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TITLE : General Requirements for Electronic Contract

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Electrical & Mechanical Services Department

C O N T E N T S

1. Introduction

Unless otherwise stated in the contract or technical specification, the requirements laid down in this document will apply to all specifications for the procurement of electronic equipment falling within the responsibility of Electrical and Mechanical Services Department (EMSD).

2. Standard requirements

2.1 Related documents and references

2.1.1 Standards

The aim is to supply and install equipment to conform to the general principles of the standards and codes of practice laid down by international, regional and national organizations. The followings are of particular relevance :

(a) IEC 61082 - Preparation of document used in electrotechnology

(b) ISO 9001 - Quality management systems

(c) ISO 14001 - Environmental management systems

(d) OHSAS 18001 - Occupational health and safety management systems

(e) IEC 60300 - Dependability management

(f) IEC 60068 - Environmental testing

(g) IEC 60050 - International Electrotechnical Vocabulary

(h) IEC 60065 - Audio, video and similar electronic apparatus – Safety requirements

(i) CISPR 14-1 - Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1 : Emission

Notwithstanding the aforesaid standards, other equivalent international, regional or national standards would also be considered if the tenderers can provide adequate information for their relevance. Any deviation should be stated clearly in the tender submission. Where specific standards are stipulated in any general or particular specifications, these standards will be mandatory.

2.1.2 Other standards and regulations

(a) General Specification for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region, latest edition issued by Building Services Branch, Architectural Department.

(b) Code of Practice for the Electricity (Wiring) Regulations issued by Electrical & Mechanical Services Department.

(c) Construction Site Safety Manual issued by the Works Branch, Development Bureau.

(d) Construction Sites (Safety) Regulations, Factory and Industrial Undertakings Ordinance (Hong Kong) Cap 59.

(e) The Telecommunications Ordinance, (Hong Kong) Cap. 106, and Subsidiary Legislation made under the Ordinance.

(f) Electricity Ordinance, (Hong Kong) Cap 406, and Subsidiary Legislation made under the Ordinance.

(g) Construction Workers Registration Ordinance Cap.583

(h) Electricity Supply Rules by local power supply companies.

(i) IEC 60364-7-704 : Low-voltage electrical installations - Part 7 - 704: Requirements for special installations or locations - Construction and demolition site installations.

2.2 Conditions in which equipment is to be installed, used or stored

2.2.1 Environment

The equipment must be suitable to operate continuously to specification throughout its normal life span in the Hong Kong climate. The following parameters will normally apply : -

(a) Temperature : 0^{o}C to 45^{o}C

(b) Relative Humidity : up to 99%

(c)	Salt Corrosion	:	Salty atmosphere as found in tropical coastal regions
(d)	Chemical Corrosion	:	Atmospheric vapours of sulphur combustion product and Hydrogen Sulphide
(e)	Sealing	:	Equipment shall be vermin proof. Outdoor items shall be weather and splash proof to prevent ingress of rain. Items that are not fully sealed shall have adequate provision for ventilation.
(f)	Solar Radiation	:	Equipment sited outdoors in direct sunlight shall be capable of withstanding the effects of solar radiation above the ambient.
(g)	Mould Growth	:	Materials which promote mould growth shall not be used.
(h)	Shock	:	Equipment must be capable of withstanding knocks and jolts likely to occur during repair work or rough handling on a work bench.
(i)	Wind Speed	:	All equipment installed outdoors shall be of heavy duty construction or housed within a heavy duty weatherproof cabinet and be designed to be able to operate normally under a loading pressure associated with a sustained wind speed of up to 74 km/hr and gusts up to 190 km/hr. In addition, the complete equipment together with the supporting structures shall be designed to withstand the loading pressure associated with sustained wind speed up to 140 km/hr without any physical damages.

2.2.2 Electrical supply

Unless specified otherwise, equipment to be powered by the mains supply shall operate at the voltage of 220Vac nominal single phase, 50 Hz with variations as stated in the Supply Rules of Power Companies. If power transformers are used they shall where possible be integral with each individual equipment. Adequate provision shall be made to protect the equipment from the adverse effects of excessive voltage and current spikes and surges.

