

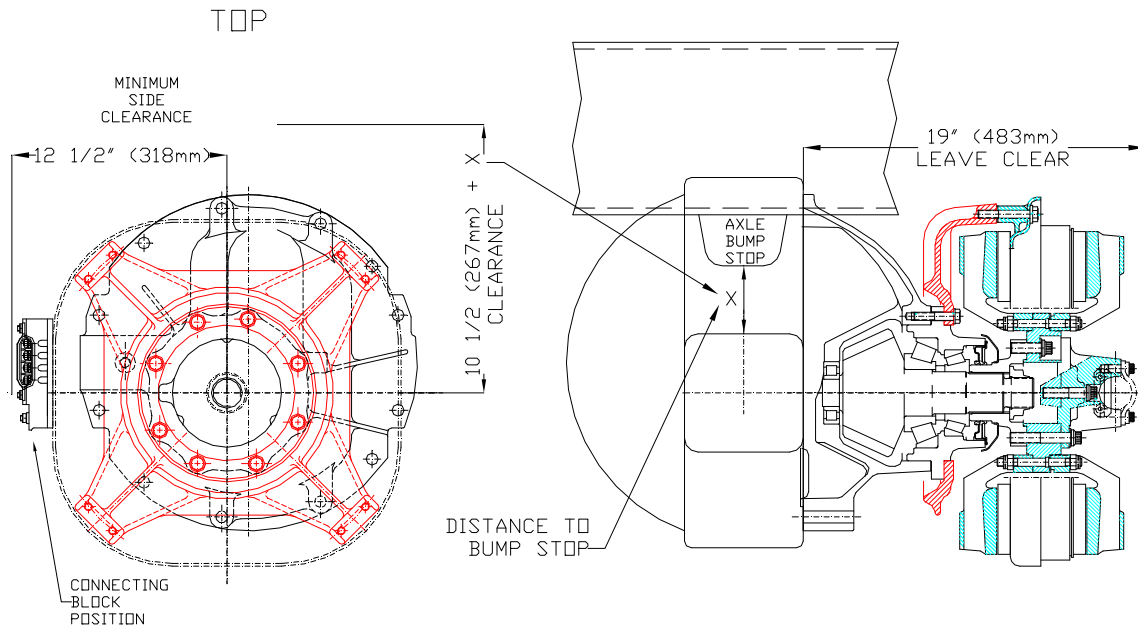
TL103040 Telma FN71-65 installation on Dana 060S axle  
**FOCAL MOUNTING KIT TIK12506**

ITEM	TELMA P/N	DESCRIPTION	QTY
1	TIB04015	ADAPTER FV7-060S AXLE	1
2	VB503910	STATOR CARRIER	1
3	TIF04076	COMPANION FLANGE	1
4	VF201400	TREP WASHER M12	8
5	VF100630	HEX HEAD SCREW M12x1.75x75/30	8
6	VF200660	SPRING WASHER Ø45x22.4x2.5	4
7	VF101500	HEX HEAD SCREW M22x1.5x50/40	4
8	TIF04115	HEX HEAD SCREW M14x2x60	6
9	VF207150	FLAT WASHER Ø30x14.5x2.5	6
10	VF200750	SPRING WASHER M14	6
11	TIF04074	BOLT 12PT 5/8-18 X 1 3/4	4
12	TIF04075	BOLT 12PT 5/8-18 X 3 1/2	4
13	TIF04047	HARDENED WASHER (5/8)	4
14	TIF04045	BOLT 12PT 5/8-18 X 2 1/2	2
15	TIF04030	5/8 HARDENED WASHER 1.06X0.66X0.09	4
16	TIF03005	LOCKWASHER 9/16	6

