

**STRONG ARGUMENTS. PALFINGER
MARINE AND WIND CRANE TECHNOLOGY**



PALFINGER MARINE LIFETIME EXCELLENCE



PALFINGER MARINE is the global leading manufacturer of highly reliable, innovative and customised marine, offshore and wind cranes as well as launch and recovery systems and boats. User-friendly application and functional design are the key benefits of the product range. Special coatings and high grade steel guarantee resistance and loading capacity even under tough conditions. A worldwide service network including supply of spare parts ensures fast and professional on-site support.

LIFETIME EXCELLENCE is our promise. For PALFINGER MARINE customers, this means excellence without compromises as well as reliable and profitable solutions within a global network of competent service partners – a lifelong product.

OWN REMARKS

HIGHEST QUALITY AND EFFICIENCY

- PALFINGER MARINE is deeply committed to the highest quality and safety standards. All products are characterised by high value retention and low maintenance. This ensures safe and economical use.

RELIABILITY

- PALFINGER MARINE is a dependable and professional partner in every situation – from telephone assistance to on-time delivery and instant on-site support. PALFINGER MARINE never lets a customer down.

FLEXIBILITY AND INNOVATION

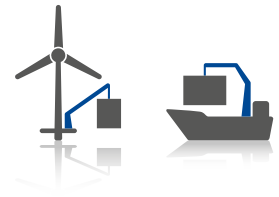
- For detecting new market trends, PALFINGER MARINE relies on more than 80 years of expert knowledge in the construction of cranes. Customers can choose from an extensive product range and receive innovative and customised solutions.

GLOBAL EXCELLENCE – LOCAL SUPPORT

- Combining excellent products, strong customer orientation and highly competent service, PALFINGER MARINE occupies a leading position in the global marine market. The overall concept of PALFINGER MARINE is characterised by a global retailer network, local distribution and service partners.

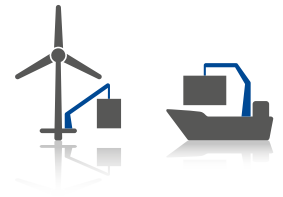
OWN REMARKS

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PALFINGER MARINE PRODUCT RANGE



MARINE CRANES



PALFINGER MARINE offers a comprehensive product range of foldable knuckle boom, heavy duty foldable knuckle boom, stiff boom, telescopic boom and knuckle boom cranes for various applications. PALFINGER MARINE products are designed to withstand extremely high strain in order to meet the safety standards and extreme environmental conditions of the marine industry.

Functional design, little maintenance effort and fast operational readiness are key benefits of PALFINGER marine cranes. Cost-efficient manufacturing in state-of-the-art production facilities and the use of high grade steel guarantee our customers a high-quality product. The cranes are designed to withstand harsh marine environmental conditions, are equipped with highly sophisticated safety features according to class rules and flag states regulations as well as many options available to meet each application.



1. FOLDABLE KNUCKLE BOOM CRANES (PC/PK)

As a result of their sophisticated crane geometry, work is effortless for PALFINGER MARINE knuckle boom cranes. They make full use of their strength and flexibility when loading and unloading of equipment, material, tools, including container handling. Due to their compact construction, they can easily be accommodated on every type of vessel also where space is at a premium. Adding various attachments like fixed workman baskets for personal handling, hydraulic supply for oil skimming and others make the PC and PK crane range a multifunctional tool.



2. HEAVY-DUTY FOLDABLE KNUCKLE BOOM CRANES (PFM)

Perfection in design and technology. The PFM is an exceptional heavy duty foldable knuckle boom crane. It moves extremely heavy loads easily and purposefully with full power and performance. Its compact fold-down position on deck leaves more room on deck. This crane positions heavy loads with precision – even at close range. Attractive additional equipment, compact and functional design, extends its range of use.



3. STIFF BOOM CRANES (PSM)

Stiff boom cranes by PALFINGER MARINE are impressive, due to their exceptional weight/power ratio and their ease to maintain. Their slender design and ability to attach additional winches make them attractive to operators. Demountable crane booms simplify transport.



4. TELESCOPIC CRANES (PTM)

PALFINGER MARINE's range of telescopic cranes demonstrate how compact and flexible they are. The extending telescopic boom enables flexible adjustment of the outreach to any operating conditions. Shorter cable lengths ensure safe load handling at close range. Operators appreciate the ease of maintenance and high level of safety.



5. KNUCKLE BOOM CRANES (PKM)

Maximum precision and quality. The PKM range fits the marine and offshore industry's specifications precisely. Severe weather and heavy seas introduce oscillating motions to suspend loads. The PALFINGER MARINE knuckle boom design enables the operator to vary the length of the hoisting rope pendulum in any given situation. This improved level of control makes the crane ideal for offshore lifting operations in higher sea states. Excellent for tubular handling through the use of pipe grabs.

OWN REMARKS

PALFINGER MARINE PRODUCT RANGE

WIND CRANES

PALFINGER WIND is the expert for cranes especially designed for the offshore wind industry. The company produces lifting devices for nacelles, platforms and substation /accomodation platforms. PALFINGER WIND guarantees its customers a strong and reliable partnership with excellent lifetime operation during the entire product life cycle. Professional consultancy, support with the installation and commissioning plus training for operation and maintenance are further benefits of this package. Customers can rely on years of experience in the field of wind technology and successes achieved due to the use of PALFINGER wind cranes on many wind farms. Innovative products that are certified by class societies ensure economic efficiency and maximum performance throughout the cranes lifetime. More than 1720 delivered wind cranes speak for themselves.

A WELL-ROUNDED PACKAGE

PALFINGER WIND offers an extensive lifting concept and the best total package for fast and cost-efficient operations. A perfectly balanced set of nacelle and platform cranes minimises breakdown times during maintenance and repair work. Professional consultancy, support with the installation and initiation plus training for maintenance and operating are further benefits of this package.

- Highest reliability and top quality products
- Best in class surface protection system
- Crane design life 25+ years
- Lifting capacity adjusted to wave height
- Perfect product mix for a customer optimised set of nacelle, platform and supply vessel cranes
- Minimised downtime for servicing and repair work
- Localised service and best customer care



HIGHEST LEVEL OF ENGINEERING COMPETENCE

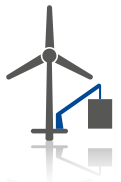
Customers benefit from years of experience in the field of wind technology and successes achieved through the use of PALFINGER wind cranes on many wind farms. Innovative products that are certified by classification societies ensure economic efficiency and maximum performance throughout the crane's lifetime.

- 80 years of experience in manufacturing cranes
- More than ten years of specialised experience in wind cranes and offshore systems
- Technical support from early development
- Highest level of product quality
- Design approved by classification societies (e.g. DNV-GL Group)
- Customised solutions

SERVICE

PALFINGER WIND offers best available customer service. A global network of engineer and locations ensures responsive, reliable and cost efficient service. A comprehensive range of service is provided, covering training, spare parts, installation, commissioning, annual inspection and maintenance as well as service agreements.

- Fast and professional on-site assistance
- Installation or installation support and commissioning
- Operator and maintenance training with detailed documents, certificates and e-learning
- Global PALFINGER and OEM spare parts delivery
- Custom-made package for wind park owners and operators



1. PLATFORM CRANES

PALFINGER WIND platform cranes are experts for flexible material handling to the platform. Platform cranes are customised to unload supply vessels rapidly and safely at main or auxiliary boat landing. A special surface coating and processing of high-quality materials protects PALFINGER WIND platform cranes against corrosion. Platform cranes are customised to accommodate any sea state.



1.1. FIXED BOOM CRANES (PF)

PALFINGER WIND Fixed Boom cranes are available in an electric or manual version. Customers benefit from a lifting system covering 0,5 to 4 mt.



1.2. STIFF BOOM CRANES (PS/PSM)

Stiff boom cranes are usually combined with foldable knuckle boom cranes in the nacelle. The advantage of this crane type is the simple handling with variable outreach and coverage of 10 to 183 mt.

- Safe and fast unloading of supply vessels
- Flexible material handling on the platform
- Optional man-riding capability



2. SUBSTATION/ACCOMMODATION PLATFORM CRANES

PALFINGER WIND substation and accommodation platform cranes are customised to withstand any marine conditions at sea. Flexible material handling systems allow for the safe and fast unloading of supply vessels. With PALFINGER WIND substation and accommodation platform cranes, the man-riding capability is optional.



PALFINGER WIND platform cranes from our PF, PSM and PKM range are the perfect supplement for handling material on substation and accommodation platforms.

