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13.3. Select crane parameters

For choice crane parameters it is necessary:

- enter the setup menu;
- select the «crane params» item;
- select boom length, lib length, jib offset, work mode crane or tower.

Date and time	Boom type
Select crane	Boom length
◀Crane params▶	Jib length
Tune radius	Reliance
Tune weight	

13.4. Set the coefficient for determination radius

For set the coefficient for determination radius it is necessary:

- enter the setup menu;
- select the «setup» item;
- select «tune radius»;

Crane params
Tune radius
◀Tune weight▶
Software update
Display test

- set maximum angle of boom;
- measure the radius by tape measure;
- adjust radius and click «save».

Boom angle	R=11.92	L=39.62
20 . 00	angle=75.00	
Save	[d_ang]=0.00	

13.5. Adjustment the determination of the load mass of crane

- push the button 2 enter to the work menu;
- enter in «setup» – «tune weight»;
- select main or aux hoist;

Crane params	
Tune radius	
◀Tune weight▶	◀Main hoist▶
Software update	Aux hoist
Display test	

Loads quantity	hoist=main	index=0
◀Main hoist, Q0▶	f=200	pol=8
Main hoist, Q1	[f]=200.00	[pol]=8
	[q]=1.00	

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- select the number of weights to adjust the load cell to the menu item «q. qty». By default use, the two weights: empty hook and maximum load;

Main hoist, Q0	hoist=main	index=0
01 . 00	f=200	pol=8
Save	[f]=200.00	[pol]=8
	[q]=1.00	

- adjust the definition of the weight on the main and auxiliary winch. To do this, the corresponding menu to specify the weight of the hook and press the save button.

1. Introduction

This manual is coverage to a rated capacity limiter system OGM240-27 (hereinafter referred to as system or OGM240) for lattice boom crane (hereinafter referred to as crane).

OGM240 protect the crane from overload and turnover, damages by working in narrow circumstances, collision crane’s mechanism with power line and datalogger short-time and long-time crane’s parameters in real time.

Manual is speaking about: functions, adjustment, order of work, instructions of technical service, disrepairs and its removal, regulations of keeping, packing and transportation.

Component parts of the system and technical operation factors are adduced in warranty service rules to OGM240-27.

Through constant working to improvement construction and perfection functional performance system inessential modifications of construction OGM240 may be not listed in this manual.

All reprimands and suggestions to constructions, service and operating documents system send to manufacturer address.

2. Safety precautions

Using a system necessary observing requirements of safety precautions, described in the operations documents for cranes.

Availability of OGM240 do not relieve the crane operator of responsibility for turnover of the crane, destruction its constructions or other accidents.

The system must be using only as rated capacity limiter for cut off the crane by overload. Each time the operator must be evident that lifting given load doesn’t cause overload.

In spite of available OGM240, prohibit trying lift load limited permissible capacity of the crane with given radius.

Do not use OGM240 in the capacity of system of weights or force measuring instrument, including tearing fasten load.

Connection of outer power source to electrical equipment of the crane with installed system is authorized only with available functioning accumulator.

When welding apparatus is working on the crane electricity ought to be turned off.

In case of leads are damaged or either component parts are mechanical is damaged (including connecting

13. Adjustment

- ! Attention!**
- 1. The system adjustment should be done only by crane’s manufacturer or Rezonans Company’s authorized services adjustments.
 - 2. Use extra caution, because in this mode OGM240 doesn’t limit the crane’s capacity and isn’t block lifting up crane boom mechanism, when the radius is maximum and minimum.

- For OGM240 adjustment it is necessary:
- prepare the system for working;
 - turn the «Work – Setup» toggle anticlockwise till adjustment mode symbol appear(toggle switch located on the rear wall of the graphical console unit);
 - settings made in the «Setup» menu;
 - after adjustmentturn the «Work – Setup» toggle clockwise till adjustment mode symbol disappear.



