AIR CONDITIONING SYSTEM SPECIFICATIONS

Project

Embassy residence & residential complex

Sukhumvit25, Watthana, Bangkok, Thailand.

Owner

Embassy of India, Thailand

DESIGN BY

บริษัท พียู แอสโซซิเอทส์ จำกัด
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CONTENT

AIRCONDITION SPECIFICATIONS

SECTION A

GENERAL SPECIFICATION AND REQUIREMENT

1. DEFINITIONS

The following terms as used in the specification and shall also be applied for elaborating the bid.

Employer, Project Office	-	The owner of the project or his authorized representative.
Engineer	-	The architect or engineer appointed by the employer to design and specify equipment for the project or the one who is authorized to sign on the drawings/ documents.
Supervisor	-	The employer's representative who supervise the installation.
Contract	-	Agreement between the employer and the contractor.
Employer, Project Office	-	The owner of the project or his authorized representative.

Contractor, M&E Contractor	-	Legal person/company or his representative who signs the awarded contract.
Works	-	Any work to be executed according to the contract drawings, specification, amendments as well as any other documents attached to the contract signed by the contractor.
Contract drawings	-	The design drawings attached to the contract.
Specification	-	Specified technical details of equipments, materials of equipments, materials, apparatus, etc., that shall be applied to the project.
Approval	-	Written document that has been signed and approved by the employer or his representative.

2. BUILDING PROVISIONS

a. Certain provisions have been made in the Building for the accommodation of the ventilation and air conditioning installations. These provisions include space allocation, openings through structural slabs, etc. sizes as

determined by the Supervisor in the services, coordinated with the architectural and structural.

b. The provisions so made are shown on the Architect Interior, Structural and Building Services Engineer's drawings. The M&E Contractor shall, however, prepare the complete builder's work drawings showing all the necessary openings with sizes, plinths, space etc. for the Mechanical Ventilation and Air-conditioning MVAC installation. The builder's work drawings should show the predetermined provisions if still application and to indicate additional openings, etc. as deemed necessary for the installation. The builder's work drawings shall be submitted for Project Officer's acceptance/approval well before the Main Contractor , M&E Contractor and Other Contractors are proceeding with their works in relation to the construction program.

c. It is the M&E Contractor's responsibility to ensure that the Main Contractor is informed of all openings required in the structure and, where additional openings are required due to the late information supplied by the M&E Contractor, they are provided at the M&E Contractor expense, unless they are covered on a duly authorized basis by the Employer on a Variation order issued Supervisor. The M&E Contractor must obtain approval from the Supervisor prior to construct the openings.

d. The M&E Contractor shall notify the Supervisor well in advance regarding on access openings in ceilings and ducts spaces to enable arrangements to be made with the Main Contractor and other Contractors accordingly, otherwise cost for later work will be borne by this Contract.

e. Limitation of Available Space/Access

M&E Contractor's attention is drawn to the space/area and access limitations shown on the drawings.

M&E Contractor shall also note the limitation of equipment access as shown on the drawings and shall ensure that all equipment can be safely transferred to the planned space. M&E Contractor should include if necessary the work for dismantling and reassembly/assembly the equipment to accommodate any access restriction.

3. The M&E Contractor is assumed to be familiar with the climatic conditions prevailing in Cambodia and to be aware of the high temperature (up to 113 deg.F.) and the high relative humidity. It is assumed that the M&E Contractor in submitting the tender has warranted the suitability of all materials and equipment for operation in the local climatic conditions.

4. STANDARDS, CODES, RULES

Otherwise specified elsewhere in the Contract, the entire system shall be manufactured, installed, tested and balanced conforming to the latest issue of the following.

