



Specification – Low Voltage Switchgear, Accessories and Kiosk (PENDA)

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1 SCOPE

Public Electricity Network Distribution Assemblies (PENDA) are stand-alone low voltage switchboards enclosed in a metal clad kiosk/housing used for the distribution of electricity to residential and commercial customers in the Horizon Power networks and regions.

This specification sets out the technical (electrical and mechanical) requirements for the performance, testing and supply of PENDA.

Approval in terms of this specification shall be obtained by one or a combination of the following:

- a) Successful completion of the appropriate tests required by this specification by an independent and accredited test authority.
- b) Provision test certificates from an independent and accredited test authority based upon an alternative specification, with test requirements at least equivalent to this specification.

NOTE: Verification of accreditation of the test authority shall be provided by NATA (National Association of Testing Authorities) accredited test house or by a test house possessing from a NATA MRA (Mutual Recognition Agreement) partner.

Tenderers must state any non-compliance with the specification in any tender submission and any alternative offers must be submitted in full and separately from any main offer.

2 NORMATIVE REFERENCES

2.1 Standards

2.1.1 Horizon Power Standards

- [1]. *Horizon Power Environmental Conditions*, standard number HPC-9EJ-01-0001-2013, available at <http://horizonpower.com.au/contractors-suppliers/contractors/manuals-and-standards/> under the 'Standards' heading.

2.1.2 Australian Standards

The following standards are available at <http://i2.saiglobal.com>.

- [2]. AS 1170.2:2021 – Structural design actions – Wind Actions.
- [3]. AS 1170.4:2007 – Structural design actions – Earthquake Actions in Australia.
- [4]. AS 2312.1:2014 – Guide to the Protection of Structural Steel against Atmospheric Corrosion by the use of Protective Coatings.
- [5]. AS 2700:2011 – Colour Standards for General Purposes.
- [6]. AS/NZS 3000:2018 – Electrical Installations – AS/NZ Wiring Rules.

- [7]. AS/NZS 4680:2006 – Hot-dip galvanised (zinc) coatings on fabricated ferrous articles.
- [8]. AS 60269.1:2005 – Low-voltage fuses – General Requirements.
- [9]. AS 60529:2004 – Degrees of protection provided by enclosures (IP Code).
- [10]. AS/NZS 60947.1:2021 – Low-Voltage switchgear and controlgear. Part 1: General Rules.
- [11]. AS/NZS 60947.3:2023 – Low-Voltage switchgear and controlgear. Part 3: Switches, disconnectors, switch-disconnectors and fuse combination units.
- [12]. AS 60890:2009 – A method of temperature-rise assessment by extrapolation for partially type-test assemblies (PTTA) of low-voltage switchgear and controlgear.
- [13]. AS/NZS 61439.1:2016 – Low-voltage switchgear and controlgear assemblies – General rules.
- [14]. AS/NZS 61439.5:2016 – Low-voltage switchgear and controlgear assemblies – Assemblies for power distribution in public networks.
- [15]. AS/NZS 62271.202:2019 – High-voltage switchgear and controlgear High-voltage/low-voltage prefabricated substation

2.1.3 Compliance with Standards

Various Standards are referenced in this Specification. The Standards have reference to the year they were published. If over the life of the Tender the Standards change, the Vendor is required to conform to the new edition of the Standard.

Unless otherwise specified herein, the *Equipment* shall be designed, manufactured and type and routine tested in accordance with the referenced Australian Standards, including all amendments. Where there is no Australian Standard equivalent, International Standards or Codes as defined in this specification shall be used. The specified documents contain provisions that, through reference in the text, constitute requirements of this Specification. At the time of publication of this Specification, the editions indicated were valid. Information on currently valid national and international standards may be obtained from the Australian Standards website – <http://www.saiglobal.com>.

2.2 Definitions and Abbreviations

For the purposes of this specification, definitions shall apply as in the relevant Australian Standards with the addition of the following general definitions:

Equipment: Public Electricity Network Distribution Assembly Type 1, 2 and 3.

FEA: Finite Element Analysis is a computerised method for predicting how a product reacts to real-world forces, vibration, heat and other physical effects.

PENDA: Public Electricity Network Distribution Assembly consists of a low voltage switchgear assembly housed in a cyclone rated metal clad kiosk.

3 GENERAL TECHNICAL REQUIREMENTS

3.1 General

The PENDA is a stand-alone low voltage switchboard housed in a metal-clad enclosure, it can be used outdoor or adapted for use within a brick compound substation. The PENDA comprises off:

1. Low Voltage Busbar Assembly built in compliance and tested to *AS/NZS 3000 [6]*, *AS/NZS 61439.1 [13]* and *AS/NZS 61439.5 [14]*;
2. Low Voltage Switchgear designed and tested to *AS/NZS 60947.1 [10]* and *AS/NZS 60947.3 [11]*; and
3. Cyclone Rated Metal Kiosk built and Support Stand designed and tested to *AS 62271.202 [15]* and *AS/NZS 61439.5 [14]*.

The PENDA comes in three sizes:

1. Type 1 – for loads up to 630 Amps
2. Type 2 – for loads up to 1400 Amps
3. Type 3 – for loads up to 2800 Amps

Appendix C provides a single line diagram that explains the method of connection for all three types of PENDA. Section 3.2, 3.3 and 3.4 provides an overview of the three types and its configuration.

3.2 Type 1 PENDA

The Type 1 shall consist of:

1. Three predrilled insulated busbars, mounted on stand-off insulators accommodating six circuits.
2. Circuit positions 1 & 2 may only accommodate either:
 - a. One 2000 Amp double ganged switch disconnecter with links, or
 - b. One 1260 Amp double ganged fused switch disconnecter, or
 - c. Two 630 Amp fused switch disconnectors
3. Circuit position 3 may only accommodate either one 630 Amp fused switch disconnecter or two 160 Amp fused switch disconnectors.
4. Circuit position 4 may only accommodate one 630 Amp fused switch disconnecter.
5. Circuit position 5 & 6 may only accommodate either one (Incomer) 2000 Amp double ganged switch disconnecter with links or two 630 Amp fused switch disconnectors.

6. Two predrilled busbars mounted on stand-off insulators, located near the bottom for neutral and earth terminations with a removable M.E.N. strip located on the left.
7. The cubicle and support stand in accordance with Section 4.1.

The overview and configuration as shown in Figure 3-1.

Figure 3-1

TYPE 1 PENDA LAYOUT

SWG	MAX FUSE	STOCK CODE	1	2	3	4	5	6
TYPE 1 PENDA		FBH0292						
PENDA BASE		CBH0492						
160A FSD	1 X 63A DIN 00	FB0866			L L			
630A FSD	1 X 400A NH2	FB0865	C/S	C/S	C/S	C/S	C/S	C/S
1000A FSD	1 X 630A NH3	FB0864						
1260A FSD	2 X 400A NH2	FB0863	C					
2000A SWD	LINKS SUPPLIED	FB0862	C			SUPPLY		

T = TRANSFORMER
 C = CUSTOMER
 E = EMERGENCY RESPONSE GENERATOR

L = LIGHTING CIRCUIT
 S = STREET CIRCUIT

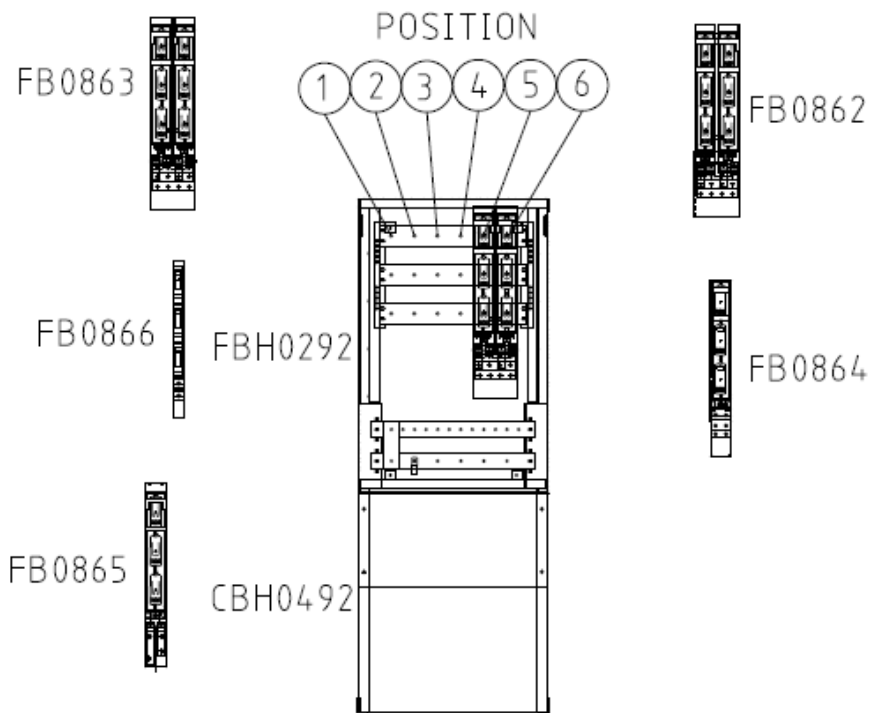


Figure 3-1 PENDA Type 1 Configuration

3.3 Type 2 PENDA

The Type 2 shall consist of:

1. Three predrilled insulated busbars, mounted on stand-off insulators accommodating ten circuits.
2. Circuit positions 1 & 2 may only accommodate either:
 - a. One 2000 Amp double ganged switch disconnecter with links, or
 - b. One 1260 Amp double ganged fused switch disconnecter, or
 - c. Two 630 Amp fused switch disconnectors.
3. Circuit positions 3 & 4 may only accommodate either:
 - a. One 1260 Amp double ganged fused switch disconnecter, or
 - b. Two 630 Amp fused switch disconnectors, or
 - c. One 630 Amp fused switch disconnecter (position 3) and two 160 Amp fused switch disconnectors (position 4).
4. Circuit positions 5, 6 & 7 may only accommodate one 630 Amp fused switch disconnecter in each position.
5. Circuit position 8 may only accommodate one 1000 Amp fused switch disconnecter.
6. Circuit positions 9 & 10 may only accommodate one (Incomer) 2000 Amp double ganged switch disconnecter with links.
8. Two predrilled busbars mounted on stand-off insulators located near the bottom for neutral and earth terminations with a removable M.E.N. strip located on the left.
9. The cubicle and stand in accordance with Section 4.1.

The overview and configuration as shown in Figure 3-2.

Figure 3-2

TYPE 2 PENDA LAYOUT

SWG	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10
TYPE 2 PENDA		FBH0293										
PENDA BASE		CBH0493										
160A FSD	1 X 63A DIN 00	FB0866				L L						
630A FSD	1 X 400A NH2	FB0865	C/S	C/S	C/S	C/S	C/S	C/S	C/S			
1000A FSD	1 X 630A NH3	FB0864								E		
1260A FSD	2 X 400A NH2	FB0863	C		C							
2000A SWD	LINKS SUPPLIED	FB0862	C1									T1

T = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE GENERATOR
 C = CUSTOMER S = STREET CIRCUIT

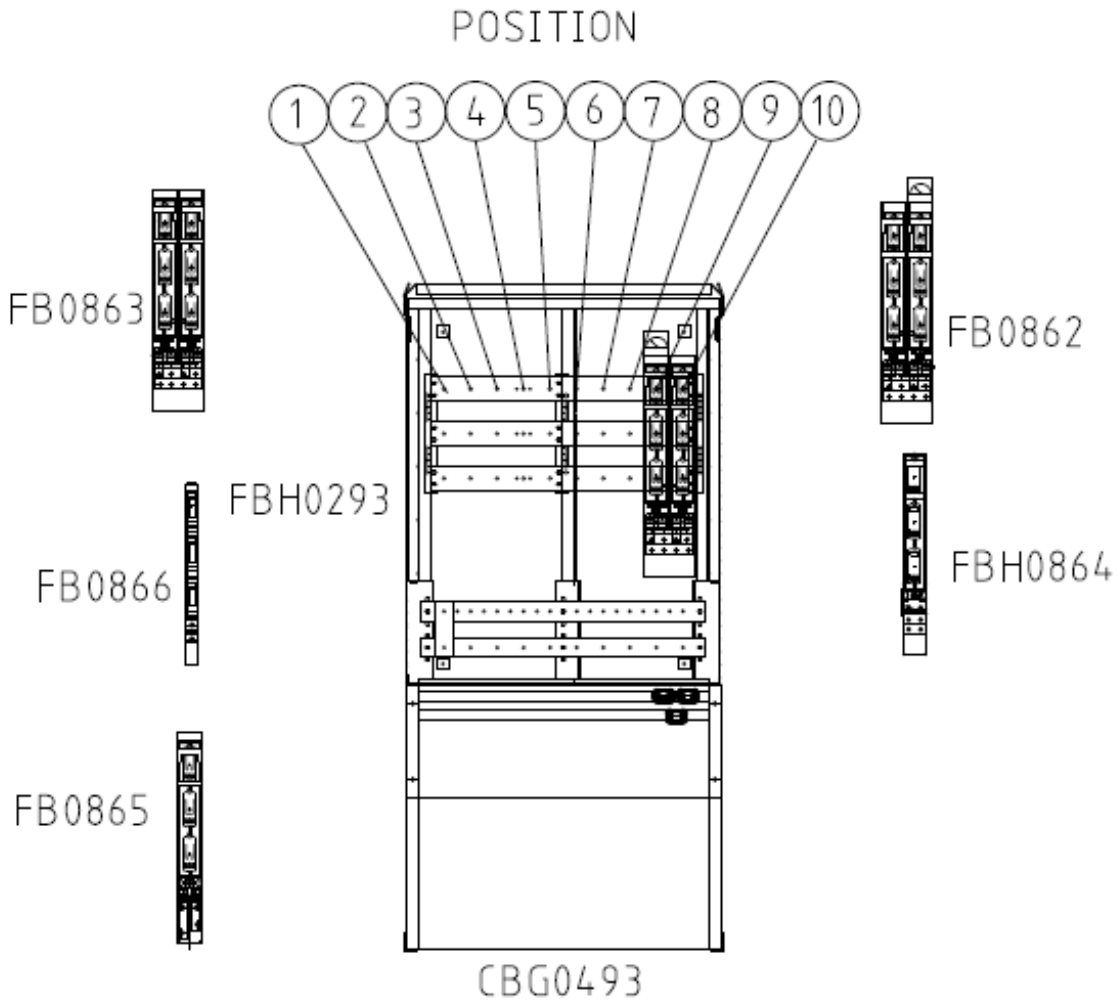


Figure 3-2 PENDA Type 2 Configuration

3.4 Type 3 PENDA

The Type 3 shall consist of:

1. Three predrilled busbars accommodating 16 circuits.
2. Circuit positions 1 & 2 may only accommodate one (Incomer 2) 2000 Amp double ganged switch disconnecter with links.
3. Circuit position 3 may only accommodate one 1000 Amp fused switch disconnecter.
4. Circuit positions 4 &5 may only accommodate either:
 - a. One 1260 Amp double ganged fused switch disconnecter, or
 - b. Two 630 Amp fused switch disconnectors, or
 - c. One 630 Amp fused switch disconnecter (position 5) and two 160 Amp fused switch disconnectors (position 4).
5. Circuit position 6 may only accommodate one 630 Amp fused switch disconnecter.
6. Circuit positions 7 & 8 may only accommodate either:
 - a. One 1260 Amp double ganged fused switch disconnecter, or
 - b. Two 630 Amp fused switch disconnectors.
7. Circuit positions 9 & 10 may only accommodate either:
 - a. One 2000 Amp double ganged switch disconnecter with links, or
 - b. One 1260 Amp double ganged fused switch disconnecter, or
 - c. Two 630 Amp fused switch disconnectors.
8. Circuit positions 11 & 12 may only accommodate either:
 - a. One 1260 Amp double ganged fused switch disconnecter, or
 - b. Two 630 Amp fused switch disconnectors.
9. Circuit position 13 may only accommodate one 630 Amp fused switch disconnecter.
10. Circuit position 14 may only accommodate one 1000 Amp fused switch disconnecter.
11. Circuit positions 15 & 16 may only accommodate one (Incomer 1) 2000 Amp double ganged switch disconnecter with links.

10. Two predrilled busbars mounted on stand-off insulators and located near the bottom for neutral and earth terminations with a removable M.E.N. strip located on the left.

11. The cubicle and stand in accordance with Section 4.1.

The overview and configuration as shown in Figure 3-3.

Figure 3-3

TYPE 3 PENDA LAYOUT

SWG	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
TYPE 3 PENDA		FBH0294																	
PENDA BASE		CBH0494																	
160A FSD	1 X 63A DJN 00	FB0866				L	L												
630 FSD	1 X 400A NH2	FB0865				C/S	C/S	C/S	C/S	C/S	C/S	C/S	C/S	C/S	C/S	C/S			
1000A FSD	1 X 630A NH3	FB0864				E											E		
1260A FSD	2 X 400A NH2	FB0863						C			C	C	C	C					
2000A SWD	LINKS SUPPLIED	FB0862				T2						C1				T1			

T = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE GENERATOR
 C = CUSTOMER S = STREET CIRCUIT

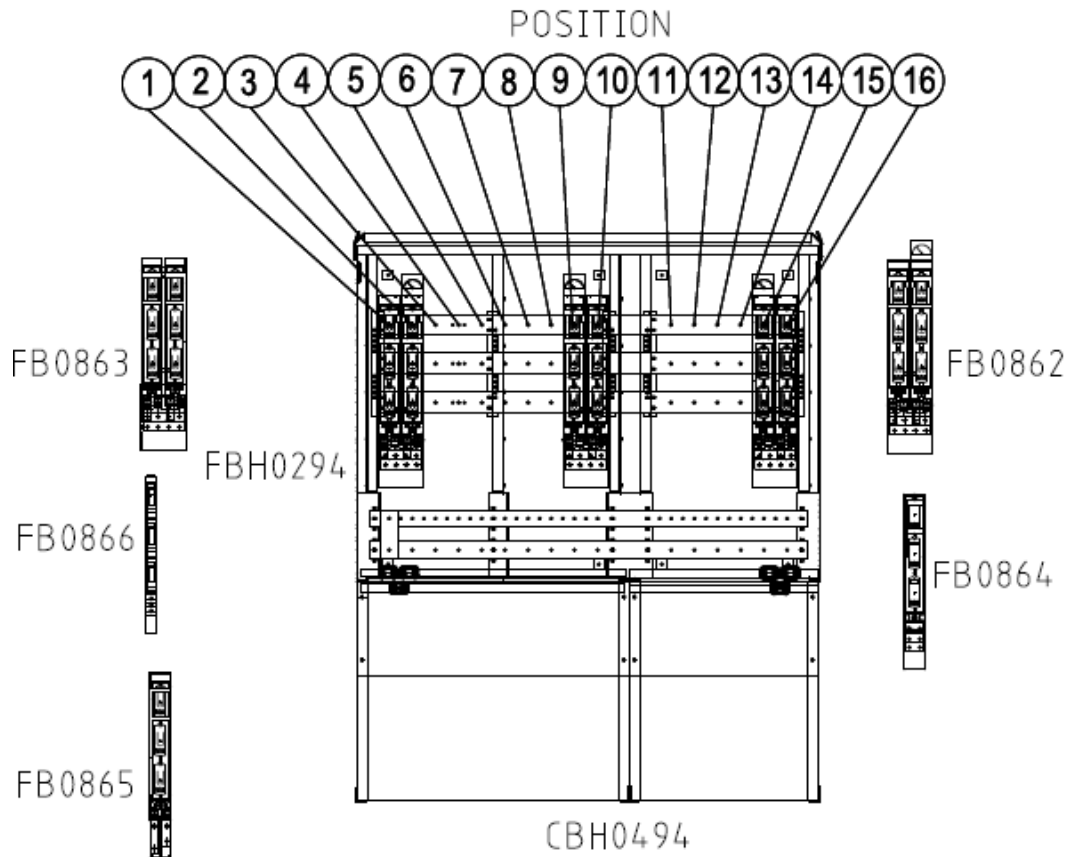


Figure 3-2 PENDA Type 3 Configuration

3.5 Environmental Conditions

The performance of the *Equipment* must meet the requirements set in Section 4.1 of the *Horizon Power Environmental Conditions [1]*.

3.6 Electrical Requirements

The electrical performance/requirement of each switchgear type is shown in Appendix B.

4 SPECIFIC TECHNICAL REQUIREMENTS

4.1 Cyclone Rated Kiosk and Stand Specific Requirements

A suitable metal-clad, outdoor, vandal proof and naturally ventilated kiosk and support stand shall be supplied to house the low voltage switchgear assembly. The kiosk shall be capable of withstanding Wind Region 'D' conditions and this shall be confirmed in accordance with AS 1170.2 [2] and AS 1170.4 [3].

The kiosk shall be constructed out of stainless steel or marine grade aluminium and shall be AFLR and BFLR (i.e. restricted and public access) AS/NZS 61439.1 [13] and AS/NZS 61439.5 [14].

The kiosk shall have an ingress protection rating of IP34D in accordance with AS/NZS 60529 [9]. The kiosk shall have adequate ventilation to relieve any built-up air pressure due to fault conditions.

4.1.1 Ventilation of Kiosk

Sufficient natural ventilation must be provided to allow adequate airflow inside the kiosk to prevent high temperature and humidity buildup.

The ventilation louvres provided shall not allow horizontal rain and/or water spray from nearby bore sprinklers to enter the kiosk. Stainless-steel perforated vermin mesh shall be fitted over any louver openings.

The vermin screen must be easily removable for cleaning or replacement without the need to remove the kiosk from the support stand.

The Vendor must show the efficiency of the kiosk cooling by submitting temperature rise calculations done to AS 60890 [12] and FEA simulations.

4.1.2 Kiosk Doors and Locking

The kiosk doors must be 3-point lockable, earthed doors to allow access to the Equipment, for ease of operation and maintenance. The kiosk door must prevent unauthorised access to the Equipment, i.e. the kiosk must be vandal-proof and child-proof. The minimum diameter hole for a padlock must be 10 mm.

The 3-point locking system must be of 'Selectrix EMKA' type (or equivalent) with a stainless-steel flush mounting handle, having the padlock hasp incorporated into the handle. Doors with separate hasps and handle systems will not be accepted.

It must not be possible to unlock the 3-point locking system without removing the padlock.

All hinges must be manufactured from SS316 stainless-steel and must have a minimum pin diameter of 10 mm.

Door seals must comprise a neoprene (or identical non sticking poly material) section, held in a metal channel on the door, and compressed by a dished edge on the fixed enclosure, when the door is closed.

A robust door restraint must be provided to hold each door in the 90° open position. The restraint must use a captive design so that it cannot be inadvertently disengaged. The restraint must be self-storing in the sense that it will prevent a closed door from rattling.

4.1.3 Kiosk Roof

The roof design of the kiosk shall be gently sloping from front to back to enable water to run off towards the rear and not accumulate anywhere on the roof surface.

The kiosk roof shall be double skinned to insulate against the effects of large temperature variations between the outside ambient and temperature inside the kiosk.

4.1.4 Support Stand

The Support Stand shall be designed to carry the full weight of the PENDA Types. The stands shall be hot dipped galvanised in accordance with *AS/NZS 4680 [7]*.

The support stand shall have removable covers to allow installation of cables. The covers shall have handles for easy of work.

4.1.5 Coupling of Kiosk and Stand

The complete kiosk and support stand shall be designed for easy installation and removal. The kiosk shall be easily separable from the support stand to facilitate replacement in case of failure to the low voltage switchgear.

The kiosk and stand shall be supplied together on a pallet designed for long distance travel.

4.1.6 Dimensional Limitation

Drawings of PENDA Type 1, 2 and 3 are shown in Appendix E. The dimensions of each kiosk are to be kept same so to make retrofitting easier.

4.1.7 Protection Coating

All internal and external surfaces shall be treated with a coating which provides protections against corrosion induced by water, salt laden atmosphere and low levels of industrial pollutants as defined in *Horizon Power Environmental Conditions [1]*.

The paint system shall be done in accordance with *AS 2312.1 [4]* and have a minimum rating of C3H.

The colour of the protection coating on the outside of the kiosk shall be 'G11 – 'Bottle Green' as shown in AS 2700 [5].

4.1.8 Markings

The kiosk shall be marked with the following identification in a location that will be visible after installation at site:

- a) Horizon Power Stock Code.
- b) Vendor's Logo/Trademark.
- c) Month and Year of manufacture.

4.1.9 Lifting Facilities

The Vendor shall provide factory fitted lifting eyes capable of lifting the full weight of the *Equipment*.

4.1.10 Mechanical Verification

The mechanical strength verification of the kiosk shall be done in accordance with *Clause 10.2.101 of AS/NZS 61439.5 [14]*.

4.2 Low Voltage Assembly Requirements

4.2.1 General

The low voltage assembly shall be designed, built and tested to *AS/NZS 61439.1 [13]* and *AS/NZS 61439.5 [14]*. The single line connection of the PENDA is shown in Appendix C.

Any exposed, live LV electrical parts within the compartments shall be adequately protected by removable covers to prevent accidental contact. Preference is for transparent covers. The LV insulation level shall meet the requirement of *Clause 10.9.4 of AS/NZS 61439.1 [13]* between phases, adjacent circuits, and protective covers.

The LV assembly shall have a neutral and earth bar supplied with holes, spaced 50 mm to suit M12 bolts for earth connections and cable neutrals. There shall be earth points to allow isolation for maintenance and testing.

Drawings of the busbar insulators and covers are shown in Appendix D.

4.2.2 Busbars

The busbar lengths, predrilled hole numbers and sizes, nut insert numbers and sizes for each PENDA Type shall be as per drawings provided in Appendix D1.2.

4.2.2.1 LV Phase Busbars

Three 100 mm x 10 mm tinned copper busbars, each spaced 185 mm apart and mounted on insulators shall be used to mount the LV assembly to the PENDA kiosk. The busbars shall be insulated.

4.2.2.2 Neutral & Earth Busbars

Two 80 mm x 6 mm tinned copper busbars, mounted on insulators shall be used for neutral and earth terminations within the PENDA kiosk. The busbars shall be installed between 100 mm and 350 mm from the base of the kiosk, with an 80 mm x 6 mm tinned copper strip used to connect the two busbars.

