

4

Special machines series *IN* for tube bundle insertion

In the final steps of the heat exchanger manufacturing cycle, the insertion of the tube bundle inside the shell threatens the integrity of the almost finished product.

Maus Italia, by its **Bundle*IN*** and **Mef shop*IN*** machines, proposes two original solutions aimed at covering the wide range of requirements.

They have been designed to meet the crescent demand for quality, safety and operating speed.

BundleIN

Tube bundle inserter for heat exchangers.

The **BundleIN**, together with the gantry crane, enables to solve the problem of a **fast, accurate, and safe** insertion.

The original functioning based on two **synchronized hydraulic guns** stretching two steel wire ropes makes it possible to apply it to **tube sheets regardless of length limits** with the following main features:

- **Tube sheet max diameter**
limitless
- **Tube bundle max length**
limitless
- **Max load capacity**
limitless (according to the gantry crane);
- **Max pulling force**
60 T (132200 Lb)
- **Max insertion speed**
2 m/min (6.5 Ft/min)



Mef shopIN

Fixed station tube bundle heat exchangers inserter/extractor.

The **Mef shopIN** is an **independent machine — no gantry crane required —** and it enables to solve the problem of **fast, accurate, and safe insertion and extraction**.

The Maus Italia expertise in **manufacturing extractors (aerial, self-positioning and off-shore extractors)** made it possible to create a machine dedicated to modern companies manufacturing heat exchangers with the following main features:

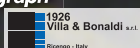
- **Tube sheet max diameter**
2000 mm (78")
- **Tube bundle max length**
7500 mm (295")
- **Max load capacity**
22 T (48500 Lb)
- **Max thrust/pulling force**
35 T (77100 Lb)
- **Max insertion/extraction speed**
1,5 m/min (4.9 Ft/min)

Maus Italia (an **ISO 9001** certified company) is able to provide **entirely customized Mef shopIN** according to the customers' requests.

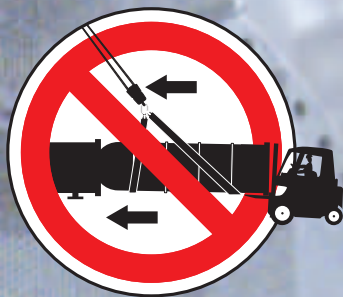


Photograph

By the kind
permission of



Tube bundle
length
limitless
Max pulling
force
60 T (132300 Lb)
Max insertion
speed
2m/min (6.5 Ft/Lb)



BundleIN

Tube bundle inserter for heat exchangers.

According to the heat exchanger manufacturers, the insertion of long and **heavy tube bundle floating inside the shells** is one of the most challenging steps of the assembly cycle.

With its **BundleIN**, Maus Italia proposes an equipment that, **together with the gantry crane, enables to solve** this kind of problem in a fast, accurate, and safe way.

The original functioning based on **two synchronized hydraulic guns stretching two steel wire ropes** makes it possible to apply it to tube sheets regardless of length limits.

Once the fixing point of the ropes to the shell has been identified, **BundleIN** is able to insert the tube bundle at a speed of **2m/min (6.5 Ft/min)**

The generated **coaxial force of 60 T (132300 Lb)** (adjustable) leads the tube bundle inside the shell **smoothly and safely**.

High force
60 T (132300 Lb)



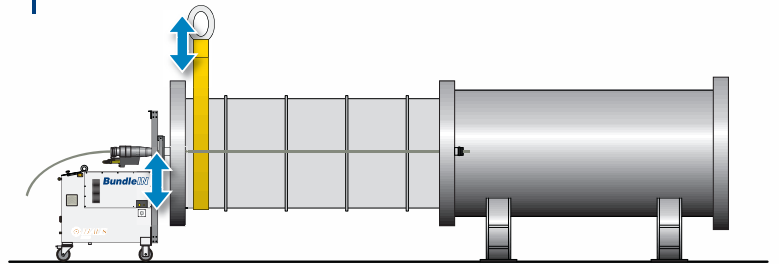
BundleIN

Tube bundles inserter
for heat exchangers

Patented  **COS** system
to compensate the gantry crane
oscillations on the Y axis

