

GOVERNMENT OF INDIA

Ministry of Railways

Schedule of Technical Requirement (STR)

for

Electro-Mechanical Signalling Items

**Signal Directorate
Research Designs & Standards Organisation
Manak Nagar, Lucknow -226011**

List of specifications and drawings for electro- mechanical signalling items-

S. NO.	ITEM DESCRIPTION	SPECIFICATION NO.	DRG. NO.
1	Electric Point Detector	IRS: S- 49/74	SA-23331, 32, 33
2	Electric Key transmitter	IRS: S- 21/2001	SA-22601
3	Electric Signal Machine	IRS: S- 25/97	SA-23851 (Adv.) SA-23852 (Adv.)
4	Electric Signal Reverser	IRS: S- 19/2000	SA-22201, 02, 03, 04 SA-22335A, SA-22335B SA-22333, 34
5	SM's Control Frame	IRS: S- 48/74	SA-24861. 62
6	Electric point machine (143 & 220 mm throw)	IRS:S 24-2002	RDSO/S 10800, RDSO/S 11000
7	Motors for Electric point machine	IRS:S 37-2022 Version-2.0	RDSO/S 10910
8	Motors for Electric signal machine	IRS: S 39/82	SA 23906 (Adv)
9	Circuit Controller	-	Drg. No. SA- 20245, 46, 66,67,76,77,86,87 SA -22401, 420,430 & 440
10	Electric Lever Lock and Circuit Controller	-	SA 22701 and 21201/M,

I. ESSENTIAL PLANT AND MACHINERY REQUIRED FOR PRODUCTION

1. Lathe machine
2. Capstan Machine
3. Milling Machine / Vertical Milling Machine
4. Shaper Machine
5. Surface Grinding machine (for Electric Point Machine, Electric Point Detector, Electric Lever Lock and Circuit Controller, SM's Control Frame)
6. Slotting Machine (for Electric Signal Reverser, Electric Key transmitter)
7. Shearing and stamping Machine (for Electric Signal Reverser, Electric Key transmitter)
8. Hand Grinder
9. Bench Grinder
10. Drilling machine / Radial Drill Machine
11. Bench Vice
12. Crimping Machine
13. Power Press / Ball Press
14. Tools, Zigs & Fixtures
15. Spray Paint Machine
16. Electric Arc Welding Machine
17. Smithy hearth (bhatti) with blower
18. Electroplating plant
19. Hot Chamber (for Electric Motor, Electric Lever Lock and Circuit Controller, Electric Key transmitter, Electric Signal Reverser, Signal Machine)
20. Temperature Controlled Soldering / Desoldering station
21. Coil Winding Machine with counter meter (for Electric Motor, Electric Lever Lock and Circuit Controller, Circuit controller, Electric Key transmitter, Electric Signal Reverser, Signal Machine)
22. Vacuum impregnation Plant (for Electric Motor, Electric Lever Lock and Circuit Controller, Circuit controller, Electric Key transmitter, Electric Signal Reverser, Signal Machine)
23. Spot welding machine (for Point machine)
24. Riveting machine (for Point machine)
25. Gear hobbing machine (for Point machine)
26. Forging machine (for Point machine)
27. Cadmium plating plant (for Point machine)
28. Epoxy coating equipment (for motor)
29. Dust chamber as per IS:9002(Part 8)-1984. (for IP 67 compliant motor)
30. Water Immersion Tank of height 1.5 meters & capable of keeping the highest point of the motor submerged by minimum 1 meter height of water column. (for IP 67 compliant motor)

