



# Maintenance Manual

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Please Note: Should you require any further information regarding Power Tee maintenance, please call us on +44 (0)1793 822566.	

## Introduction

As a Power Tee operator you are now in the top 5% of driving range vendors in the world, giving your customers the very best service available. This comes at a price; instead of a rubber backed mat with a tee protruding through it, each of your Power Tee bays now have an automated teeing system which contains a machine with moving parts, sensors and buttons. To make the best of your system, it should be in good working order at all times. Unchecked, poor reliability can lead to discredit of the system and your business and even false claims of lost balls by customers trying to get a free basket.

This manual is designed to help you get the most from your system. It is not a replacement for customer services. Golf-Tech is available via the phone during normal office hours and will be pleased to help talk you through problems or replacement procedures. If you are uncertain about what needs doing to fix a machine or how to do it, give us a call, we will respond with advice and if this fails we will repair the machine for you.

A training course is available at which the attendee will learn all of the ins and outs of their system, be given a spares and tool kit and be certified as a qualified Power Tee technician. If you can learn how to repair machines during your warranty period of one year there is no reason why you can't be self-sufficient when you come out of warranty with postal replacement of parts.

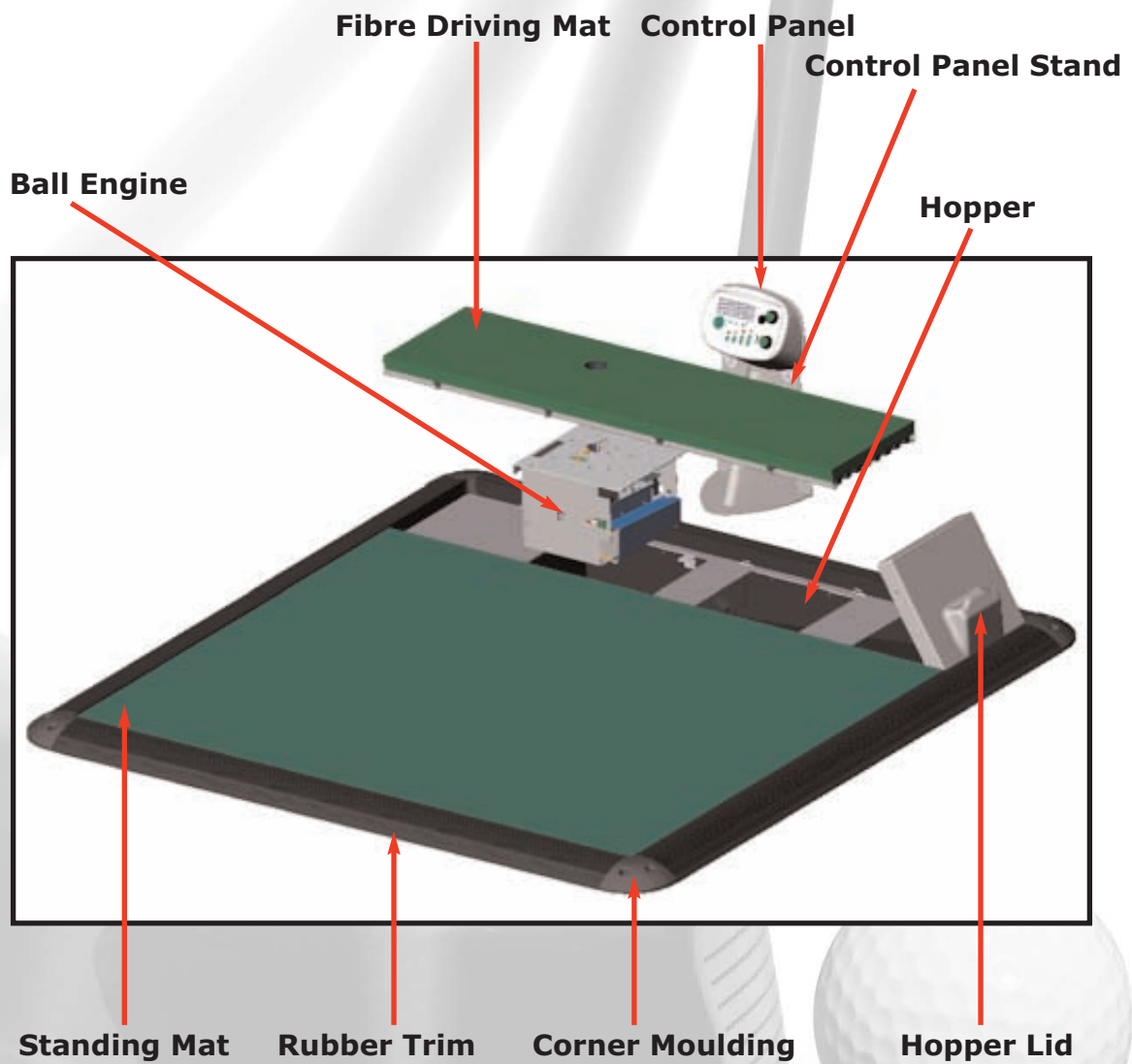
Golf-Tech is looking forward to working with you on Power Tee to help you to build your business.

### **Information to user**

Changes or modifications to this equipment, not expressly approved by Power Tee, may void the user's authority to operate this equipment.



## 1.1 Components of the Mark II Power Tee



## 1.2 Health & Safety

When working on a Power Tee bay, always handle the components with care, all efforts are made to remove sharp edges from metal components, this will not stop you cutting yourself if you handle the components carelessly. Pay particular attention to the fixing lugs on the driving mat and beware of the metal cross braces when clearing out the hopper.

Keep range customers out of the bay where you are working as they may step into the hopper and trip, or unbalance the driving mat causing it to fall and cause injury.

