



Variable Multi Flow
VMF



AIR COOLED CHILLERS - Technical Installation Manual

CHILLERS

- EXTERNAL UNITS
- HIGH EFFICIENCY

ANL 290-650



Aermec participate in the EUROVENT program: LCP. the products are present on the site www.eurovent-certification.com



Standard applied in the DESIGN and MANUFACTURE of the unit:

SAFETY

1. Machinery directive 2006/42/CE
2. Low voltage directive LVD 2006/95/CE
3. Electromagnetic compatibility directive EMC 2004/108/CE
4. Pressure vessel directive PED 97/23/CE, EN 378, UNI12735, UNI14276

ELECTRICAL

1. IEC EN 60335-2-40,
2. IEC EN 61000-6-1/2/3/4

ACOUSTICAL

1. ISO DIS 9614/2 (intensity method)

PROTECTIVE RATING

IP24

CERTIFICATION

1. EUROVENT

REFRIGERANT

This unit contains fluoride gases with greenhouse effect covered by the Kyoto Protocol. Maintenance and disposal must only be carried out by qualified staff, in accordance with local regulations.

20. GENERAL INSTRUCTIONS FOR THE INSTALLER

The EXTERNAL air cooled chillers of the ANL series with R410A have been designed and manufactured to meet the cooling needs of small and medium systems in residential or commercial buildings.

20.1. CONSERVATION OF DOCUMENTATION

1. Submit the manual with all supplementary documentation to the system user who will be responsible for the conservation of documents so that they can be available when needed.
2. Read this manual fully: all works must be carried out by qualified personnel, in accordance with any applicable current local regulations.
3. The equipment warranty does not cover any costs associated with lifting or access equipment necessary for warranty procedures.
4. Do not modify or tamper with the equipment as this could result in accidents for which the manufacturer will not be held responsible. The warranty will be voided if the above mentioned warnings are not respected.

20.2. SAFETY INSTRUCTIONS AND INSTALLATION STANDARDS

1. The equipment must be installed by a competent and qualified technician, in compliance with the applicable national legislation of the country of

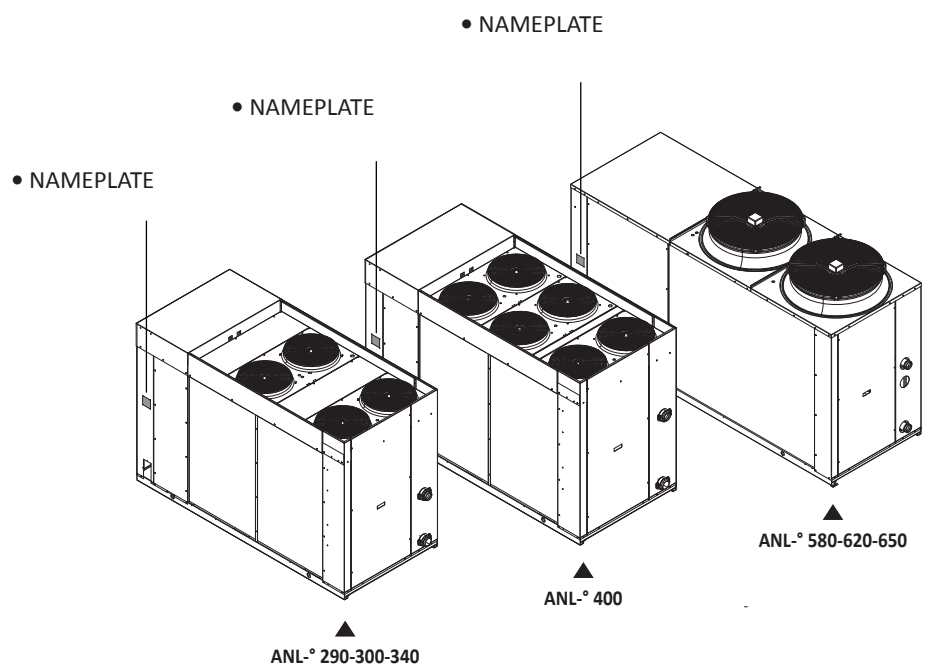
destination. AERMEC assumes no responsibility for any losses incurred by not observing these instructions.

