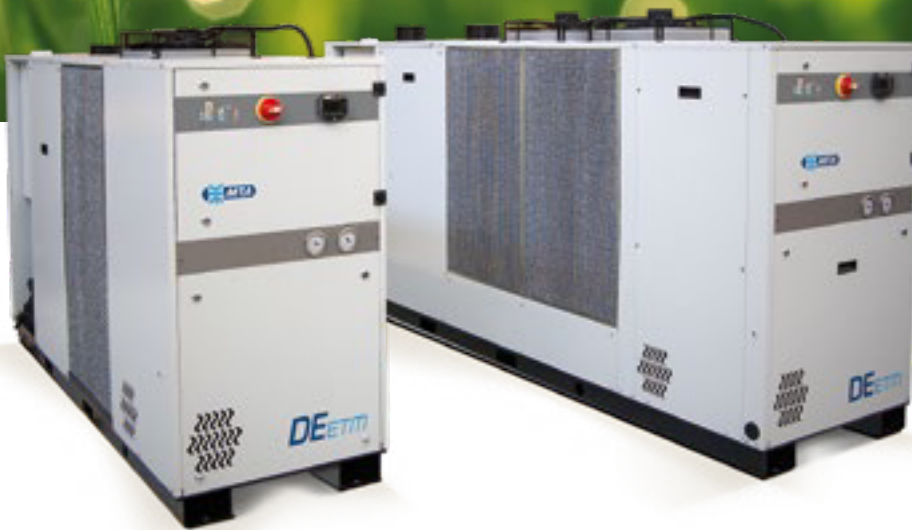




# DEETM | ENHANCED THERMAL MASS

Thermal mass cycling refrigerated air dryers  
Nominal air flow 38 - 237 m<sup>3</sup>/min



*Purifying your compressed air,  
increasing your efficiency.*

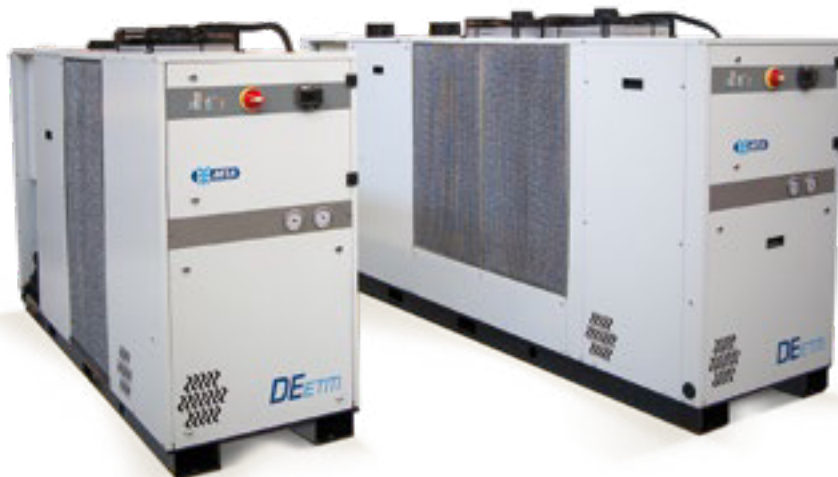


Cooling, conditioning, purifying.



# DE ETM | ENHANCED THERMAL MASS

Compressed air is a versatile and reliable power source, ideal for many modern industrial processes. For preserving the efficiency of plants and devices the compressed air supply must be clean and dry as the compression process causes an increase of concentration of the water vapor, dirt, wear particles and even degraded lubricating oil which all mix together can form a condensate aggressive for the pneumatic systems. The MTA **DE ETM** cycling dryers solve this complex and expensive problem by means of advanced technical solutions as the patented **high efficiency heat exchangers** and the **thermal mass technology** suitable to match the energy consumption of the dryer to the actual work load ensuring saving of more the 80% compared to conventional dryer. **DE ETM** energy savings can be further enhanced by means of **DDF Dynamic Dew point Function**, an advanced feature of the microprocessor control, that automatically adjusts the dew point of the processed air to a set differential from ambient temperature.



