

# **TTWEIGHTS AUDIO**

## **The GEM V2 Turntable Installation Guide** **DC Servo Decoupled Direct Rim Drive System ©**

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# *The GEM V2 Turntable Installation Guide*

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***Dear Valued Customer,***

Congratulations on your purchase of a true revolution in vinyl playback with hand built quality with 100% American content that will last a lifetime.

Thank you for your consideration and investment in the new GEM DC Servo Decoupled Direct Rim Drive System. The GEM table employs the highest technology in the remote dc servo direct rim drive motor system and remote arm pod system(s) provides silky smooth and quiet playback.

This turntable was designed to provide unparalleled pace rhythm and timing with incredibly jet black backgrounds possible with this unique decoupled turntable system.

The GEM is truly a break-through in design; the motor drives the platter directly via a specialized single drive ring coupling to the Outer Rim of the specially manufactured platter (less than .0004 run out) . The design provides a great deal of technical challenges but combined with the direct drive, accurate and heavy platter and the new massive COBALT (Carbide in the platinum version) ½ inch diameter center bearing we are able to achieve new levels of dynamics and playback accuracy. The turntable will take 10-20 hrs of normal playback to break in, the table improves over time. Optimal playback is reached after 100 hours.

Please read the manual *carefully* and watch the installation video(s) before attempting the turntable installation and set up. Please visit the web site under this tab you will find a complete set of installation manuals, videos and powerpoints.

Click tab to follow the link

[Manuals and Downloads](#)

Larry Denham

President

# The GEM V2 Turntable Installation Guide

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**IMPORTANT:**



**DO NOT ASSEMBLE THE TURNTABLE FOR A MINIMUM OF 24 to 48 HOURS AFTER THE PRODUCT IS UNPACKAGED AND RESTING IN A ROOM THAT HAS AN AMBIENT TEMPERATURE OF BETWEEN 65F (18C) TO 82F (28C) DEGREES. FAILURE TO FOLLOW THESE INSTRUCTIONS WILL RESULT IN A VOID WARRANTY**

The GEM turntable is TRULY machined to extreme close tolerances using exotic materials. The turntable design is based on rigidity, motor position and bearing clearances that require extreme tolerances. The bearing clearance is .00015 (this is 1/15 of a human hair). The Cobalt and the brass/Oilite bearing have a very different coefficient of expansion. If you attempt to assemble the turntable, cold/cool/hot before the materials normalize and the tolerances are within specifications the turntable ***WILL be damaged*** and the WARRANTY will be void.

If assembled at the wrong temperature the motor and bearing will be noisy and will not break in correctly, causing premature wear and playback noise.

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## Safety Instructions:

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- ❖ Please follow the instructions below and in the step by step instructions. Failure to do so may result in electrical hazard or injury
- ❖ Do not open the control box or the warranty will be void
- ❖ If the power cord of the GEM does not reach an outlet, a heavy duty grounded extension cord is required. The motor can draw 6 AMPS.
- ❖ Do not expose the turntable to rain or excessive moisture.
- ❖ Failure to follow the following instructions provided may result in personal injury.

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**Thank you and Congratulations on your purchase of the new GEM Turntable.**

**Model Number:** \_\_\_\_\_

**Arm Pod Type (s):** \_\_\_\_\_

**Arm Board (s):** \_\_\_\_\_

**Manufacture Date** : \_\_\_\_\_

**Warranty Start Date** : \_\_\_\_\_

Parts 10 years, 4 years labour, customer is responsible for shipping in the original packaging  
Warranty does not cover items from misuse, neglect or damage. Warranty claims factory direct  
only. See Last page for warranty.

