



# Mef Express HT

Aerial extractor for heat exchanger tube bundles

Maintenance

Tube bundle extractor



## A winning story since 1961

### The Beginning

At the end of the 1950s, Domenico Franco Agostino became the Italian representative of Albert Otto, a German manufacturer of tube expanders. In 1961 Franco Agostino's Albert Otto Italiana was founded and in 1972, after purchasing an area of 10,000 square metres in the municipality of Bagnolo Cremasco, Maus Italia Sas was established.

### The Growth

In 1976 his son Stefano, a mechanical engineer, joined the company. Together with his father, he studied products, introduced new machinery onto the market and filed the first patents by Maus Italia. Above all, Stefano was firmly convinced that people are the very heart of a company's success. Therefore, he invested in human capital by valuing people and roles, and he surrounded himself with skilled operators as well as technical, commercial and administrative collaborators. The result was a winning, competent and proactive team.

His daughter Anna - also a mechanical engineer - has been working in the company since 2016, giving new impetus and energy to the business her father and grandfather had built.

Father and daughter work together side by side every day to guarantee the excellence of Maus Italia and support all customers worldwide with competence and passion: the company's distinctive traits.



**Stefano Agostino**

CEO - Mechanical Engineer

**Anna Agostino**

COO - Mechanical and Management Engineer



## ***In-house production of each component*** ***Workshop 4.0 and 24/7 production control***

The production of Maus Italia branded items is entirely carried out in Bagnolo Cremasco, in the heart of an Italian industrial area 30 km southeast of Milan.

The company boasts a 4.0 workshop equipped with state-of-the-art machinery, an in-house heat treatment room and a final inspection department that allow Maus Italia to independently manage every phase of the manufacturing process of its wide range of products whilst maintaining high quality standards.



## ***Quality first.*** ***Design and development***

One of Maus Italia's strengths is its willingness to understand its customers' needs.

Our technical department is always ready to find operational solutions to the most complex applications, even via feasibility studies. We develop accurate work processes, draw with FEM analyses to verify our mechanical-structural performance and optimise the manufacturing process of each component.

## ***Ready To Deliver***

A well-stocked and complete warehouse of finished products enables Maus Italia ship quickly to customers all over the world according to a ready-to-deliver logic.

The warehouse is fully located within our premises in Bagnolo Cremasco at controlled temperatures and conditions to guarantee the maximum safety and quality of Maus Italia products for all our customers.

## ***Quality, environment and safety policy***

Research, quality and safety are the watchwords of Maus Italia Spa.

Maus Italia has several projects underway aimed at increasingly sustainable development and integrates environmental concerns into its business model. The company's actions, behaviour and development choices are focused not only on the short run but rather mainly on a medium and long-term horizon.



## ***Every day in over*** ***80 country*** ***worldwide***

Find an official distributor  
in your country



# Mef Express HT

*To ensure minimum downtime and protection of the tube bundle during extraction*

Maus Italia presents, for the extraction and insertion of tube bundles in the plant, a complete new range of Mef Express HT aerial tube bundle extractors with dedicated solutions for handling by crane for maintenance at great heights.

Years of evolution of the Mef Express product series have allowed the design to be revisited, making the Mef Express HT ( High Technology ) aerial tube bundle extractors of today even more lightweight, more flexible and easier to handle.

Starting from the numerous standard products that cover common market requests, Maus Italia is also able to provide custom solutions to solve extreme cases with ATEX / OFF-SHORE versions.

**For tube bundles up to 125 T in weight**



# Focus features



NO damage

## Protective

The Mef Express HT aerial extractor carefully supports the tube bundle during extraction and insertion and ensures perfect balance along its longitudinal axis, eliminating the risk of damaging the baffles or crushing the tubes.



User-friendly

## Operational simplicity

The controls on the supplied remote control make the Mef Express HT extremely simple and intuitive to use, guaranteeing the operator full control of the extraction or insertion sequence.



Planetary gearbox

## Longlasting epicyclic power

The use of powerful planetary gearboxes guarantees greater reliability and robustness than chain systems, thus minimising the need for maintenance.

Standard features



NO overturning

## Electronic overturning control

The Mef Express HT can be supplied, upon request, with the innovative EOC system which allows the handling of loads in complete safety by inhibiting any incorrect commands which would compromise stability.



ATEX

## ATEX certification

The Mef Express HT aerial extractor can, upon request, be manufactured in accordance with the ATEX directive in an explosion proof configuration for use in environments with a potentially explosive atmosphere.



Off shore

## DNV certification for FPSO and offshore platforms

Maus Italia can, upon request, design and produce DNV approval type Mef Express NAVY aerial tube bundle extractors for OFFSHORE applications, Mef fixed NAVY stationary versions and Mef Mobile NAVY self-propelled caterpillar versions.



Low Temp

## Not afraid of the cold

The Mef Express HT aerial extractor can be supplied, upon request, in the special version, suitable for operating at the very lowest temperatures.



Customized

## Adapts according to need

Maus Italia can design the Mef Express HT aerial extractor, upon request and subject to technical verification, for bundle sizes and weights different from our standard product. Special paints for colour, composition and thickness are possible.

Optional features

## Electrowelded steel ring for lifting the extractor

Maus Italia applies targeted solutions to solve customer problems.

