SPECIFICATION FOR MECHANIC MOTOR VEHICLE NSQF-4

LIST OF TOOLS AND EQUIPMENT				
MECHANIC MOTOR VEHICLE (for Batch of 24 Candidates)				
Sr. No.	**Name of the Tools & Equipment**	**Specification**	**Quantity**	**Specification Details Page No**
A. TRAINEES TOOL KIT				
1.	Allen Key set of 12 pieces	**2mm to 14mm**	6+1 nos.	18
2.	Caliper inside with spring	15 cm	6+1 nos.	19
3.	Calipers outside with spring	15 cm	6+1 nos.	20
4.	Center Punch.	10 mm. Dia. x 100 mm	6+1 nos.	21
5.	Dividers with spring	15 cm	6+1 nos.	22
6.	Electrician Screw Driver	250mm	6+1 nos.	23
7.	Hammer ball peen with handle	0.5 kg	6+1 nos.	24
8.	Hands file for Second cut flat	20 cm.	6+1 nos.	25
9.	Philips Screw Driver set of 5 pieces	100 mm to 300 mm	6+1 nos.	26
10.	Pliers combination	20 cm.	6+1 nos.	27
11.	Screw driver Blade	20cm.X 9mm.	6+1 nos.	28
12.	Screw driver Blade	30 cm. X 9 mm.	6+1 nos.	29
13.	Scriber	15 cm	6+1 nos.	30
14.	Spanner D.E. set of 12 pieces	6mm to 32mm	6+1 nos.	31
15.	Spanner, ring set of 12	6 to 32 mm. (metric)	6+1 nos.	32
16.	Spanners socket with speed handle, T-bar, ratchet and universal set of 28 pieces with box	up to 32 mm	6+1 nos.	33
17.	Steel rule	30 cm inch and metric	6+1 nos	34
18	Steel tool box with lock and key (folding type)	400x200x150 mm	6+1 nos.	35
19.	Wire cutter and stripper		6+1 nos.	36

B. INSTRUMENTS AND GENERAL SHOP OUTFIT - For 2 (1+1) units no additional items are required				
20.	Adjustable spanner (pipe wrench)	350 mm	2 nos.	37
21.	AC alternator slip ring puller	Variable	1 no.	38
22.	Air blow gun with standard accessories	Trigger operated with interchangeable nozzles	1 no.	39
23.	Ammeter DC with external shunt	300A/ 60A	4 nos.	40
24.	Air ratchet	with standard accessories	2 nos.	41
25.	Air impact wrench	With standard accessories.	2 nos.	42
26.	Anvil with Stand	50 Kg.	1 no.	43
27.	Auto Electrical test bench	For checking Dynamo, Alternator & Starter. With minimum2HP AC Motor, Digital Voltmeter & ammeter.	1 no.	44-50
28.	Battery –charger	Capable to charge batteries from 5AH – 150AH.	2 nos.	51
29.	Blow Lamp	1 litre	2 nos.	52
30.	Belt Tensioner gauge		1 no.	53
31.	Car Jet washer with standard accessories	Minimum3 Phase 1HP 1400RPM Motor, 3 Reciprocating Plungers with pressure regulator & gauge. 8m Water hose with pressure adjustable brass nozzle.	1 no.	54
32.	Chain Pulley Block capacity with tripod stand	3 ton	1 no.	55
33.	Chisel flat	10 cm	4 nos.	56
34.	Circlip pliers Expanding and contracting	15cm and 20cm	4 each	57

35.	Cleaning tray	45x30 cm.	4 nos.	58
36.	Compression testing gauge	suitable for diesel Engine with standard accessories	2 nos.	59
37.	Copper bit soldering iron	0.25 Kg	2 nos.	60
38.	Cylinder bore gauge capacity	20 to 160 mm	1 no.	61
39.	Cylinder liner- Dry & wet liner, press fit & slide fit liner		1 each (consumable)	62
40.	Depth micrometer	0-25mm	1 no.	63
41.	Dial gauge type 1 Gr. A (complete with clamping devices and with magnetic stand)		1 no.	64
42.	Different type of Engine Bearing model	10 Different types on board	1 set	65
43.	Different type of piston model	5 Different Types on board	1 set	66
44.	Drift Punch Copper	15 Cm	2 nos.	67
45.	Drill twist (various sizes)	1.5 mm to 8 mm by 0.5mm	4 nos.	68
46.	Electric Soldering Iron	230 V 60 watts 230 V 25 watts	2 each	69
47.	Electric testing screw driver		4 nos.	70
48.	Engineer's square	Blade size 15 cm	4 nos.	71
49.	Engineers stethoscope		1 no.	72
50.	Feeler gauge 20 blades (metric)		4 nos.	73
51.	File flat , bastard	20 cm	4 nos.	74

52.	File, half round ,second cut	20 cm	4 nos.	75
53.	File, Square second cut	20 cm	4 nos.	76
54.	File, Square round	30 cm	4 nos.	77
55.	File, triangular , second cut	15 cm	4 nos	78
56.	Files assorted sizes and types including safe edge file (20 No's)		2each	79
57.	Flat File , second cut	25 cm	4 nos.	80
58.	Flat File , bastard	35 cm	4 nos.	81
59.	Fuel feed pump for Diesel	Hand operated Plunger Type	1 no.	82
60.	Fuel injection pump (Diesel) inline	4/6 cylinders RSV Mechanical Pneumatic Governor Type.	1 no.	83
61.	Fuel injection pump VE pump / Distributor fuel rotary pump (DPC) pumps / along with special tools and accessories		1 each	84
62.	Grease Gun		2 nos.	85
63.	Grease Gun heavy duty trolley type	10 kg capacity	1 no.	86
64.	Growler		2 nos.	87
65.	Hacksaw frame	adjustable 20-30 cm	12 nos.	88
66.	Hammer Ball Peen	0.75 Kg	4 nos.	89
67.	Hammer Chipping	0.25 Kg	5 nos.	90
68.	Hammer copper with handle	1 Kg	4 nos.	91
69.	Hammer Mallet		4 nos.	92

70.	Hammer Plastic		4 nos.	93
71.	Hand operated crimping tool/wire	(i) up to 4mm (ii) up to 10mm	2 each	94
72.	Hand vice	Up to 37 mm	2 nos.	95
73.	Hollow Punch set of seven pieces	6mm to 15mm	2sets	96
74.	Injector – Multi hole type, Pintle type		4 each	97
75.	Injector testing set	(Hand tester)	1 no.	98
76.	Insulated Screw driver	20 cm x 9mm blade	4 nos.	99
77.	Insulated Screw driver	30 cm x 9mm blade	4 nos.	100
78.	Lifting jack screw	3 ton, 5ton & 20 Ton	1 each	101
79.	Magneto spanner set with 8 spanners			102
80.	Magnifying glass	75mm	2 nos.	103
81.	Multimeter digital	LCD Display	5 nos.	104
82.	Oil can	0.5/0.25 liter capacity	4 nos.	105
83.	Automotive oil pump for dismantling and assembling		2 nos.	106
84.	Outside micrometer	0 to 25 mm	2 nos.	107
85.	Outside micrometer	25 to 50 mm	2 nos.	108
86.	Outside micrometer	50 to 75 mm	1 no.	109
87.	Outside micrometer	75 to 100 mm	1 no.	110
88.	Philips Screw Driver set of 5 pieces	100 mm to 300 mm	2 nos.	111
89.	Piston ring compressor		2 nos.	112

90.	Piston Ring expander and remover.		2 nos.	113
91.	Piston Ring groove cleaner.		1 no.	114
92.	Pliers flat nose	15 cm	2 nos.	115
93.	Pliers round nose	15 cm	2 nos.	116
94.	Pliers side cutting	15 cm	2 nos.	117
95.	Portable electric drill Machine	Upto 10mm (heavy duty)	1 no.	118-119
96.	Prick Punch	15 cm	4 nos.	120
97.	Punch Letter 4mm (Number)		2 sets	121
98.	Radiator cut section-cross flow	Radiator with sectioned side tanks, radiator core.	1 no.	122
99.	Radiator cut section-down flow	Radiator with sectioned upper & lower tanks, radiator core and cap.	1 no.	123
100.	Radiator pressure cap	LMV	2 nos.	124
101.	Scraper Triangular	25 cm	2 nos.	125
102.	Scriber	15 cm	2 nos.	126
103.	Scriber with scribing black universal		2 nos.	127
104.	Set of stock and dies -Metric		2sets	128
105.	Sheet Metal Gauge		2 nos.	129
106.	Spanner T. flocks for screwing up and up-screwing inaccessible		2 nos.	130
107.	Spanner, adjustable	15cm	2 nos.	131
108.	Spark plug spanner 14mm x 18mm x Size	Long bit for Alto/800	2 nos.	132

109.	Starter motor axial type, pre-engagement type & Co-axial type		1each	133
110.	Steel measuring tape in a case	10 meter	2 nos.	134
111.	Steel rule 15 cm inch and metric		4 nos.	135
112.	Straight edge gauge 2 ft.		2 nos.	136
113.	Stud extractor set of 3		2sets	137
114.	Stud remover with socket handle		1 no.	138
115.	Surface gauge with dial test indicator plunger type	0.01 mm	4 nos.	139
116.	Tachometer (Counting type)		1 no.	140
117.	Tandem master cylinder with booster		4 nos.	141
118.	Thermostat		2 nos.	142
119.	Thread pitch gauge Metric		2 nos.	143
120.	Timing lighter		2 nos.	144
121.	Torque wrenches	5-35 Nm, 12-68 Nm & 50-225 Nm	1each	145
122.	Turbocharger cut sectional view	Latest WGT type to show turbine, impeller and compressor wheels.	1 no.	146
123.	Tyre pressure gauge with holding nipple		2 nos.	147
124.	Universal puller for removing pulleys, bearings		1 no.	148
125.	V' Block 75 x 38 mm pair with Clamps			149
126.	Vacuum gauge	0 to 760 mm of Hg	2 nos.	150
127.	Valve Lifter		1 no.	151
128.	Valve spring compressor universal		1 no.	152
129.	Vernier calliper	0-300 mm with least count 0.02mm	4 nos.	153

130.	Vice grip pliers		2 nos.	154
131.	Automotive Water pump for dismantling and assembling		4 nos.	155
132.	Wire Gauge (metric)		2 nos.	156
133.	Work bench	250 x 120 x 60 cm with 4 vices 12cm Jaw	4 nos.	157
134.	Working model of Air Brake Assembly	Two brake drums, vehicular air compressor driven by suitable Electric Motor, air dryer, brake chamber . stop light, different valves, air pressure gauges. With all accessories.	1 no.	158
135.	Alternator assembly used for LMV	Alternator (>50 Amp)	1 no.	159
136.	Carburetor – Solex, Mikuny for dismantling and assembling	Solex, Mikuny for dismantling and assembling	1 Each	160
137.	Chain Pulley Block-3 ton capacity with tripod stand	3 ton capacity with tripod Stand	1 no.	161
138.	Cut section Model of Mock layout of a motor car – electrical system working model	Wiring with parts and accessories of a car to be arranged according to the electrical circuit of a car. Working of Self-starter, Alternator, Wiper Motor, Horn, lighting system, sparks from plug to be shown with Distributor &battery. Should be mounted on suitable table	1 no.	162
139.	Cut section models of shock absorbers		1 no.	163
140.	Cut section of cross ply and radial tyres		1 no.	164
141.	Cut section working model of automatic transmission Gear box	Sectioned to show the internal mechanism of forward and reverse speeds.	1 no.	165
142.	Cut section working model of centrifugal clutch assembly.	Centrifugal Clutch sectioned to show the internal details	1 no.	166

143.	Cut section working model of Diaphragm clutch assembly.	Diaphragm Clutch sectioned to show the internal details	1 no.	167
144.	Cut section working model of Single plate clutch assembly	Single plate Clutch sectioned to show the internal details	1 no.	168
145.	Demonstration board of electronic Ignition system, ignition coil	With HT coil, HT wires, Spark Plugs, ignition switch, coil, distributor, battery, and wiring.	1 no.	169
146.	Demonstration board of MPFI system	With injectors, rail, inlet manifold, throttle body, distributor, ECU, purge valve, sensor, crank pulley, fuel tank module.	1 no.	170-171
147.	Disk brake in working condition with caliper assembly with all parts	Exhibiting Brake disc, Caliper assembly, tandem master cylinder, brake hoses, oil bottle, pedal, etc.	1 no.	172
148.	Drum brake assembly in Working Condition	Brake drum, tandem master cylinder, oil container, brake hose, brake pedal.	1 no.	173
149.	Front axle (Rzeeppa Joint) with stand for Dismantling and assembly	Rzeppa joint of LMV.	1 no.	174
150.	Full floating axle and semi-floating axle assembly	Drum & axle casing should be with all components in working condition.	1 no.	175
151.	Functional/experiment model of different type of sensors.	With Different type of sensors like Throttle Position Sensor, Manifold Absolute Pressure Sensor, Engine Coolant Temperature Sensor, Vehicle Speed Sensor, Oxygen Sensor, Crankshaft Position Sensor, Camshaft Position Sensor, Intake Air Temperature Sensor, Mass Air Flow Sensor, Knock Sensor with ECU.	1 no.	176-177
152.	Steering assembly – 1. Rack & pinion 2. Worm & roller 3. Recirculating ball 4. Power steering 5. Electric Assisted Power Steering	1. Rack & Pinion with steering wheel, column, tie rod end. 2. Worm & Roller steering assembly with drop arm. 3. Recirculating Ball steering with pitman shaft and drop Arm.	1 each	178-181

		4. Hydraulic working power steering with steering wheel, column, flow pipe, hydraulic pump, oil reservoir. 5. Electric Assisted Power Steering with Rack and pinion, Electric Motor and Motor Control Module		
153.	Synchronous Gear box with stand for Dismantling and assembly	Gearbox with 5 Forward & 1 Reverse Gear	1 no.	182
154.	Tandem master cylinder with booster	Working model	1 no.	183
155.	Tubed tyre of car, trucks & motorcycle		1 each	184
156.	Tubeless tyre of cars & trucks		1 each	185
157.	Tyre & split rim wheel assembly		1 no.	186
158.	Working Model of power windows	Showing parts like door, glass with motor and its gear arrangement and operating switch.	1 no.	187
159.	Working model of torque converter	Model of LMV	1 no.	188
GENERAL SHOP OUTFIT				
160.	Air conditioned CRDI Vehicle in running condition -LMV	New vehicle with CRDI engine, 04 strokes, 04 cylinders, BS-VI, fitted with air condition.	1 no.	189
161.	Arbor press hand operated	2 ton capacity	1 no.	190
162.	Automotive exhaust 5 gas analyser and Diesel Smokemeter (for petrol & Diesel)	Exhaust 5 Gas Analyzer Petrol ARAI approved to check CO, CO_2, O_2, and HC& NO. Diesel Smoke Meter ARAI approved.	1 no.	191-194
163.	Diesel Engine – CRDI - 4 stroke for Dismantling and Assembling with Swiveling Stand.	Latest 4 Stroke 4 cylinder turbo charged CRDI Engine, 800-1600cc, in running condition, with ECM, BCM (optional), and all sensors, wiring, fuel feed & cooling system & instrument cluster.	1 no.	195-196
164.	Diesel engine (Running	Single Cylinder, OH valves, fuel tank	1 no.	197

	condition) Stationary type single cylinder	with handle, fuel feed, water cooling, oil pump.		
165.	Hydraulic jack HI-LIFT type	3 ton capacity, and 5 Ton capacity	1each	198
166.	Multi Scan Tool To scan Engine, ABS & EBD, AT, SRS, Body Control and immobilizer	Should perform automotive sensor simulation test specially designed to diagnose and simulate vehicle sensor faults for sensors like MAP sensor, Intake air temperature sensor, TP sensor etc.	1 no.	199
167.	Spring tension tester	Manually operated with analogue display.	1 no.	200
168.	Trolley type portable air compressor	Belt driven compressor along with accessories	1 no.	201
169.	Working Condition of Diesel Engine – CRDI - 4 stroke Engine, Assembly with fault simulation board	Latest 4 Stroke 4 cylinder turbo charged CRDI Engine, with ECM, BCM and sensors, wiring, fuel feed, cooling system& instrument cluster. Fault setting bank for minimum 8 sensors and with diagnostic socket & Scanner to read the faults. Engine management circuit diagram to be printed on the panel board.	1 no.	202-203
170.	Cut section of 4/6 cylinder diesel engine in moving condition to show movement of internal parts	6 cylinder diesel engine in working condition to show movement of internal parts	1 no.	204
171.	Diesel Engine six Cylinder in running condition	Latest Diesel Engine CRDI 4 Stroke 6 Cylinders, Turbocharged Engine in running condition. All sensors, wiring, fuel feed, cooling system & instrument cluster	1 no.	205
172.	Air bag simulator	Driver & Co Driver Air Bags, Seat belts with front seats, crash sensors, air bag ECU, Wiring Harness	1 no.	206
173.	Air conditioning service Unit (Car)	Suitable for R134A. Recovery with vacuum pump, automatic drain & stop after recovery.	1 no.	207-208

174.	Four stroke petrol engine with CNG setup-working condition	Latest 4 Stroke 3/4 cylinder MPFI Engine in running condition 800-1600cc with ECM, BCM (optional) and all sensors, wiring, fuel feed system, cooling system& instrument cluster with CNG/ Petrol selection switch on Panel. N.B.: If ECM and BCM are available as one control unit can be purchased instead ECM, BCM as separated.	1 no	209-210
175.	Heavy Commercial vehicle	Fitted with Latest 06 cylinder CRDI diesel engine with all parts and accessories. (without body on frame)	1 no.	211
176.	MPFI petrol engine with swiveling stand along with special tools for dismantling and assembling	Latest 4 Stroke 3/4 cylinder MPFI Engine in running condition 800-1600cc with ECM, BCM (optional) and all sensors, wiring, fuel feed system, cooling system & instrument cluster. N.B.: If ECM and BCM are available as one control unit can be purchased instead ECM, BCM as separated.	1 no.	212-213
177.	Petrol Engine(2-stroke) Motor Cycle/Scooter along with special tools and accessories (Optional) * If not available in market video demonstration may be used to explain working.	Cut Section of 2 Stroke 2 W Engine Single Cylinder	1 no.	214
178.	Transfer case with stand for Dismantling and assembly.	To show the gear mechanism of forward and reverse speeds.	1 no.	215
179.	Tube/ tyre vulcanizing machine	220 V , Heater Capacity 400W x 2 With different types of Die &Mould	1 no.	216
180.	Two post car lift – capacity 4000 kg	Hydraulic Type with Mechanical Arms Locking.	1 no.	217
181.	Tyre Changer Machine	Motorized Pneumatic Type, Rim clamping facility, and bead breaking facility with air inflating device.	1 no.	218
182.	Ultrasonic Injection cleaning equipment	Flow analysis & spray pattern test, leak test, auto programming mode, ultrasonic test with timer, Min 500 ML Lit SS Tank with Lid, SS Stand.	1 no.	219

183.	Wheel alignment Machine – computerized 3D (Optional)	Latest machine for four wheel alignment. With connected camera , IR Lighting Source min. 8mm, Reflector metal based, should work in sunlight	1 no	220-221
184.	Wheel balancing machine	For wheel balancing of LMV. Motor 0.5 HP Shaft Diameter min 38mm. Hardened flange assy. Balancing catch nut of metal.	1 no.	222
185.	Working Condition of Petrol MPFI Engine Assembly with fault simulation board	Latest 4 Stroke 3/4 cylinder MPFI in running condition,800-1600cc with ECM, BCM and all sensors, wiring, fuel feed system, cooling system & instrument cluster with Fault setting bank for minimum 6 sensors with diagnostic socket&Scanner to read the faults. Engine management circuit diagram to be printed on the panel board.	1 no.	223-224
186.	Working Condition of E.V (Electric Vehicle) Car	Electric car with all required accessories including battery charger	1 No	225-227
CONSUMABLE				
187.	Battery		As required	228
188.	Brake fluids		As required	228
189.	Chalk, Prussian blue		As required	228
190.	Chemical compound for fasteners		As required	228
191.	Diesel		As required	228
192.	Different type gasket material		As required	228
193.	Different type of oil seal		As required	228
194.	Drill Twist (assorted)		As required	228

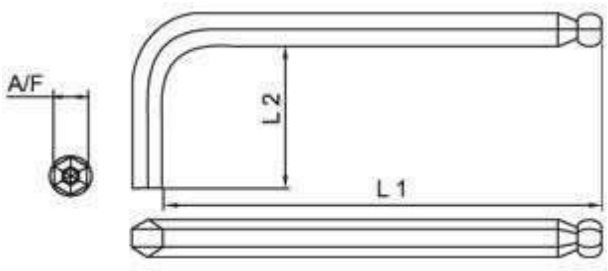
195.	Emery paper	36–60 grit , 80–120	As required	228
196.	Engine oil & Engine coolant		As required	228
197.	Gear oils		As required	228
198.	Hacksaw blade (consumable)		As required	228
199.	Holders, lamp teakwood boards, plug sockets,		As required	228
200.	Hydrometer		5 nos.	228
201.	Lapping abrasives		As required	228
202.	Petrol		As required	228
203.	Power steering oil		As required	228
204.	Radiator Coolants		As required	228
205.	Safety glasses		As required	228
206.	Steel wire Brush	50mmx150mm	5 nos.	228
207.	Battery for E.V Car		As required	228
208.	Diodes and transistors		As required	228
CLASS ROOM FURNITURE FOR TRADE THEORY				
209.	Instructor's table and Chair	Steel	1 set	229-235
210.	Students chairs with writing pads		24 nos.	236
211.	White board size	1200mm X 900 mm	1 no.	237-238
212.	Instructors lap top with latest configuration pre-		1 no.	239

	loaded with operating system and MS Office package.			
213.	LCD projector/interactive smart board.		1 no.	240
214.	Trainees locker	6½ ' x 3' x 1½'	1 set each (optional)	241-243
TOOLS & EQUIPMENTS FOR ENGINEERING DRAWING HALL				
215.	Drawing board	(700mm x500 mm) IS: 1444	24 +1 nos.	244
216.	Mini drafter		24 +1 nos.	245
217.	Set square	celluloid 45º (250 X 1.5 mm)	24 +1 nos.	246
218.	Stool for trainees		24 +1 nos.	247
219.	Cupboard (big)		1 no.	248-250
220.	White Board	8ft. x 4ft.	1 no.	251-252
221.	Trainer's Table		1 no.	253
222.	Trainer's Chair		1 no.	253
223.	Draughtsman drawing instrument box		24 +1 nos.	254-259
224.	Draughtsman table		24 +1 nos.	260-263
ADDITIONAL TOOLS AND EQUIPMENT MUST REQUIRED FOR MMV TRADE				
225	Oil filter removal spanner Chain type, band-style, universal oil filter wrench		2 Each	264
226	Sledge hammer	2. Kg.	2 Nos	265
227	SAFETY JACK STAND FOR VEHICLE	3 TON - 4 Nos 05 Ton-2 Nos	06 Nos	266
228	Battery terminal cleaner tool		1 No	267
229	Glow plug tester		1 No	268
ADDITIONAL LIST OF TOOLS AND EQUIPMENT SUGGESTED BY MR.DIVYARANJAN BHATTCHARYA GENERAL MANAGER, KIA MOTORS ARYODAYA KIA NAGPUR, AUTHORISED SERVICE CENTRE FOR PRACTICAL PURPOSE				
230	Skimming Machine		1 no.	269
231	Electrical Brake bleeding machine		1 no.	270-271

232	Coolant analyzer machine		1 no.	272
233	Headlight Aligner Machine		1 no.	273
234	Radiator cap pressure sensor		1 no.	274
ADDITIONAL LIST OF TOOLS AND EQUIPMENT SUGGESTED BY MR. , ERROS HYUNDAI NAGPUR AUTHORISED SERVICE CENTRE FOR PRACTICAL PURPOSE				
235	HVAC AC gas leakage tester		1 no.	275
236	Battery tester		1 no.	276

1. Allen Key set of 12 pieces 2mm to 14mm

1. 1.1 Basic Indicative Diagram



1.2 Generally conform to I.S 3082 – 1988
Sizes in mm: 2mm, 3mm, 4mm,4.5mm, 5mm,5.5mm, 6mm, 8mm, 10mm
11mm,12mm, 13mm, 14mm Hex Keys

1.3 Made from high grade alloy Steel - Chrome Vanadium Molybdenum (S2) which enables

1.4 higher torque as compared to Allen keys made from Cr – V Steel

1.5 Higher Hardness 57 - 62HRC

1.6 Ball Head on one side to facilitate tightening & loosening of screws at 15degrees

1.7 Precision drawn and machined

1.8 Specially coated and oiled for rust prevention

2. Caliper - Inside, Spring Type – 15 cm

2. Basic Indicative Diagram

3. Inside calipers with Size: 15 cm

4. Material for
   1.4.1 Legs: Carbon & Alloy Steel
   1.4.2 Spring: Spring Steel
   1.4.3 Others: Free Cutting Steel

5. Finish for
   1.5.1 Legs: Polished
   1.5.2 Rest parts: Auto Black

6. Hardness for
   1.6.1 Tip: 50 - 55HRC
   1.6.2 Spring: 45 - 50HRC

7. Proper rust preventive packing

3. Caliper - Outside, Spring Type – 15 cm

Basic Indicative Diagram

1. Outside Calipers with Size: 15 cm

2. Material for
    1.2.1 Legs: Carbon & Alloy Steel
    1.2.2 Spring: Spring Steel
    1.2.3 Others: Free Cutting Steel

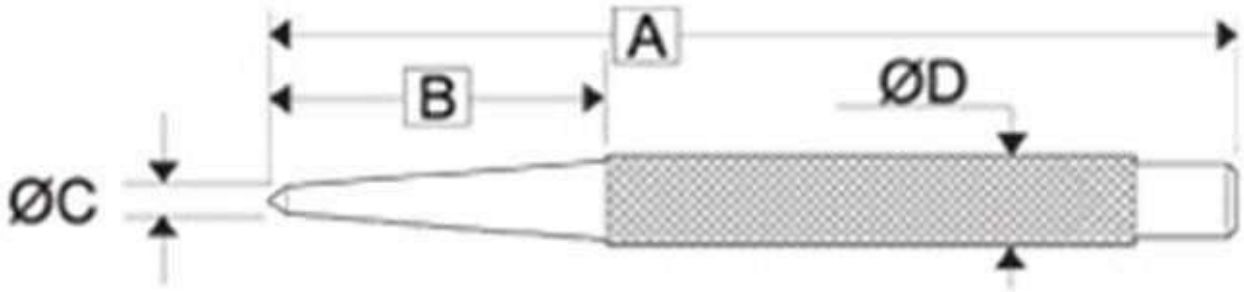
3. Finish for
    1.3.1 Legs: Polished
    1.3.2 Rest parts: Auto Black

4. Hardness for
    1.4.1 Tip: 50 - 55HRC
    1.4.2 Spring: 45 - 50HRC

5. Proper rust preventive packing

4. Center Punch - 10 mm. Dia. x 100 mm

1. Basic Indicative Diagram



2. Generally, conform to I.S. 7177 -1974

3. Dimensions (in mm): A - 100, B - 33, Ø C - 4, Ø D -10

4. Made from high grade chrome Steel

5. Hardness
   1.5.1 Working surface: 55 - 57HRC
   1.5.2 Body: 35 - 45HRC

6. Overall Length: 100mm

7. Black phosphate finish, Hardened &tempered

8. Deep knurling on body for firm grip

5. Dividers with spring 15 cm

1. Basic Indicative Diagram

2. Spring Divider Size(L): 15cm

3. Material for
   1.3.1 Legs: Carbon & Alloy Steel
   1.3.2 Spring: Spring Steel
   1.3.3 Others: Free Cutting Steel

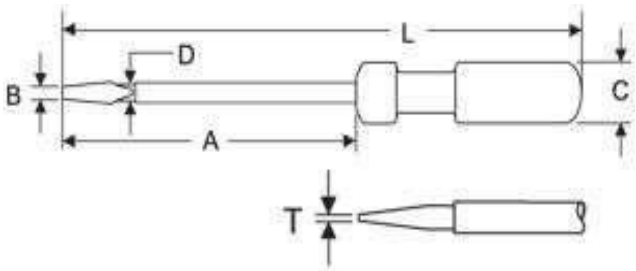
4. Finish for
   1.4.1 Legs: Polished
   1.4.2 Rest parts: Auto Black

5. Hardness for
   1.5.1 Tip: 50 - 55HRC
   1.5.2 Spring: 45 - 50HRC

6. Proper rust preventive packing

6. Electrician Screw Driver250mm

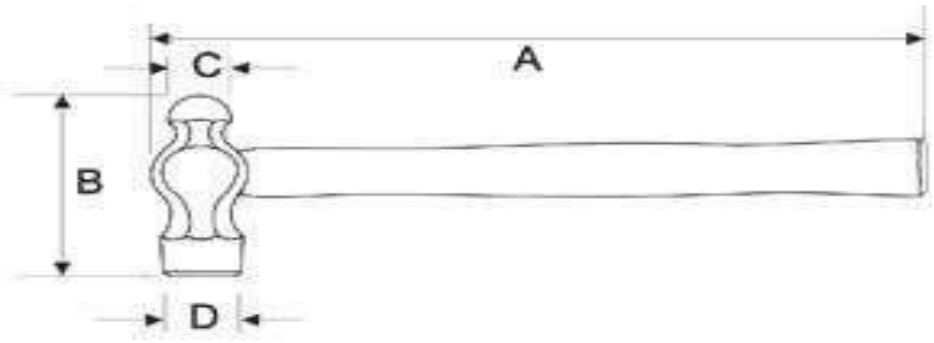
1. Basic Indicative Diagram



3. Insulated Blade
4. Dimensions:
* Size: 10 mm X 250 mm (A - 250 mm, D - 10mm)
*Tip Bit Size: B X T: 10 mm x 1.2mm
5. Blade:
1. Blade made of high-grade Silicon - Manganese Steel (EN 45A)
2. Blade should be differential hardened & tempered to resistwear, bending & meet high torque requirement
3. Hardness on Tip: 55 - 58HRC
4. Minimum Torque Value: 1. 46Kg.m
5. Bright and Smooth Nickel Chrome plating finish to effectively protect blade against corrosion
6. Handle:
1. Material of Handle: Cellulose Acetate
2. Handle should be made of high-grade CA Plastic, which is non - flammable & unaffected by oil, petrol, grease, water – practically anything
3. Handle should withstand rough use including hammering
4. Handle design should be such that it gives comfortable grip even at higher torques
5. Handle & blade assembly should be insert molded
7. Tip:
1. Tip should be formed by Forging &Trimming
2. Tip should be precision - ground to 10-degree angle to ensure firm grip in the screw slot.
3. The Blade tip should be magnetized to lift small screw from confined places or to hold the screw in position
4. Tip sides & faces should be well ground with good finish
5. Double ear coining should be provided for the blade

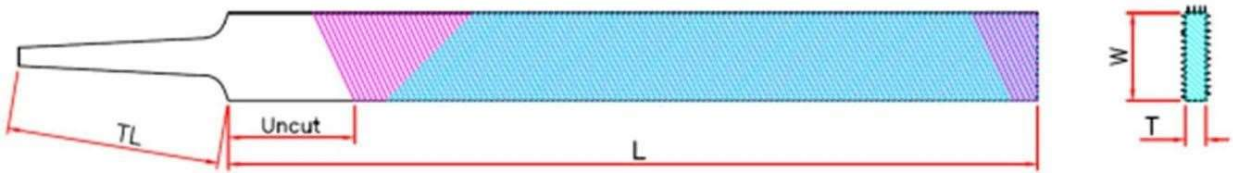
7. Hammer - Ball Peen with Handle 0.5 kg

1. Basic Indicative Diagram



2. Generally, conform to I.S. 841 -1983
3. Ball Peen Hammer
4. Length: 300 mm +10%
5. Weight: 500grams
6. Drop forged from high grade carbon Steel
7. Material: EN -9
8. Partially hardened up to 46 - 56 HRC on striking surface
9. Depth of Hardness: 6mm
10. Phosphate and painted
11. Handle
    1. Material: Hickory Wood/ Red Wood/ Babul Wood/ Indestructible Handle
    2. Handle fixed firmly to hammer head so that it does not come out after long use

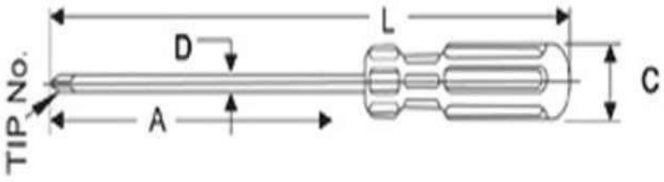
8. Hands file for Second cut flat 20 cm.



Range (In MM) Generally conforming to IS1931-2000	From	To
1. Body Length(L)	198	202
2. Tang Length (TL)	54	56
3. Width(W)	19.6	20.6
4. Thickness(T)	3.7	4.4
5. No. of Up cut /Inch	34	35
6. Up cut inclination	64^0	66^0
7. No. of Over-cut /Inch	29	30
8. Over-cut Inclination	44^0	46^0
9. No. of Edge cut /Inch	36	37
10. Edge cut Inclination	89^0	91^0
a. Hardness	60 HRC	64 HRC
b. Rake Angle	-7^0	-12^0

9. Philips Screw Driver set of 5 pieces 100 mm to 300 mm

1. Basic Indicative Diagram



2. Generally, conform to IS 844 -1979

3. Sizes:

1.3.1 A:100mm D:6mm TIP SIZE:00

1.3.2 A:150mm D:6mm TIP SIZE:0

1.3.3 A:200mm D:8mm TIP SIZE:1

1.3.4 A: 250mm D:8mm TIP SIZE:2

1.3.5 A: 300mm D:10mm TIP SIZE:3

4. Blade made of High-Grade Silicon – Manganese Steel

5. Blade should be differential hardened & tempered to resist wear, bending & meet high torque requirement

6. Hardness on Tip: 55 - 58HRC

7. The Blade tip should be magnetized to lift small screw from confined places or to hold the screw in position

8. Bright and Smooth Nickel Chrome plating finish to effectively protect blade against corrosion

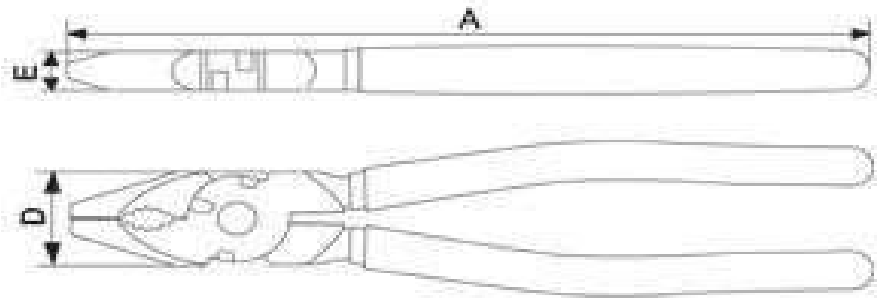
9. Handle should be made of high-grade CA Plastic, which is nonflammable & unaffected by oil, petrol, grease, water – practically anything

10. Handle should withstand rough use including hammering

11. Handle design should be such that it gives comfortable grip even at higher torques

10. Pliers combination 20 cm.

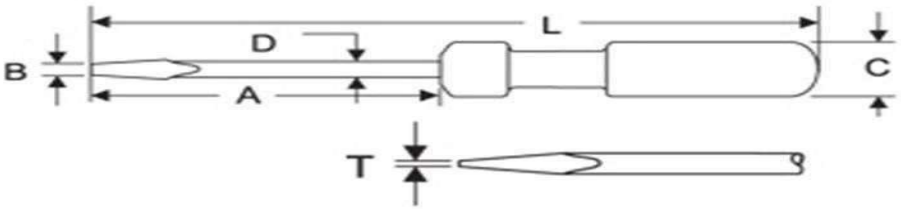
1. Basic Indicative Diagram



2. Generally, conform to IS 3650 -1981
3. Material: C -70
4. Finish: Polished / Chrome plated / Satin finish
5. Length(A): 200mm
6. Drop forged, hardened tempered
7. Differential hardening
8. Radius Gap from front side: Up to 0.2mm
9. Play between shanks: Up to 0.3mm
10. Shank Material: C70 /EN9
11. Rivet material: SAE 1541 /40Cr4
12. Cutting-edge Hardness: 60 - 62HRC
13. Shank Hardness: 40 - 48HRC
14. Rivet Hardness: 38 - 42HRC
15. High Voltage Insulation: Should be able to withstand 4000 V DC or 2800 VAC
16. Insulation Sleeves made from High Quality CA Plastic
17. Thicker Sleeves for comfortable Grip
18. Special thumb protector for sleeves to minimize the risk of electric shock incase plier slips while in use.
19. Should be able to cut soft (74 to 84 Kg/mm^2) & Hard (140 Kg/mm^2) wires
20. Should be able to cut 2 mm of hard wire Diameter & 1 mm of soft wire Diameter

11. Screw driver Blade 20cm.X 9mm.

1. Basic Indicative Diagram



2. Generally, conform to IS 844 -1979

3. Dimensions:

Size: 9 mm X 20 cm (A - 200 mm, D - 10mm)

Tip Bit Size: B X T: 10 mm X 1.2mm

4. Blade:

1. Blade made of high-grade Silicon - Manganese Steel (EN 45A)
2. Blade should be differential hardened & tempered to resist wear, bending & meet high torque requirement
3. Hardness on Tip: 55 - 58HRC
4. Minimum Torque Value: 1. 46Kg.m
5. Bright and Smooth Nickel Chrome plating finish to effectively protect blade against corrosion

5. **Handle**:

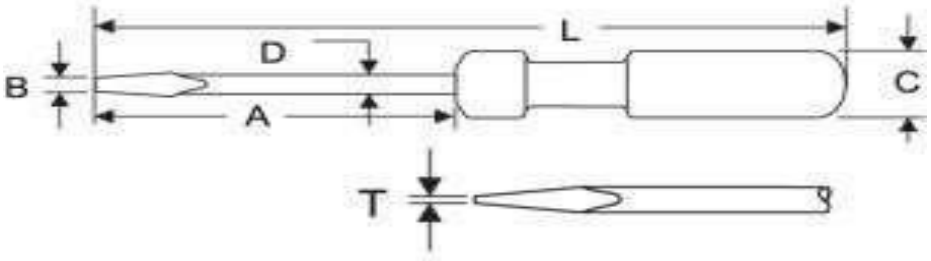
1. Material of Handle: Cellulose Acetate
2. Handle should be made of high-grade CA Plastic, which is non flammable & unaffected by oil, petrol, grease, water – practically anything
3. Handle should withstand rough use including hammering
4. Handle design should be such that it gives comfortable grip even at higher torques
5. Handle & blade assembly should be insert molded

6. Tip:

1. Tip should be formed by Forging &Trimming
2. Tip should be precision - ground to 10-degree angle to ensure firm grip in the screw slot.
3. The Blade tip should be magnetized to lift small screw from confined places or to hold the screw in position
4. Tip sides & faces should be well ground with good finish
5. Double ear coining should be provided for the blade.

12. Screw driver Blade 30 cm. X 9 mm

1. Basic Indicative Diagram



2. Generally, conform to IS 844 -1979
3. Dimensions:
   Size:9 mm X 30 cm (A - 30 cm, D - 9mm)
   Tip Bit Size: B X T: 9 mm X 1.5mm
4. Blade:
1. Blade made of high-grade Silicon - Manganese Steel (EN 45A)
2. Blade should be differentially hardened & tempered to resist wear, bending & meet high torque requirement
3. Hardness on Tip: 55 - 58HRC
4. Minimum Torque Value: 1. 46Kg.m
5. Bright and Smooth Nickel Chrome plating finish to effectively protect blade against corrosion
5. Handle:
1. Material of Handle: Cellulose Acetate
2. Handle should be made of high-grade CA Plastic, which is non -flammable & unaffected by oil, petrol, grease, water – practically anything
3. Handle should withstand rough use including hammering
4. Handle design should be such that it gives comfortable grip even at higher torques
5. Handle & blade assembly should be insert molded
6. Tip:
1. Tip should be formed by Forging &Trimming
2. Tip should be precision - ground to 10-degree angle to ensure firm grip in the screw slot.
3. The Blade tip should be magnetized to lift small screw from confined places or to hold the screw in position
4. Tip sides & faces should be well ground with good finish
5. Double ear coining should be provided for the blade.

