SUMMIT™ TRACTORS

SERVICE MANUAL

HYDROSTATIC TRANSMISSION

TX25H

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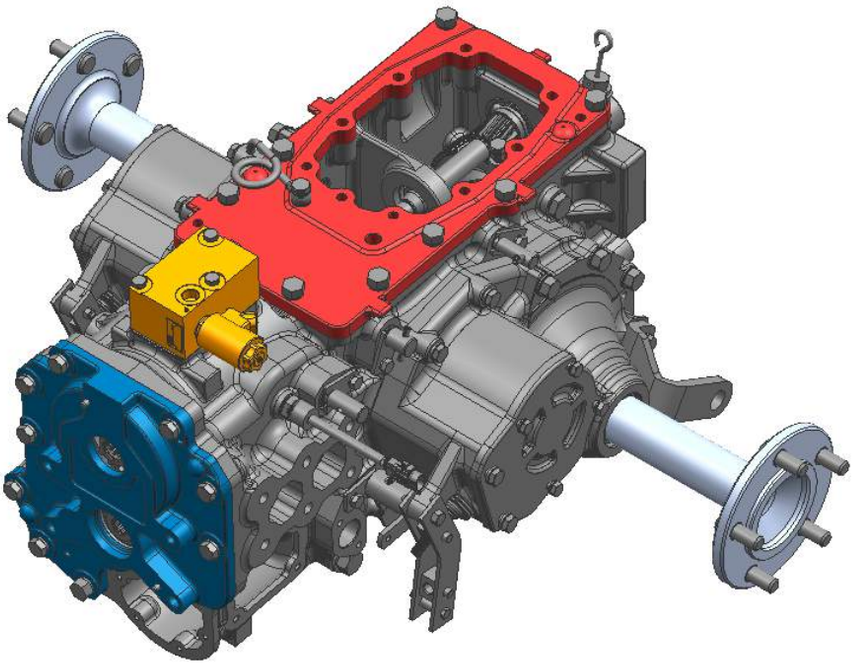
SERVICE MANUAL

ITL

HST SPEED TRANSMISSION



INTERNATIONAL TRACTORS LIMITED

HOSHIARPUR, PUNJAB (INDIA)

Part Code No:

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Published On:

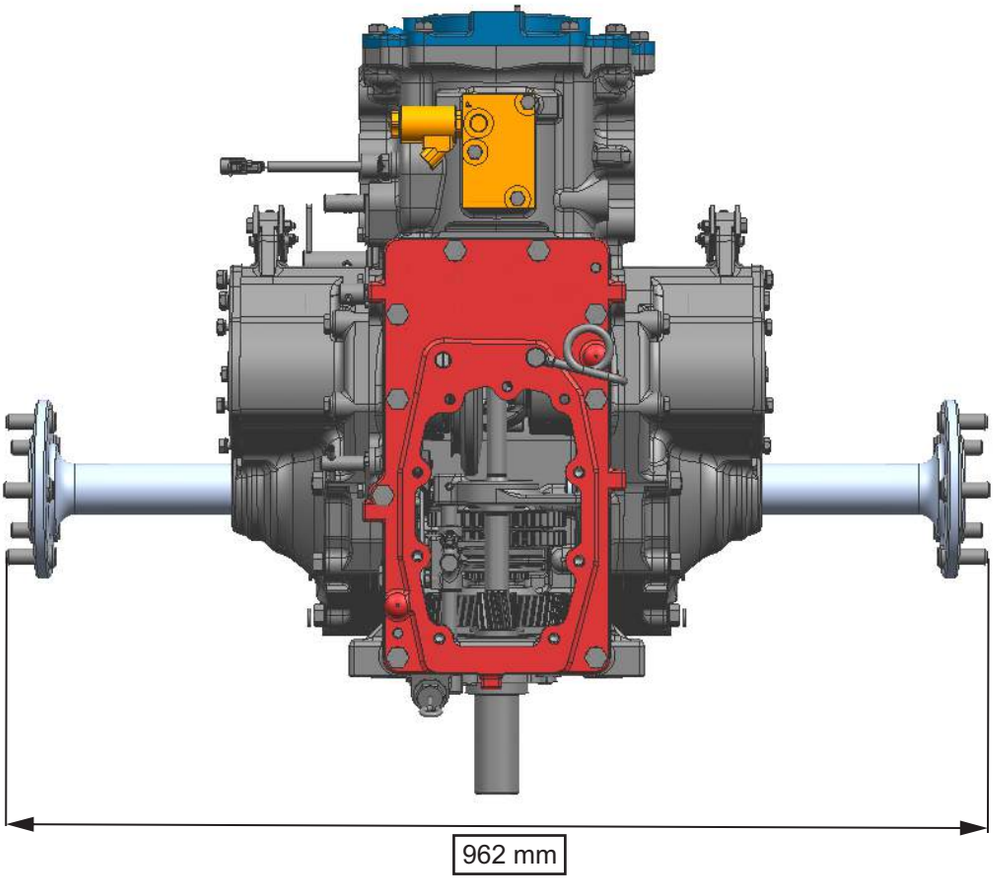
Transmission Assembly

CONTENTS

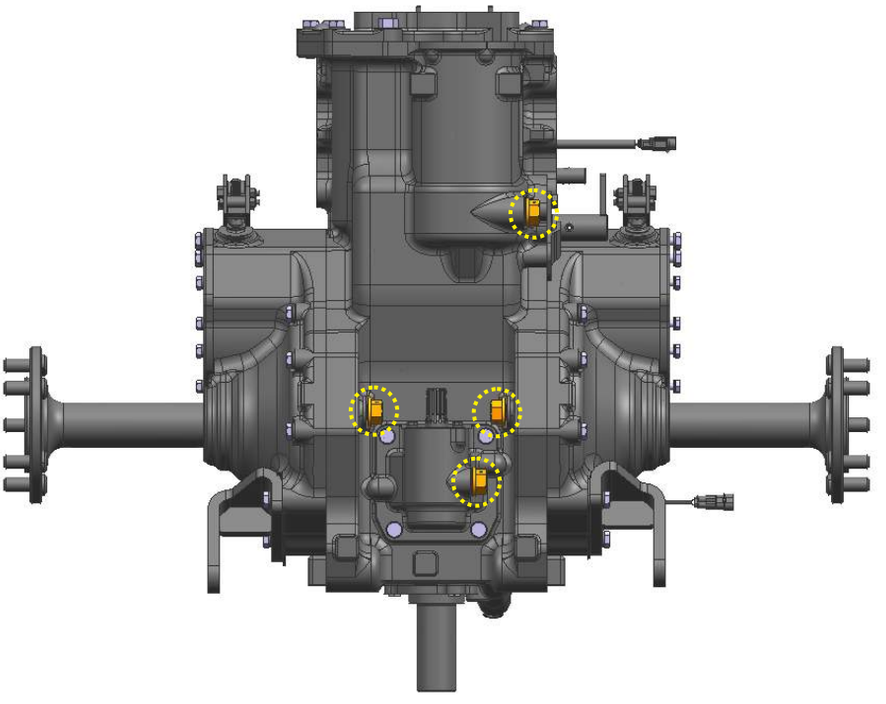
A. Main Dimensions(mm)

1. TRANSMISSION

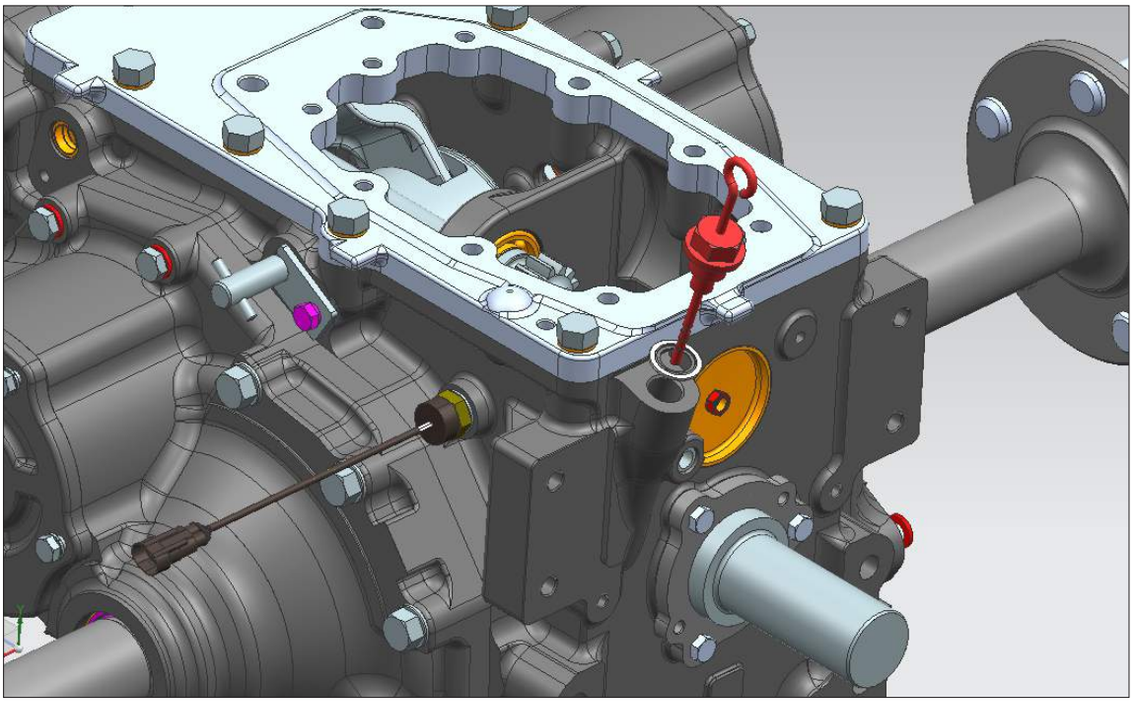
Top View (See Main View)



Transmission Oil Drain Plugs-:

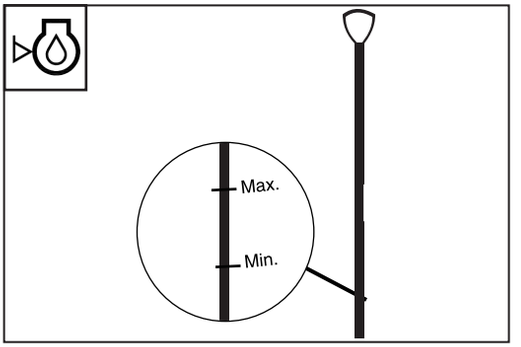


B.Transmission Oil Filler Plug/Dipstick



B.1.a Transmission Oil -:

- Capacity : 6.08 gallon(23 Litres).
- Grade : SAE-80W.
- Replacement : Every 1000 Hours.



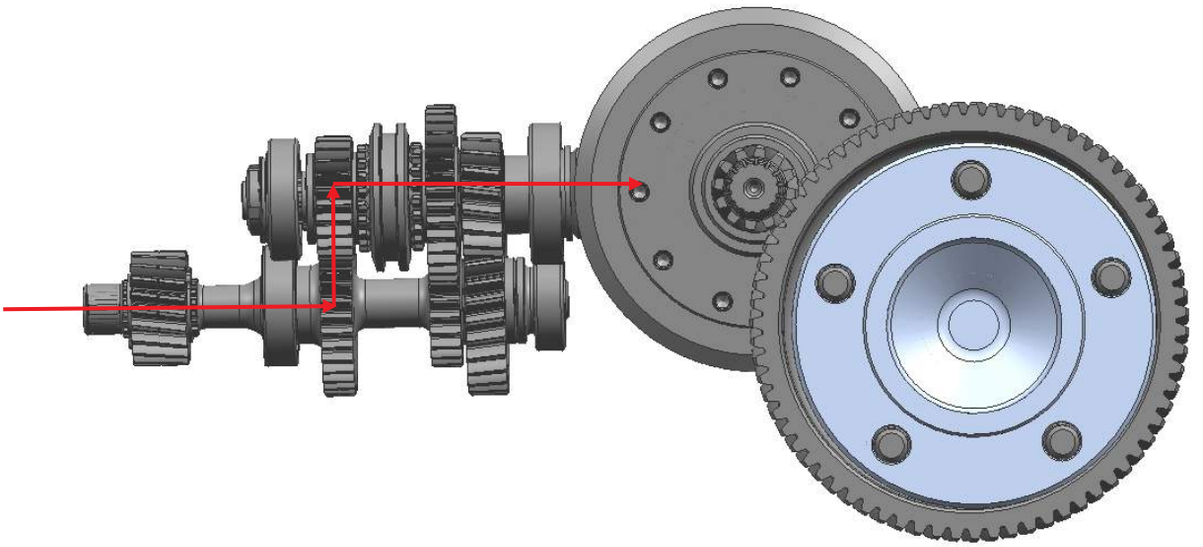
Dipstick marks

C. Sealant and Adhesives

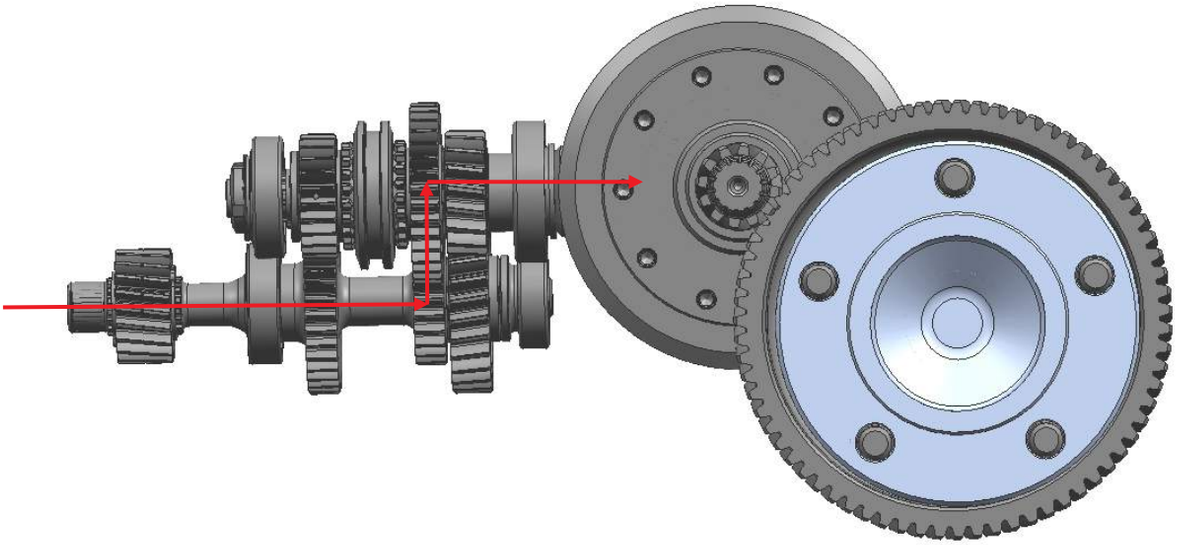
Gasket Sealant and Loctite	
Adhesive make and type	**Technical characteristics**
Sealant 5811	Flat surface sealing
Loctite 243	Bolt and Nut
Loctite 262	Tail Pinion Nut

D. HST Power Flow Chart

1. High Power Flow-:

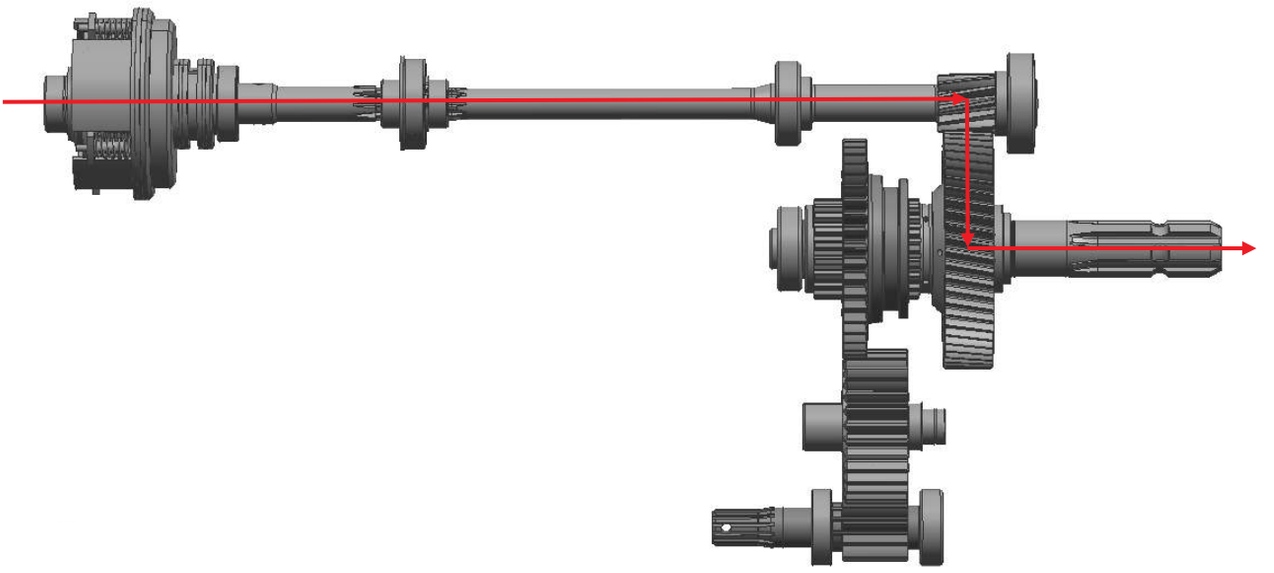


2. Low Power Flow-:

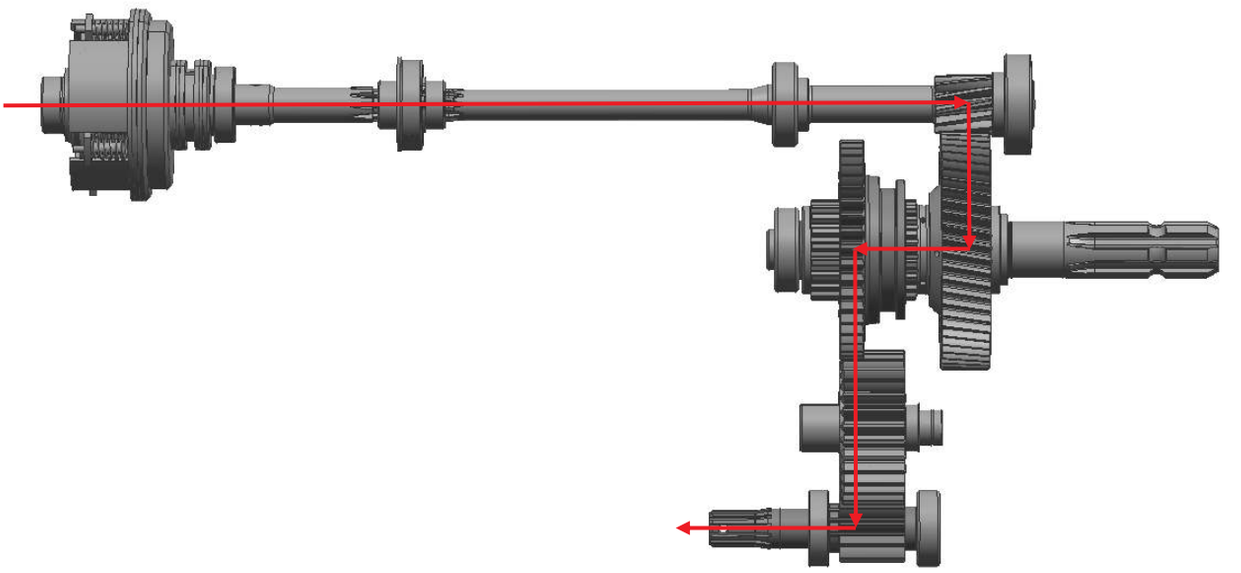


D. HST Power Flow Chart

1. Rear PTO Power Flow-:



2. Mid PTO Power Flow-:



E . Filling and Checks

To drain and load the oil and to check the oil level the transmission must be horizontal.

Scheduled maintenance oil drain.

To drain the oil remove the level filler and the drain plug .

E.1.a Fill Transmission Oil:

Fill the transmission with oil to the maximum level marked on the level dipstick

Apply the parking brake.

Keep the speed control in NEUTRAL range.

Start the engine at idle RPM until oil circulate in system.

Keep the Hydraulic Levers in Neutral Position. Shut off the Engine

Check that the transmission oil level is in the prescribed range on the level dipstick.

If necessary, top up with oil to keep the level in the prescribed range.

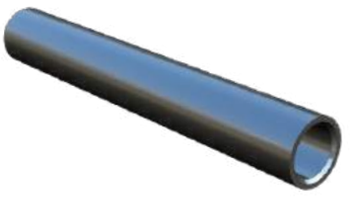
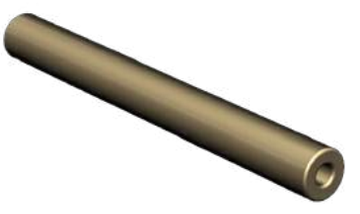
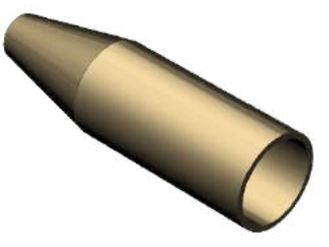
Scheduled maintenance oil check.

F. Service Schedule

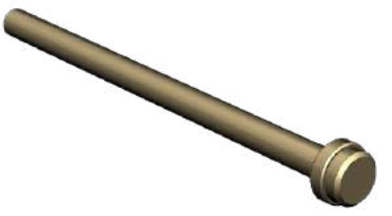
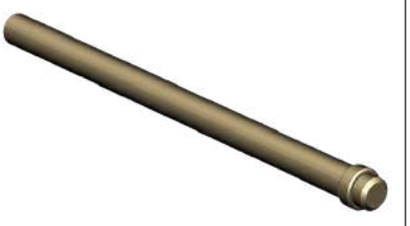
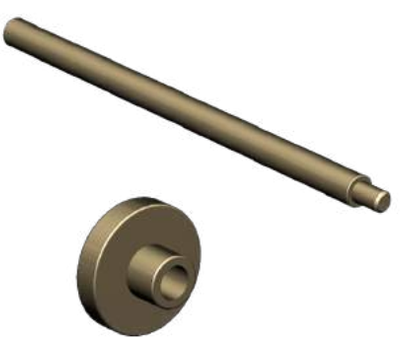
Specified maintenance intervals are for standard-duty use.
Severe operating conditions may require more short intervals.

Recommended intervals									Operation
50 h	250 h	500 h	750 h	1000 h	1250 h	1500 h	1750 h	2000 h	
				●				●	Change the transmission/hydraulic oil
			●			●			Change the oil suction strainer
●	●	●	●	●	●	●	●	●	Clean the Transmission Breather Assy

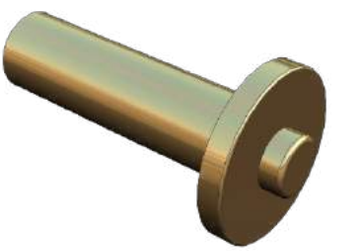
G. Special Service Tool

Sr. No.	Part NO.	Description	Purpose	Picture
1.	9+9 001	Mandrel	Pressing Taper Roller Bearing of Tail Pinion.	
2.	9+9 002	Mandrel	Pressing Dowel Pin DIA 10*45.	
3.	9+9 003	Mandrel	Pressing Cotter Sleeve DIA 6	
4.	9+9 004	Guiding Sleeve	4WD Oil Seal fitment	

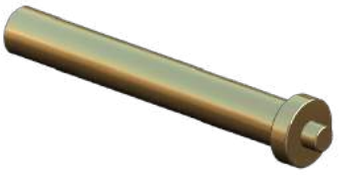
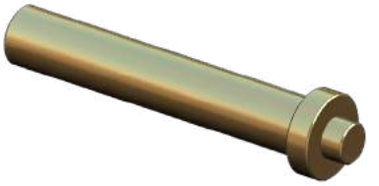
G. Special Service Tool

Sr. No.	Part NO.	Description	Purpose	Picture
9.	9+9 009	Mandrel	Pressing Cap in Clutch Housing	
10.	9+9 010	Mandrel	Pressing Cap in Clutch Housing	
11.	9+9 011	Mandrel	Pressing Ball Bearing 6007 in Clutch Housing	
12.	9+9 012	Mandrel	Pressing Ball Bearing 6307 in Clutch Housing	

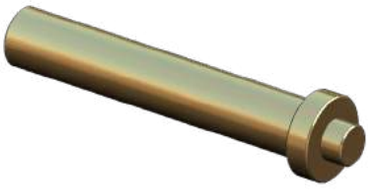
G. Special Service Tool

Sr. No.	Part NO.	Description	Purpose	Picture
5.	9+9 005	Mandrel	Pressing Ball Bearing BB 1063 in Intermediate Shaft	
6.	9+9 006	Mandrel	Pressing Ball Bearing 6305 in Lay Shaft	
7.	9+9 007	Mandrel	Pressing Ball Bearing BB1063 in Clutch Housing	
8.	9+9 008	Mandrel	Pressing Oil Seal in Clutch Housing	

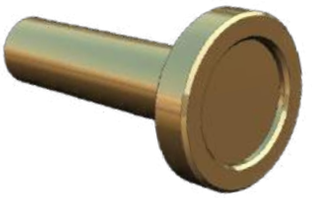
G. Special Service Tool

Sr. No.	Part NO.	Description	Purpose	Picture
13.	18ME251	Mandrel	Pressing Oil Seal 25X52X10 of 4WD Output Shaft	
14.	18ME248	Mandrel	Pressing Ball Bearing 6406 in Rear Axle Bull Pinion Shaft.	
15.	18ME249	Mandrel	Pressing Ball Bearing 6304 on Lay Shaft.	
16.	18ME244	Mandrel	Pressing Ball Bearing 6205 in Transmission Housing of Rear PTO Output Shaft	

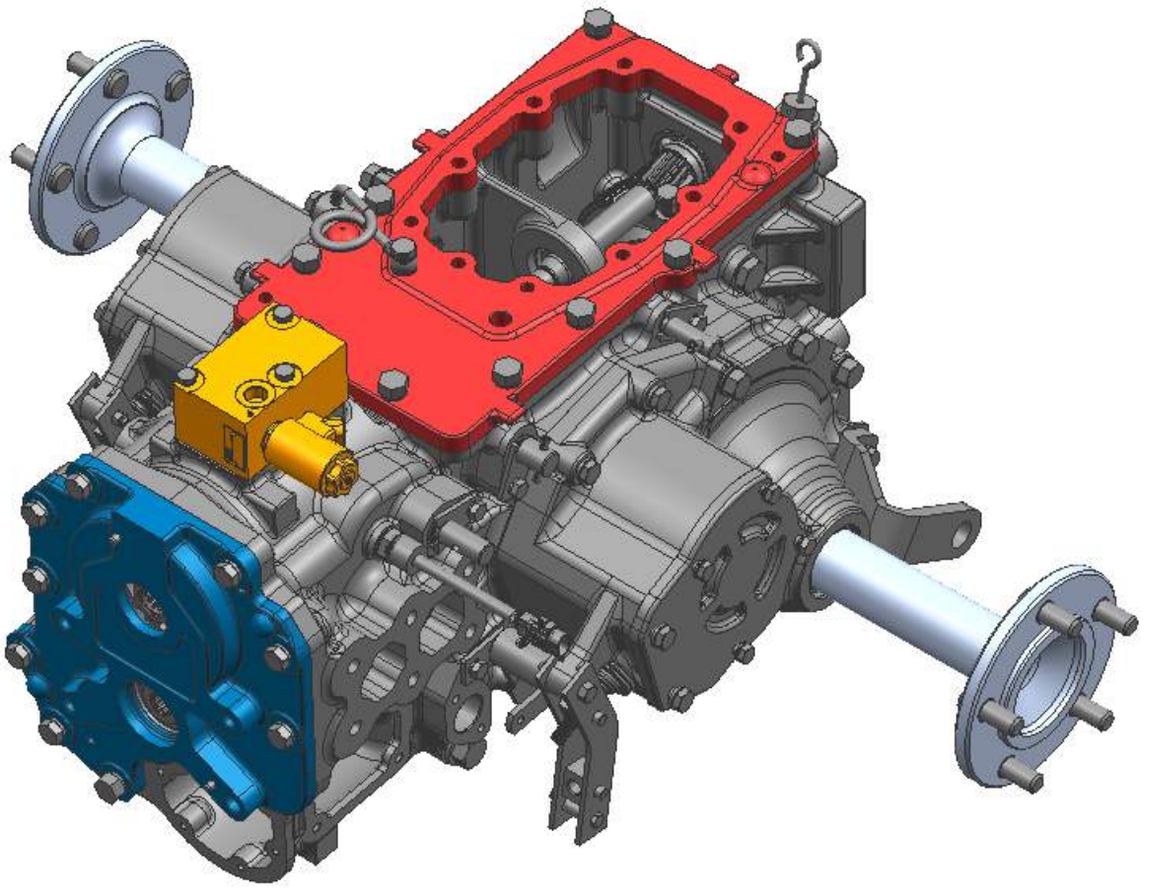
G. Special Service Tool

Sr. No.	Part NO.	Description	Purpose	Picture
17.	18ME237	Mandrel	Pressing Ball Bearing 6205 in Transmission of PTO Intermediate Shaft	
18.	18ME252	Mandrel	Pressing Oil Seal 50X68X10 in Rear Axle Housing fitment of Rear Axle Shaft	
19.	18ME235	Mandrel	Tool for tightening Withdrawal Nut	
20.	17ME113	Mandrel	Pressing Ball Bearing 6011 in Differential Cage.	

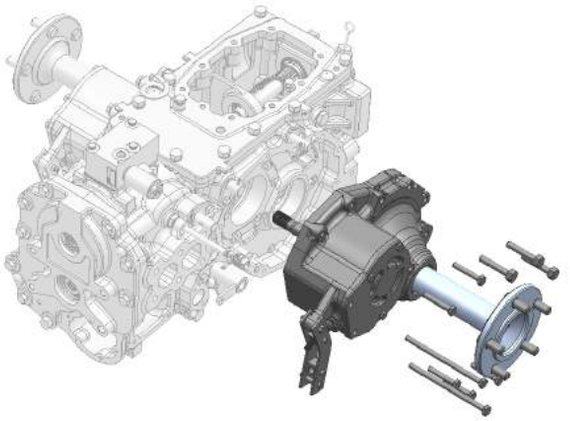
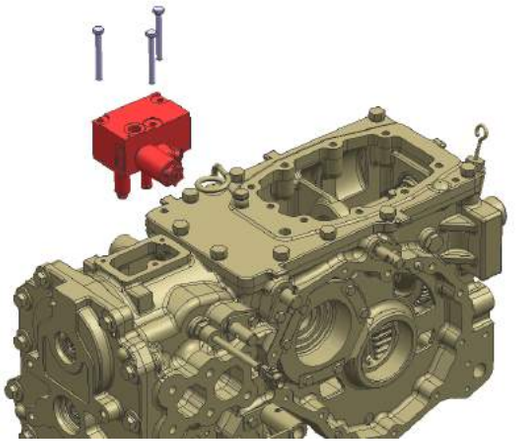
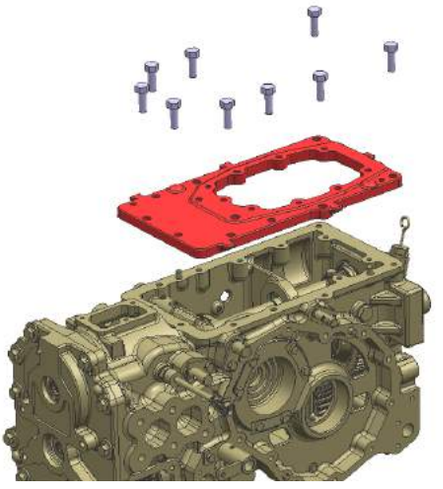
G. Special Service Tool

Sr. No.	Part NO.	Description	Purpose	Picture
21.	17ME111	Mandrel	Pressing Ball Bearing 6211 in Differential Cage.	

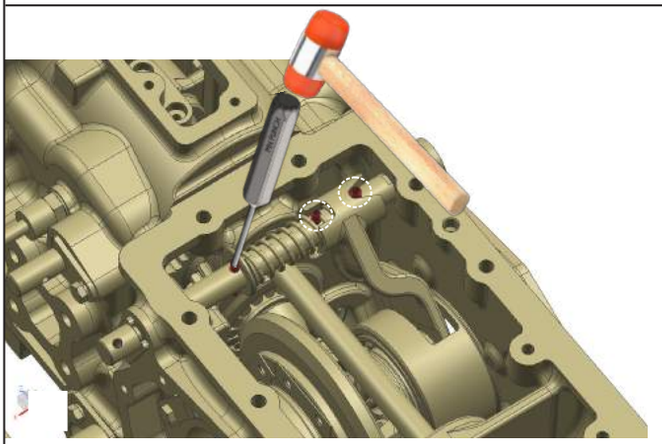
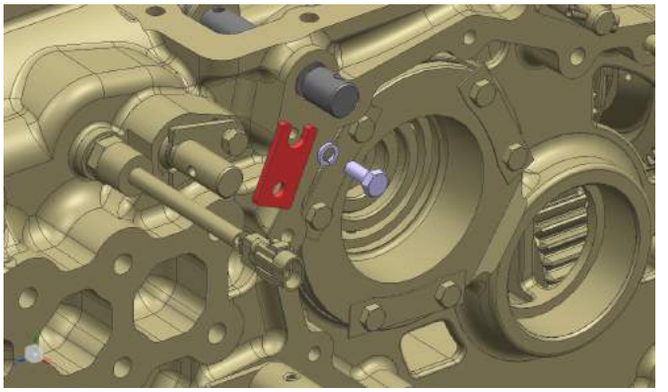
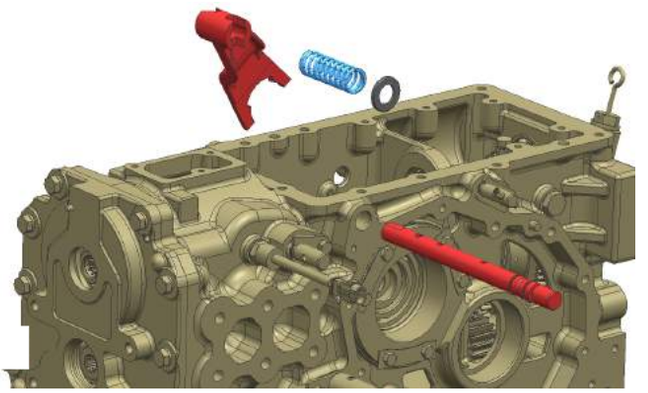
Transmission Assembly



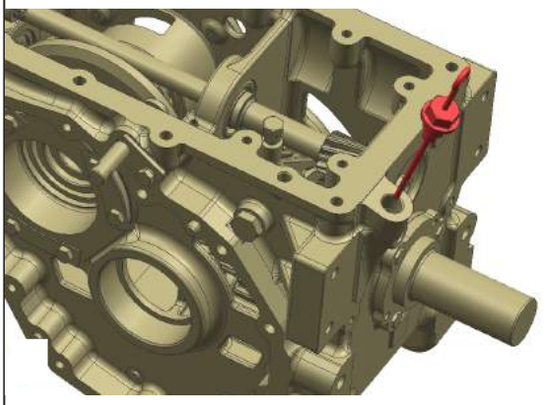
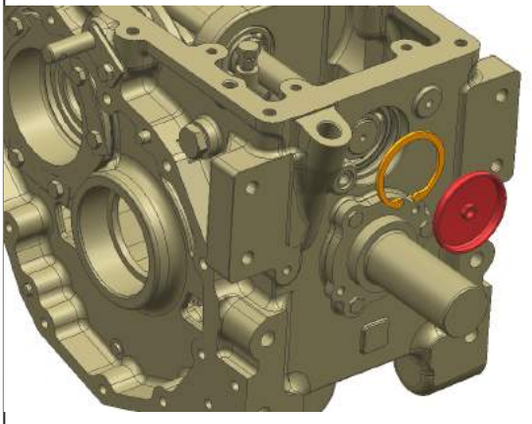
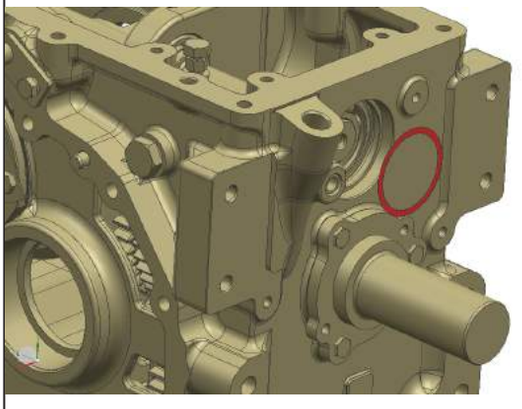
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 1	**Step 1:** i. Remove the bolts of trumpet housing. ii. Remove the rear axle and trumpet housing from differential housing.
 Fig- 2	**Step 2:** i. Remove the bolts. ii. Remove the PTO valve assembly.
 Fig- 3	**Step 3:** i. Remove the bolts. ii. Remove the intermediate plate.