- Safe and fast unloading of supply vessels
- Flexible material handling on the platform
- Customised to accommodate any sea state
- Rescue lowering point
- Optional man-riding capability



3. NACELLE CRANES

Nacelle cranes feature compact design and an ideal weighting and performance ratio. Reliable operation is guaranteed even in tight spaces. PALFINGER WIND nacelle cranes enable safe and fast lifting from the platform to the nacelle and from the heli-deck into the nacelle. Passenger transportation and blade and tower inspections are also simplified and available for several crane types.



3.1. FOLDABLE KNUCKLE BOOM CRANES (PK)

Foldable knuckle boom cranes are the right partner for transporting heavy loads such as generator parts, drives or electric motors into the nacelle. Compact storage and exceptional flexibility simplify wind farm operations considerably.



3.2. COMPACT TELESCOPIC CRANES (PC)

The compact telescopic cranes are typically used for handling toolkits and spare parts. Despite their light weight, PC cranes convince customers with their high performance.

- Safe and fast lifting from the platform to the nacelle
- Safe and fast lifting from helideck into the nacelle
- Handling within the nacelle
- Optional man-riding capability

FLEXIBILITY



PALFINGER MARINE offers a comprehensive product range of marine and wind cranes. Customers receive the right crane system for every maritime and offshore application: from the classic PK foldable knuckle boom crane, the maintenance-friendly PSM stiff boom crane and the flexible PTM telescopic boom crane to the all-rounder PKM knuckle boom crane and the heavy-duty foldable knuckle boom crane PFM.

With several pieces of supplementary equipment, PALFINGER MARINE provides various possibilities and is able to meet the customer's demands. To adjust the marine crane to the customer's special requirements, it is possible to choose from numerous functional special features. The experts of PALFINGER MARINE are available for consultation concerning the product and equipment selection.

OWN REMARKS

INDIVIDUAL EQUIPMENT POSSIBILITIES

- Various possibilities of operation
- Various safety features compliant to international standards and applicable to rules and regulations of the flag state
- Building up of different winch systems and combinations
- Numerous possibilities of extension booms (up to 36 m)

POSSIBILITIES OF OPERATIONS

- Remote control
- Standing platform
- Operator cabin
- Decentralised control stand



OWN REMARKS

TECHNOLOGY

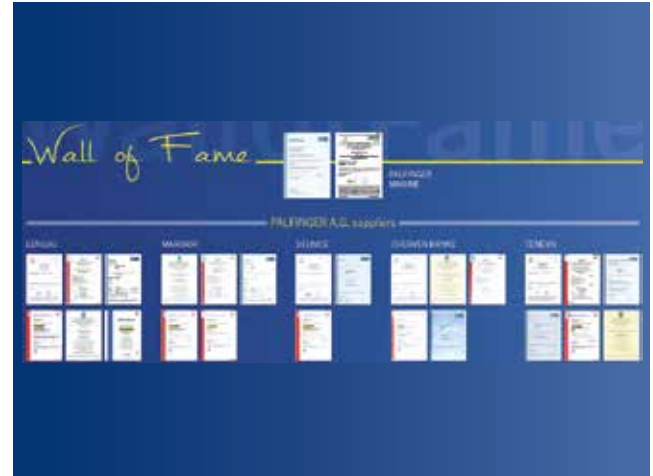


PALFINGER MARINE is the specialist in the area of maritime lifting equipment. A full 80 years of experience in the production of various crane types reinforce the knowledge and the professional competence in crane technology.

The requirements of the markets have led to a continuous development of the marine and wind cranes, which enables PALFINGER MARINE to supply innovative and customised solutions within the flexible and wide product range. For more than 20 years, PALFINGER MARINE has been developing cranes that meet the special requirements of the high seas.

PALFINGER MARINE offers several different product families that can be adjusted according to customer's requirements. Adjustments regarding outreach, boom length or pedestal height can be enabled in consultation with the application engineering of PALFINGER MARINE.

PRODUCTION TECHNOLOGY



The foundation stone for quality is laid in production. Through the specialisation of component manufacturing in the individual PALFINGER production plants, PALFINGER optimises its processes and thereby increased its productivity and quality. In the field of steel processing and machining, PALFINGER has the latest cutting, bending, edging and welding technologies at its production sites. A highlight is the new, highly automated hexagonal boom production in the Austrian plant in Lengau. Thanks to the new technology, high-strength steel can be processed and machined with extreme precision. Even the tiniest deviations in manufacturing are avoided, and as a result even more exact crane movements are guaranteed. Following numerous modernisation measures, the plant in Maribor now operates as a competence centre for the production of large components. With the cylinder production in Tenevo, PALFINGER has advanced and become the largest manufacturer of hydraulic cylinders worldwide.

PALFINGER has the ability to bend profiles into half shells up to a maximum length of 10 meters at the sheet metal bender in the PALFINGER plant in Maribor. This ensures a high quality standard for the profile geometry.

These half shells, which build the basement of the entire extension boom system, are welded with the use of the sophisticated technology of the fully automated welding robot.

RISK, SAFETY AND MACHINERY DIRECTIVE



PRODUCT FEATURES

Safety is a main focus of PALFINGER MARINE. Therefore all cranes are designed and built according to established rules and newest standards with a high level of safety.

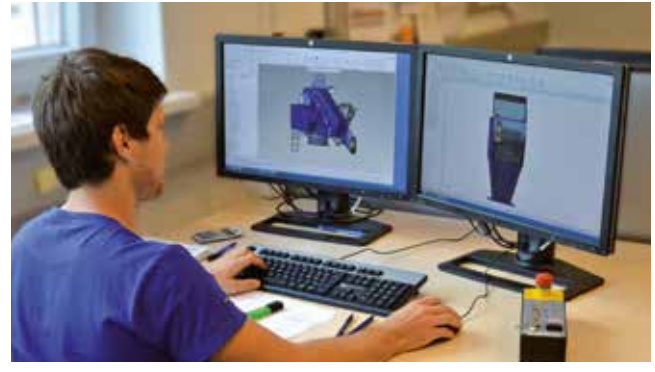
For the minimisation of risks we utilise techniques like risk assessment, failure mode and effect analysis, fault tree analysis and Ishikawa diagrams to create safe machines and to reduce any risk for the operator, the environment and your financial investment.

Additionally CE-certification according to the Machinery Directive 2006/42/EC is available on request. The Machinery Directive was created for the European market to ensure a common safety level throughout all member states.

BENEFITS

- Minimised risk for operator, environment and financial investment
- High safety level
- Fulfils the European Machinery Directive 2006/42/EC

PRODUCT FEATURES AND FUNCTIONAL DESIGN



A good design must primarily fulfil its purpose, i.e. it should fulfil the function of the component in the best way possible. Moreover, it must be possible to use it easily, ergonomically and economically. PALFINGER MARINE knows how to combine functionality with individuality – through the use of new materials, shapes, colours and detailed solutions. The best product quality through special marine painting, finest design and finish procedures enhance the product lifetime of marine cranes enormously.

BENEFITS

- Functional design elements increase operator comfort
- Functional design elements simplify service and maintenance
- Functional design elements protect the operator against incorrect operations
- Longer product lifetime due to protection of sensitive components
- Weight-optimised structure
- Easy transportation possible due to adapted crane geometry
- Compact design saves valuable space



CLASSIFICATION SOCIETIES

A classification society is an institute for ship owners that has the functional ability to evaluate vessels (including certain construction parts). Insurance policies for these vessels are created based on these results. If a class-certified crane is requested by the customer PALFINGER MARINE takes care of the entire approval process that is defined by the concerning classification society. Cranes are designed to meet the regulations and requirements of the classification societies.










Based on the results of the Manufacturer Product Quality Assessment (MPQA), which measures PALFINGER's ability to control product quality, the component-producing PALFINGER plants in Lengau, Maribor and Cherven Bryag obtained the Manufacturing Survey Arrangement (MSA) awarded by the classification society Det Norske Veritas. Additionally, the cylinder production plant in Tenevo gained the Alternative Product Certification (APC) awarded by Germanischer Lloyd. Being APC or MSA-certified brings PALFINGER in the position to certify the products without the presence of a surveyor. This status ensures greater time flexibility and more efficiency in the product certification.