13.1. Set time and date

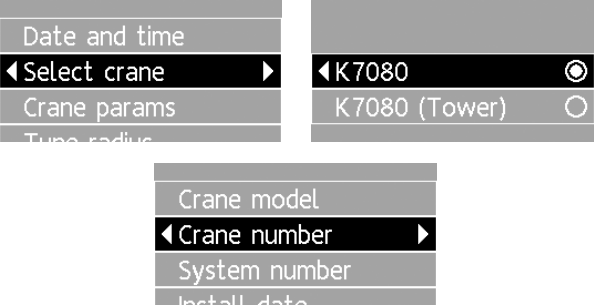
- For set up the date and time it is necessary:
- enter the setup menu;

- select the «date and time» item;
- set the correct date and time;
- click save.



13.2. Choice of the crane’s version

- For choice the type of crane it is necessary:
- enter the setup menu;
 - select the «select crane» item;
 - select crane name, crane number, install date.



12. Keeping and transportation regulations

OGM240 ought to be stored in the closed storehouse in the producer's packing and don't open.

Storage conditions in the line of climatic factors ought to correspond the storage requirements for products of «moderate and cold climate» group. The current-conducting dust, acid, alkali and other corrosive substances in the storehouse ought to be absent.

The retention cycle of OGM240 is nothing more than 6 month.

The system may be transported by all types of the covered transport (truck, airplane and train) with following regulations for current transport.

Transporting conditions in the line of climatic factors ought to correspond to the storage requirements.

The system ought to be transported in the producer's pack or in the wood box, where mechanical failures of component parts are except.

By transporting packages with OGM240 ought to be protected from atmospheric precipitation and blow influence.

The mark of the transport packages ought to correspond to the requirements of package marking.

By storage and transport it is permissible to put boxes with OGM240 nothing more than 3 layers. Boxes ought to remove as provided by manipulation symbols.

The crane's close and open maintenance realize, when crane is close and open.

During realizing of maintenance component parts of the system recommended to take apart, exception connecting cable. In this case will be necessary to protect plug-and-sockets of connecting cable from dust and moisture, covered its answered parts by the oil paper and then polyethylene film.

If it is not possible to dismantle, it is necessary to except the direct influence of precipitation and sun radiation, the hitting dust and moisture inside modules and sensors, connecting cable should not contact with fuels and lubricants materials.

The operator console ought to be secured from the regular hit of rain and snow. Recommend to support the supplementary safety of complementary parts of OGM240 with polyethylene film or other materials.

When the crane will be open, it will be necessary to make the season maintenance.

10. Check with test weights

The OGM240 check with test weights in the crane's structure should be done by adjuster of the system under the direction of technical and engineering employee, who is in charge of keeping the crane in the operation condition.

Only certificated system adjuster or engineer, who in charge of keeping crane in health status, have a right to make marks about works in the warranty service rules and log-book.

The check ought to take place on the certificated testing area with test weights, which has inaccuracy of the mass nothing more than that 3%.

The check conduct at the next order:

- place minimum radius;
- gage the real radius by measure and to compare it with operator console's display (if the divergence of display and real radius more than 1,5%, to adjustment the radius);
- place maximum radius;
- gage the real radius by measure and to compare it with operator console's display (if the divergence of display and real radius more than 1,5%, to adjustment the radius);
- by maximum radius to lift up the load, conforming to the warranty service rules value by this radius;

cable), as well as mark about regulation in the warranty service rules is missing, operation of system is prohibited.

3. Description and component parts working

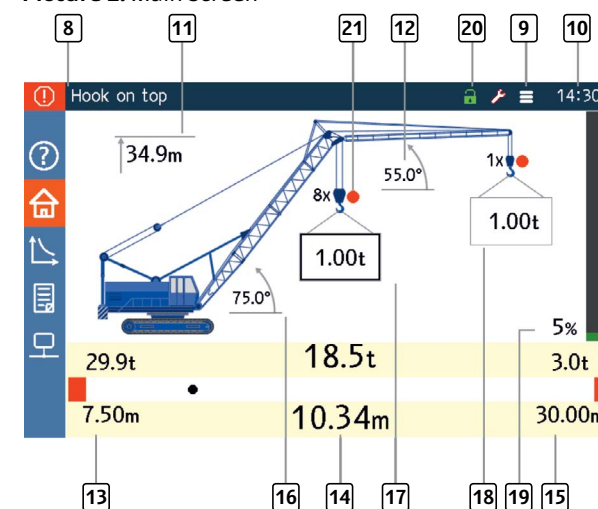
System OGM240 is consist of:

- operator console;
- control module;
- boom angle sensor;
- two jib angle sensor;
- rolling line tensiometer for main hoist;
- rolling line tensiometer for auxiliary hoist.