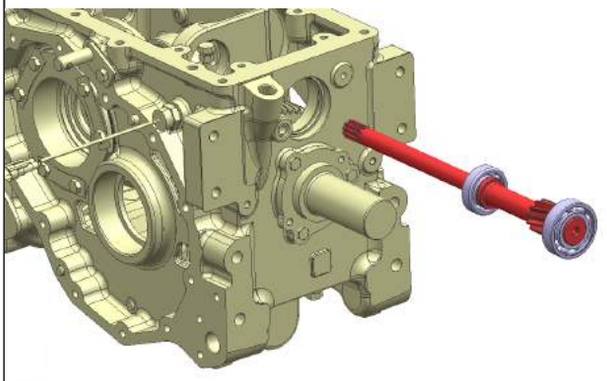
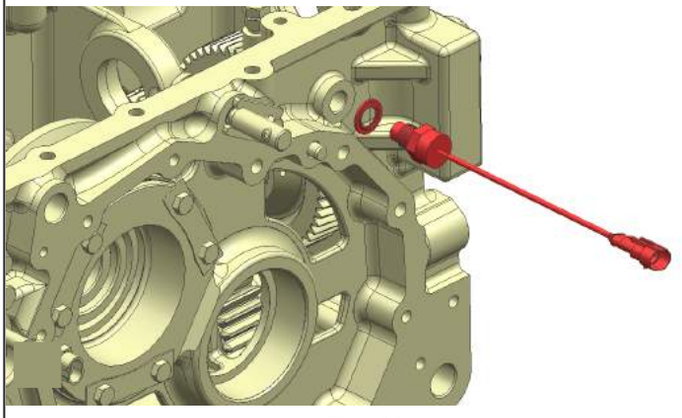
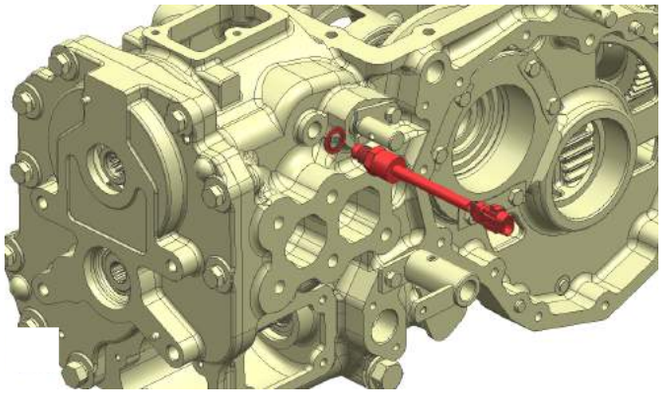
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 4	**Step 4:** I. Remove three split pin by using tool.
 Fig- 5	**Step 5:** I. Remove the bolt. ii. Remove the locking strip.
 Fig- 6	**Step 6:** I. Remove the diff. lock fork, spring, spacer and diff. lock shaft.

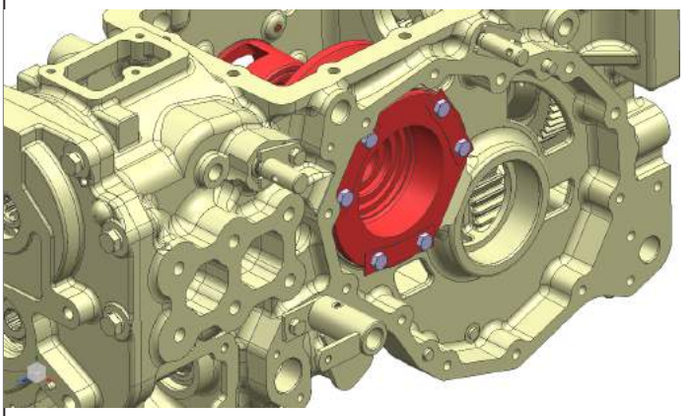
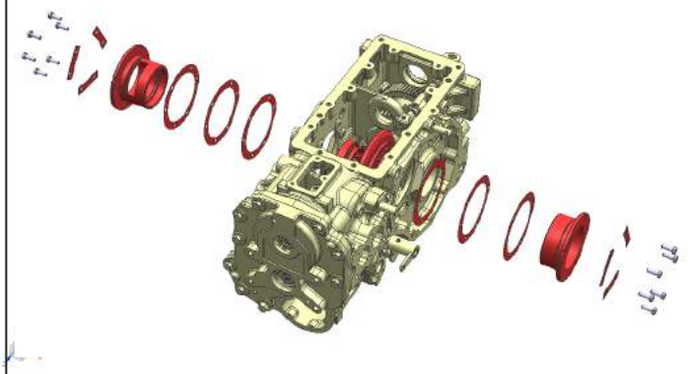
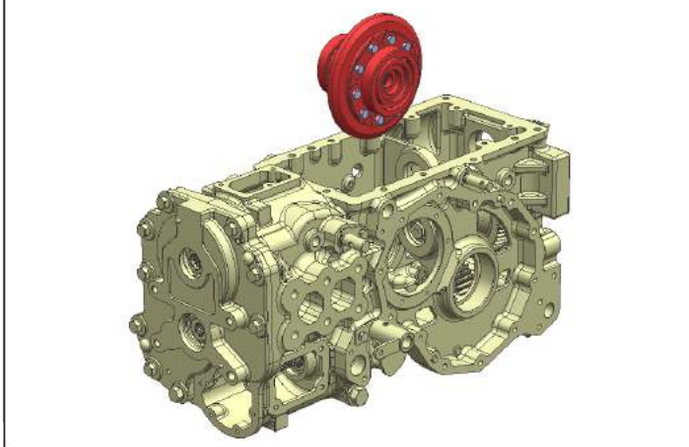
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 7	**Step 7:** I. Remove the dipstick assembly.
 Fig- 8	**Step 8:** i. Remove the cap from differential housing. ii. Remove the internal circlip by using tool.
 Fig- 9	**Step 9:** I. Remove the shim.

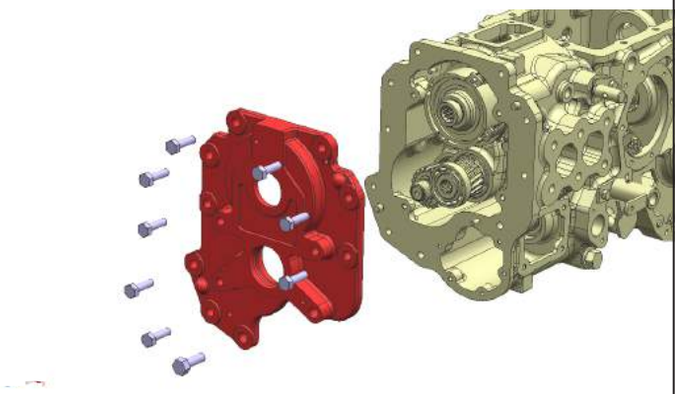
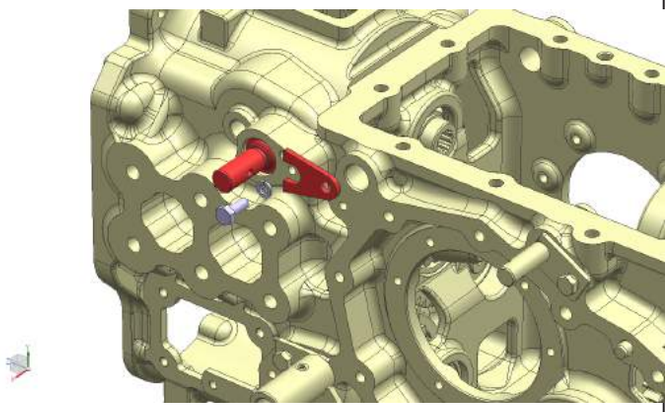
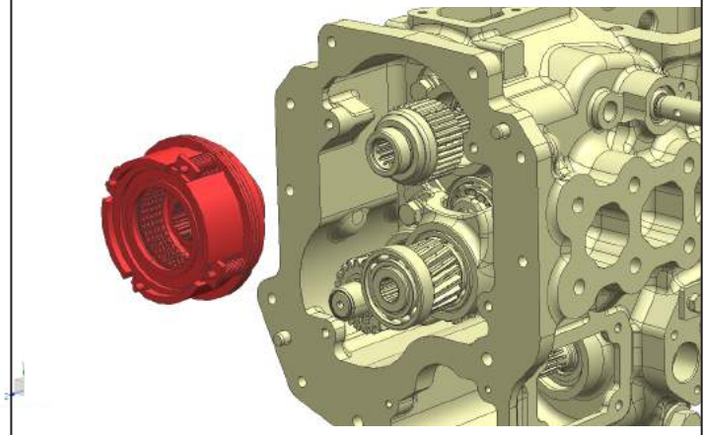
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 10	**Step 10:** i. Remove the ball bearing 6206, PTO intermediate shaft and ball bearing 6205.
 Fig- 11	**Step 11:** I. Remove the PTO switch.
 Fig- 12	**Step 12:** i. Remove parking brake switch.

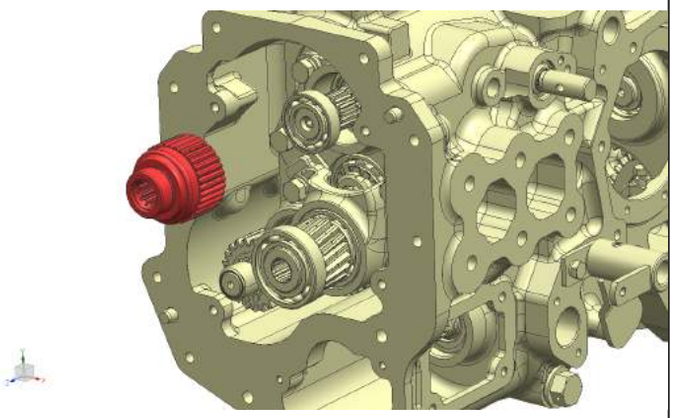
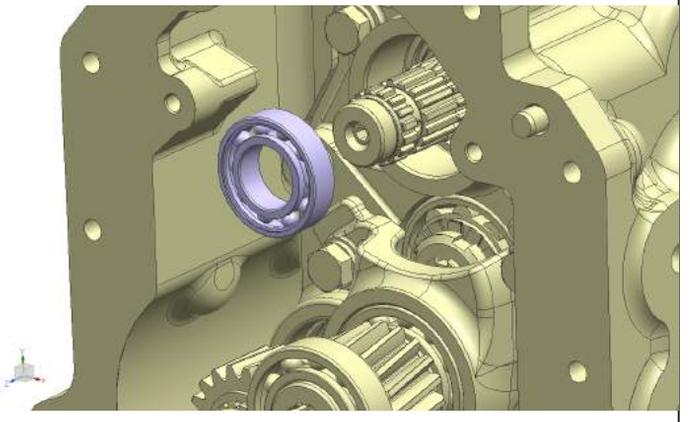
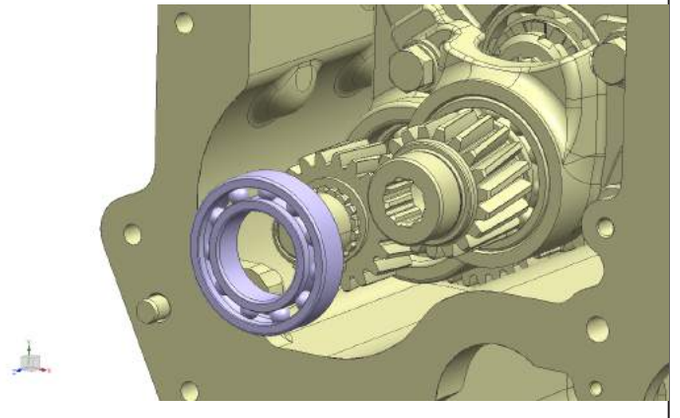
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 13	**Step 13:** i. Remove the bolts of differential cage.
 Fig- 14	**Step 14:** i. Remove the locking plate, differential cage and shims.
 Fig- 15	**Step 15:** i. Remove the differential cage assembly.

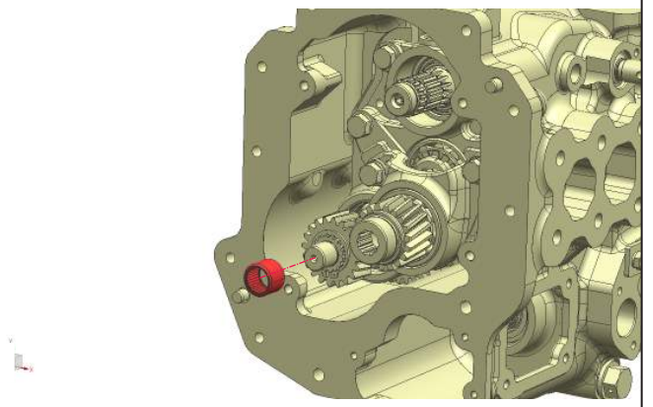
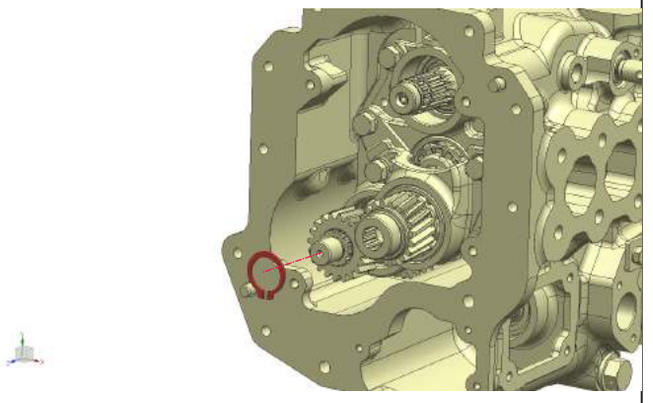
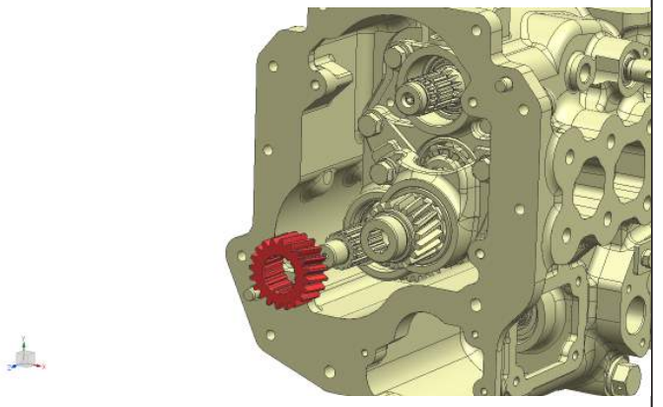
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 16	**Step 16:** i. Remove the bolts. ii. Remove the intermediate plate.
 Fig- 17	**Step 17:** I. Remove the bolt and locking strip.
 Fig- 18	**Step 18:** i. Remove the JMI PTO clutch assembly.

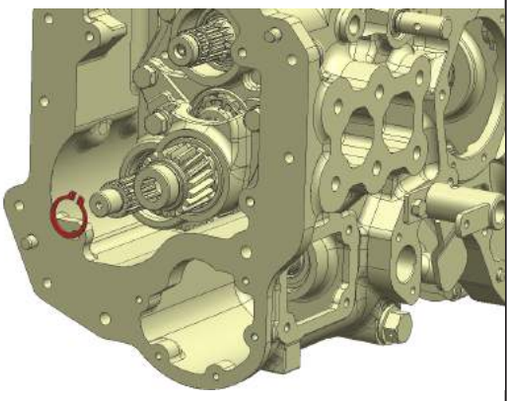
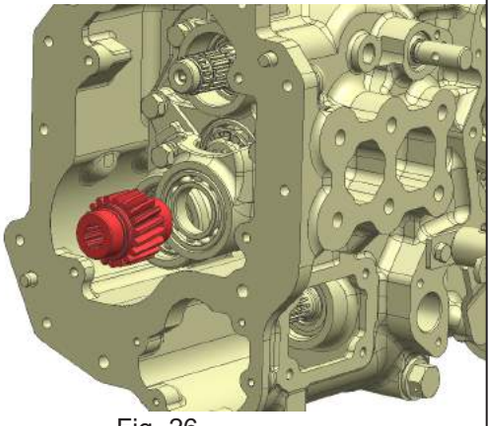
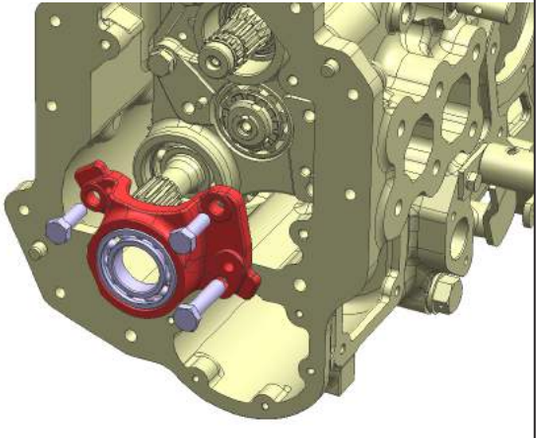
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 19	**Step 19:** i. Remove hub PTO clutch.
 Fig- 20	**Step 20 :** I. Remove the ball bearing 6005.
 Fig- 21	**Step 21:** I. Remove the ball bearing 6007.

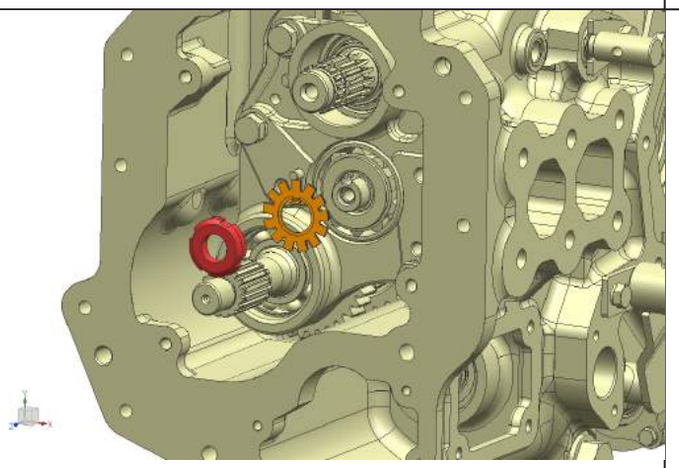
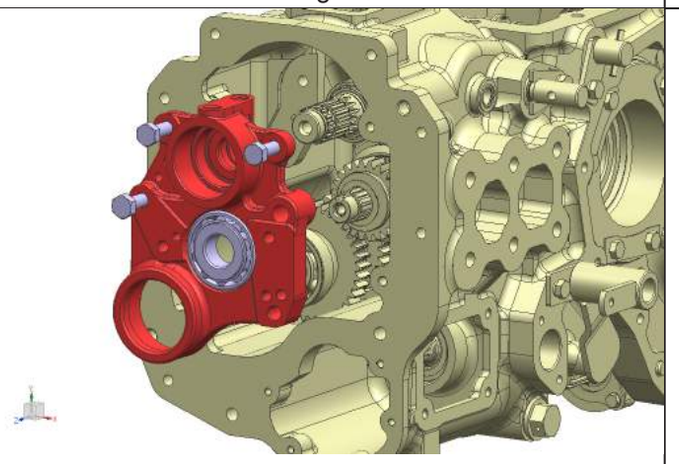
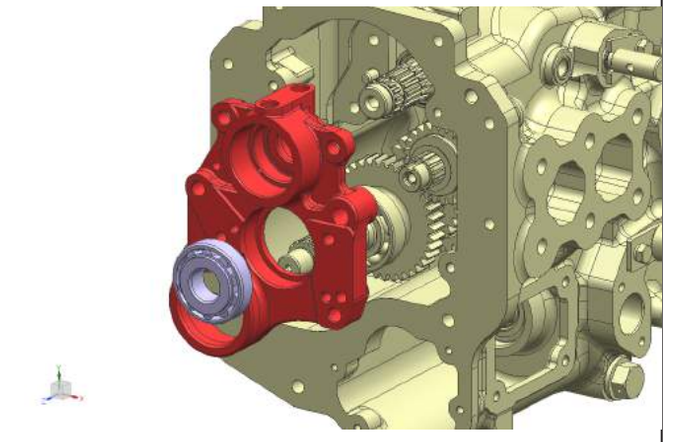
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 22	**Step 22:** I. Remove the needle bush.
 Fig- 23	**Step 23:** I. Remove the circlip.
 Fig- 24	**Step 24:** I. Remove the driven gear Z-20.

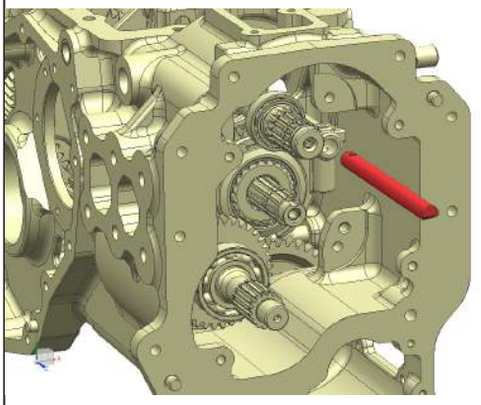
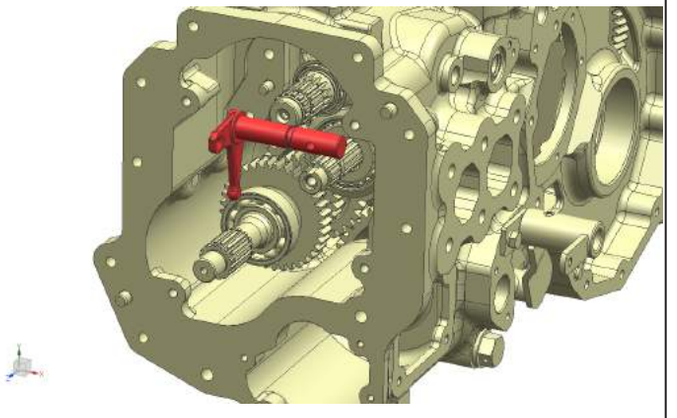
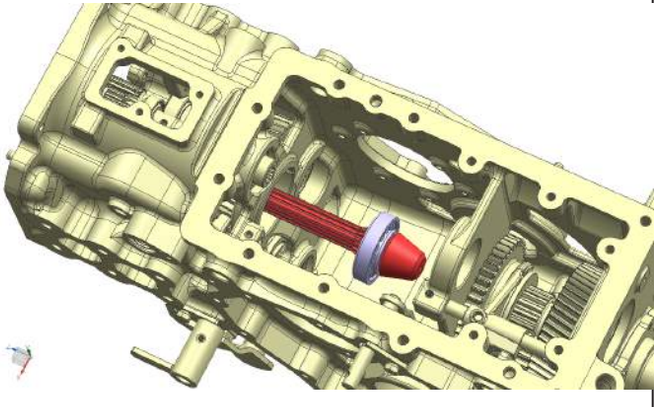
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 25	**Step 25:** I. Remove the circlip.
 Fig- 26	**Step 26:** I. Remove driven gear Z-19.
 Fig- 27	**Step 27:** I. Remove the three bolts. ii. Remove the bearing holder bracket and ball bearing 6007.

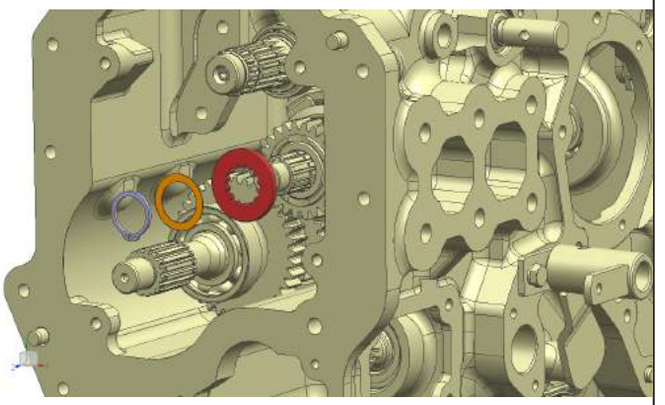
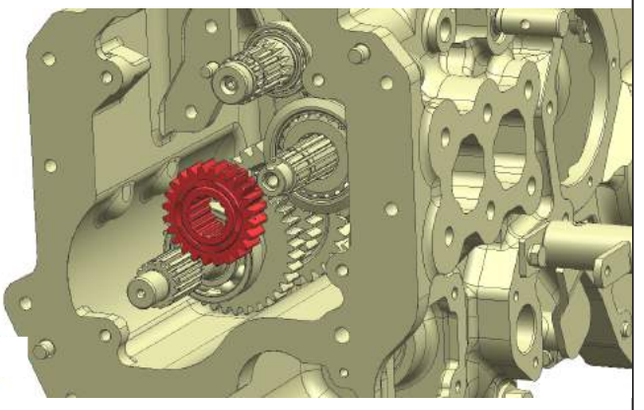
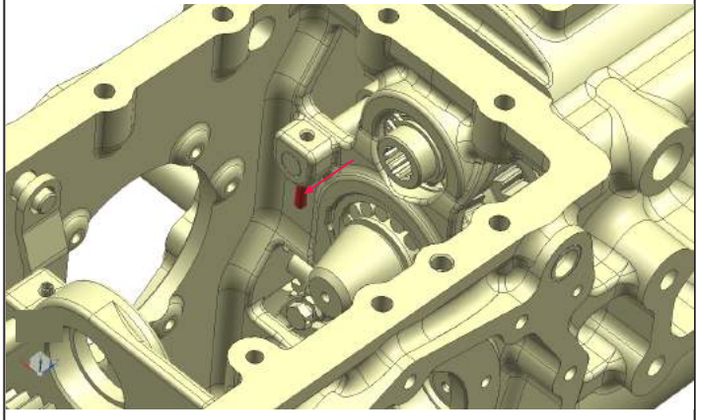
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 28	**Step 28:** I. Remove the withdrawal nut and locking washer.
 Fig- 29	**Step 29:** I. Remove the bolts of bearing holder plate. ii. Remove the bearing holder plate.
 Fig- 30	**Step 30:** I. Remove the taper roller bearing.

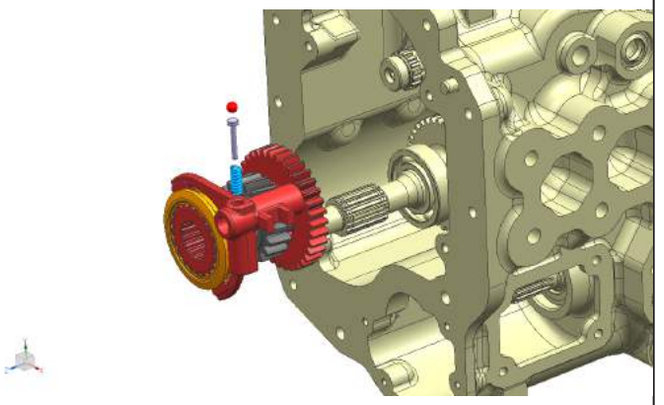
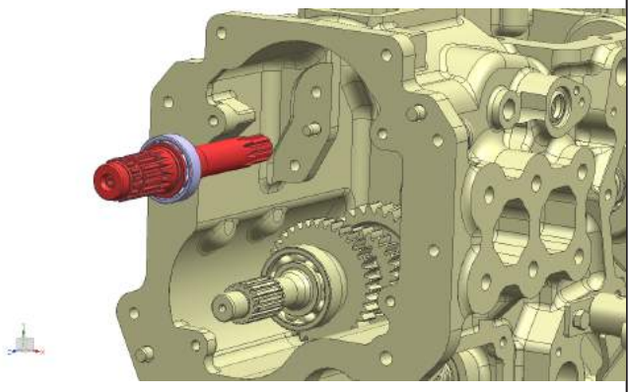
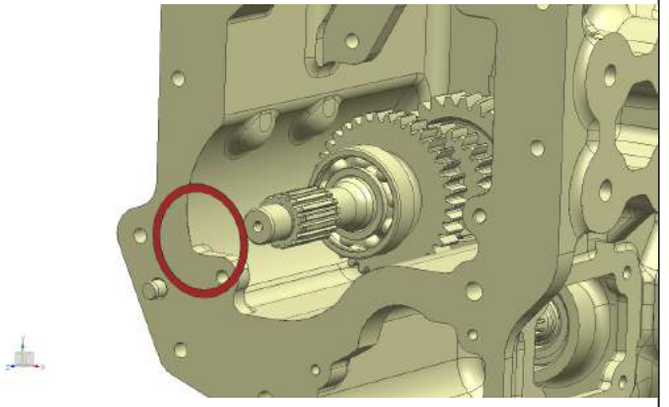
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 34	**Step 34:** I. Remove the shifter rod from differential housing.
 Fig- 35	**Step 35:** I. Remove the shifter lug from differential housing.
 Fig- 36	**Step 36:** I. Remove the tail pinion shaft and taper roller bearing.

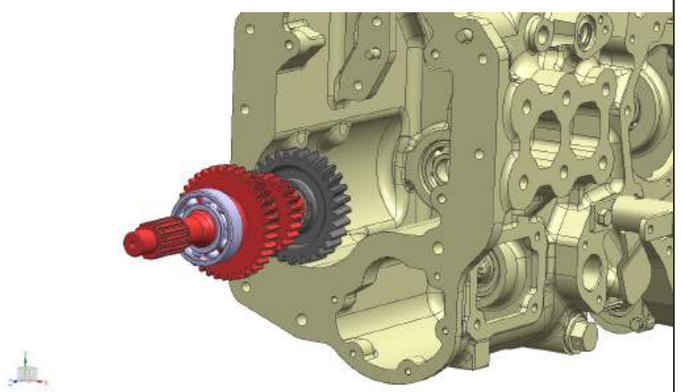
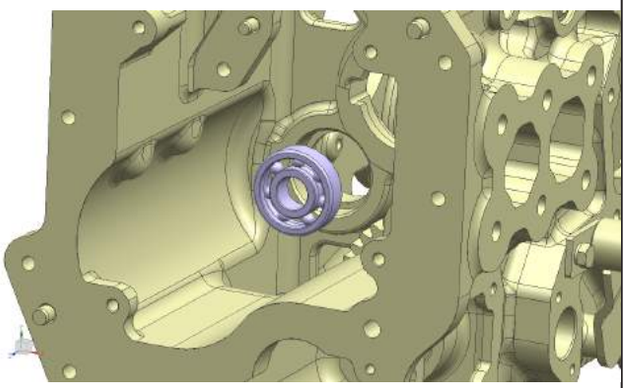
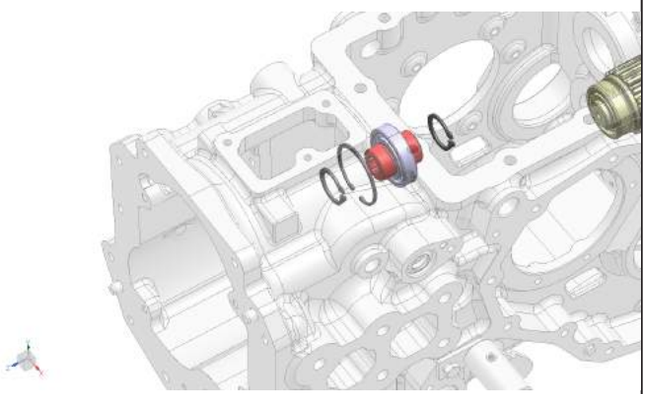
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 31	**Step 31:** I. Remove the circlip, shim and thrust washer.
 Fig- 32	**Step 32:** I. Remove the dog gear high Z-24.
 Fig- 33	**Step 33:** I. Remove the split pin by using tool.

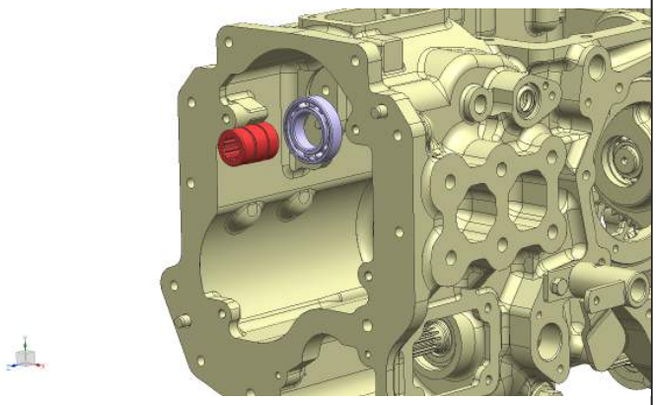
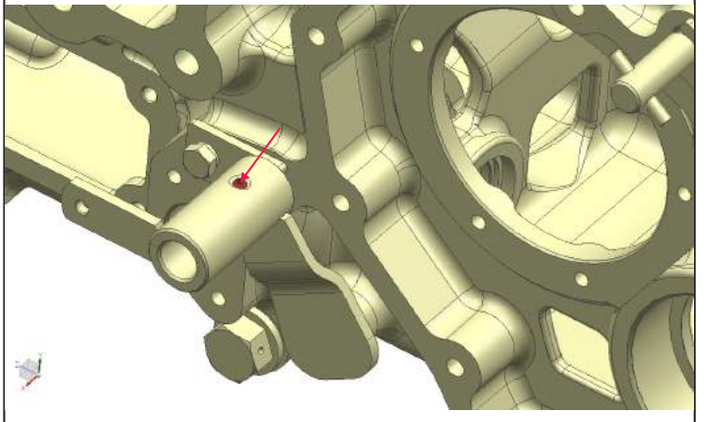
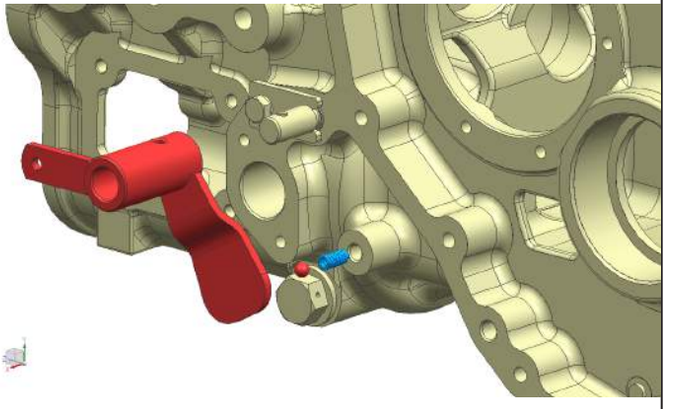
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 37	**Step 37:** I. Remove the shifter sleeve, hub, fork, dog gear low and driver gear 4WD.
 Fig- 38	**Step 38:** I. Remove the PTO drive shaft and ball bearing 6005.
 Fig- 39	**Step 39:** I. Remove the shim and tie the with PTO drive shaft.

