



ETM_{dm}
DRYING MODULE

ENHANCED
THERMAL MASS

Compressed air treatment modules
Nominal air flow 30 – 540 m³/min.



*Purifying your compressed air,
increasing your efficiency.*



Cooling, conditioning, purifying.



ETM_{DM}
D R Y I N G M O D U L E

ENHANCED
THERMAL MASS

The ETM DM are compressed air treatment modular units that can be connected to each other via MASTER/SLAVE logic. Each unit integrates a high-efficiency compact aluminium exchanger, a separation system and a condensate drain. In the MASTER configuration, the ETM DM modules include an electronic control unit that ensures correct operation.



Standard features

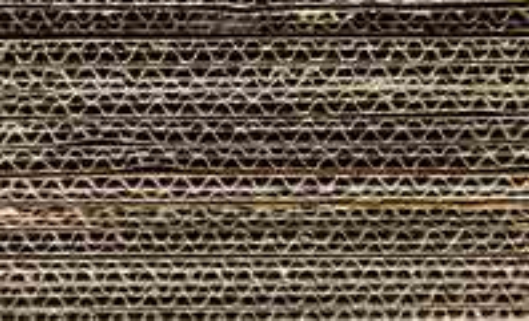
- An extremely robust 2-in-1 heat exchanger, comprising an air-air heat exchanger, an air-glycol water exchanger – optimised for an exchange in countercurrent;
- Demister condensate separator for perfect condensate separation also with reduced compressed air flow rates, removable using Victaulic connections;
- IC208CX microprocessor control and management of standard energy savings on MASTER modules;
- Dynamic dew-point DDF energy saving function with ambient temperature “tracking logic” (ambient sensor DDF kit necessary);
- General alarm free contact;
- Liquid chiller remote ON/OFF control;
- Timed standard condensate drain with cycle times fully adjustable by the microprocessor;
- Safety system for protection against freezing of the condensate.

Options

- Condensate separator completely in AISI304;
- Zero loss capacitive condensate drain;
- Packaging for shipment by container;
- Packaging for shipment by sea.

Kits

- Flanged connections kit (single module);
- Flanged manifold kit (connection of 2/3 MASTER/SLAVE modules);
- Hydraulic connection kit (max distance 5/10 m);
- Propylene glycol Eco PG kit (25 kg cans);
- Propylene glycol concentration measuring kit;
- Kit RS485 Modbus;
- Supervision kit xWEB300D;
- Ambient temperature sensor DDF kit (only combined with TAEvo chiller).



ETM DM the MTA's modular air treatment modules for large capacity systems



Installable anywhere

The upgrading of large systems for the production of compressed air is often problematic and very expensive due to the lack of available space in equipment rooms. ETM DM modules perfectly solve this problem because, thanks to their compact dimensions and the possibility of being connected to a chiller located outside of the compressor room, they can also be easily integrated within existing systems. Multiple SLAVE modules can be connected to a single MASTER module thanks to the inlet/outlet manifolds sized to minimise air-side pressure drops. It is thus possible to adapt as far as possible the combination of MASTER/SLAVE modules to the characteristics of the installation site.



Maximum reliability level

Very often large systems are not designed according to redundancy criteria as the installation of multiple dryers in stand-by with the corresponding piping take up valuable space. During maintenance these systems must therefore be put offline causing costly system downtime. The modular approach of the ETM DM ensures intrinsic redundancy of the critical components and therefore enables the reduction of periods of system downtime.



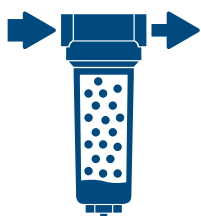
Adaptable to every need

Given the flow of air to be treated and thus selected, a chiller is capable of providing the cooling power necessary for drying of the air. Using a dedicated thermodynamic simulation software it is possible to optimise system performance by choosing between several combinations of MASTER/SLAVE modules. It is in fact possible to choose between several chiller + drying module combinations by sizing the system to ensure optimal pressure loss level without affecting the level of electrical power absorbed while increasing the level of redundancy and safety of the system.



