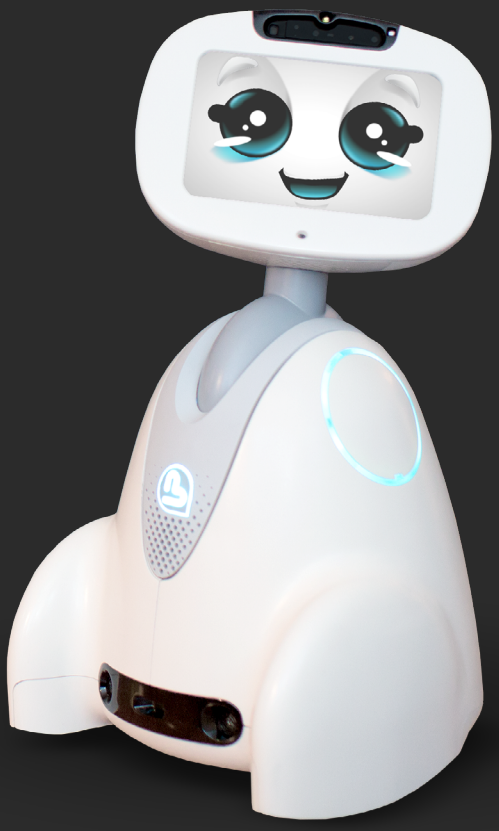
Buddy

User Guide V1.0



Buddy®
The Emotional Robot

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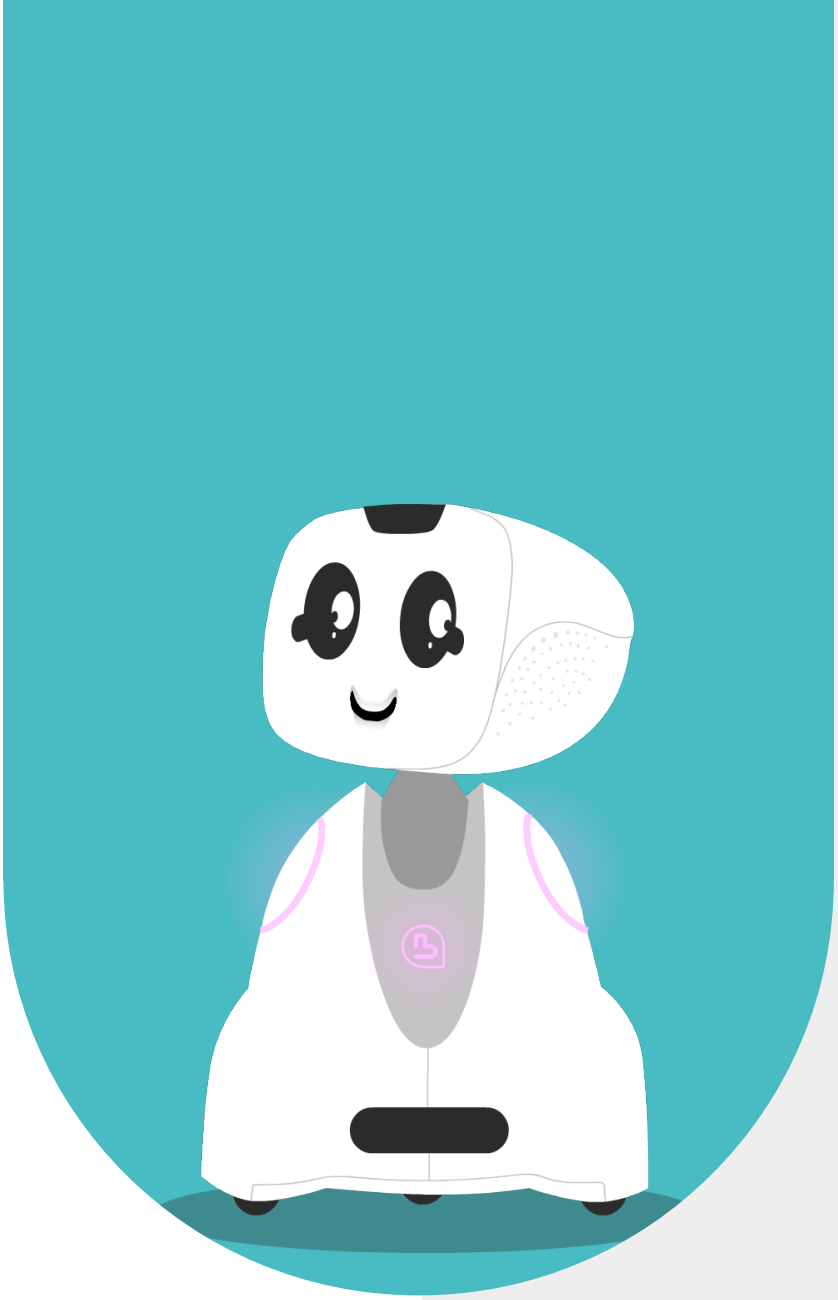
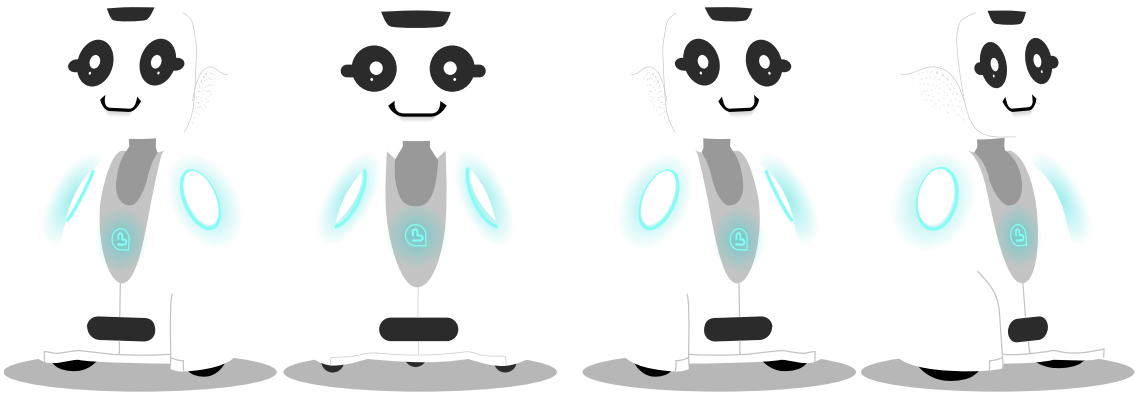
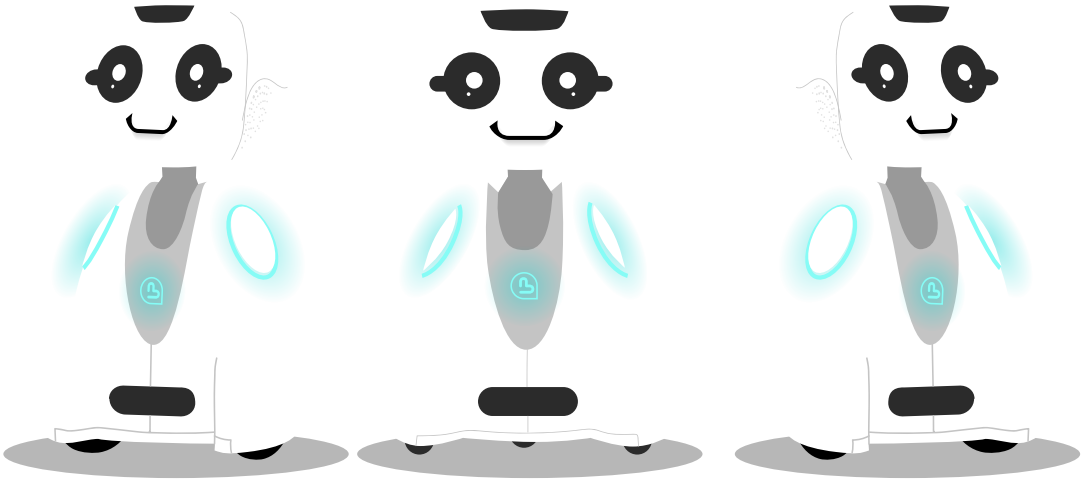


2 - USER GUIDE CONTENT





This user guide describes in its entirety all the functions of the robot.

- A description of the equipment in its operation and maintenance.
- The access to menu settings to configure and personalize the robot.
- The list of applications delivered and how to launch and close them.
- The way to interact with the robot and the discovery of its capabilities.

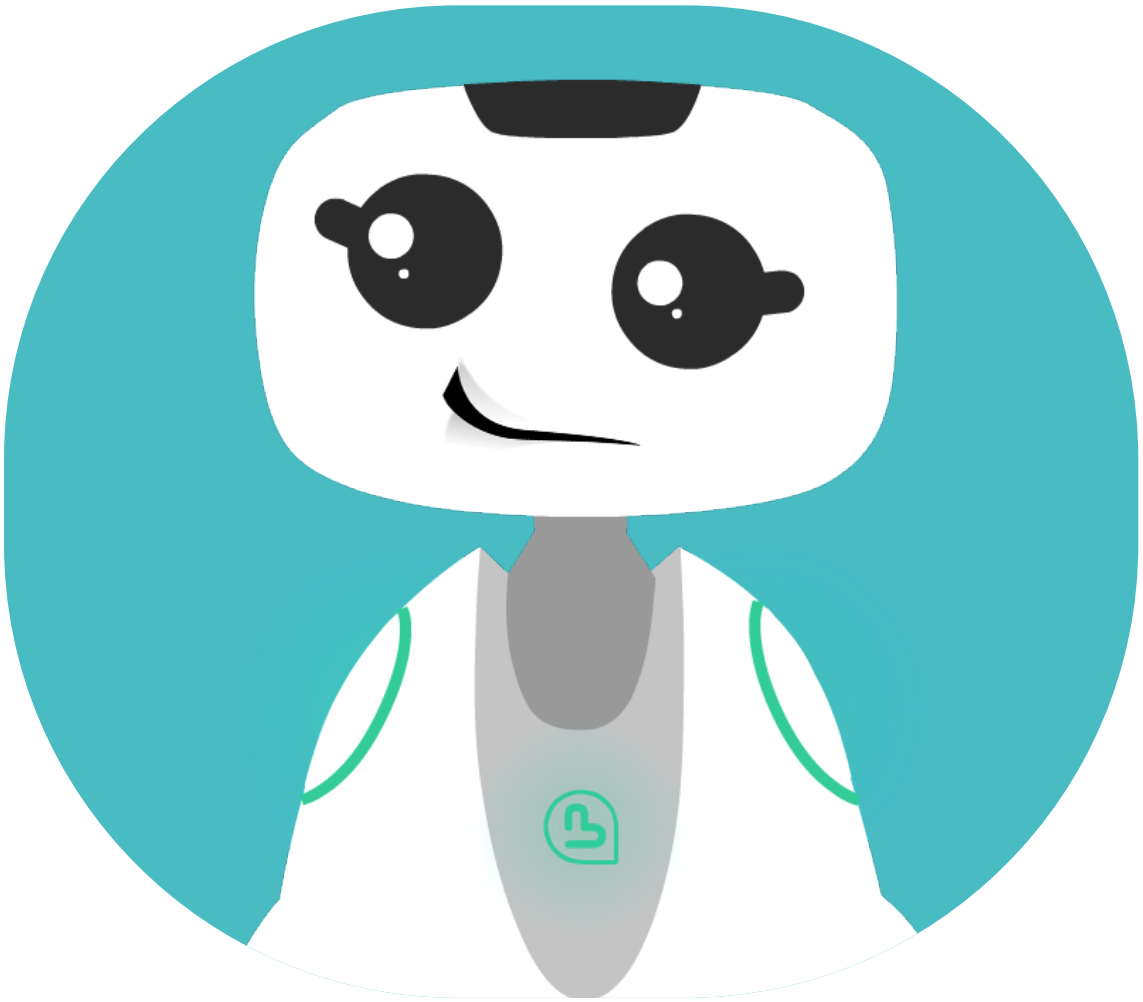
At the end of the document, you would be able to access other sources of support.

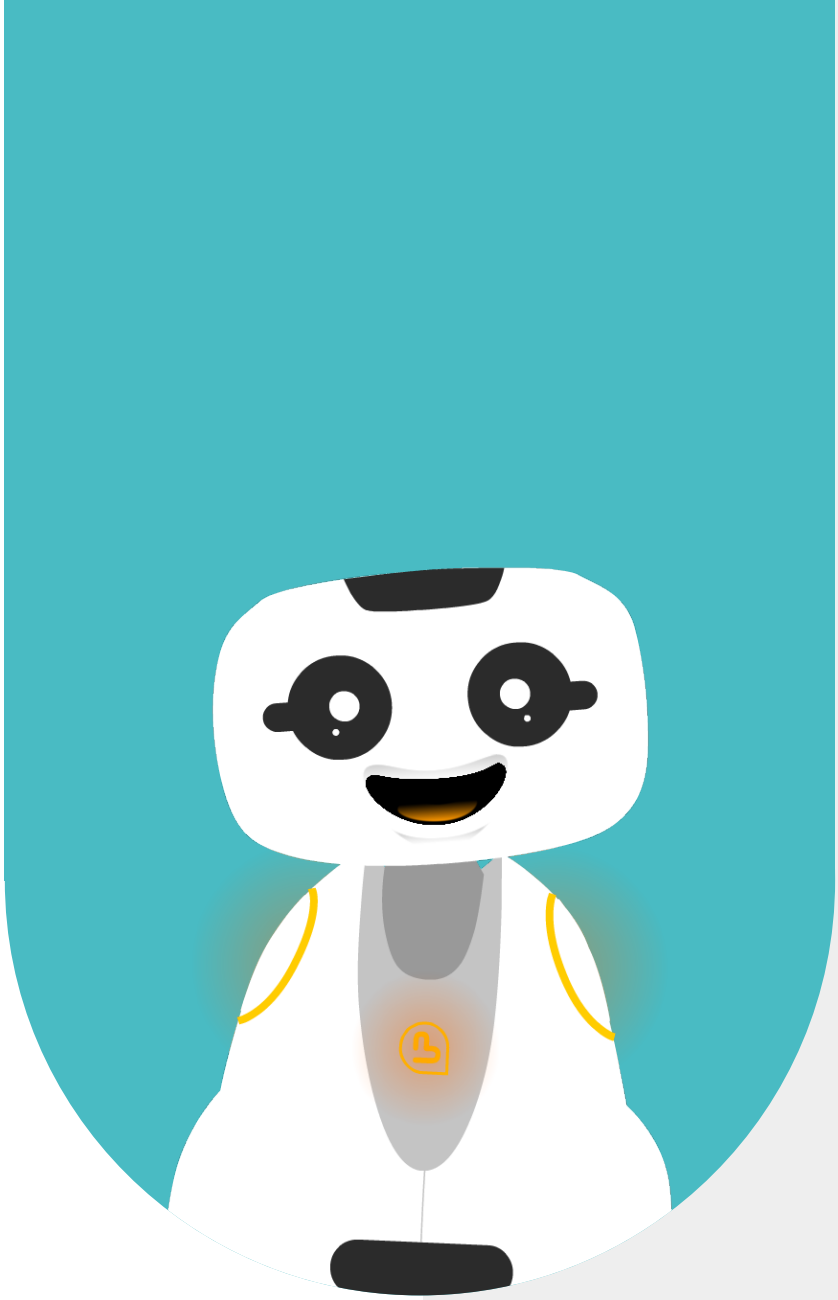
3 - WHO IS BUDDY

Buddy is a companion robot designed to interact with users through voice, vision or touch interactions. It is made up of several sensors that allow it to perceive the world around it.
Buddy is designed to adapt to places whose characteristics are unknown in advance.

The robot moves by rolling, avoiding obstacles, passing certain thresholds of doors or inclined planes but will not be able to climb stairs or open doors.
It can see, hear and understand within the limits of what Buddy has learned.
It is a Companion robot that provides services whose user experience is new, which sometimes can surprise, requires a form of adaptation or indulgence but never leaves you indifferent.

With Buddy, we end up adopting “him” as it is, and Buddy will end up adapting better over time.





4 - GENERAL DESCRIPTION OF THE ROBOT

Buddy is made up of sensors (Obstacle detection, Cliff sensors, Cameras, Caress sensors, Omnidirectional microphones, Touch screen), and actuators (Wheel motors, head motors, arm connectors).

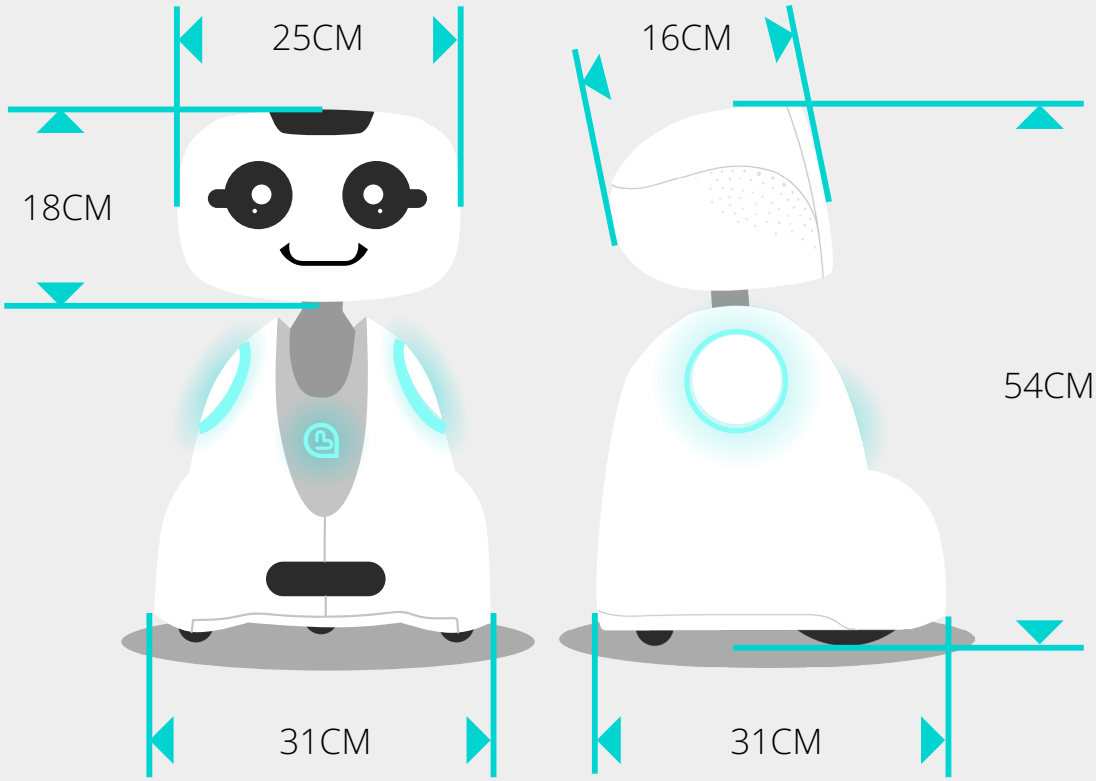
Buddy expresses its emotions through a screen that displays its face and through LEDs on its shoulders and chest.

It communicates via Wifi wireless networks, 4G SIM card (optional), Bluetooth.

