

KUNSAN AB ELECTRICAL SYSTEM STANDARD

ELECTRICAL IDENTIFICATION STANDARD

KUNSAN AB

FOREWORD

1. Purpose. This standard provides electrical identification guidance and criteria for electrical system on Kunsan AB. It applies to base personnel and contractors working on Kunsan AB.
2. Application. Requirements in this standard are mandatory.

2.1. Effective Date: Immediately

2.2. Intended Users:

- Base Personnel
- A/E Design Agency
- Construction Contractors working on Kunsan AB

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1. GENERAL

- 1.1. The purpose of this guidance is to provide identification standards for electrical equipment, raceways, and conductors.
- 1.2. Provide labels, nameplates, panel directories, cable tags as specified herein and according to attached electrical identification drawings.
- 1.3. The orange on labels shall comply with the orange on ANSI Z535 Color Chart.
- 1.4. Prior to making labels and tags, complete schedule indicating label size, lettering size, color, and actual label/tag information shall be to be submitted to BCE for approval.

2. PRIMARY DISTRIBUTION SYSTEM IDENTIFICATION

2.1. GENERAL

- 2.1.1. Equipment identification labels and cable tags for all electrical equipment including, but not limited to, switchgears, transformers, cables in manholes, etc.
- 2.1.2. Label shall be printed on a permanent self-adhesive laminated vinyl tapes. The vinyl tape shall have a minimum 3 mil thickness and be resistant to water, UV light, most chemicals; it also shall work on surfaces up to 200 °F. The letters on label shall be printed with resin-based ink or ribbon. The letter shall be resistant to UV light, moisture, abrasion, and most chemicals. Cable tags shall be engraved on plastic plates.
- 2.1.3. The points of labeling and tagging are indicated on Figure-1 Illustration of Labeling for Primary Distribution System.
- 2.1.4. The contractor shall request the identification names for switchgears, transformers, and manholes prior to request of power outage. The newly assigned IDs for new primary electrical distribution equipment shall be marked on the one-line diagram and primary distribution plan of power outage request submittal.



Figure-2 Equipment Label (Example)

2.2.2. Operating Handles/Fault Indicator Viewing Window Label

- Material: Permanent self-adhesive laminated label
- Size: 51mmW x 25mmH
- Font: Arial Black, 8mmH
- Color: Black Letters on Orange Background
- Position: At Operating Handles and Viewing Windows

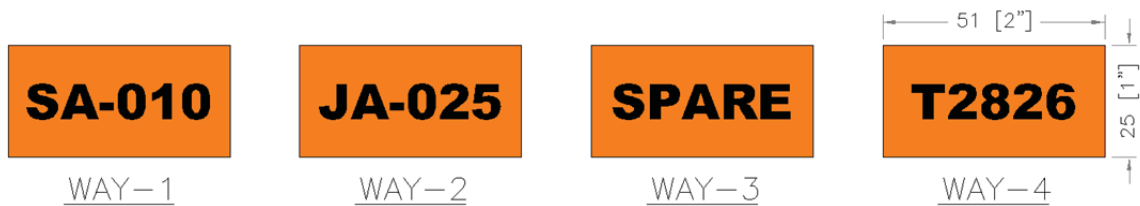


Figure-3 Operating Handle/Viewing Window Labels (Example)

2.2.3. Fault Interrupter Setting Value Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: Arial, 1st line: 5mm Height, Remainder: 2.5 or 3mm Height
- Color: Black Letters on Orange Background
- Position: At Trip Control Box

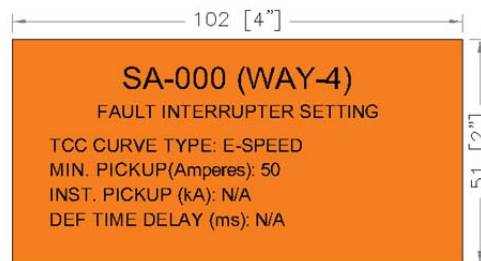


Figure-4 Fault Interrupter Setting Value Label (Example)

2.2.4. Primary Cable Identification Tags

- Material: Engraved on 1.5mmTHK. plastic plate
- Size: 50mm Diameter
- Font: Arial Narrow, 5mmH

- Color: White Letters on Black Background
- Position: At Cable Termination Points



Figure-5 Primary Cable Identification Tags (Example)