2.2.3 Relation to associated equipment

Equipment should not be installed in locations where :

a. Any interference emitted from it would impair the functioning of already installed equipment.

or b. It would be subjected to interference from already installed equipment which would impair its performance.

Where a number of equipment have to be installed they should be so located that mutual interference is kept to an acceptable level.

Care shall be taken to ensure that any wiring or cabling used to interconnect equipment or to provide signal or supply paths does not transmit interference to other wiring, cabling or equipment located nearby.

Signal wiring must be segregated from power supply cables and housed in separate screened conduits or trunking. Where a number of signal wires are run together steps shall be taken to ensure that crosstalk is reduced to acceptable level by the use of techniques such as screening, twisted pairs etc. as required. If it is not possible to eliminate interference by these methods then the wires will need to be physically separated.

Suppressors fitted to any part of the system should not degrade the performance of the equipment below the acceptable level and should not affect the safety of the equipment.

2.2.4 Safety

All equipment supplied shall be of a safe design and shall be installed in a safe manner. The installation shall not present hazards to the user or the public in anyway. Warnings of any potential hazards associated with the equipment shall be displayed. All equipment and installation shall conform to the electrical standard of safety regulations as defined in clause 2.1.2.

2.2.5 Others

Contractor shall also provide details of other utilities and/or special conditions, which are required for the proper operations of the equipment such as water supply, gas supply, drainage, exhaust, air-conditioning, air filtration, floor loading etc.

2.3 Design practice

2.3.1 General

(a) The equipment shall be designed for prolonged, continuous and reliable operation. The design and construction must be of high engineering standard and must withstand handling and transportation without degradation of performance.

(b) The equipment shall be supplied complete with all the detachable items e.g. connectors, interconnection cables etc. required for normal operation. Connectors shall have dedicated locations and it should not be possible to insert a connector into an incorrect position. Where the same type of connector is used on more than one cable then the connectors shall be polarised to prevent an inadvertent connection of wrong parts.

(c) All units, sub-assemblies, components and adjustable controls shall be readily accessible for maintenance purposes.

(d) Adequate test points and other test facilities shall be provided to permit ease of maintenance.

(e) Modular design involving plug-in sub-assemblies is preferred to other forms of construction.

2.3.2 Drawings and diagrams

(a) Drawings shall include a drawing number and a means of recording amendments.

(b) Installation diagrams shall be to IEC 61082 or approved equivalent and shall include diagram number and a means of recording amendments.

2.3.3 Interchangeability

(a) All units/subassemblies and components of the same type must be mechanically and electrically interchangeable without the necessity for changing components.

(b) Correct impedance and level matching shall be maintained at all interfaces between items of equipment.

2.3.4 Appearance and protective finish

Metal surfaces must be either corrosion-resistant or protected against corrosion by painting, plating, galvanizing, anodizing or any other suitable surface treatment. Any such protective layer should be continuous and free from blemishes and scratches. Electrical contacts and PCBs shall also be protected in an appropriate manner that does not impair the electrical characteristics.

2.3.5 Method of marking and coding

(a) All equipment supplied shall carry the name, trademark or other means of identifying the manufacturer. The equipment shall carry a label with model number, serial number and date of manufacture.

(b) All electrical components shall be identified by circuit code numbers (or component reference numbers), which shall be marked alongside the component on part of the supporting structure. When this is not possible a layout drawing shall be included in the equipment handbook. The location and type of component should be clearly shown in the drawing against the appropriate circuit reference number.

(c) Each sub-assembly of the equipment shall be clearly labelled, in English, in accordance with the function. A serial number must also be marked on each sub-unit for identification purposes.

(d) Each cable shall be clearly labelled and preferably carry its own unique identification code. All wiring terminations shall be finished in a neat and approved manner and shall each be separately identified by a wiring code number.

