



SERVICE BULLETIN

INSPECTION AND REWORK INSTRUCTIONS

DATE	03/27/2017 REV. 004
APPLIES TO	FIRE APPARATUS INDEPENDENT FRONT SUSPENSIONS MODELS: IFS2400S-FT & IFS2000S-FT IFS20-XXXXX, IFS24-XXXXX
SUBJECT	IFS BALL JOINTS – RECALL NHTSA ID: 17E013
CONDITION	The central steering system ball joints located in the relay rod may not have been properly torqued, or secured with Loctite 242.
CORRECTION	Check central steering system ball joints breakaway torque, and repair if found loose, as per instructions below
LABOR ALLOCATION	3.0 hours for removal and repair (two people for 1.5 hrs.) 1.0 additional hour if ball joints are damaged and need to be replaced (two people for 0.5 hrs.)
TOOLS REQUIRED	Side Cutter, Vice Grip, Pliers, 3lb hammer 30mm, 1 5/16" and 1 1/8" socket with 1/2" drive 1 1/2" socket with 3/4" drive 1 1/8" end wrench Hook style pry-bar and small dull chisel 1/2" clicker style torque wrench (90-100 lbf-ft) 1/2" clicker style torque wrench (155-170 lbf-ft) 1/2" clicker style torque wrench (295-315 lbf-ft) 3/4" clicker style torque wrench (500 to 600 lbf-ft) 1/2" and 3/4" Impact Wrench Jack stands x two (2) 10t - 12t Steady vice for application of 500 ft.lb breakaway torque Loctite 242 ® thread-locker Ball joint tools 50mm: Wrench 708116-03 and Clamp 708116-06. For ball joint loaner tools; call Mark Bachman (765) 838-0361 ext. 6 or Jerry McReynolds (417) 466-1056

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<p>SERVICE PARTS AND KITS</p> <p>APPLICABLE</p>	<p>1. Cotter pins and sacrificial nuts required</p> <ul style="list-style-type: none"> • K714259 <ul style="list-style-type: none"> ○ Nut Hex Castle M20x1.5 (705381-02) - 2 off ○ Nut Hex Castle M24x1.5 (705381-02) - 2 off ○ Cotter pin 1.58x0.18 (705381-03) – 2 off ○ Cotter pin 1.40x0.15 (705382-03) – 2 off ○ M20x1.5 Nut Hex Sacrificial ○ M24x1.5 Nut Hex Sacrificial <p>2. Ball joints if damaged</p> <p>IFS20-XXXXFT and IFS24-XXXXFT</p> <ul style="list-style-type: none"> • 50mm Ball joint 705381-01 (2 off per vehicle)
<p>NOTE</p>	<p>1. <i>Ensure that all washers found under castle nuts are re-installed in their original positions.</i></p> <p>2. <i>Warranty claim invoice to be complete with the following:</i></p> <ul style="list-style-type: none"> • <i>Suspension serial number, VIN number with information of facility that performed the inspection and repairs.</i> • <i>A description of condition found and work performed on each side of the suspension.</i> <p>3. <i>Claim payment approval requires that any parts replaced, must be returned, using the return material authorization process. (Excluding castle nuts and cotter pins)</i></p>

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GENERAL INSTRUCTIONS

Please thoroughly review entire work procedure before starting work. If there are questions and/or concerns with steps defined in this procedure, contact Mark Bachman at 765-838-0361 ext. 6



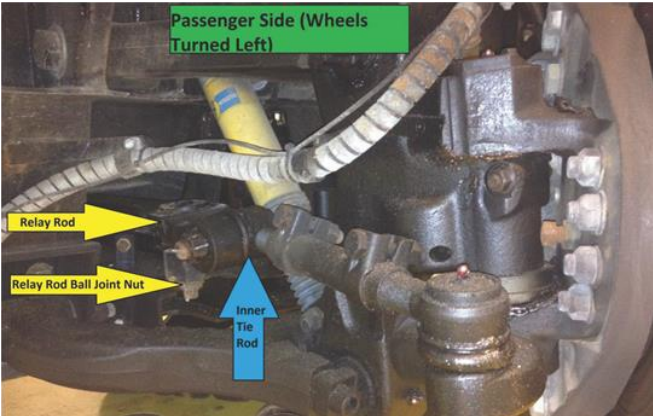
IMPORTANT SAFETY NOTICE

All applicable industry safety standards to be followed when performing the work identified in this procedure.

