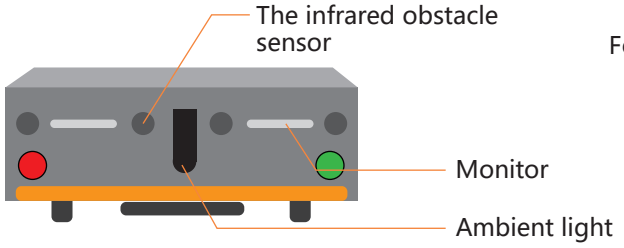
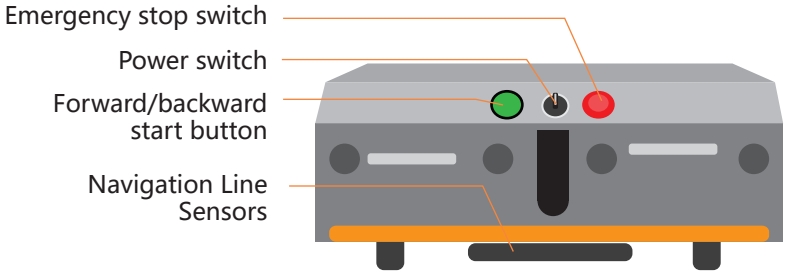
Synopsis:

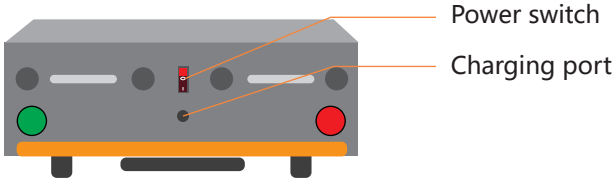
XBOT Intelligent Transportation Trolley is an industrial alternative to manual transportation tools, the main application scenarios: electronic factory material delivery, wave soldering over the furnace fixture delivery, logistics, etc. XBOT Intelligent Transportation Trolley is based on the core of the brushless hub motor drive, supplemented with double insurance industrial-grade collision avoidance sensors, with kinetic energy recovery, sinusoidal drive, gyroscope calibration and other technical characteristics, and the use of high-security lithum iron phosphate battery power supply, quiet, power saving and long life. It is powered by high safety lithium iron phosphate battery, which is quiet and energy-saving with long sevice life.

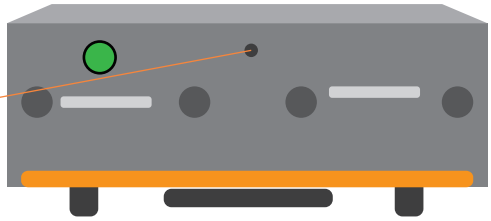
Front indicator chart





Instruction on the back



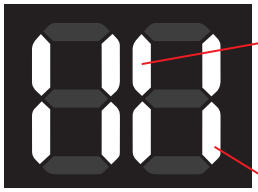


Display Function Introduction

- Branching path
- Multi-site
- Circular
- Remote controls
- Bluetooth connectio
- Server connection
- Follow mode
- Lock the car
- Malfunction

The two contacts on the inside of the collision bar on the back of the car (without the display screen) will light up according to the corresponding position after hitting the object

The front side of the car (screen side) is the same as above



The infrared obstacle sensor (four) on the back of the car is in state, and it will light up according to the corresponding position when occluded

The front of the car, same as above

When an error occurs, the digital display lights up the "Fault" indicator and shows the error code starting with "E+". For instance, for a "Communication Fault" with a fault code of 10, it first displays the letter "E" followed by the number "10". (Refer to page 14 for error code lookup.)

The lighting annotations for the car are as follows:

The lighting status of the car can be switched within the app, with options including "red-blue flashing", "green breathing", and "off".

"Blue light" indicates the stage of finding the starting point;
"purple light" indicates the learning phase;
"Yellow light" indicates the deceleration state;
"Red light" indicates stop state;
"Red and blue alternating (green breathing light)" indicates normal driving state;
"Orange light" indicates low battery, please charge.

Product Parameters:

Product model	XBOT-AGV50/50(with stand)	XBOT-AGV100/150	XBOT-AGV100/150
Driving method	Brushless DC motor drive	Brushless DC motor drive/ High Torque Reduction Brushless Motor	High Torque Reduction Brushless Motor
Path type	A and B stations operate in a straight back-and-forth motion (with multiple stops possible)		
Load weight	50kg	100kg/150kg	300kg
Running speed	0.5-4km/h	0.5-4km/h	0.5-2.9km/h
Station stop duration	1 second-40 minutes		
Stopping accuracy	±20mm	±20mm/±10mm	±10mm
Minimum turning radius	0.8m	1m,90 degree turn	1.2m,90 degree turn
Battery capacity	13.8 Ah lithium iron phosphate batteries	18.4 Ah lithium iron phosphate batteries	27.6 Ah lithium iron phosphate batteries
No-load running time	100 hours		
Full load run time	Approximately 40 hours	Approximately 40 hours	Approximately 30 hours
Average charging time	4-6 hours		
Vehicle size	430mm*370mm*160mm /430mm*370mm*590mm	760mm*530mm*210mm	900mm*590mm*210mm
Vehicle weight	17/25kg	36/40kg	60kg
Obstacle detection	Infrared sensor, anti-collision switch; Optional laser to avoid glare	Laser sensor, front and rear collision stop Structure	Laser sensor, front and rear collision stop Structure
Return mode	Auto/manual, manual bi-directional start: forward run, reverse run		
Charging method	Direct charge/external charge Optional wireless charging		
Charging voltage	AC220V--DC25.2V5A		
Warning light	Yes		
Standard accessories	Magnetic stripe 20 meters, charger 1		
Stripe parameter	Glossy N-pole, adhesive backed S-pole; Thickness 1.2*Width 30mm; 50 meters weighs about 6.6KG		

