Section 5 - Works Requirements

This Section contains the Specification, the Drawings, and supplementary information that describe the Works to be procured.

SECTION-I

GENERAL TECHNICAL SPECIFICATION

1. Background:

NEA wishes to invite the Bid for Supply, Delivery, Installation, Testing and Commissioning of 132 kV Disconnecting Switch. The place where tendered work is to be performed is located at Dhalkebar substations of the Dhanusa District of Nepal. NEA intends to replace the existing Line 132 kV Disconnecting Switch at Dhalkebar Substation with new 132 kV Disconnecting Switch & at the same place.

132 kV Disconnecting Switch to be supplied as per samples are fallows.

a) Eight Nos. of Supply & Delivery of 132 kV, 2000 A Outdoor 132 kV Disconnecting Switch, without grounding switch complete with operating mechanism, hardware clamp & all accessories as per specification.
b) Four Nos. of Supply & Delivery of 132 kV, 2000 A Outdoor 132 kV Disconnecting Switch, with grounding switches complete with operating mechanism hardware clamp & all accessories as per specification.

2. Scope of work:

This Specification covers the Design, Manufacture, Assembly, Shop test, Supply, Delivery, Installation, Testing and Commissioning of 132 kV Disconnecting Switch at Dhalkebar Substation.

The scope of work under this Tender is as follows:

2.1 Supply, Delivery Installation testing & Commissioning Work

2.1.1 Supply, Delivery, Installation, Testing and Commissioning of 132 kV Disconnecting Switch & Operating Mechanism at Dhalkebar Substation for efficient and trouble free operation as specified.

2.1.2 Dismantling of existing 132 kV Disconnecting Switch & Operating Mechanism.

Note: Bidder is strongly requested for site visit and makes detail study of site.

DISCONNECTING SWITCH

1 GENERAL

This specification covers the design, manufacture, assembly, shop test, supply, delivery, installation works, field test and commissioning of outdoor type disconnecting switches complete with all accessories for efficient and trouble-free operation as specified hereunder.

The equipment specified in this Section shall conform to the latest edition of the appropriate IEC specifications and/or other recognized international standards. In particular:

IEC 60129 High-voltage alternating current disconnectors and earthing switches
IEC 60529 Degree of protection provided by enclosures

SHORTLISTED MANUFACTURER:

"It is preferred that the following equipment be supplied from the manufacturers listed hereunder:

ABB, AREVA (Formerly ALSTOM), CGL, Hitachi, Siemens, Toshiba/Mitsubishi, LG, Fuji, GE, Schnieder Electric.

2 DESIGN REQUIREMENTS

2.1 The disconnecting switches shall be used for the 50Hz, 3 phase system.

2.2 The equipment shall be installed outdoor. All equipment, accessories and wiring shall be provided with sub-tropical finish to prevent fungus growth.

2.3 The maximum temperature rise in any part of the equipment at specified rating shall not exceed the permissible limits as stipulated in relevant standards.

2.4 The rated peak short circuit current or the rated short time current carried by the equipment shall not cause;

(a) mechanical damage to any part of the equipment
(b) separation of Contacts
(c) Insulation damage of "Current Carrying Part".

2.5 The disconnecting switches shall be (*center rotating for 36 kV & 66 kV and above centre break)* with contact blades moving through *horizontal/vertical* plane.

2.6 The rating, the accessories to be furnished and the schedule of equipment are detailed in Appendix.

2.7 The disconnecting switches shall be able to carry the rated current continuously and rated short time current for one seconds without exceeding the temperature limit specified in the relevant standard.

2.8 The disconnecting switches shall be capable of withstanding the dynamic and thermal effects of maximum possible short circuit current.

2.9 In case of disconnecting switch with grounding switch, the grounding switch shall be capable of making to a dead short circuit without damage of the equipment or endangering operator. It shall be provided with and interlocking with the corresponding disconnecting switch.

3 CONSTRUCTION FEATURES

3.1 The 3-pole disconnecting switches shall be gang-operated type so that all the poles make and break simultaneously.

3.2 The disconnecting switches shall be designed for *upright/vertical* mounting on steel structure. Disconnecting switches to be mounted on gantry structure shall include necessary steel channels, bolts, nuts, etc.

3.3 The disconnecting switches shall have padlocking arrangement in both "open" and "closed" positions.

3.4 All current carrying parts shall be of non-ferrous metal or alloy. All live parts shall be designed to avoid sharp points and edges.