4.2.3 Busbar Insulators

Busbar insulators shall be used to mount the Phase, Neutral and Earth busbars to the PENDA kiosk. The insulators shall comply with *AS/NZS 61439.1 [13]* and be suitable to withstand the electrical stresses, temperatures and mechanical forces that may be experienced without damage, over the expected service life of the assembly.

The insulators shall be suitable for use within an enclosure that is pollution degree 4 – Industrial as defined in *Clause 7.1.3.2 of AS/NZS 60947.1 [10]*.

4.2.4 Busbar Cover

A clear plastic (such as polycarbonate) bus bar cover shall be provided to make the bus bar assembly touch safe. The bus bar cover shall either be attached to the side of the switchgear or onto the bus bar using non-conductive (plastic) M12 bolts. All fixings are to be provided in the kit.

The bus bar covers shall span four vacant circuits but shall also be perforated to allow circuits to be added later without the need to cut the bus bar cover. The cover shall be suitable to withstand the electrical stresses, temperatures and mechanical forces that may be experienced over the expected service life, without damage, within the switchgear assembly in accordance with *AS/NZS 61439.1 [13]*.

4.2.5 Name Plate

A name plate for the low voltage switchgear in accordance with *AS/NZS 61439.1 [13]* shall be fitted in a clearly visible location on the assembly. The low voltage assembly must have the ratings on the name plate.

4.3 Low Voltage Switchgear Requirements

The Low Voltage switchgear shall be designed and tested in accordance with *AS/NZS 60497.1 [10]*. Where Horizon Power's requirements contradict the normative sections with the industry standards listed in Section 2.1.2, this shall be formally communicated to Horizon Power. The Vendor shall make recommendations on how Horizon Power's desired functionality can be achieved whilst still complying to the industry standard.

4.3.1 Temperature De-Rating

The Vendor's de-rating curves shall be provided for the low voltage switchgear based on use within the metal clad kiosk with an internal ambient temperature of 70°C. Horizon Power will use temperature calculations based on *AS 60890 [12]* to determine the maximum temperature of the internal kiosk.

Any current loading limitation, based on power losses of the fuses or links shall be declared by the Vendor within the equipment data sheet.

4.3.2 Fuse Switches and Switch Disconnectors

The following requirements must be met for fuse switches and switch disconnectors:

- Suitable for 185 mm busbar spacing between phases.
- Compatible with DIN type LV fuses in sizes NH2 and NH3 as per AS 60269.1 [8].
- Rated short time withstand current of at least 40 kA/1 sec, a higher conditional short circuit withstand current may be accepted at the discretion of Horizon Power subject to confirmation the switchgear will be protected by an upstream protection device i.e. MCCB.
- Suitable for uninterrupted duty.
- Fused switched can be single/double opening and must be ganged to open all three phases simultaneously. Preference will be given to switches with a top and bottom handle for ease of operation.
- The strength of the operating mechanism and reliability of indication of position shall be proven by completing the test as prescribed in *Clause 9.2.6.2 of AS/NZS 60947.1 [10]*. The Vendor shall state the force required to operate the switch on the data sheet.
- The switches shall be suited for isolation and marked as an isolating switch. There shall be locking facilities to prevent inadvertent closing.
- The phase colours (R, W & B) of outgoing terminals shall be clearly identified by means of a permanent system such as a heat proof paint and embossed / stamped letters.
- Testing facilities shall be incorporated that allow the presence of voltage to be detected with a handheld test instrument on either side of the fuses, or operating mechanisms of switches.
- An IP2X rating shall be maintained to protect against inadvertent contact with live parts. The rating shall be maintained, even when in the open / off position, once installed.
- Phase and circuit barriers shall be fitted over cable terminations that provide an IP2X rating to protect against inadvertent contact with live cables.
- Shorting and earthing stubs shall be provided for each outgoing phase terminal of the LV switchgear to allow work to be done safely on isolated outgoing cables.
- The outgoing terminals of the switchgear shall allow termination of cable sizes as shown in Appendix D.

5 PACKAGING REQUIREMENTS

The *Equipment* shall be delivered on pallets designed for long distance travel to the Region Depots and shall be marked clearly with the following information:

- Vendor/Manufacture Name
- Vendor/Manufacture part reference number
- Horizon Power Order Number
- Horizon Power Stock Code
- Package weight and dimensions.

Test report and operation and maintenance manual to be included.

6 TESTING REQUIREMENTS

6.1 General

In the absence of an Australian Standard the relevant International Industry standards shall be followed. Any proposed variation of tests shall be subject to approval by Horizon Power. This includes using tests from ANSI, ASTM or IEC standards.

The Vendor shall submit its Inspection and Test program to Horizon Power 4 weeks after order acknowledge.

The factory inspections and testing shall in no way relieve or reduce the responsibility and liability of the Vendor for any defects found after the delivery and installation of the *Equipment*.

All costs incurred by the Manufacturer in carrying out the tests and demonstrations specified, including the cost of all components damaged or destroyed, shall be borne by the Manufacturer, and shall be included in the prices quoted.

6.2 Type Tests

Type Test reports shall be supplied for the first order of each PENDA type.

The low voltage switchgear shall be tested to *AS/NZS 60947.3 [11]*.

The metal clad kiosk and low voltage switchgear shall be tested to *AS/NZS 61439.1 [13]* and *AS/NZS 61439.5. [14]*.

The complete design of the PENDA kiosk and stand shall be shown to withstand Wind Region 'D' conditions using the method outlined in *AS 1170.2 [2]*.

Mechanical withstand test will be completed as per *Clause 10.2.101 of AS/NZS 61439.5 [14]*.

Temperature rise in the kiosk shall be determined using calculations shown in *AS 60890 [12]* and modelled using FEA.

6.3 Routine Tests

Routine tests of the low voltage switch disconnecter and fuse switches as specified by AS/NZS 60947.1 [10] shall be carried out on every unit supplied.

The complete low voltage assembly and kiosk shall have routine tests as specified AS/NZS 61439.1 [13] for every order.

6.4 Cost of Tests

The type testing as prescribed in Section 6.2 shall be undertaken on the first order of each Type of PENDA and shall be included as part of the costs.

The Vendor shall submit itemised costs of each routine and type test if Horizon Power wishes to do tests outside of the Contract.

7 DOCUMENTATION

7.1 General Requirements

All drawings, manuals and other documents supplied by the Vendor shall have the following information:

- a) Specification Number.
- b) Stock Code.
- c) Order Number.

All documents submitted shall be in English.

7.2 Drawings

The Vendor shall submit CAD drawings (in DGN or DXF and PDF format) showing the General Arrangement of the switchgear and other structural drawings. These drawings shall contain the following information:

- Physical dimensions of the *Equipment*
- Three-dimensional isometric general arrangement
- Front, side, and plan elevations
- Equipment weights
- Materials list of associated parts
- Bus bar attachment detail
- Cable attachment detail
- Operating and locking mechanisms in the open and closed positions
- Horizon Power stock code

- Vendor's part number

7.3 Test Certificates

The Vendor shall supply test certificates with the following information:

- The manufacturer's name
- Manufacturer Identification
- Rating identification
- Horizon Power Specification Number
- Horizon Power Stock Code
- Standard and clauses tested

7.4 Data Sheets

The Vendor shall provide a data sheet for low voltage switchgear, assembly and kiosk with the following information:

- Vendors part number
- Horizon Power Stock Code
- Rated Voltage
- Rated current and any current loading limitation
- Rated impulse withstand voltage
- Pollution degree
- Rated duty
- Rated short time fault current withstand and duration
- Utilization category
- The force required to effectively operate each item shall be stated by the manufacturer in the equipment data sheet.

7.5 Installation, Operation and Maintenance Manual

The Installation, Operation and Maintenance Manual shall include the following:

- a) A concise description of each item of *Equipment* and the purpose for which the switchgear was designed and manufactured.
- b) The function and operation of each part and any tool or accessory needed for its operation that is supplied by the Vendor.

- c) Detailed installation procedures and instructions and pre-commissioning testing program.
- d) Instructions on how to adjust any of the parts.
- e) Recommended comprehensive routine maintenance, parts replacement schedule.
- f) Recommended method of disposal at end-of-life cycle.
- g) Any special precautions to be taken in replacement or adjustment of any items including detailed Materials Safety Data Sheet (MSDS) documentation.

8 PROTOTYPE AND SAMPLE

A prototype of the Type 2 kiosk and low voltage switchgear assembly shall be produced to allow Horizon Power to evaluate the suitability of the Equipment in Horizon Power's network. If the prototype meets functionality, the unit shall be used for type testing as prescribed in Section 6.2.

The cost of the prototype shall be itemised in a number of agreed units to be purchased.

APPENDIX A REVISION INFORMATION

(Informative) Horizon Power has endeavoured to provide standards of the highest quality and would appreciate notification of errors or queries.

Each Standard makes use of its own comment sheet which is maintained throughout the life of the standard, which lists all comments made by stakeholders regarding the standard.

A comment sheet found in **DM# 42119526**, can be used to record any errors or queries found in or pertaining to this standard. This comment sheet will be referred to each time the standard is updated.

Date	Rev No.	Notes
26/04/2024	0	Initial Document Creation

APPENDIX B TECHNICAL SCHEDULES

B1 LOW VOLTAGE SWITCHGEAR

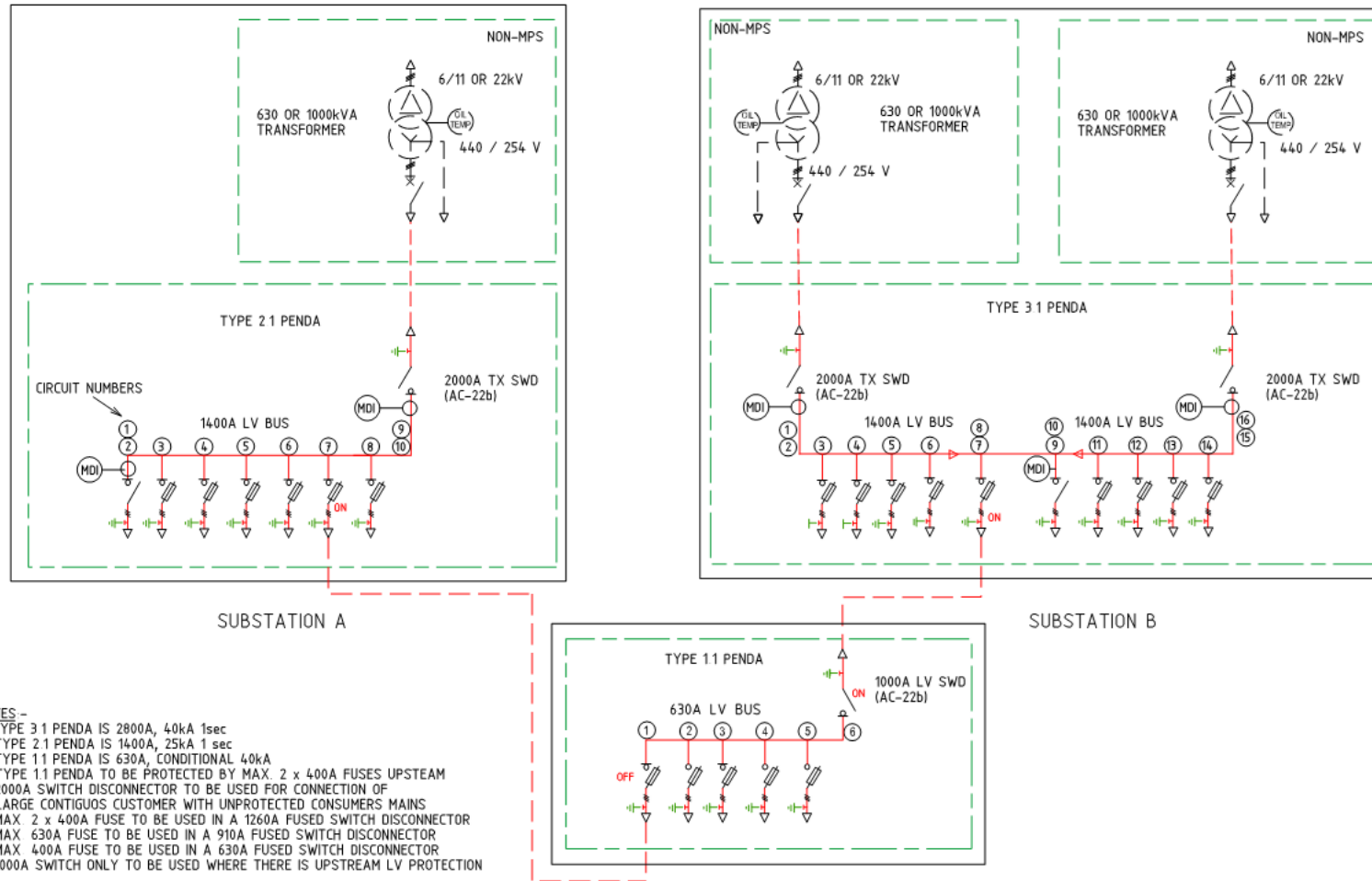
Table B1-1

Item No	Description	Unit	Horizon Power Stock Code					
			FB0866	FB0865	FB0875	FB0864	FB0863	FB0862
1	Rated Current	A	160	630	1000	1000	1260	2000
2	Number of Phases		3	3	3	3	3	3
3	Rated Voltage	V	440	440	440	440	440	440
4	Rated Frequency	Hz	50	50	50	50	50	50
5	Rated Insulation Volage	V	1000	1000	1000	1000	1000	1000
6	Overvoltage Category		IV	IV	IV	IV	IV	IV
7	Lightning impulse withstand voltage	kV	12	12	12	12	12	12
8	Maximum Permissible Ambient Temperature During Operation	°C	70	70	70	70	70	70
9	Maximum Permissible Sound Power Level	dB	<36	<36	<36	<36	<36	<36
10	Expected Service Life	Years	35	35	35	35	35	35
11	Pole Impedance (new)	Ω	N/A	N/A	N/A	N/A	N/A	N/A

