Going NUTS over a new spindle nut!
Red Bull RockCrawling Team installs X-Lock Spindle Nuts by Stage 8
By: Justin Webster

First off, a disclaimer! In this article, I will refer to a part I call a “spindle nut”... The actual name for this part is either a “hub nut” or “spindle nut” or “wheel bearing nut” depending on who you talk to. Some people will say that spindle nuts are the small nuts that hold the spindle to the outer steering knuckle. Others call those smaller nuts, “spindle retainer nuts”. For clarity, I am speaking about the larger nuts that thread onto the outermost portion of a spindle and hold the wheel bearings in place and in the proper state of pre-load. The below photo shows the general type of nut I am referring to:

The background:

For years, our team has had issues with losing spindle nuts or fighting with a less than perfect design. Four times we have had issues.

On the Dana 44 of our daily driven stock modified Jeep, we did a popular full-floating axle conversion and only one month later lost a wheel while flat towing due to poor quality control on the hardness and design of the spindle nut washers that came with the kit. The washer was so soft that the locking “tang” eventually spun itself out of the spindle keyway and allowed the spindle nut and spindle jam-nut to unscrew on the Driver’s side of the vehicle. On the driver’s side, the wheels are usually spinning counter-clockwise, in turn putting a loosening force on the spindle nuts on that side. Talk about a bummer driving along in your towrig and watching your Jeep’s wheel passing you! We were not the only ones to suffer this problem.

Within a year of that incident, after we switched to Dana 60’s, we made the jump to the Dana spindle nuts with the pin style inner hub nut. The design was quite simple with a small pin engaging the center washer and keeping everything from spinning. Well, simple or not, we made an installer error on one occasion, not getting the small pin properly engaged into the washer, and ended up with a very loose spindle nut. The collar damage from that was a damaged set of bearings as well as damage to the small spindle bearing (the small bearing inside the back of the spindle where the outer axle rides). You might ask how a bearing inside the spindle could be fatigued by the wheel bearings being loose...well, here’s how: The hub was loose causing the drive flange to run out of alignment and in turn the outer axle ran out of alignment (wobbling) and that side loaded the small roller bearing enough to damage it. Talk about a hassle...not only were we at a competition and had to come up with new wheel bearings, but also to remove that small spindle bearing without proper tools... TALK ABOUT A “PI.T.A.”! Anyway, that was the second time we were bitten and no chance we’d get bitten a third time...right? Well, no, not if we go with a new kind of spindle nut that came out...so we tried the newest one that came out a few years ago.

That new spindle nut came with the RockCrusher Axles we put into the RockHer 1. Although the nuts looked like they had good potential, they had two problems. First, there was no tool in existence that could install the dang things. We had to make our own and it was a pretty weak tool considering the design of the nuts along with the internal spacing between the spindle and outer hub. Second, it only had a couple of possible positions to set the locking “set screw” and that meant we couldn’t get the adjustment of the adjuster nut to the tightness (bearing preload) we prefer. We tried them for a season and finally decided to ditch them.

Going back to the Dana Spicer Spindle nuts, we vowed to take better care installing them to ensure the engagement pin was perfect each time. Here’s a photo series showing you how they go together:

The inner nut goes onto the spindle and gets tightened up against the wheel bearings to the proper torque. The red arrow shows the engagement pin.
By Dustin Webster

Going NUTS over a new spindle nut!

You know, it was tough admitting we had a nut problem ;-)  But I know for me, I'm glad to have found the nut, installing that washer with a million holes, only to find you have to change your preload 5 more times until So that's it!  Simple and effective is an understatement.  Mike put it all together in a matter of minutes and everything...another good idea by the manufacturer.

Next comes the locking assembly that I'll call the "spider".  It can be installed with a set of snap ring pliers as...snap ring slots?  This makes it nice because you can install the nut either direction and you can still assemble different places apiece.  That means you'll have far more holding power that you'd ever need.

The locking washer has a "tang" that slides into a keyway on the spindle keeping the washer from rotating and the engagement pin slides into the washer, keeping the inner spindle nut from rotating.

After jacking the wheel off the ground and properly supporting the axle with a jack-stand, Mike pulled the drive wheel bearing preload.

