

1.12 มาตรฐานและคุณสมบัติทางเทคนิค (Standard and Specification)

(Specification No. RMIS-073/2562)

(สำหรับรายการที่ 1 และ รายการที่ 2)



PROVINCIAL ELECTRICITY AUTHORITY

POWER SYSTEM STANDARD DIVISION

AC AND DC STATION SERVICE DISTRIBUTION BOARDS AND ACCESSORIES

Specification No.: RMIS-073/2557

Approved date: 12 / 03 / 2557

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Invitation to Bid No.:

C Material, equipment, and specifications for AC AND DC STATION SERVICE DISTRIBUTION BOARDS AND ACCESSORIES

C1 General material and packing instructions

Additional to the general instructions, the following shall be observed:

1a Scope

These specifications cover AC and DC station service distribution boards (hereinafter called the AC and DC distribution boards) suitable for indoor installation in substations.

1b Standards

The AC and DC station service distribution boards and accessories shall be manufactured and tested in accordance with the following standards:

IEC 60947-2: 2013	Low-voltage switchgear and controlgear – Part 2: Circuit – breakers
IEC 60947-3: 2012	Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch – disconnectors and fuse – combination units
IEC 60044-1: 2010	Instrument transformers – Part 1: Current transformers
IEC 61643-1: 2002	Surge protective devices connected to low-voltage power systems – Part 1: Performance requirements and testing methods
IEC 60529: 2001	Degrees of protection provided by enclosures (IP Code)

And all other relevant standards, unless otherwise specified in these specification.

PEA will also accept the AC and DC station service distribution boards and accessories tested in accordance with the later edition of the above standards.

1c Principal requirements

1c.1 General

The boards shall be of self – standing, floor mounted type and vermin-proof designed, degree of protection shall be IP 4X according to IEC 60529. The thickness of steel sheet shall be at least 2 mm. The dimension of the AC and DC distribution boards shall be approximate 800 mm wide x 2,340 mm high x 550 mm deep. Painting of AC and DC distribution boards shall use RAL 7032 color code.

The boards will be completed with molded-case circuit breakers, Automatic Transfer Switch (ATS) and all necessary control, indication and alarm devices.

A label will be provided for each circuit, giving breaker type and a description of the circuit supplied.

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1c.2 Site and service conditions

The equipment shall be capable of operating at its full ratings under site and service conditions as mentioned below:

Altitude	: up to 1,000 m above sea level
Ambient air temperature	: 40°C ⁽¹⁾ maximum
Average relative humidity in any one year	: up to 94 %
Climate condition	: tropical climate

Note: ⁽¹⁾ According to IEC 62271-1 over 40°C will be possible under special requirement.

1c.3 Equipments characteristics

The continuous and short-time/short-circuit rating of the AC and DC distribution boards shall be designed in accordance with the specified station service transformer rating and the expected short circuit rating. All material, equipment and installation shall comply with IEC standards.

1c.3.1 AC station service distribution boards

1c.3.1.1 General requirements

The AC distribution boards shall have the rating voltage of 400/230 V, 3-phase 4-wire. Each AC distribution board shall be provided with circuit breakers, ATS (if required), measuring devices and 3-phase 4-wire under voltage relay with time delay, as specified in the relevant drawings.

1c.3.1.2 Design

The boards for 400 V AC shall be of self-standing, floor mounted, metal-enclosed of panel type and vermin-proof designed, degree of protection shall be IP 4X according to IEC 60529.

Each AC distribution board shall be equipped with at least the following equipment unless other in the relevant drawing (s).

1. Molded-case circuit breakers
2. Automatic Transfer Switch (ATS)
3. Selector switches for selecting power source
4. Selector switch for Manual/Auto
5. Push button manual control TS1
6. Push button manual control TS2
7. Voltmeter with selector switch
8. Ammeter with selector switch
9. Kilowatt-hour meter, 3-phase 4-wire
10. Under voltage relay, 3-phase 4-wire
11. Surge protective devices for AC power supply
12. Indicating lamps

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13. Heater and hygrostat
14. Heater control switch OFF/Auto/Manual
15. Lighting and door switch

The AC distribution boards shall have a hinged front access door provided with a lock.

All equipment and connections shall be operable from the front of the boards.

The boards shall be fully equipped for future spare feeders of various sizes used in the panels. The incoming molded-case circuit breakers and bus ratings shall be selected considering the spares also.

The boards shall have copper busbars for phases, neutral and earth. The neutral busbar shall also have full insulation against earth and be connected to earth with one link in the board only. The earth busbar shall preferably be located near the outgoing cable terminals.

Each phase shall be suitably identification by marks corresponding to the phase sequence A-red, B-yellow and C-blue. The neutral bus shall be marked N-white and the protective earthing bus shall be marked PE-green/yellow.

The main circuit breaker shall be molded-case circuit breaker corresponding to the rated current of the station service transformer and shall also have I/O point counts and auxiliary alarm contacts for CSCS according to **APPENDIX 1**.

The branch outgoing circuits shall be protected by means of molded-case circuit breakers.

The number of branch outgoing circuits, circuit breaker rating and detail of accessories shall be according to **APPENDIX 2** and drawing No.SA4-017/53005.

All molded-case circuit breakers shall be manually operated, trip free from the handle and provided with thermal overload and instantaneous magnetic protection in accordance with IEC 60947-2. The operating handle shall clearly indicate whether the circuit breaker is “ON”, “OFF”, or “TRIPPED”.

The molded - case circuit breakers provided shall have not less than 10 kA symmetrical interrupting capacity at 400 V AC.

The Automatic Transfer Switch (ATS) for selecting AC power source automatically, if required, shall be provided with manually/electrically operate, mechanically hold and mechanically interlock mechanism in accordance with IEC 60947-3.

The ATS shall have I/O point counts for CSCS according to **APPENDIX 1**.

The ATS shall be of two ways with three poles type. The magnetic contactor shall not be acceptable. When the main circuit breaker is tripped, the operation of ATS shall be blocked.

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Voltmeters and ammeters shall have dimensions 96 mm x 96 mm and be flush-mounted type, 0 – 500 V of voltage range, 0 – 200 A of ampere range, dust and moisture proof, 1.5 accuracy class or better. Selector switches shall be provided for a voltmeter (7-positions) and an ammeter (4-positions). The digital measuring instrument shall be also accepted. The indicating instruments shall be of square type with 240° scales. The instrument scales shall have a white background and the same design of figures and gradation. The indicated values shall be given directly without constants.