2.3.6 Design approval

All designs made by the Contractor for items to become part of the Works, including racks, cabinets and panels, shall be submitted to the Engineer, together with necessary diagrams, drawings and descriptions relating to the items, for approval prior to manufacture. Notwithstanding any approval given by the Engineer or his representative, the Contractor shall ensure that all equipment and materials to be incorporated into the Works are fit for the intended purpose.

2.4 Reliability

All equipment shall be designed to operate continuously without degradation in performance unless otherwise stated in Particular Specification. A statement on the "Mean Time Between Failure" (MTBF) for each equipment should be included in the tender.

2.5 Environmental performance

2.5.1 Reduction/elimination of environmentally sensitive materials

All equipment supplied shall be free from (or at low level of) any harmful chemicals or toxic substances. The Contractor should be aware of avoiding harmful chemicals or hazardous substances in the production of the equipment or prevent exposure to these hazardous substances during installation and operation of the equipment.

2.5.2 Recycling

The Contractor shall study and propose the full life cycle of their products, including provision of take-back or recycling material (such as reporting paper, packaging material, etc.) once they become obsolete. The Contractor shall adapt recyclable material for application or implementation as far as possible.

2.5.3 Energy conservation

The Contractor shall propose and adopt equipment with higher energy efficiency performance, such as CPU with power consumption less than 70W, appliances with Energy Efficiency Label (such as electronic ballasts, photocopiers, laser printers, LCD monitors and computers) or products by renewable energy, etc..

2.6 Life

The life of an equipment is to be regarded as the period over which the performance does not drop below a tolerable level, having regard to reliability. This will normally be not less than 10 years. During this period it should be possible with reasonable repair and setting up to maintain the performance to the limits defined in the technical specification.

2.7 Testing

The Contractor shall be required to carry out tests to demonstrate that the equipment and system meet the specification and other contractual requirements. The Contractor shall also be responsible for the timely preparation and compilation of all allocation test schedules, test procedures and test reports.

2.7.1 Test methods and equipment for assessing performance

(a) Test methods and procedures shall follow the agreed standards defined either by the manufacturer or as laid down in the technical specification.

(b) The Contractor shall submit a schedule of site performance and commissioning tests at least 1 month prior to the commencement of the scheduled commissioning date.

(c) Special tools, test equipment, test objects and simulator required for the demonstration of either bench or commissioning tests shall be made available by the Contractor at no extra charge to the Government.

(d) All test equipment used by the Contractor shall be properly and periodically calibrated. Measuring standards used in calibration should be traceable to international or national measurement standards, or to an industry recognized manufacturer's internal reference, subject to approval of the Engineer.

(e) Calibration procedures and results shall be documented and signed by the certifying body where applicable. The Contractor may be requested to show evidence of calibration of test equipment by submission of copies of these calibration records prior to conduction of any tests.

2.7.2 Acceptance test

The acceptance test is divided into stages. All equipment to be installed or supplied may be subjected to inspection and bench testing at the specified EMSD Electronics Workshop prior to delivery to the site for installation. A site performance and commissioning test will be conducted after the installation. The Contractor shall meet the cost of deliveries for bench test. Notwithstanding, the Contractor shall have carried out the tests in accordance with the requirements and procedures designated in the Particular Specification and submitted the associated test reports for inspection. The Engineer or his representative reserves the right to witness all tests at the Contractor's premises.

2.7.3 Criteria for passing acceptance tests

(a) Checks shall be carried out by the Contractor on all parameters and functions of all the equipment supplied before and after the installation. The readings taken during the checking shall be recorded and submitted to the Engineer or his representative for examination.

(b) After installation the whole system shall be tested by the Contractor in the presence of the Engineer or his representative. In addition to checking the parameters listed in the technical specification, the operational features of the system will be evaluated to check for correct cable connections, proper terminations, absence of inter-equipment interference etc.

(c) An equipment or installation is deemed to pass the tests if all parameters and functions of the equipment or installation comply with all the performance requirements as stipulated in the technical specification. A test report shall also be complied and submitted to the Engineer or his representative for scrutinization.

(d) No equipment or system shall be offered up for acceptance by the Contractor until he has carried out his own tests and has established that the acceptance criteria have been met.

