

# Project Catalogue

# Cranes



# Legacy brands

MacGregor is the Original Equipment Manufacturer (OEM) for the following brands:

Ankerløkken Marine, Allset, ASCA, Becker, BMH, Conver-OSR, Grampian Hydraulics, Flintstone, Greer Marine, Hamworthy, Hatlapa, **Hydralift**, **Hydramarine**, Hydramaskin, **Hägglunds**, Interschalt, **KGW**, Kocks, **Krupp Fördertechnik**, Kvaerner Ships Equipment, KYB - ASCA, KYB – Kayaba Industries / Navire Cargo Gear, **LMG**, Luezhoe, MacGregor, MacGregor-Conver, MacGregor-Hägglunds, MacGregor-Kayaba, MacGregor-Navire, Mongstad Engineering, **MTT**, Navire, Navire Cargo Gear, **NMF**, Nordströms, **Norlift**, **O&K**, Ozean Service & Reparatur, Platform Crane Services (PCS), Plimsoll, Porsgrunn, Pusnes, Rapp Marine, Triplex, Macgregor, Velle Systems, Vestnorsk Hydraulikkservice (VNH) and Von Tell



# Shipping is your business, cargo handling is ours

## Experience that adds value

More than 13,000 MacGregor cranes have been delivered over the past 55 years. Advanced designs and user-friendly operation are some of their key elements.

MacGregor's deck cranes are the safest, most efficient and productive marine cargo cranes on the market today and operate on ships throughout the world.

## Whatever the ship type

There are MacGregor cranes to suit every type of vessel and cargo handling duty, whether your ship is a bulk carrier, container vessel, general cargo ship, tanker or another type of vessel.

By installing MacGregor cranes, you have a wide range of extra features, accessories and tools available for you to choose from to suit your ship type. You also have the full support of MacGregor's worldwide service network to keep you up and running.

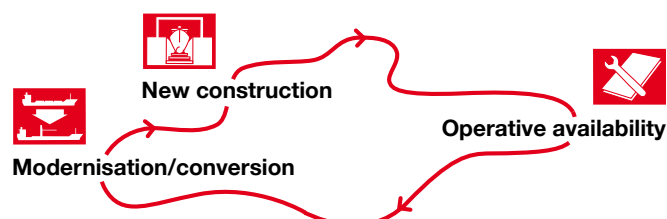
## Partners in production

Offering clear logistical benefits for shipowners and shipyards, MacGregor cranes are manufactured by carefully selected and approved production partners in China and Korea. MacGregor provides conceptual know-how, design, key components, continuous production supervision and rigorous quality control and testing. Our experience of part-ner production started already back in the 1960's.

## Support throughout your ship's lifetime

Our aim is to add value to your business throughout the lifetime of your ship. Starting at the newbuilding stage, our naval architects help you develop an optimal vessel design for a specific operational profile. This is achieved by designing integrated cargo flow systems with customised features. Once the ship is in service. MacGregor provides lifetime support in the form of maintenance and service solutions that ensure optimum equipment availability.

Later in your ship's life-cycle, our modernisation and conversion programmes help you get even more from your investment by optimising performance to match current market needs.



# Glossary

Condition Monitoring  
Customized Spare Part Packages  
Emergency Box  
Protection cage  
Wire sheave guards  
Log reinforcement kit  
Bearing support kit  
Log block kit  
UAV Inspection & Surveying  
Crane control system CC3000  
System Upgrade Legacy Systems  
Remote-control crane system  
Jib Collision Prevention  
Anti-Collision Protection (Fixed Deck Items)  
Anti-Collision Protection (Anti-Jib Conflict)  
Crane Camera System  
Active Pendulation Control  
Active Rotation Control (ARC)  
Load Turning Device  
Crane Grab  
Maintenance Platform for Grab Equipment  
Power Supply and Stabilizing Winch Offline pump & filter  
Crane House Ventilation  
Oil Cooler upgrade  
Gear Oil Cooler for Grab Operation  
Air-conditioning unit  
Personnel handling system  
Personnel Handling Legacy Products  
Ship-to-Ship transfer  
Load indicator  
ECB05 Safe Load Indicator System  
Y/D Star Delta starter  
Winch replacements  
Winch Modification  
Structural Changes  
Steel structure replacement  
Operator cabin  
Add-on AHC  
Data Logger  
Triple-Digital Radios  
LED-Lighting  
Cardan Kit  
Grease Drain  
Automatic Slewing Bearing Greasing  
Oil Level Dip Stick for Gear Boxes Reverse  
Power Compensation  
Vertical Boom for Sea Voyage  
Fly-Jib Extension  
Tugger Arms  
ROC-Unit – Remote Access  
OnWatch Scout  
Colibri 3D Motion Compensated Crane

**Note:**

***Not every product named in this catalogue is suitable for every type of crane.***

***Please contact the Project team to evaluate the possibility.***

# Contact us

## Crane types by legacy company

### Macgregor

Bulk: GLBE; GLBS; GLB

General purpose: GP

Cargo: GL; GLE; GLH; GLHE; LC

Heavy Lift: HCE

Hose handling: HH

Four-rope grab & heavy duty: K4

Trans-loading: TCE

### TTS-NMF

Boat and Provision: PK; BPK

Bulk: DKV; DKVS

Container: PKL; DKI-III

Multi-Purpose: DKII; DDK; DKV

Heavy Lift: DKII; DKSL

Offshore OC; Knuckle Boom

### TTS Marine AS, Hydralift, Norlift

General Purpose: GP; MCV; KMVC; MCVT

General Purpose: Cargo: GPC;

Cargo Crane: Low built: CCL; MCVC

Cargo Crane: Slim type: CCS;

Gantry crane: G

Davit: HL2D; HL6D; HL9D; HLF

Telescopic, slide out: HLT

Painterline, Booms: HLP

Suffix:

O Offshore

K Knuckle boom jib

T Telescopic Jib

FX Fixed Jib, non luffing

### TTS-LMG, O&K; Krupp Foerdertechnik

Standard: KL

Bulk: TLB; TLBE

Slim: K; KS

Cylinder: HL

Four-rope grab: V

Gemini: FGH

## Your contact point

**Chong Heng Lee, Singapore**

**Florian Schmidt Hamburg, Germany**

**Sebastian Burow Hamburg, Germany**

**Lennis Wegner Hamburg, Germany**

**Florian Schmidt Hamburg, Germany**

**Glenn Odegard Kristiansand, Norway**

**Richgard Urdal Kristiansand, Norway**

**Haakon Aadnevik Kristiansand, Norway**

**Florian Schmidt Hamburg, Germany**

**Sebastian Burow Hamburg, Germany**

**Lennis Wegner Hamburg, Germany**



## Accessories and extras

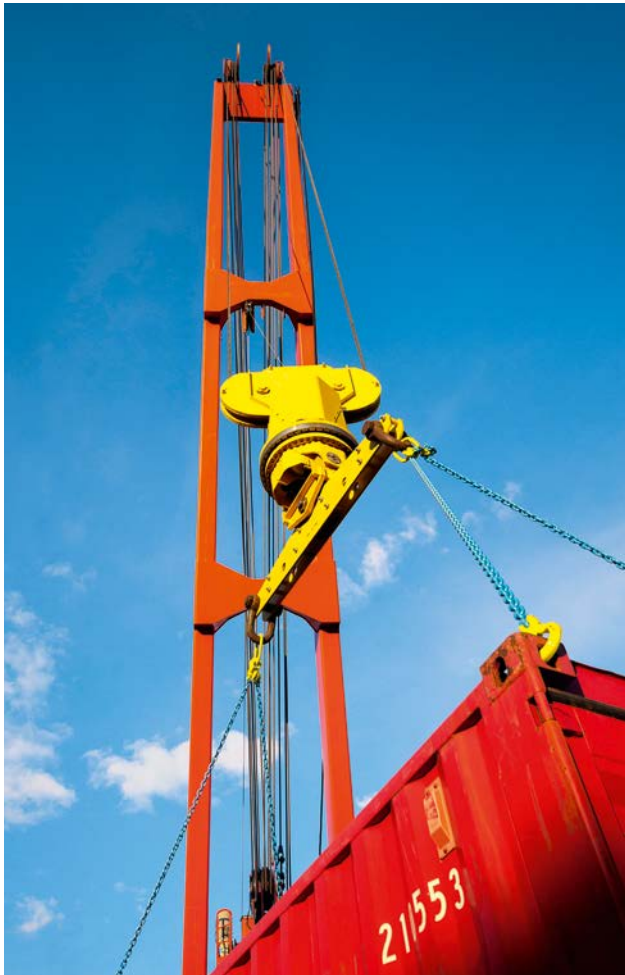
MacGregor cranes can easily be furnished with a variety of extra equipment to improve overall visibility, reliability and performance.

Examples from the huge range of optional extras that are available from MacGregor include spreader and grab handling equipment and programmed controlled cargo spotting to improve cargo handling efficiency and reduce cargo damage.

### Optional extras

- Air-conditioning
- Anti-collision system, static, dynamic and 3D
- Auto team (one driver for two cranes)
- Active Pendulation Control (APC)
- Active Rotation Control for power swivel (ARC)
- Extra deck lights and warning lights
- Extra heaters
- Extra limit switches
- Stabilizing winch and cable winch
- Power limitation system on VFD cranes
- Power management system
- Remote control
- Spreader equipment
- Ships office display from cranes
- Team beams

Electric power swivel with ARC



## Lifetime value with MacGregor solutions

We provide you with efficient and reliable solutions for your cargo handling needs.

Cranes for all ship types and every cargo handling duty.

The crane housings are totally enclosed providing protection from the weather, corrosion and damage.

Modular designs enable us to provide the shortest possible lead times as well as top-of-the-line quality.

Modern cranes complying with international standards and regulations.

MacGregors North Star



## Global service on a local basis

- MacGregor operates in more than 50 countries
- MacGregor service network consists of more than 60 stations in major ports around the globe
- Approximately 900 skilled MacGregor service professionals at your service
- Original MacGregor spare parts and repair services on a planned schedule, on demand and on emergency basis

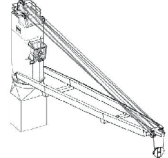
# Condition Monitoring

Inspections every one, two or five years. We offer inspections on lifting appliances and lifesaving appliances such as cranes, winches, davits, release gears, rescue boats, life boats and free-fall boats.



**Macgregor**

phone: 0049 (0) 40 554 361 752 ; email: henning.dreyer@tsgroup.com

| Crane Check Sheet   |                 |
|---|-----------------|
|  | Crane Serial:   |
|   | Operating hrs.  |
|   | Hull / IMO no.: |
|   | Customer:       |
|   | Date:           |
|   | Place:          |
| Auditor:  |                 |

1. **Records about known malfunctions, fault messages or other crane problems**

|  |
|--|
|  |
|  |
|  |

2. **Steel structure (general crane condition)**

| Item              | i.O. | n.i.O | Remarks |
|-------------------|------|-------|---------|
| Base - Column     |      |       |         |
| Crane tower       |      |       |         |
| Jib               |      |       |         |
| Doors and hatches |      |       |         |

3. **Mechanic**

3.1 **Inspection of rope pulleys on the crane tower**

| Item                                 | i.O. | n.i.O | Remarks |
|--------------------------------------|------|-------|---------|
| Corrosion / condition of the pulleys |      |       |         |
| Bearing clearance                    |      |       |         |
| Groove wear                          |      |       |         |
| Greasing and free turning            |      |       |         |
| Pulleys are turning noiseless        |      |       |         |

## Benefits

- Permanent overview about the condition of the crane.
- Follow up included detailed report and spare part recommendation.
- Better budget planning since the repairs andt necessary.
- Reduced down times and costs due to pro active maintenance.



# Customized Spare Part Packages

Tailored spare part box set including

|                                  |  |
|----------------------------------|--|
| Trouble shooting tools and parts | Pressure gauges 4bar,60bar,400bar, multimeter, cable shoes, shrinking tube |
| Critical electronically items    | Potentiometer, pressure sensor, current converter                          |
| Critical hydraulic parts         | Pump solenoids, proportional valve, brake valve etc.                       |
| Wear and tear parts              | Brake lamellas, cylindrical bearing, O-rings etc.                          |
| Maintenance parts                | Brake filters , control oil filter, Rope bushes etc.                       |



Troubleshooting Tools

Critical Electronic Parts

Critical Hydraulic Parts

Wear and Tear Parts

Maintenance Parts







## Benefits

- All crane parts are well sorted, protected and stored in one place.
- No further mix up with parts of e.g. emergency generator, main engine, engine control room.
- Always up to date; which spare parts are in stock without searching through the entire ship store.



Troubleshooting Tools



Critical Electronic Parts



Critical Hydraulic Parts



Wear and Tear Parts



Maintenance Parts

# Emergency box - hydraulic cranes

Easy access to critical spare parts ensures crane operation



## General

To ensure the performance of your ship cranes, it is vital to have quick and easy access to critical spare parts. This way expensive downtime can be avoided.

Our emergency box contains the most critical spare parts that will keep your crane running. The included parts are selected by our service department, based on years of experience.

A paper binder with hydraulic and electric circuit diagrams is included in the emergency box, to enable quick troubleshooting - together with an inventory list with all included spares, to facilitate easy refill of the box.

## Advantages

- Quick access to critical spare parts
- Increases the availability of the cranes
- Advantageous price, compared to buying single items
- Suitable for all hydraulic cranes with control system CC2000 or CC3000
- Easy to store on board
- Easy to refill after use

### Included spare parts

The content in each emergency box is individually adapted to suit the cranes on board your vessel.

|   |      |
|---|------|
| • Controller; hoisting                    | x 1  |
| • Controller; slewing/luffing             | x 1  |
| • Electronic MC-card                      | x 1  |
| • Electronic CC-card                      | x 1  |
| • Motor switch; Q5                        | x 1  |
| • Contact set; for K1                     | x 1  |
| • Contact set; for K2, K3                 | x 1  |
| • Coil; for K1, K2, K3                    | x 1  |
| • Contactor; K5, K34                      | x 1  |
| • Contactor; K32, K33                     | x 1  |
| • Auxiliary contact block, NO             | x 2  |
| • Auxiliary contact block, NC             | x 2  |
| • Time delayer; K9                        | x 1  |
| • Time relay; K70                         | x 1  |
| • Time relay; K71                         | x 1  |
| • Transformer; T3                         | x 1  |
| • Micro switch; for limit box             | x 1  |
| • Fuse; F4, F6                            | x 10 |
| • Slack wire switch, hoisting             | x 1  |
| • Slack wire switch, luffing              | x 1  |
| • Power supply; U1                        | x 1  |
| • Pressure transmitter                    | x 1  |
| • Pressure switch; 1311                   | x 1  |
| • Pressure switch; 1381 and 2481          | x 1  |
| • Filter cartridge                        | x 1  |
| • Roller bearing for wire sheave (crane)  | x 2  |
|   | x 4  |
| • Circlip for wire sheave bearing (crane) | x 2  |
|   | x 4  |
| • Roller bearing for wire sheave (block)  |      |
| • Circlip for wire sheave bearing (block) |      |

### Aluminum box

The spare parts are stored in a strong aluminum box that can be locked with padlocks. The inside of the box is lined with soft protection material to prevent the parts from any damages.



Size: 900 x 400 x 500 mm.  
Weight: 75 kg (approx.)



### Ordering emergency box

Please state Mfg No. for the cranes when ordering.

| Crane | Control    | Part No |
|-------|------------|---------|
| GL    | CC2000     | 1192536 |
| GL    | CC3000     | 1194649 |
| GL    | CC3000 MLC | 1239959 |
| GLB   | CC3000     | 1239978 |
| GLH   | CC2000     | 1239985 |

# Protection cage

Provides a greater zone of protection and safeguards your crane housing from damage

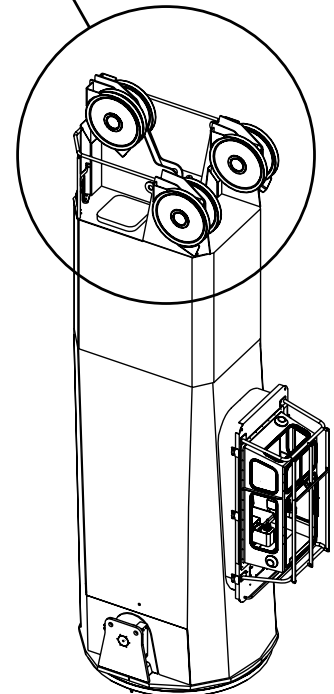
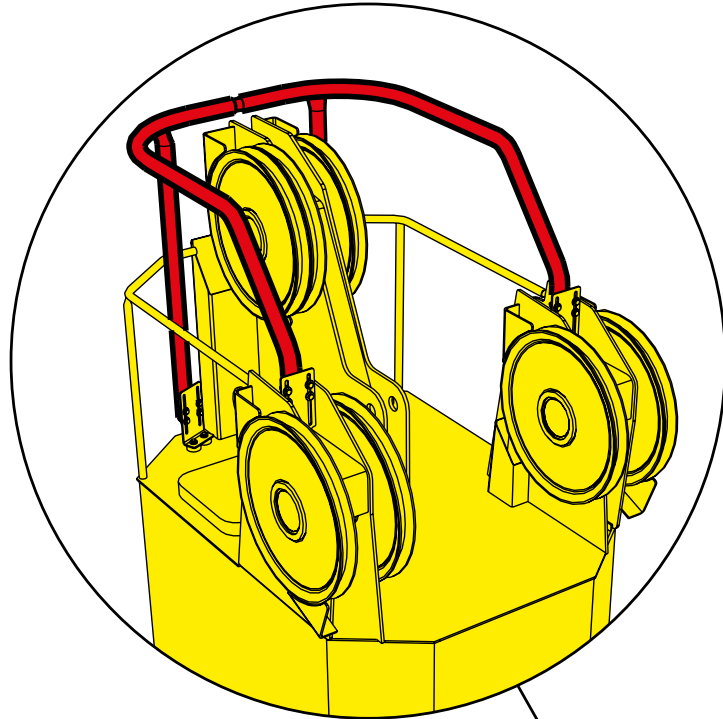
A MacGregor steel-frame protection cage ensures that sensitive components at the top of a shipboard crane housing are protected from accidental damage caused, for example, by direct impact from port gantry cranes.

The protection cage provides a greater zone of protection and increases the probability that a gantry crane driver will detect a potential problem before causing any damage to vital machinery on top of the crane housing.

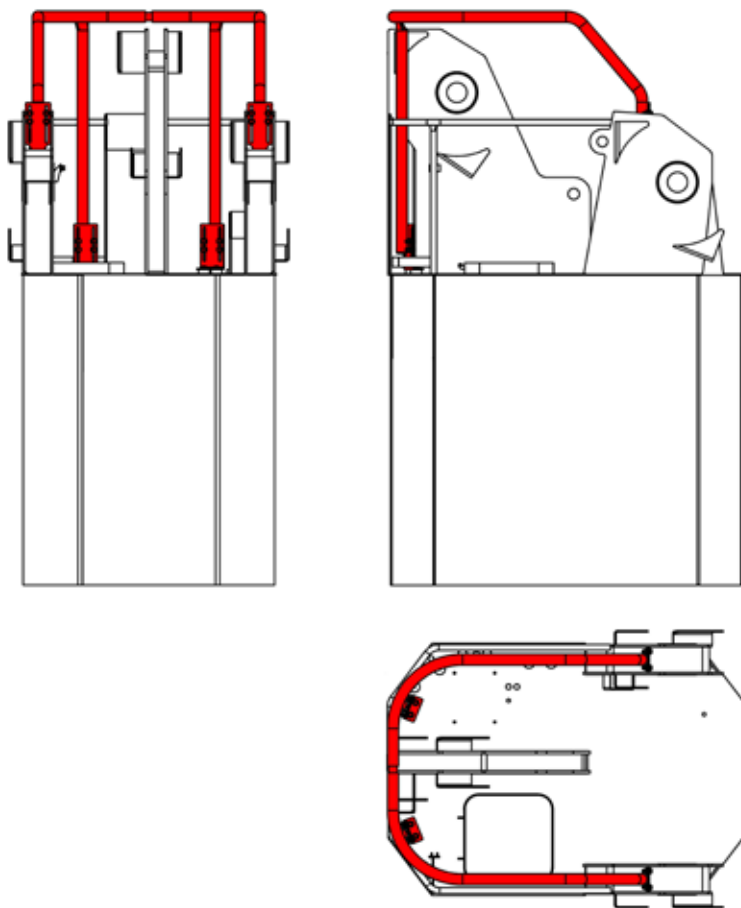
Damage to wire-rope sheaves and derailment protectors is difficult to detect, and even minor impacts can lead to significant accidents and expensive repair costs. Any damage to the protection cage can easily be detected.

