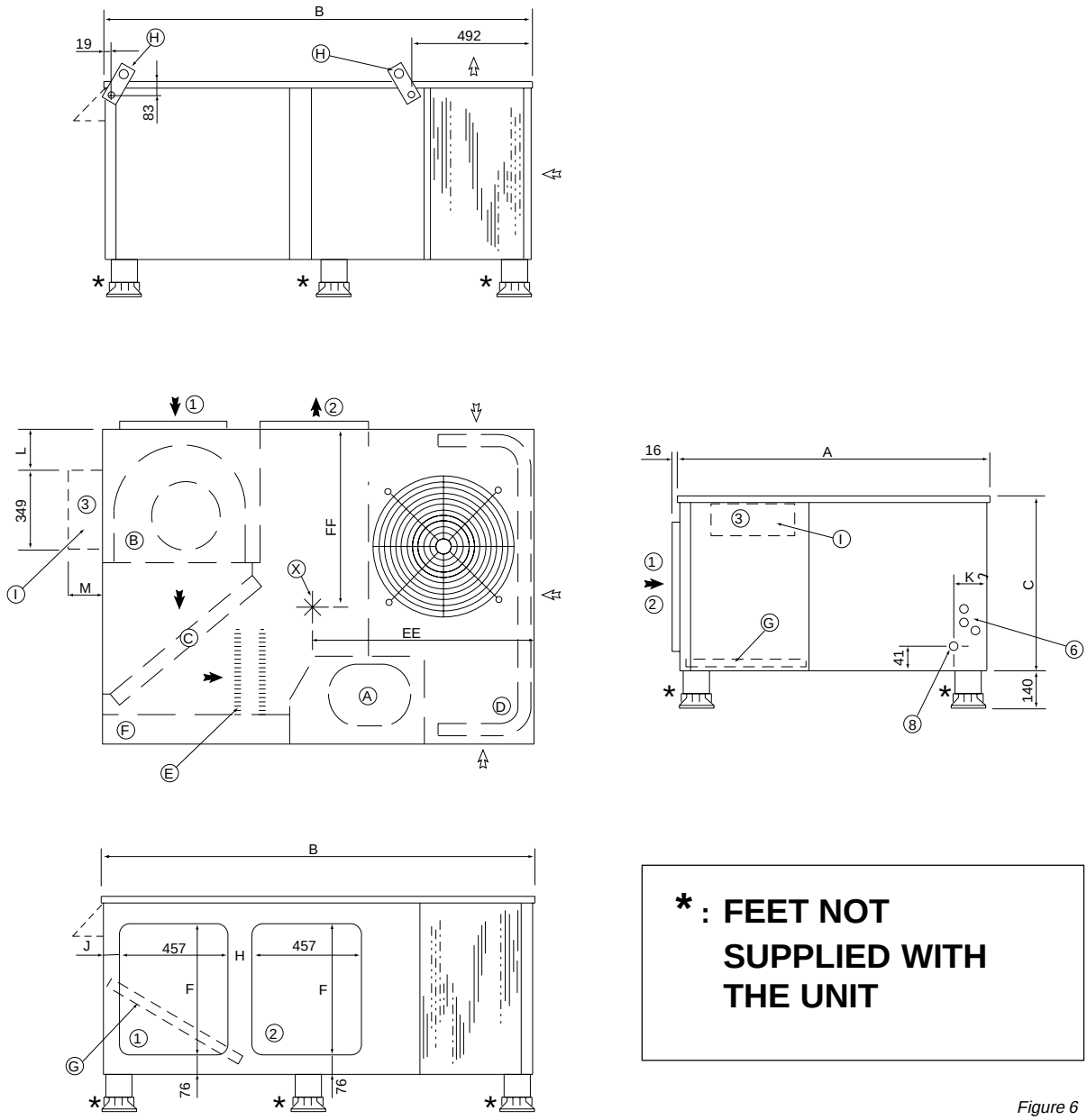
DIMENSIONS AND WEIGHTS

MODELE - SIZE		020	025	030	035	040	045	055	065	075	090
LCA	kg	483	493	502	508	513	531	1000	1035	1095	1125
LCK	kg	483	493	502	508	513	531	1000	1035	-	1125
LHA	kg	495	505	514	528	533	551	1028	1063	1123	-
LHK	kg	495	505	514	528	533	551	1028	1063	-	-
LGA	kg	510	520	528	544	549	567	1025	1060	1120	1150
LGK	kg	510	520	528	544	549	567	1025	1060	-	1150
LDA	kg	522	532	540	564	569	587	1053	1088	1148	-
LDK	kg	522	532	540	564	569	587	1053	1088	-	-
Length	mm	2521	2521	2521	2521	2521	2521	3369	3369	3369	3369
Width	mm	1213	1213	1213	1473	1473	1473	2289	2289	2289	2289
Height	mm	1138	1138	1138	1270	1270	1270	1378	1378	1378	1378
High heat burner	kg	14	14	14	18	18	18	36	36	36	36
Comfort pack downflow	kg	29	29	29	33	33	33	63	63	63	63
Comfort pack horizontal	kg	29	29	29	33	33	33	63	63	63	63
Deluxe pack downflow	kg	54	54	54	57	57	57	166	166	166	166
Deluxe pack horizontal	kg	54	54	54	57	57	57	166	166	166	166
Deluxe energy pack downflow	kg	54	54	54	57	57	57	166	166	166	166
Deluxe energy pack horizontal	kg	54	54	54	57	57	57	166	166	166	166
Electric heater	kg	19	19	19	22	22	22	38	38	38	38
Economiser	kg	20	20	20	21	21	21	82	82	82	82
Manual fresh air damper	kg	12	12	12	12	12	12	18	18	18	18
Motorised fresh air damper	kg	13	13	13	14	14	14	20	20	20	20
Fresh air hood	kg	5	5	5	5	5	5	20	20	20	20
Gravity exhaust damper	kg	4	4	4	4	4	4	9	9	9	9
Powered exhaust fan	kg	13	13	13	13	13	13	30	30	30	30
14" roof mounting frame	kg	54	54	54	57	57	57	73	73	73	73
Horizontal roof mounting frame (26")	kg	-	-	-	-	-	-	100	100	100	100
Metal frame filters	kg	12	12	12	14	14	14	25	25	25	25
Adjustable roof frame	kg	75	75	75	80	80	80	95	95	95	95
Hot water coil	kg	24	24	24	28	28	28	56	56	56	56

Select base unit + accessories to establish total nett weight

DIMENSIONS (mm)

BASIC UNIT



*** : FEET NOT SUPPLIED WITH THE UNIT**

Figure 6

SIZE	A	B	C	H	J	K	L	M	EE	FF
10	1168	1524	584	76	102	165	51	127	730	686
13	1321	1842	737	127	76	156	127	203	883	781
15	1321	1842	737	127	76	156	127	203	921	756

A	Compressor	**G**	Filter	**1**	Return air
B	Fan	**H**	Lifting holes	**2**	Supply air
C	Evaporator coil	**I**	Outdoor air damper	**3**	Fresh air
D	Condenser coil	**J**	Economiser	**4**	Exhaust air
E	Electric heater	**K**	Roof mounting frame	**6**	Power entry
F	Control box	**X**	Centre of gravity	**8**	Condensate drain

DIMENSIONS (mm)

UNIT WITH HORIZONTAL ECONOMISER DAMPER SECTION AND GRAVITY EXHAUST DAMPER

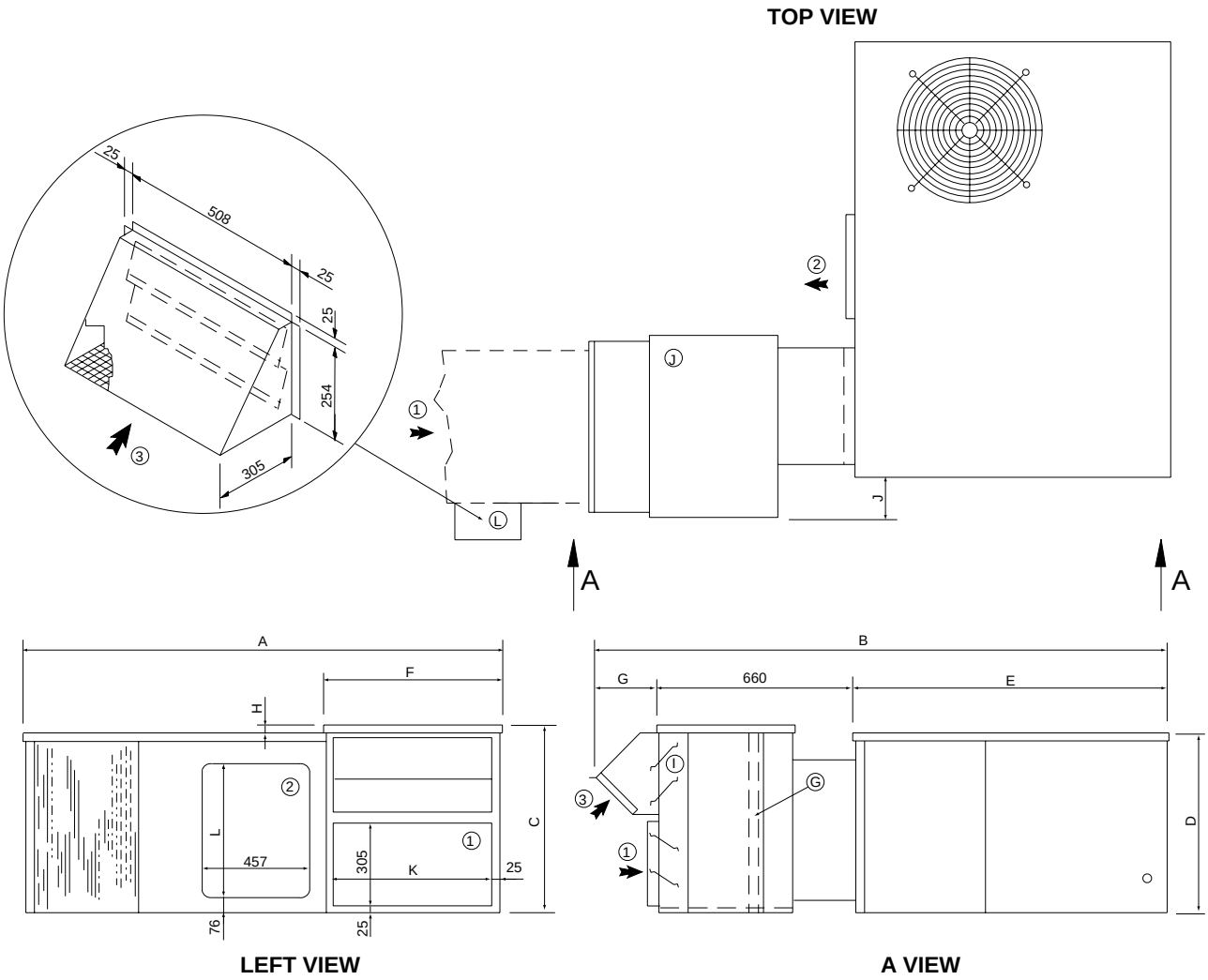


Figure 7

SIZE	A	B	C	D	E	F	G	H	J	K	L
10	1600	2070	660	584	1168	660	241	76	76	610	330
13	2019	2286	772	737	1321	775	305	38	178	733	559
15	2019	2286	772	737	1321	775	305	38	178	733	559

A	Compressor	**G**	Filter	**1**	Return air
B	Fan	**H**	Lifting holes	**2**	Supply air
C	Evaporator coil	**I**	Outdoor air damper	**3**	Fresh air
D	Condenser coil	**J**	Economiser	**4**	Exhaust air
E	Electric heater	**K**	Roof mounting frame		
F	Control box				

DIMENSIONS (mm)

UNIT WITH ECONOMISER DAMPER SECTION AND ROOF MOUNTING FRAME

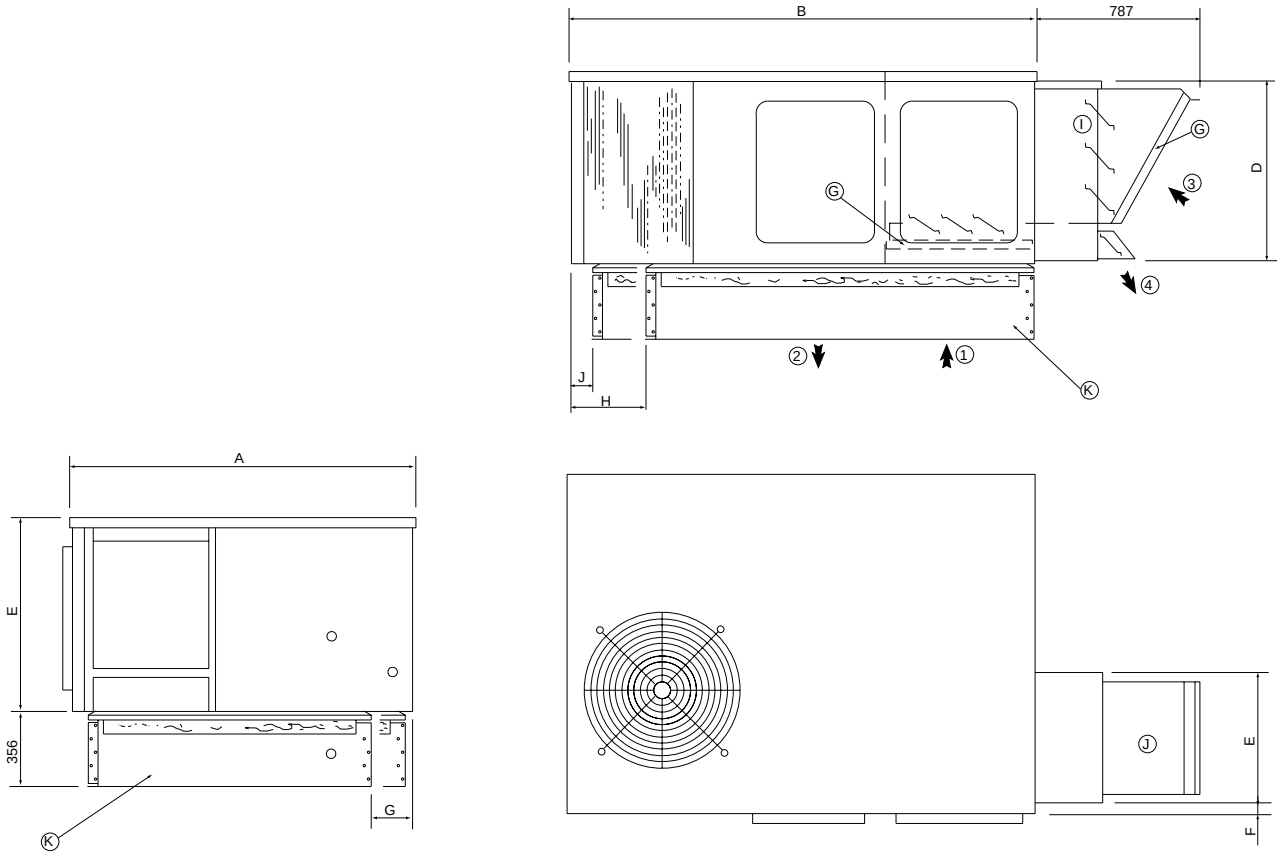


Figure 8

SIZE	A	B	C	D	E	F	G	H	J
10	1168	1524	584	552	410	19	-	-	-
13	1321	1842	737	705	514	38	178	406	89
15	1321	1842	737	705	514	38	178	406	89

A	Compressor	**G**	Filter	**1**	Return air
B	Fan	**H**	Lifting holes	**2**	Supply air
C	Evaporator coil	**I**	Outdoor air damper	**3**	Fresh air
D	Condenser coil	**J**	Economiser	**4**	Exhaust air
E	Electric heater	**K**	Roof mounting frame		
F	Control box				

LG_/LC_/LH_/LD_ 020/025/030 DIMENSIONS (mm)

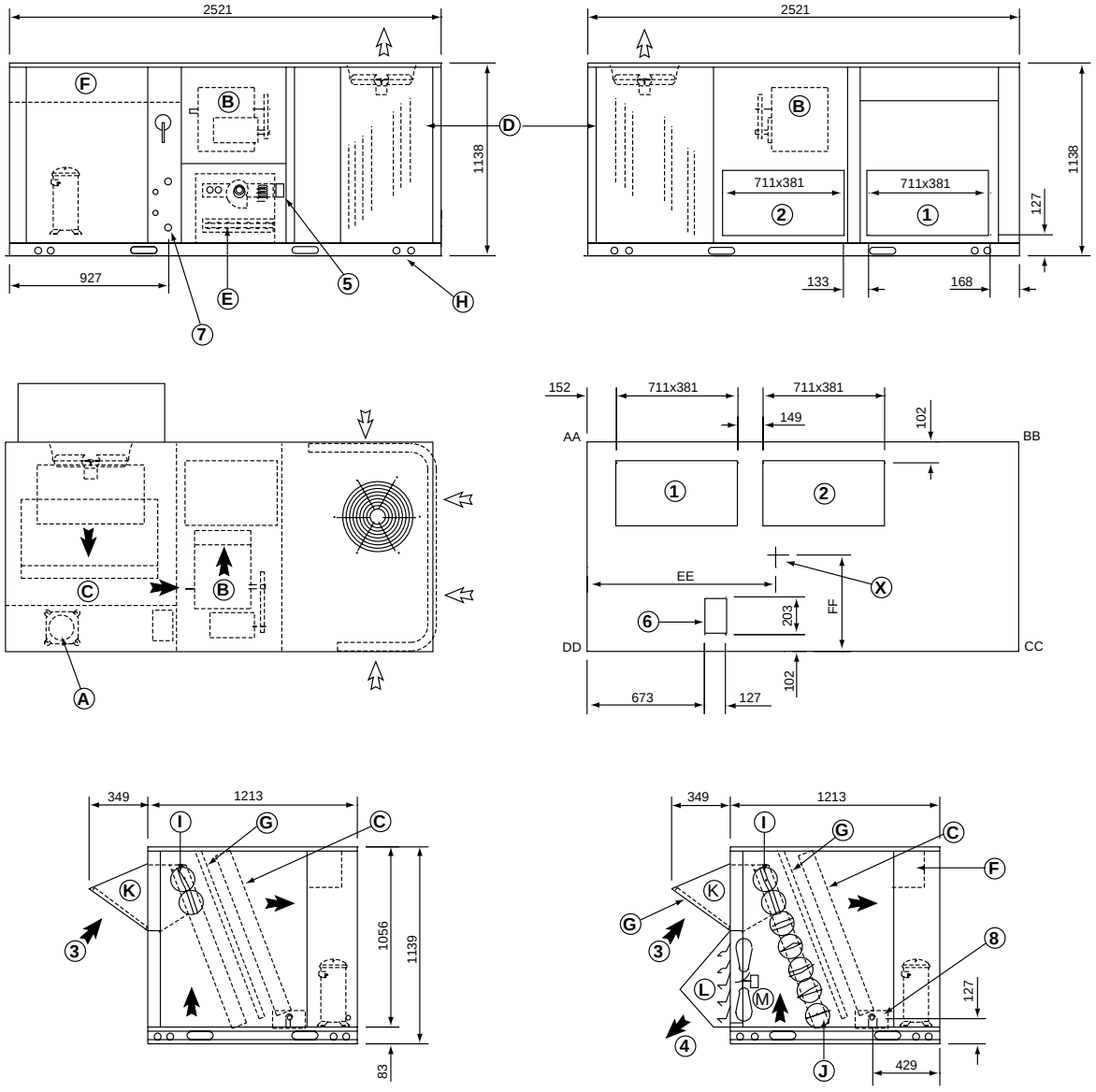


Figure 9

SIZE	Load distribution (kg)				Centre of gravity (mm)	
	AA	BB	CC	DD	EE	FF
LCA/LCK 20	130	105	110	136	1105	546
LCA/LCK 25	135	108	113	145	1092	533
LCA/LCK 30	135	108	113	145	1092	533
LGA/LGK 20	137	111	116	146	1105	546
LGA/LGK 25	142	114	119	153	1092	533
LGA/LGK 30	142	114	119	153	1092	533

Base unit : The standard unit with NO OPTIONS

A	Compressor	**I**	Outdoor air damper (Manual or automatic,factory or field installed)	**1**	Return air
B	Fan	**J**	Economiser (Factory or field installed)	**2**	Supply air
C	Evaporator coil	**K**	Outdoor air hood (Factory or field installed) **(1)**	**3**	Fresh air
D	Condenser coil	**L**	Gravity exhaust damper (Factory or field installed)	**4**	Exhaust air
E	Heat exchanger	**M**	Power exhaust fan (Factory or field installed) **(2)**	**5**	Flue outlet
F	Control box			**6**	Power entry
G	Filter			**7**	Gas entry
H	Lifting holes	**X**	Centre of gravity	**8**	Condensate drain

(1) Furnished with Economiser or outdor air damper

(2) Down-flow applications only

LG_/LC_/LH_/LD_ 035/040/045 DIMENSIONS (mm)

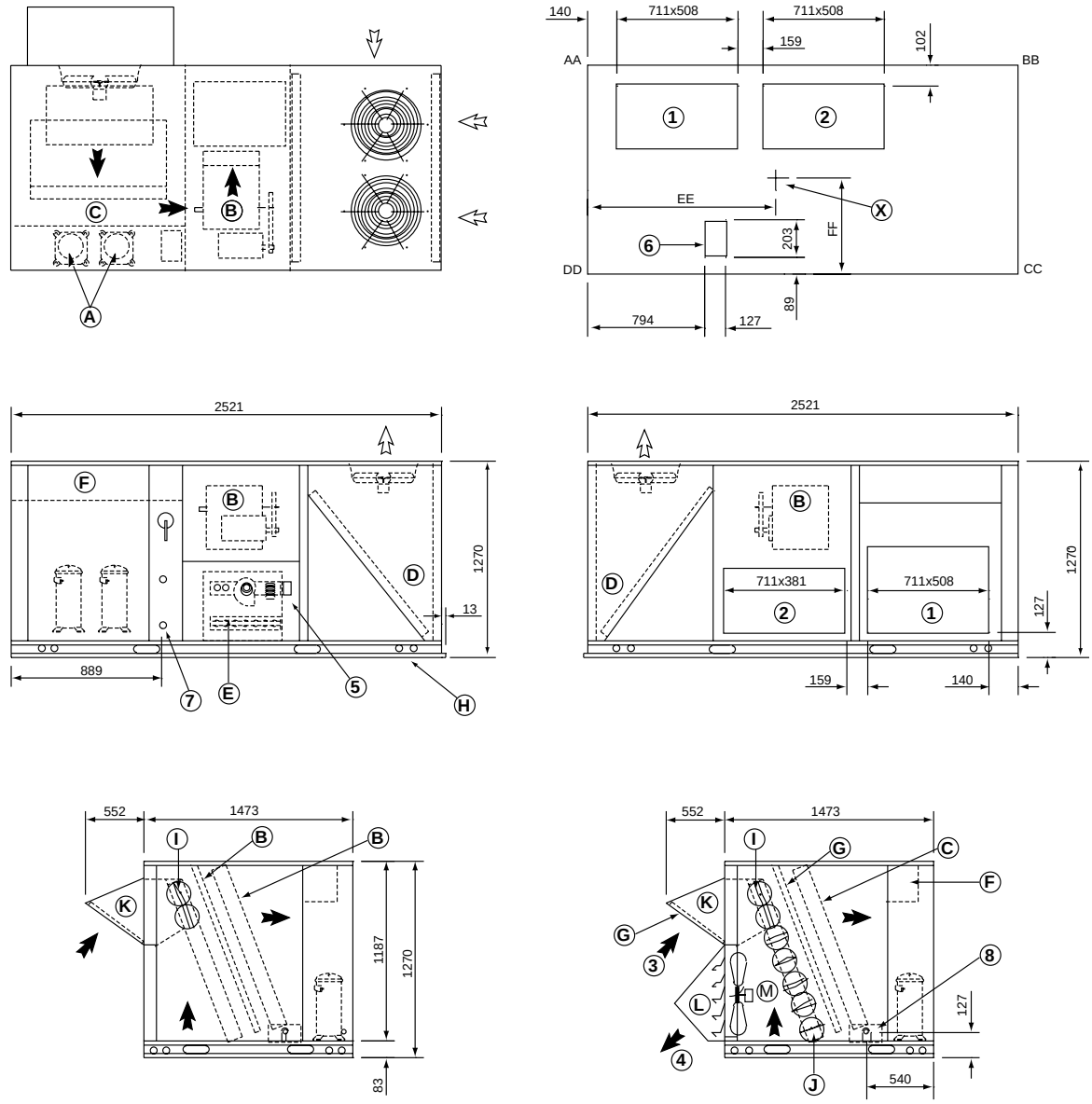


Figure 10

SIZE	Load distribution (kg)				Centre of gravity (mm)	
	AA	BB	CC	DD	EE	FF
LCA/LCK 035	122	113	127	145	1194	546
LCA/LCK 040	122	113	127	145	1194	546
LCA/LCK 045	127	118	132	154	1168	533
LGA/LGK 035	127	118	136	150	1194	546
LGA/LGK 040	132	118	136	150	1194	546
LGA/LGK 045	136	122	136	159	1168	533

Base unit : The standard unit with NO OPTIONS

A	Compressor	**I**	Outdoor air damper (Manual or automatic,factory or field installed)	**1**	Return air
B	Fan	**J**	Economiser (Factory or field installed)	**2**	Supply air
C	Evaporator coil	**K**	Outdoor air hood (Factory or field installed) **(1)**	**3**	Fresh air
D	Condenser coil	**L**	Gravity exhaust damper (Factory or field installed)	**4**	Exhaust air
E	Heat exchanger	**M**	Power exhaust fan (Factory or field installed) **(2)**	**5**	Flue outlet
F	Control box			**6**	Power entry
G	Filter			**7**	Gas entry
H	Lifting holes	**X**	Centre of gravity	**8**	Condensate drain

(1) Furnished with Economiser or outdor air damper

(2) Down-flow applications only

LG_/LC_/LH_/LD_ 055/065/075/090 DIMENSIONS (mm)

Note : 090 units not available in heatpump and dual fuel configurations (LH_/LD_)
models 055, 065 & 075 : 2 compressors - model 090 : 4 compressors

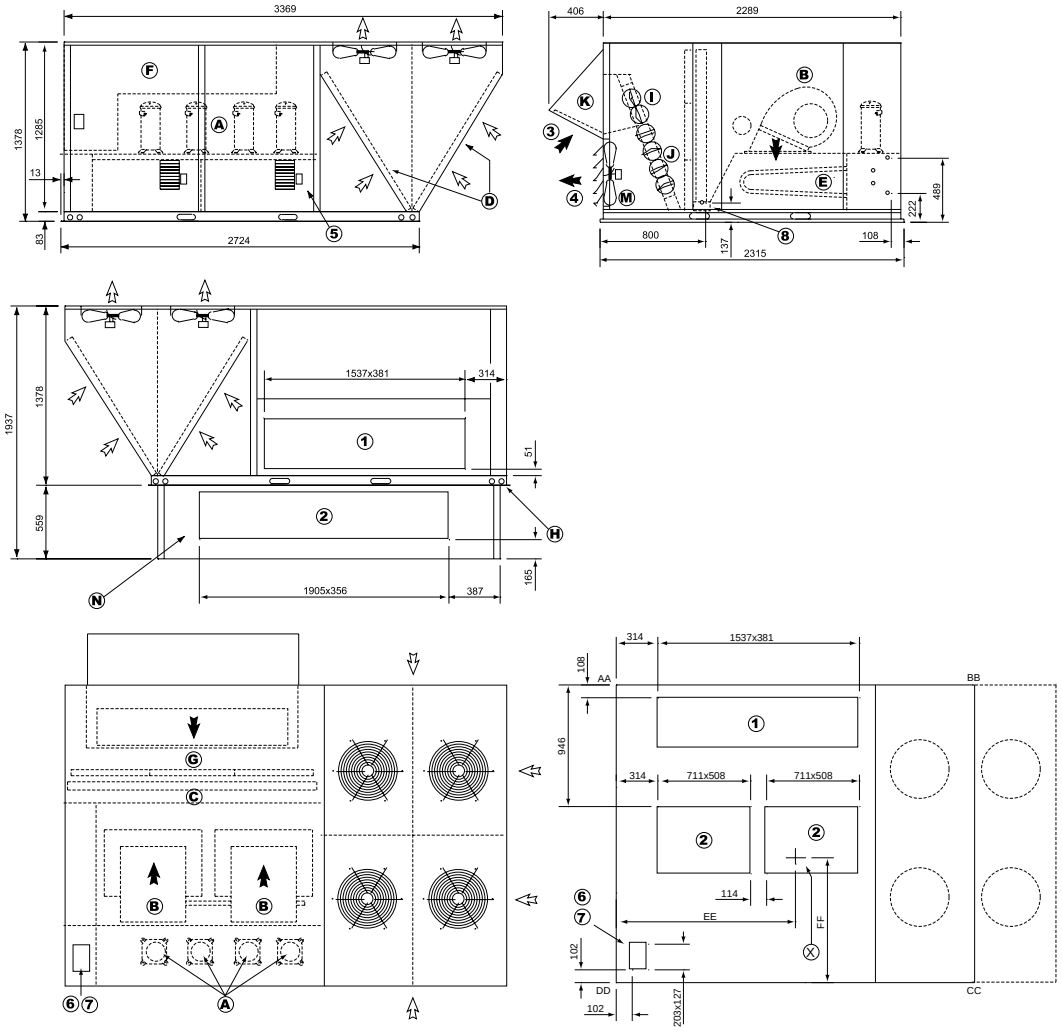


Figure 11

SIZE	Load distribution (kg)				Centre of gravity (mm)	
	AA	BB	CC	DD	EE	FF
LCA/LCK 055	204	209	281	272	1384	991
LCA/LCK 065	213	209	290	295	1346	965
LCA 075	218	231	318	299	1410	965
LCA/LCK 090	218	231	318	299	1410	965
LGA/LGK 055	213	213	295	295	1359	965
LGA/LGK 065	218	209	308	322	1384	953
LGA 075	222	236	336	322	1384	954
LGA/LGK 090	222	236	336	322	1384	953

Base unit : The standard unit with NO OPTIONS

A	Compressor	**I**	Outdoor air damper (Manual or automatic,factory or field installed)	**1**	Return air
B	Fan	**J**	Economiser (Factory or field installed)	**2**	Supply air
C	Evaporator coil	**K**	Outdoor air hood (Factory or field installed) **(1)**	**3**	Fresh air
D	Condenser coil	**L**	Gravity exhaust damper (Factory or field installed)	**4**	Exhaust air
E	Heat exchanger	**M**	Power exhaust fan (Factory or field installed) **(2)**	**5**	Flue outlet
F	Control box	**N**	Horizontal roof mounting frame **(3)**	**6**	Power entry
G	Filter			**7**	Gas entry
H	Lifting holes	**X**	Centre of gravity	**8**	Condensate drain

(1) Furnished with economiser or outdor air damper
(2) Down-flow applications only
(3) Required for horizontal applications with optional return air panel kit

PRELIMINARY CHECK ITEMS

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

- Is there sufficient space for the equipment?
- Is the surface on which the equipment will be placed 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?
- Does the noise level of the equipment meet the specification ?
- 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 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

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 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.

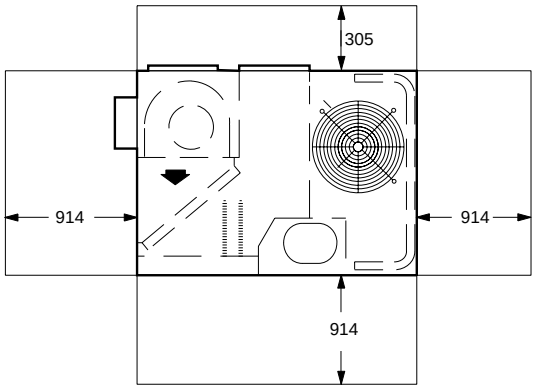
Figures 12 & 13 show the required clearances for both Smart & Linea units

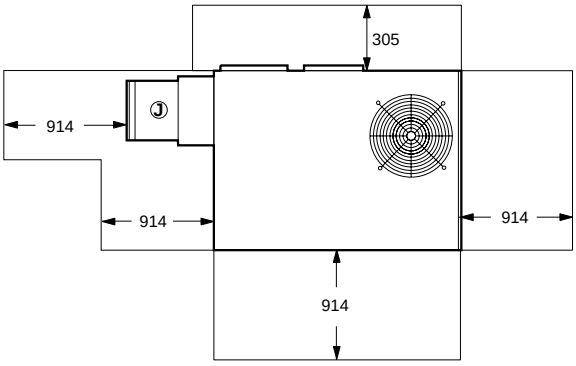
CONNECTIONS

- Ensure that all the pipework crossing walls or roofs are secured and insulated to avoid condensation problems.

NOTE : The AQUILUX covers which protect the finned surfaces must be removed prior to unit commissioning.

SMART Units - RECOMMENDED CLEARANCES





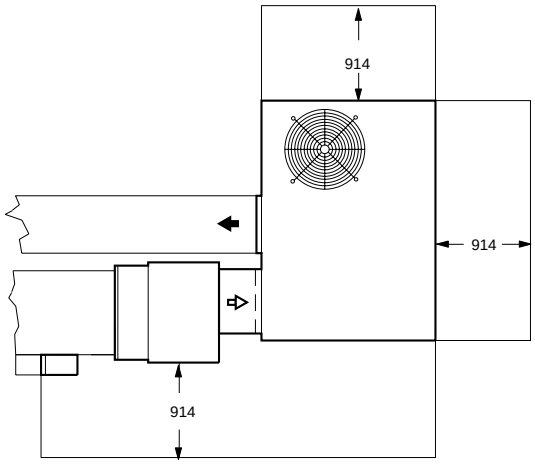
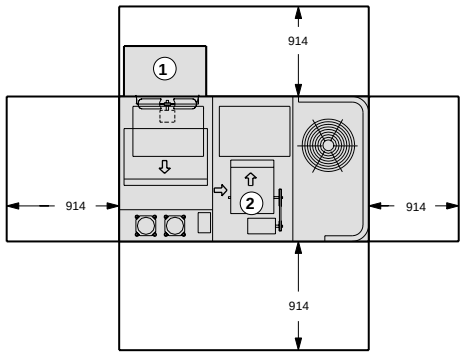


Figure 12

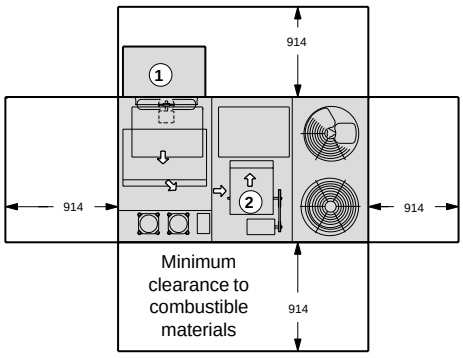
LINEA™ Units - RECOMMENDED CLEARANCES

MODELS
020-025-030



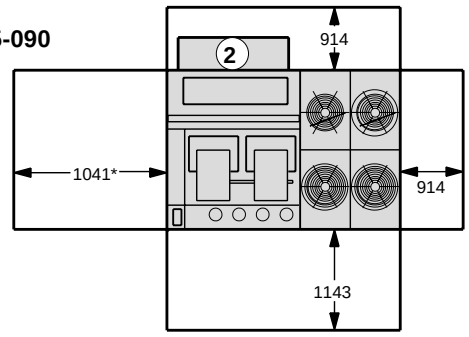
1 Optional outdoor air hood
2 Blower
Note : Top clearance not obstructed
Entire perimeter of unit base requires support when elevated above mounting surface
Minimum clearance to combustible materials

MODELS
035-040-045



1 Optional outdoor air hood
2 Blower
Note : Top clearance not obstructed
Entire perimeter of unit base requires support when elevated above mounting surface

MODELS
055-065-075-090



2 Blower
***** Recommended service clearance for blower deck removal
Note : Top clearance not obstructed
Entire perimeter of unit base requires support when elevated above mounting surface

Figure 13

ROOF MOUNTING

NOTE : Some units are equipped with a blower bracket that must be removed to install some accessories or when unit is used in horizontal applications. However, this bracket does not need to be removed unless it is necessary.

NOTE : Securely fasten roof frame to roof per local codes.

Downflow Application

1. The roof mounting frame must be installed, flashed and sealed in accordance with the instructions provided with the frame.

2. The roof mounting frame should be square and level to 5 mm per linea metre in any direction.

3. Duct or duct enclosure must be attached to the roof mounting frame and not to the SCA/SHA unit. Supply and return air plenums must be installed before setting the unit.

4. Place unit on frame according to roof mounting frame instructions. Defrost drainage hole end of unit must overhang roof mounting frame as described in figures 3 and 4.

5. Cut insulation away from overhang on bottom of units. See shaded areas in figure 15.

Roof Mounting With Installer's Frame

Many types of roof framing or supports can be used to install the unit, depending upon different roof structures. Refer to figure 16 for typical field fabricated mounting frame. Items to keep in mind when building frame or supports are :

1. Frame must be shorter than cabinet length to allow for 76 mm overhang for defrost drainage holes.

2. Make sure the frame or supports are square, level and not twisted.

3. Frame or supports must be high enough to prevent any form of moisture from entering unit.

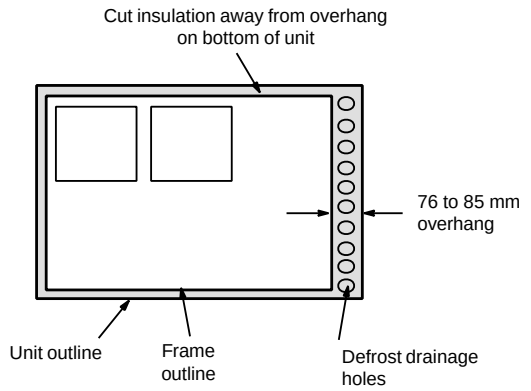
   Recommended frame height is 356 mm

4. Install unit at least 102 mm above finished roof to allow adequate drainage of water during defrost (SHA units).

5. Horizontal discharge units installed on roof require support along the longer sides of unit base. Support must be constructed of steel or suitably treated wood materials.

POSITION ON ROOF MOUNTING FRAME

SCA/SHA 010



SCA/SHA 013-015

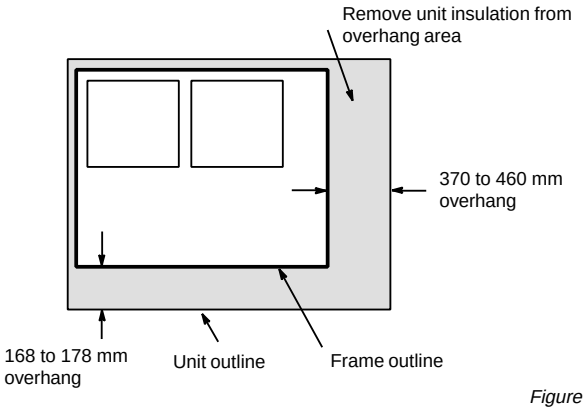


Figure 14

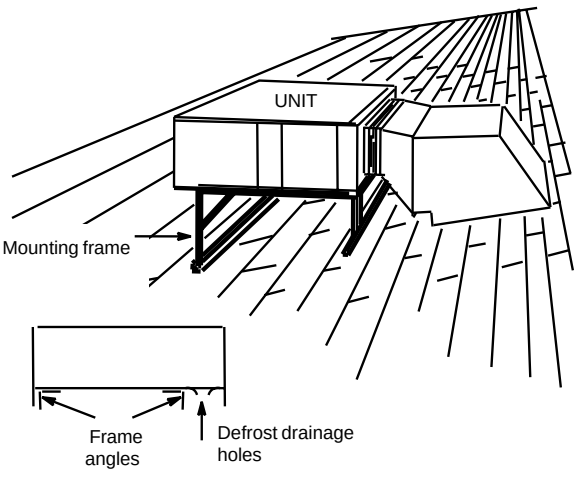


Figure 15

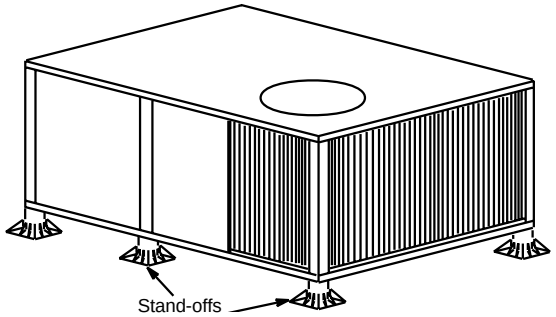
SLAB MOUNTING

1. Specific installation clearances must be maintained when mounting SCA/SHA series units.

2. Install unit on a level slab high enough above ground (102 mm) to allow adequate drainage of water during defrost. Top of slab should be located so run-off water from higher ground will not collect around unit. NOTE : Elevation of the unit may be accomplished by constructing a frame using suitable materials. If a support frame is constructed, IT MUST NOT BLOCK DRAIN HOLES IN UNIT BASE.

3. Support unit at long sides of unit base. A stand-off kit, which consists of six (152 mm) high plastic stand-offs, is available (See figure 16).

4. When installed in areas where low ambient temperatures exist, unit should be located so winter prevailing winds do not blow directly into the outdoor coil.



