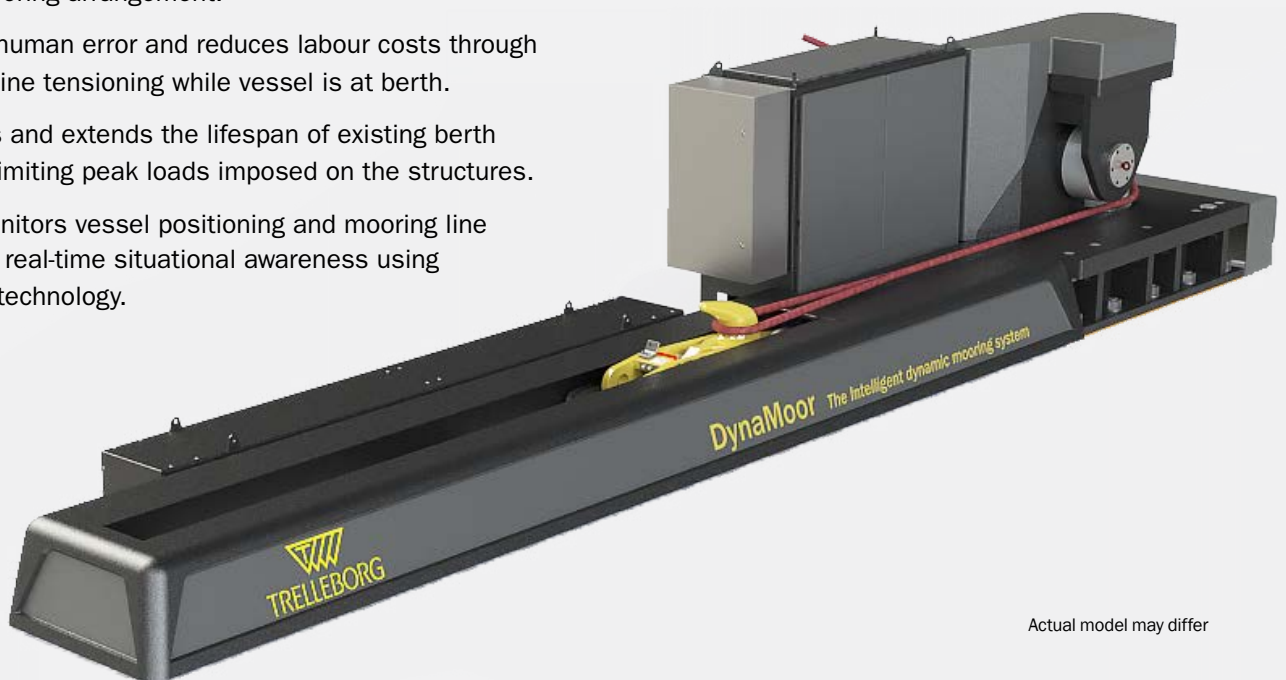




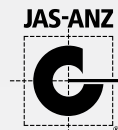
## KEY BENEFITS

- Enhances the continuity of product transfer operations and berth efficiency through the reduction of vessel motions caused by long period waves, inclement weather and the effects of passing vessels.
- Ensures mooring lines are optimally tensioned to improve safety by removing the risks associated with snapback and pinchpoints.
- Does not rely on other wharf furniture such as bollards for mounting and set-up.
- Improves mooring line utilisation, avoids line and mooring failure by re-distributing peak mooring line tensions through mooring arrangement.
- Minimizes human error and reduces labour costs through automatic line tensioning while vessel is at berth.
- Safeguards and extends the lifespan of existing berth assets by limiting peak loads imposed on the structures.
- Actively monitors vessel positioning and mooring line tension via real-time situational awareness using SmartPort technology.

