

User guide

Promobot V.4 robot

promo-bot.ai

Service robot for business

Dear user!

We thank you for choosing and purchasing an innovative product that is highly reliable and efficient in operation. We are confident that our robot will serve you for many years to come.

Please note that efficient and safe operation and proper maintenance are only possible after you have carefully read this user guide.

After obtaining the robot, we recommend that you check that all of its contents are complete and free of any visible damage that may have occurred during transportation.

We wish you an enjoyable usage of our product!

Promobot

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TERMS AND DEFINITIONS

1. **Owner of the robot** — organization or person that bought one or several robots.
2. **Movement along the points of the drawn map** — robot's ability to follow a map route.
3. **Individual Application Case (IAC), application case, case** — a scenario of robot use, implemented at the level of robot software, which allows to realize specific business tasks. Examples of cases include: robot promoter, guide, concierge (more information about the cases on the official Promobot website). An individual case is developed and installed at the customer's request at the stage of robot purchase.
4. **Linguistic database** — database that contains a set of rules and replies (phrases), used as a robot's response to particular phrases or events. Designed for holding a conversation with a person.
5. **Emotion matrix** — RGB matrix on the head of a robot, the «face» of the Promobot robot.
6. **Operation zone of the robot, operation zone** — space with the height up to 2.0 m above floor level which includes the robot's permanent or temporary location.
7. **Robot** — the autonomous service Promobot V.4 robot.
8. **A robot without a case, a robot without IAC, a robot with a standard case** is a robot consultant with a basic set of functions, i.e. a robot whose functionality is limited to answering questions and a few basic applications.
9. **Automatic movement mode** is a mode of robot movement in which the robot moves without human intervention according to internal algorithms and bypasses obstacles on its own.
10. **Point-to-point movement mode** is a type of automatic movement in which the robot moves along a route defined on the map.
11. **Interaction mode** — the state of the robot when a person is talking to it, or when a person is using the display on the robot's chest. It is the opposite of standby mode.
12. **Standby mode** — the state of the robot when it is not interacting with a human, i.e. when it is waiting for a question, phrase, or touch on the display from a visitor. It is the opposite of the interaction mode.
13. **Promo material display mode** — a type of standby mode where videos or images are played on the robot's touch screen display.

14. **Random movement mode, function of random movement** — a type of automatic movement in which the robot moves within a set radius in search of communication.
15. **Replication is the process of copying parameter values** from the database (from a remote server) to the robot (local server).
16. **Manual mode** — motion control mode, in which the robot is moved in space using a controller, buttons in the service menu, or via the telepresence interface.
17. **Touch screen display** — a screen on the front of the robot's torso that is used to display the robot's main menu as well as accept user input.
18. **Degree of freedom** — the number of independent displacements of a mechanical system determined by the number of particles forming the system and imposed mechanical bonds.

1. OVERVIEW

Promobot V.4 robot is an autonomous service robot designed for communication with people. It is able to serve as a consultant, promoter, administrative assistant, concierge, tour guide and others.

The robot communicates with people, answers the questions and consults customers, moves freely in the building, avoids obstacles and interacts with the public.

1.1. Robot functions

Promobot V.4 robot is designed for:

- **communicating with people:**
 - initiates communication;
 - maintains a dialog on general topics and answers questions;
 - remembers and recognizes people's faces;
- **accomplishing business tasks:**
 - explains the company's services;
 - maintains a task-oriented dialog;
 - shows promotional materials on the touch screen display;
- **performing functions¹:**
 - accepting payment;
 - scanning and filling out documents;
 - issuance of access or loyalty cards;
 - integration with external systems and services (electronic queue, access control and management systems, internal document management systems, etc.);
 - temperature measurement;
 - printing of receipts, coupons and photos, etc.

¹ — The ability to perform the functions in this list depends on the robot's configuration and the customized use case embedded in the software.

1.2. Specifications

Table 1. Specifications of Promobot V.4 robot

No.	Parameter, unit of measure		Description
BASIC			
1	Size of the robot (HxWxL), mm	Minimum	1485x740x716
		Maximum	1585x2060x716
2	Size of the charging station (HxWxL), mm		635x430x300
3	Size of the shipping case (HxWxL), maximum, mm		1645x920x1010
4	Robot weight, kg		Up to 130
5	Weight of the charging station, kg		10
6	Total weight (with packing), kg		Up to 205
7	Body		ABS plastic
8	Charging time, h	Charging station	Up to 10
		Power cord	Up to 8
9	Battery life, h		Up to 8
10	Power consumption, W		400
11	Input, V		110–220
12	Frequency, Hz		50–60
MOVEMENT			
13	Movement speed, m/s		Up to 0.2
14	Random movement		Yes
15	Auto approach to the charging station		Yes
16	Motor-wheels	Number, pcs.	2
		Diameter, "	6.7
17	Steering wheels	Number, pcs.	2
		Diameter, "	2
18	Head, number of degrees of freedom		2
19	Robot arms	Number, pcs.	2
		Number of degrees of freedom	7
20	Torso	Number of degrees of freedom ¹	3
		Change of the height	Yes

¹ — With the passport scanner included, the number of degrees of freedom will be reduced to 2.

No.	Parameter, unit of measure		Description
EQUIPEMENT			
21	Face recognition camera	Resolution, px.	1280x720
		Resolution of the telepresence, px.	640x480
		Frames per second	Up to 30
22	Face search camera	Resolution, px.	1920x1080
		Frames per second	Up to 25
23	Charging station search camera	Resolution, px.	640x480
		Frames per second	Up to 30
24	Microphones	Omnidirectional	Yes
		Microphone array ¹	Optional extra
25	Speakers	Number, pcs.	2
		Power (each), W	10
26	Display	Technology	LED IPS
		Touch screen	Yes
		Diagonal, "	11.6
		Resolution, px.	1920x1080
27	Emotion matrix	Number of colors	RGB (full-color)
		Diagonal, "	8.9
		Resolution, px.	64x64
28	Segmented RGB LED backlight		Yes
29	Sensors	Obstacle detection (ultrasonic), pcs.	16
		Obstacle detection (infrared), pcs.	16
		Touch, pcs.	4
COMMUNICATION			
30	Pronunciation of speech modules		Synthesis of speech
31	Languages (by default)		Russian, English
32	Number of memorable faces ²		10
33	Service of linguistic base and analytics		Yes

¹ — Optional extras are bought separately.

² — Number of memorable faces can be additionally expanded.

No.	Parameter, unit of measure	Description
OPTIONAL EXTRAS ¹		
34	Equipement	Photo printer
35		Receipt/coupon printer
36		Barcode/QR code scanner
37		Passport scanner
38		Card dispenser
39		Bracket for attaching a bank terminal
40		Navigation equipment package for building a map of the room
41		Thermometer
42		Services
43	Studio Service	
44	Telepresence	

¹ — Optional extras are bought separately.

1.3. Contents of delivery

When unpacking the robot, check that the following items are included (Table 2).

Upon obtaining the robot, it is recommended to check the delivery for completeness and absence of visible damage that may have occurred during transportation or improper storage in the seller's warehouse. In case of damage, please contact the technical support chat (Paragraph 14).

Table 2. Contents of delivery

Title	Quantity
Promobot V.4 robot	1 pc.
Charging station	1 pc.
Charging cable	1 pc.
Specially designed shipping case	1 pc.
Wireless controller	1 pc.
Operating instructions	1 pc.
Photo paper ¹	2 pkg.
Toner cartridge for photo printer ¹	2 pc.
Receipt printer paper (roll) ²	1 pc.
Scales with height meter ³	1 pc.



¹ — If a photo printer is included in the robot package.

² — If a receipt/coupon printer is included in the robot package.

³ — Depends on the selected configuration.

¹ — Depends on the selected configuration.

² — The service may not be used for the purpose of covert data collection, including: recording video, audio or text information without prior authorization. When using the service, you should take into account the legal restrictions of the country where the robot is located.



1.4. Web services

The robot comes with access to the following web services:

- Linguistic database and analytics** — multifunctional service with the main purpose to control the robot's speech and its communicative abilities. The service includes filling in and adjusting the phrases to which the robot will respond, as well as responses to them. In addition, it is possible to view dialogs between visitors and the robot through the service. Access to the web interface provides the ability to view and edit the settings of the robot and linguistic base, and can also be used by the Owner of the robot to obtain analytics and additional information. A personal user profile of the service is created for the Owner and access to the management of all purchased robots is provided.

Access: lingvo.promo-bot.ai

- Telepresence**¹ — service designed for remote monitoring and control of a Promobot robot. The service allows:
 - to view the video stream from the robot's camera, as well as receive audio from the microphones²;
 - monitor the user's dialog with the robot in chat mode and manage its lines;
 - control the robot's movement, as well as arm and head movements;
 - set emotions on the facial emotion matrix.

The service is an optional extra and can be purchased separately.

Access: teleop.promo-bot.ru, teleop-new.promo-bot.ru

- SIP telephony**¹ — service which provides the possibility of audio communication with the operator (e.g., employee call button), or calling emergency services (police, ambulance). The service is optional, and its availability is agreed at the stage of coordinating the robot's configuration and functions.
- Movement Studio**¹ — web-service designed to create scenarios for controlling the robot's movements, facial expressions, gestures and lighting. The service allows you to create movements and dances, for example, to create robot shows at exhibitions, performances in theaters and unique shows for events. The service is an optional extra and can be purchased separately.

Access: movementstudio.promo-bot.ru

You can restore/re-acquire your account and access addresses to services, as well as clarify the availability of access to additional services by contacting technical support (Paragraph 14).

2. ROBOT ARRANGEMENT

Promobot V.4 robot consists of the following main components presented in Figure 2.1.

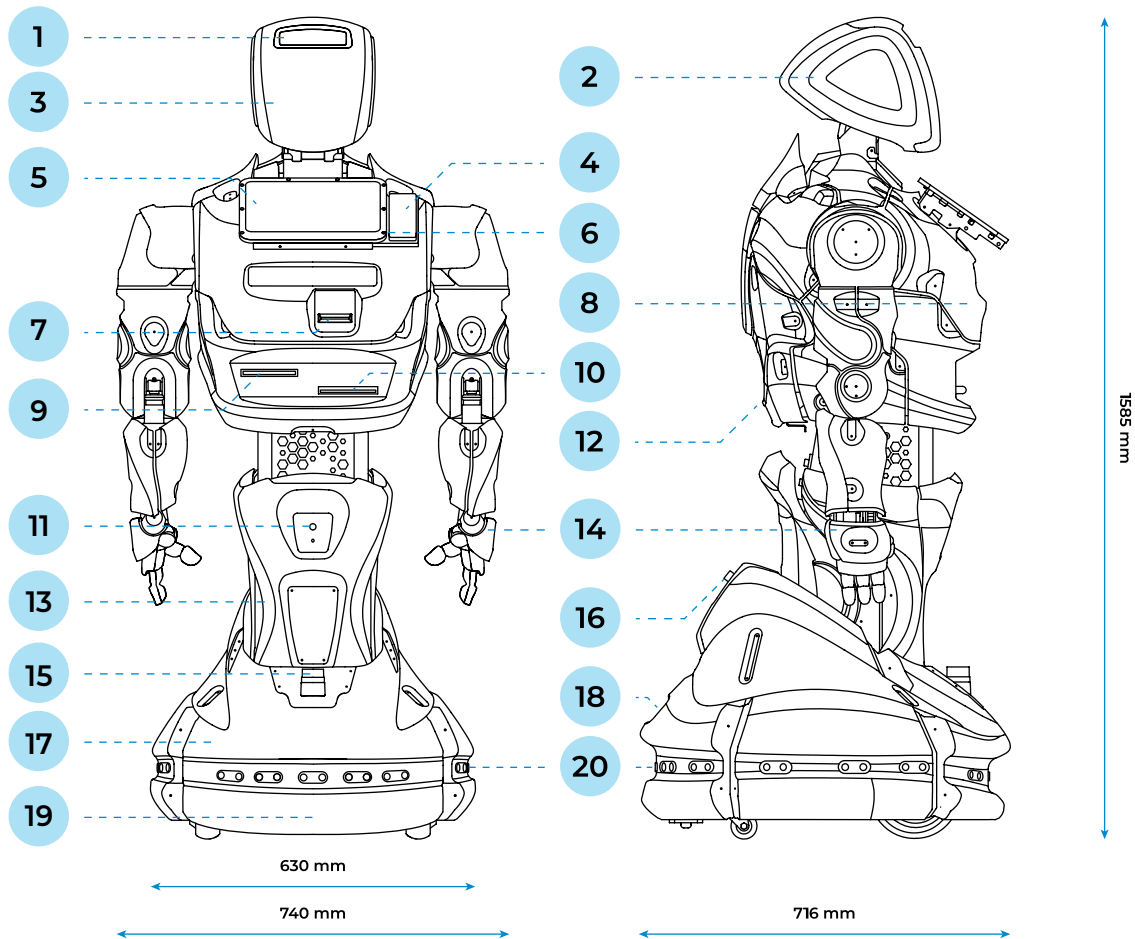


Fig.2.1. Promobot V.4 robot, main components

- | | |
|---|----------------------------------|
| 1. Head, equipped with a microphone, thermometer ¹ , face search and recognition cameras | 6. Microphone array ¹ |
| 2. Touch sensor and segmental RGB LED backlight | 7. Card dispenser ¹ |
| 3. Emotion matrix | 8. Speakers |
| 4. Bracket for attaching a bank terminal ¹ | 9. Receipt printer ¹ |
| 5. Touch screen display | 10. Photo printer ¹ |

- | | |
|---|--|
| 11. Charging station search camera | 17. Movement platform |
| 12. Service bay | 18. Operating ports |
| 13. Actuator (lift) | 19. Inertial measurement unit (IMU) ¹ |
| 14. Robot arms, equipped with touch sensors | 20. A system of sensors to detect obstacles while moving |
| 15. Lidar ¹ | |
| 16. Kill switch | |



NOTE

The manufacturer reserves the right to make changes in the construction, design, equipment or manufacturing technology of the product without prior notice in order to improve its properties.

¹ — Depends on the selected configuration

2.1. Head

The robot’s head technically and visually enables human-robot communication. The function of the robot’s “face” is performed by an emotion matrix, located on the front part of the head. Above the matrix are:

- camera that records the position of the interlocutor in space and allows to “follow” them thanks to a moving neck, maintaining “eye contact”,
- camera, designed to “recognize” the interlocutor,
- microphone for speech recognition,
- thermometer¹.

The components of the robot head are presented in Figure 2.2.

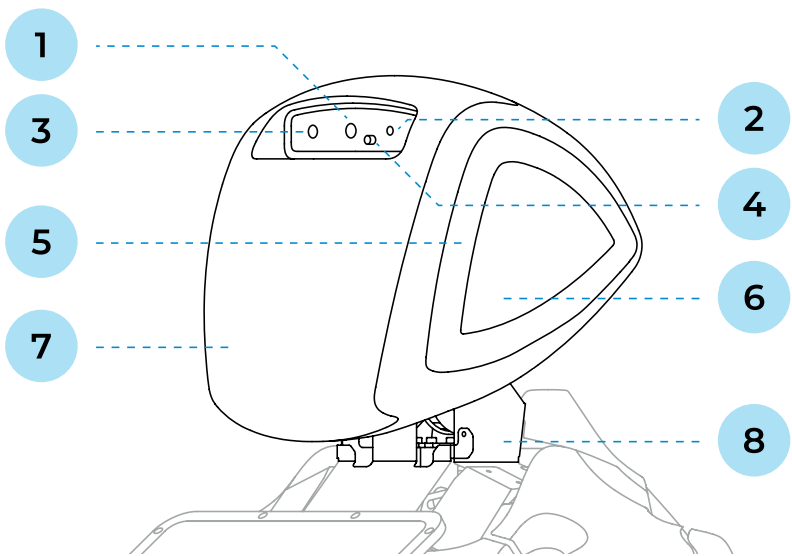


Fig.2.2. Promobot V.4 robot, main components of the head

- | | |
|-----------------------------|----------------------|
| 1. Face recognition camera | 5. RGB LED backlight |
| 2. Microphone | 6. Touch sensors |
| 3. Face search camera | 7. Emotion matrix |
| 4. Thermometer ¹ | 8. Moving neck |

¹ — Depends on the selected configuration.

1. In interaction mode, the robot uses a **face recognition camera** to distinguish people from each other. Through the introduction procedure it is possible to store information about the recognized person in a database (with the user’s consent) for a personalized greeting when the robot is contacted again.
2. In standby mode, the robot can use a **microphone** for speech recognition (used when no microphone array is available).
3. In standby mode, the robot uses a **face search camera** to search for people in the distance and in front of it. The camera has a wide viewing angle and detects the presence of a person at a distance of one and a half meters. This allows the robot in random movement mode to move in the direction of the person to initiate communication.
4. **RGB backlight** changes depending on the current status of the robot. Meaning of backlight colors:



- White — standard backlight mode.
- Green — indicates the operation of speech synthesis.
- Orange — indicates the operation of a speech recognition system.
- Blue — indicates the operation of an obstacle detection sensor.
- Yellow — indicates the operation of the touch sensor.

- 5. **Touch sensors** are placed symmetrically on the left and right sides of the robot, and the robot blinks RGB lights in response to touch.
- 6. **Emotion matrix** serves the function of “face” and, depending on the information received, displays animations of various “emotions” and speech reproduction.
- 7. **Moving neck** is responsible for head movement in 2 degrees of freedom.
- 8. **Thermometer**¹ records human body temperature.



DO NOT:

- touch the camera;
- allow moisture and foreign objects to enter the openings of the microphones and video camera;
- attempt to turn the robot’s head by yourself;
- attempt to repair malfunctions on your own.

¹ — Availability depends on the selected configuration

2.2. Torso

The robot's torso (Fig. 2.3) contains components for human interaction. On the torso there is a touch screen display that both displays information and provides the ability to interact with the robot interface. The robot's torso also includes additional equipment that realizes the functions of accepting payment, scanning documents, printing receipts and photos, issuing loyalty cards or passes, etc. The availability of these functions depends on the robot's configuration and can be called from the interface on the robot's display or by voice control. In addition, the torso is mobile and automatically adjusts to the height of the person who interacts with it.

