



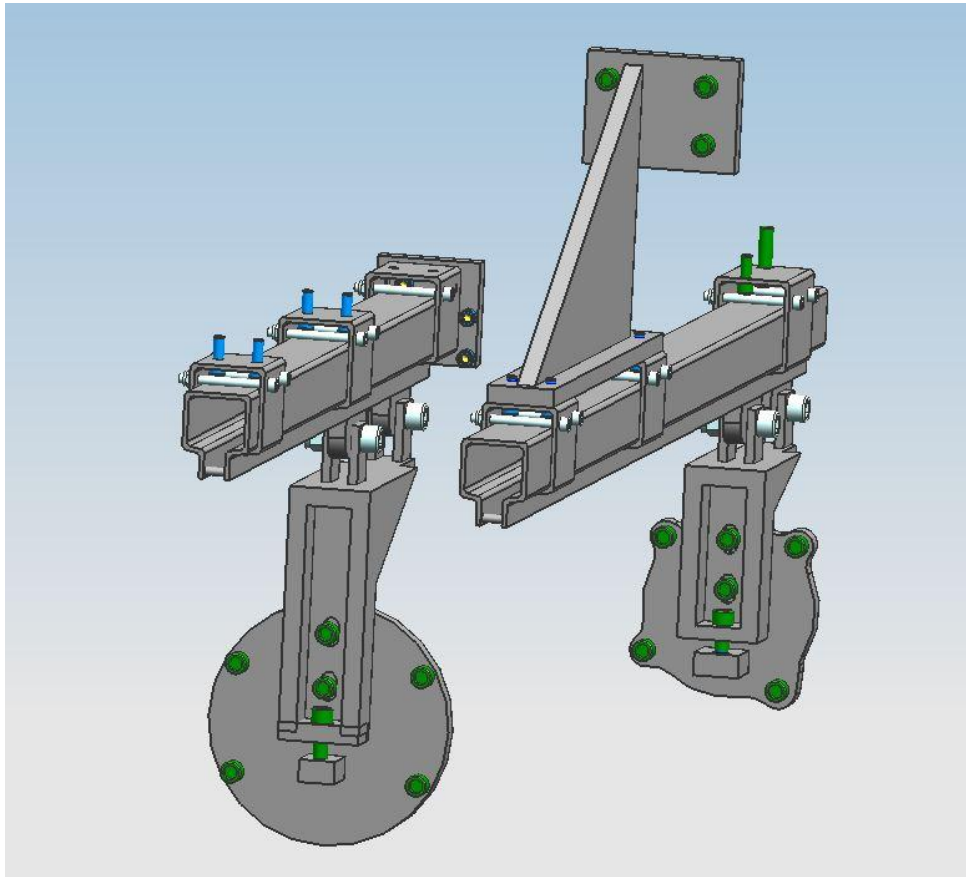
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# INSTRUCTION MANUAL (ORIGINAL)

## Lifting accessory

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## LIFTING ACCESSORY

## FOR PUMP COVER

PAAF326940 / -

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## Premise

This instruction manual contains important information and instructions for using the lifting accessory properly.

It is important that every user involved in the transport, installation, adjustment, operation, maintenance, repair and dismantling of the lifting accessory reads this instruction manual carefully before proceeding with the necessary operations in order to avoid manoeuvres that could damage the lifting accessory itself or put the safety of the people around the lifting accessory at risk.

It is important that the instruction manual is available for the operator and that the instruction manual is carefully stored in the same place where the lifting accessory is being used. The instruction manual must be easily and immediately available if it urgently needs to be consulted, or needs to be used for any other reason.

If after reading this instruction manual you still have uncertainties about using the lifting accessory, please contact the technical persons at Wärtsilä, who will give assistance.

Finally, we would like to remind you that the current regulations on safety and hygiene at work and protection of the environment must be observed at all times when using the lifting accessory.

The user must always behave appropriately in relation to the specific dangers of lifting and transporting operations.

The operator is expected to make sure that the lifting accessory is used only in optimal conditions for the safety of both people and property.

In case of interpretation disputes the English version of manual applies.

To help you understand this instruction manual better, we mean by:

### **Lift series**

A number of continuative lifting actions performed in a certain period of time *e.g.* in a day, in a week

### **Crane**

Machine for shifting loads, for example a bridge crane

### **Danger zone**

Any space within and/or around machinery in which a person can be exposed to a hazard

### **Residual risk**

Residual risk is risk which remains after protection actions

## General information

### Description

The lifting accessory must be attached mechanically to the load according to this instruction manual.

The lifting accessory is suitable for lifting and shifting specific types of loads, which are described in this instruction manual.

It is strictly forbidden to use the lifting accessory for any other load lifting or in other situations than described in this instruction manual.

The lifting accessory is painted with colour shade RAL7039 (Quartz grey).

### Technical standards referred to

This lifting accessory has been designed according to machinery directive 2006/42/EC (main requirements) and requirements of following (parts/clauses of) harmonized and international standards have been applied:

- EN 13155:2003+A2:2009 - Cranes. Safety. Non-fixed load lifting attachments
- EN ISO 14121-1 - Safety of machinery. Risk assessment. Part 1:Principles
- EN ISO 12100-1-2: 2010 - Safety of machinery. Basic concepts, general principles for design.

### Elements supplied

The following elements have been supplied:

- Lifting accessory for W31 engine pump cover and PTO-shaft moving (Figure 1).

