NOVA S PRO User Manual V1.0

Safety Tips

- Read this instruction manual carefully before operating the NOVA S PRO robot.
- The NOVA S PRO robot power adapter input voltage is 100-240V AC power.
- Do not touch the ball feed wheel while it is working.
- Do not get close to the ball outlet when the robot is working.

Warning

- Except for the lateral rotation joint, other joints of this product are automatically adjusted. Please do not knock, press or drop this product.
- This product is used for entertainment or training in table tennis. If any physical discomfort occurs during use, please stop using it immediately and seek medical attention in time.
- Do not modify, disassemble or repair this product by yourself.

Notice

- Before connecting to the power source, please check whether the power adapter is damaged or leaking. If so, do not use it.
- If you find any abnormality(strange sound, odor, etc.) with this product after turning it on , please turn it off immediately and cut off the power supply.
- Minors should use this product under the guidance of their parents or coaches.
- It is strictly forbidden to pour bad balls or foreign objects into the ball return module to avoid machine malfunction.

Hint

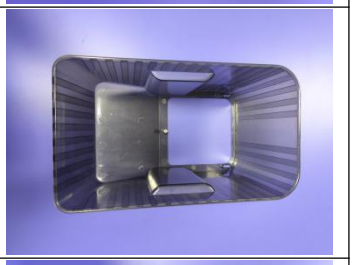
- Only D40+ table tennis balls can be used with this product.

- It is recommended to clean and maintain this product regularly to provide you with a better experience.
- It is recommended to wash new table tennis balls before use.

CONTENTS

Please read this manual carefully and keep it properly before using the product.

1. Product Composition

Serial Number	Name	Quantity	Picture
1	Robot	1	
2	Power adapter	1	
3	Ball storage box	1	
4	N-Control S	1	
5	Portable storage bag (optional)	1	
6	Mobile power supply (optional)	1	

2. Product Installation and Technical Parameters

2.1. Install the Robot

2.1.1. Open the packaging box and take out the robot and accessories. (Figure 2-1)

Figure 2-1

2.1.2. Remove the ball storage box and align the robot boss with the slot of the ball storage box as shown in Figure 2-2, and gently push the ball storage box forward.

Figure 2-2

2.1.3. Press down the fixing screw of the ball storage box and turn it clockwise to tighten it. (Figure 2-3)

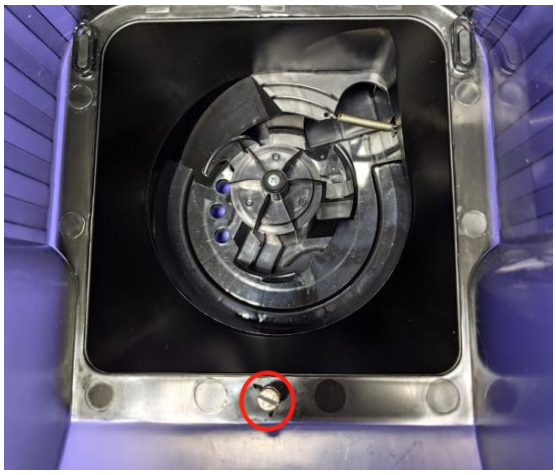


Figure 2-3

2.1.4. Place the robot at a suitable position. The default positions are standard position and near-net position (Figure 2-4, 2-5). If you use the custom combination function, the robot can be placed at any position on the table.

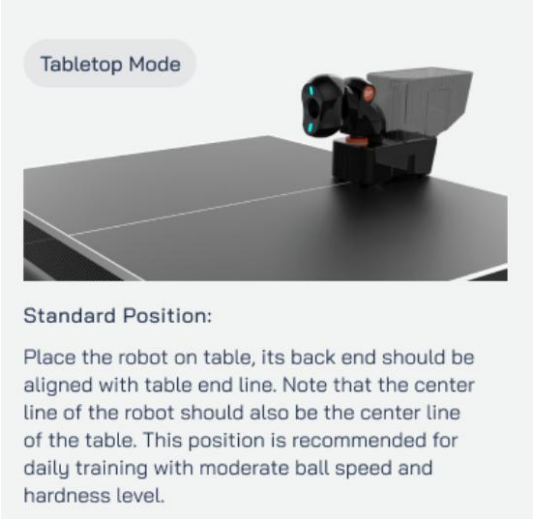


Figure 2-4

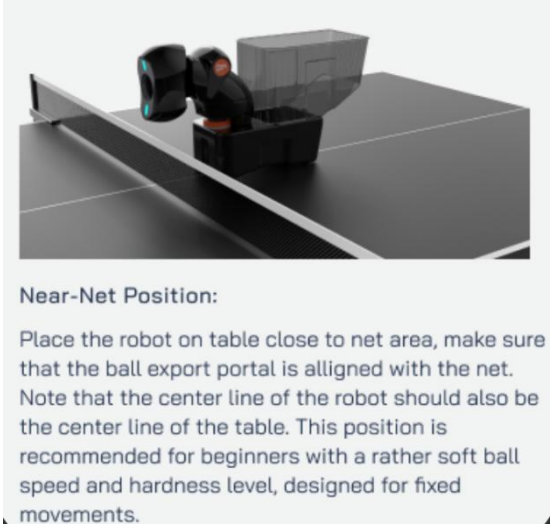


Figure 2-5

2.1.5. Pour the table tennis balls into the ball storage box, connect the power adapter, and turn the switch to the " | " position. (Figure 2-6)

Figure 2-6

Extensions:

Connect the power adapter

Take out the power adapter and connect the input wiring harness. The input end is connected to the power supply, and the output end is connected to the DC connector of the robot.

Robot power on/off

Power on: Turn the robot switch to the "｜" position, and the indicator light on the robot's head will light up .

Shutdown: Turn the robot switch to the "O" position and the indicator light on the robot head will go out .

Pour in table tennis balls

Pour the cleaned table tennis balls into the ball storage box . It is recommended to pour about 150 ping-pong balls for the first use.

It is strictly forbidden to pour broken balls or foreign objects into the ball storage box to avoid causing robot malfunction.

2.2. Robot Technical Parameters

Model	NOVA S PRO
Ball delivery method	Feed balls vertically upwards
Serving method	Two-wheel drive
Ball speed	2～15m/s
Rotation type	Top spin, left top spin, left spin, left under spin, under spin, right under spin, right spin, right top spin, no spin
Rotation speed	Maximum 60 rpm
Ball frequency	30～90 pieces/minute
Installation location	Programmed drills: standard position, near-net position Custom drills: any position on the table
Left and right swing function	Automatic,continuous
Left and right swing angle	44°（-22°~22°）Mechanical angle ±25°
Up and down arc adjustment function	Non-automatic
Up and down arc adjustment angle	50°（-20°～30°）Mechanical angle -17-33°
Side spin adjustment function	Manual
Side spin adjustment angle	180°±90°
Two jump ball	Support
Product packaging size	600 * 460 * 230mm
Rated voltage	DC24V

Product included	Adapter (AC100～240, 50/60HZ)
Wireless communication method	Bluetooth
Switch/button	Power switch/network pairing button (Bluetooth)
OTA update	Support
Android/IOS	Support (Mobile APP)

2.3. N-Control S Technical Parameters

Adaptation	Standard
N-Control S type	Button
Display size	1.5 in
Pairing method	Bluetooth
Programmed drills	Standard position: 36 (programmed combinations) × 2 (left and right hand) × 3 (difficulty level) = 216 Near-net position: 8 (programmed combinations) × 2 (left and right hands) × 3 (difficulty level) = 48 Total programmed combinations: 44 (36+8) Total programmed drills: 264 (216+48)
Custom drill	Support one combination
Holding hands	Left/right hand
Supported languages	Chinese/English
Firmware upgrade	Mobile APP firmware upgrade

* After receiving N-Control S, users need to purchase 2 AAA batteries and install them according to the positive and negative polarity markings.

Environmental Protection

Waste electrical and electronic products must not be mixed with unsorted municipal waste. Correct disposal of this product will help save valuable resources and prevent any potential negative effects on human health and the environment that could otherwise be caused by inappropriate waste disposal.

Warning

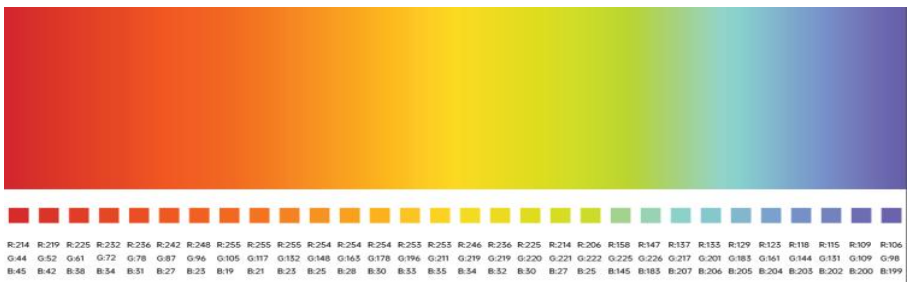
* Do not throw the battery into fire to prevent the battery from exploding or releasing toxic or hazardous substances.

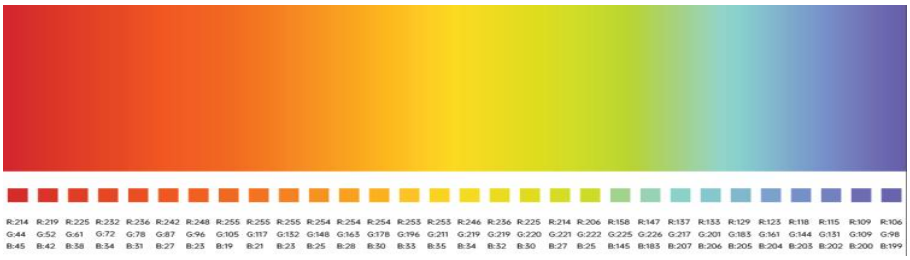
* Do not short-circuit the battery to prevent the battery from burning and causing fire.

2.4. Robot Indicator Light Language

Upper Light		**Lower Light**		**Light language explanation**
Color	**Frequency (times/sec)**	**Color**	**Frequency (times/sec)**	
Blue Light	1	Blue Light	1	Bluetooth not connected
Blue Light	Always on	Blue Light	Always on	Bluetooth connected
Yellow Light	1	Yellow Light	1	Bluetooth pairing mode
White Light	Always on	White Light	Always on	Firmware upgrading status

The rotation of different colored lights in the serve:

The higher the upper wheel speed, the closer the indicator light is to red. When the speed is close	

to 0, the indicator light color is closer to blue.	
The higher the lower wheel speed, the closer the indicator light is to red. When the speed is close to 0, the indicator light color is closer to blue.	
1. If the upper indicator light is red and the lower indicator light is blue, the serve is a strong topspin ball. 2. If the upper indicator light is red and the lower indicator light is red, the serve is a high-speed no-spin ball. 3. If the upper indicator light is blue and the lower indicator light is red, the serve is a strong backspin ball. 4. If the upper indicator light is blue and the lower indicator light is blue, the serve is a low-speed no-spin ball.	

3. Use of PONGBOT APP

3.1. APP Download and Installation

Users can download the PONGBOT APP and complete the installation through the following channels : Google Play Store, Apple Store, or scan the QR code below to download.

During installation, if you are prompted to enable location or Bluetooth permissions, please choose to enable.

3.2. Account Registration and System Settings

3.2.1. After opening the APP, new users click on "Register a new account" on the login interface and register according to the prompts. After successful registration, they can log in with their account and password. During registration, the verification code is valid for 60 minutes. (Figure 3-1, Figure 3-2)