## Benefits

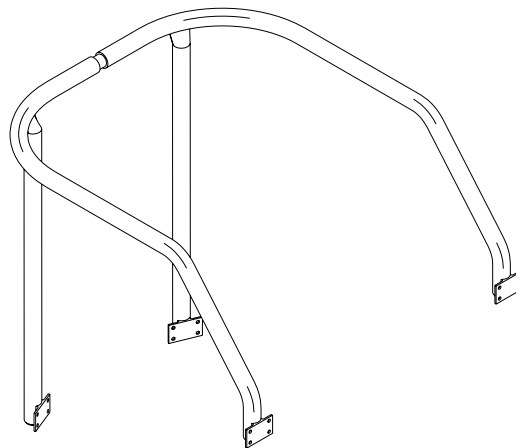
- Prevents accidents
- Reduces damage
- Saves repair costs
- Easy to assemble, modular design
- Lightweight
- Easy to replace if damaged
- Fits GL and GLB crane types
- Reduced risk/cost for shipowner



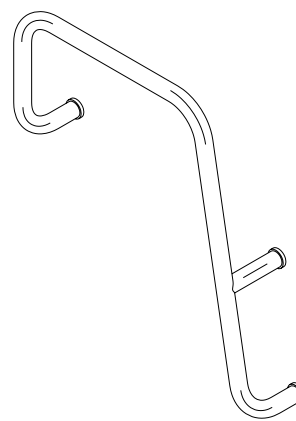
## Principle, Design A



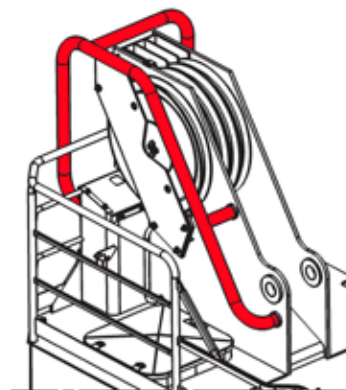
## Design A



## Design B



## Design C



### Ordering information

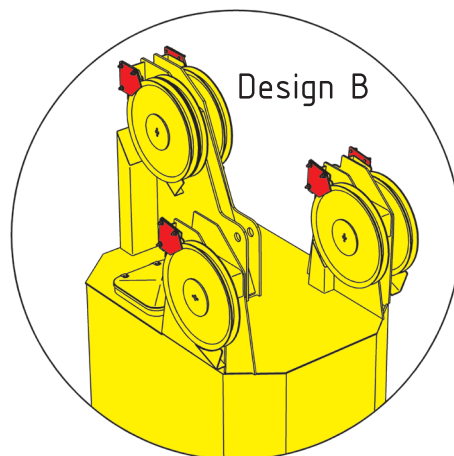
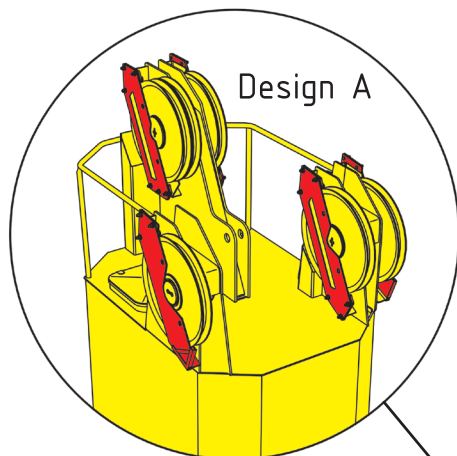
- 189 2536-801 Protection cage, Design A (weight 155kg)
- 289 0570-801 Protection cage, Design B (weight 55kg)
- 289 5803-801 Protection cage GLB, design C

### Installation requirements

- Personnel required: an engineer
- Installation time: approximately 4 to 6 hours/crane
- Tools: standard hand tools and welding equipment for brackets

# Wire sheave guards

Protect wire rope and prevent accidents from happening



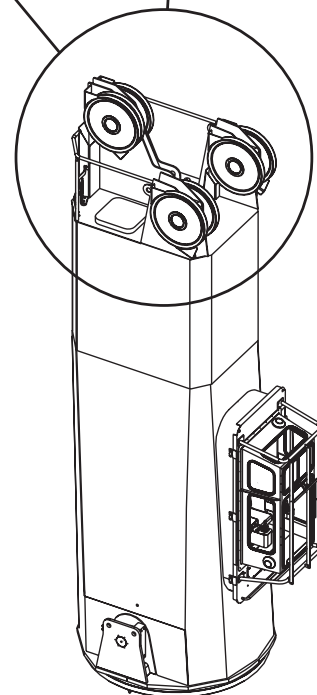
MacGregor wire sheave guards protect wire-rope sheaves from damage and minimize the risk of them breaking away from the crane.

Wire sheaves, located at the top of a shipboard crane housing, contain bearings designed for high-load operations. If a bearing breaks down in the sheave or is damaged by, for example, a gantry crane, there is a risk that the entire sheave will be pushed off the shaft. If the wire sheaves or the wire guides at the top of the crane are damaged, they can potentially fall, leading to serious injury and/or loss of life.

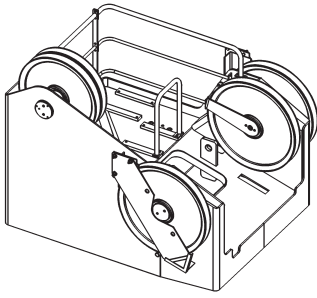
The sheave guards are available in two interchangeable designs; A and B. As standard, all new cranes are delivered with design A, therefore this would be the recommendation for any upgrade or modernization.

## Benefits

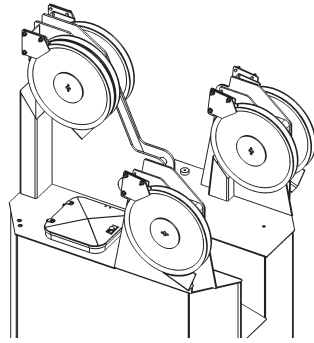
- Increases safety
- Prevents accidents
- Reduces damage
- Easy to install
- Reduces risk/cost for shipowner
- Improves wire derailment protection



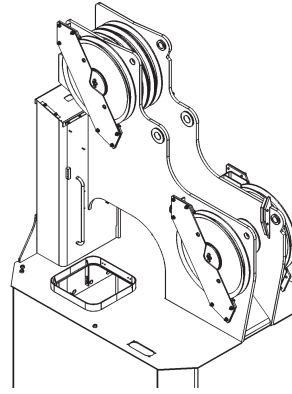
Crane top, Type 1



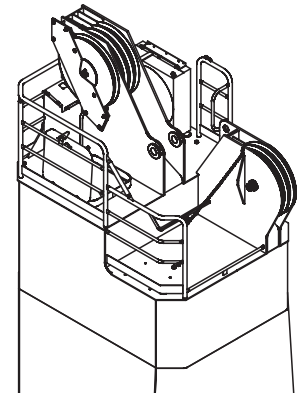
Crane top, Type 2



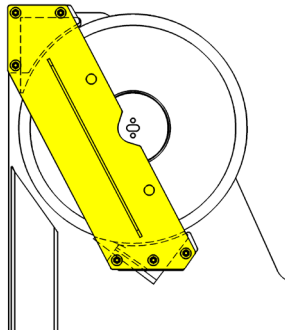
Crane top, Type 3



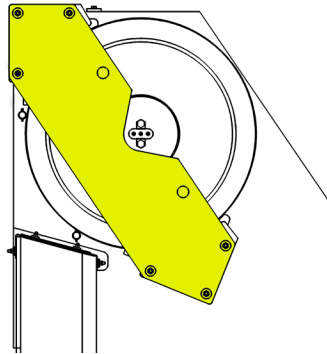
Crane top, Type 4



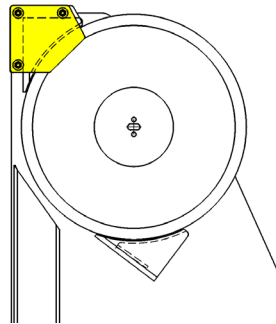
Design A



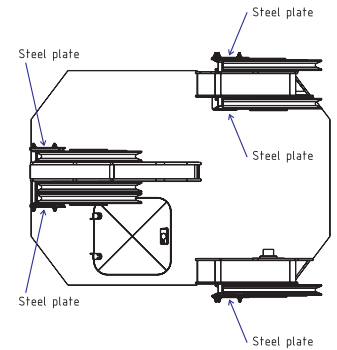
Design A, for GLB cranes



Design B



Principle design



**Ordering information**

|                        |              |               |
|------------------------|--------------|---------------|
| Crane top 1, Design A: | 189 7538-801 | Weight: 90kg  |
| Crane top 1, Design B: | 189 7537-801 | Weight: 30kg  |
| Crane top 2, Design A: | 189 4689-801 | Weight: 200kg |
| Crane top 2, Design B: | 189 5956-801 | Weight: 50kg  |
| Crane top 3, Design A: | 189 7425-801 | Weight: 130kg |
| Crane top 3, Design B: | 189 7424-801 | Weight: 35kg  |
| Crane top 4, Design A: | 390 7581-801 | Weight: 27kg  |

The part numbers above are standard sheave protection kits that contain components to modify the top of one crane housing. For some crane types, there may be components left over after installation.

**Installation requirements**

Personnel required:  
engineer

Installation time: approximately 4 to 6 hours/crane

Tools required: standard hand tools and welding equipment for brackets



# Log reinforcement kit

MacGregor has developed a log reinforcement kit for your GLB crane's jib top. It offers safety and efficiency improvements and consists of a:



## Ordering information

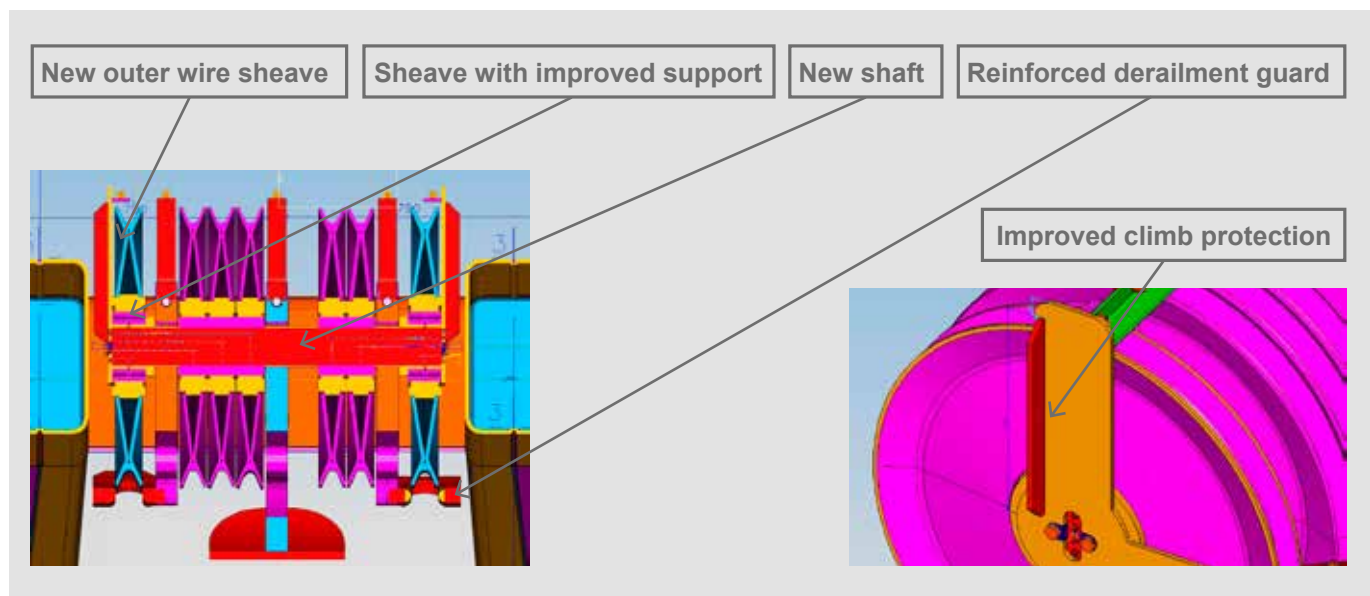
Part codes for different GLB-crane types:

- New outer wire sheave with upsized bearing
- Reinforced derailment guard
- New shaft
- Improved climb protection
- Sleeve with improved bearing support

- Rebuild kit: GLB\_ver\_3628\_ver\_1\_1264739
- Rebuild kit: GLB\_ver\_3628\_ver\_2\_1264740
- Rebuild kit: GLB\_ver\_3026\_ver\_1\_1265100
- Rebuild kit: GLB\_ver\_3026\_ver\_2\_1265104
- Rebuild kit: GLB\_ver\_3026\_ver\_3\_1275449

## Installation requirements

- Personnel required: an engineer
- It is recommended that the wire-sheave bearing is replaced during the log reinforcement kit installation





# Bearing support kit

Keeps your GLB crane bearings in position



The MacGregor bearing support kit keeps bulk handling crane bearings in a locked position and prevents wire sheaves from tilting. They are designed for the lifting blocks of GLB cranes with safe working loads (SWL) of 32 and 36 tonnes.

## Technical details

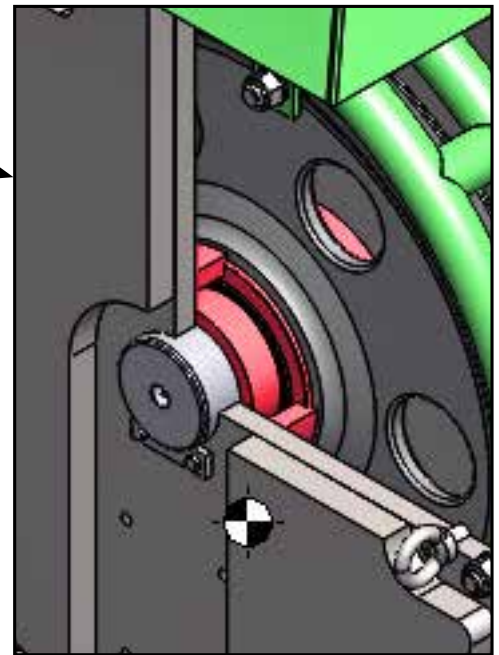
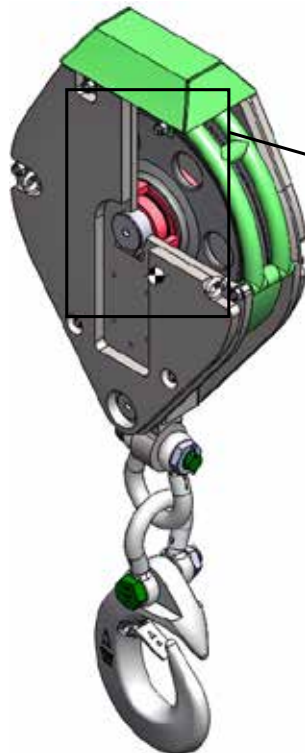
- Red: bearing support kit
- Blue: shaft
- Yellow: bearing
- Grey: lifting block body and wire sheave

## Ordering information

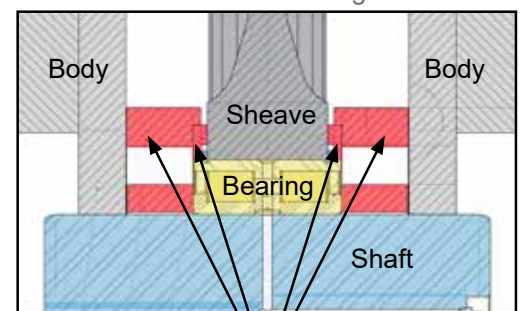
- Part No. 1275983 for GLB SWL 32 tonnes
- Part No. 1275982 for GLB SWL 36 tonnes

## Installation requirements

- Personnel required: an engineer
- It is recommended that the wire-sheave bearing is replaced during the bearing support installation



Cross section of lifting block



Bearing support kit on both sides of bearing

# Log block kit



The MacGregor log-lifting block kit has been upgraded to offer a fleet angle limiter and bearing support, improving efficiency and safety for log lifts. The fleet angle limiter prevents the crane's wires from climbing outside the lifting block's wire-sheave groove and also keeps the lifting block at an upright angle. The bearing support element keeps the bearing in a locked position and prevents the sheave from tilting.

It is designed for MacGregor GLB cranes with safe working loads (SWL) of 32 tonnes.

For further information and cost estimates, please contact the MacGregor Competence Centre for crane modernisations or any MacGregor office.

## Technical details

- Green: retrofitted fleet angle limiter
- Red: bearing support kit
- Blue: shaft
- Yellow: bearing
- Grey: lifting block body and wire sheave

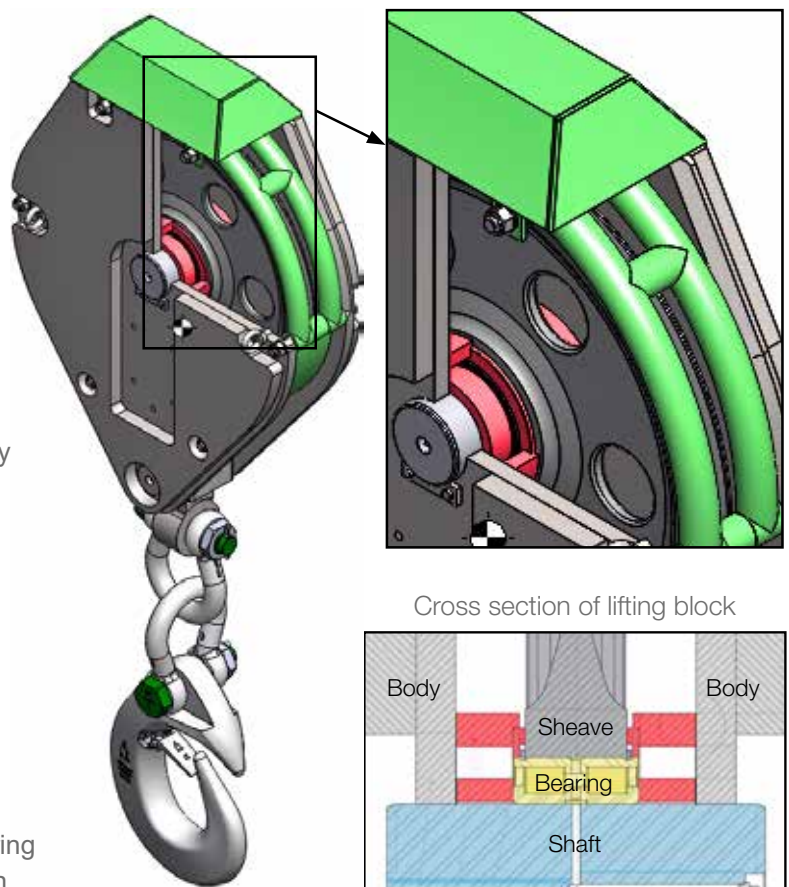
The lifting block is delivered complete with the hook, including the material and test certificates. Delivery excludes third-party classification society costs.

## Ordering information

- Part No. 1278143 for SWL 32 tonnes

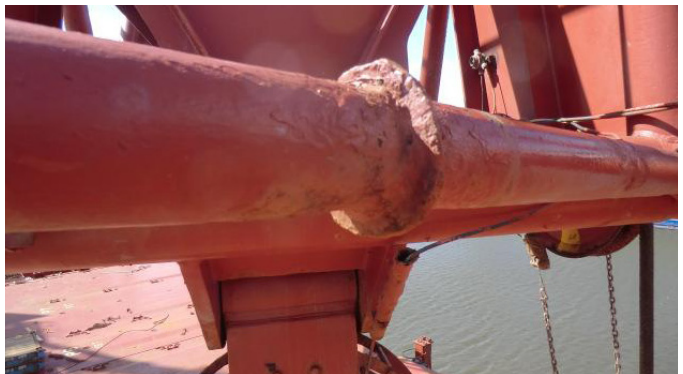
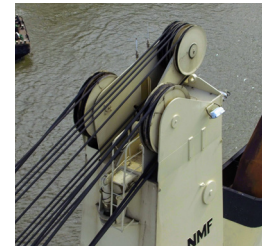
## Installation requirements

- Personnel required: an engineer
- It is recommended that the wire-sheave bearing is replaced during the log block kit installation



# UAV Inspection & Surveying

Visual inspections with high resolution camera systems mounted to Unmanned Aerial Vehicles (UAV) provided through a mobile intervention team in any unreachable and therefore confined space without installing scaffolds or using on-shore cranes.



## Benefits

- Risk of accidents is reduced to the minimum by the use of high tech drones.
- In a very short time frame, an exhaustive visual analysis of a defined area can be provided.
- Efficient ratio between costs and added value generated.
- Visual inspection of hazardous areas without any risk to human life.
- High resolution pictures and videos from the perfect perspective.

# Crane control system CC3000



The crane safety system includes a well-proven and very reliable MacGregor crane control system.

- The safety system includes a display located in the cabin, the 'Mac-Heavyvisor'. It gives the driver information about current hook load, hoisting speed and outreach, and other information from the crane control system. The display can also show list and trim in degrees (optional).
- The primary software-based safety system is connected to load cells, encoders and transmitters and also has a degree of redundancy.

- Information shown on the display for each crane can be transmitted via the slip ring device, through a cable, to a PC in the ship's office or the bridge. This makes it easy for the chief officer to have excellent control of a team lift operation, for example.
- The crane display is also used for logging crane operation.
- The CC3000 is type-approved by DNV GL, which tested critical hardware and software components.

Human Machine Interface (HMI)  
MacGregor Crane Information System



- Real-time information on active systems Load/speed/outreach
- information Logs information for analysis
- Errors/warnings/events
- Touchscreen display



MacGregor VFD cranes



## Case study:

# New crane control features enable faster, safer and closer lifts

Two new control system features deliver enhanced cargo handling capabilities for MacGregor cranes; one allows a single operator to control two separate cranes in a team lift, the other refines the anti-collision separation between adjacent cranes

MacGregor continuously hones its products, never satisfied that they cannot be improved. Two important advances to its market-leading CC3000 control system for its range of deck cranes are presented. The 'Auto Team' and 'anti-collision' functions both expand operational capabilities and can be implemented on new MacGregor cranes equipped with the latest version of CC3000. It is also possible to update older cranes equipped with this control system to incorporate these functions.

