

ENGINEERING DRAWING

(NSQF)

2nd YEAR
(For 2 Year Trades)

(As per Revised Syllabus July 2022)

Group 24

Group 24 CTS Trades Covered

Mechanic Agricultural Machinery, Mechanic Motor Vehicle,
Mechanic Electric Vehicle



Directorate General of Training

DIRECTORATE GENERAL OF TRAINING
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
GOVERNMENT OF INDIA



NATIONAL INSTRUCTIONAL
MEDIA INSTITUTE, CHENNAI

Post Box No. 3142, CTI Campus, Guindy, Chennai - 600 032

Engineering Drawing (NSQF) 2nd Year (For 2 Year Trades)

Group 24 Engineering Trades

As per Revised syllabus July 2022 under CTS

Developed & Published by



National Instructional Media Institute

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FOREWORD

The Government of India has set an ambitious target of imparting skills one out of every four Indians, to help them secure jobs as part of the National Skills Development Policy. Industrial Training Institutes (ITIs) play a vital role in this process especially in terms of providing skilled manpower. Keeping this in mind, and for providing the current industry relevant skill training to Trainees, ITI syllabus has been recently updated with the help of comprising various stakeholder's viz. Industries, Entrepreneurs, Academicians and representatives from ITIs.

The National Instructional Media Institute (NIMI), Chennai, has now come up with instructional material to suit the revised curriculum for **Engineering Drawing 2nd Year (For 2 Year Trades) NSQF Group 24 Engineering Trades (Revised 2022)** under CTS will help the trainees to get an international equivalency standard where their skill proficiency and competency will be duly recognized across the globe and this will also increase the scope of recognition of prior learning. NSQF trainees will also get the opportunities to promote life long learning and skill development. I have no doubt that with NSQF the trainers and trainees of ITIs, and all stakeholders will derive maximum benefits from these IMPs and that NIMI's effort will go a long way in improving the quality of Vocational training in the country.

The Director General of Training, Executive Director & Staff of NIMI and members of Media Development Committee deserve appreciation for their contribution in bringing out this publication.

Jai Hind

ATUL KUMAR TIWARI, I.A.S.

Secretary
Ministry of Skill Development & Entrepreneurship,
Government of India.

December 2023
New Delhi - 110 001

PREFACE

The National Instructional Media Institute(NIMI) was set up at Chennai, by the Directorate General of Training, Ministry of skill Development and Entrepreneurship, Government of India, with the technical assistance from the Govt of the Federal Republic of Germany with the prime objective of developing and disseminating instructional Material for various trades as per prescribed syllabus and Craftsman Training Programme(CTS) under NSQF levels.

The Instructional materials are developed and produced in the form of Instructional Media Packages (IMPs), consisting of Trade Theory, Trade Practical, Test and Assignment Book, Instructor Guide and Wall charts. The above material will enable to achieve overall improvement in the standard of training in ITIs.

A national multi-skill programme called SKILL INDIA, was launched by the Government of India, through a Gazette Notification from the Ministry of Finance (Dept of Economic Affairs), Govt of India, dated 27th December 2013, with a view to create opportunities, space and scope for the development of talents of Indian Youth, and to develop those sectors under Skill Development.

The emphasis is to skill the Youth in such a manner to enable them to get employment and also improve Entrepreneurship by providing training, support and guidance for all occupation that were of traditional types. The training programme would be in the lines of International level, so that youths of our Country can get employed within the Country or Overseas employment. The **National Skill Qualification Framework (NSQF)**, anchored at the National Skill Development Agency(NSDA), is a Nationally Integrated Education and competency-based framework, to organize all qualifications according to a series of **levels of Knowledge, Skill and Aptitude**. Under NSQF the learner can acquire the Certification for Competency needed at any level through formal, non-formal or informal learning.

The **Engineering Drawing** 2nd Year (For 2 Year Trades) NSQF Group 24 - Engineering Trades (Revised 2022) under CTS is one of the book developed by the core group members as per the NSQF syllabus.

The **Engineering Drawing** 2nd Year (For 2 Year Trades) NSQF Group 24 - Engineering Trades under (Revised 2022) CTS as per NSQF is the outcome of the collective efforts of experts from Field Institutes of DGT, Champion ITI's for each of the Sectors, and also Media Development Committee (**MDC**) members and Staff of **NIMI**. NIMI wishes that the above material will fulfill to satisfy the long needs of the trainees and instructors and shall help the trainees for their Employability in Vocational Training.

NIMI would like to take this opportunity to convey sincere thanks to all the Members and Media Development Committee (MDC) members.

Chennai - 600 032

EXECUTIVE DIRECTOR

ACKNOWLEDGEMENT

The National Instructional Media Institute (NIMI) sincerely acknowledge with thanks the co-operation and contribution of the following Media Developers to bring this IMP for the course **Engineering Drawing 2nd Year (For 2 Year Trades) Group 24 - Engineering Trades** as per NSQF Revised 2022.

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NIMI CO-ORDINATORS

Shri. Nirmalya Nath	-	Deputy General Manager, NIMI, Chennai - 32.
Shri. G. Michael Johny	-	Manager, NIMI, Chennai - 32.

NIMI records its appreciation of the **Data Entry, CAD, DTP Operators** for their excellent and devoted services in the process of development of this IMP.

NIMI also acknowledges with thanks, the efforts rendered by all other staff who have contributed for the development of this book.

INTRODUCTION

Theory and procedure along with the related exercises for further practice

This book on theory and procedure along with related exercises contains theoretical information on **2nd Year Engineering drawing** NSQF (For 2 Year Revised syllabus July 2022 Group 24 - Engineering Trades) and procedure of drawing/ sketching different exercise for further practice are also available. Wherever required, BIS specification has been used.

Exercise for further practice

The practice exercise is given with Theory and procedure for 2nd Year book made obsolete as it was felt that, it is very difficult to work in workbook using drawing instruments. It is well known fact that, any drawing is prepared on suitable standard size of drawing sheets only.

The instructor is herewith advised to go through the instructions given below and to follow them in view of imparting much drawing skill in the trainees.

Acquiring the above said ability and doing small drawings is not a simple task. These books will provide a good platform for achieving the said skills.

Time allotment - 2nd Year : 40 Hrs

Sl. No.	Topic	Exercise No.	Time in Hrs
1	Reading of Electrical, Electronic & Mechanical Sign and Symbols used in Automobile	2.1.01	4
2	Sketches of Electrical, Electronic & Mechanical components used in Automobile	2.2.02	6
3	Reading of Electrical wiring diagram and Layout diagram used in Automobile	2.3.03	10
4	Drawing of electrical circuit diagram used in automobile	2.4.04	10
5	Drawing of Block diagram of Instruments & equipment of trades	2.5.05	10
			40 Hrs

Instructions to the Instructors

It is suggested to get the drawing prepared on A4/A3 sheets preferably on only one side. If separate table and chair facility is available for every trainee then it is preferred to use A3 sheets and if the drawing hall is provided with desks then A4 sheets may be used. However while preparing bigger drawings on A4 sheets suitable reduction scale to be used or multiple sheets may be used for detailed and assembly drawings.

First the border and the title block to be drawn only for the first sheet of the chapter. Eg. for conical sections only first sheet will have the title block whereas the rest of the sheets of that chapter will have only borders.

Serial number of sheet and total no. of sheets to be mentioned on each sheet.

The completed sheet to be punched and filled in a box file/ suitable files and preserved by the trainees carefully after the approval of instructor, VP and Principal of the Institute.

The file may be referred by the authority before granting the internal marks at the end of the Year.

CONTENTS

Exercise No.	Topic of the Exercise	Page No.
2.1.01	Reading of Electrical, Electronic & Mechanical Sign and Symbols used in Automobile Reading of electrical, electronic & mechanical sign and symbols used in automobile	1
2.2.02	Sketches of Electrical, Electronic & Mechanical components used in Automobile Sketches of electrical, electronic & mechanical components used in automobile	8
2.3.03	Reading of Electrical wiring diagram and Layout diagram used in Automobile Reading of electrical wiring diagram and layout diagram used in automobile	14
2.4.04	Drawing of Electrical circuit diagram used in Automobile Drawing of electrical circuit diagram used in automobile	18
2.2.05	Drawing of Block diagram of Instruments & equipment of trades Drawing of block diagram of instruments & equipment of trades	21

LEARNING / ASSESSABLE OUTCOME

On completion of this book you shall be able to

- **Read and apply engineering drawing for different application in the field of work. NOSCSC/N9401**

SYLLABUS

2nd Year

**Group 24 - Revised syllabus July 2022
2 Year Engineering trades under CTS**

Duration: 2 Year

CTS Trades Covered: Mechanic Agricultural Machinery, Mechanic Motor Vehicle,
Mechanic Electric Vehicle






S.no.	Syllabus	Time in Hrs
1	Reading of Electrical, Electronic & Mechanical Sign and Symbols used in Automobile	4
2	Sketches of Electrical, Electronic & Mechanical components used in Automobile	6
3	Reading of Electrical wiring diagram and Layout diagram used in Automobile	10
4	Drawing of Electrical circuit diagram used in Automobile	10
5	Drawing of Block diagram of Instruments & equipment of trades	10
	Total	40

Reading of electrical, electronic & mechanical sign and symbols used in automobile







Traffic signs











Traffic signs are divided into 3 main categories














- Mandatory/Regulatory signs
- Cautionary signs
- Information signs

	Red circle instructs what should not be done.
	Blue circle instructs what should be done
	Triangle cautions
	Blue rectangle informs
	Restriction ends sign This sign indicated the point at which all prohibitions notified by prohibitory signs for moving of vehicles cease to apply.

Typical cautionary sign

	
Right/Left hand curve: This sign is used where the direction of curve changes. The sign warns the driver to reduce the speed and proceed caution along the road.	
	
Right/Left hair pin bend: This sign is used where the change in direction is so considerable that it amounts to reversal of direction. The symbol bends to right or left depending upon the road alignment.	
	
Right/Left reverse bend: This sign is used where the nature of the reverse bend is not obvious to approaching traffic and constitutes a hazard. If the first curve is to the right, a right reverse bend shall be used. If the first curve is to the left, a left reverse bend is used.	

	Narrow bridge: This sign is erected on roads in advance of bridges where the clear width between the kerbs or wheel guards is less than normal width or carriageway.
	Gap in Median: This sign is installed ahead of a gap in the median of a divided carriageway, other than an intersection.
	Narrow road: This sign is normally found in rural areas where a sudden reduction in width of pavement causes a danger to traffic.
	Road widens: This sign is normally found in rural areas where a sudden widening of road causes a danger to traffic, such as, a two-lane road suddenly widening to a dual carriageway.
	Cycle crossing: This sign is erected in advance of all uncontrolled cycle crossings.
	Pedestrian crossing: This sign is erected in advance of both approaches to uncontrolled pedestrian crossings.
	School: This sign is erected where school buildings or grounds are adjacent to the road where the traffic creates a hazard to children.
	Men at work: This sign is displayed only when men and machines are working on the road or adjacent to it or on overhead lines or poles. This sign is removed when the work is completed.
	
Side road left/right: This sign is displayed in advance of the side road intersections where a large volume of entering traffic together with restricted sight distance is likely to constitute a hazard. The driver is warned of the existence of a junction.	

		
Y-Intersection: These signs are displayed on the approach to a bifurcation on any road. This sign warns of the existence of a junction and no other indication given.		
		
Major road: These signs are displayed in advance of crossing with the major road, where a sufficiently large volume of traffic together with a sufficiently large volume of traffic together with restricted sight is likely to cause a hazard.		
		
Staggered Intersection: This sign is used to indicate junctions where the distance between two junctions is not more than 60 meters.		
	T Intersection: This sign is displayed in advance of T-junctions where the nature of inter-section is not obvious to approaching traffic. This sign is used to warn the driver of the existence of a junction.	
	Roundabout: This sign is used where it is necessary to indicate the approach to a roundabout.	
	Start of dual carriageway: This sign is displayed when a single carriageway ends into a dual carriageway.	
	End of dual carriageway: This sign is displayed when a dual carriageway is ending and a single carriageway is starting.	
		
Reduced carriageway: These signs caution the driver of the reduction in the width of the carriageway ahead. This is displayed on undivided carriageways when some portion of the carriageway is closed or reduced for repairs.		

	Two way operation: This sign is used to caution the driver of a changed pattern of traffic operation of the carriageway expected to carry traffic in one direction only.
	Cross Road: This sign is displayed in advance of the cross road where a sufficiently large volume of crossing or entering traffic with restricted sight distance is likely to constitute a hazard.
	Cattle: This sign is used where there is danger due to farm animals or cattle crossing on the road.
	Traffic diversion on dual carriageway way: This sign warns the driver of the diversion of traffic from one carriageway to the other. It is used on dual carriageway when one carriageway is closed.
	Falling rocks: This sign is used wherever rocks are liable to fall on the road seasonally or throughout the year. The symbol may be reversed to show the side from which rockfall is expected.
	Ferry: This sign is used to warn the drivers about the existence of a ferry crossing across a river.
	Lane closure: This sign cautions the driver of the closure of a portion of the carriageway on multilane highways.
	Barrier: This sign is erected in advance of a gate controlling entry into a road. A definition plate with words "Slow barrier ahead" or "Toll Barrier Ahead" is also displayed on the sign.
	Loose gravel: This sign is used on section of a road on which gravel may be thrown up by fast moving vehicles.
	Overhead cable: This sign cautions driver of the presence of overhead power transmission lines.

	Quarry side or river bank: This sign is used to caution the driver of the presence of water by the side of the road and the impending danger.
	Rough Road: This sign is posted where the road is rough and the drivers are required to slow down their vehicles for safe travel.
	Runway: This sign is used to warn the drivers of the presence of runway ahead and possible movement of the aircrafts.
	Series of bends: This sign is used to installed to caution the driver of the presence of zig-zag for a long distance over the section of road ahead.
	Slippery road: This sign is used to installed to caution the driver of the presence of zig-zag for a long distance over the section of road ahead.
	Sudden side wind: This sign is used to caution the driver of the danger of side winds which endangers the lives of travelers. This sign is posted at places where such weather conditions exist.
	Traffic signals: This sign is used to caution the drivers of the presence of traffic signals.
	Unguarded railway crossing: This sign is used on the approaches of level crossings where there are no gates or other barriers. An advance warning sign (with two bars) is installed at a distance of 200 meters and second sign (with one bar) is installed near the crossing.
	Guarded railway crossing: This sign is used to warn traffic on the approaches to guarded railway crossing. An advance warning sign (with two bars) is installed at a distance of 200 meters and second sign (with one bar) is installed near the crossing.