II. ESSENTIAL TESTING EQUIPMENTS REQUIRED FOR QUALITY ASSURANCE

1. Testing facilities for Chemical Analysis & Mechanical Properties Test of various materials used.
(Testing may be permitted from Govt. approved / NABL accredited lab)
2. Digital Multimeter (3.5 digit or better)
3. Insulation Tester (500 Volts)
4. Milli ohm meter
5. High voltage break down tester (0 - 3 KV)
6. Dial type pressure gauge
7. Variac (0-300 Volt)
8. Inside and out side calipers
9. Measuring Scales (Steel)
10. Measuring tape (6 meter)
11. Hardness testing machine to test castings
(Optional in case casting is outsourced. In such case, this is mandatory for the manufacturer whom this activity is outsourced.)
12. Spring balance (50 Kg to 300 Kg, as required)
13. Dial/digital type vernier calipers
14. Micrometer
15. Contact resistance test set up.
16. Test set up with volt meter, ammeter and stabilized power supply
17. Electronic Timer
18. Surface finish checking equipment
19. 'GO' and 'NO GO' gauges
20. Load test setup for Electric signal machine (for Electric signal machine)
21. Semaphore signal complete (for Electric signal machine)
22. Electronic timer (for Point Machine)
23. load test set up for point machine (for Point Machine)
24. Electronic counter (for Point Machine)
25. 52/60 kg. (UIC rail) 1 in 12 turnout (Switch portion) (for 143mm Throw Point machine. Optional)
26. 60 kg. Thick Web Switch 1 in 12 turnout (Switch portion) (for 220mm Throw Point machine)
27. Profile gauges to check notches of lock & drive rods (for Point Machine)
28. AC immunity tester (for Point Machine, motor)
29. Tacho meter. (for motor)
30. Temperature rise test set up (for Motor)
31. Motor torque/Momentary over load test set up (for Motor)
32. Ultrasonic Flaw Detector (for Electric Point Machine. Testing may be permitted from authorized accredited outside agencies.)

Note:

1. Plant, machinery and testing equipments given above are only indicative. All necessary plant and machinery of adequate capacity and testing equipments as necessary to manufacture the product as per RDSO specification and drawings and to ensure quality shall be provided.
2. Outsourcing, if any, of any component/ sub assembly shall be indicated in the 'Quality Assurance Plan' and approval of RDSO, Lucknow shall be obtained. Outsourcing of a vital component/ sub assembly shall be from ISO-9000 certified manufacturer. In case of outsourcing, the ultimate responsibility to ensure quality, reliability and compliance of RDSO specification & drawings for the outsourced component/ sub assembly shall be of the vendor of the electromechanical signalling item and all necessary tests and checks shall be done by him to ensure the same. Sampling plan and details of tests and checks proposed to be conducted by him on outsourced components/ sub assembly shall be indicated in the QAP. Proper test record with traceability to the final product shall be maintained.

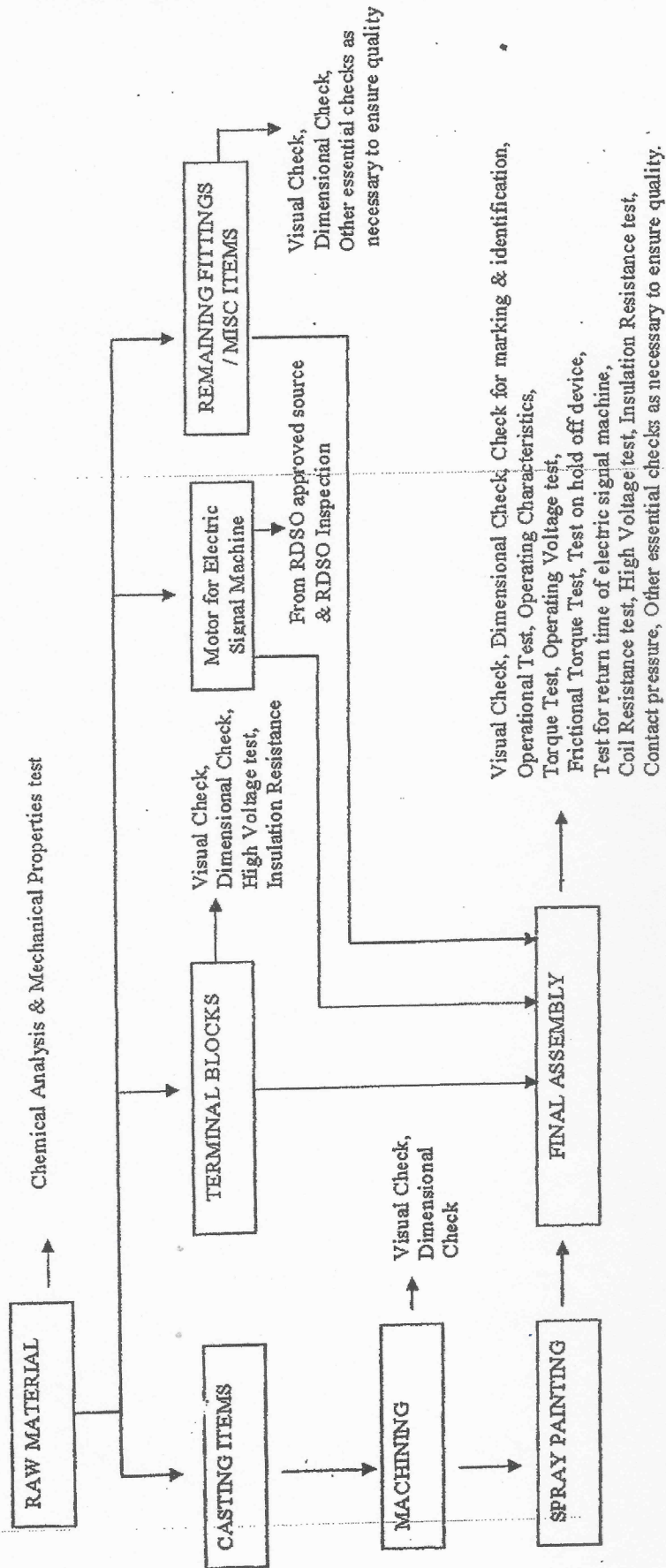
In case manufacturing of some component/ sub assembly is outsourced, plant & machinery as required for manufacturing of that component/ sub assembly may be considered optional for the vendor applying for registration/ approved by RDSO.

