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## REF: Service Procedures 11E

# What Causes the 1991-2003 Shift Arm to Scrub the Starter Gear

The fact that the shift arm has scrub marks or striations does not mean you have a problem that needs immediate attention.

These marks can be found on most 91-03 Sportsters so it is a very common condition.

Due to the primary cover "setting" the positioning of the shifter shaft as well as the clearances in the parts, it's not possible to measure "installed" dims/specs.

The cover will put the shifter in a different place than you can guesstimate with the cover off.

There are only small clearances between the detent plate or shift arm from the clutch basket during normal operation.

So normal wear and expanded clearances can cause the markings on the arm.

The slight scoring on the arm should not make a noticeable amount of noise other than a possible intermittent sound from momentary contact.

And you may not be able to hear that over the pipes, especially at higher RPM.

You may be able to help the situation by adding new parts, washers, springs, or checking adjustments and alignments and etc.

But the condition isn't directly related to wear, alignment / adjustment. It's directly related to design.

The loose clearances will allow for enough slop in the shift chain to let the shift arm "kiss" the starter ring gear on occasion.

You'll probably see witness marks on the arm but they should not be deep.

In this instance, the shift arm will rub the ring gear on occasion but not all the time and the witness marks should not be very deep (momentary contact only).

With deep scratches or the shift arm continuously rubs without stopping (permanent contact), check to see if the starter ring gear is backing away from the clutch basket.

Witness marks from momentary contact <sup>1)</sup>



**The starter ring gear is pressed onto the rear of the clutch basket and has been known to slide rearward away from it.**

This may never happen as it doesn't happen everyday, but always keep that in mind when it's found that the shift arm is constantly scrubbing the ring gear.

There are plenty of loose clearances in the shift chain that could cause contact but most of these involve only momentary contact.

But there should be clearance between the shift arm and starter ring gear if you lift the shift shaft to the upper extreme.

A measurement was taken between the arm and gear with a feeler gauge at .043" (1.0922mm) without any scrubbing noticed (shaft lifted up by hand w/ cover off).

This dim is just a dirty one and results will vary. But the point of that measurement is there is that there will be some clearance between the two.

If the arm stays against the ring gear when the shaft is lifted, check the starter ring gear for breakage or slippage.

<p>Measuring clearance (results vary) <sup>2)</sup></p>	<p>Notice the gap near the gear on the right <sup>3)</sup></p>
<p>Measuring overall clearance between shift arm and starter gear. .043" feeler gauge was inserted with no scrubbing while spinning the clutch sprocket in neutral, shifter shaft lifted up by hand.</p> <p>1998 Sportster</p>	<p>1998 Sportster Starter ring gear in tact</p> <p>Slipped Starter Ring Gear</p> <p>1994 Sportster Starter ring gear slipped back</p>
<p>Correct starter ring gear position <sup>4)</sup></p>	<p>Slipped starter ring gear <sup>5)</sup></p>



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1) 2)

photo by Hippysmack

3)

combined photos from Hippysmack and argos587 of the XLFORUM

<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/frame-mount-evo-sportster-talk-1986-2003-models/202628-1994-transmission-noise-from-shifter/page3?t=2079818&page=3>

4)

photo by Hippysmack of the XLFORUM

<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/frame-mount-evo-sportster-talk-1986-2003-models/202628-1994-transmission-noise-from-shifter/page4#post4522101>

5)

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