

1. DESCRIPTION

The MARS Building Maintenance Unit (BMU) is a simple and economic system for all cleaning and maintenance access on buildings and structures. It is manufactured in accordance to the European standard EN 1808. The cradle is designed to take two people together with their tools and cleaning materials, up to a maximum working height of 160 m.

The system consists of:

- a mobile traversing trolley with a fix or rotating spreader bar on a single jib, housing also the lifting mechanism and the controls,
- an aluminium cradle suspended from the trolley by galvanised steel wire ropes,
- a concrete track (A model) or rail track (B model).

The noise level emitted by the machine does not exceed 73 dB.

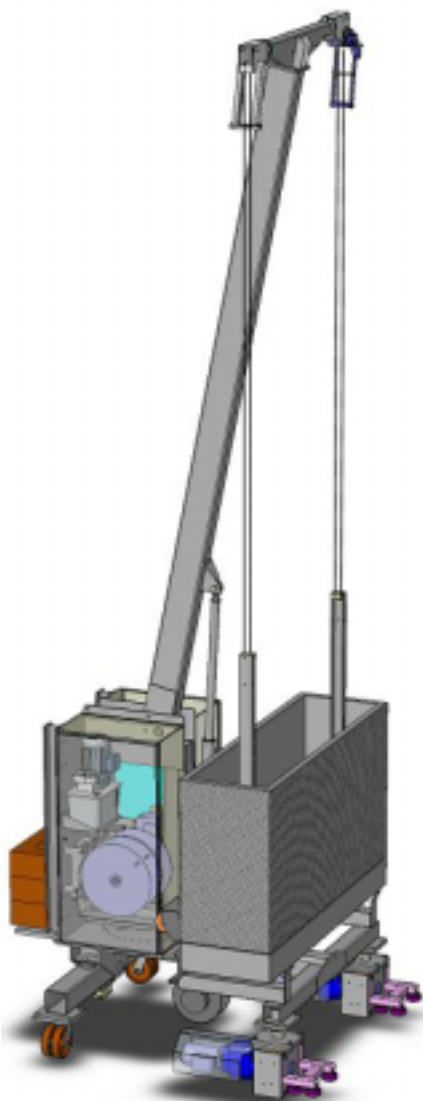
A motorised **TIRAK® XD-312P** is used for lifting and lowering the cradle, manufactured by the TRACTEL Group and specially designed for SECALT building maintenance units.

Access of personnel to the cradle is totally safe, with the cradle positioned on the trolley (série MA-100) or on the roof next to the trolley (serie MA-200 and MA-300).

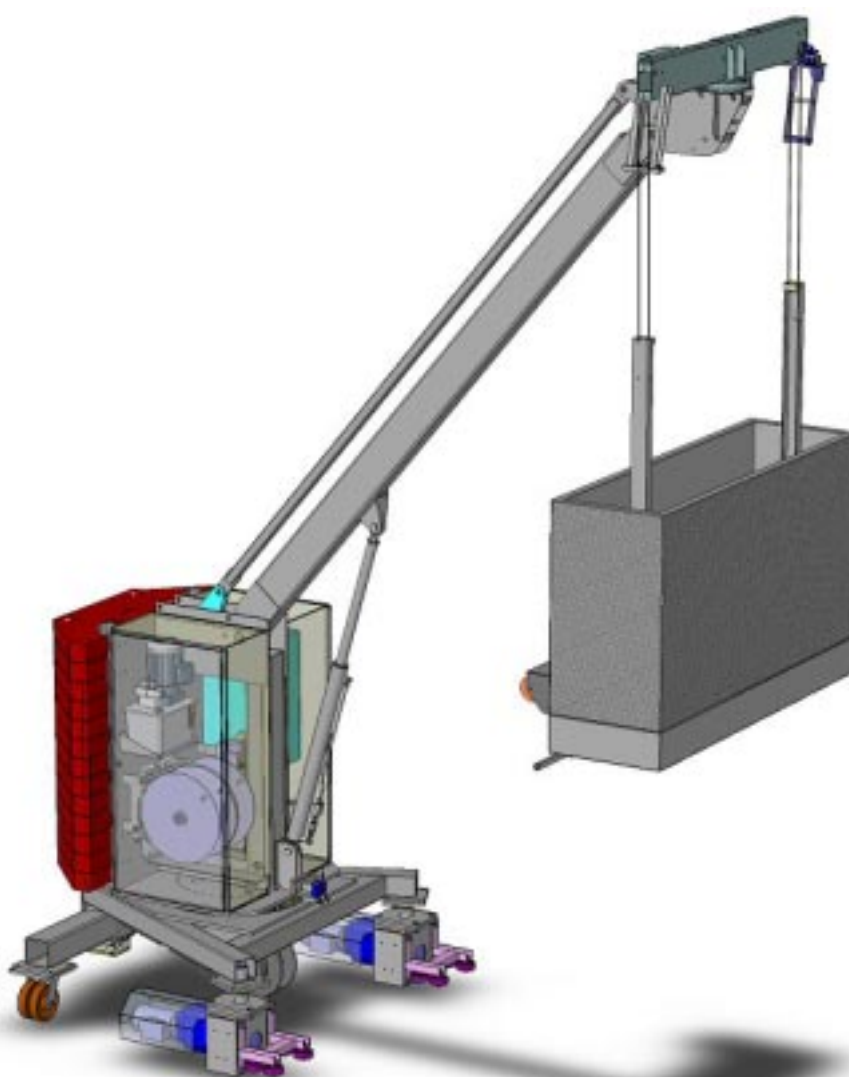
All the operations are powered:

- lifting and lowering of the cradle
- angle of the jib
- traversing of the trolley
- slewing of the turret
- slewing of the spreader bar.