**DynaMoor is a safe, cost effective, mooring solution that provides dynamic tension control of mooring lines and dampens vessel motions, increasing port and terminal throughput by allowing operations to continue in a wider range of conditions.**



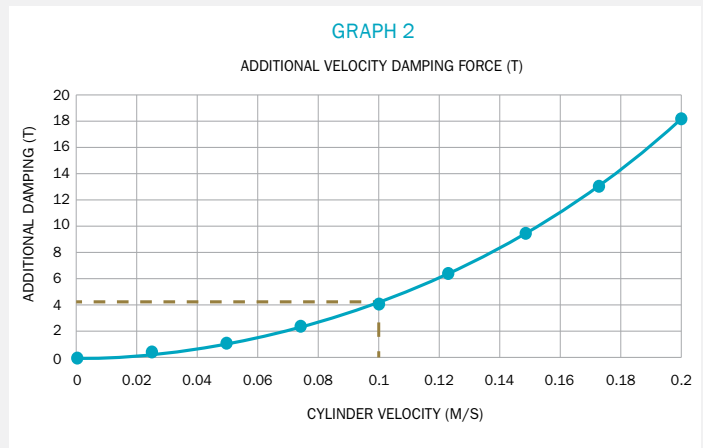
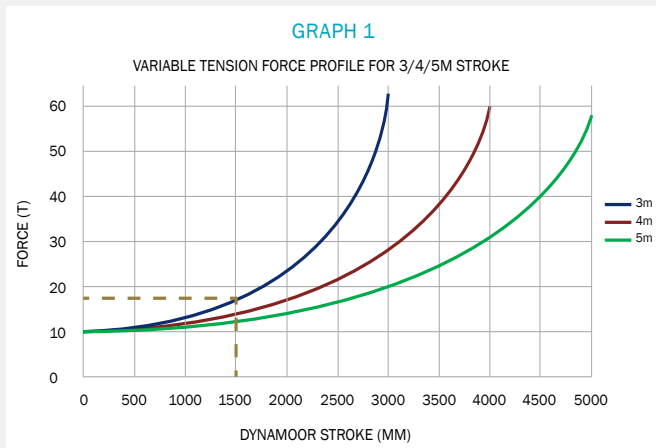
Actual model may differ



## PRODUCT VARIANTS

MODEL	DM60-3	DM60-4	DM60-5			
Orientation	Horizontal					
Damping length (m)	3	4	5			
Damping capacity (T)	60					
Safe working load (T)	150					
Mooring line connection (Q=QRH/B=Bitt)	Q	B	Q	B	Q	B
<b>MODE OF DAMPING CONTROL</b> (choose one of three modes below)						
Variable (refer note N1)	V					
Pay-in/Pay-out (refer note N2)	P					
Multi-mode (V&P) (refer note N3)	M					
Fairlead (refer drawings on page 4)	Integrated - Vertical: 0° to 35°, Horizontal: -30° to 80°.					
Classification	Non-Hazardous. Hazardous available on application.					
Local controls	1x push button control panel beside mooring unit.					

NOTES	
N1	Refer to performance graph 1 for the J curve response for the 3, 4, 5 metre damping lengths respectively. Other response curves available.
N2	Minimum 15T differential between pay-in and pay-out settings is recommended. Minimum pay-in setting of 10T.
N3	To change between modes, the DynaMoor unit must be under no mooring load and be able to move to a new starting position.
N4	If using a DynaMoor Bitt, it is recommended that the mooring line should be connected to a vessel winch.
N5	Maximum DynaMoor response speed (cylinder velocity) is 500mm/second.
N6	It is recommended to use only one mooring line per DynaMoor unit to minimise friction, wear and tear on mooring line due to vessel motion.
N7	HMPE/Dyneema mooring line materials recommended. Other line types can be utilised if the overall line stretch is less than 20% of the DynaMoor stroke, to ensure efficient use of DynaMoor.

