

# TERAFLEX

## PRODUCT INSTALLATION GUIDE

### Extreme Short Shaft Kit

Part # 4444400



**Important Notes:**

Prior to beginning this or any installation read these instructions to familiarize yourself with the required steps and evaluate if you are experienced and capable to personally perform these modifications.

Refer to the parts list to ensure that all necessary components and hardware has been included. If any parts are missing please contact your local retailer for assistance.

**Required Tools:**

- 10mm allen
- 13,14,15mm socket or wrench
- 10mm 12 point socket or wrench
- 1 1/8" socket
- Hammer
- Punch
- Flat head screw driver
- Snap ring pliers
- Pry bar
- Ft-lbs torque wrench
- Silicon
- Brake clean
- ATF dextron III

4444400 Extreme Short Shaft Kit

Component Item ID	Item Name	Qty Per Assy
36	Washer 5/16" Lock Zinc Plated wsr 5/16	4
74	Bolt 1/4"-20 UNC x 3/4" Long (ESS Sensor)	1
93	Bolt 5/16"-24 UNF x 1.25" Long 12 Point Head	4
458	Washer 1/4" Flat wsr 1/4	1
231112	7/8"-20 UNEF Flanged Crimp Yoke Nut	1
600051	Output Bearing	1
600069	Short Shaft	1
600070	Housing	1
600071	Yoke	1
600072	Speed Sensor Tone Ring	1
600108	Speed Sensor	1
600427	Internal Snap Ring Used to Retain Output Bearing	1
2199920	Housing Seal	1

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# Installation

1. Drain the transfer case using a 10mm allen.



2. Remove the speedometer gear drive using a 13mm socket.



3. Remove the front and rear drive shafts.
4. Remove the shift lever using a 14mm socket or wrench.
5. Remove the transfer case from the transmission using a 14mm socket or wrench and remove from vehicle.



6. Remove the slip yoke boot using a flat head screwdriver to loosen the clamp.



7. Remove the harmonic balancer (if equipped) using a punch and hammer. Make sure that you rotate the balancer while driving it off to ease in removal.



8. Remove the rear output shaft seal.



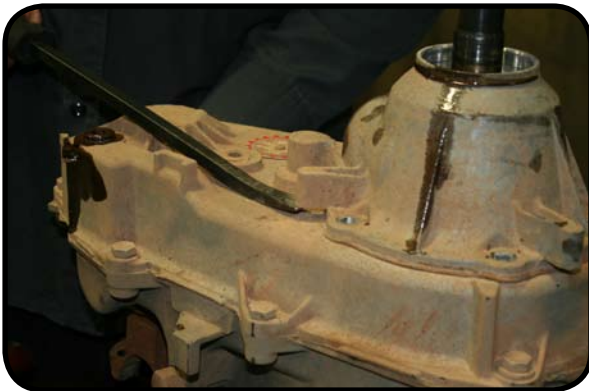
9. Remove the front output yoke using a 1 1/8" socket.



10. Place the transfer case onto the mounting studs. Remove the rear output shaft snap ring.



11. Remove the rear output housing using a 15mm socket and separate it from the transfer case.



12. You will need to remove eight bolts to separate the transfer case. On seven bolts use a 15mm socket and the last bolt is a 10mm 12point that also needs to be removed. Now separate the two half using the pry slots that are machined into the case.



13. Remove the front and rear output shafts together with the drive chain.



14. Remove the drive sprocket snap ring and remove the drive gear from the main shaft.



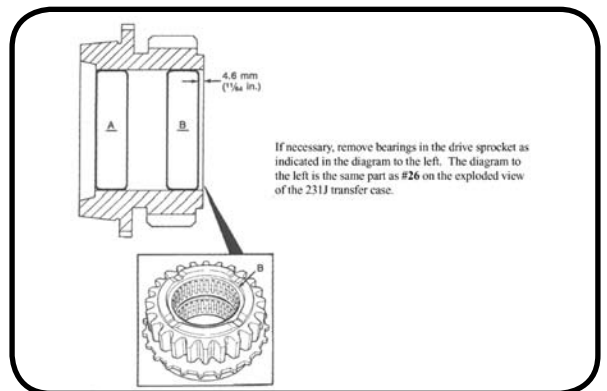
15. Check the mode fork inserts for damage. If they are worn replace them with factory replacement parts. Remember which way the syncro sleeve goes on the range fork. The short half of the splines should go down.