## Enhanced Energy Savings

Most of industrial processes feature variable compressed air load profiles. The high efficiency solutions of DE ETM dryers as the thermal mass technology, the DDF function and the high efficiency heat exchangers ensure significant savings by matching the energy consumption to the incoming compressed air demand. The refrigerant compressor is automatically switched off in case of zero-load condition.

## Reliable Operation

DE ETM dryer integrates a strong industrial chiller providing cold storage. The careful selection of the materials and components assure trouble free service life, long service intervals and few component replacements.

## Easy maintenance

Removable frontal panel assures easy access to the main refrigeration components, thus facilitating maintenance operations also with dryer ON. Condenser filters stand-ard prevent mechanical equipment fouling by stopping debris.

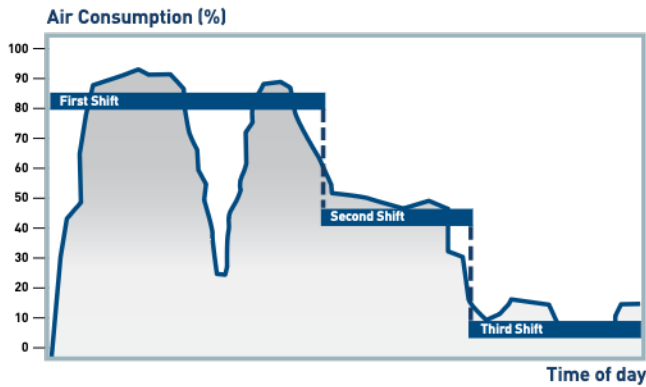
## Respect for the Environment

The eco-friendly refrigerant R410A (ODP=0) with outstanding heat conductivity, coupled with the low absorbed power level of the scroll compressors, reduce the environment impact, minimizing the energy waste. Recyclable and high quality materials ensure respect of environment, and reduces the carbon footprint.



**UNBEATABLE ENERGY EFFICIENCY, LOW PRESSURE DROPS, MAXIMUM RELIABILITY, SYSTEM SIMPLIFICATION: THESE ARE THE ADVANTAGES OF MTA DRYERS.**

## Enhanced Thermal Mass



## Thermal mass

Typically refrigerated air dryers are usually sized for the most extreme working conditions (i.e., summer season with the air compressor operating at maximum load), however this condition is rarely achieved.

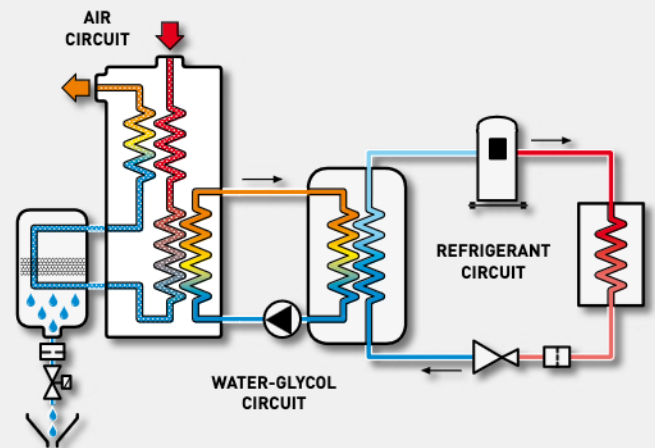
Air demand usually fluctuates during the day and average ambient and inlet temperatures throughout the year are much lower than maximum used to size the system, so that the dryer rarely operate at full load.

DE ETM dryers can store cold energy until it is needed, matching their power consumption to actual operating conditions and ensuring perfect dew point control together with the lowest operating costs.

## How it works

DE ETM dryer integrate a three stage module with a strong industrial chiller providing cold storage and high energy savings.

Hot moist compressed air enters the heat exchanger module Air-to-Air side, where it is pre-cooled by the dry air leaving the dryer. The pre-cooled air enters the Air-to-Fluid exchanger where it is further cooled to the required dew point by the thermal mass fluid (glycol-water mixture). Thanks to this cooling effect, water vapor condenses out of the air and is efficiently separated by the demister, then removed by the condensate drain. The exiting cold dry compressed air then returns to the Air-to-Air heat exchanger where it is reheated by the incoming air above the dew point, to prevent sweating in the piping. The thermal mass fluid circulates through the chiller evaporator where heat is removed by cold liquid refrigerant flowing through the chiller from the refrigeration system. The excess refrigeration capacity that is not needed to cool the compressed air is used to cool the storage medium. Once the thermal mass has been chilled to a pre-determined temperature, the microprocessor turns the refrigeration compressor off. The air is now dried solely by the thermal medium. After the thermal mass fluid warms up, the microprocessor restarts the refrigeration compressor. DE ETM evaporator is totally immersed in the chiller reservoir eliminating radiant heat loss while preventing dew point spikes.



