UNIFLAIR

UNISPLIT

AIR-COOLED DIRECT-EXPANSION AIR CONDITIONING UNITS

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

Read this manual carefully before creating the network connection of the units and keep it for future reference

GB

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IMPORTANT SAFETY WARNINGS

This unit has been subjected to risk analysis under EC Directive 89/392/CEE. The technical solutions implemented during the design phase are described in the unit's technical documentation.

This unit is built to perform the functions for which it was designed without risk. There are however some residual risks, particularly regarding maintenance.

These risks do not entail danger to the user as long as the installation, operation and maintenance of the unit are all carried out according to the instructions in this manual and on the labels on the unit.

This unit contains refrigerant gas circuits under pressure, live electrical components, hot surfaces and rotating devices such as the fans

Before accessing the inside of the unit, disconnect it from the electrical power supply.

All service and maintenance operations which require access to the inside of the unit while it is in operation must be performed by qualified and experienced personnel who are aware of the necessary precautions.

In the event of fire, water and other conductive substances must not be used to put out the fire near live electrical components. This warning must be displayed on notices in the unit installation location.

In any case, all safety legislation of the installation location must be followed.

If the refrigerants used come into contact with fire they decompose, forming acids and other irritants. The smell of these substances, **even at concentrations below danger levels,** gives enough warning to allow evacuation of the area at risk.

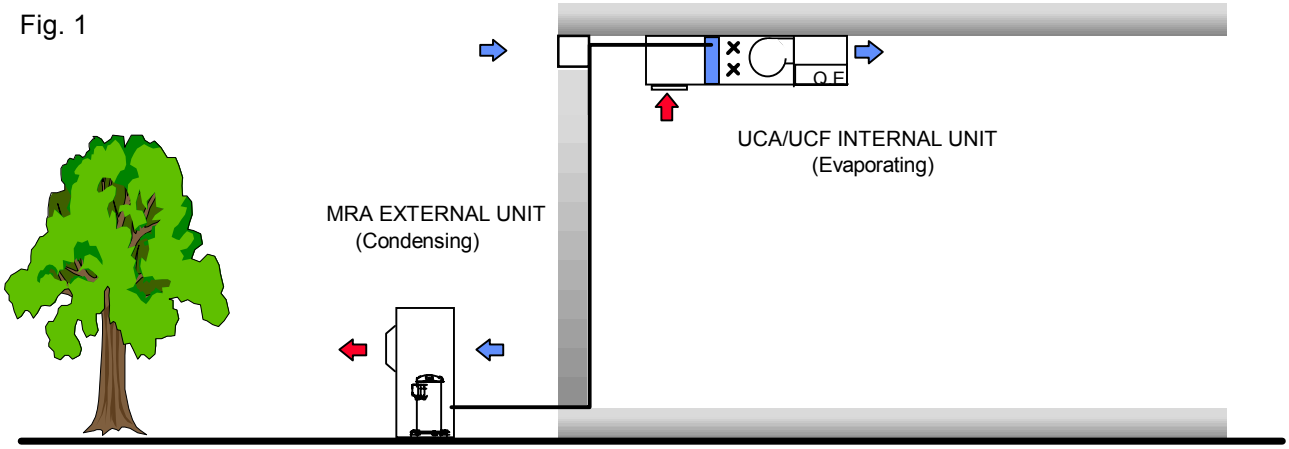
INDEX

	PAGE
Important safety warnings	2
Index	3
Function principles	4
Unit with free-cooling cycle - UCF	5
Basic instructions	6
Starting the unit	6
What to do if the unit does not start	6
What to do if the unit does not provide enough cooling	6
Stopping the unit	6
Regular maintenance	7
Data plate	7
Internal unit - UCA/UCF	7
External unit - MRA	
General characteristics	8
Function limits	8
Dimensions and weights	9
Transport and preparation	10
Receiving the unit	10
Moving and storage	10
Positioning the internal unit - UCA/UCF	10
Positioning the external unit - MRA	10
Connecting the user terminal	12
Connections for external free-cooling air	12
Accessing the unit	13
Internal unit - UCA/UCF	13
External unit - MRA	13
Refrigerant connections	14
Connecting the condensate drain	14
Electrical connections	15
Connection to the mains, cable sections, protection	15
Electrical characteristics of components	15
Power supply cable sections and recommended line fuses	15
Start-up and testing	16
Evacuating the refrigerant circuit	16
Start-up procedure	16
Refrigerant charge	16
Regulation of condensation pressure	16
Regulating the air-cooled condenser fan	17
Setting the regulation and safety devices	17
Setting the dirty filter sensor	17
Problem solving	18
Maintenance	20
Cleaning and changing the air filter	21
Maintenance of the damper - replacing the motor	21

FUNCTION PRINCIPLES

The UNISPLIT is an air-cooled direct-expansion air conditioning unit.
UNISPLIT air conditioners consist of two distinct elements: the evaporating section (UCA/UCF) installed in the air conditioned room and the condensing section (MRA) installed outside.
The evaporating section is designed for ceiling installation and enables the controlling of room parameters via a sophisticated microprocessor control.

Fig. 1



The free-cooling system of the UCF version uses a damper to permit the intake of external air if its temperature is low enough to dissipate the thermal load (see section on microprocessor control).

The air from the room is taken in via the grille on the underside of the unit (or via the external air intake on the UCF model), filtered, cooled by the evaporator coil and discharged into the room via the front output plenum with double row of louvers.

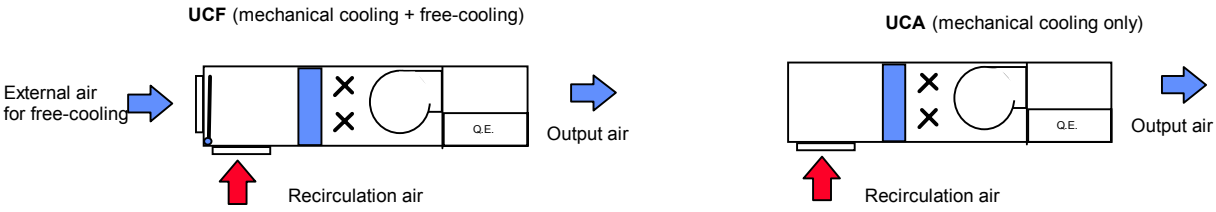


Fig. 2

The refrigerant compressor is in the external unit, located in a front-access compartment isolated from the airflow. An axial fan moves the airflow across the condenser.

