



## ACHIEVEMENT MEASUREMENT 2



# INFORMATION FOR EMPLOYERS AND APPRENTICES

**@ National Electrotechnical Training Organisation, 2001**

## INFORMATION FOR EMPLOYERS AND APPRENTICES

The Achievement Measurement 2 (AM2) skill test must be taken by apprentices who are approaching the end of their training for the JIB Apprentice Training scheme and the electrical installation engineering Modern Apprenticeship and others who wish to use the test to accredit practical experience.

The leaflet contains information on the first major revision of the test to be carried out since its inception in 1985. The revision has been carried out to enable the test to match current working practice in the electrical installation industry and includes a completely new test section concerned with the rectification of faults. The AM2 (revised) skill test was effective from the 1<sup>st</sup> September 1997 and available through the approved test centres.

The duration of the AM2 skill test will be three days.

*Throughout this leaflet, the term Candidate refers to an Apprentice or Adult undertaking the test*

### THE TEST

The AM2 skill test comprises four sections:

A1	Composite installation
A2	Visual inspection
A3	Functional operation
B	Inspection and testing of the composite installation
C1	Safe isolation of test unit (including risk assessment)
C2	Safe isolation of supplies
D1	Fault diagnosis
D2	Fault rectification

The four sections must be completed within the specified target times. The work must comply with the requirements of the current IEE Wiring Regulations (BS 7671) and Health and Safety Regulations. Candidates will be permitted to refer to the current edition of the IEE Wiring Regulations (BS 7671), IEE Guidance Note No.3 Inspection and Testing and the IEE On-Site Guide (OSG) during the tests. Candidates will work on a standard test unit, using drawings, block and circuit diagrams and written instructions.

Candidates must present themselves at the test centre dressed in suitable working clothing and wear sound footwear.

The AM2 skill test can only be taken at an Approved AM2 Test Centre, licensed annually by the National Electrotechnical Training Organisation (NET). A test place should be booked directly with an Approved AM2 Test Centre (see approved list). Candidates must provide photographic identification to the Approved AM2 Test Centre prior to commencement of the test.

## EMPLOYER AND CANDIDATE CHECK LIST

Preparation on the points listed below should prove beneficial when taking the AM2 skills test.

### Employer

- Provide sufficient lead time for the candidate to prepare
- Ensure candidate is prepared
- Provide refresher training as necessary
- Provide candidate briefing prior to the test
- Encourage the candidate to approach the test in a positive and confident manner

### Candidate

- Understand what competencies you are required to demonstrate
- Familiarise yourself with correct isolation of supply procedures
- Study and understand the power circuit requirements
- Note carefully the motor control function requirements
- Familiarise yourself on the fault diagnosis techniques
- Check the inspection and testing procedures as listed in the IEE On-Site Guide
- Be familiar with the appropriate test instruments and their correct usage

*Note on the provision of tools*

*A set of tools will be required to carry out the installation work. Candidates should use their own tools provided these have been checked by the examiner and found to be sound and in a safe condition. Stanley type knives and cordless screwdrivers are not permitted for installation work.*

## A1 COMPOSITE INSTALLATION

Target time 10 hours

This is an installation which includes a range of electrical wiring systems, each devised to test a candidate's proficiency in particular aspects of electrical installation work. The electricity supply will be provided from a TN-S three phase 4 wire 400V system.

The illustration (Figure A) shows the layout of prefixed components on the test unit. Figure B shows the layout of the completed installation.