Selector switches shall be of the multistage, rotary type, 600 V, 20 A, continuous duty and shall be designed for switchboard mounting with all contact mechanisms behind the panel. All contacts shall be enclosed in covers, which can be easily removed when installed on the panel board to afford complete accessibility to contacts and terminals. Each contact shall be of the readily renewable, self-cleaning type and shall be of the wipe-type.

Kilowatt hour meter shall be of the flush-mounted type, dust and moisture proof, 2.0 accuracy class or better, 3 - phase, 4 - wire, 50 Hz system design suitable for the provided current transformer. The current transformers shall be dry type for mounting on busbars or cores. Secondary current shall be 5 A, accuracy class 1.0 or better in accordance with IEC 60044-1.

All indicating lamps used in the AC distribution board shall be LED type.

Nameplates shall be provided and mounted for each assembly, each piece of equipment mounted on an assembly, and each power circuit. All nameplates shall be of laminated plastic material, black on the surface with white internal layer. Lettering shall be machine-engraved into the nameplate to form white letters against a black background.

To ensure the power supply security, the board shall be designed according to following principles:

- Incoming low voltage feeders from station service transformers will never be operated in parallel.

All cables shall enter the AC distribution boards from the bottom through cable glands mounted in the bottom gland plate made of non-magnetic metal.

Alarm indication will be foreseen on the AC distribution board. One general LV/AC alarm contact shall be connected to CSCS.

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1c.3.2 DC station service distribution boards

1c.3.2.1 General requirements

Two types of DC distribution boards shall be provided:

- One for 125 V DC supply
- One for 48 V DC supply

Circuit breakers shall be two poles type.

Each DC distribution board shall be equipped with circuit breakers, ATS (if required), measuring instruments, at least one voltmeter and one ammeter.

1c.3.2.2 Design

Equipment is required to supply all loads imposed by motor drives, protective devices, CSCS, telecommunication equipments, control, indicators, alarms etc., under normal operation.

The boards for 125 V DC and 48 V DC shall be of self-standing, floor mounted, metal-enclosed of panel type and vermin-proof designed, degree of protection shall be IP 4X according to IEC 60529.

Each DC distribution board shall be equipped with at least the following equipment unless other in the relevant drawing(s).

1. Molded - case circuit breakers
2. Automatic Transfer Switch (ATS) (If required, see “C3 Schedule of detailed requirement”)
3. Selector switches for selecting power source⁽¹⁾
4. Selector switch for Manual/Auto⁽¹⁾
5. Push button manual control CH1⁽¹⁾
6. Push button manual control CH2⁽¹⁾
7. Voltmeter(s)
8. Ammeter(s)
9. Shunt for ammeter
10. Surge protective devices for DC power supply
11. Indicating lamps
12. Heater and hygostat
13. Heater control switch OFF/Auto/Manual
14. Lighting and door switch

Note: ⁽¹⁾ shall be provided if the ATS is required.

The DC distribution boards shall be provided to supply DC power to the switchyard equipment, control and protection systems. Copper busbars shall be of suitable cross section for DC power supply.

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Distribution boards for DC shall be metal-enclosed. The battery boards shall have separate enclosures and shall be mounted as close to batteries as possible.

The DC distribution boards shall have a hinged front access door provided with a lock.

All equipment and connections shall be operable from the front of the board.

The DC busbars shall have the color codes green for positive and gray for negative.

The main circuit breaker shall be molded-case circuit breaker with appropriate rating and shall also have I/O point counts and auxiliary alarm contacts for CSCS according to **APPENDIX 1**.

The branch circuits shall be protected by means of 2-pole molded-case circuit breakers.

The number of branch outgoing circuits, circuit breaker rating and detail of accessories shall be according to **APPENDIX 2** and drawing No.SA4-017/53005.

All molded-case circuit breakers shall be manually operated, trip free from the handle and provided with thermal overload and instantaneous magnetic protection in accordance with IEC 60947-2. The operating handle shall clearly indicate whether the circuit breaker is “ON”, “OFF”, or “TRIPPED”.

The provision of branch outgoing circuit breakers for future extension as shown in the relevant drawing(s) shall be provided.

The molded - case circuit breakers provided shall have not less than 5 kA symmetrical interrupting capacity at 250 V DC.

The ATS for selecting the DC power source automatically, if required, shall be provided with manually/electrically operate, mechanically hold and mechanically interlock mechanism in accordance with IEC 60947-3. It will be possible to lock (key locked switch) the automatic change over switch in a chosen position.

The ATS shall have I/O point counts and auxiliary alarm contacts for CSCS according to **APPENDIX 1**.

The ATS shall be of two ways with two poles type. The magnetic contactor shall not be acceptable. When the main circuit breaker is tripped, the operation of ATS shall be blocked.

Voltmeter and ammeter shall have dimensions 96 mm x 96 mm and be flush-mounted type, 0 – 150 V of voltage range, 0 – 100 A of ampere range, dust and moisture proof, 1.5 accuracy class or better. The indicating instruments shall be of square type with 240° scales, the instrument scales shall have a white background and the same design of figures and gradation. The indicated values shall be given directly without constants.

All indicating lamps used in DC distribution board shall be LED types.

Nameplates shall be provided and mounted for each assembly, each piece of equipment mounted on an assembly, and each power circuit. All nameplates shall be of laminated plastic material, black on the surface with white internal layer. Lettering shall be machine-engraved into the nameplate to form white letters against a black background.

All cables shall enter the DC distribution board from the bottom through cable glands mounted in the bottom gland plate made of non-magnetic metal.

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1c.3.3 Surge Protective Devices (SPDs) for power supply

1c.3.3.1 General

This system is designed to protect failures of highly-sensitive equipment caused by electrostatic discharges, switching over voltage and lightning strike over voltage. The surge protective device is separated into 2 classes.

Class I: Coarse protection

This is to protect the lightning voltage from LPZ0 to LPZ1 by using the arrester class I/B (Lightning current arrester).

Class II: Medium protection

This is to protect the surge voltage in or between LPZ1 to LPZ2 by using arrester class II/C (Surge voltage arrester).

1c.3.3.2 Material

Lightning current arresters for AC distribution board

The lightning current arresters shall be made of the arc quenching spark gap in order to arrest the lightning surge in the 10/350 μ s wave form and to eliminate the line follow on current according to the standard. The spark gap shall have the electronic trigger or similar technology for controlling the let through voltage is not greater than the protection level indicated in the technical data below. The lightning current arresters shall install parallel together with surge voltage arrester at main AC distribution board. Local indicator of the arrester shall be provided in order to indicate the status of the arrester.

