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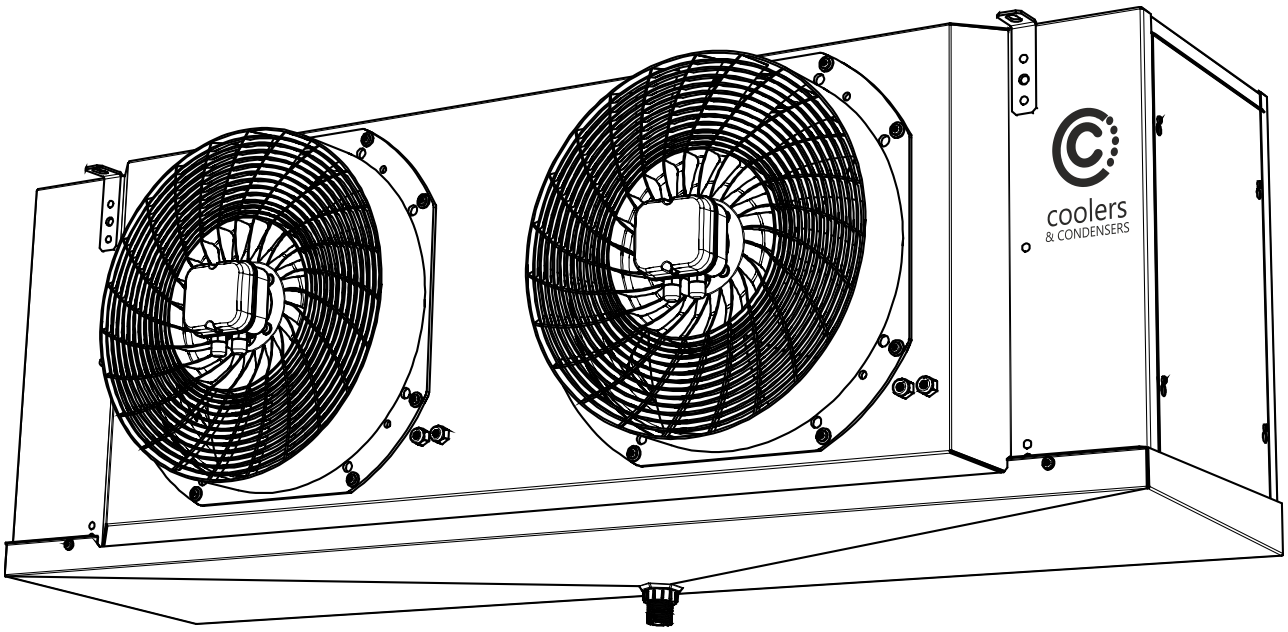
& CONDENSERS

MSKA-12 Cubic Coolers

Installation and Maintenance Instructions



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Health & Safety

Ensure that the following conditions are observed: -

1. The electrical supply is suited to the equipment supplied.
2. The cooler is suited to the refrigerant, temperature and pressure to which it will be applied.
3. The cooler is installed to a high standard of electrical and refrigeration practice.
4. The User is responsible for protection against over-pressurisation, including that caused by external fire. The maximum operating pressure is shown on the unit serial plate.
5. For fluid air coolers it is the responsibility of the user to ensure that the fluid is suitable for the operational temperatures and that coil is protected from damage due to freezing.
6. Avoid disconnection under pressure.
7. It is the responsibility of the Refrigeration Contractor or End User to provide safe working platform to carry out routine Maintenance or Warranty repair. For further details refer to our Condition of Sales.

Upon Receipt

Check immediately for any signs of damage. In the event of any problems notify the carrier immediately and Coolers & Condensers Ltd within 48 hours. With regret an "unexamined" signature and delayed notification of damage will not be accepted

The coil is delivered with a 2 Barg holding charge. This can be verified by accessing the Schrader valve on the end of the connection stub. When the unit is delivered the internal pressure should be checked to ensure the unit is holding pressure. If no pressure can be found, then a comment should be made on the delivery note.

Pressure Testing:

All equipment has been factory tested to 1.43 x the maximum operating pressure (MOP). The information about the unit operating pressures can be found on the unit label. The equipment must not be subjected to pressures greater than these during testing of the system. If a higher system pressure test is required, the unit must be isolated from the system to prevent damage. The MOP using R744, CO2 refrigerant is 80 Bar as standard.

Installation Instructions

Location

Air movement: Coolers should be positioned to achieve the following criteria: -

1. Full air circulation through the cooler - coil air return face must not be obstructed.
2. No short circuiting of air which will lead to purely local air cooling.
3. Air discharge is arranged to provide the required air throw. (See air throw notes in leaflets CA.110 and VA.120).