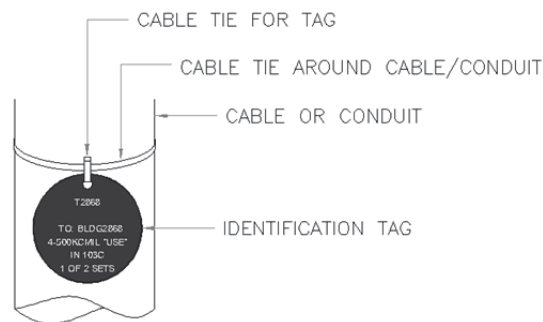


Figure-6 Cable Identification Tag Installation Detail

2.3. CABLE IDENTIFICATION TAGS IN MANHOLE

The tags shall be attached on incoming and outgoing sections of cables in manholes. See para. 2.2.1.d. Cable Identification Tags for material, size, font. The lettering on tags shall be complied with below examples, Figure-7 Cable Identification Tags in Manhole.

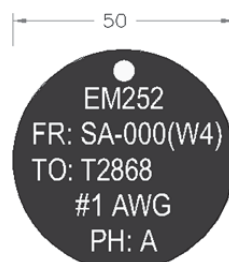


Figure-7 Primary Cable Identification Tags in Manhole (Example)

2.4. Pad Mounted Transformer

Provide labels for enclosure, transformer information, connected loads and tags for primary/secondary cable termination points.

2.4.1 Equipment Identification Label

- Material: Permanent self-adhesive laminated label
- Size: 178mmW x 51mmH

- Font: Arial Black, 27mmH
- Color: Black Letters on Orange Background
- Position: Front Side of Enclosure



Figure-8 Transformer Identification Label (Example)

2.4.2 Transformer Information Label

- Material: Permanent self-adhesive laminated label
- Size: 178mmW x 51mmH
- Font: Arial Black, 1st Line: 12mmH, Remainder: 6mmH
- Color: Black Letters on Orange Background
- Position: On Secondary Compartment Door



Figure-9 Transformer Information Label (Example)

2.4.3 Transformer Secondary Load Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: Arial, 1st Line: 6mmH, Remainder: 4mmH
- Color: Black Letters on Orange Background
- Position: Above Ground Bus In Transformer Secondary Compartment

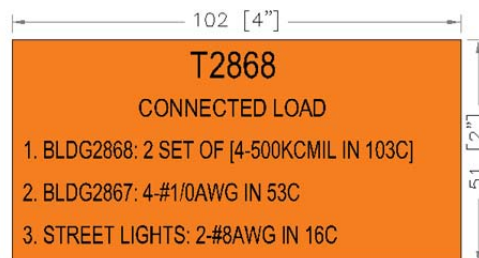


Figure-10 Transformer Load Label (Example)

2.4.4 Primary Cable Identification Tags

See para. 2.2.1.d. Cable Identification Tags.

2.4.5 Conduit Identification Tags for Secondary Cables

See para. 2.2.1.d. Cable Identification Tags. The lettering on tags shall be complied with below examples, Figure-11 conduit Identification Tags.



Figure-11 Conduit Identification Tags (Example)

2.5. ARC-FLASH HAZARD WARNING LABEL

Provide arc flash warning labels on electrical equipment likely to require examination, servicing, or maintenance while energized. Some typical types of equipment include pad-mounted transformers, switchgear, sectionalizing cabinet on primary electrical distribution system.

- Material: Permanent self-adhesive laminated label
- Size: 152mmW x 102mmH
- Font: Header-Arial Black 14mmH, Remainder-Arial Black 6mmH
- Color: OSHA/NFPA 70E/ANSI Standard Color
- Position: Front Side of Equipment

