

NON-DOMESTIC
ELECTRICAL
INSTALLATION
SAFETY CODE

By:

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SCOPE

01 INTRODUCTION

02 INSTALLATION

03 OPERATIONS

04 MAINTENANCE

05 CLOSING

PART 1:

INTRODUCTION

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FACTS & STATISTICS

CAUSES

Improper installation & maintenance

32%

Failure to practice safety work procedures

30.5%

FACTS & STATISTICS

LOCATION

Non-domestic electrical installations

26%

Residential premises

15.7%

NON-DOMESTIC
ELECTRICAL
INSTALLATION
SAFETY CODE



CUSTODIAN

01

- Developed in line with the requirement under section 33B of the ESA 1990 [Act A1501]

- All non-domestic installations & installation of licensees for retail and private.
- To owners/tenants/operators and any of their personnel/personnel of their contractors sub.c

SCOPE

02

- Suitable practices.
- Safety requirements accordance technical standards/ good practices.
- Type of tools and equipment.
- Safety management programme.

OBJECTIVES

03

PART 2: **INSTALLATION**

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PART 2: INSTALLATION

A. LEGAL REQUIREMENT

- a. Electricity Supply Act 1990:
 - Section 9
 - Section 21
 - Section 23
- b. Electricity Regulations:
 - Regulation 15 (1)
 - Regulation 110 (1)

B. DESIGN

- a. The installation shall be designed to:
 - Be safe for operation
 - Ensure a reliable & security supply of electricity

C. SELECTION OF MATERIAL & EQUIPMENT

- a. Material and equipment shall be adequate in terms of their:
 - Thermal ratings
 - Mechanical strength

PART 2: INSTALLATION

D.

Means of Isolation

Isolation as required by Regulation 18, ER 1994

E.

Safety Considerations

Accordance with the relevant standards and regulations

F.

Determination of MD

Suitable diversity factors shall be applied at the design stage

G.

Determination of SC Currents

Three phase symmetrical short-circuit current values a has to be calculated

PART 2: INSTALLATION

H.