Component parts of system connected with single-wire digital channel. Connections do by network circuit type «star» with one central device. In the capacity of central device used display console.

The operator console via digital channel get and process data from sensors. Then console monitoring load and geometry variables of crane. If limits are exceeded, console makes block signal. The operator console contains internal datalogger.

Picture 2. Main screen



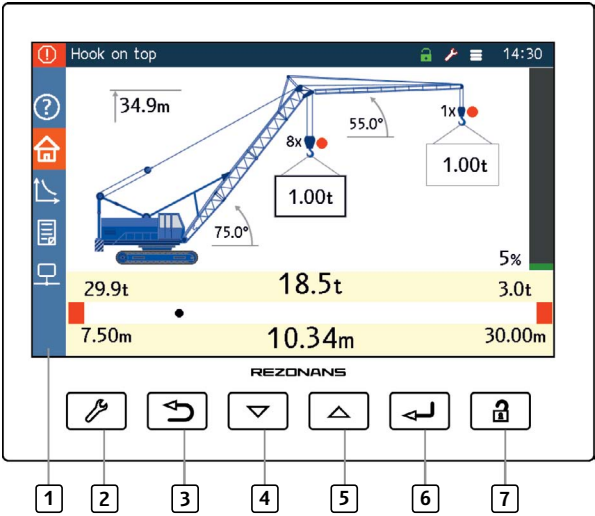
- 8 Status bar information messages.
- 9 Brightness indicator.
- 10 Time.
- 11 Boom head height.
- 12 Jib offset.
- 13 Minimum radius for current boom length.

- 14 Current radius for active lift.
- 15 Maximum radius for current boom length.
- 16 Boom angle.
- 17 Weight on the boom.
- 18 Weight on the jib.
- 19 Load moment.
- 20 Unlock.
- 21 A2B Switch indicator.

4. Buttons and indicators

Outward appearance of the front panel of console is described on the pictures 1 and 2.

Picture 1. Front panel of console



- 1 **The color liquid-crystal display.**
- 2 **«Menu» button:**
 - choose crane’s equipment configuration (hoist reeving; boom length; jib length and offset;)
 - choose reading contains internal datalogger;
 - choose setting operator console (brightness, volume, language)
 - choose system settings (boom and jib angle, weight)
 - update program.
- 3 **«Back» button** – allow back to the main screen or up on menu level.
- 4 **«Down» button** – next screen, reduce the parameter, move the cursor down.
- 5 **«Up» button:**
 - go to the previous screen;
 - move cursor up in menu;
 - increase the parameter.
- 6 **«Enter» button:**
 - choose menu item;
 - save parameter.
- 7 **«Unlock» button** releases the lock mechanism of the crane.

11. Marking and sealing

Every product, included to the complete set off the system, ought to be marked by:

- the trademark of producer;
- the conventional sign of the product;
- the serial number by producer numbering scheme.

The sealing of products, included to the complete set off OGM240, made by quality service of Rezonans Company and do in the place of cover fastener.

On the operator console sealing additionally the «Work – Setup» toggle (by the seal of crane’s producer or authorized service, who make balancing and commissioning work of system).

- make sure, that the system’s actuation is absent (if the system is actuated, it will be necessary to make it adjustment);
- check it displayed radius is correct (if the display information and real radius are differ, to adjustment the radius);
- lower the load;
- increase the mass of load by 10% and to lift it up;
- make sure, that the system is activated (if OGM240 isn’t activated, to adjustment it);
- lower the load;
- place minimum radius;
- lift up the load, conforming to the warranty service rules value by given radius;
- make sure, that the system is activated (if the system is activated, to adjustment it);
- increase the radius and to convince, that the system is activated (if the system isn’t activated, to adjustment it);
- lower the load;
- if the system has adjusted, it is necessary to repeat the test;
- make a note about working in the warranty service rules of the system and in the log-book of the crane.