Wireless charging parameters:

Input voltage	AC220V±15%	Emission heat dissipation method	Air cooling
Input current	3A（MAX）	Receiving heat dissipation method	Natural heat dissipation
Output voltage	25.2V DC	Operating temperature	-20℃~50℃
Output current	5A/10A	Storage temperature	-30℃~70℃
Power efficiency	≥80%	Horizontal X-axis deviation	±20MM
Charging distance	20-40MM	Horizontal Y-axis deviation	±10MM

List of versions:

Standard version/three-button remote control version (maximum number of stops 100)

AB two-point cruising, loop line cruising, and multiple stops in the middle.
APP can adjust traveling speed, turning speed, deceleration line speed and self-start time after stopping.
Configure two 3-key remote controls, remote control forward, pause, backward. (Optional USB to 433 remote control, send commands through computer serial port)

Operation method:

1、Check the APP, make sure the track memory switch is "off"; then turn on the "auto start after stop" switch, set 3 seconds, then restart the cart.
2、After restarting, press the green button, the trolley will be in blue light state, after finding the starting point, it will change to purple light, purple is the learning mode, after learning, it will be in red, blue and green light state, that is, it will be in normal mode.
3、After all normal operation, turn on the "track memory" switch, if you need to start it manually, then turn off the "automatic start after stopping" switch.Track memory switch off state: every time when the power is turned on again, the car firstly lights up blue light, after recognizing the starting point, the car lights up purple light to learn the route, and after driving the track once, it turns into red and blue light for the normal driving state.
Track memory switch open state: the car has saved the last learning path, every time the power supply is turned on again, the car is first lighted in blue, to find the starting point, after recognizing the starting point, the memory is restored, and it will be changed to the normal mode (red and blue lights).This saves time spent in learning mode.

Site editing (site limit 60)

Includes standard version features
Edit forward, backward and dwell time for different sites.
Can preset 3 multi-site running programs for different needs.
Example: Monday stay 1, 2, 3, 4, 5, 6 sites, Tuesday stay 1, 3, 5 sites, Wednesday stay 2, 4, 6 sites
Operation: see page 11 for details

Site Summoning version (60 sites maximum)

Includes the full functions of site editing, and is equipped with two 15-key remote controllers for use.
Each site can be equipped with a multi-button remote control, and through the learning function,
each site number and the remote control number will be paired together, which site needs the trolley just need to press the corresponding numerical keys, the trolley can be automatically run to the location.
Operation Methods: See page 12 for details

USB to 433:

Tested in accordance with the Site Summoning method, with the host computer plugged into a USB to 433 RFer for control. (See annex for 433 command sheet)

RS485 serial communication (wired/wireless):

Basic version: After testing according to the method of standard version, the upper computer is wired/wireless and AGV for communication control.
Multi-site positioning function: according to the site summoning version, test with 15-key remote control first, after that, the host computer wired/wireless and AGV carry out communication control. (485 protocol, 485 commands see annex)

Trackless operation (Bluetooth remote control):

