

<Auto Tee-Up (GT-I) Manual>

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1. Basic Configuration and Specifications

The basic system configuration consists of GDR (PC) + GT-I + 2 Keypad & FND Modules.

1.1 Bidirectional Communication Integration with GDR Client

- Mainly used for detecting communication ports, ball presence, and tee height adjustment data.
- Communication Method: RS-232

1.2 Bidirectional Communication Integration with Keypad (Manufactured by Saeilwin)

- Keypad operations are handled through communication, including data for ball supply, left/right movement, up/down movement, and mulligan functions.
- Communication Method: RS-232

1.3 Control of Each Tee-Up Machine via Main Control PC

- Controls include assigning operation time and power ON/OFF.
- Equipped with a central control system.

1.4 2-Keypad&FND Module



1.4.1 Supports GDR-Linked / Non-Linked Modes (Controlled via Keypad Switch)

1.4.2 Configuration: Left/Right Up/Down Buttons and a Center FND Display

1.4.2.1 The FND Displays 3 Alphanumeric Characters

- Linked Mode: The tee height is displayed during communication-based operation and returns to the previous state after 1 second.
- Non-Linked Mode: The ball count is displayed, increasing by 1 for each ball.

1.4.2.2 Tee height is displayed in inches. Example: 1_0, 1_2, 1_4 ...

1.4.2.3 Error codes are displayed in case of emergency. (Refer to Error Code List)

1.5 Ball Supply Controller: MAIN

1.5.1 Ball Supply Motor Control Model: BOAI LRS-545-24V-6500

Specifications: 24V, 6,500 RPM (DC



Motor)

1.5.2 Ball Collector Operation Control

1.5.2.1 Upon power-on, the tee base performs one downward movement to the home position and then enters standby mode.

1.5.2.2 When a signal is received or manual keypad operation is detected, the DC motor rotates (rotating the disc) until a ball is detected by the side optical sensor on the rubber tee. When a ball is detected, the ball collector DC motor stops, and the rubber tee-up operation is performed immediately afterward.

1.5.2.3 If the ball supply to the tee is not detected during normal operation, the ball supply motor runs continuously for 12 seconds. If it reaches 12 seconds, the motor stops (no alarm generated).

After replenishing balls in the collector, if a ball is detected within 12 seconds through keypad operation, ball supply resumes and normal operation continues.

1.5.2.4 Immediately after detecting a ball on the tee, a reverse rotation of approximately 5 mm is performed.

1.5.2.5 A ball jam (overload) occurs when the current reaches or exceeds the overcurrent threshold of 1.5A. If this current level is maintained for 1.5 seconds, the ball supply motor performs 3 retry cycles (forward/reverse rotation).

If normal supply does not resume after a total of 3 retries, operation stops and error code **E-1** is displayed.

1.5.2.6 If normal operation is restored after two operation cycles, the accumulated overload detection count is reset.

1.5.3 Auto Tee-Up Motor Control Model: NIDEC KH56KM2U262 **Specification:** 3.6V (Stepping Motor)



1.5.4 Tee-Up Motor Operation Control

1.5.4.1 When position data is received from the home sensor (photo sensor) location, the stepping motor performs forward/reverse rotation according to the designated position.

1.5.4.2 When power is applied, the tee base performs one cycle of upward/downward motion with no ball present.

1.5.4.3 After the initial operation is completed, the tee-up motor remains in standby with the tee base lowered. When a ball is supplied onto the tee via the rotating disc, and the side sensor detects the ball, the tee-up motor rotates, raising the tee base to deliver the ball.

1.5.4.4 After rising, if there is no ball on the tee (meaning a shot was taken), the tee base returns downward normally and supplies a new ball. If it was a swing miss or the ball rolled off, press the ball supply button once to lower the tee and allow another ball to be supplied.

1.5.4.5 After the tee base descends, the process in 1.5.4.3 is repeated.

1.5.5 Tee Height Control

– Function to check the home position when power is ON/OFF.