## 1.3 Warranty

Golf-Tech warrants that, for a period of one year after shipment, products manufactured by it shall be free from defects in material and workmanship when installed, serviced and operated within the specifications for which they were designed. Golf-Tech will replace or repair any equipment or parts that fail provided that investigation and factory inspection discloses that such defect developed under normal and proper use by the original user. Golf-Tech's liability under this warranty is limited to such replacement or repair and it shall not be held liable in any form of action for incidental or consequential damages to property or person. The foregoing is in lieu of all other warranties, express or implied, including the warranties of merchantability and fitness for particular purpose. Representations and warranties made by any person, including dealers and representatives of seller, which are inconsistent or conflict with the terms of this warranty (including but not limited to limitations of liability as set forth above), shall not be binding upon Golf-Tech unless reduced to writing and approved by an expressly authorised representative of Golf-Tech.

## 1.4 Benefits to Business

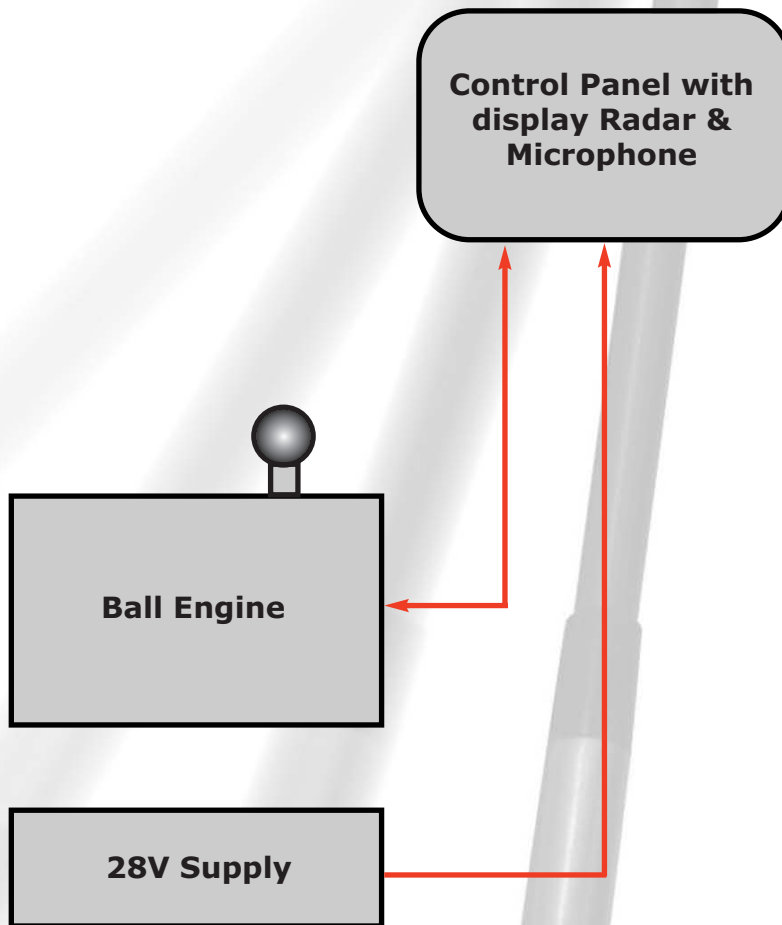
As well as being a highly desirable way to practice your golf on the driving range, Power Tee offers significant benefits to the business operating the system. These come in the shape of repeat purchases by golfers who have hit their balls quickly and have more time to spend on the range, and repeat purchases by golfers who feel less tired by virtue of not having to bend down to tee up each ball. In peak times when the range customers are queuing, Power Tees will put through 30 to 40% more balls per hour than a conventional mat. Many customers will go the extra mile to use a Power Tee over a normal mat. To get the best out of your tees make sure you keep them in tip top shape and looking good.

## 1.5 Golfer Benefits

Some golfers will see the Power Tee as a gimmick or lazy person's toy. If you are on the range and people are not using the Power Tees, find out why and offer them 5 free balls showing them the tee heights and new ball button. Many top golfers talk about Swing Grooving, Muscle Memory and Repetition. Power Tee also allows golfers to make small and measured adjustments to each swing and see the net result on ball flight. The more you and your team promote these benefits the more successful Power Tee will be for you.

## 2 Power Tee Diagrams

### 2.1 Power Tee Diagrams



Power Tee is the ultimate modular system comprising of two main components: Control Panel & Ball Engine, both of which can be replaced on site and the faulty component returned to us for repair and test in the factory.

In the event of failure, there are diagnostic features to the software that will help you to identify which component has failed or jammed.

### 2.2 Ball Engine

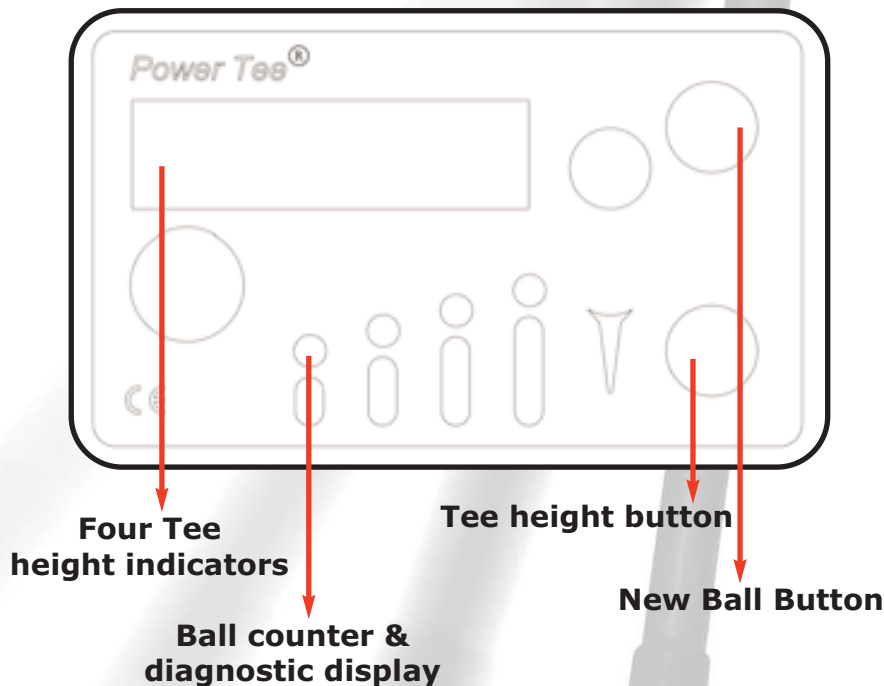
The patented Ball Engine contains every moving part in the Power Tee. There are a few operations you can carry out to repair the Ball Engine, namely spring replacements and greasing of some moving parts, apart from these the Ball Engine will generally be returned to base for bench repair.