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12	Temperature Derating Factors	°C	N/A	N/A	N/A	N/A	N/A	N/A
13	Dimensional Limitations							
14	Width	mm	50	100	100	100	200	209
15	Height	mm	750	840	840	840	915	915
16	Depth	mm	140	190	190	190	190	190
17	Bus Bar Spacing	mm	185	185	185	185	185	185
18	Minimum rated short time withstand current	RMS kA/1s	Conditional 40	40	40	Conditional 40	40	40
19	Suitable for uninterrupted duty	Y/N	Y	Y	Y	Y	Y	Y
20	Utilisation Category (at rated voltage)		AC22B	AC22B	AC22B	AC22B	AC22B	AC22B
21	Lockable operating handle	Y/N	Y	Y	Y	Y	Y	Y
22	Ingress Protection Rating (open position)		IP2X	IP2X	IP2X	IP2X	IP2X	IP2X
23	Fuse or Link Size		NH00	NH2 & NH3	NH2 & NH3	NH3	NH2 & NH3	NH3
26	Pollution Degree		IV	IV	IV	IV	IV	IV
25	Minimum Creepage Distances	mm	14	14	14	14	14	14
26	Maximum cables to be terminated	mm ²	1 x 95	2 x 240	2 x 400	3 x 400	4 x 300	4 x 400

APPENDIX C PENDA SINGLE LINE DIAGRAM

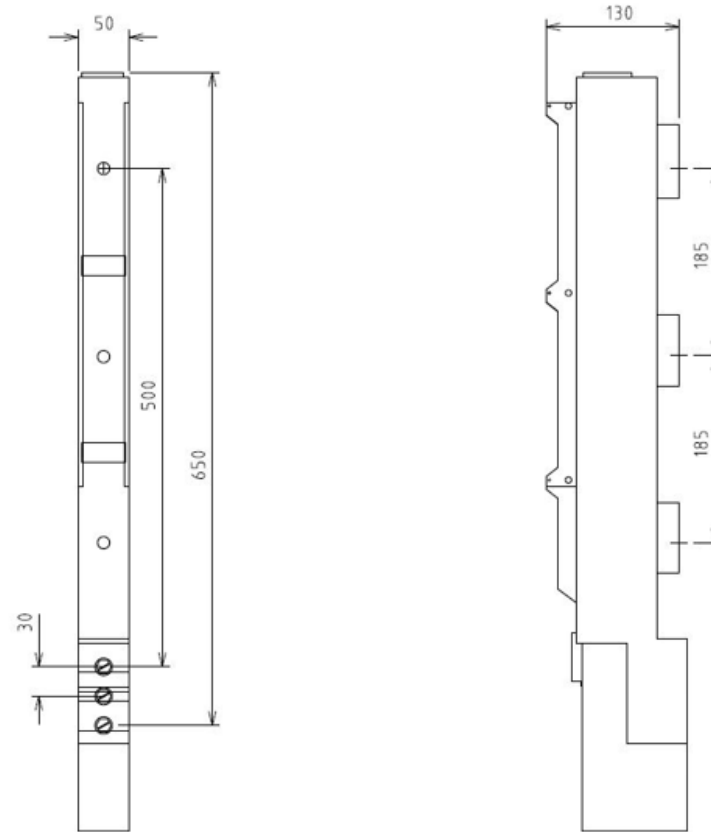


- NOTES -
- 1 TYPE 3 1 PENDA IS 2000A, 40kA 1sec
 - 2 TYPE 2 1 PENDA IS 1400A, 25kA 1 sec
 - 3 TYPE 1 1 PENDA IS 630A, CONDITIONAL 40kA
 - 4 TYPE 1 1 PENDA TO BE PROTECTED BY MAX. 2 x 400A FUSES UPSTREAM
 - 5 2000A SWITCH DISCONNECTOR TO BE USED FOR CONNECTION OF LARGE CONTIGUOUS CUSTOMER WITH UNPROTECTED CONSUMERS MAINS
 - 6 MAX 2 x 400A FUSE TO BE USED IN A 1260A FUSED SWITCH DISCONNECTOR
 - 7 MAX 630A FUSE TO BE USED IN A 910A FUSED SWITCH DISCONNECTOR
 - 8 MAX 400A FUSE TO BE USED IN A 630A FUSED SWITCH DISCONNECTOR
 - 9 1000A SWITCH ONLY TO BE USED WHERE THERE IS UPSTREAM LV PROTECTION

Figure C-1 PENDA Single Line Diagram

APPENDIX D LOW VOLTAGE SWITCHGEAR DIMENSIONAL DRAWINGS

D1.1 SWITCHGEAR DRAWINGS



NOTES:

1. SERVICE CABLE CONNECTION
FUSED SWITCH DISCONNECTOR
2. CABLE LUGS NOT REQUIRED
3. MAXIMUM 160A FUSES (NH1)
4. MAXIMUM 1 x 95 sqmm
CABLE PER PHASE

Figure D-1 FB0866 160A Fuse Switch Disconnect

NOTES:

1. STREET FEEDER OR CUSTOMER FUSED SWITCH DISCONNECTOR
2. M12 CABLE TERMINATIONS
3. USE WEBER LOCKING EARTH PLUG
4. MAXIMUM 400A FUSES (NH3)
5. MAXIMUM 2 x 240 sqmm CABLES PER PHASE

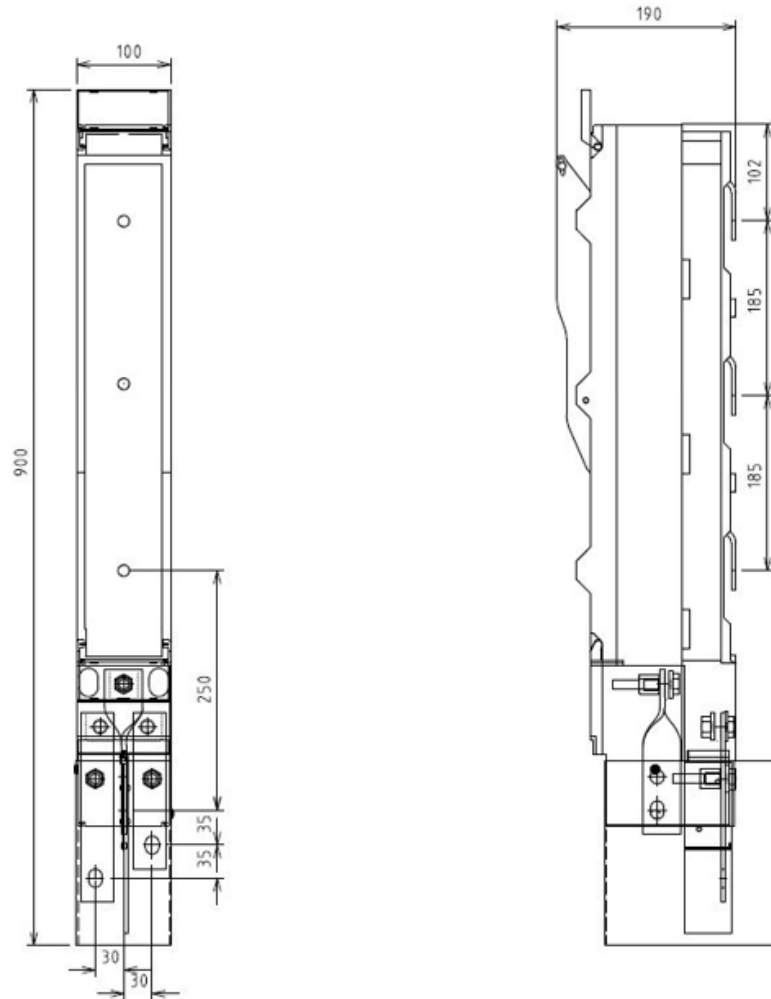


Figure D-2 FB0865 630A Fuse Switch Disconnecter

NOTES:

1. CUSTOMER SWITCH DISCONNECTOR
2. M12 CABLE TERMINATIONS
3. USE WEBER LOCKING EARTH PLUG
4. SUPPLIED WITH LINKS FITTED
5. MAXIMUM 4 x 300 sq mm CU CABLES PER PHASE, OR
3 x 400mm² Cu CABLES PER PHASE

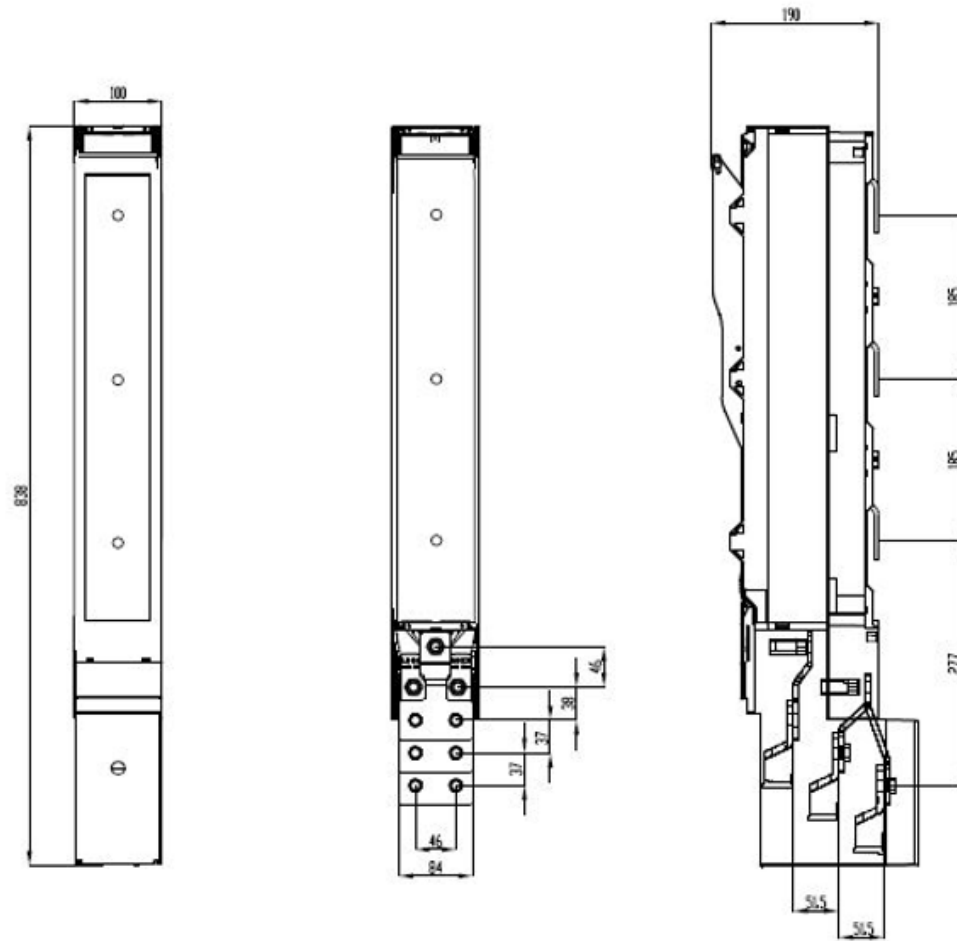


Figure D-3 FB0864/FB0875 1000A Fuse Switch/Switch Disconnecter

NOTES:

1. CUSTOMER FUSED SWITCH DISCONNECTOR
2. M12 CABLE TERMINATIONS
3. USE WEBER LOCKING EARTH PLUG
4. USE MAXIMUM OF 2 x 630A FUSES (NH3)
5. MAXIMUM OF 4 x 300mm² Cu CABLES PER PHASE