## Secure, High-Performance

The new high efficiency heat exchangers, with optimized counter flow fluid dynamics, integrated air-air side, ensures low power consumption and keep the pressure drops to a minimum level. The accurate design and the integrated efficient low velocity water separator ensures a steady pressure dew point and protects the dryer from any risk of freezing of condensed moisture.

## Robust Design

Heavy duty structure with panels protected by an epoxy polyester powder coating. Electrical panel is IP54 compliant with EN 60204-1 and tested for electromagnetic compatibility in accordance with applicable EMC standards. Phase monitor standard provides protection against phase loss and phase reversal.

## User Friendly

DE ETM automatically adapts itself to any operating condition, without any need to adjust or switch OFF the dryer. User friendly digital control is standard on all the models and shows all the main parameters, providing warnings and alarm to ensure correct dryer operation.

## Guaranteed Quality

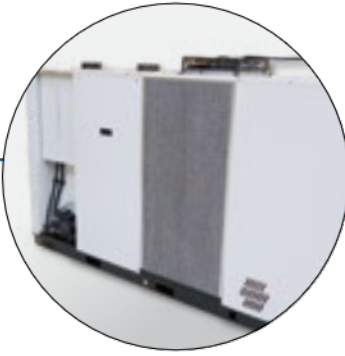
All models are individually tested: refrigerant charge and leakage control, microprocessor and safety device setting verification. Leading brand components are used throughout, ensuring long term reliability.



## Built to perform

### CONDENSING SECTION

The air-cooled condenser (copper tubes/aluminum fins) is fitted on one side only, reducing space requirements. It has a high working efficiency at high ambient temperatures (+46°C). A condenser aluminum cleanable air filter is standard. Option: centrifugal fans (mod. 032-150) and axial fans EC brushless with high head pressure (mod. 190-225).



### ELECTRIC PANEL

The control section is electrically isolated from the power section through a transformer. The power section is fitted with an interlocked door main switch to prevent access while power supply is on. Electrical equipment is compliant with EN 60204-1 and electrical panel protection degree IP54 compliant with EN 60529. The chiller is tested for electromagnetic compatibility in accordance with applicable EMC standards. A phase monitor standard provides protection against phase loss and phase reversal.

### CONTROL

Microprocessor control and energy management system IC208CX.

### SCROLL COMPRESSORS

Compressors with orbiting scrolls, with 2-pole electric motor, mounted on rubber anti-vibration dampers and complete with protection against overheating, excessive currents and against high temperature of the exhaust gases. Thanks to the axial/radial compliance, the low weight of the rotating components and the absence of suction and discharge valves, they offer a series of benefits as a reduced energy consumptions, low vibrations, less moving parts and high resistance to liquid refrigerant returns.

### PUMP

Low energy centrifugal pumps with seals made of silicon carbide (SiC/SiC/EPDM). This pump ensures the circulation of the thermal mass fluid between the chiller evaporator and the aluminum module.

### STRUCTURE

Heavy duty structure with galvanized carbon steel panels protected by an epoxy polyester power coating. Thanks to the configuration of the base, the handling of the unit is easy and secure with a forklift or by lifting bars.

### REFRIGERANT FLUID

Eco-friendly refrigerant R410A (ODP=0).

### THERMAL MASS STORAGE

The chiller evaporator (refrigerant to coolant fluid exchanger) is mounted inside the thermal mass tank itself, reducing power consumption and improving temperature control. The thermal mass fluid flows in contact with the finned surface of the evaporator, cooled by the refrigerant R410A which evaporates inside the tubes. In partial load conditions the excess refrigeration capacity that is not needed to cool the compressed air is used to cool the storage medium.