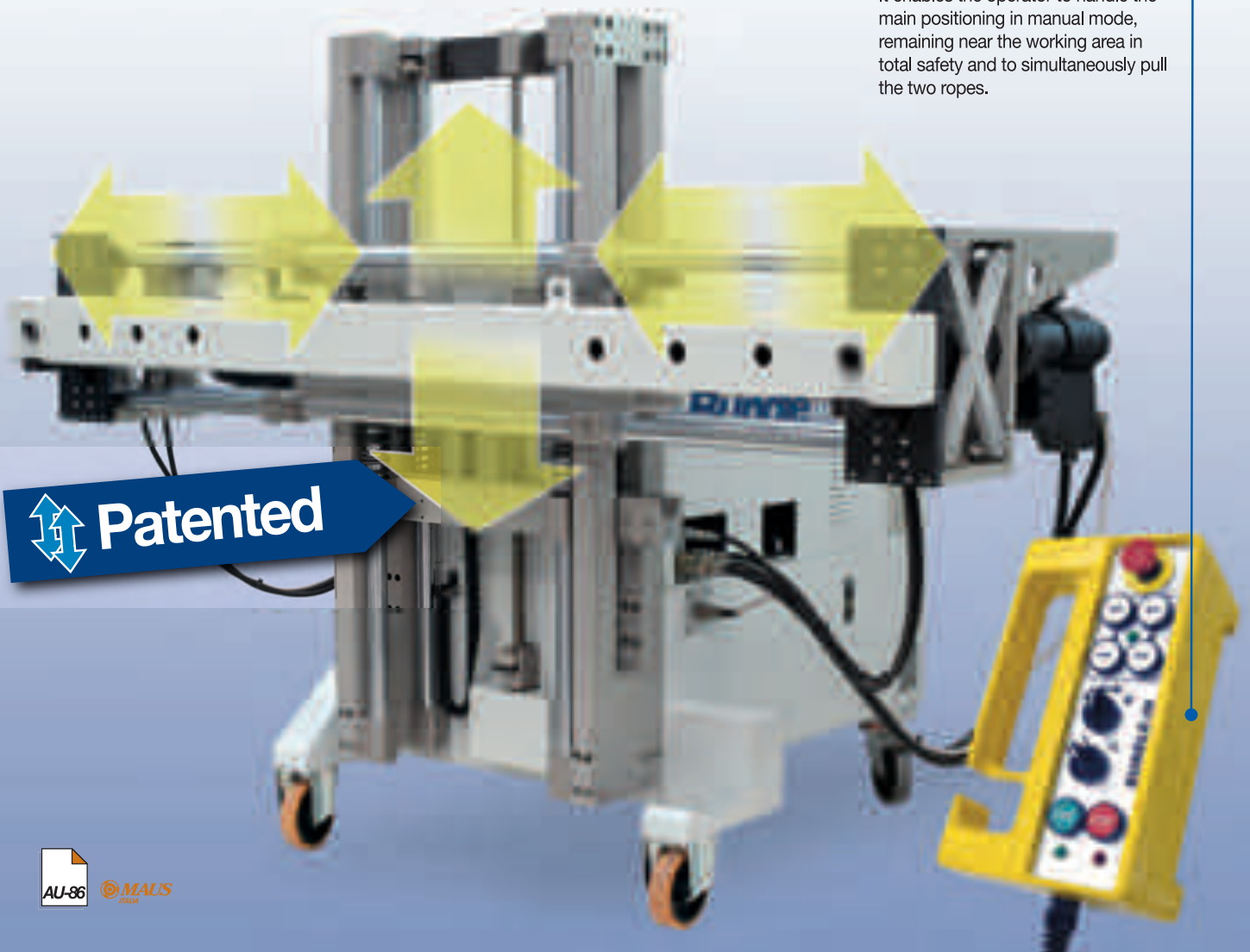
The patented **COS** system enables the **BundleIN** to make rapidly, accurately and safely the insertion, by compensating the inevitable oscillations due to the gantry crane movement during the insertion operation.