Electric Defrost

Units with electric defrost require a 400V 3Ph + Neutral Supply. Heaters are evenly balanced across phases. Coil heater rods are wired in pairs between Phase and Neutral, Drain Tray rods are wired individually between Phase and Neutral, refer to the wiring diagrams in this document. All units must be wired with a protective earth mains connection. The cooler may have two electrical termination boxes of which one only (marked in the appropriate way) will require the electrical supply. This is normally at the opposite end to the refrigerant connections, when fitted, the second box is a

terminal box for the star point / Neutral of the load and an internal link wire passes through the cooler to the main connection box. All terminal boxes are rated to IP55.

Pump Down

It is essential that the cooler be pumped down thoroughly before defrosting commences. Failure to do so can cause ice build-up on the coil during the defrost cycle.

Electric Defrost Termination

If on time termination, depending on cooler size, we suggest the initial period be set between 35 and 45 minutes.

If using temperature termination care must be taken in positioning the thermostat bulb. In general, this should be positioned where the last trace of frost disappears, usually on the external cooler finned face. Several factors, including cooler position relative to a door or produce, precise TEV setting etc. may cause identical coolers to frost differently (see maintenance notes). Termination bulbs should not be placed in the space immediately above a heater element.

Cooling re-start after defrosting

Whilst the defrost system is more than adequate to prevent icing during defrost, the system should incorporate a drain down time and ensure that the fans operate, if only briefly, once the defrost is completed to expel any condensate from the fan casing.

Pressure Limitation

Pressure limitation during defrost must be considered. A cooler which cycles on and off high pressure during defrost may not clear properly. Fluctuation in pressure may lead to liquid loading in the lowest circuits and subsequent ice build-up.

Fixings

Cooler weights are given in the appropriate leaflet. All fixings are suitable for a maximum of M12 bolts. On the Smaller ranges the hanger bars are rated at 50 kg per hanging point. Coolers & Condensers Ltd. expect its coolers to be handled and lifted using appropriate mechanical lifting equipment.

Occasionally customers may prefer to lift the cooler the ceiling using a turfing method where the cooler is pulled up to the ceiling using the four corner hanging points. It expected that this lifting method is to be carried out by an experienced lifting team and provision should be made in the case of a wire failure. The corner hangers must be raised evenly with the unit kept level. Uneven lifting may overload the corner brackets causing permanent damage to the cooler casing. Coolers & Condensers Ltd recommend that the cooler be followed up by a lifting platform to support the cooler to avoid any problems during the lift. It is the responsibility of the installer to ensure that a proper risk assessment is conducted prior to the lift and all measures to eliminate risk are taken.

Drainage

The drain line connector is supplied in a linen bag secured to the end of the coil; it is supplied with a rubber sealing washer. Fit the washer onto the male threaded drain connector and pass the threaded part through the inside of the drain pan, locate the hexagon flange securely into the matching cup of the drain tray. Secure in place with the plastic nut, tighten by hand only. The connector thread size is 1” BSPP Male.

Drain lines must have adequate fall and be trapped. They must be supported independently of the cooler and not place any undue stress on the drain connector. In low temperature applications drains must have either an internal or external heat source and

should be insulated. **MOST IMPORTANT!** The heater tape, if external, must provide heating right up to the cooler casing.

Refrigeration Connections

Refrigeration connections should be made in accordance with good refrigeration practice. Pipework must be adequately supported to prevent vibration or external load on the cooler headers etc. Any vibration in the connecting pipe work can risk damage and potential leaks in the coil.

Cooler Circuiting

The liquid inlet tube and distributor will be fitted on DX systems and will require an externally equalised TEV or electronic expansion device.

Electrical Connections

All electrical connections must be made in accordance with IEE Regulation and good electrical practice. All units are designed for 230V 1ph 50/60Hz + Neutral supply for the fanset(s) and 400V 3ph 50Hz + Neutral Supply for defrost when selected.

All electrical components must only be wired between Phase and Neutral, they must not be wired between Phases.

The heater terminal box is fitted with links across the Neutral terminals, and a small 'Star-Point' terminal box is fitted at the opposite end, with a neutral balance wire run through the cooler back to the main terminal box. Please refer to the wiring diagrams in this document for more details.

Changing Heater Elements

If the situation should arise where a Coil heater element needs to be changed it should be ensured that the power supply to the unit is disconnected and locked off from accidental reconnection. It is assumed that whoever is responsible for changing the elements is working in a safe manner and the power is prevented from being applied until the work is finished and checked.

Heating elements in the coil block are wired in pairs and must be replaced as such. Do not attempt to replace only one element of a pair, as the risk of overvoltage may occur on reconnection.

To remove an element pair from the coil, disconnect both supply and neutral wires from the terminal box. Remove the spring two spring clips off either end of both heaters in the pair, these again will require replacement when fitting the new element. The heater pair can then be withdrawn from the opposite end to the supply box, typically the refrigerant connection end. If the element has split, it will require a twist and pull action to remove it.