FEET NOT SUPPLIED WITH THE UNIT

Figure 16

5. Locate unit away from overhanging roof lines which would allow water or ice to drop on, or in front of, coil.

ROOFMOUNTING FRAME PARTS IDENTIFICATION

(1) : BAG ASSEMBLY CONTAINING SCREWS
(1) : BAG ASSEMBLY CONTAINING INSULATION

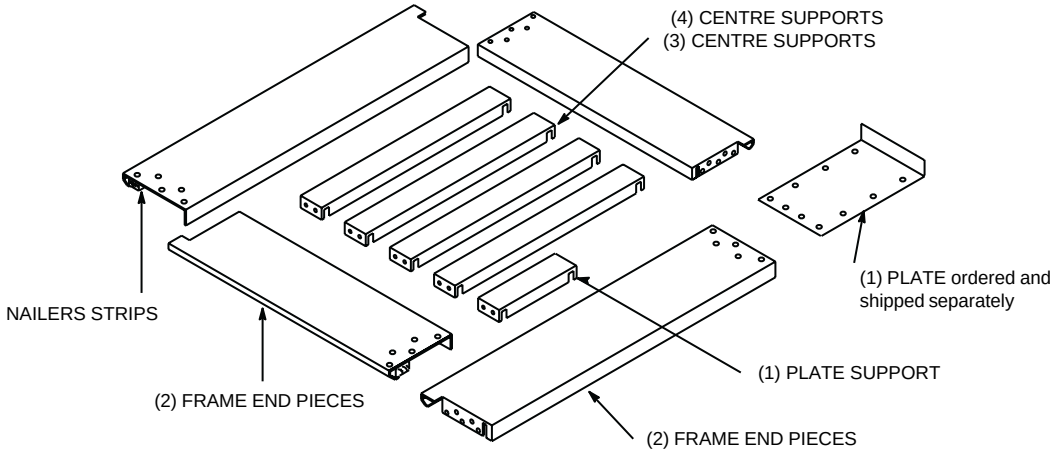


Figure 17

ASSEMBLED ROOFMOUNTING FRAME (supplied loose for site assembly) MODEL 010 - 013 - 015

Secure side and end pieces with five #10-16x3/4" sheet metal screws.
Secure centre support with #10-16x3/4" sheet metal screws.
See detail A

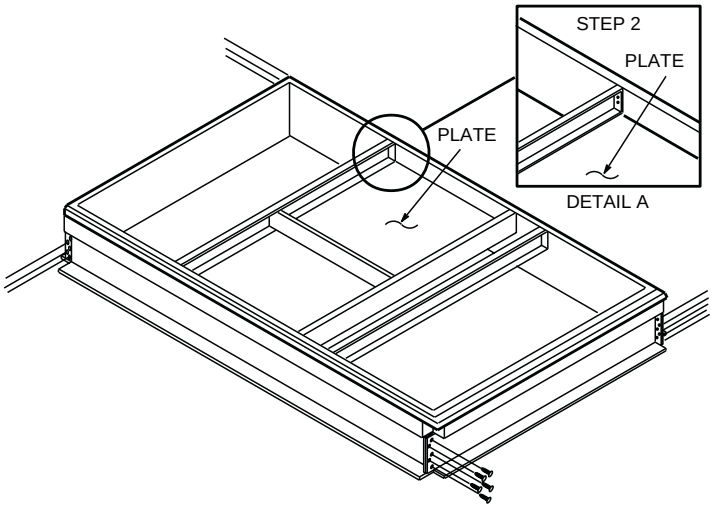


Figure 18

ROOFMOUNTING FRAME PARTS IDENTIFICATION

See figure 19 for parts identification.

APPLICATION

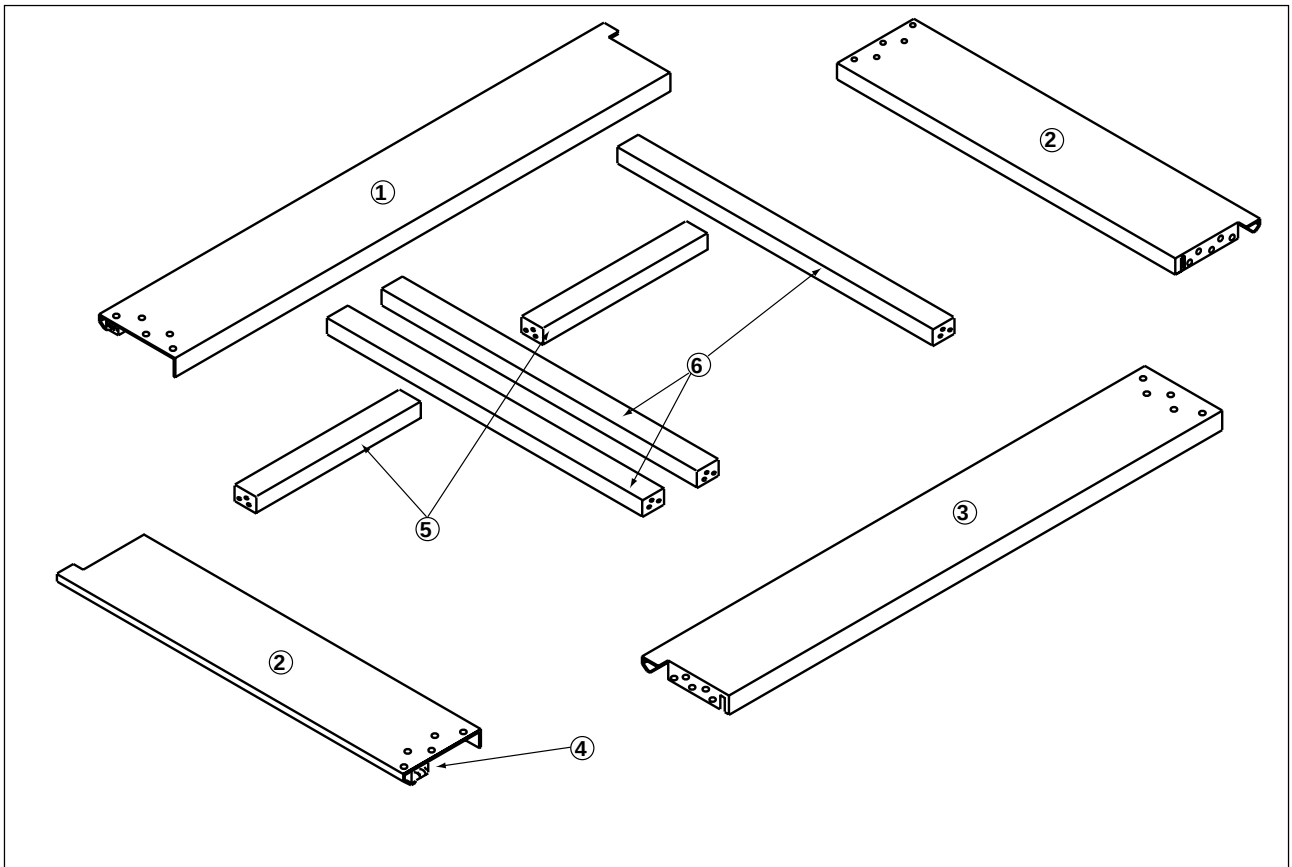
Roof mounting frames provide support when the units are installed in downflow rooftop applications.

The LC/LG/LD/LH is 356 mm in height.

The mounting frame can be installed directly on deck having adequate structural strength or on roof supports under deck.

NOTE : Frame assembly must be installed level within 5 mm per linear meter in any direction.

PARTS IDENTIFICATION

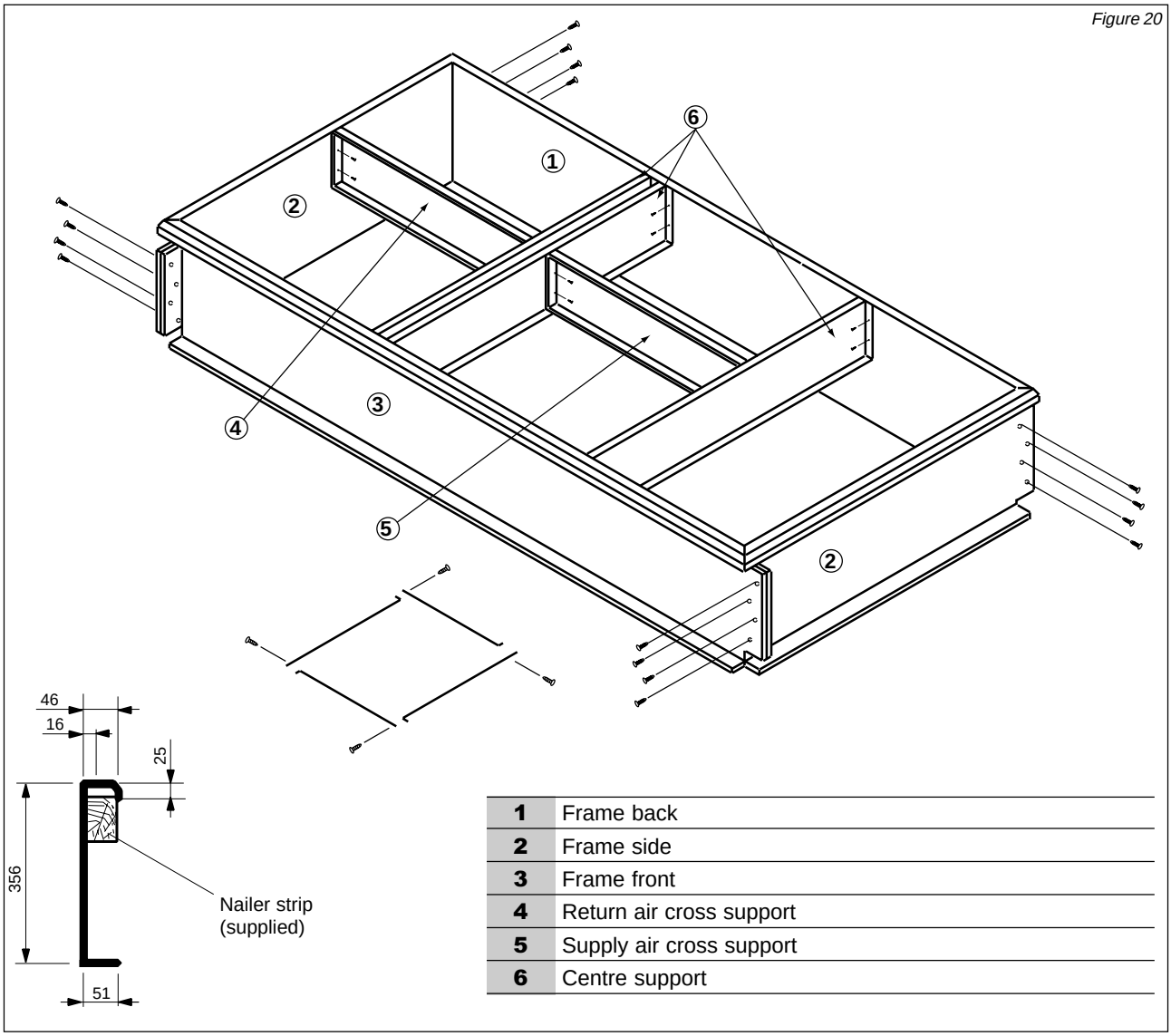


1	Frame back
2	Frame side
3	Frame front
4	Nailer strips
5	Supply and return air cross support
6	Centre support

Figure 19

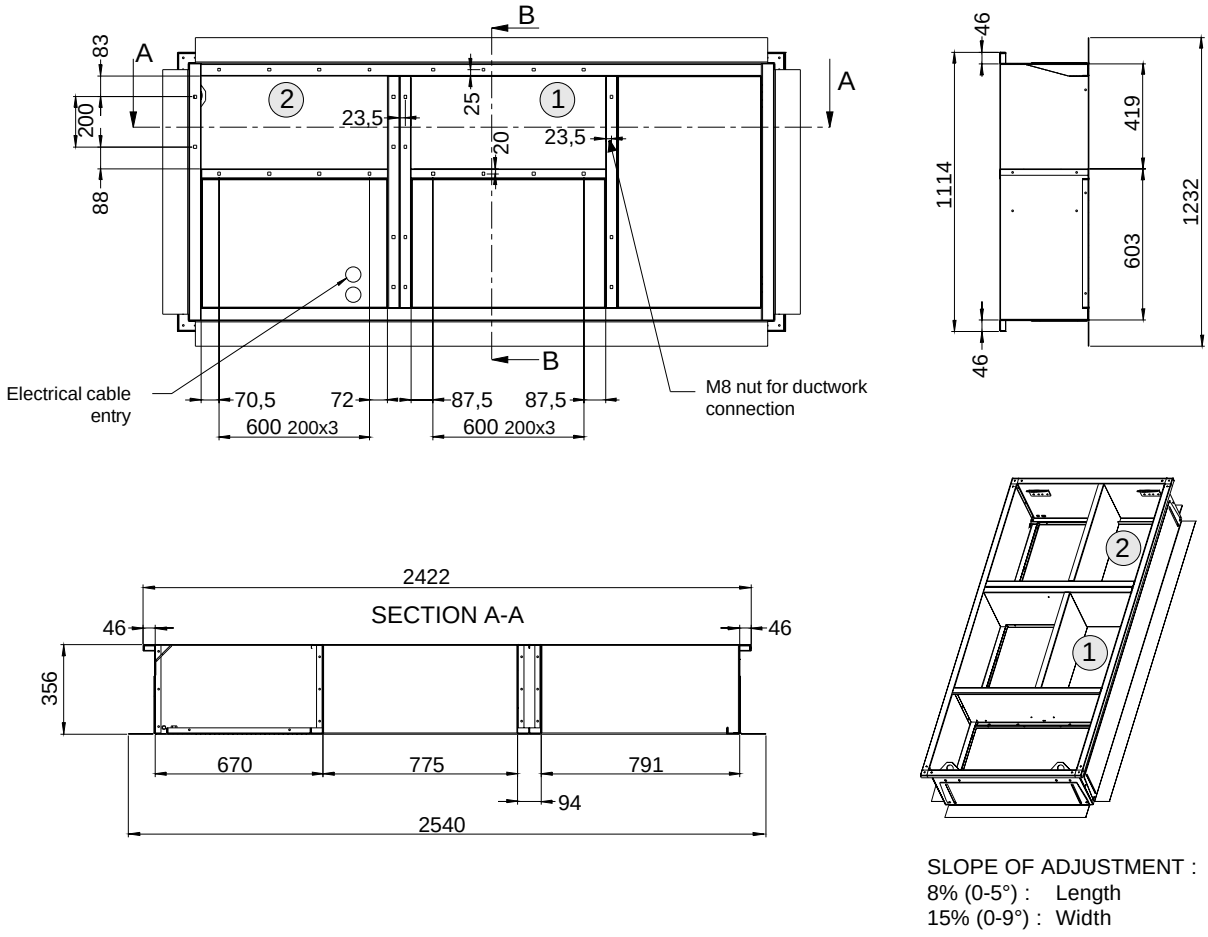
ASSEMBLY INSTRUCTIONS FOR ROOFMONTING FRAME, MODELS 020-025-030-040-045 (SUPPLIED LOOSE FOR SITE ASSEMBLY)

Figure 20



1	Frame back
2	Frame side
3	Frame front
4	Return air cross support
5	Supply air cross support
6	Centre support

ADJUSTABLE ROOFCUB, LINEA 020 - 025 - 030

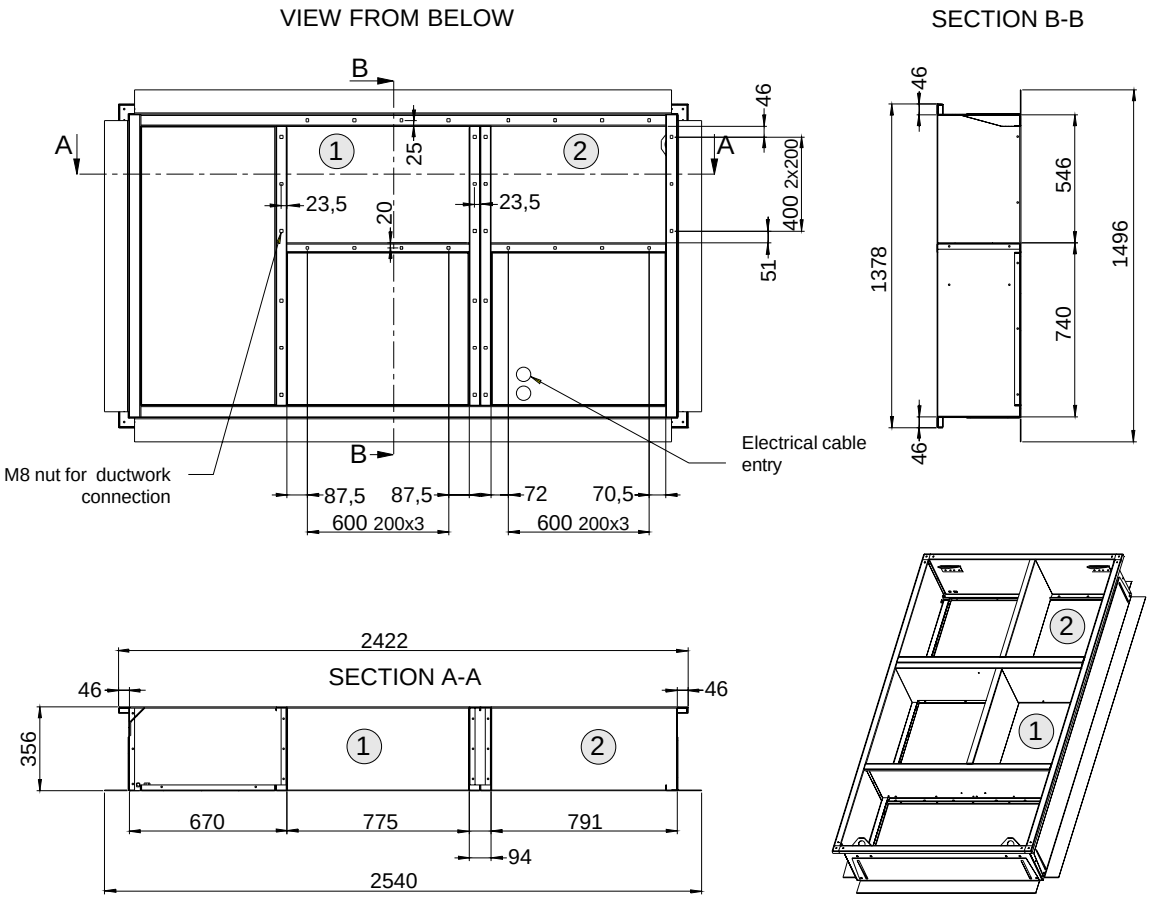


SLOPE OF ADJUSTMENT :
8% (0-5°) : Length
15% (0-9°) : Width

1	Supply
2	Return

Figure 21

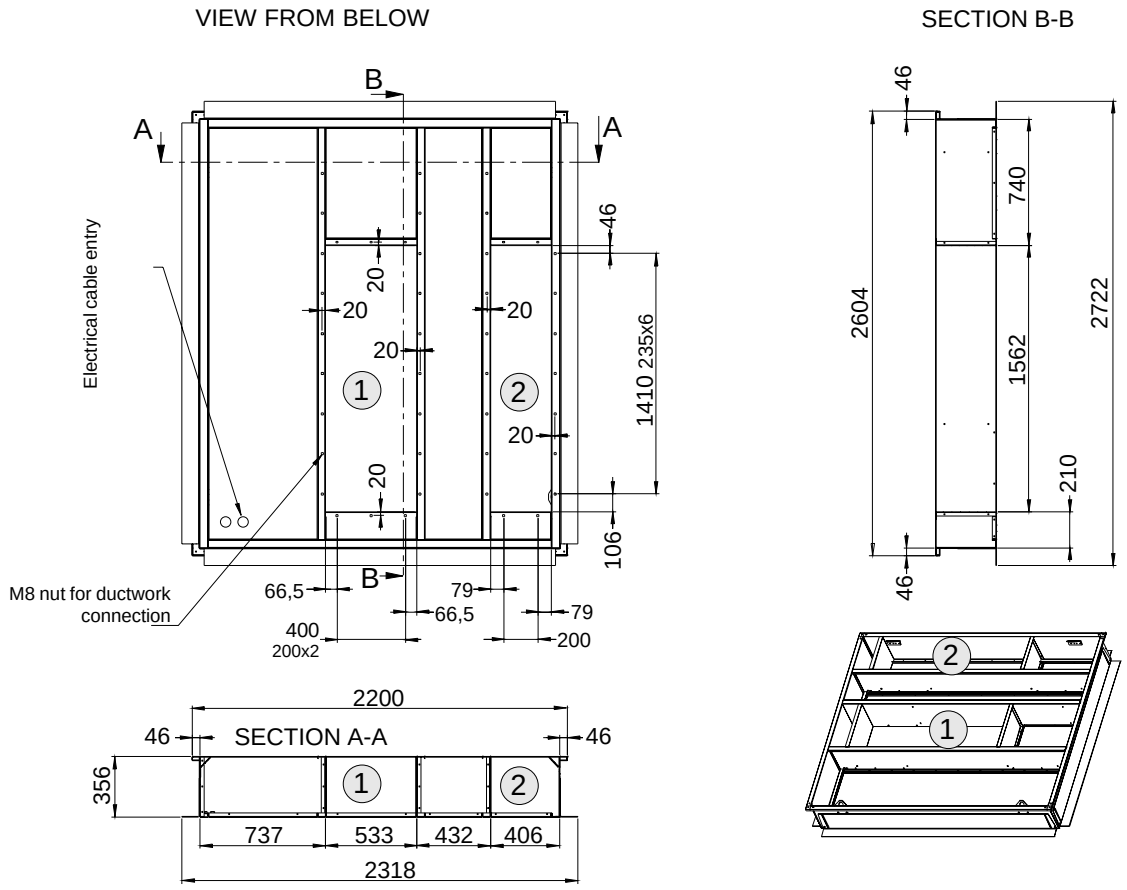
ADJUSTABLE ROOFCUB, LINEA 035 - 040 - 045



1	Supply
2	Return

Figure 22

ADJUSTABLE ROOFCUB, LINEA 055 - 065 - 075 - 090

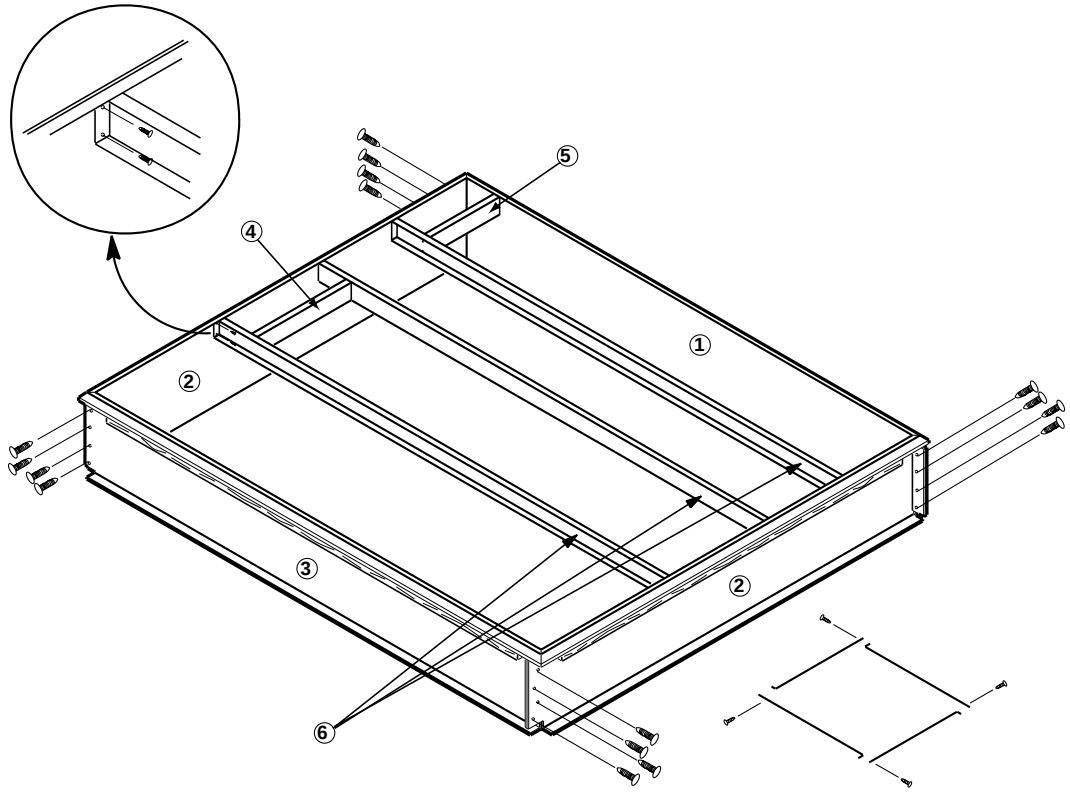


1	Supply
2	Return

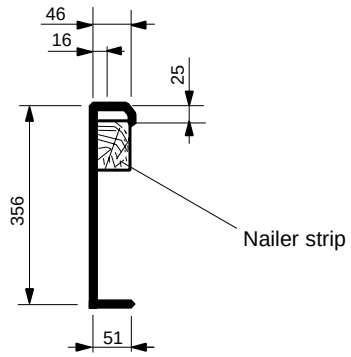
Figure 23

ASSEMBLY INSTRUCTIONS FOR ROOFMONTING FRAME, MODELS 055-065-075-090 (SUPPLIED LOOSE FOR SITE ASSEMBLY)

Figure 24



1	Frame back
2	Frame side
3	Frame front
4	Return air cross support
5	Supply air cross support
6	Centre support



SECURING FRAME

To assure proper mating with units, it is mandatory the mounting frame be squared to roof structure as follows :

1. With frame situated level in desired location on roof trusses, tack weld corner of frame.
2. Measure frame diagonally from corner to corner as shown in figure 25. These dimensions must be equal for frame to be square.
3. It is extremely important to sight frame from all corners to make certain frame is not twisted across top side. Shim frame under any low sides.

   Maximum slope tolerance is 5 mm per linear metre in any direction.
4. After frame has been squared, straightened and shimmed, weld or attach frame securely to roof deck.

NOTE : Securely fasten roof frame to roof per local codes.

SQUARING FRAME

Frame is square when length from corner A to B is equal to lenght from corner C to D.

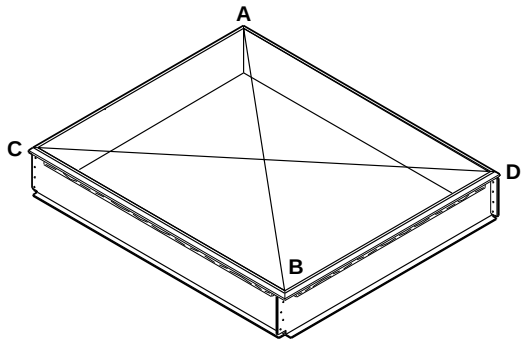


Figure 25

CURBING AND FLASHING

1. Outside of frame should be insulated with rigid type insulation, preferably 51 mm thick. Do not use combustible material for filling around frame.
2. Counter-flash and seal around frame as shown in figure 26.
3. When bottom power service is used, cut counter flashing for conduit clearance and make a watertight seal around conduit section passing through counter flashing (see figure 27).

IMPORTANT : If a poured roof is used, such as concrete, be sure inside of mounting frame is adequately braced to ensure a square and level frame.

4. The roof mounting frame is equipped with two 7/8" knockouts. One knockout is located below the unit power entry. The other knockout is located below the unit low voltage power entry. These knockouts allow low and high voltage power to be brought from beneath unit. The knockout below the unit power entry may need to be enlarged depending on unit power requirements and the conduit size required.

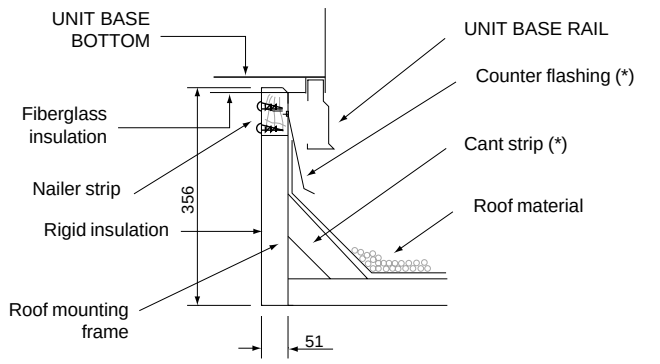


Figure 26

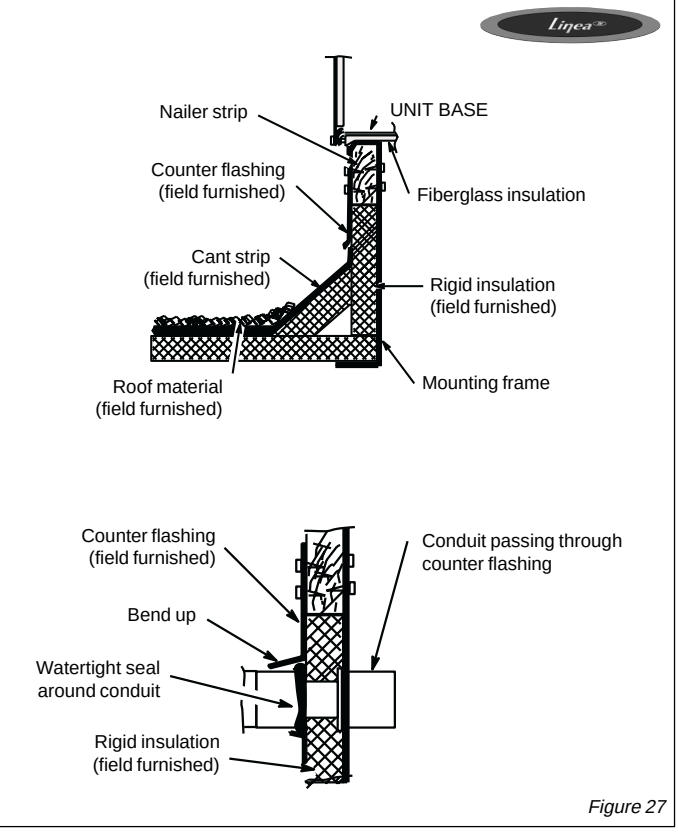


Figure 27

MISCELLANEOUS

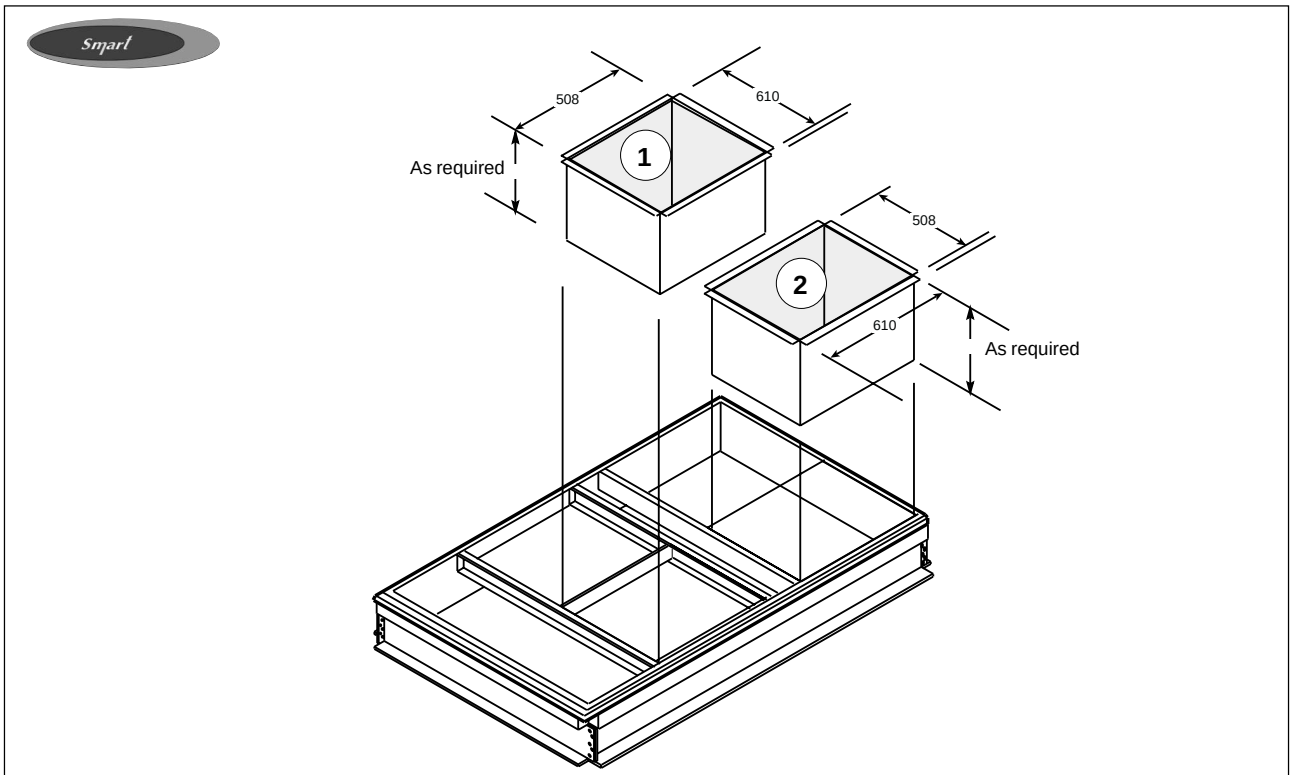
1. Where pipes and electrical conduit extend through roof, flashing must conform to local roofing standards.
2. Roof walkways should be provided around equipment to facilitate servicing.

SUPPLY AND RETURN PLENUM*

IMPORTANT : Plenum system must be installed before unit is set on mounting frame. Plenums must be constructed of galvanized steel with coated fiberglass insulation applied to the inside. It is recommended that 13 mm thick, 48kg/m^3 density fiberglass insulation be used.

However, if 24 kg/m^3 density insulation is used, it should be secured with mechanical fasteners. Install plenums as shown in figure 29.

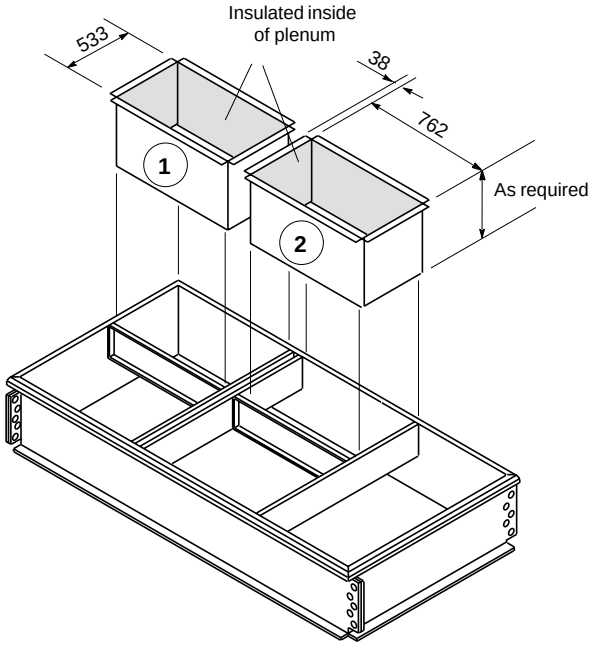
*** : Plenum not supplied. Diagram for information only.**



1	Supply air plenum*
2	Return air plenum*

Figure 28

1	Supply air plenum*
2	Return air plenum*



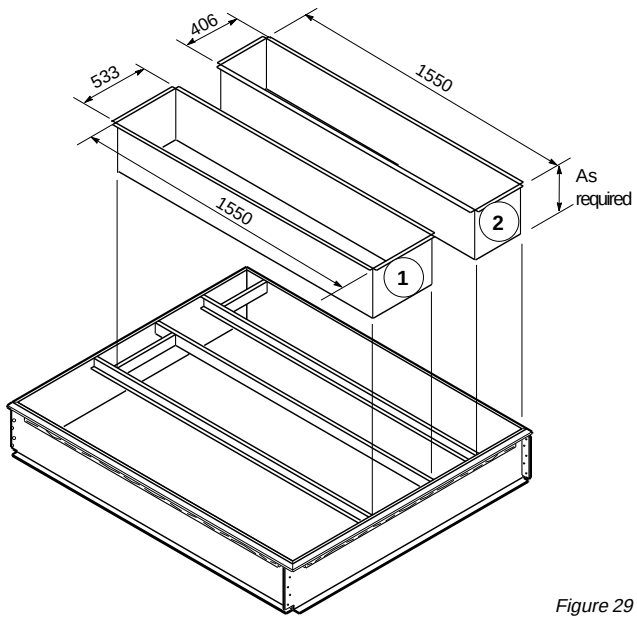


Figure 29

CONDENSATE DRAINS

The following practices are recommended to ensure condensate removal. Before installation, check local codes concerning condensate removal. Refer to figure 30 for typical condensate piping.

1. Drain piping should not be smaller than drain connection at coil.

2. A trap in the drain line is recommended when drain is on the negative side of the system blower. This will allow water to escape from the drain pan. It is also advisable to trap the line when drain is on the positive side of system blower. This will prevent conditioned air from escaping through the drain line.

3. In most cases the trap will be deep enough to offset the difference in static pressure between the drain pan and the atmoshpere. If not the case, alternative traps may be required.

   NOTE-Unit condensate drain pipe opening must be sealed air tight after installation of drain.

4. Horizontal runs must be pitched 25 mm per 3 metres of drain line to offset line friction.

5. An open vent in drain line will sometimes be required due to line length, friction and static pressure.

6. Drains should be constructed in a manner to facilitate future cleaning.

7. On applications where a drain line is not required, install a 90° elbow on drain connection to direct condensate downward.

TYPICAL CONDENSATE DRAIN(*)

(*) : Supplied with the unit

Figure 30

This work must only be carried out by trained refrigeration engineers

Before connecting to 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 electrical connections in the control panel and on the motors are secure.
- Ensure that all drive motors are secure.
- Using the electrical wiring diagram, check the conformity of the electrical safety devices (circuit breaker settings, presence and rating of fuses).

At this point attach the manometers to the refrigerant circuit

Powering up the system

- Make sure that the thermostat is located where it will not be affected by sunlight, drafts or vibration. A position approximately 1.5 meters from the floor, near the Centre of the structure is desirable. Connect 24VAC class II control wiring to thermostt and to unit.
- Connect line voltage power supply from the isolating switch to the bottom of the compressor contactor in the unit.
- Unit is equipped with ground screw. Ground unit with a suitable ground connection either through unit supply wiring or an earth ground.
- Unit voltage openings must be sealed weather tight after wiring is completed.

Reverse Cycle Test

On reversible units this test is used to check the switching of the 4-way valves. Start the reverse cycle with reference to the cold or hot temperature threshold data according to the climatic conditions at the time of testing

COOLING START-UP AND ADJUSTMENT

Crankcase Heaters

Three phase units only-Crankcase heaters must be energized for 24 hours before attempting to start compressors. Set thermostat levers so there is no demand to prevent compressor from cycling. Apply power to unit.

Preliminary Check

1. Make sure refrigerant lines do not rub against cabinet or against each other.
2. Inspect all electrical wiring, both factory and field installed, for loose connections.
3. Check voltage at the disconnect switch. Voltage must be within range listed on unit nameplate. If not, consult power company and have voltage condition corrected before starting unit.
4. Recheck voltage with unit running. If power is not within range listed on unit nameplate, stop unit and consult power company. Check amperage of unit. Refer to unit nameplate for correct running amps.
5. Make sure filter is in place before start-up.

Cooling Start-Up

1. Set thermostat system switch in “Cool” position, fan switch in “On” or “Auto” position and adjust room thermostat to a setting below room temperature.
2. Close unit isolating switch.
3. Compressor will start and cycle on thermostat demand and operation.

Three Phase Compressor Rotation

Three phase scroll compressors must be phased sequentially to ensure correct compressor rotation and operation.
At compressor start-up, a rise in discharge and drop in suction pressures indicates proper compressor phasing. If discharge and suction pressures do not function normally, follow these steps:

1. Disconnect power to the compressor and the unit.
2. Reverse any two field power leads to the unit.
3. Reapply power to the compressor and unit.

Discharge and suction pressures should operate at their normal start-up ranges.

NOTE : The compressor noise level will be significantly higher when phasing is incorrect and will not provide cooling when operating backwards.

Charging

It is not recommended that the system be charged below 15° C. If charging below 15° C is required or if system is completely void of refrigerant, the recommended and most accurate method of charging is to weigh the refrigerant into the unit according to the amount shown on the unit rating plate.

HEATING START-UP

Heating Cycle — Heat Pump

1. Set thermostat switch in “Heat” position and blower switch in “On” or “Auto” position. Set heating adjustment lever above room temperature. Close unit isolating switch.
2. Compressor will cycle on demand from room thermostat and outdoor coil fan will cycle with compressor. Blower will operate according to position of blower switch on thermostat.
3. A defrost control is used to prevent excessive outdoor coil icing. As a defrost cycle is initiated, the reversing valve switches, inducing heat to outdoor coil. Outdoor fan stops during this process.

Heating (Optional Electric Heat)

1. When heat requirements exceed heat pump capacity, the thermostat automatically activates the optional electric heat.
2. On thermostats equipped with emergency heat function, emergency heat (auxiliary electric heat) may be manually activated by placing thermostat system switch in “Emergency Heat” position.
3. Refer to thermostat operation section for details on indicator light functions.

BLOWER OPERATION AND ADJUSTMENTS

Unit is equipped with direct drive, multi-speed indoor blower. See unit wiring diagram for factory setting.

Blower Operation

1. Blower operation is manually set at the thermostat subbase fan switch. When fan switch is in “On” position, blower operates continuously.

2. When fan switch is in "Auto" position, blower will cycle with demand. Blowers and entire unit will be off when system switch is in "Off" position.

Blower Speed Adjustment

Blower motor wires are routed back to the unit control box when the wires end in pigtails. blower motor speed can then be changed by rearranging the pigtail connections.

IMPORTANT : To prevent motor burnout, never connect more than one motor lead to any one connection. Black and blue motor taps must be connected together when operating on low or medium speeds. Tape unused motor leads separately.

Minimum Blower Speed (With Electric Heat)

Refer to ECH16 installation instructions for minimum allowable blower speed when electric heat is used.

SCA = Cooling only unit
SHA = Heat pump rooftop

		External static pressure (Pa)								
		0	25	50	75	100	125	150	175	185
SIZE	**Fan speed**	**Q (m^3/h)**	**Q (m^3/h)**	**Q (m^3/h)**	**Q (m^3/h)**	**Q (m^3/h)**	**Q (m^3/h)**	**Q (m^3/h)**	**Q (m^3/h)**	**Q (m^3/h)**
	Low	1295	1260	1224	1188	1152	1080	1008	972	900
10	**Medium - Low**	1620	1584	1548	1512	1440	1404	1332	1260	1188
Side	**Medium - High**	1818	1800	1728	1692	1620	1548	1476	1404	1332
Discharge	**High**	2088	2052	1980	1944	1872	1800	1692	1620	1548
	Low	1296	1260	1224	1188	1116	1080	1008	972	900
10	**Medium - Low**	1602	1548	1512	1476	1440	1368	1296	1260	1188
Bottom	**Medium - High**	1710	1692	1656	1620	1548	1512	1440	1368	1296
discharge	**High**	1980	1944	1872	1836	1728	1692	1620	1512	1440
13	**Low**	1692	1692	1656	1620	1584	1548	1512	1476	1404
Side and	**Medium**	2556	2484	2448	2376	2304	2232	2124	2016	1908
bottom discharge	**High**	3042	2952	2844	2772	2628	2484	2340	2196	2016
15	**Low**	2682	2628	2592	2520	2448	2376	2268	2196	2088
Side	**Medium**	3096	3060	2988	2916	2808	2700	2592	2484	2340
discharge	**High**	3492	3420	3348	3276	3168	3060	2916	2772	2628
15	**Low**	2502	2448	2412	2376	2304	2268	2196	2124	2052
Bottom	**Medium**	2808	2736	2664	2628	2520	2448	2340	2232	2124
discharge	**High**	3078	3024	2952	2880	2772	2700	2556	2484	2340

THERMOSTAT OPERATION

Some heat pump thermostats incorporate isolating contacts and an emergency heat function (which includes an amber indicating light). This feature is applicable to some systems using auxiliary electric heat.
When the room thermostat is placed in the emergency heat position, the compressor is locked-out and heating is provided entirely by the auxiliary electric heat. An amber indicating light simultaneously comes on to remind the user that the system switch is operating in the emergency heat mode.
Emergency heat is usually used during a heat pump shutdown, but it should also be used following a power outage if power has been off for over an hour and the outdoor temperature is below 10°C. System should be left in emergency heat mode at least six hours to allow the the crankcase heater (if applicable) sufficient time to prevent compressor slugging.