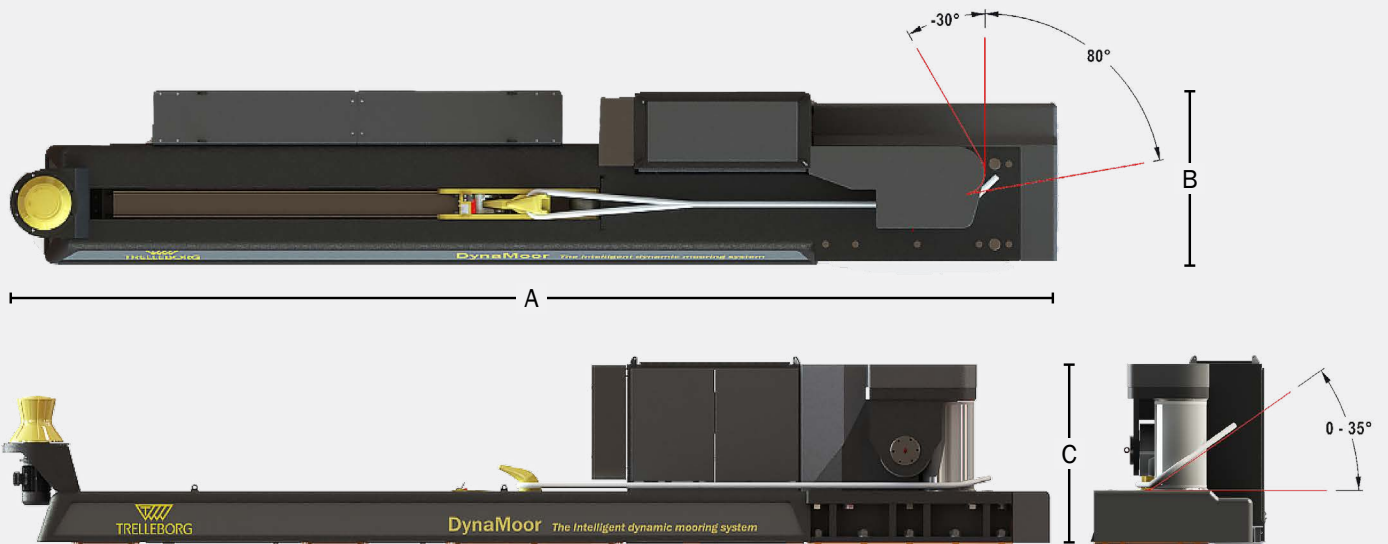


## PRODUCT OPTIONS

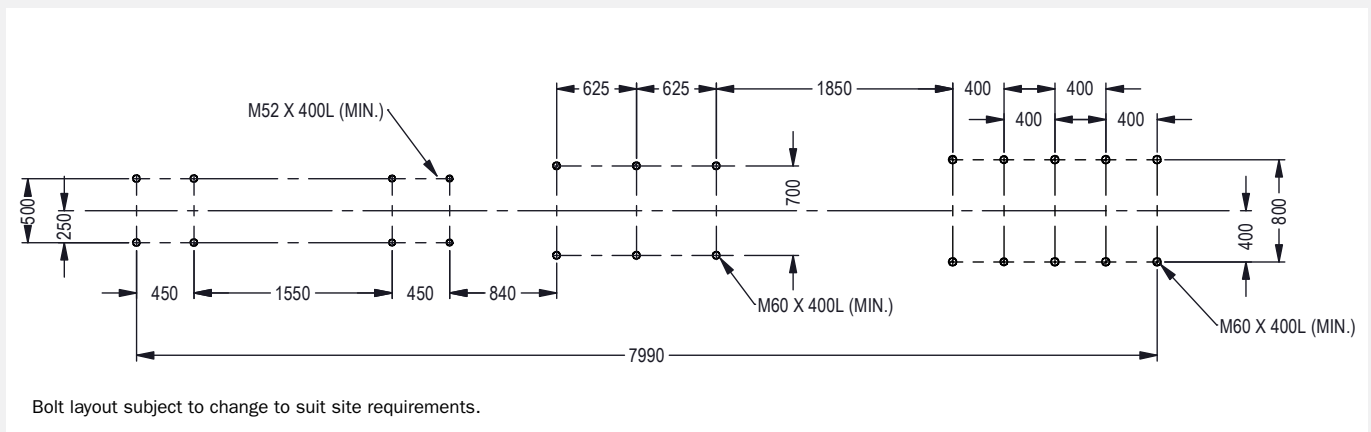
CODE	OPTION	NOTES
CAP	Capstan 1.5T line pull	Dual direction braked 30m/min line speed.
RCP	Remote control panel	Located outside snapback zone. Power and communications cabling to DynaMoor unit by others.
TMS	Temperature management system	Recommended for high ambient temperatures (>40°C) and/or situations where DynaMoor is constantly paying in/out.
RDC	Rail guide debris cover	Recommended for dry bulk terminals.
RSC	Rail scrapers	Recommended for dry bulk terminals.
VEL	Velocity damping	Provides additional damping based on DynaMoor QRH or Bitt velocity when paying out for variable mode DynaMoor units. Refer to performance graph 2.
WLS	Warning light, line tensioning and siren system	Audible and visible alerts for port personnel in the mooring zone.
CONTROL SYSTEM OPTIONS		
IMS	Integrated control and monitoring system	Includes one equipment rack with server and control system software for control and monitoring of DynaMoor units, plus one desktop workstation located at Port Control Room.
CLD	Cloud-based control monitoring system	Includes cloud-based server and control system software for control and monitoring of DynaMoor unit. Located in Trelleborg cloud.
DMT	DynaMoor tablets	Requires IMS or CLD option.
SMARTPORT SOFTWARE MODULES (requires IMS options)		
ERR	Remote release	From DynaMoor tablet or work station.
PMN	Power Management	DynaMoor units can be staggered in startup procedure - for sites where power is restricted.