An optional electric resistance for re-heating can be fitted downstream from the evaporator coil.

UNIT WITH FREE-COOLING CYCLE - UCF

The free-cooling cycle consists of the introduction into the room of external air when this is cold enough to dissipate the thermal load in the room.
The unit has a butterfly grille and two air intakes:

- recirculation air intake
- external air intake.

A. **NORMAL FUNCTION** (Fig. 3a)
During normal function the damper is positioned to take in air only from the room, closing the external air intake. The air taken in is filtered, cooled and re-introduced into the room.
Cooling is via the refrigerant cycle, starting the compressor of the external unit.

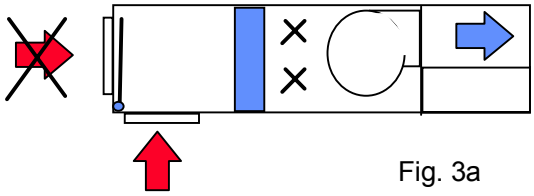


Fig. 3a

B. **FREE-COOLING** (Fig. 3b)
As soon as the external air reaches a low enough temperature to maintain room temperature at the required level, the damper changes position to take in and discharge into the room external air instead of recirculated air.
The expulsion of the air must be guaranteed by fitting en excess pressure damper in the room to allow the expulsion of the same quantity of air as that introduced by the free-cooling cycle.
During free-cooling function the compressor is off.

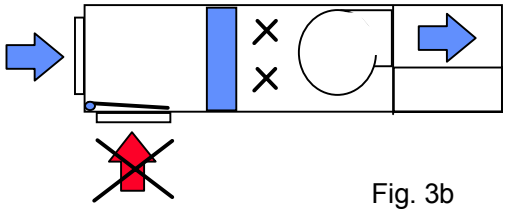


Fig. 3b

C. **MODULATING FUNCTION** (fig. 3c)
If external temperatures fall even further the introduction of only external air would provide too much cooling for the room.
The control system therefore modulates the position of the damper, mixing external air with recirculated air and maintaining room temperature at the required level.
In any case, the temperature of the air introduced into the room is kept above a pre-set minimum level.

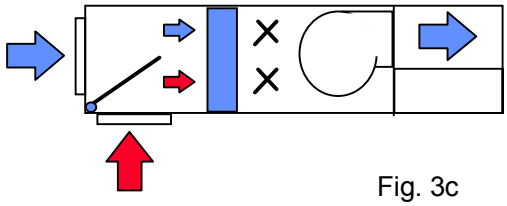


Fig. 3c

D. **INTELLIGENT FREE-COOLING**
This is an exclusive feature which enables dynamic energy-saving management and which gives far superior performance compared to conventional fixed-point free-cooling systems.
The microprocessor compares the thermal load in the room at that moment with the external temperature and calculates the optimum temperature at which to start free-cooling operation.
In this way the temperature at which free-cooling starts is not fixed but adapts to the changing conditions of the room.

	⇒ external temperature increase ⇒			
Mechanical cooling (compressor)				
Free-cooling				
Internal air recirculation				

BASIC INSTRUCTIONS

This section contains only a summary of the information necessary for the operation of the unit. Please refer to the following pages for further details.

IMPORTANT: the description of the control system and of the unit's function logic is given in the instruction manual for the mP20 microprocessor control.

STARTING THE UNIT

CONNECT the power to the electrical panels of both the internal and external units. Close the switch on the unit, turn on the power supply and check that the yellow LED on the control circuit is on.

DO NOT START THE UNIT FOR AT LEAST 12 HOURS to allow enough time for the electric resistance to evacuate any refrigerant which has accumulated in the compressor crankcase. **AFTER AT LEAST 12 HOURS** from when the power supply was turned on:

- **ARM** the automatic switches on the electrical panel
- **OPEN** the intercept valves on the refrigerant circuit
- **START** the unit by pressing the ON/OFF button on the control panel. The fan will start after a short delay and the green LED on the user terminal will come on.
- **If there is an alarm condition**, signalled by the red LED and the buzzer on the user terminal, please refer to the instruction manual for the microprocessor control.

WHAT TO DO IF THE UNIT DOES NOT START

Check that:

1. the electrical panel and the auxiliary circuit transformer primary are powered
2. the general switch and the automatic switches on the electrical panel are closed
3. the fuse on the auxiliary 24V circuit is not blown
4. the connectors on the control circuit are correctly inserted
5. the yellow LED on the control circuit is on
6. there are no alarm conditions signalled by the user terminal with the buzzer or the red LED
7. the external unit has power supply and that RPT terminals 20 and 240 are powered.

WHAT TO DO IF THE UNIT DOES NOT PROVIDE ENOUGH COOLING

If, 30 minutes after starting up the unit, the room temperature is too high, check that:

1. the electrical panel has power supply
2. The automatic switches on the electrical panel are all armed
3. The control is not signalling an alarm condition (see also the instruction manual for the control)
4. the temperature set value is correct and that the compressor is working
5. the airflow is not obstructed (see section on Air Distribution)
6. The thermal load to be dissipated is not greater than planned
7. the external unit has power supply

IMPORTANT: in the event of a fault with the unit, call only qualified technicians for service

STOPPING THE UNIT

To stop the unit press the On/Off button on the user terminal. After a short interval, the fan will stop and the green LED will go off.

Only in the event of long shutdown periods is it recommended to switch off the power supply. and open the switch on the unit itself.

REGULAR MAINTENANCE

(see also the section on Maintenance)

- **Check** that the room parameter values shown by the control are correct
- **Check the filters regularly** for dirt and obstructions and replace them in the event of a dirty filter alarm
- **Check** the refrigerant charge, ensuring that there are very few or no bubbles visible in the flow sight glass on the refrigerant circuit
- **Check** that the noise made by the unit is normal
- **Check** the correct flow of condensation water to the drain
- **Remove** all foreign bodies (leaves, seeds, dust, etc.) from the external condensing unit using a jet of compressed air or water.

DATA PLATE

The data plate is located in the electrical panel compartment and gives the following information:

- Model
- Serial number
- Current and power absorbed
- Set values for the regulation and safety devices

The table below gives the identification system for UNISPLIT air conditioning units.