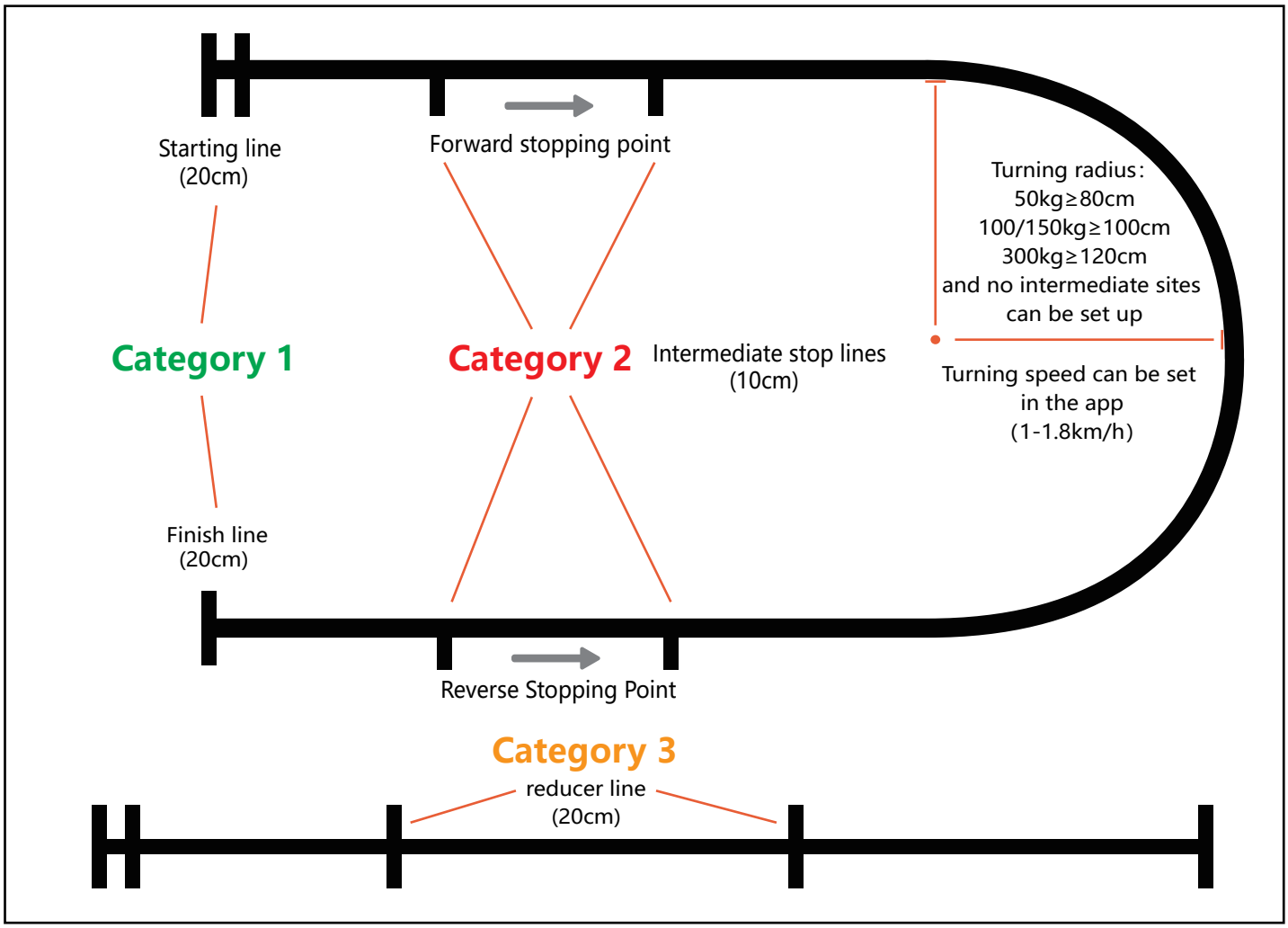
Handheld Bluetooth remote control, trackless running, remote control acceleration and deceleration, cruise control. Get out of the track bondage to let the car control as you like. Includes standard version functions

Method of operation:

1,Turn on the red power switch

2,Press the start button ,The car runs along the magnetic track and stops at the stop line
3,Press Start button again, the car along the magnetic track in reverse to the other end of the stop line to stop
4,If there is a stop in the middle, the car will stop at the middle stop on the right side of the driving direction, press the start button to continue in the current direction
5,Mode Selection:
Manual Mode - After stopping, you need to manually press the start button for the cart to start.
Auto mode - The car automatically travels back and forth according to the residence time set in the App.

Magnetic stripe logo symbol classification:



Category 1
Start line: two 20cm long magnetic strips placed 10cm apart at the start of the route.
End line: a 20cm long magnetic strip placed at the end of the route.

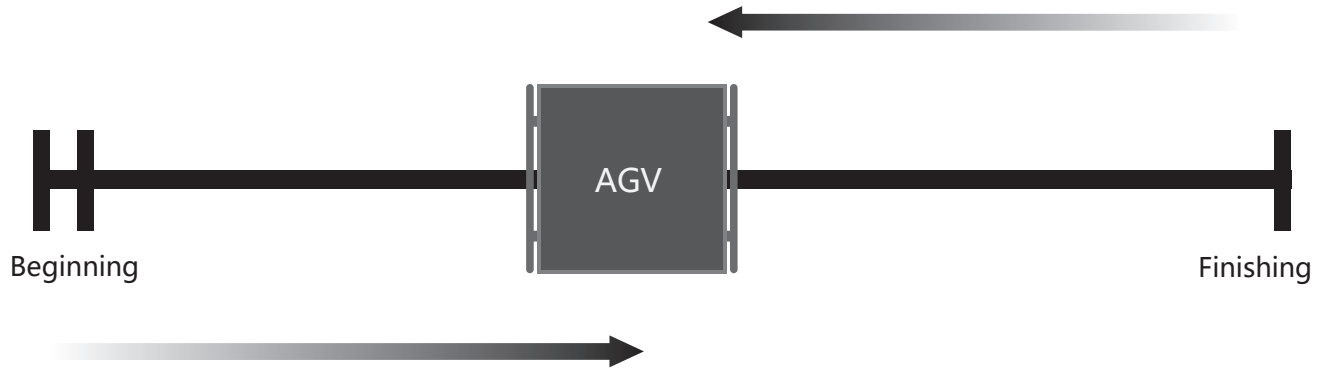
Category 2
Intermediate stop line: If there is a need to stop during the trip, it will be set on the right side of the traveling direction of the trolley, and can be set up as many as needed.

Category 3
Deceleration line: If the trolley is in high speed mode (speed ≥2.0km/h), two deceleration lines are set in the zone with deceleration demand, the trolley starts decelerating when it drives into the first deceleration line in the forward direction (the speed is reduced to 1-1.8km/h, which can be set by APP), and deceleration is lifted when it drives out of the second deceleration line.