COMPRESSOR CONTROLS

High Pressure Switch

The compressor circuit is protected by a high pressure switch which opens at 28,27 bar and is manually reset.

Crankcase Heaters

SCA/SHA three phase units are equipped with a self regulating crankcase heater which must be energized at all times to prevent compressor damage due to refrigerant migration.

Freezestat (Commercial Units Only)

Commercial models are equipped with a freezestat which prevents compressor operation if the indoor coil temperature drops below -2°C+1.6 and automatically resets at 14°C + 2.

Defrost System

The defrost cycle is temperature-initiated and time/pressure-terminated.

Defrost Control

This control asks for defrost every 90 minutes, and if the defrost thermostat senses temperatures below (2°C) the unit will defrost. The defrost control can be field adjusted from a 90 minute to either a 60 minute or 30 minute interval if warranted by climatic conditions. Defrost cycle will be terminated when the defrost pressure switch senses pressures above 19 bar. The control will not allow a defrost to last for more than 14 minutes.

Defrost Thermostat

The defrost thermostat is mounted on line between the outdoor distributor and check valve/drier. The unit will not defrost unless this thermostat senses the line to be 2°C or colder.

This work must only be carried out by a trained refrigeration engineer

Before connecting to 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 electrical connections in the control panel and on the motors are secure.
- 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.
- Using the electrical wiring diagram, check the conformity of the electrical safety devices (circuit breaker settings, presence and rating of fuses).

At this point attach the manometers to the refrigerant circuit

Powering up the system with the isolating switch

- Check the direction of rotation of the fans. Refer to the rotation arrows situated next to the coils or fans (NOTE: unlike a coil, a fan rotating in the wrong direction may fail).
- The fans' direction of rotation is checked during an end of production test.
- If they turn in the opposite direction, disconnect the power supply to the machine at the building's mains switch, reverse two phases of the incoming supply to the machine and try again.
- If only one of the fans rotates in the wrong direction, disconnect the power supply at the machine's isolating switch and reverse two of the component initial phases on the terminal within the electrical panel.

Using CLIMATIC

- Check the voltages recorded against the rated values, in particular on the system supply fans.
- If the readings on the fans are outside the limits, this indicates excessive air flow which will affect the thermodynamic performance. Refer to the "Air Flow Balancing" section.

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

- "Clogged filter" detection test : vary the setpoint value (KP02, setpoint 93) in respect to the air pressure variable value (KP02, variable16). Observe the response of the CLIMATIC.
- Same procedure for detecting "Missing Filter" (setpoint 94) or "Air Flow Detection" (setpoint 92).
- (If fitted), check the smoke detection function.
- (If fitted), check the Firestat by pressing the test button.
- Disconnect the circuit breakers of the condenser fans and check the high pressure cut-out points on different refrigerant circuits.

Reverse Cycle Test

On reversible units this test is used to check the switching of the 4-way valves. Start the reverse cycle with reference to the cold or hot temperature setpoint data according to the climatic conditions at the time of testing (setpoint 15 + setpoint 16).
Your machine is now operational.
You can now proceed to the setting stage. See the "Control" section.

Three Phase Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and blower rotation and operation. Compressor and blower are wired in phase at the factory. Power wires are color coded as follows: line 1-red, line 2-yellow, line 3-blue.

- Observe suction and discharge pressures and blower rotation on unit start-up.
- Suction pressure must drop, discharge pressure must rise, and blower rotation must match rotation marking. If pressure differential is not observed or blower rotation is not correct.
- Disconnect all remote electrical power supplies.
- Reverse any two field-installed wires connected to the main isolator.
- Make sure the connections are tight. Discharge and suction pressures should operate at their normal start-up ranges.

Refrigerant Charge

WARNING : Do not exceed nameplate charge under any condition.
This unit is factory charged and should require no further adjustment. If the system requires charge, reclaim the charge, evacuate the system, and add required nameplate charge.
NOTE : System charging is not recommended below 15°C. In temperatures below 15°C , the charge must be weighed into the system.

Compressor Controls

See unit wiring diagram to determine which controls are used on each unit.

High Pressure Switch

The compressor circuit is protected by a high pressure switch which cuts out at 28,25 bar + 07, bar.

Low Pressure Switch

The compressor circuit is protected by a low pressure switch. Switch cuts out at 1,72 bar and automatically resets at 3,79 bar.

Crankcase Heater

Compressors have belly band compressor oil heaters which must be on 24 hours before running compressors. As soon as power is connected the heaters are energised once power is applied at main isolator .

Freeze/Sensors Protection

De-energise compressors when evaporator coil temperature falls below its setpoint to prevent evaporator freeze-up, reset when evaporator coil temperature reaches its secondary setpoint.
NOTE : For setpoint values refer to Climatic section of this document.

FILTER

UNIT MODEL NO.	FILTER SIZE
SHA 010	406mm x 635mm x 25mm
SHA 013, 015	508mm x 635mm x 25mm

Filters are provided with all units. Filters are installed external to the system in horizontal air flow applications. In downflow air discharge applications install filters as follows.

1. Remove screw holding blower shipping bracket to blower housing. Slide bracket to front and tip forward to remove.

2. **SHA010** - See figure 31.

   Remove filter from behind the horizontal supply air cover.

   Slide filter into brackets in blower compartment.

   Match air flow arrows on filter to actual air flow.

   SHA 013, 015 units - See figure 32.

   Remove filter from left side of blower compartment and slide into brackets.

   Match air flow arrows on filter to actual air flow.

3. Replace panels and seal weathertight

SCA/SHA 010

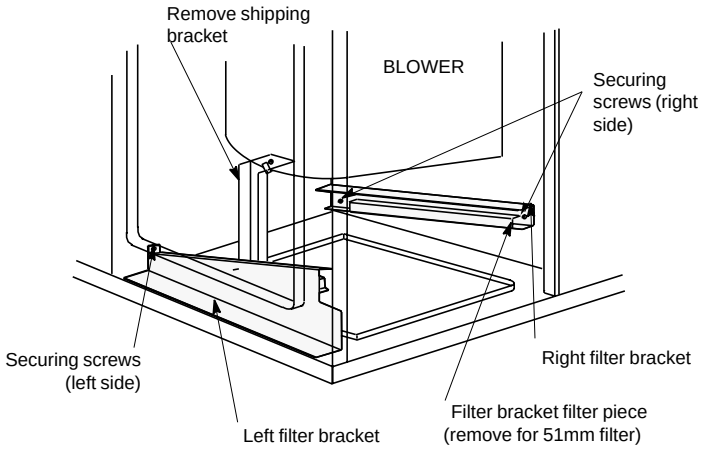


Figure 31

NOTE : When installing 51 mm filters remove filler piece in each bracket.

NOTE : In horizontal air flow configurations remove brackets and filter.

SCA/SHA 013 - 015

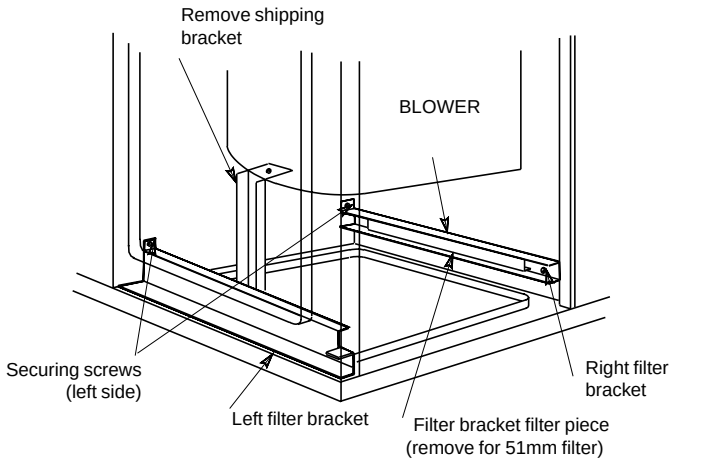


Figure 32

The CLIMATIC™ 2 controls the filters. Two types of problems may occur :

1 - **004** error code (lit LED “filter”) or the following icon (for a graphics screen - KP07) :

Item 8 on KP 17 indicates that the filters must be changed. The unit has not stopped but the airflow is likely to be reduced due to increased pressure drop acros the filters.

2 - **005** error code or the following icon (for a graphics screen - KP07) :

Item 29 on KP17 indicates that the filters are out of position : either they have been damaged or not been replaced during maintenance. In the latter case, the unit has not stopped but the increased flowrate may result in the motor overheating. It is important to check the filter immediately.

KP 17 DISPLAY

Figure 33

FILTER REPLACEMENT

After opening the filter access panel, unscrew the butterfly nuts maintaining the filter support and remove it (figure 34).

Remove the cells that are slide-mounted (figure 34).
Use the rod in the lower filter section to remove the cells at the botton of the sliders.

Install new filters inside the sliders.

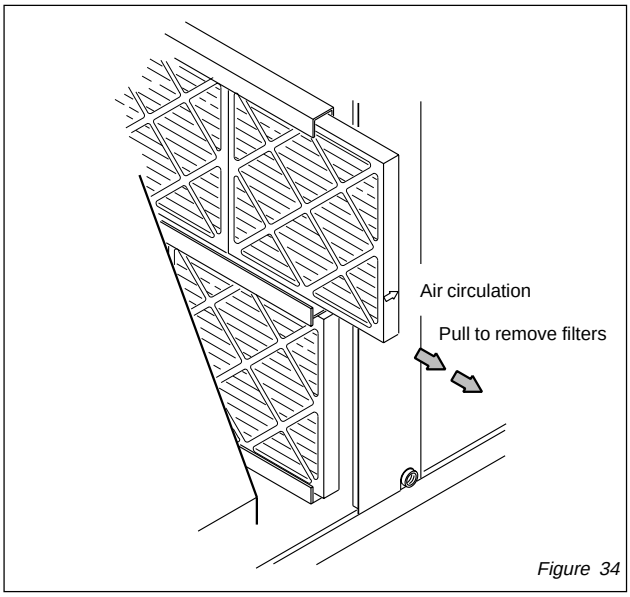


Figure 34

FAN OPERATION

To reset the Fan Control, use the KP02 (refer to the CLIMATIC section of this document).

FAN ACCESS

- Disconnect the fan drive plug as well as the “overheat” plug on the LG_/LD_ units.
- Remove the screws on each side of the mounting base plate.
- Pull the mounting base plate out of the unit.

ESTABLISHING AIRFLOW RATE (m^3/s)

- The following measurements are made with a dry coil. Switch the fan on without any cooling demand. The air filters must be in their position when the measurements are made.
- With all access panels in their position measure the static pressure outside the unit.
- Measure the inside fan rotation (r.p.m).
- Use the static pressure and the measured r.p.m. to calculate the volumetric flow rate (m^3/s).
- The fan rotation (r.p.m.) can be adjusted with the drive pulley. Loosen the Allen screw and turn the adjusting pulley to the right to reduce the air flow rate (see figure 35).

FAN MOTOR MOUNTING FRAME

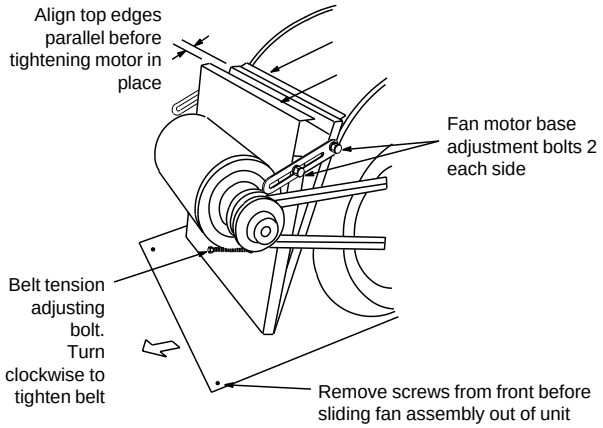


Figure 35

FAN BELT ADJUSTMENT

The pulley alignment and tension must remain constant to ensure a long life. Tension new belts 24 to 28 hours following their first service. Any increased stretch and extra flexibility can then be taken up.

- Loosen the 4 safety bolts securing the chassis.
- To increase the belt tension, turn the adjusting button to the right. Pull the drive outside and tension the belt. This will increase the distance between the fan drive and the fan housing. To reduce the belt tension, turn the adjusting button to the left.
- Tighten the two bolts on the drive motor (pulley side).

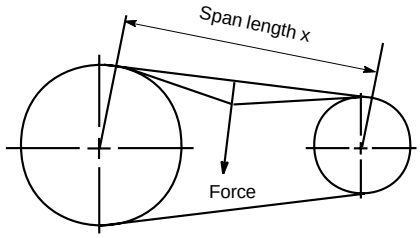
  NOTE: The upper part of the fan drive base plate must be parallel with the mounting chassis base plate before tightening the two bolts on the other side of the base plate. The drive and fan spokes must be parallel.
- Tighten the two bolts on the other side of the base plate.

BELT TENSION CONTROL

Too much tension reduces the belt life and resistance. Control the tension as follows:

- Measure the overall length X (see figure 36).
- Apply some pressure at the centre of the overall length (X) to deflect the belt by 1.5 mm over an overall length of 100 mm. For a 400 mm belt, the deflection should be 6 mm.
- Measure the belt deflection force. The deflection force must be 32 N for a used belt and 48 N for a new belt. The belt needs to be tensioned more when the deflection is below the value and must be slackened when the deflection exceeds the value.

MEASURE BELT TENSION



Deflection 1,5 mm per 100 mm of span

Figure 36

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.

The economiser are designed for use with standard (downflow) SMART units.
The economiser opens a set of dampers to allow 0 to 100 percent outdoor air to be used for cooling when outdoor humidity and temperature are acceptable.
Additional (2nd stage) cooling demand is directed to the compressor while the dampers remain open. if outdoor air becomes unacceptable, the outdoor air dampers close to a predetermined minimum position while the compressor cooling circuit cycles as needed.

DOWNFLOW ECONOMISER

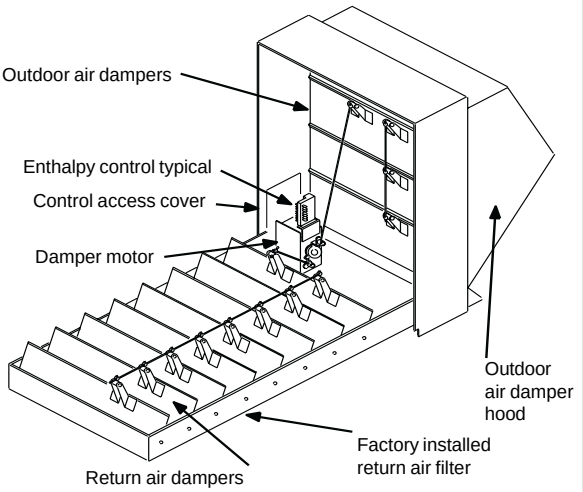
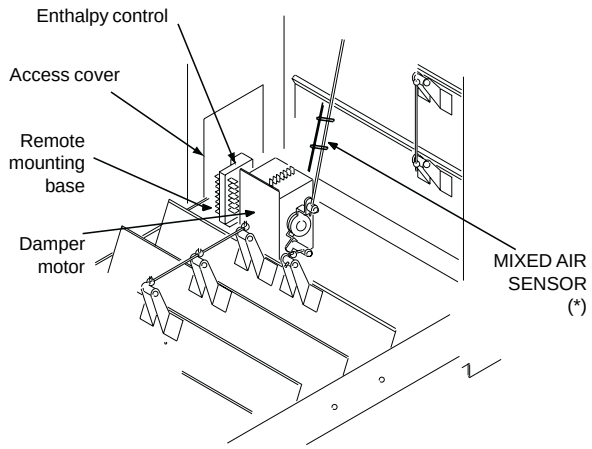


Figure 37

PARTS ARRANGEMENT



(*) : Mixed air sensor should be removed from economiser and installed in supply air stream as shown in figure 39

Figure 38

MIXED AIR SENSOR INSTALLATION

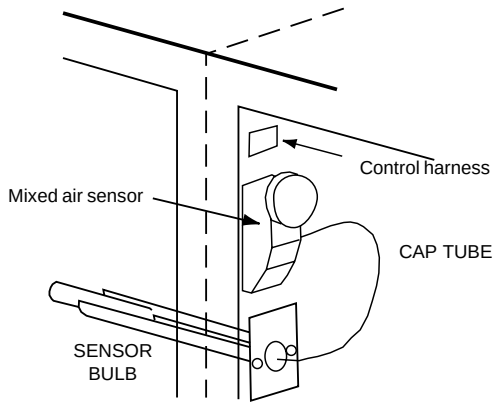


Figure 39

PARTS ARRANGEMENT

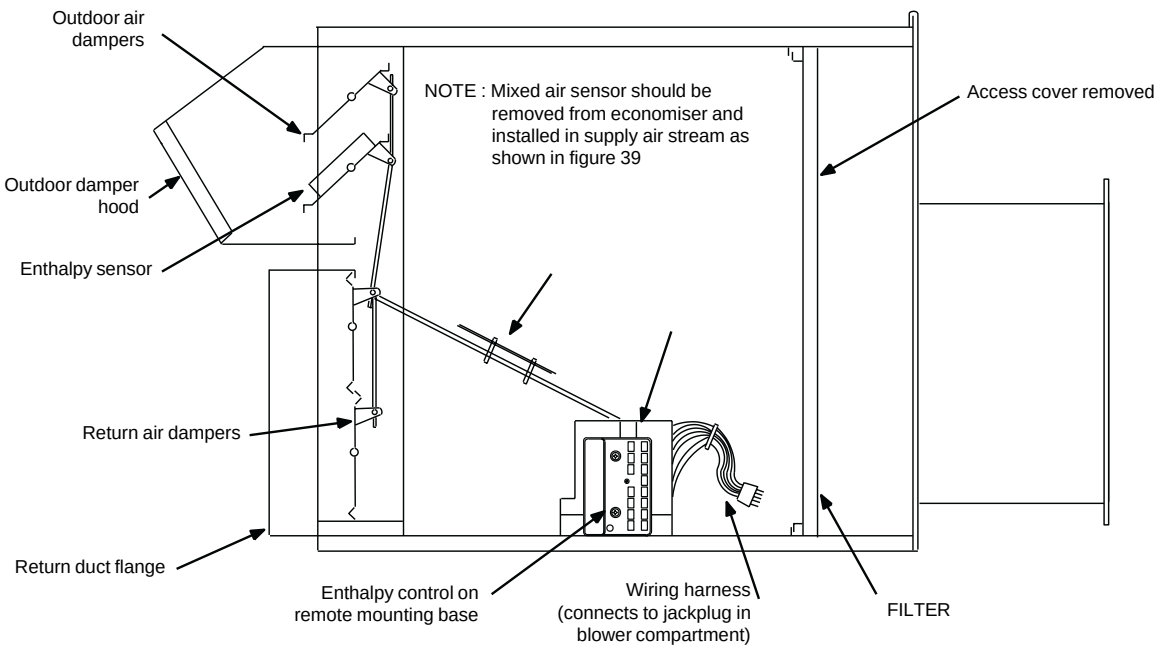


Figure 40

HORIZONTAL ECONOMISER

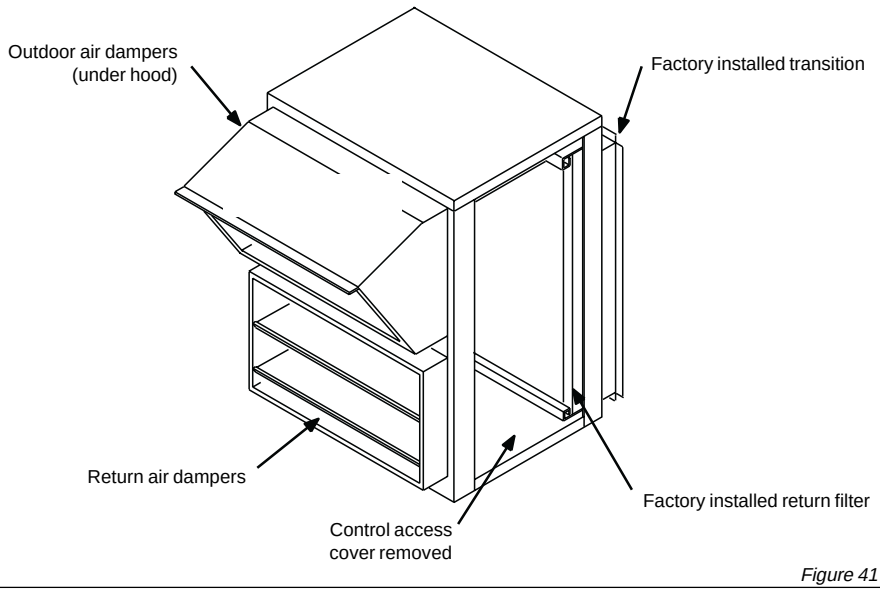


Figure 41

INSTALLATION

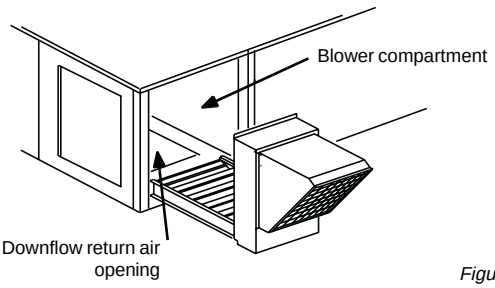


Figure 42

INSTALLATION

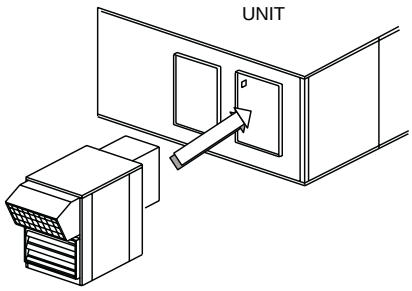


Figure 43

The optional low ambient kit allows for mechanical cooling operation at low outdoor temperature.

The low ambient pressure switch cycles the condenser fan while allowing normal compressor operation. This intermittent fan operation results in a high evaporating temperature which allows the system to operate without icing the evaporator coil and losing capacity.

ADJUSTMENT :

The low ambient pressure switch is adjustable but the adjustment knob DOES NOT adjust CUT-IN or CUT-OUT points. CUT-IN point is fixed and cannot be adjusted. The scale on the switch measures the differences in pressure between preset CUT-IN and adjustable CUT-OUT points. Adjustment knob changes CUT-OUT point by adjusting the DIFFERENCE between CUT-IN and CUT-OUT.

The low ambient pressure switch is factory set to CUT-IN at 19,65 bar with a difference of 10,67 bar (CUT-OUT at 9,65 bar). Adjustment should not be needed. If adjustment is needed, adjust the switch as follow :

1. Loosen knob securing screw to allow knob stop to pass over fixed stop on control (see figure 45).

   DIFFERENCE (set by knob) = CUT-IN (fixed) minus CUT-OUT POINT
2. Rotate the knob as needed to set the difference indicator at 10,0 bar.
3. Tighten the securing screw after adjusting.

   To find CUT-OUT point, re-arrange the equation so that :

   CUT-OUT = CUT-IN minus the DIFFERENCE.

LOW AMBIENT KIT TYPICAL INSTALLATION

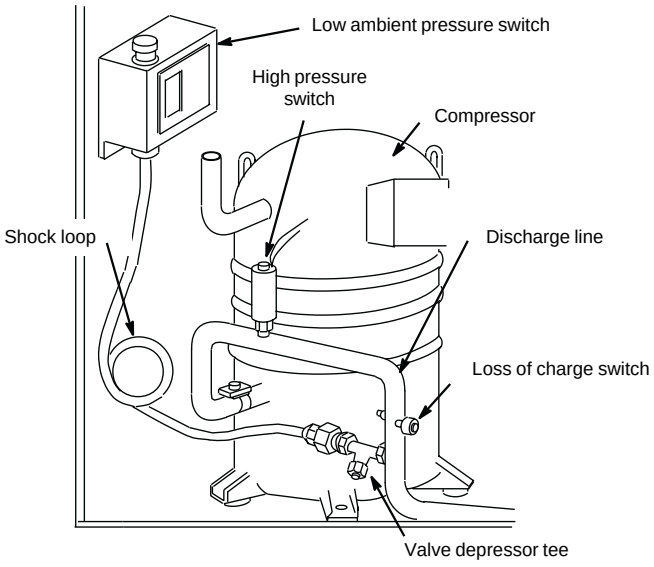


Figure 44

LOW AMBIENT ADJUSTMENT

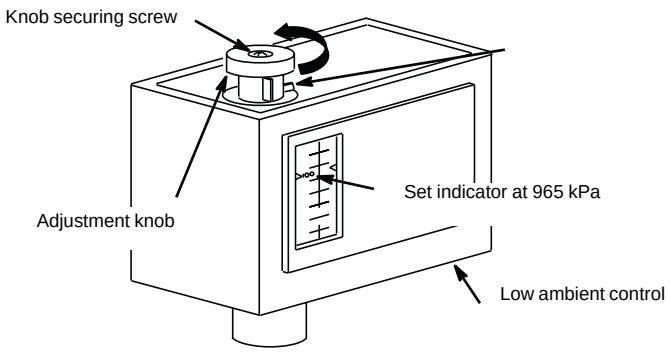


Figure 45

Smart

The outdoor air damper section installs in the SMART range to allow a fixed amount of outside air into the system. The outdoor air damper replaces the unit side panel where a downflow economiser would normally be installed. The dampers may be manually adjusted and fixed in place to allow up to 25 percent outside air into the system at all times. The washable filter supplied with the outdoor air damper can be cleaned with water and mild detergent.

FRESH AIR DAMPER

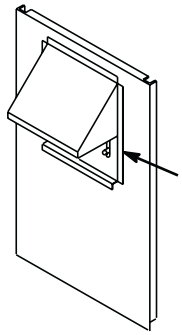


Figure 46

Linéa™

APPLICATION

Optional outdoor air dampers provide up to 25 percent fresh air for return.
Damper assembly is motorized : damper modulates simultaneously with the blower during the occupied period and remains closed during the unoccupied period (figure 47)
Damper assembly is manually operated : damper position is manually set at installation and remains in that position (see figures 48 & 49).

MOTORISED OUTDOOR AIR DAMPER

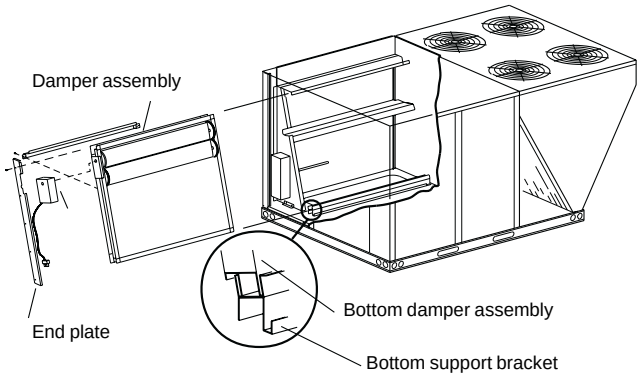


Figure 47

MOTORIZED DAMPER ASSEMBLY

1. Disconnect all power unit.
2. Release latches and open filter access panel.
3. Align bottom of damper assembly with support bracket and slide assembly into unit (see figure 47).
4. Fit damper assembly end plate over end plate of assembly and secure with retained screws.
5. Connect damper motor plug P3 to unit jack J3.

MANUAL OUTDOOR AIR DAMPER - UNITS 020 TO 045

SIDE VIEW

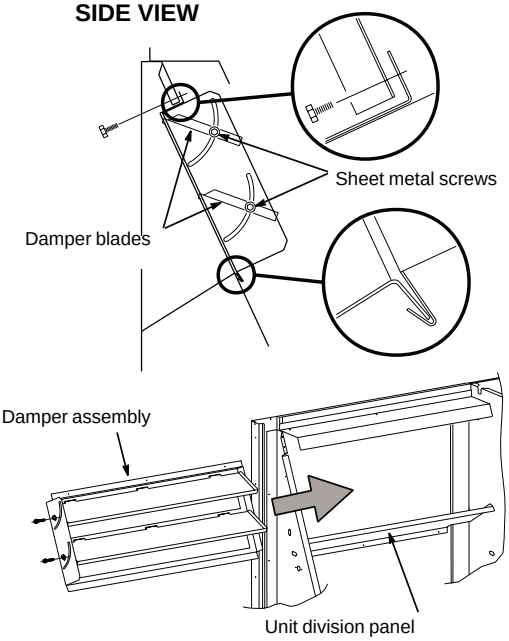


Figure 48

MANUAL DAMPER ASSEMBLY SIZES 020 TO 045.

1. Disconnect all power to unit.
2. Release latches and open filter access panel.
3. Align damper assembly as shown in figure 48 and slide assembly into unit.
4. Fit damper assembly end plate over en d of assembly and secure with retained screws.
5. Loosen sheet metal screws on damper assembly en d plate. Adjust to desired setting and tighten screws (see figure 48).

MANUAL OUTDOOR AIR DAMPER - UNITS 055 TO 090

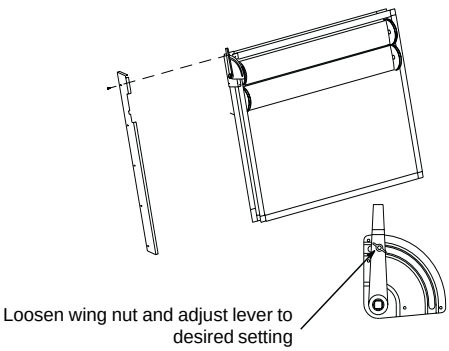


Figure 49

MANUAL DAMPER ASSEMBLY SIZES 055 TO 090.

1. Disconnect all power to unit.
2. Release latches and open filter access panel.
3. Align bottom of damper assembly with support bracket and slide assembly into unit (see figure 49).
4. Fit damper assembly end plate over end of assembly and secure with retained screws.
5. Loosen wing nuts on damper adjustment lever on damper assembly end plate. Adjust to desired setting and tighten wing nut (see figure 49).

Note : Gravity exhaust dampers are required with economisers.

The economiser is used with LINEA units in downflow and horizontal air discharge applications. The econmiser uses outdoor air for free cooling when temperature and/or humidity is suitable.

INSTALL ECONOMISER

1. Disconnect all power to unit.
2. Release latches and open filter access panel.
3. Align bottom of economiser with economiser support bracket and slide economiser into unit. See figure 51.
4. Fit economiser end plate over end of economiser and secure end plate with sheet metal screws.
5. For wiring detail, refer to unit wiring diagram and information supplied with economiser.

JACK/PLUG CONNECTIONS

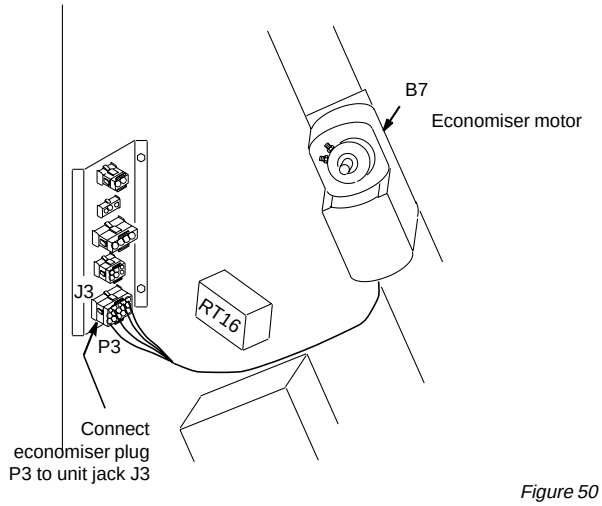


Figure 50

ECONOMISER INSTALLATION

ECONOMISER ASSEMBLY
Unit 020 to 030 has 6 blades
Units 035 to 045 have 7 blades
Units 055 to 090 have 6 blades

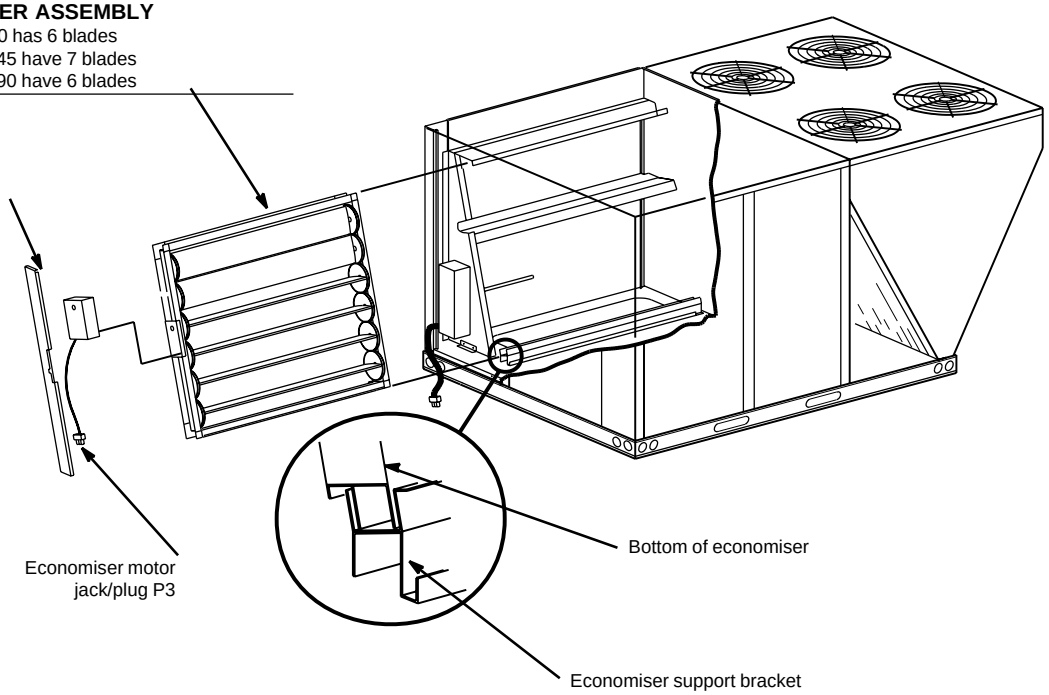


Figure 51

APPLICATION

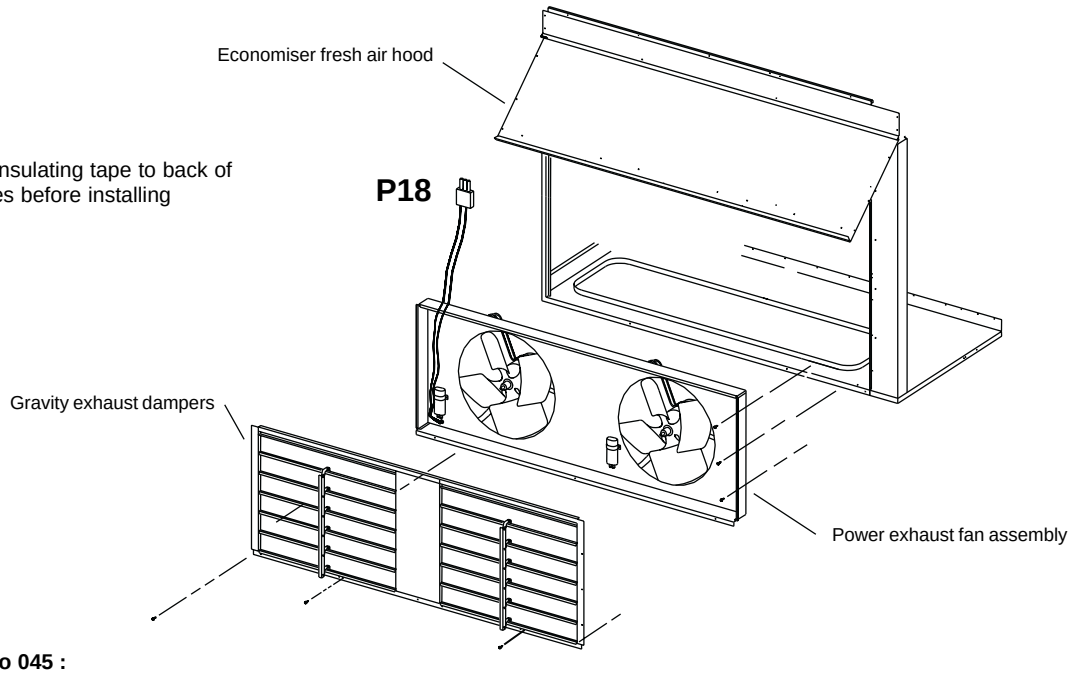
Power exhaust fans are applied to LINEA series units installed with downflow air discharge and equipped with an economiser. The power exhaust fan option cannot be used in horizontal air discharge applications.

INSTALLATION

1. Disconnect electrical power to unit.
2. Remove both upper and lower rear panels from unit. Also remove optional gravity exhaust damper if unit contains one.
3. Install outdoor air hood using instructions provided with economiser.
4. Apply foam insulating tape on the back of the flanged edges.
5. Lift the fan assembly and place in the bottom of the opening in the unit. Slide top of assembly into top of opening first. Secure with screws provided.
6. Reach through fan orifice and connect power exhaust fan P18 plug and unit J18 jack.
7. Install gravity exhaust damper according to instructions provided with damper.

For wiring detail, refer to unit wiring diagram and information supplied with power exhaust fan assembly.

POWER EXHAUST FAN ASSEMBLY
UNITS 055 TO 090 SHOWN



NOTE :
Apply foam insulating tape to back of flanged edges before installing

UNITS 020 to 045 :
Have 1 fan

Figure 52

Gravity exhaust dampers allow exhaust air to be discharged from the system when an economiser and/or power exhaust is operating. Gravity exhaust dampers also prevent outdoor air infiltration during unit off cycle.
Gravity exhaust dampers are used in downflow air discharge applications. Horizontal gravity exhaust dampers are used in horizontal air discharge applications and are installed in the return air plenum.

Gravity exhaust dampers must be used any time a power exhaust damper is installed in an LINEA Series unit. A gravity exhaust damper is required in the system when an economiser is installed unless other provisions are made to exhaust indoor air.

INSTALLATION - Downflow Application

1. Disconnect power to unit. Remove lower rear unit panel.
2. Remove screw in damper or sheet metal straps across face of dampers which hold dampers in place for shipping.
3. Apply foam insulating tape around the back of the flanged edges of the gravity exhaust damper assembly.

NOTE : on unit when gravity exhaust damper is being used with the power exhaust fans, gravity exhaust damper is installed over the outside side of the power exhaust fan assembly.

4. Align holes along the flanged edge of the gravity exhaust damper with holes along the bottom of the unit.
5. Use screws provided to secure gravity exhaust assembly to unit.
6. Reapply power to unit.

INSTALLATION - Horizontal Application

1. Cut opening in return air plenum on 020 to 045 units and two openings in return air plenum on 055 to 090 units. See figure 53 for dimensions. Make sure openings is centered top to bottom in plenum. On 055 to 090 units, gravity exhaust dampers may be installed either on opposing sides of plenum or adjacent to each other. If adjacent, allow a minimum of 102mm between the two openings.
2. Secure hood sides to hood top as shown in figure 53.
3. Apply foam insulating tape around the back of the flanged edges of the horizontal gravity exhaust damper assembly.
4. Align screw holes on top edges of hood and damper assembly.
5. Slide combined horizontal gravity exhaust damper assembly into plenum opening and secure using screws provided (see figure 53).

GRAVITY EXHAUST DAMPER INSTALLATION

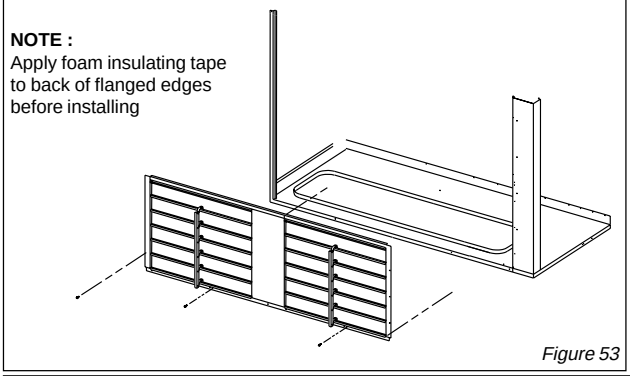


Figure 53

HORIZONTAL GRAVITY EXHAUST DAMPER INSTALLATION

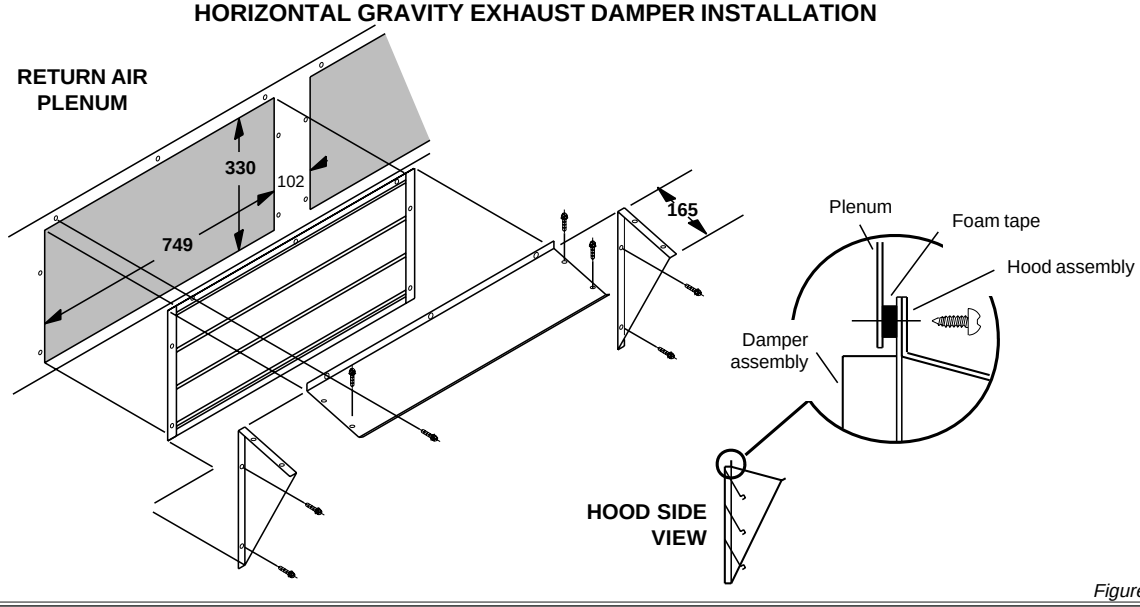


Figure 54

HYDRAULIC CONNECTIONS

When a hot water heating coil is installated (option), the heating coil pipe connections should be connected to isolating valves provided by others, on system side of the unit.
However, 3-way control valve is provided and hard wired to unit controllers supplied with the unit.

