

# INNOVATIVE MOORING & BERTHING

QUICK RELEASE MOORING HOOKS  
IMOOR JETTY MANAGEMENT SYSTEM

*imoor*®



INNOVATIVE MOORING & BERTHING

**mampaey**®

OFFSHORE INDUSTRIES



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*“All Mampaey’s applications are designed, developed and manufactured using the best components according to the latest, globally accepted standards for industrial and process control equipment. Spare parts are available worldwide.”*

# FOR OVER A CENTURY THE WORLD’S LEADING EXPERT IN OFFSHORE MOORING SYSTEMS

Mampaey Offshore Industries, established in 1904 and still privately owned and managed by the fourth Mampaey generation, is the global market leader in the design & engineering, manufacturing and commissioning of innovative berthing, mooring and towing systems.

## TRACK RECORD OF INNOVATIVE SOLUTIONS

Over the years our dedication to serve our customers has resulted in several maritime innovations that has driven the new standards in the towing and mooring industry. All these developments have contributed to our continuously expanding global customer base.

## PROVEN QUALITY

All our products are designed and manufactured to safely withstand the toughest mechanical and environmental conditions, anywhere, day in day out.

## LONGER LIFESPAN AND LOW MAINTENANCE

Mampaey’s products are manufactured of materials that meet the highest standards and therefore guarantee low maintenance and minimum amount of spares throughout its lifespan. Adding up these features result in a unrivalled long lifespan. Mampaey’s track record of the highest quality safe and innovative products offer the most economical solution to your specific maritime needs. The low, total costs of ownership turn all Mampaey’s solutions into a solid investment.

*Gerard and Frank Mampaeij*



*“ The low, total costs of ownership turn all Mampaey’s solutions into a solid investment ”*





# QUICK RELEASE MOORING HOOKS

## Safe link in the mooring process

Ever since the early 1950's Mampaey is well known for designing, engineering and supplying innovative Quick Release Mooring Hooks (QRMH) to the various oil and gas industries. In the course of all these years the design objective has been the same: the constant improvement of ship handling operations in terms of reliability and safety. The result is a QRMH that releases the mooring lines with minimal effort, even under full load conditions.

Resetting the mooring hook to the operative status requires just one simple action. In the standard versions the QRMH are able to safely handle workloads from 40 up to 200 metric tons. QRMH-units can be supplied in single, double, triple quadruple or sextuple hook configurations. All QRMH are fully compatible with other iMoore components.

### OPTIONAL FEATURES

- Integral capstans
- Remote control system
- Mooring load monitoring system
- Electrical insulation
- Dust protection covers
- Anti rope slip devices (keepers)
- Special coatings
- Special low temperature executions
- Customized designs

### SOLID PACKAGE OF QRMH BENEFITS

- Low costs of ownership
- Manufactured from certified steel plates
- Manual releasing requires a minimum effort at full SWL
- Individually tested at 150% of SWL
- Resetting by simple one-man-action
- Coatings in accordance with ISO standards
- Spark-free operation
- Disassembly with standard hand tools
- Installation on concrete structures or steel decks
- Operation 180° horizontally and 45° vertically
- ATEX compliant
- Long proven durability

# CAPSTANS

## Reduced handling time and weight

Like all Mampaey equipment the capstans are designed and manufactured for safe and economic handling of vessels. Capstans can greatly reduce the handling time of the linesmen needed for mooring. They prevent heavy lifting of mooring lines. In the standard versions the capstans are available from 1 tons up to 3 tons nominal pull. Capstans are often an integral part of a complete 'Hook Package'. If so required Mampaey capstans can also be supplied as separately freestanding units or as add-on units.

### CAPSTANS' BENEFITS

- Certified for Zones 1 and 2 or non-hazardous areas
- Maintenance free. Lubricated for life
- 3-Phase squirrel cage induction motor with direct vertically mounted planetary gear reducer providing required output, torque and speed
- Foot switch and/or push button operation
- Local non-reversible or reversible type motor starter
- Optionally equipped with mechanical or electric braking device
- Single- and dual speed capstans available

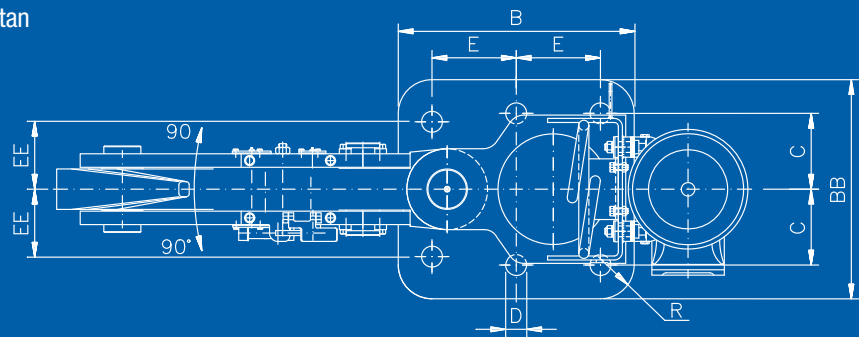
### SPECIAL VERSIONS

- Increased pull capacity available
- Perpendicular gearbox with horizontal motors
- Low temperature executions