It recharges manually via a connector plugged into the charger or automatically by going to its charging station (optional).

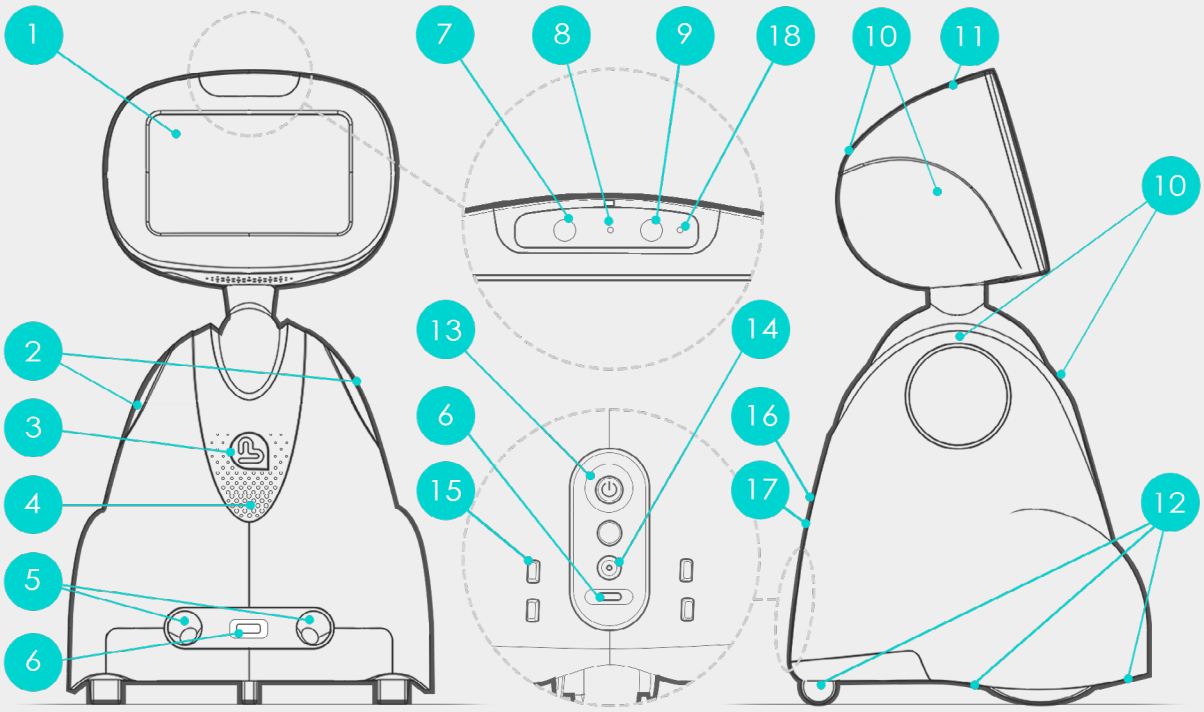
It stops at the edge of a staircase, a table or when an obstacle hinders its movement.

4.1 - DIMENSIONS



4.2 - TECHNICAL SHEET

Here are the abilities and technical specifications of Buddy Robot



1. Touch Screen 8’
2. LEDs and Accessories hub X2
3. Heart LED
4. Speakers
5. Ultrasonic distance sensors X2
6. IR Distance sensors X4
7. 13M Camera (80°)
8. Lighting LED
9. 13M Camera (130°)
10. Touch sensor
11. Omnidirectional microphones
12. IR Cliff sensors X7
13. On/ Off button
14. Power connector
15. Charging pads
16. Slot Nano SIM (4G)
17. USB port
18. LED feedback camera enabled/ disabled

Height: 560mm Width: 350mm Depth: 350mm

Lithium battery < 100Wh

Weight: 8kg

4.3 - ROBOT MOVEMENTS

Buddy has 4 degrees of freedom.
Linear motion

- Move forward (Speed maximum 70 cm/s)
- Move backward (Speed maximum 35 cm/s)

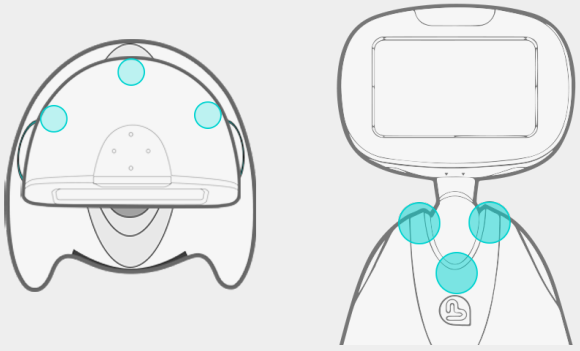
Three rotations

- The body rotates Left/Right
- The head rotates Left/Right (movement of 'No' +/- 90°)
- Head spins up and down (movement of 'Yes' +80° / -60°)

These movements can be sequential and simultaneous. A combination of movements describes a 'body' behavior.

4.4 - PERCEIVE, FEEL, FACIAL EXPRESSION.

Buddy is equipped with sensors to perceive and feel its environment and actuators to express itself.

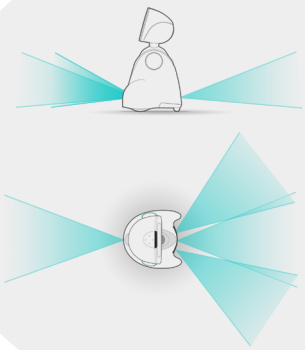


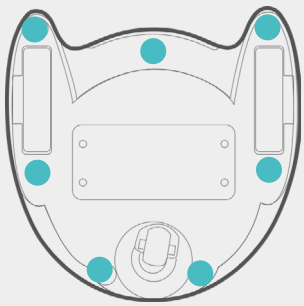
Reflexes

- Cliff sensors : 7 sensors located under the robot, they detect cliff, Buddy stops at the edge of a table or a staircase.
- Obstacles sensors : 6 obstacles sensors located in front and behind the body.

The feeling 'caress' sensors

3 sensors on the head
3 sensors on the body





Visual perception

- Camera ‘daylight vision’ : 1 color camera for 130° overview
- Camera ‘daylight vision’ : 1 color camera for 80° ‘Zoom’

Listening

- Micro array : 4 micros omnidirectional (360°)
- Micro : 1 micro monodirectional (front listening)

The feeling

- Caress sensors : 3 sensors on the head
    - Feel the ‘touch’, ‘Slide’, ‘Knock’
- Accelerometer : 2 sensors positioned in the body and in the head£
    - Feeling ‘Hustle’, ‘Fall/Drop’, ‘Carry/Move’

Facial expression

An 8 ” touch screen allows Buddy to display facial expressions and interactive information.

- A directional speaker, on the robot’s torso.
- Colored LEDs on the torso (its heart) and on the arm inserts.
- LED lighting in front at head height.
- Wheels and neck motors for body expression movements.

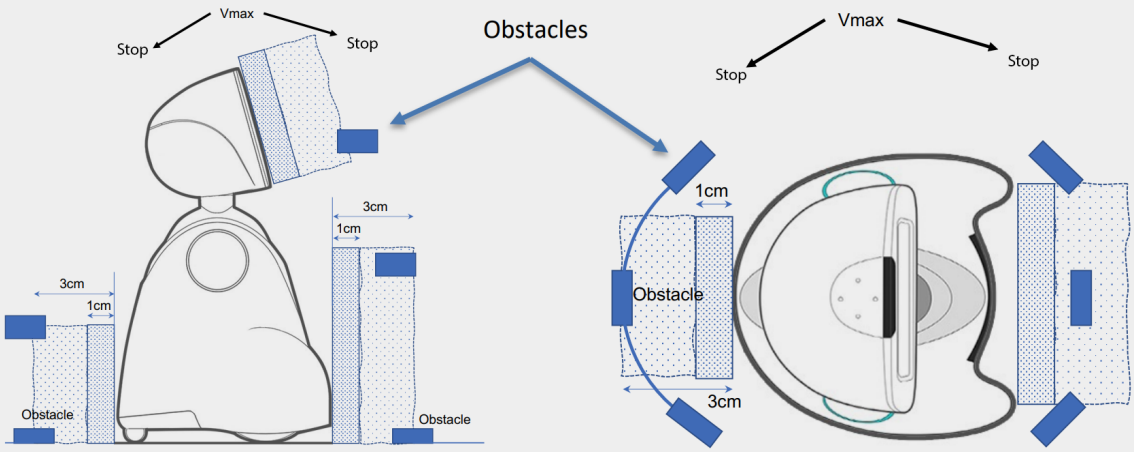
4.5 - SAFETY OF THE ROBOT MOVEMENTS

The safety principle for a robot is to stop if it detects obstacles that hinder its movements or edges of cliff during its movements.

There is one exception to these rules, when the robot is remotely piloted by a person then the obstacle detection is disabled because it is the pilot who decides to stop. In any case, the robot will stop if it detects the edge of a table or stairs.

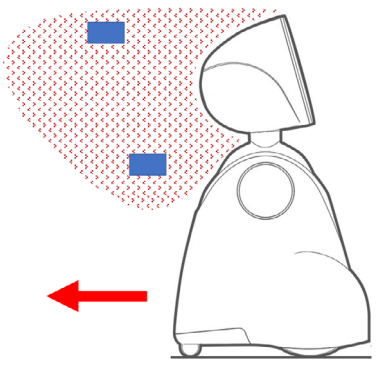
Obstacles detection

There is a zone called «sanctuary» where the robot stops, whatever the speed of the robot it must stop within this 3 cm zone.
There is a so-called «dead zone» where the robot does not detect obstacles, it is located up to 1cm from the sensors.
The illustrations below show where these areas are located:

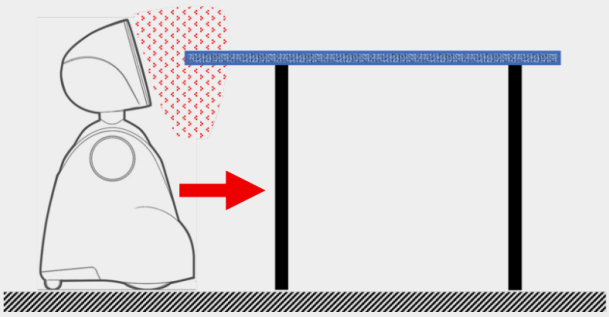


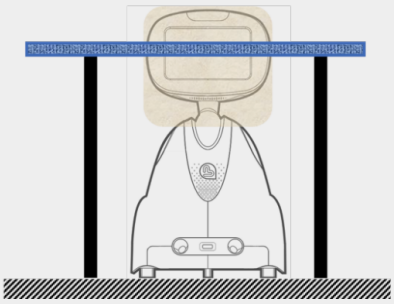
There are undetected areas (in RED) during movements. These areas vary depending on the type of robot movement.

Area not detected when the robot moves backward:

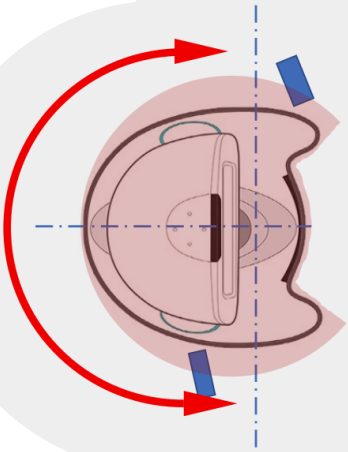


Area not detected when the robot moves towards a low table <56cm height :

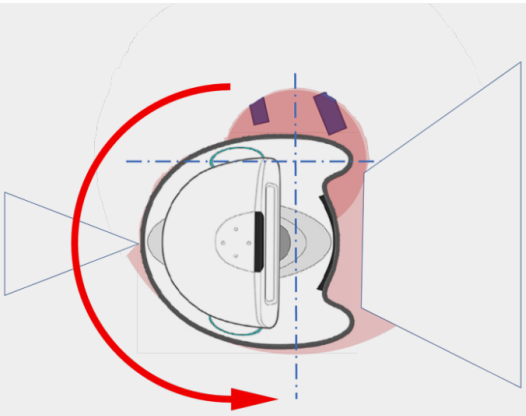


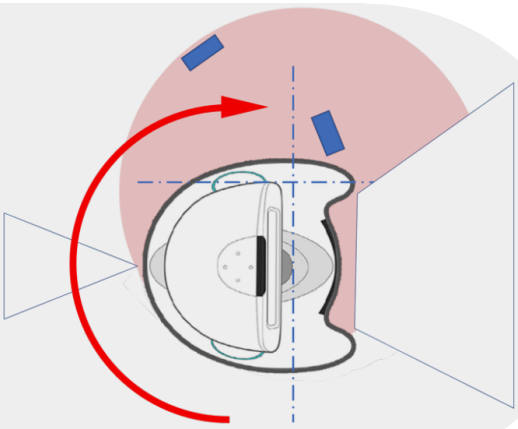


Undetected areas in rotation when the robot turns on itself:



Undetected areas in rotation when the robot turns around on one wheel:



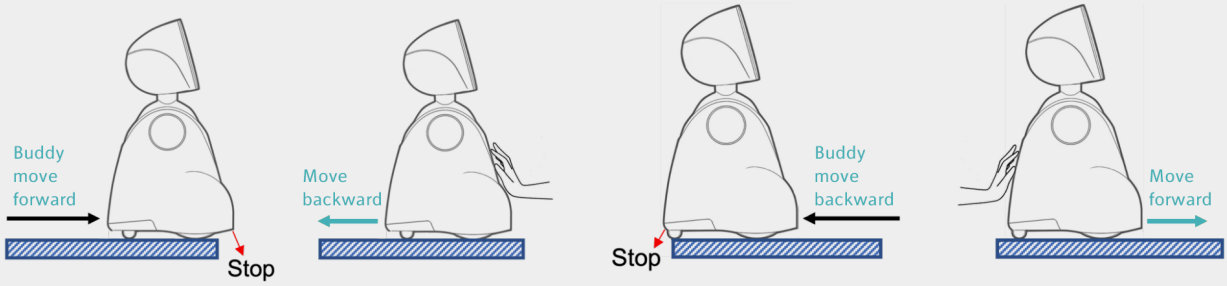


Detection of edges cliff

Edge detection is done when the robot moves and encounters a hole.
There are three types of situations:

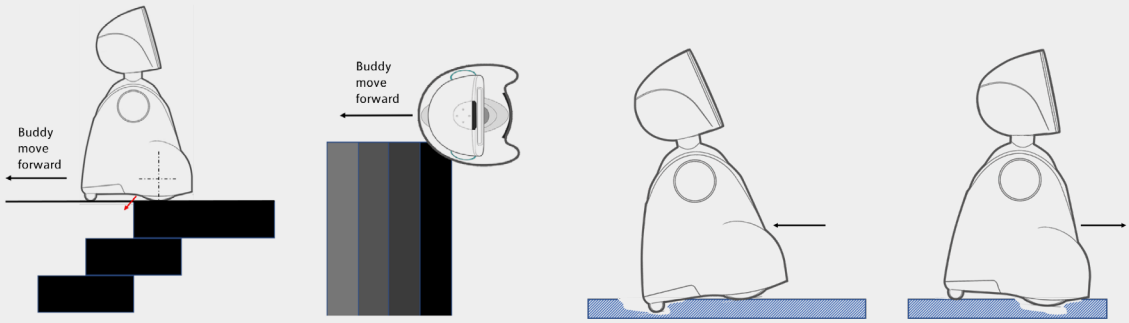
- The robot is positioned on a table
- The robot is on the ground and encounters a descending staircase
- A hole in the ground in the path of the robot

When the robot stops due to hole detection, it must be manually moved to unlock its wheels.



Stairs :

Holes in the ground:



Sometimes Buddy doesn't detect holes in the ground. This can happen if the hole is a little deeper than the ground clearance of its wheel housing (1.5 cm).

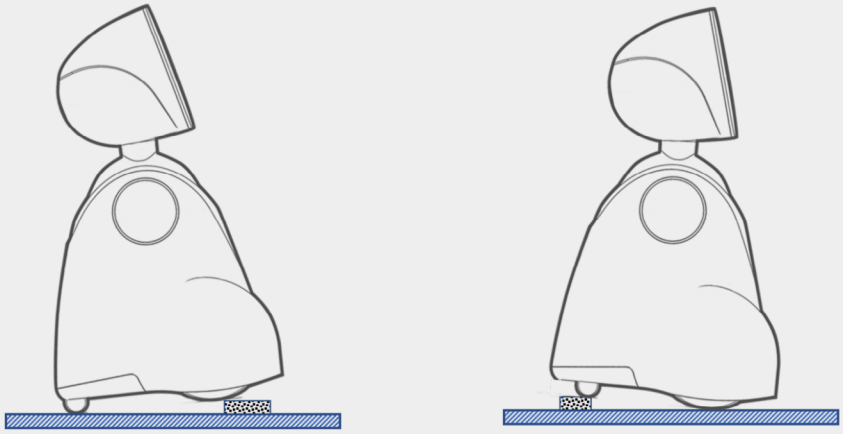
In this case, you simply must lift Buddy up to get it through the hole.

4.6 - THRESHOLDS AND SLOPES

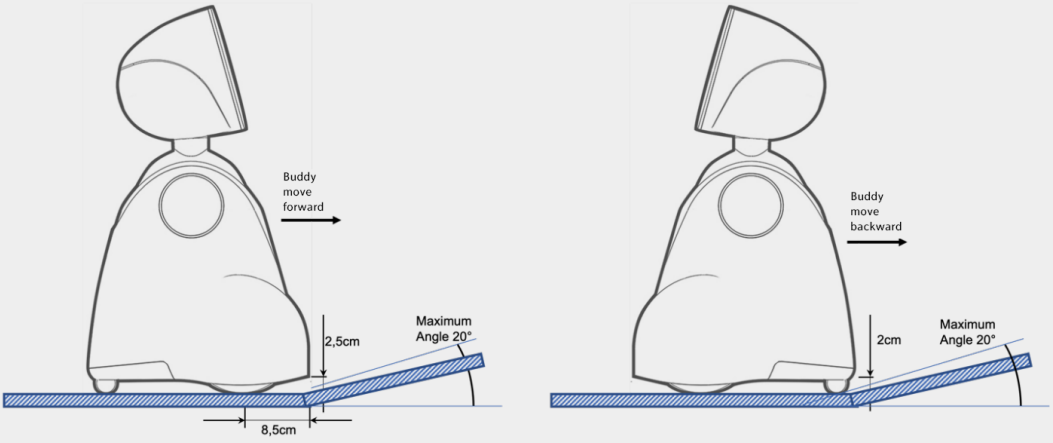
Buddy can pass a number of obstacles such as door thresholds, carpet edges, ramps.