The ring can be:

- Circular
- Oval
- Divisible in three parts



### Circular

Solution for all sizes of models up to the Mef express HT 2045/75



### Oval

Solution to facilitate the handling of the extractor in small spaces, mainly requested for OFF SHORE application



### Divisible in 3 parts

Solution for sizes of models from the Mef express HT 2545/75 upwards to facilitate transport on the plant, as well as shipping

## Adjustable hydraulic vices

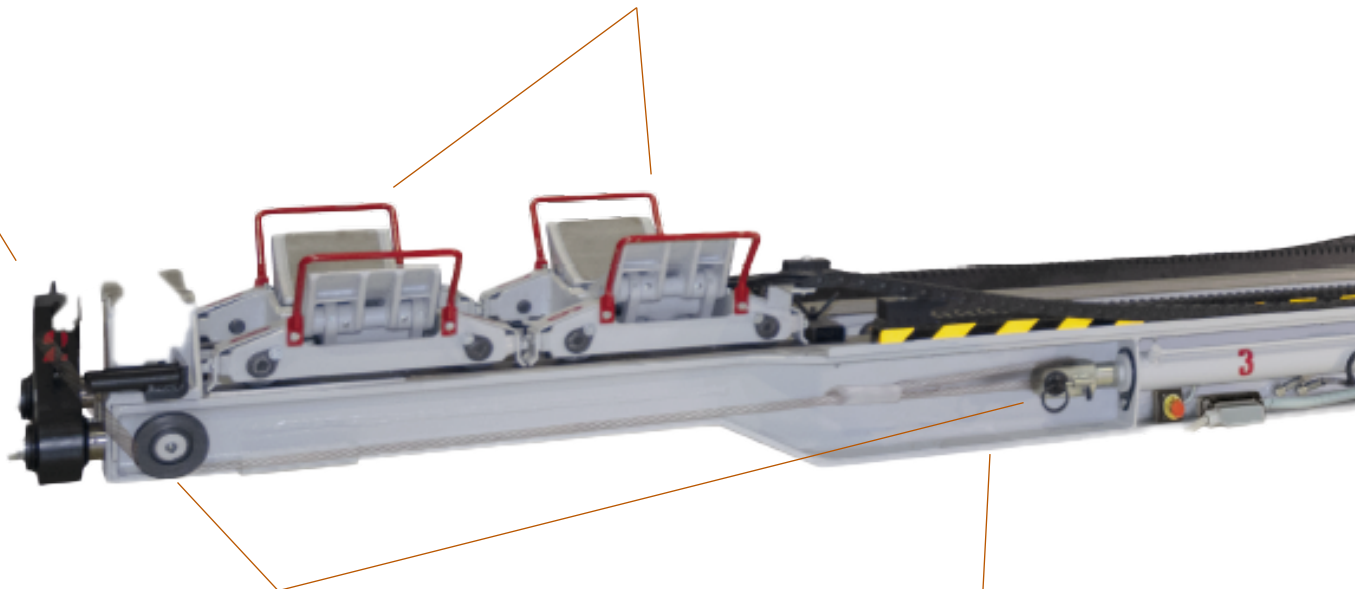
for anchoring the machine to the exchanger flange

- left and right side synchronous movement (standard)
- left and right independent movement (optional)

## Support trolleys

to support the tube bundle

- with manual controls (standard)
- hydraulically operated (optional)



## Hydraulic rope tensioning system

for safe anchoring of the extractor to the exchanger.

- left and right side synchronous movement (standard)
- left and right side independent movement (optional)