- Arrester class : class I/B
- Arrester rated voltage : 330 V AC
- Lightning test current (10/350 μ s) according to IEC 61024-1 : 50 kA per phase
- Quenching short circuit current at U_n without backup fuse : 50 kA r.m.s.
- Protection level : ≤ 1.5 kV
- Temperature range : -40°C to 70°C

Surge voltage arresters

The surge voltage arresters shall be made of single unit of metal oxide varistor at rated discharge current specified below. The equipment shall arrest the surge which may come from switching action or/and lightning impulse to reduce the voltage impulse to the safe level. The equipment shall be comprised of base element and plug unit. When the plug unit is expired, it shall be replaced only the plug unit without rewiring in order to avoid shutting down the system. There shall be the indicator to show the status of the plug unit whether it can be use or it is already defect. In same time of the expiration of the plug unit the arrester shall be cut of the system in order to avoid short circuit.

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(1) Surge voltage arresters for AC distribution board

The arrester shall install parallel together with lightning current arrester at main AC distribution board.

It shall have rating as the follows:

- Arrester class : class II/C
- Nominal voltage, U_n : 230 V AC
- Arrester rated voltage, U_c : 275 V AC
- Nominal discharge surge current, I_n (8/20 μ s) : 20 kA per phase
- Max discharge surge current, I_{max} (8/20 μ s) : 40 kA per phase
- Response time : ≤ 25 ns
- Protection level (5 kA) : ≤ 1 kV
- Protection level with I_n : < 1.35 kV
- Temperature range : -40°C to 70°C

(2) Surge voltage arresters for 125 V DC distribution board

This arrester shall install parallel in 125 V DC distribution board. It shall have rating as the follows:

- Arrester class : class II/C
- Arrester rated voltage, U_c : 200 V DC
- Nominal discharge surge current, I_n (8/20 μ s) : 20 kA per phase
- Max discharge surge current, I_{max} (8/20 μ s) : 40 kA per phase
- Response time : ≤ 25 ns
- Protection level (5 kA) : ≤ 550 V
- Protection level with, I_n : < 800 V
- Temperature range : -40°C to 70°C

(3) Surge voltage arrester for 48 V DC distribution board

This arrester shall install parallel in 48 V DC distribution board. It shall have rating as the follows:

- Arrester class : class II/C
- Arrester rated voltage, U_c : 100 VDC
- Nominal discharge surge current, I_n (8/20 μ s) : 20 kA per phase
- Max discharge surge current, I_{max} (8/20 μ s) : 40 kA per phase
- Response time : ≤ 25 ns
- Protection level (5 kA) : ≤ 300 V
- Protection level with I_n : < 500 V
- Temperature range : -40°C to 70°C

The bidder may be offer the Lightning current arresters class I/B and surge voltage arresters class II/C combined in the one unit but the arrester characteristic shall be fulfill as specified above.

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1c.3.3.3 Installation

The arresters shall be installed parallel from main of the power system to ground busbar with the required fuses protection before the arrester. The cable size shall not be smaller than 16 mm² up to 25 mm² for the surge voltage arrester and 16 mm² up to 35 mm² for lightning current arrester depend on the main cable supply. The total length of the cable shall be as short as possible and not more than 3 meters between main to ground.

1d Packing

All distribution boards shall be packed in crate(s) or wooden case(s) to avoid damage during transportation and suitable for outdoor storing.

If the crate or wooden case is made of rubber wood (Yang-para or Hevea brasiliensis), the wooden parts shall be treated with wood preservative. The details of wood treated shall be described.

The plastic foam shall not be accepted.

1e Tests and test reports

Type tests

The circuit breakers shall be passed all relevant items of the type tests in accordance with the IEC 60947-2: 2013 or later edition.

The current transformers shall be passed all relevant items of the type test in accordance with the IEC 60044-1: 2010 or later edition.

The surge protective devices (SPDs) for power supply shall be passed all relevant items of the type tests in accordance with the IEC 61643-1: 2002 or later edition.

The type tests shall be conducted by the acknowledged independent testing laboratories.

The reports of type tests shall be submitted with the bid or within fifteen (15) calendar days of the closing date. The AC and DC station service distribution boards and accessories offered without submitting the type tests, mentioned above, shall be rejected.

Acceptance tests

The AC and DC station service distribution boards and accessories shall pass the acceptance tests at least as following:

1. General construction check
2. Check wire terminations for loose connections, wire markings and cable tags
3. Check operation of circuit breakers
4. Wiring continuity check
5. Insulation resistance measurement
6. Molded-case circuit breaker characteristic test
7. Metering instrument test including tests of at least as specified elsewhere for relevant instrument
8. Protective relay test (if any) including tests of at least as specified elsewhere for relevant relay
9. Electrical and mechanical interlocking facilities

The supplier shall provide free access to the facilities where the equipment is being manufactured and shall satisfy the representatives that the material and equipment are in accordance with this specification and the purchase contract.

The costs of all tests and reports shall be borne by the Contractor.



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C2 Material and packing data to be given by bidder

2a The whole distribution board shall be clearly described

2b Drawings, with dimensions in mm, of distribution boards

2c Catalogues and details of: busbars, circuit-breakers, ammeters, voltmeters, watt-hour meters, selector switches, current transformers, fuses, lamps, etc.

2d Wiring diagrams

2e Load schedule

2e Packing details

Packing method

Number of sets or pieces in each package

Dimensions of each package in cm

Gross weight of each package in kg

Net weight of each package in kg

Number of packages

Type of storage facility required (outdoor)

Notes: Conditions for documentation and consideration

1. The Contractor has to supply the following documents in **English or Thai**, before shipment/delivery, for each ordered AC and DC station service distribution boards and accessories.

1.1 Three (3) sets of reports of type tests and acceptance tests

1.2 Three (3) sets of instruction book for installation, operation, and maintenance

The above document shall be sent to the following address:

Substation Maintenance Division

Provincial Electricity Authority

200 Ngam Wong Wan Road, Chatuchak

Bangkok Metropolis 10900

Thailand

2. The Bidders have to submit, the sufficient references describing the previous experience of the manufacture (e.g. list of supply of equipment and/or materials having the same or similar design as proposed, field experience, the registration of TISI, the copies of license, and/or the inspection to supplier's factory by PEA's inspectors, etc.) to the satisfaction of PEA.



