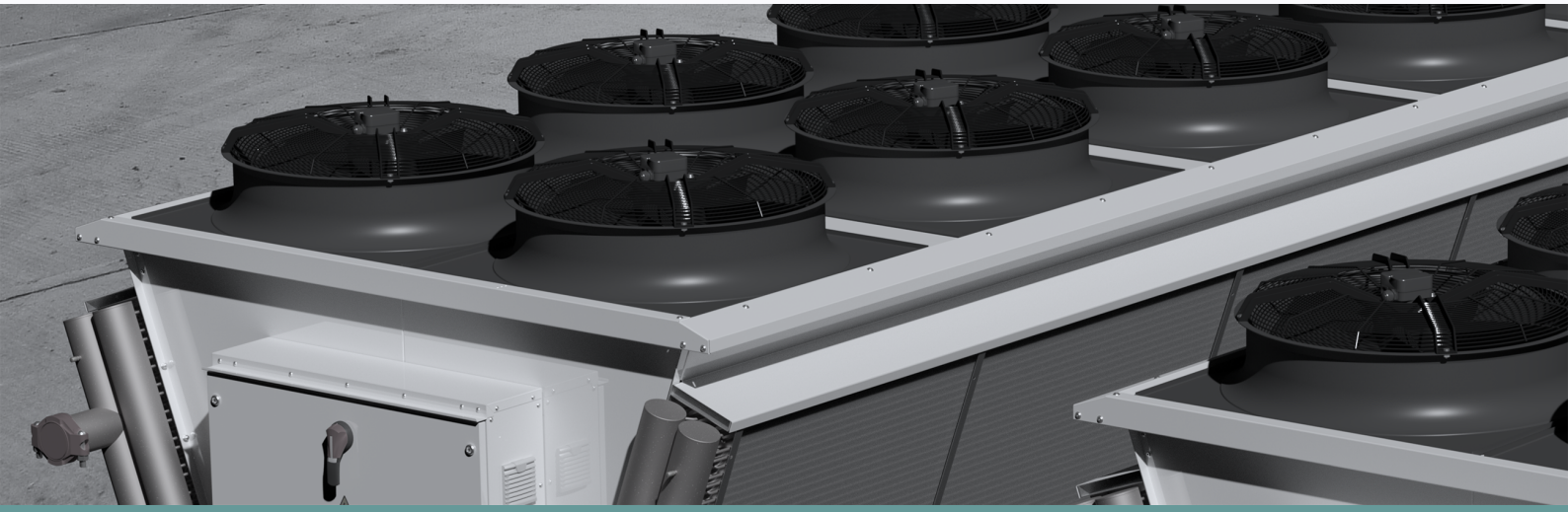
MISTRAL-W

High-performance dry coolers

Heat rejection: 150÷2000kW



TECHNICAL MANUAL

November 2020

www.kaltra.com

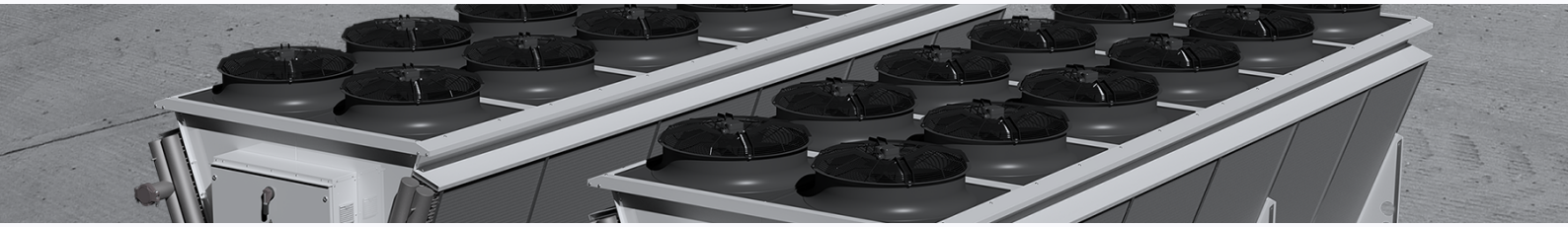
KALTRA

MISTRAL-W

High-performance dry coolers

Expertly engineered, reliable and efficient dry coolers for refrigeration, air conditioning, and process cooling applications. The range includes 480 models in V-shaped design, with the capacity range from 150 to 2000 kilowatts. The machines offer easy installation, low maintenance costs, and long service life.

- High-performance finned tube heat exchangers with inner-grooved copper tubes
- Efficient fans driven by AC-/EC-motors optimized for low energy consumption
- Low-noise packages for quiet operation



Features and optionals

Mistral-W series dry coolers available with plenty of options and accessories to meet customer's installation requirements, suit different environmental conditions and efficiency demands.

- DESIGNED FOR WATER, GLYCOLS, OILS AND SPECIAL FLUIDS
- EVAPORATIVE PRE-COOLING OR WATER SPRAY SYSTEMS
- INTELLIGENT FAN SPEED CONTROL
- EVAPORATING WATER RECIRCULATION, PUMPING, AND TOP-UP
- LEADING ENERGY EFFICIENCIES IN APPLICATIONS
- HEAT EXCHANGER COATINGS FOR CORROSION PROTECTION
- EXACT FLUID TEMPERATURE CONTROL
- ROBUST DESIGN FOR LONG SERVICE LIFE

KALTRA

CUSTOMER SERVICES

Commissioning, Maintenance, and Warranty

As standard, Kaltra guarantees all non-consumable parts only for a period of 36 months, variations tailored to suit product and application are also available; please contact Kaltra for full terms and details. To further protect your investment in Kaltra products, Kaltra can provide full commissioning services, comprehensive maintenance packages and service cover 24 hours a day, 365 days a year. (EU sites)
For a free quotation contact Kaltra or your local sales engineer. All Kaltra products are designed in accordance with EU Directives regarding prevention of build up of water, associated with the risk of contaminants such as legionella. For effective prevention of such risk it is necessary that the equipment is maintained in accordance with Kaltra recommendations.

⚠ **CAUTION**

Warranty cover is not a substitute for maintenance. Warranty cover is conditional to maintenance being carried out in accordance with the recommendations provided during the warranty period. Failure to have the maintenance procedures carried out will invalidate the warranty and any liabilities by Kaltra.

In addition to commissioning, a 24 hour, 7 days a week on-call service is available throughout the year to EU sites. This service will enable customers to contact a duty engineer outside normal working hours and receive assistance over the telephone or per email. The duty engineer can, if necessary, attend site, usually within 24 hours or less. Full details will be forwarded on acceptance of the maintenance agreement.

Spares

The list of recommended spares for 1, 3 and 5 years could be supplied with every unit and is also available from our Spares department on request.

Training

As well as our comprehensive range of products, Kaltra offers training courses. For further information please contact Kaltra.