13. Scriber 15 cm

1. Basic Indicative Diagram

2. Scriber with Min. Length15 cm

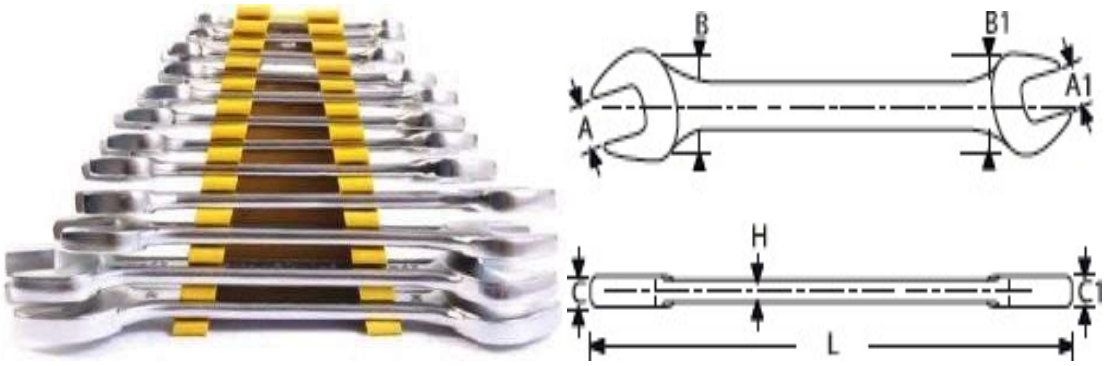
3. 90 ° Bend and Straight

4. Both Point end Hardness 55 - 60HRC

5. Should be of material EN -9

14. Spanner D.E. set of 12 pieces 6mm to 32mm

1. Basic Indicative Diagram

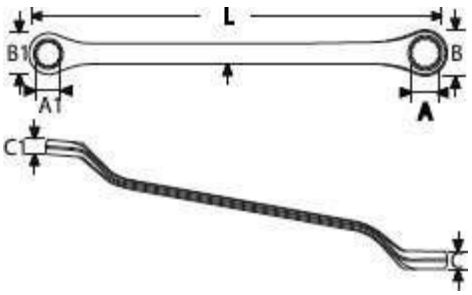


1. Generally, conform to IS 2028 -1998
   a. Sizes: 6X7, 8X9, 10X11, 12X13, 14X15, 16X17, 18X19,20X22,21X23,24X27 25X28,30X32
2. Slightly Rounded handles - Sandblasted
3. Non-Damaging Grip on nut due to close wrench opening tolerances
4. I - section design of handle and heads to combine strength and low weight
5. Salt Spray Test Should be conducted
6. Should not have sharp cuts, pit mark cutting Burs
7. Should have Anti-slip design Feature.
8. Thoroughly corrosion protected with Nickel chrome finish
9. Deep forged from Chrome vanadium Steel(31CrV3)
10. Hardness: 42 - 45HRC
11. Head at each end are of different sizes and set at an angle of 15degrees
12. Web should be provided in forging
13. Minimum Torque Values in Kg .m

1. Nominal Width A/F 6 - 0.6, 7 - 0.9, 8 - 1.3, 9 - 1.9, 10 - 2.5, 11 - 3.3, 12 - 4.2
2. Nominal Width A/F 13 - 5.3, 14 - 6.5, 15 - 7.8, 16 - 9.4, 17 - 10.9, 18 - 13.0
   Nominal Width A/F 19 - 15.2, 20 - 17.50, 21 - 20.20, 22 - 22.9,23-26.0,24-26.0,24-29.3
   Nominal Width A/F 25-32.8,26-36.6,27-40.7,28-45.0,30-54.6,32- 65.50.

15. Spanner, ring set of 12 6 to 32 mm. (metric)

1. Basic Indicative Diagram



Generally, Conform to IS 2029 -1998
Sizes: 6X7,8X9,10X11,12X13,14X15,16X17,18X19,20X22,21X23,24X27,25X28, 30X32 mm

1. Thin-walled rings to provide accessibility in confined spaces
2. Slightly rounded handles - sand blasted to give comfortable grip
3. Non-Damaging Grip on nut due to close wrench opening tolerances
4. I - section design of handle and heads to combine strength and low weight
5. Thoroughly corrosion protected with Nickel chrome finish
6. Deep forged from Chrome vanadium Steel(31CrV3)
7. Forging Finish: Should be free from forging defects such as pitted, un filling, excess flash etc.
8. A/F broaching finish should be good and should have flank bi hex
9. Grinding finish: Part line flash is smooth & enough ground
10. Surface finish: Bright Ni – Cr plated
11. Plating thickness: Minimum 3.5microns
12. Hardness: 42 - 48HRC
13. Minimum Torque Values in Kg m

1 Nominal Width A/F 6-1.8, 7-2.6, 8-3.50, 9-4.6, 10-5.90, 11-7.40, 12-9.10
.2 Nominal Width A/F 13-10.90, 14-13.0, 15-15.30, 16-17.80, 17-20.50
.3 Nominal Width A/F 18-23.4, 19-26.6, 20-30.0, 21-31.6, 22-37.5, 23-41.6
.4 Nominal Width A/F 24-46.0, 25-50.6, 26-55.5, 27-60.6, 28-66.0, 30-77.5 .5 Nominal Width A/F 32-90.10

16. Spanners socket with speed handle, T-bar, ratchet and universal set of 28 pieces with box up to 32 mm

Basic Indicative Diagram

1. 1/2 Inch Ratchet Socket Set, 2 Extension Bar, T - Bar, Universal Joint,
2. Sockets = 8,9,10,11,12, 13,14,15,16,17,18,19,21,22,23,24,26,27,28, 29,30 and 32 mm, in a Plastic Case Box
3. 27 Pieces set which Includes 22 Pieces 1/2-inch Sockets: 8, 9, 10, 11,12, 13, 14, 15, 16, 17,18, 19,21,
4. 22, 23, 24, 26, 27, 28, 29, 30, 32 mm, Extension Bar - 5-inch, 10-inch,Universal Joint, Sliding T - Bar, Ratchet Handle
5. Cold forging from high quality Chrome Vanadium Steel
6. Ultra-Premium Finish to provide scratch proof surface with enhanced protection against corrosion. (Mirror Finish & Matt finish not acceptable)
7. Should provide a Non slip grip even in slippery applications (Knurled Band)
8. 48 Teeth Gear Structure Ratchet with quick release push button & Head Should be repairable.
9. Universal Joint should be hinged through 180° in both directions
10. Profile should provide larger contact area between socket and fastener
11. Brand & Size etched on each individual socket to ensure quick & convenient identification
12. Blow molded plastic case to securely fit all pieces for easy organization and convenient portability.

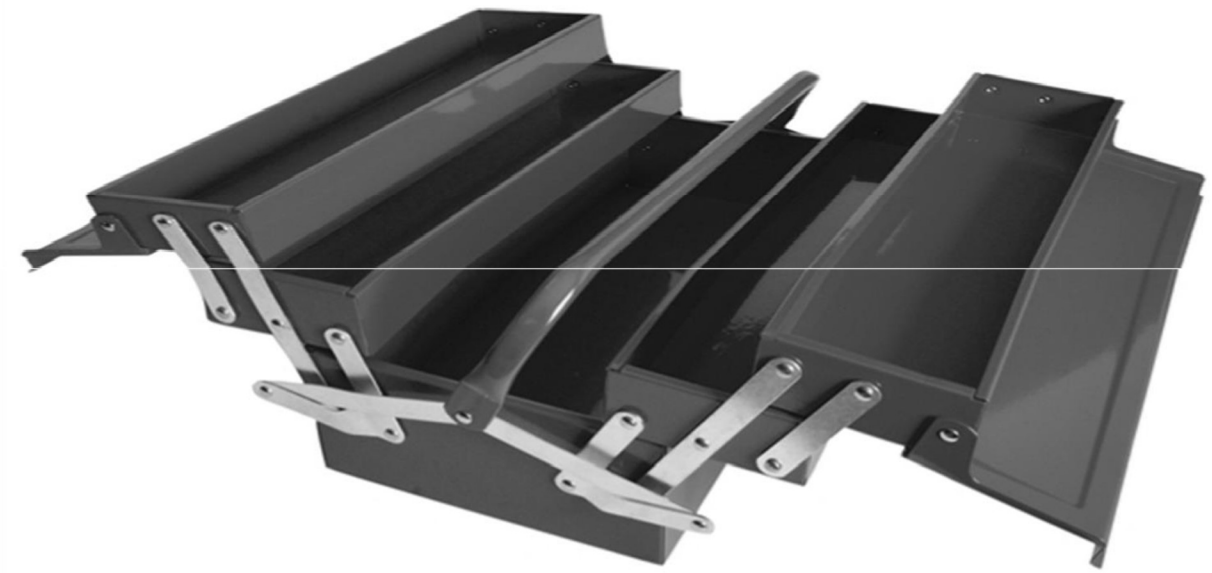
17. Steel rule 30 cm inch and metric

Basic Indicative Diagram

1. Material: Stainless-steel
2. Thickness: 0.5mm
3. Hardness: 30 - 35 HRC (Specially Hardened)
4. Finish: Polished 2B / Anti-Glare Satin Chrome
5. Surface roughness: 0.6 Microns max
6. Range: 300mm
7. Measuring least count: Metric Graduation+0.5mmand
8. English graduation 1/64 inch
9. Accuracy: Meteorology Standard EEC Class

18. Steel tool box with lock and key (folding type) 400x200x150 mm

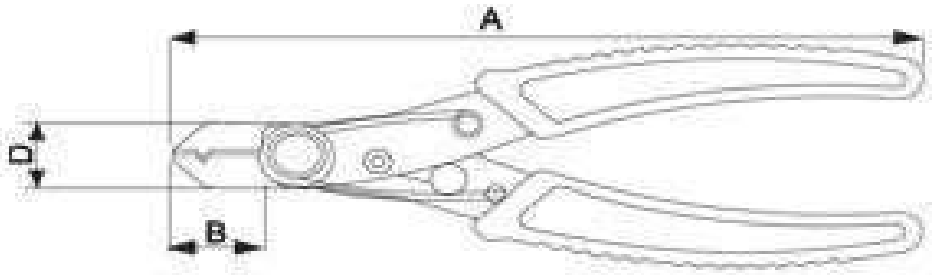
1. Basic Indicative Diagram:



2. 5 Tray Cantilever box with overall Dimensions:
   I. Width: Depth: Height = 400 mm: 200 mm: 150mm
   II. Variation: ± 20mm
3. Corrosion resistant powder coated finish
4. Riveting should be of Stainless-steel
5. Minimum Load Capacity: 33kg
6. Construction in CRC Sheet with thickness:
   I. I. Base and Side: 0.65 mm
   II. Partition=1.0mm
7. Joining Clips should be of CRC Sheet with 15 mm thickness
8. Handle should be of ERW MS Pipe ø 12.7 mm X 1.0 mm thick
9. Provision of Padlock in lid
10. Color: Blue, Yellow, Red, Orange or Black

19. Wire cutter and stripper

1. Basic Indicative Diagram



2. Generally, conform to I.S. 5995 -1971

3. Dimensions (in mm): A - 150, B - 18, D -15

4. Sleeve should be made of Cellulose Acetate

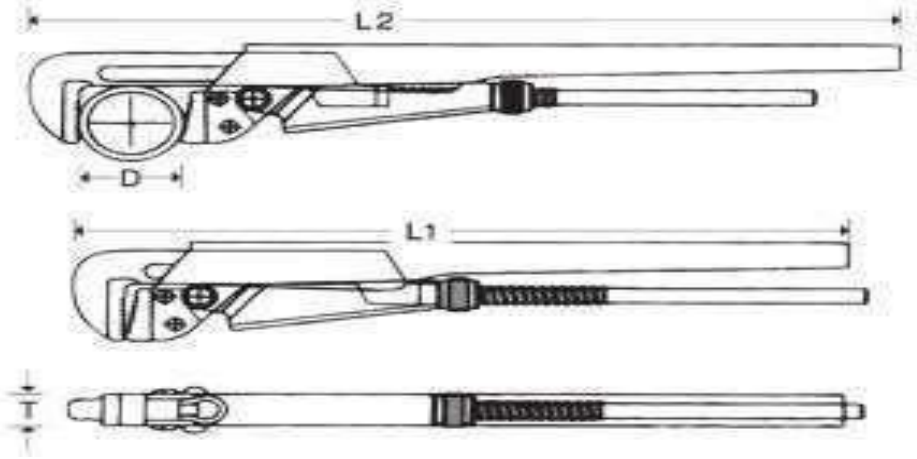
5. Should withstand 400 VACS

6. Drop forged from high grade carbon Steel (EN9)

7. Accurate machined and Heat-treated

20 . Adjustable spanner (pipe wrench) 350 mm

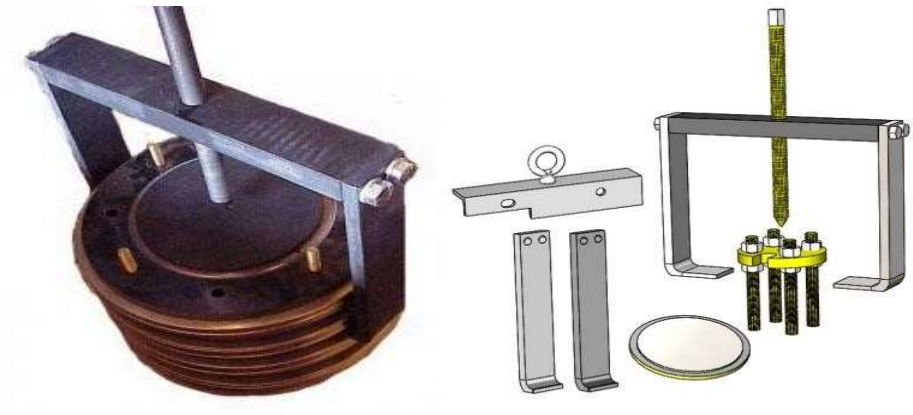
Basic Indicative Diagram



1. Length: 350mm
2. Least maximum Opening: 48mm
3. Suitable for pipe: 36mm
4. Jaws should be dropped forged from high grade carbon Steel
5. Differential Hardness pattern of the jaws should have wear resistance teeth
6. Hardness
   i. Jaws: 55 - 58HRC ii. Jaw Shank:45 - 47HRC
7. Jaws should have precision machined integral teeth with included angle of 76 degrees to provide best matching, strength & firm gripping without biting on the job.
8. Should be provided with specially designed tubular handles & brackets for fixing movable jaw & fix jaw so that action of forward & backward is possible
9. Heat treated and suitably knurled nut to make easy movement of the jaw
10. Phosphate Jaws
11. Powder coated tubular handle & bracket against rusting
12. Specially threaded extension bar should be provided to movable jaw for maximum opening

21. AC alternator slip ring puller Variable

Basic Indicative Diagram



1. Should generally conform to I.S 9193 -1988
2. No of Jaws:2

21.3 Minimum Spread:35mm

3. Maximum Spread:200mm
4. Drop forged jaws made of carbon Steel
5. Hardness:35 - 45HRC
6. Reversible Jaw design to enable inside and outside operation
7. Jaw Design should allow flexibility of use in shallow or deep spaces
8. Screw threads should be precision maintained
9. The Pulling force should be equally distributed evenly on the bearing or gear to facilitate smooth and fast operation without any damage to bearing or gear
10. Protective capon screw end to increase life of screw tip the centers crew is provided with a special adjustable cap for better gripping.
11. Screws should be black anodized
12. Jaws, link plates, protective cap and connecting bolts should be plated

22. Air blow gun with standard accessories Trigger operated with interchangeable nozzles

1. Basic Indicative Diagram

2. Die Cast Al construction Air Blowgun
3. Extended 9-inch X ø 6.2mm (ID) long aluminum tube
4. 1/2-inch rubber tip
5. 5m polyurethane coil Hose, Kink resistant &lightweight
6. Hose ID ø 5mm, Hose OD ø 8mm; ¼ inch Threads
7. Hose material PUR -Ester
8. Hose Hardness 98 Shore 'A'
9. Polyacetal bend restrictors
10. Burst Pressure 508PSI (35Bar)
11. Crimped with solid brass swivel (360°) with quick change connector of Steel construction with standard seal material suitable for air application
12. Compressed air pressure less than 30 psi when outlet blocked
13. Solid Brass swivel fittings at both ends offer 360°rotation
14. Noise level should be<85dBA

23. Ammeter DC with external shunt 300A/ 60A

Basic Indicative Diagram

Range:
Moving Coil, 0 - 300 A, Analog
Type: Moving Coil DC, Analog
Input: 75mV,
Accuracy: Class 1.5 Should have
linear scale
Should be easily replaceable glass and bezel
Scale should have interchangeability
Should be easy installation with swivel screws
Should have Glass filled polycarbonate housing (UL 94-V-0) Knife edge pointer.
Self-lifting terminal clamp assembly
IP 52 protection
Wide measurement band:10 to 100% of FSD Movement
I Moving coil movement should have pivots of very high hardness
II. Movement should have suspended between spring loaded Sapphire Jewels
III. Movement should have properly shielded & critically damped by eddy currents induced in coil former
Reference Standards:

I Performance Standard:	IEC 60051 & IS1248
II. Safety standard:	IEC 61010
III. Nominal case and cutout dimensions:	IS 2419 & DIN43700
IV. Scale and Pointer:	DIN43802

V. Connection and Terminal markings: DIN43807
VI. Terminal bolts/leads: DIN 46200 /46282
VII. Safety requirements and protective measures: IS 9249 -1979
VIII .Front frames dimensions: DIN43718
IX . Environmental conditions specifications: IS 9000 part 5, 7, 8
Certifications:
I.ERDA Type tested II.CE Certified
III.UL Approved IV. RoHS complied

24. Air ratchet with standard accessories

Basic Indicative Diagram

1. ½ inch Sq. drive Air ratchet,
2. Handle Housing Material: Aluminum, Front case material: Steel
3. Max. torque 1210Nm(@15s)
4. Air inlet ¼ inch, Net Wt. 2.6 Kg Max.
5. Air consumption 4 CFM max.
6. STEEL Finish
7. Pin Hole in the impact sockets
8. Torque 1.5X ANSI/1.3XDIN
9. delivers best-in-class performance with a number of premium features.

You can choose between a ½" or ⅜" drive, but you'll never have to

sacrifice comfort or power with this line.

10. Lever actuation; variable speed
11. Free Speed Sound Level (DBA).85 DBA
12. 1/2-inch 14 Piece Cr Mo impact socket set: 10mm, 11mm, 12mm, 13mm,

14mm, 15mm,16mm, 17mm, 18mm, 19mm, 21mm, 22mm,24mm,27mm

25. Air impact wrench with standard accessories.

1. Basic Indicative Diagram

2. ½ inch Sq. drive Impact Wrench,

3. Handle Housing Material: Aluminum, Front case material: Steel

4. Max. torque 1210Nm(@15s)

5. Air inlet ¼ inch, Net Wt. 2.6 Kg Max.

6. Air consumption 4 CFM max.

7. Twin hammer mechanism with front Exhaust

8. 6 Speed position control to adjust tool speed

9. 1/2-inch 14 Piece Cr Mo impact socket set: 10mm, 11mm, 12mm,

13mm, 14mm, 15mm,16mm, 17mm, 18mm, 19mm, 21mm,22mm,24mm,27mm

10. Impact sockets in Blow Mold Case

11. Hardness of Impact sockets 38 - 55 HRC with Super Grip Profile

12. Black Oxide Finish

13. Pin Hole in the impact sockets

14. Torque 1.5X ANSI/1.3XDIN

15. Brand & Size etched on each individual socket to ensure quick & convenient identification

16. ½inch(F)to3/8inch(M)impactreduceradaptorwithsamematerialconstruction

as of impact sockets.

26. Anvil with Stand 50 Kgs

Basic Indicative Diagram

1. Total Length: 515 ±2mm

2. Total Width: 155 ± 1mm

3. Base Length: 265 ± 1mm

4. Height: 240 ± 1mm

5. Total Weight: 50Kg

6. Material: Ductile Cast-iron

7. Suitable stand should be supplied for Anvil

27. Auto Electrical test bench For checking Dynamo, Alternator & Starter. With minimum 2HP AC Motor, Digital Voltmeter & ammeter.

Basic Indicative Diagram

1.2 General Features:

1.2.1 The readings can be read through digital meters
1.2.2 5 HP, 3 Phase, 1440 RPM motor induction motor suitable for 50 Hz / 415 V AC Supply with variable frequency drive 5 H.P. for speed variation
1.2.3 Alternator loading up to 170 A / 14 V & 110 A / 24 V
1.2.4 Heavy duty transformer for starter testing with light run test
1.2.5 Poly V / V groove for alternator checking
1.2.6 Battery charging ammeter to read the battery current
1.2.7 Heavy duty rugged frame for mounting alternator & starter
1.2.8 Three phase 4 pole isolator switch
1.2.9 All tripping MCB's available
1.2.10 PCB / bat excitation available
1.2.11 Accessories like bulbs / fuses / belts and cables for test of alternator / starter/ continuity / battery along
with manual & calibration certificates to be provided
1.2.12 Facility to check continuity test of excitation winding using 6 V - DC Output

1.2.13 Facility to check short circuit of starter / alternator- rotor using 40 / 80 V AC
1.2.14 Dimensions: Length X Width X Height: 800mm X 850mm X 650mm (Approx.)
1.2.15 Weight: 150 Kgs net (Approx.)
1.2.16 Facility to charge battery (Not in the scope of supply) using appropriate cable harness

1.3 Components of Auto Electrical Test Bench:

1.3.1 Volt Meter Digital, 0-30 V DC 1 No
1.3.2 Ammeter Digital, 0-30 A 1 No
1.3.3 Ammeter Digital, 0-200 A 1 no
1.3.4 RPM Indicator Digital 0-5000rpm 1 no
1.3.5 Motor 5HP(3.7KW), 50 Hz, 415 Volt AC 1 No
1.3.6 VARIABLE FREQUENCY DRIVE 415V 3PH ,5HP 1 No
1.3.7 Diode, 150 A, 400 V 4 Nos
1.3.8 Transformer, 12V / 200 A, 24 V / 150 A 1 No
1.3.9 Transformer, 0-240 V Primary, 12-0-12 V Secondary 1 No
1.3.10 Transformer, 0-240 V Primary, 0-6V-40V-80V Secondary 1 No
1.3.11 Contactor, 25 A, 240V Coil 1 No
1.3.12 Contactor, 9 A, 240V Coil 1 Nos
1.3.13 Timer, Aux 240 V 1 No
1.3.14 Toggle Switch, Double Pole Double Throw 6 A 240 V 4 Nos
1.3.15 Shunt 30 A, 75 mV 1 No
1.3.16 Toggle Switch, Single Pole Single Throw 6 A 240 V 1 No
1.3.17 MCB Single Pole, 25 A 240 V, 50 Hz 2 Nos
1.3.18 Isolator Double Pole, 63 A 240 V, 50 Hz 1 No
1.3.19 40 A 4 Pole main switch isolator 1 No
1.3.20 Rotary Switch, 15 A, 220 V 8 Nos
1.3.21 Fuse Holder 2 Nos
1.3.22 Push Button, Green 3 Nos
1.3.23 Normally Open Element, Green 240 V, 10 A 3 Nos
1.3.24 Normally Closed Element, Red 240 V, 10 A 1 No
1.3.25 Indicator, 22.5 Mm R / Y / B 4 Nos
1.3.26 Reset Switch Pbs 1 No
1.3.27 Shunt, 200 A 75 Mv 2 Nos
1.3.28 Terminals: BTI-100, 100 A Red & Black 2 No Each
1.3.29 Terminals: BTI -30, 30 A Red & Black 1 No Each
1.3.30 Terminals: BS-5 Red 9 Nos
1.3.31 Terminals: BS-5 Black 6 Nos
1.3.32 Terminals: BS-5 Yellow 1 Nos
1.3.33 LED Holder / Led: 10 Mm 4 Nos
1.3.34 Resister: 2.7 Ohm / 350 W 2 No
1.3.35 Resister: 1.4 Ohm / 350 W 11 Nos
1.3.36 Solenoid Switch: 12 V DC 2 Nos
1.3.37 Fan: 240 v, 4” Cooling Fan 2 Nos
1.3.38 Relay: 12V DC, 250 Ohm, 10 A 1 No
1.3.39 Single Phase Preventer: 415 V, 50 Hz 1 No
1.3.40 Bridge: 35 A 1 No
1.3.41 Mounting Bushes 4 Nos

1.3.42 Wires As Required
1.3.43 Metal Chassis
1.3.44 Mounting Vice (X-Y directional movement and V block 1 No with clamping arrangement)
1.3.45 Pulley with Multispeed options - 28 Bore 1 No
1.3.46 Vacuum Kit With Tank 1 No
1.3.47 PCBs: Power / Control 2 Nos
1.3.48 V Belt / Poly V Belt: A-52 / 6pk 1345 1 Each
1.3.49 6 SQ MM Terminal Block 1 No
1.3.50 Hylams (Different sizes) 05 Sizes
1.3.51 Front Plate 01 No
1.3.52 RPM variation potentiometer 5k 1 no
1.3.53 Auto transformer 0-220v 8amps with motor 1 no

1.4 Voltmeter

1.4.1 Display Type Red LED Super Bright Display
1.4.2 Maximum Display 1999 Counts l Resolution 1 Count
1.4.3 Polarity Indication " - " is indicated for Negative Input
1.4.4 Over Range Indication " 1 " or " -1 "
1.4.5 Red Antiglare
1.4.6 Faceplate with Annunciators
1.4.7 Case / Housing DIN Black ABS, Dimension as per DIN (48 x96)
1.4.8 Mounting Clamps Sturdy, Moulded ABS with suitable Hardware
1.4.9 Connectors Terminal Block
1.4.10 Brass Terminals l Display Stability Within ± 2 Digits
1.4.11 0- 199.9 V voltage measurement range

1.5 Ammeter

1.5.1 Display Type Red LED Super Bright Display
1.5.2 Maximum Display 1999 Counts l Resolution 1 Count
1.5.3 Polarity Indication " - " is indicated for Negative Input
1.5.4 Over Range Indication " 1 " or " -1 "
1.5.5 Faceplate Red Antiglare
1.5.6 Faceplate with Annunciators
1.5.7 Case Terminals
1.5.8 Case / Housing DIN Black ABS, Dimension as per DIN (48 x 96)
1.5.9 Mounting Clamps Sturdy, Moulded ABS with suitable Hardware
1.5.10 Connectors Terminal Block: Thermoplastic (UL 94V-0) with Tin Plated
1.5.11 Brass Terminals l Display Stability Within ± 2 Digits
1.5.12 0-1000 Amps current measurement range

1.6 RPM meter

1.6.1 Display Type Red LED Super Bright Display
1.6.2 Maximum Display 1999 Counts l Resolution 1 Count
1.6.3 Polarity Indication " - " is indicated for Negative Input
1.6.4 Over Range Indication " 1 " or " -1 "
1.6.5 Faceplate Red Antiglare
1.6.6 Faceplate with Annunciators

1.6.7 Case Terminals
1.6.8 Case / Housing DIN Black ABS, Dimension as per DIN (48 x 96)
1.6.9 Mounting Clamps Sturdy, Moulded ABS with suitable Hardware
1.6.10 Connectors Terminal Block: Thermoplastic (UL 94V-0) with Tin Plated
1.6.11 Brass Terminals l Display Stability Within ± 2 Digits
1.6.12 0-5000 rpm measurement range

1.7 Motor

1.7.1 TEFC Class F Insulation foot mounted induction motor
1.7.2 AC Supply Voltage 415 V+ / -10%, 50 Hz+ / -5% class F insulation
1.7.3 4 pole motor with foot mounting 1440 RPM max
1.7.4 Frame Size: 100 S 4pole

1.8 VARIABLE SPEED DRIVE

1.8.1 LCD Display Type
1.8.2 PROGRAMMABLE
1.8.3 5 HP KW 415V 50HZ
1.8.4 OUTPUT variation from 0-415v
1.8.5 Speed setting through potentiometer
1.8.6 0-5000 rpm settable range

1.9 RPM Potentiometer

1.9.1 5k ten turns
1.9.2 Fine rpm adjustments
1.9.3 Panel mounting type
1.9.4 With knob for rotation
1.9.5 0-5000 rpm settable range

1.10 Auto transformer

1.10.1 Copper wound foot mounted with CRNO core
1.10.2 220v 8amps capacity
1.10.3 Fitted with motor and gears
1.10.4 Motor rating 3kg-cm torque
1.10.5 0-220v variation with arm rotating
1.10.6 Push button motor operation

1.11 Diodes with Aluminium Heat Sink

1.11.1 Maximum Average forward current : 150 A
1.11.2 Maximum Peak forward voltage drop: 1.4 V

1.12 Step Down Transformer

1.12.1 Copper wound foot mounted with CRNO core
1.12.2 Step down type of winding
1.12.3 2.8KVA rating
1.12.4 AC Supply Voltage:240 V +/-10%, 50Hz +/-5%, Class F Insulation
1.12.5 Ambient Max Temperature of 120 deg
1.12.6 Output Voltage: 15 V +/- 10%
1.12.7 Output Current: 150 A max @ 15 V

1.13 Contactor / Overload Relays

1.13.1 Contactor application: Motor control

1.13.2 Poles description:3P
1.13.3 Pole contact composition:3 NO
1.13.4 Control Circuit Type: AC 50 Hz
1.13.5 Control Circuit Voltage: 240 V AC 50 Hz
1.13.6 Auxiliary contact composition: 1 NO + 1 NC

1.14 Timer

1.14.1 ON Delay
1.14.2 Dual supply voltage
1.14.3 LED status indicator: Power ON, Relay ON
1.14.4 DIN Rail / Back panel mount
1.14.5 Finger safe terminals
1.14.6 Supply Voltage 240V AC
1.14.7 Power Consumption 6VA max

1.15 Toggle Switch

1.15.1 Power Switch conforms to safety standards for electrical equipment
1.15.2 Compact with a good space factor
1.15.3 Item Standard Rating 6 A
1.15.4 Terminal Types

1.16 MCB

1.16.1 Rated current: 25 A
1.16.2 Number of poles: 1P
1.16.3 Rated operational AC Voltage: 240 V
1.16.4 Frequency: 50 Hz
1.16.5 Number of modules: 1

1.17 Rotary Switch

1.17.1 DC switching: 5-40 A
1.17.2 Rear termination
1.17.3 Mountings: Standard Front Panel
1.17.4 Resistance loads application and Switching of resistive loads, including moderate overloads
1.17.5 Rated Operational Voltage: Max V DC 250

1.18 Fuse Holder with Fuse

1.18.1 Contact Finish: Silver Plated
1.18.2 Housing Material: Phenolic
1.18.3 Terminals: Copper
1.18.4 Mounting Type: Panel Mounting
1.18.5 Fuse Link Size (mm): 6.3 X 32
1.18.6 Panel Thickness Max (mm): 3
1.18.7 Current Rating: 10 A 240 V AC

1.19 Push Button / Indicator with Element Switches

1.19.1 Operating positions: All positions
1.19.2 Contact: Block
1.19.3 Contact Operation: Slow Break NO or NC

1.20 200 A / mV DC Shunt

1.20.1 Operating Temperature: -10 ^{o}C to 55 ^{o}C

1.20.2 Maximum load: The load should not exceed 0.1% of the nominal current rating for specified accuracy.

1.21 Terminals - Push Button / Indicator with Element Switches

1.21.1 Mounting Arrangement: Panel Mounting
1.21.2 Rating: 100 A / 60 A / 30 A 240 V AC
1.21.3 Contact Material: Brass Nickel Plated
1.21.4 Insulation Material: Phenolic (Bakelite)
1.21.5 Colour: Red / Black

1.22 LED Holder with LED

1.22.1 Metal holder of housing 10mm LED
1.22.2 Supply voltage: 240V MAX
1.22.3 Dimensions (L X D): 15 X 14 mm
1.22.4 Peak Forward Current: 120 mA
1.22.5 Continuous Forward Current: 30 mA

1.23 Resistors

1.23.1 Power Rating full power dissipation at 70°C to 350°C
1.23.2 Temperature Range -55°C to 350°C
1.23.3 Voltage Rating / Limiting Voltage / Max working Voltage V = P X R
1.23.4 Voltage Proof / Dielectric Withstanding Voltage

1.24 Cooling Fan

1.24.1 Operating Voltage: 240 V (185 – 245 VAC)
1.24.2 Insulation: Class B

1.25 DC Relay

1.25.1 Contact resistance: 50 mΩ max
1.25.2 Operate Time: 25 ms max
1.25.3 Release Time: 25 ms max

1.26 Wires

1.26.1 Resistance as per: IS 8130
1.26.2 Tensile strength / annealing as per: IS 8130
1.26.3 Wrapping as per: IS 8130
1.26.4 Diameter as per: IS 8130

1.27 Chassis

1.27.1 Complete fabricated structure with laser cutting and Turret punching
1.27.2 Angles and CRCA sheets
1.27.3 Powder coated
1.27.4 Heavy duty mounting flats at the corners for base mounting bush

1.28 Standard Accessories

1.28.1 Accessories / Attachment Required for Auto Electrical Test bench
1.28.1.1 Alternator cable
1.28.1.2 Starter cable
1.28.1.3 Battery cable
1.28.1.4 Continuity Test cable 1 no
1.28.1.5 Belts 2 sizes
1.28.1.6 Bulbs / Fuses 1 each

1.28.2 Operation Manual: 01 Nos.

1.28.3 Maintenance Chart / Schedule: 01 Nos.

1.29 Other Features

1.29.1 Safety requirements: Emergency stop button

1.30 Space Requirement for Installation

1.30.1 Floor arrangement in mm: 1000 mm X 1000 mm (Approx.)

1.31 Foundation / Installation Specification

1.31.1 Mechanical and electrical and civil Installation and commissioning, loading and unloading will be done by bidder at site.

1.32 Electric Supply Specification

1.32.1 Mains Supply:415 V AC, 3 Phase, 50 Hz AC Power supply

28. Battery –charger Capable to charge batteries from 5AH – 150AH.

Basic Indicative Diagram

I. Output Voltage 6 - 24 V

II. Max Current 12 Amps

III. Maximum No of Batteries 2

IV. Charging current should reduce gradually as the battery gets charged.

29. Blow Lamp 1 litter

Basic Indicative Diagram

1. Material Used: Brass & Iron Steel

2. Additional Name: Brass Pressure Kerosene Blow Lamp

3. 29.3 Application/Use: Heating

4. Capacity: 1000 ml,

5. Rubber grip on handle

6. Extra burner cleaning pin

7. Plunger type pump

8. Extra pump sailing ring

30. Belt Tensioner Gauge

1. Basic Indicative Diagram

2. Compact design

3. Scale for easy reference

4. Designed to work with all belt drive models with capacity: 4.5Kg

5. L shaped pad to fit all belt sizes

31. Car Jet washer with standard accessories Minimum3 Phase 1HP 1400RPM Motor, 3 Reciprocating Plungers with pressure regulator & gauge. 8m Water hose with pressure adjustable brass nozzle.

Basic Indicative Diagram

1. Motor Power 3 Phase, 1 HP with Starter
2. Type of Mounting Stationary Base with Heavy duty Stand
3. Model WP-100
4. Total Discharge lts /min 13
5. Motor Pulley Diameter 80 mm
6. Normal Working Pressure Kg/Cm2 19
7. Maximum working Pressure Kg/Cm2 22
8. No. of Guns One and 8m Water hose with pressure adjustable brass nozzle, Water filter
9. Hose Length 6 mts X 1
10. Pump speed RPM 380
11. RPM 1440
12. Gross Weight 36 Kg Approx. Including Standard Accessories
13. Type of Gun Material-Brass with pressure regulator & gauge
14. Plungers 03 Reciprocating Plungers

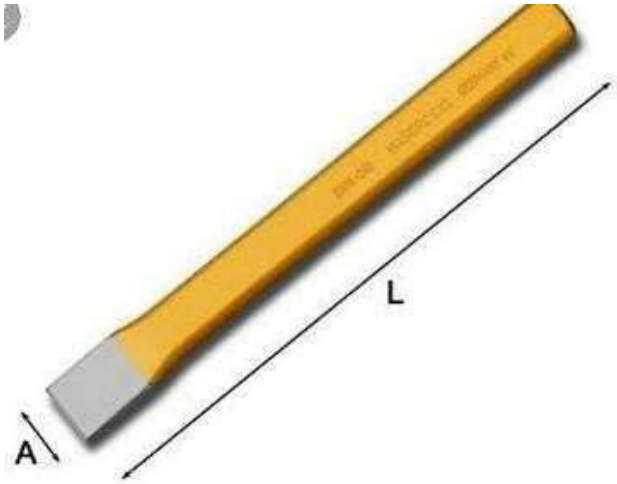
32. Chain Pulley Block capacity with tripod stand 3 ton

Basic Indicative Diagram

1. Standard Lift ---------- 15 m
2. Throat Opening ---------- 23.2 mm
3. Capacity ---------- 3 Ton
4. Test Load ---------- 4.5 Ton
5. Length ---------- 182 mm
6. Load Chain Dia ---------- 8 mm
7. Number of Fall ---------- 2
8. Effort Required to Lift Max Load ---------- 298 N
9. Head Room ---------- 532 mm
10. Width ---------- 174 mm
11. Net Weight ---------- 26 kg
12. Items in Pack ----------1 Piece
13. Tripod stand for chain pully block
14. Size ---------- 3 mtr
15. Height ---------- 3 mtr
16. Max Load ---------- 3 ton

33. Chisel Flat 10 cm

Basic Indicative Diagram



1. Size: 10 cm

2. Made from high carbon Steel Heat Treated

3. Hardness

Cutting Portion: 55 - 57HRC

Striking Portion: 35 - 45HRC

4. Spraying Surface

5. Hardened and Tempered Edges to Cut Steel and Concrete easily

34. Cir clip pliers Expanding and contracting 15cm and 20cm

Basic Indicative Diagram

1. Generally, conform to IS 7990 -1976

2. External Straight

3. Capacity: 40 - 100mm

4. Length: 150 MM AND 200mm

5. Tipsshouldprecisionmachinedwithdimensionstoavailablestandards.Tipsarebent andprovided with serrations to prevent Circlip from “Flying away” during use.

6. Drop Forged from suitable High-Grade Steel

7. Hardness: 43 - 48HRC

8. Rivet should be hardened to prevent play after long use

9. Pliers should be fitted with return spring between the shanks to facilitate smoothoperation

10. PVC Dip coated sleeve

35. Cleaning tray 45x30 cm.

Basic Indicative Diagram

1. 45 CM X30 CM X 8 MM Heavy Duty Washer

2. 22-gauge GI Sheet

3. Machine Drain Pan,

4. Galvanized Steel

5. Drip Tray Catch

6. Leak proof

36. Compression testing gauge suitable for diesel Engine with standard accessories

Basic Indicative Diagram

1. Quick-connect adapter

2. Push pressure scale: 0 <> 1000 PSI, 0 <> 7000

KPA Reads pressure from 0 to 1000 PSI

3. 2-9/16" diameter gauge

4. Thumb button air release

5. Should be supplied with adapters for Suzuki, Hyundai, GM,Ford, Isuzu, Mercedes, Toyota,

Volkswagen &Peugeot.