Keep in mind, this design does not use a jam nut, so you'll only need to know the torque spec for the proper tightened to the proper torque specs for your application...be careful to ensure you are using the wheel bearing load the small pin properly engaged into the washer, and ended up with a very loose spindle nut.  The collateral damage from that was a damaged set of bearings as well as damage to the small spindle bearing (the small...dang things.  We had to make our own and it was a pretty weak tool considering the design of the nuts along...loaded the small roller bearing enough to damage it. Talk about a hassle...not only were we at a competition...screwed the whole thing up.  Want to know what's worse?  We had to make our own jack-stand, because the size of our...hang the brave new world of Dana 60 spindle nuts.  We were losing nuts all the time, and the design was flawed.  It's a shame, because they were a pretty cool idea overall.  But after we loaded the Dana 60 spindle bolts up, we...ditch them.

Our biggest complaint was the preload...the internal spacing between the spindle and outer hub.  Second, it only had a couple of possible positions for the preload...dang things.  We had to make our own and it was a pretty weak tool considering the design of the nuts along...from another team that there was a new Spindle nut available that we haven't yet seen.  I did some research and...happened to MANY people, so it's not just a fluke thing.

Within a year of that incident, after we switched to Dana 60's, we made the jump to the Dana spindle nuts with...'

For years, our team has had issues with losing spindle nuts or fighting with a less than perfect design.  Four months, we were in competition and had to do a quick change of the front High-9 differential due to a locker...now.  I already described the first time, but the second time was FAR more dangerous!  In the past couple of...breaks...clearly, a very dangerous situation. She was alright because we have...caliper mount (the...GOOD!  So, we're going to jump to the Dana spindle nuts and hope we don't have another wheel issue.  The Red Bull RockCrawling Team
By Dustin Webster

Going NUTS over a new spindle nut!

...another good idea by the manufacturer.

Now comes the snap ring that holds the "spider" pressed tight into the "star". Notice there are two different snap ring slots? This makes it nice because you can install the nut either direction and you can still assemble everything...another good idea by the manufacturer.

Follow that with the single adjuster nut. It is much thicker than the nuts anyone else supplies and is cut with 8 indexes will fail!

Now for the order that the Stage 8 X-lock goes together. As it was impossible with my camera to show you the makes the swap easy and quick.

FYI, we never had to remove the wheel or any other components as we're only switching the spindle nut. This

When the washer is properly in place, the pin looks like this, poking into the hole...the problem is, when you are in a hurry or the lighting isn't just perfect, you may not get the pin exactly in place and the washer no longer acts as a lock. This photo shows the correct install.

The next shot just shows the jam nut that tensions against the locking washer.
Pretty simple right??? Well, it should be, but I cannot tell you how many times I have seen this messed up simply due to installer error or the jam nut not holding in the proper tension. We've suffered this fate twice now. I already described the first time, but the second time was FAR more dangerous! In the past couple of months, we were in competition and had to do a quick change of the front High-9 differential due to a locker issue. When putting the axle back together, we were in a hurry and somehow didn't get the spindle nut on properly. Because we had not noticed the wheel wobbling, we ended up breaking a brake caliper mount (the part that is cast into the caliper). When we locked up the brakes, the caliper spun around the axle and tore out the brakeline and Becca lost the brakes...clearly, a very dangerous situation. She was aight because we have redundant braking systems on our rigs (something most people do not have) but had she been on a big downhill with no time to think, or not had the redundant braking options, things easily could have gone far worse.

Now you know that we've had some issues...including issues that had a wheel leaving the vehicle entirely on the highway, and Becca losing the brakes on a competition course...both easily situations that could have killed someone inside or outside the vehicle. Funny to think that a simple nut could cause so much trouble, but it's happened to MANY people, so it's not just a fluke thing.

As we always push for safety and much of the time, find that safety in new technology, we were excited to hear from another team that there was a new Spindle nut available that we haven't yet seen. I did some research and after seeing the concept, ordered up a set. The reason I'm writing this story is simple. This product will completely eliminate the deadly issues we've had...PERIOD. If you're running a Dana 44 or 60 spindle, you should consider Stage 8's new "X-Lock, locking spindle nuts.

Here's the sequence Mike Foster (one of our crew) went through to swap to the new spindle nuts:

After jacking the wheel off the ground and properly supporting the axle with a jack stand, Mike pulled the drive...
By Dustin Webster

The Red Bull RockCrawling Team installs X-Lock Spindle Nuts by Stage 8

Going NUTS over a new spindle nut!