### INSTALLATION ASPECTS

### SKILL ACTIVITY

PVC/SWA/PVC Cable 10MM <sup>2</sup> four core	Measuring, cutting to length, installing and terminating between pre-fixed equipment.
Metal Conduit 20mm	Measuring, cutting to length, filing and reaming, bending, threading, installing between pre-fixed equipment.
Main Equipotential and Supplementary Bonding	Measuring, clipping and dressing, terminating and fixing bonding clamps on service pipes etc.
Mineral Insulated Cable (PVC sheathed) 4L 1.5mm <sup>2</sup> MICC	Measuring, cutting to length, shaping, dressing, securing, terminating, glanding; identifying conductors and connecting between pre-fixed equipment.
Circuit Wiring - Lighting Circuit	Install PVC insulated cables for the two way and intermediate lighting circuit. Install key operated override 'on' switch adjacent to the intermediate switch.
Emergency Luminaire	Install FP200 2 core and earth cable between the plastic dado trunking and 20mm end box. Connections to be to the Luminaire Support Coupler (LSC).
Industrial Socket Outlet (400V)	Install and connect the 16A triple pole and earth socket outlet to the output terminals of the 20A TP&N switchfuse.
Three Phase Motor Circuit	Installing cables in trunking and conduit; terminating and making connections between a three phase squirrel cage motor, a motor starter, a remote start/stop/inch station and run and trip warning lights, with the aid of a wiring diagram. (see fig. C)
SRCD	Install cables in metal trunking to SRCD.

Circuit Wiring –  
Ring Circuit

Installing cables in metal and PVC trunking and PVC conduit; terminating and making connections from the distribution board to:

- a ring circuit of 13A switch-socket outlets.
- a spur to a 13A socket outlet including flexible cable to a tubular heater via a 13A plug.

## **A2 VISUAL INSPECTION**

**Target Time 30 minutes**

Candidates are to carry out a visual inspection of the completed installation as required by the current edition of the IEE Wiring Regulations (BS 7671) and establish whether the results are acceptable by completing the Visual Inspection test sheet provided.

## **A3 FUNCTIONAL TESTING**

**Target Time 30 Minutes**

After the installation has been inspected and tested each candidate will be required to demonstrate that the following final circuits operate correctly:

- Two-way and intermediate switched lighting circuit
- Operate the Landlords Key Switch
- Operate the Emergency Luminaire Key Switch to effect simulated mains failure
- Tubular heater
- Motor and control circuit

## **B INSPECTION AND TESTING**

**Target Time 1 Hour 30**

**Minutes**

On completing the composite installation, each candidate will be required to carry out prescribed pre-commissioning electrical installation tests in accordance with the IEE Wiring Regulations (BS 7671).

Each candidate will be supplied with necessary instructions, a copy of the current IEE OnSite Guide, test results sheets and a range of instruments from which to select and prepare the one appropriate for each test.

## **C1 SAFE ISOLATION OF TEST RIG (RISK ASSESSMENT)**

**Target Time 15 Minutes**

Each candidate, prior to the commencement of the composite installation (Section A) will be required to demonstrate the safe isolation of their test unit to ensure and verify it is safe to work on. Candidates will be required to complete an assessment of safe working practice (risk assessment) sheet.

## **C2 SAFE ISOLATION OF SUPPLIES**

**Target Time 30 Minutes**

Candidates will be required, under observation, to demonstrate how to safely isolate circuits or items of equipment to ensure and verify it is safe to work on. This section of the test is carried out on the Fault Diagnosis Unit. Safe isolation procedure is shown in Figure D.