6. All above items should be placed secured in a blow molded plastic box ormetal box

37. Copper bit soldering iron 0.25 Kg

Basic Indicative Diagram

1. Should have wooden handle

2. Length:14 inches long (±10%)

3. Hatchet material

4. Copper Shape: Chisel type

5. Should be suitable for soldering

38. Cylinder Bore Gauge capacity 20 – 160 mm

Basic Indicative Diagram:

1. Compliance
2. Dial: Generally Conforming to JISB 7503 /1997
3. Stem: Generally Conforming to IS 7515 /1982
4. Range: 20 mm -160mm
5. Reading: 0.01mm
6. Graduation: 0 - 50 -0
7. Measuring Depth: 250mm
8. Material: Stainless Steel / Alloy Steel
9. Standard Accessories:
10. Suitable spanner set

a. Washers 0.5mm, 1mm, 2mm,3mm and extension Rods

b. Wooden / Plastic Box with proper cushioning

c. Operating Manual

39. Cylinder liner- Dry & wet liner, press fit &slide fit liner

Basic Indicative Diagram

1. The model of Cylinder Liners is made out of original Used Liners.

2. The entire system is suitably painted and mounted on wooden base.

Dry Liner:

1. Inner Diameter 107mm

2. Outer Diameter: 113mm

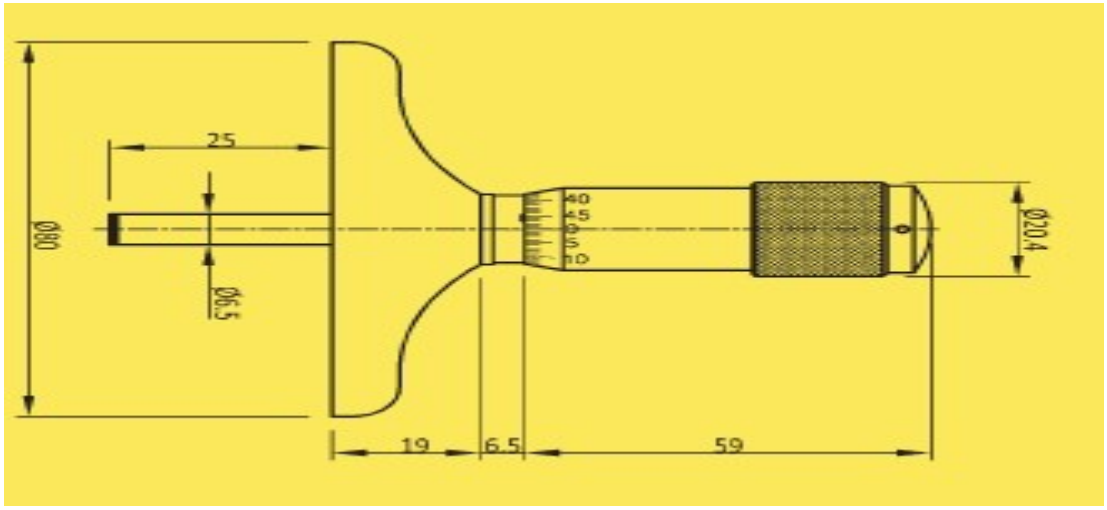
Wet Liner:

3. Inner Diameter: 96mm

4. Outer Diameter: 100.6mm

40. Depth Micrometer 0 - 25 mm

Basic Indicative Diagram:



1. Compliance: Generally Compliant to DIN863
2. Range: 0 mm -25mm
3. Reading: 0.01mm
4. Accuracy: 10µm
5. Measuring Depth: 25mm
6. Material: Stainless Steel / Alloy Steel
7. Standard Accessories:

I. Suitable spanner

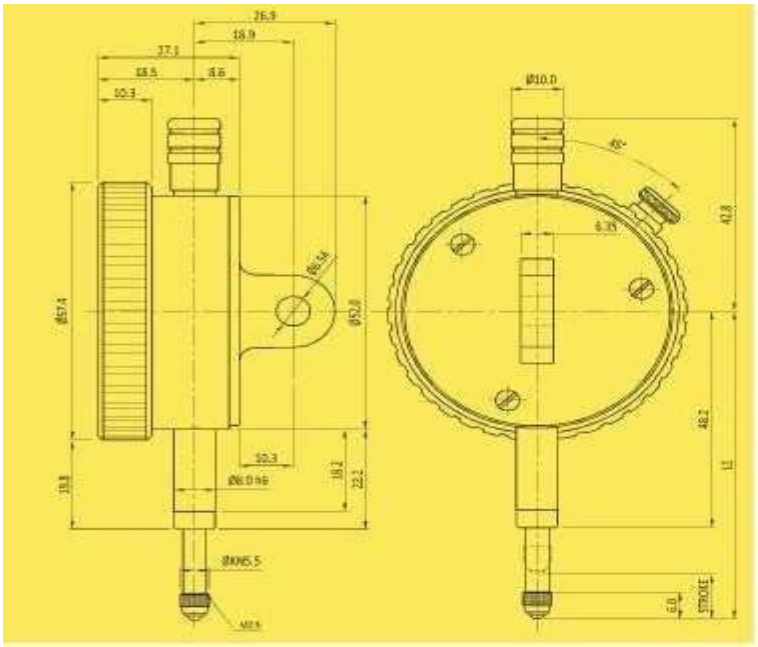
II. Interchangeable rods

III. Wooden / Plastic Box with proper cushioning

IV. Operating Manual

41. Dial gauge type 1 Gr. A (complete with clamping devices and with magnetic stand)

1. Basic Indicative Diagram:



2. Compliance
   Dial: Generally Compliant to IS 2092 /1983
3. Reading: 0.01mm
4. Range: 0-10mm
5. Graduation: 0-100
6. System of Measurement: Metric
7. Accuracy: 20µm
8. Magnetic force for stand: 600 N(Approx.)
9. Stand (L×W×H): 60 X 50 X 55 mm (Approx.)
10. Stand Weight: 1.5 Kg (Approx.)
11. Standard Accessories:

I. Spanner
II. Wooden/Plastic Corrugated Box with proper Cushioning for Magnetic Stand
III. 3mm Diameter T.C. ball Anvil fitted to the gauge
IV. Operating Manual

42. Different type of Engine Bearing model 10 Different types on board

Basic Indicative Diagram

1. Good working condition item should be used

2. Complete bearings of Engine assembly of following types

I .Needle Bearing

Ii .Roller Bearing

iii. Taper Roller Bearing

iv. Ball Bearing

v. Thrust Bearing

vi. Main Bearing

vii. Cam Shaft Bush Bearing

viii. Connecting Rod Bearing

All the bearings should be displayed on to a suitable board with technical and

constructional diagram details printed on to a colorful panel with details of applications

43. Different type of piston model 5 Different Types on board

Basic Indicative Diagram

Complete Pistons of Car Engine assembly

The set should contain the following 5 types of pistons

1. Flathead Piston: Carburetor engine (Brand-new item should be used)

2. Recessed Head: MPFI Engine (Brand-new item should be used)

3. Concave: Diesel Engine (Brand-new item should be used)

4. Bowl Type Piston: CRDI (Brand-new item should be used)

5. Dome Head:2 stroke Bajaj scooters (Old item can be used)

All the pistons should be displayed on to a suitable board with technical and constructional diagram details printed on to a colorful panel with details of applications

44. Drift Punch Copper 15 Cm

Basic Indicative Diagram

1. Length: 150 mm ± 1mm

2. Diameter: 8 mm ± 0.1mm

3. Pin Diameter: 3 mm ± 0.05mm

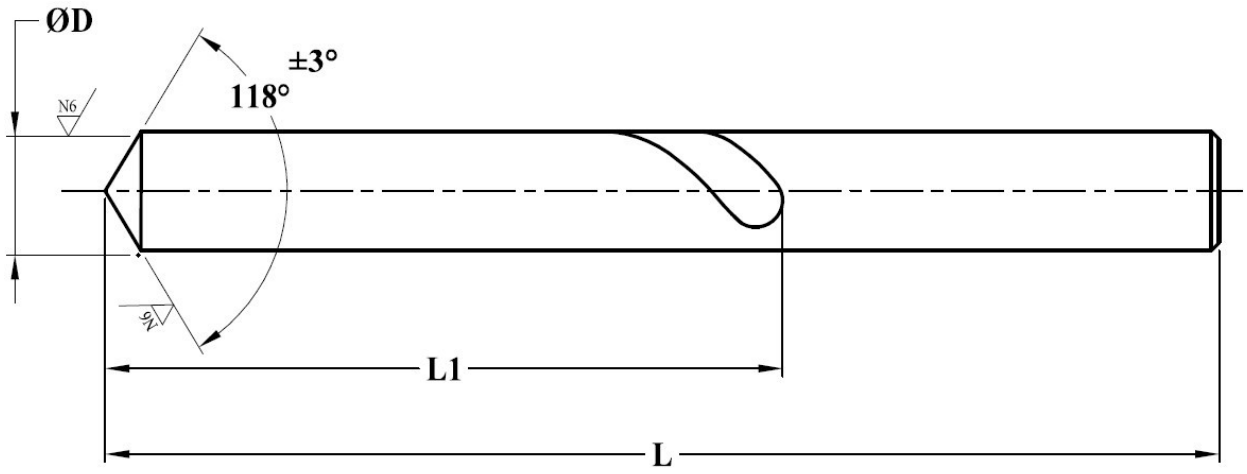
4. Hardness: 45 - 50HRC

5. Should have uniformly heat treated and knurled body

6. Brass Material

45. Drill Twist (various sizes) 1.5 mm to 8 mm by 0.5mm

1. Basic Indicative Diagram



2. Compliance: Confirming to IS: 5101 -1991

3. Drill Diameter 'ØD': Ø1.5 mm to Ø 8.0mm by 0.5 (Set of 14)

4. Shank: Parallel

5. Material: HSS-M2

6. Finish: Milled /Ground

7. Hardness: 760 HV to 900HV

8. Surface Treatment: Bright finish

9. Suitable Wooden/ Plastic/ Metal Box for storage

10. Long service life.

11. Fast stock removal

12. Precision

13. High quality std

14. Packaging in plastic or wooden box

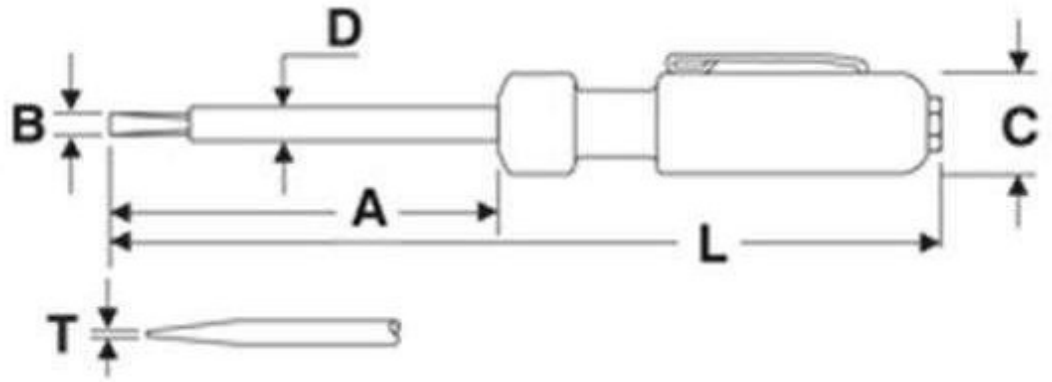
46. Electric Soldering Iron 230 V 60 watts 230 V 25 watts

Basic Indicative Diagram

1. Should have Specially coated Copper bits (High Quality) for Longer Life.
2. Should have Special double layered cartridge type element transfer heat very efficiently directly
to the bits.
3. Should have Iron reach soldering temperature within few seconds
4. Should have Prolonged Life of heating Elements and Soldering Bits.
5. Should have Extremely low leakage current.
6. Should have Very light and heat resistant handles for comfortable
use.
7. Tip replacement should be Easy and speedy
8. 25 Watts/ 240 Volts Soldering Iron
9. Should have Maximum Temperature: 380oC

47. Electric testing screw driver

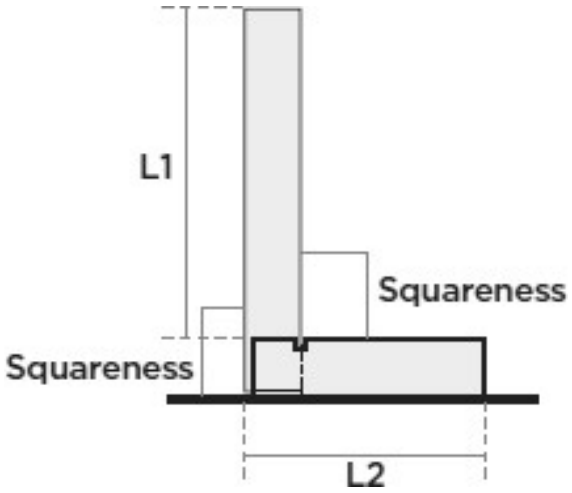
Basic Indicative Diagram



1. Generally conforming to IS 5579 - 1985
2. Dimension
I. A: 60 mm
II. D: 6 mm
III. Tip Size: B X T = 3.5 mm X 0.5 mm
3. Minimum Torque Value: 0.09 Kg m
4.Generally, conform to IS 5579 - 1985
5. Blade made of high-grade Silicon - Manganese Steel (EN - 45A)
6. Blade should be differentially hardened & tempered to resist wear, bending & meet
I. high torque requirement
7. Hardness on Tip: 55 - 57 HRC
8. Bright and Smooth Nickel Chrome plating finish to effectively protect blade against
I. corrosion
9. Handle should be made of high-grade CA Plastic, which is non - flammable & unaffected
I. by oil, petrol, grease, water - practically anything
10. Suitable for checking at minimum 90 V DC and 60 AC voltage and maximum up to 500V AC
11. Blade is provided with PVC insulation sleeve & resistance having 1 mega ohm for
I. preventing the electric shock
12. NEON filled glow lamp should give a visible glow in normal day light
13. Maximum leakage current of 0.12 microampere ensures safe & shock free in use.
14. Tip should be precision - ground to 5-degree angle to ensure firm grip in the screw
I. slot.

48. Engineer's Square – Blade size 15 cm

Basic Indicative Diagram



1. Blade length (L1): 150mm

2. Stock length (L2): 100mm

3. Squareness: 16microns

4. Material for Blade: Spring Steel

5. Stock: MS

6. Hardness of Blade: 40 - 50HRC

7. Groove on the inner corner of the stock

49. Engineers Stethoscope

Basic Indicative Diagram

1. Should be able to locate noises in engines or bearings and other moving parts

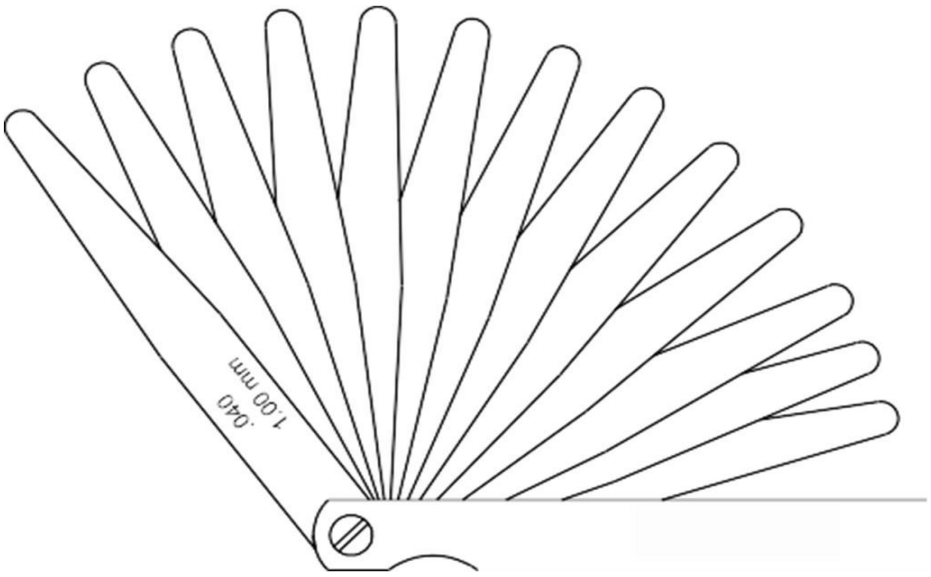
2. High quality surgical grade PVC and rubber parts for increased sound definition

3. Plastic ear pieces to minimize outside noise with aluminum alloy probe/ needle for finding

4. exact location of specific noises

50. Feeler Gauge 20 blades (metric)

Basic Indicative Diagram



1. Material: Spring steel C-60

2. Hardness: 55 - 58HRC

3. Range: 0.05 mm to 2.0 mm /0.3mm to 1 mm

4. Accuracy: As per T2 grade tolerances

5. No. of Blades:20

a. Finish: Fine Polished

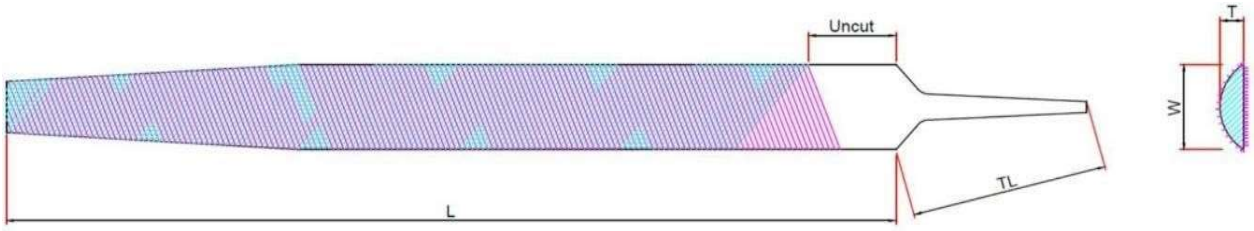
b. Uses: Feeler gauges each leaf should be made by fine blanking

6. Each leaf should have permanent marked leaf thickness in metric &English

7. Packing: Each assembly should be stacked with external cover duly marked with model size with tightening screw in plastic pouch

51. File flat, bastard 20cm

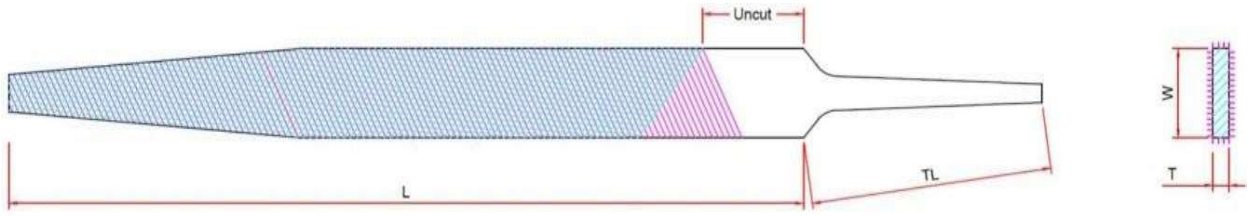
Basic Indicative Diagram



Range (In MM)	From	To
Generally conforming to IS1931-2000		
1. Body Length(L)	198	202
2. Tang Length (TL)	54	56
3. Width(W)	19.6	20.6
4. Thickness(T)	3.7	4.4
5. No. of Up cut /Inch	24	26
6. Up cut inclination	640	660
7. No. of Over-cut /Inch	18	20
8. Over-cut Inclination	440	460
9. No. of Edge cut /Inch	25	27
10. Edge cut Inclination	890	910
11. Hardness	60 HRC	64 HRC
12. Performance in 7500strokes	15	15.5
13 Rake Angle	-70	-120

52. File, half round, second cut 20 cm

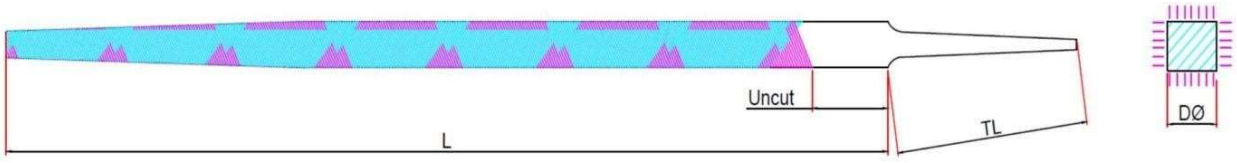
Basic Indicative Diagram



	Range (InMM)	
	From	To
Generally conforming to IS1931-2000		
1. Body Length(L)	200	202
2. Tang Length (TL)	60	61
3. Width(W)	23.70	24.70
4. Thickness(T)	6.55	7.25
5. No. of Upcut /Inch	(29-30F/S)	(28-29R/S)
6. Upcut inclination 650 650		
7. No. of Over-cut /Inch	(24-25 F/S)	(24-25R/S)
8. Over-cut Inclination	500	500
9. No. of Edge cut /Inch	28	29
10. Edge cut Inclination	650	650
11. Hardness	60 HRC	64 HRC
12. Rake Angle	-70	-120

53. File, Square second cut 20 cm

Basic Indicative Diagram

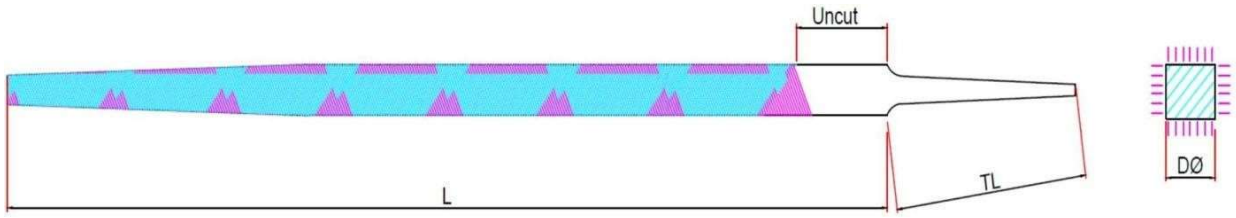


Range(IN MM

	From	To
Generally conforming to IS1931-2000		
1. Body Length (L)	198	202
2. Tang Length (TL)	55	56
3. Square Side	6.80	7.80
4. No. of Up cut /Inch	37	38
5. Up cut inclination	65^0	65^0
6. No. of Over-cut /Inch	31	32
7. Over-cut Inclination	50^0	50^0
8. Edge cut Inclination	89^0	91^0
9. Hardness	60 HRC	64 HRC
10. Rake Angle	-7^0-	12^0

54. File, Square round 30 cm

Basic Indicative Diagram

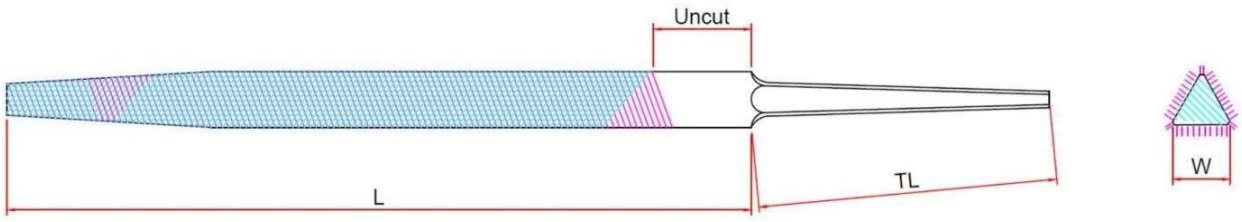


Range (In MM)

	From	To
Generally conforming to IS1931-2000		
1. Body Length (L)	298	300
2. Tang Length (TL)	59	61
3. Square Side	8	9
4. No. of Up cut /Inch	24	25
5. Up cut inclination	64^0	66^0
6. No. of Over-cut /Inch	20	21
7. Over cut Inclination	49^0	51^0
8. Hardness	60 HRC	64 HRC
9. Rake Angle	-7^0-	12^0

55. File, triangular, second cut 15 cm

Basic Indicative Diagram



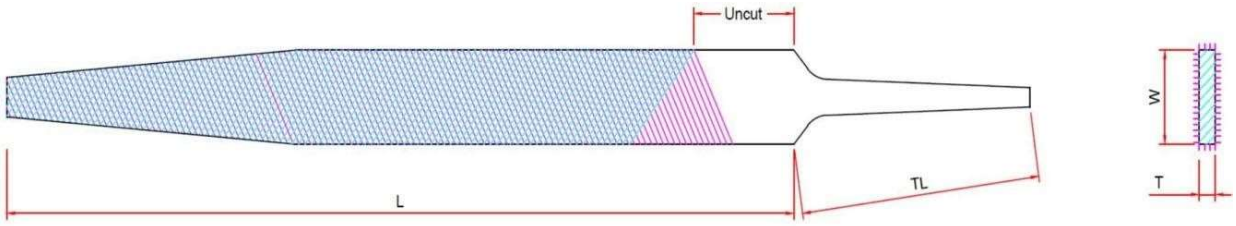
	Range (In MM)	
	From	To
Generally conforming to IS1931-2000		
1. Body Length(L)	148	152
2. Tang Length (TL)	58	59
3. Equilateral Triangle Side(W)	11.05	11.75
4. No. of Upcut /Inch	38	39
5. No. of Over cut /Inch	33	34
6. Upcut inclination	57^0	63^0
7. No. of Edge cut /Inch	44	45
8. Edge cut Inclination	76^0	78^0
9. Hardness	60 HRC	64HRC
10 Rake Angle	-7^0-	12^0

56. Files assorted sizes and types including safe edge file (20 No's)

Set of 10 X 02 Nos each = 20 Files

57. Flat File, second cut 25 cm

Basic Indicative Diagram

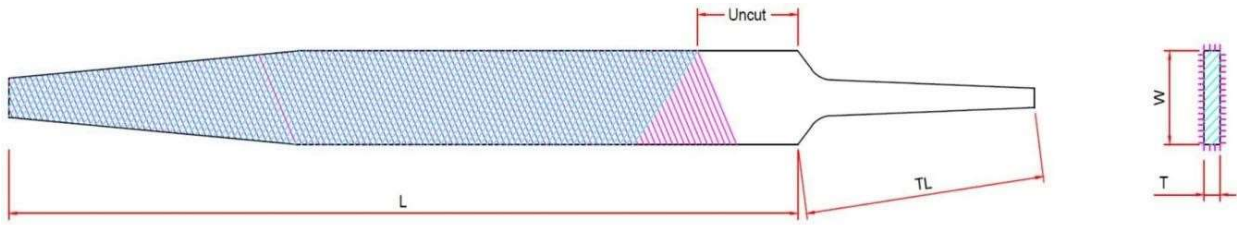


Range (In MM)

	From	To
Generally conforming to IS1931-2000		
1. Body Length(L)	248	252
2. Tang Length (TL)	59	61
3. Equilateral Triangle Side(W)	23.9	24.9
Thickness (T)	5.05	5.75
4. No. of Up cut /Inch	29	30
5. No. of Over cut /Inch	23	24
6. Up cut inclination	640	660
7. No. of Edge cut /Inch	31	32
8. Edge cut Inclination	890	910
9. Hardness	60HRC	64HRC
10. Rake Angle	-70	- 120

58. Flat File, bastard 35 cm

Basic Indicative Diagram



	Range (In MM)	
	From	To
Generally conforming to IS1931-2000		
1. Body Length(L)	348	352
2. Tang Length (TL)	74	76
3. Equilateral Triangle Side(W)	34.6	35.6
4. No. of Up cut /Inch	15	16
5. No. of Over cut /Inch	12	13
6. Up cut inclination	640	660
7. No. of Edge cut /Inch	18	19
8. Edge cut Inclination	890	910
9. Hardness	60HRC	64 HRC
10. Rake Angle	-70	-120
11. Overcut Inclination	440	460

59. Fuel feed pump for Diesel Hand operated Plunger Type

Basic Indicative Diagram

1. Brand-new item should be used

2. Suitable for six-cylinder diesel engine manufactured by standard company

3. The model is mounted on to a wooden base/MS Angle Stand base and it is suitably painted.

4. Parts catalogue suitable sketch on Vinyl Board

60. Fuel injection pump (Diesel) inline 4/6 cylinders RSV Mechanical Pneumatic Governor Type.

Basic Indicative Diagram

1. Good working condition item should be used
2. Suitable for six-cylinder diesel engine manufactured by
3. standard company RSV type governor
4. Parts catalogue suitable sketch on Vinyl Board
5. The model is mounted on to a wooden base/MS Angle Stand base and it is suitably painted

61. Fuel injection pump VE pump / Distributor fuel rotary pump (DPC) pumps / along with special tools and accessories

Basic Indicative Diagram

1. However, the Item should be in good working condition.
2. Suitable for four-cylinder diesel engine manufactured by standard company
3. Parts catalogue suitable sketch on Viny l Board
4. The model is mounted on to a wooden base/MS Angle Stand base and
5. It is suitably painted

62. Grease Gun

Basic Indicative Diagram

1. 150 mm rigid Steel extension & 4 jaw coupler
2. Aluminum die Cast grease gun head with
3. built - in release wall Soft Rubber grip on lever handle
4. Powder Coated Body
5. Delivers: Up to 1 Gram/Stroke
6. Develops: Up to 6,000PSI
7. 500gms Bulk Capacity/
8. 400gms with Cartridge

9 Heavy duty and latest technology

63. Grease Gun heavy duty trolley type 10 kg capacity

Basic Indicative Diagram

1. Material Mild Steel (heavy duty)
2. Output per stroke (gm) 3 gm
3. Delivery Hose - Length (mm) 2000 mm
4. Blocked Pressure (Bar) 140 Bar
5. Delivery Hose - ID (mm) 6.4 mm
6. Drum Capacity (Kg) 10 kg
7. Weight (Kg)
8. Wheel
9. Full body
10. Grease pipe
11. Handle
12. Parts catalogue
13. Heavy duty and latest technology 9.5 kg caster wheels with brake with powder coating and painting As per Requirement With proper Grip As per Requirement

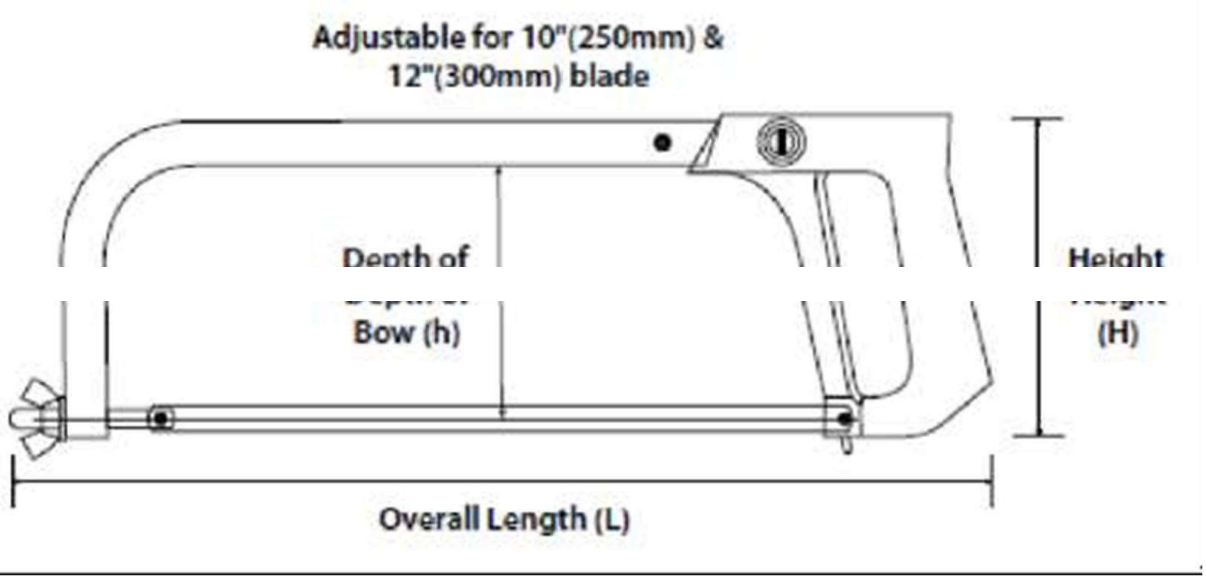
64. Growler

Basic Indicative Diagram

1. This tester shows precisely the spot of earth, short, circuits and open circuits of the starter motor
2. It checks the state of earth of the armature
3. It checks short circuits on the core piece of the armature
4. Input voltage: single phase, 220V, 50/60Hz
5. Testing current: 2A
6. Testing range: 40 to 120 mm Ã~
7. Testing voltage: 24V
8. Testing armature with ampere meter and testing probes.
9. Armature DIA: 20mm to 100 mm.
10. Available for higher ratings motors
11. Durable, Easy to use 117.6 220/230Volts Input
12. High low indicators
13. On off switch
14. Heavy duty and latest technology

65. Hacksaw Frame - adjustable 20-30 cm

1. Basic Indicative Diagram



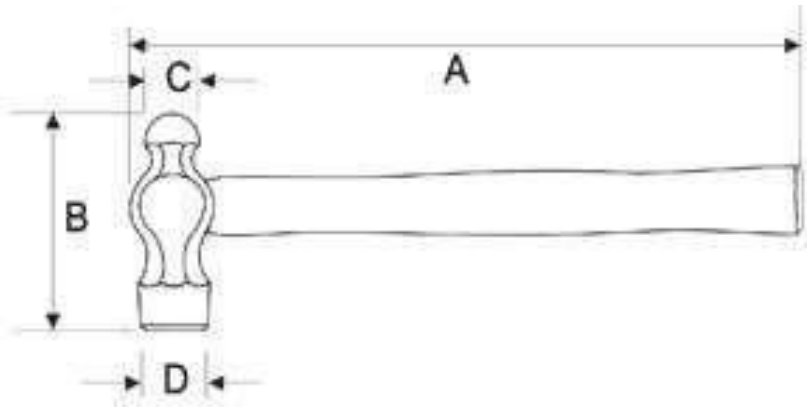
1. Adjustable for 10-inch (250mm) & 12-inch (300mm) blades
2. The blade can additionally be set for sawing at90°
3. Storage compartment in the tubular bow should allow for storing spare blades
4. Should be Fittedwitha12"(300mm) Steel hack sawblade
5. Overall Length(L): 430mm +10%

I. Height(H): 150 mm +10%
II. Depth of Bow(H): 106mm +10%
III. Strong Frame
IV. Should have adjustable tension lever
V. Should be able to build 30000 PSI in 12turns

66. Hammer - Ball Peen - 0.75 Kg

(DVET/MS/Specification MTE/VOLUME-03/Varsion-3/2018 - 19/ Sr. No-57/, P. No-63)

1. Basic Indicative Diagram



1. Generally, conform to I.S. 841 -1983
2. Ball Peen Hammer
3. Length: 300 mm +10%
4. Weight: 0.75kg
5. Drop forged from high grade carbon Steel
6. Material: EN -9
7. Partially hardened up to 46 - 56 HRC on striking surface
8. Depth of Hardness: 6mm
9. Phosphatide and painted
10. Handle

I. Material: Hickory Wood/ Red Wood/ Babul Wood/ Indestructible Handle
II. Handle fixed firmly to hammer head so that it does not come out after long use

67. Hammer - Chipping - 0.25 Kg

1. Basic Indicative Diagram

1. Weight: 250 grams +10%

2. High carbon Steel forged head

3. Hardened and tempered for high strength

4. Handle: Spiral metal Handle

5. Should be useful to clean and remove slag from welds

68. Hammer copper with handle 1 Kg

1. Basic Indicative Diagram

1. Brass Head

2. Weight: 1000gram

3. 12-inch Handle Hammer

4. Non-Sparking

5. Handle

I. Material: Indestructible Handle

II. 4 spring Steel bars running all the way through handle.

III. Bars locked with hammer head using Steel locking plates

IV. Ergonomic rubber grip to absorb shock &vibration

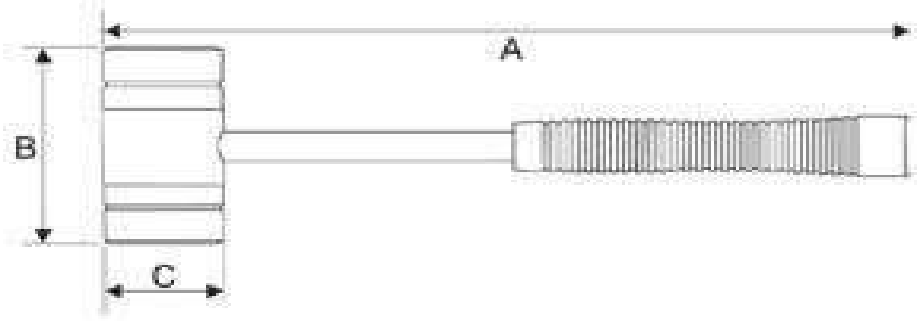
69. Hammer Mallet

1. Basic Indicative Diagram

1. Dimensions
   I. Total Length: 325 mm ± 3mm
   II. Max. Width.: 128 ± 1mm
   III. Min. Width: 112 ± 1mm
   IV. Thickness: 60 mm ± 1mm
2. Wood material: Hard Wood
3. Handle grip is secured by a long taper
4. Should be light weight for fine working
5. Finishing = Fine finishing with body or chamfered.
6. Should easy to operate for operator during hammering.

70. Hammer – Plastic

1. Basic Indicative Diagram



2. Generally, conform to I.S. 10838 -1984

3. Mallet Diameter: 30mm

4. Mallet should be made of Cellular Acetate Material

5. Striking part (Head) should be replaceable

6. Handle

I. Material: Should be made of cold rolled mild Steel pipe and should be chrome plated

II. Handle should be fitted with rubber grip sleeves.

III. Handle fitted firmly to hammer head so that it does not come out after long use

71. Hand operated crimping tool/wire (i) up to 4mm ii) up to 10mm

1.1 Basic Indicative Diagram

1.2 Should have the following 5functions
1.2.1 Wire cutter
1.2.2 Wire stripper
1.2.3 Bolt cutter
1.2.4 Insulation crimping
1.2.5 Non insulation Crimping
1.3 Size: 225mm
1.4 Induction hardened cutting edges
1.5 Finger Guard for Better Control & Added Safety
1.6 Bi - material Grip for comfort

72. Hand vice Up to 37 mm

1.1 Basic Indicative Diagram

1. Total Length: 153 mm ± 2mm
2. Jaw Width: 37 mm ±2mm
3. Total Height: 80 mm ±2mm
4. Body material: Ductile Cast Iron
5. Spring should easily go up &down
6. Should be used during grinding, hammering etc.

73. Hollow Punch Set of 7 Pieces 6mm to 16mm

1. Basic Indicative Diagram

2. Generally, conform to I.S. 7177 -1974

3. Hollow Punch Set - 6 mm to 16 mm, Set of 7Pieces

4. Cylindrical Hollow Punch

I. Hole Diameter (in mm):6,8,10,11,12,13,16

II. Hardness

III. Tip Hardness (Induction Hardened): 40 - 50HRC

IV. Striking end Hardness: 15 - 20HRC

74. Injector – Multi hole type, Pintle type

Basic Indicative Diagram

1. Should consists auto injectors
2. Multi hole CRDI (4holes)
3. Single Hole Pintle Type
4. Set should consist of 4Injector
5. Parts catalogue suitable sketch on Vinyl Board

75. Injector testing set (Hand tester)

1. Transparent fuel container with filter.

2. Manual Hand operating lever / Handle with grip.

3. Along with split pin.

i. Three way shut off valve with valve spindle.

ii. High quality Pressure Gauge

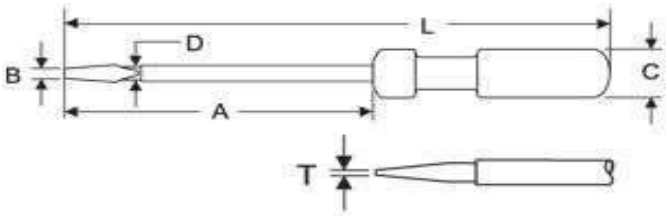
iii. Range: 0 - 400 BAR & 0 - 40 M Pa

iv. All type of Injector fuel pressure chart

v. Suitable fuel pipes for all injector

76. Insulated Screw driver 20 cm x 9mm blade

1. Basic Indicative Diagram



2. Generally, conform to IS 844 -1979

3. Insulated Blade

4. Dimensions:

I. Size: 8 mm X 200 mm (A - 20 cm, D - 9mm)

II. Tip Bit Size: B X T: 9.0 mm X 1.2mm

5. Blade:

I. Blade made of high-grade Silicon - Manganese Steel (EN 45A)

II. Blade should be differentially hardened & tempered to resist wear, bending & meet high torque requirement

III. Hardness on Tip: 55 - 58HRCIV. Minimum Torque Value: 1. 17Kg.m

V. Bright and Smooth Nickel Chrome plating finish to effectively protect bladeagainst corrosion

6. Handle:

I. Material of Handle: Cellulose Acetate

II. Handle should be made of high-grade CA Plastic, which is non - flammable & unaffected by oil, petrol, grease, water – practically anything

III. Handle should withstand rough use including hammering

IV. Handle design should be such that it gives comfortable gripeven at higher torques

V. Handle & blade assembly should be insert molded

7. Tip:

I. Tip should be formed by Forging &Trimming

II. Tip should be precision - ground to 10-degree angle to ensure firm grip in the screw slot.

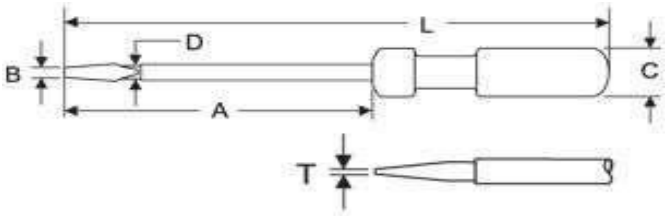
III. The Blade tip should be magnetized to lift small screw fromconfined places or to hold the screw in position

IV. Tip sides & faces should be well ground with good finish

V. Double ear coining should be provided for the blade.

78. Insulated Screw driver 30 cm x 9mm blade

1. Basic Indicative Diagram



2. Generally, conform to IS 844 -1979
3. Insulated Blade
4. Dimensions:
I. Size: 8 mm X 300 mm (A – 30 cm, D - 9mm)
II. Tip Bit Size: B X T: 9.0 mm X 1.2mm
5. Blade:
I. Blade made of high-grade Silicon - Manganese Steel (EN 45A)
II. Blade should be differentially hardened & tempered to resist wear, bending & meet high torque requirement
III. Hardness on Tip: 55 - 58HRC
IV. Minimum Torque Value: 1. 17Kg.m
V. Bright and Smooth Nickel Chrome plating finish to effectively protect blade against corrosion
6. Handle:
I. Material of Handle: Cellulose Acetate
II. Handle should be made of high-grade CA Plastic, which is non - flammable & unaffected by oil, petrol, grease, water - practically anything
III. Handle should withstand rough use including hammering
IV. Handle design should be such that it gives comfortable gripeven at higher torques
V. Handle & blade assembly should be insert molded
7. Tip:
I. Tip should be formed by Forging &Trimming
II. Tip should be precision - ground to 10-degree angle to ensurefirm grip in the screw slot.
III. The Blade tip should be magnetized to lift small screw fromconfined places or to hold the screw in position
IV. Tip sides & faces should be well ground with good finish
V. Double ear coining should be provided for the blade.