The Ball Engine is connected to the Control Panel via a six-way cable.



## 2.3 Control Panel

The Control Panel houses the display, the power switch, microphone, radar module sensor and the two buttons for requesting a new ball or changing the tee height.



## 2.4 Sensors & Terminology

There are three main sensors you need to be aware of in a Power Tee. These are:

- 1 Radar module sensor**
- 2 Microphone**
- 3 Ball in hopper sensor**

The radar and microphone sensors combine to detect when a ball is struck. If a Power Tee detects a swing combined with a specific type of loud sound (that of a ball being hit) the Power Tee will present a new ball. If either of the sensors is not working properly the machine will not present the ball automatically and the golfer will need to press the "new ball button" on the Control Panel to have a new ball presented.

The ball in hopper sensor is a light beam that travels along the scoop of the Ball Engine. When balls are poured into the hopper, they roll onto the Ball Engine scoop where the beam is broken and the machine starts its cycle presenting a new ball for the golfer to start his practice.

## 2.5 Power Switch

The power switch is located on the underside of the Control Panel. Operating this switch disconnects the Power Tee completely from the DC supply. Remaking this switch will automatically re-initialise the Ball Engine and its controlling software.

## 3 Routine Maintenance

### 3.1 Water Issues

When a Power Tee is supplied, the hopper is completely sealed to within 50mm of the surface to which it is fitted. It is therefore possible for the hopper to fill with water. If the hopper fills to within 120mm of the surface the electronics will become wet and stop working. Drying the Ball Engine overnight should revive the Ball Engine.

#### There are three ways for water to enter the machine

##### 1 Rain / surface water

Depending on the height of roof, overhang, prevailing winds and frequency/intensity of rain, the amount of water entering the machine through rain should be no more than a few mm per month, this will give rise to the need for cleaning out once every 2 months under normal conditions.

##### 2 With the balls supplied

Some ball dispenser / washers supply the balls wet, in this case the amount of water deposited in each machine will depend on many factors, mainly the number of uses per day and the amount of water on the balls when they reach the bay. To get a feel for this input the machines should be regularly checked in the first two months of operation. Bear in mind that the more popular bays will take in more water than the quieter bays.

##### 3 From below ground / flooding

In the vast majority of ranges the water table is many metres below the surface of the range, however if the water table rises to within 50mm of the range surface, water can flow freely into the machine and flood the Ball Engine. If this is a rare occurrence on your range, the Ball Engines can be removed when flood warnings come in and replaced when the range reopens. If the water table is naturally high but doesn't come to within 50mm of the range surface, the hopper will keep the mechanism protected from this type of ingress.

#### There are three ways for water to exit the machine

##### 1 Evaporation

Over time, any water entering the system will gradually evaporate. The rate of evaporation is unlikely to exceed the rate at which water enters the machines except in the driest hottest periods.

##### 2 Manual removal

The water can be mopped out or vacuumed out at regular times during the year. This operation must be scheduled and carried out regularly (monthly) for the first year of operation with the frequency being reduced as the operator becomes familiar with the water input at that particular site.

##### 3 Drain hole

Although the liner is supplied sealed, it is possible to drill a hole in the liner to shallow water to drain freely from the liner. Before doing this it is important to be sure that the water table does not rise high enough to flood the liner from outside. Units that are damaged due to extended periods submerged in water are not covered under the warranty.



## 3.2 Daily Maintenance

Tees should be inspected on a daily basis. The Control Panel will flash the top and bottom tee height simultaneously if the tee is broken. Not all customers will tell the reception if the tee breaks when they are using it. All staff who are regularly on the range should be briefed to look out for broken tees when on the range.

## 3.3 Monthly Maintenance

On a monthly basis, each machine should have the ball tray inspected for foreign objects and cleaned with a damp cloth. The surrounding trim, hopper lid and the control panel should be cleaned. Vacuuming the standing mat and the driving mat will increase the life of the mats.

## 3.4 Quarterly Maintenance

On a quarterly basis, the Ball Engines should be cleaned, inspected and greased.

**NB – ONLY GREASE SUPPLIED BY GOLF-TECH SHOULD BE USED AS IT IS SPECIFIED FOR THE ENVIRONMENT (CASTROL LMX).**

# 4 Possible Bay Faults

In many cases, re-setting the Power Tee will cure the problem. Turning the machine off does this via the switch on the underside of the Control Panel and then switching back on again.

## 4.1 Power Tee dead no display

This is most likely to be the Control Panel, however a damaged cable or faulty Ball Engine may be short-circuiting the Control Panel. To find the component where the fault lies is a process of elimination. To avoid damaging your replacement Control Panel, do not connect the 6 way cable, only connect the two power cables to the switch before switching on the panel (see below, section 5.4, for instructions on how to change the Control Panel). The display will read, "Ball Engine not connected".

Turn off the Control Panel and connect the 6-way connector (this connects the Ball Engine). Turn on the unit and wait for two seconds. If the display was readable, then the fault was with the actual control panel. If the display remains blank, the Ball Engine or Ball Engine cable caused the fault, turn off the Control Panel immediately to avoid damaging it. Change Ball Engine and repeat. If the display remains blank, replace the ball engine cable (refer to Section 5.7).