Service Contacts

For further assistance, please e-mail: support@kaltra.de or telephone:

Sales enquiries:	+49 (0) 89 943 99 8 66	sales@kaltra.de
24/7 support hotline:	+49 (0) 151 418 586 90	support@kaltra.de
Information:	+49 (0) 911 253 421 07	info@kaltra.de
Delivery:	+49 (0) 89 943 99 8 66	delivery@kaltra.de
Spares:	+49 (0) 89 943 99 8 66	spares@kaltra.de

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SAFETY

The information contained in this manual is critical to the correct operation and maintenance of the unit and should be read by all persons responsible for the installation, commissioning and maintenance of this Kaltra unit.
The equipment has been designed and manufactured to meet international safety standards but, like any mechanical/electrical equipment, care must be taken if you are to obtain the best results.

⚠ **CAUTION**

When working with any air conditioning units ensure that the electrical isolator is switched off prior to servicing or repair work and that there is no power to any part of the equipment. Also ensure that there are no other power feeds to the unit such as fire alarm circuits, BMS circuits etc.
Electrical installation, commissioning and maintenance work on this equipment should be undertaken by competent and trained personnel in accordance with local relevant standards and codes of practice. A full hazard data sheet in accordance with COSHH regulations is available should this be required.

Personal Protective Equipment and Handling

Kaltra recommends that personal protective equipment is used whilst installing, maintaining and commissioning equipment. Some operations when servicing or maintaining the unit may require additional assistance with regard to manual handling. This requirement is down to the discretion of the engineer. Remember do not perform a lift that exceeds your ability.

Ecodesign Directive

The product range within this document is designed in accordance to the European Ecodesign Directive 2009/125/EC.

Conformity To Standards

Kaltra certify that the equipment detailed in this manual conforms with the following EC Directives:

Electromagnetic Compatibility Directive (EMC)	2014/30/EU
Machinery Directive (MD)	89/392/EEC version 2006/42/EC
Pressure Equipment Directive (PED)	2014/68/EU
Ecodesign	2009/125/EC
Safety of machinery	EN 60204-1
Safety of household and similar electrical appliances	EN 60335-1

To comply with these directives appropriate national & harmonised standards have been applied. These are listed on the Declaration of Conformity, supplied with each product.

⚠ **IMPORTANT**

Apply unit specification provided by Kaltra to check project specific unit characteristics, such as unit dimensions, the number and layout of fans, predicted performance, dry and operating weights, start and operating currents, design fluid flow and limits, fluid composition, unit water side pressure drop, airflow and others.
Unit specifications at various project conditions and unit general arrangement drawings are available from Kaltra upon request.

⚠ **IMPORTANT**

Apply unit drawings and electrical schematics supplied by Kaltra to define certain model parameters, optional features installed, component data, external service requirements. Unit drawings. electrical wiring, and control schematics are supplied with the equipment or available upon request within the manufacturing.

CONTENT

INTRODUCTION

Purpose of Present Manual

The purpose of this manual is to inform service technicians of Mistral-W Series dry coolers manufactured by Kaltra. This manual covers Mistral-W Series unit components and construction, and handling, design guidelines, installation, and maintenance procedures.

> ⚠ **IMPORTANT** All personnel being responsible for the operation, installation, and maintenance of present units must carefully read and fully understand these instructions before transportation, loading/unloading, handling, installing, and carry out maintenance procedures.

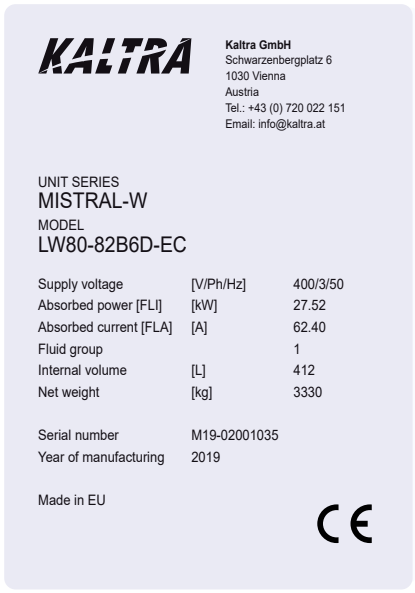
Unit Description

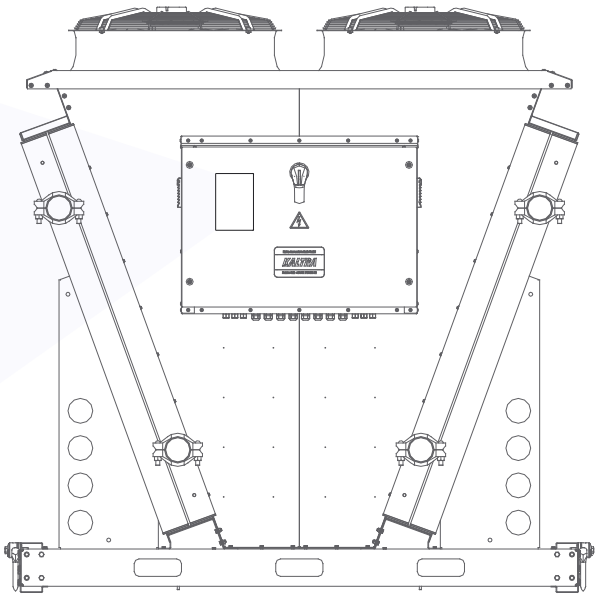
Mistral-W Series units are high-performance dry coolers intended for cooling of water, glycols, brines, and special fluids. The series designed for outdoor installation for vertical airflow throughout V-shaped heat exchanger assembly. The units equipped with heat exchangers with round copper tubes and plate aluminum fins, axial fans driven by AC or EC motors, and epoxy-painted steel enclosure. As standard, the units supplied with AC-driven fans. Options include EC-driven fans, fan diffusers, wiring, electrical box, and more (please refer to the corresponding section of the present manual).

Model Identification

Mistral-W		L	W	-	80	-	8.2	B	6	D	-	EC
Heat exchanger(s) size	- L	Standard Enlarged										
Designation	W	Dry cooler with 2 fan rows										
Fan diameter		Diameter in mm·10										
Number of fans		Fans per row Number of rows										
Heat exchanger type		A/B/C/D										
Fan motor poles		Number of poles										
Fan motor type		D/Y/S										
Fan motor type	AC EC	AC-motor fans EC-motor fans										

The model code can be found on the nameplate on the front side of the unit or inside an electrical panel if present:





UNIT COMPONENTS AND CONSTRUCTION

The range is made up of heat exchangers, commonly incorporating aluminum fin material and copper tubes, axial fan set, and painted galvanized steel casework. Optional components may vary with application.

Painted Galvanized Steel Casework

The unit casework is coated with epoxy baked powder paint to provide a durable finish. The paint color is Signal White (RAL 9002) or similar.