<p>Steep ascent/Steep descent: This sign is displayed before a steep upgrade/downgrade that may constitute a hazard to traffic. A gradient of 10 percent and above is considered steep gradient.</p>	
	<p>Rumble strip: This sign is installed in advance of the rumble strips provided on the road to control the speed of the vehicle.</p>
	<p>Dangerous dip: This sign is used where a sharp dip in the profile of the road or a causeway is likely to cause considerable discomfort to traffic.</p>
	<p>Speed breaker: This sign warns the drivers of the presence of a speed breaker.</p>

Parking signs

	Parking Arrow mark side
	Parking both sides
	Scooter & motor cycle stand
	Cycle stand
	Taxi stand
	Auto rickshaw stand
	Cycle rickshaw stand

Speed limit and vehicle control signs

	<p>Speed limit: This sign is erected at the beginning of the section of the road or area covered by a speed restriction, with numerals indicating the speed limit in kilometers per hour.</p>
	<p>Width limit: This sign is used where entry of vehicles exceeding a particular width is prohibited.</p>
	<p>Height limit: This sign is erected in advance of an overhead structure where entry is prohibited for vehicles whose height exceeds a certain limit.</p>
	<p>Length limit: This sign is used where entry of vehicles is prohibited for vehicles whose laden weight exceeds a certain limits.</p>
	<p>Load limit: This is used where entry of vehicles is prohibited for vehicles whose laden weight exceeds a certain limits.</p>
	<p>Axle load limit: This sign is used where entry of vehicle is prohibited for vehicles whose gross load exceeds a certain limits.</p>

Prohibitory signs

<p>Straight prohibited or no entry: These signs are located at places where the vehicles are not allowed to enter. It is generally erected at the end of one-way-road to prohibit traffic entering the roadway in the wrong direction and also at each intersection along the one way road.</p>	
<p>One way sign: These signs are located at the entry to the one-way street and repeated at intermediate intersection on that street.</p>	

	Vehicles prohibited in both directions: This sign is used at the approach end of the roads where entry to all types of vehicular traffic is prohibited, especially in areas which have been designed as pedestrian malls.
	Horn prohibited: This sign is used on stretches of the road where sounding of horn is not allowed, near hospitals and in silence zones.
	Cycle prohibited: This sign is erected on each entry to the road where cycles are to be prohibited.
	Pedestrian prohibited: This sign is erected on each entry to the road where pedestrians are to be prohibited.
Right/Left turn prohibited: These signs are used at places where vehicles are not allowed to make a turn to the right or left. The signs are also used at the intersections of one-way street to supplement the one-way sign.	
	U-U-turn prohibited: This sign is used at places where vehicles are forbidden to make a turn to the reverse direction of travel between the sign and next inter-section beyond it.
	Overtaking prohibited: This sign is erected at the beginning of such sections of highways where sight distance is restricted and overtaking will be dangerous.
	All motor vehicles prohibited: This sign is used at places where entry to all types of motor vehicles is prohibited.
	Trucks prohibited: This sign is erected on each entry to the road where hand carts are to be prohibited.
	Hand Card Prohibited: This sign is erected on each entry to the road where hand carts are to be prohibited.








	Bullock cart prohibited: This sign is erected on each entry to the road where bullock carts are to be prohibited.
	Tonga prohibited: This sign is erected on each entry to the road where tongas are to be prohibited.
	Bullock carts & hand carts prohibited: This sign is erected on each entry to the road where all types of slow moving vehicles except cycles are to be prohibited.

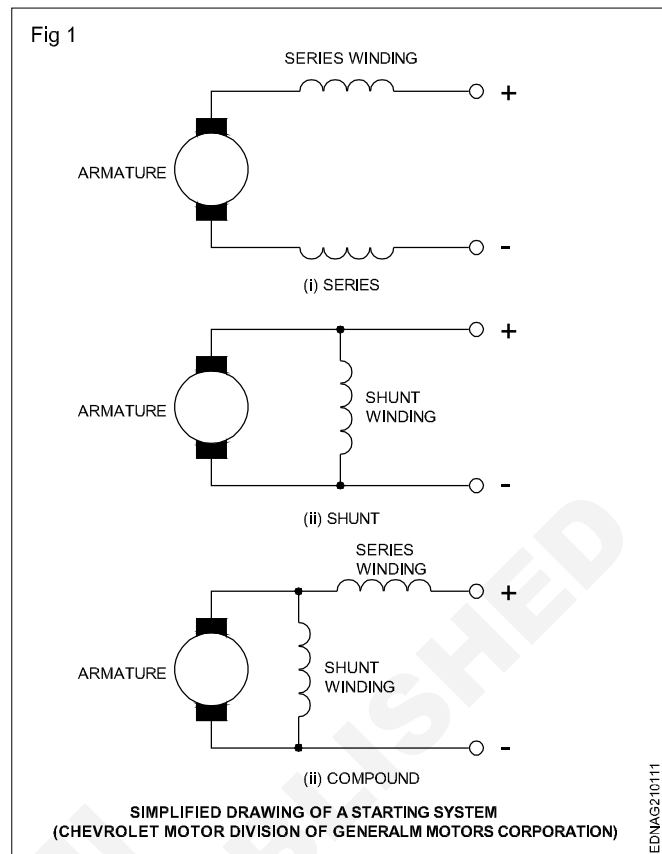
Stop and give way signs

	Stop sign: This sign is used on roadways where traffic is required to stop before entering a major road. The vehicle shall proceed past the stop before entering a major road. The vehicle shall proceed past the stop line only after ascertaining that this will not cause any damage to traffic on the main road.
	Give way sign: This sign is used to assign right-of-way to traffic on certain roadways and intersections, the intention being that the vehicles controlled by the sign must give way to the other traffic having the right of way.

Compulsory direction control and other signs

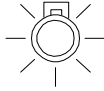









Compulsory turn left/right: These signs indicate the appropriate direction in which the vehicles are permitted to proceed.	
Compulsory ahead or turn left/right: These signs indicate the appropriate directions in which the vehicles are permitted to proceed. Vehicles are supposed to move either of the given two directions.	
	Compulsory ahead: This sign indicates that the vehicle is only permitted to proceed ahead.





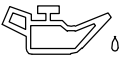




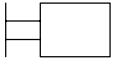
	<p>Compulsory keep left: This sign is most frequently used on bollards or islands and refuges in the middle of the carriageway and at the beginning of central reserves of dual carriageway. The vehicles are obliged to keep left only.</p>
	<p>Compulsory cycle rickshaw track: This sign means only cycles and rickshaws are allowed on this road / carriageway.</p>
	<p>Compulsory sound horn: This sign means the motor vehicles shall compulsorily sound horn at the location where the sign is place. This sign in mostly put at sharp curves on hill roads.</p>
	<p>Main road ahead: This sign means the vehicles can either go straight or turn left.</p>
	<p>Main road ahead: This sign means the vehicles can either go straight or turn right.</p>
	<p>Pedestrians only: This sign means only pedestrians are allowed and the traffic is not allowed on this road carriageway.</p>
	<p>Buses only: This sign means that only buses are allowed and other traffic is not allowed on this road/carriageway.</p>

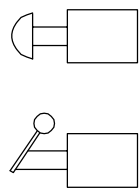
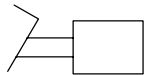


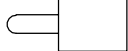
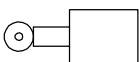


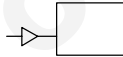
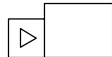


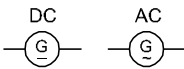
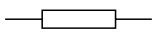



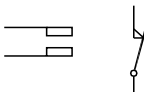
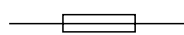
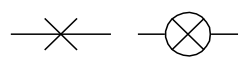


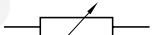

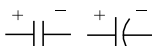


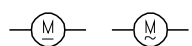
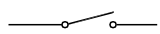


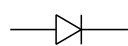


Symbolic representation - Different symbols used in the related trades

Sign and symbols for related trades

S.No.	Description	Symbol
1	Bulb indicator	
2	Cruise control indicator	
3	Traction control indicator	TCS OFF
4	Stability control indicator	
5	Centre differential lock (or 4Hi/Lo)	
6	Proximity sensor indicator	P 
7	Econ indicator	
8	Electric power steering indicator	
9	Glow plug indicator	
10	Check engine light	
11	Seatbelt indicator	

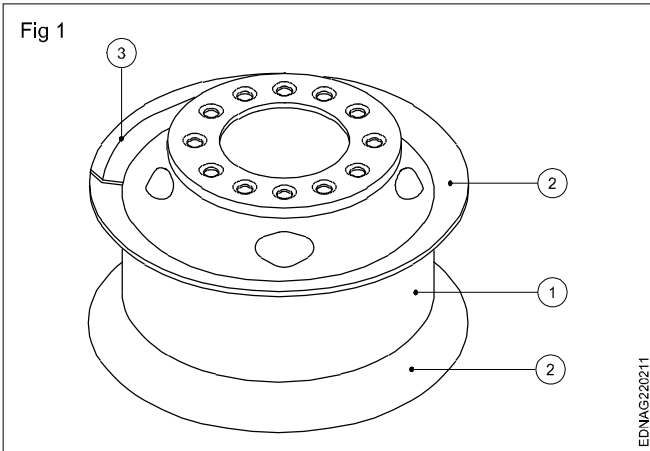
S.No.	Description	Symbol
12	Airbag indicator	
13	Brake indicator	
14	ABS indicator	
15	Temperature warning	
16	Oil level/ Pressure warning	
17	Electrical system warning	
18	Transmission warning light	
19	Tire pressure monitoring system	
20	High beam indicator	
21	Manual General	

S.No.	Description	Symbol
22	Pushbutton	
23	Foot pedal	
24	Spring return	
25	Spring-centered	
26	Plunger	
27	Roller operated	
28	Hydraulic direct actuation	
29	Hydraulic pilot actuation	
30	Pneumatic direct actuation	
31	Pneumatic pilot actuation	
32	Electrical	
33	Battery	
34	Generator	
35	Resistance	

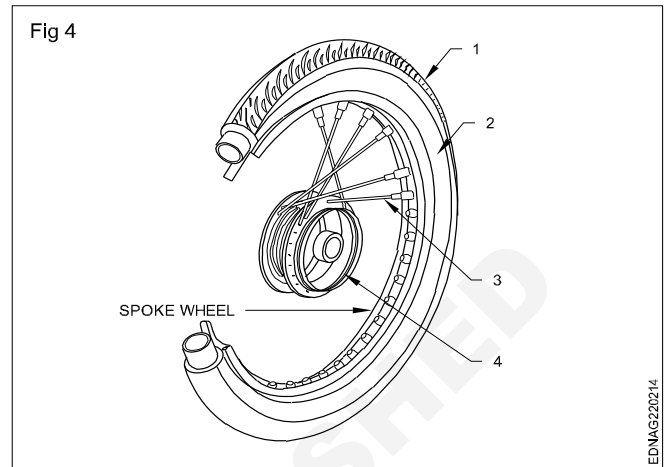
S.No.	Description	Symbol
36	Coil with core	
37	Contact breaker	
38	Fuse	
39	Blub (lamp)	
40	Earth/Ground	
41	Heavy duty switches	
42	Rheostat	
43	Induction coil	
44	Condenser	
45	Wire crossed	
46	Ammeter	
47	Motor	
48	Switch	
49	Coil (without core)	
50	Spark gap	
51	Rectifier (diode)	
52	Wire joint	
53	Voltmeter	

Sketches of electrical, electronic & mechanical components used in automobile

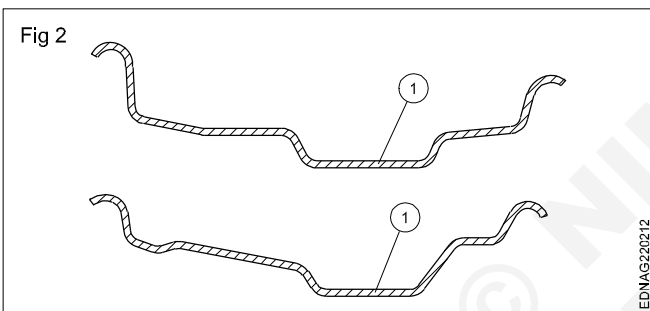
Flat type rim (Fig 1)



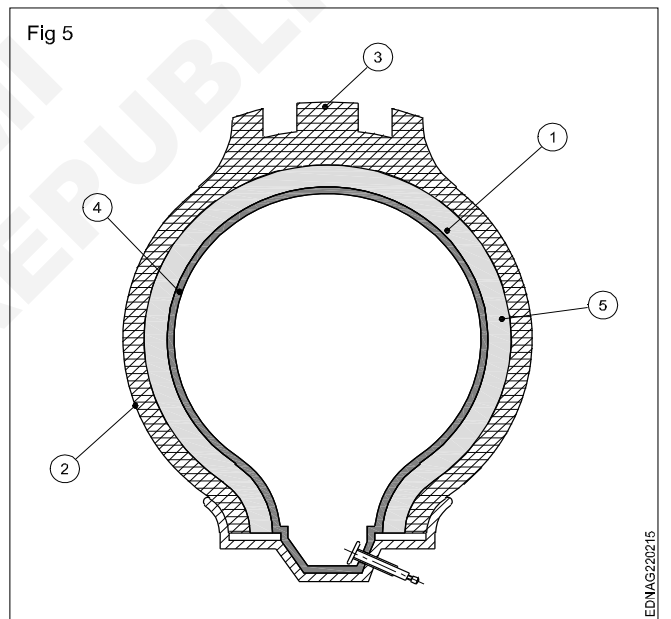
Wire spoke wheels (Fig 4)



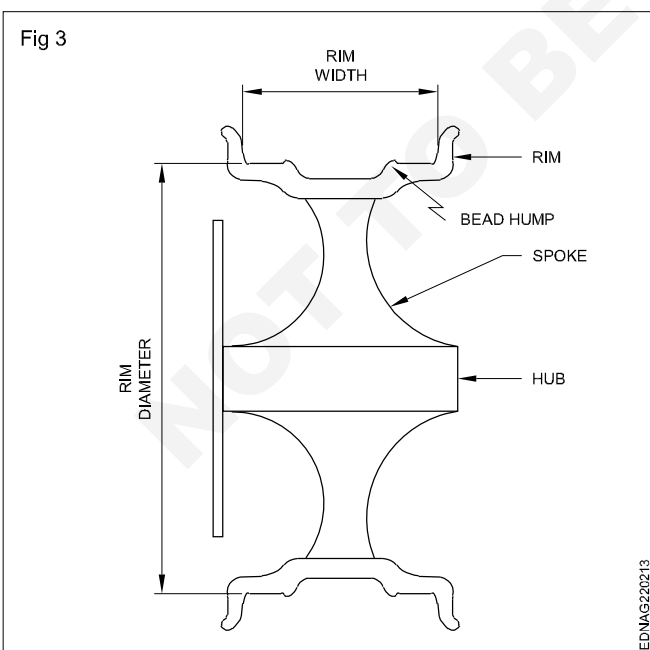
Drop centre rim (Fig 2)