**Quality Assurance – ISO9001:2000 Compliant Manufacturing Division**

**Company Information:**

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**TTWeights Audio**

**LJT Manufacturing**

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**Web Site(s)**

Products: [www.ttweights.com](http://www.ttweights.com)

Manufacturing: [www.ljtmfg.com](http://www.ljtmfg.com)

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## Tools Required

- Standard Imperial Allen Key Set
- Screw driver slot type
- 4-6 inch carpenter level for platform
- Strobe Disk/ Strobe for 33.33/45 and 78 RPM (You can purchase the one we have used at <http://www.kabusa.com> under sound accessories) available with coupling package built in to ring setting [tool](#)
- [The use of Dual Lighted Magnifying Headset recommended: see YouTube Video](#)

**Contents Included:** *Please unpack carefully and check contents.*

NOTE: Use special caution with the platter and Cobalt/Carbide bearing assembly. Leave in the packaging until ready to install. Do not rest the platter on the bearing. Unpack and install as per instructions. *Please check the content*

1. Three 2.0 Diameter Brass Disks with O rings installed
2. Three TTSoundPoints - GEM Isolation Points
3. One GEM OAK Plinth with 2024 Aluminum Bearing Housing Point Bases Pre-Installed
4. One GEM Platter and Bearing Shaft Assembly
5. Spare O-Ring Kit
6. One power supply, cable assembly and power cord
7. One Power and Speed Controller Unit
8. One TTWeight and Level Combination 1 LB Weight Aluminum
9. One TTSuperWeight (ULTRA and Platinum has the 1lb level and the TTSuperWeight)
10. One Remote Arm Pod
11. Handling Gloves
12. Micro Fibre Cloth

## The Supporting Stand or Shelf Requirements



**Important:** The turntable requires a robust stand capable of holding 80 lbs to 120 lbs with the platform. Please provide a platform that is very stable and is and free from vibration. Dedicated platform and resonance control stands will make a difference on any turntable. A minimum of 1.5 inch hardwood or equivalent base is recommended. The table and platform must be flat and level or the remote motor will not engage parallel to the platter and will not couple properly, causing the table to run incorrectly.

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## Dimensions of the GEM Shelf/Stand Requirements

Minimum Size of Shelf/Stand: 18.5 x 16.5 Inches with the **Optional GEM Platform**

*Minimum Size with a **9 Inch** Tone Arm:*

Width: 17 inches (457 mm)

Depth: 16 inches (407 mm)

*Minimum Size with a **12 Inch** Tone Arm:*

Width: 21 inches (457 mm)

Depth: 18 inches (407 mm)

*Please skip to The GEM Turntable Set up Procedure next section if you do not have the optional platform (not required)*

## Optional GEM Platform Installation

Minimum Stand or shelf Dimensions: 18.5 x 16.5 Inches and larger

Platform Dimensions and Material: 24 x 18 x 2 ¼ Inches Laminated Rock Maple.

Platform Decoupling Points: CNC Machined Spikes with screwdriver top levelling and self locking.

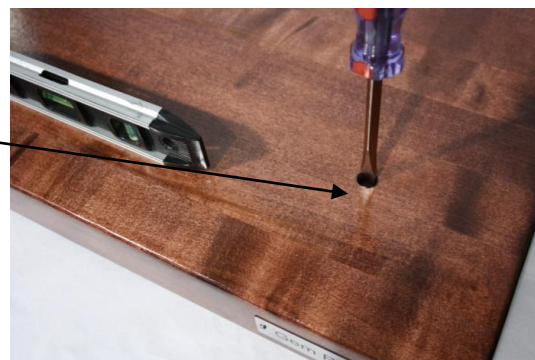
Height of stand with Points 2.75 to 3.00 inches (1/4 inch of adjustment). The points protrude 1/4 to 3/8 of an inch from the base.

Motor Base: 5.5 x 2.4 inch height Solid Lead Alloy Motor Base Black Painted Finish

The motor base is very heavy weighing more than 20 lbs.

Please be careful when handling this component. The bottom of the base is a .5 mm cork layer to assure to provide a rigid non moving platform for the motor. Place the motor base and then the platform as shown. Repeat to final platform position.