78. Lifting jack screw 3 ton, 5ton & 20 Ton

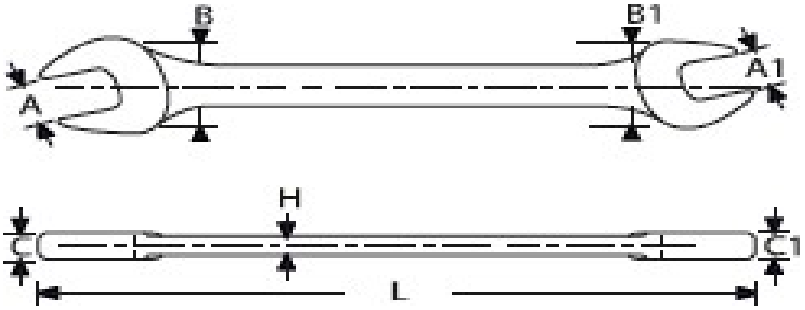
Basic Indicative Diagram

3 Ton 5 Ton 20 Ton

1. Lifting Capacity: 3,5, and 20 Ton (03 Nos)
2. Screw Diameter: 63.5mm
3. Gear Worm Ratio: 4:1, 6:1 & 8:1(Each)
4. Body Material: Ductile Cast Iron
5. Lifting Screw Material: Cold Drawn Steel
6. Provided with suitable Tommy Bar for each Jack
7. It should hold load without back driving in absence of vibration.
8. Drive Sleeve should be supported on anti-friction tapered roller

79. Magneto spanner set with 8 spanners

Basic Indicative Diagram



1. Generally, Conform to IS 2028 -1998

2. Sizes: 6X7, 8X9, 10X11, 12X13, 14X15, 16X17, 18X19,20X22

3. Slightly Rounded handles – Sand Blasted

4. Non-Damaging Grip on nut due to close wrench opening tolerances

5. I - section design of handle and heads to combine strength and low weight

6. Thoroughly corrosion protected with Nickel chrome finish

7. Deep forged from Chrome vanadium Steel(31CrV3)

8. Hardness: 42 - 45HRC

9. Head at each end are of different sizes and set at an angle of 15degrees

10. Web should be provided in forging

80. Magnifying glass 75mm

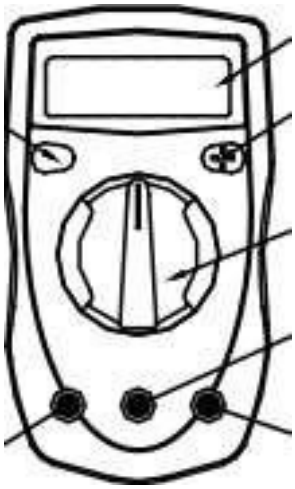
Basic Indicative Diagram

1. Nominal Width A/F 6 - 0.6, 7 - 0.9, 8 - 1.3, 9 - 1.9, 10 - 2.5,11 - 3.3, 12 - 4.2
2. Nominal Width A/F 13 - 5.3, 14 - 6.5, 15 - 7.8, 16 - 9.4,17 - 10.9, 18 - 13.0
3. Nominal Width A/F 19 - 15.2, 20 - 17.50, 21 - 20.20, 22 - 22.9

1. Type: Magnifying Glass
2. Lens Magnification: 4X:6X
3. Lens Diameter: 75 mm
4. Lens Type: Plano Convex
5. Lens Material: Crystal

81. Multi meter digital LCD Display

Basic Indicative Diagram



1. Display Count: 4000
2. DC Voltage: 400mV-500V (Accuracy ±0.8%+1)
3. AC Voltage: 400mV-500V (Accuracy ±1.2%+3)
4. AC Current: 400µA -10A (Accuracy ±1%+2)
5. DC Current: 400µA- 10A (Accuracy ±1.5%+5)
6. Resistance: 400Ωto40MΩ(Accuracy±1%+2)
7. Capacitance 4nF to 100uF (Accuracy ±4%+3)
8. Auto Range: Should be available
9. Diode Measurement: Should be available
10. Continuity Buzzer: Should be available Low Battery Indication: Should be available Input impedance for DCV should be available Protection: DualFuse rotection
11. Size: 130 mm X 75 mm X 35 mm (±10%)
12. Compliance: CE Certificate, CAT II, ETL Certified Accessories

I. Test Lead II. Manual III. Required Batteries
IV. Calibration Certificate
V. Plastic or Wooden Carrying Case with required cushioning

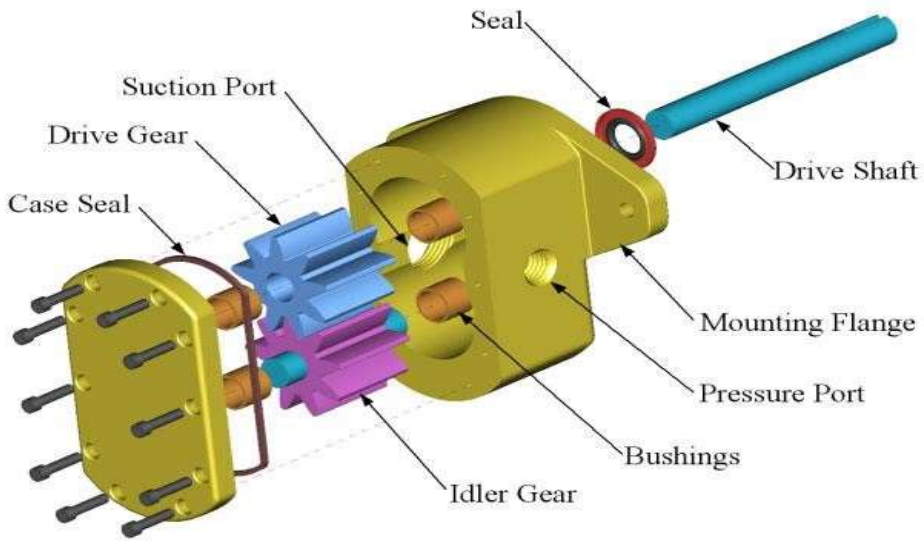
82. Oil can 0.5/0.25-liter capacity

Basic Indicative Diagram

1. Metal Oil can with **250** ml Capacity
2. 150 mm rigid Steels pout
3. Tin coated Steel body
4. with premium powder coated finish
5. Steel pump with double ball check
6. Discharge of 16 - 18 ml per 10 strokes
7. with general Mobil oil

83. Automotive oil pump for dismantling and assembling.

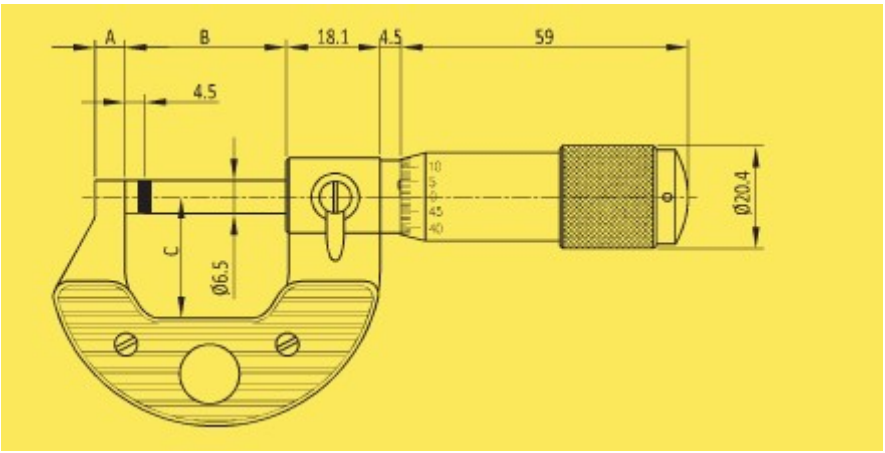
Basic Indicative Diagram



a. Parts Preferred Material Acceptable Alternatives Externals (incl. casing, head, bracket,
b. and relief valve body if applicable) Cast Iron – ASTM A48, Class 35B
1. None Rotor Gear Cast Iron – ASTM A48, Class 35B Steel – ASTM A148, Grade 80-40
2. Ductile Iron – ASTM A536, Grade 60-40-18
3. Idler Gear Cast Iron – ASTM A48, Class 35B Steel – ASTM A148, Grade 80-40
4. Powdered Metal, MPIF Std 35 FC-0208-50
5. Rotor Shaft Cold Drawn Steel – ASTM A108, Grade 1045 17-4 PH Stainless Steel – ASTM A564 Type 630 Cond. H1150 Idler Pin Hardened Steel – ASTM A108, Grade 1045 induction hardened Tungsten Carbide Nit alloy.

84. Outside micrometer 0 to 25 mm

Basic Indicative Diagram



1. Compliance: Generally Compliant to IS 2967 /1938

2. Range: 0 mm -25mm

3. Reading: 0.01mm

4. Accuracy: 4 µm

5. Spindle Material: Stainless Steel / Alloy steel

6. Standard Accessories:

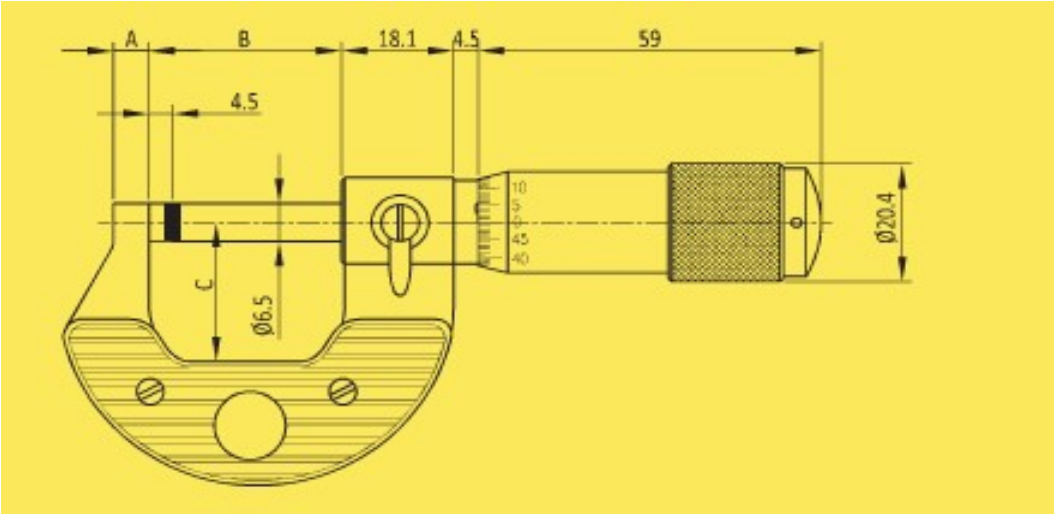
7. Suitable spanner,

8. Wooden / Plastic Box with proper cushioning

9. Operating Manual

85. Outside micrometer 25 to 50 mm

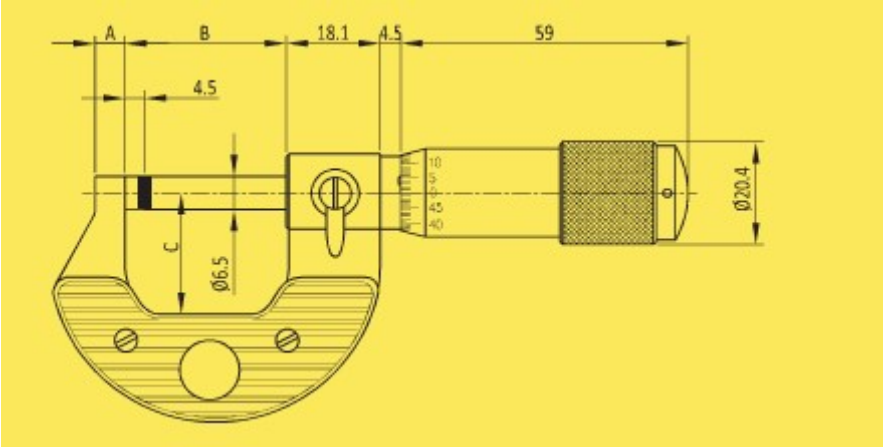
Basic Indicative Diagram



1. Compliance: Generally Compliant to IS 2967 /1938
2. Range: 25 mm -50mm
3. Reading: 0.01mm
4. Accuracy: 4 µm
5. Spindle Material: Stainless Steel / Alloy Steel
6. Standard Accessories:
7. Suitable spanner
8. Distance Piece
9. Wooden / Plastic Box with proper cushioning
10. Operating Manual

86. Outside micrometer 50 to 75 mm

Basic Indicative Diagram



1. Compliance: Generally Compliant to IS 2967 /1938

2. Range: 50 mm -75mm

3. Reading: 0.01mm

4. Accuracy: 4 µm

5. Spindle Material: Stainless Steel / Alloy Steel

6. Standard Accessories:

7. Suitable spanner

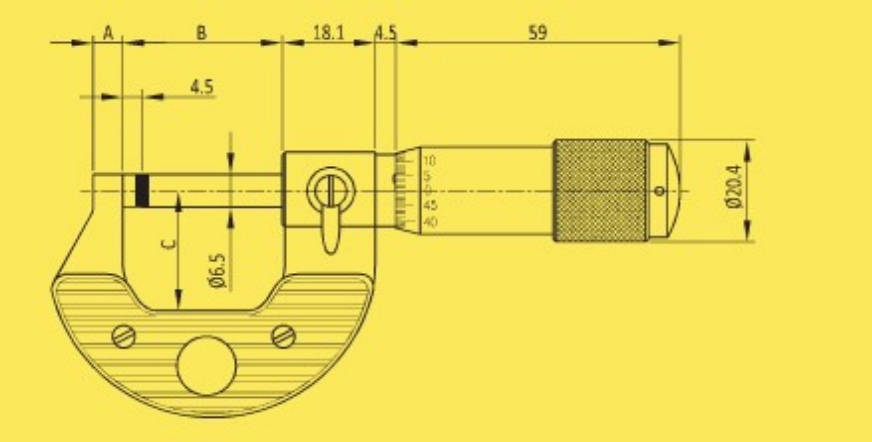
8. Distance Piece

9. Wooden / Plastic Box with proper cushioning

10. Operating Manual

87. Outside micrometer 75 to 100 mm

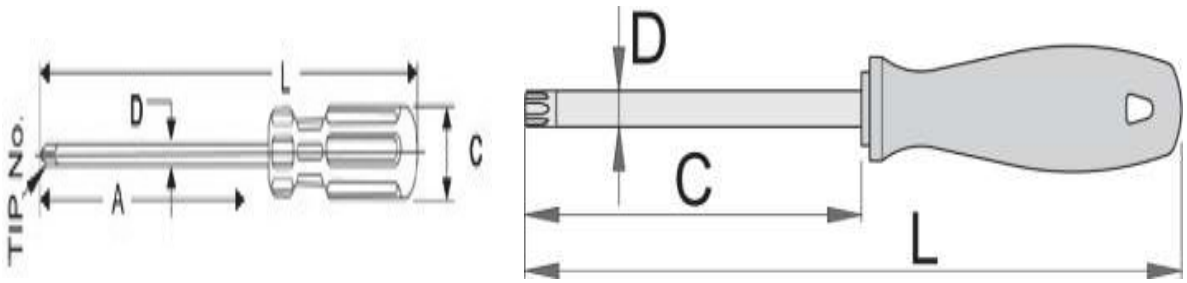
Basic Indicative Diagram



1. Compliance: Generally Compliant to IS 2967 /1938
2. Range: 75 mm - 100mm
3. Reading: 0.01mm
4. Accuracy: 4 µm
5. Spindle Material: Stainless Steel / Alloy Steel
6. Standard Accessories:
7. Suitable spanner
8. Distance Piece
9. Wooden / Plastic Box with proper cushioning
10. Operating Manual

88. Philips Screw Driver set of 5 pieces (100 mm to 300 mm)

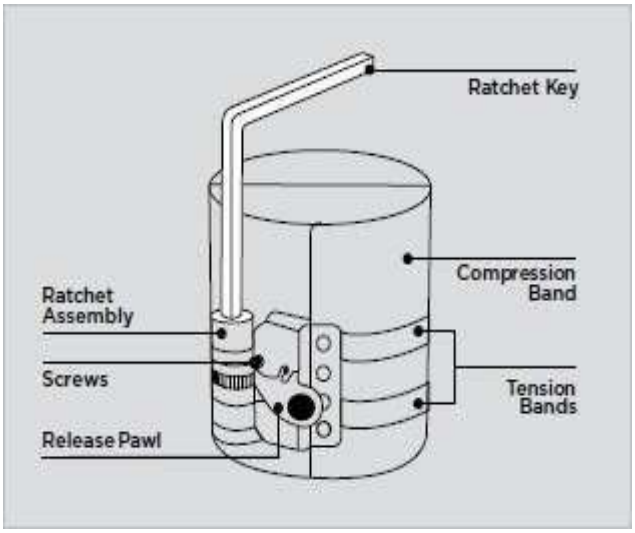
Basic Indicative Diagram



For Philips Screw Driver
1. Generally, conform to IS 844 -1979
2. Sizes:
a. A:100mm D:6mm TIP SIZE:1
b. A:150mm D:6mm TIP SIZE:2
c. A:200mm D:8mm TIP SIZE:3
d. A: 250mm D:10mm TIP SIZE:4
e. A: 300mm D:10mm TIP SIZE:5
3. Blade made of High-Grade Silicon - Manganese Steel
4. Blade should be differential hardened & tempered to resist wear,bending & meet high torque requirement
5. Hardness on Tip: 55 - 58HRC
6. The Blade tip should be magnetized to lift small screw from confined place
Or To hold the screw in position
7. Bright and Smooth Nickel Chrome plating finish to effectively protect blade against corrosion
8. Handle should be made of high-grade CA Plastic,
9. which is non-flammable &unaffected by oil, petrol, grease,
10. water - practically anything
11. Handle should withstand rough use including hammering
12. Handle design should be such that it gives comfortable grip even at higher Torques

89. Piston Ring Compressor

1. Basic Indicative Diagram



2. Material: High Grade Spring Steel

3. Minimum Ring Diameter: 50mm

4. Maximum Ring Diameter: 125mm

5. Height: 75mm

6. Comes with Ratchet key

7. Friction proof edges

90. Piston Ring Ex-pander and Remover

1. Basic Indicative Diagram

2. Capacity: ø 50 - 100mm

3. Overall Length:215mm

4. Material: High Grade Special Tool Steel

5. Finish: Bright Nickel-plated

6. Grip: Rubber/ Plastic

7. High quality material

8. Thicker Sleeves for comfortable Grip

91. Piston Ring Groove Cleaner

Basic Indicative Diagram

1. Handles pistons ø 1 inch to 5inch

2. For pistons with grooves of sizes

3. i.e., cutter wheelies

I. 5/64inch

II. 3/32inch

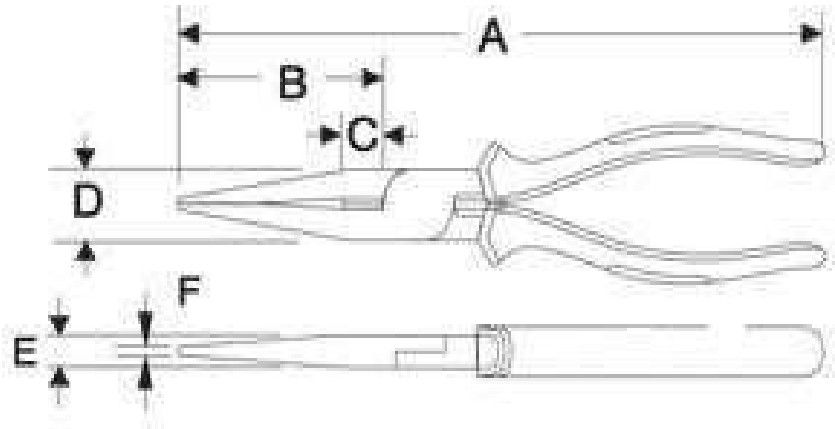
III. 1/8inch

IV. 5/32inch

V. 3/16inch

92. Plier - Flat Nose – 15 cm

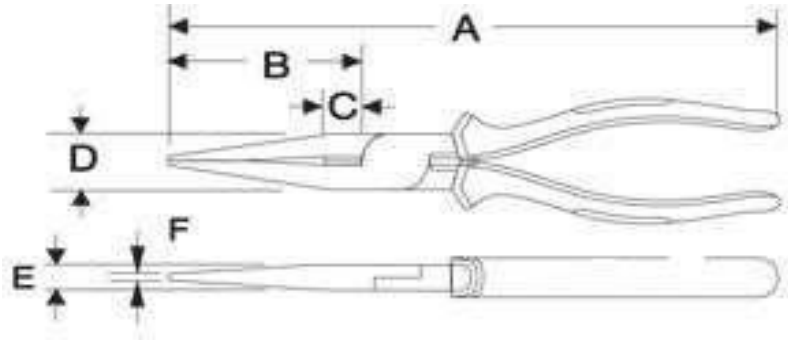
1. Basic Indicative Diagram



2. Generally, conform to IS 3552 -1989
3. Length: 150mm
4. Drop Forged from High Carbon Steel & scientifically treated to give tough body (45 - 48HRC)
5. Cutting edges should be induction hardened. Cutting edge Hardness 55 -60HRC.
6. Rivet should be hardened and made of carbon Steel
7. High Voltage Insulation: Should be able to withstand 4000 V DC or 2800 VAC
8. Minimum load value: 9.58Kg
9. Insulation Sleeves made from High Quality CA Plastic which are long lasting and will not break or crack even if it falls from Height and ensures safe electrical working.
10. Thicker Sleeves for comfortable Grip
11. Special thumb protect or for sleeves to minimize the risk of electric shock incase plier slips while in use.
12. Should be able to cut soft (74 to 84 Kg/ mm^2) & Hard (140 mm^2) wires
13. Should be able to cut Hard wire of Diameter: 1.60 mm & Soft wire of Diameter: 1.0 mm
14. Cutting edges should be sharp and precision machined to appropriate angle to cut thick and thin wires with ease.

93. Plier - Round Nose – 15 cm

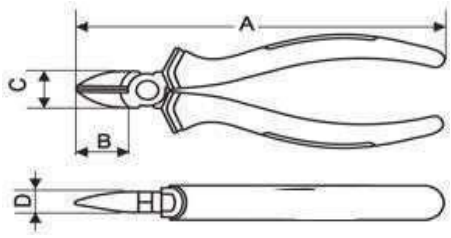
1. Basic Indicative Diagram



2. Generally, conform to IS 3552 -1989
3. Length: 150mm
4. Drop Forged from High Carbon Steel & scientifically treated to give tough body (45 - 48HRC)
5. Cutting edges should be induction hardened. Cutting edge Hardness 55 -60HRC.
6. Rivet should be hardened and made of carbon Steel
7. High Voltage Insulation: Should be able to withstand 4000 V DC or 2800 VAC
8. Insulation Sleeves made from High Quality CA Plastic which are long lasting and will not break or crack even if it falls from Height and ensures safe electrical working.
9. Thicker Sleeves for comfortable Grip
10. Special thumb protect or for sleeves to minimize the risk of electric shock incase plier slips while in use.
11. Should be able to cut soft (74 to 84 Kg/ mm^2) & Hard (140 Kg/ mm^2) wires
12. Should be able to cut Hard wire of Diameter: 1.60 mm & Soft wire of Diameter: 1.0 mm
13. Cutting edges should be sharp and precision machined to appropriate angle to cut thick and thin wires with ease

94. Pliers side cutting 15 cm

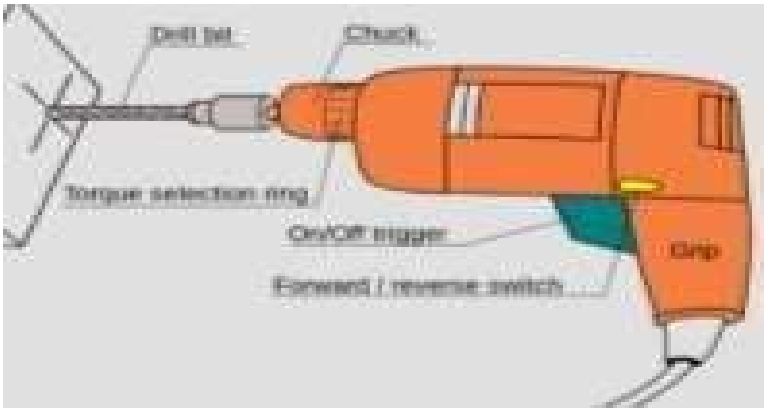
Basic Indicative Diagram



1. Generally, conform to IS 4378 -1990
2. Drop Forged from High Carbon Steel & scientifically treated to give tough body (45 - 48HRC)
3. Cutting edges should be induction hardened. Cutting edge Hardness 55 - 60HRC.
4. Rivet should be hardened and made of carbon Steel
5. Length: 150mm
6. High Voltage Insulation: Should be able to withstand 4000 V DC or 2800 VAC
7. Insulation Sleeves made from High Quality CA Plastic
8. Thicker Sleeves for comfortable Grip
9. Specialthumbprotectorforsleevestominimizetheriskofelectricshocki N case plier slips while in use.
10. Should be able to cut soft (74 to 84 Kg/ mm²) & Hard (140 Kg/ mm²) wires
11. Should be able to cut 2.0 mm of hard wire Diameter & 1.5 mm of soft wire Diameter
12. Cutting edges should be sharp and precision machined to
13. appropriate angle to cut thick and thin wires with ease

95. Portable electric drill Machine Up to 10mm (heavy duty)

Basic Indicative Diagram:



1. Drilling machine should generally conform to IS 36501 -1981.
2. Power input: 600 Watt (Min.)
3. Drilling diameter:

I. Concrete: 13mm

II. Steel: 10mm

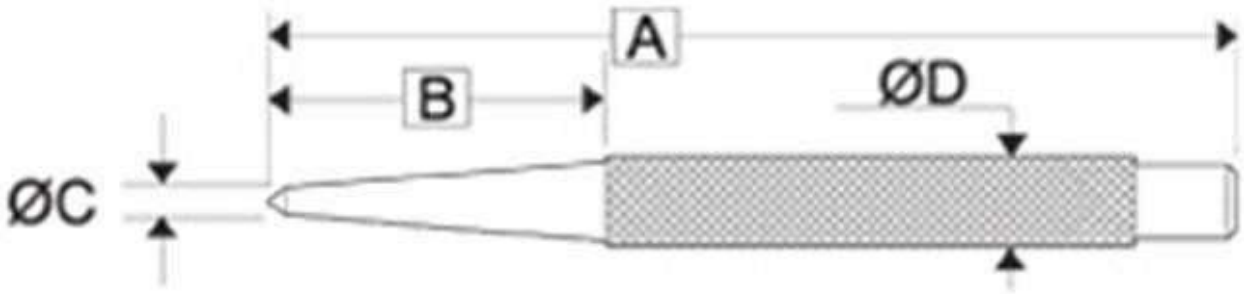
III. Wood: 25mm

4. No load speed: 0 - 2800rpm
5. Impact rate: 25000 bpm
6. Should have soft in line grip for a secure hold
7. Should have Rotating brush plate for constant power in reverse and forward rotation
8. Should have Forward / Reverse rotation for inserting and removing screws
9. Should be able to have Easy and precise control of the RPM - variable speed
10. Should have double insulation - shock proof fiber body

11. Dimensions:
I. Overall Length in mm (±10%): 275mm
II. Overall Height in mm (±10%): 180mm
III. Net Weight (without cable & blade) (±10%.): 1.7kg
12. Protection Class: Double Insulation
13. Standard Accessories
I. Auxiliary handle = 01no
II. Blow molded plastic case to securely fit all pieces for easy organization and convenient portability = 01no
III. Depth gauge = 01no
IV. Spirit level (225 mm) with 3 spirit bulbs (for horizontal, vertical & angular level testing) = 01no
V. Knife (Length - 150 mm, Blade width 15 mm) = 01no
VI. Claw Hammer (Weight 340 grams) = 01no
VII. Adjustable Wrench (Length 150 mm, Maximum jaw opening 19 mm) = 01no
VIII. Combination Plier (Length 160 mm, Maximum jaw opening 25 mm) = 01no
IX. Measuring tape (Length 3-meter, 11 mm tape width) = 01no
X. Drill bits
2.14.10.1 Masonry: 05 no
2.14.10.2 Wood: 04 no
2.14.10.3 HSS: 05 no
14.. CRV Bit: 10no
a. Magnetic Bit Holder: 01no
b. Socket: 7no
c. Socket Adaptor: 1 no
d. Assorted Screws: 30no
e. Assorted Plastic Plugs: 30no

96. Prick Punch 15 cm

1. Basic Indicative Diagram



2. Generally, conform to I.S. 7177 -1974

3. Dimensions (in mm): A - 150, B - 33, Ø C - 3 mm, Ø D - 10mm

4. Hardness: 55 to 60HRC

5. Manufactured from carbon Steel

6. Single piece construction with round shank& round chamfered striking end

7. Induction hardened to ensure consistent Hardness with special tempering process to prevent the head from fracturing, thereby preventing accidents

8. Rust inhibiting black oxide finish

9. Point angle 30degree

97. Punch Letter 4mm (Number)

1. Basic Indicative Diagram

2. Manufactured from select quality carbon Steel
3. Individual Punches should be induction hardened for durability and extended ife
4. Hardness at Stamping end: 58 – 62HRC
5. Hardness at Striking end: 38 – 42 HRC. This prevents splintering of the punch
6. Chamfer ed striking end to prevent breakage and accidents due to flying splinters
7. Number Punch Set should contain 9 pieces (04mm)- '0' to '9'. Numbers '6' & '9' can be
8. interchangeable
9. LetterPunchSetshouldcontain27pieces, alphabets 'A' through 'Z' and ampersand '&'
10. Set with proper box plastic/ metal.

98. Radiator cut section-cross flow Radiator with sectioned side tanks, radiator core.

Basic Indicative Diagram

1. Components:
2. Side Tank
3. Radiator Core
4. Radiator Cap
5. Radiator should be used for sectioning to show the cross flow and radiator core and(fins) construction.
6. Internal coloring to identify coolant path to be provided.
7. The model should be mounted on to a paint finished metal stand
8. Vinyl Display Board displaying water flow with naming

99. Radiator cut section-down flow Radiator with sectioned upper & lower tanks, radiator core and cap.

Basic Indicative Diagram

1. Components:

I. Side Tank

II. Radiator Core

III. Radiator Cap

2. Radiator should be used for sectioning to show the down flow and radiator core and (fins)construction.
3. Internal coloring to identify coolant path to be provided.
4. The model should be mounted on to a paint finished metal stand Vinyl Display Board displaying water flow with naming.

100. Radiator pressure cap LMV

Basic Indicative Diagram

1. Brand-new item should be supplied Should consists of

a. Upper Seal

b. Main Seal Spring

c. Main Rubber Seal

d. Low Pressure Valve

2. Parts catalogue suitable sketch on Vinyl Board

101. Scraper Triangular 25 cm

Basic Indicative Diagram

1. Triangular

I. Total Length: 330 mm ± 2mm

II. Blade Length: 250 mm ± 1mm

III. Blade Width: 16 mm ± 1mm

2. Blade Material: High Carbon Steel

3. Blade Hardness: 55 - 60HRC

4. Handle with proper grip wooden / plastic

102. Scriber 15 cm

Basic Indicative Diagram

1. Scriber with Min. Length15 cm
2. 90 ° Bend and Straight
3. Both Point end Hardness 55 - 60HRC
4. Should be of material EN -9
5. Proper knurling on grip portion

6 Should be supplied in Wooden / Plastic Box with proper cushioning

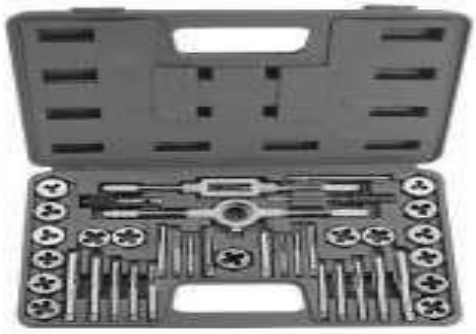
103. Scriber with scribing black universal

Basic Indicative Diagram

1. Base should be made from case hardened steel, ground on bottom and at one end.
2. Should have provision for Fine adjustment. This adjustment should be made by a knurled thumbscrew
3. Height: 450mm
4. Base length: 100mm
5. Width: 85mm
6. Scriber: 150mm
7. Should be supplied in Wooden / Plastic Box with proper cushioning

104. Set of stock and dies –Metric

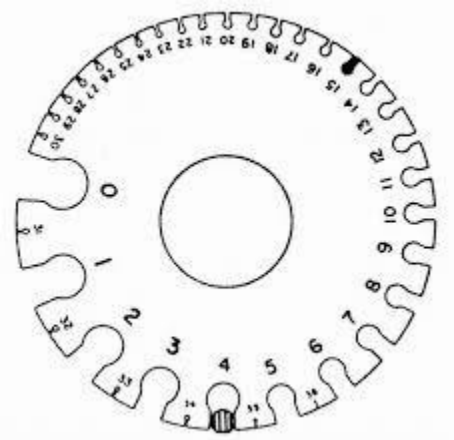
Basic Indicative Diagram



i. Tap and Die Set - M3 to M18, Taps Set and Die Sets,
ii. Die Stock and Tap Wrench Made of High-Speed Steel HRC 56 -60
iii. 13HandTap Set consisting of 3Hand Taps viz.
iv. First, Second and Third of size specified below
v. 13 Round Dies of sizes specified below
1. Hand Tap and Round Dies
2. Sizes: 3.00 - 0.50 mm 4.00 -0.70 mm 187.7.3 5.00 - 0.80 mm
187.7.4 6.00 - 1.00 mm 187.7.5
7.00 - 1.00 mm 187.7.6
8.00 - 1.00 mm 187.7.7
9.00 - 1.25 mm 187.7.8
10.00 - 1.50 mm 187.7.9
12.00 - 1.75 mm 187.7.10
14.00 - 2.00 mm 187.7.11
16.00 - 2.00 mm 187.7.12
18.00 - 2.50mm
i. 1/8 inch - 28BSP
ii. T Handle Tap Wrench M2 - M6, M6 -M10
iii. Adjustable Bar Type Tap wrench M1 - M12, M4 - M20(forged body)
iv. Die Stock Holder for Round Dies 13/16-inch, 1 inch & 1.1/2inch
v. Thread Pitch Gauge - 16 leaves 0.35mm -3mm
vi. 60 Pieces Set
vii. Provided with suitable Wooden/ Plastic/ Metal Box

105. Sheet Metal Gauge

Basic Indicative Diagram



1. Material: Stainless -X12CrMnNiN18-9-5
2. Thickness: 1.0mm
3. Hardness: 30-35 HRC (specially hardened)
4. Finish: Polished 2B / Antiglare Satin Chrome
5. Surface roughness: 0.6 microns max
6. Range: 0-36 SWG (incremental of 1gauge)
7. Measuring least count: 36 SWG (0.19mm)
8. Accuracy: Within + 0.05mm
9. Should be supplied in Wooden / Plastic Box with proper cushioning

106. Spanner T. flocks for screwing up and up-screwing inaccessible

. Basic Indicative Diagram

1. metal forged

2. easy handling

3. rubber grip on handle

i. size:8mm,10mm,12mm & 13mm

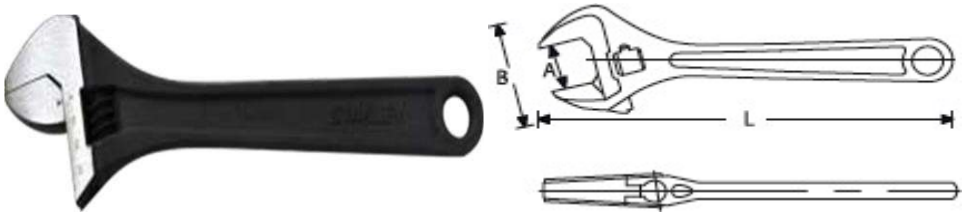
ii. Cold forging from high quality chrome Vanadium Steel

4. Ultra - Premium Finish to provide scratch proof surface with enhanced protection against corrosion. (Mirror Finish & Matt finish not acceptable)

5. Should be supplied in Wooden / Plastic Box with proper cushioning

107. Spanner Adjustable – 15 cm

Basic Indicative Diagram



1. Generally, Conform to IS 6149 - 1984 Grade II
2. Length(L): 150mm
3. Plain Carbon Steel/ Cr - V Steel
4. Knurl adjusting mechanism for quick & precise adjustment
5. Built - in tension spring stabilizes movable jaw. Laser - etched mm jaw scale for easy adjustment
6. Drop forged with high grade forging Steel
7. Play between jaws: 1.20 mm(maximum)
8. Hardness: 40 - 50 HRC
9. Minimum Torque Value: 8 Kg.m
10. Maximum Opening (A): 19mm
11. Madewith15degreeheadangletoallowuseinnarrowspaceshavingarc movement of
12. only 30degree
13. Jaw Shank should not
14. Protrude out even when fully opened in full condition, movable jaw should align with outer radius of the handle.
15. Adjustable Wrenches Black Phosphate Finish
16. Light weight handle design.
17. Should be supplied in Wooden / Plastic Box with proper cushioning

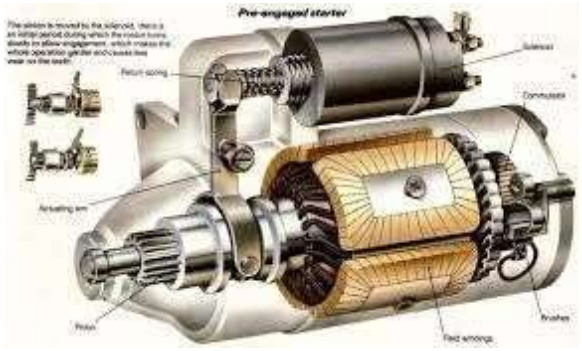
108. Spark plug spanner 14mm x18mm x Size Long bit for Alto/800

Basic Indicative Diagram

1. Generally conforming to I.S 2030 -1989
2. Made from tubular section of Steel
3. Heat treated to give maximum strength
4. Hardness: 29 to 34 HRC (carbonizing depth minimum up to 0.3mm)
5. Body and Hexagon should have good alignment and ends should be square with axis
6. Bright Zinc plating for rust protection
7. Sizes in mm: 14 X 15, 16 X 17, 18 X 19, 20 X 22, 21 X23.
8. Should be supplied in Wooden / Plastic Box with proper cushioning

109. Starter motor axial type, per-engagement type & Co-axial type

Basic Indicative Diagram



1.	Technology	Reduction-Gear Technology
2.	Type	Nose-less type
3.	Voltage	12V & 24V.
4.	Rated Output Power	0.7 kW to 3.5 kW.
5.	Application	Diesel Engine. Up to 4.5 Litres. Capacity, 4 CYL.
6.	Weight	2.8 kg. to 6.6 kg.
7.	Rotation	Clock wise and Anti-Clock wise (as viewed from Pinion end)
8.	Operating Conditions	From -40° C to +130° C peak (Storage)
9.		From -40° C to +100° C (No Load)
10.	Protection Category	IP-54 Certified. For Splash & Dust norms DIN40050.
11.		IP-67 Design, with Water Dip-Proof, underway.
12.	Construction	Closely balanced Armature assembly

110. Steel measuring tape in a case 10 meter

Basic Indicative Diagram

1. Tape length: 10meters
2. Tape width: 9.5mm
3. Tapes coated with Epoxy based scratch guard material to ensure longer life
4. Bold & Easy to read printing
5. Ensures Class II Accuracy at 20 Degree when subjected to tension of 50Newton
6. Tong Copper Rivet to ensure stronger end hook.Should be supplied in Wooden / Plastic Box with proper cushioning

111. Steel rule 15 cm inch and metric

Basic Indicative Diagram

1. Material: Stainless-steel
2. Thickness: 0.5mm
3. Hardness: 30 - 35 HRC (Specially Hardened)
4. Finish: Polished 2B / Anti-Glare Satin Chrome
5. Surface roughness: 0.6 Microns max
6. Range: 150 mm Scale
7. Measuring least count: Metric Graduation +0.5mm and English graduation