AC-Motor Fans

The external rotor AC motor allows the use of low power output, single- or three-phase, and speed controllable motor to power the fan. The motor features inbuilt thermal overload protection and the assembly supplied complete with a guard grille.

Heat Exchangers

Large surface area heat exchanger positioned to optimize airflow and heat transfer rate, manufactured from round copper tubes and aluminum fins. The factory test pressure is not less than 16 bar.

Optionals

Mistral-W Series dry coolers can be equipped with the following optional components and accessories:

- EC-motor fans: EC fans incorporate electronically commutated DC motor control to provide highly accurate fan rotation speed and offer maximum airflow performance while keeping sound levels to a minimum
- Electrical wiring: wiring as per current European standards. All electrical components are rated for year-round outdoor use, wiring is color-coded and numbered for identification
- Electrical enclosure: powder-coated steel enclosure with mains isolator, over/short circuit protection, IP66-rated
- Single/multiple circuiting
- Protective mesh grilles for heat exchangers
- Air filtration for heat exchangers
- Heat exchanger protective coatings for high corrosion resistance
- Isolating valves
- Pump sets: single or twin pump assemblies, equipped with fixed-speed or variable-speed electrical motors
- Discharge air plenum: factory fitted, constructed from galvanized sheet steel and coated with epoxy baked powder paint to direct discharge air vertically to reduce air recirculation and provide a degree of acoustic reduction in the horizontal plane
- Fan diffusers: boost fan efficiency and reduce the operating noise
- Fan speed control: the fan speed controller is intended to regulate fan rotation speed to control fluid outlet temperature of the dry cooler and operates based on inputs received from temperature probe(s) installed on fluid outlet manifold(s). Depending on the requested unit configuration, fan speed controllers may operate in master-slave mode or independently. Fan speed controller provides Modbus connectivity for external control and monitoring
- E•VAP™ evaporative pre-cooling system with aluminum pads: enables substantial energy savings for cooling units by lowering the temperature of the air delivered to heat exchangers. Optionally may include water treatment/circulation module
- Evaporative pre-cooling system with cellulose pads. Optionally may include water treatment/circulation module
- Adiabatic spray pre-cooling system: provides adiabatic cooling effect via intermittent water spray on incoming air stream of unit's heat exchangers
- Rubber-type anti-vibration dampers
- Individual fan switch-offs

OPERATING LIMITS

Outdoor air conditions		
Minimum air dry bulb temperature (units w/ AC-fans)	°C	-40.0[1,3]
Minimum air dry bulb temperature (units w/ EC-fans)	°C	-25.0[1,2,3]
Maximum air dry bulb temperature	°C	60.0

[1] - It is a customer responsibility to use appropriate glycol concentration or other methods to avoid fluid freezing during low ambient conditions

[2] - Contact Kaltra for EC-motor fans suitable for lower ambient operating contitions

[3] - Contact Kaltra for special design of fan system

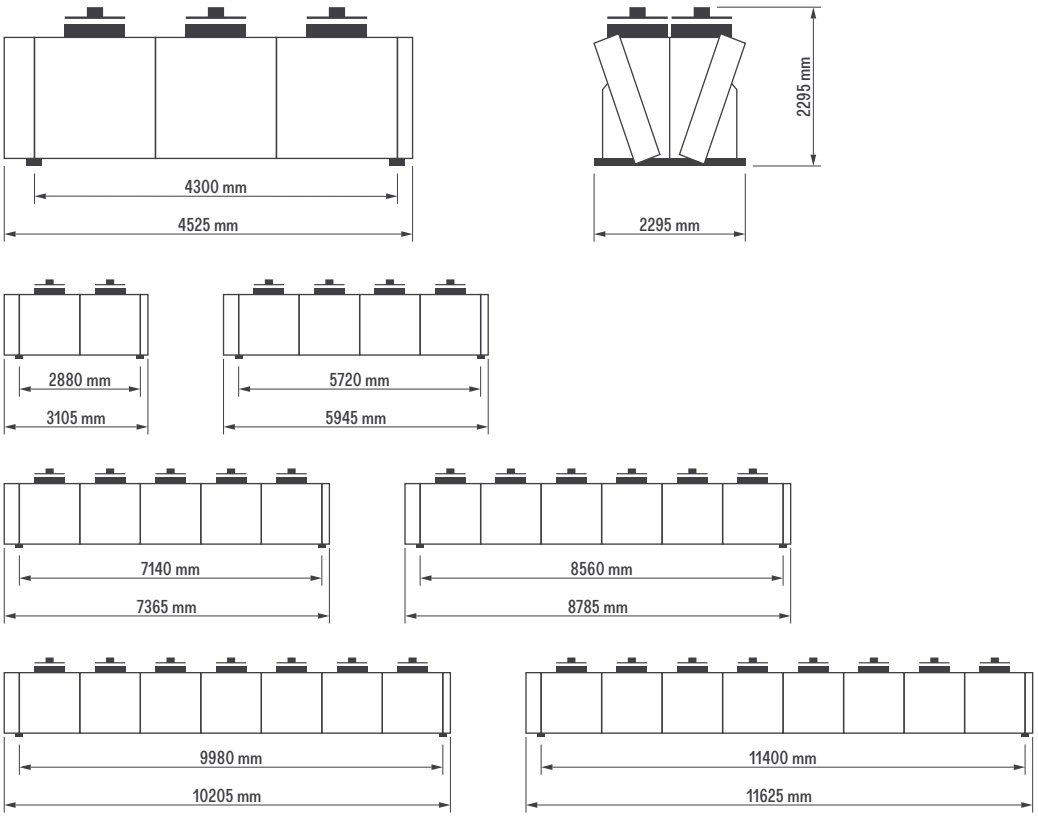
SUPPLIER DOCUMENTATION

As standard, Kaltra supplies the following documents with Mistral-W Series dry coolers:

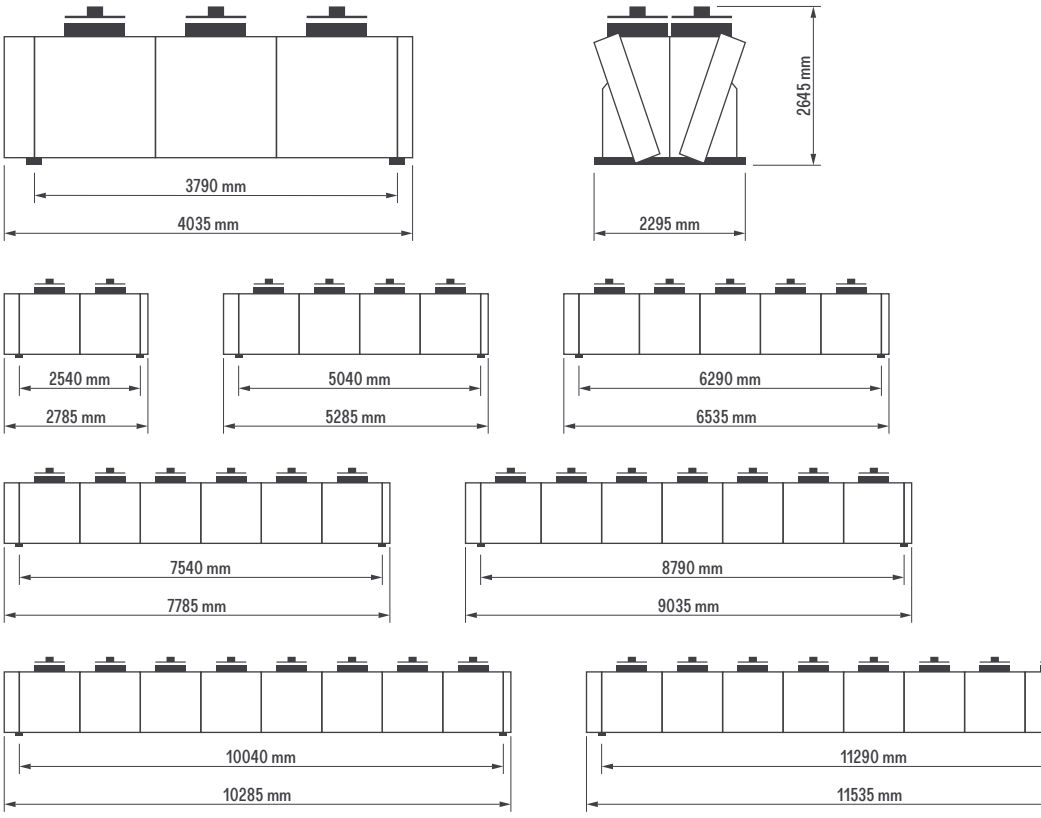
- Dimensional drawing(s)
- Installation, Operation, and Maintenance Manual
- User's Manual for Fan Speed Controller (if factory-installed)
- User's Manual for Evaporative Pre-Cooling System (if factory-installed)
- User's Manual for Adiabatic Spray System (if factory-installed)
- User's Manual for Pumping Set (if factory-installed)
- Wiring diagram(s)
- CE Declaration, if required
- Other documents, e.g., Factory Acceptance Test (FAT) Report, if requested with the order

DIMENSIONS

Models W80, W90, W100



Models LW80, LW90, LW100



STORAGE, HANDLING, AND TRANSPORTATION

⚠ **CAUTION** During transportation and handling, avoid exerting undue pressures, accidental hits, and avoid any shocks that could damage the unit.

Transportation and Storage Conditions

During transportation and storage of the unit:

- Do not remove the packing, if present
- Storage temperature should be between -40°C and +60°C without water condensation
- Ensure there is no water inside heat exchangers
- Units carefully protected and preserved for transportation and storage for the period of 3 months. If a unit shall be stored longer before the installation it should be carefully unpacked, inspected by specialists and repacked after 3 months period from the date of the delivery

⚠ **WARNING** In case of any visible damage revealed immediately contact Kaltra for further investigation.

Unpacking

Shift the product to a location closer to the final installation site prior to unpacking the unit.

- The unit should be carefully unpacked, checked for any damages and completeness. In case of any damage or shortage it should be reported to Kaltra immediately
- Package materials should be recycled in accordance with local regulations

Lifting with Forklift

⚠ **IMPORTANT** Do not use forklift for lifting units longer than 4000mm (more than 6 axial fans).

When handling with a forklift, ensure forks are at least 150mm longer than the unit's depth when loaded.

Lifting with Crane

For safe unit lifting, follow the below recommendations:

- It is necessary to follow local regulations and practice for lifting of the units of certain type, weight and dimensions
- The unit should be lifted by lugs and better with all packing on, if present. If slings are using for lifting they should be put on properly to be sure that slings do not damage the unit
- Use the appropriate spreader bars/lifting slings (provided by others) with the lugs provided. The size of spreader bar and length of lifting slings should be selected so that not to interfere with unit casing or fan assemblies
- Attach individual lifting slings to each of the lifting lugs provided; each individual sling must be capable of lifting the whole unit
- Do not use single sling between two or more lifting points to avoid load shift
- Use only lifting points provided in accordance with the drawing mentioned herewith
- All lifting points must be used for lifting
- The unit should be lifted slowly, evenly, with maximum protection to people around. Unit should maintain a level attitude during unloading
- The unit should be well supported and balanced during lifting and handling procedure. Take care to observe actual loading point data
- If the unit is damaged it should be immediately checked and described in respective report
- Refer to dimensional drawing(s) supplied with the unit for exact lifting lug locations

⚠ **WARNING** Kaltra accepts no responsibility for any mishandlings during unit lifting or moving.

Before lifting, ensure the unit's structural integrity and make sure that lifting lugs are fastened securely to the unit. Release transportation stacking plates, locks, support beams, if any. Depending on unit size, follow the appropriate lifting scheme shown below.

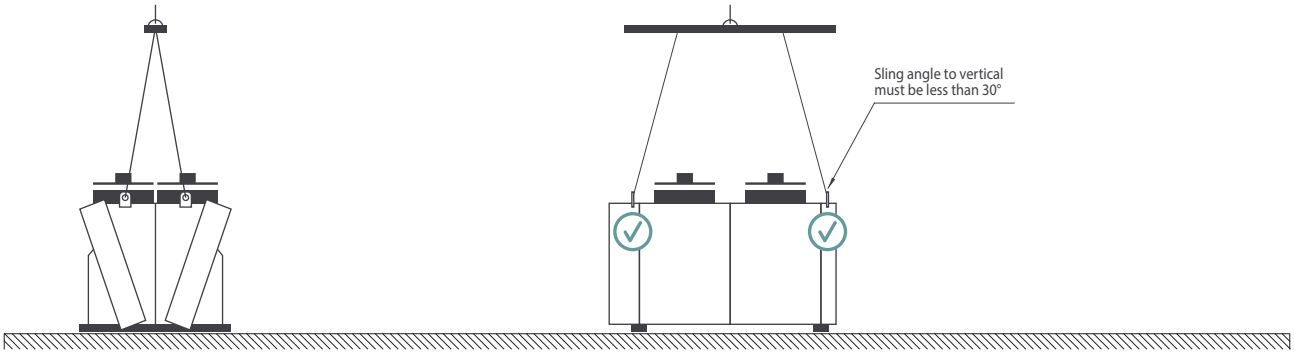
⚠ IMPORTANT

Check the unit is as ordered, discrepancies or transit damage should be reported to Kaltra immediately. Care should be taken to ensure the unit does not sustain damage before it is lifted into final position. It is strictly prohibited to use the connections, which are delicate parts of the coil, as anchoring points when lifting or handling the unit. This would cause serious damage to the coil and serious risks for the safety of persons and goods.