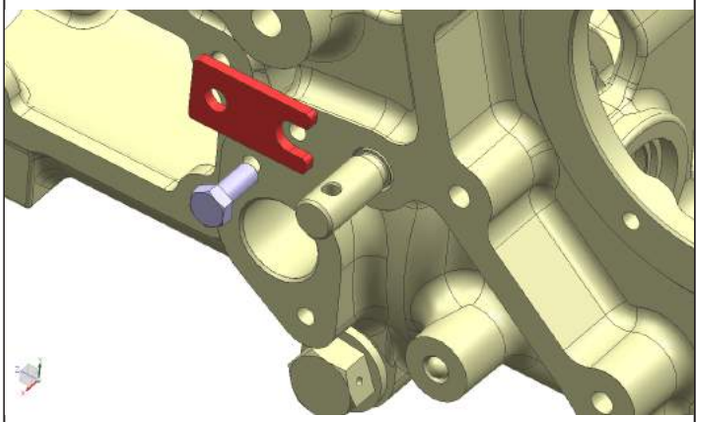
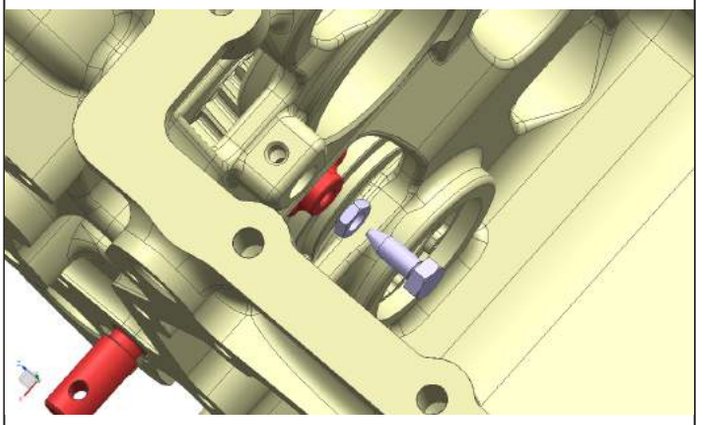
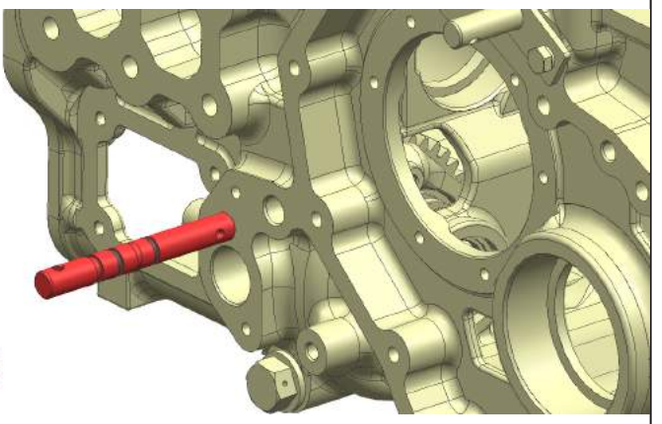
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 40	**Step 40:** I. Remove the ball bearing 6206, range lay shaft, idler gear 4WD.
 Fig- 41	**Step 41:** I. Remove the ball bearing 6304.
 Fig- 42	**Step 42:** I. Remove the internal circlip from differential housing. ii. Remove the external circlip from connecting sleeve PTO.

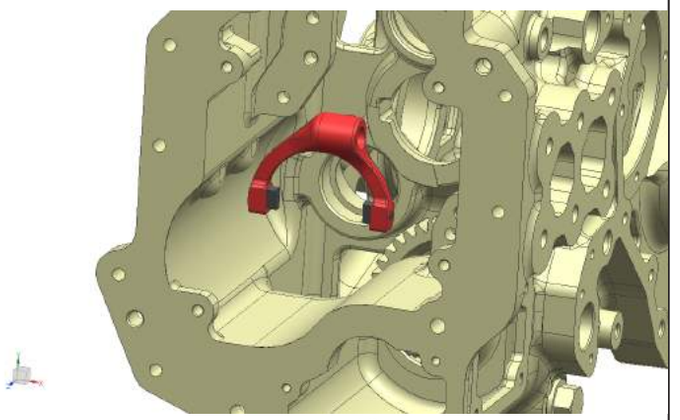
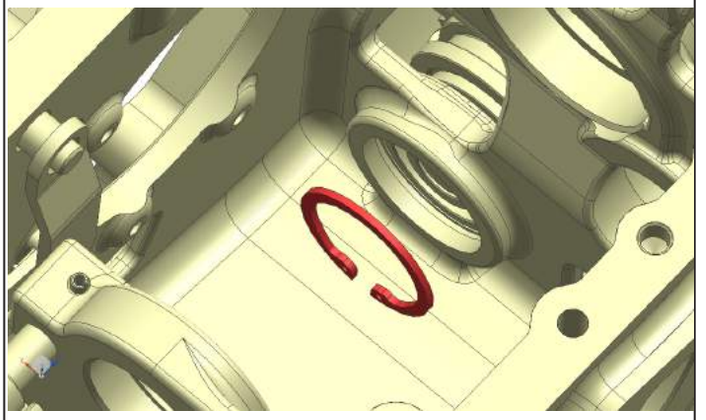
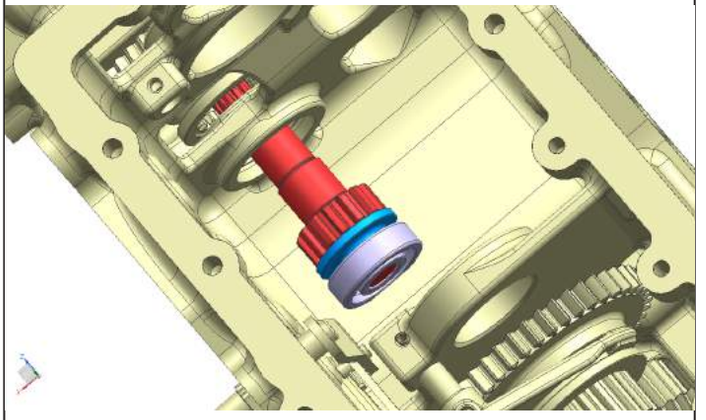
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 43	**Step 43:** I. Remove the connecting sleeve PTO and ball bearing.
 Fig- 44	**Step 44:** I. Remove the split pin by using tool.
 Fig- 45	**Step 45:** I. Remove the pivot lug, ball and spring.

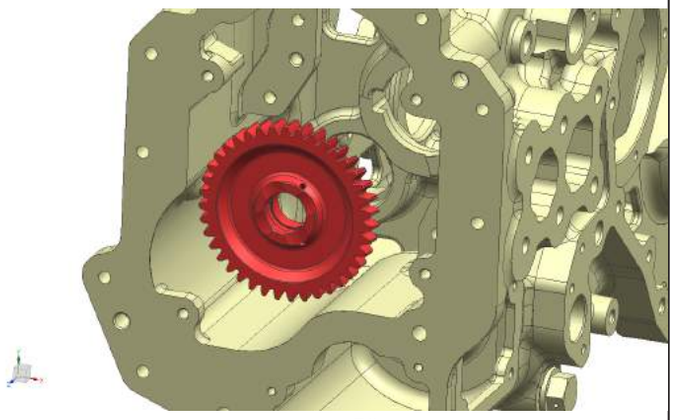
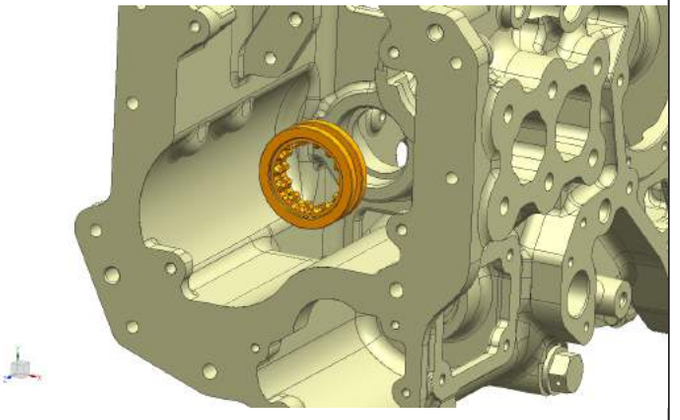
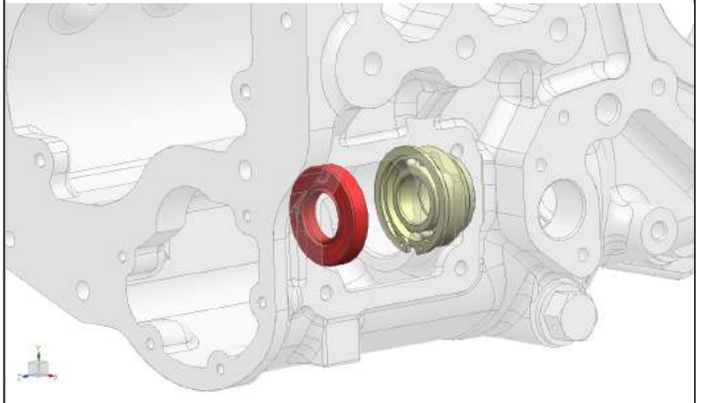
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 46	**Step 46:** I. Remove the bolt. ii. Remove the locking plate.
 Fig- 47	**Step 47:** I. Remove the bolt and nut from fork.
 Fig- 48	**Step 48:** I. Remove the pivot rod.

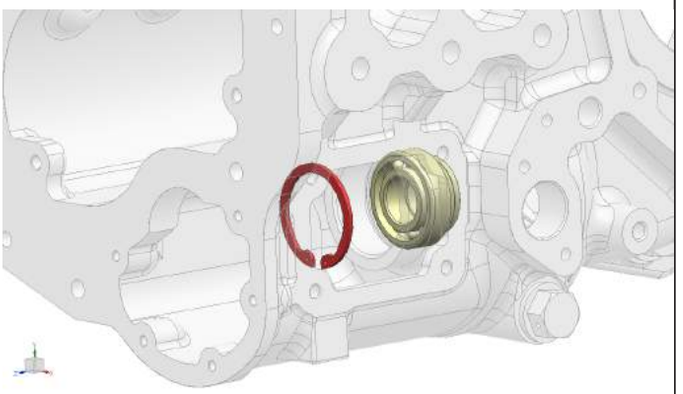
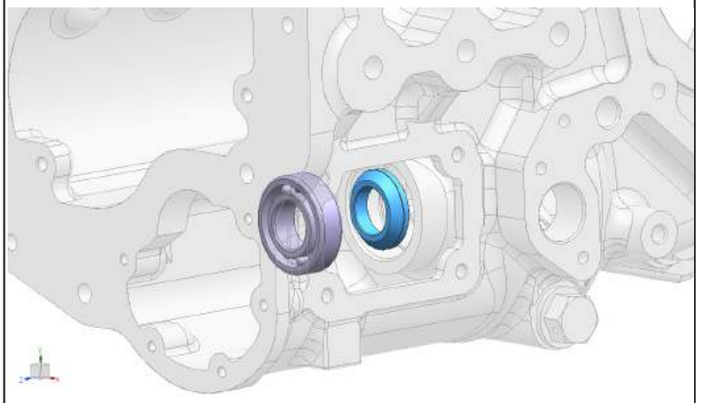
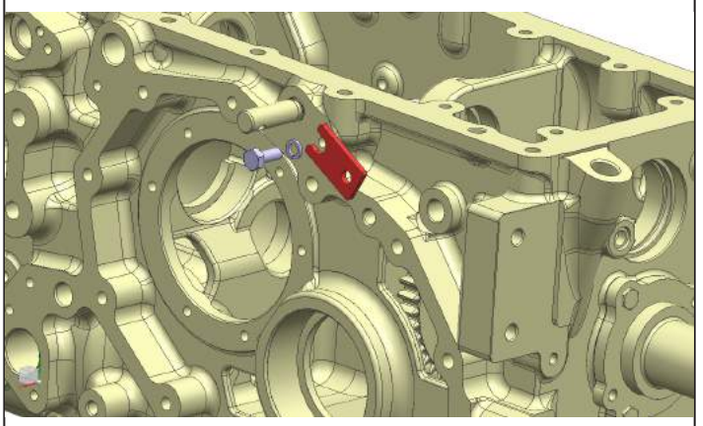
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 49	**Step 49:** I. Remove the fork 4WD.
 Fig- 50	**Step 50:** I. Remove the internal circlip.
 Fig- 51	**Step 51:** I. Remove the ball bearing 6304, spacer and 4WD output shaft.

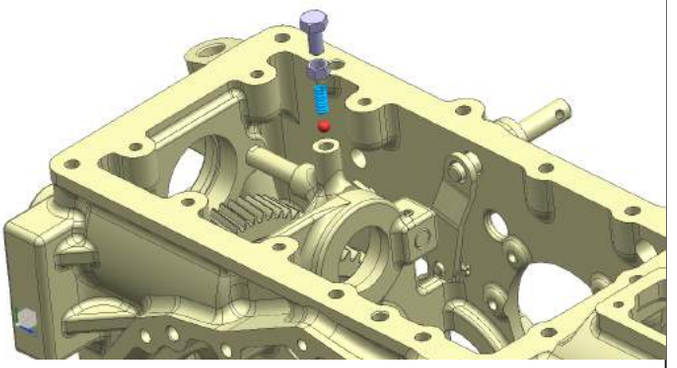
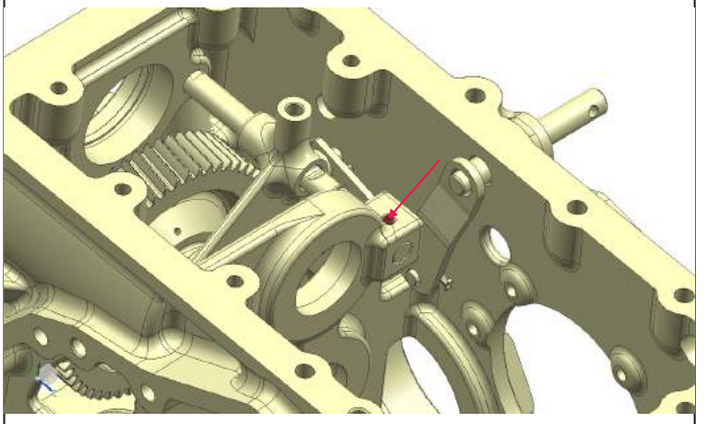
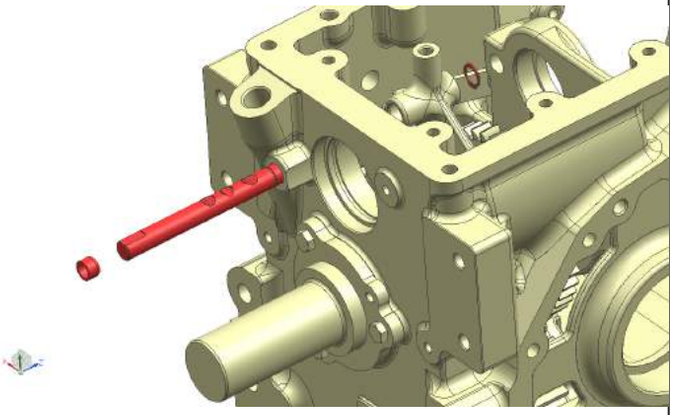
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 52	**Step 52:** I. Remove the driven gear 4WD.
 Fig- 53	**Step 53:** I. Remove the shifter sleeve 4WD.
 Fig- 54	**Step 54:** I. Remove the oil seal.

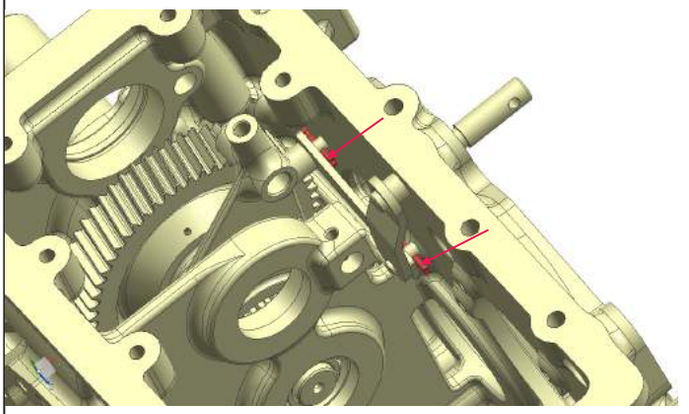
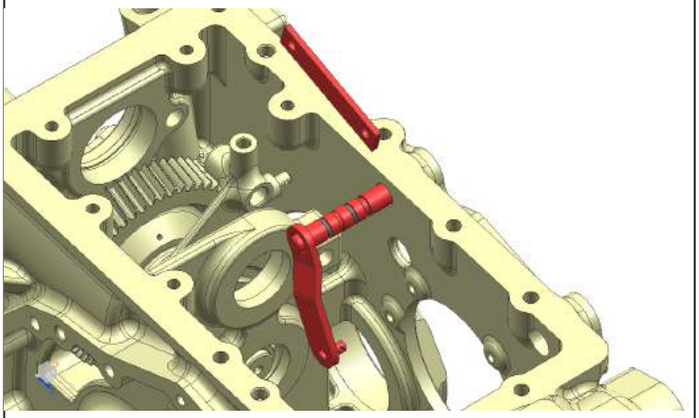
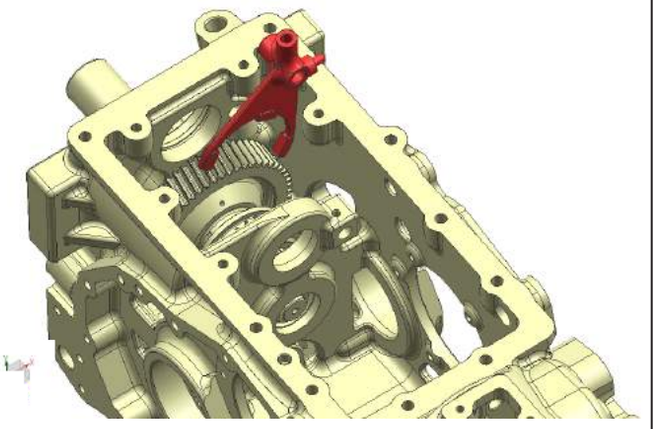
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 55	**Step 55:** I. Remove the internal circlip from differential housing.
 Fig- 56	**Step 56:** I. Remove the ball bearing and spacer.
 Fig- 57	**Step 57:** I. Remove the bolt. ii. Remove the locking plate.

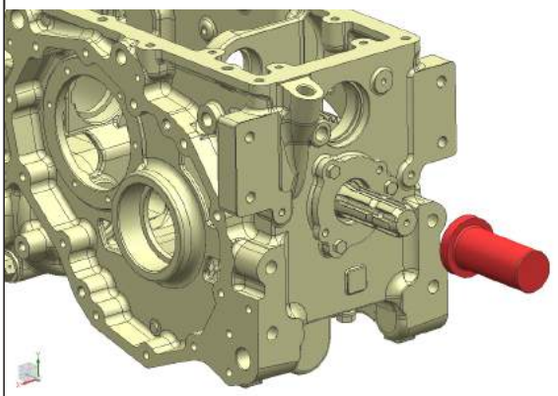
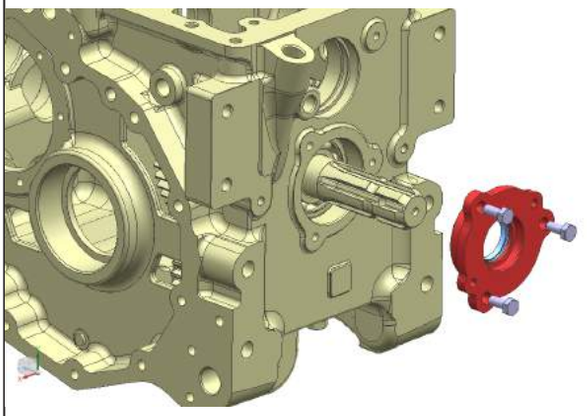
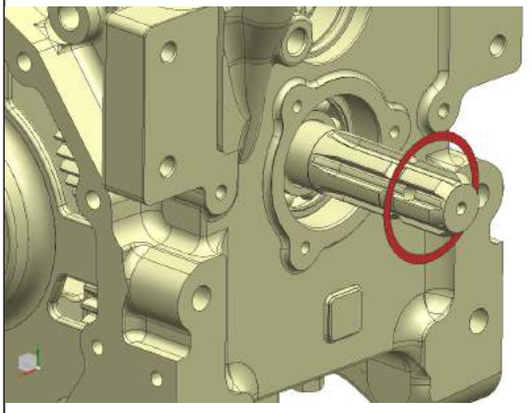
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 58	**Step 58:** I. Remove the bolt. ii. Remove the spring and ball.
 Fig- 59	**Step 59:** i. Remove the split pin.
 Fig- 60	**Step 60:** I. Remove the cap and circlip. ii. Remove the PTO shifter rod.

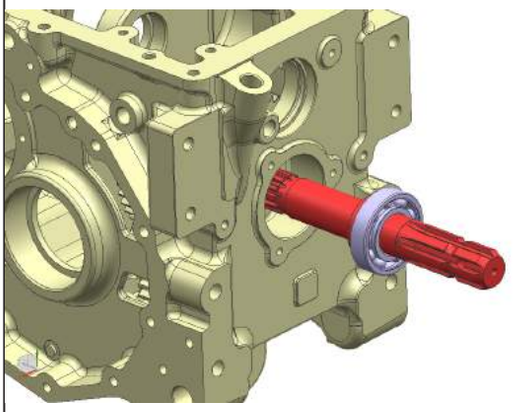
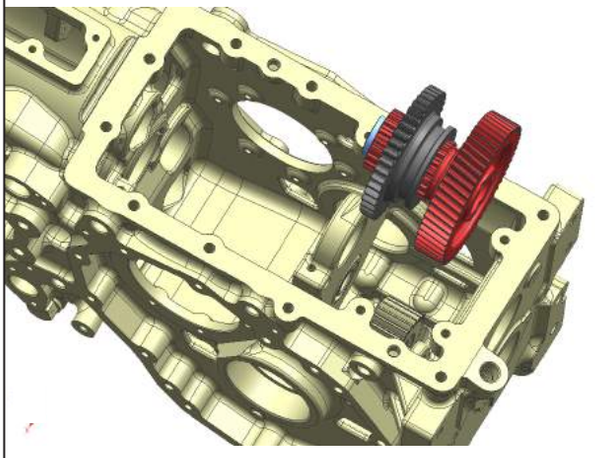
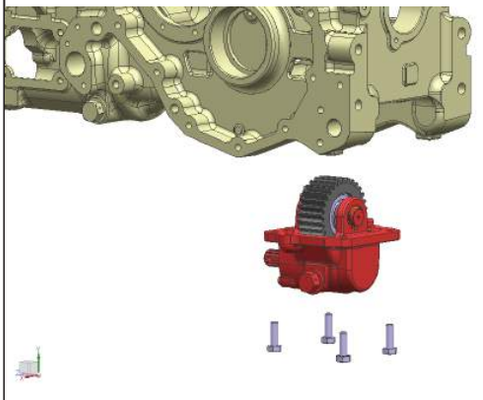
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 61	**Step 61:** I. Remove the cotter pin.
 Fig- 62	**Step 62:** I. Remove the link PTO shifter and pivot lug.
 Fig- 63	**Step 63:** I. Remove the PTO fork.

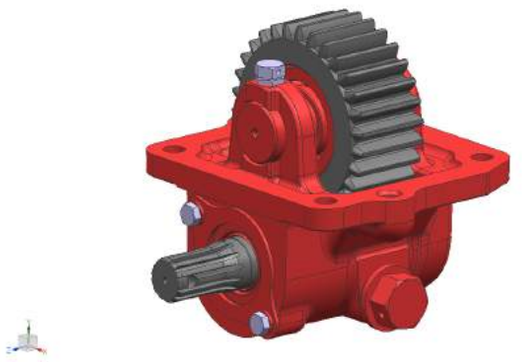
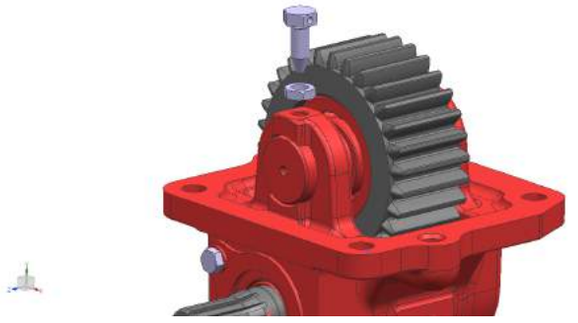
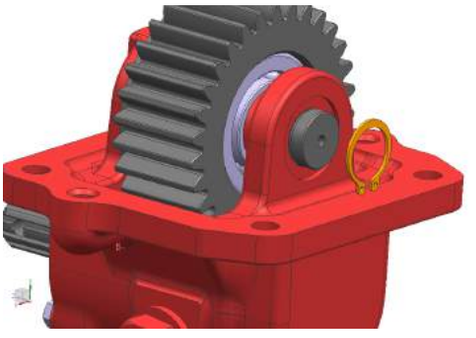
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 64	**Step 64:** I. Remove the PTO cap.
 Fig- 65	**Step 65:** I. Remove the bolts of PTO output cover.
 Fig- 66	**Step 66:** I. Remove the shim. ii. Remove the PTO output shaft.

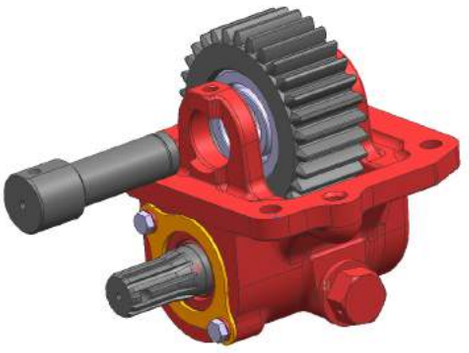
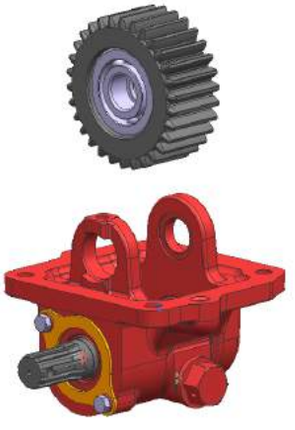
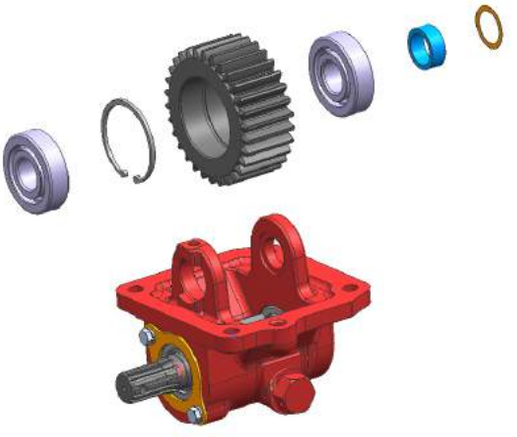
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 67	**Step 67:** I. Remove the ball bearing 6207 and PTO output shaft.
 Fig- 68	**Step 68:** I. Remove the hub, sliding gear and fixed gear.
 Fig- 69	**Step 69:** I. Remove the bolts. ii. Remove the mid PTO sub assembly.

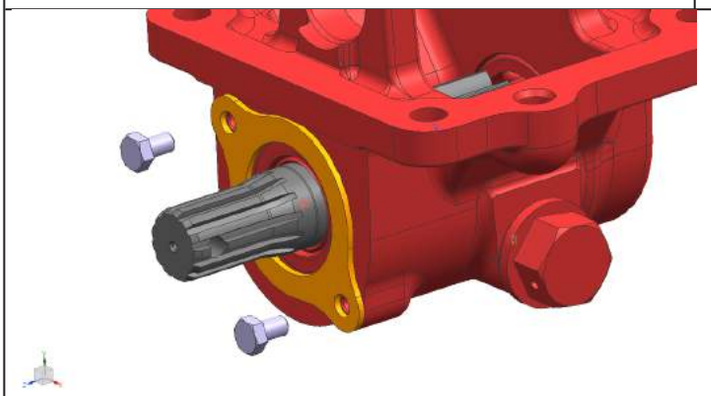
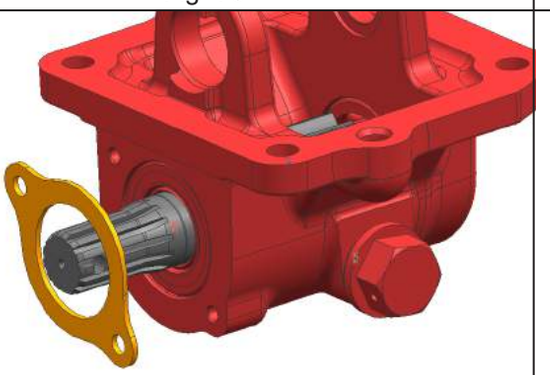
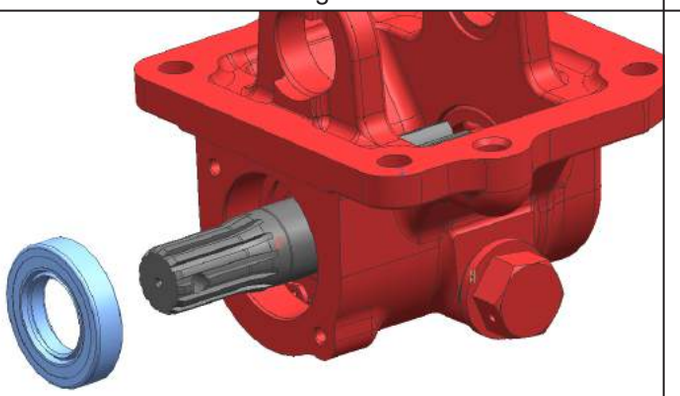
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 70	**Step 70:** I. Take mid PTO sub assembly.
 Fig- 71	**Step 71:** I. Remove the bolt and nut.
 **Fig- 72**	**Step 72:** I. Remove the circlip of idler shaft.

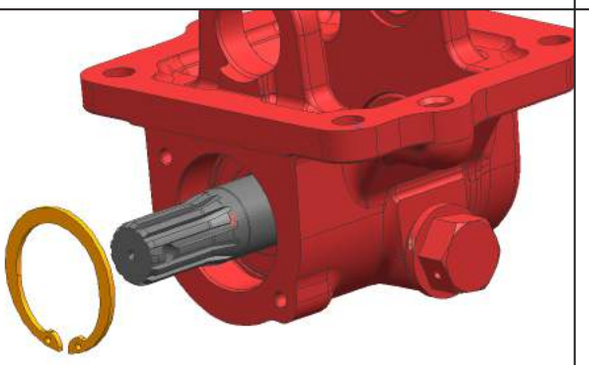
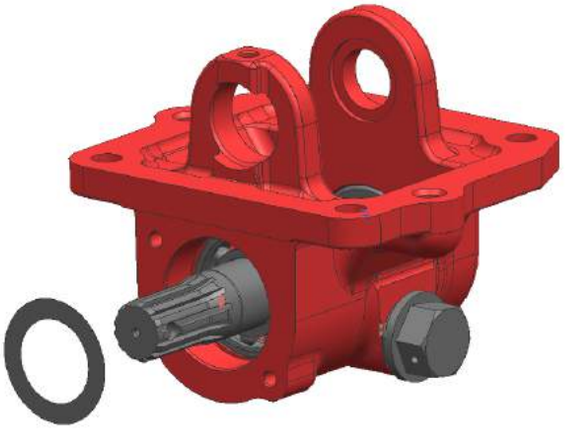
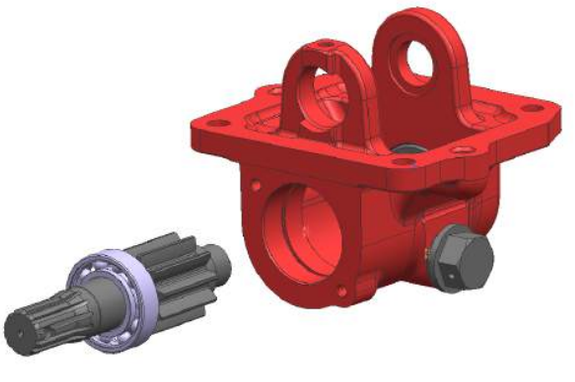
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 73	**Step 73:** I. Remove the idler shaft.
 Fig- 74	**Step 74:** I. Remove the idler gear.
 Fig- 75	**Step 75:** I. Remove the ball bearings, circlip, spacer and shim.

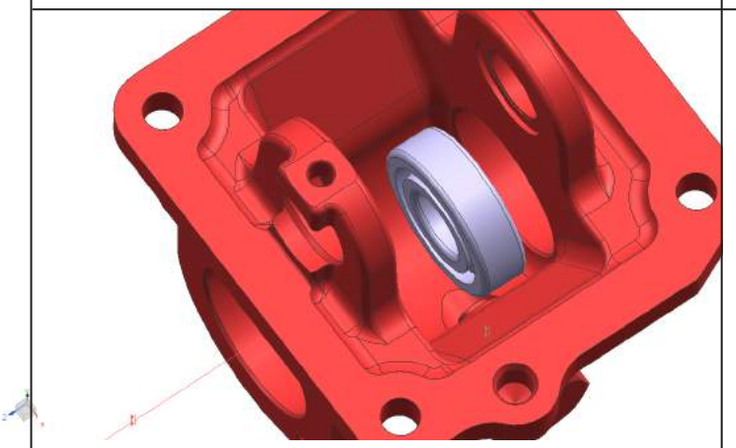
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 76	**Step 76:** I. Remove the bolts.
 Fig- 77	**Step 77:** I. Remove the seal stopper.
 Fig- 78	**Step 78:** I. Remove the oil seal.

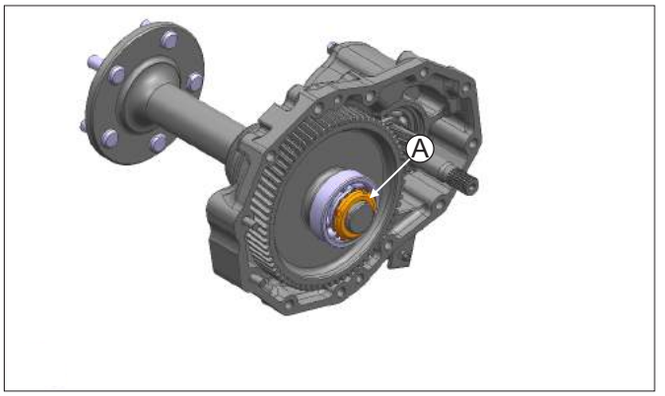
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 79	**Step 79:** I. Remove the internal circlip.
 Fig- 80	**Step 80:** I. Remove the shim.
 Fig- 81	**Step 81:** I. Remove the ball bearing 6005.

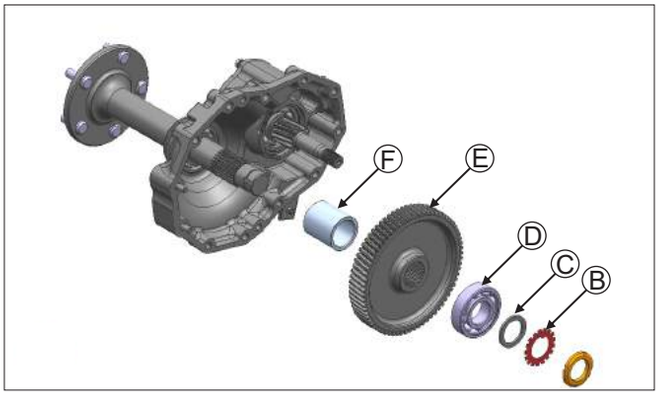
H. Dis-assembly of Differential Housing

Figure	Instruction
 Fig- 1	**Step 83:** I. Remove the ball Bearing 6204.