To fit the replacement coil heater pair, use a length of straight 1/4" tube over each heater wire. Feed the tubes and wires into the coil block and continue to push both heaters through the block until the rigid end of the heater protrudes 70mm out of the block at each end.

Reconnect the heater wiring into the correct terminals of the supply box.

The Tray Heaters are held to the underside of the inner drain pan. Three individual 230V tray heaters are wired from each Phase to Neutral. They are accessed by removing the outer drain pan. The tray heaters are held to the underside of the inner skin with aluminium retainer clips. To remove the element from the clamps first unwire the leads from the terminal box and ease the heaters out from the clips and then extract from the end of the unit.

Tray elements also have spring clips at either end the new elements must have these to prevent the heater creeping. When replacing

the tray elements please make sure the element is touching the tray skin, but do not force the element hard against the tray surface. The ideal tension is so the element can be twisted by fingers whilst still touching the inner drain pan skin. Please note again that the spring clips at either end must be replaced to hold the element.

Liquid Line Sight Glass

On DX systems it is recommended that a correctly rated sight glass is fitted immediately before the TEV. In the event of plant problems confirmation of a full liquid glass prior to the valve is essential before any worthwhile investigation of the cooler can be made.

Maintenance Instructions

IMPORTANT

The cooler should be isolated from all electrical supplies during any maintenance operations.

Fan motors may be fitted with a drain hole in each end cover, and in the terminal box. The motor drain hole should be at the lowest point of the motor when it is installed. Plugs that cover the drain holes should be either removed entirely if condensation is liable to occur due to large variations in operating temperature or removed periodically to allow any general build-up of condensation to drain away. The frequency of plug removal will be dictated by environmental conditions; a record should be kept.

It is essential that the following should be checked at regular intervals: -

1. Fans and motors, for free operation (check tip clearance), correct rotation and undue vibration.
2. Cooler fastenings, fan motor mounts, fan propeller, grub screw fixings.
3. Electric wiring.
4. Incoming refrigeration piping for any sign of chafe or wear on cooler casing.
5. Cooler coil block ends for any signs of leaks (oil etc).
6. Fin for accumulation of dirt, debris or minor damage. Minor fin damage can be combed out.
7. Drain pans and drain lines for signs of blockage or ice build-up.
8. Casing for minor damage. Casing should be touched up with matching paint, standard colour will be RAL9010 semi-gloss. The underlying material is pre-galvanised sheet but should be sealed from the surrounding environment.

Electric Defrost

Should ice form on the coil we suggest the following procedure:

1. Commence manual defrost and check each heater using ‘Clip-on’ ammeter (a phase amperage check at the control panel is not accurate enough).
2. Replace any inoperative heaters (see special note) and remove ice from coil using extended defrost. Ice removal can be accelerated by covering fan apertures and exposed fin faces with polythene sheeting etc.
3. Assuming all heaters are operational, and the coil is now clear operate the cooler for sufficient time to accumulate a generous frost load (a loaded one which holds the heat and provides a greater ‘washing’ effect).

Cooler Cleaning

External casework should be kept clean with the use of a mild dedicated soap cleaner and warm water only. Coils should only be cleaned with plain water or a dedicated pH neutral coil cleaning solution, prepared in accordance with

the manufacturer's instructions, and applied with a soft brush only, avoiding damage to the coil fins and tubing.
IMPORTANT Do not allow high pressure water jets to contact the fans, as this may penetrate the motor leading to failure, do not use high pressure water jets on the coil surface as damage to the fins will occur.

Coolers & Condensers Ltd cannot recommend a specific cleaning regime or period of cleaning, this is to be decided by the management of the final user and to be appropriate to the type of product in the room. The most important issue after the reduction of bacteria within the casing is the corrosion potential and wash down which are the only way of keeping corrosion at a minimum. For extremely corrosive environments a freshwater wash down at the end of every shift on both sides of the coil is recommend.

Fan plates may be hinged to provide access to the cooler plenum and fans; **ELECTRICAL SUPPLY MUST BE ISOLATED** before these components are open. There are no interlocks provided on the unit. Access inside the cooler and in the coil plenum must be undertaken with care, whilst every effort is made during manufacture to ensure all sharp edges are removed personnel must wear safety gloves when cleaning inside the unit due the number of fins and metal edges.

It has been found on many sites that there may be regular washing of the more easily exposed finned areas, but less accessible areas are neglected. It is these neglected areas that corrode more readily. It has also been seen that coolers can be exposed to aggressive cleaning substance because of over spray from the cleaning of other items within the same room, if the fans are left running whilst there is over spray, fluids will be deposited onto the finned surfaces. It is imperative that corrosive substances are washed off with freshwater to prevent corrosion. All materials used in evaporators that are exposed to a moist air stream containing corrosive chemicals (even stainless steel) will be corroded if not cleaned and washed down correctly.