AMCA	-	Air Moving and Conditioning Association
ANSI	-	American National Standard Institute
API	-	American Petroleum Institute
ARI	-	Air-conditioning and Refrigeration Institute
ASHARE	-	American Society of Heating, Engineer, Inc.
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society of Testing Materials
BS	-	British Standard
FM	-	Factory Mutual
IEC	-	International Electro-Technical Commission
NFC	-	National Fire Code
NEC	-	National Electrical Code
NEMA	-	National Electrical Manufacutrers Association
NFPA	-	National Fire Protection Association
SMACNA	-	Sheet Metal and Air-conditioning Contractors National Association Inc.
UL	-	Underwriter's Laboratory, Inc.

5. CERTIFIED INSTITUTES

Incase testing or certifying is called for equipments and accessories which the Contractor intends to use for the Project, the Contractors shall be responsible at his own expense to submit test reports and certificates from the reputable institutes accepted by the Employer.

6. OFF-SITE PRE-FABRICATION

As much off-site pre-fabrication work as possible is specified for this project, only installation and assembly of pre-fabricated items are permitted on site. These include, but not be limited to, air ducts together with fittings, pipe branches, etc.

On-site fabrication must be kept to an absolute minimum, and these can only be approved after the Subcontractor has demonstrated to the satisfaction of the Supervisor that off-site pre-fabrication is either not possible or more costly or more time-consuming.

7. ELECTRICAL WORK

All electrical installation should comply with technical specification of electrical and communication installation. M&E Contractor to coordinate with equipment suppliers on cable sizes and connections, etc.

8. EQUIPMENT SERVICE/MAINTENANCE

All fans, coils, volume damper are to be accessible and capable of beingreached without difficulty for service/adjustment/maintenance.

9. DUCT CONSTRUCTION TOLERANCE

All ductwork shall be manufactured as far as practicable to dimensions given on the Drawings after confirmation by taking actual dimension from site. Where site dimensions cannot be taken in advance, dimensions shall be obtained from Architectural/Structural detail dimensioned drawings and the M&E Contractor shall make suitable provisions to accommodate minor discrepancies that may occur between the dimensions on these drawings and those measured from the site.

It is the M&E Contractor responsibility to check the amount of tolerance required to fit the ducts into the ceiling void. The M&E Contractor shall co-ordinate with all other Contractors on site before actual installation takes place.

10. TEMPORARY PROTECTION

The M&E Contractor should include the proper protection of all equipment/materials installed during the course of construction. In the event when equipments are installed prior to the fixing of external wall/windows/cladding, M&E Contractor is to take appropriate measure to protect the equipment from element of weather.

11. All equipments and materials used in this Contract works shall be approved/accepted by local authorities to comply with relevant regulations.

12. Equipment catalogues and manufacturer's specifications related to the proposed equipment shall be specific and shall include all necessary technical and engineering information for the Supervisor to ascertain that equipment offered conforms to specification. Sales catalogue of a general nature will not be accepted.

13. STATUTORY OBLIGATIONS AND REGULATIONS

The M&E Contract works shall fully comply with all statutory obligations and regulations together with any amendments made thereto as required by relevant Government Authorities and any other local authorities having jurisdiction.

14. Shop drawings showing proposed pipe work and ductwork alignment, installation details, plant room installation, control schematic diagrams complete with dimensions, sections and details where considered appropriate and necessary by the Supervisor, shall be submitted for approval prior to works proceed.

Shop drawings for AHU rooms, plant rooms and other critical areas at the discretion of the Supervisor shall be drawn on a scale of 1:20 minimum.

15. LIST OF APPROVED MANUFACTURERS

This list of approved manufacturers is given as a standard of quality. If a bidder wishes to offer apparatus of a make not mentioned in this list, he shall ascertain himself that such make is of equal quality to that mentioned the Specification, and he shall furnish with his bid full details of the apparatus in order to enable the Supervisor to judge the quality of the make offered.