OPTIONS

- Design review
- Manufacturing survey
- Load test
- Review manufacturing record book

OWN REMARKS

CLASSIFICATION SOCIETIES

-  DNV-GL Group, Germany
-  American Bureau of Shipping (ABS), United States of America
-  Bureau Veritas (BV), France
-  Lloyd's Register (LR), Great Britain
-  Registro Italiano Navale (RINA), Italy
-  Russian Maritime Register of Shipping (RMRS), Russia
-  Russian River Register (RRR), Russia
-  China Classification Society (CCS), China
-  Nippon Kaiji Kyokai (NKK), Japan

and further more on request

OWN REMARKS

SALES AND PROJECT ENGINEERING



Experienced sales engineers help finding the right crane model and configuration to match the given specifications for the lifting application as well as flag state standards and class rules and regulations. PALFINGER MARINE's customers profit from profound competence.

BENEFITS

- Assistance in crane selection
- Adaptation of the crane to customer needs
- Fulfilment of classification and regulation requirements
- Cost competitive solutions without compromise on stringent safety requirements
- Crane customised for applicable sea state conditions

OWN REMARKS

QUALITY MANAGEMENT



The high quality of the products is a main focus at PALFINGER MARINE. PALFINGER MARINE's certified quality management system in compliance with ISO 9001:2008 ensures process-reliable production, assembly and sales. The application of preventive methods of advanced quality planning is part of the QM system as well as regular internal and external audits in which PALFINGER MARINE checks the operation and reliability of the QM system.

TESTING PROCEDURES

- Goods receipt check
- Self-check in the manufacturing process
- Detailed final inspection
- Sub-supplier audits
- Supplier evaluation
- Non destructive testing (NDT) procedures:
 - * MT: Magnet particle inspection of the weld seam
 - * PT: Liquid penetration inspection of the weld seam
 - * VT: Visual weld inspection
 - * UT: Ultrasonic weld inspection
 - * RT: X-ray weld inspection

HEALTH, SAFETY AND ENVIRONMENT (HSE)



Health, safety and environment continually occupy a central stage at PALFINGER MARINE. HSE entails the continuous improvement of safety and job satisfaction as well as the provision of a safe and healthy working environment. PALFINGER MARINE attaches great importance to compliance with international quality and performance standards. From the management through to the individual employees, everyone is responsible for guaranteeing compliance with the HSE guidelines.

HSE GUIDELINES

- Creation of healthy workplaces
- Job satisfaction for every employee
- Acceptance of responsibility for the own safety and for the safety of others
- Reduction of accidents and injuries down to 0%
- Environmentally friendly procedures and processes

OWN REMARKS

ENVIRONMENTAL PROTECTION



Environmental protection is a big topic for PALFINGER MARINE. The use of environmentally compatible and recyclable materials is a matter of course.

ENVIRONMENTAL FRIENDLINESS

- Use of water-soluble finish coats in surface treatment
- Biodegradable hydraulic oils (optional)
- Use of variable flow pumps reduce the energy consumption of the hydraulic supply unit

OWN REMARKS

SUSTAINABILITY



As a family grown business, PALFINGER has been paying attention to issues such as sustainability for many years. Sustainability is not a new concept at PALFINGER but has been genuinely incorporated into the various areas of the company as a matter of course. Sustainable operations optimise products and processes and significantly contribute to PALFINGER's economic success.

SUSTAINABILITY FACTORS

- Sustainable products
- Responsible employer
- Eco-efficiency in production
- Fair business

GREEN BRAND Austria 2014/15

Due to PALFINGER's commitment to sustainability and resource saving, the PALFINGER group was rewarded as the first Austrian industrial company for the "GREEN BRAND Austria 2014/2015". This independent quality seal validates engagement to climate protection, sustainability and environmental responsibility.

OVERLOAD WARNING (OWOA)

PRODUCT FEATURES

OWOA stands for **O**verload **W**arning **O**ptical and **A**coustic. It gives the crane operator feedback about the overload situation. In the standard setting, a yellow light informs the operator before reaching the safe working load. A red light as well as an acoustic signal gives a warning when the limit of the crane is reached and shortly before the overload protection activates.

MORE EFFICIENCY IN USE

- Maximise utilisation of the crane by avoiding overload situations
- Helps to recognise how much lifting capacity of the crane is left

REQUIRED COMPONENTS

- Pressure sensor
- PLC/relay
- Horn
- Light

DISPLAY OF PAYLOAD

- Green: 60-90% of payload
- Yellow: 90-100% of payload
- Red: >100% of payload (overload)



LED SIGNAL COLUMN

- permanent green:** standard operation, handling via control valve
- flashing green:** standard operation, handling via remote control
- permanent orange:** overload warning crane and winch is active
- flashing orange:** manual overload protection system MOPS is active
- permanent red:** overload crane and winch is active
- flashing red:** automatic overload protection system AOPS is active
- permanent white:** permanent manriding is active
- flashing white:** constant tension is active
- flashing blue:** error of system, sensor or operator



SAFETY



PALFINGER MARINE guarantees a high level of safety for the crane operation. PALFINGER MARINE is committed to the highest quality and safety standards during the comprehensive production process and beyond and places value on compliance with international quality and performance standards. The result is the guarantee of the stable value of the products and the functional reliability for the operator.

SAFE CRANE OPERATION

- State-of-the-art safety features
- Safety features according to the European Directive of General Machinery
- Certification by international classification societies
- Safe crane operation guaranteed via detailed operator guidelines
- Safety features avoid damage to the crane due to overload
- Crane design compliant with applicable regulations and standards



SAFETY FEATURES

Safety features protect the crane from damage, guarantee a higher level of safety for the personnel and make operating more convenient.

PALFINGER MARINE offers a wide range of safety features that are hydraulically or electrically operated:

- Emergency cut-off
- Load holding valves for all functions
- Spring centered control valves
- Luffing cylinder limitation
- Fail safe brakes
- Hook stop devices
- Overload Warning Optical and Acoustical (OWOA)
- Overload cut-off system that allows the crane to be utilised with the full SWL
- Overload cut-off for the winch including a three turns stop device
- Winch overload protection systems (AOPS, MOPS)
- Programmable Logic Controller (PLC)
- Load indicator systems
- Boom override
- Offshore Control System (OCS)
- Key switch for changing sea state and man riding mode

PLC – PROGRAMMABLE LOGIC CONTROLLER

PRODUCT FEATURES

The PLC (**P**rogrammable **L**ogic **C**ontroller) is a digital computer used for the automation of electromechanical processes, such as the control of crane overload protection.

The PLC is designed for multiple input and output arrangements, extended temperature ranges, immunity to electrical noise and resistance to vibration and impact. When advanced safety logics is required, a PLC is used.

Additionally, the PLC can be used in combination with the terminal of the OCS.

With the PLC and various sensors and switches, it is possible to realise complex safety features.

HOW IT WORKS

The input information that allows the PLC to operate is provided by a set of various sensors depending on the crane setup that can include the following:

- Load sensors
- Pressure sensors
- Inclination sensors
- Switches such as a top stop switch or sea state switch
- Length measuring devices for telescopic booms and ropes

The PLC then applies the programmed logic and activates output devices such as the following:

- Magnetic valves
- Warning lights and horns (OWOA)
- Displays
- Data logging

BENEFITS

- Crane motion control
- Full utilisation of the working range due to advanced safety logic
- Higher safety and protection functions
- Flexible adaption to customer needs

BOOM OVERRIDE

The boom angle override function is used for cranes that are mounted on wind turbine platforms. It prevents the boom from going to high and crashing into the rotor blade.

The angle sensor is mounted on the main boom.

This means, if the crane boom gets to a specified angle, the PLC deenergise the magnetic valve and blocks the boom up function. Then the boom angle override button must be pushed. This button is internally connected to the rotor brake and stops the rotor. After one minute, the rotor should be stopped and it is possible to override the specified angle.

REQUIRED COMPONENTS

- Angle sensor
- Switch
- PLC
- Magnetic valves



OWN REMARKS

WINCH OVERLOAD PROTECTION SYSTEM

AUTOMATIC OVERLOAD PROTECTION SYSTEM

The crane can optionally be equipped with an automatic overload protection system (AOPS). The function is activated automatically if the forces that interact on the crane exceed the AOPS limit value and the crane is within a defined geometry range ("over sea"). The retaining force of the winch is 100% of the safe working load. The winch brake and the slewing brake (only for cranes with a ball bearing slewing ring) are released as soon the AOPS function is activated.

PREREQUISITE FOR ACTIVATING THE AOPS AUTOMATICALLY

- Crane handling in one of the sea state modes
- Crane is within the AOPS geometry range (radius and slewing angle)

MANUAL OVERLOAD PROTECTION SYSTEM

The crane can optionally be equipped with a manual overload protection system (MOPS). The activation of the function takes place manually with the MOPS button on the terminal or the remote control. This button is protected against incorrect activation with a protection cover. The activation of the MOPS button leads to the release of the winch brake. When MOPS is activated the retaining force of the winch is 10-20% of the safe working load.