## 4.2 Ball is not automatically replaced after each shot

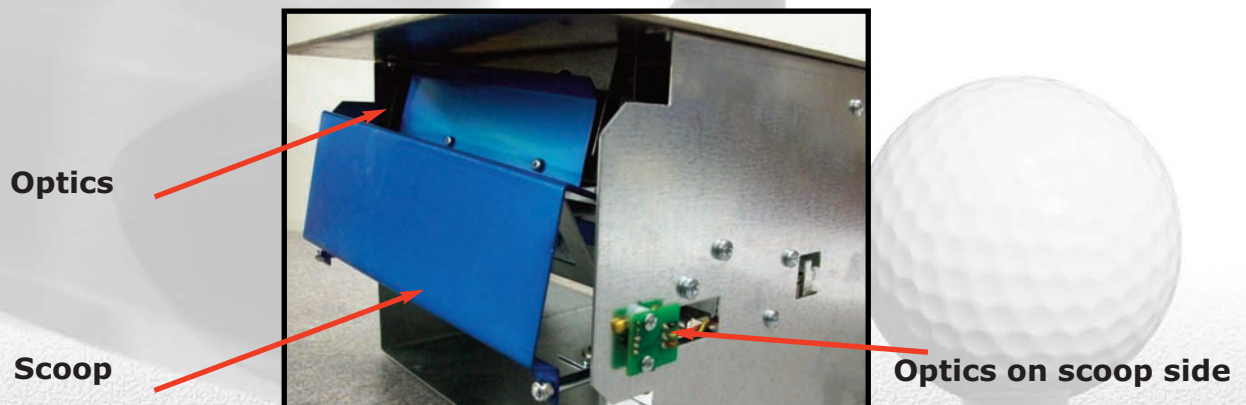
This fault will be caused by either the microphone or the radar PCB in the Control Panel. To determine which is the cause of the problem, the Power Tee must be put into set-up mode.

To do this you must:

- Press and hold both the tee height and new ball button on the Control Panel.
- Switch off power button on underside of Control Panel, wait 2 seconds and switch back on.
- After a few seconds the display will read, "release buttons to select mode".
- Release both the tee height and new ball button simultaneously.
- Pressing the tee height button three times will select the set-up mode. Then press the new ball button to accept this mode.
- The lower line of the display will now show two meters.
- The meter beginning with "S" is the Speed meter and should respond to a hand waving across the top of the tee in a motion simulating a golf club hitting a ball.
- If this does not work, the fault lies in the radar module in the Control Panel, you will need to replace the Control Panel.
- The meter beginning with "M" is a Microphone meter and should respond to a clap near the Control Panel or a light tap on the lower half of the Control Panel enclosure. If the meter does not respond, you will need to replace the Control Panel.

## 4.3 Power Tee does not start when balls poured into hopper

This is caused by a problem with the ball in hopper detectors, remove the Ball Engine and inspect the optics for dirt and debris.



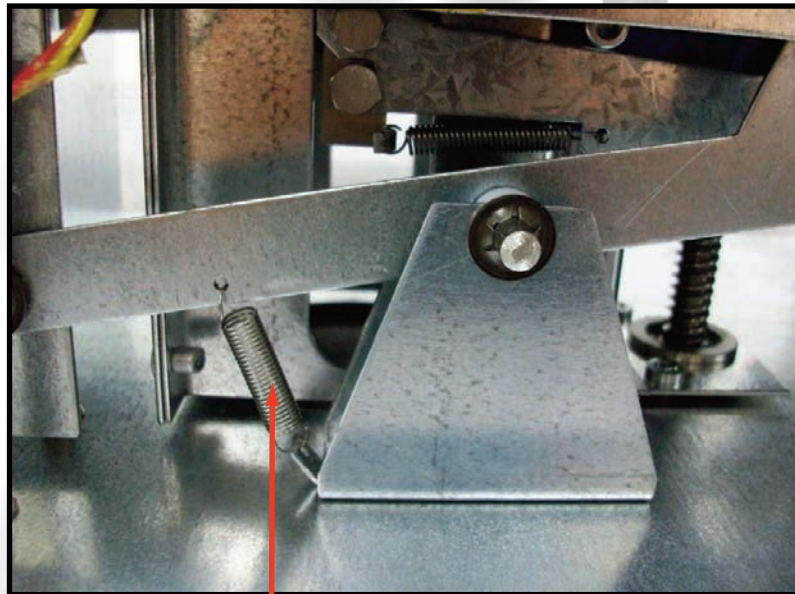
If there is no obvious fault, the spare Ball Engine should be fitted and the faulty Ball Engine returned to the factory for repair.



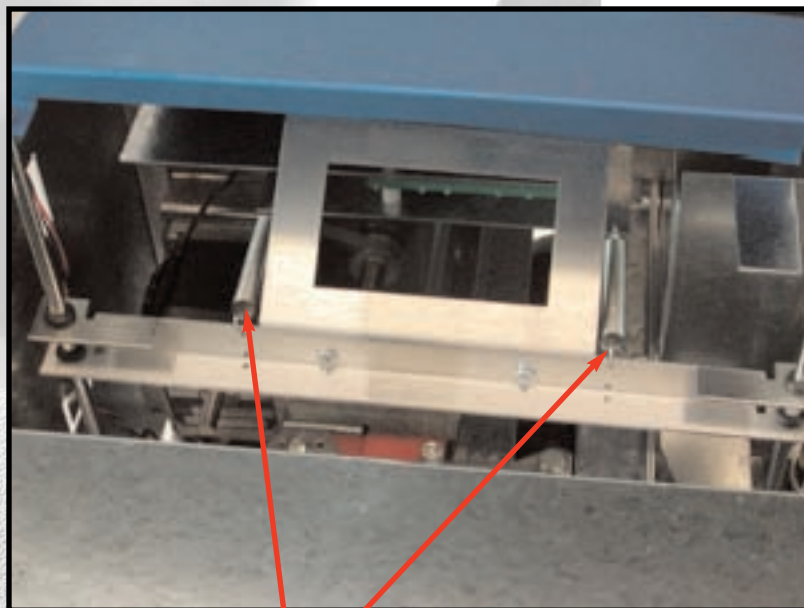
#### 4.4 Balls do not feed from hopper to tee

Ensure that balls are not stacked up on top of the scoop. Once all balls are removed from the hopper and scoop, reset the machine. If the fault persists remove the Ball Engine and check the injector spring and scoop springs. If the fault persists exchange the Ball Engine.

