

TATA MOTORS

SC/ 2014/13	Model : Introduction of Xenon 3.0L DICOR BS-III 4X4	Group : 00	Feb-14
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All Dealers / TASSs'

Subject: Introduction of Xenon 3.0L DICOR BS-III 4X4

We have already informed you about the introduction of XENON 3.0L DICOR BS-III 4X2 vide SC_2012_18 dated Jun 12. Now we are pleased to inform you about the launch of Xenon 3.0L DICOR BSIII in 4X4 configuration



Chassis type designation

Model	Chassis Barrel	VC No.
Xenon 3.0L DICOR 4X4 BS-III	464244	55021531R

We are enclosing the following details:

1. Technical Specifications (Annexure-1)
2. Transfer Case for 4WD (Annexure-2)
3. Automatic Hub Lock on front axle (Annexure-3)
4. Limited slip differential on Rear axle (Annexure-4)
5. Special Tools (Annexure-5)
6. Maintenance schedule (Annexure-6)
7. Recommended Lubricants & coolant (Annexure-7)
8. Warranty norms and Free service (Annexure-8)
9. Ancillary support (Annexure-9)

CUSTOMER CARE (COMMERCIAL VEHICLE BUSINESS UNIT)

(As per policy of Tata Motors to continuously improve their products, the company reserves the right to make changes of any nature on vehicles and aggregates without any obligation to incorporate them on previous vehicle)

ANNEXURE - 1 TECHNICAL SPECIFICATION

ENGINE	
Model	TATA 3.0L DICOR BS-III
Type	Water cooled Direct Injection Common Rail Turbo Charged Intercooled Diesel Engine with Crankcase breather
No. Of Cylinders	4 Inline
Bore / Stroke	97 mm x100 mm
Capacity	2956 cc
Max. Engine Output	83.2kW at 3000 rpm
Max. Torque	300 Nm at 1600-2200 rpm
Compression Ratio	17.5:1
Firing Order	1 - 3 -4-2
Engine Oil Capacity	Min. 5.5 liters.
Weight Of Engine	325
Special Items / Features	1) Exhaust Gas Recirculation System
	2)Fully Electronic Controlled Fuel injection System
CLUTCH	
Type	Single Plate Dry Friction Diaphragm
Outside dia.	240 mm
GEAR BOX	
Model	TATA G-76/5 4.1 with overdrive
No of gears	5 Forward 1 Reverse
Gear Ratio	1st-4.1, 2nd-2.22, 3rd-1.37, 4th-1.00, 5th-0.77, Rev-3.75
TRANSFER CASE	
Type	With Electrical Shift Arrangement Mounted on Gear Box with Electronic Controller Unit
Drive Options	4x2 - Ratio 1:1
	4x4 High - Ratio 1:1
	4x4 Low - Ratio 1:2.48
REAR AXLE	
Type	Salisbury Rear Axle with Semi-Floating Axle Shafts & Limited slip differential
Ratio	3.36 (37/11)
FRONT AXLE	
Type	Independently Suspended with Automatic Hub Locks
Ratio	3.36 (37/11)
STEERING	
Type	Power assisted
Ratio	18.2 : 1, 18.9:1 (Alternate)
BRAKES	
Type	Vacuum Assisted Independent Hydraulic brakes
Front Brake	Ventilated Disc brakes 296 mm dia. with twin pot caliper
Rear Brake	282 dia. Drum Brake With Auto Adjuster.

FRAME	
Type	Ladder Type Cranked Frame
SUSPENSION	
Front	Double Wishbone Type with Torsion bar
Rear	Parabolic leaf Springs
TYRES	
	215 / 75 R 16 LT Tubeless
FUEL TANK	
Capacity	65 Liters
ELECTRICAL SYSTEMS	
System Voltage	12 volts
Alternator Capacity	125 Amps
Battery	12 V,80 Ah
PERFORMANCE	
Max Speed	143 Kmph
Max Gradeability	32% at rated GVW
Min turning circle dia.	12.0 m
Wheelbase	3150 mm
WEIGHTS	
Kerb weight	2060 Kg
Gross vehicle weight	2950 Kg
Max permissible FAW	1280 Kg
Max permissible RAW	1670 Kg

ANNEXURE- 2 TRANSFER CASE

- **4 Wheel drive**

In 2H mode, only the rear two wheels of the vehicle are powered by the engine and the front wheels are merely pushed. By shifting to four wheels drive mode (4H or 4L) the rear as well as the front axles get geared to the engine through transfer case and transmit the engine power to all four wheels. This gives the vehicle increased traction.

In 4H mode, the transmitted engine torque and the vehicle speed remains the same as in 2H. However, when you shift to 4L mode engine torque is multiplied and vehicle moves at low speed in the same gears with increased traction. 4L mode is provided for negotiating sharp gradients or driving through loose soil/ sand

1. Technical Specification




Transfer Case Shifting	Electric Shift On Fly (ESOF)
Configuration	Part time, Single offset
Rear Output Configuration	Fixed Yoke
Front Output Configuration	Fixed Yoke
Input Configuration	Female Spline
Drop Angle	40 degree
Offset Hand	Right Hand
High Range Ratio	1:1
Low Range Ratio	2.48:1
Lubrication System	Force lubrication by Gerotor Pump
Housing Material	Aluminum
Dry Weight in Kgs.	30
Shift Pattern	2H - 4H - 4L
Shift Control	Selector Switch

