



**VEGA**  
A B S O L U T E

# GNSS BEACON VEGA M410

USER MANUAL



## CONTENTS

INTRODUCTION.....	3
1 DESCRIPTION AND OPERATION .....	4
2 SPECIFICATION.....	5
3 ACTIVATION.....	6
4 OPERATION MODES .....	9
Background.....	9
Test.....	9
Tracking.....	10
5 PROTECTION METHODS.....	11
Protection with motion sensor.....	11
Perimeter guarding .....	13
6 SETTINGS.....	15
7 PARAMETERS FOR WORK WITH WIALON.....	19
8 OPERATING WITH THE DEVICE.....	20
Indication .....	20
SMS-commands .....	21
Work with the Website.....	23
Configurator .....	23
9 TRANSPORTATION AND STORAGE REQUIREMENTS.....	24
10 COMPLETE SET .....	25
11 WARRANTY.....	26
APPENDIX – EXAMPLES OF SMS-MESSAGES WITH THE DEVICE SETTINGS.....	28

## INTRODUCTION

This manual is designated for GNSS beacon Vega M410 (hereinafter – the beacon) manufactured by OOO Vega-Absolute and provides information on powering and activation procedure, control commands and functions of the device

Work with the device does not require special training or professional skills. This user manual contains all necessary information for efficient operation.



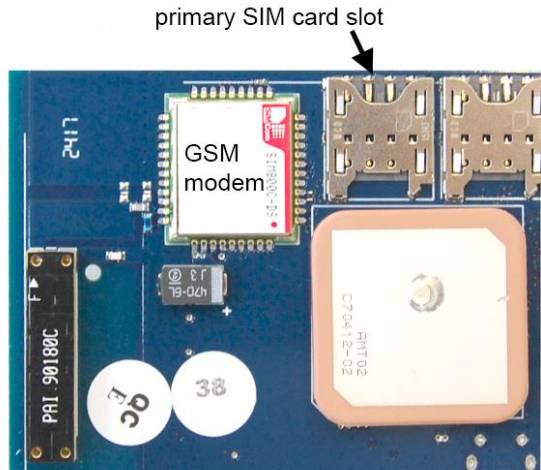
## 2 SPECIFICATION

Main	
Operating temperatures, °C	-40...+85
Internal antennas	GLONASS/GPS, GSM
GSM modem	850/900/1800/1900
GPRS data class	class 12
Navigation receiver sensitivity	No more than -160 dBm
Power	
Built-in battery capacity	12,8 Ah
Autonomous operation in the following modes: - «Background» - «Tracking»	up to 5 years up to 3 months
Case	
Ingress protection rating	IP67
Device dimensions	90 x 75 x 40 mm

### 3 ACTIVATION

#### STEP 1

Open the cover of the device and insert the micro-SIM card in the primary slot. The device shall be powered off at this step.



Only the primary SIM card can be used for activation:  
the slot for the primary SIM card is located next to the GSM modem on the board

#### STEP 2

Insert the batteries into the battery compartment.

The red indicator starts flashing (double flashings every 3 seconds) - registration in the GSM network. After registration in the GSM network, the indicator starts frequently flashing - the device is ready for activation.

### STEP 3

There are three ways to activate the device:

1. Call the SIM-card number of the device. The device hangs up the incoming call and remembers the phone number from which the call has been made as the owner's phone number. This method is only possible if the device SIM-card supports voice communication.
2. Send an SMS-message with the text **1234\*35\*** to the SIM-card number of the device - the device remembers the phone number from which the message has been received as the owner's phone number.
3. Send an SMS-message with the text **1234\*35#+XXXXXXXXXXXX\*** to the SIM-card number of the device, where **+XXXXXXXXXXXX** is the phone number that the device shall remember as the owner's phone number.



**You should make a call or send an SMS-message to the SIM-card number of the device within 5 minutes**

After 5 minutes the inactivated device switches to emergency mode in 5 minutes and starts flashing every 8 seconds. In this case, repeat activation procedure starting from step 2.

### STEP 4

After an incoming call or an SMS, the device automatically identifies the phone number and sends an SMS-message with the current device settings. The description of the parameters is in chapter "Settings".

Then the device turns on the GPS / GLONASS receiver and switches to the satellite search mode to identify its own location. The indicator is flashing every 3 seconds.