1/64inch

8. Accuracy: Meteorology Standard EEC Class - I

112. Straight edge gauge 2 ft.

Basic Indicative Diagram

1. Length: 600 mm ± 1mm
2. Width: 45 mm ± 1mm
3. Thickness: 9 mm ± 0.1mm
4. Angle: 30Degree
5. Hardness: 35 HRC
6. Material: Steel
7. Finishing Precision Ground Tool Steel.
8. Should be supplied in Wooden / Plastic Box with proper cushioning

113. Stud extractor set of 3

1. Basic Indicative Diagram

2. Five Pieces Set: Size 3 mm, 6 mm, 8 mm, 11 mm, 14mm

3. Heat treated Cr - Mo Steel

4. Should be supplied in Wooden / Plastic Box with proper cushioning

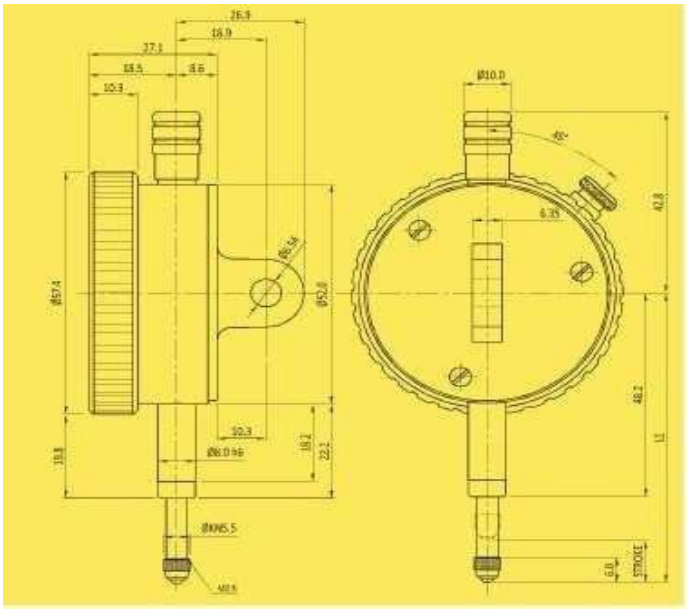
114. Stud remover with socket handle

Basic Indicative Diagram

1. Capacity: 20mm
2. Material: Chrome vanadium Steel
3. Eccentric roller grips stud more firmly
4. Should be compatible to half inch square drive wrench
5. Should be supplied in Wooden / Plastic Box with proper cushioning

115. Surface gauge with dial test indicator plunger type 0.01 mm

Basic Indicative Diagram:



1. Compliance Dial: Generally Compliant to IS 2092 /1983
2. Reading: 0.01mm
3. Range: 0-10mm
4. Graduation: 0-100
5. System of Measurement: Metric
6. Accuracy: 20μm
7. Magnetic force for stand: 600 N(Approx.)
8. Stand(L×W×H): 60 X 50 X 55 mm (Approx.)
9. Stand Weight: 1.5 K g(Approx.)
10. Standard Accessories:

I. Spanner
II. Wooden/Plastic Box with proper cushioning for Plunger Type Dial Gauge and Corrugated Box with proper Cushioning for Magnetic Stand
III. 3mm Diameter T.C. ball Anvil fitted to the gauge
IV. Operating Manual

116. Tachometer (Counting type)

Basic Indicative Diagram

1. Scale: 10000 rpm
2. Scale Plate Diam: *58 m/m*
3. Size w/o attachment: *87m/m W * 133m/mL*25m/mH*
4. Net Weight: *300g*
5. Size of case: *116m/m W*140m/mL*45m/mH*
6. Gross Weight: *450g*
7. Should be supplied in Wooden / Plastic Box with proper cushioning
7. Accessories:

I. : *Concave rubber contact tip*

II. : *Convex rubber contact tip*

III. : *wheel (pulley) for peripheral speed measuring*

IV. : *spare rubber contact tip*

117 Tandem master cylinders with booster

Basic Indicative Diagram

1. TANDEM MASTER CYLINDER

2. BRAKE OIL STORAGE 200 ml to 400 ml capacity.

3. BOOSTER ATTACHED

4. BRAKE LINKAGE WITH RUBBER BOOT

5. Parts catalogue suitable sketch on Vinyl Board

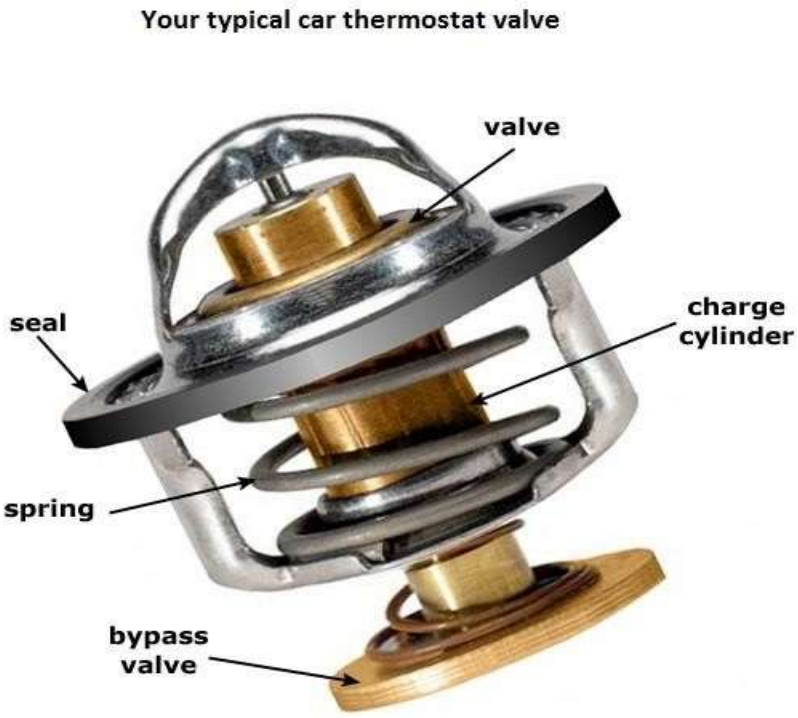
6 The entire model should be mounted on a sturdy iron frame

7 Suitable color painting to be done for different parts for easy identification.

8 With Oil reservoir

118 Thermostat

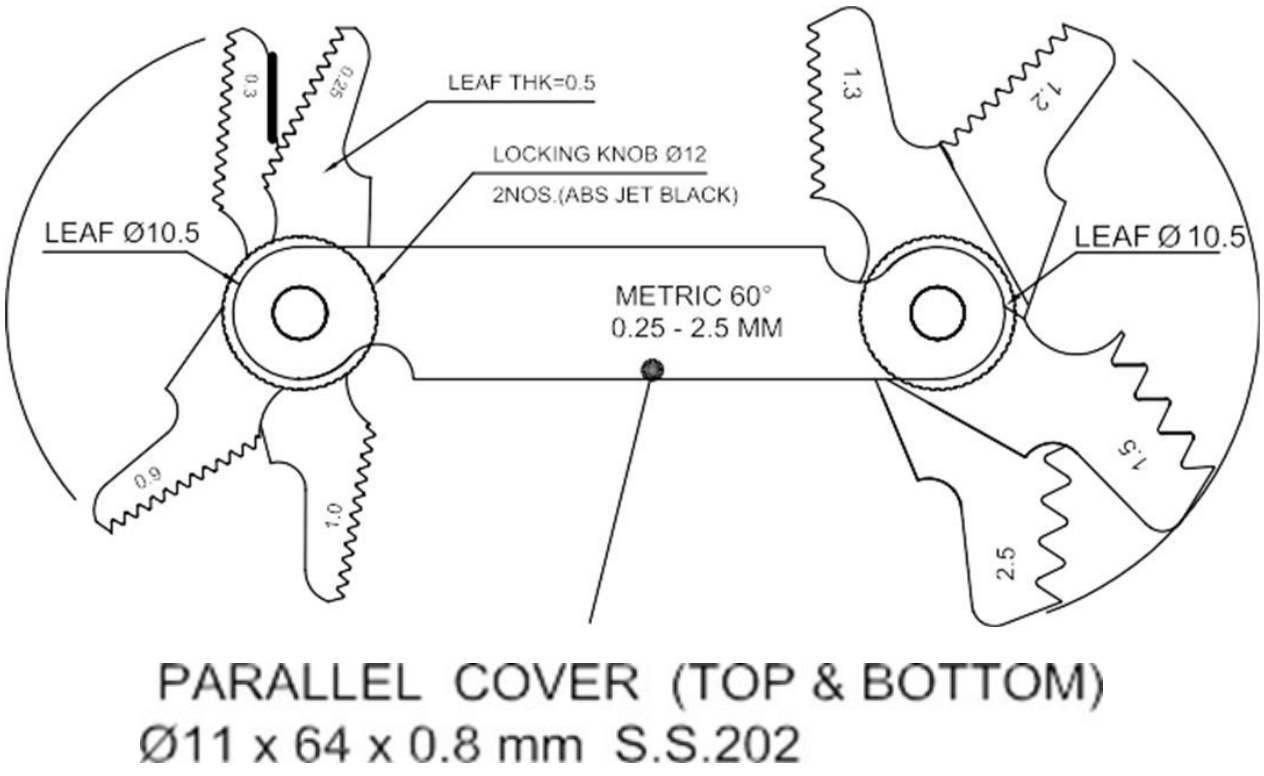
Basic Indicative Diagram



1. Working condition
2. Generally, about 200 degrees F, 95 degrees C
3. Parts catalogue suitable sketch on Vinyl Board
4. Suitable for Heavy vehicle
5. Material Brass and MS

119. Thread pitch gauge Metric, 0.25 to 6 mm, 21 Leaves

Basic Indicative Diagram



1. Material: Carbon Steel
2. Range: 21 Leaves 4 - 80 TPI (55°) and Metric60°
3. Finish: Polished
4. Should be supplied in Wooden / Plastic Box with proper cushioning

120. TIMING LIGHTER

Basic Indicative Diagram

1. CABLE LENGTH SHOULD BE MIN. 135 AND
2. ABOVE CARRY CASE
3. A battery-powered light for two- and four-cycle engines and for use on all ignition systems. Accuracy up to 14,000 RPM.
4. PROS Light has a bright flash at all speeds

I. Features a protective sleeve that withstands temperatures up to 1,200-degrees Fahrenheit
II. 4-foot lead length
III. Batteries included

121. Torque wrenches 5-35 Nm, 12-68 Nm & 50-225 Nm

Basic Indicative Diagram

1. 48 teeth ratchet to allow engagement angle of 7 - 1/2 ° (which is ideal) for precise adjustment & non slip use
2. Chrome - Molybdenum Steel Square Drive
3. Fully secure locking mechanism to avoid forced adjustment
4. Lens (Screen) for clear reading of torque value
5. Ratcheting Kind, click sound after achieving the torque
6. Each unit should be individually serial numbered & includes calibration certificate traceable to international standards
7. Accuracy: +/ -4%
8. Torque Range 5 - 35Nm

I. Fine scale 0.1Nm
II. Length 325mm
III. 3/8-inch square drive

9. Torque Range 12- 68Nm

I. Fine scale0.5Nm
II. Length 400mm
III. 1/2-inch square drive

10. Torque Range 50 - 225Nm

I. Fine scale0.5Nm
II. Length 515mm
III. 1/2-inch square drive

122. Turbocharger cut sectional view Latest WGT type to show turbine, impeller and compressor wheels.

Basic Indicative Diagram

1. Should be Suitably sectioned to demonstrate the internal construction details showing the minute information,
2. The model is suitably sectioned to show the internal details such as turbine and compressor wheel, gun metal bushes, oil path etc.
3. The model should be suitably painted and mounted on a suitable wooden base
4. Bigger in size (truck Model)
5. Suitable As per Automobile norms color painting to be done for different parts for easy identification. Vinyl Display Board displaying Turbo Charger with naming.

123. Tyre pressure gauge with holding nipple

Basic Indicative Diagram

1. Easy change chuck system
   button operation
2. Auto shut-off for increased battery life
3. Displays Kg F, BAR, PSI, KP A
   measurements
4. Large face LCD digital read-out
5. Unit covered with rubber sleeve for extra comfort and durability
6. ON power Button,
7. auto shut off in 90 seconds if not in use

i. LCD backlight
ii. 2-position lever - 1st position deflates, 2nd position
   inflates with 21" hose

8. AAA batteries
9. Should be supplied in Wooden / Plastic Box with proper cushioning

124. Universal puller for removing pulleys, bearings

Basic Indicative Diagram

1. Should generally conform to I.S 9193 -1988
2. No of Jaws: 3
3. Minimum Spread: 25mm
4. Maximum Spread: 150mm
5. Drop forged jaws made of carbon Steel
6. Hardness: 35 - 45HRC
7. Reversible Jaw design to enable inside and outside operation
8. Jaw Design should allow flexibility of use in shallow or deep spaces
9. Screw threads should be precision maintained
10. The Pulling force should be equally distributed evenly on the bearing or gear to facilitate smooth and fast operation without any damage to bearing or gear
11. Protective capon screw end to increase life of screw tip. The center screw is provided with a special adjustable cap for better gripping.
12. Screws should be black anodized
13. Jaws, link plates, protective cap and connecting bolts should belated

125. V' Block 75 x 38 mm pair with Clamps

Basic Indicative Diagram

1. Total Length: 75 mm ±1mm
2. Total Width.: 38 mm ± 0.2mm
3. Total Height: 38 mm ± 0.2mm
4. Angle: 90Degree

126 VACCUM GAUGE 0 to 760 mm of Hg.

Basic Indicative Diagram

1. Inches of mercury (Hg) on a scale of 0 to 30, and the metric equivalent. Size = 4" Dial Metal Body
2. Rubber hose pipe to connect combustion chamber
3. Should be supplied in Wooden / Plastic Box with proper cushioning

127. VALVE LIFTERS

Basic Indicative Diagram

- Casting steel with adjusting screw on valve base
- Soft rubber grip on lever handle
- Powder coated body
- Material: High Grade Special Tool Steel
- Finish: Bright Nickel Plated
- This valve spring compressor tool is designed to compress valve springs on overhead valve engines.
- It includes two valve spring adapters, which fit valve spring retainers up to 1 inch (25mm) and 1-3/16 inches (30mm).
- It has a jaw opening of 1-3/8 inches to 5-5/8 inches (35mm to 142mm) and a throat clearance of 5-7/8 inches (150mm)."

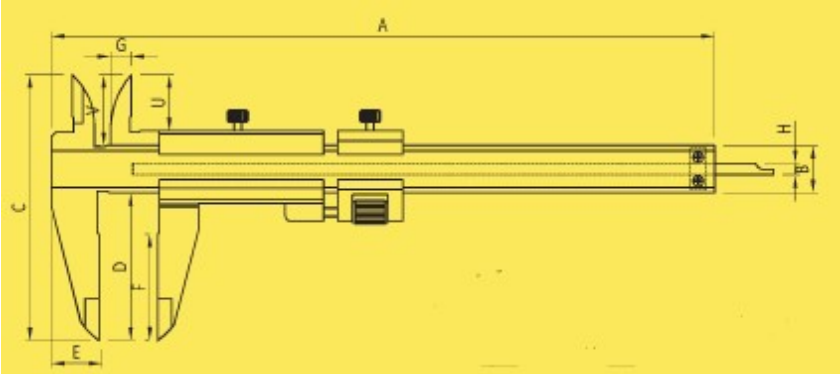
128. Valve spring compressors universal

Basic Indicative Diagram

1. casting steel with adjusting screw on valve base
2. good quality plastic box
3. Casting steel with adjusting screw on valve base
4. Soft rubber grip on lever handle
5. Powder coated body
6. Material: High Grade Special Tool Steel
7. Finish: Bright Nickel Plate
8. 10Pcs Valve Spring Compressor Kit---------- Suitable for your motorcycle, ATV, UTV, car, and other small engine vehicles and equipment; All collets are 1.75 inches (4.4cm) long with 9.5-inch (24.1cm) maximum jaw openings.
9. BUILT TO LAST: Each component is constructed from high-quality metal with a black-oxide finish for maximum strength and longevity that resists rust and corrosion.

129. Vernier caliper 0-300 mm with least count 0.02mm

Basic Indicative Diagram



1. Compliance: Generally Compliant to DIN862

2. Range: 0 mm - 300mm

3. Overall Length: 400mm

4. Lower jaw length: Min. 60mm

5. Upper jaw length: Min. 25mm

6. Graduation: 0.02mm

7. Accuracy: ± 0.05mm

8. Material: Stainless Steel / Alloy Steel

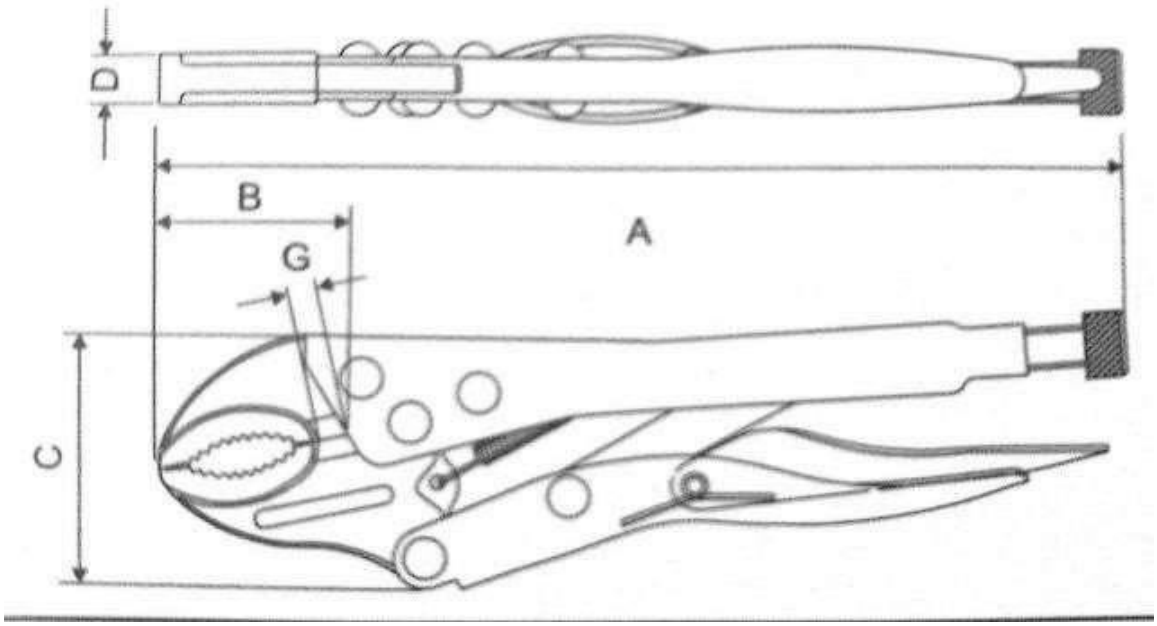
9. Standard Accessories:

I. Operating Manual

II. Wooden / Plastic Box with proper cushioning

130. Vice Grip Plier

Basic Indicative Diagram



1. Generally, conform to IS 10372 -1982

2. Size: A: 250 mm, B: 45 mm, C: 65 mm, D: 12mm

3. Curved jaw

4. Jaws should be forged from High grade Alloy Steel

5. Jaws should be specially hardened and tempered to give tough body

6. Handles should be made from good quality cold drawn Steel sheets

7. End Screw is provided with knurling for quick jaw adjustment

8. Smooth, Quick releasing mechanism helps in single handed operation

9. Nickel Plated for rust prevention

131. Automotive Water pump for dismantling and assembling

Basic Indicative Diagram

1. WORKING CONDITION

i. INCLUDES- IMPELER, PULLY, HOUSING

2. 3/4" Roller bearing

3. CNC machined impeller

4. Carbon ceramic seal

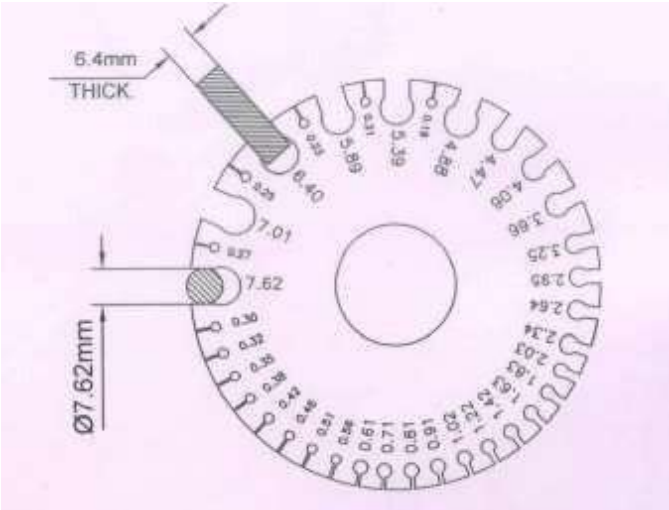
5. Triple bolt pattern flange

6. Stainless steel Hardware

7. Heavy Vehicle pump to be supply

132. Wire Gauge(Metric)

Basic Indicative Diagram



1. Material: Stainless -X12CrMnNiN18-9-5
2. Thickness: 1.0mm
3. Hardness: 30-35 HRC (Specially Hardened)
4. Finish: Polished 2B / Anti-glare Satin Chrome
5. Surface roughness: 0.6 microns max
6. Range: 0-36 SWG (incremental of 1gauge)
7. Measuring least count: 36 SWG - Standard Wire Gauge (0.19mm)
8. Accuracy: +0.05mm
9. Should be supplied in Wooden / Plastic Box with proper cushioning

133 Work bench 250 x 120 x 60 cm with 4 vices 12cm Jaw

Basic Indicative Diagram

Range from 28 inches to 36 inches deep, 48 inches to 96 inches wide and 28 inches to 38 inches
WOODEN TOP 2 inch wooden and 1-inch heavy rubber
Heavy Duty Workbench - 600kg Bench Load
Heavy duty powder-coated steel uprights and beams
Basic Indicative Diagram

1. bench vice 15cm jaw fitted
1. Bench Vice - 120mm
2. Total Length: 380 mm ± 2 mm 209.3 Height: 155 mm ± 2 mm
3. Jaw Width: 125 mm ± 2 mm 209.5 Jaw depth: 70 mm ± 2mm
4. Jaw opening: 145 mm ± 2mm
5. Body should be made from shock resistant Cast Iron & should be free from sand holes.
6. Malleable Steel nuts for extra tough grip.
7. Jaw made of special carbon Steel (properly heat treated grinded). 209.10
8. Clamping force: 2600 K

134. Working model of Air Brake Assembly Two brake drums, vehicular air compressor driven by suitable Electric Motor, air dryer, brake chamber. stop light, different valves, air pressure gauges. With all accessories.

Basic Indicative Diagram

i. Air brake system of a truck Foot valve
ii. Two air reservoirs
2. Air dryer with unload-er valve Purge tank
i. Air filter
3. System protection valve Air compressor
4. Rear spring break chamber with hand brake chamber Hand brake valve
5. Two Front wheel assembly with following components
i. Brake Drum
ii. Brake Liner
iii. Anchor Plate
iv. Wheel Hub
v. Slake Adjuster
vi. Brake Cam
vii. Cam Roller
viii. Front Brake Chamber
ix. Return Springs
x. Air Pressure gauge for front and rear systems separately.
xi. The entire air brake system should be made working using high air pressure compressor head connected to 3 HP single phase motor with double belt pulley system. The Air compressor head should be connected to the air tank by UHP hose pipe.
6. Sturdy iron frame with NC spray painting.
i. Pneumatic connections to be with flexible Polyethylene Tubing of 12mm Outer Diameter
ii. Colored circuit/ Schematic diagram with la-belling/naming to be printed on to Aluminum cl-added Organic sun board.

135. Alternator assembly used for LMV Alternator (>50 Amp)

Basic Indicative Diagram

1. Brand-new item

b. Alternator with Aluminum body.

1. 12 V alternator with maximum out put current of 65Amps Regulating Voltage: 14.2+0.5V

2. Approx. weight 5.0 Kg with external fan and pulley Parts catalogue suitable sketch on Vinyl Board

136. Carburetor – Solex, Mikuny for dismantling and assembling Carburetor – Mikuny type for Dismantling and Assembling

Basic Indicative Diagram

1. Double barrel down draft carburetor should be of good quality

2. Type: Mikuny Type (any equivalent make) Parts Catalogue

Solex type for Dismantling and Assembling

1. Single barrel side draft carburetor, Carburetor should be of good quality Type: Solex Type (any equivalent make) Parts Catalogue

137. Chain Pulley Block-3 ton capacity with tripod stand 3 ton capacity with tripod Stand

Basic Indicative Diagram

1. Standard Lift 15 m
2. Throat Opening 23.2 mm
3. Capacity 3 Ton
4. Test Load 4.5 Ton
5. Length 182 mm
6. Load Chain Día 8 mm
7. Number of Fall 2
8. Effort Required to Lift Max Load 298 N
9. Head Room 532 mm
10. Width 174 mm
11. Net Weight 26 kg
12. Items in Pack
13. Tripod stand for chain pully block1 Piece
14. Size 3 mtr
15. Height 3 mtr
16. Max Load 3 ton
17. No Of Poles3

138. Cut section Model of Mock layout of a motor car Electrical system working model wiring with parts and accessories of a car to be arranged according to the electrical circuit of a car. Working of Self-starter, Alternator, Wiper Motor, Horn, lighting system, sparks from plug to be shown with Distributor & battery. Should be mounted on suitable table

Basic Indicative Diagram

I. Basic Electrical system of a Car II. Components
III. Self starter IV. Alternator
V. Wiper Motor VI. Horn
VII. Head lights VIII. Tail lamps
IX. Parking lamps X. Side indicators
XI. Brake light XII. Distributor
XIII. spark plugs XIV. Distributor
XV. Temperature switch XVI. Fuel Float
XVII. Combination switch
XVIII. The entire system should be working by 12V Battery & Alternator should be working by single phase AC motor for charging purpose.
XIX. Sturdy iron frame with NC spray painting.
XX. The model should have the colour printed circuit diagram to enhance the understanding of different connections.
XXI. The internal connections of different parts are also printed along with the circuit diagram, so that this should give a complete idea about the car body wiring system and also tracing the circuit should be made easy
XXII. All new parts and original wiring should be used to maintain the wire colour codes and originality
XXIII. Inbuilt battery should be provided along with the Model.
XXIV. An option for fault simulation of major circuits will be provided.
XXV. Cut section and working models such as Starter motor, Distributor, Alternator and horn assembly will have to be provided.

139. Cut section models of shock absorbers

Basic Indicative Diagram

1. Shock Absorber with metal body,

Component:

i. Damper

ii. Hydraulic Oil Area

iii. Rubber Seal

iv. Fluid return valve

v. Theshockabsorbershouldbesectionedsuchawaythatthefluidreturnvalveandthe

connections should be shown

vi. Colored circuit/ Schematic diagram with labeling/naming to be printed onto Aluminum cladded

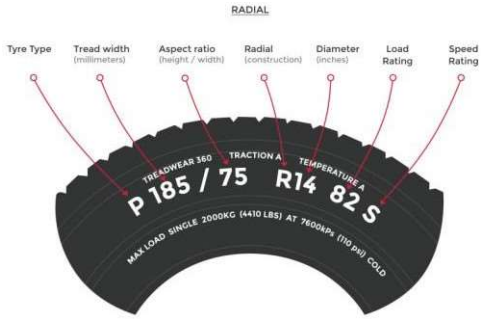
Organic sun board

vii. The Shock absorbers should be place on 25mm imported acrylic with metal frame for display of

Technical details and schematics.

140. Cut section of cross ply and radial tires

Basic Indicative Diagram



1. The entire model should be mounted on a sturdy iron frame Suitable color painting to be done

For different parts for easy identification with specific Vinyl Display Board.

2. Vinyl Display Board displaying Tire with naming.

141. Cut section working model of automatic transmission Gear box Sectioned to show the internal mechanism of forward and reverse speeds.

Basic Indicative Diagram

For Rear Wheel Drive Automatic Transmission with Aluminum body Should contain the following components

1. Gears
2. Clutch Plate
3. Oil Seal
4. Hydraulic Valve
5. Sensors
6. Bearing
7. Torque Converter
8. Turbine
9. Impeller
10. Input Shaft
11. Ring Gear

The sectioning should be done such that the internal details such as different clutch plate set up for speed variation and reduction planetary gear setup etc. with its connectivity should be clearly displayed by sectioning The painting should be carried out in such a way that different colours should be used for different components such a s identification of sectioned area etc. according to the colours code for easy identification of different systems and mechanisms. All the hardware's and gears should be suitably electro plated. The entire model should be mounted on sturdy iron stand with lock able caster wheels. Vinyl Display Board displaying complete Gear Box specifications with torque and clearance.

142 Cut section working model of centrifugal clutch assembly. Centrifugal Clutch sectioned to show the internal details

Basic Indicative Diagram

Centrifugal Clutch with Continuously Variable Transmission with following components

1. Gear box
2. Spring
3. Belt
4. Driven Pulley

*The sectioning will be done such that the internal detail s such a s different clutch plate set up for speed variation setup etc. with its connectivity will be clearly displayed by sectioning.

*The painting will be carried out in such a way that different colours will be used for different components such as identification of sectioned area etc. according to the colours code for easy identification of different systems and mechanisms.

*The model should be coupled with variable speed DC motor- 600 RPM (minimum).

By operating DC motor, the centrifugal clutch engagement and disengagement at high RPM & low RPM can be displayed.

*Helical gear is used to shift the clutch and the V shaped gear has multipleratios on it which keeps on changing and adjusting according to the slippage due to the higher RPM.

*All the hardware's and gears will be suitably electroplated.

*The entire model will be mounted on sturdy iron stand with lockable casterwheels Vinyl Display Board displaying complete Gear Box specificationswith torque and clearance.

143. Cut section working model of Diaphragm clutch assembly. Diaphragm Clutch sectioned to show the internal details

Basic Indicative Diagram

1. Clutch system of Car Assembly with following components
2. Fly wheel
3. Pressure Plate
4. Clutch Disc
5. Release Bearing
6. Clutch Cable
7. Clutch Pedal
8. The model should be connected to a foot pedal through necessary cable circuit, so that by pressing the pedal the clutch engagement and disengagement can be seen.
9. The clutch assembly should be sectioned to show the pressure plate, clutch plate re-leaser bearing etc. the sectioning should be done in such a way that the operation of the clutch is not hampered.
10. The entire model should be mounted on a sturdy iron frame
11. Suitable color painting to be done for different parts for easy identification with specific Vinyl Display Board.

144 Cut section working model of Single plate clutch assembly Single plate Clutch sectioned to show the internal details

Basic Indicative Diagram

Clutch system of Car Assembly (Coil spring type) with following component
1. Fly wheel
2. Pressure Plate
3. Clutch Disc
4. Release Bearing
5. Clutch Cable
6. Clutch Spring
7. Clutch Pedal

*The model should be connected to a foot pedal through necessary cable circuit, so that by pressing the pedal the clutch engagement and disengagement can be seen.
*The clutch assembly should be sectioned to show the pressure plate, clutch plate re-leaser bearing etc.
*The sectioning should be done in such a way that the operation of the clutch is not hampered.
*The entire model should be mounted on a sturdy iron frame Suitable color painting to be done for different parts for easy identification Vinyl Display Board displaying Clutch Assembly with naming.

145. Demonstration board of electronic Ignition system, ignition coil With HT coil, HT wires, Spark Plugs, ignition switch, coil, distributor, battery, and wiring.

Basic Indicative Diagram

The Electronic ignition system Module should be designed on the Good working condition Ignition system of an automobile four-wheeler, wherein the principle of operation and working of the same can be demonstrated.

The model should consist of the following

1. ECU (Electronic Control Unit)
2. Inductive Distributor
3. Ignition Coil
4. HT Wires
5. Spark Plugs
6. Suitable Battery

All parts and accessories should be arranged on to a Color printed board and the system should be made functional. The electrical circuit diagram with parts and its connection should be printed on to a color base.

This open demonstration working unit should be made from original parts such as Switches, Electronic ignition coil, Distributor, three spark plugs and a battery for Power source, with necessary wiring connections. By switching on the switch and by giving rotation to the Distributor, Sequential Sparks in the Spark Plugs can be demonstrated.

The above model should be fixed on Printed Circuit Sun Board with working Principal diagram.

146. Demonstration board of MPFI system with injectors, rail, inlet manifold, throttle body, distributor, purge valve, sensor, crank pulley, fuel tank module.

Basic Indicative Diagram

*Demonstration Board - MPFI System Basic Indicative Diagram

* The Instruction board should adopt the real components of Multi point fuel injection system (MPFI) to illustrate engine fuel system structure and working principle.

* The components should be rigged onto color circuit diagram and made functional. Real and opera table engine fuel injection system with partial engine block should be assembled onto a color printed board to illustrate the structure and working process Colored circuit diagram on the training Module printed on to 6mm organic glass base, where in the students can compare the diagram and actual diagram.

* Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, frequency and wave form signals should be provided on to the printed circuit diagram.

* The training module should be fitted with diagnostic socket (DLC) along with Scan tool to read fault codes, clear fault codes and read data stream.

* Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults.
*User can adjust the number and type of faults- Set the line break, grounding short circuit, improper contact or open circuit faults can be induced Good working condition Parts should be provided with fuel tank.
* The instruction board should be connected to 220V AC socket. The training module should be fabricated using steel pipe frame with spray painted.
* The entire setup is provided with caster wheels with brakes for easy movement of the same.

* Sensors namely, lambda sensor, engine speed sensor, cam position sensor, throttle position

Sensor

* Inlet manifold with pressure gauge

* Petrol injector

* Throttle body

* Canister purge valve

* ECU

* Small fuel tank

* Fuel pump

* Distributor

* Fuel injector

* Piping

* Ignition key

*MPFI sequence simulator with variable speed drive

147. Disk brake in working condition with caliper assembly with all parts Exhibiting Brake disc, Caliper assembly, tandem master cylinder, brake hoses, oil bottle, pedal, etc.

Basic Indicative Diagram

Good working condition item should be used
Complete front Disc brake system of Car contents following components
1. Caliper assembly
2. Master Cylinder
3. Brake Fluid Tank
4. High Pressure Pipe
5. Disc Pad
6. Brake Pedal

The model is made from two sets of Disc brake with caliper and master cylinderThe model is equipped with two discs with hubs, two master cylinder, twocaliper assembly, etc.
One side is made working another side is sectioned to show the innerconstruction details
The entire model should be mounted on a sturdy iron frameSuitable color painting to be done for different parts for easy identification.
Parts catalogue suitable sketch on Vinyl Board

148. Drum brake assembly in Working Condition Brake drum, tandem master cylinder, oil container, brake hose, brake pedal.

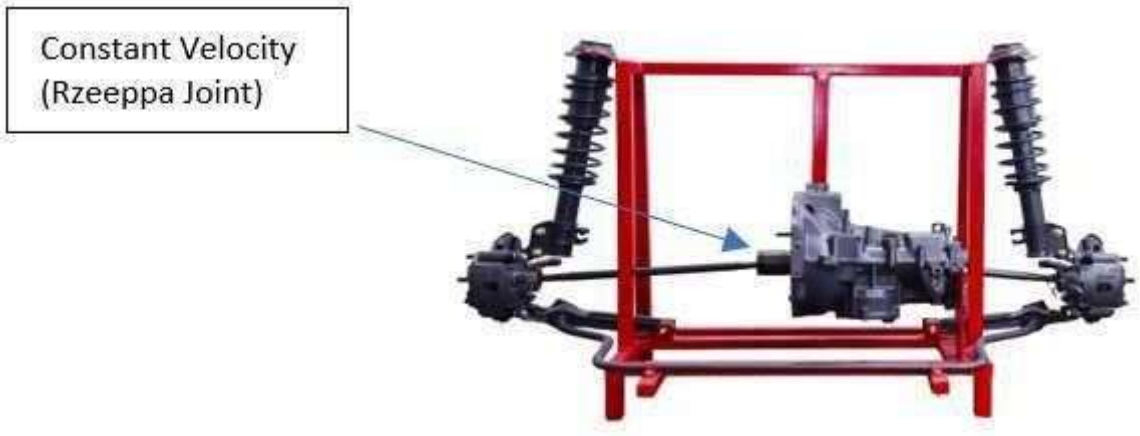
Basic Indicative Diagram

Good working condition item should be used
The assembly should consist of following components:
1. Brake system of Car
2. Hub Bearing Drum
3. Wheel Cylinder
4. Brake Shoe Brake self-adjusting system
5. Tandem Master Cylinder
6. Brake Fluid Tank
7. Brake Pedal
8. Metal flexible Pipeline

The model should be made from two sets of Drum brake and master cylinder
The model should be equipped with two drum brake with hubs, two master cylinder.
One side should be made working another side is sectioned to show the inner construction details.
The entire model should be mounted on a sturdy iron frame Suitable color painting to be done for different parts for easy identification. Parts catalogue suitable sketch on Vinyl Board

149. Front axle (Rzeeppa Joint) with stand for Dismantling and assembly Rzeppa joint of LMV.

Basic Indicative Diagram



Good Working condition item will be used Front wheel drive transmission

Re zipped Joint (Constant velocity joint) Tire end rod Front Suspension system Disc brake

Caliper assembly

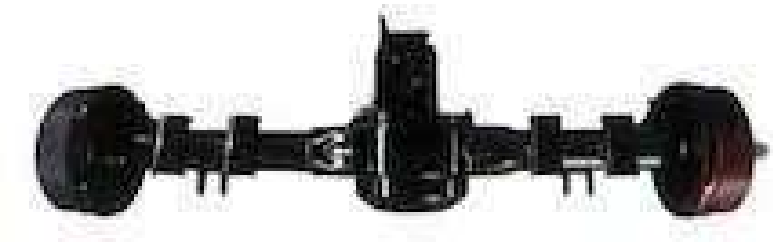
The above model should be mounted on paint finished metal stand with caster wheels.

Suitable color painting to be done for different parts for easy identification.

Parts catalogue suitable sketch on Vinyl Board

150. Full floating axle and semi- floating axle assembly Drum & axle casing should be With all components in working condition.

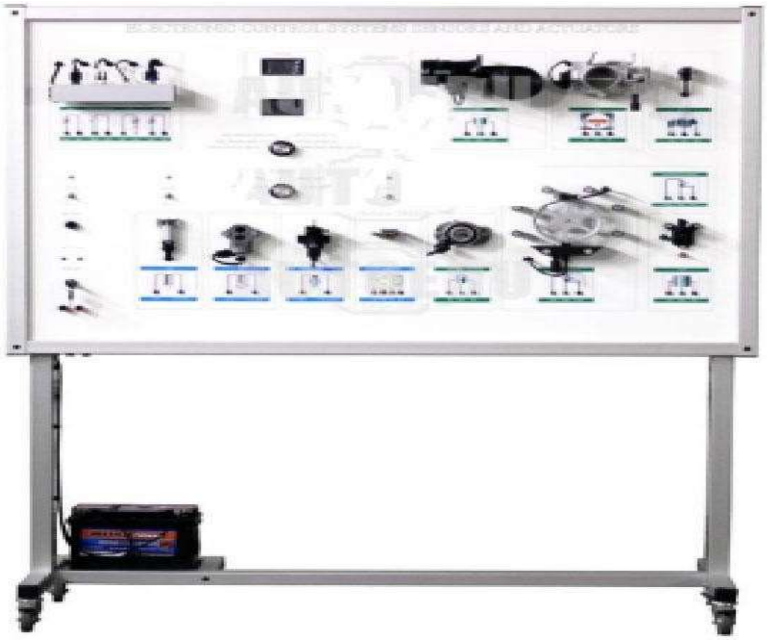
Basic Indicative Diagram



Good Working Condition item should be used
Fully Floating assembly should consist of following components:
1. Banjo Housing
2. Differential Gear Box
3. Brake Drum Assembly
4. Brake Shoe
5. Brake shoe cam
6. Axel
7. Wheel Hub Assembly
8. Should be mounted on suitable metal frame paint finish
9. Semi floating assembly should consist of following components:
I. Differential Gear Box
II. Brake Drum Assembly
III. Brake Shoe
IV. Wheel Cylinder
V. Axle **VI**. Axle housing **VII**. Rear axle body
VIII. Should be mounted on suitable metal frame, paint finish Parts catalogue suitable sketch on Vinyl Board

151. Functional/experiment model of different type of sensors. With Different type of sensors like Throttle Position Sensor, Manifold Absolute Pressure Sensor, Engine Coolant Temperature Sensor, Vehicle Speed Sensor, Oxygen Sensor, Crankshaft Position Sensor, Camshaft Position Sensor, Intake Air Temperature Sensor, Mass Air Flow Sensor, Knock Sensor with ECU.