All equipment, whether on this list or offered as an alternative, must be supported by locally available supplies of spare parts.

a. Air Conditioner

DAIKIN, MITSUBISHI, TOSHIBA

b. Air Compressor

Comp Air or Approved Equal

c. Centrifugal Fan & Other Ventilation Fan

Panasonic, Kruger or Approved Equal

d. Ventilation Fan Propeller

Panasonic, Mitsubishi or Approved Equal

e. Vibration Isolator

Mason, Tozen or Approved Equal

f. Air Grilles

Titus, Price, Comfort Flow, Flow Thru or Approved Equal

g. Piping Insulation

Aeroflex, Koolphen, Ruba or Approved Equal

h. Filter

American Air Filter, Eco-Air, Farr, Honey well or Approved Equal

i. EE Component (Must Corresponding to EE Contractor's Material Approved)

Siemens, GE, Mitsubishi, Square-D or Approved Equal

j. EE Wiring (Must Corresponding to EE Contractor's Material Approved)

KTC or Approved Equal

k. EE Conduit (Must Corresponding to EE Contractor's Material Approved)

RSI, Arrow Pipe, TAS or Approved Equal

16. GENERAL NOTE

16.1 Guarantee that all items of work included within the scope of this contract are in accordance with all local and national building codes and requirements. Any additional work required to meet these requirements is included in the base Contract.

16.2 Replace or, if approved by the Supervisor, repair at no additional cost any defective of damaged work and repeat tests as necessary until all work is proven satisfactory to the Architect, Engineer and Employer.

16.3 Provide all field measurements for the proper completion of the work. However, field measurements should be kept to a minimum so as to avoid any possible delays to the fabrication and delivery of materials.

16.4 Provide a responsible representative who shall attend all Job Progress and Safety Meetings conducted by the Engineer and/or General Contractor on a regular basis, to review construction schedule, establish trade priorities, etc.

16.5 All concrete housekeeping pads required for this Contractor's equipment shall be provided by this Contractor.

16.6 M&E Contractor is responsible for the safety and protection of his work and labor work force as required by governing regulations, including the covering of any holes, shaft to openings, etc., so as to avoid any safety hazards.

16.7 Attention is called to existing building and utilities. Lifting over the adjacent property shall not be permitted. Exercise care to avoid damaging or obstructing access to any existing buildings or utilities. This Contractor shall be responsible for repairing, at no additional cost to this Contract, any damage to existing buildings or utilities resulting from his operations.

16.8 Clean and maintain streets and sidewalks free from all mud and debris caused to be littered by this Contractor's trucks or equipment to the satisfaction of the Engineer , General Contractor, Owner and applicable municipal authorities.

16.9 Toilet facilities shall be provided, in locations designated by the General Contractor, at no cost to Contractor during normal working hours.

16.10 Furnish flagmen and maintain traffic control as directed by the Engineer for the proper completion of Contractor's work.

16.11 Maintain an adequate labor work force as required on a daily basis to properly clean up all the debris associated with Contractor's work. All rubbish/debris resulting from Contractor's operation shall be deposited directly into "dumpster type" rubbish containers provided on the ground level of the project by the General Contractor. Removal and disposal of "dumpster type" rubbish containers shall be the responsibility of others'

16.12 M&E Contractor shall be responsible for the structural integrity of the building during stockpiling of his material and erection of his system, provided that elements effect on the overall structural integrity, such as the concrete framing, concrete floors, etc., are erected within the

limitations prescribed by the Contractor Documents. Contractor will not be responsible for the structural design of the building.

16.13 All reference to "M&E Contractor" and "Contractor" in the technical specification means "Electrical / MVAC / FS / SN / contractor ".

16.14 It is responsibility of the M&E Contractor to check the site job before priced and installed their M&E work without additional cost later.

16.15 It is responsibility of the M&E Contractor to allow their cost for coordinate with the relevant Government without extra charge to the owner later. The owner shall pay according to official receive from Government Authority only.

