CIRCUIT PROTECTION

AUTOMATIC DISCONNECTION of SUPPLY

USE OF CLASS II EQUIPMENT

ELECTRICAL SEPARATION

AS 3000:2007

2.4.2 PROTECTION BY AUTOMATIC DISCONNECTION OF SUPPLY

2.4.3 TYPES OF DEVICES

ENCLOSED FUSE LINK AS 60269

MINIATURE OVER CURRENT BREAKER AS 3111

MOULDED CASE CIRCUIT BREAKER AS 60947.2

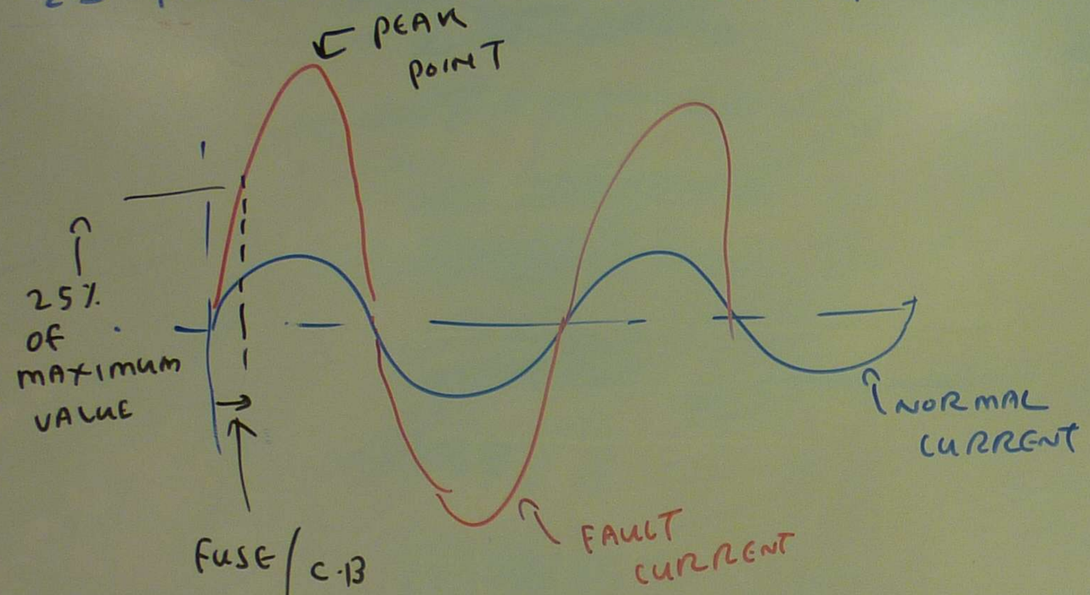
FIXED SETTING RCD AS/NZS 3190

(SEMI ENCLOSED REWIRABLE FUSES SHALL NOT BE USED)

2.5

25
OF
MA
VA

2.5 PROTECTION AGAINST OVER CURRENT



OPERATES TO CUT OFF THE SUPPLY

$$I_B \leq I_N \leq I_Z$$

&

$$I_2 \leq 1.45\, I_Z$$

I_2 = EFFECTIVE OPERATION CURRENT

IT NEEDS TO FOLLOW THE ABOVE EQUATIONS TO CO-ORDINATE THE PROTECTION

2.5.3.1 PROTECTION CO-ORDINATION

I_B - MAXIMUM DEMAND CURRENT (AS3000 → MAXIMUM DEMAND

APPENDIX - C - AS3000

I_N - NOMINAL CURRENT OF PROTECTIVE DEVICE 10.A FUSE

I_Z - CONTINUOUS CURRENT CAPACITY OF CONDUCTOR

AS3008

2.5.4.1

PROTECTION

CURRENT

THE PROSP

CURRENT

OF ELECTRI

DETERMI

$$t = \frac{k^2}{}$$

t = SHOR

TIM

k = M

S = C

I = E

2.5.4.1

PROTECTION AGAINST SHORT CIRCUIT CURRENT

THE PROSPECTIVE SHORT CIRCUIT CURRENT AT EVERY RELEVANT POINT OF ELECTRICAL INSTALLATION SHALL BE DETERMINED BY - CALCULATION