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APPENDIX 1

I/O Point counts for AC and DC station service distribution boards and accessories

Status point

Item	Point Name	Descriptor	Descriptor				Point Type	DNP Points			Remark
			0	1	2	3		Object	Class	Address	
1	Automatic transfer switch for AC distribution board No._	Auto/Manual	Undefined	Manual	Auto	Fault	DI	O:02 V:01	1		
2	Automatic transfer switch for DC distribution board No._	Auto/Manual	Undefined	Manual	Auto	Fault	DI	O:02 V:01	1		
3	Main AC supply No._	Normal/Fail	Normal	Fail			DI	O:02 V:01	1		
4	AC distribution board No._	Normal/Fail	Normal	Fail			DI	O:02 V:01	1		
5	DC distribution board No._	Normal/Fail	Normal	Fail			DI	O:02 V:01	1		

Note: DI: Digital Input



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APPENDIX 2

LOAD SCHEDULE

TABLE 2.1 - LOAD SCHEDULE OF AC STATION SERVICE DISTRIBUTION BOARD

Circuit No.	Description ⁽¹⁾	Number of pole(s) of CB	Rated current of CB (AT/AF)	Cable size (sq.mm.)
52-1		1	20/100	
52-2		1	20/100	
52-3		1	20/100	
52-4		1	20/100	
52-5		1	20/100	
52-6		1	20/100	
52-7		1	20/100	
52-8		1	20/100	
52-9		1	20/100	
52-10		1	20/100	
52-11		1	20/100	
52-12		1	20/100	
52-13		1	20/100	
52-14		1	20/100	
52-15		1	20/100	
52-16		1	20/100	
52-17		1	20/100	
52-18		1	20/100	
52-19		1	20/100	
52-20		1	20/100	
52-21		1	30/100	
52-22		1	30/100	
52-23		1	30/100	
52-24		1	30/100	
52-25		1	30/100	
52-26		1	30/100	



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Circuit No.	Description ⁽¹⁾	Number of pole(s) of CB	Rated current of CB (AT/AF)	Cable size (sq.mm.)
52-27		1	60/100	
52-28		1	60/100	
52-29		1	60/100	
52-30		1	60/100	
52-31		3	30/100	
52-32		3	30/100	
52-33		3	30/100	
52-34		3	30/100	
52-35		3	60/100	
52-36		3	60/100	
52-37		3	60/100	
52-38		3	60/100	
52-39		3	100/100	
52-40		3	100/100	

Note: ⁽¹⁾ The description of each circuit branch will be specified by PEA.



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TABLE 2.2 - LOAD SCHEDULE OF 125 V DC STATION SERVICE DISTRIBUTION BOARD

Circuit No.	Description ⁽¹⁾	Number of pole(s) of CB	Rated current of CB (AT/AF)	Cable size (sq.mm.)
72-1		2	20/100	
72-2		2	20/100	
72-3		2	20/100	
72-4		2	20/100	
72-5		2	20/100	
72-6		2	20/100	
72-7		2	20/100	
72-8		2	20/100	
72-9		2	20/100	
72-10		2	20/100	
72-11		2	20/100	
72-12		2	20/100	
72-13		2	20/100	
72-14		2	20/100	
72-15		2	20/100	
72-16		2	20/100	
72-17		2	20/100	
72-18		2	20/100	
72-19		2	20/100	
72-20		2	20/100	
72-21		2	20/100	
72-22		2	20/100	
72-23		2	20/100	
72-24		2	20/100	
72-25		2	20/100	
72-26		2	20/100	
72-27		2	20/100	
72-28		2	20/100	
72-29		2	20/100	



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Circuit No.	Description ⁽¹⁾	Number of pole(s) of CB	Rated current of CB (AT/AF)	Cable size (sq.mm.)
72-30		2	20/100	
72-31		2	20/100	
72-32		2	20/100	
72-33		2	20/100	
72-34		2	20/100	
72-35		2	20/100	
72-36		2	20/100	
72-37		2	20/100	
72-38		2	20/100	
72-39		2	20/100	
72-40		2	30/100	

Note: ⁽¹⁾ The description of each circuit branch will be specified by PEA.



การไฟฟ้าส่วนภูมิภาค
PROVINCIAL ELECTRICITY AUTHORITY

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POWER SYSTEM STANDARD DIVISION

AC AND DC STATION SERVICE DISTRIBUTION BOARDS AND ACCESSORIES

Specification No.RMIS-073/2557

Approved date : 12 / 03 / 2557

Rev. No. : 1

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TABLE 2.3 - LOAD SCHEDULE OF 48 V DC STATION SERVICE DISTRIBUTION BOARD

Circuit No.	Description ⁽¹⁾	Number of pole(s) of CB	Rated current of CB (AT/AF)	Cable size (sq.mm.)
72-1		2	20/100	
72-2		2	20/100	
72-3		2	20/100	
72-4		2	20/100	
72-5		2	20/100	
72-6		2	20/100	
72-7		2	20/100	
72-8		2	20/100	
72-9		2	20/100	
72-10		2	20/100	
72-11		2	20/100	
72-12		2	20/100	
72-13		2	20/100	
72-14		2	20/100	
72-15		2	20/100	
72-16		2	20/100	
72-17		2	20/100	
72-18		2	20/100	
72-19		2	20/100	
72-20		2	20/100	
72-21		2	20/100	
72-22		2	20/100	
72-23		2	20/100	
72-24		2	20/100	
72-25		2	20/100	
72-26		2	20/100	
72-27		2	20/100	
72-28		2	20/100	
72-29		2	20/100	



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Circuit No.	Description ⁽¹⁾	Number of pole(s) of CB	Rated current of CB (AT/AF)	Cable size (sq.mm.)
72-30		2	20/100	
72-31		2	20/100	
72-32		2	20/100	
72-33		2	20/100	
72-34		2	20/100	
72-35		2	20/100	
72-36		2	20/100	
72-37		2	20/100	
72-38		2	20/100	
72-39		2	20/100	
72-40		2	20/100	

Note: ⁽¹⁾ The description of each circuit branch will be specified by PEA.