2. Before commencing any works it is necessary to **CAREFULLY READ THE INSTRUCTIONS AND MINIMISE ANY RISKS BY TAKING APPROPRIATE SAFETY PRECAUTIONS**. All relevant personnel must be made aware of the procedures and possible risks that may arise at the time of installation of the unit.

21. PRODUCT IDENTIFICATION

The ANL units are identified by:

1. **PACKING LABEL**
(with product identification data).
2. **NAMEPLATE**
(see figure below).



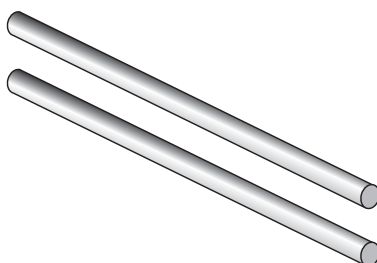
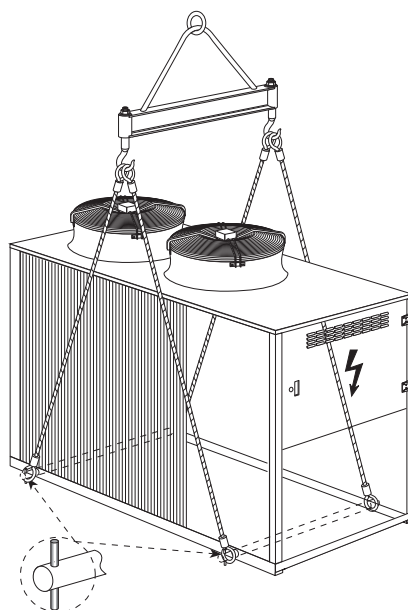
22. LOCATION OF INSTALLATION

Before proceeding with the installation of the equipment agree the location with the client, taking into account the following points:

1. The base must be able to support the weight of the unit.
2. The safe distances between the unit and other equipment or structures must be strictly respected to ensure the intake and outlet air is free to circulate.
3. The equipment must be installed by a competent and qualified technician, in compliance with the applicable national legislation of the country of destination, respecting the required minimum maintenance access spaces.

23. POSITIONING

- Before lifting the unit verify the lifting capability of the equipment being used, taking into account the information provided with the packaging.
- When lifting insert through the unit's base holes lifting bars (NOT PROVIDED) of sufficient length to locate the lifting chains and safety lugs.
- Position the unit in the place indicated by the client, inserting between the unit's base and the base support a rubber pad (minimum 10 mm thick) or anti-vibration mounts. For further information refer to the dimensional tables.
- Secure the unit and ensure it is level; check that sufficient access is provided for hydraulic and electrical connections.
- In the case of installation where gusts of wind may occur adequately secure the unit using appropriate ties.



WARNING:
Lifting bars are NOT provided.



WARNING:

If the unit is installed in particularly windy locations the provision of wind barriers may be necessary to avoid malfunctions.

29. OPERATING CHARACTERISTICS

29.1. COOLING SETPOINT

(Factory default) = 7°C, Δt = 5K.

29.2. COMPRESSOR DELAY TIMERS

To avoid excessive compressor starts two functions are provided.

- Minimum time compressor is OFF 180 seconds.
- Minimum time compressor is ON 120 seconds.

29.3. CIRCULATING PUMPS

The wiring schematic provides outputs to control the circulating pumps. The system pump starts immediately and after 40 seconds of operation, when the water flow is stabilised, the pressure differential/flow switch control function is enabled. If no alarms are present the unit will start.

