30-SDMS-03

REV. 00

SPECIFICATIONS

FOR

AUTOMATIC TRANSFER SWITCH FOR MV NETWORK

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1.0 SCOPE

This SEC Distribution Material Standard Specification (SDMS) specifies the minimum technical requirements for design, engineering, manufacture, inspection, testing and performance of Automatic Transfer Switch (Indoor/Outdoor) SF6, intended to be used for automatic transfer of source supply for MV load from one source feeder to the standby source in the consumer system in Saudi Arabia**.**

2.0 CROSS REFERENCES

This Material Standard Specification shall always be read in conjunction with SEC General Specification No. 01-SDMS-01, titled "General Requirements for All Equipment/Materials", which shall be considered as an integral part of this SDMS.

3.0 APPLICABLE CODES AND STANDARDS

The latest revision/amendments of the following Codes and Standards shall be applicable for the equipment/material covered in this SDMS . In case of conflict, the vendor/manufacturer may propose equipment/material conforming to one group of Industry Codes and Standards quoted hereunder without jeopardizing the requirements of this SDMS.

3.1	IEC 61869-1	Instrument Transformer, Part1: General requirements
3.2	IEC 61869-2	Instrument Transformer, Part -2: Curent Transformer
3.3	IEC 60051	Direct Acting Indicating Analog Electrical Measuring Instruments and their Accessories
3.4	IEC 60073	Basic and Safety Principles for Man-Machine Interface, Marking and Identification-Coding Principles for Indicators and Actuators
3.5	IEC 62271-1	High Voltage Switchgear – Common Requirements.
3.6	IEC 62271-100	High Voltage Circuit Breakers.
3.7	IEC 60529	Degree of Protection provided by Enclosures
3.8	IEC 60616	Terminal & Tapping Markings for Power Transformers
3.9	IEC 60664	Insulation Co-ordination for Equipment Within Low Voltage Systems
3.10	IEC 62271-200	High Voltage Switchgear

3.11	ANSI/IEEE C37.20.7	Internal Arcing Tests
3.12	IEC 60255 (relevant parts)	Electrical relays.
3.13	ANSI/IEEE	General Requirements for Dry Type Distribution and Power Transformer
3.14	ANSI/NFPA 70	National Electrical Code
3.15	40-SDMS-02A	Electronic Revenue CT and CT/VT Meters
3.16	38-SDMS-03	LV Digital Panel Meters

4.0 SERVICE CONDITIONS

4.1 MV Automatic Transfer Switch shall be suitable for operation under the service conditions as per SEC latest revision of SEC General specification No. 01-SDMS-01

4.2 The ATS and fittings shall withstand the effect of direct solar radiation at the field location. The temperature of exposed surface shall be regarded as 75 °C plus the effect of internal heating.

5.0 SYSTEM PARAMETRS

The Automatic Transfer Switch shall be suitable for installation in a system as given by SEC General specification No. 01-SDMS-01

6.0 DESIGN AND CONSTRUCTION REQUIREMENTS

6.1 General Requirements

The switch shall be Closed Transition Transfer Switch (CTTS) type. Each CTTs shall consist of medium voltage free standing switchgear with Vacuum circuit breakers and a microprocessor controller to provide automatic operation. The CTTS shall be able to transfer the load without interruption (closed transition). The maximum interconnection time shall be 100ms.The CTTs shall operate as a conventional break-before-make (open transition switch when the power source serving the load fails.

6.2 Current Ratings

The current rating of ATS shall be 600 Amp. For13.8 kV and 33 kV (or as per tender requirements).

6.3 Basic Insulation Level

The BIL for 13.8 kV and 33 kV switches shall be as per SEC General specification No. 01-SDMS-01 latest revision.

6.4 Rated Short Time Withstand Current

The rated rms short time current for one second shall be as per SEC specification 01-SDMS-01 latest revision for 13.8 kV and 33 kV switches respectively.

6.5 Mechanical Life of Switch

Mechanical life without requiring maintenance shall be 2000 operating cycles.