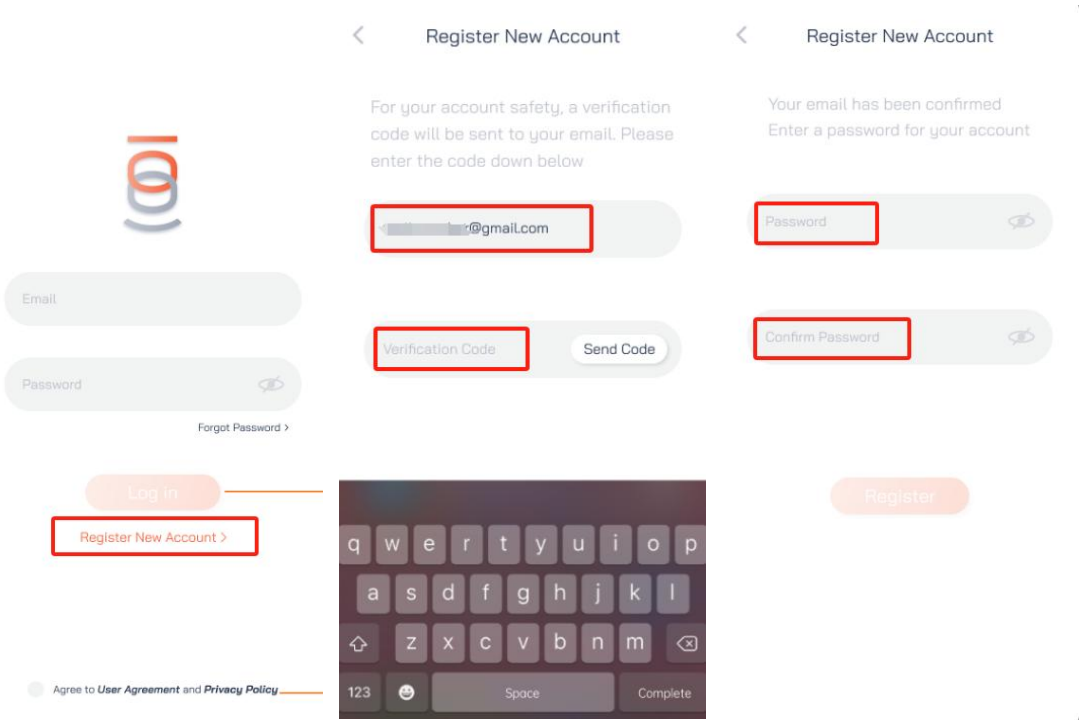


Figure 3-1

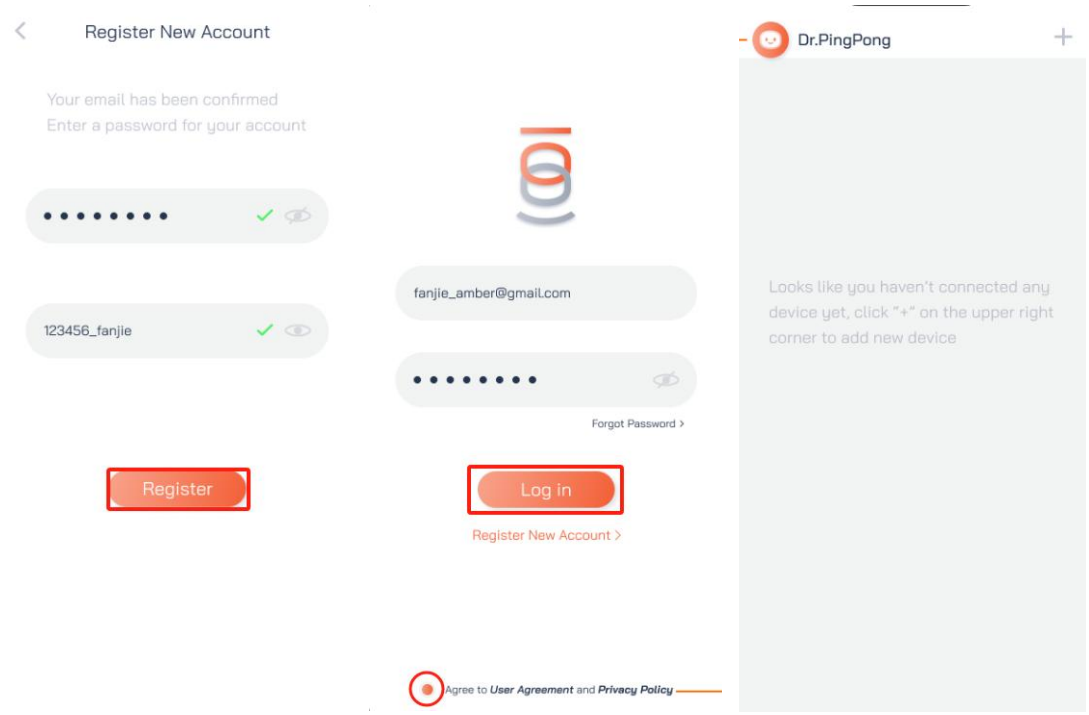


Figure 3-2

3.2.2. Modify User Name, Avatar and Password

Click the avatar icon in the upper left corner of the APP homepage - My Account to make changes. (Figure 3-3)

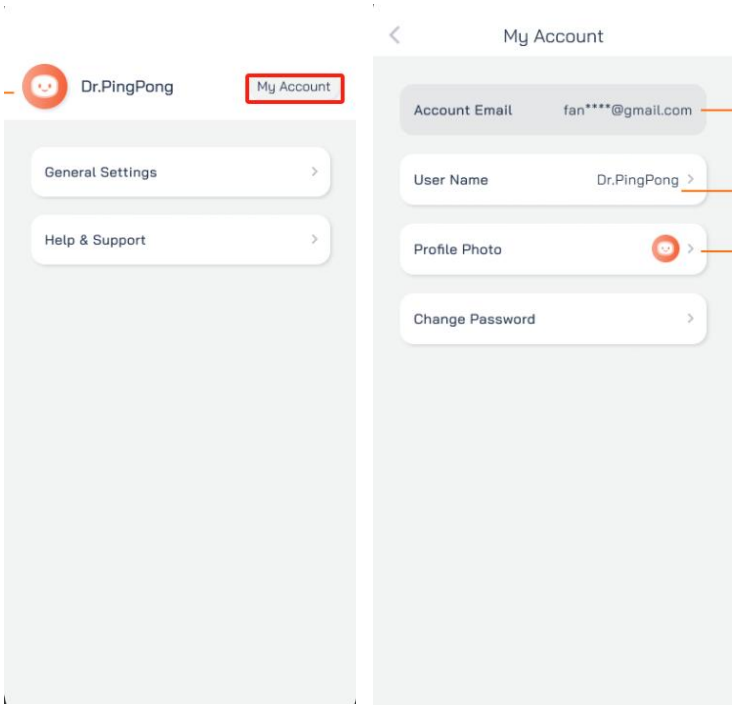


Figure 3-3

3.2.3. System Settings

Click the avatar icon in the upper left corner of the APP homepage - System Settings. You can view or upgrade the APP version in About, switch to different languages in Language Options, and view the User Agreement and Privacy Policy in Legal Information. (Figure 3-4)

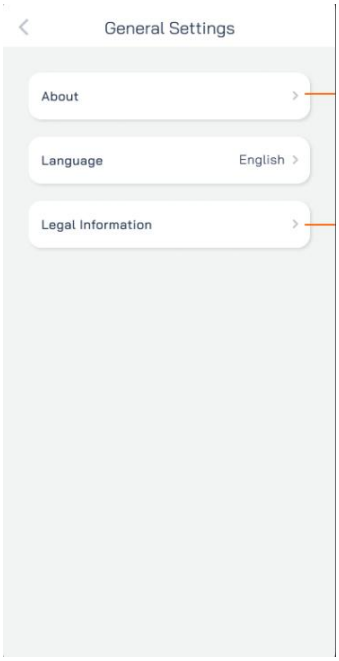


Figure 3-4

3.2.4. Help and Support

Click the avatar icon in the upper left corner of the APP homepage - System Settings to view the help video of the corresponding product. (Figure 3-5)

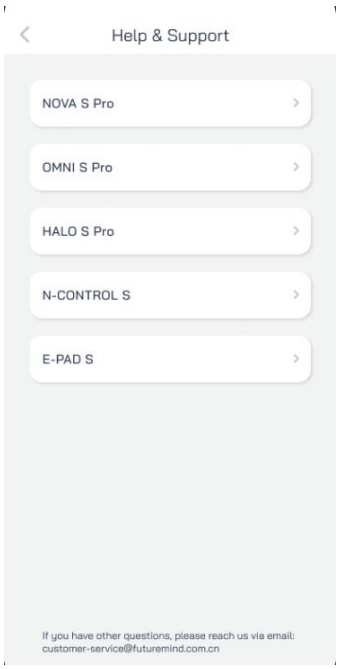


Figure 3-5

3.3. Robot Adding

The communication method between PONGBOT APP and the machine is Bluetooth communication.

3.3.1. Robot Bluetooth Pairing

Connect the robot to the power supply and turn the switch to the "｜" position. Turn on the Bluetooth function of the mobile phone, enter the Pongbot APP, click the "+" in the upper right corner of the page, select the NOVA S PRO model robot , and the APP will automatically search for nearby robots of the same model . In the device list , select the device that matches the last two digits of the SN on the robot nameplate, click the pairing button, and wait for the APP to complete the Bluetooth pairing with the robot . (Figure 3-6)

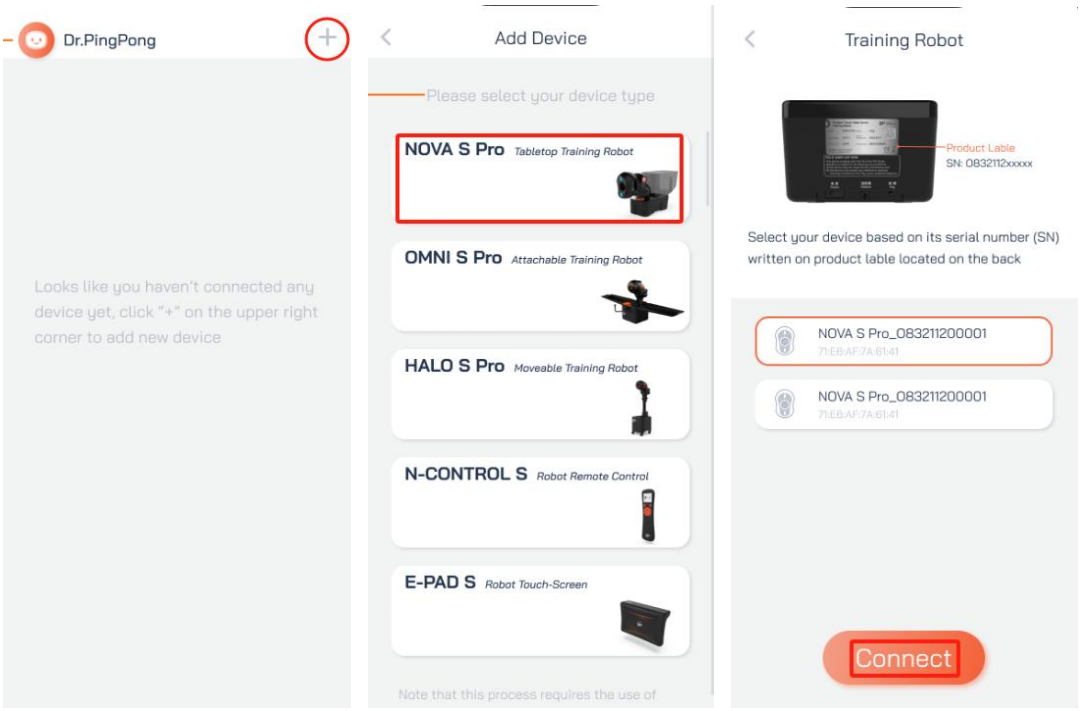


Figure 3-6

3.3.2. Device Initialization

Select the robot that has been connected via Bluetooth , click the Start button, wait for the robot to complete initialization, and enter the robot page. (Figure 3-7)

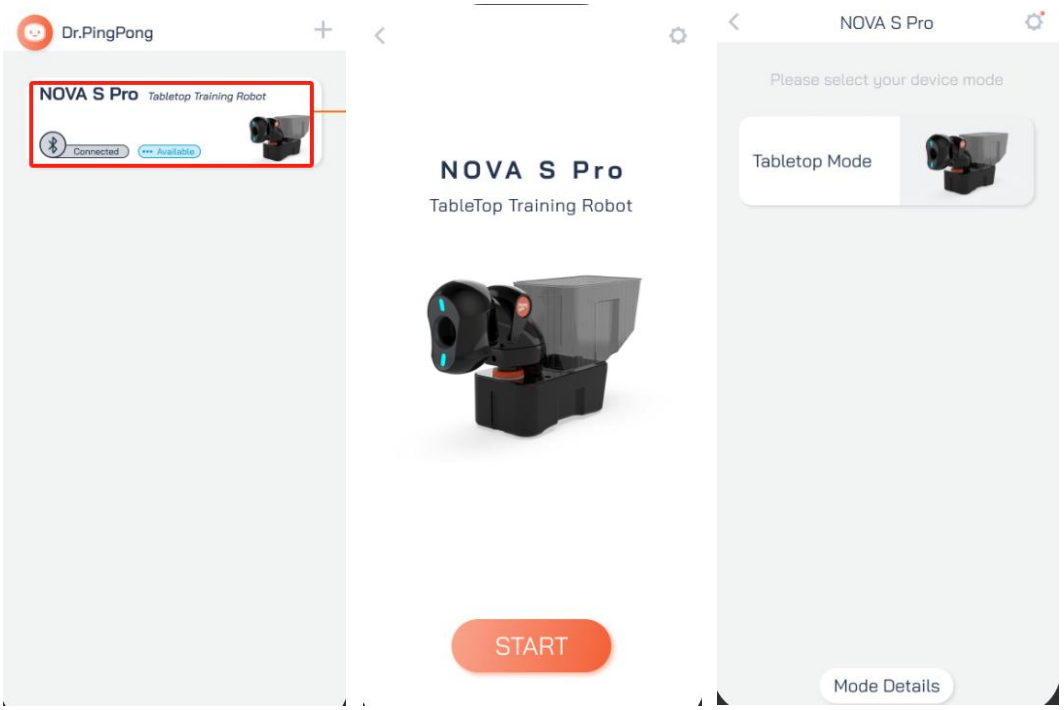


Figure 3-7

3.4. Use of Programmed Combinations

We built the PongSmart AI platform, which enables us to establish a human-machine collaborative training environment, and we have also established a strategic partnership with the China Table Tennis Academy (CTTC, led by Shi Zhihao, former head coach of the Chinese national table tennis team).