5. Prepare to work

Sequence of the system preparing:

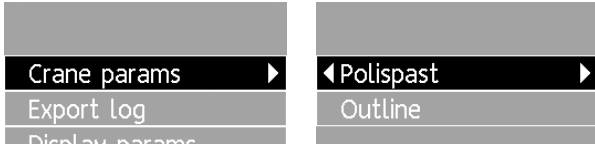
1. When the temperature of environment will lower (below 0), recommended to warm the air inside the cab before exploitation of the system.
2. Power in the operator console is on.
3. Make sure, that test mode is started. To check, that status bar has no errors.

If the system detects a fault. The error will be displayed in the status bar. When multiple errors happen their description can be viewed on the screen of information messages.

4. Check the number of reevings, boom configuration, status of support outline is correct.

For choice the number of reevings it is necessary:

- press 2 button to enter the menu;
- use up and down button for enter in menu «crane params» >«polispast»;



- select correct reevings number and press 2 button for exit.
- | | |
|----|---|
| 8x | ⊙ |
| 7x | ○ |
| 6x | ○ |
| 5x | ○ |
- For choice the position of the support outline it is necessary:
- in menu «crane params» select «outline» item;
- | | |
|-----------|---|
| Polispast | ▶ |
| Outline | |
- select outline position and press 2 button for exit
- For choice the boom configuration end extender (jib) it is necessary:
- press 2 button to enter the menu;
 - use up and down button for enter in menu «setup», «crane params» then select boom and jib length and angle;
 - press 2 button for exit.

The season maintenance realize by certificated adjusters of the system with marking in the warranty service rules.

The list of the season maintenance:

Working content and implementation method	Specification	Necessary materials and instruments
To make works included to the first and second maintenances.	According to the list of the first and second maintenances work.	
To check the status of the cab and its seals.	Don't allow: <ul style="list-style-type: none"> – the absence of cab's glasses; – the defect of the cab's heater (preparing to a winter season); – damages or absence of the cab's rubber seal, windows and doors. 	
To check the system with specimen weights.	The actuation safety error and capacity extend shouldn't be more than 3%.	Collection of weights (inaccuracy 1%), metallic tape measure (inaccuracy 3%).
To check the safety actuation of dangerous approach to the power line (if the AC Field Detector is available).	When the crane is approaching to the power line (voltage 220 V) nearer than 1,5 meters, the safety of dangerous approach to the power line ought to be activated.	The model of the power line, metallic tape measure (inaccuracy 3%).
To read the information from built-in datalogger.	According to the section 7.3.	

To check the display, indicators and control parts safety.	Display should not be damaged, indicators and illuminated indicator boards ought to light brightly, beep signal ought to be audited loudly, buttons ought to work without jams.	
To check the system's function, the block of uppermost hook position.	OGM240 ought to go to the operation mode, on the display messages about disrepairs ought to be absent. If the hook gets to the uppermost position, its lifting ought to stop.	

The first and second maintenances made by certificated adjusters of the system with marking in the warranty service rules. The list of the first and second maintenances:

Working content and implementation method	Specification	Necessary materials and instruments
To make works included to the everyshift maintenance.	According to the list of everyshift maintenance work.	
To check the status of protective coats, fasteners, modules and sensors seal safety. If it is necessary to clean out and tighten connections.	On the operator console and sensors isn't allowed: – damage protective coats; – loosen fasteners; – damage rubber seal (result to the violation leaktightness).	Rags, the flint paper, engineer's wrenches kit, turnscrew.
To check the system's function: – switching of the operation mode automatically; – blocking of the maximum and minimum radius.	OGM240 ought: – change load characteristic, when zone of the work, length of the crane boom and other parameters are changed; – cut off the crane's boom lifting mechanism, when limit angle of up and down are reached.	
To dry the front panel of operator console.	The dirt on the front panel isn't allowed.	Rags, cleaner.

6. Order of work

After testing the system go to display main parameters of the crane (picture 2).

All parameters in this screen displays the basic parameters of the crane mass of the lifting load, capacity of the crane for current radius, radius; crane arm length and current time. For switching between screen use 4 and 5 button.

Display information messages (picture 3) displays all information messages displayed at the time.