6.6 Electrical Life of switch

The electrical life at 3000 amp. Shall be10 operating cycles while at rated current 600 amp. It shall be 1000 Cycles.

6.7 Circuit Breaker

The circuit breaker shall be operated by means of a stored energy mechanism which is normally charged by a universal motor but can also be charged by the manual handle supplied on each breaker for manual emergency closing or testing. The closing speed of the moving contacts shall be independent of both control voltage and the operator.

The interruption medium for switch breaker shall be Vacuum or SF6.The design and material of electrodes shall be such that it will result in low chopping level throughout its service life. The interrupter shall be provided with means to ascertain the permissible contact wear and to indicate the end of the service life of the vacuum bottle.

6.8 Insulation

The interconnecting bus bars and operating mechanism shall be housed in an SF6 tank. The tank shall be gas tight provided a color coded gas pressure gauge so as to **show the pressure in** so as show the pressure satisfactory or dangerous different zones. The gas tightness shall be warranted for life. However a valve shall be provided at an accessible place. The bushings shall incorporate an internal sealant around flanges to prevent SF6 leakage. The operating rod shall preferably be sealed by a flexible metal bellow.

6.9 SF6 ATS SWITCH

6.9.1 The switch shall have provision to accommodate two incoming (source) and one outgoing (load) feeders. The incoming supplies shall be designed source "1" and source " 2". and outgoing as load. The switch shall normally be suitable to operate through source 1 feeder. In case source 1 feeder fails and voltage level drops to abnormal for a specified period the load shall automatically be transferred to the source 2 feeder or vice versa and shall remain connected till required to be fed through source 1 after feeder voltage recovery to normal. The load shall not be transferred to a dead feeder in any case. The switch shall have provision for manual operation. The switch shall be equipped with all necessary components to accomplish above functions.

6.9.2 The auto transfer mechanism shall be a stored energy device. All the necessary components for automatic transfer of switch from one source to the other source together with necessary control, relaying and cabling requirements shall be provided including provision to synchronize the respective parameters of both sources.

6.9.3 For automatic transfer operation, necessary relaying components to sense control voltage, frequency and phase sequence and to provide automatic transfer operation shall be provided. The sensing relay shall be set for pick up at 85 % and drop out at 75 % of normal voltage. The sensing transformer shall be rated at 13.8 kV /110V.

6.9.4 A time delay relay shall be provided to adjust time delay before transfer to prevent unnecessary shifting of load due to momentary drop in line voltage. Adjustable time shall be from 1 to 10 seconds. The load shall be transferred to source-2 at the lapse of time delay.

6.9.5 The ATs/CTTs shall be capable to operate through manually initiated transfer operation by receiving a manually initiated transfer signal locally by an operator, or remotely by SCADA/DCS system.

6.9.6 Visual indication of source positions as below shall be provided:

Source - 1	Yellow
Source - 2	Red

6.9.7 The switch shall be of **double throw type** and shall have "ON-OFF-ON" and also "ON-ON" operation positions required for the transfer mechanism.

6.9.8 A current sensing mechanism shall be provided on the load side to isolate the load under fault conditions.

6.9.9 The load transfer switch shall be of 3 pole type in a group operated unit. The switch shall be designed for **INDOOR/OUTDOOR** installations.

6.9.10 Lifting lugs shall be provided with the switch for lifting the complete assembly or the mechanism as and when required.

6.9.11 Interlock system between switches to prevent transfer of electricity between sources during the fault in outgoing.

6.9.12 The system shall have interlocking between incomer switches to prevent connecting both sources at same time.

6.9.13 There shall be option / provision to bye-pass/ disable the ATS feature if required.

6.10 CABLE CONNECTIONS

The switches shall be provided with terminals for connecting the incoming an outgoing cable terminations. The terminals shall be easily accessible for cable connections. The terminal shall be easily accessible for cable connections with proper protection. The terminals shall be suitable for connecting termination lugs as per respective SEC specifications. Alternately bushings shall suit for connection through separable insulated cable connectors suitable for cables specified in respective SEC specifications.