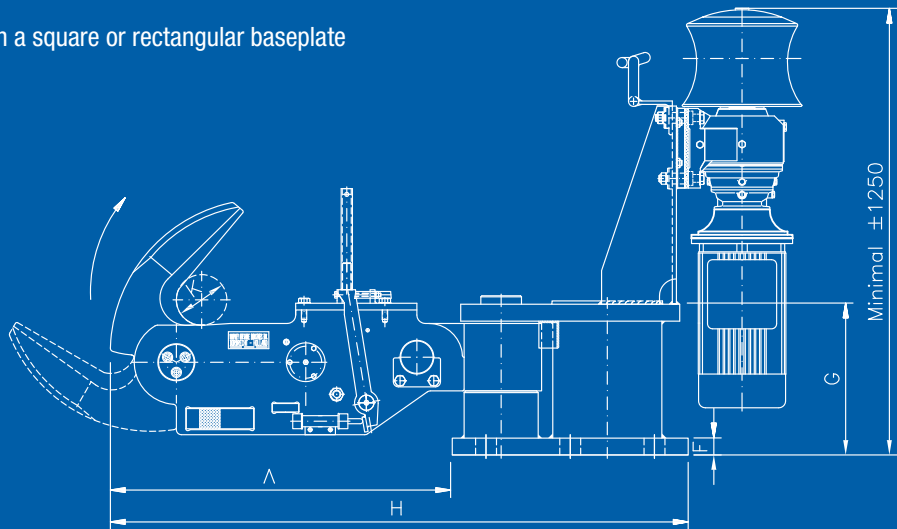
SINGLE HOOK ASSEMBLY

MHC.000.401.000 = Mooring unit with capstan  
MHX.000.401.000 = Mooring unit without capstan



- Drawing number
- Number of hooks: one
- Mooring hook unit with a square or rectangular baseplate
- Capacity each hook

TYPICAL DESIGN



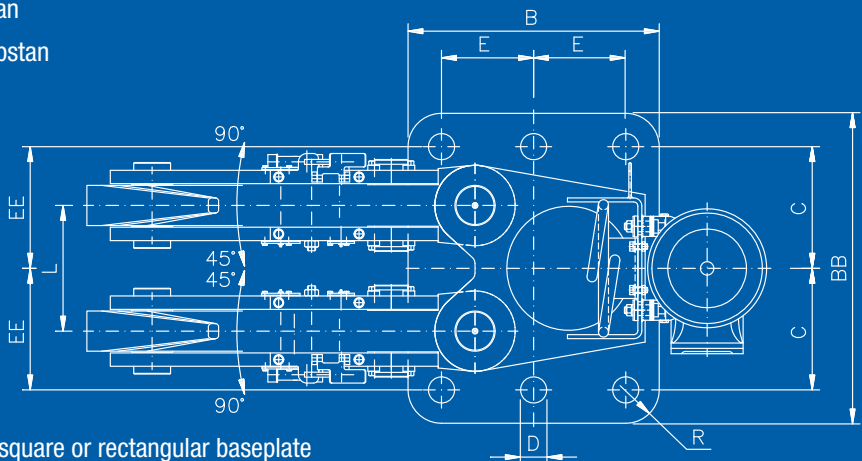
Cap. = Capacity mounting base in kN  
Wt. = Weight in kilograms, excl. capstan  
X. = Number ans size of HD bolts  
S.W.L. = Working load in kN

dimensions are in millimeters

Type MHC	SWL	Cap.	Wt.	A	B	BB	C	D	E	EE	F	G	H	K	R	X
040.401	400	400	304	668	600	600	225	54	225	225	35	370	1268	96	75	4x M48
060.401	600	600	512	873	650	650	235	54	235	200	45	407	1523	130	90	6x M48
075.401	750	750	587	923	650	650	225	62	225	200	45	417	1573	130	100	6x M56
100.401	1000	1000	792	1014	700	650	225	62	250	200	50	447	1714	150	100	6x M56
125.401	1250	1250	887	1085	700	650	225	70	250	200	55	479	1785	150	100	6x M64
150.401	1500	1500	1072	1184	700	650	225	78	250	195	55	489	1884	150	100	6x M72

