



PRE-FABRICATED CONTAINERIZED E-HOUSE (A NEW MARKET TREND)



***INTEGRATED ELECTRICAL SOLUTION
TO MAKE YOUR BUSINESS MORE
FLEXIBLE, SAFETY AND CONVENIENT***



®

M Electrical & Engineering Sdn Bhd

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M Electrical & Engineering Sdn Bhd

PRE-FABRICATED CONTAINERIZED E-HOUSE

ABOUT US

M Electrical & Engineering Sdn Bhd is a company in manufacturing, supplying and servicing of all kind of electrical equipment and apparatus, as well as power distribution products and solutions.

Our principal activities are fabrication, supply, subcontracting, modification and servicing all kinds of switchboards and electrical panels from standard to custom made to meet customer's needs. Besides in house facilities of machining and fabrication, we are also specialized in switchboards and panels assembly, wiring works and even inspection and testing along with our experienced team.

OVERVIEW

CONTAINERIZED E-HOUSE, also known as powerhouse, container e-room, switch-room or mobile substation, the E-house is a metal enclosure for switchgears, frequency converters, control systems and any kind of equipment usually installed in a substation. It is also an integrated solution with a customized design and manufacture to meet each customer's specific needs.

FEATURES

Assembled in a single platform, they may integrate the electrical and automation systems, such as transformers, medium voltage control gear and switchgear, medium voltage and low voltage MCCs, PLCs and auxiliary equipment. The units are delivered assembled, interconnected and tested at the factory. They represent a customized solution, eliminating the need of masonry works and different suppliers. In addition, since there are no size limitations, they can be used in small and large installations, in many different environments, even aggressive ones, and industrial activities.

While providing a lifetime of 30 years, E-houses can be configured to withstand extreme climate and environmental conditions such as temperature, humidity, storm and bomb blasts with various levels of fire rating.

ADVANTAGES

- ❖ Shorter lead time to execute the projects
- ❖ Shorter assembly time in field
- ❖ Little infrastructure required at the site (lower mobilization and demobilization costs)
- ❖ The assemble at the factory and installation in the field are not subject to weather conditions.
- ❖ Unique engineering for the integration of all the devices and systems.
- ❖ Reduction of the storage area and works in the field.
- ❖ Better control of manufacturing process and quality systems.
- ❖ Reduction of engineering, project management and supply costs (optimization of the procurement process).
- ❖ Logistic gain in the manufacturing, platform testing, start-up and commissioning.
- ❖ Shorter lead time.



M ELECTRICAL & ENGINEERING



A NEW MARKET TREND FOR PRE-FABRICATED CONTAINERIZED E-HOUSE

FAST, MODULAR, PLUG- AND-PLAY POWER SUPPLY SOLUTION

TIME

- REDUCED BUILDING TIME IN COMPARISON TO MASONRY.
- SHORTER TRANSPORTATION TIME.

CONVENIENCE

- FLEXIBLE MODULARIZATION TO BUILD THE E-HOUSE.
- A SINGLE CONTRACT TO SUPPLY A FULL SOLUTION.

WARRANTY

- COMMISSIONING AT THE FACTORY AND POSSIBILITY OF PLATFORM TESTING.

GUARANTEE

- BETTER PROCESS CONTROL AND QUALITY SYSTEMS.

FLEXIBILITY

- THE ASSEMBLY AT THE FACTORY AND INSTALLATION IN THE FIELD ARE NOT SUBJECT TO WEATHER CONDITIONS.
- ROBUST EQUIPMENT ABLE TO EFFICIENT AND RELIABILITY FULFILL THE REQUIREMENTS OR DIFFERENT APPLICATIONS.



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TECHNICAL DATA AND SPECIFICATIONS

Your E-House will be customised to the specific power and environmental needs of your project. The panel design makes it easily adaptable for the equipment layout you require, and simplifies any future expansion.

APPLICATIONS

- ❖ TRANSFORMER UNIT
- ❖ AUTOMATION ROOM
- ❖ HVAC ROOM
- ❖ PANEL UNIT
- ❖ RESTROOM
- ❖ LOCKER ROOM
- ❖ IT / OPERATION ROOM
- ❖ BATTERY ROOM

TYPICAL COMPONENTS



- ❖ Medium Voltage Switchgear and Control gear.
- ❖ HV / LV Main Switch Board
- ❖ SCADA, protection, control and metering
- ❖ Dry type and oil type transformers
- ❖ A/C Ventilation Units
- ❖ HVAC (heating, ventilation, air conditioning)
- ❖ Fire detection and extinguishing system
- ❖ Battery banks and rectifiers
- ❖ UPS
- ❖ CCTV
- ❖ Medium and low voltage soft-starters and frequency inverters (VFD)
- ❖ Internal and External Lightning
- ❖ PFC (Power Factor correction) and harmonic filters



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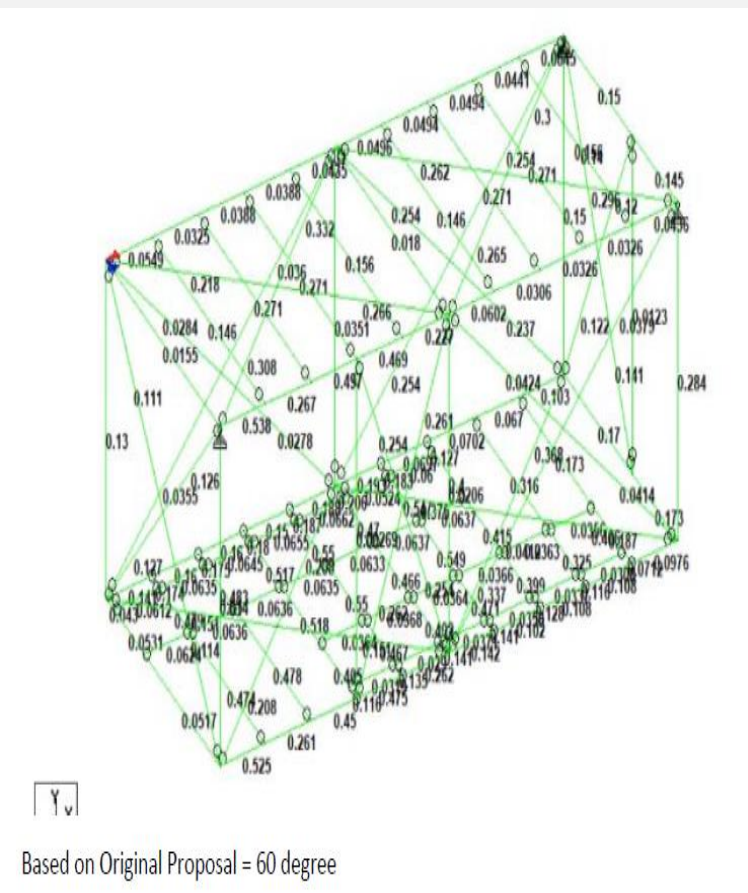
TECHNICAL DATA AND SPECIFICATIONS

MECHANICAL STRUCTURE



- ❖ Base made of BS EN 10025; S275 carbon steel beams (I-BEAM).
- ❖ Ceiling and roof frames made of BS EN 10219; S275 square steel tubes (HOLLOW BEAM) for internal and 3mm mild steel plate for external.
- ❖ Wall are made of MS EN 10025-2:2011 S275JR+AR Corrugated Sheet Steels with structural of BS EN 10219; S275 square steel tubes.
- ❖ Fixed or removable floor with chequered or smooth plates.
- ❖ Steel quality inspection certificate issued by the manufacturer.
- ❖ Monitoring and inspection of the weld and painting processes executed by accredited personnel.