3.4.1. Confirm the Robot Position

In the tabletop operation interface, the robot placement is divided into standard position mode, near-net position mode and custom position mode. On the standard position and near-net position pages, first check the placement details and place the robot in the correct position as required. (Figure 3-8)

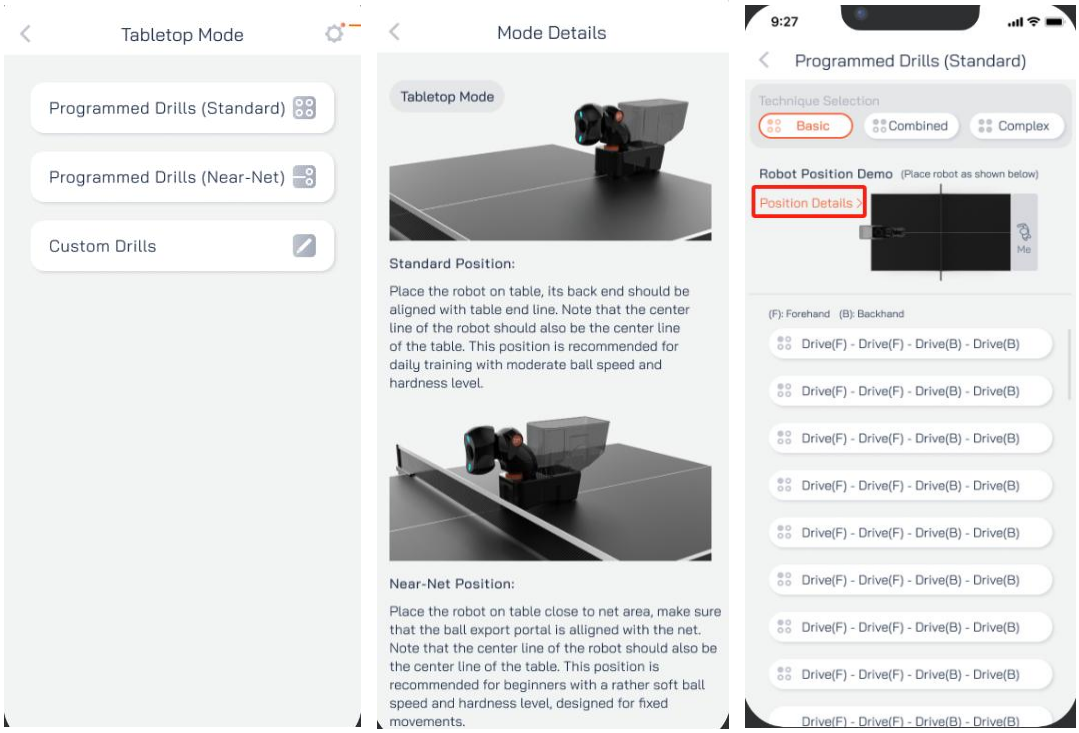


Figure 3-8

3.4.2. Details of Programmed Combination Parameters

Placement	Combination Type	Combination Name	The first ball	The second ball	The third ball	The 4th ball	The 5th ball	Combination Introduction
Standard position	Basic(single point)	Push(B)	B,US, SC					The training technique for Backhand Push emphasizes dealing with short court underspin balls within the table tennis table. During the training process, stepping forward and drawing back the racket are required, pushing the bottom of the ball. Fingers and wrists should be engaged to complete the hit.
		Push(F)	F,US, SC					The training technique for Forehand Push primarily focuses on handling short court underspin balls within the table tennis table. During training, it is necessary to step forward and draw back the racket, pushing the bottom of the table tennis ball. Fingers and wrists should be used to generate power for the hit.

		Drive(B)	B,TS, LC					The training combination for Backhand Drive, the most commonly used topspin backhand return technique, requires hitting the ball at its highest point. Drawing back the racket and quickly contracting the forearm are essential for completing the hit.
		Drive(F)	F,TS, LC					The training combination for Forehand Drive, the most commonly used topspin return technique in table tennis, involves ensuring the hit is made at the highest point of the incoming ball. The racket needs to be drawn back, and the forearm quickly contracted to complete the hit.
		Loop(F)	F,US, LC					Forehand Loop is a common technique for dealing with long underspin balls away from the table. When executing this shot, it's crucial to draw back the racket early, rotate the body, squat, push off the ground, and turn. Leg power is used to transfer weight to the waist, rotating the body and arm to complete the hit. When dealing with strongly spinning underspin balls, reduce ball impact and increase racket wrapping and friction.

		Loop(B)	B,US, LC					Backhand Loop is a common technique for handling long underspin balls. It requires early racket preparation, body rotation, squatting, pushing off the ground, and turning. Leg power is utilized to shift weight to the waist, rotating the body and arm to complete the hit. For strongly spinning balls, reduce impact and increase racket wrapping and friction.
	Combined(two points)	Loop(F)-Drive(B)	F,US, LC	B,TS, LC				Forehand Loop with Backhand Drive focuses on transitioning between underspin and topspin, requiring footwork adjustments and early racket preparation for varying spin types.
		Loop(F)-Drive(F)	F,US, LC	F,TS, LC				Forehand Loop with Forehand Drive trains the transition between underspin and topspin. When facing different spin types, adjust your stance through footwork to locate the sweet spot and prepare the racket in advance.

		Drive(F)-Drive(B)	F,TS, LC	B,TS, LC				Forehand Drive and Backhand Drive combines forehand drive, backhand drive, and footwork movements. After each hit, reset your posture and adjust your steps according to the incoming ball's location.
		Push(F)-Drive(F)	F,US, SC	M,TS, LC				Forehand Push with Forehand Drive involves adjusting your stance after a forehand push to execute a sideway topspin drive. When performing the forehand push, preferably return the ball to the opponent's backhand side, forcing them to deal with a backhand underspin loop, thereby strategizing for a sideway topspin drive on your next hit.
		Push(B)-Loop(F)	B,US, SC	F,US, LC				Backhand Push with Forehand Loop begins with managing short underspin balls, often using a short placement for control. When the opponent returns a long ball to your forehand, adjust your stance to execute a forehand underspin loop for an attack.

		Loop(F)-Drive(B)	F,US,LC	B,TS,LC				Forehand Loop with Backhand Drive focuses on transitioning between underspin and topspin, requiring footwork adjustments and early racket preparation for varying spin types.
		Push(F)-Loop(B)	F,US,SC	B,US,LC				Forehand Push with Backhand Loop involves handling short underspin balls, typically using a short placement to control the opponent. When the opponent returns a long ball to your backhand, adjust your stance to perform a backhand underspin loop for an attack.
		Drive(F)-Drive(F)	F,TS,LC	M,TS,LC				Forehand Drive with Forehand Drive combines forehand drive with footwork training. After stabilizing power and returns with fixed-point forehand drive, incorporate footwork movements to handle balls at two different landing points. After each hit, reset your posture and adjust your steps based on the incoming ball's position.

		Push(B)-Loop(B)	B,US, SC	B,US, LC				Backhand Push with Backhand Loop starts with handling short underspin balls, often using a short placement. When the opponent returns a long ball to your backhand, adjust your stance to perform a backhand underspin loop for an attack.
		Push(F)-Loop(F)	F,US, SC	F,US, LC				Forehand Push with Forehand Loop starts with handling short underspin balls, often using a short placement to control the opponent. After the opponent returns a long ball to your forehand, adjust your stance to execute a forehand underspin loop for an attack.
		Loop(F)-Loop(F)	F,US, LC	M,US, LC				Forehand Loop with Forehand Loop integrates forehand underspin loop and footwork adjustments. It primarily deals with consecutive underspin balls with varying landing points. After each forehand underspin loop, quickly reset, adjust your stance, locate the next hit's sweet spot, and draw back the racket to complete the hit.

		Loop(B)-Drive(F)	B,US,LC	F,TS,LC				Backhand Loop with Forehand Drive emphasizes the transition between underspin and topspin, utilizing footwork to locate the sweet spot and prepare the racket in advance.
	Complex(multiple points)	Loop(B)-Drive(B)-Drive(F)	B,US,LC	B,TS,LC	F,TS,LC			Backhand Loop with Backhand Drive and Forehand Drive simulates real - game returns, training strategic shifts through underspin loops, transitioning into topspin attacks, and subsequent forehand/backhand returns.
		Push(F)-Loop(F)-Drive(B)	F,US,SC	F,US,LC	B,TS,LC			Forehand Push with Forehand Loop and Backhand Drive simulates real-game returns, necessitating timely resets and adjustments in stance and footwork based on the incoming ball's position and spin.
		Push(B)-Loop(F)-Drive(F)	B,US,SC	F,US,LC	F,TS,LC			Backhand Push with Forehand Loop and Forehand Drive simulates real-game returns, emphasizing timely resets and adjustments in stance and footwork based on the ball's trajectory and spin.

		Push(B)-Loop(B)-Drive(F)	B,US,SC	B,US,LC	F,TS,LC			Backhand Push with Backhand Loop and Forehand Drive is a comprehensive real-game simulation, emphasizing timely resets and stance/footwork adjustments for varying incoming balls.
		Drive(B)-Drive(F)-Drive(F)	B,TS,LC	F,TS,LC	F,TS,LC			Backhand Drive with Forehand Drive and Forehand Drive combines sideway attacks and forehand defenses to adjust offensive and defensive rhythms in comprehensive topspin footwork training.
		Push(F)-Loop(F)-Drive(F)	F,US,LC	F,US,LC	F,TS,LC			Forehand Push with Forehand Loop and Forehand Drive is comprehensive real-game simulation, requiring timely resets and adjustments in stance and footwork based on the incoming ball's characteristics.
		Random Drive	TS,LC,R	TS,LC,R	TS,LC,R	TS,LC,R	TS,LC,R	Random Drive trains for inconsistent topspin returns with both forehand and backhand. Through footwork adjustments, find the best return point and complete the hit. Unpredictable landing points demand swift resets and footwork

								modifications.
		2/3 Court Random Drive	TS,LC,R	TS,LC,R	TS,LC,R	TS,LC,R	TS,LC,R	2/3 Court Random Drive trains for inconsistent topspin returns on the forehand half of the table. Through footwork adjustments, locate the optimal return point and complete the hit. Inconsistent landing points increase unpredictability, requiring quick resets and footwork adjustments.
		Loop(F)-Drive(B)-Drive(F).	F,US,LC	B,TS,LC	F,TS,LC			Forehand Loop with Backhand and Forehand Drive simulates real-game returns, focusing on strategic adjustments through underspin loops against long underspin balls, transitioning into topspin attacks and subsequent forehand/backhand returns.
		Push(F)-Loop(F)-Drive(F)	F,US,SC	F,US,LC	F,TS,LC			Forehand Push, Forehand Loop with Forehand Drive is a comprehensive training technique involving multiple landing points and spin variations. It trains various technical movements and spin changes, affecting the overall offensive and defensive systems, from

								table control to sideway attacks and defensive diving shots.
		Push(B)-Loop(B)-Drive(B)	B,US, SC	B,US, LC	B,TS, LC			Backhand Push, Backhand Loop with Backhand Drive simulates real-game returns, necessitating timely resets and adjustments in stance and footwork to handle incoming balls effectively.
		Push(F)-Loop(B)-Drive(B)	F,US, SC	B,US, LC	B,TS, LC			Forehand Push,Backhand Loop with Backhand Drive simulates real-game returns, requiring timely resets and adjustments in stance and footwork based on the incoming ball's position and spin.
		All Random	TS,R	TS,R	TS,R			All Random training incorporates short underspin balls within the table and inconsistent topspin balls at mid-to-far distances. Prompt footwork adjustments are crucial to locate the sweet spot and complete returns.

		Push(B)-Loop(F)-Drive(B)	B,US, SC	F,US, LC	B,TS, LC			Backhand Push with Forehand Loop and Backhand Drive simulates real-game returns, requiring quick resets and adjustments in stance and footwork based on the ball's position and spin.
		Push(F)-Loop(B)-Drive(F)	F,US, SC	B,US, LC	F,TS, LC			Forehand Push with Backhand Loop and Forehand Drive is a comprehensive real-game simulation, requiring swift resets and adaptations in stance and footwork to incoming balls.
		Loop(F)-Drive(F)-Drive(B)	F,US, LC	F,TS, LC	B,TS, LC			Forehand Loop with Forehand and Backhand Drive simulates real-game returns, training adjustments in offensive and defensive strategies through underspin loop techniques against long underspin balls, transitioning into topspin attacks and consecutive forehand/backhand returns.

		Loop(B)-Drive(F)-Drive(B)	B,US, LC	F,TS, LC	B,TS, LC			Backhand Loop with Forehand and Backhand Drive simulates real-game returns, emphasizing strategic changes through underspin loops, transitioning into topspin attacks, and consecutive forehand/backhand returns.
		Drive(F)-Drive(F)-Drive(F)	F,TS, LC	M,TS, LC	B,TS, LC			Forehand Drive 3 Shots is a comprehensive topspin footwork training exercise, focusing on handling topspin balls at different landing points. After each hit, promptly adjust your stance and footwork.
Near-net position	Basic(single point)	Drive(F)	F,TS, LC					The training combination for Forehand Drive, the most commonly used topspin return technique in table tennis, involves ensuring the hit is made at the highest point of the incoming ball. The racket needs to be drawn back, and the forearm quickly contracted to complete the hit.
		Push(F)	F,US, SC					The training technique for Forehand Push primarily focuses on handling short court underspin balls within the table tennis table. During training, it is necessary to step forward and draw back the racket, pushing the bottom of the table

								tennis ball. Fingers and wrists should be used to generate power for the hit.
		Loop(B)	B,US, LC					Backhand Loop is a common technique for handling long underspin balls. It requires early racket preparation, body rotation, squatting, pushing off the ground, and turning. Leg power is utilized to shift weight to the waist, rotating the body and arm to complete the hit. For strongly spinning balls, reduce impact and increase racket wrapping and friction.
		Drive(B)	B,TS, LC					The training combination for Backhand Drive, the most commonly used topspin backhand return technique, requires hitting the ball at its highest point. Drawing back the racket and quickly contracting the forearm are essential for completing the hit.
		Push(B)	B,US, SC					The training technique for Backhand Push emphasizes dealing with short court underspin balls within the table tennis table. During the training process, stepping forward and drawing back the racket are required, pushing the bottom of the ball. Fingers and wrists should be engaged to

								complete the hit.
		Loop(F)	F,US, LC					Forehand Loop is a common technique for dealing with long underspin balls away from the table. When executing this shot, it's crucial to draw back the racket early, rotate the body, squat, push off the ground, and turn. Leg power is used to transfer weight to the waist, rotating the body and arm to complete the hit. When dealing with strongly spinning underspin balls, reduce ball impact and increase racket wrapping and friction.
	Combined(two points)	Drive(F)-Drive(F)	F,TS, LC	M,TS, LC				Forehand Drive with Forehand Drive combines forehand drive with footwork training. After stabilizing power and returns with fixed-point forehand drive, incorporate footwork movements to handle balls at two different landing points. After each hit, reset your posture and adjust your steps based on the incoming ball's position.
		Drive(F)-Drive(B)	B,TS, LC	F,TS, LC				Forehand Drive with Backhand Drive combines forehand drive, backhand drive with footwork movements. After each hit, reset your posture and adjust your steps according to the

								incoming ball's location.
Abbreviations: F – Forehand, B – Backhand, M – Middle,TS – Topspin, US – Under spin,NS -No spin, SC-Short Court, MC-Middle Court, LC-Long Court, R – Random								

3.4.3. Serve Settings

After confirming the robot's placement, select the combination that needs to be trained.

