



PARTICIPANT HANDBOOK



Automotive

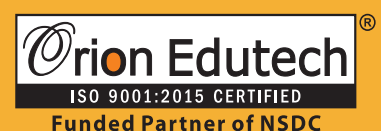
Language:
English

Basic Automotive Service Technician (2 and 3 Wheelers)



N · S · D · C
National
Skill Development
Corporation

Transforming the skill landscape



Funded Partner of NSDC

Basic Automotive Service Technician (2 & 3 Wheelers)



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Welcome Note

Dear Participant,

Welcome to the "**Basic Automotive Service Technician (2 & 3 Wheelers)**" training programme. On completion of this programme, it is expected that you will join the automobile industry as an LMV Driver, Commercial Vehicle Driver, Taxi Driver or Driving Assistant. As a driving assistant or mechanic, you would be able to lubricate the parts of the vehicle, locate the defects and attend to the minor maintenance of different types of light motor vehicles.

Read each module, log in your key learnings and attempt the worksheet questions at the end.

General Instructions to Trainee:

- 1.** Greet your instructor and the other participants when you enter the class.
- 2.** Always be punctual in every class.
- 3.** Be regular. Candidates, who fall short of the required attendance, will not be certified.
- 4.** Inform your instructor if you need to miss a class for any reason/s.
- 5.** Pay attention to what your instructor is saying or showing.
- 6.** If you do not understand anything, put up your hand and seek clarification without any hesitation.
- 7.** Make sure you do all the exercises at the end of each module in this book. It will help you understand the concepts better.
- 8.** Practice any new skills you have learnt as many times as possible. Seek the help of your Trainer or co-participant for practice.
- 9.** Take all necessary precautions, as instructed by your Trainer, while working with electricity and with tools.
- 10.** Make sure you are neatly attired and presentable at all times.
- 11.** Participate actively in all the activities, discussions and games during training.
- 12.** Always take a bath, wear clean clothes and comb your hair before you come to class.
- 13.** The three most important words you must always remember and use in your daily conversations are PLEASE, THANK YOU and SORRY.

Introduction

Driving safely through chaotic Indian roads requires more precautions than one can imagine. When you take your vehicle out on the streets, the first thing you see is how vehicles attempt to overtake each other from different sides. Hence, safety becomes the first priority when you get behind the wheels of a vehicle.

What is therefore essential is an effective training programme that would let one drive light motor vehicles like 2 & 3 wheelers with absolute safety. Driving in traffic is more than just knowing how to operate the mechanisms that control the vehicle; it requires knowing how to apply the rules of the road, which ensures safe and efficient driving.

An educated driver will always have an intuitive understanding of the basics of vehicle handling that would keep him/her not only safe and alert but also quite confident while driving on the roads. One will also know everything about driving heavy as well as light motor vehicles on different kinds of roads and surfaces keeping in mind the traffic rules

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CHAPTER - 1

GENERAL SERVICE INFORMATION

LEARNING OUTCOMES:



- Getting knowledge about the job role of Automotive Service Technician
- Gathering knowledge on general service information
- Knowing different general safety tips
- Identifying 2 and 3 wheeler components

PRE-SESSION ACTIVITY

- The trainer will ask the trainees to share their ideas on how to maintain road safety. The trainees will one by one share their ideas on the same.

1.1 General introduction of an Automotive Service Technician:

1.1.1 Who is an Automotive Service Technician?

A: Like the other technicians, an automotive service technician also inspects, maintains and repairs electric, gas, hybrid and alternative fuel vehicles. In smaller businesses, their duties may include a full range of repair and maintenance services.

1.1.2 Job duties of an Automotive Service Technician:

- The main duty is to identify mechanical problems. They can often use computerized diagnostic equipment.
- They have to test all parts and systems to ensure that they are working properly.
- They have to follow the checklists to ensure that all critical parts are examined.
- They have to perform basic care and maintenance, including changing oil, giving tune-ups, checking fluid levels, and rotating tyres.
- They have to repair or replace worn parts, such as brake pads and wheel bearings.
- In addition to that, they do disassemble and reassemble parts of a vehicle.
- They also use testing equipment to ensure that repairs and maintenance are effective.
- Lastly, they explain to the clients about their automotive vehicle/s problems and the repairs that should be done.

1.1.3 Other job responsibilities:

- Beside these, Service technicians work on traditional mechanical components such as engines, transmissions and drive belts. However, they must be familiar with a growing number of electronic systems, like braking, transmissions, and steering systems, which are controlled primarily by computers and electronic components.
- Other integrated electronic systems, such as accident-avoidance sensors, are becoming common as well. In addition, a growing number of technicians are required to work on vehicles that run on alternative fuels, such as ethanol and electricity.
- Service technicians use many different tools, including computerized diagnostic tools and power tools such as pneumatic wrenches, lathes, welding torches, and jacks and hoists. These tools usually are owned by their employers.
- Service technicians also use many common hand tools, such as sockets and ratchets, wrenches and pliers. These tools are generally owned by service technicians.

1.2 General Service Information:

1.2.1 Important facts about vehicle maintenance:

When a vehicle is properly maintained, it will be more dependable, safer, last longer and increase the satisfaction with the product. The owners also have a responsibility towards the environment and make sure that they give equal importance to the emission control. Regular service and regular maintenance helps to accomplish these goals by keeping the engine running efficiently.