3.5 All metal parts shall be of such material and treated in such a way as to avoid rust, corrosion and deterioration due to atmospheric conditions. Ferrous parts shall be hot-dip galvanized.

3.6 Bolts, nuts, pins, etc. shall be provided with appropriate locking arrangement such as lock nuts, spring washers, key, etc.

3.7 Bearing housing shall be weatherproof with provision for lubrication. The design, however, shall be such as not to require frequent lubrication.

3.8 All bearings in the current path shall be shorted by flexible copper conductor of adequate size (minimum – 150 mm^2) to allow the specified fault current through it without injury.

3.9 Main contacts

The main contacts shall be of silver-plated copper alloy and controlled by powerful springs designed for floating and pressure point contact.

The contacts shall have sufficient area and pressure to withstand the electromagnetic stresses developed during short circuit without excessive heating liable to pitting or welding.

Contacts shall be adjustable to allow for wear, shall be easily replaceable and shall have minimum movable parts and adjustments.

The moving blade shall be made of electrolytic-copper/aluminum tube for centre rotating type disconnecting switch. Rotating feature of the blade at the end of tube travel for contact wiping shall be provided.

Arcing horns shall be provided to divert the arc from main contacts to the separating horns after the main contacts have opened. Arcing horns shall be renewable type.

3.10 Insulators and Terminals

Insulators shall be post type, brown glazed and solid core single stage type.

The porcelain used for insulators shall be manufactured by wet process and shall be homogenous and free from cavities and other flaws.

Caps and pins shall be of the highest quality malleable iron or forged steel and smoothly galvanized.

Arcing horns as required shall be furnished.
All insulators of identical ratings shall be interchangeable.
The terminals of the disconnecting switch shall be provided with terminal connectors.

4 OPERATING MECHANISM

4.1 Disconnecting Switches

The operating mechanism for 66 kV and above, disconnecting switches shall be motor operated. The driving motor of the motor operated disconnecting switch shall be suitable for operating on 400/230 V AC/110 V DC supply. The mechanism shall also be equipped with dependable manual operating device for emergency operation when the power operating mechanism is inoperative.

The operating mechanism for 36 kV disconnecting switch shall be manual. The operating handle shall be such that it can be operated easily from standing height from ground level. Grounding of handle through copper flexible conductor of adequate size shall be provided.

The control shall be such that the disconnecting switch can be opened or closed from local as well as remote. LOCAL/REMOTE selector switch and OPEN/STOP/CLOSE push buttons shall be provided at the local "Mechanism Box" for local electrical operation. The LOCAL/REMOTE selector switch shall be lockable type.

Starters, relays and limit switches shall be provided as required for operation, indication and interlocks. All electrical controls shall be suitable for 110V DC.

The disconnecting switch shall be provided with a minimum number of eight (8) normally closed and eight (8) normally open electrically separated (Voltage free) auxiliary contacts for system interlock in addition to the auxiliary contacts required for its own indication and operational requirements so as to have a trouble free operation of the system. The contacts shall be convertible type so that normally open contact may be converted to normally closed contact and vice-versa at site.

All auxiliary contacts shall be wired up to terminal block in local mechanism box. All auxiliary contacts shall be silver plated and shall have positive wiping action when closing.

The auxiliary contacts shall be adjustable type to suit the following requirements.

(a) Signaling of "closed position" shall not take place unless main power contacts have reached a position so that rated normal and short time current can be carried safely.
(b) Signaling of "open position" shall not take place unless the main power contacts are at a safe isolating distance.

The operating device, auxiliary switches and all other devices shall be housed in a weatherproof box of sheet steel / aluminum alloy construction. The enclosure protection of the mechanism box shall be IP-55W as per IEC. The thickness of the sheet steel shall be at least 2mm. In the case of aluminum alloy, the operating box shall be of robust design. The box shall have gasket-hinged door with lock and key. The box shall be suitable for fixing on disconnecting switch steel structure. A 4mm thick removable gland plate shall be provided at the bottom of the box for cable entry. The box shall be mounted at a safe working clearance from the live parts of switches. Thermostat-controlled space heater with ON-OFF switches rated 230V, 1 phase, 50Hz shall be provided to prevent condensation within the mechanism box.