## Electrowelded steel structure

to support the weight of the tube bundle



### Lifting points

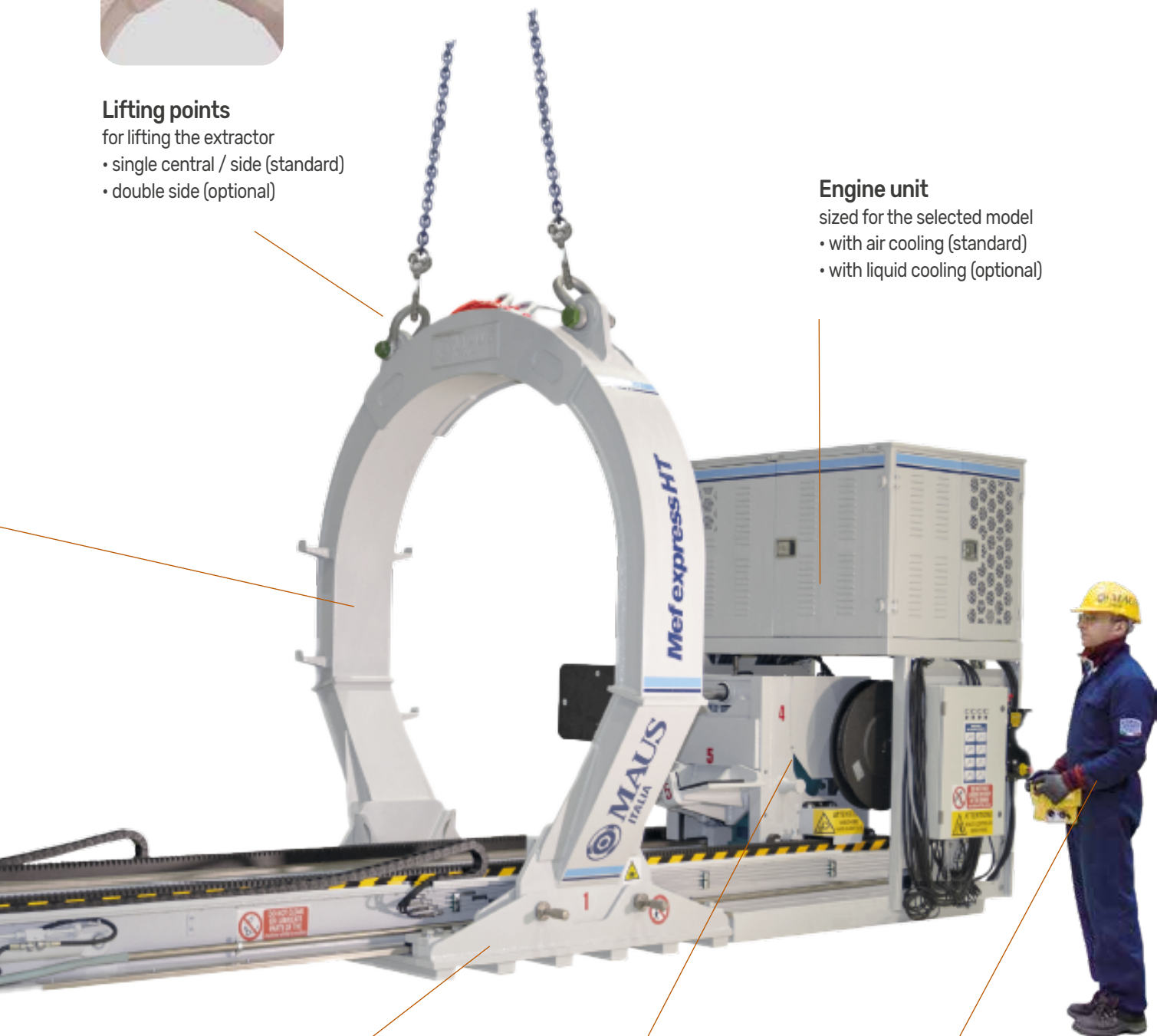
for lifting the extractor

- single central / side (standard)
- double side (optional)

### Engine unit

sized for the selected model

- with air cooling (standard)
- with liquid cooling (optional)



### Extractor base

for balancing during extraction

- the large support area guarantees stability during the overhead balancing phase

### Main carriage

for coupling/pulling/pushing the tube bundle

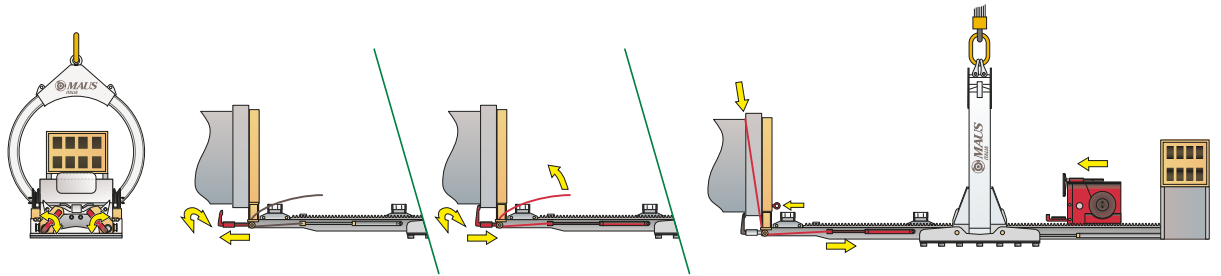
- with planetary gearbox (standard)
- increased pulling force (optional)

### Remote control

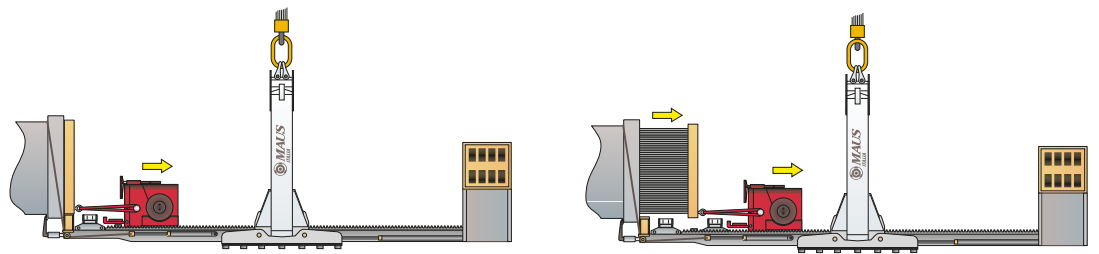
for controlling the available hydraulic movements

- with connection cable (standard)
- radio control (optional in addition to the standard)

