

SECTION-III (Part-A)

SPECIFICATION OF 11 KV SECTIONALISER ALONG WITH CONTROLLER AND MOUNTING ACCESSORIES UNDER TN-2662

1. Scope:

This specification covers the supply of pole mounted SF6 gas insulated 11kV Sectionalisher including controller for outdoor installation with supporting structures & all accessories for sectionalizing function at voltage of 11 kV, 3 phase 50 Hz with solidly earthed neutral system. Sectionalisher has programmable fault detection, sectionalising features and integrated remote operation capability.

2. Standards:

The Sectionalisher should comply with IEC 62271-1 & IEC 62271-103.

3. Type and rating:

The Sectionalisher shall be of the outdoor type, 11 kV, 3 pole, 50 Hz and suitable for operation in following climatic conditions

- a) Altitude - up to 3000 m;
(For altitudes above 1000m derate in accordance with ANSI C37.60)
- b) Ambient temperature minimum - -5°C ;
maximum - 50°C
- c) Maximum daily variation - 35°C
- d) Pollution level - medium/heavy;
- e) Lightning activity - high.

The Sectionalizer shall have the following criteria:

Sr. No	Particulars	
1	Place of Manufacturer	India
2	Nos. of Phase	3
3	Nominal system voltage (U) (r.m.s.)	11kV
4	Maximum system voltage (Um) (r.m.s.)	15.5 kV
5	Rated current	400/630 A
6	Short circuit level	12.5 kA (1sec)
7	Fault make capacity (RMS)	12.5kA
8	Fault make peak (50Hz)	32.5kAp
9	Power frequency voltage	50kV
10	Lightning Impulse Withstand Voltage	110 kVp
11	System frequency	50 Hz
12	Interrupting medium	SF6 Gas
13	Insulation medium	SF6 insulated
14	Rated gas pressure	0.05Mpa (gauge), 20°C
15	Bushings	Silicone rubber
16	Minimal number of no load mechanical operation	5000
17	Full load operations	600
18	Operating Mechanism	LV motor
19	Supply voltage of the motor	24V DC
20	Construction	Stainless Steel of grade
21	Detection features	Number of detection groups: 4

4. Mounting:

The Sectionalizer shall be suitable for single / double pole mounting. Adequately rated lifting eyes shall be provided and they shall be designed to allow the completely assembled Sectionalizer. The Sectionalizer shall be fitted with an external M12 Earthing stud, complete with a nut, lock nut and spring washer. The earth stud shall be welded to the tank for optimal earthing connection. All support structures and associated bolts and nuts with these parts, shall be hot-dip galvanized.

5. Finish

All interior and exterior ferrous surfaces of the Sectionalizer and control cabinets shall be manufactured from marine grade 316 Stainless steel or 304 grade stainless steel.

6. Control equipment:

6.1 Cabinets that house equipment for detection and control shall be mounted independently of the Sectionalizer.

6.2 Suitable ultraviolet-resistant cable shall be provided to connect the Sectionalizer to the control cabinet.

6.3 It shall be possible to disconnect the cable at the Sectionalizer while the Sectionalizer is connected to the power system, without causing damage or mal-operation: care shall be taken that CTs are not open circuited.

6.4 A robust, multipin weather proof connector shall be supplied. Preference will be given to products supplying connectors at both the Sectionalizer and the control cabinet.

6.5 Cabinets shall be adequately sealed and dust protected and shall be internally treated to prevent moisture condensation. The degree of protection shall be suitable for purpose.

6.6 The control cabinet shall be for all – weather access & vandal resistant.

6.7 The door of the cabinet shall be fitted with a robust fastening arrangement that is capable of being secured by a padlock that has a two point locking mechanism system.

6.8 The cabinet shall be fitted with an external earthing stud with a nut, lock nut and a serrated washer.

6.9 The control cabinet shall house Control and detection enclosure, which shall incorporate all the electronic modules. These electronic circuits shall fulfill the functions, detection; network measurement; Communications; Switch control; Operator interface; and Uninterruptible power supply.

6.10 All the components shall be assembled in a die cast aluminum enclosure to protect the electronics against electromagnetic, electrostatic and environmental influences.

6.11 The controller shall provide following integrated features:-

- Local human machine interface (HMI) shall be menu driven via 6 menu display groups.
- Trip & close circuit isolation shall be through switches.
- Front mounted isolated RS 232 data port for local communication at site.
- It shall be with automatic and manual battery health monitoring.