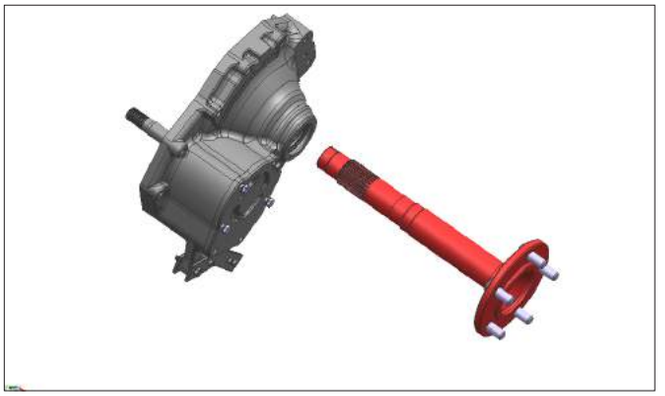
I. Disassembly of Trumpet Housing



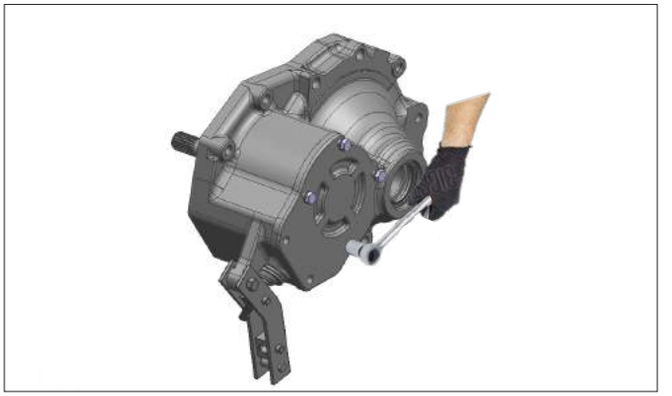
1.Unlock the locking washer by using tool and remove the locking nut (A).



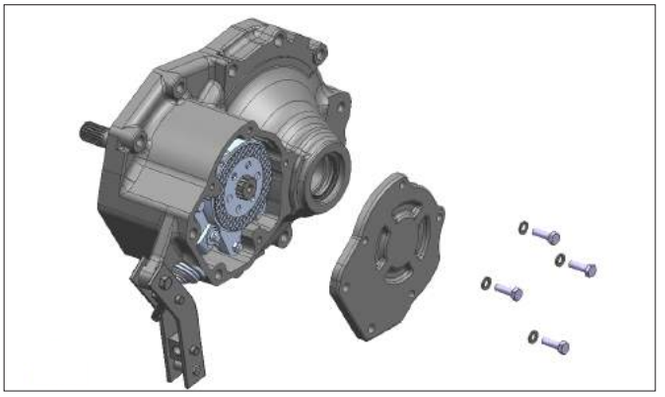
2.Remove the locking washer (B), spacer (C), bearing(D), bull gear (E) and sleeve (F).



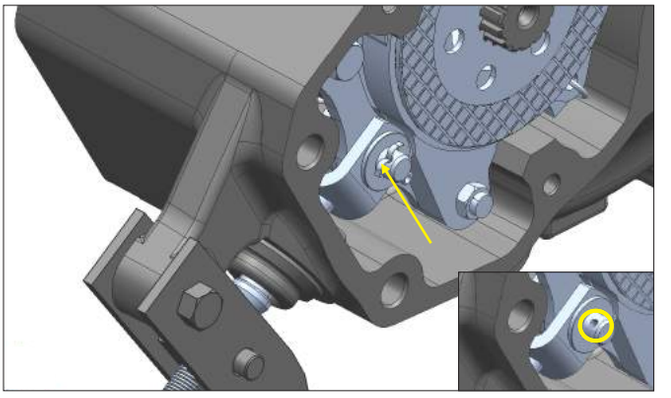
3.Remove the rear axle and oil seal. Discard the oil Seal and replace with new one during assembly.



4.Remove the bolts of brake cover.

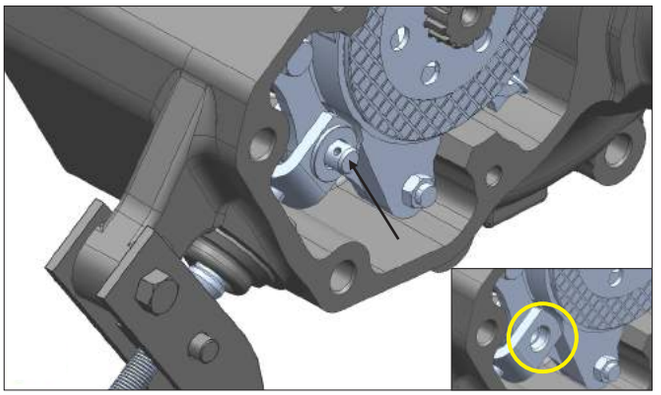


5.Remove the brake cover.

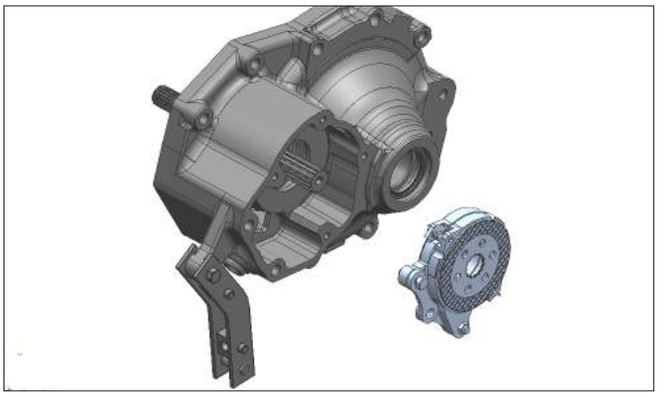


6.Remove the split pin.

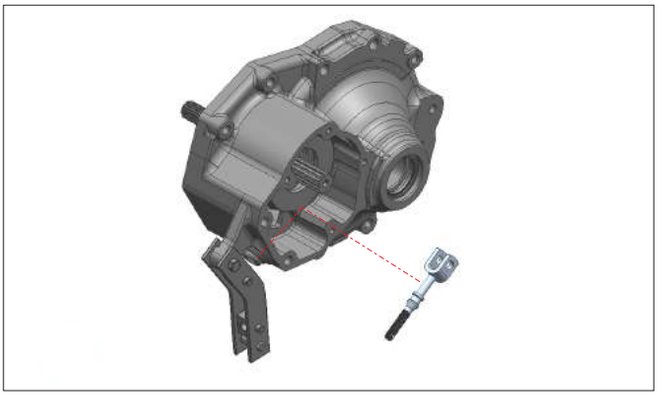
I. Disassembly of Trumpet Housing



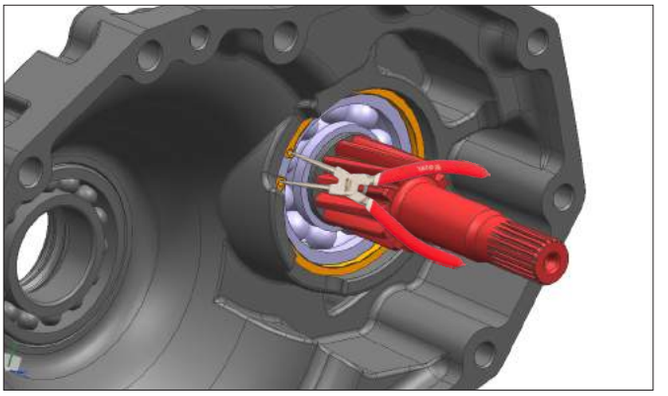
7.Remove the bolt of brake actuating rod.



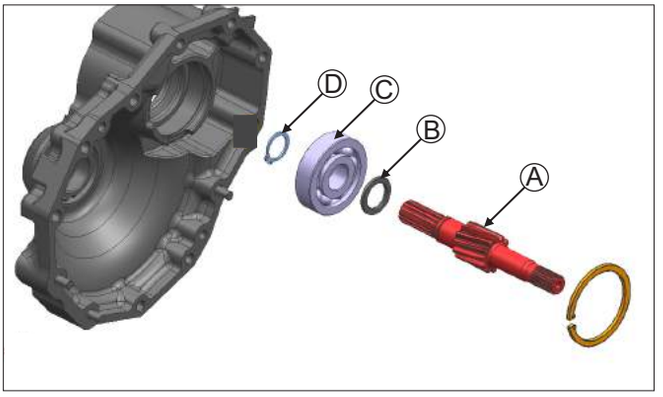
8.Remove the brake assembly.



9.Remove the brake actuating rod.

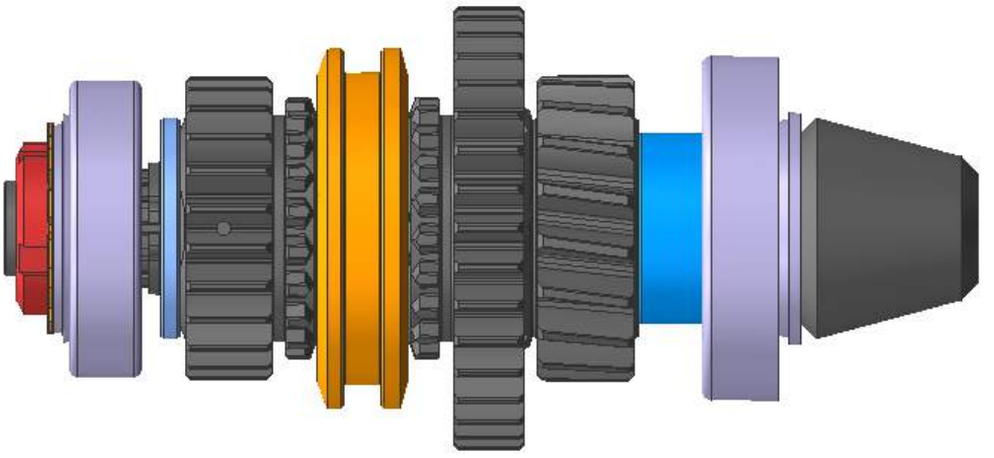


10.Remove the circlip of bull shaft bearing.

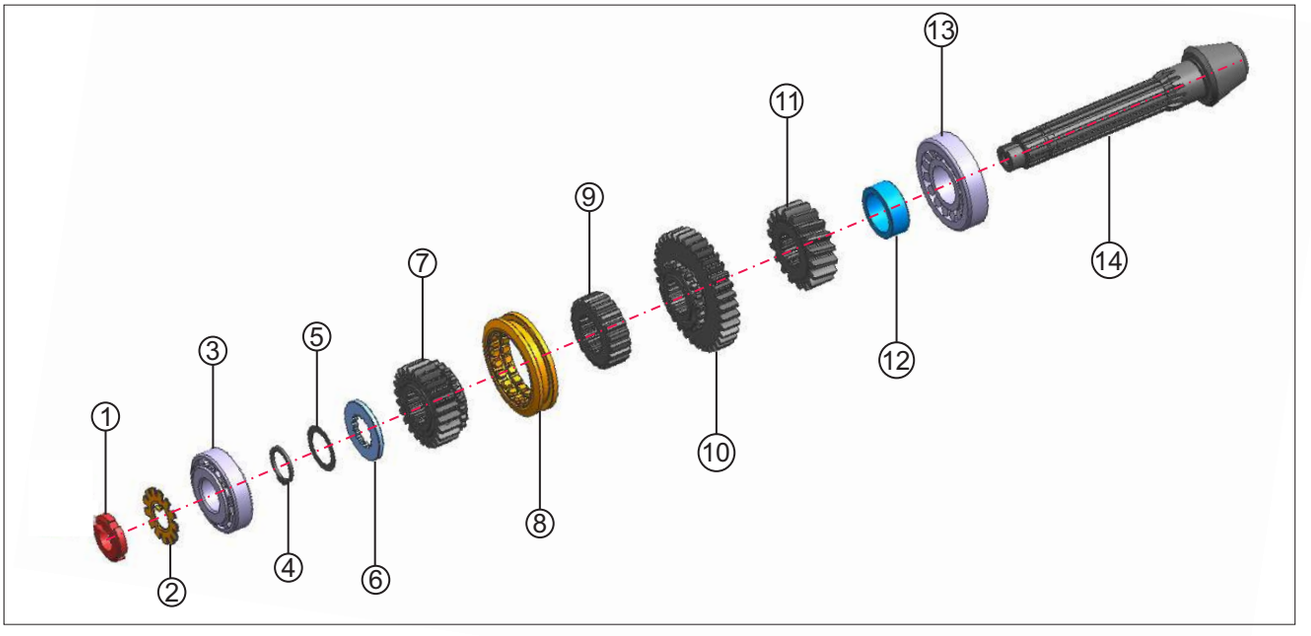


11.Remove the bull shaft (A), spacer (B) and bearing (C) and circlip (D).

J. Disassembly of Tail Pinion Shaft

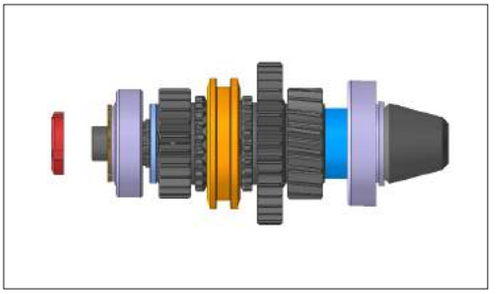


Exploded View

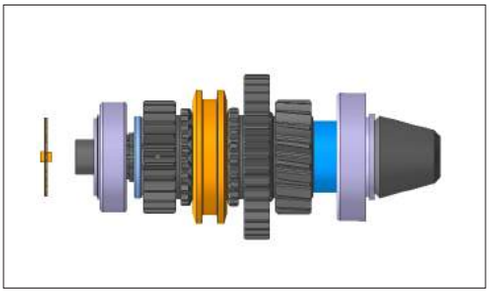


1	Withdrawal Nut
2	Locking Washer
3	Taper Roller Bearing
4	External Circlip
5	Shim
6	Thrust Washer
7	Dog Gear High Z-24
8	Shifter Sleeve
9	Hub
10	Dog Gear Low Z-35
11	Driver Gear 4WD
12	Spacer
13	Taper Roller Bearing
14	Tail Pinion Shaft

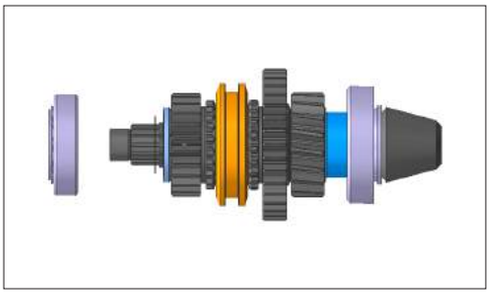
J. Disassembly of Tail Pinion Shaft



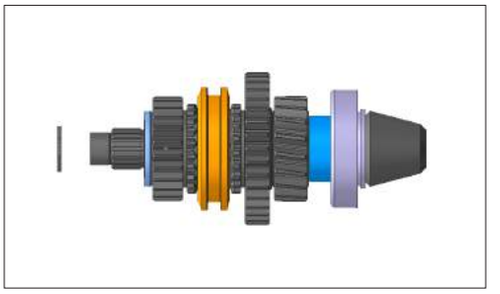
a.Remove the withdrawal nut.



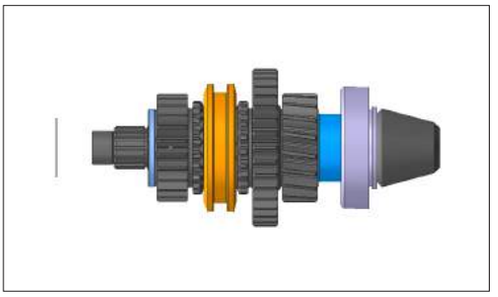
b.Remove the locking washer.



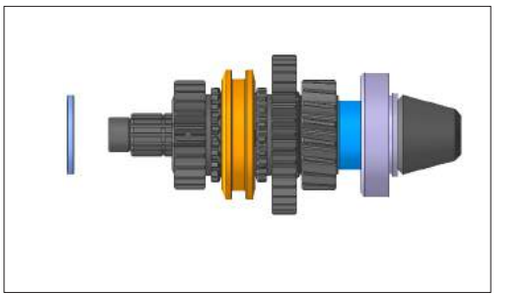
c.Remove the taper roller bearing



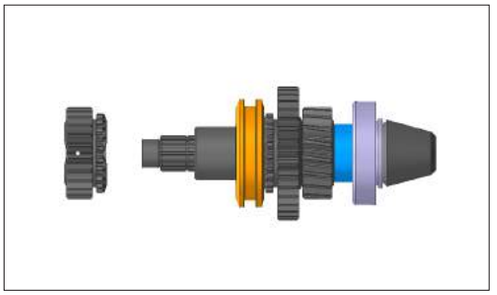
d.Remove the circlip.



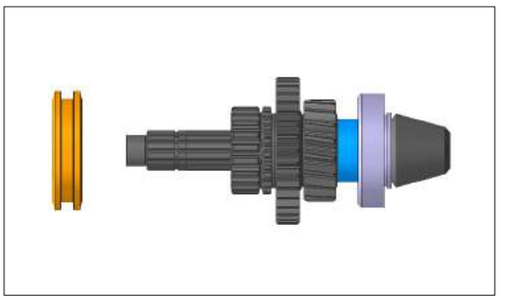
e.Remove the shim.



f.Remove the thrust washer.

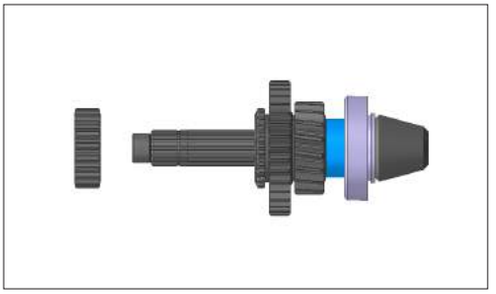


g.Remove the dog gear high Z-24.

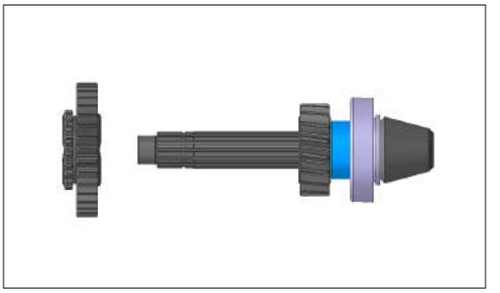


h.Remove the shifter sleeve.

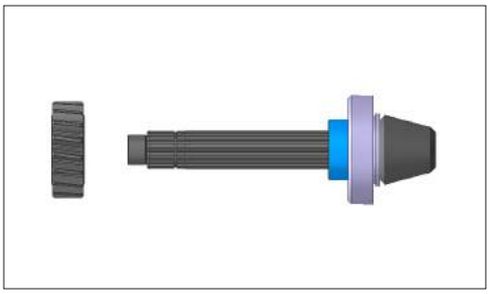
J. Disassembly of Tail Pinion Shaft



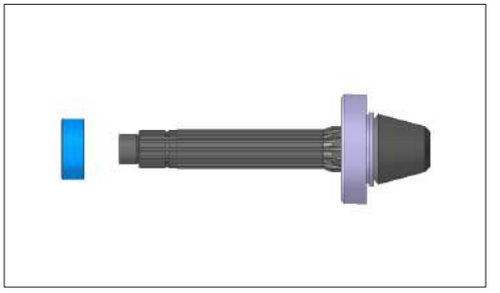
i.Remove the hub.



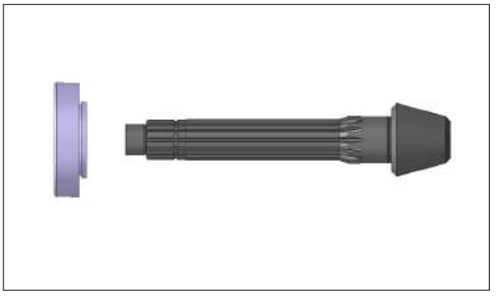
j.Remove the dog gear low Z-35.



k.Remove the driver gear 4WD.

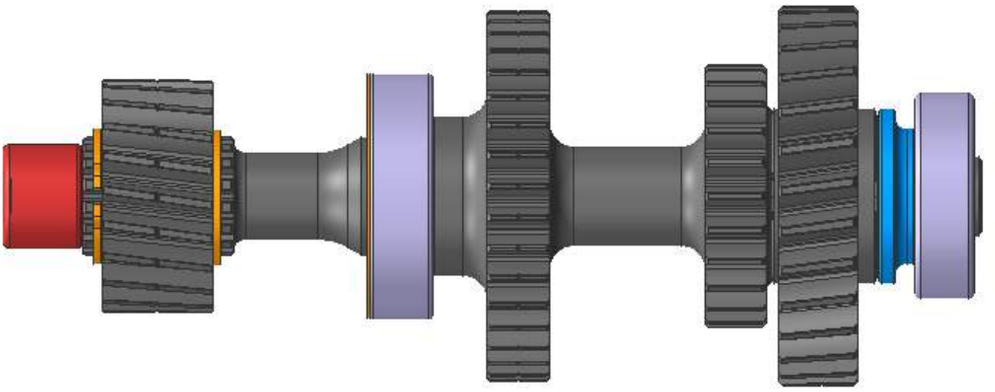


l.Remove the spacer.

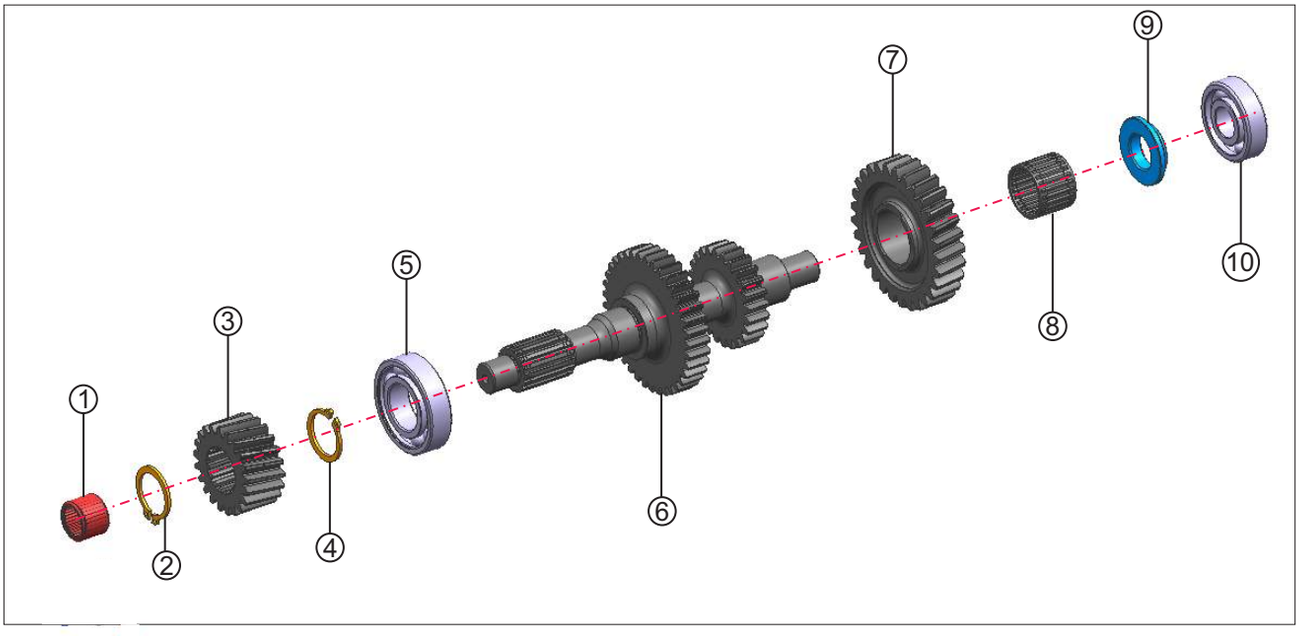


m.Remove the taper roller bearing.

K. Disassembly of Range Lay Shaft

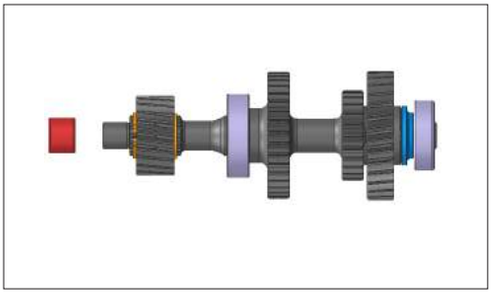


Exploded View

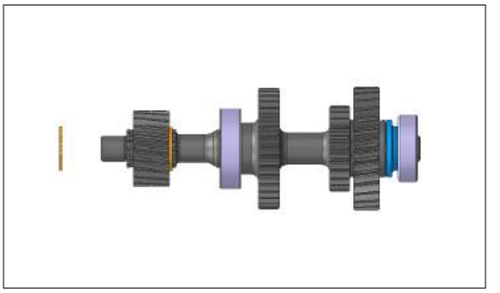


1	Needle Bush
2	Circlip
3	Driven Gear Z-21
4	Circlip
5	Ball Bearing 6206
6	Range Lay Shaft
7	Idler Gear 4WD
8	Needle Roller Bearing
9	Spacer
10	Ball Bearing 6304

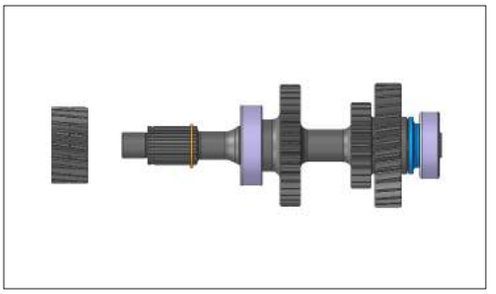
K. Disassembly of Range Lay Shaft



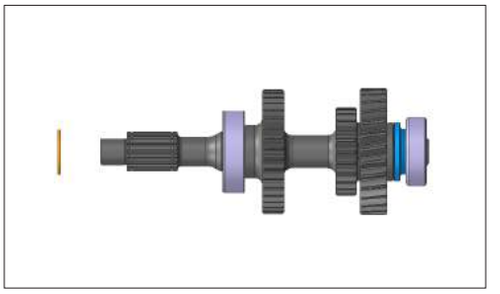
a.Remove the needle bush.



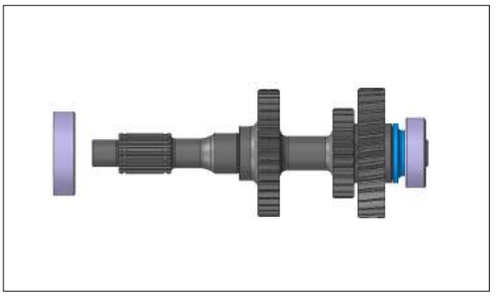
b.Remove the circlip.



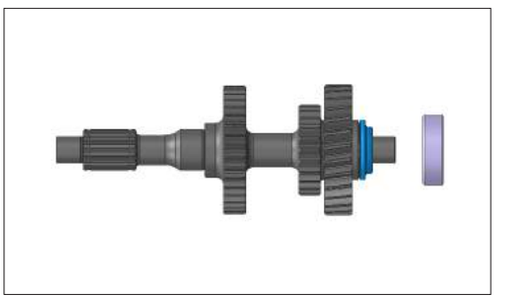
c.Remove the driven gear Z-21.



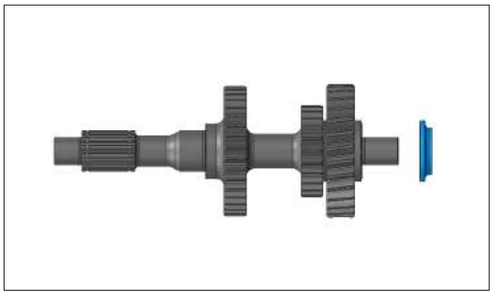
d.Remove the circlip.



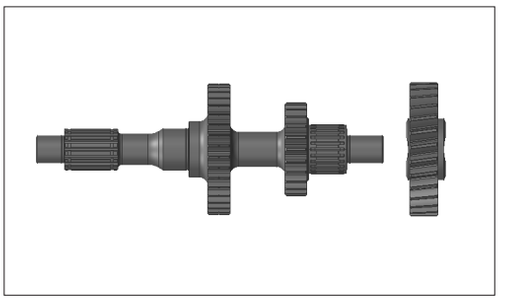
e.Remove the ball bearing 6206.



f.Remove the ball bearing 6304.

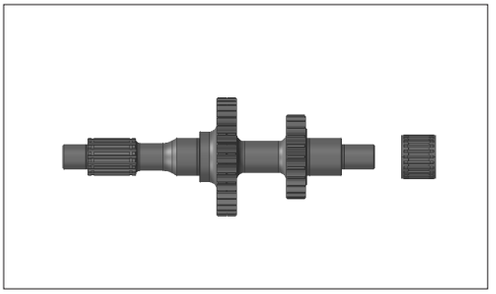


g.Remove the spacer.



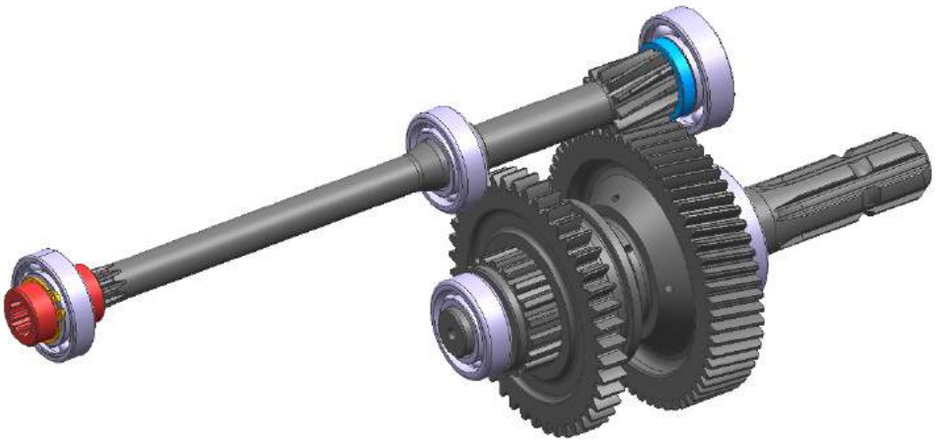
h.Remove the idler gear 4WD.

K. Disassembly of Range Lay Shaft

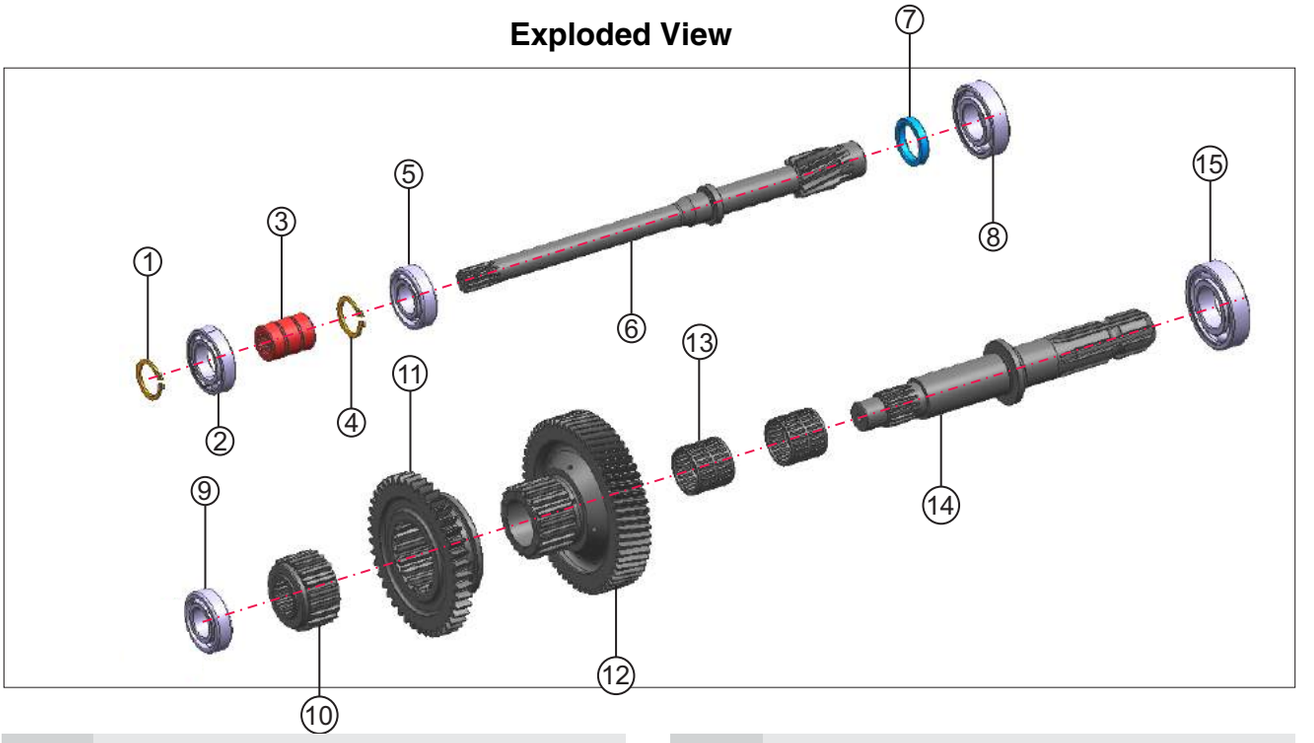


a.Remove the needle roller bearing.

L. Disassembly of PTO Sub Assembly



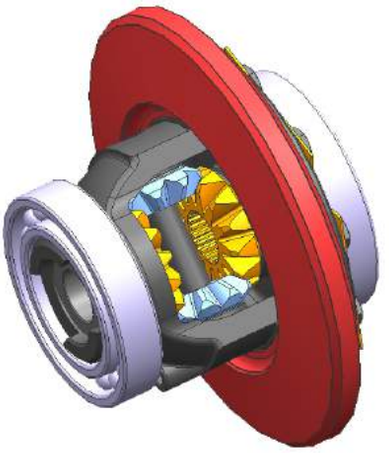
Exploded View

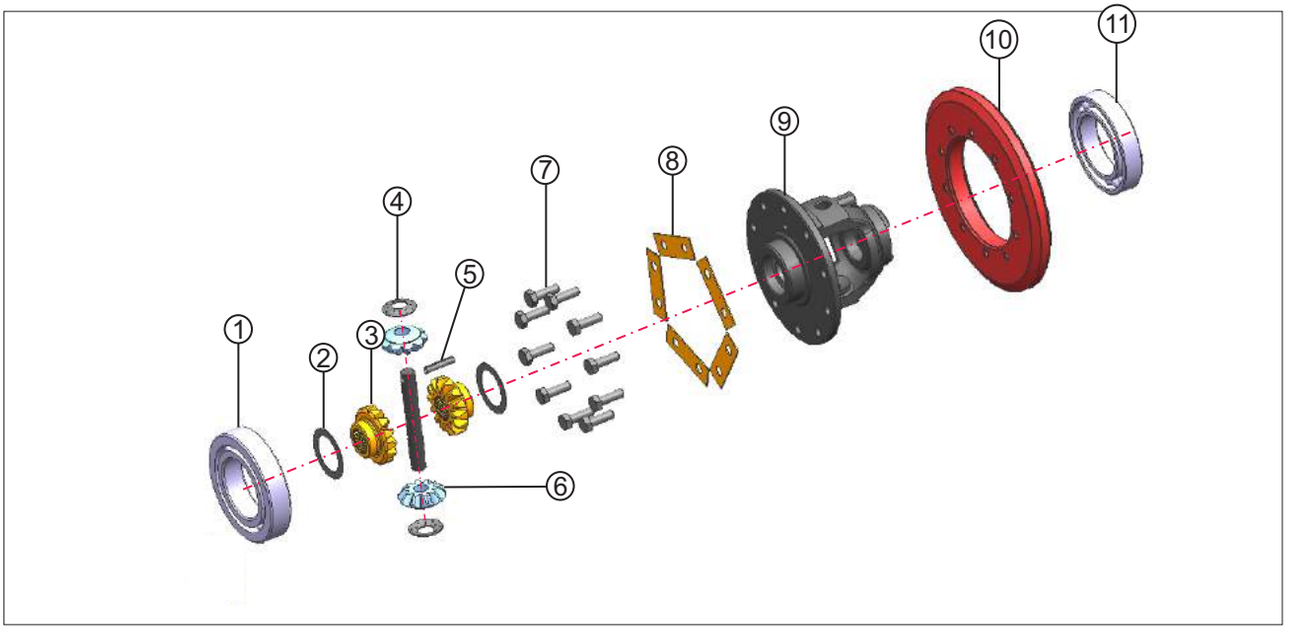


1	Circlip
2	Ball Bearing
3	Connecting Sleeve PTO
4	Circlip
5	Ball Bearing 6205
6	PTO Intermediate Shaft
7	Spacer

8	Ball Bearing 6206
9	Ball Bearing 6205
10	Hub PTO
11	Sliding Gear PTO Z-43
12	Fixed Gear Z-60
13	Needle Roller Bearing
14	PTO Output Shaft
15	Ball Bearing 6207

M. Dis-assembly Differential Cage Sub:-

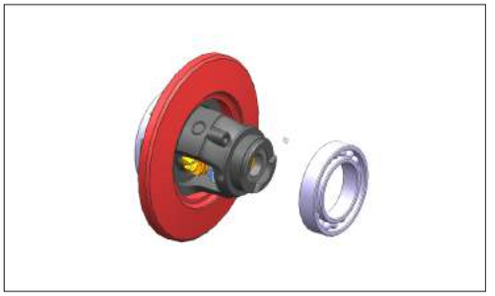




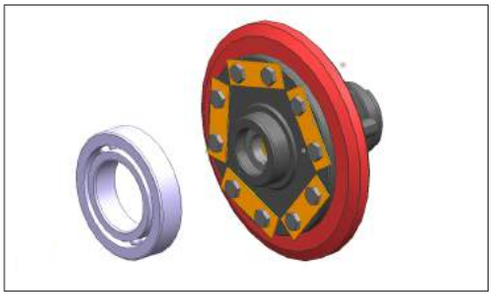
1	Ball Bearing 6011
2	Diff Side Gear Liner
3	Diff. Side Gear 14T
4	Thrust Washer
5	Spring Cotter Sleeve
6	Diff Pinion Gear 10T

7	Bolt
8	Locking Washer
9	Diff Cage Assembly
10	Crown Wheel
11	Ball Bearing 6211

M. Disassembly of Differential Sub Cage



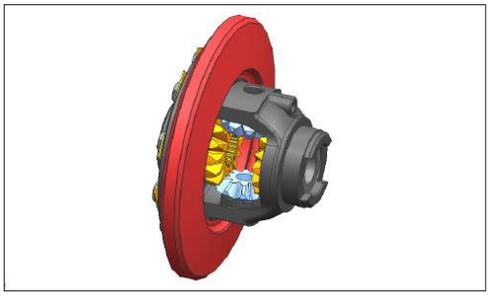
a.Remove the differential cage ball bearing 6011.