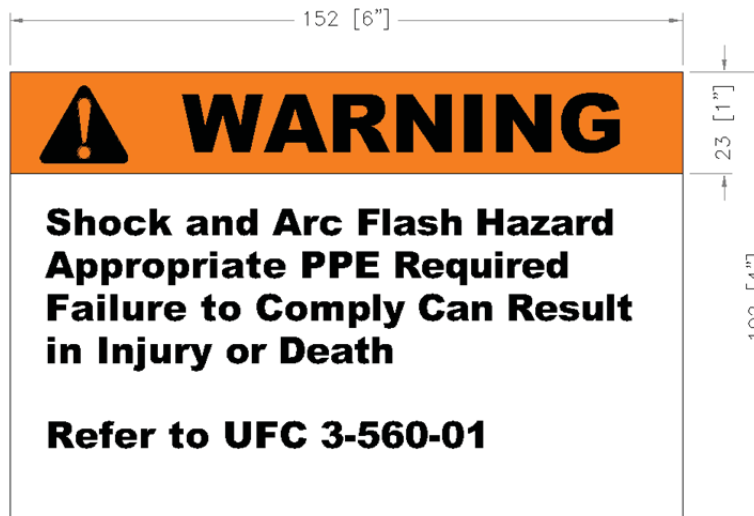


Figure-12 Arc Flash Warning Label for Primary Distribution System

3. SECONDARY DISTRIBUTION SYSTEM IDENTIFICATION

3.1. GENERAL

Equipment identification labels for all electrical equipment including, but not limited to, service equipment, service disconnect, switchboards, Panelboards, transfer switches, disconnect switches, step down transformers, fixed equipment, motor starters, MCC's, motors, receptacles, etc.

3.1.1. MATERIAL

Label shall be printed on a permanent self-adhesive laminated vinyl tapes. The vinyl tape shall have a minimum 3 mil thickness and be resistant to water, UV light, most chemicals; it also shall work on surfaces up to 200 °F. The letters on label shall be printed with resin-based ink or ribbon. The letter shall be resistant to UV light, moisture, abrasion, and most chemicals.