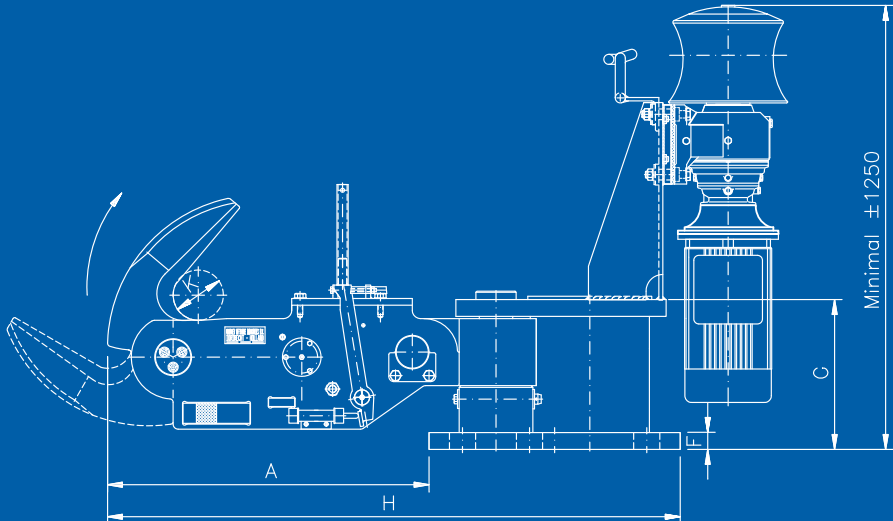
DOUBLE HOOK ASSEMBLY

MHC.000.402.000 = Mooring unit with capstan  
MHX.000.402.000 = Mooring unit without capstan



- Drawing number
- Number of hooks: two
- Mooring hook unit with a square or rectangular baseplate
- Capacity each hook

TYPICAL DESIGN



Cap. = Capacity mounting base in kN  
Wt. = Weight in kilograms, excl. capstan  
X. = Number ans size of HD bolts  
S.W.L. = Working load in kN

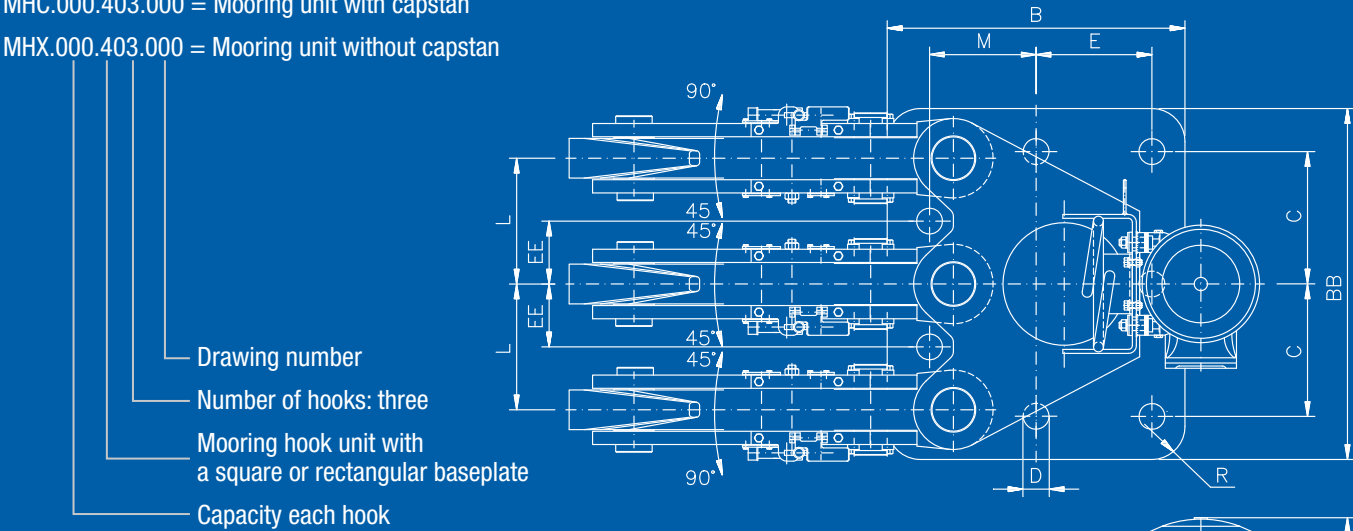
dimensions are in millimeters

Type MHC	SWL	Cap.	Wt.	A	B	BB	C	D	E	EE	F	G	H	K	L	R	X
040.402	400	800	491	583	650	700	260	54	235	260	35	370	1233	96	300	90	6x M48
060.402	600	1200	878	788	750	780	290	62	275	290	45	407	1538	130	330	100	6x M56
075.402	750	1500	1049	888	750	850	325	70	275	325	45	417	1638	130	350	100	6x M64
100.402	1000	2000	1439	959	750	925	363	78	275	363	50	447	1709	150	375	100	6x M72
125.402	1250	2500	1602	1030	750	925	363	86	275	363	55	479	1780	150	375	100	6x M80
150.402	1500	3000	1970	1134	750	1000	400	86	275	400	55	489	1884	150	425	100	7x M80