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.
- Check the connections for possible leaks.
- Reset the 3-way valve to automatic.

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.
If possible, use glycol with corrosion inhibitor.

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, ensure isolating valves are closed, open drain cocks and airvents to drain off water.

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 ELECTROLYTIC REACTION IS NOT COVERED BY THE WARRANTY.

PRELIMINARY CHECKS ON COMMISSIONING

NOTE: Any work on the gas system must only be carried out by suitably qualified personnel.

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

Measure the pressure on the gas solenoid valve inlet.

Make sure that the gas supply line installation conforms to the local safety regulations.

Check that the supply air flow is correct.

Check that the air inlet combustion vents and the flue outlet are fitted and not blocked.

PIPEWORK SOUNDNESS TESTS

All gas pipework must be tested for soundness using approved methods only. The pipework must not be connected to the unit during testing at pressure in excess of 60 mbar, as this may cause damage to the gas valve. Regulations may require that a manual gas shut-off valve is mounted on the supply pipework external to the unit (not supplied).
This valve should be suitable for isolating the unit in the event of an emergency.

When the connections have all be made check the system for any leaks using approved methods.

ALTITUDE SETTINGS

Natural gas units can operate up to a height of 610 m above sea level without being altered.

GAS TYPES

Before installation, check that the local distribution conditions, nature of gas and pressure, and adjustment of the appliance are compatible.
These appliance are suitable for use under the conditions defined by the gas categories listed in the following table (on next page) for the country of installation.
LG/LD series heating units are factory adjusted for "G20" type natural gas for direct installation in Great Britain, Spain, Italy, Denmark, Ireland, Germany, Belgium and France.
For installation in The Netherlands (cat. I_{2L}) the gas pressure should be adjusted for natural gas type G25 as shown in the following table.
In Belgium this adjustment may be made if the appliance is installed permanently on a network supplying gas type G25 (Ei).
In France this adjustment may be made if supplied with gas type G25 (Ei) BUT the appliance MUST be returned to the factory setting above if it is subsequently supplied with gas type G20 (Es).

	LG/LD MODELS-020,025,030		LG/LD MODELS 035, 040, 045		LG/LD MODELS 055, 065, 075, 090	
Gas Connection Size	20 mm				25 mm	
Number of injectors	7	10	6	11	12	22
Injector size Nat. Gas	2.06 mm		2.18 mm		2.18 mm	
Injector size Propane.	1.25 mm		1.32 mm		1.32 mm	

Natural Gas cat.index 2H: AT,DK,ES,FI,GB,IE,IT,PT,SE. 2ELL: DE 2E(R)B: BE. 2Er: FR (Factory Setting)

Gas type G20		standard heat unit LG/D...S		high heat unit LG/D…H		standard heat unit LG/D...S		high heat unit LG/D…H		standard heat unit LG/D...S		high heat unit LG/D…H	
Nominal Supply Pressure: 20 mbar		low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire
Input gross	kW	21,4	32,2	31,0	46,8	21,8	33,5	39,2	60,3	43,6	67,0	78,3	120,5
Input net	kW	19,3	29,0	27,9	42,1	19,6	30,2	35,3	54,3	39,2	60,3	70,5	108,5
Output	kW	17,12	25,76	24,8	37,44	17,4	26,8	31,3	48,2	34,84	53,6	62,66	96,4
Gas cons.	m^3/hr	2,04	3,07	2,95	4,46	2,07	3,19	3,73	5,74	4,15	6,38	7,46	11,48
Press. setting	mbar	2,9	6,9	3,0	7,0	3,1	7,4	3,1	7,4	3,1	7,4	3,1	7,4

Natural Gas cat. index 2L: NL (2E(R)B: BE 2Er: FR - G25 SETTING ONLY) - Pressure setting by installer

Gas type G25		standard heat unit LG/D...S		high heat unit LG/D…H		standard heat unit LG/D...S		high heat unit LG/D…H		standard heat unit LG/D...S		high heat unit LG/D…H	
Nominal Supply Pressure: 25 mbar		low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire
Input gross	kW	21,4	32,2	31,0	46,8	21,8	33,5	39,2	60,3	43,6	67,0	78,3	120,5
Input net	kW	19,3	29,0	27,9	42,1	19,6	30,2	35,3	54,3	39,2	60,3	70,5	108,5
Output	kW	17,1	25,8	24,8	37,4	17,4	26,8	31,3	48,2	34,8	53,6	62,7	96,4
Gas cons.	m^3/hr	2,37	3,57	3,43	5,19	2,41	3,71	4,34	6,68	4,83	7,42	8,68	13,35
Press. setting	mbar	4,4	9,9	4,3	10,1	4,7	11,0	4,7	11,0	4,7	11,0	4,7	11,0

Propane cat. index 3P: BE,DE,ES,FR,GB,IE,NL,PT - Factory or field conversion

Gas type G31		standard heat unit LG/D...S		high heat unit LG/D…H		standard heat unit LG/D...S		high heat unit LG/D…H		standard heat unit LG/D...S		high heat unit LG/D…H	
Nominal Supply Pressure: 37 / 50 mbar		low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire	low fire	high fire
Input gross	kW	21,0	31,5	30,3	45,8	21,3	30,5	38,4	55,0	42,6	61,0	76,6	110,0
Input net	kW	19,3	29,0	27,9	42,1	19,6	28,1	35,3	50,6	39,2	56,1	70,5	101,2
Output	kW	17,1	25,8	24,8	37,4	17,4	24,4	31,3	44,0	34,8	48,8	62,7	88,0
Gas cons.	kg/hr	1,50	2,25	2,17	3,27	1,52	2,18	2,74	3,93	3,05	4,36	5,48	7,86
Press. setting	mbar	8,4	19,9	8,5	20,0	11,0	21,7	11,0	21,7	11,0	21,7	11,0	21,7

CONNECT GAS PIPING (LG_/LD_ UNITS)

Before connecting piping, ensure that installation satisfies national and local standards.
Supply should be at the correct nominal pressure for the gas type used (see table), and should remain within +/- 5 mbar of this pressure under all operating conditions. Pipes should be sized to ensure that the pressure remains within the correct operating range with all appliances operating.
Figure 55 shows complete bottom gas entry piping.

GAS PIPE CONNECTION OUTSIDE UNIT

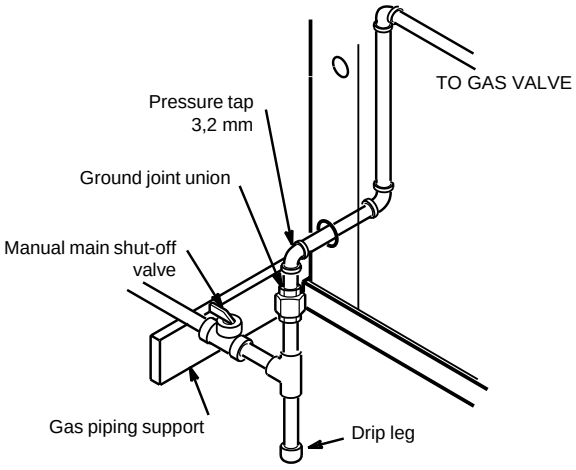


Figure 55

NOTE :
LENNOX LINEA GAS FIRED ROOFTOPS ARE NOT SUITABLE FOR INTERNAL INSTALLATION. THEY SHOULD BE INSTALLED EXTERNAL TO THE BUILDING AND IN CONJUNCTION WITH THE GUIDELINES LAID OUT IN THIS MANUAL.

GAS HEAT START UP

Gas Valve operation (Figure 56)

Gas appliance must only be started-up and commissioned by suitably qualified personnel. The unit is equipped with a fully automatic Spark ignitor system, there is no pilot. The gas valve is fully automatic, and does not incorporate any manual control.
During commissioning the manifold (gas valve outlet) pressure must be checked at both high and low fire conditions and adjusted as necessary (see above table).
Once commissioned, the burner operation is fully automatic.
In the event of failure to light, contact a suitably qualified gas technician.

GAS VALVE PRESSURE TAPPING LOCATIONS

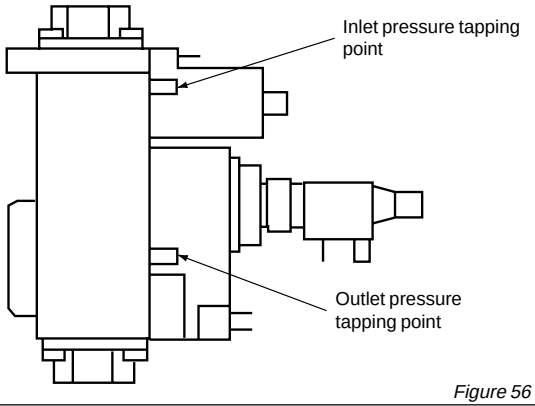


Figure 56

To Turn Off Gas To Unit

1. Lower setpoint using KP02 maintenance controller.
2. Turn off all electrical power to unit if service is to be performed.
3. Isolate gas supply external to unit.

PRESSURE TEST GAS PIPING (LG_ UNITS)

When pressure testing gas lines, the gas valve must be disconnected and isolated. Gas valves can be damaged if subjected to more than 60mbar. See figure 57
If the test pressure is equal to or less than 60mbar, use the main manual shut-off valve before pressure testing to isolate the furnace fromthe gas supply system.

NOTE : Codes may require that manual main shut-off valve and union (furnished by installer) be installed in gas line external to unit. Union must be of the ground joint type.

After all connections have been made, check all piping connections for gas leaks. Use a soap solution or otherpreferred means. Do not use matches candles or other sources of ignition to check for gas leaks.

NOTE : In case of emergency, shut down is required. Turn off the main manual shut-off valve and disconnect main power to unit. These devices should be properly labeled by the installer.

PRESSURE TEST GAS VALVE

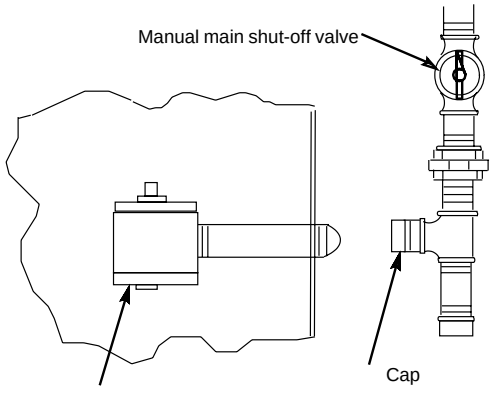


Figure 57

HEATING OPERATION AND ADJUSTMENTS (LG/LD UNITS)

Heating Sequence of Operation

1. On a heating demand the combustion air fan starts immediately.
2. Combustion air pressure switch proves blower operation, then allows power to ignition control. Switch is factory set and requires no adjustment.
3. After a 45-second prepurge, spark ignitor energizes and gas valve solenoid opens.
4. Spark ignites gas, ignition sensor proves the flame and combustion continues.
5. If flame is not detected after first ignition trial, ignition control will repeat steps 3 and 4 four more times before locking out the gas valve.
6. Using a KP02 reset the unit faults then press the ignition system reset button to reset the ignition control.

Limit Controls

Limit controls are factory-set and are not adjustable. The primary limit is located on the vestibule panel above the burners. The secondary limit is located on the blower deck behind the blower housing.

Heating Adjustment

Main burners are factory-set and do not require adjustment.

Spark gap on ignition electrode must be 3.2mm+0.8mm. Check spark gap as follows :

1. Loosen four screws and remove burner support cap. See figure 58.
2. Remove left burner and check gap with appropriately sized twist drills or feeler gauges.
3. Replace burner and burner support cap. Secure cap in place with retained screws.

TYPICAL HEAT SECTION

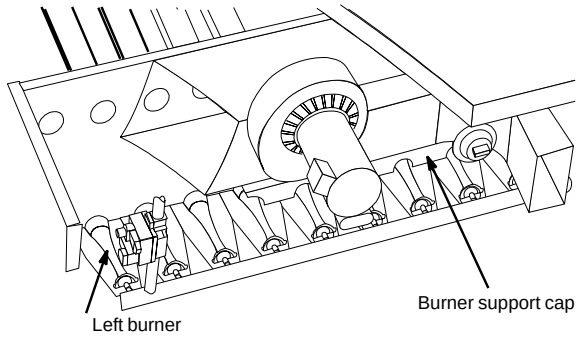


Figure 58

The intake hood top panel is secured to the unit. The intake hood sides, filters, and three support brackets are shipped unassembled in the blower compartment. Assemble hoods and install as follows :

1. Remove screws securing side flanges of top hood to unit.
2. Pivot top hood open and secure sides of intake hood to top of hood using three sheet metal screws on each side.
3. Align two holes on intake hood side panel with two holes on bottom (longer) filter bracket. Secure both sides of bottom filter bracket to hood sides with sheet metal screws.
4. Secure intake hood sides to unit.
5. Position hood stiffener underneath hood top and align screw holes with hood top screw holes. Secure with sheet metal screws.
6. Secure the longer top filter bracket to top of hood. Install two filters.
7. Slide third filter into bottom filter bracket and hold in place at the top of the opening with the shorter filter bracket. Align holes on hood with bracket holes and secure filter bracket with sheet metal screws.

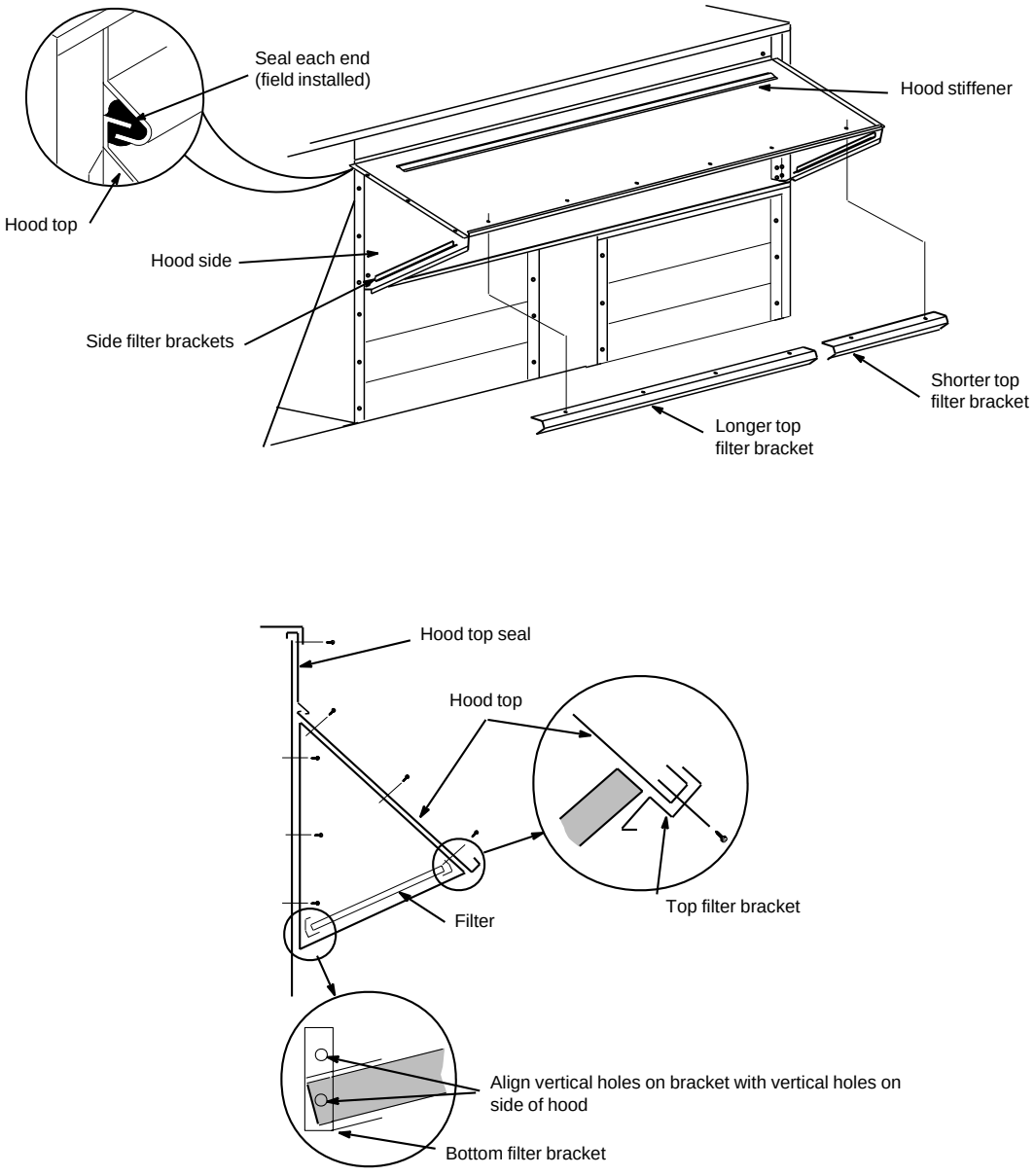


Figure 59

ELECTRICAL CONNECTIONS POWER SUPPLY

Do not apply power or close disconnect switch until installation is complete. Refer to start-up directions. Refer closely to unit wiring diagram. Refer to unit nameplate for minimum circuit ampacity and maximum fuse size.

400/3ph/50Hz volt units are factory wired.

Your new LENNOX Thermostat has been designed to provide accurate control and display of room temperature. In addition, it will also display all relevant information ertaining in your system.

The clearly marked buttons and informative display make it extremely easy to understand and simple to use.
Please take a few moments to read the brief instructions and familiarize yourself with the various functions in order to obtain maximum benefit from this truly unique electronic control.

The thermostat normally displays room temperature, mode of operation and whether Cooling or Heating is currently on. The six button on the front of the unit allow complete control of your equipment.
You may select different heating and cooling setpoints for the system to maintain, eg. 20ºC in heating and 24ºC in cooling. Raising or lowering the setpoint in heating or cooling is as simple as pushing a button. In addition, you may choose to display the temperature in ºF or ºC.
The thermostat also allows you to select continuous fan operation (useful when using an air cleaner), or have the fan come on with the equipment.

USER CONTROLS :

MODE :

Select the desired mode of operation by pressing the MODE button repeatedly :

. . . . . Controls cooling system only (the word "COOL" is displayed for 5 seconds).

. . . . . Controls Heating system only (the word "HEAT" is displayed for 5 seconds).

. . . . Controls both heating and cooling systems (auto changeover) (the word "AUTO" is displayed of 5 seconds).

OFF : . . . . . Disables thermostat so equipment will not operate (the word «OFF» is displayed). Avoid using the OFF mode during extremely cold weather to prevent damage from freezing.

COOLING ( ):

Select the temperature you want your equipment to maintain while in the cooling mode by pressing and holding the and buttons.
The temperature setpoint is displayed dor 5 seconds.

HEATING ( ) :

Select the temperature you want your equipment to maintain while in the heating mode by pressing and holding the or buttons. The temperature setpoint displayed for 5 seconds after releasing the button.

FAN ( ) :

The Fan will come on automatically when the system is operating, but there is no indication of this on the display. To select continuous Fan operation, press the FAN button and the display will show .
This is recommended on electronic air filters or continuous ventilation requirements.

NOTE: The thermostat never allows less than 2ºF (1ºC) difference between the heating and cooling setpoints.

LIMITED OVERRIDE :

When the keyboard is locked, (switch #4 "ON"), the user may override the temperature setpoint for 1 hour by pressing either the or button. The range or temperature override is +/- 3 ºF or ºC from the programmed daytime setpoint.

DAY/NIGHT BUTTON :

When the LENNOX thermostat is initially installed, the display will show the symbol for your day temperature. By pressing the DAY / NIGHT button or closing the CLK1 and CLK2 terminals on the back of the thermostat (installer connected) your may select an alternate or night temperature. (The LENNOX thermostat will remember this setpoint). Simply press the DAY / NIGHT button to alternate between temperature settings.

CELSIUS / FAHRENHEIT :

Simultaneously press and to swith between ºF and ºC temperature display.

REMOTE SENSOR (OPTION) :

The LENNOX thermostat is designed to accept the Electronic Remote Sensor which will allow you to locate your thermostat in an area away from view.

POWER FAILURES :

Your thermostat employs the latest developments in solid state electronic technology. One of the unique features of your thermostat is that there is no battery required to maintain your selected setpoints in the event of a power lost as the memory is unaffected by power failures of any duration. When power is restored, the termostat will ontinue operating as if the power had never been off.

TEMPERATURE ACCURANCY :

Full temperature accuracy will only be realized after the thermostat has been installed and powered for at least one hour.

INSTALLATION INSTRUCTIONS

LOCATION:

To ensure proper operation, the termostat should be mounted on an inside wall in a frequently occupied area of the building. In addition, its position must be at least 46 cm from any outside wall, and approximately 1.5 m above the floor in a location with freely circulating air of an average temperature.

BE SURE TO AVOID THE FOLLOWING LOCATIONS :

- Behind doors or in corners where freely circulating air is unavailable.
- Where direct sunlight or radiant heat from appliances might affect control operation.
- On an outside wall.
- Adjacent to, or in line with, conditioned air discharge grilles, stairwells, or outside doors.
- Where its operation may be affected by steam or water pipes or warm air stacks in an adjacent partition space, or by an unheated / uncooled area behind tbe thermostat.
- Where its operation will be affected by the supply air of an adjacent unit.
- Near sources of electrical interference such as arcing relay contacts.

THERMOSTAT INSTALLATION :

1. Insert a flat blade screwdriver or a coin 1/8” into the slot located in the bottom center of the thermostat case and twist ¼ turn. When you feel or hear a “click”, grasp the case from the bottom two corners and separate form the subbase as shown in the diagram at the right.

   Some models require more force than others when separating due to the number of terminals on the subbase.
2. Swing the thermostat out from the bottom.
3. Lift the thermostat up and off the subbase.
4. Place the rectangular opening in the subbase over the equipment control wires protruding form the wall and, using the subbase as a template, mark the location of the two mounting holes (exact vertical mounting is necessary only for appearance).
5. Use the supplied anchors and screws for mounting on drywall or plaster; drill two 5 cm diameter holes at the marked locations; use a hammer to tap the nylon anchors in flush to the wall surface an fasten subbase using the supplied screws. (Do not overtighten !).
6. Connet the wires from your system to the thermostat terminals as shown in the wiring diagrams. Carefully dress the wires so that any excess in pushed back into the wall cavily or junction box. Ensure that the wires are flush to the plastic subbase. The access hole should be sealed or stuffed to preven drafts from the wall affecting the thermostat.
7. Before the thermostat is re-installed on the subbase, install the optional clock/timer, indoor remote sensor and outdoor remote sensor, if used. Refer to the intallation instructions supplied with each option. Also, check the position of the slide switches on the lower left corner on the back of the thermostat.

REPLACING THE THERMOSTAT ON THE SUBBASE

1. Position the thermostat on the hinged tabs located at the top of the subbase.
2. Gently swing the thermostat down and press on the bottom center edge until it snaps in place.

SWITCH SETTINGS

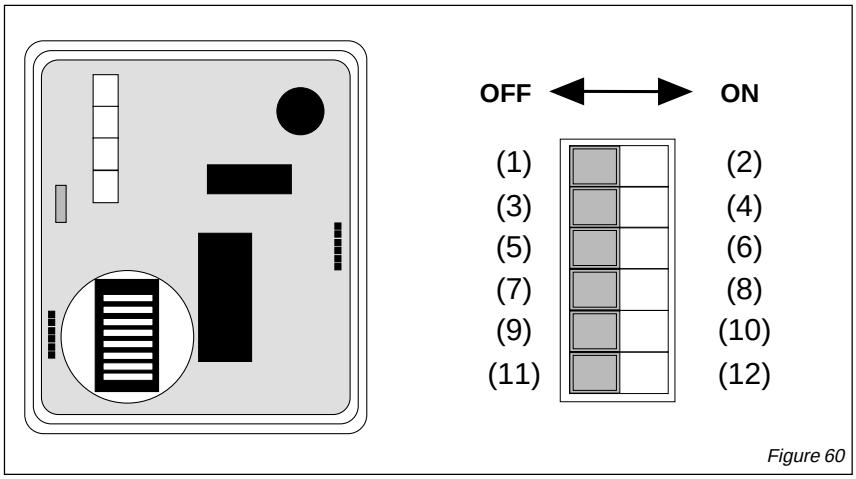


Figure 60

1. 4 minutes (minimum ON/OFF)
2. 2 minutes (minimum ON/OFF)
3. Keyboard unlocked
4. Keyborad locked
5. Fan immediate with heat call
6. Fan ON with plenum switch
7. Single stage
8. Multistage
9. LED #1, icon OFF
10. LED #1, filter icon
11. LED #2, icon OFF
12. LED #2, wrench/fault icon

SPECIFICATIONS

Rated voltage ..... 20-30 Vac, 24 nominal

Rated A.C. ..... 0,050 Amps to 0,75 Amps continuous per output with surges to 3 Amps max.

Current rated
D.C. or "R" ..... 0 Amps to 0,75 Amps continuous per output with surges to 3 Amps max.

Control range ..... Heating : 5°C to 30°C in 1° steps

Cooling 16°C to 40°C in 1° steps

Thermostat
measurement range ..... 4°C to 48°C

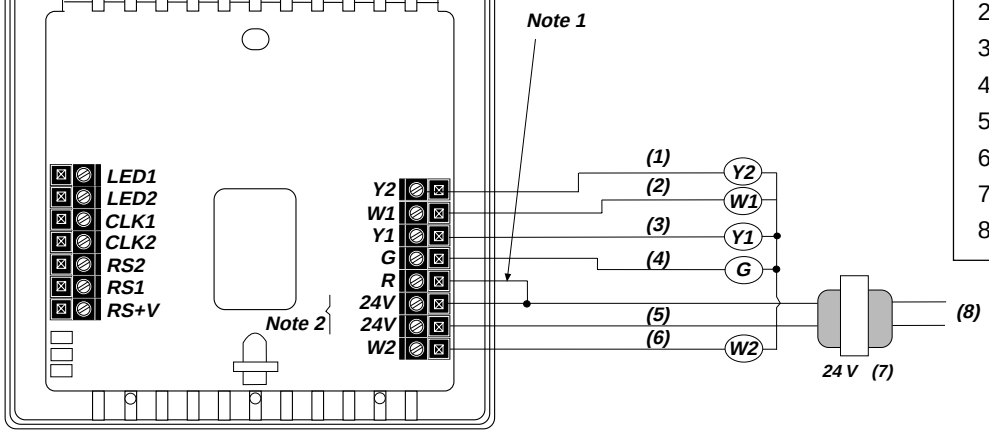
O.D.T.
measurement range
(outdoor temperature) ..... -48°C to 48°C

Control accuracy ..... +5°C at 20°C

Minimum dead band ..... (between heating and cooling)
1°C

Note : This thermostat contains electronic circuit replacing the conventional mechanical anticipator

Note 1 : If jumper is removed, a dedicated transformer is required at the "R" terminal to power the loads
Note 2 : This thermostat may be used with 24 volt DC. The negative side of the DC supply must be wired to the 24V terminal



1. Compressor #2
2. Heat stage #1
3. Cool stage #1
4. Fan
5. Common
6. Heat stage #2
7. Transformer
8. Line voltage

Figure 61

OUTPUT TERMINAL FUNCTIONS

W1 ..... Energizes on a call for first stage heat.

Y1 ..... Energizes on a call for first stage cool.

Y2 ..... Energizes on a call for second stage cool.

G ..... Energizes the fan circuit

R ..... Independent switching voltage

24 Vac ..... 24 Vac

24 Vac (c) .. 24 Vac common

W2 ..... Energizes on a call for second stage heat

LED1& LED2 ..... Free lights for status or function indication

CLK1 & CLK2 ..... Independent remote clock/timer option for alternate setpoints

RS2 & RS1 & RS+V ..... For outdoor temperature sensor and/or indoor remote sensor options

INSTALLATION INSTRUCTIONS

The Indoor sensor is designed to sense the air temperature at a remote location and send this Information by digital communications to the thermostat. Any number of sensors up to six can be connected together to provide temperature averaging. The sensor can also be modified for use with a duct sensor, or to connect an existing L2S-RS network to a new thermostat.

SINGLE SENSOR INSTALLATION

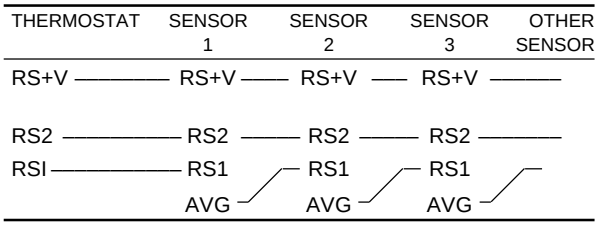
1. Install the thermostat according to the instruction manual supplied with it. Check that the thermostat is operating (Display shows the correct temperature.)

   CAUTION: Remove the thermostat from the subbase while wiring the sensor to avoid damage from live wires. This is important.
2. Install three-wire cable from the thermostat to the remote sensor location. Maximum distance = 90 m.
3. Open the sensor case by depressing the button on the bottom edge of the case until the latch releases. Remove the cover by pulling it out and up at the bottom.
4. Remove the board from the subbase by pulling back the latch that holds it at the center bottom.
5. Use the subbase as a template to mark the mounting hole locations on the wall. Drill size for the wall anchors is 1/4 inch. Mount the subbase over the wires coming out of the wall using the two screws and anchors provided. The angled corner on the subbase should be in the bottom right.
6. Snap the board back into the subbase. Check to be sure that the latch holds the board properly. Check that the thermostat(sensor element) is positioned under the holes in the cover but not touching the cover or subbase.
7. Strip 35 mm of insulation from the three wires et the Remote Sensor. Install the wires in the terminals labelled RS2, RS+V and RSI. Push any extra wire back into the wall cavity. Seal the hole in the wall around the cable to eliminate any draft that might affect the sensor. (Refer to Figure 62)
8. Note the wire colour going to each terminal. The order of the wires on the thermostat is not the same as the sensor.
9. Connect the wires on the thermostat subbase to the terminals labelled RS2, RSI and RS+V. Make sure that each terminal on the sensor is wired to the terminal with the same name on the thermostat.
10. Mount the thermostat on the subbase and check to be sure that it is showing the temperature.

11. Re-install the cover on the remote sensor by hooking it on the top and snapping the bottom into place.

USING MULTIPLE SENSORS FOT TEMPERATURE AVERAGING

Any number from two to six sensors may be connected together to provide temperature averaging in a large area or several zones being controlled by the same system.



Maximum distance between any 2 sensors is 300 ft. (90m).

1. Wire the first sensor using the single sensor instructions.
2. **CAUTION** : Make sure that there is no power to the sensors by removing the thermostat from the subbase.
3. Connect wires to each additional sensor in the following manner. An outdoor sensor can also be connected in any location in the chain (refer to figure 63)

4. Replace the thermostat on the subbase. Check for proper operation of each sensor by connecting a jumper between terminals 1 and 2. This shorts out the thermistor. The displayed temperature will go up several degrees if the sensor is properly installed. Repeat for each sensor.

RETROFIT TO MULTIPLE L2S-RS SENSORS

If an older thermostat with multiple sensors is replaced, the existing L2S-RS sensor may still be used. An LX-IDS sensor must be added between them and the new thermostat.

1. Install the new sensor using the Single Sensor Instructions.

2. Clip the thermistor from the new sensor with wire cutters as shown in figure 64.

3. Connect the two-wire shielded cable from the L2S-RS sensors to terminals 1 and 2 of the new sensor. Connect the shield of the cable to terminal 2 also.

USING A DUCT SENSOR:

The sensor and thermostat are designed to sense air temperature in a room. The fast moving air in a duct has small but rapid changes in temperature. This will affect the control algorithm of the thermostat. For better control, it is recommended that the air temperature is sensed in the room.

1. Install the indoor sensor using the Single Sensor Instructions.

2. Clip the thermistor from the indoor sensor with wire cutters as shown in figure 64.

3. Install the duct sensor in the return air duct according to the instructions supplied with it. Connect the two wires from the duct sensor to terminals 1 and 2 of the indoor sensor. If shielded cable was required because of a long distance to the sensor box, connect the shield to terminal 2 also.

TROUBLESHOOTING

Thermostat has no display :

Check wiring between thermostat and sensor.
Incorrect wiring can damage the thermostat, transformer or blow a fuse.
Check 24VAC supply.

Thermostat reads «AC» :

24VAC power is disconnected.

Not sure if display is showing local or remote temperature :

Breathe on the wall near the bottom left corner of thermostat.
Temperature will go up for a few seconds if sensing locally.

Thermostat displays very high temperature :

Wires on sensor element are shorted together. Separate them.

Thermostat displays very low temperature:

Check wiring of probe or duct sensor.
Sensor element is not connected to board or is broken.

INSTALLATION DIAGRAMS

SINGLE SENSOR

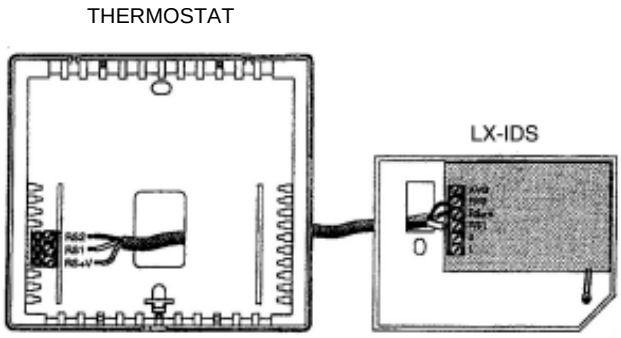


Figure 62

MULTIPLE SENSORS (temperature averaging)

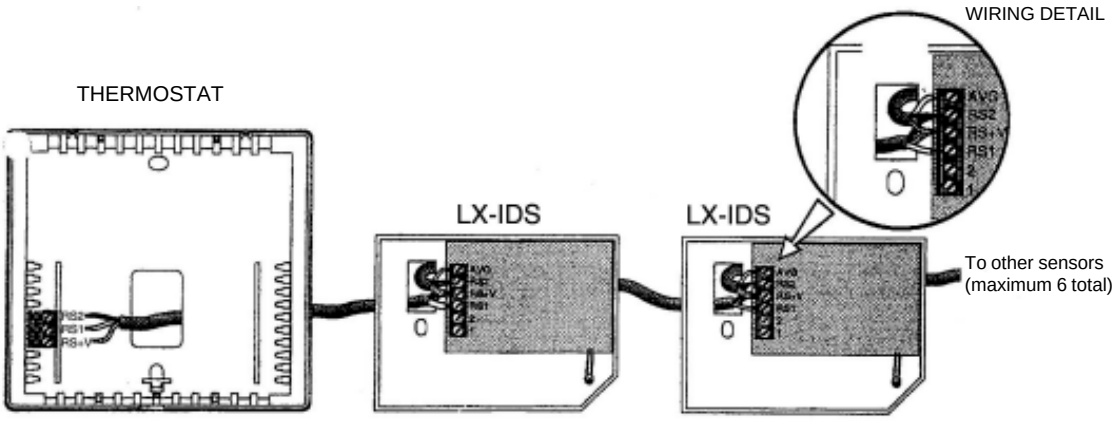


Figure 63

RETROFIT TO MULTIPLE L2S-RS SENSORS OR INSTALLING AN RDS-10K DUCT SENSOR

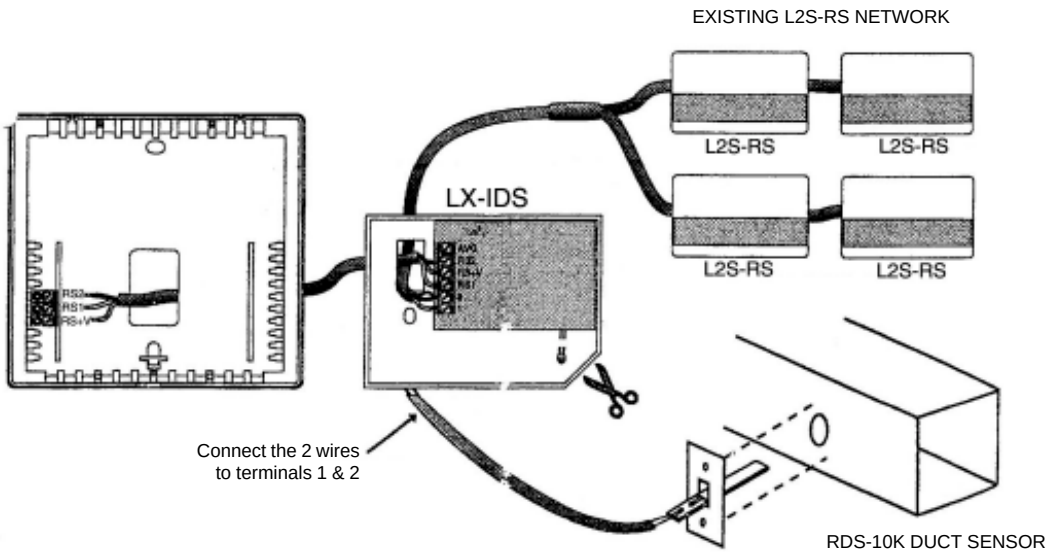
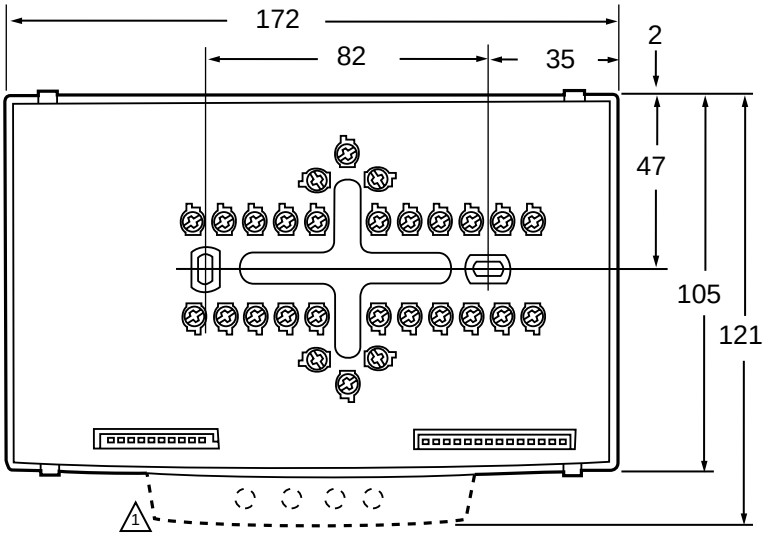


Figure 64

DIMENSIONS

Subbase Q7300 D is supplied with the T7300 controller.

Q7300 D



T7300

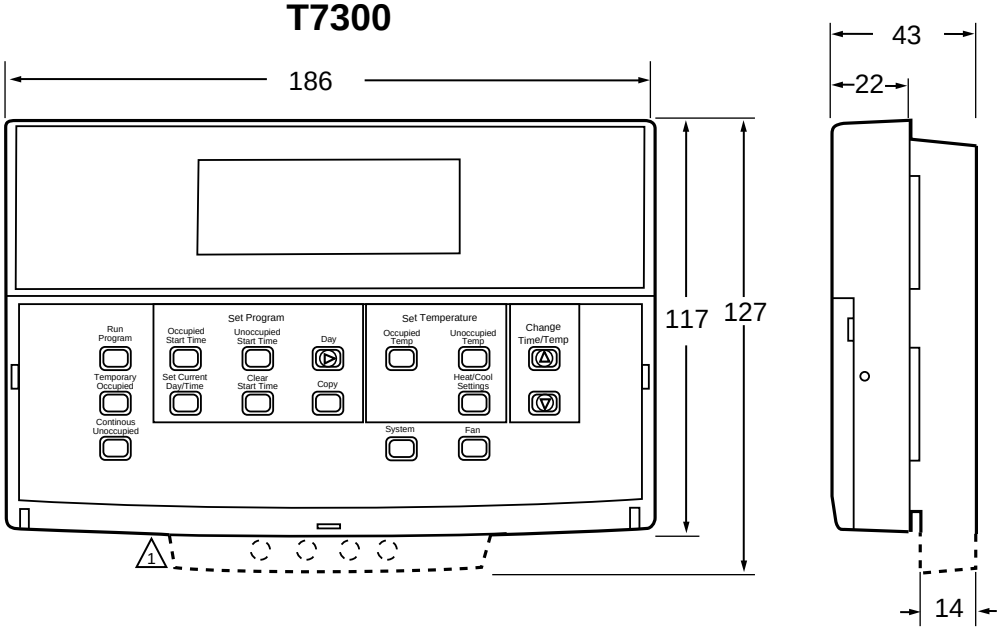


Figure 65

INSTALLATION

When Installing this Product…

1. Read these instructions carefully. Failure to follow the instructions can damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After completing installation, use these instructions to check out the product operation.

Location

Q7300 Subbase without Remote-Mounted Temperature Sensor

Install the thermostat about 1.5 meters above the floor in an area with good air circulation at average temperature. See figure 66.

Do not install the thermostat where it can be affected by :

- drafts, or dead spots behind doors and in corners,
- hot or cold air from ducts,
- radiant heat from sun or appliances,
- concealed pipes and chimneys,
- unheated (uncooled) areas such as an outside wall behind the thermostat.

Q7300 Subbase with Remote-Mounted Temperature Sensor(s)

If only the remote-mounted temperature sensor(s) is used to sense and control room temperature, then install the thermostat in an area that is accessible for setting and adjusting the temperature and settings.

If both the subbase and remote-mounted temperature sensor(s) are used to sense and control room temperature, then install the subbase about 1.5 meters above the floor in an area with good air circulation.

Install the remote-mounted sensor(s) about 1.5 meters above the floor in an area with good air circulation at average temperature. See figure 66.

Do not mount the sensor(s) where it can be affected by :

- drafts, or dead spots behind doors and in corners,
- hot or cold air from ducts,
- radiant heat from sun or appliances,
- concealed pipes and chimneys,
- unheated (uncooled) areas such as an outside wall behind the thermostat.