### HYDRAULIC CIRCUIT FILLING TANK

Plastic tank for filling the circuit and displaying the water level. It is protected by a galvanized and painted sheet steel casing.



### OPTIONS

- Zero loss condensate drain (capacitive);
- Low ambient temperature version (-5 °C): heaters on the condensate line (exchanger, separator, condensate drain);
- High head pressure fans: centrifugal fans (mod. 032-150); High head axial brushless EC fans (mod. 190-225);
- Prepainted condenser coils;
- Condensate separator completely in AISI 304.

### KIT

- Kit Victaulic® kit with flanged connections (mod. 032-110): n°2 flanged adapter nipples + n°2 counterflanges + gaskets + nuts and bolts;
- Antifreeze tank kit Eco PG: 25 kg tank containing a mixing of propylene glycol + additives against algae;
- Height adjustable feet kit;
- Packaging for transportation by container: wooden cage equipped with wooden skid and the mounting accessories required for the insertion and extraction of the units inside the container;
- Seawood packing: fumigated seawood case and protection bag with hygroscopic salts, suitable for long sea transports (about 6 months);
- RS485 communication kit;
- Supervisor Kit xWEB300D;
- Supervisor Kit xWEB300D + modem;
- Remote Control Kit.

### THERMAL MASS FLUID

The thermal mass fluid is a mixture of water and propylene glycol.

### OVERSIZED DEMISTER SEPARATOR

High efficiency demister separator maintenance free (stainless steel demister) offering perfect condensate separation even at partial air flows. Version in AISI 304 available as option.

### NEW ADVANCED ALUMINUM MODULE

2-in-1 extremely robust aluminum module including an high efficiency counter flow Air to Air heat exchanger and an Air to thermal mass fluid heat exchanger.

### CONDENSATE DRAIN

All the model are fitted with microprocessor controlled timed drain including a ball valve and a strainer. The drain open time and cycle time are fully adjustable and the settings can be locked in to avoid tampering. Zero loss drain (option): a capacitive sensor measures the level of the condensed moisture and automatically opens a valve to drain it off, preventing any pressure loss.



### ADVANCED DIGITAL CONTROL & ENERGY MANAGEMENT SYSTEM

DE ETM features an advanced and easy to use microprocessor control IC208CX. The user interface features a comprehensive digital display by an icon based interface. The control manages the operation of the dryer and monitors its energy consumption.

#### Main features

- Thermostatic control of the process fluid;
- Dynamic Dew point Function;
- Energy saving monitoring;
- Condensate drain programming;
- Manual drain test;
- Management of the automatic rotation of the starting sequence of compressors.

#### Digital Display Readouts

- Pressure dew point temperature;
- Air inlet /outlet temperatures;
- Ambient temperature;
- Display LEDs: dryer ON, common alarm, drain status, alarms codes;
- Energy saving level.



#### Alarms

- High Dew Point;
- High inlet air temperature;
- Capacitive zero loss drain fault alarm;
- Low coolant temperature;
- Low evaporation pressure;
- High condensing pressure;
- Fans thermal protections trip;
- Tank level alarm;
- Compressor fault;
- Phase sequence alarm
- Sensors fault;
- Service warning;
- Potential-free general alarm contact.



It is strongly recommended to install a pre-filter (min. filtration grade P 3µm) to prevent module and drainer clogging.



Cooling, conditioning, purifying.

# Enhanced Energy Savings

## ENERGY SAVING COMPARISON

### DE ETM Thermal Mass Cycling dryers

Thanks to the thermal mass technology they can store cold energy until it is needed, matching its power consumption to actual operating conditions and ensuring the lowest operating costs.

### Hot gas by pass dryer

"Non-cycling" dryers work with the refrigerant compressor continuously running independently from the inlet condition, using a by-pass valve to control evaporating pressure. Energy consumption remains almost constant also in absence of compressed air flow.

### DDF DYNAMIC DEW POINT FUNCTION

The dynamic dew point function is an ambient dew point tracking system available as standard. The dryer controls automatically the dew point setting of the process air to a set differential from the ambient temperature.

Thanks to DDF algorithm the dew point setting can be increased proportionally to the ambient temperature without any risk of condensation in the compressed air system as the relative humidity in the air is kept below 30% in every working condition.