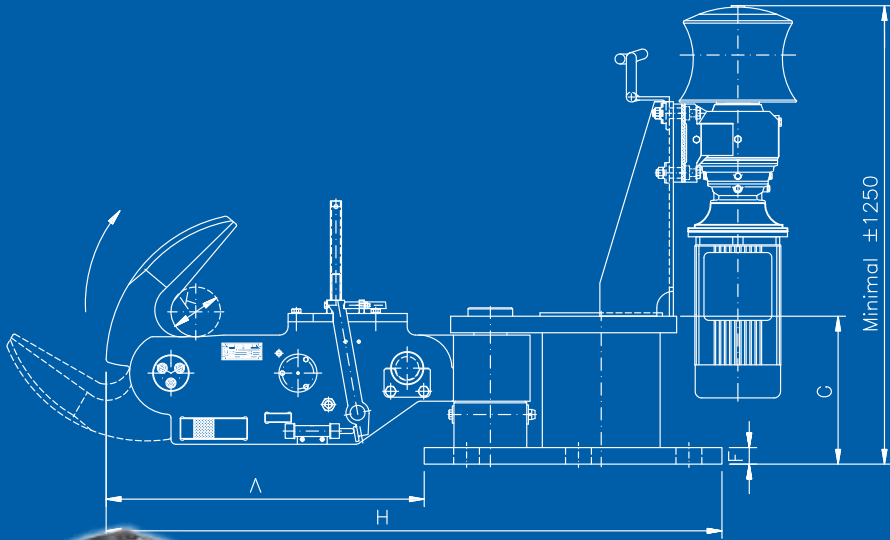
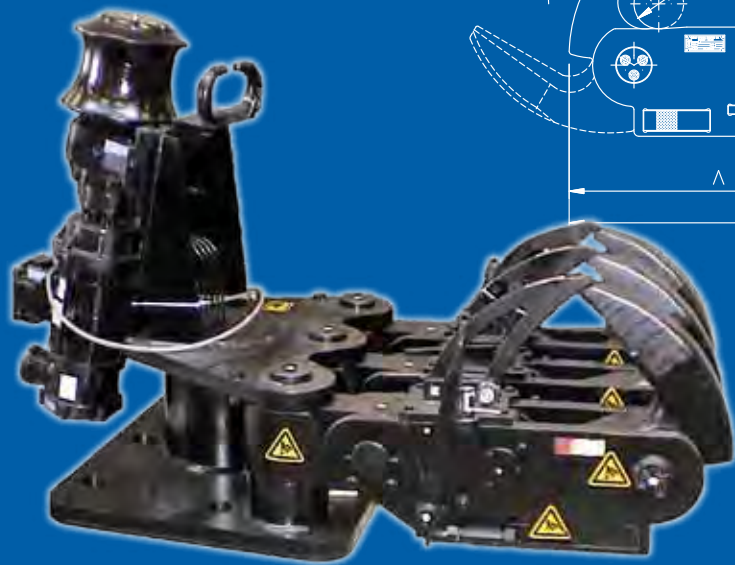
TRIPLE HOOK ASSEMBLY

MHC.000.403.000 = Mooring unit with capstan  
MHX.000.403.000 = Mooring unit without capstan



Drawing number  
Number of hooks: three  
Mooring hook unit with  
a square or rectangular baseplate  
Capacity each hook

TYPICAL DESIGN



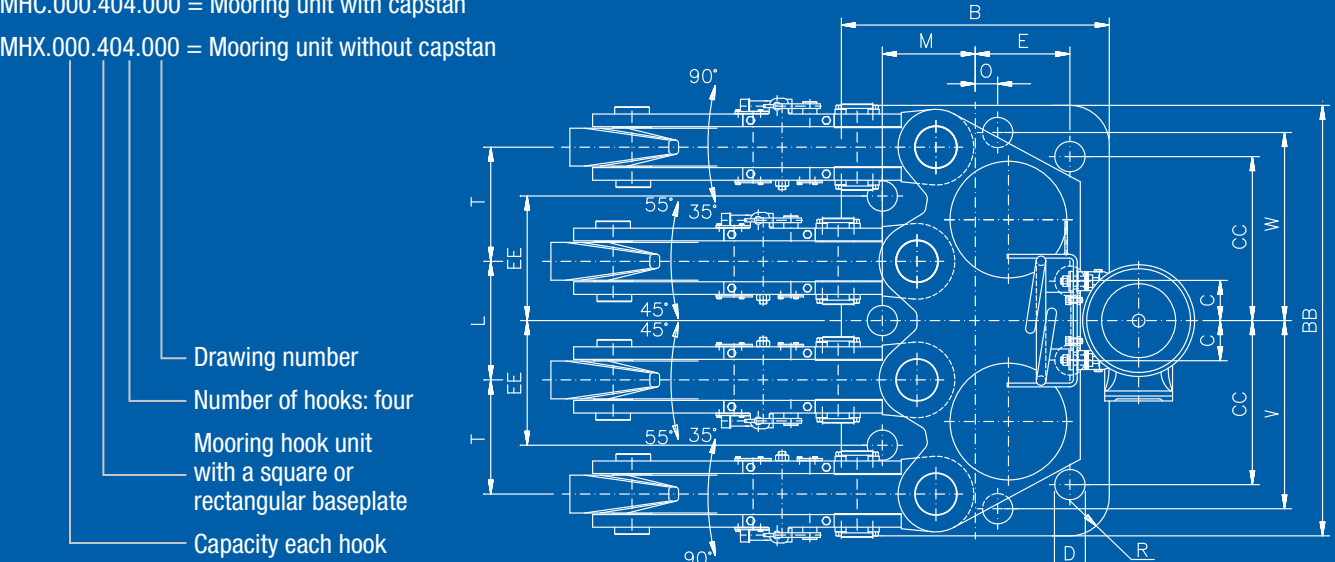
Cap. = Capacity mounting base in kN  
Wt. = Weight in kilograms, excl. capstan  
X. = Number ans size of HD bolts  
S.W.L. = Working load in kN