#### 4.5 Broken springs



**Replace injector spring if broken**

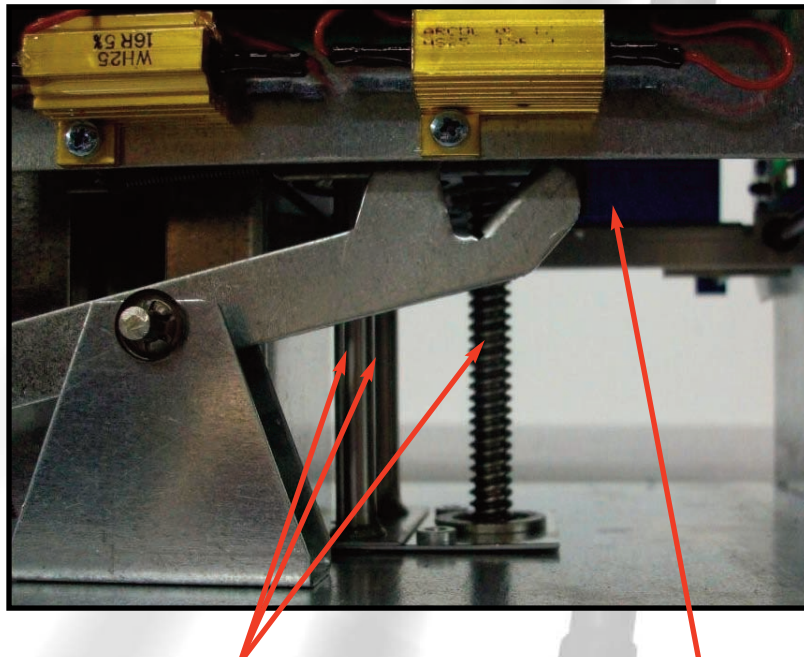


**Replace scoop spring if broken**



## 4.6 Machine is noisy as tee lowers

If the machine is making a “chattering” noise as the tee lowers, this normally indicates that the lead screw and/or guide bearing bars require lubrication.



**Grease the lead screw and the two bearing bars above and below the carriage**

**Carriage**

## 5 Maintenance procedures

### 5.1 Tee change

Cycle the Power Tee into the up position by dropping a ball into the hole where the ball normally emerges and pressing the new ball button. When the tee is in the up position, select the top tee height and use the tool provided to remove the damaged tee. Drop the tee fixing bolt into a new tee and refit. If the damaged tee is stuck in the mechanism, select the lowest tee height and use a screw driver to straighten the damaged tee so that the tee fixing bolt can be removed. Drop the tee fixing bolt into a new tee and refit.

### 5.2 Reset Power Tee

To reset the Power Tee, switch the power button on underside of Control Panel, wait 2 seconds then switch back on, the machine will initialise. After initialisation the Control Panel will display a “TRAVEL” reading. The travel must be between 101mm and 105mm. If the travel is less than this there may be a mechanical fault or a foreign object in the Ball Engine restricting the movement.

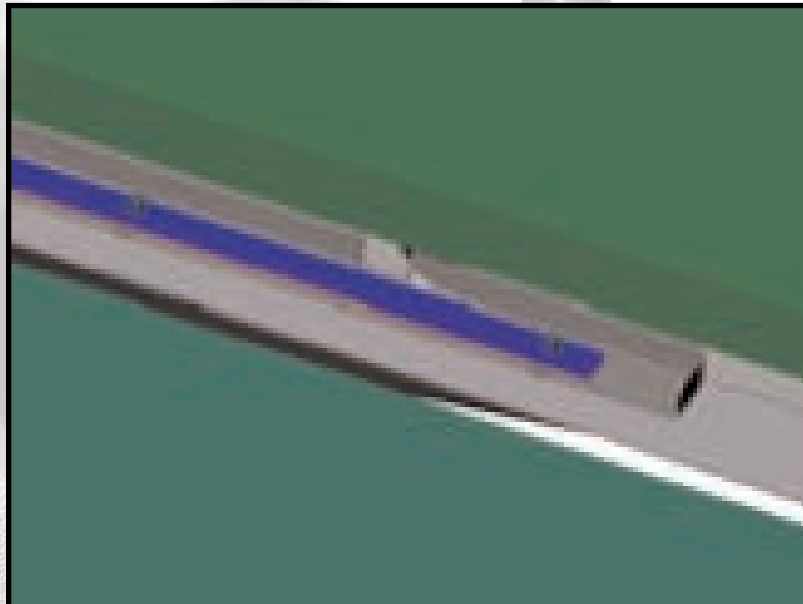
## 5.3 Driving Mat removal and fitting

### Removal

Lift the edge of the standing mat furthest from the driving mat and pull away from the driving mat by about 6".