Navigation cable installation:

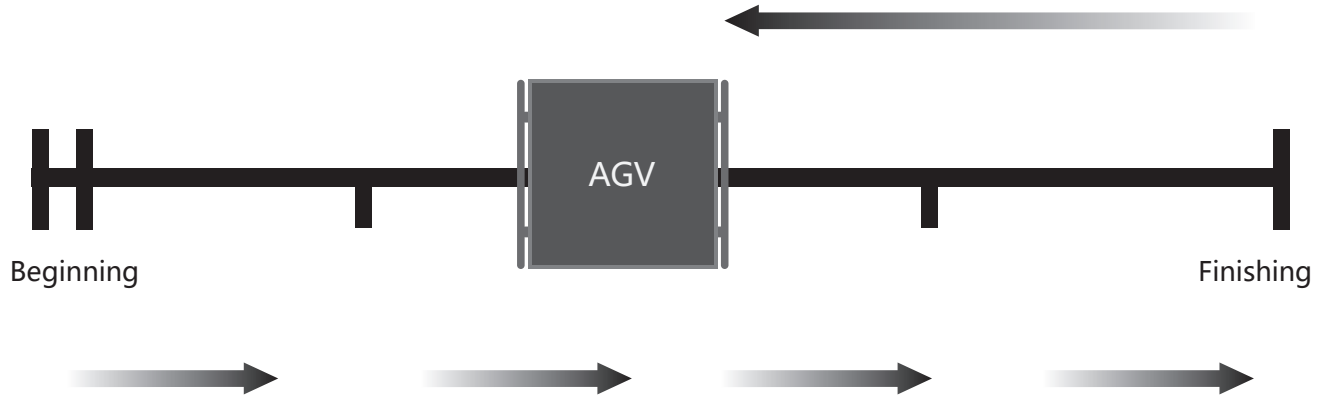
Mode 1 Straight round trip

The car travels to the end stop line and stops at the finish line,Press the Start key to return directly to the starting Stop line



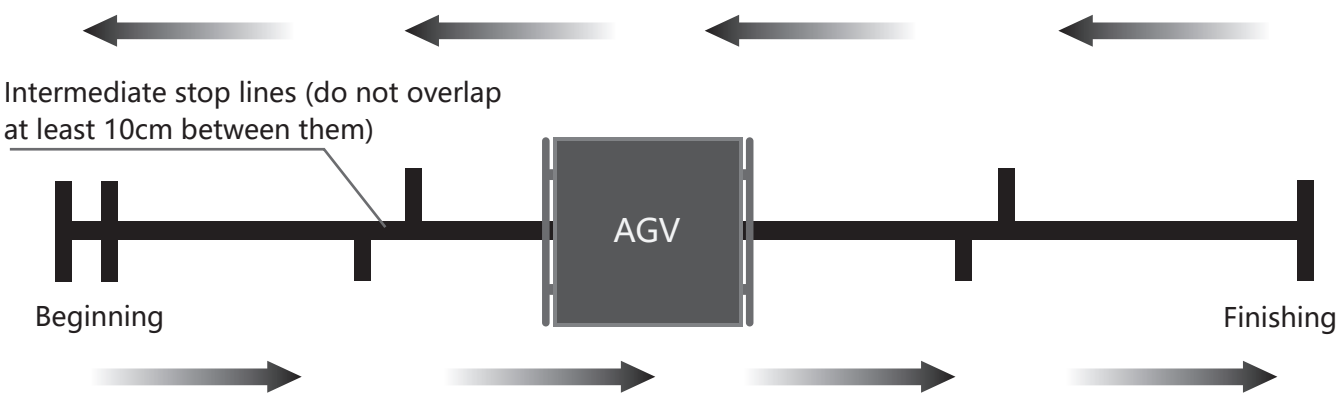
Mode 2 Straight round trip with multiple stops on one side

The trolley stops at the intermediate stops in turn while traveling, and stops at the end point.
Stop at the end stop line, press the start button to return directly to the start stop line.



