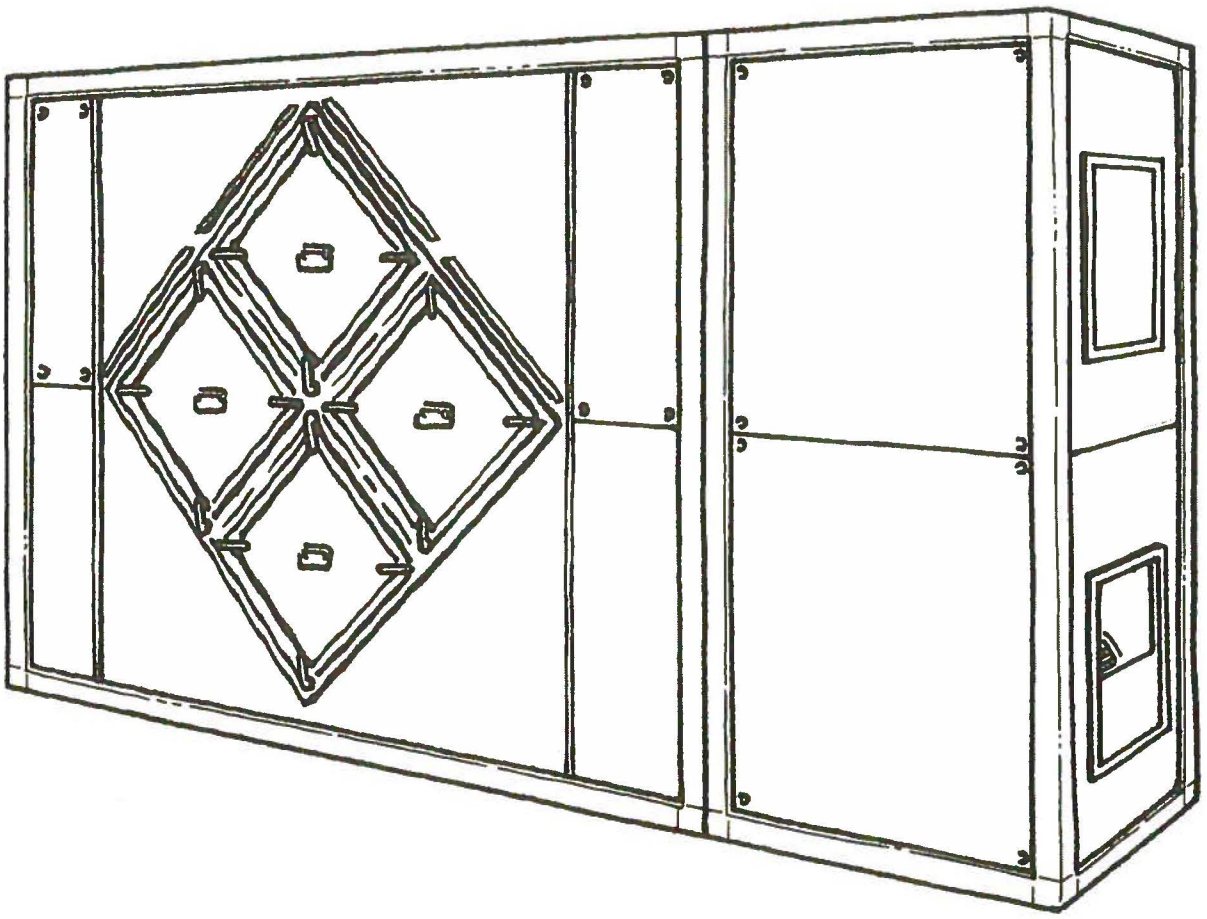
Dantherm®

INSTRUCTION MANUAL XVV



Contents:

0. Introduction

The Dantherm air-to-air heat recovery package type XVV consists of a modular section housing the crossflow recuperators and protective filters, with provision made within the cabinet for additional equipment that can be fitted at the time of manufacture.

The additional equipment available comprises after heating coils, frost protection coils, bag filters and a heat pump system.
Two types of cabinet are standard and depending on air flow requirements, either Type 10 using a one module concept or type 40 using a four module arrangement will be chosen. Type 40 allows air volume and efficiency which are up to 40% higher than for Type 10.

The height and length dimensions of both cabinets are constant, but, the width will change with the number of recuperators used in relation to the air volume requirements. The width will be for 1, 2, 3 or 4 recuperator modules.
The heat exchanger section can be used as an addition to an existing air handling system, if the pressure of the fans can be adjusted to allow for the resistance of the recuperator modules.

If not the DANTHERM fan section type »W« can be used. This fan section consists of a cabinet housing an exhaust fan and a supply fan matched in output to the design requirements of recuperators, with both motors and fans mounted on an integral base with anti-vibration dampers.

The »W« fan section is joined to the recuperator cabinet with securing clamps and sealed at all four sides with purpose made sealing strips.

The recuperator and fan cabinets are of a robust construction, with rigid corner sections and cross members, allowing all the side panels to be removed for ease of servicing, whilst still retaining its original rigid strength.

All cabinet parts are constructed from hot galvanised steel sheet.

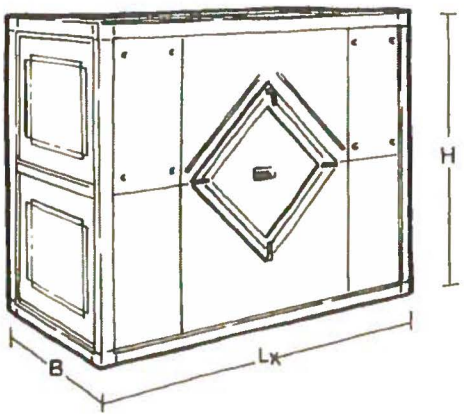
The electrical controls can be fitted into a separate control panel, which can be situated according to the customer's requirements. During installation, connection is made between the control panel and the terminal boxes for the different XVV-components by the installer. Units with heat pumps are pre-wired except for the motor loads that have to be connected to the contactors already fitted. On units without the heat pump, no controls are supplied and the installer should make provision for the supply of the contactors.

1

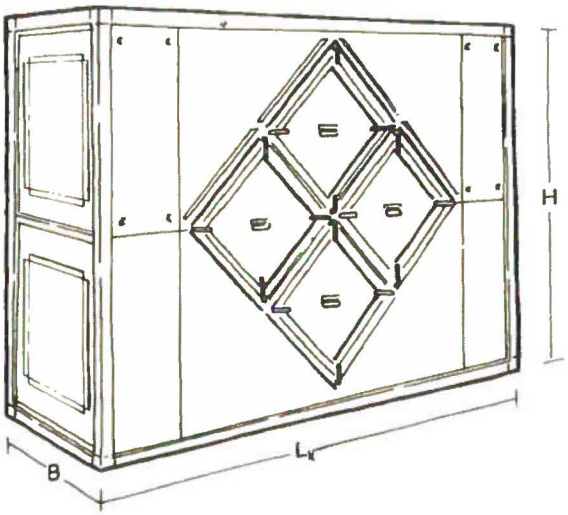
1. Technical Data

Diagonal Flow Recuperator

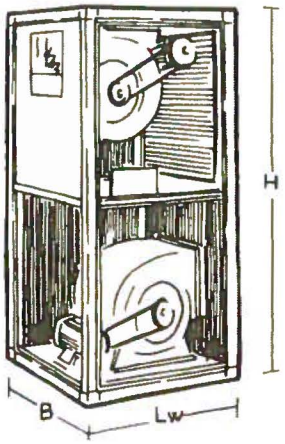
Recuperator unit Type XVV 1–

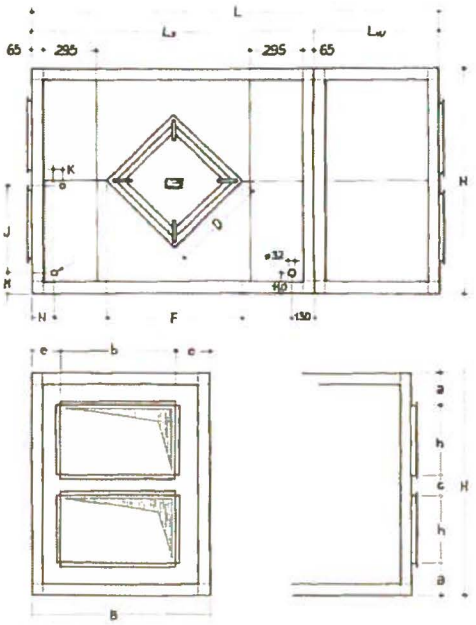


Recuperator unit type XVV 4–



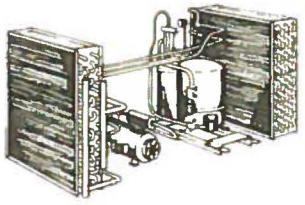
Fan unit type W–





		MODEL							
		11	12	13	14	41	42	43	44
Dim. H	mm	1285	1285	1285	1285	1750	1750	1750	1750
B	mm	476	880	1285	1685	476	880	1285	1685
L	mm	2290	2390	2390	2390	3050	3150	3270	3465
L_x	mm	1580	1580	1580	1580	2340	2340	2340	2340
L_w	mm	710	810	810	810	710	810	930	1125
h	mm	400	400	400	400	600	600	600	600
b	mm	300	600	1000	1200	300	600	1000	1200
a	mm	182	182	182	182	198	198	198	198
c	mm	121	121	121	121	154	154	154	154
e	mm	88	140	142	242	88	140	142	242
D	mm	550	550	550	550	1100	1100	1100	1100
F	mm	765	765	765	765	1530	1530	1530	1530
J	mm	500	500	500	500	700	700	700	700
K	mm	33	33	33	33	36	36	36	36
M	mm	105	105	105	105	125	125	125	125
N	mm	130	130	130	130	135	135	135	135
Air vol. std.	m³/h	2250	4500	6750	9000	3200	6400	9600	12800
Weight of XVV	kg	140	210	270	340	330	540	740	950
Weight of W	kg	120	160	190	280	150	190	250	320

Heat Pump type WP



TYPE		WP-11	WP-12	WP-13	WP-14
Cool. cap. 5°/40°C	kW	6,2	9,8	17,1	21,5
Heating capacity	kW	8,0	12,5	21,7	27,4
Effect consump.	kW	1,8	2,7	4,6	5,9
Temp. rise Δt	°C	10,6	8,3	9,6	9,1
Weight	kg	80	110	170	200

TYPE		WP-41	WP-42	WP-43	WP-44
Cool. cap. 5°/40°C	kW	9,8	17,1	21,5	27,2
Heating capacity	kW	12,5	21,7	27,4	34,7
Effect consump.	kW	2,7	4,6	5,9	7,5
Temp. rise Δt	°C	11,7	10,1	8,5	8,1
Weight	kg	90	150	200	360

2. Description of components

2.1 Heat exchanger unit type XVV

2.1.1 Cabinet

The heat recuperator cabinet is constructed from hot galvanized steel sheet. The supporting frame construction facilitates the secure installation of the various components.

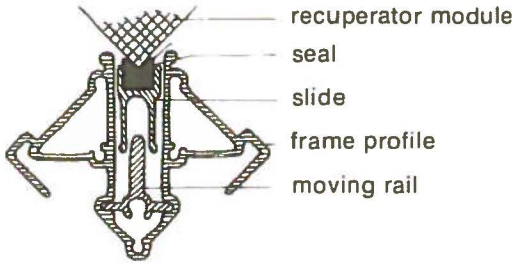
Two or three of the front cover panels are fixed in the corners by manually operated locking handles, and are provided for the access to the servicing of components in the air flow.