16. Verify the length of your mode fork shift rod as shown. If your shift rod measures 10.2", it will need to be cut down to a length of 9.380". This is typical of 1988 and 1989 model YJ's & XJ's.



17. If your vehicle is a 1996 and older you will have to remove the bearings from the drive sprocket. You can use a big socket and hammer or equivalent to remove them.



18. Install the drive gear onto the new short shaft and install the new snap ring.



19. Install the new short shaft with the front output shaft and the drive chain.



20. Clean the seal surface and use silicone adhesive to seal the front and rear half of the case.



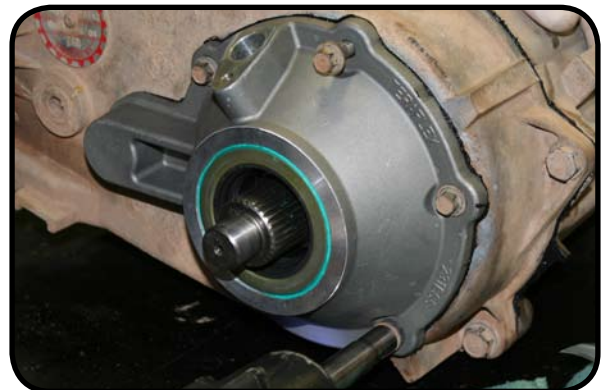
21. Install the rear half of the case. Make sure that the oil pick up and the magnet are installed in the case. Install the oil pump onto the shaft. Torque the bolts to 25 ft-lbs.



22. Install the speed sensor tone ring.



23. Install the new rear housing. Use silicon adhesive on the seal surface and torque to 20 ft-lbs.



24. Install the new yoke. Use silicon on the splines of the yoke to create the seal. Use red thread locker on the yoke nut and torque to 100 ft-lbs.