4.2 Grounding Switches

The grounding switch shall be triple pole manually and gang operated. The mechanism shall be such that one operator alone shall be able to operate without undue effort. Electrical and mechanical interlocking shall be provided for the safe operation of grounding switch.

The grounding switch shall be capable of withstanding the electrical and mechanical stresses developed by a short circuit current specified in Appendix. The cross-section of the flexible copper connection between rotating shaft and structure shall be capable to allow specified fault through it without injury but of minimum size 150 mm^2.

Arrangement shall be provided to padlock the grounding switch in open and closed positions.

The operating handle shall be such that it can be operated easily from standing height from ground level. Grounding of handle through copper flexible conductor of adequate size shall be provided.

Each grounding switch shall be provided with four (4) normally closed and four (4) normally open contacts for remote indication and interlocking purpose.

All the auxiliary contacts and interlocking coils shall be housed in a mechanism box. The box shall be suitable for fixing on grounding switch steel structure. A 4mm thick removable gland plate shall be provided at the bottom of the box for cable entry.

Auxiliary contacts shall be suitable for 0.5A, 110V DC inductive breaking duty.

The auxiliary coils shall be suitable for 110V DC supply.

5 TESTS

(a) Routine Tests

On completion each disconnecting switch shall be subjected to following routine tests. As far as practical, the procedure of IEC shall be followed:

- Power frequency voltage dry test
- Measurement of resistance of main circuit
- Control and secondary wiring check tests
- Mechanical operation test

(b) Design Tests

The disconnecting switch design tests shall include following:

- Dielectric tests, including impulse withstand tests
- Radio interference tests
- Temperature rise tests
- Short-time withstand current tests
- Operating and mechanism endurance test
- Voltage drop test.

The voltage drop across one complete phase of a switch shall be measured when carrying rated current.

The Bidder shall submit copy of design test report from recognized testing laboratory for the disconnecting switch of the offered model along with the bid.

(c) Field Tests

After installation at Site, the disconnecting switches shall be subjected to the following field tests:

(a) Construction inspection
(b) Measurement of insulation resistance of main and auxiliary circuits
(c) Mechanical operation test

6 DRAWINGS, DATA AND MANUALS

6.1 The General arrangement drawing with Technical leaflets shall be furnished with the Bid.

6.2 After award of Contract the successful Bidder shall submit the required number of copies of the following drawings and data for approval of the Employer.

(a) Outline dimensional drawings of the equipment showing general arrangement and location of fittings.

(b) Transport/shipping dimensions with weights.

(c) Foundation and anchor bolt details including loading condition.

(d) Assembly drawings for erection at site with part numbers and schedule of materials.

(e) Electrical schematic and wiring diagram.

(f) Any other relevant drawings and data necessary for erection, operation and maintenance.

(g) Instruction manual and data sheets.

(h) Any other relevant data, drawing and information necessary for review of the items stated above.

7 SPARE PARTS

For each type of disconnecting switch, the spare parts shall be provided in required quantities as listed in Price Schedule. Further spare parts as recommended by the manufacturer shall also be included in the Price Schedule.

APPENDIX 6-1

TECHNICAL PARTICULARS OF 132 kV DISCONNECTING SWITCH WITH & WITHOUT GROUNDING SWITCH

S. No	Description	Disconnecting switch 132 kV
1.	Type	3 poles, center break
2.	Rated Voltage	145 kV
3.	Frequency	50 Hz
4.	Insulation levels	
	a) Basic impulse level (BIL)	650 kV (crest)
	b) Power frequency withstand voltage (For1 minute)	275 kV
5.	Current ratings	
	a) Continuous current	2000A
	b) Rated Short Time current (1 sec.)	25 kA
6.	Operating mechanism of disconnecting switch	Motor operated (both local and remote operation) and manual
7.	Auxiliary power supply	
	a) Space heater and cubicle	230V,1-phase, 50Hz
	b) Control circuit	110 V DC
	c) Operating motor	230/400 V, 50 Hz
8.	Grounding Switch	Applicable/not Applicable
9.	Applicable standard	IEC

SPECIFICATION OF CABLES

1 GENERAL

This specification covers the Design, Manufacture, Factory test, Supply, Delivery, Field test and Installation of all Power, Control and Instrumentation cables required for the entire project.