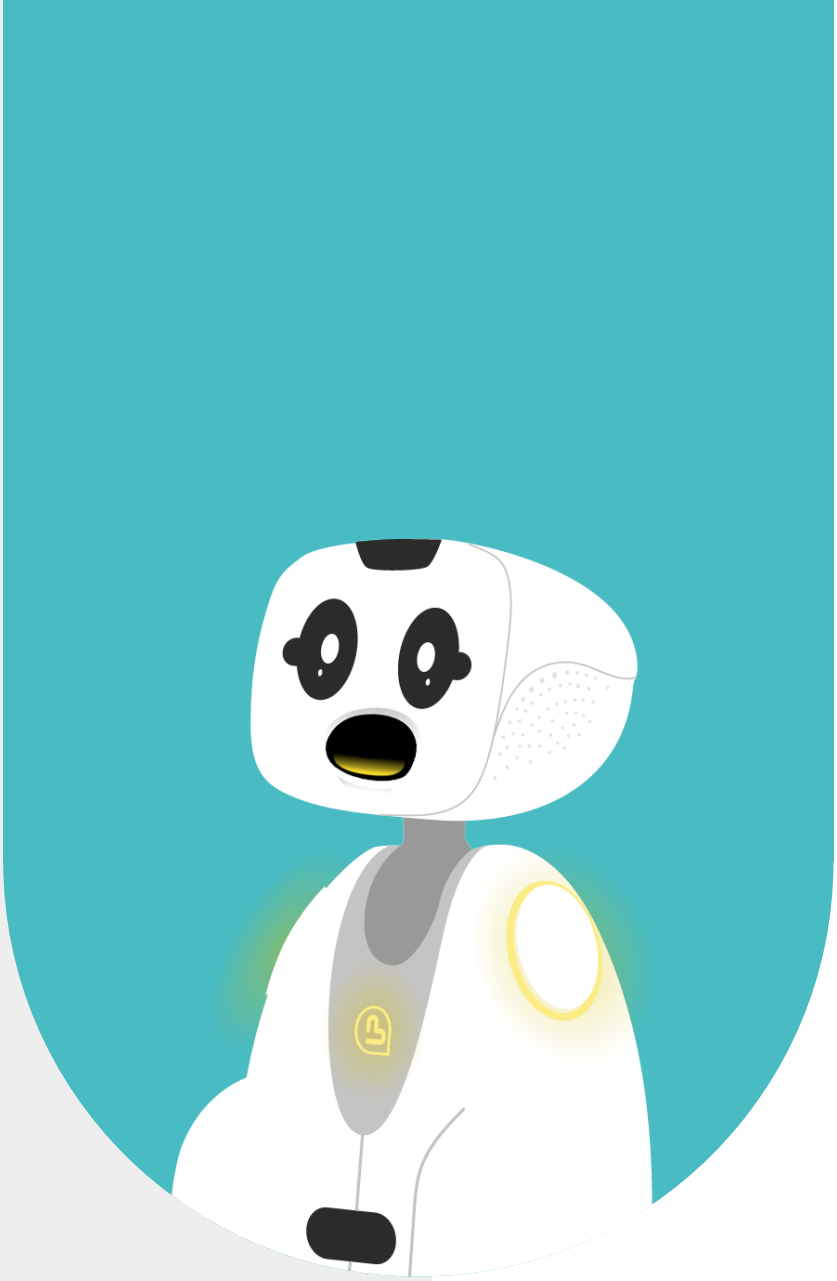
Threshold crossings

The passages above an obstacle are characterized by a door threshold, a carpet edge or an object lying on the ground (a cable...).
To pass these obstacles, their **maximum** height must be **1.5 cm**



The ramp crossings





5 - ENERGY MANAGEMENT

A full recharge must be done after the first unpacking of the robot.

The robot has an autonomy of up to 6 hours depending on its use.
It can be manually connected to a power supply in case of static use or when it is switched off.
The robot can also go to park in its charging station (optional).

5.1 - POWERED THROUGH 'JACK' CONNECTOR.

The robot remains functional when it is physically connected to its power supply. It is not recommended to roll the cable as the power jack connector may be damaged.

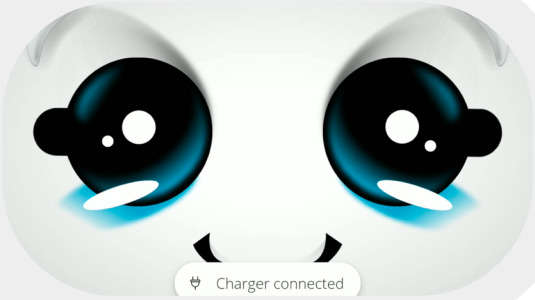
5.2 - ROBOT BATTERY

Please note that the battery is integrated under the robot's chassis and cannot be changed by the user.

In case of a problem, the after-sales service will determine whether the battery should be replaced by a technician.

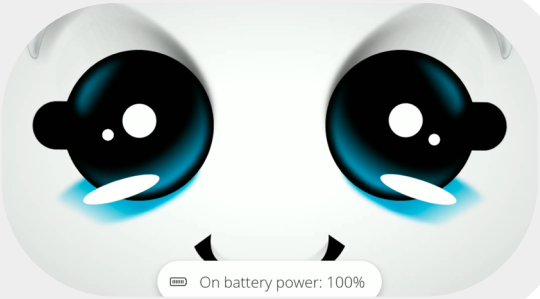
5.3 - POWER ON/OFF INDICATOR

The power indicator is displayed at the top of the screen on the Buddy Menu page.



When the robot is connected to the power supply

The heart and shoulder LEDs light up once gradually in green.

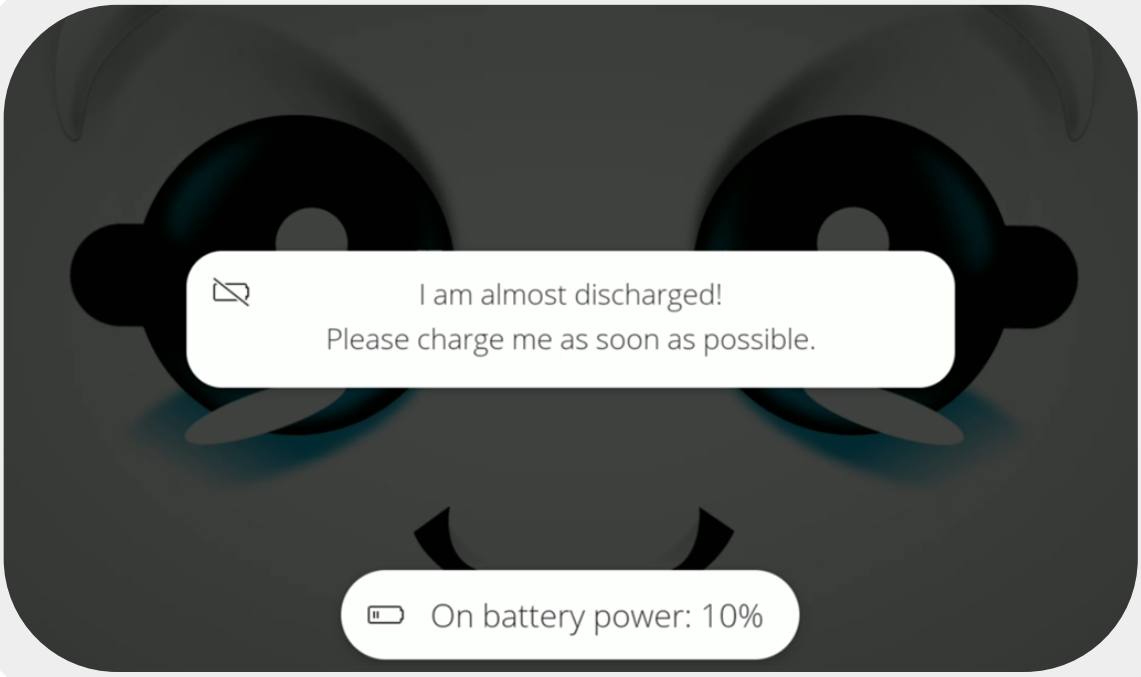


When the robot is disconnected from the power supply

The heart and shoulder LEDs light up once gradually in red.

5.4 - DISPLAY OF CHARGE LEVEL

Buddy must be started to indicate its charge level.
The battery level is displayed at the top of the screen on the Buddy Menu page.

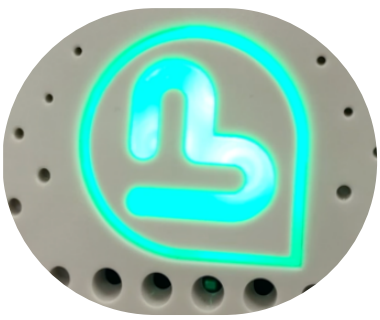


Battery level is <10%
LEDs blink progressively from red to orange

Battery level is between 11% to 80%
LEDs blink progressively from orange to green

Battery level >80%
LEDs blink progressively from green to green

Battery level is 100%
The heart LED is static and in green color
Shoulder LEDs stop blinking and are in blue color



5.5 - POWER SUPPLY FROM THE CHARGING STATION (OPTION)

For the robot to self-park, the charging station must be fixed to the wall and the robot must be placed in visual proximity to its station.

You can then start the robot parking process by the voice command «Ok Buddy, go park» or by the Buddy Menu.

6 - STARTING THE ROBOT

6.1 - SWITCH ON THE ROBOT

The robot is switched on by pressing the 'Power' button and a sequence of logos and LEDs are displayed.
The colors of the LEDs indicate the battery level (see LEDs charge level display)

Press the 'Power' button for 2 seconds

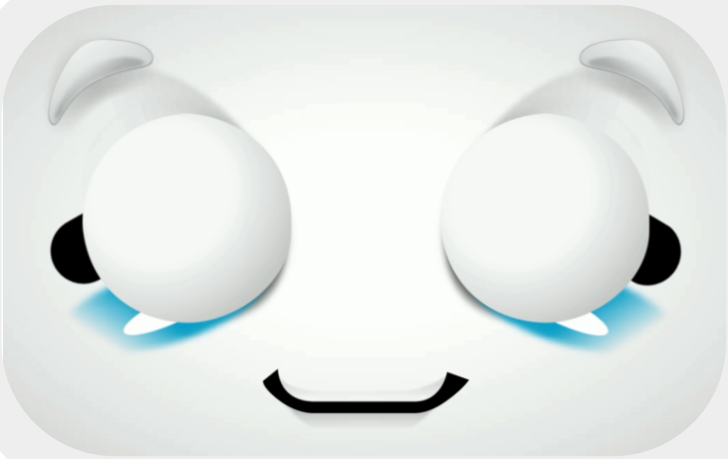
6.2 BOOT SEQUENCE

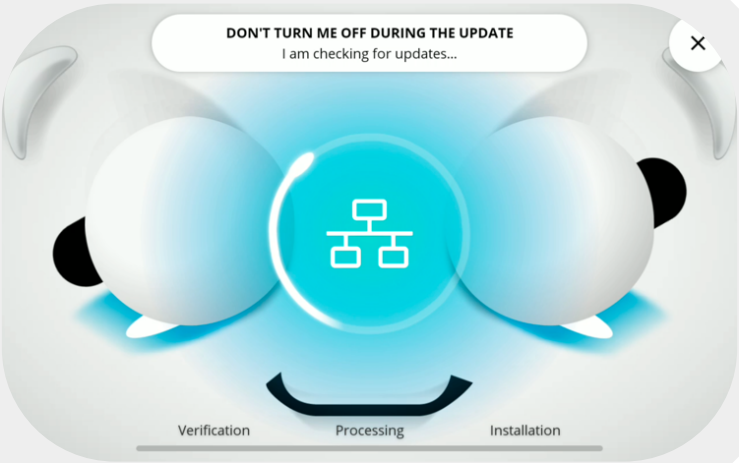
Loading Firmware

Loading robot's software

6.3 - SEARCH FOR UPDATES

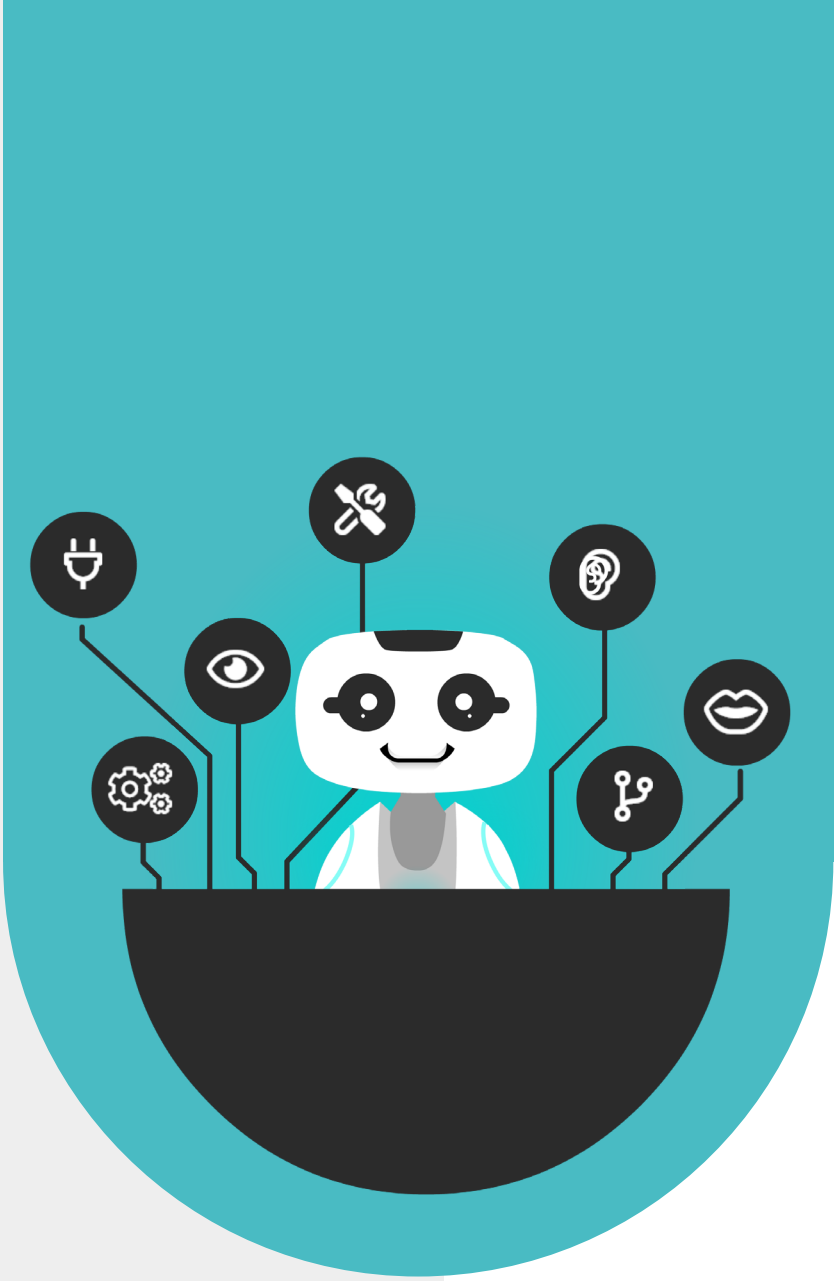
Starting Buddy's environment





Looking for upgrade

Buddy wakes up



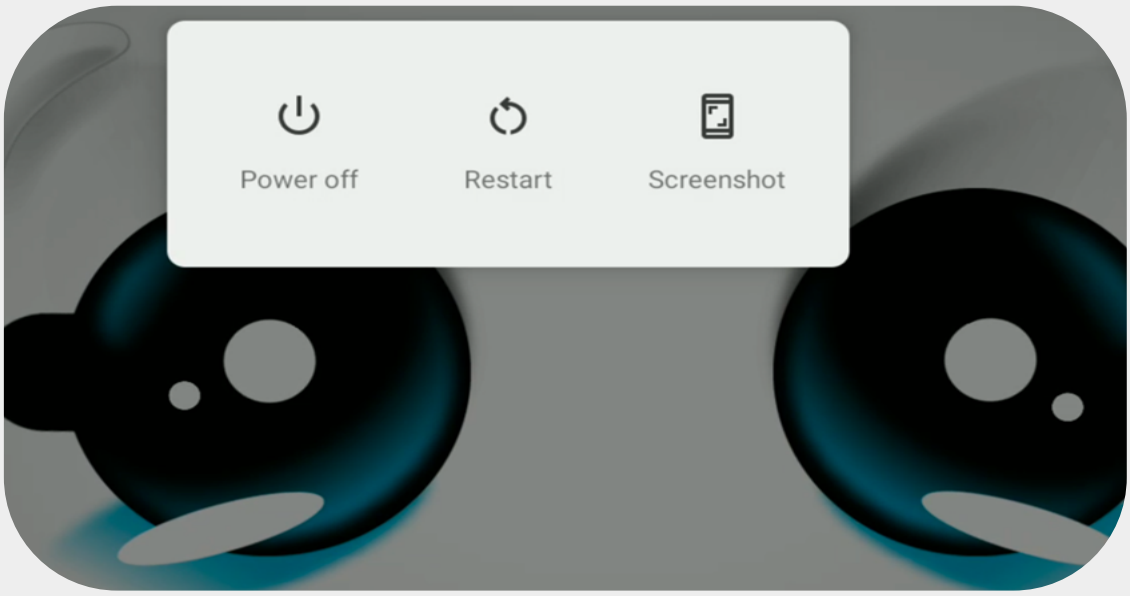
7 - SWITCH OFF THE ROBOT

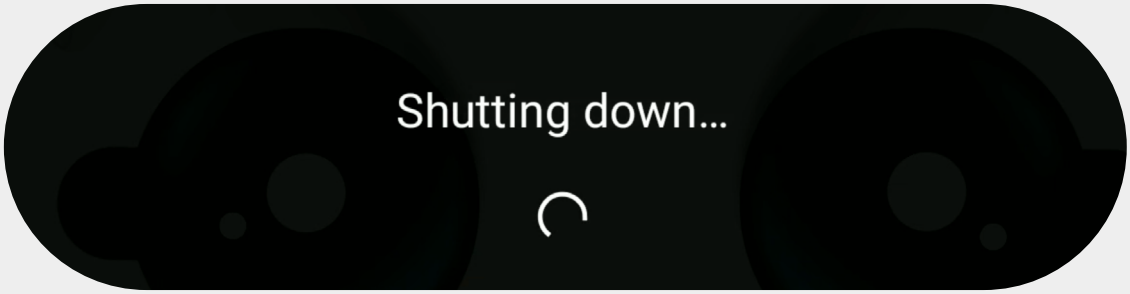
7.1 - TWO WAYS FOR TURNING OFF THE ROBOT

Long press (>5s) until the robot turns off

OR

Short press (<2s) then confirm by pressing the button displayed on the screen





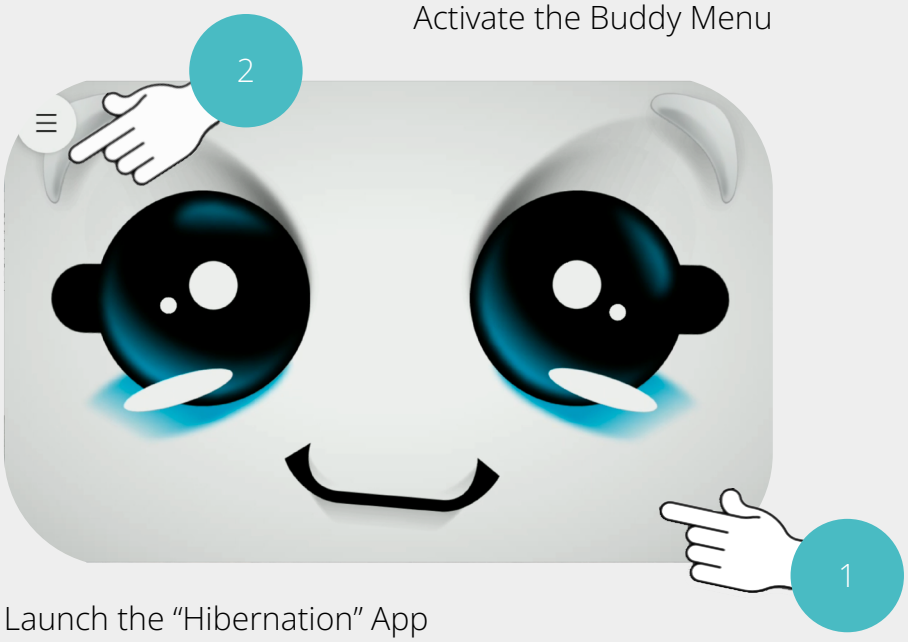
7.2 PUT THE ROBOT INTO HIBERNATION

In the case of prolonged storage or non-use of the robot for a long period, we recommend activating “Hibernation” mode from the Buddy Menu.