6.11 SEQUENCE OF OPERATION

The sequence of operation shall be as under by default.

CASE	ATS SWITCHES/CB STATUS				
Feeder	F1 (MAIN SOURCE)	F2 (Stand-by SOURCE)	F3 (LOAD)	F4 (Spare Source) Manual operated	REMARKS
Normal Operation (Healthy sources)	ON	OFF	ON	OFF	-
Outage at F1 (voltage absent for 3 sec or more)	OFF First step	ON Second step	ON	OFF	Time delay is required to avoid ATS operation at voltage fluctuation
Readiness of F1 (voltage recovered for 3 sec or more)	ON Second step	OFF First step	ON	OFF	Parallel operation is not allowed in this case by means of sequence of operation and by interlock

6.12 MICROPROCESSOR CONTROL

The controlling sensing and logic shall be provided by a single built-in microprocessor for maximum reliability , minimum maintenance, and the ability to communicate serially through an optional serial communication module.
The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug in type. The panel shall be enclosed with a protective cover and be mounted separately from transfer switch unit for safety and easy maintenance.. The Operators manual shall be provided in a built-in pocket in the control unit.
The controller shall meet or exceed the requirements of Electromagnetic Compatibility (EMC) as per relevant international standards.

6.13 Enclosure

6.13.1 The load bearing members such as mainframe, mounting brackets etc. shall be fabricated from a minimum of 2.0 mm thick steel sheet or 3.0 mm ALUZINC suitably braced or supported. The non-load bearing members like side, rear, top doors etc. shall be fabricated from a minimum 1.5mm thick steel sheet suitably braced or supported. Where other metals are used, the thickness may be modified to provide equivalent strength and deflection.

6.13.2 Enclosure shall have sufficient strength to withstand strains caused by transportation, handling and thermal dynamic forces of short circuits.

6.13.3 Enclosure shall be reinforced to provide a rigid self-supporting structure. The freestanding panels shall be floor mounted by means of anchor bolts whereas for wall mounted panels suitable mounting brackets shall be provided.

6.13.4 Floor-mounted enclosure shall be furnished with a removable, bolted rear door if required whereas wall mounted panels shall be with hinged front door(s) only.

6.13.5 Enclosure shall be provided with dedicated hinged front door with handle and provision for a key/padlocking. The doors shall be provided with gaskets to ensure dust and vermin proofing.

6.13.6 Enclosure shall be equipped with hand operated safety latches. A doorstopper shall be provided with each hinged door to hold the door in open position, if required.

6.13.7 Door of main distribution board/panel shall be provided with a pocket to keep schematic drawings or circuit diagrams, contained in an envelope of durable non-fading material suitable for protection against climatic conditions specified in 01-SDMS-01.

6.13.8 Mounting brackets, as necessary shall be arranged inside each panel for mounting of circuit breakers and other devices. All equipment shall be suitably located to facilitate easy access for operation, maintenance and replacement as per ANSI/NFPA 70 or equivalent.

6.13.9 The enclosure degree of protection shall be as per 01-SDMS-01.

6.13.10 Adequate ventilation openings in the form of louvers shall be provided, wherever required. Ventilation louvers shall be vermin-proof and shall be provided with removable filters or removable wire mesh to minimize ingress of dust.

6.13.11 The panel design shall ensure that the heat generated by various apparatus mounted inside the panel shall not affect the performance of any of the devices. Heat loss calculations shall be provided.

6.13.12 All enclosure shall be designed for bottom cable entry through cable glands, All cutouts, except cable gland cutout, shall be suitably casketed for dust proofing. All spare cutouts shall be covered with metal cover plates.

6.13.13 Enclosure shall have removable type lifting eyes or lifting beams installed on top of the panels and shall be capable of being rolled into installation position without distortion or damage. The panel base shall be capable of withstanding such movement without distortion or damage.