Lifting accessory documentation:

- Instruction manual in original version and/or translation
- Copy of the original EC declaration of conformity

Lifting accessory components:

1. Bracket (1 pcs)
2. Forked bracket (4 pcs)
3. Forked bracket (1 pcs)
4. Hexagon socket screw M10x100 (11pcs)
5. Right-hand rail (1 pcs)
6. M10 self-locking nut(11pcs)
7. Hexagon socket screw M20x70 (4 pcs)
8. M20 self-locking nut (4pcs)
9. Hexagon socket screw M16x50 (18pcs)
10. Hexagon socket screw M12x30 (9 pcs)
11. Bracket right (1 pcs)
12. Plate right(1 pcs)
13. Left-hand rail (1pcs)
14. Bracket (1 pcs)
15. Bracket left (1 pcs)
16. Plate left (1 pcs)
17. Hexagon socket screw M10x40 (3 pcs)
18. Wheel set (4 pcs)

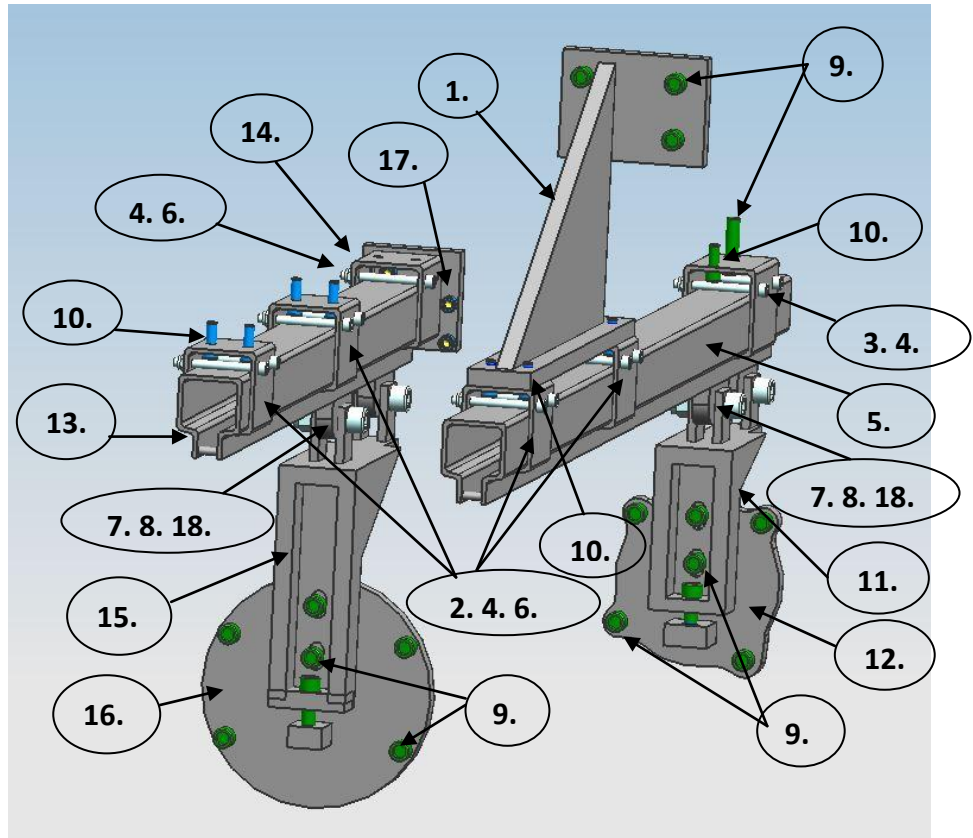


Figure 1. Lifting accessory and component specification

## Working load limit

The maximum working load limit (WLL) for the lifting accessory is 1200 kg.

The used static test coefficient for the lifting accessory is two (2). This value is used only in theoretical study in calculations.

## Expected uses

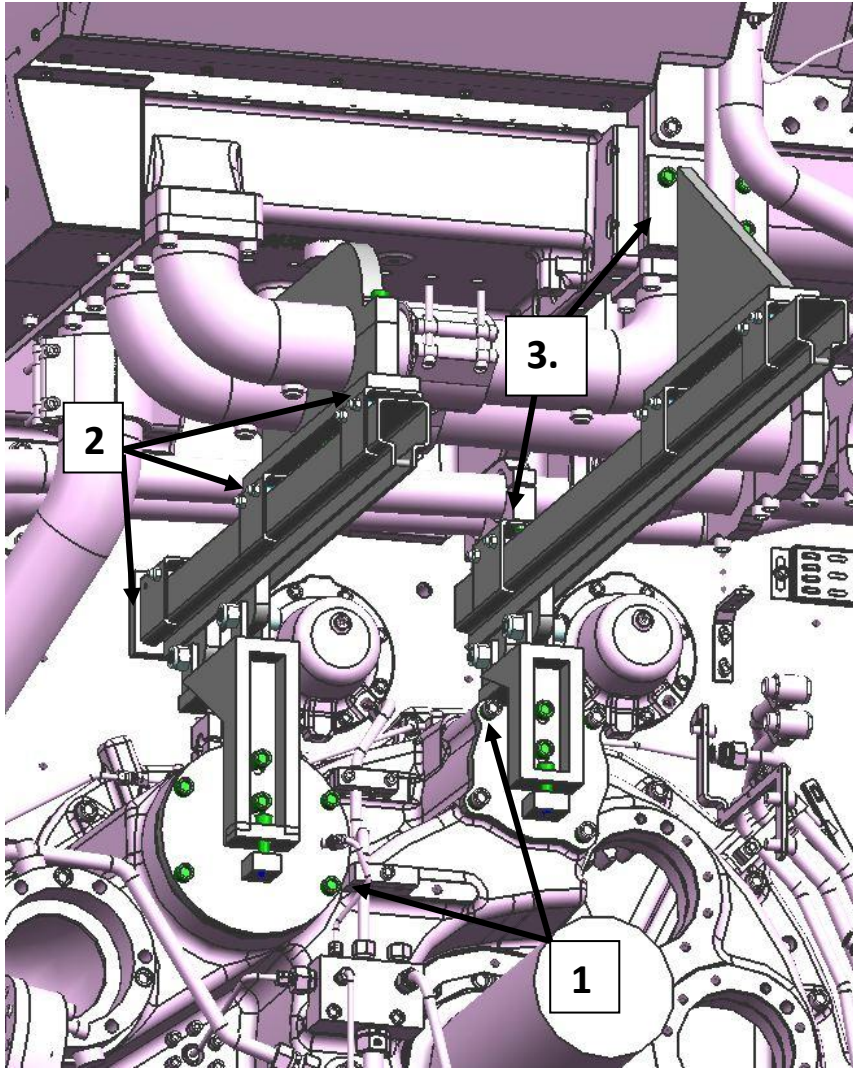
This Wärtsilä lifting accessory must be used only for lifting and shifting the loads described below and in accordance with this manual.

Components supplied by any other manufacturer may not be used.