STRUCTURAL CALCULATION



- ❖ In order to design the frame of the E-House, the following parameters are considered:
 - ❖ 1. Number of supports on which E-House will be installed
 - ❖ 2. Weight of the E-House
 - ❖ 3. Weight and position of the equipment inside the E-House
 - ❖ 4. Wind load
 - ❖ 5. Earthquake condition (overseas if applicable)
 - ❖ 6. Lifting Angle and Arrangements
- ❖ Once those parameters are obtained, the structural calculation can determine stresses and deformations to which the E-House frame will be subject in the place of installation, during lifting and shipment.



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TECHNICAL DATA AND SPECIFICATIONS

WALL CONSTRUCTION



- ❖ Wall are made of MS EN 10025-2:2011 S275JR+AR Corrugated Sheet Steel with structural of BS EN 10219; S275 square steel tubes.
- ❖ Lining between the square steel tubes – rock wool (thermal insulation)
- ❖ The welding system of the external corrugated sheets provides excellent resistance against bad weather.
- ❖ Pads may be supplied for easy back access to the panel boards and fire stop wall.

CEILING AND TOP ROOF



- ❖ Ceiling and roof frames made of BS EN 10219; S275 square steel tubes (HOLLOW BEAM) for internal and 3mm mild steel sheets for external.
- ❖ Roof may be optionally supplied with lightning protection system (LPS). The LPS can be made according to the Franklin method or the electro geometric model.
- ❖ Top catwalk and lifeline anchorage system may be supplied, ensuring quick and safe access to the roof.
- ❖ The welding system of the external corrugated sheets provides excellent resistance under the hardest weather conditions.



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TECHNICAL DATA AND SPECIFICATIONS

DOORS



- ❖ Manufactured with the same thermal insulation used in the walls and ceiling.
- ❖ Door is fire resistance door.
- ❖ Doors with panic bar (Optional)
- ❖ Double doors for equipment and personnel (optional: panic bar)
- ❖ Rubber gasket on the doors to prevent the ingress, dust, sand and to keep the pressure inside the room.
- ❖ Drip caps may be installed on the doors (Optional).
- ❖ Door Closer, Stainless Steel Hinges and Lockset.

PROTECTIVE COATING



- ❖ Surface Preparation – Blast Cleaning to SA 2.5
- ❖ Carbon Steel and External Wall – Zinc Rich Epoxy primer, High Build Epoxy on secondary and finished with aliphatic polyurethane paint.
- ❖ Internal Wall and Insulation Wool – Surface Tolerance Epoxy
- ❖ Anti-slippage floor paint (optional)
- ❖ Optional coating resistant to acids and corrosive fluids.
- ❖ Finishing colour – Gray RAL7035 (other colours on request)
- ❖ Painting scheme according to SSPC-SP10, taking into account the environment characteristics, usage and operating conditions and cost effectiveness.



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TECHNICAL DATA AND SPECIFICATIONS

FIRE DETECTION AND ALARM SYSTEM



- ❖ Containerized E-house is supplied with a fire detection and alarm system composed by fire alarm, smoke detectors, manual actuators, audio-visual indicators and portable fire extinguishers for manual firefighting.
- ❖ Automatic firefighting with extinguishing agents such as CO₂, FM200, NOVEC 1230 may be supplied under request to provide precise detection and immediate firefighting when fire starts.
- ❖ This optional system allows the interconnection with the control system of the customer's plant such as heating, ventilation and air conditioning HVAC.
- ❖ In case of fire, HVAC equipment is immediately shut down, reducing the possibility of fast spread of the fire.

INTERNAL / EMERGENCY / EXTERNAL LIGHTING, POWER OUTLETS AND EMERGENCY EXIT (EXPLOSION PROOF)



- ❖ Internal lighting system is composed of surface-mount lamps designed to meet the specified luminance levels with LED tubes.
- ❖ The emergency lighting system uses 2 self-contained LED lamps with sealed battery.
- ❖ External lighting and Emergency Exit Sign may be supplied depend on the requirement of customer.
- ❖ External and internal power outlets are installed to meet the project specifications, with voltage and current levels and models suitable for the intended application.
- ❖ Normal Type or Explosion Proof Type also can be chosen, depend also the requirement of customer.



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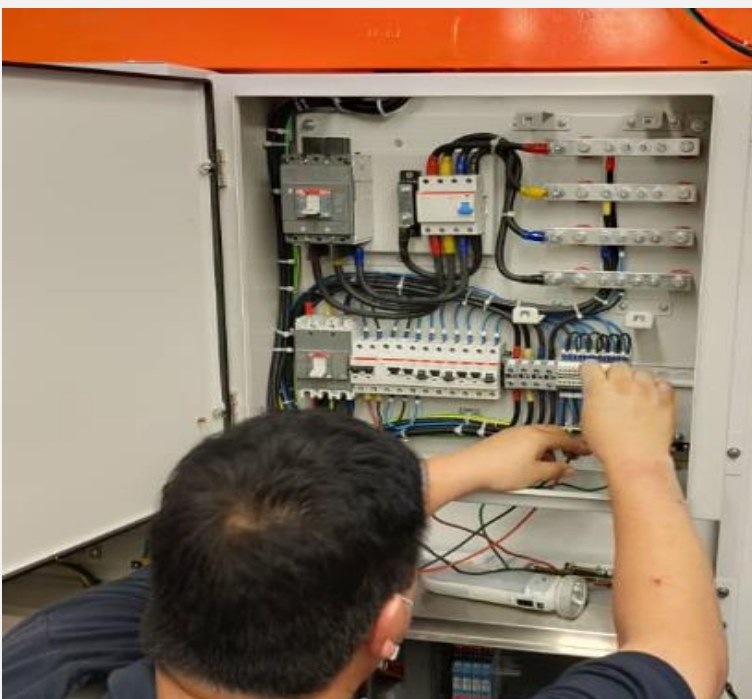
TECHNICAL DATA AND SPECIFICATIONS

AIR CONDITIONING SYSTEMS



- ❖ Designed to provide the suitable temperature for the correct operation of the equipment and comfort the operator.
- ❖ The system is designed based on the size of the E-house, internet heat generated by the people and thermal conditions of the external environment.
- ❖ A pressurization system with filters may be included to prevent the ingress of dust and other contaminations.
- ❖ Redundant equipment and automation systems may be supplied to ensure constant operation of the solution, providing high reliability.

TESTING PROCEDURE



- ❖ Visual and dimensional inspection
- ❖ Electrical continuity
- ❖ Insulation resistance
- ❖ Withstand voltage test
- ❖ Routine tests on the equipment part of the system, according to applicable standards
- ❖ Functional tests on the complete assembly (electrical panel boards, lightning systems, air conditioning, firefighting and internal electrical hook-ups and etc.)



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TECHNICAL DATA AND SPECIFICATIONS (FUTURE WORK)

ACCESS CONTROL SYSTEM AND CCTV (FUTURE WORKS)



- ❖ The Access Control System and CCTV may be supplied in order to meet the need of the customer.
- ❖ The access control is composed of a control panel, access reader, electromagnetic door lock and door sensors.
- ❖ This system may be integrated to the control system of the customer's plant together with the CCTV so that the security staff will have precise control against unauthorized access.