CE The MARS machine conforms to EU Directives and is manufactured in accordance with ISO 9001.



MARS model serie Ma100
(concrete track - fix spreader bar)



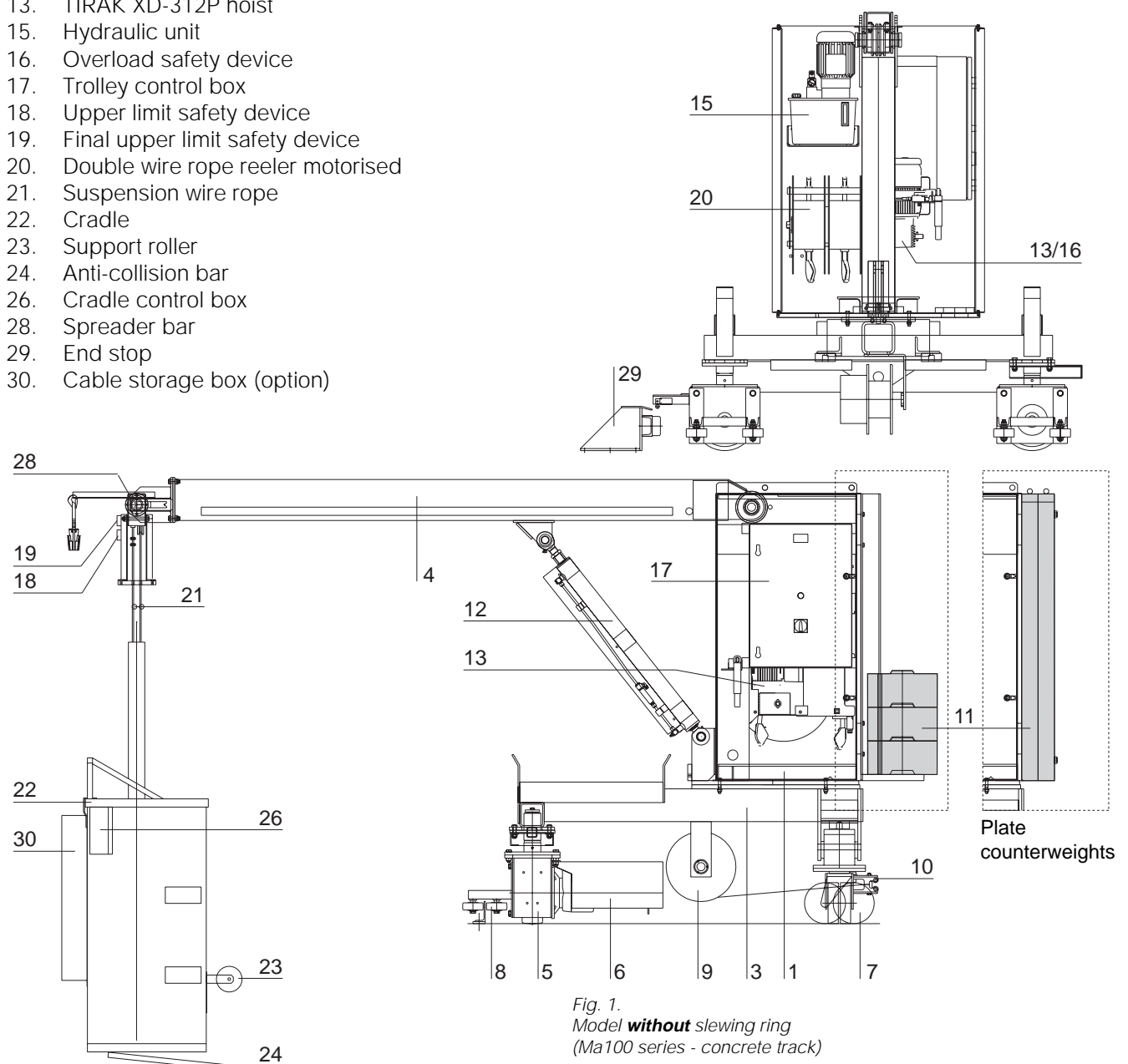
MARS model serie Ma200 / Ma300
(concrete track - rotating spreader bar)

2. PRESENTATION OF THE EQUIPMENT

2.1. Main components

2.1.1. MARS machine Ma100 series (without slewing ring)

1. Turret
3. Central beam
4. Jib
5. Powered roller frame
6. Geared motor with brake
7. Rear roller frame (not powered)
8. Guide wheel
9. Reel for power supply cable
10. Guide for power supply cable
11. Counterweight
12. Hydraulic ram
13. TIRAK XD-312P hoist
15. Hydraulic unit
16. Overload safety device
17. Trolley control box
18. Upper limit safety device
19. Final upper limit safety device
20. Double wire rope reeler motorised
21. Suspension wire rope
22. Cradle
23. Support roller
24. Anti-collision bar
26. Cradle control box
28. Spreader bar
29. End stop
30. Cable storage box (option)

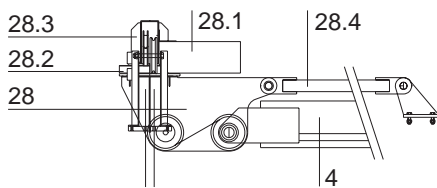


**2.1.2. MARS machine Ma200 and Ma300 series
(with slewing ring)**

1. Turret
2. Powered slewing ring
3. Lower trolley
4. Jib
5. Powered roller frame
6. Geared motor with brake
7. Rear roller frame (not powered)
8. Guide wheel
9. Reel for power supply cable
10. Guide for power supply cable
11. Counterweight
12. Hydraulic ram
13. TIRAK XD-312P hoist
14. Geared slewing motor
15. Hydraulic unit
16. Overload safety device
17. Trolley control box
18. Upper limit safety device
19. Final upper limit safety device
20. Double wire rope reeler motorised