Thanks to the patented **COS** system, the loads generated by the oscillations of the tube bundle hung onto the gantry crane during the insertion operation are absorbed by the **BundleIN** thus preserving the wheel integrity and enabling a smooth movement on the floor.



Remote control

It enables the operator to handle the main positioning in manual mode, remaining near the working area in total safety and to simultaneously pull the two ropes.

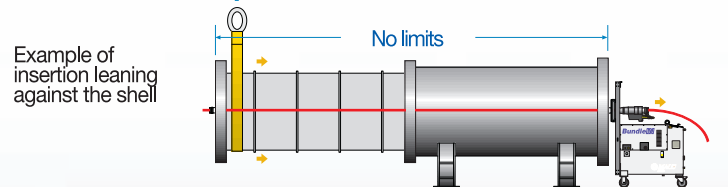
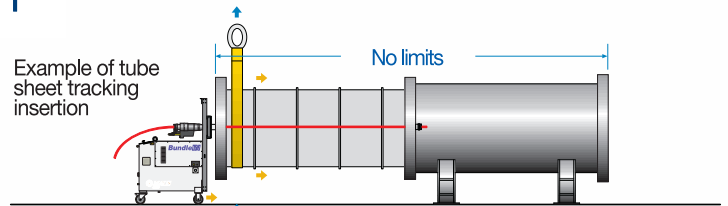


 **Patented**

BundleIN

Tube bundles inserter
for heat exchangers

Limitless
Tube sheet diameter
Tube sheet length
Load capacity



— Traction rope

Traction devices

Independent hydraulic guns mounted on sliding supports

Positioner

Two-axis system

- Manual **horizontal**
- **Vertical** servo assisted equipped with **COS** system for gantry crane oscillation compensation.

Hydraulic power unit

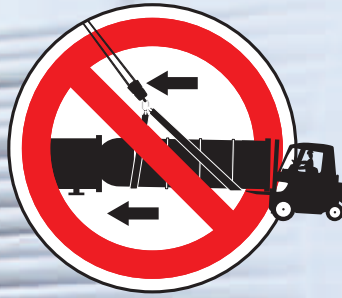
Electric cabinet

Installed on the machine with integrated aeration system.

Total safety

for both the operator and the product

Tube bundle
max length
7500 mm (24.6 Ft)
Max thrust/pulling
force
35 T (77200 Lb)
Max insertion
speed
1,5m/min (4.9 Ft/Lb)



Mef shop^{IN}

Self positioning tube bundles inserter/extractor for shell and tube heat exchangers

The **Mef shop^{IN}** is an independent machine — no gantry crane required — and it enables to solve the problem of fast, accurate, and safe insertion and extraction.

Thanks to its experience in **manufacturing maintenance extractors**, Maus Italia presents a machine dedicated to modern companies manufacturing heat exchangers with the following main features:

- **Tube sheet max diameter**
2000 mm (78");
- **Tube bundle max length**
7500 mm (295");
- **Max load capacity**
22 T (48500 Lb);
- **Max thrust/pulling force**
35 T (77100 Lb);
- **Max insertion/extraction speed**
1,5 m/min (4.9 Ft/min)

Maus Italia (an ISO 9001 certified company) is able to provide entirely customized **Mef shop^{IN}** according to the customers requests.

Main crane

Main part of the **Mef shopIN** to insert and extract the tube bundle; it is equipped with a **hydraulic driving bracket with a vertical run of 300 mm (11.8")** to support the tube bundle.

Two **hose winding wheels** are assembled on both sides of the trolley to guarantee a completely safe hydraulic tube **windup and unwinding**.

Hydraulic pusher

Telescopic structure to speed up the tube bundle insertion

Independent support trolleys

Servo assisted and manual hydraulic trolleys to support the intermediate bearings during the insertion/extraction operations.