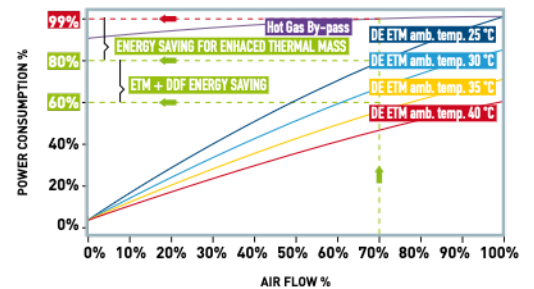
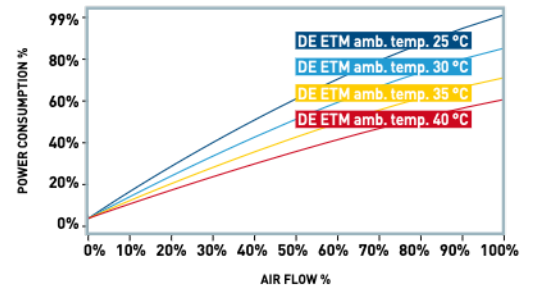
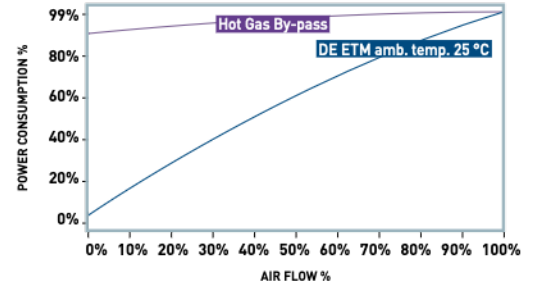
The intelligent increase of the dew point made by DDF reduces the cooling energy required to dry the incoming air load on the dryer, another boost to energy efficiency.

## ENERGY SAVING CALCULATIONS

The example below calculates the annual energy savings of a DE ETM 110 dryer compared to a non-cycling design. The DE ETM 110 ensures an annual energy saving of 9302 kWh corresponding to a cost saving of 930 € and a reduction on annual CO<sub>2</sub> emissions of 2679 kg. With DDF Dynamic Dew Point function activated the energy savings can be further increased. With a medium ambient temperature of +35 °C the DE ETM 110 ensures an annual energy saving of 19094 kWh corresponding to a cost saving of 1.909 € and a reduction on annual CO<sub>2</sub> emissions of 5499 kg.

Compressed Air Flow 110 m <sup>3</sup> /min		Non-Cycling Dryers	DE ETM 110	DE ETM + DDF
Energy consumption per year	kWh	48470	39168	29376
Energy cost per year	€	4.847	3.917	2.938
CO <sub>2</sub> emission per year	kg	13959	11280	8460
Energy saving per year	kWh	-	9302	19094
Cost saving per year	€	-	930	1.909
CO <sub>2</sub> emission saved per year	kg	-	2679	5499

Load profile: 4800 h/year, load = 70%. Energy costs = 0,1 €/kWh. Kg CO<sub>2</sub>/kWh = 0,288.



## NEW ADVANCED HEAT EXCHANGER

DE ETM dryers feature a 2-in-1 extremely robust aluminum heat exchanger including an Air to Air heat exchanger, the Air to chilled mass heat exchanger with a water separator externally connected by Victaulic joints. This advanced heat exchanger has been engineered specifically to maximize the heat transfer coefficient. Thanks to wide air channels and an oversized demister separator it ensures optimum dewpoint performance and guarantees industry leading pressure drops.