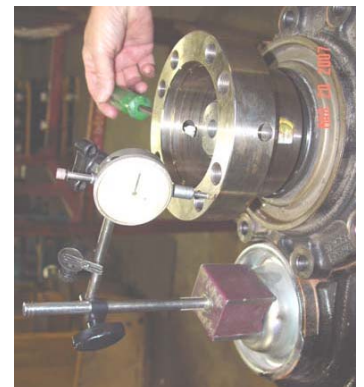
ADD:  
 RETARDER WITH SPACER INDEX 279  
 TELMA FLANGE YOKE 1610-VB107389 or 1710-VB107149  
 TIR04001 SPOT FACE TOOL RENTAL  
 WITH SPECIAL 1 3/16" (30mm) CUTTER / 9/16" PILOT  
 SEE ENGINEERING FOR MORE DETAILS

### CHECK CLEARANCES

CLEARANCES NEEDED  
 FV7 RETROFIT ON DANA 060S AXLES



1. Spot face pinion cage bolt holes
  - a. Raise at least one wheel off the ground so the pinion shaft can turn freely.
  - b. Remove all pinion cage bolts except one.
  - c. Assemble the shaft guide onto the tool frame.
  - d. Install the spot facing bit and shaft assembly into the shaft guide oriented so the long part of the guide will be facing away from the axle.
  - e. Install the depth stop onto the shaft.
  - f. Mount the assembled tool on the end yoke using longer bolts (not included) that fit into the u-joint strap mounting holes.
  - g. Attach the drill motor to the bit driver shaft.
  - h. Position the spot facing tool in a pinion cage hole.
  - i. Lock down the shaft assembly onto the tool frame.
  - j. Make sure the spot facing bit is seated all the way against the surface of the pinion cage.
  - k. Lock down the depth stop in a position using a feeler gauge of thickness 0.020" between the depth stop and the shaft guide
  - l. Spot face the surface of each pinion cage hole. Remove the one bolt holding the pinion cage in place and move it to a hole that has been spot faced in order to cut all holes.
  - m. If after cutting all holes at least once, any hole is not cut all the way around, reset the depth stop using a feeler gauge of 0.010" and spot face again. Repeat spot face procedure using a 0.010" feeler gauge if additional steps are needed to have a completely machined surface around each hole. Contact Telma technical department before total spot face depth exceeds 0.040". This depth will be reached after the first cut of 0.020" depth plus two cuts each of 0.010" depth.
  - n. Remove the spot face tool and end yoke from the axle after spot facing procedure is complete.
- 2) Install stator carrier.
  - a. Assemble the stator carrier adapter TIB04015 to the stator carrier VB503910 as shown on the assembly drawing using the four M22x1.4x50mm hex bolts VF101500 and four hardened flat washers (45mmODx22.5mmIDx2.5mm thick) VF200660. Tighten to 220 lb-ft. Use high strength Loctite 271. Put a paint mark on each bolt and the stator carrier after tightening. Cut off the end of the bolts flush with the adapter after assembly to stator carrier as shown on the assembly drawing.
  - b. Install the flat washers TIF04102 (27.6 x 15.2 x 2.4mm) under the heads of the longer pinion cage bolts M14 x 2.0 x 60mm (TIF04115).
  - c. Install the pinion cage bolts through the six holes of the adapter TIB04015.
  - d. Place the six M14 flat washers TIF04102 on the pinion cage bolts and carefully install the stator carrier assembly onto the pinion cage making sure the flat washers are between the adapter and pinion cage to space out the adapter past the spot face depth. Tighten the six M14 pinion cage bolts to 114-140 lb-ft. Use high strength Loctite 271. Put a paint mark on each bolt and the stator carrier after tightening.
- 3) Install pinion companion flange.
  - a. Install a new pinion seal
  - b. Install the companion flange TIF04076
  - c. Use a new pinion nut. Tighten to 575-703 lb-ft. Use high strength Loctite 271. Put a paint mark on the nut and shaft after tightening.
  - d. Check companion flange runout. Check that the flange runout is no greater than 0.002" (0.05mm). Replace the flange if not within specifications.



