

ELECTRIC GUITAR USER'S MANUAL

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DEAR GUITAR PLAYER!

Thank you for purchasing an electric guitar of our production. We are convinced that you have made a good choice and that your new instrument will help you in developing your musical talent.

We would like to help you in achieving this goal and this is why we would like you to familiarise yourself with a number of maintenance rules.

Maintenance and operation.

- 1. Use only good quality strings, preferably from a single set. Acoustic and classical guitar strings are NOT suitable for an electric guitar.
- 2. The way you wind the strings around the tuning keys is crucial for the instrument to stay in tune. Remember to read the chapter explaining this procedure.
- 3. In order to work correctly, a bridge (especially a tremolo bridge) has to be correctly balanced and adjusted. It is the bridge that determines if the instrument is tuned well. It also determines the overall comfort of playing.
- 4. Setting up the proper neck relief and the action of the strings is very important to achieve good comfort of playing. These procedures need to be performed each time the gauges of the strings are changed.
- 5. In order for a string to hold its pitch well, its intonation has to be adjusted.

A separate chapter is devoted to this procedure.

- 6. It is recommended to change the strings after 30 hours of operation. After this period most strings tend to lose their bright sound and stop holding their pitch.
- 7. It is advised to clean the instrument, particularly the strings, after each period of playing it. Suitable products are available in good music shops.
- 8. When transporting the instrument, a gig bag or a hardshell case should be used in order to prevent damage caused by mechanical shock or temperature change.
- 9. A guitar is a delicate instrument. The finish is vulnerable to scratches, fractures and even chipping. Take good care of your instrument and use it according to the goal it was built for.
- 10. Protect your instrument from low and high temperature, and also from humidity.
- 11. Do not expose the instrument to direct sunlight for long periods of time. Do not leave your instrument close to heating devices, nor in a car on a hot day.
- 12. Avoid sudden changes of temperature or humidity. In winter, after bringing a chilled instrument into a heated room, leave it for a few hours in its case, until it has returned to room temperature.
- 13. Clean the strings and lacquer surfaces with a dry, delicate cotton cloth. For thorough cleaning, use specialized products only (Guitar Polish and String Cleaner). Instruments with natural finish should be conserved with special products based on natural wax and oils.
- 14. Make sure that all parts of the instrument are cleaned regularly. Use bearing lube to regularly clean the tremolo arm's socket, and remember to lubricate the spot, where the tremolo's knife-edge meets the stud bolts.

Disregard of the above rules may result in loss of warranty.



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<u>(M</u> Winding the strings on tuning keys

Depending on the construction of the bridge, insert the ball into the slot of the bridge, pull the string through the hole in the tremolo block, pull the string through the hole in the body, or cut off the ball and install the string in the locking saddle (Floyd Rose). Next, pull the string through the hole in the tuning key's post. Next, stretch the string and bend it (90°) 3-5cm behind the tuning key. Position the bent part of the string at the edge of the hole in the tuning key's post and point the end down (6 tuners in line; when the tuners use 3+3 system - point the end of the string towards the centre of the headstock. Next, paying attention that the string between the tuning key and the nut (locking nut). Next, pull it strongly up and back (fig. 1). Wind the string over the tuning key in the way that the string winds around and pushes the created loop to the surface of the tuning key (fig. 2). The above procedure should be performed only on unwound strings (E1, H2 and G3).



In case of wound strings (D4, A5 and E6) we do not make a loop before winding them over the tuning key. The first turn of the string around the key should go above the bent part of the string. Further turns should go under the bent part (fig. 3). The windings should cling to each other, but the string should not cross itself (fig. 4).

After having tuned the instrument, it is advised to cut the loose ends of the string more or less 0,5cm behind the keys. The ends should be bent towards the front of the headstock (fig. 5).

If an instrument is equipped with locking tuning pegs, the string winding procedure is the same for all strings. We do not wind the string around the tuning peg. After installing a string in the bridge, we pull it through the hole in the tuning key's post and, while holding the string behind it, we stretch it firmly (fig. 6). We lock the stretched string by tightening the bolt inside the key using the correct screw. Next, we tune the string to the desired pitch. It should only take several turns of the key.

In many tuning keys, it is possible to adjust the strength needed to turn a key by using a special screw (fig. 7).

Remember: even if the instrument is equipped with a locking nut, you still need to correctly install the strings on the tuning pegs.



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The height of each single saddle is usually set by adjusting two screws at the sides of the saddle (fig. 8). The saddles should be positioned in a slight curve - the difference between the inner and outer saddles should be close to 1mm. This is caused by the necessity of the saddles to follow the radius of the fingerboard. In some older bridge types (Tele) two strings use one saddle. In this case the action is set for two strings at the same time.

The height of the string over the 12th fret depends on personal preferences of the musician. A standard string action is: 2.0 mm for the E1 string and 2.5 mm for the E6 string.