If more than one remote sensor are required, they must be arranged in a temperature averaging network consisting of two, three, four, five or nine sensors.

TYPICAL LOCATION OF THERMOSTAT OR REMOTE-MOUNTED SENSOR

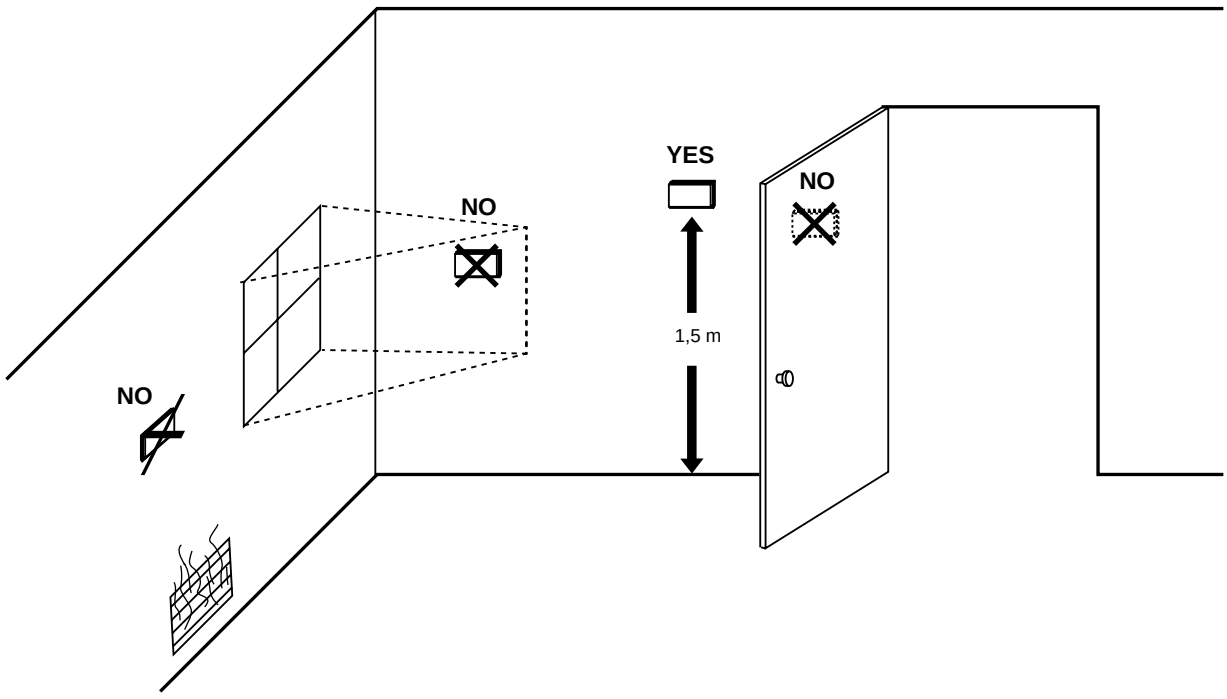


Figure 66

Mounting Subbase

The subbase or wallplate may be installed horizontally on the wall or a 2 in. x 4 in. wiring box. Position the subbase or wallplate horizontally on the wall or on a 50.8. x 101,6 mm wiring box.

1. Position and level the subbase (for appearance only). The thermostat operates properly even when not level.
2. Use a pencil to mark the mounting holes. See figure 67.
3. Remove the subbase from the wall and drill two 3/16 inch holes in the wall (if drywall) as marked.

   For firmer material such as plaster or wood, drill two 7/ 32 inch holes. Gently tap anchors (provided) into the drilled holes until flush with the wall.
4. Position the subbase over the holes, pulling wires through the wiring opening.
5. Loosely insert the mounting screws into the holes.
6. Tighten mounting screws.

MOUNTING SUBBASE OR WALLPLATE

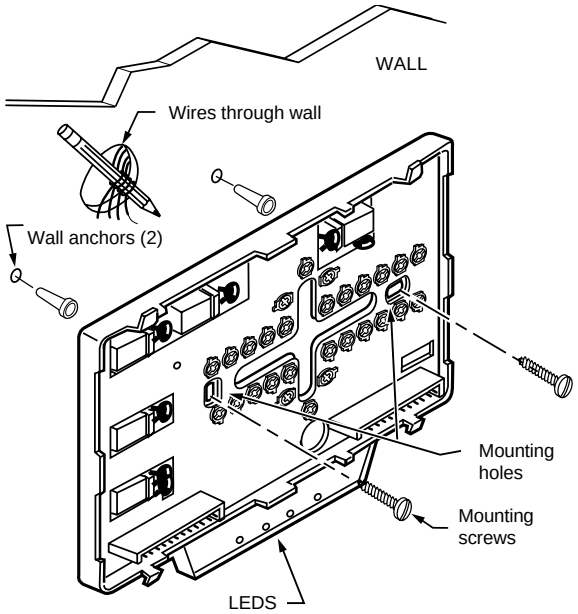


Figure 67

Wiring subbase

All wiring must comply with local electrical codes and ordinances. Follow equipment manufacturer wiring instructions when available.
Refer to below table for terminal designations.

CAUTION

Electrical Shock Hazard.
Power supply can cause electrical shock.
Disconnect power before beginning installation.

TERMINAL DESIGNATION AND DESCRIPTIONS

Standard terminal designations	Alternate terminal designations	Typical connection	Function	Terminal type
A1	A2[a]	Dry auxiliary contacts for economizer control; A1 is normally open during Unoccupied periods and closed during Occupied periods.	Output	Dry contact
A2	A1[a]	Dry auxiliary contacts for economiser control (A2 is common)	Input	Dry contact
A3	-	Dry auxiliary contacts for economizer control; A3 is normally open during Occupied periods and closed during Unoccupied periods.	Output	Dry contact
AS, AS	-	Discharge air sensor connection	Input	-
B	-	Heating changeover valve	Output	24V powered contact
E	K	Emergency heat relay	Output	24V powered contact
G	F	Fan relay	Output	24V powered contact
O	R	Cooling changeover valve	Output	24V powered contact

[a] : Some OEM models reverse the economiser terminal designation A1 and A2

TERMINAL DESIGNATION AND DESCRIPTIONS (continued)

Standard terminal designations	Alternate terminal designations	Typical connection	Function	Terminal type
R	V	24V system transformer	Input	-
RC	-	24V cooling transformer	Input	-
RH	-	24V heating transformer	Input	-
T, T	-	Remote sensor input for T7047	Input	
W1	H1, R3	Auxiliary heat relay (Q7300 D)	Output	24V powered contact
W2	H2, R4, W3, Y	Stage 2 heating relay	Output	24V powered contact
W3	-	Stage 3 heating relay	Output	24V powered contact
X	B[b], C, X1, X2	Common	Input	
X1, X3	A, A1, A2, C, L, X, Z	User defined Light Emiting Diodes (LEDs)	Annunciation	-
X4	-	LED Common	Annunciation	-
Y1	C1, M, Y	Stage 1 compressor contactor (Q7300 D)	Output	24V powered contact
Y2	C2	Stage 2 cooling compressor (conventional) Stage 2 compressor contactor (heat pump)	Output	24V powered contact
Y3	-	Stage 3 cooling compressor	Output	24V powered contact
-	C, H, L	HSII control panel	-	-
-	O	Momentary circuit changeover	-	-
-	P	Defrost	-	-
-	R1, R2	Low- and high-speed fan relays	-	-
-	T	External temperature readout, T-relay ; Outdoor thermistor	-	-

[a] : Some OEM models reverse the economiser terminal designation A1 and A2
[b] : Some OEM models label the terminal for transformer common B

1. Loosen the terminal screws on the subbase or wallplate and connect the system wires. See figure 68.

IMPORTANT

Use 18-gauge, solid-conductor color-coded thermostat cable for proper wiring. If using 18- gauge stranded wire, no more than ten wires can be used. Do not use larger than 18-gauge wire.

2. Securely tighten each terminal screw.
3. Push excess wire back into the hole.
4. Plug the hole with nonflammable insulation to prevent drafts from affecting the thermostat.

PROPER WIRING TECHNIQUE

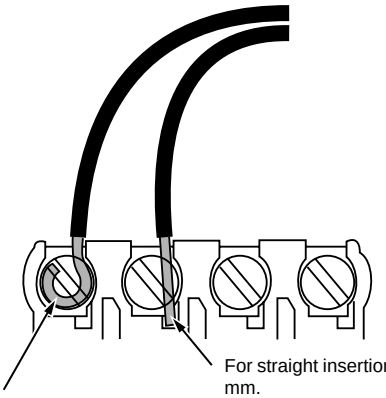


Figure 68

Mounting Thermostat on Subbase or Wallplate

The thermostat mounts on the subbase or wallplate after they are installed.

1. Engage the tabs at the top of the thermostat and subbase or wallplate. See figure 69.
2. Press the lower edge of the case to latch.

NOTE :

To remove the thermostat from the wall, first pull out at the bottom of the thermostat ; then remove the top.

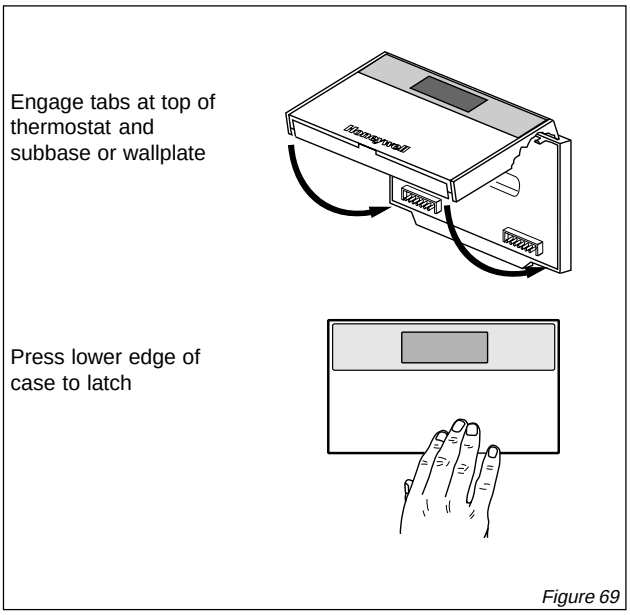


Figure 69

SETTINGS

Using Thermostat Keys

The thermostat keys are used to :

- set current time and day,
- program times and setpoints for heating and cooling,
- override the program temperatures,
- display present setting,
- set system and fan operation,
- configure Installer Setup,
- check Installer System Test.

See figure 70 for key information (next page).

Setting System and Fan (select models)

The system default setting is Heat. The fan default is set so the fan operates continuously in Occupied periods, Unoccupied period recovery times and with the heating and cooling equipment in Unoccupied periods. Use the System and Fan keys to change the settings. Fan and system operation are configured in the Installer Setup options.

The system settings are :

Em Heat (T7300/Q7300 D) :
Emergency heat relay is on continuously. Thermostat cycles highest stage of heat. Cooling system is off. Compressor is de-energized.

Heat : Thermostat controls the heating.
Off : Both the heating and cooling are off.
Cool : Thermostat controls the cooling.
Auto : Thermostat automatically changes between heating and cooling depending on the indoor temperature.

The fan settings are :

On : Fan operates continuously in occupied period.
Auto : Equipment controls the fan in the Unoccupied periods. The Intelligent Fan™ operation offers three choices for the fan operation in Occupied periods :
- fan turns on only when there is a call for heating or cooling.
- fan operates continuously in Occupied periods.
- fan is on continuously in Occupied periods and Unoccupied period recovery times.

Setting Temperature

Refer to following table for the default temperature setpoints. See Programming section for complete instructions on changing the setpoints.

Control	Occupied	Unoccupied
Heating	20°C	13°C
Cooling	25,5°C	32°C

THERMOSTAT KEY LOCATIONS AND DESCRIPTIONS

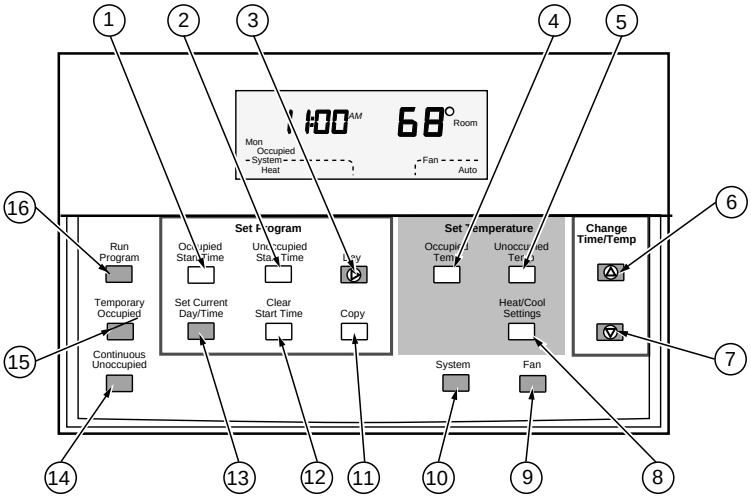


Figure 70

1. Enter occupied program mode
2. Enter unoccupied program mode
3. Set current day or program day
4. Set occupied temperature setpoints
5. Set unoccupied temperature setpoints and scrolls through installer setup and system test
6. Increase temperature or time setting
7. Decrease temperature or time setting
8. Change between heating ans cooling setpoints and scrolls backwards through installer setup numbers and system test
9. Select fan operation
10. Select system operation
11. Copy one programmed day to another day
12. Clear program period
13. Set current day and time
14. Enter hold mode
15. Set override temperature offset and activate temporary override
16. Returns to normal operation

INSTALLER SETUP

NOTE : For most applications, the thermostat factory settings do not need to be changed.
The Installer Setup is used by the installer to customize the thermostat to specific systems. Installer Setups are listed in the below table. The below table includes all the configuration options available.
A combination of key presses are required to use the Installer Setup feature.

- To enter the Installer Setup, press and hold the Heat/Cool Settings key and both the increase and decrease keys until the first number is displayed. All display segments appear for approximately three seconds before the number is displayed. See figures 71 and 72.
- To advance to the next Installer Setup number, press the Unoccupied Temp key.
- To return to an Installer Setup number, press the Heat/Cool Settings key.
- To change a setting, use the increase or decrease key.
- To exit the Installer Setup, press the Run Program key.

  The Installer Setup is automatically exited if no key is pressed for four minutes.

NOTE : Be sure to set the thermostat time after exiting the Installer Setup. Installer Setup numbers are listed in below table.

CAUTION

Possible Equipment Damage.
Fan must be running when system is operating.
Heat pump and electric heat systems must be configured correctly in Installer Setup 2 to prevent equipment damage caused by the system running without the fan.

IMPORTANT

Only configurable numbers are shown on the device.
Example : If the thermostat does not have a system key, Installer Setup number 12 will not be displayed.
Review following table factory settings and mark any desired changes in the Actual Setting column. When the Installer Setup is complete, review the settings to confirm that they match the system.

LED DISPLAY OF ALL SEGMENTS

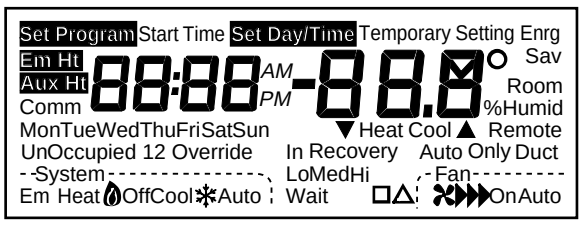


Figure 71

INSTALLER SETUP NUMBER AND SETTING DISPLAY

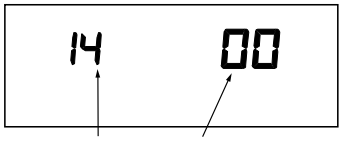


Figure 72

THERMOSTAT INSTALLER SETUP OPTIONS

Select	Installer setup number (press unocuppied temp. key to change	Factory setting		Other choices (press ▲ or ▼ key to change)		Actual setting
		Display	Description	Display	Description	
Not used	1	-	-	-	-	-
Fan operation[a]	2	0	Conventional applications where equipment controls fan operation in heat mode	1	Electric heat applications where thermostat controls fan operation in heat mode.	
Output stages of heating	3	Depends on subbase	Stages of heat	0, 1, 2, or 3	0 -No heating 1 -One stage of heat 2 -Two stages fo heat 3 -Three stages of heat	
Output stages of cooling	8	Depends on subbase	Stages of cooling	0, 1, 2 or 3	0 – No cooling 1 – One stage of cool 2 – Two stages of cool 3 – Three stages of cool	
System setting adjustment (models with system key)	12	Depends on model	System selection	0, 1 or 2	0 – System setting key is operational 1 – Auto setting is disabled 2 – Auto setting only	
Not used	13	-	-	-	-	-
Degree temperature display	14	0	Temperature is displayed in °F	1	Temperature is displayed in °C	
Displaying temperature (T7300 F only)	15	0	Temperature is displayed	1	Temperature is not displayed	
Clock format	16	0	12-hour clock format	1	24-hour clock format	
Intelligent Fan™ operation	17	2	Fan operates con-tinuously in Occupied and recovery modes. Fan operates with call for heating or cooling in Unoccupied mode.	0 or 1	0 - Fan only operates with calls for heating or cooling in occupied and Unoccupied modes. 1 - Fan operates continuously in Occupied mode. Fan operates with calls for heating or cooling in Unoccupied mode	
Auxiliary contact operation	18	0	0 –Time of contact day	0 or 1	1 – Economiser contacts	
Extended fan operation in heating[a] (T7300F only)	19	0	No extended fan operation after the call for heat ends	1	Fan operation os extended 90 seconds after the call for heat ends.	

THERMOSTAT INSTALLER SETUP OPTIONS (continued)

Select	Installer setup number (press unocuppied temp. key to change	Factory setting		Other choices (press ▲ or ▼ key to change)		Actual setting
		Display	Description	Display	Description	
Extended fan operation in cooling (T7300 only)	20	0	No extended fan operation after the call for cool ends	1	Fan operation is extended 90 seconds after the call for cool ends	
Fan key adjustment (models with fan key)	21	0	Fan setting key is operational	1	Fan setting key is Auto only	
Remote sensing	22	0	Remote sensing not activated	1	Remote sensing activated	
Temperature averaging network[b] (T7300 only)	23	0	Temperature averaging disabled	1	Temperature averaging between local sensor and remote sensor(s) activated	
Not used	24	-	-	-	-	-
Keypad lockout level (keypad lockout is enabled and disabled by DIP switch 1 on back of thermostat).	25	0	No lockout	1 or 2	1 -Lockout all keys on thermostat except system and fan settings, temporary setpoint, clock and day adjustments, increase ▲ and decrease ▼ keys. 2 -Lockout all keys except Set Current Day/Time, ▲ and decrease ▼ keys. 3 -Lockout all keys except "Temporary Occupied" and "Set Current Day/Time" (for clock, day adjustment).	
Duration of temperature override	26	3	3 – Three hour override	1, 8 or 12	1 – One hour override 8 – Eight hour override 12 – Twelve hour override	
Not used	27 thru 29	-	-	-	-	-
Deadband (T7300F only)	30	2	Heating and cooling setpoints can be set no closer than 1,1 °C	3 thru 10	Heating and cooling setpoints can be set no closer than the chosen value	
Interstage control point (T7300F, Q7300 C, D only)	31	0	Disabled	1 thru 12	Temperature has to change more than the chosen value before the system calls for the next stage. Example : 20°C is the heat setpoint, 1.1°C is the interstage setting, temperature is 18.5°C, the second stage turns on, brings the temperature to 19°C and turns off. The heat pump continues to run until the setpoint is met.	
Minimum on-time (T7300F)	32	2	2-minute minimum on-time for heating and cooling	0 or 1	No minimum on-time or 1-minute minimum on-time for heating and cooling	
Minimum off-time for the compressor	33	4	4-minute minimum off-time for the compressor	0, 1, 2, 3 or 5	Minimum number of minutes (0 thru 5) the compressor is off between calls for the compressor	
Temperature range stops in heating (T7300F)	34	90	Highest heating setpoint	40 to 89	Temperature range 0.6°C increments) for heating setpoint.	

THERMOSTAT INSTALLER SETUP OPTIONS (continued)

Select	Installer setup number (press unocuppied temp. key to change	Factory setting		Other choices (press ▲ or ▼ key to change)		Actual setting
		Display	Description	Display	Description	
Temperature range stops in cooling (T7300)	35	45	Lowest cooling setpoint	46 to 89	Temperature range (0.6°C increments) for cooling setpoint	
Not used	36	-	-	-	-	-
Temperature display adjustment	37	0	No difference in displayed temperature and actual room temperature	1 thru 6	1- Display adjusts to 0.6°C higher than actual room temperature. 2- Display adjusts to 1.1°C higher than actual room temperature. 3- Display adjusts to 1.7°C higher than actual room temperature. 4- Display adjusts to 0.6°C lower than actual room temperature. 5- Display adjusts to 1.1°C lower than actual room temperature. 6- Display adjusts to 1.7°C lower than actual room temperature.	
Minimum off-times in heating	38	4	4 – 4 minute minimum off-time	0, 1, 2, 3 or 5	Minimum number of minutes (0 thru 5) the heating equipment is off between calls for heat	
Not used	39	-	-	-	-	-
Installer Setup lockout (keypad lockout is enabled and disabled by DIP switch 1 on back of thermostat).	40	0	0 - Installer Setup lockout.	1	1 - Installer Setup lockout activated.	

Setting Keypad Lockout Switch

The DIP switch 1, on the back of the thermostat, activates the lockout features. The switch must be set to the ON position (up) to activate the lockout feature. See figure 73. The factory setting is off (down). Remove the thermostat from the subbase and set the switch to ON if keypad lockout is desired.
The level of lockout is determined by the Installer Setup numbers 25 and 40.

SET THE KEYPAD LOCKOUT DIP SWITCH 1 ON BACK OF THERMOSTAT

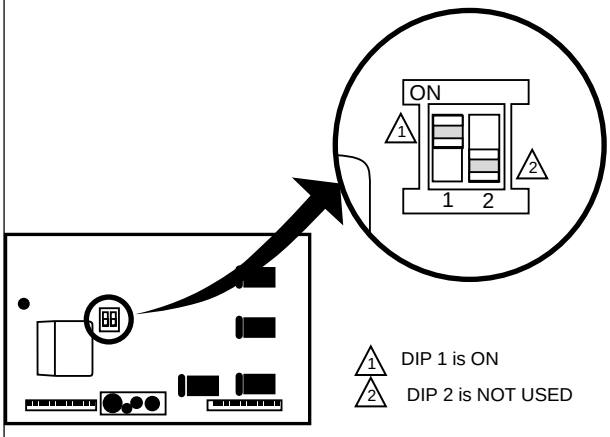


Figure 73

PROGRAMMING

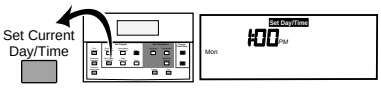
The program has four temperature settings, Occupied and Unoccupied heat and cool. The thermostat will operate at the Unoccupied temperature setting unless the thermostat is programmed. The following chart shows the Default temperature settings.

	Occupied setpoint		Unoccupied setpoint	
Control	**Default**	**Desired**	**Default**	**Desired**
Heating	21 °C		13°C	
Cooling	25,5 °C		32 °C	

1 - SETTING CURRENT DAY AND TIME

1.1 - Press Set Current Day/Time

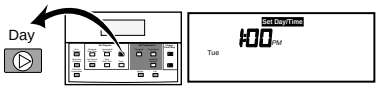
NOTE : On initial power up or after an extended power loss, 1:00 PM flashes on the LCD until a key is pressed.



1.2 - Press Day ***until the current day is displayed***

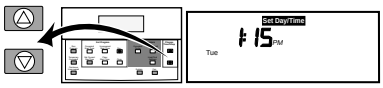
NOTE :

Sun =	Sunday
Mon =	Monday
Tue =	Tuesday
Wed =	Wednesday
Thu =	Thursday
Fri =	Friday
Sat =	Saturday

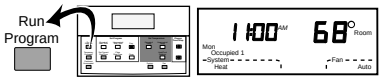


1.3 - Press increase ▲ ***or decrease*** ▼ ***key until the current time is displayed***

NOTE : Tapping the Set Current Day/Time will change the time in one hour increments



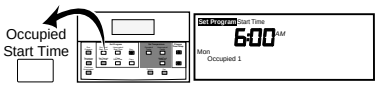
1.4 - Press Run Program



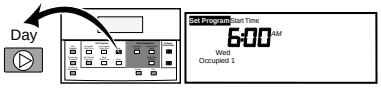
2 - SETTING PROGRAM TIMES

2.1 - Press Occupied Start Time

NOTE : Anytime a start time is not required, press the Clear Start Time



2.2 - Press Day ***until the desired day is displayed***

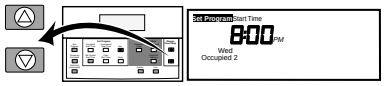


2.3 - Press increase ▲ ***or decrease*** ▼ ***key until the desired start time is displayed***

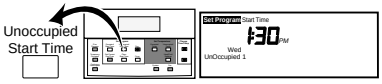
NOTE : The program times are in fifteen minute intervals (example : 8:00, 8:15, 8:30)

2.4 - Press Occupied Start Time ***a second time to set a second Occupied Start Time.***

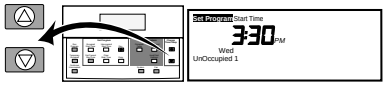
2.5 - Press increase ▲ ***or decrease*** ▼ ***key until the desired start time is displayed***



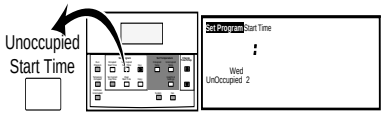
2.6 - Press Unoccupied Start Time



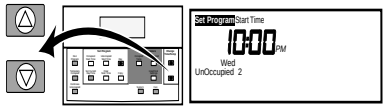
2.7 - Press increase ▲ ***or decrease*** ▼ ***key until the desired start time is displayed***



2.8 - Press Unoccupied Start Time ***a second time to set a second Unoccupied Start Time***



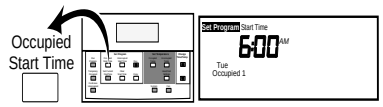
2.9 - Press increase ▲ ***or decrease*** ▼ ***key until the desired start time is displayed***



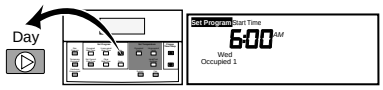
3 - COPYING A DAY

NOTE : The thermostat must be in the program mode to use the copy feature. Go to step 2 if the thermostat is already in the program mode.

3.1 - Press Occupied Start Time

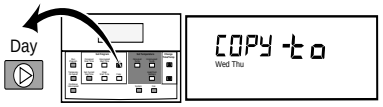


3.2 - Press Day ***to select the day to be copied if different from the day displayed***



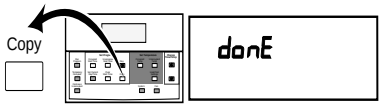
3.3 - Press Copy

3.4 - Press Day ***until the day to be copied to is displayed***



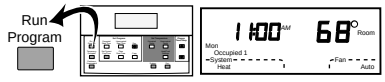
3.5 - Press Copy

NOTE : "donE" will be displayed for two seconds and the the normal program display will be shown.



3.6 - Repeat step 3.2 through 3.5 for all the days desired

3.7 - Press Run Program



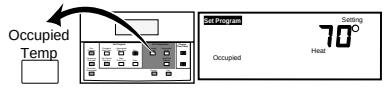
4 - SETTING PROGRAM TEMPERATURE SETPOINTS

NOTE : The setpoint temperature range is

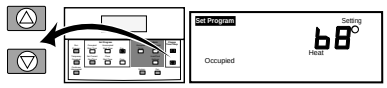
7 to 31°C for heating and

9 to 37°C for cooling

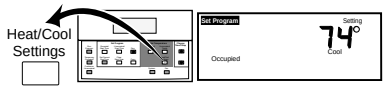
4.1 - Press Occupied Temp



4.2 - Press increase ▲ ***or decrease*** ▽ ***key until the desired temperature is displayed***

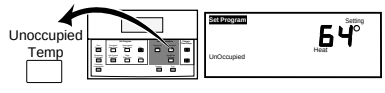


4.3 - Press Heat/Cool Settings ***to change between heat and cool settings***

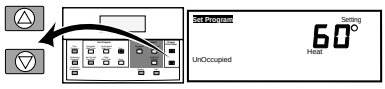


4.4 - Press increase ▲ ***or decrease*** ▽ ***key until the desired temperature is displayed***

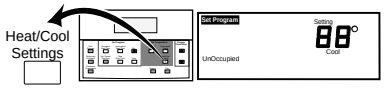
4.5 - Press Unoccupied Temp



4.6 - Press increase ▲ ***or decrease*** ▽ ***key until the desired temperature is displayed***

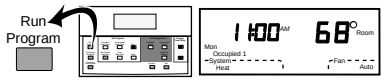


4.7 - Press Unoccupied Temp ***to change between heat and cool settings***



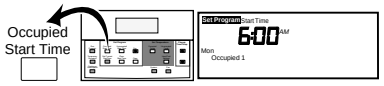
4.8 - Press increase ▲ ***or decrease*** ▽ ***key until the desired temperature is displayed***

4.9 - Press Run Program

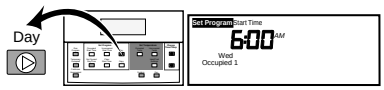


5 - CLEARING PROGRAM START TIMES

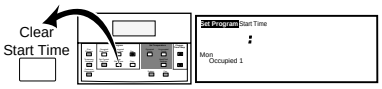
5.1 - Press Occupied Start Time ***or*** Unoccupied Start Time ***until the start time to be cleared is displayed***



5.2 - Press Day ***until the desired day is displayed***

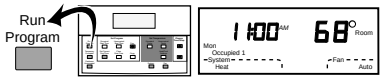


5.3 - Press Clear Start Time



5.4 - Repeat step 5.1 to 5.3 for all the start times to be cleared

5.5 - Press Run Program

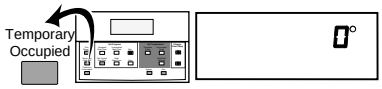


6 - TEMPORARY OCCUPIED OVERRIDE

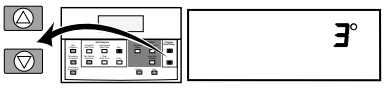
Setting temperature offset for temporary override

6.1 - Press Occupied Temp

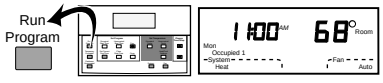
6.2 - Press Temporary Occupied



6.3 - Press increase or decrease key until the desired temperature offset is displayed (range 0 to 3°C)



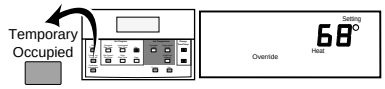
6.4 - Press Run Program



7 - USING TEMPORARY OVERRIDE

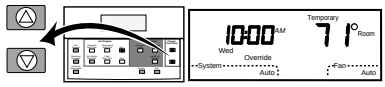
7.1 - Press Temporary Occupied

NOTE : The default temperature setting is the Occupied setpoint.

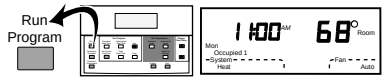


7.2 - Press increase or decrease key to change the default setting by the offset (range 0 to 3°C), if desired

NOTE : If the offset is zero, the default setting changes in one degree increments. If the offset is 1 through 5, the default setting changes by plus or minus the offset.



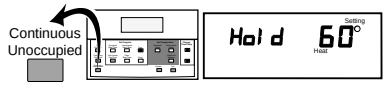
7.3 - Press Run Program ***to cancel the override***



8 - USING CONTINUOUS UNOCCUPIED

8.1 - Press Continuous Unoccupied

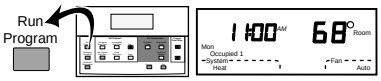
NOTE : The default temperature setting is the Unoccupied setpoint. The default appears for five seconds and then the display shows the room temperature.



8.2 - Press increase or decrease key to change the default setting, if desired

8.3 - Press Heat/Cool Settings ***to change between heat and cool settings. Use increase or decrease key to adjust temperature settings***

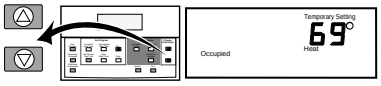
8.4 - Press Run Program ***again to cancel the Hold and to return to the program***



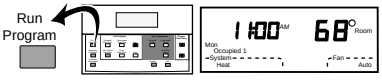
9 - CHANGING TEMPERATURE SETPOINT UNTIL NEXT PROGRAM PERIOD

1 - Press increase or decrease key until the desired temperature is displayed

NOTE : If If ▲or ▼ appear under the temperature display, it means that both the heating and cooling setpoints are being adjusted. Tapping the key will change both the heat and cool setpoints by one degree. Press Heat/Cool Settings after the desired setpoint is reached to review the settings.



9.2 - Press Run Program ***to cancel the temporary setpoint and to return to the program***



The CLIMATIC™ 'Comfort' control Display allows an untrained person to easily operate a Lennox Roof-Top.
This display connects to a single Rooftop and, through the use of the control keys, LED's and display the user can see how the connected Rooftop is operating, wether there are any faults, modify the comfort setpoint and override the Rooftop operation.
If installed correctly the CLIMATIC™ "Comfort" control display can be installed up to 1000 m away from the Rooftop unit.

DISPLAY (1 - figure 74)

In 'Automatic' operation the comfort setpoint is displayed in the event of a fault detected on the unit an error code is automatically displayed.

The + / - keys **(2)** are used to change the heating/cooling/ operating setpoints.

The LED **(3)** indicates the current operating mode:

- In 'Automatic' mode, i.e. in the programmed time schedules, the LED flashes,
- In forced occupied mode, the LED is permanently on
- In forced unoccupied mode, the LED is off.

Forced Occupied Key **(4)**
Pressing this key will override the Automatic control and force the unit to run in its "Occupied" mode.
Whilst in this mode the LED **(3)** will remain permanently on.
To return to "Automatic" mode press button **(6)** when the LED **(3)** will flash again.

Forced Unoccupied Key **(5)**
If, to save energy, the installations are not used within a period programmed for automatic use, it is possible, by pressing this key, to force the unit into its to "unoccupied" mode. The LED **(3)**, which was previously flashing or lit, will now go out.

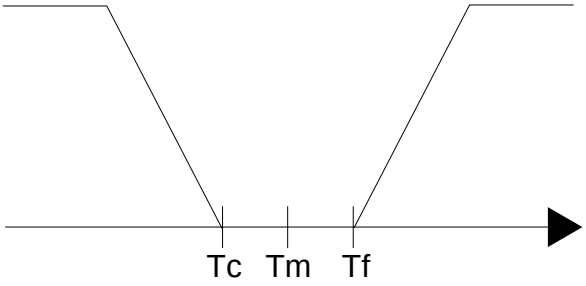
Automatic Operation Key **(6)**
If the system was previously set to forced occupied mode (LED **(3)** lit) or forced unoccupied mode (LED **(3)** off), this key allows you to return to the automatic programmed mode. The LED will flash.

NOTE: 'Forced' modes will automatically be re-set at 00:00h

LED **(7)** Indicates whether the unit is operating or not.

LED **(8)** Indicates that the filters are dirty.

LED **(9)** Indicates a general fault has been detected by the Climatic, Refer to the "Fault Codes" section of this manual.



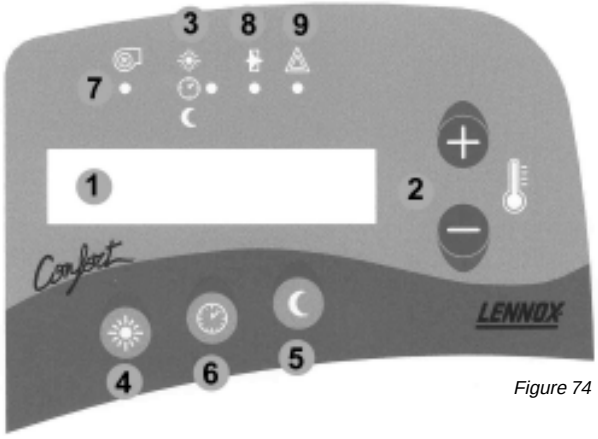


Figure 74

KP17 COMFORT CONTROL DISPLAY WIRING

Failure to install the Comfort control display with the recommended cable may cause the display to malfunction.
The KP17 remote must be connected to the CLIMATIC™ using a 4 x 0.5 mm^2 braid-screened cable.
This connection is provided through a remote interface card which is located within the Control panel section.
Refer to the wiring section of this manual.

This display unit allows you to read and modify all the values of the variables or setpoints of the rooftop to which it is connected.

NOTE: If your ROOFTOP already has a KP17 Comfort display connected (see previous section) simply disconnect it and connect this panel to the same location, once completed re-connect the KP17. It is not necessary to switch off the power to the CLIMATIC™ whilst the KP02/KP17 is being changed.

The dialogue with the controller is initiated by the Climatic. If, after 3 attempts, no communication is established, a message will be displayed signalling the problem. The unit will then try to re-connect at regular intervals.

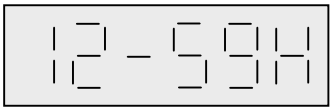
CALLOUT:

1 LIQUID CRYSTAL DISPLAY
2 RAISE/LOWER KEYS
3 "FILTER" LED (flashing red)
4 "ADDRESS" KEY
5 "MODE" KEY
6 "VALUE" KEY
7 UNIT RUNNING" LED
8 "MODE" LED
9 "GENERAL ALARM" LED.

Figure 75

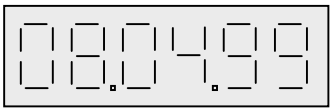
1 - DISPLAY FORMATS

Hour
Default display. If the display unit has been inactive for 5 minutes, this screen will automatically be displayed.



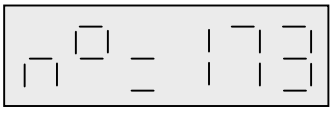
<--> 12 hours and 59 minutes

Date



<--> 8 April 1999

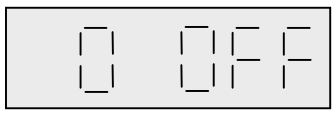
Variable or setpoint address



Variable or setpoint value

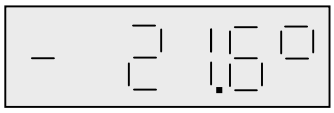
Digital Values

1 <--> ON

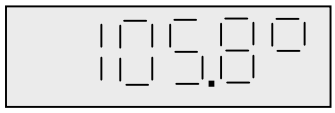


0 <--> OFF

Temperatures
Temperatures are displayed in °C, to an accuracy of 0.1 °C



<--> -21.6 °C

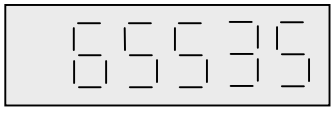


<--> + 105.8 °C

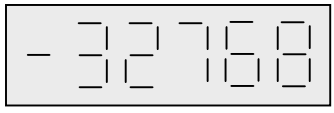
Pressures
Pressure is given in bars, to an accuracy of 0.1 bar.

<--> 18.3 bars

Other analog values



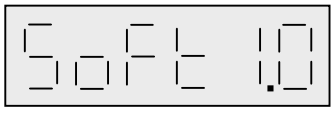
Values displayed



Values non displayed

Specific Displays

Software Version
When the unit is powered up, the KP02 software version number is displayed.

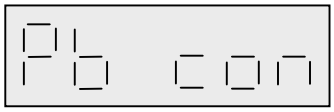


<--> version 1.0 (for example)

Display Test
The display can only be tested for correct operation when the unit is powered up and by pressing on the 3 keys "A", "M" and "-" simultaneously. If the display is working correctly, the following will be displayed :

All digits are properly displayed.

Communication Error
If there is no communication between the KP02 display unit and the CPU card, the following message is displayed :



<--> "Communication problem"

2 - OPERATING MODES

The maintenance display allows for 4 modes of operation. Key **[M]** allows you to move successively and in a loop from one mode to the next.
The current mode is indicated by the status of LEDs **[V]** and **[C]** :

Status of LEDs associated with current mode :	[V]	[C]
A. The variable mode allows you to read the values of variables	lit	not lit
B. The setpoint mode allows you to change the settings	not lit	lit
C. The read date mode allows you to view the time and the date	not lit	not lit
D. The date setting mode allows you to change the time and the date	lit	lit

A : VARIABLES MODE

Pressing key **[A]** displays the address of the variable being read.
To go to a higher address, press **[A]** while simultaneously pressing on **[+]**.
The address will increase slowly by pressing **[+]** intermittently or more quickly by keeping your finger on the key.
To go to a lower address, proceed as above but with the **[-]** key.

When the required address appears, press **[V]** to display the variable value. If you do not press any key, the display will automatically return after a minute. The variables are updated every second.

B : SETPOINTS MODE

The setpoint address can be chosen in the same way as for the variable address (see above).
When the address of the required setpoint appears, pressing **[V]** will likewise display the current value.
To increase the setpoint press **[V]** while holding down the **[+]** key at the same time.
The address will increase slowly by pressing **[+]** intermittently or more quickly by keeping your finger on the key.
To go to a lower setpoint, proceed as above but with the **[-]** key as well as the **[V]** key.

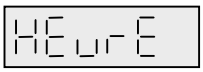
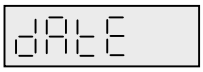
The new value is applied when **[V]** is released.

PASSWORD
Access to all the setpoints is password-protected. Enter the password before making changes.
To do so, following the above procedure : go to address setting n° 0 and enter the number corresponding to your password.
If the password code is correct, the following message will appear when key **[V]** is released :

If the keypad has been inactive for 5 minutes, the password is reactivated. You must therefore enter it again to continue making changes to the setpoint values.

C : DATE READING MODE

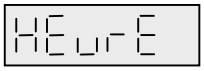
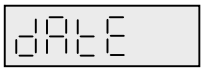
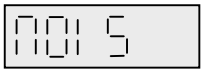
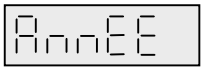
One of the following modes

- Hour 
- or date 

can be chosen by pressing **[A]** and briefly pressing on **[+]** or **[-]**.
Pressing **[V]** will display the value of the data selected, otherwise it will automatically be displayed after a minute.

D : DATE SETTING MODE

This mode allows the 6 date modes to be set :

- Hours and minutes <--> 
- Day of the month <--> 
- Day of the week <--> 
- Month <--> 
- Year <--> 

In the same way as for the setpoints, the value can be increased by simultaneously pressing on keys **[V]** and **[+]** and they can be decreased by simultaneously pressing on **[V]** and **[-]**.