INTERNAL UNIT - UCA/UCF

Family	Type	Function	Model	Number of Compressors	Version	Control System
U: UNISPLIT	C: Ceiling unit	A: mechanical cooling F: mechanical cooling + free-cooling			C: Base version T: version with electric re-heat	W:. mPW microprocessor
U	**C**	**F**	**034**	**1**	**C**	**W**

EXTERNAL UNIT - MRA

Family	Compressor Type	Function	Model	Number of Compressors	Version	Control System
	R: hermetic rotating scroll	A: Air-cooled			0: Standard	N: no control
M	**R**	**A**	**022**	**1**	**0**	**N**

GENERAL CHARACTERISTICS

These characteristics refer to standard units and may change for special or modified units.

INTERNAL UNIT

MODEL UC*...		0341		
POWER SUPPLY	V/ph/Hz	230/1/50		
COOLING CAPACITY				
Room at 24°C - 50% UR (1)	kW	5.7	7.1	8.0
Room at 26°C - 45% UR (1)	kW	5.9	7.2	8.2
Room at 26°C, T_{ext} = 14°C (2)	kW	6.7	6.7	8.1
CENTRIFUGAL FANS				
Nominal airflow	l/s	515	515	810
	m³/h	1850	1850	2200
Number of fans (3)		1	1	1
Nominal power absorbed (each)	kW	0.44	0.44	0.44
AIR FILTER				
Efficiency (doc Eurovent 4-5)		EU2	EU2	EU2
Front dimensions	mm	845x300	845x300	845x300
EVAPORATOR COIL				
Frontal surface	m^2	0.23	0.23	0.23
Number of rows		4	4	4
ELECTRIC HEATER (optional)				
Number of steps		1	1	1
Total capacity	kW	3	3	3

(1) Mechanical cooling con T_{ext} = 35°C

(2) Free Cooling

(3) The fan group consists of two impellers splined on a single shaft.

EXTERNAL UNIT

MODEL MR*...		0221	0281	0341	0221	0281	0341
POWER SUPPLY	V/ph/Hz	230/1/50			400/3/50		
REFRIGERANT COMPRESSOR							
Type		SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
Nominal absorbed power (ARI standard)	kW	1.8	2.2	2.5	-	-	2.5
CONDENSER FAN							
Nominal airflow	l/s	500	830	830			
	m³/h	1800	2990	2990			
Number of fans/poles		1 / 6	1 / 6	1 / 6			
Nominal absorbed power (each)	kW	0.14	0.14	0.14			
CONDENSER COIL							
Fin/tube material		Al / Cu	Al / Cu	Al / Cu			
Frontal surface	m^2	0.36	0.36	0.36			
Number of rows		3	3	3			

FUNCTION LIMITS

The external MRA unit can operate with external temperatures between -15°C and +46°C; the internal UCA/UCF unit is designed to operate in temperatures between 18 and 32°C.
Intelligent free-cooling is activated as a function of the thermal load in the room and the external air temperature (unlike conventional fixed point systems which start at a pre-set temperature - see also mP20/W instruction manual).

DIMENSIONS AND WEIGHTS

INTERNAL UNIT UCA-UCF0341

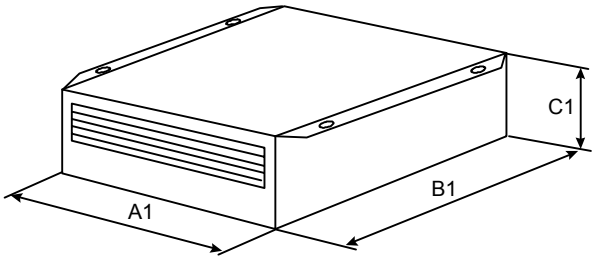


Fig. 4a - Unit without packing

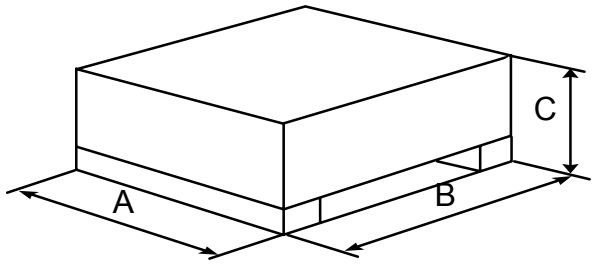


Fig. 4b - Unit with packing

EXTERNAL UNIT MRA0221-281-341

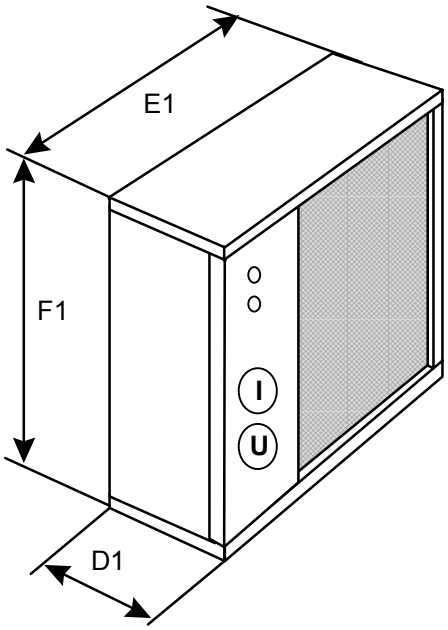


Fig. 4c - Unit without packing

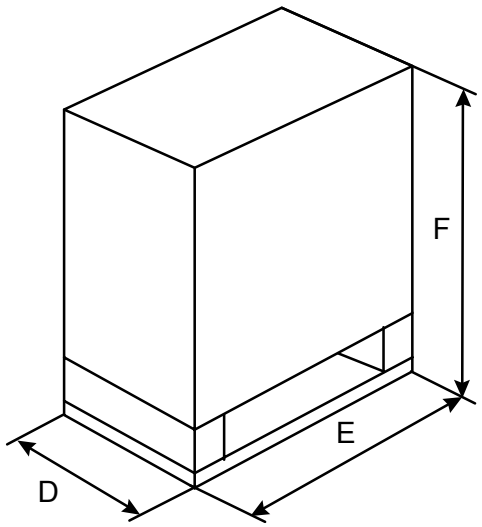


Fig. 4d - Unit with packing

Unit dimensions in mm, with and without packing, are given in the table below.