On the serve preparation page, the user first needs to rotate the robot's head to the sample position according to the diagram.

The default practice time is 5 minutes. Users can click the "+" or "-" buttons to increase or decrease the practice time according to their training needs.

The difficulty level defaults to 1 star. If the user increases the difficulty level, the serve speed, rotation speed, frequency, etc. will increase the difficulty to a certain extent.

For single-point combinations, the serving order selection is sequential or random, and the effect is the same. If a combination has 2 or more single balls and the serving order selection is sequential, after starting training, the robot will serve in the order of the single balls in the combination. For example, for the Drive(F)-Drive(B) combination, in sequential mode, the robot will serve repeatedly in the order of one left and one right. If the serving order selection is random, the robot will no longer serve in the order of the single balls, and the probability of each single ball appearing in each serve is equal.

Users can choose the racket hand according to their own habits. Choosing different racket hands will result in the forehand landing point falling on different half of the table. For example, if the racket hand is selected as the left hand, the Drive(F) in the programmed combination will land on the left half of the table.

After setting the parameters, click the Start button and the robot will start serving. (Figure 3-9)

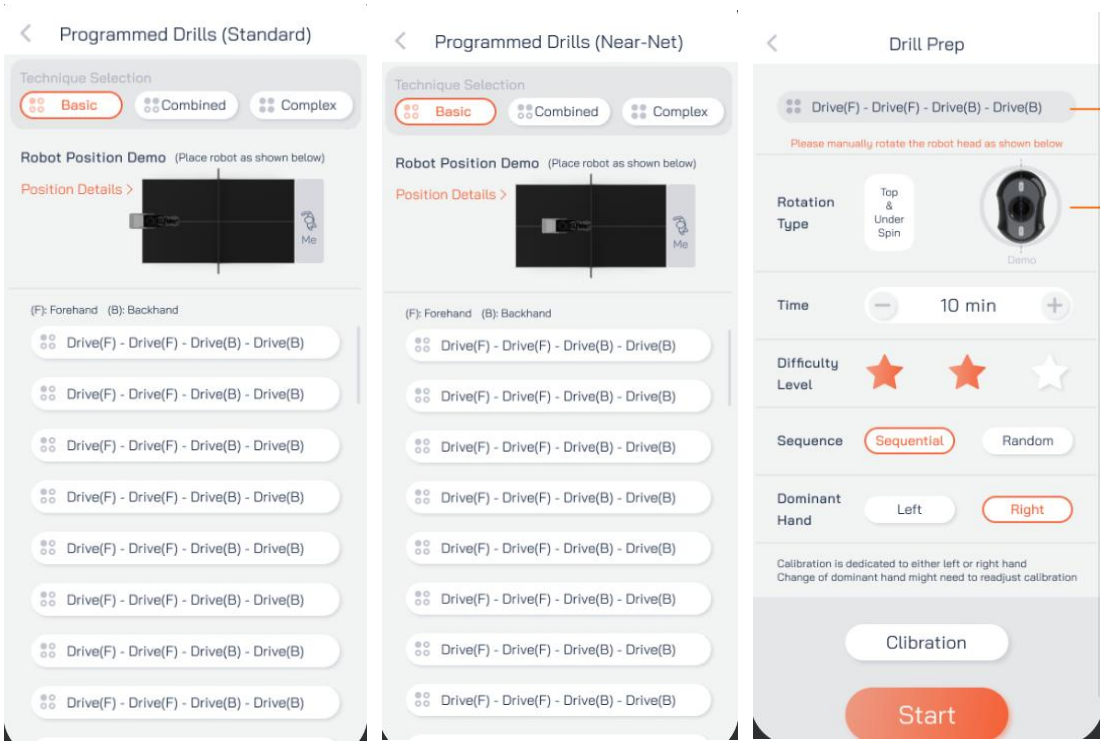


Figure 3-9

3.4.4. Pause/Stop

In the serving interface, users can view the training target duration and the cumulative training duration, and can also pause/continue/stop training. (Figure 3-10)

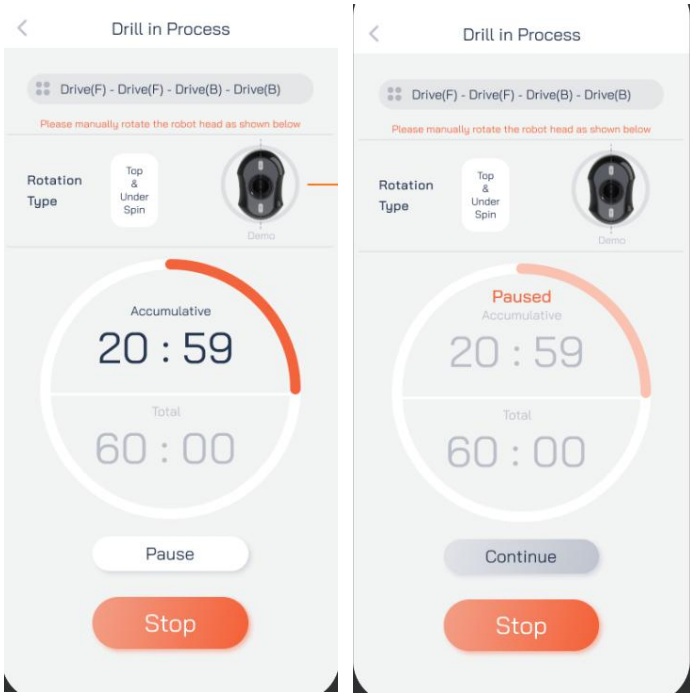


Figure 3-10

3.4.5. Calibration

If the default ball parameters do not meet the training requirements, the user can return to the serve preparation page. In the ball adjustment, the user can also set the serve frequency and adjust the serve landing point.

The larger the frequency parameter is, the more serves are made per minute.

If the left & right parameter is a positive value, the landing point is adjusted to the right side of the player (the player faces the robot) , and the larger the value, the further the landing point is adjusted to the right. On the contrary, if the parameter is a negative value, the landing point is adjusted to the left side of the player , and the smaller the value, the further the landing point is adjusted to the left. If the front & back parameter is a positive value, the landing point is adjusted to the net of the table, and the larger the value, the closer the landing point is to the net. On the contrary, if the parameter is a negative value, the landing point is adjusted to the bottom edge of the table, and the smaller the value, the further the landing point is adjusted to the bottom edge.

After the adjustment is completed, click the Test Combination button to check whether it meets the training requirements. If it meets the requirements, click the Confirm button to return to the serve preparation page. Click the Start button to start training.

On the ball adjustment page, after changing the parameters, it will take effect on all single balls in the combination. (Figure 3-11)

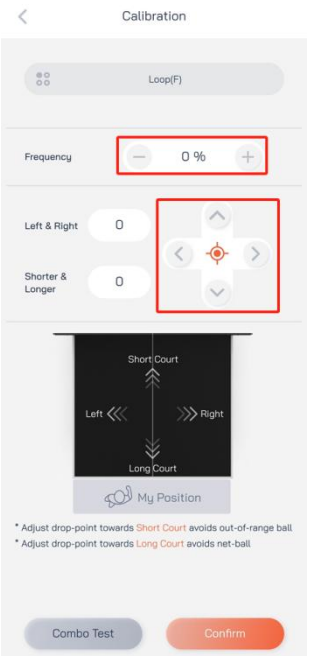


Figure 3-11

3.5. Custom Combinations

3.5.1. Add/Delete Custom Combinations

On the custom page, click the Add button in the lower right corner of the page to start editing your own training combination. First, on the machine position selection page, you need to select the corresponding position in the nine-square grid according to the actual position and angle of the robot, and adjust the angle below so that the animation effect in the schematic diagram is consistent with the actual angle of the robot . The adjustment method is to directly drag the semicircle around the center of the ring to rotate, or click "+" or "-" for fine-tuning.

The reset button returns the machine angle to the default 0^{o} .

Click the Confirm button to enter the serve parameter setting interface.

You can also refer to the serving coverage of the current robot placement angle in the schematic diagram to adjust the actual robot placement angle. (Figure 3-12)

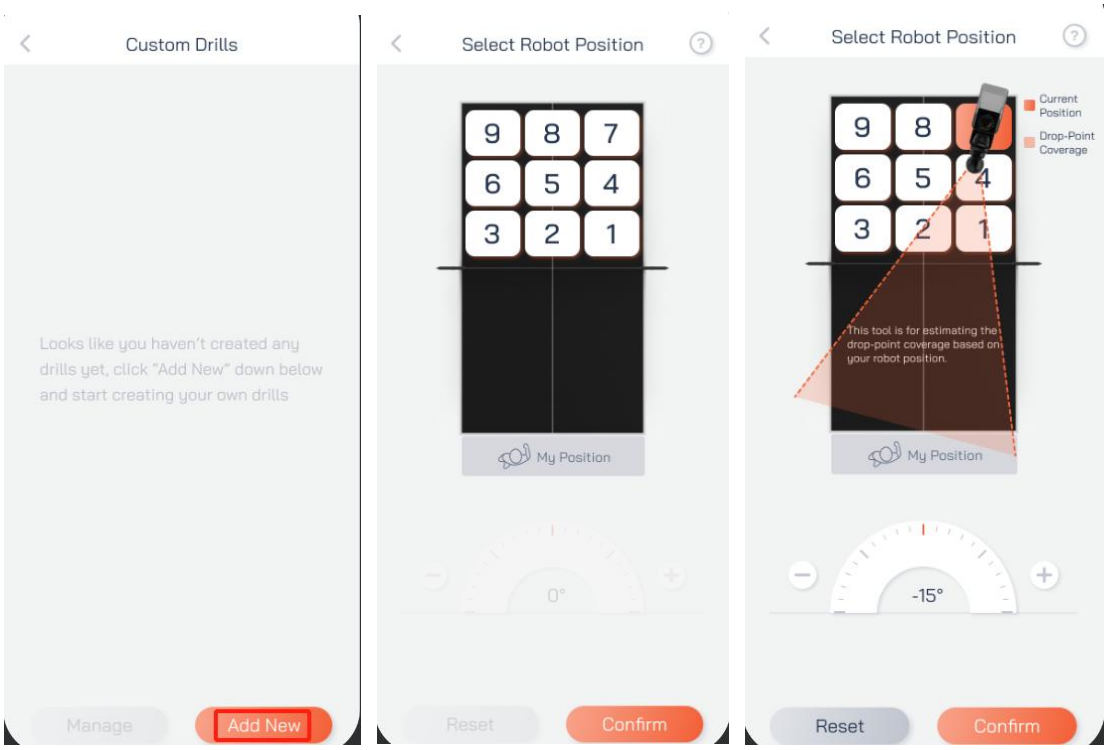


Figure 3-12

3.5.2. Custom Combination Naming

Enter the name of the custom combination in the input box at the top of the custom parameter setting page. The name is given by the user. The general naming rule is to name it according to the characteristics of the custom combination, such as forehand and backhand, top and bottom spin, etc. A custom name can be entered with up to 35 characters. (Figure 3-13)

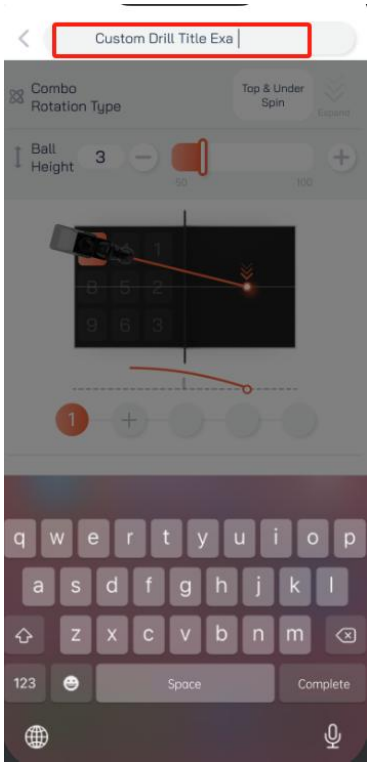


Figure 3-13

3.5.3. Rotation Type

After completing the naming of the custom combination, you need to select the rotation type of the combination and further confirm the single ball rotation type. If you need to set a right-handed ball, first select the rotation type to left and right & right, then rotate the robot head to the position shown in the diagram, and finally select the single ball rotation type to right. In addition, you need to note that after confirming the first single ball rotation type, the subsequent combination rotation type cannot be changed, and only the single ball rotation type can be modified. (Figure 3-14)

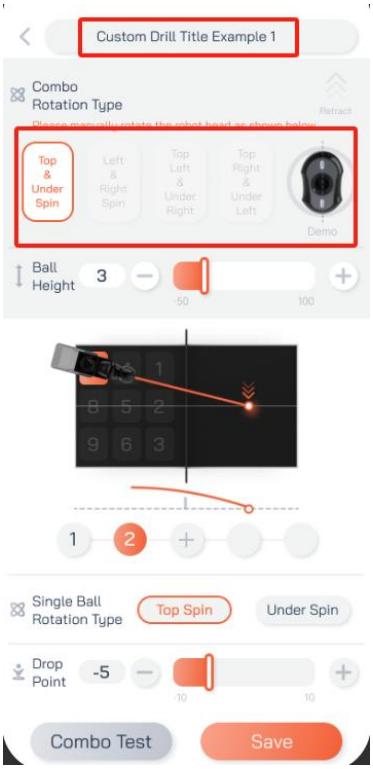


Figure 3-14

3.5.4. Ball Height

The ball height parameter adjusts the height of the ball from the robot when it passes through the net. Once the height of the first single ball is confirmed, the newly added single ball will automatically use the height parameter of the first single ball. If the ball height parameter of the newly added single ball is modified, the set single ball parameters will also change accordingly. Therefore, the robot cannot adjust the pitch angle of the serve during the serve.