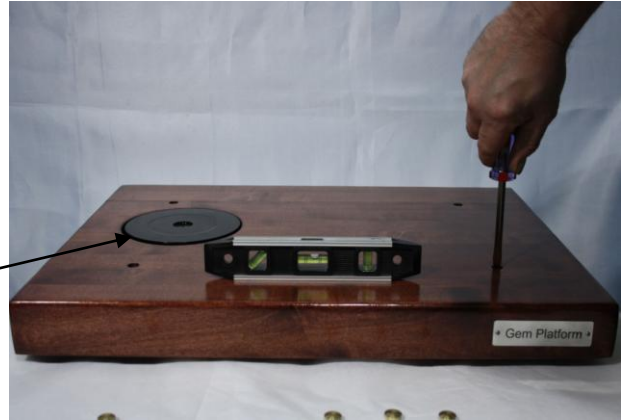
Using a tight fitting standard screwdriver press down firmly and screw the point slowly, they are a tight self locking design that will not resonate. Use a standard carpenter level to level platform.



## *The GEM V2 Turntable Installation Guide*

Level all four points and make sure the platform is very solid and does not rock, this is critical.

Once the platform is level make sure the motor base is in the center of the hole in the maple platform. The design is decoupling, so it is very important that the base does not contact the platform in any way, please assure there is an even gap all the way around the hole.



There are four brass plugs to cover the adjustment access holes, it is best to leave them loose until the table is complete. The rear right plug will be most probably left off due to tone arm location; the arm pod will sit over the hole.



The final set up will look like this, the controller may be placed 3 ft from the turntable table



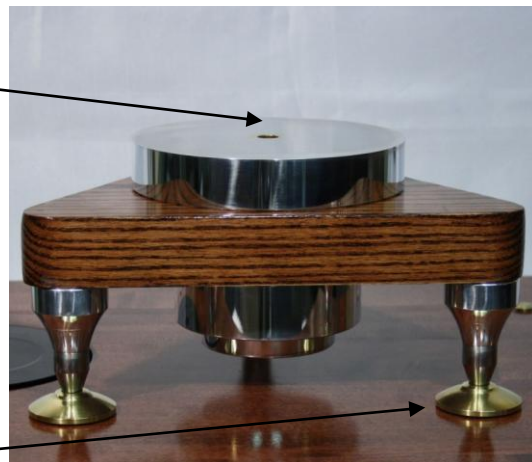
# The GEM V2 Turntable Installation Guide

## The GEM Turntable Installation

### Turntable Sound Point Isolation Discs

CHECK the THRUST BEARING: Be sure to look down the bearing hole and make sure the carbide thrust ball can be seen in the base of the bearing hole in the center position.

Carefully (easier with two people) place the plinth on the three (3) discs. The disks have o rings inset and provide a rock solid location for the turntable rotating assembly. Do not remove o rings and make sure they are installed and seated properly.



### Install Main Platter

Remove the packaging tape and install the platter into the bearing very carefully align the bearing and slowly ease the bearing in to place. **Do not let go.** The bearing is porous and there may not be an air pocket and the platter may drop onto the carbide ball and cause damage.



*Please wear the gloves provided and do not touch the outer rim with your hands, o rings may be handled but wiped after replacement with micro fibre cloth. The micro fibre cloth is provided to clean the rim drive BEFORE setting up the tone arm, use the cloth provided. It is a very special knit and cleans micro sized particles. Put away in a clean spot.*

The platter should spin freely. Allow the platter to settle for one hour. If you press gently on the platter if it is seated properly it should be rigid no sponginess (air in the bearing). The air will take time to escape through the porous Oilite Bearing. This is a .0002 clearance bearing. Do not over grease, the table is pre lubricated from the factory and does not require oil for 2-4 years of use.



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**Greasing the Platter:** USE AEROSHELL GREASE 22 OR EQUIVALENT, SYNTHETIC AEROSPACE GREASE FOR AIRCRAFT

### Level the Turntable

Place the TTWeight Level combo on the plinth as shown and level each foot. Unlock the collar (turn CCW), turn the point and relock once the table has been levelled. Adjust all three feet.



This procedure should be used if the platter is removed for any reason. Place the platter bearing side up in the packaging foam with the small hole. Clean the shaft with the very clean rag and wipe a very thin layer of grease around the entire shaft with your clean finger. Cleanliness in this case is very critical and time and care should be taken. Once re installed let the platter seat in to place for one hour. Press firmly on the platter and it should be rigid, sponginess indicates and once firmly seated you may proceed to the next step .