For different types of data, the setting ranges are as follows :

Item	Minimum value	Maximum value
Hours and minutes	00-00H	23-59 H
Day of the month	1	31
Day of the week	1	7
Month	1	12
Year	0	99

Changes are only incorporated when key **[A]** is pressed.

NOTE : The compatibility of the value for the day of the month is not checked when it is entered. You might therefore enter February 31st but when you try to validate, it will be ignored and the preceding value stored.

3 - POWER SUPPLY (LED 7 - figure 66)

When lit, the LED indicates that the machine is powered up.

4 - MODE (LED 8 - figure 66)

This LED indicates the current operating mode.
In normal mode, i.e. within the programmed schedules, the LED flashes.
In forced day mode, the LED is permanently on and in forced night mode, the LED is off.

5 - FILTER DIRTY (LED 3 - figure 66)

This LED indicates that the Climatic has detected that the filter is blocked.

6 - GENERAL FAULT (LED 9 - figure 66)

This LED indicates a general fault has been detected - refer to "fault codes" section of this manual.

LIST OF SETPOINTS

1st Level

		Min.	Factory	Maxi.
0	Password to access level 2 setpoints and variables	0	#	255
1	Temperature, required setpoint for room, day mode	8.0	21.0	35.0
2	(Used by KP17 only) KP17 Remote control, overide, occupied mode	Off	Off	On
3	(Used by KP17 only) KP17 Remote control, overide, automatic mode	Off	Off	On
4	(Used by KP17 only) KP17 Remote control, overide, unoccupied mode	Off	Off	On
5	Fault reset	Off	Off	On
6	Remote control, On / Off, unit	Off	Off	On
7	(Special software request) Remote control, On / Off, customer output KP12/2	Off	Off	On
8	(Used for setting up different time zones) Mode, Selection 0 = Day 1 = Week-end 2 = Night 3 = 4 = Morning 5 = Midday 6 = Evening 7 = BMS	0	0	7
9	Defines end of weekend/Start of week (1 = Sunday, 2 = Monday, etc) Mode, day of the weekn start of mode	1	#	7
10	(Used with setpoint 8 - mode selection - to define the hour of the start time) Mode, hour, start of mode	0	#	23
11	Used with setpoint 8 - mode selection - to define the minute of the start time Mode, minute, start of mode	0	#	59
12	Defines end of week/Start of weekend (6 = Friday, 7 = Saturday, etc) Mode,day of the week, end of mode	1	#	7
13	Used with setpoint 8 - mode selection - to define the hour of the stop time Mode, hour, end of mode	0	#	23
14	Used with setpoint 8 - mode selection - to define the minute of the stop time Mode, minute, end of mode	0	#	59
15	Defines day mode deadzone, other time zones = cooling setpoint) Mode, temperture, room cooling setpoint	8.0	#	35.0
16	Defines day mode deadzone (other time zones = heating setpoint) Mode, temperature, room heating setpoint	8.0	#	35.0
17	(FLEXY™ only)* On = Absolute humidity (g/kg) / Off = Relative humidity (%)	Off	Off	On
18	(FLEXY™ only)* Mode, relative humidity (%), room minimum setpoint required	0	#	100
19	(FLEXY™ only)* Room mode, Relative humidity (%), maximum setpoint required	0	#	100
20	(FLEXY™ only)* Mode, Absolute humidity (g/kg), room minimum setpoint required	0.0	#	30.0
21	(FLEXY™ only)* Mode, Absolute humidity (g/kg), room maximum setpoint required	0.0	#	30.0
22	Mode, Percentage, Minimum fresh air	0	#	100
23	Mode, Fan activity in control zone (cooling mode/heating mode)	Off	#	On
24	Mode, Fan activity in dead zone	Off	#	On
25	(Special application request only) Mode, Fan automation, dead zone	Off	#	On
26	(FLEXY™ only)* Mode, Fan low speed, control zone	Off	#	On

* : FLEXY™ is an other range of ROOFTOP. For more informations, please consult your regional office

		Min.	Factory	Maxi.
27	(FLEXY™ only)* Mode, Fan low speed, dead zone	Off	#	On
28	(FLEXY™ only)* Mode, Fan low speed automation	Off	#	On
29	(on = Unit runs at maximum 50% during "night mode") Mode, Low noise	Off	#	On
30	(J-BUS only) Remote control, overide, Mode	Off	Off	On
31	(J-BUS only) Remote control, Overide, Low fan speed	Off	Off	On
32	(J-BUS only) Remote control, Overide damper with recycled air	Off	Off	On
33	(J-BUS only) Remote control, Overide damper with minimum fresh air	Off	Off	On
34	(J-BUS only) Remote control, Overide damper with fresh air	Off	Off	On
35	(J-BUS only) Remote control, Overide 50% load limit	Off	Off	On
36	(J-BUS only) Remote control, Overide heating cancellation	Off	Off	On
37	(J-BUS only) Remote control, Overide cooling cancellation	Off	Off	On
38	(J-BUS only) Remote control, Overide electrical heaters cancellation	Off	Off	On
39	On = Electrical heaters during defrosting	Off	On	On
40	(Alarm only) Room temperature, low setpoint	5.0	10.0	20.0
41	(Alarm only) Room temperature, high setpoint	20.0	40.0	40.0
42	Room relative humidity (%), low setpoint	0	0	50
43	Room relative humidity (%), high setpoint	50	100	100
44	Room absolute humidity (g/kg), low setpoint	0.0	0.0	30.0
45	Room absolute humidity (g/kg), high setpoint	0.0	30.0	30.0
46	Temperature, Curved gradient of anticipated speed	0.0	10.0	20.0
47	(0 = Start at times set in "modes" only, no anticipation start Value, Gradient of anticipated speed	0	12	100
48	Quantity of CO2, Ppm, minimum fresh air	0	1000	2000
49	Quantity of CO2, Ppm, maximum fresh air	0	1500	2000
50	Percentage, Fresh air damper opening before fan will start	0	10	100

2nd Level

		Min.	Factory	Maxi.
51	Maximum temperature, required setpoint for room, day mode	21.0	27.0	35.0
52	Minimum temperature, required setpoint for room, day mode	8.0	17.0	21.0
53	(Compressor minimum run time in seconds)	25	180	1800
54	Differential temperature, engaged heat setting	0.0	1.0	10.0

* : FLEXY™ is an other range of ROOFTOP. For more informations, please consult your regional office

		Min.	Factory	Maxi.
55	Differential temperature, heating setting between 2 steps	0.1	1.0	10.0
56	Differential temperature, engaged cooling setting	0.0	1.0	10.0
57	Differential temperature, cold setting between 2 steps	0.1	1.0	10.0
58	(Not used - special option only) On = Compressors then chilled water coil, room setting	Off	Off	On
59	On = Heat pump and/or sas then hot water coil or elec. heat, room setting	Off	On	On
60	On = Gas then heat pump, room setting	Off	Off	On
61	On = Supply setting on	Off	Off	On
62	Time, sampling of supply setting (integration delay)	1	10	120
63	On = Compressors then chilled water coil, supply setting	Off	Off	On
64	On = Heat pump and/or gas then hot water coil or elec. heat, supply setting	Off	Off	On
65	On = Gas then heat pump, supply setting	Off	Off	On
66	(Not used - Future facility) - Reserved On = constant supply air temperature via air damper modulation	Off	Off	On
67	(FLEXY™ only)* Time, Sampling of humidity setting	1	10	120
68	(FLEXY™ only)* Humidity range (%), humidity setting	1	5	50
69	(FLEXY™ only)* Differential humidity (%), Engaged dehumidity setting	1	5	50
70	(FLEXY™ only)* Differential humidity (%), Dehumidity setting between 2 steps	1	5	50
71	Supply temperature, low setpoint, 1st level	setpoint 72 +2.0	8.0	19.0
72	Supply temperature, low setpoint, 2nd level	setpoint 73 +2.0	6.0	17.0
73	Supply temperature, low setpoint, 3rd level	1.0	2.0	15.0
74	Supply temperature, high setpoint, 1st level	20.0	40.0	70.0
75	Supply temperature, high setpoint, 2nd level	setpoint 74	60.0	70.0
76	Temperature, Outside air minimum setpoint, (Outdoor air <Setpoint 76 = No free cooling, Min % fresh air)	0.0	5.0	30.0
77	Temperature, Outside air maximum setpoint, (Outdoor air>Setpoint 77 = 50 % compressors OFF in cooling)	0.0	26.0	60.0
78	(Not used - future facility) - Percentage, maximum fresh air, Damper modulation to provide constant supply air temperature	0	60	100
79	Outside air temperature, setpoint, 50% compressor (Outdoor air<Setpoint 79 = 50 % compressors stop)	10.0	12.0	30.0
80	Outside air temperature, setpoint, 100% compressor (Outdoor air<Setpoint 80 = ALL compressors stop)	10.0	12.0	30.0
81	Icing temperature setpoint, evaporator coil	-5.0	-1.0	3.0
82	Defrost temperature setpoint, evaporator coil	5.0	10.0	15.0
83	Delay, icing setpoint, evaporator coil	1	360	600
84	Outside air temperature, setpoint, 100% compressor heatpump (Outdoor air<Setpoint 84 = ALL compressor stop)	-50.0	-20.0	20.0
85	Outside temperature, setpoint, authorised defrosting, condenser coil	8.0	10.0	20.0
86	(on LINEA™ only) - (R22 = -3, R407C = 1) Battery temperature, setpoint, authorised defrosting, condenser coil	-10.0	-3.0	6.0

* : FLEXY™ is an other range of ROOFTOP. For more informations, please consult your regional office

		Min.	Factory	Maxi.
87	Coefficient, icing time, condenser coil	0	3	12
88	Number, condenser restart, condenser coil	1	1	8
89	Low temperature, setpoint, air/water cooled heat exchanger (non standard)	4.0	5.0	20.0
90	High temperature, setpoint, air/water cooled heat exchanger (non standard)	20.0	45.0	46.0
91	Outside temperature, setpoint, 100% electrical heater discharge (Outdoor air > Setpoint 91 = electric heater stop)	-20.0	10.0	30.0
92	Sensing setpoint, air flow cutout	0.0	0.2	5.0
93	Sensing setpoint, clogged filters	0.0	2.5	5.0
94	Sensing setpoint, missing filters	0.0	0.5	5.0
95	KP17 = on = On/Off unit	Off	Off	On
96	Delay, closing, KP 12-2 "Day" input	4	60	65535
97	Delay, Opening, KP 12-2 "Day" input	2	300	65535
98	Unit type	0	0	65535
99	On = "LINEA™" series, Off = "FLEXY™" series*	Off	#	On
100	On = Low ambiant Option fitted (Disable setpoints 79&80) (Off = Enable setpoints 79 & 80)	Off	#	On
101	(FLEXY™ only)* On = Advanced Control Pack option fitted	Off	#	On
102	Slave J-Bus, number	1	1	10
103	Link, number	0	0	7
104	All setpoint values overide to factory default EPROM values (centre column)	Off	Off	On
105	Test stages (for factory test procedures only reduces all delay timers to 0)	0	0	65535

* : FLEXY™ is an other range of ROOFTOP. For more informations, please consult your regional office

VARIABLE LIST *(june 2001)*

1st Level

0	Error code
1	Temperature, room
2	Relative humidity (%),room
3	Temperature, outside air
4	Relative humidity (%), outside, air
5	Temperature, supply Air
6	Temperature, chilled water battery
7	Temperature, compressor, no. 1
8	Temperature, compressor, no. 2
9	Temperature, compressor, no. 3
10	Temperature, compressor, no. 4
11	Temperature, condenser, no. 1
12	Temperature, condenser, no. 2
13	Temperature, condenser, no. 3
14	Temperature, condenser, no. 4
15	Temperature, air/water cooled heat exchanger, water outlet
16	Pressure, air flow (mb)
17	Air quality sensor, CO^2 (ppm)
18	Pressure, compressor, no. 1
19	Pressure, compressor, no. 2
20	Pressure, compressor, no. 3
21	Pressure, compressor, no. 4
22	Volt free contact, remote control, unit Off
23	Volt free contact, remote control, forced occupied mode
24	Volt free contact, remote control, forced unoccupied mode
25	Volt free contact, remote control, 50% load limit
26	Volt free contact, remote control, heating disable
27	Volt free contact, remote control, cooling disable
28	Volt free contact, remote control,low ventilation speed
29	Auxiliary contact, blower fan
30	Volt free contact, error, DAD board, detected smoke
31	Auxiliary contact, compressor, no. 1
32	Auxiliary contact, compressor, no. 2
33	Auxiliary contact, compressor, no. 3
34	Auxiliary contact, compressor, no. 4
35	Pressure switch, compressor, no. 1, low pressure
36	Pressure switch, compressor, no. 2, low pressure
37	Pressure switch, compressor, no. 3, low pressure
38	Pressure switch, compressor, no. 4, low pressure
39	Auxiliary contact, condenser fan, no. 1
40	Auxiliary contact, condenser fan, no. 2
41	Auxiliary contact, condenser fan, no. 3
42	Auxiliary contact, condenser fan, no. 4
43	Volt free contact, air/water cooled heat exchanger, water flow regulator
44	Auxiliary contact, pump (hot water coil - frost protection pump)
45	Auxiliary contact, electrical heater, no. 1
46	Auxiliary contact, electrical heater, no. 2
47	Auxiliary contact, gas grade, no. 1
48	Auxiliary contact, gas grade, no. 2
49	Volt free contact, humidifier, error, control & setting board
50	Volt free contact, leak water
51	Volt free contact, information, miscellaneous source
52	Output, supply fan
53	Output, low speed supply fan

54	Output, Extract fan
55	Output, compressor, no. 1
56	Output, compressor, no. 2
57	Output, compressor, no. 3
58	Output, compressor, no. 4
59	Output, compressor, no. 1, hot gas injection valve
60	Output, compressor, no. 1, cycle reversing valve
61	Output, compressor, no. 2, cycle reversing valve
62	Output, compressor, no. 3, cycle reversing valve
63	Output, compressor, no. 4, cycle reversing valve
64	Output, condenser fan, no. 1
65	Output, condenser fan, no. 2
66	Output, condenser fan, no. 3
67	Output, condenser fan, no. 4
68	(FLEXY™ only)* - Output, pump
69	Output, electrical heater, no. 1, 1st level
70	Output, electrical heater, no. 1, 2nd level
71	Output, Electrical Heater, no. 2
72	Output gas grade, no. 1, 1st level
73	Output, gas grade, no. 1, 2nd level
74	Output, gas grade, no. 2
75	Output, humidifier
76	Output, miscellaneous
77	Proportional action, economiser
78	Proportional action, chilled water battery
79	Proportional action, hot water battery
80	Proportional action, electrical heaters, static relays
81	Proportional action, humidifier
82	Status, supply fan
83	Status, damper
84	Status, chilled water coil
85	Status, hot water coil
86	Status, compressor, no. 1
87	Status, compressor, no. 2
88	Status, compressor, no. 3
89	Status, compressor, no. 4
90	Status, condenser fans
91	Status, pump
92	Status, electrical heaters
93	Status, gas
94	Status, humidifier
95	Room setpoint, minimum setting, heating
96	Room setpoint, maximum setting, cooling
97	Room setpoint, minimum power point, heating
98	Room setpoint, maximum power point, cooling
99	Setpoint, supply setting
100	Setting, minimum power point, heating, supply
101	Setting, maximum power point, cooling, supply
102	Setting, minimum setpoint, humidification, room
103	Setting, maximum setpoint, dehumidification, room
104	Setting, minimum power point, humidification, room
105	Setting, maximum power point, dehumidification, room
106	Function, operational conditions
107	On = Special software
108	Version number, Software

* : FLEXY™ is an other range of ROOFTOP. For more informations, please consult your regional office

This display unit allows you to operate 1 to 8 machines. The icon and schematic display provides a vivid and user-friendly interface.It uses a liquid crystal monochrome display, with background lighting, consisting of 240 x 128 pixels. It has 2 LEDs and 12 keys.
The remote console must be connected to the unit using a 4 x 0.5 mm² braid-screened cable. (max length is 1000 m).
Plan the console electric supply in 230V/50Hz (500 mA)
On the unit, connection the the KP01 card J18 input will be done with connection items (screws...) delivered with the console.

ITEMS:

1 LCD SCREEN, 240x128 PIXELS, MONOCHROME, BACKGROUND LIGHTING

2 5 KEYS FOR FIXED FUNCTIONS

3 7 "SCREEN" KEYS FOR VARIOUS FUNCTIONS

4 "ON" LED

5 "GENERAL ALARM" LED.

The main display unit functions are as follows:

- Control of a range of interactive screens allowing access to all information and control data.
- Continual resetting of all dynamic parameters displayed in the various screens.
- Recording of successive status of pre-defined variables to create analog and event histories.

A KP07 unit can be attached to more than 8 LENNOX Rooftops, providing they have the same software.

The link between the controllers and the display is serial and uses the JBUS protocol. After being connected, the unit tries to establish communication with the specified machines. If, after 3 attempts, the unit cannot communicate with the Roof-Top(s), the latter will be "disconnected". The connection failure is displayed on the screen and recorded in the event history. The display unit will then try to re-connect at regular intervals.

NOTE : To adjust the screen contrast, please consult the end of this section.

1 - SCREEN KEYS WITH VARIABLE FUNCTIONS (figure 76)

Figure 76

There are 7 keys located around the LCD screen :

The function of these keys may vary from one screen to another and is defined on the active screen by an icon. In the case of keys **[1]**, **[2]**, **[3]** and **[4]**, the icon is displayed above the key. For the 3 other keys **[A]**, **[B]** and **[C]**, the icon appears to their left.

Each key allows you to :

- Proceed to another screen, or
- Write a value in a given variable.

2 - FIXED KEYS (FIGURE 67)

The functions of these 5 keys are fixed :

PAGE DOWN :

Moves to the next page of the same screen type.

PAGE UP :

Returns to the previous page of the same screen type.

STRUCTURE :

Returns to the first screen (showing the structure).

PREVIOUS SCREEN :

Returns to the screen previously displayed

MODIFICATION :

Pressing on this key activates the "modification" mode (see below).

3 - ON (LED 4 - figure 67)

When lit, it indicates that the machine is powered up.

4 - GENERAL FAULT (LED 5 - figure 67)

This LED indicates a general fault has been detected.

5 - "MODIFICATION" MODE

This mode allows you to change the values of all the variables displayed on the active screen. It uses the 4 keys "**1**", "**2**", "**3**" and "**4**" by attributing preset functions to them :

KEY / ASSOCIATED ICON

Selects the variable to be changed

Selects the number to be changed

(By pressing successively on the key the cursor will move from digit to digit, from right to left, then the cursor remains on the last digit of the value to be changed.)

Increases the number from 0 to 9

Confirms the current change.

Through "MODIFICATION" mode, the user is able to :

- choose the number of the controller he wishes to see the variables of (if several Lennox Rooftops are attached to the same KP07 display unit),
- control the setpoints.

To exit "MODIFICATION" mode and return to the active screen, press the "MODIFICATION" key.

Note :

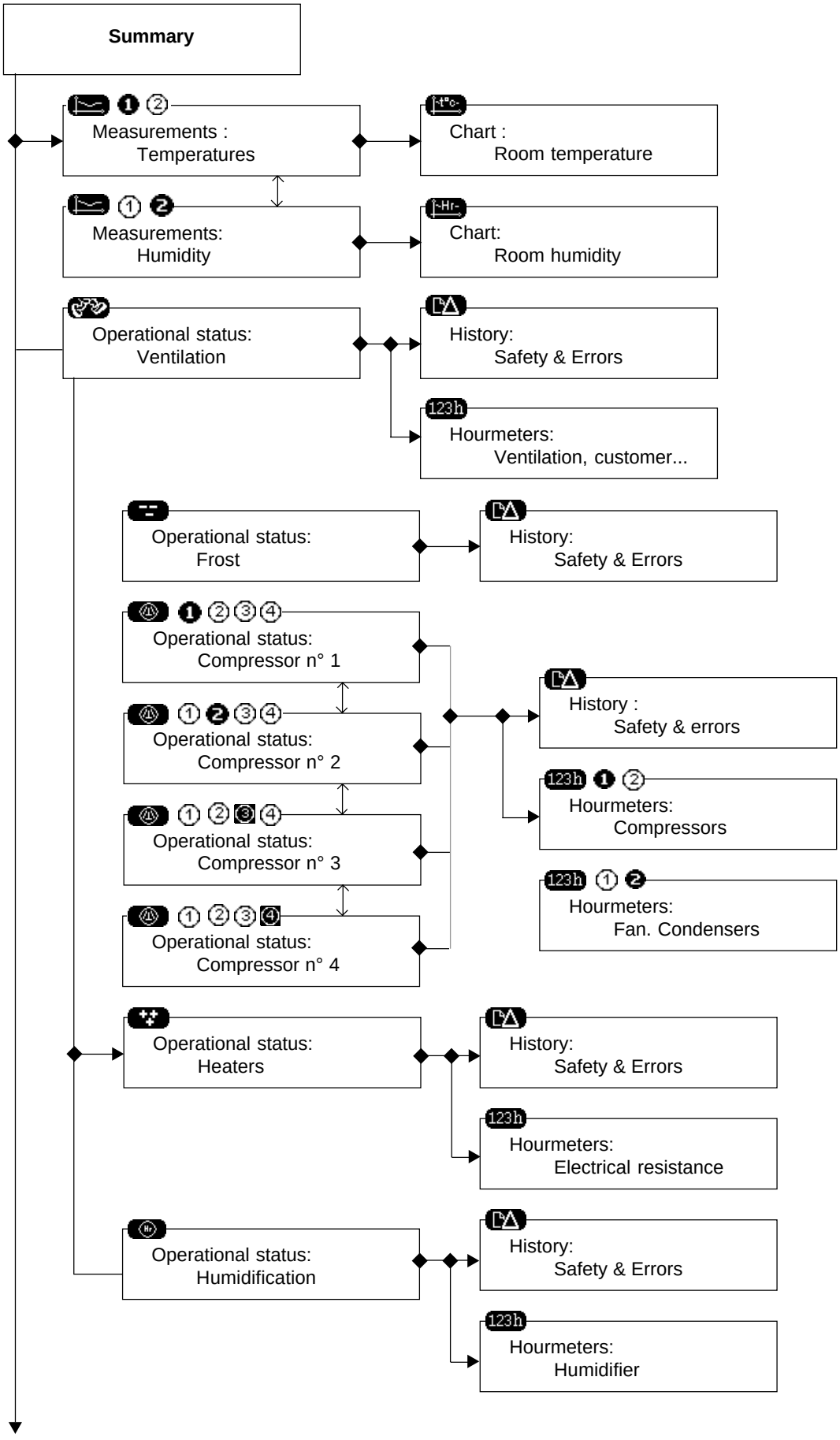
- During modification, the screen is no longer updated.
- If a change is not confirmed, the variable will retain its previous value.

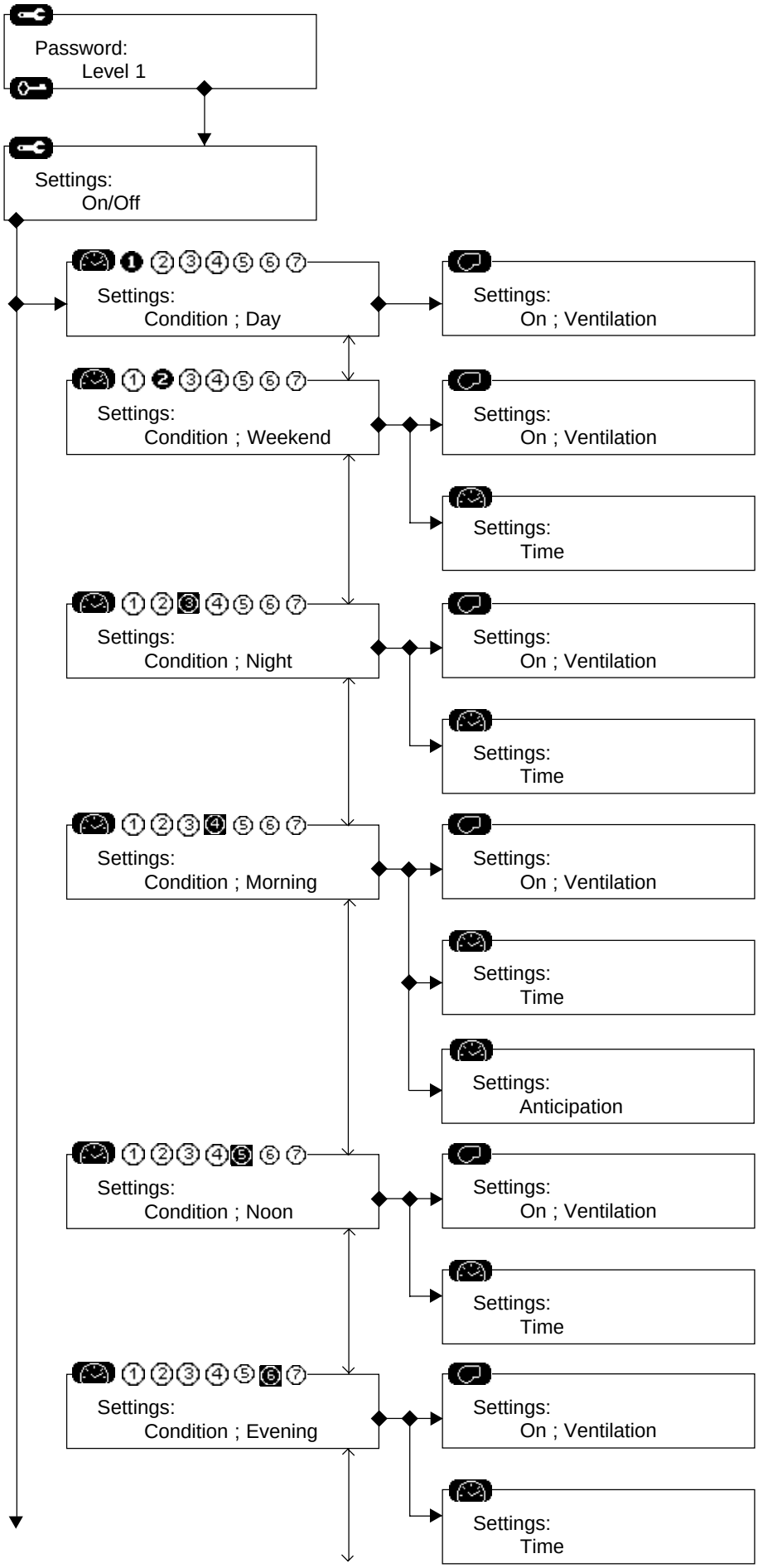
CONTRAST SETTING

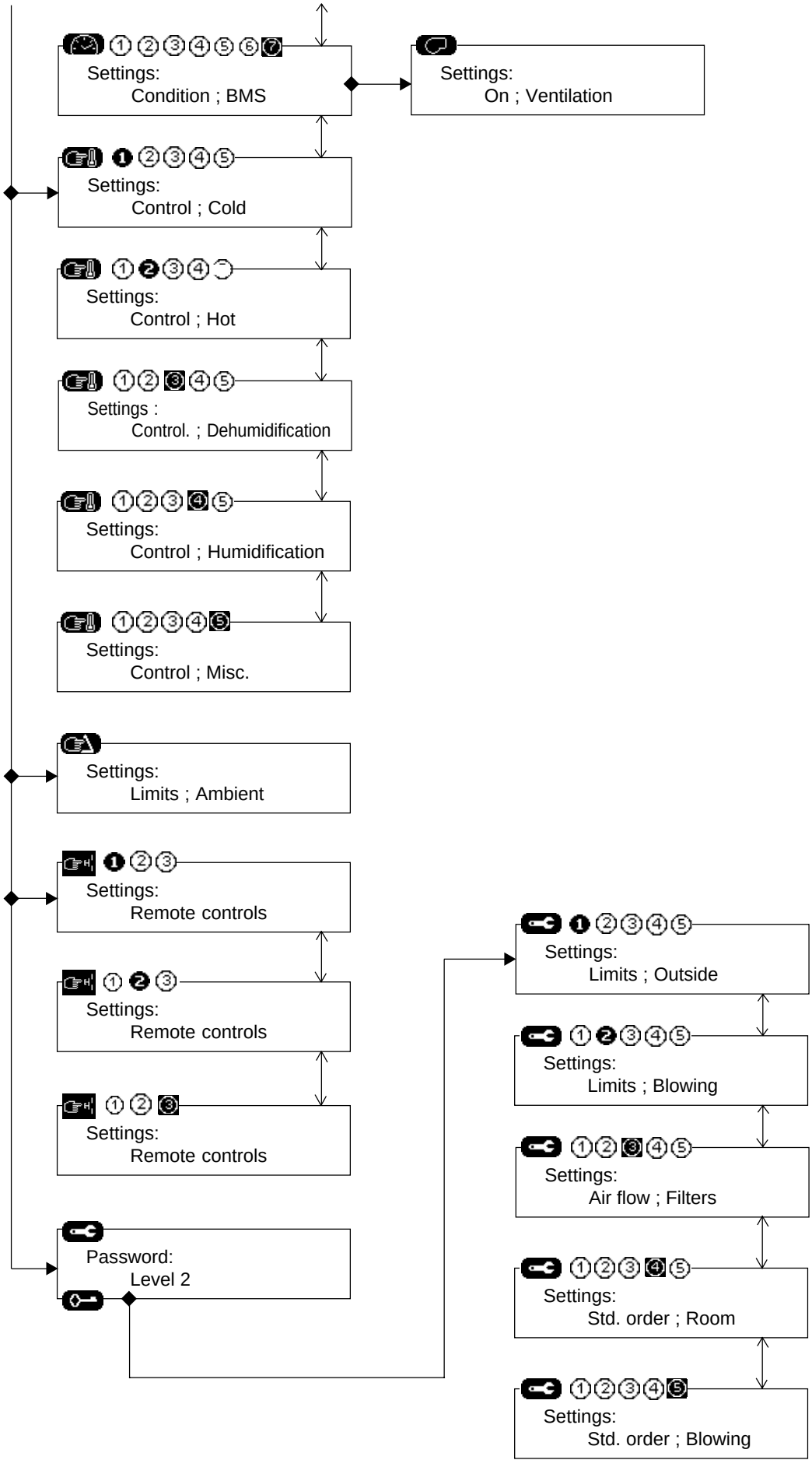
The display contrast can be set in "MODIFICATION" mode:

- Pressing successively on key **[A]** increases the contrast.
- Pressing successively on key **[B]** decreases the contrast.
- Key **[C]** allows you to find the default contrast.

GENERAL SCREEN LAYOUT




Password:
Level 1
Settings:
On/Off
Settings:
Condition ; Day
Settings:
On ; Ventilation
Settings:
Condition ; Weekend
Settings:
On ; Ventilation
Settings:
Time
Settings:
Condition ; Night
Settings:
On ; Ventilation
Settings:
Time
Settings:
Condition ; Morning
Settings:
On ; Ventilation
Settings:
Time
Settings:
Anticipation
Settings:
Condition ; Noon
Settings:
On ; Ventilation
Settings:
Time
Settings:
Condition ; Evening
Settings:
On ; Ventilation
Settings:
Time


Settings:
Condition ; BMS
Settings:
On ; Ventilation
Settings:
Control ; Cold
Settings:
Control ; Hot
Settings :
Control. ; Dehumidification
Settings:
Control ; Humidification
Settings:
Control ; Misc.
Settings:
Limits ; Ambient
Settings:
Remote controls
Settings:
Remote controls
Settings:
Remote controls
Password:
Level 2
Settings:
Limits ; Outside
Settings:
Limits ; Blowing
Settings:
Air flow ; Filters
Settings:
Std. order ; Room
Settings:
Std. order ; Blowing

INDEX OF ICONS

Keys

	Select variable to change
	Select digit to change.
	Increase value
	Enter current change.
	Go to temperature and humidity values and charts.
	Go to the machine component status.
	Go to various notices.
	Go to room temperature chart.
	Reset errors and error meters.
	Go to error history.
	Go to operation hourmeters.
	Go to frosting component status.
	Go to compressor and condenser operational status.
	Go to heating devices operational status.
	Enter password.
	Go to operational condition settings.
	Go to control settings.
	Go to safety settings.
	Go to On/Off and Discharge settings.
	Go to fan On/Off settings.
	Go to anticipation settings.

Logging on

	Log on password to go to settings.
	Log on date and time.

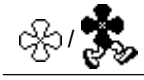
Sensors

	Temperature sensor
	Humidity sensor
	Pressure sensor
	Return or room data
	Supply data
	Outside data

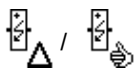
Operating conditions

	Operating condition: Day
	Operating condition: Weekend
	Operating condition: Night
	Operating condition: Morning
	Operating condition: Noon
	Operating condition: Evening
	Operating condition: BMS

Operating status

	Cooling mode setting operation.
	Heating mode setting operation.
	Device in manual mode (prohibited under control)
	(On / Off) Customer option
	(On / Off) blower fan
	Filters
	(On / Off) Fresh air damper.
	(On / Off) Cold proportional valve, cold water battery
	(On / Off) Compressor
	Compressor defrosting.
	Compressor stopped in anti-short cycle.
	(On / Off) Condensor
	(On / Off) Gas grade.
	Half flow gas.
	(On / Off) Hot proportional valve, hot water valve.
	(On / Off) Electrical heaters.

Errors

	General alarm
	(Start / End) Communication interrupted between unit KP07 and a CPU board.
	(Start / End) [081][083][085][086][087][113] [123] [133] [143] Faulty temperature sensors.
	(Start / End) [013][022][096] Low temperature limit.
	(Start / End) [012][023][097] High temperature limit.
	(Start / End) [094] Error : only applicable to customer.
	(Start / End) [091] Faulty processing fan.
	(Start / End) [001] Wrong air flow.
	(Start / End) [099] Error smoke.
	(Start / End) [004] Dirty filters.
	(Start / End) [005] Missing filters.
	(Start / End) [115][125][135][145] Faulty high pressure or faulty electrical compressor.
	(Start / End) [117][127][137][147] Faulty low pressure compressor.
	(Start / End) [092][093] Faulty condensers.
	(Start / End) [011] Faulty electrical batteries.
	(Start / End) [014][015] Faulty gas burner.

This option is used for making a connection to the BMS only, by a set of volt free contacts.
It requires the addition of a KP05 card, if this is not already in place, and a KP12 card.
Input connection must be by screened cable only.

Limits of relays :

- 10A – 250V with resistive load
- 4A – 250V with inductive load.

Input	Function
A	Instruction shift : A 0/20mA signal can be used to add a linear shift of 0 to 10 °C to the setpoint temperature (mid-point between air-conditioning and heating setpoint). If your command signal is a different type, our engineers can advise you on the type of interface to use before input to the CLIMATIC™ (0-10V with interface)
B	Unit on/off (ROOF-TOP on when unit is off).
C	Contact - force night operation
D	Contact - force day operation
E	Contact - force operation at 50%.
F	Lock heating function
G	Lock air-conditioning function.
H	Feedback of information from an external client component

Output	Function
a	Signal filter fault
b	Signal fan fault
c	Signal compressor fault
d	Signal fault on gas burner or electric coil.
e	Signal supplying temperature greater than setpoint (Setpoint 74)
f	Signal supplying temperature less than setpoint (setpoint 71)
g	Command from an external client component

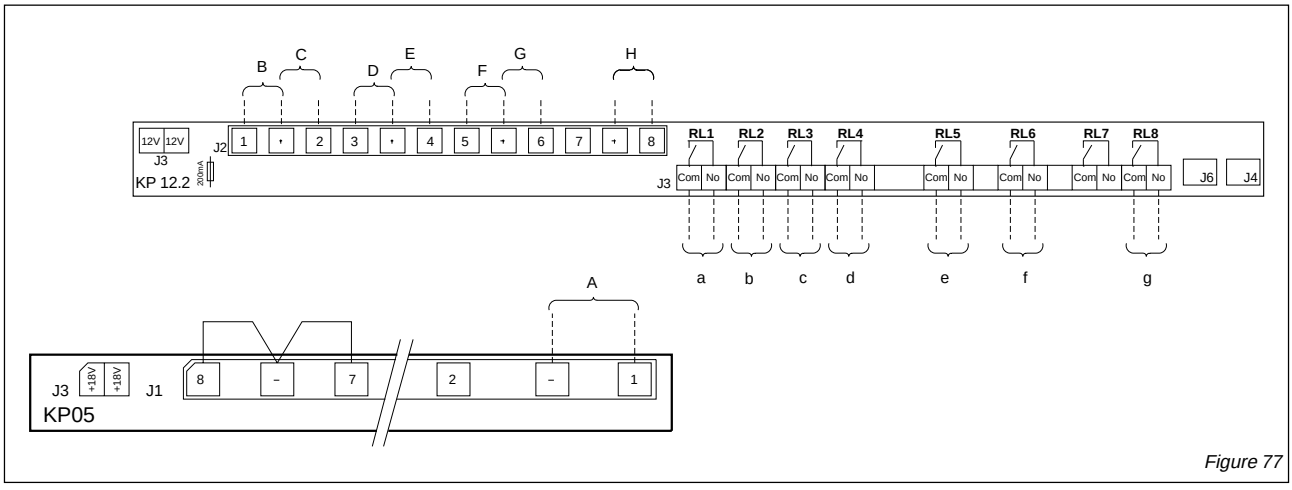


Figure 77

ON - OFF

The unit is declared On if setpoint 6 (C06) is ON.
The unit can be stopped by a remote control command by volt free contact.
On KP12 extension card - see chapter on BMS contact kit.

For certain configurations a CLIMATIC™ system actuator can be used to control an external function (option : Client).
The Client option is declared On if setpoint 7 (C07) is ON.

DEFINITION OF TIME SLOT PARAMETERS

The CLIMATIC™ allows you to programme 5 operating zones per day, in addition to an idle zone for the weekend.
Slot activation is :

- automatically controlled by the CLIMATIC™, if you have defined these time parameters for each slot
- forced manually by action on the controller (instructions 02/03 and 04 for KP02).
- forced by the BMS contacts kit (see this chapter).
- forced by the computer connection.

The five available time slots are :

WEEK-END

NIGHT

MORNING

NOON

EVENING

If none of the time slots listed above is active, the active slot is :

DAY

A particular time slot :

BMS is activated if the unit is connected to a computer network.

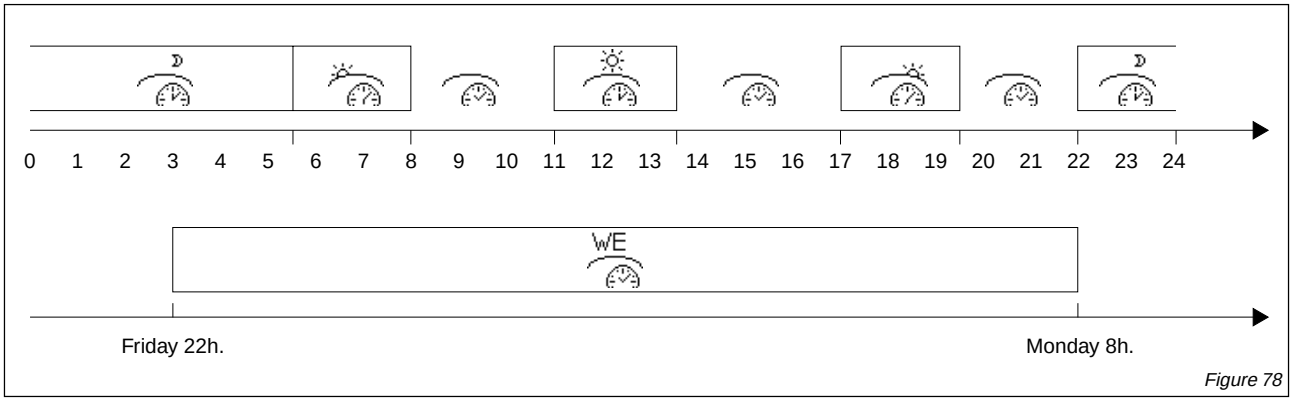


Figure 78

With the KP07 :

- Go directly to the screen concerning the time slot to be modified, enter the parameters described below on the screen (see organisation of screens in KP07chapter).

With the KP02 :

- The slot to be set up must first be defined by the 08 instruction. Enter the information below then return to the 08 instruction to go to the next slot.

DESCRIPTION OF PARAMETERS

Parameters are defined for the time slot. Select by instruction 08 setting.
0 = DAY / 1 = WEEKEND / 2 = NIGHT / 3 = unused / 4 = MORNING / 5 =MIDDAY / 6 = EVENING / 7 = BMS.

Instruction	Description
09	Day of the week of start of setting . From 1 to 7, 1 = Sunday.
10	Hour of start of setting
11	Minutes for start of setting
12	Day of the end of setting
13	Hour of end of setting
14	Minutes of end of setting
15	Setpoint in heating
16	Setpoint in air conditioning
23	Fan operation in regulation zone *. ON on OFF off
24	Fan operation in neutral zone*. ON on OFF off
25	Automatic fan operation in neutral zone*. In this zone after operation in air-conditioning mode, the fan is off. If after one hour the ambient air is still in this zone the fan is started up again.
29	Low noise
30	Instruction used to force operation in the current setting

* The regulation zone is defined for a temperature less than the heating instruction or greater than the air-conditioning instruction. The neutral zone is between these 2 values.

NOTE: The end of the night slot night is defined by the start of the morning slot : this is why there is no need to define the end of the night slot in the table below

Setpoint value for KP02	DAY = 0	WEEK-END = 1	NIGHT = 2	MORNING = 4	MIDDAY = 5	EVENING = 6	BMS = 7
9	-	7	-	-	-	-	-
10	-	22	22	6	12	19	-
11	-	0	0	0	0	0	-
12	-	2	-	-	-	-	-
13	-	6	-	6	12	19	
14	-	0	-	0	0	0	
15	23.0	30.0	30.0	23.0	23.0	23.0	23.0
16	19.0	10.0	10.0	19.0	19.0	19.0	19.0
17	Off	Off	Off	Off	Off	Off	Off
18	0	0	0	0	0	0	0
19	100	100	100	100	100	100	100
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	30.0	30.0	30.0	30.0	30.0	30.0	30.0
22	20	0	0	0	20	20	20
23	On	On	On	On	On	On	On
24	On	Off	Off	Off	On	On	On
25	Off	Off	Off	Off	Off	Off	Off
26	Off	Off	Off	Off	Off	Off	Off
27	Off	Off	Off	Off	Off	Off	Off
28	Off	Off	Off	Off	Off	Off	Off
29	Off	Off	Off	Off	Off	Off	Off
30	Off	Off	Off	Off	Off	Off	Off

ADVANCE ACTIVATION OF THE MORNING SLOT

Depending on the thermal inertia of the building or the installation and external climatic conditions, it is possible to advance the switch from the NIGHT slot to the MORNING slot.