Failure to safely support the vehicle and follow the procedures in this bulletin can lead to material damage and/or personal injury.

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Step	Instruction	Illustration
1	Safely lift vehicle until the wheels are off the ground. Properly support vehicle with 10t to 12t jack stands.	
2	Steer wheels all the way to the left	
3	Starting on the right hand side (passenger), remove cotter pin and castle nut from tie rod end that is connected to the relay rod.	

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4	Place sacrificial 7/8"-14 nut on rod end stud and strike with hammer to un-seat tapered connection.	
5	Remove tie rod end from relay rod assembly and position tie rod against wheel	
6	Mark the pitman arm to steering box output shaft as shown, to ensure correct alignment when re-assembling. Remove pinch bolt nut from right pitman arm (leaving pinch bolt in pitman arm to prevent pitman arm from falling from steering box output shaft)	

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7	Using small chisel, spread pitman arm end	
8	Remove pinch bolt from pitman arm	
9	Lower pitman arm and position pitman arm to where it's parallel with the relay rod	

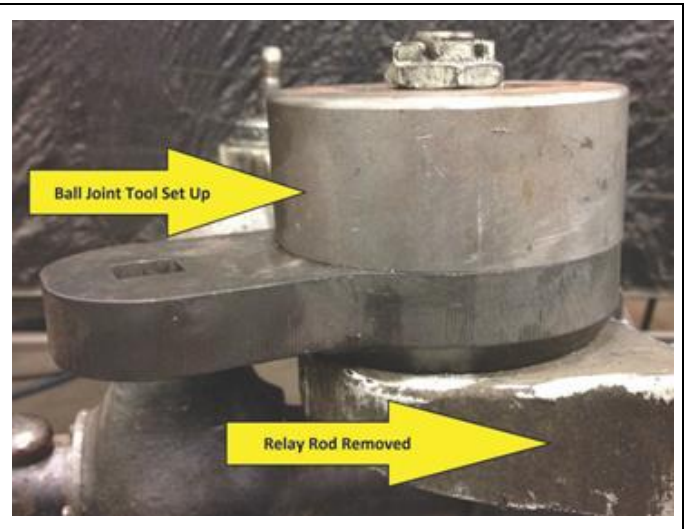
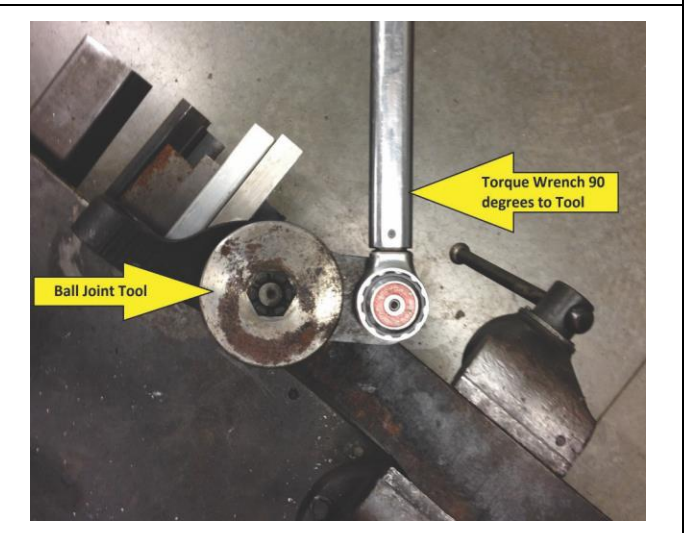
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10	Steer wheels all the way to the right and switch sides	
11	Repeat steps for the left hand side (driver side). Remove relay rod assembly. (Slide relay rod assembly out towards the left side of the vehicle)	
12	Remove the cotter pin from the ball joint stud. Remove the castle nut from the ball joint stud, and retain for re-install. <i>Ensure that all washers found under castle nuts are re-installed in their original position</i>	
13	Place relay rod assembly in vice as shown. Remove pitman arms from the ball joints, using sacrificial nuts.	