2.8 Control of quality, environment, occupational health and safety

2.8.1 Requirements

Equipment shall be designed, manufactured and installed in accordance with the principles of ISO 9001, ISO 14001 and OHSAS 18001 or equivalent. The Contractor should establish and maintain the Quality, Environmental and Occupational Health and Safety Management System in respect of all elements of the works. The process and procedure of the works under this Quality, Environmental and Occupational Health and Safety Management System shall be submitted for comment and approval. The Contractor should detail the quality control procedures used in both the manufacture of the equipment and during the installation of the system (see extract of our "Quality, Environmental, Occupational Health and Safety Policy" for reference).

2.8.2 Instructions regarding rejects and non-compliance

Any defects in the equipment or workmanship and material found by the Engineer or his representative will be notified to the Contractor in writing. The Contractor shall undertake to rectify such defects with due diligence and expediency and shall request the Engineer or his representative for re-inspection. In the event that non-compliance still exists after the alignment or making good, the Contractor shall be liable to supply another model of the same equipment category as approved by the Engineer and at no extra cost to the Government.

2.9 Spares

(a) The Contractor is required to guarantee that spares shall be available to cover the full life of the equipment. Sufficient spares shall be held in Hong Kong by the Tender to cater for maintenance during the Defects Liability Period.

(b) The Contractor shall provide a list of recommended essential spares which are not normally available through local component vendors in Hong Kong. The list of spares shall include all essential and consumable spares suitable for normal consumption in a one year period immediately after the Defects Liability Period.

(c) The list shall itemise the cost of each spare. The total cost of the spares shall not be included in the contract price but shall be listed as a separate item.

(d) The Contractor is required to deliver the spare parts within six (6) months after receipt of the order, unless otherwise specified by the Contractor and accepted by the Engineer.

(e) Upon the request of the Engineer or his representative, the Contractor shall, at no extra cost to the Government, demonstrate, the proper functioning of some or all of the ordered spares by insertion or installation into the equipment.

2.10 Packaging

2.10.1 Specification

(a) The equipment shall be shipped and delivered in cases which offer proper protection against normal rough handling during transportation. Dehydrating chemicals shall be packed with each package to prevent moisture absorption. "Static-sensitive" integrated circuits shall be transported on "anti-static" frames and containers.

(b) All spare modules/sub-units shall be wrapped with the equivalent of no less than 12 mm thick polyethylene foam and cased in carton boxes. For electronic circuit modules employing CMOS integrated circuits, the module shall first be placed inside a bag made of conductive plastic before packaging in the foam and carton box.

2.10.2 Period of storage of spares

It should be noted that the spare parts may be kept in stores for a long period of time. The Contractor shall state whether there is any storage life applicable to the spares holdings being specified.

2.11 Documentation

2.11.1 For each equipment offered, tenderers shall supply with the tender full and complete technical information in English sufficiently detailed to enable a technical assessment of the equipment to be made. Submissions without sufficient information may be disqualified.

2.11.2 The Contractor shall, within one month prior to equipment delivery, supply the number of equipment handbook in English language as stated in clause 2.11.4 giving full details on : -

(a) Principle of operations;

(b) Details of installation and setting-up procedures;

(c) Maintenance and operation instructions;

(d) Schematic and block diagrams,

(e) Circuit diagrams with details down to component levels with their respective descriptions;

(f) Calibration procedures; and

(g) Full parts list;

2.11.3 Should any Original Equipment Manufacturer (OEM) products be included, the documents as specified in 2.11.2 above shall also be provided.

2.11.4 Three sets of the manufacturer's operations and maintenance manuals in English shall be provided with each equipment ordered, up to a maximum of six sets per model of equipment. The following table indicates the number of documents required :

No. of equipment per model	Sets of maintenance manuals required	Sets of operations manuals required
1-2	3 (at least 1 original)	3 (at least 1 original)
3-5	4 (at least 1 original)	4 (at least 2 originals)
6 or more	6 (at least 2 originals)	6 (at least 3 originals)

All photocopies of operations and maintenance manuals shall be properly stamped and certified as true copies of the original by the manufacturer.