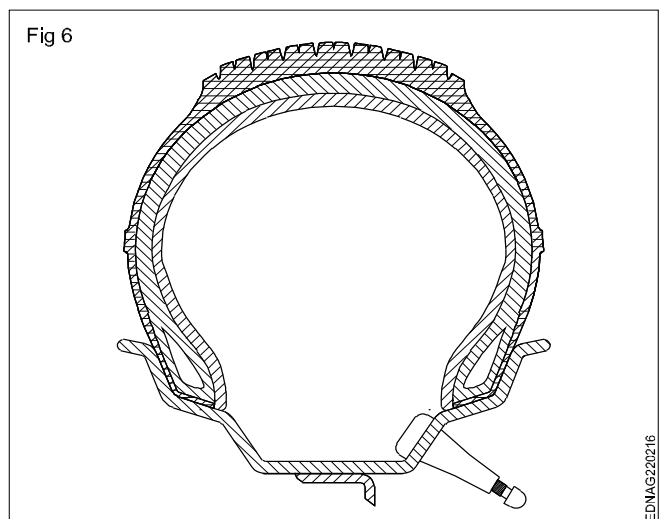
Tube tyre (Fig 5)



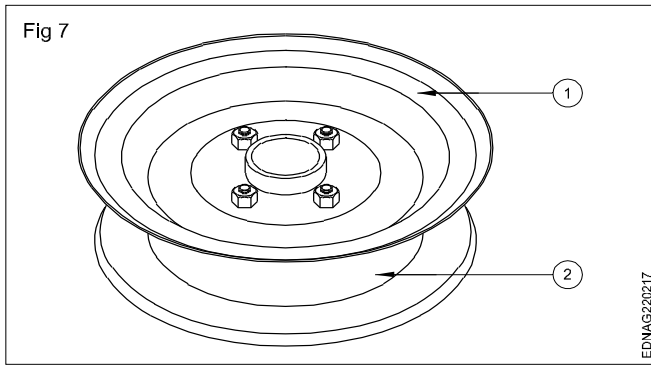
Wheel construction (Fig 3)



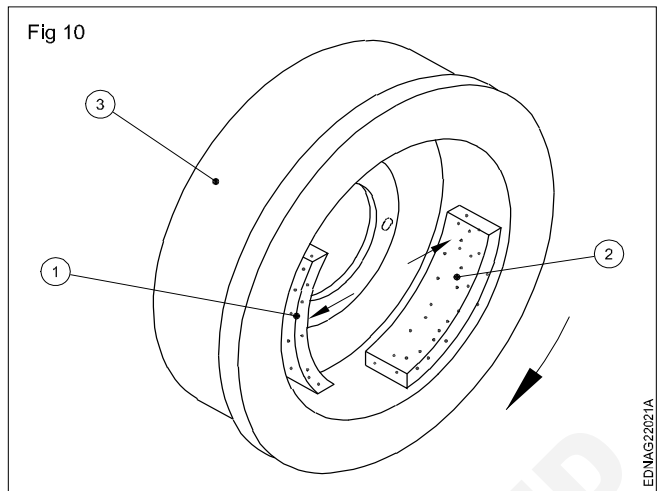
Tubeless tyre (Fig 6)



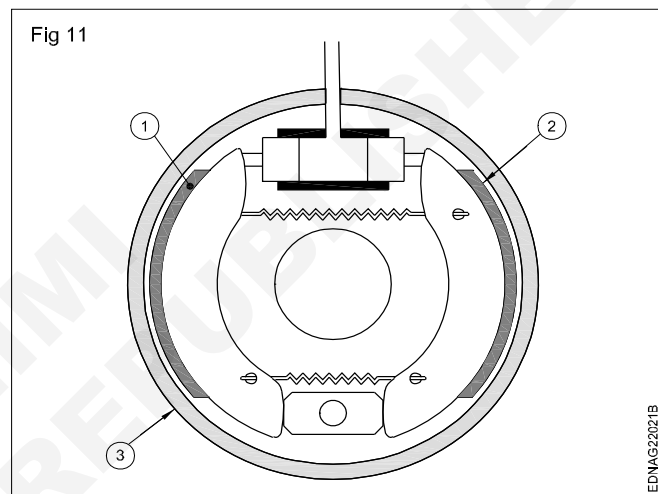
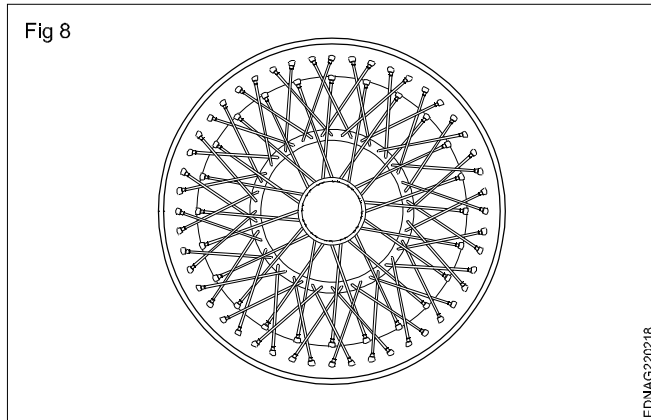
Disc wheel (Fig 7)



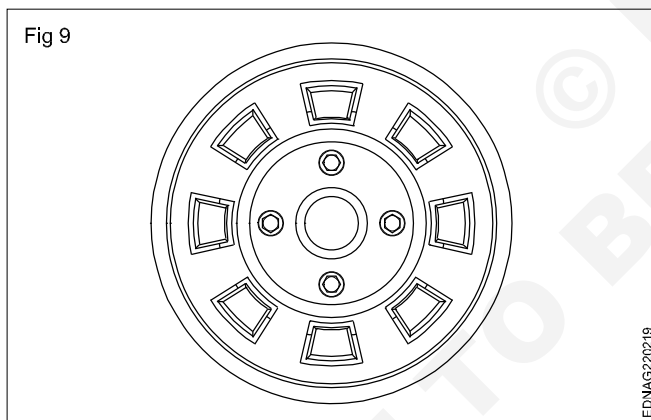
Drum brake (Fig 10 & 11)



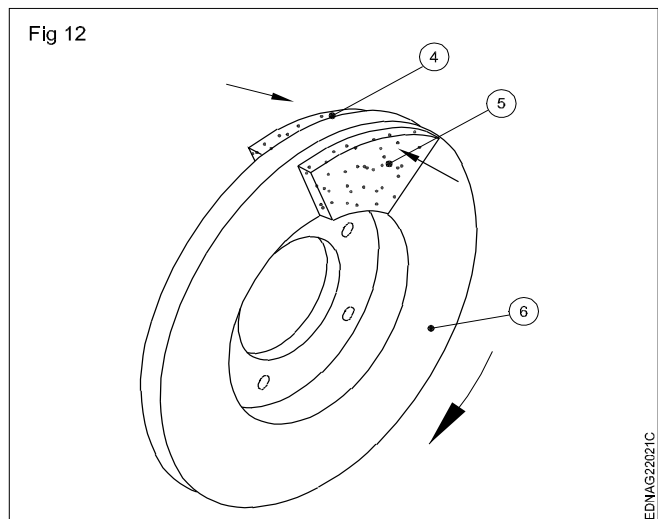
Wire wheel (Fig 8)

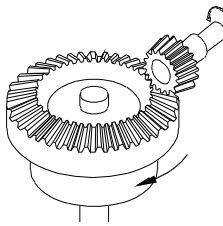
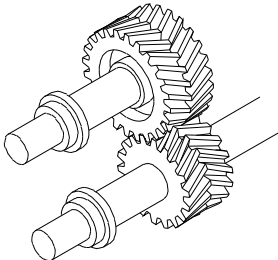


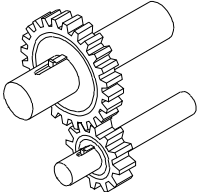
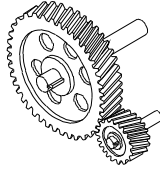
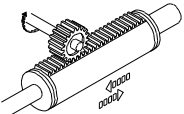
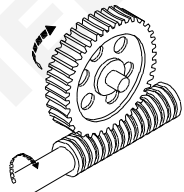
Split wheel (Fig 9)



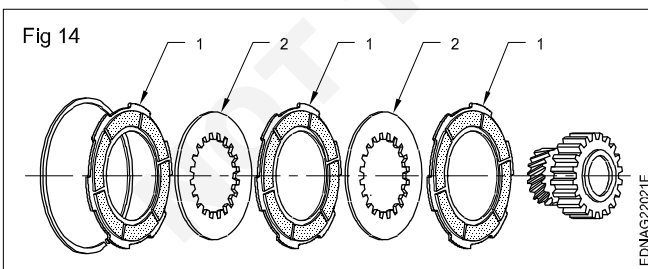
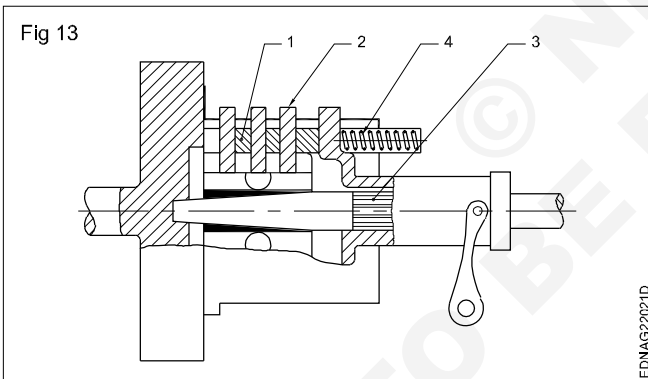
Disc brakes (Fig 12)



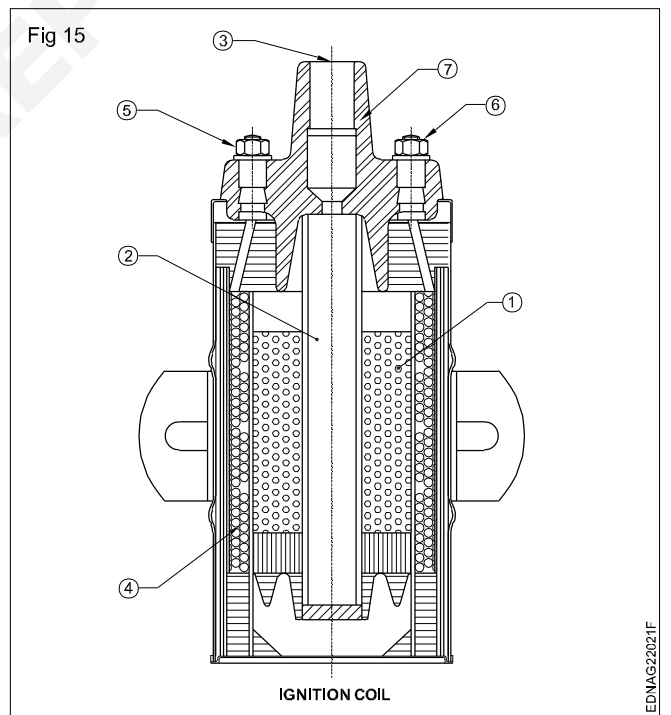
Spiral bevel gears		Herring bone gears
		

Spur gears	Helical gears	Rack & pinion	Worm gears
 <p data-bbox="167 896 470 963">Teeth are straight and parallel to the gear axis.</p>	 <p data-bbox="502 896 837 963">Teeth are at an angle to the gear axis.</p>	 <p data-bbox="885 896 1173 963">Teeth are parallel to the axis of the gears.</p>	 <p data-bbox="1252 896 1508 985">Teeth are at an angle with the axis and are curved.</p>

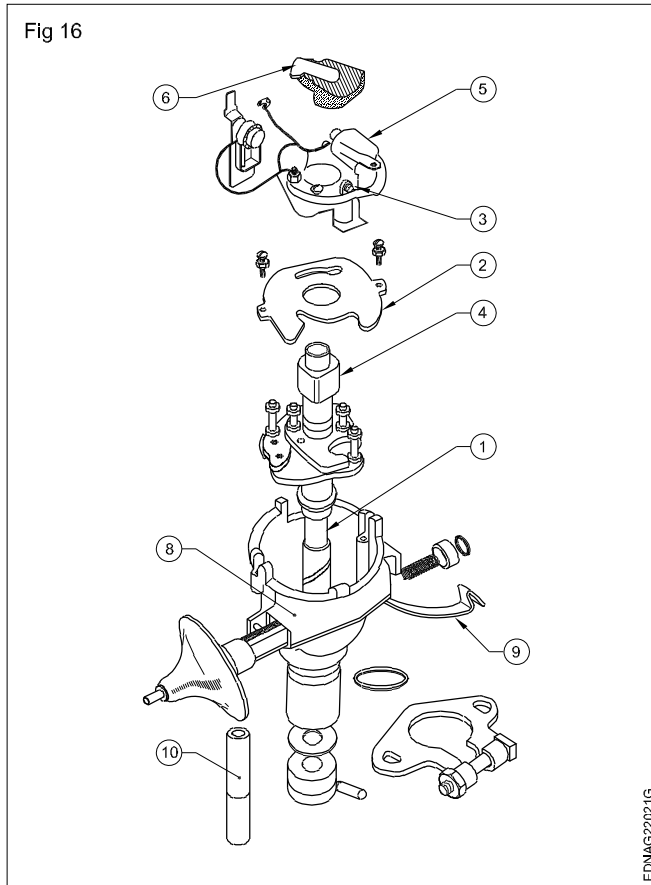
Multi-plate clutch (Fig 13&14)



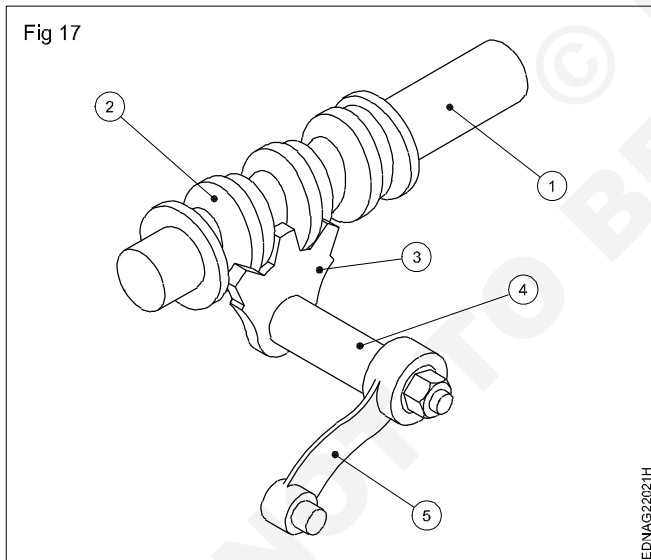
Ignition coil (Fig 15)