(OR)

MEASUREMENT

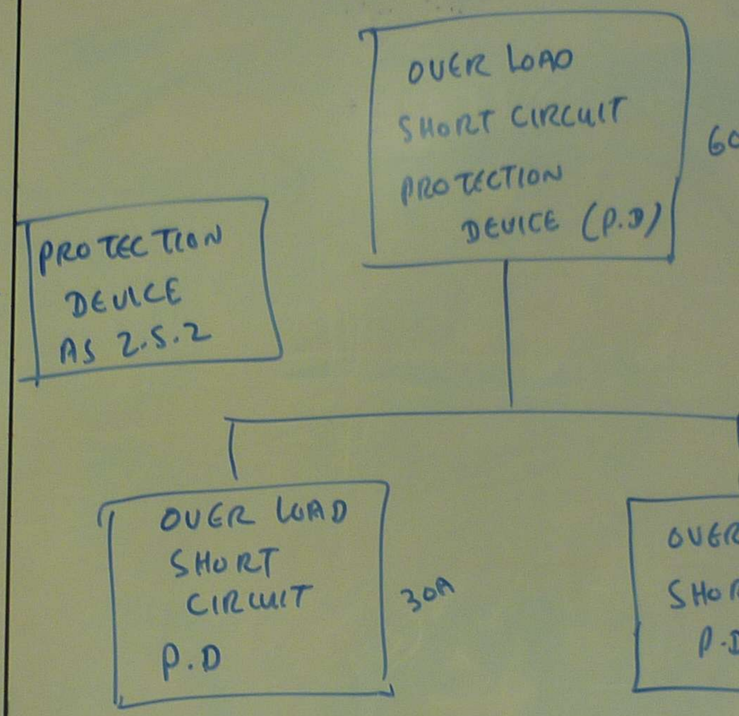
$$t = \frac{k^2 S^2}{I^2}$$

t = SHORT CIRCUIT CURRENT TIME OF DURATION

k = MATERIAL FACTOR

S = CONDUCTOR C.S.A

I = EFFECTIVE SHORT CIRCUIT CURRENT



OVER LOAD / SHORT CIRCUIT PROTECTION

2.5.3.2 / 2.5.4.2

AS 2.5.2

CIRCUIT BREAKER (OVER LOAD / SHORT CIRCUIT RELEASE)

FUSE COMBINATION UNITS

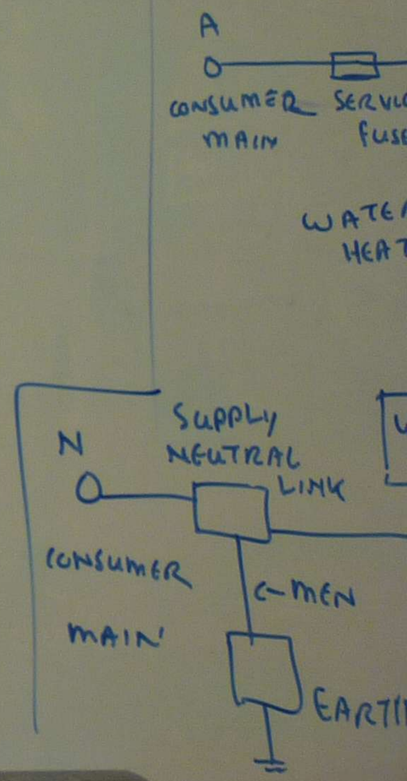
HRC FUSE

C.B IN CONJUNCTION WITH FUSE

AS 2.5.3.2

POSITION OF PROTECTIVE DEVICES.