2 EQUIPMENT TO BE FURNISHED

2.1 The following cables shall be furnished in accordance with specification:

a) 33kV Power Cable

b) 11kV Power Cable

c) Control and Instrumentation cable

d) Power Cables

e) Communication Cables

2.2 The Contractor shall be responsible for estimating and supplying the quantity of various types and sizes of the cables. In course of actual execution if it is found that additional cross-sections, types or quantities of cables are required than those indicated in his proposal, the same shall be supplied without any additional charge to the employer.

3 DESIGN REQUIREMENTS

1 GENERAL

This specification covers the design, manufacture, factory test, supply, delivery, installation, field-testing and commissioning of all Power, Control, Communication and Instrumentation cables required for the entire project.

2 DESIGN REQUIREMENTS

33 &11 kV Power Cable

a) General

The rated voltage of the power cables shall be19/33(36) kV&6/10(12) kV.

The power cable shall be cross-linked polyethylene insulated, screened and steel tape armoured.

The scope of works shall include the supply and connection of power cables from power transformer secondary to the 33kV and 11 kV incomer. The cables shall be supplied with necessary terminations and accessories for both connecting ends. From 11kV panel to Outgoing terminal point.

The scope also include connection of 33kV power cable from 33kV Gantry to Outgoing line termination point. The scope include any necessary structure required for mounting and supporting the cables.

b) Conductor

Conductor for power cable shall consist of stranded annealed copper wires. They shall comply with IEC Publication.

c) Cable Rating

The minimum current rating for the cable and conditions of installation shall be as follows:

i) For transformer incomer, the size of the cable shall not be less than as specified Copper single core cable.

ii) For outgoing, the size of the cable specified is 300Sq.mm Aluminum three core cable. The cable is to be used if the existing cable is found unsuitable for used. If no cable or partial cable is used, the contractor shall provide termination joints (3 outdoor and 3 indoor) to Employer as spare.

d) Anti-Termite Covering

Anti-termite protection shall be applied to the cable and shall be black PVC suitable for the operating temperature of cable and shall meet the requirements of IEC standard.

e) Outer Covering

The outer covering of the cable shall be extruded, continuous black PVC suitable for the operating temperature of cable and shall meet the requirements of IEC standard.

f) Cable Drum

Cable drum shall be non- returnable and made of steel suitably protected against corrosion.

g) Outdoor and Indoor Termination

33 kV &11 kV cable terminations shall be of the heat-shrinkable type / pre-moulded push on type. Terminations for cable shall be provided in sufficient quantities for complete installations of all feeders of the substations. The cost of all necessary termination kits shall be included in the price of the cables.

h) Jointing Accessories

Cables shall be installed in maximum possible lengths and straight-through jointing shall not be permitted without the prior written approval of the Employer.

i) Voltage Identification

The plastic covering shall be embossed with the name of the manufacturer, number of conductors, the cross sections, type of insulation followed by:

Electric cable - (Corresponding) volts

j) Phase Identification

Phase identification for either triplex or multi-core conductor cable shall be in accordance with the following:

Phase A (R) : Red
Phase B (Y) : Yellow
Phase C (B) : Blue

2.1 ***Specific requirements***

2.1.1 The Contractor shall also supply cable termination kits for both ends of each cable without any additional cost to the Employer unless stated otherwise in the Price Schedule.

If no cable or partial cable is used, the contractor shall provide termination joints (3 outdoor and 3 indoor) to Employer as spare.

600 Volt Power Cable

a) General

The low voltage cables shall be 600 V grade polyethylene insulated and PVC sheathed. Low voltage AC power systems will be solidly grounded neutral with phase to phase voltage level of 400 V and phase to neutral voltage of 230V AC system and the DC system with 110V. The size of the single core conductor shall not be less than 2.5 sq. mm for lighting and 4 sq. mm for power. The main (incomer) cable to AC distribution panel shall be three & half (3.5) core and not less than 120 sq. mm.

b) Conductor

Conductor shall consist of stranded annealed copper wires. They shall comply with IEC publication. The cable is intended for use at normal conductor operating temperatures not exceeding 75 degree C.

c) Insulation

The electrically and thermally stable polyethylene insulation shall be extruded onto the conductor so as to prevent contamination and voids in the insulation.

d) Current Rating

The Contractor shall state the maximum continuous current rating and conditions of installation for low voltage power cables.

e) Jacket

The cable core assembly shall be covered with a flame-retardative and moisture resistant PVC jacket, which is free stripping from the insulation. The overall jacket shall be clean, dry, and free of grease and shall be suitable for ink or paint application.

f) Anti-termite protection shall be applied to the cable and shall consist of either a non-magnetic metallic barrier or layer of nylon sheathing.

g) Identification

1) Each cable shall have a printed legend on the overall jacket with the manufacturer's name, voltage class, the number and size of conductors, type of insulation.