The lifting situation is constituted as follows:

- Load:
  - Pump cover and PTO-shaft of Wärtsilä W31 engine. The same lifting accessory assort is also used to move water pumps and oil pump (check document DAAFXXXXX).
- Fastening points of lifting accessory (figure 2):
  1. Two fastening points to load (8pcs M16x50 hexagon socket screws).
  2. Fastening point for left-hand rail to engine (7pcs M12x30 hexagon socket screw).

3. Fastening points for right-hand rail to engine (5pcs M12x30 hexagon socket screws and 4pcs M16x50 hexagon socket screws).



**Figure 2.** Lifting situation and fastening points (figure is suggestive)

The load must be fastened exactly and only as shown in this instruction manual.

**The lifting accessory operator is always responsible for checking on the load-bearing capacity of the lifting accessory in relation to the load limit.**

## **Working conditions and working life**

If the lifting accessory is correctly maintained, the maximum working life of the lifting accessory is 20.000 lift cycles.

In order to keep a record of lift cycles, a register is provided at the end of this instruction manual (see: “Attachment–Register of lift cycles”). This is to be compiled at the end of each lift series. By “lift series” we mean a number of continuative lifting actions performed in a certain period of time (e.g. in a day, in a week).

## **Instructions for using the lifting accessory**

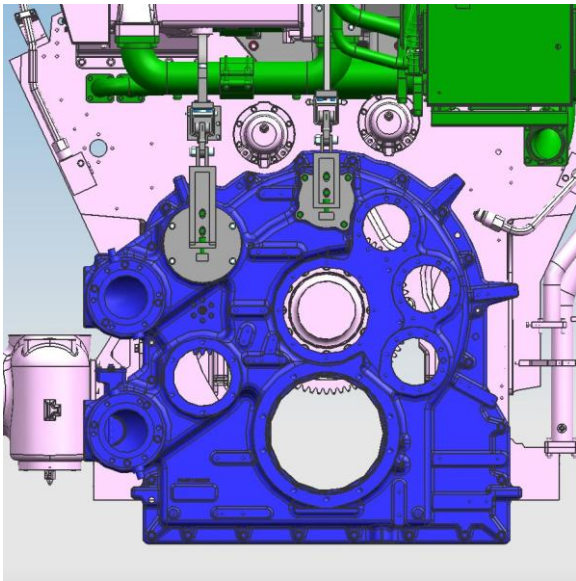
### **General lifting regulations**

- Staying under load is forbidden.
- The weight of the lifted part must be known before lifting.
- Do not “shock load”.
- Ensure the fastening of the load.
- Lifting forbidden if the markings of the accessory are unreadable.
- Warn others near the lifting area.
- Danger zone must be marked.
- Forced moving of load is forbidden.
- It is strictly forbidden to use the lifting accessory for extraction tool, lifted part must always be extracted before lifting event.
- Ensure straight lift in the middle of the load, lifting forbidden if load is indirect.
- Ensure direct visibility to the working area.
- Troubleshooting must be carried out carefully.
- Safety regulations must be observed during the troubleshooting.
- The load shall not be exposed to external forces during the troubleshooting.
- Keep your hands always above the load, never below.
- Working surface/platform must be safe to use in all situations.

## Preparing, attaching and adjusting the accessory

All preparation work must be done before lifting the load (cleaning, extracting etc.). The only possible fastening way is presented in figures below (Figures 3-13).

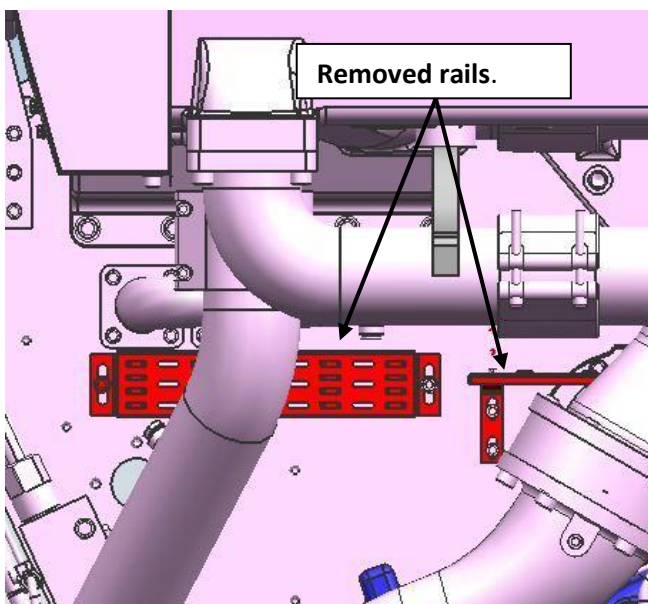
This lifting accessory is designed to move Wärtsilä W31 engine pump cover and PTO-shaft out of the engine. The tool is designed for the empty pump cover. All pumps and pipes in the pump cover to be removed first (Figure 3). All screws need to be tightened according to instructions before the pump cover can be moved. Both rails are to be installed before the tool can be used.



**Figure 3.** Empty pump cover

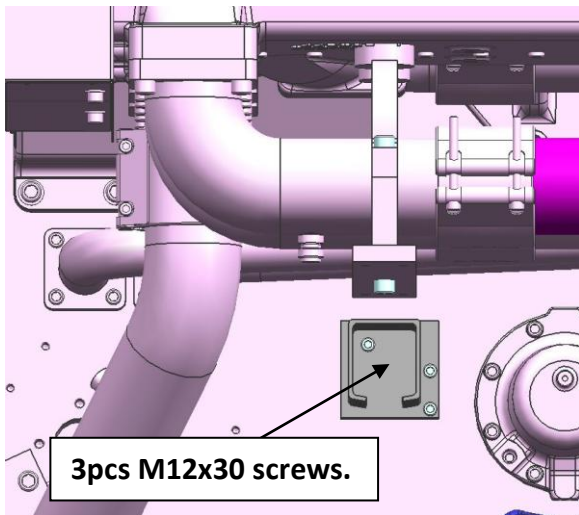
### Mounting of left-hand rail

Remove the left-hand and the middle cable rail in the engine block (Figure 4). Assemble the brackets (parts 2 & 14) first to the engine. Assemble the bracket (14) in the engine block, use three M10x40 10.9 hexagon socket screw (Figure 5). Assemble two pieces of the forked brackets (part 2) to the water pipe brackets, use four M12x30 10.9 hexagon socket screw (Figure 6).