Hydraulic vices

To guarantee a fast and safe **anchoring to the shell flange** with a run of 500 mm (20")

Remote control (optional radio version)

It enables the operator to handle the **main positioning in manual mode, remaining near the working area in total safety 6 m (20 Ft)** (cable provided).

Mef shopIN

Self positioning tube bundles inserter/extractor for shell and tube heat exchangers

Mobile frame

Normalized steel electrowelded structure to handle the tube sheet with:

- X transverse stroke:** ± 100 mm (3.9")
- Z longitudinal stroke:** 1500 mm (59.0")
- Y vertical stroke** 1000 mm (39.3")
+ 270 mm (10.7")

Fixed frame

Normalized steel electrowelded structure equipped with four lifting columns and stabilizing legs.

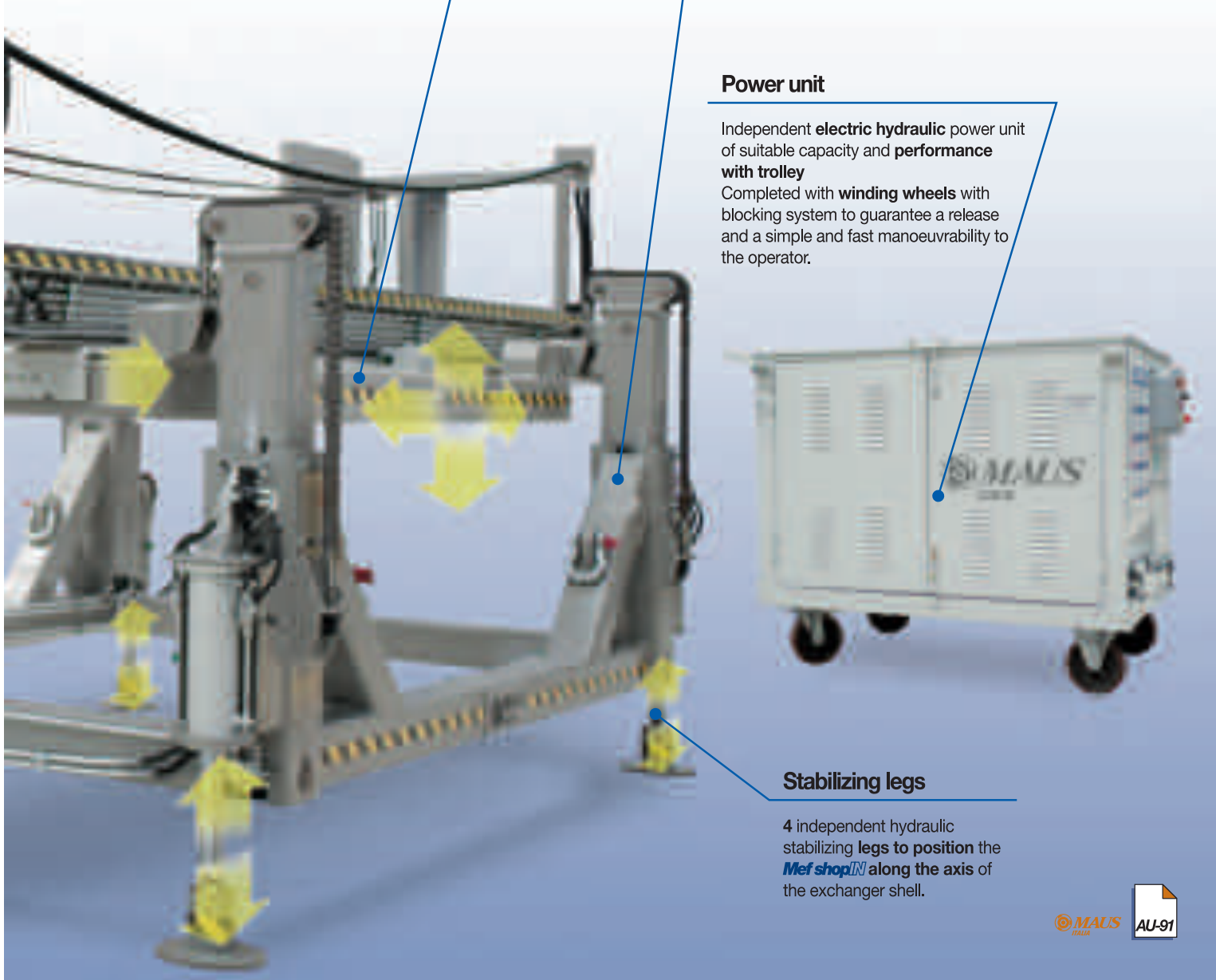
Power unit

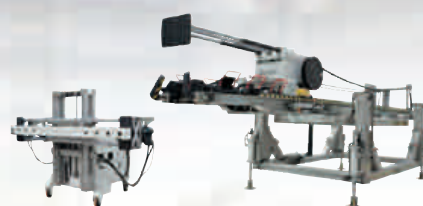
Independent **electric hydraulic** power unit of suitable capacity and **performance with trolley**

Completed with **winding wheels** with blocking system to guarantee a release and a simple and fast manoeuvrability to the operator.

Stabilizing legs

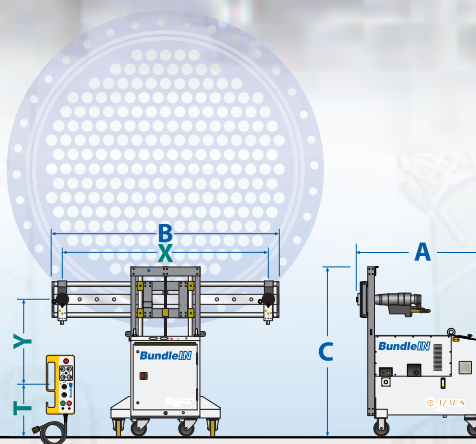
4 independent hydraulic stabilizing legs to position the **Mef shopIN** along the axis of the exchanger shell.





Supply		Bundle	Mef shop