Tune-O-Matic type bridges

In Tune-O-Matic style bridges the action adjustment is global, which means that we adjust the height of all the strings at the same time. We perform this by adjusting two screws on which the bridge is placed. By turning the screws clockwise we lower the bridge. By turning them counter-clockwise we raise it. Sometimes the bridge is placed on two large spinners and this is what we use to adjust the height of the bridge (fig. 10). The proper curve of the strings over the frets is given by the curve of the base of the bridge, different height of placement of the saddles or different heights of the saddles themselves.

Tremolo bridges

In traditional vintage-type tremolos (attached to the body with 6 screws) the height of the strings over the frets is determined in the same way as in fixed bridges (fig. 11), that is by changing the height of each saddle separately. In newer constructions, in which the whole structure is placed on two stud bolts (also Floyd Rose bridges), adjustment is accomplished by operating the stud bolts and changing the action of all strings at the same time. A proper curve of the strings over the fingerboard (radius) is achieved by a change of thickness of the base of the bridge, different saddle heights, or with each saddle adjusted separately, like in fixed bridges (fig. 12).



fig. 9











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If your guitar is equipped with a tremolo system, you can smoothly change the pitch of strings - either by raising or lowering it. Although the change in pitch works on all strings at the same time, the amount of the change is not equal to all strings, which means that while lowering the pitch of a chord the sounds will not change in proportion. Using the system to the fullest and its proper work can only be achieved after it is adjusted properly.

Adjustment procedures are correlated with the way the bridge reacts to tuning. The bridge is set up properly when the base of the bridge is perpendicular to the two studs that hold it. Usually this means that the base of the bridge is also parallel to the instrument's body. (fig. 13). This is achieved by tuning the instrument and adjusting the spring tension adjustment screws (12). The goal of this procedure is to balance the tension of the strings with the tension of the springs. Depending on the gauge of the strings, the tension of the springs needs to be weakened or strengthened. Thicker gauge sets require increasing the tension of the springs. By the process of decreasing the error, we reach the situation, in which the springs balance the correctly tuned strings' tension and the base of the bridge is parallel to the surface of the body.

When changing strings, the best solution for the new set is to be of the same gauge. We change the strings using the following procedure: we remove the old E6 string and immediately replace it with a new one and tune it to the desired pitch. We perform the same procedure with the remaining strings.



Most Floyd Rose equipped guitars are also equipped with locking nuts. (fig. 14). When changing strings, the locks should be loosened or taken off to enable changing strings and to let the string move freely on the nut during tuning. Usually the pressure pads are tightened or loosened using an Allen wrench. After changing and tuning the strings, the locks need to be tightened on the nut by turning the Allen wrench clockwise. After that, further string tuning is performed with the help of fine tuners (fig.13 - 8).

The step-by-step procedure for changing strings is illustrated by figure 14:

- (1) loosening the locks;
- (2) removing the locks while changing strings, tuning, neck relief adjustment and action adjustment;
- (3) reinstalling the locks;
- (4) tightening the locks after completing all adjustment procedures.

Neck relief

Setting up a proper neck relief is achieved by loosening or tightening the truss rod which is placed in the axis of the neck. The truss rod adjustment screw is placed either in an opening next to the nut (nut locks) or at the heel of the neck. We check the neck relief by fretting the string on the first and last fret simultaneously. With the relief set up correctly, the height of the string above the 8th fret should measure about 0,5 mm.

If the string is higher (concave neck), one should tighten the adjustment screw.

If the string is lower(convex neck), one should loosen the adjustment screw (fig. 15).

It is important to remember to carefully insert the Allen key's tip into the truss rod's adjustment screw to prevent its damage and adjustment difficulties. Extensive force should not be used and the Allen key's movement should be gradual, not larger than 1/8 of a full turn. The truss rod's screw should never be left loose in order to prevent from buzzing. Some instruments may be equipped with double action truss rods. This enables the neck to be adjusted both ways, even when the neck is convex after the strings are installed. The relief needs to be checked each time the strings are changed.



Stabilising the tuning

After each string has been changed and after tuning it to the desired pitch, hold it with your fingers above the 12th fret and pull it 1cm away from the fretboard for around 10 seconds (fig. 16). Retune the string and repeat this procedure until the last stretching will not cause a change in the pitch. After stabilising the tuning, adjust the intonation.

Attention: an electronic chromatic tuner will greatly facilitate all the procedures connected with tuning the instrument.



fig. 16

Adjusting intonation

Adjusting the intonation is crucial to eliminating the error in the string pitch on certain frets. It consists of tuning the string exactly to the desired pitch and then fine tuning its bridge saddle to make the pitch at the 12th fret exactly an octave higher. If after tuning a string the pitch on the 12th fret is too low, the saddle of the bridge should be moved toward the front edge of the bridge (the scale should be shortened). If after tuning a string the pitch on the 12th fret is too high, the saddle of the bridge should be moved toward the rear edge of the bridge (the scale should be lengthened).

This action is usually repeated a few times in order to achieve precise intonation. Retune the string after each repositioning of its saddle. When the intonation is set up properly, the saddles are usually positioned in a diagonal line. If they do not, or if the range of regulation appears too small, the problem is either the strings being too worn out or of bad quality.