25. Install the new speed sensor into the tail housing using the supplied bolt and washer.

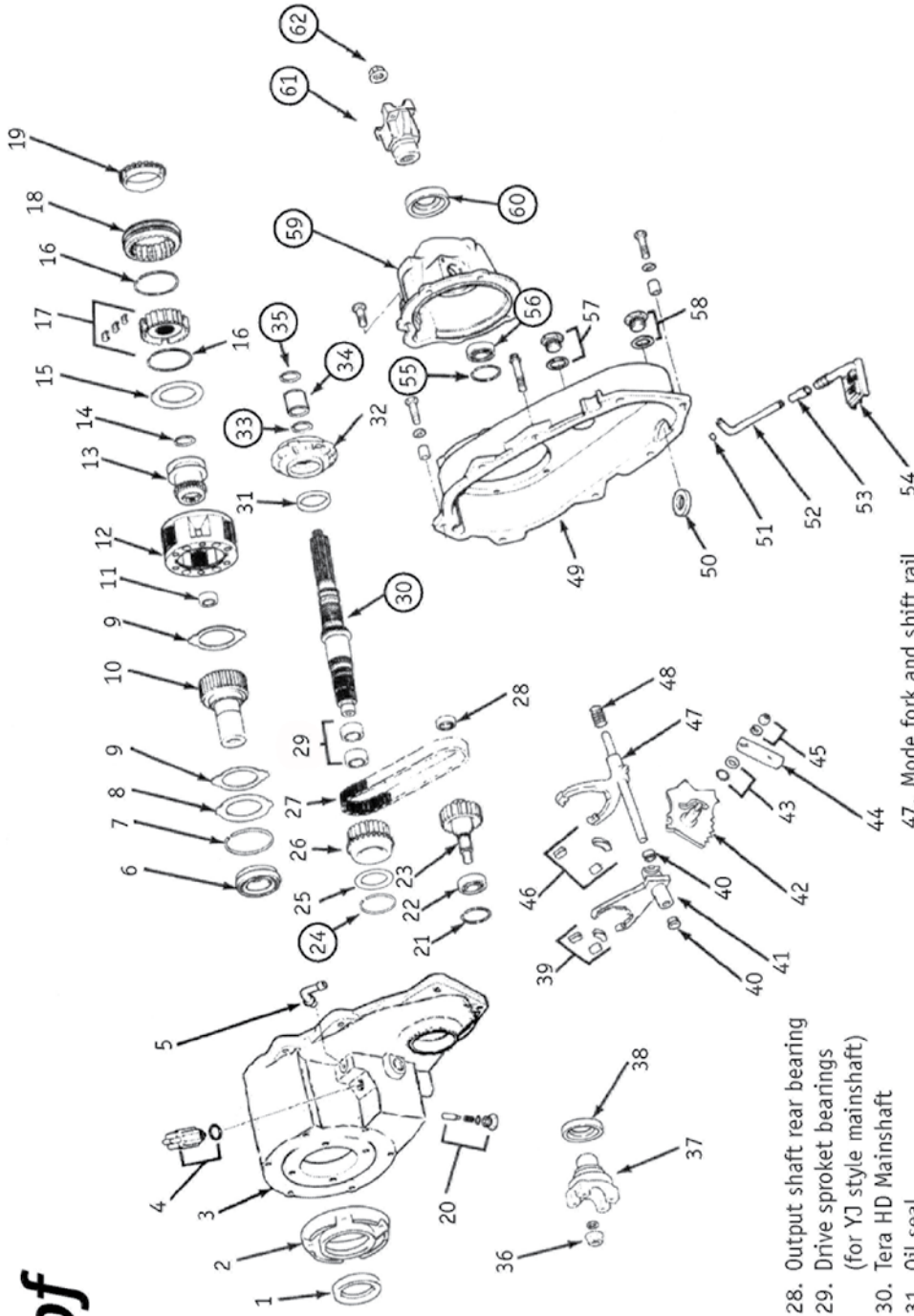


26. Reinstall the transfer case into the vehicle. Torque the mounting nuts to 30 Ft-lbs.
27. Reinstall the speed sensor into the transfer case.
28. Reinstall the shift lever.
29. For best sealing results do not fill the transfer case for 24 hours. The longer you wait the better the silicon will set up and seal the transfer case. Use recommend ATF dextron III.

# Exploded View of the 231J Transfer Case

○ Included in the Tera Low231 Heavy Duty Short Shaft kit

**Note:** This diagram shows the Tera Low231 Heavy Duty Short Shaft kit, Tera Low231 4.0:1 case, and the Tera Low2WD kit. A stock setup will appear different than pictured.