	Unit without packing						Unit with packing					
Unit	**A1**	**B1**	**C1**	**D1**	**E1**	**F1**	**A**	**B**	**C**	**D**	**E**	**F**
UC*0341	950	1050	330	-	-	-	1060	1150	490	-	-	-
MRA0221	-	-	-	360	850	610	-	-	-	480	910	760
MRA0281	-	-	-	360	850	610	-	-	-	480	910	760
MRA0341	-	-	-	360	850	610	-	-	-	480	910	760

The weight of the internal unit UCA/UCF is approximately 105 kg with electric heater and packing; the weight of the external unit MRA is approx. 75 kg.

TRANSPORT AND PREPARATION

RECEIVING THE UNIT

When the unit is delivered check that it is complete and in perfect condition; **notify the transport immediately of any damage** which might be due to careless transport.

MOVING AND STORAGE

Move the unit as close as possible to the installation location before removing the packaging. **The unit must never be tilted or turned upside down, nor exposed to the elements**.
Lifting can be done:
- with a fork-lift, inserting the forks in the holes in the pallet
- with slings under the unit (the slings must not exert pressure on the sides of the unit).

The unit must be stored, preferably in its own packaging, in a closed environment protected from excess humidity and temperature (< 90% R.H, < 50°C).

POSITIONING THE INTERNAL UCA/UCF UNIT

The internal unit UCA/UCF must be fixed via the side flanges to the ceiling of the room, using the screws supplied; check that the ceiling is strong enough to support the weight of the unit. When installing the unit check that it is level; an inclination of more than 1° could cause the condensate tray to overflow.

IMPORTANT: the unit must be installed in a closed room and must not be exposed to the elements.

POSITIONING THE EXTERNAL MRA UNIT

This unit is designed to be installed outdoors but should be protected from rain, snow and water flowing from drains or gutters. Do not install the unit near the sea (it should be at least 200m from the shore) or in areas with sulphurous springs. Make sure that the unit is not exposed to air containing inflammable or greasy substances.

The airflow taken in by the fans via the condenser coil must not be obstructed in order not to reduce efficiency or cause the compressor safety devices to stop the unit. The minimum distances in fig.5 must be respected.
The air discharge side (the fan side) must never be directed towards a wall.

If the installation location is windy, the unit should be installed in a sheltered position; the wind could obstruct the airflow through the cooling coil or make it excessive.
If this is not possible, adequate wind-protection measures should be taken (see fig. 6).

Check that the load capacity of the surface under the unit is sufficient to support its weight (see dimension diagram).

Fig. 5

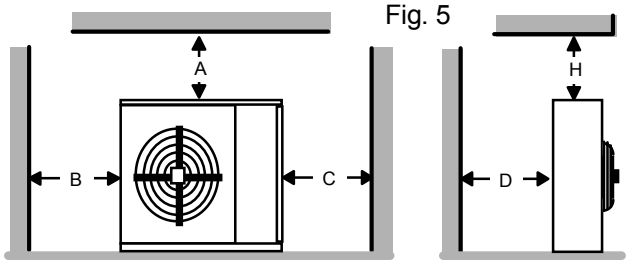
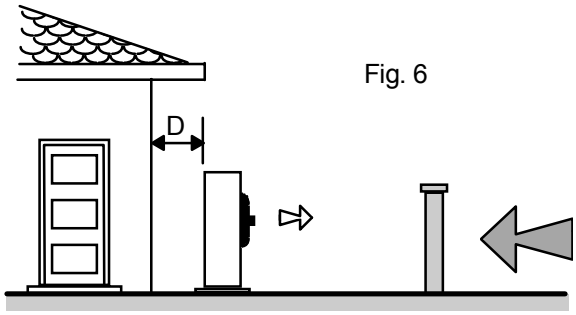


Fig. 6



Dimensions in mm	A - H	B	C	D
MRA0221	-	150	500	150
MRA0281	-	150	500	150
MRA0341	-	150	500	150

If the internal and external units are installed at different heights, do not exceed the distances in the diagram below and follow the indications in the diagrams included with the unit.

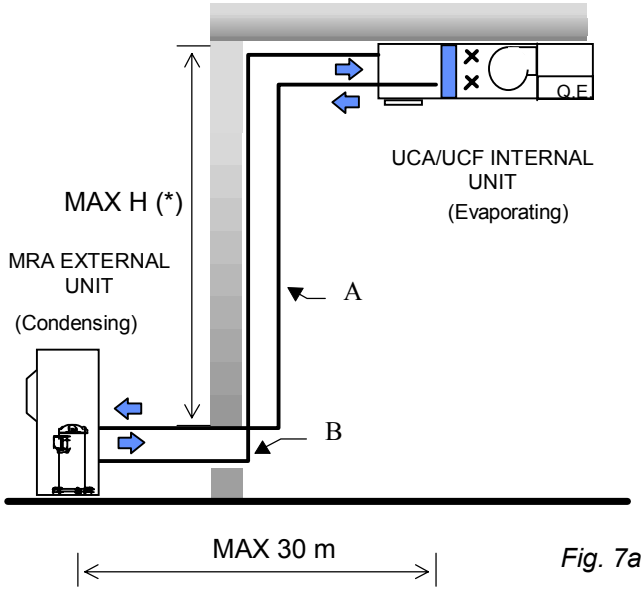


Fig. 7a

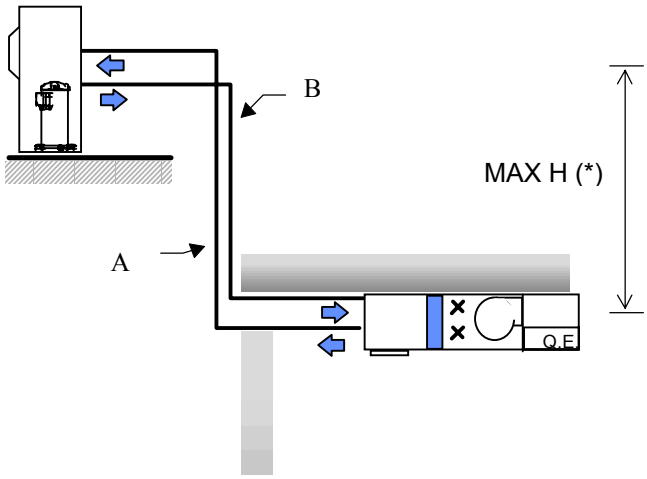
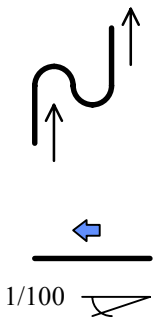


Fig. 7b

A: intake line (low pressure)
B: liquid line

Line A connections: Ø16 mm (5/8”);
Line B connections: Ø10 mm (3/8”);

(*) Max. recommended value of H is 15m if the MRA unit is positioned as in fig. 7a and 5m if positioned as in fig. 7b. A siphon and counter-siphon should be fitted every 5 metres of height difference, as shown in the diagram, right. The horizontal sections of the intake line A should have a downwards inclination of 1cm per metre towards the external unit



Position the MRA unit on a horizontal surface; in any case any inclination must be no more than 1.5°.