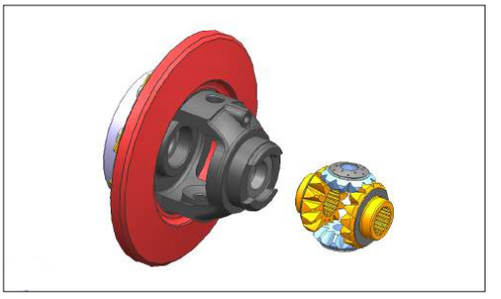
b.Remove the differential cage ball bearing 6211.

c.Remove the spring cotter sleeve.

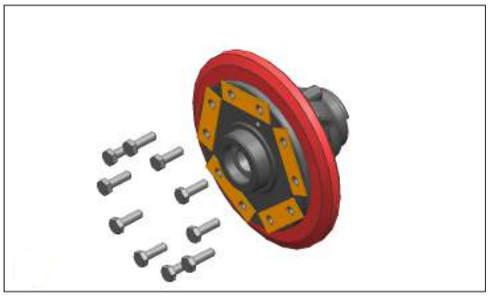
d.Remove the pinion shaft.



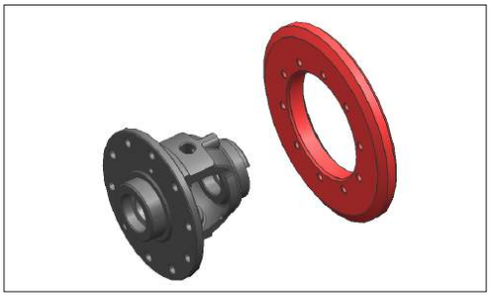
e. Remove the differential pinion gear.



f.Remove the all differential side gear, thrust washer and liner.

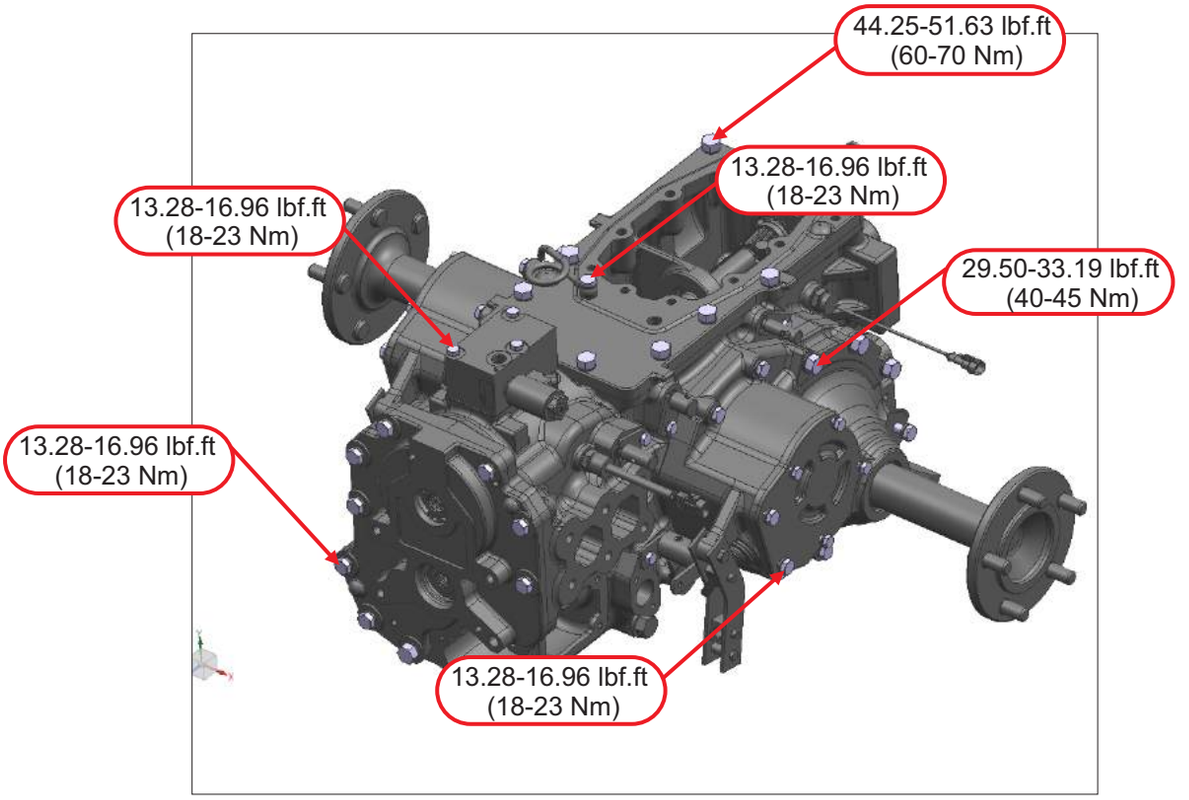


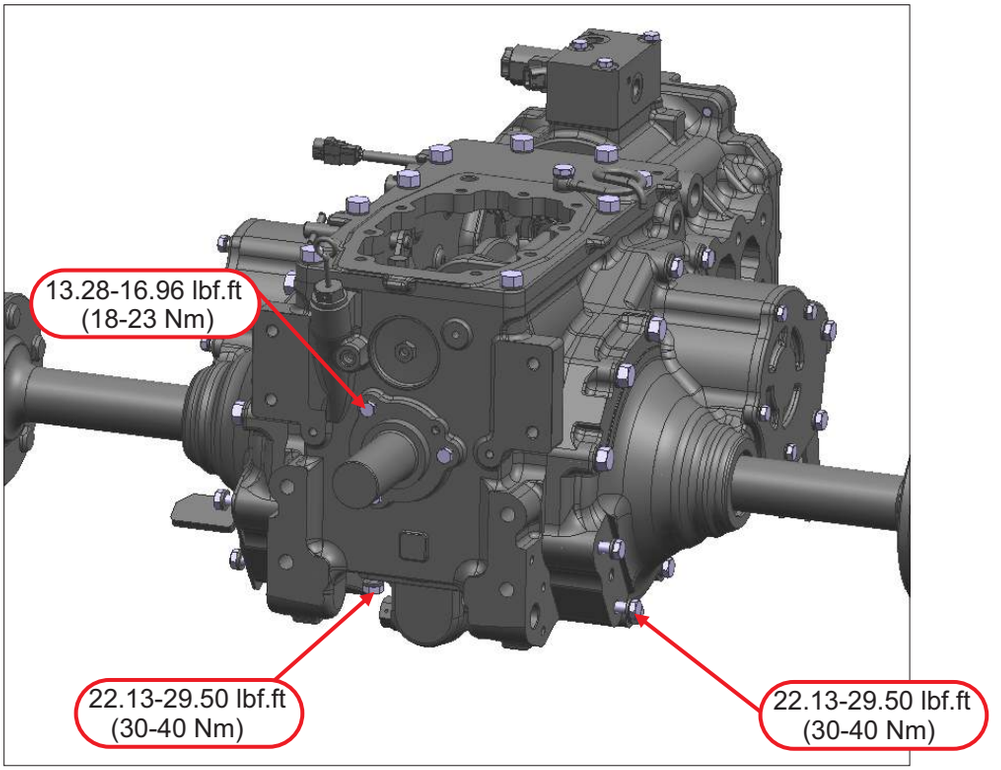
g. Remove the bolt and locking washer.



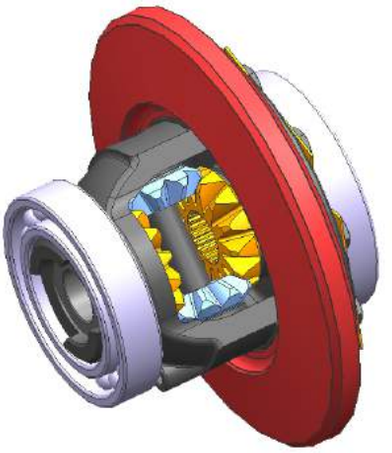
h.Remove the crown wheel.

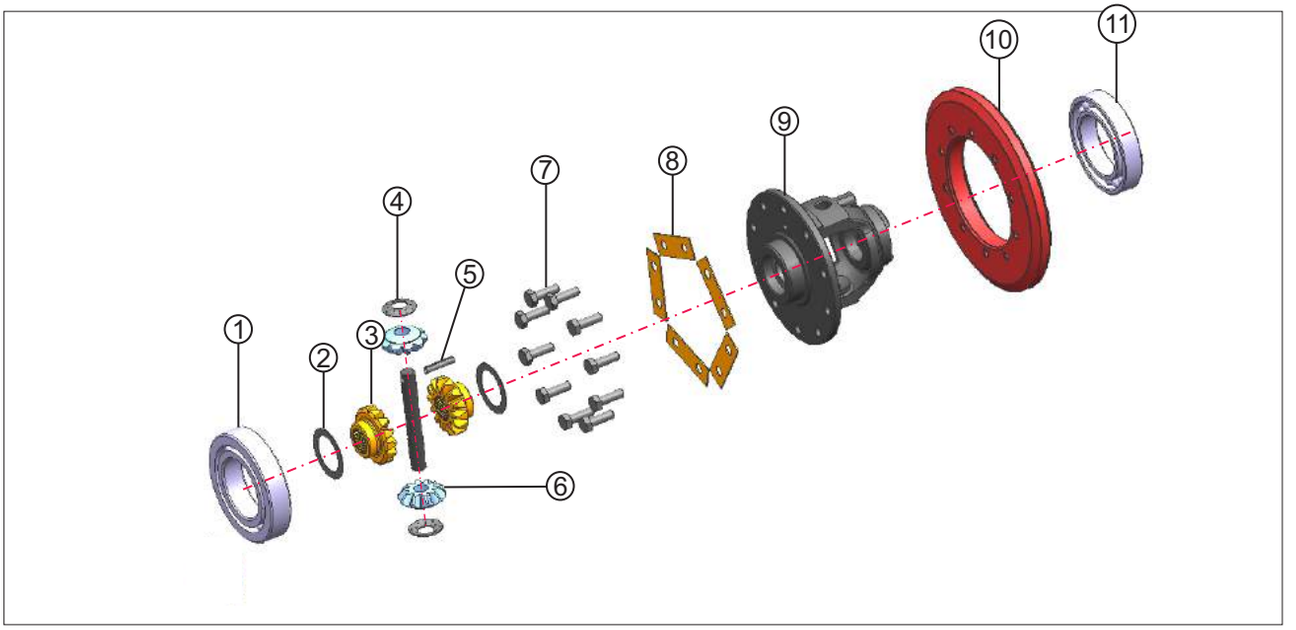
N. Torque Chart-Differential Housing





O. Differential Sub Cage Assembly

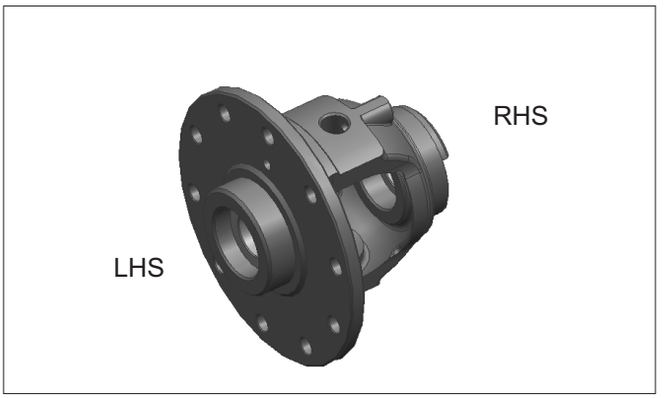




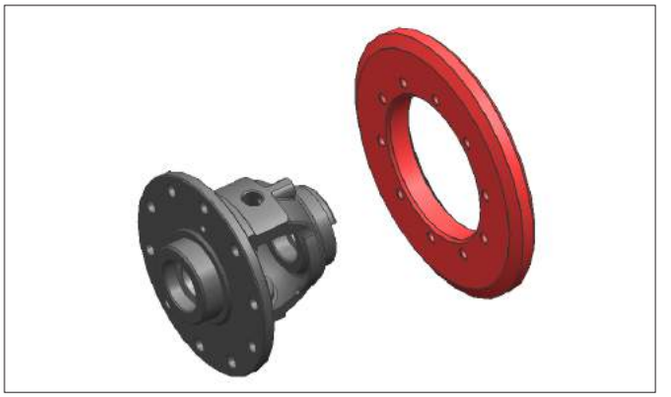
1	Ball Bearing 6011
2	Diff Side Gear Liner
3	Diff. Side Gear 14T
4	Thrust Washer
5	Spring Cotter Sleeve
6	Diff Pinion Gear 10T

7	Bolt
8	Locking Washer
9	Diff Cage Assembly
10	Crown Wheel
11	Ball Bearing 6211

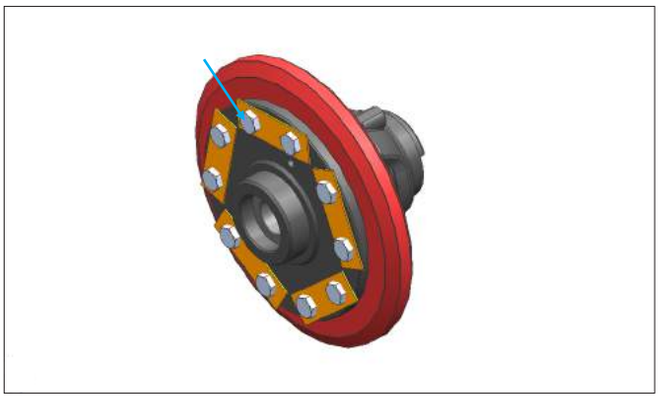
O. Differential Sub Cage Assembly



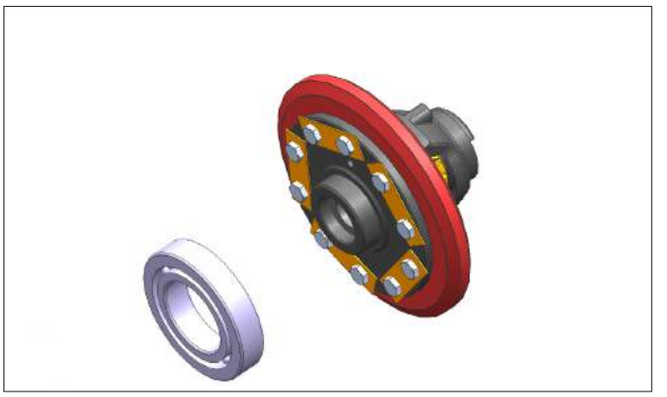
a.Take the differential cage.



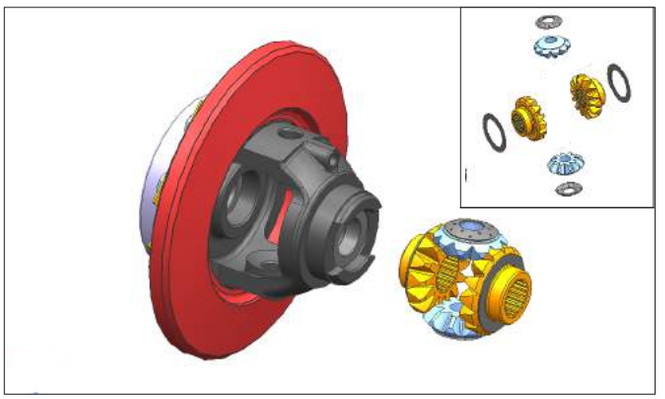
b.Assemble the crown wheel in RHS of differential cage. Plain face of the crown wheel towards cage side.



c.Tight the bolts of diff. cage and lock the locking strip. Torque= 13.28-16.96 lbf.ft (18-23 Nm). Loctite 243



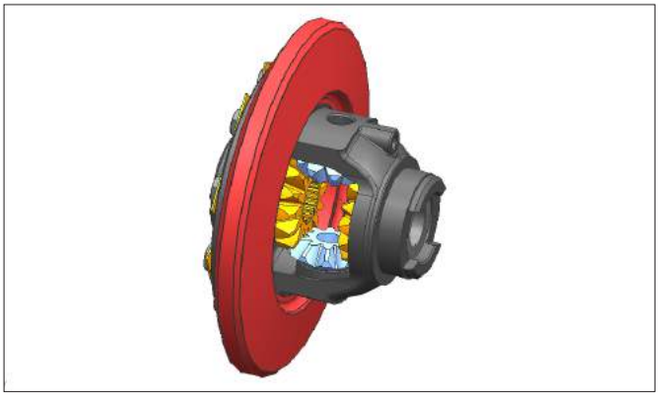
d. Press the LHS ball bearing 6211 on the differential cage by using mandrel.



e.Assembly differential side gear.

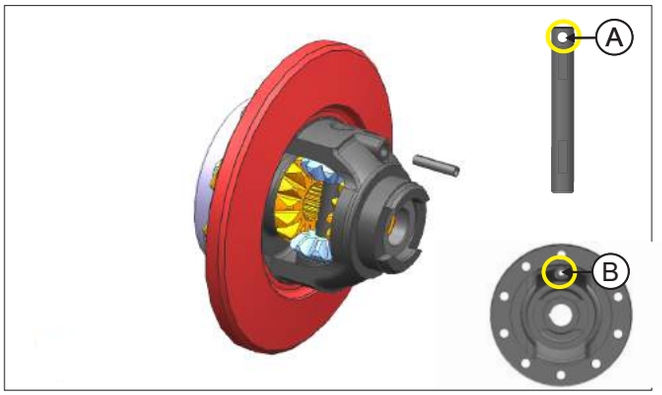
f. Assemble the inner and outer gear with liner.

O. Differential Sub Cage Assembly

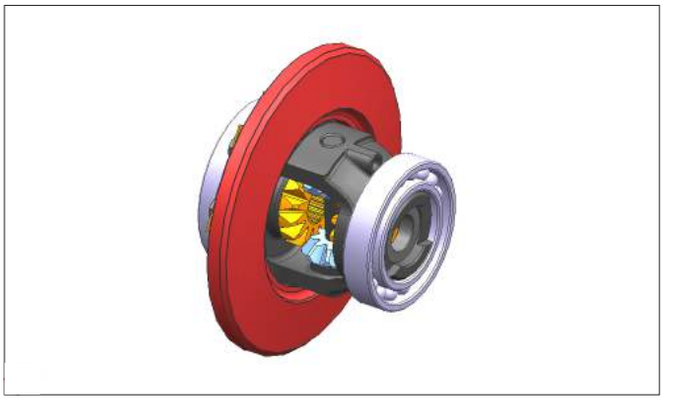


g.Assemble the second differential pinion gear with thrust washer.

h.Insert the pinion shaft.

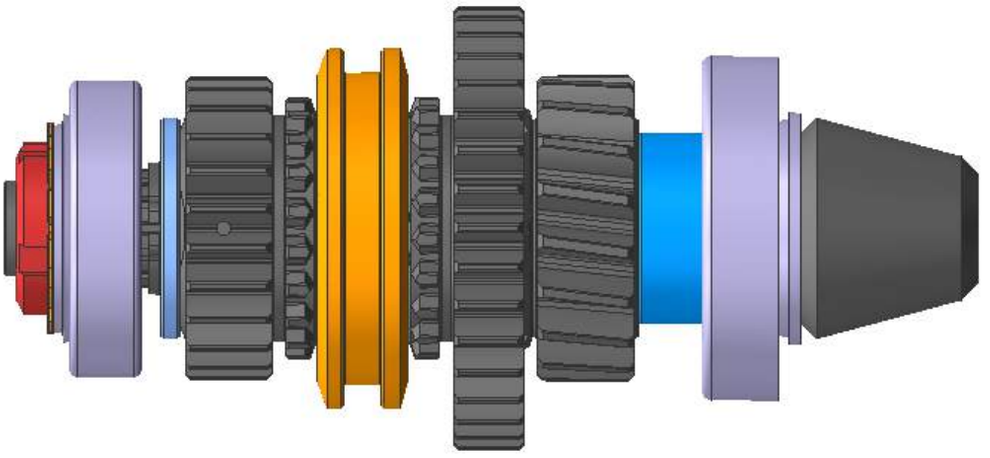


i.Align the hole (A) of shaft with hole (B) end. Press the sleeve by using hammer.

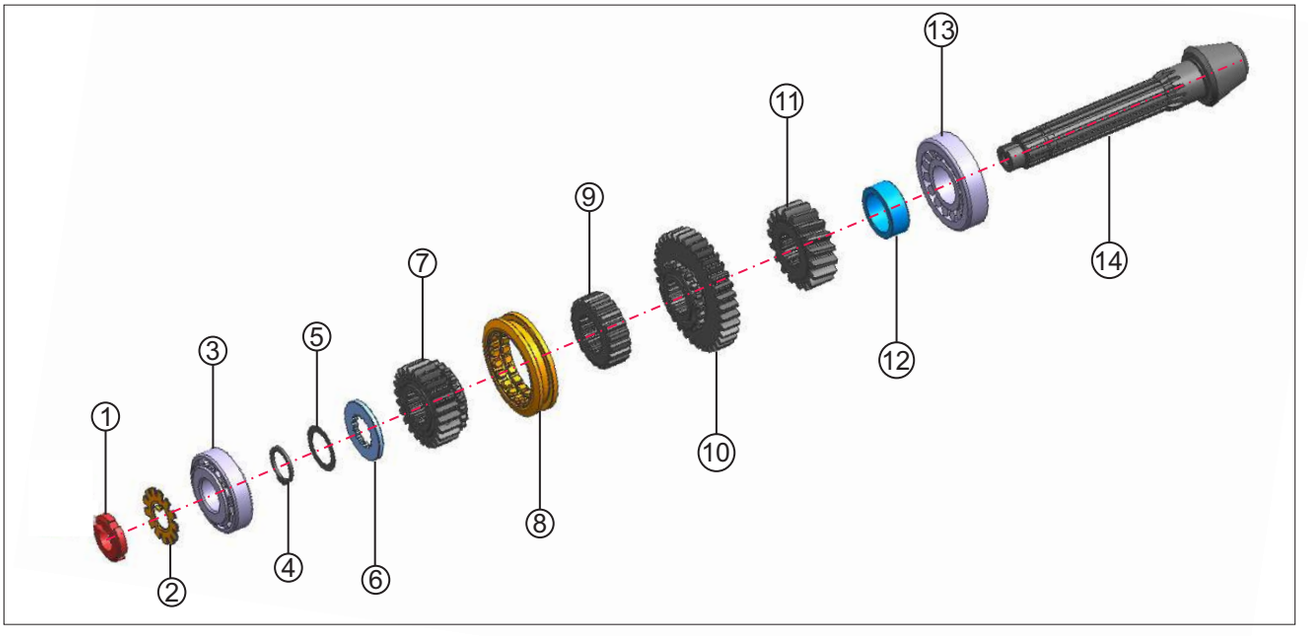


j.Assemble ball bearing 6011 on the RHS differential cage by using mandrel.

P. Assembly of Tail Pinion Shaft

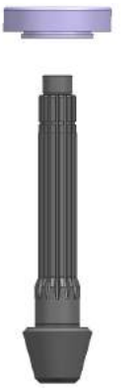


Exploded View

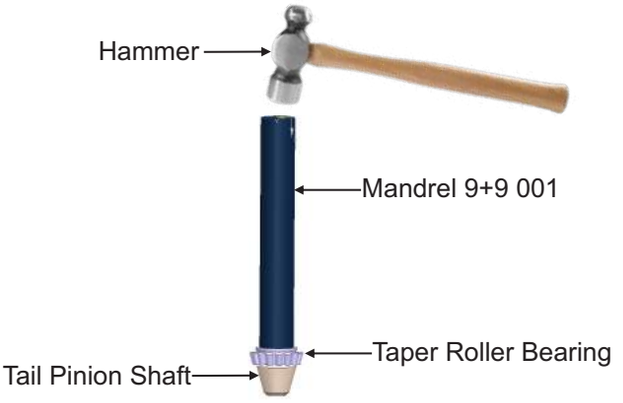


1	Withdrawal Nut	8	Shifter Sleeve
2	Locking Washer	9	Hub
3	Taper Roller Bearing	10	Dog Gear Low Z-35
4	External Circlip	11	Driver Gear 4WD
5	Shim	12	Spacer
6	Thrust Washer	13	Taper Roller Bearing
7	Dog Gear High Z-24	14	Tail Pinion Shaft

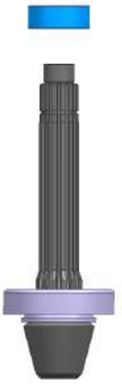
P. Assembly of Tail Pinion Shaft



1.Take tail pinion shaft and taper roller bearing.



2.Install the taper roller bearing by using mandrel 9+9 001.



3.Insert the spacer.

4.Insert the driver gear 4WD..

5.Insert the dog gear low.

6.Insert the hub.

P. Assembly of Tail Pinion Shaft

7.Insert the shifter sleeve.

8.Insert the dog gear high.

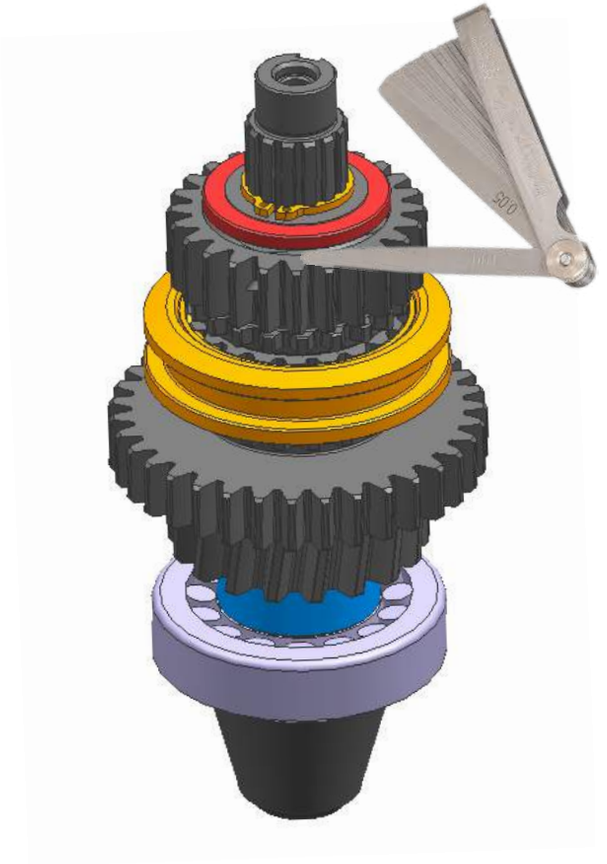
9.Insert the thrust washer.

10.Insert the circlip.

Q. Procedure of Shim Selection for Tail Pinion Shaft

Step 1: Assemble the circlip and lock the tail pinion shaft.

Step 3: Remove the circlip. Insert the shims as per required. Reassemble the circlip at its position.



Step 2: Measure the clearance between spacer and dog gear low.

Shim selection process :-

Ex.

Clearance between spacer and dog gear low =0.25 mm (A)

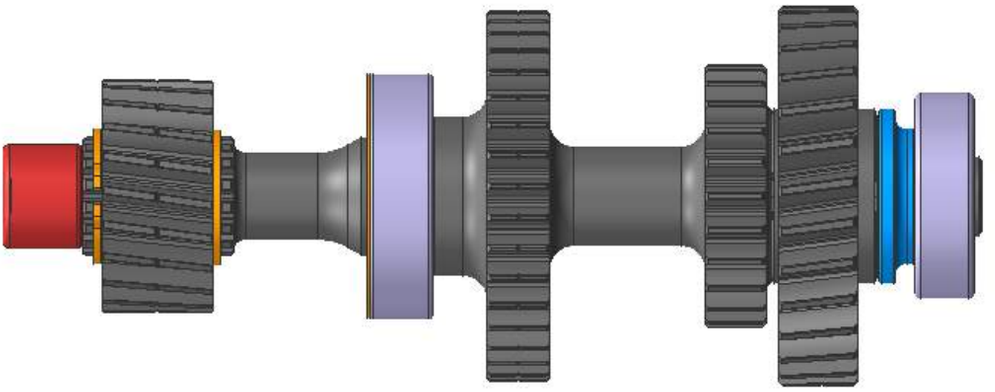
Specified limit= 0.10-0.15 mm (B)

Required shim thickness= A - B

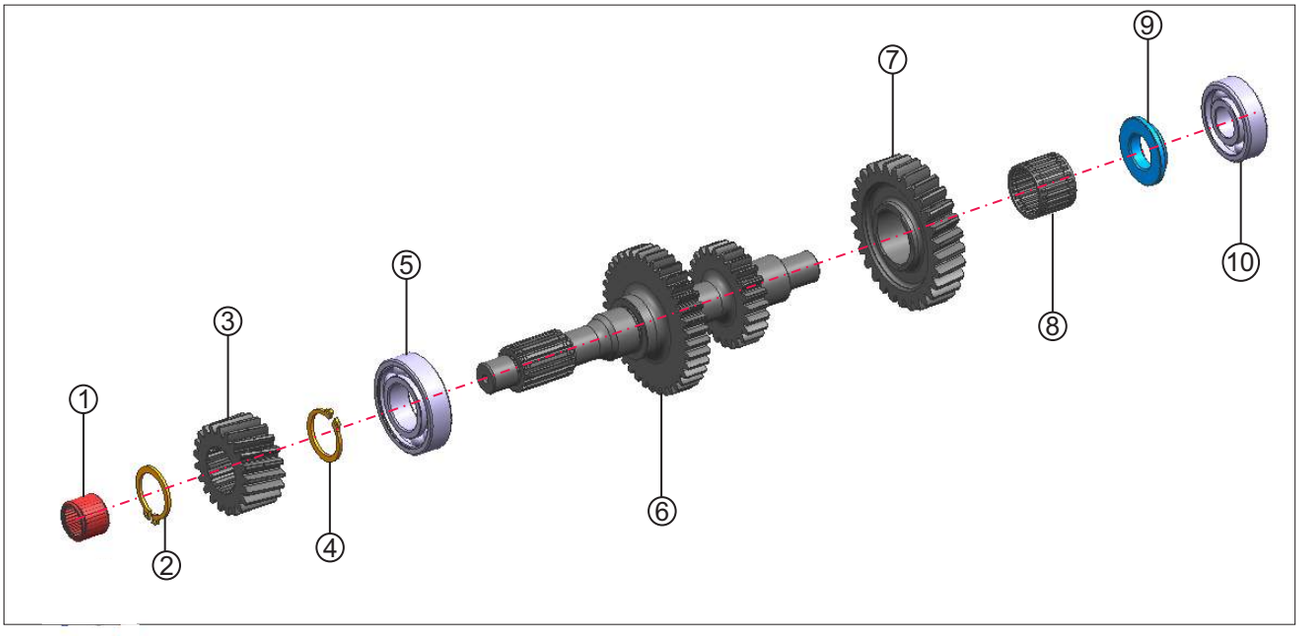
= 0.25 - 0.10

= 0.15 mm

R. Range Lay Shaft Assembly



Exploded View



1	Needle Bush
2	Circlip
3	Driven Gear Z-21
4	Circlip
5	Ball Bearing 6206
6	Range Lay Shaft
7	Idler Gear 4WD
8	Needle Roller Bearing
9	Spacer
10	Ball Bearing 6304

R. Assembly of Range Lay Shaft

a. Insert the needle roller bearing.

b. Insert the idle gear 4WD.

c. Insert the spacer.

d. Insert the ball bearing 6304.

e. Insert the spacer.

f. Insert the circlip.

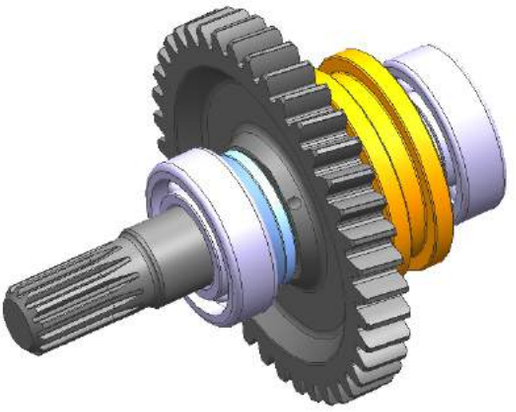
R. Assembly of Range Lay Shaft

g. Insert the driven gear.

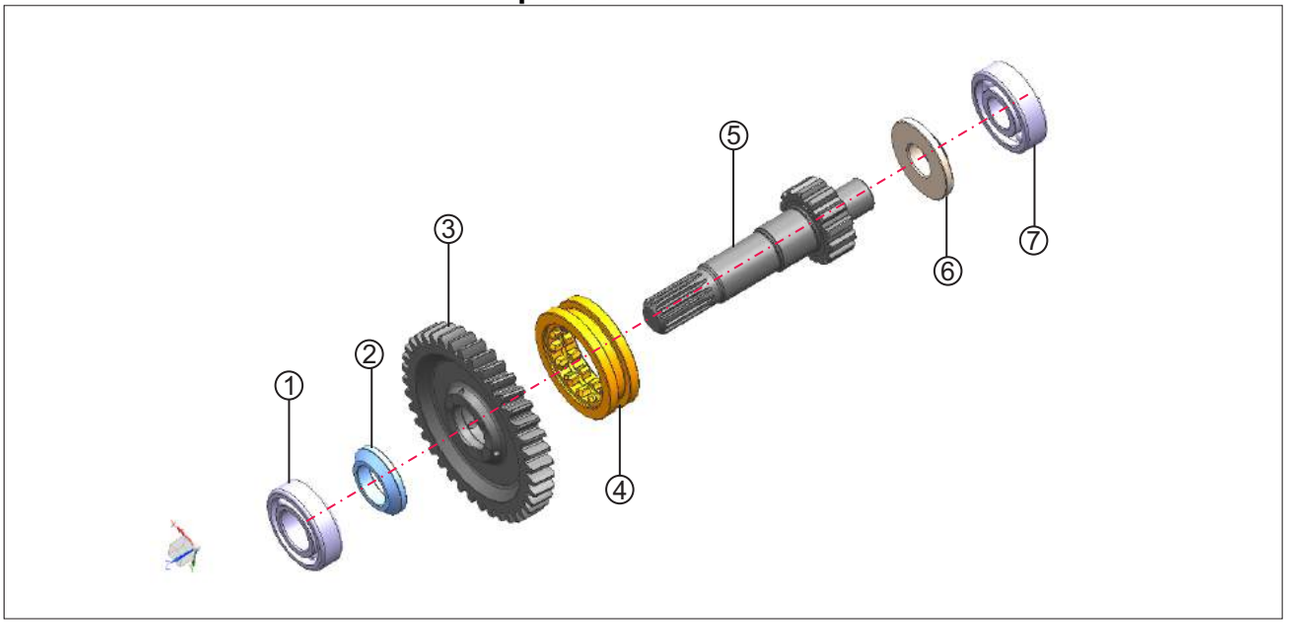
h. Insert the circlip.