## **D1 FAULT DIAGNOSIS**

**Target Time 1 Hour 45 Minutes**

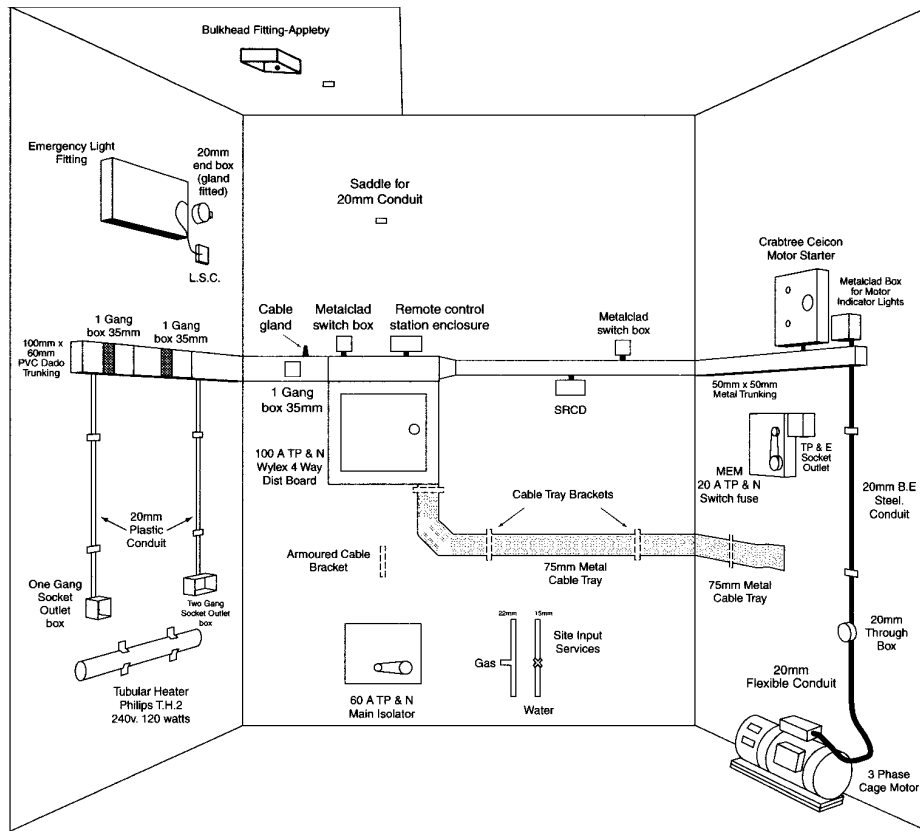
Candidates will be required to diagnose and locate seven faults, introduced to the Fault Diagnosis Unit (Figure F) by the examiner, selected from a range of common faults. Each fault will be introduced individually to the candidates by either the examiner demonstrating the fault symptom or by the use of job cards.

## **D2 FAULT RECTIFICATION (WHERE POSSIBLE)**

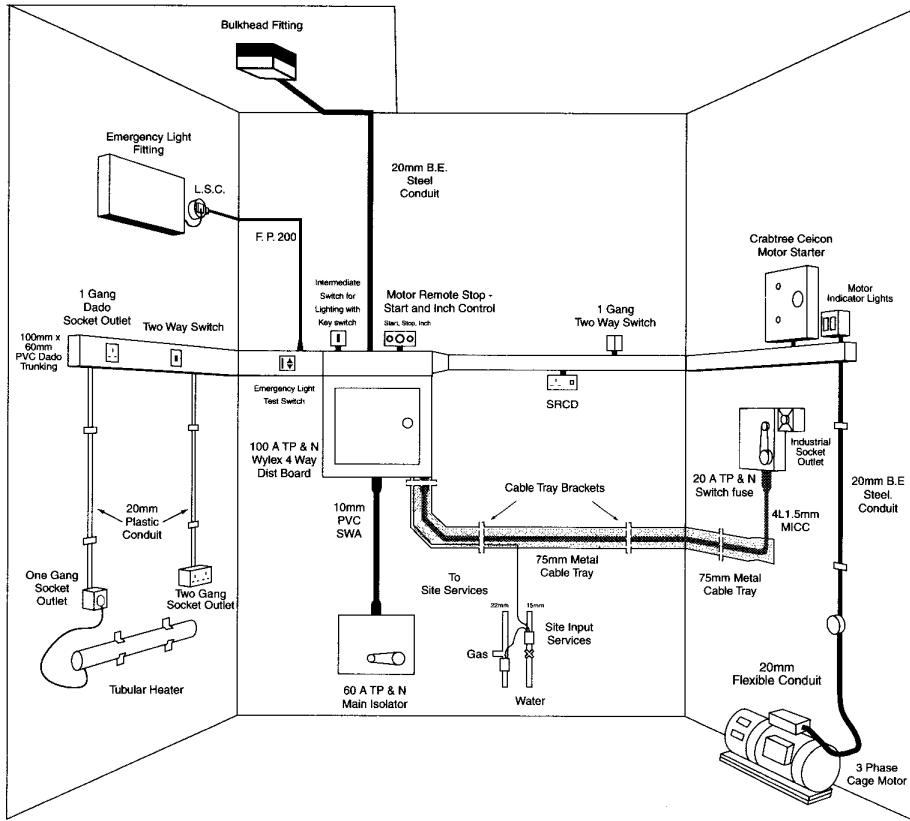
**Target Time 1 Hour 30 Minutes**

Candidates will be required to diagnose, locate and rectify (where possible) five faults which will be introduced to the Fault Diagnosis Unit. Each fault will be introduced individually to the candidates with the use of job cards. (Figure E for example)