21. Suspension wire rope
22. Cradle
23. Support roller
24. Anti-collision bar
26. Cradle control box
28. Spreader bar fix or rotating
- 28.1. Spreader bar geared motor
- 28.2. Slewing ring
- 28.3. Pivoting jib
- 28.4. Connecting link
29. End stop
30. Cable storage box (option)

Rotating spreader bar



Fix spreader bar

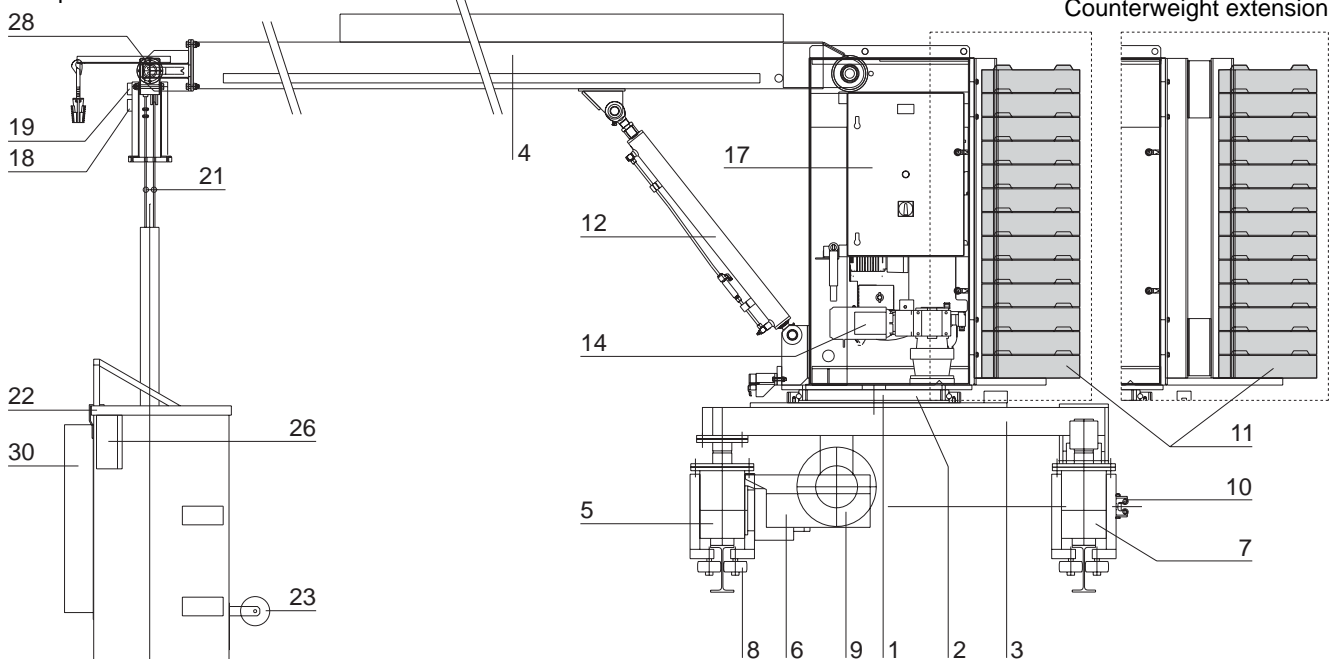


Fig. 2.
Model **with** slewing ring
(Ma200 and Ma300 series - rail track)

2.2. Machine identification

Ma = MARS machine
with 2 m cradle
for 2 people

Ma 1 15 A F

F = fix spreader bar
R = rotating spreader bar

- 1 = machine **without slewing ring**
- 2 = machine **with slewing ring**
- 3 = machine **with slewing ring for very long jib**

A = concrete track
B = rails

- 13 = wheel span 1300 mm
- 15 = wheel span 1500 mm
- 18 = wheel span 1800 mm

2.3. MARS machine on concrete track - Standard models

model	max. height (m)	standard length of jibs (m)											
		3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5
Ma-115A-F	40												
	80												
	120												
	160												
Ma-213A-R	40												
	80												
	120												
	160												
Ma-213A-F	40												
	80												
	120												
	160												
Ma-215A-R	40												
	80												
	120												
	160												
Ma-215A-F	40												
	80												
	120												
	160												
Ma-315A-R	40												
	80												
	120												
	160												
Ma-315A-F	40												
	80												
	120												
	160												

Standard configuration: = WLL 240 kg = WLL 240 kg + MINIFOR 300 kg (WLL= Working Load Limit)

Special configurations on request:

- Additional loads
- Shifted counterweights
- Special cradle



According to EN 1808 suspended platforms at heights exceeding 40 meters must be equipped with anchors each 20 m guiding the wire ropes.

2.4. MARS machine on rail track - Standard models

model	max. height (m)	standard length of jibs (m)											
		3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5
Ma-115B-F	40												
	80												
	120												
	160												
Ma-213B-R	40												
	80												
	120												
	160												
Ma-213B-F	40												
	80												
	120												
	160												
Ma-215B-R	40												
	80												
	120												
	160												
Ma-215B-F	40												
	80												
	120												
	160												
Ma-218B-R	40												
	80												
	120												
	160												
Ma-218B-F	40												
	80												
	120												
	160												
Ma-315B-R	40												
	80												
	120												
	160												
Ma-315B-F	40												
	80												
	120												
	160												
Ma-318B-R	40												
	80												
	120												
	160												
Ma-318B-F	40												
	80												
	120												
	160												

Standard configuration: = WLL 240 kg = WLL 240 kg + MINIFOR 300 kg (WLL= Working Load Limit)

According to EN 1808 suspended platforms at heights exceeding 40 meters must be equipped with anchors each 20 m guiding the wire ropes.