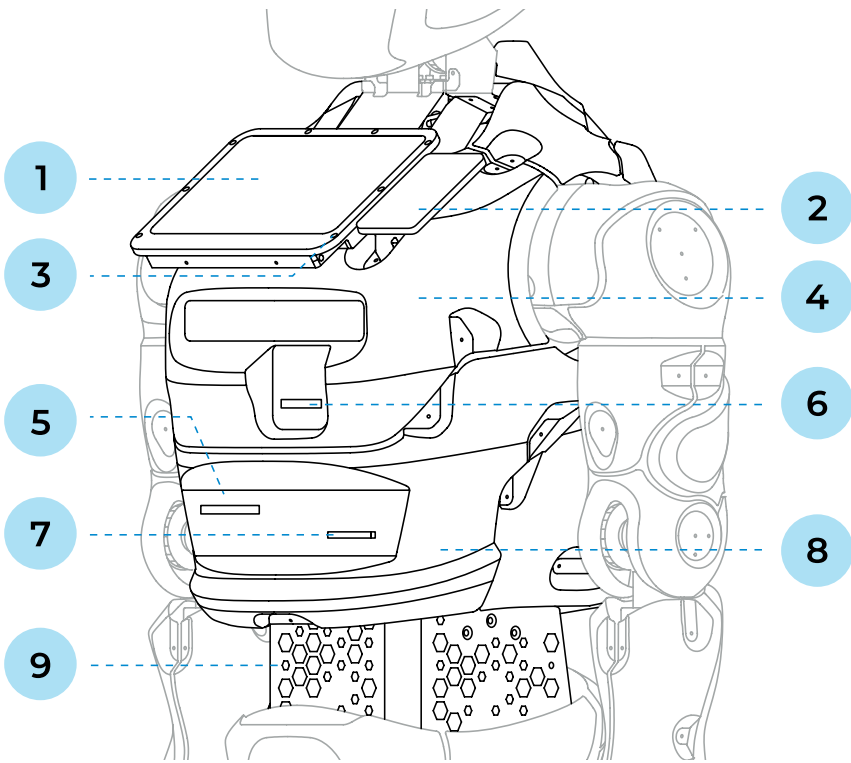


Fig.2.3. Promobot V.4 robot, main components of the torso

- | | |
|---|--------------------------------|
| 1. Touch screen display | 6. Card dispenser ¹ |
| 2. Bracket for attaching a bank terminal ¹ | 7. Photo printer ¹ |
| 3. Microphone array ¹ | 8. Service bay |
| 4. Speakers | 9. Moving torso |
| 5. Receipt printer ¹ | |

¹ — Depends on the selected configuration

- 1. **Touch screen display** shows the main menu of interaction with the robot, broadcasts promotional materials and accepts user commands.
- 2. **Bracket for attaching a bank terminal**¹ allows to place a terminal for accepting bank card payments. The terminal is installed separately.
- 3. **Microphone array**¹ is used for improved speech recognition compared to a single microphone. The microphone array works in conjunction with a face recognition camera to determine the user's position and capture the user's voice.
- 4. **Speakers** are used to play back synthesized robot speech, audio files and the sound of videos.
- 5. **Receipt printer**¹ is used to print receipts or coupons on special thermal paper.
- 6. **Card dispenser**¹ allows to use the robot for issuing plastic cards in automatic mode.
- 7. **Photo printer**¹ is used for printing images on photo paper, e.g. photos or promotional materials.
- 8. **Service bay** is a hidden equipment area under the robot body. It is where the card dispenser, receipt printer, and photo printer are serviced.
- 9. **Moving torso** allows movement in three degrees of freedom.

¹ — Depends on the selected configuration

To open the service bay, press the bay lock lever under the lower part of the rear cover and pull the cover towards yourself as shown in Figure 2.4.

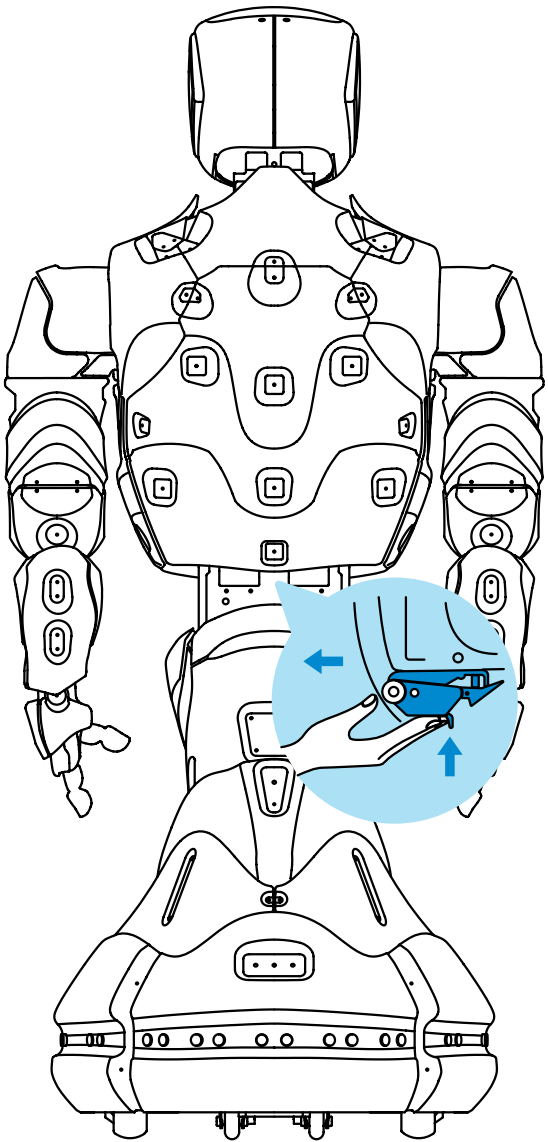


Fig.2.4. Opening the service bay



DO NOT:

- allow the robot parts, especially the touch screen display, to become dirty;
- allow moisture and foreign objects to enter the technological openings of the robot (speakers, receipt printer and photo printer).

2.3. Robot arms

Arms are designed for robot's gesticulation during communication. Seven¹ degrees of freedom allow to imitate the movement of a person's arms. A hand is equipped with a touch sensor to detect handshakes and other actions. Figure 2.5 represents the kinematic diagram of movement transfer from the motor of the arm to its component part. The diagram contains information about the dimensions of components in millimeters and about the directions of rotation of such parts.

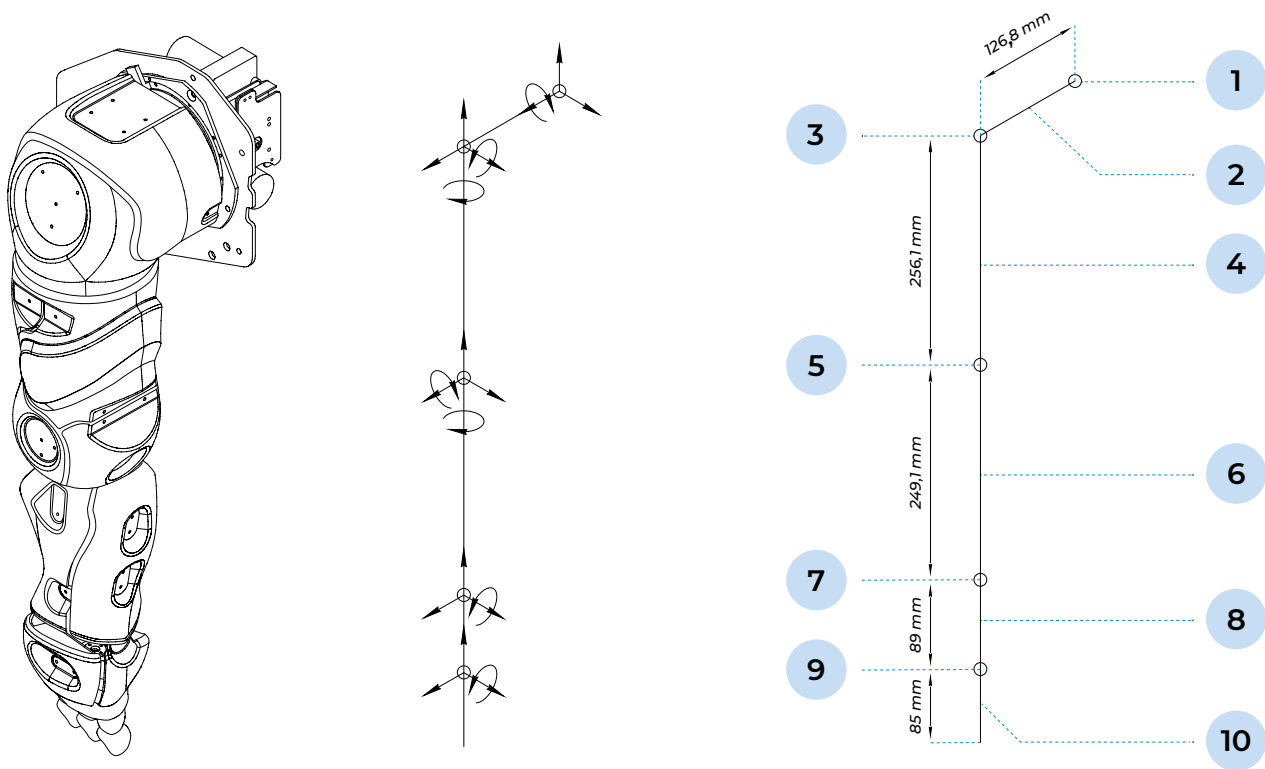


Fig.2.5. Kinematic diagram of the robot arm

- | | |
|-------------------------|-----------------|
| 1. Supra-shoulder joint | 6. Forearm |
| 2. Shoulder support | 7. Wrist |
| 3. Shoulder joint | 8. Hand |
| 4. Shoulder | 9. Finger joint |
| 5. Elbow joint | 10. Fingers |

¹ — The actual number of degrees of freedom: ⁶+1, the bending of the robot's fingers is only for a limited angle, so the last joint is listed as "+1".



ATTENTION!

To avoid undesirable consequences, triggering the robot's lower front obstacle sensors blocks arm movement until the obstacle in front of the sensors disappears.



DO NOT:

- allow moisture and foreign objects to get into the openings of the moving parts of the hand;
- allow excessive impact on the robot hand;
- attempt to perform joint movements independently.

The robot arms are mechanical devices, so they are calibrated every time the robot is started. If there is a malfunction during calibration (case described in section 11), it may be necessary to set them to the reset position manually (this should only happen when the robot is powered off). In the reset position, the robot arms are straightened along the torso with the hands facing the torso as shown in Figure 2.7.



Fig.2.6. Robot arms in the reset position

2.4. Movement platform

The main purpose of the movement platform is to provide the independent movement of the robot. Movement is accomplished by means of two motor-wheels and two steering rollers. The robot can move autonomously, be controlled with a controller (section 7.2) or with the telepresence service (section 1.4).

Safe autonomous movement is realized by obstacle detection sensors. If the robot is equipped with a lidar and a constructed map of the room, it can move to specified points on the map. The robot independently detects the charging station with the help of a special camera and is automatically directed to it when recharging is necessary. The composition of the movement platform is shown in Figures 2.8, 2.9 and 2.10.

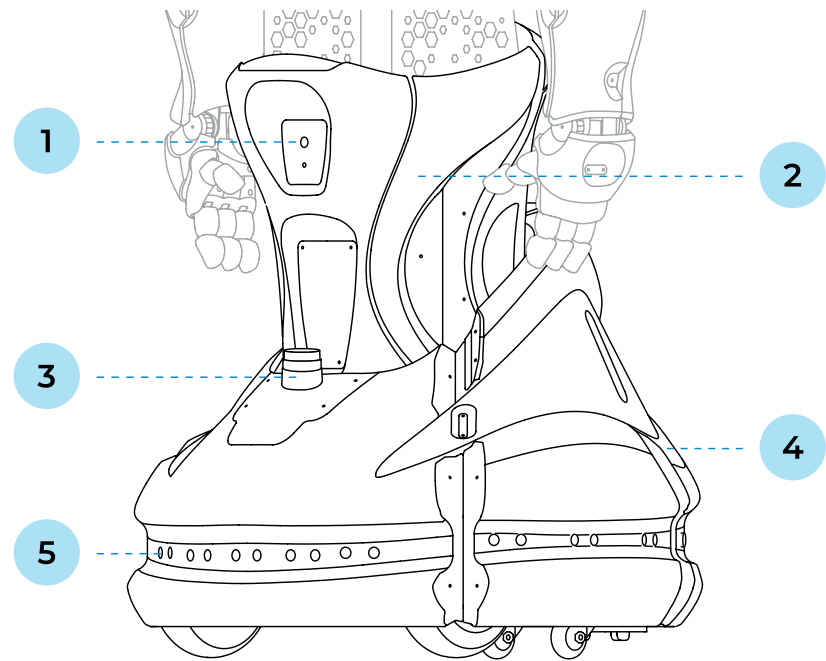


Fig.2.7. Promobot V.4 robot, main components of the movement platform (front view)

- | | |
|-----------------------------------|---|
| 1. Charging station search camera | 4. Movement platform |
| 2. Actuator (lift) | 5. A system of sensors to detect obstacles while moving |
| 3. Lidar ¹ | |

¹ — Depends on the selected configurationconfiguration

1. **Charging station search camera** searches for charging station identification tags to automatically approach and place the robot for recharging.
2. During operation, the height of the robot is adjusted using an **actuator (lift)**. Once the interaction begins, the robot will automatically adjust its height to the height of the person.
3. **Lidar¹** is used to navigate in the room. Lidar scans the space in front of the robot using a laser beam to fix the robot's position on the map.
4. **Movement platform** is equipped with two driving wheels and thrusters.
5. On the perimeter of Promobot V.4 there are **16 obstacle detection sensors**, which are combined ultrasonic and infrared sensors. The distances of the sensors can be viewed in the Service menu (**Settings, Navigation** section, more details in Chapter 6). By default, the sensing range of the front sensors is 60 cm, the rear sensors — 80 cm.



ATTENTION!

The specified sensing distances have been experimentally adjusted in numerous tests!
It is not recommended to change them, as this may cause the robot to collide with obstacles.

The sensors are equipped with LED indication:

- Blue — the ultrasonic sensor has been triggered;
- Green — the infrared sensor has been triggered;
- Turquoise — ultrasonic and infrared sensors have been triggered;
- No color — no sensors triggered.

When the front sensors are triggered in automatic movement mode, the robot will stop for 5 seconds, then if the obstacle is gone, it will continue moving, otherwise it will pull back and try to find another way.

¹ — Depends on the selected configurationconfiguration

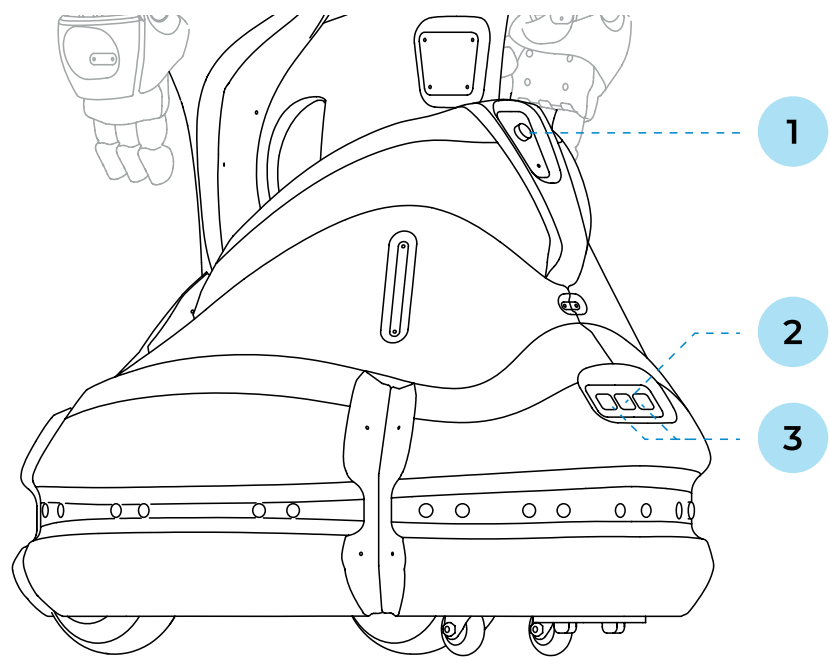


Fig.2.8. Promobot V.4. robot, main components of the movement platform (back view)

- 1. Kill switch
- 2. Charging port
- 3. USB ports

- 1. **Kill switch** allows the Owner to instantly cut power to all of the robot's actuators in the event of an emergency.
- 2. The robot can be charged using the cable supplied with the robot. Connect the charging cable to the battery **charging port** shown in Figure 2.8. For more information on how to charge the robot, please refer to section 5.4 of this guide.
- 3. **USB port** is used for uploading files to the robot, as well as for downloading photos, videos and other data from the robot.

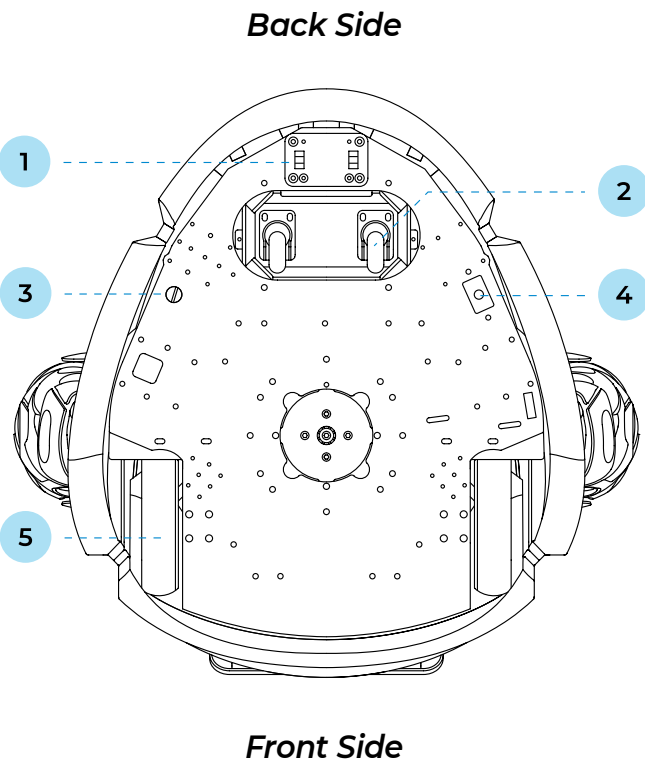


Fig.2.9. Promobot V.4 robot, bottom view (bottom of the movement platform)

- 1. Contacts for charging station
- 2. Steering rollers
- 3. Power button
- 4. Circuit breaker button
- 5. Motor-wheels

- 1. **Motor-wheels** are connected to an electric motor and control the robot's speed and braking.
- 2. **Steering rollers** assist in turning while moving.
- 3. **Power button** sends a signal of starting/ending operation to the system.
- 4. **Circuit breaker button** is used to completely de-energize the robot's systems.

To turn on the robot for the first time, you must first press the **circuit breaker button** and then press the **power button**. For subsequent power-ups, only the **power button** needs to be pressed.

**NOTE**

The power and circuit breaker buttons are intentionally located on the bottom of the movement platform to prevent accidental pressing. To press them, you must approach the robot from the side and locate the button without lifting the robot (Fig. 2.11).

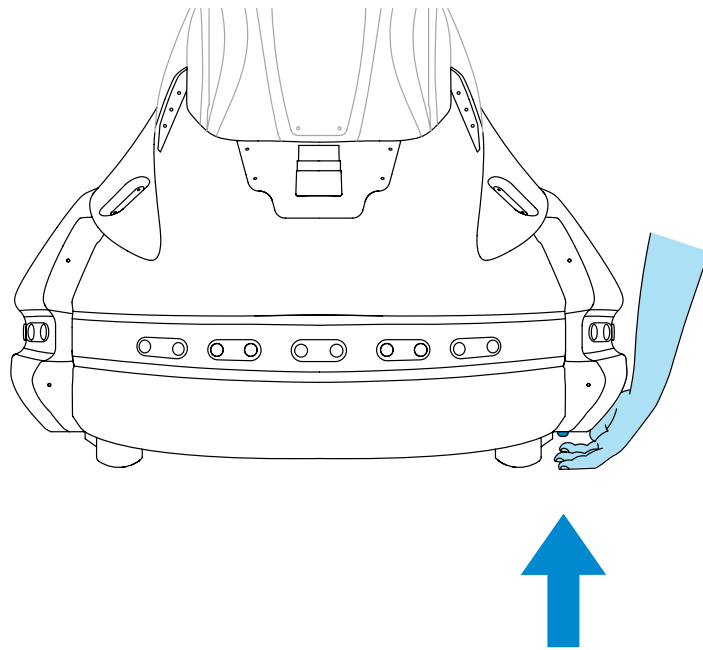


Fig.2.10. Pressing the button on the bottom of the movement platform

**DO NOT:**

- allow moisture and foreign objects to get into the openings of the elevator's moving elements and into the robot's wheelbase;
- allow moisture to get into the charging and USB ports;
- allow the camera or sensors to become dirty or blocked by foreign objects;
- touch the wheels while the robot is moving;
- allow objects that could make it difficult to rotate to get under the robot's wheels.