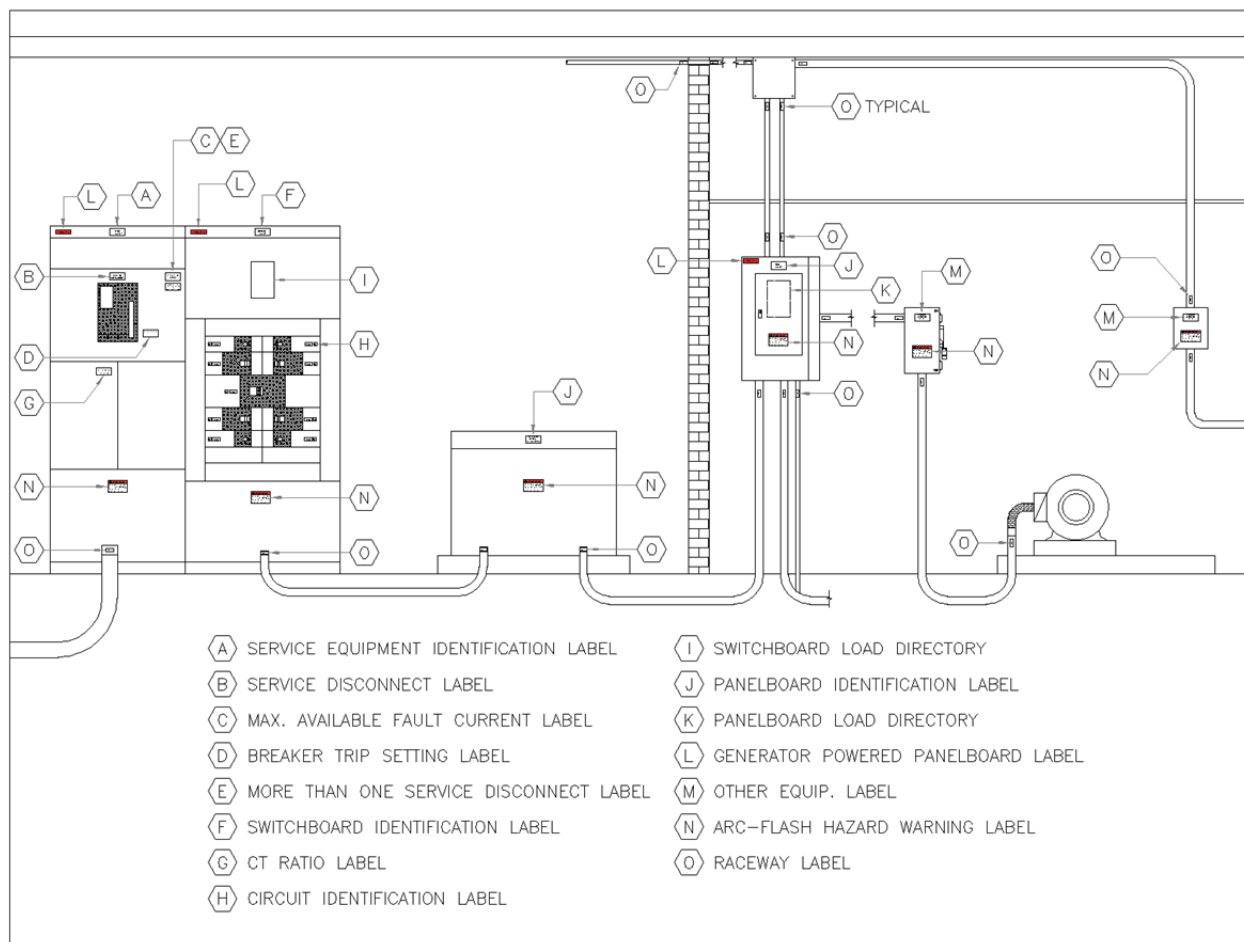


Figure-13 Illustration of Labeling for Secondary Distribution System

3.2. SERVICE EQUIPMENT

The definition of Service equipment is the necessary equipment, usually consisting of a circuit breaker(s) or switch(es) and fuse(s) and their accessories, connected to the load end of service conductors to a building or other structure, or an otherwise designated area, and intended to constitute the main control and cutoff of the supply. The labels for service equipment shall be as followings.

- Service Equipment Identification Label
- Service Disconnect Label per NEC 230.70(B)
- Maximum Available Fault Current Label per NEC 110.24(A)
- Breaker Trip Setting Values Label for adjustable trip breaker
- More Than One Service Disconnect Label, if a facility has more than one service disconnect.
- CT Ratio Label

3.2.1. Service Equipment Identification Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: Arial Black, 1st Line- 3mmH, 2nd-10mm H, 3rd-4mmH, 4th & 5th-3mmH
- Color: Black Letters on White Background
- Position: At Main Service Equipment Enclosure

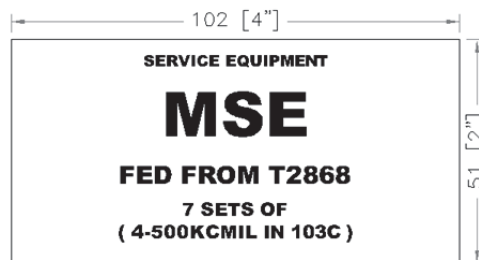


Figure-14 Service Equipment Identification Label (Example)

3.2.2. Service Disconnect Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: Arial, 8mmH
- Color: Black Letters on Orange Background
- Position: At Service Disconnect Mean



Figure-15 Service Disconnect Label

3.2.3. Maximum Available Fault Current Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: Arial Black, 1st, 2nd & 3rd Line- 5mmH, 4th-3mmH
- Color: Black Letters on White Background
- Position: At Service Disconnect Mean

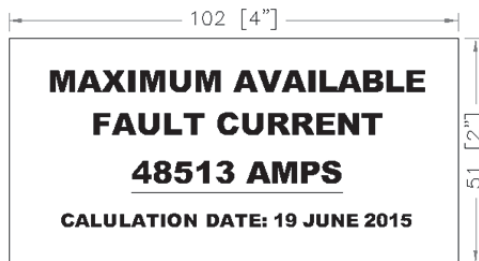


Figure-16 Maximum Available Fault Current Label (Example)

3.2.4. Breaker Trip Setting Values Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: Arial Black, 1st Line-5mmH, Remainder-Arial, 3mmH
- Color: Black Letters on White Background
- Position: At Adjustable Breakers

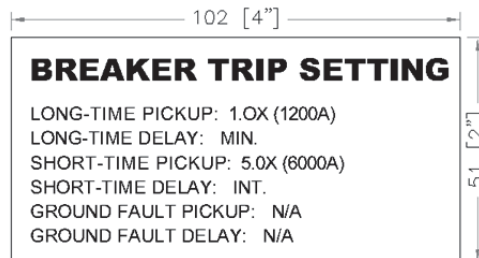


Figure-17 Breaker Trip Setting Values Label (Example)

3.2.5. More Than One Service Disconnect Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: Arial Black, 1st Line-6mmH, Remainder-4mmH
- Color: Black Letters on Orange Background
- Position: At Service Disconnect Mean