AS 2.5.4.2 POSITION OF SHORT CIRCUIT DEVICES



60A

D)

OVER LOAD / SHORT CIRCUIT PROTECTION

2.5.3.2 / 2.5.4.2

OVER LOAD
SHORT CIRCUIT
P.D

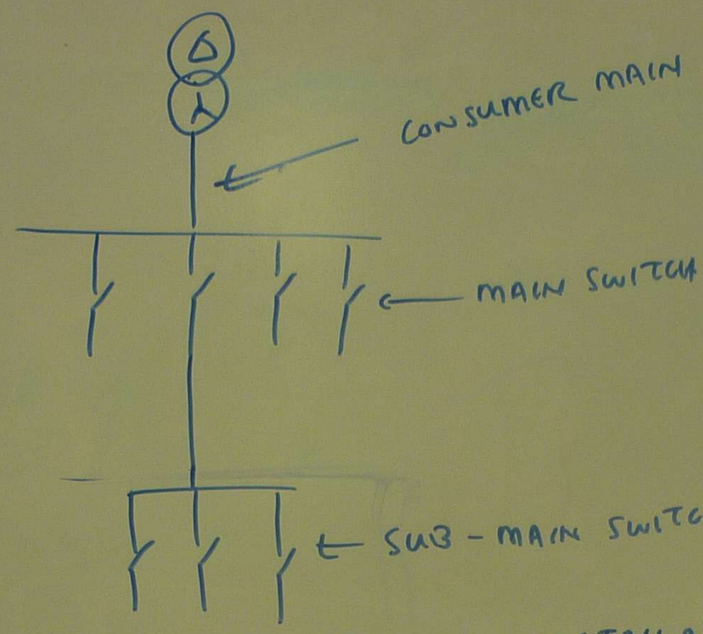
30A

UAD / SHORT
UIT RELEASE)