16.16 Unless otherwise specified, all pipes which run from the building to out side and all pipes which run across floating slab must be installed flexible pipe. 300 mm. long.

16.17 Unless otherwise specified, all outside metal pipes shall be hot dip galvanized or Fiberglass with resin cover 3 layers minimum, for all outside valve and associated must be stainless steel or cast iron

16.18 It is responsibility of M&E contractor to provide and install concrete foundation minimum 100 mm. above finishing floor for all M&E equipment.

16.19 It is responsibility of M&E contractor to testing and commissioning all M&E system by expert company and/or expert team and make formal reports to Supervising officer's (S.O.) for approval

16.20 On-site labor camp for this Contractor's work force will NOT be allowed.

AIRCONDITION SPECIFICATIONS

SECTION B

VARIABLE REFRIGERANT VOLUME AIR CONDITIONER

1. Require latest product from Daikin, Mitsubishi, Toshiba or approve equal.
2. Capacity shall not less than specified on drawing.
3. Refrigerant R-410a.
4. All Inverter compressor
5. Thermostat must be the latest product and submit master catalog to owner for approval before ordering

AIRCONDITION SPECIFICATIONS

SECTION C

TESTING & COMMISSIONING

4.1 Testing and commissioning shall be in accordance with SMACNA commissioning code.

4.2 Instruments Required

a. A complete set of testing equipment to confirm the performance of the installation shall be provided by the M/E Contractor who shall carry out the commissioning tests described under SMACNA, HVAC SYSTEMS, TESTING, ADJUSTING AND BALANLING MANUAL testing and balancing manual. All testing equipment and instruments and labour required for the execution of such tests or verifications shall be provided by the M/E Contractor. Apparatus provided shall remain the property of the M/E Contractor.

b. The required apparatus shall include but not necessarily be limited to the following:-

- 1 Recorder for temperature and humidity.
- 1 Recorder for measuring flow rate through orifice plates.
- 1 Combined maximum and minimum thermometer.
- 1 Vane anemometer with accessories.
- 1 Approved type of velometer with accessories.
- 1 Sound level meter with frequency analyze.
- 1 mounted deg.C db thermometer.

- 1 portable deg.C instrument/laboratory grade sling psychrometer.
- 1 portable keyboard.

4.3 Execution of Tests

a. The M/E Contractor shall obtain the Building Services Engineer's approval for the method of testing, and shall submit to the Building Services Engineer two copies of the test results including the method so employed on each and every completed section of the installation and each and every piece of equipment. All recording charts shall also be submitted for approval and retention.

b. The M/E Contractor shall repeat tests when there are discrepancies between the recorded test results and site measurements witnessed by the Building Services Engineer. Tests shall be repeated to the satisfaction of the Building Services Engineer. The duration of tests shall be at the discretion of the Building Services Engineer

4.4 Performance Tests

a. The M/E Contractor shall demonstrate to the Building Services Engineer that the installation is adjusted and regulated correctly to perform the function for which it has been designed, e.g. room temperature and humidity, air quantities, etc. All adjustments, balancing and regulating shall be carried out as necessary until the required values and conditions are achieved.

b. Room temperatures and humidities shall be measured by recording instruments located four feet above floor level at points away from the influence of draughts or hot or cold surfaces.

c. Demonstration of achieving room temperatures shall not be carried out when weather conditions are likely to cause undue influence to the results.

d. Air quantities shall be measured by velometer or anemometer, using standard duct traverse, register outlet velocity recommended by the supplier, and/or hooded flow devices.

e. Functions including monitors and control of the Building Management System should be tested for every aspects as alarm, printing, graphics, etc.

4.5 Pipe Systems

All refrigerant pipework shall be tested in accordance with recommendation of the manufacturer using dry nitrogen. After the system has been charged with refrigerant, it shall be thoroughly checked for leaks using Halide detector.