**Slide the mat clamp to the right and lift the near edge of the driving mat.**

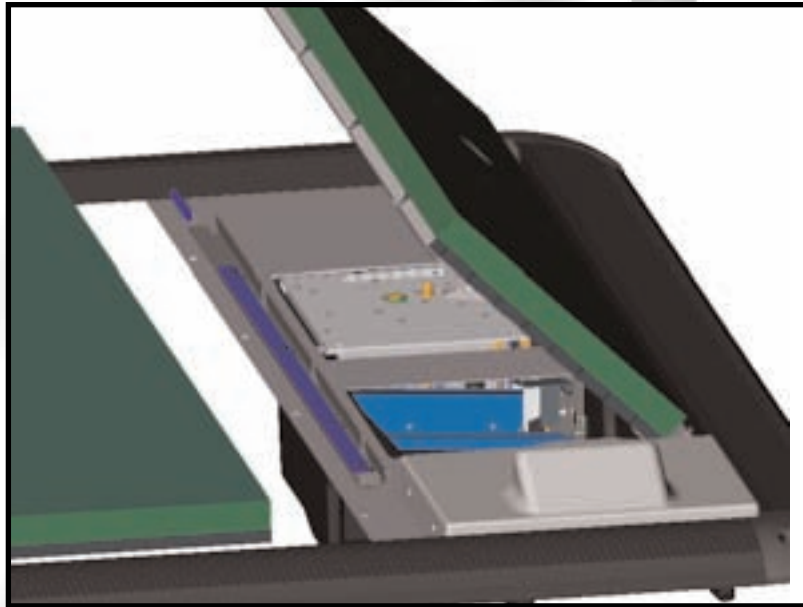


**Lay the mat to one side ensuring that it is in a safe place where people will not trip on it.**

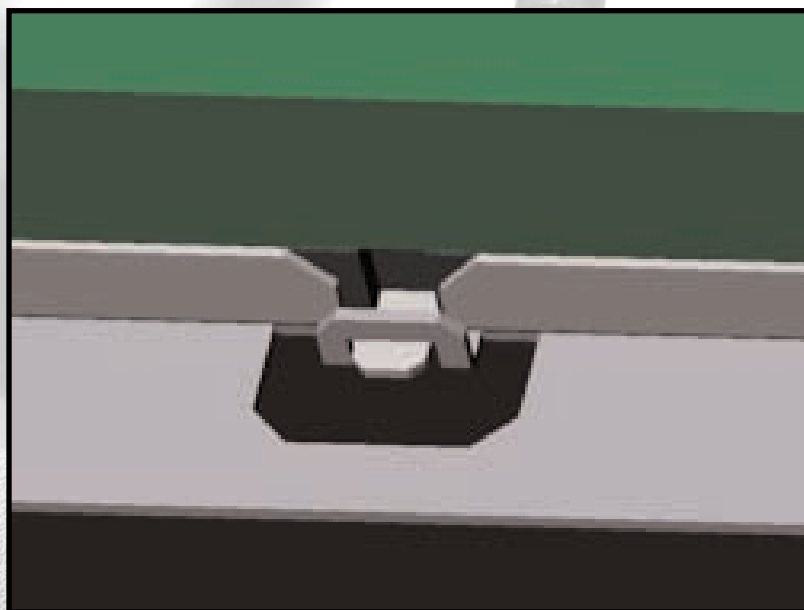
## Refitting

Ensure that the metal lugs on the metal rails have not been damaged. If the mat was not fitted properly the lugs may be "bent" out of position. If there is any damage, use a reasonable size pair of pliers and bend the lugs back into position.

Place the mat in position ready for refitting at approximately 45 degrees to the ground.



**Slide the mat away from you ensuring that all of the lugs locate properly under their loops.**



**Lower the mat into position while holding the mat clamp to the right. When the mat is firmly in place, release the mat clamp.**



## 5.4 Control panel change

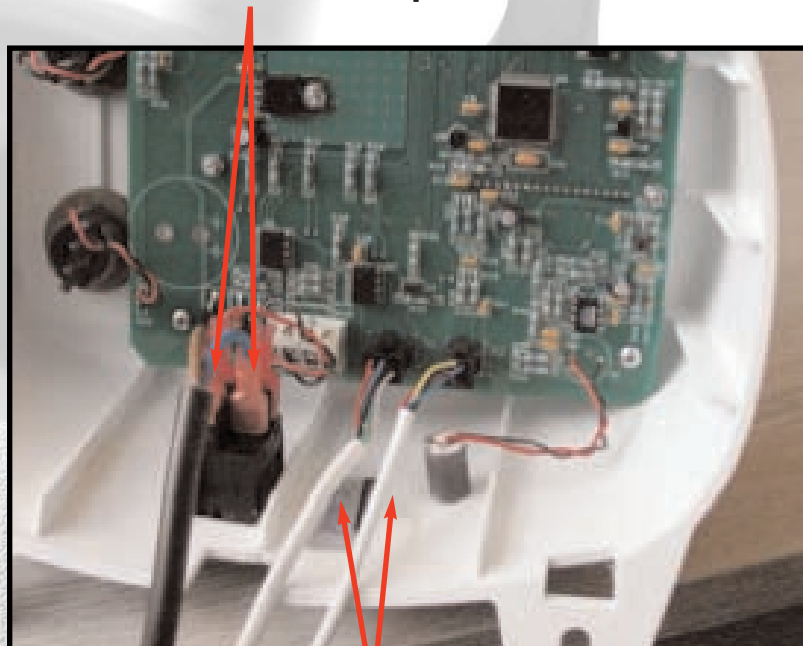
Switch off the power to the bay via the switch on the underside of the Control Panel  
Undo the two lower retaining screws.



**Undo these two screws**

Ensure that the metal lugs on the metal rails have not been damaged. If the mat was not fitted properly the lugs may be "bent" out of position. If there is any damage, use a reasonable size pair of pliers and bend the lugs back into position. Place the mat in position ready for refitting at approximately 45 degrees to the ground.