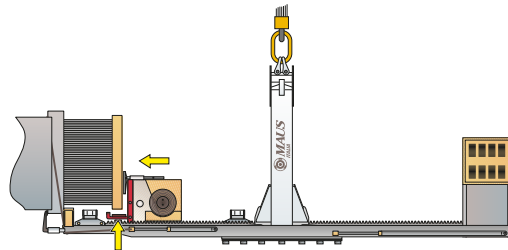
**1** Anchoring to the shell



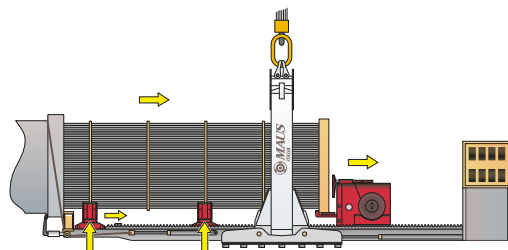
**2** Pull the tubesheet with rope



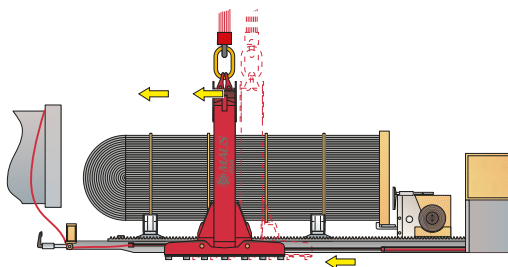
**3** Coupling and start of extraction



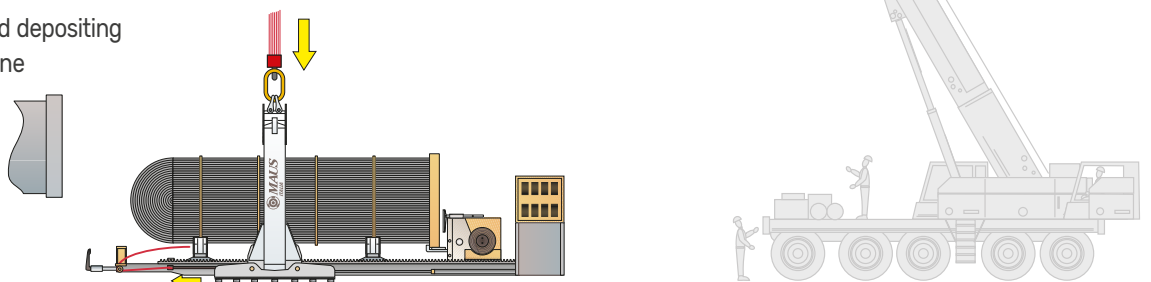
**4** Extraction and support



**5** End of extraction and balancing



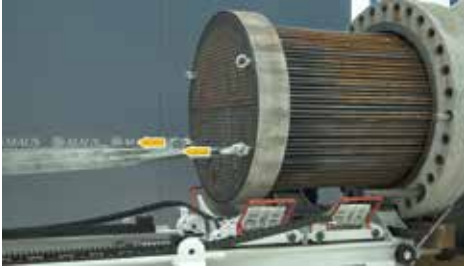
**6** Release from shell and depositing on ground using a crane







