Harness diagnostics page of www.kinman.com

Total of 10 pages

11-Sept-2017 Rev-17

Every Harness is thoroughly tested before shipping by 2 staff cross checking each other. You can see the signature of the person who performed the test inscribed on the back of the Red shipping panel. Most problems happen during install.

It is helpful to possess a multimeter because resistance checks can reveal a multitude of problems *and* confirm good connections.

These pages deal with both Strat and Tele harness. ***Telecaster*** harness are different so are occasionally mentioned specifically. Pay attention to the sections that fit your issue the best.

There are 4 sections in this document:-

Section 1. Noise (hum and buzz).
Section 2. No sound from harness
Section 3. Abnormal sound
Section 4. Control function issues
Section 5. Mechanical issues

Section 1. Noise (hum and buzz).

Definitions:

Sound: the musical sounds made by the strings.

Noise: any undesirable interference which is not part of the musical spectrum (as generated by the strings) which radiates from an exterior source such as lighting dimmers, motors etc.

Hum: a low pitched main hum of 50 Hz or 60 Hz. Kinman pickups are hum cancelling.

Buzz: a high pitched 'buzz' that sounds more like an annoying insect than a hum, it is a harmonic of 50/60 Hz hum but behaves differently to hum. Buzz can not be cancelled like hum, it has to be shielded out of vulnerable wiring in your guitar as well as the pickups. That's why you might need shielding installed in your guitar if it's not already present.

Shielding: Any conductive medium acting as a barrier to 'buzz', ineffective against 'hum'. There are several types; can be metal foil lining a cavity in a guitar, it can also be a Black or Silver conductive paint applied to the walls and floor of a cavity and often embedded under the finish. It can also be strands of wires or metal foil wrapped around a cable. The strings are the prime source of shielding for pickups and the human player also. To be effective shielding media must be grounded. Ungrounded shielding actually results in more Buzz than if it was not there at all.

You hear a buzz:
Don't jump to conclusions yet because it is likely you had a buzz all along but didn't notice it amid the hum and noise coming from your previous set of non-noiseless pickups. Now that you have Zero-Hum pickups the buzz stands alone and becomes more noticeable. But read on anyway to find out if you really have a problem and if so how you can solve it.

The pickups/harness are not yet installed: This is not a fair test because the harness is operating without any of the shielding provided by the guitar. Only make judgments about noise after the harness and pickups are installed in the guitar and strings have been put on (strings provide some shielding and prevent buzz)

The pickups/harness are installed but no strings on: This is not a fair test because the pickups are operating without any of the shielding provided by the strings. Strings provide some shielding and prevent buzz.



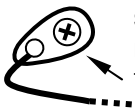
The harness is installed in the guitar: If you hear a buzz after installing a Kinman NoSoldering Harness it is most likely a shielding issue. The following will help you pin point the cause and offer a solution.

1) A common occurrence is the ground wire to the string or bridge is not connected or has a faulty connection. Don't reply on a meter to assess a good connection, if the buzzing is not reduced when you touch the strings while you have the guitar strapped on in a playing position it is a sure sign the strings are not grounded. Solution: Solder the ground wire from the bridge or spring claw (in the case a vibrato bridge is fitted) to the cover of the volume pot or other ground point. When this ground wire is working correctly the buzzing will subside when you touch the strings.

- Solution: Solder the ground wire from the bridge or spring claw (in the case a vibrato bridge is fitted) to the cover of the volume pot or other ground point. When this ground wire is working correctly the buzzing will subside when you touch the strings.
- Some bridges like Telecaster depend on the bridge pressing onto the ground wire and occasionally a solid connection is not obtained. Reposition the ground wire to a fresh position that assures a solid connection *-or-* put a small strip of copper tape over the exposed ground wire and another onto the bottom of the bridge, the area that contacts the wire.

Your guitar has shielding: (see also next bullet point 2 for No Shielding)
If your guitar has shielding but any part of it is not effectively connected to a ground point the buzz will be worse than if there was no shielding at all.

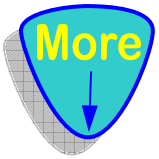
- **Solution**: Metal foil can be visually inspected for continuous connection as well as with a multimeter but shielding paint may not be visible so a multimeter must be used. Look for missing links between different sections of shielding. One example is an isolated pickup, control or output cavity … ground connection can be via a single wire attached to the shielding via a tab and fixing screw or conductive paint can pass through a connecting tunnel between two cavity's. Wires can go direct to a ground point or to another section of shielding and then another wire goes to a ground point, If a tab is loosened or disturbed it may permanently lose connection to the shielding medium. Do not disturb tabs that are fastened with a screw onto the wood and connected to a wire.