**First disconnect the two power connectors**

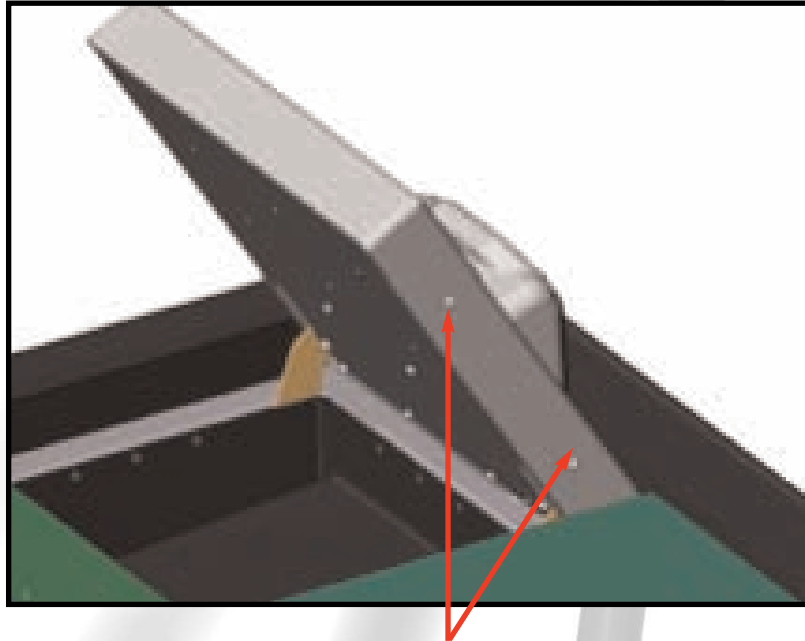


**Then disconnect the six way cable**

To refit the new panel, reverse the procedure.

## 5.5 Replacing hopper lid

Open the Hopper Lid and remove the four cover retaining screws.

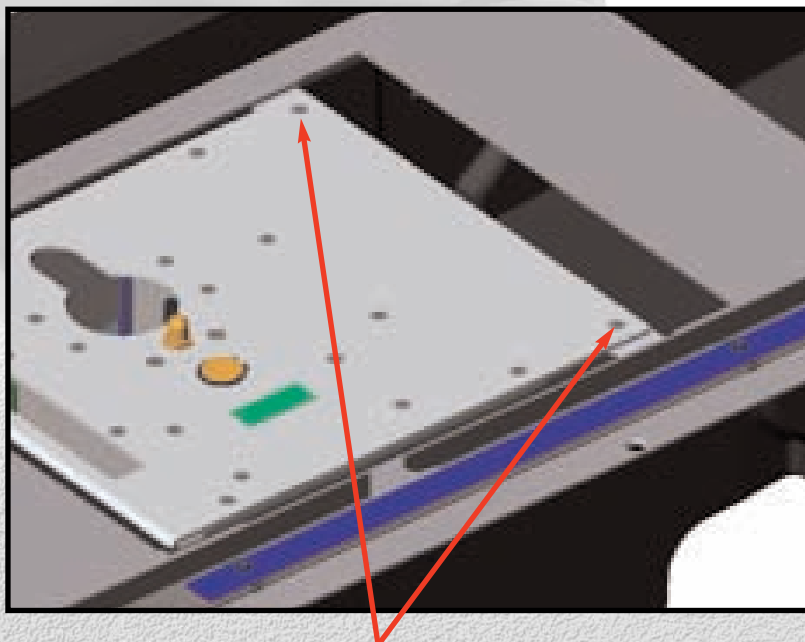


**Remove two screws from each side using the allen key supplied.**

Lower the lid and lift off the cover. To refit the hopper lid, press new cover onto hopper lid when lid is closed and replace screws.

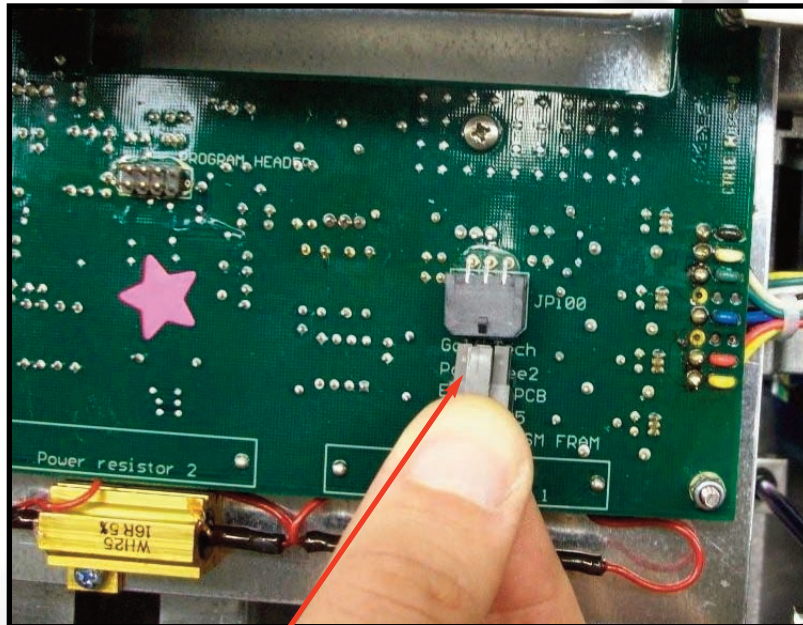
## 5.6 Ball engine change

- Switch off Power Tee at the Control Panel.
- Remove the Driving Mat as described above (section 5.3).
- Remove any balls or foreign objects from hopper.
- Remove the two retaining screws.



**Remove these two screws only**

Carefully lift out the Ball Engine and place on the first hopper brace.



**Disconnect cable, taking care to press in the locking lug before pulling connector.**

- Set faulty Ball Engine to one side and take opportunity to clean out any foreign objects from inside the hopper base.
  - Place new Ball Engine on the first hopper brace.
  - Reconnect the cable.
  - Lower the new Ball Engine into place.
- BE CAREFUL NOT TO TRAP THE CABLE BETWEEN THE BALL ENGINE TOP PLATE AND REAR SUPPORT STUDS.**
- **IMPORTANT** - Refit retaining screws.
  - Replace driving mat.
  - Switch on Power Tee and check travel is between 101 and 105mm.