2. Salient Features

Part - time system	Allows driver to select two or four wheel drive operation
Lightweight construction	Reduces total vehicle's weight to enhance efficiency
Hi-Vo Chain Drive output	Provides quiet four-wheel drive
Upper disconnect to chain	Reduces unnecessary parasitic losses in two-wheel drive
Positive displacement oil pump and filter	Assure full lubrication while driving or towing. Reduces maintenance needs
Helical gearing	Delivers quiet, low-range operation
Four - wheel drive indicator light switch	Indicates four wheel drive for drivers convenience
Selector switch for different modes	Simplifies selection of transfer case operating modes
Electric shift-on-the-fly	Provides effortless engagement of four wheel drive at highway speeds

3. Components & Operation

COMPONENTS

Sr no.	Components	Representative Photo
1	Transfer Case with Shift Motor, Speed Sensor and Electric Clutch	
2	Electronic Control Unit (ECU)	
3	Mode selector switch and Indicator lights 4H and 4L on the dash board	

Operation

The power is received by input shaft which is coupled with output shaft of transmission gear box by matching splines. There are two outputs, one for rear wheels and the other for front wheels. Three selector positions are provided

Position	Speed Ratio	Operation
2H- Two high position	1:1	Only the two rear wheel are drive at 1:1 speed ratio
4H- Four high position	1:1	All four wheel are drive at 1:1 speed ratio
4L- Four low position	2.48:1	All four wheel are driven at 2.48:1 speed ratio

Planetary gear set provides gear reduction. Power is transferred to the front wheel drive through a Morse HY-VO chain drive. Unit operates in an oil bath. An oil pump is used to provide positive lubrication to the planetary gear set and other upper output shaft components.

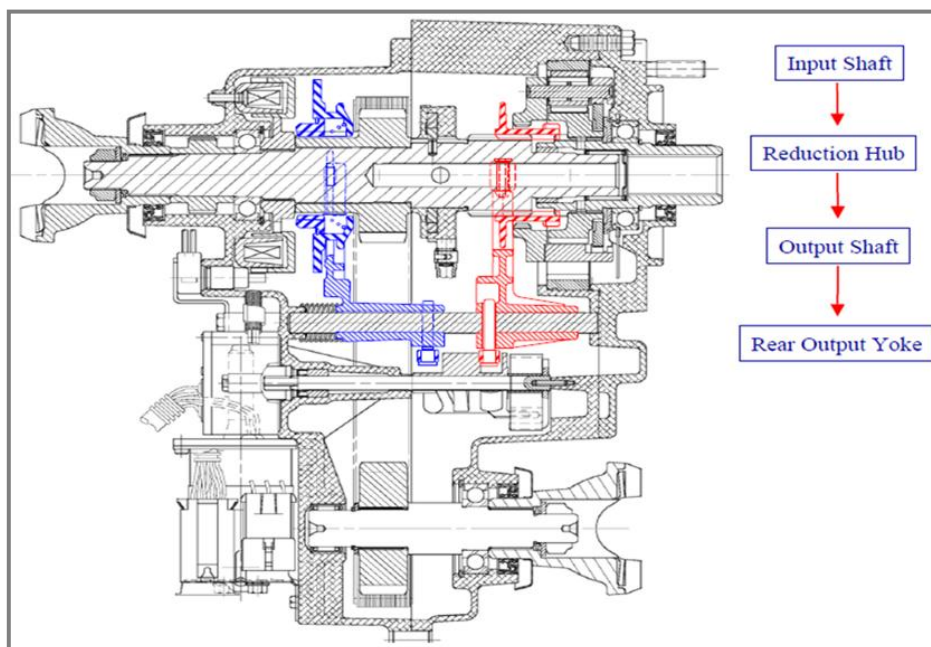
The different modes are obtained by rotating selector switch for selection. This in turn gives signal to the Electronic Control Unit (ECU), which controls operations intelligently. It senses the conditions and shifts the transfer case as per the selected mode. Inbuilt diagnostic system is provided in the T/case ECU for T/cases electrical components.

Selection Mode

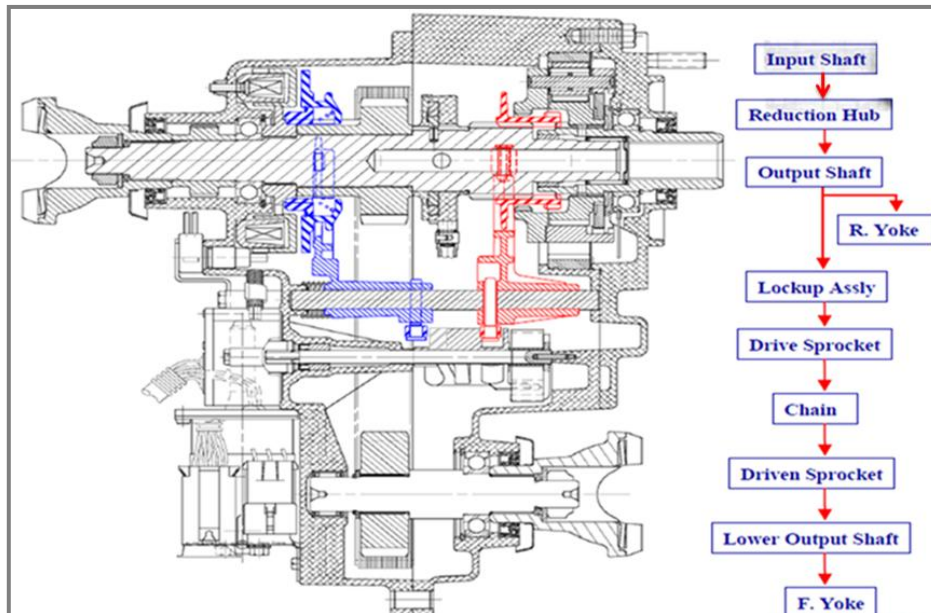
Rotary switch is provided for selection of three different modes