To test for connection of embedded shielding paint one has to use a sharp, pointed object like a large sewing needle to pierce through the finish coating into the shielding paint and wood lying beneath. Contacting the probes of a multimeter onto the needles will cause a reading if the shielding has connection between the needles. This method can be used to check for connection between tabs and shielding as well as between different sections of shielding in different cavities or shielding within one cavity. If no reading on the meter it probably indicates bad tab connection or bad paint or bad connection between sections of shielding, depending on where the needles are positioned.

Since it is extremely difficult and expensive to repair bad embedded shielding paint or bad tab connections an economical solution is to apply metal foil shielding over the top of the finish. This and a lot of the other points mentioned in this section are discussed in detail in the shielding section on the Perfect Guitar page of kinman.com

2) **Your guitar DOES NOT have shielding:**
You will hear a buzz when you are NOT in contact with a piece of hardware that is grounded. When you touch the strings, bridge and some of the metal objects that are effectively grounded you become the shield and prevent buzz from entering the electrical system. Some guitar players are satisfied with this because they seldom let go of the strings, or they always turn the volume pot to zero when not playing. If not you may want to consider shielding your guitar and refer to >Tech Support >Perfect Guitar >Shielding.



3) **Also your guitar is a *Telecaster (bridge pickup)*:**

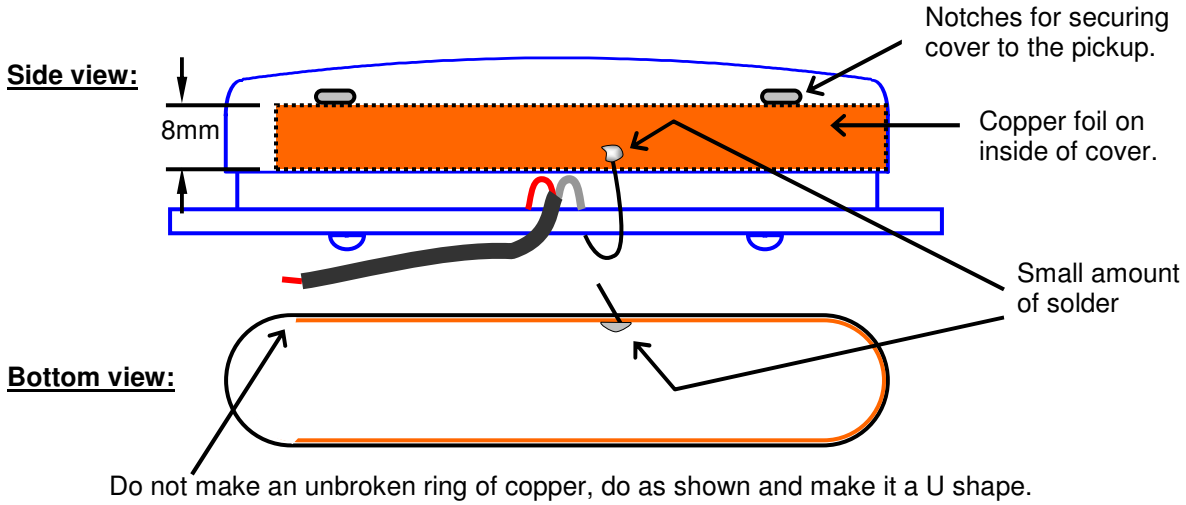
First discover if there is a difference in the buzz when you are touching the strings (but not touching the control panel or metal knobs) and when you are NOT. If there is no difference it indicates the strings are not grounded. They get their ground connection via the 3 mounting screws of the bridge pickup.

- **Solution**: Adjust the bridge pickup a bit closer to the strings, so the screws come into contact with the metal plate on the bottom of the pickup. This will establish the ground connection to the bridge and the strings and provide shielding for the pickups. The noise will reduce dramatically.

4) **Also your guitar is a *Telecaster (neck pickup)*:**

Even though our Tele covers are moulded plastic there is a thin coating of metal over them to give them the same appearance as a regular Tele neck pickup. This metal coating is extremely thin (1 micron: a human hair is 75 microns) and difficult to ground. Normally when it is touched nothing happens because it is almost impossible to not touch the strings at the same time, the strings being grounded therefore prevent any buzzing. If in some rare occasion you touch the cover without being in contact with the ground of the guitar (strings or bridge) you will notice a small buzz or hum which shouldn't be a problem under normal playing conditions.