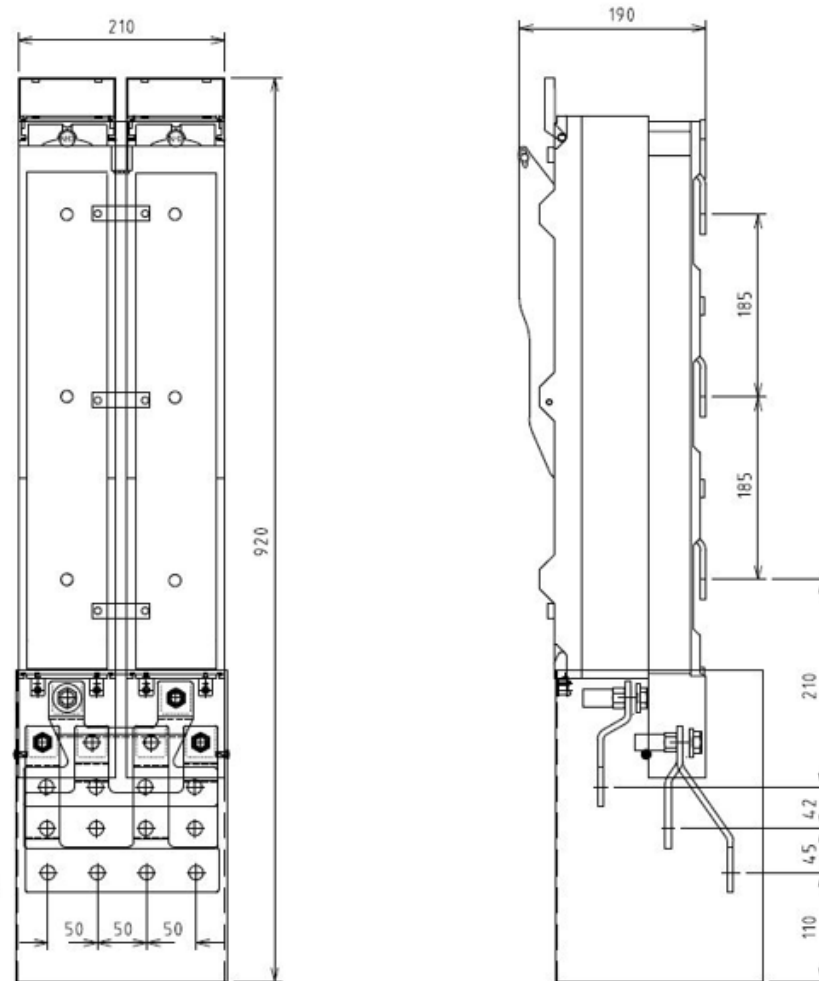


Figure D-4 FB0866 1260A Fuse Switch Disconnecter

NOTES:

1. CUSTOMER FUSED SWITCH DISCONNECTOR
2. M12 CABLE TERMINATIONS
3. USE WEBER LOCKING EARTH PLUG
4. USE MAXIMUM OF 2 x 630A FUSES (NH3)
5. MAXIMUM OF 4 x 300mm² Cu CABLES PER PHASE

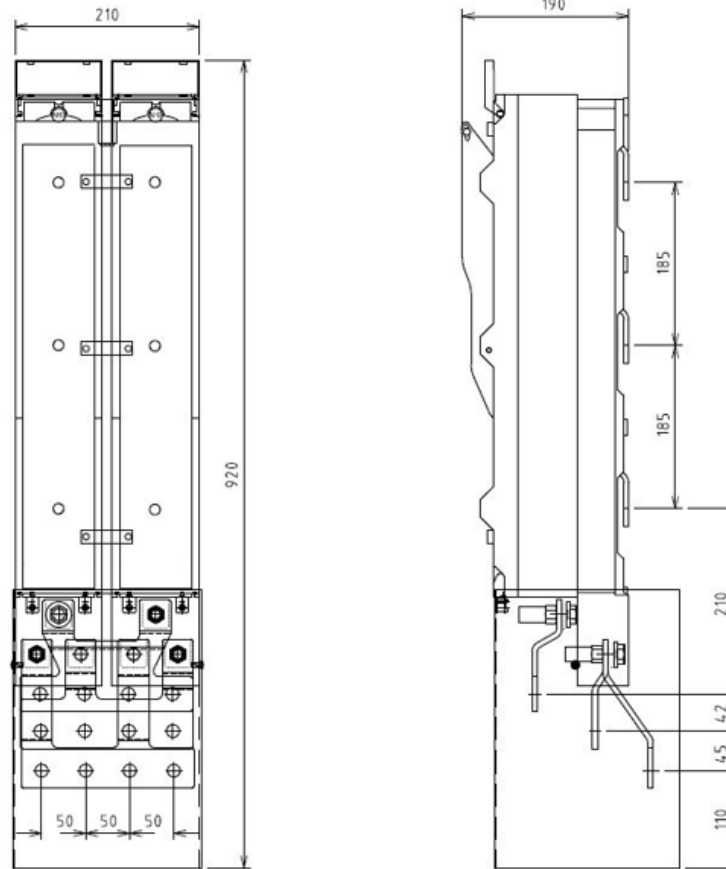


Figure D-5 FB0866 2000A Switch Disconnecter

D1.2 LOW VOLTAGE SWITCHGEAR PARTS DRAWING

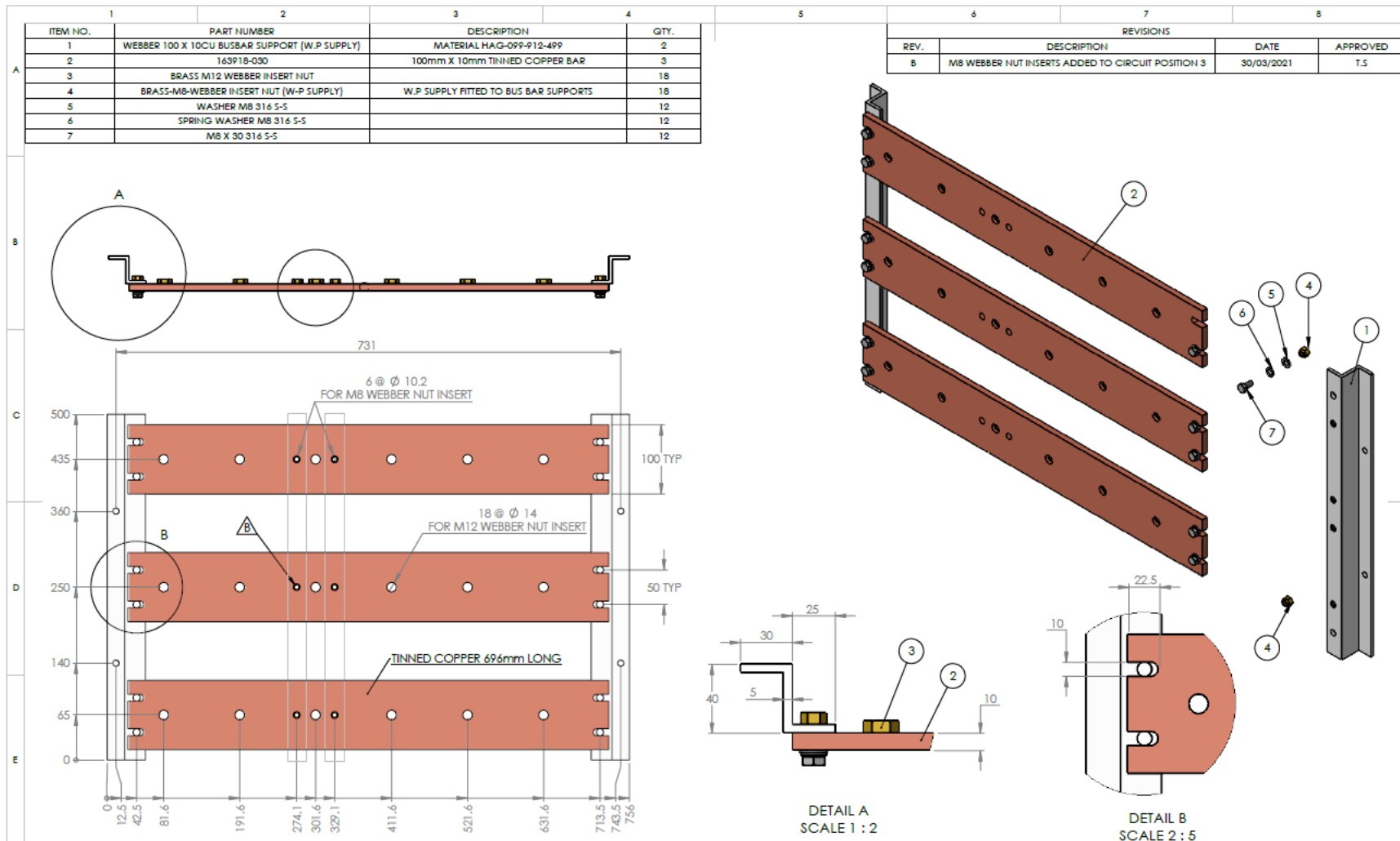


Figure D-6 FB0285 Type 1 Busbar

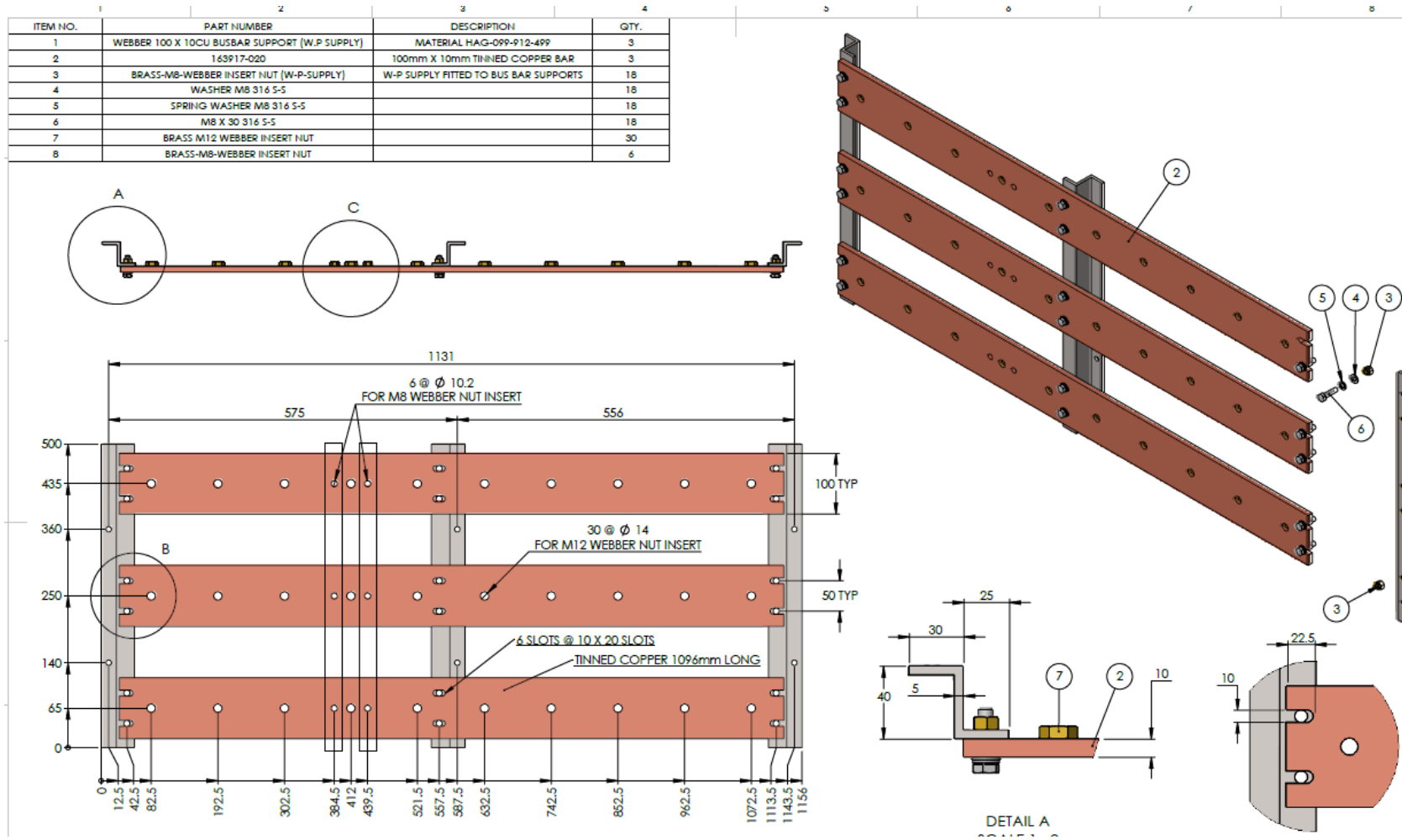


Figure D-7 FB0286 Type 2 Busbar

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	163P19-050	100mm x 10mm TINNED COPPER BAR	3
2	WEBBER 100 X 10CU BUSBAR SUPPORT (W.P SUPPLY)	MATERIAL HAG-099-912-499	5
3	BRASS M12 WEBBER INSERT NUT		48
4	BRASS-M8-WEBBER INSERT NUT (W-P-SUPPLY)	W-P SUPPLY FITTED TO BUS BAR SUPPORTS	30
5	WASHER M8 316 5-5		30
6	SPRING WASHER M8 316 5-5		30
7	M8 X 30 316 5-5		30
8	BRASS M8 WEBBER INSERT NUT		6