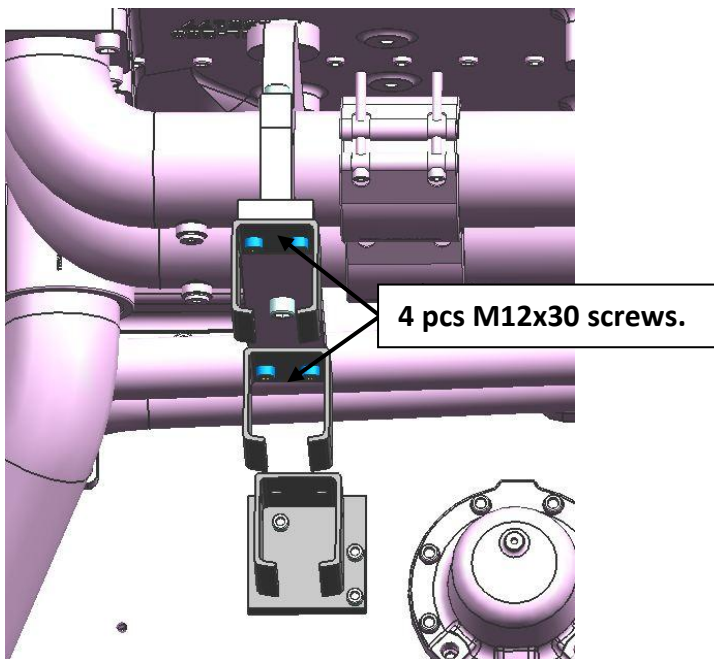


**Figure 4.** Rails which will be removed.





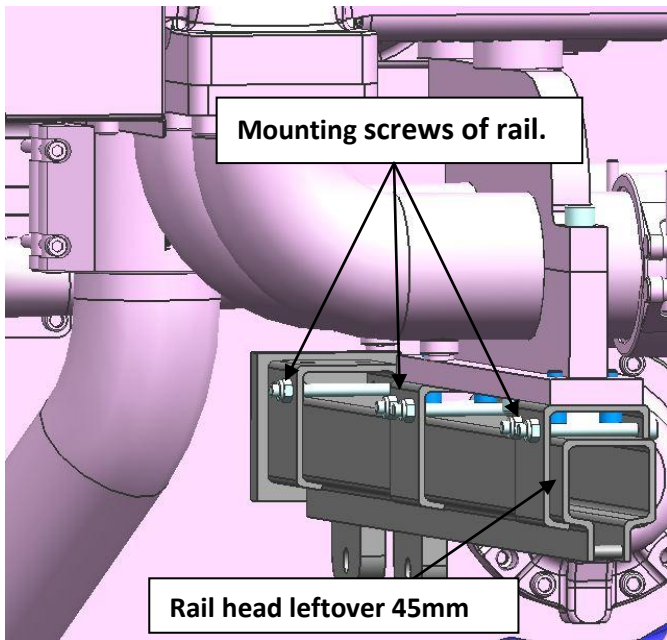
**Figure 5.** Bracket has been mounted to engine block.



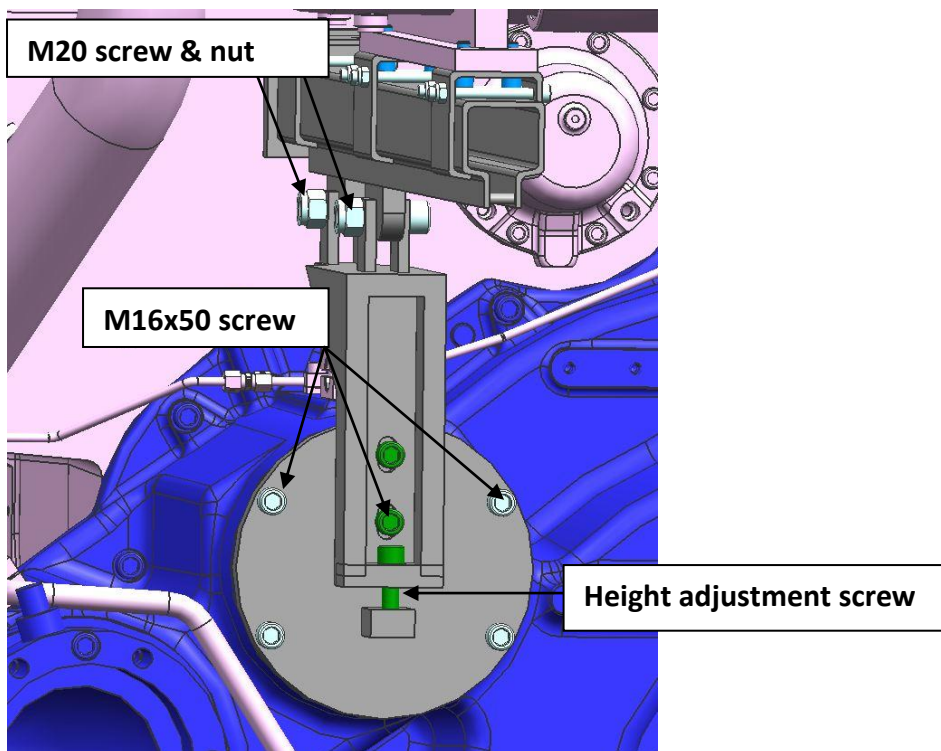
**Figure 6.** Front forked brackets.

Slip the rail (part 13) inside the forked brackets. Check that the rail head leftover is 45mm outside of the front forked bracket. Mount the rail in position, use five M10x100 10.9 hexagon socket screws and M10 self-locking nuts (Figure 7). Assemble the plate (part 16) to the pump cover to replace the upper water pump, using four M16x50 10.9 hexagon socket screws (Figure 8).