I. Insert the needle bush.

S. 4WD Shaft Sub Assembly :-

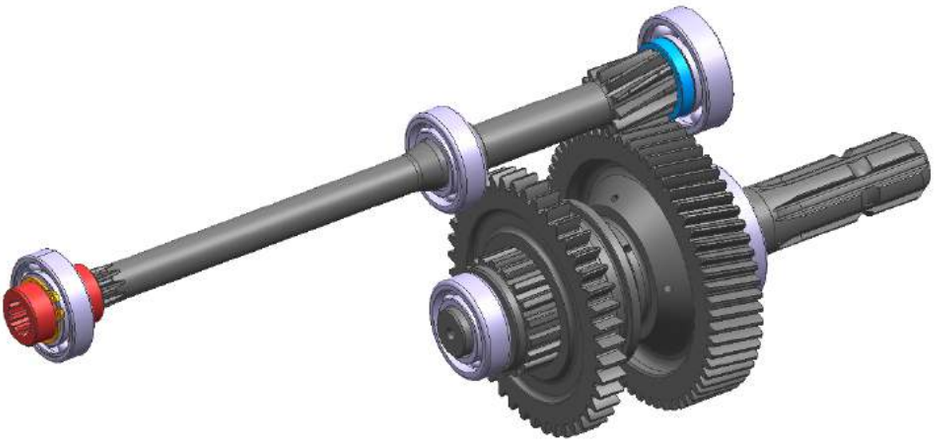


Exploded View

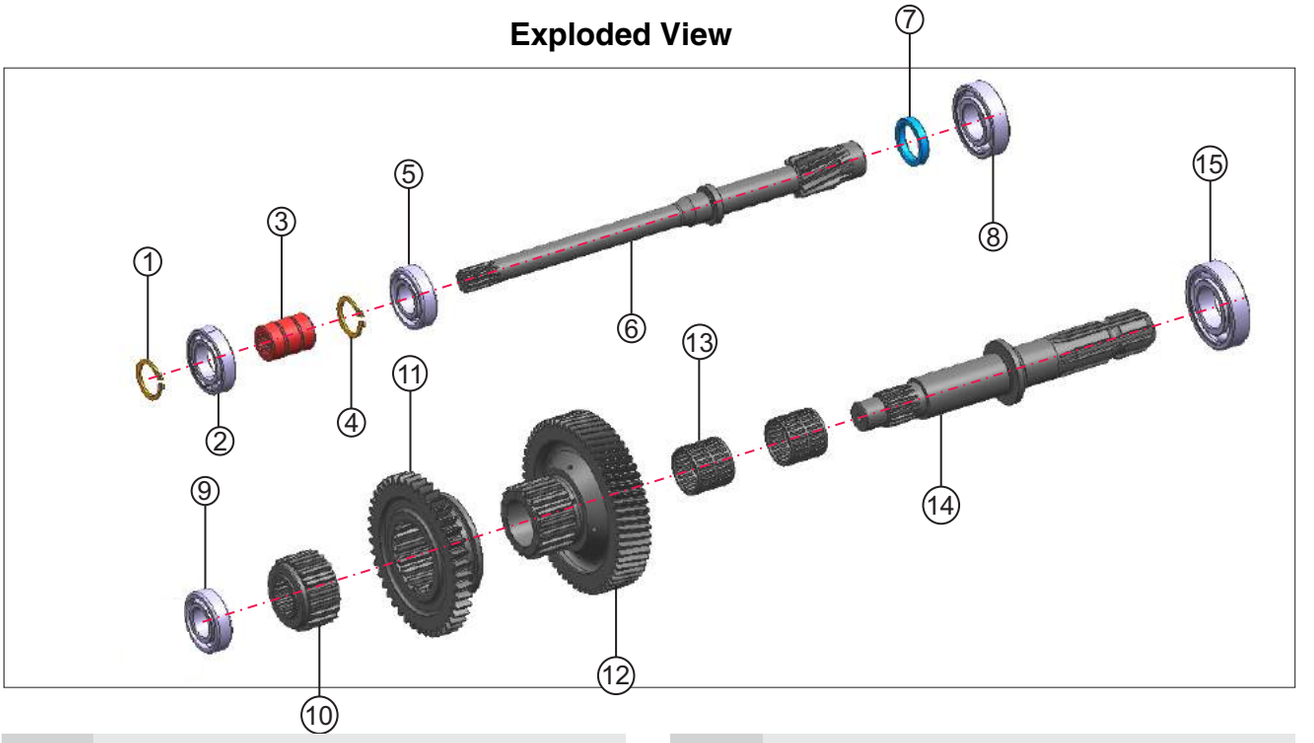


1	Ball Bearing 6205
2	Spacer
3	Driven Gear 4WD
4	Shifter Sleeve
5	4WD Output Shaft
6	Spacer
7	Ball Bearing 6304

T. PTO Sub Assembly



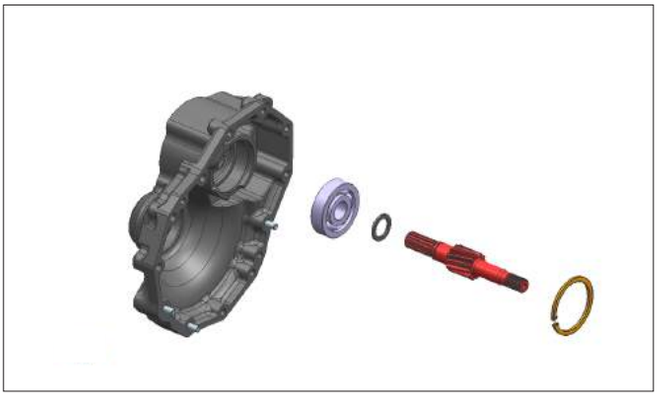
Exploded View



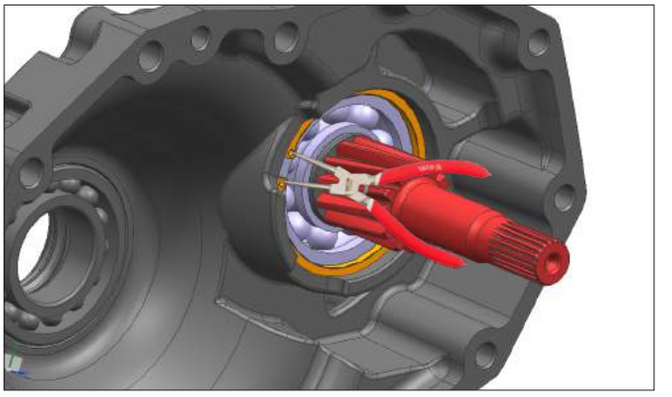
1	Circlip
2	Ball Bearing
3	Connecting Sleeve PTO
4	Circlip
5	Ball Bearing 6205
6	PTO Intermediate Shaft
7	Spacer

8	Ball Bearing 6206
9	Ball Bearing 6205
10	Hub PTO
11	Sliding Gear PTO Z-43
12	Fixed Gear Z-60
13	Needle Roller Bearing
14	PTO Output Shaft
15	Ball Bearing 6207

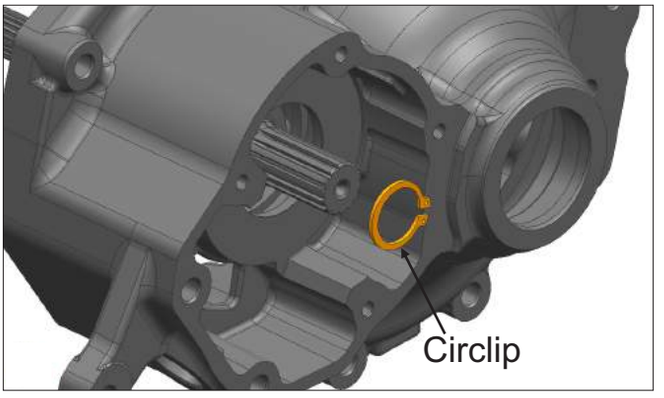
U. Assembly of Trumpet Housing



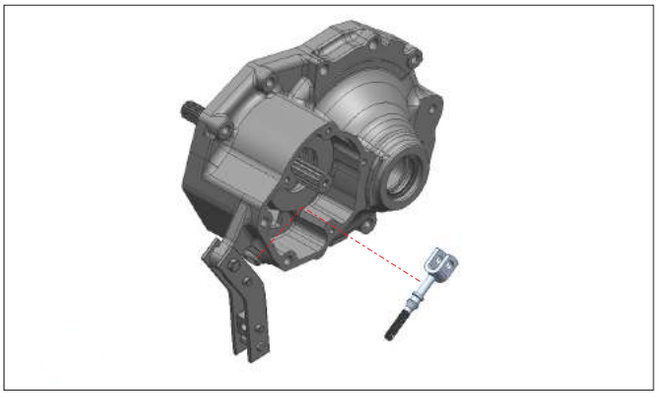
1. Assemble ball bearing 6406 in trumpet housing by using mandrel 18ME248 and insert spacer, bull pinion shaft.



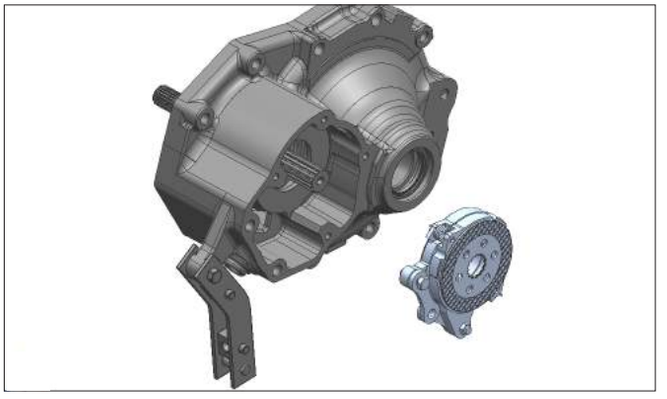
2. Lock the external circlip.



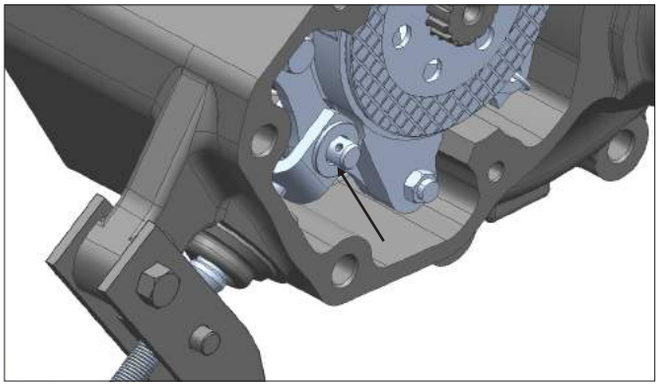
3. Lock the internal circlip.



4. Assemble the brake actuating shaft.

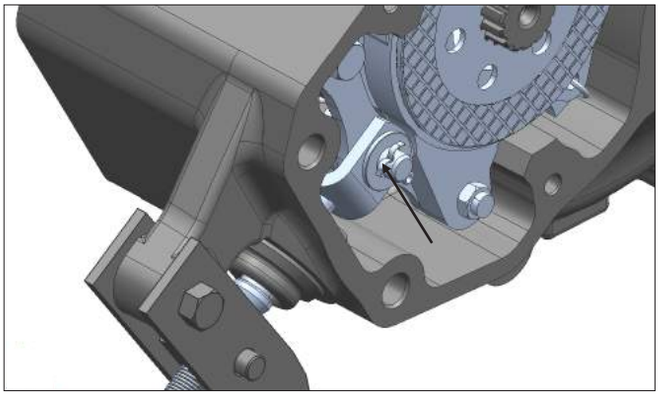


5. Insert the brake assembly.

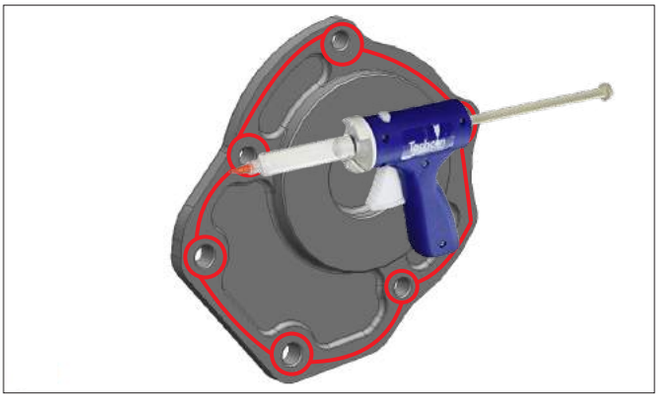


6. Insert the bolt in brake assemble and engage with brake actuating shaft.

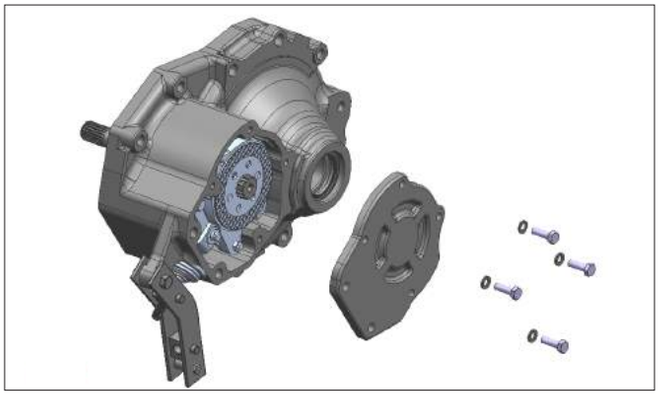
U. Assembly of Trumpet Housing



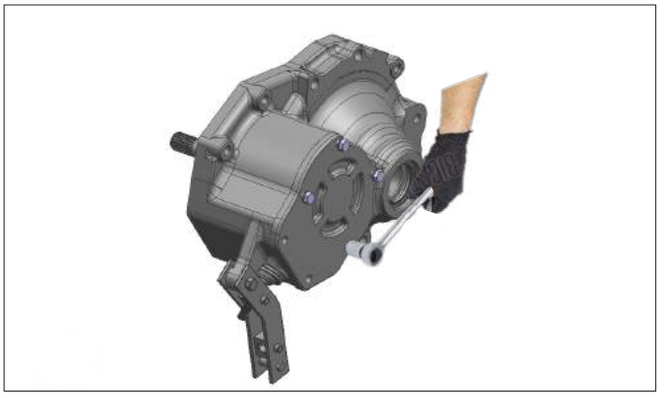
7. Insert the cotter pin.



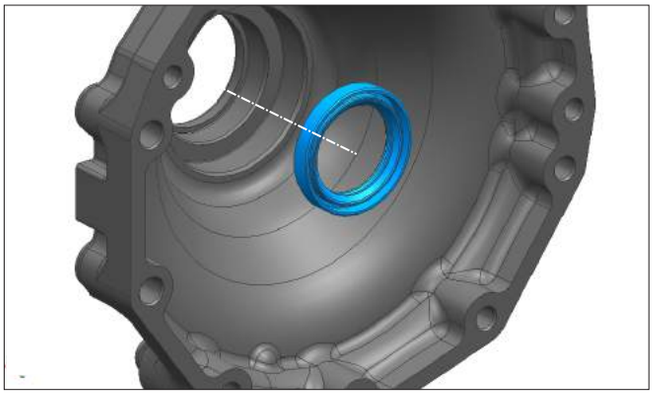
8. Apply sealant 5811 on the brake cover.



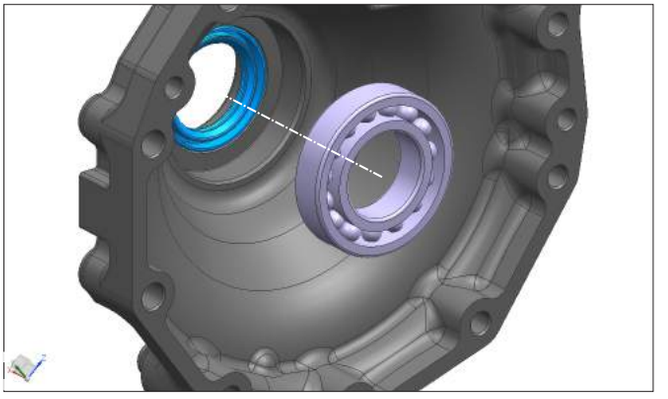
9. Apply loctite on the bolts and tight the bolts of brake cover.(loctite 243)
Torque= 13.28-18.44 lbf.ft (18-25 Nm).



10. Assemble the brake cover.

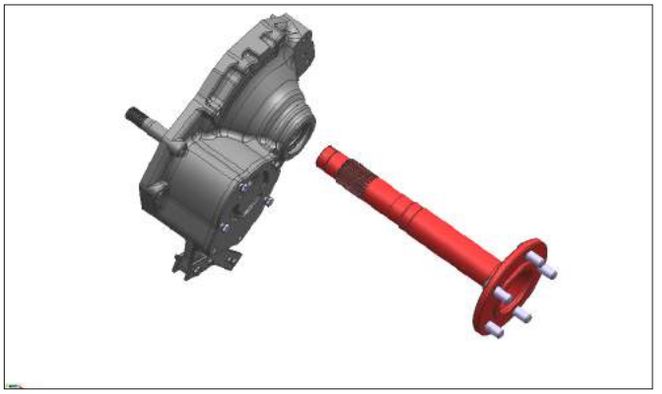


11. Assemble the oil seal in brake housing by using mandrel 18ME252 .

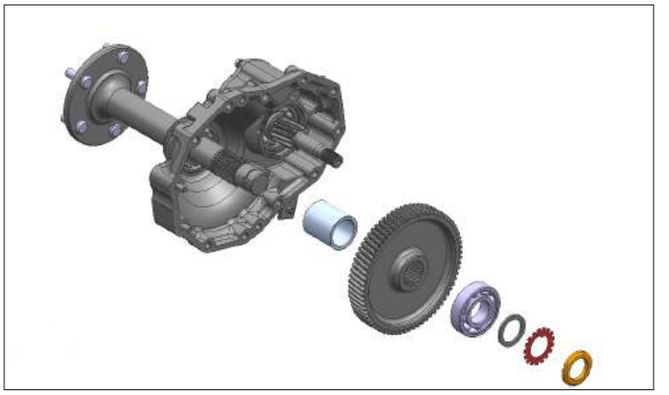


12. Assemble the ball bearing 6209 in brake housing.

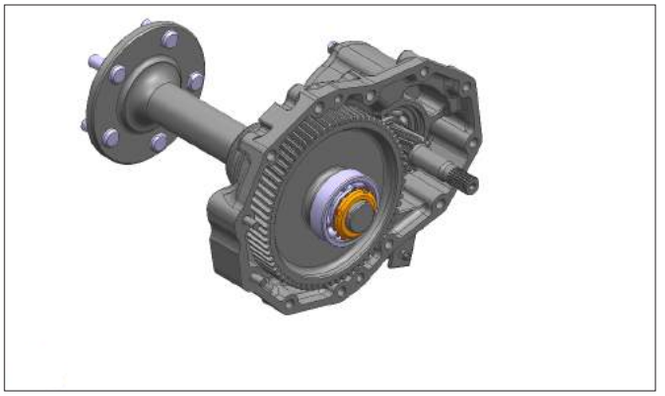
U. Assembly of Trumpet Housing



13.Assemble the rear axle.

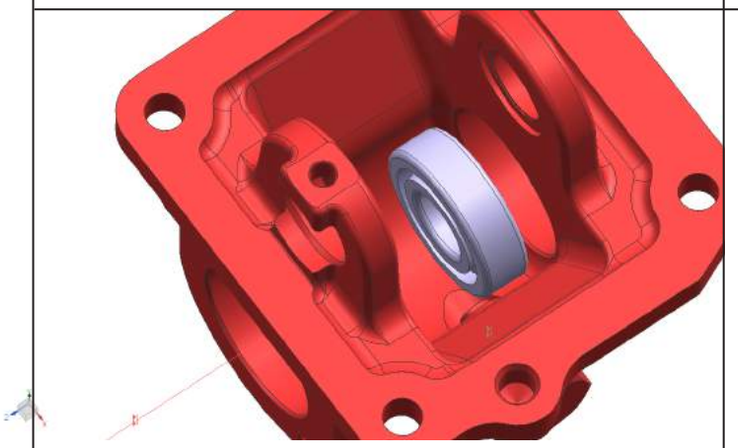
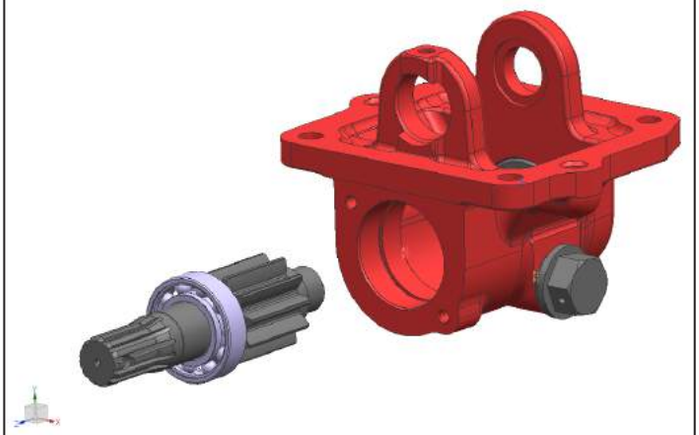
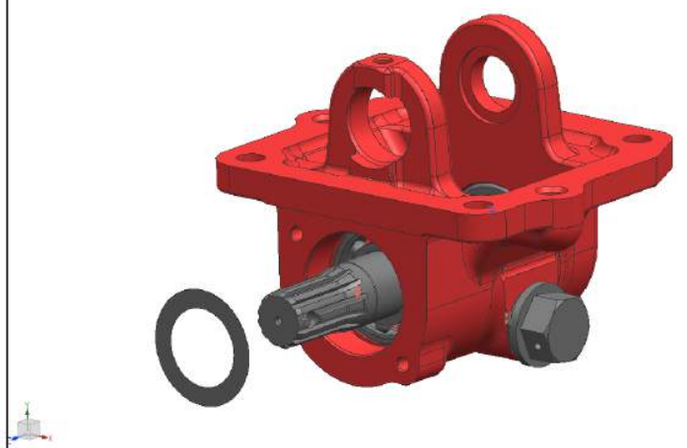


14.Insert the spacer, bull gear and assemble ball bearing 6308 by using mandrel HST 07 . Insert spacer, lock washer.

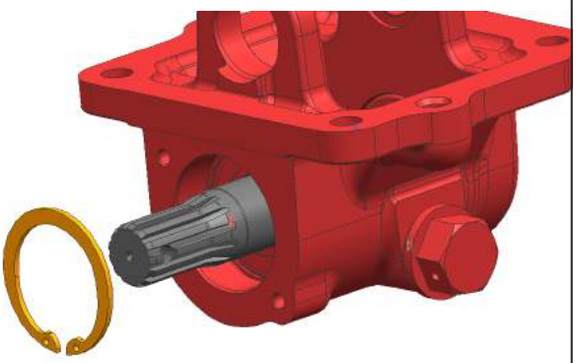
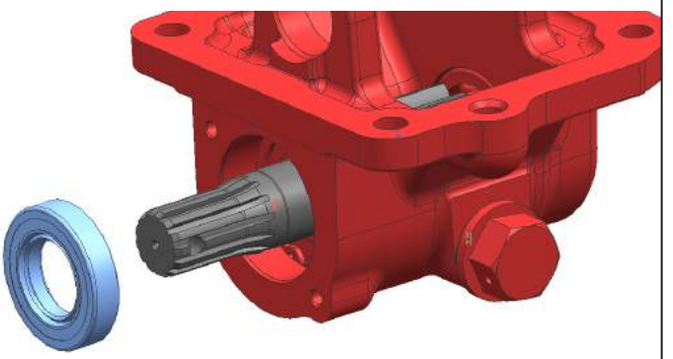
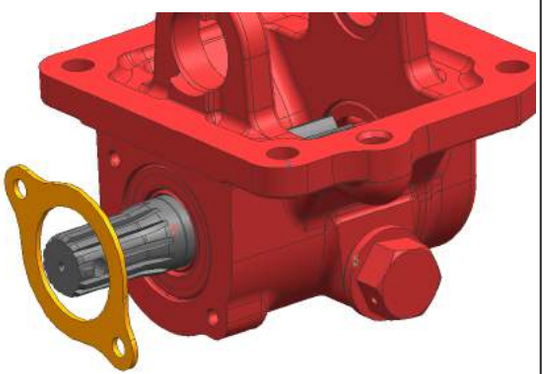


15.Tight the locking nut by using tool 18ME235.
Torque= 44.25-51.63 lbf.ft (60-70 NM)

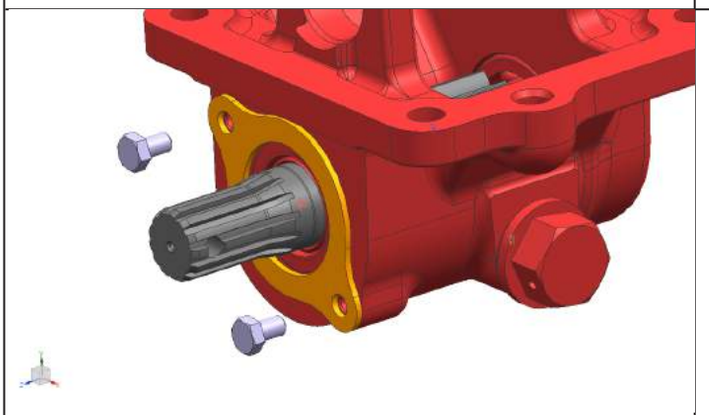
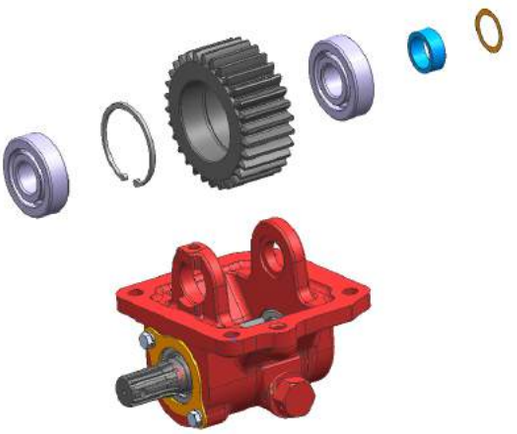
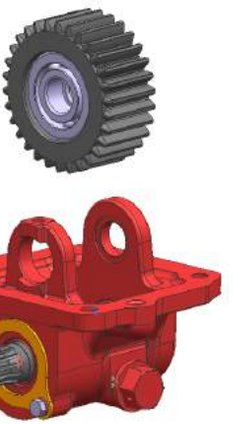
V. Assembly of Drop Box Mid PTO:

Figure	Instruction
 Fig- 1	**Step 1:** I. Remove the ball Bearing 6204.
 Fig- 2	**Step 2:** I. Assemble the mid PTO output shaft and ball bearing 6005.
 Fig- 3	**Step 3:** I. Insert the shim.

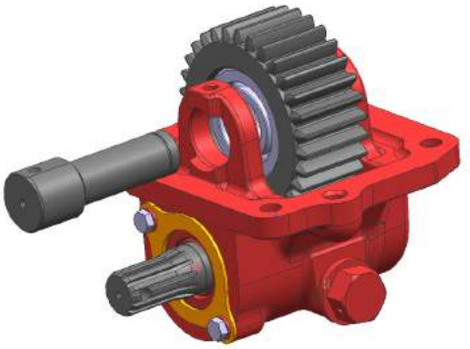
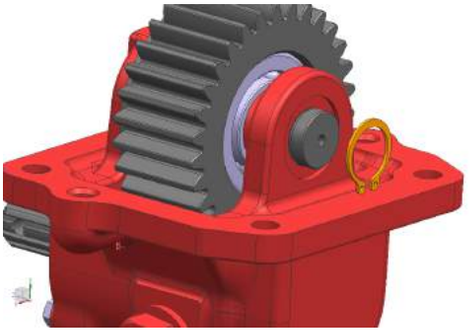
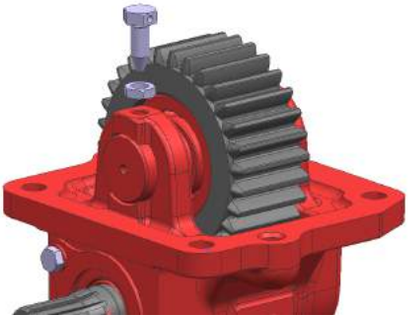
V. Assembly of Drop Box Mid PTO:

Figure	Instruction
 Fig- 4	**Step 4:** I. Assemble the internal circlip.
 Fig- 5	**Step 5:** I. Assemble the oil seal.
 Fig- 6	**Step 6:** I. Assemble the oil seal stopper.

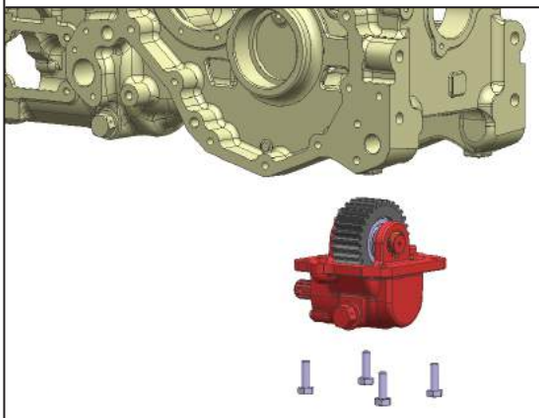
V. Assembly of Drop Box Mid PTO:

Figure	Instruction
 Fig- 7	**Step 7:** I. Assemble the bolts. Torque : 3.69-7.38 lbf.ft(5-10 Nm).
 Fig- 8	**Step 8:** I. Assemble ball bearings, idler gear mid PTO, circlip, spacer and shim.
 Fig- 9	**Step 9:** I. Assemble the idler gear mid PTO assembly.

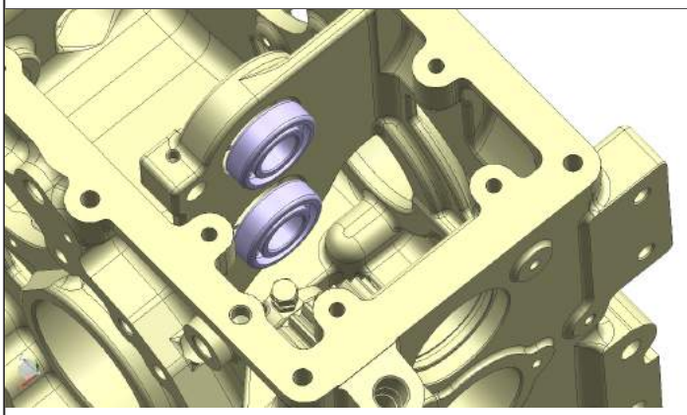
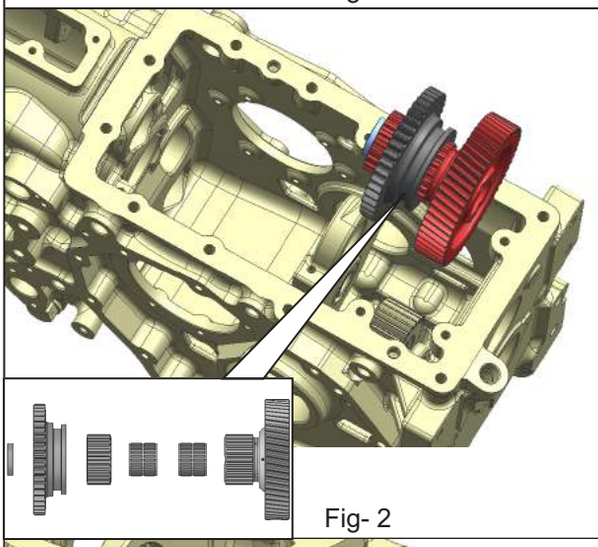
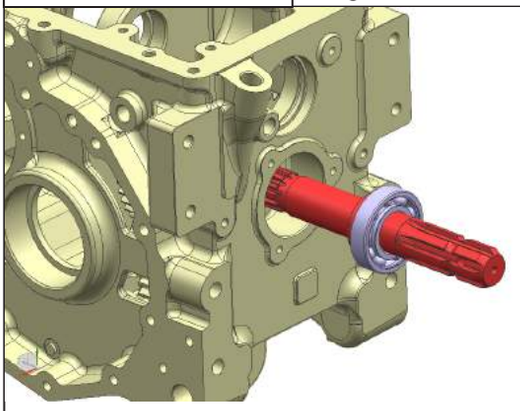
V. Assembly of Drop Box Mid PTO:

Figure	Instruction
 Fig- 10	**Step 10:** I. Assemble the idler shaft mid PTO..
 Fig- 11	**Step 11:** I. Assemble the external circlip.
 Fig- 12	**Step 12:** I. Assemble bolt and nut.