3. TECHNICAL SPECIFICATIONS

Trolley

traversing by two brake motors		0.25 kW 50Hz
traversing speed		8 m/mn.
lifting hoist	type	TIRAK XD-312P
nominal capacity	daN	350
safety device	type	integrated
power supply cable		4G-2.5
useful length	m	20

Cradle

dimensions	mm	2000x600
nominal working load	daN	CE version = 240 kg
= max. number of persons		2
deadweight	± kg	100
lifting / lowering speed	m/mn	8.5
control		via pendant cable or MAGTRON
suspension wire rope	type	Ø6.5 mm, 5 strands
number		1 + 1
diameter	mm	6.5
guaranted breaking load	daN	2840

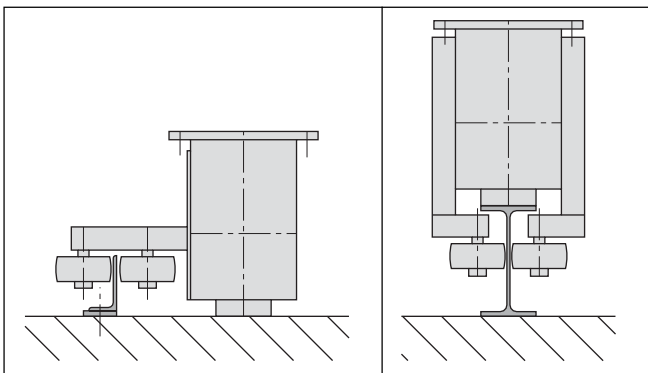


Fig. 3 - Traversing on concrete track, Fig. 4 - Traversing on rails with "L" shaped guide rail

4. TRAVERSING TROLLEY

The lower trolley (3) is hot galvanised at 500 gr/m². The trolley has 4 wheels, 2 front wheels are powered and the two rear wheels are mounted on an articulated beam. A polyurethane layer gives smooth and silent traversing and a good grip. The trolley is guided along the track by guide wheels (8) attached to the wheel box when "L" shaped guide rails (Fig. 3), concrete guide or rails are used (Fig. 4).

5. LIFTING MECHANISM

The lifting mechanism is the TIRAK electric traction hoist, model XD-312P, especially designed for man-riding. The operation of the TIRAK is based on the principle of pressure pulleys. The gripping of the wire rope in the pulley is achieved by a set of rollers, activated by a compression spring (Fig. 5).