2.11.5 Within 1 month after completion of installation, the Contractor shall supply one set of "As Installed" drawings showing the positions of all items of equipment installed and the routing of interconnecting cables.

2.11.6 The Contractor shall not use confidentiality as a reason for withholding the supply of relevant documentation required by Government. The Government representative will if required certify that all sensitive material in handbooks will not be released to any organisation outside Government. Any charges for such material supplied shall be included within the contract. The Contractor should make sure that all his overseas/local principals understand such obligation when submitting tender.

2.11.7 The Government shall be granted the right of duplicating the documents stated in clause 2.11.4 for internal use.

2.11.8 The Government shall be kept informed of any modifications during the operational life of the equipment.

2.12 Maintenance

2.12.1 The tenderers shall state in his tender the "Mean Time to Repair" (MTTR) in hours for major equipment offered, and provide the same for other equipment upon request by the Engineer.

2.12.2 During the Defects Liability Period, in addition to any other obligations of the Contractor provided for in the Contract, the Contractor shall carry out the maintenance work provided for in Sub-Clause 2.12.4 (a) - (d) at no additional cost to the Government. Provided however that if the maintenance work is necessitated by any cause beyond the Contractor's control, excepting fair wear and tear, then the maintenance work will, if the Engineer so orders, be carried out by the Contractor and shall be valued at a rate agreed between the Engineer and the Contractor. In the event of disagreement, the Engineer shall fix such rate as shall in his opinion be reasonable and notify the Contractor accordingly.

2.12.3 After the expiration of the Defects Liability Period, the Contractor may be required at the option of Government, to enter into a separate maintenance service contract, renewable annually. The Contractor shall quote the annual maintenance charge. The charge shall be valid for at least two years after the expiry of the Defects Liability Period, and thereafter not exceeding Consumer Price Index (A) increases unless agreed by the Engineer.

2.12.4 During the Defects Liability Period and any additional maintenance period opted for by Government as depicted in Clause 2.11.2, the Contractor shall be responsible for all routine and preventive maintenance services, and rectification of any defects arising from equipment wear and tear; failure of material etc. This shall include services described in the following sub-paragraphs :-

(a) to carry out all repairs necessary to maintain the equipment and installation in good working order and in conformity with the Specification.

(b) to provide all transport, labour, materials, consumables (e.g. filament lamps and thermionic valves), and equipment including cleaning materials, tools and all testing instruments required for the maintenance services.

(c) to despatch competent and specially trained technicians to attend to any requirement for inspection, fault diagnosis, and repair within 24 hours of receiving the report of a fault, unless otherwise stated in the Particular Specification.

(d) to despatch competent and specially trained technicians quarterly, during normal working hours, Monday to Saturday, to inspect, clean and provide all services required under an organised preventive maintenance scheme. Such services shall follow the recommendations of the maintenance manual. If such is not comprehensively given in the related manuals, the level and standard of the rendered services shall have the prior agreement of the Engineer. The technicians shall make entries in the Maintenance Record Book in the manner described hereunder :

(i) on arrival at the Site, the technicians shall report to the Office and sign the "Maintenance Record Book" kept by the Officer-in-charge. At the time of signing, the technicians shall take note of any message written therein concerning the performance of the system as a whole of the installation and effect any repairs, replacements or adjustments which may be required to bring the system up to its original performance standards, irrespective of whether or not such repairs, replacements, adjustments are written down in the "Maintenance Record Book".

(ii) upon leaving the Site, the technicians shall report to the Officer-in-charge and record in the "Maintenance Record Book", a brief description of any repairs, replacement, adjustments or other services carried out. If after the inspection, no repairs, replacement or adjustments are considered necessary then the technicians shall record in the "Maintenance Record Book" that the system was found to be operating satisfactorily.

2.12.5 The Contractor shall make recommendations on the number, level of skills, qualifications, and relevant experience of technicians required to take over the subsequent maintenance after expiry of the Defects Liability Period, should the Government so desire.