Mode 3 Straight round trip with bilateral multiple stops

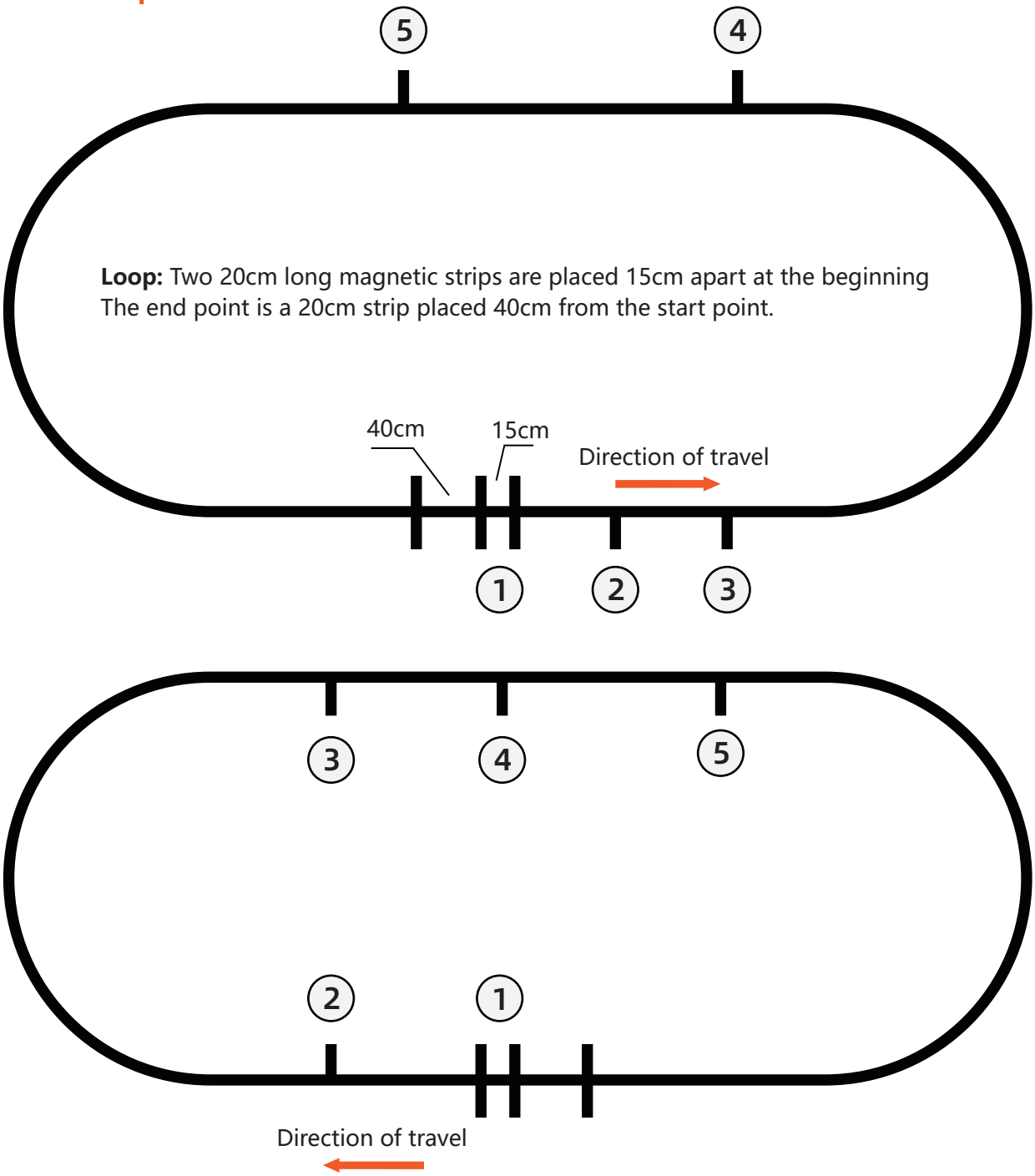
The vehicle stops at the right-hand intermediate stops in turn while traveling, and then stops at the end stop line.Press the start button to stop again at the right center stop on the way back to the starting point.



Mode 4 Right Angle Turn

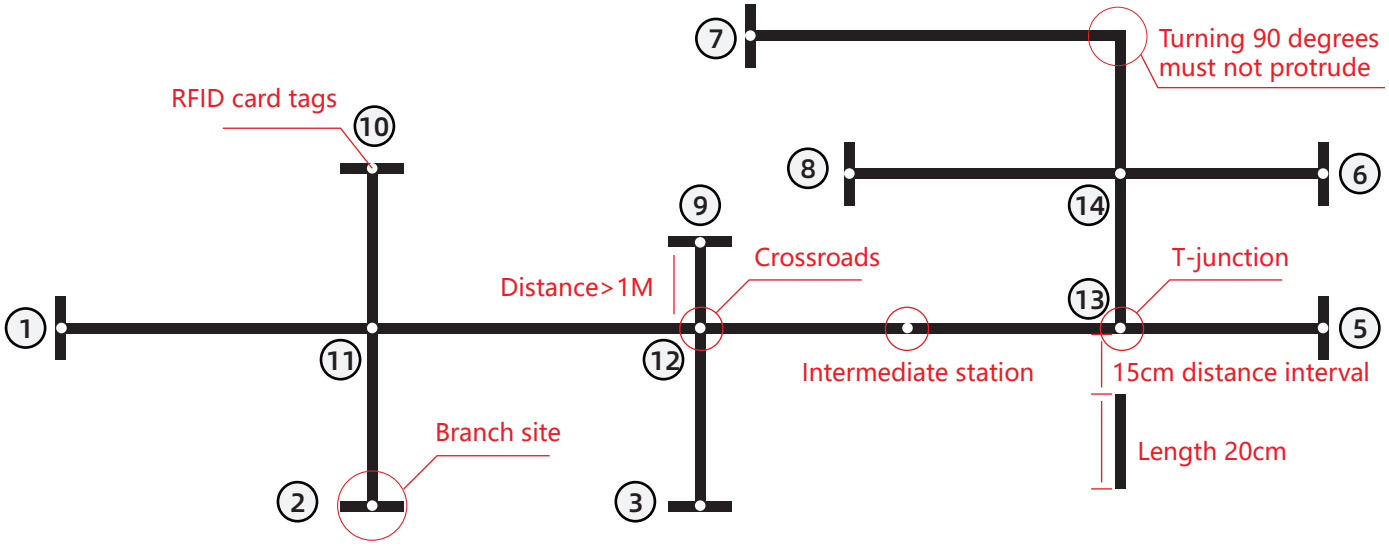
The two magnetic tracks are affixed at 90 degrees and the intersection must not be out of the way.
This function is only available for AGVs of 100KG and above.

Mode 5 Loop



Mode 6 Multi-Site Bifurcation

Multiple branch route stops can be added to the main magnetic track using RFID card tags.
Make 90-degree turns through intersections to reach target stops.
This feature requires optional AGV models weighing 100KG and above equipped with RFID cards.