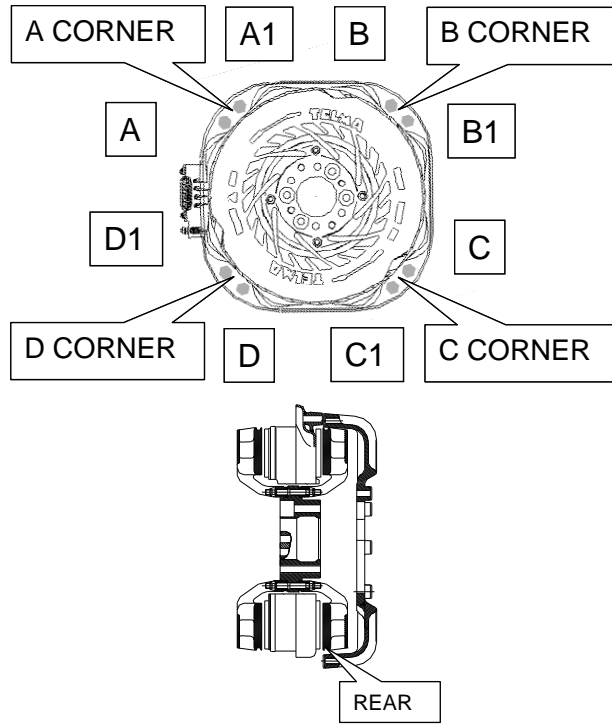
- 4) Install the retarder.
  - a. Place the retarder equipped with the rotor spacer onto a transmission jack with the 4 countersunk holes of the rotor spacer facing away from the axle.
  - b. Align the 4 countersunk holes of the rotor spacer with the holes in the companion flange.
  - c. Place a hardened flat washer TIF04047 under the head of each of the four 5/8-18UNF x 1 3/4 12 point head bolts TIF04074 and attach the rotor spacer to the companion flange in the countersunk holes. Tighten to 150 lb-ft. Use high strength Loctite 271. A pry bar can put in the fins of the rotor and against one of the stator arms to prevent rotation. Put a paint mark on each bolt and rotor spacer after tightening.
- 5) Adjust the rear air gap.
  - a. Use a small pry bar to lift the stator corners and install the 8 bolts VF100630. Use M12 or 1/2" flat washers under the head of each bolt instead of the Trep washers VF201400 which will be used for final assembly.
  - b. Remove the air gap adjusting shims from the crate that the focal was packaged in. Each crate contains one plastic bag with 5 individual bags of shims inside. The bags are labeled with the shim thickness in millimeters.



<i>Stator Shim Set VB200330</i>		
<i>Thickness</i>		<i>Quantity</i>
<i>mm</i>	<i>inches</i>	
<b>1/10</b>	<b>0.004"</b>	<b>4</b>
<b>2/10</b>	<b>0.008"</b>	<b>8</b>
<b>6/10</b>	<b>0.024"</b>	<b>4</b>
<b>12/10</b>	<b>0.048"</b>	<b>4</b>
<b>15/10</b>	<b>0.060"</b>	<b>4</b>

- c. Place one shim of each thickness from the stator shim set VB200330 between the stator and each of the four stator arms. Tighten the eight stator bolts to 65 lb-ft.
- d. Measure the air gap between the rear rotor and the pole shoe at the end of the coil on either side of each of the stator mounting points and enter into the table below. Use the table to determine how many shims to add or remove at each corner to obtain the target of 0.049"-0.055".
- e. Loosen the eight stator bolts slightly and add or remove the required shims to obtain the correct air gap.
- f. Remove one stator bolt at a time, replace the flat washer with the Trep washer, add high strength Loctite 271, and tighten to 65 lb-ft. Repeat for the other bolts. Put a paint mark on each bolt and stator after tightening.