29.4. ANTI-FREEZE ALARM

The alarm ¹¹ is always active even in standby mode. To prevent damage to the plate heat exchanger by

freezing of the water within the unit is stopped and an alarm raised if the water temperature drops below the minimum anti-freeze setpoint of 3°C. The unit can only re-start after a manual reset and if the anti-freeze sensor reads a water temperature above 4°C ¹². With the unit in off mode and with a water temperature below 4°C the factory fitted electric heaters on the heat exchanger are turned on, and turned off when the water temperature exceeds 5°C. The water pump always remains active.

29.5. WATER FLOW ALARM

The unit has a low water flow rate alarm using a factory fitted differential pressure switch or flow switch. This safety activates after the first 40 seconds of pump operation if the water flow rate is not sufficient. The operation of this alarm stops the compressors and the pump.



WARNING

¹¹ The anti-freeze setpoint can only be adjusted by an authorised service centre and only after verifying that the hydraulic circuit has the correct % of anti-freeze solution.

¹² If this alarm occurs immediately call the authorised technical service assistance.



WARNING

We recommend a service log book is provided for the unit (responsibility of the user) to keep records of any works on the unit, which will aid maintenance and repair works. Note in the service log book date, type of works (routine maintenance, inspection or repair), describing the event and the measures taken.



WARNING

It is **FORBIDDEN** to charge with refrigerant circuit with a refrigerant type different to that indicated. Using a different refrigerant can cause serious damage to the unit.

30. ROUTINE MAINTENANCE

It is forbidden to carry out any cleaning operation before isolating from the power supply ¹.

Confirm no voltage is present before commencing works.

Periodic maintenance is a fundamental requirement to ensure efficient unit operation both in terms of operation and energy efficiency.

The fundamental required annual checks are:

30.1. HYDRAULIC CIRCUIT

CHECK:

1. Water circuit is filled.
2. Water filter is clean.
3. Operation of the differential pressure or flow switch.
4. Absence of air in the system (vent).
5. Water flow rate is always constant through the evaporator.
6. Condition of the hydraulic piping insulation.
7. The percentage of anti-freeze liquid, as may be required

30.2. ELECTRIC CIRCUIT

CHECK:

1. Operation of safeties.
2. Power supply voltage.
3. Electrical power input.
4. Tightness of connections and terminals.
5. Operation of the compressor crankcase heater.

30.3. REFRIGERANT CIRCUIT

CHECK:

1. State of compressors.

2. Efficiency of the plate heat exchanger.
3. Operating pressures.
4. Leaks to confirm the correct operating refrigerant charge.
5. Operation of the high and low pressure pre-stats
6. Efficient operation of the filter drier.

30.4. MECHANICAL CHECKS

CHECK:

1. **Tightness of screws**, of compressors and electrical panel and external panelling of the unit. Poor fixings cause noise and abnormal vibrations.
2. The state of the unit structure.
Treat any parts showing signs of corrosion with the appropriate paints to reduce or eliminate rust.

31. SPECIAL MAINTENANCE

The ANL units are factory charged with R410A and tested. In normal operation they therefore do not require any intervention from the technical assistance service in relation to the refrigerant charge. Over time some small leaks can appear, causing discharging the circuit and causing a malfunction of the unit. In this case the leaks have to be found and repaired and the unit recharged in accordance and as required under current legislation and good working practices.

32. DISPOSAL

Ensure that the disposal of the unit is carried out in accordance with the current legal requirements.

**WARNING**

Confirm the hydraulic integrity of the joints.

**WARNING**

It is recommended to repeat this procedure after the unit has operated for a few hours and to periodically check the system pressure. Charging to be done with unit off (pump OFF).

**WARNING**

If the system contains anti-freeze this must not be discharged to the drains as the liquid may be a pollutant.

It must be recovered and recycled.

33. SYSTEM CHARGING

Before commencing the charging procedure position the main isolator of the unit in the OFF position.

1. Ensure that the system drain valve is closed
2. Open all the system air vents and of the terminal units
3. Open the system isolating valves
4. Start filling slowly opening the system water charging valve external to the unit
5. When water exits the terminal units air vents close them and continue charging until the required system operating pressure is reached.