PLATFORMS, LADDERS, RAILING AND HAND RAILS (FUTURE WORKS)



- ❖ Customer may be optionally ordered so as to meet the requirements for personnel and equipment access to the room and to the inspection and maintenance areas.



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PAST PROJECTS KINABALU ELECTRIC SUBMERSIBLE PUMP

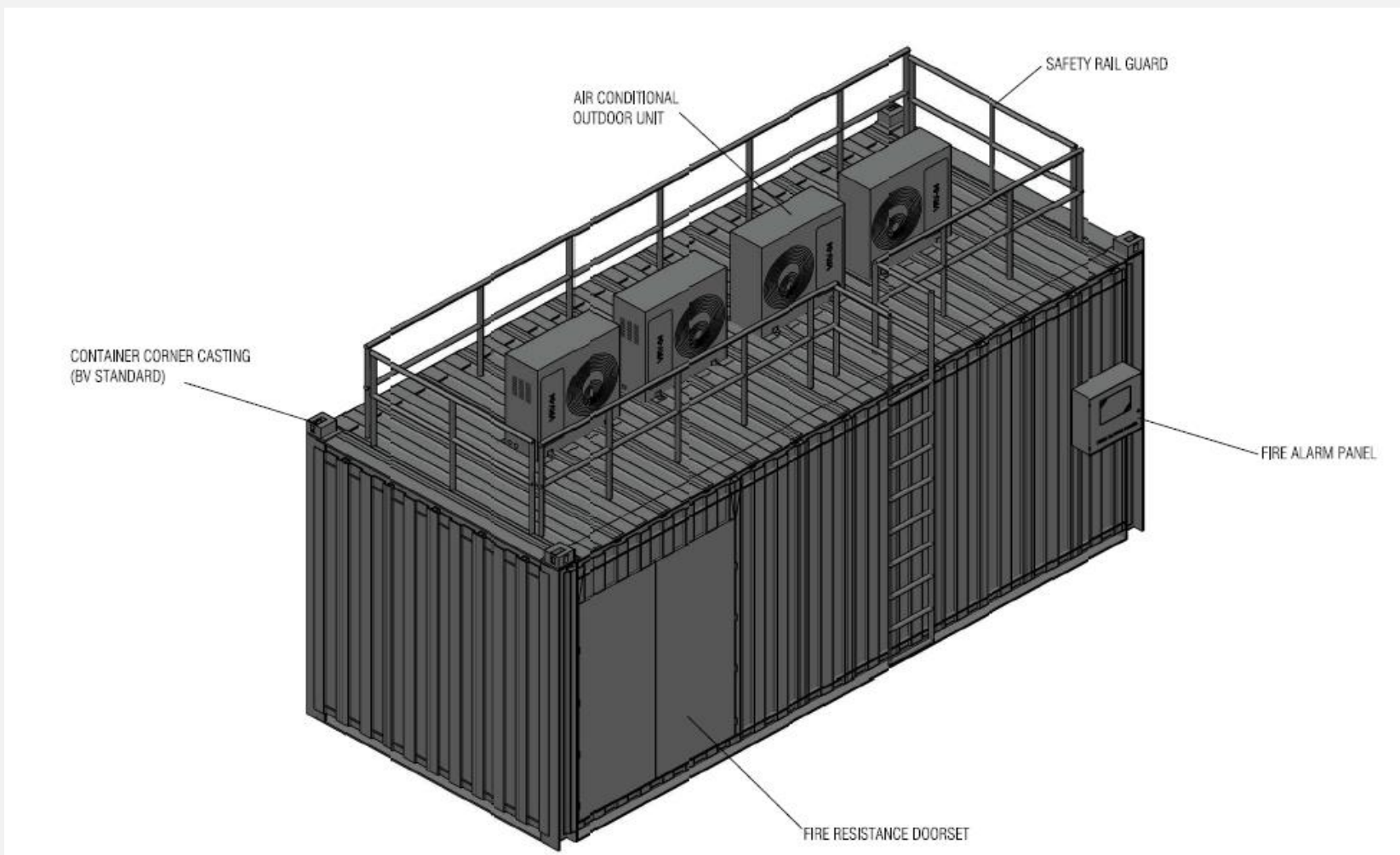
PROJECT COMPLETION: SEPTEMBER 2020

PROJECT OVERVIEW

This project is a rejuvenation project which located at Kinabalu field based in offshore Sabah. Key to this rejuvenation is the installation of four new electrical submersible pump (ESP) wells on the Kinabalu platforms.

As part of the projects, the ESP will need some power generation, and this is where the containerized E-house comes in. The E-House will have a Variable Speed Drivers (VSD_ and Low Voltage Switchboards which are controls the speed at which the ESP operates at.

CONTAINERIZED E-HOUSE LOAD PLAN GENERAL ARRANGEMENT (ISOMETRIC)