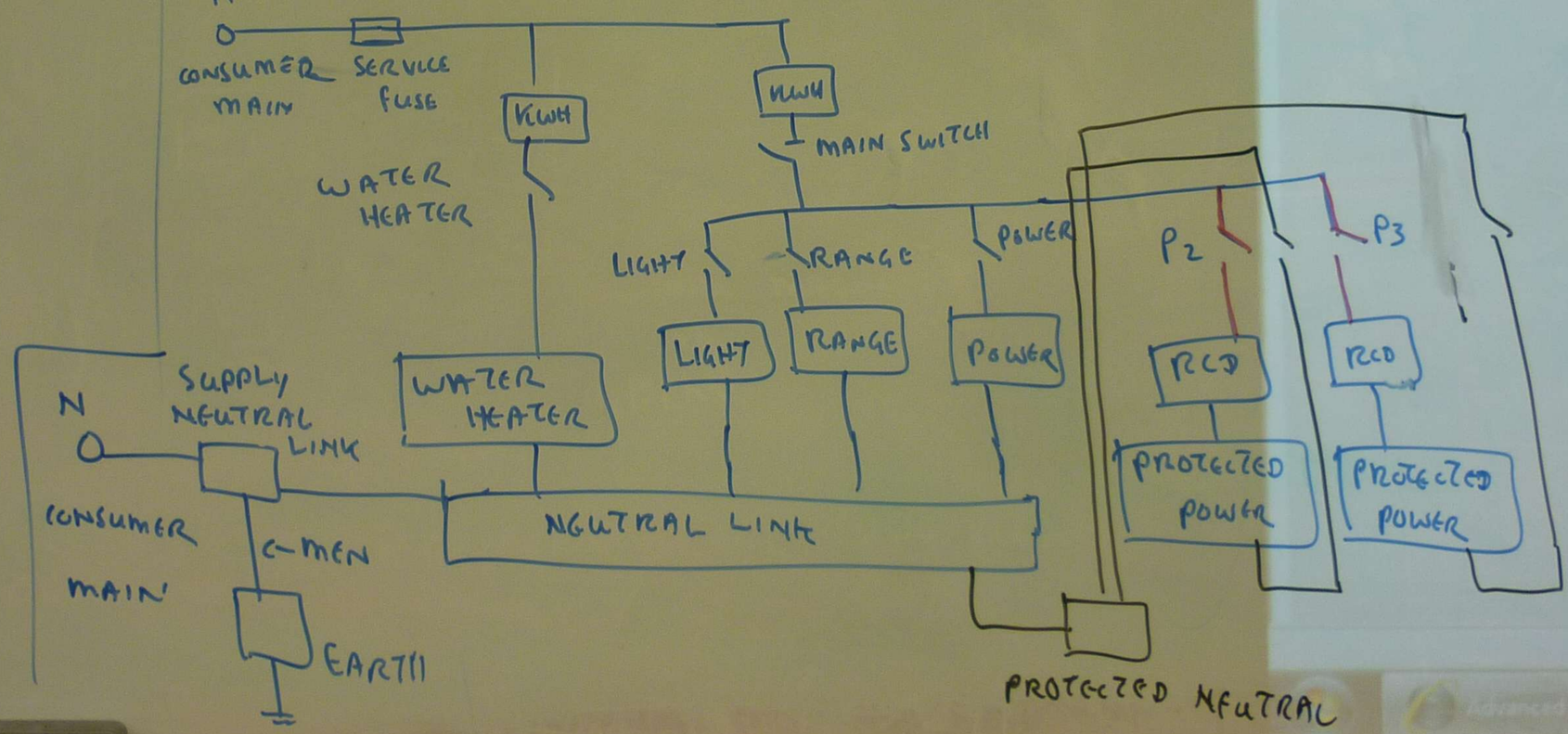
ITH FUSE

ECTIVE DEVICES.

OF SHORT CIRCUIT
DEVICES



TYPICAL INSTALLATION CIRCUIT ARRANGEMENT



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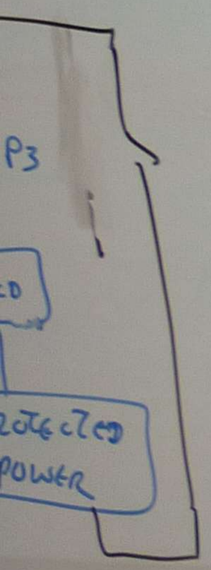
TUTORIAL

1. WHAT TYPES OF PROTECTION DEVICES ARE TO BE UTILIZED IN CIRCUIT PROTECTION ?
2. WHAT IS THE REQUIREMENT OF PROTECTION DEVICE?
3. WRITE THE EQUATION FOR PROTECTION SCHEME CO-ORDINATION.
4. WRITE THE FORMULA FOR PROTECTION AGAINST SHORT CIRCUIT CURRENT.
5. DESCRIBE THE AS 3000 RULES RELATED TO POSITION OF PROTECTIVE DEVICE, POSITION OF SHORT CIRCUIT DEVICE
6. SKETCH TYPICAL INSTALLATION CIRCUIT ARRANGEMENT.



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EARTH FAULT PROTECTION

EARTH LEAKAGE CURRENT CAN NOT BE PROTECTED BY CIRCUIT BREAKER & FUSE

EARTHING SYSTEM NEEDS TO BE PROVIDED TO METALLIC BODIES OF EQUIPMENTS.

RCD RESIDUAL CURRENT DEVICE FOR EARTH LEAKAGE PROTECTION.

RCD CLASSIFICATION

01

- TYPE I — RESIDUAL CURRENT NOT EXCEEDING 10mA
- TYPE II — RESIDUAL CURRENT BETWEEN 10mA & 30mA
- TYPE III — RESIDUAL CURRENT BETWEEN 30mA & 300mA
- TYPE IV — TYPE III WITH SELECTIVE TRIPPING TIME DELAY

PORTABLE

CLASS L

CLASS H

AS

2.6.2

THE LO

NOT B

FOLLOW

— M

TH

B

— T

9 BY

METALLIC

KAGE

EXCEEDING 10mA

EEN 10mA & 30mA

EEN 30mA & 300mA

TRIPPING TIME DELAY

PORTABLE RCD

CLASS L – HOUSE HOLD / GENERAL USE

CLASS H – GENERAL INDUSTRIAL USE.