## 5.7 Ball Engine Cable (6 way connector)

- Remove Control Panel and Ball Engine. (See above for details).
- Tie string around the Ball Engine cable in liner.
- Tape over the join to prevent snagging.
- Pull the cable through the conduit drawing the string behind.
- Attach cable to the string in a similar way and pull back into place using the string.
- Replace any cable ties.
- Replace Ball Engine and Control Panel.

## 6 DC Power supply

Each bay is fed approx. 28V DC from a switch mode 110-240V mains power supply. The number of Power Tees installed will govern the size and number of Power Supply Unit(s).

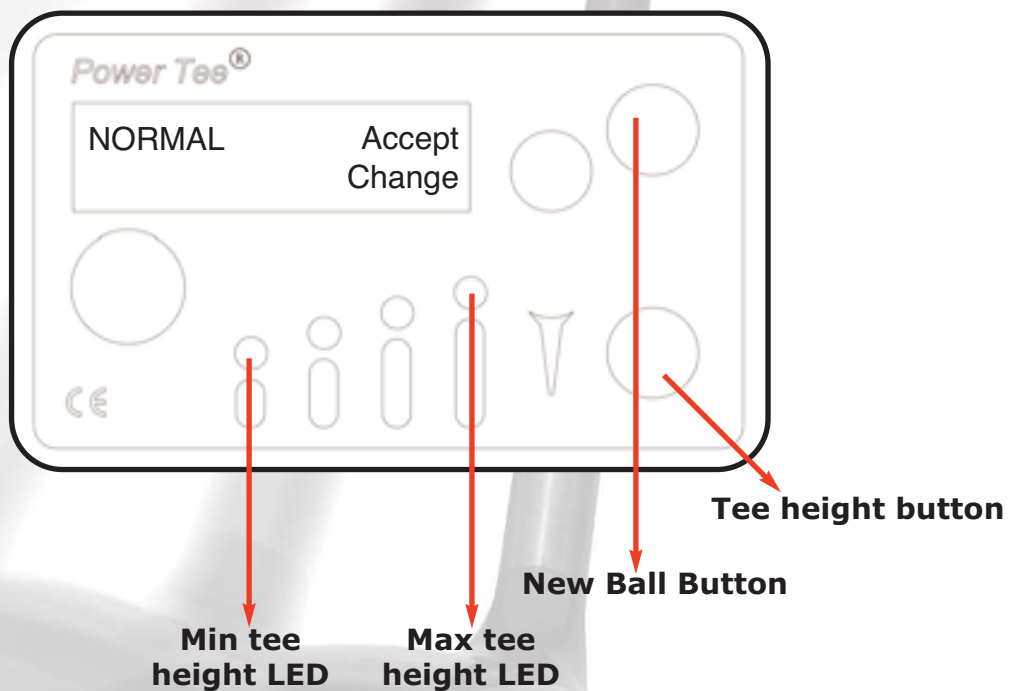


## 7 Software Diagnostics

Each bay is fed approx. 28V DC from a switch mode 110-240V mains power supply. The number of Power Tees installed will govern the size and number of Power Supply Unit(s).

To enter software diagnostics, press and hold both the tee height and new ball buttons on the Control Panel. Switch the power button on underside of Control Panel, wait 2 seconds then switch back on. After a few seconds the display will read, "release buttons to select mode". Release both the tee height and new ball button simultaneously. Pressing the "tee height" button will cycle through the various diagnostic modes.

Display will default to:



Press the tee height button to cycle through the four modes:

Mode 1	-	Normal
Mode 2	-	Nudge
Mode 3	-	Auto
Mode 4	-	Set-up

### **Mode 1      Normal**

Same setting for normal start up

### **Mode 2      Nudge**

Accept the nudge mode by pressing the "new ball" button. The Ball Engine will go through the start up sequence to set min and max travel.

Pressing the "new ball" button raises the tee and pressing the "tee height" button lowers the tee. The top left display will show the travel in millimetres.

The bottom left will display "C T H ". These are the optic sensor diagnostics. As the tee moves up and down, the optic beams will be blocked and the characters will show. When the beam is not blocked, the display will only show a "dash".

The "C" sensor is the carriage position sensor. This is the main sensor that the machine relies on to set the initial min and max travel.

The "T" sensor informs the machine whether the tee is present or whether there is a ball still on the tee when cycling to feed a new ball, this sometimes happens when a person presses the button for a new ball when a ball is already on the tee. If there is no tee present, the minimum and maximum tee height LED's will flash (in normal mode only).

The "H" sensor informs the machine that there is a ball on the scoop that is fed directly from the hopper. This is the sensor that starts the cycle when the golfer pours the balls into the hopper.

If any of the sensors are faulty, the display will only show the dash character when the beam is interrupted. The Ball Engine will have to be returned to Golf-Tech for base repairs.

### **Mode 3      Auto**

This mode is for in-house testing. The engine undergoes comprehensive testing to ensure correct build. Not to be used on site for normal usage or fault finding.

### **Mode 4      Set-Up**

Cycles through the following:

-----	BAY
-----	ADDRESS
-----	MIN T HEIGHT
-----	MAX T HEIGHT
-----	BALL COUNT

Bay	-	Balls served by this display unit
Address	-	Communications address for display (usually the bay no)
Min T Height	-	Lowest tee height default = 3 (range 2 - 12mm)
Max T Height	-	Highest tee height default = 38 (range 26 - 38mm)
Ball Count	-	ON/OFF

## **8      Switching Power Tee on/restarting/resetting**

Each individual bay has a delay system built in to ensure that when the system is switched on not all the bays start together causing a temporary overload in the power supply unit. When switching on an individual bay, holding the "tee height button" and then switching the control panel on will overcome this countdown delay.