Bifurcated Route Magnetic Rail/RFID Card Installation Requirements:

1. The length of each branch line extending from the intersection must be greater than 1 meter; at intersections where branches further split, the intersection must be marked with a "cross" shape. On the other side of the "T-shaped intersection", a magnetic strip with a length of 20 centimeters must be spaced 15 centimeters apart (for the 300kg model, the spacing should be 20 centimeters with a magnetic strip length of 30 centimeters).
2. The ends of the magnetic track at the 90-degree turning position of the main magnetic track must not protrude; a stopping line with a length of 20 centimeters must be marked to form a "T" shape with the main magnetic track.
3. Circular RFID cards are labeled with numbers "1" to "15" representing station numbers, corresponding to the number of buttons on the remote control. The circular RFID cards must be placed at the "stopping line" and "T-shaped intersection of the main magnetic track", sequentially labeled from 1 to 15 without missing any cards in between. First, place each "branch station", and then place the "crossroad/T-shaped intersection".
4. "Intermediate stations" can be added on the main magnetic track, which must be at a distance greater than the length of the vehicle from the preceding and following

Navigation cable installation tips:

Straight line: If the straight line distance is too long, it is recommended to stick it by stages, two meters for a section, one person steps on one end, another person pulls the other end, and then straighten it and stick it on the ground, so that the overall sticking out of the magnetic stripe is straight.
Turns: the arc of the turn can be tied to a pencil on a string, according to the actual radius of the turn to draw the arc, and then the magnetic strips in accordance with the arc to paste, but also need to be 2 people , one person to fix the magnetic strips, and the other on the ground in accordance with the arc of the slow paste.

High Speed Mode:

Speed ≥ 2km/h for high-speed mode, this mode is applicable to the longer track, the middle station is not dense situation

Usage:

1,After connecting the app and entering the settings page, adjust the speed to be greater than 2km/h, then turn off the machine

2,After power on, first put the car to the starting point of the track, the front (with display board) facing forward, press the start button, the car will be in the learning mode (ambient light is purple) under the speed of 1.5km/h along the track back and forth once, and finally the car back to the starting point, learning mode

3,Next the cart will exercise at the set speed and automatically slow down as it approaches the station line and stop line.

Every time you turn on the computer, you have to perform step 2 first

This learning mode supports a maximum of 50 stations, with each station recommended to be spaced more than 2 meters apart.

APP Function:

Scan the code to download "XBOT" APP

Figure 1

Figure 2

Figure 3

Figure 4

Main page (Figure 1)

Bluetooth Connection: Click this button to disconnect the current Bluetooth connection or reconnect Bluetooth.

Bluetooth remote control: Click to enter the Bluetooth remote control mode, you can use your cell phone to control the car.

Settings: You can customize thevehicle, including: customizing the vehicle name, switching the key mode, adjusting the speed, switching the multi-site mode, etc., as shown in Fig. 3 and 4.

Sensors: You can observe the running status of the trolley in real time outside the field of view, and whether the sensors are blocked or not. (See next page for detailed description)

Site editor: refer to the previous page for usage

Detailed information: you can view various data of the vehicle, as shown in Figure 2

Settings (figures III and IV)

Advanced settings: see next page

Track Memory: For standard/three-piece remote control version; turn on this switch, the route recorded last time will be saved after the trolley is switched on and off, and can be used every time you turn on the power to use it, no need to enter the learning mode again.

Button Mode: This mode is divided into single/dual button mode;

Dual Button Mode: When the cart stops, it will travel in the direction of touching the green start button.

Dual Button Mode (Key Swap) : When this function is selected in Dual Button Mode, the traveling direction of the trolley is opposite to the direction of the green start button.

Single button mode: After the trolley stops, the trolley will only follow the original route no matter from which side the start button is touched.

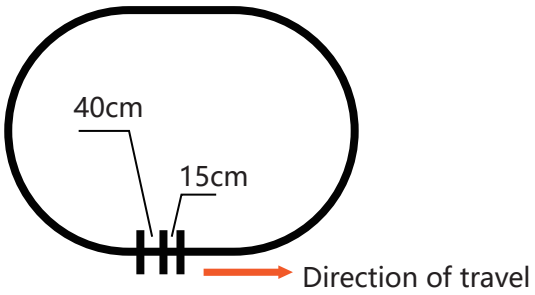
Ambient light mode: option to turn ambient light on or off

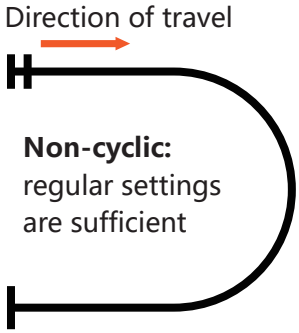
Sound master switch: selectable to turn sound on or off

Advanced Settings

485 Timing: When communicating with the host computer via 485, if this setting is used, the trolley will report the current status of the trolley to the host computer once every 2 seconds; for example, the speed, the power, the station and other information.

Route type: ring, non-ring can be selected; the following figure is an example:





Battery type: Different battery types will correspond to different remaining battery calculations.

Operational state

Trolley operation status: Displays the trolley's traveling status, speed, charging status, and whether or not the photoelectric cell is blocked.

Turning on/off the photoeye: If a photoeye malfunctions, the trolley may not be able to run.In this case, you can click to close the photoeye (the photoeye is covered with a red cross), and the trolley will resume operation.