6.13.14 The paint finish of panel(s) shall be RAL 7033

6.13.15 Miscellaneous Electrical Features

a. Lighting controlled by toggle switch shall be provided in each vertical section of the panel. Toggle switch for light(s) in the cubicle shall be conveniently located beside each door. Fluorescent strip lights are preferred over incandescent lights.

b. A thermostatically controlled 230V, AC, single-phase anti-condensation heater with overriding manual control shall be provided within the panel. Switch for manual overriding shall be located adjacent to the light switch. Space heater capacity shall be as required to maintain the compartment and section internal temperature above the dew point.

c. A 230V, 20A, AC single-phase duplex receptacle outlet having parallel slot with grounding U-slot shall be provided . The outlet shall be suitable for use with three (3) pin plugs

6.14 Bus bars

6.14.1 All bus bars shall be made of high conducting tinned copper of at least 98% conductivity and of uniform cross section.

6.14.2 Bus bars and inter-connectors shall be insulated with colored PVC heat shrink sleeve.

6.14.3 Bus bars shall be rated and braced to withstand full available short circuit current.

6.14.4 The neutral bus bar in a 3-phase, 4-wire system shall be of the same capacity as the phase buses. The neutral bus bar and neutral terminal blocks shall be insulated from the panel structure.

6.14.5 The Bus bars shall be mounted on insulators and firmly jointed. Bus bar joints, contact surfaces with breakers and other devices shall be silver plated to ensure good conductivity.

6.14.6 Vertical sections (droppers) shall be connected to the main bus by means of bus bars and not by cable connections or vertical cable drops.

6.14.7 Transparent acrylic plate/cover shall be provided between bus bars and compartment doors.

6.15 Relays, Meters, Instruments

The relays, meters and instruments used shall follow the SEC standard prequalification process.

6.15.1 The relays and contactors shall be designed such that reasonable mechanical shock or external vibration does not operate or damage them.

6.15.2 Relays shall be of back connected, dust proof, flush mounted and switchboard type. The relay modules shall be rack mounted withdrawable / plug in type.

6.15.3 All relays shall have test terminal block facilities. Test facilities shall be mounted on front of the rack.

6.15.4 Relays and contactors shall be mounted in locations most convenient for maintenance, inspection and testing.

6.15.5 Relays, meters and instruments shall be provided as specified in the scope of work / technical specification of consumer.

6.15.6 Upper edge of protective relays and meters shall not be higher than 2.0m to allow convenient maintenance, inspection, target reset and testing from ground level.

6.15.7 The bottom of any relay or test block shall not be less than 300mm from floor level.

6.15.8 LED type indicators with current limiting series resistor shall be provided.

6.15.9 The following meters, instruments and relays shall be furnished conforming to respective standards.

a. One 3 phase, 4 wire Digital Power Demand Meter (DPDM) to read current, voltage, MW and MVAR with maximum demand and MWH and MVARH.

b. For each bus one digital voltmeter.

c. All AC meters shall be rated for 60Hz operation. All meters shall be capable of withstanding long duration overloads up to 120% of the rated electrical input quantity (ies) without affecting calibration. All meters shall be provided with a zero adjustment accessible from outside the case and located in the front. All meters shall be of flush mounted type, direct reading, back connected, dust proof and switch board type, having removable transparent dust tight window cover. Accuracy class of ammeter and voltmeter shall be Class 0.5 or better.

d. Following relays shall be provided on the incomer.

i. 3-phase over-current relay
ii. Earth fault relay
iii. Over/under voltage relay
iv. One trip relay (94) to trip the breaker in case of activation of any fault relay mentioned above and to block the auto changeover scheme.

6.16 Instrument Transformers

The instrument transformers used shall follow the SEC standard prequalification process.

6.16.1 Bus Bar primary/window type Current Transformer (CTs) shall be used.

6.16.2 The secondary windings of each CT shall be rated as specified in Data Schedule and shall be grounded at one point only.

6.16.3 CT accuracy class shall be as specified in Technical Data Schedule.

6.16.4 The mechanical and thermal current ratings of CTs shall be coordinated with the momentary and short circuit current of the associated circuit breaker, respectively.