- 2H - Two wheel high
- 4H - Four wheel high
- 4L - Four wheel low

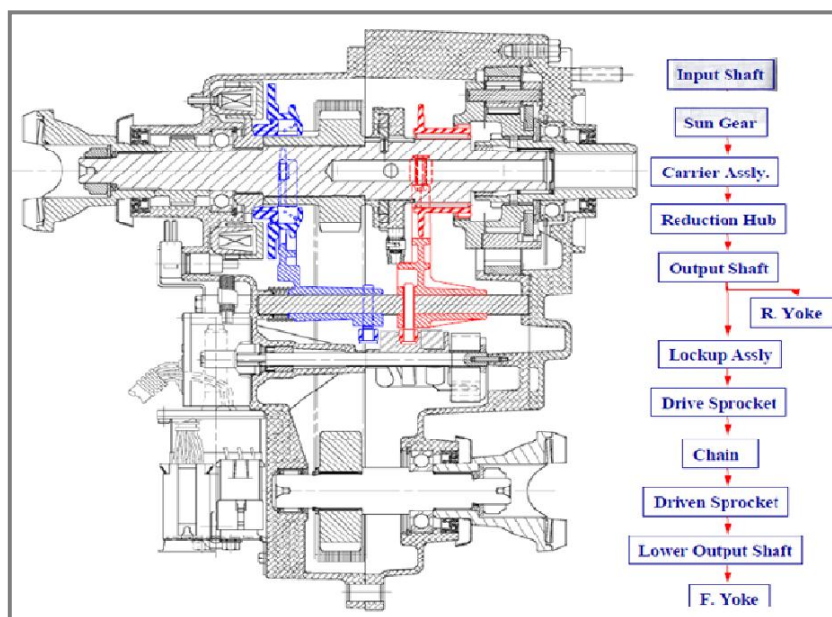
2H - Two wheel high



4H - Four wheel high



4L - Four wheel low



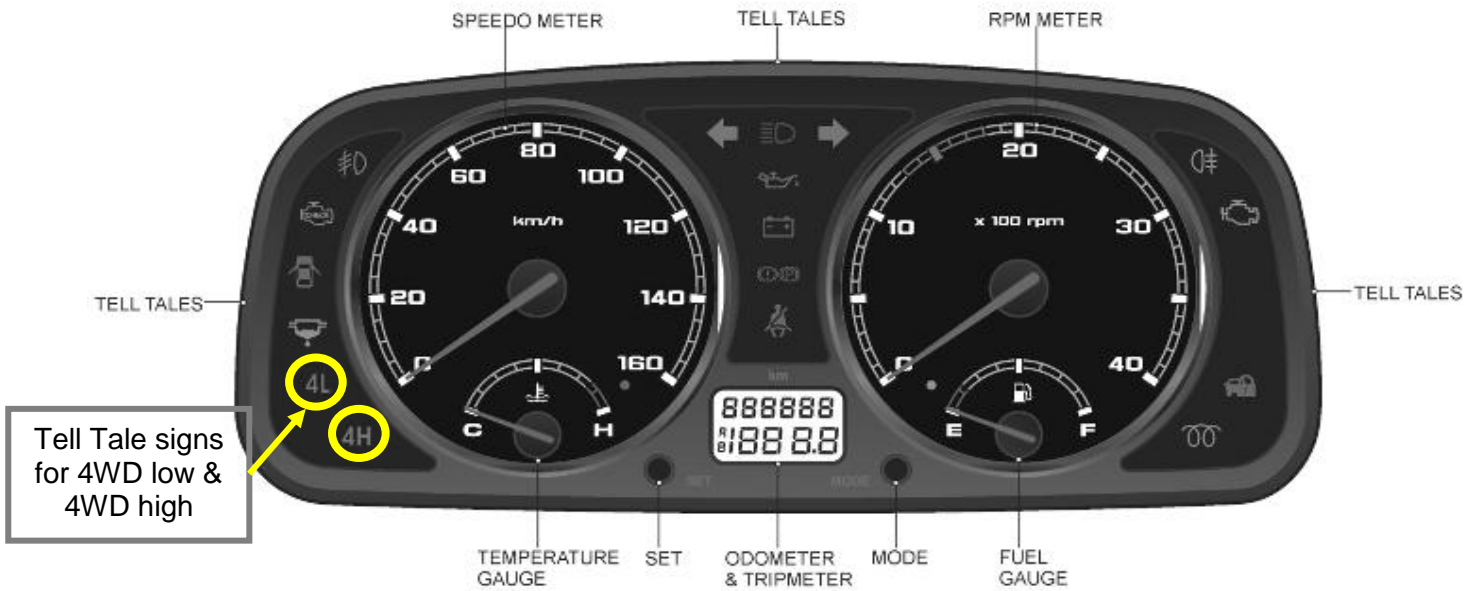
- Selection operation

- a. Shifting from 2WD to 4WD Or 4WD to 2WD

- Shift selector switch mode from 2H to 4H. 4WD HI indicator light will turn ON & vice versa
- Shifting is possible during driving