02 – AS/NZS 3190
AS/NZS 3003

2.6.2 SELECTION & ARRANGEMENT

03

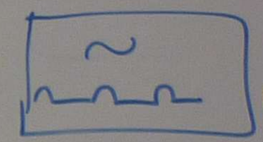
THE LOAD CURRENT RATING OF RCD SHALL NOT BE LESS THAN THE GREATER OF THE FOLLOWINGS

– MAXIMUM DEMAND OF THE PORTION OF THE ELECTRICAL INSTALLATION BEING PROTECTED BY THE DEVICE
– THE HIGHEST CURRENT RATING OF ANY OVER LOAD PROTECTIVE DEVICES.

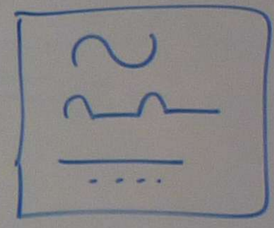
2.6.2.2 TYPE O

AC RCD

TYPE (A)



TYPE (B)



TYPE (S) TIME DELA
'S'

ERAL USE

RIAL USE.

NAGEMENT

03

OF RCD SHALL

GREATER OF THE

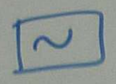
F THE PORTION OF

LATION BEING PROTECTED

NT RATING OF ANY OUER

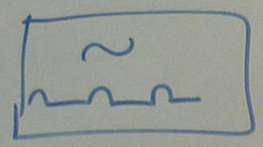
VICES.

2.6.2.2 TYPE OF RCD



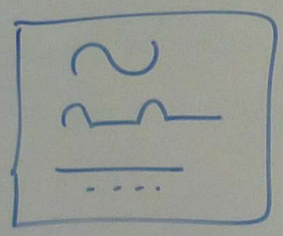
AC RCD

TYPE (A)