2) The colors for core identification and color sequence shall be in accordance with follows

- Single-core : Black
- Twin : Red and black
- Three-core : Red, yellow and blue
- Four-core : Red, yellow, blue and black

Control and Instrumentation Cable

a) General

All control and instrumentation cable shall be 600 V grade as per IEC standard, multi conductor, color-coded, PVC insulated armored cable. Each multicore cable shall have not less than 20 percent or 2 spare cores, whichever is the greater.

b) Conductor

Copper conductor shall be stranded circular non-compacted minimum cross-section of 2.5 sq.mm. For CT circuits, the minimum cross-section shall be not less than 4 sq.mm.

c) Insulation

The electrically and thermally stable PVC insulation shall be extruded onto the conductor so as to prevent contamination and voids in the insulation.

d) Assembly

1) Multicore connductor cables shall be assembled in accordance with applicable IEC standards.

2) A flame-retardative binder tape may be used underneath the overall jacket of multi-conductor cables, if required, to achieve the desired flame retardative characteristics. Tapes, if used, shall be non-hygroscopic.

e) Jacket

1) The cable core assembly shall be covered with a flame retardative and resistant jacket, which is free stripping from the insulation.

2) The overall jacket shall be clean, dry, and free of grease and shall be suitable for ink or paint application.

3) Cable jacketing and the interstices within the jacket shall be free of water. Evidence of water shall be the ground for rejection of the cable.

f) Anti- Termite Covering

Anti-termite protection shall be applied to the cable and shall consist of either a non-magnetic metallic barrier or layer of nylon sheathing.

g) Identification

Each cable shall have a printed legend on the overall jacket, with the manufacturer's name, voltage class, the number and size of conductors, and a unique number or code indicating the production run or batch. The identification shall remain legible for the life of the cable.

2.4 Communication Cable

a) All cables and wiring shall have copper conductors and PVC insulation and shall comply with IEC standards.

b) Each communication cable shall have not less than 20 percent or 4 spare twisted pairs whichever is the greater. Cabling and wiring installations shall be arranged to minimize the risk of fire and damages, which might be caused in the event of fire.

c) For telephone type cables, 2 conductor wires of not less than 0.6 mm dia shall be used. Where twin or quad make up is required in any cable, the cores shall be uniformly twisted and the lays arranged such that cross talk is reduced to a minimum.

f) No conductor smaller than 32/0.2mm (1mm^2), or having less than three strands, shall be used for interconnecting the cables except in the case of telephone extensions. All cables shall have insulation, which will withstand the highest temperature to be experienced in service.

g) Each conductor of a multicore cable shall be readily identified by a numbered marker tape or, in the case of telephone type cables, color coded insulation.

2.4. SPECIAL REQUIREMENTS

Small cut piece lengths of cables will not be accepted. Cables up to 500 meters in length or as approved by Employer shall be of one length shipped in a drum of adequate size. For higher quantities, multiple lengths/drums may be shipped subject to the approval of Employer.

2.5 DRAWINGS, DATA & MANUALS

The following information shall be furnished along with the bid.

a) Manufacturer's leaflets giving constructional details, dimensions and characteristics of different cables.
b) Current rating of cables including derating factor due to grouping, ambient temperature and type of various installation.

2.6 TESTS

2.6.1 Routine and Design Tests

Power cableshall be subjected to following routine tests. As far as practical, the procedure of IEC shall be followed:

a) Measurement of the electrical resistance of conductor
b) Partial discharge test
c) Voltage test

The power cable design tests shall include following:

a) Partial discharge test
b) Bending test, followed by a partial discharge test
c) Tan delta measurement
d) Heating cycle test, followed by a partial discharge test
e) Impulse test, followed by voltage test
f) Voltage test for 4 hours.

The Bidder shall submit copy of design test report from recognized testing laboratory for the offered power cable along with the bid.

2.6.2 Field Tests

After installation at Site, cables shall be subjected but not limited to the following tests:

a) Measurement of insulation resistance

2.7 PERFORMANCE GUARANTEE

The performance figures quoted on schedule of Technical Data shall be guaranteed within the tolerance permitted by relevant standards and shall become part of the Contract. In case of failure of the cables to meet the guarantees, the Employer reserves the right to reject the item. The Contractor shall have to rectify/replace the defect/defective part at no extra cost to the Employer and without delaying the commissioning schedule.