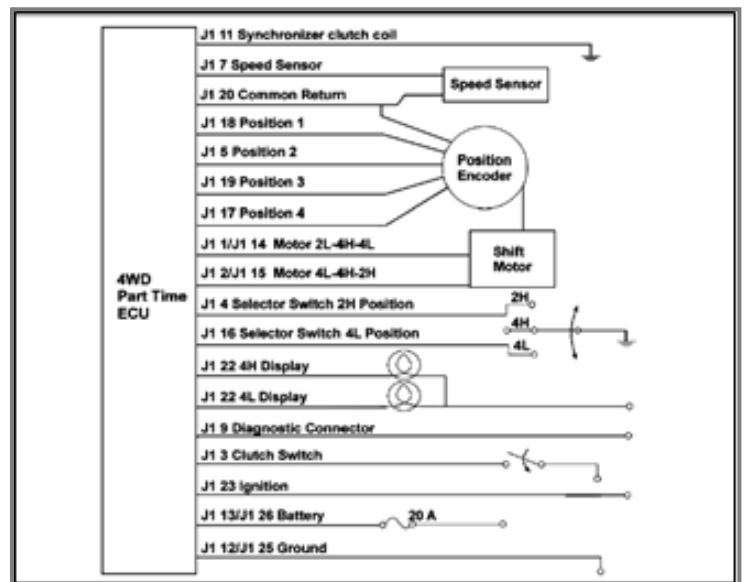
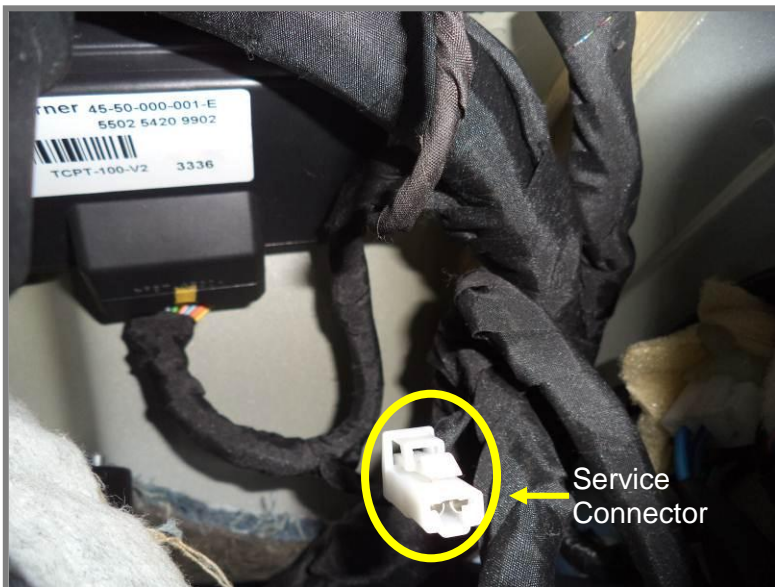
- b. Shifting from 4H to 4L Or 4L to 4H

- Stop the vehicle
- Apply clutch pedal
- Shift selector switch mode from 4H to 4L Or 4L to 4H. 4WD LO indicator light will turn ON & vice versa
- Drive vehicle in 1st gear @ 20-30 Km/hrs only.



4. Electronic Control Unit (ECU)

Electronic Control Unit (ECU) is located behind the glove box under dashboard. Driver operates a selector switch to shift the vehicle from two wheel drive to four wheel drive (and vice versa). Shifting is possible during driving (only in 2H to 4H Mode & 4H to 2H).



ECU Diagnostics

ECU detects transfer case system malfunctions and indicates malfunctioning parts through flashing indicator lights. The operator will be alerted of fault condition by continuous illumination of both 4WD HI and 4WD LOW lights on dashboard when ignition is ON.

A service connector is provided to indicate the fault codes in binary. Turn the ignition switch ON. Connect one end to the pin hole number 9 in ECU connector and other end to the ignition switch (pin no. 23). The flashing of indicator light will show the defective code (As illustrated in the table). Identify the malfunctioning part and replace it.

L1	L2	L3	Binary code	Decimal Equivalent	Fault With
Off	Off	On	001	1	ECU Module
Off	On	Off	010	2	Shift Motor
Off	On	On	011	3	Synchronizer clutch
On	Off	Off	100	4	Speed Sensor
On	On	Off	110	6	Selector Switch
On	On	On	111	7	Motor Position Switch

- Use only 12V 3-watt bulb for diagnostic purpose.