PROTECTION



**1.
ELECTRICAL
SHOCK**

**2.
THERMAL
EFFECT**

**3.
VOLTAGE
DISTURBANCES**

**6.
SUPPLY
DISTURBANCES**

**5.
ELECTROMAGNETIC
DISTURBANCES**

**4.
OVERCURRENT &
EARTH FAULT
CURRENT**

PART 2: INSTALLATION

I. SELECTION & ERECTION OF ELECTRICAL EQUIPMENT



1) NOMINAL VOLATAGE & PERMITTED TOLERANCE

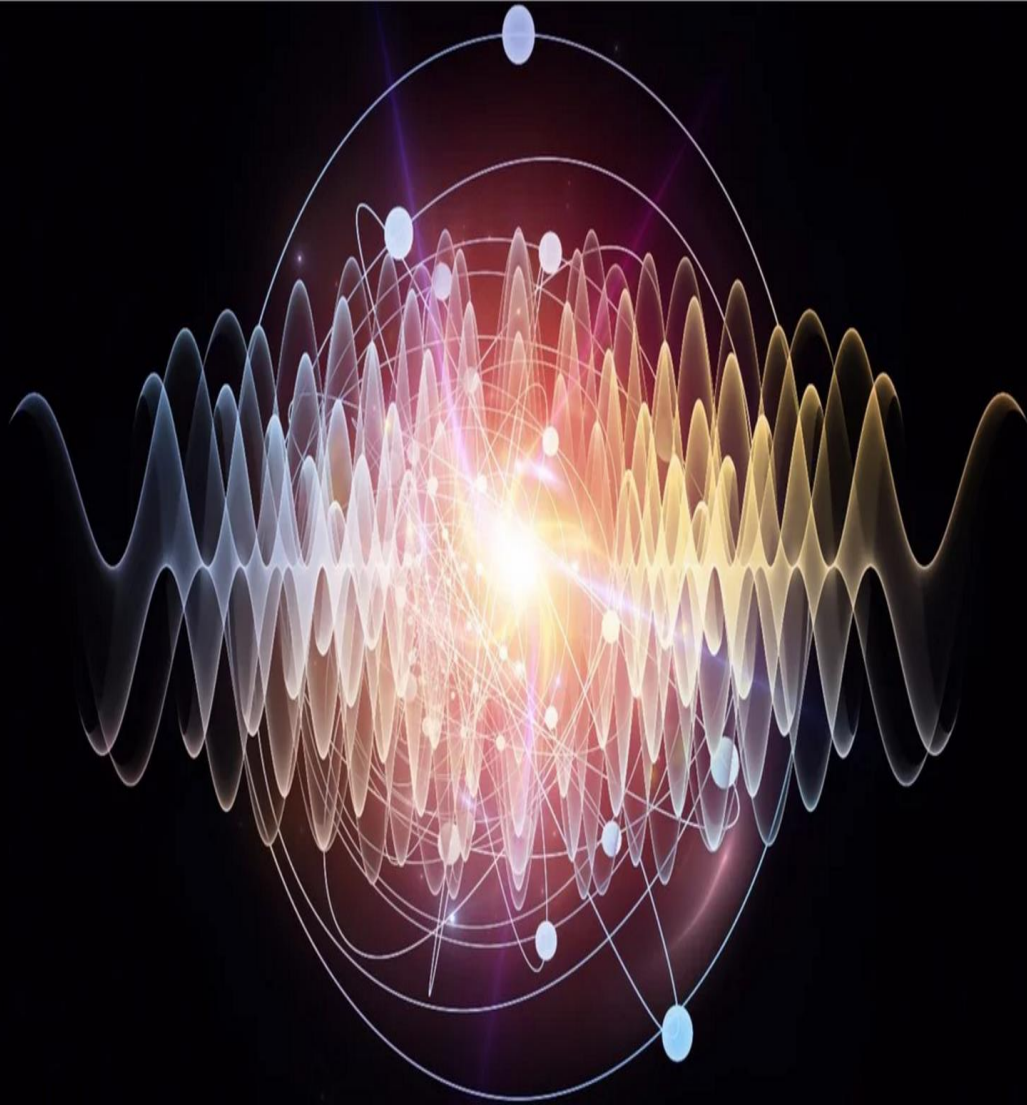
**MALAYSIA COMPLY WITH
EUROPEAN AGREEMENT**

HERE ARE THE DETAILS:

- ◆ **Before Year 2008: 240/415 +5% - 10%**
- ◆ **After Year 2008 : 230/400 -6% +10%**