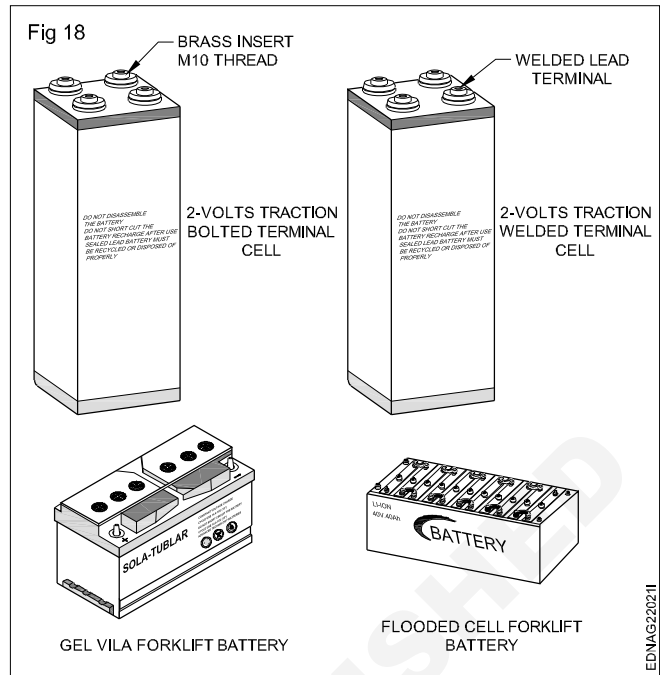
Distributor (Fig 16)



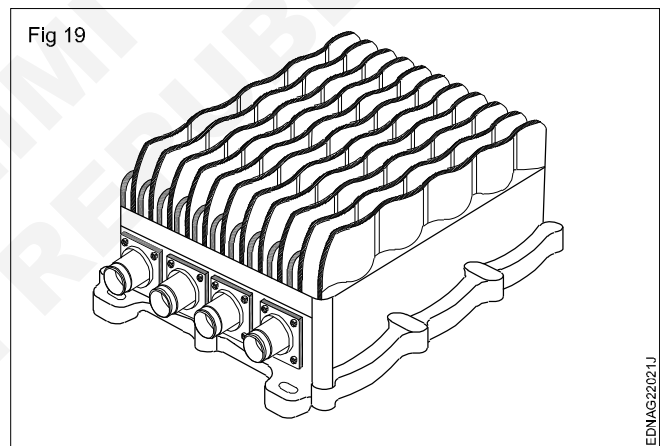
Steering gear box (Fig 17)



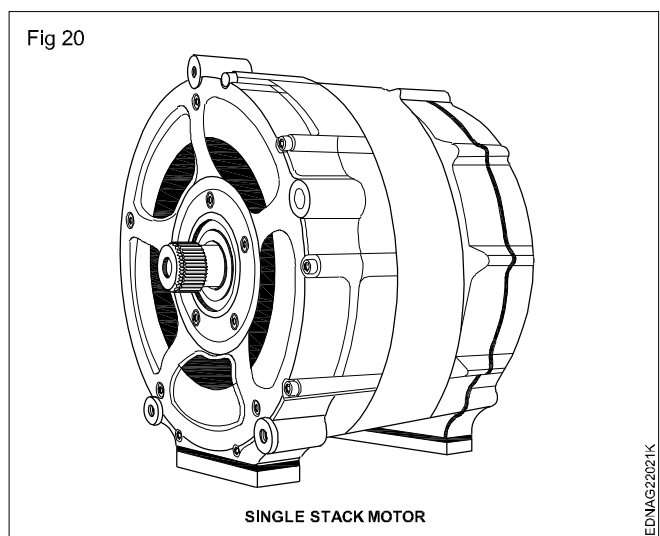
Traction battery pack (Fig 18)



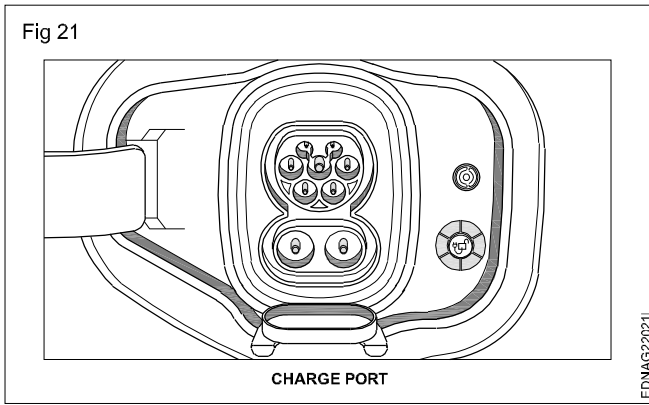
DC-DC converter (Fig 19)



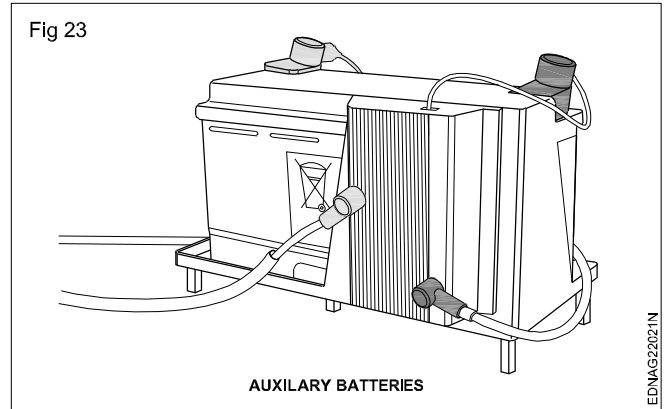
Electric motor (Fig 20)



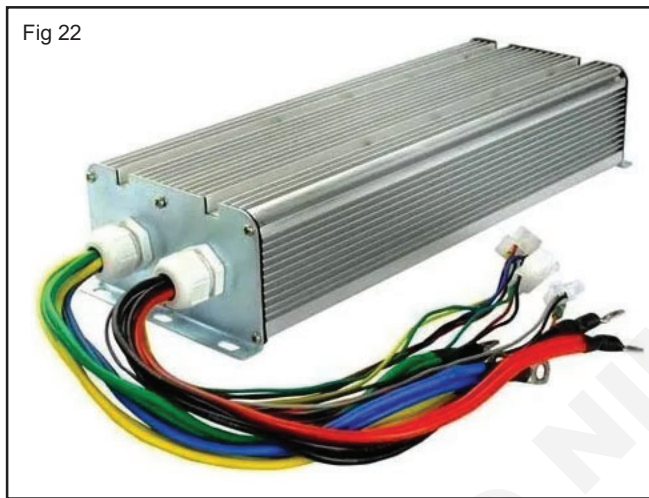
Charge port (Fig 21)



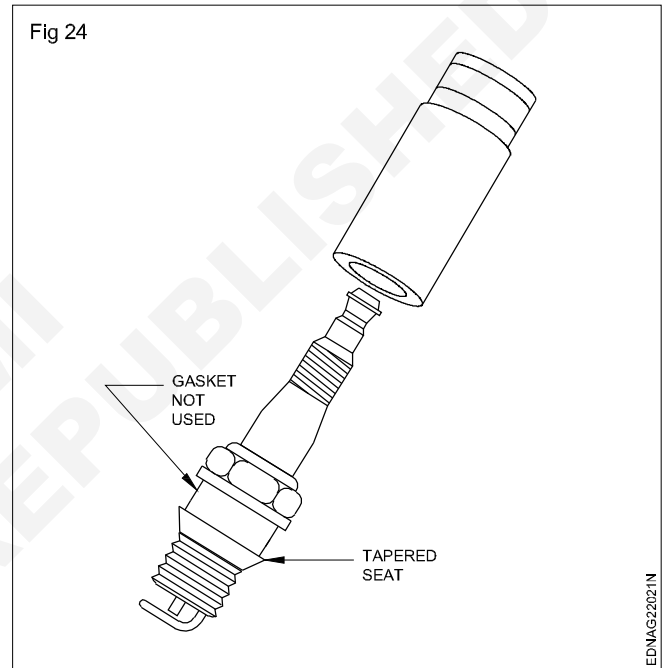
Auxiliary batteries (Fig 23)



Controller (Fig 22)

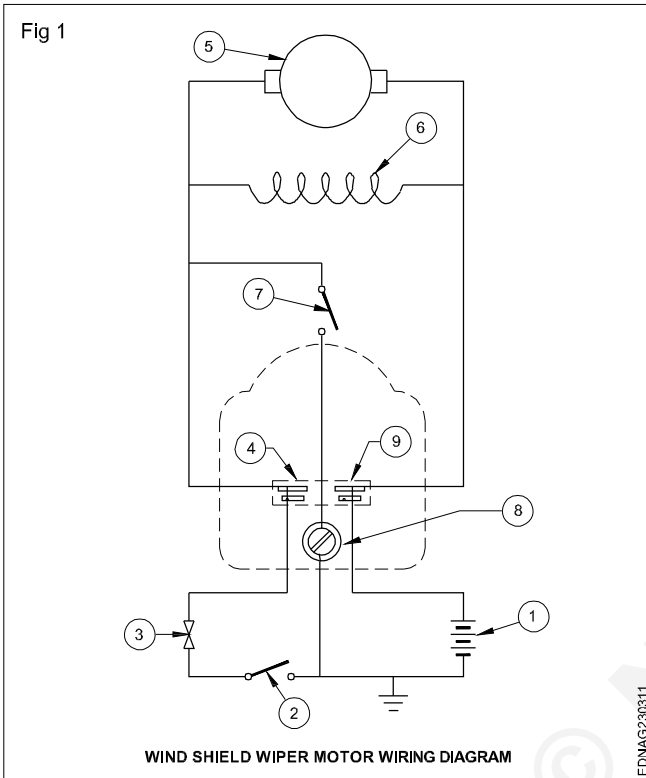


Engines use spark plugs with tapered seats (Fig 24)

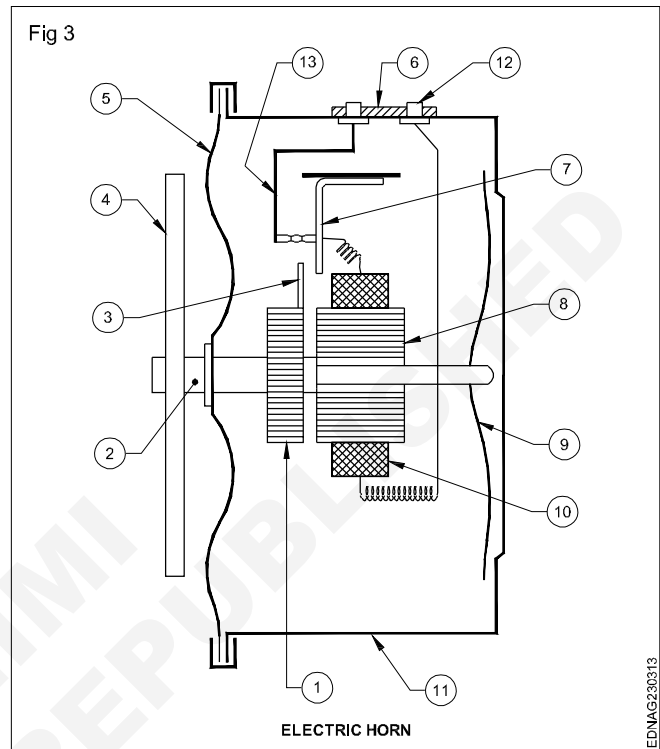


Reading of electrical wiring diagram and layout diagram used in automobile

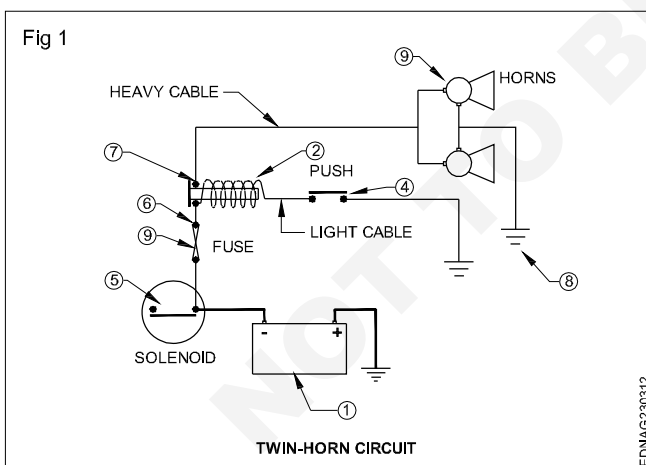
Wind shield wiper motor wiring diagram (Fig 1)



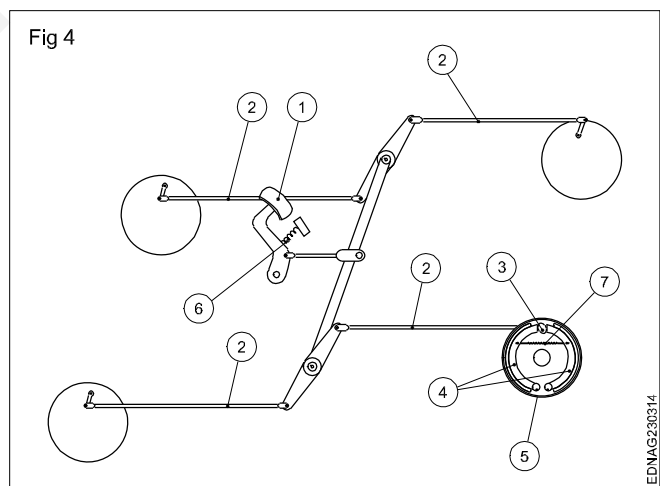
Construction (Electric horn) (Fig 3)



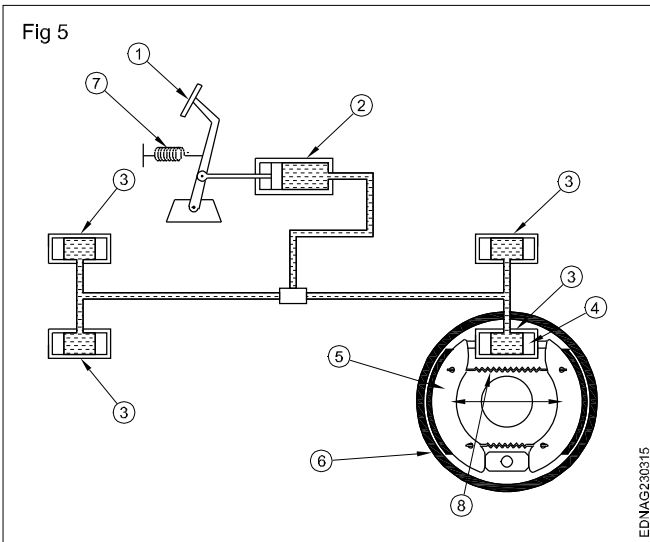
Twin-Horn circuit (Fig 2)