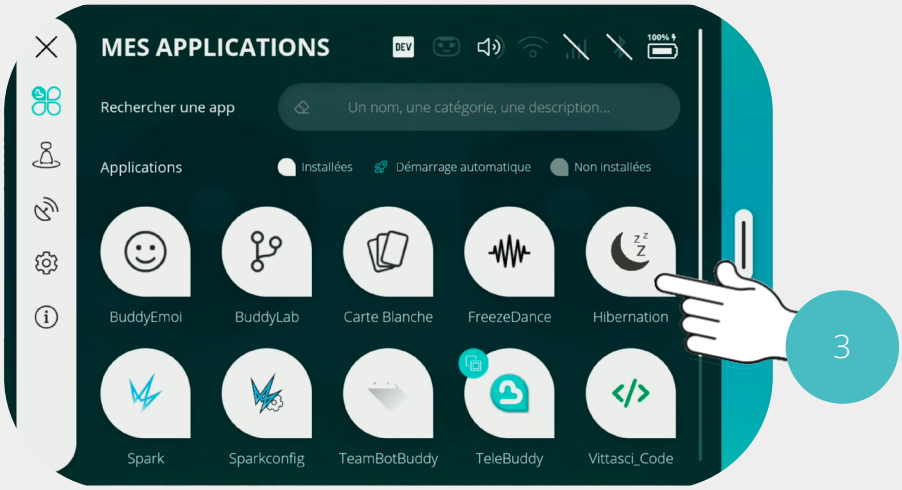
This hibernation mode allows the robot to preserve its battery.

If the robot is plugged into its power supply, unplug it.

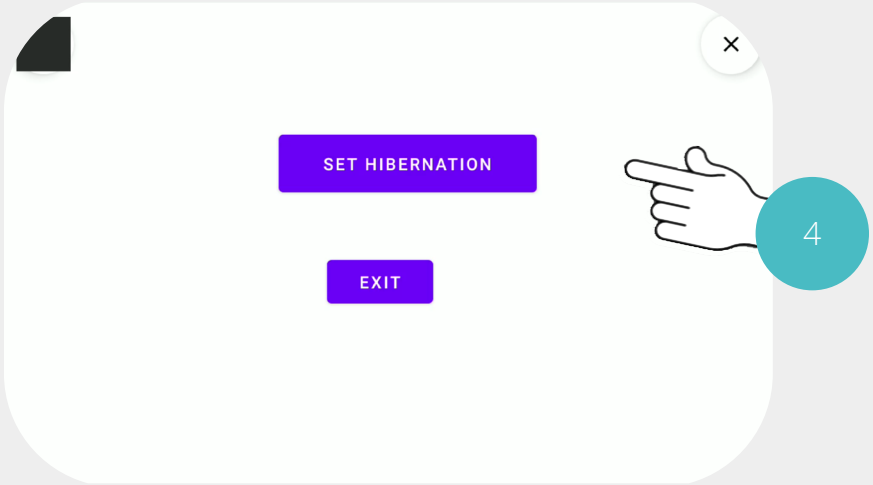
Activate the Buddy Menu

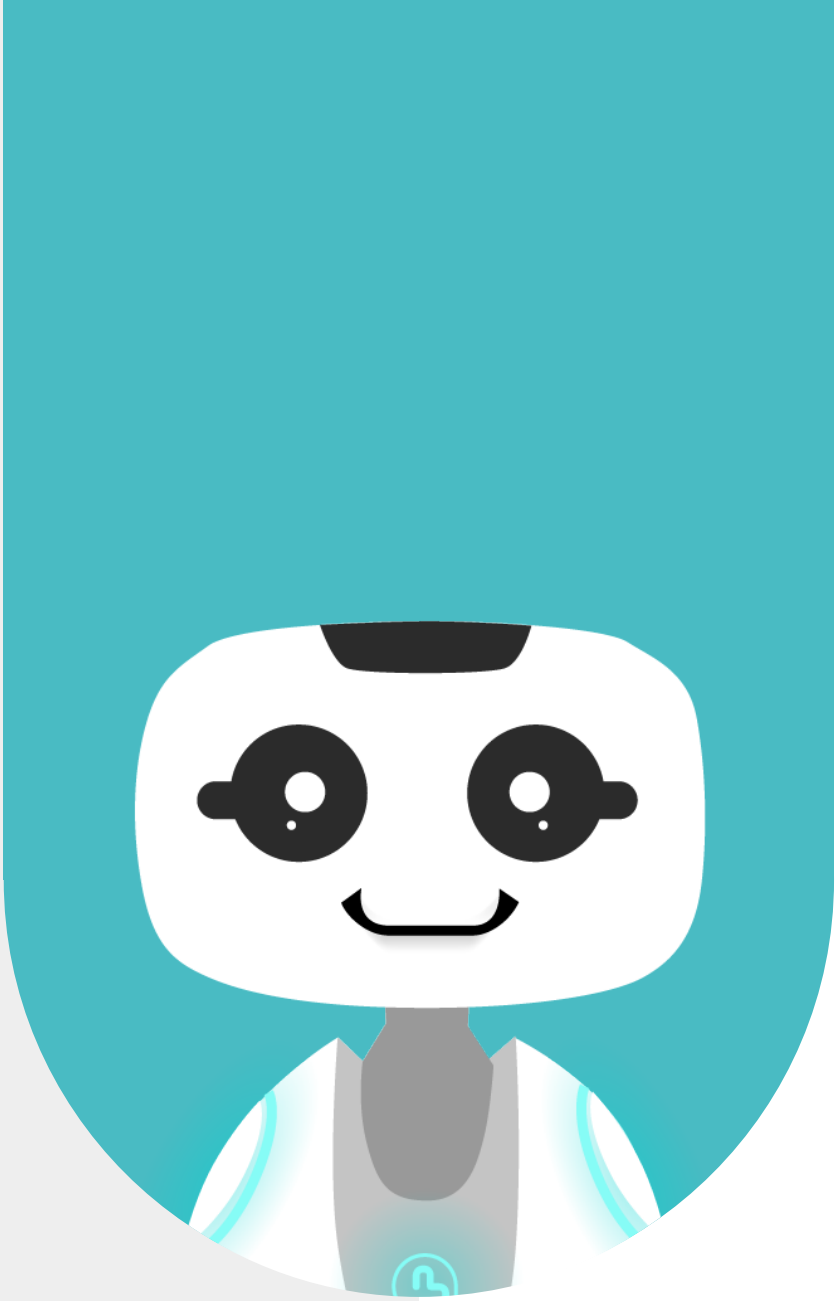


Launch the “Hibernation” App



Start hibernation

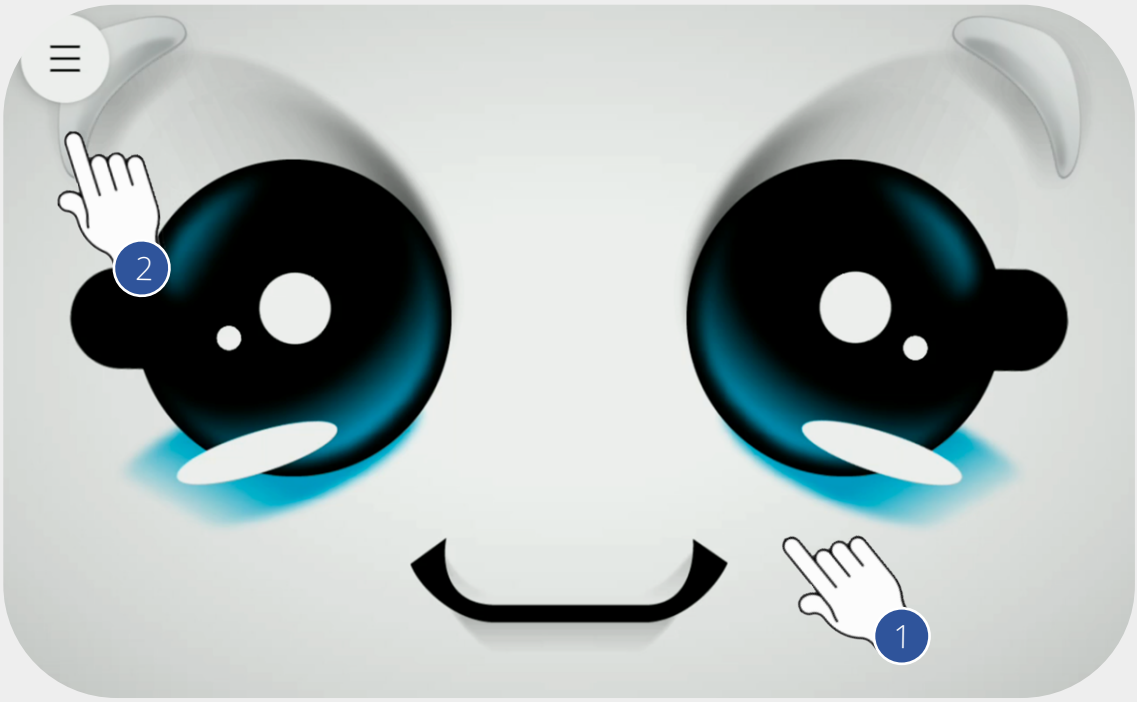


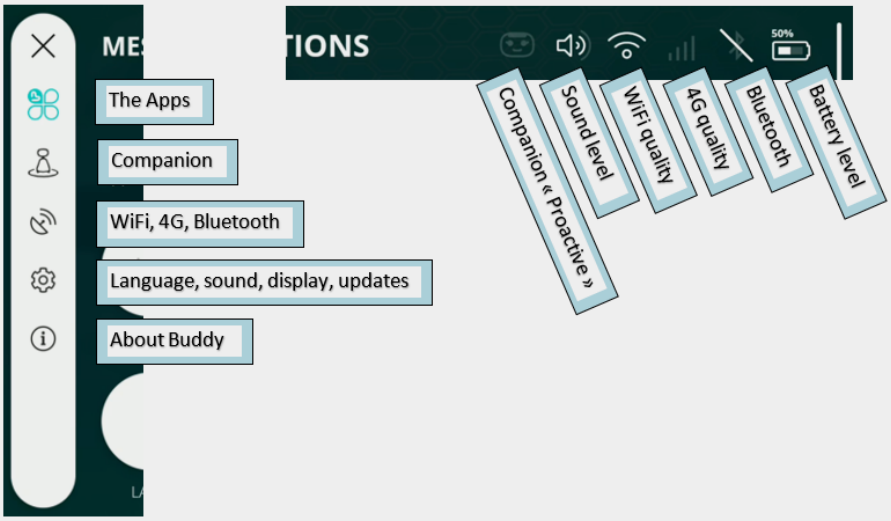


8 - ACCESSING THE BUDDY MENU

All the settings parameters are accessible via the Buddy menu.

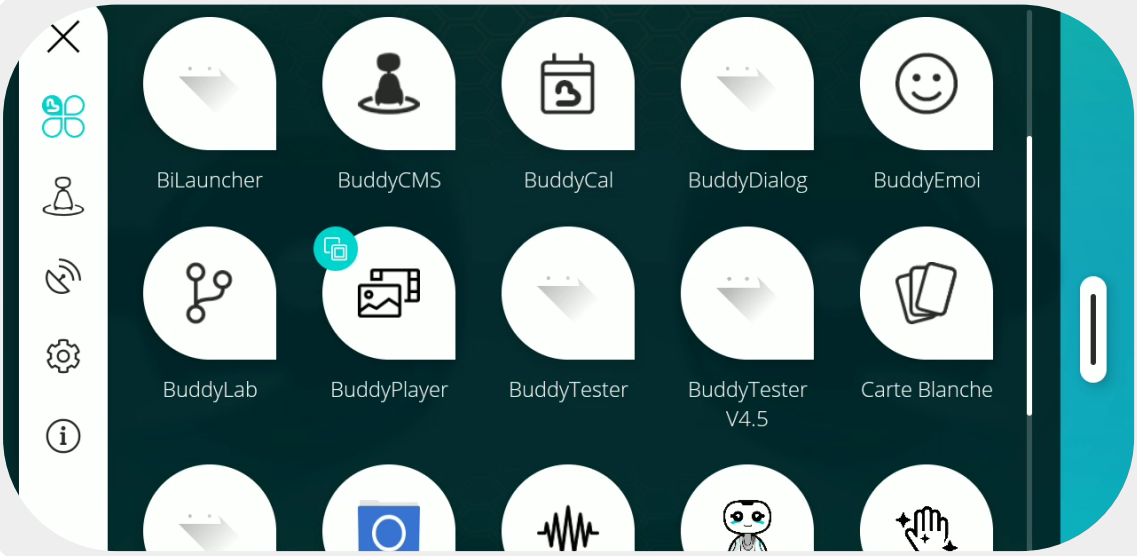
Activate Menu
Press anywhere on the screen to display the Menu button for 2s.



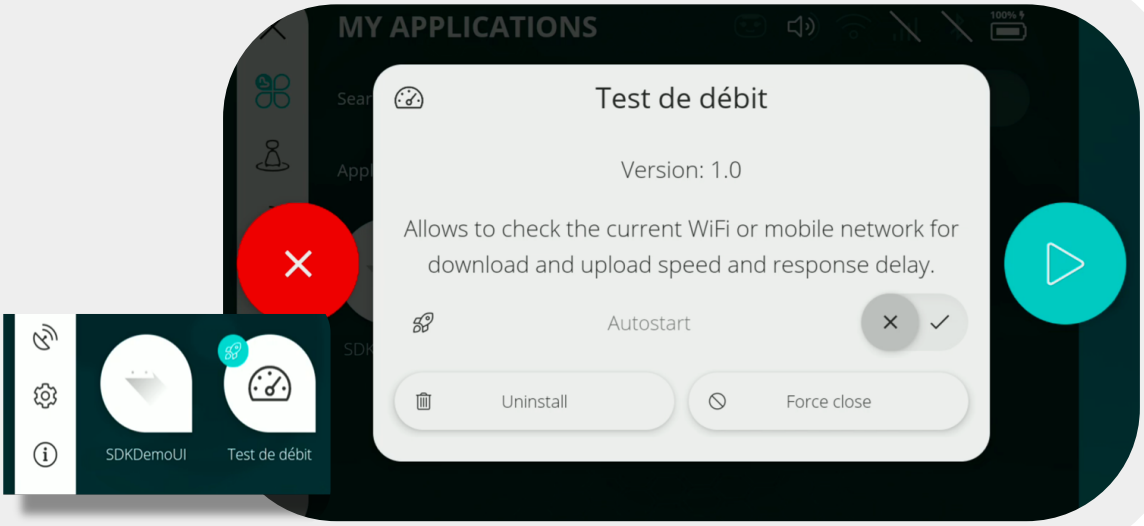


8.1 - APPS MENU

Launching App
Press the icon of the application you want to launch.

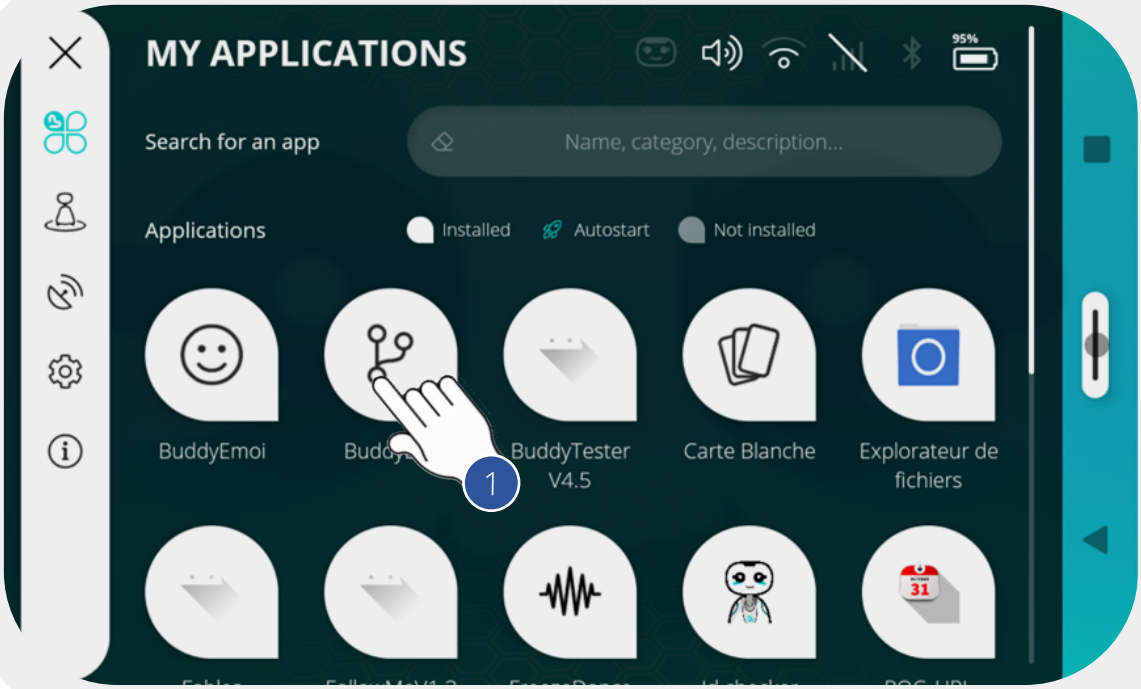


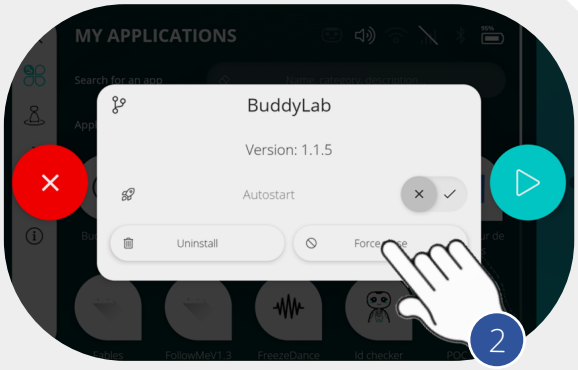
Automatic launch option at startup
Keep pressing on the application until the pop-up window appears.
Activate option « Automatic launch »



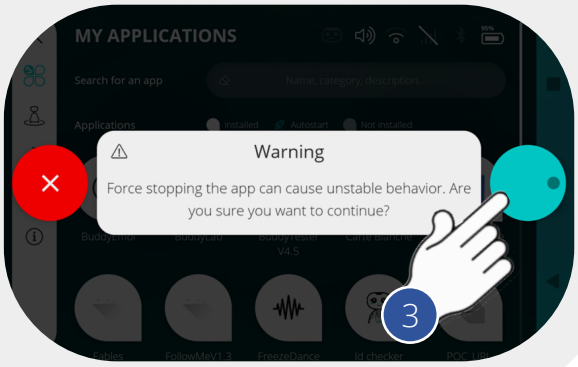
An auto-start indicator appears on the application icon

Option: Force Stop an App
Hold down on the app until the Pop-up window appears.