3. REQUIREMENTS FOR THE OPERATION ZONE

The operation zone of the robot is defined as the area of its free movement. There are special requirements for the room where Promobot V.4 will be placed: the robot is not intended for outdoor use, as it is a technologically complex electrical product that requires protection from moisture. In addition, direct sunlight can damage the robot's body parts and "blind" the robot's cameras, and wind interferes with speech recognition. The robot requires a stable internet signal to operate the speech recognition system and a flat surface to move on.

Fulfilling these requirements will affect the safety of the robot, the safety of its use and the efficiency of its operation.

3.1. Requirements for the location

The room or place where the Promobot V.4 robot will be used must meet the following requirements:

- air temperature from +10° to +35°C;
- air humidity not more than 70%;
- average illumination level not less than 50 lux.

In the immediate vicinity of the intended zone of operation of the Promobot V.4 robot, there must be no sources of:

- high voltage;
- bright blinding lights (including spotlights);
- big noise and loud music.

Promobot V.4 robot needs access to the Internet, so the following requirements are imposed on the room:

- Availability of seamless Wi-Fi (802.11n) coverage at 2.4 or 5.0 GHz with a guaranteed two-way throughput of at least 4 Mbps over the entire area of the room. Ping to address 8.8.8.8 is no more than 50 milliseconds.
- Radio transparency (no thick walls, large columns or obstacles) on the path of radio waves propagating Wi-Fi frequencies from the access point to the robot.
- Low interference on Wi-Fi frequencies (no other working access points and Wi-Fi routers of 802.11 ac standards in the immediate vicinity).
- Ports 80, 443, 8080, 22105, 22111 are open in the router settings. Detailed information is given in p.6.2 of this guide.

When organizing access to the Internet, please note that **the robot does not connect to hidden networks.**

3.2. Requirements for floor surface

The robot is moved by two driving motor-wheels and two steering rollers. The wheels have no shock absorption system, and the steering rollers are hard, small in diameter. The weight of the robot is over 120 kg. The following requirements are made on the floor surface for correct movement:

1. No thresholds, steps or other obstacles higher than 1 cm, as well as no drastic differences in floor height in the room.
2. No inclined surfaces or ramps steeper than 10 degrees on the path of the Promobot V.4.
3. No areas on the floor with smooth polished or slippery surfaces on which the robot's wheels can slip.
4. No areas on the floor with hard surfaces, such as carpet with a pile height of more than 10 mm.
5. No moving parts on the floor (carpets, etc.).

3.3. Requirements for the charging station location

The choice of the location of the charging station must meet certain mandatory criteria, as the correct location of the charging station determines the correct operation of the automatic charging function. When selecting a location, first of all, attention should be paid to the surface of the station location, the requirements for which are listed in p. 3.2.

In addition to the surface requirements, the following conditions must also be taken into account:

- The charging station must be located so that the robot can reach it from anywhere in the room.
- The charging station must be located near a wall with no skirting board and provide charging space for one robot of at least 700 x 700 mm.
- The charging station must be stationary. For this purpose, the station should be positioned so that the rear part is leaned against a wall or other rigid support. Otherwise, the station must be rigidly fixed to the floor.
- The lateral distance to walls or other obstacles to the right and left of the charging station must be at least 1 meter in each direction. The distance in front of the charging station must be free for at least 3 meters. It is not permitted to obstruct the robot's passage to the charging station.
- The charging station must be connected to a serviceable, earthed socket outlet with a voltage of 220V and a power of at least 400W. The power cable must not be under tension



ATTENTION!

Avoid an arrangement, in which one charging station is used for two or more robots. Moreover, it is not recommended to place the charging stations close to each other to avoid conflicts when charging.

3.4. Navigation system requirements

The robot's navigation system relies on the use of a lidar, a laser scanner located in the lower part of the robot (an optional extra) and a pre-built map of the room. Additionally, due to the technological features of the lidar, the following requirements are imposed on the room:

1. Wall surfaces should not completely reflect, transmit, or absorb light. The presence of mirrors, glasses, and dark matte surfaces at a height of up to 40 cm from the floor along the entire perimeter of the room is unacceptable. If the elimination of glass surfaces is impossible, they should be sealed with a special film (the name of specific film models can be requested in the technical support chat).
2. The distance between walls and objects in places where the robot passes should be at least 1.7 meters.
3. It is not allowed to rearrange large objects (sofas, cabinets) in the room after building a map of the robot. Redesign or rearrangement of the room requires rearrangement of the map.
4. It is advisable to have objects with high legs (e.g. tables and chairs) in the area where the robot is moving.

4. SAFETY PRECAUTIONS

4.1. General safety rules

1. Use the Promobot V.4 robot only for its intended purpose, as specified in the user guide, in rooms that meet the requirements described in Paragraph 3.
2. Do not use the Promobot V.4 robot outdoors or in rooms with high air humidity.
3. Robot arms may cause injury during operation of the Promobot V.4 robot. Avoid contact with the arms while the robot is moving.
4. The wheels of the Promobot V.4 robot may cause injury. Avoid contact with the wheels while they are rotating.

4.2. Electrical safety

1. When using the Promobot V.4 robot, follow the general safety rules for the use of electrical appliances.
2. Before repairing and storing the Promobot V.4 robot, disconnect the power supply of the robot, disconnect the charging cable from the robot and from the charging station, and disconnect the plug of the charging station's power cord from the socket.
3. Observe the mains voltage when charging the batteries. The mains voltage should be 220V at 50-60 Hz. A voltage higher or lower than 220V may cause damage to the batteries and charger.
4. Regularly inspect the mains cord of the charging station as well as the power cord for damage and wear. The batteries must only be charged if they are in perfect condition.
5. If the power cord is damaged or broken, immediately unplug it from the power outlet.
6. Do not use the power cord to pull its plug out of the socket. Do not step on the power cord.
7. The mains socket of the power supply must match the plug of the power cord of the tool. It is not recommended to use connectors and adapters for charging from the charging station and via cable. Use only grounded plugs for the charging station. Using ungrounded outlets may cause the robot to malfunction.

8. Use only commercially available standard extension cords. The cross-section of extension cords must not be smaller than the mains cord of the tool. For lengths up to 20 m use an extension cord with a minimum cross-section of 1.5 mm² or more, for lengths from 20 m to 50 m use an extension cord with a cross-section of 2.5 mm².
9. When using an extension cable wound on the reel, pull the cable to its full length. If necessary, consult an electrician.

5. PREPARING THE PROMOBOT V.4 ROBOT FOR USE

Before putting the robot into operation, remove it from the shipping case, make sure it is intact, and arrange the operation zone for the robot according to Paragraph 3.



ATTENTION!

If the robot is transported in sub-zero temperatures, be sure to allow the robot to warm up in a heated room for at least two hours before the activation.

5.1. Unpacking the robot

5.1.1. General information about packaging

The Promobot V.4 robot is shipped in a special transport case (Fig. 5.1). In the case, the robot is placed in a polyethylene foam bag (Fig. 5.2), which protects the robot from damage during transportation. The robot is secured inside the case with a special bracket (Fig. 5.3).

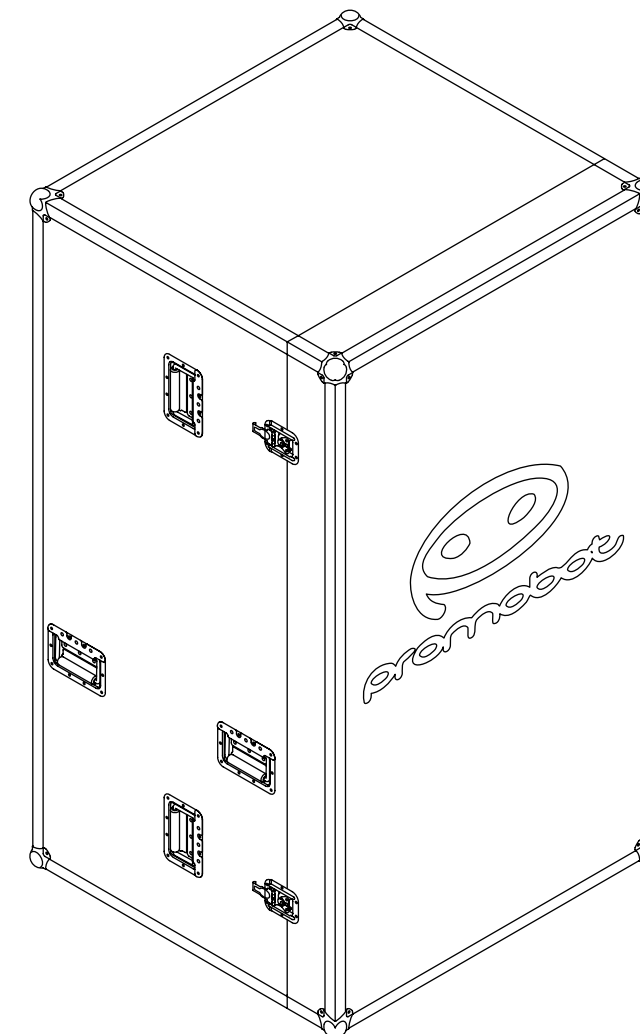


Fig. 5.1. Shipping case for transporting the robot

The case is equipped with wheels (Fig. 5.4), locks (Fig. 5.5) and handles. The robot can be moved either strictly vertically, according to the marking on the sticker (Fig. 5.6), or horizontally on the wheels.

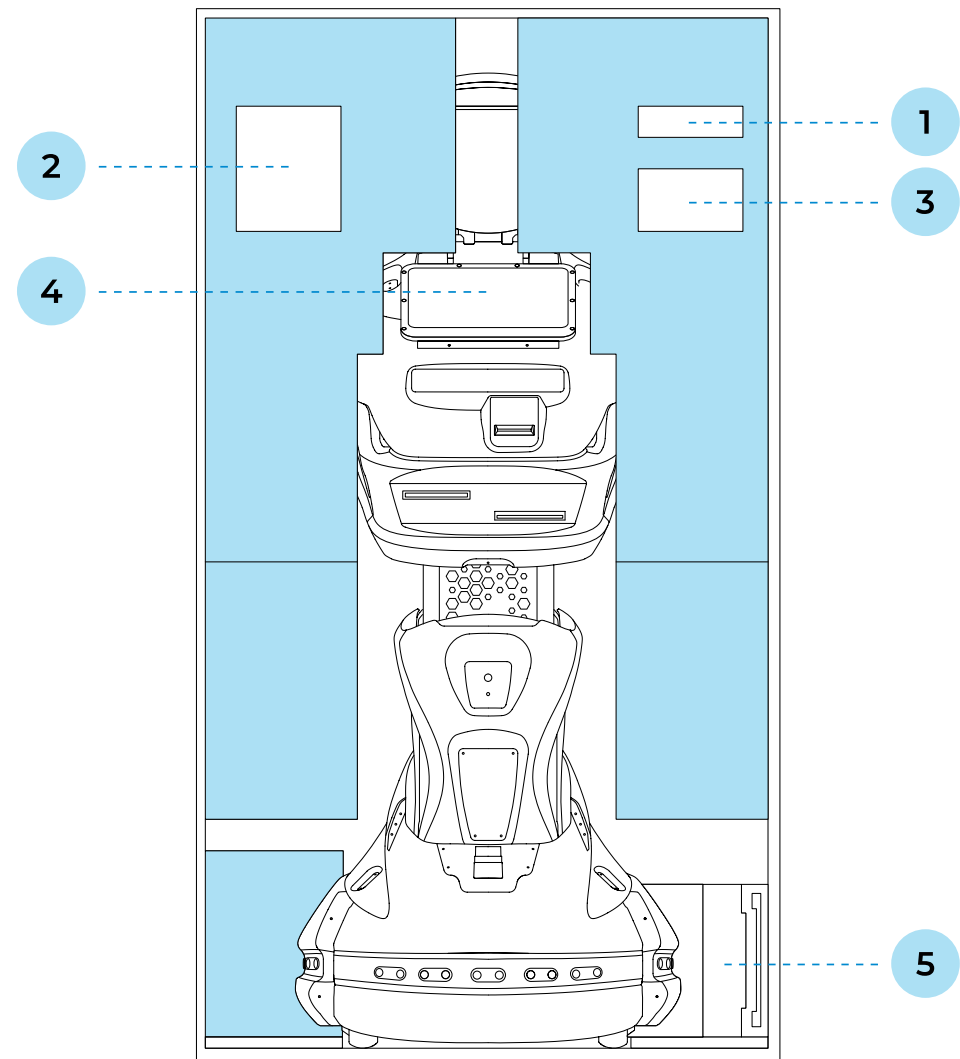


Fig. 5.2. Robot in a lodgement

- 1. Metal stand for overcoming the threshold of the case
- 2. Power cord
- 3. Controller
- 4. Robot
- 5. Charging station

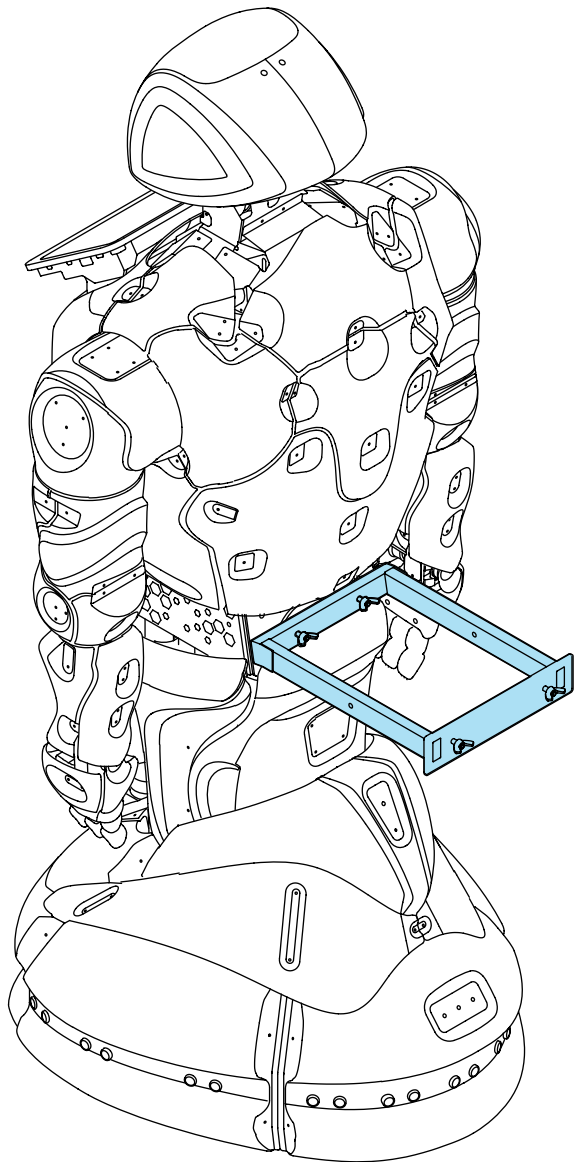


Fig. 5.3. Bracket for attaching the robot to the shipping case

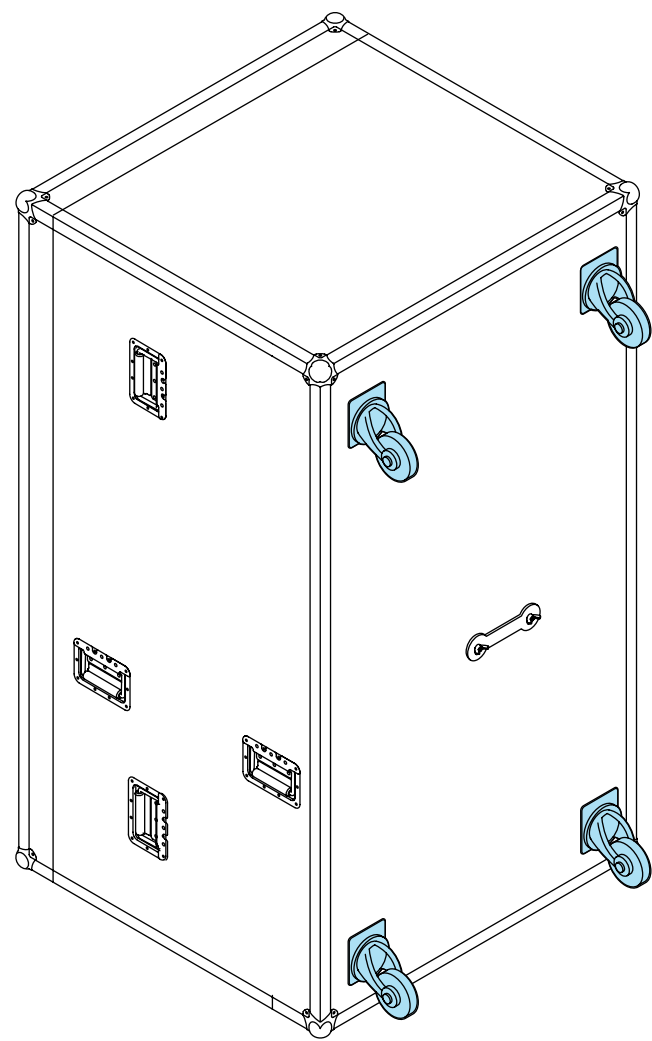


Fig. 5.4. Bottom of the case with the wheels

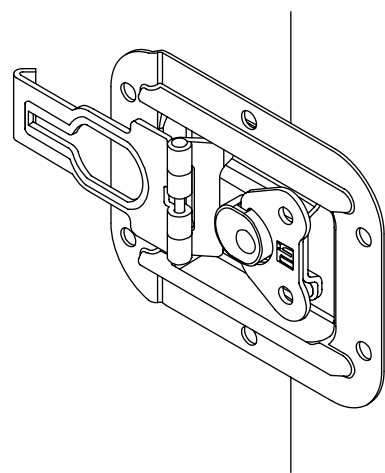


Fig. 5.5. Case lock

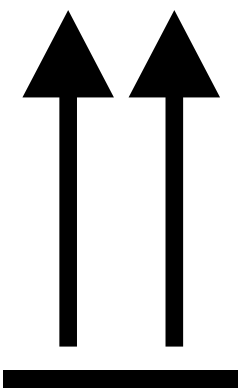


Fig. 5.6. Case sticker with a marking

5.1.2. Removing the robot from the shipping case



ATTENTION!
Do not unpack the robot without assistance!