3. Audit of the manufacturing process of outsourced component/ sub assembly in the manufacturing premises shall be carried out by the vendor of the electromechanical signalling item atleast once a year and report submitted to Director/QA/RDSO. Duly qualified persons having knowledge of the outsourced manufacturing process shall be deputed for audit. Proper audit record shall be maintained.
4. Checks and tests shown in the Quality Assurance Flow Charts are only indicative. All necessary checks and tests as necessary to ensure quality shall be carried out at every stage of manufacturing and proper record of all checks and tests shall be maintained.
5. This STR shall be applicable to all new vendors applying for registration.
6. All existing approved vendors shall be advised for implementation of new STR. A reasonable period for compliance shall be given.

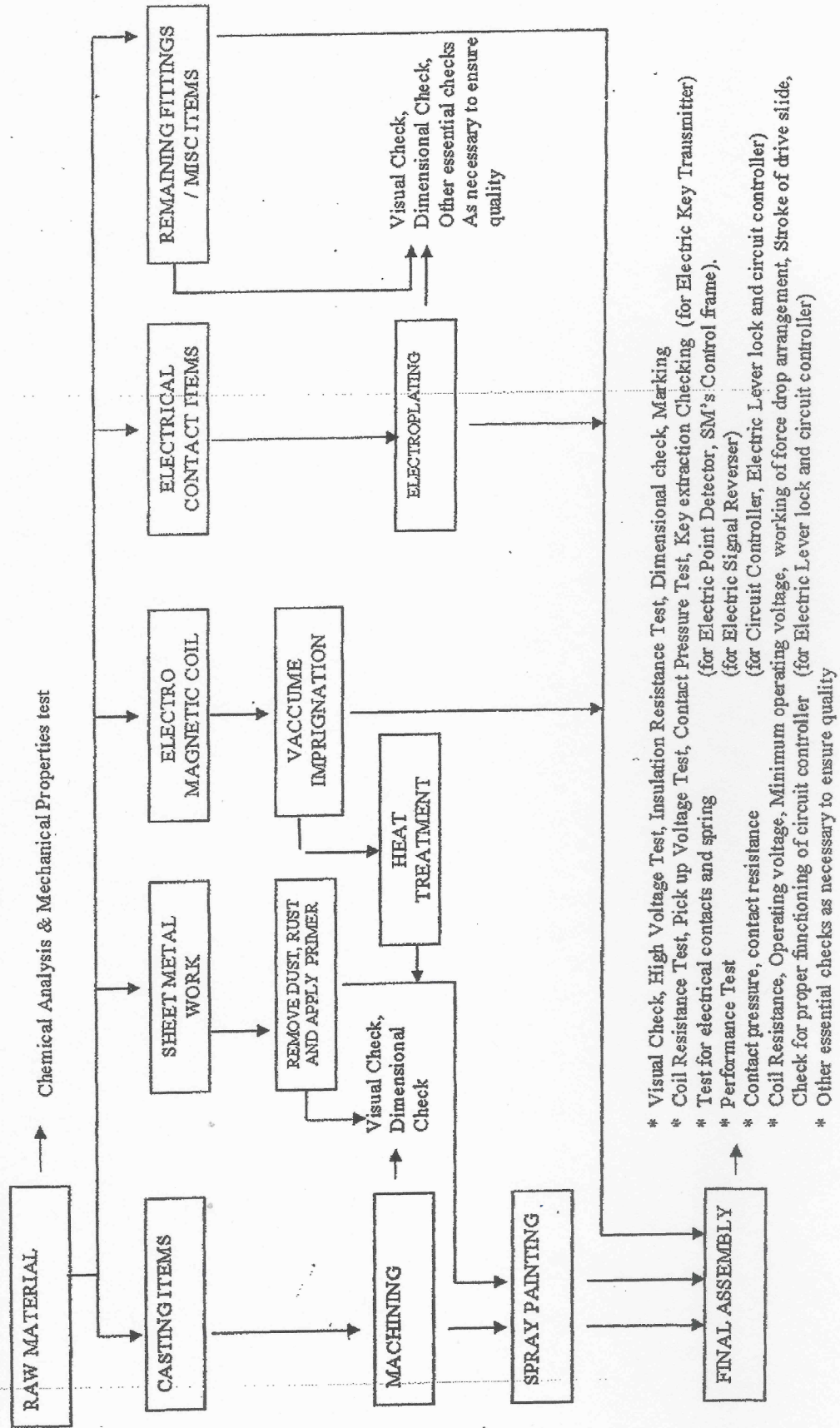
III. COPY HOLDER:

ED / QA/S&T/RDSO
DSIG-EM
ADE/ES-II

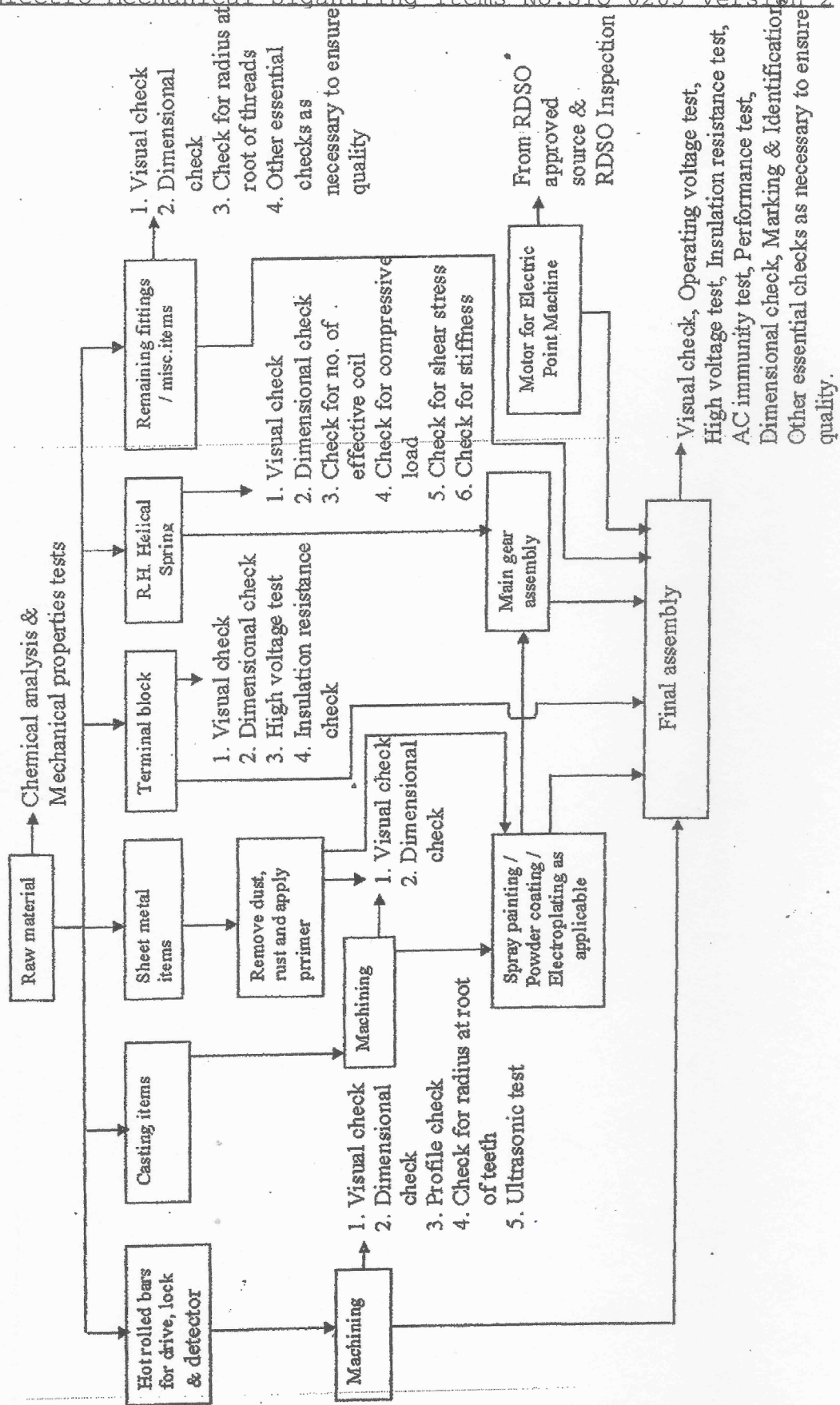
Quality Assurance Flow Chart For Electric Signal Machine