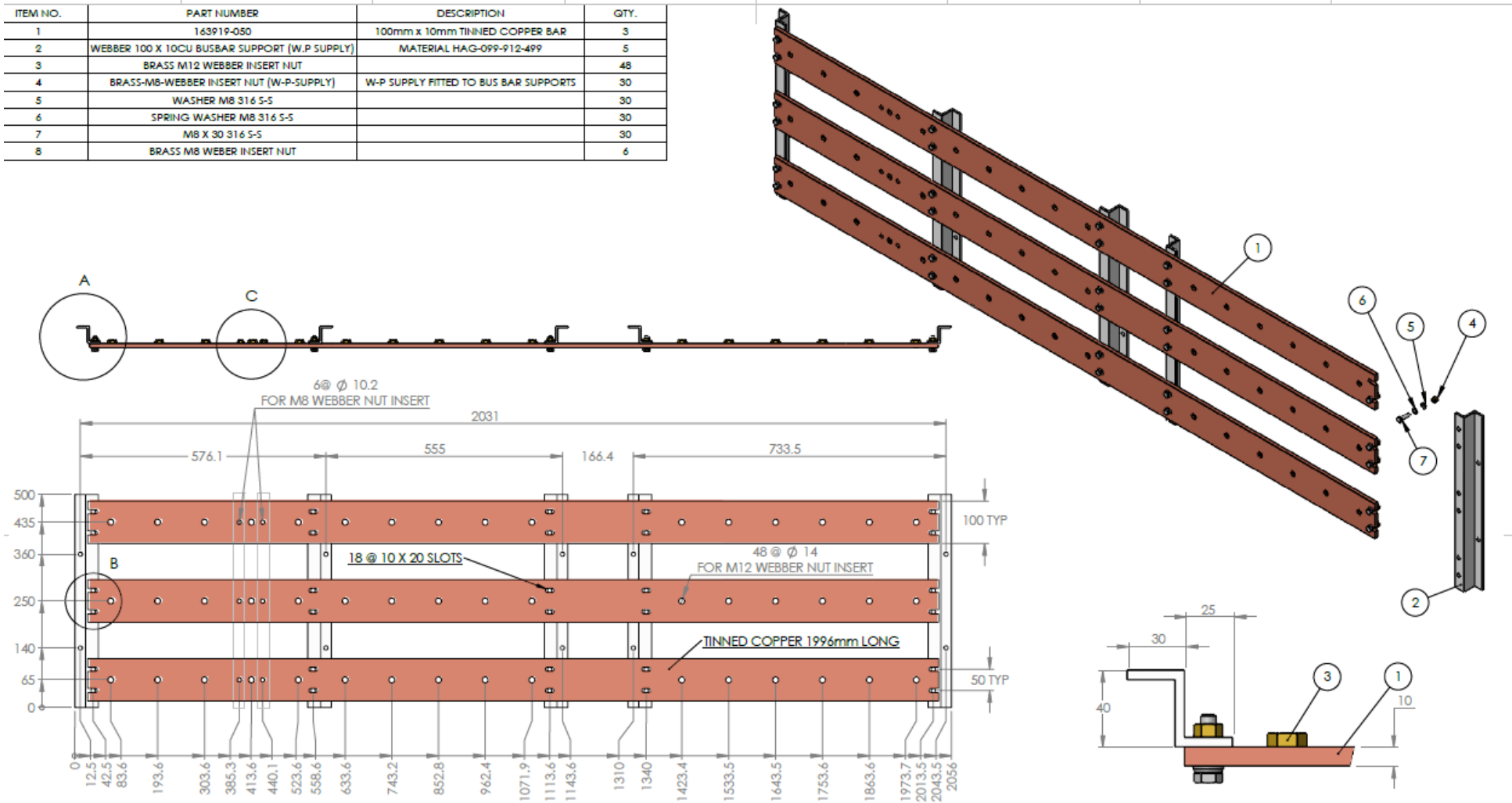


Figure D-8 FB0287 Type 3 Busbar

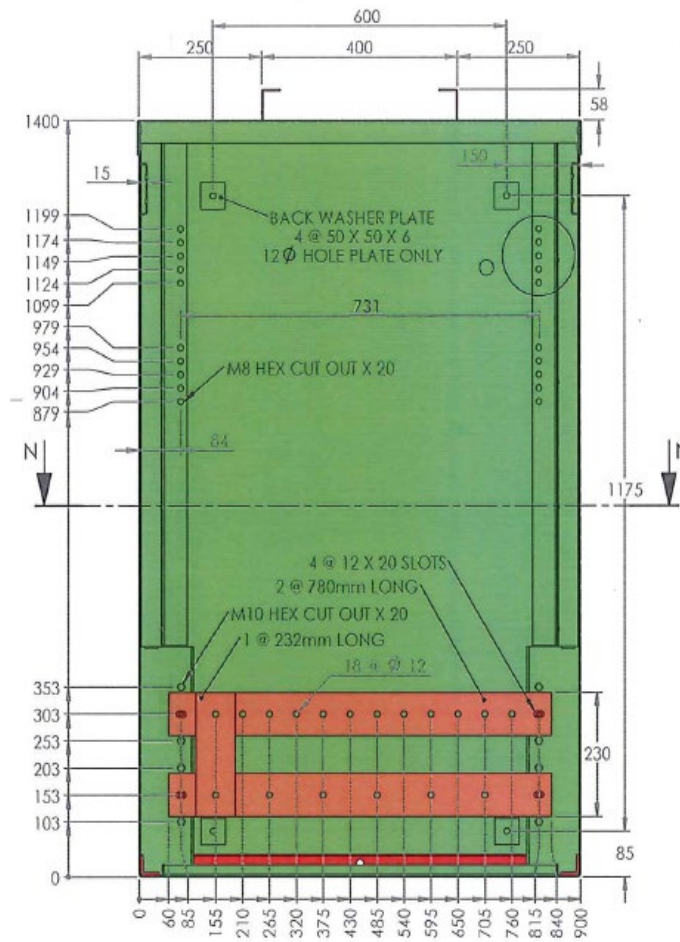


Figure D-9 Neutral and Earth Bar for Type 1

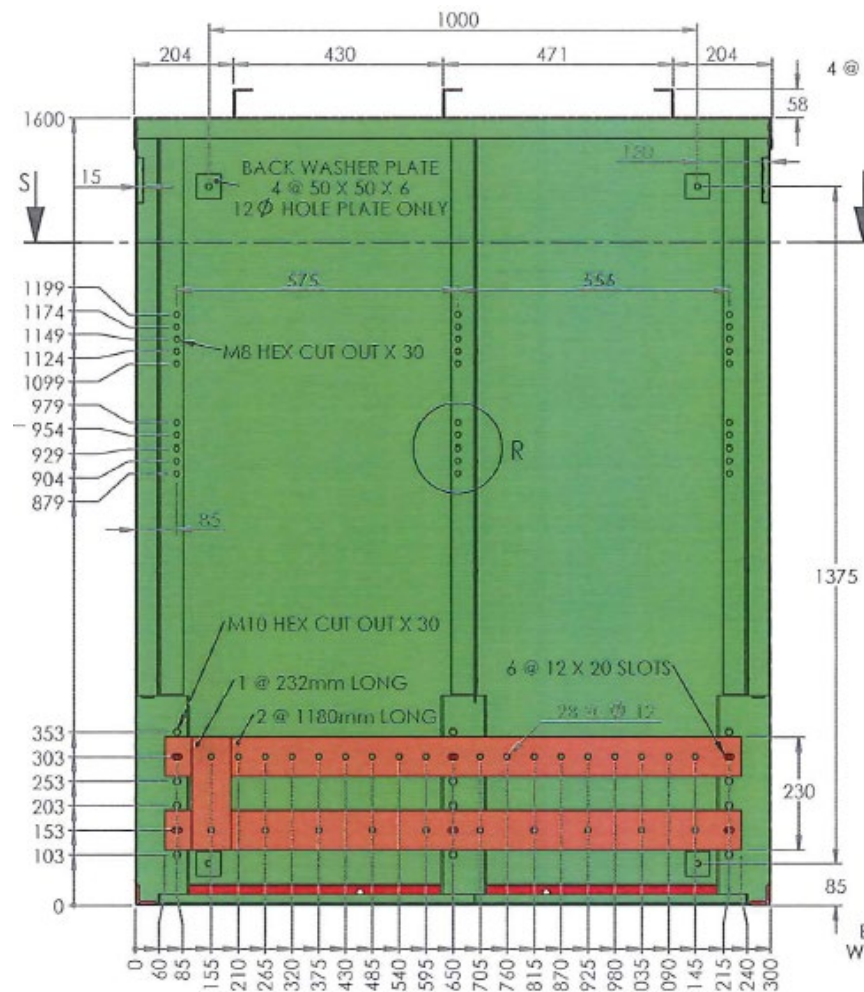


Figure D-10 Neutral and Earth Bar for Type 2

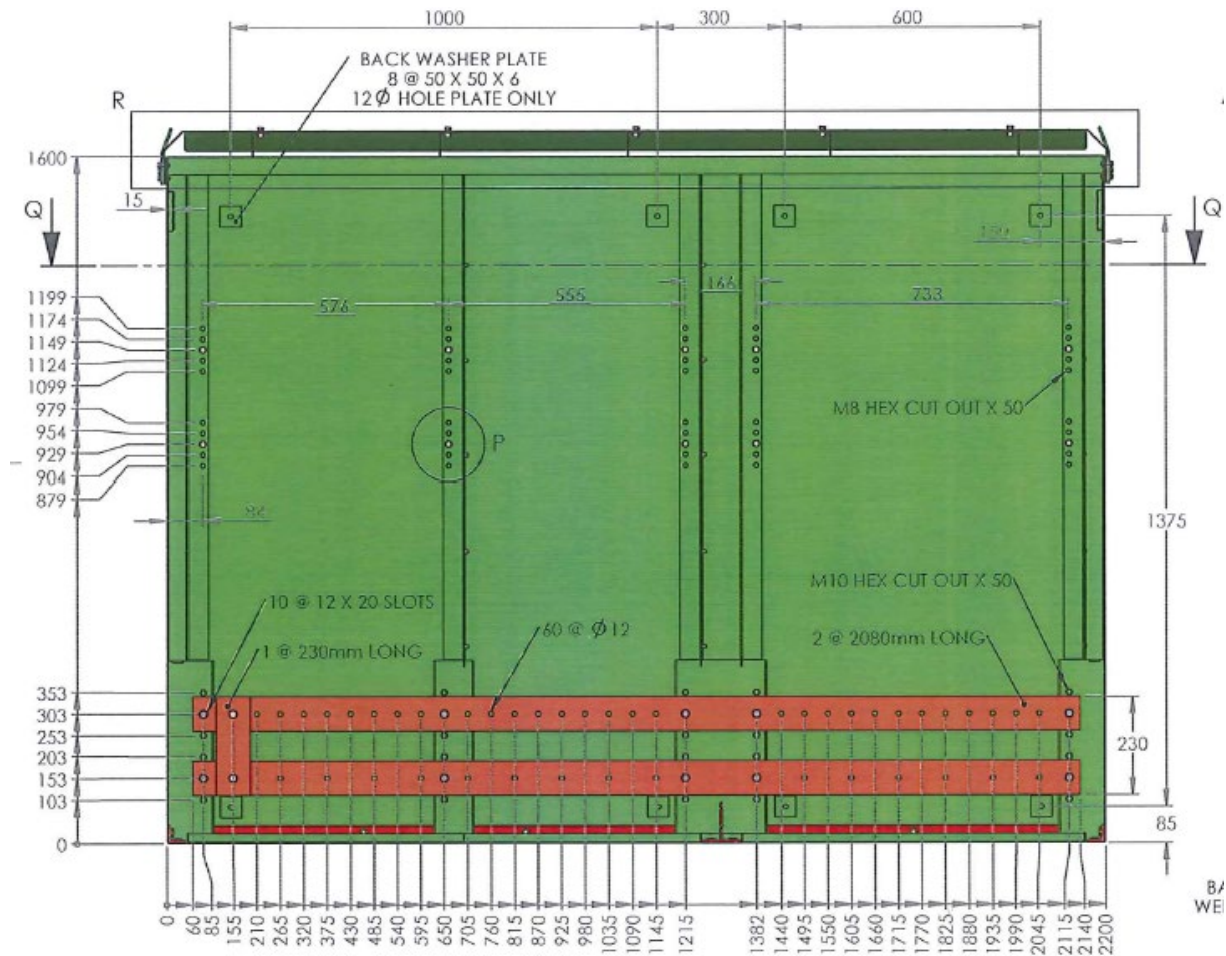


Figure D-11 Neutral and Earth Bar for Type 3

APPENDIX E PENDA DIMENSIONAL LIMITATION

E1 PENDA TYPE 1 KIOSK AND BASE

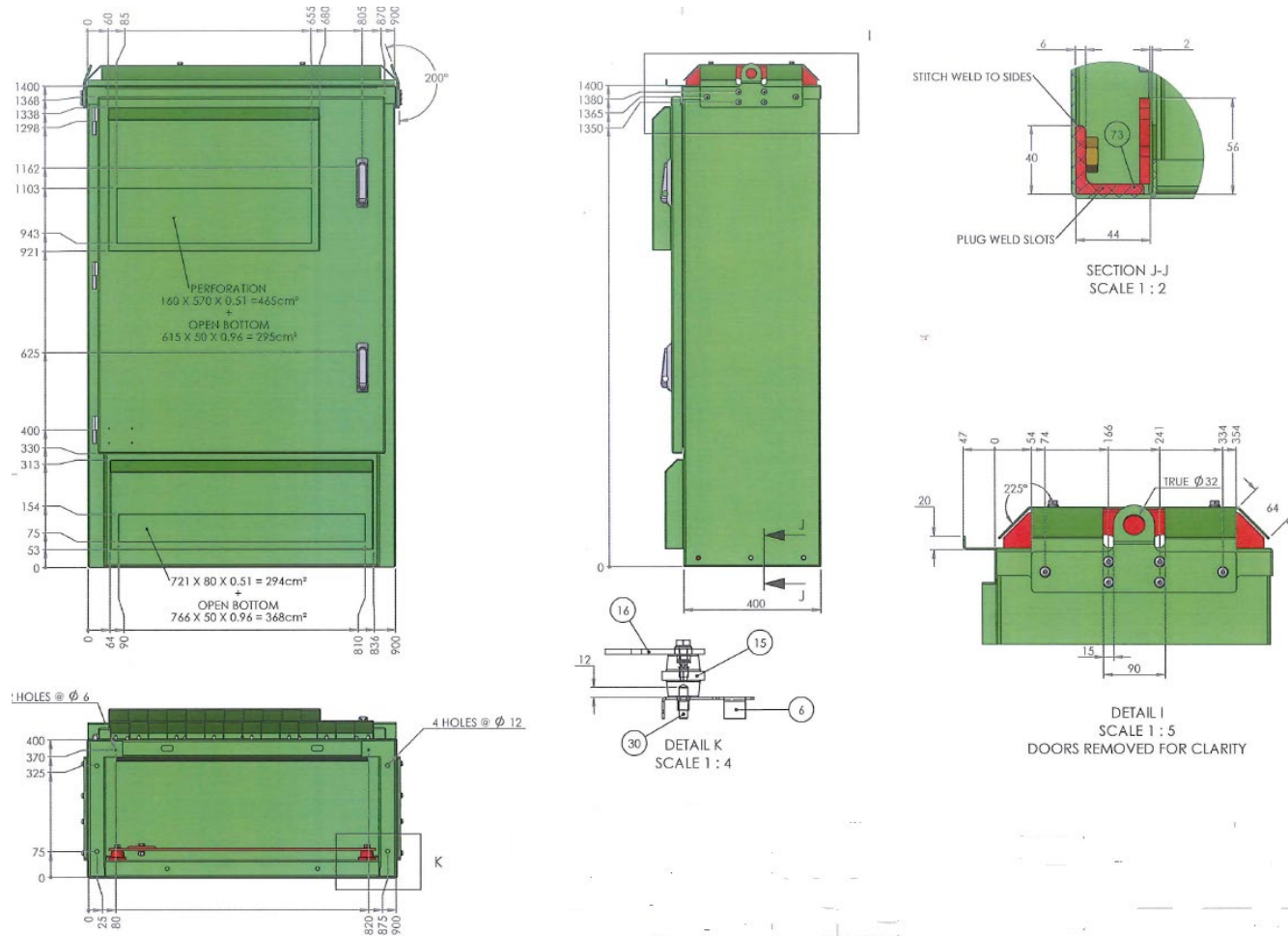


Figure E-1 Type 1 Kiosk Dimension

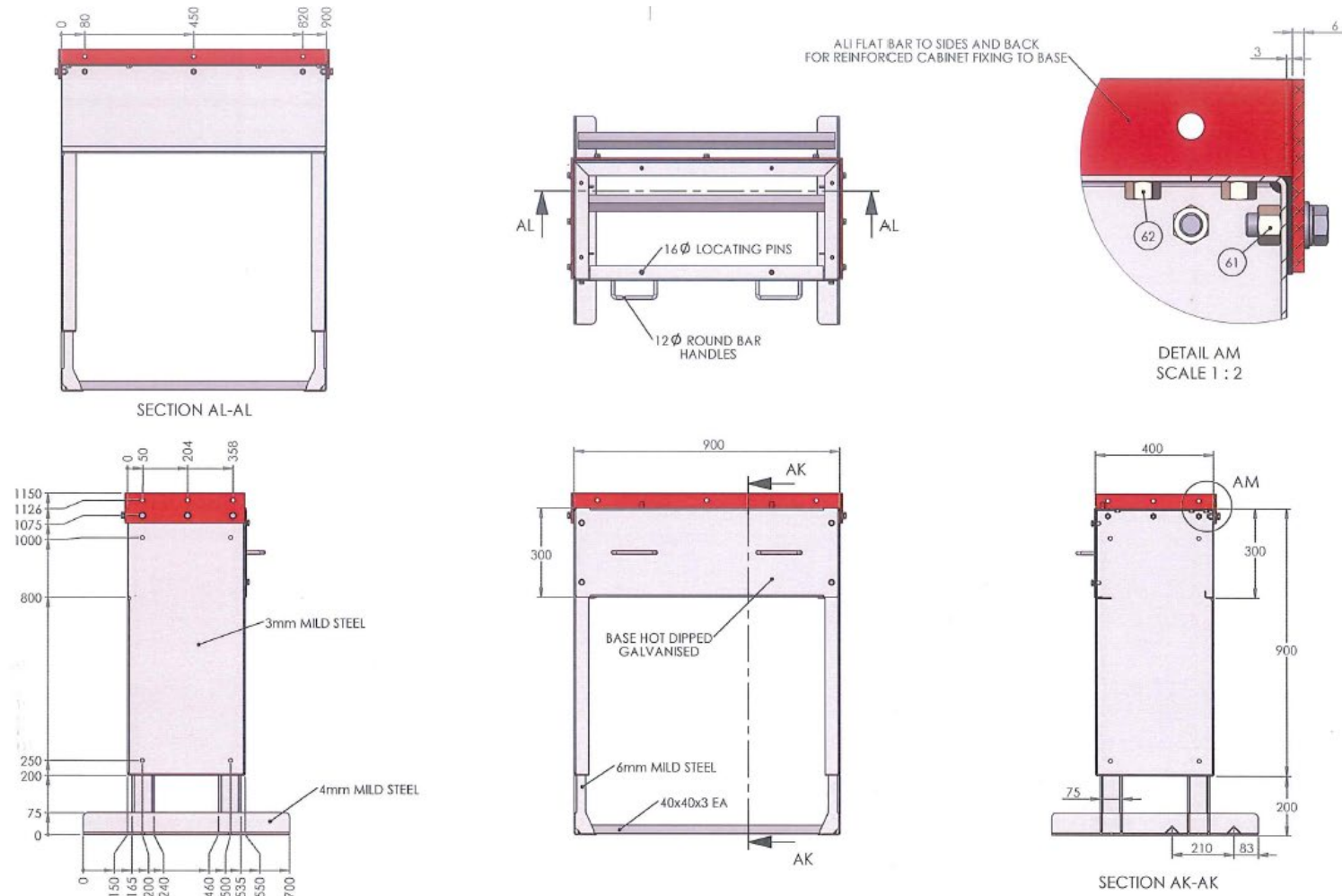


Figure E-2 Type 1 Base and Stand Dimension

E2 PENDA TYPE 2 KIOSK AND BASE

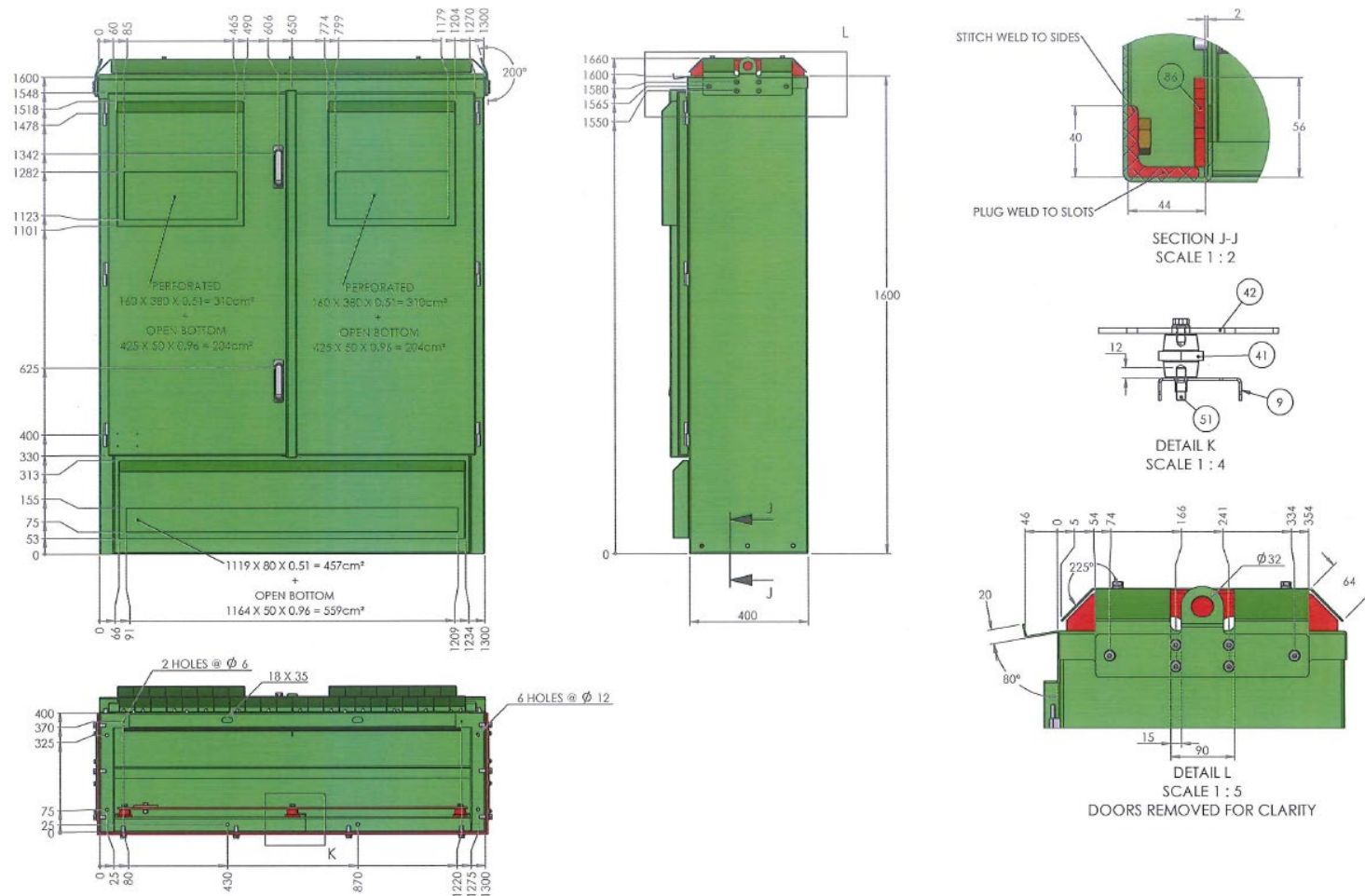


Figure E-3 Type 2 Kiosk Dimension

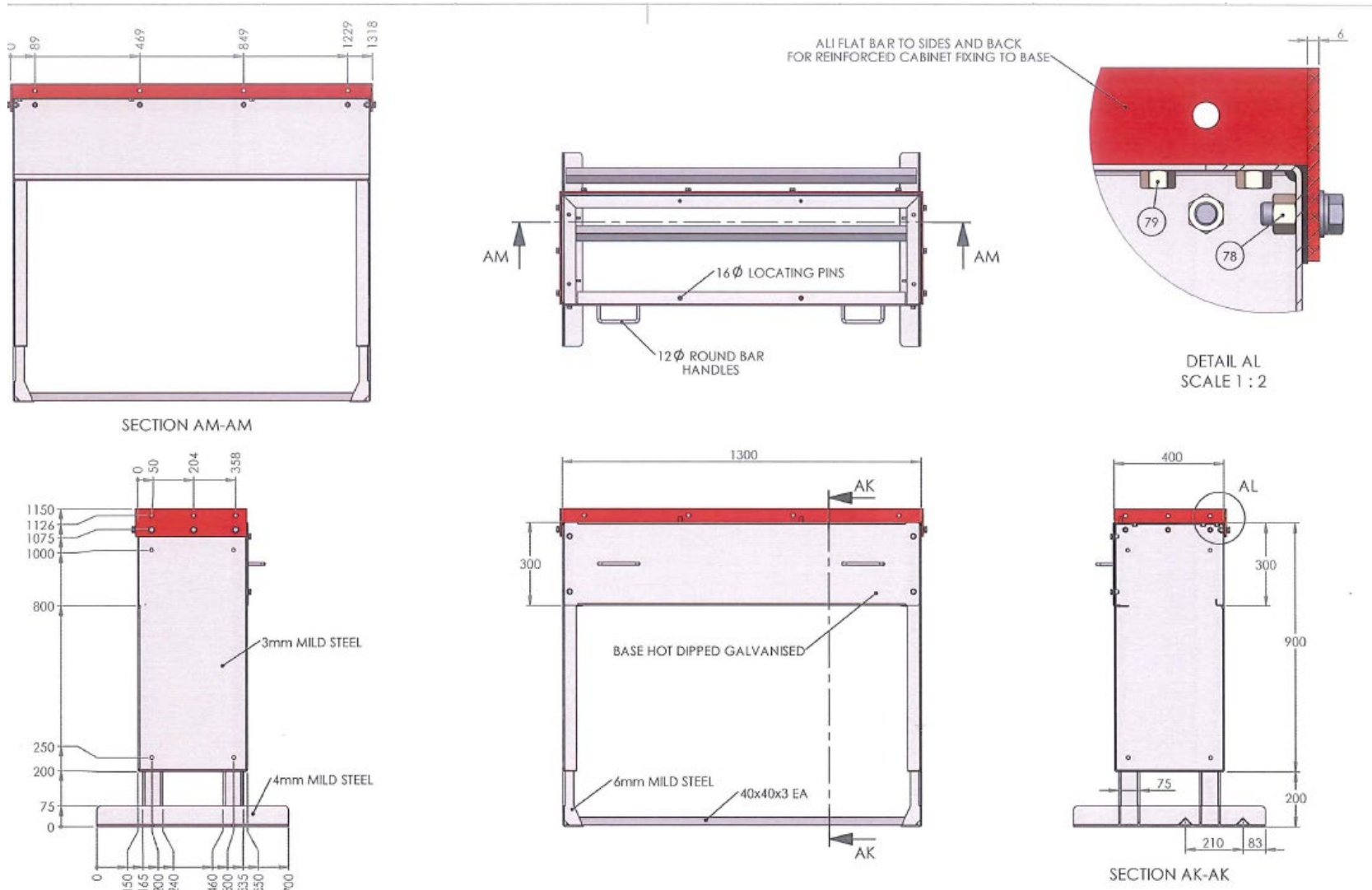


Figure E-4 Type 2 Base and Stand Dimension

E3 PENDA TYPE 3 KIOSK AND BASE

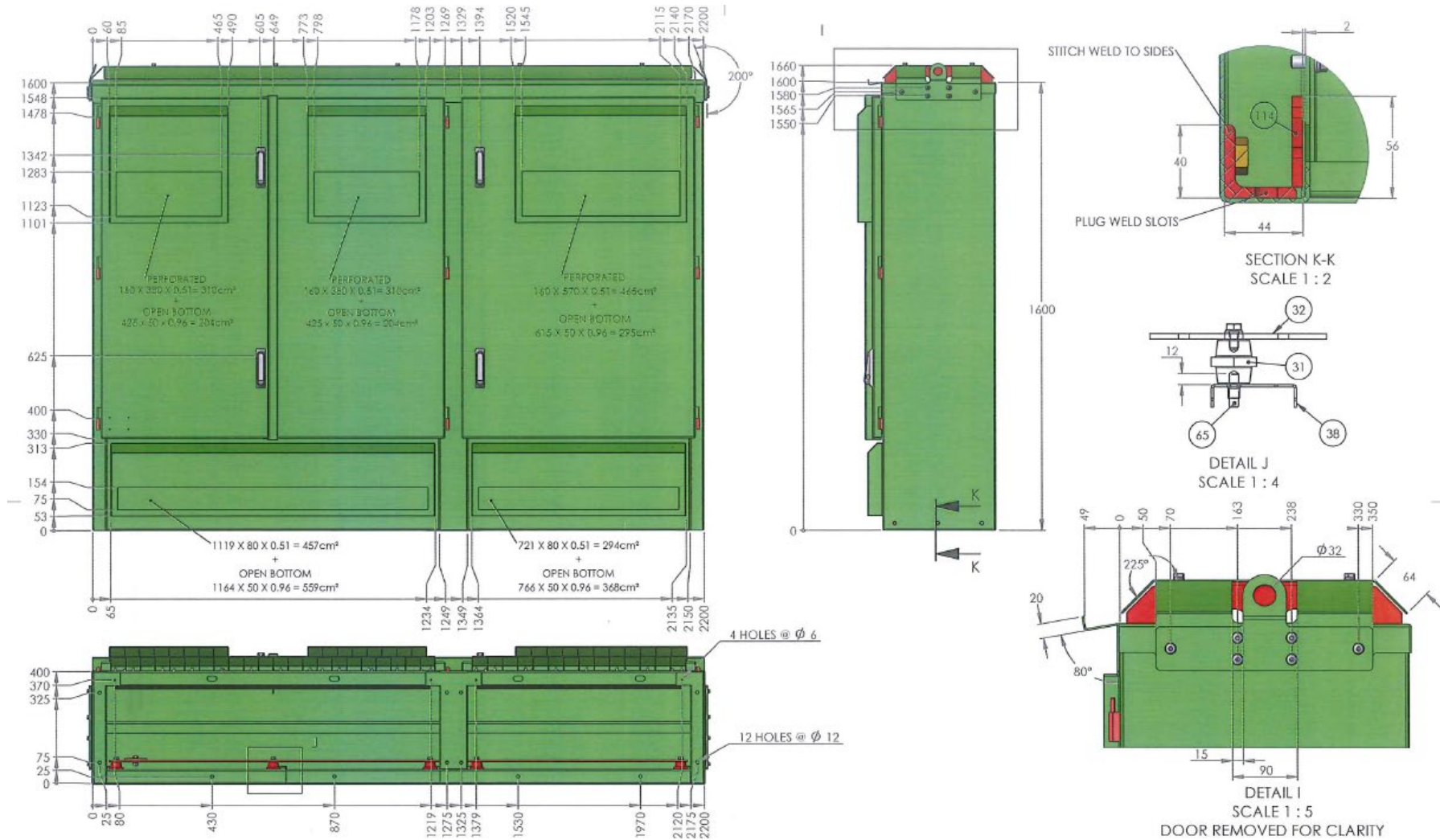


Figure E-5 Type 3 Kiosk Dimension

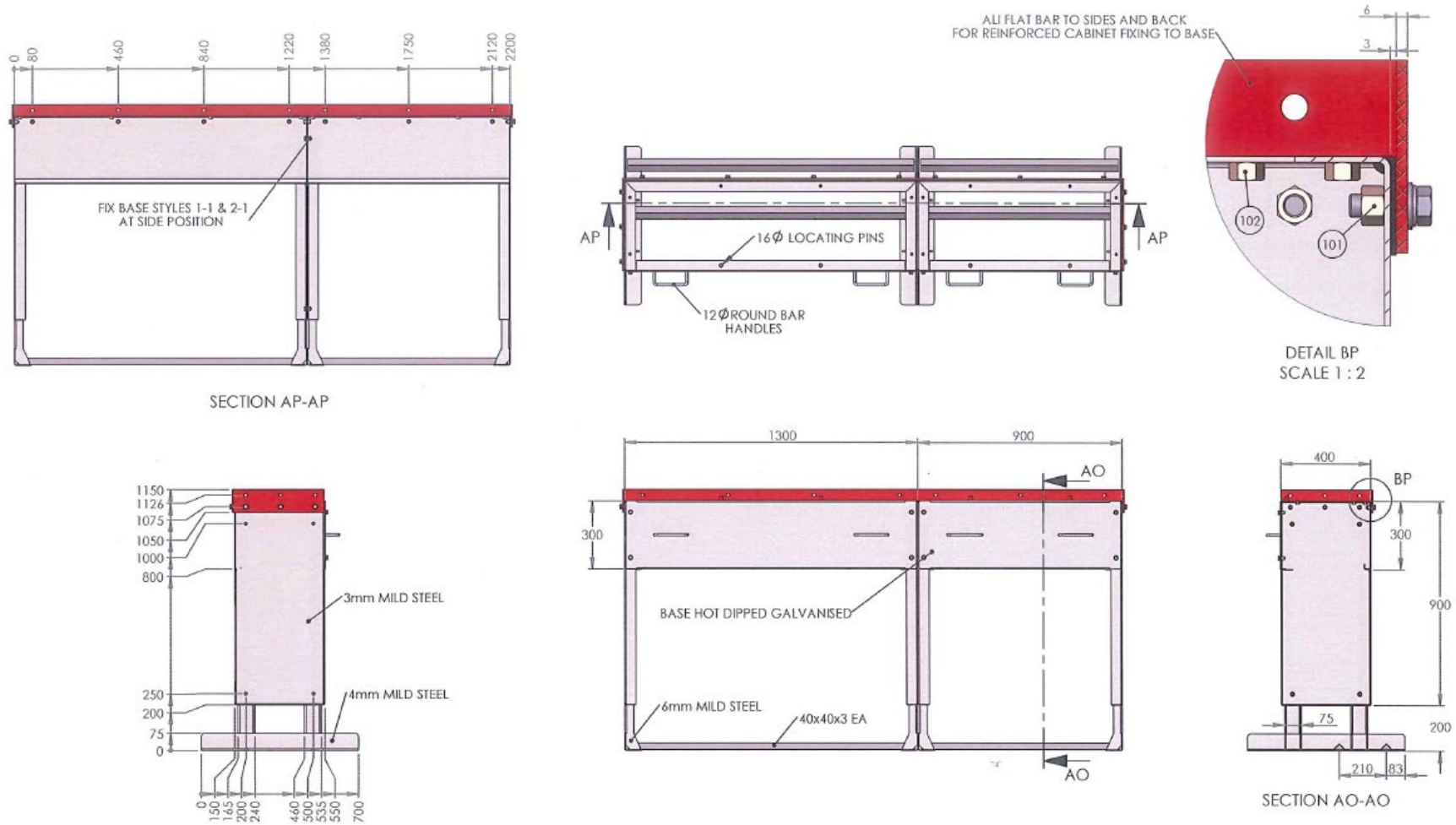


Figure E-6 Type 3 Base and Stand Dimension

APPENDIX F TECHNICAL COMPLIANCE

The Vendor shall indicate below whether this offer is fully compliant with the nominated clause in this Specification. A YES shall ONLY be indicated if the offer is 100% compliant with the relevant Clause. If NO is indicated and supporting documents are submitted, then mark the ATT box with the attachment number.

CLAUSE NUMBER		YES	NO	ATT.
3	General Technical Requirements			
3.1	General	<input type="checkbox"/>	<input type="checkbox"/>	
3.2	Type 1 PENDA	<input type="checkbox"/>	<input type="checkbox"/>	