**Greasing the Platter:** USE AEROSHELL GREASE 22 OR EQUIVALENT, SYNTHETIC AEROSPACE GREASE FOR AIRCRAFT



# The GEM V2 Turntable Installation Guide

## Controller and Connections

### Ground Connection

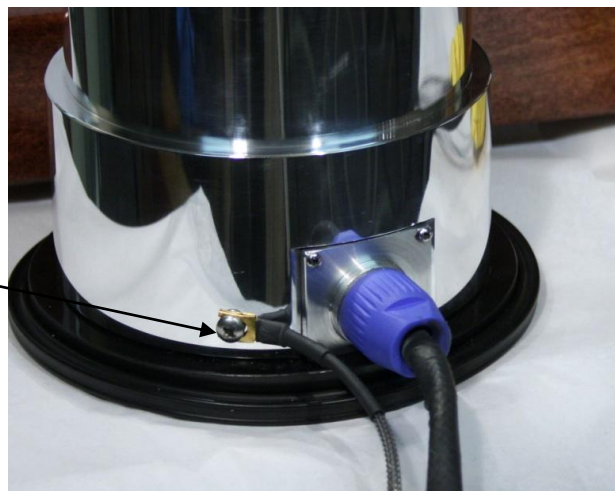
The GEM power supply is a 24 volt output/universal incoming voltage that provides a perfect 24 Volts regardless of line voltage fluctuations. A hospital grade plug, ground cable and XLR connectors included as shown.



**Never** attempt to unscrew the Blue cable locking nut.

It is very important that the ground is attached before any cables are connected.

Screw in ground plug to motor assembly firmly, do not over tighten and use a Phillips screwdriver only



There is a square rubber "Trim Ring" around the base of the motor. The ring is not fixed to the motor, gently tuck it around the base and it will provide a nice finished look and additional sound isolation.



## *The GEM V2 Turntable Installation Guide*

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Plug XLR motor controller cable from the motor to the right rear panel of the controller, this is an XLR connector

Plug XLR power cable from the power supply to the left side of the rear panel of the controller, this is an XLR connector



Plug the DC power supply in to the electrical outlet.

The rear panel main power switch is shipped in the off (down) position, once the cables are securely in place switch the main power to the on (up) position.

Note: The servo motor drive will rotate quickly when initially powered up and stop. The motor now has power and will be in a platter breaking mode.

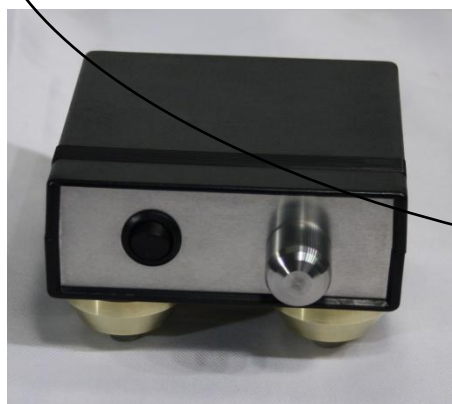


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The DC motor also provides a nice braking feature to slow down the platter when the main power is on. Leave the main power switch on unless you are away for extended periods. Test the motor by simply switching front panel platter on and off. It should run smoothly and start and stop quickly as shown clear of the drive rim. The controller can play any record speed, the Ultra has the convenience of two preset (33/45) speed circuits and each speed has an individual speed control. The silver can be dialed in to any speed with a strobe and a turn of the pitch control.



### GEM Silver Base Controller



GEM silver controller, front panel, left is platter on/off, right variable speed control. 33/45 and 78 may be dialed in



GEM silver controller rear panel, power plug left, main servo motor power switch motor plug on the right. The main power provides electrical platter breaking and is left on most of the time

### GEM Ultra Controller



GEM ultra controller, front panel, left is 33/45 speed selector, middle platter on/off, two controls on right, pitch for 33 and pitch for 45 rpm



GEM ultra rear panel same as the silver above

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## **Check Levelling**

The table and platform must be flat and level or the remote motor will not engage parallel to the platter and will not couple properly, causing the table to run incorrectly. There can be a couple of degrees but watch the clearance on the drive wheel and rim.