7. Detection, Measurement & Power Quality characteristics

7.1 Detection features:

The Following detection element shall be provided with at least 4 independent detection group.

- Phase Instantaneous Over-current
- Earth Instantaneous Over-current
- Phase Time Over-current.
- Earth Time Over-current.
- Sensitive Earth fault (SEF).
- Earth fault.
- Sensitive Earth Fault Instantaneous Over-current.
- Cold load pickup control.

7.1.1 Each of the detection elements is monitored with independent definite time settings and fault threshold.

7.1.2 The ratio of drop-off current to pick-up current shall be at least 90 % for all detection functions.

7.1.3 The O/C pick-up setting shall be selectable from 10 A to 800 A in steps.

7.1.4 A cold load pick-up feature shall be provided that allows user selectable modification of detection element characteristics under condition of system power restoration.

7.1.5 The SEF functions shall be equipped with harmonic filtering to prevent operation when harmonics are present in the primary residual earth currents

7.1.6 SEF a primary earth fault current of 4A to 20A in steps not exceeding 1A shall be detectable.

7.1.7 The Sectionaliser and Control element shall support multiple detection groups and this shall meet the requirements specified below:

- The Sectionaliser shall have minimum 4 independent detection groups. The Detection Groups shall have clear indication and shall be marked as "I, II, III, IV or "A, B, C, D"
- Each detection group shall have the facility to configure O/C, E/F and SEF fault detection current and definite time.
- Changes to any of the detection parameter to any of the not active detection group shall not affect the detection functionality of the active detection group.
- Information about activation of any of the detection group shall be recorded in history and shall be easily assessable. Information about fault detection shall clearly indicate the detection group, active at the time of fault.

8. Sectionalising function:

8.1 The number of detected faults to trip shall be selectable from 1 to 3.

8.2 Reset times shall ideally be separately selectable from 5s to 120s in 1s steps.

9. Statistical Measurement Function

The Measurement shall be done with one of the following methods i.e. three-phase-3-wire method; and or the three-phase-4-wire method and made available at HMI and remote location.

Quantities to be measured/calculated with specified accuracy are:

- Live/Dead indication
- Line & phase Voltage
- Line & phase Current
- Frequency
- Power (kW, kVA, kVAR)
- Energy
- Power Factor
- Supply Outage Monitoring

10. Local Engineering: The Sectionaliser controller shall contain a real time clock (with leap year support) that can be set both locally and remotely.

11. Event Recording: The controller shall provide, Non-volatile memory storage shall be sized to store at least 5000 logs as :

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- All operating, detection and communications parameters.
- An event record containing at least 5000 events.
- All setting change logging.

12. Tele control requirements

12.1 The Sectionalizer controller shall detect and report disconnection of the control cable between the controller and Sectionalizer.

12.2 It shall be possible to operate Sectionalizer change the active detection group, turn Sectionalizer functionally ON/OFF and turn E/F and SEF ON/OFF remotely using the protocol specified

13. Communication

13.1 - As a minimum, one independent RS-232,

13.2- A USB port shall be provided to upload the non-volatile data to and from a personal computer..

13.3- To interface to remote communications equipment (modems, GSM/GPRS)

13.4 - Provision shall be made for mounting radios and modems

13.5- The protocol to be supported by the AR controller for remote communications shall be as per IEC 60870-5-101/60870-5-104/DNP3.0

14. Power Supplies:

2 numbers 12V, 18Ah maintenance free chargeable batteries inside the cabinet of control panel shall provide energy for the operation of all units (control panel, RTU and communication system). The batteries must be capable of providing at least 36 hours of carryover upon loss of AC source power, the batteries shall be capable of providing at least 20 open and close operations. External 230V ac supply is required to charge the batteries. Battery Low' indication shall be available locally and remotely and shall include a battery test. The indication of "Battery Low" status shall allow for further ten operations. The minimum battery life expectancy shall be 2 years.

15.0 Rating plate

The rating plate shall be indelibly marked with:

- a) The manufacture's name
- b) Origin of Country : India
- c) The equipment type designation and serial number of the Sectionalizer

- d) Nominal & Maximum system voltage
- e) Rated current
- f) Rated Frequency
- g) Rated power frequency withstand voltage and rated lightning impulse voltage
- h) Rated Short time withstand current
- i) Rated making capacity
- j) Insulation medium
- k) The mass in kilograms
- l) The date of manufacture
- m)Auxiliary supply voltage

16. Packing

All equipment shall be carefully packed to prevent damage or deterioration during normal transportation, handling and storage. Each container shall bear the following information on the outside of the container:

- The address of the destination
- The gross mass, in kilograms
- The name of the manufacturer
- The purchaser's order number

17. SCHEDULE OF REQUIREMENT

The approximate requirement of Sectionalizers is **13 Nos.** This requirement is tentative and the purchaser may increase/decrease the net quantity to be purchased at the time of deciding the tender.