BENEFITS

- AOPS and MOPS complies with EN13852
- The system prevents the crane from becoming damaged when the hook is entangled with a moving object

OWN REMARKS

ATEX CERTIFICATION



PRODUCT FEATURES

Operating in explosive environments requires special precautions. For this reason PALFINGER MARINE cranes optionally comply with the European ATEX directive and respective standards. A comprehensive ignition protection analysis is the basis of a wide range of modifications further improving the safety of PALFINGER MARINE cranes. To ensure safe operation in all environments the crane and its equipment are adapted to the required ATEX classification. An ignition prevention system constantly monitors the temperature condition of the crane and initiates emergency measures in case of danger.

SAFE CRANE OPERATION

ATEX declaration available for:

- Zone 1 or 2
- Group II
- Gas group IIA or IIB
- Temperature classification T1 to T4 (equals 450°C - 135°C)

BENEFITS

- Safe crane operation in explosive environments
- Fulfils the European ATEX directive 94/9/EC
- Fulfils EN 13463-1, EN 13463-3, EN 13463-5 and EN 13463-6

OPTIONS

- ATEX certified crane on request
- ATEX certified hydraulic power unit on request

OFFSHORE CONTROL SYSTEM (OCS)



PRODUCT FEATURES

The PALFINGER MARINE Offshore Control System sets a new level in terms of safety features. The system complies with EN13849-1/2 and is designed for cranes that are used for offshore applications mounted on drillships, barges, (oil) platforms, FPSOs, semi-submersibles or similar.

FUNCTIONS

- Signal processing of sensors, switches and buttons
- Signal output to the operator
- Emergency stop function
- Manual overload protection system (MOPS)
- Automatic overload protection system (AOPS)
- Overload protection (crane and winch)
- Monitoring of section pressure and rope force
- Geometry limitation
- Controlling of the operating modes
- Realisation of top stop function
- Monitoring of Constant Tension mode (CT)
- Monitoring of parking position
- Monitoring of man-riding mode
- Payload calculation and display of the actual load
- Plausibility check of movements
- Wind measurements
- Data logging
- Visualisation via LED lights and LED column
- Handling and visualisation via display and control terminal
- Handling and visualisation via remote control



OPTIONS

- The Hetricon Radio Remote Control allows the customer to benefit from all the features of the Offshore Control System
- The 7" colour display gives the operator all information about the crane and operating conditions
- The Offshore Control System can also be combined with a man-riding function (not possible in combination with AOPS/MOPS)

COMPONENTS

- Control unit
- Display unit
- Terminal
- Remote control as an option
- LED signal column

BENEFITS

- Overload protection and emergency stop implemented for offshore and harbour application; rated as performance level D according to EN13849
- AOPS and MOPS in accordance to EN13852 prevent the crane from becoming damaged when the hook is entangled with a moving object while performing overboard lifts
- CT function of the winch that allows safe hoisting of loads during wave motions
- Monitoring of the crane geometry to avoid dangerous overload situations
- Data logging in the style of EN13852
- Top stop that switches off the winch before the load attachment crashes into the pulley head; includes a rope tension meter and line detection to calculate the load
- Safety requirement fulfils EN13852-1 in general

TERMINAL



SERVICE

As part of the PALFINGER MARINE Offshore Control System, the terminal is responsible for displaying and operating the functions. The terminal enables handling at the control stand of the crane, in combination with the levers of the control valve for the individual movements. Switches and buttons for the selection of the operating modes, special functions and LED indicator lights, which show the condition of the crane, are provided to the operator via the PALFINGER MARINE terminal.

BENEFITS

- Compatible with the FLVK control stand
- Display of the current payload enables safe crane operation
- Compatible with the Programmable Logic Controller (PLC)
- Easy handling of the different operating modes
- Condition of the crane visible thanks to indicator lights

OWN REMARKS

CONTROL STAND FLVK



PRODUCT FEATURES

The FLVK is PALFINGER MARINE's customised housing for the control valve. The operation levers are protected by a cover and therefore a maximum on lifetime is guaranteed. The control stand FLVK is not attached and is designed for individual mounting on deck.

BENEFITS

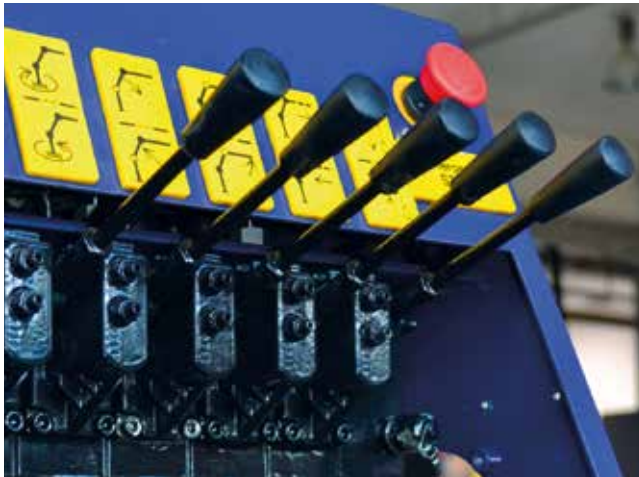
- Ergonomically arranged control elements
- Easy maintenance thanks to large openings
- Sheet steel with marine painting finish
- Prevention of corrosion and unauthorized operation
- New modular design: from 4 to 7 hydraulic crane functions

OPTIONS

- Compatible with new terminal of OCS
- Also available in combination with a remote control

OWN REMARKS

CONTROL VALVE



PRODUCT FEATURES

The control valve is the key to smooth and accurate crane movements. It allows the use of one or more hydraulic functions at the same time. To assure safe crane operation, the functions must not interfere. For this reason, PALFINGER MARINE uses only premium suppliers to guarantee a perfect interaction between electronics and hydraulics and the maximum level of safety, comfort and functionality. The well-proven Danfoss and HAWE proportional control valves are specially customised to meet the crane requirements. They provide the customer with the best end-user control, high productivity and optimum safety.

OPTIONS

- Prepared for constant or load sensing pump
- Additional sections for individual functions
- In combination or prepared for remote control with solenoids
- Protected fixture in PALFINGER MARINE local control stand FLVK or standing platform

OWN REMARKS

STANDING PLATFORM



PRODUCT FEATURES

The PALFINGER MARINE standing platform is mounted on the crane column. It gives the operator a wide overview over the working area. A completely new modular design offers major improvements. The main control valve and control interfaces are ergonomically arranged. The control elements are protected by a cover that guarantees the maximum lifetime and prevents unauthorised operation.

BENEFITS

- Ergonomically arranged control elements
- Easy maintenance
- Sheet steel with marine painting finish
- Prevention of corrosion and unauthorised operation thanks to a protection cover
- New modular design: from 4 to 7 hydraulic functions

OPTIONS

- Stainless steel version available
- Also available in combination with a remote control
- Suitable for the new Offshore Control System with a 7" display

REMOTE CONTROL



PRODUCT FEATURES

A remote control allows safe and efficient crane operation. PALFINGER MARINE only uses high quality remote controls from Scanreco and Hetrico especially designed for use in marine environments.

HOW IT WORKS

The remote control transmitter (handset) is responsible for transmitting the commands made on the levers to the receiver. The receiver forwards the signals to the electronics which convert them into crane movements by means of hydraulic control valves.

MORE EFFICIENT IN USE

- Efficient “one-man operation”
- Actuation of additional functions directly from the operating console
- The operator can see the crane load even when not standing near the crane

OWN REMARKS



OPERATOR-FRIENDLINESS

- Ergonomic transmission console facilitates relaxed work
- Individual operating elements (cross or linear lever) available
- Individual speed settings possible
- Different sizes of handsets available

SAFE CRANE OPERATION

- Possible to work outside the danger zone
- Safety switch-off in the event of frequency overlap
- Alternative cable operation is available when working in areas where radio frequencies are not permitted
- ATEX version is available for operation in explosive environments

OWN REMARKS

WORKMAN BASKET



PRODUCT FEATURES

With the PALFINGER MARINE workman baskets, the crane becomes a multipurpose working machine. The workman basket is ideal for inspection and maintenance work. With the possibility of disconnecting the basket, the crane can be used occasionally in hook or winch application but with reduced hoisting power. The basket is available in various setups in order to fulfil customer needs.