1.2.2 The effects of maintaining a vehicle properly:

- More dependable vehicle
- Less chance of a costly breakdown
- A safer vehicle and goods
- Cleaner and environment friendly vehicle
- Higher resale value at the time of trade in or sale
- An intact warranty

1.2.3 Manufacturer maintenance schedules:

It is prescribed to maintain a proper schedule for outlining specific operations so that the various components and systems can work properly. This is done at different mileage intervals to ensure proper operation and prevent premature wear.

1.2.4 Safety and Scheduled Maintenance:

The safety aspect of properly maintaining a vehicle, especially when it has a high mileage, should not be ignored. Failing brakes and other problems can be prevented by following Vehicle Preventive Maintenance & care practices.

- **High mileage inspection and evaluation:**

If the vehicle has passed the 100,000 mile mark and the owner wants to prolong its useful life, then it is the time to have it thoroughly evaluated by a trained technician who can recommend needed repairs or service. It is a technician's job to guide the owner using factory-level information detailing the vehicle's service requirements.

- **Recommendations for changing filters:**

It is best to follow the Service maintenance schedules found in most new vehicle owner's manuals, with a few exceptions:

- ✓ Air filters need to be inspected regularly and replaced as often as needed. Dirty air filters can increase fuel consumption and exhaust emissions.
- ✓ Fuel filters should be replaced as per our recommended schedule. If the tank is dirty or rusty, constant fuel recirculation can pick up a lot of debris that ends up in the filter.
- ✓ If the filter plugs, the engine is starved for fuel or unfiltered fuel and later on this can damage injectors.
- ✓ Owners' manuals have a suggested change interval for the transmission fluids which should be followed and known to the technician.

- **Cooling System:**

- ✓ Replacing coolant on a regular basis will extend the life of the radiator and other cooling system components.
- ✓ Whenever a fluid comes in contact with metal, electro-chemical degradation occurs. This results in an increase in the level of acid. This higher acid level, if left unchanged, can result in costly repairs.
- ✓ Regular change helps in reducing the acid level and extends the life of key cooling system parts like the water pump, radiator, hoses, heater core and more.
- ✓ When coolant is changed, the system should be reverse flushed rather than simply drained. This helps dislodge and remove accumulated debris and debris in the system. It also removes old coolant that would otherwise remain in the engine block.

- **Brake Fluid:**

Brake fluid, just like any other fluid in the vehicle, needs to be tested every year and replaced at least every 2 years. The main problem with brake fluid is that it absorbs moisture (hygroscopic) from the air. This reduces the boiling point of the brake fluid, causing the fluid to boil under heavy braking, affecting hydraulic operation of the brake system. This results in a spongy brake pedal and reduced braking effectiveness. See the owner's manual for more information.

**DO YOU KNOW?**

The first road-worthy vehicles used a lever instead of a steering wheel to steer.

• **Other preventive maintenance tips:**





- ✓ Inspect windshield wiper blades for cracks, tears and windshield smearing.
- ✓ Check tyre inflation weekly. Under-inflated tyres waste fuel and cause uneven tyre wear.
- ✓ Under-inflated tyres can lead to tyre overheating and complete tyre failure.
- ✓ Inspect drive belts every time the oil is changed and replace when they show any signs of cracking or wear.
- ✓ Check battery cables and connections for corrosion and clean if needed.
- ✓ Check all vehicle lights, including headlights, brake lights, turn signals, parking lights, license plate lights and marker lights.


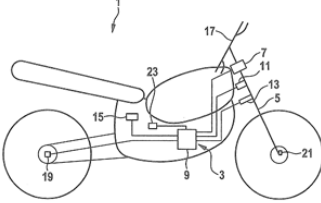
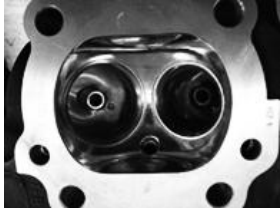







1.3 General Safety:





Following are some of the safety rules every person should follow:

<p>Awareness of traffic signs includes-</p> <ul style="list-style-type: none"> • Hand Signals • Direction Indicators • Traffic Signs and Signals • Lanes of the Road 	
<p>Speeding limit-</p> <ul style="list-style-type: none"> • Install Speed Witness Radars • Always wear your shields 	
<p>Seat belts-</p> <ul style="list-style-type: none"> • Always wear seat belts in a four wheeler • Always wear helmet on a two wheeler 	

<p>Awareness through hoardings –</p> <ul style="list-style-type: none"> • While driving, keep an eye on the hoardings that are often quite helpful for drivers. 	
<p>Insurance covers for all drivers –</p> <ul style="list-style-type: none"> • All drivers must ensure that they have driving insurance policies. 	
<p>Design feature of the vehicles –</p> <ul style="list-style-type: none"> • It is very important for any driver to check the design of the driving area so that he/she can drive with ease. 	
<p>Proper road maintenance and warnings –</p> <ul style="list-style-type: none"> • One of the most important safety rules is to follow the road signs and symbols so that there is no possibility of accidents. 	