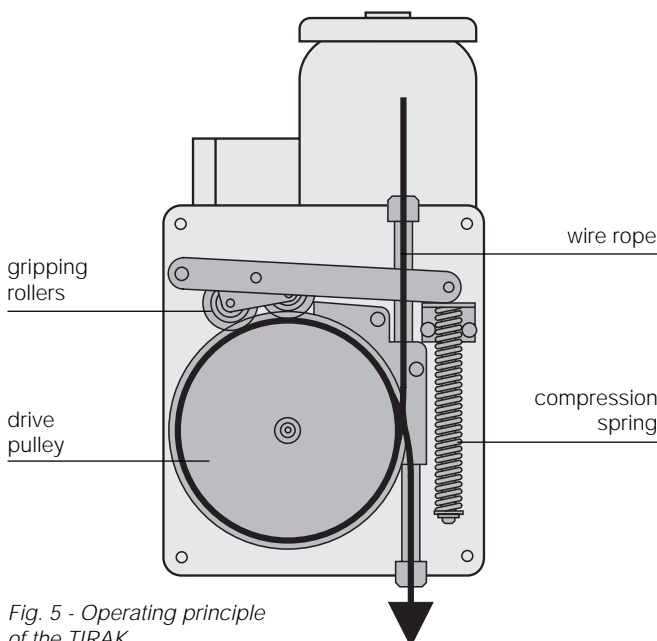


Fig. 5 - Operating principle of the TIRAK

6. STANDARD DIMENSIONS (EXAMPLES):

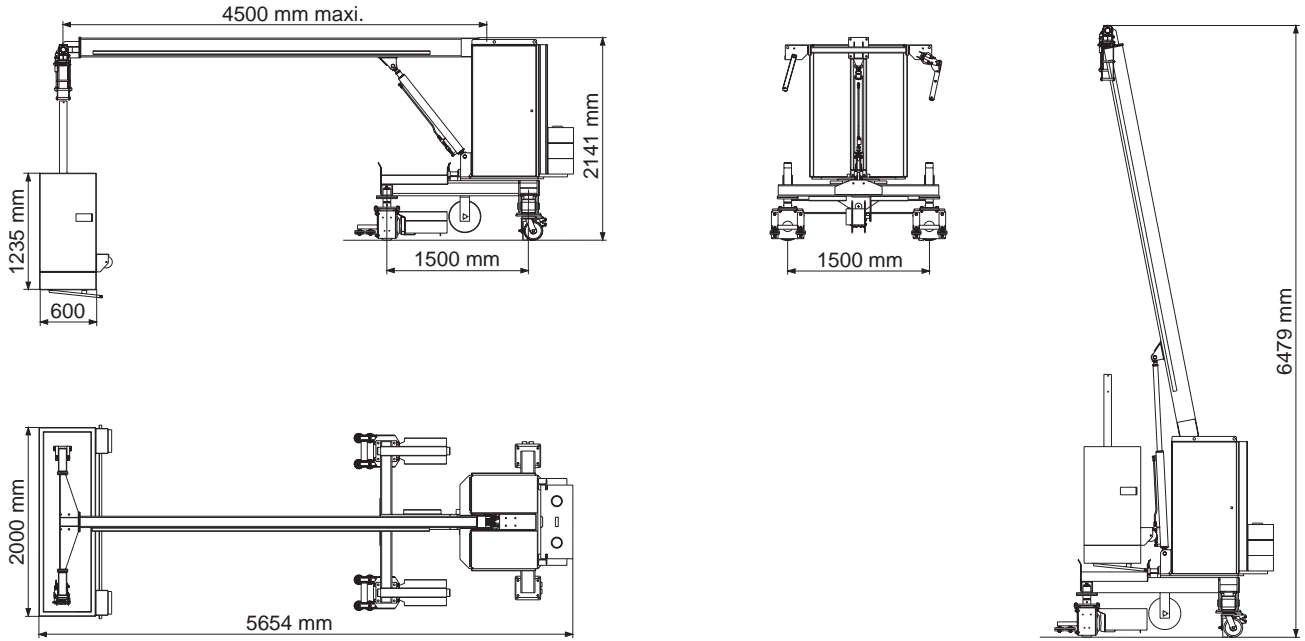


Fig. 6 - MARS model MA100 serie

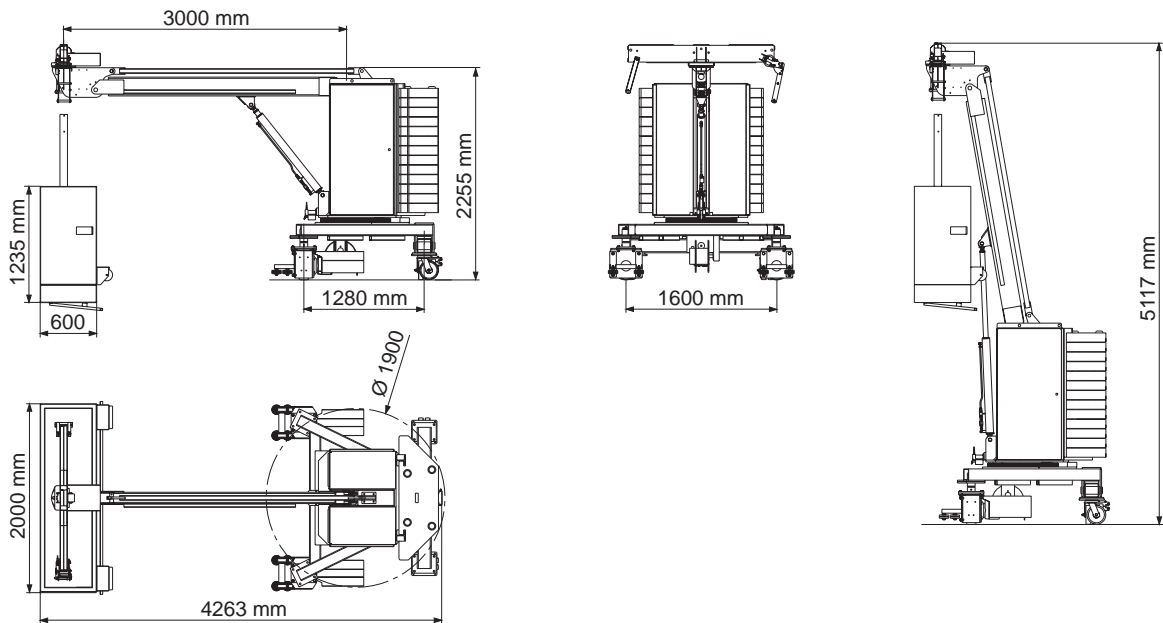


Fig. 7 - MARS model MA200 / MA300 series

7. HYDRAULIC SYSTEM

The hydraulic power pack (15) operates the jib (4) using the hydraulic ram (12).

The hydraulic components are essentially as follows:

- 1 hydraulic ram,
- 1 hydraulic unit,
- geared pump,
- electric motor,
- non-return valve,
- safety valve,
- two-way weatherproofed electro-valve,
- throttle.

8. JIB

The jib (4), in tubular steel section, articulates on a shaft fixed to the frame of the turret and activated by a hydraulic ram (12). The hydraulic power pack is located in the turret. The jib length can be up to 8.5 m.

9. SPREADER BAR

The spreader bar is a welded galvanised steel construction, fix or rotating, to bring the cradle perfectly parallel to the facade.

10. ELECTRICAL CONTROLS

The electrical controls consist of the following main items:

a) On the building (supplied by the customer)

- the main switch, located on the roof,
- power supply points, 3-phases + earth positioned along the track and protected by a 30 mA differential 10 A circuit-breaker.

b) On the trolley

- the power supply cable for connecting the trolley to the power points. This cable is stored on a reeler (9) under the trolley.
- a electrical control box.

c) Sur la nacelle

- a control box

11. CRADLE

The cradle (22) is a tubular aluminium structure, clad with perforated aluminium panels.

Two foam rollers (23) allow the cradle to rest lightly against the facade (max. effort 25 daN) and absorb the swaying movements.

Four swivel castor are fitted to the base of the cradle to make transport easier on the ground.

An anti-collision bar (24) fitted under the cradle prevents collision with obstacles when lowering.

12. WIRE ROPES

The cradle is suspended from the jib by sheaved wire ropes. The TIRAK XD-312P is equipped with an overspeed safety brake. This brake acts in case of a too speedy descent of the cradle. The wire ropes are stored on a powered double reeler.