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Specification No. RMIS-073/2557: AC AND DC STATION SERVICE DISTRIBUTION BOARDS
AND ACCESSORIES

Page 1 of 1

C3 Schedule of detailed requirement

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
1	1040110001	set(s)	AC station service distribution board <u>with</u> automatic transfer switch (ATS), 400/230 V AC 3-phase, 4-wire, 50 Hz system, equipped with main and branch circuit-breakers and accessories according to drawing No. SA4-015/56008 and SA4-017/53005.
2	1040110000	set(s)	DC station service distribution board <u>with</u> automatic transfer switch (ATS), 48 V DC, equipped with main and branch circuit-breakers and accessories according to drawing No. SA4-015/56010 and SA4-017/53005.
3	1040110002	set(s)	DC station service distribution board <u>with</u> automatic transfer switch (ATS), 125 V DC, equipped with main and branch circuit-breakers and accessories according to drawing No. SA4-015/56009 and SA4-017/53005 (125 V DC distribution board No.1).
4	1040110004	set(s)	DC station service distribution board <u>without</u> automatic transfer switch (ATS), 125 V DC, equipped with main and branch circuit-breakers and accessories according to drawing No. SA4-015/56009 and SA4-017/53005 (125 V DC distribution board No.2).
			Note: 1. Enclosed Drawings No. SA4-017/53005, SA4-015/56008, SA4-015/56009 and SA4-015/56010 2. The bidders has to submit, together with the bid, the sufficient references describing the previous experience of the suppliers, (e.g. list of supply of equipment and/or materials having the same or similar design as proposed, field experience, the registration of TISI, the copies of license, and/or the inspection to supplier's factory by PEA's inspectors, etc.) to the satisfaction of PEA.
			II

PROVINCIAL ELECTRICITY AUTHORITY

POWER SYSTEM STANDARD DIVISION

Specification No. RMIS-073/2557: AC AND DC STATION SERVICE DISTRIBUTION BOARDS AND ACCESSORIES

Page 1 of 1

C4 Price schedule

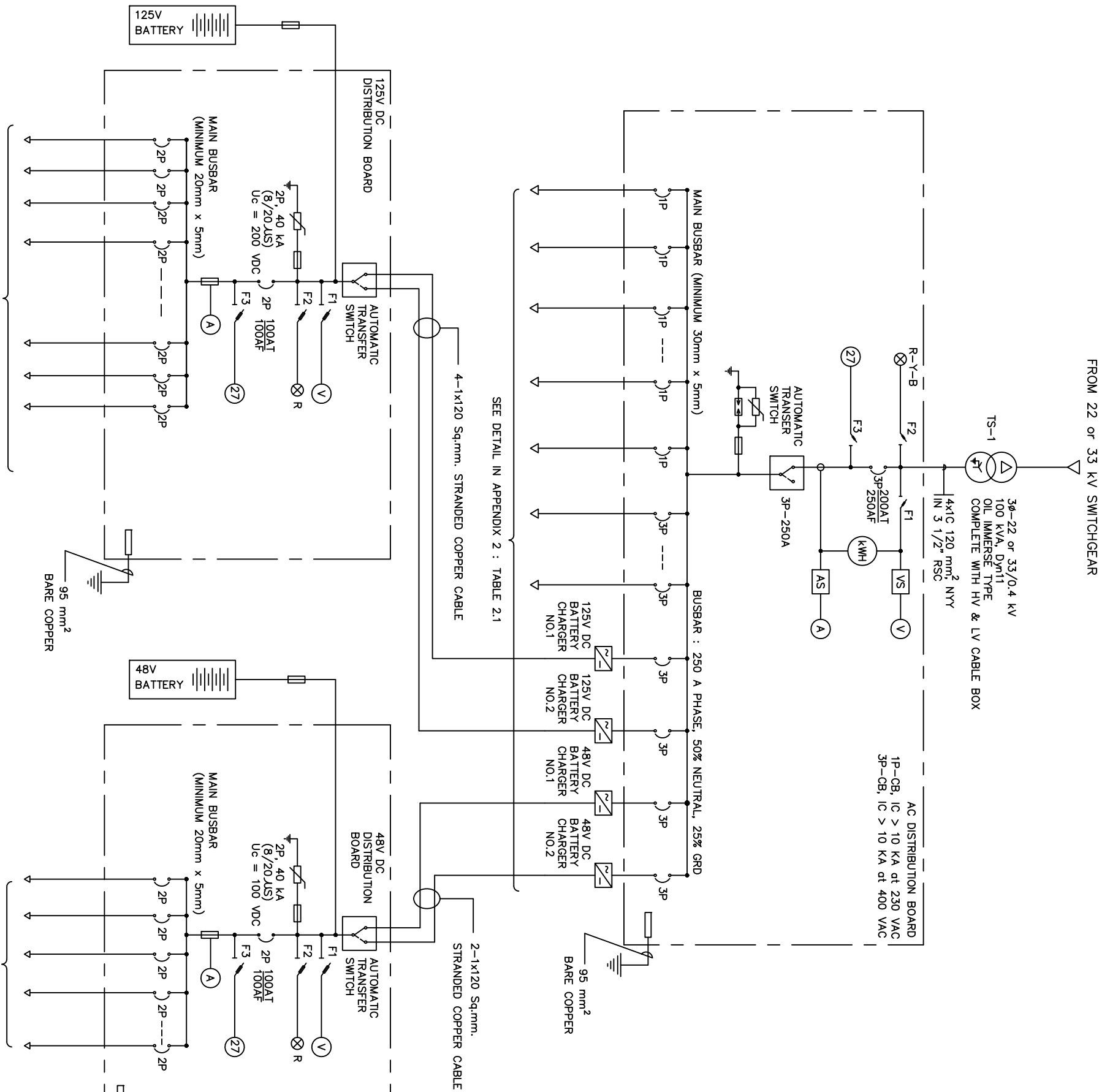
Invitation to Bid No.

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
1	1040110001		AC station service distribution board <u>with</u> automatic transfer switch (ATS), 400/230 V AC 3-phase, 4-wire, 50 Hz system, equipped with main and branch circuit-breakers and accessories according to drawing No. SA4-015/56008 and SA4-017/53005.	set(s)		
2	1040110000		DC station service distribution board <u>with</u> automatic transfer switch (ATS), 48 V DC, equipped with main and branch circuit-breakers and accessories according to drawing No. SA4-015/56010 and SA4-017/53005.	set(s)		
3	1040110002		DC station service distribution board <u>with</u> automatic transfer switch (ATS), 125 V DC, equipped with main and branch circuit-breakers and accessories according to drawing No. SA4-015/56009 and SA4-017/53005 (125 V DC distribution board No.1).	set(s)		
4	1040110004		DC station service distribution board <u>without</u> automatic transfer switch (ATS), 125 V DC, equipped with main and branch circuit-breakers and accessories according to drawing No. SA4-015/56009 and SA4-017/53005 (125 V DC distribution board No.2).	set(s)		
II						