To search satellites and identify the coordinates, it is recommended to place the device in a place where the sky is clearly seen, e. g. if the device is activated in a room, bring it to the window.

Every time the device identifies its coordinates, it also identifies the current time and adjusts its internal clock through satellites. Time setting takes the time zone into account, which is set by the parameter "P". The default parameter is 03, which means +3 hours to GMT.

## STEP 5

After identifying the coordinates, the device registers again in the network and sends an SMS-message with the coordinates of the device. After sending the coordinates, the device switches to standby mode, waiting for SMS-messages with settings or commands from the user. The device stays 5 minutes in this mode and then switches to sleep mode and operates in the "BACKGROUND" mode. While waiting for SMS with settings and commands, the indicator is flashing three times every three seconds.



If the device is enabled, when changing the batteries or pressing the «reset» button on the top of the device, do not perform step 3



If after turning off the device the SIM-card has been changed to another one, repeat all steps, i. e. re-activate the device



## 4 OPERATION MODES

### BACKGROUND

"BACKGROUND" mode is the basic mode of the device operation. In this mode, the device is inactive most of the time. The device becomes active only during communication sessions from one to three times per day, depending on the settings. The time of the main session and the quantity of the device's communications are set in parameters "24" and "12" respectively. The default settings are configured so that the device communicates once a day at 12.00.



The device identifies its coordinates only during the main session (parameter "24", see table 1).

During additional communication sessions (parameter "12", see table 1) the device switches on only for receiving possible SMS-commands and synchronizing with the server. You can obtain the coordinates in the intermediate session by sending an SMS-command with the text "500" or "09" to the device. If the command is sent from the unknown number, add the device PIN ("XXXX500" or "XXXX09") before the command. The default PIN is 1234.

When the command "500" is received, the device identifies and sends coordinates in the text form (see Appendix, example No. 4).

When the command "09" is received, the device identifies and sends coordinates in the form of an active Internet link. By clicking the link, the user can see the location of the object in Google or Yandex-maps.

### TEST

In the «TEST» mode, the device identifies and sends its coordinates as an SMS-message or to the server (depending on the parameter "G", see table 1) every hour within 24 hours after

switching to this mode. After 24 hours the device automatically switches to "BACKGROUND" mode.

To activate the "TEST" mode, send an SMS-message to the SIM-card number of the device with the text "911" from the owner's phone number. If the command is sent from the unknown number, add the device PIN ("XXXX911") before the command. The default PIN is 1234.

To deactivate the «TEST» mode, send an SMS-message to the SIM-card number of the device with the text "999" from the owner's phone number.

## TRACKING

In the "TRACKING" mode, the device identifies and sends its coordinates as an SMS-message or to the server (depending on the parameter "G", see table 1) every 20 minutes.

To activate the "TRACKING" mode, send an SMS-message to the SIM-card number of the device with the text "007" or "666" from the owner's phone number, or "XXXX007" or "XXXX666", where XXXX is the device PIN (default 1234).

To deactivate the "TRACKING" mode, send an SMS-message to the SIM-card number of the device with the text "999" from the owner's phone number, or "XXXX999", where XXXX is the device PIN (default is 1234).



The device consumes a significant amount of energy in the «TRACKING» mode, so the batteries can be uncharged within 3 months

## 5 PROTECTION METHODS

### PROTECTION WITH MOTION SENSOR

When enabling this function, the device switches on and identifies its coordinates when the object with the sensor starts moving. Parameters "38", "20", "47", "T", "D" and "C" are responsible for the operation of the sensor (see the chapter "Settings").

The motion sensor has four settings:

- Motion sensor is OFF
- Motion sensor is continuously ON
- Motion sensor works at a specific time of a day
- Motion sensor works only two time periods

The sensor is OFF by default.

When the sensor triggers, the device proceeds as follows.

1. When the motion sensor triggers, the device switches from the sleep mode and makes a phone call to the owner's phone number. When the owner of the device answers the call, the device announces "**Alarm! The motion sensor has triggered**". After this the device remains connected for 30 seconds. Within this period, you can send a command to the device to turn off the motion sensor for several hours by pressing the combination of keys **X\***, where X is a digit from 1 to 9. For example, if you want to turn off the sensor for 6 hours, press **6\*** after alarm announcement.