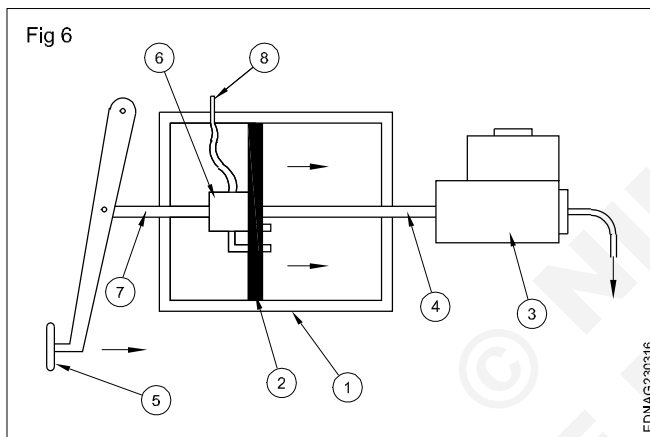
Mechanical brakes (Fig 4)



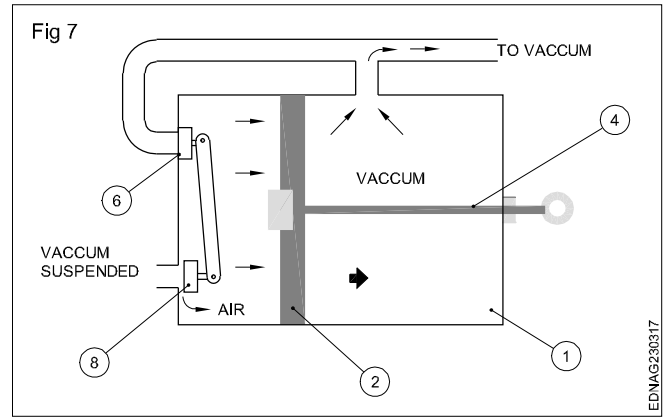
Operation (Fig 5)



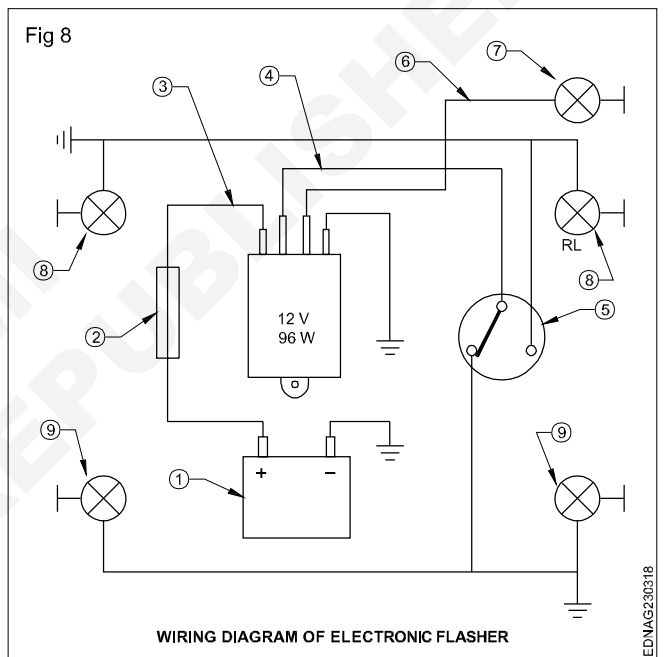
Vacuum-assisted power brakes (Fig 6)



Vacuum suspended power brakes (Fig 7)



Wiring diagram of Electronic flasher (Fig 8)



Electric car wiring diagram (Fig 9,10&11)

Fig 9

2001 MADP 4095 SOLAR PANEL WIRING - Kyocera KD245GX panels (09-07-2012)

CONTINUOUS CURRENT = For circuits carrying DC currents from PV modules, multiply the short-circuit current by 125% and use this value for all further calculations (per NEC 690.8 & UL1703).
80% OPERATION = The overcurrent device (i.e. fuse) must be rated at 125% of the CONTINUOUS CURRENT. This is to prevent overcurrent devices from being operated at more than 80% of rating.

For each of the three PV circuits:

$$I_{CONTINUOUS CURRENT} = I_{Short Circuit Current} \times 125\% = 8.91 \times 1.25 = 11.14A$$

$$I_{80\% OPERATION} = I_{CONTINUOUS CURRENT} \times 125\% = 11.14 \times 1.25 = 13.9A$$

(use 15A fuse) ... for 3 circuits:
 $3 \times 13.9 = 41.7A$

Cable ampacity without deratings must be 13.9A

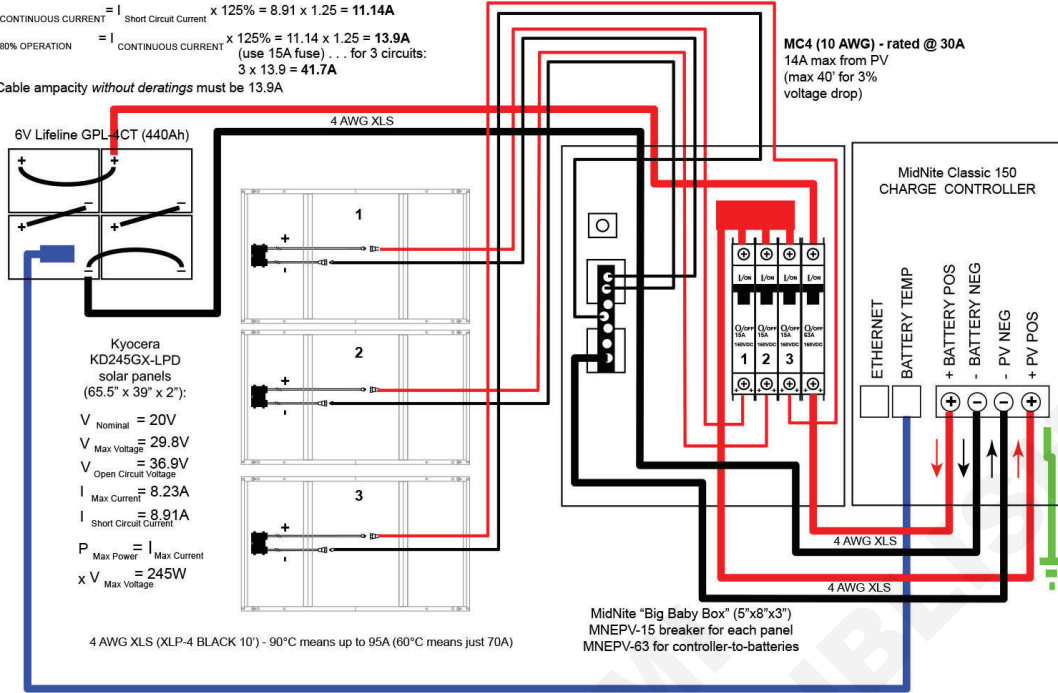


Fig 10

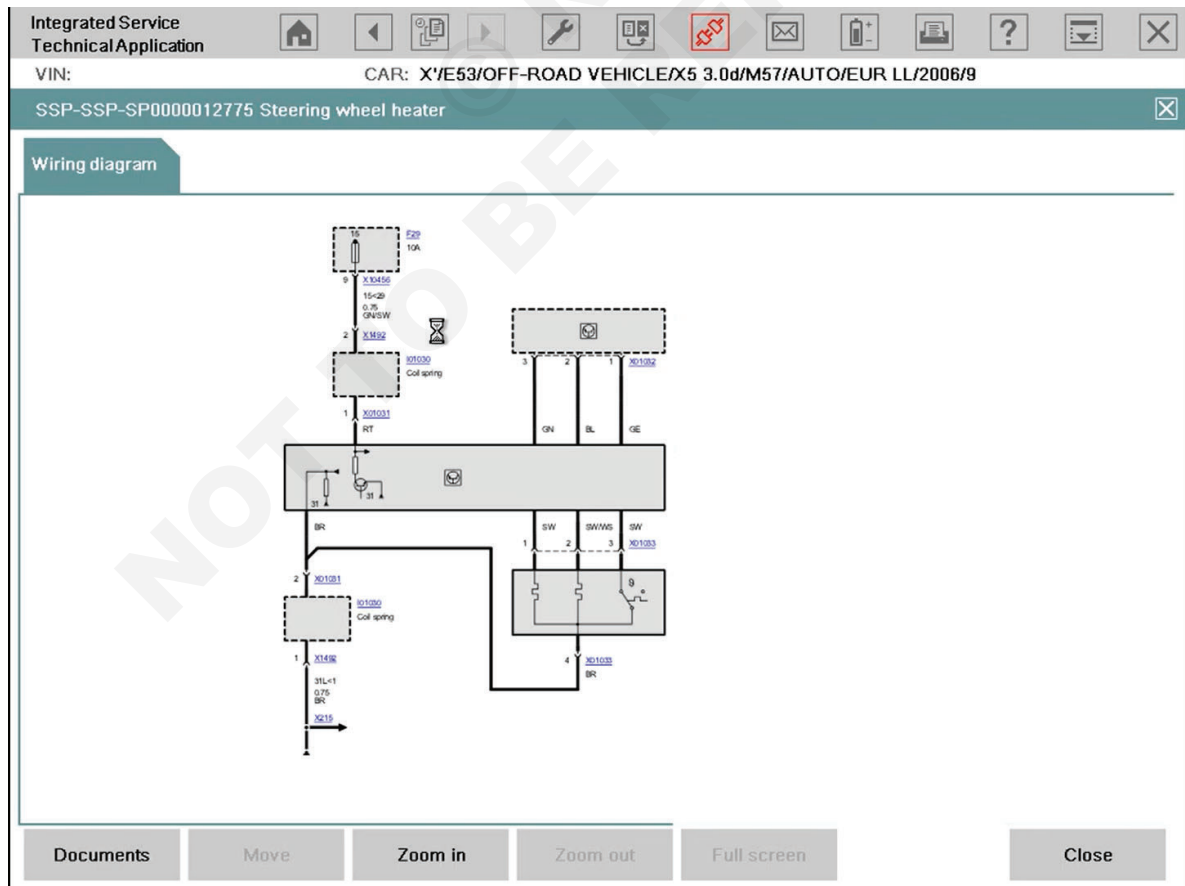
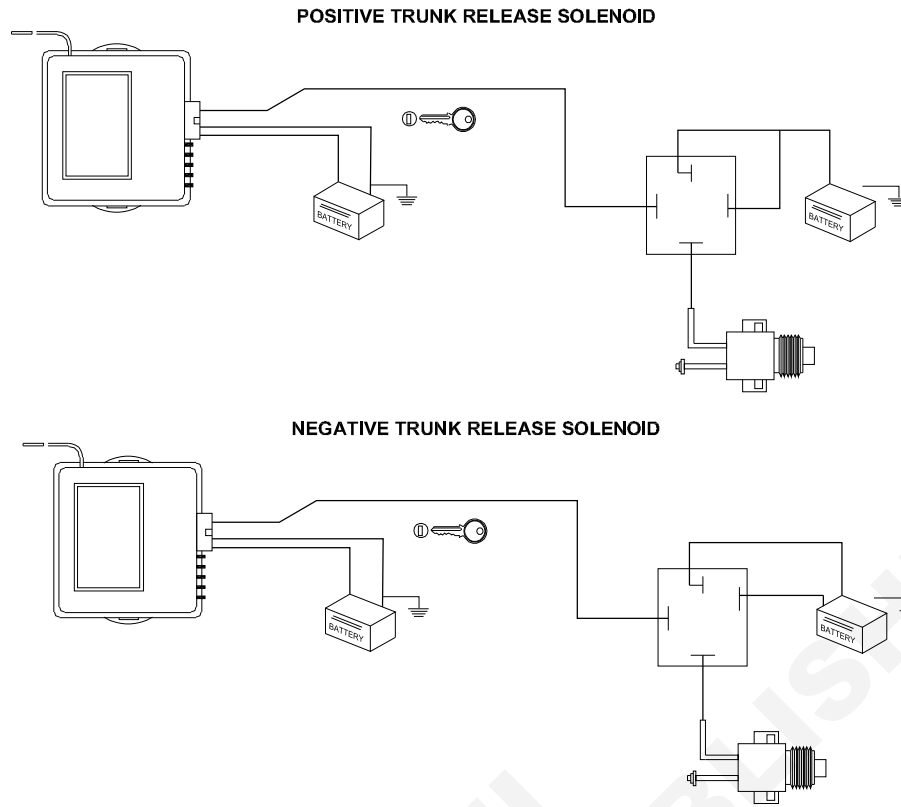


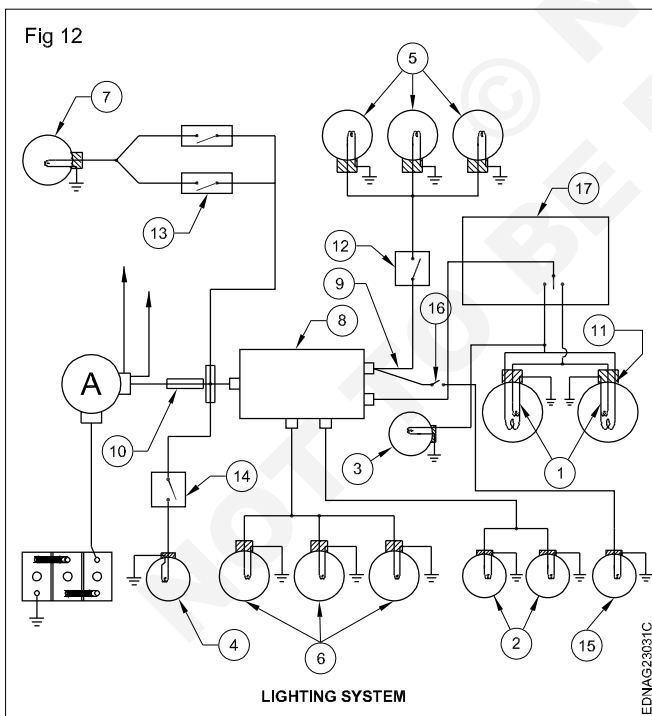
Fig 11



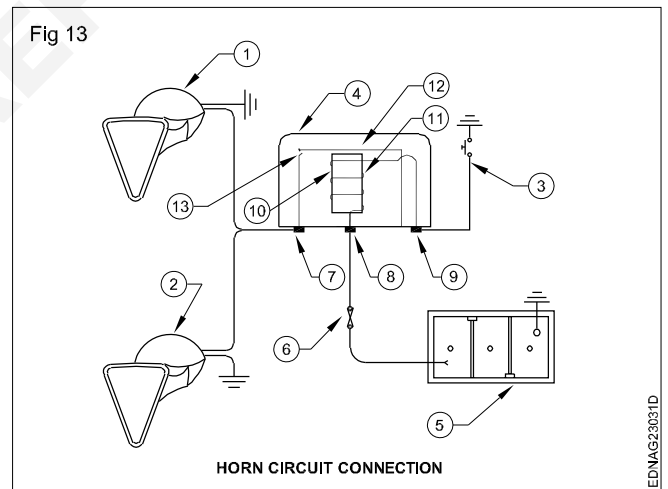
EDNAG23031B

Lighting system (Fig 12)

Horn circuit connection (Fig 13)