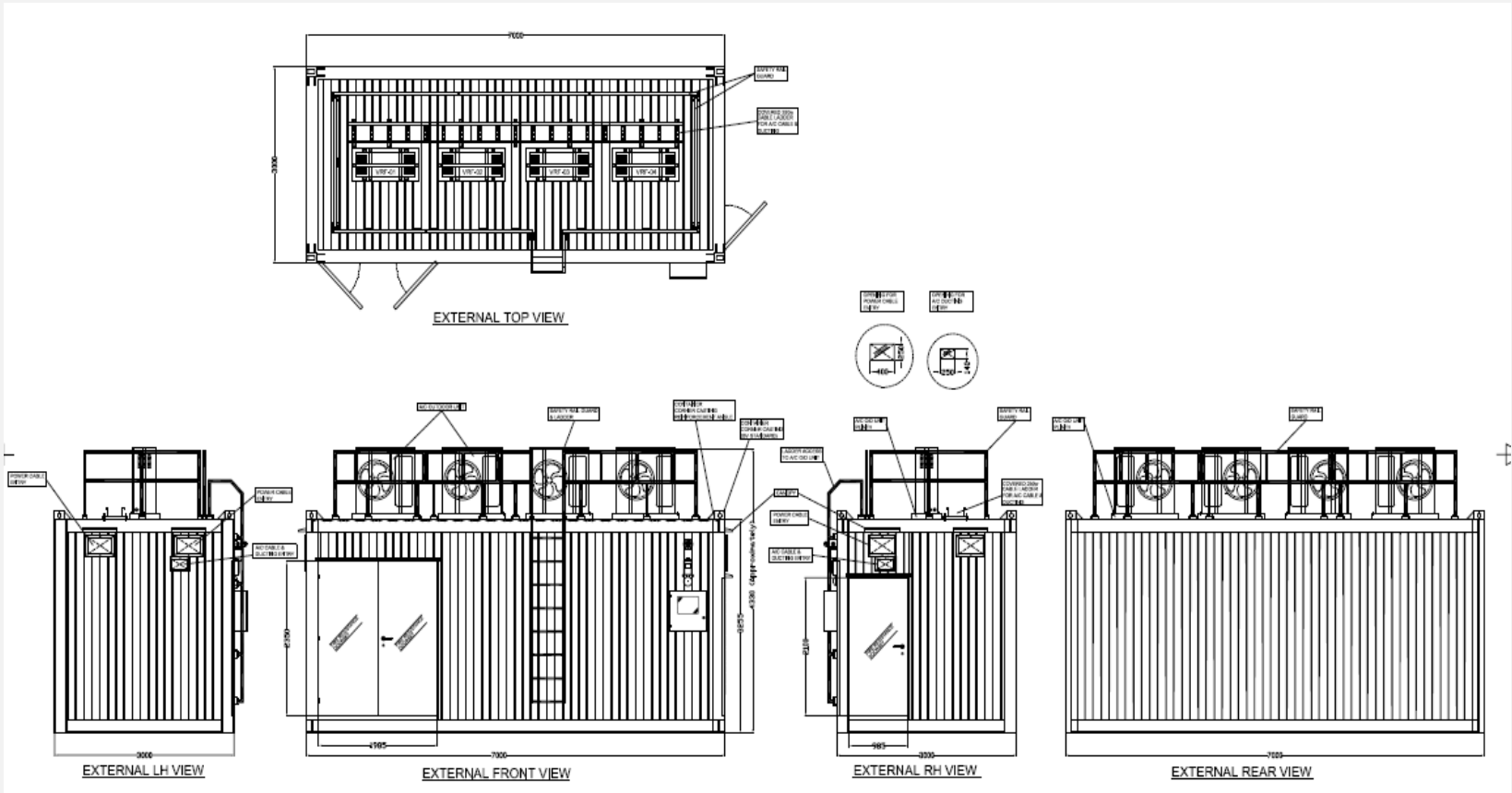




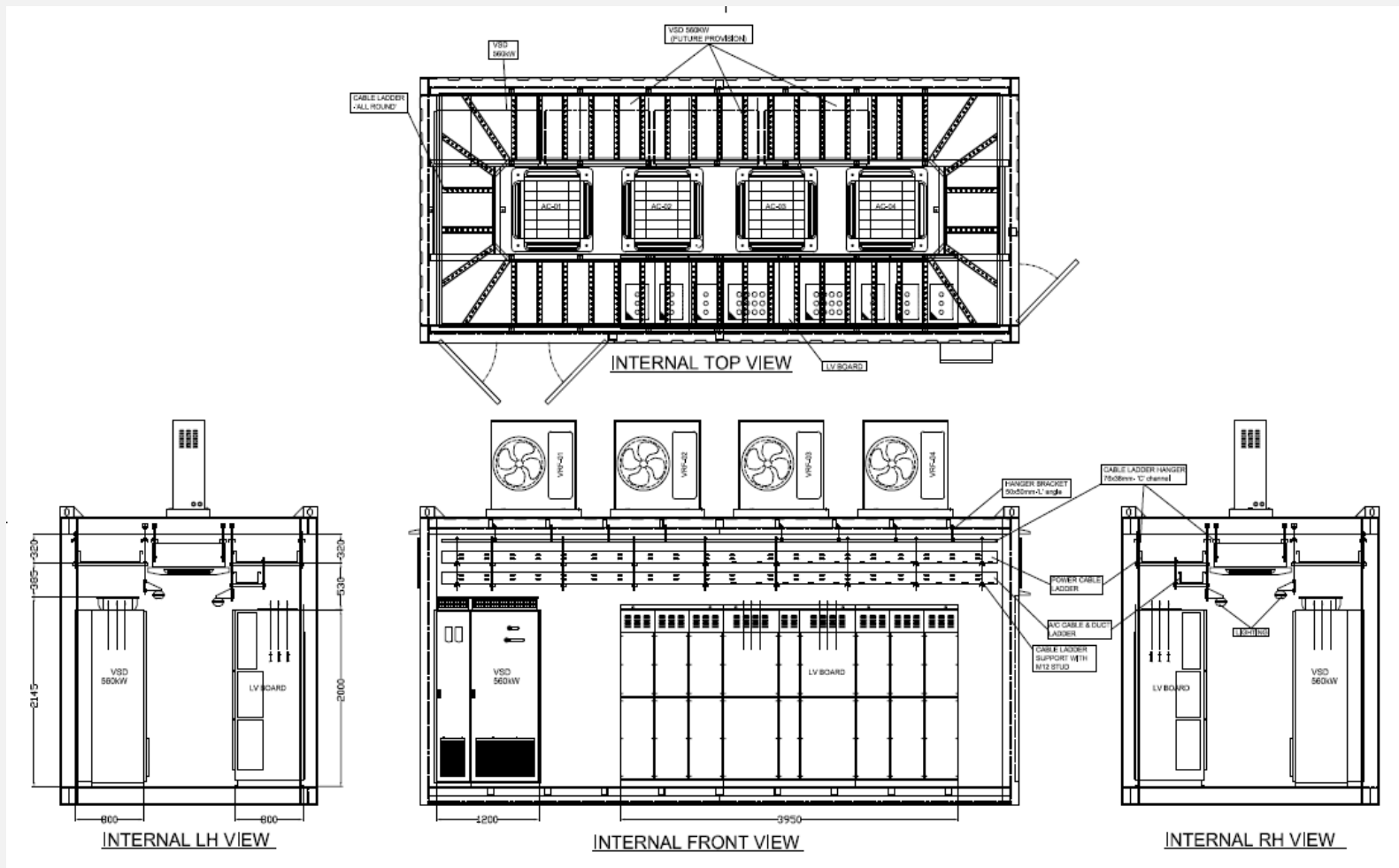
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PAST PROJECTS KINABALU ELECTRIC SUBMERSIBLE PUMP

CONTAINERIZED E-HOUSE LOAD PLAN GENERAL ARRANGEMENT (EXTERNAL)



CONTAINERIZED E-HOUSE LOAD PLAN GENERAL ARRANGEMENT (INTERNAL)