APP firmware upgrade method

APP home page, lower right corner, details-force firmware upgrade-enter the upgrade code provided by the manufacturer, complete the upgrade and reboot.

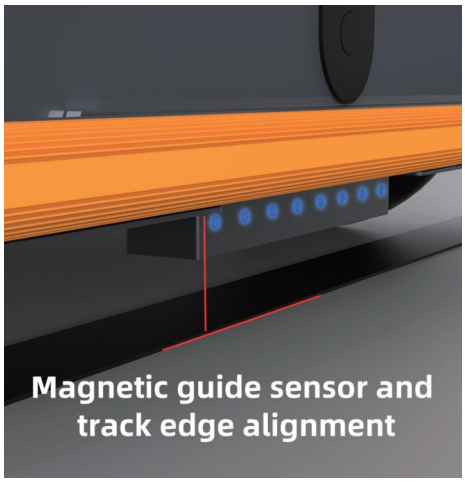
Magnetic Guidance Calibration Method

1.New version of Magnetic Conductivity Sensor Calibration Method

Phenomenon: the magnetic guide sensor receives unstable signals; no light, only a blue light or a number of blue lights at the same time, etc.; trolley on the magnetic track reported "61" fault code.

Solution: It is recommended to calibrate the magnetic track at the location where the magnetic signal is not detected, rotate the car by 90 degrees, first adjust the side of the instrument display at the front of the car, and put the magnetic guide sensor underneath on the ground right above the magnetic track, open the APP "Settings-Advanced Settings", and then press and hold down the "Front magnetic guide calibration", after 3 seconds, the body magnetic guide sensor will blink once, then release it. Open the APP "Settings - Advanced Settings", press and hold the right arrow of "Front Magnetic Guidance Calibration", after 3 seconds, the magnetic guidance sensor will blink once, then release it.

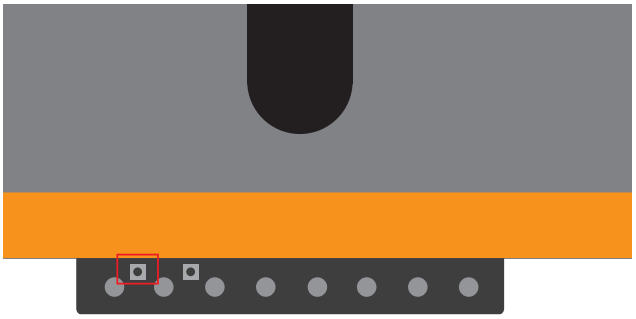
Then follow this method to calibrate the other side of the car (press and hold "Rear Guidance Calibration" in the APP).After calibration, turn off the machine, place the AGV cart in the middle of the magnetic stripe and turn on the machine to start. Normal driving two blue lights are on, then calibration is successful.



2.Older versions of the magnetic susceptibility sensor calibration method

Phenomenon: the magnetic guide sensor receiving signal is not stable; not light, only light a light or light a number of lights at the same time, etc.; trolley on the magnetic track reported "61" fault code.

Solution: It is recommended to calibrate the car at the location of the magnetic track where no magnetic signal is detected, rotate the car by 90 degrees, and place the 8 blue/red lighted magnetic guide sensors on the ground right above the magnetic stripe.Rotate the car by 90 degrees, put the 8 blue/red lighted magnetic sensors on the ground right above the magnetic stripe, press and hold the first button above the magnetic module until all the blue/red lights go out and then light up, then release it. Follow this method to calibrate the other side of the car as well.
After calibration, turn off the power, place the AGV in the middle of the magnetic stripe, and turn on the power to start. If two blue/red lights are on during normal driving, the calibration is successful.



Site Editor

This feature applies to multiple round-trip modes

Figure 5

Figure 6

Figure 7

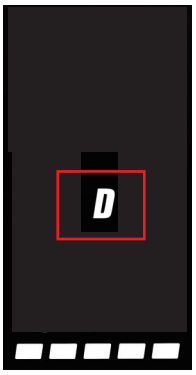


Figure 8

In the process of using AGV, it will involve the application of multiple stations. According to the actual demand, the stopping time and direction of each station can be set separately, so that the vehicle can work more efficiently and intelligently.

Note: If the AGV does not have this function, you need to pay for the activation code from the manufacturer and open the site editing function through the activation code on the APP.

1.Lay out the navigation lines and set up the start, end and intermediate stops according to your needs (the maximum number of stops is 60).

2.After the cart is powered on, the cell phone connects to Bluetooth and the APP turns on the multi-site switch (as shown in Figure 5), the cart display will show the "D" symbol (as shown in Figure 8), indicating that the multi-site editing mode is enabled.

3.Go to the site edit screen and delete all the site routes in it

4.Put the car on the magnetic track, press the green start button; at this time, the car will show blue lights, automatically find the starting point, after finding the starting point, the car will turn purple lights, and then automatically drive the route once at a speed of 1.5km/h, learning is complete!

5.Enter the station editing page of APP to check whether the number of stations displayed in APP and the actual number of stations on the ground are the same, if not, you need to re-check the magnetic stripe of the ground station and re-learn it. You can freely input the dwell time of each sub-station, the maximum length is 32767 seconds.

In normal mode, the red and blue lights are flashing/green light is always on. In learning mode, all the stations stop in sequence, and after learning, the car will automatically slow down before reaching the stations and entering the curves by changing speed according to the speed set by APP in the straight line section.