SYMBOLS

CIRCUIT BREAKER

DISCONNECTING SWITCH WITH FUSE

FUSE

AUTOMATIC TRANSFER SWITCH, DOUBLE THROW

LOAD BREAK SWITCH, MOTOR OPERATION

COMBINATION LIGHTING CURRENT ARRESTER AND SURGE VOLTAGE ARRESTER

SURGE VOLTAGE ARRESTER

KILOWATT HOUR METER

VOLT METER

AMP. METER

VOLT SELECTOR SWITCH

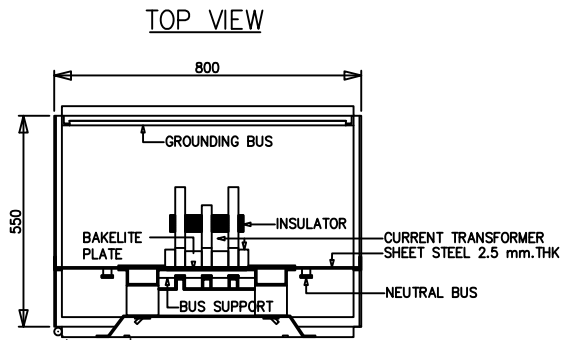
AMP SELECTOR SWITCH

RED - YELLOW - BLUE LAMP INDICATOR

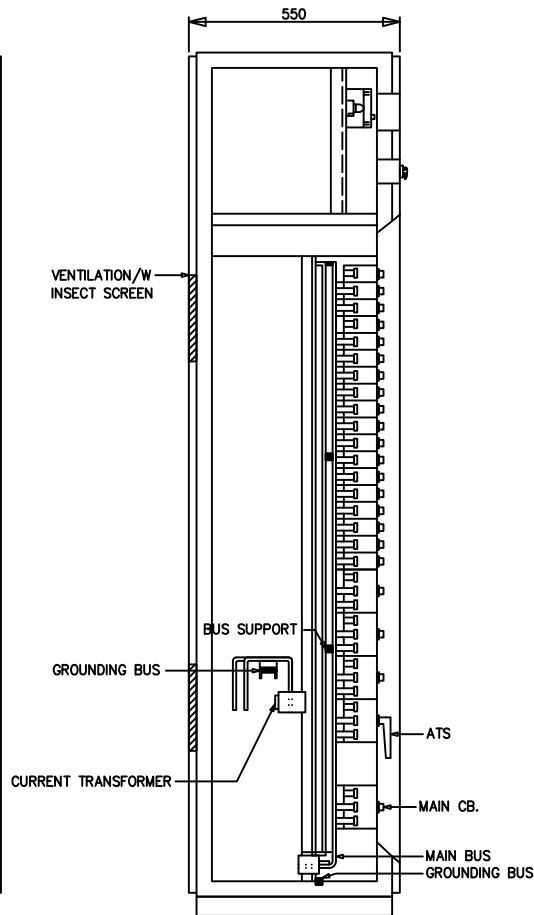
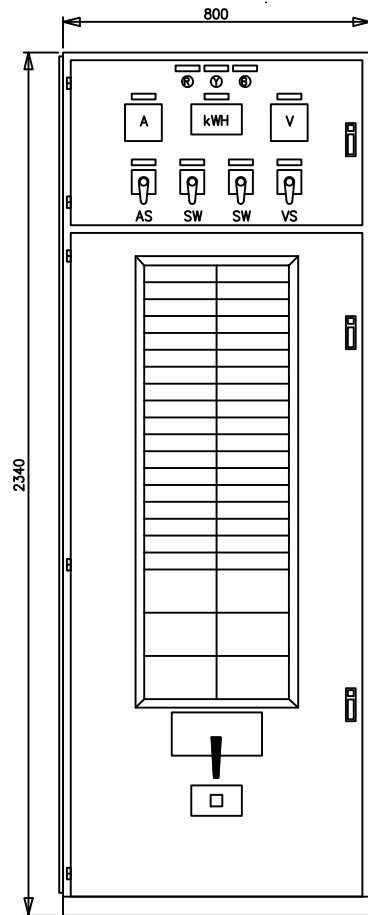
UNDER VOLTAGE RELAY

AC & DC STATION SERVICE DISTRIBUTION BOARD (TYPE B)
FOR 22 or 33 kV INDOOR SWITCHGEAR

กองมาตรฐานระบบไฟฟ้า ฝ่ายมาตรฐานและควบคุมปลอดภัย การไฟฟ้าส่วนภูมิภาค		
มติด่วน.....	SINGLE LINE DIAGRAM	
วันที่ 12 มี.ค. 2557	AC & DC STATION SERVICE DISTRIBUTION BOARD	
	แบบเลขที่.....SA4-017/53005	แผ่นที่ 2 ของจำนวน 2 แผ่น



PRELIMINARY



NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. THE CONTRACTOR SHALL SUBMIT THE DESIGN DRAWINGS SHOWING THE CIRCUIT BREAKER RATINGS, ARRANGEMENT AND NAMEPLATE DESIGNATION TO THE AUTHORITY FOR APPROVAL.
3. THE NEUTRAL BUS ON AC BOARD SHALL HAVE SUFFICIENT TERMINALS TO ACCOMMODATE THE NEUTRAL LEADS FROM EACH BREAKER CIRCUIT.
4. A GROUND BUS SHALL BE COMPLETE WITH SOLDERLESS TERMINAL LUG FOR TERMINATING 95 mm² STRANDED COPPER GROUND CABLE FROM CONTROL BUILDING AND SUBSTATION GROUNDING SYSTEM.