2.1.2 Module frame

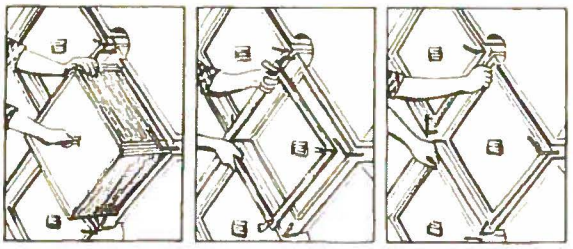
The most important part of the XVV is the recuperator module which is described in section 2.1.3. The recuperators are mounted in module frames which are secured in the corners with an airtight seal against the cabinet.

The module frames are made of extruded aluminium profiles, which are kept together by a frame of galvanized steel sheet.

Each corner of the frames are supplied with a locking mechanism. After having positioned the recuperator modules, push in the four handles of the front frame and turn 45°. By this action the slides with the rubber seal are pushed against the corner profiles of the module to secure a tight seal between the frame and recuperator module.

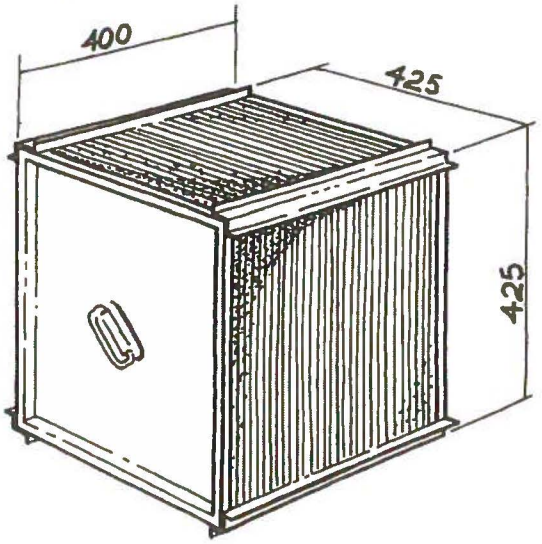


Externally the end of module frame is covered by a separate front sealing frame providing an air seal between frame and recuperator module. The sealing frame is held in position at each corner by four brackets which are fixed to the above mentioned locking handles, when pushed in and turned.



2.1.3 Recuperator module

The recuperator modules are available in one standard size 425×425×400 mm. The weight of the module is 25 kg.



Data:

Type	:	MV-A
Dimensions	:	425×425×400
Weight	:	25 kg
Max. temp.	:	140°C
No. of plates	:	94
Sheet dimension	:	0,4 mm
Plate spacing	:	3,65 mm

The module is built up of a series of profiled, epoxy coated anodized aluminium plates with precise spacings which are two by two clamped together at top and bottom edges and their counter parts clamped together at both side edges. This method of connection allows air to pass through the unsealed plates top to bottom and allows air to pass through the other unsealed plates side to side so that the two air streams have no contact with each other.
As shown above these plates are mounted into a box-arrangement with four openings, each separated by corner profiles. The distance between the plates allows air to pass freely in a turbulent flow which increases the heat transmission across the plates.

2.1.4 Flat filters

Standard units are supplied with a flat filter fitted next to the recuperator module. This filter restricts coarse impurities and thus protects the heat exchanger and the heating coils, if fitted, from dirt. The flat filter consists of an external and an internal frame and between these two frames a coarse mat filter type G 85 is fitted. The flat filter is mounted in a slide which can be removed through the cover panel for cleaning.

2.1.5 Condensate drain

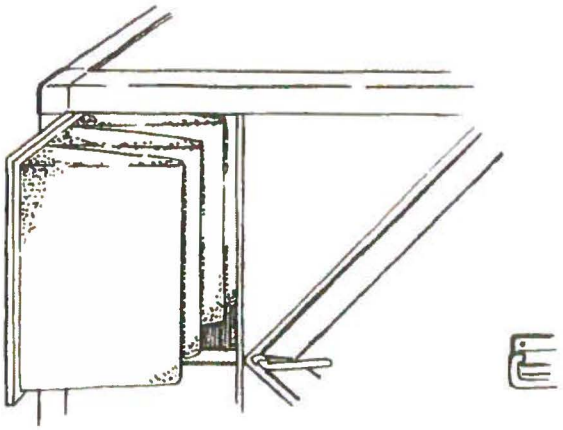
Condensation will be prevalent in most plants and this water must be led away. The water is collected inside the unit in a condense tray from which the water is led through a water trap and a ∅32 mm plastic drain pipe through the front cover of the unit.

Units with heat pump for summer operation are supplied with two drains.

The placing of the drain is shown on sketch in section 1.

2.1.6 Bag filters

The unit is available with bag filters, as an optional extra. The bag filters are placed behind the upper service access covers and are mounted in a slide for easy removal.



2.1.7 Heating coils

Different sorts of heating coils are available as optional extras, - coils for water, steam or electricity. When placed before the heat recuperator they are defined as pre-heating frost protection and when placed after, as after-heating coils. The coils are situated under the service covers or the corresponding cover panel at the lower part of the recuperator front section.

Connections for the coils are led through the front cover panels.

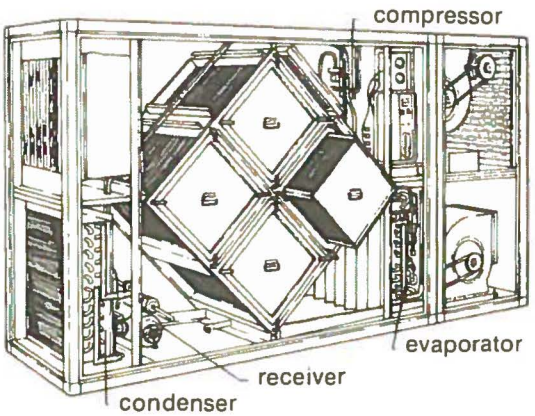
The terminal box for electric heating coils is led through the front cover panels.

2.1.8 Separator plates

If condensation is likely to occur, separator plates should be fitted in the exhaust air opening over the condense tray. The separator plates consist of S-shaped extruded aluminium profiles which are assembled in parallel to each other. These profiles form a labyrinth where the droplets are collected and run off to the condense tray.

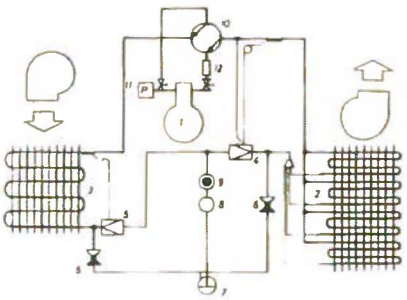
2.1.9 Heat pump type WP

The heat pump which is an optional extra is built into the heat recuperator section type XVV.
The cooling surface - the evaporator - of the heat pump is fitted in the exhaust air flow, where it absorbs the remainder of the heat, whereas the heating surface - the condenser - is fitted in the supply air flow for additional heating.
The compressor and most other components of the cooling system are situated behind the service cover on the supply air side.



The cooling plant is run by a hermetical cooling compressor and it is reversible to allow de-frosting which means that the cooling cycle is reversed so that the warm gases condense on the evaporator coil ensuring quick de-frosting.
The de-frosting process is controlled by an electronic control system.

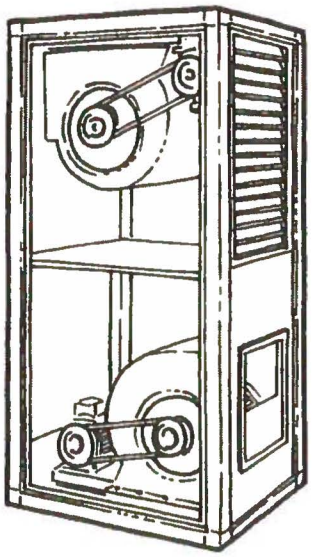
Cooling system for heat pumps type WP



1. Hermetic compressor
2. Evaporator (normal operation
3. Condenser (normal operation
4. Primary thermostatic valve
5. Secondary thermostatic valve
6. Check valves
7. Receiver
8. Liquid line drier
9. Sight glass
10. Reversing valve
11. High pressure control
12. Suction line accumulator

2.2 Fan unit type W

2.2.1 Cabinet



The cabinet is built up in the same way as described for the heat recuperator section (2.1.1).

2.2.2 Fans

The fans used are always of the centrifugal type and they are driven by electric motors through a V-belt drive. The r.p.m. rating of standard fans is 700-1500 r.p.m., whereas special fans, with backward curved blades, can go up to 3000 r.p.m. The fans are mounted on two transverse rails resting on vibration dampers fixed to the frame profiles construction of the unit.

2.2.3 Fan motors

Various fan motors are available to comply with various demands for air volumes and air pressures. To meet the demand for alternative air outputs, two-speed motors are in some cases installed. Such motors are pole switching woundings.

Bigger motors will in many cases be wired for delta-star start.

Motor output	Frame	Motors for fan unit type W. 1400 r.p.m. and 1400/700 r.p.m.								Cross-section of conductor to motors			
										380 V		220 V	
		11	12	13	14	41	42	43	44	DoI	Y-D	DoI	Y-D
0,75 kW	80 G	X								1,5		1,5	
1,1 kW	90 S	X				X				1,5		1,5	
1,5 kW	90 L		X			X				1,5		1,5	
2,2 kW	100 L		X	X		X	X			1,5		1,5	
3,0 kW	100 L			X	X		X	X		1,5	1,5	1,5	1,5
4,0 kW	112 M			X	X			X	X	1,5	1,5	2,5	1,5
5,5 kW	132 S				X			X	X	1,5	1,5	2,5	1,5
7,5 kW	132 M									2,5	1,5	4,0	2,5
											Step		Step
0,4/0,7 kW	90 L	X								1,5		1,5	
0,6/1,0 kW	100 L	X				X				1,5		1,5	
0,9/1,5 kW	100 LX	(X)	X			X				1,5		1,5	
1,3/2,2 kW	112 M		X	X		X	X			1,5		1,5	
1,7/2,6 kW	132 S			X	X		X	X		1,5		1,5	
2,2/3,7 kW	132 M			X	X		X	X	X	1,5	1,5	1,5	1,5
3,1/4,8 kW	132 MX			(X)	X			X	X	1,5	1,5	2,5	1,5
4,3/6,5 kW	160 M				X			X	X	1,5	1,5	4,0	1,5

It is possible to combine the motors on each unit, also one and two-speed motors.

The motor variations lie within the limits of above chart.

2.2.4 Fan drive

The drive between the fan and the motor is made with a V-belt, belt profile SPA (12,5 × 10 mm). On systems up to 7,5 kW, the motor pulley is adjustable and the fan pulley is fixed.

One or two belts are used, depending upon motor size.

The belt tension is adjusted by means of the swivel motor mounting plate.

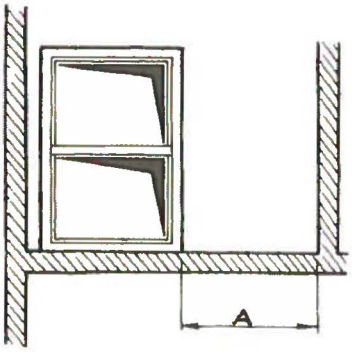
3. Installation

3

3.1 Positioning

It is important when installing the unit to allow for access for servicing. All service work can be carried out from one side as specified when ordering.