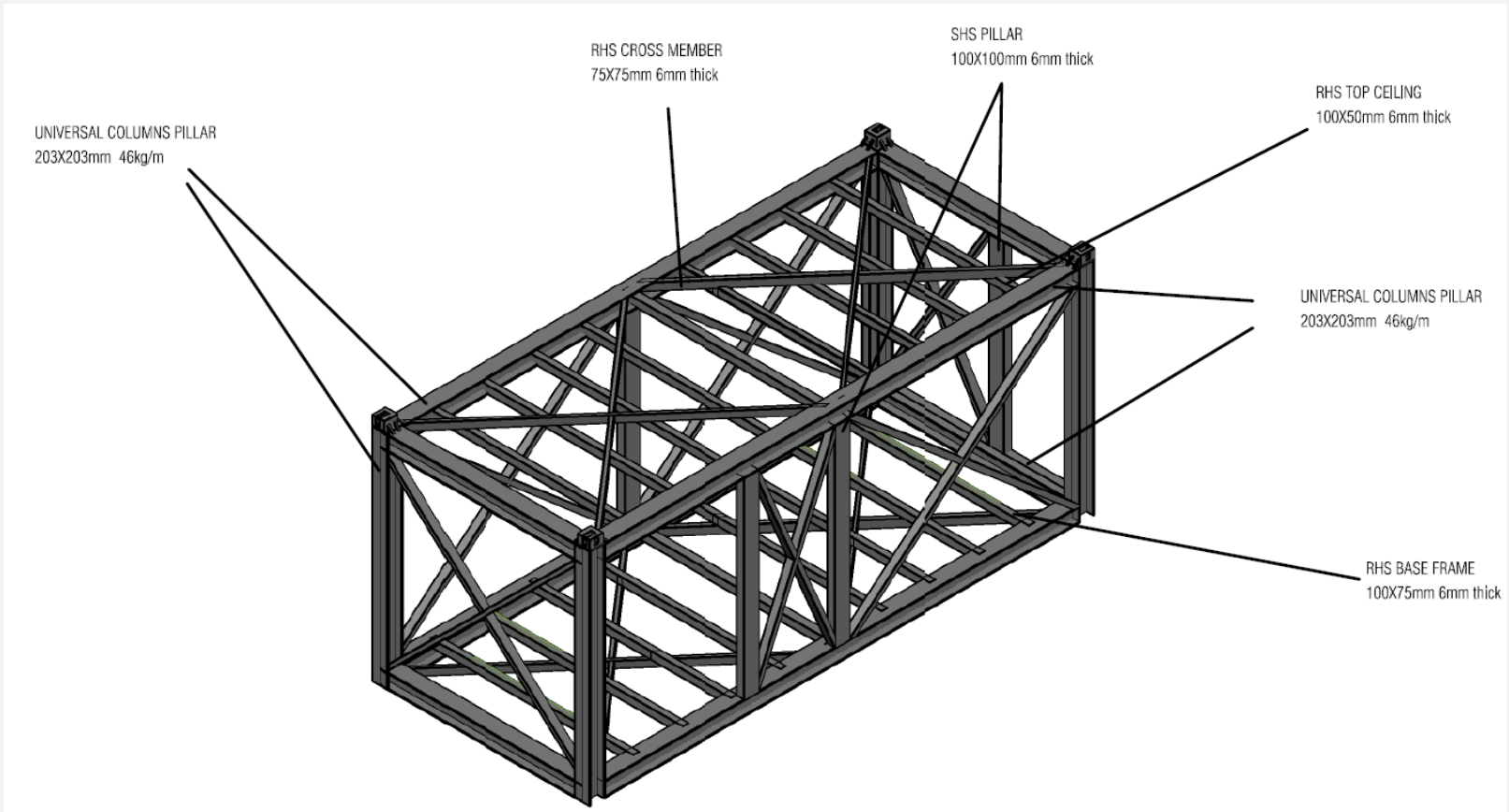




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PAST PROJECTS KINABALU ELECTRIC SUBMERSIBLE PUMP

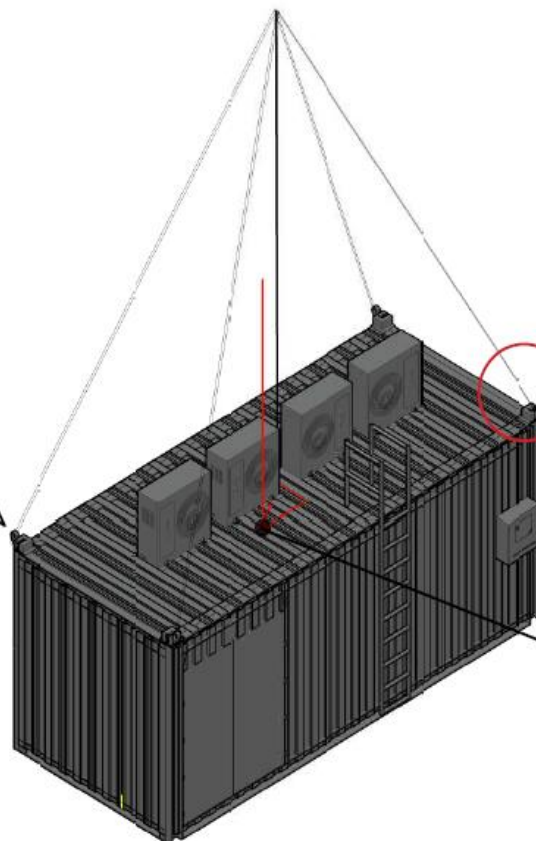
CONTAINERIZED E-HOUSE LOAD PLAN STRUCTURAL & BASE FRAME (ISOMETRIC)



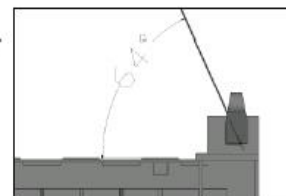
CONTAINERIZED E-HOUSE LOAD PLAN LIFTING ARRANGEMENT (ISOMETRIC)



CONTAINER LIFTING LUGS



| INFORMATION | |
|---|-------------------------|
| HOISTING SLING AS SUITABLE TO CARRY THE TOTAL WEIGHT | |
| PROPOSE LENGTH | 4 LENGTH x 8 METER EACH |
| WEIGHT | |
| LV SWITCHBOARD | 1,700KGS (APPROX.) |
| 560KW VSD X 4 UNITS | 4,720KGS (APPROX.) |
| AIR CONDITIONING + MISC | 1,300KGS (APPROX.) |
| E-HOUSE | 7,300KGS (APPROX.) |
| TOTAL WEIGHT | 15,020KGS (APPROX.) |
| DESIGNED TOTAL LOAD | 18,000KGS |
| *REMARK: | |
| —SAFETY RAIL GUARD & LADDER CAN REMOVED AND SITE INSTALLED | |
| — D SHACKLE WILL BE USED (BY HOISTING AGENCY) TO HOLD THE SLING WITH HOOK AS PER STANDARD PRACTICE. | |



CENTRE OF GRAVITY (COG)
2666MM (L) X 2052MM (D)
DIMENSIONS FROM HOOK MID POINT TO COG
824MM (L) X 536MM (D)



M Electrical & Engineering Sdn Bhd

PAST PROJECTS KINABALU ELECTRIC SUBMERSIBLE PUMP

LOAD TEST REPORT

PHOTO ATTACHMENT (Certificate No. TS 665230)
Picture shown during Load Testing – E House Frame Container.

Customer : M Electrical & Engineering Sdn.Bhd.



35TON LOAD CELL 2035-204DH3T



E HOUSE FRAME CONTAINER. TARE WEIGHT – 5TON



LOAD TEST WORK IN PROGRESS & HOLDING TIME : 10 MINUTES.

PROOF LOAD : 18TON

BY: HT. Sim

04/08/2020



TST TESTING CENTRE SDN.BHD.(557612-W)

LOT 11071 & 11072, Batu 3 ½, Jalan Kampung Jawa,
41000 Klang, Selangor Malaysia.

Tel : 603-51623096, 51625793, 51621533, 51621535

Fax : 603-51623094, 51617855



M Electrical & Engineering Sdn Bhd

PAST PROJECTS KINABALU ELECTRIC SUBMERSIBLE PUMP

MAGNETIC PARTICLE TEST REPORT

TEST REPORT

(This Report is issued subject to the terms & conditions set out below)

MAGNETIC PARTICLE TESTING

Our Ref: NT-8700002614/LCA/MT/02

Date: 13th August 2020

Page: 1 of 3



SetSCO Services (M) Sdn Bhd
Business Reg. No. (73888-K)
31, Jalan Industri Mas 12,
Taman Mas,
47100 Puchong,
Selangor Darul Ehsan
Tel: (03) 8052 6822 / 7822
Fax: (03) 8052 5822

Head Office :
SetSCO Services Pte Ltd
18, Toban Garden Crescent
Singapore 608925
Tel : (65) 6566 7777
Fax : (65) 6566 7718
www.setSCO.com
Business Reg. No. 10690209D