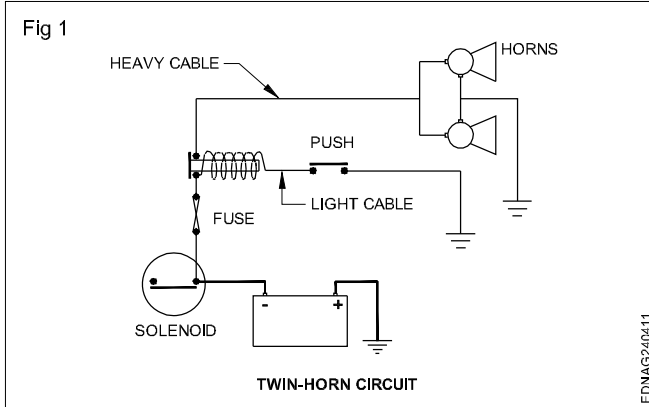
EDNAG23031C



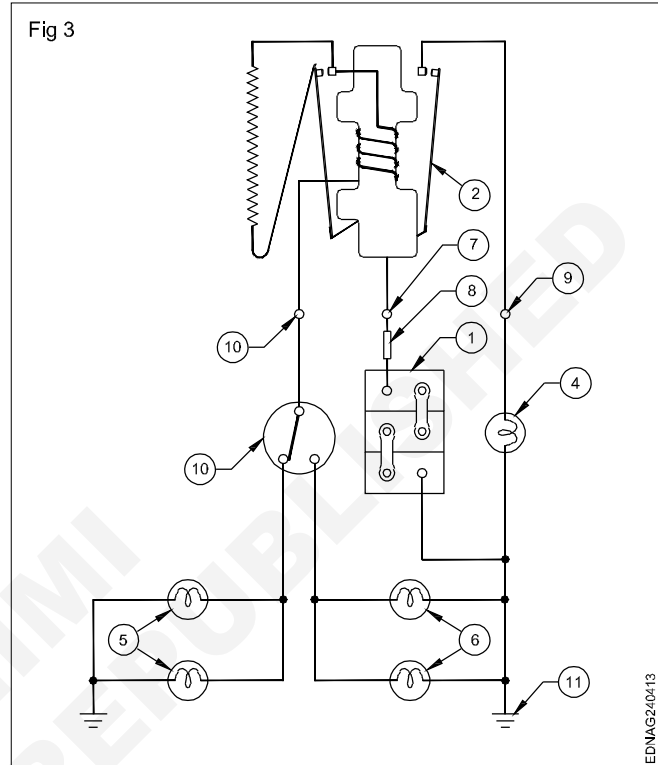
EDNAG23031D

Drawing of electrical circuit diagram used in automobile

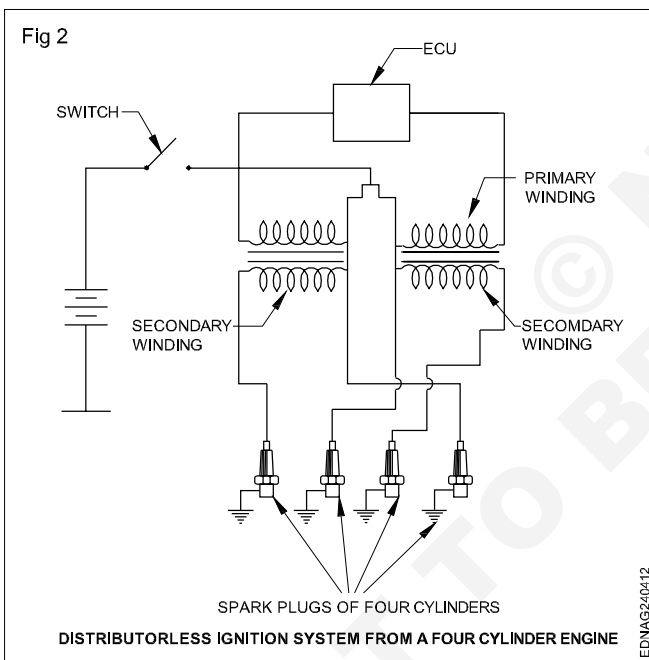
Twin-horn circuit (Fig 1)



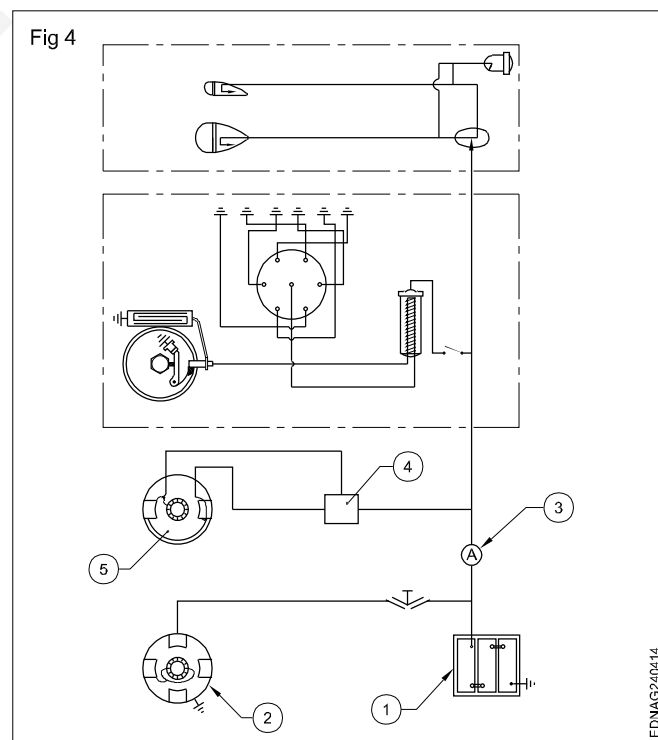
Flasher circuit (Fig 3)



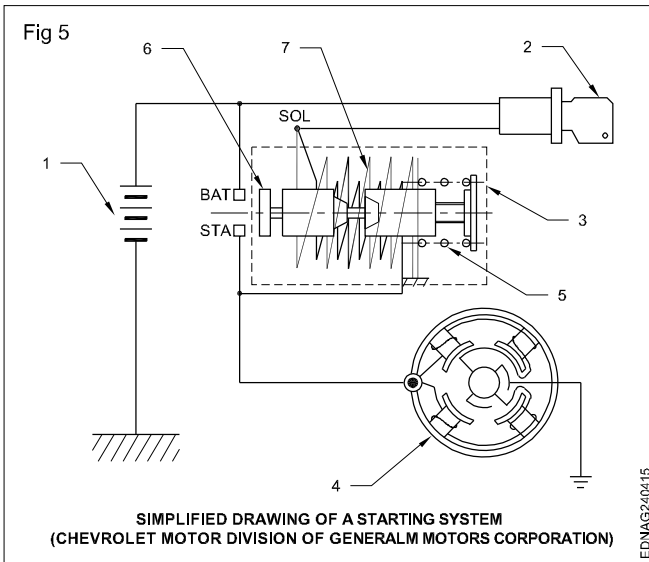
Distributor less ignition system (Fig 2)



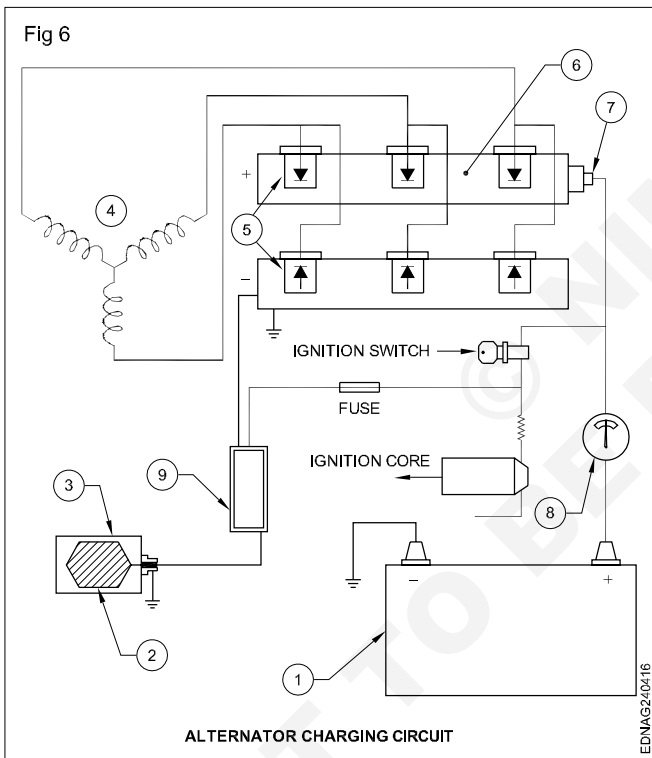
Automotive electric system (Fig 4)



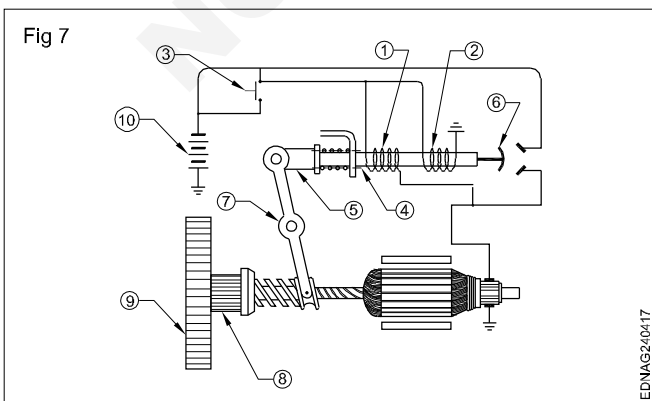
Description of a starting circuit (Fig 5)



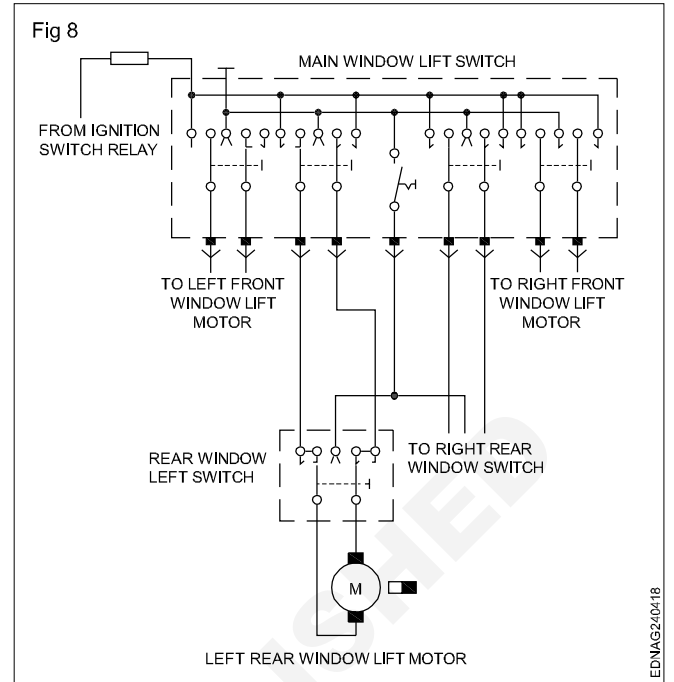
Alternator charging circuit (Fig 6)



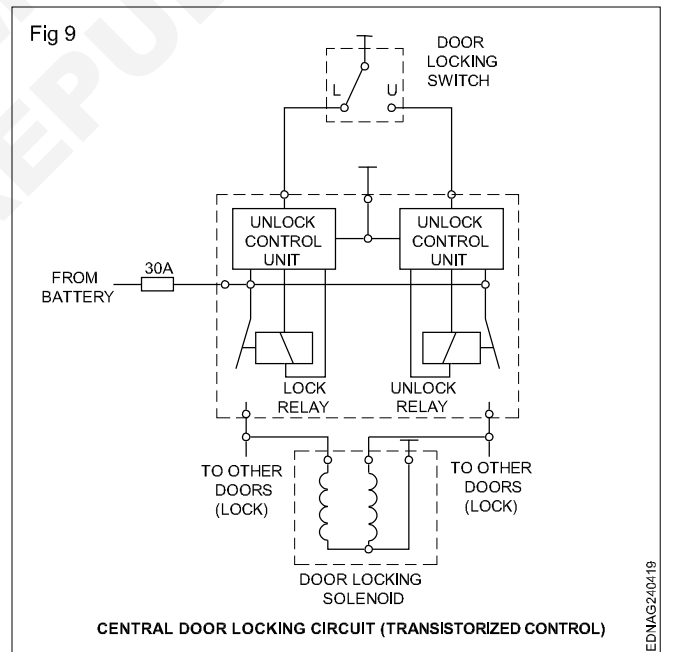
Construction of solenoid switch (Fig 7)



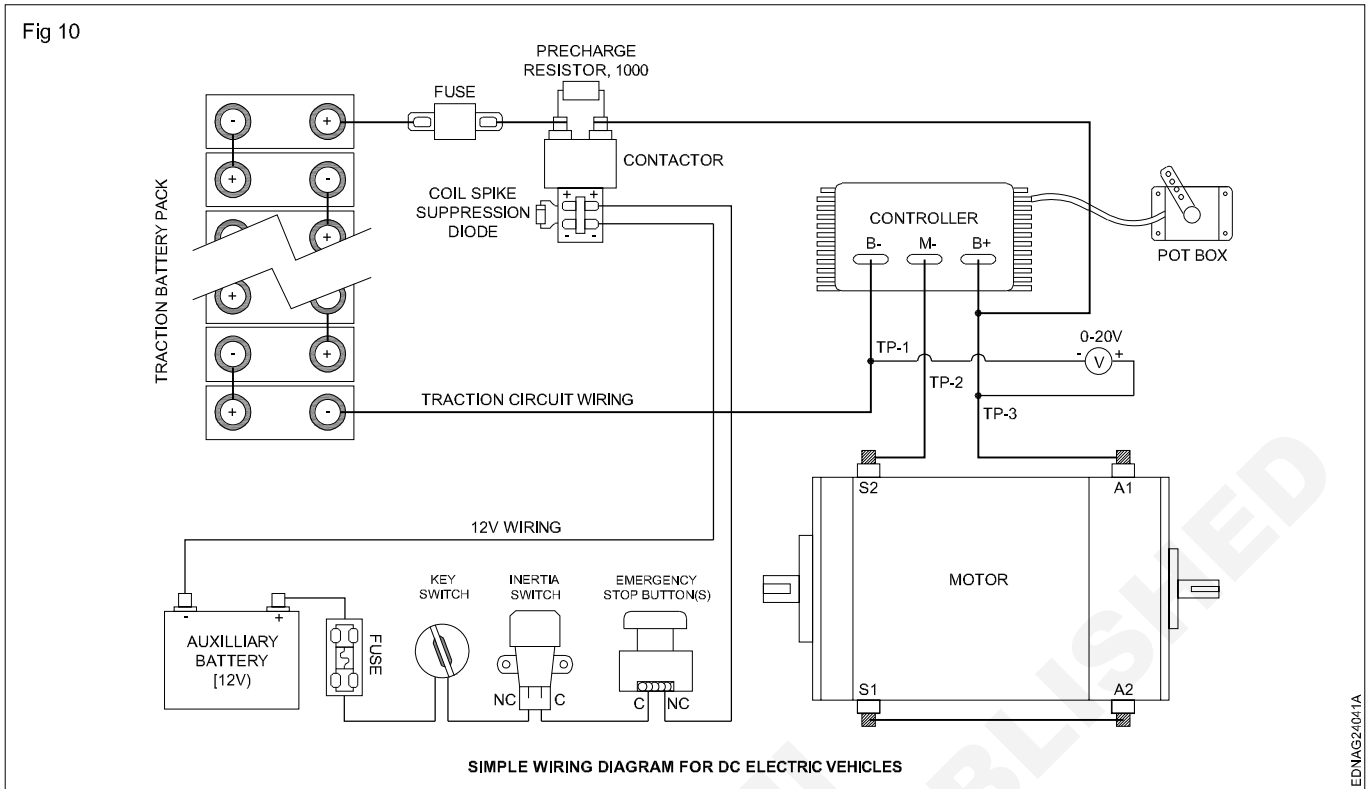
the circuit for electric operation of a rear passenger window (Fig 7)