Anchoring to the shell **1**



Pull the tubesheet with rope **2**



Coupling and start of extraction **3**



Extraction and support **4**



End of extraction and balancing **5**



Release from shell and depositing on ground using a crane **6**

## **Extraction sequence**

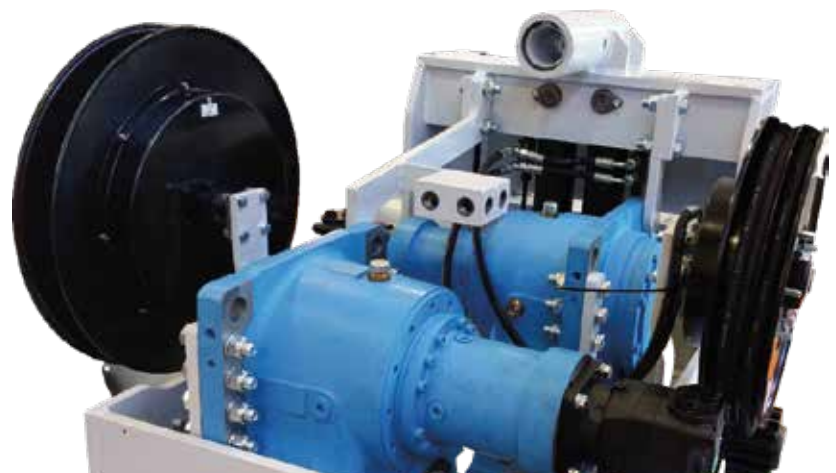


## **/ Longlasting epicyclic power**

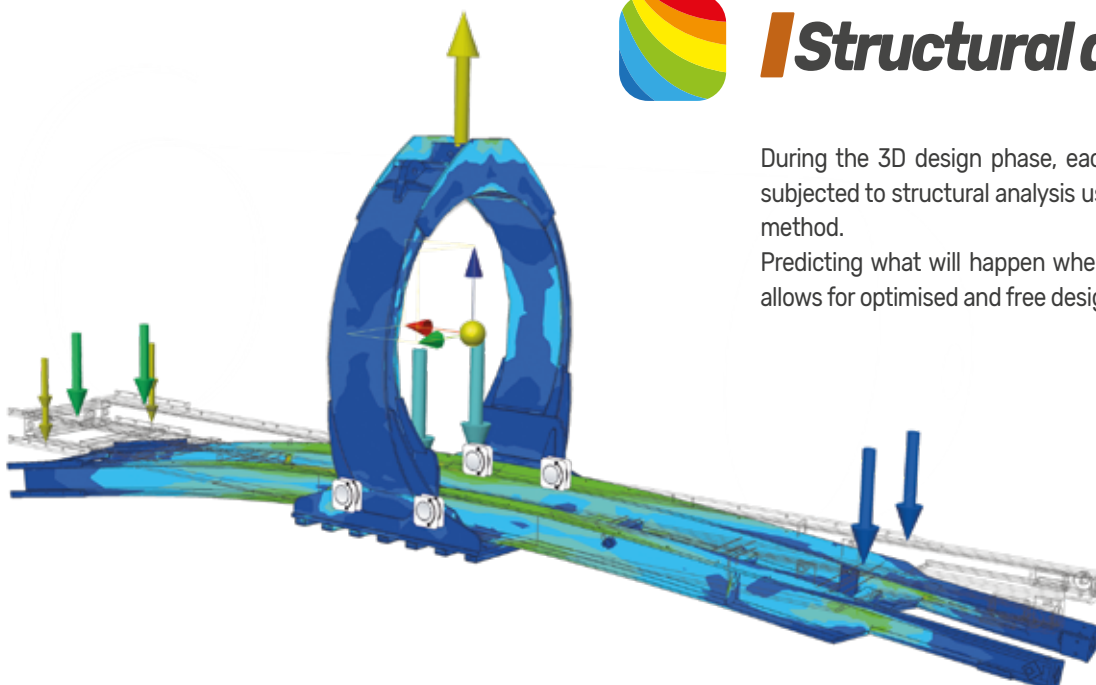


The use of powerful planetary gearboxes (between 1 and 3 according to pulling force) improves reliability and makes possible the increase of pulling force compared to chain systems, thus minimising maintenance of the transmission components.

Components such as these make the Mef Express HT extractor a high-performance machine, capable of standing out in the world of heat exchanger maintenance.



MAXIMUM VALUE



## **/ Structural analysis**

During the 3D design phase, each bundle extractor is subjected to structural analysis using the finite element method.

Predicting what will happen when the product is used allows for optimised and free design.

# Standard features of aerial tube bundle extractors

## Air-cooled diesel engine

Standard motorisation consists of an air-cooled diesel engine sized appropriately for the selected Mef express HT model.



## Spark arrestor with vibration damping

Fire and explosion protection device to limit combustion by extinguishing flames.



## Hydraulic balancing system

Two powerful hydraulic pistons allow balancing of the extractor by modifying, if necessary, the position of the frame with respect to the ring attached to the crane.



## Easy container transport

For sizes from the Mef Express HT 2545/75 up, the lifting ring can be disassembled into 3 parts to allow the extractor to be shipped in Open Top containers and help truck transportation.



## Dynamometric test of the carriage

All of our extractors are subjected to dynamometric testing to verify the actual pulling force of the carriage which will be included in the test report.



## Manual adjustment of the bundle supports

Correct support of the tube bundle is guaranteed by the support trolleys which, resting on the diaphragms, support it safely without compromising its integrity.



## Remote control with connection cable

A practical remote control with cable allows the operator to control all of the commands, whilst staying at a safe distance from the extraction area.



## Alternative lifting points

To bypass obstacles, such as nozzles, pipes or valves, which are often present on the longitudinal axis of the Mef express HT or for use with the anchor hook of the lifting crane.



## Onboard controls

All the main controls can be activated directly on the machine with hydraulic levers on the rear of the Mef express HT.



# Optional features

of overhead tube bundle extractors

## Telescopic arms for rotation of the bundle



Innovative remotely-controlled system for rotating the tube bundle which allows safe alignment the bundle with the shell, avoiding the need for the operator to climb on the Mef Express HT during the final insertion phase



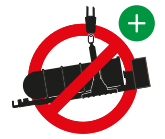
## Power-assisted hydraulic supports



Controlled quickly and intuitively by the operator from a safe distance via remote control, these speed up the extraction and insertion of the bundle with power-assisted adjustment, reducing system downtime and increasing manoeuvring capacity of the bundle during insertion



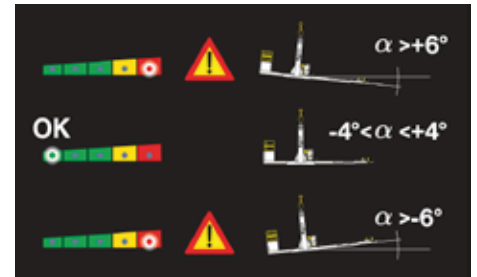
# EOC electronic overturning control



Innovative control system which allows overhead handling of loads in complete safety by inhibiting any incorrect commands that could compromise the stability of the Mef express HT.

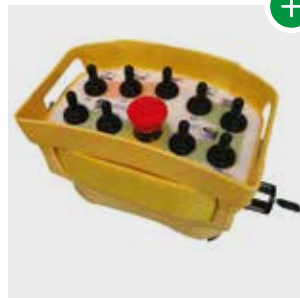
## Main functions of the EOC system

- display on the remote control screen of the real-time position of the extractor carriage corresponding to the length of the extracted ( or to be inserted ) bundle;
- display on the remote control screen of the real-time inclination of the Mef express HT;
- limitation of the maximum inclination with blocking of dangerous movements when the permitted inclination has been exceeded;
- automatic self-balancing that can be activated by the operator via remote control which brings the Mef express HT back to a balanced condition;
- electric throttle integrated into the remote control that allows variation of the engine's rpm, reducing fuel consumption, improving the extractor's autonomy and making the extraction area healthier.