The side of the platter must be close to 90 degrees to the table. If the table is warped DO NOT attempt to set the motor up until the platform is adjusted.



## **Critical Design of the Motor:**

The large mass housing is machined from billet aluminum and is internally dampened with copper pellets; you may hear them when you move the motor in place and they will settle upon use.

Torque and Bearings: The motor is very high torque but we are not going to employ all the torque, a high torque motor was chosen for the 3.5 inch internal bearing spacing and the limitless power. Lateral wear does not occur with this massive motor. The energy is managed in the housing and base, a very slight vibration on the side of the motor pod is normal. There should be NO vibration in the stand or plinth of the table.

The housing is aluminum; the base is made of 4 pieces  
– Delrin - Micro foam layer- Cork Base - Outer Rubber trim ring

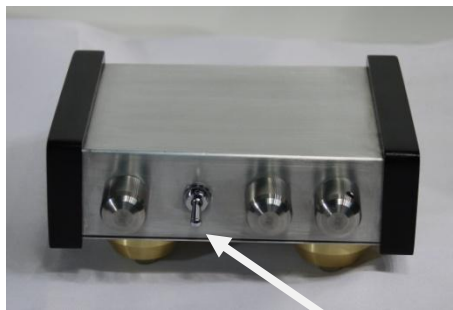


## **Positioning the Motor**

The motor must be moved into position very carefully. Begin the process by moving the motor to the drive rim until the o ring just touches the platter. Slowly turn the platter and observe the motor drive wheel being rotated by the platter. Make sure this is done slowly, do not push the motor against the platter.

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Correct positioning is essential as the system is designed to connect by the weight of the motor housing alone. The drive wheel should be in the middle portion of the rim  $\pm 1/8$  of an inch. Assure it does not ride on the chamfer of the rim drive. The picture is ideal.



Next move the platter switch to the up position. Observe the speed at which the platter accelerates; it should be 3 to 4 seconds. If the platter is not coupled and the o-rings are slipping, stop the platter, tap the motor in gently and try the process again. The speed is set to 33.33 rpm at the factory and will be close, but does require fine adjustment. Run the platter for one hour at 33.33 rpm. Set the speed using the strobe as recommended. Stop the platter and move the platter by hand back and forth, the drive wheel should be moving back and forth with the movement of the platter.

Re Adjust: "Trim Ring" around the base of the motor. The ring is not fixed to the motor, gently tuck it around the base and it will provide a nice finished look and additional sound isolation.



# The GEM V2 Turntable Installation Guide

## Tone Arm and Arm Pod Installation

The GEM can have up to 3 remote arm pods from a 9 inch to 14 inches with the GEM Platform. The table will accommodate any length arm if desired provided the shelf or rack is large enough. This is a factory supplied 12 inch Jelco. Please read the Jelco manual, this is a guide.

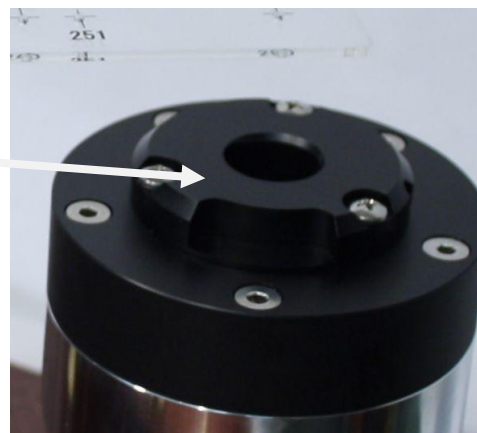
### Definition of Terms Used Setting up Tone Arms

Vertical Tracking Force (VTF):	Vertical tracking force, downforce on the cartridge					
SRA	Stylus Rake Angle, the angle at which the stylus intersect the vinyl looking from the side					
VTA	Vertical Tracking Angle Same as SRA					
Spindle to Pivot Distance	The distance from the tone arm pivot point to the Turntable spindle					
Effective Length	distance from the pivot to the stylus, equal to the overhang plus the spindle to pivot distance					
Azimuth	Looking at the cartridge body from the front, it is the left to right tilt of the cartridge body					
Zenith	Aligning the stylus with in the groove in the horizontal plane dials in zenith.					
	Looking down on the cartridge from above, zenith is changed by rotating the cartridge					

### Installing the Remote Tone Arm Pod

The Jelco pod is shown; the mounting base for the tone arm is already installed for you as shown. You may also have had a blank or pre drilled pod mount.