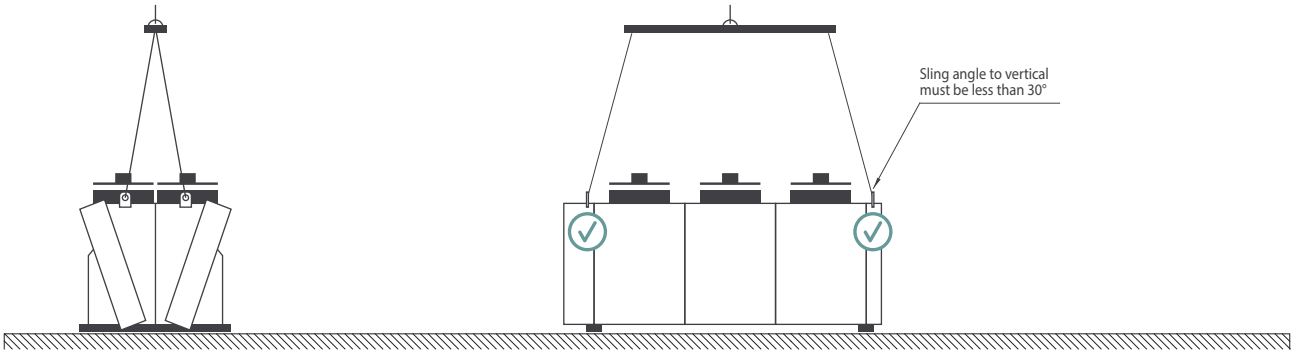
⚠ WARNING

The unit should be moved by lifting specialists.