Ultimate energy saving

The load profiles of most of the manufacturing industries are highly variable. The flow rates of compressed air to be processed and the process temperatures fluctuate greatly during the day, forcing the dryers to operate at partial load for most of the time. Thanks to the energy that the TAE tank is able to store in partial load conditions, the system, consisting of one or several ETM DM modules connected to a TAEevo chiller, thus equates to a thermal mass energy saving dryer. The system is able to adapt its energy consumption to the actual requirement for inlet compressed air ensuring the highest level of energy saving.



Integratable filtration

The microprocessor board of each unit can integrate the control of an external filter. If the filter requires maintenance, a differential pressure switch with alarm free contact sends a signal to the microprocessor which generates a warning signal visible both on the display of the microprocessor control and remotely, where the ETM DM unit is integrated within a Modbus RS485 network.

Built to perform

ADVANCED DIGITAL CONTROL

ETM DM module features technologically advanced, easy-to-use microprocessor control. IC208CX manages fully independently operation of the ETM DM module and can activate the chiller using a remote ON/OFF key.



Main features

- ON/OFF button to turn on the chiller remotely;
- Management of the IN/OUT temperatures on the air side and water side;
- Condensate drain programming;
- Manual timed drain test;
- Anti-freeze protection function;
- TTL serial connection.

Digital Display Readouts

- Pressure dew point temperature;
- Air-water inlet/outlet temperatures;
- Display LEDs: ON, common alarm, drain status, alarms codes.

Alarms

- High Dew Point;
- High/Low inlet/outlet air temperature;
- High/Low inlet coolant temperature;
- Service warning for an external filter;
- Potential-free general alarm contact;
- Pressure switch on hydraulic circuit.

CONTROL (MASTER UNIT)

Microprocessor control IC208CX.

ADVANCED ALUMINUM MODULE

An extremely robust 2-in-1 heat exchanger, comprising an air-air heat exchanger, an air-glycol water exchanger – optimised for an exchange in countercurrent.

DEMISTER CONDENSATE SEPARATOR

It allows the perfect separation of condensate even with reduced compressed air flow rates. The AISI304 demister is installed inside a carbon steel tank (version completely in AISI304 available as optional).

CONDENSATE DRAINS

Standard timed condensate drain with cycle times fully adjustable by the microprocessor. Zero loss drainer (optional) with drain cycles, which are automatically managed by a capacitive level sensor, avoiding any loss of pressure.



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



MODULAR DESIGN

Thanks to the modular approach it is possible to connect up to 6 ETM DM units in MASTER/SLAVE mode, and then to meet optimally the needs of large-capacity systems (up to 540 m³/min).

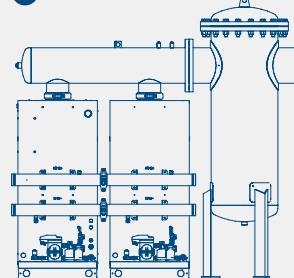
In case of an expansion in the production capacity of a plant with a consequent increase of compressed air demand, it is easily possible to increase the drying capacity of the system, by adding one or more SLAVE modules to each single MASTER module.

On the right, some modular configuration examples for an ETM DM mod. 090:

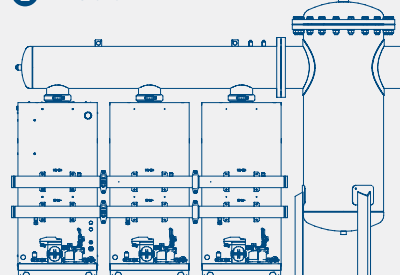
- | | |
|----------------------|----------------------|
| 1. MASTER + 1x SLAVE | 3. MASTER + 4x SLAVE |
| 2. MASTER + 2x SLAVE | 4. MASTER + 5x SLAVE |