Please read the Jelco manual in addition to this manual, this is a set up guide. Please see other features i.e. dampening oil as per Jelco specifications.



### Arm Positioning Spindle to Pivot Distance of 12 inches (290 mm) Protractor Included with Jelco Arm

Place the pre assembled arm pod for the Jelco 12 inch arm as shown in the picture using the setting ruler provided. Put the spindle hole over the platter spindle and swing the ruler to position over the arm pod. It may be set anywhere around the table. Line the



## The GEM V2 Turntable Installation Guide

Center of the pod to the 290 mm by eye directly over the pod.

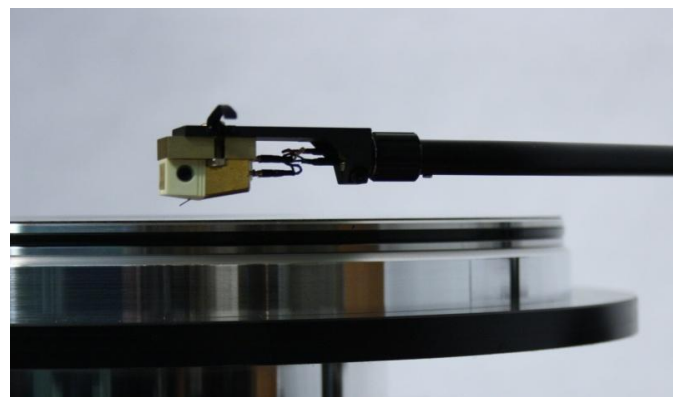


Slide the tone arm cable through the slot and up the center hole and plug in to tone arm.

Position the tone arm in the mount and using the Jelco supplied Allen key to tighten the arm in to a high rough position.

### Set the Rough VTA (Height)

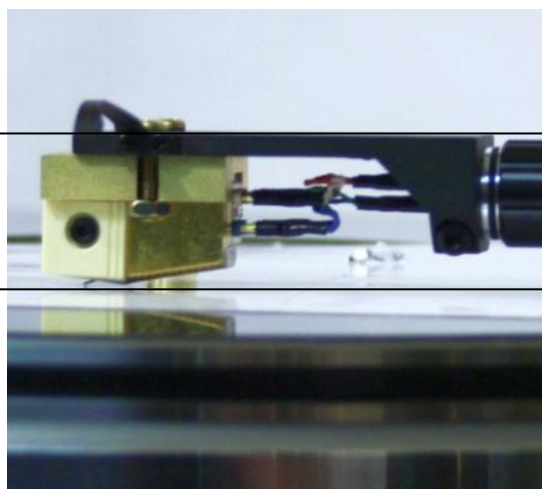
Move the tone arm up in the post assuring the arm is above the platter surface when the arm is in the up position.



Carefully move the arm over the platter and adjust the arm with the allen key to a safe up position roughly as shown.

You do not want to nick the platter when moving the arm over the platter. This is for safety.

Set your cartridge tracking force with a proper digital scale by moving the weights at the end of the tone arm. We order the Jelco arms equipped with two weights, a 4 to 12 gram and a 12 to 24 gram. Make sure you use the weight suitable to the mass of your cartridge.



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Lower the arm and set the arm as parallel to the record surface as you can to set the VTA/SRA position. The figure on the right the VTA is slightly low, lift tone arm to compensate until correct.