Corrosion

If it is felt that the environment that the cooler will work in will have harmful effect upon the materials of the cooler, it is vital that the information is given to Coolers & Condensers Ltd at the quote stage so provision in the selection of materials can be made.

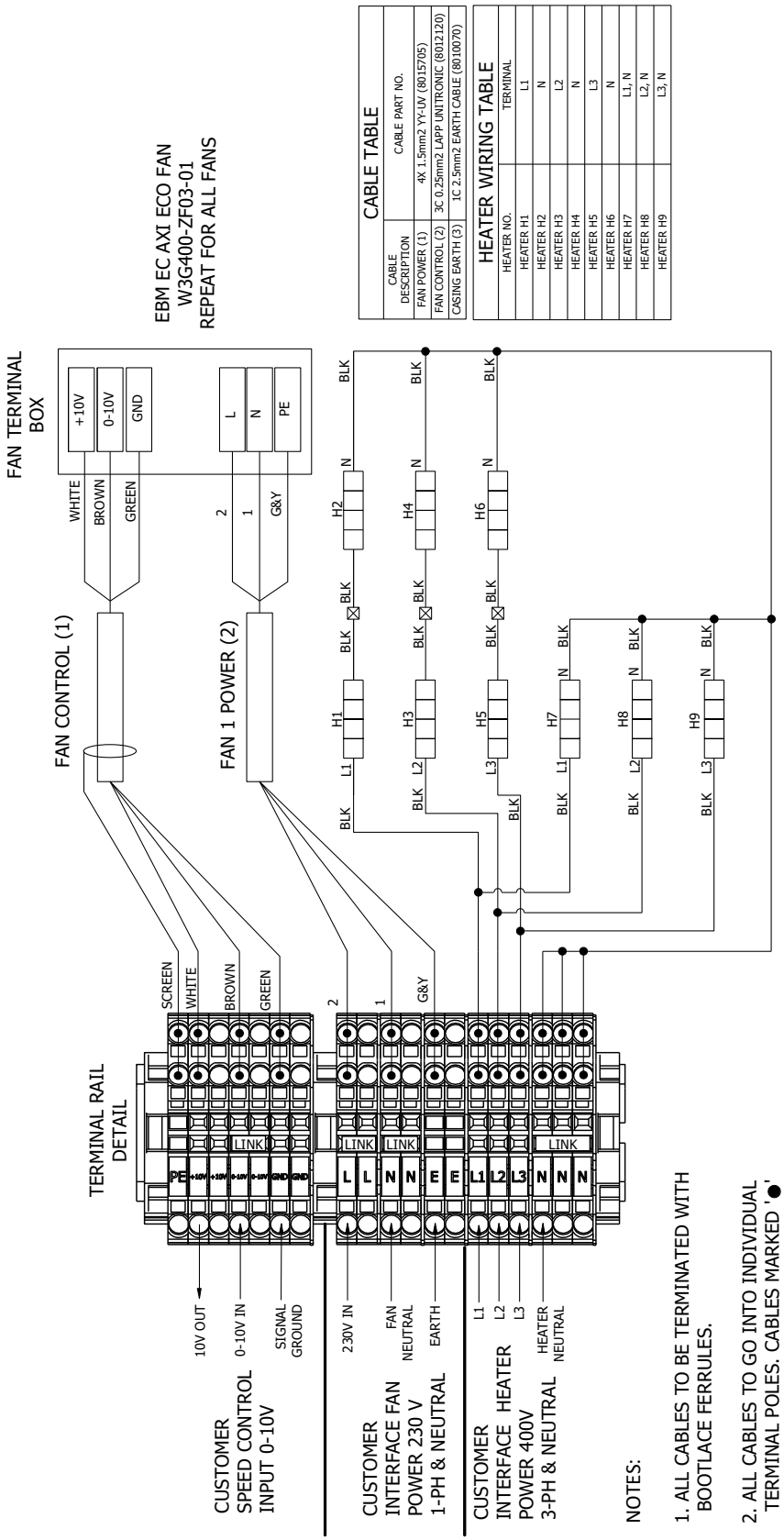
Cooler Wiring

Units are fitted with Variable Speed EC Fans requiring a 0-10V DC signal to run and control the fan speed. If required utilise the +10 VDC supply from the terminals marked "+10", wired to your control device, and return the fan speed 0-10 VDC signal to the terminals marked "0-10V". **The Fan Power Supply must always be energized to maintain the fan electronics, it is not acceptable to control fans by switching the power supply on and off.**