1.4 Handling of 2 wheeler components:

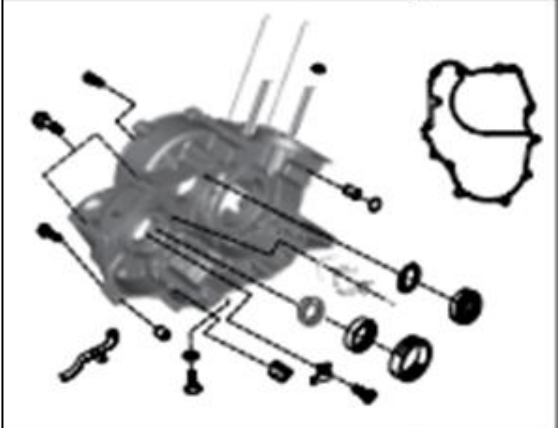
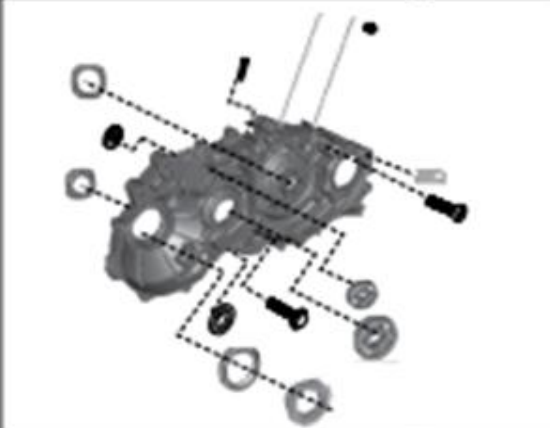
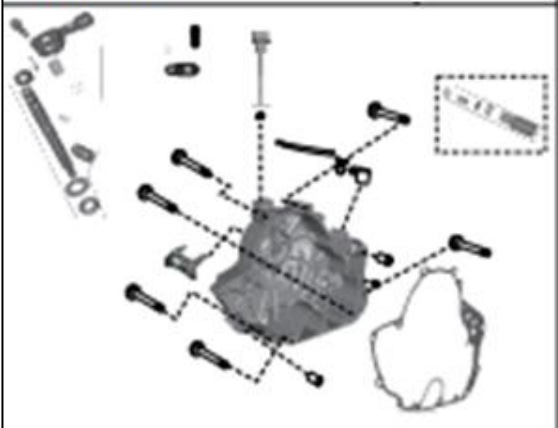
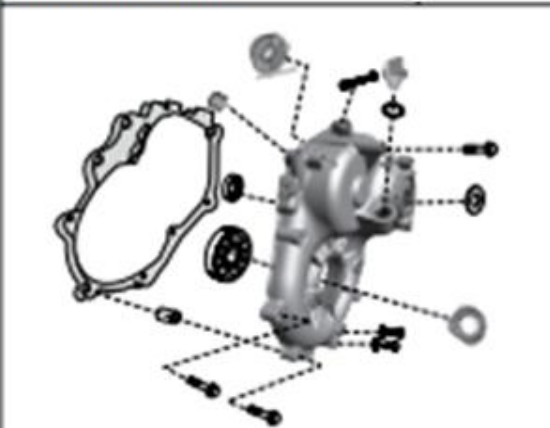
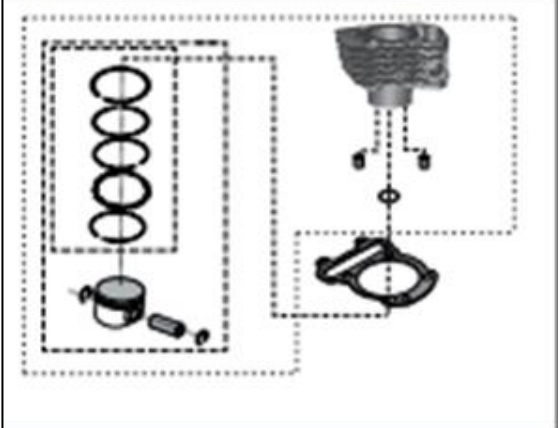

<p style="text-align: center;">Air filter assembly</p> 	<p style="text-align: center;">Chassis frame</p> 
<p style="text-align: center;">Auto valve</p> 	<p style="text-align: center;">Clutch assembly</p> 
<p style="text-align: center;">Brake pedal</p> 	<p style="text-align: center;">Clutch cover</p> 
<p style="text-align: center;">Camshafts</p> 	<p style="text-align: center;">Control cables</p> 
<p style="text-align: center;">Carburettor</p> 	<p style="text-align: center;">Crank case</p> 



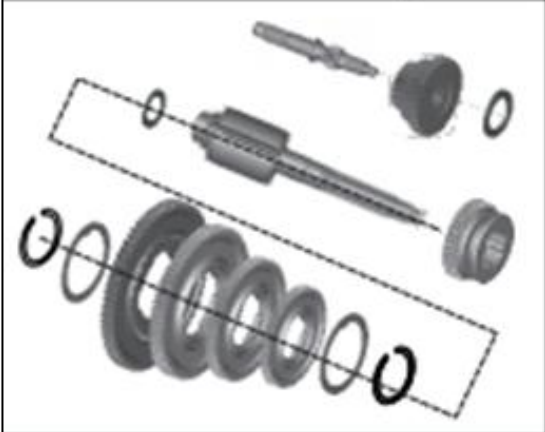
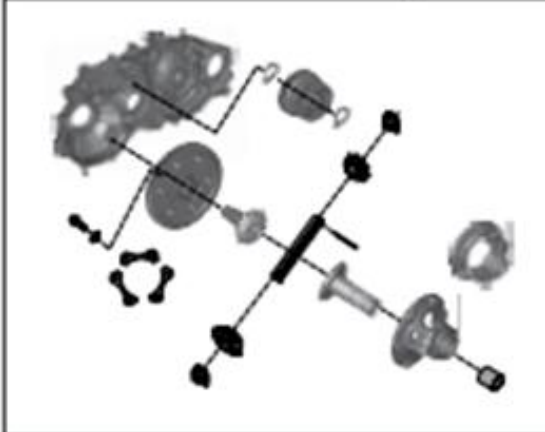
<p style="text-align: center;">Chain case</p> 	<p style="text-align: center;">Crankshaft</p> 
<p style="text-align: center;">Chain cover</p> 	<p style="text-align: center;">Cylinder and piston assembly</p> 
<p style="text-align: center;">Vehicle number plate</p>	<p style="text-align: center;">Fuel tank cap</p>
<p style="text-align: center;">Electrical equipment</p>	<p style="text-align: center;">Handle bar</p>
<p style="text-align: center;">Fork front</p>	<p style="text-align: center;">Handle lamp assembly</p>
<p style="text-align: center;">Front fender</p>	<p style="text-align: center;">Kick starter</p>
<p style="text-align: center;">Front hub</p>	<p style="text-align: center;">Meter assembly</p>