In order to remove the robot from the case, follow the steps below:

1. Place the case in vertical position according to the transportation marking (Fig. 5.6).
2. Unscrew the thumbscrews (Fig. 5.5) on the four locks of the lid, disengage the locks, remove the lid by pulling it forward and put it aside.
3. Check by eye the condition of the robot and accessories after transportation. If any damage is detected, contact technical support.
4. Detach the bracket from the case. To do this, unscrew the bolts holding the bracket on the back side of the case, where the wheels are located (Fig. 5.7), and remove the fixing plate.



NOTE
If the screws cannot be loosened by hand, use the special slot in the metal stand as a wrench.

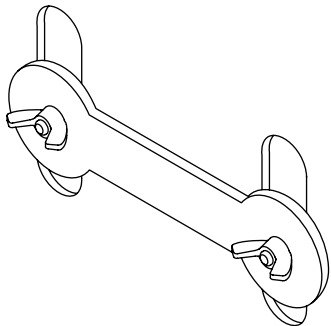
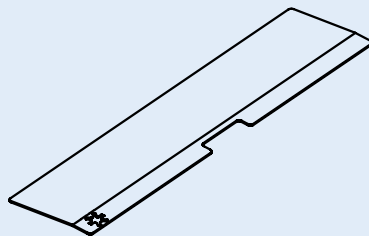


Fig. 5.7. Thumbscrews on the bracket attachment

5. Pull the metal stand out of the lodgement and place it on the profile of the case to remove the robot easily (Fig. 5.8).

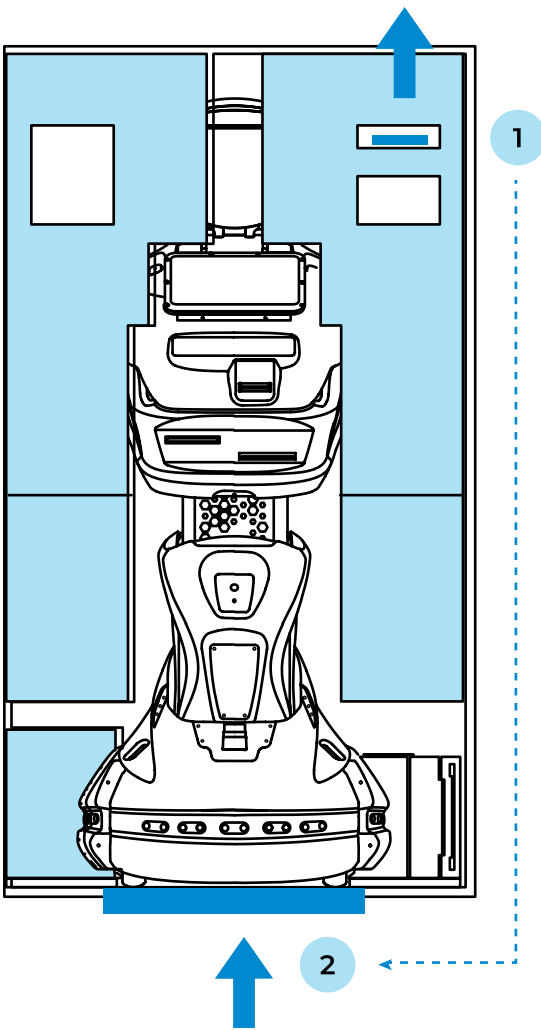


Fig. 5.8. Metal stand in the lodgement inside the case

1. Position of the stand when transporting the robot
2. Position of the stand when removing the robot from the case

6. Holding the robot by the lodgement or by wrapping your hands around the metal part of the torso, gently roll the robot out of the case along with the lodgement and retaining bracket.


ATTENTION!

Do not attempt to remove the robot from the case by pulling on the plastic parts of the case or the metal mesh! These parts can be deformed.

7. Remove the two lodgement elements from the robot by gently pulling them apart (Fig. 5.9).

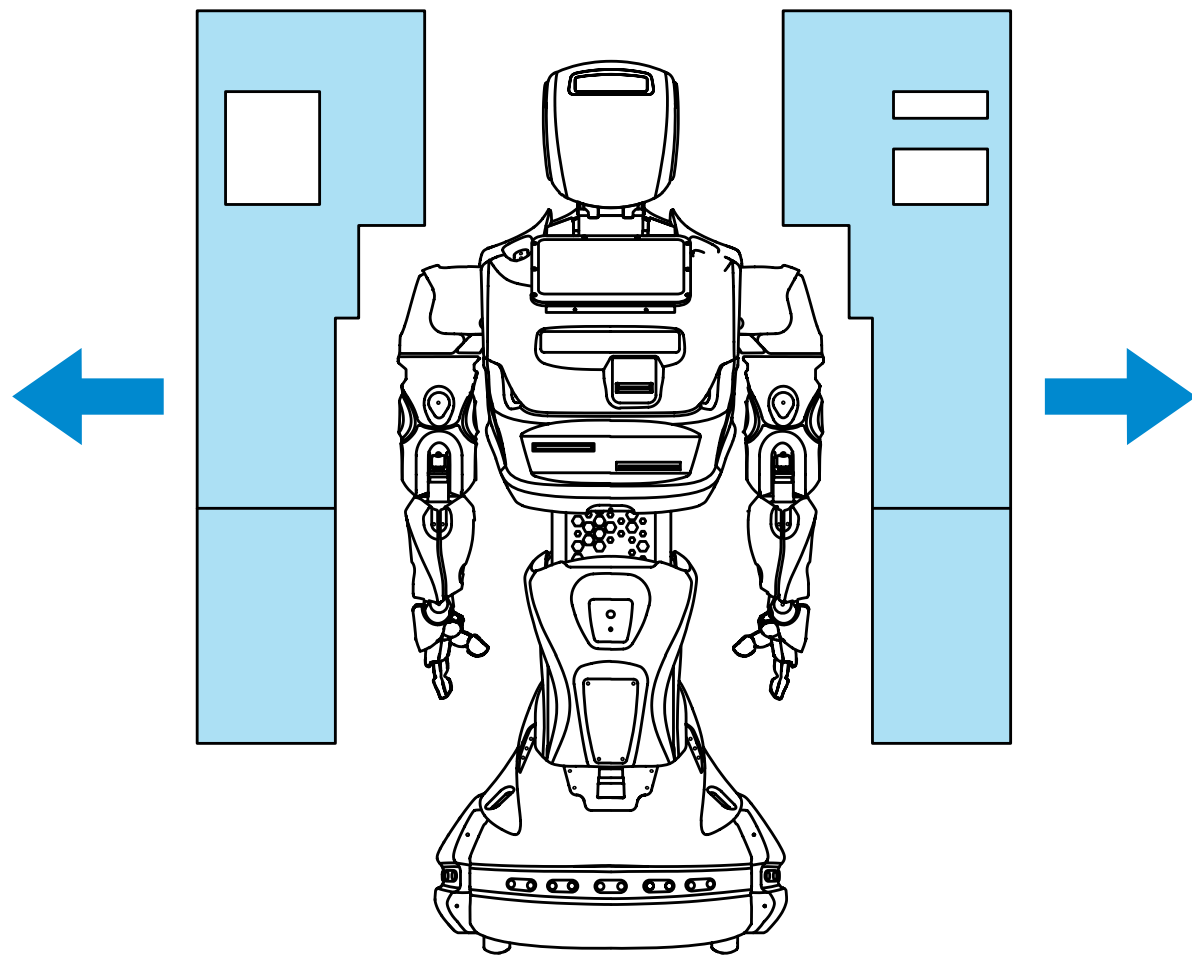


Fig. 5.9. Removing the robot from the lodgement

8. Detach the retaining bracket from the robot's "waist" by removing the two thumbscrews as shown in Fig. 5.10. The screws can be secured in the bracket itself by screwed holes in the inner side walls of the bracket (Fig. 5.11).

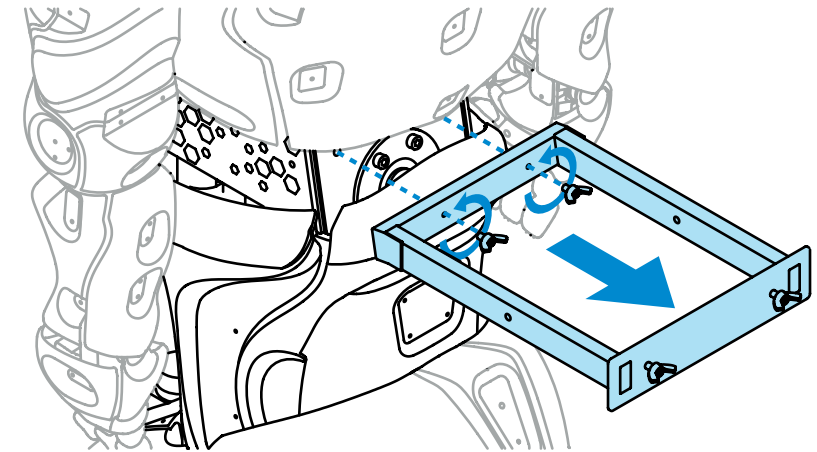


Fig. 5.10. Detaching the retaining bracket

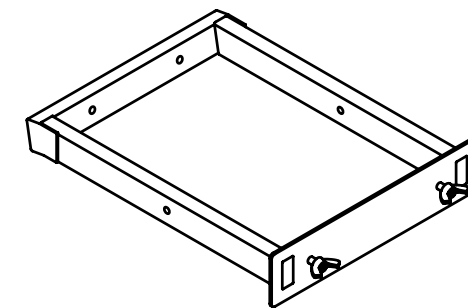


Fig. 5.11. Retaining bracket

9. Remove the protective bag from the robot.
10. Remove the supplemental accessories from the lodgement: charging station, charging cable and controller.
11. Place the lodgement and bracket back into the case and close the case with the lid. Keep the accessories in the case, as you may need them if the robot has to be transported.

5.2. Robot activation

In order to switch on the robot for the first time, press the **circuit break button** and only then press the **power button**, which are located on the bottom of the movement platform (more details in Paragraph 2.4). For the following switching on of the robot, you only need to press the **power button**.

After pressing the power button and a short sound signal, the robot will start loading all its systems (Fig. 5.12).

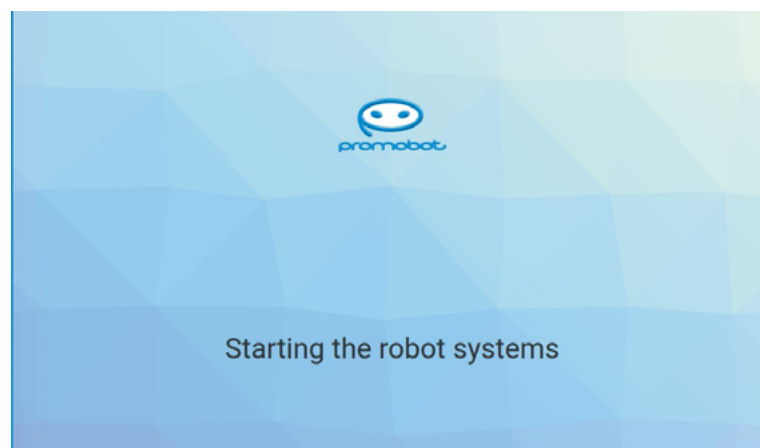


Fig. 5.12. Robot system startup screen

When all robot systems are finally loaded, the start screen will appear on the touch screen display (Fig. 5.13).



Fig. 5.13. Start screen

1. Start button
2. Configuration button

1. The **Start** button runs the robot application case (see Paragraph 7.1).
2. The **Configuration** button takes you to the robot Service menu (see Paragraph 6).

At the same time as the robot starts up, the calibration process of the moving parts will begin. Calibration is needed for proper movement and will be performed each time the robot is switched off completely or the drives are powered off using the kill switch.

Refer to Chapter 7 of this guide for information about utilization of the robot.



ATTENTION!

For a correct calibration, the actuators must be set to the initial position and the robot's movements during the process must not be restricted by foreign objects. Be careful, the calibration starts automatically!

5.3. Robot shutdown

The robot shutdown is done by long (3-4 seconds) pressing the on/off button (located on the bottom of the movement platform) until a sound signal is emitted. When the robot is switched off, the corresponding inscription is played on the emotion matrix.

5.4. Setting the robot for charging



NOTE

If the robot's battery is low, a notification will appear on the emotion matrix, and a corresponding voice message will be played.

The charging station is supplied with the robot and consists of the following parts displayed in Figure 5.14.

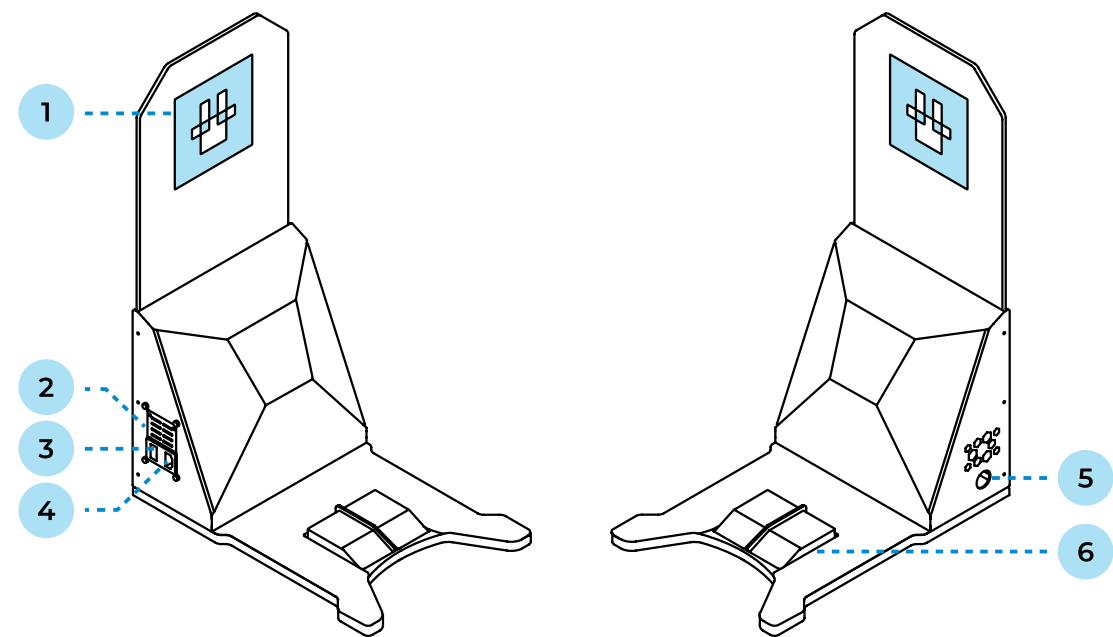


Fig. 5.14. Charging station for the Promobot V.4 robot

- | | |
|--|-------------------------------|
| 1. Charging station identification mark | 4. Mains power cord connector |
| 2. Mains mode toggle switch ¹ | 5. Charging cable connector |
| 3. Power toggle switch ¹ | 6. Charging contacts |


Before using the charging station, make sure that all preparations have been made:

1. The charging station is installed according to the location requirements (Paragraph 3.3).
2. The power cord of the charging station is connected to the connector.
3. The plug of the charging station power cord is plugged into the power socket.
4. The **mains mode toggle switch** is switched to 110V or 230V, depending on the **mains** used.
5. The **power toggle switch** is switched to the “On” position.

¹ — Depends on the selected configurationconfiguration

Once all preparations have been made, the robot can be set to charge. There are two methods: charging with the charging contacts and charging with a special cable (included in the delivery).


The first method of charging is accomplished using the robot's automatic approach to the charging station. For this function to work correctly, **the robot must be within a radius of 4 to 6 meters from the charging station, and the station must be easily accessible** (the charging station identification mark must be in the line of sight of the charging station search camera) and all preparations must be made. To run the algorithm, the robot must be in the automatic movement mode (Paragraph 6.1).

**DO NOT:**
Attempt to plug in the power cord while the Send to Charge application is running.

The robot employs the following algorithm of actions:

1. Finding the location of the charging station by a special black and white mark on the shield protruding from the charging station.
2. Approaching the charging station and turning towards it with its rear.
3. Docking, during which the robot drives the rear part of the movement platform onto the charging station's charging contacts.

The second method of charging is used in case if it is impossible or difficult to use automatic charging. In order to do this, you will need to connect the special power cord from the delivery set to the power port on the back of the robot's movement platform (Paragraph 2.4).

**NOTE**
It is recommended that you unplug the charging station and power cable when the robot is not in use (e.g. overnight and on non-working days). This will prolong the life of the charging station and power cable.
If the charging station and/or power cord are constantly connected to the mains, they will not last more than one year.

6. SERVICE MENU

The main parameters of the robot operation are configured in the Service menu. Go to the Promobot V.4 service menu by pressing the **Control** button on the start screen (Fig. 5.13).

6.1. General information

In order to access the Service menu of the robot, you must enter the password (Fig. 6.1). By default, all robots have a standard password, which can be obtained by contacting technical support. The password can be changed after accessing the menu.

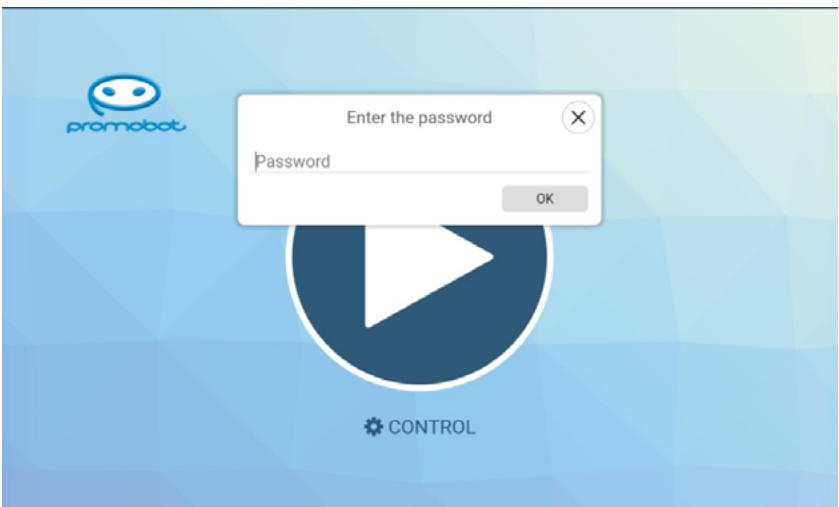


Fig. 6.1. Password entry window for accessing the service menu

The service menu (Fig. 6.2) provides quick access to the controls, which include:

- **Speaker volume and microphone sensitivity controls.** The values of the controls affect the system parameters and are saved until the robot is switched off. At the power up, the parameter values are downloaded from the server, and changing the value directly from the server will only be applied the next time the robot is started up. The controls on the robot's main screen work in the same way (you can set constant values in **Settings**, in the **System** submenu).
- The **Send to Charge** button, which will cause the robot to start moving in search of a charging station.

- **Automatic Mode** switch, responsible for activating the robot's automatic movement mode.
- **Controller Phrase Mode** switch, which puts the controller into a special mode. In this mode, the user can use the joystick to command the robot to speak set phrases.
- The **Response Log** switch, which controls the display of the system interaction log on the main screen. When enabled, recognized user phrases and generated robot response phrases will be displayed on the screen.
- The **Collapse** button to hide the robot interface may be needed when you want to access the robot's operating system directly.
- The **Reset** button to reset the robot interface will be needed whenever the values of any parameters in the Service Menu have been changed.