The free space in front of the plant should not be less than that shown below.



	A min. mm
11-41	600
12-13-14	850
42-43-44	850

3.2 Transport and handling

It is advisable to leave the components on the wooden pallets on which they are delivered. It is then possible to lift the unit with a fork lift truck or a pallet lift truck.

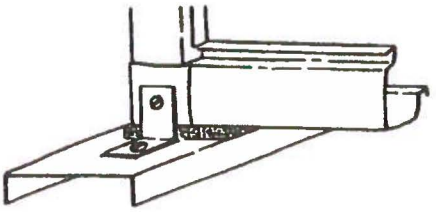
When lifting the unit without the pallet be aware that the frame construction in spite of its strength and rigidity is liable to damage. Therefore a wooden support should be used to spread the loading.

It should be noted that when lifting the unit there is a risk that it will tip forward or turn over, because the centre of gravity is high in some components.

3.3.0 Installing on site

The simplest way of installing the unit is on the floor or some other flat surface capable of supporting its weight.

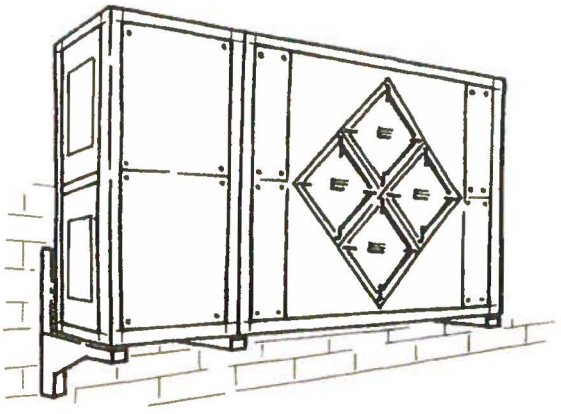
To avoid movement of the unit on its plateform, some form of fixing should be made. For example an angle bracket can be fixed to the plateform and the corner of the unit.



The following examples are only a guide to installation. Make sure that the materials and systems chosen are capable of supporting the weight of the unit.

3.3.1 Installation on a wall

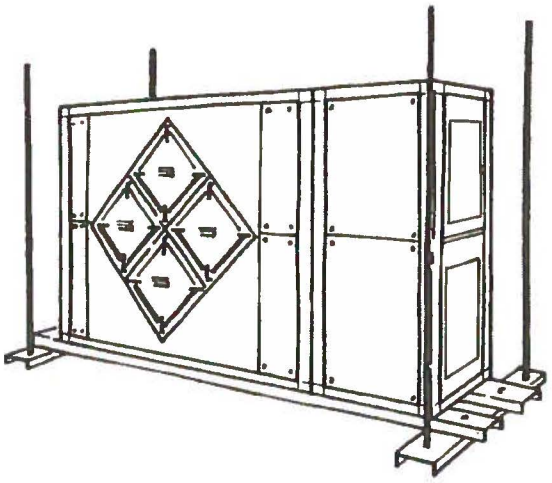
When mounting the unit on the wall, wall brackets can be used for sizes up to XVV 12 and XVV 42. For bigger units i.e. XVV 13, 14, 43 and 44, these brackets should be supported by some sort of rods either to the floor or to the ceiling. Use one bracket at each end and one at the point where the XVV and W sections are joined together.

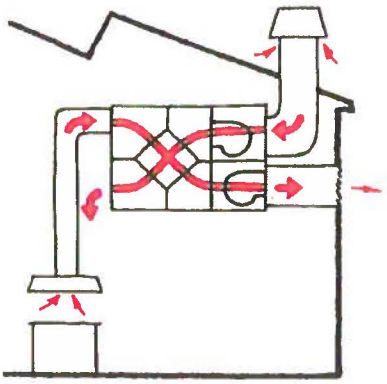


Longitudinal supports as shown in the following illustration are required with this installation. They have been omitted for clarity of the wall brackets.

3.3.2 Installation under a ceiling

This system is the most commonly used, if the roof construction is capable of supporting the weight. The support straps should be situated on a level with the corner profiles so there is a free access for servicing. This system can be used for XVV units combined with W fan units up to XVV 12 and 42. For bigger units an extra support should be used in the centre of the outside supports. It is advisable to fit a rubber packing between the unit and the plateform to reduce vibrations.





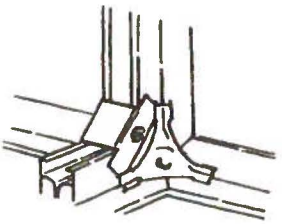
3.4 Assembly of recuperator unit and fan unit

Recuperator unit and fan unit are supplied in separate crates to site.

It is most convenient to position the recuperator unit type XVV first when assembling the two units.

The side facing the fan unit is supplied with securing brackets and sealing material. Remove nut and clamp from the securing brackets and position the fan unit which is supplied with the same sort of sealing material.

Remove the cover panels of the fan unit and from the inside position the securing brackets and tighten up the bolts to form a rigid connection of the two units.



3.5 Condensate drain

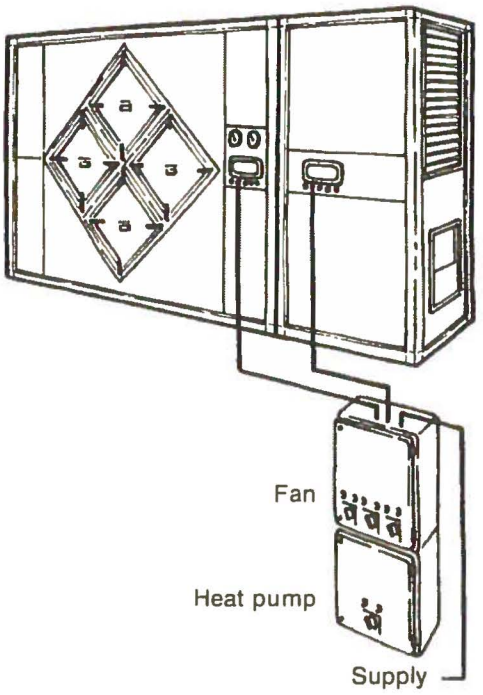
Condensation will take place in systems with high relative humidity. This water is collected in a built-in condensate tray of stainless steel, which if required can be fitted with separator plates in the condensate tray area. A 32 mm plastic drain pipe with trap is fitted internally to the condensate tray. This plastic pipe terminates on the outside of the cover panel. To allow cleaning of the condensate tray it is practical to fit a flexible hose to the permanent drain pipe which is taken to a drain. At the same time a flexible connection is obtained. The drain pipe should not be less than 32 mm and it is recommended, in cases with high negative pressures in the exhaust fan, to fit an extra water trap in the drain pipe to eliminate the negative pressure and to avoid air being sucked in through the drain pipe.

The upper fan in the fan unit type W is supplied with a condensate tray and drain through a 1/2" plastic drain pipe. This pipe should be taken to the condensate tray of the XVV unit and be fixed to it.

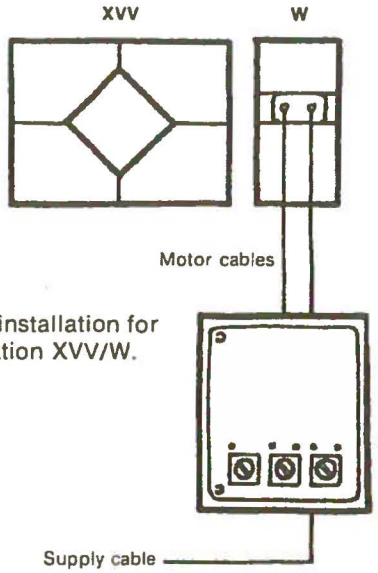
3.6 Duct connection

The four duct connections are all made in the same way. A recess channel on the outside of the air opening will accept an external flange made on to the ducting and sealing compound can be bolted into this channel to make an air tight connection.
The flange can be secured with self tapping screws from the base of the channel.

3.7 Electrical installation

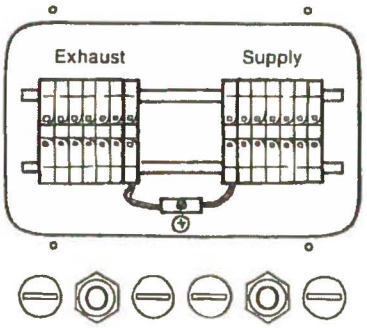


The control panel is fitted in a separate box, protection class IP 34.
The separate control panel can be mounted on the wall in a convenient place for operation and supervision, if required.
The control panel is adapted to suit each particular plant and if nothing else is specified it is supplied with the required contactors, thermal relays, delay circuits, fuses etc., all connected to a terminal strip.
The terminal strip contains all terminals for power supply and for electrical connection to all components.
The flange of the control panel is supplied with seven holes for cable glands PG 16, with the cable entries at the top of the box.
For a ventilation plant without heat pump no electrical connections are required to the heat recuperator section.



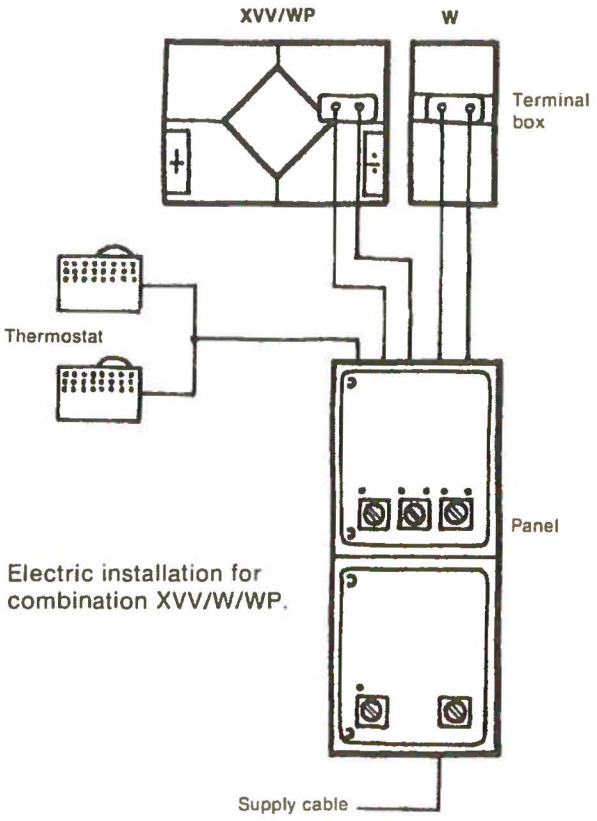
Electric installation for combination XVV/W.

Standard motors need two 4-core cables inclusive of earth wire, whereas two-speed motors or motors for star-delta start require a 7-core cable plus an earth wire.
The core cross section is shown in the motor size diagram in section 2.2.3.
On the fan section and recuperator section with heat pump the cables are connected in the terminal box on the front of the unit.



Terminal box with terminals.

The cable enters through two cable glands type PG 16. Pre-punched holes are available for extra cable glands for particular control functions or check functions, and there is enough space for fitting extra terminals on the asymmetric 32 mm DIN rail.
The terminals are of Wieland make, type 9700/6 for 4 mm² core cross-section.
The terminals in the control panel and in the terminal box are identically marked and each cable is connected between terminals of the same marking.



Electric installation for combination XVV/W/WP.