### Air-to-Air Heat Exchanger

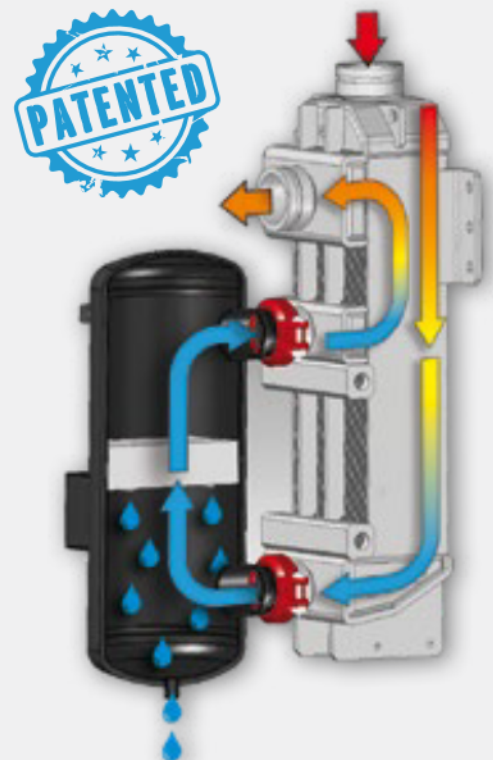
Hot and moist air enters the Air-to-Air heat exchanger where it exchanges heat in total counter flow with the outgoing cold air. Precooling saves energy by reducing the heat load on the evaporator section. The cold dry compressed air passes through the secondary side of the Air-to-Air heat exchanger where it is reheated by the hot inlet air it is precooling. Reheating prevents down-stream pipe sweating.

### Air-to-chilled mass Heat Exchanger

The pre-cooled air enters the Air-to-chilled mass Heat Exchanger where it is cooled to the required dew point by exchanging heat in counter flow with the cold thermal mass fluid, allowing maximum thermal exchange. Due to the cooling effect the water vapor in the compressed air condenses in droplets that can be easily removed by the condensate separator.

### Moisture Separator

After cooling the cold air enters an high efficiency demister separator maintenance free (stainless steel demister) offering perfect condensate separation even at partial air flows. The condensate droplets are then removed falling into the generously dimensioned drainage chamber or sump for disposal through the microprocessor controlled drain.



Model	Nominal air flow (*)		Power supply	Nominal absorption power (*)	Air connections	Overall dimensions (mm)						Weight (Kg)			
	CLASS 5 dew point ≤ 7 °C					V/Ph/Hz	kW	DN (**)	A	B	C		D	E	F
	m <sup>3</sup> /min	m <sup>3</sup> /h													
DE ETM 032	38,2	2292	400/3/50	3,2	100 (4")	662	1404	2256	253	552	1425	521			
DE ETM 037	43,9	2634	400/3/50	3,8	100 (4")	662	1404	2256	253	552	1425	537			
DE ETM 045	52,5	3150	400/3/50	4,5	100 (4")	662	1404	2256	253	552	1425	546			
DE ETM 052	62,4	3744	400/3/50	5,0	125 (5")	662	1404	2256	254	504	1473	628			
DE ETM 060	72,2	4332	400/3/50	6,9	125 (5")	662	1422	2256	254	504	1473	655			
DE ETM 077	91,9	5514	400/3/50	7,9	125 (5")	662	1422	2256	254	504	1473	655			
DE ETM 090	107,4	6444	400/3/50	8,6	150 (6")	761	1469	2936	198	640	2072	1005			
DE ETM 110	118,4	7104	400/3/50	10,7	150 (6")	761	1469	2936	198	640	2072	1010			
DE ETM 130	155	9300	400/3/50	13,0	200	1007	1816	2986	417	504	2040	1323			
DE ETM 150	178,1	10686	400/3/50	13,7	200	1007	1816	2986	417	504	2040	1323			
DE ETM 190	226,3	13578	400/3/50	16,9	250	1011	2090	3445	387	618	2406	1895			
DE ETM 225	236,8	14208	400/3/50	22,6	250	1011	2090	3445	387	618	2406	1930			

(\*) Data refers to the following working conditions: air FAD 20 °C / 1bar A, pressure 7 bar(g), ambient temperature 25 °C, air inlet temperature 35 °C, according to ISO 8573.1 standard.

(\*\*) Models from 032 to 110: n°2 victaulic welding stub pipe + n°2 victaulic couplings; models from 130 to 225: maifolds with flanged connections + n°2 counterflanges + n°2 gaskets + nuts and bolts.

Weights are net (without packing and for timed drain configuration). Refrigerant fluids: R410A. Protection class IP54.

Maximum working pressure 14 bar(g); maximum ambient temperature 46 °C; maximum inlet temperature +65 °C.

The correction factors in the following table should be used as a guide only; for accurate selection at conditions differing from the above the selection software should be utilised. Capacity Correction Factors (indicative values): CAPACITY = RATED VALUE 7 bar(g) x K1 x K2 x K3.