## TTWeights 12 Inch (290 mm) Basic Protractor for initial tone arm set up for a *Included with the Manual Hard Copy*

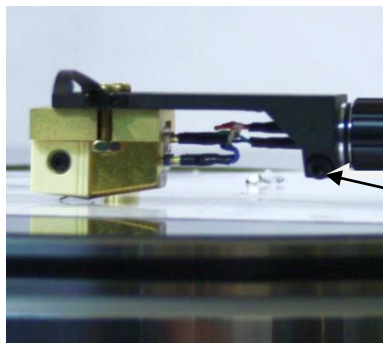
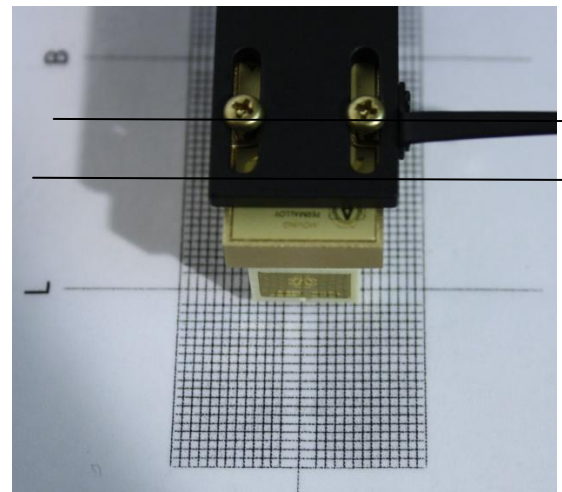
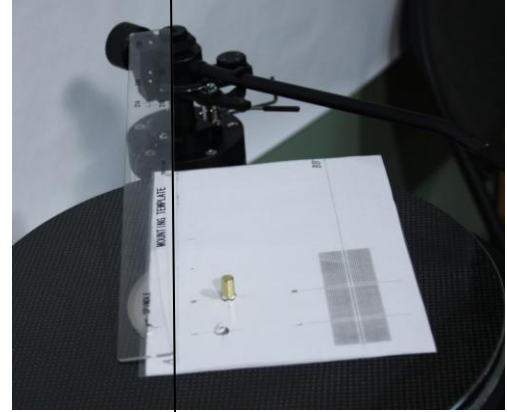
1 –Line up the A-A line with the pivot point of the tone arm with the ruler by eye, rough position

2 – Line up tone arm (move pod) to match the cross hairs. There are the two common methods, try each; the Lofgren (L) or Baerwald (B) they are slightly different alignment theories but both work well. Move the spindle point and set the tone arm to the corresponding cross hairs. Align the zenith by loosening the screws and rotating the cartridge until the front face parallel to the cross hairs and make sure you align the stylus tip to the cross hairs as shown.

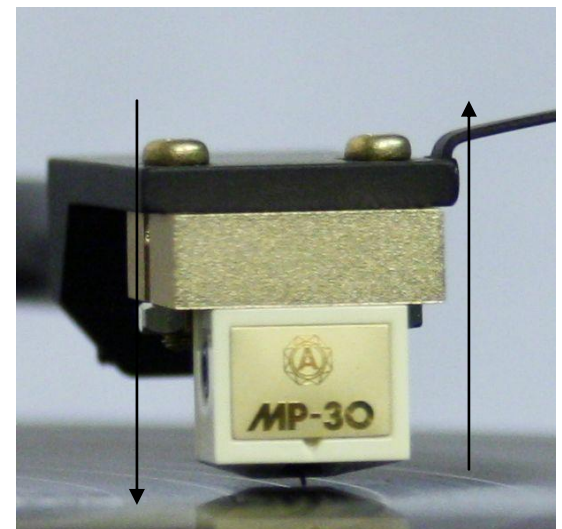
The huge advantage of the remote pod is the cartridge does not have to be adjusted to set the final position relative to the grid lines. The final fine adjustment can be done by gently moving the arm pod. (Maximum 1 mm or you must move the cartridge in the head shell)

To complete your tone arm cartridge set up final VTA, the arm should be parallel with the platter surface in the down position as shown.

Please recheck the position and down force, the Jelco is equipped with an Azimuth adjustment in the head shell itself. This adjustment rotates the cartridge left to right when viewed head on.



The cart should be parallel with the record.  
The azimuth locking screw is here. Unlock and the head will move to adjust the azimuth. Tip – take the head shell off first.