6.16.5 The looping of feeder cables or secondary conductors through the window of window type CTs is not acceptable.

6.16.6 Potential transformers shall be provided with fuse on primary side and MCB with auxiliary contact on secondary side.

6.17 Wiring

6.17.1 All wiring within the panels shall be installed and tested at the factory unless otherwise specified. All wiring used within the panels shall be heat and flame retardant, rated for 90ºC maximum operating temperature, type SIS as listed in ANSI/NFPA 70 or approved equivalent, rated 600/1000V, with insulated tinned stranded annealed copper conductor and shall not be smaller than 2.5mm^2. All CT secondary related circuits within the panel shall not be smaller than 2.5mm^2.

6.17.2 For SCADA digital and analog input signals, status/alarm signaling circuits wiring size shall not be less than 0.8mm2 up to the first termination point, only if the associated device cannot accommodate larger wire sizes. For SCADA Control Output Signals the wiring size shall not be less than 1.5mm2.

6.17.3 All the wires shall be adequately rated for thermal withstand of short circuit current, in accordance with back-up tripping time.

6.17.4 Wiring shall be made without splices. Where screw type terminals are used, the control wires shall have solder less insulated 'O'/ring type, tin-plated copper crimp type terminal. Spade/fork type wire lugs shall not be used.

6.17.5 Wiring of meters/relays mounted on the doors shall be mechanically protected.

6.18 Terminal blocks

a. All terminal blocks shall be spring-loaded type for use with flat, hooked type crimps. If a common termination is required between terminal blocks, preformed wire jumpers or manufacturer's own shorting bar can be used. Compatible end stops, end plates, barriers and terminal block identifications shall be used. Groups of terminal blocks shall be identified using engraved labels.

b. Terminal block for CT secondary wiring shall be provided with shorting and grounding facilities. All PT circuits shall be provided with link type terminal blocks to facilitate isolation of PTs from the circuit to perform voltage injection tests. These terminal blocks shall be clearly marked with phase, function, core number and ratio.

c. In special circumstances where wire sizes exceed the terminal block capability, correctly sized terminal blocks shall be used .

d. In all instances, terminal blocks shall be mounted on DIN rails. The DIN rails shall be mounted on the bottom and sides of the panel.

e. Terminal blocks shall be grouped according to function, i.e. Power Supplies (AC or DC), CT, DC controls, annunciation, SCADA etc. The function shall be labeled accordingly. Terminal blocks for different voltages (AC/DC) shall be located on separate DIN rails.

f. Where panels are to be shipped in sections and assembled in the field, the wiring between sections shall be provided preformed. One end of the wire shall be terminated on terminal block and other end shall be bundled and tagged properly

6.19 External Cabling

6.19.1 All external cabling to floor mounted panels shall be brought to the panel from bottom, unless otherwise specified.

6.19.2 Removable plates underneath the terminal blocks shall be punched for installation of incoming conduits or control cables.

6.19.3 Cabling shall enter the panel through suitable cable gland to prevent with sharp metal edges.

6.19.4 In cable compartment, insulating barriers shall be provided between phases as well as between phases and metallic partitions of the panel. The insulating barriers shall not obstruct termination of three-core cables.

6.19.5 Provisions shall be made for the connection of all power cables including proper terminal connectors or lugs, clamps, or terminations. The location of the power cable connections shall be arranged to

a. ensure that cable entry is exactly below the termination point

b. provide adequate vertical space for holding incoming cables from conduit entry to connectors

c. provide adequate space for cable termination devices

d. adaptability of specified cable sizes

6.19.6 Terminal lugs for power cables shall be suitable for use with copper or aluminum conductor material.

6.19.7 All terminal lugs for power cables shall be of bolted type with two crimping element per lug.

6.20 Grounding

6.20.1 All metal parts in the panel shall be effectively bonded together.

6.20.2 A copper ground bus of minimum 300mm2 in size shall be provided running the entire length of panel line-up and firmly bolted to the housing shall be provided. The ground bus shall be located minimum 50mm above the bottom of the panel.