OPTIONS

- Automatic hydraulically operated levelling system
- Slewable arm that provides more flexibility
- Optimal safety and efficiency is provided in combination with a remote control
- An overload switch allows choosing between man-riding and cargo mode in order to profit of a maximum on lifting capacity and safety

BENEFITS

- Comfort and safety at the highest level
- Diverse applications for daily use
- Marine crane as multipurpose work machine
- Allows inspection and maintenance work
- Efficient working thanks to quick-change system

HYDRAULIC CYLINDERS



PRODUCT FEATURES

The hydraulic cylinders are a main component of every PALFINGER MARINE crane. In order to withstand the harsh marine environment, marine crane cylinders are marine painted. The piston rods have a special nickel-chromium layer of 60 microns that provides perfect protection against corrosion. On the lifting, outer, slewing and extension boom cylinders, load holding valves are installed, which gives the customer the maximum level of safety in the case of any hose damage or failure.

BENEFITS

- Withstand harsh and hostile environments
- High production standard of cylinder-specialised PALFINGER facility

OWN REMARKS

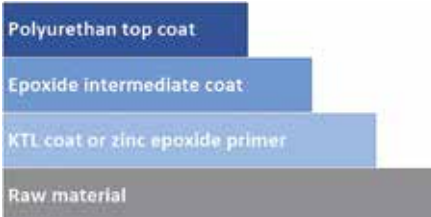
SURFACE TREATMENT



PRODUCT FEATURES

The right surface treatment is the foundation for durable and long-lasting surface protection. Through innovative technology for surface coating, PALFINGER MARINE establishes a high quality standard. The special seawater-resistant, three-layer marine paint according to ISO 12944-2 C5-M-M with a nominal film thickness of 240 micron guarantees maximum protection in the harsh marine environment. On PK cranes, standard part priming is performed by means of KTL (electrostatic cathodic dip painting) treatment that ensures a high level of cavity protection. Every crane part is painted independently and separately. Steel against steel surfaces like bolt threads, flanges, bolts or pin holes are sealed and/or corrosion protected by the use of special grease.

COATING SYSTEM



HOW IT WORKS

1. The crane components are cleaned of all impurities by means of grit blasting. According to ISO 8501, the surface preparation grade is Sa 2 1/2. The surface of sandblasted steel parts must show a medium roughness according to ISO 8503-1. Welds, edges and other areas with surface imperfections are prepared according to ISO 8501-3 grade P2.
- 2a. The zinc epoxy primer is applied.
- 2b. For standard PK parts, the components are degreased, rinsed, activated and coated with zinc phosphating in the individual immersion tanks. After two additional rinsing processes, the surfaces are passivated as well as rinsed with pure water. The electrostatic cathodic dip painting follows by immersing the crane components completely into the paint. Excess paint is washed off in two additional steps with an ultra-filtration rinse. Afterwards, the paint is cured at a temperature of 115 degrees for 1.5 hours.
3. Crane components are then given an epoxy intermediate coat in a further work step.
4. After drying, a polyurethane top coat is applied.

BENEFITS

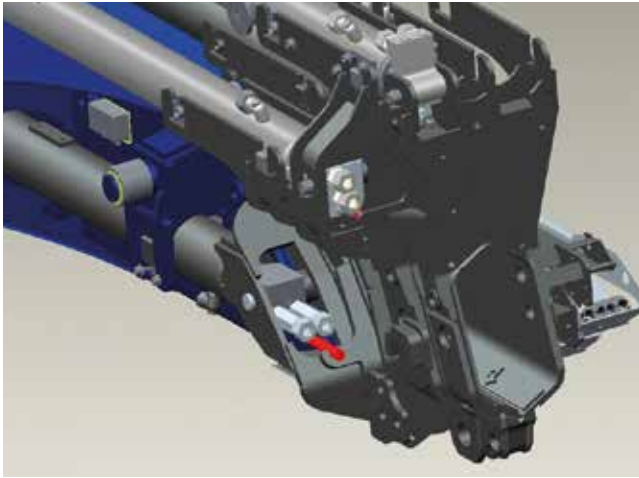
- Long-life surface protection in maritime environment
- Excellent corrosion protection of all components
- Perfect cavity protection
- High impact and temperature resistance
- FROSIO inspector present at PALFINGER MARINE

OPTIONS

- Choice from RAL colours
- HEMPEL, JOTUN and INTERNATIONAL as paint suppliers
- Special coating systems according to ISO 12944-2
- Duplex system with flame galvanized components
- Painting according to NORSOK M-501 system A.1
- Customer-specific paint specifications

OWN REMARKS

SEQUENCE CONTROL



PRODUCT FEATURES

To achieve weight-optimised construction, several or all extension booms on a crane must have sequence control. This means that first the larger extension boom extends or retracts and only then the next smaller extension boom. The patented tube-in-tube sequence control with oil feed-through is technically the perfect solution to achieve a hose-free system.

OWN REMARKS

HIGH-SPEED EXTENSION (RETURN OIL UTILISATION)



PRODUCT FEATURES

High-speed extension is a feature for selected PALFINGER MARINE PK cranes. Also referred to as return oil utilisation, this feature is a regenerative hydraulic circuit for the extension booms. It speeds up the boom extend functions by up to 30%.

HOW IT WORKS

The returning oil is fed back into the pressure side of the function rather than first going back to the control valve. The increased flow on the pressure side results in a faster movement of the cylinder(s).

BENEFITS

- Higher speed in extension booms
- 30% increase in working speed
- More efficiency thanks to reduced load cycle times

OWN REMARKS

HYDRAULIC WINCHES



PRODUCT FEATURES

The hydraulic rope winch is an important component of marine cranes. Hence, the power of the winch itself determines the efficiency of the entire crane to a great extent.

PALFINGER MARINE uses different suppliers, depending on the customer's demands. High-quality load holding valves and a drum with grooves are mandatory. Minimum rope breaking strength is 5 x SWL (safe working load). During the design process, the greatest possible attention was paid to the lifting capacity, speed and optimum winding behaviour.

MORE EFFICIENCY IN USE

- Many different performance classes
- Optimal efficiency
- High working speeds
- Optimised corrosion protection
- Single or double line operation to maximise speed or hoisting capacity
- Optimised spooling/winding thanks to grooved drums
- Capacity shields indicate the winch's maximum lifting capacity depending on different coiling situations
- Rope winch mounted at the knuckle or main boom depending on crane type

OPTIONS

- Proven electrically or hydraulically operated safety devices
 - > Overload cut-off which stops the crane movement in the event of crane overload (SWL succeeded)
 - > 3-layer end switch which avoids that the rope is completely wound off the drum body (minimum 3 layers of rope remain on the drum) and that the winch loses its pulling force
- Top-Stop which switches off the winch before the load attachment hits the pulley head
- Constant Tension Function
 - A sensitive hydraulic load sensing system will detect the load and will fully automatic keep the wire under tension. For crane operations it is regarded as very useful for unloading supply vessels from fixed platforms or moving vessels.
 - > Line-pull is constant
 - > Safe landing and lifting of loads
- Winches approved for man-riding
- Rope tension meter that detects the load on the rope
- Various drum types depending on required rope length

AVAILABLE DRIVE MECHANISMS

- Planetary drive with gear reduction:
 - The planetary drive reduces the engine revolutions down to a speed suitable for the drum body for the rope winch work.
- Axial piston hydraulic motor:
 - The axial piston motor works with a high hydraulic pressure and guarantees a strong and uniform traction force.
- Spring-loaded, hydraulically controlled, multiple-disc brake:
 - The multiple-disc brakes keep the drum body in position when there is no hydraulic pilot signal. With a hydraulic pressure of 20 bar, the spring-loaded brake can be opened.
- Lowering brake valve: The lowering brake valve contains all hydraulic connections of the rope winch.

OPTIONS FOR NEW PULLY HEAD SYSTEM

- Integrated load / rope force detection
- Layer recognition
- Integrated Top Stop

LIFTING OF PERSONNEL - MAN-RIDING (WINCH APPLICATION)



PRODUCT FEATURES

A man-riding winch is a device specially designed for hoisting/lowering of personnel and is equipped with two mechanically and functionally independent brakes, whereby the second brake acts directly on the drum. The rated capacity does not exceed 50% of the rated capacity for lifting loads at the maximal radius and wave height. This information is provided in the instructions and load chart. Whenever the mode for lifting personnel is selected. In any case a key switch must be installed. The mode man-riding/cargo can be switched only with no load on the hook.