Central door locking circuit (Transistorized control) (Fig 8)

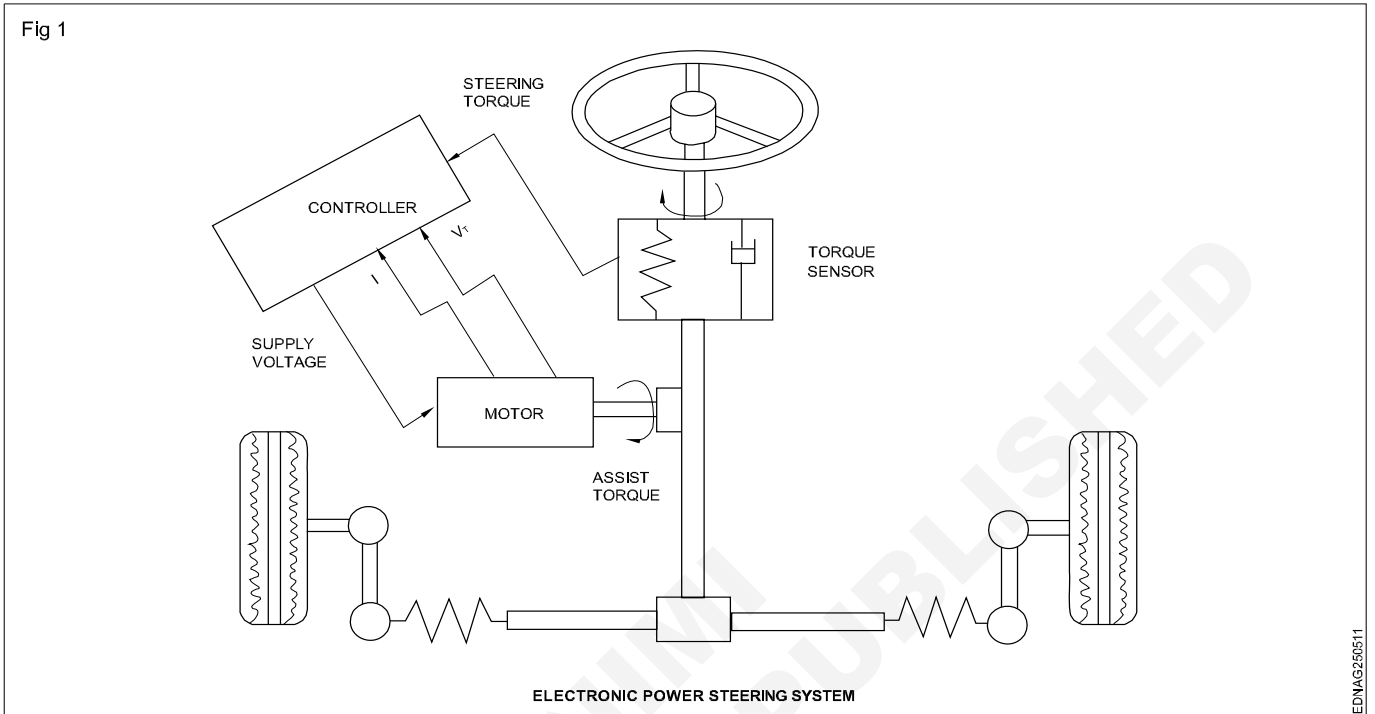


Circuit diagram for DC electric vehicles (Fig 9)

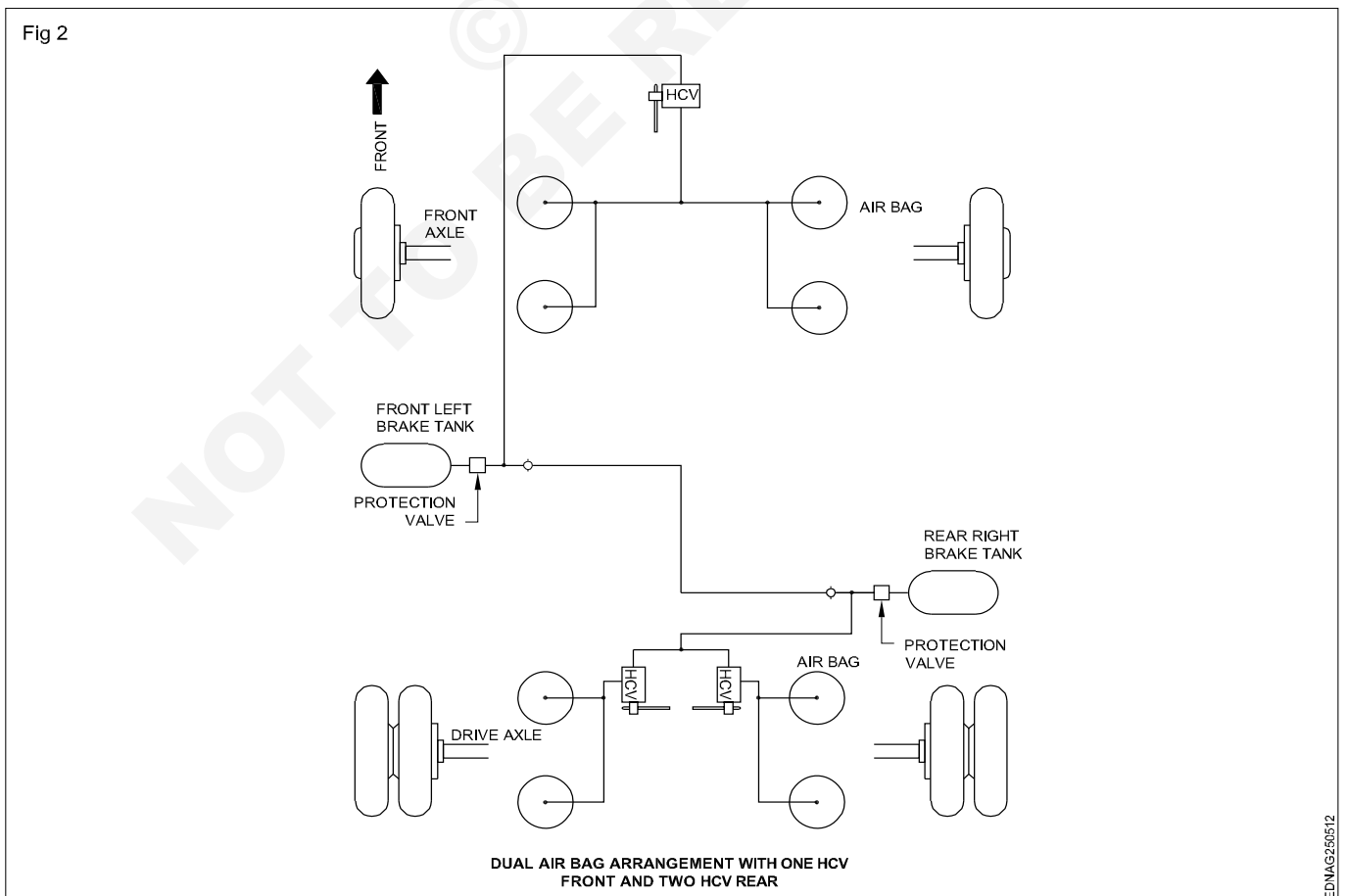


Drawing of block diagram of instruments & equipment of trades

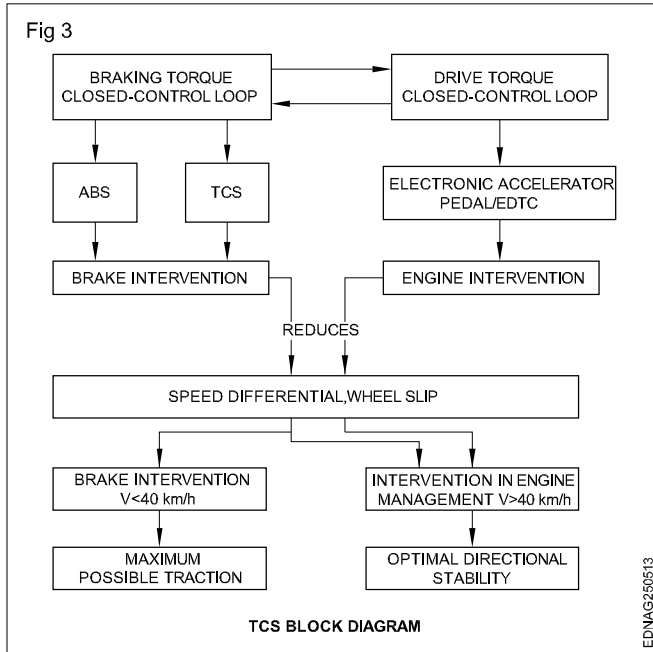
Electronic power steering system (Fig 1)



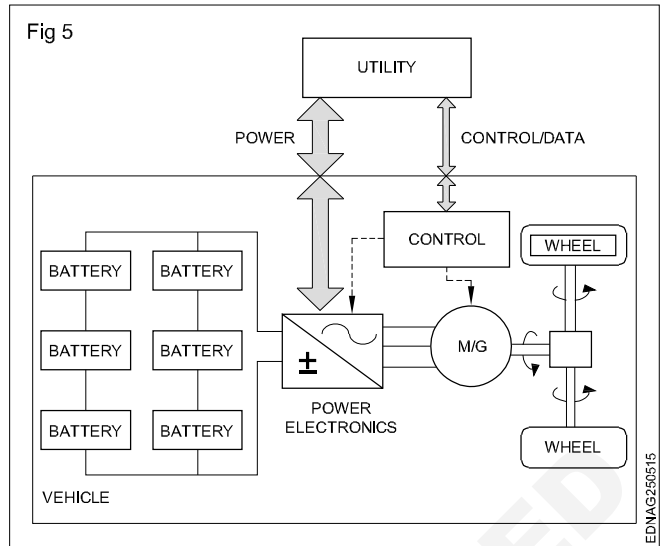
Dual air bag arrangement with one HCV front and two HCV rear (Fig 2)



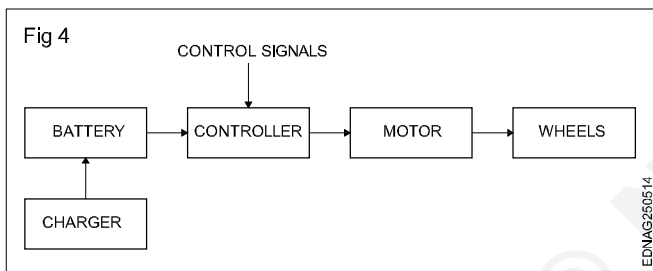
TCS block diagram (Fig 3)



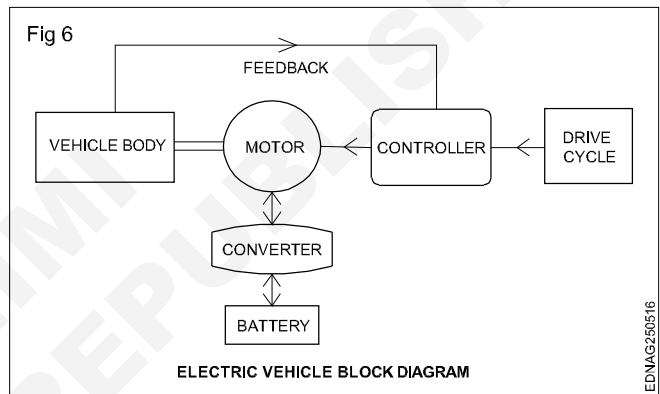
Block diagram of an electric vehicle with V2G (Fig 5)



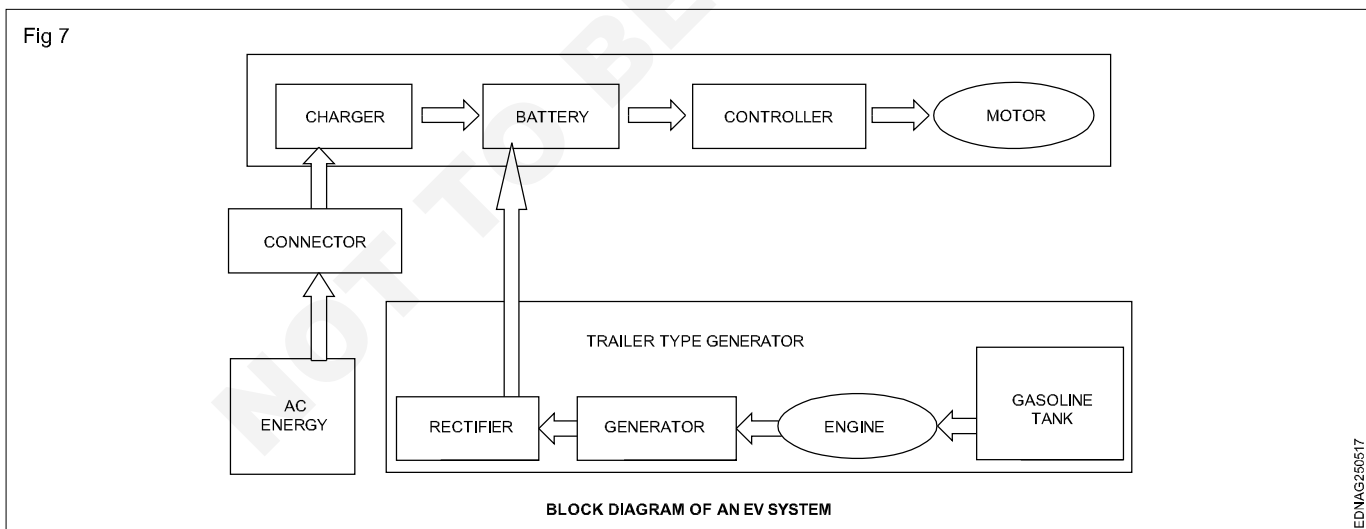
Block diagram of an electric car (Fig 4)