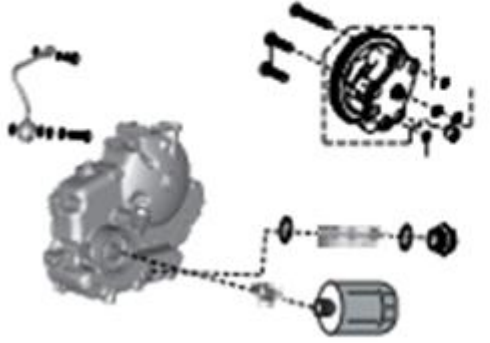
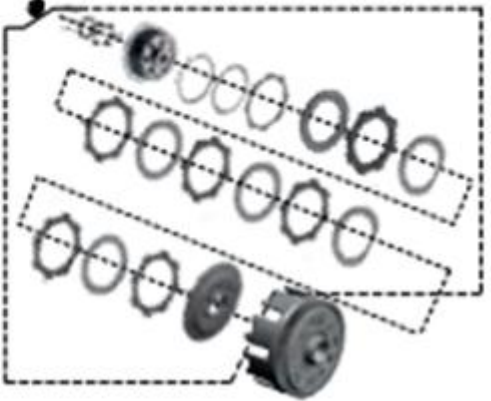

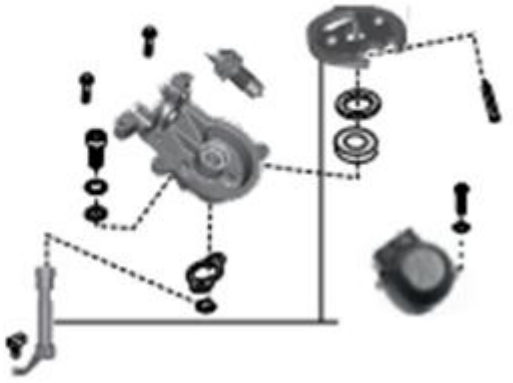
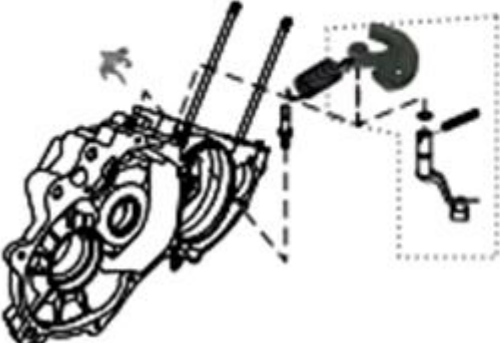
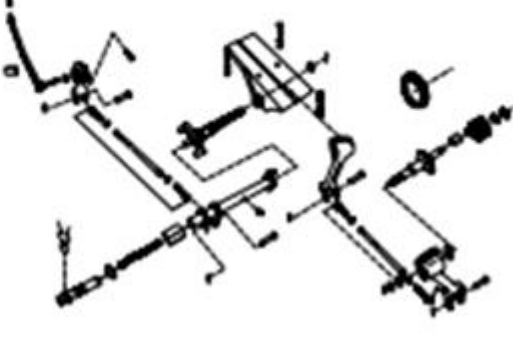
1.5 Handling of 3 wheeler components:



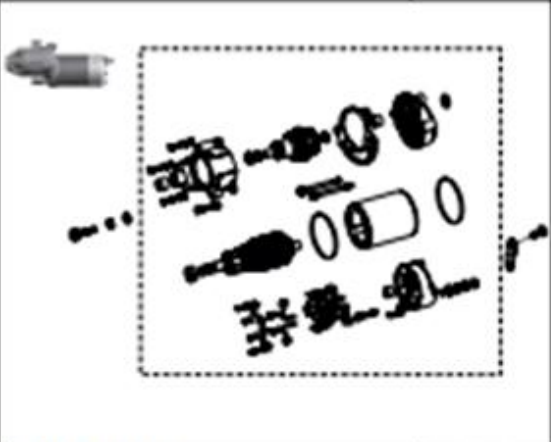
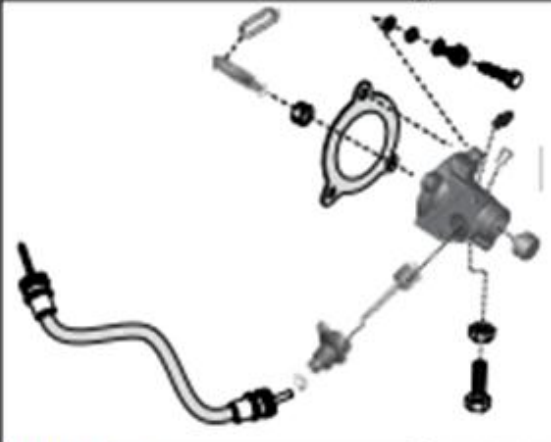
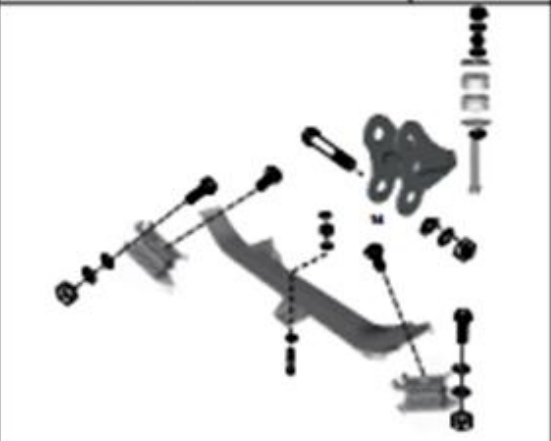
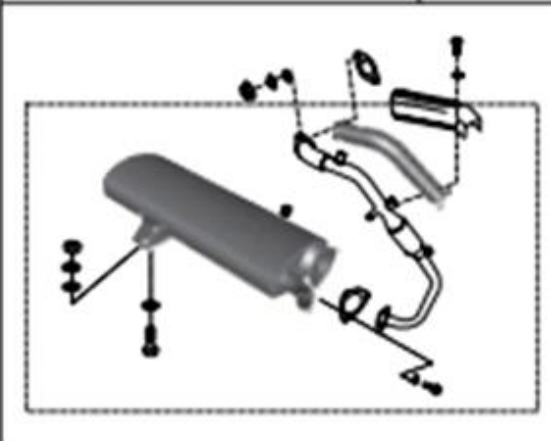
S.N.	Description
1	Engine & Crankcase Clutch Side
2	Crank Case Magneto Side
3	Clutch Cover
4	Differential Cover
5	Cylinder / Piston Assembly
6	Cylinder Head
7	Rocker Arm Assly & Valve
8	Cam Shaft & Chain Tensioner
9	Crank Shaft Assembly
10	Main Shaft
11	Gear Transmission
12	Differential Assembly
13	Pump Assly Oil
14	Clutch Plate Assly
15	Clutch Housing Comp
16	Gear Shifter Assly
17	Sector Complete - Revers Gear
18	Sector Gear Assly
19	Cowling
20	Magneto Assembly & H.T. Coil
21	Starter Motor Assly
22	Fare Meter Drive Unit
23	Engine Mounting
24	Silencer Assembly
25	Carburettor
26	Air Filter Complete
26a	Air Filter Complete
27	Pipe air intake
28	Oil Cooler
29	Petrol Tank & Petrol Cock Assly.
29a	Petrol Tank & Petrol Cock Assly.
29b	Petrol Tank & Petrol Cock Assly.
30	Propeller Shaft / Flanges
31	CV Shaft
32	Training Arm Assly.
32a	Training Arm Assly.

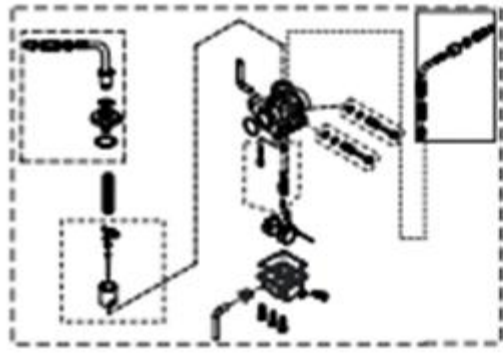
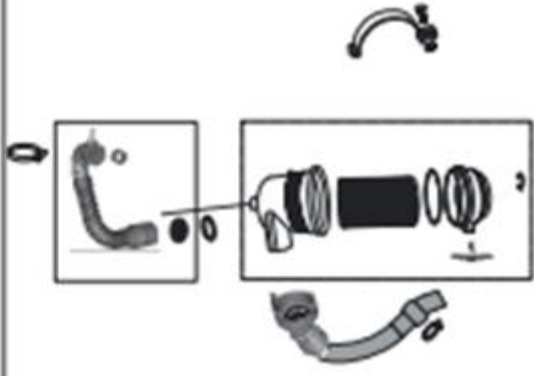