Activate the «Force Stop» Option



A message appears, once read, please click on validate

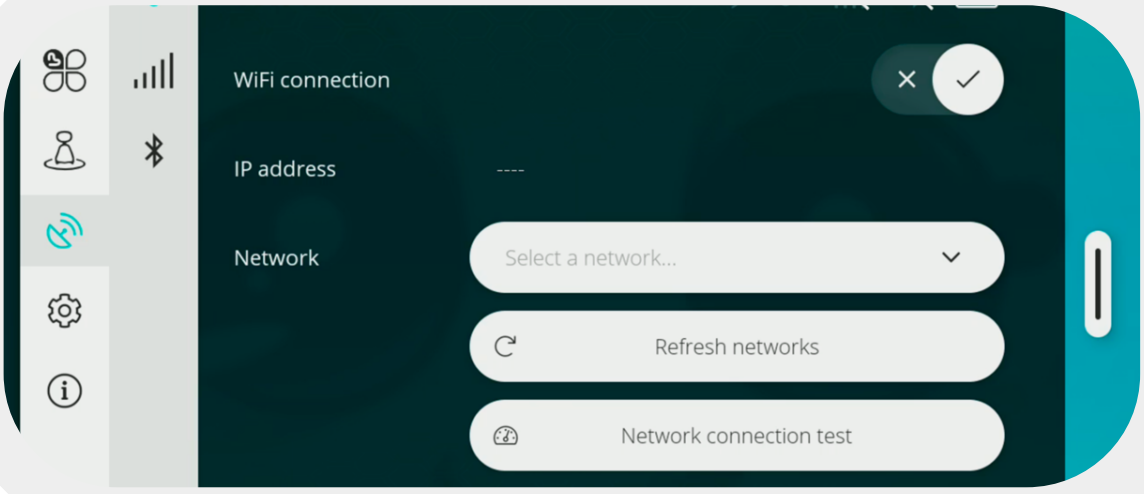
8.2 - “COMPANION” MENU

Enable/Disable ”Companion” Mode ’
Click on ‘Proactive’

When the ‘Proactive’ button is activated, Buddy is in ‘Companion’ mode.
See chapter ‘Companion mode’.

8.3 - NETWORK MENU WIFI, 4G, BLUETOOTH

Enable/Disable WiFi

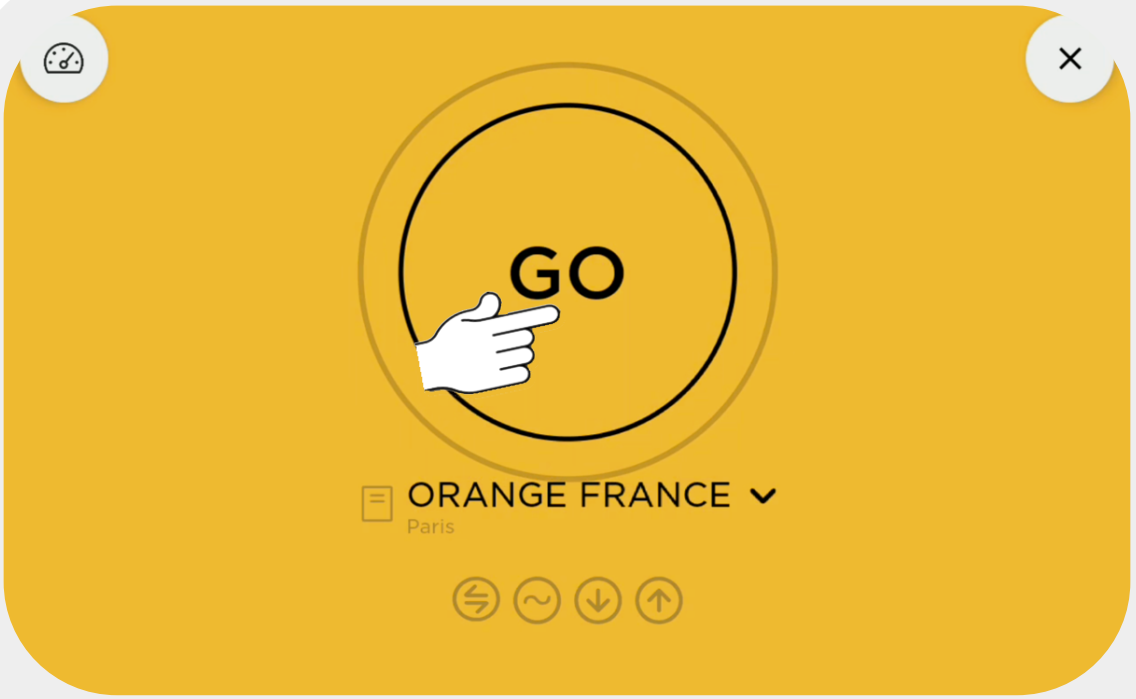


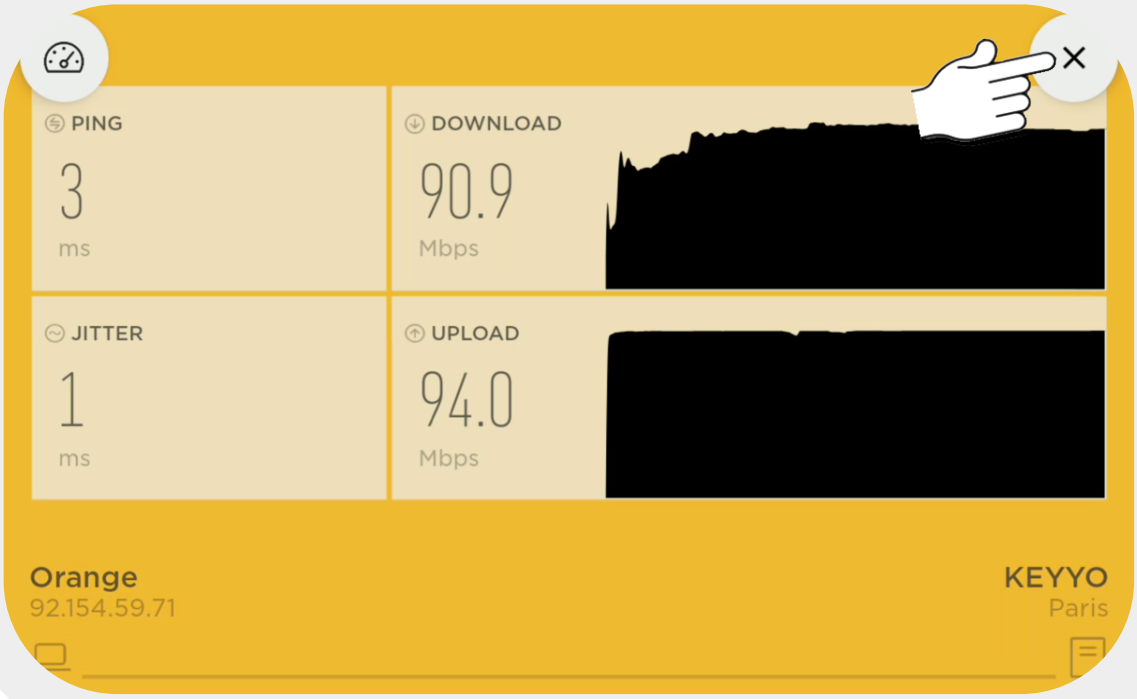
Enable/Disable LTE 4G

The SIM card must be inserted when the robot is switched off.
A PIN code will be requested to activate the SIM card.

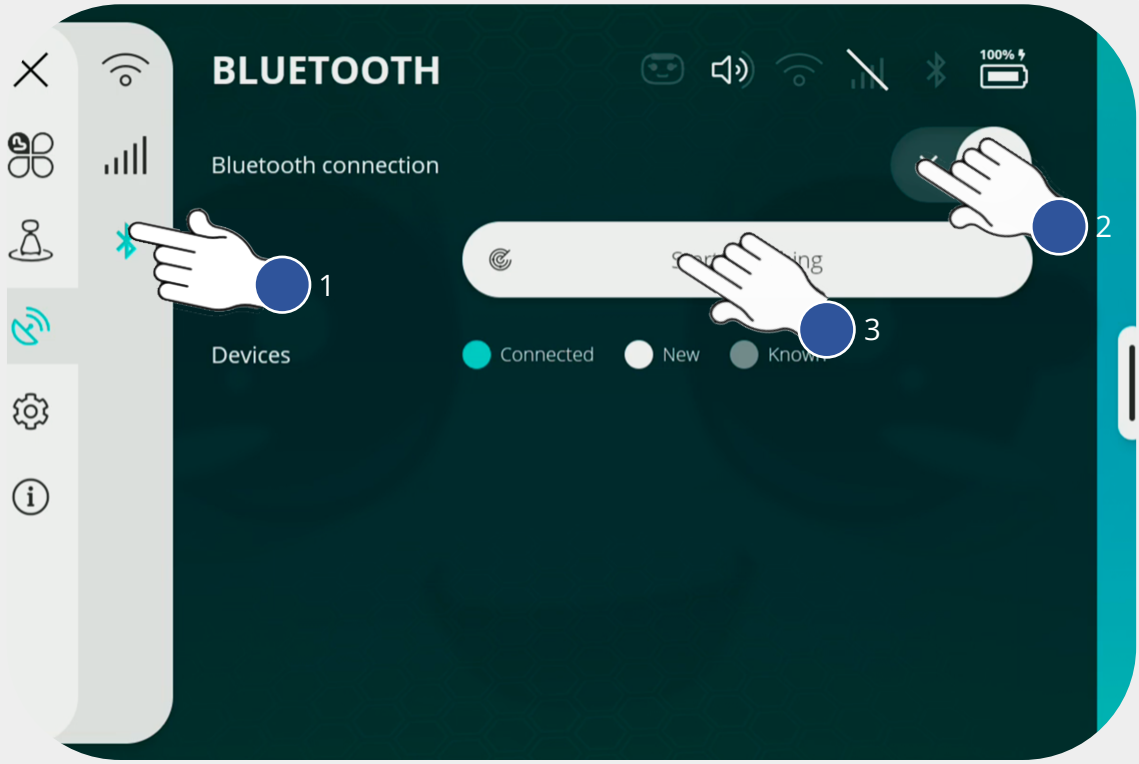
Insert Nano-SIM card and switch on the robot