The time advanced, in minutes, is calculated using the following formula :
Time advanced = (gradient start temperature) x inertia coefficient

For example :

- Outside temperature 0 °C
- Gradient start temperature set to + 10°C (i.e. below 10°C outside, you want to advance start-up)
- Inertia coefficient set to 12
- Start of Morning slot set to 8h30

In these conditions the switch to the morning slot will be advanced by : (10 - 0) x 12 i.e. 120 min.
The installation will therefore start up at 6h30 instead of 8h30.

REGULATION OF AMBIENT AIR

Two power factors, one for cooling (variable 98), the other for heating (variable 97), are calculated according to the difference in temperature between the SETPOINT and the reference temperature.
The progression of these cooling or heating power factors is limited by the temperature hysteresis and the activation differentials between 2 stages.
If the hysteresis value is 0, the power factor concerned is no longer limited.
See below for setting hysteresis and activation differentials.

The power factors are periodically recalculated by the CLIMATIC™. The integration time (setpoint 53) is adjustable. This parameter should depend on the air agitation ratio of the unit and temperature variations in the sector to be air conditioned.

ORDER OF COMPONENTS IN REGULATION

Cooling operation

Setpoint 58 = Off
Damper ➔ Water coil ➔ Compressors

Setpoint 58 = On
Damper ➔ Compressors ➔ Water coil

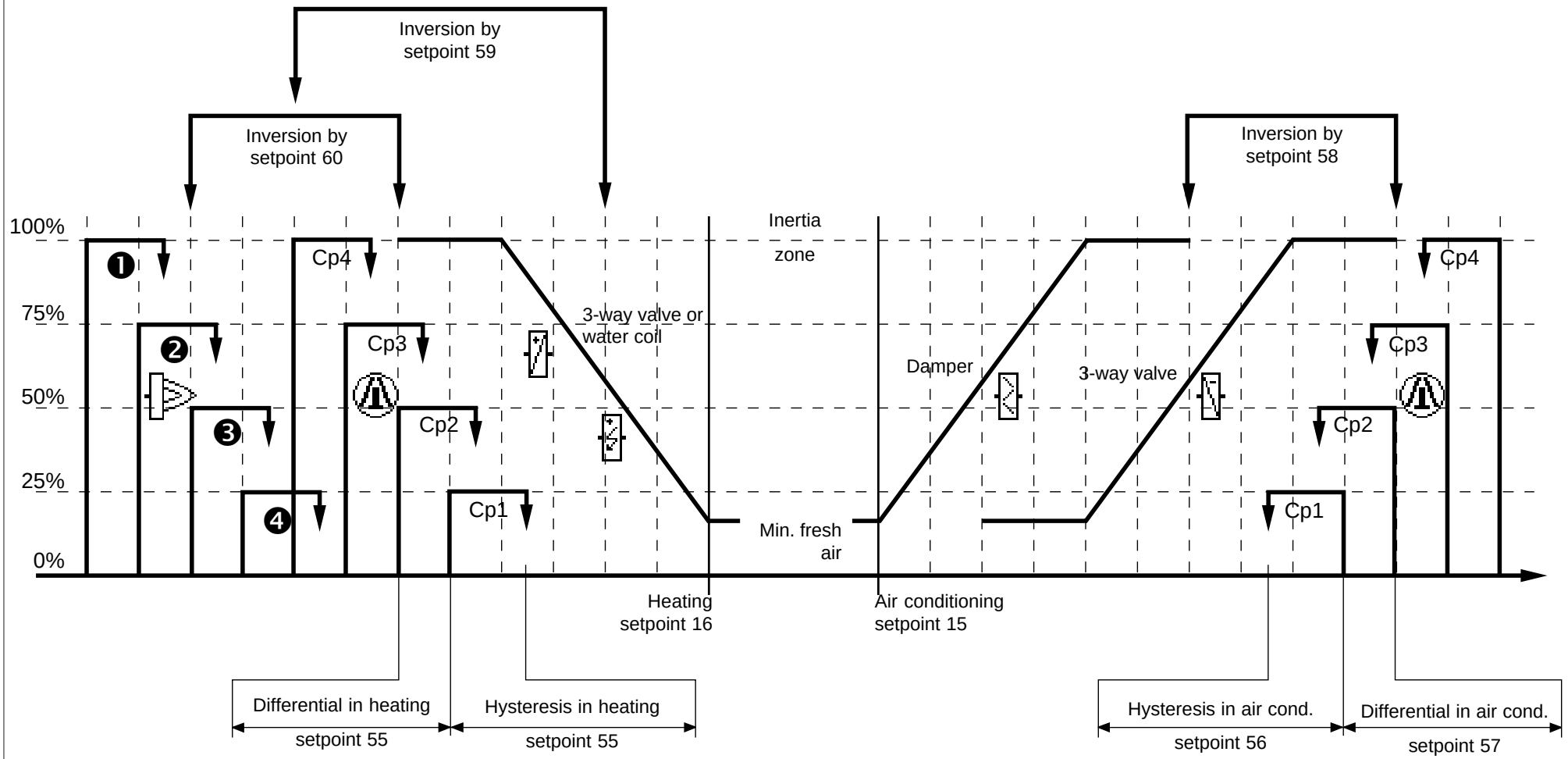
Heating operation

Setpoint 59 = Off
Water coil or electric coil ➔ Compressors ➔ Gas

Setpoint 59 = On
Compressors ➔ Gas ➔ Water coil or electric coil

Setpoint 60 = Off
Water coil or electric coil ➔ Gas ➔ Compressors

Setpoint 60 = On
Water coil or electric coil ➔ Compressors ➔ Gas



❶ : Gas 1+2 High fire

❷ : Gas 1+2 Low fire

❸ : Gas 1 High fire

❹ : Gas 1 Low fire

Cp1...Cp4 : Compressor no. 1...4

Figure 79

REGULATION OF SUPPLY AIR

Supplying air regulation should be activated by setting setpoint 61 to ON.

The main aim of supplying air regulation is to maintain the temperature of supplied air at a value close to the average of the neutral zone, if ambient air regulation is not active.

Two power factors, one for cooling (variable 101), and the other for heating (variable 100), are calculated according to the difference in temperature between the setpoint and the reference temperature.

The power factors are periodically recalculated by the CLIMATIC™. The integration time (setpoint 62) is adjustable

ORDER OF COMPONENTS IN REGULATION

Cooling operation

Setpoint 63 = Off
Damper ➔ Water coil ➔ Compressors

Setpoint 63 = On
Damper ➔ Compressors ➔ Water coil

Heating operation

Setpoint 64 = Off
Water coil or electric coil ➔ Compressors ➔ Gas

Setpoint 64 = On
Compressors ➔ Gas ➔ Water coil or electric coil

Setpoint 65 = Off
Water coil or electric coil ➔ Gas ➔ Compressors

Setpoint 65 = On
Water coil or electric coil ➔ Compressors ➔ Gas

REGULATION IN HUMIDITY

Two power factors, one for dehumidifying (variable 105), the other for humidifying (variable 104), are calculated according to the difference in relative humidity between the setpoint and the reference relative humidity.

The power factors are recalculated periodically by the CLIMATIC™. The integration time is adjustable (setpoint 67).

SETTING THE FRESH AIR MINIMUM

The minimum value for opening the damper to outside air can be set by instruction (see configuration of operating zones). This value is expressed directly as a percentage.

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 17.

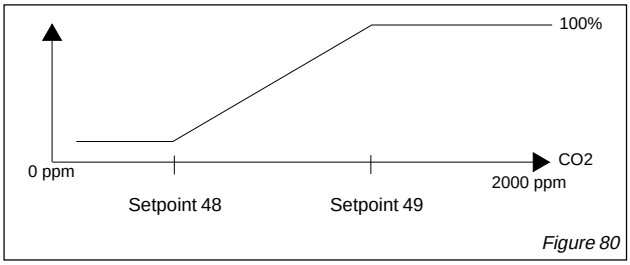


Figure 80

Setpoint 48 defines the number of ppm up to which the fresh air minimum is still achieved. Setpoint 49 defines the number of ppm from which 100% fresh air is used

ENTHALPY FUNCTION

This function is used to control the use of the economiser register according to air enthalpy. If the outside humidity is greater than the inside humidity, the respective enthalpy values are then calculated. According to the result obtained, input of new air is optimised.

COMPRESSOR-RELATED FUNCTIONS

Anti-short cycle

The CLIMATIC™ provides protection of the compressors against frequent restarts. This is why the compressors cannot be started, even if requested to do so by regulation, unless the time since they were last put into operation is greater than six minutes.

Defrost function

For heat pump units and air condensation units, cycle inversion phases are programmed for defrosting the outside coil.

Defrosting is activated depending on :

- outside temperature (limit set by setpoint 85),
- coil temperature (limit set by setpoint 86),
- with overall weighting by an icing constant (setpoint 87).

DIAGRAM REFERENCE LEGEND

B1	Compressor 1
B3	Motor supply air blower
B4	Motor condenser fan
C1	Capacitor condenser fan motor
C4	Capacitor supply air blower
CB3	Circuit breaker - electric heat
CB4	Circuit breaker - unit
F1	Fuse transformer T1
HR1	Crankcase heater compressor 1
HE1	Element - Electric heat 1
HE2	Element - Electric heat 2
K1	Contactor compressor
K3	Contactor blower
K11	Relay night setback
K15	Electric heat
K43	Relay - econo heat
S4	Switch limit high pressure
S11	Switch pressure low ambient
S15	Switch - limit electric heat
S24	Switch loss of charge
T1	Transformer 24V control
TB1	Terminal Block low voltage (24V)
TBM	Terminal block mains 5 pole

INSTALLER WIRING

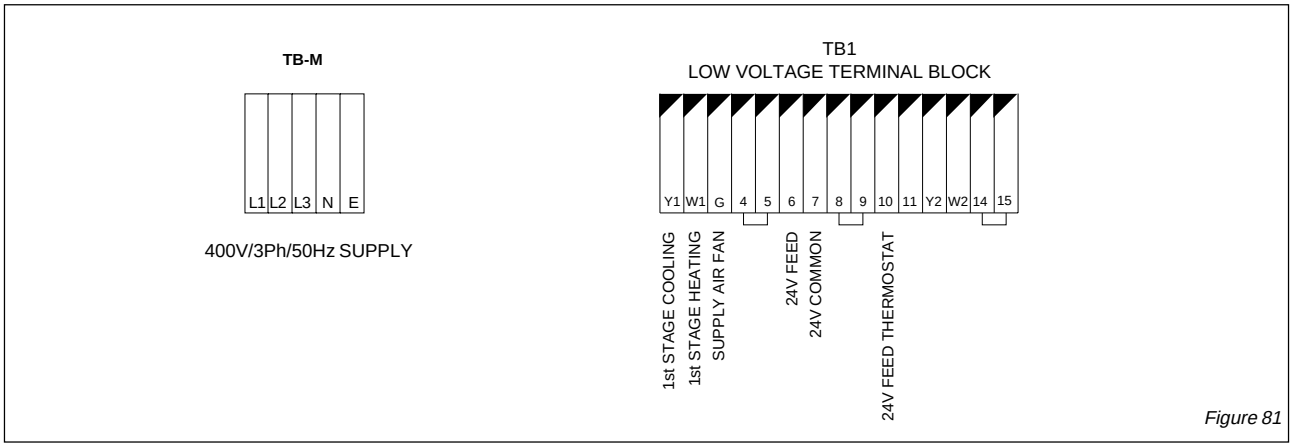


Figure 81

HIGH VOLTAGE WIRING

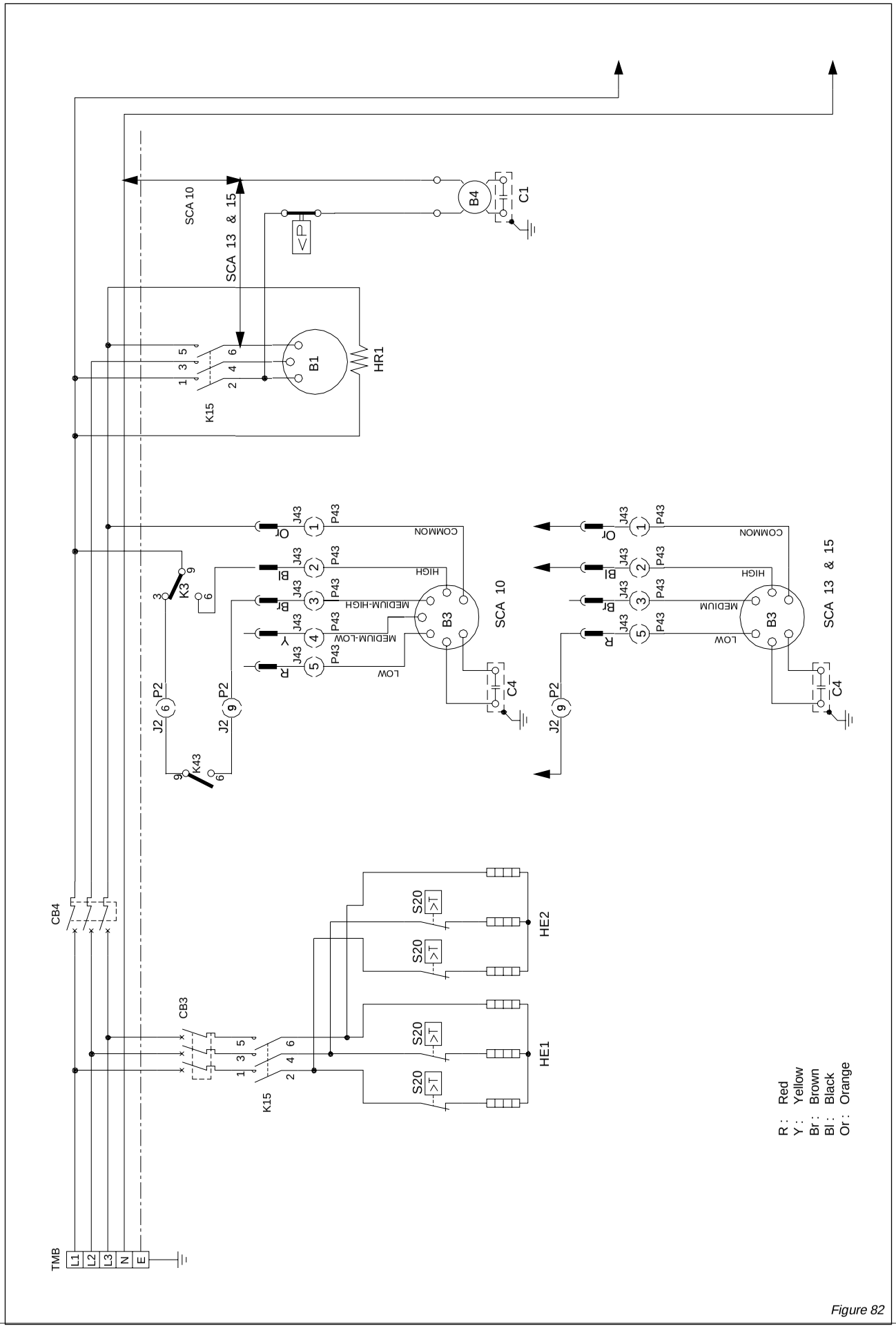


Figure 82

24V CONTROL WIRING

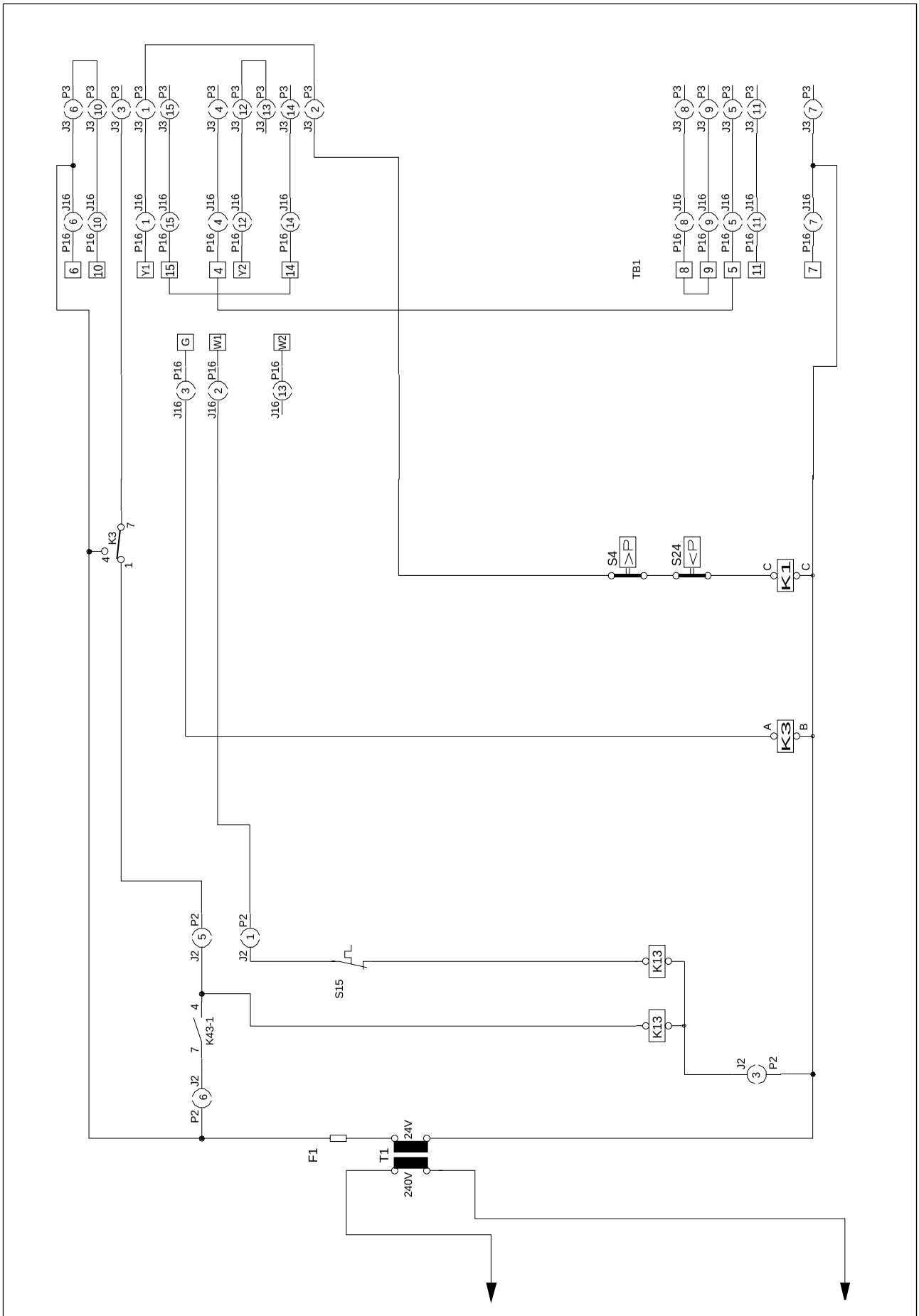


Figure 83

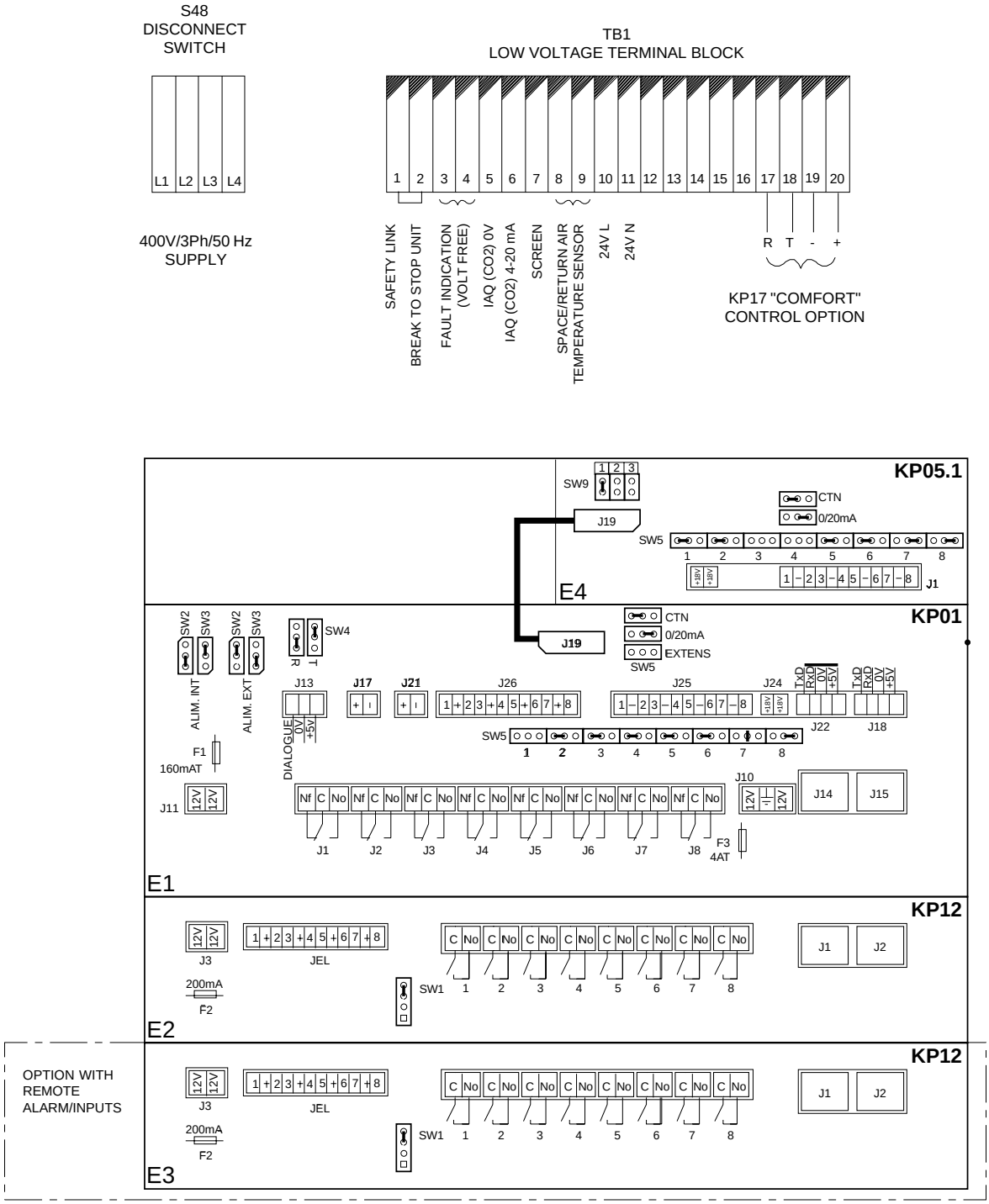
DIAGRAM REFERENCE LEGEND

A3	Control - burner 1
A12	Control - burner 2
A17	Control - DAD smoke detector
B1	Compressor 1
B2	Compressor 2
B3	Motor - indoor fan
B4	Motor - outoor fan 1
B5	Motor - outoor fan 2
B6	Motor - combustion air fan 1
B7	Motor - economiser actuator (option)
B10	Motor - exhaust fan 1
B11	Motor - exhaust fan 2
B13	Compressor 3
B15	Motor - combustion air fan 2
B20	Compressor 4
B21	Motor - outdoor fan 3
B22	Motor - outdoor fan 4
C1	Capacitor - outoor fan 1
C2	Capacitor - outoor fan 1
C3	Capacitor - combustion air fan 1
C6	Capacitor - exhaust fan 1
C8	Capacitor - exhaust fan 2
C11	Capacitor - combustion air fan 2
C18	Capacitor - outoor fan 3
C19	Capacitor - outoor fan 4
CB1	Circuit breaker - compressor 1
CB2	Circuit breaker - compressor 2
CB3	Circuit breaker - indoor fan
CB8	Circuit breaker - transformer T1
CB10	Circuit breaker - outdoor fans
CB14	Circuit breaker - compressor 3
CB146	Circuit breaker - compressor 4
E1	Control - KP01 master module
E2	Control - KP12 digital input/output module
E3	Control - KP12 optional input/output module
E4	Control - KP05 analogue input module
F1	Fuse - T1 24V, 10A
F2	Fuse - T1 12V, 2.5A
F3	Fuse - T1 12V, 0.5A
F4	Fuse - T1 230V, 0.25A
GV1	Valve - gas burner 1
GV3	Valve - gas burner 2
HE1	Element - electric heat 1
HE2	Element - electric heat 2
HE3	Element - electric heat 3
HE4	Element - electric heat 4
HE5	Element - electric heat 5
HE6	Element - electric heat 6
HR1	Heater - crankcase compressor 1
HR2	Heater - crankcase compressor 2
HR3	Heater - crankcase compressor 3
HR4	Heater - crankcase compressor 4
K1	Contactor - compressor 1
K2	Contactor - compressor 2
K3	Contactor - indoor fan motor
K10	Contactor - outdoor fans 1 & 2
K12	Relay - gas valve prove, burner 1
K13	Relay - combustion fan 1
K14	Contactor - compressor 3
K15	Contactor - Electric heat 1
K16	Contactor - Electric heat 2
K17	Contactor - Electric heat 3
K18	Contactor - Electric heat 4
K19	Relay - combustion fan 2
K20	Relay - gas valve prove, burner 2
K65	Contactor - exhaust fan 1 & 2
K68	Contactor - outdoor fans 3 & 4
K146	Contactor - compressor 4
L1	Solenoïd - Reversing valve 1
L2	Solenoïd - Reversing valve 2
PS1	Sensor - fan/filter pressure (option)
RH1	Sensor - outdoor air enthalpy
RH2	Sensor - return air enthalpy
RT6	Sensor - discharge air temperature
RT16	Sensor - space/return air temperature
RT17	Sensor - outdoor air temperature
RT46	Sensor - defrost, compressor 1
RT 49	Sensor - freeze, compressor 1
RT 50	Sensor - freeze, compressor 2
RT 53	Sensor - freeze, compressor 3
RT 95	Sensor - freeze, compressor 4
RT107	Sensor - defrost, compressor 2
SD1	Sensor - smoke detector
S4	Switch - high pressure, compressor 1
S5	Switch - high temperature compressor 1
S7	Switch - high pressure, compressor 2
S8	Switch - high temperature compressor 2
S10	Switch - primary limit, burner 1
S11	Switch - low ambient pressure, compressor 1
S15	Switch - primary limit, electric heat 1
S18	Switch - combustion air prove, burner 1
S20	Switch - secondary limit, electric heat
S21	Switch - secondary limit, burner 2
S28	Switch - high pressure, compressor 3
S29	Switch - high temperature compressor 3
S45	Switch - combustion air prove, burner 2
S47	Switch - flame rollout 1
S48	Switch - main disconnect
S69	Switch - flame rollout 2
S84	Switch - low ambient pressure, compressor 2
S85	Switch - low ambient pressure, compressor 3
S87	Switch - low pressure, compressor 1
S88	Switch - low pressure, compressor 2
S93	Switch - high temperature, compressor 4
S94	Switch - low ambient pressure, compressor 4
S96	Switch - high pressure, compressor 3
S97	Switch - low pressure, compressor 4
S98	Switch - low pressure, compressor 3
S99	Switch - primary limit, burner 2
S100	Switch - secondary limit, burner 2
S107	Switch - primary limit, electric heat 2
T1	Transformer - controls
T18	Transformer - combustion air fans
TB1	Terminal block,customer controls
TB34	Terminal block,transformer T1

UNIT JACK-PLUG CONNECTORS

J1/P1	Jack/plug - combustion fan 1
J3/P3	Jack/plug - damper motor (option)
J13/P13	Jack/plug - combustion fan 2
J15/P15	Jack/plug - burner 1
J28/P28	Jack/plug - burner 2
J35/P35	Jack/plug - low ambient 1
J36/P36	Jack/plug - low ambient 2
J64/P64	Jack/plug - fan/filter pressure sensor (option)
J101/P101	Jack/plug - smoke detector option
J135/P135	Jack/plug - secondary limit burner 1
J141/P141	Jack/plug - secondary limit burner 2

INSTALLER WIRING

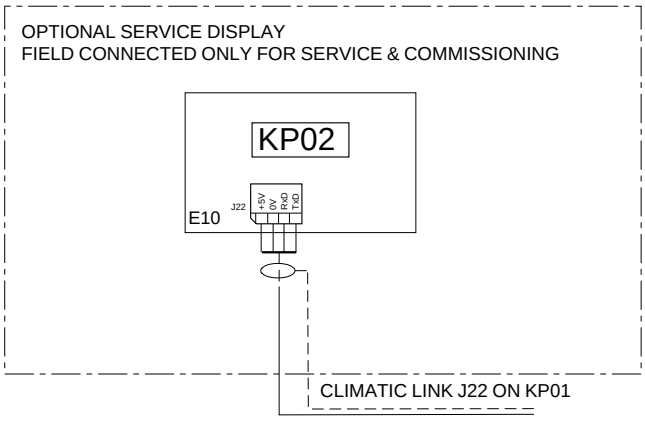


KP17 connection via screened pairs
KP02 provided with own connection wire+plug
CO2 sensor - 4 core screened cable required
Temperature sensor connections via one screened pair
All cabling shall be minimum 0,5 mm².

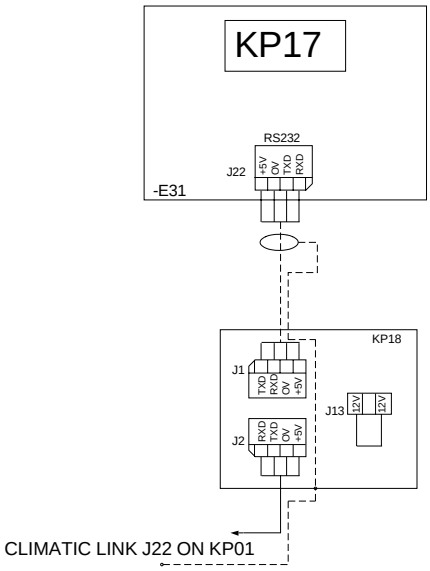
Figure 84

CONTROLLER

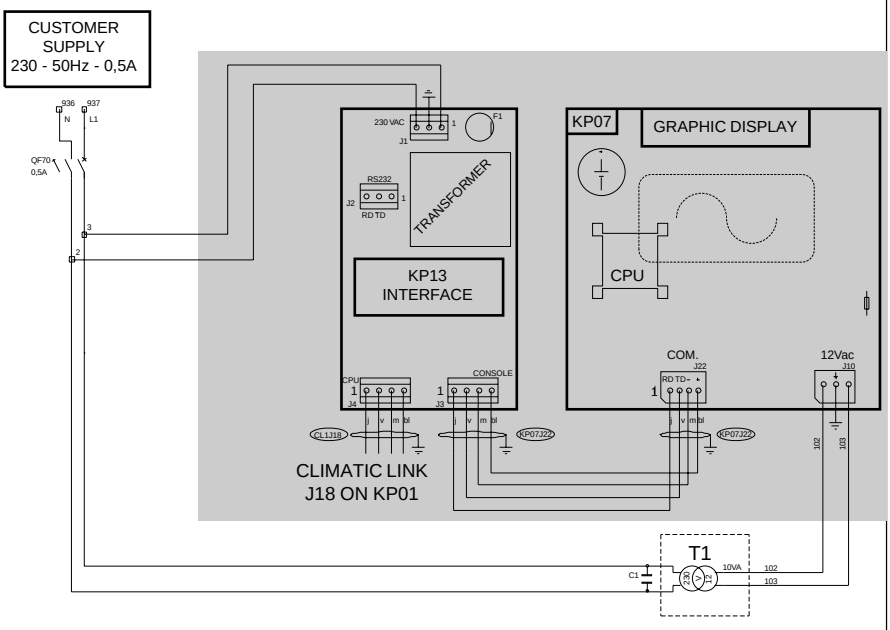
KP02 MAINTENANCE



KP17 COMFORT



KP07 REMOTE



COMPRESSORS AND FANS

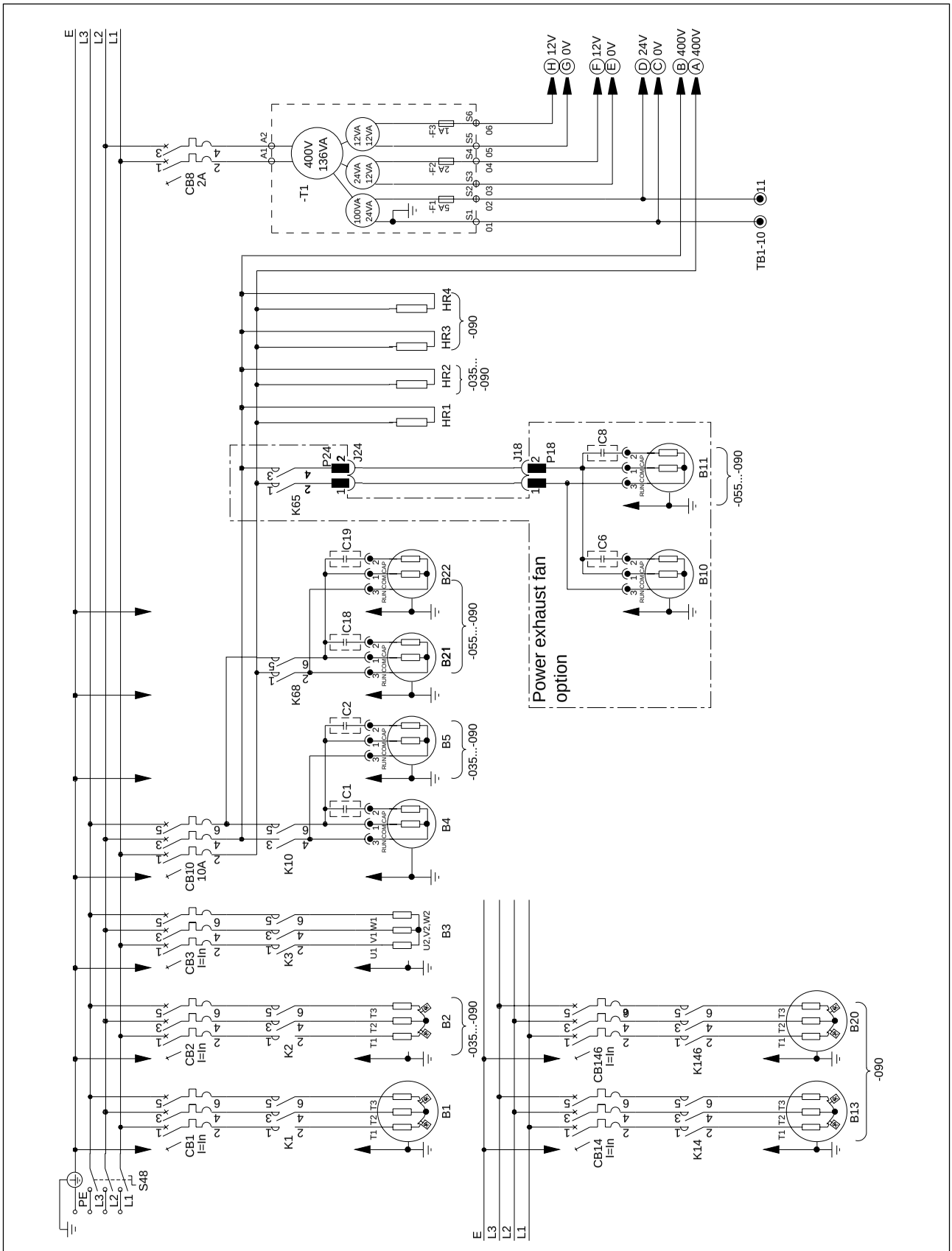
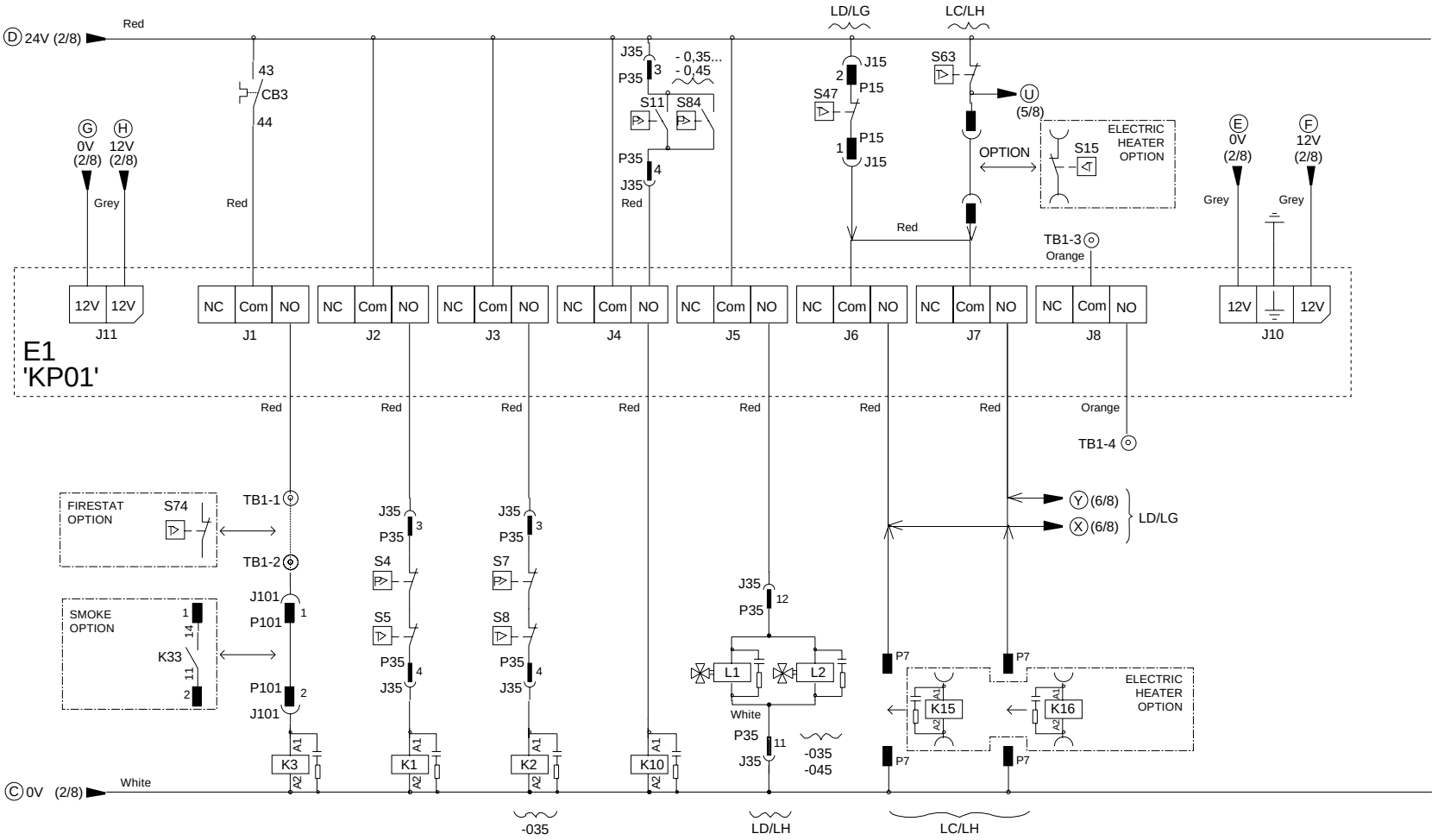