Adjustment method: You can drag the scale mark on the slide rail, or use the left and right "+" and "-" buttons to make fine adjustments. The adjustment method for other parameters is the same.

If you need to set 2 jump ball (the first landing point is on the robot half of the table, and the second landing point is on the player half of the table), you can set the ball height parameter to a negative value, and adjust the speed parameter to achieve 2 jump ball. If you need to set 1 jump ball (the robot serves the ball directly on the player half of the table) to connect 2 jump ball in the same combination, after setting

1 jump ball, adjust the speed of the second single ball to achieve 2 jump ball for the second single ball. (Figure 3-15)

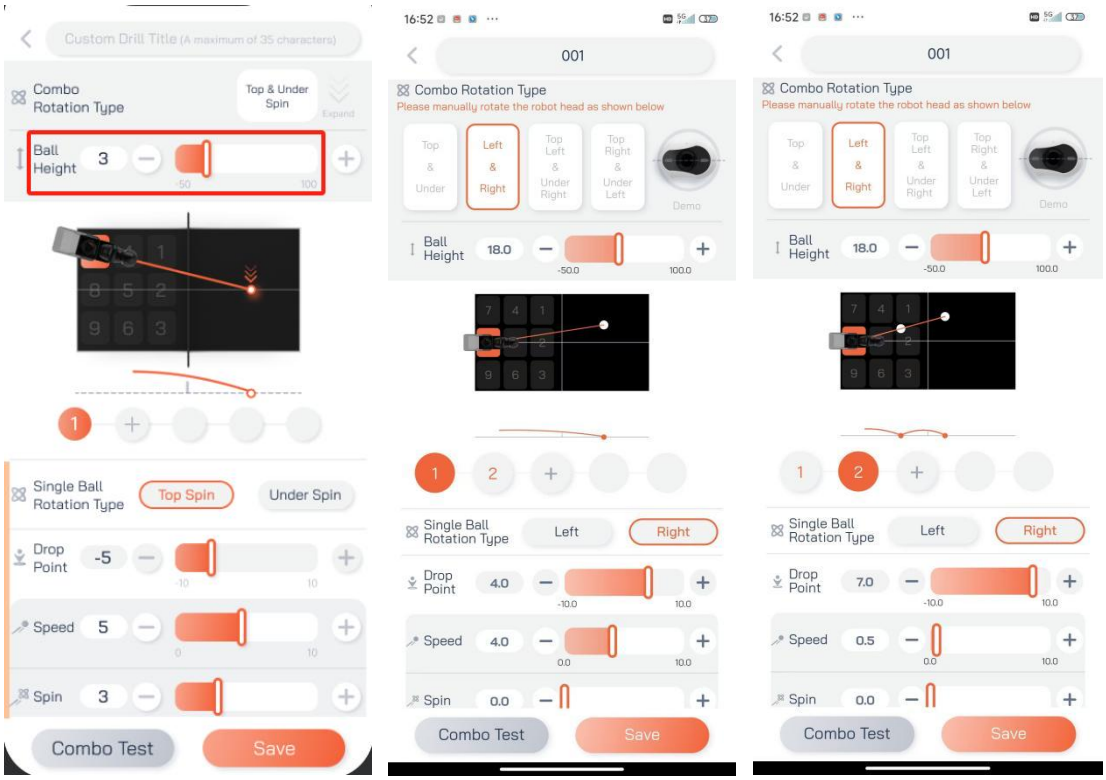


Figure 3-15

3.5.5. Real-time Animation

The animation effect on the page shows the landing point and trajectory of the single ball in the custom combination, which is convenient for customers to judge whether the single ball has landed on the net or gone out of the table. This animation effect is for reference only. (Figure 3-16)

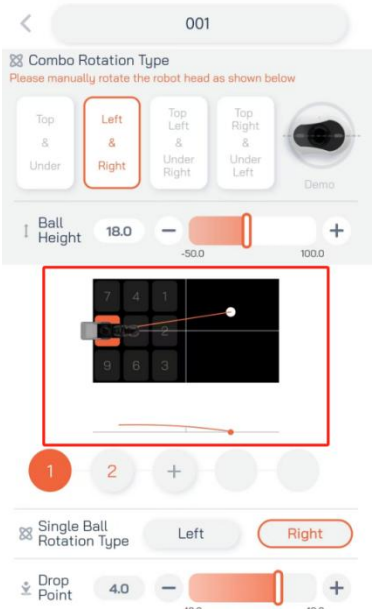


Figure 3-16

3.5.6. Drop Point

When the parameter is 0, the landing point is near the center line of the table. When the parameter is a positive value, the landing point is on the right side of the table. When the parameter is a negative value, the landing point is on the left side of the table. The larger the absolute value of the parameter, the farther away from the center line of the table. (Figure 3-17)

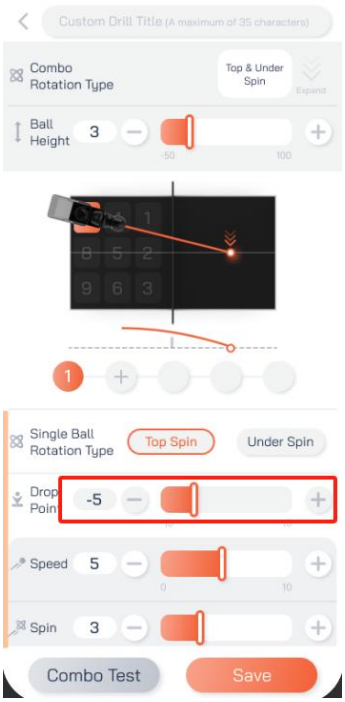


Figure 3-17

3.5.7. Speed

The speed parameter adjusts the speed of the ball sent by the robot in the air, which can also be understood as the force of the ball flying forward in the air. When other parameters are the same, the larger the speed parameter, the faster the ball is sent. For the landing point of the serve, the larger the speed parameter, the closer the landing point is to the bottom edge of the table. (Figure 3-18)

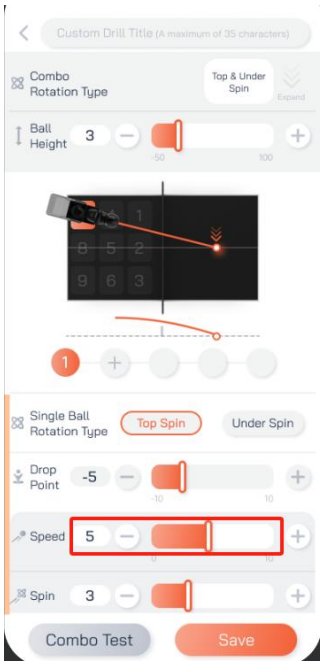


Figure 3-18

3.5.8. Spin

The spin parameter adjusts the speed of the table tennis ball's rotation around its axis. The unit is revolutions per second (r/s). The larger the spin parameter, the faster the ball sent by the robot will spin. When the spin is 0, the ball sent by the robot will be a non-spin ball.

It should be noted that when adjusting the Speed, the system will automatically adapt to the maximum Spin range at that speed. (Figure 3-19)

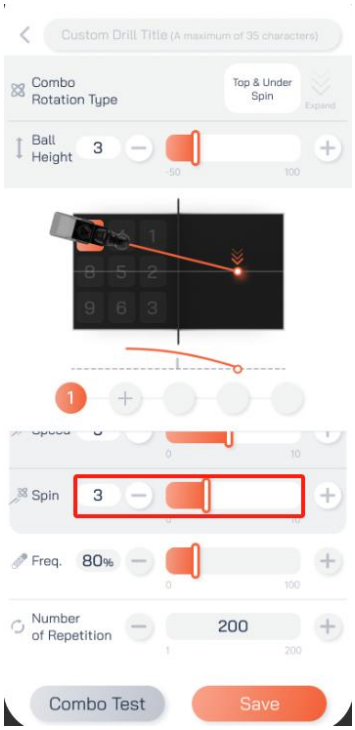


Figure 3-19

3.5.9. Frequency

The frequency parameter adjusts the number of balls that the robot serves in one minute (30-90 per minute). The larger the frequency parameter, the more balls are served per minute. The frequency level is divided into 100 levels, and each 10 increase in the frequency parameter increases the number of serves per minute by approximately 6. In addition, if you need to increase the time interval between each set of serves so that you can return to the ready state, you can reduce the frequency parameter of the first single ball. Similarly, in some special combinations, you need to train a combination of single balls with different rhythms, which can be achieved by adjusting the frequency of each single ball. (Figure 3-20)

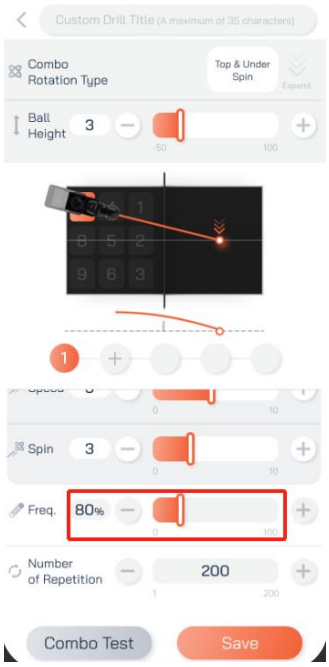


Figure 3-20

3.5.10. Number of repetition

The number of single ball repetitions adjusts the number of times the single ball is served in a round of serving. If you need to train forehand push to connect 2-shot backhand drive, there are 2 ways to achieve it. The first is to set 3 single balls, the first single ball is set as forehand push, and the second and third single balls are set as backhand drive; the second is to set the first single ball as forehand push, the second single ball as backhand drive, and set the number of single ball repetitions of the second single ball to 2. (Figure 3-21)

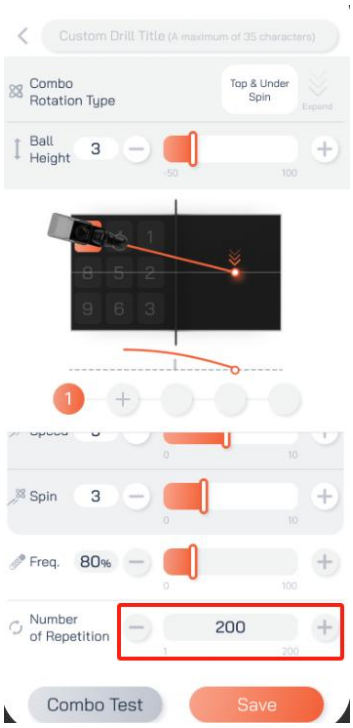


Figure 3-21

3.5.11. Add/Delete Single Ball

After setting the first single ball, you can click "+" to start setting the next single ball. A combination can set up to 5 single balls. If you want to delete a single ball, long press the single ball number and drag it to the deletion area below, and click the confirmation button to complete the deletion. (Figure 3-22)

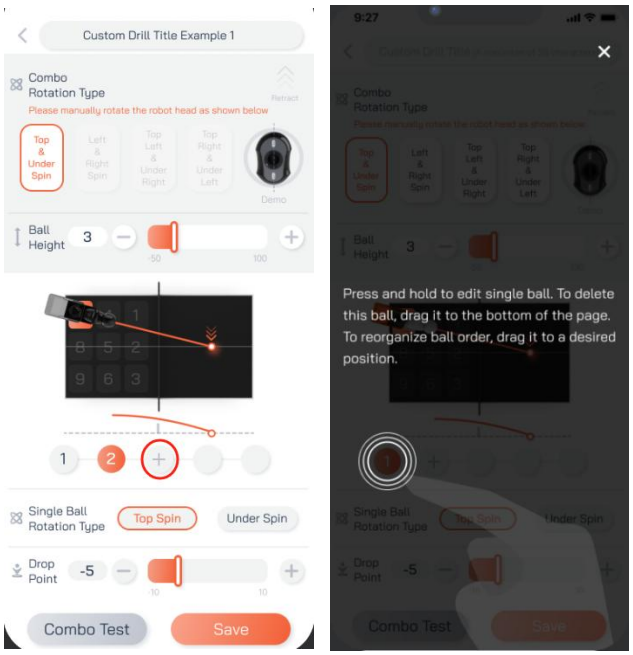


Figure 3-22

3.5.12. Combo Test

After setting the custom combination, rotate the robot head to the corresponding position according to the diagram on the right side of the combination rotation type (pay attention to the up and down direction of the robot head, the upper lens is wide and the lower lens is narrow. After rotating to a qualified angle, the joint will make a crisp "click" sound), click the Combo Test button, and try to play the custom combination ball. If it does not meet the requirements, you can adjust the parameters of each single ball according to the difference. If it meets the requirements, name the combination at the top of the page, and finally click the Save button below to save it. (Figure 3-23)

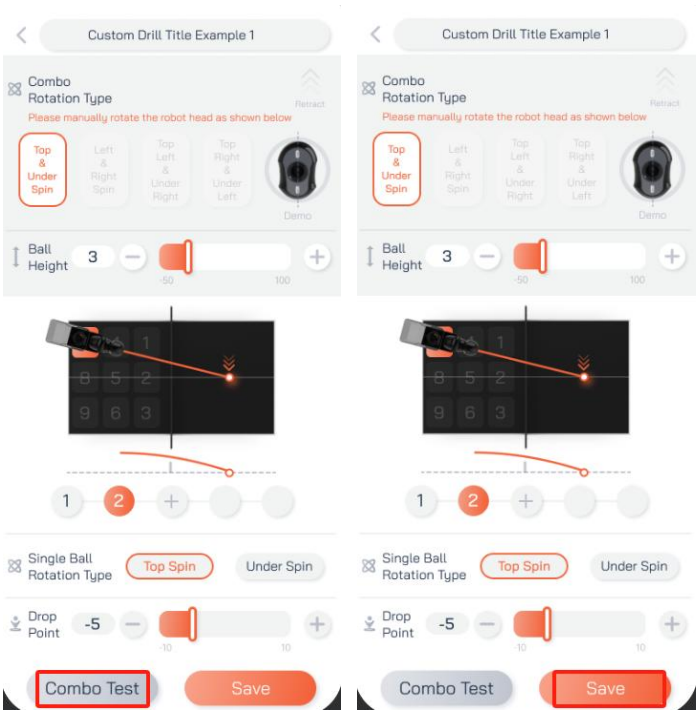


Figure 3-23

3.5.13. Serve Settings

After the custom combination is saved, it will automatically jump to the custom combination list. If you want to start training, you need to select the training combination. On the serve preparation page, the user needs to check whether the robot's head is consistent with the rotation type example diagram on the page. If not, you need to adjust it to be consistent first.