6.20.3 Two (2) solder less ground connectors shall be provided on the ground bus, one on each end section of the bus for connection to the station grounding system. The ground connectors shall be suitable for bare stranded copper ground conductor of 120mm2.

6.20.4 Non-conductive coatings such as paint shall be removed at all points of connection between the ground bus and the panel assembly to ensure good electrical contact.

6.20.5 All hinged doors and panels shall be properly grounded with minimum 35mm2 copper braids at least two different locations. For sub-compartment and interior doors, smaller sizes can be used for copper braids.

6.20.6 Devices mounted on the panel shall be grounded as required. Each connection to the ground bus shall be arranged in such a way that it may be disconnected without disturbing the continuity of the ground bus or any other device ground connection

6.21 Nameplate

Each main and sub-distribution panel shall bear nameplate of stainless steel/Aluminum or other non-corrodible material fastened to the panel by stainless steel screws or rivets. The nameplate shall be permanently and legibly marked in English and Arabic contain the information as per ANSI C57.16 or equivalent IEC Standard and additional information as follows:

a. Rated Voltage (V)
b. Rated Current of Bus bar (A)
c. Rated Current of Incoming Unit
d. Rated Current of outgoing Unit
e. Short circuit current rating (kA)
f. CT ratio Installed
g. Manufacturer /vendor name and trade mark
h. Year of manufacture
i. Gross weight when fully equipped
j. Serial. No.
k. 30-SDMS-03 Rev:0

7.0 TESTS

7.1 All equipment shall be type tested at an independent laboratory duly witnessed by engineers in accordance with the latest standards and as specified herein.

7.2 The switchgear including circuit breakers and MV switches offered shall meet the type test requirements as mentioned below according to relevant standards.

a) Dielectric Tests
b) Temperature Rise Tests
c) Making and Breaking Tests
d) Peak and Short Circuit Withstand Current Tests
e) Measurement of resistance of main circuit
e) Operation and Mechanical Endurance Tests
f) Internal arc test certificate for bus bar compartment
g) Internal arc test certificate for cable boxes
h) All relevant tests for Relays
i) All relevant tests for Instrument transformers

7.3 Degree of protection as SEC specification no. 01-SDMS-01 latest revision

7.4 The switchgear including circuit breakers and HV switches offered shall meet the routine test requirements of the standards listed below:

a) Power Frequency Voltage Tests
b) Insulation Tests on Auxiliary Circuits
c) Measurement of Resistance of Main Circuit
d) Operation and mechanical tests
g) All relevant tests for relays
h) All tests to prove the interlocks
i) All tests for meters

7.5 Purchase reserve the right to visit the factory during manufacture of any or all items covered by this specification, for inspection of material or witness of tests. Accordingly, the manufacturer shall give the purchaser adequate notice of manufacturing and testing schedule.

7.6 Special tests

Functional checks of the complete panel shall be performed in the factory against the approved Vendor Drawings and as per this standard requirement. All circuits & Wiring shall be tested with simulated functional condition for proper operation.

8.0 INSPECTION

may wish to witness tests or to visit factory during manufacture of any or all items covered in this specification. Accordingly, the supplier shall give advance notice to of the manufacturing and test schedule.

9.0 PACKING AND SHIPPING

Packing and shipping shall generally be as per General Requirements 01-SDMS-01 including the following:

i. The ATS shall be delivered ready for service.
ii. Supplier shall contact Materials Department of for additional packing, handling, and shipment instructions as applicable.
iii. Packing crates shall be marked with the following:

- Manufacturer's name
- Country of origin
- Purchase order number
- item number
- Gross weight in kilograms
- Handling instructions
- Final destination store

10.0 GUARANTEE

The supplier shall guarantee the ATS against all defects arising out of faulty design or workmanship, or defective material for a period of one year from the date of commissioning or two years from date of delivery. client/customer certificates for date of commissioning or delivery shall be accepted.

11.0 SUBMITTALS

Submittals required with tender:

The supplier shall complete and return one copy of Data Schedule given by the Purchase.

The supplier shall provide following drawings /documents with the offer for each ATS rating offered Outline diagram of switch.