ADM	Auto prepare of DynaMoor for individual vessels	Unique parameters for vessels can be set, so that DynaMoor units can be prepared for conditions tailored to that vessel prior to the vessel's arrival either by AIS or operator input. Includes additional AIS hardware and antenna system at IMS.
PVP	Passing vessel protection	Automatic adjustment of DynaMoor Pay-out setting as vessels approach and pass by using AIS and Geo-fencing. Includes additional AIS hardware and antenna system at IMS.
VPM	Vessel position management	Input of third party data to automatically adjust tension of DynaMoor unit(s). Input of QRH load data to monitor overall line balancing of the vessel.
DMC	DynaMoor co-ordination system	DynaMoor units at berth communicate with each other in order to co-ordinate Pay-in/Pay-out responses during extreme vessel motion.
<p><b>NOTES:</b> All power and communications cabling and interfaces between DynaMoor units, IMS, cloud and third party devices such as ADCP's or QRH load monitoring systems by others. All cellular connection, data and internet subscriptions by others. All cloud-based subscriptions by others.</p>		

# PRODUCT OPTIONS

MODEL	DM60-3		DM60-4		DM60-5	
A with capstan	9200		11200		13200	
A without capstan	8800		10800		12800	
B			1700			
C			1730			
Anchor bolt size (mm)	M52x400	M60x400	M52x400	M60x400	M52x400	M60x400
Anchor bolt quantity	8	16	12	16	12	16
Approximate shipping mass (kg)	11400		12600		13700	