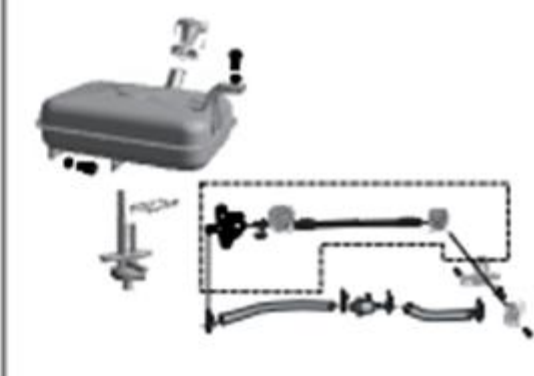
S.N.	Description
33	Rear Wheel exle
33a	Rear Wheel exle
34	Front Shock Absorber & Drum
35	Front Shock Absorber & linkage
36	Front Hub
37	Front brake drum
40	Front Mudguard
39	Auto Adjuster Brake System
40	Steering Column Assly.
41	Brake Pipe
42	Tandon Master Cylinder
43	Brake Pedal
44	Clutch Pedal
45	Handle Bar Assly.
46	Control Cables
47	Frame Chassis Assly
48	Harness Wiring
49	Dashboard Assembly
50	Wind Shield & Wiper Motor
51	Steering & Head Lamp cover
52	Passenger Body
52a	Passenger Body
53	Hood Frame Assly & Seat Assly.
53a	Hood Frame Assly & Seat Assly.
54	Head Light Assly & Blinkers
55	Tail Lamp Assly
56	Switches & Horn
57	Electrical Units
58	Cylinder for CNG & LPG Vehicle
59	Hoses
60	Relay & Solenoid
51	Filter Valve
62	1st Stage Reduction Unit
63	Regulator
64	Multi Valve(Zero Deg)
65	Battery

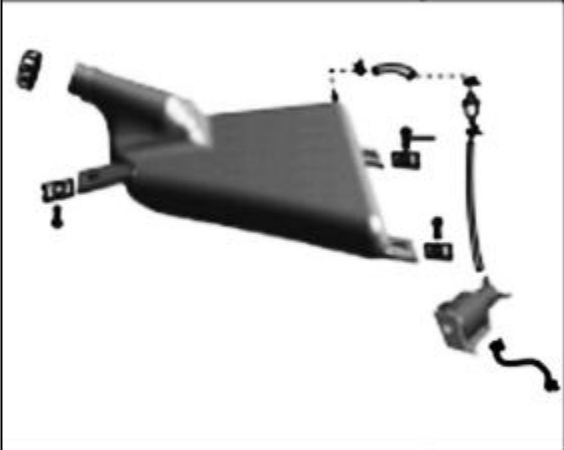
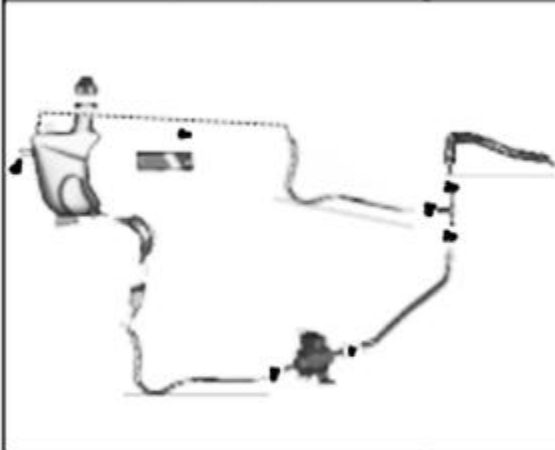
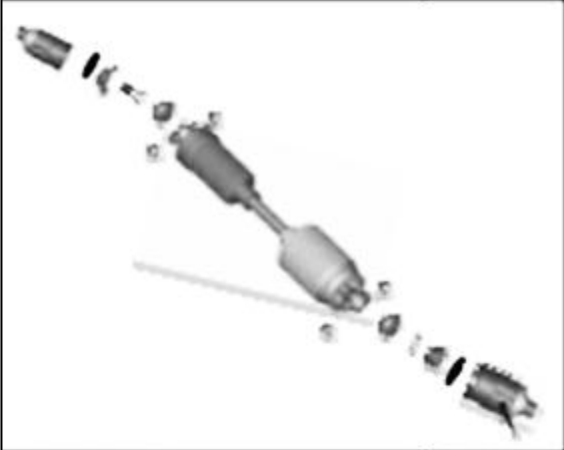
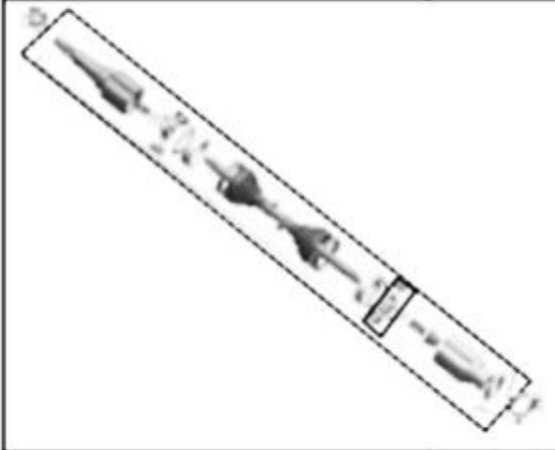
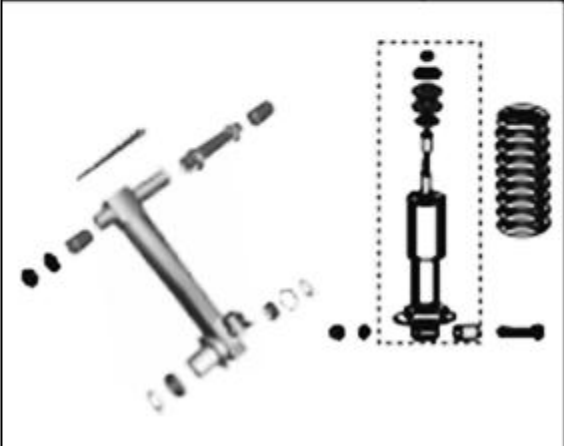
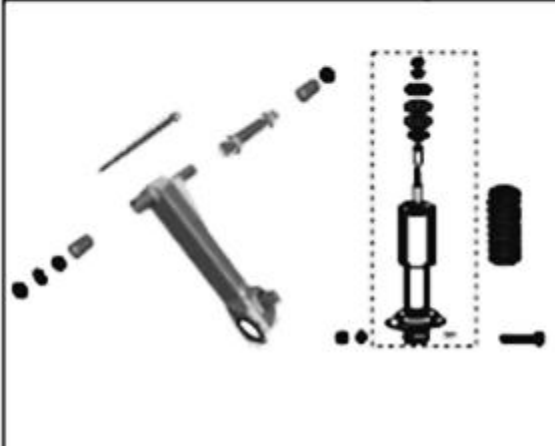
Pictorial Index		RE 45/4-STROKE PETROL,CNG,LPG
PLATE NO. : 1 ENGINE & CRANKCASE CLUTCH SIDE	PLATE NO. : 2 CRANKCASE MAGNETO SIDE	
		