MS ISO/IEC 17025
TESTING
SAMM NO. 737

| PROJECT: TS 665230 (After Loadtest) | |
|---|---|
| CLIENT: M ELECTRICAL & ENGINEERING | TEST LOCATION: M ELECTRICAL ENGINEERING |
| ATTENTION: MR. SIM | DATE OF TEST: 11th August 2020 |
| TEST METHOD : Wet (Visible) | TEST EQUIPMENT USED: |
| MATERIAL : Carbon Steel | 1) Permanent Yoke (AC); Model: PM 2004 Y1; PN1410 |
| THICKNESS : N/A | 2) Viewing Condition – White light intensity of min. 100 fc (1 000 Lx) |
| WELDING PROCESS : SMAW | TEST MEDIUM: |
| SURFACE PREPARATION: Power Brushed | 1) White Contrast Paint – Ardrox / 8901W |
| STRESS RELIEVED : YES | 2) Black Magnetic Ink - Ardrox / 800/3 |
| TEST PROCEDURE: As in ASTM E 709: 2014 - Standard Guide for Magnetic Particle Examination. The distance between the legs of the yoke was set between 75-150 mm apart. | |
| TECHNIQUE: Wet continuous flow technique was adopted using magnetisation separately in two different directions perpendicular to each other. | |



Tested By
Name: Nik Mohd Aiman
TESTING OFFICER

TRF/02
Rev 0, 3 Feb 2014



Checked By
Name: Lim Chia Aik
SENIOR MANAGER

Terms & Conditions:

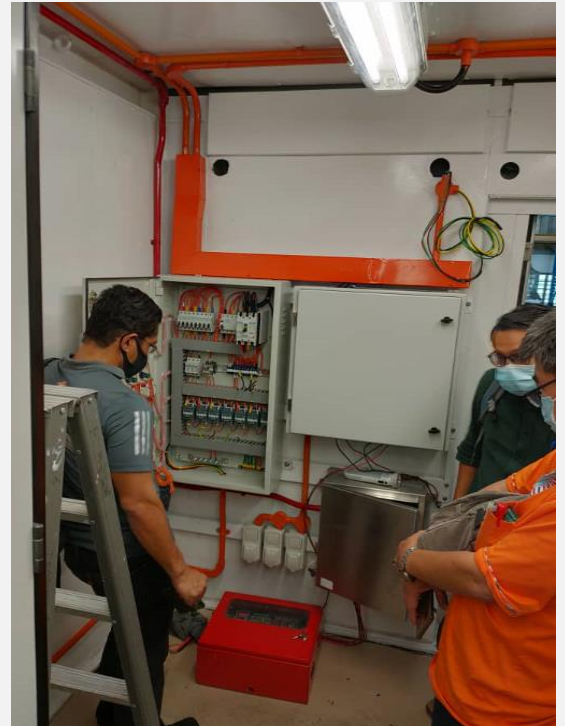
- (1) The Report is prepared for the sole use of the Client and is prepared based upon the items submitted, the services required by the Client and the conditions under which the Services are performed by SETSCO. The Report is not intended to be representative of similar or equivalent Services on similar or equivalent items. The Report does not constitute an endorsement by SETSCO of the item.
- (2) SETSCO agrees to use reasonable diligence in the performance of the Services but no warranties are given and none may be implied directly or indirectly relating to the Services, the Report or the facilities of SETSCO.
- (3) The Report may not be used in any publicity material without the written consent of SETSCO.
- (4) The Report shall not be reproduced in part or in full unless approval in writing has been given by SETSCO.
- (5) SETSCO shall under no circumstances be liable to the Client or its agents, servants or representatives, in contract, tort (including negligence or breach of statutory duty) or otherwise for any direct or indirect loss or damage suffered by the Client, its agents, servants or representative howsoever arising or whether connected with the Services provided by SETSCO herein.



M Electrical & Engineering Sdn Bhd

PAST PROJECTS KINABALU ELECTRIC SUBMERSIBLE PUMP

CONTAINERIZED E HOUSE PRODUCT (COMPLETE)



CONTAINERIZED E-HOUSE



M Electrical & Engineering Sdn Bhd

PAST PROJECTS

GDS IDC SERVICES

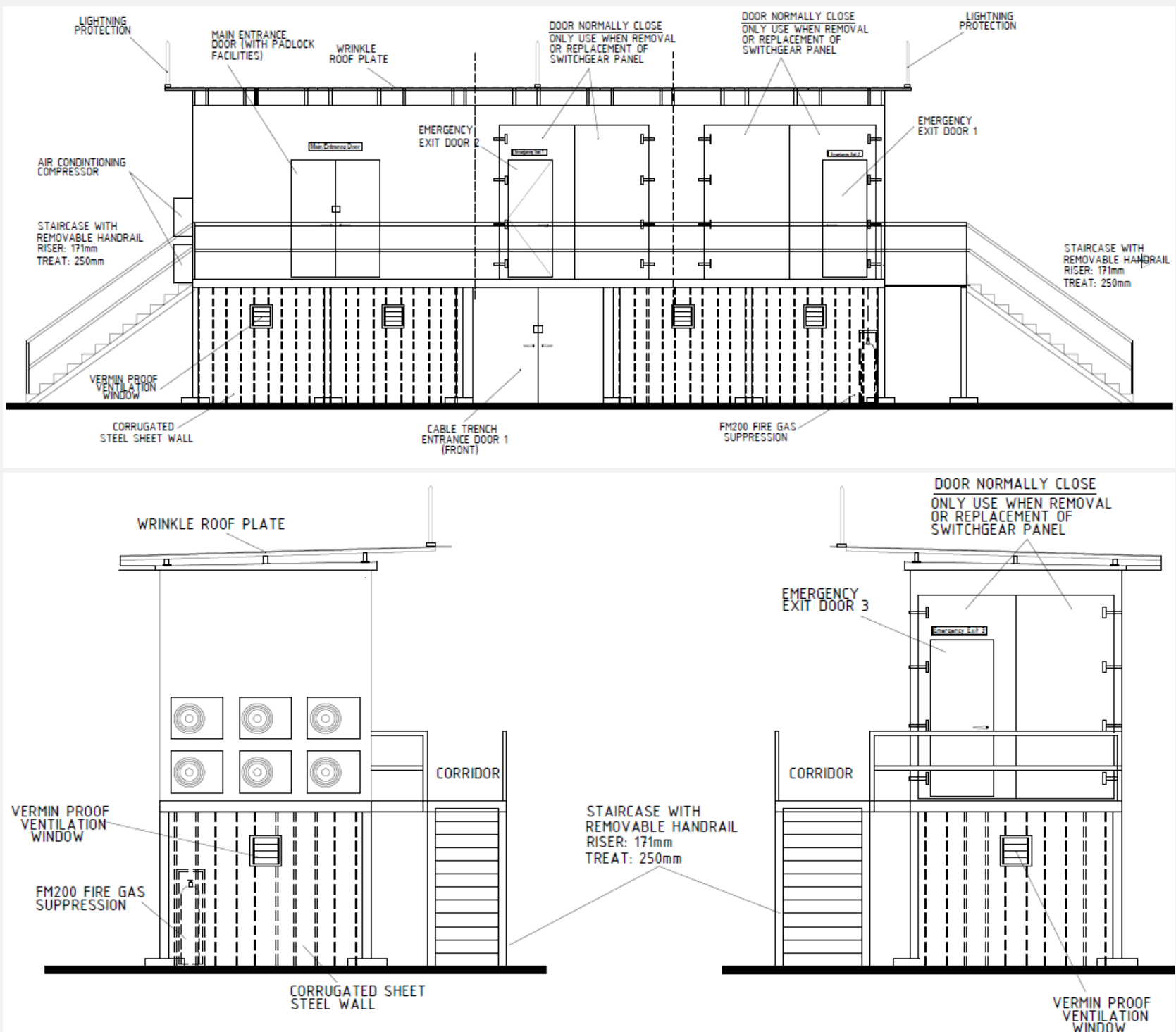
DATA CENTRE

PROJECT COMPLETION: JANUARY 2023

PROJECT OVERVIEW

This project scope consists of Design, Fabrication, Supply, Installation and Testing of 33kV Containerised Main Switching Station with Ancillary Equipment. This 33kV Containerised Main Switching Station is a temporary substation for the development of Data Centre which located at Nusajaya, Johor Bahru. The owner for this project is GDS IDC Service (Malaysia) Sdn. Bhd.