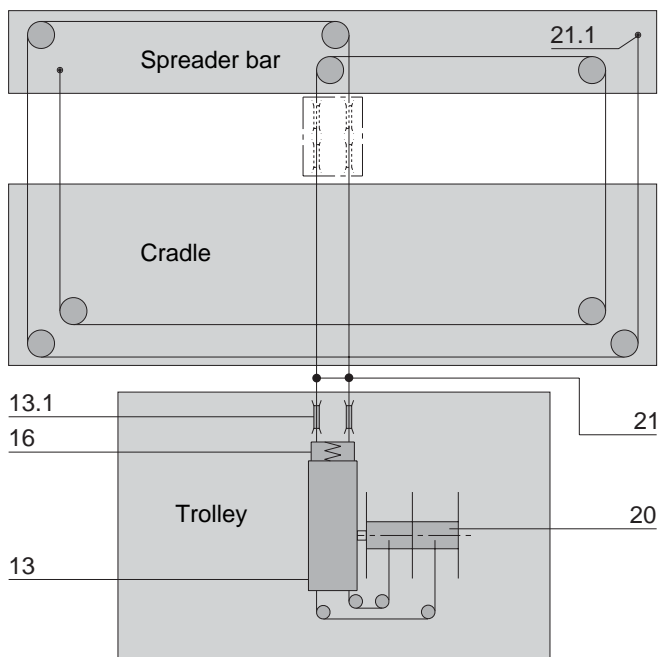


Fig. 8 - Diagrammatic representative of the wire ropes

- 13. TIRAK hoist
- 13.1 Return pulley
- 16. Overload safety device
- 20. Wire rope reeler
- 21. Suspension wire ropes
- 21.1 Cable attachment

13. CONTROLS

13.1. Selection of the control panel (flexible cable)

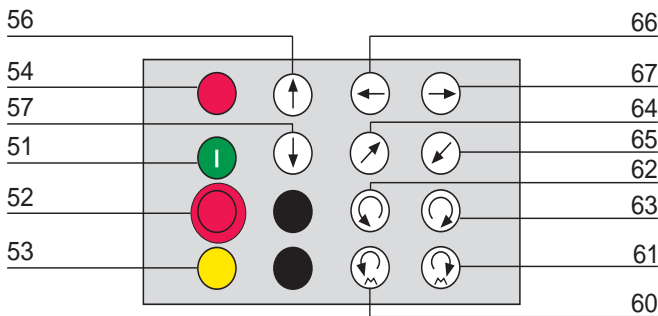
The equipment has two control panels:
The control panel is selected using the lockable switch (32) on the trolley control box:

- 1 main control panel in the cradle, connected to the trolley by a flexible cable.
- 1 control panel on the trolley for emergency operations in the event of failure of the main control panel.

**1 key is held by the operator,
1 key is held by the persons responsible for
carrying out emergency operations.**



**These staff must be trained for such
operations, as when trolley control is
selected, the cradle emergency stop and
limit switches no longer operate.**



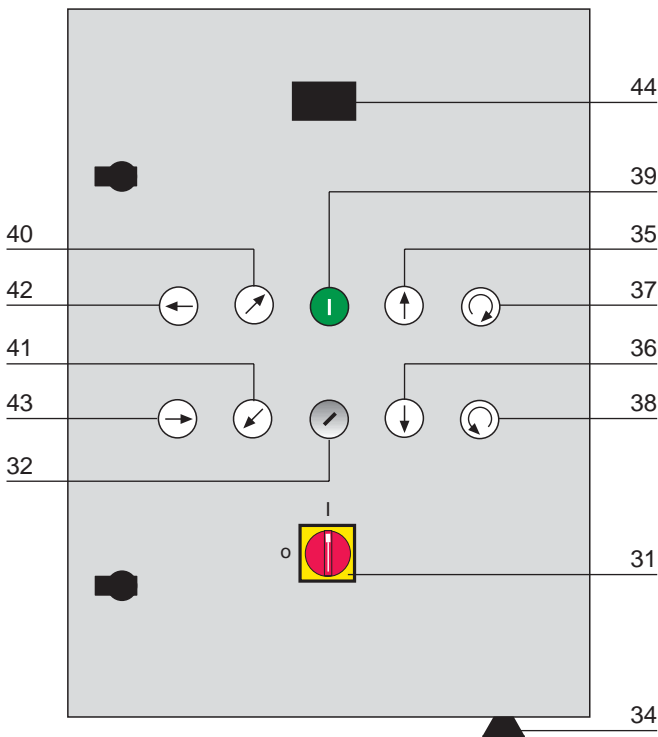
Cradle control box

13.1.1. Cradle controls

- 51. Start
- 52. Emergency stop
- 53. Lower anti-collision bar shunt
- 54. Light for overload
- 56. Lift cradle
- 57. Lower cradle
- 60. Slewing spreader bar to left*
- 61. Slewing spreader bar to right*
- 62. Slew turret to left*
- 63. Slew turret to right*
- 64. Lift jib
- 65. Lower jib
- 66. Traverse left
- 67. Traverse right