3.3	Type 2 PENDA	<input type="checkbox"/>	<input type="checkbox"/>	
3.4	Type 3 PENDA	<input type="checkbox"/>	<input type="checkbox"/>	
3.5	Environmental Conditions	<input type="checkbox"/>	<input type="checkbox"/>	
3.6	Electrical Requirements	<input type="checkbox"/>	<input type="checkbox"/>	
4	Specific Technical Requirements	<input type="checkbox"/>	<input type="checkbox"/>	
4.1	Cyclone Rated Kiosk and Stand Requirements	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.1	Ventilation of Kiosk	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.2	Kiosk Doors and Locking	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.3	Kiosk Roof	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.4	Support Stand	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.5	Coupling of Kiosk and Stand	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.6	Dimensional Limitation	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.7	Protection Coating	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.8	Markings	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.9	Lifting Facilities	<input type="checkbox"/>	<input type="checkbox"/>	
4.1.10	Mechanical Verification	<input type="checkbox"/>	<input type="checkbox"/>	
4.2	Low Voltage Assembly Requirements	<input type="checkbox"/>	<input type="checkbox"/>	
4.2.1	General	<input type="checkbox"/>	<input type="checkbox"/>	
4.2.2	Busbars	<input type="checkbox"/>	<input type="checkbox"/>	
4.2.2.1	LV Phase Busbars	<input type="checkbox"/>	<input type="checkbox"/>	