It is recommended that every time you turn on the power, the trolley is placed about one meter in front of the starting point, press the green button in the direction of the starting point, and let the trolley drive towards the starting point, and then restore the memory to enter the normal mode after recognizing the starting point as soon as possible.

"**One-click clear**": to clear the saved driving program, this function needs to stop the vehicle to be able to carry out, if it can not be cleared, press the red stop button of the car can be cleared.

"**Preview Stations**": You can preview whether your edited trolley traveling route is correct or not, and you can display the number of stations and the length of time the trolley stays at each station in the preview.

Call of Sites (with multi-site diversions)

15-button remote control

1.Download the mobile phone APP, open the mobile phone Bluetooth connected to the car, go to the site editor interface,Delete all the site routes in it

2.Put the car on the magnetic track, press the green start button; then the CAR will show a blue light and automatically look for the starting point, after finding the starting point, the car will turn purple lights, and then automatically drive the route once at a speed of 1.5km/h, learning is complete!

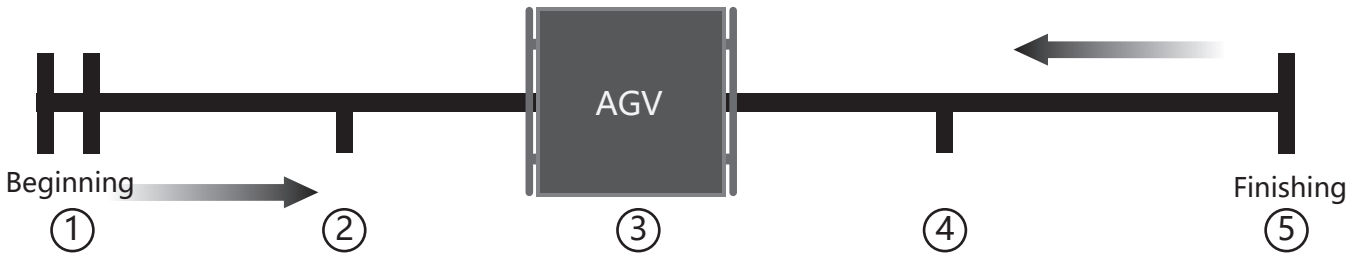
"Multi-site diversions": There is no need to recognize the starting point, after APP clears the route, any station starts the AGV and recognizes any station and then enters the purple light learning mode.

3.After finishing the study, go to the APP station editing page and click "Preview Route" to check whether the number of APP stations is the same as the actual number of stations on the ground, if it is not, you need to check the stations and study again.

The normal driving state is "blinking red and blue lights". In Learning Mode, all stops will be stopped. After learning, the car will automatically follow the speed set by the app on a straight route, and will automatically slow down at corners and before arriving at stops.

The first time the car is powered on after each switch, you need to press the green start button to let the car find the starting point automatically; to save time, each time the car is powered on, you can press the green button in the direction of the double horizontal lines to let the car move towards the starting point, and when it finds the starting point, the car stops and waits for the remote control to call it.

Note: No more stop lines are required for the return trip



Charging method:

Method 1, plug in the charger, the charger indicator red light means charging in progress, green light means full.
Method 2, Remove the battery, the charger charges the battery directly.
Method 3, wireless charging (optional); refer to "Wireless Charging Manual".

Note: When the trolley meter shows one frame of power, or the warning light is on orange, it means it needs to be charged. When charging, please turn off the power first and use the special charger to charge.
Please turn off the power first and use the special charger to charge (make sure to use the special charger, otherwise the battery will be damaged), when charging, the charger indicator light will be red, and when it is full, it will be green, and the charger will be overcharged to protect the battery, and the charger will last about 6 hours.

Fault Code:

Fault Code	Description
1	
2	Communication fails, please check the Bluetooth module and electronic control connecting wire. Turn on and off the machine 2 times continuously
8	
9	CPU initialization abnormality, need to detect the main control board
10	Bluetooth board communication failure
11	Left motor current sensor abnormal, need to test the main control board
12	Left motor current sensor abnormal, need to test the main control board
13	Left motor current sensor abnormal, need to test the main control board
14	Right motor current sensor abnormal, need to test the main control board
15	Right motor current sensor abnormal, need to test the main control board
16	Right motor current sensor abnormal, need to test the main control board
25	The electronic control does not receive data from the Bluetooth panel, check the Bluetooth module and the electronic control wires.
26	Abnormal drive voltage, need to test the main control board and battery voltage is normal
29	CPU initialization abnormality, need to detect the main control board
35	Gyro initialization is abnormal, please test the main control board
36	Left motor hall sensor abnormal, please test the motor wiring or replace the motor
39	Right motor hall sensor abnormal, please test the motor wiring or replace the motor
61	Go off the rails
62	Too many sites, number of sites should be less than 100
63	Learning error
64	Block (a road)
65	Hang in the air
66	Vehicle swings or rotates significantly from side to side
67	Abnormal gyroscope rotation angular velocity data
68	The gyroscope determines that the rotation speed is too high
69	Excessive speed difference between the two motors
70	The two motors rotate in opposite directions, such as when spinning in place
71	Motor Hall Abnormal
72	Use of the process such as not being able to read the gyroscope data, such as when the gyroscope is soldered.

Caution:

When pushing the trolley, do not pass over a road with a difference in height (e.g., a threshold, etc.) to prevent damage to the front and rear magnetic sensors.

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