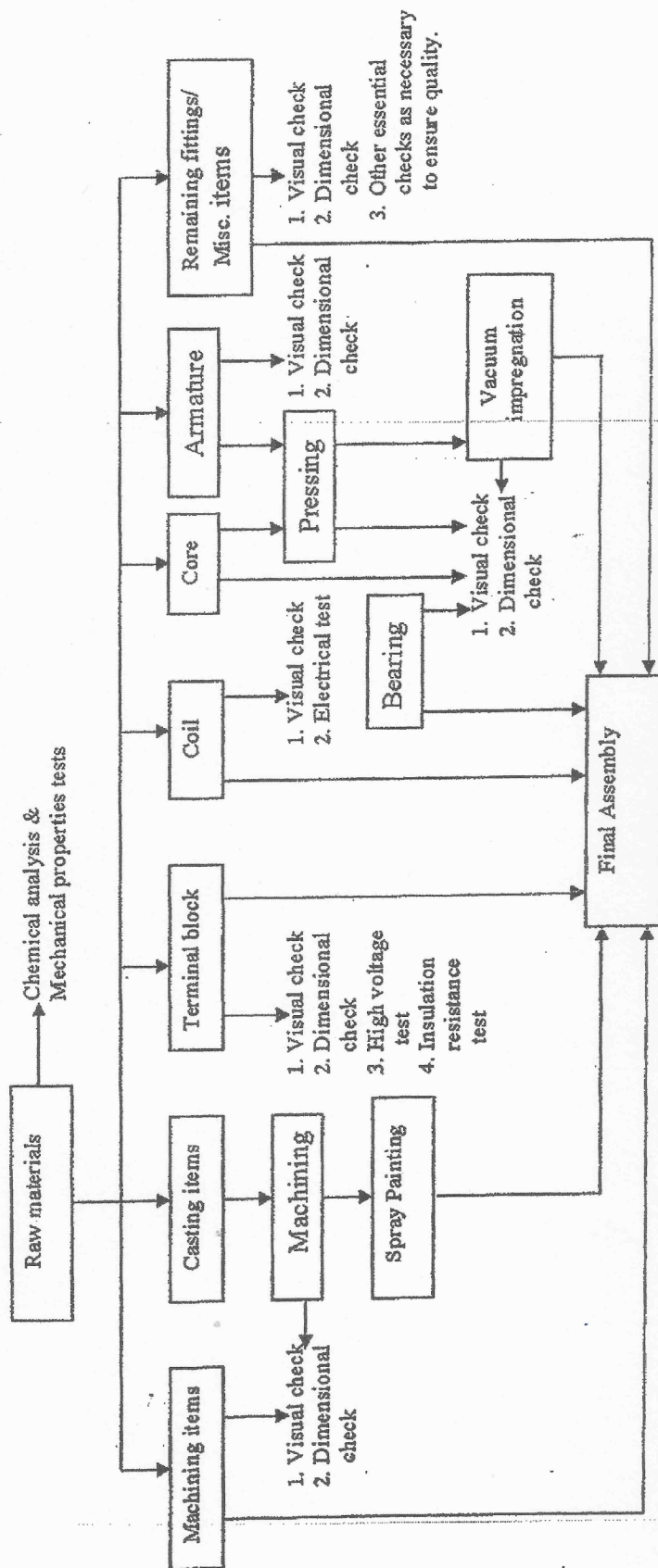
Quality Assurance Flow Chart For
Circuit Controller, Electric Lever lock and Circuit Controller, Electric Point and Lock Detector,
Electric Signal Reverser, Electric Key Transmitter and SM's Control Frame



QUALITY ASSURANCE FLOW CHART FOR ELECTRIC POINT MACHINE



QUALITY ASSURANCE FLOW CHART FOR MOTORS OF ELECTRIC POINT MACHINE & ELECTRIC SIGNAL MACHINE



Visual check, Marking & Identification. Insulation resistance test, High voltage test, Test for Operating requirements, Temperature rise test, Momentary overload test, AC immunity test, Test under full load condition (for Motor of Electric Point Machine), Other essential checks as necessary to ensure quality.

Dust Ingress Test and Water Immersion Test shall be conducted on IP-67 compliant motors for EPM.