The diagram below shows the power consumptions of each motor to determine the fusing for different combinations

380 V	Motor current							
kW	11	12	13	14	41	42	43	44
0,75	2,0							
1,1	2,6				2,6			
1,5		3,5			3,5			
2,2		5,0	5,0		5,0	5,0		
3,0			6,6	6,6		6,6	6,6	
4,0			8,5	8,5			8,5	8,5
5,5				11,5			11,5	11,5
7,5								15,5
0,4/0,7	1,9							
0,6/1,0	2,5				2,5			
0,9/1,5		3,5			3,5			
1,3/2,2		5,0	5,0		5,0	5,0		
1,7/2,6			5,8	5,8		5,8	5,8	
2,2/3,7			8,1	8,1		8,1	8,1	8,1
3,1/4,8			10,2	10,2			10,2	10,2
4,3/6,5							13,6	13,6
Heat pump	4,1	6,5	12,0	15,0	4,3	12,0	15,0	18,0

220 V	Motor current							
kW	11	12	13	14	41	42	43	44
0,75	3,4							
1,1	4,4				4,4			
1,5		6,0			6,0			
2,2		8,7	8,7		8,7	8,7		
3,0			11,5	11,5		11,5	11,5	
4,0			14,7	14,7			14,7	14,7
5,5				19,8			19,8	19,8
7,5								26,5
0,4/0,7	3,2							
0,6/1,0	4,2				4,2			
0,9/1,5		6,0			6,0			
1,3/2,2		8,7	8,7		8,7	8,7		
1,7/2,6			10,0	10,0		10,0	10,8	
2,2/3,7			14,0	14,0		14,0	14,0	14,0
3,1/4,8			17,6	17,6			17,6	17,6
4,3/6,5							23,5	23,5
Heat pump	7,1	11,2	20,8	26,0	7,4	20,8	26,0	31,0

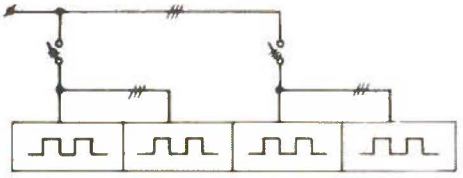
3.7.1 Connection of electric heating coils

The electric heating elements which are supplied with the unit are for pre-heating or after-heating of the fresh air supply and they are fitted in the recuperator cabinet or directly in the ductwork.

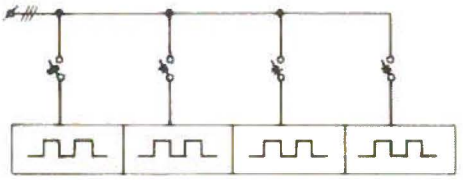
In many cases there are special requirements for control of the heat requirement and therefore the heat control is not made as an integral part of the unit, but allowance can be made in the control panel for building in contactors and control system.

Heating coils supplied with the XVV-system will be of different heat outputs, dependent on type and purpose of plant. In all cases the heat output is split up on several steps of different outputs, allowing to switch in and out gradually. Each step requires its own contactor.

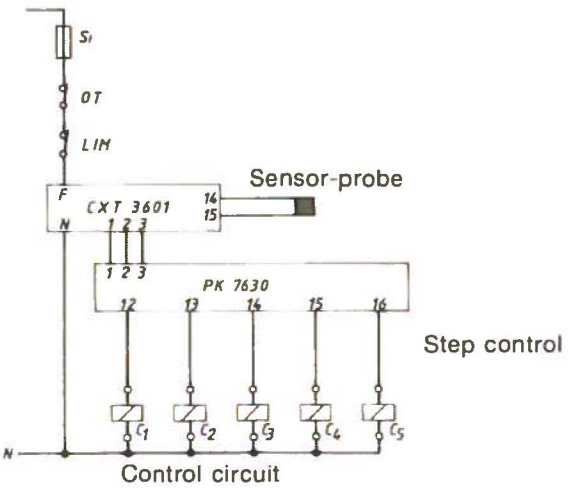
Electric heat output split up into 2 steps.



Electric heat output split up into 4 steps.

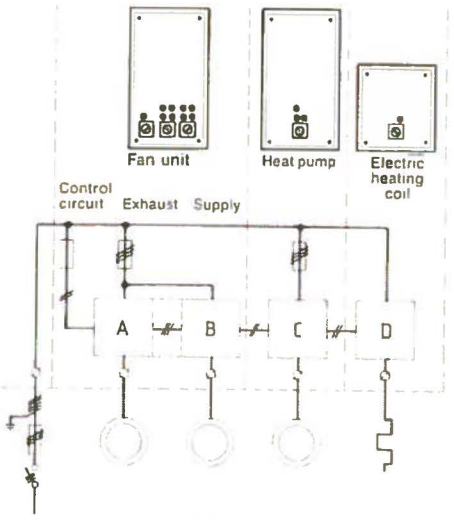


If less sophisticated control is acceptable, e.g. via 2 steps - as shown in the top sketch, a simple thermostatic control can be used.
For more complicated controls, e.g. via 4 steps as shown on the sketch at the bottom, some form of electronic control will be needed, which can be built up as the one below.



3.7.2 Wiring diagram XVV/W/WP

Due to the complex and flexible concept of the XVV/W/WP systems, the wiring diagram is built up of single diagrams for each function.
These diagrams can be combined as required.
Diagram A and B are for control of fan, whereas diagram C and D only apply when heat pumps and electric heating coils are built in. Diagram D can be read in connection with B if no heat pump is built into the plant.



Main wiring diagram for XVV/W/WP.

The complex and flexible concept of the system arises because for each of the fan motors it is possible to choose between standard motors and 2-speed motors. The standard motors can start directly (DOL) or by a star-delta start (Y-D), while 2-speed motors can either start directly (DOL) or by a two-stage start, which means that the motor always starts on the lower stage, after which it may be switched over to high speed. The two-stage start is only used when starting bigger motors, when specifically required. The table below shows the control possibilities which can be combined. Any A-B-C-D combination can be made out of the following wiring diagrams.

Diagram A: **Exhaust:**
- Alt. A I : direct start
- Alt. A II : Delta-star start
- Alt. A III : 2-speed motor, direct start
- Alt. A IV : 2-speed motor, low/high start

Diagram B: **Supply:**
- Alt. B I : Direct start
- Alt. B II : Delta-start start
- Alt. B III : 2-speed motor, direct start
- Alt. B IV : 2-speed motor, low/high start

Diagram C: **Heat pump:**
- Alt. C I : Standard for winter operation
- Alt. C II : Winter operation/summer cooling

Diagram D: **Electric heating coil:**
- Alt. D I : Thermostat controlled
- Alt. D II : Electronic control

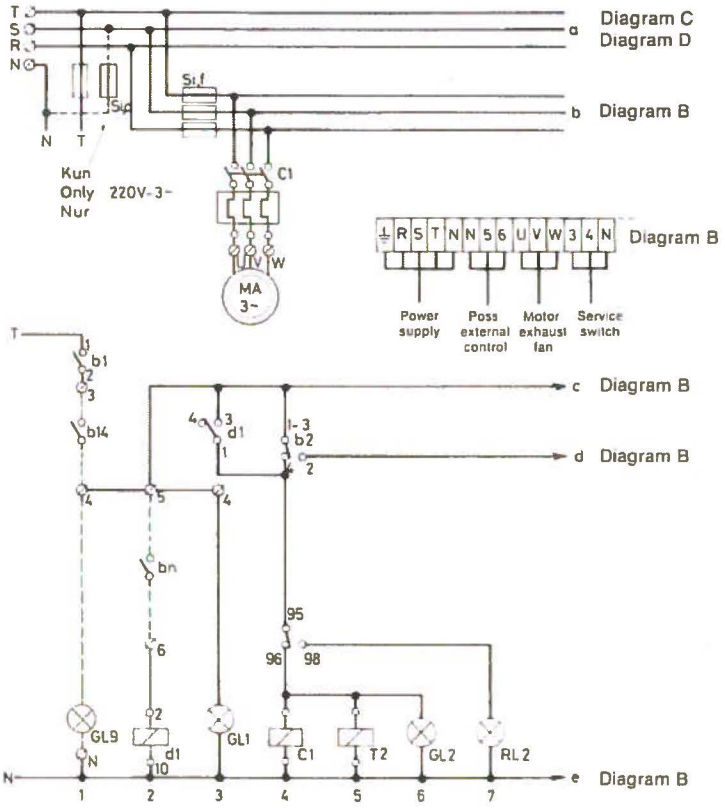
Component identification for XVV-wiring diagrams

AS	Temperature sensor for fresh air
b1	System switch for control circuit
b2	Switch, low-high for exhaust fan
b3	Switch, low-high for supply fan
b4	Switch for heat pump
b5	Room thermostat, heat pump, winter operation
b6	Room thermostat, heat pump, summer operation
b7	Pressure switch for cooling plant
b8	Switch winter-/summer operation for heat pump
b9	Switch for electric heating coil
b10	Safety thermostat electric heating coil LIM
b11	Safety thermostat electric heating coil High Limit
b12	Room thermostat/duct thermostat step 1
b13	Room thermostat/duct thermostat step 2
b14	Service switch fan unit
bn	External or automatic switch for fan functions
CS	Temperature sensor for evaporator coil
C1-C3	Motor contactors for exhaust fan
C4-C6	Motor contactors for supply fan
C7	Motor contactors for heat pump compressor
C8-C11	Switches for electric heating coil
d1	Auxiliary relay for external/automatic control
d2	Auxiliary relay for switch-over winter/summer
d3	Auxiliary relay for defrosting winter/summer
d4	Auxiliary relay for cutting out compressor
DR	Differencial relay for temperature control
Ec	Electronic control
GL 1	Green control lamp for control circuit
GL 2	Green control lamp for exhaust fan low speed
GL 3	Green control lamp for exhaust fan high speed
GL 4	Green control lamp for supply fan low speed
GL 5	Green control lamp for supply fan high speed
GL 6	Green control lamp for operation of heat pump
GL 7	Green control lamp for compressor operation
GL 8	Grenn control lamp for operation of electric heating coil
h	Hour meter for operation of heat pump compressor
MA	Motor for exhaust fan
MI	Motor for supply fan
MK	Compressor motor for heat pump
M	4-way valve for defrosting
RL 2	Red control lamp, thermal overload of exhaust fan low speed
RL 3	Red control lamp, thermal overload of exhaust fan high speed
RL 4	Red control lamp, thermal overload of supply fan low speed
RL 5	Red control lamp, thermal overload of supply fan high speed
RL 6	Red control lamp, high pressure cut out in cooling plant
RL 7	Red control lamp, thermal overload of compressor motor
RS	Room sensor for differencial relay (NTC)
Si,c	Automatic fuse 1 pole 6 A for control circuit
Si,f	Automatic fuse 3 pole for fans
Si,h	Automatic fuse 3 pole for heat pump
T1	Timer for switching over to Y-D or low/high at start
T2	Timer for possible delay of supply fan motor at start
T3	Timer for switching over to Y-D or low/high at start
T4	Timer for delay of compressor at start
W	Electric heating coil