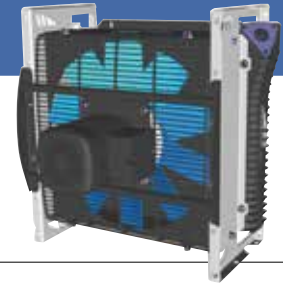
MORE EFFICIENCY IN USE

- Separate pressure range for the winch
- Always equipped with a Top Stop
- Control stands are equipped with a manual key selection switch for lifting people

SAFE CRANE OPERATION

- Additional brake on the winch
- Separate testing of each brake mandatory
- Steel wire ropes for hoisting have a minimum safety factor of 10
- Five winding stop device
- Reduced lifting capacity in man-riding mode
- Reduced lifting velocity in man-riding mode

OIL COOLER AND TANK HEATER



OIL COOLER

PRODUCT FEATURES

Oil coolers for various environmental conditions, ambient temperatures, operation duties and applications are offered in the PALFINGER MARINE product range. They are light and compact and can be fastened directly to the crane column or power unit with a protective bracket.

HOW IT WORKS

An air-oil cooler transports air with a fan over a long, looped, oil-filled line. If needed, the cooler can also be switched on by an automatic thermostat so that the oil temperature does not exceed a permissible level. Additional cooling takes place in the tank when the cooled oil is admixed to the remaining amount of oil.

MORE EFFICIENCY IN USE

- Longer lifetime of the oil, seals, valves and other hydraulic components through lower oil temperature
- The crane can be operated in a very hot climate and with high load cycles

TANK HEATER

PRODUCT FEATURES

If the operating place of the crane is in the cold seas, it is recommended to install a tank heater to bring the hydraulic oil to operating temperature before working.

HOW IT WORKS

Hydraulic oil becomes viscous at a temperature of 40°C. Hydraulic oil that is too viscous can strongly influence the function and the controllability of the crane and therefore requires that the hydraulic oil be brought to the appropriate temperature (40–70°C) before operating the crane. The tank heater starts working if the main switch on the power unit is turned on.

HYDRAULIC POWER UNIT (HPU)



PRODUCT FEATURES

PALFINGER MARINE only uses components in the premium segment. As standard, Bosch Rexroth hydraulic axial piston pumps are used. The motor of the power unit is a high-quality three-phase squirrel-cage electric motor that is totally enclosed. To achieve the maximum performance, the HPU and the included oil tank are adapted to the crane requirements. For PK and PFM cranes the optional HPU is external and can be installed on or below deck. For PTM, PKM and PSM cranes the HPU is installed inside the crane column as standard.

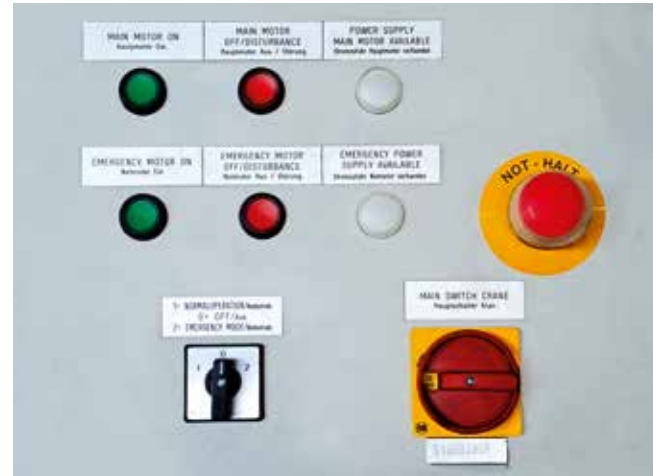
BENEFITS

- Three-phase squirrel-cage electric motor available in specified voltage and frequency
- Withstand harsh and hostile environments
- Equipped with fluid level indicator and filler-breather filter
- Load sensing or constant flow pump available
- IEC 60034-5 Protection class IP55 as standard and IP56 on request
- Duty cycle S1 according to IEC 60034-1
- Execution depending on environmental conditions

OPTIONS

- Motor removal kit for HPUs integrated in the pedestal
- Tank heating with integrated power switch
- Oil cooler with integrated thermostat
- Various pieces of monitoring equipment available on request
- Anti-vibration mount
- Electric motor supplied with standstill heating
- ATEX certified HPU
- Various emergency systems like hand pump, pneumatic pump, etc.
- Customer specific solutions

ELECTRIC TERMINAL BOX (ETB)



PRODUCT FEATURES

The Electric Terminal Box (ETB) is the interface between the hydraulic power unit and the vessel. A motor start/stop button, an emergency cut-off push button, control lamps for “fault” and “motor on” as well as a star delta starting unit is installed on the terminal.

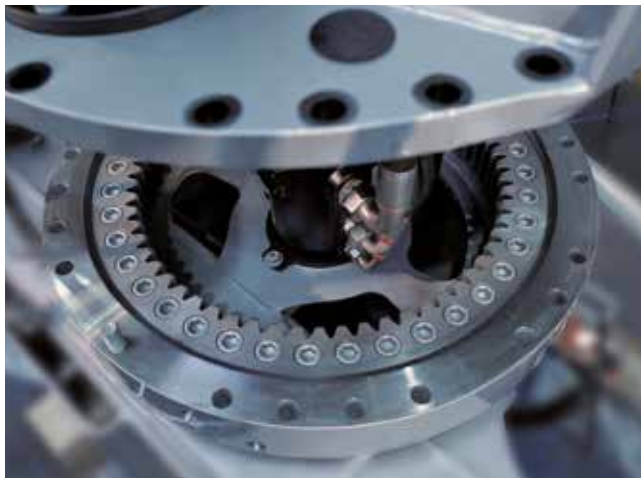
BENEFITS

- Available in specified voltage and frequency
- Protection class IP65 according to IEC 60034-5
- Transformer unit for control-voltage
- Withstand harsh and hostile environments
- Execution depending on environmental conditions

OPTIONS

- Housing in plastic or stainless steel
- Preparation for external "motor start/stop" function
- Preparation for external emergency cut off push button
- Various monitoring tools (minimum oil level, maximum oil temperature, minimum oil pressure)
- Transformer unit to 24V DC/10A
- ETB heating
- ATEX certified ETB

CONTINUOUS SLEWING SYSTEM



PRODUCT FEATURES

The PALFINGER MARINE continuous slewing mechanism permits an unrestricted radius of action. The crane is rotated or “slewed” using one or more gear boxes and hydraulic motors rather than a rack and pinion system. All endless slewing mechanisms come as standard with a high-quality roller ball bearing. At the customer’s request, the continuous slewing system can be limited by an electrically or hydraulically operated slewing limitation.

HOW IT WORKS

A hydraulic motor drives a pinion which meshes with a base-mounted high-quality roller ball bearing, rotating the crane. The gears are precision-machined to minimise backlash between the gears. The roller ball bearing is made with very tight tolerances for width, flatness and perpendicularity. The matching surfaces on the base and the column are machined in a single clamping for the highest possible accuracy. If class rules require or a higher slewing moment is needed more motors are used. One motor is hydraulically preloaded against the other, which eliminates all backlash in the rotation system.

MORE EFFICIENCY IN USE

- Faster cycle times because the crane can be slewed over a shorter distance; the crane works more efficient and faster
- Higher slewing moment through minimised friction in the slewing mechanism

SAFE CRANE OPERATION

- Safe and smoother operation thanks to elimination of catching end stop
- Accurate positioning of loads thanks to low clearance on slewing mechanism

MAINTENANCE- AND SERVICE-FRIENDLINESS

- Longer service life of the slewing system because of the ball bearing slewing ring
- Very little maintenance is needed on the ball bearing slewing ring

OWN REMARKS

PEDESTAL



PRODUCT FEATURES

There are several possibilities available for the fixation of marine cranes. Depending on the requirements, the customer can choose between different options: The crane pedestal can either be welded or screwed.

OPTIONS

- Pedestal as an option for the crane
- Welded or screwed pedestal
- Various pedestal heights and segments available to follow the construction conditions and operating ranges

BENEFITS

- Pedestal can be delivered in advance to match the construction progress of the vessel
- Hinged maintenance openings for inspection and service works
- On PSM, PTM and PKM cranes the HPU is integrated in the pedestal
- The bolt circle of the pedestal's flange can be adapted to match existing mounting flanges

STAINLESS STEEL PARTS



PRODUCT FEATURES

To resist the harsh and hostile maritime environment, many parts like pipes, couplings or fittings are made out of stainless steel (A4 class).