Dimensional drawings showing front elevation with door, front elevation without door, side sectional views, foundation drawings and top plan of ATs as well as wiring diagram.
Type test certificates for switches of identical design circuit breakers and instrument transformers

Details of terminals.

Mounting arrangements.

Lifting arrangements.

Details of filling valves.

Details of cable terminations and cable clamps.

Type test certificates for switches / of identical design.

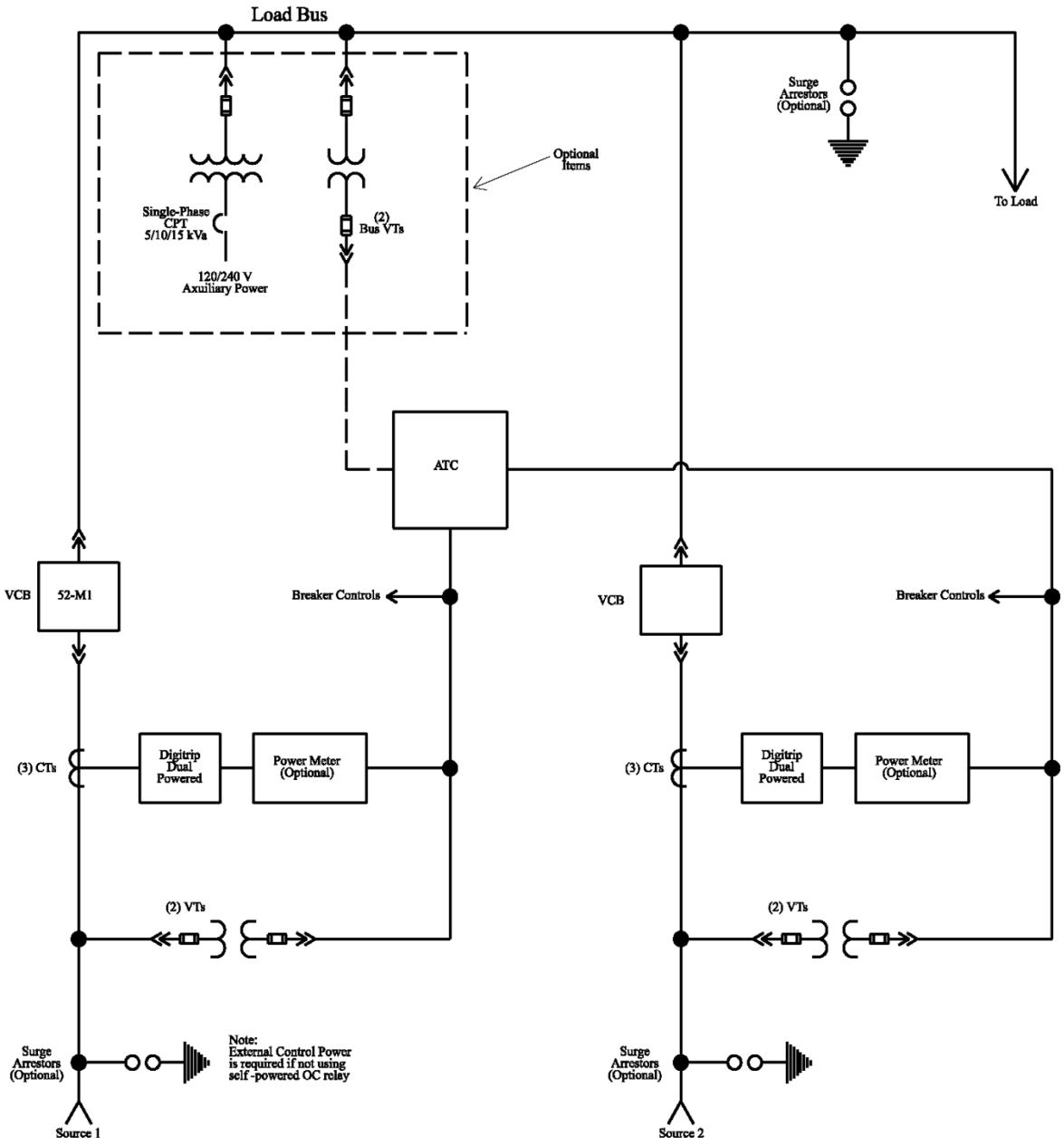

FIGURE 1. TYPICAL ATS KEY DIAGRAM

13.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCH MV)
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Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
3.0	**APPLICABLE CODES AND STANDARDS**			
	Applicable Industry Standards			
6.0	**DESIGN AND CONSTRUCTION REQUIREMENTS**			
6.1	Make /Model Country of Origin Switch type		Indoor/outdoor	
6.2	Switch Rating Service Voltage Maximum operating Voltage Rated Frequency Rated current rating of CBs Short circuit withstand current of CBs (1 sec.) Rate Making current (peak)	± 10%	Amp. kV kV HZ Amp. kA kA	
6.3	BIL (Impulse withstand voltage) Power Frequency Voltage withstand Internal Arc Fault withstand current		kV kV kA	

13.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCH MV)
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Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
6.6	Making time of CB Opening time of CB Arc Duration Total Breaking time. Operating Mechanism		ms ms ms ms Spring charged	
6.13	Enclosure Overall Dimensions mm (Width x Depth x Height) Degree of Protection Finish method Finish color			

13.0 TECHNICAL DATA SCHEDULE

()AUTO TRANSFER SWITCH MV)
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Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
	Miniature Circuit Breaker (MCCB) (if applicable)			
	MCB make		*	
	MCB Type		*	
	Country of manufacture		*	
	Catalogue No.			
	Nominal Rating (V)			
	AC Voltage (Vac)		*	
	DC Voltage (Vdc)			
	Ampere Capacity (A)		*	
	AC		*	