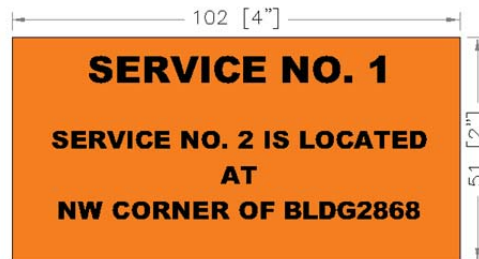


Figure-18 More Than One Service Disconnect Label (Example)

3.2.6. CT Ratio Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: Arial Black, 6mmH
- Color: Black Letters on White Background
- Position: On CT Compartment

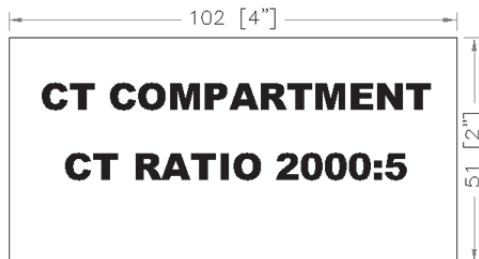


Figure-19 CT Ratio Label (Example)

3.3. SWITCHBOARD

The definition of switchboard is a large single panel, frame, or assembly of panels on which are mounted on the face, back, or both, switches, overcurrent and other protective devices, buses, and usually instruments. These assemblies are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets. The labels for switchboard shall be as followings.

- Equipment Identification Label
- Circuit Identification Labels per NEC408.4(A)

- Breaker Trip Setting Values Label for adjustable trip breakers
- Load Directories

3.3.1. Equipment Identification Label

See Para. 3.2.1. for switchboard identification label.

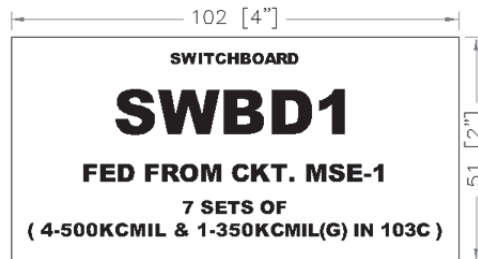


Figure-20 Switchboard Identification Label (Example)

3.3.2. Circuit Identification Label

The identification shall be at each circuit breaker in a switchboard per NEC 408.4(A). The circuit identification for switchboard shall consist of a circuit number label and circuit description label.

- Material: Permanent self-adhesive laminated label
- Size: 19mmW x 19mmH & 51mmW x 19mmH
- Font: CKT. Number Label: Arial Black, 10mmH
CKT. Description Label: 1st Line- Arial Narrow, 2.5mmH
2nd Line-Arial Black, 6mmH
- Color: Black Letters on White Background
- Position: At Circuit Breakers

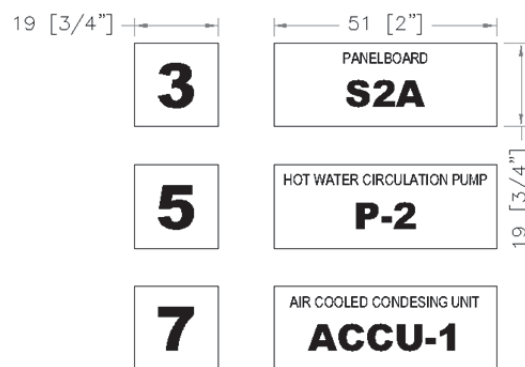


Figure-21 Circuit Number & Description Label on Switchboard (Example)

3.3.3. Breaker Trip Setting Values Label

Provide the breaker trip setting values label for adjustable breaker only. See Para. 3.2.4. for the label.

3.3.4. Switchboard Load Directory

Provide neatly typed schedule under plastic jacket or protective cover and affix it on front side of switchboard.