XVV/W - Exhaust

Direct start

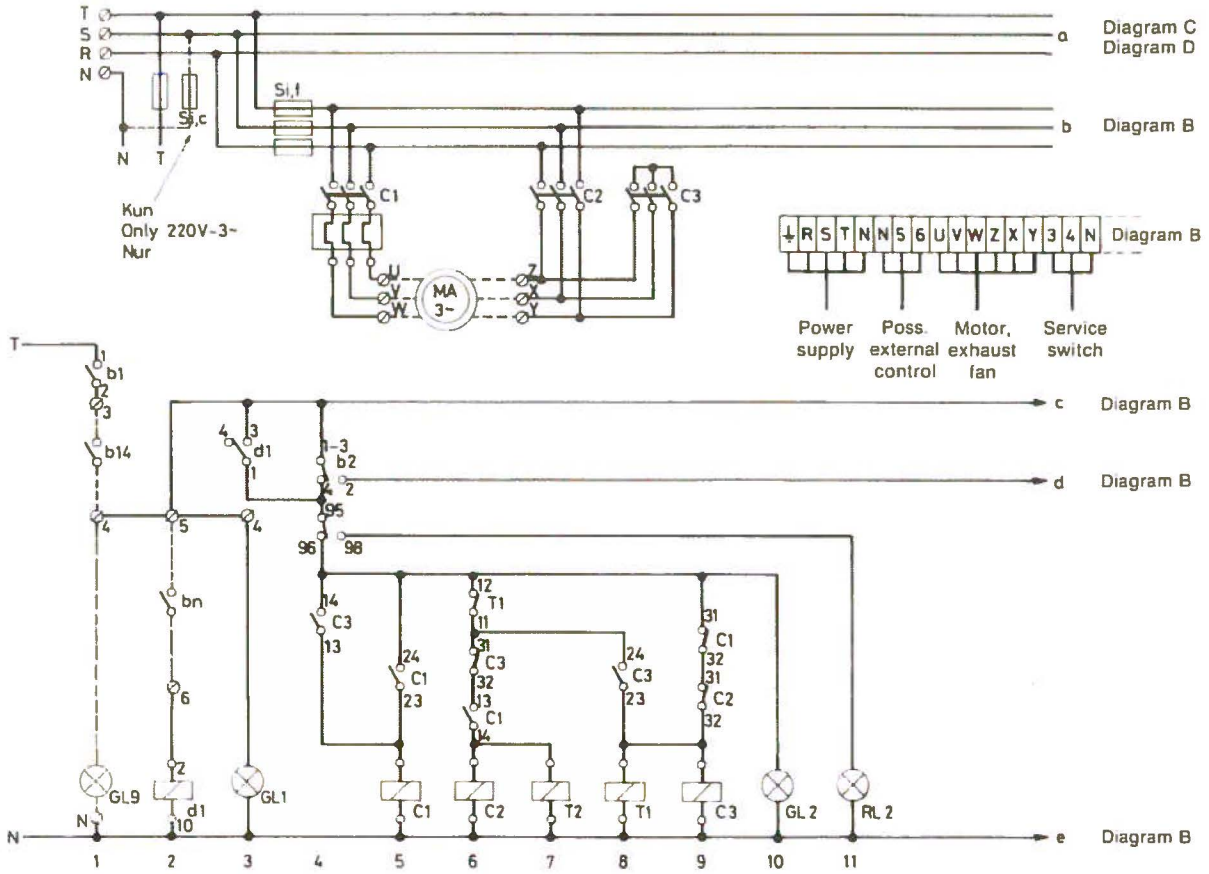
Diagram A-I



XVV/W - Exhaust

Y-D start

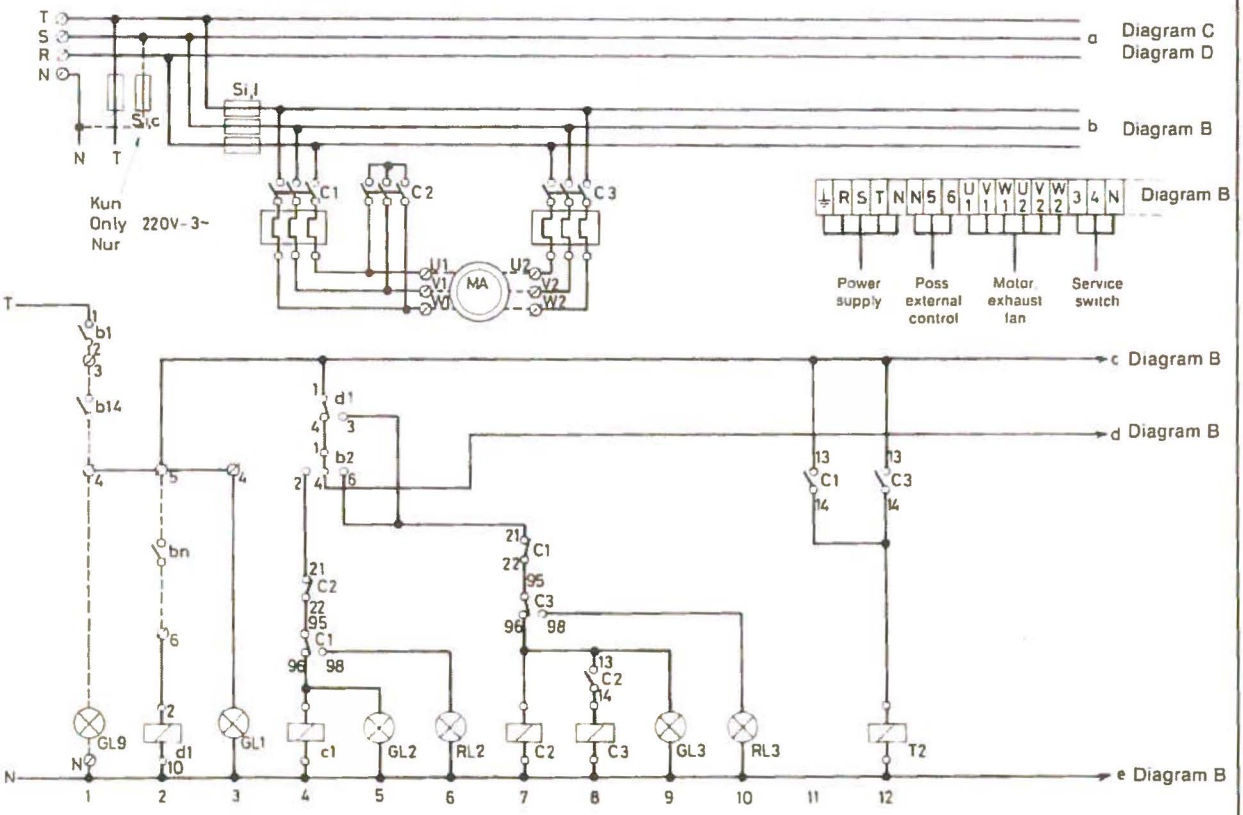
Diagram A-II



XVV/W - Exhaust

Diagram A-III

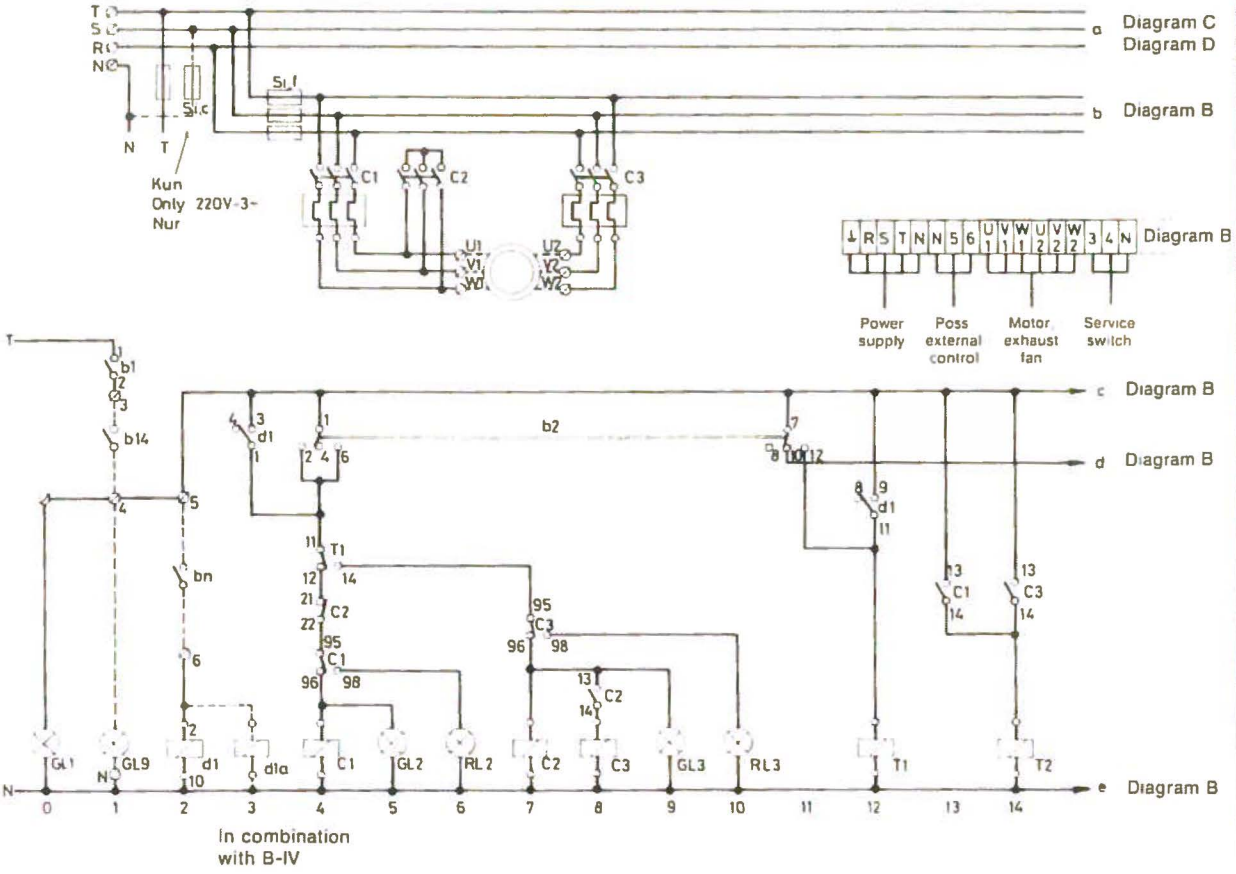
2-speed motor, direct start



XVV/W - Exhaust

Diagram A-IV

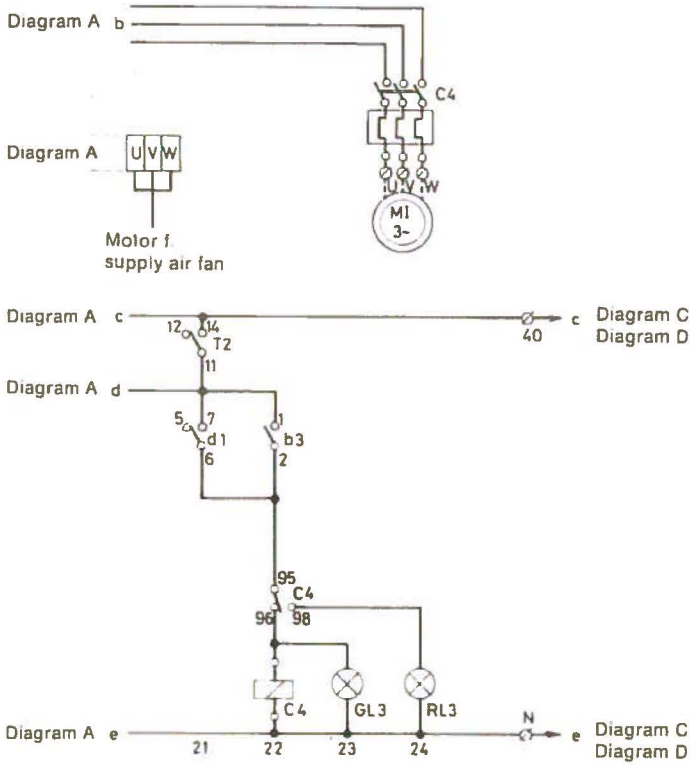
2-speed motor, low/high start



XVV/W - Supply air

Direct start

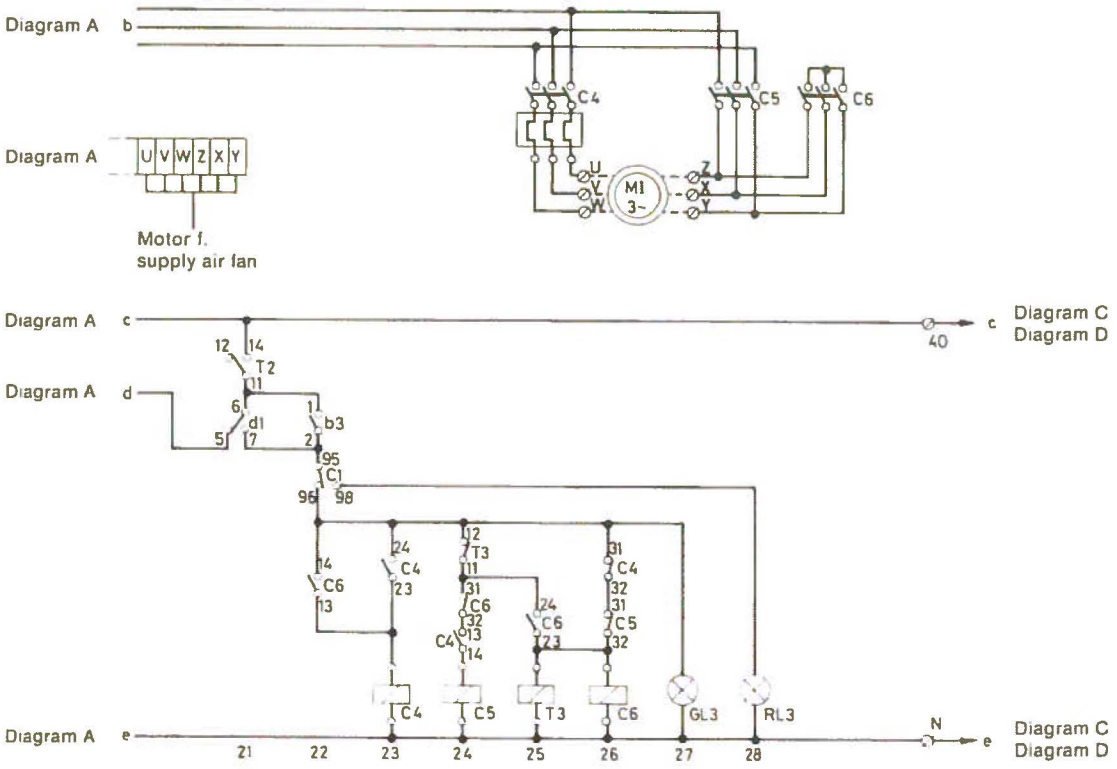
Diagram B-I



XVV/W - Supply air

Y-D start

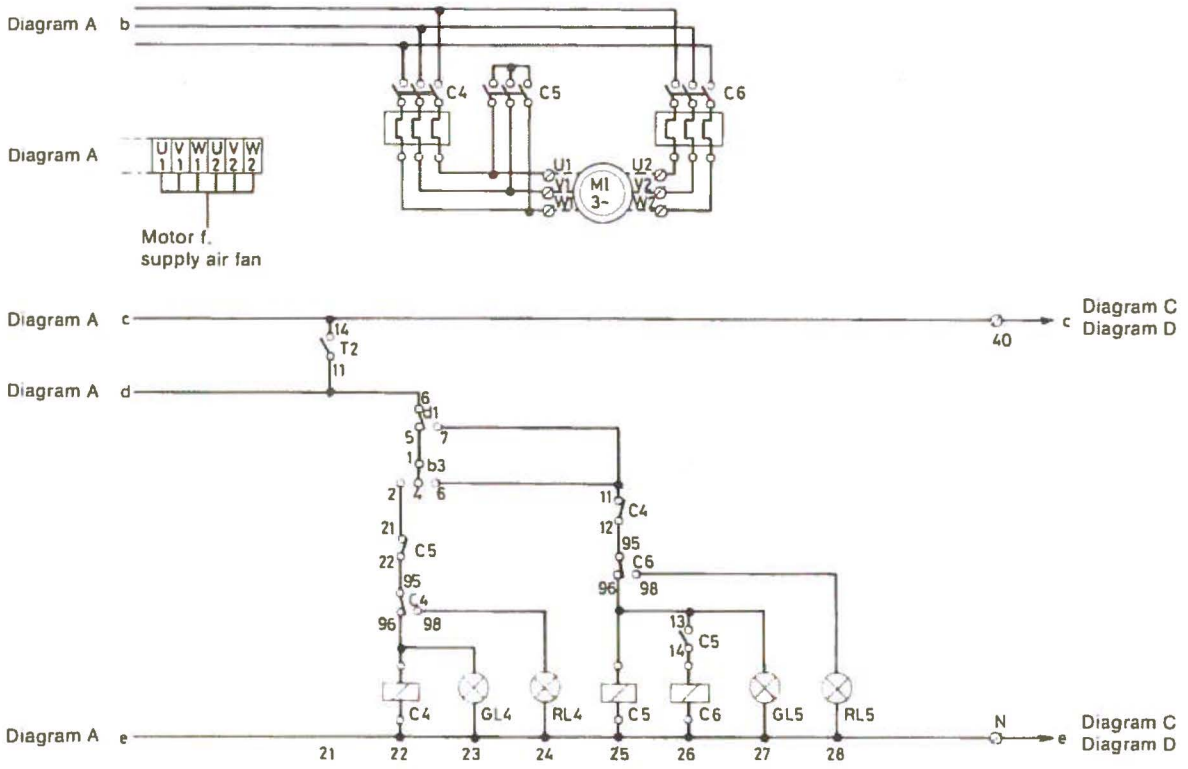
Diagram B-II



XVV/W - Supply air

2-speed motor, direct start

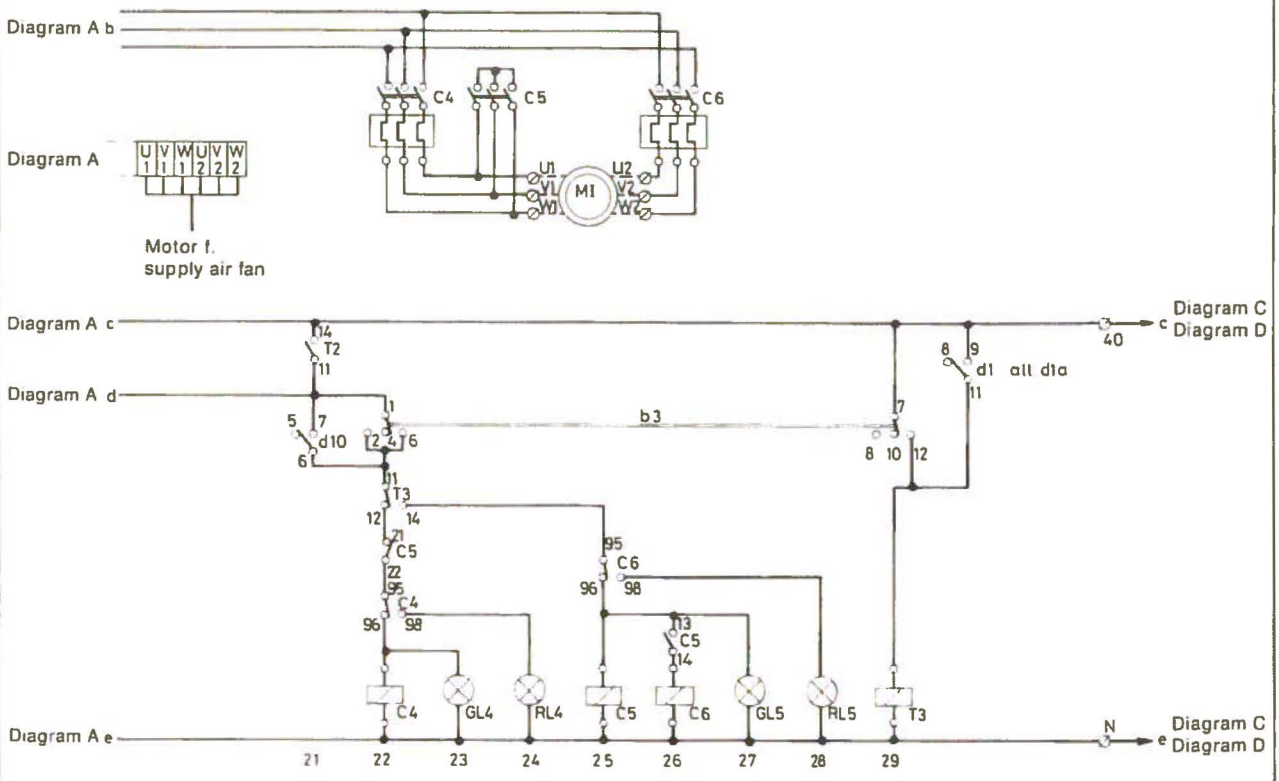
Diagram B-III



XVV/W - Supply air

2-speed motor, low/high start

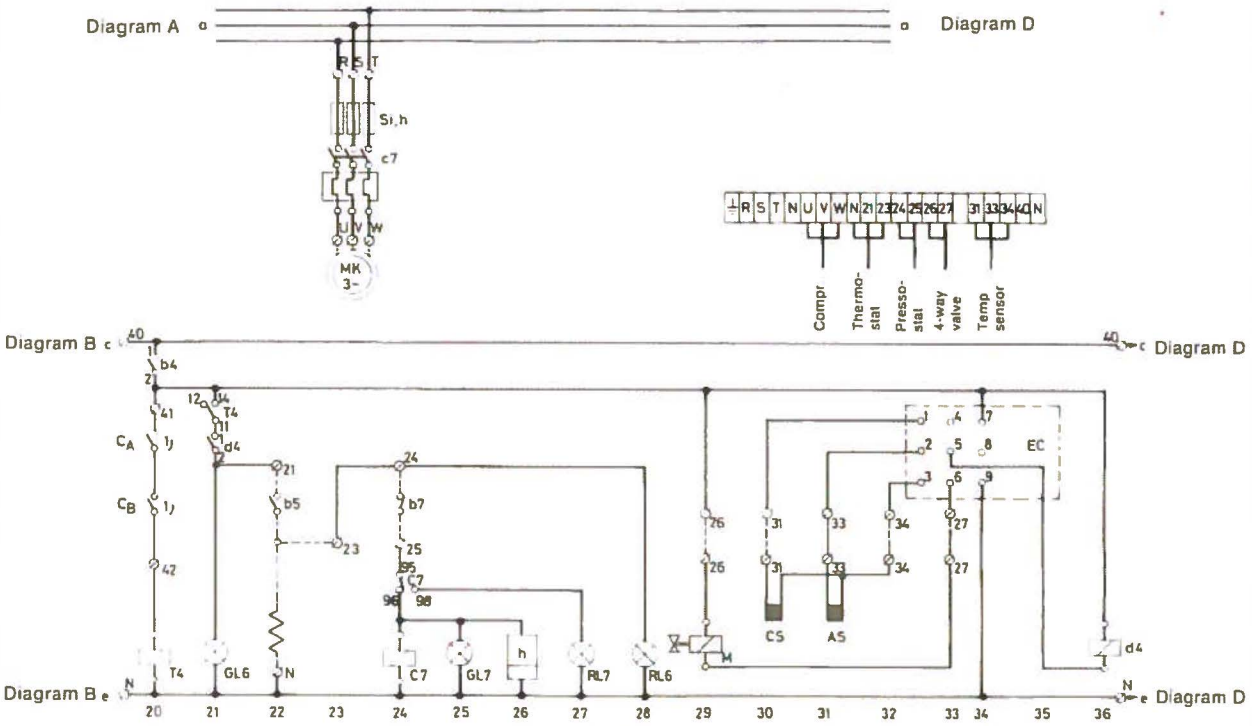
Diagram B-IV



XVV/WP - Heat pump

Standard for winter operation

Diagram C-I

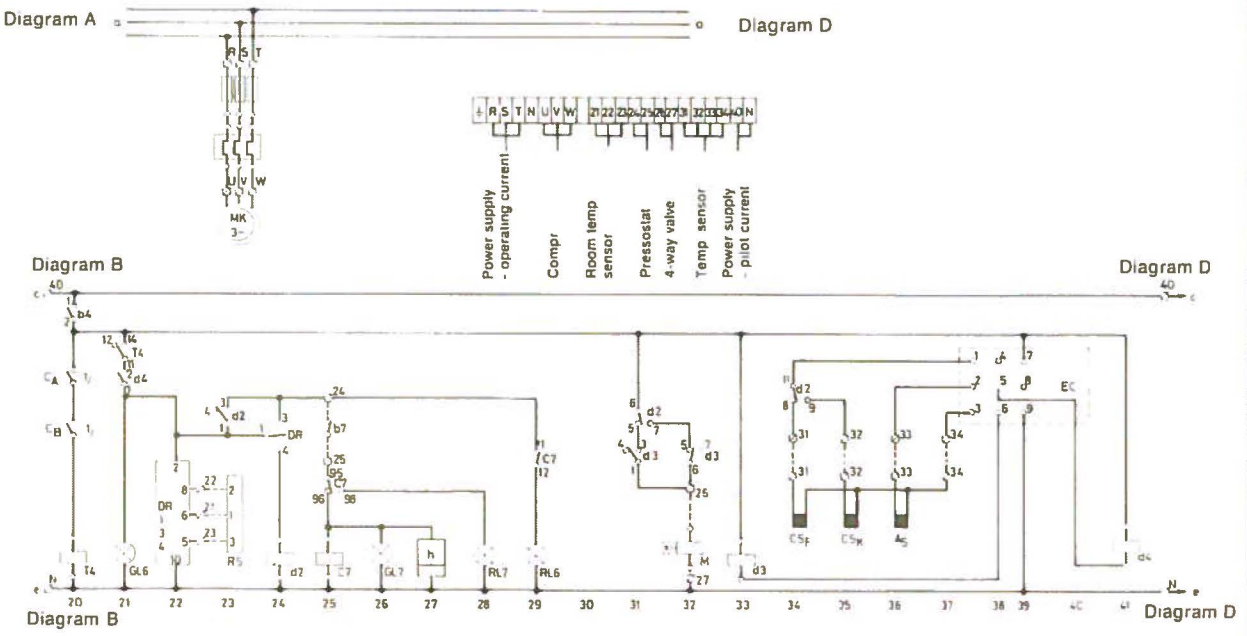


1) Diagram A-I, C_A C1 13-14 — Diagram A-III, C_A C3 23-24 — Diagram B-I, C_B C4 13-14 — Diagram B-III, C_B : C6 23-24