Height	Home Position	Not Use	in	25	30	35	40	45	50	55	60
Data	X06	X0A		X0B	0X0C	0X00	0X01	0X02	0X03	0X04	0X05

1.5.5.1 7-Step Position Control

1.5.5.2 Standard 9 Sections / Actual Height (Considering Mat)

1-0X05 (60 mm – Upper Limit) / 85 mm

2-0X04(55mm) / 80mm

3-0X03(50mm) / 75mm

4-0X02(45mm) / 70mm

5-0X01(40mm) →default / 65mm

6-0X00(35mm) / 60mm

7-0X0C(30mm) / 55mm

8-0X0B(25mm) / 50mm

9-0X06 (0 mm – Home Position)

1.5.6 Sensing Method

1.5.6.1 Detection of stepping motor operation time limit, home position, position, and upper limit.

1.5.6.2 Home Position Detection: Detected by a photo sensor located at the lower home position.

1.5.6.3 Upper Limit Detection: Detected through stepping motor overload values.

1.5.6.4 Ball Detection and Collector Control: When a ball is seated on the tee, the side optical sensor detects it, stopping the collector and initiating tee-up or preparing for tee-up.

1.6 AC Input and DC Output Specifications

1.6.1 (a) AC Inlet (Equipped with fuse, noise filter, and ON/OFF switch.)

1.6.2 (b) SMPS (DC 24V, 4.5A)

1.7 Control Interface Ports

1.7.1 PC Interface Port

- RS-232 Communication × 1: Integration with GDR PC

- RS-422 Communication: Control of tee-up machines from the main PC (supports up to 255 units)