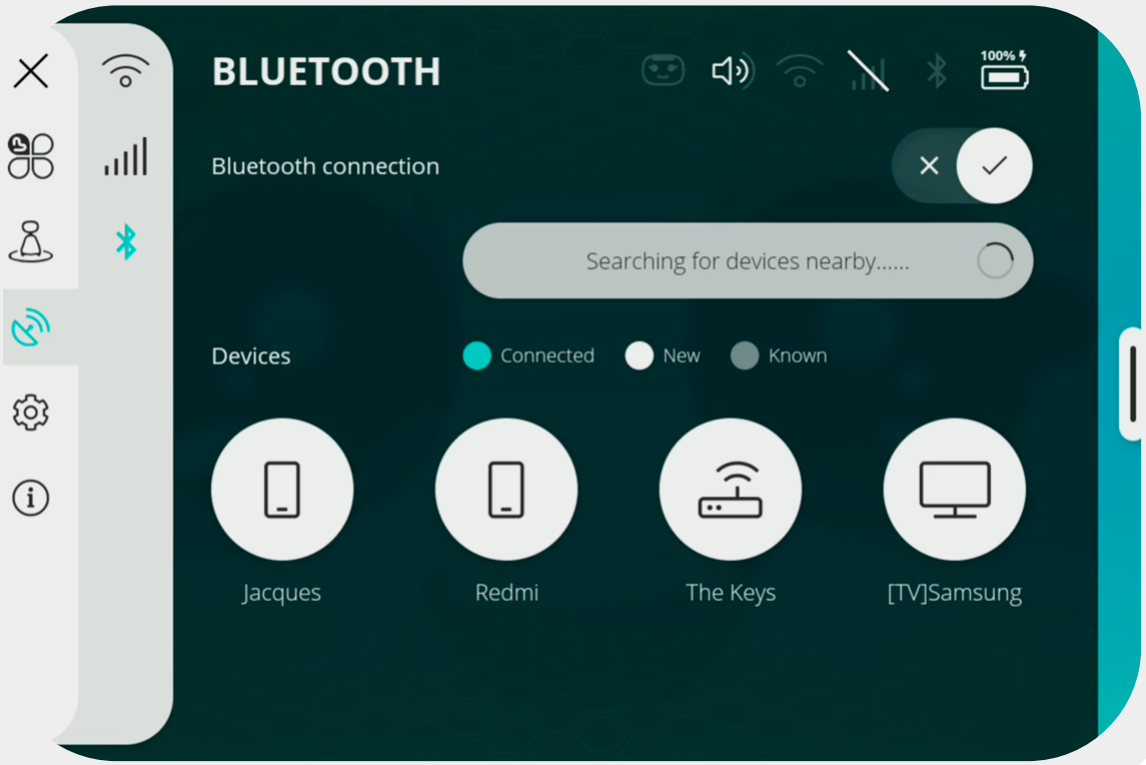
Quality test of network WiFi or LTE 4G



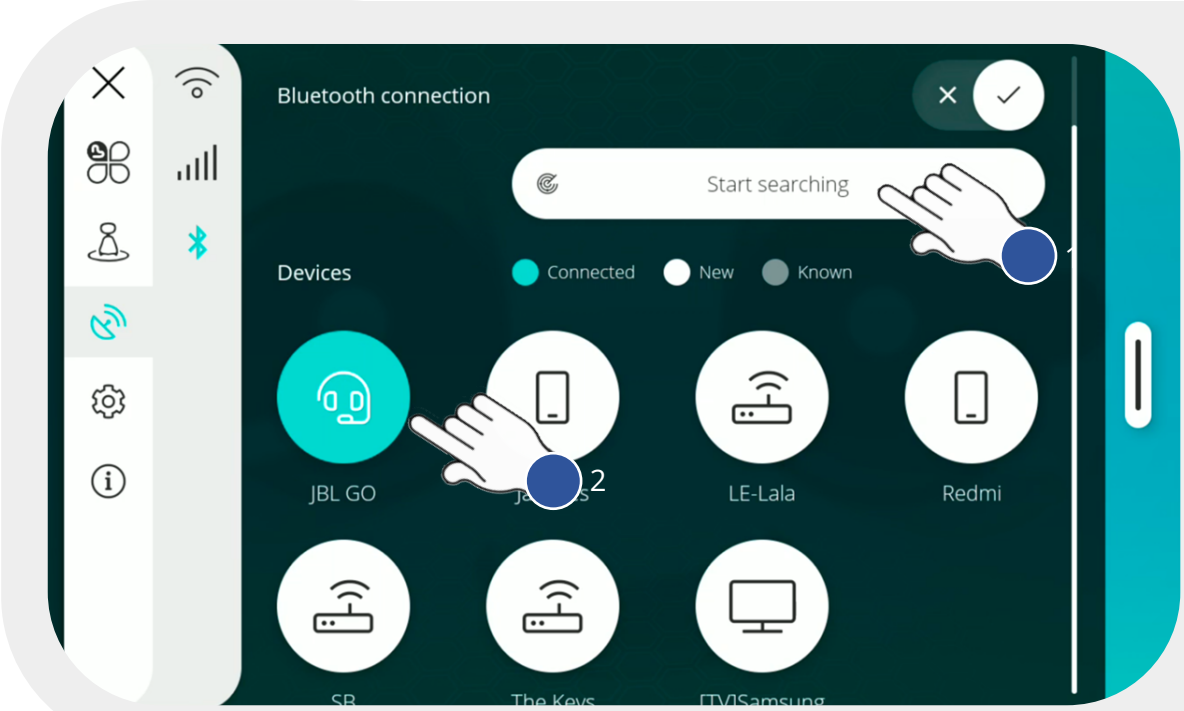


Connecting Bluetooth device

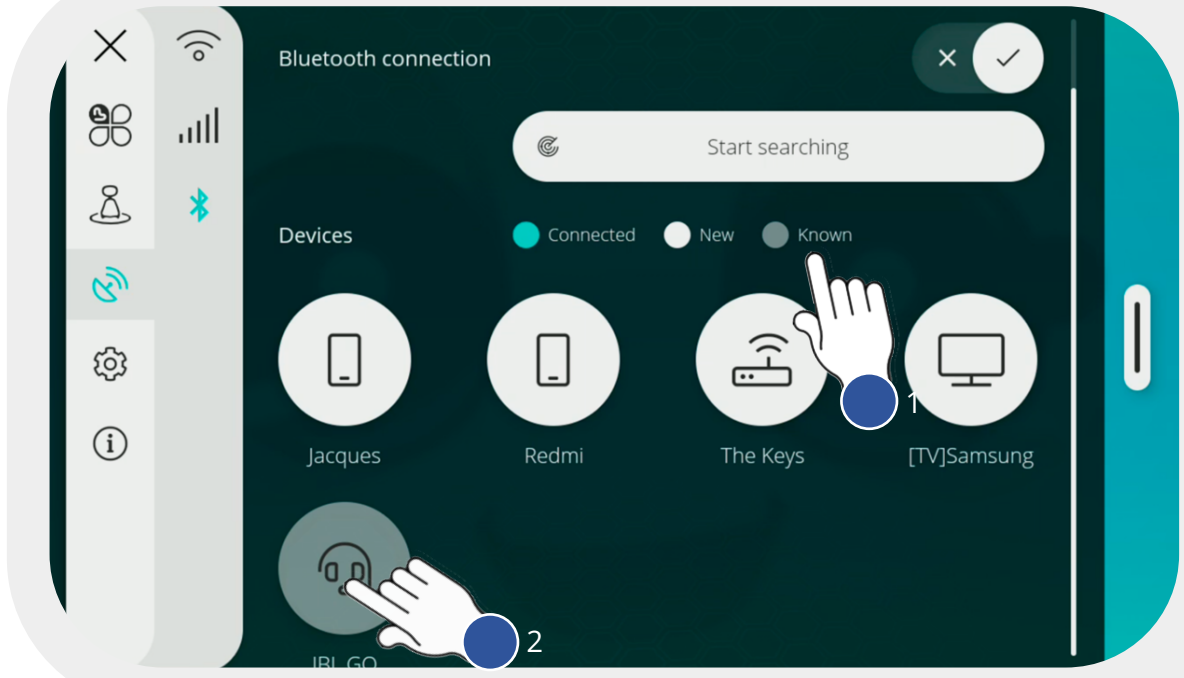




Connected Bluetooth devices

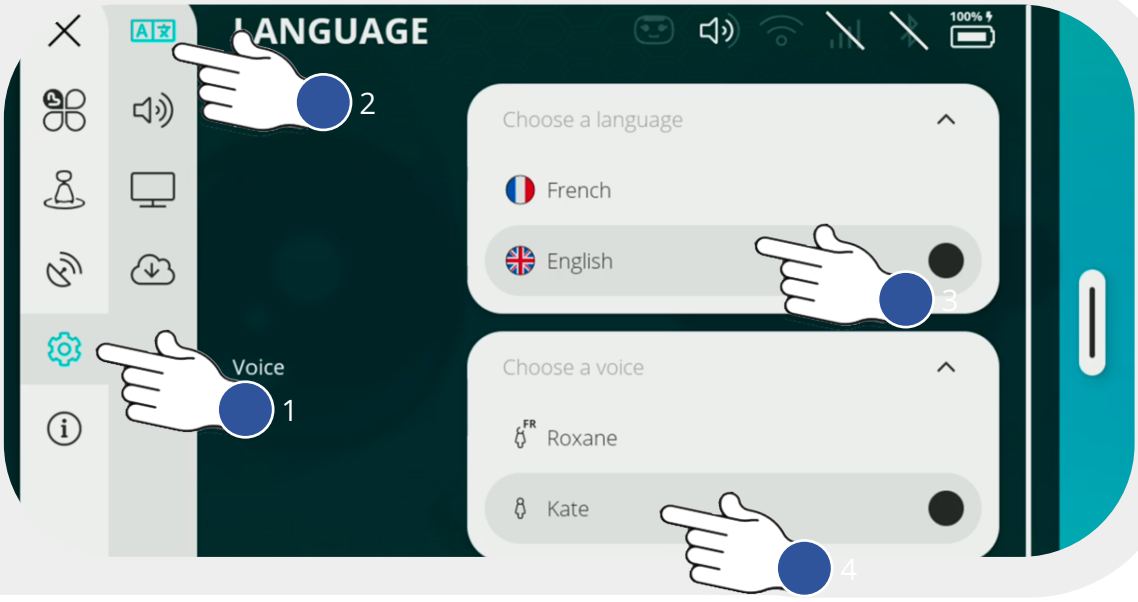


Bluetooth devices known but not connected

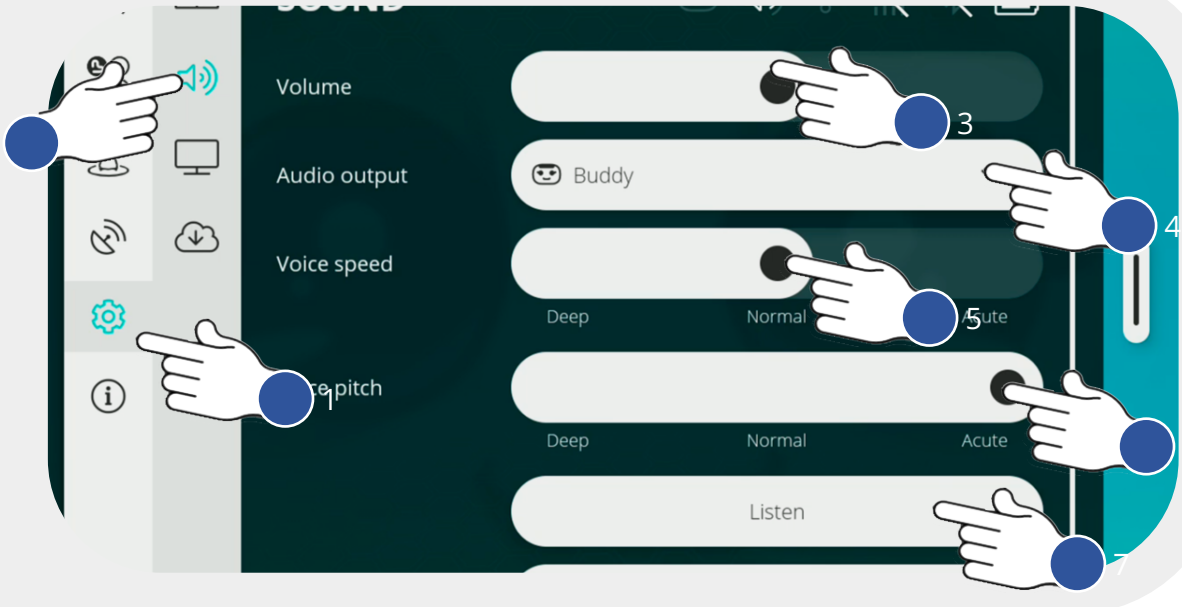


8.4 - LANGUAGE, SOUND, DISPLAY, UPDATES SETTINGS

Language and voice selection

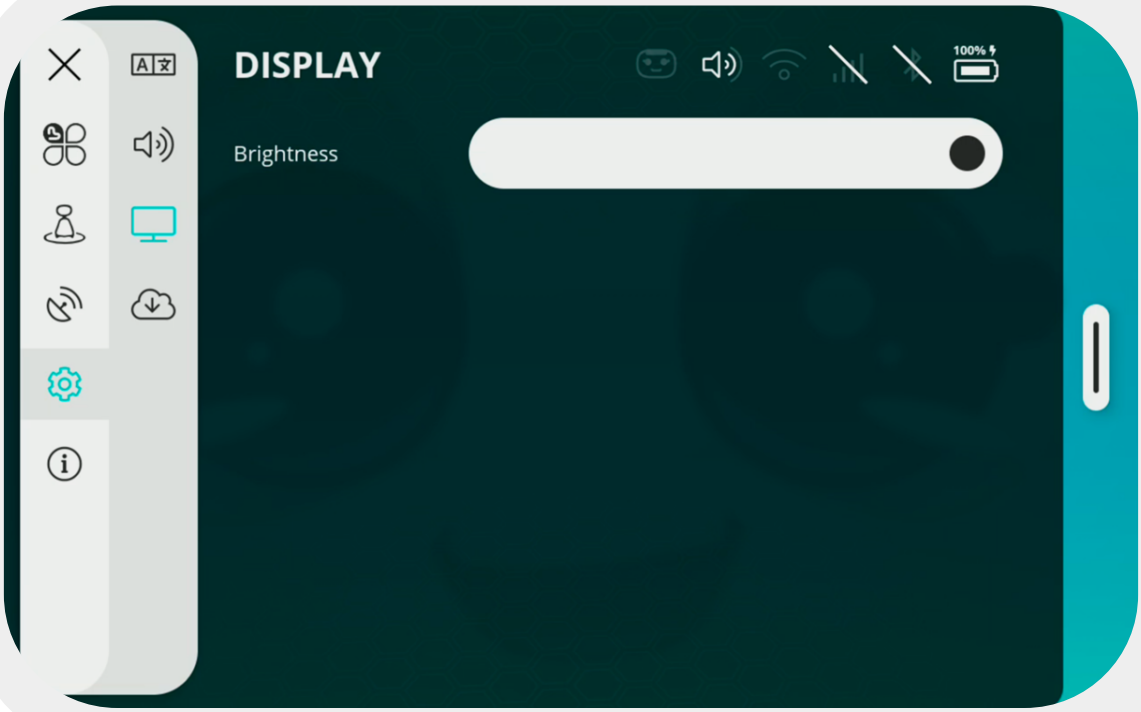


Volume and speech speed settings

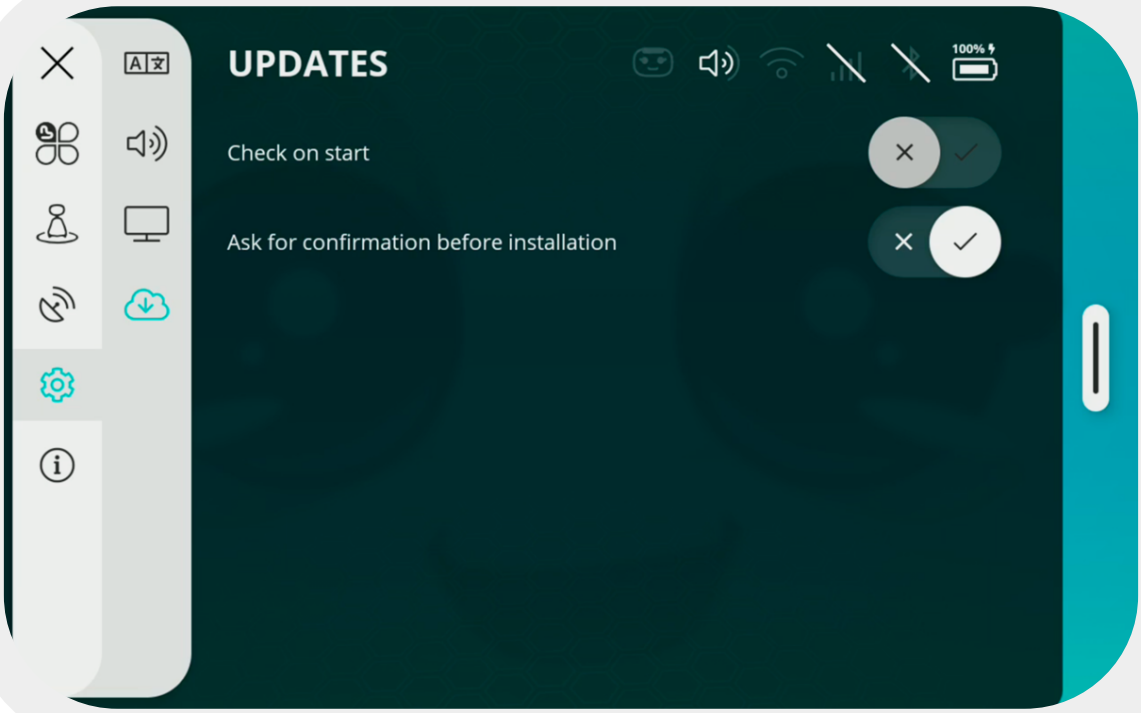


3- Volume control
4- Audio output (e.g., to a connected Bluetooth speaker).
5- Set the speed at which Buddy speaks.
6- Setting the pitch of Buddy's voice.
7- Listen to test voice, tone and speed of speech.

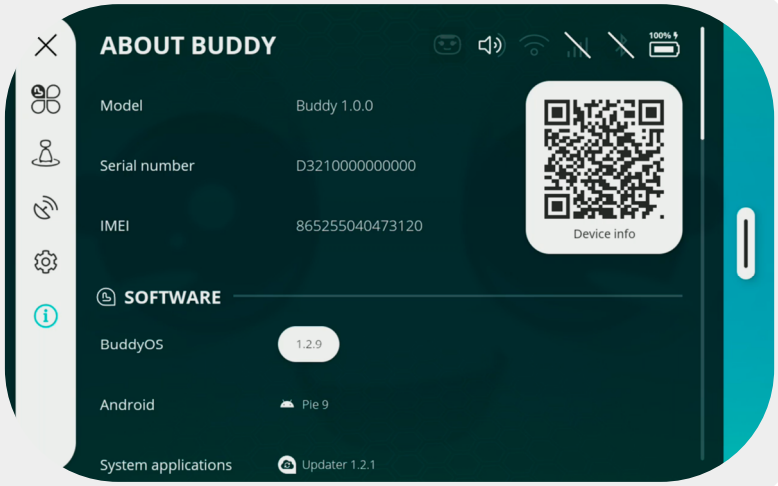
Brightness settings



Update setting

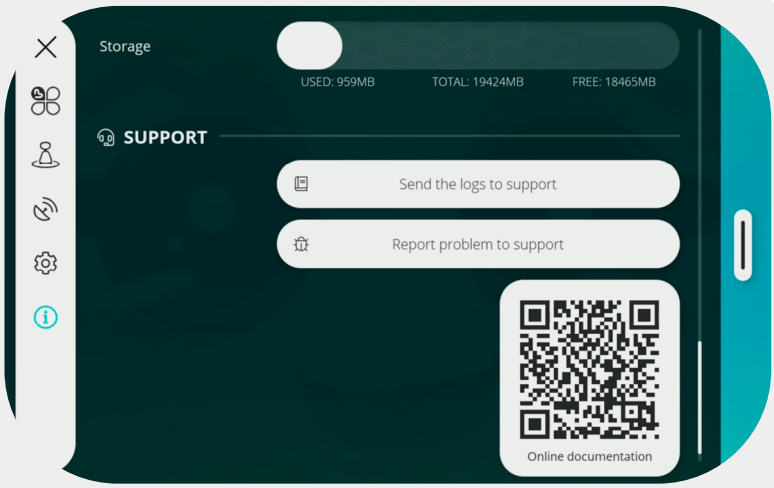


8.5 - INFORMATION « ABOUT BUDDY »