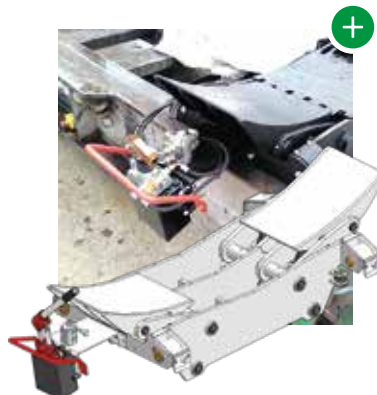
## Radio control

Evolution of the standard remote control allows the operator greater freedom of action without cluttering the work area with a connection cable



## Hydraulic trolley with manual pump

Interchangeable product on all models which use the manual version. The manual pump simply and economically speeds up the insertion process



## Liquid cooled diesel engine

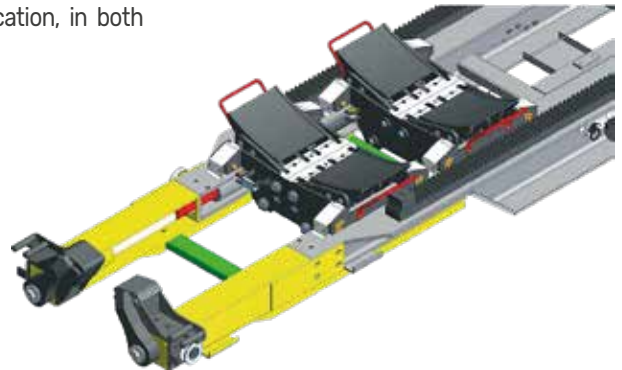
When air cooling is insufficient or unsuitable for current regulations, MAUS ITALIA can offer engines with low environmental impact and water cooling



## **Removable extension for maximum flexibility of use**



We offer an extension of 1000 mm ( 39" ) which allows the Mef express HT to increase the maximum length of the extractable bundle or to reach very recessed bundles under roofs. The extension can be customised, upon request and after technical verification, in both shape and length.



## **Increased pulling force**

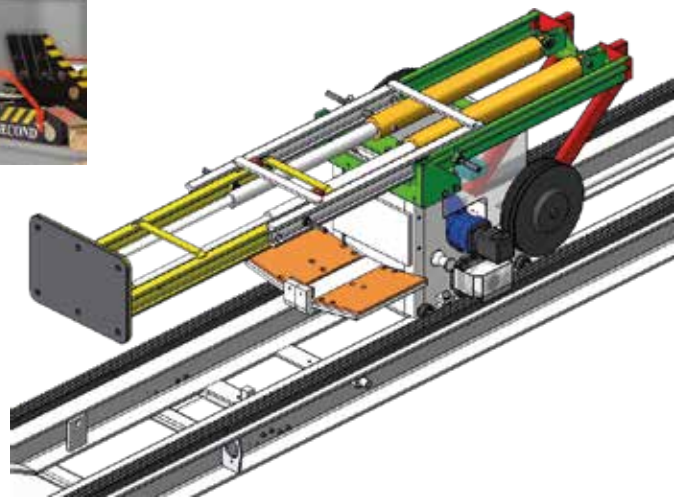
The extraordinary pulling force offered by Maus Italia for its standard models can, if necessary, be increased for extremely heavy tube bundles.

An additional planetary gearbox increases the pulling force by over 400 kN ( 90000 lb ).



# Power-assisted hydraulic pusher

The main carriage pusher is offered with hydraulic movement to avoid potentially dangerous situations for the operator and to speed up the final insertion phase



## Anchoring beam to the exchanger

When access to the back of the exchanger flange is impossible, a beam can be designed and built which, when properly fixed, recreates the anchor point.



## Adapter for the carriage shelf

If the tube sheet has a protrusion on its lower part, an adapter with a recess can be designed and built to allow it to be housed.



## Extensions for bypassing obstacles

Where there are obstacles in front of the exchanger which interfere with the extractor, extensions can be designed and built with an increased centre distance to allow them to be bypassed



**Certified manufacture of aerial tube bundle extractors**

Maus Italia can, on customer request, manufacture Mef Express HT extractors in an explosion proof version, certified to operate in environments with potentially explosive atmospheres ( ATEX ) and on offshore/FPSO platforms ( DNV - MARITIME ).

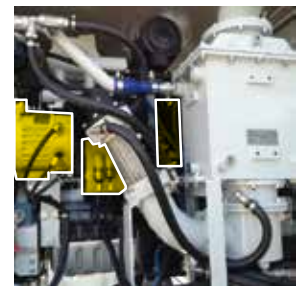
**Armoured power circuits**

Power circuits are insulated in explosion proof containers to prevent potential sparks from entering the work environment.



**Armoured engine components**

Components such as the alternator, the starter motor and the battery are insulated in explosion proof containers to prevent potential sparks from entering the work environment.



**Combustion gas cooling**

The insertion of a heat exchanger and vibration damper allows the rapid cooling of exhaust gases up to the values allowed by the reference thermal class T.



**Mef Express HT**

For the North American market (Canada and USA), MAUS ITALIA designs, manufactures and certifies its tube bundle extractors according to CSA reference standards.





## Overdrive control

A vacuum shutoff valve installed on the engine intake prevents the engine from overheating due to overdrive.