2.12.6 Equipment sub-assemblies or components which are replaced during the Defects Liability Period shall have further warranty period for one year commencing from the date of replacement.

2.12.7 The use of special tools and test equipment for maintenance purpose should be kept to an optimum but details of these should be supplied. The Contractor shall recommend a list of all appropriate special tools and test equipment in order that the equipment and system can subsequently be serviced and maintained by local maintenance staff. The list shall be appended with relevant technical details and price breakdown. Special tools shall include specially-shaped keys and wrenches, jumpers, extender cards and cords etc. Special test equipment shall include simulators, diagnostic modules etc. but exclude common equipment like oscilloscope and DVM.

- End -

Appendix A – “Quality, Environmental, Occupational Health and Safety Policy, Electronics and Data Communication Division”

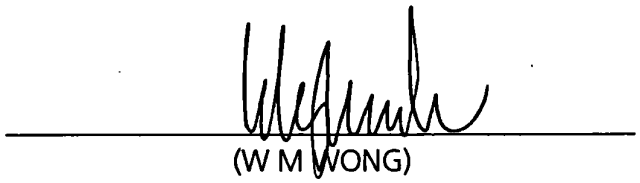
Electrical and Mechanical Services Department
Electronics and Data Communication Division

Quality, Environmental, Occupational Health and Safety Policy

The Electronics and Data Communication Division is committed to providing high quality engineering services in project management for electronics, data communication, information technology systems, and supporting services of departmental computer systems in a cost-effective and environmentally responsible manner at a high standard of occupational health and safety working environment. The Integrated Management System is developed to meet the requirements of ISO 9001:2000, ISO 14001:2004, OHSAS 18001:2007 and F&IU (SM) Regulation.

In the delivery of professional project management and supporting services, we are committed to :

1. Understand our customers' need and meet their requirements in an efficient and professional manner with an aim for quality excellence and total customer satisfaction.
2. Undertake an environmentally responsible manner such as reducing energy consumption and the use of materials which are harmful to the environment in all stages of the project management.
3. Manage the occupational health and safety risk and maintain a safe and healthy working environment and work systems for all our staff, and appropriate protection to other people who may be affected by our works.
4. Comply with relevant ordinances and other requirements related to environmental protection and occupational health and safety.
5. Provide adequate resources for implementing the IMS including the provision of necessary information, staff training and supervision.
6. Implement, maintain and continually improve the Integrated Management System to seek opportunities in improving the system.
7. Communicate this policy to all staff members and the interested parties including contractors and relevant persons working for or on behalf of Electronics and Data Communication Division.



(W M WONG)
Electronics and Data Communication Manager

Appendix B – “Quality, Environmental, Occupational Health and Safety Policy, Project Division”

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3 Quality, Environmental, Occupational Health and Safety Policy

Electrical and Mechanical Services Department
Project Division

Quality, Environmental, Occupational Health and Safety Policy

The Project Division is committed to providing high quality engineering services in project management for electrical, mechanical, electronics and telecommunication installations in a cost-effective and environmentally responsible manner at a high standard of occupational health and safety working environment. The Integrated Management System is developed to meet the requirements of ISO 9001:2000, ISO 14001:2004, OHSAS 18001:2007 and F&IU (SM) Regulation.

In the delivery of professional project management services, we are committed to :

1. Understand our customers' need and meet their requirements in an efficient and professional manner with an aim for quality excellence and total customer satisfaction.
2. Undertake an environmentally responsible manner such as reducing energy consumption and the use of materials which are harmful to the environment in all stages of the project management.
3. Manage our health and safety risk and maintain a safe and healthy working environment and work systems for all our staff, and appropriate protection to other people who may be affected by our works.
4. Comply with relevant ordinances and other requirements related to environmental protection and occupational health and safety.
5. Provide adequate resources for implementing the IMS including the provision of necessary information, staff training and supervision.
6. Implement, maintain and continually improve the Integrated Management System to seek opportunities in improving the system.
7. Communicate this policy to all staff members and the interested parties including contractors and relevant persons working for or on behalf of Project Division.

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(Y M LI) Project Manager