- **Solution:** this buzz can be solved by lining the inside of the cover with adhesive backed copper foil with a small wire soldered to it and connected to a ground point. The 8mm wide strip of copper foil shown in the diagram will solve the buzz. Make sure the copper does not cover the notches.



NOTE: April-2017 our Gen-2 Tele neck pickups are fitted with a grounded metal cover and there is no problem with contact buzz. Buy a replacement cover on the Website.

Section 2. -a) No sound from a pickup or -b) no sound from the harness.

Definitions:

Conductor: Any part made of metal. Includes wires, terminals, screws, shielding foil, pot covers, control plates, control knobs made of metal, strings, metal hardware of the guitar and the player himself.

Short circuit: Is where a signal in a conductor is shorted due to that conductor coming into accidental contact with another conductor. If a short exists from a signal part to ground there is no output. Another kind of short is between different signal carrying conductors and that may cause a control or part of the control circuit to not function.

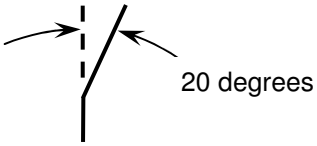
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Open circuit: Is where the signal pathway is interrupted when a conductor is broken or disconnected from it's destination or source.

A variety of situations can mean you get no sound from your harness, usually these things happen during install and can be fixed easily.

a) No sound from one pickup.

1) ***If it's a Tele bridge pickup*** (next 3 points)
   - ➢ an obvious problem can be the plug has not been inserted to the Harness with correct orientation. The word Hot on the plug should be visible (Left hand installs it is not visible) and it should align with the word 'HOT' printed on the circuit board adjacent the socket.
     - o **Solution**: Remove the plug and reinsert it with the opposite orientation, double check before re-assembling the control panel.
   - ➢ If another control panel has been substituted for the replacement Kinman panel there is a possibility the switch slot is not long enough.
     - o **Solution**: The slot need to be lengthened *or* preferable grind a portion of the switch lever where it interferes with the control panel, to allow the lever more travel.
   - ➢ If the switch lever has an excessive bend it causes the knob to hit the control panel thereby preventing the switch terminals from engaging.
     - o **Solution**: Take the knob off and take some of the bend out of the switch lever. The ideal angle is about 20 degrees



2) Another connection issue can be the pins on the miniature plugs for the pickups can be inadvertently bent out of alignment or just simply don't sit properly within the socket. This is a rare occurrence but should be checked regardless.
   - o **Solution**: First, simply take the plug out of the socket of the pickup that doesn't work and put it back into the socket -or- just give it a little bit of a jiggle in the socket.
   - o **Solution**: If you can see an obvious bend or misalignment of the pins they can be carefully bent back into the original shape (parallel with each other).

3) You have done the above with no result. Next measure the resistance of the pickup with a multimeter. Remove the pickup plug from the harness socket and then touch the probes of the multimeter onto the pins of the plug, you should get a reading of between 6Kand 9K ohms, if so skip to 3). If no reading it could mean there is an open circuit caused by a bad solder point or a broken wire in the pickup. Close to Zero ohms means a short circuit, most likely in the cable. This can be caused if too much heat was applied during soldering and the Red sheath has become melted by the shield wires causing the inner wire to contact the outer shield conductor. Close inspect the end of the cable where it connects to the pickup and look for signs of the Red sheath being melted.

   - o **Solution**: For open circuit: Rework the solder points on the baseplate of the pickup, being careful not to melt the Red inner of the attached cable. If still open circuit it could mean an accidentally broken coil wire caused by taking the cover off without undue care. Remove the cover having regard to the special instructions for doing so on www.kinman.com My Products >Strats >Additional Information >Pickup COVER stuff >Removing covers. Inspect the fine coil wires leading to the solder points on the baseplate to see if any are broken. If a broken wire is evident email us for a Return Authorization and then Return to us for rewind.
   - o **Solution**: For short circuit in the hookup cable: Use a sharply pointed object such as a needle to prize the wires apart and away from the Red inner. Put a single drop of super glue or other convenient permanent separating medium into the gap between the bare wires and the Red inner to prevent reoccurrence.

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4) If the direct resistance checks out OK insert the plug into the harness socket and select a single pickup alone, other then the subject pickup on the selector switch. Then measure the resistance of the pickup again only this time touch the probes onto the metal pins emanating from the back of the socket. A significantly different result from 2) above might be indicating a problem with connection within the socket or a problem on the circuit board.