PART 2: INSTALLATION

I. SELECTION & ERECTION OF ELECTRICAL EQUIPMENT



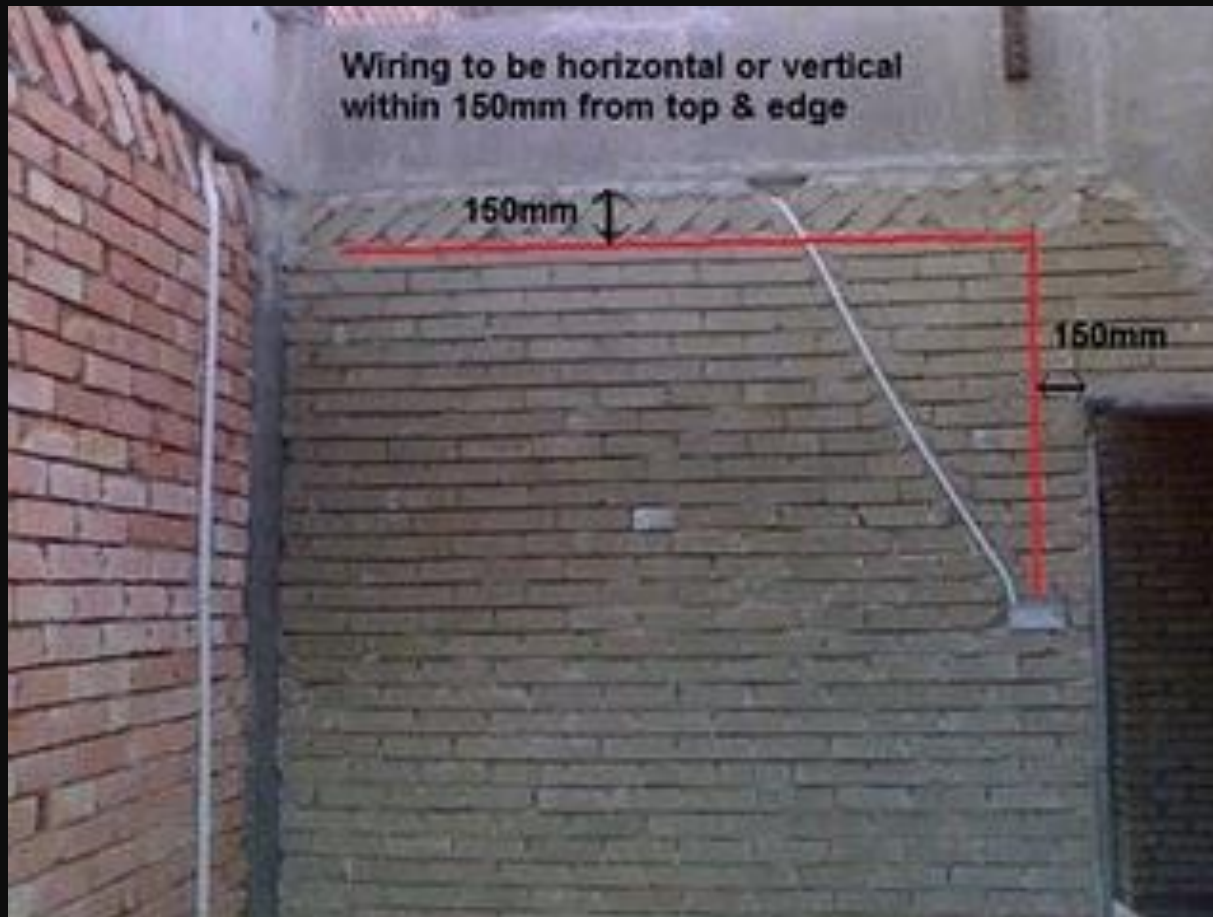
2) SUPPLY FREQUENCY

50 Hz

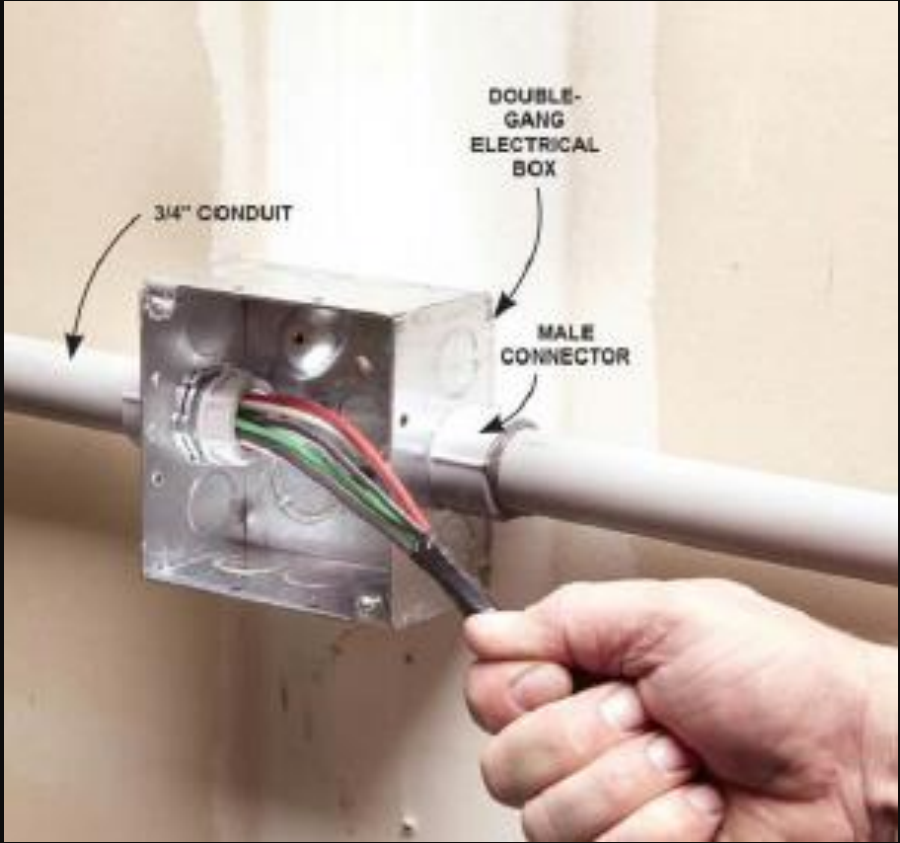
+ -1%

PART 2: INSTALLATION





Picture 1 - COP28; Wiring buried behind wall must be installed horizontally or vertically within 150mm from top and edge of wall.



PART 1: INSTALLATION

K. OTHER EQUIPMENT

Shall be appropriate for use in terms of:

- ❖ safety
- ❖ electromagnetic compatibility
- ❖ service provided

Shall be constructed:

- ❖ in a manner for it to function as intended
- ❖ taking into consideration the environment where it is placed





L. Competent Control

- Done by or under the direct supervision of competent persons

M. Precautions for Work on Equipment Made Dead

- Prevent electrical equipment which has been made dead, from becoming electrically charged.

N. Work on or Within the Safety Clearance to Live Conductors

- No person shall be engaged in any work or activity on or within safety clearance to any live conductor.

O. Working Space, Access and Lighting

- Adequate working space/means of access/lighting shall be provided to prevent injuries.

P. Permit to Work

Owner shall ensure there is an **APPROVED WORK CERTIFICATION SYSTEM** which shall include:

1. Authorisation for the issuance and cancellation of PTW for the component of the installation concerned

2. Access be given for the parts /area of the installation which are safe to conduct work

3. Knowledge and competency needed for the person requesting the PTW



PART 2: INSTALLATION