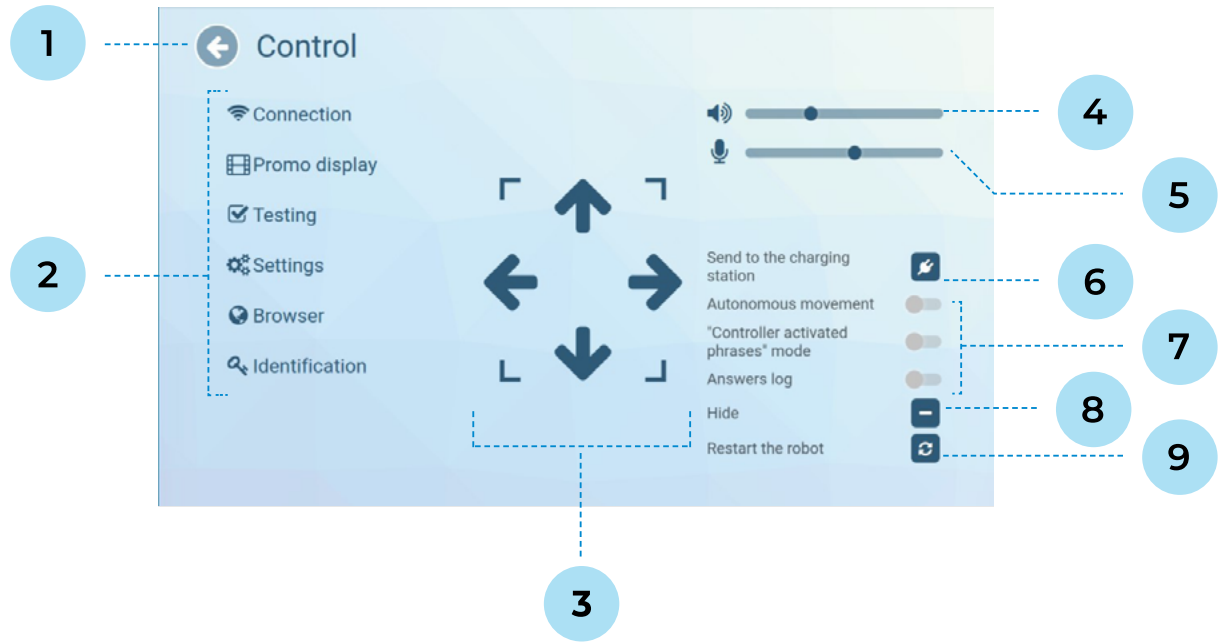


Fig. 6.2. Service menu screen

- | | |
|---|-------------------------------|
| 1. Service menu exit button | 6. Send to Charge button |
| 2. List of service menu submenus | 7. Switches for special modes |
| 3. Buttons for robot control (in manual mode) | 8. Interface minimize button |
| 4. Speaker volume control | 9. Robot systems reset button |
| 5. Microphone sensitivity control | |

6.2. Internet connection

This section of the Service Menu contains information (Fig.6.3) about the available Wi-Fi networks for connection, and also displays the signal strength of each of them.



Fig. 6.3. Network connection screen



NOTE

Before connecting to the network, make sure that the ports listed in Table 3 are open in the router settings.

Table 3. List of ports and resource protocols required for robot operation

No	Remote resource	Port	Protocol	Purpose
1	google.com	80, 443	TCP/UDP	Speech recognition
2	lingvo.promo-bot.ai	80, 443	TCP/UDP	Web interface of the linguistic base
3	lingvo-edu.promo-bot.ai	80, 443	TCP	Web interface of the linguistic base
4	vpn-v4.promo-bot.ai	22111	TCP	VPN connection for remote monitoring and configuration



NOTE

The list of ports may expand depending on the services or resources used. It is recommended to select the network with maximum signal strength. The robot does not connect to hidden networks.

No	Remote resource	Port	Protocol	Purpose
5	vpn-edu.promo-bot.ai	22105	TCP, UDP	VPN connection for remote monitoring and configuration
6	46.4.94.90	80, 443	TCP/UDP	STUN / TURN for the service of telepresence
7	update.promo-bot.ru	80, 443	TCP/UDP	Software update
8	teleop.promo-bot.ru	80, 443, 8080	TCP/UDP	Service of telepresence
9	teleop-new.promo-bot.ru	80, 443, 8080	TCP/UDP	Service of telepresence (new)
10	archive.ubuntu.com	80	TCP/UDP	Software update
11	ru.archive.ubuntu.com	80	TCP/UDP	Software update
12	security.ubuntu.com	80	TCP/UDP	Software update
13	archive.canonical.com	80	TCP/UDP	Software update
14	extras.ubuntu.com	80	TCP/UDP	Software update
15	ppa.launchpad.net	80	TCP/UDP	Software update
16	dl.google.com	80	TCP/UDP	Software update
17	apt.postgresql.org	80	TCP/UDP	Software update
18	repo.yandex.ru	80	TCP/UDP	Software update
19	repo.zabbix.com	80	TCP/UDP	Software update
20	apt-archive.postgresql.org	80, 443	TCP	Software update
21	download.docker.com	80, 443, 5000	TCP	Software update
22	registry.promo-bot.ai	80, 443, 5000	TCP	Software update

When connected to a network, the ping value and signal strength of the Wi-Fi network can be found by clicking **Connection info** (Fig. 6.4) at the bottom of the screen. For the robot to work correctly, the ping value must be **above 0 and below 80 ms**. A ping value of 0 means that there is no access to the Internet.

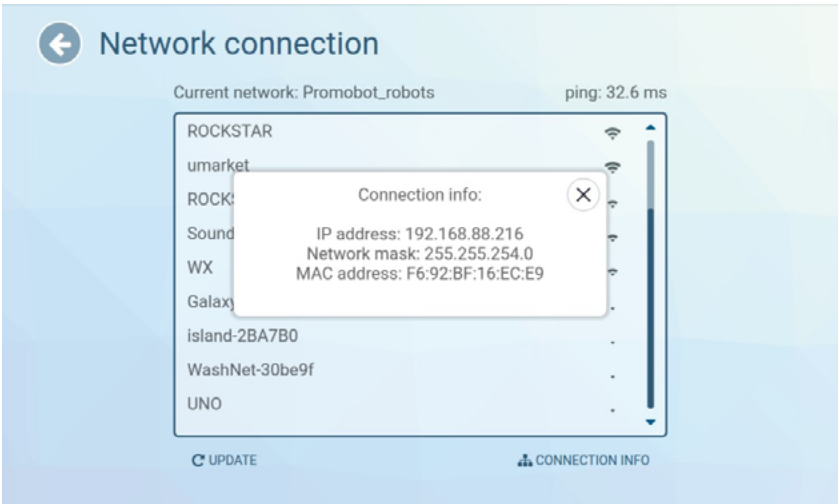


Fig. 6.4. Connection information window

You can close the connection information window by clicking on the cross in the upper right corner of the window.

To connect to a network, select it by clicking on it in the list of available networks. If the network is not displayed in the list, press the “Update” button. In the window that opens, enter the network access password and press the “OK” button.

If the connection is successful, the name of the network to which the connection is made will appear next to the “Current network” item. You can check the connection status using a browser, to do this, go back to the “Management” window and select “Browser”, then open any web page (if the page loads, then the Internet connection is successful).

While the “Connect to network” menu is open, the connection symbol in the status bar may periodically show that the network is not connected (the current connection to the network can be checked in the “Current network” field), because at this moment the available connections are being searched.

6.3. Display promo

Display promo is a robot function that allows you to display one or more images/videos on the robot's touch screen display. The promo materials are cyclically played on the robot display, following each other in alphabetical order. This function is realized in two variants (can work simultaneously):

- **Slideshow** — promo materials are displayed on the screen all of the time (this mode works only on a robot without a customized case);
- **Promo when printing** — promo materials are displayed on the screen while the “Photo from Robot” application is running (more information about the application in Chapter 7 of this guide).



NOTE

This paragraph describes the process of **selecting** a promotional material that is **already** in the robot's file system. Adding promotional materials to the robot's file system is described in the **Upload promo** (paragraph 6.4). Supported extensions for promotional materials are described in **Upload promo** (paragraph 6.4). Displaying files with other extensions is not guaranteed by the manufacturer. The resolution of the slideshow window is 1180x568 pixels.

Figure 6.5 shows a screenshot of the display promo customization screen.

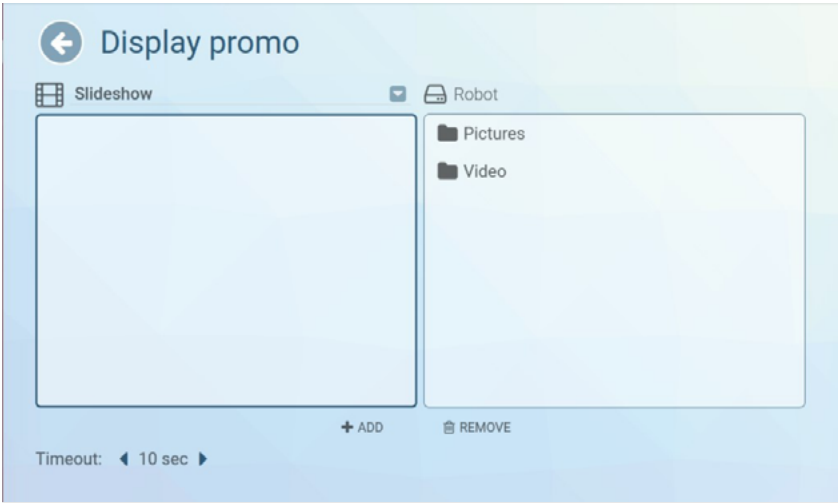


Fig. 6.5. Display promo customization screen (file manager)

In order to add a promo material to be displayed, select the required images and/or videos on the right side of the screen and click the **Add** button at the bottom of the screen. Confirm the action by clicking the **Yes** button in the dialog box (Fig. 6.6).

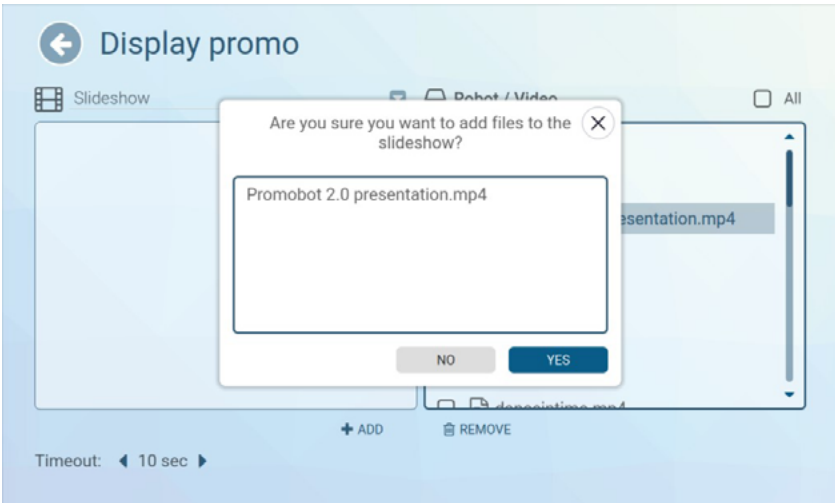


Fig. 6.6. Confirmation window for adding a promo to display

After confirmation, the added file will be displayed on the left side of the screen (Fig. 6.7).

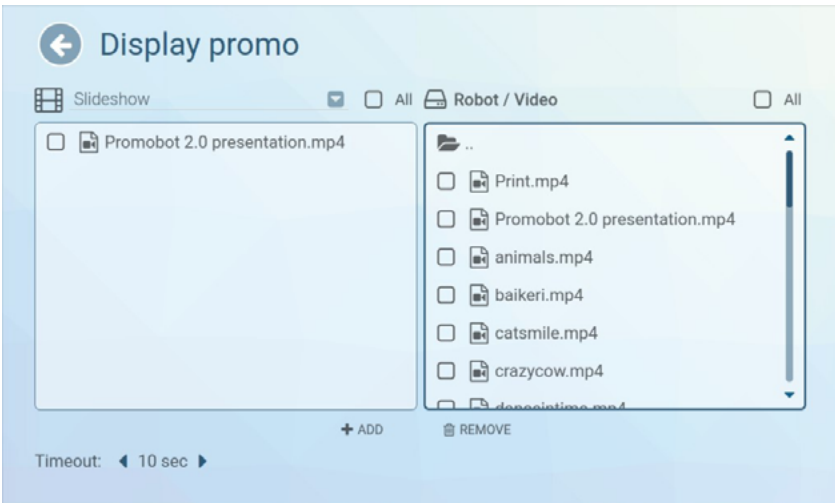


Fig. 6.7. Display promo customization screen (the image to be displayed is selected)

In order to delete promotional materials from those selected for display, select the file from the list on the left and click the **Delete** button at the bottom of the screen, then confirm the file deletion with the **Yes** button in the dialog box (Fig. 6.8).

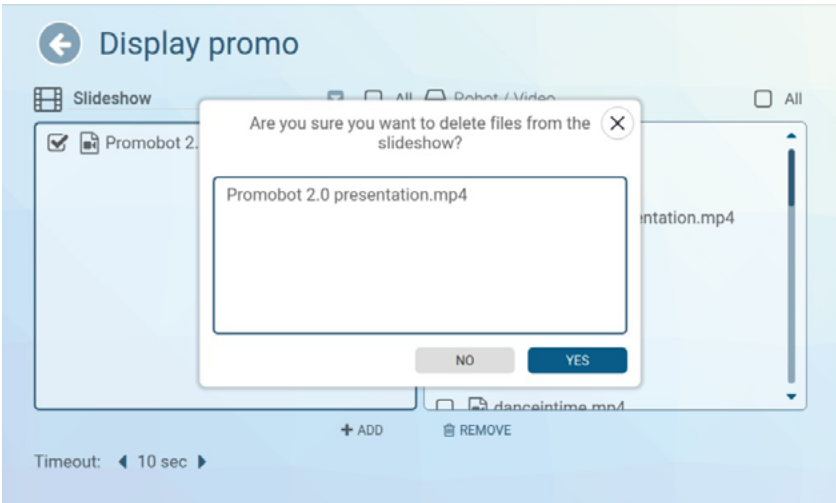


Fig. 6.8. Confirmation window for deletion of a promotional material

You can set the frequency of material changes with the **Timeout** parameter (time in seconds). This parameter is shared by **Slideshow** and **Promo when printing**.

To switch between **Slideshow** and **Promo when printing**, use the drop-down list at the top left of the screen (Fig. 6.9). Selecting materials to be displayed in **Promo when printing** is similar to selecting materials to be displayed in **Slideshow**.

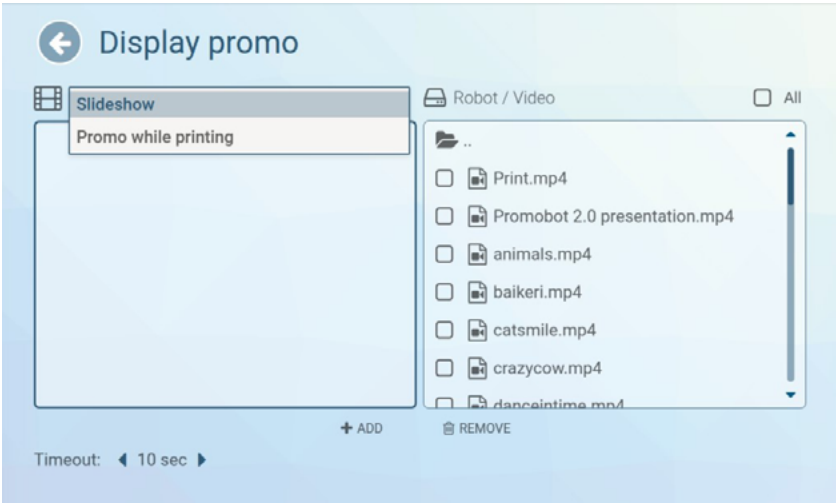


Fig. 6.9. Display promo customization screen (drop-down list: Slideshow and Promo when printing)

6.4. Upload promo



ATTENTION!

The section is only available when a USB key is connected via the USB port on the back of the movement platform (Paragraph 2.4).

In this section of the Service menu, you can upload promotional materials and photo frames (more about photo frames in Chapter 7) from a USB key into the robot's file system (Fig. 6.10).

In order to copy a new promotional material from external media, follow the steps below:

- 1. On the left side of the screen (external device), select the desired video files and/or images;
- 2. On the right side of the screen (robot file system), open the folder where you want to place the files (for photo frames to be displayed in the “Photos from Robot” app, select the **Photo frames** folder);
- 3. Click the **Copy** button at the bottom of the screen. The added files will appear on the right side of the screen.

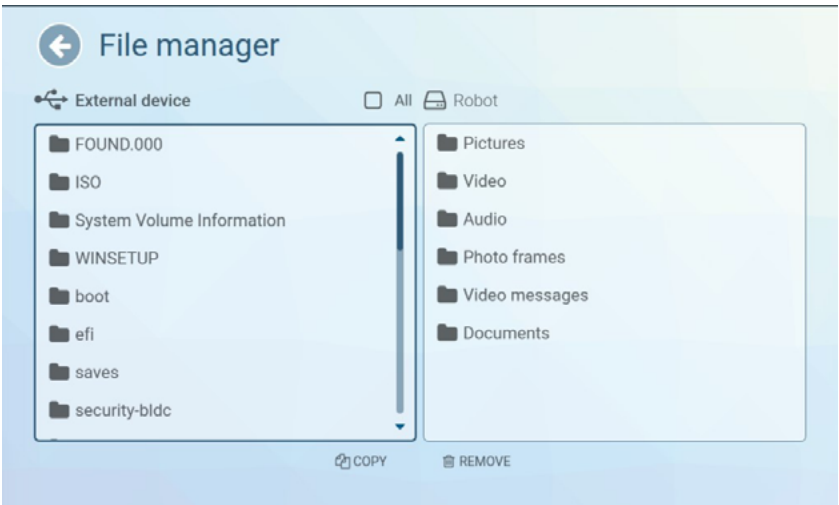


Fig. 6.10. Upload promo screen (file manager)

In the same section of the Service menu, you can load photo frames that should be available in the “Photos from Robot” application (more about this application in Chapter 7). A photo frame is an image that must have an alpha channel (transparent layer) as its background. Photo frames are loaded using the same algorithm as described above.

Recommended resolution values for promotional materials are listed in Table 4.



ATTENTION!

Do not use unnecessary punctuation marks (i.e. all but one dot separating the file extension) in file names! Otherwise, the robot software will crash.

Table 4. Recommended resolution values for promotional materials

Promo type	Recommended resolution
promotional materials in Slideshow	1180x568
promotional materials in Promo when printing	1262x647
Photo frames	1208x810

The supported file formats are listed in Table 5.

Table 5. Supported file formats

File type	Supported formats
Video	*.mp4, *.avi, *.mkv
Images	*.jpg, *.jpeg, *.png, *.gif
Audio	*.mp3
Documents	*.pdf, *.doc, *.docx, *.xls, *.xlsx, *.ppt, *.pptx, *.txt, *.csv
Photo frames	*.png



ATTENTION!

The Document type is used for files sent via email, the robot interface **does not** contain viewing tools for files of this type.