If the owner's phone is unavailable or the owner does not answer the call within 30 seconds, the device sends an SMS with the text "**Motion sensor has triggered!**".

2. Then the device identifies and sends its coordinates to the user in the form of SMS or to the server (depending on the parameter "G", see Table 1). After that the device remains connected for 3 minutes to receive possible SMS-commands and switches to the sleep mode.

3. After this procedure, the device powers off the motion sensor, and does not respond to movements for the time set in parameter "47" (ignoring period of the motion sensor, see Table 1). The default value for this parameter is **5 minutes**.

4. After the ignoring period, the sensor switches on again. Next time the sensor triggers, the device again identifies and sends its coordinates to the user. In this case, the call, and the message "**Motion sensor has triggered!**" are not sent.

5. If there is no movement for 5 minutes after the motion sensor triggers, the device switches from the sleep mode, identifies and sends its coordinates to the user so that the user can determine where the tracking object has stopped.

If, after the motion sensor triggers, the device receives an SMS-command with the text "999", the motion sensor is disabled until the next main session, which time is set by parameter "24" (see Table 1).

## PERIMETER GUARDING

The device has a perimeter guard function. When this function is enabled during the main communication session, the device identifies whether it is inside a specified geofence or outside it.

Geofence means a circle with a diameter of 1 to 999 km, which central point has the coordinates identified when this function was enabled.

If the device detects that the current location is outside the specified geofence, it makes a phone call to the owner's phone number. If the owner answers the call, the device announces "**Alarm! The perimeter of the security zone has been violated**". If the user does not answer within 30 seconds, the device sends an SMS with a notification.

Geofence violation detection is specified by the parameter **Z** and has four setting options:

### Option 1

Control is OFF. To enable this option, send an SMS-command with the text "**XXXX\*Z#0\***", where XXXX is the device PIN.

### Option 2

Control is ON. If the device detects violation of the specified zone, it performs the above-stated procedure and turns off the control of zone violation.

To enable this option, send an SMS-command with the text "**XXXX\*Z#YYY\***", where XXXX is the device PIN, and YYY is the diameter of the security zone.

### Option 3

Control is ON. If the device detects violation of the specified zone, it performs the above-stated procedure and keeps controlling the security zone violation each main session, which time is set in the parameter "**24**" (see the chapter "Settings").

To enable this option, send an SMS-command with the text «XXXX\*Z#2YYY\*», where XXXX is the device PIN, and YYY is the diameter of the security zone.

#### Option 4

Control is ON. If the device detects violation of the specified zone, it performs the above-stated procedure and sets a new security zone, which center is the coordinates identified in the current session.

To enable this option, send an SMS-command with the text «XXXX\*Z#3YYY\*», where XXXX is the device PIN, and YYY is the diameter of the security zone.

If the device receives one of the above-stated commands to enable zone violation control but is not able to identify the coordinates in the current session, the control does not turn on, and sends the message "**Parameter Z is not changed. Coordinates are not identified.**" to the User.

## 6 SETTINGS

This chapter describes the parameters available for changing with SMS-commands. Commands can be sent both from the owner's phone and from another phone (only with the device PIN before the main command). PIN means a four-digit PIN, the default value is 1234.

Table 1.

<b>39</b>	PIN (by default - 1234)
	SMS-command: PIN*39#XXXX*
	Example. PIN changed from 1234 to 7777: 1234*39#7777*
<b>35</b>	Phone number, where the device sends messages
	SMS-command: PIN*35#+7XXXXXXXXXX*
	Example. phone number changed to +7222222222: 1234*35#+7222222222*
<b>58</b>	The balance threshold at which the device sends a message "Balance: Value" (by default - 50)
	SMS-command: PIN*58#XXX
	Example. Threshold setting: 100: 1234*58#100*
<b>59</b>	The balance request code. Detected automatically if the SIM-card is of MTS, Beeline, Megaphone, or Tele2 cell operator
	SMS-command: PIN*59#*XXX#*
	Example. Balance request code setting: *111#: 1234*59#*111#*
<b>24</b>	Main session time (by default – random value)
	SMS-command: PIN*24#hhmm
	Example. Main session time setting: 13:00: 1234*24#1300*