4.2.2.2	Neutral & Earth Busbars	<input type="checkbox"/>	<input type="checkbox"/>	
4.2.3	Busbar Insulators	<input type="checkbox"/>	<input type="checkbox"/>	
4.2.4	Busbar Cover	<input type="checkbox"/>	<input type="checkbox"/>	
4.2.5	Name Plate	<input type="checkbox"/>	<input type="checkbox"/>	
4.3	Low Voltage Switchgear Requirements	<input type="checkbox"/>	<input type="checkbox"/>	
4.3.1	Temperature De-Rating	<input type="checkbox"/>	<input type="checkbox"/>	

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CLAUSE NUMBER		YES	NO	ATT.
4.3.2	Fuse Switches and Switch Disconnectors	<input type="checkbox"/>	<input type="checkbox"/>	
5	Packaging Requirements	<input type="checkbox"/>	<input type="checkbox"/>	
6	Testing Requirements			
6.1	General	<input type="checkbox"/>	<input type="checkbox"/>	
6.2	Type Tests	<input type="checkbox"/>	<input type="checkbox"/>	
6.3	Routine Tests	<input type="checkbox"/>	<input type="checkbox"/>	
6.4	Cost of Tests	<input type="checkbox"/>	<input type="checkbox"/>	
7	Documentation			
7.1	General Requirements	<input type="checkbox"/>	<input type="checkbox"/>	
7.2	Drawings	<input type="checkbox"/>	<input type="checkbox"/>	
7.3	Test Certificates	<input type="checkbox"/>	<input type="checkbox"/>	
7.4	Data Sheets	<input type="checkbox"/>	<input type="checkbox"/>	
7.5	Installation, Operation and Maintenance Manual	<input type="checkbox"/>	<input type="checkbox"/>	
8	Prototype and Sample	<input type="checkbox"/>	<input type="checkbox"/>	