6.5. Testing

This section of the Service Menu contains a test interface that allows you to check the functionality of the robot's main systems (Fig. 6.11).



ATTENTION!

Full testing functionality is only available after the robot has been launched (see section 7.1 for more details on the startup process).

Using the test screen, you can check the operation of the robot's moving parts (arms and head), camera images, microphone and speaker operation, and query the status of the installed hardware.

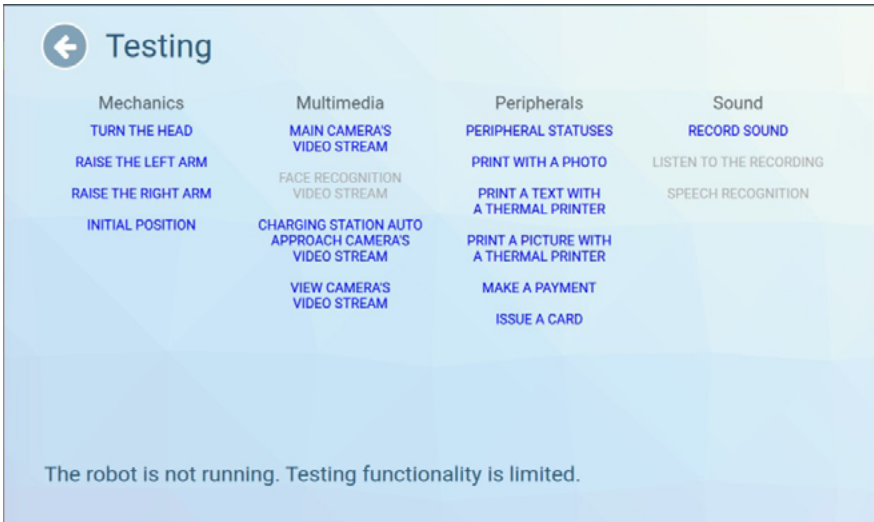


Fig. 6.11. Testing screen

6.6. Settings

This section of the Service Menu contains the interface for setting parameters (Fig. 6.12), for convenience divided into several groups:

- **System** — contains basic settings of the Promobot systemсодержит
- **Applications** — contains settings of applications and widgets installed on Promobot.
- **Face recognition** — contains management of the face database and settings of the Promobot face recognition system.
- **Navigation** — contains parameters of the Promobot robot movement system.
- **Linguo base** — contains settings for using Promobot linguobase.
- **Language settings** — contains settings for Promobot's language recognition and speech synthesis packages.
- **Online service** —contains settings of Internet services used by Promobot, for example, e-mail client.
- **Update** — contains tools for checking if Promobot updates are available and downloading them.



ATTENTION!

The **Face recognition** and **Navigation** sections for advanced users only.

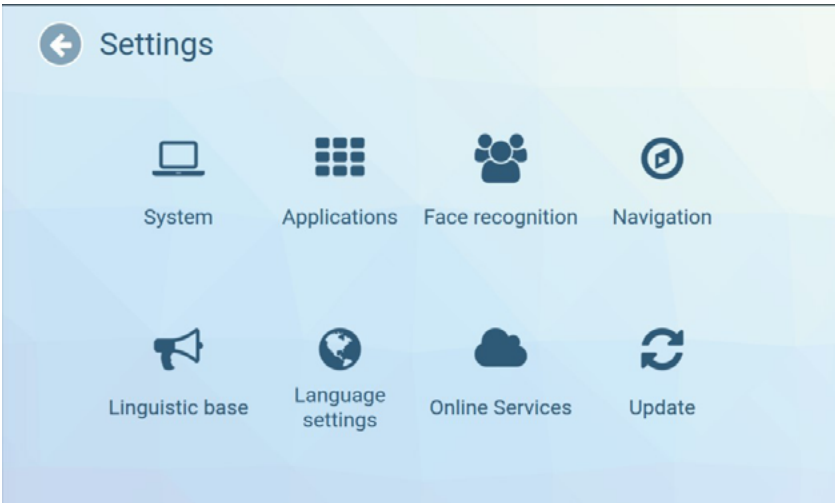


Fig. 6.12. Device settings screen

6.7. Browser

In this section of the Service menu a browser window opens. It is possible to access any sites on the Internet, as well as, if necessary, to pass authorization to connect to the Wi-Fi network. By default, the Promobot website is set as the start page (Fig.6.13)

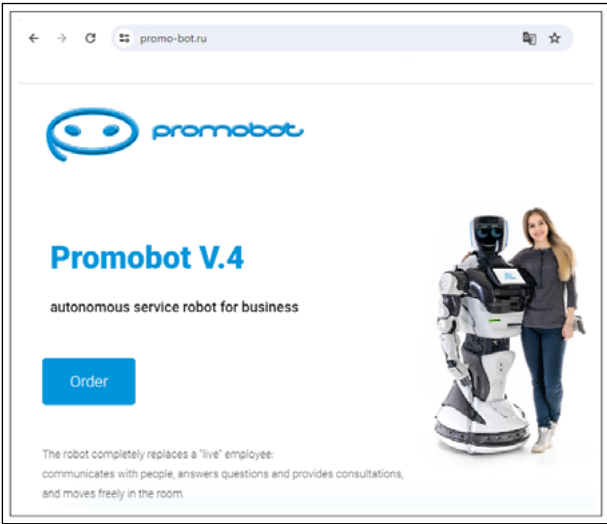


Fig. 6.13. Built-in browser screen

6.8. Identification

In this section, you can change the password for accessing the Service Menu.

To change the password, enter the new password, and then re-enter the password to confirm the correct entry (Fig. 6.14)

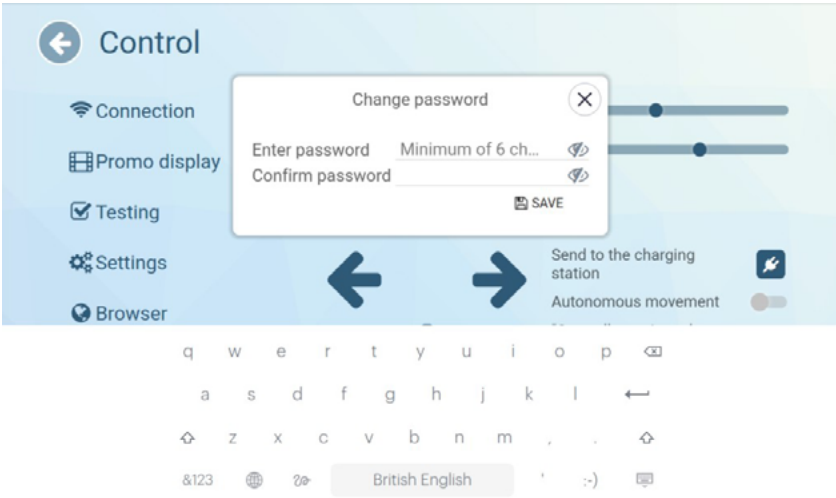


Fig. 6.14. Service menu access password change window



NOTE

It is recommended that you change the password the first time you turn it on. It is recommended that you change your password every 120 days. The password must meet the following requirements:

- password length of at least 6 characters;
- password must consist of acceptable characters, namely: Latin letters in upper and lower case, Arabic numerals, special characters.

The password is not subject to disclosure or unauthorized sharing.

If you suspect that your password has been compromised due to its loss or unauthorized access to it, you should generate a new password as soon as possible, but no later than 24 hours after becoming aware of the incident.

6.9. Face Recognition

The robot is equipped with a camera that is used for face recognition. With its help, the robot identifies people it knows, and can start a familiarization procedure for strangers so that it can greet them by name at the next meeting. An individual greeting can be set for a "familiar" person via the linguo base.

6.9.1. Recognition settings



ATTENTION!

The settings of this section are selected by specialists, it is not recommended to change them without consulting the technical support service.

Face recognition settings can be found in the Service menu, under **Settings**, under **Face Recognition** (Fig. 6.15).

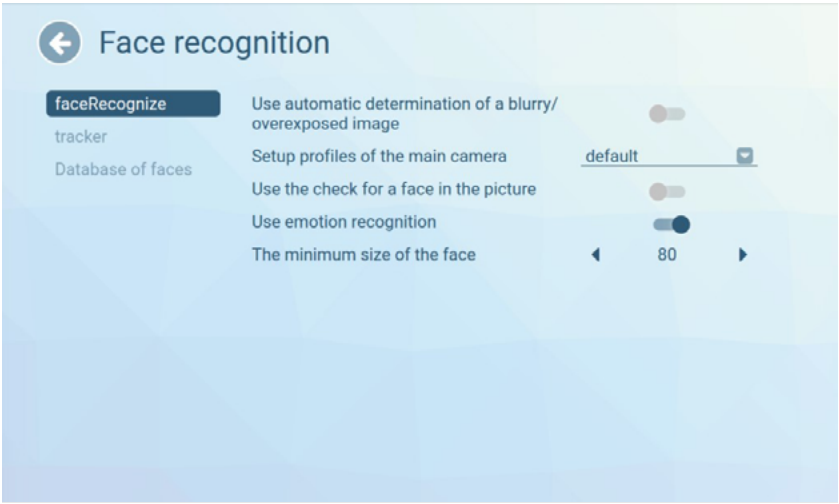


Fig. 6.15. Face recognition settings

Use blurred/ illuminated face auto-detection — when the switch is enabled, the face recognition camera will detect from the image that the face in the image is blurred or illuminated. If the current image is above a certain threshold, the recognition will only start when the value of these indicators becomes less than the threshold.

The main camera setup profiles — is a drop-down list with the following options: default, custom, wdr, lowillumination. Most often, the face recognition camera is adjusted by technicians individually for each robot (namely, for the lighting in the room where the robot will be installed), this mode is called custom (also known as default). The wdr variant is used for rooms with high contrast, the lowillumination variant is used for low-lighted rooms.

Use face in the picture check — when the switch is on, the robot checks whether the face in the camera is a photo, drawing, mannequin, etc. The robot does not start interaction. If the check is enabled and the recognized face is "fake", the robot does not start the interaction.

Use emovement recognition— the emovement recognition function is used in the Emovements app (this app recognizes the user's emovement and the robot duplicates it using animation on its emovement display matrix

The minimum face size — a value that determines how close you need to get to the robot before it starts tracking a person's face. This value depends on other internal settings and the software version installed on the robot. By default, a person's face is recognized at a distance of up to one and a half meters.

6.9.2. Face database

You can manage the saved faces in the same section, on the **Face Database** tab (Fig. 6.16). Faces are saved so that the robot will greet the visitor by name the next time it meets him or her

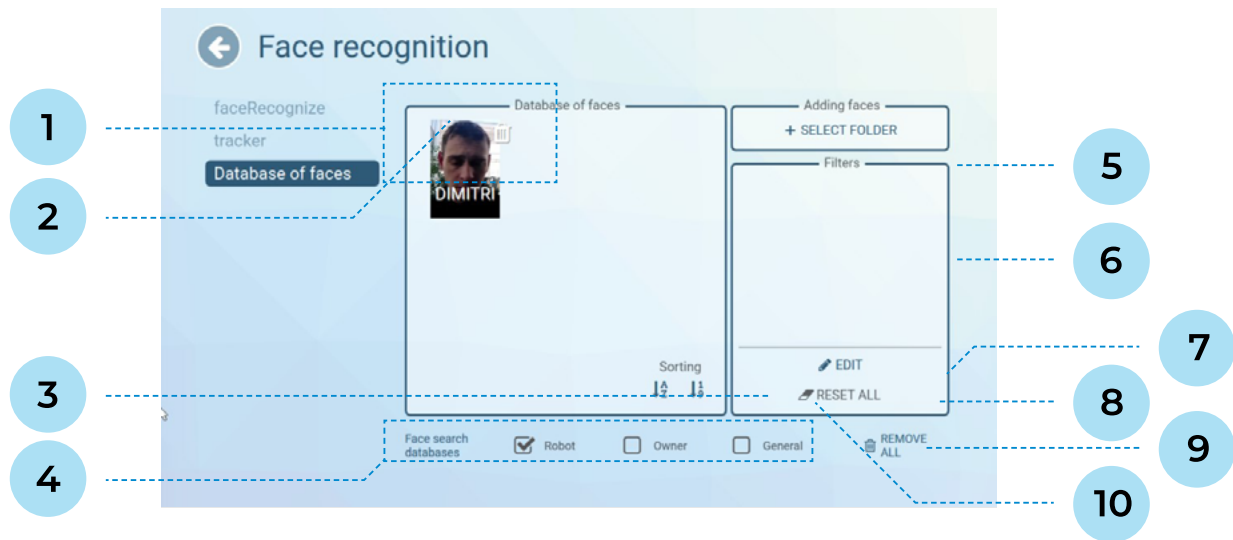


Fig. 6.16. Face Recognition Settings, Face Base tab.

1. **The display area of saved users in the face database** — photos with names are displayed, if you click on the photo you can see the date of acquaintance and the date of the last meeting.
2. **Delete user button** — allows you to delete this particular user. When clicked, a window will be displayed to confirm the deletion.
3. **Sort users by name** — you can sort in forward or reverse order, or not apply sorting.
4. **Face search databases.** During operation, the robot scans the user's face and searches for the user's face in databases of saved faces. You can select (one or more) face search databases at the bottom of the screen:
 - **Robot** — the face database of this particular robot.
 - **Owner** — a database of faces common to all the owner's robots, if you select it, you can get to know one robot, and all the owner's robots will be recognized.
 - **General** — a database of celebrity faces.
 - **Select a folder** — here you can upload photos of people so that the robot knows them in advance and the person does not have to go through the introduction procedure when meeting the robot (Fig. 6.17).
5. **The display area of applied filters** — you can filter users by name, date of acquaintance and date of

the last meeting to make it easier to search the database of persons

6. **Edit** — button for editing filters (Fig. 6.18).
7. **Reset all** — button to reset all filters.
8. **Delete all** — button for clearing the face database.
9. **Sort users by date of acquaintance** — you can sort in forward (from oldest to newest) or reverse order, or do not apply sorting.

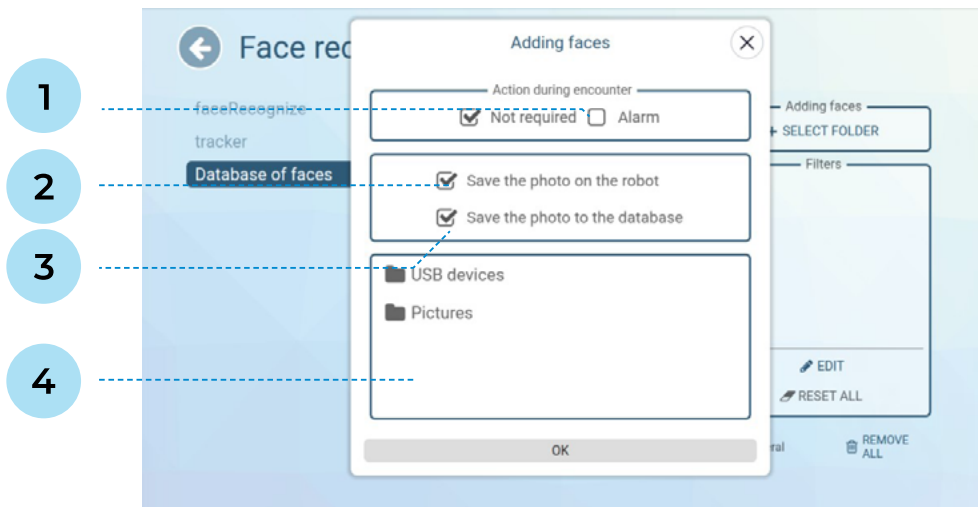


Fig. 6.17. Adding photos to the face database

1. **Encounter Action: Alarm** — used only for the "police officer" application case, when a face is recognized from a photo uploaded with this option, a SIP call is initiated to a specified number.
2. **Save a photo on the robot** — if this option is enabled, the photo thumbnail will be displayed in the rectangular area of the face database. It is recommended to enable this option.
3. **Save a photo to the database** — if this option is enabled, the photo will be displayed in the web interface of the person's database.
4. **The file manager area** — used to access images in the robot's file system (including if the image is to be loaded from a USB stick).

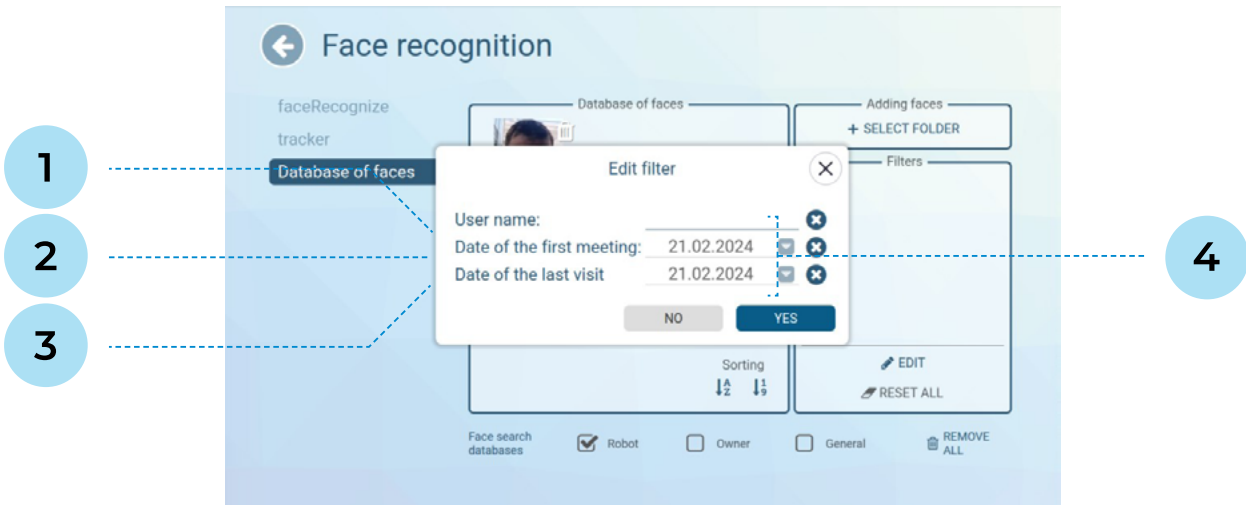


Fig. 6.18. Facial filter editing in the database

- 1. **User name** — entered from the keyboard. You can enter a specific name in its entirety or filter users by part of the name, for example, by the first letter.
- 2. **Date of acquaintance** — the date of the person's entry into the database.
- 3. **Date of last visit** — the date when this user was last recognised.
- 4. **Field Clear Buttons** — these buttons are convenient to use to quickly erase a value from a field.

6.10. Navigation

The robot movement settings are located in the Service Menu, in the **Settings** item, in the **Navigation** section (Fig. 6.19).