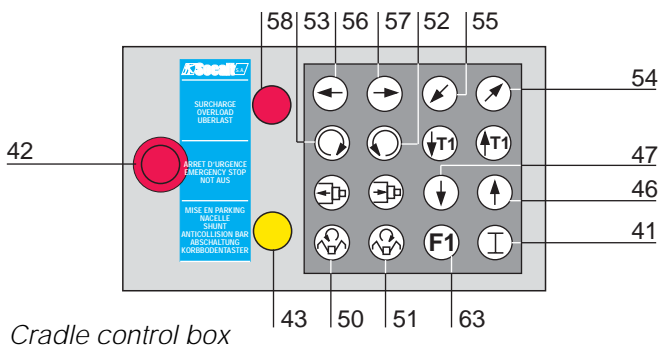
**Only for series Ma200 and Ma300*

13.1.2. Trolley control box

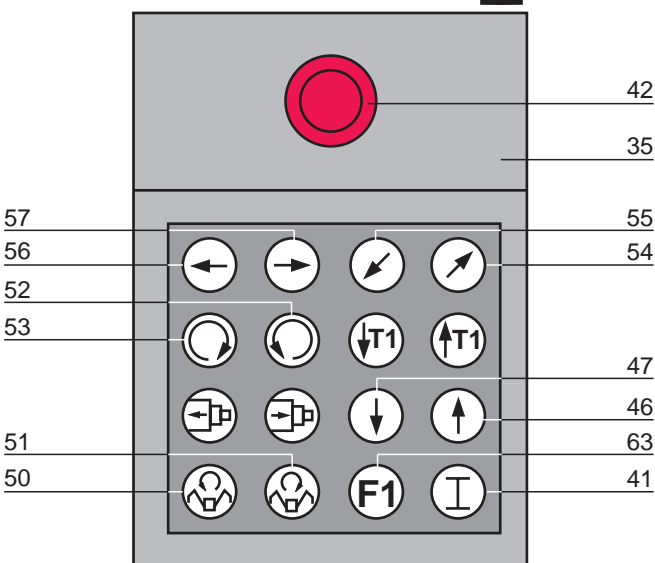
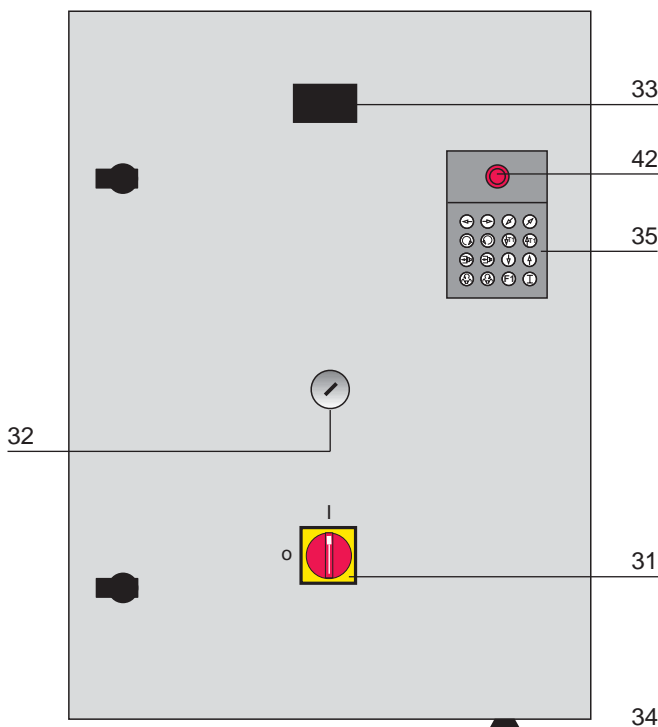


Trolley control box

- 31. Main switch + emergency stop
- 32. Lockable rotary switch for
TROLLEY control or CRADLE control
- 34. Buzzer.
- 35. Lift cradle
- 36. Lower cradle
- 37. Slew turret to right
- 38. Slew turret to left
- 39. Start
- 40. Lift jib
- 41. Lower jib
- 42. Traverse left
- 43. Traverse right
- 44. Control panel showing the main contactor and the
phase controller



Cradle control box



Trolley control box

13.2. Selection of the control panel (automate)

The equipment has two control panels:
The control panel is selected using the lockable switch (32) on the trolley control box:

- 1 main control panel (pendant control station) in the cradle, connected to the trolley by a flexible cable.
- 1 control panel on the trolley for emergency operations in the event of failure of the main control panel.

**1 key is held by the operator,
1 key is held by the persons responsible for
carrying out emergency operations.**



**These staff must be trained for such
operations, as when trolley control is
selected, the cradle emergency stop and
limit switches no longer operate.**

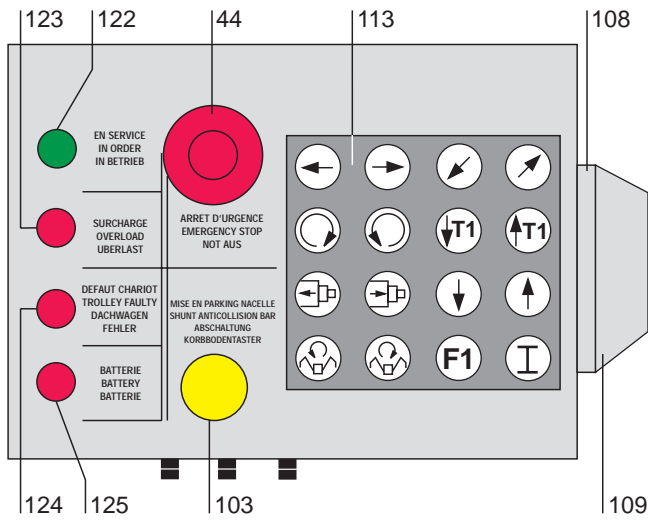
13.2.1. Cradle control panel

- 41. Start pressing (41) for more than 5 sec. stops the buzzer
- 42. Emergency stop
- 43. Anti-collision bar shunt
- 46. Lift cradle
- 47. Lower cradle
- 50. Slew spreader bar to left*
- 51. Slew spreader bar to right*
- 52. Slew turret to left*
- 53. Slew turret to right*
- 54. Lift jib
- 55. Lower jib
- 56. Traverse left
- 57. Traverse right
- 58. Control lamp OVERLOAD
- 63. Automatic cradle stop (plug)