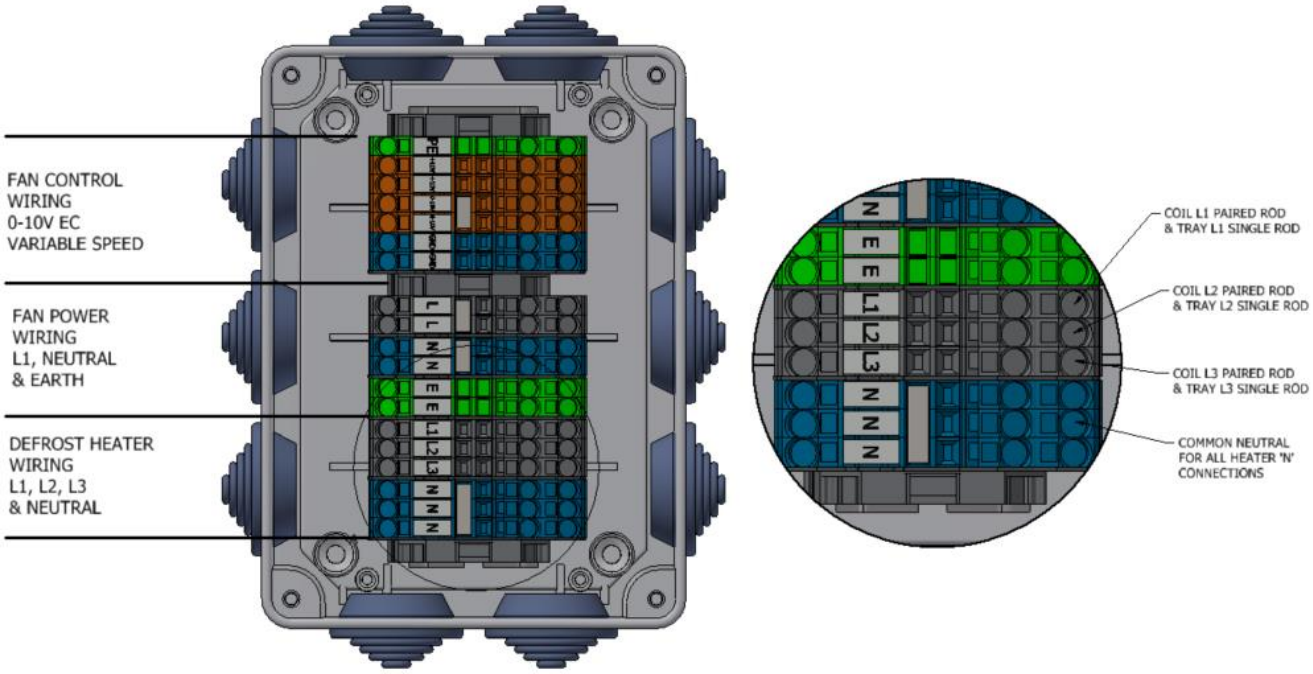
Use the table below to determine the fan control voltage, **important** : unit performance is dependent on fan speed, ensure the speed used matches the installation specification.

DC Control Voltage	Fan Speed
10V	1300 rpm
9.37V	1200 rpm
8.11V	1000 rpm
6.85V	800 rpm

Cooler Wiring Diagram (Typical to all units)



Defrost Heater Wiring, 3ph



All Units Fan & Heater Electrical Data

Unit Type	No. Fans	FLA / Fan	Total FLA Fans	Fan Rated Voltage (50/60Hz AC)	Fan Power Total W	Units with Defrost '-ED' Heater FLA Per Phase	Heater Power Total W
MSKA-12B1	1	1.3	1.3	200-240V L1 to N	165	3.5A	2380
MSKA-12C1	1	1.3	1.3	200-240V L1 to N	165	5.2A	3600
MSKA-12B2	2	1.3	2.6	200-240V L1 to N	330	7.0A	4830
MSKA-12B3	3	1.3	2.6	200-240V L1 to N	495	10.5A	7200
MSKA-12A4	4	1.3	3.9	200-240V L1 to N	660	12.3A	8460

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Unit nomenclature and Weights