You know, it was tough admitting we had a nut problem ;-) But I know for me, I'm glad to have found the

ones I described at the beginning of this article. The locking washer indexes properly...then if all the planets are not in alignment you'll still have issues, just like a nut, installing that washer with a million holes, only to find you have to change your preload 5 more times until you know the hassle it usually is doing the Spicer spindle nuts, we're stoked to not have to keep adjusting the

snap ring slots? This makes it nice because you can install the nut either direction and you can still assemble different places apiece. That means you'll have far more holding power that you'd ever need.

Anyway, the "spider" has 8 different possible positions but only one will fit depending on the positions of the wheel bearing preload.

nut torque specs and not the jam nut specs as the jam nut specs are far too tight for wheel bearing preload.

reliefs instead of the usual 4. This gives you two different index option with your hub socket. That nut is tightened to the proper torque specs for your application...be careful to ensure you are using the wheel bearing relief.

Follow that with the single adjuster nut. It is much thicker than the nuts anyone else supplies and is cut with 8

indexes will fail!

with either side facing the wheel bearing. Next, the main locking device (let's call it the "star") goes in place. It makes the swap easy and quick.

Next comes the locking assembly that I'll call the "spider". It can be installed with a set of snap ring pliers as

PolyPerformance Drive Flange by the way...other brands may remove/install differently.

Then Mike used a small pick to remove the spiral clip that holds the actual drive "slug" in place. This is a

PolyPerformance Drive Flange by the way...other brands may remove/install differently.

as we always push for safety and much of the time, find that safety in new technology, we were excited to hear about a new Spindle nut available that we haven't yet seen. I did some research on this nut and found several reports of issues with others that have used this type of nut.

For years, our team has had issues with losing spindle nuts or fighting with a less than perfect design. Four times we have had issues.

For years, our team has had issues with losing spindle nuts or fighting with a less than perfect design. Four times we have had issues.

As we always push for safety and much of the time, find that safety in new technology, we were excited to hear about a new Spindle nut available that we haven't yet seen. I did some research on this nut and found several reports of issues with others that have used this type of nut.

properly. Because we had not noticed the wheel wobbling, we ended up breaking a brake caliper mount (the

from another team that there was a new Spindle nut available that we haven't yet seen. I did some research

In our latest incident, our driver was solo on the Red Bull RockCrawling Team's RockHer 1. She had been stateside while we were in Europe and had no prior experience with these vehicles. One of our team members had previously told her, "If you ever drive one of these on a downhill with no time to think, or not had the redundant braking options, things easily could have gone far worse.

However, the issue was not the nut itself, but rather the spindle nut washers that came with the kit. The washer was so soft that the locking "tang" eventually spun off the "spider" and caused the nut to be loose.

Then Mike used a small pick to remove the spiral clip that holds the actual drive "slug" in place. This is a

PolyPerformance Drive Flange by the way...other brands may remove/install differently.

We have also suffered issues with the hub with either side facing the wheel bearing. This washer does not have any tang and is the same on both surfaces, so it can be installed either way.

At the start of the season, we had a problem with the preload on the drive flange and decided to try using the Stage 8 X-lock spindle nut.

It was impossible with my camera to show you the engagement pin. Mike had to pull the wheel off the ground and pop up the flange cap by removing the three Allen bolts.

Then Mike used a small pick to remove the spiral clip that holds the actual drive "slug" in place. This is a PolyPerformance Drive Flange by the way...other brands may remove/install differently.

Then Mike used a small pick to remove the spiral clip that holds the actual drive "slug" in place. This is a PolyPerformance Drive Flange by the way...other brands may remove/install differently.

This pin engages with a keyway in the inner spindle nut, and then once that pin is engaged, the pin slides into the washer, keeping the inner spindle nut from rotating.

The locking washer has a "tang" that slides into a keyway on the spindle keeping the washer from rotating and engaged. Once the pin is engaged, the washer no longer slides on the spindle nut, which prevents the washer from rotating.

The red arrow shows the engagement pin.
By Dustin Webster

The Red Bull RockCrawling Team installs X-Lock Spindle Nuts by Stage 8

Going NUTS over a new spindle nut!

You know, it was tough admitting we had a nut problem ;-) But I know for me, I'm glad to have found the ones I described at the beginning of this article.

Knowing the hassle it usually is doing the Spicer spindle nuts, we're stoked to not have to keep adjusting the wheel bearing preload.