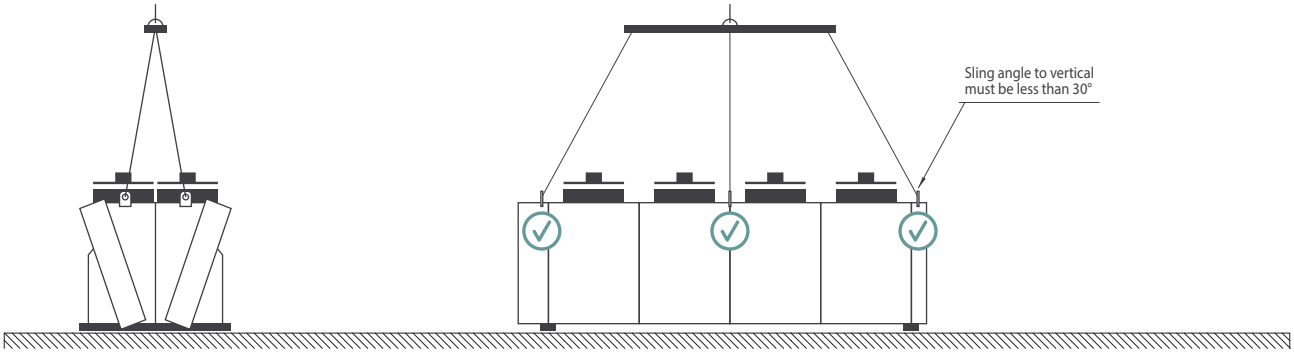
4-Fan Units



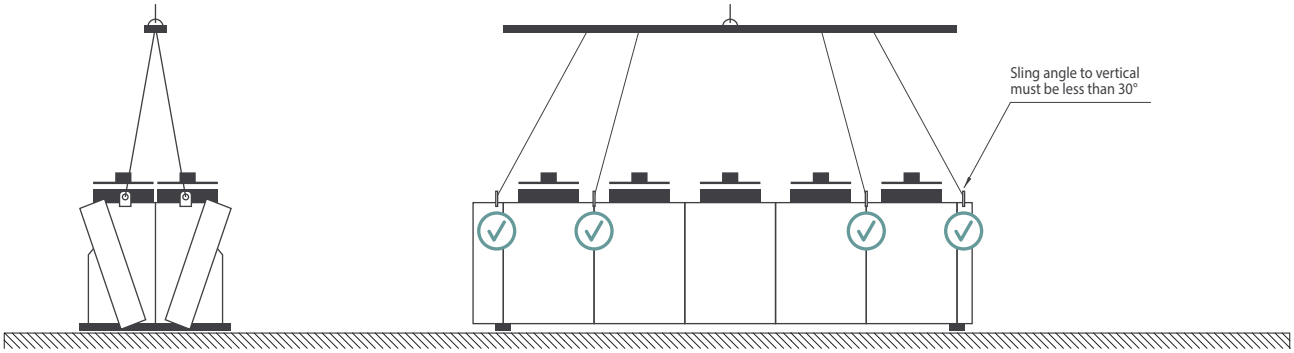
6-Fan Units



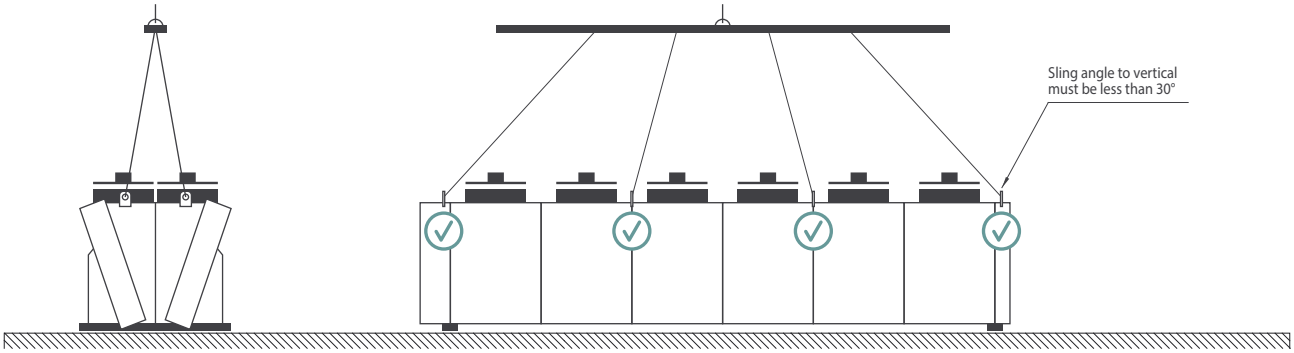
8-Fan Units



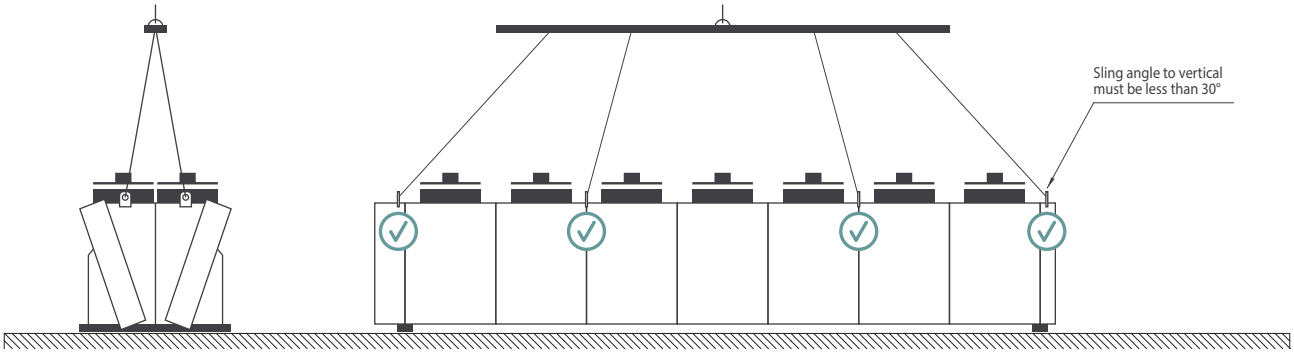
10-Fan Units



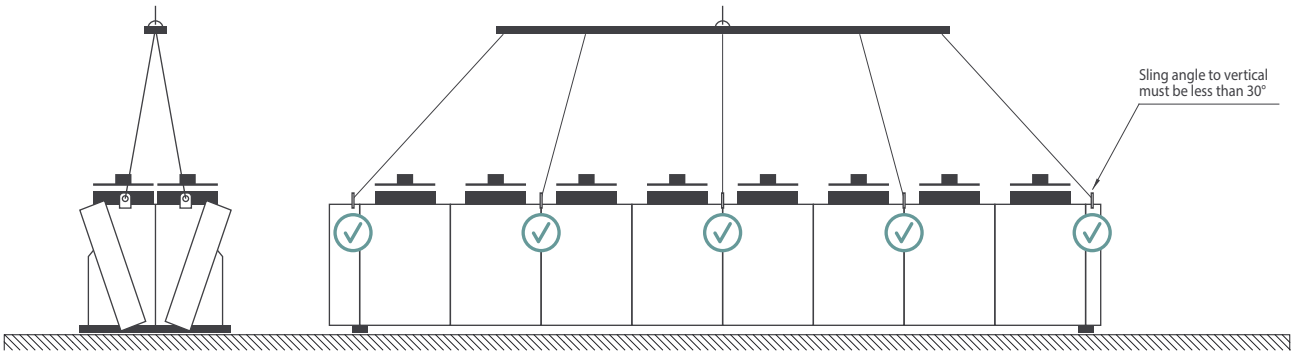
12-Fan Units



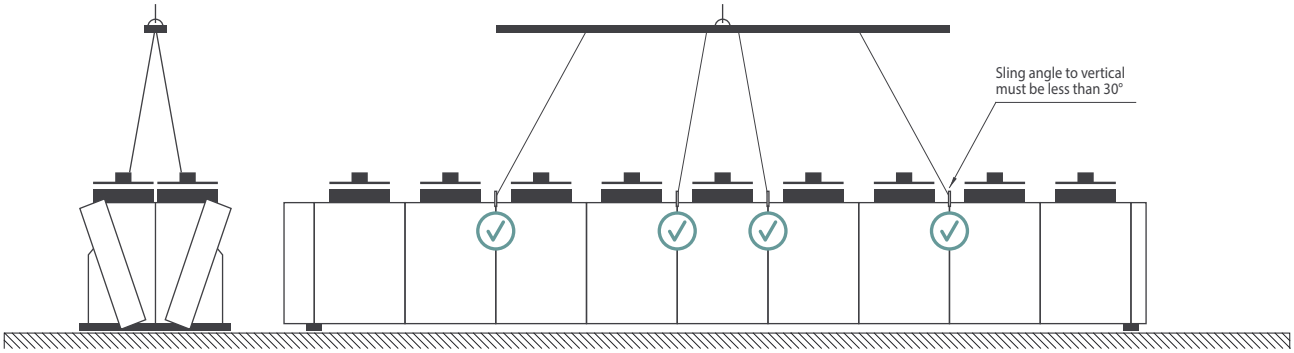
14-Fan Units



16-Fan Units



18-Fan Units



INSTALLATION

The installation of the units should be carried out by trained and experienced specialists in accordance with common practice, recommendations of a present manual, local rules and requirements and directives in force.
Mistral-W Series unit are intended for outdoor installation with vertical air flow direction.
Before locating the unit in its final location, appropriate load calculations should be completed, taking into consideration functional unit load. This is to ensure its operating platform will withstand the unit's distributed weight. It is the responsibility of the installer to ensure that the relevant national building legislation is met and the operating surface is suitable to withstand the supplied unit.
For efficient operation, the unit needs airflow to be unrestricted and inlet air to be at ambient temperature.
Units should be fixed securely using fasteners or anti-vibration dampers (if supplied). It is the responsibility of the installer to ensure the unit is fixed in location.
Adjacent building styles, plant, and prevailing winds can cause air currents which, in turn, can create down draughts, consequently forcing the discharge air back down into the air intake stream, causing high air intake temperatures and subsequent loss of performance.
Adding effects together, the inlet air temperature may rise above ambient and produce a serious effect on the performance.
Sound pressure levels away from the unit will be affected by its surrounding objects/obstructions such as solid walls resulting in higher than specified levels of sound pressure.

⚠ **IMPORTANT** Kaltra takes no responsibility for improper installation, which may cause system malfunction or damage to the equipment.

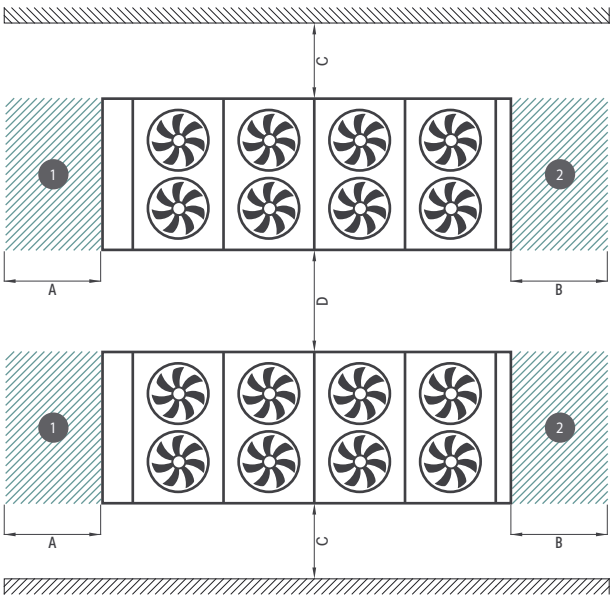
System designer and installing engineer should be responsible for checking and observing all the requirements in accordance with system application and installation.