Fig. 6.19. Navigation settings

- 1. **Use radius restriction** — if this option is enabled, a pop-up window will be displayed when starting the case, in which you will have to select the radius within which the robot will move in the chaotic movement mode. The option is deactivated if there is a map of the room built and loaded on the robot.
- 2. **Movement radius** — the robot will move to search new communications within this radius, counting from the launch point.
- 3. **Movement time** — specified in seconds. During this time, the robot moves randomly, then pauses for the movement pause time, and then continues moving.
- 4. **Movement pause time** — specified in seconds. During this pause, the robot scans the space and selects the driving direction.
- 5. **Angular speed** — speed when turning. This parameter affects the speed in the chaotic movement mode, when controlling with the arrows in the service menu and when driving with the controller. It is not recommended to change the default value without consulting the technical support service.
- 6. **Linear speed** — speed when driving in a straight line. This parameter affects the speed in the chaotic movement mode, when driving with the arrows in the service menu and when driving with the controller. It is not recommended to change the default value without consulting the technical support service.
- 7. **Sensor distance. In front of the bottom** — specified in centimeters. Sensor sensing distance of the

sensors located on the movement platform. By default — 60 cm. It is not recommended to change this value, as it may cause the robot to collide with obstacles!

- 8. **Sensor distance. Rear bottom** — specified in centimeters. Sensor sensing distance of the sensors located on the movement platform. The default value is 60 cm. It is not recommended to change this value, as it may cause the robot to collide with obstacles!
- 9. **Sensor distance. In front of the top** — specified in centimeters. Distance of the sensor located on the torso of the robot. By default — 100 cm. It is not recommended to change this value, as it may cause the robot to collide with obstacles!

7. INTENDED USE

Promobot V.4 robot can be delivered with an individual application case (concierge, tour guide, police officer, etc.) or with a default case (robot consultant). An individual use case is customized for a particular customer, may contain a unique set of functions and is adjusted at the stage of robot ordering. The principles of operation of individual cases should be requested from the technical support service.

This manual describes the interface of Promobot V.4 robot with the default case.

7.1. General information

To start the Promobot V.4 robot, press the **Start button** on the start screen (Fig. 7.1).

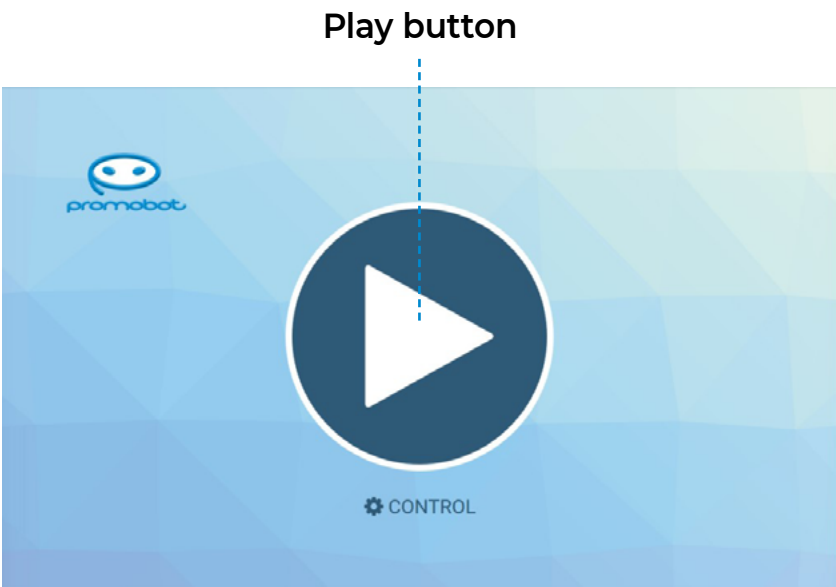


Fig. 7.1. Start button on the start screen

After startup, the screen will display a window for selecting the radius of robot movement — the robot will move to search for new communications within this radius, counting from the start point. Select the radius, click on the Yes button to confirm (the robot will not start driving immediately after that), then the user interface will be displayed (Fig. 7.2). As have already mentioned before, the user intendeder face depends on the application case. Figure 7.2 shows the interface of the robot counselor.



Fig. 7.2. Main screen

- | | |
|-------------------------------------|--|
| 1. Service menu call area | 5. Language selection widget |
| 2. Application menu | 6. Sound settings widget |
| 3. Button to interrupt robot speech | 7. Recognized/synthesized speech output area |
| 4. Camera video stream | |

At any time from the main screen you can go to the **Service menu** to control the robot or change settings. To activate the menu, it is necessary to make a quick fourfold press in the area indicated in Figure 7.2. When the Service Menu is activated, an access window will appear, in which you need to enter a password. By default, all robots have a standard password, which can be obtained by contacting the technical support service. The password can be changed after entering the menu (see Section 6.8).

Clicking on the **Applications Menu** button opens the applications and widgets panel of Promobot V.4 robot (Fig. 7.3). The composition of applications and widgets displayed on this screen can be customized in the Service Menu, see Section 7.1.2 for a description of the applications that the robot has.

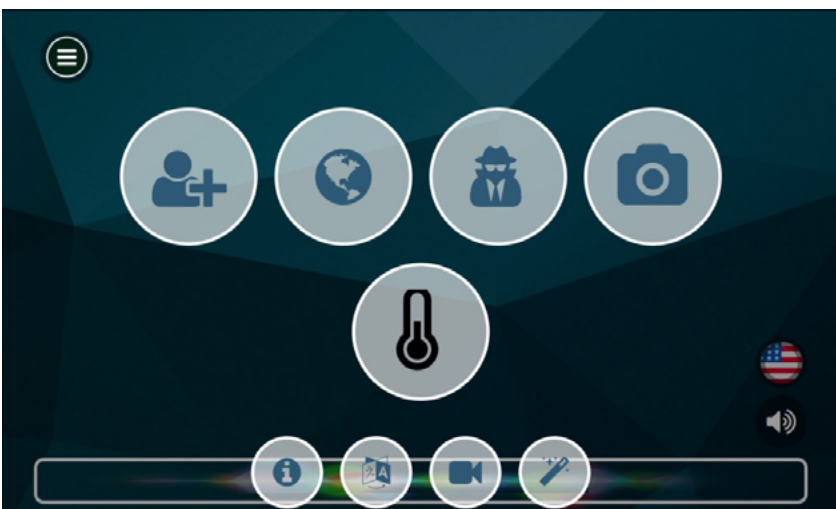


Fig. 7.3. Widgets and applications screen

Clicking on the button with the eye icon in the upper right corner opens the interface for viewing the video stream from the camera in real time (Fig. 7.4).

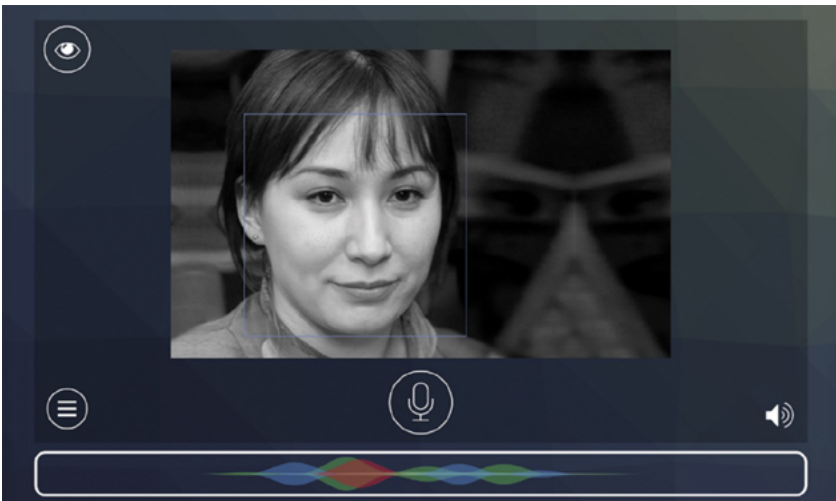


Fig. 7.4. Viewing video stream data

Clicking on the **Sound button** in the lower right corner allows you to temporarily (until reboot) change the settings of speech synthesis and volume of the robot's speakers (Fig. 7.5).



Fig. 7.5. Robot speech synthesis and volume settings

In the upper part of the Promobot screen there is a status panel (Fig. 7.6). The Decryptions to the panel elements are given below.



Fig. 7.6. Status panel on the robot screen

- | | |
|--|------------------------------------|
| 1. Robot ID | 4. Display of push notifications |
| 2. Current date and time | 5. Replication status |
| 3. CPU utilization status, expressed as a percentage | 6. Wi-Fi network connection status |
| | 7. Robot battery charge status |

Replication status:

- ✓ Success
Replication was successful
- ✗ Fail
Replication error
- ↻ In progress
The replication process is underway
- ? Undefined
Undefined replication status

Battery charge status:

- 0–20 %
- 20–40 %
- 40–60 %
- 60–80 %
- 80–100 %
- ⚡ Charging

Displaying push notifications:

- No notifications
- 87 There are notifications (indicating the number)

7.2. Applications

Up to fifteen applications can be displayed in the **Application Menu** at the same time. The displayed applications are selected from the **Service Menu**. The list of available applications is as follows:



Acquaintance — through the acquaintance procedure, information (face, name, age) about the recognized person is stored (saved) in the database (with the user’s consent) so that next time the robot greets this visitor by name.



Photo from the robot — Photo from the robot — in this application the visitor can take a photo, add a frame for the photo (if the robot owner has added frames through the Service Menu) and receive his photo by email or by printing it on the printer (depending on the robot’s configuration).



Browser— this application allows you to access a website. The start page can be set in the Service menu.



Record a video message — record a video message — with this app, visitors can record a short (up to 30 seconds) video message to leave feedback about the company



Promobot Loyalty — by default, this app asks the visitor for contact information and starts recording a video message to get feedback. With the help of linguo base rules, you can supplement this application with a questionnaire. More information can be requested from the technical support service.



Surprise me — this entertaining app offers a game where the robot will guess a number or symbol riddled by the user



Emovements — in this entertaining application, the robot will recognize the emovement on the user's face and repeat it on the matrix.



Change language — this application displays a window with a list of languages available for selection



Addresses and Contacts — this application displays information (address, phone number, email) on the robot’s display. You can specify addresses and phone numbers for output in the Service menu



Charging App — this application allows you to command the robot to move to the charging station. The robot will not move to the charging station immediately, but will first display a confirmation window.



Promobot FaceRecognize — in this application, the robot will say and display the name and age of the person with whom the acquaintance has already occurred. If there was no dating, the robot in this application will offer you to go through the dating process.



Promobot shutup — can be used so that the robot does not speak any replicas for five minutes.

7.3. Controller

To control the robot remotely, some systems can be controlled using the controller (Fig. 7.7). To control the robot, use the paired controller supplied (the number on the controller corresponds to the robot number). If the controller fails or is lost, please contact the technical support center.

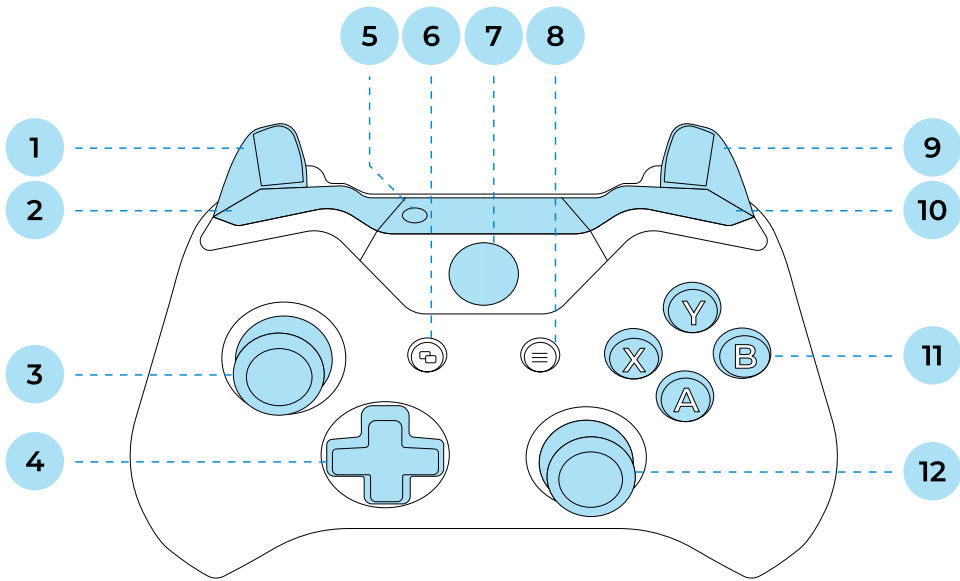


Fig. 7.7. Controller for controlling the robot with button names indicated

1. Left trigger

2. Left bumper

3. Left stick

4. Cross bracket

5. Connection button

6. Back button
7. Start button

8. Start button

9. Right trigger

10. Right bumper

11. A, B, X, Y buttons

12. Right stick

The combinations for controlling the robot are shown in Table 6.

Table 6. Controller button combinations with description of purpose

Combination	Description
Back + Start	Switching the automatic movement model
Back + Y	The mode of phrases from the joystick

Combination	Description
A + B + left stick	Moving the robot at a very fast speed
A + left stick	Moving the robot at a fast speed
B + left stick	Moving the robot at normal speed
A/B + bracket	Head control (actuator additionally operates when moving up and down)
X + left bumper	Increase the speaker volume by 5%
X + left trigger	Lower the speaker volume by 5%
X + right bumper	Increase the microphone sensitivity by 2%
X + right trigger	Lower the microphone sensitivity by 2%
Right bumper + left bumper	Maintaining the center of the autonomous driving radius
Only in phrase mode from the controller:	
Y + right trigger	The next phrase
Y +right bumper	The previous phrase

¹ — When switching the mode from controller to automatic movement, make sure that the robot is not connected to the charging station via the charging cable (only allowed by docking with the charging contacts of the station).

8. ADDITIONAL DEVICES

The Promobot V.4 robot can be additionally equipped with equipment that performs various functions — from taking payment to measuring blood pressure. In addition to physical incorporation, their addition is reflected in the use case, control of the devices is embedded in the touch screen menu and voice control.



NOTE

This list contains the most commonly used devices and their operation techniques, if you do not see the one installed on your particular robot model, please contact technical support service. If you have any doubts as to whether your robot is equipped with the equipment listed above, you should also contact technical support.

8.1. Photo printer

The photo printer allows you to print color photos or postcards depending on the paper selected.

8.1.1. General information

Photos are printed on Canon Selphy CP1000 printer-compatible 100x148 mm (4x6") glossy photo paper. The paper included in the Canon RP-108IN kit (108 sheets of photo paper + 2 toner cartridges) will work. Use of incompatible paper will void the printer warranty.

If the paper cassette is empty when printing starts, an error message appears and printing is canceled.

During the printing process, photos/postcards may appear several times in the photo exit hole on the front of the robot's torso, and you must wait until the printing process is complete.



ATTENTION!

Before carrying out maintenance work, read the user manual for the printer Canon Selphy CP1000

8.1.2. Adding paper

It's recommended that you replenish the printer's paper supply at regular intervals by following the steps below (Fig. 8.1):

1. Carefully open the paper cassette cover.
2. Remove the packaging film from the photo paper and load it inside with the glossy side up (max. 18 sheets).
3. Close the cassette until it clicks into place and then put it back in.

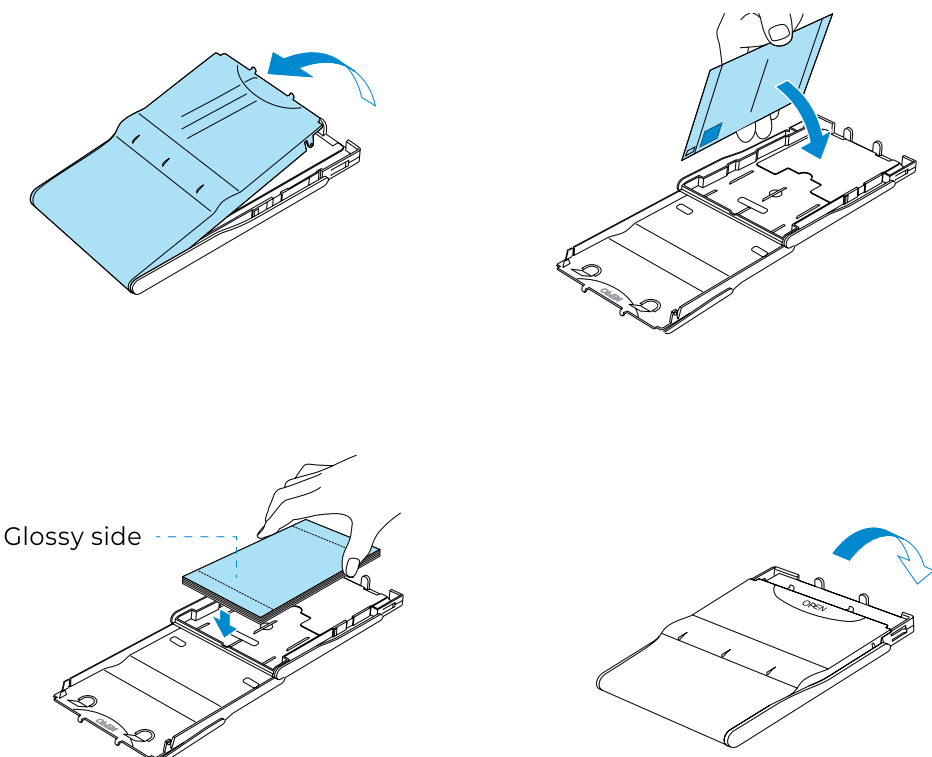


Fig. 8.1. Instructions for adding paper to the printer

8.1.3. Replacing toner cartridges

To replace the cartridges, proceed as follows (follows these steps):

1. Open the service compartment of the robot (see section 2.2).
2. The printer is located on the left side relative to the rear cover, the printer position is indicated in Figure 8.2.
3. To remove the cartridge it is necessary to press the lock indicated in Figure 8.3 and replace it. The new cartridge should be installed until the lock clicks. When the work is finished, return the service compartment of the robot to its original position by pushing it inside the robot.

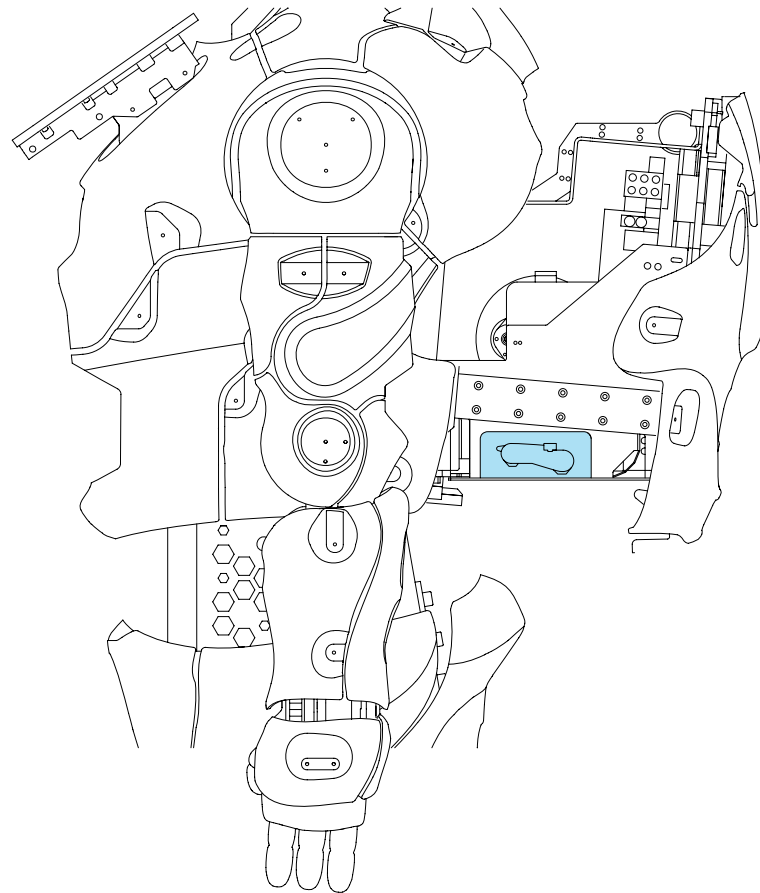


Fig. 8.2. Printer position in the service compartment of the robot (side view of the robot)

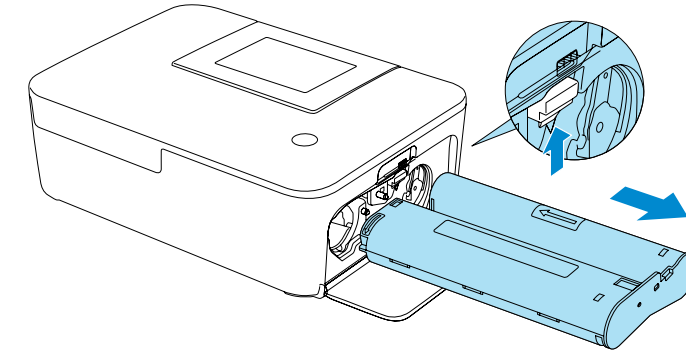


Fig. 8.3. Replacing toner cartridges



ATTENTION!