MORE EFFICIENCY IN USE

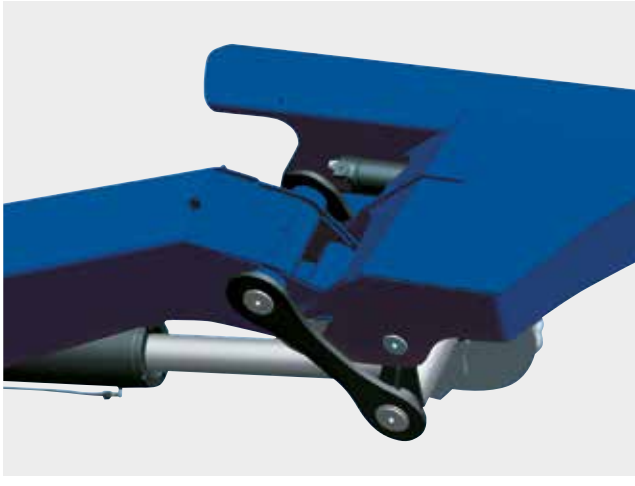
- Reduced maintenance work
- Longer lifetime
- Stainless steel hose and pipe fittings, metric according to DIN 2353
- Stainless steel hydraulic pipes & pipe clamps according to ISO 8434-1

OPTIONS

- Pipes
- Couplings
- Fittings
- Nuts and bolts (except high tensile parts)
- Greasing nipples

OWN REMARKS

POWER LINK – DOUBLE LINKAGE SYSTEM



PRODUCT FEATURES

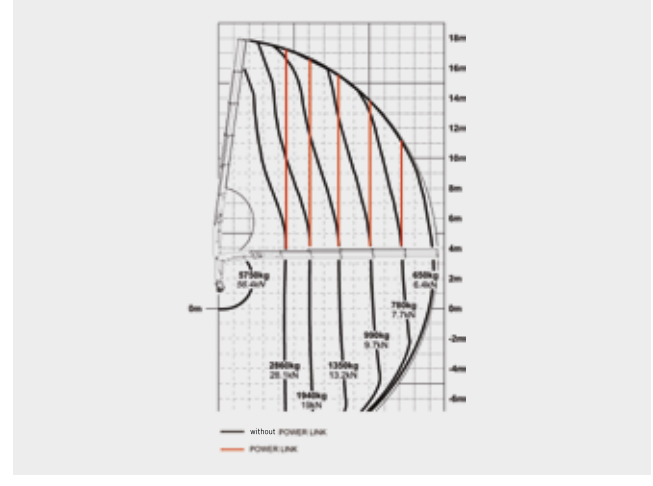
The linkage system is a special connection between the knuckle boom and main boom that increases the lifting power of the crane in the most important boom positions. The PALFINGER Power Link system is a double linkage system with a linkage on the knuckle boom and a linkage between the main boom and crane column.

HOW IT WORKS

On a crane without Power Link the distance between the bolts and cylinder pivot point changes during the motion sequence. Through this change, the crane loses up to 70% of its power. With Power Link this distance is constant. Therefore constant lifting moment is achieved independently of the boom position.

MORE EFFICIENCY IN USE

- The maximum load can be raised vertically, achieving greater outreach with maximum load (load curves run vertically on the payload charts)
- The crane can lift the maximum load even when main boom and knuckle boom in one line
- Compact transport size through parallel folding up of the boom system
- Nearly constant lifting force
- Almost stable speed in the endlayers



A GREAT VARIETY OF APPLICATIONS

- Larger operating radius
- Maximum load can be lifted even with main boom fully erected (this is the weakest position for non-linkage cranes)
- Heavy and bulky loads can be brought close to the column

OPERATOR-FRIENDLINESS

- Easier crane operation thanks to constant speed during the movement in hook mode

OWN REMARKS

HOSE EQUIPMENT



PRODUCT FEATURES

In order to use special equipment at the boom tip like workman baskets, lifting yokes or pipe grabs, hose equipment is required. The hose tray is the easiest and best option to guide hoses as well as cables to the boom tip. As an alternative to a hose tray, cranes can be configured with hose or cable drums on the main boom.

BENEFITS

- Hydraulic connection for equipment at the boom tip
- Optimal guiding of the hoses even with a bigger number of extensions
- Protected installation of the hoses

OPTIONS

- Quick connect couplings

OWN REMARKS

SPIRAL PIPE HOSE



PRODUCT FEATURES

The hydraulic hoses that run from the base to the boom system are guided in a robust spiral pipe hose.

A spiral pipe hose protects the hydraulic hoses against damage. Through the installation on the outside, easy maintenance is possible.

BENEFITS

- Ideal protection of the hydraulic hoses to keep them clean and protected against damage
- Service and repair work is simplified considerably compared to hoses enclosed inside the unit

OWN REMARKS

EQUIPMENT



PRODUCT FEATURES

The PALFINGER range of equipment includes a multitude of devices and add-ons that considerably expand the scope of applications of the crane. Grippers, rotators and much more are available. All accessories from the PALFINGER Equipment Centre (PEC) are optimised to be added to the PALFINGER MARINE crane and are therefore the first choice. Besides an extensive range of standard products, special solutions are also available on request.

A GREAT VARIETY OF APPLICATIONS

- A crane can be used as a multipurpose work machine

OWN REMARKS

DEVELOPMENT

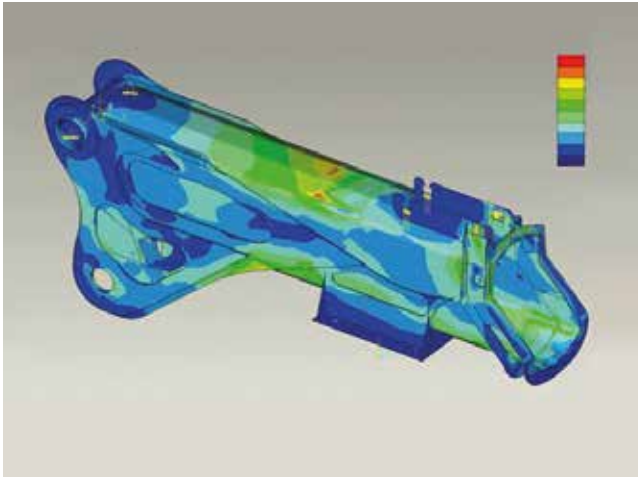


FEATURES

The foundation for a reliable and successful product is its design. Finite element calculations, field and endurance tests, strain gage measurements ensure an optimum balance between weight and strength. At the research and development centre interest is focused on topics like ergonomics, functionality, weight and material optimisation. Major involvement in the area of research and development, and cooperation with universities and technical universities form the foundation for innumerable patents and innovations in the competence areas of the geometry of kinematics, electronics, painting technology, materials, processing and production technology.

OWN REMARKS

FINITE ELEMENT TECHNOLOGY



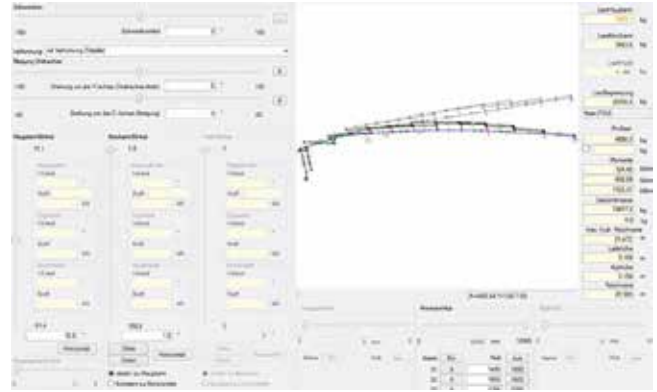
FEATURES

High tech in crane design; All load-bearing components are calculated with finite element technology, which has been used for years. They are optimised and designed to be weight-saving. Years of development edge – PALFINGER's ideas are repeatedly copied, and many of solutions developed by PALFINGER become the technical standard in crane construction over the years.



OWN REMARKS

NON-LINEAR CALCULATION INDUS



PRODUCT FEATURES

The design department of PALFINGER MARINE calculates the marine and wind cranes according to the regulations of the classification societies with the help of the calculation program INDUS.

This calculation is non-linear, complies with the regulations of the class societies and standards and considers the application, such as shipboard or offshore. INDUS covers different requirements of the regulations, such as dynamic factors, wave heights, wind, load cases, vessel inclination, type of vessel (platform, semisubmersible, barge, FPSO), type of crane, man riding and winch operation.