<u>SWITCHBOARD "SWBD1" LOAD SCHEDULE</u>							
FED FROM PNLBD "MSE" IN RM112 MAIN CB: N/A SYS. VOLTAGE: 3PH-480Y/277V POLE SPACE: 30 FEEDER: CKT. MSE, 2 SETS OF (4-500KCMIL IN 103C)							
CKT NO.	LOAD DESCRIPTIONS	CB SIZE	WIRE	CKT NO.	LOAD DESCRIPTIONS	CB SIZE	WIRE
1	PNLBD E4MP IN RM101	3P 600AT	2 SETS OF (4#350MCM & 1#1AWG(G) IN 63C)	2	PNLBD 4LP1 IN RM102	3P 40AT	4#8AWG & 1#10AWG(G) IN 21C
3	PNLBD S2A IN RM101	3P 40AT	4#8AWG & 1#10AWG(G) IN 21C	4	PNLBD 4M1 IN MECH RM	3P 200AT	4#3/0AWG & 1#6AWG(G) IN 53C
5	WATER CHILLER WC-1	3P 110AT	3#1AWG & 1#6AWG(G) IN 53C	6	TVSS IN MECH RM	3P 30AT	3#10AWG & 1#10AWG(G) IN 16C
7	AIR COLLED CONDENSING UNIT ACCU-1	3P 110AT	3#1AWG & 1#6AWG(G) IN 53C	8	SPARE	3P 50AT	
9	SPARE	3P 50AT		10	SPACE		

Figure-22 Switchboard Load directory (Example)

3.4. PANELBOARD

The definition of panelboard is a single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of lights, heat, or power circuits; designed to be placed in a cabinet or cutout box placed in or against a wall, partition, or other support; and accessible only from the front. The labels for panelboard shall be as followings.

- Equipment Identification Label
- Circuit Identification Number Labels

- Load Directories
- Generator Powered Panelboard Label

3.4.1. Equipment Identification Label

See Para. 3.2.1. for panelboard identification label.

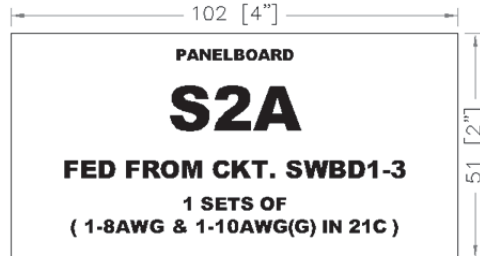


Figure-23 Panelboard Identification Label (Example)

3.4.2. Circuit Identification Number Label

The Circuit Identification Number Labels shall be provided by panelboard manufacture.

3.4.3. Panelboard Load Directories

Provide neatly typed schedule under plastic jacket or protective cover and affix it on inside face of panelboard door.

PANELBOARD "2AA" LOAD SCHEDULE							
FED FROM PNLBD "S2A" IN RM112							
MAIN CB: 3P-225AF-150AT SYS. VOLTAGE: 3PH-208Y/120V POLE SPACE: 30							
FEEDER: CKT. S2A-5, 4-#3/0AWG & 1-#6AWG(G) IN 53C							
CKT NO.	LOAD DESCRIPTIONS	CB SIZE	WIRE	CKT NO.	LOAD DESCRIPTIONS	CB SIZE	WIRE
1	LIGHTS RM101, 102, 103	1P 20AT	2#12&1#12(G) IN 16C	2	LIGHTS, RM101	1P 20AT	2#12&1#12(G)
3	COPY MACHINE, RM101	2P 20AT	2#12&1#12(G)	4	LIGHTS, RM102	1P 20AT	2#12&1#12(G)
5	AIR COMPRESSOR 1.5HP, MECH RM	3P 20AT	3#12&1#12(G)	6	LIGHTS, RM102	1P 20AT	2#12&1#12(G)
7	SPARE	1P 20AT		8	RECEPTACLES, RM101	1P 20AT	2#12&1#12(G)
9	SPACE			10	RECEPTACLES, RM102	1P 20AT	2#12&1#12(G)
				12	RECEPTACLES, RM102	1P 20AT	2#12&1#12(G)
				14	SPARE	1P 20AT	
				16	SPACE		

Figure-24 Panelboard Load directory (Example)

3.5. GENERATOR POWERED PANELBOARD LABEL

Switchboard and Panelboard which is capable of being powered by standby generator shall be labeled as below example label.