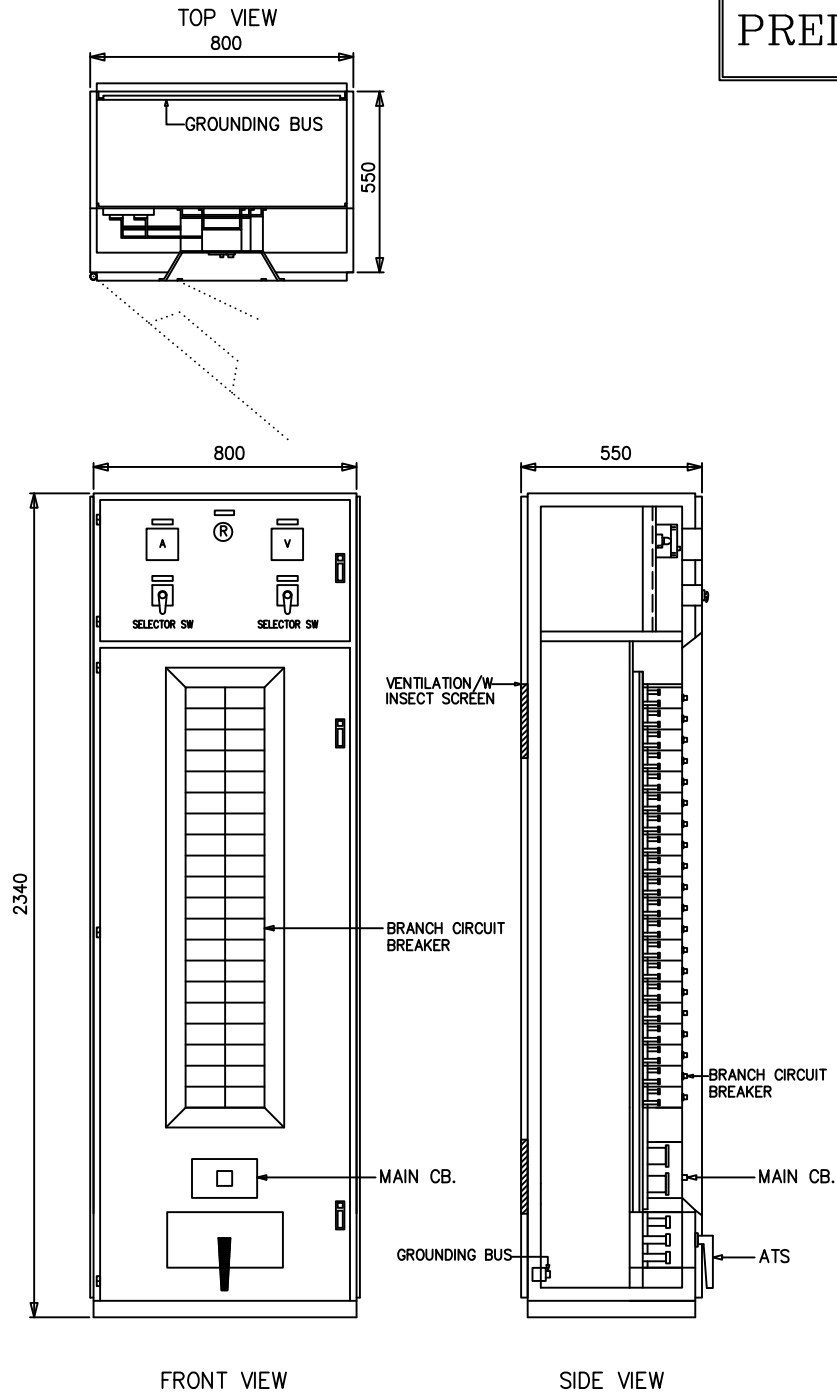
กองมาตรฐานระบบไฟฟ้า ฝ่ายมาตรฐานและความปลอดภัย การไฟฟ้าส่วนภูมิภาค

มิติเป็น มิลลิเมตร
วันที่ 12 มี.ค. 2557

AC STATION SERVICE DISTRIBUTION BOARD

แบบเลขที่ SA4-015/56008
แผ่นที่ ..1.. ของจำนวน ..1.. แผ่น

PRELIMINARY



125 V DC DISTRIBUTION BOARD NO.1

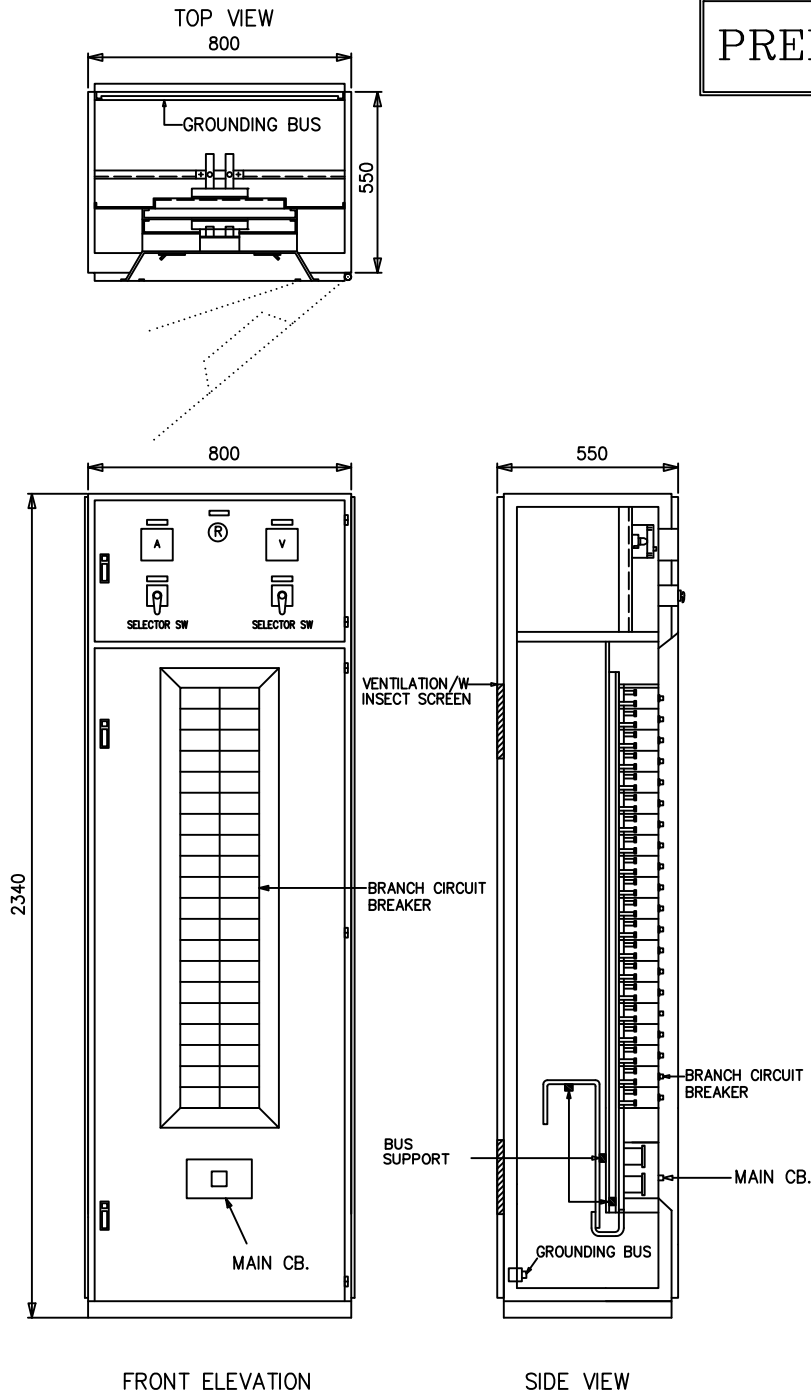
กองมาตรฐานระบบไฟฟ้า ฝ่ายมาตรฐานและความปลอดภัย การไฟฟ้าส่วนภูมิภาค