Assemble the next bracket (part 15, Figure 8). Mount the bracket to the wheel set using two M20x70 10.9 hexagon socket screws and M20 self-locking nuts. M20 screws may be left without tightening to the moment. You must check that the nuts are locked. Connect the bracket and the plate, using two M16x50 10.9 hexagon socket screws. Set M16x50 10.9 height adjustment screw at the same time. Do not tighten the screws between the plate and the bracket before you have adjusted the height of the bracket. Remove clearances on the bracket tightening the height adjustment screw. Verify that all screws are tightened before moving the pump cover. The tightening moments are in the table on page 13.



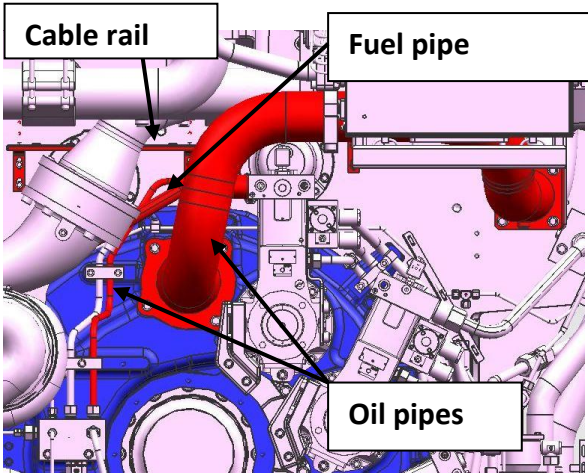
**Figure 7.** Rail has been mounted



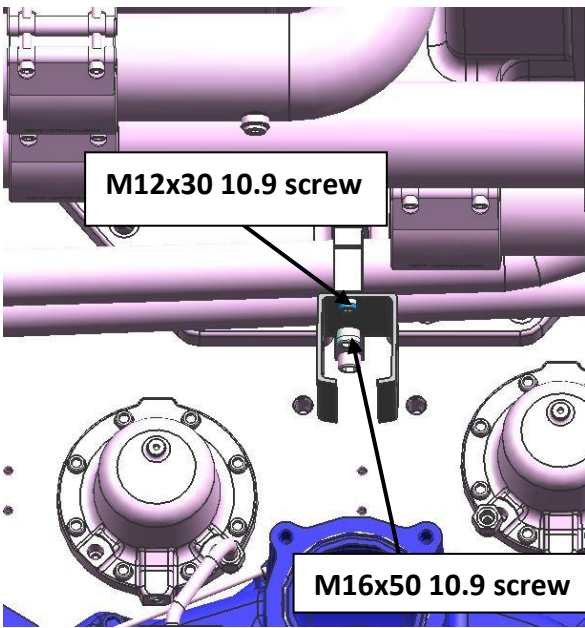
**Figure 8.** Bracket and plate has been mounted.

### Mounting of right-hand rail

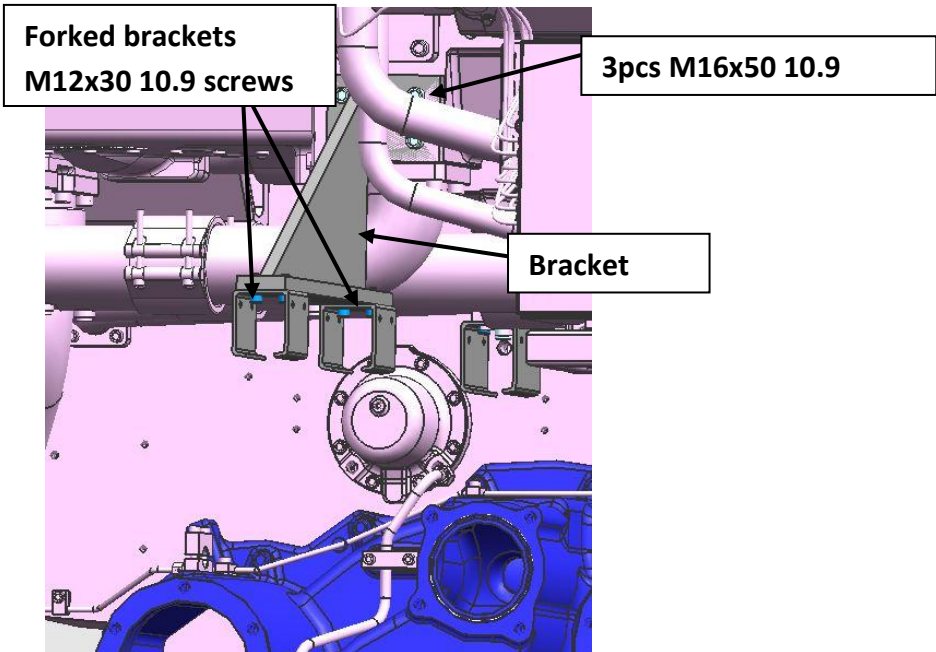
Remove the big oil pipe from the pump cover, high pressure fuel pipe, oil pipe of balancing shaft bearing and middle cable rail from the engine block (Figure 9). Assemble the brackets first (parts 1& 3) to engine. Mount bracket (part 3) below the oil pipes bracket. Replace the original screws from the bracket to M16x50 10.9 and M12x30 10.9 screws (Figure 10). Assemble the bracket (part 1) to the bracket of turbocharger, use three M16x50 10.9 hexagon socket screws. Assemble two forked brackets (part 2) below the first assembled bracket (part 1), use four M12x30 10.9 screws (Figure 11).



**Kuva 9.**Parts which will be removed.



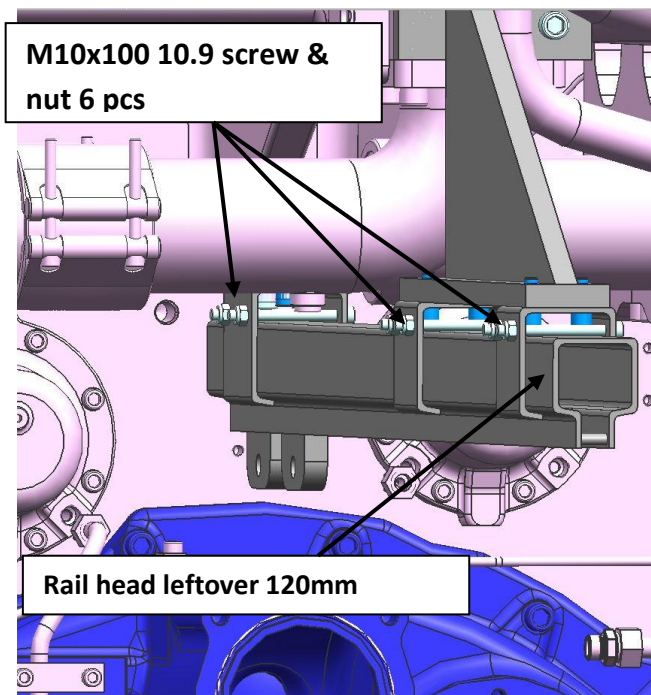
**Figure 10.** Rear forked bracket.