TECHNICAL DATA SHEET
(To Be Completed By the Tenderer)

ITEM No.19: 132kV DISCONNECTING SWITCH ***Sheet 1 of 2***

	DESCRIPTION	UNIT	(i) NEA REQ	DATA to be Filled
			(ii) 132kV	**132kV**
1	**Manufacturer and Country of Origin**			
2	**Year of manufacturing experience**	Years	5	
3	**Manufacturer's Designation as per submitted catalogue**			
4	**Applicable standard**		IEC	
5	**Type**		3 pole, Single throw, Outdoor, Center break	
6	**Frequency**	Hz	50	
7	**Rated Voltage**			
7.1	Nominal	kV	132	
7.2	Maximum	kV	145	
8	**Rated current**			
8.1	Continuous at 45°C ambient	A	2000	
8.2	Short time for 1 sec at max. kV	kA	25	
8.3	Peak short time current	kA		
9	**Temperature rise above 45 degree C ambient at normal rated current**		As per IEC	
9.1	Contacts	°C		
9.2	Current carrying parts	°C		
10	**Maximum current the switch can safely interrupt**			
10.1	Bus/line charging current	A	0.5 min	
10.2	Potential transformer magnetizing current	A	0.5 min	
11	**Clearance**			
11.1	Between live part and ground	mm		
11.2	Between fixed contact and blade in open position	mm	3300	
12	**Insulation level**			
12.1	Impulse withstand voltage(peak)	kV	650	
12.2	Power frequency withstand voltage (1min, rms)	kV	275	
13	**Main contacts**			
	- Material of fixed contacts		copper alloy	
	- Coating of fixed contacts		Silver plated	
	- Material of moving contacts		copper alloy	
	- Coating of moving contacts		Silver plated	
	- Material of the contacts of the earthing switch		copper alloy	
	- Coating of the contacts of the earthing switch		Silver Alloy	
14	**Material of terminals**			
14.1	Coating of terminals			
15	Operating mechanism		Motor and manual operated	

TECHNICAL DATA SHEET
(To Be Completed By the Tenderer)

ITEM No.19: 132kV DISCONNECTING SWITCH ***Sheet 2 of 2***

	DESCRIPTION	UNIT	(iii) NEA REQ (iv) 132kV	DATA to be Filled 132kV
16	**Auxiliary contacts**			
16.1	Type	Convertible or fixed	Convertible	
16.2	Continuous current at 110V DC	A	10	
16.3	Material		Copper	
16.4	Contacts silver plated	Yes/No	Yes	
17	**No. of operations switch can withstand without deterioration of contacts**	No.	1000	
19	**Auxiliary power supply**			
19.1	Space heater and cubicle	V/phase	230V/phase	
19.2	Control circuit	V, DC	110V DC	
19.3	Operating motor	V, phase	400/230V AC	
20	**Local operator provided**	Yes/No	Yes	
21	**Insulator**			
21.1	Manufacturer			
21.2	Type		Single stack post type	
21.3	Creepage Distance in Air	mm	3300	
21.4	Tensile Strength			
21.5	Cantilever Strength			
22	**Number of N.C. contacts**	No.	8 min	
23	**Number of N.O. contacts**	No.	8 min	
24	**Enclosure protection** Material / Thickness of sheet	mm	IP-55w Steel / 2 Aluminum / > 3	
25	**Operating mechanism**		Motor & Manual Operated	
26	**Types of interlocks furnished**		Electrical and manual	
27	**Earthing Switch**			
27.1	Operating Mechanism		Manual Operated	
27.2	Type of Interlocks		Electrical and manual	
22	**Number of N.C. contacts**	No.	8	
23	**Number of N.O. contacts**	No.	8	
27	**Weight of Isolator**	Kg		
28	**Dimension (L x B x H**			
29	**Delivery of equipment in months** following award of contract (Allowing time for approval of drawing)	Month		
30	ISO 9001 certificate submitted?	Yes/No	Yes	
31	Has manufacturer exported units?	Yes/No	Yes	
32.	Technical literature/drawings submitted?	Yes/No	Yes	

Deviations from technical requirements:

Signed…….. As representative for……

Address…….. Date……