"The better our crane control systems are, the greater the productivity of the crane," says Per-Erik Nilsson, Marketing and Sales Director for MacGregor Cranes. "If we can deliver faster, safer and more accurate cargo handling capabilities, our customers will benefit from improved port turnaround times. In some cases, they can perform more complex lifts than previously possible. For example, big and bulky project cargo will be loaded and discharged much faster having these features installed.

"It has always been possible to operate twin cranes – two cranes on the same foundation – in team with one operator. But to operate two separate cranes with only one operator is a real breakthrough and significantly extends a crane's, and therefore a vessel's, capabilities."

Automatic control of separate cranes is made possible by the CC3000's 'Auto Team' function for team lifts. "With the CC3000 control system running in Auto Team mode, lifts are faster and safer than with two separate operators using manual controls. Auto Team also makes it possible for two sets of twin-cranes to be operated, which means that one operator can control four cranes," he notes. "Special 'team beams' that are sometimes used during manual team lifts are not needed in Auto Team mode."

Before a Team lift can start the cranes need to be positioned correctly. The lift lines are attached to the cargo; the lift wires of both cranes are tensioned and the

load is lifted and balanced. The position of the cranes is then calibrated. Auto Team mode can now be engaged and the lift commenced; the distance between the crane hooks and the rotation of the cargo is maintained during the Team lift operation.

Lift data is displayed on a screen in the operator's cabin; it is also possible to use an external display for supervising the operation from the ship's bridge. The display provides information about weight, outreach, lift height and lift speed for both cranes. Auto Team has a safety system for avoiding and dealing with overload situations. It provides on-screen information on how to prevent and balance-out Team overload conditions.

MacGregor's second CC3000 advance is its anti-collision feature, which is used to prevent collisions between adjacent cranes. Based on an earlier anticollision system for dynamic obstacles, anti-collision allows cranes to work closer together, while maintaining a safe separation. The previous system used a 'stop wall' between the cranes, while anti-collision employs a 'safety box' around the crane and its jib," he says. "anti-collision makes sure that the boxes of adjacent cranes do not overlap with each other.

"Anti-collision is very similar to the normal anti-collision system in terms of encoders and alarms, but instead of having a defined stop-zone, it calculates a safety box around each crane jib and crane housing. This expands the cranes' operating parameters, and ultimately improves cargo handling rates. In addition to the calculated no-go areas, there are also precautionary approach zones where luffing and/or slewing speed is automatically reduced. Anti-collision can also be used to avoid static obstacles," he adds.

*Source: MacGregor News spring 2013.*

MacGregor's latest CC3000 microcomputer-based crane control system delivers a number of advantages including improved operational efficiency, easy maintenance, enhanced monitoring capabilities and comprehensive diagnostic functions. The CC3000 enables the capture of valuable analytical data such as the number of lifts, cycle times, overloads and brake cycles.

The CC3000 replaces the CC2000 and older B-box control systems.

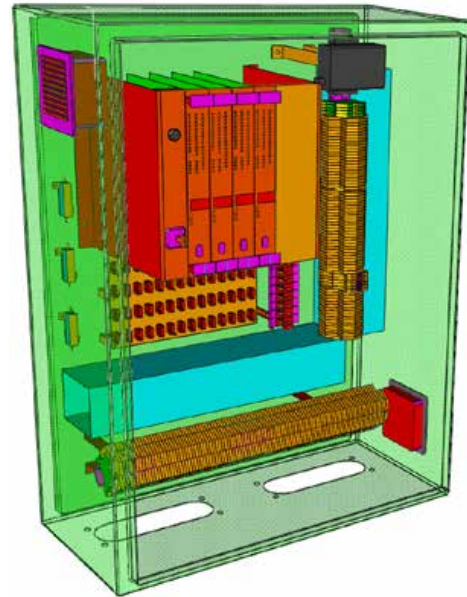
**Benefits**

- Crane parameters such as pump types, number of pumps, ramp time and load can be easily configured without replacing any hardware
- Four totally interchangeable microprocessor cards replace the older analogue control system, which required numerous unique electronic cards
- Clear, concise documentation details and explains error messages to aid trouble-shooting
- Service personnel can easily check for open/short-circuited outputs with the built-in test system
- A user-friendly event log displays statistics and error messages, which can be studied on site or sent to experts for evaluation
- Significantly improved cargo handling control when in twin crane operating mode.

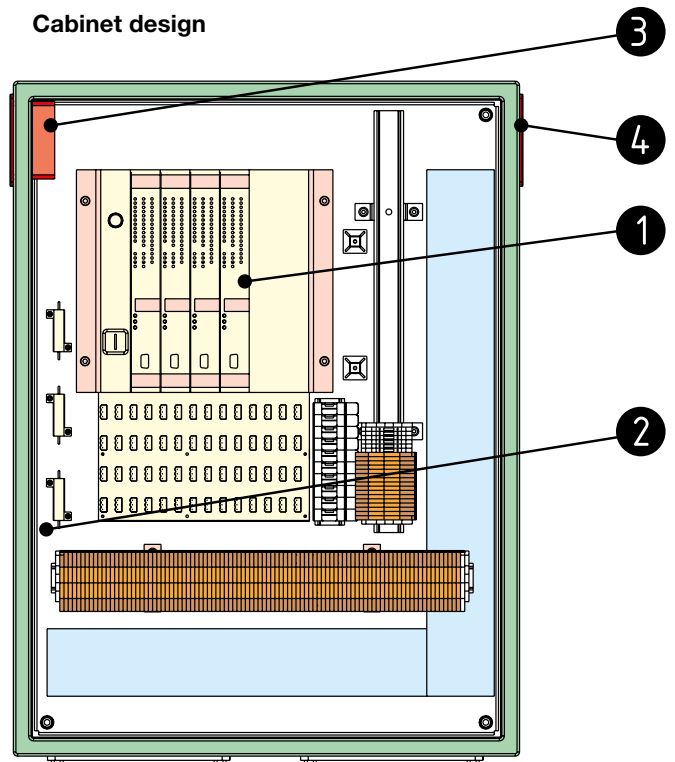
**Cabinet design for controller cards**



- Standardised MC-cards and CC-cards
- Easy configuration
- Reduced range of spares
- Service-friendly
- Possibility to expand capabilities with:
  - cabin monitoring
  - load monitoring
  - remote-control system
  - limit switches
  - maximum load curve (MLC)



**Cabinet design**



1. Controller cards: four
2. Heater element: maintains a dry environment for the cards when the crane is not in operation
3. Fan with inlet air filter: maintains a constant temperature inside the cabinet during operation
4. Outlet air filter: prevents dirty air from entering the cabinet when the fan is not running



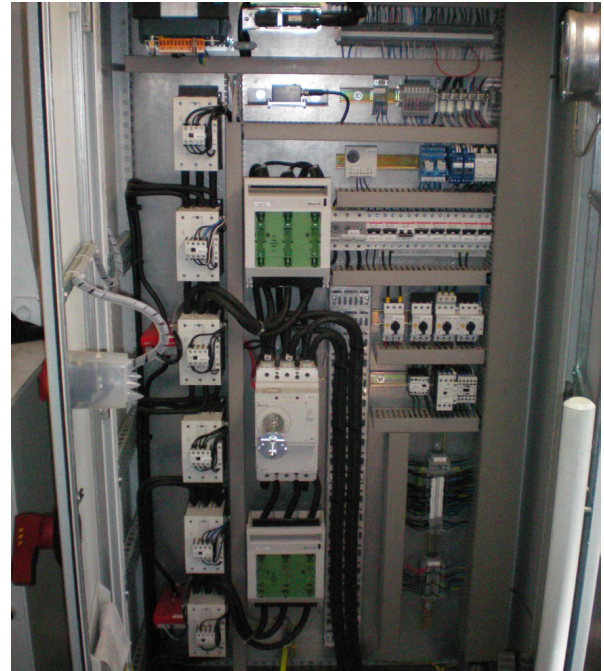
# System Upgrade Legacy Systems

The control system is a critical part of the crane. Without this, the crane would not function in a safe and efficient manner.

Upgrading the control system ensure that the system will perform according the current operational requirements, as well as including diagnostic capabilities and remote monitoring to reduce costs related to troubleshooting and support.

Main deliverables (depending on crane type)

- Joysticks with crane operator consoles, buttons, lamps
- PLC with the latest software technology
- Touch screen for operator readouts
- Touch screen for Safe Load Indicator, warnings, alarms and selections
- Prepared for Remote Access connection



## Benefits

- Most of the time the costs to support the old system are equal to the new replacement system.
- Granted availability of spare parts with short delivery times and market oriented prices.
- Sustainable value enhancement and increased uptime control.
- Nowadays, spare parts for old control systems are difficult to purchase and it is impossible to get parts on short notice.
- With a retro fit of the control system, most parts can be delivered on board on short notice.

# Remote-control crane system



Perfect control when visibility is limited



To complement deck cranes equipped with CC2000 or CC3000 control systems, MacGregor offers a remote-control system that gives operators full control outside the crane cabin.

Through radio transmission or a cabled connection, the remote-control system increases crane handling precision by providing much greater visibility for cargo loads that would normally be hidden from view, out of the operator's range of sight.

## Benefits

- Increased visibility for cargo loads that would normally be hidden from view
- Increased cargo handling precision in all weather conditions
- Increased operating flexibility
- Useful when securing equipment prior to sailing
- Easier crane servicing



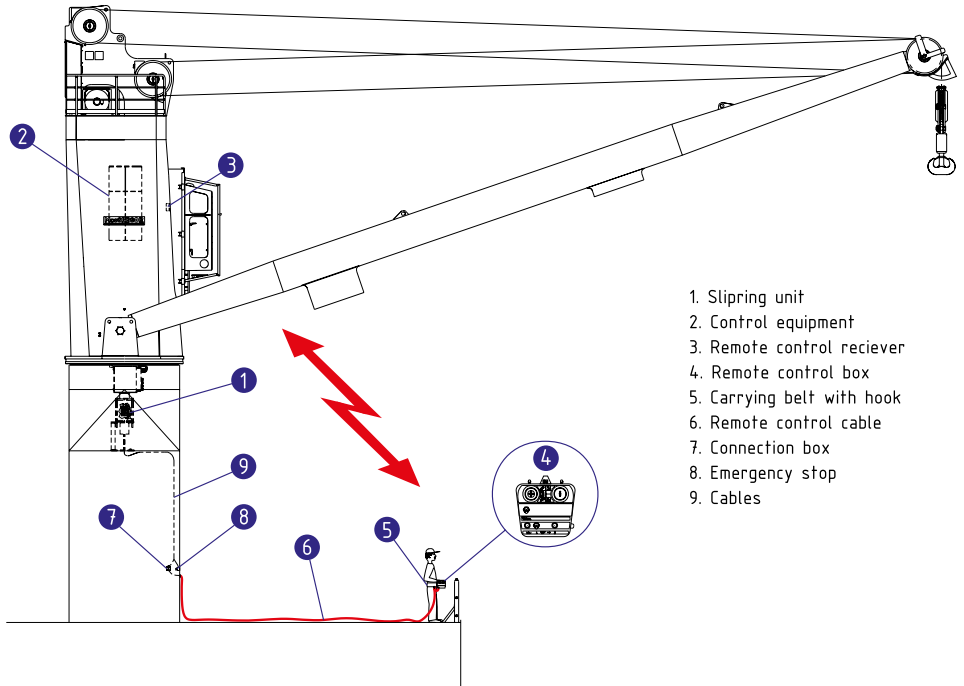


**System description**

The remote-control system requires the crane to be equipped with a CC2000 or CC3000 control system. It consists of one base unit located inside the crane and a portable remote-control unit that can be carried by the operator. The units are connected by radio or cable and do not require any changes to the slipping unit. An emergency stop button is mounted on the outside of the crane pedestal.

**Technical data** Battery

capacity: Weight 10 hours  
 (remote box): 2.2kg  
 Cable length 40m  
 (standard): 418-473MHz  
 Frequency range:



- 1. Slipping unit
- 2. Control equipment
- 3. Remote control receiver
- 4. Remote control box
- 5. Carrying belt with hook
- 6. Remote control cable
- 7. Connection box
- 8. Emergency stop
- 9. Cables

**Ordering information**

Contact MacGregor for advice on ordering the correct parts.

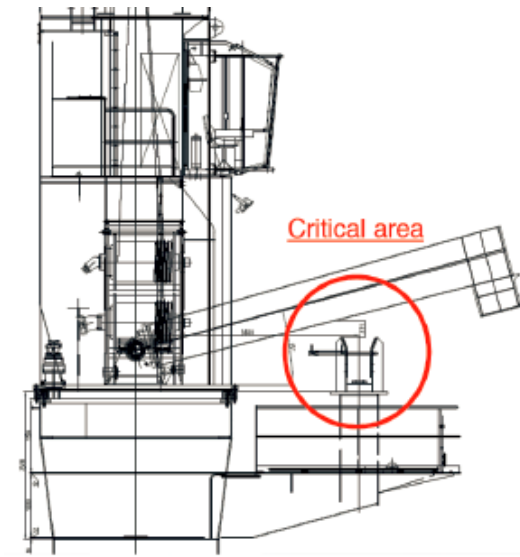
**Installation requirements**

Personnel required: an engineer  
 Installation time: approximately 30 to 40 hours  
 Tools required: standard hand tools and a laptop



# Jib Collision Prevention

Fixated safety luffing limit switch (proximity switches) to prevent the allowed working range from being exceeded even if the working limit switch is not properly set. Most of the jib damages occur due to incorrectly adjusted limit switches. The independent working proximity switch is activated and stops the jib once the critical area is reached.



## Benefits

- Active risk reduction against misuse and time-consuming repairs / off hire.
- A damage to the jib causes high expenses like off-hire costs, locating a suitable repair location and the repair costs themselves.
- Usually, the time frame of the repair plan is 2-3 weeks. At this time the crane is blocked for any cargo operation.
- This is a valuable device for preventing jib damages and jib collisions.



# Anti-Collision Protection (Fixed Deck Items)

The Anti-Collision System is an additional function for protecting against collisions between the crane jib and fixated obstacles (e.g. superstructure, deckhouse, etc.) on board. The fixated obstacles on board are stored in the coordinating system in the crane control system. If the crane jib is located in the restricted area, the crane movements for slewing and topping are automatically stopped. By luffing up the jib above the stored coordinate, the restricted area can be left.



## Benefits

- Protection of crane and ship steel structures. Risk control.
- The Anti-collision protection is an “Upgrade” of the jib collision prevention.
- Risk control.

# Anti-Collision Protection (Anti-Jib Conflict)

The Anti-Collision System is an additional function that stops the crane jibs from colliding with each other. Sometimes the situation requires that one cargo hold is discharged with two cranes. The active collision protection calculates the jib positions in real time and stops the jib movement before a collision takes place.



## Benefits

- Protection of crane and ship steel structures. Risk control.
- The Anti-collision protection is an “Upgrade” of the jib collision prevention.
- Risk control.



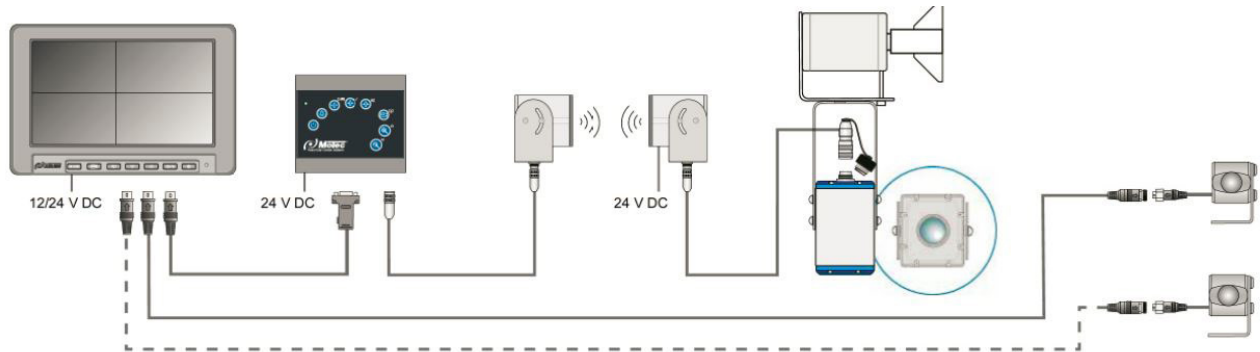
# Crane Camera System

Camera which enables the operator to handle cargo more precisely and carefully. Also available as a WIFI-Version. The crane camera features a zoom function.



Driver Cabin

Jib Head / Hook Block



## Benefits

- General cargo and sensitive products can be placed and handled more carefully.
- Cargo can be placed more precisely and efficiently.
- Direct crane control without having an assistant between the operator and cargo.
- The camera system is also available with a data record modus. In the case of an accident, this function can help in clarifying unexplained circumstances quickly.
- On request included remote access via Internet.

# Active Pendulation Control

Assisted cargo handling not only improves discharge times and the safety of crew and cargo, but it can also have major benefits for offshore and trans-loading operations.



MacGregor's APC system uses motion data to make cargo landing and lifting operations as smooth and safe as possible

MacGregor can offer a unique cargo handling aid, called active pendulation control (APC), which cancels out swing motions when cranes are transferring cargo between moving or stationary objects.

As cargo positioning may easily account for as much as 40 percent of the total crane cycle time, anything that helps to reduce this can therefore yield a large gain in productivity. MacGregor believes that cargo handling aids could be used to benefit numerous operations, including the installation of offshore windmills and other offshore heavy load handling operations.

MacGregor recognises that challenging load handling situations exist in the open sea, in high sea states, when both the discharging and the receiving vessels are moving. Sometimes having a skilled crane operator is not enough to cope with them; these conditions can endanger the safety of employees and cargo.

Also, as ships increase in size, larger vessels may frequently be unable to get into convenient ports. Therefore, transloading at sea will become increasingly necessary and may not even be possible without anti-pendulation assistance for some bulkers or container ships.

MacGregor's APC system uses a set of motion sensors to detect and prevent pendulation induced by sea motion and wind. It also has the ability to compensate for ship motions in other vessels during ship-to-ship cargo transfer. This is achieved by placing sensors on the target vessel. The system then uses motion data from both vessels to make cargo landing and lifting operations as smooth and safe as possible.

APC is especially useful on bulkers for less experienced drivers who could benefit from greater precision and faster positioning of the grab above the hoppers. Minimized pendulation of the grab can also increase overall operational speed and reduce stress in bearings, wires and sheaves. At an unprotected harbor, where waves can cause significant vessel movement, APC also helps the crane operator reduce pendulation.

A gyroscope installed in the hook block communicates wireless with the crane control system. The wireless communication reduces the need for cables that are exposed to wear and tear and that can cause downtime for repairs. All the maintenance required is a battery change between shifts.

# Active Rotation Control (ARC)



**Pin-point positioning saves time and money**

MacGregor has developed an Active Rotation Control (ARC) system for its range of MacGregor cranes that stabilises

Positioning cargo in port is a difficult and time-consuming job for the crane driver. Limited vision, heavy rain and wind make it even more complicated. A load can start rotating in the air and stopping this motion requires a highly-skilled crane driver. Even for an experienced driver, this operation takes a lot of time and effort. The ARC system overcomes these issues. It has an automatic swivel control that maintains the cargo's position during the entire

operation. When activated, cargo positioning times can be shortened by up to 30 percent. Shorter positioning times and a smooth drive significantly lower energy consumption and increase efficiency. These ensure that the ARC solution pays for itself in a short period of time.

it into the correct position. This work can be dangerous and there is a risk that the cargo could bump into surrounding structures, potentially damaging them and the cargo. With the ARC solution, these hazardous and time-consuming tasks can be eliminated as the positioning work is automatic.

**Eliminates hazardous tasks** Port workers often have to attach wires to the load and manually pull



### Easy to use

It only takes a few minutes to learn how to use the system. There is a separate control box with two controls: one to set the start position and one to set the end position. With joystick control, the cargo's position can be accurately fine-tuned.