- Q. Supervision & Testing of Installations**
- R. Initial Inspection, Testing & Commissioning**
- S. Safety Clearance**

PART 3: **OPERATIONS**

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PART 3: OPERATIONS



All operational works shall be in accordance with the requirements of this **CODE and the owner's and/or operator's **SAFETY MANAGEMENT PROGRAMME****

PART 3.1:

SAFETY MANAGEMENT PROGRAMME

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ELEMENTS OF SAFETY MANAGEMENT PROGRAMME

- SMP required for managing electrical risks **should incorporate essential management elements of an effective safety management system.**
- However, the specific plan or programme **may vary in their details** depending on the nature of the electrical works and risks at the particular infrastructure or installation.

AUDIT CHECKLIST



AUDIT CHECKLIST

- It is recommended that **the checklist be used as a guide or benchmark** by the responsible parties under the Act

ELEMENT 1: POLICY AND PROGRAMME

1.1 Electrical Safety Policy & Programme:

- The licensee/installation has a written policy, programme to ensure electrical safety.
- The policy, signed by the top management.
- The objectives, responsibilities and arrangements.

1.2 Documentation:

- Maintained and readily accessible.
- Contain information on electrical safety



ELEMENT 2: ORGANISING



DANGER

2.1 Responsibility:

- Assigns duties responsibility for electrical safety management to line management.

2.2 Competence:

- Adequate training and information on electrical safety.
- The company complies with ESA 1990 & ER 1994.