## CANDIDATES NOTES



**FIGURE A – AM2 TEST UNIT SHOWING PRE-FIXED COMPONENTS**



**FIGURE B – AM2 TEST UNIT SHOWING COMPLETED COMPOSITE INSTALLATION**

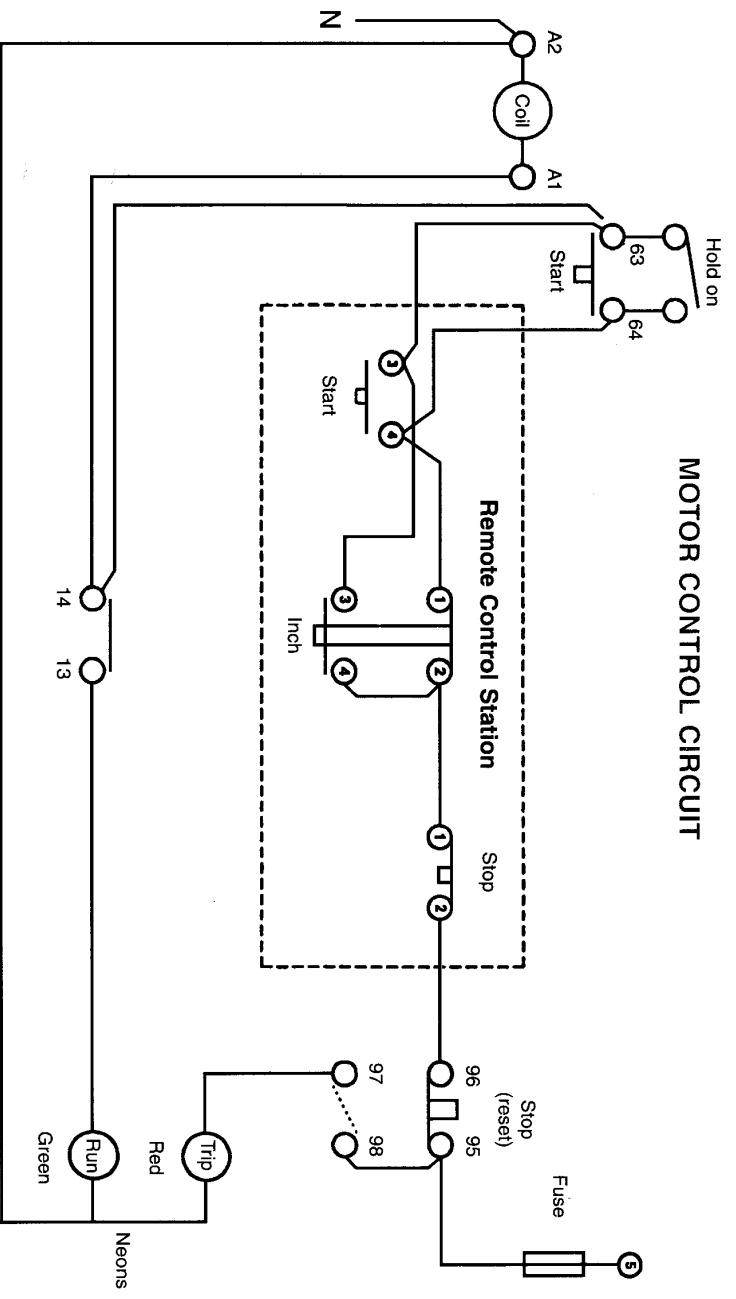


FIGURE C - MOTOR CONTROL CIRCUIT SCHEMATIC DIAGRAM

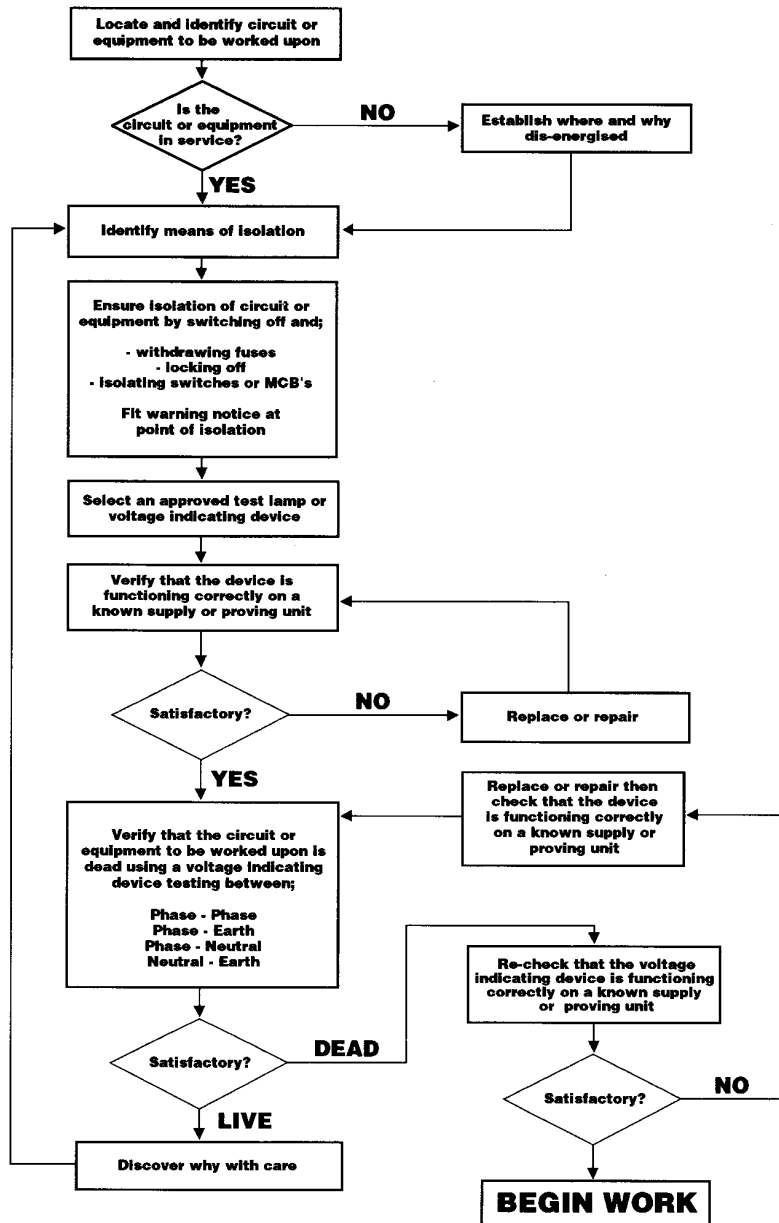
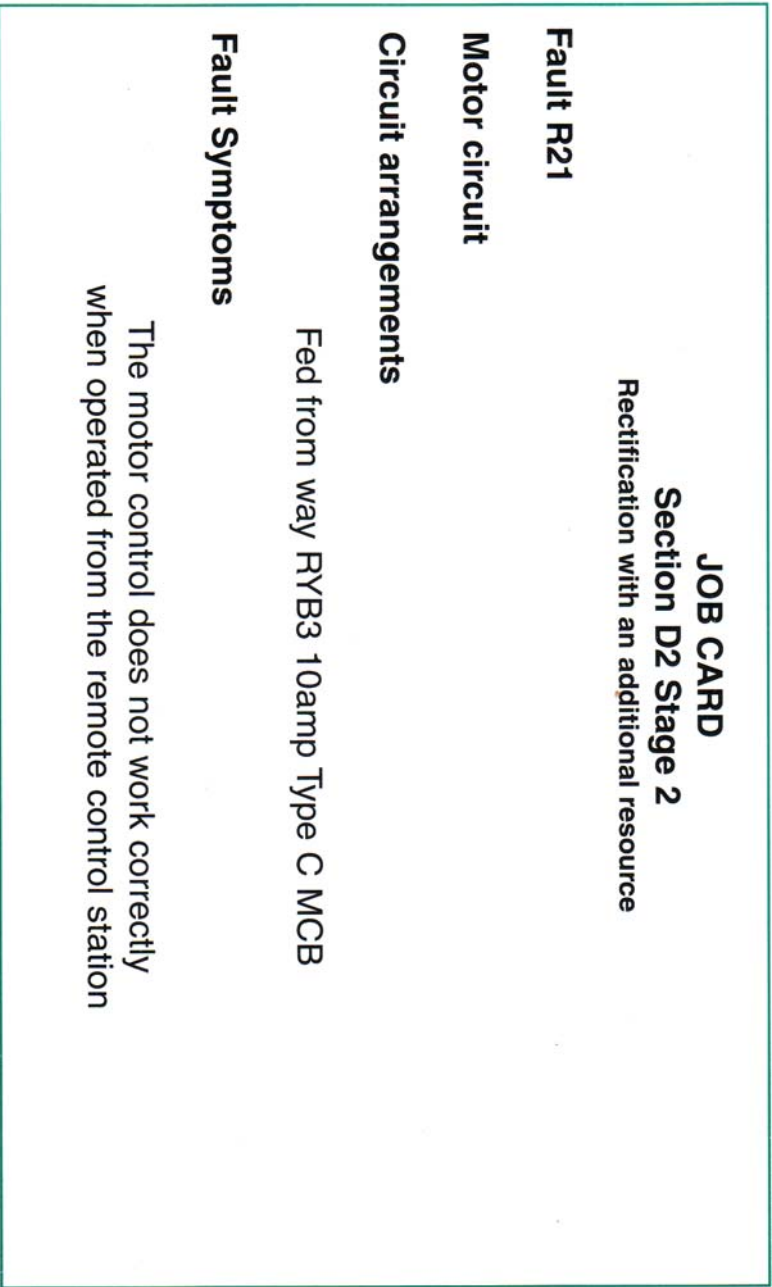