Next comes the snap ring that holds the "spider" pressed tight into the "star". Notice there are two different snap ring slots? This makes it nice because you can install the nut either direction and you can still assemble with either side facing the wheel bearing.

Now the main locking device (let's call it the "star") goes in place. It indexes will fail!

There are two holes simply for holding it that way. You don't actually "spring" them with the snap ring pliers, you install inside the hub, we'll just show you on the ground how it works.

Using a bolt taken from the flange cover we just removed, Mike screws it in a few turns to create a handle to pull the slug out with. If it doesn't come easily, Mike can just spin the wheel to relieve possible tension on the axle or flange splines. Note the dirt on the outer edge of the outer flange splines??...someone's in trouble for installing a dirty flange during a speedy swap at a recent event :)

Next, we removed the Spicer spindle nuts shown in the photos above.

FYL we never had to remove the wheel or any other components as we're only switching the spindle nut. This makes the swap easy and quick.

Now for the order that the Stage 8 X-lock goes together. As it was impossible with my camera to show you the install inside the hub, we'll just show you on the ground how it works.

First, the large flat washer or "spacer" is installed over the spindle and up against the outer surface of the outer wheel bearing. This washer does not have any tang and is the same on both surfaces, so it can be installed with either side facing the wheel bearing. Next, the main locking device (let's call it the "star") goes in place. It has a tang that must be indexed so the tang slides into the keyway in the spindle. The "star" can face either direction as both sides are the same. You can see how beefy this piece is. NO CHANCE that the tang or indexes will fail!
Follow that with the single adjuster nut. It is much thicker than the nuts anyone else supplies and is cut with 8 reliefs instead of the usual 4. This gives you two different index option with your hub socket. That nut is tightened to the proper torque specs for your application...be careful to ensure you are using the wheel bearing nut torque specs and not the jam nut specs as the jam nut specs are far too tight for wheel bearing preload. Keep in mind, this design does not use a jam nut, so you’ll only need to know the torque spec for the proper wheel bearing preload.
Next comes the locking assembly that I'll call the "spider". It can be installed with a set of snap ring pliers as there are two holes simply for holding it that way. You don't actually "spring" them with the snap ring pliers, you only hold them. That was a great idea as installing and pulling those Spider washers is a hassle if you don't have tiny fingers. Indexing the Stage 8 version is a cakewalk.

Anyway, the "spider" has 8 different possible positions but only one will fit depending on the positions of the "star" and the adjuster nut. Mike didn't get lucky and get the right 1 out of 8 on the first try, but the 4th position he tried slid right in. In this photo, you can see how the "spider" engages the "star" AND the adjuster nut in 8 different places apiece. That means you'll have far more holding power that you'd ever need.

Now comes the snap ring that holds the "spider" pressed tight into the "star". Notice there are two different snap ring slots? This makes it nice because you can install the nut either direction and you can still assemble everything...another good idea by the manufacturer.
Going NUTS over a new spindle nut!

You know, it was tough admitting we had a nut problem ;-) But I know for me, I’m glad to have found the ones I described at the beginning of this article. The nut, installing that washer with a million holes, only to find you have to change your preload 5 more times until knowing the hassle it usually is doing the Spicer spindle nuts, we’re stoked to not have to keep adjusting the everything...another good idea by the manufacturer.

Anyway, the “spider” has 8 different possible positions but only one will fit depending on the positions of the snap ring slots? This makes it nice because you can install the nut either direction and you can still assemble...the hub socket indexes will fail!

Now for the order that the Stage 8 X-lock goes together. As it was impossible with my camera to show you the flange cap by removing the three Allen bolts

Here’s the sequence Mike Foster (one of our crew) went through to swap to the new spindle nuts:

From another team that there was a new Spindle nut available that we haven’t yet seen. I did some research redundant braking systems on our rigs (something most people do not have) but had she been on a big issue. When putting the axle back together, we were in a hurry and somehow didn’t get the spindle nut on months, we were in competition and had to do a quick change of the front High-9 differential due to a locker simply due to installer error or the jam nut not holding in the proper tension. We’ve suffered this fate twice now. I already described the first time, but the second time was FAR more dangerous! In the past couple of

Going back to the Dana Spicer Spindle nuts, we vowed to take better care installing them to ensure the engagement pin was perfect each time. Here’s a photo series showing you how they go together:

The inner nut goes onto the spindle and gets tightened up against the wheel bearings to the proper torque.

The next shot just shows the jam nut that tensions against the locking washer.