BENEFITS

- Accurate crane dimensioning
- Consideration of different operation modes
- Calculation of the crane according to the regulations of a particular classification society

EXPANSION MEASUREMENTS, ENDURANCE TESTS, HYDRO-PULSER TEST BENCHES



FEATURES

By using expansion measurements and automatic endurance tests, PALFINGER MARINE cranes are tested for the expected service life even before the start of production and within a few months. The components are subjected to the harshest loads on modern hydropulsers test benches to be able to offer top quality products. With this technology, it is possible for PALFINGER MARINE to optimise components to meet the harshest customer demands.

OWN REMARKS

CLIMATE EXPOSURE TEST CABINET



FEATURES

PALFINGER MARINE tests the most important components (control spool and electronic components) in the climate exposure test cabinet, which simulates tough, real-world conditions (extremely low and/or high temperatures, temperature fluctuations, air humidity, etc.).



OWN REMARKS

ASSEMBLY AND TESTING



SERVICE

Before PALFINGER MARINE cranes leave the plant, they have to pass a lot of tests.

The highest quality standards require strict and meticulously accurate testing methods. Therefore, every crane passes through an extensive check on the test bench. Successive execution of the stipulated testing steps takes place on the basis of specifically defined working and process instructions.

PALFINGER MARINE additionally offers the possibility to perform a FAT (Factory Acceptance Test) on the crane. The FAT procedure contains a comprehensive list of tasks that have to be tested (e.g. static overload test of the crane structure, dynamic test of the crane, overload and dynamic test on winch, hook block test, etc.).

SAFE CRANE OPERATION

- Meticulous test guarantees reliable and safe crane operation

OWN REMARKS

WARRANTY



SERVICE

PALFINGER MARINE cranes are quality products and guarantee maximum cost-effectiveness through different guarantee terms. The guarantee period starts on delivery to the customer but no later than six months after the crane has left the PALFINGER MARINE factory. Under certain conditions, these guarantee terms can vary and be defined separately as part of a service agreement in coordination with the sales and after sales department.

MORE EFFICIENCY IN USE*

- Full guarantee on all cranes for 12 months or 1000 operating hours, whichever is reached first
- Guarantee on load-bearing parts** for 24 months or 2000 operating hours, whichever is reached first

* Only valid for marine cranes. Warranty terms for wind cranes are mostly defined case by case in the service agreements.

** Load-bearing parts are weld components that show no natural wear and tear. They include cylinder tubes, the crane base, the crane post, the main boom, the knuckle boom, the thrusting arms and mechanical extensions.

GUARANTEE EXTENSION*

- Full warranty possible for up to 12+12 months, subject to an additional charge
- Full warranty possible for up to 12+36 months, subject to an additional charge
- Full warranty possible for up to 12+48 months, subject to an additional charge

* Excluded from the guarantee extension are all accessory parts such as grab, rotator, rope winch, etc.

TRAINING AND PALFINGER UNIVERSITY



SERVICE

PALFINGER MARINE offers comprehensive training by specialised staff that trains and prepares clients for ongoing operations and unexpected issues. Only qualified and experienced customer service employees who are familiar with the latest technologies and regulations provide the best service. Specialised trainers teach the dealers directly on site or at the PALFINGER University. Contemporary education with a practical orientation can be guaranteed by the recently equipped training centre.

BENEFITS

- Competent help worldwide
- Training courses for the operators, shipyard employees and vessel crews
- Efficient knowledge transfer thanks to "train the trainer"-concept
- Knowledge transfer through crane hand over
- State-of-the-art regulations and technologies
- Central administration and organisation of passed and planned training courses

TECHNICAL SUPPORT AND SERVICE AGREEMENTS



SERVICE

PALFINGER MARINE provides an extensive service network thanks to globally located sales and service bases. The highly trained personnel of PALFINGER MARINE and their service partners provide help in the case of emergencies quickly.

Additionally, a service agreement with PALFINGER MARINE ensures and optimises the life cycle of the equipment and maximises the customer's return of investment. Individual service agreements range from simple delivery contracts to multi-year partnerships. Customers can choose a level of partnership that will free them to focus on the core business.

BENEFITS

- Low failure rates
- Highest level of equipment availability
- Quick help in emergencies
- Single point of contact
- Fixed prices for single-year or five-year services
- Ongoing compliance with latest regulations
- Shipping or offshore wind farm agreements

PALFINGER MARINE SERVICE PARTNERS WORLDWIDE



INSPECTION AND MAINTENANCE



SERVICE

The PALFINGER MARINE team helps to keep marine equipment up to date with the latest regulations. PALFINGER MARINE has a worldwide team of trained service staff to carry out inspections and maintenance in accordance with the current rules and regulations.

BENEFITS

- Training courses for the operators, shipyard employees and vessel crews
- Service certificate after final inspection
- Proved checklists and service reports
- Professional service technicians
- Preventive and corrective maintenance, trouble shooting, field service and repair services

OWN REMARKS

ORIGINAL SPARE PARTS



SERVICE

PALFINGER MARINE delivers a full range of spare parts, tools and consumables. Customers benefit from a seamless single-source service as well as from a 24-hour provision of spare parts within Europe. All original spare parts are tested and meet the PALFINGER MARINE quality standard.

MORE EFFICIENCY IN USE

- Low failure rates
- Highest level of equipment availability
- Longer equipment lifetime due to spare parts guarantee
- Single point of contact and single point of billing thanks to centrally located spare part storage
- Competitive prices because of global purchasing strength

OWN REMARKS



SERVICE

PATIS-ONLINE is a program for showing technical information sheets, operator guidelines, repair manuals, spare part catalogues, electric and hydraulic drawings, service information, test certificates, training documents as well as “as built”-documentation.

PALFINGER's new service management database PALIPEDIA allows full technical documentation of the complete servicing history. In the system, the service maintenance intervals are defined individually.

This “product intelligence” offers a lot of benefits for the customers. Customers of PALFINGER MARINE can request access to the EXTRANET, which enables easy access to all necessary and helpful documents and information.

The system has features like upload and download functions. The search for keywords, product groups and equipment numbers makes the overview easier. The system enables the service staff access to all registered users with precise status information.

BENEFITS OF PALIPEDIA

- Full-text and keyword search
- Search process provides autocompletion
- Convenient handling
- Optimisation of user interface
- Upload and download functions
- Greater clarity of the applications
- Full technical documentation
- Servicing history
- Real-time status of the customer's equipment with display of the service maintenance intervals

ABBREVIATIONS

ABS	American Bureau of Shipping
AOPS	Automatic Overload Protection System
APC	Alternative Product Certification
ATEX	Explosive Atmosphere
BV	Bureau Veritas
CCS	China Classification Society
CT	Constant Tension
DLI	Digital Load Indicator
DMS	Strain gauge
DNV-GL	DNV-GL Group
EN	European Standard
ETB	Electric Terminal Box
FAT	Factory Acceptance Test
FLAM	Zinc Thermal Spraying
FLVK	Control Stand including protection of control valve
FPSO	Floating Production Storage and Offloading Unit
HPU	Hydraulic Power Unit
HSE	Health, Safety and Environment
ISO	International Organization for Standardization
KTL	Electrostatic Cathodic Dip Painting
LR	Lloyd's Register
MOPS	Manual Overload Protection System
MPQA	Manufacturer Product Quality Assessment
MR	Man Riding
MSA	Manufacturing Survey Arrangement
MT	Magnet particle inspection of the weld seam
NDT	Non Destructive Test
NKK	Nippon Kaiji Kyokai
OCS	Offshore Control System
OSV	Offshore Supply Vessel
OWOA	Overload Warning Optical and Acoustical
PC	Compact Telescopic Crane
PEC	PALFINGER Equipment Center
PF	Fixed Boom Crane
PFM	Heavy-duty Foldable Knuckle Boom Crane
PK	Foldable Knuckle Boom Crane
PKM	Knuckle Boom Crane
PLC	Programmable Logic Controller
PSM	Stiff Boom Crane
PT	Liquid penetration inspection of the weld seam
PTM	Telescopic Crane
QM	Quality Management

RINA	Registro Italiano Navale
RMRS	Russian Maritime Register of Shipping
RRR	Russian River Register
RT	X-ray weld inspection
SWL	Safe Working Load
UT	Ultrasonic weld inspection
VT	Visual weld inspection

PALFINGER MARINE GMBH
F.-W.-Scherer-Straße 24 | 5020 Salzburg
Austria

T +43 662 4684
marinecrane@palfinger.com
www.palfingermarine.com