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 25mmH
- Font: Arial Black, 4mmH
- Color: Black Letters on Orange Background
- Position: On Front Side of Panelboard

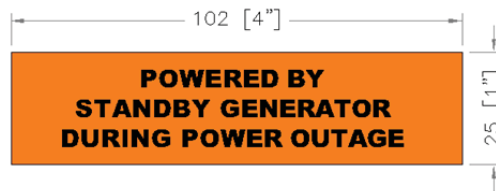


Figure-25 Generator Powered Panelboard Label

3.6. SYSTEM VOLTAGE LABEL

Provide the system voltage labels for all of electrical equipment including, but not limited to, switchboard, panelboard, disconnect switch, transfer switch, motor control center, magnetic motor starter, manual motor starter, enclosed circuit breaker, dry type transformer, etc.

a) Full Size Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 25mmH
- Font: Arial Black 10mmH
- Color: Black Letters on Orange Background
- Position: On front side of equipment

b) Half Size Label

- Material: Permanent self-adhesive laminated label
- Size: 51mmW x 13mmH
- Font: Arial Black 5mmH
- Color: Black Letters on Orange Background
- Position: On front side of equipment

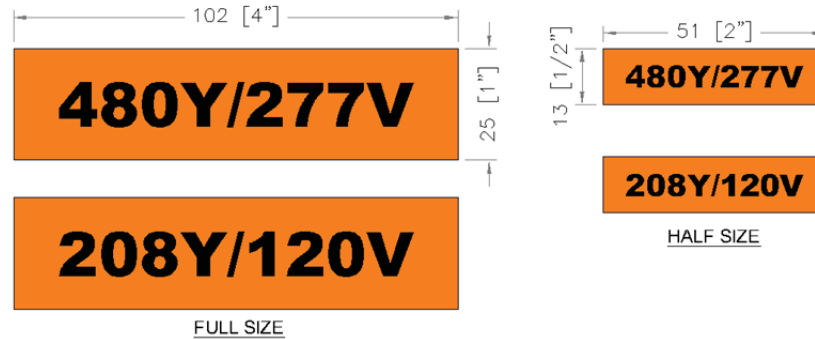


Figure-26 System Voltage Label

3.7. OTHER EQUIPMENT LABELS

Provide the labels for the other electrical equipment such as disconnect switch, motor control center, magnetic motor starter, manual motor starter, enclosed circuit breaker, dry type transformer, receptacle, toggle Switch, etc.

3.7.1. Naming Conventions

Other equipment shall be named in accordance with mechanical equipment schedule. Unless otherwise indicated herein, the name and label format shall be coordinated with the BCE.

3.7.2. Label Format

Other equipment label size shall be selected by equipment dimensions.

c) Full Size Label

- Material: Permanent self-adhesive laminated label
- Size: 102mmW x 51mmH
- Font: 1st Line-Arial Black 3mmH, 2nd Line- Arial Black 10mmH, 3rd, 5th, 6th Lines- Arial Narrow 3mmH, 4th Line-Arial Black 4mmH
- Color: Black Letters on White Background
- Position: On front side of equipment

d) Half Size Label

- Material: Permanent self-adhesive laminated label
- Size: 75mmW x 38mmH
- Font: 1st Line-Arial Black 1.5mmH, 2nd Line- Arial Black 5mmH, 3rd, 5th, 6th Lines- Arial Narrow 1.5mmH, 4th Line-Arial Black 2mmH
- Color: Black Letters on White Background
- Position: On front side of equipment

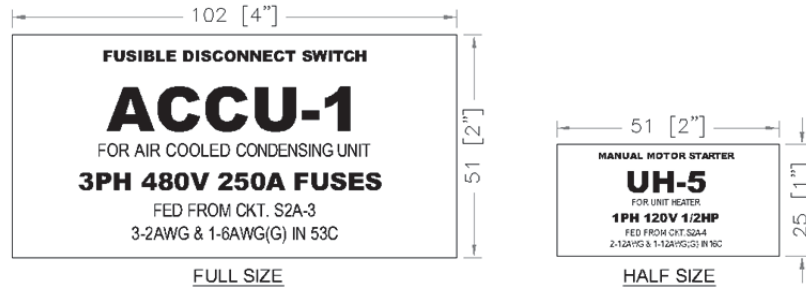


Figure-27 Other Equipment Labels (Example)

3.8. RECEPTACLE AND SWITCH LABEL

Receptacle label shall be affixed on top of face plate and indicates a circuit number of power source.