If only one part is malfunctioning, the indicator light will display defective code three times continuously. If more than two parts are malfunctioning, the first malfunctioning part will be displayed three times and then the other malfunctioning parts will be displayed. After repair, clear the fault stored in the memory. Ground the service connector and keep ignition 'ON' for five seconds continuously to erase defective code

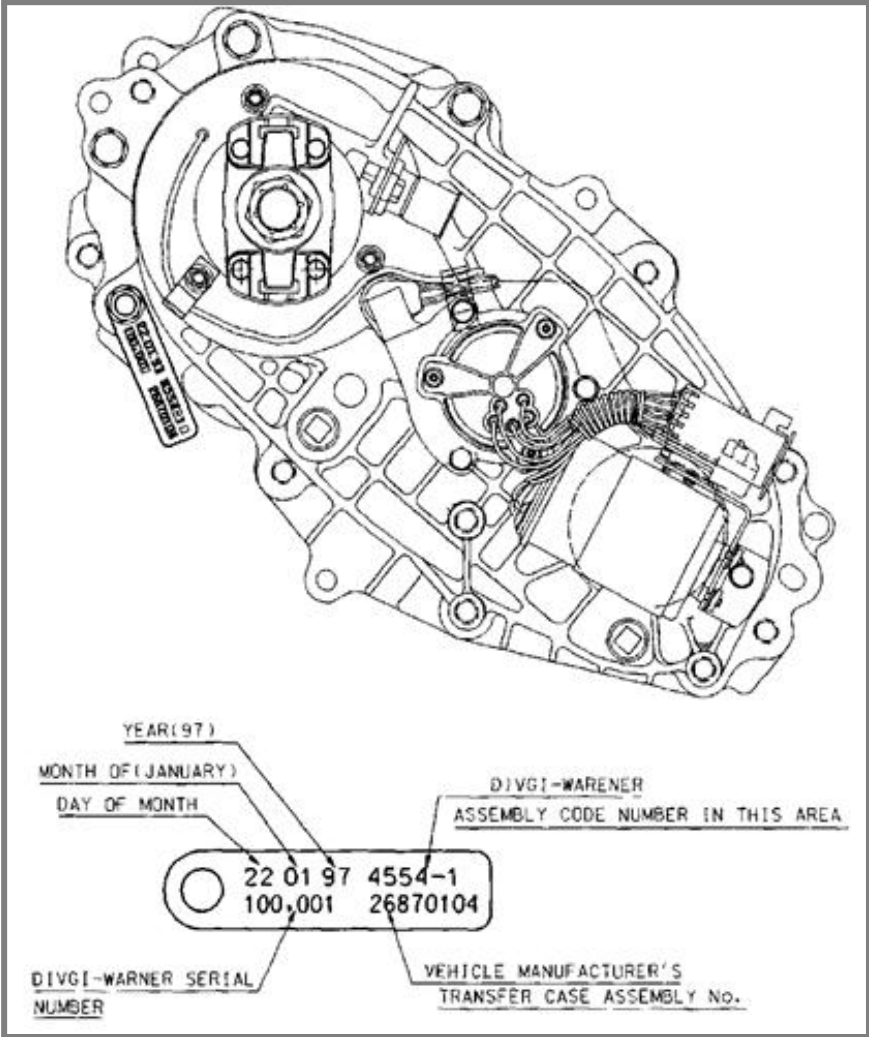
Defect Code Diagram

Connect a service connector as described earlier. Turn the ignition switch ON 4H or 4L CHECK indicator will turn ON for 0.6 seconds and turn OFF for 3 seconds. Then it will display a defective code 3 times continuously.

No.	Defect Codes	Malfunctioning Part
1	<p>Binary Code 0 0 1</p>	ECU
2	<p>Binary Code 0 1 0</p>	Shift Motor
3	<p>Binary Code 0 1 1</p>	Synchronizer Clutch
4	<p>Binary Code 1 0 0</p>	Speed Sensor
6	<p>Binary Code 1 1 0</p>	Selector Switch
7	<p>Binary Code 1 1 1</p>	Motor Position Sensor

NOTE: Before replacing the malfunctioning parts with defective codes, check the wires and connectors for proper condition.

5. Transfer Case Serial No. system



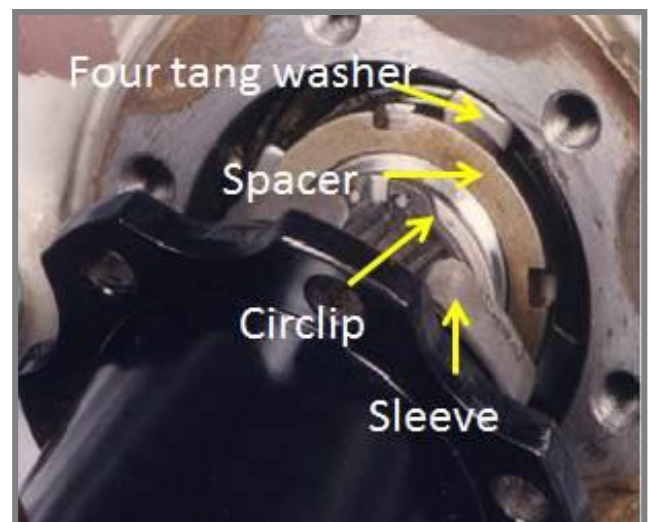
ANNEXURE- 3 AUTOMATIC HUB LOCK ON FRONT AXLE