18. GUARANTEED TECHNICAL & OTHER PARTICULARS:

The tenderer shall furnish complete guaranteed and other particulars of material offered by him as per Schedule-V.

19. DELAY IN DELIVERY:

The delay in delivery shall invoke provisions of clause No.1.23 & 1.24 of General Conditions of Contract (Section-II).

20. MANUFACTURER'S WARRANTY:

The offered equipment/material shall be guaranteed for satisfactory operation for a period of **60 months** from the date of receipt of last consignment at site. For this purpose you shall furnish manufacturer's warrantee on Rajasthan State Non-judicial Stamp Paper worth Rs.500/- in a manner detailed at Clause 1.41 of "General Conditions of Contract".

21. PAYMENT

60% (Sixty percent) Payment of each consignment with taxes & duties shall be payable on supply of Sectionalizers complete with accessories.

Balance 40% (Forty percent) payment shall be released by Sr.A.O. (CPC) on production of satisfactory installation & commissioning report of Sectionalizers duly verified by the concerned Assistant Engineer(O&M). No extra payment for installation & commissioning of Sectionalizers will be paid to the supplier.

The bank commission charges, if any shall be borne by the supplier.

While issuing the Installation & Commissioning Report, the nodal officer should ensure that activities as per clause No. 2.0 of Section-III (part-B) have been completed by the supplier.

22. MODE OF PAYMENT:

This shall be governed by the clause No.1.42.9 entitled "Mode of Payment" of the General Conditions of Contract and subsequent amendments issued by the Nigam from time to time.

23. PERFORMANCE SECURITY:

The successful bidder at the time of signing of the contract agreement, may submit option for deduction of performance security from his each running and final bill @ 10% of the amount of the bill.

24. TESTS :

21.1 TEST BEFORE DESPATCH : Sectionalizers with accessories shall be subjected at manufacturer's works before dispatch, to the following tests as per relevant IS/IEC.

A) ROUTINE AND ACCEPTANCE TESTS ON EACH UNIT:

- (i) Visual inspection and dimension check as per clause No.7.5 of IEC62271-1
- (ii) Dry Power frequency withstand test as per clause No.7.1 of IEC62271-1
- (iii) Main circuit contact resistance measurement as per clause No.7.3 of IEC62271-1
- (iv) Mechanical operation test as per clause No.7.101 of IEC62271-103
- (v) Test on Auxiliary & Control circuits as per clause No.7.2 of IEC62271-1

B) The following type tests shall be conducted on the material as per relevant standards:

- (i) Dielectric tests on main circuits.

- (ii) Measurement of resistance of main current path
- (iii) Temperature rise test.
- (iv) Short time withstand current and peak withstand current test.
- (v) Test to verify the degrees of protection
- (vi) Tests to prove satisfactory mechanical operation and endurance

25. INSPECTION & TESTING:

Inspection & testing shall be as per relevant IS/GTP'S of PO. The inspecting officer shall select 5% samples randomly from the offered lot for physical verification and inspection as per specification and purchase order.

The suppliers should satisfy themselves that the material is in accordance with the terms of the contract and fully confirm to required specifications by carrying out a through pre-inspection of each quota before tending the same for inspection to the inspecting officer nominated by the purchaser. Such pre-inspection on the part of the suppliers would minimize the chances of rejection in inspection.

The material shall be tested and inspected by an authorized inspecting officer of the purchaser before dispatch. The purchaser reserves the right to get the material tested in any testing laboratory before dispatch.

26. DEPARTURE FROM SPECIFICATION:

Should the tenderer wish to depart from the specification in any respect, he should clearly state such departures indicating the reasons thereof. Unless this is done, the departmental specification will hold good and shall be binding on the supplier unless the departures have been approved in writing by the purchaser.

27. FURNISHING OF PROTO TYPE SECTIONALIZER:-

One Proto Type Sectionalizer conforming to various requirements of technical specification along with subsequent modifications made, has to be supplied by the successful bidder within two months of placement of detailed purchase order for our inspection & approval. The offer for inspection of subsequent material shall be entertained only after approval of proto type Sectionalizer and successful bidder will have to complete the entire ordered quantity within six months from the approval of proto type Sectionalizer. Prior to supply of prototype Sectionalizer, the detailed drawings, Bill of Material & protection scheme shall be got approved.