Basic Indicative Diagram



* Demonstration Board - Functional/experiment model of different type of sensors Basic Indicative Diagram
* The Instruction board should adopt the real components of Functional/experiment model of different type of sensors to illustrate engine fuel system structure and working principle.
* The components should be rigged onto color circuit diagram and made functional. Real and opera table SENSOR
* Detection terminals for operator to detect various sensors, actuators, electrical signals for Engine control unit, such as resistive, voltage, current, frequency and wave form signals should be provided on to the printed circuit diagram.

* The training module should be fitted with diagnostic socket (DLC) along with Scan tool to read fault codes, clear fault codes and read data stream.
* Fault setting switch bank will be provided to induce faults in the training module to Demonstrate the fault and to diagnose faults.
*The instruction board should be connected to 220V AC socket. The training module should be fabricated using steel pipe frame with spray painted.
* The entire setup is provided with caster wheels with brakes for easy movement of the same.
* Air pressure sensor
* Camshaft position sensor
* Crankshaft sensor
* Engine controller
* Fuel injector and rail assembly
*Fuel pressure sensor
* Rail pressure regulator
* Sensor assembly MAF
* Speed sensor assembly
* Water temperature sensor
* Fuel delivery system consisting of:
* Small fuel tank
* Fuel pump
* Distributor
* Common rail with fuel injector
* Piping
* Ignition key

152. Steering assembly –

1. Rack & pinion 2.Worm & roller 3. Recirculating ball 4.Power steering 5. Electric Assisted Power Steering

1. Rack & Pinion with steering wheel, column, tie rod end.
2. Worm & Roller steering assembly with drop arm.
3. Recirculating Ball steering with pitman shaft and drop Arm.
4. Hydraulic working power steering with steering wheel, column, flow pipe, hydraulic pump, oil reservoir.
5. Electric Assisted Power Steering with Rack and pinion, Electric Motor and Motor Control Module

Basic Indicative Diagram

Hydraulic working power steering with All accessories (steering wheel, column, flow pipe, hydraulic pump, oil reservoir)

Good working condition item should be used Set of Two Power Steering (Hydraulic & Electronic)

Hydraulic Power Steering Assembly with stand Hydraulic pumps assembly

I. Pressure pipe
II. Return pipe
III. Pump reservoir
IV. Steering column
V. Rack assembly with control valve
VI. Tie end rod
VII. With heavy duty suitable stand

Electric Assisted Power Steering

Electric Assisted Power Steering
I. Rack and pinion
II. Electric Motor
III. Motor Control Module

*Both models should be mounted on independent sturdy iron frames Suitable color painting to bed one for different parts for easy identification. Parts catalogue suitable sketch on Vinyl Board With heavy duty Suitable Stand

Basic Indicative Diagram

Rack And Pinon Steering Assembly

Good working condition item should be used Should consist of
I. Rack & Pinion Steering assembly
II. Rack Shaft with Pinion
III. Steering Column
IV. Tie Rod End.
The entire model should be mounted on a sturdy iron frame Suitable color painting to be done for different parts for easy identification. Parts catalogue suitable sketch on Vinyl Board
*With heavy duty Suitable Stand.

Basic Indicative Diagram

2. Worm & Roller steering assembly with drop arm

Good working condition item should be used Should consist of
I. Re-circulating ball type Steering assembly-
II. Re-circulating ball with nut and sector cross shaft
III. Drop Arm steering column

The entire model should be mounted on a sturdy iron frame
*Suitable color painting to be done for different parts for easy identification. Parts catalogue suitable sketch on Vinyl Board
*With heavy duty Suitable Stand

Basic Indicative Diagram

3. Recirculating Ball steering with pit man shaft and drop Arm.

This part should be suitably reconditioned and supplied Should consist of:
I. Steering column assembly,
II. Worm and roller
III. Drop arm
The entire model should be mounted on a sturdy iron frame Suitable color painting to be done for different parts for easy identification. Parts catalogue suitable sketch on Vinyl Board

153. Synchronous Gear box with stand for Dismantling and assembly Gearbox with 5 Gear Forward & 1 Reverse

Basic Indicative Diagram

Cut Section Model of Synchronous Transmission Gear Box Basic Indicative Diagram For Rear Wheel Drive Synchronous Transmission with Aluminum body Should contain the following components
*Synchronous Gears (**5 Gear Forward & 1 Reverse)**

*Clutch Plate and pressure plate assembly

*Oil Seal

*Bearing Input Shaft

*Ring Gear The sectioning should be done such that internal details of different synchronous units sets of speed variation and reduction should be seen.

The colouring should be in proper manner that the transmission of the every gear should be seen .

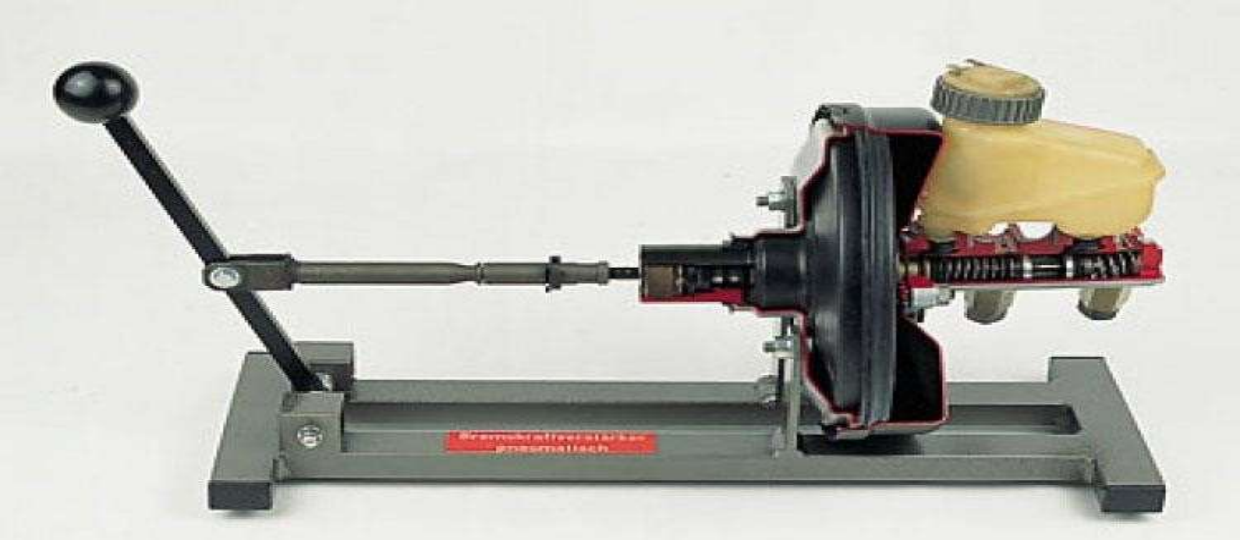
*All the shifting mechanism and gears shifting rings should be suitably electroplated.

*The entire model should be mounted on sturdy iron stand with lockable caster wheels. Vinyl Display Board displaying complete Gear Box specifications with torque and clearance

*With heavy duty Suitable Stand

154. Tandem master cylinder with booster Working model

Basic Indicative Diagram



TANDEM MASTER CYLINDER
BRAKE OIL STORAGE (200 ML TO 500 ML)
BOOSTER ATTACHED
BRAKE LINKAGE WITH RUBBER BOOT

* The entire Cut Section model should be mounted on sturdy iron stand with lockable caster wheels.

* Vinyl Display Board displaying complete Tandem master cylinder with booster Working model

* All the Parts and components should be suitably electroplated.

*Vinyl Display Board displaying complete brake system specifications with torque and clearance With Heavy duty suitable stand

155. Tubed tire of car, trucks & motorcycle

Basic Indicative Diagram

Car Tyre Specification: 165/65 R13, R16, 77T Tube Less Tyre, Radius 15 inch. High Performance Tyre. Tyre Weight 10-15 kg.

Truck Tyre Specification: 315/80 R22.5 Radial Tyre 156/150L 20 Ply , 315/80 R22.5 Cross Ply Tyre 156/150L 20 Ply

Motor Bike Tyre Specification: Front Tyre 90/90 R17 Tubeless / Tube Tyre

Rear Tyre 130/90 R15 Tubeless / Tube Tyre

Features

*Aggressive wide lateral grooves

*Variable draft groove technology

*Deeper grooves

*Tougher sidewalls

***TUBE**

*The majority of inner tubes will be made of butyl rubber. It's the least expensive material and also the most robust. A butyl tube will be black and is repairable with a standard puncture kit if you geta flat.

156. Tubeless Tyre of cars & trucks

Basic Indicative Diagram

As per trade Requirement

*Car Tyre Specification: 165/65 R13, R16, 77T Tube Less Tyre, Radius 15 inch. High Performance Tyre. Tyre Weight 10-15 kg.

* Truck Tyre Specification: 315/80 R22.5 Radial Tyre 156/150L 20 Ply, 315/80 R22.5 Cross Ply Tyre 156/150L 20 Ply

157. Tyre & split rim wheel assembly

Basic Indicative Diagram

As per trade Requirement

*Truck Tyre Specification: 315/80 R22.5 Radial Tyre 156/150L 20 Ply, 315/80 R22.5 Cross Ply Tyre 156/150L 20 Ply

*Rim Specification: Pressed Alloy Iron Construction with appropriate tyre specification

158. Working Model of power windows Showing parts like door, glass with motor and its gear arrangement and operating switch.

Basic Indicative Diagram

Should be the Driver side door assembly

The Door assembly should be suitably sectioned, to show the working of power window motor, glass plane, window lift mechanism etc.

A battery should be connected to the door assembly with suitable wiring and original door switch should be provided on the door pad and by operating the switch the model can be demonstrated.

The entire model should be mounted on a sturdy iron frame

Suitable color painting to be done for different parts for easy identification. Parts catalogue suitable sketch on Vinyl Board

159. Working model of torque converter Model of LMV

Basic Indicative Diagram

It should be supplied as a set of two pieces, Complete torque converter & cut section of converter. Both torque converters can be old but should be in good condition.
Complete torque converter
It should be sealed and mounted on paint finished sturdy iron frame with handle for rotating.
Cut section of converter
It should display the internal details such as the stater-turbine, rotor, Impeller, Tarring ton bearing (one side rotating) and springloaded clutch-plate.
By rotating the handle provided, starter, rotor, turbine, etc., can be operatedand demonstrated.
The entire model should be mounted on a suitablebase.
Parts catalogue suitable sketch on VinylBoard

160. Air conditioned CRDI Vehicle in running condition -LMV New vehicle with CRDI engine,04 strokes, 04 cylinders, BS-VI, fitted with air condition.

Basic Indicative Diagram

LMV Specification:
*Maximum Power: 55 - 65 BHP @ 3000 - 3200 rpm
*Maximum Torque: 180 - 200 Nm @ 1200 - 1500 rpm
*Engine Type: BS IV - BS VI, CRDI Turbo Charge with EGR, SOHC / DOHC
*Engine Description: 2.0L to 2.8 L (2000cc to 2800cc)
*No. Cylinders: 4 Cylinder In-line
*Gear Box: Manual 5 Forward And 1 Reverse
*Drive Type: Rear Wheel Drive
*Clutch and Clutch operation type: Diaphragm Type with Hydraulic operated
*Ground Clearance: Above 150mm
*Steering Type: Power Assisted (Hydraulic or Electric)
*Turning Radius: 4.8 to 5.8 meter
*Wheel Size Radius: 15 inches
*Seating Capacity: 6 + 1
*Air Condition
*Air Bag at Front
*Antilock Braking System (ABS)
*Power Window: Front and Read
*Front Brake Type: Disc
*Rear Brake type: Drum or Disc
*Front Tyre Type and size: Radial 215 / 75 R16 Tubeless or Tube Tyre
*Rear Tyre Type and size: Radial or Cross ply 215 / 75 R16 Tubeless or Tube Tyre
*Digital Dash Board
*Safety Seat Belts for front and rear
*Company Fitted Center locking feature.
*Rear view mirror both side*Fuel Tank Capacity 40 liter and above.

161. Arbor press hand operated 2 Ton capacity

Basic Indicative Diagram

* For riveting, squeezing, punching, bending, and other pressing applications

* Base drilled for mounting on bench or pedestal

* Sturdy, cast-iron construction

* Removable machined steel anvil provides accurate work support in four slot positions

*Rugged steel ram is driven by machined pinion

* All the hardware's and parts will be suitably electroplated.

*Approx. cap -2 Ton

* Throat Depth & Over Base- 7 1/2"&12 ½

*Max Día Work- 15''

* Ram Size x Lg- 1 1/2" Sq. x 18"

*Leverage Ratio- 50:1,

*O'all press Ht -21 1/2",

*Base Size (Lg.*Wd) -8" x 18"

162. Automotive exhaust 5 gas analyser and Diesel Smokemeter (for petrol & Diesel) Exhaust 5 Gas Analyzer Petrol ARAI approved to check CO, CO_2, O_2, and HC& NO. Diesel Smoke Meter ARAI approved.

Basic Indicative Diagram

1 Compliances: Conforms to ISO 3930

2 CO (Carbon Monoxide): Range 0 - 15% ,	Resolution 0.01%
3 CO2 (Carbon Dioxide): Range 0 - 19.9% ,	Resolution 0.01%
4 HC (Hydro Carbon): Range 0 - 20000 PPM,	Resolution 1 PPM
5 O2 (Oxygen): Range 0 - 25%,	Resolution 0.01%
6 NOx (Oxides of Nitrogen): Range 0 - 5000 PPM,	Resolution 1 PPM
7 Lambda : Range 0.20 to 2.00	Resolution 0.001
8 Engine RPM (Battery based): Range 400 to 9990 RPM	Resolution 10 RPM

9 Operating temperature :+5°C to +45°C

10 Measuring gas intake:3 Litres/minute

11 Leak test: Electronic

12 Condensate discharge :Automatic

13 Response (for Sample probe length of 3m) : < 15 Sec.

14 Warm-up time @25°C & above : < 3 minute

15 Zero calibration : Automatic

16 Span calibration : Digital

17 Power Supply :12V DC ±2V battery 100-265V AC, Single phase, 50-60Hz

18 Power Consumption : 25W

19 Should have the following Features

- NDIR (Non-Dispersive Infra-red) Technology
- Engine RPM measurement facility
- 7 Segment LED display
- Automatic zero calibration
- Digital span calibration
- RS232C serial port for PC interface
- NOx measurement
- Engine oil temperature measurement
- DC operation suitable for “Road tests” using vehicle battery
- Display of Lambda / AFR / PEF.
- Petrol / CNG / LPG selection.
- Indication for Low / High flow.
- Indication for battery Low / High voltage.
- Electronic leak check facility.
- Gas scrubber for cleaning of impure particles.
- Hydro Carbon residue test.

20 Accessories

- Sampling probe Assembly
- Inductive Pick up and Cable Assembly
- Battery Cable (for DC Operation)
- Gas Scrubber Kit
- Gas Test Software and USB Cable

Diesel Smoke Meter

1 Basic Indicative Diagram

Compliance : IS4553

3 Opacity: Range 0 - 99.9% Resolution - 0.10%

4 K-value : Range 0 - 9.99m1 Resolution - 0.01m;

5 Linearity: Range ± 0.1m^{1}

6 Repeatability: Range ± 0.1m^{1}

7 Zero & Pan drift: Range ± 0.1m^{1}

8 Response time – Physical : Less than 0.4 Seconds

9 Response time – Electrical : Less than 1 Millisecond

10 Warm-up time @25°C & above: Less than 7 Minutes

11 Engine RPM (Battery based) : Range 400 - 9990 RPM Resolution -10 RPM

12 Oil Temperature: Range 0 - 150°C Resolution -1°C

13 Operating temperature: Range +5°C to +50°C

14 Smoke Measuring cell length : 215mm (430 mm folded length)

15 Power Supply : 12V DC ±2V battery 100-265V AC, Single phase, 50-60Hz

16 Power Consumption : 300W AC

17 Features

- Suitable for free acceleration test.

- Engine RPM measurement – Vibration sensor based and Battery based.
- Engine oil temperature measurement.
- Operates on 230V AC (or) 12V DC power supply.
- Portable, Compact & light weight design, suitable for “Road tests” using vehicle battery
- Low & High voltage indication for battery operation.
- Automatic Zero and Span calibration.
- Automatic Pressure regulation and moisture separation.
- Handheld, Menu driven LCD remote control unit.
- Pass / Fail indication and emission limit in printout.
- Vehicle no., vehicle specification, operator name and test data in printout.
- RS232C serial port for PC interface.
- Accelerometer based RPM measurement
- 4 Digital LED Display

18 Standard Accessories

- Smoke Sampling Hose
- Oil Temperature Probe
- Smoke Sampling Probe ID 16mm
- Battery Cable (For DC operation)
- Smoke sampling probe ID 10 & 22.5 mm & Vertical exhaust extension pipe
- Smoke test software & RS232 Interface cable

163. Diesel Engine – CRDI - 4 stroke for Dismantling and Assembling with Swiveling Stand. Latest 4 Stroke 4 cylinder turbo charged CRDI Engine, 800-1600cc, in running condition, With ECM, BCM (optional), and all sensors, wiring, fuel feed & cooling system & instrument cluster.

Basic Indicative Diagram

The model should be made with two stand setups wherein one stand should be mounted with which can be rotated 360 degrees on the stand, so that's lowly rotating the handle provided the engine can be rotated and lock and any position and angle to enable the students to assemble or dismantle then engine.

A large oil drip pan should be provided at the bottom to collect the small screws, parts and oil dripping.

The rotating stand is made from steel tube with gears for slow speed operation along with self-retention wheels.

The Paint finished rotating stand should be provided with heavy duty caster wheels with brakes.

The other stand should be fitted with cooling system, exhaust system with Catalytic converter, Fuel system and engine starting system.

Byconnectingthetwostandstogetherwithallnecessaryconnectionsuchasradiatorconnection, fuel line, electrical connections etc. the engine can be started and made to work.

So that the students should understand the fitting and connections involved inthe engine starting, also they can check and confirm the reassembling of the engine assembly.

By disconnecting the stands, the engine can be dismantled for practice.

First trolley should contain – Radiator assembly with contain Battery & Dashboard fuel tank with wiring harness Second trolley should contain – Engine with Swiveling stand. Diesel Engine CRDI: 4 Cylinder, turbocharged diesel.

Aluminum engine head and cast-iron block,

Bore: 70 - 90mm

Stroke: 80 - 110mm

Displacement: 1186 - 1493CC

Compression Ratio: (16-22:1)

Maximum Power: 70 - 110 HP at 2200-

4000 RPM Valve Gear: 4 per Cylinder

DOHC, Ignition & Fuel System: Common Rail Direct

Injection Cooling System: Water Cooling

Fuel Tank: 10 Liter including fuel gauge

164. Diesel engine (Running condition) Stationary type single cylinder Single Cylinder, OH valves, fuel tank with handle, fuel feed, water cooling, oil pump

Basic Indicative Diagram

1 4 stroke Single Cylinder
2 10 HP Air Cooled stationary type diesel engine running condition
3 Four stroke, single cylinder fitted with suitable metal stand.
4 The system should consist of
4.1 OH valves
4.2 Fuel tank 10L, Air filter
4.3 Complete fuel system
4.4 Starting, exhaust systems (Silencer with manifold and tail pipe)
4.5 Starting handle
4.6 Water Cooling system
4.7 Air Pump
***Cylinder Single Cylinder**
*Cubic Capacity 0.553 L
*Bore X Stroke 80X110 mm
*Speed 1500 rpm
*Torque at Full Load 2.387 Kg-m

165. Hydraulic jack HI-LIFT type 3 ton capacity, and 5 Ton capacity

Basic Indicative Diagram

* Dual-spring cylinder return system
*Heavy Steel and cast-iron body
* 3-Ton weight capacity trolley type.
* Maximum Height: 385 mm
* Minimum Height: 135 mm
* Length of Trolley Jack: 124 cm
* Breadth of Trolley Jack: 15 TO 18 cm
* Rust and Water-resistance
* Great operating range
* Very safe during operation
*5-TON weight capacity trolley type
* Maximum Height: 560 mm
* Minimum Height: 140 mm
* Length of Trolley Jack: 124 cm
* Breadth of Trolley Jack: 20 cm
* All the hardware's and parts should be suitably electroplated or Power Coated.

166. Multi Scan Tool To scan Engine, ABS & EBD, AT, SRS, Body Control and immobilizer Should perform automotive sensor simulation test specially designed to diagnose and simulate vehicle sensor faults for sensors like MAP sensor, Intake air temperature sensor, TP sensor etc.

Basic Indicative Diagram 

1. Multi Scan Tool with Android based operating system. Should have display of minimum size 10" sunlight readable touch screen with CPU of1.2 GHZ quad core and 2GBRam.Memory capacity should be of min 16GB to accommodate entire diagnostic software application and diagnostic data.
At least7000mAH lithium polymer Battery. Should have front and rear camera for taking photo of components.
2. Should have wireless Connectivity with car. Should have solid and rigid design.
3. Should have demo mode to teach students diagnostic functionality without actually connecting car with scanner.
4. Shouldconnectwithwirelessprintersuppliedwithscannertoprintthetroublecodes. Should have a function of recording live data streaming which can be played at any time.
5. Should have actuation test functionality to test component without running the engine.
6. Should support freeze frame data function. Should allow access to diagnostic community. Customer management for the workshop.
7. Special functions: key matching, key coding, key programming, battery reset, break reset
8. Remote diagnosis & maintenance.3 channel oscilloscopes to show result of vehicle's sensor or actuator circuits and visualizes the signals in the graphic wave forms in scanner's hardware itself.
9. Should have all diagnostic adaptor for all Asian, European and USA brands available in India
10. One click updates online via Wi-Fi.
11. BuiltincarrepairproceduredatabaseandcarrepairtipsapplicationatleastforIndian cars.
12. Should have digital multi meter function that performs the measurement of voltage, resistance, frequency and display it in scanner screen itself.
13. Should have function of sensor testing by sensor simulation test like manually drawn waveform simulation test, predefined sensor's wave form simulation test, DC voltage simulation test, frequency simulation test etc. to find engine sensor faults quickly.
14. Manual should be provided in English all Indian andImports vehicles. Fault finding manual all Indian and Imports vehicles.

67. Spring tension tester Manually operated with analogue display.

Basic Indicative Diagram

* The machine is table mounted & hand operated.
* Load measurement.
* Standard displacement resolution is 0.01 m
* Tension Shackles & Compression plates are provided for Tension & Compression springs
* Loading accuracy well within ±1%, conforms to IS:1828 / BS:1610.
* The module should be fabricated using steel pipe frame with spray painted.
* The entire setup is provided with caster wheels with brakes for easy movement of the same.
* Maximum Capacity: 100 kg / 1000 N.
* Type of Spring: Tension & Compression.
* Free length of tension spring: 100 mm.
* Diameter of compression spring: 80 mm.
* Maximum Cross Head Travel-without sample/grip: 100 mm.
* Force Measuring Resolution: 0.02 kg (20gms)/0.2 N.
* Suitable dial Gauges and Scale

168. Trolley type portable air compressor Belt driven compressor along with accessories

Basic Indicative Diagram

Specifications

Product Category

Mobile Air Compressors (with suitable wheels)

Compressor Technology

Reciprocating Piston

Power Source

AC Three Phase (optional feature);

Lubrication Style

Lubricated

Mass Flow Capacity

9.7 to 202 SCFM (16.49 to 343 m^3/hr)

Discharge / Operating Pressure

0 to 175 psi (0 to 123 m H2O)

Horse Power

1.5 to 35 HP

Mounting

Skid / Base Plate Mounted (optional feature); Tank Mounted (optional feature)

The entire setup is provided with caster wheels with brakes for easy movement of the same.

Features

Multistage (optional feature); 2 Stage (optional feature) and 10 mtr air hose pipe with valve FRL UNITDRIVEN BELT and tire nipple

With Safety valve, air filter, Guard, drain valve, Pressure gauge, auto cut-off switch

169. Working Condition of Diesel Engine – CRDI - 4 stroke Engine, Assembly with fault simulation board Latest 4 Stroke 4 cylinder turbo charged CRDI Engine, with ECM, BCM and sensors, wiring, fuel feed, cooling system& instrument cluster. Fault setting bank for minimum 8 sensors and with diagnostic socket & Scanner to read the faults. Engine management circuit diagram to be printed on the panel board.

Basic Indicative Diagram

1 The system should be is designed based on latest technology diesel engines with Common rail direct fuel injection system.

2 The trainer should help to simulate engine start up, speedup, slowdown, and other actions so as to illustrate the structure and working principle of CRDI engines.

3 Real and operating CRDI Diesel engine, illustrating the structure and working process.

4 Specifications

4.1 Diesel Engine CRDI: 4 Cylinder, turbo charged diesel.

4.2 Aluminum engine head and cast-iron block, Bore:70- 90mm

4.3 Stroke: 80 - 110mm

4.4 Displacement: 1186 - 1493CC

4.5 Compression Ratio: (16-22:1)

4.6 Maximum Power: 70 - 110 HP at 2200- 4000 RPM

4.7 DOHC, Fuel System: Common Rail Direct Injection Cooling System: Water Cooling

4.8 Fuel Tank: 10 Liter including fuel gauge

5 Colored circuit diagram on the training Module printed on to 6mm organic glass base.

6 Detection terminals for operator to detect various sensors, actuators, electrical signals for engine control unit, such as resistive, voltage, current, frequency and wave form signals are provided on to the printed circuit diagram.

7 Automobile meters are fitted on to the training module along with the printed circuit diagram, to demonstrate engine speed, temperature, fuel pressure, charging light etc.,

8 The training module is fitted with diagnostic socket (DLC) for universal automobile decoder (Scan tool) to read fault codes, clear fault codes and read data stream.

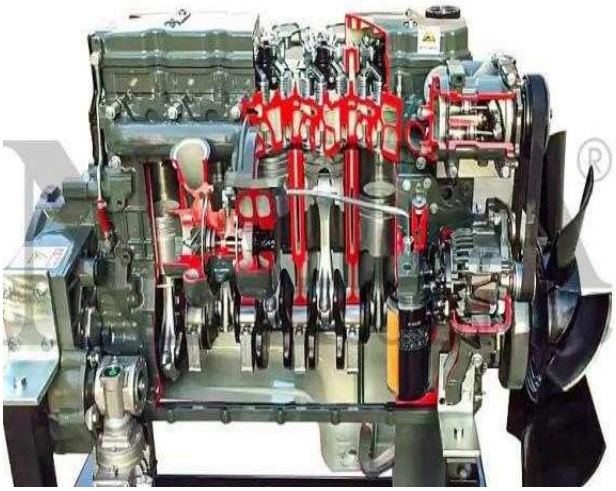
9 Fault setting switch bank will be provided to induce faults in the training module to demonstrate the fault and to diagnose faults.

10 Good working condition engine will be provided with fuel tank and battery. Throttle control is provided on the module to accelerate.

11 The training module should be fabricated using steel pipe frame with spray painted for good looks and the entire setup is provided with caster wheels with brakes for easy movement of the same.

170. Cut section of 4/6 cylinder diesel engine in moving condition to show movement of internal parts 6 cylinder diesel engine in working condition to show movement of internal parts

Basic Indicative Diagram



* The cutting should enable the moving parts like connecting rod, piston, valve & spring, pump, crankshaft, Timing gear / chain etc. are visible Internal components – timing gears, chain, hardware (bolts & nuts), push rod should be chrome plated Inlet Valve & Outlet Valves should be painted differently.
* Cooling system in sectional - radiator, water pump, elbow, water jackets and Thermostat Valve. Lubricating System in sectional - oil pump, oil filter, oil chamber.
* Fuel Supply system in sectional - Fuel injection pump (CRDI), injector (only two injectors cut), air cleaner, intake manifold. Exhaust system in sectional - exhaust manifold, silencer catalytic converter. Electrical system in sectional - starter & Alternator.
* The following movable & stationary parts should be visible.
* Cylinder Head, Engine Block, Piston, Rings and Connecting Rod ,4 Rocker Shaft Assembly.

Crank Shaft, Timing Gear, Fly Wheel, Valves, Cam Shaft, Tappet & Push Rod, Oil Pump
Suitable Electric motor drive with reduction gear to be provided to understand moving parts of engine. 1. RGB-LED lighting to show the working of four strokes (inlet in white, compression in blue, power in orange and exhaust in red) should be done for all cylinders. Different color painting to be done for different systems (Intake- Dark blue, Exhaust Red, Coolant- Light blue, Oil- Yellow, cut area- Signal red) Necessary parts of engine should be attractively colored for better understanding. Whole assembly should be mounted on suitable metal stand. Vinyl Display
Board displaying complete Engine specifications with engine torque and clearance

171. Diesel Engine six Cylinder in running condition Latest Diesel Engine CRDI 4 Stroke 6 Cylinders, Turbocharged Engine in running condition. All sensors, wiring, fuel feed, cooling system & instrument cluster

Basic Indicative Diagram

Diesel Engine with all required accessories like Starting system, Fuel feed system, Cooling System with reserve tank, charging system, Lubrication system, Exhaust System with Catalytic converter including exhaust brake and Air intake system Should consists of Battery, Starter motor, Alternator, Fuel injection Pump (inline type), injector, fuel tank, water, separator, fuel filter, radiator, cooling fan, oil filter, oil pump etc.in working condition.
Engine should be mounted on M.S. Sturdy frame having four caster wheels for easy shifting and a panel board fitted on a frame having Fuel meter, Temp. Meter, Oil Pressure, Amp meter & RPM Meter (Digital) fitted in a panel board. Acrylic Sheet should be provided at the back side of the panel board for easy view of wiring. Engine should be start from panel board by ignition switch and it should be in a running condition with speed controlled from panel board with Engine full specification board with engine torque, including clearance.
Engine Specifications:
Type: 4 Stroke cycle, six-cylinder CRDI turbo charged inter cooler, water cooled Piston Displacement:4500 CC to 6000 CC No. of Cylinder: 6
Max. Output (BHP): 100 to 150 KW at 2000 to 3000RPMTorque: 450 to 600 NM at 1200 to 2000 RPM, Fuel Tank Capacity: 30 Lit to 40Lit, Battery: 12 Volts.

172. Air bag simulator Driver & Co Driver Air Bags, Seat belts with front seats, crash sensors, air bag ECU, Wiring Harness

Basic Indicative Diagram

1. The Instruction board should adopt the real components of Air bag system to illustrate Air bag safety system structure and working principle.
2. Real and opera table Air bag system should be assembled along with colour printed board to illustrating the structure and working process.
3. The model should be equipped with seat cart, seat belt for actual working principle of the system.
4. The Vehicle Crash should be Simulated by pushing and hitting the crash sensor along the seat cart provided to demonstrate the quick airbag inflation.

b. A person should be able to sit in the seat cart secured with seat belt.

1. By pushing the seat cart and colliding, the air bag should explode and a real feel of collision should be experienced with air bag safety.

c. The training module should be fabricated using steel pipe frame with spraypainted. Option for floor grouting should be provided.

173. Air conditioning service Unit (Car) Suitable for R134A. Recovery with vacuum pump, automatic drain & stop after recovery.

Basic Indicative Diagram

1 Service Processes

1.1 Refrigerant Extraction and Recycling: Fully Automatic

1.2 Draining Old Oil : Automatic

1.3 Evacuation/ Creating Vacuum: Automatic

1.4 Vacuum Check / Leak Check: Automatic

1.5 Fresh Oil Filing: Automatic

1.6 Refrigerant Filing: Automatic

2 Operation and Display

2.1 Process Control: User friendly display

2.2 Display: 5 inch color touch screen

2.3 Pressure Gauge for HP/LP (100 mm): Should be available

2.4 Manual Evacuation Time Adjustment: Should be available

2.5 Status Display: 72 A/audio

2.6 Maintenance Tasks Display: Static Diagnosis

2.7 Printer: Should be provided

2.8 UV dye injection should be provided

3 Recovery/ Recycling/ Recharge

3.1 Refrigerant: R134a

3.2 Internal Reservoir (Refrigerant Bottle): 12 liters

3.3 Compressor: 1/3HP

3.4 Vacuum Pump Power: 51 L/min

3.5 Refrigerant Filling Accuracy: ± 10 gm

4 Features

4.1 Filter in recovery line to eliminate humidity & acidity

4.2 Manual air purge from refrigerant tank

4.3 Automatic High pressure protection for Compressor

4.4 Audible indication / alarm

4.5 Caution & error message / prompt

4.6 Self diagnosis for checking the fitness of the machine

4.7 Check valves to facilitate quick, easy & safe servicing

4.8 Vehicle data base (up to 500 vehicles)

4.9 Software update through USB interface

4.10 Vehicle data update through USB interface

4.11 Shock proof protection for load cells

4.12 Quick coupler provision for new oil & used oil bottle

5 General Equipment Data

5.1 Power Supply: 230 V

6 Standard Accessories

6.1 Service Hoses HP/LP

6.2 Quick Connectors HP/LP

6.3 Oil Bottles - 2 Nos.

174. Four stroke petrol engine with CNG setup-working condition Latest 4 Stroke 3/4 cylinder MPFI Engine in running condition 800-1600cc with ECM, BCM (optional) and all sensors, wiring, fuel feed system, cooling system& instrument cluster with CNG/ Petrol selection switch on Panel. N.B.: If ECM and BCM are available as one control unit can be purchased instead ECM, BCM as separated.

Basic Indicative Diagram

The Four stroke Petrol Engine with Company approved CNG setup, All the fittings of the engine along

with radiator, silencer, air filter, starter, battery, alternator, indication meters, fuel tank,

CNG setup with CNG tank, electrical wiring with ignition switch etc. CNG tank should be removable.

Fully filled CNG tank should be supplied along with the setup. All mounted on to a sturdy C section

iron frame with caster wheels (mobile trolley) Engine Type: 4 Cylinder, naturally aspirated petrol

engine.

Bore: 70 - 90 mm Stoke: 65 - 110 mm

Displacement: 1000 - 1200CCCompressionRatio:(8-15: 1)

Maximum Power: 50-80 HP

Valve Gear: 4 per Cylinder SOHC, Fuel supply system: MPFI

Ignition system: Spark Ignition Cooling System: Water Cooling

Fuel Tank: 10 Liter with fuel gauge

5.6.11 CNG Cylinder: 8 Kg with gauge with suitable fore filling purpose All the required accessories like meter, fuel tank,

radiator etc., along with the engine should be arrange on Frame with its original fittings with rubber damp and clamps to nullify the vibrations.

The wiring for the sensors, indication meters etc., should be connected properly so that after cranking the ignition, the engine should start working, the indications such as alternator charging, oil pressure, temperature etc., should be displayed on the necessary indication display board attached.

MPFI engines should be fitted with all necessary sensors, injectors and other MPFI accessories, ECU etc., which should be duly connected by its original wiring harness and should be made to work along with necessary indications.

175. Heavy Commercial vehicle Fitted with Latest 06 cylinder CRDI diesel engine with all parts and accessories. (without body on frame)

Basic Indicative Diagram

HCV Specification:
*Maximum Power: 180 to 250 BHP @ 2000 - 2800 rpm
*Maximum Torque: 660 - 850 Nm @ 1200 - 2200 rpm
*Engine Type: BS IV - BS VI, CRDI Turbo Charge with EGR, SOHC / DOHC
*Engine Description: 5.0L to 6L (5000cc to 6000cc)
*No. Cylinders: 6 Cylinder In-line
*Gear Box: Manual Synchronize 6 speed gear box GB900 -GB960
*Drive Type: Rear Wheel Drive 4 x 2
*Clutch and Clutch operation type: Diaphragm Type with air-Hydraulic assisted.
*Steering Type: Power Hydraulic steering with Tilt and Telescopic.
*Wheel Size Radius: 315 / 80 R22.5 (156/150)
*Air Anti-lock Braking System (ABS)
*Front Brake Type: Disc Air Brakes
*Rear Brake type: Drum or Disc Air Brakes
*Front Tyre Type and size: Radial 315 / 80 R22.5 Tubeless or Tube Tyre
*Rear Tyre Type and size: Radial or Cross ply 315 / 80 R22.5 Tubeless or Tube Tyre
*Digital Dash Board Cluster
*Safety Seat Belts for front
*Rear view mirror both side
*Maximum Speed 80 kmph.
*Electrical Battery: 24V 110 Ah
*Fuel Tank Capacity 400 liter and above.
*Suspension: Air suspension at front and at rear with antiroll bar.
*Accessories: RUPD, SUPD, Hazard Triangle, Spare wheel, wheel Spanner, Screw jack, T Bar

176. MPFI petrol engine with swiveling stand along with special tools for dismantling and assembling Latest 4 Stroke 3/4 cylinder MPFI Engine in running condition 800-1600cc with ECM, BCM (optional) and all sensors, wiring, fuel feed system, cooling system & instrument cluster. N.B.: If ECM and BCM are available as one control unit can be purchased instead ECM, BCM as separated.

Basic Indicative Diagram

2. The model should be made with two stand setup wherein one stand should be mounted with which can be rotated 360 degrees on the stand so that slowly rotating the handle provided the engine can be rotated and lock and any position and angle to enable the students to assemble or dismantle the engine.
3. A large oil drip pan should be provided at the bottom to collect the small screws, parts and oil dripping.
4. The rotating stand is made from steel tube with gears for slow speed operation along with self-retention wheels.
5. The Paint finished rotating stand should be provided with heavy duty caster wheels with brakes.
6. The other stand should be fitted with cooling system, exhaust system with Catalytic converter, Fuel system and engine starting system.
7. By connecting the two stands together with all necessary connection such as radiator connection, fuel line, electrical connections etc. the engine can be started and made to work.
8. So that the students should understand the fitting and connections involved in the engine starting, also they can check and confirm the reassembling of the engine assembly.

9. By disconnecting the stands, the engine can be dismantled for practice.
10. First trolley should contain - Radiator assembly with contain Battery & Dash board fuel tank with wiring harness
11. Second trolley should contain - Engine with Swiveling stand. Petrol Engine MPFI: 4 Cylinder, PETROL BS6 ENGINE. Aluminum engine head and block,
Display Displacement: 800 TO 1400CC
Valve Gear: 4 per Cylinder
DOHC, Ignition & Fuel System: MPFI System: Water cooling
Fuel Tank: 10 Liter including fuel gauge
I. Including engine assembly torque chart and suitable wiring diagram with colour code on Vinyl Board
II. On another stand the ECM (Electronic Control Module), Accelerator Pedal, Ignition Key, along with wiring connections are mounted.
III. The engine should be equipped with the electronically operated Exhaust gas re circulation system.
IV. By assembling both the stands together the engine can be made functional.
V. The trainees should be able to dismantle the engine and reassemble by inter connecting the two stands.
VI. The trainees should be able to learn the necessary connection for the engine starting and also test for the correctness of the engine after reassembling

177. Petrol Engine(2-stroke) Motor Cycle/Scooter along with special tools and accessories (Optional)

*** If not available in market video demonstration may be used to explain working.**
Cut Section of 2 Stroke 2 W Engine Single Cylinder

Basic Indicative Diagram

1. The petrol engine setup should be supplied along with silencer, air filter
2. All mounted on to a sturdy iron frame with caster wheels (mobile trolley)
3. Suitably sectioned to show piston movement, inlet and exhaust port, carburetor, multi plate clutch, gear box and rear wheel assembly.
4. Different color painting to be done for different systems (Intake port - Dark blue, Exhaust port- Red, Oil- Yellow, Cut area- Signal red)
5. Necessary parts of engine should be attractively coloured for better understanding.
6. Parts catalogue suitable sketch on Vinyl Board with clearance and torque.

178. Transfer case with stand for Dismantling and assembly. To show the gear mechanism of forward and reverse speeds.

Basic Indicative Diagram

1. Car gear Box 5 forward 1 reverse gear full metal body
2. with its connectivity should be clearly displayed by sectioning
3. The painting should be carried out in such a way that different colours should be used for different components such as identification of sectioned area etc.
4. according to the colours code for easy identification of different systems and mechanisms.
5. All the hardware's and gears should be suitably electroplated.
6. The entire model should be mounted on sturdy iron stand with lockable caster wheels.
7. Vinyl Display Board displaying complete **Transfer case** specifications with torque and clearance
8. The entire setup is provided with caster wheels with brakes for easy movement of the same.