Minimum Clearances

⚠ **IMPORTANT** During installation, minimum clearances shall be maintained for proper air supply, distribution, and discharge, hydronic and electrical connections, and unit servicing.

Surface Installation

When installing on the surface with air intake from unit's sides, the following minimum clearances shall be maintained:



1. Service area for electrical/control panel and front fluid connections
2. Service area for back fluid connections (if present)

Mistral-W Series		Minimum distance			
Unit size		A	B	C	D
Models W/LW 2.2	mm	750	750	750	1000
Models W/LW 3.2	mm	750	750	750	1000
Models W/LW 4.2	mm	750	750	1000	1500
Models W/LW 5.2	mm	1000	1000	1250	2000
Models W/LW 6.2	mm	1000	1000	1750	2500
Models W/LW 7.2	mm	1000	1000	2000	3000
Models W/LW 8.2	mm	1000	1000	2500	3500
Models LW 9.2	mm	1000	1000	2500	3500

Elevated Installation

When installing units on the support frame with air intake from the unit's sides and bottom, minimum distances between the units and other obstacles like walls may be reduced based on the frame height. The support frame shall allow free air paths to the unit's heat exchangers. Contact Kaltra for detailed calculations for minimum distances and frame height.
In case the distance between two adjacent units is shorter than 200mm, blind paneling shall be provided to cover the gap and avoid mixing inlet and discharge airflows.
If minimum clearance considerations cannot be met, contact Kaltra for calculations of possible airflow reduction and consequent decrease in unit capacity.

Positioning and Levelling

When positioning the unit, follow the below rules:

- Allow at least the minimum recommended clearances for maintenance and service. See the appropriate section of present manual
- Check if required free space available around the unit for hydraulic and electrical connections. See the appropriate section of present manual
- Check if required free space available for proper air supply and discharge. See the appropriate section of present manual
- The base for unit positioning should be levelled to ensure unit case geometry
- The base for unit positioning should be stable and strong to carry an equipment of its size and weight
- Do not use crowbars or similar devices for the positioning as they can damage the unit
- Prevailing wind directions must be taken into account when positioning the unit to achieve maximum performance
- Installation surface and adjacent area shall be kept clean from dust, mud, derbies to avoid heat exchangers' contamination which may affect the heat rejection capacity of the unit

Electrical Connections

⚠ **WARNING**

Arc flash and electric shock hazard. Open all local and remote electrical power supply disconnect switches, verify with a voltmeter that power is off and wear appropriate personal protective equipment before working within the electric control enclosure. Failure to comply can cause severe injury or death. Customer must provide earth ground to the unit as per applicable codes and regulations. Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power. The controller does not isolate power from the unit. The factory-supplied, optional disconnect switch is inside the unit. The only way to ensure that there is no voltage inside the unit is to install and open a remote disconnect switch. Refer to the unit electrical schematic. Follow all local codes and regulations.

Single- or three- phase electrical service is required for all models. Electrical service must conform to national and local electrical codes. Refer to equipment nameplate regarding wire size and circuit protection requirements. Refer to electrical schematic when making connections. Refer the appropriate submittal drawing for electrical service entrances into unit.

Terminated Units

If no mains isolator specified on the unit it is the installers' responsibility to ensure appropriate isolation is incorporated within the system. With or without unit isolation; it is the installers' responsibility to provide over and short circuit protection for the installation.

Controls

Control options are supplied according to customer specification. Individual instructions are provided to guide the setting and use of control options. When a control option is specified, the unit will contain the necessary equipment to isolate and provide over current and short circuit protection for the unit.

Wiring Diagrams and Documentation

Wiring diagrams and other relevant documentation will either be supplied in the units' junction box or in a separately supplied documentation pack or in electronic form.

WARNING Improper cable sizing/rating and loose electrical connections can cause overheated cable and electrical connection terminals resulting in smoke, fire, equipment and building damage, injury or death. Use correctly sized copper cable only and verify that all electrical connections are tight before turning the power on.

WARNING Improper electrical connection of three-phase input power can cause unit damage. Service technicians should use a gauge set on the system during the initial start up to verify that the three-phase power is connected properly.

Connecting power to the unit:
- Use suitable equipment to check the grounding system efficiency
- Ensure that the facility voltage and frequency correspond to those of the unit name plate
- Ensure the main disconnect switch is in the off position
- Refer to wiring diagram supplied with the unit and connect the building power supply line to the voltage terminals appropriately

Process Fluid Connections

The unit shall be connected to fluid pipework using appropriate connection type, size, and pressure ratings. Please refer to submittal drawings supplied with the unit.

Process Fluid Pipework

Process fluid pipework shall be installed as per accepted practices, international and local regulations, and taking into account all the requirements of the present manual, and shall be suitable for:
- Maximum operating pressure including relevant safety factor
- Process fluid used
- Ambient conditions

Pipework to and from the unit shall be selected to suit the application and not the unit's connection size. Pipework should be supported independently from the dry cooler in a way that prevents the transmission of vibration to the unit. Dry cooler connections cannot be used in any manner as supports to hold external pipes or fittings. All pipework used must be clean. Never introduce foreign bodies into the circuit.

IMPORTANT It is the responsibility of the installing contractor/site engineer to check the pipe size is correct for each system installation and application. Design should be in accordance with accepted practices to ensure correct unit operation.

IMPORTANT Kaltra takes no responsibility for improper pipework installation, which may cause system malfunction or damage to the equipment.

CAUTION All work must be carried out by technically trained and competent personnel.

Process Fluids

Mistral-W Series dry coolers are compatible with numerous working fluids, including water, glycols (ethylene or propylene glycol), ethanol, oils, and special fluids. Before charging the system:
- Ensure the fluid to be used and additives, if any, are compatible with the unit
- The units are designed for use in closed systems, where the fluid is re-circulated

Fluid inhibitors may be required to prevent corrosion of system components. The fluid supplier should supply compatibility information with their fluid when incorporated with system components, including details of any required inhibitors. It is the installer's responsibility to ensure the working fluid is compatible with any supplied products and that necessary precautions/preventative measures are taken to avoid product failure.
National legislation should be adhered to in relation to the supply, usage, and eventual disposal of any working fluid.

Frost Protection

Dry coolers using water or water-based solutions must be protected by adding anti-freeze, e.g., glycols, in sufficient concentration, as shown in the below table:

Glycol concentration	Freezing point (°C)	
	Ethylene Glycol	Propylene Glycol
Wt. 10% / Vol. 10%	-3.2 / -3.8	-3.3 / -3.4
Wt. 15% / Vol. 15%	-5.5 / -6.2	-5.1 / -5.3
Wt. 20% / Vol. 20%	-7.8 / -8.9	-7.1 / -7.4
Wt. 25% / Vol. 25%	-10.7 / -12.1	-9.6 / -10.0
Wt. 30% / Vol. 30%	-14.1 / -15.7	-12.7 / -13.1
Wt. 35% / Vol. 35%	-17.9 / -19.9	-16.5 / 16.9
Wt. 40% / Vol. 40%	-22.3 / -24.8	-21.1 / -21.5
Wt. 45% / Vol. 45%	-27.5 / -30.4	-26.7 / -27.1
Wt. 50% / Vol. 50%	-33.8 / -37.0	-33.5 / -33.7

⚠ **IMPORTANT**

Before running the unit for the first time, check that all guards, motor mountings, and electrical covers are secure, all unnecessary terminal block links are removed, and fans rotate freely. Check that the fan rotation of three-phase units is correct.