CONTAINERIZED MAIN SWITCHING STATION (EXTERNAL VIEW)





M Electrical & Engineering Sdn Bhd

PAST PROJECTS GDS IDC SERVICES DATA CENTRE

33KV CONTAINERIZED MAIN SWITCHING STATION (COMPLETE)





M Electrical & Engineering Sdn Bhd

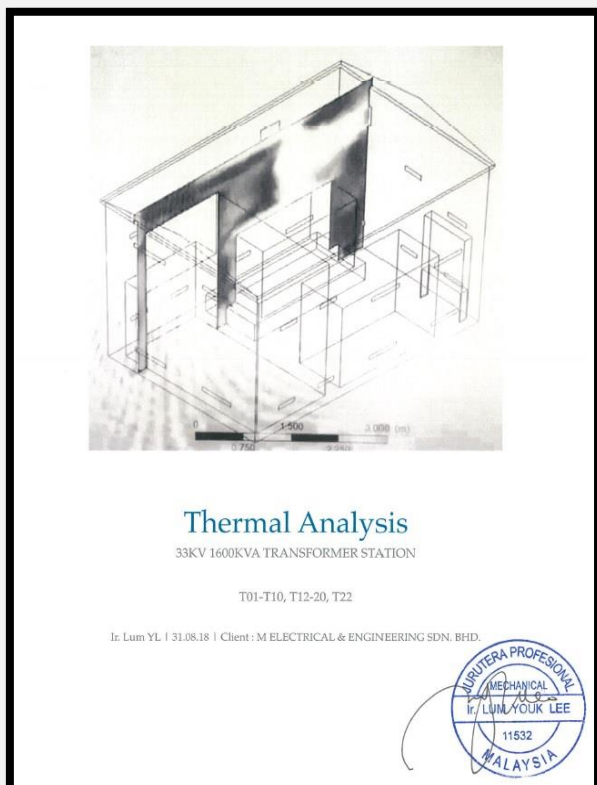
REGISTRATIONS & CERTIFICATIONS



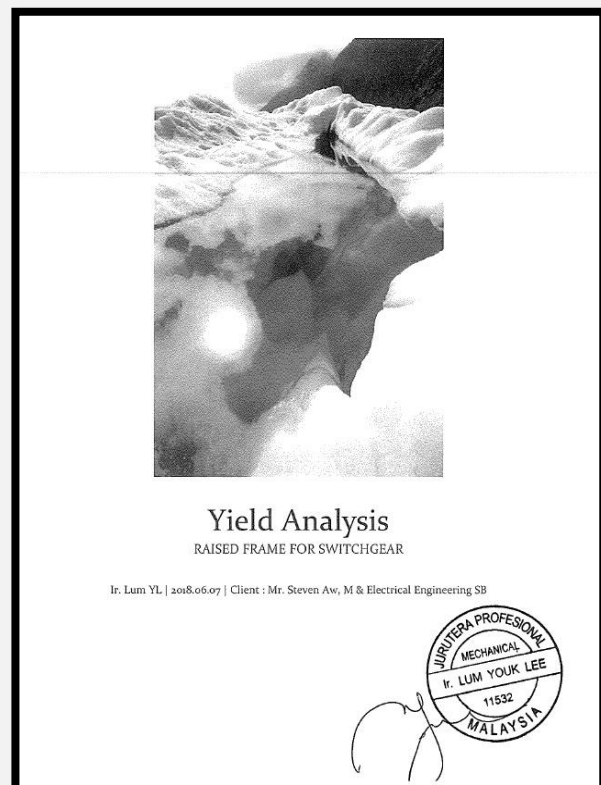
Registered Electrical Switch Board Manufacturer Under Energy Commission (ST) Malaysia



ISO 9001:2015 Certification From Global Group UK



Thermal Analysis Package Sub-Station



Yield Strength Analysis Raised Frame for E-House

CONTAINERIZED E-HOUSE



M Electrical & Engineering Sdn Bhd

REGISTRATIONS & CERTIFICATIONS

GFC-777
REV0

REPORT OF LOAD TEST

CLIENT: GOFORTH CORPORATION SDN. BHD.
 179, LOT 756, JALAN LIGHT INDUSTRIAL PARK, ALAM SURAB 3,
 CITY INDUSTRIAL SUBANG, SELANGOR.
 TEL: +603 5636 7558 FAX: +603 5636 7538

LOCATION OF ISSUE: GOFORTH CORPORATION SDN. BHD.
 6, JALAN WAWASAN 3/107, KAWASAN PERINDUSTRIAN SUNGAI KAPAR,
 (DUGAN) - KUBU KAPAR, SELANGOR, MALAYSIA.
 T: +603 210 1188 F: +603 2906 2929 E: info@goforth.com.my

CLIENT ORDER/PO NO: 1370/19
GOFORTH REF NO: HS-00795
TEST DATE: 8 November 2019
TEST LOCATION: GOFORTH, SG KAPAR, INDAH

SPECIMEN TYPE: STRUCTURAL SKID
NO: 1
DESCRIPTION: LOAD TEST CONDUCTED ON CLIENT'S FRAME
 DIMENSION: 3150MM X 2650MM X 152MM

DECLARED LOAD(S) (KG): N/A
TEST LOAD: 20 TON

LOAD CELL DETAIL(S):
 LOAD CELL 1: PSC2201208-002
 LOAD CELL 2: N/A
 COUNTERWEIGHT DETAIL(S): STEEL WIRE ROPE

ADDITIONAL TEST(S) CARRIED OUT:
 CONDITION: Dry
 TYPE OF TEST: N/A
 RESULT: N/A
 REPORT NO: N/A

REMARKS/NOTES:
 LOAD TEST IN ACCORDANCE TO CLIENT'S INSTRUCTIONS / PROCEDURE
 LOAD TEST WAS HELD FOR: 15 MINUTES

TEST RESULT:
 NO DEFORMATION OR FAILURE OBSERVED ON THE SPECIMEN DURING AND AFTER TEST

I hereby certify that the above described material(s) was inspected, tested and conducted in accordance with the company's and/or client's work procedure and in accordance to the standard stated (if applicable) at the date of the test.

P. H. M. W. W. W.
 DATE: 8 November 2019

M ELECTRICAL & ENGINEERING SDN. BHD.
 DATE: 8 November 2019

Your Total Lifting & Rigging Solutions Partner

Load Test of M Electrical & Engineering Package Sub Station (BASE FRAME)

Certificate No.
TS 665230
Customer Order No.