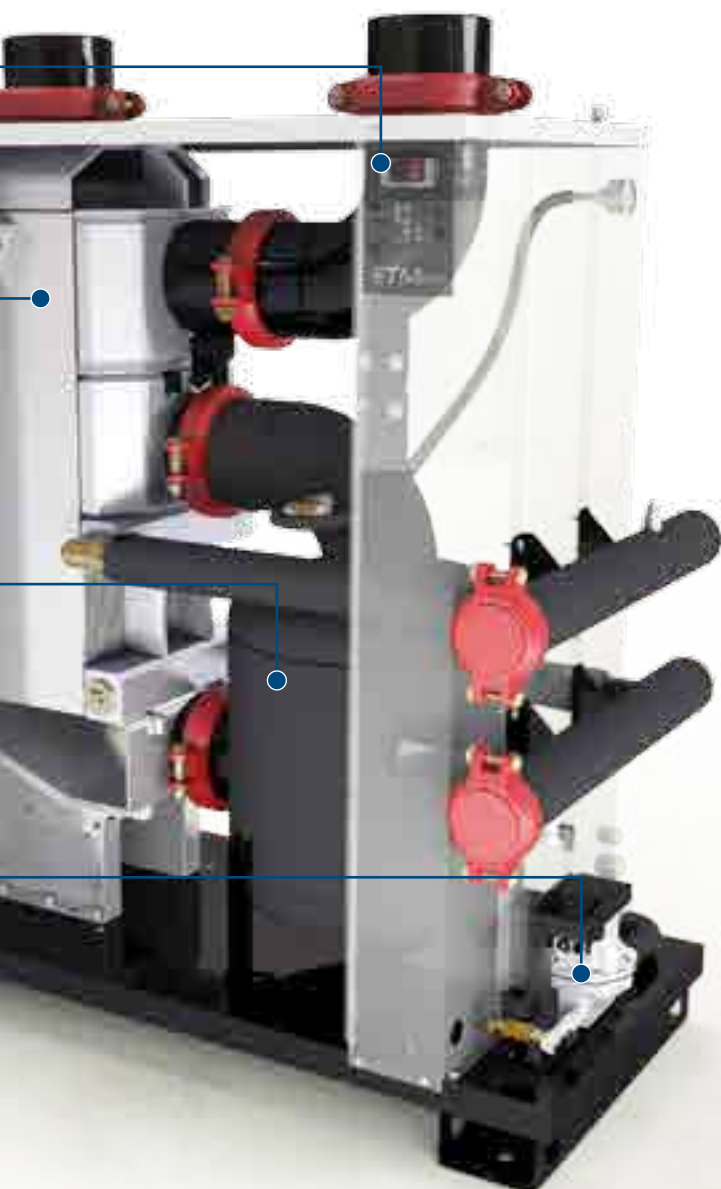
Please note: filters and manifolds are available as option.

1 TWIN 090



2 TRIO 090





HIGH EFFICIENCY ALUMINUM HEAT EXCHANGER

ETM DM modules 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.

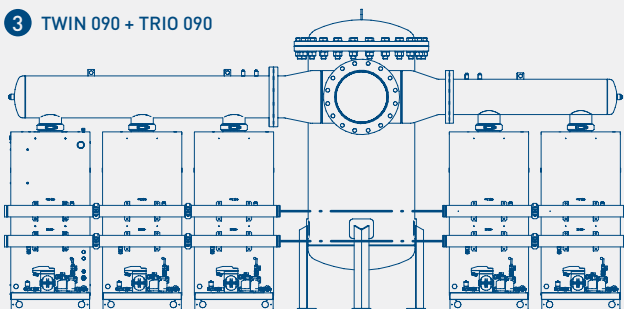
Air-to-chilled mass Heat Exchanger

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.

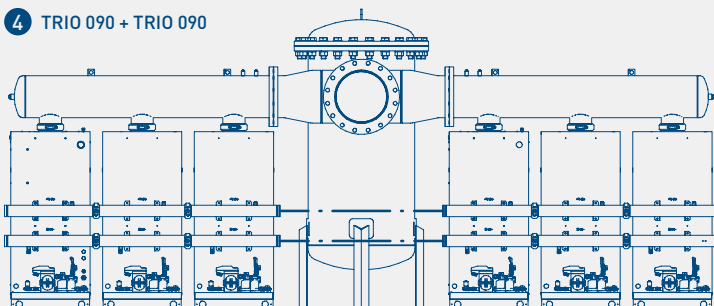
Moisture Separator

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.