	DC			
	Short Circuit Interrupting Capacity		*	
	Symmetrical (kA)		*	
	Asymmetrical (kA)		*	
	Duration (Sec)			
	Auxiliary Contacts provided for Alarm			
	No. of NO contacts		*	
	No. of NC contacts		*	
			*	
			*	
			*	

13.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCH MV)
(Page 4 of 6)

Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
6.15	Relays, Meters, Instruments and Contactors		Yes	
	Complete list of required protective Relays and Dc contactors provided		*	
			*	
	Drawing Attachments			
	Relay one line diagram		*	
	Panel layout			
	Technical literature or catalogue of all Relays/ and Dc contactors		*	
	required		*	
	Relays			
	Make			
	Type/Function		*	
			*	
6.15	Digital AC Meters			
	Digital KWH meter			
	Relevant SDMS			
	Make		*	
	Accuracy class			
	Digital AC Ammeter		*	
	Make		*	
	Accuracy Class			
	Digital AC Voltmeter		*	
	Make		*	
	Accuracy class			

13.0 TECHNICAL DATA SCHEDULE

(page 5 of 6)

Enquiry No. _____ Item No. _____

Ref.	Description	Unit	SEC Specified Values	Vendor Proposed Values
6.16	Instrument Transformer CT Secondary Rating (A) Accuracy Class Metering Protection		 1 A 1 *	
6.17	Wiring and Terminal blocks Type of Insulated wire		 *	
6.18	Type of Terminal Blocks (Vendor to provide literature or catalogue MV cable Termination/Cable box size Distance between bushing to cable clamp Grounding		 750	
6.20	Size of copper ground bus (mm x mm) Type of ground clamp or conductor Size of ground conductor (mm sq.)		 *	

*** values to be proposed by vendors**

13.0 TECHNICAL DATA SCHEDULE

(AUTOTRANSFER SWITCH MV)

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Enquiry No: _____ Item No: _____

A) Additional technical information or features specified client / customer.

B) Additional supplementary data or features proposed by vendor /supplier.

C) Other particulars to be filled up by Vendor/Supplier.
(Use separate sheet if needed).

Address	Manufacturer	Vendor/Supplier
Name of the Company		
Location & Office Address		
Authorized Name & Signature		
Date		
Official Seal / Stamp		