179. Tube/ tyre vulcanizing machine 220 V , Heater Capacity 400W x 2 With different types of Die & Mould

Basic Indicative Diagram

Tire Auto Repair Machine, Vulcanizing Machine, Vulcanizer Adjustable Height Tower Tire Spreader Tool for Light Truck and Car

1. Working voltage 220V
2. Watts 800W (400X2)
3. Temperature 140-150°C
4. Timer Scope 0-120 Minutes

With Standard dies and mould.
Item Weight 15.84 pounds (7.13 kg)
Product Dimensions 17.72 x 7.87 x 13.78 inches (45 x 20 x 35 cm)or Higher as per std
Vulcanizing repair process cures the patch and inner tire lining to form a dense, sealed repair job.
An adjustable, swing-open, rotating C-frame cavity simplifies tire loading and unloading while maximizing stability
★Simple, one-man operation. Repairs tread, shoulder and sidewall. Large-capacity, fully rotating C frame accommodates different wheel sizes and allows for vertical or horizontal repairs
★Energy and cost efficient for lower operating costs. Lightweight, self-standing design offers port ability and maximum stability. Doesn't require any time-consuming tensioning straps
★Adjustable height tower. Contoured inner and outer curing heads conform to a variety of tire profiles Long-life Acme thread hand-wheel screw applies over 4,000-lbs. of pressure and heat for maximum adhesion of patch to casing
★Handles long sidewall repairs. Cures both patch and plug at the same time. Curing heads can be operated individually or simultaneously for maximum repair efficiency. Constant controlled heating elements maintain optimum temperature

180. Two post car lift – capacity 4000 kg Hydraulic Type with Mechanical Arms Locking.

Basic Indicative Diagram

Paint: Powder coat mat finish Mechanical
lock: Single point lock
release Arm Lock: Spring loaded lock
Arm Adaptor: Standard and 10″ extension
adaptor Arm Design: Symmetric design
Post Design: Symmetric design
Piston: Direct drive hydraulic piston for fast and steady operation

Technical specification

Lifting arm adjustment
Max /Min Front: 780 / 1140mm ± 5%
Max /Min Rear: 780 / 1140mm ± 5%
7.10.3 Power Supply: 380 V AC, 3 Phase,50Hz
7.10.4 Motors: 3.0 HP
Lifting Capacity:4 Tons
Over all Height: 3500 mm ± 5 %
Over all Width: 3500 mm ± 5 %
Under Bar Clearance:3300 mm ± 5 %
Inside Column Distance:2800 mm ± 5 %
Load Distribution: 1: 1
Lifting Time: < 45 seconds.
Drive through clearance: 2500 mm ± 5 %
Maximum lifting height:1800 mm ±

181. Tyre Changer Machine Motorized Pneumatic Type, Rim clamping facility, and bead breaking facility with air inflating device.

Basic Indicative Diagram

1 Turn table
I. Inside clamping capacity: 12 - 22"
II. Outside clamping capacity: 10 - 22"
III. Maximum Tyre diameter (± 5%) : 1000 mm
IV. Maximum Tyre width: 13"
V. Rotation Speed: 6.8 RPM
VI. Bead Loosener Range: 70-340 mm
VII. Clamping Cylinders: 2
VIII. Motor Power: 0.75 HP
2 Mounting Tool
I. Column: Fixe
II. Head clamping: Manual
III. Power Supply: Single Phase, 230V
IV. Operating Pressure: 8 -10 Bar
V. Number of Pedals 3
3 Accessories
I. Tyre Lever: Yes
II. Plastic protection for Mounting Nose: Yes
III. Manual Inflator: Yes
IV. FRL: Yes

182. Ultrasonic Injection cleaning equipment Flow analysis & spray pattern test, leak test, auto programming mode, ultrasonic test with timer, Min 500 ML Lit SS Tank with Lid, SS Stand.

Basic Indicative Diagram

Functions

1. Uniformity/ Spray ability Test: Should be able to test the uniformity of injecting amount of each injector, and to monitor the spraying status of each injector with the help of backlight.
2. Leakage Test: Should be able to test the sealing and dribbling conditions of injectors under system pressure.
3. Injecting flow test: Should be able to check the injecting amount of the injector in 15 seconds of constant injection.
4. Auto test: Should be able to test injectors by simulating different working conditions.
5. Ultrasonic cleaning: Should be able to perform simultaneous cleaning on several injectors and to remove the carbon deposits on the injector completely.
6. On-vehicle cleaning: The unit should be equipped with various adapters and couplers that facilitate cleaning on the injectors on vehicle. Features It Should be suitable for all EGI (Exhaust Gas Ignition) vehicle sand should help to achieve automatic cleaning and testing of injectors.

Working conditions:

I. Temperature: -10 ～+45 Degree Celsius II. Relative humidity: < 85%
III. Intensity of outer magnetic field: <400A/m IV. No naked flame within: 2
meter Specifications:
I. Main unit power supply: AC 220V ± 10%, 50HzII. Ultrasonic cleaner power: 100W
III. Simulated RPM Range: 10 ～9990 RPM; Step: 10 RPMIV. Time range: 1～9999s
V. Pulse width: 0.5～25ms; Step 0.1msVI. Fuel tank capacity: 3500 to 4000ml (±10%)
VII. Dimensions: 400mm X 400mm X 600mm; (±10%)Weight: 30 Kg (±10%)

183. Wheel alignment Machine –computerized 3D (Optional) Latest machine for four wheel alignment. With connected camera , IR Lighting Source min. 8mm, Reflector metal based, should work in sunlight

Basic Indicative Diagram

1. Measurement System: True 3D

modeling of vehicle spindle Plane Camera support configuration: Fixed Beam.

2. Installation Configuration: Suitable in Wheel alignment PIT as well as the Alignment lift

3. Wheel Clamp Range: Rim clamp - self centering clamp 11″ to 22″ Measuring Range

4. Track Width: 48 to96″

5. Wheelbase: 79″ to 180″

6. Individual Toe: ± 35 degree

7. Camber: ± 55 degree

8. Caster &SAI: ± 30 degree Toe out outturns

9. Hardware: 2 Camera version with PC

10. Software: Window based application software

11. System Footprints: Turn table center to camera system front 8 Accuracy & Range Accuracy Range
12. Camber 0.05deg 55 deg
13. Caster 0.08deg 30 deg
14. Kingpin 0.08deg 30deg
15. Toe 0.04 deg 35 deg
16. Setback 2.5mm/0.1″
17. Thrust Angle 0.02deg 35deg
18. Included Angle 0.13deg 30 deg
19. Lock Angle 0.06deg 35deg
20. Toe out Turn 0.03deg measured at 20 deg Power Supply: 230 VAC, 1Phase,50Hz
21. Display Type: Monitor
22. Should be supplied with Printer, Set of 4 clamps and targets Machine Weight: 70 Kgs (± 10%)
23. Suitable in Wheel alignment PIT will be provided by the institute. Supplier has to submit necessary drawing in advance.
24. Fixed 3D Camera Beam - 3D Imaging Alignment technology, Four Wheel alignment
25. Two camera technology
26. Suitable to measure caster, camber, sai and rear toe and camber

184. Wheel balancing machine For wheel balancing of LMV. Motor 0.5 HP Shaft Diameter min 38mm. Hardened flange assy. Balancing catch nut of metal.

Basic Indicative Diagram

1 Max Wheel Weight: 70 Kg
2 Rim Diameter: 8" -25"
3 Rim Width: 1"-20"
4 RPM: 100 RPM
5 Accuracy: 1 Grams
6 Angular Resolution: 0.7 degree
7 Measuring Time: 4.5 seconds
8 Motor: 0.5 HP
9 Shaft Diameter: Min 38 mm
10 Length of shaft: 225 mm
11 Automatic input of Distance/Diameter.
12 Semi-Automatic Pre-selection of balancing mode.
13 Digital display
14 With all necessary accessories including wheel guard
15 Features

- Optimization program
- Semi-Automatic Parameter Entry
- Gauge Arm with Wheel Weight positioning system.
- Mechanical Shaft Lock.
- With Split weight, hidden weight program

185. Working Condition of Petrol MPFI Engine Assembly with fault simulation board Latest 4 Stroke 3/4 cylinder MPFI in running condition, 800-1600cc with ECM, BCM and all sensors, wiring, fuel feed system, cooling system & instrument cluster with Fault setting bank for minimum 6 sensors with diagnostic socket & Scanner to read the faults. Engine management circuit diagram to be printed on the panel board.

Basic Indicative Diagram

1. The device should be designed based on latest technology with Multi Point Fuel Injection System. The trainer should be able to simulate engine start up, speedup, slowdown and other actions so as to illustrate the structure and working principle of MPFI engines.
2. Engine Type: 4 Cylinder, naturally aspirated petrol.

I. Bore: 70 - 95mm,
II. Stoke: 72 - 110mm
III. Displacement: 1000 - 1200CC
IV. Compression Ratio: (8-16:1)
V. Maximum Power: 50-80 HP at 3200-6000 RPM. Valve Gear: 4 Per Cylinder.
VI. Fuel Supply System: MPFI
VII. Ignition system: Spark Ignition

VIII. Cooling System: Water Cooling with Reserve tank Fuel Tank: 10 Liter including fuel
Gauge

3. Real and operating MPFI petrol engine, illustrating the structure and working process. Engine management circuit diagram with wiring colour code and internal diagram of the ECU with part listing and naming should be printed on to Colour printed board base.

4. Testpointsshouldbeprovidedontheprintedbasesothatdifferentvoltages/current, resistance values etc. can tested/understood using a multi meter.

5. Automobile meters should be fitted on to the training module along with the printed circuit diagram, to demonstrate engine speed, temperature, fuel pressure, charging light etc.,

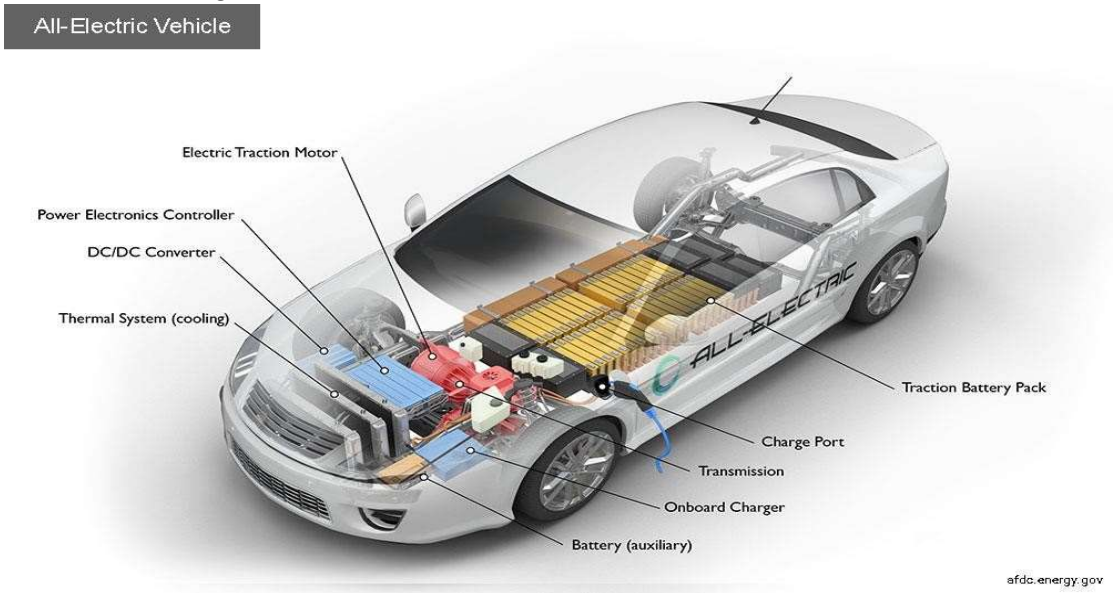
6. The training module should be fitted with diagnostic socket (DLC) for universal automobile decoder (Scan tool) to read fault codes, clear fault codes and read data stream.

7. Fault setting switch bank should be provided to induce faults in the training module to Set, demonstrate and diagnosis the line break grounding short circuit, improper contactor open circuit faults can be induced, user can adjust the number and type of faults.

8. User can adjust the number and type of faults- Set the line break grounding short circuit, improper contact or open circuit faults can be induced

186. Working Condition of E.V (Electric Vehicle) Car Electric car with all required accessories including battery charger

Basic Indicative Diagram



Key Components of an All-Electric Car

Battery (all-electric auxiliary): In an electric drive vehicle, the auxiliary battery provides electricity to power vehicle accessories.
Charge port: The charge port allows the vehicle to connect to an external power supply in order to charge the traction battery pack.
DC/DC converter: This device converts higher-voltage DC power from the traction battery pack to the lower-voltage DC power needed to run vehicle accessories and recharge the auxiliary battery.
Electric traction motor: Using power from the traction battery pack, this motor drives the vehicle's wheels. Some vehicles use motor generators that perform both the drive and regeneration functions.
Onboard charger: Takes the incoming AC electricity supplied via the charge port and converts it to DC power for charging the traction battery. It also communicates with the charging equipment and monitors battery characteristics such as voltage, current, temperature, and state of charge while charging the pack.
Power electronics controller: This unit manages the flow of electrical energy delivered by the traction battery, controlling the speed of the electric traction motor and the torque it produces.
Thermal system (cooling): This system maintains a proper operating temperature range of the engine, electric motor, power electronics, and other components.
Traction battery pack: Stores electricity for use by the electric traction motor.
Transmission (electric): The transmission transfers mechanical power from the electric traction motor to drive the wheels.

THE KEY COMPONENTS OF AN ELECTRIC VEHICLE

EVs continue to change the landscape of the auto industry at a rapid pace and many questions arise for consumers and businesses alike. In our previous EV article, we covered the topic of EV charging and charging infrastructure, one of the biggest factors in the adoption of EVs. As a follow-up, we thought it would be helpful to address some of the key components of an EV, as well as some of the ways in which they differ from their internal combustion engine (ICE) counterparts.

While EVs have far fewer moving parts than a traditional ICE vehicle, there's a steep learning curve as many of their key components are quite different - here's a rundown of the most important parts:

1. Battery Pack

The battery pack, consisting of lithium-ion batteries, is the most important and expensive component of an EV, storing energy and giving power to the entire vehicle including the electric motor that allows the vehicle to move. While these batteries have come a long way, according to the U.S. Department of Energy, "research and development are ongoing to reduce their relatively high cost, extend their useful life, and address safety concerns in regard to overheating." You can learn more details about EV batteries in this CarandDriver article.

Though battery packs are exclusive to EV vehicles, ICE vehicles do have a much smaller battery present that both powers the starter, as well as some of the electronic components while the vehicle is off. The alternator takes over once the ICE vehicle is running.

2. Electric Motor(s)

EVs use an electric motor (or two, depending on EV model or drive type), to drive the wheels, similar to the engine of an ICE vehicle. Electrical energy is transferred from the battery to the motor(s) and is then converted to mechanical energy. The number of motors and their placement determines whether the EV is front-wheel, rear-wheel, or all-wheel drive. Electric motors are far less complex than internal combustion engines and do not require maintenance, contrary to the latter.

3. Power Electronics

The power electronics in an EV are composed of inverters, converters, controllers, and the onboard charger. These components contribute to the flow of electricity throughout the vehicle, primarily from the battery to the electric motor, as well as other powered components of the vehicle, such as the heating and ventilation system, lighting, infotainment, etc.

More specifically, power electronics are responsible for converting direct current to alternating current (DC to AC inverter) or the inverse (AC to DC converting), as well as DC/DC converters which either increase battery voltage (boost) or decrease battery voltage (buck).

4. Charging System

The charging system is made up of the charging port where the cable is plugged in, the charging cable, and the onboard charger that converts AC power from the electrical grid into DC energy which is then sent to and stored in the battery. DC fast charging means AC power is converted to DC outside of the vehicle and sent directly to the EV battery, bypassing the onboard charger. Learn more about EV charging in our previous article of the series.

5. Thermal Management System

The thermal management system, comprising radiators, fans, and coolant pumps, is a crucial component of EVs. This system helps regulate the temperature of the battery pack, electric motor, and power electronics to ensure they are operating at an optimal temperature for the best performance as well as increasing longevity. Without a thermal management system, these components would be susceptible to damage through overheating or excessive cooler conditions. Not only does the regulation of temperature protect the vehicle's most valuable parts, but it also helps maximize efficiency and range by minimizing energy loss. While ICE vehicles may not be as greatly impacted by extreme weather conditions, performance, and fuel efficiency can still be reduced.

6. Regenerative Braking System

You may already be familiar with regenerative braking as one of the key functionalities of a hybrid vehicle. This system converts the kinetic energy generated during braking into electrical energy that is stored in the battery, which in turn reduces the amount of energy required from the battery.

Unlike traditional ICE vehicles, the regenerative braking systems store energy back into the battery that would otherwise have been lost. These systems also help reduce wear on the brakes by leveraging the electric motor to slow down the vehicle when activated, such as driving down a hill or approaching a stop sign.

7. Electric Vehicle Control Unit (VCU)

The vehicle control unit (VCU) is responsible for controlling and coordinating processes relating to the functional aspects of an EV. In other words, it acts as the brain of the vehicle. The VCU receives information (such as battery temperature, motor speed, vehicle speed, etc.) from various sensors and systems, and ensures that the vehicle operates efficiently and safely. Additionally, the VCU communicates with other control units including the battery management system (BMS) and motor controller to ensure all systems are working together.

Understanding the core components of an EV and how they work together is essential in enabling EV owners to help extend the life of these vehicles and ensure they are functioning optimally. Automotive businesses also benefit from a comprehensive knowledge of EV structure to better protect their investments and develop the best possible business processes for managing their EV-related workflows.

All Items are consumables Required as per Instructor Demand's

187. Battery

188. Brake Fluids

189. Chalk, Prussian Blue

190. Chemical Compounds for fasteners

191 Diesel

192. Different Type Gasket Materials

193. Different Type of Oil Seals

194. Drill Twists (Assorted)

195. Emery Paper

196. Engine Oil and Engine Coolant

197. Gear Oils

198. Hack Saw Blade (Consumables)

199. Holders, Lamp, Teak Wood Boards, Plug Sockets

200. Hydrometer

201. Lapping Abrasives

202. Petrol

203. Power Steering Oil

204. Radiator Coolants

205. Safety Glasses

206. Steel Wire Brush

207. Battery for E.V Car

208. Diodes and transistors

*** CLASS ROOM FURNITURE FOR TRADE THEORY ***

209. Instructor's table and Chair Steel

Instructor/ Office Chair

1. Basic Indicative Diagram:

1.1 Manufacturing, Supplying and Installation of Mid-back Tubular framed Chair for Instructor in the Classroom as per the following design, specification, manufacturing process and tests.

1.2 Dimensions:

1.2.1 Overall size of 610mm (W) X 640mm (D) X 850 mm (H).

1.2.2 Seat Size: 470mm (W) x 480mm (D) X 450 mm (H).

1.2.3 Mid Back size: 475mm (W) x 580 mm (H).

1.2.4 Net Weigh: Minimum 6 to 8 Kg

1.3 Construction:

1.3.1 Seat and Back Assembly:

Seat and Back Assembly: Seat and back are made up of 12mm thick hot- pressed plywood,

upholstered with fabric upholstery covers (Fabric colour shall be approved by DVET)and molded Polyurethane foam .The Back foam is designed with contoured lumbar support for extra comfort The seat has extra thick foam on front edge to give comfort to political area. The polyurethane foam shall be as per manufacturer's specification. Seat durability test(cyclic test) to perform 1,00,000 cycles for a load of 57 Kgs made to free fall on the seat from a height of25mm.

1.3.2 High Resilience Polyurethane Foam:

The HR Polyurethane foam shall be moulded with density = 45 +/-2 Kg/m3 and Hardness = 20 +/- 2 Kgs on Hampered machine complying to IS:7888 at 25%compressionanditshouldbecoveredwithfabricaspermanufacturer's shade card. The polyurethane foam shall be as per manufacturer's specification.

1.3.3 Armrest:

The one-piece armrests shall be injection molded from black co-polymer Polypropylene. Tested to perform 60,000 cycles for a load of 40 Kgs applied at 10 Deg.

3.4.4 Understructure Assembly

The understructure assembly is a cantilever type powder coated (DFT 50-60 microns) tubular mainframe made of dia 25 +/- 3mm X 2 +/- 1.6mm thk M.S.ERW Tube (IS: 7138).

3.5 Finish

:

3.5.1 Epoxy Polyester Powder coated to the thickness of 50 - 60 microns (+/-10).

3.5.2 Process: The body including tubular framework, support, etc. for Chair involves an 8 step powder coating process consisting of anti rust surface treatment viz. Hot water rinse, Knock of decreasing, decreasing, cold water rinse, photo statting,cold water rinse, passivation, dry off oven treatment and finished with powdercoatingusingepoxypolyesterpowderof50-60microns (+/-10). The material is then oven baked with a controlled temperature of 180 deg.C to 200 deg.C.

3.5.3 Tests:

The powder coating treatment shall strictly comply with IS:13871 (1993) inclusive of method of tests i.e., Dry film/ coating thickness, Finish, Gloss 60° , Colour retention, Scratch hardness, Impact resistance test, Conical Mandrel test, Erich sen cupping test, Pencil hardness, DFT measurement, Salt spray test, A adhesive on Cross cut test, Rub test with MEK, Protection against humidity, Resistance to boiling water, lubricating oil, petrol, heat double bake, bleeding, detergents, acid/ alkali. The test reports shall be submitted along with the tender.

3.6 Colour

3.6.1 The colour of the Fabric shall be Carbon Black, Milan Red, Copper Moon

3.6.2 Final colour scheme will be approved by DVET at the time of placement of

order. Manufacturer to furnish various colour schemes available with them.

3.7 Manufacturing Process:

3.7.1 The complete unit shall be as per manufacturer' s specifications and Flow chart of manufacturing process shall be submitted along with the tender.

3.7.2 Raw materials (Wood working): 1) Medium Density Fiber Board (MDF), 2) Plywood 3)Fabric.

Process (Wood working): Plywood from approved supplier -> Wood Cutting (cutting from 12mm thk. mother plywood 1200mm x 2400mm sheet to the desired size on Panel saw machine with no sharp edges, no glue marks, no scratches, no machine marks and no cracks at drill hole) -> Sizing/ Routing (fine sizing and setting curvilinear shapes) -> Fabric from approved supplier - >Inspection of fabric->Fabric cutting to desired shape->Ironing to cut piece of fabric -> Fabric stapling on the tile -> Fabric pasting to metal tile -> Fabric tile inspection->Fabric tile plastic wrapping->Assembly and Packaging (panel assembly, final inspection/ correction if required, packing and dispatch).

3.7.3 Raw materials (Metal working): 1) Stainless Steel (Nickel and Chromium added to prevent steel from rusting), 2) Mild steel and 3) Epoxy polyester powder (for powder coating).

Process (Metal working): CRCA sheet from approved supplier -> Notching (cutting at the edge and punching holes, shearing, turret punching/ press operation, debarring of punched sheet) -> Metal forming (blending for the purpose of different applications, sheet bending) -> Assembly/Sub-Assembly (for welded all components get assembled and for knock down sub-assembly takes place. CO2 welding and spot welding is done) -> Pre-treatment (8 step process including anti-rust surface treatment) -> Powder coating (surface coating applied in the form of powder and on curing produces a protective coating, examination of test coating specimen for blisters, flaking and corrosion) -> Assembly and Packaging (carcass/ panel assembly, final inspection/ correction if required, packing and dispatch).

3.7.4 Raw materials (Metal working): 1) Aluminum Extrusion.

Process (Metal working): Aluminum Extrusion from approved supplier -> Cutting of Aluminum extrusions to desired size -> Assembly and Packaging (car case/panel assembly, final inspection/correction if required, packing and dispatch).

3.7.5 The manufacturing processes given are generalized. Need to consider wherever it is applicable as per the Specifications of the product.

3.7.6 All raw materials for manufacturing process shall be as per relevant IS code.

Size and Weight:

3.7.7 Overall Length: 610mm

3.7.8 Overall Width: 640mm

3.7.9 Overall Height: 850mm

3.7.10 Net Weight: Minimum 6 to 8 Kg

Instructor/ Office Table

1.4 Basic Indicative Diagram

1.5 Manufacturing, Supplying and Installation of Pre- laminated Instructor Table as per the following design, specification, manufacturing process and tests.
1.6 Dimensions: Overall size of 140cm (W) X 700cm (D) X 76cm(H).
1.7 Construction:
1.7.1 Top Work surface:
18mm thick pre-laminated board as per IS:12823 of approved shade with2mm thick PVC edge banding all over the work surface edges.
1.7.2 Understructure:
Rectangular Frame Fabricated component in 1.2mm thick CRCA (IS: 513).
1.7.3 Leg:
1.7.3.1 Fabricated component in 38mm x 25mm x 1.2mm thick CRCA ERW Tube (IS:7138).
1.7.3.2 Plastic Cap for Cable travel- Injection Molded Polypropylene.
1.7.3.3 Leveler glide for Leg- Nylon 6 and MS Bolt.
1.7.4 Storage Pedestal:

1.7.4.1 Out of 3 drawers (Box + Box + File), the bottommost will be the file drawer and top drawer shall have open cil tray. The storage unit shall also have suitable sliding arrangement, handle locking facility, etc.
1.7.4.2 Shell- 0.6mm thick CRCA (IS:513).
1.7.4.3 Drawer Tray- 0.6mm thick CRCA (IS:513).
1.7.4.4 Drawer Front- 0.8mm thick CRCA (IS:513).
1.7.4.5 Frame Assembly- 1.2mm thick CRCA (IS:513).
1.7.4.6 Lock- 10 Lever Cam Lock central locking mechanism.
1.7.4.7 Handle- Injection Molded Polypropylene.
1.7.4.8 Leveler- Nylon 6 and MS Bolt.
1.8 Wire Management:
1.8.1 Entry of wires into the Table shall be possible from the floor
1.8.2 Horizontal Wire Carrier- 0.7mm thick CRCA (IS:513)
1.8.3 Vertical Wire Carrier- 0.8mm thick CRCA (IS:513)

7.5.4 (Only provision of carrier for electrical/data slots below the work top shall be
provided)
7.6 Finish
:
7.6.1 EpoxyPolyesterPowdertothethicknessofminimum50-60microns (+/-10).
7.6.2 Process:
The body including under structure, framework, legs, storage pedestal
including fittings involves an 8-step powder coating process consisting of
Antirust surface treatment viz. Hot water rinse, Knock of decreasing,
Decreasing, cold water rinse, Photostatting, cold water rinse, passivation, dry
off oven treatment and finished with powder coating using epoxy polyester
powder of 50 - 60 microns (+/-10). The material is then oven baked with a
controlled temperature of 180 deg .C to 200 deg. C.
7.6.3 Tests:
The powder coating treatment shall strictly comply with IS:13871 (1993)
inclusive of method of tests i.e., Dry film/ coating thickness, Finish, Gloss 60° ,

Colour retention, Scratch hardness, Impact resistance test, Conical Mandrel test, Erickson cupping test, Pencil hardness, DFT measurement, Salt spray test, Adhesion Cross cutest, Rub test with MEK, Protection against humidity, Resistance to boiling water, lubricating oil petrol heat double bake bleeding, detergents, acid/ alkali. The test reports shall be submitted along with the tender.

7.7 Colour :

7.7.1 The colour of the PLB shall be Silver Grey / Teak and Core Ash/ Grey for framework.

7.7.2 Final colour scheme will be approved by DVET at the time of placement of order. Manufacturer to furnish various colour schemes available with them.

7.8 Manufacturing Process:

7.8.1 Thecompleteunitshallbeaspermanufacturer' sspecificationsandshallbe submitted along with the tender.

7.8.2 Raw materials (Wood working): 1) Plain Particle Board (PPB), 2) Medium Density Fiber Board (MDF), 3) Pr-laminate Board (PLB), 4) Decorative Laminate (DL), 5) Fabric and 6) Lipping (PVC lipping).

Process(Woodworking):MDF board from approved supplier->Woodcutting (cutting from mother board 600mm x 2400mm sheet to the desired size on Panel saw machine with no sharp edges, no glue marks, no scratches, no machine marks and no cracks at drill hole) -> Lamination (Hot lamination adhering Decorative laminate to MDF board using approved make adhesive) -> Sizing/ Routing (fine sizing and setting curvilinear shapes) -> Lipping/ Edge banding (adhering PVC lipping on MDF board using hot melt glue under heat and pressure) -> Finishing -> Assembly and Packaging (car case/ panel assembly, final inspection/ correction if required, packing and dispatch).

7.8.3 Raw materials (Metal working): 1) Stainless Steel (Nickel and Chromium added to prevent steel from rusting), 2) Mild steel and 3) Epoxy polyester powder (for powder coating).

Process (Metal working): CRCA sheet from approved supplier -> Notching (cutting at the edge and

punching holes, shearing, turret punching/ press operation, deburring of punched sheet) -> Metal forming (blending for the purpose of different applications, sheet bending)->Assembly/Sub-Assembly (for welded all components get assembled and for knock down sub-assembly takes place. CO2 welding and spot welding is done) -> Pre-treatment (8 step process including anti-rust surface treatment) -> Powder coating (surface coating applied in the form of powder and on curing produces a protective coating, examination of test coating specimen for blisters, flaking and corrosion) -> Assembly and Packaging (car case/ panel assembly, final inspection/ correction if required, packing and dispatch)

Raw materials (Metal working): 1) Aluminum Extrusion.

Process (Metal working): Aluminum Extrusion from approved supplier -> Cutting of Aluminum extrusions to desired size -> Assembly and Packaging (car case/panel assembly, final inspection/correction if required packing and dispatch).

7.8.4 The manufacturing processes given are generalized. Need to consider wherever it is applicable as per the Specifications of the product.

7.8.5 All raw materials for manufacturing process shall be as per relevant IS code.

Size and Weight:

7.8.6 Overall Length: 1200mm

7.8.7 Overall Width: 600mm

7.8.8 Overall Height: 735mm

7.8.9 Net Weight: Minimum 40 - 50Kg

210. Students chairs with writing pads

Basic Indicative Diagram

1. Type of Product: Bar Stool
2. Weight : 8 Kg
3. Color: Black
4. Model No: Mavic Frame
5. Material: Carbon Steel

211. White board size 1200mm X 900 mm

Basic Indicative Diagram

Manufacturing, Supplying and Installation of wall mounted Ceramic coated steel sheet top surface White Board with the following design specifications manufacturing process and tests.
Size of White Board: 4X6 feet.
Confirming to ISCODE–3087,733
White Board with Ceramic Coated Steel Sheet Top Surface:
Steel writing board for writing purpose mounted on wooden based particles board (as per IS;3087) with lector galvanized backing steel sheet and frame anodized extruded Aluminum alloy hollow section.
Writing Surface:
The writing top surface shall be made of steel sheet of thickness 0.27 to 0.30 mm. It shall have vitreous enamel coating of 0.095mm min. thickness on top and 0.03 mm min. on the back. The top shall be free from waviness and shall show excellent-eras ability. Gloss of sheet shall be 60 deg @Lead60.
Core Materials:
Thecorematerialshallbe9 mm thick wood Base plain particleboard. Supported with Test Certificates of the Manufacturers.)
Backing Materials:

The backing material sheet shall be minimum 0.25 mm thick electro galvanized steel sheet. Both the top and the backing sheet shall be properly fixed with particle board using rubber-based adhesive to avoid any moisture absorption. (Supported with Test Certificates of the Manufacturers.)

Aluminum Frame:

TheBoardshallhaveallroundframingofanodizedextrudedaluminiumalloyshollowsection. Designation 63400 as per IS: 733-1983 with Amendment No. 1 (Reaffirmed2006) Edition 4.1(Supported with Test Certificates of the manufacturer)

The Frame section shall be

A. Front: 25mm,

B. Side: 18mm

C. Wall thickness:0.8 mm (+ 0.03mm)

Fitting Accessories:

ThewritingboardshallbeprovidedwithsuitableheavydutywallmountingBrackets.The board should be provided with necessary fitting clamps. The clamps should be Mild steel with suitable corrosion free coating like chrome plating/ Powder coating material to sustain board weight. A set of 4 nos. of Screw and 4 nos for Rawal Plugs should be provided with each board for fitting on the wall.

Board Corners:

The corner of the boardshouldbemadeupwith100%virgin ABS material.

Packing:

The boards shall be packed in corrugated paper

Packing / box packing for local delivery and in wood encrate for dispatch by rail /road transport to with stand

Transit hazards.

Free Accessories:

No Chalk Trayand1No.MagneticDusterand1No.Marker should be provided free with each board.

Marking:

Each board's hall be provided with in delible marking for:

Name/Trade mark of the manufacturer

Type of board

Weight: The weigh to Green board shall be25-30Kg.

212. Instructors lap top with latest configuration pre-loaded with operating system and MS Office package.

Basic Indicative Diagram:

Processor Intel® Core™ Ultra 7 165H, v Pro® Enterprise

OS Windows 11 Pro

(Dell Technologies recommends Windows 11 Pro for business)

Graphics Intel® Arc™ Pro GraphicsMemory32 GB: LPDDR5x, 7467 MT/s,

dual-channelStorage500 GB M.2 PCIe NVMe Gen 4 2230 SSDDisplay35.5-cm. display Full HD+ (1920X1200)

213. LCD projector/interactive smart board.

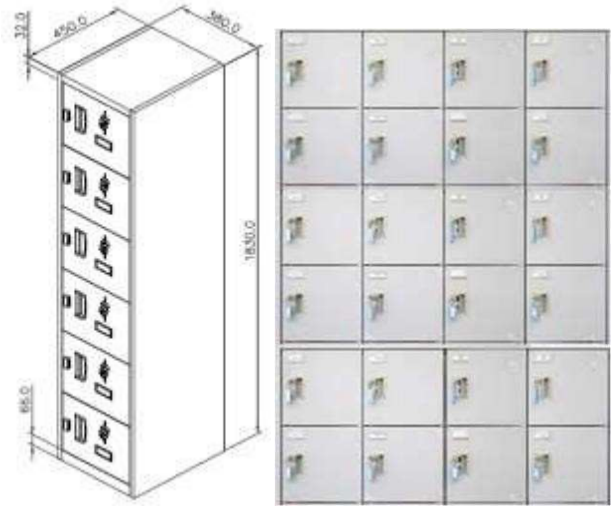
Basic Indicative Diagram:

Features on Android Platform

S.No	Parameter	Specification
1.	Drag N Drop feature in AIWaft smart board	Drag Image from Browser & Drop to Whiteboard
2.	Multi-window Mode in AIWaft smart board	4-way Split window
3.	Picture-In-Picture	Any input over Android
4.	Whiteboard Sharing	Export, QR Code, e-mail & Cloud storage
5.	Handwritten Recognition	Available
6.	Multiuser Whiteboard	Up to 4 User simultaneous whiteboard
7.	Shape Recognition	Available
8.	Interactive File Manager	Direct Sharing of file from file manager through QR code
9.	9 Way Screen sharing	Android, Win, Mac, IOS
10.	Inbuilt Geometrical Tools	Compass, Protector, Set-Square
11.	Math's Formula Tools	Type and insert formula to whiteboard
12.	Calculative Graph Tools	All types of graphs with equation on whiteboard
13.	3-D Shapes	3D Geometrical shapes with rotation & colour filling
14.	Board-In-Board	Available
15.	Inbuilt 3-D Planetary System	All planets with 3D rotation facility
16.	Inbuilt Recording	Available
17.	Sticky Notes	Available
18	Mind Map	Available

214. Trainees locker

1.9 Basic Indicative Diagram



Confirming to IS CODE - 513 (2008), 13871(1993)

1. The overall size of the storage shall be 1520mm (W) x 450mm (D) x 1830 mm(H).
2. Net weight: minimum 60-80 kg
3. There shall be 4 units of 6 Door Lockers of equal dimensions.
4. Combination:

I. 6 Door Base Unit (Size-380mmW)- one number

II. 6 Door Add On unit (Size-380mmW)- Three number

5. Construction:

I. The construction shall be Knock Down Construction.

II. Overall Construction shall be 0.6mm thick CRCA confirming to IS:513 -2008 grade.

III. Shelf should have uniform load carrying capacity up to35Kg.

IV. Handle-Aesthetically appealing Snap fit ABS plastic handle.

V. Label Holder-Plastic label holder should be provided for identification.

6. Thelockingmechanismshallbeprovidedforindividualcompartment.Lockshouldb e 10 Lever cam lock with lock lever. Min. 03 keys for each compartment shall be provided.
7. Finish:

I. Epoxy Polyester Powder in fire retardant paint coated to the thickness of minimum 50 - 60 microns (+/-10).

II. Process:

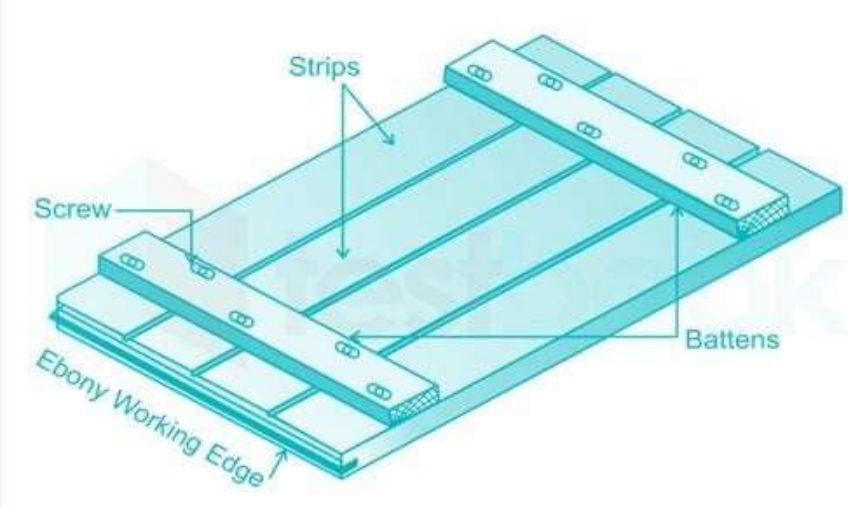
The body including shelves, compartment, frame work for door involves an 8-step powder
coating process consisting of anti-rust surface treatment viz. Hot water rinse, knock
of decreasing, decreasing, cold water rinse, phosphate, cold water rinse,
passivation, dry off oven treatment and finished with powder coating using epoxy
polyester powder of minimum 50 - 60 microns (+/-10). The material is the novel baked
with a controlled temperature of180 deg .C to 200deg.C.
III. Tests:
The powder coating treatment shall strictly comply with IS:13871 (1993) inclusive of
method of tests i.e. Dry film/ coating thickness, Finish, Gloss 60° , Colour
retention, Scratch hardness, Impact resistance test, Conical Mandrel test, Erickson
cupping test, Pencil hardness, DFT measurement, Salt spray test, Adhesion Cross cut
test, Rub test with MEK, Protection against humidity, Resistance to boiling water,
lubricating oil, petrol, heat double bake, bleeding, detergents, acid/ alkali. The
test reports shall be submitted along with the tender.
8. Colour:
I. The colour shall be Prince Grey / Snow-bell Grey.
II. Final colour scheme will be approved by DVET at the time of
placement of order. Manufacturer to furnish various colour schemes available with them
9. Manufacturing Process:
I. The complete unit shall be as per manufacturer' s specifications and Flow
chart of manufacturing process shall be submitted along with the tender.
II. Raw materials (Wood working): 1) Plain Particle Board (PPB), 2) Medium Density Fibre
Board (MDF), 3) Pre-laminate Board (PLB), 4) Decorative Laminate (DL), 5) Fabric and 6)
Lipping (PVC lipping).
Process (Woodworking):MDF board from approved supplier->Woodcutting (cutting from mother

board 600mm x 2400mm sheet to the desired size on Panel saw machine with no sharp edges,
no glue marks, no scratches, no machine marks and no cracks at drill hole) -> Lamination
(Hot lamination adhering Decorative laminate to MDF board using approved make adhesive)
-> Sizing/ Routing (fine sizing and setting curvilinear shapes) -> Lipping/ Edge banding
(adhering PVC lipping on MDF board using hot melt glue under heat and pressure) ->
Finishing -> Assembly and Packaging (car case/ panel assembly, final inspection/ correction if required, packing and dispatch).
III. Raw materials (Metal working): 1) Stainless Steel (Nickel and Chromium added to prevent steel from rusting), 2) Mild steel and 3) Epoxy polyester powder (for powder coating).Process (Metal working): CRCA sheet from approved supplier -> Notching (cutting at the edge and punching holes, shearing, turret punching/ press operation, deburring of
punched sheet) -> Metal forming (blending for the purpose of different applications,
sheet bending) -> Assembly/Sub-Assembly (for welded all components get assembled and for
knock down sub-assembly takes place. CO2 welding and spot welding is done) -> Pretreatment (8 step process including anti-rust surface treatment) -> Powder coating
(surface coating applied in the form of powder and on curing produces a protective
coating, examination of test coating specimen for blisters, flaking and corrosion) ->
Assembly and Packaging (car case/ panel assembly, final inspection/ correction if required, packing and dispatch).
IV. Raw materials (Metal working): 1) Aluminum Extrusion.Process (Metal working): Aluminum Extrusion from approved supplier -> Cutting of Aluminum extrusions to desired size -> Assembly and Packaging (car case/panel assembly,final inspection/correction if required, packing and dispatch).
V. The manufacturing processes given are generalized. Need to consider wherever it is applicable as per the Specifications of the product.
VI. All raw materials for manufacturing process shall be as per relevant IS code.