MAINTENANCE

CAUTION All work must be carried out by technically trained competent personnel. The equipment contains live electrical and moving parts, isolate prior to maintenance or repair work.

WARNING It is owner responsibility to provide scheduled unit and system maintenance in accordance with the schedule and requirements mentioned below. Incorrect maintenance within warranty period invalidates warranty obligations of the manufacturer. It is important to follow maintenance schedule as a minimum not only for warranty period but for the whole life time of the equipment.

- All system parameters checked should be carefully written down on maintenance sheet, compared with those from unit commissioning sheet and previous maintenance records
- Appropriate service tools, test and safety equipment should be employed for maintenance works

WARNING The unit contains live electrical terminals and moving elements which should be isolated remotely before any maintenance works.

Maintenance Schedule

The maintenance schedule indicates the time between maintenance operations. It is necessary to carry out all maintenance tasks described below in case the unit has been stopped for a period longer than three months.

Three-Months Interval

Type	Action	Description
General inspection	Check for visible mechanical damage of the unit	Visually inspect the unit for general wear and tear; treat any paint damage or rust if necessary
	Check for excess vibration from any rotating parts	Check fans and unit enclosure for excess vibration; be careful near rotating equipment components
Cleaning	Check unit fans for mud and dirt	Clean fan motors, impellers, and other components, if necessary. Switch off the unit before cleaning and ensure fans stop rotation
	Check unit heat exchangers for mud, dirt, and debris	Remove debris, clean heat exchanger from mud and dirt. Use appropriate chemicals and rinse heat exchangers when cleaning is completed. Be careful near rotating unit fans

Six-Months Interval

Perform all maintenance tasks specified for three-months interval, as well as the following works:

Type	Action	Description
General inspection	Check electrical connections	Check all electrical connections for tightness
	Check fan amps	Check fan amps current values at each phase
	Check control components	If installed, check control components for proper operation and readings (controller, sensors, fans boards, alarm signaling)
Heat exchangers	Check fluid connections	Check the unit fluid connections and pipework ancillaries for damages and leaks. Perform repair, if necessary
	Check unit heat exchangers	Check the unit heat exchangers for leaks. Perform visual check for fin and tube damages or traces of corrosion. Perform repair, if necessary

Heat Exchanger Cleaning

It is essential that the heat exchanger coil is kept clean to maintain the designed heat transfer rate and help to ensure the unit's life cycle meets expectations. General debris such as leaves, paper, dust, and pollen can be removed using a brush, with compressed air blowing against the direction of airflow (maximum allowed pressure is 3bar) or an industrial vacuum cleaner.
Fins should be brushed in the longitudinal direction with a soft brush.
If using EC fans, it is possible to reverse these using the designated input signal to the fan set (refer to wiring diagram of the unit). To move as much debris as possible, it is advisable to run the fans at the maximum speed. The fans do not need to operate in reverse for longer than 2 minutes to move large debris and lightly applied particles on the fin surface.
Heavier fouling must be removed using a pressure water/steam jet washer (maximum allowed pressure is 3bar) against the direction of airflow, at a distance of 300-400mm, using a neutral cleaning agent if required. The spray should be even across the coil face and, as with a brush, applied in a longitudinal direction across the fins.
The jet of the cleaner should be held vertical to the fin bank to avoid fin damage.
Any cleaning fluids should be suitable for both tube and fin materials; incorrect use of fluids could be corrosive towards heat exchanger materials. For clarification of specific cleaning fluids, please contact Kaltra to provide specific guidance on the acceptability of the working fluid.

WARRANTY

All Mistral-W Series units or parts (non-consumable) supplied for installation within the EU and commissioned by Kaltra engineers carry a full parts & labor warranty for a period of 36 months from the date of commissioning or 39 months from the date of dispatch, whichever is the sooner.
Units supplied by Kaltra for installation within the EU or for export that are properly commissioned in accordance with Kaltra standards and specifications, not commissioned by Kaltra engineers carry a 36 month warranty on non-consumable parts only from the date of commissioning or 39 months from the date of dispatch, whichever is the sooner. Parts or equipment installed or commissioned not to acceptable Kaltra standards or specifications invalidate all warranty. Warranty is only valid in the event that equipment is properly protected and serviced as per the Kaltra manuals provided.
In the event of a problem being reported and once the warranty is confirmed as valid under the given installation and operating conditions, Kaltra will provide the appropriate warranty coverage attributable to the rectification of any affected Kaltra equipment supplied (excluding costs for any specialist access or lifting equipment that must be ordered by the customer).
Once the warranty is confirmed, maintenance must be continued to validate the warranty period. Any spare part supplied by Kaltra under warranty shall be warranted for the unexpired period of the warranty or three months from delivery, whichever period is the longer. To be read in conjunction with the Kaltra Terms of Sale, Warranty and Warranty Procedure, available upon request.

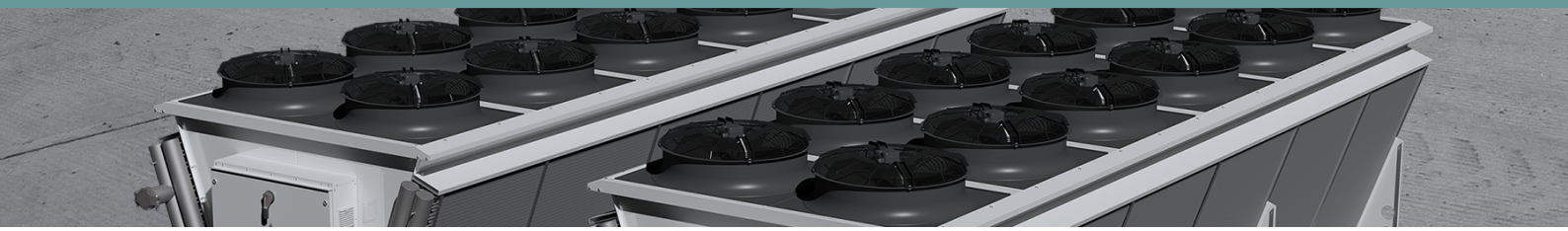
NOTES

MISTRAL-W

High-performance dry coolers

TECHNICAL MANUAL

November 2020



KALTRA

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