AC - RCD
RESIDUAL PULSATING DC

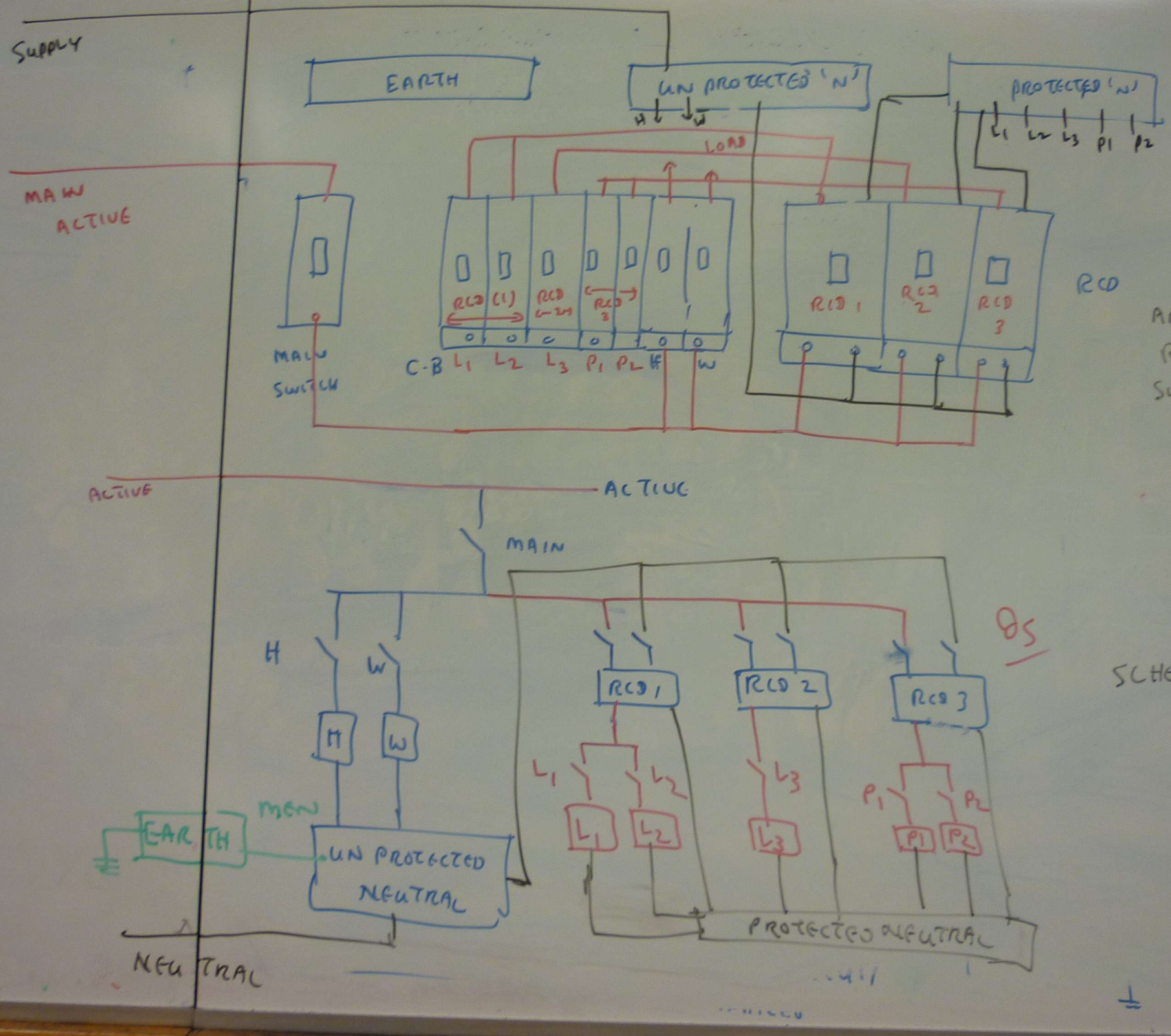
TYPE (B)

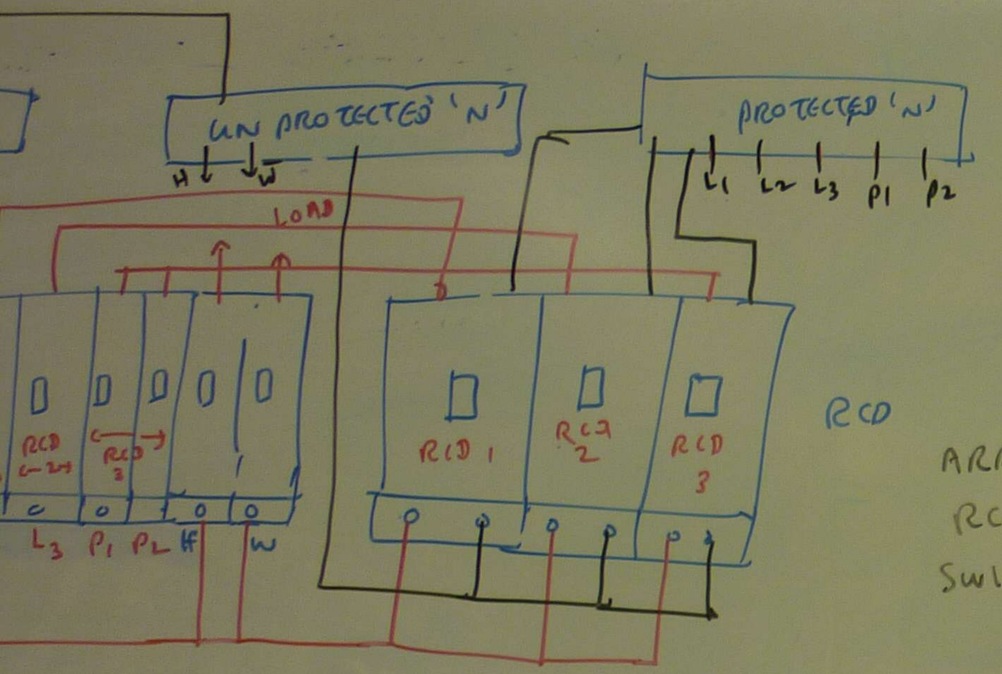


AS FOR TYPE (A)
RESIDUAL SINUSOIDAL 1000 Hz
RESIDUAL (DC)