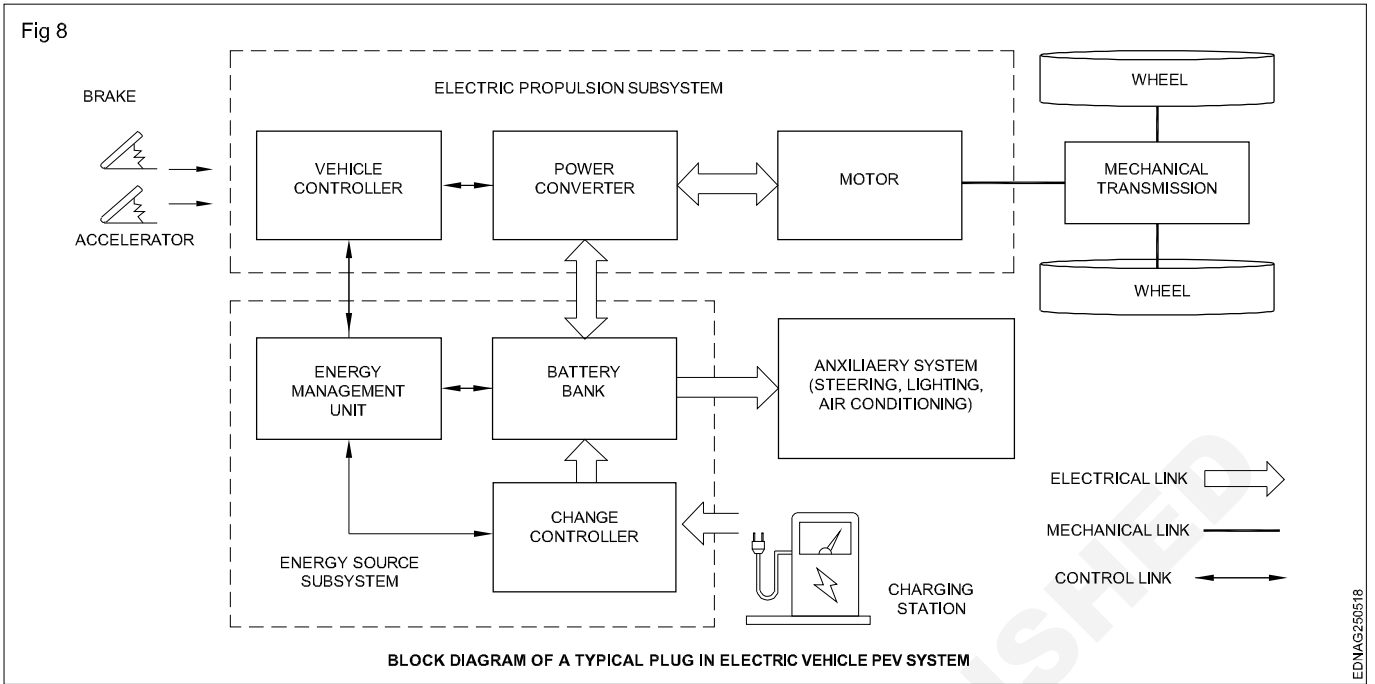
Block diagram of an electric vehicle (Fig 6)



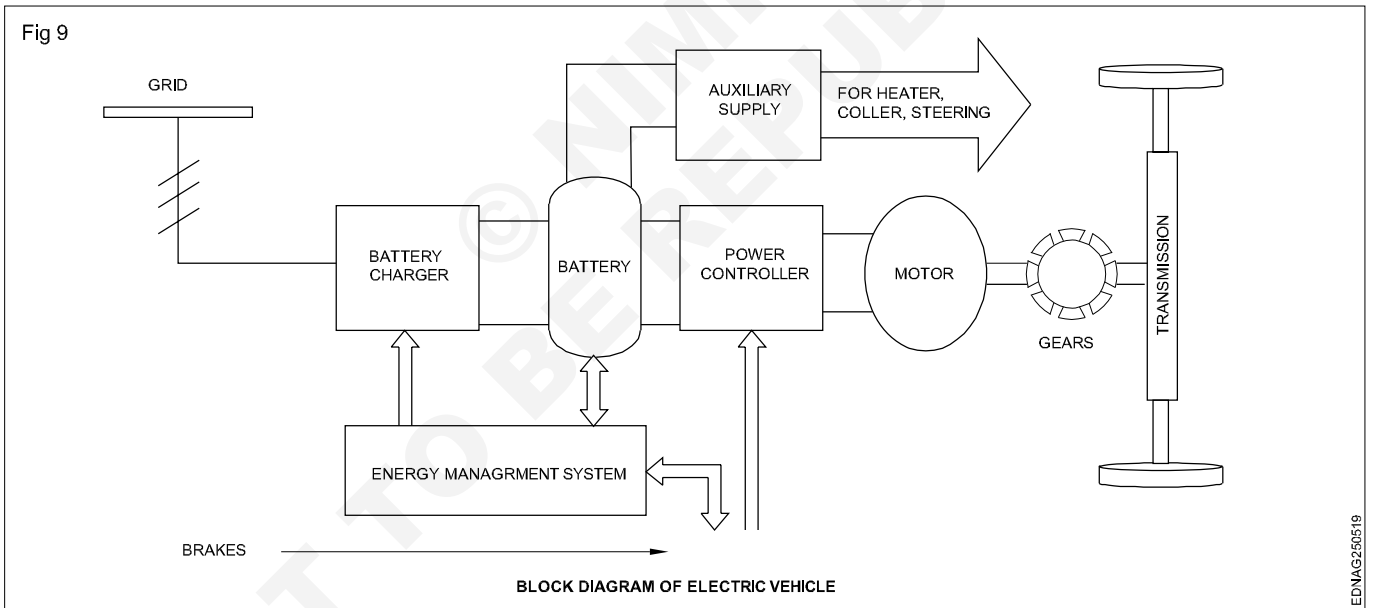
Block diagram of an EV system (Fig 7)



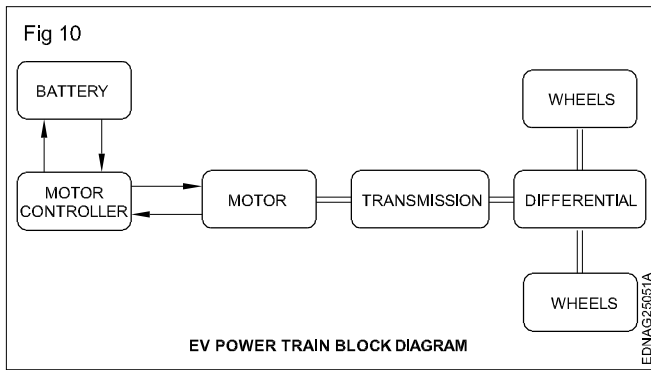
Block diagram of a typical plug in electric vehicle PEV system (Fig 8)



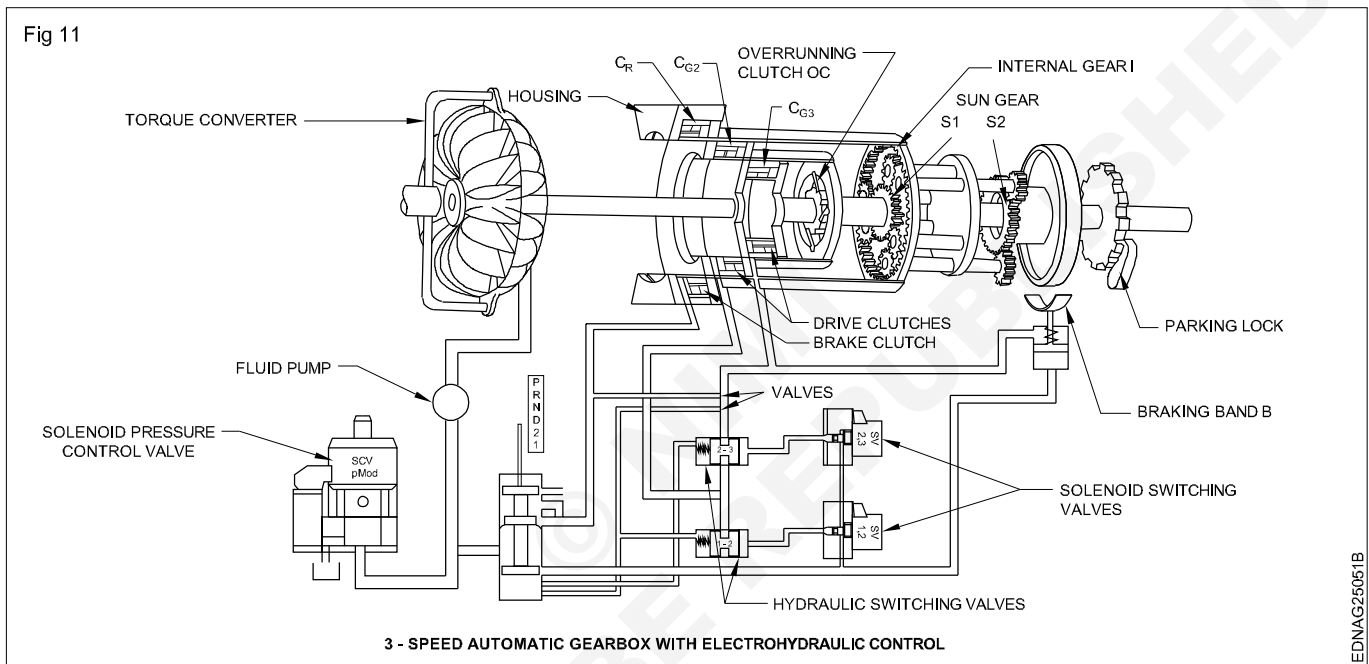
Block diagram of electric vehicle (Fig 9)



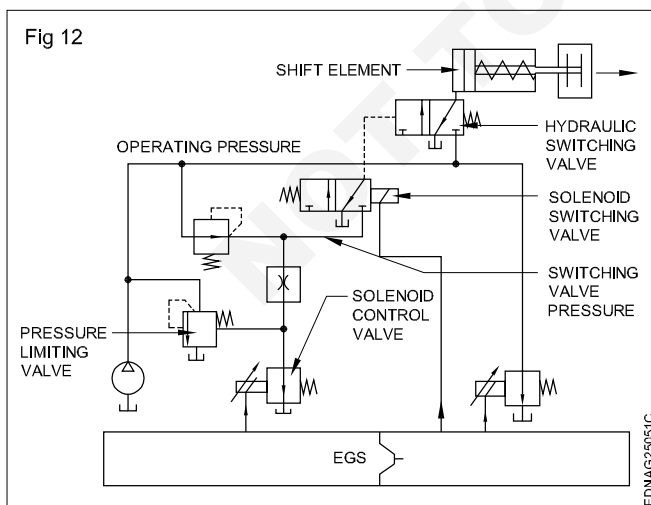
EV power train block diagram (Fig 10)



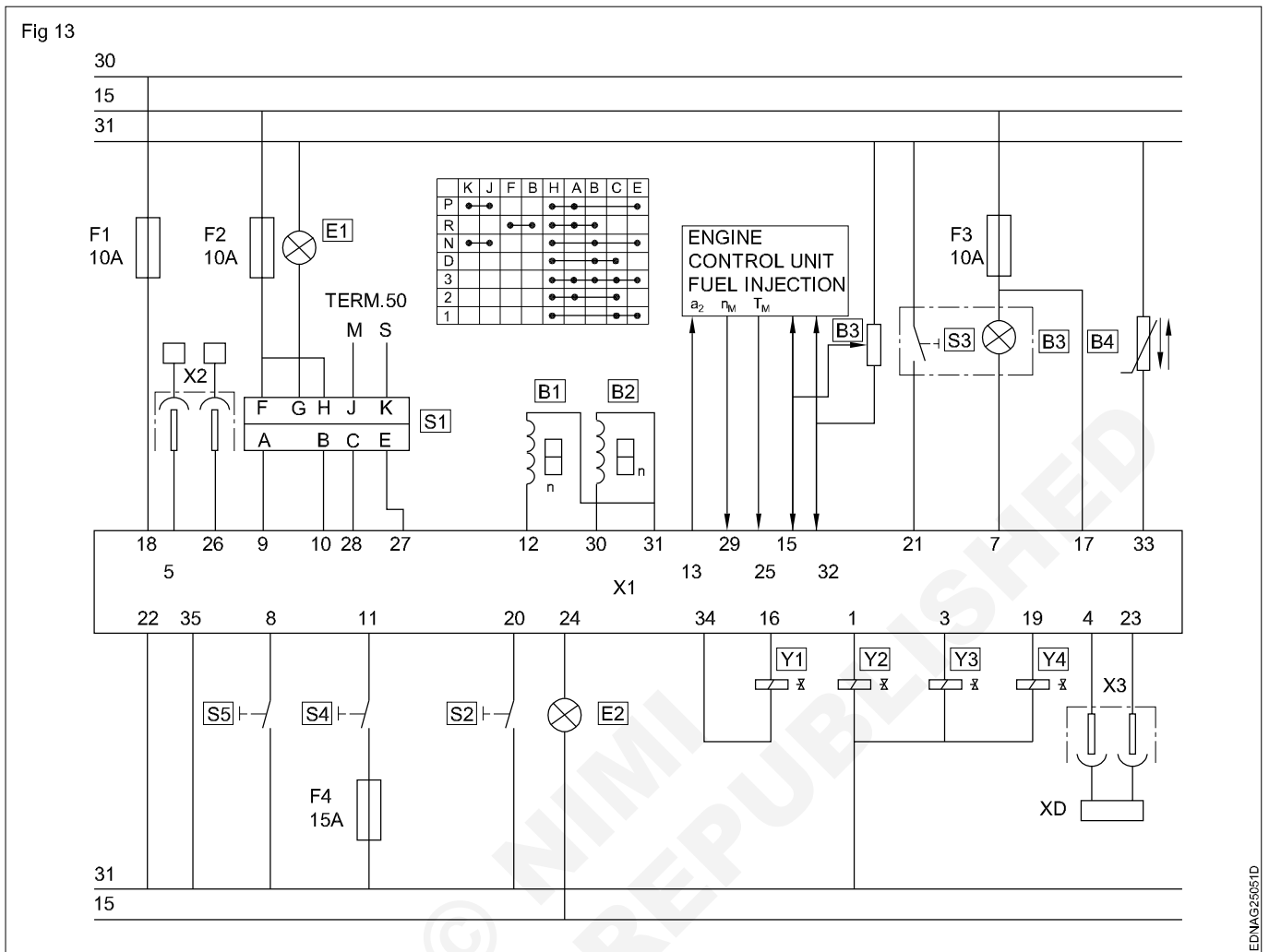
3-speed automatic gear box with electrohydraulic control (Fig 11)



Shift-pressure controls (Fig 12)



Block diagram of electronic automatic gear box control (Fig 13)



Engine immobilizer system diagram (Fig 14)