Picture 3. Information page

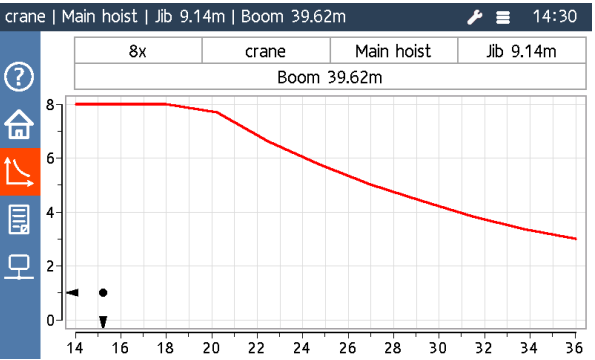


Picture 4 shows the screen with the current load charts of the crane. At the top of the screen is a table configuration of the crane. Configuration can be changed through the main menu and is described in sec. 13.

The datalogger screen contains a summary information about crane (picture 5).

To check the sensors connected safety system use screen shown in (picture 6).

Picture 4. Load charts page



OGM240 doesn't switch to the working operation mode, display «line circuited to the plus output».	The multiplex connection line is circuited to the plus output of the crane's electrical system (24 V).	To remove the circuit of the line to the plus output of the crane's electrical system.
Display information isn't refreshed.	LCD controller error.	To deactivate the power of system, wait for 10 seconds and activate the power again.
The same, but by repeated power information isn't refreshed.	The controller of LCD is broken. The defective operator console.	To replace or to repair the operator console. To adjustment the system following the operation and installation manual .

The crane capacity also decreases:

- when section of the crane arm are pulled out;
- when the faster work of the cargo winch is on;
- when the crane work with incomplete support outline;
- when the boom enters to the non-working area (above the cab).

For quantitative estimation of crane loading OGM240 is calculating next formula:

$$M = \frac{Q}{Q_M} * 100\%$$

The preliminary alarm on, when loading extent is more than 90%. At the same time yellow «Limit» indicator on and beep signal is ringing.

If loading extent is more than 105%, then red «Stop» indicator on and beep signal is ringing interrupted with lesser period of repetition. The crane's mechanisms are blocked.

After the block was activated allowed movement together with the «unlock» button pressed.

7.2. Limits of the crane movements (crane boom up/down and load's extreme position)

The limit group for prevention crane's mechanisms damages:

- the limit of maximum hook lifting;
- the limit of reeling rope cargo of the winch;
- the limit of minimum boot;
- the limit of maximum radius.

When one of the limits is activated, crane's mechanisms are blocked, «Stop» indicator is on, information message is displayed and beep signal is ring interrupted. After movements limit activate, only movements back are authorized with «unlock» button pressed.

7.3. Datalogger

The Datalogger include three parts of memory for storage:

- the operational information;
- the overload information;
- the long-term information.

The operational information and the overload information consist of notes. One note is including:

- the date and the time of record;
- the loading extent;
- mass of the load;
- the permissible maximum load mass for the current radius;
- the crane boom angulation;
- the radius;

Picture 5. Datalogger page

crane Main hoist No jib Boom 12.90m		14 31
Crane model	K7080_CRANE 80T	
Crane serial number		
Maximum permitted capacity	80.0t	
Rated capacity limiter system	OGM240-27.3-000	
System serial number		
Software version	0.1, Aug 3 2014	
Install date	---	
Engine hours	00:01	
Total quantity of working cycles	0	
Current date	Wed, 17 May 2000	

Picture 6. Sensors page

crane | Main hoist | No jib | Boom 12.90m

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7. Functionality

7.1. Rated Capacity Limiter

Capacity limiter make it possible:

- inform the operator about limit loading;
- turn off mechanisms of the crane, when the mass of lifting load is exceed maximum capacity for the current radius.
- secure back moving possibility (decrease loading extent).

For this function realization OGM240 is detecting the load mass and maximum capacity for the current radius.

! OGM240 is not mass-gauge instrument. The mass of load is detected with inaccuracy enough for functions of rated capacity limiter and may be difference of mass of the load. Permissible error testing of capacity adduced in warranty service rules. The crane capacity depends on radius and crane boom length. With radius and crane boom length increase, capacity will decrease. The crane capacity set in the table form and described in the warranty service rules.