Figure 85



NC : Normally closed
Com : Common
NO : Normally opened

Figure 86

THERMOSTAT / SENSOR INPUT

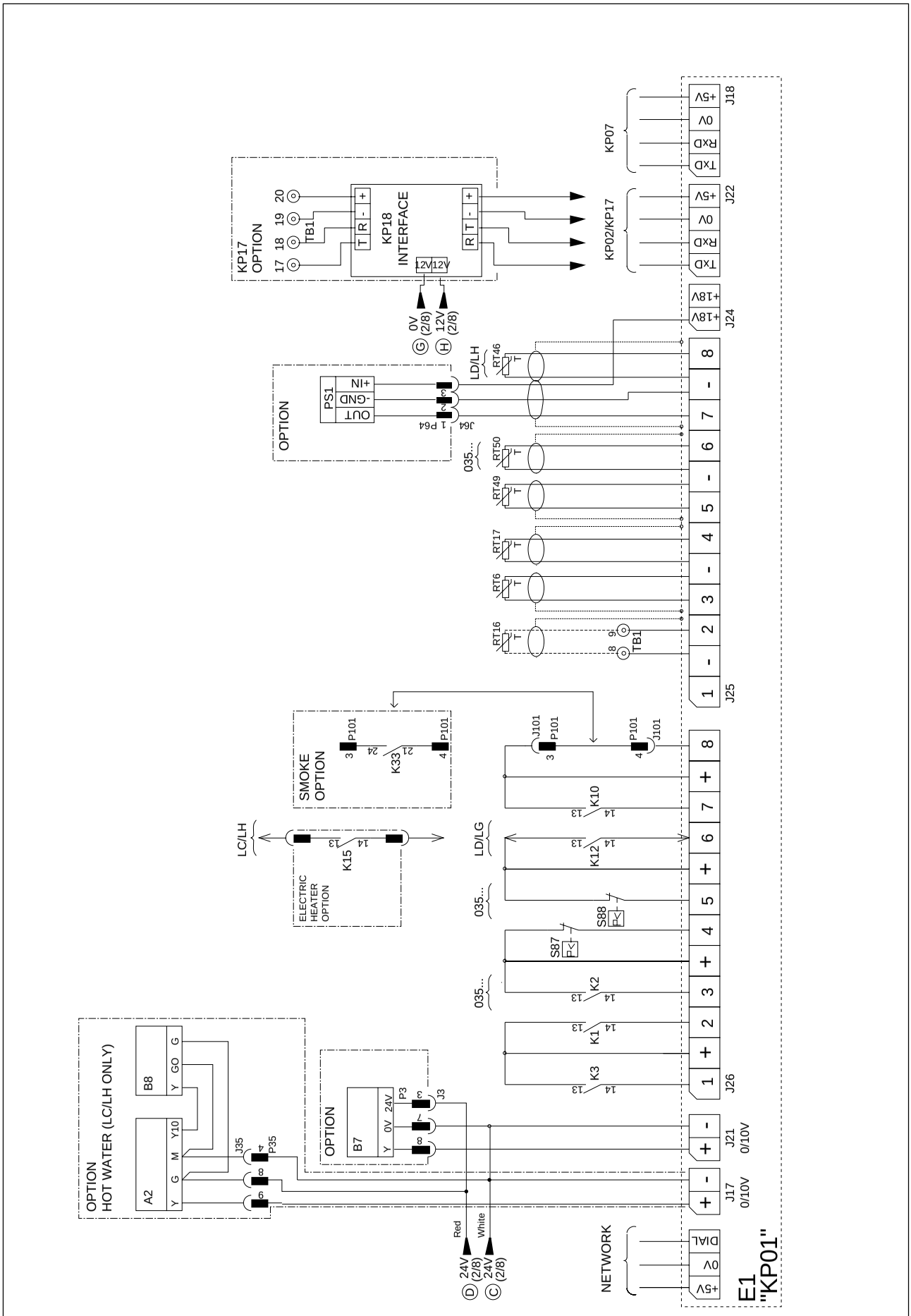


Figure 87

WIRING DIAGRAMS

AUX. CONTROL INPUTS AND OUTPUTS

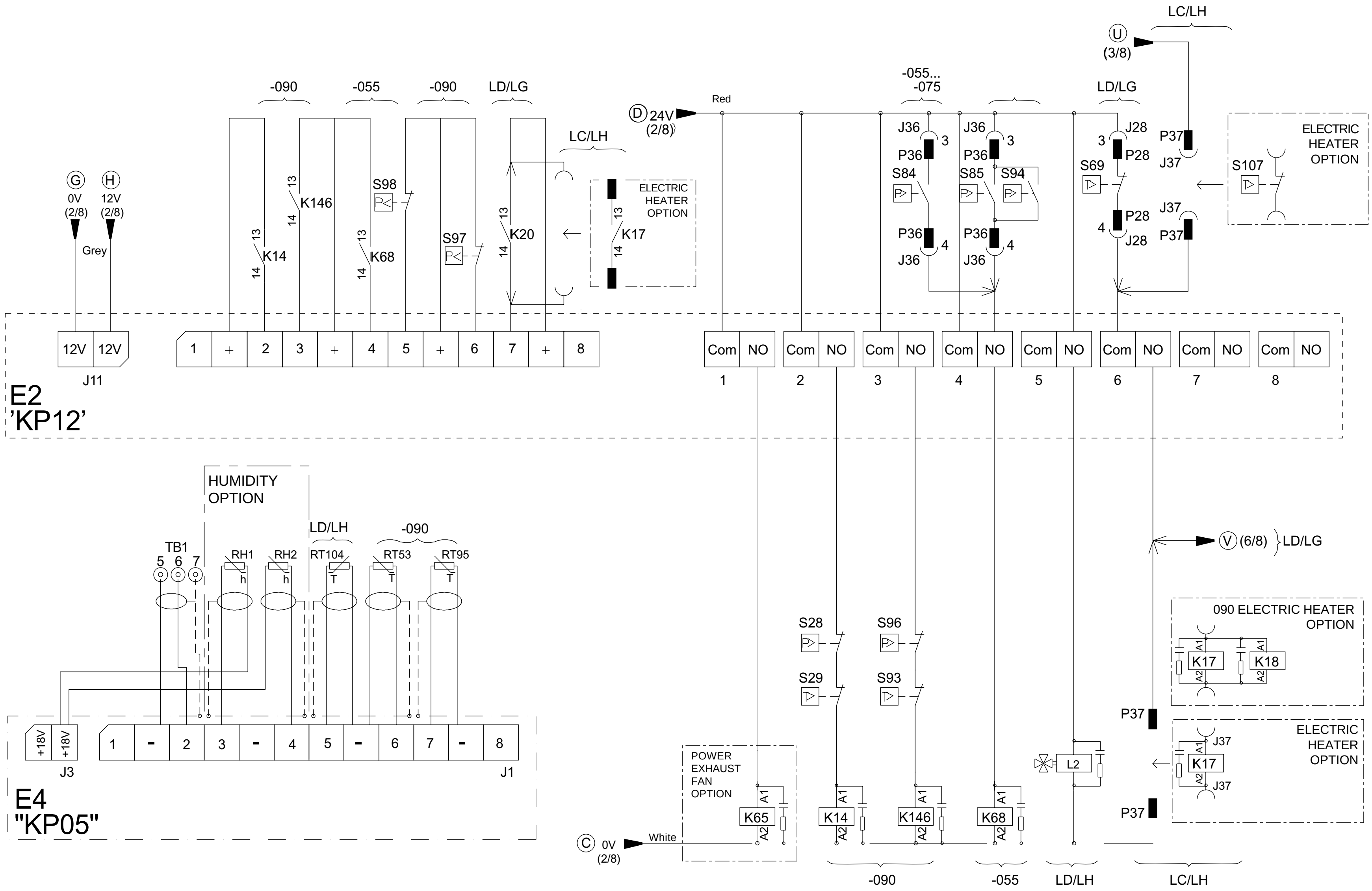


Figure 88

GAS HEAT

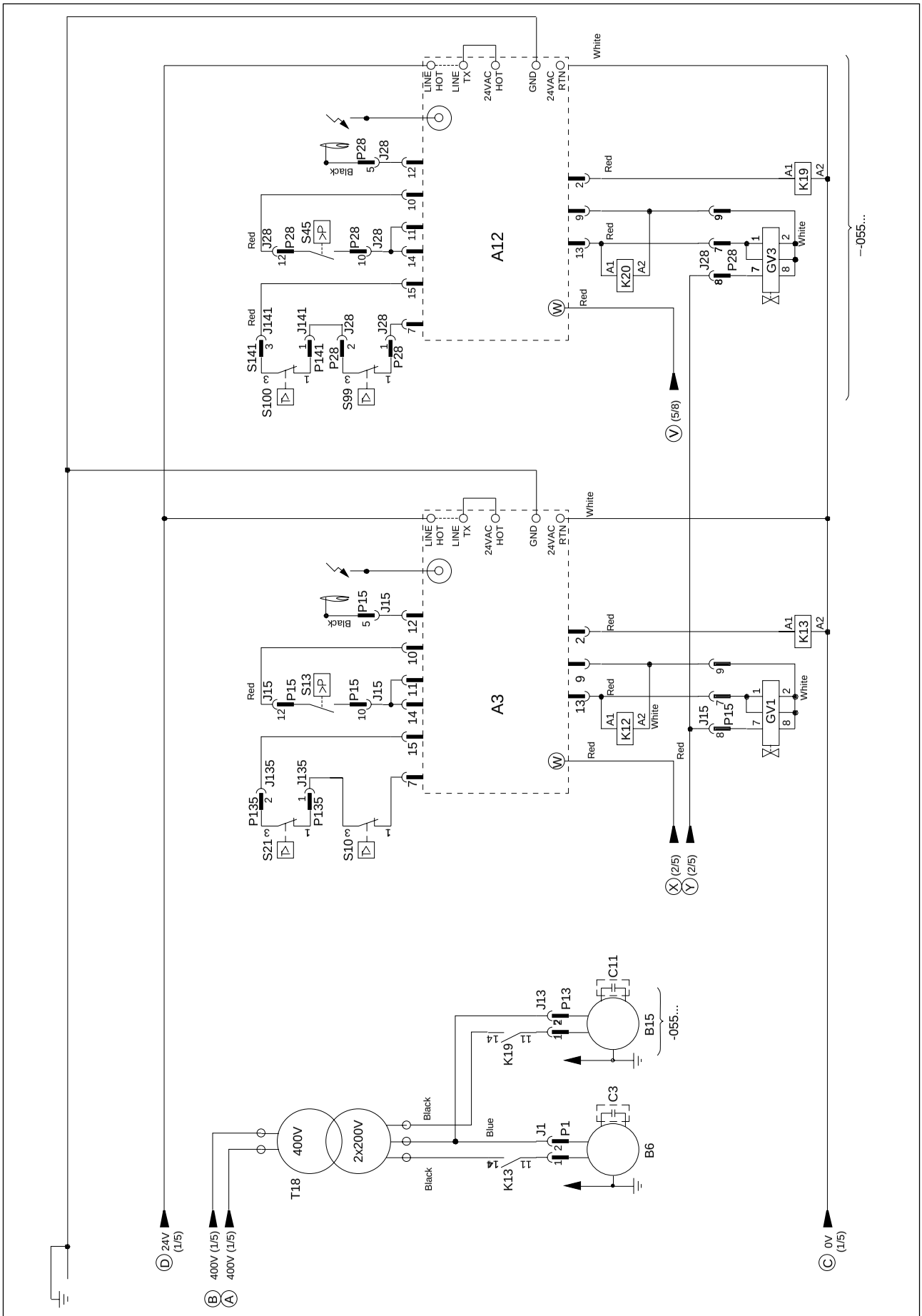
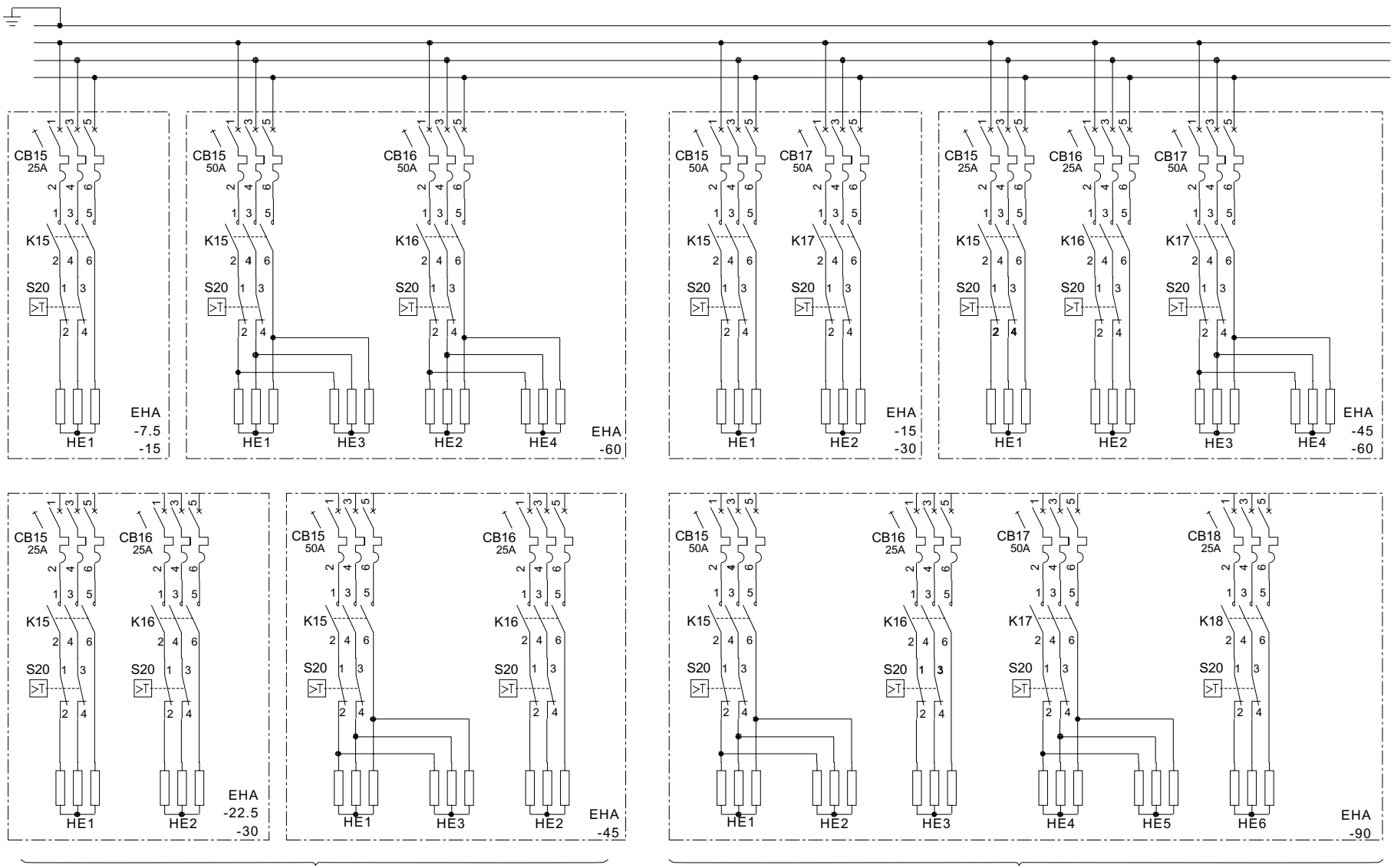


Figure 89



EHA = ELECTRIC HEATER

Figure 90

SMOKE OPTION

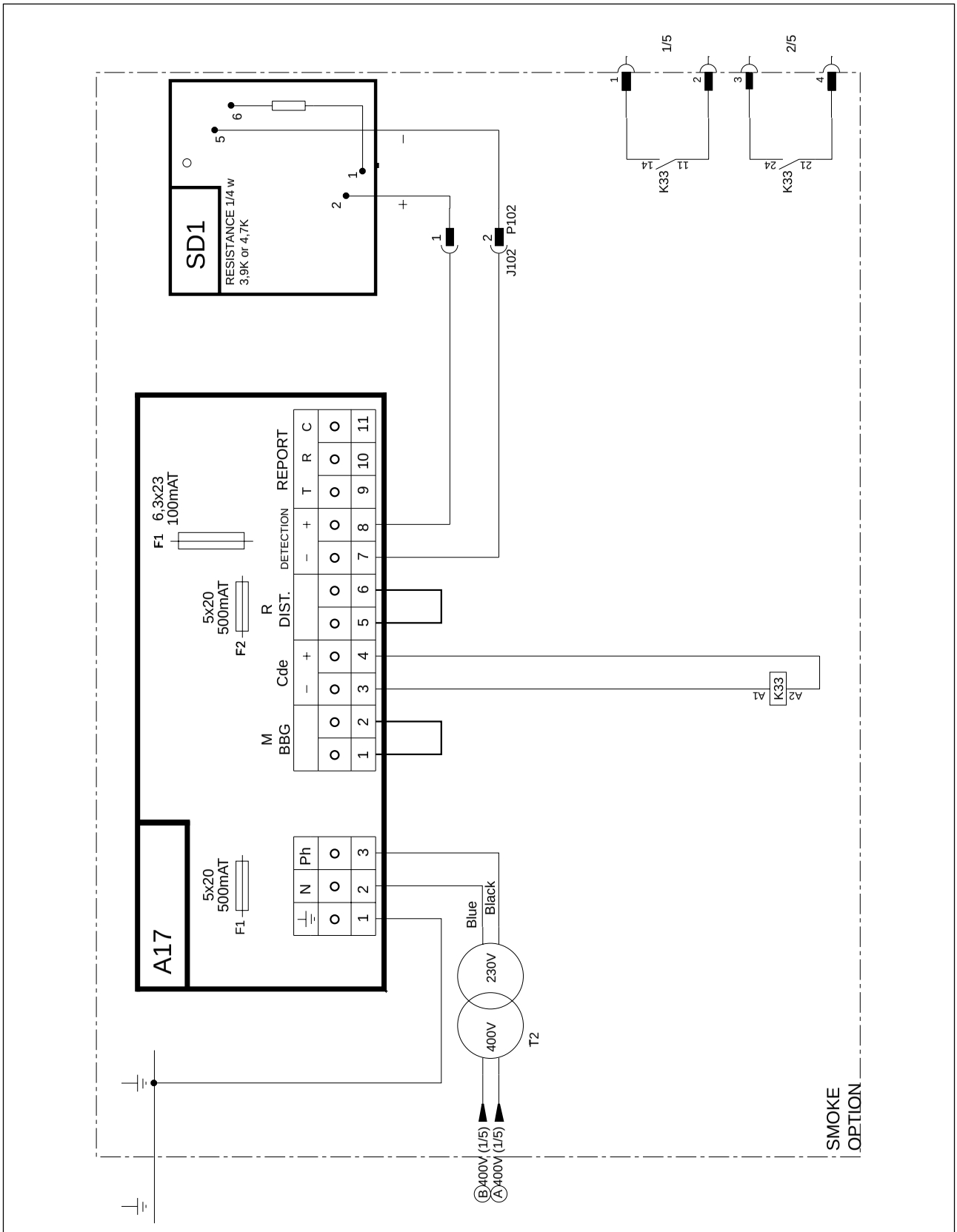


Figure 91

000	No error
Pb com	Communication error

001	Failure air flow
004	Dirty filters
005	Missing filters
011	Faulty electrical heater batteries
012	Supply air overtemperature
013	Temperature too low
014	Faulty gas burner no. 1
015	Faulty gas burner no. 2
022	Supply temperature too low
023	Room overtemperature
031	Faulty humidifier
032	Room humidity too low
033	Room overtemperature
041	Faulty pump
081	Faulty return air or room temperature sensor
082	Faulty return air or room relative humidity sensor
083	Faulty outside temperature sensor
084	Faulty outside relative humidity sensor
085	Faulty supply air temperature sensor
086	Faulty cold water loop temperature sensor
087	Faulty water condenser outlet temperature sensor
091	Faulty blower fan
092	Faulty condenser : system 1 or 2
093	Faulty condenser : system 3 or 4
094	Customer error
096	Condensor water temperature too low
097	Condensor water overtemperature
098	Faulty water flow
099	Error : smoke
111	Faulty condenser temperature sensor no. 1
112	Faulty pressure transmitter no. 1
113	Faulty frost temperature sensor no. 1
115	Faulty high pressure or faulty electrical power compressor no. 1
117	Faulty low pressure compressor no. 1
121	Faulty condenser temperature sensor no. 2
122	Faulty pressure transmitter no. 2
123	Faulty frost temperature sensor no. 2
125	Faulty high pressure or faulty electrical power compressor no. 2
127	Faulty low pressure compressor no. 2
131	Faulty condenser temperature sensor no. 3
132	Faulty pressure transmitter no. 3
133	Faulty frost temperature sensor no. 3
135	Faulty high pressure or faulty electrical power compressor no. 3
137	Faulty low pressure compressor no. 3
141	Faulty condenser temperature sensor no. 4
142	Faulty pressure transmitter no. 4
143	Faulty frost temperature sensor no. 4
145	Faulty high pressure or faulty electrical power compressor no. 4
147	Faulty low pressure compressor no. 4

The following text includes references such as **[C11]** and **[V25]**. They relate to the threshold or variable numbers used with the KP02 unit.

001

Wrong Air Flow

If the pressure differential obtained by the analog sensor **[V16]** is less than the setpoint value **[C92]** for more than 20 seconds, and if the blower fan has operated for more than 1 minute 30 seconds, the air flow safety system is activated and stops the ventilation.
The air flow safety system automatically stops after 1 minute 30 seconds and is automatically locked out after 3 cut-outs in the same day. In this case a manual reset is obligatory. The cut-out counter is reset to zero every evening at 20:00 if the value does not exceed 3 failures.

004

Dirty Filters

If the pressure differential obtained by the analog sensor **[V16]** is greater than the setpoint value **[C94]** for more than one minute, the CLIMATIC indicates that the filters are dirty. The unit is not stopped.

005

Missing Filters

If the pressure differential obtained by the analog sensor **[V16]** is less than the setpoint value **[C90]** for more than one minute, the CLIMATIC indicates that the filters are missing. The unit is not stopped.

SUPPLY AIR TEMPERATURE SAFETY SYSTEM

Supply Air Overtemperature Limit

1st Safety Level
If the supply air temperature is greater than or equal to the setpoint **[C74]**, the heat control system starts to reduce progressively. The control cycle will recommence normal operation for a temperature lower than 3°C below this setpoint.

012

2nd Safety Level
If the supply air temperature is greater than or equal to the setpoint **[C75]**, the safety system is activated. The safety system automatically stops at a temperature lower than 3°C below this setpoint.

Supply Air Temperature Too Low

1st Safety Level
If the supply air temperature is greater than or equal to the setpoint **[C71]**, the cold control system starts to reduce progressively. The control cycle will recommence normal operation for a temperature in excess of 3°C above this setpoint.

2nd Safety Level
If the supply air temperature is less than or equal to the setpoint **[C72]**, the unit automatically positions its fresh air damper to the all air recycled position and cuts out cold production. This safety level automatically stops at a temperature in excess of 3°C above this setpoint.

3rd Safety Level

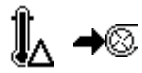
022

If the supply air temperature is less than or equal to the setpoint **[C73]** for more than 15 minutes and for 15 minutes after the fan has started, the "supply air temperature too low" safety system is activated. The unit shuts down completely.

This safety system cuts out if the supply air temperature is greater than 3°C above this setpoint. It is automatically maintained after 3 cut-outs in the same day, and in this case a manual reset is obligatory. The cut-out counter is reset to zero every evening at 20:00 if the value does not exceed 3 failures.

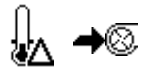
NOTE : If a unit has a hot water battery, the temperature setpoint value is fixed at +6°C and the register time set to 5 seconds. In addition, if the antifreeze thermostat is opened, the 3rd safety level is immediately automatically maintained. In this case, manual resetting of the thermostat followed by the CLIMATIC is obligatory

Room Overtemperature Safety System

023 

Upper Room Air Limit

If the room temperature is greater than or equal to the setpoint **[C41]**, the safety system is activated. It automatically cuts out at a temperature lower than 3°C below this setpoint.

013 

Lower Room Air Limit

If the room temperature is less than or equal to the setpoint **[C40]**, the safety system is activate

Faulty Electrical Heater Batteries

011 

The electrical heater battery safety thermostats act directly on the heater stage contactors. This information is fed to the CLIMATIC via auxiliary contacts.
If the CLIMATIC gives the order to the heater to operate and if 5 seconds later the auxiliary contact is still open, the heat safety system is activated and stops the electrical heater assembly. This safety system is automatically locked-out. In this case a manual reset is obligatory.
Note : This fault is also displayed in the event of a contact "shunt".

014 

015 

Faulty Gas Burners

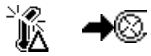
If there is a fault with the gas control boxes the heat safety system is activated and stops the respective burner.
This safety system automatically cuts out on the CLIMATIC and the control unit must be manually reset.

Faulty Pump

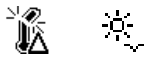
041 

The internal protection of the water pump motor acts directly on the pump contactor. This information is transmitted to the CLIMATIC™ via an auxiliary contact of the contactor.
If the CLIMATIC gives the pump the order to operate and if 5 seconds later the auxiliary contact remains open, the safety system is activated and stops the pump.
The safety system is immediately automatically locked out. In this case, manual resetting is obligatory.
Note: This error is also displayed in the event of a "shunt" of the auxiliary contact of the contactor.

Sensor Status

081  Room temperature sensor missing or faulty.

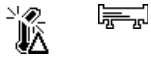
082  Room relative humidity sensor missing or faulty

083  Outside air temperature sensor faulty

084  Outside relative humidity sensor faulty

085  Supply Air temperature sensor faulty

086  Temperature sensor on cold water loop faulty

087  Temperature sensor on condenser water outlet faulty.

NOTE :
Missing or faulty room, supply air or outside air temperature sensors can affect the overall control system. A safety device will be activated and all equipment except for the ventilation will cut out. Failure of the other sensors will only stop the equipment involved.

089

Faulty inter card link

The inter card link is faulty or missing.

Faulty blower fan

The fan contactor is not connected although the CLIMATIC requests it.

- The thermostat fire safety mechanism, or the fire insertion, is open.
- The internal protection of the blower fan motor is open.

091 

The fire detector and the fan motor internal protection act directly on the fan motor contactor. This information is transmitted to the CLIMATIC via an auxiliary contact of the contactor. If the CLIMATIC gives the order to operate to the fan and if the auxiliary contact is still open 5 seconds later, the fan safety system is activated and stops the unit.
The safety system is immediately automatically locked out. In this case, manual resetting is obligatory.
If a unit is fitted with an all-or-nothing servomotor-powered damper, the detection time extends to 2 minutes (FLEXY™ only)*
Note: This error is also displayed in the event of a "shunt" of the auxiliary contact of the contactor.

Faulty ventilation, condenser circuit 1 or 2

092 

The fan contactor is not connected although the CLIMATIC requests it.
The fan motor internal protection acts directly on the fan motor contactor. This information is transmitted to the CLIMATIC via an auxiliary contact of the contactor.
If the CLIMATIC gives the order to operate to the fan and if the auxiliary contact is still open 5 seconds later, the fan safety system is activated and stops the condenser fan and the compressors concerned.
The safety system is immediately automatically locked out. In this case, manual resetting is obligatory.

Faulty ventilation, condenser circuit 3 or 4.

093 

The fan contactor is not connected although the CLIMATIC™ requests it.
The fan motor internal protection acts directly on the fan motor contactor. This information is transmitted to the CLIMATIC via an auxiliary contact of the contactor.
If the CLIMATIC gives the order to operate to the fan and if the auxiliary contact is still open 5 seconds later, the fan safety system is activated and stops the condenser fan and the compressors concerned.
The safety system is immediately automatically setpoint. In this case, manual resetting is obligatory.

* : FLEXY™ is an other range of ROOFTOP. For more informations, please consult your regional office

094 

Customer error
A fault has been detected, external to the unit.

WATER HEAT EXCHANGER OUTLET TEMPERATURE SAFETY SYSTEM.

Condenser Water Temperature Too Low

096 

If the temperature of the water loop is less than or equal to the preset setpoint **[C89]** during the operation of one of the compressors, the condenser safety mechanism is applied. The compressors are stopped.
This safety mechanism automatically cuts out if the loop temperature exceeds 4°C from this setpoint.
It is also automatically locked out after 3 failures within a day. In this case, manual resetting is obligatory. The counter is reset to zero every evening at 20:00 if its value does not exceed 3 failures.

Condenser Water Temperature Too High

096 

The temperature of the water loop is greater than or equal to the preset setpoint **[C90]** during the operation of one of the compressors, the condenser safety mechanism is applied. The compressors are stopped.
This safety mechanism automatically cuts out if the loop temperature is less than 4°C from this setpoint.
It is also automaticallylocked out after 3 failures within a day. In this case, manual resetting is obligatory. The counter is reset to zero every evening at 20:00 if its value does not exceed 3 failures.

Faulty Water Flow

098 

If the contact of the water flow controller is open for more than 20 seconds, the condenser safety mechanism is applied. The compressors are stopped.
This safety mechanism automatically cuts out if the loop temperature is less than 4°C from this setpoint.
It is also automatically locked out after 3 failures within a day. In this case, manual resetting is obligatory. The meter is reset to zero every evening at 20:00 if its value does not exceed 3 failures.

Error : Smoke

099 

If the contact closes due to the smoke detector card, the smoke safety mechanism is activated.
The unit is completely shut down and the fresh air louver is set to the fresh air position.
This safety mechanism is automaticallylocked out. In this case, manual resetting is obligatory.

Refrigeration system faults

111		①
121		②
131		③
141		④

Faulty condenser temperature sensor

112		①
122		②
132		③
142		④

Faulty pressure transmitter sensor, refrigeration system

113		①
123		②
133		③
143		④

Faulty refrigeration system, frost temperature sensor

High pressure switch safety or compressor electrical safety

115		①
125		②
135		③
145		④

The compressor contactor is not connected although the CLIMATIC requests it.

- The high pressure pressostat is open.
- The internal protection of the compressor motor is open.

The high pressure pressostat and the compressor motor thermal protection act directly on the compressor contactor. This information is transmitted to the CLIMATIC via an auxiliary contact of the contactor.
If the CLIMATIC gives the order to operate to the compressor and if the auxiliary contact is still open 5 seconds later, the fan safety system is activated and stops the compressor.The safety system automatically cuts out after 4 minutes.
It is also automatically locked out after 3 failures within a day. In this case, manual resetting is obligatory. The counter is reset to zero every evening at 20:00 if its value does not exceed 3 failures.

Faulty low pressure compressor

117		①
127		②
137		③
147		④

If the low pressure pressostat is open and the compressor has been operating for more than 2 minutes, the low pressure safety system is activated and stops the compressor. This safety system is not taken into account during the defrost cycle for the heat pump units.
The compressor is engaged when the pressostat contact closes.
It is also automatically locked out after 3 failures within a day. In this case, manual resetting is obligatory. The counter is reset to zero every evening at 20:00 if its value does not exceed 3 failures.

The unit should be inspected at least once a year by a qualified service technician.

LUBRICATION

All motor bearings are prelubricated. No further lubrication is required.

FILTERS

Filters should be checked monthly and cleaned or replaced

OUTDOOR COIL

1. Check and clean coil if necessary.
2. Check connecting lines for evidence of oil leaks.

INDOOR COIL

1. Check and clean coil if necessary.
2. Check connecting lines for evidence of oil leaks.
3. Check condensate drain pan and line, clean if necessary.

ELECTRICAL

1. Check all wiring both factory and field for loose connections.
2. Check for correct voltage at unit (unit operating).
3. Check amp-draw on both outdoor fan motor and blower motor.

Regular maintenance of your Rooftop will extend its operating life and reduce operating faults. We recommend that the unit is serviced by a trained refrigeration engineer. A log book kept near the equipment detailing work carried out, by whom and when, is an excellent diagnostic tool.
The panel opening key is required for this work (see "TRANSPORT" page 3).

MOTOR-FAN ASSEMBLY

After 50 operating hours check the belt tension and the pulley screws for tightness. Repeat this check every two months.
The fans contain bearings that are "lubricated for life", but we recommend replacing them every 10,000 operating hours.
During this inspection, check the condition of the anti-vibration mounts, by looking for any cracks or signs of abnormal wear.

FILTERS

The filters fitted as standard are manufactured with a washable and recyclable material. The CLIMATIC indicates if they are blocked. The cleaning schedule is directly related to the environment in which the equipment is operated. However, monthly cleaning is recommended. A blocked filter will reduce the performance and reliability of the Rooftop.
After removing the filters, remove any dust and wash them in a tepid water solution with a little liquid detergent. After rinsing in fresh water, leave the filters to dry. Take all necessary precautions during operation to avoid damaging or piercing the media, as this would require the damaged cell to be replaced.
NOTE : The equipment must never be operated with the filters removed.
To avoid prolonged shutdown, always keep a spare filter set.

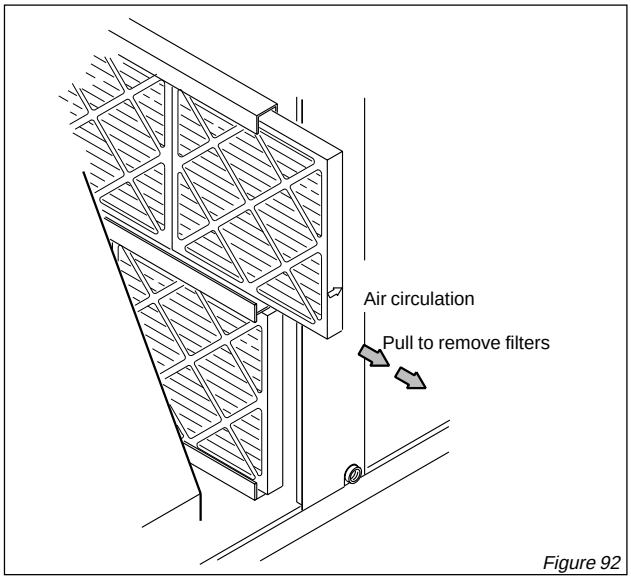


Figure 92

BURNERS (LG_/LD_ UNITS)

1. Periodically examine burner flames for proper appearance during the heating season.
2. Before each heating season examine the burners for any deposits or blockage which may have occurred.
3. Clean burners as follows:

   a - Turn off both electrical power and gas supply to unit.

   b - Open access panel to burner compartment.

   c - Remove burner retaining bracket and lift burners from orifices.

   d - Clean as necessary and replace burners. Refit retaining brackets. Make sure that burner heads line up correctly. Spark gap on ignition electrode must be properly set. Refer to Heating Adjustment section. Replace access panel.

Restore electrical power and gas supply.
Follow lighting instructions attached to unit and use inspection port in access panel to check flame.

COMBUSTION AIR FAN (LG/LD UNITS)

A combustion air fan proving switch checks combustion air fan operation before allowing power to the gas controller. Gas controller will not operate if blower is obstructed.
Under normal operating conditions, the combustion air fan wheel should be checked and cleaned prior to the heating season. However, it should be examined periodically during the heating season to establish an ideal cleaning schedule. With power supply disconnected, the condition of the blower wheel can be determined by looking through the vent opening.

Clean combustion air fan as follows :

1. Shut off power supply and gas to unit.
2. Disconnect pressure switch air tubing from combustion air fan port.
3. Remove and retain screws securing combustion air fan to flue box. Remove and retain two screws from bracket supporting vent connector. See figure 81

WARNING

Danger of explosion.
Can cause injury or death. Do not overtighten main burner mounting screws. Snug righten only.

HEAT EXCHANGER ASSEMBLY

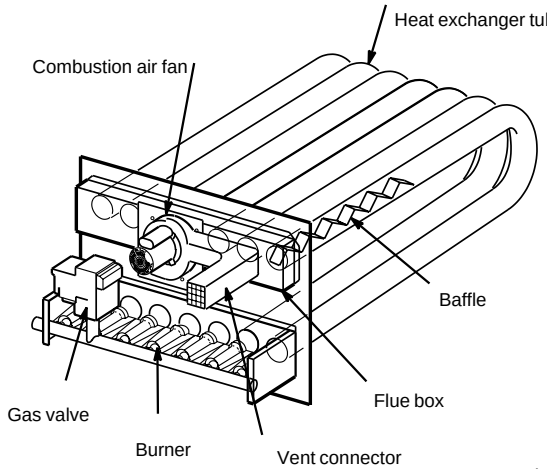


Figure 93

4. Clean blower wheel blades with a small brush and wipe off any dust from housing. Clean accumulated dust from front of flue box cover.
5. Return combustion air fan motor and vent connector to original location and secure with retained screws. It is recommended that the combustion air fan gasket be replaced during reassembly.
6. Clean combustion air inlet louvers on heat access panel using a small brush.

HEAT EXCHANGERS

The performance of your equipment is directly linked to the state of the heat exchangers, and it is therefore important to ensure that they are cleaned regularly.

EVAPORATOR COIL (INTERNAL)

The exchange area must be kept clean at all times. It is protected by the filters. If the filters are well maintained, the battery will only require occasional general cleaning.
A brief inspection should be carried out when servicing the filters.

CONDENSOR COIL (EXTERNAL)

The condensor coil is not protected by the filters. The cleaning schedule is directly related to the environment in which the equipment is operated. A brief inspection should be carried out when servicing the machine. Cleaning can be performed using compressed air or a soft brush. Maximum caution is needed as the aluminium fins are relatively fragile.
However, this type of cleaning is sometimes difficult and relatively ineffective because the clogging is caused by a mixture of grease vapour and powder. For this reason we would recommend cleaning with PRESTOSOL, a degreasing agent with very low toxicity, non-flammable and which does not corrode standard metals.
As a rule, it is sufficient to apply the product to the fins, moving up and down and from left to right (as if you were painting it). If the coil is very blocked, it may be necessary to wait a few minutes after first applying the product and then continue.
This cleaning must be performed when the machine is switched off. In addition, prior to restarting the machine, we recommend waiting until the coil is fully drained and the solvent has totally evaporated.

SUPPLY AIR FAN IMPELLOR

Annually inspect supply air fan impellor for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

MAJOR GAS PARTS FOR LINEA™ SERIES ROOFTOP

Z200361	12mm valve gas h/well Ref VR8605Q 2010
Z201766	Control-Spark ignition
97J7101	Combustion air switch
97J8201	Combustion air fan
79J2101	Ignitor
79J2201	Flame sensor
97J6801	Flame roll switch

Qualified engineers that are registered to the relevant gas authority standard must carry out all work.

HOT WATER COIL

At the start of the heating season, check the following :

- There is sufficient water in the system
- The battery has been correctly drained
- The percentage of antifreeze proportion is sufficient for the degree of protection required.

CONDENSATE TRAY AND DRAIN TRAP

The trag must be free of sediment and dirt which could block the movement of condensation. Check that the siphon is not obstructed. This inspection must be carried out at least once a year, preferably at the start of the air-conditioning season.

ELECTRICAL TERMINALS

At least once a year :

- Power down the machine, blow away any dust from inside the unit, and check and tighten if necessary the connections.
- Power up the machine, test the safety mechanisms.
- An analysis of the terminal in operating mode can throw light on any strange noises from the contactors or other units. Foreign bodies can disrupt the operation of the components and causes noisy vibration.

To avoid accidents, remember that this type of maintenance requires electrical expertise.

REFRIGERATION CIRCUITS

At least once a year, carry out an in-depth inspection of the refrigerant circuits.
In addition, before each season (or every 3 months if used permanently) the tasks listed in the maintenance contract must be performed, i.e. check the refrigerant change, evaporation and condensing temperatures etc...

This work must be carried out by a trained refrigeration engineer. We shall therefore keep the details of the work and the type of checks to be performed to a minimum.

IN ACCORDANCE WITH THE LAW
REFRIGERATION FLUIDS MUST BE COLLECTED.
DEGASSING INTO THE ATMOSPHERE IS FORBIDDEN.

MAINTENANCE SCHEDULE

NOTE :
It is recommended that maintenance is performed when changing from the heating to the cooling season and vice-versa, for example every 6 months.

	After 50 hours	2 months	3 months	6 months	Annually
Fan motor assembly	**X (1)**				
Gas burner					**X**
Terminal unit					**X**
Air-conditioning only					
Filters and internal battery		**X**			
External battery					**X**
Hot water battery					**X**
Condensate tray					**X**
Refrigerant system					**X**
Permanent operation					
Filters and internal battery		**X**			
External battery				**X**	
Condensate tray				**X**	
Refrigerant system				**X**	

(1) : If new belts fitted

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.

WARRANTY

For warranty to apply to this product it must be maintained in accordance with the manufactures recommendations. Failure to comply with this condition may result warranty claims being reused.

This equipment is connected to a high voltage power supply and a combustion gas supply, it also contains refrigerant gas under high pressure.
Unqualified persons should not work on or service this equipment as it may result in injury or death.

Only companies with the correct certification should work on this equipment, LENNOX SERVICE have the necessary skills and certification to maintain this equipment.
Please contact LENNOX SERVICE for a Lifetime Care Agreement or any other service or spare part requirements.

LENNOX® Industries UK

EC Declaration of Conformity

Lennox Industries, Westgate Interchange, Northampton, NN5 5AG England.
Hereby declare that the equipment detailed below conforms with the essential health and safety requirements of The EC Directive on Machinery Safety 98/37 EC

Description of Machinery	Rooftop packaged air conditioner/heatpump
Series / Model	LCA, LCK, LHA, LHK Series
Serial Number(s)	.....
Relevant EC Directives with which this Machinery complies	Machinery Safety 98/37 EC Low Voltage 73/23 EC Electro Magnetic Compatibility 89/336 EC
Year when CE mark was first affixed	2000
Harmonised Standards Applied 1.	EN 292-1, EN 292-2, EN 294, EN 60204-1 EN 50081-1, EN50082-1
Signed, for Lennox Industries Limited	B. R. Scouse
Name of Signatory	Bernard R. Scouse
Job Title Of Signatory	Product Development Manager
Date	27/02/01

This equipment must be installed in accordance with the instructions provided.

If this equipment is modified without prior consultation with our Technical Department, this declaration becomes void.

Lennox Industries
Westgate Interchange
Northampton
NN5 5AG England.
Telephone (44) 1604 599400 Fax (44) 1604 594200

1. A complete list of technical specifications and applied standards is available from Lennox Industries Limited.

F:\QUALITY\DOCS\CE Certificates\CE-Linea.doc 27/02/01

LENNOX® Industries UK

EC Declaration of Conformity

Lennox Industries, Westgate Interchange, Northampton, NN5 5AG England.
Hereby declare that the equipment detailed below conforms with the essential health and safety requirements of The EC Directive on Machinery Safety 98/37 EC

Description of Machinery	Rooftop packaged air conditioner/heatpump with gas fired heating.
Series / Model	LGA, LGK, LDA, LDK Series
Serial Number(s)	.....
Relevant EC Directives with which this Machinery complies	Machinery Safety 98/37 EC Low Voltage 78/23 EC Electro Magnetic Compatibility 89/336 EC Gas Appliance Directive 90/396 EC
Year when CE mark was first affixed	2000
Harmonised Standards Applied 1.	EN 292-1, EN 292-2, EN 294, EN 60204-1 EN 50081-1, EN50082-1, EN1020.
Signed, for Lennox Industries Limited	B. R. Scouse
Name of Signatory	Bernard R. Scouse
Job Title Of Signatory	Product Development Manager
Date	27/02/01

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1. A complete list of technical specifications and applied standards is available from Lennox Industries Limited.

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EC Type Examination Certificate

Issued by Advantica Certification Services

Certificate No.	EC-87/99/71/M1
Notified Body No.	0087
Project No.	2/31387
Date	18 January 2001
Original/Supplementary	Supplementary
Applicant/Manufacturer	Lennox Industries Ltd PO Box 174 Westgate Interchange Northampton NN5 5AG
Normative Reference(s)	BS EN 1020:1998
EC Product Identification No.	87AU71
Model Designations	See Appendix

Declaration

Type samples representative of the product(s) detailed have been tested and examined and found to comply with the Essential Requirements detailed in Annex I of the European Gas Appliance Directive (90/396/EEC).

Signed on behalf of the Advantica Notified Body (No. 0087)

Graham McKay, Manager, Certification Services
Advantica Technologies Ltd, Ashby Road, Loughborough, Leicestershire LE11 3GR

ADVANTICA

Appendix to Certificate EC-87/99/71/M1

Page 2 of 2

Product Type	Model Designation	Gas Category & Pressure	Destination Countries
Electric Cooling & Gas-Fired Air Heater	Linea LGA 020, 025, 030, 035, 040, 045, 055, 065, 075 & 090 Linea LGK 020, 025, 030, 035, 040, 045, 055, 065, 075 & 090	I_{2H} (20)	AT, DK, ES, FI, GB, IE, IT, PT & SE
		I_{2ELL} (20)	DE
		$I_{2E(R)B}$ (20/25)	BE
		I_{2Er} (20/25)	FR
		I_{2L} (25)	NL
		I_{3P} (37)	BE, ES, FR, GB, IE & PT
		I_{3P} (50)	DE & NL
Electric Heat Pump & Gas-Fired Air Heater	Linea LDA 020, 025, 030, 035, 040, 045, 055, 065 & 075 Linea LDK 020, 025, 030, 035, 040, 045, 055, 065 & 075	I_{2H} (20)	AT, DK, ES, FI, GB, IE, IT, PT & SE
		I_{2ELL} (20)	DE
		$I_{2E(R)B}$ (20/25)	BE
		I_{2Er} (20/25)	FR
		I_{2L} (25)	NL
		I_{3P} (37)	BE, ES, FR, GB, IE & PT
		I_{3P} (50)	DE & NL

Note: This supplementary certificate has been issued to cover additional models and modifications to the alternative forms of the LGA Series.

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