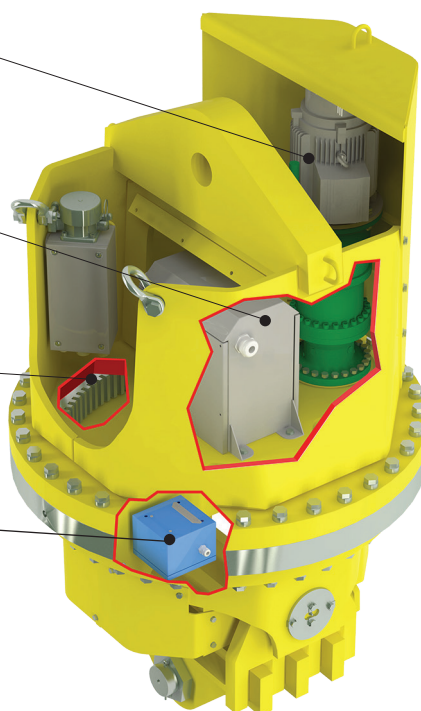
### Modern technology

Electric motor (with brake)  
Frequency-operated for a smooth drive

Slipring  
A slipring transmits power between the fixed and moving parts

Slewing bearing  
The slewing bearing is centre-line located and electrically operated

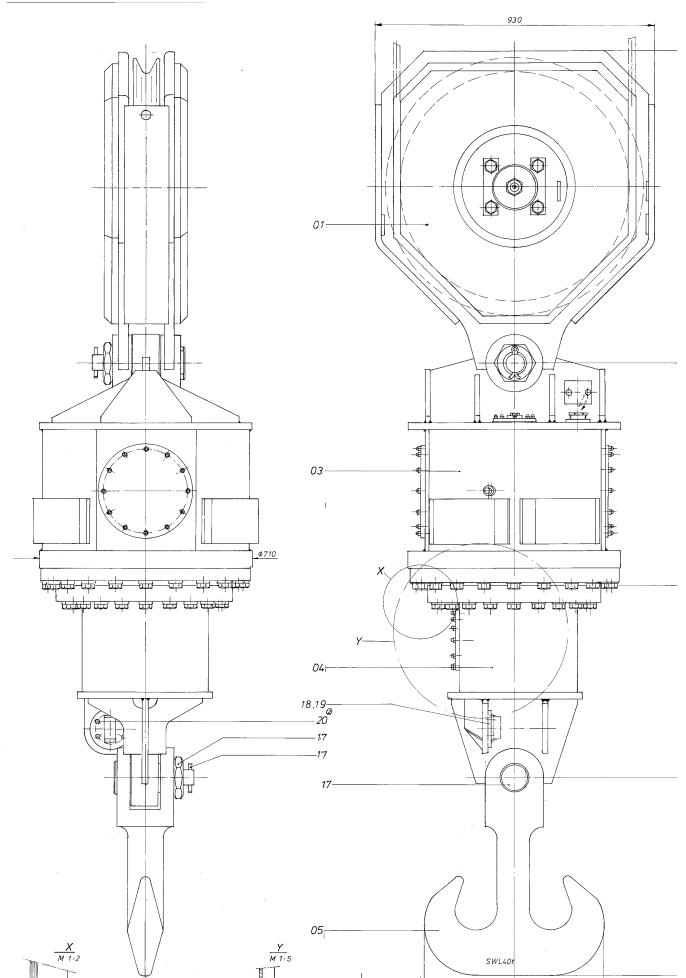
Gyro  
Gyroscopic stabilization cancels out torsional pendulations and keeps the cargo steady





# Load Turning Device

Electrical turnable power swivel which rotates the cargo until the correct position has been reached.



## Benefits

- General cargo and sensitive products can be placed and handled more carefully.
- Cargo can be placed more precisely and efficiently.
- Direct crane control without having an assistant between the operator and cargo.



# Crane Grab

We offer the rapid, global supply of non-MacGregor grab

## **Make MacGregor service Grab your first choice**

MacGregor can satisfy customers' various special requirements for bulk cargo loading & unloading, and can optimize and customize products according to customers' willingness.

The performance expectations and requirements of grab have substantially increased in line with the need for safer and more effective equipment that offers lifetime profitability.

## **Long service life**

Original MacGregor equipment ensures a long, efficient service life for your equipment, driving down maintenance costs and improving safety and profitability.

## **Continuous development**

We are committed to continuous customer-driven developments, proven in the field and designed to deliver the best possible performance. Our expert knowledge of cargo handling is translated into optimized solutions that protect your cargo.



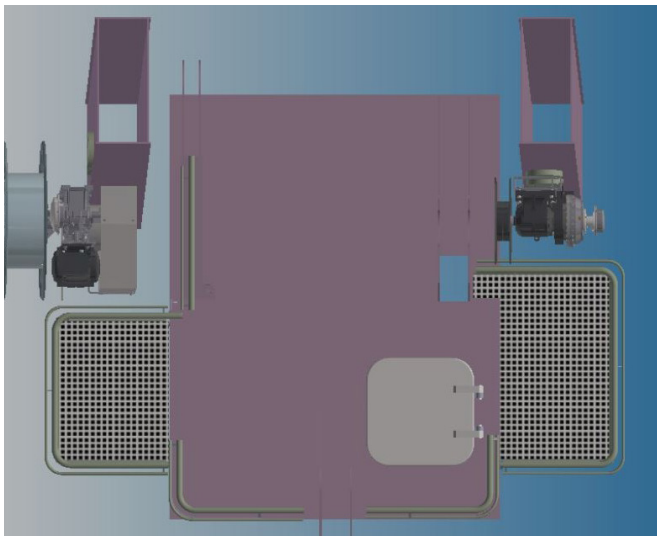
## **MacGregor is able to supply grab from the following**

- 4 Ropes Dual Scoop Mechanical Grab – K50 Crane
- 4 Ropes Dual Scoop Mechanical Grab – K30 Crane
- Electro Hydraulic Clamshell Grab – 25T / 30T / 35T
- Radio Remote Control Grab – 16T / 20T / 30T / 50T and etc



# Maintenance Platform for Grab Equipment

A platform allowing crew to easily reach the grab cable drum and stabilization winch for important maintenance purposes.



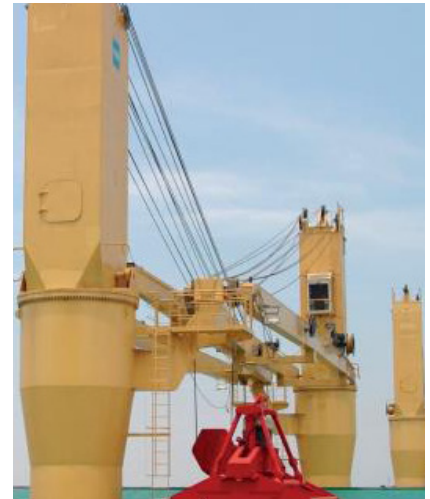
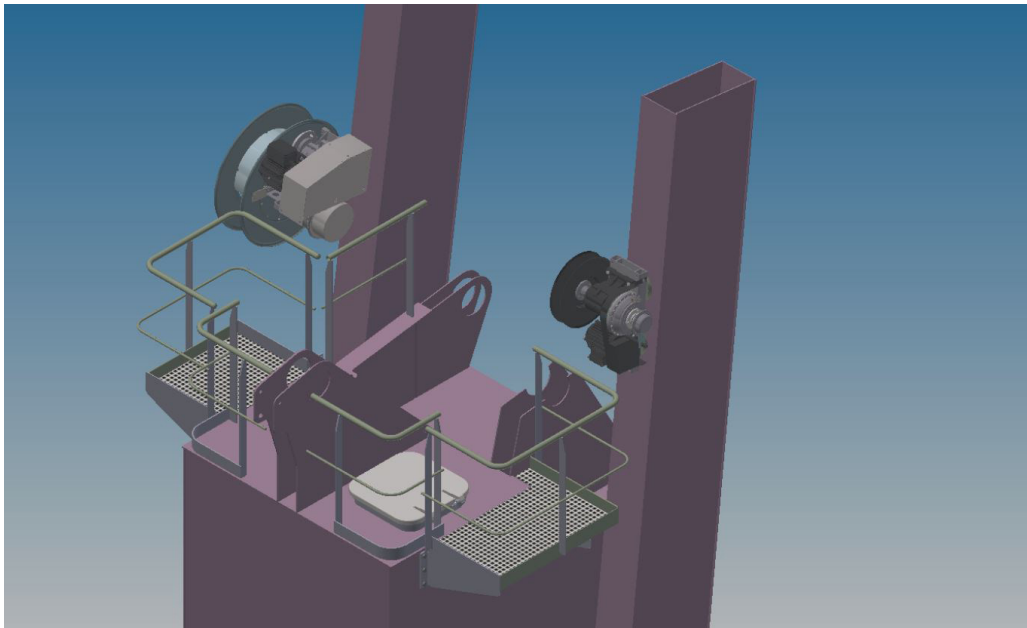
## Benefit

- Easy and safe access to work on critical items frequently, time and cost savings without shore assistance.



# Power Supply and Stabilizing Winch

Exchanging cargo or changing routes requires the handling of bulk products or the installation of a load turning device. In order to fulfill the charter requirements each crane can be equipped with a power supply drum as well as with a load stabilizing winch.



## Benefits

- More flexibility in the area of cargo handling and charter inquiries.
- Sustainable value enhancement due to the improved usability.



# Offline pump & filter



Contaminated oil is one of the main causes of operating faults in hydraulic systems and can significantly impact the service life of equipment.

MacGregor's offline filtration unit filters the hydraulic oil in a separate circuit using a high-capacity filter element. The unit extends the usable life of oil by relieving the oil filters in the main flow and reducing water and solids contamination.

The unit is installed close to the main hydraulic tank and operates independently of the main hydraulic system to provide 24-hour continuous filtration.

The filtration unit is suitable for crane types with oil tank volumes up to 1,000 liters and includes: an electric motor, an electric switch with overload protection, a 10m electric cable, a hydraulic pump and a filter holder; all of which are pre-mounted on a steel plate for easy installation onto the crane. All necessary hydraulic hoses and couplings are included.

The electric cable connects to a separate feed with its own power supply to ensure continuous operation even

when the crane is not running. If the oil is too cold or the filter element is dirty, a manometer will indicate a pressure drop inside the filter cartridge. In response, a pressure relief valve will divert the oil. The pressure gauge displays the pressure level before and after a cartridge change to facilitate easy measuring of the pressure and sampling of oil.

To allow the filter cartridge to be changed, a clearance of 400mm should be reserved during installation.

## Benefits

- Eliminates/dramatically reduces both solid and water contaminants
- Increased oil purity improves crane reliability and lifetime of hydraulic components
- Fewer oil changes
- Separate filter system with constant pressure and low flow provides extremely efficient filtration
- An optional thermostat can be fitted to the system to facilitate an automatic start/stop function
- The unit is delivered complete with all the necessary mechanical, hydraulic and electrical parts, together with installation instructions

### Filter unit

|                          |   |
|--------------------------|---|
| Pump displacement:       | 1.0cc/rev                                 |
| Nominal flow:            | 1.2l/min (at 50Hz)<br>1.4 l/min (at 60Hz) |
| Maximum oil temperature: | +80°C                                     |
| Viscosity range:         | 20 to 180cSt                              |
| Electric motor:          | 230VAC 50/60Hz                            |
| Power consumption:       | 0.18kW                                    |
| Weight:                  | 19kg                                      |

### A standard cellulose filter cartridge is included in the delivery:

|                                 |                      |
|---------------------------------|----------------------|
| Maximum viscosity:              | 180cSt               |
| Minimum temperature ISO-VG 68:  | approximately +20°C  |
| Minimum temperature ISO-VG 100: | approximately +25°C  |
| Filter efficiency:              | $\beta_{0.5} > 200$  |
| Water collection capacity:      | 85 - 150ml/cartridge |
| Minimum replacement interval:   | six months           |
| Filter cartridge:               | cellulose material   |

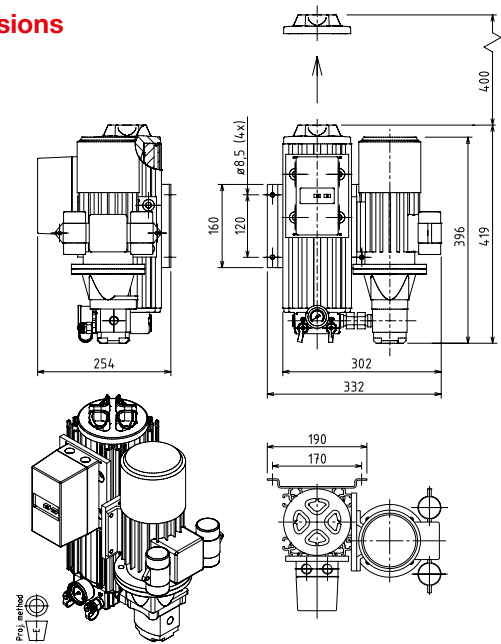
### For cold climates, a special filter cartridge can be ordered separately:

|                                 |                     |
|---------------------------------|---------------------|
| Maximum viscosity:              | 800cSt              |
| Minimum temperature ISO-VG 68:  | approximately +5°C  |
| Minimum temperature ISO-VG 100: | approximately +10°C |
| Filter efficiency:              | $\beta_{1.0} > 200$ |
| Water collection capacity:      | no                  |
| Minimum replacement interval:   | no                  |

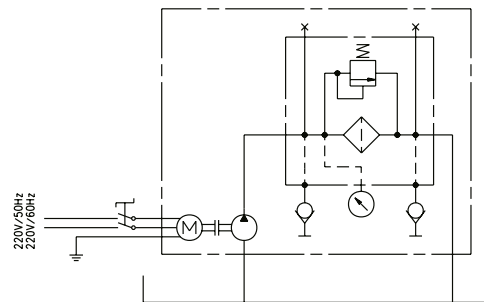
### Ordering information

|               |                                       |
|---------------|---------------------------------------|
| 189 6208-801  | Installation, crane type G            |
| 189 6207-801  | Installation, crane type GL           |
| 1236440       | Installation, crane type GLB          |
| 875 29001-010 | Filter cartridge, standard/cellulose  |
| 875 29001-011 | Filter cartridge, optional/fibreglass |

### Dimensions



### Hydraulic circuit



### Installation requirements

|                     |  |
|---------------------|--|
| Personnel required: | an engineer  |
| Installation time:  | approximately 2 to 4 hours/crane                       |
| Tools required:     | standard hand tools and welding equipment for brackets |

# Crane House Ventilation

Considerably lower temperature inside the crane house

## General

Ventilation fan fitted through crane house wall. Adequate ventilation is an important prerequisite for reliable crane machinery and provides a comfortable working environment for the crane operator.

To increase crane housing ventilation, which also means better cooling capacity in older cranes' hydraulic systems, it is recommended that a new modernized ventilation unit is installed, as used in our cranes today.



## Benefits

- Crane house ventilation will improve working environment for service personnel and operators and increase lifetime of important and expensive.
- A thermostat is included in the starting equipment and the electric motor with fan will thus start and stop automatically according to settings in thermostat.
- It is our standard ventilator in our current production and available from stock.
- Intended for crane types: G, H, L and GL. In principle suitable on all cranes which do not have any crane house ventilation.
- A new crane house ventilation unit is delivered as a complete set with necessary assembly, mechanical and electrical parts, and installation instructions. The material set is delivered as a complete package with all necessary parts included.

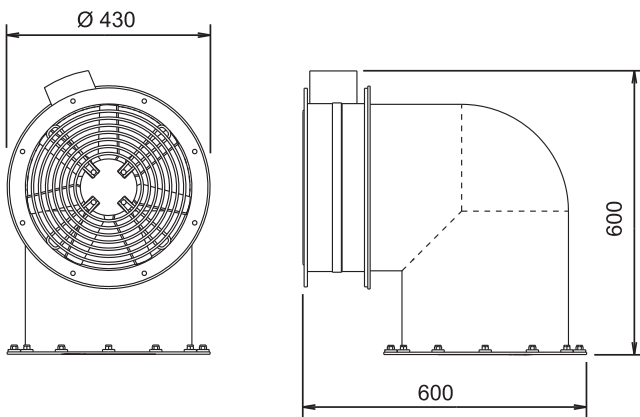
## System description

The ventilator to be placed on crane house top or crane wall somewhere. This to be judged case by case depending on crane type/design. In some cranes the ventilation can be placed where the oil cooler is installed. In such cranes the oil cooler will be replaced with an improved one and installed outside

## Technical data

|                 |                               |
|-----------------|-------------------------------|
| Air flow:       | 0.65 m <sup>3</sup> /s        |
| Noise level:    | 72 dB(A)                      |
| Electric motor: | 400V 50/60Hz (4-pole) 0.21 kW |
| Power:          |                               |
| Weight:         | 22 kg                         |

## Dimensions



## Ordering

|              |                                     |
|--------------|-------------------------------------|
| 288 1188-XXX | Ventilation fan, crane type G.      |
| 288 2269-XXX | Ventilation fan, crane type H.      |
| 289 0549-XXX | Ventilation fan, crane type L1, L2. |

Each order has to be adapted to the crane it concerns, so there can be several part-no's or alternatives. The base is ventilation fan 388 9464.

## Installation

Totally estimated installation time 0.5 - 1.0 day/crane.

Engineer: 6 manhours (approx.).

Fitter assistance: 8 -12 manhours.





# Oil Cooler upgrade

Improved cooling capacity increase a crane's lifetime

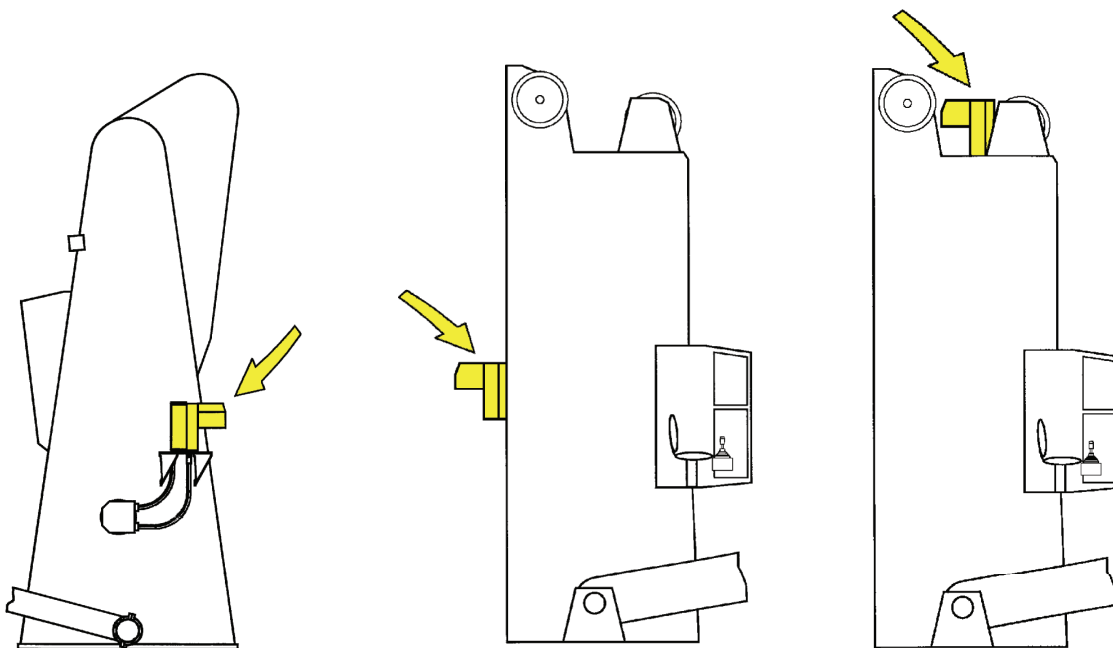
## General

A ten-year-old cooler has most probably lost at least 50 percent of its cooling capacity. This is due to corrosion or bad contact between the oil pipes and cooling flanges. Instead of working as a conductor of heat it works like an isolator, the cooling flanges will also be clogged due to dirt and salt corrosion.

The price of a new complete cooler unit is in most cases lower than the existing cooler element. Separate cooling elements or electric motors can be delivered separately as spares later on.

## Advantages

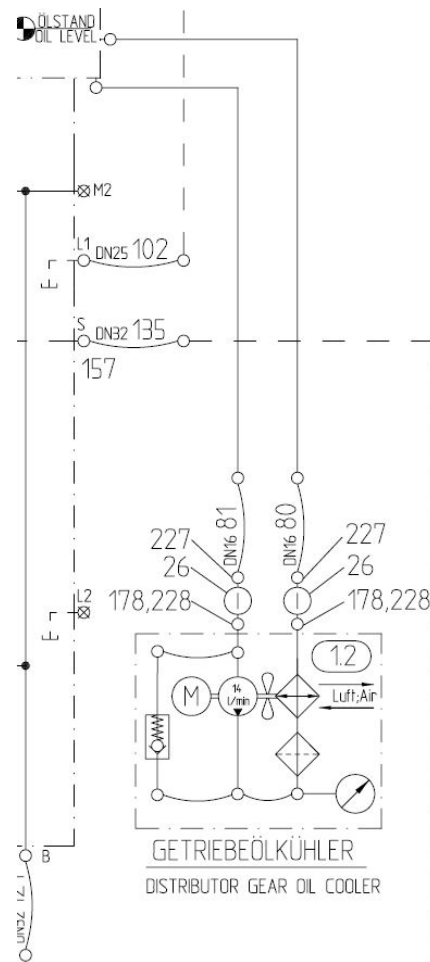
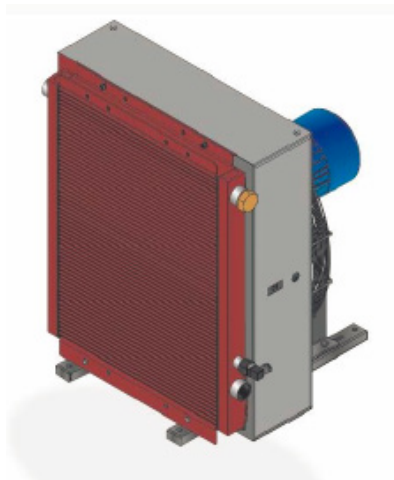
- Improvement in cooling capacity of up to 80 percent
- Lifetime of expensive hydraulic components, such as pumps and motors, increased by 50 percent
- Much less wear on hydraulic components
- Easier and cheaper to service and maintain
- Standard cooler in current production, available from stock
- Lighter in weight than previous models (approx. 50kg).



Installation of new cooler

# Gear Oil Cooler for Grab Operation

Additional gear oil cooling system to increase the lifting cycles on multi purpose or heavy lift cranes for grab operation. Each crane is designed for a defined number of lifting cycles. An uncontrolled increase in the lifting cycles might cause an overheating of the luffing- and hoisting gearboxes which leads to heavy and expensive damages. In order to keep the oil temperature within the working range, an additional oil cooling system can be installed.