CONNECTING THE USER TERMINAL
(units with mP20 control)

The optional remote user terminal should be connected to the unit with shielded twisted cable of minimum 0.5mm^2 section. For connections of more than 50m please contact Uniflair Technical Assistance.
Connection of the terminal to the base circuit inside the UCA/UCF unit is via the cable supplied. Simply insert one of the two connectors into socket A at the back of the terminal casing.
The User Terminal can be mounted either in a centralised panel or on the wall, using the special recessed support supplied.

N.B.: The optional user terminal is supplied with wall fixing plate and 3 metres of cable. For longer cable lengths, please contact the nearest UNIFLAIR assistance centre.

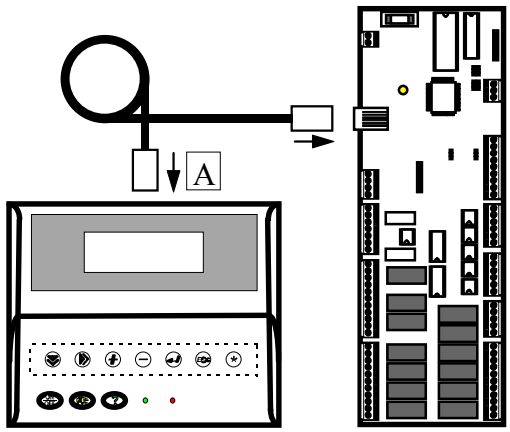


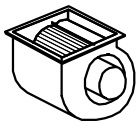
Fig. 8

The control receives current from the 230V/24V (TR) transformer in the UCA/UCF unit. It receives signals from the external MRA unit relating to power supply and the intervention of the HP and LP pressostats, via 24V auxiliary cables (min. section 1mm).
The electrical connections between MRA and UCF are shown in the electrical diagrams shipped with the unit. The terminals involved are 20,120,130,100, 0 and 240 (with the exception of special units).
On UCA units the mP20 control receives signals from the room air and discharge air sensors. On UCF units there is also the signal from the external air sensor. It is also possible to specify a power loss signal and connections for smoke/flame detectors.

CONNECTIONS FOR THE EXTERNAL FREE-COOLING AIR
UCF unit with free-cooling

Free-cooling units have a butterfly damper which enables the introduction of external air if the outside temperature is low enough to dissipate the thermal load in the air conditioned room.
It is also possible to pre-set the minimum opening of the damper to guarantee the introduction of a certain proportion of fresh air in any function mode.
The recirculated air is taken in through the grille on the underside while fresh air enters from the back of the unit.
The fresh air connections can be made either with rigid rectangular ducting or flexible circular tubes. The air intakes on the rear of the unit are Ø 250mm, as shown in the drawings of the internal unit.

UCA/UCF units have centrifugal fans; the high head pressure of these fans enables ducting of the free-cooling air.
For all installations it is necessary to make sure that the available head pressure of the unit's fan is compatible with the pressure drop of the ducting.



ACCESSING THE UNIT

INTERNAL UCA/UCF UNIT

Normal installation and maintenance operations require only the front and underside panels to be removed. It is very unlikely that the side panels will need to be opened.

ELECTRICAL PANEL COVER

The hinged protective cover of the electrical panel; to open, turn the top screws ¼ of a turn. Re-close with a screwdriver.

LOWER FRONT PANEL

The front panel gives access to the main components of the unit. To open:

- open the latches
- hold the side of the panel and pull it forwards.

To close, follow the sequence in reverse.

IMPORTANT: Support the front panel with at least one hand to stop it falling.

FAN PROTECTION COVER

The fan housing is protected by a metal cover. To access the housing, undo the screws and remove the cover.

SIDE HATCH

Remove the panel on the right hand side of the unit to access the motorised free-cooling damper.

SIDE PANELS

The side panels can be removed by undoing the fixing screws on the front and side of each panel.

EXTERNAL MRA UNIT

Turn catch 2 to remove the front panel and access the power section of the electrical panel. Undo screws 4 to access components for inspection.
To remove the panel, pull the lower end outwards and slide the top end out of the unit cover.

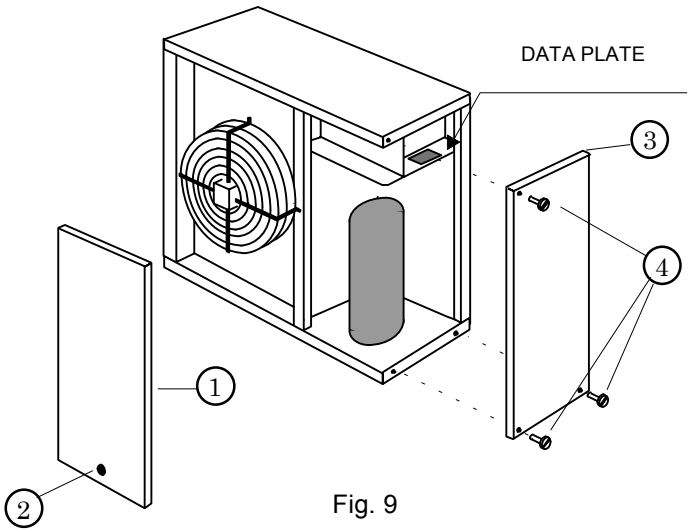


Fig. 9

REFRIGERANT CONNECTIONS

The refrigerant circuit must be connected to the external condensing unit via CUB-quality copper piping for both discharge and intake.

The total length of lines must be no more than 30m and lines must be laid by an expert refrigeration technician, following the indications in fig. 7 and paying particular attention to:

- The insulation of the gas intake piping in the rooms
- the insulation of the liquid line against sunlight or other heat sources

The valves on both units have flare connections; the diameter is shown on the diagrams included with the unit.