9. Technical service

9.1. General instructions

The maintenance of the system secure:

- OGM240 always ready to exploitation;
- the crane work safety and secure;
- the removal of causes, which arouse the premature wear and unit’s damage and crane’s mechanisms;
- the extension of interrepair times.

The maintenance of the system make at the same time, when regular maintenance of the crane take place. Safety precautions ought to be up to quality arrangements of crane’s service.

9.2. Forms and periodicity of maintenance

The maintenance of the system is depended on the period and the volume of work and may be divided on the next forms:

Working content and implementation method	Specification	Necessary materials and instruments
To inspect and clean modules and sensors from dust and dirt.	The dirt on modules, sensors and cable isn't allowed.	Rags
To check seals safety.	Damages of plumbs either component parts of the system aren't allowed.	

9.3. Maintenance order

The everyshift maintenance makes by operator and mark in the log-book. The list of the everyshift maintenance work:

- the everyshift maintenance (make every day before of the work, indepen-dently of shifts number);
 - the first periodical maintenance (make one time in the quarter);
 - the second periodical maintenance (make two time in the year);
 - the season maintenance (make two time in the year (spring and autumn), when regular second periodical maintenance come);
 - the crane’s close and open maintenance (make, when crane and system are close and open).
- The everyshift maintenance ought to be made by crane operator, other maintenances – adjusters of the authorized centers of Rezonans plc.

- the height lifting of the boom head;
- the turning angle of the crane’s platform;
- the code of the crane boom equipment;
- the number of reevings;
- the supply outline status;
- limits activated information;
- discrete input and output information;
- information about forced removal of limits.

The operating information is recording with period from 1 to 25 second. The period of recording depend of the crane loading extent: when loading is maximum period is minimum, when loading is minimum period is maximum.

Record overloading information make once at the cycle and besides:

- the load extent must be more than 100%;
- information about maximum loading extent is keeping throughout cycle.

Long-term information include:

- the general hour meter;
- total number of working cycles;
- the statistics of lifting loads;
- the crane characteristic number;
- the system number;
- the crane number;
- the date of the system placing on the crane.

The information is transferring to the computer throughout flash disk. For reading information it is necessary

- insert USB storage disk to the slot of operator console (must be format in FAT32 file system);
- verify usb-device icon in status bar are shown;
- pres 2 button to enter the menu, choose «export log»;
- press «export» to confirm action;
- unplug usb storage dvice;
- to start program Rezonans LogConverter in the recording file’s folder, the result of working should be information with the file name .lgk.

The datalogger information may be edited and printed according to manual of the program Rezonans LogSystem. You may download latest version of the program on the site www.rezonans-tech.ru.

8. Disrepairs possibility and its removal

In case of OGM240 failure it is necessary:

- check modules and sensors (if it has mechanical damage);
- check the repair of electric connections of sensors and the operator console, the status of electric plug-and-sockets of component parts of the system;
- change or to repair the damaged module or the sensor of OGM240.

! **Attention!** Defects should be removed only by authorized centre adjusters of Rezonans plc.

✓ To avoid damaged of connection cable do not remove operator console with connected cable.

The damage	The cause	The method of removal
OGM240 isn't on.	The power lead damaged, the short circuit or the power circuit broken.	To replace or repair the damaged lead. To remove short circuit or repair power circuit.
OGM240 on, display «alarm».	The sensor doesn't answer (the sensor is absent, the break or the short circuit in the sensor's lead). The defective sensor.	To remove break or short circuit in the lead. To replace or to repair the sensor.
OGM240 doesn't switch to the working operation mode, display «datalogger defected».	Chips for information storage of datalogger are broken.	To replace or to repair the operator console. To adjust the system.
OGM240 doesn't switch to the working operation mode, display «clock defected».	Chips of the real time of datalogger are breakdown.	To replace or to repair the operator console. To adjustment the system.
OGM240 doesn't switch to the working operation mode, display «line circuited to the minus output (ground)».	The multiplex connection line is circuited to the crane's minus output.	To remove the circuit of the line to the minus output.