Model,
SN, IMEI,
SOFTWARE

SOFTWARE,
HARDWARE

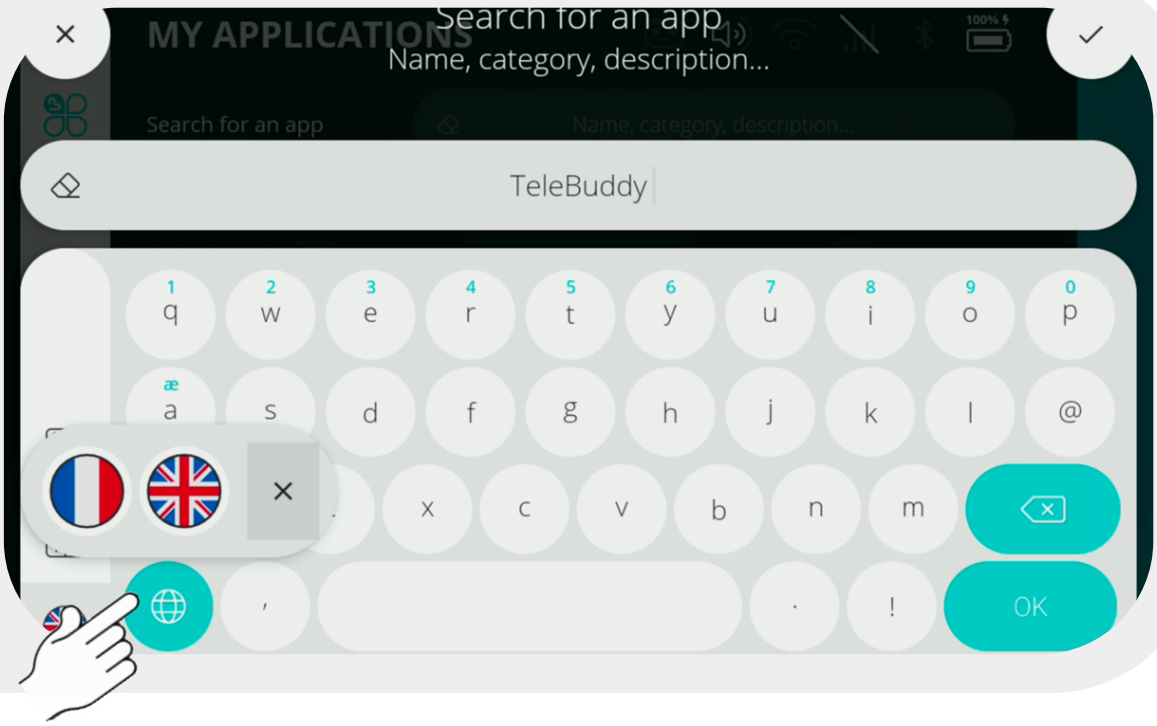


SUPPORT

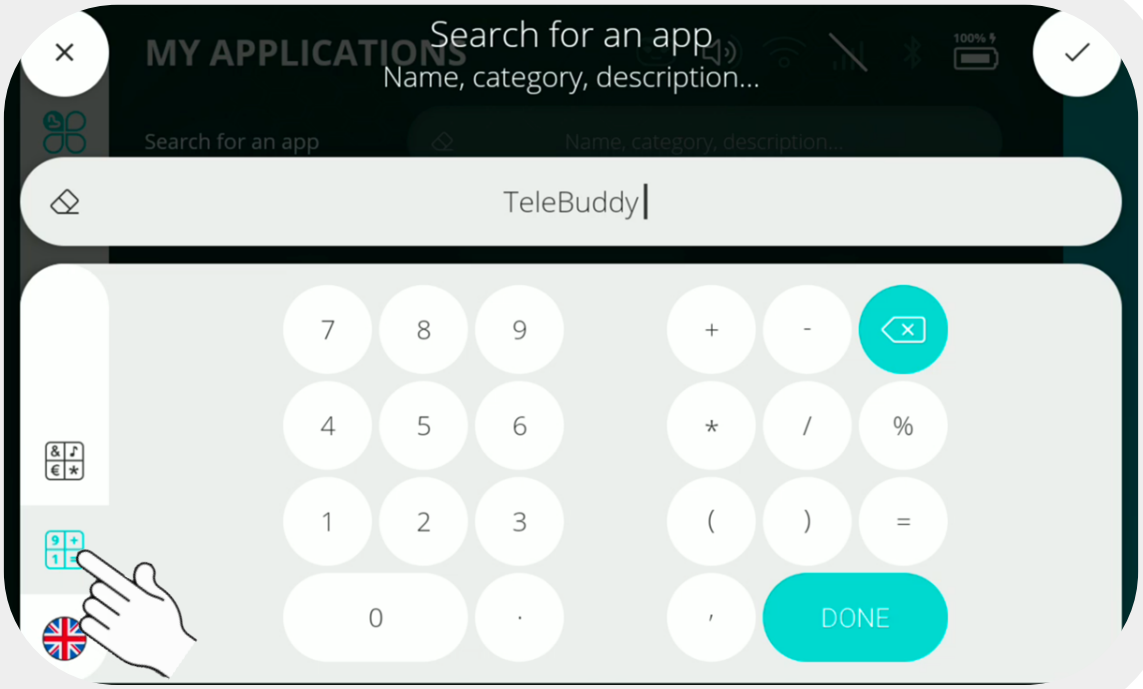
9 - KEYBOARD

9.1 - LANGUAGE SETTINGS

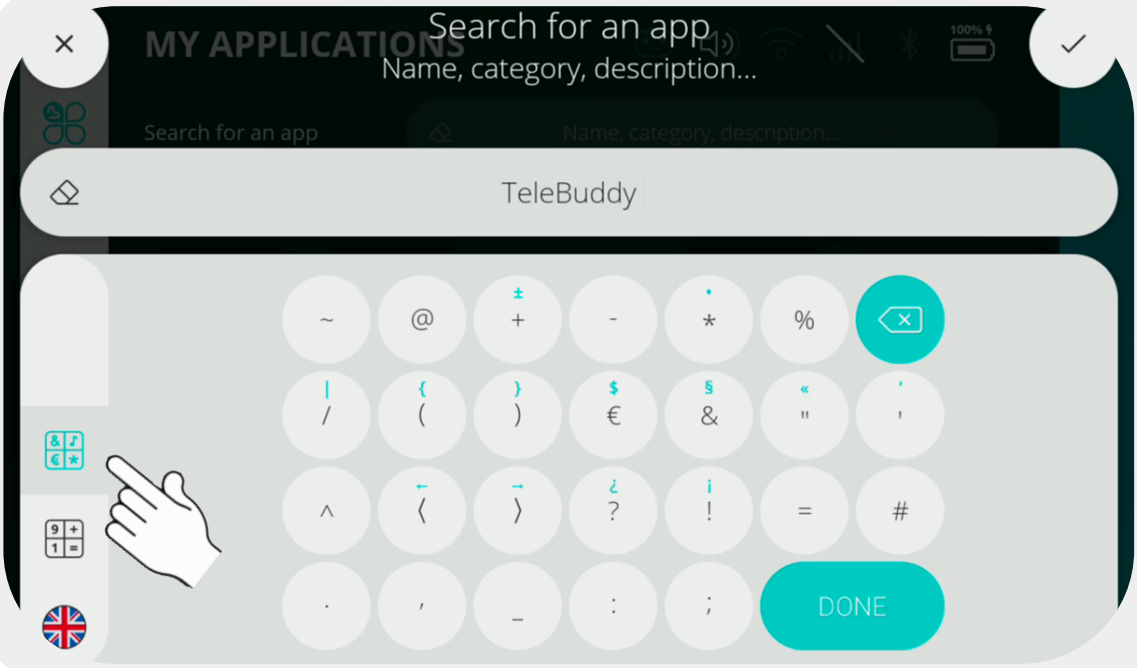
Alphanumeric or numeric inputs



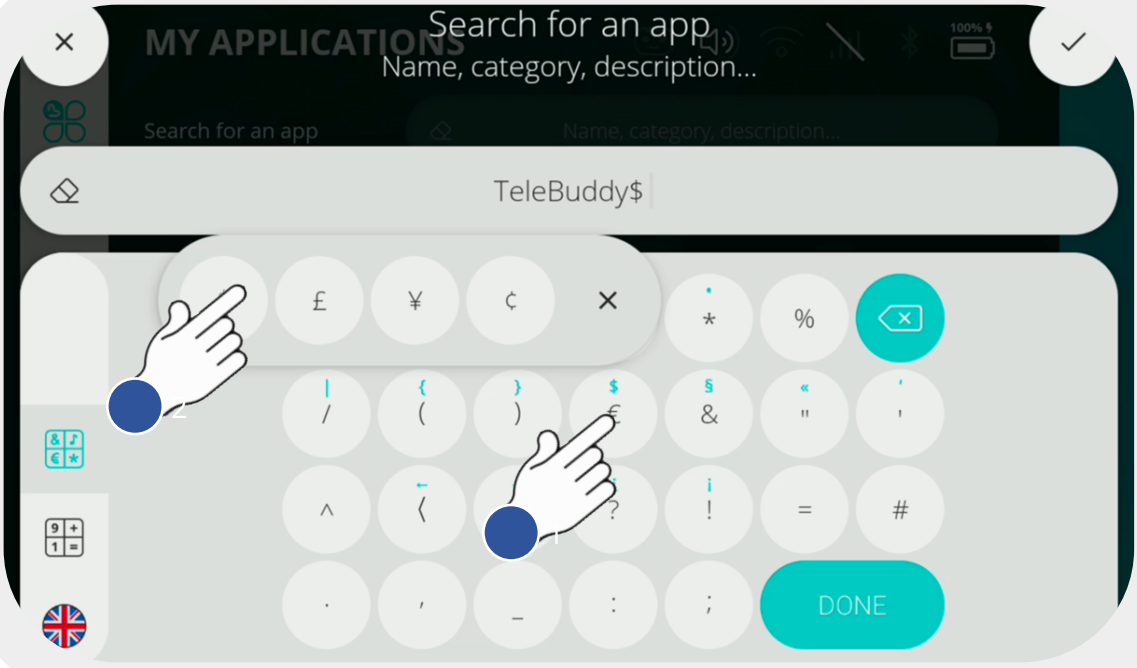
9.2 - NUMERIC KEYBOARD



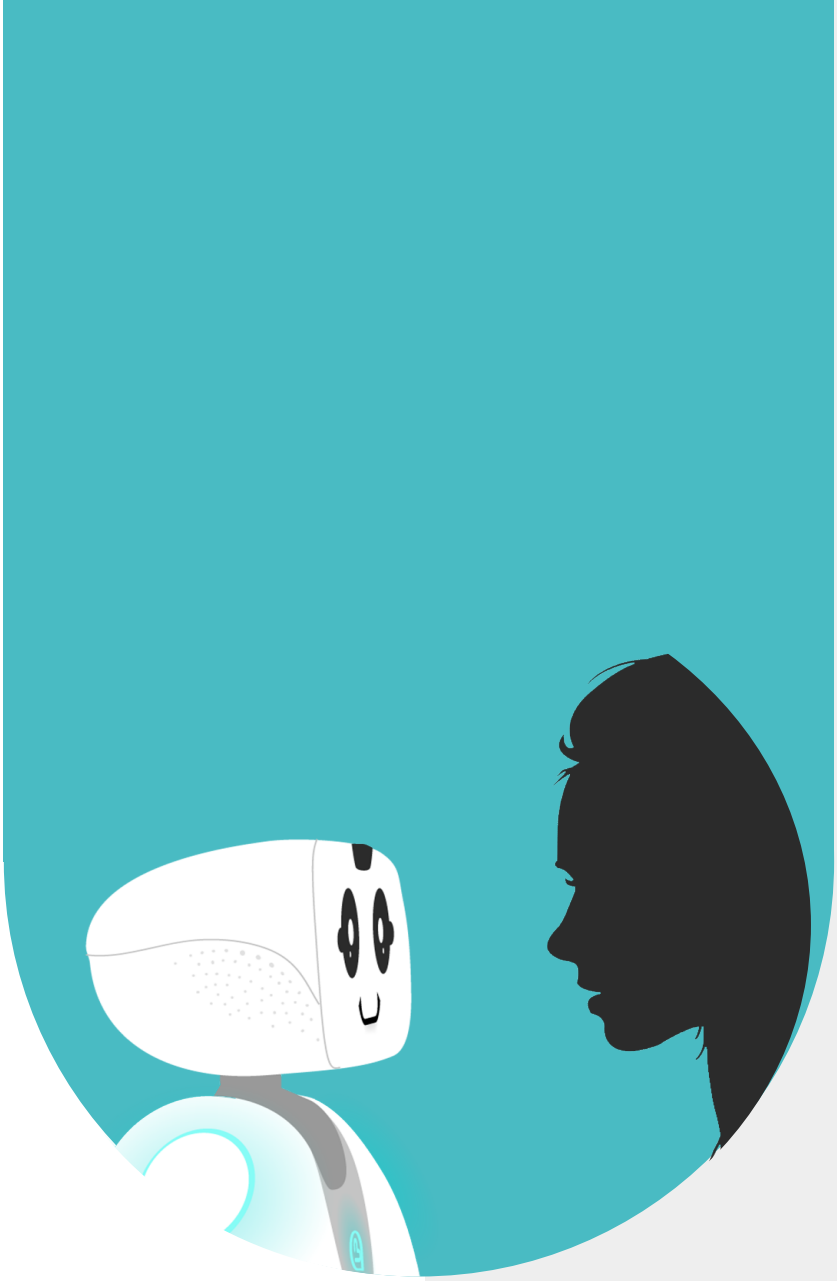
9.3 - SPECIAL CHARACTERS KEYBOARD



9.4 - SPECIAL CHARACTERS KEYBOARD (SHIFT)



1 - Press and hold to display the characters in ‘Green’.
2 - Choose one of the special characters.



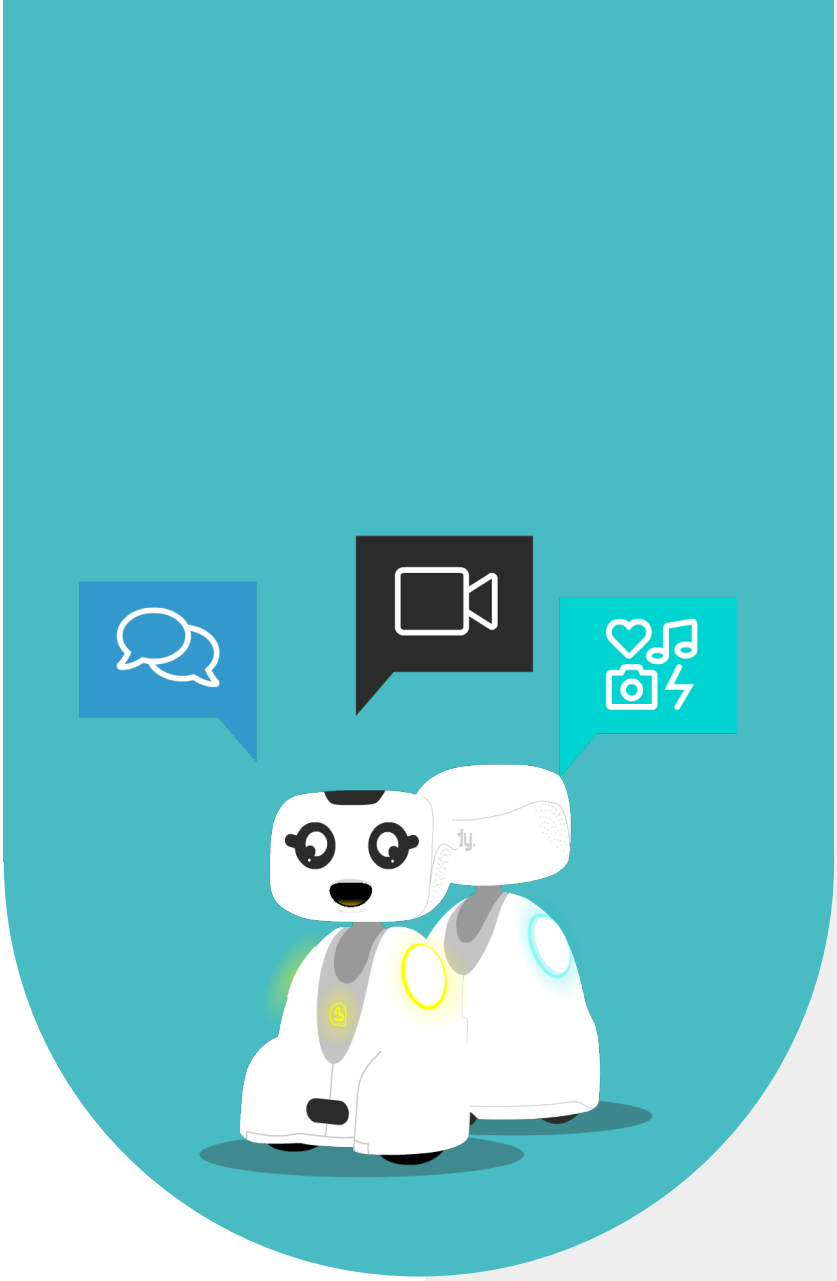
10 - HOW TO SPEAK TO BUDDY

Heart and shoulder LEDs are yellow/green

Buddy can understand what is being said to it.
First, it is necessary to say «Ok Buddy» to trigger its listening skills.

Once triggered, Buddy goes into 'listening' mode
- A particular face is displayed
- LEDs light up yellow/green
- Blue waves are displayed on the sides of its face

Face 'Listen' and blue waves appear on each side



11 - BUDDY'S VOICE COMMANDS

List of voice commands that Buddy understands and whose associated actions are executed. Buddy can be in 'Proactive' or 'Inactive' Companion mode.
Even in 'Inactive' mode, Buddy includes some voice commands (blue column).

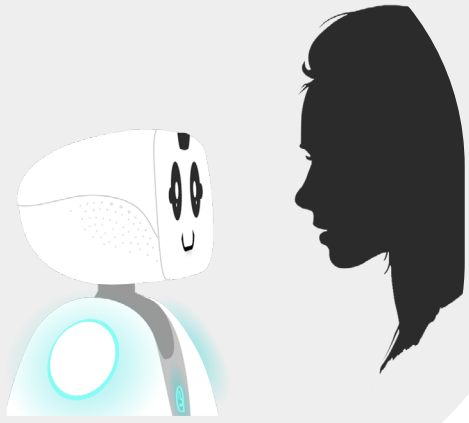
Voice commands	Actions
OK BUDDY	TRIGGER LISTENING
STOP LISTENING [TO ME] DO NOT LISTEN [TO ME]	STOP LISTENING
WHAT IS YOUR STATUS ? WHAT COMPANION MODE ARE YOU IN ? ARE YOU IN PROACTIVE OR INACTIVE COMPANION ? WHAT IS YOUR COMPANION MODE ?	STATUS OF COMPANION MODE
TAKE A NAP GO TO SLEEP	BUDDY FALLS ASLEEP BUDDY GOES INTO STANDBY MODE
TURN OFF YOU CAN TURN OFF YOU TURN OFF SHUTDOWN	SHUTDOWN BUDDY
LAUNCH/START/OPEN « X » CAN YOU PLEASE START « X » COULD YOU OPEN « X »	LAUNCH APP « X »
EXIT/CLOSE/CANCEL APP/ACTIVITY CAN YOU PLEASE STOP THE ACTIVITY CAN YOU CLOSE THE CURRENT APP	QUIT APP/ACTIVITY
WHAT IS YOUR BATTERY LEVEL	BUDDY GIVES ITS BATTERY LEVEL
WHAT IS YOUR VOLUME WHAT IS YOUR SOUND VOLUME HOW LOUD ARE YOU	BUDDY GIVES ITS VOLUME LEVEL
TURN UP THE VOLUME SPEAK LOUDER INCREASE THE VOLUME	BUDDY INCREASES ITS VOICE VOLUME

TURN DOWN THE VOLUME LOWER YOUR VOICE DECREASE THE VOLUME	BUDDY DECREASES ITS VOICE VOLUME
LOOK AT ME LOOK AT ME IN THE EYES WATCH ME	BUDDY KEEPS TRACKING A USER WITH HIS EYES, HEAD AND BODY
STOP LOOKING AT ME DON'T LOOK AT ME ANYMORE STOP WATCHING AT ME	BUDDY STOPS LOOKING AT THE USER
WHAT TIME IS IT?	BUDDY GIVES THE TIME
WHAT IS THE DATE? WHAT IS THE DAY TODAY?	BUDDY GIVES THE DATE
CAN YOU DANCE? PLEASE DANCE FOR ME CAN YOU PLEASE DO A LITTLE DANCE	BUDDY DANCES FOR A BIT
WALK AROUND GO FOR A WALK TAKE A WALK	BUDDY GOES FOR A RANDOM WALK
STOP WALKING AROUND STAY WHERE YOU ARE STAY HERE	BUDDY STOPS WALKING AROUND

Get Buddy moving	**Movements**
PUT YOUR HEAD STRAIGHT PUT YOUR HEAD UP	BUDDY MOVES ITS HEAD TO POSITION ZERO
DON'T MOVE DO NOT MOVE STOP MOVING	WHEELS' MOTORS ARE DISABLE
YOU CAN MOVE	WHEELS' MOTORS ARE ENABLE
GO/MOVE FORWARD PLEASE MOVE FORWARD A LITTLE/A LOT	BUDDY GOES FORWARD

GO/MOVE BACKWARD PLEASE MOVE BACKWARD A LITTLE	BUDDY GOES BACKWARD
TURN/GO ON YOUR LEFT/RIGHT PLEASE TURN LEFT/RIGHT	BUDDY TURNS LEFT/RIGHT
TURN AROUND ROTATE BACK	180° TURN
MAKE A FULL TURN DO A 360 / PIROUETTE TAKE A SPIN ON YOURSELF	360° TURN
TURN WITHOUT STOPPING TURNS CONTINUOUSLY KEEP SPINING	BUDDY TURNS CONTINUOUSLY
STOP SPINNING	BUDDY STOP SPINNING
LOOK UP LIFT UP THE HEAD	BUDDY LIFTS ITS HEAD
LOOK DOWN MOVE THE HEAD DOWN	BUDDY PULLS DOWN ITS HEAD
LOOK AT YOUR LEFT/RIGHT TURN YOU HEAD TO THE LEFT/RIGHT	BUDDY TURNS ITS HEAD LEFT/RIGHT

SHOW ME WHEN YOU ARE :	Face expression
NORMAL/NEUTRAL	NEUTRAL
SAD	SAD
SCARED/BE AFRAID	SCARED
SICK	SICK
HAPPY	HAPPY
LOVING	LOVE
TIRED	TIRED
GRUMPY	GRUMPY
SURPRISED	SURPRISED
ANGRY	ANGRY
LISTENING	LISTENING

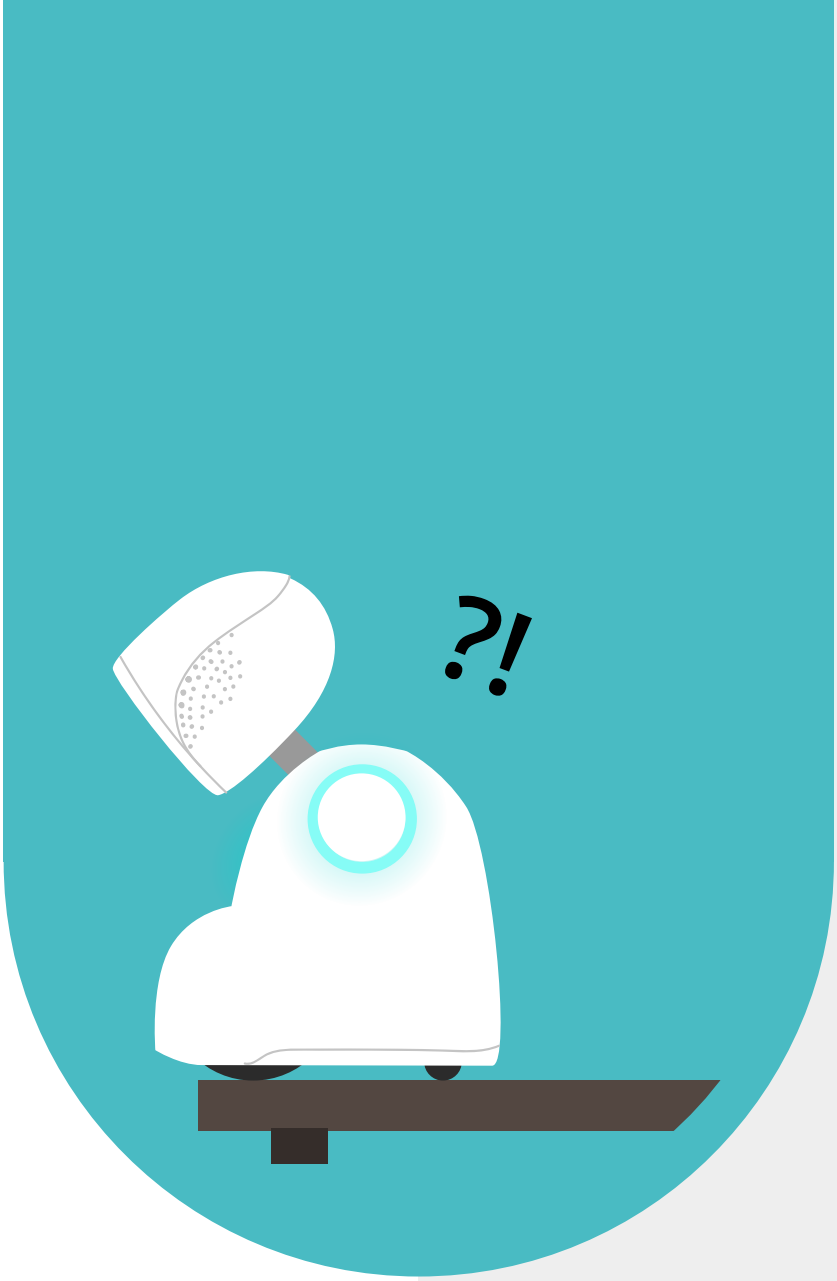


Voice commands

HELLO BUDDY
GOODBYE
TELL ME A JOKE
CAN YOU TELL A JOKE?
SAY SOMETHING
MIMIC THE DOG
MIMIC THE CAT

Questions

WHO ARE YOU?
WHAT IS YOUR NAME?
WHAT CAN YOU DO?
CAN YOU EXPLAIN TO ME WHAT YOU CAN DO?
CAN WE CHANGE YOUR NAME?
CAN I CHANGE YOUR NAME?
HOW ARE YOU?
HOW DO YOU DO?
ARE YOU OK?
WHAT'S UP?
DO YOU VACUUM?
CAN YOU VACUUM?
CAN YOU MAKE COFFEE?
DO YOU MAKE COFFEE?
WHAT ARE YOU EATING?
ARE YOU HUNGRY?
HOW OLD ARE YOU?
WHO IS YOUR FATHER?
WHERE IS YOUR FATHER?
WHO ARE YOUR PARENTS?
DO YOU HAVE ANY RELATIVES?
WHAT ARE YOUR ORIGINS?
WHO DESIGNED YOU?
WHO MADE YOU?
ARE YOU A BOY?
ARE YOU A GIRL?
ARE YOU A ROBOT?
DO YOU HAVE BROTHERS AND SISTERS?
CAN I GIVE YOU A KISS?
MAY I KISS YOU?
ARE ROBOTS SUBJECT TO RULES?
WHAT RULES DO ROBOTS FOLLOW ?
WHAT IS YOUR FAVOURITE COLOUR ?