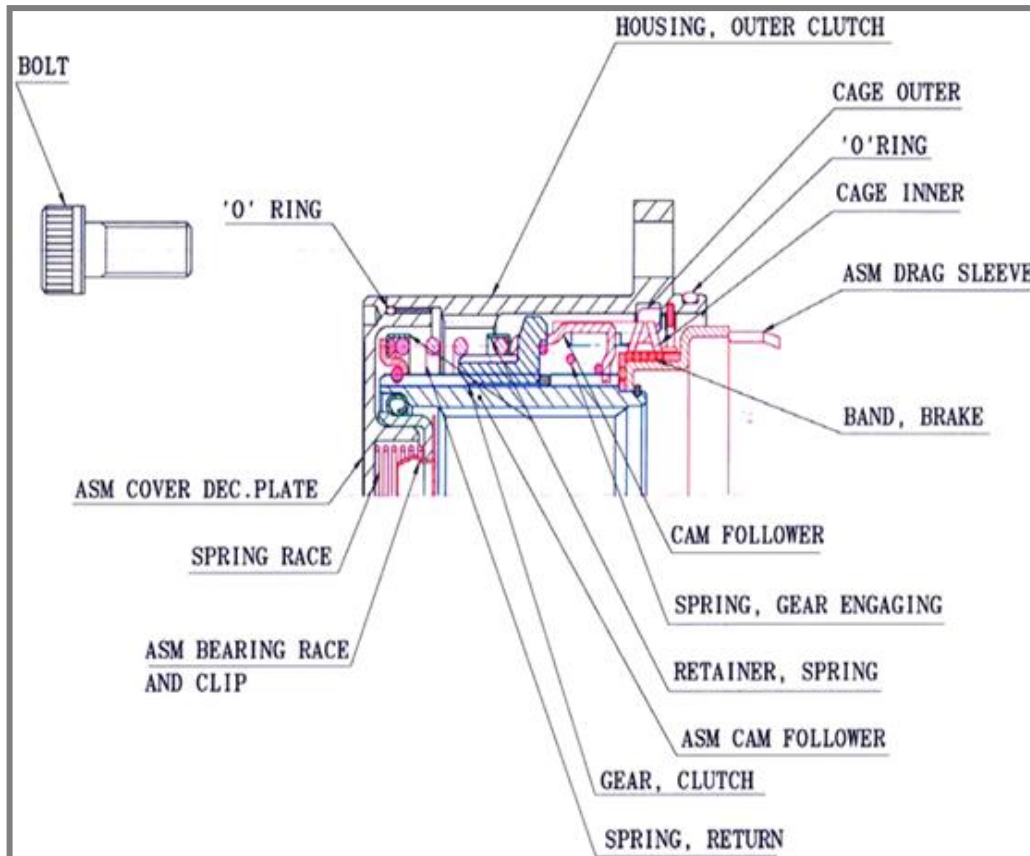
When 4WD is selected, automatic hub locks axle shaft to wheel hub. This occurs when vehicle is driven in forward or reverse direction.

- **Technical Specification**

Input Configuration	Female Spline
Output Configuration	Bolted Flange Gross Weight 1.75 Kgs. Approx. (M10 X 25 mm, 6 nos. Bolts)
Location	74 mm Dia. And 'O' ring for water resistance
Working Principle	Automatic Locking
Projected Length over from the face of the wheel	74.0 mm (Nom.)
Locking & Unlocking degree	90 Deg. (C.W. & C.C.W)
Gross Weight	1.75 Kgs. Approx.
Lubrication** 1.Assy. Drag Sleeve 2.Assy. Auto hub lock 3.Assy. Bearing Race	1.Darmex 123 Lt grease 2.ATF Castrol - TQ 3.Castrol LCG -2 Grease

- **Construction**





Freewheeling of Front hub:

1. After shifting from 2WD to 4WD - Drive vehicle in desired direction. Both automatic locking hubs should lock.
2. After shifting from 4WD to 2WD - for effective freewheeling of front wheels, direction of vehicle motion needs to be change. If in 4H mode vehicle was moving forward, then stop it, wait & engage reverse gear. If it was moving reverse in 4H mode then stop it, wait & then engage forward of main gear box. After stopping & changing the gear vehicle must travel in opposite direction for min of 3m for freewheeling.

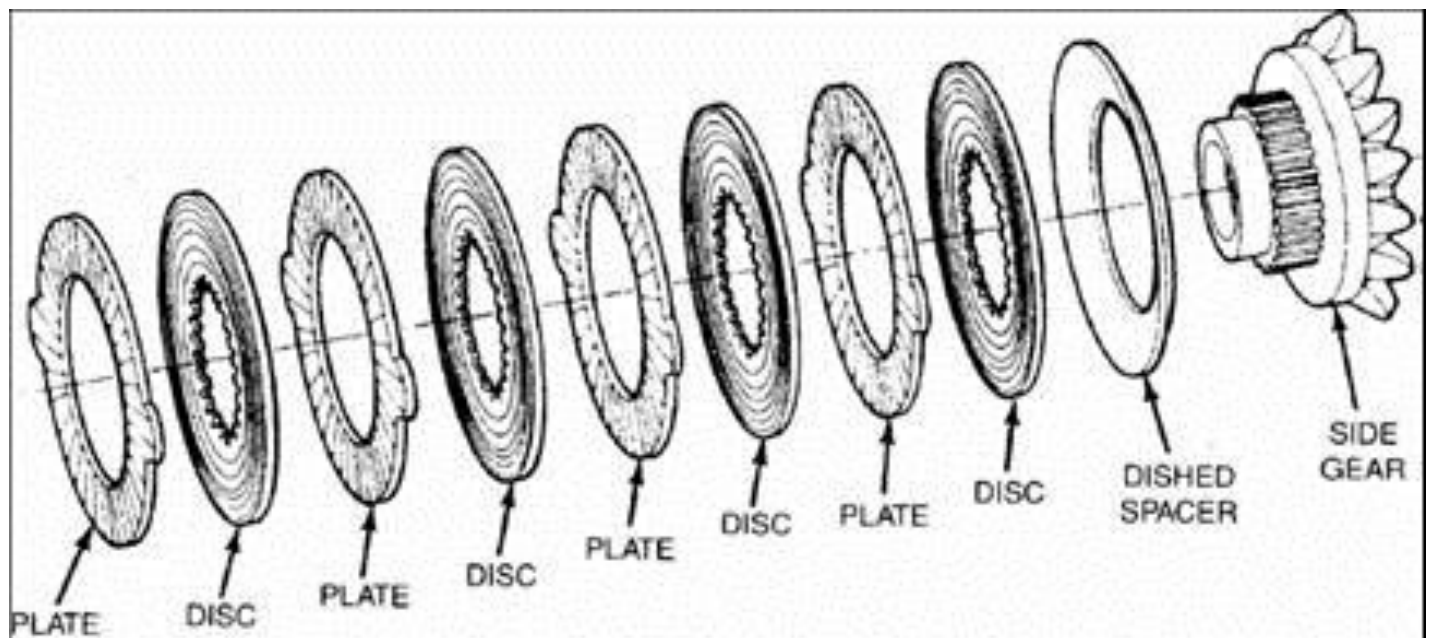
Caution **:

1. Do not wash auto hub lock parts with water, kerosene, petrol, diesel etc. as the Darmex 123 Lt grease on drag sleeve & bearing grease Castrol LCG-2 will get washed off.
Only ATF Castrol - TQ to be used for washing / cleaning of auto hub lock assy at every 45,000 kms or during replacement of assy.
2. Drag sleeve & bearing in auto hub lock are lubricated during OE assembly only.
3. Auto hub lock spare parts kit is also supplied with lubricated drag sleeve & wheel bearing assy.

ANNEXURE- 4 LIMITED SLIP DIFFERENTIAL ON REAR AXLE

A limited slip differential (LSD) or anti-spin is a type of traction aiding device that uses a mechanical system that activates under centrifugal force to positively lock the left and right spider gears together when one wheel spins a certain amount faster than the other. The LSD performs like an open differential under “normal” conditions, and automatically transfers torque to the wheel with better traction when conditions demand.

This system is similar to conventional differential, except that part of torque from ring gear is transmitted through clutch packs between side gears and differential case. In case of wheel slippage clutch pack opposite to slipping side, is activated by separating forces between pinion mate and corresponding side gear. This increases torque delivered to non-slipping wheel and vehicle begins to move.



Note: LSD feature gets activated & deactivated automatically. No driver intervention is required.

ANNEXURE- 5 SPECIAL TOOLS

Transfer Case (DivgiWarner Pvt. Ltd.)	
Repair Fixture II	270458902808
Yoke holder	270458902802
Oil seal fitting tool (Motor)	270458902804
Seal driver	270458902801
NRB removing fixture (input shaft)	270458902805
Needle bearing puller (Cover)	270458902809
Snap ring pliers (Lower output shaft)	270458902810
Snap rings pliers (Adapter)	270458902803
Drift for ball bearing	270458902811
Front Axle 4 X 4 (SPICER India Ltd)	
Dolley to press oil seal in hub	270458903301
Dolley for pressing oil seal in tube	270458903302
Dolley to press cup in hub (outer)	270458903303
Dolley to press cup in hub (inner)	270458903304
Dolley for pressing Needle Roller Bearing in the tube	270458903305
Dolley for pressing Cylindrical Roller Bearing in housing	270458903306
Adaptor to remove cup from hub (inner)	270458903307
Adaptor to remove cup from hub (outer)	270458903308
Dummy Bearing	270458903309
Adaptor to remove pinion inner cup	270458903310
Handle for dollies	270458903311
Expander from M 30 carrier	270458903312
Pinion height setting gauge	270458903313
Dolley for pressing outer pinion bearing cup in housing	270458903314
Adaptor to remove pinion outer cup	270458903315
Dolley for pressing inner bearing cone on pinion	270458903316
Height setting gauge master block	270458903317
Check nut spanner	270458903318
Dolley to press oil seal in spindle	270458903319
Dolley to press bearing cone in spindle	270458903320
Dolley for pressing inner pinion bearing cup in housing	270458903321
Adaptor to remove differential bearing	270458903322
Adaptor to remove pinion inner bearing	270458903323
Puller to remove right side bearing from flange carrier	270458903324
Dolley for pressing differential case bearing	270458903325
Adaptor to remove bearing cone on spindle	270458903326
Dolley to press needle roller bearing in spindle	270458903327
Bearing puller	270458903328
Adaptor plug spindle	270458903329
Plain pliers, snap ring	270458903330
Tank pliers - snap ring	270458903331