33.2. SYSTEM DRAINING

1. Before commencing draining the draining procedure position the main isolator of the unit in the OFF position
2. Ensure the system water charging valve is closed
3. Open the system drain valve external to the unit and all the system air vents and of the terminal units.

33.5. UNIT DRAINING**WARNING**

During the winter period the water in the heat exchanger may freeze when the system is off, causing

irreversible damage to the heat exchanger.

There are three solutions to avoid the risk of freezing



1. Complete draining of water from the unit.
 2. Operating with glycol, with a percentage of glycol selected in accordance with the minimum anticipated external temperature.
 3. Use of electric heaters.
- In such cases the electric heaters must always have power available for the whole period of possible freezing (unit in stand-by)






34. PROCEDURE FOR SELECTION OF SYSTEM TYPE

Several parameters of the MODU CONTROL board have to be set, based on the type of system the unit is installed.

These changes of parameters are summarised in the table below to permit the installer to make the appropriate selections.

34.1. HOW TO MODIFY A USER MENU PARAMETER

To access the USER setting press the key  and confirm the password 000 pressing the key . The display will show the parameters of the **USER** index as three identifying characters; the index remains displayed for a second and then is replaced by the value of the parameter it relates to.

To move to the following parameter use the arrow keys . To modify a parameter press the key , modify the value using the arrow keys  and confirm the modification pressing the key . To exit the menu press the key .

34.2. HOW TO MODIFY AN INSTALLER MENU PARAMETER

To enter and modify the **INSTALLER** menu follow the same procedure as the USER menu above.

Password INSTALLER menu: 030

QUESTION	ANSWER	WHAT TO DO
(1) What type of terminals are installed in the heating circuit?	• The unit is a cooling only model	• Go to question 2
	• Radiant panels	• Enter in parameter StC (index 3 menu USER) with the value of 35 °C
	• Fan coil units or low temperature radiators	• Enter in parameter StC (index 3 menu USER) with the value of 45 °C (default value)
	• Other applications	• Enter in parameter StC (index 3 menu USER) with the value of 55 °C
(2) Is the remote control accessory panel installed (PR3)?	• Not installed	• Go to question 3
	• Installed	• Enter in parameter PAN (index 9 menu INSTALLER) with the appropriate value: Value (1): • Season selection controlled from the chiller circuit board • ON/OFF control from the PR3 Value (2): • Season selection controlled from the PR3 • ON/OFF control from the chiller circuit board Value (3): • Season selection controlled from the PR3 • ON/OFF control from the PR3
(3) Is domestic hot water production present?	• Not present • Present	• Go to question 5 • Enter in parameter ASA (menu INSTALLER) with the value (1)
(4) In the domestic hot water circuit is a three way diverting valve present?	• Not present	• Go to question 5
	• Present	• Enter in parameter AAS (index C menu INSTALLER) with the appropriate value (in seconds): this parameter shows the reversing time for the three way diverting valve in the circuit for the production of domestic hot water
(5) Is an ambient thermostat present?	• Not present	• No function
	• Present	• This parameter enables a digital contact ID (shown on the electrical schematic with the reference TRA) onto which to connect an ambient thermostat with which to disable the compressors and electric heaters. Enter in parameter trA (index D menu INSTALLER), with the appropriate value selecting from: 1. Value (1 or 2): ENABLED 2. Value (0 or 3): DISABLED 3. It is reminded that the OPEN state of the contact represents: • stops compressors and heaters if the parameter value is set to 1 • stops compressors, pump and heaters if the parameter value is set to 2 • pump alarm (as in the previous software version), if the parameter value is set to 3



WARNING

For more information refer to the **USER manual** provided with the unit and available on the website www.aermec.com