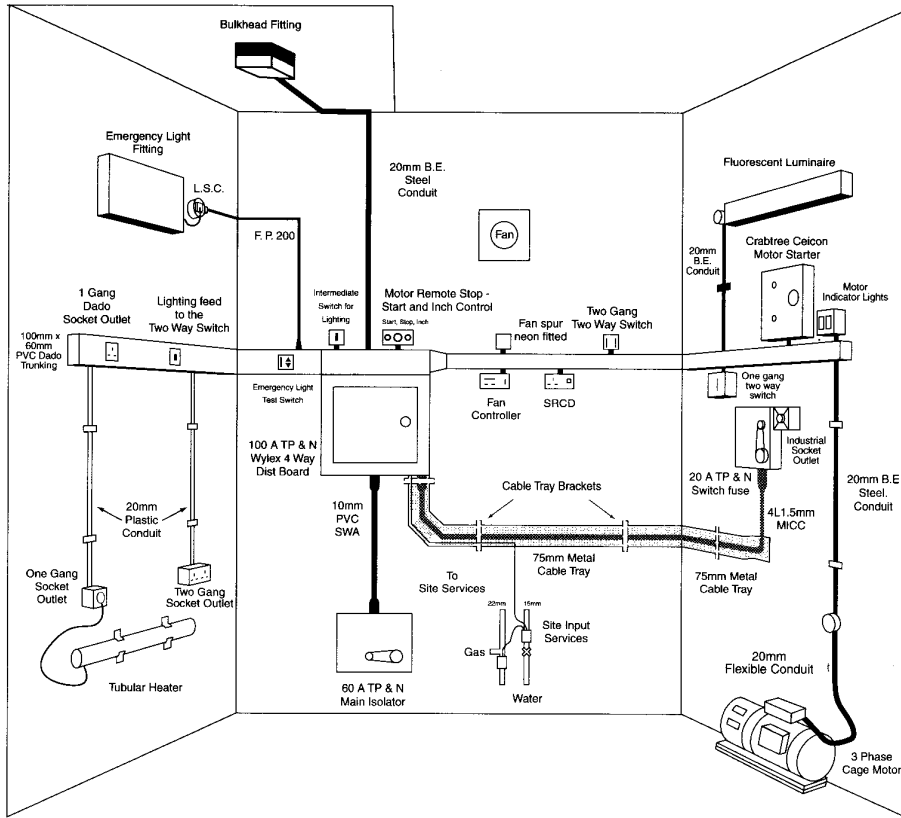


FIGURE D - SAFE ISOLATION PROCEDURE



**FIGURE E - Example of Job Card**



**FIGURE F – AM2 TEST FAULT DIAGNOSTIC UNIT**