## Benefits

- More flexibility of cargo handling and charter inquiries.
- Equipment protection even with increased lifting cycles.
- Sustainable value enhancement due to increased usability.



# Air-conditioning unit



MacGregor offers air-conditioning (AC) units for crane cabins that maintain a constant optimum temperature and working climate for crane operators. This ensures that the driver will be as alert as possible during loading and unloading operations, potentially reducing costly damage to the load and the crane caused by avoidable accidents.

MacGregor AC units can be supplied as part of a new crane delivery and are an ideal retrofit device for GL, GLB, GLBE, GLE and K-type crane cabins.

## Benefits

- Air conditioning improves the climate inside the driver's cabin when operating in warm or cold environments
  - Comfortable cabin temperatures keep operators more alert during loading/unloading operations
  - Three different modes are available via a switch mechanism on the cabin control panel
  - Latest fan and motor technology
  - UV-resistant plastic fan rotor/blades
  - Corrosion protection
  - User-friendly functionality
- 
- Environmentally-friendly refrigerants

Air-conditioning unit installed on a crane cabin



### Technical information

MacGregor AC units have a cooling function for use in warm climates and use the cabin's heater, which is supplied as standard, for cold conditions and to dehumidify the air when necessary.

### Crane control panel switch modes

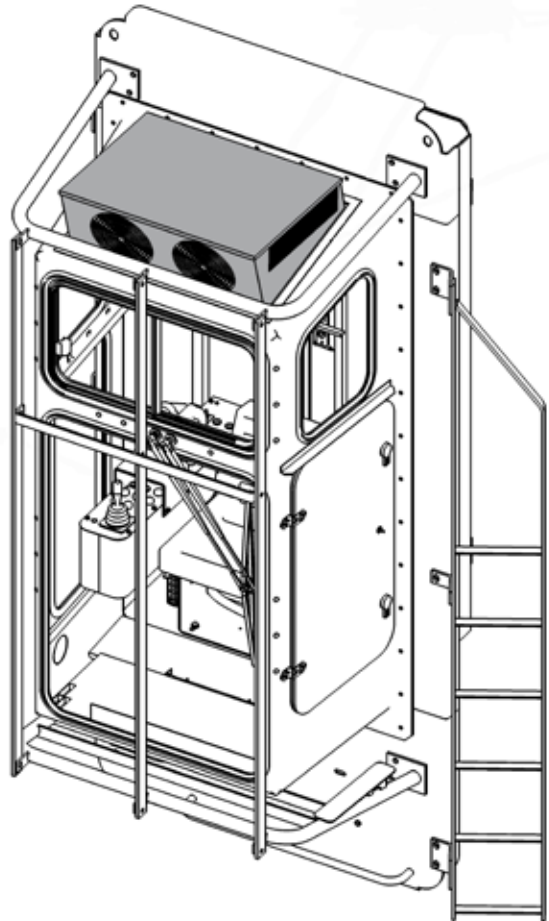
- 0 - AC and heater Off (both AC and cabin heater are off)
- 1 - Cabin heater On (heater is a standard feature in the cabin)
- 2 - AC-unit On

### AC-control panel switch modes

- 0 - AC-unit Off
- 1 - AC-unit On, the unit is cooling the air
- 2 - Thermostat to adjust temperature

### Ordering information

Because the frame for each air-conditioning unit is tailor-made for a specific crane, part numbers can vary. Please contact MacGregor for advice on ordering the correct parts.



### Installation requirements

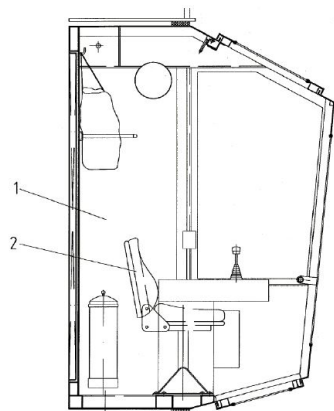
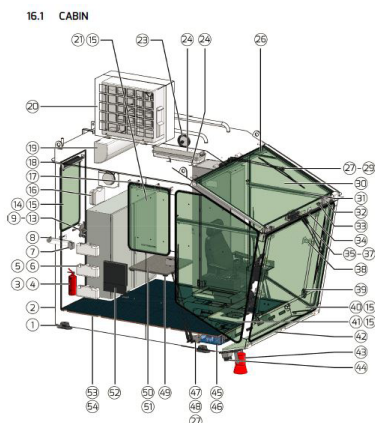
MacGregor AC units are delivered with a frame that is screwed to the cabin roof and all necessary installation parts. The unit has a manually-operated control panel, which is installed in the cabin with a thermostat switch, a selector switch and two pilot lamps that indicate whether the unit is in heating or cooling mode.

If retrofitting the AC unit, the ventilator and window at the top of the cabin have to be removed. These parts are replaced by the frame, which is tailor-made for the cabin and subsequently sealed. The AC-unit is mounted into the space from the outside.

Electrical installations are carried out inside the cabin's domed roof, making it possible for an operator to switch between the cabin heater, which is supplied as standard, or the AC-unit.

For further information and cost estimates, please contact any MacGregor office.

### Aircon for legacy brands:



# Personnel handling system



Ensures the safe, efficient transfer of your crew

MacGregor has developed a new personnel handling system for use with its general purpose (GP) and hose-handling (HH) cranes. It has been designed to ensure the safe transfer of crew and meets the ever stricter regulation demands set by classification societies such as Det Norske Veritas (DNV), the American Bureau of Shipping (ABS) and Lloyds Register (LR).

## Benefits

There are special class requirements for personnel transfer operations and for each vessel; MacGregor considers the standards set by each society. All of MacGregor's GP and HH cranes have one dedicated brake for cargo handling and a second safety brake for personnel lifts. The operational design of this brake depends on the classification society.



To handle personnel, cranes need to be updated with new parts. A MacGregor personnel handling system installation includes a winch with double brakes, valves, hydraulic hoses and various other components. MacGregor liaises with classification societies to ensure that each element meets approval before installation and testing.

**New winch with double brakes**





**Extra brake**



### **Installation requirements**

- Design adaptation (depending on classification)
- New winch with extra brake (existing hydraulic motor can be used)
- Additional mechanical parts and components for hydraulic system
- New documentation/instructions and installation drawings
- Classification approval of drawings
- MacGregor can assist with installation and commissioning

### **Installation of new hoist winch**

approximately 60 to 100 hours/crane

Lifting capacity of winch and load test inspection by class are not included in this timeframe.

For further information and cost estimates, please contact the MacGregor Competence Centre for crane modernisations or any MacGregor office.



# Personnel Handling Legacy Products

Requirements for safe lifting of personnel have changed over the years. Our personnel handling solution is tailor-made for each project to match the crane with the newest class requirements.

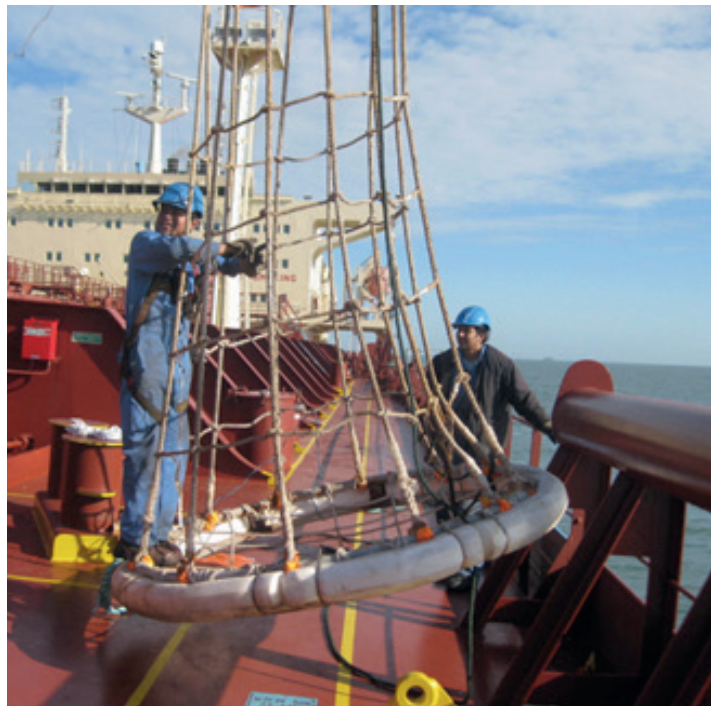
The winch comes with a class society product certificate.  
The conversion is in accordance with regulations from class society and ready for system approval and certification.

The control station is equipped with a manual key selection switch for the purpose of lifting persons. The switch is lockable in both positions with a removable key and has an adjacent warning light which continuously indicates when it is activated.

Our system can be incorporated on cranes with or without a sophisticated control system.

Main deliverables (depending on crane type)

- Winch with double brake
- Electrical driven emergency aggregate for recovery in case of power failure
- Separate mode for personnel handling
- De-rating of winch in personnel modus
- Letter of conformity from maker
- Bypass of MOPS/AOPS, CT and AHC



# Ship-to-Ship transfer

By installing safety upgrades on the crane, it will have the safety level of an offshore crane for ship-to-ship handling in accordance with criteria from the DNV “Standard for certification no. 2.22 Lifting Appliances.”



## Main deliverables (depending on crane type)

- New or modified winch where necessary
- New wire, sheave, bolt, modification of wire sheave bracket etc.
- New hook
- New main control valve
- New main hydraulic pump
- New main electric motor with starter
- New flexible coupling between electric motor and hydraulic pump
- Electrical sensors, angle sensors, limit sensors
- Macgregor MOPS system
- De-rating according to significant wave height (HS) and dynamic factors
- Calculations of new load curves
- Signs, procedures, load charts
- Modification of control system to include additional feature required on the crane
- Brackets, frame, platform, cable trays, joystick frame, monitor frame in cabin
- Engineering, programming and documentation



# Load indicator



## One unit, two useful functions

A MacGregor load indicator accurately measures not only a load's weight, but also records the pressure in the hydraulic system when lifting a load. This offers a very efficient modernisation solution for all hydraulic cranes, enabling an operator to weigh a load and use the pressure gauge to verify hydraulic system pressures during servicing.

### System

The load indicator is connected to the hoisting circuit, providing precise load information. The pressure-gauge is located in front of the operator on the right-hand side. The load indicator measures pressures corresponding to the weight of the load using a pressure manometer.

### Benefits

- Two functions in one unit: load and pressure
- Fits all hydraulic cranes
- Supplied as a complete set with all necessary parts
- Quick and easy to install and calibrate (2 to 4 hours)
- Pressure gauge means that the unit can be used for servicing and maintenance purposes



## Features

- Hydraulic pressure shown in bars
- Weight shown in metric tonnes
- Two load scales: blue for low-speed driving mode, red for high-speed mode

## Ordering information

287 8851-XXX scale must be adapted to each crane

## Installation requirements

Personnel required: an engineer

Installation time: approximately 2 to 4 hours/crane

Tools required: standard hand tools and drilling machine



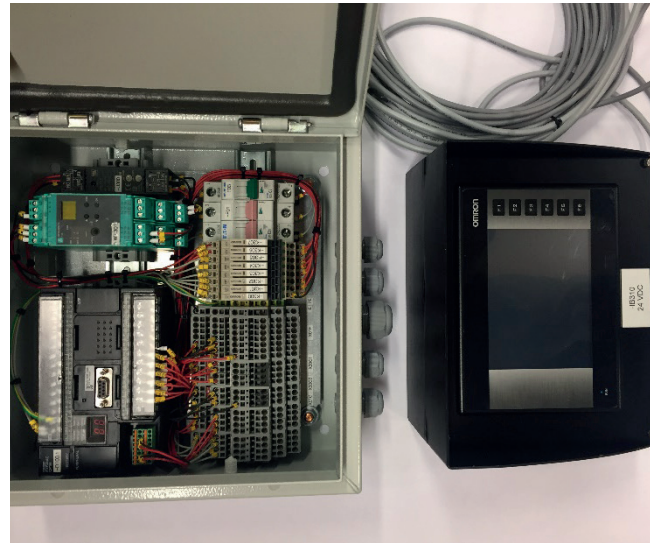
# ECB05 Safe Load Indicator System

The ECB05 - Safe Load Indicator System provides significant information in plain text and graphic readout information.

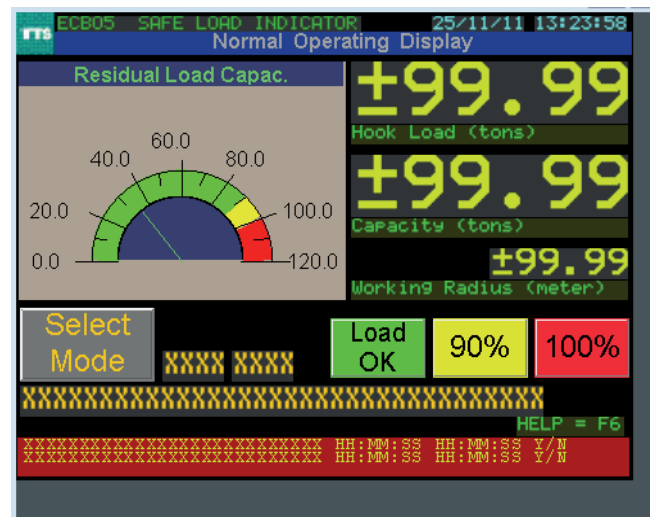
It has a password protected screen for parameter adjustments. It also has a built in alarm system, and real time clock.

The system consists of an operator console, a control box with a programmable unit, necessary interface units, and a tilt arm for mounting the operator console.

The installation will be carried out by a Macgregor Service Engineer. Any necessary adjustments for the new control system will be implemented. The adjustments are specific for each crane.



TOUCH SCREEN  
PASSWORD PROTECT  
ALARM SYSTEM  
REAL TIME CLOCK



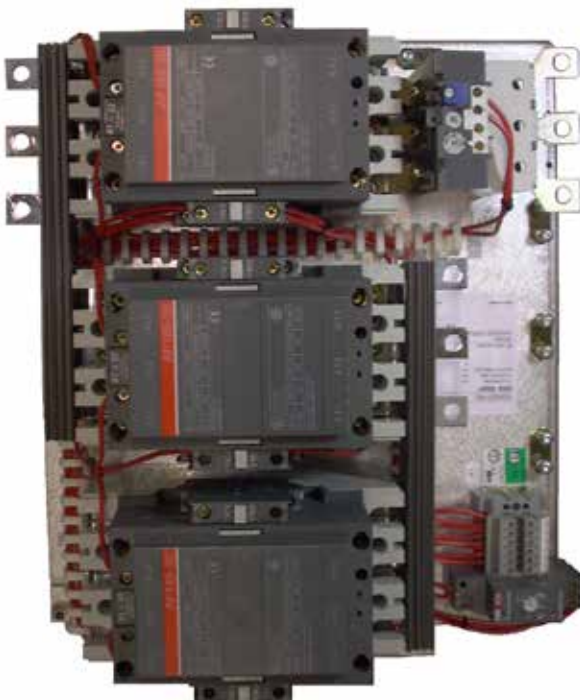
# Y/D Star Delta starter



Replacing historic starters with new Y/D Star Delta units improves crane performance and reliability, and overcomes the issue of obsolete spare parts. EG-type and EH-type Star Delta starters, used on older cranes, are no longer in production and include parts such as contacts, coils and over-current relays.

Y/D Star Delta starters feature an intelligent 'soft-start' function that avoids starting current peaks and reduces stresses on mechanical and hydraulic components.

## New type



## Advantages of a new Y/D starter

- Less sensitive to voltage drops and electrical disturbances, resulting in increased reliability
- Better spare parts availability for parts such as contacts and over-current relays
- Easy to install as the new unit fits existing fastenings screws in A-type cubicles
- Delivered as a complete unit with all necessary assembly, mechanical and electrical parts for installation.

## Old type EG



## Ordering information

Old Star Delta starters are replaced as a complete unit according to the table below:

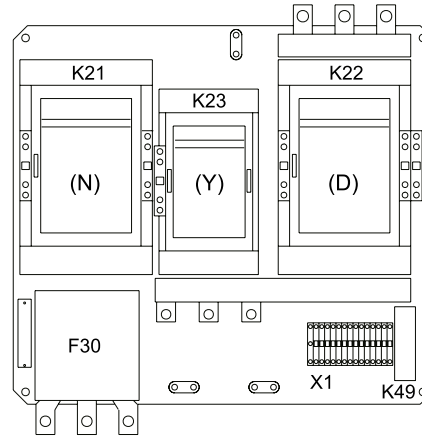
| Old Part-No   | Type      | New Part-No          |
|---------------|-----------|----------------------|
| 5591 2143-933 | KDEG 160T | <b>5591 2180-320</b> |
| 5591 2143-939 | KDEG 160T |                      |
| 5591 2143-953 | KDEG 315T | <b>5591 2180-321</b> |
| 5591 2143-959 | KDEG 315T |                      |
| 5591 2143-963 | KDEG 315T |                      |
| 5591 2143-969 | KDEG 315T |                      |
| 5591 2145-828 | DEHS 100  | <b>1218586</b>       |
| 5591 2145-838 | DEHS 160  | <b>5591 2181-320</b> |
| 5591 2145-842 | DEHS 160  |                      |
| 5591 2146-216 | DEHS 160  |                      |
| 5591 2146-265 | DEHS 160  |                      |
| 5591 2146-266 | DEHS 160  |                      |
| 5591 2146-346 | DEHS 160  |                      |
| 5591 2146-355 | DEHS 160  |                      |
| 5591 2146-356 | DEHS 160  |                      |
| 5591 2148-150 | DEHS 210  |                      |
| 5591 2148-151 | DEHS 210  |                      |
| 5591 2148-200 | DEHS 210  |                      |
| 5591 2148-201 | DEHS 210  |                      |
| 5591 2149-150 | DEHS 210  |                      |
| 5591 2149-151 | DEHS 210  |                      |
| 5591 2149-200 | DEHS 210  |                      |
| 5591 2149-201 | DEHS 210  |                      |
| 5591 2145-852 | DEHS 250  |                      |
| 5591 2146-455 | DEHS 250  |                      |
| 5591 2146-456 | DEHS 250  |                      |
| 5591 2146-535 | DEHS 250  |                      |
| 5591 2146-536 | DEHS 250  |                      |
| 5591 2146-555 | DEHS 550  | <b>5591 2182-501</b> |
| 5591 2146-556 | DEHS 550  |                      |

## Additional information

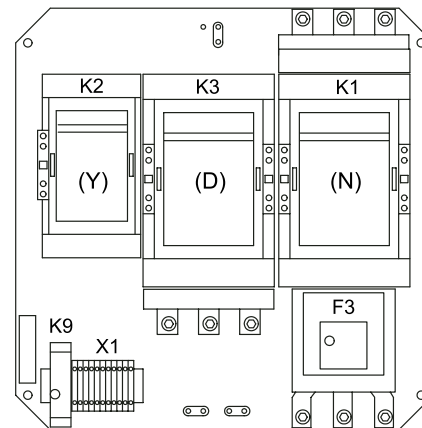
For each new Star Delta starter additional information is available:

| Part-No Spare | Parts Service | Info       |
|---------------|---------------|------------|
| 5591 2180-320 | 625-8561.001  | -          |
| 5591 2180-321 | 625-8561.002  | 625/1635 E |
| 5591 2181-320 | 625-8561.003  | 625/1636 E |
| 5591 2181-321 | 625-8561.004  | -          |
| 5591 2182-501 | 625-8561.005  | -          |

## Replacement for EG-type unit (principle)



## Replacement for EH-type unit (principle)



# Winch replacements

New complete solutions with high-speed motors



MacGregor offers a complete solution to replace obsolete CA420-400-type winches with low-speed, high-torque motors. This type of winch is no longer in production and cannot be delivered as a spare part if it breaks down. The same applies for MDA42-type disc brakes.

The modern MacGregor winch replacement consists of a high-speed motor and a planetary gearbox, and is normally available from stock. Some design work is required prior to installation, depending on the crane

control system (cubicle B/CC2000). Hoisting speeds are occasionally reduced; this is investigated on a case-by-case basis.