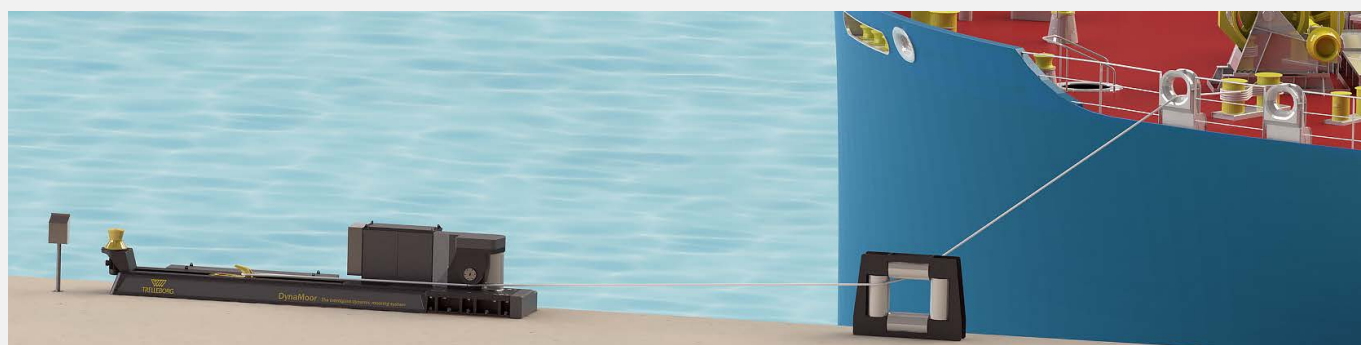


Layouts shown are DM60-3 unit with optional capstan.



## TECHNICAL SPECIFICATIONS

1 QRH SPECIFICATIONS		
1.1	Hook Construction	Frame (side plates): Carbon Steel ASTM A572 Grade 50. Hook body, primary release block: cross shaft are high strength alloy steel to ASTM A148.
1.2	Bitt Specification	Fabricated Frame. Low alloy steel grade Q355D to GB/T1591-2018 equivalent to ASTM A572 grade 50. Mooring Line Diameter Max Ø 110mm.
2 STRUCTURE		
2.1	Fabricated frame and fairlead	Low alloy steel grade Q355D to GB/T1591-2018 equivalent to ASTM A572 grade 50.
2.2	Temperature Range	Operating -20°C to +50°C.
2.3	Foundation Types	Suitable for installation on concrete or steel foundations.
2.4	Hold Down Bolts (Anchors) Supplied with unit as standard	M52 x 400mmL & M60 x 400mmL ISO898-1:2013 (E), Property Class 8.8 Finish: Hot-dip galvanizing (HDG) to ISO10684: 2004 (E).
2.5	Anchor Template	One mild steel template supplied per jetty.
2.6	Fasteners	Where possible all fasteners used in the assembly of DynaMoor units are A4-80 stainless steel. Non-stainless steel fasteners are high strength Property Class 8.8 or 10.9 alloy steel, HDG for long-term corrosion protection.
3 SYSTEM		
3.1	HPU Enclosure	Non-Hazardous Areas – Stainless steel GR316, IP66. Hazardous Areas – Epoxy coated aluminium alloy, Zone 1 IIB, T3, IP66.
3.2	Electrical	Supply Voltage – 3 phase (with neutral and earth): 380 to 415 @ 50Hz, 440 to 480 60Hz.
3.3	Peak power consumption	Maximum of ~11kW per unit as vessel arrives (3-7mins). Once vessel moored and DynaMoor in operation: <0.2kW. If mooring line adjustment required, max. 11kW for <2min. Max. ~11kW as vessel departs (1-2mins). With no vessel moored: <0.2kW.



DynaMoor unit with optional universal roller fairlead.



## TECHNICAL SPECIFICATIONS

4 QUALITY & TESTING		
4.1	Welding & NDT	AWS D1.1.
4.2	Testing	Each QRH standard Proof Load = 125%. Each QRH is individually load tested to Proof Load and manually released at the rated Standard Working Load (SWL).
5 PROTECTIVE COATING		
5.1	Surface Treatment	Surface Preparation – Class 2.5 Blast (1). 1st Coat: Nominal 75µm DFT epoxy zinc-rich primer. 2nd Coat: Nominal 200µm DFT two-part epoxy, containing MIO. 3rd Coat: Nominal 50µm re-coatable two-part polyurethane. Colour scheme as shown in datasheet.
6 OPTIONAL (available at additional cost)		
6.1	Class Design Approval	Independent 3rd Party inspection & certification.



### GET IN TOUCH

Website | [trelleborg.com/marineandinfrastructure](https://trelleborg.com/marineandinfrastructure)  
Email | [mooring@trelleborg.com](mailto:mooring@trelleborg.com)

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