## Non-sparking stainless steel protections

Each sliding part is coated with stainless steel which also protects it from accumulations of grease, thus avoiding related maintenance.



The manufacture of an ATEX certified extractor is achieved by increasing its thermal and electric safety with components that have been designed to avoid, under any circumstances, the ignition of gas which may be present in the working atmosphere.



The surface temperature of the each component and of the exhaust gases must remain below the threshold defined by the reference class T.



Any possible cause of a spark must be eliminated: from electrostatic charges to insulation in armoured containers of each power circuit.

A number of the solutions adopted for manufacture of an ATEX extractor are shown on the page.

**Mef Express HT** **NAVY**



**DNV**  
ST-0378 | ST-E273  
MARITIME



Off shore

Maus Italia can, on customer request, manufacture Mef express HT extractors in an offshore version. The DNV MARITIME certified transformation includes everything already done to obtain the ATEX certification with additional specifications for lifting accessories, movement and sizing guided by the certification specifications with a more accurate process control.



## Movement certification

Movement components, such as hydraulic cylinders and planetary gearboxes, are DNV certified for use in the open sea and in cases of extreme stress.



## Welding certification

Welds are subjected to magneticscopic (or radiographic) examination to obtain DNV certification.

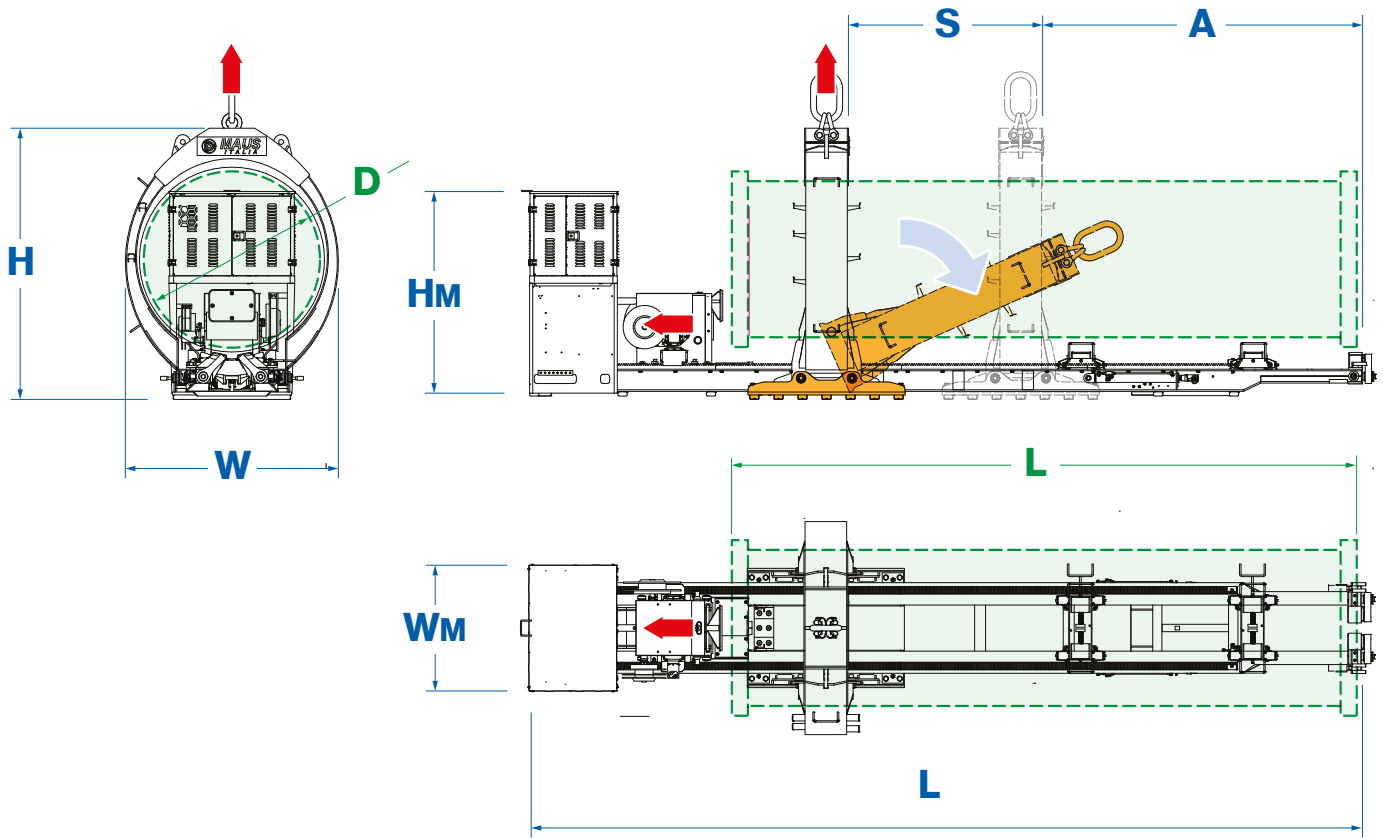


## Lifting certification

Supplied chains, shackles and lifting hooks are DNV certified for use in the open sea and in cases of extreme stress.