Diagram A-II, C_A C2 13-14 — Diagram A-IV, C_A C4 23-24 — Diagram B-II, C_B C5 13-14 — Diagram B-IV, C_B : C6 23-24

XVV/WP - Heat pump

Winter-/summer operation

Diagram C-II

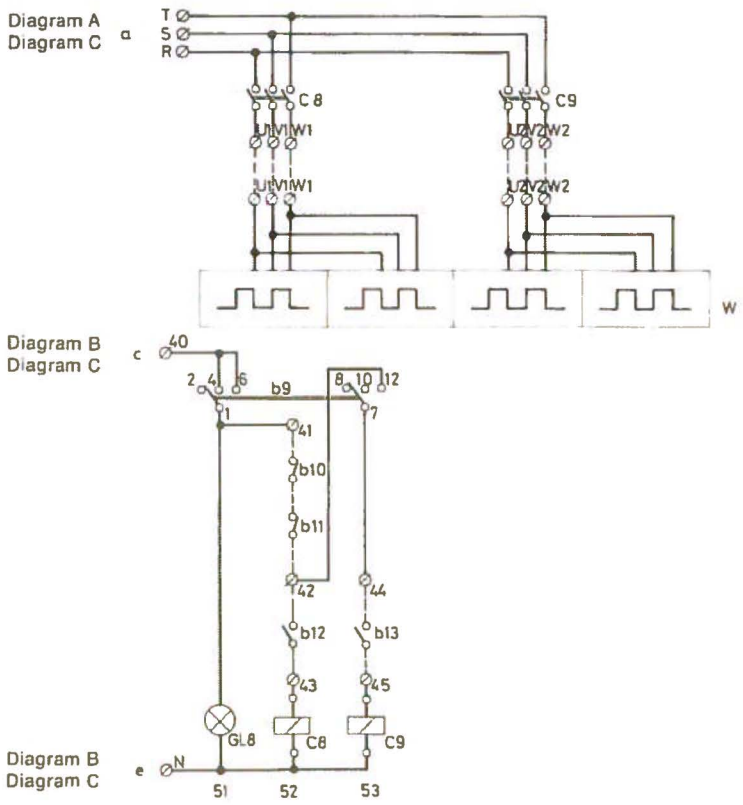


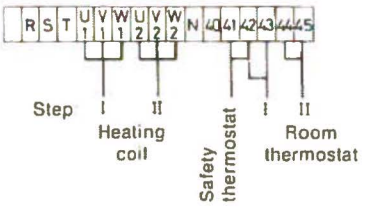
1) Diagram A-I, C_A C1 13-14 — Diagram B-I, C_B C4 13-14
Diagram A-II, C_A C2 13-14 — Diagram B-II, C_B C5 13-14
Diagram A-III, C_A C3 23-24 — Diagram B-III, C_B C6 23-24
Diagram A-IV, C_A C3 23-24 — Diagram B-IV, C_B C6 23-24

XVV / - Electric Heating Coil

Thermostat controlled

Diagram D-I

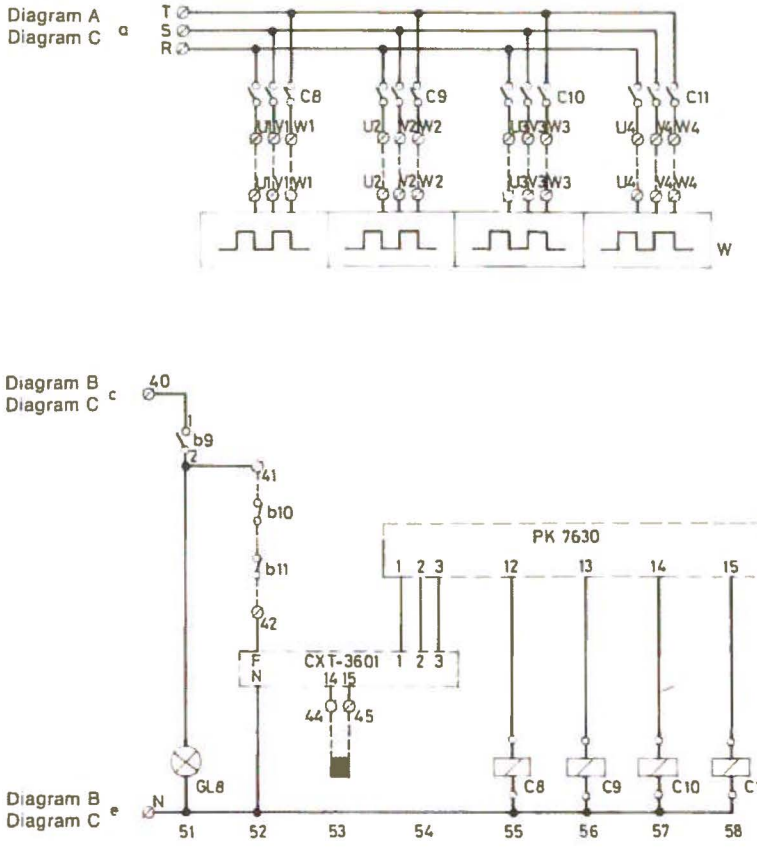


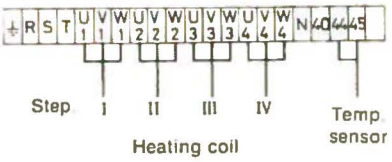


XVV / - Electric Heating Coil

Electronic control

Diagram D-II



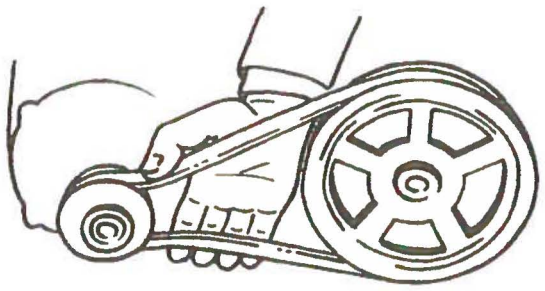


4. Commissioning

The r.p.m rating of the fan is set at the factory to give the required air output as ordered, but it may be necessary to increase or decrease the required amount of air flow and the adjustable pulley will give 5% variation either way.

To change the adjustable pulley, slacken off the allen grub screw and screw the pulley in to increase the r.p.m. and out to decrease the r.p.m. of the fan. If twin V-belts are fitted, ensure that tension is the same on both belts and be sure to tighten the allen grub screws well after the adjustment. At the same time, slacken off the four bolts holding the motor base plate and it will be possible to move it towards the fan or away from it.

The belts are tightened in this way and after having locked the motor base, ensure that with a light pressure the belts can be moved inwards about 20 mm.



When adjusting the r.p.m. rating of the fan, it is necessary to check the power consumption of the fan motor by means of an ammeter. The power consumption should not exceed the value stamped on the motor.

5. Maintenance

The requirement for inspection and service will depend on site conditions and the treated air.