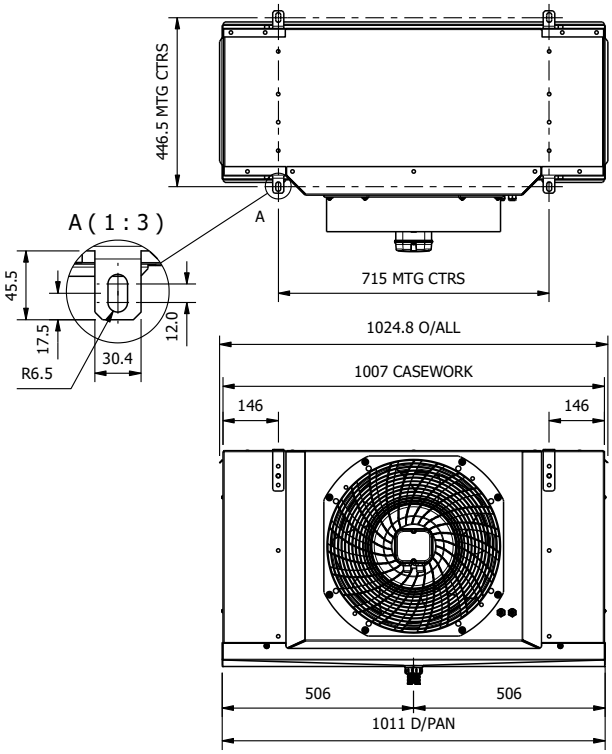
Part Number	Short Part Number	Short Part Number	Dimension			Dry Wt.	Connections	
			L	B	H			
Defrost	No Defrost	Defrost	mm	mm	mm	kg	Inlet	Outlet
4mm Fin Spacing								
MSKA-12B1-0404-040M1A- / ED	MSKA2144N	MSKA2144L	1007	590	575	80	1/2"	1-1/8"
MSKA-12B1-0604-040M1A- / ED	MSKA2264N	MSKA2264L	1007	590	575	85	1/2"	1-1/8"
MSKA-12C1-0404-040M1A- / ED	MSKA2344N	MSKA2344L	1332	590	575	104	5/8"	1-1/8"
MSKA-12C1-0604-040M1A- / ED	MSKA2464N	MSKA2464L	1332	590	575	112	5/8"	1-1/8"
MSKA-12B2-0404-040M1A- / ED	MSKA2544N	MSKA2544L	1682	590	575	129	5/8"	1-1/8"
MSKA-12B2-0604-040M1A- / ED	MSKA2664N	MSKA2664L	1682	590	575	139	5/8"	1-1/8"
MSKA-12B3-0404-040M1A- / ED	MSKA2744N	MSKA2744L	2357	590	575	170	7/8"	1-3/8"
MSKA-12B3-0604-040M1A- / ED	MSKA2864N	MSKA2864L	2357	590	575	195	7/8"	1-3/8"
MSKA-12A4-0404-040M1A- / ED	n/a	n/a	2732	590	575	200	7/8"	1-3/8"
MSKA-12A4-0604-040M1A- / ED	MSKA2964N	MSKA2964L	2732	590	575	217	7/8"	1-3/8"
6mm Fin Spacing								
MSKA-12B1-0406-040M1A- / ED	MSKA2146N	MSKA2146L	1007	590	575	79	1/2"	1-1/8"
MSKA-12B1-0606-040M1A- / ED	MSKA2266N	MSKA2266L	1007	590	575	83	1/2"	1-1/8"
MSKA-12C1-0406-040M1A- / ED	MSKA2346N	MSKA2346L	1332	590	575	101	5/8"	1-1/8"
MSKA-12C1-0606-040M1A- / ED	MSKA2466N	MSKA2466L	1332	590	575	109	5/8"	1-1/8"
MSKA-12B2-0406-040M1A- / ED	MSKA2546N	MSKA2546L	1682	590	575	127	5/8"	1-1/8"
MSKA-12B2-0606-040M1A- / ED	MSKA2666N	MSKA2666L	1682	590	575	135	5/8"	1-1/8"
MSKA-12B3-0406-040M1A- / ED	MSKA2746N	MSKA2746L	2357	590	575	166	7/8"	1-3/8"
MSKA-12B3-0606-040M1A- / ED	MSKA2866N	MSKA2866L	2357	590	575	189	7/8"	1-3/8"
MSKA-12A4-0406-040M1A- / ED	n/a	n/a	2732	590	575	195	7/8"	1-3/8"
MSKA-12A4-0606-040M1A- / ED	MSKA2966N	MSKA2966L	2732	590	575	210	7/8"	1-3/8"