N	The period for automatic identification of coordinates by satellites (at all other times the coordinates are identified by the GSM base stations)
	SMS-command: PIN*N#X*
	Example. Period setting: 6 days: 1234*N#6*
12	Communication frequency (by default - 1)
	SMS-Command: PIN*12#X* , where X = 1...3 1 – every 24 hours 2 – every 12 hours 3 – every 8 hours
	Example. Communication frequency setting: every 8 hours: 1234*12#3*
P	Time zone (by default - 03)
	SMS-command: PIN*P#XX* (P – in Latin)
	Example. Time zone setting: +7 (Novosibirsk): 1234*P#07*
00	Coordinates form in SMS (by default - 3)
	SMS-command: PIN*00#X* , where X = 0...3 0 – dd,dddd 1 – dd mm,mmm` 2 – dd mm`ss,ss`` 3 – internet link
	Example. Form setting: dd,dddd: 1234*00#0*
38	Operation mode of the motion sensor (by default - 0)
	SMS-command: PIN*38#X or 38X, where X = 0...3 0 – OFF 1 – continuously ON 2 – ON in time interval 1 3 – ON in time intervals 1 and 2



	Example. Sensor ON in time interval 1: 1234*38#2* or 38
20	Security periods, when the motion sensor works (the first period by default is from 23:00 to 07:00, the second period is from 10:00 to 17:00)
	SMS-command: PIN*20#hhmm HHMM* or PIN*20#hhmm HHMM; ppss PPSS*
	Example 1. The first security period setting: from 8:00 to 16:00: 1234*20#0800 1600* Example 2. The first security period setting: from 5:00 to 9:00, the second security period setting: from 17:00 to 21:00: 1234*20#0500 0900; 1700 2100*
47	Ignoring time of the motion sensor triggering (by default - 5)
	SMS-command: PIN*47#X, where X=5...99
	Example. Ignoring time setting: 6 minutes: 1234*47#6*
G	Messages (by default - 1)
	SMS-Command: PIN*G#X*, where X = 1...3 1 – only SMS 2 – only to the server 3 – SMS + server
	Example. Messages sent only to the server: 1234*G#2*
Z	Security zone violation control (by default - 0 001)
	SMS-command: PIN*z#X YYY, where X = 0...3 Y = 1...999 (security zone diameter, km) 0 – security zone violation is not controlled 1 – one triggering and control deactivating 2 – one triggering without control deactivating 3 – triggering and new point capture
	Example 1. Control activation of time zone violation (5km) without control deactivating in case of triggering: 1234*z#2 5*

K	Changing the password for adding a device to the "Personal Account" on website (by default is placed in the device label)
	SMS-command: PIN*K#X* Latin letters and digits are allowed (from 1 to 32 symbols)
	Example. The device code setting: kod321: 1234*K#kod321*



The following settings are designated only for the advanced users

IP	Setting of the IP-address and server port, where the data from the device are sent
	SMS-Command: PIN*IP#xxx.xxx.xxx.xxx:yyyyy*
	Example. IP: 123.123.123.123 and port: 55555 1234*ip#123.123.123.123:55555*
T	Sensor sensitivity per amplitude
	SMS-Command: PIN*T#xx*, where x=0...40, T – in Latin
	Example. Sensitivity per effect amplitude 15: 1234*T#15*
C	Double control of the sensor motion (by default - 0)
	SMS-Command: PIN*C#x*, where x=0...1
	Checking algorithm of false triggering: 0 – OFF 1 – ON
	Example. Double control of the motion sensor OFF: 1234*C#0* C – in Latin

## 7 PARAMETERS FOR WORK WITH WIALON

The device supports data exchange via WIALON protocol. Table 2 shows the device parameters for working with this protocol.

Table 2.

<b>w</b>	Start work with WIALON (by default is OFF)
	SMS-Command: PIN*w#X*
	Example. Make data transfer by WIALON IPS 2.0 protocol is ON: 1234*w#1*
<b>wip</b>	Setting of IP-address and WIALON server port
	SMS-Command: PIN*wip#XXX.XXX.XXX.XXX:YYYYY*
	Example. IP Setting: 193.193.165.165 and port: 20332: 1234*wip#193.193.165.165:20332*
<b>wdp</b>	The device password setting for server access via WIALON protocol
	SMS-Command: PIN*wdp#XXXXX
	Example. Password setting: 12345: 1234*wdp#12345*

## 8 OPERATING WITH THE DEVICE

### INDICATION

The device has one red LED, which flashing depends on the state of the device. The values of the various indication types are shown in Table 3.