In the picture in the middle of the page, you can view the position and angle of the robot on the table, which is convenient for users to quickly place the robot to the corresponding position during the next training. In addition, in the picture, you can intuitively understand the number of single balls in the combination, the rotation type and order of each single ball, and whether each single ball is a one-jump ball or two-jump balls.

At the bottom of the page, you can set the practice time and serving order. After setting, you can click the Start button to start experiencing this custom combination ball.

In the serving interface, users can view the training target duration and the cumulative training duration, and can also pause/continue/stop training. (Figure 3-24)

If you need to modify the parameters of a single ball, click the Edit Combo button to enter the parameter editing page. The editing method is the same as when adding a new combination. After completing the modification and confirming, click the Save button to save.

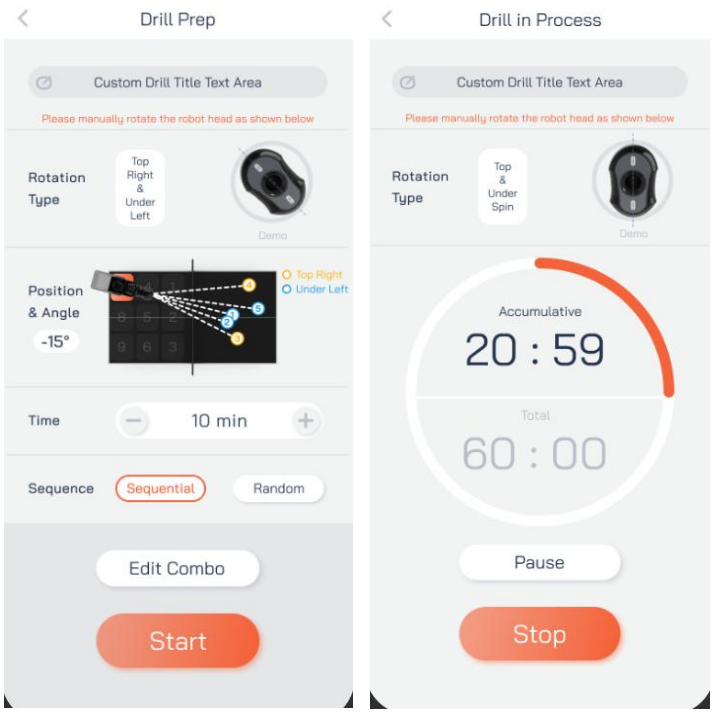


Figure 3-24

3.5.14. Customization Examples

In order to help users become familiar with custom editing more quickly, we will take Drive(F)-Drive(B) and Push(F)-Drive(B) as examples to help everyone quickly understand the skills of custom combination editing.

① Drive(F)-Drive(B)

The forehand drive with backhand drive combines forehand drive, backhand drive with footwork. After each shot, the player needs to readjust his posture and footwork according to the position of the ball.

According to the description of the Drive(F)-Drive(B) combination, we can know that the combination contains 2 single balls, the first single ball is a forehand ball, the second single ball is a backhand ball, and both single balls are topspin balls.

Taking the robot in the standard position as an example, enter the custom combination page, click the Add button, select position 8, select the default landing range, and click the Confirm button to enter the parameter editing page.

ⅰ. In the input box at the top of the page, enter "Drive(F)-Drive(B)" to complete the naming of the combination;

ⅱ. Select top & Under Spin as the combined rotation type;

ⅲ. The ball height is set to 50;

ⅳ. Start setting the parameters of the first single ball. Select topspin as the single ball rotation type , set the drop point parameter to 4, the speed parameter to 3, the spin parameter to 2 , the frequency parameter to 50%, and the number of repetitions to 1;

ⅴ. Start setting the parameters for the second single ball. Select topspin as the single ball rotation type, set the drop point parameter to -4, the speed parameter to 3, the spin parameter to 2, the frequency parameter to 50%, and the number of repetitions to 1.

ⅵ. Click the Combo Test button to check whether the ball sent by the robot meets the training requirements. If so, click the Save button to save.

② Push(F)-Drive(B)

The forehand push with backhand drive is a short-court spin to a long-court top spin, which is mainly used to train footwork adjustment and racket type changes.

According to the description of the Push(F)-Drive(B) combination, we can know that the combination contains 2 single balls, the first single ball is a forehand short-court underspin ball, and the second single ball is a backhand flong-court topspin ball. Taking the robot in the standard position as an example, enter the custom combination page, click the Add button, select position 8, select the default landing range, and click the Confirm button to enter the parameter editing page.

ⅰ. In the input box at the top of the page, enter "Push(F)-Drive(B) " to complete the naming of the combination;

ⅱ. Select Top & Under Spin as the combined rotation type;

ⅲ. The ball height is set to 40;

ⅳ. Start setting the parameters of the first single ball. Select underspin as the single ball rotation type, set the drop point parameter to 6, the speed parameter to 2, the spin parameter to 4, the frequency parameter to 10%, and the number of repetitions to 1;

ⅴ. Start setting the parameters for the second single ball. Select topspin as the single ball rotation type, set the drop point parameter to -7, the speed parameter to 3, the spin parameter to 3.5, the frequency parameter to 50%, and the number of repetitions to 1.

ⅵ. Click the Combo Test button to check whether the ball sent by the robot meets the training requirements. If so, click the Save button to save.

3.5.15. Tips for custom combination settings:

※ To adjust the landing point forward or backward , you can adjust the ball height and speed parameters (once the ball height is modified, it will take effect on all single balls. You need to check whether the edited single ball is suitable for the modified ball height parameter).

※In order to ensure the accuracy of the animation effect, the actual position of the robot must be consistent with the position in the animation effect.

※ The robot does not support switching between different combination rotation types during serve, such as switching from topspin to sidespin, so the user needs to confirm the combination rotation type before editing.

※2 jump ball can be achieved by lowering the ball height or by reducing the speed.

3.5.16. Custom combination list management

On the custom combination page, users can click the Manage button to enter the combination management page. On this page, users can select or abandon the selection by clicking the combination name, or click the Select All button to quickly select all combinations. Click the Delete button and confirm to delete the selected combination. Once the combination is deleted, it cannot be restored. Users should use the Delete function with caution. (Figure 3-25)

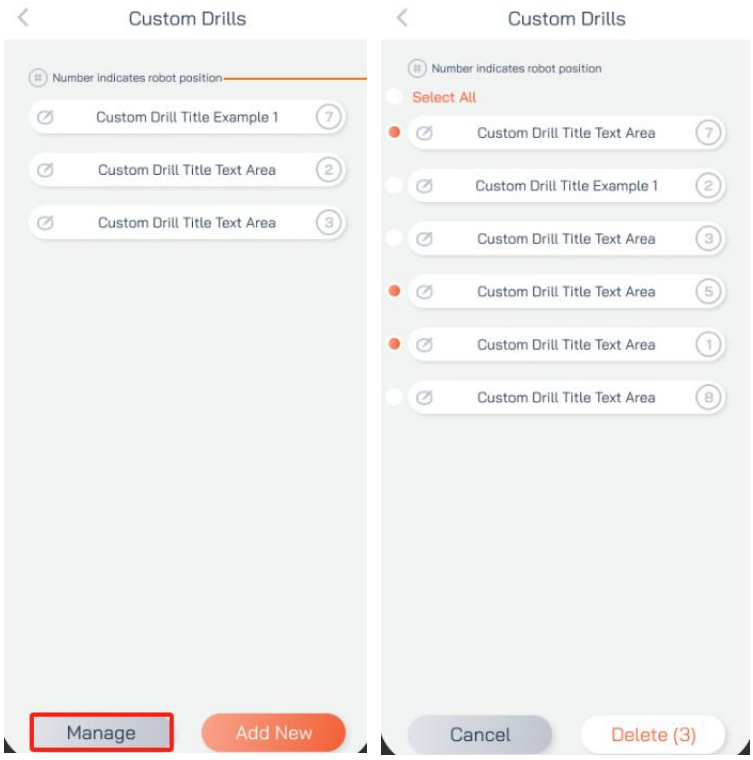


Figure 3-25

3.5.17. APP Settings

Click the settings button in the upper right corner to view and set the robot's related information. (Figure 3-26-1)

Enter the device name page, the user can modify the name of the robot; (Figure 3-26-2)

Enter the device information page, the user can view the robot's name, serial number and current version information; (Figure 3-26-3)

Enter the firmware upgrade page, the user can view the current version information, if there is a new version, you can click the upgrade button to upgrade the version. During the upgrade process, you cannot terminate it at will, such as disconnecting the mobile phone network, exiting the APP, turning off the robot, etc., to avoid causing robot malfunctions.

Enter the programmed drills calibration page, the user can adjust the landing point according to the prompts and test the effect of the landing point (the method is the same as the ball adjustment of the programmed drills). After the adjustment is completed, click the confirmation button to save. The adjustment is only applicable to the standard position programmed drills. (Figure 3-26-4)

Enter the Help and Support page , where users can view relevant help videos or documents about the robot. (Figure 3-26-5)

Click the Delete Device button to unbind the APP from the robot.

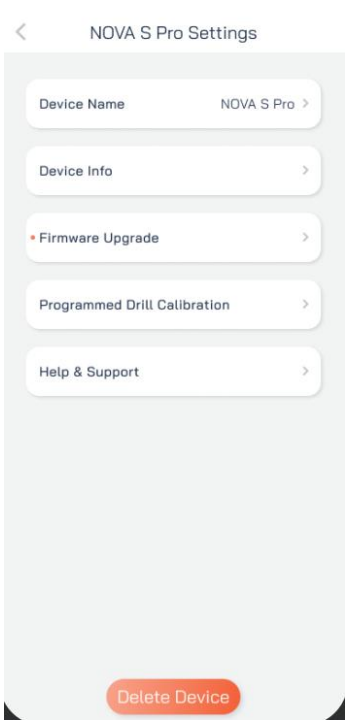


Figure 3-26-1

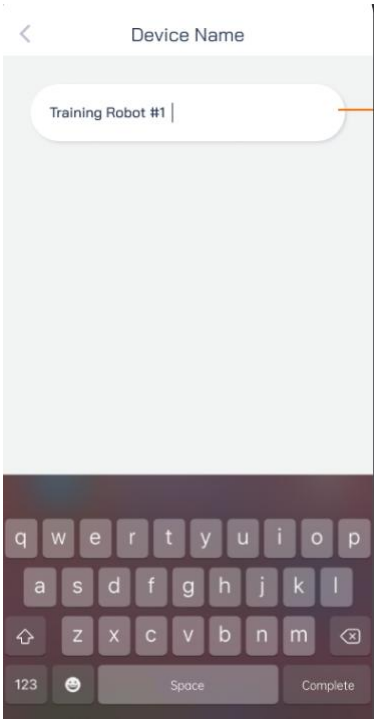


Figure 3-26-2

Figure 3-26-3

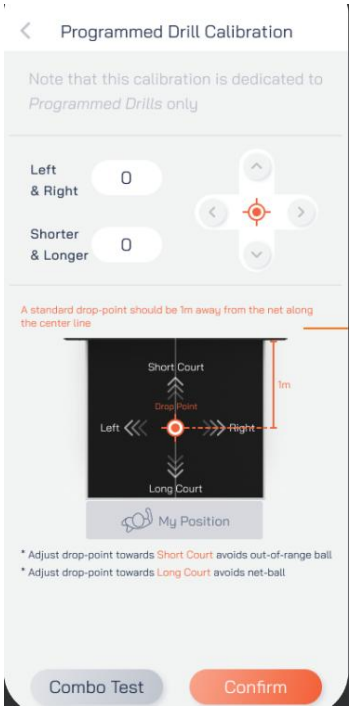


Figure 3-26-4

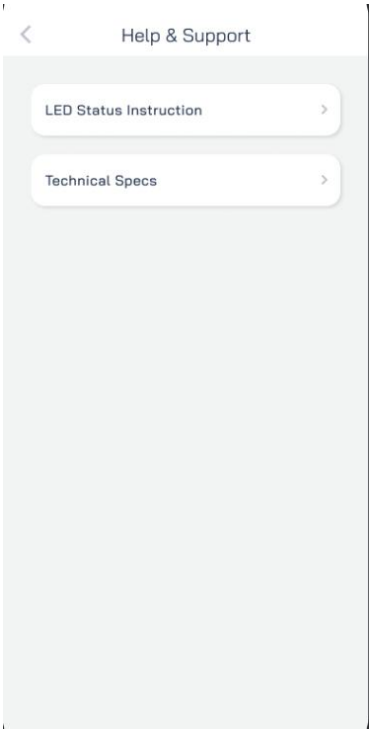


Figure 3-26-5

In addition, the robot and the APP are not strongly bound one to one. If the current Bluetooth paired APP phone is not near the robot, or the current Bluetooth paired APP phone turns off the Bluetooth function, other people can also pair the robot with the machine through the PONGBOT APP to use, and there is no need for the person who has completed the Bluetooth pairing last time to delete the robot in the APP.