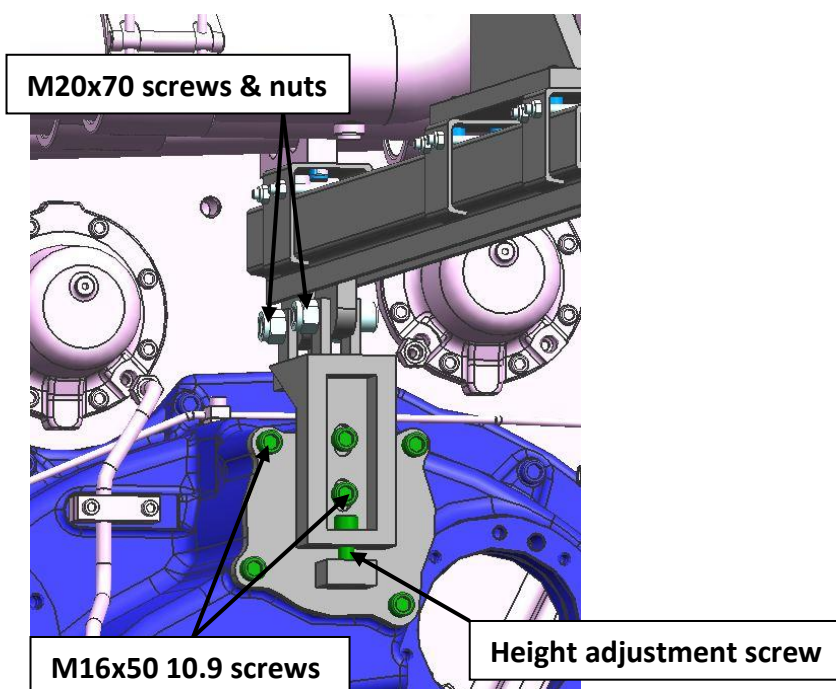
**Figure11.** Front forked brackets.

Slip the rail (part 5) inside the forked brackets. Check that the rail head leftover is 120mm outside the front forked bracket. Mount the rail in position, use six M10x100 10.9 hexagon socket screws and M10 self-locking nuts (Figure 12). Assemble the plate (part 12) to the location of the oil pipe which has been removed from the pump cover, use four M16x50 10.9 hexagon socket screw.

Mount the bracket (part 11) to the wheel set using two M20 10.9 hexagon socket screws and M20 self-locking nuts. Connect the bracket and the plate, using two M16x50 10.9 hexagon socket screws. Set M16x50 10.9 height adjustment screw at the same time. Do not tighten the screws between the plate and the bracket before you have adjusted the height of the bracket. Remove clearances on the bracket tightening the height adjustment screw (Figure 13). Verify that all screws are tightened before moving the pump cover. The tightening moments are in the table on page 13.



**Figure 12.** Rail has been mounted



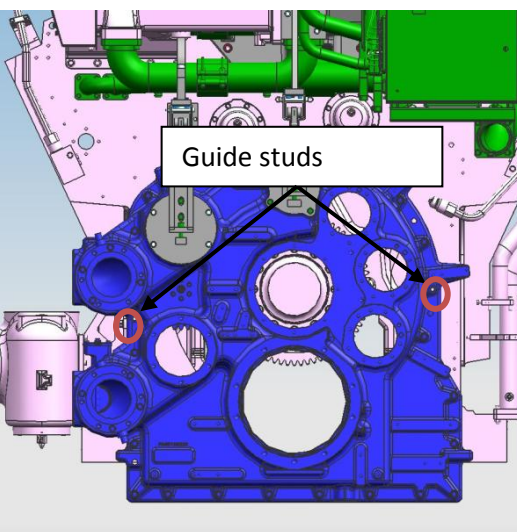
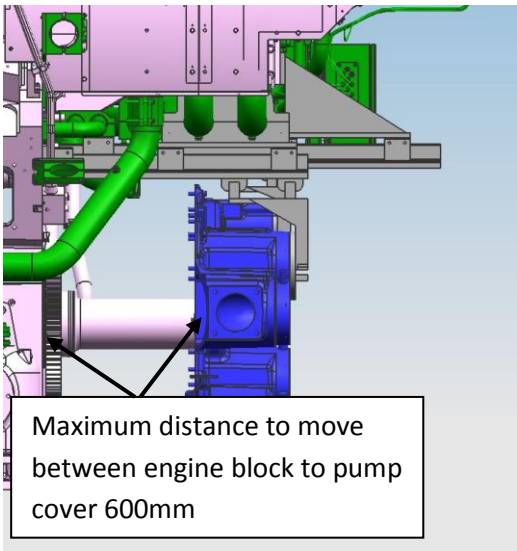
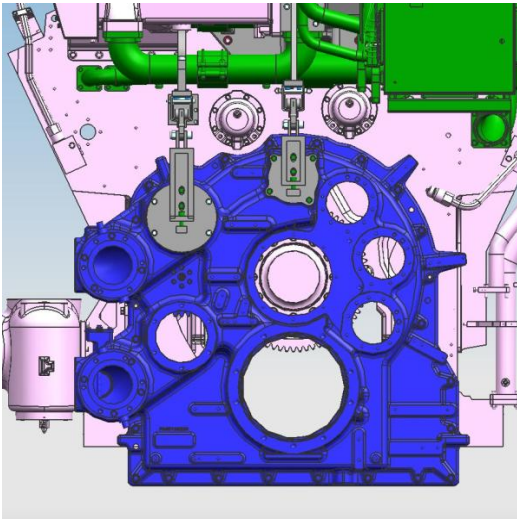
**Figure 13.** Bracket and plate has been mounted

## Tightening moments

Screw	Moment
M10 10.9	71Nm
M12 10.9	123Nm
M16 10.9	302Nm
M20 10.9	592Nm

Tightening torques must not be exceeded in any case

## Load removal



Figures 14, 15 ja 16.