CONNECTING THE CONDENSATE DRAIN

Condensation water drains from the tray under the coil through a siphoned flexible tube fitted in the unit. The end of the tube should be connected to the main water drain of the building via a Ø21mm rubber or plastic tube with a minimum inclination of 1%.
If the height of the drainage point does not permit the free flow of the water, the optional condensate drain pump must be fitted (UNIFLAIR product code MPPC100X1A), which enables the water to be drained when the gravity system does not work.

ELECTRICAL CONNECTIONS

Correct electrical connections, in line with best practice and in accordance with all applicable legislation, is important for the prevention of injuries and for ensuring the correct long term operation of the unit.

CONNECTION TO THE MAINS POWER SUPPLY - CABLE SECTIONS - PROTECTION

Before carrying out any operation on electrical components make sure that there is no power supply to the unit and that the main switch on the unit is off (open). The electrical diagrams and the layout of the electrical panel can be found in the unit; these show the connections between the internal and external units, to the mains power supply and to the remote terminal.
After checking that the mains voltage corresponds with the unit's nominal data shown in the electrical panel (voltage, number of phases and frequency), insert the power cable through the pre-drilled holes in the unit.
Fix the ends of the power supply cable to the upper terminals of the general switch in the electrical panel and tighten the screws.
Both the internal and external units are fitted with general switch, automatic switches for fan circuit and electric re-heat, mains check relay (MRA only) and phase sequence control (MRA 3-phase only).

ELECTRICAL CHARACTERISTICS OF COMPONENTS

INTERNAL UNIT		FANS					RE-HEAT	
MODEL	VOLTAGE	No.	kW	OA	FLA	LRA	kW	OA
0341	230/1/50	1	0.44	2.2	3.0	4.0	3	13

EXTERNAL UNIT		FANS			COMPRESSOR					COMPRESSOR			
MODEL	VOLTAGE	No.	kW	OA	kW	OA	FLA	LRA	VOLTAGE	kW	OA	FLA	LRA
MRA0221	230/1/50	1	0.14	0.64	1.8	7.9	9.4	45.0	400/3/50 (1)	-	-	-	-
MRA0281	230/1/50	1	0.14	0.64	2.2	10.2	12.2	58.5	400/3/50 (1)	-	-	-	-
MRA0341	230/1/50	1	0.14	0.64	2.5	11.9	14.1	73.0	400/3/50 (1)	2.5	4.6	5.2	38.5

kW: nominal capacity (ARI standard conditions)
OA: current absorbed in nominal conditions;
(1): special version to order.
FLA: current absorbed at max. load
LRA: start-up current.

POWER SUPPLY CABLE SECTIONS AND RECOMMENDED LINE FUSES

	INTERNAL UNIT **VERSION C**		INTERNAL UNIT **VERSION T**		EXTERNAL UNIT **MRA** (*230/1+N/50*)		EXTERNAL UNIT **MRA** (*400/3+N/50*)	
MODEL	LINE	FUSES (a)	LINE	FUSES (a)	LINE	FUSES (a)	LINE	FUSES (a)
0221	2x2.5+2.5PE	40 A	2x2.5+2.5PE	40 A	2x2.5+2.5PE	40 A	4x2.5+2.5PE	40 A
0281	2x2.5+2.5PE	40 A	2x2.5+2.5PE	40 A	2x2.5+2.5PE	40 A	4x2.5+2.5PE	40 A
0341	2x2.5+2.5PE	40 A	2x2.5+2.5PE	40 A	2x2.5+2.5PE	40 A	4x2.5+2.5PE	40 A

NOTE (a): back-up protection before the power supply line, for I_{cc} upto 50kA

START-UP AND TESTING

EVACUATION OF THE REFRIGERANT CIRCUIT

The unit is pre-charged with a minimum refrigerant load which is not sufficient to enable the unit to function.
Create a vacuum in the connection lines and the MRA remote condenser; maintain a pressure of less than 100 absolute Pa (recommended pressure 0,3 mbar or 0.25 mmHg ca) to evacuate the air and remove any traces of humidity. Allow at least two hours to create the vacuum and maintain it for at least one hour. **Do not use the compressor to create the vacuum in the circuit.**
Fill the circuit with HCFC-R22 refrigerant until the line pressure is stabilised.

START-UP PROCEDURE

1. Check the auxiliary circuit transformer primary to ensure that the connection terminal corresponds to the effective power supply voltage.
2. Turn on the power supply to the electrical panel, close the switch on the unit, turn on the power supply to the unit and check that the yellow “LINE” LED on the control is on.
3. Arm all the automatic switches on the electrical panel
4. Open all the shut-off valves on the refrigerant circuit
5. Press the ON/OFF button on the control to start the unit. After a short delay the fan will start and the green “SYSTEM ON" LED will come on on the user terminal

If there is an alarm condition, signalled by the red “ALARM” LED and by the buzzer on the user terminal, consult the instruction manual for the microprocessor control.
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REFRIGERANT LOAD

After starting the compressor **slowly** charge the UC internal unit with refrigerant via the special valve located immediately after the thermostatic valve, until the bubbles in the flow sight glass disappear. **Check the data plates of the unit and of the compressor for the type of refrigerant used.**
The charging must be done under the project’s room conditions and with a discharge pressure of 16-18 bar (equivalent to a saturation temperature of 48°C). If the unit has on-off condensation control, make sure that the condenser fan does not keep switching on and off, if necessary by partially obstructing the intake area.
Check that the supercooling of the liquid at the thermostatic valve intake is between 3 and 5°C less than the condensation temperature reading on the manometer scale and that the superheating of the vapour at the evaporator output is between 5 and 8°C.
The dilution ratio of the system is around 5% by weight of oil to refrigerant. In the event that it is necessary to top up the oil use only these types:

Refrigerant	Type of oil recommended		
R22 (Mineral oil)	Suniso 3 GS	Texaco WF 32	Fuchs KM
R407C (POE)	Mobil EAL Arctic 22 CC	ICI EMKARATE RL 32S	

REGULATION OF CONDENSATION PRESSURE

Condensation pressure of the unit must be between:

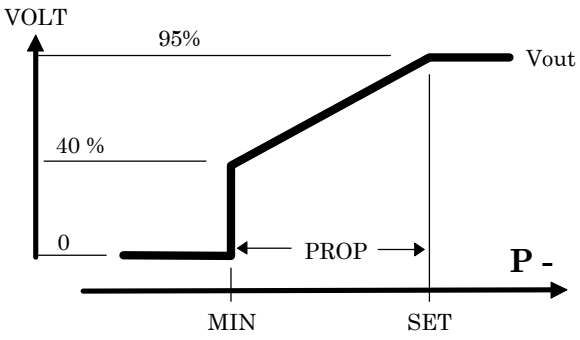
- a minimum of 40°C (for correct function of the thermostatic valve and to avoid the freezing of the evaporator coil with low temperatures)
- a maximum of 63°C.