dimensions are in millimeters

Type MHC	SWL	Cap.	Wt.	A	B	BB	C	D	E	EE	F	G	H	K	L	M	R	X
040.403	400	1200	707	598	700	800	310	62	260	145	35	370	1298	96	290	275	90	6x M56
060.403	600	1800	1268	863	800	900	335	70	310	162	45	407	1663	130	325	310	100	6x M64
075.403	750	2250	1540	893	850	1000	375	78	325	175	45	417	1743	130	350	325	100	6x M72
100.403	1000	3000	2144	959	900	1060	400	78	350	190	50	447	1859	150	380	322	100	7x M72
125.403	1250	3750	2450	1030	900	1060	400	86	350	190	55	479	1930	150	380	322	100	7x M80
150.403	1500	4500	3043	1154	1020	1200	475	96	385	212	55	489	2174	150	448	385	125	7x M90

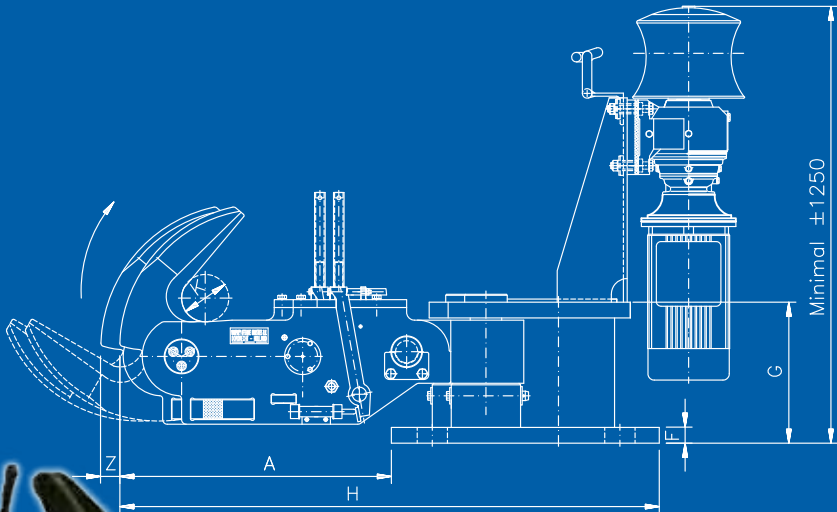
QUADRUPLE HOOK ASSEMBLY

MHC.000.404.000 = Mooring unit with capstan  
MHX.000.404.000 = Mooring unit without capstan



Drawing number  
Number of hooks: four  
Mooring hook unit  
with a square or  
rectangular baseplate  
Capacity each hook

TYPICAL DESIGN



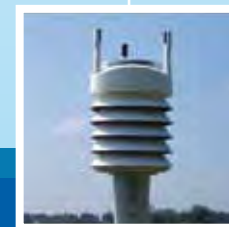
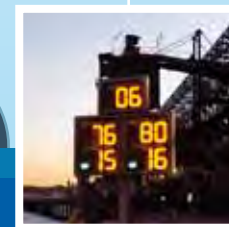
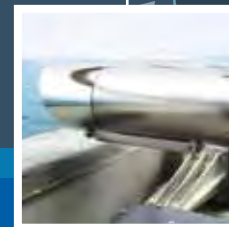
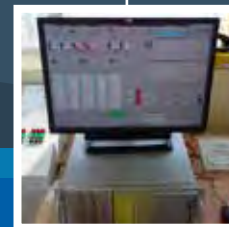
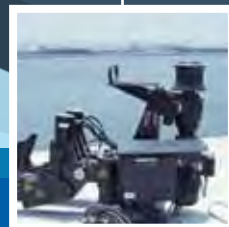
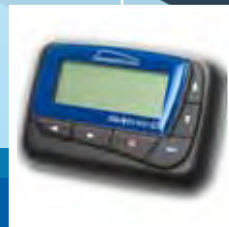
Cap. = Capacity mounting base in kN  
Wt. = Weight in kilograms, excl. capstan  
X. = Number ans size of HD bolts  
S.W.L. = Working load in kN

dimensions are in millimeters

Type MHC	SWL	Cap.	Wt.	A	B	BB	C	CC	D	E	EE	F	G	H	K	L	M	O	R	T	Z	X
040.404	400	1600	938	578	650	1120	100	470	70	235	300	35	370	1228	96	300	235	--	90	300	40	7x M64
060.404	600	2400	1670	778	750	1185	115	445	78	275	330	45	407	1528	130	325	255	--	100	320	56	7x M72
075.404	750	3000	2032	823	800	1300	150	505	86	290	355	45	417	1623	130	350	280	--	100	340	50	7x M80
100.404	1000	4000	2807	859	850	1365	125	520	96	300	395	50	447	1709	150	376	295	--	125	362	60	7x M90
125.404	1250	5000	3199	930	850	1365	125	520	96	300	395	55	479	1780	150	376	295	--	125	362	60	7x M90
150.404	1500	6000	3974	1046	925	1570	170	605	86	325	435	55	489	1971	150	426	325	60	135	415	80	9x M80