- Material: Permanent self-adhesive laminated label
- Size: 51mmW x 13mmH
- Font: Arial 6mmH
- Color: Black Letters on White Background
- Position: On Face plate

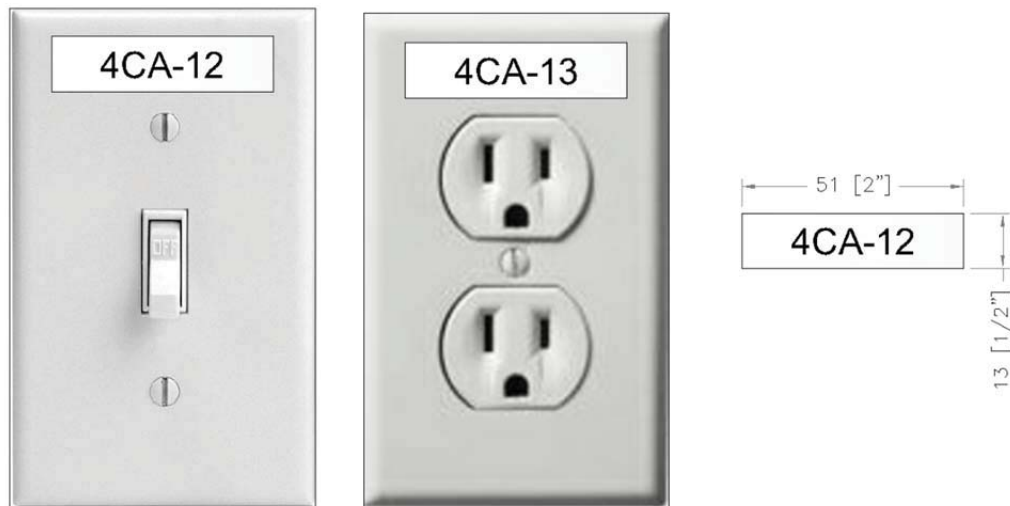


Figure-28 Receptacle & Toggle Switch Labels (Example)

3.9. RACEWAY LABEL

Provide conduit labels on the surface of exposed conduits and conduits in accessible ceiling spaces. Label conduit at all wall penetrations and connections to all panels, junction boxes, and equipment served. The label shall indicate a panel name and circuit numbers of conductors routed through the conduit.

- Material: Permanent self-adhesive laminated label
- Size: 51mmW x 19mmH
- Font: Arial Narrow 6mmH

- Color: Black Letters on White Background
- Position: On Conduit

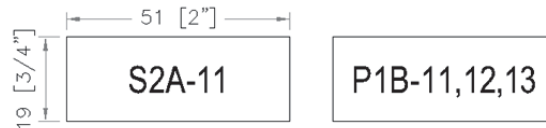


Figure-29 Conduit Labels (Example)

3.10. ARC-FLASH HAZARD WARNING LABEL

Provide arc flash warning labels on electrical equipment likely to require examination, servicing, or maintenance while energized. Some typical types of equipment include pad-mounted transformers, switchgear, switchboards, Panelboards, disconnect switches, industrial control panels, meter socket enclosures, and motor control centers that are in other than dwelling occupancies.

- Material: Permanent self-adhesive laminated label
- Size: 152mmW x 102mmH
- Font: Header-Arial Black 14mmH, Remainder-Arial Black 6mmH
- Color: OSHA/NFPA 70E/ANSI Standard Color
- Position: Front Side of Equipment

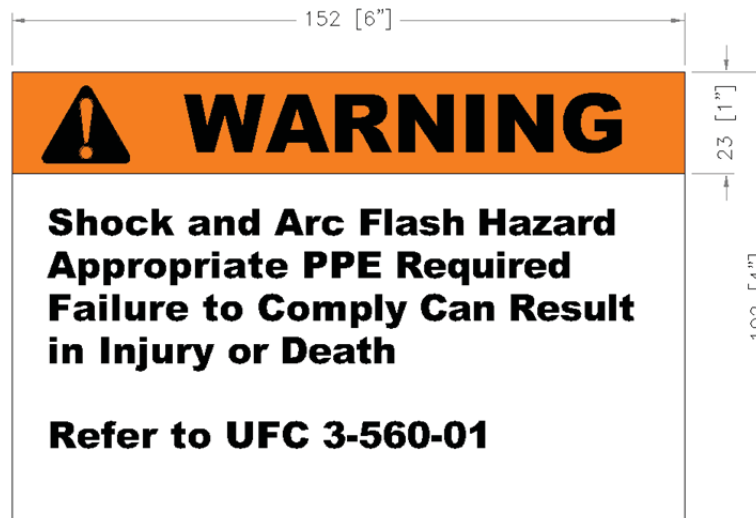


Figure-30 Arc Flash Warning Label for Low Voltage System