(figure is suggestive)

1. The pump cover has been mounted to the rails. All pumps and pipes have been removed from the pump cover.

2. Make sure that all the screws are tightened according to the instruction manual. Pay special attention to the adjustments of the height and the locking. The load must not be moved in any case only to the support of the height adjustment screws. The load must be moved by steady and calm movements, sudden movements are forbidden (Figures 14 and 15).



**Make sure that the lifting accessory is firmly and evenly tightened to the pump cover before moving.**

3. Use at least two M16 studs screws at the reinstallation stage to guide the pump cover in place (Figure 16).



**Danger! Do not stay under or in the danger zone of the load.**



**Danger of objects falling from above and being thrown!**



**Danger of objects or materials with a high temperature!**

**Risk of hand, feet, head, eye and body injury. Risk of hearing loss.**



**Always use personal protection equipment during operation when working with the lifting accessory.**

## Limits on the use and operating environment

### Temperature

The lifting accessory is designed and recommended to use in the normal temperature of about +20 ° C.

The limits of temperature for use are given below:

- Lowest possible temperature for use + 10 ° C
- Highest possible temperature for use + 60 ° C

**NOTE! Lifting forbidden if lifting accessory temperature is lower or higher than given limits above.**

If more detailed information is needed about use and operating temperature, please contact the technical persons at Wärtsilä.

### Operating environment

The lifting accessory must not be used in damaging environment conditions.

### Danger zones and prohibited uses

While the lifting accessory is lifting a load the area under and near the load is considered as a danger zone. No one must stay under or in the vicinity of the load while it is being lifted (except the operator involved in the handling activities).

Ensure that all work safety regulations and ergonomics are taken into account when using the lifting accessory.

### User training

Lifting accessory operators must be trained in the use of the lifting accessory.

The lifting and shifting of the load should be planned and must be supervised step by step during the lifting event.

### Maintenance and repair

If permanent deformation and / or broken components are detected, it is not allowed to use the lifting accessory. Faulty components must be replaced. It is not allowed to repair the components. If spare parts are needed, please contact Wärtsilä.

**Use only original spare parts.**

### Checks and inspections

The lifting accessory must be inspected before each use. Lifting accessory must also be inspected if flaws are suspected, or the lifting accessory has been overloaded or used in damaging environment conditions.

Before each lifting situation, the user must always proceed as follows:

- A visual check for the lifting accessory. There should not be any signs of corrosion or deformation that could compromise its reliability.
- Check especially the components which are installed to the lifting accessory for example locking functions and that the threads of the lifting eye bolt and welding boss are unbroken. There should not be any sign of cracks or deformation.
- Welds check must be performed by specialist (enough experienced person). Welds must not display any fault on the paint or signs of corrosion.

Periodic inspection is carried out annually by specialist inspection person. The lifting accessory has a sign plate which has a field for inspection markings. The field shows if the inspection is valid.

After a period of inactivity of over 3 years, the whole lifting accessory must in any case be checked and carefully inspected by specialist inspection person, especially the welding.

In all unclear situations regarding the condition of the lifting accessory, please contact Wärtsilä.

The lifting accessories are inspected yearly. Inspection should be marked with identifying colour:

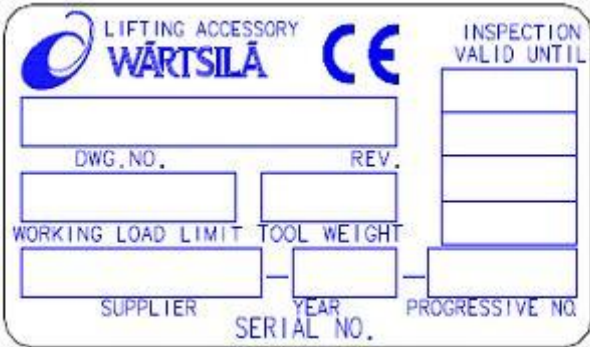
Year	Colour of inspection
2013	Orange
2014	Blue
2015	Yellow
2016	White
2017	Green

In year 2018 inspection colour cycle starts from beginning. The year 2018 inspection colour is the first colour in the table (orange), the year 2019 inspection colour is second colour in the table (blue) and so on.

## Markings

### Sign plate

The lifting accessory has a sign plate on its side (Figure 17).



The sign plate is a rectangular label with a rounded border. It features the Wärtsilä logo and 'LIFTING ACCESSORY WÄRTSILÄ CE' at the top. Below this, there are several fields for technical data: 'DWG. NO.' and 'REV.' in a single row; 'WORKING LOAD LIMIT' and 'TOOL WEIGHT' in a single row; and 'SUPPLIER', 'YEAR', and 'PROGRESSIVE NO.' in a single row. A 'SERIAL NO.' field is located below the 'YEAR' field. On the right side, there is a vertical column of four boxes labeled 'INSPECTION VALID UNTIL'.









**Figure 17.** Lifting accessory sign plate





The sign plate has a field for inspection markings. The marking shows if the inspection is valid. Lifting is forbidden if the markings of the sign plate are unreadable.

### Safety warnings and residual risks

As far as residual risks are concerned the user must follow and take notice of given safety warnings.

Sign	Identification	Residual risk
	Obligation!  Wear protective gloves.	Risk of hand injury.
	Obligation!  Wear protective shoes.	Risk of foot injury.
	Obligation!  Wear protective helmet.	Risk of head injury.
	Obligation!  Ear protection.	Risk of hearing loss
	Obligation!  Eye protection.	Risk of eye injury
	Obligation!  Body protection.	Risk of body injury
	Warning!  General danger arising from the shifting of the load	Mistakes in manoeuvres can lead to impact or crushing
	Danger zone!  Do not go under the load or danger zone while it is being lifted or shifted.	Injuries due to the load or hanging parts falling.