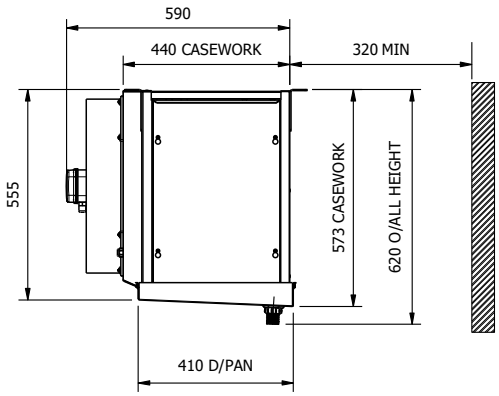
MSKA-12 Spare Parts List

Unit Type	Fan	End Cover	Drain Tray	Drain Connection & Washer	Coil Heater (Linked Pair)	Drain Tray Heater (Single)	Heater End Clip
MSKA-12B1	1854020	MS-12-009	MS-12-068-008	480-4BP-DCA	3 x 5402100	3 x 5402110	7426300
MSKA-12C1	1854020	MS-12-009	MS-12-100-008	480-4BP-DCA	3 x 5402200	3 x 5402210	7426300
MSKA-12B2	1854020	MS-12-009	MS-12-135-008	480-4BP-DCA	3 x 5402300	3 x 5402310	7426300
MSKA-12B3	1854020	MS-12-009	MS-12-203-008	480-4BP-DCA	3 x 5402000	3 x 5402010	7426300
MSKA-12A4	1854020	MS-12-009	MS-12-240-008	480-4BP-DCA	3 x 5402400	3 x 5402410	7426300