1. Require latest product from Daikin, Mitsubishi, Toshiba or approve equal.

2. Capacity shall not less than specified on drawing.

3. Refrigerant R-410a.

4. All Inverter compressor

5. Thermostat must be the latest product and submit master catalog to owner for approval before ordering

PANEL BOARD

PROJECT : EMBASASY RESSIDENCE

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Ladyao, Chatujak, Bangkok 10900, Thailand.

Panel Name : PVRV(A1)-2-A Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A1)-2-A Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A1)-2-1A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A1)-2-2A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A1)-2-3A			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7										
9										
11										
2	FCU (A1)-2-4A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,200	1,600	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,400			30 AT					
	Total Demand Load	4,400			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

PROJECT : EMBASASY RESSIDENCE

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Panel Name : PVRV(A1)-2-B Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A1)-2-B Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A1)-2-1B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A1)-2-2B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A1)-2-3B			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A1)-2-1B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	2,200	1,600	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	5,400			30 AT					
	Total Demand Load	5,400			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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Panel Name : PVRV(A1)-2-D Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A1)-2-D Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A1)-2-1D	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A1)-2-2D		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A1)-2-3D			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A1)-2-4D	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A1)-2-5D	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A1)-2-6D		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,200	1,200	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,000			30 AT					
	Total Demand Load	4,000			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

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Panel Name : PVRV(A1)-3 TO 7-A Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A1)-3TO 7-A Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A1)-3-1A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A1)-3-2A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A1)-3-3A			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A1)-3-4A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	2,200	1,600	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	5,400			30 AT					
	Total Demand Load	5,400			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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Panel Name : PVRV(A1)-3 TO 7-B Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A1)-3TO 7-B Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A1)-3-1B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A1)-3-2B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A1)-3-3B			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A1)-3-4B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	2,200	1,600	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	5,400			30 AT					
	Total Demand Load	5,400			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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Panel Name : PVRV(A1)-3-C Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A1)-3-C Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A1)-3-1C	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A1)-3-2C		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A1)-3-3C			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A1)-3-4C	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A1)-3-5C	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A1)-3-6C		400		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,000	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,400			30 AT					
	Total Demand Load	4,400			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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21/161 Soi Ladprao 15 Ladprao Road,
Ladyao, Chatujak, Bangkok 10900, Thailand.

Panel Name : PVRV(A1)-3-D Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A1)-3-D Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A1)-3-1D	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A1)-3-2D		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A1)-3-3D			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A1)-3-4D	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A1)-3-5D	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A1)-3-6D		400		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,000	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,400			30 AT					
	Total Demand Load	4,400			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

PROJECT : EMBASASY RESSIDENCE

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Panel Name : PVRV(A2)-1-A Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A2)-1-A Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A2)-1-1A	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A2)-1-2A		400		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A42)-1-3A			400	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7										
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,400	1,400	1,400	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,200			30 AT					
	Total Demand Load	4,200			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

PROJECT : EMBASASY RESSIDENCE

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Panel Name : PVRV(A2)-2 TO 4-A Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A2)-2- TO 4-A Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A2)-2-1A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A2)-2-2A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A2)-2-3A			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A2)-2-4A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A2)-2-5A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A2)-2-6A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,200	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,600			30 AT					
	Total Demand Load	4,600			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

PROJECT : EMBASASY RESSIDENCE

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Panel Name : PVRV(A2)-2 TO 4-B Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A2)-2- TO 4-B Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A2)-2-1B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A2)-2-2B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A2)-2-3B			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A2)-2-4B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A2)-2-5B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A2)-2-6B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,200	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,600			30 AT					
	Total Demand Load	4,600			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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Panel Name : PVRV(A2)- 5-A Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A2)- 5-A Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A2)-5-1A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A2)-5-2A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A2)-5-3A			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A2)-5-4A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A2)-5-5A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A2)-5-6A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	FCU (A2)-5-7A			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,200	1,200	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,200			30 AT					
	Total Demand Load	4,200			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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Panel Name : PVRV(A2)- 5-B Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A2)- 5-B Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A2)-5-1B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A2)-5-2B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A2)-5-3B			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A2)-5-4B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A2)-5-5B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A2)-5-6B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,200	1,200	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,200			30 AT					
	Total Demand Load	4,200			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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PROJECT : EMBASASY RESSIDENCE