Voltage	Volt - Ph	400 - 3	400 - 3
Frequency	Hz	50	50
Power	Kw	8	15
Protection degree	IP	44	44
Dimensions		Bundle	Mef shop
Length	A mm (Ft)	2700 (9.0)	8770 (28.9)
Width	B mm (Ft)	1500 (5.0)	2950 (9.7)
Height	C mm (Ft)	2000 (6.6)	2540 (8.4)
Heigh for transport	mm (Ft)	2000 (6.6)	1540 (5.1)
Weight	Kg (Lb)	800 (1764)	8350 (18400)
Colours	RAL	7030 - 7035	7030 - 7035
Additional packing (external unit)		---	1
Additional packing dim.	mm (Ft)	---	1110x1 800x1350 (5.6x5.9x4.5)
Additional packing weight	Kg (Lb)	---	500 (1100)
Dimensional capacities		Bundle	Mef shop
Stroke	X mm (inches)	1000÷2400 (39÷94)	±100 (±4)
Stroke	Y mm (inches)	1000 (39)	1000+270 (39+10.5)
Stroke	Z mm (inches)	limitless	6500+1000 (256+39)
Minimum height	T (under the TS) mm (inches)	600 (24)	700 (28)
Tank capacity	Lt (GalUS)	150 (39)	150 (39)
Working capacity		Bundle	Mef shop
Tube sheet diameter	mm (inches)	limitless	2000 (295")
Tube bundle length	mm (inches)	limitless	7500 (78")
Max load capacity	T (Lb)	✳ limitless	22 (48500)
Tube sheet max thickness	mm (inches)	limitless	500 (3.688)
Thrust/pulling force	T (Lb)	60 (132300)	35 (77200)
Ins./ext. max speed	m/min (Ft/min)	2,0 (6.5)	1,5 (4.9)
Max pressure	Bar (Psi)	300 (4350)	180 (2600)
Pump capacity	Lt/min (US gpm)	60 (15.8)	30 (7.9)

BundleIN



Mef shopIN