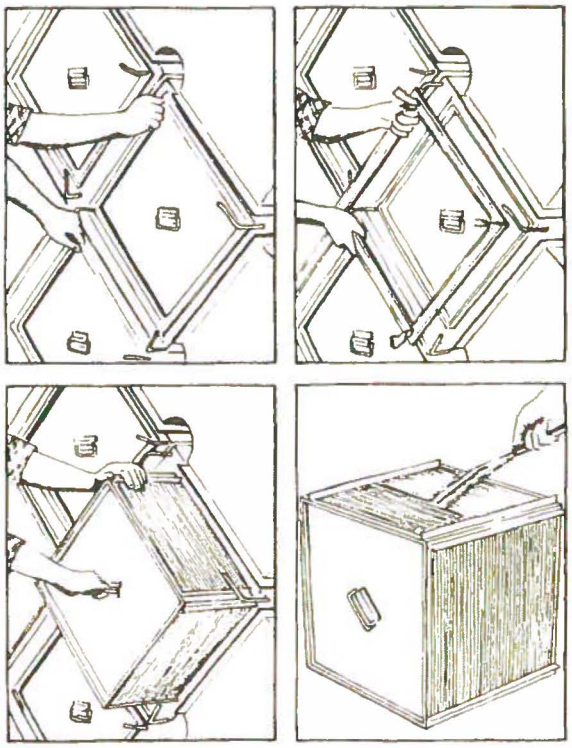
The different components of the plant require different kinds of inspection but irrespective of the regular operational inspection, at least one thorough inspection should be carried out each year.

5.1 Cleaning of recuperator module

Remove the recuperator from the frames after having taken off the front sealing frame.

The locking handles on each corner are turned clockwise 45° to a position so that the levers are parallel to the edge of the frame.

At this position the pin on the shaft of the handles will be in line with the cut-out slot in the frame and the handles can be pulled outwards releasing the pressure from the seals and also freeing the front sealing frame.
Remove the front sealing frame by turning the corner locking catches outwards and inwards.
By pulling firmly on the handles, the modules can be withdrawn from the frame and removed for cleaning.



5

Depending upon the condition of the modules, cleaning can be done in one of two ways. For normal dust deposits, blow compressed air through each plate spacing. When the deposit on the plates consists of grease, hose down with hot water and detergent. If necessary, immerge the module in a suitable vessel filled with a detergent solution.
Do not use hard or sharp tools to remove deposits as the plates are easily damaged.
If the deposits are of such a nature that cleaning takes a long time, it is advisable to have a spare set of modules available.
Before replacing the module, check the seals at both ends of the module for damage or loss of flexibility. To change the seal prise up the edge of the seal and pull clear from the channel. Fit the new seal and trim ends to make an airtight fit.

Smoke test
In order to test for leakage in the recuperator, a smoke test carried out in the exhaust ductwork will reveal if smoke is leaking into the fresh air. If so, the recuperator plates may be leaking or- more probable - the rubber seals need replacing.

5.2 Check of module frames

With the modules removed for inspection, check that all four seals on the locking rails are intact and have a smooth surface. If they are damaged, they must be replaced. To do this, insert a fine tool under the front edge and prise upwards. The seal can now be lifted clear of the recess.

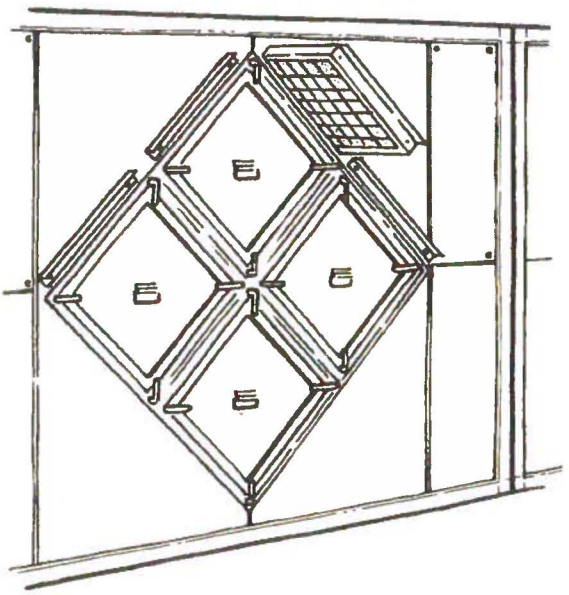
Cut a new section of seal at the correct length and insert into the recess. Push the seal carefully into the recess. Check that the locking mechanism still moves easily. If there is any stiffness in the movement, lubricate the slide mechanism and make several movements to disperse the oil, wait approx. 10 minutes and wipe away any surplus oil. If the locking pin is damaged, it should be replaced. As the handle is screwed into the locking mechanism it is possible that it may by accident have been screwed out of adjustment.

Check if there is any slackness when in locked position. If so it can be rectified by screwing the handle outwards until it fits tightly.
If it is not possible to lock, then screw in the handle.

Check the sealing material on the front sealing frame, and replace if necessary.

5.3 Cleaning of filter

5.3.1 Cleaning of flat plate filter



The area of the flat filters is relatively small and therefore will get dirty fairly quickly and require inspection and cleaning to be carried out frequently.

For cleaning take out the flat filters after having unscrewed the two quick-release screws on the guide plate.

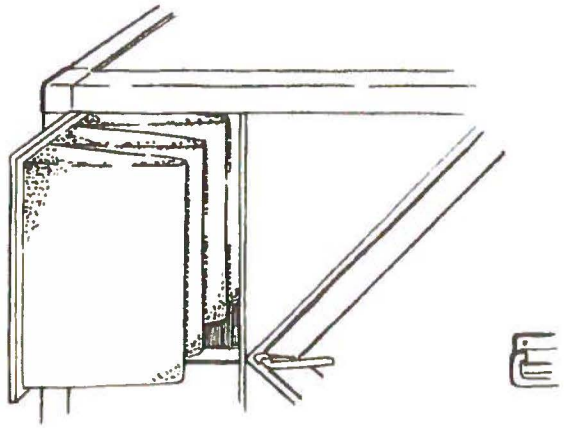
The filter mat is fitted between two wire netting frames and can be removed for cleaning, either by blowing compressed air through it or by vacuum cleaning. It is also possible to wash it in soapy water, and it should be replaced now and then.

According to the ASHRAE Standards, this flat filter is defined as a coarse filter type G 85.

Filter mats of the following dimensions are required for the various models.

XVV	Quantity	Dimensions in mm
11	2	435× 380
12	2	435× 780
13	2	435×1180
14	2	435×1580
41	4	435× 380
42	4	435× 780
43	4	435×1180
44	4	435×1580

5.3.2 Cleaning of bag filters



Bag filters, if fitted, are situated behind the top service covers and are accessible after having removed the covers.

To remove the service cover, turn the small screw in the middle of the four locking brackets 5-8 times, turn the locking brackets 90° and the cover can be removed.

The bag filters are fitted on sliding rails and can be withdrawn for cleaning, which is done either with compressed air or by vacuum cleaning. The filters can be washed in soapy water and should be replaced from time to time.

5.4 Cleaning and check of fans

Check and clean the fan unit at least once every 12 months. Remove the cover panels of the fan unit as described above for service covers 5.3.2.

Remove dust or other deposits from the fan blades with a vacuum cleaner.

Check the fan bearings for slackness or noise. Defective bearings must be replaced.

Normally it is not necessary to remove the fan from the cabinet when replacing the bearings.

5.4.1 Replacement of fan

To replace the fan, the following procedure should be followed:

Top fan:
Remove all side and top cover panels of the fan unit and the cover plate of the recuperator unit adjacent to the fan unit. Remove the motor as described, if necessary. Remove the four bolts, retaining the fan housing to the base and lift the fan free from the cabinet. To refit fan and motor, follow the opposite procedure.

Bottom fan
Remove the bottom cover panels of the fan unit and recuperator unit adjacent to the fan unit. Remove motor and V-belts.

In some cases it is not necessary to remove the motor. Remove the four bolts retaining the fan housing to the base. To remove the rear bolts a socket extension is required.
Now it is possible to take away the fan from the cabinet.

Check the direction of rotation and that the belt tension is correct as mentioned above.

5.4.2 Check and replacement of fan motors

From the factory the motor is fitted with an acid free, high quality lubricating grease with a life time of about 10.000 working hours or maximum 3 years. After this period the bearings should be completely cleaned of the old grease and half filled with new. Should too much grease be applied there is a risk of the bearings being damaged because of overheating.

Replacement of motors
The motors are mounted on an adjustable base, which allows tightening of the V-belt. Motors are held by four bolts, which are accessible when taking away the belts and tipping the motor base.

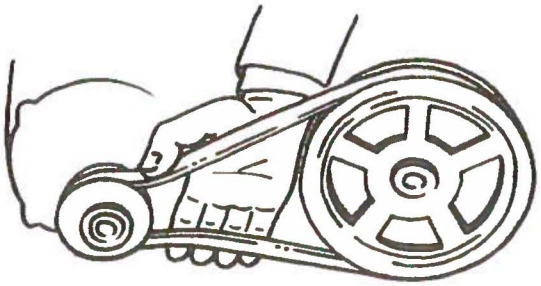
Remove the old motor and fit the new one with its pulley fitted. Ensure that the V-pulleys are in line when fixing the motor.

After having fitted the V-belts they have to be adjusted for correct tension. This is done by tipping the adjustable motor base. The correct tension of the V-belt is such that with a light pressure between the fingers, the belt can be moved about 20 mm.

Check the rotation direction of the fan after having re-established the electricity supply.

5.4.3 Check of fan drive

The belt tension of the fan transmission should be checked at the same time as the annual inspection.



The tension of the belt is correct when with a light pressure the belt can be moved about 20 mm. To adjust the belt tension, slacken off the four bolts holding the motor base and it will be possible to tip the motor to tighten the belt.

Check the belt tension again after having locked the motor base in position.

At the first sign of wear, replace the fan belts.

Ensure that the pulleys are firmly fixed to the shafts and that the adjustable section of the pulley is tightened up.

5.5 Check of heat pump

The heat pump must be serviced by a qualified refrigeration engineer. If the heat pump is in use for the winter period only, servicing should be carried out annually, otherwise two service visits will be required to maintain the efficiency of the unit. Most components used in the unit are generally available, whereas evaporator and condenser coils can be obtained from Dantherm as spare parts.

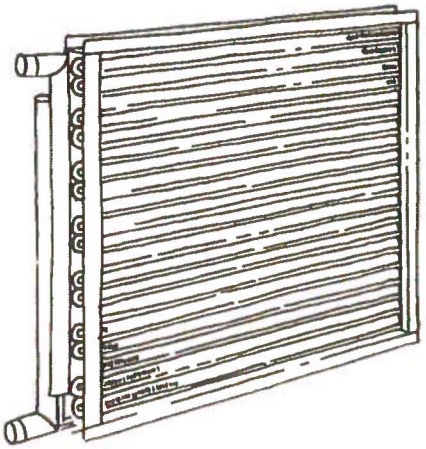
5.6 Cleaning of electric heating coils

Check and tighten all wire connections for power to the heating coils. Check that no internal wires are burnt or damaged. Check the thermostats for correct setting.

Clean off any deposits of dust from the heating elements and fin section by blowing with compressed air or by brushing.

5.7 Cleaning of LPHW or steam heating coils

Check for leaks and clean fin section as mentioned above. Check motorised valves, if fitted, for correct operation.



5.8 Cleaning of condensate drain

The condensate pipe should be checked and cleaned, if necessary, and any sludge accumulating in the condense tray should be removed.

5.9 Check of cover panel insulation

Check for any damage to the insulation of the cover panels and replace, as necessary.

5.10 Check and lubrication of dampers

Check and lubricate all moving parts.

Motor actuators should be checked for full travel, and all connections should be tightened. Lubricate with light oil.