Make sure that the cover is securely fastened.

8.2. Receipt printer

A receipt printer is installed on the robot to print receipts, electronic queue slips, coupons, and any other summary information using minimal consumables.

8.2.1. General information

Checks are printed on thermal paper with a width of 80/82.5 mm and density from 60 to 120 g/m². The diameter of the bushing of the roll with thermal paper must be at least 25 mm.



ATTENTION!

Before performing maintenance, read the user manual for the Custom VKP80III thermal printer.

8.2.2. Clearing a paper jam

To clear a paper jam, proceed as follows:

1. Open the service compartment of the robot (see section 2.2). The printer is located on the right side relative to the rear cover, the printer position is indicated in Fig. 8.4.
2. Unlock the printer cover using the opening lever (Fig. 8.5).
3. Raise the printer cover to the maximum position (Fig. 8.6).
4. Remove the paper fragments.
5. Close the printer cover

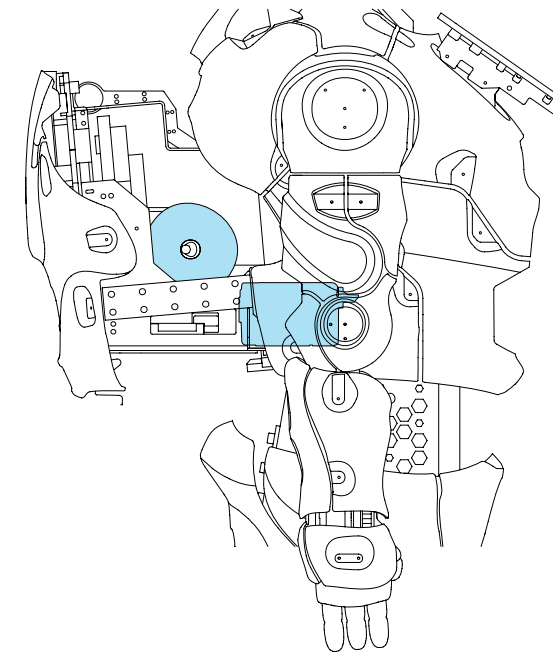


Fig. 8.4. Check printer position in the service compartment of the robot (side view of the robot)

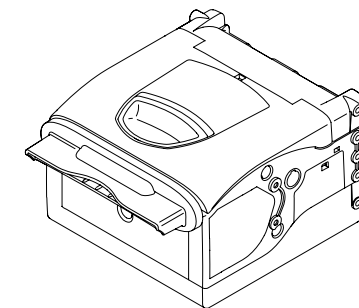


Fig. 8.5. Receipt printer

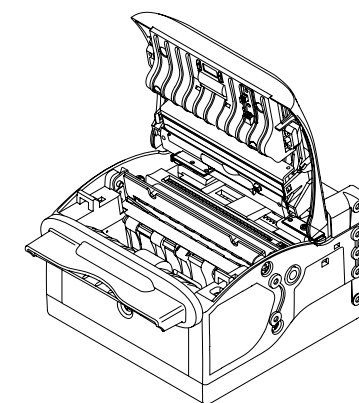


Fig. 8.6. Receipt printer with raised cover

8.2.3. Replacing the receipt tape

To replace the receipt tape, follow these steps:

- 1. Remove the used receipt tape roll.
- 2. Place the new paper roll on the paper holder.
- 3. Insert the end of the paper into the paper feeder as shown in Figure 8.7 and wait until the receipt tape starts to scroll automatically



NOTE
Refer to your Custom VKP80III printer manual for more information

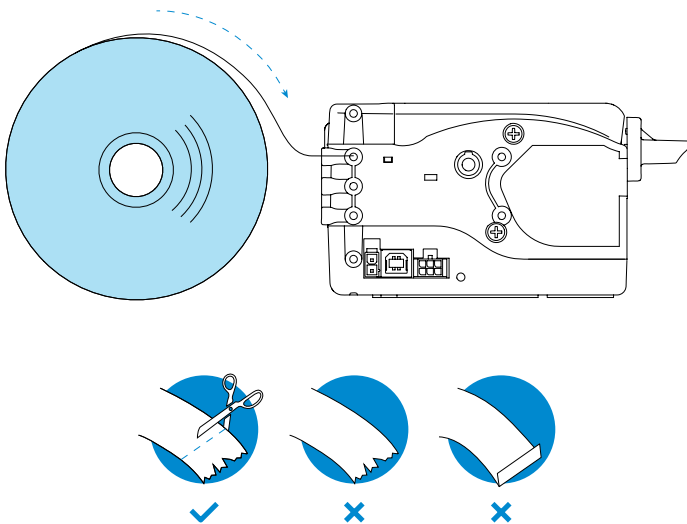


Fig. 8.7. Instruction for adding a roll of paper to the printer

8.3. Bank Terminal

The bank terminal is a secure PCI-certified cashless payment device. The terminal is equipped with readers for accepting all types of bank cards, including contactless cards. The device reads the card and is used to enter the PIN code, communication with the bank is realized through the Internet connection.



- ATTENTION!**
- The bank terminal is not included in the delivery package and shall be separately under the acquiring agreement, the robot package may contain only the bank terminal mounting bracket.
 - Consultation and service related to the operation of the terminal are carried out in accordance with the acquiring agreement.
 - Installation of the terminal is carried out only by Promobot specialists.

8.4. Card issuing device

8.4.1. General information

**NOTE**

The revision or mid of the device may differ from the one shown below. Please check the model and revision information of the device with the manufacturer.

The device allows you to issue or accept cards (depends on the selected mode of operation), by default — to issue.

When issuing the card, it can be issued immediately or it can first take a position for the card data to be read by a separate device — RFID IronLogic — and only be issued after scanning. Scanning the chip contained in the card allows the card number to be recorded in the system, this may be necessary if the robot is used in an enterprise with PACS.

There is an additional option (realized- implemented through the use case), which allows you to take back an unclaimed card. If a card remains in the device for a certain period of time (set in the use case) after issuance, it is taken back and dumped into a separate compartment (cards received in the receiving mode are also stored-fall in this compartment).

The device is compatible with cards that meet the following conditions:

- card size: 55x86 mm;
- card thickness: 0.8 mm;
- capacity: up to 180 cards.

**NOTE**

For more information, refer to the Creator CRT-531 card issuing device datasheet.

8.4.2. Replenishment of card stock

The access card compartment (Fig. 8.8) is located in the service compartment of the robot. Replenishment of cards is carried out by simply adding them to the issuing compartment.

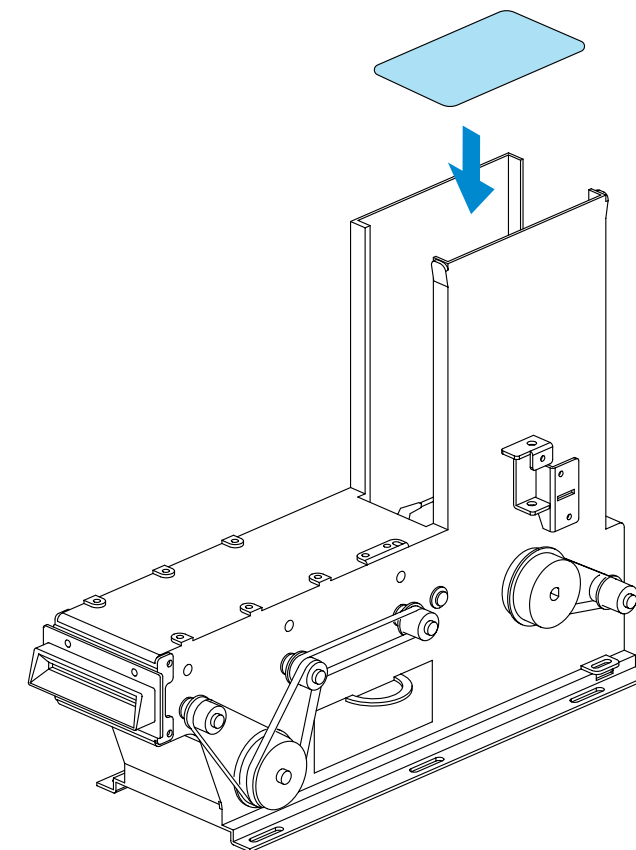


Fig. 8.8. Access card compartment

8.4.3. Retrieval of received/unclaimed cards

The compartment for received/unclaimed cards (Fig. 8.9) is located next to the compartment for issued access cards in the service compartment of the robot.

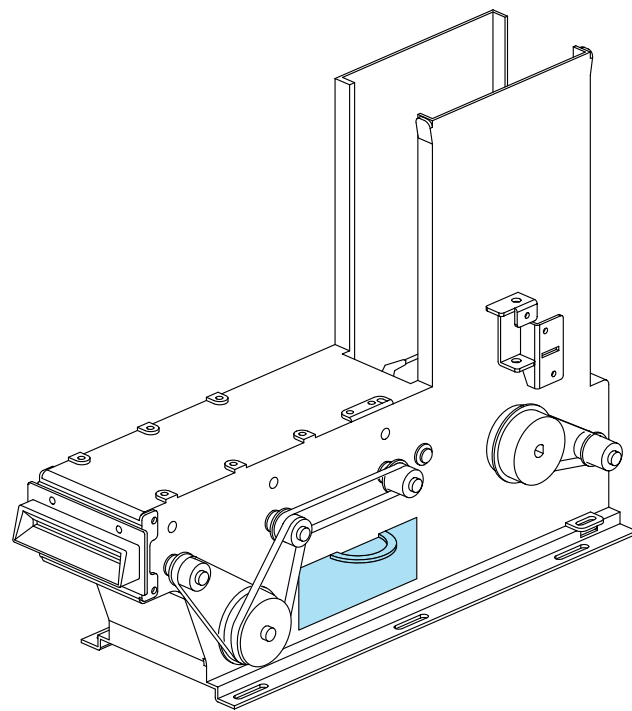


Fig. 8.9. Compartment for received/unclaimed cards

9. TRANSPORTATION AND STORAGE CONDITIONS

9.1. Transportation conditions

1. The robot should only be transported in the specially designed case in which it is delivered.
2. The robot in the manufacturer's packaging can be transported by all types of covered transport. It is recommended to carry out transportation at an air temperature from +10 to +35°C and relative humidity up to 70%.
3. In case of transportation of the robot in sub-zero temperatures, after the end of transportation it is necessary to leave the robot to warm up to a temperature of at least +10°C (leave it in a warm room for 2-3 hours before turning it on).
4. The robot and other components should be securely fastened inside the case. The vertical position of the robot must correspond to the shipping marking "top" on the case (the robot must be packed with its head up in accordance with the direction of the arrows on the marking). During transportation, turn off the power to the robot and secure the robot with the transportation bracket. Before transportation, make sure that the robot is de-energized by pressing the disconnect button on the bottom of the mobile platform (see section 2.4). You can check that the robot is de-energized by pressing the power button — pressing the power button on a de-energized robot should not turn the robot on.
5. Before transportation, make sure that there are no foreign objects inside the case. The presence of foreign objects can damage parts of the robot.
6. During transportation, any possible shocks and movements of the robot case inside the vehicle must be excluded.
7. When transporting the robot, the height change actuator must be in its lowest position and the robot body must be secured in a fully erect position.
8. The robot case is a fragile load. Ensure appropriate transportation and storage conditions for the entire transportation period.

9.2. Storage conditions

1. The storage place must be kept free of dampness, water vapor, flammable liquids and gases.
2. The robot should be stored in a heated and ventilated room, where direct sunlight is excluded, at a temperature of 0 to +40°C (recommended at +25°C) and relative humidity of 65%.
3. To avoid undesirable consequences, unauthorized persons and children should be kept away from the storage place.

10. WARRANTY CONDITIONS

1. In case of any problems during operation of the Promobot V.4 robot, please contact the technical support service.
2. When buying the robot, check that it is complete and in good working order.
3. Carefully read the operating instructions before using the robot.
4. The legal basis for these warranty terms and conditions is applicable law.
5. The warranty period for this product is 12 months from the date of delivery. In case of elimination of defects of the product, the warranty period is extended for the period during which it was not used.
6. The service life of the robot directly depends on the operating conditions.
7. The warranty does not cover malfunctions of the robot caused by:
 - non-compliance by the user with the instructions for use of the product;
 - mechanical damage caused by external impact or any other impact;
 - misuse of the product;
 - natural disaster;
 - unfavorable atmospheric and other external influences on the product, such as: rain, snow, high humidity, heat, aggressive environments;
 - use of accessories, consumables and spare parts not recommended or approved by the manufacturer;
 - penetration of foreign objects, insects, animals, materials or substances into the product;
 - overloading, resulting in failure of electric motors, servo drives, switches, monitors and other assemblies and parts. Unconditional signs of overloading of the product include, among others: destruction of the matrix of displays, deformation or melting of parts and units of the product, darkening or charring of wire insulation under the influence of high temperature.
8. The warranty does not apply to:
 - Products that have been opened, repaired or modified by anyone other than Promobot specialists;
 - Accessories and spare parts that have failed due to normal wear and tear, such as housing parts and consumables, including servo drives, LEDs, bolted connections.

11. UTILIZATION



At the end of its service life, the robot must be recycled at a special recycling center. In this way, the principles of respect for natural resources and environmental protection will be observed. To find a suitable recycling center, you can search online maps of your city, example: "office equipment recycling center".



Also on our website you can find information about reception points in big cities:
<https://promo-bot.ru/information/recycling>

12. CERTIFICATION

Promobot LLC hereby declares that the Promobot V.4.0 robot complies with the requirements:

- TP TC 004/2011 "On safety of low-voltage equipment"*
- TP TC 020/2011 "Electromagnetic compatibility of technical means"*
- TP TC – The abbreviation stands for technical regulations in force in the territory of the Customs Union.

13. SOLVING TECHNICAL PROBLEMS

This section describes situations that users have ever encountered and how to resolve them. In cases where the solutions listed here do not work, you should contact technical support service (section 12).

1. The robot does not switch on and emits a long beeping signal

- Check the circuit break button. It is located on the bottom of the mobile platform (see section 2.4). If the robot is unpacked for the first time, the button is in the break position — press it and try again.
- Make sure the robot is charged. You can put the robot on charge and try again after 20-30 minutes.

2. The robot does not move

In the test menu, the "script not found" notification is displayed when attempting to perform a movement. This means that the start calibration has not been performed. In this case:

- Check the position of the red emergency stop button, it must be pressed. If the button is uppressed, press it and restart the robot interface using the **Restart Robot** button located in the Service Menu (see section 6.1).
- Before starting the robot with the **Start button**, make sure that the robot's arms are in the zero position (see section 2.3). If this is not the case, switch off the robot, move the arms manually to the zero position and switch the robot on.

The test menu displays a notification that a script is running but no movement is occurring. In this case:

- Pay attention to the indication of the lights on the robot's head. If they light up blue when you try to execute a script, it means that the obstacle sensors have triggered and prevented the robot from executing the script.
- Give the robot more room and retest.

The robot fails to perform a movement and an obstacle notification appears on the display. This means that the distance sensors have triggered and prevented the robot from executing the script. In this case:

- Give the robot more room and retest

3. The robot cannot hear

- Make sure that the robot is connected to a Wi-fi network and has Internet access (see section 6.2). You can use the browser in the robot's Service Menu to check Internet access (see 6.7).

- Make sure that the controller phrase mode is not enabled in the Service Menu (see 6.1). The robot does not interact in this mode.

4. Changes to the linguo base have not been applied

- Make sure that the replication was successful (the corresponding icon will appear in the upper right corner next to the battery indication, see section 7.1). 7.1).
- If it does not work, make sure that the phrase recognized by the robot corresponds to what is indicated in the "robot hears" field.

5. Does not connect to the network

- Make sure that the network you want to connect to meets the requirements (see section 6.2).
- Make sure that the correct password is used when connecting.

6. The robot does not respond to commands from the controller

- Make sure that the controller is switched on (the center button should light up with a constant indication).

7. The robot does not drive or move its head with the controller

- Check the position of the red button, it must be pressed. If the button is unpressed, press it and restart the robot interface using the **Restart Robot** button located in the Service Menu (see section 6.1).

8. The robot does not pronounce phrases from the controller

- Make sure that the controller phrases mode is activated in the Service menu (see section 6.1). Important: If changes have been made to the phrases, the controller phrase mode must be deactivated after data replication and reactivated to apply the changes.
- Make sure that data replication has taken place (an icon will appear in the upper right corner next to the battery indication, see section 7.1). 7.1).

9. The photo printer does not print

Make sure the paper is loaded correctly (glossy side up) in the tray, the tray is correctly installed in the robot, and a cartridge is installed in the printer.

10. The receipt printer does not print

- Make sure a roll of paper is installed in the printer.

11. The robot does not approach the charging station.

- Make sure that requirements for automatic approach to the charging station are met.
- Make sure that there is a video stream from the charging approach camera in the test menu (see section 6.5).

12. The robot does not charge

- Make sure that the charging station is plugged into a serviceable outlet and that the toggle switch on the charging station is in the "On" position.
- Make sure that the black power cable is tightly connected to the socket and to the charging station.
- If charging the robot via the charging cable, make sure that the cable is tightly connected to the robot and to the charging station.
- If charging the robot by docking with the charging contacts, make sure that the robot is level on the charging station site.

13. The robot does not move in automatic mode

- Check the position of the red button, it must be pressed. If the button is unpressed, press it and restart the robot interface using the Restart Robot button located in the Service Menu (see section 6.1).
- Pay attention to the indication of the lights on the robot's head. If they light up blue when you try to execute a script, it means that the obstacle sensors have triggered and prevented the robot from moving. Give the robot more room and try again.

14. TECHNICAL SUPPORT SERVICE

When you sign a contract to purchase a robot, a personalized technical support chat is created on Telegram. If you have any questions, such as technical serviceability, operation of the accompanying software or robot operation, please contact the created chat room.

If you have lost your personal chat contacts, please contact Promobot by any convenient way specified in the Contact Us section.

PROMOBOT

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