- **Solution**: Gently Jiggle the plug sideways and simultaneously in and out of the socket a little bit. This might cause the connection to be re-established and everything will be OK. If not and the problem appears to be on the circuit board Contact Me via www.kinman.com

5) If a K9 harness and the bridge pickup has no sound in the series mode then remove any shielding foil covering the area where the pickups mount. This foil is causing a short of the bridge pickup to ground via the mounting screws of the middle pickup.

6) Still no result: Test the magnet charges of the pickup as follows.
The strength of the magnet can be tested by comparing with other magnets using a small wand made from a cut-off from a wound E string (like in the diagram below). Holding the wand at one end in your fingers put the other end onto the top of the magnet and flick it away from the magnet. In this way you can get a good idea of how strong the magnets are just by feeling how much force is required to make the string depart from the top of the magnet. Compare various magnets and see if the suspect one is less strong than any others that are behaving satisfactorily.



- **Solution:** If magnets are not magnetized Contact us via www.kinman.com If we can't instruct you we will refer you to someone who can recharge the magnets. If not it might be necessary to return the pickup to the factory.

b) No sound from harness.

1) The most common cause with **Strat harness** is accidental disconnection:
   - One the side of the volume pot is a miniature plug and socket for the purpose of making the volume pot replaceable without soldering. This can become disengaged during install if the harness is handled without care and sensitivity.
   - **Solution**: Insert the Plug back into the socket with the white wire at the top. For added security apply a small piece of sticky tape or Blu-Tack across the plug and socket.

2) The output cable has been incorrectly connected.
   - **Solution**: The inner Red wire of the output cable should be in the correct port of the Connector block. This is clearly identified in the photo in the fitting instructions. It is always on one end of the Connector block, never in the middle port.

3) The next most common problem is incorrect connections.
   - The pickup plugs have been inserted incorrectly or upside down.
   - **Solution**: Only if you see the plug is inserted wrong then pull the plugs out and reinsert making sure the pins are received into the corresponding holes in the sockets. Make sure the word hot is visible and the hot pin goes into the correct hole.

4) Another common problem concerns a short circuit of the output cable or jack socket.
A simple test is to take the little plugs for the output cable out of the Connector Block, connect a guitar cable to the output socket and into a live amplifier. With the amp volume turned down to 1 or 2 touch the tip of the plug on the end of the Red inner of the output cable. If no noise then you have a short circuit in that system. A short circuit on the output system is caused by one of two things:
   - The jack socket is mis-aligned in the body cavity causing the hot terminal (the one that pokes out from the socket and contacts the tip of the plug) to come into contact with the cavity wall, causing a short circuit with the shielding medium resulting in no sound.
   - **Solution**: Align the output socket correctly, tighten the retaining nut securely to prevent unwanted rotation in the future.

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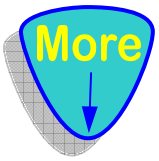
- too much heat was applied during soldering and the Red sheath has become melted by the wire causing that wire to contact the outer shield conductor. Close inspect both ends of the cable and look for signs of the Red sheath being melted.
  - **Solution**: Use a sharply pointed object such as a needle to prize the wires apart. Put a single drop of super glue into the gap between the conductors to prevent reoccurrence.

5) Occasionally the Red wire gets broken at the jack socket and is hidden under the heat shrink. Test resistance between the hot terminal of the socket and the Red wire or ferrule on the opposite end of the cable with a multimeter. If more than 1 or 2 ohms the solder join or wire may be compromised.
   - **Solution:** cut the heat shrink off the terminal to expose the solder point and inspect the wire and solder point. Repair as necessary.

6) Short circuits between conductors is another possibility.
- Check for obvious signs of conductors being in close proximity that may come into contact occasionally under very little force. One such example is the Bypass filter parts (capacitor and resistor) that are attached to the terminals of the volume pot. If mishandled during installing these parts may come into contact with the pot cover.
  - **Solution**: Manipulate or arrange the wires of these parts so they are not close to another conductor.

- Metal foil shielding can come adrift and come into contact with a harness conductor causing a short circuit.
  - **Solution**: Identify the piece of shielding responsible for the short circuit and make it secure. This can be a simple piece of sticky tape or an adhesive applied to the back of the foil or it can be a dab of solder to join two pieces of foil.

See next page for Section 3.