Sign	Identification	Residual risk
	<p>Warning!</p> <p>Danger from hanging loads.</p> <p>Danger of objects falling from above.</p> <p>Danger of being thrown.</p>	Injuries caused by the fall of objects not correctly attached to the lifting accessory or uncontrolled movements.
	<p>Warning!</p> <p>Danger of hot surface.</p>	Injuries caused by the objects or materials with a high temperature.

## Storage and transport

Store the lifting accessory in a clean and dry place. We would like to emphasize the importance of having a storage space with normal conditions of use (damaging atmospheres, extreme temperatures and humidity changes must be avoided).

Protect the lifting accessory against corrosion and damaging during the storage or transportation.

Properties of the lifting accessory:

- Weight ~ 100kg
- Dimensions 1500mm x 660mm x 970mm
- Material Steel

## Disposal of the accessory

### References to the regulations

Every element, object or substance arising from human activities, in the natural course of things, is destined to become “waste”.

These types of waste must be disposed of in compliance with the applicable laws and directives on care for the environment in the country where the lifting accessory was used.

### Decommissioning and dismantling

The lifting accessory must be dismantled, the parts separated and then prepared for disposal according to the local environmental laws and regulations.

Remember that environmental protection and recycling of the material is for the benefit of us all.

The whole lifting accessory is made of ferrous material (steel), which as a form of waste is not particularly toxic or harmful.

## Assistance

For assistance with this product, please contact:

Wärtsilä Finland Oy  
Järvikatu 2 - 4  
P.O. BOX 244  
65101 Vaasa  
Tel. +358 10 709 0000  
Fax: +358 10 709 1380  
24h tel. +358 10 709 080  
Web [www.wartsila.com](http://www.wartsila.com)

Attachment – EC declaration of conformity



**EC Declaration of conformity CE**

Doc.id: DAAFXXXXXX

(Machinery directive 2006/42/EC, Annex II, sub. A)

Page 1/1

Manufacturer:  
**Wärtsilä Finland Oy**  
Järvikatu 2-4  
P.O. BOX 244  
65101 Vaasa  
Finland

Herewith declares:

- that following lifting accessory type/series:

**Lifting accessory type/series: PAAF326940 / -**

with all relevant equipment is in conformity with main requirements of the following EC directive:

**Machinery Directive 2006/42/EC**

- that following (parts/clauses of) harmonised standards have been applied:

**EN 13155:2003+A2:2009** Cranes. Safety. Non-fixed load lifting attachments

- that following (parts/clauses of) international and national standards have been applied:

**EN ISO 12100-1-2** Safety of machinery. Basic concepts, general principles for design.

**EN ISO 14121-1** Safety of machinery. Risk assessment. Part 1:Principles

The relevant technical documentation, in accordance with Machinery Directive 2006/42/EC annex VII A, can be made available and transmitted to national authorities for inspection on application to:

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*Petri Illikainen*

Design Manager, Product Design  
Wärtsilä Finland Oy

Vaasa, Finland xx/xx2015

**Sign on behalf of the Wärtsilä Finland Oy**

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*Kenneth Rönnbäck*

Director, Delivery Centre Vaasa  
Wärtsilä Finland Oy

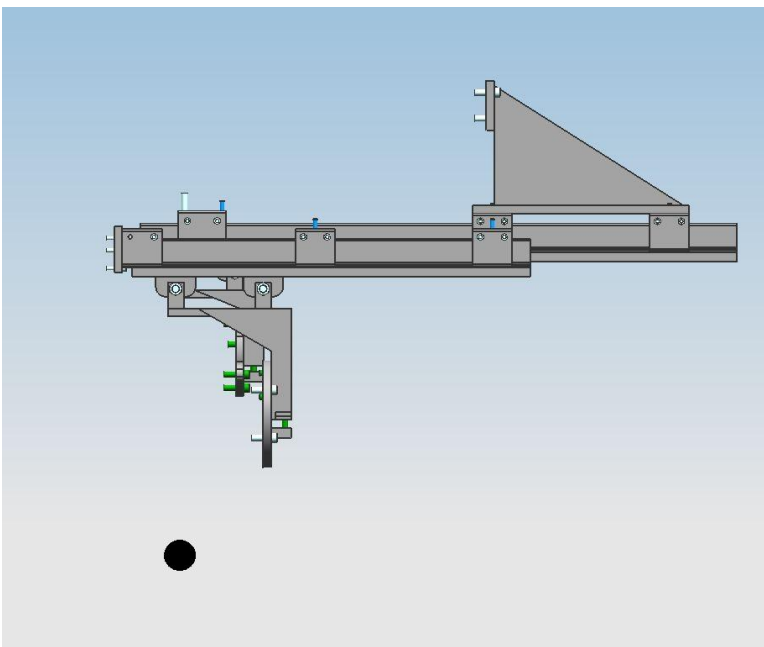
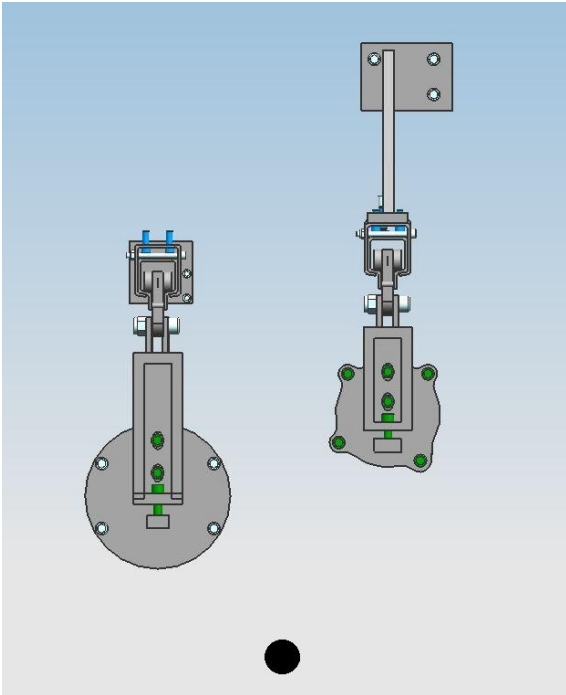
## Attachment - Lift cycle register

	Dates – Period of time	Place of use	Number of lift cycles	Operator's signature
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

## Attachment - Lifting diagrams

Centre of gravity is show to below

- 1. From the front
- 2. Side view



● = Point mass