## IMOOR SYSTEM: THE COMBINED SOLUTION

Ultimate control, monitoring and safety



**imoor**®

### IMOOR BENEFITS

- Reduces** : operational costs, jetty- and fender damage, ship's- and installation's down time
- Enlarges** : control, monitoring and safety
- Enables** : stand alone functionality, local data recording, monitoring shipping discharge & loading, histogram trends
- Increases** : durability and overall jetty economy
- Introduces** : clear day- , night- and bad weather visibility, flexible data entry, multifunctional display
- Includes** : modular expandability, turn key installation, low maintenance, small amount of spare parts

### IMOOR MODULES

The iMoore system is based upon a modular design and typically comprises the following:

#### Remote Control System

(RCS) for remote release of quick release mooring hooks

#### Berthing Approach System

(BAS) assists pilots and crew by closely measuring the ship's speed, distance and angle to the jetty

#### Mooring Load Monitoring System

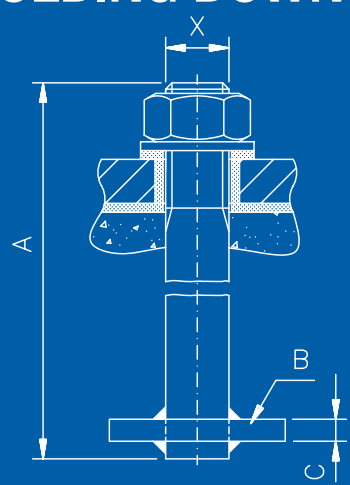
(MLMS) keeps a close and constant eye on the mooring lines' loads.

#### Environmental Monitoring System

(EMS) collects and displays relevant water- and weather information



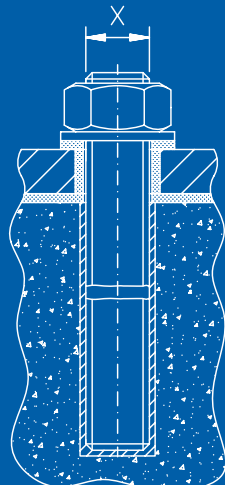
# HOLDING DOWN BOLTS



Anchor-Bolts for New Concrete

X	M48, M56, M64, M72, M80, M90
A	950
B	200 x 180
C	25

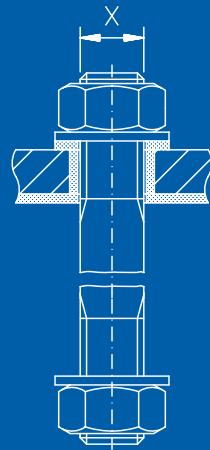
dimensions are in millimeters



Anchor-Bolts for Existing Concrete

X	M48, M56, M64, M72, M80, M90
A	1150

dimensions are in millimeters



Anchor-Bolts for Steel Deck

X	M48, M56, M64, M72, M80, M90
A	600

dimensions are in millimeters

# OPTIONAL FEATURES



Keeper



Dust Protection Cover



Back to back

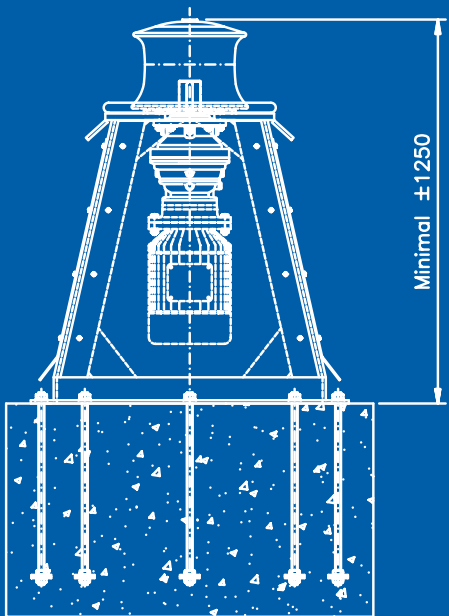
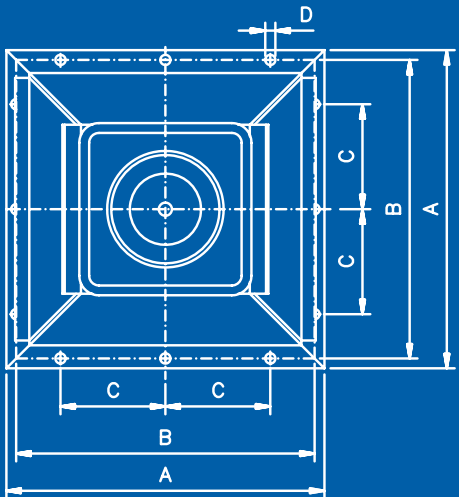