**** TOOLS & EQUIPMENTS FOR ENGINEERING DRAWING HALL ****

215. Drawing board (700mm x500 mm) IS: 1444

Basic Indicative Diagram



S. No	Designation	Size in mm Length × Width × Thickness	To be used with sheet sizes
1.	D_0	1500 × 1000 × 25	A_0
2.	D_1	1000 × 700 × 25	A_1
3.	D_2	700 × 500 × 15	A_2
4.	D_3	500 × 350 × 15	A_3

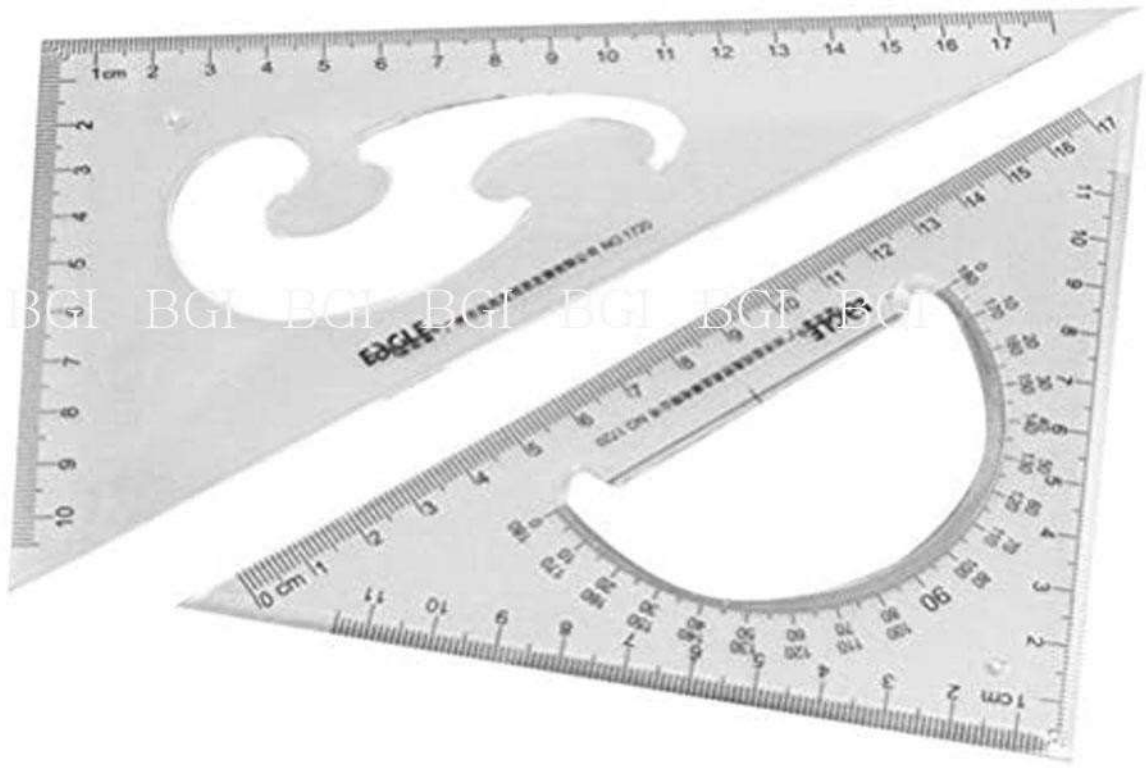
216. Mini drafter

Basic Indicative Diagram

Feature	**Easy to Use**
Type	**Mini Drafter**
Material	**Metal**
Cover	**Bag**
Use	**A Mini Drafter is Used for Preparing Drawing Quickly & Accurately.**

217. Set square celluloid 45° (250 X 1.5 mm)

Basic Indicative Diagram



Color	Transparent
Packaging Type	Box Packing
Dimensions	8 x 10 inch
Country of Origin	Made in India

The set commonly used for school studies like geometry, geographic and other subjects. Golden Engineering Corporation brings to you one of the most durable set of square with protector. We are specialized in designing a range of square set, which is made using quality raw material.

218. Stool for trainees

Basic Indicative Diagram

1. Material Stainless Steel

2. Trolley Size (mm X mm X mm) 3*4

3. Loading Capacity >250 kg

219. Cupboard (big)

Basic Indicative Diagram

Manufacturing, Supplying and Installation of Steel Cupboard having four shelves making five compartments with two door shutters as per the following design specification manufacturing process and tests.
Confirming to ISCODE–513(2008),13871(1993)
Dimensions Overallsizeof915mm(W)X485mm(D)X1980mm (H).
Construction:
The construction shall be welded construction with 0.7mm thick CRCA for shelf and 0.8mm thick for sides and back confirming to IS: 513 -2008 grade. The width of the side sheet shall correspond to the depth of the top. The sides shall extend between the extreme surface of the top and bottom shelves. The width of the back sheet shall correspond to width of the top. The back shall extend between the extreme surface of the top and bottom shelves.
Thelengthofthetopandbottomshallcoverthewidthofthecabinetandthebreadthshallcover thedepthofthecabinetmadeof0.8mmthick CRCA.
The inside folded edges shall have stiffening. The welded edges should be machine finished.
All material should be used of relevant ISI specification.
Configuration (Doors):
Two door shutters shall be made of 0.8mm thick CRCA and all other MetalcomponentshallbemadeofO. 9mmthickCRCA.CRCAD grade conforming to IS:513-2008.Shuttershallhavemetalstiffenerssuitablyweldedorrivetedtostiffen the door. The centre to

centre distance between two adjacent hinges to the right side of the cabinet shall have a hole for the handle and key slot for the key of the lock.
The clearance around the door between the door flanges and side top and bottom Flangesshallnotbemorethan1.25mm.
Hinges:
The hinges shall be either plain butt type made from CRCA not less than 1.6mm thick or double folded type fabricated from CRCA sheet not less than 1.25mm thick. The hinges shall be secured to the mild steel hinge bracket not less than 2.5mm thick on one side and shall be secured to the door on the other side of the fulcrum. The number of hinges per door leaf shall not be less three.
Lock:
The locking and handle of the storage shall be oxidized brass Mazak handle with
Three way locking mechanism controlled by lock operated by handle with min 03 duplicate keys of Godrej /Vijay an or of approved make.
Shelves:
The shelf panel (minimum four nos.) shall be height adjustable and should be made of 0.7mm thick CRCA steel confirming to IS: 513 -2008 grade to take the maximum load bearing capacity of 75 Kg uniformly distributed per shelf. Shelves shall have lipped flanges 25mm in width and 15mm in depth. Each shelf shall be supported on four shelf brackets. The bracket shall be made of CRCA not less than 1.6mm thick. The bracket shall be so designed and constructed that the shelf is securely supported and that adjustment inside the bracket can be effected easily. Four rack strips with machine punched slots shall be provided for supporting the shelves covering the full height of the cabinet. Rack strips shall be made of CRCA not less than1.00mm thick.
Pedestal:
Two pedestals spanning the depth of the cabinet shall be made from CRCA sheet not less than 1.00mm thick and shall be properly stiffened. The pedestal shall not project out of the cabinet and shall be 125±5mmin height.
Finish:
Epoxy Polyester Powder in fire retardant paint coated to the thickness ofminimum40–60microns **(+/-10).**
Process:
The body including shelves, framework for door including hinges involves an8 step powder coating process consisting of anti-rust surface treatment viz. Hot water rinse, Knock of degreasing, de-greasing, cold water rinse, phosphating, cold water rinse, passivation, dry off oven treatment and finished with powder coating using epoxy polyester powder of minimum 40–60microns (+/-10). Thematerialisthenovenbakedwithacontrolledtemperatureof180 deg. C to200 deg. C.
Tests:
The powder coating treatment shall strictly comply with IS:13871 (1993) inclusive of method of tests i.e. Dry film/ coating thickness, Finish, Gloss 60°,Colour retention, Scratch hardness, Impact resistance test, Conical Mandrel test, Erichsen cupping test, Pencil hardness, DFT measurement, Salt spray test, Adhesion Cross cut test, Rub test with MEK, Protection against humidity, Resistance to boiling water, lubricating oil, petrol, heat double bake ,bleeding,

detergents, acid/ alkali. The test reports shall be submitted along with the tender.
Colour:
The colour shall be Prince Grey/Snow bell Grey.
FinalcolourschemewillbeapprovedbyDVETatthetimeofplacementoforder.Manufacturer to furnish various colours schemes available with them.
manufacturing Process:
he complete unit shall be asper manufacturer's specifications and Flow
Chart of manufacturing process shall be submitted along with the tender.
aw materials (Wood working): 1) Plain Particle Board (PPB), 2) Medium Density Fiber Board (MDF), 3) Pre-laminate Board (PLB), 4) Decorative Laminate (DL), 5) Fabric and 6) Lipping (PVC lipping).
Process (Woodworking):MDF board from approved supplier->Wood Cutting (cutting from mother board 600mm x 2400mm sheet to the desired size on Panel saw machine with no sharp edges, no glue marks, no scratches, no machine marks and no cracks at drill hole) -> Lamination (Hot
LaminationadheringDecorativelaminatetoMDFboardusingapprovedmakeadhesive)
Sizing/ Routing (fine sizing and setting curvilinear shapes) -> Lipping / Edge banding (adhering PVC lipping on MDF board using hot melt glue under heat and pressure)->Finishing->Assembly and Packaging (car case / panel assembly, final inspection/correction if required, packing and dispatch).
aw materials(Metalworking):1)Stainless Steel(Nickel and Chromium added to prevent steel from rusting), 2) Mild steel and 3) Epoxy polyester powder (for powder coating).
Process (Metal working): CRCA sheet from approved supplier -> Notching (cutting at the edge and punching holes, shearing, turret punching/ press operation, de-burring of punched sheet) -> Metal forming (blending for the purpose of different applications, sheet bending)->Assembly/Sub-Assembly (forweldedallcomponentsgetassembledandforknockdownsubassemblytakes place. CO2 welding and spot welding is done) -> Pre-treatment (8 step process including anti-rust surface treatment) -> Powder coating (surface coating applied in the form of powder and on curing produces a protective coating ,examination of test coating specimen for blisters, flaking and corrosion)->Assembly and Packaging(car case/ panel assembly, final inspection/ correction i f required, packing and dispatch).
aw materials(Metalworking):1) Aluminum Extrusion.
Process (Metal working): Aluminum Extrusion from approved supplier ->Cutting of Aluminum extrusions to desired size -> Assembly and Packaging (car case /panel assembly, final inspection/correction if required, packing and dispatch).
or Steel Cupboard only Welded construction is acceptable.
he manufacturing processes given are generalized. Need to consider where verity is applicable as per the Specifications of the product.
* raw materials for manufacturing process shall be as per relevant IS code.
Size and Weight:
A. Overall Length: 915mm
B. Overall Width: 485mm
C. Overall Height: 1980mm
D. Net Weight: Minimum70to80Kg

220. White Board 8ft. x 4ft.

Basic Indicative Diagram:

Manufacturing, Supplying and Installation of wall mounted Ceramic coated steel sheet top surface White Board with the following design specifications, manufacturing process sand tests
Size of White Board: 8X4 feet.
Confirming to ISCODE–3087, 733
White Board with Ceramic Coated Steel Sheet Top Surface:
Steel writing board for writing purpose mounted on wooden based particles board (as per IS: 3087) with
Electro galvanized backing steel sheet and frame a anodize detruded Aluminum alloy hollow section.
Writing Surface:
The writing top surface shall be made of steel sheet of thickness 0.27 to 0.30 mm. It shall have vitreous enamel coating of 0.095mm min. thickness on top and 0.03 mm min. on the back. The top shall be free from waviness and shall show excellent-eras ability. Gloss of sheet shall be 60 deg @Lead60.
Core Materials:
The core material shall be 9mm thick wood Base plain particle board (Supported with Test Certificates of the Manufacturers.)
Backing Materials:
The backing material sheet shall be minimum 0.25 mm thick electro galvanized steel sheet. Both the top and the backing sheet shall be properly fixed with particle board using rubber-based adhesive to avoid any moisture absorption. (Supported with Test Certificates of the Manufacturers.)
Aluminum Frame:

TheBoardshallhaveallroundframingofanodizedextrudedaluminiumalloyshollowsection. Designation 63400 as per IS: 733-1983 with Amendment No. 1 (Reaffirmed2006) Edition 4.1 (Supported with Test Certificates of the manufacturer)
The Frame section shall be

D. Front: 25mm,
E. Side: 18mm
F. Wall thickness:0.8 mm (+ 0.03mm)
Fitting Accessories:
ThewritingboardshallbeprovidedwithsuitableheavydutywallmountingBrackets.The board should be provided with necessary fitting clamps. The clamps should be Mild steel with suitable corrosion free coating like chrome plating/ Powder coating material to sustain board weight. A set of 4 nos. of Screw and 4 no's for Rawal Plugs should be provided with each board for fitting on the wall.
Board Corners:
The corner of the boardshouldbemadeupwith100%virgin ABS material.
Packing:
The boards shall be packed in corrugated paper
Packing / box packing for local delivery and in wooden crate for dispatch by rail / road transport to with stand transit hazards.
Free Accessories:
No. ChalkTrayand1No.MagneticDusterand1No.Marker should be provided free with each board.
Marking:
Each boards hall be provided with in reliable marking for:
Name/Trade mark of the manufacturer
Type of board
Weight: The weigh to Green board shall be25-30Kg.

221. Trainer's Table

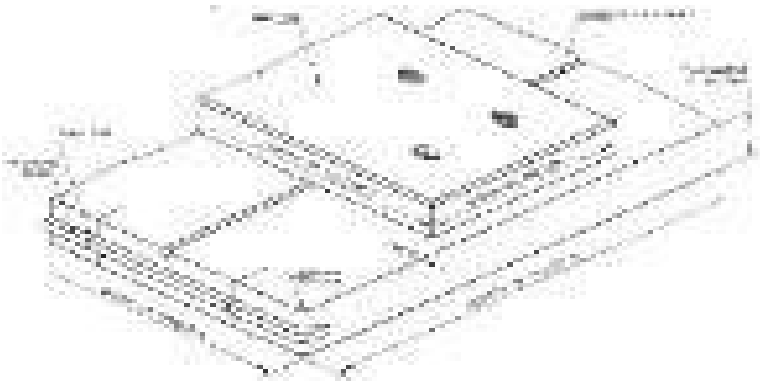
As pre Required…..

222. Trainer's Chairs

As pre Required…

223. Draughtsman drawing instrument box

i. Basic Indicative Diagram:



ii. This specification for Drawing Board - Engineers Pattern is based on BIS 1444 - 1989 with consideration has been given to the need for keeping the drawing boards sizes as small as possible taking into consideration the dimensions of the parallelogram formed by the extreme movement of drafting unit. The drawing board size is in the rangeofsizessuitableforusewiththeISO 'A' rangeoftrimmedpapersandIS10711: 1983 'Sizesofdrawingsheets'.

iii. Dimension: The dimensions and tolerances on dimensions of the size of drawing board shall be designated as 'D1' size 920x650 mm with tolerance on length /width of ±5mm, thickness 22mm, tolerance on thickness of ±1mm, Tolerance on Straightness of Working Edge 0.25mm Recommended for Use with Sheet of 'A1' size

iv. Material:

1. Timber:

a. The working surface of the board and the battens shall be constructed from any one of the following species of

timber (see IS 399 :1963).
b. Working Surface: Benteke, Blue pine, Fir, Cypress, Oak, Redcedar.
c. Battens: Aini, Anjan, Bijasal, Black chuglam, Padauk, Safed sir is, Salai, Sissoo, Teak, Walnut.
d. The wood used shall be thoroughly seasoned and shall have attained a moisture content of not more than 12 percent, which may be 14 percent in the case of teak, when the board is intended for use in mo is t zones(seeIS287:1973).It shall be free from knots, cracks, sap, shakes and other defects which may affect the service ability or appearance of the boards (see IS 707 :1976).
2. Block board:
a. In the case of block board type drawing boards, the timber for the core and the face veneer shall be from the species given in Timer or any of the Bom box malabarica or Soft timbers.
b. Core: The core reepers for block board type drawing boards shall not exceed 20 mm in width, and shall conform to 5.2 of IS 1659 : 1979.
c. Veneers: For block boards type of drawing boards, the grain direction of the veneers shall be perpendicular to the grain direction of the core materials. The top facing veneers shall not have any defects other than these permitted in 6.1 and 6.2 of IS 1328:1982.Thebottom(back)veneer shall not have de fect so ther thanthosepermittedforFace 'A' inTable2ofIS303:1975.
d. Adhesive: The adhesive used and bonding shall conform to BWRor WWR Grades of IS 848 :1974.
e. Lipping :The timber for lipping shall be fine-grained hard wood from the species of timber given under Class I of Appendix A of IS 303 : 1975. Lipping shall be done externally on all exposed edges of the block board to a maximum width of 10 mm and shall be jointed by adhesive.
f. The block board used for the manufacture of drawing boards shall conform to the requirements of 7.1, 7.2, 7.3, 8.1 and 8.2 of IS1659
i. : 1979.

v. Edge :The working edge shall be well seasoned ,fine grained hard wood such as ebony (Diospyros melanoxylon Roxb. or Diospyros sp.) or rosewood (Dalbergia latifolia Roxb.), or of aluminium or plastic. Where plastics material is used it shall be of sheet form,complyingwithfollowingrequirements:a)Thematerialshallbehomogeneous ,

1. b) The coefficient of expansion shall not be greater than 0.000 09 percent within the temperature range 0 to 60° C and relative humidity range 25 percent to 100 percent, The material shall possess toughness, hardness and flexibility in sufficient degree to permit constant handling and use without deterioration, and d) The material shall contain not more than 2 percent plasticizer.

vi. Washers: The washers with slots shall be made of rolled brass sheet (see IS 410 : 1977);orcoppersheet,andshallbe1’ 7to2’ 0mminthickness.Thewoodscrewsused shall be of brass (see IS 6760 :1972).

vii. Construction:

1. WorkingSurface:

a. The boards shall have as moot hand true working surface. They shall not twist or bow by more than 1 mm. However, in case of drawing boards to be used on drafting machines, the twist or bow shall not exceed 2 mm. In order to ensure a permanently true working surface, longitudinal grooves of 5 mm to 7mmdepthand3mminwidthshallbecut atintervals of notmorethan100 mm, at the back of the board, leaving the longitudinal strength practically unimpaired and taking the transverse strength out of the board so that the trueness of surface in this direction is controlled by the pair of wooden battens screwed to the back of the board. The entire board shall be manufactured from the same species of timber pieces, 100 to 150 mm in width,shall be used in the construction of the board and the grain of he wood shall run along the length of the board. The pieces of wood shall be properly and permanently joined together by means of tongue and groove joints or butt joint sandsecurelyglued. The projection of the tongue and groo vejoints shall not exceed 3 mm. The edges shall be trimmed

square and the corners roundedtoaradiusofapproximately10mm.Patchingorstoppingofdefects shall not be resorted to. The block board type drawing boards shall be mounted directly on the drafting machine without battens and fixing screws.

b. When a steel straightedge, 1 m long and complying with the requirements of IS 2233 : 1962, is placed on a working surface, the surface shall not deviate from the straightedge by more than 1.5 mm, irrespective of the position of the straightedge on the surface.

2. Working Edge: A true working edge shall be provided by the insertion of a suitable strip which shall be securely glued to the working end of the board. The dimensions and position of the strip shall be as specified in IS 1444 - 1989.To admit of its contraction with the body of the board, the stripshallbe saw-cut, after insertion, at points coinciding with the longitudinal grooves at the back of the board or located midway between them. The edge shall be providedinallcasesexceptingwhenthedrawingboardsarefittedondrafting machines.Oppositeedgesshallbeparallelwithinatoleranceof±0.5mmover each1’ Omlengthofworkingedge.Whenasteelstraightedge,complyingwith therequirementsofIS2233:1962,isplacedalonga working edge,that edge shallnotdeviatefromthestraightedgebymorethan0.25mmovereach1m length of the working edge.

3. Battens: Two battens smoothly finished and with chamfered or rounded edges shall be fitted to the back of the board. The battens shall be 114±6/0 mm wide in case of size D0, and 74± 6/0 mm wide in case of sizes D1, D2 and D3. The thickness of the battens shall be 20± 5/0 mm. The length of each battens shall be such that it leaves a margin of 10 mm on both edges of the board. They shall be fitted at a distance of 75 to 85 mm from the ends of the board by means of round-head wood screws of suitable length with oval and round washers. The heads of the screws and the washers shall be housed in recesses below the surface of the battens in a zigzag way. The screw holes in battens and oval washers shall be slotted or elongated to allow for the expansion of contraction of the board. The end slotted

holes shall be 25 mm clear from each end of battens and the others at equal intervals, clear of the grooves.Everyintermediateplankshallbeprovidedwithonescrewwhileth e end planks shall be provided with two screws. While fixing the screws, joints and grooves shall be avoided.

viii. Finish: The edges of the board shall be coated with two coats of approved varnish.

ix. Marking: Each board shall be clearlyand legibly markedon the back with the

1. manufacturer' s name or trademark and also the year of manufacture.

x. Packing - In the absence of any specific agreement as to the mode of packing each board shall be properly protected to prevent damage of the working edge in transit and in storage.

xi. Conforming to BIS 1444 :1989.

xii. Manufacturing Process:

1. The complete unit shall be as per manufacturer' s specifications and Flow chart of

2. manufacturing process shall be submitted along with the tender.

3. Raw materials (Wood working): 1) Plain Particle Board (PPB), 2) Medium Density Fiber Board (MDF), 3) Pre-laminate Board (PLB), 4) Decorative Laminate (DL), 5) Fabric and 6) Lipping (PVC lipping).

4. Process(Woodworking):MDF board from approved supplier->Wood Cutting (cutting from mother board 600mm x 2400mm sheet to the desired size on Panel saw machine with no sharp edges, no glue marks, no scratches, no machine marks and no cracks at drill hole) -> Lamination (Hot lamination adhering Decorative laminate to MDF board using approved make adhesive)

• Sizing/ Routing (fine sizing and setting curvilinear shapes) -> Lipping/ Edge banding (adhering PVC lipping on MDF board using hot melt glue under heat and pressure) -> Finishing -> Assembly and Packaging (carcass/ panel assembly, final inspection/ correction if required, packing and dispatch).

1. Raw materials (Metal working): 1) Stainless Steel (Nickel and Chromium added to prevent steel from rusting), 2) Mild steel and 3) Epoxy polyester powder (for powder coating).

2. Process (Metal working): CRCA sheet from approved supplier -> Notching (cutting at the edge and punching holes, shearing, turret punching/ press operation, deburring of punched sheet) ->

Metal forming (blending for the purpose of different applications, sheet bending) -> Assembly/Sub-Assembly (for welded all components get assembled and for knock down subassembly takes place. CO2 welding and spot welding is done) -> Pre-treatment (8 step process including anti-rust surface treatment) -> Powder coating (surface coating applied in the form of powder and on curing produces a protective coating, examination of test coating specimen for blisters, flaking and corrosion) -> Assembly and Packaging (carcase/ panel assembly, final inspection/ correction if required, packing and dispatch).

3. Raw materials (Metal working): 1) Aluminum Extrusion Process (Metal working): Aluminum Extrusion from approved supplier -> Cutting of Aluminum extrusions to desired size -> Assembly and Packaging (carcase / panel assembly, final inspection/ correction if required, packing and dispatch).

4. The manufacturing processes given are generalized. Need to consider wherever it is applicable as per the Specs. of the product.

5. All raw materials for manufacturing process shall be as per relevant IS code.

i. Size and Weight:

1. Overall Length: 920mm
2. Overall Width: 650mm
3. Overall Height: 22 mm(Thickness)
4. Net Weight: 4 – 5

224. Draughtsman table

1. Basic Indicative Diagram:

i. 77.16 Manufacturing, Supplying and Installation of Fully Adjustable & Modular Drawing Stand with Drawing Board (Drafting Table) with the following design, specifications, manufacturing process andtests.
b. Confirming to IS CODE: 513D, 3074, 14587-1998
c. Dimensions:
i. Width of the Stand: 960 to 980mm
ii. Depth of the Stand: 680 to 700mm
iii. Min Height of the Stand (Vertical Drawing Board): 880 to 900mm
iv. Max height of the Stand (Vertical Drawing Board): 1480 to 1500mm
v. Min Height of the Stand (Horizontal Drawing Board): 780 to 800mm
vi. Max height of the Stand (Horizontal Drawing Board): 1080 to 1120mm
vii. Overall size of the Drawing Board: 762 X 1066mm
viii. Angle Adjustment: 0° to90°
d. Design:
1. Drawing Table consists of two parts:
ii. First part is the steel frame structure with accessories tray.
iii. Second part is the drawing board that is made up of minimum 12mm thick

pre-laminated MD Fboard.
e. Construction:
i. The steel frame structure should be made of
1. 25mm x 25mm x 0.9mm (20Gauge)
2. 25mm x 50mm x 0.9mm (20gauge)
3. 20mm x 20mm x 0.9mm (20Gauge)
4. 25mm x 50mm x 1.2mm (18Gauge)
a. Thick (CRCA) Mild Steel Tubes and 0.7mm thick CRCA (Mild Steel) Sheets. b. The structure should support the drawing board with the help of 6 self tapping screwed joints.
Other metalfittingstobe manufactured using
Ø5/8" (CRCA) Steel Tubes of thickness 0.9mm and minimum Ø12mm brightbar.
ii. Accessoriestrayforkeepingthedraftinginstrumentsshouldbeprovidedwith the drawing table, below the drawing board as shown in the figure. The accessory tray should be a single-piece sheet-metal part with all the 4 edges folded (bent)upwards.
iii. Cold Rolled (CRCA) Mild Steel Tubes of 0.9mm and 1.2mm thickness conforming to IS 3074 should be used for the structure.
iv. Cold Rolled (CRCA) Mild Steel Sheets of 0.7mm thickness conforming to IS 513D should be used for the accessories tray.
v. Drawing Board: Minimum 12mm thick MDF compliant pre-laminated board of approved shade with 2mm thick PVC edge banding of matching color (as perapproval)alloverthe worksurfaceedges.Pre-laminatedMDFBoardshall conform to IS14587-1998.
f. Functions:
i. 4levelingboltstobeused(2ineachleg)forstabilityonunevenfloor.Leveling bolts to be manufactured using 10mm ABS molded bolts.
ii. All pipe/tube ends to be covered tightly and properly with ABS molded buffers/endcaps.Otherplasticpartstobemoldedusing ABS,NylonorGlassfilled Nylononly.
iii. Stand should be such that the height of the drawing board as well as the angle can be
fully adjusted with the help of 4 pivoted joints and 4 friction clutches. The design should permit a height adjustment of the drawing board from 79cm to 148cm (measured from the ground with zero adjustment of the leveling bolts) and an angle adjustment of 0° (parallel to the ground) to 90° (perpendicular the ground).
iv. The friction clutches should support positive (slip-free) locking and unlocking of the drawing board at any operating position and should not slip under normal working loads/conditions. Each friction clutch to be

manufactured using a set of 13 strips of 1.2mm thick CRCA (Mild Steel) Sheets, zinc plated and insert molded into an ABS block so that a rigid, play-free joint isformed.

v. Each friction clutch should be operated separately by a camoperatedhandle as shown in the figure. These handles should fulfill the locking/unlocking action in a quarter (90°) turn of the cam. The handles to be molded using Glass-filled Fiber Nylon and should be supplied with a 10 years replacement warranty against manufacturing defects/breakages.

vi. The tightening/ loosening bolts/ nuts with M.S. powder coated handle may be provided with additional locking mechanism such as cotter pin, lock nuts or other suitable arrangement (as per approval) to ensure that the connections stay secure at all times.

g. Finish:

1. Epoxy Polyester Powder Coating to the thickness of minimum 50 - 60 microns (± 10 microns). The body including the frame work legs and tray involves an 8 step powder coating process consisting of antirust surface treatment viz. hot water rinse, knockof degreasing, degreasing, cold water rinse, phosphating, cold water rinse, passivation, dry off oven treatment and finished with powder coating using epoxy polyester powder.Thematerialisthenovenbakedwithacontrolledtemperatureof130 -200° C

h. Colour:

i. The structure should be powder-coated in Nickel Grey color as per approval.

ii. The accessories tray should be powder-coated in Blue Moon color as per approval.

iii. Allplasticcomponentsshouldbeinjectionmoldedonlywithvirginmaterialin Black/Dark Grey color as per approval.

iv. Color of Pre-laminated MDF board: Final color scheme of the prelaminated board as well as edge banding will be approved by DVET at the time of placement of order. Manufacturer to furnish various color schemes available with them.

i. Manufacturing Process:

i. In-house CNC Laser cutting machines should be used for cutting sheet metal as well as tubular parts.

ii. All plastic components to be made up of ABS/ Nylon/ Glass-filled Nylon and should be in-house molded on a fully automatic CNC controlled vertical injection molding machine. Plastic parts should not have visible sink marks, war page, flash, discoloration, blow holes, ejector marks or any other defect.

iii. Stands should be manufactured with proper in-house tooling, jigs, dies and fixtures to ensure uniformity and standardization in all parts.
iv. Stands should have interchangeability of all components to ensure free availability and fixing/ replacement of any part of the structure over 5years.
v. All sheet-metal shearing, bending and folding operations to be carried out on in-house press brakes, hydraulic presses and shearing machines/ iron workers.
vi. In-house MIG welding for clean and full strength welds and a play-free structure. All welded edges should be machine finished (through grinders or polishing instrument).
vii. All edge scorners and joint soft he steel frame and the accessories tray should be chip free and properly chamfered/rounded.
viii. The structure and the accessories tray should be epoxy powder coated in an in-house powder coating facility with standard pre-treatment procedure.
ix. The manufacturing processes given are generalized. Need to consider wherever it is applicable as per the Specifications of the product.
x. All raw materials for manufacturing process shall be as per relevant IS code.
j. Size and Weight:
i. Overall Length: 1500mm
ii. Overall Depth: 1000mm
iii. Overall Height: 1000mm
iv. Net Weight: Minimum 18-2

ADDITIONAL LIST OF TOOLS AND EQUIPMENT ESSENTIAL TO ADD IN SYALLABUS FOR PRACTICAL

225. Hammer 2 kg (Sledge) with handle

1. Basic Indicative Diagram:

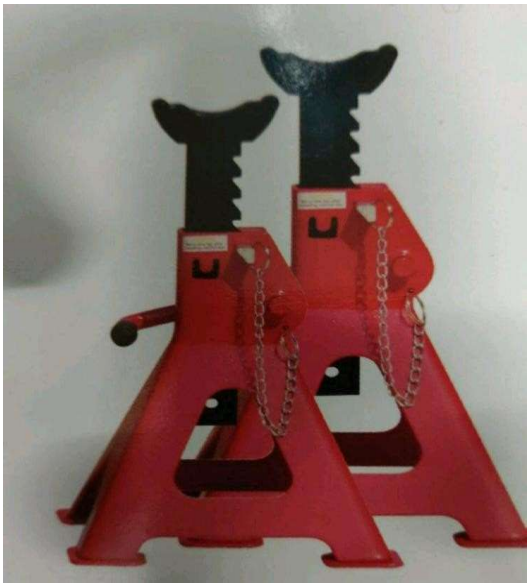
Handle Material	**Wooden**
Head Material	**Iron**
Weight	**2000 g**

Key Features

- Sledge Hammer Comes with Double-Faced Head & Strong Wooden Handle.
- Striking Solid Sledge Head Delivers a Hard & Positive Strike.
- All-Purpose Sledge Hammer is Ideal for Applications where a Strong Blow is Required.

226. Safety stand for vehicle lifting 3 ton and 5 ton

1. Basic Indicative Diagram:



Max Lifting Height : 435 mm (17.1 Inches)

Min Lifting Height : 268 mm (10.5 inches)

Body : Metal Steel.

Weight :- 16 Kg

Color :	Red & Black
	A jack stand is a metal height-adjustable mechanical device that is used to support the weight of a lifted vehicle. Most commonly, they are placed underneath the car

227. Oil filter removal spanner Chain type, band-style, universal oil filter wrench

1. Basic Indicative Diagram:

Chain type

band-style

universal oil filter wrench

Chain type

- Hexagon Oil Filter Wrench Chain also will handle all shapes, round, square, octagon etc
- A great repair dismantle wrench tool for car oil filter, is ideal for removing difficult filters cramped engine compartments
- Remove dia 2.36 inch to 5.51 inch (60mm to 140mm) Chain length 19.69 inch (500mm)
- Steel Color Silver Tone

band-style

Color: Black
Material: Steel, Vinyl
Overall Dimensions: 8.30 in. L x 4.40 in. W x 1.25 in. H
Item Weight (lb.): 0.52

- **universal oil filter wrench**

Type of Product : Oil Filter Wrench

Range (mm) : 63-120 mm

228. Battery terminal cleaner tool

1. Basic Indicative Diagram:

- Length 3 – 3/8 inch
- Stiff wire bristles

229. Glow plug tester

1. Basic Indicative Diagram:

9.2	Should enable fast diagnosis of glow plug failure or degradatior disassemble the plug from the engine.
9.3	Suitable for any 12 Volt DC vehicle system.
9.4	Should connect directly to vehicle battery.

ADDITIONAL LIST OF TOOLS AND EQUIPMENT SUGGESTED BY MR.DIVYARANJAN BHATTCHARYA GENERAL MANAGER, KIA MOTORS ARYODAYA KIA NAGPUR, AUTHORISED SERVICE CENTRE FOR PRACTICAL PURPOSE

230. Skimming Machine

1. Basic Indicative Diagram:

RPM	1400 RPM
Processing Diameter Of Brake Disc	Up to 400 mm
Motor Power Spindle	1.1 kW
Exterior Dimensions	690 X 890 X 880 mm Brake Disc Skimming Machine resurface all kind of disc/drum brake having the high accuracy of skimming process. You will be free from hearing the regular problem in the car after resurfacing like wobbling, car vibration during braking, brake paddle vibrations.

231. Electrical Brake bleeding machine

1. Basic Indicative Diagram:

Modal	Electrical Brake Bleeding Machine
Material	Mild Steel
Type Of Vehicle	4 Wheeler
Type	Fully Automatic
Automation Grade	Fully Automatic
Usage/Application	Automobile Industry

Technical Specifications :

Power supply	12V/230V
Operating pressure	0.5–3.5 bar
Weight	7 kg
Length	310 mm
Width	290 mm

Height	400 mm
Filling hose length	2.5 m
Container size max.	5 L

DESCRIPTION

- Fast and professional maintenance of brake, clutch and ABS systems.
- Suitable for brake fluid of types DOT 3, DOT 4, DOT 4 Plus and DOT 5.1.
- 1 – man operation.
- Portable Machine can run on 12V DC.
- Practical due to low weight.
- High performance quality product made in Germany.
- Mobile brake service perfectly organised.
- No transferring of the brake fluid since the original container serves as the tank.
- Automatic shutdown when the reservoir is empty.
- Not necessary to bleed the device when changing the container.
- Stepless adjustment of the working pressure from 0.5 to 3.5 bar.
- Pressureless decoupling on the vehicle.
- Leak testing of the brake and clutch system.
- Pulsating liquid flow, air bubbles are thus pushed out of the lines.

232. Coolant analyzer machine

1. Basic Indicative Diagram:

To check the quality of coolant in the cooling system

• Only 1 drop of coolant required

• Can also check specific gravity of acid in the battery

• Fast, simple, and accurate

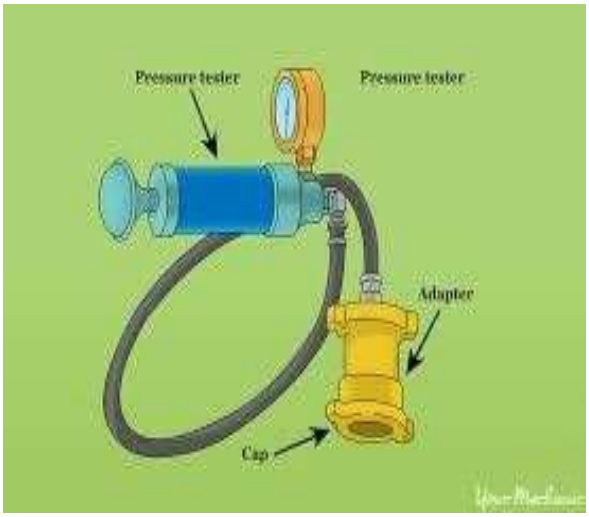
233. Headlight Aligner Machine

1. Basic Indicative Diagram:

Brand	ATS ELGI
Dimension	1535 x 630 x 630mm
Lens Diameter	200mm
Lens Type	200mm
Model Name/Number	HLBA
Rear Panel	Adjustable with calibrated wheel
Column height	1413mm
Leveling of HBT	Optical visor with 3 wheels on top
Optical box shape	Rectangular(Metallic)
Lux meter	Analog or Digital
Indication available	Lux values at 25m

234. Radiator cap pressure sensor

1. Basic Indicative Diagram:



Exterior Finish	Metal
Item dimensions L x W x H	30 x 20 x 10 Millimeters
Vehicle Service Type	Motorcycle, Van, Car
Style	Modern

About this item

- Function of High Pressure Radiator Cap: The radiator cap not only prevent the water tank from leaking,increase the tightness of the water tank cover,but also adjusting the pressure balance for the water tank to keep the water level balance.Safety water tank cap with temperature gauge can show you the accurate water tank temperature without launching the engine.
- Real Time Monitor Temperature : The radiator cap come with a temperature gauge,allows you to easily monitor the temperature in real time and provide accurate readings to tell if it is safe to open the radiator cap.This radiator thermometer gauge cap has a bright color gradient meter, its color coded display makes it easy to baseline temp while motoring down the road that provides high visibility to help you understand the temperature of the engine.
- Excellent Quality&Easy to Install: The high pressure radiator cap made of industrial aluminum material, durable and hardness.The spring is treated to prevent rust.It has good resistance to high temperature and low temperature.Its safe seal allows it to be used kinds of weather conditions.It is easy to install,just take off the old cap out, and screw on the new one.
- High Pressure Radiator Cap With Silicone Seal : Equipped with quality silicone inner stopper to prevent leakage,and the silicone inner stopper helps enhance the heatproof function and the compactness of the tank cap.The radiator cap are designed with a higher pressure rating than OEM caps to raise your coolants boiling point,boiling and coolant loss can be reduced.A better replacement for your radiator cap and fit for offroad cars, motorcycles, engineering vans.
- How the Radiator Cap Work: As the water temperature rises, the cooling water expands. When the pressure exceeds the release pressure (0.9KG), the water tank cover string will open, allowing the cooling water to flow to the auxiliary water tank for storage.when the water temperature decreases, the cooling water shrinks. The cooling water flows from the auxiliary water tank to the water tank to keep the water level balanced.

ADDITIONAL LIST OF TOOLS AND EQUIPMENT SUGGESTED BY MR. IRFAN SIDDIQUI SERVICE MANAGER, EROS HYUNDAI NAGPUR AUTHORISED SERVICE CENTRE FOR PRACTICAL PURPOSE

235. HVAC AC gas leakage tester

1. Basic Indicative Diagram:

Measurement Range	0C to 50C
Color	Yellow,Green,Blue
Features	Eco friedly
Display Type	Digital

Refrigerant Gas Leak Detector
Features: • Detects CFC's, HFC's & HCFC's including R11, R22, R134A, etc

- High sensitivity setting locates R134A leaks to 3gm/year
- Flexible gooseneck probe
- Easy one handed operation
- Audible & visual indicators
- Rubber sleeve protects detector & probe

236 Battery testers

1. Basic Indicative Diagram:

Weight	1.7 lbs (771g)
Operating Temperature	0 DegreeC to +50 DegreeC (32 DegreeF to +122
Display	5-line Text/Graphical Backlit Display
Power Requirements	Uses the power of the battery under test and 6AA
Languages	English,Spanish and French-Canadian
Housing Material	Acid-resistant ABS plastic
Dimensions	10.6" x 3.9" x 2.4" (27cm x 10cm x 5cm)

Product Description

The MDX-600 Battery and Electrical System Analyzer Series with conductance technology makes battery testing safe, fast, and simple. Three models with a range of capabilities offer technology to meet your service needs, from basic battery testing to full battery and electrical systems diagnostics for advanced battery types.

Available Accessories:
A156 Universal Soft Carry-All Bag A207 4-ft Replaceable Cable A208 10--ft Replaceable Cable A033 Lead Stud Adapter Set (2 male, 2 female) A095 6-Pack Thermal P