4. Use of N-Control S

4.1. Hardware Introduction

4.1.1. Button Introduction

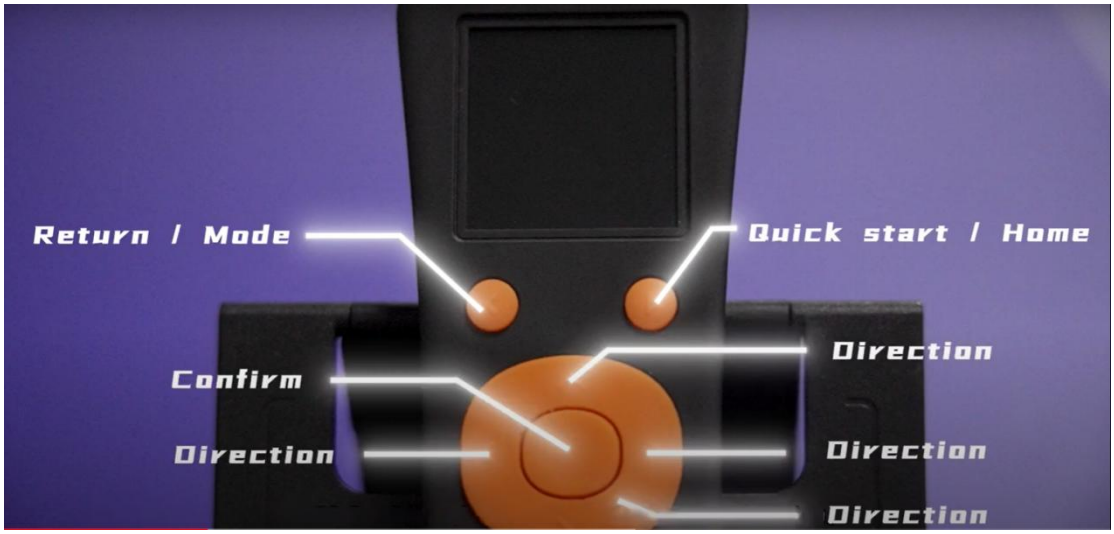


Figure 4-1

4.1.2 Bluetooth Connection Display

The robot icon is connected. (Figure 4-2)

Figure 4-2

4.1.3. Battery Level Reminder

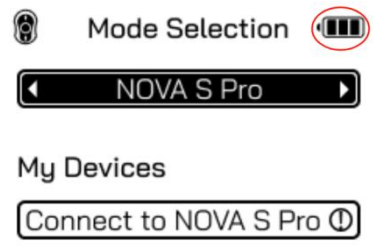


Figure 4-3

4.2. Bluetooth Pairing

The Bluetooth pairing between N-Control S and the robot has been completed when the robot is shipped from the factory. After the user installs the battery of N-Control S and confirms that the robot icon is displayed in the upper left corner (Figure 4-2) , the user can directly select the robot and press the confirmation button to enter the robot usage page. If the received N-Control S cannot be used directly, the user can also complete the Bluetooth pairing between N-Control S and the robot according to the following steps .

Turn on the NOVA S PRO robot, find the network configuration switch button on the back of the robot (Figure 4-4), and quickly press it twice to switch the robot indicator light to flashing yellow (Bluetooth connection mode).

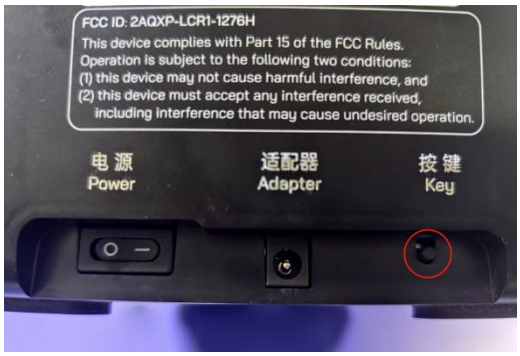


Figure 4-4

Wake up N-Control S screen by pressing any button, use the arrow keys to select the paired robot (Figure 4-5), press the confirmation button, select the re-pairing button , and wait for the robot and N-Control S to complete Bluetooth pairing and course update.(Figure 4-6)

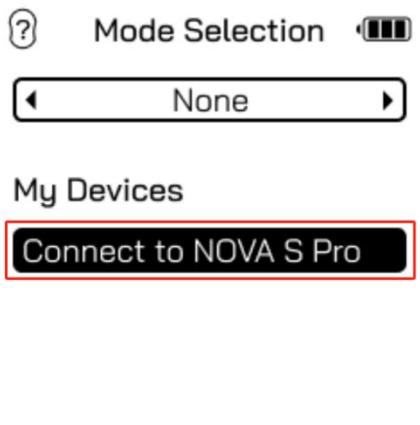


Figure 4-5

Figure 4-6

4.3. Programmed Combinations

4.3.1. Position Selection

Enter the robot page. Like the PONGBOT APP, the user needs to select the standard position or near-net position according to the position of the robot, and press the confirmation button to enter the programmed combination page. In the standard position, ensure that the bottom edge of the robot's ball return module is aligned with the short side of the table, and the robot is located at the center line of the table (Figure 4-7-1) . In the near-net position, ensure that the robot's ball outlet is flush with the net, and the robot is located at the center line of the table (Figure 4-7-2) . The operation method of the programmed combinations in the standard position and near-net position is the same.

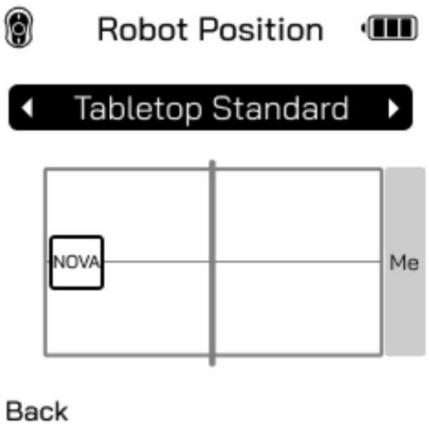


Figure 4-7-1

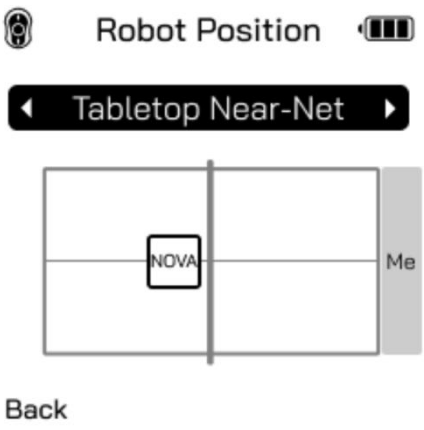


Figure 4-7-2

4.3.2. Combination Selection and Serve Settings

Like the PONGBOT APP, the programmed combinations of N-Control S are also divided into Basic(single-point), Combined(two-point) and Complex(multi-point) combinations (Figure 4-8-1) . After confirming that the robot head is consistent with the example according to the prompts (Figure 4-8-2), select the required training combination. On the single-point combination page, you can select the corresponding combination according to your training needs. The order of serving can be selected sequentially or randomly. There is no other parameter modification. Press the start button to start training. (Figure 4-8-3)

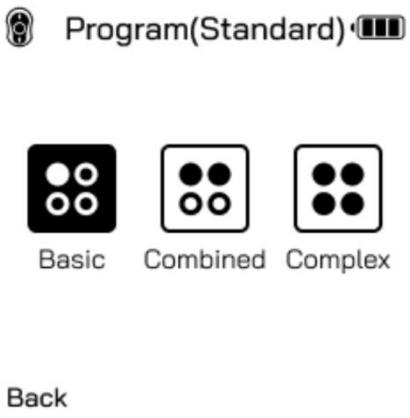


Figure 4-8-1

Figure 4-8-2

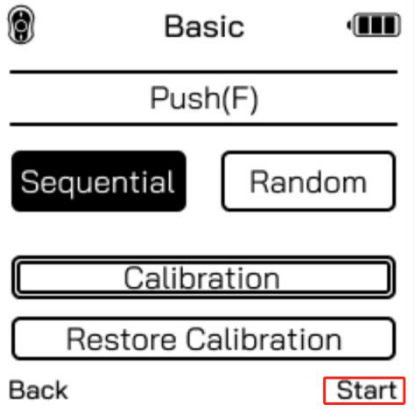


Figure 4-8-3

4.3.3. Real-time Adjustment of the Ball Height and Difficulty Level

During the practice, the user can adjust the difficulty level of the combination by using the left and right arrow buttons, and can also use the up and down keys to adjust the height of the serve over the net in real time. If you need to pause/stop serving, just press the corresponding button. (Figure 4-9)

Figure 4-9

4.3.4. Parameter Modification

If the drop point and ball height of the programmed combination do not meet the training requirements, the user can return to the combination serve setting page, select Calibration (Figure 4-10) , and then modify the Shorter&Longer and Lefe&Right parameters, fine-tune the drop point, and serve frequency on the jump page. The operation method is as follows: First, use the direction keys to select the parameter to be modified, and press the confirmation key. At this time, the background of the parameter to be modified switches from white background to black background, and then use the left and right keys to adjust the parameter to be modified. After the parameter adjustment is completed, press the confirmation key again to exit the parameter editing.

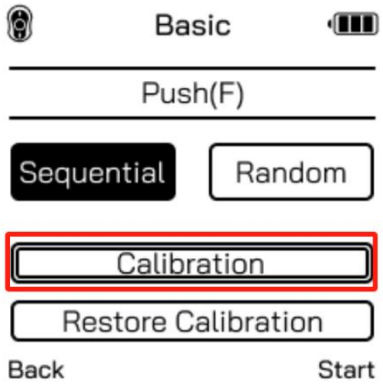


Figure 4-10

Shorter&Longer: A positive value of the parameter increases the height over the net. The higher the value, the higher the height over the net and the closer to the bottom edge of the table the ball will land. A negative value decreases the height of the net. The lower the value, the lower the height of the net, and the closer the serve lands to the net of the table.

Left&Right: When the parameter is positive, the landing point of the serve will shift to the right side of the trainer. The larger the value, the greater the distance it will shift to the right. When the parameter is negative, the landing point of the serve will shift to the left side of the trainer. The smaller the value, the greater the distance it will shift to the left.

Frequency: The larger the value of this parameter is, the more serves you will receive

per minute. The base number for each modification is 10.

After the above three parameters are adjusted, they will only take effect on all single balls of this combination.

After modifying all parameters, the user can select the serve test and press the confirmation button to check whether the serve meets the training requirements. Press the confirmation button again to end the serve test. After all parameters are modified, press the confirmation button in the upper right corner to save.

If you need to restore the default parameters of the combination, just select Restore Calibration and press the confirmation key, and select Yes on the confirmation page to restore the default parameters. (Figure 4-11)

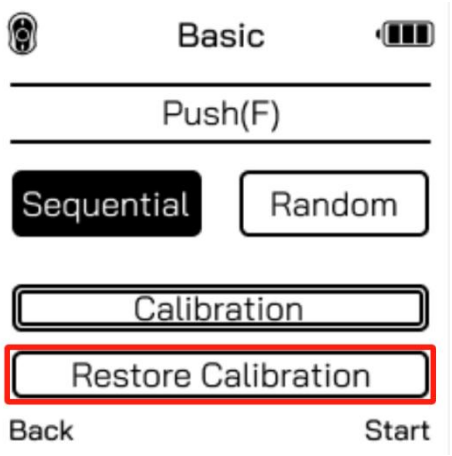


Figure 4-11

4.4. Custom

Users can use N-Control S to edit custom combinations. The editing logic is consistent with the APP. N-Control S can only save one custom combination.

4.4.1. Select Rotation Type

When using Custom, the robot position is not restricted. After entering the Custom, the user must first select the combined rotation type. Once confirmed, the combined rotation type cannot be changed. Only the single ball rotation type can be selected (Figure 4-12). Press the Next button to enter the single ball setting page.

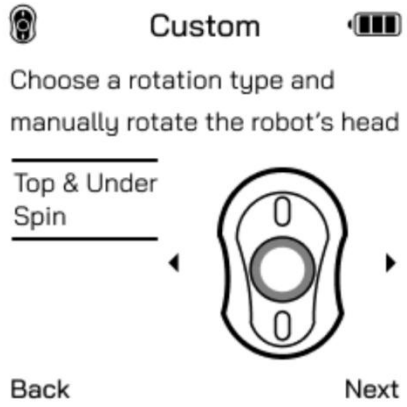


Figure 4-12

4.4.2. Adjusting Single Ball Parameters

The Custom can add up to 5 single balls. Press the confirmation button to enter the first single ball editing page. On this page, users can switch different parameters with the left and right keys, and adjust the parameter values with the up and down keys (Figure 4-13-1) . After the parameters of the first single ball are set, press the trial button to verify whether the serve meets the training requirements. In the trial page, users can adjust the arc parameters according to the trajectory of the serve, and use the up and down keys for fine-tuning, and the left and right keys for large-scale adjustments (Figure 4-13-2) . After confirming that all parameters meet the training requirements, press the stop button to return to the parameter setting page. At this time, press the return button in the upper left corner to return to the Custom page.

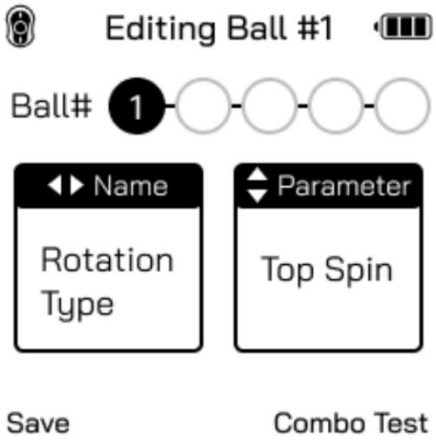


Figure 4-13-1

Figure 1-13-2

4.4.3. Added Single Ball

If you need to add a single ball, use the left and right keys to select the cursor ⊕ and press the confirmation key to start editing the second single ball. (Figure 4-14)

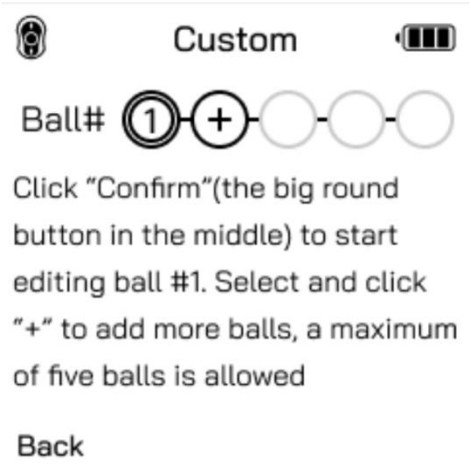


Figure 4-14

In the Custom page, users can adjust the ball height parameter according to the trajectory of the serve. The up and down keys can be used for fine adjustments, and the left and right keys can be used for large adjustments. The modified arc parameters will take effect on all single balls.