The background:

That spindle nuts are the small nuts that hold the spindle to the outer steering knuckle. Others call those either a “hub nut” or “spindle nut” or “wheel bearing nut” depending on who you talk to. Some people will say tools...TALK ABOUT A “P.I.T.A.!” Anyway, that was the second time we were bitten and no chance we’d get loaded the small roller bearing enough to damage it. Talk about a hassle...not only were we at a competition spindle could be fatigued by the wheel bearings being loose...well, here’s how: The hub was loose causing the small pin properly engaged into the washer, and ended up with a very loose spindle nut. The collateral loosening force on the spindle nuts on that side. Talk about a bummer driving along in your towrig and itself out of the spindle keyway and allowed the spindle nut and spindle jam-nut to unscrew on the Driver’s side.

On the Dana 44 of our daily driven stock modified Jeep, we did a popular full-float axle conversion and only times we have had issues.

The background:

Below photo shows the general type of nut I am referring to:

Background:

Disclaimer

www.Stage8.com
So that's it! Simple and effective is an understatement. Mike put it all together in a matter of minutes and knowing the hassle it usually is doing the Spicer spindle nuts, we're stoked to not have to keep adjusting the nut, installing that washer with a million holes, only to find you have to change your preload 5 more times until the locking washer indexes properly...then if all the planets are not in alignment you'll still have issues, just like the ones I described at the beginning of this article.

You know, it was tough admitting we had a nut problem ;-) But I know for me, I'm glad to have found the solution.

Stage 8 - Ask your friendly Pirate 4x4 vendors if they are a retailer!

www.Stage8.com
The Red Bull RockCrawling Team installs X-Lock Spindle Nuts by Stage 8

Going NUTS over a new spindle nut!

the ones I described at the beginning of this article.

nut, installing that washer with a million holes, only to find you have to change your preload 5 more times until

knowing the hassle it usually is doing the Spicer spindle nuts, we're stoked to not have to keep adjusting the

everything...another good idea by the manufacturer.

Different places apiece. That means you'll have far more holding power that you'd ever need.

“star” and the adjuster nut. Mike didn't get lucky and get the right 1 out of 8 on the first try, but the 4th position

have tiny fingers. Indexing the Stage 8 version is a cakewalk.

First, the large flat washer or “spacer” is installed over the spindle and up against the outer surface of the outer

wheel bearing preload.

Keep in mind, this design does not use a jam nut, so you'll only need to know the torque spec for the proper

tightened to the proper torque specs for your application...be careful to ensure you are using the wheel bearing

FYI, we never had to remove the wheel or any other components as we're only switching the spindle nut. This

Next, we removed the Spicer spindle nuts shown in the photos above.

Now for the order that the Stage 8 X-lock goes together. As it was impossible with my camera to show you the

has a tang that must be indexed so the tang slides into the keyway in the spindle. The “star” can face either

with either side facing the wheel bearing. Next, the main locking device (let's call it the “star”) goes in place. It

Now you know that we've had some issues...including issues that had a wheel leaving the vehicle entirely on

worse.

redundant braking systems on our rigs (something most people do not have) but had she been on a big

properly. Because we had not noticed the wheel wobbling, we ended up breaking a brake caliper mount (the

simply due to installer error or the jam nut not holding in the proper tension. We've suffered this fate twice

bitten a third time...right? Well, no, not if we go with a new kind of spindle nut that came out...so we tried the

newest one hat came out a few years ago.

bitten a second time...right again? The red arrow shows the engagement pin.

Here's the sequence Mike Foster (one of our crew) went through to swap to the new spindle nuts:

engagement pin was perfect each time. Here's a photo series showing you how they go together:

Going back to the Dana Spicer Spindle nuts, we vowed to take better care installing them to ensure the

spindle could be fatigued by the wheel bearings being loose...well, here's how: The hub was loose causing the

small pin properly engaged into the washer, and ended up with a very loose spindle nut. The collateral

loosening force on the spindle nuts on that side. Talk about a bummer driving along in your towrig and

itself out of the spindle keyway and allowed the spindle nut and spindle jam-nut to unscrew on the Driver's side

times we have had issues.

The background:

that spindle nuts are the small nuts that hold the spindle to the outer steering knuckle. Others call those

First off, a disclaimer! In this article, I will refer to a part I call a “spindle nut”... The actual name for this part is

Red Bull RockCrawling Team

Pirate4x4.com

Disclaimer