Clamp crimper	270458903332
Ball assembly tool	270458903333
Puller	265458903304
Holder yoke	269858903505
Press	269858903515
Adaptor ring	269858903516
Slide hammer puller	269858903507
Installer pinion oil seal	269858903513
Handle universal	269858903506
Drive square for drain plug	269858903524
Gear Box (G 76)	
Handle - for drift	264058903511
Holder - for main shaft coupling flange	265158903511
Holder for coupling yoke	269858903505 or 269858904102
Puller - For taper roller bearing counter shaft	265458902604
Drift - for drive shaft taper roller bearing	265458902605
Drift - for counter shaft taper roller bearing	265458902606
Drift - for rear cover oil seal	265458902607
Puller - for drive shaft & counter shaft taper roller bearing	265458902612
Mounting plate	265458902613
Drift - for main shaft 2nd speed spacer	265458903511
Puller - for main shaft 2nd speed spacer	3125892533
Socket for end yoke nut	269858904101
Puller for removal of front half housing	265458902609

ANNEXURE - 6 IMPORTANT MAINTENANCE SCHEDULE FOR 4WD

Sr. No	Operation	Frequency in km	15,000 km	30,000 km	45,000 km	60,000 km	75,000 km	90,000 km	105,000 km	120,000 km	135,000 km	150,000 km
1	Change gearbox oil (Change oil in gearbox first at 45000 Kms and thereafter at every 90000)	90,000			●			●				
2	Transfer case oil	45000			●			●			●	
3	Change oil in rear axle & live front axle	75,000					●					●
4	Lubricate front live axle hub lock parts with ATF oil (except drag sleeve)**	45000			●			●			●	

Note: All other Service Operations remain same as XENON 3.0L DICOR 4X2 BSIII vehicle.

ANNEXURE- 7 RECOMMENDED LUBRICANTS & COOLANT

Aggregate	Qty.	Fluid type	Recommended Brands
Engine	6.5 Ltrs	SAE 15W40 / API CH4 and MB 228.3 as per SS 6471	1. Castrol - Castrol RX Turbo 15W40 (CH4) 2. BPCL - MAK Tata Motors Genuine engine oil 15W40 (CH4) 3. Shell - Shell Rimula T3 15W40
Coolant	9 Ltrs	Non - Amino base	1. BPCL - MAK Tata Motors Super Kool 2. Castrol - Long life Coolant 3. IOCL - Servo Kool TM"
Gear Box	1.9 Ltrs	Synthetic gear oil 75W90 GL4	1. BPCL - MAK Tata Motors Spirol Synth 75W90 2. Castrol - Castrol Synth 75W90
Transfer Case	1.2 Ltrs	BWA specs - 40-00-244-002-A	1. CASTROL TQ 2. HPCL ATF 3. IOCL - SERVO TRANSFLUID 4. CHEMOLEUMS TQA
Front & Rear axle	Front- 1.2 Ltrs Rear - 2.2 Ltrs	SAE 85W140 with 7% anglomol 6043 by weight / API GL5	1. BPCL - MAK Tata Motors Spirol LL 85W140 2. Castrol - Extra Long life rear axle oil 85W140 3. IOCL - Servo gear axle TM 4. Shell - Spirax T2 A 85W140"
Power Steering	1.4 / 1.6 Ltrs	ATF - Dexron II-D	1. BPCL - MAK Tata Motors Autran II 2. Castrol - TQD 3. IOCL - Servo steer TM 4. Shell - Spirax T2 ATF
Front live axle Wheel Bearing	92 gm	RR3 Grease	1. BPCL - MAK Tata Motors RR3 Grease 2. Castrol - Castrol AP Super grease 3. IOCL - Servo Gem TM3 4. Shell - Shell Gadus T1"
All Grease Nipples	As Required		
Rear axle wheel bearing	--	Lubricated by differential oil	
Clutch Fluid	As Required	DOT 4	1. Castrol UBF DOT 4 2. Golden cruiser brake fluid DOT 4
Brake Fluid			

Precaution for transfer case lubrication:

- Before checking or removing oil, warming up the transfer case is necessary. This should be done by driving the vehicle for a short distance.
- Do not use an impact wrench to open or tighten the drain and oil level plugs. This may damage threads in transfer case housing.

ANNEXURE - 8 WARRANTY & FREES SERVICES

Warranty shall be valid for **36 months** from date of sale of the vehicle or **3, 00,000 km**, whichever is earlier.

Free Services

Sr. No	Service	Km covered	Months
1	PDI	At the time of delivery of vehicle	---
2	First Service	14,500 to 15,500 Km	12
3	Second Service	29,500 to 30,500 Km	24
4	Third Service	44,500 to 45,500 Km	36

ANNEXURE - 9 ANCILLARIES SUPPORTS

1. Transfer Case & Automatic Hub Lock:

Supplier Name: DivgiWarner Pvt. Ltd
75, General Block, MIDC, Bhosari
Pune 411026 India
Tel - 912027129690, 27302000, Fax - 912027129691

Contact Persons:

1. Mr. Sadashiv Manjre (Head - Customer Service)
Mob. No. 08308831936
2. Mr. Chitale (Service Manager)
Mob. No. 09881255496
3. Mr. Zaheed Inamdar (Service engineer)
Mob. No. 08308831932

2. Front & Rear Axle:

Supplier Name: SPICER INDIA LTD.
29 Milestones, Pune- Nasik Highway
Village: Kurudi, Tal: Khed, Dist.: Pune - 410501
Tel: 922135301136, Fax- 912135301122

Contact Persons:

1. Mr. S Maheshwaran (Service Incharge - All India)
Mob. No. 09552510560
2. Mr. D Prabhakaran
Mob. No. 09525510464

Note: For detailed maintenance & repair procedures please refer Xenon 3L 4X4 BS3 workshop manual.