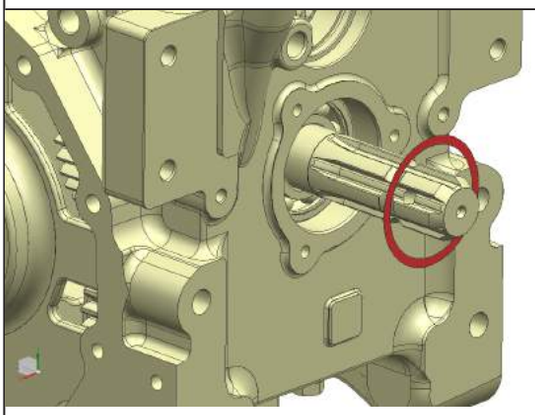
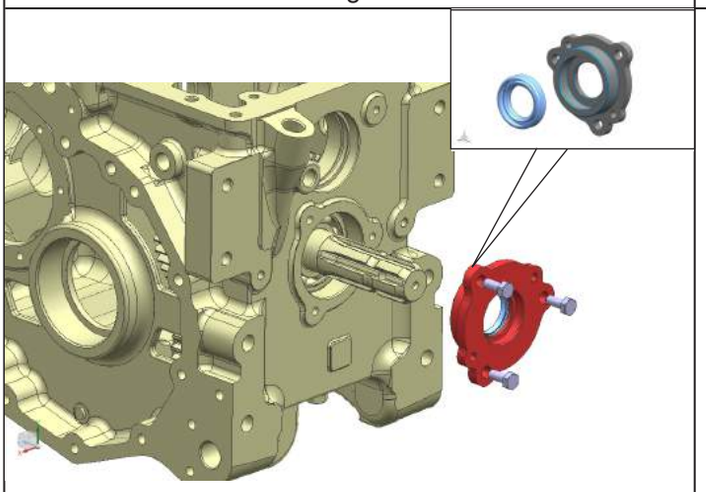
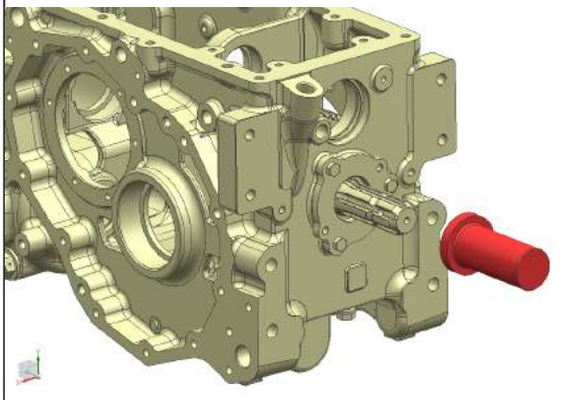
V. Assembly of Drop Box Mid PTO:

Figure	Instruction
 Fig- 13	**Step 13:** I. Assemble the bolts of drop box mid PTO assembly. Torque : 22.13-29.50 lbf.ft (30-40 Nm)

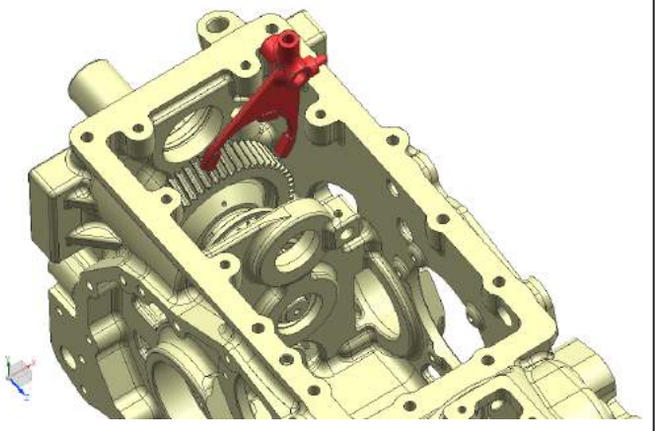
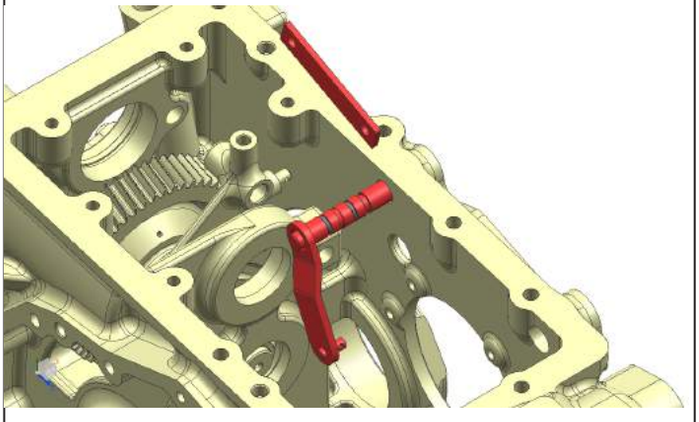
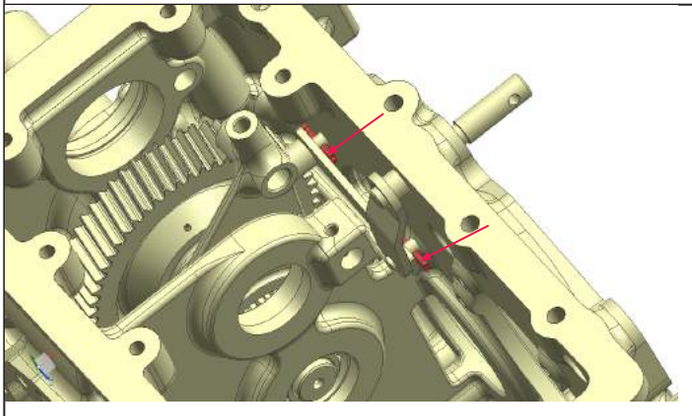
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 1	**Step 1:** I. Assemble ball bearings 6205 in differential housing.
 Fig- 2	**Step 2:** I. Insert the spacer, PTO sliding gear, hub, needle roller bearings and PTO fixed gear.
 Fig- 3	**Step 3:** I. Insert the ball bearing 6207 and PTO output shaft.

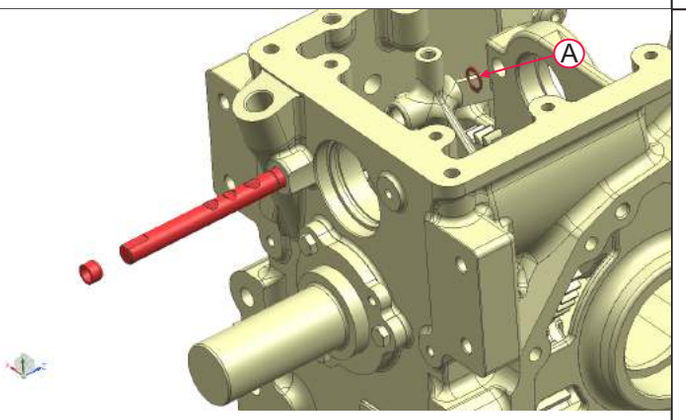
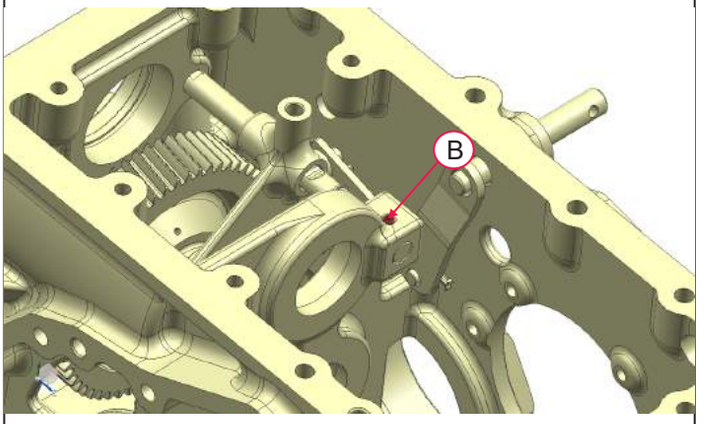
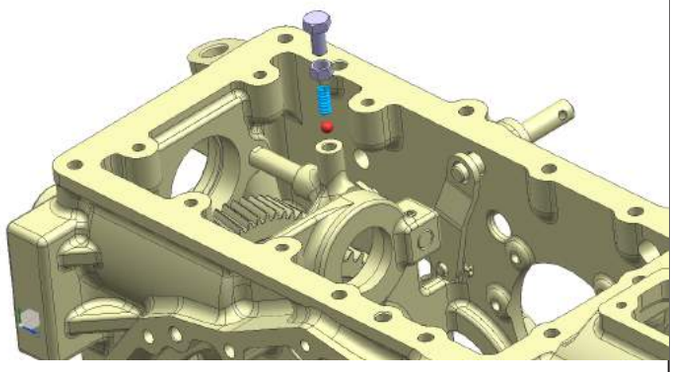
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 4	**Step 4:** I. Insert the shim.
 Fig- 5	**Step 5:** I. Assemble the oil seal and PTO output cover. Tight the bolts. Torque: 13.28-16.96 lbf.ft(18-23 Nm) Loctite 5188
 Fig- 6	**Step 6:** I. Assemble the PTO cap.

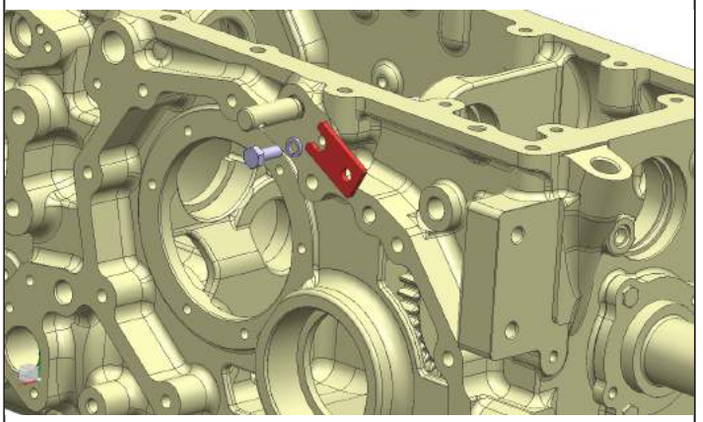
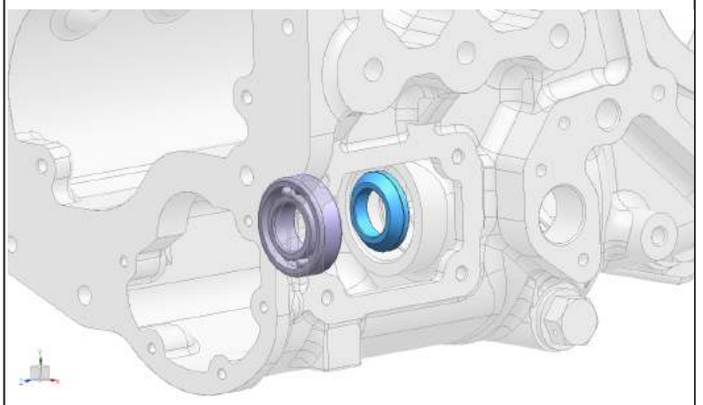
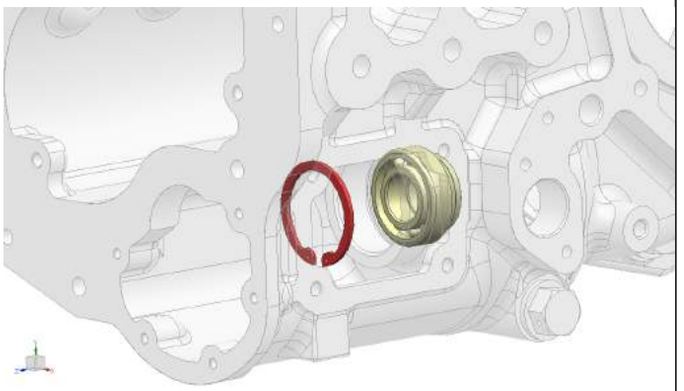
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 7	**Step 7:** I. Insert the PTO fork.
 Fig- 8	**Step 8:** I. Assemble the link PTO shifter and pivot lug.
 Fig- 9	**Step 9:** I. Assemble the cotter pin.

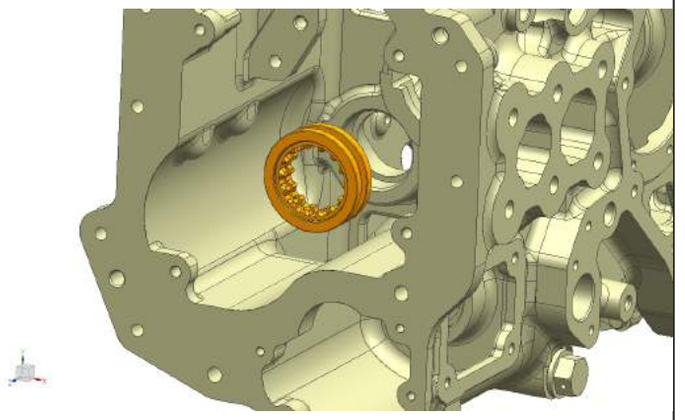
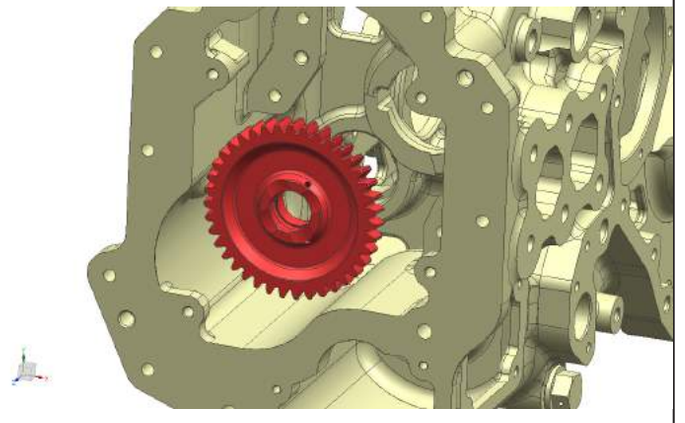
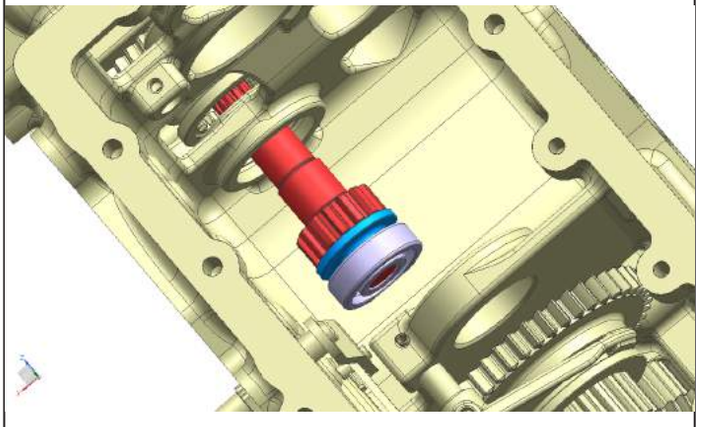
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 10	**Step 10:** I. Insert the PTO shifter rod. ii. Assemble the cap and circlip (A).
 Fig- 11	**Step 11:** i. Assemble the split pin (B).
 Fig- 12	**Step 12:** I. Insert the ball and spring. ii. Tight the bolt.

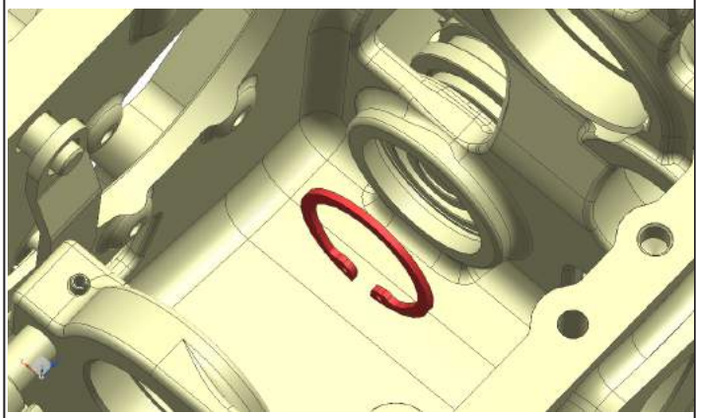
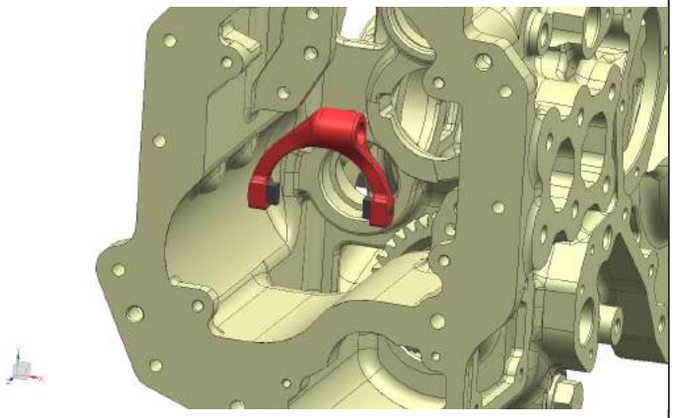
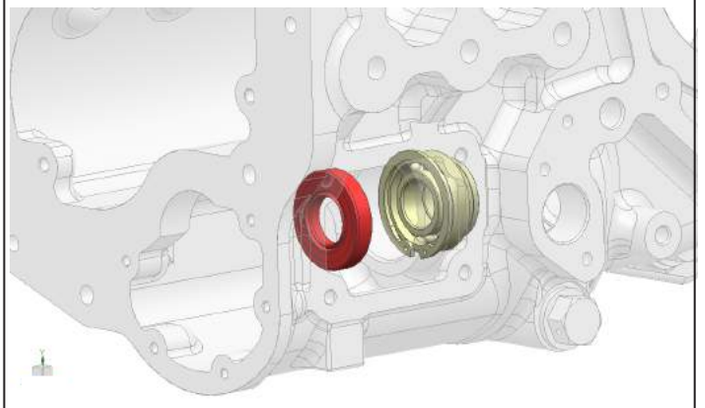
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 13	**Step 13:** I. Assemble the locking plate. ii. Tight the bolt. Torque: 13.28-16.96 lbf.ft(18-23 Nm) Loctite 5188
 Fig- 14	**Step 14:** I. Assemble the ball bearing and spacer.
 Fig- 15	**Step 15:** I. Assemble the internal circlip from differential housing.

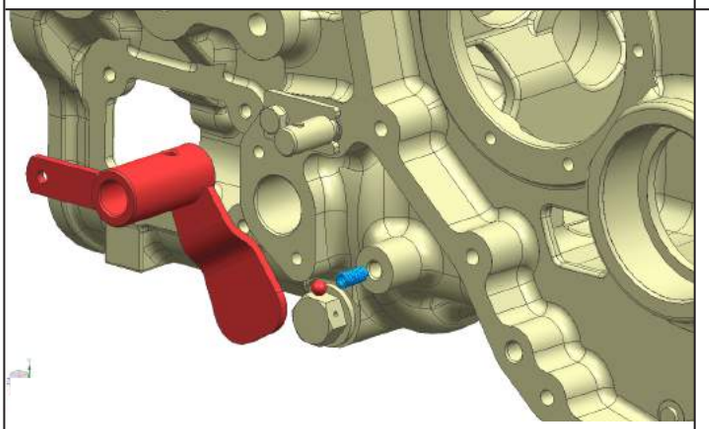
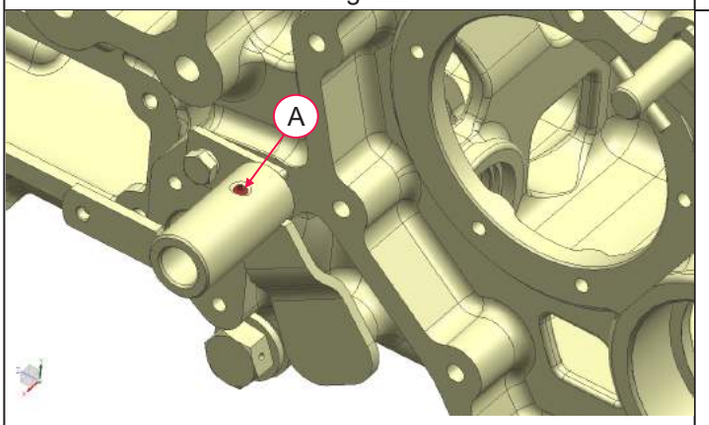
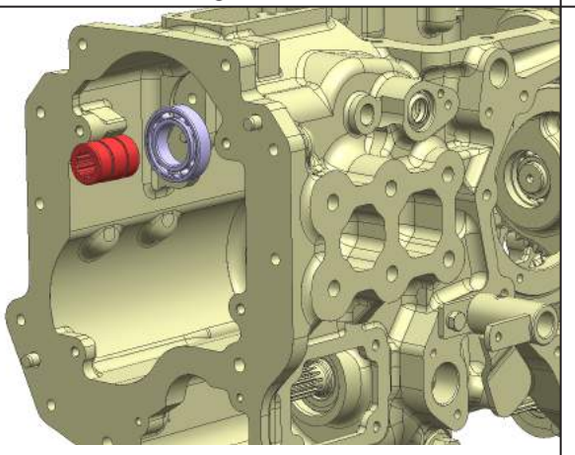
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 16	**Step 16:** I. Insert the shifter sleeve 4WD.
 Fig- 17	**Step 17:** I. Insert the driven gear 4WD.
 Fig- 18	**Step 18:** I. Assemble the ball bearing 6304, spacer and 4WD output shaft.

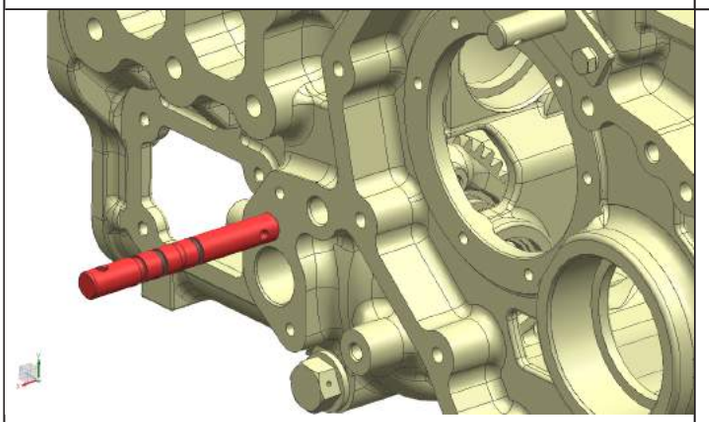
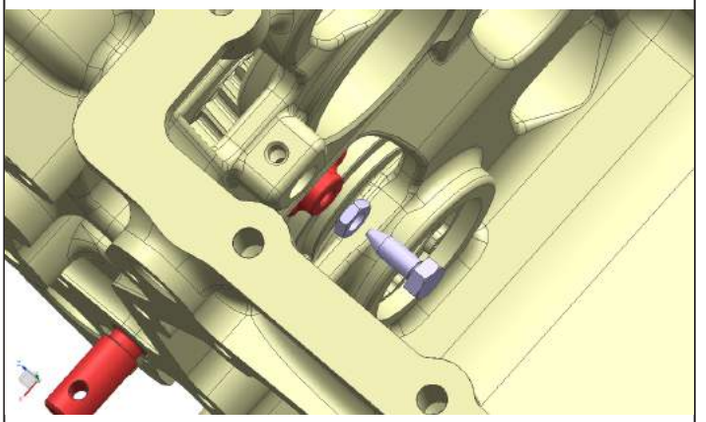
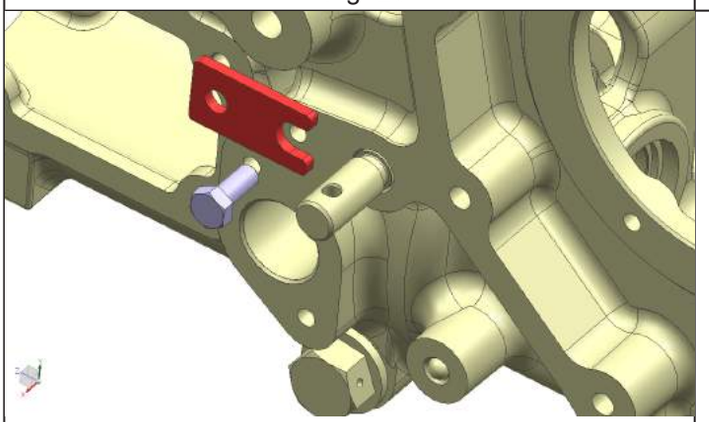
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 19	**Step 19:** I. Assemble the internal circlip.
 Fig- 20	**Step 20:** I. Assemble the fork 4WD.
 Fig- 21	**Step 21:** I. Assemble the oil seal.

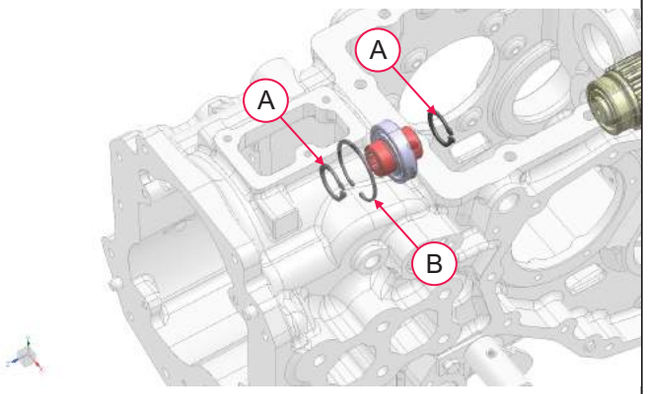
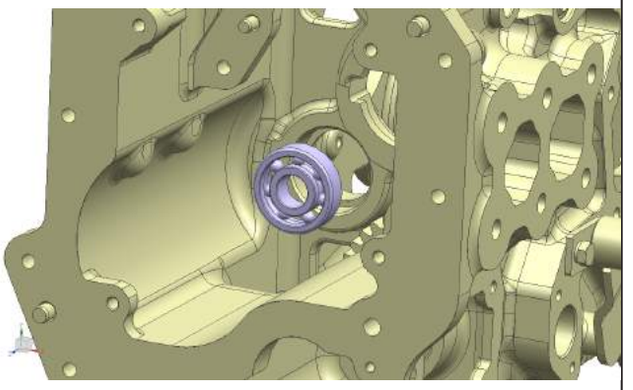
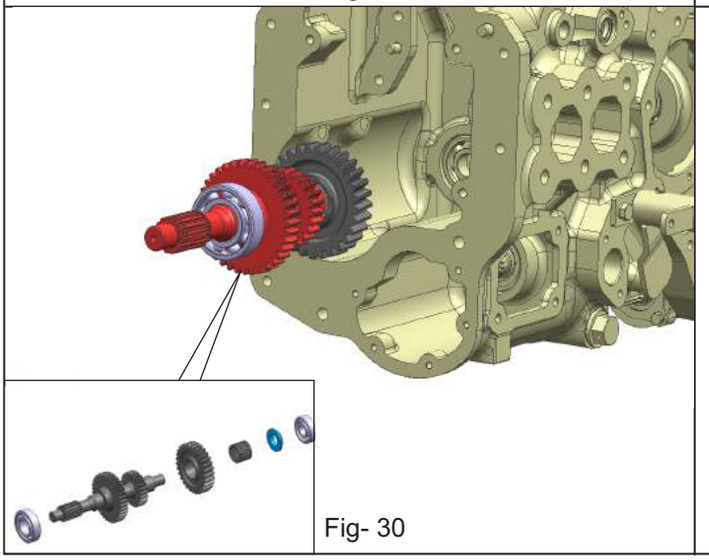
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 22	**Step 22:** I. Insert the ball and spring and assemble the pivot lug.
 Fig- 23	**Step 23:** I. Assemble the split pin (A) by using tool.
 Fig- 24	**Step 24:** I. Assemble the connecting sleeve PTO and ball bearing.

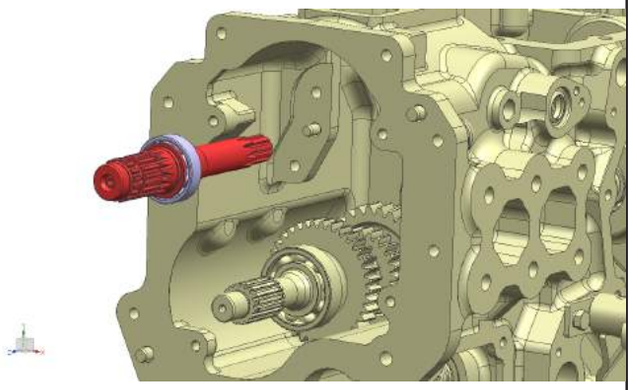
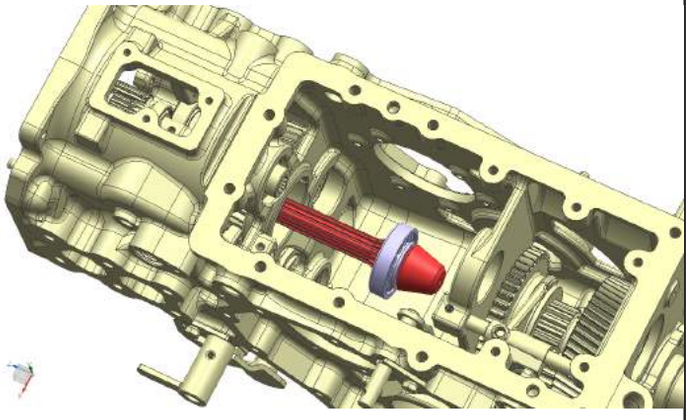
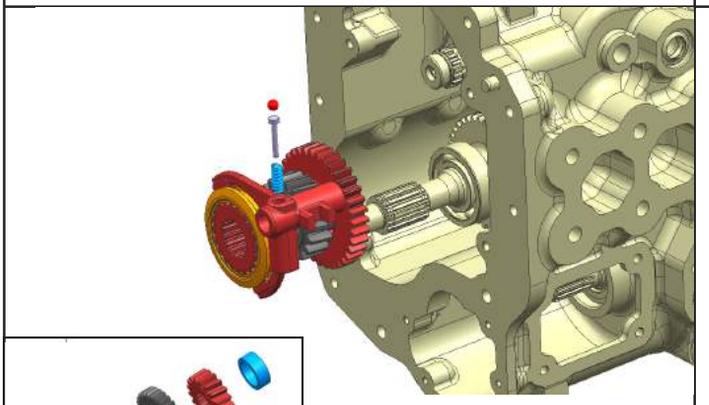
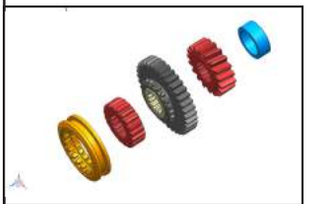
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 25	**Step 25:** I. Assemble the pivot rod.
 Fig- 26	**Step 26:** I. Tight the bolt and nut. Torque: 13.28-16.96 lbf.ft(18-23 Nm)
 Fig- 27	**Step 27:** I. Assemble the locking plate. ii. Tight the bolt. Torque: 13.28-16.96 lbf.ft(18-23 Nm) Loctite 5188

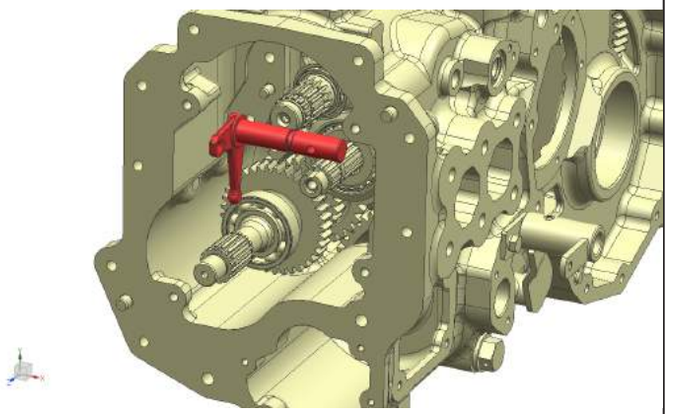
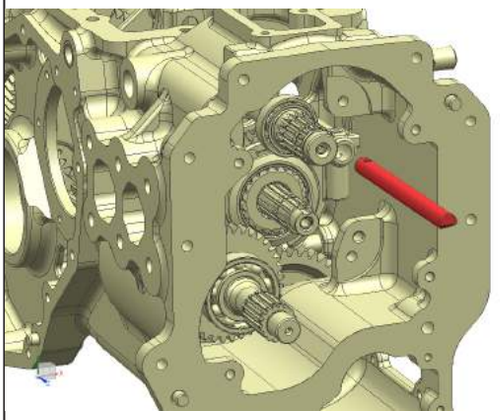
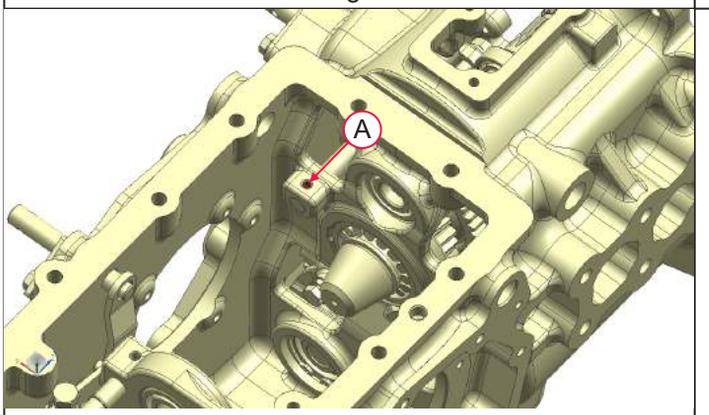
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 28	**Step 28:** I. Assemble the external circlips (A) from connecting sleeve PTO. ii. Assemble the internal circlip (B) from differential housing.
 Fig- 29	**Step 29:** I. Remove the ball bearing 6304.
 Fig- 30	**Step 30:** I. Assemble the ball bearing 6206, range lay shaft, idler gear 4WD.

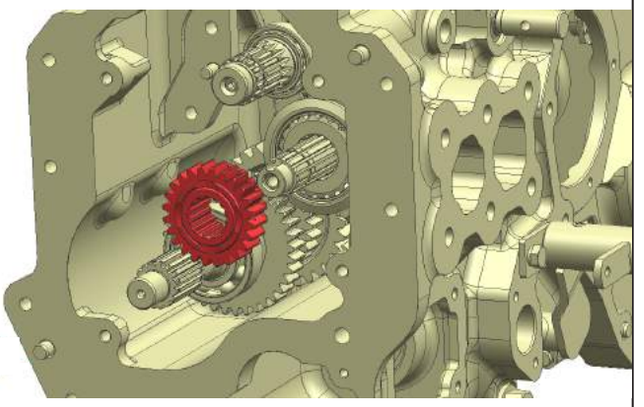
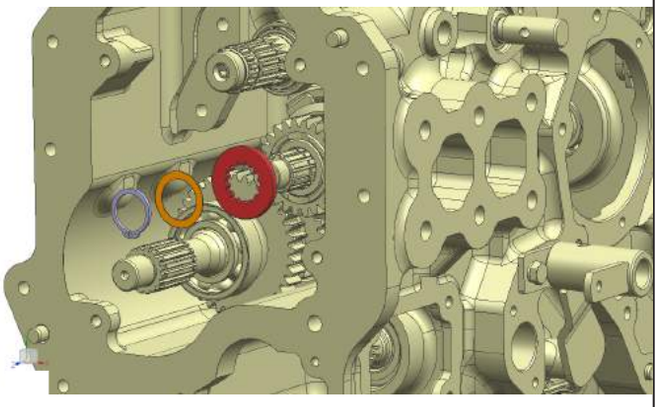
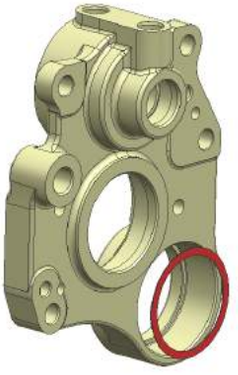
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 31	**Step 31:** I. Assemble the PTO drive shaft and ball bearing 6005.
 Fig- 32	**Step 32:** I. Assemble the tail pinion shaft and taper roller bearing.
  Fig- 33	**Step 33:** i. Insert spring, pin and ball in fork. ii. Assemble the shifter sleeve, hub, fork, dog gear low and driver gear 4WD.