Section 3. Abnormal sounds:

Definitions:

Out of phase: According to the Kinman glossary, Technical …. When 2 pickups or pickup coils are connected in such a way that the current flows are in opposite directions and tend to cancel one another they are said to be out of phase. A simply analogy is when 2 batteries are connected end to end the wrong way, there is no current. Position 2 and 4 of a Strat switch is not out of phase, in fact quite the opposite…they are in-phase. Out of phase sounds consist of very little bass, dominate mids and highs with a characteristic 'nasal, honky' sound and have a much lower level than normal in-phase sounds.

Output level: The term applied to the amount of electrical or sonic energy outputted from a pickup or amplifier.

1) One pickup has less output than the others.
   - Most pickups in the bridge position are not as loud as the neck position because the strings vibrate with less amplitude close to the bridge.
     - Read Kinman recommendations about pickup adjustment on www.kinman.com >Tone Workshop >Tone.
   - Can sometimes be caused by a connection issue where the pins on the miniature plugs for the pickups are not connecting properly within the socket.
     - **Solution**: First, simply take the plug out of the socket of the pickup that doesn't work and put it back into the socket -or- just give it a little bit of a jiggle in the socket

2) Certain position of the selector switch you hear a honky sound with lower output. This is out-of-phase sound caused by a reversed pickup connection.
   - **Solution**: Identify which pickup plug is inserted the wrong way and remove it from the socket and reinsert it the correct way. On Strat harness the word 'Hot' should be visible on the outside of the plugs and should be on the same side of the socket that has Hot printed onto the circuit board.

3) A pickup has dark sound and very low output. This is probably a partial short circuit caused by melted Red insulation around the inner wire of the shielded cable.
   - **Solution**: Close inspect the hook-up cable where it terminates to the baseplate and look for signs of the strands of shielding wire melted into the Red sheath surrounding the inner conductor. Using a pointed object like a needle prize the strands of shield wire out of the red plastic sheath and put a single drop of super glue in the gap you just created to prevent recurrence.
   - Can sometimes be caused by a connection issue where the pins on the miniature plugs for the pickups are not connecting properly within the socket.
     - **Solution**: First, simply take the plug out of the socket of the pickup that doesn't work and put it back into the socket -or- just give it a little bit of a jiggle in the socket

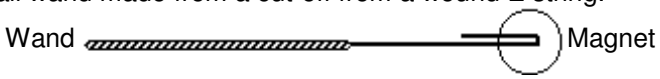
4) A pickup has a thin, nasal, low output sound. This is indicative of an open circuit pickup caused by a broken strand of the copper coil winding.
   1. **Solution**: the pickup should be returned to us for repair.

5) When using overdrive/distortion (via amp or a pedal) I get a shrill-like sound.
   - Customers own reply) what I am experiencing is the fact that the Kinman pups are extremely sensitive (this is a good thing) and do a very good job of amplifying all the sounds my guitar is producing. When overdriven through a Tube amp I have to bring down the highs (eq) in order to get a smoother/less harsh tone. My original Fender pups were not as responsive or bright sounding as the Kinmans. I just needed to figure out how to "dial in" the right sounds. Just took some extra tweaking when playing through my Traynor tube amp.



6) One string is dull or dead. This indicates one of the following:-
   - the pickup is installed in wrong orientation. Check that the tallest magnet is under the D-4th string.
   - the G-3rd string may be adjusted higher or lower than the other strings on the bridge saddle. Navigate to >Technical >Adjust & Set-up
   - either a dud string or a dead magnet. These are a rare occurrence but do happen occasionally.

   Test for magnet strength: The strength of the magnet can be tested by comparing with other magnets using a small wand made from a cut-off from a wound E string.



   Holding the wand at one end in your fingers put the other end onto the top of the magnet and flick it away from the magnet. In this way you can get a good idea of how strong the magnets are just by feeling how much force is required to make the string depart from the top of the magnet. Compare various magnets and see if the suspect one is less strong than any others that are behaving satisfactorily.

   2. **Solution**: Fit a new string or contact us to arrange re-magnetization as the case may be.

7) The overall sound is muffled, lacks sparkle and has weak output.
Possible fault: The jack socket is mis-aligned in the body cavity causing the hot terminal (the one that pokes out from the socket and contacts the tip of the plug) to come into contact with the cavity wall, causing a partial short circuit with the shielding medium (or wood) resulting in dull sound.
   - **Solution**: Align the output socket correctly and tighten the retaining nut securely to prevent unwanted rotation in the future.