The unit has condensation pressure regulation devices which are set as described below.

REGULATION OF THE AIR-COOLED CONDENSER FAN

Condensation pressure is controlled by a TRIAC (RVC) voltage regulator on the condenser fan power supply. Depending on the version of the unit the regulator is one of two types:

1. RVC/e, fitted on UCF units with free-cooling cycle, controlled by the microprocessor and with condensation temperature sensor. The RVC control can receive a signal from a sensor located between the flow sight glass and the thermostatic valve (UCA/UCF) via auxiliary 24V shielded cables connected to terminals Y1 and 0 (in some special units this sensor is located on the external unit, after the compressor).
   Setting is via the User Terminal (see mP20/W microprocessor control manual); standard settings are:
   - maximum speed for saturated condensation temperature of **50°C** (corresponding to a discharge pressure of 18,5 bar with R22);
   - minimum speed for saturated condensation temperature of **35°C** (corresponding to a discharge pressure of 12,7 bar with R22);
   - minimum fan power supply voltage (cut-off voltage) of 15% of mains voltage.
2. RVC/p, on UCA units without free-cooling cycle, with autonomous function and condensation pressure sensor.
   The regulator output voltage (and therefore fan speed) varies between a maximum of 95% and a minimum of 40% of mains voltage (i.e. between 220V and 90V with mains voltage of 230V) with variation of condensation pressure in the PROP proportional band (see Fig. 12).
   The SET point for pressure corresponds to maximum voltage output. It can be set with the adjustment screw on the sensor element.
   Below the MIN minimum operating pressure the fan stops. For this to happen the potentiometer on the RVC/p regulator must be turned fully anti-clockwise. If not, when pressure falls the fan would continue to function but at low speed, causing loss of control of condensation pressure with low external temperatures. The PROP proportional band is fixed at 5 bar.



Factory default settings give a maximum speed for a discharge pressure corresponding to a saturation temperature of 50°C and a minimum speed for a pressure which corresponds to 35°C (with R22).

SETTING THE REGULATION AND SAFETY DEVICES

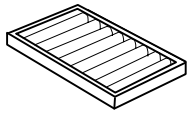
After starting the unit, make the following settings:
- **Room temperature:** see mP20/W microprocessor control manual
- **Dirty filter differential pressostat (optional):** see section on SETTING THE DIRTY FILTER SENSOR.

For information regarding the airflow sensor, see the mP20/W microprocessor control manual.
Check that safety devices are set to the values given in the following table:

Ref.	Description	Action	Diff.	Re-set
AP	HP Pressostat	25.5 bar (opening)	-	manual
BP	LP Pressostat	2.0 bar (opening)	1.5 bar	3.5 bar
TSR	Electric heater safety thermostat	320°C (opening)	-	manual

The UCA/UCF internal unit is fitted with an airflow pressostat (FS). This detects potentially dangerous situations resulting from function of the electric re-heat (on UC* 0341 T* models) if the fan is faulty or the filter is blocked. If there is little or no airflow the temperature inside the unit could reach very high levels. Further protection is provided by the heating element safety thermostat (TSR) and the emergency function relay (RFE) which cuts power supply to the heating element and activates free-cooling function if the power to the external MRA unit fails (see mP20/W manual).

SETTING THE DIRTY FILTER SENSOR



The optional dirty filter pressostat (PFS) must be set as a function of the pressure drop. This depends not only on how dirty the filter is but also on the airflow and therefore on the setting of the speed regulation. The setting must be made when the filter is clean and in the following sequence:
- Set the speed regulator at the desired function value (see FAN SPEED REGULATION)
- Set the pressostat intervention point at 1.5 mbar
- Gradually cover the filter; check that the pressostat intervenes with around 50-60% of the surface covered;

If the pressostat does not intervene, gradually reduce its setting; if it cuts in too soon, raise the setting..

PROBLEM SOLVING

PROBLEM	POSSIBLE CAUSE	CHECK/CORRECTIVE ACTION
THE AIR CONDITIONER DOES NOT WORK	There is no power supply to the electrical panel	Check for mains power on both the internal and external units
		Check that the main switch is closed
	The base circuit of the mP20 microprocessor control has no power supply	Check that the fuses are active
	The circuit does not receive function command	Check for alarm conditions
THE COMPRESSOR IS NOISY	The compressor is damaged	Call the nearest service centre for repair or replacement of the compressor
HIGH OUTPUT PRESSURE OR INTERVENTION OF HIGH PRESSURE PRESSOSTAT	Airflow to the condenser is insufficient or the intake temperature is too high	Check for any re-circulation of condensation air and the positioning of the external MRA unit
		Check that the temperature of the condensation air is within the unit's function limits
		Check the fan rotation direction; remove any material blocking the condenser (leaves, paper, etc.)
		Check that the finned coil and the filter are not dirty
	The filter and the condenser coil are dirty but the dirty filter pressostat does not intervene	Set the pressostat
	The fan is not working	Check for intervention of thermal and/or magnetic fan protection
		Re-set or replace the faulty fans
	There is air in the circuit, shown by bubbles, despite super-cooling	Evacuate and re-charge the circuit
	There is excessive supercooling at the condenser liquid output	There is too much refrigerant in the circuit; the condenser is partially flooded: remove some refrigerant from the circuit.
	Valves on the circuit are partially closed	Check the opening of the valves
LOW CONDENSATION PRESSURE	The temperature sensor is not working	Check the function of the air temperature sensor
	The unit operates with external temperatures which are too low	Check that the unit is functioning within the temperature limits given in this manual