PLATE NO. : 3 CLUTCH COVER	PLATE NO. : 4 DIFFERENTIAL COVER	
		
PLATE NO. : 5 CYLINDER / PISTON ASSEMBLY	PLATE NO. : 6 CYLINDER HEAD	
		


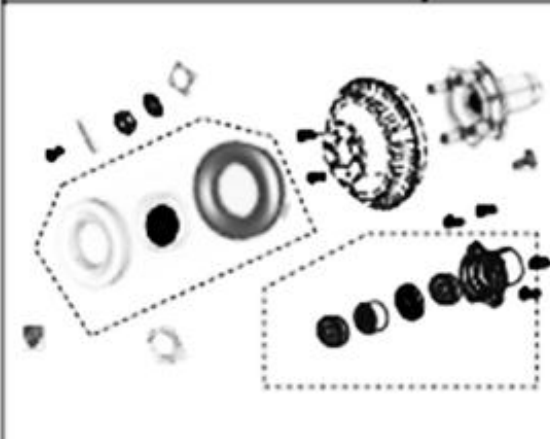
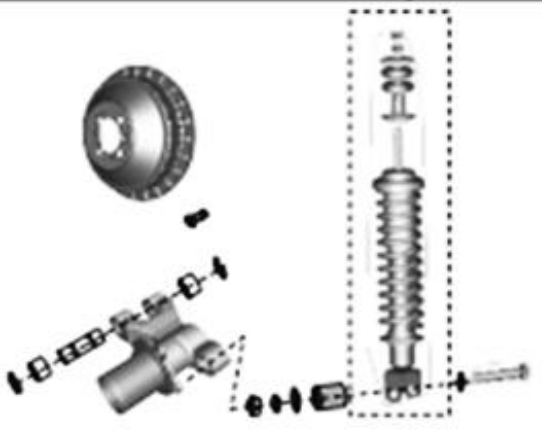
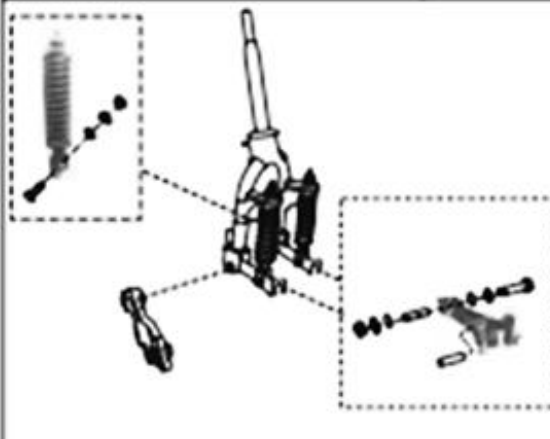


Pictorial Index		RE 45/4-STROKE PETROL,CNG,LPG
PLATE NO. : 7 ROCKER ARM ASSLY & VALVE		PLATE NO. : 8 CAM SHAFT AND CHAIN TENSIONER
PLATE NO. : 9 CRANK SHAFT ASSEMBLY		PLATE NO. : 10 MAIN SHAFT
PLATE NO. : 11 GEAR TRANSMISSION	PAGE NO.:	PLATE NO. : 12 DIFFERENTIAL ASSEMBLY
		