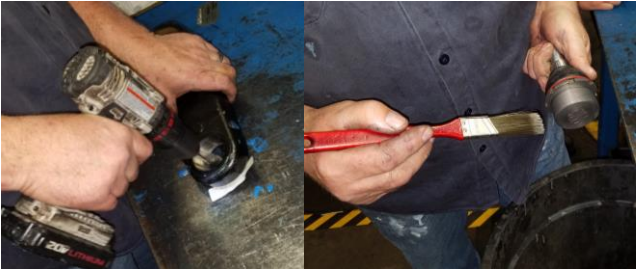


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14	<p>Using 50 mm ball joint tool and castle nut, place over ball joint (Use caution do not tear boot)</p> <p>Run castle nut down, leaving castle nut slightly loose (“DO NOT RUN DOWN TIGHT)</p> <p>Note: Tool 708116-03 is used with castle nut to hold tool 708116-06 loosely on the ball joints. Be sure that tooling set up is not binding when loosening, castle nut should come off freely after ball joint is loose.</p>	
15	<p>Using torque wrench (Set at 500 ft.lb) place in ball joint tool and apply 500 ft.lb of breakaway torque to the ball joint.</p> <p>Repeat this for the other ball joint.</p>	

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16	<p>If ball joint moves (Breaks loose) before reaching required torque (500 lbf-ft), remove ball joint from pitman arm and clean external thread on ball joint and internal thread on pitman arm using a wire wheel. Clean threads with denatured alcohol.</p>	
17	<p>Ensure threads are clean and dry. Ensure that the Loctite242 is not expired. Using Loctite, 242 apply generously to the external threads of both ball joints and internal threads of the relay rod. (Ensure that all threads are covered)</p>	
18	<p>Install ball joint with Loctite 242 applied, into the relay rod. Screw in by hand, until properly seated. Using 50 mm ball joint tool and castle nut, placed over ball joint (Use caution do not tear boot), torque the ball joint to 325-375 lbf-ft. Be sure that tooling set up is not binding when tightening. Castle nut should come off freely after ball joint is torqued. Ensure that the ball joint is fully seated into the relay rod. Repeat for opposite side.</p>	
19	<p>Install pitman arm assemblies onto ball joints mounted in the relay rod. Torque ball joint castle nut to 225-245 lbf-ft. Advance the nut to align the castle nut slot with thru hole to allow cotter pin to be installed. Note: Never back off castle nuts to install</p>	



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	cotter pins.	
20	<p>Reinstall the relay rod assembly to the front suspension in reverse order to removal using new cotter pins and the following torque specs:</p> <ul style="list-style-type: none">• Tie rod castle nut – 90-100 lbf-ft.• Ball joint castle – 225-245 lbf-ft.• Pitman arm attachment bolt – 295-315 lbf-ft. <p>When tightening castle nuts:</p> <ul style="list-style-type: none">• Achieve specified torque• Advance the nut to align the castle slot with thru hole to allow cotter pin to be installed. <p>Note: Never back off castle nuts to install cotter pins</p>	

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Expected results

- Completion of the above work will result in proper retention of ball joints within the Pitman arms/ Bell cranks.
- The unit will not require re-alignment, as no parts affecting alignment are resized or adjusted.
- When driven, the unit's steering should feel tight and precise.

Exceptions and escalation

The work described above while complete, cannot insure that the work is completed error free. A few of the common mistakes that must be avoided include:

1. Failure to completely clean the threads of the pitman arm / ball joints prior to application of Loctite 242.
 - a. Remove all debris from threads.
 - b. Remove any oil or other residue from threads using Denatured Alcohol.
2. Improper torque due to use of non-calibrated equipment, or equipment with expired calibration.
 - a. Insure that all equipment used is properly calibrated and said calibration has not expired.
3. Improperly torquing the castle nut when using the ball joint tools (This can result in improper torque application.)
 - a. For removal, nut should be tightened until tool is almost seated, with no gaps above or below
 - i. Nut should never be more than hand tight.
 - b. For installation, run the ball joint down until the flange touches, then put the ball joint tool in place.
 - i. Run nut down to contact and back off slightly.
 - ii. If another repositioning of the ball joint tool is required, reset the nut as above *each* time.
4. Failure to insure that ball joints have not been damaged during the removal or installation could lead to premature ball joint failure.
 - a. Check for cuts, holes or heavily abraded areas.

If any parts are damaged during the inspection or repair, or any questions arise please call:

Mark Bachman at 765 838-0361 ext. 6. or Jerry McReynolds (417) 466-1056



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Approvals

Reyco Granning

R.Steenekamp	<i>R.Steenekamp</i>	VP of Engineering	02/23/2017
Name	Signature	Title	Date

Rosenbauer

Name	Signature	Title	Date

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