After all single balls are set, press the Save button in the upper right corner to save the Custom combination. (Figure 4-15)

Figure 4-15

4.4.4. Serve Settings

The user can select sequential or random serving order according to training needs (Figure 4-16) . After confirming the selection, press the start button in the upper right corner. After confirming that the robot head is consistent with the schematic diagram,

press the Start button to start training.

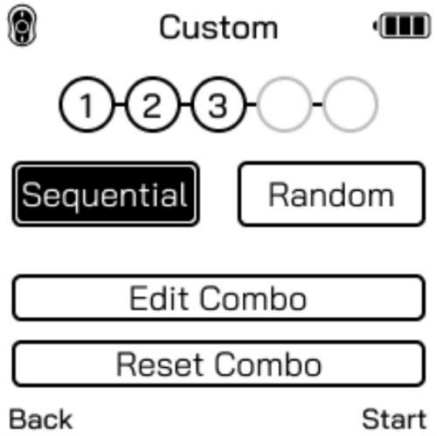


Figure 4-16

In the practice page, users can adjust the ball height using the up and down keys according to the actual serve effect. After the parameter is modified, it will take effect on all single balls in the combination. (Figure 4-17)

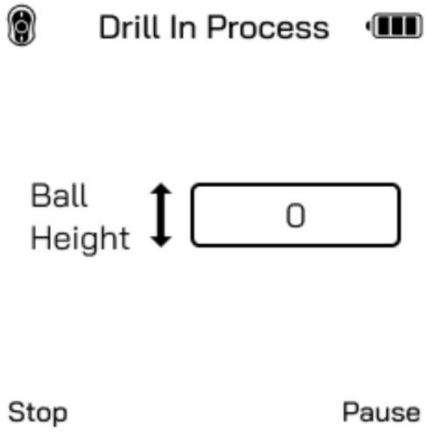


Figure 4-17

If you need to modify the parameters of the Custom combination, on the Custom page, select the Edit Combo and press the confirmation key to modify it. If you need to delete the Custom combination, on the Custom page, select the Reset Combo and press the confirmation key to reset the Custom combination. (Figure 4-18)

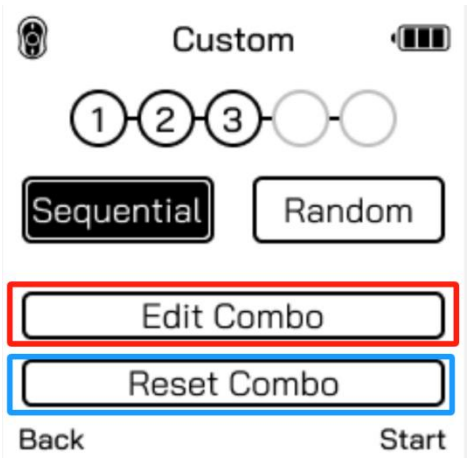


Figure 4-18

4.5. Settings

Select Settings and press the Confirm button to enter the Settings page, where users can set system parameters, and the parameters are effective for all combinations (including programmed drills and Custom).

4.5.1. Language and Dominant Hand

On the first page, you can set the language to Chinese or English. The dominant hand can be selected as left or right hand according to the user's holding hand. Operation method: Use the up and down keys to select, and press the confirm key to save. (Figure 4-19)

Figure 4-19

4.5.2. Practice Time or Number of Practice Sets

On the second page, you can set the time or number of practice sets. The default

parameters of time and combo are 0, which means serving all the time. If you need to modify, the operation method is: select the parameter name to be modified by using the up and down keys, and press the confirmation key. At this time, the background of the parameter name changes from white to black. Press the confirmation key again, and the background of the parameter value on the right changes from white to black. At this time, use the left and right keys to adjust the parameter value. After the adjustment is completed, press the confirmation key again to save the parameter. (Figure 4-20)

Figure 4-20

4.5.3 Screen Auto-Lock

Page 3 can set the N-Control S screen off time, use the up and down keys to move, press the confirm key, the parameter background changes from white to black, and the changes are saved. (Figure 4-21)

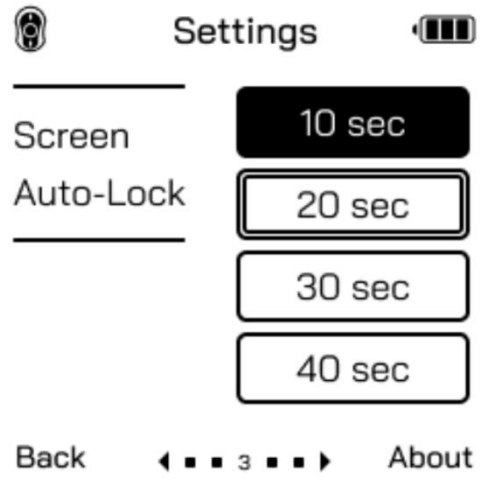


Figure 4-21

4.5.4. Shorter and longer Adjustment

Page 4 can set the arc height of topspin and backspin. The default value of Shorter&Longer are 0. If you need to modify, the operation method is: select the name of the modified parameter with the up and down keys, press the confirmation key, and the parameter value background on the right will switch from white to black. At this time, use the left and right keys to adjust the parameter value. After the adjustment is completed, press the confirmation key again to save the parameter. This operation is generally suitable for scenes where you need to adjust the arc of all programmed drills. (Figure 4-22)

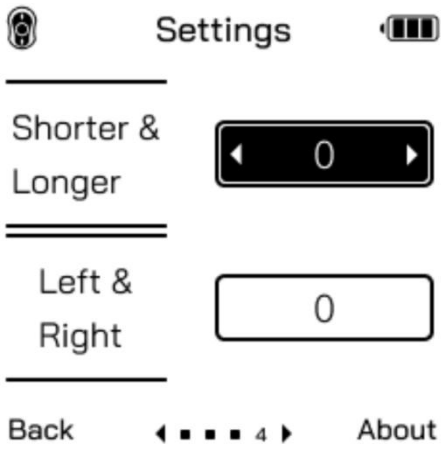


Figure 4-22

4.5.5. Left and Right Adjustment

Page 5 can set the parameters of landing point in left-right direction. The default parameter is 0. If you need to modify, press the confirmation key, the background of parameter value will switch from white to black, and then adjust the parameters using the left and right arrow keys. After the adjustment is completed, press the confirmation key again to save the parameters. (Figure 4-23)

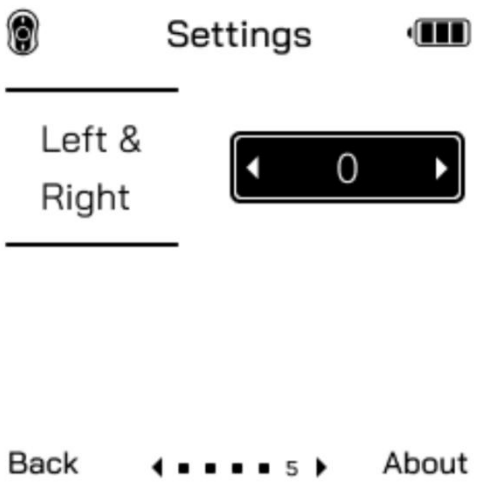


Figure 4-23

4.5.6. About

Press the About button in the upper right corner to view the current firmware version number and serial number of N-Control S.

If you need to restore the factory settings of the programmed drill, select the programmed parameter factory reset button, press the confirmation button, and select Yes on the confirmation page to restore the factory programmed parameters; similarly, you can also restore all factory settings parameters on the About page. (Figure 4-24-1, Figure 4-24-2)

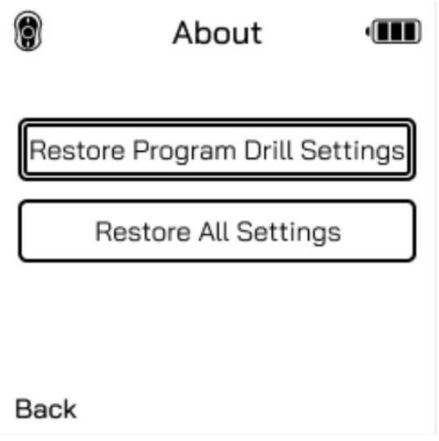


Figure 4-24-1

Figure 4-24-2

4.6. N-Control S Version Upgrade

Click "+" in the upper right corner of the APP page, select the N-CONTROL S model

on the Add Device page, and the APP will automatically search for nearby N-Control S. Select the serial number that matches the N-Control S , click the Pairing button, and wait for the APP to complete the Bluetooth pairing with the remote control. After the Bluetooth connection, click the Done button to view the paired N-Control S in the device list.

Click on the paired N-Control S to enter the detailed information page. If there is an upgradeable version, click the upgrade button at the bottom of the page to upgrade the version. (Figure 4-25)

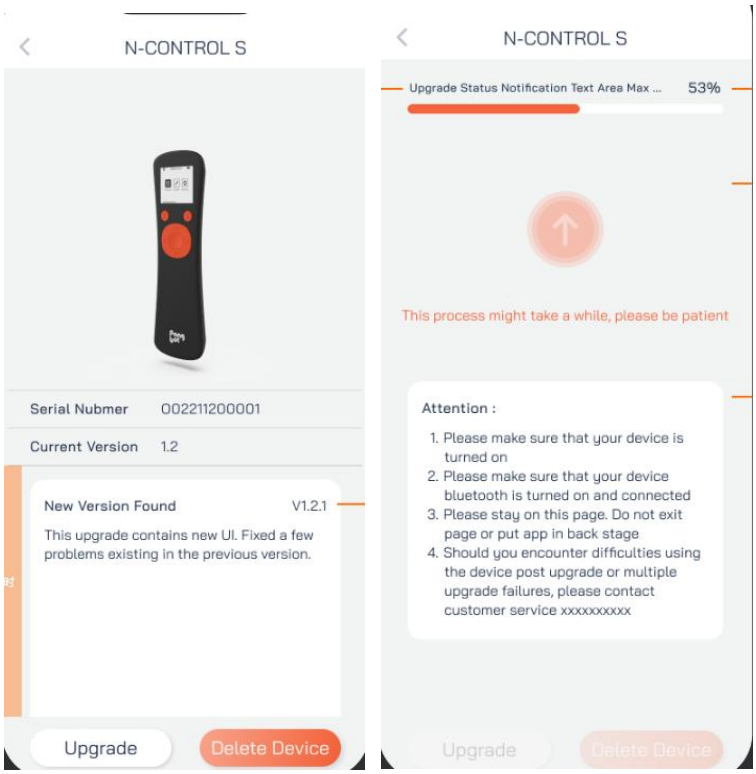


Figure 4-25

N-Control S on the APP page, click Delete Device to delete it.

5. Troubleshooting

Fault Phenomenon	Troubleshooting Methods
The indicator light on the robot head does not light up when it is turned on	1. Check whether the switch is in the "I" state; 2. Check whether the power input is normal; 3. If there are no problems with the above checks, please contact PONGBOT after-sales personnel.
The robot cannot send out table tennis balls	1. Check whether there are enough table tennis balls in the ball storage box; 2. Check whether there are any bad balls or foreign objects in the ball delivery channel, causing the ball to get stuck; 3. Check whether the ball delivery wheel is delivering the ball normally.
The robot's rotation type does not match the actual serve rotation type	Confirm that the robot head is consistent with the rotation type example diagram
The robot's serve point is inconsistent with the set parameters	1. Check whether the robot is placed in the correct position. 2. If a mobile power supply is used, check whether the power of the mobile power supply is sufficient. 3. Check whether the pitch and left- -right parameters in the settings are abnormal.
When adding a device in the APP , the robot cannot be searched	1. Check whether the robot is turned on. 2. Check whether the Bluetooth function of the mobile phone is turned on. 3. Check whether the positioning function of the mobile phone is turned on.

N-Control S cannot control the robot	1. Confirm whether N-Control S has completed Bluetooth connection with the robot
N-Control S screen cannot be woken up	1. Confirm whether the positive and negative poles of the battery are installed correctly; 2. Confirm whether the battery has sufficient power;

5.1. Robot Fault Light Language

Upper Light		**Lower Light**		**Light Language Explanation**
Color	**Frequency (times/second)**	**Color**	**Frequency (times/second)**	
Red	1	Red	Always on	Pitch initialization failed
Red	Always on	Red	1	Left and right initialization failed
Red	1	Red	1	Ball delivery failure
Red	Always on	Red	Always on	MCU and ESP communication failed (SN code reading failed)

5.2. Cleaning and Maintenance

※ Clean the dust and foreign matter in the ball storage box regularly ;

※ Regularly clean the dust and foreign matter of the ball squeezing wheel and inside the ball outlet tube ;

※ Clean the hair and foreign matter on the motor shaft of the ball squeezing motor regularly ;

Note: The above operations must be performed when the robot is powered off.

6. Warranty Period

Name	Warranty
Robot	1 year
N -Control S	1 year
Power adapter	1 year
Other accessories	1 year
Core components (all motors)	3 years

We warrant to retail purchasers that this product will be free from defects in material and workmanship for a period of 1 year from the date of purchase.

If the device fails during the warranty period, you will receive a replacement part and replacement instructions. If you choose to return this product, please comply with the following requirements, otherwise it will affect your normal return.

i . Provide necessary invoices, receipts or other valid information;

ii . Confirm that all accessories are complete and not missing;

iii . Make sure the packaging is safe to avoid damage during transportation.

After-sales Contact Information

Email: service@pongbotsports.com

WhatsApp: +86 18321792700