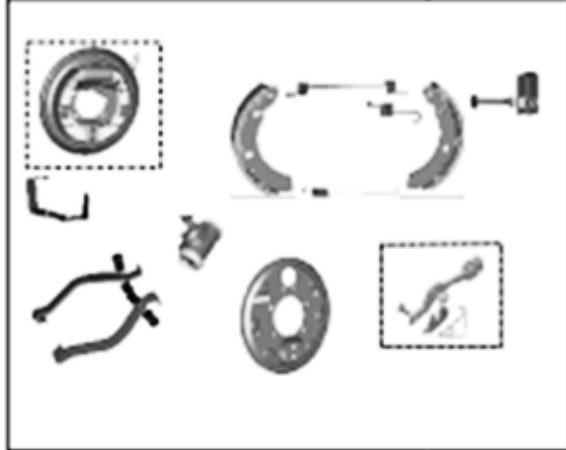
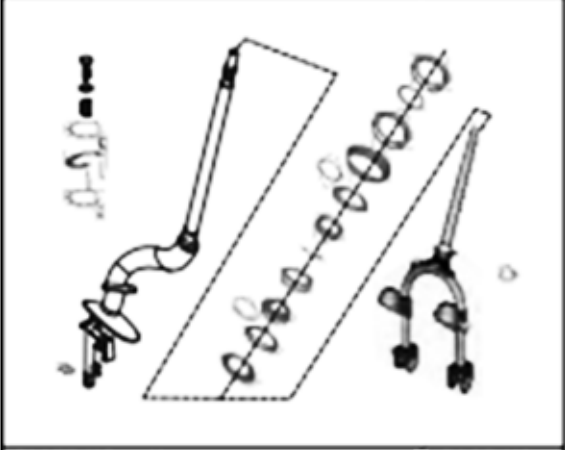
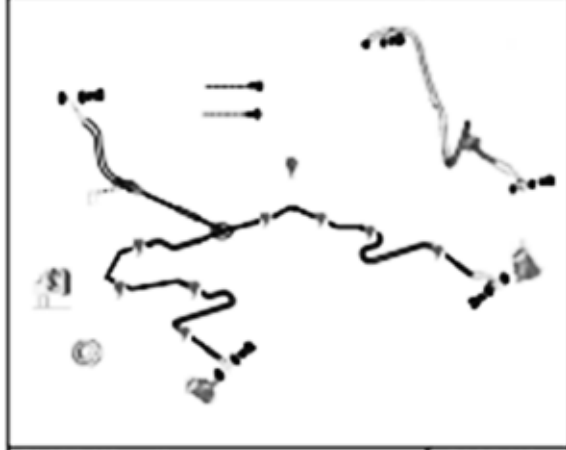
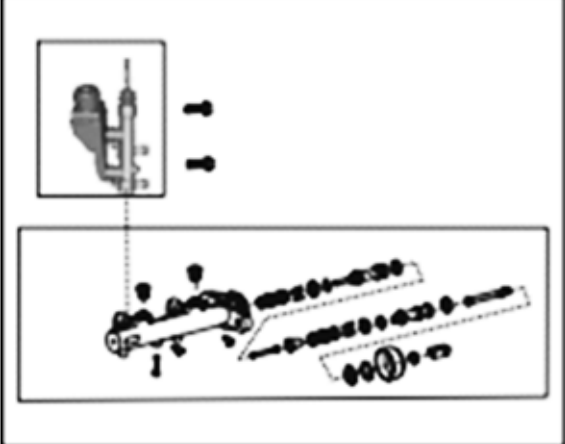
Pictorial Index		RE 45/4-STROKE PETROL, CNG, LPG
PLATE NO. : 13 PUMP ASSLY OIL	PLATE NO. : 14 CLUTCH PLATE ASSLY	
		
PLATE NO. : 15 CLUTCH HOUSING COMPLETE	PLATE NO. : 16 GEAR SHIFTER ASSEMBLY	
		
PLATE NO. : 17 SECTOR COMPLETE-REVERS GEAR	PLATE NO. : 18 SECTOR GEAR ASSLY	
		

Pictorial Index		RE 45/4-STROKE PETROL, CNG, LPG	
PLATE NO. : 19 COWLING		PLATE NO. : 20 MAGNETO ASSEMBLY & H.T. COIL	
PLATE NO. : 21 STARTER MOTOR ASSLY		PLATE NO. : 22 FARE METER DRIVE UNIT	
PLATE NO. : 23 ENGINE MOUNTING		PLATE NO. : 24 SILENCER ASSEMBLY	

Pictorial Index		RE 45/4-STROKE PETROL, CNG, LPG
<p>PLATE NO. : 25 CARBURETTOR</p> 	<p>PLATE NO. : 26 AIR FILTER COMPLETE</p> 	
<p>PLATE NO. : 26a AIR FILTER COMPLETE</p> 	<p>PLATE NO. : 27 PIPE AIR INTAKE</p> 	
<p>PLATE NO. : 28 OIL COOLER</p> 	<p>PLATE NO. : 29 PETROL TANK</p> 	

Pictorial Index		RE 45/4-STROKE PETROL,CNG,LPG
<p>PLATE NO. : 29a ENGINE & CRANKCASE CLUTCH SIDE</p> 	<p>PLATE NO. : 29b PETROL TANK (CNG/LPG)</p> 	
<p>PLATE NO. : 30 PROPELLER SHAFT / FLANGES</p> 	<p>PLATE NO. : 31 CV SHAFT</p> 	
<p>PLATE NO. : 32 TRAILING ARM/ RR SH. ABS</p> 	<p>PLATE NO. : 32a TRAILING ARM/ RR SH. ABS</p> 	

Pictorial Index		RE 45/4-STROKE PETROL, CNG, LPG
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<p>PLATE NO. : 34 FRONT SHOCK ABSORBER & DRUM</p> 	<p>PLATE NO. : 35 FRONT SHOCK ABSORBER & LINKAGE</p> 	
<p>PLATE NO. : 36 FRONT HUB</p> 	<p>PLATE NO. : 37 FRONT BRAKE DRUM</p> 	

Pictorial Index		RE 45/4-STROKE PETROL, CNG, LPG
<p>PLATE NO. : 38 FRONT MUDGUARD</p> 	<p>PLATE NO. : 39 AUTO ADJUSTER BRAKE SYSTEM</p> 	
<p>PLATE NO. : 40 STEERING COLUMN ASSLY.</p> 	<p>PLATE NO. : 41 BRAKE PIPE</p> 	
<p>PLATE NO. : 42 TANDEM MASTER CYLINDER</p> 	<p>PLATE NO. : 43 BRAKE PEDAL</p> 