1.7.2 Keypad Communication Ports RS-232 Communication × 2

1.7.3 Tee Replacement Button

1.8 System Update

1.8.1 Firmware Download

- Firmware download via RS-422 communication

- Firmware is downloaded through the MAIN BOARD 'J5' connector

1.9 MAIN PCB

Co

Keypad Power / Control

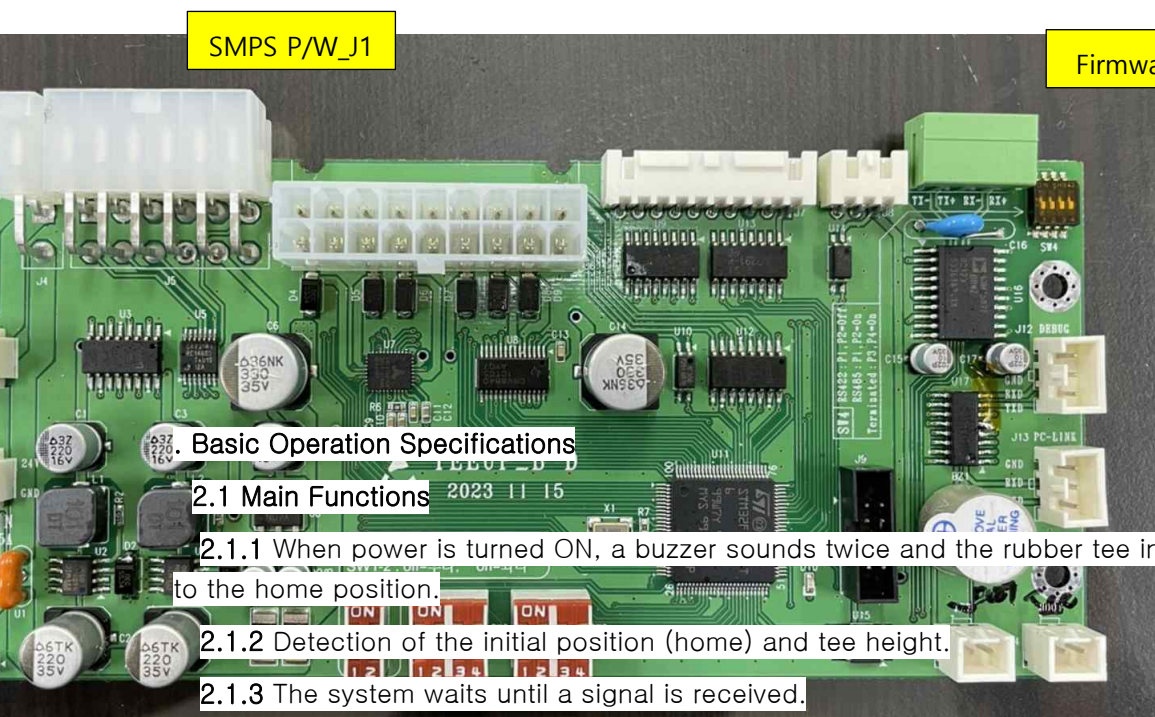
Ball Collector & Tee-Up Unit

RS422

SMPS P/W_J1

Firmware Port

RS232



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2. Basic Operation Specifications

2.1 Main Functions

2.1.1 When power is turned ON, a buzzer sounds twice and the rubber tee initializes by returning to the home position.

2.1.2 Detection of the initial position (home) and tee height.

2.1.3 The system waits until a signal is received.

2.1.4 Communication Linked / Non-Linked Modes (Switch Selection)

2.1.4.1 In GDR-linked mode, tee-up/down operations and ball supply are executed according to the defined protocol.

2.1.4.2 In GDR non-linked mode (emergency mode), communication with the PC is disabled, and operation is performed via manual keypad control.

(At this time, the keypad FND displays and counts the ball count.)

● **Note:** Since there is no tee-down signal in manual mode, after tee-up—whether it is a normal shot or a missed shot—press the keypad button once to supply the next ball.

2.1.5 Forced Ball Supply Function: During normal play, tee-up/down operations are based on PC ↔ Auto Tee-Up communication. However, if for any reason the ball disappears after tee-up, pressing the ball supply button once will supply another ball. (Applies to both GDR-linked and non-linked modes.)

2.1.6 Central Control Function (Main PC → Tee-Up Machine Control)

2.1.6.1: The tee-up machine can be assigned an independent operation duration separate from the GDR client. (The keypad FND displays the time count.) After the assigned duration ends, the tee-up machine switches to **IDLE mode**.

2.1.6.2: Tee-up machine power ON/OFF control.

2.1.7 Tee Height Adjustment Function

2.1.7.1 In GDR-Linked Mode (Defined Protocol)

- Tee height is adjusted based on data transmitted from the GDR. Alternatively, holding the keypad button for 1 second triggers height adjustment.

2.1.7.2 In GDR Non-Linked Mode Height is adjusted by holding the keypad button for 1 second.

2.1.8 Ball Hit Detection

2.1.8.1 In GDR-Linked Mode (Defined Protocol) After tee-up, ball-hit/shot detection occurs via communication, and tee-down is triggered accordingly.

2.1.8.2 In GDR Non-Linked Mode Ball presence cannot be detected after tee-up.

2.1.9 Emergency Alarm Function

2.1.9.1 Buzzer alarm and error message functions.

2.1.9.2 Overload, home-sensor failure, etc., are displayed through the FND or buzzer.
(Refer to alarm/error code table.)

✳ **ERROR Display Method:** Shown via **FND and Buzzer**.

<Alarm Code Table>

Status	FND Display	Buzzer	Remarks
Overload Alarm	E-1	Buzzer sounds once at 0.5-second intervals each time an overload is detected.	When the ball collector's rotating plate fails to operate continuously 3 times <i>(If normal operation occurs after 2 accumulated failures, the accumulated count is reset)</i>
Tee Down Error <i>(Home Position Sensor)</i>	E-2	Three buzzer sounds at 0.5-second intervals	1. At Power-On: If the lower home position sensor is not detected for more than 14 seconds 2. During Use: If the lower home position sensor is not detected for more than 4 seconds
Firmware Version Display	F-4	None	Displayed for 1 second, then switches to GDR / Normal Mode
Initial Power ON	None	Two buzzer sounds at 0.5-second intervals	