35. FAULTS AND REMEDIES

FAULT	CAUSE	REMEDY
Unit does not start	<ul style="list-style-type: none"> Lack of electrical voltage 	<ul style="list-style-type: none"> Check electrical voltage is present Check the upstream safety devices providing power to the unit
	<ul style="list-style-type: none"> General isolator is OFF Remote contact is OFF (if present) Control panel is OFF Main isolator is OFF Compressor circuit breaker is OFF 	<ul style="list-style-type: none"> Place in ON
	<ul style="list-style-type: none"> Power supply voltage too low 	<ul style="list-style-type: none"> Check power supply
	<ul style="list-style-type: none"> Compressor contactor coil faulty Electronic board faulty Starting capacitor faulty Compressor faulty 	<ul style="list-style-type: none"> Replace the component
Low capacity output	<ul style="list-style-type: none"> Lack of refrigerant charge Condenser coil dirty Water filter clogged Unit location Operating outside of limits 	<ul style="list-style-type: none"> Check charge and for leaks Clean condenser coil Clean water filter Check performance Check against operating limit charts
Compressor noisy	<ul style="list-style-type: none"> Liquid refrigerant return to compressor Inadequate fixing down 	<ul style="list-style-type: none"> Check and correct
	<ul style="list-style-type: none"> Phase reversal 	<ul style="list-style-type: none"> Reverse one phase (400V/3N/50Hz only)
Noise and vibrations	<ul style="list-style-type: none"> Contact between metal components 	<ul style="list-style-type: none"> Check and correct
	<ul style="list-style-type: none"> Weak base support 	<ul style="list-style-type: none"> Improve base support
	<ul style="list-style-type: none"> Loose fixings 	<ul style="list-style-type: none"> Tighten fixings
Compressor stops on safeties	<ul style="list-style-type: none"> Discharge pressure too high Suction pressure too low Power supply voltage too low Electrical connections loose Operating outside of limits 	<ul style="list-style-type: none"> Check against operating limits chart
	<ul style="list-style-type: none"> Pressostat faulty 	<ul style="list-style-type: none"> Replace the component
	<ul style="list-style-type: none"> Thermal cut-out operates 	<ul style="list-style-type: none"> Check voltage and settings Check insulation of windings
Compressor discharge pressure high	<ul style="list-style-type: none"> External air temperature high System water inlet temperature high 	<ul style="list-style-type: none"> Check against operating limits chart
	<ul style="list-style-type: none"> Insufficient air flow Insufficient water flow 	<ul style="list-style-type: none"> Check: <ol style="list-style-type: none"> fan operation condenser coil clean pump operation (and speed) water filter clean
	<ul style="list-style-type: none"> Faulty fan control 	<ul style="list-style-type: none"> Check and replace if faulty
	<ul style="list-style-type: none"> Air in water circuit 	<ul style="list-style-type: none"> Vent circuit
	<ul style="list-style-type: none"> Refrigerant charge too high 	<ul style="list-style-type: none"> Check charge and adjust
Discharge pressure low	<ul style="list-style-type: none"> External air temperature low System water inlet temperature low 	<ul style="list-style-type: none"> Check against operating limits chart
	<ul style="list-style-type: none"> Moisture in refrigerant circuit 	<ul style="list-style-type: none"> Remove charge and replace
	<ul style="list-style-type: none"> Air in water circuit 	<ul style="list-style-type: none"> Vent circuit
	<ul style="list-style-type: none"> Refrigerant charge too low 	<ul style="list-style-type: none"> Check charge and adjust
Suction pressure high	<ul style="list-style-type: none"> External air temperature high System water inlet temperature high Thermostatic expansion valve too open or faulty 	<ul style="list-style-type: none"> Check against operating limits chart Adjust or replace if faulty
Suction pressure low	<ul style="list-style-type: none"> System water inlet temperature low External air temperature low Thermostatic expansion valve faulty or obstructed 	<ul style="list-style-type: none"> Check against operating limits chart Adjust or replace if faulty
	<ul style="list-style-type: none"> Insufficient water flow Insufficient air flow 	<ul style="list-style-type: none"> Check: <ol style="list-style-type: none"> fan operation condenser coil clean pump operation (and speed) water filter clean