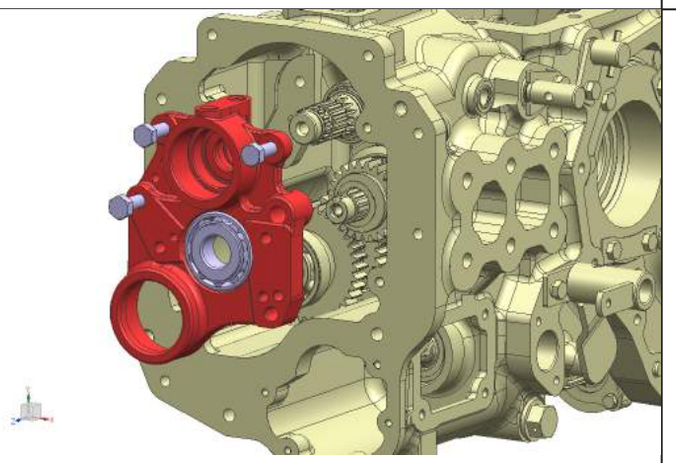
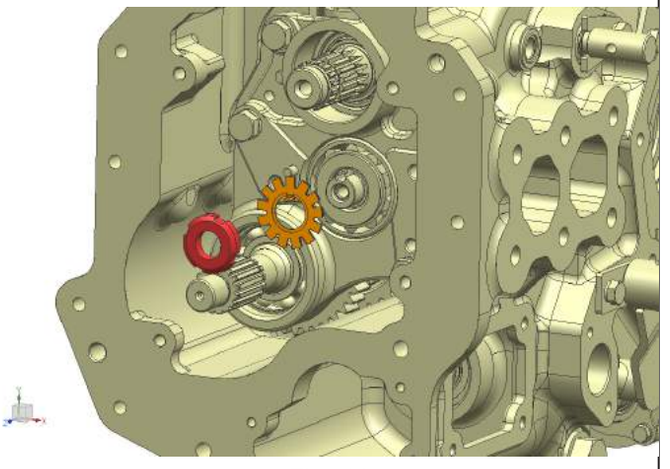
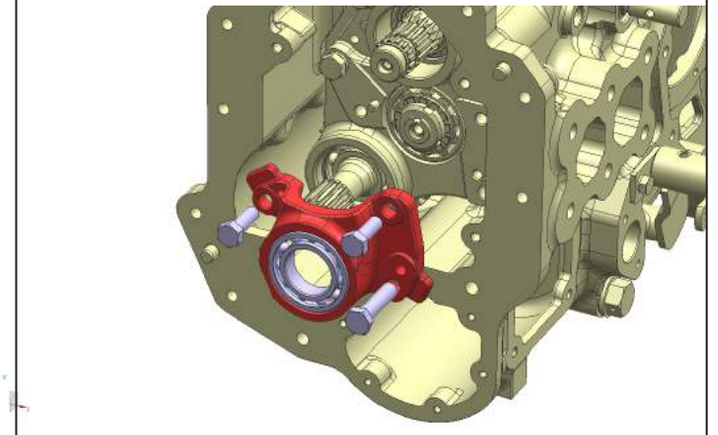
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 34	**Step 34:** I. Assemble the shifter lug from differential housing.
 Fig- 35	**Step 35:** I. Assemble the shifter rod from differential housing.
 Fig- 36	**Step 36:** I. Assemble the split pin (A) by using tool.

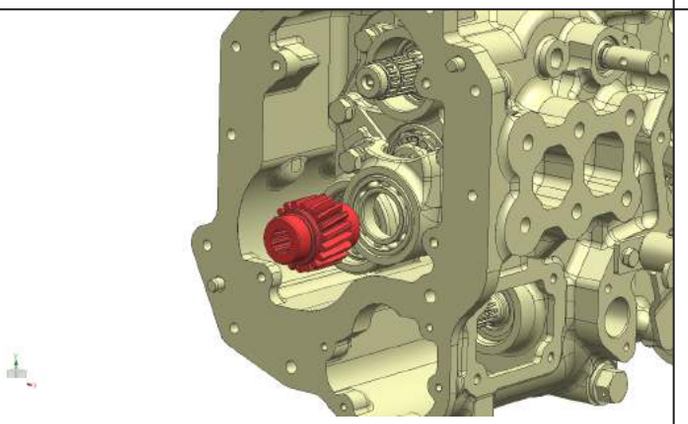
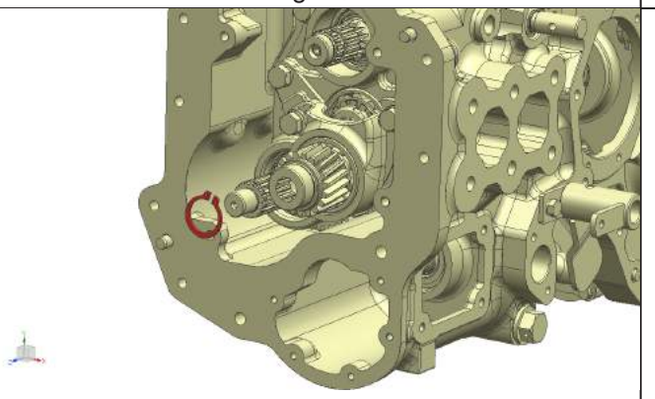
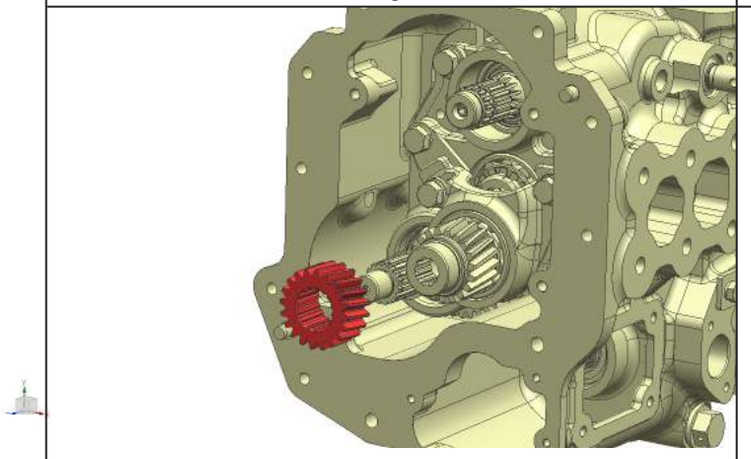
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 37	**Step 37:** I. Insert the dog gear high Z-24.
 Fig- 38	**Step 38:** I. Insert the shim and thrust washer an assemble the circlip.
 Fig- 39	**Step 39:** I. Insert the shim in bearing holder plate.

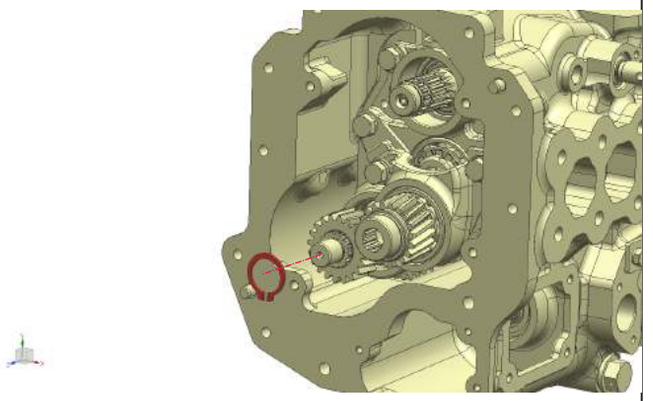
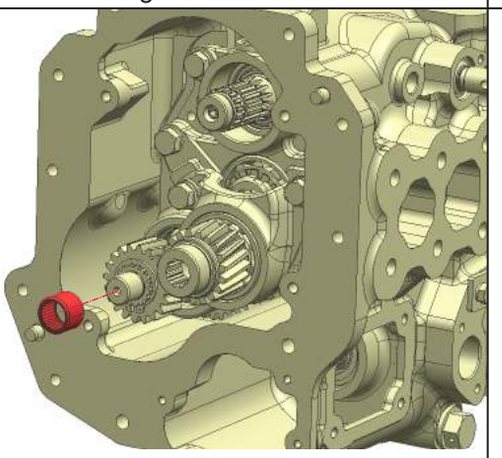
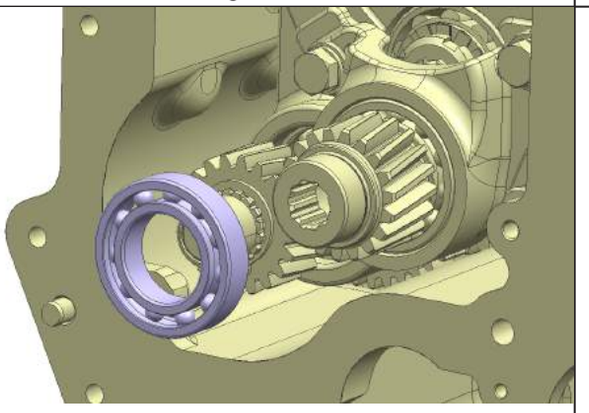
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 40	**Step 40:** I. Assemble the bearing holder plate and tight the bolts. Torque:22.13-29.50 lbf.ft(30-40 Nm)
 Fig- 41	**Step 41:** I. Insert the locking washer and tight the withdrawal nut.
 Fig- 42	**Step 42:** I. Assemble the bearing holder bracket and ball bearing 6007. ii. Tight the three bolts. Torque:22.13-29.50 lbf.ft(30-40 Nm)

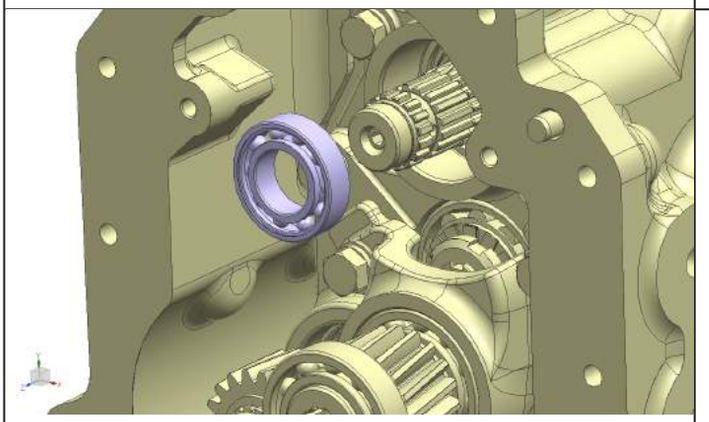
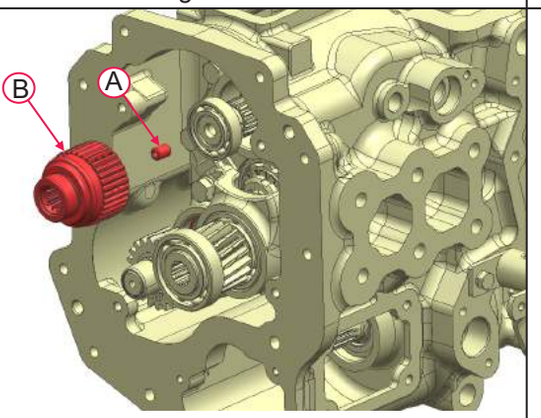
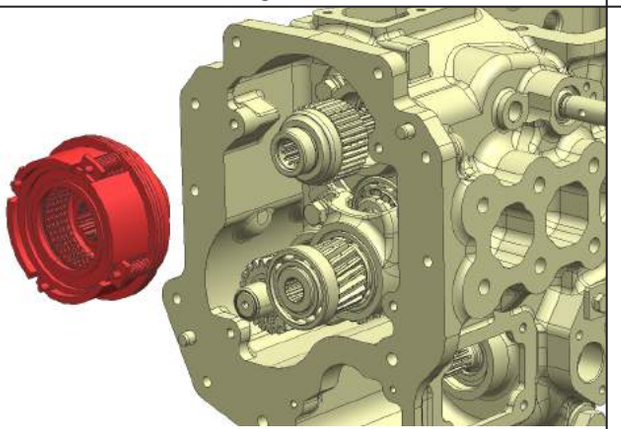
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 43	**Step 43:** I. Assemble driven gear Z-19.
 Fig- 44	**Step 44:** I. Assemble the circlip.
 Fig- 45	**Step 45:** I. Assemble the driven gear Z-20.

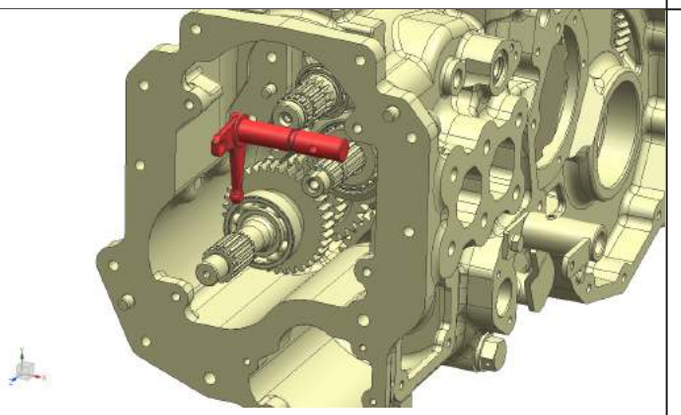
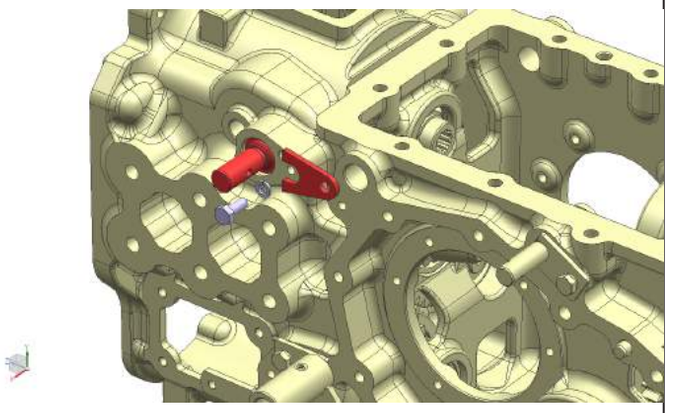
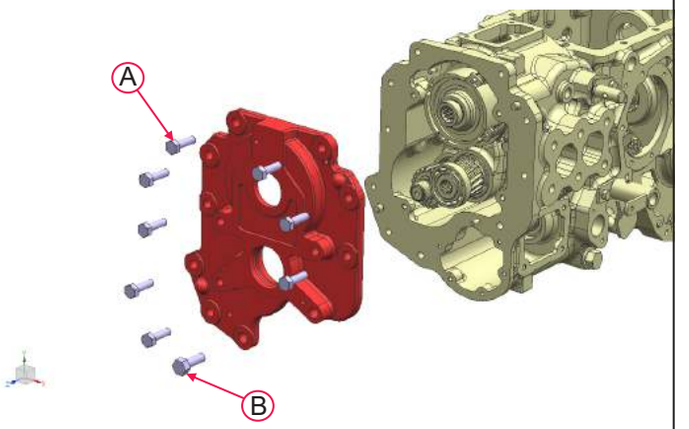
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 46	**Step 46:** I. Assemble the circlip.
 Fig- 47	**Step 47:** I. Assemble the needle bush.
 Fig- 48	**Step 48:** I. Assemble the ball bearing 6007.

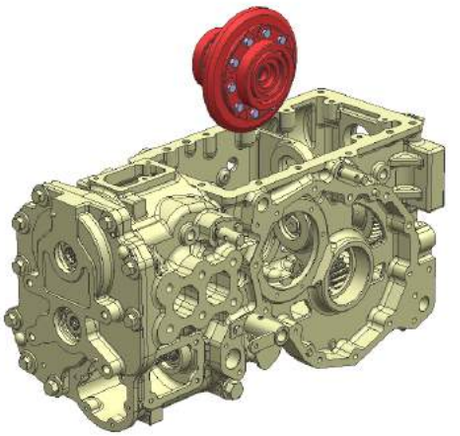
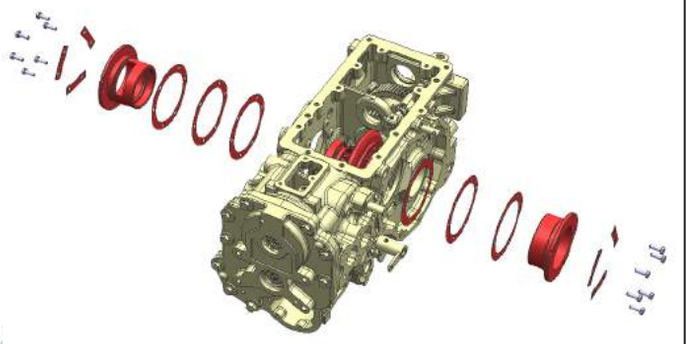
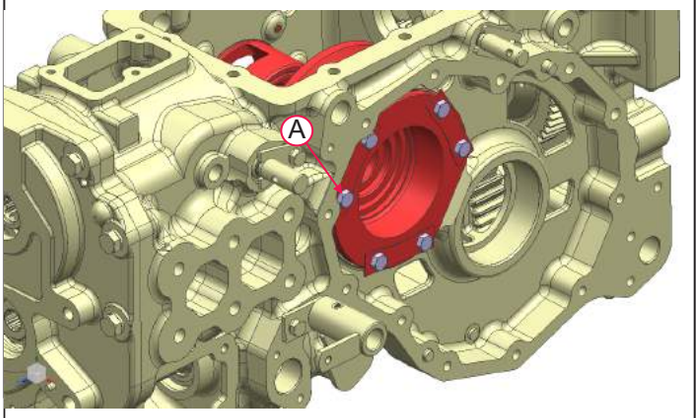
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 49	**Step 49:** I. Assemble the ball bearing 6005.
 Fig- 50	**Step 50:** I. Assemble the grub screw (A) and hub PTO clutch (B).
 Fig- 51	**Step 51:** I. Assemble the JMI PTO clutch assembly.

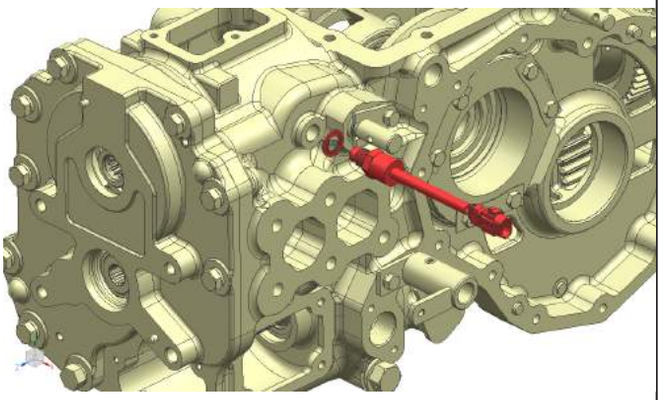
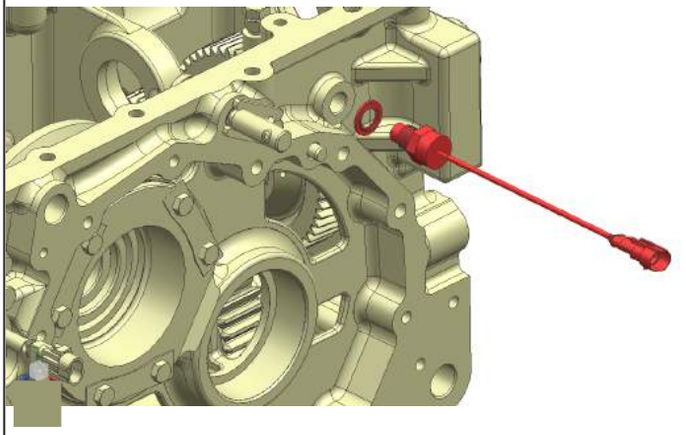
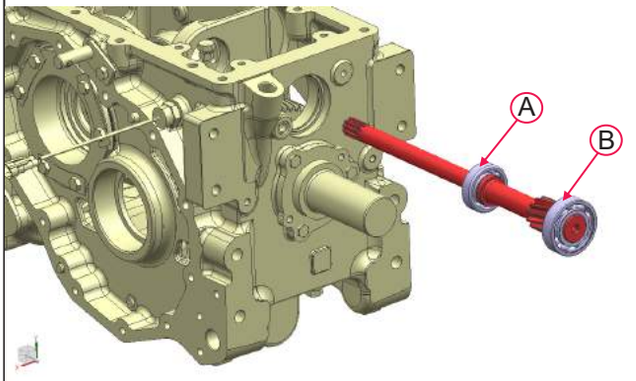
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 52	**Step 52:** I. Assemble the shifter lug from differential housing.
 Fig- 53	**Step 53:** I. Assemble the locking strip and tight the bolt. Torque: 13.28-16.96 lbf.ft(18-23 Nm)
 Fig- 54	**Step 54:** I. Assemble the intermediate plate. ii. Tight the bolts. M10 Bolt Torque (A): 25.81-29.50 lbf.ft(35-40 Nm.) M12 Bolt Torque(B): 44.25-51.63 lbf.ft(60-70 Nm.)

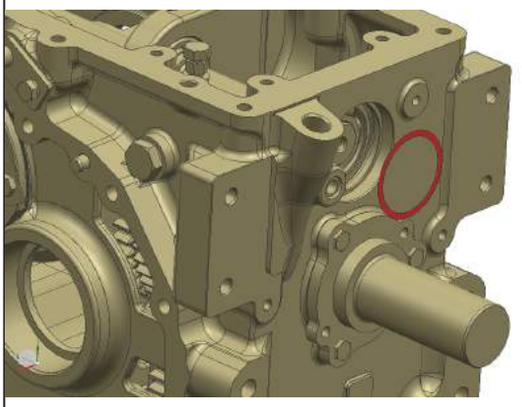
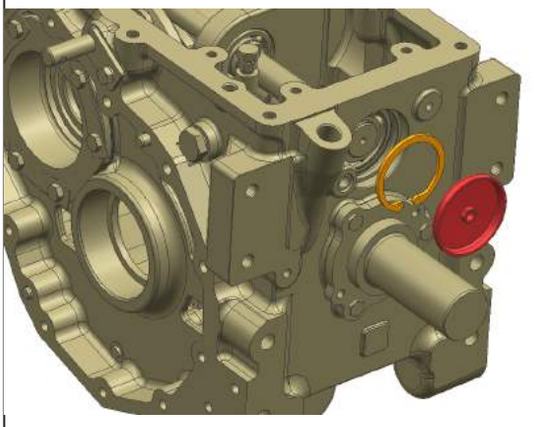
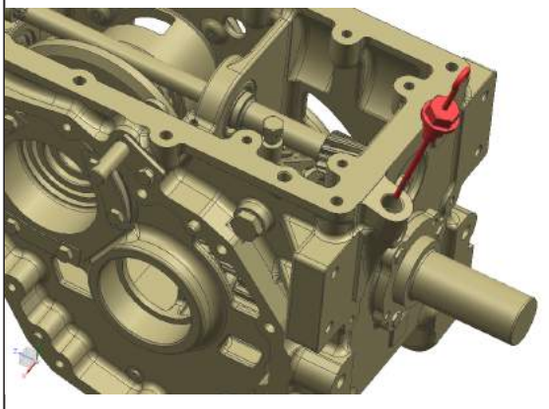
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 55	**Step 55:** I. Insert the differential cage assembly.
 Fig- 56	**Step 56:** I. Assemble the locking plate, differential cage and shims as per requirement.
 Fig- 57	**Step 57:** I. Tight the bolts (A) of differential cage. Torque: 13.28-16.96 lbf.ft(18-23 Nm)

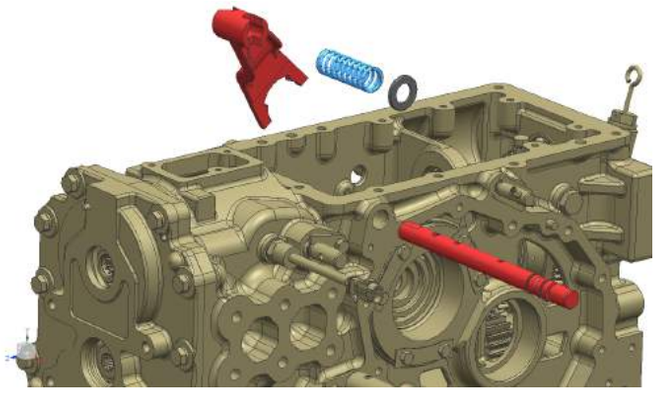
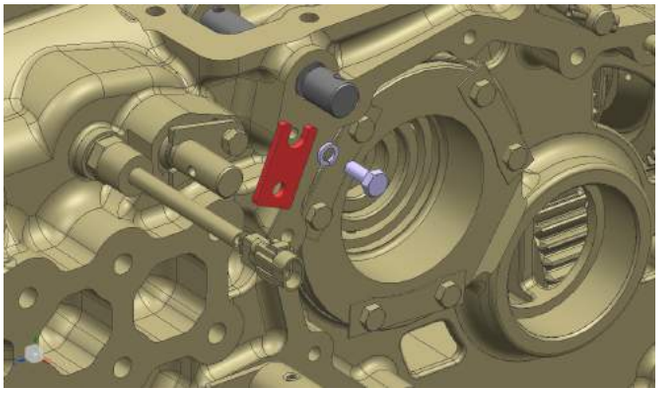
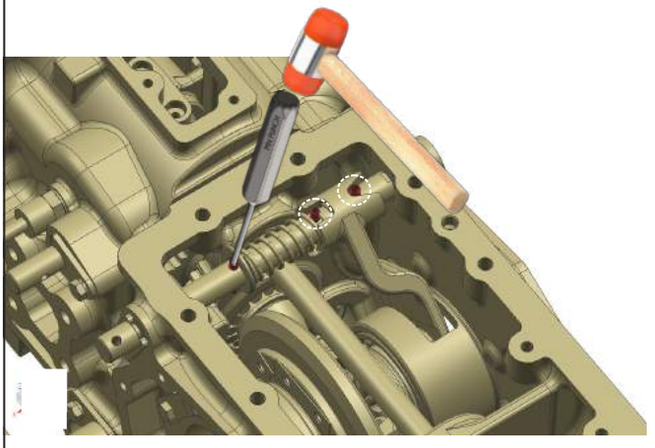
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 58	**Step 58:** I. Assemble parking brake switch.
 Fig- 59	**Step 59:** I. Assemble the PTO switch.
 Fig- 60	**Step 60:** I. Assemble the ball bearing 6205 (A), PTO intermediate shaft and ball bearing 6206 (B).

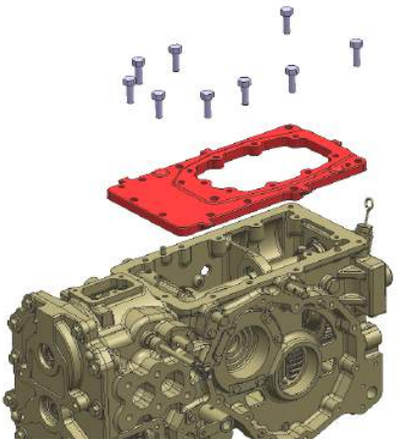
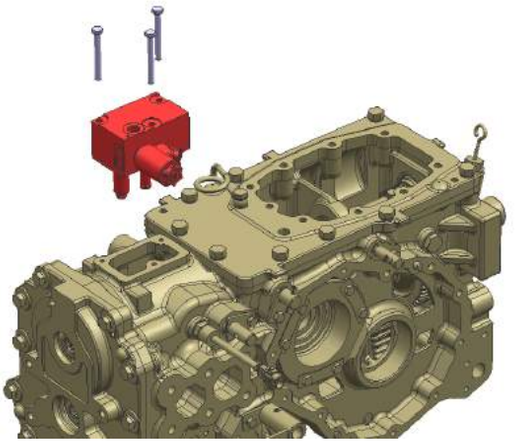
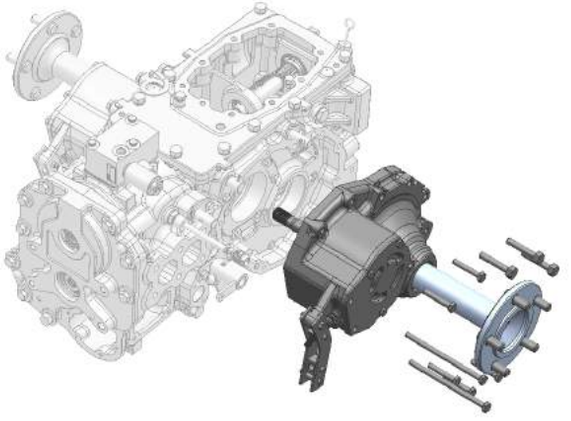
X. Assembly of Differential Housing

Figure	Instruction
 Fig- 7	**Step 61:** I. Remove the shim.
 Fig- 62	**Step 62:** I. Assemble the internal circlip by using tool. ii. Assemble the cap from differential housing.
 Fig- 63	**Step 63:** I. Assemble the dipstick assembly.

X. Assembly of Differential Housing

Figure	Instruction
 Fig- 64	**Step 64:** I. Assemble the diff. lock fork, spring, spacer anddiff. lock shaft.
 Fig- 65	**Step 65:** I. Assemble the locking strip. ii. Tight the bolt. Torque: 13.28-16.96 lbf.ft(18-23 Nm)
 Fig- 66	**Step 66:** I. Assemble three split pin by using tool.

X. Assembly of Differential Housing

Figure	Instruction
 Fig- 67	**Step 67:** I. Assemble the intermediate plate. ii. Tight the bolts. Torque: 44.25-51.63 lbf.ft(60-70 Nm)
 Fig- 68	**Step 68:** I. Assemble the PTO valve assembly. ii. Tight the bolts. Torque: 13.28-16.96 lbf.ft(18-23 Nm)
 Fig- 69	**Step 69:** I. Assemble the rear axle and trumpet housing. ii. Tight the bolts of trumpet housing. Torque: 29.50-33.19 lbf.ft(40-45 Nm)

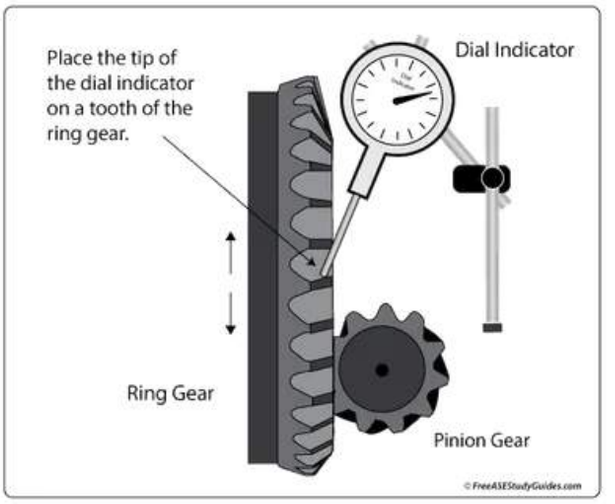
Y. Differential Backlash Adjustment

1. While slowly rotating differential carrier, lightly tap carrier with a soft-faced mallet to make sure bearing on other side of ring gear is seated.

2. Attach a dial indicator to housing, as shown, with contact point positioned on ring gear splines.

NOTE: Ring gear carrier is not preloaded and will have normal side-to-side movement.

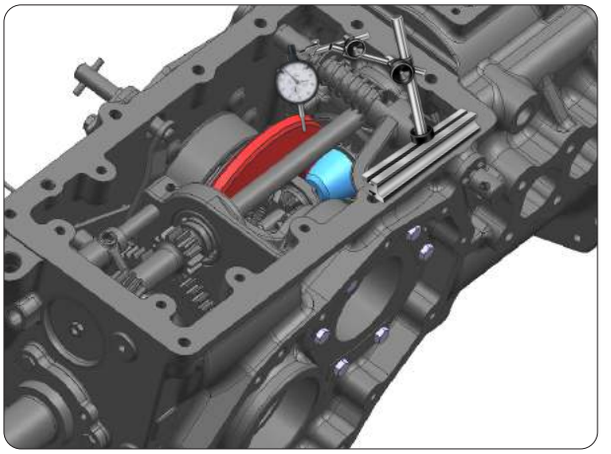
3. While holding input shaft, move carrier and ring gear to determine differential backlash. Backlash should be within specification.



Specification

Differential Backlash-Distance .....0.18—0.33 mm

4. To adjust backlash, remove six cap screws (C) Turn differential quill (A) to specified angle and install cap screws in the two threaded holes. Use cap screws to draw out the quill.



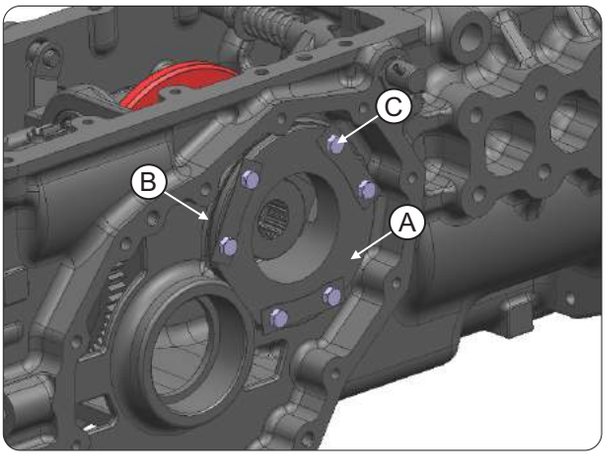
Specification

Differential Quill—Angle .....30°

5. Remove shims (B) to decrease backlash and add shims to increase.

6. Recheck backlash after removing or adding shims.

7. Tighten differential cap screws to specification.



Specification

Differential Cap Screw—Torque.....52 N•m (43 lb-ft)

A—Differential Quill
B—Shim
C—Cap Screw (6 used)

IMPORTANT: Always check and adjust backlash after cone point adjustment has been made.

Z. Troubleshooting

Gear Box :

S.NO.	PROBLEM	PROBABLE CAUSES	REMEDIES
1	**NOISE**		
	Humming (a pecutior noise)	Wear on gear teeth flank	Replace the gear.
		Damage on gear teeth flank	Replace the gear.
	Metallic grinding	oil level low.	Top up oil level.
	Whine (Bullet passing sound)	Backlash less	Correct the back lash either by replacing gear on housing.
		Gear machining improper	Replace the gear.
	Hissing (Leaking noise tent-tire to air lack)	worn out bearing	Replace the bearing.
		Bearing ball/race pitted	Replace the bearing.
	Ratting (Ruppict series of short loud noise)	Backlash more	Correct the back lash either by
			replacing gears or housing.
		Bearing seat loosen	Replace the gearing or replace the housing.
		Bearing play more	Replace the gearing.
		Excessive end play	Correct the end play by tightening the hex retaining nut or replacing spacers/gears.
	Knocking (Noise of sharp blue)	Dent on the gear tooth	Remove the dent by polishing.
		Gear tooth damage	Replace the gear.
		Foreign matter present	Clean the gear train and strain the oil.
2	**HARD SHIFTING**	Insufficient oil.	Top up the oil.
		Detent lock assy. Tight	Replace detent-retaining spring.
		Bent in shifter rod	Replace the shifter rod.
		Gear tooth battered	Replace the gear.
		Sliding Gears tight on shaft	Free the gear shaft by polishing or by replacing gear/shaft.
		Pilot bearing jam	Replacing the bearing
		Excessive clutch free paly	Adjust & correct free play.
		Inter-lock pin tight	Loosen the pin by polishing.
		Clutch is not disengaging.	Adjust & correct
3	**GEAR SLIPPING OUT**	Incomplete gear engaging	Engage gear fully.
		weak detent retaining spring	Replace the spring.
		Shifter rod retaining groove worn out	Replace the spring rod.
		Gear teeth rounded off	Replace the gear.
		Worn out / bent shifter fork	Replace the shifter fork.
4	**GEAR STICKING**	Detent balls/spring stuck	Free & lubrication.
		Scoring on fork.	Replace fork.
		Clutch not disengaging.	Adjust & correct.

Z. Troubleshooting

Differential :

S.NO.	TROUBLE	PROBABLE CAUSE	REMEDIES
1	Humming	1.Incorrect adjustment of crown wheel & Tail pinion. 2.Tooth contact pattern not correct.	1.Re-adjust as per procedure. 2.Correct the tooth contact pattern by doing the adjustment as per the procedure.
2	Noise while Accelerating	Tooth contact shifted toward thick end.	Adjust tooth contact pattern as per the procedure.
3	Noise while De-accelerating	Tooth contact shifted toward thick end.	Adjust tooth contact pattern as per the procedure
4	Noise while Turning	1.Bevel pinion tight on bevel gear.	1.Correct the gap.
		2.Damaged teeth of bevel	2.Replace the damaged gear.
		3.Excessive backlash between bevel pinion and bevel gear	3.Correct the backlash. 4.Replace the bearing.
		4.Defective axle bearing	

Brake :

S. No.	PROBLEM	PROBABLE CAUSES	REMEDIES
1.	NO BRAKING ACTION	Pedal linkage broken or disconnected	Replace or repair
2.	POOR BRAKING ACTION	Brake setting improper	Adjust & correct
		Glazed brake liners	Replace
		Glazed brake disc	Correct by machining or replace
3.	BRAKE STUCKING	Linkage retracting spring loose	Replace springs
		Brake disc plate spring tension less	Replace springs
		Binding in linkage	Lubricant & free
4.	NOISE WHILE BRAKING	Loose rivets of brake lining	Correct or replace
		Worn out brake lining	Replace
		Rough or worn out brake disc plate	Correct by machining or replace
		Foreign matter imbedded in lining	Clean the liners
		Loose part in the system.	Tighten the loose part

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