Sextuple



Pulley

# CAPSTANS



Freestanding Capstans

Motor Cap.	A	B	C	D	K	L	X
3 kW	970	910	320	Ø22	500	Ø60	12xM20
4 kW	970	910	320	Ø22	500	Ø60	12xM20
5.5 kW	970	910	320	Ø22	500	Ø60	12xM20
7.5 kW	1016	956	320	Ø22	500	Ø60	12xM20
11 kW	1016	956	320	Ø22	500	Ø60	12xM20
15 kW	1016	956	320	Ø22	500	Ø60	12xM20

dimensions are in millimeters



# SPECIAL CONSTRUCTIONS



## REMOTE CONTROL SYSTEMS (RCS)

### Safe grip on mooring hooks

In case of emergency the hooks can be released from a distance - for instance a jetty control room - by remote control. With this option the hooks can be released individually or simultaneously. The remote control system is compatible with iMoor enabling central control from various locations and portable devices such as PDA's. Local hook control can be obtained with push buttons. Open- or closed hook indications can be transmitted to the remote control panel or displayed by iMoor application software.

### ELECTRIC REMOTE CONTROL (ERCS)

The release mechanism of the mooring hook is operated by an electric solenoid mounted on the hook.

### HYDRAULIC REMOTE CONTROL (HRCS)

The release mechanism of the hook is operated by a hydraulic cylinder mounted on the hook. Hydraulic pressure is provided by a hydraulic power pack fitted on each mooring unit.

### REMOTE CONTROL PANEL

There are several in- and outdoor configurations including pushbutton panels, virtual panels on computer screen, explosion proof - ATEX certified - panels.



## MOORING LOAD MONITORING SYSTEMS (MLMS)

### Constant watch on mooring lines

Ultimate safety is obtained by Mampaey's mooring load monitoring system. MLMS keeps a close and constant watch on the forces occurring in the mooring lines. Immediate action can be taken in the event of possible slack or overload situations which are detected by MLMS in an early stage. Load information is displayed in real time, alarms can be preset upon SWL requirements. The retrievable MLMS-data can be used as a specific estimate for the number of mooring lines required for safe mooring.

### FULLY COMPATIBLE IMOOR MODULE

As the MLMS-system is compatible with Mampaey's iMoor components, information about loads in comparison with - for instance - local conditions can be measured with the additional environmental monitoring system. This information can be displayed on different portable devices such as PDA's and pagers.





## BERTHING APPROACH SYSTEM (BAS)

### Keeping a close eye on the berthing process

Two (eye safe) Lasers, a Large LED Display (LLD), audio alarms and hand-held devices (pagers, PDA's, laptops, etc.) make for an innovative approach system that leaves no room for uncertainty. Mampaey's BAS can operate as a 'stand alone' system and typically consists of:

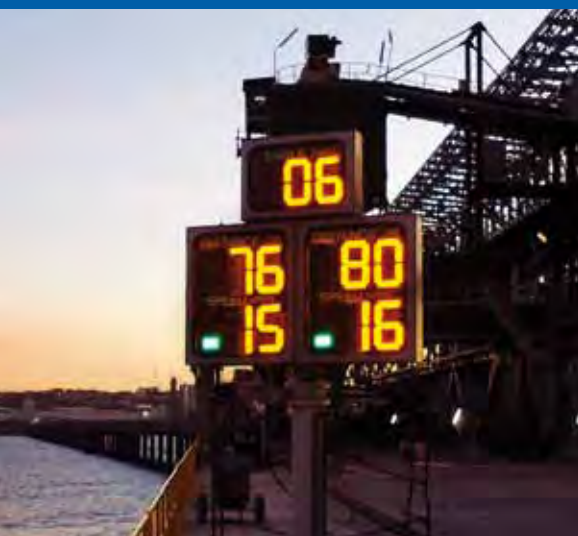
- High quality, robust, ATEX-approved, eye safe Lasers.
- Highly visible Large LED Display (LLD), clearly indicating distance, speed and angle with integrated "traffic lights" for speed warnings.
- Independent traffic light display can also be provided.

Before berthing and after the berthing process has been completed, the LLD can be put to further use displaying mooring- and/or environmental information.

High quality handling data, tuned to achieve the best possible accuracy at the fastest refreshing speed.

After the vessel is moored to the fenders the system will monitor the fender deflection & drift-off and generate alarms.

Jetty and ship's safety is assured by i-moor's adjustable alarm settings for the ship's speed and angle during the berthing process.



## ENVIRONMENTAL MONITORING SYSTEM (EMS)

### Monitors all environmental factors

Clear and present display of all meteorological and oceanographic quantities is of importance for safe berthing & mooring.

Mampaey's EMS can operate as a 'stand alone' system and typically consists of:

- Weather Station (measuring wind speed & direction, air pressure, air temperature, humidity and precipitation)
- Current Sensor (measuring current speed & direction and seawater temperature)
- Wave & Tide Sensor

In addition sensors for visibility, wave direction, specific seawater weight, current profiles, etc. can also be provided

The ideal location for i-Moor's EMS-sensors is stipulated by the Jetty lay out & orientation, global location and environmental circumstances.