TST TESTING CENTRE SDN. BHD. (557612-W)
 Lot 11071 & 11072, Batu 3 1/2, Jalan Kampung Jawa,
 41000 Klang, Selangor, Malaysia.
 Tel: 603-5162 3096, 5162 5793, 5162 1533, 5162 1535 Fax: 603-5162 3094, 5161 7855

CERTIFICATE OF TEST AND EXAMINATION OF LIFTING APPLIANCES AND LIFTING GEAR

This calibration of Force Measuring System is performed in accordance with calibration procedure written with reference to calibration section of relevant BS EN ISO 7500-1:2010 standards. The reference standards used are traceable to national standards.

| Distinguishing Mark No. (i) | Description of item. This should include size, material and particulars of any heat treatment (ii) | Number tested and examined (iii) | Dates of test and examination (iv) | Proof Load Applied (Specify units) (v) | Working Load Limit (Specify units) (vi) |
|-----------------------------|--|----------------------------------|------------------------------------|--|---|
| TS 665230 | E HOUSE FRAME CONTAINER. TABLE WEIGHT - 5 TON PROOF LOAD TEST - 18 TON THE ABOVE ITEM WAS LIFTED AND HELD FOR 10 MINUTES AND TEST LOADED TO 2.0 TIME OF TABLE WEIGHT. FOUND TO BE SATISFACTORY. NO SIGN OF DAMAGE WAS OBSERVED DURING THE TIME OF INSPECTION. | 1 TON | 04/08/2020 | 18.00 TON | -- |

(2) Name & Address of maker, supplier or repairer
ITEM SUPPLIED BY CUSTOMER

(3) Name of firm, company, association or person undertaking the test and examination.
TST Testing Centre Sdn. Bhd.

(4) Name of person who carried out test and examination
Position: JHT Sim / Tester
Date: 04/08/2020

(5) I certify on behalf of the firm, company, association or person named in (3) & (4) before, that the items or appliances described herein were tested and thereafter thoroughly examined by a competent person; found to have withstood the proof load without deformation, found to be free from cracks, flaws or other defects; and that the above particulars are correct.

(6) Name & Address of owner
M ELECTRICAL & ENGINEERING SDN. BHD.

The above equipment has been tested and examined and is for normal use by a person who has been instructed, trained and where necessary is supervising in its proper use.

Certificate of Test and Examination of Lifting Appliances and Lifting Gear

TEST REPORT
(This Report is issued subject to the terms & conditions set out below)

SETSCO
Setesco Services (M) Sdn Bhd
Business Reg. No. 17288-02
31, Jalan Industri Mela 12,
Taman Mela,
47100 Puchong,
Selangor Darul Ehsan
Tel: (603) 8556 7777
Fax: (03) 8556 7719
www.setesco.com
Business Reg. No. 106920290

MAGNETIC PARTICLE TESTING
 As in ASTM E 709-2014 / LC/AMT/02
 Date: 13th August 2020
 Page: 1 of 3

PROJECT: TS 665230 (After Loadtest)

CLIENT: M ELECTRICAL & ENGINEERING
TEST LOCATION: M ELECTRICAL ENGINEERING

ATTENTION: MR. SIM
TEST METHOD: Wet (Visible)
MATERIAL: Carbon Steel
THICKNESS: N/A
WELDING PROCESS: SMAW
SURFACE PREPARATION: Power Brushed
STRESS RELIEVED: YES

DATE OF TEST: 11th August 2020
TEST EQUIPMENT USED:
 1) Permanent Yoke (AC);
 Model: PM 2004 Y1; PN1410
 2) Viewing Condition - White light intensity of min. 100 fc (1 000 Lx)
TEST MEDIUM:
 1) White Contrast Paint - Ardrex / 8901W
 2) Black Magnetic Ink - Ardrex / 8003

TEST PROCEDURE:
 As in ASTM E 709-2014 - Standard Guide for Magnetic Particle Examination. The distance between the legs of the yoke was set between 75-150 mm apart.

TECHNIQUE:
 Wet continuous flow technique was adopted using magnetisation separately in two different directions perpendicular to each other.

TESTED BY: Name: Nik Mohd Aiman
TESTING OFFICER

CHECKED BY: Name: Lim Chia Aik
SENIOR MANAGER

TRP/02
Rev 0, 3 Feb 2014

Terms & Conditions:
 (1) This Report is prepared for the sole use of the Client and is prepared based upon the information submitted by the Client and the conditions under which the Services are performed by SETSCO. The Report is not intended to be representative of similar or equivalent Services on similar or equivalent items. The Report does not constitute an endorsement by SETSCO of the item.
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Magnetic Particle Testing of M Electrical Containerized E-House

PETRONAS

LICENSE TO SUPPLY PRODUCTSERVICE TO EXPLORATION AND OILGAS COMPANIES IN MALAYSIA

In exercising the powers conferred by Section 7, Petroleum Development Act 1974 and in accordance to Regulation 5 of the Petroleum Regulation 1974, delegated to me by the Prime Minister of Malaysia, I hereby issue the license under Regulation 7 of the Petroleum Regulation for the purpose of the above as:

Certificate generated at: 15/06/2022

COMPANY NAME: ENERGY METHOD ENGINEERING (M) SDN. BHD.
LICENSE NO: 12825W
LICENSE PERIOD: 04/08/2022 - 03/08/2025

| SPECIAL CONDITION FOR COMPANY | | | | | | | |
|------------------------------------|------------------------|---|-------------------|-------------------|------------------------------------|------------------------|-------------|
| No | Section | Remark | Effective Date | Due Date | | | |
| CATEGORIES OF LICENSE REGISTRATION | | | | | | | |
| APPROVED LICENSE CATEGORIES | | | | | | | |
| NO | LIC/PROFESSIONAL | Service/Supplier Code | Special Condition | Mode of Operation | Principal Name (If Applicable) | Approval Date / Time | Expiry Date |
| 1 | License | 1415100P Portable Generator Set | No | Dealer | Not Applicable | 14/04/2022 09:49:28 AM | 03/04/2025 |
| 2 | License & Registration | 1417130S HV Switchgear | No | Self-operated | Not Applicable | 14/04/2022 09:43:09 PM | 03/04/2025 |
| 3 | License & Registration | 1414140S Electrical Equipments Leasing/Rental | No | Self-operated | Not Applicable | 14/04/2022 09:13:30 AM | 03/04/2025 |
| 4 | License & Registration | 1416100P Containerized Substation | No | Agent | M Electrical & Engineering Sdn Bhd | 14/04/2022 10:35:31 AM | 03/04/2025 |
| 5 | License & Registration | 141100S Variable Speed Drive and Soft Starter | No | Self-operated | Not Applicable | 14/04/2022 10:35:01 AM | 03/04/2025 |

1416100P Containerized Substation No Agent M Electrical & Engineering Sdn Bhd

| SPECIAL CONDITION FOR WIRE | | | | | | | |
|----------------------------|------------------------|---|--------|----------------|----------------|------------------------|------------|
| No | Service/Supplier Code | Section | Remark | Effective Date | Due Date | | |
| 11 | License & Registration | 1416100P Generator Control System | No | Agent | Self Bhd | 09/12/21 AM | 03/04/2025 |
| 12 | License & Registration | 1410200P Explosion Proof Electrical Parts, Components & Accessories | No | Dealer | Not Applicable | 14/04/2022 09:48:46 AM | 03/04/2025 |
| 13 | License & Registration | 1417140S Protection Relay Maintenance | No | Self-operated | Not Applicable | 14/04/2022 09:44:09 PM | 03/04/2025 |
| 14 | License & Registration | 1417130S LV Switchgear | No | Self-operated | Not Applicable | 14/04/2022 09:43:35 PM | 03/04/2025 |

Petronas License and Certification for Containerized E-House

<http://www.m-electrical.com.my>



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