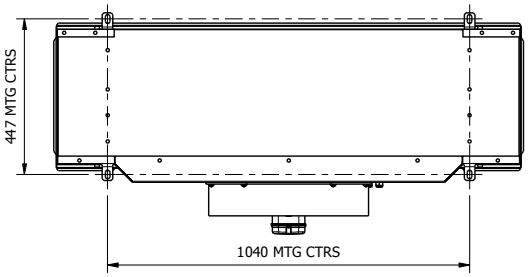
Unit Dimensions

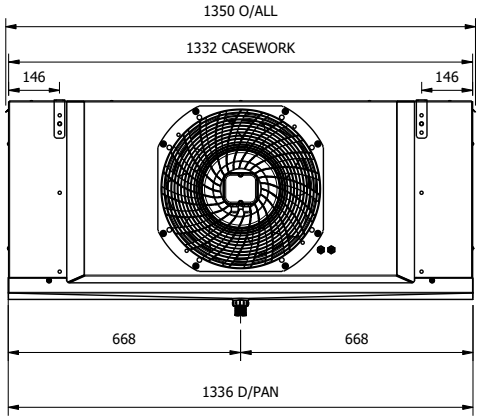
1 Fan Unit Dimensions “B1” Module

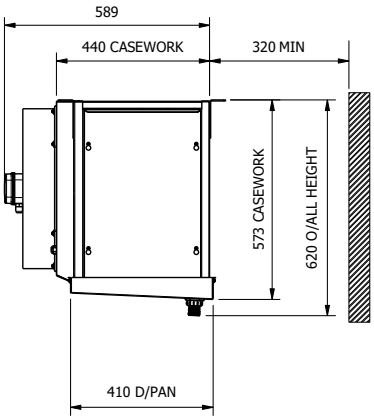




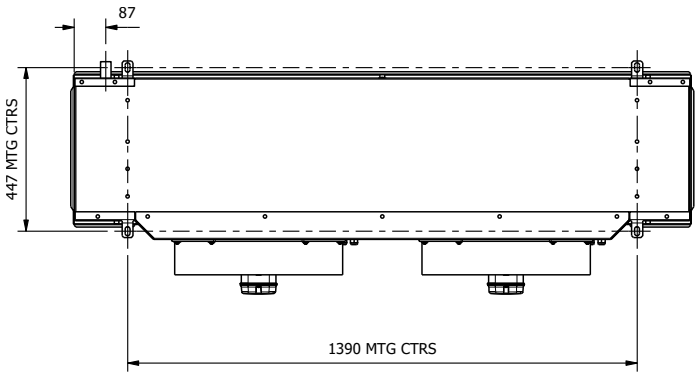
1 Fan Unit Dimensions “C1” Module

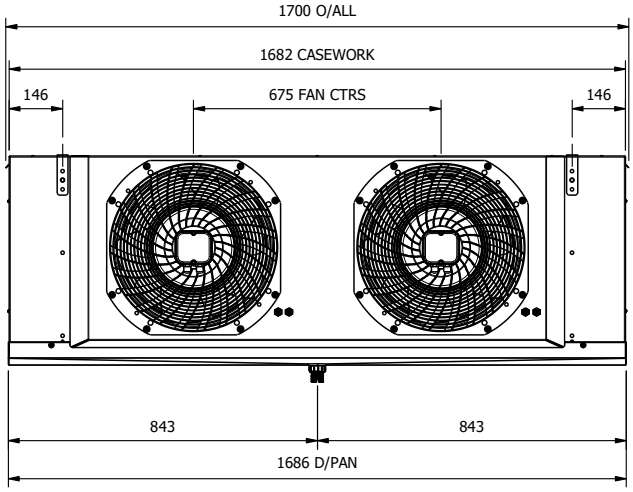


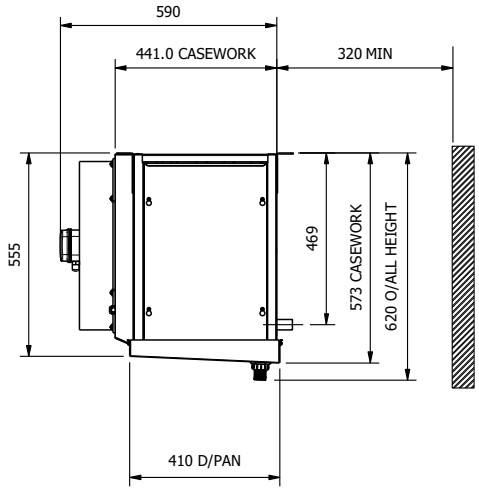




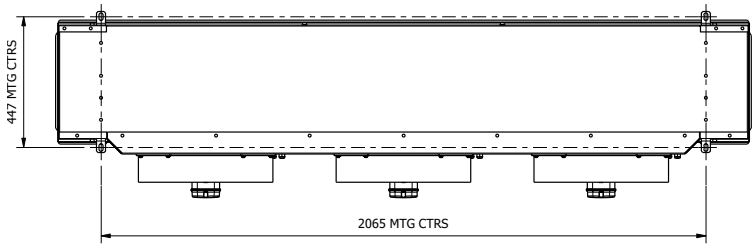
2 Fan Unit Dimensions “B2” Modules

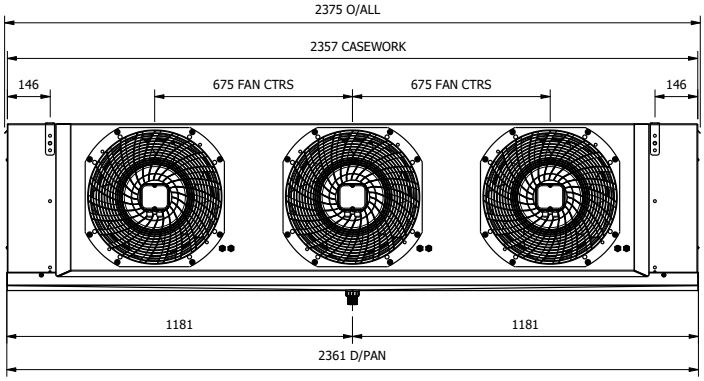


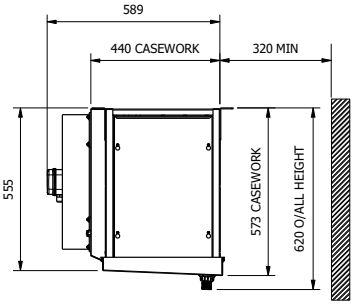




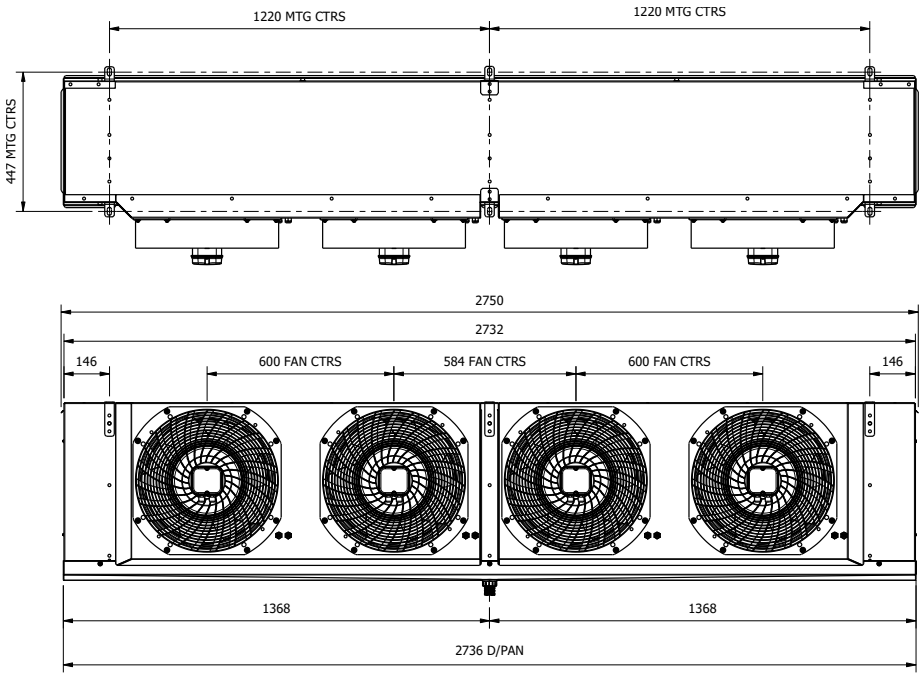
3 Fan Unit Dimensions “B3” Modules







4 Fan Unit Dimensions “A4” Modules



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