Table 3.

Frequent flashings	Waiting for an incoming call or SMS while the device is activating
Double flashings every 3 seconds	Registration in the GSM network is proceeding
Flashings every 3 seconds	Coordinates searching, GPS/GLONASS is ON
Triple flashings every 3 seconds	The device is active, waiting for SMS-commands
One short, one long flashing	GPRS is ON
Flashing every 8 seconds	Error
Two long and three short flashings	USB data transmitting
Four flashings every 3 seconds	Updating of the device firmware

**SMS-COMMANDS**

The tracking device is controlled, operation modes and protection methods are changed with the SMS-commands. The description of the SMS-commands is shown in Table 4.

Table 4.

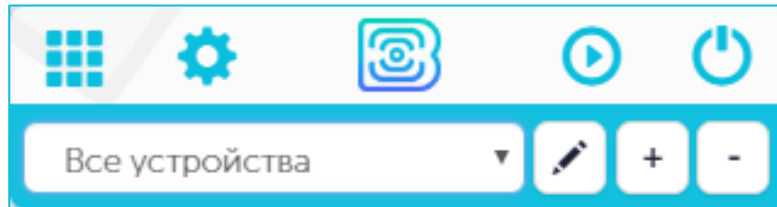
007 or 666 – from the owner’s phone number XXXX666 or XXXX007 – from the unknown number	«Tracking» mode ON
911 - from the owner’s phone number or XXXX911 – from the unknown number	«Test» mode ON
999 - from the owner’s phone number or XXXX999 – from the unknown number	«Test», «Tracking» mode OFF. Switch to «Background» mode. Motion sensor OFF till the main session, set in parameter 24 (see Table 1)
999Y – from the owner’s phone number or XXXX999Y – from the unknown number	Motion sensor OFF for Y hours, where Y is digit from 1 to 9 Example. Sensor OFF for 5 hours: 9995
500 - from the owner’s phone number or XXXX500– from the unknown number	Send the coordinates and the device status in the text form
09 - from the owner’s phone number or XXXX09 – from the unknown number	Send the coordinates and the device status in the form of Internet link

<p>380 - from the owner's phone number or XXXX380 – from the unknown number</p>	<p>Motion sensor OFF</p>
<p>381 - from the owner's phone number or XXXX381 – from the unknown number</p>	<p>Protection ON with motion sensor. Motion sensor continuously works</p>
<p>382 - from the owner's phone number or XXXX382 – from the unknown number</p>	<p>Protection ON with motion sensor in time interval 1, set in parameter 20 (table 1)</p>
<p>383 - from the owner's phone number or XXXX383 – from the unknown number</p>	<p>Protection ON with motion sensor in time intervals 1 and 2, set in parameter 20 (table 1)</p>
<p>XXXX*up*</p>	<p>Update firmware of the device</p>
<p>XXXX*40*</p>	<p>Send the device main settings</p>
<p>XXXX*42*</p>	<p>Send the device additional settings. See Appendix, Example 2</p>
<p>XXXX*43*</p>	<p>Send the device settings for work with WIALON. See Appendix, Example 3</p>

## WORK WITH THE WEBSITE

For more efficient and convenient work with the device, register on the website: [vega-m.com](http://vega-m.com) and bind your tracking device to your personal account.

Also, on the website it is possible to activate the device using the "Quick start" button. Click the button and follow the step-by-step instructions.



## CONFIGURATOR

You can configure and manage device parameters, as well as update firmware, through the "M100 (M110) Configurator" program. Connection to the device through the Configurator program is carried out automatically when the device is connected to the computer via USB and the Configurator is launched.

The program does not require installation and is freely available on the product website [vega-absolute.ru](http://vega-absolute.ru).

## 9 TRANSPORTATION AND STORAGE REQUIREMENTS

The tracking device shall be stored in its original packaging in heated room at temperatures +5 °C to +40 °C and relative humidity less than 85%.

The tracking device shall be transported in covered freight compartments of all types at any distance at temperatures -40 °C to +85 °C. If the device is transported at temperatures below zero, hold it at room temperature for 24 hours before operation.



## 10 COMPLETE SET

The GNSS beacon Vega M410 is delivered complete with:

GNSS beacon – 1 pc.