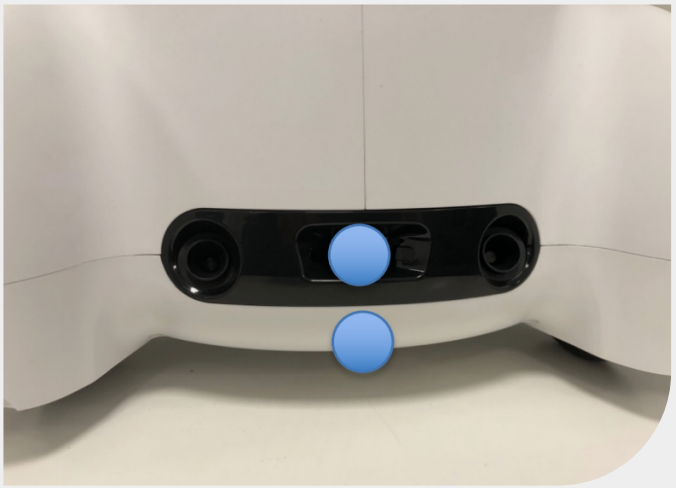


12 - SAFETY INSTRUCTIONS

- Children must not use the robot without the presence of an adult.
- Do not open the robot otherwise the warranty will no longer work.
- The robot must not be exposed to water projections or to any projectiles that could damage its structure (plastic, screen, wheels, ...).
- Outdoor use is not recommended, except to protect the robot from water, prolonged exposure to the sun, sand projections, muddy ground, ...
- Do not store or use the robot in a place that is too dusty.
- Do not leave the robot in the sun behind a window.
- Do not handle the robot roughly, do not crush the head, the screen, the wheels, the accessories inserted in the housings of the arms or the external connectors.
- Do not force the neck to move from left to right, up and down.
- Do not restrain the neck movements.
- Do not place the robot with its head down under a table that is too low to raise the head.
- Do not force the movement of the wheels if they are blocked.
- The touch screen will not work with wet hands.
- Do not drop the robot by tilting it or letting go of it.
- If the robot shows physical damage, call for assistance.
- Turn off the robot immediately if there are any suspicious smells or noises.
- Pay attention to your eyes when the LED light is on.
- Pay attention to your ears when the noise level of the robot is too high.
- Do not disassemble the robot.
- Do not remove the battery without instructions from a technician.
- Do not change the appearance of the robot by applying paint, pen ink, glue or any other material that cannot be removed without damage.
- Do not pierce the robot.
- Do not force the power connector.
- Do not use any other power supply than the one supplied with the robot.
- Do not plug the power supply into an electrical outlet that is not securely attached or that does not comply with current standards.
- Do not use the power supply if the wires are damaged.
- Only use accessories approved by Blue Frog Robotics.
- The robot works properly in an ambient temperature range of 5°C to 35°C and a humidity level ideally between 35% and 65%.
- The robot is not protected against bites, scratches or jostling by pets.

13 - MAINTENANCE

The robot has many sensors to perceive its environment.
The proper functioning of the sensors depends on their cleanliness.
Here are the sensor locations to be cleaned with a dry cloth or cotton swab.Do not use cleaning products that could damage the painted surface of the robot.



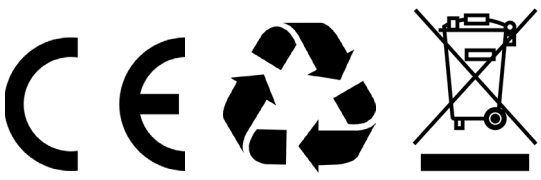
14 - WASTE MANAGEMENT

This symbol on the product, its accessories or documentation indicates that neither the product nor its used electronic accessories (charger, robot, battery, accessories, etc.) may be disposed of with other household waste.

To avoid harm to the environment or human health due tò uncontrolled disposal, please separate these items from other waste and recycle them to promote sustainable reuse of material resources.

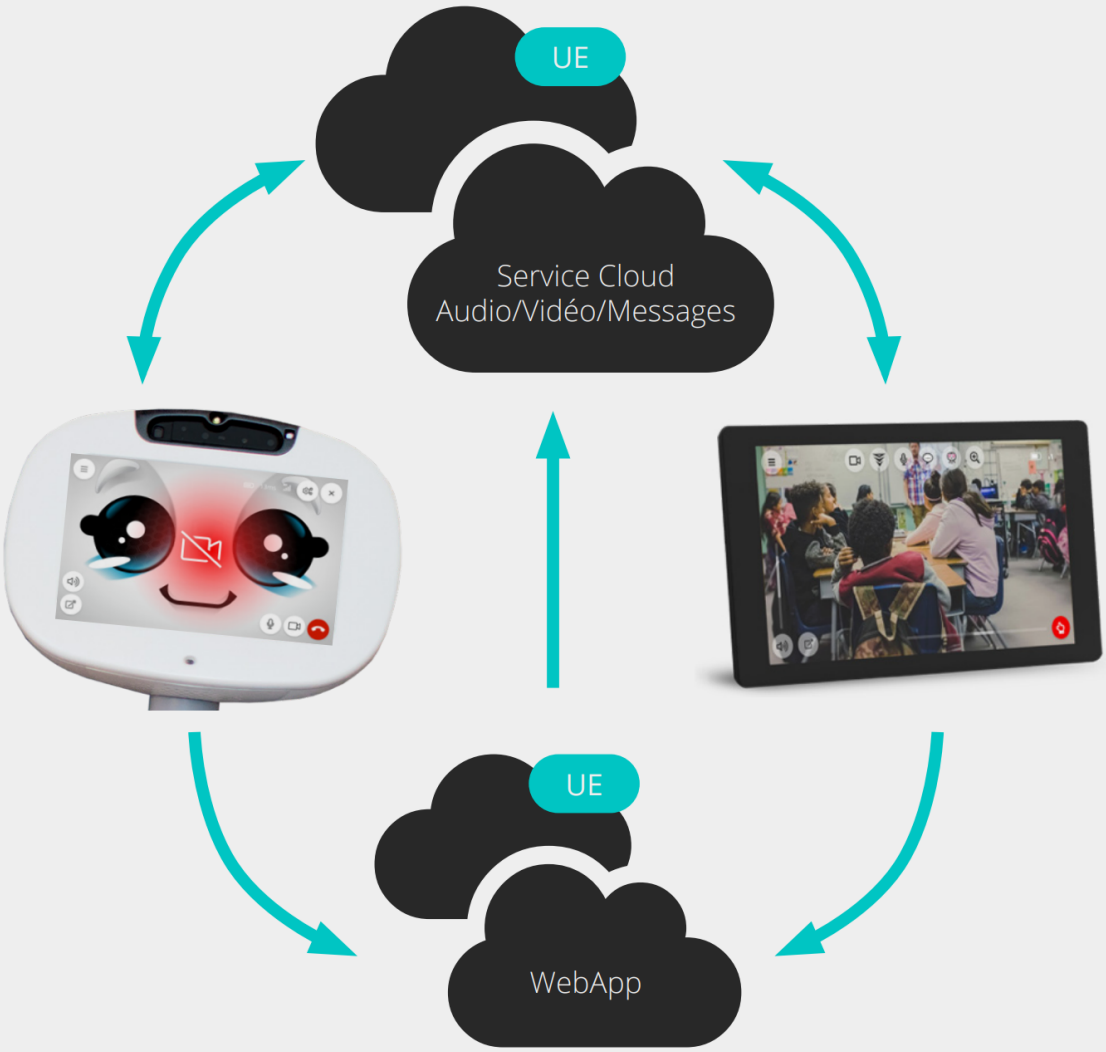
Individuals should contact the dealer from whom they purchased the product or the appropriate government authority to inquire about where and how to recycle these items in an environmentally sound manner.

Business users should contact their supplier and check the conditions in the purchase contract. This device and its electronic accessories should not be mixed with other commercial waste.



15 - PERSONAL DATA PROTECTION

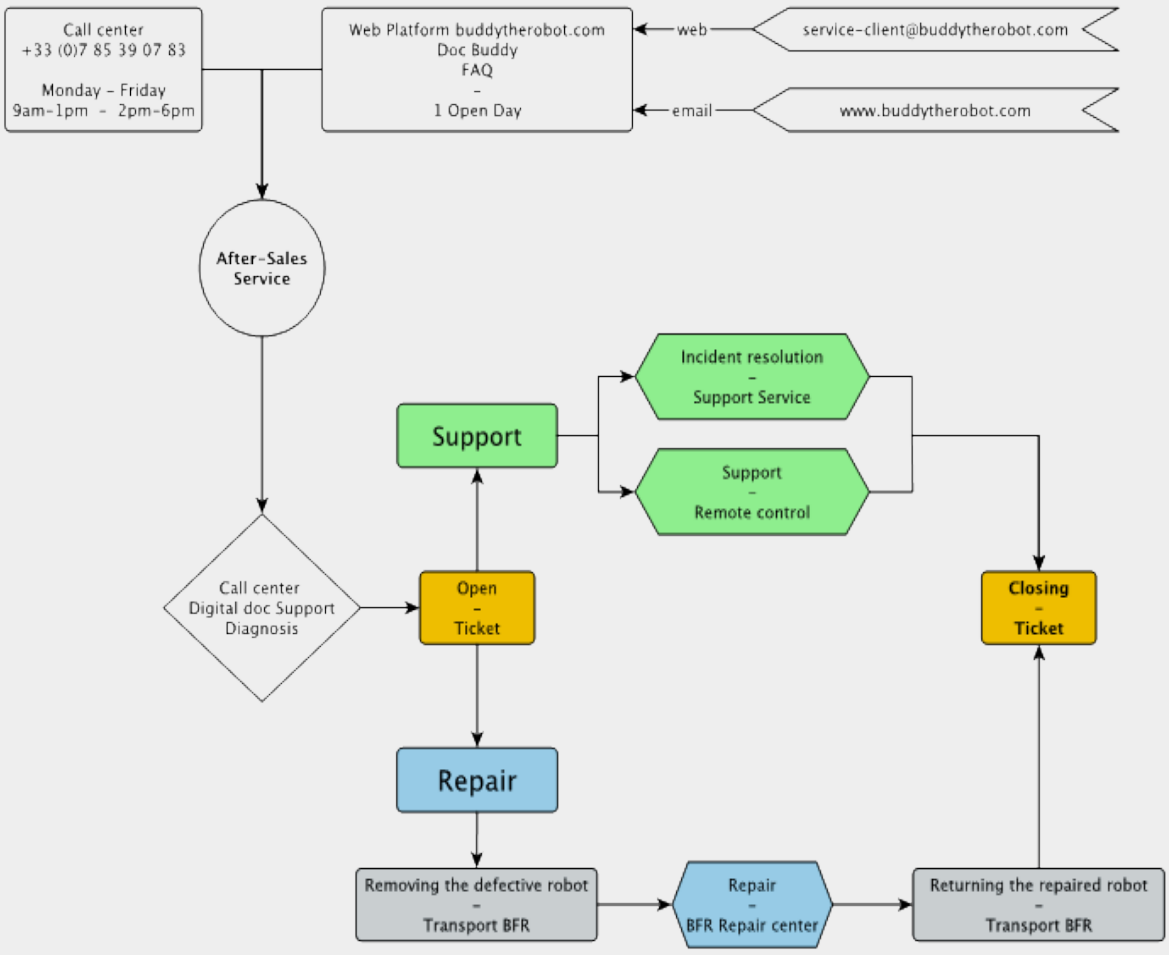
The management of personal data respects the RGPD compliance.
The database containing user data is hosted in Europe. The images taken during the Telepresence service are acquired by the robot's cameras and then transferred and stored on the Tablet. All images can be deleted from the MyBuddyApp Menu.
The Telepresence service servers are hosted in Europe. Audio/Video exchanges are encrypted.

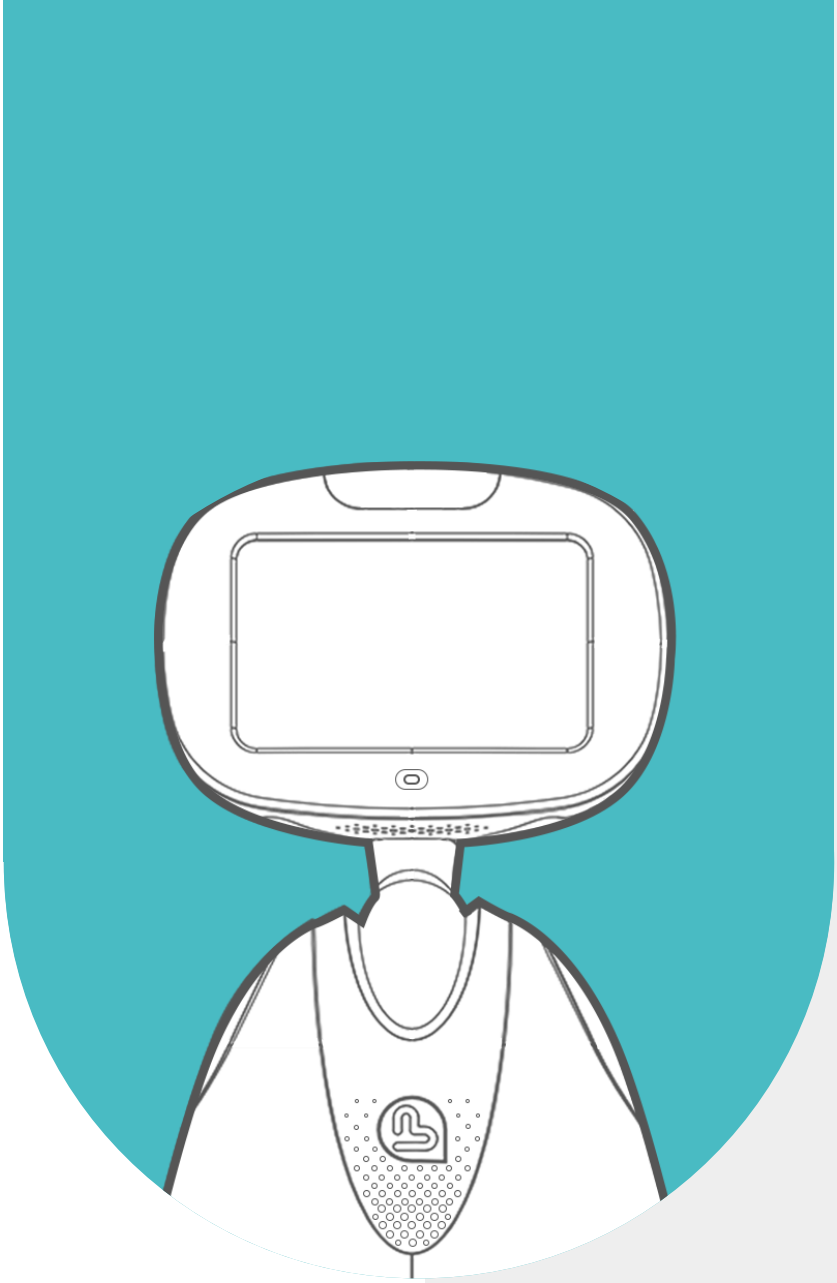


16 - WARRANTY, SUPPORT AND AFTER-SALES SERVICE

The standard warranty is one year return to the workshop with no commitment on the time of care and repair.

The procedures for contacting customer service are as follows:





17 - LEGAL NOTICE

We, BLUE FROG ROBOTICS, declare under our sole responsibility, that the Buddy The Robot equipment, model B02, is in compliance with the RED Directive 2014/53/EU.

We hereby declare that all essential radio test suites have been performed and that the above product complies with all essential requirements of the Radio Equipment Directive 2014/53/EU.
The Buddy The Robot equipment, model B01, and all associated accessories comply with the CE and RoHS 2011/65/EU directives.
Use of the device is restricted to indoor use only when operating in the 5150-5350MHz frequency band

Frequency band :

Bluetooth and Bluetooth LE: 2402MHz - 2480MHz
802.11b/g/n(20): 2412MHz -2472MHz
802.11a/n20/n40/ac20/ac40/ac80: 5180MHz - 5320MHz, 5500MHz-5700MHz
SRD: 5745MHz -5825MHz
GSM 900/1800: 880MHz - 915MHz/ 1710MHz-1785MHz, 1805MHz-1880MHz
WCDMA BAND I/VIII: 1920MHz-1980MHz, 2110MHz-2170MHz/ 880MHz-915MHz, 925MHz-960MHz
LTE (FDD Band1/3/7/8/20/28): 1980MHz-1980MHz, 2110MHz-2170MHz/ 1710MHz- 1785MHz, 1805MHz-1880MHz/2500MHz-2570MHz, 2620MHz-2690MHz/880MHz- 915MHz, 925MHz-960MHz/ 832MHz-862MHz, 791MHz-821MHz
LTE (TDD Band38/40): 2570MHz-2620MHz/ 2300MHz-2400MHz

Output power :

Bluetooth: 15.16dBm
Bluetooth LE: 2.66dBm
802.11b/g/n (20) : 19.76dBm
802.11a/n20/n40/ac20/ac40/ac80 : 19.48dBm/19.38dBm/19.55dBm SRD :13.74dBm
GSM 900/1800 : 26.46dBm/22.44dBm
WCDMA BAND I/VIII : 24.91dBm/26.46dBm
LTE (FDD Band1/3/7/8/20/28) : 24.41dBm/24.94dBm/26.18dBm/25.46dBm/25.29dBm/26.6dBm LTE (TDD Band38/40) : 25.04dBm/24.99dBm