PROBLEM	POSSIBLE CAUSE	CHECK/CORRECTIVE ACTION
LOW CONDENSATION PRESSURE OR INTERVENTION OF LOW PRESSURE PRESSOSTAT	The thermostatic valve is not set or defective	Check that the superheating of the thermostatic valve is correct (approx. 5°C)
		Check that the bulb has not lost pressure
	Low supply of refrigerant to the thermostatic valve	Check the opening of the valves on the liquid line
	The dryer filter cartridge is dirty	Check whether the dryer filter cartridge needs to be changed; the temperature differential before and after the filter must be less than 2°C
	With cold outside temperatures, the LP pressostat intervenes before the cooling circuit is stable	Set the LP pressostat inhibition time on start-up to 120 seconds
	Insufficient refrigerant charge	Check for leaks and re-charge until supercooling of the liquid at the condenser (MRA unit) output is 3-5°C
THE COMPRESSOR DOES NOT WORK WHEN CALLED BY THE THERMOSTAT	One of the unit's safety devices has intervened	Check for alarms on the user terminal display
	Short circuit protection has intervened	Check the cause of the short circuit and change the fuses
	The LP pressostat has intervened	See 'Low output pressure or intervention of low pressure pressostat'
	The HP pressostat has intervened	See 'High output pressure or intervention of high pressure pressostat'
	The control system is not giving a correct signal	Check the control system
THE COMPRESSOR INTERNAL PROTECTION CUTS IN N.B. Before starting the compressor, check compressor winding resistance and continuity	The motor is overloaded	Check that the unit is functioning within the temperature limits given in this manual
	Power supply voltage is not correct	Check that the power supply voltage is the same as on the data plate
	The rotor is blocked	Change the compressor
HIGH EVAPORATION PRESSURE	Liquid return to the compressor	Check the function of the expansion valve and the correct position of the bulb
		Check that the superheating of the expansion valve is correct (around 5°C)
		Check that the equaliser tube of the thermostatic valve does not contain liquid

MAINTENANCE

The following regular maintenance operations should be carried out.

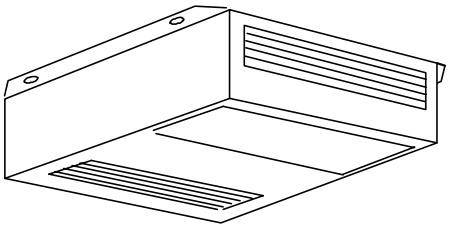
WEEKLY
- Check that the room values shown by the control are accurate
- Check the refrigerant load; make sure that there are no more than a few bubbles in the flow sight glass on the refrigerant circuit
- Check that the temperature and noise emitted by the compressor and the fan are normal
- Check the air filter; clean or replace it if it triggers the dirty filter alarm
- Check the power supply voltage

MONTHLY
- Check that evaporation and condensation pressures (or saturated temperatures) are normal
- Check the correct flow of condensation water to the drain
- Check whether the MRA condenser is dirty, removing any obstructing material (leaves, paper, etc.) with a jet of compressed air or water
- Check that all terminal connections are tight

QUARTERLY
- The set values of the regulation and safety devices (see SETTING THE REGULATION AND SAFETY DEVICES).

For the following maintenance and regulation operations please refer to the diagram of the UCA/UCF unit in fig. 10:

- regulation of the thermostatic valve (VT)
- changing the dryer filter cartridge (FD)
- charging the circuit via the valve after the thermostatic valve
- checking the flow sight glass (SF), changing the air filter
- changing the damper motor on UCF units (M).



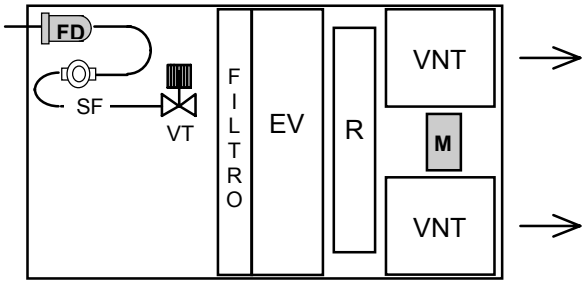


Fig. 10 - UCA Unit - view from below

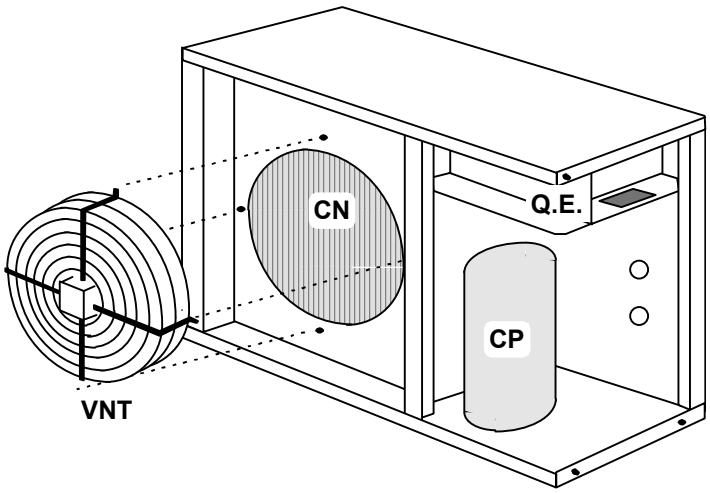


Fig. 11 - MRA Unit.

Fig. 11 shows the main components of the MRA condensing unit:

- scroll compressor (CP);
- axial fan (VNT) with protection grille
- condenser coil (CN)
- electrical panel (QE)

CLEANING AND CHANGING THE AIR FILTER

Remove and inspect the filter cartridge regularly and whenever there is a blocked filter alarm. Tap the filter to remove large particles of dust and then clean with a vacuum cleaner. If the filter is blocked, replace it with an equivalent model .

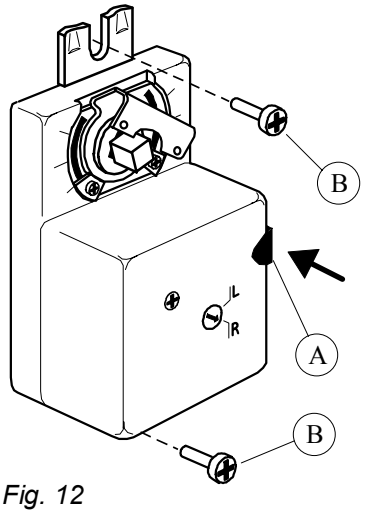


Fig. 12

DAMPER MAINTENANCE - CHANGING THE MOTOR

Check that the damper can move freely and that the neoprene rubber around the edge of the damper gives a tight seal.
In an emergency (i.e. if the motor breaks) or for maintenance, it is possible to move the damper manually by pressing the release knob.

To take out the motor undo fixing screws B and remove the motor from the damper shaft. If necessary, replace the motor with another of equivalent characteristics (UNIFLAIR code SESM020A1A - see spare parts list).