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	I	II	III	
measurement	Average of each corner e.g. (A+A1)÷2	Thickness of shims to add or remove 0.052"± column II		
		column II less than 0.052" shims to add = 0.052" - column II	column II greater than 0.052" shims to take out = column II - 0.052"	
A				
A1				
B				
B1				
C				
C1				
D				
D1				

6) Check the front air gap.

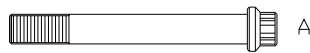
The air gap for the **front side** of the focal has been pre-shimmed at the factory. This means that once the rear side air gap has been established, the front rotor air gap should be within the specified range of .049"-.055". To check this, measure the air gap of the A, B, C and D coils and divide by four. If the average reading falls outside the specified range, the front rotor will need to be removed and re-shimming will be required. Choose the proper shim from the rotor shim set VB200300 or VB202045 so that the air gap will be as close as possible to 0.052" and between 0.049" and 0.055". To add or remove rotor shims take off the front rotor by removing the four nuts holding it on. The shims are under the rotor. Tightening torque for the nuts is 65 lb-ft.

7) Install the flange yoke

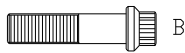
- a. Install the flange yoke using the four 12 point head 5/8-18UNF x 3 1/2 bolts (all), two 12 point head bolts 5/8-8UNF x 2 1/2" (1710 and 1810), .
- b. Use high strength Loctite 271. Tighten to 150 lb-ft. Put a paint mark on each bolt and the flange yoke after tightening.

TOOLS REQUIRED:  
 5/8" 12 PT SOCKET 1/2" OR 3/4" DRIVE  
 15/16" 12 or 6 PT SOCKET  
 TORQUE WRENCH 250 LB.-FT. CAPACITY  
 AIR TOOLS

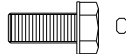
12PT. FLANGE HEAD 5/8"-18UNF (all)



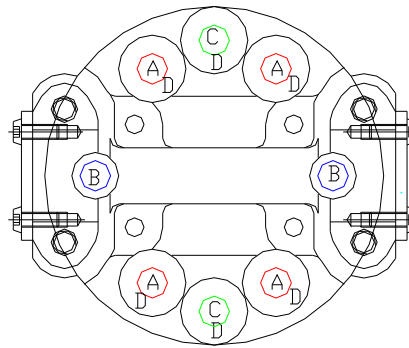
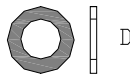
12PT. FLANGE HEAD 5/8"-18UNF (1710 & 1810)



HEX HEAD 5/8"-18UNF (1810 only)



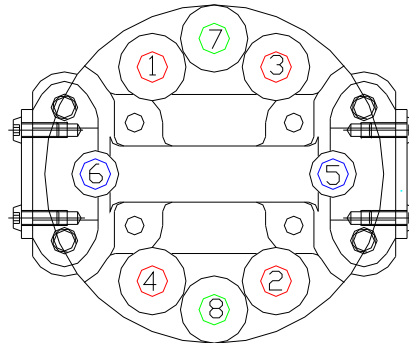
HARDENED WASHER  
 1.06 X 0.66 X 0.09



FLANGE YOKE

ASSEMBLY PROCEDURE:

- (1) INSTALL FLANGE YOKE ON ROTOR SPACER WITH HOLES ALIGNED.
- (2) ASSEMBLE WASHERS ON BOLTS WHERE NEEDED AND START BOLTS IN HOLES BY HAND.
- (3) SCREW BOLTS DOWN WITH AIR TOOL UNTIL SNUG.
- (4) TIGHTEN ALL BOLTS TO 180-230 LB-FT (245-310 Nm)  
 FOLLOW TORQUE SEQUENCE SHOWN.  
 USE LOCTITE 271 ON ALL FASTENERS  
 PAINT MARK BOLT HEADS AFTER TIGHTENING



BOLT TORQUE SEQUENCE

# ASSEMBLY DRAWING