1. Front input seal
2. Front bearing retainer and seal
3. Tera HD Low231 case
4. Vacuum switch and seal
5. Vent assembly
6. Input gear bearing and snap ring
7. Low-range gear snap ring
8. Input gear retainer
9. Low-range gear thrust washer
10. Input gear
11. Input gear pilot bearing
12. Planetary gear assembly
13. Range fork shift hub
14. Synchro hub snap ring
15. Shim
16. Synchro hub springs
17. Synchro hub and inserts
18. Synchro sleeve
19. Stop ring
20. Shift detent plug, spring, and pin
21. Snap ring
22. Front output shaft bearing
23. Front output shaft
24. Large snap ring
25. Shim
26. Drive sprocket
27. Drive chain
28. Output shaft rear bearing
29. Drive sprocket bearings (for YJ style mainshaft)
30. Tera HD Mainshaft
31. Oil seal
32. Oil pump assembly
33. Snap ring
34. Speedometer drive gear
35. Snap ring
36. Front yoke nut
37. Front yoke
38. Front output seal
39. Range fork inserts
40. Range fork bushings
41. Range fork
42. Sector
43. O-ring and seal
44. Range lever
45. Range lever nut and washer
46. Mode fork inserts
47. Mode fork and shift rail
48. Mode spring
49. Rear case
50. Magnet
51. Pickup tube oil ring
52. Mode fork inserts
53. Tube connector
54. Oil pickup screen
55. Snap ring
56. Rear bearing
57. Fill plug and gasket
58. Drain plug and gasket
59. Rear housing
60. Rear output seal
61. Rear yoke
62. Rear yoke nut



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Figure 3

## Wiring to work with older Jeeps such as 1997-98 TJ Wrangler:

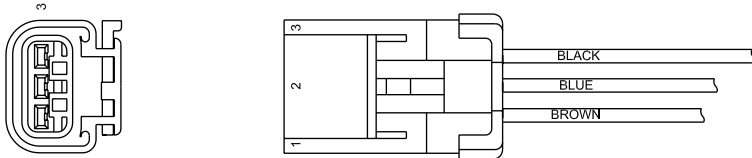
In order to use the TeraFlex 231ESS in Wranglers and YJs built prior to 1999 it may be necessary to change the connector on the end of the factory chassis wiring harness. This will allow you to plug the speed sensor included with the TeraLow 231ESS directly into the vehicle wiring harness.

This wiring diagram shows the color code and location of the wires that will be changed.

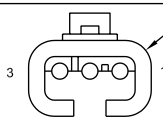
Cut the plug off the vehicle side of the wiring harness right at the connector leaving you with 3 wires. TeraFlex can sell you the new female connector (**TeraFlex Part Number 5202308**) to go onto the factory wiring harness. Trim back the insulation and hook the wires up as shown in the diagram. The Violet/Orange wire is the 5V supply and hooks to the Brown wire on the new TeraFlex plug. The Brown/Yellow wire is the sensor ground and hooks to the Blue center wire on the new TeraFlex plug. The White/Orange wire carries the speed signal back to the computer and hooks to the black wire on the new TeraFlex plug. Solder all connections and cover with heat shrink tubing and electrical tape to protect the wiring.

**FEMALE SPEED SENSOR PLUG**  
TERA PART# BLD5202308.

THIS IS THE VEHICLE SIDE THAT THE 231ESS SENSOR PLUGS INTO. THIS IS THE SAME FACTORY PLUG THAT IS FOUND ON NEWER JEEPS.



**OLDER FACTORY FEMALE PLUG**



PLEASE SEE THE CHARTS BELOW FOR A GUIDE IF YOUR FACTORY SPEEDOMETER PLUG DOES NOT MATCH THE NEW 231ESS SENSOR PLUG. YOU CAN CUT OFF THE FACTORY FEMALE PLUG AND SPLICE IN A NEW STYLE FEMALE PLUG THAT YOU MAY PURCHASE FROM TERAFLEX, PART# BLD5205308. USE THIS INFORMATION ONLY AS A GUIDE AS IT IS CORRECT TO THE BEST OF OUR KNOWLEDGE, BUT WE CANNOT VERIFY THE CONSISTENCY ON ALL WRANGLERS.

PLEASE NOTE OUR SENSOR IS RATED 5-24 VDC. ON OLDER JEEPS WITH AFTERMARKET GAGES YOU DO NOT NEED TO STEP DOWN THE VOLTAGE TO 5VDC.