3 TWIN 090 + TRIO 090



4 TRIO 090 + TRIO 090



High energy saving

COMPARISON OF ENERGY SAVING SYSTEMS

ETM DM systems + TAEevo chiller

Thanks to the thermal mass technology the systems consisting of the ETM DM modules + TAEevo chiller are able to adapt the refrigeration power produced according to the flow of processed air, ensuring maximum energy savings.

Hot gas dryers (HGBV)

In the hot gas dryers (non cycling) the refrigerating compressor operates constantly regardless of the input conditions, using a by-pass valve to control the evaporation pressure. Energy consumption remains almost constant even without compressed air flow.

DDF Dynamic Dew point Function (only available in combination with TAEevo TECH chiller)

Special attention was paid to the management logic aimed at reducing energy needs through the dynamic dew point DDF function. The "tracking logic" of the DDF function ambient temperature varies the dew point dynamically thereby minimising the consumption of refrigerator compressors, protecting the system from any risk of condensate in the system as the relative humidity is maintained below 30% for each operating condition. Dynamic increasing of the dew point controlled by the DDF algorithm reduces the cooling capacity necessary to dry the incoming air and therefore further reduces energy consumption.

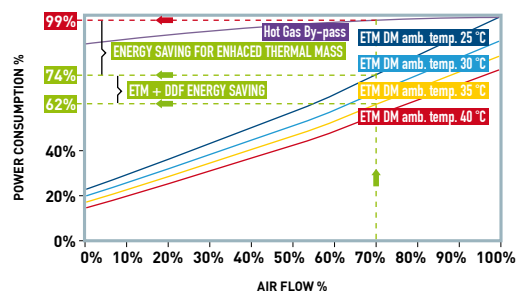
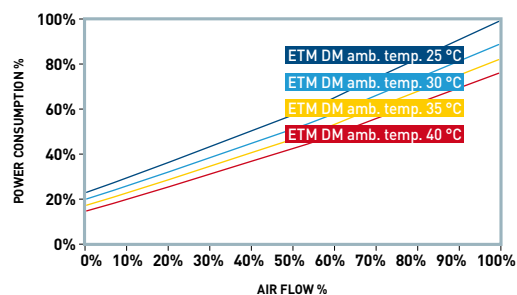
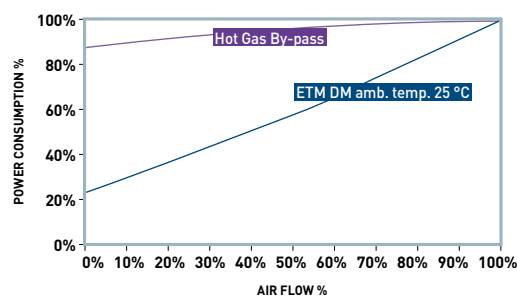
ENERGY SAVING CALCULATIONS

The following example calculates the annual energy savings of a system consisting of an ETM DM 090 module associated with a TAEevo TECH 121 liquid chiller compared with an equivalent hot gas dryer. Thanks to thermal mass technology, the annual energy saving is 11.402 kWh, which is equivalent to a saving of €1.140 and a reduction of annual emissions of CO₂ of 3.284 kg. Assuming operation at a temperature of +35 °C, the energy saving can be further increased through activation of the dynamic dew point DDF function.

Under these conditions the annual energy saving is 16.478 kWh, corresponding to an annual saving of €1.648 and an annual emission reduction of CO₂ of 4.746 kg.

Compressed Air Flow 90 m ³ /min		Non-Cycling Dryers	ETM DM 090	ETM DM + DDF
Energy consumption per year	kWh	43.926	32.524	27.448
Energy cost per year	€	4.393	3.252	2.745
CO ₂ emission per year	kg	12.651	9.367	7.905
Energy saving per year	kWh	-	11.402	16.478
Cost saving per year	€	-	1.140	1.648
CO ₂ emission saved per year	kg	-	3.284	4.746

Load profile: 4800 h/year, load = 70%. Energy costs = 0,1 €/kWh. Kg CO₂/kWh = 0,288.



HOW DOES IT WORK?