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Panel Name : PVRV(A2)- 6-A Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A2)- 6-A Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A2)-6-1A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A2)-6-2A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A2)-6-3A			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A2)-6-4A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A2)-6-5A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,200	1,200	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,200			30 AT					
	Total Demand Load	4,200			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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Panel Name : PVRV(A2)- 6-B Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A2)- 6-B Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A2)-6-1B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A2)-6-2B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A2)-6-3B			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A2)-6-4B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A2)-6-5B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A2)-6-6B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,200	1,200	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,200			30 AT					
	Total Demand Load	4,200			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

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Panel Name : PVRV(A4)-1-A Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A4)-1-A Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A4)-1-1A	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A4)-1-2A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A4)-1-3A			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7										
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,400	1,600	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	4,600			30 AT					
	Total Demand Load	4,600			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

PROJECT : EMBASASY RESSIDENCE

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Panel Name : PVRV(A4)-1-B Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A4)-1-B Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A4)-1-1B	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A4)-1-2B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A4)-1-3B			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A4)-1-4B	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,800	1,600	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	5,000			30 AT					
	Total Demand Load	5,000			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

PROJECT : EMBASASY RESSIDENCE

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Panel Name : PVRV(A4)-1-C Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A4)-1-C Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A4)-1-1C	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A4)-1-2C		400		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A4)-1-3C			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A4)-1-4C	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	2,000	1,400	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	5,000			30 AT					
	Total Demand Load	5,000			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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Panel Name : PVRV(A4)-2-A Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A4)-2-A Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A4)-2-1A	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A4)-2-2A		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A4)-2-3A			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A4)-2-1A	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	2,000	1,600	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	5,200			30 AT					
	Total Demand Load	5,200			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

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Panel Name : PVRV(A4)-2-B Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A4)-2-B Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A4)-2-1B	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A4)-2-2B		600		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A4)-2-3B			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A4)-2-4B	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	Spare	1,000			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	Spare		1,000		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	2,000	1,600	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	5,200			30 AT					
	Total Demand Load	5,200			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.

PANEL BOARD

PROJECT : EMBASASY RESSIDENCE

บริษัท พียู แอสโซซิเอทส์ จำกัด
P.U. ASSOCIATES CO.,LTD.
21/161 Soi Ladprao 15 Ladprao Road,
Ladyao, Chatujak, Bangkok 10900, Thailand.

Panel Name : PVRV(A4)-2-C Mounting : Surface RATED : 415/240V Capacity : 12 CCT

Connect to : VRV(A4)-2-C Door : HINGE IC > 30 KA Location : EE ROOM

CCT No.	Description	Connected Load (VA)			CB(AT)			FEEDER	RACE WAY	REMARK
		A	B	C	Pole	Amp.	IC(kA)			
1	FCU (A4)-2-1C	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
3	FCU (A4)-2-2C		400		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
5	FCU (A4)-2-3C			600	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
7	FCU (A4)-2-4C	600			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
9										
11										
2	FCU (A4)-2-5C	400			1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
4	FCU (A4)-2-6C		400		1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
6	Spare			1,000	1	16	10	2 - 2.5 , 2.5 G IEC01	15 mm.EMT	
8										
10										
12										
	Connected Load	1,400	800	1,600	MAIN CB : 3P			4 - 6 , 4 G IEC01	25 mm.IMC	
	Total Connected Load	3,800			30 AT					
	Total Demand Load	3,800			IC > 30 KA 415 V					

NOTE E=Earth Leakage CB Open Circuit at 30 mA with in 0.02 second.