## Benefits

- Upgrade to modern performance standards
- Less expensive, widely available spare parts
- Complete delivery
- Reduced risk/cost for the shipowner
- Proven design



## Scope of delivery

All necessary components are included in the delivery:

- New hoisting winch (2,400kg)
- Screws and washers for securing new winch to crane bottom plate
- New hydraulic A6VM200cc-type motor
- Hydraulic valves for 'brake-opening' and 'flush-unloading'
- Adapter kit for hoisting limit switches box
- Components for modernizing hydraulic system including hydraulic hoses, coupling and clamps
- Modification of crane control system: cubicle B requires new electronic adapter card; CC2000 requires system adjustment

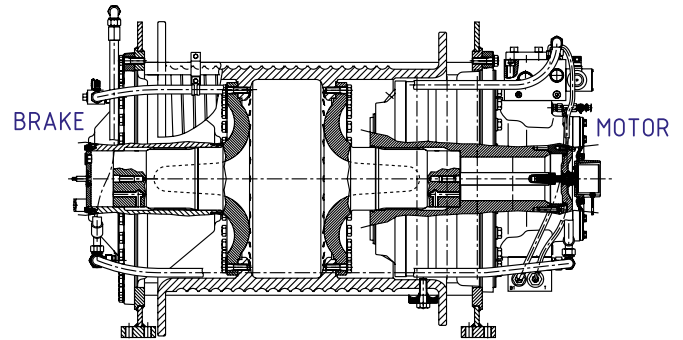
## Ordering information

|              |  |
|--------------|--|
| 490 5268-801 | Cubicle B:<br>IMO 9168582, No.1, s/n 62504451<br>IMO 9168582, No.2, s/n 62504452<br>IMO 9168570, No.1, s/n 62504453<br>IMO 9168570, No.2, s/n 62504454     |
| 490 5268-802 | Cubicle B:<br>IMO L9155365, No.1, s/n 62504255<br>IMO L9155377, No.1, s/n 62504257<br>IMO L9155389, No.1, s/n 62504259<br>IMO L9155391, No.1, s/n 62504261 |
| 490 5268-803 | Cubicle B:<br>IMO L9155365, No.2, s/n 62504256<br>IMO L9155377, No.2, s/n 62504258<br>IMO L9155389, No.2, s/n 62504260<br>IMO L9155391, No.2, s/n 62504262 |

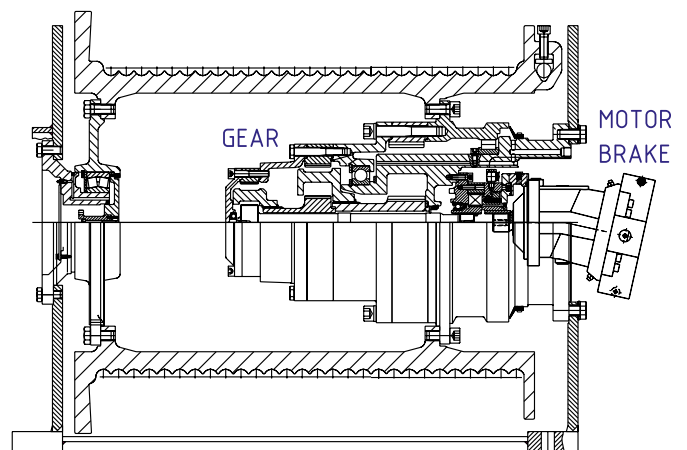
490 7010-801 Cranes with CC2000 control system

Weight: approximately 2,700kg

## Original winch compact CA420-400/MDA42



## New winch with gearbox and high-speed motor



# Winch Modification

When a new project requires different winch parameters, it might be an option to consider if the existing winch could be modified.

## Examples of modifications:

- Extension of wire length (will normally reduce SWL)
- Hoisting speed increase
- Wave compensation (see add-on AHC)
- Overload hydraulic quick release
- Constant tension
- Any other according to request





# Structural Changes

Modifying an existing crane for a different utilization is a cost effective and time saving solution that opens up possibilities to enter new market opportunities.

## We offer the following structural changes:

- Boom extension
- Expanding the reach of the crane
- Increase of SWL
- Increasing the lifting capacity of the crane
- Wire extension
- Increasing the operational depth capabilities of the crane
- Slew limit
- Reducing the slew sector of the crane
- Adapting for operator cabin



# Steel structure replacement

In some cases it is unavoidable to replace complete steel segments. Whether due to corrosion or serious accidents, a new construction is often preferable to repair for economic and safety reasons.



**We offer the following structural replacements**

- Boom complete
- Rope sheave assemblies
- Jib bearing structure
- and much more manufactures close to your needs



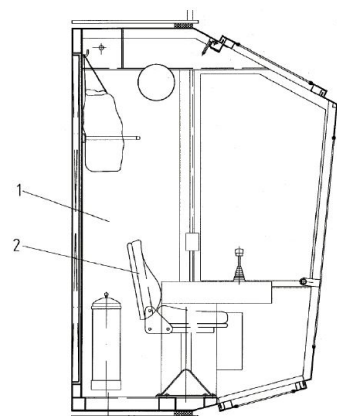
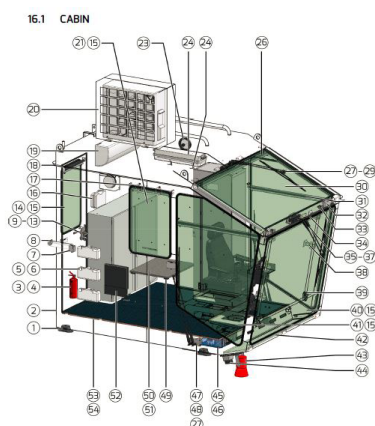
# Operator cabin

In some cases it is unavoidable to replace a complete driver cabin.

Whether due to corrosion or changed AMSA rules in Australia, we are able to replace and upgrade your existing cabin.



## Examples



## Benefits

- OEM Quality
- Best market pricing due to long term contracts
- Easy fit
- Steel frame or complete assembly



# Add-on AHC

Macgregor has developed an add-on Active Heave Compensation (AHC) solution for crane winches and winches in general. The solution uses the existing hydraulic/electric power that is already available on the crane, which means that we can deliver add-on AHC for any crane. This gives the possibility for cranes without AHC to offer their services in a bigger market.

The modification is a simplified solution as it uses existing components and few new components are added. The modification can be performed with short down time, and on site.

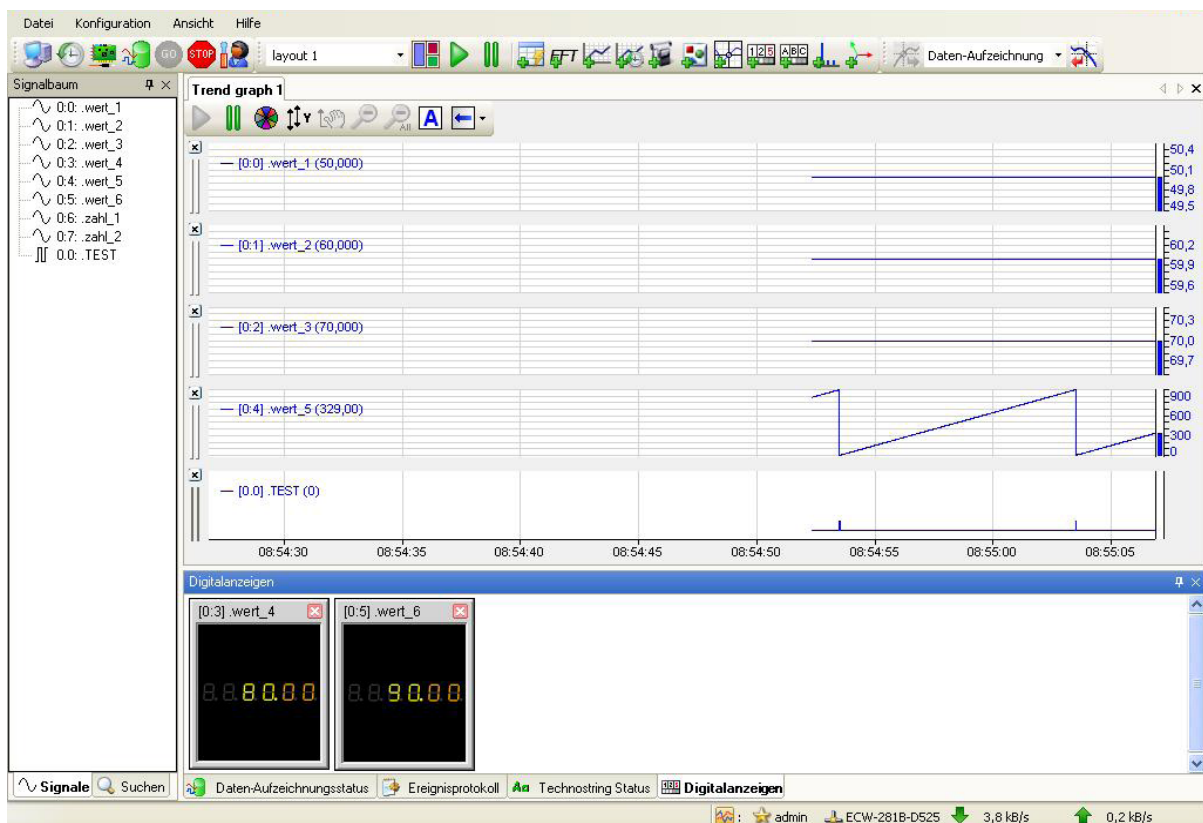
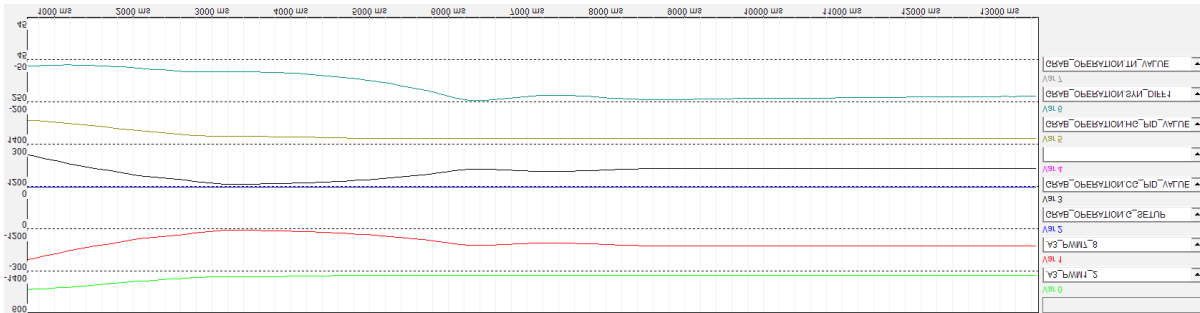
## Necessary modifications:

- Absolute encoder for the winch drum
- Motion Reference Unit
- Updated software or new PLC with AHC software
- Minor hydraulic updates



# Data Logger

The data recorder logs main crane data such as load on the hook, outreach, crane settings of the main components etc. to verify load cycles and crane operations. Also, in case of failure, troubleshooting is easier because all essential data is available.



## Benefits

- Faster and more efficient troubleshooting in case of break downs.
- Misuse and questions of responsibility can be visually demonstrated.
- Efficiency of cargo operation can be monitored.
- Remote download of parameters in combination with ROC-M is possible.



# Triple-Digital Radios

Triple Digital Radio enables the crane operator to keep in close contact to other crew members. "Push to talk" button can be added within the control lever or as a pedal.

**Versatile and future proof**

- DES
- DSP
- OTAP
- IPX5
- GPS
- COLOR LCD TFT
- IPX8
- MIL-810

**Triple-Digital Radios – An Industry First!**

Gen2

NXDN™ DMR P25

**Designed for toughest operating conditions**

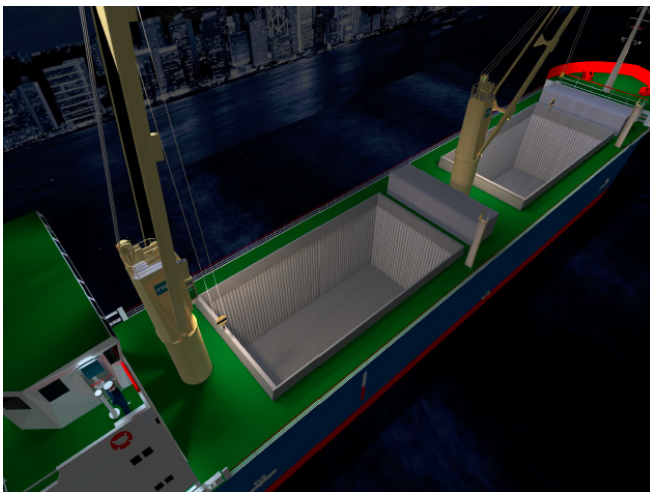
## Benefits

- Enables crane drivers to operate and talk to deck people simultaneously.
- The radios are available with a dual-band function.
- This technology enables more efficient cargo operation since the crane operator does not need to release the control levers anymore.
- Man-down detection or motion detection will be automatically engaged when the acceleration and tilt sensor detect unusual behavior.
- Hands-free operation via blue-tooth compatibility enables hands-free operation.
- GPS to transmit position in emergency cases.



# LED-Lighting

Maintenance free LED light solutions for rough environment conditions.



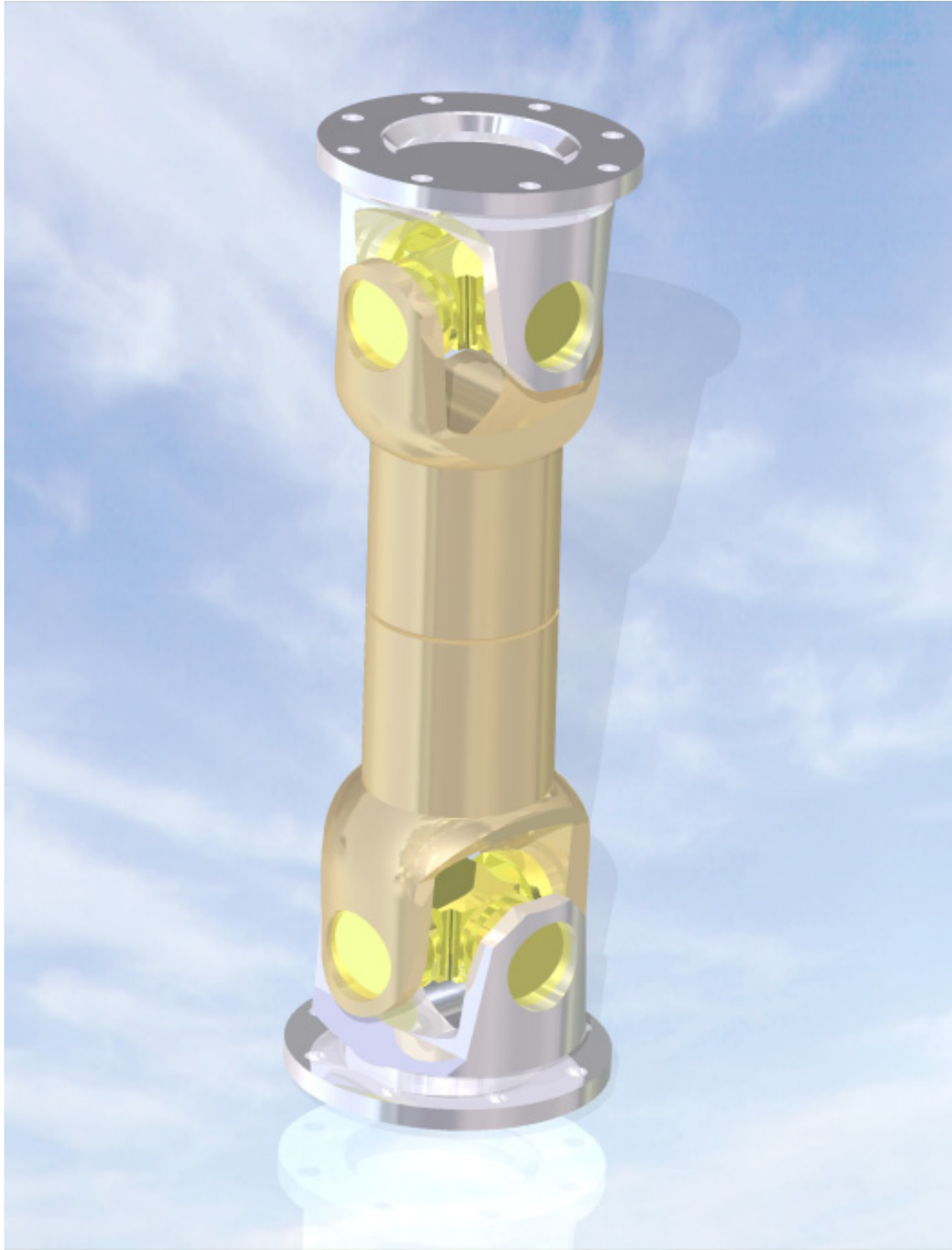
## Benefits

- Extremely long system lifetime.
- Wide ambient temperature range.
- Cost savings due to reduced maintenance intervals and manpower.
- Available as flood, spot and search lights.
- Certified to cover different requirements such as IECEx-, Atex-, Inmetro-, TR CU- or UL standard.
- Existing lighting can easily be exchanged with LED technology.

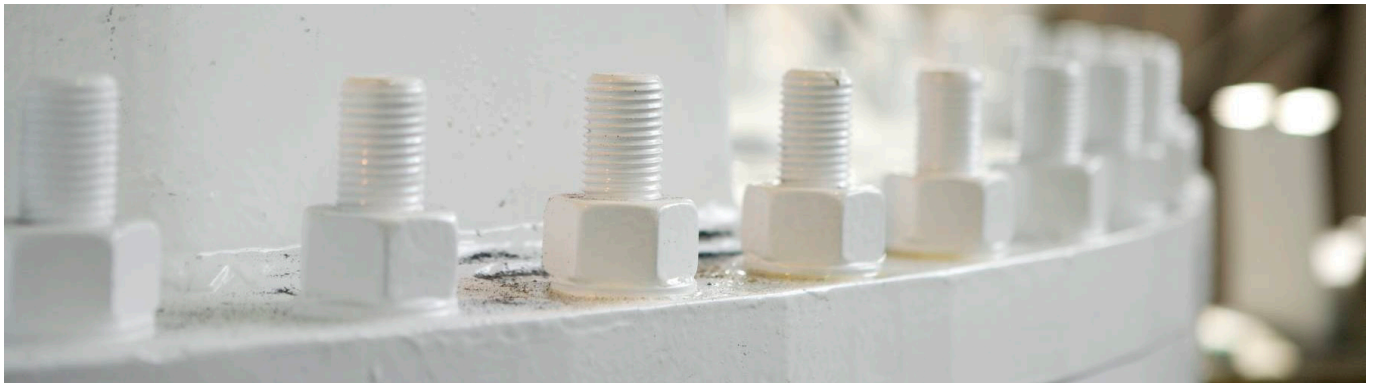


# Cardan Kit

Macgregor has developed a Crane Conversion Kit to modernize your crane from flexible coupling to cardan shaft!







Macgregor has developed a Cardan-Shaft Crane Conversion Kit to modernize your crane!

This is done by retrofitting a cardan-shaft coupling, replacing the flexible coupling between the electrical motor and hydraulic pump to obtain an even more reliable solution.

This new Crane Conversion Kit is made to upgrade your crane to cope with tomorrow's challenges, environments and demands for reliability and efficiency.

### **Benefits**

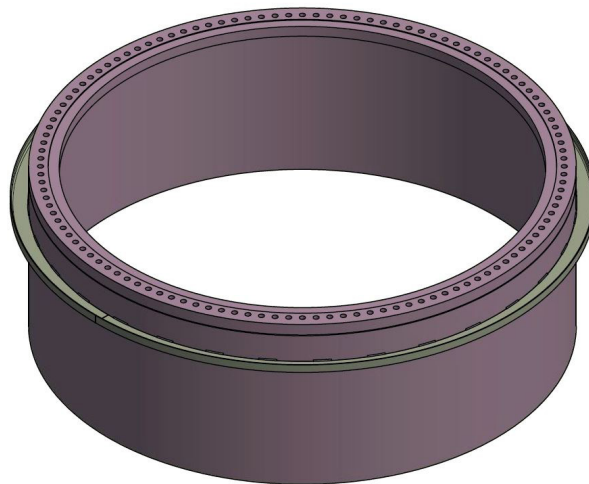
- Your crane will have increased reliability, and you will avoid the risk of flexible coupling failure during your important operations.
- A minimum of maintenance and spare parts required.
- From an economic point of view this will be a good investment!

This conversion will be fitted according to your crane's specifications, and will be handled by our dedicated conversions technical staff to provide you with the best solution.



# Grease Drain

Grease collector to avoid pollution in the crane column caused by maintenance works on the slew bearing. One of the frequent maintenance tasks is the greasing of the slew bearings. This maintenance task's requires that the bearings are completely filled up with "new" grease until "old" grease appears on the outer side of the bearing.



## Benefits

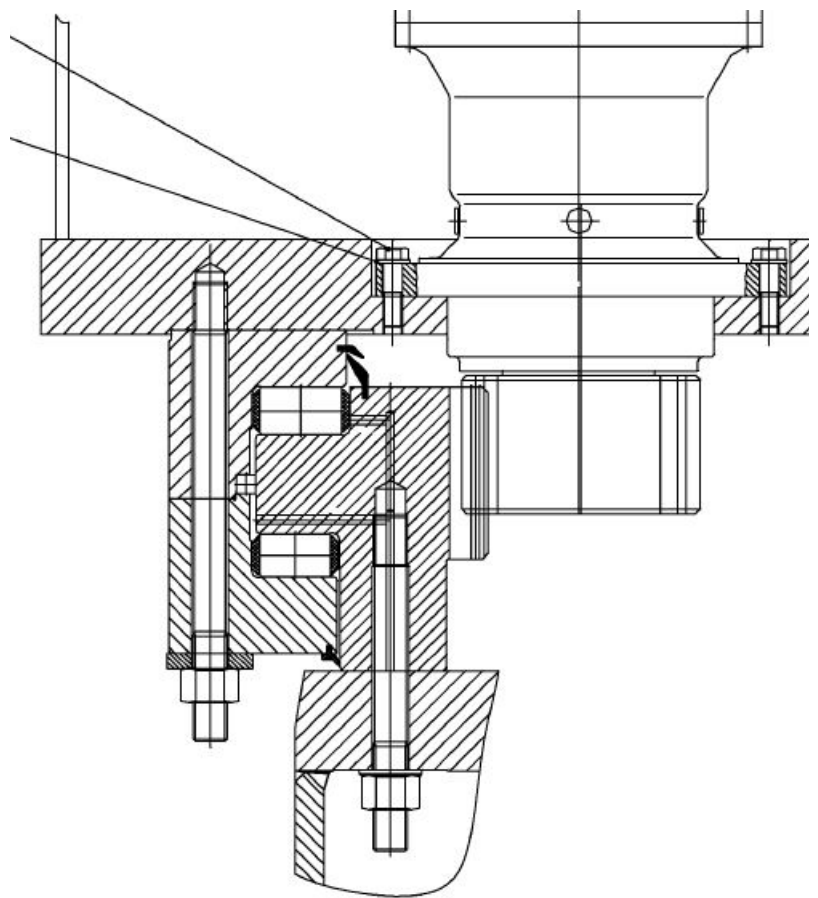
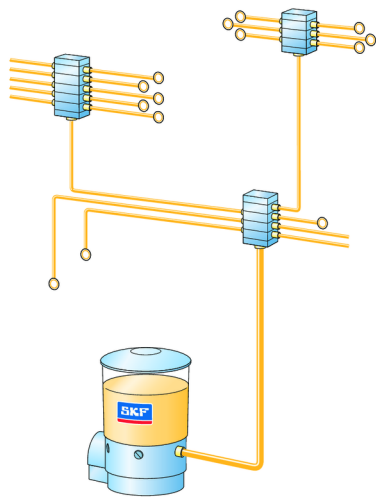
- No contamination of the column, main deck and environment.
- Time saving cleaning works.