มิติเป็น มิลลิเมตร
วันที่ 12 มี.ค. 2557

125 V DC STATION SERVICE
DISTRIBUTION BOARD

แบบเลขที่ SA4-015/56009
แผ่นที่ ..1.. ของจำนวน ..2.. แผ่น

PRELIMINARY



FRONT ELEVATION SIDE VIEW
125 V DC DISTRIBUTION BOARD NO.2

NOTES :

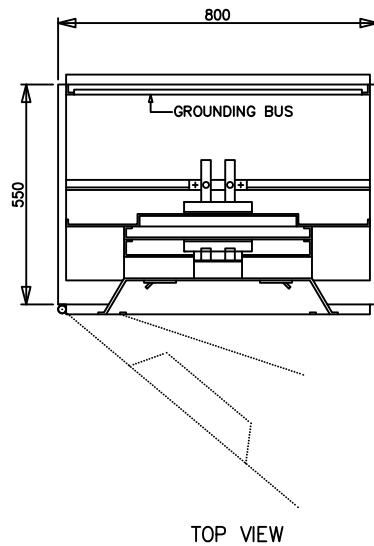
1. THE CONTRACTOR SHALL SUBMIT THE DESIGN DRAWINGS SHOWING THE CIRCUIT BREAKER RATINGS, ARRANGEMENT AND NAMEPLATE DESIGNATION TO THE AUTHORITY FOR APPROVAL.
2. ALL BUSES SHALL HAVE AMPERES CURRENT-CARRYING CAPACITIES OF AT LEAST 300 A.
3. A GROUND BUS SHALL BE COMPLETED WITH SOLDERLESS TERMINAL LUG FOR TERMINATING 95 mm² STRANDED COPPER GROUND CABLE FROM CONTROL BUILDING AND SUBSTATION GROUNDING SYSTEM.

กองมาตรฐานระบบไฟฟ้า ฝ่ายมาตรฐานและความปลอดภัย การไฟฟ้าส่วนภูมิภาค

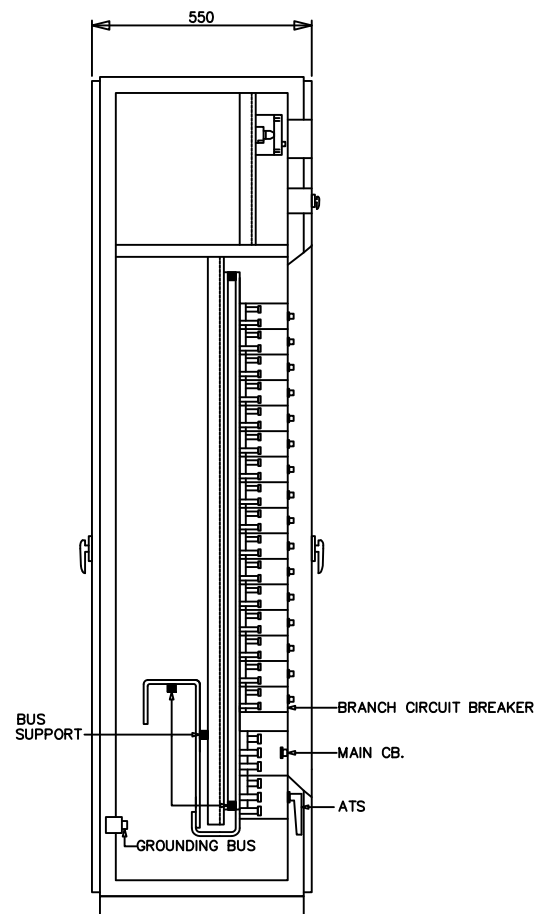
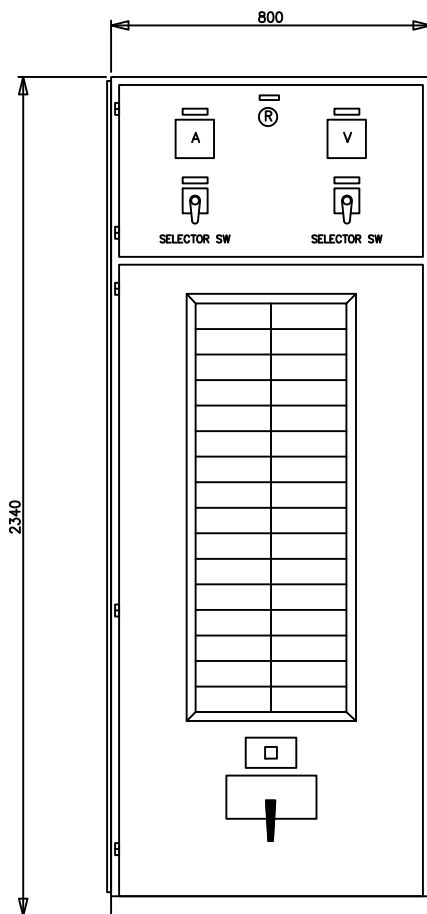
มิติเป็น มิลลิเมตร
วันที่ 12 มี.ค. 2557

125 V DC STATION SERVICE
DISTRIBUTION BOARD

แบบเลขที่ SA4-015/56009
แผ่นที่ ..2.. ของจำนวน ..2.. แผ่น



PRELIMINARY



NOTES :

1. THE CONTRACTOR SHALL SUBMIT THE DESIGN DRAWINGS SHOWING THE CIRCUIT BREAKER RATINGS, ARRANGEMENT AND NAMEPLATE DESIGNATION TO AUTHORITY FOR APPROVAL.
2. ALL BUSES SHALL HAVE AMPERES CURRENT-CARRYING CAPACITIES OF AT LEAST 200 A
3. A GROUND BUS SHALL BE COMPLETED WITH SOLDERLESS TERMINAL LUG FOR TERMINATING 95 mm² STRANDED COPPER GROUND CABLE FROM CONTROL BUILDING AND SUBSTATION GROUNDING SYSTEM

กองมาตรฐานระบบไฟฟ้า ฝ่ายมาตรฐานและความปลอดภัย การไฟฟ้าส่วนภูมิภาค

มิติเป็น มิลลิเมตร
วันที่ 12 มี.ค. 2557

48 V DC STATION SERVICE
DISTRIBUTION BOARD

แบบเลขที่ SA4-015/56010
แผ่นที่ ..1.. ของจำนวน ..1.. แผ่น