The ETM DM module connected to the compressed air distribution system must be hydraulically connected with the liquid chiller via an appropriate hydraulic kit. When fully operational, the hot compressed air, and humidity load, enters the air-air heat exchanger of each ETM DM module where it is pre-cooled by the dried air exiting the dryer. The pre-cooled air then enters the air-water exchanger where the glycol water coming from the liquid chiller further cools the air until the required dew point is reached. Due to the cooling, the water vapour contained in the air condenses into liquid droplets that are effectively separated by the demister separator and then removed through the condensate drain. The cold and dried compressed air in output then returns to the air-air heat exchanger where it is heated again by the incoming air, to avoid phenomena of humidity condensation on the outer surface of the compressed air distribution system pipes. The water/glycol mixture flows through the liquid chiller evaporator where it is cooled by the coolant liquid during evaporation. In partial load conditions, the excess cooling capacity, not needed to cool the compressed air, is used to cool the fluid contained in the chiller tank (Thermal Mass). When the thermal mass reaches the set point temperature, the controller switches off the chiller compressor reducing energy consumption (in this condition the air is dried due to the energy stored in the Thermal Mass).



Technical data

Single module	Nominal air flow (*)		Pressure drops air-side	Available versions			Power supply	Connections			Weight (kg)	
	m³/min	m³/h		MASTER (M)	SLAVE (S)	Max no. of connectable units		IN/OUT Air side (1)	IN/OUT Water side (2)	Condensate drain(3)	MASTER (M)	SLAVE (S)
ETM DM 030	30	1.800	0,12	•	-	1M	230 /1/ 50-60	DN100 (4")	Rp 1"	φ 8 mm	166	-
ETM DM 060	60	3.600	0,15	•	•	1M + 5S	230 /1/ 50-60	DN125 (5")	DN65 (2.1/2")	φ 8 mm	290	277
ETM DM 090	90	5.400	0,17	•	•	1M + 5S	230 /1/ 50-60	DN150 (6")	DN80 (3")	φ 8 mm	349	336

Multiple modules (5)	Nominal air flow (*)		Pressure drops air-side	Configuration			Power supply	Connections				Weight (kg)	
	m³/min	m³/h		Model	MASTER (M)	SLAVE (S)		IN/OUT Air side single module (1)	IN/OUT Manifold Air side (1)	IN/OUT Water side (2)	Condensate drain(3)	without manifolds	with manifolds
TWIN 060	120	7.200	0,17	ETM DM 060	1	1	230 /1/ 50-60	DN125 (5")	DN200 (8")	DN65 (2.1/2")	φ 8 mm	567	647
TWIN 090	180	10.800	0,21	ETM DM 090	1	1	230 /1/ 50-60	DN150 (6")	DN250 (10")	DN80 (3")	φ 8 mm	685	793
TRIO 090	270	16.200	0,21	ETM DM 090	1	2	230 /1/ 50-60	DN150 (6")	DN300 (12")	DN80 (3")	φ 8 mm	1.021	1.227
TWIN 090 x 2	360	21.600	0,21	ETM DM 090	1	3	230 /1/ 50-60	DN150 (6")	DN250 (10")+DN250 (10")	DN80 (3")	φ 8 mm	1.357	1.574
TWIN 090+TRIO 090	450	27.000	0,21	ETM DM 090	1	4	230 /1/ 50-60	DN150 (6")	DN250 (10")+DN300 (12")	DN80 (3")	φ 8 mm	1.693	2.008
TRIO 090 x 2	540	32.400	0,21	ETM DM 090	1	5	230 /1/ 50-60	DN150 (6")	DN300 (12")+DN300 (12")	DN80 (3")	φ 8 mm	2.029	2.441

Overall Dimensions	ETM DM 030	ETM DM 060	ETM DM 090	TWIN 060	TWIN 090	TRIO 090	TWIN 090 x 2	TWIN 090+TRIO 090	TRIO 090 x 2
A	970	1200	1200	1200	1200	1200	Refer to TWIN 090	Refer to TWIN 090 + TRIO 090	Refer to TRIO 090
B	490	746	746	1400	1400	2100			
C (without manifolds)	1421	1512	1507	1512	1507	1507			
C* [with manifolds]	-	-	-	1762	1843	1870			

(*) The data refer to the following operating conditions: air FAD 20 °C/1 bar A, pressure 7 bar (g), ambient temperature 25 °C, air inlet temperature 35 °C, according to the ISO 8573.1 standards. Operating limits: maximum pressure air side 14 bar(g); maximum pressure water side 6 bar(g); ambient temperature min/max +5 °C/50 °C; inlet temperature max +65 °C; IP22 protection class. The hydraulic circuit should be filled with 30% anti-freezing liquid Eco PG + 70% fresh water from tap.