Screw – 6 pcs.

Factory certificate – 1 pc.

## 11 WARRANTY

The manufacturer guarantees that the product complies with the current technical documentation, subject to the storage, transportation and operation conditions specified in the "User Manual".

The warranty period is 36 months.

The warranty does not apply to batteries.

The warranty period of operation is calculated from the date of sale marked in the product factory certificate, and from the release date when such a mark is absent. During the warranty period, the manufacturer is obliged to provide repair services or replace a failed device or its components.

The manufacturer does not bear warranty obligations in the event of a product failure if:

- the product does not have a factory certificate;
- the factory certificate does not have an TCD stamp and / or there is no sticker with information about the device;
- the serial number (DevEUI, EMEI) printed on the product differs from the serial number (DevEUI, EMEI) specified in the factory certificate;
- the product has been subject to alterations in the design and / or software which are not provided for in the operational documentation;
- the product has mechanical, electrical and / or other damage and defects arising from violation of the conditions of transportation, storage and operation;
- the product has traces of repair outside the manufacturer's service center;

- the components of the product have internal damage caused by the ingress of foreign objects / liquids and / or natural disasters (flood, fire, etc.).

The average service life of the product is 5 years.

In the event of a warranty claim, contact the service center:

119A, Bol'shevistskaya Str., Novosibirsk, 630009, Russia.

Tel.: +7 (383) 206-41-35

e-mail: [remont@vega-absolute.ru](mailto:remont@vega-absolute.ru)

APPENDIX – EXAMPLES OF SMS-MESSAGES WITH THE DEVICE SETTINGS

SMS-MESSAGE WITH SETTINGS  
EXAMPLE

39 1234

35 +79131112233

SUT

A/h 40 %

58 50

59 \*102#

24 1200

P 06

00 3

12 3

03 0

38 1

20 2300 0700; 1000 1700

47 5

G 3

Z 1 001

4/4

SMS=1

ID 3422525

EXPLANATION

Device PIN is 1234

Owner's phone number

The current operation mode is «Background»

Battery charge is 40 %

Balance threshold is 50

Balance request code is \*102#

Main session time is 12:00

The device time zone is +6

Coordinates form in SMS is Internet link

Device is ON 3 times per day

Language is Russian

Motion sensor is always ON

Guarding periods are 23:00 – 7:00 and 10:00 – 17:00

Ignoring time of motion sensor after triggering is 5 minutes

Data transferring: SMS + server

Perimeter control is ON, mode 1, Geofence diameter is 1 km

GSM signal level is maximum, excellent

Total quantity of SMS which sent by the device from the activation

Device ID

### SMS-MESSAGE WITH ADDITIONAL SETTINGS EXAMPLE

T = 10

C = 1

IP 11.22.33.44:5555

Ver A: 22

Ver B: 1

IMEI: xxxxxxxxxxxxxx

### EXPLANATION

Motion sensor sensitivity by amplitude =10

Double control of motion sensor (protection from false triggering) – ON

IP address and server port, where the device sends the messages

Firmware version is 22

Bootloader version is 1

IMEI number of the device

### SMS\_MESSAGE WITH WIALON SETTINGS EXAMPLE

WIALON: 1

IP 193.193.165.165:20332

Password 12345

### EXPLANATION

Work with WIALON is ON

IP address of additional server

Password for access to server via WIALON

### SMS-MESSAGE EXAMPLE IN TEXT FORM

18.03.16 06:26:07

55 34` 23,34``

082 43` 23,45``

Sat = 1

Ts = 01:15

40 km/h

A=123

T = 25

A/h = 40%

12 = 1

4/4

Bal=235

MCC=250

и т.д.

### EXPLANATION

Date and time of coordinates determination

Coordinates

Quantity of the found satellites

Time spent on coordinates determination

Speed

Motion amplitude

Ambient temperature

Battery charge

The device switches from the sleep mode once (1) per day

GSM signal has MAX level

Balance

GSM base station parameters: MCC, MNC, LAC, CID

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Revision	Date	Name	Comments
01	17.10.2017	KEV	Document creation date
02	24.09.2018	KEV	Function adjustment (112 is not supported)
03	01.07.2022	KEV	New warranty conditions, new service center address



[vega-absolute.ru](http://vega-absolute.ru)

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