In case if there is delay in furnishing of proto type Sectionalizer by the firm for our inspection beyond 60 days, the delivery schedule shall be reduced by the number of days for which above delay was occurred. Further, in case successful bidder does not get its proto type approved within one year from the date of receipt of detailed Purchase Order or initial contractual delivery period whichever occurs earlier, then in such case it will be treated as failure of supply of material on part of the firm and action as per the provision of P.O. will be initiated.

The proto type sample shall be inspected by a team of two officers including one from M&P Wing.

If the bidder has already got approved Proto type sample in the previous tender with similar specification of the instant tender, furnishing of fresh proto type sample is not required.

28. QUALITY ASSURANCE PLAN :

25.1 The Bidder shall invariably furnish the following information alongwith his offer, failing which the offer shall be liable for rejection. Information shall be separately given for individual type of equipment offered.

- i) Statement giving list of important raw materials. Names of sub-suppliers for the raw material, list of standards according to which the raw materials are tested, list of tests normally carried out on raw material in the presence of Supplier's representative, and copies of test certificates.
- ii) Information and copies of test certificates as in (i) above in respect of bought out items.
- iii) List of manufacturing facilities available.
- iv) Level of automation achieved and list of areas where manual processing exists.
- iv) Level of areas in manufacturing process where stage inspections are normally carried out for quality control and details of such tests and inspections.
- v) Special features provided in the equipment to make it maintenance free.
- vi) List of testing equipment available with the Supplier for final testing of equipment specified and test plant limitation, if any vis-a-vis the type, special, acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in the schedule of deviations from specified test requirements.

25.2 The Supplier shall within 30 days of placement of order submit the following information to the Purchaser.

- i) List of raw material as well as bought out accessories and the name of the material as well as bought out accessories and the names of sub-suppliers selected from those furnished along with the offer.
- ii) Type test certificates of the raw material and bought out accessories.
- iii) Quality assurance plan(QAP) with hold points for Purchaser's inspection. The QAP and Purchaser's hold points shall be discussed between the Purchaser and the Supplier before the QAP is finalised.

25.3 The Supplier shall submit the routine test certificates of bought out items and raw material at the time of routine testing of the fully assembled equipment.

29. DOCUMENTATION :

26.1 All drawings shall conform to Standards. All dimensions and data shall be in S.I. Units.

26.2 The Bidder shall furnish one set of following drawings along with his offer:

- i) General outline drawings of the complete Arresters with technical parameters.

26.3 TEST REPORTS :

- i) One copy of acceptance test reports shall be furnished to the Purchaser.
- ii) All records of routine test reports shall be maintained by the Supplier at his works for periodic inspection by the Purchaser.
- iii) All test reports of tests conducted during manufacture shall be maintained by the Supplier. These shall be produced for verification as and when requested for by the Purchaser.

30. ADDITIONAL ORDER

Repeat orders for additional quantities, upto 50% of original ordered quantities, may be placed by the Nigam, on the same rates, terms and conditions given in the contract.

SECTION-III (PART-B)

1.0 SCOPE

This specification is intended to cover the erection & commissioning of 11 KV Sectionalizer, complete in all respect at various 11 KV feeders under Jaipur Discom.

2.0 ACTIVITY

The following main activities are to be carried out by the supplier for erection & commissioning of 11 KV Sectionalizer:-

- a) Erection & Commissioning including connections of Sectionalizer on single / double pole structure is in supplier scope. Single / double pole structure shall be provided by Nigam.
- b) Connection of Earthing of Sectionalizer from the earth providing M.S. flat shall be in the scope of supplier.
- c) All Civil works related with erection & commissioning of 11 KV Sectionalizer.

3.0 INSTALLATION & COMMISSIONING OF 11 KV SECTIONALIZER

The 11 KV Sectionalizer supplied shall be installed & commissioned by the successful bidder, at various 11 KV feeders under Jaipur Discom. The name of 11 KV feeders shall be intimated at the time of dispatch instructions/stores.

Installation & commissioning of 11 KV Sectionalizer complete with accessories including use of special tools & conducting all pre-commissioning tests before energisation shall be carried out by the supplier. PG/T-Clamps of required size to connect incoming & outgoing terminals of 11 KV Sectionalizer to main feeder shall be arranged by the supplier, however, required ACSR conductor for jumpers shall be arranged by the Nigam.