# Easier truck transport



2045 75		2545 75		2545 100		3070 100		35125 113		Mef express HT		
2000	78	2500	98	2500	98	3000	118	3500	138	D	mm inches	Ø tube sheet (max.)
7500	24	7500	24	10000	33	10000	33	11300	37	L	mm ft	Bundle length (max.)
45	99200	45	99200	45	99200	70	154300	125	275500	T	lb	Tube bundle weight (max.) Lifting capacity



All Mef express HT models offered by MAUS ITALIA are tested with a static load factor equal to 150% of the nominal capacity (WLL Working Load Limit)



2045 75		2545 75		2545 100		3070 100		35125 113		Mef express HT		
9125	30.0	9125	30.0	12060	39.0	12060	39.0	13420	44.0	L	mm ft	Length
2300	7.5	3200	10.5	3200	10.5	3860	12.7	4300	14.1	W	mm ft	Width
2930	9.6	3700	12.1	3700	12.1	4370	14.3	4780	15.7	H	mm ft	Height
1800	5.9	1800	5.9	1800	5.9	2140	7.0	2300	7.5	Wm	mm ft	Width to the engine
2250	7.4	2250	7.4	2250	7.4	2250	7.4	2250	7.4	Hm	mm ft	Height to the engine
3510	11.5	3510	11.5	4250	13.9	4250	13.9	5695	18.7	A	mm ft	Ring approach (min.)
2114	6.9	2114	6.9	2750	9.0	2750	9.0	2850	9.4	S	mm ft	Balancing ring stroke
8600	18959	9700	21384	10900	24030	16000	35273	21000	46297		Kg lb	Weight
1,3	5.3	1,3	5.3	1,0	4.1	1,0	4.1	1,0	4.1		m/min ft/min	Extraction speed (max.)
520	117000	520	117000	520	117000	900	202300	1380	310200		kN lb	Extraction force (max.)
2		2		3		3		4				N° of standard CS manual support trolleys
16*	35000	16*	35000	16*	35000	30	66000	30	66000	T	lb	Lifting capacity of single carriage
900	202300	900	202300	900	202300	1380	310200	/	/		kN lb	Extraction force (max.) Increased pulling force (optional)

\*Available also with 2 cylinder for lifting capacity 21 T ( 46000 lb )



Extension

1000 mmm (39") extensions are available for all models which allow the Mef Express HT to increase the maximum length of the loadable bundle. The extension can, upon request, be customised in both shape and length.



Customized

Maus Italia can, upon request and after technical verification, design and manufacture the Mef Express HT overhead extractor for bundles and weights which are different to the standard product.



Lenght

The length measurements "L" suggested above can be changed on request.



The increased pulling force request transforms some parameters of the Mef express HT :

- Length L + 400 mm (+ 1.31 ft)
- Weight + 500 kg (+ 1100 lb)

## CS support trolleys

for supporting the tube bundle during extraction/insertion with the Mef express HT series extractors.



CS M

This is the entry level model, manually controlled by the operator using removable keys. Complete in their functionality, they guarantee reliability and robustness.



CS P

This is the intermediate model, hydraulically controlled by the operator via a manual hydraulic pump installed directly on the trolley. Speeds up all lifting operations and is interchangeable with any manual models already purchased (also for the previous Mef express series)

In the event of need or of obstruction, the manual pump of the CS P support trolley can be disconnected by means of quick couplings.



CS I

This is the highest performing model, hydraulically controlled by the operator via remote control (or levers on the machine).

It significantly speeds up all lifting operations by keeping the operator at a distance from the extraction/insertion area.

Maus Italia technical staff suggest the insertion of at least one CS I trolley on each model of the Mef express HT tube bundle extractor .

The hydraulic system can manage up to two CS I trolleys .

Mef express HT	CS M	CSP	CS I	Lifting capacity ↑
Models on which the trolley works	Cod.	Cod.	Cod.	T lb
904/70	CS M-40	CS P-40	CS I-40	4,0 8800
1310/65 1722/65 1722/75 2030/75	CS M-150	CS P-150	CS I-150	15 33000
2045/75 2545/75 2545/100	CS M-160	CS P-160	CS I-160	16 35000
optional available also with 2 cylinder	CS M-210	CS P-210	CS I-210	21 46000
3070/100	CS M-300	CS P-300	CS I-300	30 66000
35125/113	CS M-300	CS P-300	CS I-300	30 66000

**1 hydraulic cylinder**  
for each saddle

**2 hydraulic cylinder**  
for each saddle

## ***Ideal combinations in plant maintenance***

Combined use with BundleTutor series of tube bundle transporters



### ***BundleTutor Lifter***

**Aerial transporter for the handling of tube bundles**

The Mef express HT aerial tube bundle extractor is used in combination with the Bundle Tutor lifter Super aerial transporter for handling tube bundles inside the plant. This allows you to quickly release the extractor for a new operation.

The Bundle Tutor lifter E electric plug-in model is particularly suggested for use in heat exchanger manufacturing workshops.



### ***BundleTutor Mobil***

**Self-propelled transporter for the handling of tube bundles**

The Mef express HT overhead tube bundle extractor is used in combination with the Bundle Tutor mobil self-propelled transporter inside the plant for safe and protected handling of the tube bundle, as well as for speeding up loading and unloading without the need for a crane.



# Heat exchanger's world

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**MAUS ITALIA SPA IS THE WORLD LEADING MANUFACTURER OF TOOLS AND MACHINES FOR THE PRODUCTION AND MAINTENANCE OF HEAT EXCHANGERS**



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