**1997 TJ**  
VEHICLE SPEED SENSOR PLUG

CAV	WIRE COLOR ON NEW 231ESS SENSOR	CONNECT TO FACTORY WIRE COLOR	WIRE FUNCTION
1	BROWN	VT/OR	5V SUPPLY
2	BLUE	BR/YL	SENSOR GROUND 1
3	BLACK	WT/OR	VEHICLE SPEED SENSOR SIGNAL

**1993-1995 YJ**  
VEHICLE SPEED SENSOR PLUG

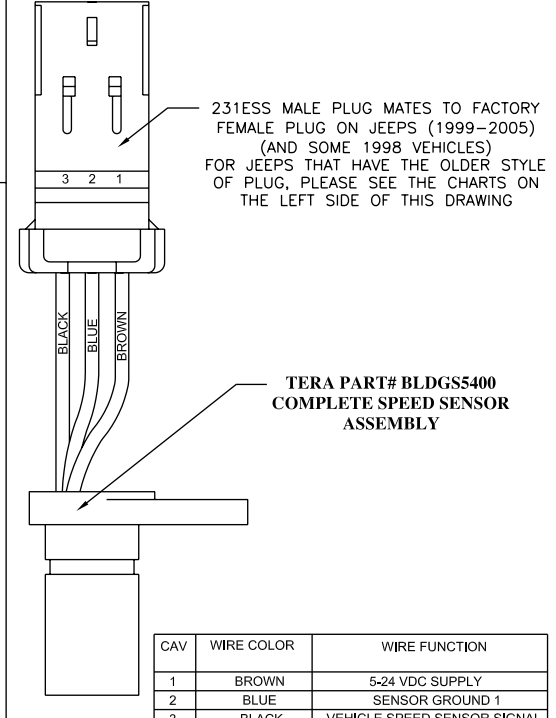
CAV	CONNECTS TO WIRE COLOR ON NEW 231ESS PLUG	EXISTING FACTORY WIRE COLOR	WIRE FUNCTION
1	BROWN	OR	5V SUPPLY
2	BLUE	BK/LB	SENSOR GROUND 1
3	BLACK	WT/OR	VEHICLE SPEED SENSOR SIGNAL

**1992 YJ**  
VEHICLE SPEED SENSOR PLUG

CAV	CONNECTS TO WIRE COLOR ON NEW 231ESS PLUG	EXISTING FACTORY WIRE COLOR	WIRE FUNCTION
1	BROWN	WT/BK	5V SUPPLY
2	BLUE	BR/RD	SENSOR GROUND 1
3	BLACK	BL	VEHICLE SPEED SENSOR SIGNAL

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REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	B	CHANGED PART NUMBER FOR SENSOR ASSEMBLY	11 NOV 2005	BAC
	C	ADDED INFORMATION ON YJ VEHICLES	15 JUN 2006	BAC
	D	ADDED THAT SENSOR IS RATED FOR 5-24VDC	28 AUG 2007	BAC



**TERA PART# BLDGS5400**  
COMPLETE SPEED SENSOR ASSEMBLY

CAV	WIRE COLOR	WIRE FUNCTION
1	BROWN	5-24 VDC SUPPLY
2	BLUE	SENSOR GROUND 1
3	BLACK	VEHICLE SPEED SENSOR SIGNAL

DRAWN BY: B.CALVIN	DATE DRAWN: 09 APR 2005	TERA MANUFACTURING
TOLERANCE UNLESS OTHERWISE SPECIFIED (FOR INCH DIMENSIONS)		00231ESS EXTREME SS SENSOR AND CONNECTOR PIN-OUTS
FRACTIONAL ±1/32	DECIMAL .X ±0.03 .XX ±0.015 .XXX ±0.005	ANGLES ±2°
SIZE A	ACAD NO. BLD231ESS-WIRING	DWG NO. BLD231ESS-WIRING
SCALE NTS	REV D	SHEET 1 OF 1





## **PRODUCT INFORMATION & WARRANTY**

### **MAINTENANCE INFORMATION:**

It is the buyer's responsibility to have all suspension, drivetrain, steering, and other components checked for proper tightness and torque after the first 100 miles and every 3000 miles after that.