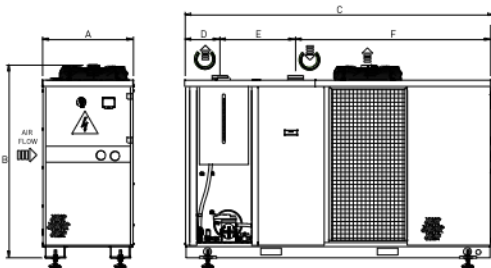
Working pressure	bar (g)	3	4	5	6	7	8	9	10	11	12	13	14
Correction factor	K1	0,55	0,69	0,81	0,91	1,00	1,07	1,13	1,19	1,23	1,26	1,29	1,32

Air inlet temperature	°C	30	35	40	45	50	55	60
Correction factor	K2	1,21	1,00	0,8	0,65	0,53	0,43	0,41

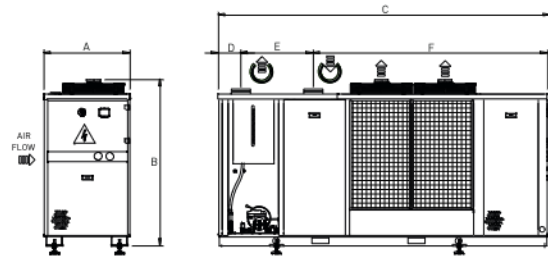
Ambient temperature	°C	20	25	30	35	40	46
Correction factor (***)	K3	1,03	1,00	0,96	0,91	0,85	0,76

(\*\*\*) Ambient correction factor is available if the DDF function is disable.

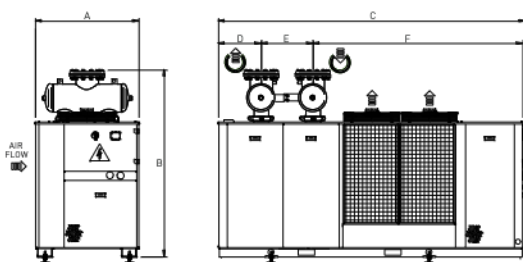
DE ETM 032 - 077



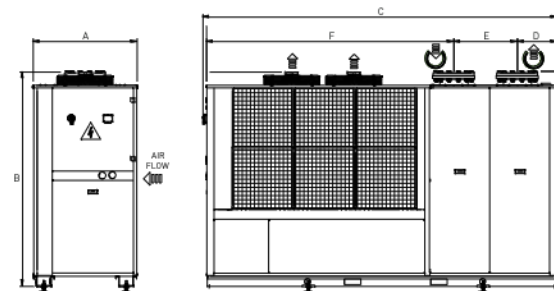
DE ETM 090 - 110



DE ETM 130 - 150



DE ETM 190 - 225



Complete your compressed air treatment system with MTA aftercoolers, separators, filters, adsorption dryers, drains, oil-water separators and chillers.





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**M.T.A. S.p.A.**  
**Business Office**  
Viale Spagna, 8 ZI  
35020 Tribano (PD) Italy

Tel. +39 049 9588611  
Fax +39 049 9588676

info@mta-it.com  
www.mta-it.com

**MTA France S.A.**  
Tel: +33 04 7249 8989  
www.mtafrance.fr

**MTA Deutschland GmbH**  
Tel: +49 (2157) 12402 - 0  
www.mta.de

**Novair-MTA, S.A.U. (España)**  
Tel: +34 938 281 790  
www.novair-mta.com

**SC MTA ROMÂNIA Srl**  
Tel: +40 723 022023  
www.mta-it.ro

**MTA USA, LLC**  
Tel: +1 716 693 8651  
www.mta-usa.com

**MTA Australasia Pty Ltd**  
Tel: +61 1300 304 177  
www.mta-au.com

MTA is represented in over 80 countries worldwide. For information concerning your nearest MTA representative please contact M.T.A. S.p.A.

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MTA is ISO9001 certified, a sign of its commitment to complete customer satisfaction.



MTA products comply with European safety directives, as recognised by the CE symbol.



EAC Declaration



Cooling, conditioning, purifying.