# Automatic Slewing Bearing Greasing

Automatic grease pump unit for slewing bearings.

Remark: Please note that this is only available for equipment with slewing bearing greasing points on the underside of the bearing.

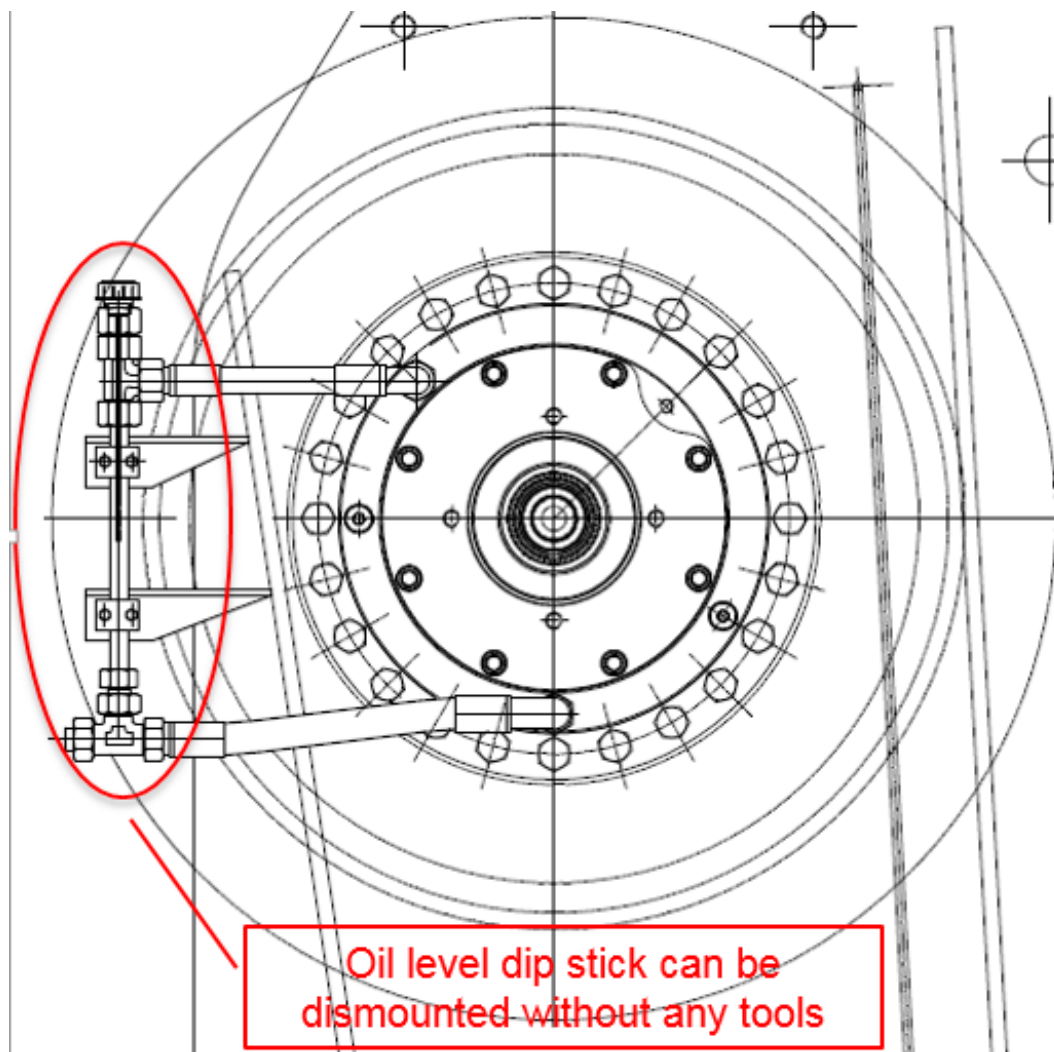


## Benefits

- Bearing, gear and chain life are increased by applying small, pre-measured amounts of lubricant frequently while the machine is operating.
- Reduced wear and tear and lower risk of damages.

# Oil Level Dip Stick for Gear Boxes

Oil level dip stick for an easier and faster oil level check of the luffing and hoisting winches. The standard procedure is normally to open an oil level blind plug and to use a flash light in order to check the current oil level. Due to the required preparations the oil level is rarely checked which leads to gearbox damage. The oil level dip stick allows each crew member quickly and easily to check the oil levels before starting/leaving the crane.



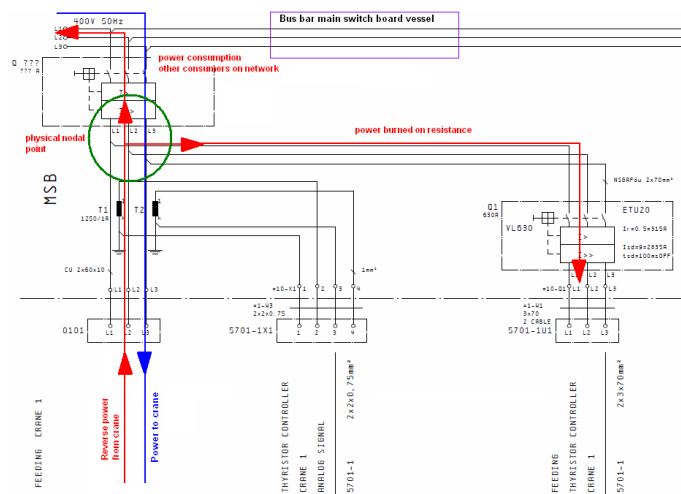
## Benefits

- Active risk reduction of gear box damages caused by low oil levels or worn brake units.
- Easy access and possibility to check the oil level anytime, even during cargo operation.



# Reverse Power Compensation

Consumption device to stop reverse power from being fed into the board electronic system. Reverse power occurs when load is being lowered and the electrical motor switches over into generator mode. The reverse power as well as the missing torque on the drive shafts can cause expensive damages to the equipment.



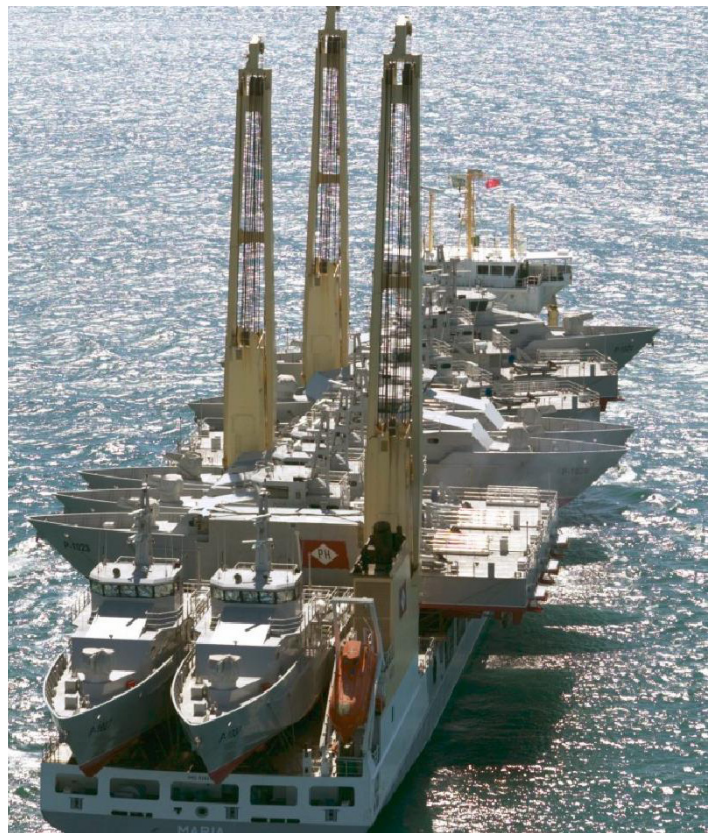
## Benefits

- Protection of diesel generator, connected electronic and hydraulic components.
- Especially for heavy lift and four rope grab cranes, to avoid black outs and damages to electronic control parts in the engine control room.



# Vertical Boom for Sea Voyage

Additional locking device to keep the jib in upright position during sea voyage.



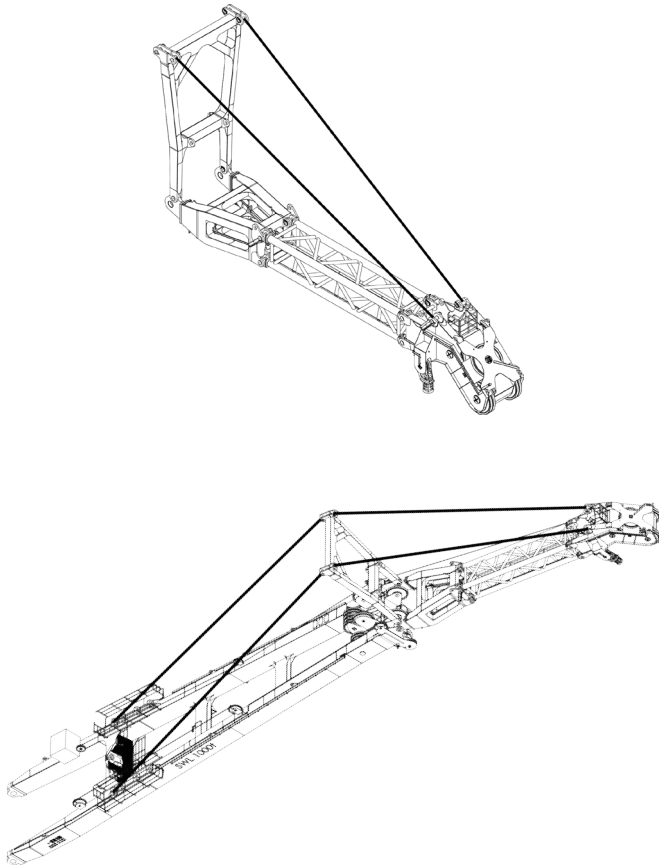
## Benefits

- Safe and class-approved lifting of personell.
- Sustainable value enhancement due to the increased usability.



# Fly-Jib Extension

The Fly Jib Extension increases the lifting heights for special lifting operations, mainly applicable for offshore operations. With a fly jib preparation, a fly jib can be easily installed on a reinforced structure of the main jib.



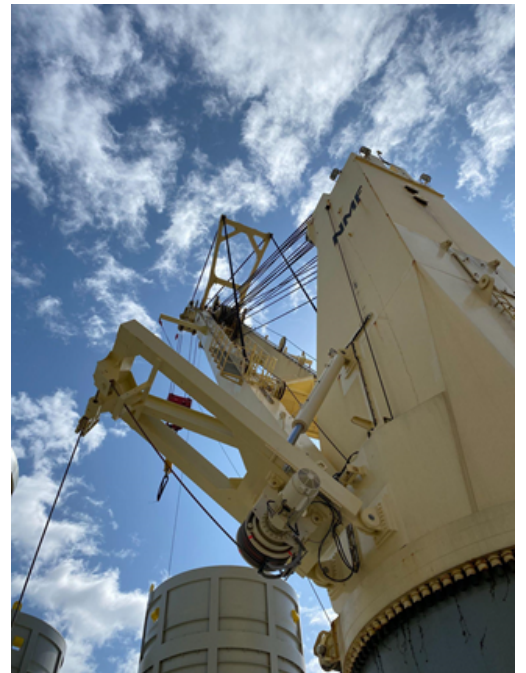
## Benefits

- More flexibility in the area of cargo handling and charter inquiries.
- Sustainable value enhancement due to the increased usability.



# Tugger Arms

External, movable, remote controlled arms with remote controlled 20 t winches to stabilize heavy cargo (up to 550 to) even in offshore conditions. The arms are integrated in the existing hydraulic, electric and mechanic crane system without affecting the steel structure and its stability.



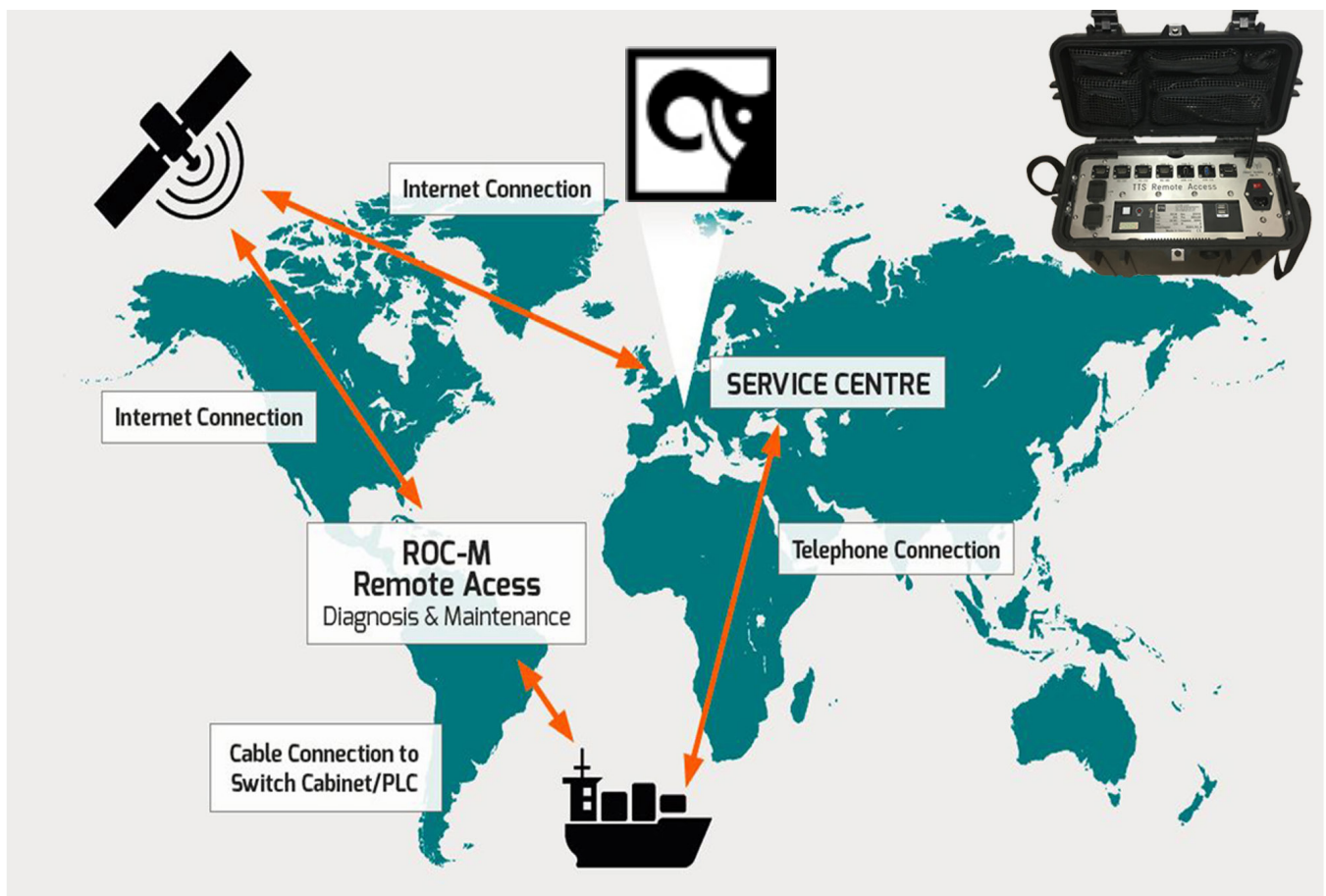
## Benefits

- More flexibility in the area of heavy cargo handling and charter inquiries.
- Less manpower during operation due to full remote control.
- Punctual control of heavy cargo up to 550 to



# ROC-Unit - Remote Access

The Remote Access is a plug and play device designed to allow Macgregor to access the crane control system without being on board. Once an internet connection is established, our software engineer is able to read incoming and outgoing plc signals. Error causes or defective parts can be located as if a Macgregor Service Engineer were on site.



## Benefits

- Issues can be solved remotely, which reduces support time significantly.
- The remote access enables the software engineer to support even if the vessel is located in critical or not reachable areas.
- Working remotely means there are no travel costs.
- Damaged components can be located in advance and brought with the attending service engineer directly.
- Software updates or emergency mode activation does not requires the engineers to be on board in person.



# OnWatch Scout

Maximising operational availability



# See Tomorrow. Today



## Protect your business and minimise unplanned downtime

A critical equipment or system malfunction can result in significant **loss of revenues, emergency repair costs and reputation damage.**

OnWatch Scout increases the flow of information from ship to shore and moves support from a reactive to proactive mode, with operational data streamed directly from the vessel, monitored, analysed and used to provide guidance on performance.

## Features



Analyse data to quickly identify and isolate problems



Detect operator errors



Identify incorrect maintenance



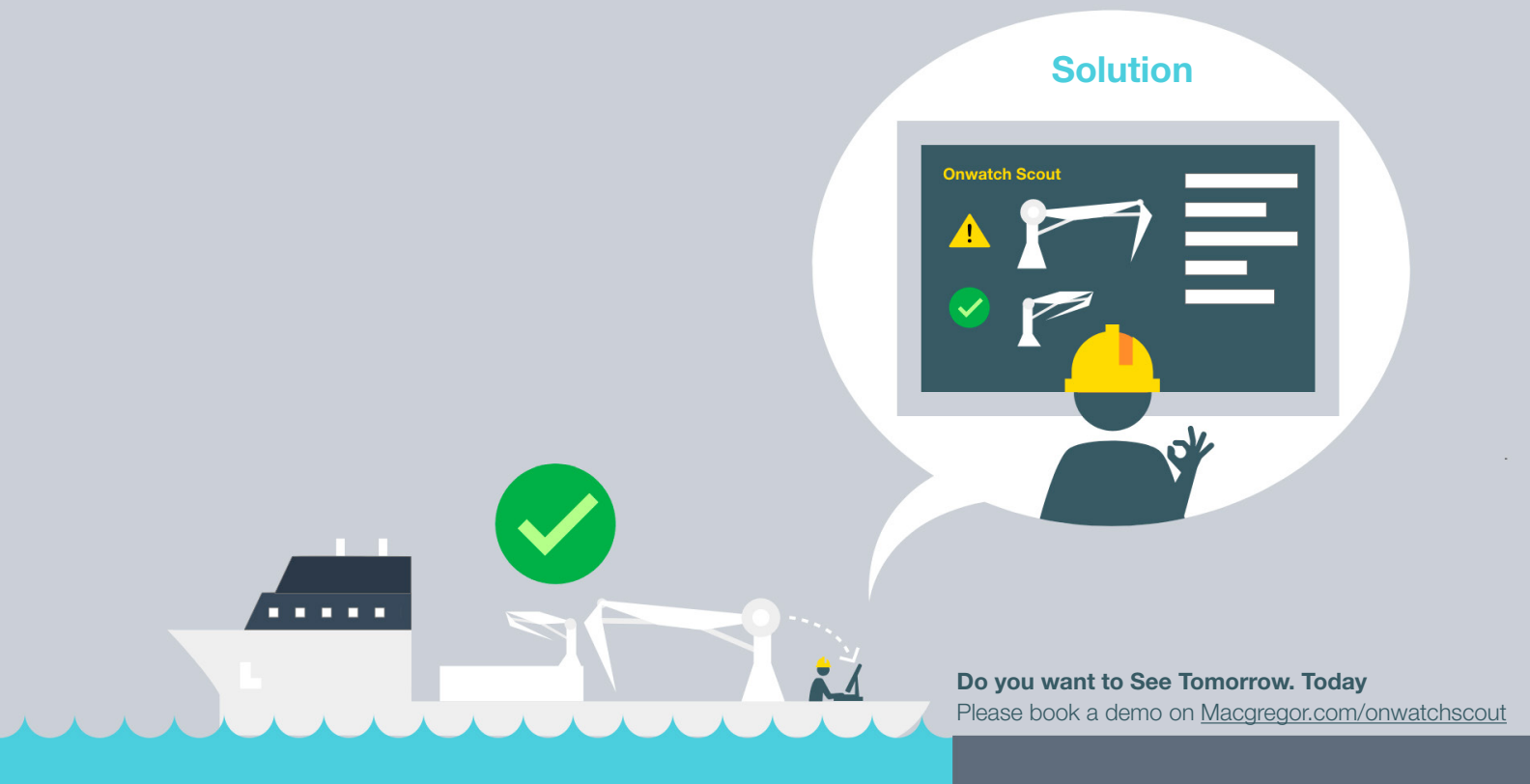
Help crew locate faulty parts



Guide crew through difficult operations and repair processes



Upgrade software and fine-tune functions



## Solution: Analytics & Predictive Maintenance

1. OnWatch Scout connects installed equipment to advanced monitoring systems that continuously analyse component condition and predict maintenance needs.
2. It detects patterns in component state or equipment behaviour which, through a combination of extensive experience, technical expertise and the application of artificial intelligence, can identify changes that indicate risk of failure.
3. Access to this information enhances the ability to maximise equipment availability, minimise unplanned downtime and more effectively plan maintenance activities - thereby increasing the operational availability of valuable ship assets.