### **NOTICE TO INSTALLER:**

The enclosed "Warning to Driver" sticker must be installed in the vehicle in driver's view. This sticker is to act as a constant safety reminder when operating the vehicle. It is your responsibility as the equipment installer to install the provided sticker and to forward the product instructions to the vehicle's owner for review. If a "Warning to Driver" sticker or product installation guide were not included in the kit, FREE replacement stickers and instructions are available by request. It is the installer's duty to ensure a safe and controllable vehicle after the modifications have been performed.

### **WARNING:**

Neither the seller nor the manufacturer will be liable for any loss, damage, or injury directly or indirectly arising from the use of or inability to determine the use of these products. Before using, the user shall determine the suitability of the products for its intended use, and the user shall assume all responsibility and risk in connection therewith.

### **WARNING TO DRIVER:**

This vehicle has been modified to enhance off road performance and has unique handling characteristics. Use in harsh environments can cause extreme stress on the components. Vehicle should be inspected after being off road to make sure that all the components are in working order and safe to travel on the highway. All fasteners should be checked so that they are at the correct torque specifications as the vibration and stresses from off roading may cause critical fasteners to work loose. Extra care should be taken to inspect the critical components, steering, and brake systems. During each oil change components such as arms, tie rod ends, etc should be greased and checked for excessive wear. Any worn components should be replaced. When returning to the pavement always set or restore tire air pressure to the factory recommendation and connect or engage any disabled sway bar mechanisms. Because of the higher center of gravity and larger tires, this vehicle handles and reacts differently than many passenger cars, both on and off road. You must drive it safely! Extreme care should be taken to prevent vehicle rollover or loss of control, which can result in serious injury or death. Avoid sudden sharp turns or abrupt maneuvers. Generally, braking performance and capabilities are decreased when significantly larger/heavier tires are used, especially when used in combination with transfer case low-range reduction kits. Take this into consideration while driving. Do not add, alter or fabricate any factory or aftermarket parts to increase vehicle height over the intended height of the TeraFlex product purchased. Mixing component brand is not recommended. TeraFlex Inc. will not be responsible for any altered product or any improper installation or use of our products. We will be happy to answer any questions concerning the design, function, and correct use of our products. It is ultimately the buyer's responsibility to have all bolts/nuts checked for tightness after the first 100 miles and then every 3000 miles. Wheel alignment, steering system, suspension and drive line systems must be inspected by a qualified professional mechanic at least every 3000 miles.

### **TERAFLEX PRODUCT WARRANTY:**

Tera Manufacturing warrants TeraFlex Suspension products to the original retail purchaser to be free of defects in material and workmanship for as long as the original purchaser owns the vehicle on which products were originally installed.

Failure to complete regular maintenance (grease every 3000 miles) on TeraFlex FlexArms will void this warranty. All other conditions of the standard TeraFlex product warranty apply.

All TeraLow products are covered by TeraFlex's two (2) year warranty to be free of defects in material and workmanship for two years from date purchased.

Tera axles are covered by a 12-month warranty to be free of defects in materials and workmanship.

This warranty does not cover or include product finish, improperly installed or applied products, improperly maintained products, products or components used for racing or competition or damage due to abuse or neglect, products that fail due to the use of larger tire and wheel combinations.

All returns must be accompanied by an original invoice. It is the customer's responsibility to remove the product from the vehicle. Shipping charges are the responsibility of the customer. Tera Manufacturing will pay the return freight if the product meets the terms of warranty.

This warranty is for the replacement or repair of defective TeraFlex products only and does not include freight charges, labor charges for removal of or installation of TeraFlex or related products or components, costs incurred due to down time of the vehicle, or lost profits due to vehicle down time.

A returned goods authorization number (RGA#) must accompany any returned products. For more information please contact a TeraFlex customer service representative.

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