Because of different types of bridges and saddles, the saddle adjustment is achieved by different means. they are schematically presented in fig. 17.



The height of the strings over the pickups

The distance between the pickups and the strings is an important factor of the instrument's sound. This distance depends on the type of pickups and the type of strings used. It is checked by fretting the string on the last fret and measuring the distance between the surface of the pickup and the surface of the string. For the bridge pickup the standard heights are: 2.0 mm for the E1 string and 2.5 mm for the E6 string and for the neck pickup: 2.5 mm for the E1 string and 3.0 mm for the E6 string. We usually regulate the height of the pickups by adjusting the screws that attach them to the body of the instrument. Turning the screws clockwise will decrease the height and turning them counterclockwise will increase the height. If a pickup is equipped with adjustable pole pieces, it is possible to adjust the differences in volume between strings by determining the height of each pole piece.



The Piezo System

Some guitars are equipped with Graph Tech saddles with built in piezo pickups. The pickup signal is led to the instrument's output jack after it has been amplified by a preamp powered by a single 9V battery. The preamp is located in the guitar's control cavity and attached to the piezo/magnetic signal mixing knob (Blender). The preamp enables adjusting the piezo pickup's output level to the output level of magnetic pickups (for the Blender's centre setting), as well as determining the amount of EQ for the piezo pickup. It is achieved by adjusting two small PR-type controls located on the piezo system's plate. Adjustments should be performed carefully, using a small screwdriver or a similar tool (fig. 19).



When shipped from the factory, the piezo volume is set up to match the magnetic pickup's volume. It may require adjustment after changing strings or after changing the height of the magnetic pickups under the strings. Piezo pickups tend to carry much more high frequencies compared to magnetic pickups. In some instances, this may lead to signal distortion. In order to rectify the problem, it is advised to either (fig. 20), decrease the piezo system's output volume (fig. 21), decrease the amplifier's input gain or adjust its EQ. Signal distortion may be also caused by an empty battery. In this case, the battery should be replaced immediately, with attention to correct polarisation. The piezo system's battery is located in a special compartment placed at the back of the body, next to the control cavity. The guitar's output jack also functions as a power switch. To prolong battery life, remove the plug from the output jack when not using your instrument.

Given the fragility of the saddles' construction and the fact that they are linked to the electronics with thin wires, it is recommended to use special caution while replacing strings and intonation and action adjustments. Use of superfluous force may cause damage to the piezo system.

Depending on pickup and electronics' configuration, there are a few different ways of controlling both piezo and magnetic signals. One of them is described below.

The piezo system is activated by the push-pull master volume knob. The next knob acts as a piezo and magnetic signals' mixer (Blender) (fig. 22).



Battery replacement

If a guitar is equipped with active electronics, a preamp, a piezo system, or LED fret markers, they are usually powered by one or two 9V batteries. The battery compartment (or compartments) are located on the back of the instrument's body (fig. 23). Opening them does not require tools, however caution is advised in order not to break the delicate lid. The compartment's construction prevents putting the battery in the wrong way. The compartment is locked by gently pushing the lid back, which produces a distinct click.

Cleaning

In order to preserve the aesthetic look and good technical shape, the instrument should be regularly cleaned and maintained. An instrument should be thoroughly cleaned after each playing session - especially the neck, strings and body. Attention should be given to wiping all sweat residue, which is the main cause of string and metal parts' corrosion. It also decreases the gloss of the finish. The best tool for wiping the sweat residue is a soft, dry cloth. As an option, some types of specifically formulated polish can be used, respectably for finished, not finished and metal parts. These products should be handled with caution and their usefulness should be first checked on a small, less visible piece of surface. Products based on acids, alkalis, benzene, gasoline, alcohols, solvents and strong detergents, should not be used. We advise thorough cleaning and maintenance during each string change.



Natural (wax and oil) finishes require different kinds of attention. Delicate cloths can be used for cleaning, but maintaining the the finish is achieved by using a specifically formulated polish based on natural oils. When using them, be sure to act according to the instructions on their containers.

Rosewood, ebony and other types of exotic wood occasionally require impregnating. The need for such an operation may be indicated by the wood looking more pale and mat. In order to facilitate impregnating, it is recommended to remove the strings and to wipe the fretboard with a soft brush. Next, after soaking a cloth with Lemon Oil (Fretboard Conditioner) rub it in the fretboard. This procedure should be repeated a few times with hour-long intervals. In the end, wipe the residue off with a dry cloth.

Other options

Due to the restricted volume of this User's Manual, an array of other options and technical solutions was not mentioned here. Among these are: Hipshot D-tuners, different bridge constructions, LED fret markers, or sophisticated electronics packages. If you encounter problems with your instrument, visit our technical support page at *www.mayones.com*, or contact us via email.

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Mayones Guitars & Basses

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Mayones Guitars and Basses care constantly about the quality of their instruments and release their newer and upgraded versions, as well as search for the best possible building materials.

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