(1) IN/OUT air-side connections Mod. 030-090: 2x weld Victaulic connections + 2x Victaulic jaws.

(2) IN/OUT water-side connections Mod. 030-090. MASTER module Mod. 060-090: 2x weld Victaulic connections + 4x Victaulic jaws + 2x Victaulic plugs.

SLAVE module Mod. 060-090: 2x Victaulic jaws.

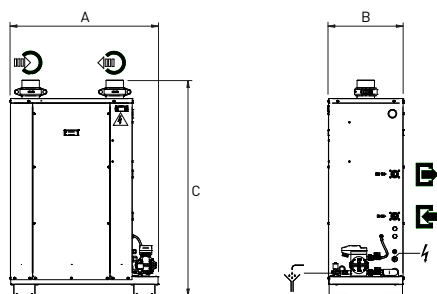
(3) Condensate drain connection: polyamide pipe φ 8 mm / length 2 m.

(4) Weights are net (without packing).

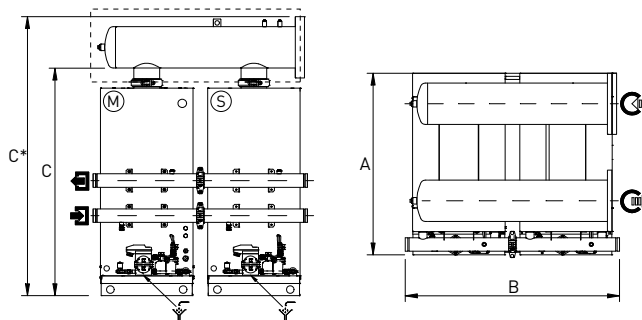
(5) Multiple modules: the assembly of MASTER and SLAVE modules and of the air manifolds is at customers' charge.

For accurate selection at conditions differing from the above the selection software should be utilized or please contact MTA.

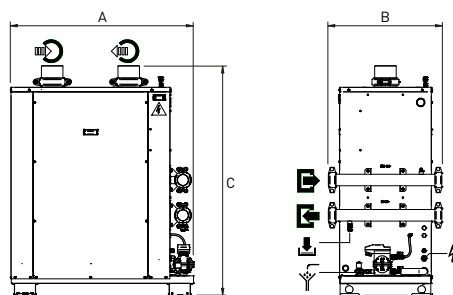
ETM DM 030



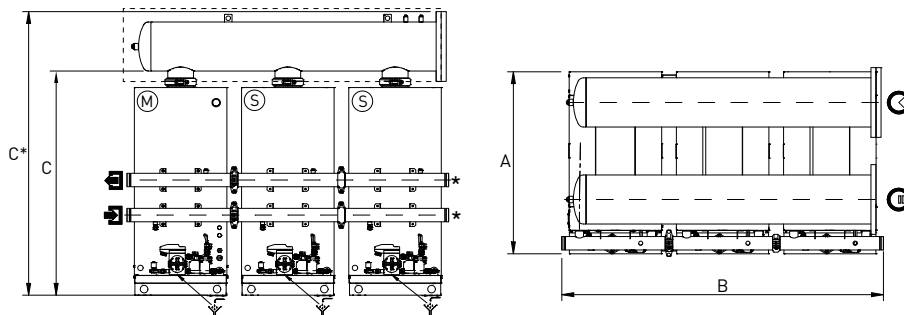
TWIN 060-090



ETM DM 060-090



TRIO 090



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





www.mta-it.com



The images of the products in the document are for illustrative purposes only and therefore do not have any contractual value.

M.T.A. S.p.A.

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.

The data contained herein is not binding. With a view to continuous improvement, MTA SpA reserves the right to make changes without prior notice.



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.