2.3 Communication:

- Disseminate information on electrical risks and control measures.
- Warning signs are used.
- Arrangements suggestions and complaints.

ELEMENT 3: PLANNING & IMPLEMENTATION



3.1 Planning and Implementation:

The installation's electrical safety management programme supports:

- Compliance with ESA 1990, ER 1994, codes and guidelines.
- Implementation of all elements of the electrical safety management system.
- Continual improvement.

ELEMENT 4: RISK CONTROL MEASURES



4.1 Identification, Evaluation and Control of Risks:

- Elimination
- Substitution
- Engineering controls
- Administrative controls
- PPE

4.2 Permit-To-Work System:

A written Permit-To-Work (PTW) system must be made available.

4.3 Emergency Preparedness:

A written emergency preparedness programme for the installation is available and made known to employees and regularly rehearsed.

ELEMENT 5: PERFORMANCE EVALUATION

5.1 Investigation of Electrical-related Accidents and Incidents:

- Carried out by competent persons, with the appropriate participation of management and workers.

5.2 Performance Monitoring and Review:

- A system for installation's management to regularly monitor electrical safety performance is established.
- Records and statistics of electrical accidents.

PERFORMANCE



EXCELLENT

GOOD

AVERAGE

POOR

ELEMENT 6: ACTION FOR IMPROVEMENT

6.1 Preventive and Corrective Action:

- Arrangements for preventive and corrective actions are established and updated.

6.2 Continual Improvement:

Take into account the results of:

- Risk assessments
- Performance measurements investigations
- Audits
- Changes in ESA 1990 & ER 1994
- Benchmarked with other similar organisations



PART 4: **MAINTENANCE**

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IMPORTANT!

**Maintenance
Schedules**

**Precautions when
Working on Installation**

**Use of Personal
Protective Equipment**

**Maintenance of
Records**



PART 5: **CLOSING**

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IMPORTANT!

ELECTRICITY SUPPLY (AMENDMENT) ACT 2015

Code by Commission

SECTION 50A / 50E

ELECTRICITY SUPPLY ACT 1990

[Act 447]

NON-DOMESTIC ELECTRICAL INSTALLATION SAFETY CODE

KOD/ST/No.4/2016

IN exercise of the power conferred by Section 50A of the Electricity Supply Act 1990 [Act 447], the Energy Commission, with the approval of the Minister makes the following Code:

Citation and Commencement

1. This Code may be cited as the "Non-Domestic Electrical Installation Safety Code".
2. The Non-Domestic Electrical Installation Safety Code will be issued by the Commission, based on the approval by the Commission on 20th October 2016 and the Minister on 24th December 2016 and shall be enforced and effect from the date of registration.

Application of the Code

3. This Code shall be applicable to all non-domestic installations of consumers and installation of licensees for retail and licensees of private installation where electricity is supplied to, except installations as stated in part 1.2.4 of the Code.

Interpretation

4. The term and expression used shall, unless defined in the Code or the context otherwise requires, have the same meaning as in the Act or Regulations made under it.

Notice by the Commission

6. The Energy Commission may issue written notices from time to time in relation to the Code.

Amendment and Variation

7. The Energy Commission under Section 50b of Electricity Supply (Amendment) Act 2015, may at any time review, amend, modify, vary or revoke this Code or any part thereof, under the following circumstances:

- i) to effect changes in the electricity supply industry;
- ii) where it is expedient to address safety aspect of electrical installation in respect to design, construction, inspection and testing, operation and maintenance;
- iii) as recommended by the Non-Domestic Electrical Installation Safety Code Committee and approved by the Energy Commission; or
- iv) any other justifiable reasons as the Energy Commission deems necessary.

Dated : 17 MAY 2017



Suruhanjaya Tenaga
Energy Commission

DATUK IR. AHMAD FAUZI BIN HASAN
Chief Executive Officer
for Energy Commission

THANK YOU

Question?

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