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## Optional VTA Adjustable Tone Arm Set Up

The massive VTA Adjustable GEM Remote Arm Pod provides a plus or minus one inch travel from 5 to 7 inches in height. This unique feature provides the ability to minimize the height of the tone arm and greatly improve rigidity of the tone arm.

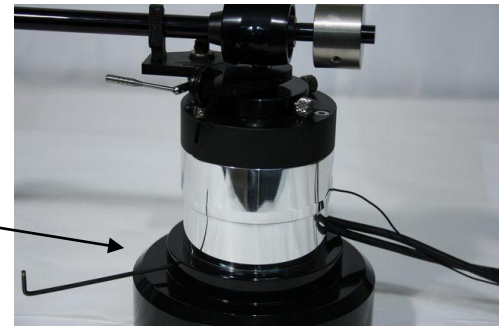
The arm pod is a three piece construction and weighs 20 plus lbs. The black lead alloy base is 5.625 diameter x 2.2 inches tall. The base has a precisely machined bore providing a sealed cylinder that accepts the 3.45 diameter arm post. The cylinder and piston fit is precise providing an air pocket that controls the movement.



### The Moveable Arm Post

The arm post is polished aluminum piston that slides up and down in the base by hand with .100 graduation lines for precise adjustment.

The piston is supported by an air cushion that moves gradually and safely when unlocked, with precision the piston is locked in position very rigidly by one simple allen screw.



The Arm Pod shown in the high position. Always hold the piston when adjusting the pod and be careful.

# *The GEM V2 Turntable Installation Guide*

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***It is time to enjoy your state of the art GEM Turntable, please enjoy!***

1 – The motor should be very quiet. There may be some energy drain into the platform. This is normal but indicates your platform is resonating. A minimum of 1.5 inch hardwood or an equivalent base at minimum is recommended.

2 – Playback should be fast with extreme dynamics compared to belt drive tables. The details will be upfront and there should be superb clarity NO AUDIBLE NOISE FLOOR. Noise on playback indicates over coupling .

Remember that the table takes some time to reach smooth synergetic operation of rotating components. Please check the speed regularly and adjust if necessary. Do not be afraid to re adjust the motor a couple of times during the first few weeks.

Run the turntable for 15 minutes at 33 RPM and check the speed once again. Adjust if required.

## **Turntable Break in Period**

IMPORTANT: Each GEM is set up at the factory and run for several hours for basic break in. Please run the table following the initial break in chart below. There should be no vibration and the platter should turn smoothly without run out.

1. Once the GEM set up is complete run the table for another two hour at 33 rpm setting
2. Set 33.33 rpm speed once again

The table requires a to 1 to 2 minute warm up period at 33 rpm for very critical listening prior to playback for the optimal speed control. Always check speed with the table warmed up! The table can be operated normally and will complete break in after 50 hrs of playback

## **Ring Drive Pulley Maintenance**

Replace the o-ring only every 1000 hrs or more of playback (roughly 1000 LPs played).



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## **TTWeights / LJT Manufacturing and Consulting Limited Warranty**

TTWeights / LJT Manufacturing and Consulting (TTW) is providing a warranty for this unit against defects in materials and/or workmanship for four (4) years from the date of purchase by the original retail purchaser. TTW's sole obligation under this warranty is limited to the repair or replacement, at TTW's option, of any part(s) found to be defective. TTW's obligation to repair or replace defective parts is the purchaser's sole and exclusive remedy, and TTW's shall not be liable for any injury and/or property damage, direct or indirect, arising out of the use of the product or defect in or failure of the product. This warranty does not extend to any product/turntable whose serial number has been defaced or altered. Any product that TTW determines to cause a defect or malfunction due to incorrect installation, modification, misuse, or servicing by the purchaser or service technician not authorized by TTW to perform such service will not be warranted. This warranty does not cover trivial or cosmetic defects that do not impair the unit's normal function. TTW reserves the right to make engineering changes to this product without assuming any obligation to install such change in any product previously manufactured. This warranty to repair or replace defective parts is in lieu of all other express or implied warranties of merchantability or fitness for a particular purpose. There are no warranties that extend beyond the description herein.

Product is subject to change without notice due to continuous research and development.

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