Possible fault: There is a short circuit in the tone pot causing permanent tone cut. To verify the cause disconnect the tone pot by unplugging it from the harness.
   - **Solution:** If the sound returns to normal look for an obvious cause on the tone pot, possibly the middle terminal in contact with the pot cover or stray shielding.

➢ Can sometimes be caused by a connection issue where the pins on the miniature plugs for the pickups are not connecting properly within the socket.
   - **Solution**: First, simply take the plug out of the socket of the pickup that doesn't work and put it back into the socket -or- just give it a little bit of a jiggle in the socket

8) In a K9 system there are random crackling noises in position 2 of the selector switch (and the sound can also have low output)

▪ Check that the 6 pin connector on the K9 control has not come apart.
   - **Solution.** Push the connector together

9) Microphonic squeal (feedback) Please refer to Pickup Diagnostic page.

10) Touching any (grounded) hardware such as bridge, strings or metal knobs causes a loud buzz. **Cause**: the output cable has a reversed connection i.e. the Red (hot) is incorrectly connected to ground.
   - **Solution:** reconnect the Hot wire (Red) of the output cable to the terminal (port) that is marked with a Red dot (usually at the left side). If you used a non-Kinman output cable also check the connections on the jack socket.

11) In a K9 harness position 2 (Knob 'OUT' in SERIES mode) only the middle pickup works, the bridge does not. The metal foil on the back of the pickguard is covering the entire back surface and contacts the mounting screws for the middle pickup and the middle pickup does not have 3 conductor hook-up cable therefore the bridge hot is connected to ground and is shorted out.
   - Solution: Cut the metal foil away from around the mounting screws of the middle pickup so the mounting screws are not in contact.

More

Section 4. Control function issues:

1) The K9 control doesn't work in all positions.
    - **Solution:** Study the K9 Switching Function chart available on this webpage, you will notice the Push/Push switch only operates in position 2.

2) The K9 is popped out in switch position 2 but the sound does not get louder.
    - See point 11) above, or on previous page
    - This might indicate either the bridge or middle pickup has been plugged in reverse
        - **Solution:** Check the plug connections, the word Hot should be visible on the plug and not on the side you can't see.

3) The K9 control wont stay 'IN".
    - See Mechanical Issue in section 5.

4) The Tone control doesn't work.
    - Some Harness have an internal switch that lets the player select from 2 different value capacitors for different kind of treble cut. By default those harness are shipped with that switch set to HDTC (High Definition Tone Control), the less aggressive one of the two available.
        - **Solution**: Many players come to appreciate the HDTC after understanding it more by reading the relevant bullet point in the Harness section of www.kinman.com
        - **Solution**: Look on the Harness circuit board for the slide switch and reset it to 'Normal' to revert to a regular Tone control.

5) Position 2 of selector switch is barely audible in a K9 Harness.
    - Check that the 6 pin connector on the K9 control has not come apart.
        - **Solution.** Push the connector together

Section 5. Mechanical issues

1) **One of my pickup leans or tilts slightly towards the neck.**

All pickups should sit at right angles to the pickguard. Leaning can be caused by excessively long mounting screws, cables bunching under the pickup, pickguard screw holes that are off the centerline of the pickups, old pickguards that have shrunk or replacement pickguards whose slots don't align well with the body cavities.

2) **I noticed a loose/broken wire at the coil termination point in the baseplate of a pickup (the one where the Red output cable is connected), is this anything to be concerned about?**

There are 2 loops of wire from the coil that pass through that termination point in the base plate where the cable connects. The primary connection is achieved in the first pass. Often the end of the second loop will come adrift but it's nothing to worry about. That secondary loop is only there to ensure that the first loop doesn't come adrift.

3) **The K9 control will not stay 'IN'**.

The most likely cause is there are too many star washers fitted to the bushing of the control (behind the pickguard), preventing the bushing from poking through the pickguard enough to allow the knob to 'bottom' and the clutch to engage. Removing 1 or 2 Star washers should fix this. Continued next page …..



Occasionally the clutch in the switch fails due to the knob being pulled off when set to the 'IN' position. A replacement must be fitted so Contact Kinman.

4) The knob on the K9 control is loose.

The knobs should be an easy but firm slide fit on the Pot shafts. Open the split shaft with extreme care only if the knob is loose. If excessive force is used one half of the split shaft will break off. Also if the knob fits too tightly it will damage the switch when pulling the knob off. **CAUTION:** The knob on the push/push switch should only be removed with the switch in the 'OUT' position. Damage caused by pulling the knob off the shaft with the switch in the 'IN' position is not covered by warranty.

End / FIN