04

TYPE (S) TIME DELAYED RCD
'S' SYMBOL


SUPPLY
EARTH
UN PROTECTED 'N'
PROTECTED 'N'
H
W
L1 L2 L3 P1 P2
LOAD
MAIN ACTIVE
RCD (1)
RCD 2
RCD 3
MAIN SWITCH
C-B L1 L2 L3 P1 P2 H W
RCD 1
RCD 2
RCD 3
RCD
ARRANGEMENT of RCD SWITCH BOARD LAYOUT
ACTIVE
ACTIVE
MAIN
H
W
H
W
EARTH
MAIN
UN PROTECTED NEUTRAL
RCD 1
RCD 2
RCD 3
L1
L2
L3
P1
P2
PROTECTED NEUTRAL
NEUTRAL
SCHEMATIC DIAGRAM



ARRANGEMENT of RCD SWITCH BOARD LAYOUT

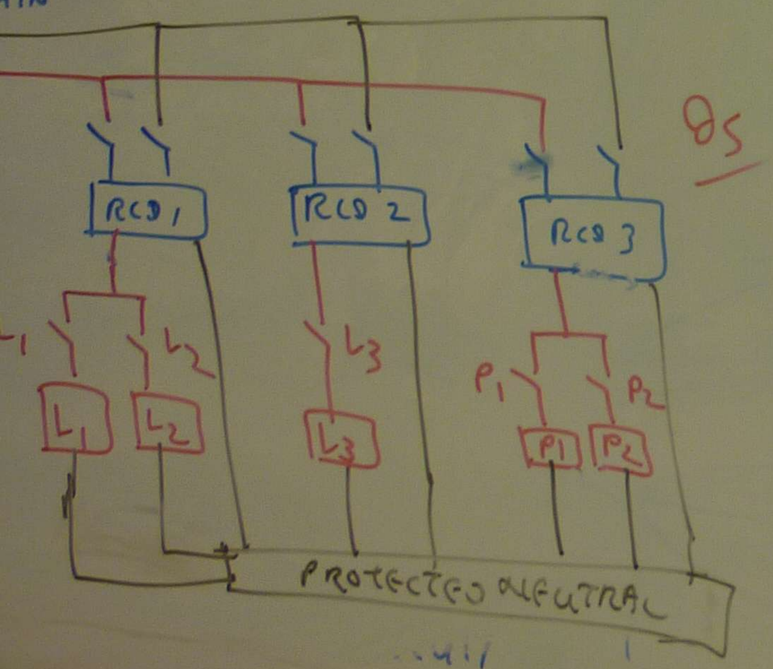
MAIN

SWITCH BOARD

AS 3000

2-4 SWITCH BOARD

2.4.2 LOCATION RESTRICTION



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SCHEMATIC DIAGRAM

TUTORI

1. CLASSIFY T
3. EXPLAIN THE
4. WHAT KIND
5. SKETCH S

RAL

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TUTORIAL

1. CLASSIFY THE TYPES OF RCD
2. WHAT ARE THE AUSTRALIAN STANDARDS THAT RCDS NEED TO COMPLY WITH?
3. EXPLAIN THE SELECTION & ARRANGEMENT OF RCD
4. WHAT KIND OF RCD IS SUITABLE FOR RESIDUAL DC
5. SKETCH SWITCH BOARD LAYOUT DIAGRAM FOR GIVEN SCHEMATIC DIAGRAM