## Key benefits

OnWatch Scout enables shipowners and operators to maximise the availability, earning potential and efficiency of their fleet by:



Maximising equipment availability and minimising unplanned downtime



Monitoring component condition and predicting potentially critical performance issues



Optimising planned maintenance intervals through measurement of use and condition



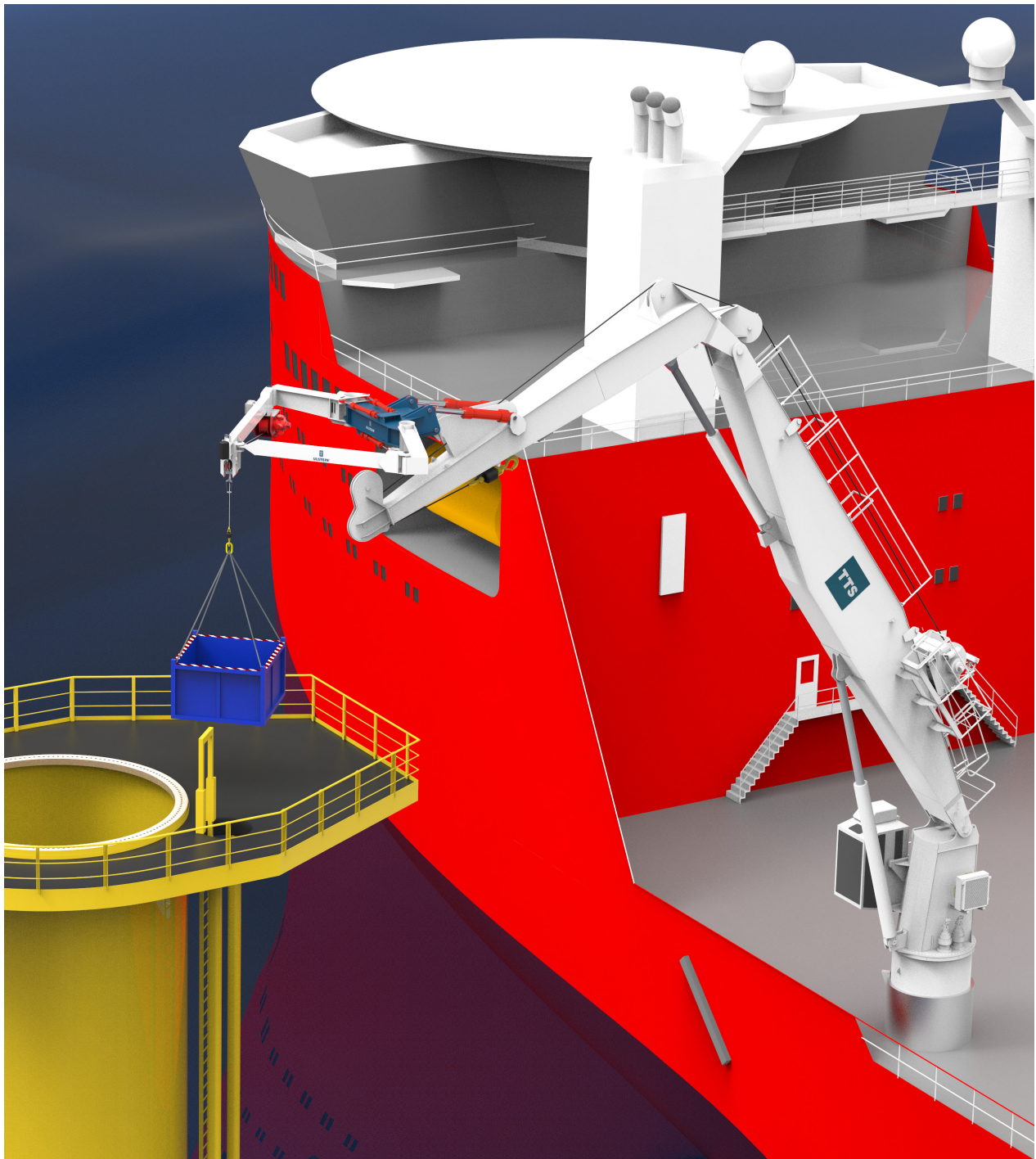
Supported by 24/7 expert availability and remote access to adjust and update control system software



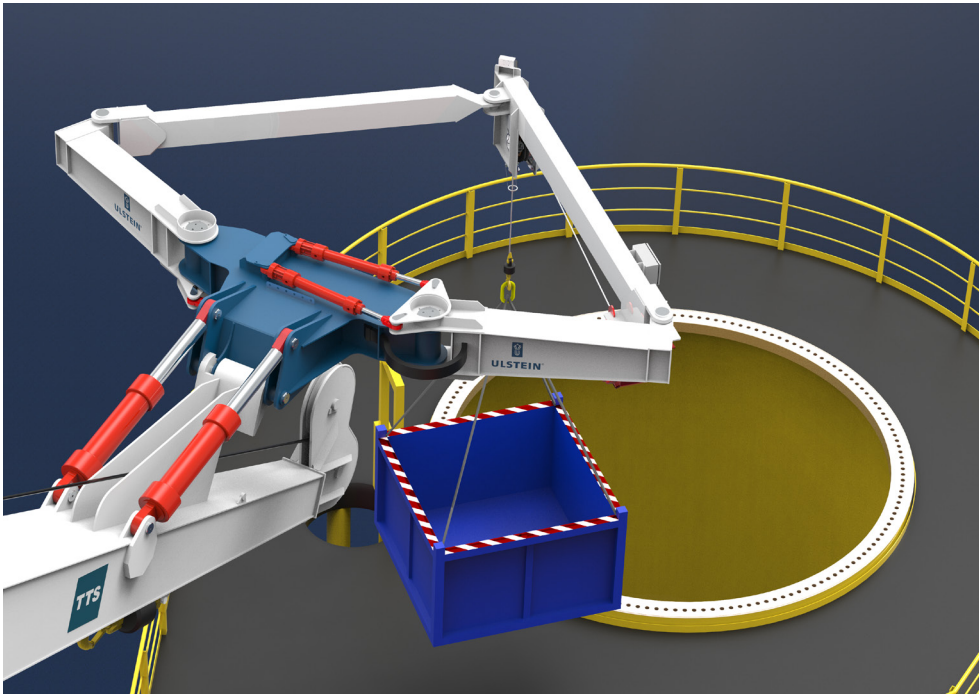
Developed through decades of operational experience and technical expertise

# Colibri 3D Motion Compensated Crane

The Macgregor Colibri™ combines Macgregor's competences in crane design and manufacturing with Ulstein's expertise in innovative motion technology and analysis. All Macgregor Colibri™ cranes are based on Macgregor's range of cylinder luffing box boom cranes designed for long service life in harsh, North Sea conditions.



## Available Sizes & IACS



The Colibri™ is available as standard in the following sizes:

- 1.0mT
- 3.0mT
- 7.0mT

Other sizes are available on request.

The Colibri™ can be delivered with a 3<sup>rd</sup> Party Certificate from most IACS member societies.

## Retrofitting & Operability

The Colibri™ is also suitable for installation on existing knuckle boom cranes of any make. Generally, a retrofit will require a rebuild of the Control System, Folding Jib, and supply lines along

the jibs. In some cases a more substantial rebuild may be required, but on all Macgregor Offshore Cranes manufactured after 2009 the required scope is minimal.

We can provide tailored solutions and operability studies to evaluate the potential performance of the retrofit, and accurately determine the required scope. Please do not

hesitate in contacting us to find out more about the possibilities available.



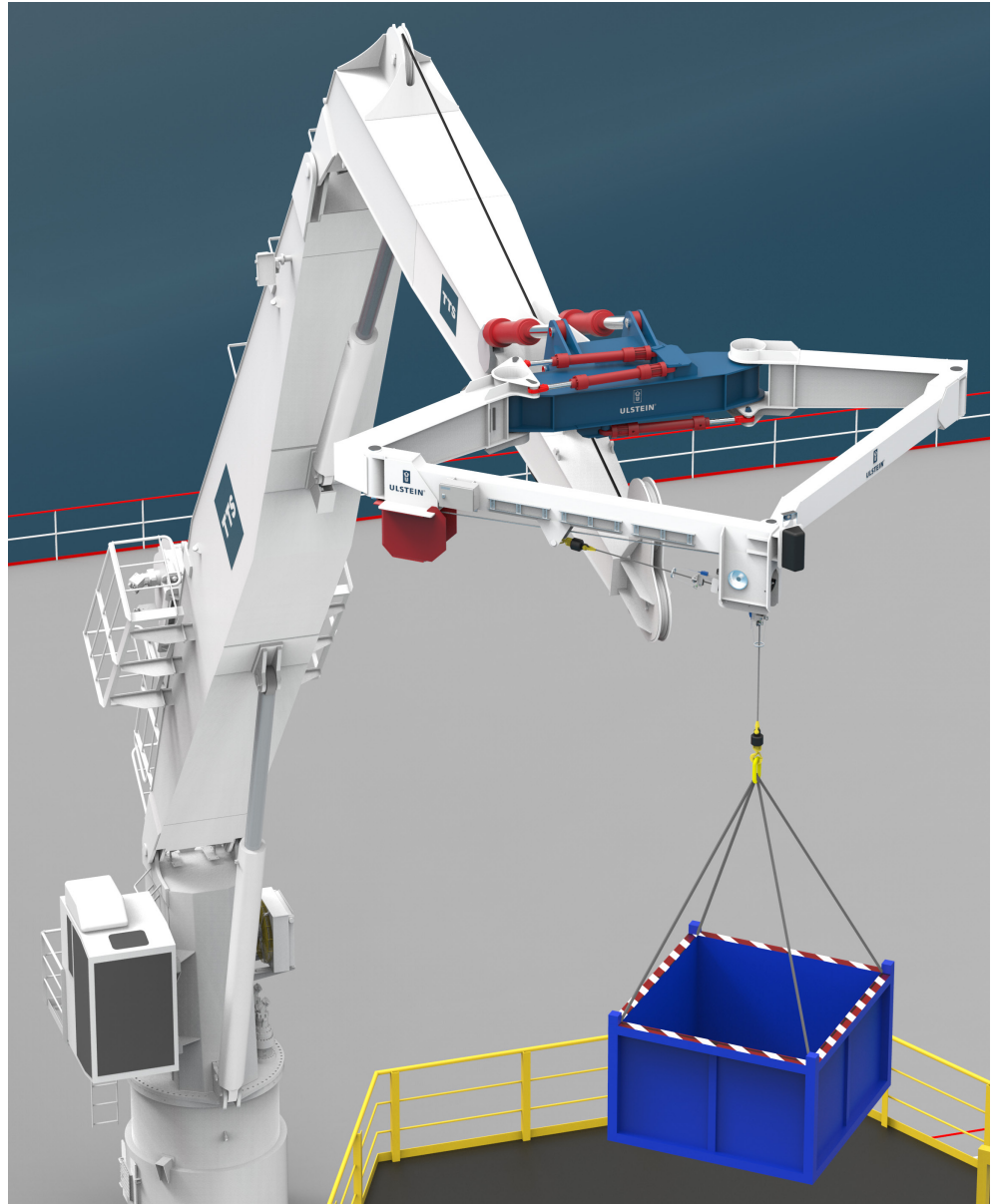
# The Principle

In any motion compensation system, sufficient power should be available to move the object. When more mass is introduced into a system, more power is required.

The first generation of motion compensated cranes were based on moving the entire crane structure in order to keep the boom tip still. These systems required a relatively high power installed and large foundations to enable the compensation equipment to move a crane structure of 30-50T.

Ulstein started on a bright idea - to *reduce the compensated mass to an absolute minimum*. From this idea, the Colibri™ motion compensation concept was formed.

The development of the Colibri™ went through several iterations, and in cooperation with Macgregor resulted in a cost efficient, lightweight, high performance system.

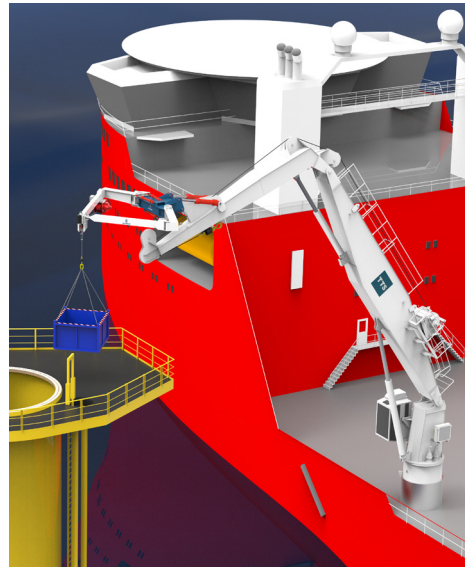


# Best of both worlds

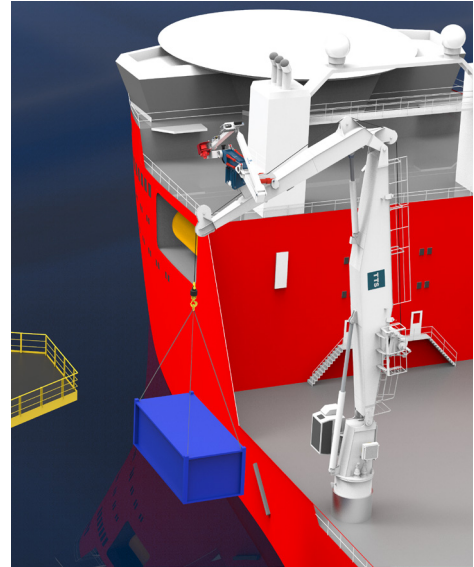
The Colibri™ is in principal an additional articulation on the folding jib of a traditional Knuckle Boom Crane.

However, this extra articulation can compensate in the X & Y plane, adding an additional axis of compensation.

The Colibri™ crane functions both as a normal offshore crane with AHC, and as a 3D motion compensated crane, without the need for any mobilization or interchanging of parts. The Colibri™ has it's own cylinders that control the articulation, so switching from Main Winch operation to Colibri™ operation can be rigged in a couple of minutes.



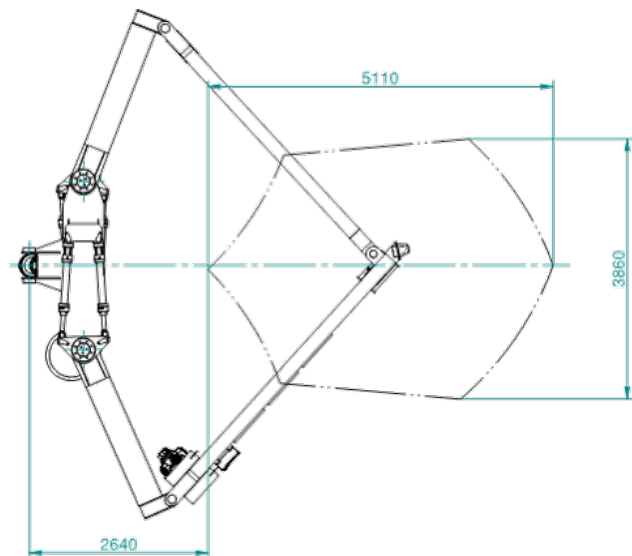
Colibri™ 3D Operation



Main Winch Operation

## Standard Features

- Independent Main Winch from 1T to 50T
- Anti-sway function with wind load compensation
- Side-/Off-lead detection
- Colibri™ Anti-collision system
- X / Y Compensation
- Z Compensation
- Camera on Jib-tip and Colibri™
- Constant Tension function on all winches
- User friendly, touch screen graphical interface (HMI)
- Integrated Hydraulic Power Unit (HPU)
- 24/7 Remote Access System
- Emergency Operation
- Safety systems according to applicable Class
- High quality marine grade components and surface treatment throughout.



Colibri™ X & Y Operation Envelope

## Optional Features

- Main Winch with AHC and Subsea capability
- Personnel Handling on both Colibri™ and Main Winch
- Fully redundant HPU array
- Radio Remote Control
- Remote Release load hooks
- Remote mounted HPU (tank-top, machinery space)
- IP Camera on Jib-tip and Colibri™ with Wi-Fi connectivity
- Crane Anti-collision system
- Tugger Winches
- Variable Constant Tension, 0-80% of SWL (CT-VAR)
- XYZ Control
- Path Control
- Condition Based Monitoring System
- Winterization

The X & Y operational envelope is controlled by hydraulic cylinders, fed by the integrated HPU array in the crane, resulting in reduced installed power on the vessel. The Z-axis compensation is via a conventional AHC winch based on Macgregor' market leading system, which has proven levels of compensation exceeding 99%.

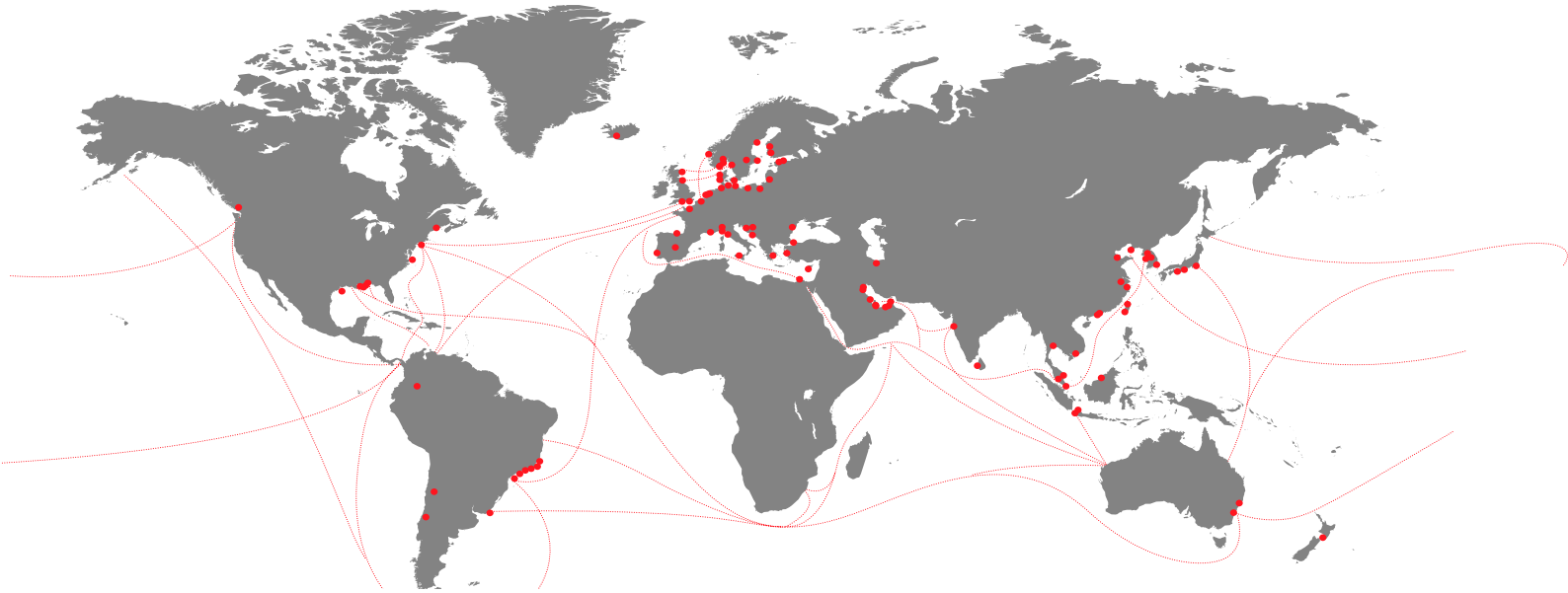
The Colibri™ has an absolute minimum of moving parts, ensuring both low CAPEX and OPEX. Furthermore with Macgregor' 24/7 remote access service, downtime and service costs are reduced, as trouble shooting and tuning can be done via remote connection.





# Worldwide service network

Whenever needed you can rely on our support



MacGregor is a leader in intelligent maritime cargo and load handling with a strong portfolio of MacGregor, Hatlapa, Porsgrunn, Pusnes, Rapp and Triplex products, services and solutions, all designed to perform with the sea.

Shipbuilders, shipowners and operators are able to optimise the lifetime profitability, safety, reliability and environmental sustainability of their operations by working in close cooperation with MacGregor. [www.macgregor.com](http://www.macgregor.com)

MacGregor is part of Cargotec. Cargotec's (Nasdaq Helsinki: CGCBV) sales in 2018 totalled approximately EUR 3.3 billion and it employs around 12,000 people worldwide. [www.cargotec.com](http://www.cargotec.com)

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