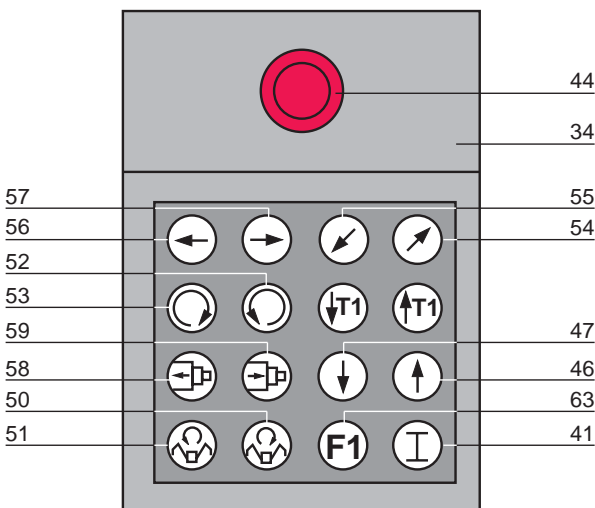
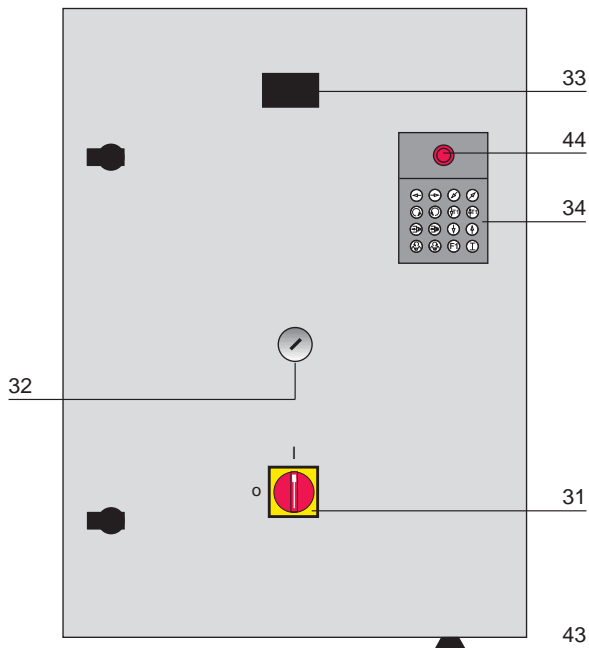
**Only for series Ma200 and Ma300*

13.2.2. Trolley control box

- 31. Main switch
- 32. Lockable rotary switch for EMERGENCY control or CRADLE control
- 33. PLC display
- 34. Buzzer.
- 35. Emergency control panel



Cradle control box



Emergency control panel on the trolley

13.3. Selection of the control panel (MAGTRON)

The equipment has two control panels:
The control panel is selected using the lockable switch (32) on the trolley control box:

- 1 main control panel in the cradle, connected to the trolley by a MAGTRON system.
- 1 control panel on the trolley for emergency operations in the event of failure of the main control panel.

**1 key is held by the operator,
1 key is held by the persons responsible for
carrying out emergency operations.**



**These staff must be trained for such
operations, as when trolley control is
selected, the cradle emergency stop and
limit switches no longer operate.**

13.3.1. MAGTRON control panel on the cradle

- 113. MAGTRON control box keyboard (controls identical to those on the emergency control panel on the trolley)
- 44. Emergency stop
- 103. Shunt the lower anti-collision bar
- 108. Socket for battery
- 109. Battery housing
- 122. Control light "in order" (machine ready to use)
- 123. Control light "Light ON when cradle is overloaded"
- 124. Control light "Trolley faulty"
- 125. Control light "Light ON when battery is low"

13.3.2. Trolley control box

- 31. Main switch
- 32. Lockable rotary switch for TROLLEY control or CRADLE control
- 33. PLC display
- 43. Buzzer.
- 34. Emergency control panel
- 41. Start
- 44. Emergency stop
- 46. Lift cradle
- 47. Lower cradle
- 50. Slew spreader bar to left*
- 51. Slew spreader bar to right*
- 52. Slew turret to left*
- 53. Slew turret to right*
- 54. Lift jib
- 55. Lower jib
- 56. Traversing left
- 57. Traversing right
- 58. Telescoping jib OUT
- 59. Telescoping jib IN
- 63. Automatic cradle stop (plug)

*Only for series Ma200 and Ma300

14. SAFETY DEVICES

To ensure safe operation without danger to personnel, the machine is fitted with a number of safety devices which monitor the correct operation of the various components and operate in the event of a breakdown or fault.

14.1. Safety device on the cradle

- emergency stop
- lower anti-collision bar

14.2. Safety device on the trolley

- emergency stop
- cradle upper safety limit switch
- cradle FINAL upper safety limit switch
- cradle overload safety device incorporated in the TIRAK hoist
- overspeed safety device incorporated in the TIRAK hoist
- slack wire rope safety device
- end of wire rope safety device
- electrical supply cable end limit
- slew turret
- slew spreader bar
- traversing end limit
- emergency lowering handle
- phase order safety device
- manual lowering in the event of a power break

14.3. Self-test safety device (machine with PLC)

- on the cradle control panels
- on the contactors

15. OPTIONS

- cradle with additional basket
- upper anti-collision bar
- cable storage box
- jib anticollision
- anemometer
- presence of rail or concrete guide
- MINIFOR, hoist for lifting material
- connection to control room (fault report)
- automatic cradle stop with guiding system (plug) (suspended platforms at heights exceeding 40 meters for according to EN 1808)