The agency should engage team of experienced Engineers & skilled staff for the purpose of Installation & Commissioning of 11 KV Sectionalizer

4.0 NODAL OFFICER:

The concern Assistant Engineer (O&M) shall be the Nodal officer for supervision of installation & commissioning of 11 KV Sectionalizer.

5.0 WORK COMPLETION SCHEDULE

The Installation & Commissioning of 11 KV Sectionalizer shall be completed within 30 days from the date of receipt of intimation of location where supplied 11 KV Sectionalizers are to be installed. The concerned Nigam's officer shall give intimation to the firm only after transporting the 11 KV Sectionalizer at Site.

6.0 DELAY IN WORK COMPLETION:

In case of delay in Installation & Commissioning of 11 KV Sectionalizer beyond 30 days from the date of intimation to the supplier about the site (the date of receipt of intimation shall be treated as the date of mail/ 3 days from the date of dispatch of letter about intimation of site by the field officer), an amount at the rate of 1/4th percent per week or part thereof subject to maximum 5% of cost of material delay in Installation & Commissioning shall be recovered from the supplier. The amount of recovery will be worked out on the basis of ex-works price.

Schedule-V**Guaranteed Technical Particulars of the Sectionalizer:**

Sr. No	Particulars	Specification	Manufacturer's Guaranteed Specifications
1	Name of manufacturer	To be mentioned	
2	Place of Manufacturing	India	
3	Type /Designation	To be mentioned	
4	No. of poles	03 (Three)	
5	Applicable Standard	IEC 62271-103	
6	Nominal system voltage (U) (r.m.s.)	11 kV	
7	Maximum system voltage (Um) (r.m.s.)	15.5 kV	
8	Load current	400/630 A	
9	Rated Short time withstand current	12.5 kA for 1 sec	
11	Rated peak withstand current and peak making current	32 kAp	
12	Rated Power Frequency withstand voltage	50 kV	
13	Rated Lightning Impulse Withstand Voltage (BIL)	110 kVp	
14	System frequency	50Hz	
15	Number of phases	3	
16	Interrupting medium	SF6 gas	
17	Insulation medium	SF6 insulated	
18	Rated gas pressure	To be specified	
	Bushings	Silicone rubber	
19	Minimal number of no load mechanical operation	5000	

20	Full load operations	600	
21	Operating Mechanism	LV motor	
22	Supply voltage of the motor	24V dc	
23	Operating temperature (ambient)	-5 deg C to 50 deg C	
24	Max temperature rise at terminals	50 deg C	
25	Mode of operation	Automatic	
26	Minimum creepage	31mm/kV	
27	IP class – Sectionaliser Body	IP 65	
28	IP class –control panel	IP 54	
29	Enclosure Material	Stainless Steel	
30	Cable	Minimum 7 meter long multi-core ultraviolet resistance control cables including power cable	
31	Battery	2 Nos.,12V, 18Ah maintenance free battery with 2 years guarantee, Run time over 36hrs without AC power	
32	External Auxiliary control voltage	110 - 230V AC	
33	Voltage sensor	Inbuilt capacitive divider in bushings	
34	Current transformer	Ring type CT	
35	Counter to trip during fault	Selectable: 1 to 3	
36	Reset times	Selectable from 5sec to 120 sec in steps of 1 sec	
37	Number of fault detection group	4 (marked as "I, II,III,IV" or "A,B,C,D")	
38	Fault detection features 1. Phase Instantaneous Over-current	All the features shall be present. A 'No' should be indicated for a feature which is not present	

	<ol style="list-style-type: none"> 2. Earth Instantaneous Over-current 3. Phase Time Over-current. 4. Earth Time Over-current. 5. Sensitive Earth fault (SEF). 6. Earth fault. 7. Sensitive Earth Fault Instantaneous Over-current. 8. Cold load pickup control. 		
38	<p>Measurement Features</p> <ol style="list-style-type: none"> 1.Voltage 2. Current 3. Frequency 4. Power (Active, Reactive, Apparent) 5. Power factor 	All the features shall be present. A 'No' should be indicated for a feature which is not present	
40	Number of event recording	Minimum 5000	
41	Communication protocols	Protocols:DNP3.0/IEC 60870-5-101/104	
42	Approximate weight of Body	To be mentioned	
43	Approximate weight of Controller	To be mentioned	