# IMOOR SYSTEM

## Safe, sound and solid jetty management

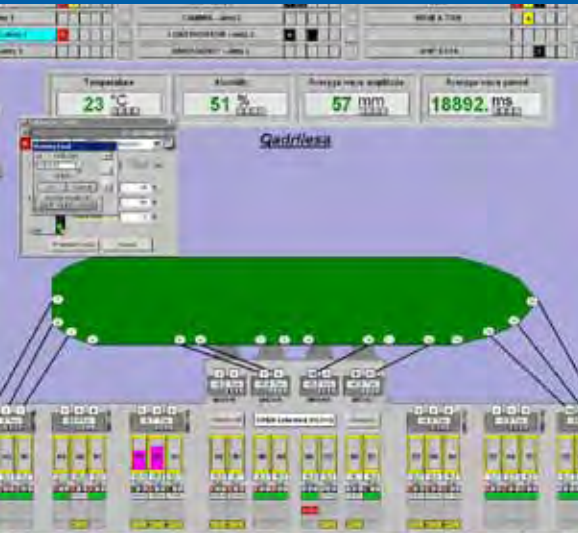
As all other products, the iMoor system is an 'in house' development by Mampaey Offshore Industries. Design, programming and testing are conducted in the best possible manner. All according to the high quality, industrial standards of our company. The Mampaey I-Moor Software Package is SCADA based and can easily be customized to client's requirements and be interfaced to other systems. Complete and simultaneously monitoring and controlling several jetties. Information can be distributed via the internet and thus be shared globally and/or by the ship's crew.

The relevant information from the various sensors is post processed on PLC's and further transmitted to (and visualized by) the Jetty Computer. This form of local processing ensures the stand alone functionality of the main modules.

Histogram trends can be provided for each vessel as ship's data is stored centrally. Specific data bases include mooring schedules, rope tension limits, trend logs, event- & alarm archives and configurable, emergency release information. Typical i-moor applications, such as mooring load monitoring, remote hook release & hook status, berthing approach data and meteorological & oceanographic info as well as AIS or CCTV images can be made visible. All information can be distributed locally or globally and be monitored via LAN, WLAN, UHF or the internet (for instance on board of the vessel).

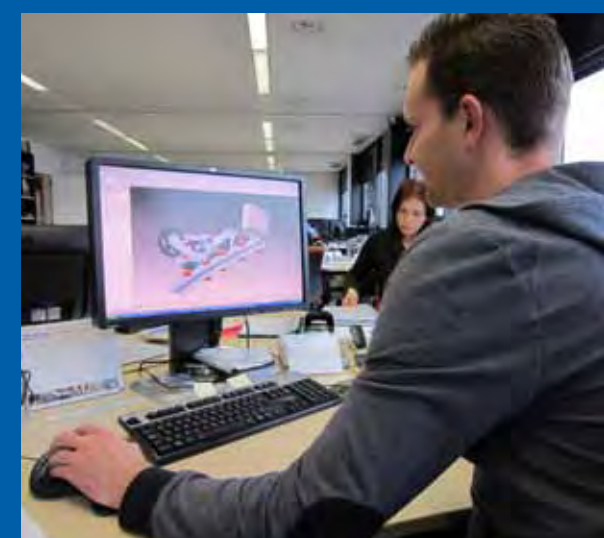
### OPTIONAL FEATURES PROVIDE MORE CONTROL AND SAFETY

- Interface to Distributed Control System (DCS) - to provide I-Moor data to client's main computer system.
- Interface to Ship to Shore Link (SSL) - to provide I-Moor data to client's main computer system.
- Interface to Emergency Shut Down System (ESD) - for emergency remote release of hooks from client's ESD.
- Automatic Identification System (AIS) - can be an integrated part of iMOOR.
- Closed Circuit Television (CCTV) provide a clear view of the Jetty and the Vessel. Images can be displayed on the Jetty computer.
- Other Interfaces and Monitoring Possibilities.



## ENGINEERING, COMMISSIONING AND TRAINING

All electrical, mechanical and IT engineering is carried out by Mampaey's in house engineering department. In order to get the best possible product design, Mampaey uses 3-D modelling and Finite element analyses of all equipment. After completion of installation, the equipment can be commissioned and started up by Mampaey's engineers. Professional training of jetty and control room personnel can be performed on site location or at Mampaey's premises.





## ADDITIONAL INTEGRATED BERTHING, MOORING AND TOWING SOLUTIONS

Offshore Hooks



Mooring Hooks



Towing Hooks



Load Test & Calibration



Mooring Buoys



Postbus 667  
3300 AR Dordrecht  
The Netherlands

Jacobus Lipsweg 38  
3316 BP Dordrecht  
The Netherlands

T +31 78 617 33 22  
F +31 78 617 52 11  
E [info@mampaey.com](mailto:info@mampaey.com)  
I [www.mampaey.com](http://www.mampaey.com)

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