Saudi Electricity Company	الشركة السعودية للكهرباء

SEC DISTRIBUTION MATERIALS SPECIFICATION	31-SDMS-13 Rev. 00
	DATE: 12-2016G

31-SDMS-13

REV. 00

SPECIFICATIONS

FOR

AUTOMATIC TRANSFER SWITCH FOR LOW VOLTAGE NETWORK

TABLE OF CONTENTS

SECTION		TITLE	PAGE NO.
1.0		SCOPE	3
2.0		CROSS REFERENCES	3
3.0		APPLICABLE CODES AND STANDARDS	3
4.0		DESIGN AND CONSTRUCTION REQUIREMENTS	4
	4.1	Auto Transfer Switch Design Requirements	4
	4.2	Control	5
	4.3	Sequence of Operation	6
	4.4	Standard Accessories.	7
	4.5	Enclosures	7
	4.6	Circuit Breakers	9
	4.7	Bus bars	10
	4.8	Relays, Meters, Instruments and contactors	11
	4.9	Instrument Transformers	12
	4.10	Wiring	12
	4.11	Terminal blocks	13
	4.12	External Cabling	13
	4.13	Grounding	14
	4.14	Nameplate	15
5.0		TESTS	15
6.0		INSPECTION	16
7.0		PACKING AND SHIPMENT	16
8.0		WARRANTY	17
9.0		SUBMITTALS	17
10.0		DIAGRAMS	18-19
11.0		DATA SCHEDULE	20-26

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 for LV network, intended to be used in 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 60947-06-1	Low voltage switchgear and control gear Multiple Function Equipment Transfer switch equipment
3.6	BSI BS EN 60439-1	Low Voltage Switchgear and Control gear Assemblies, Part 1: Requirements for Type-Tested and Partially Type-Tested Assemblies
3.7	IEC 60529	Degree of Protection provided by Enclosures
3.8	IEC 60664	Insulation Co-ordination for Equipment Within Low Voltage Systems

3.9	IEC 60947-1	Low Voltage Switchgear and control gear Part1: General Rules
3.10	IEC 60947-2	Low Voltage Switchgear and Control gear, Part 2: Circuit Breaker
3.11	IEC 60255 (relevant parts)	Electrical relays.
3.12	ANSI/NFPA 70	National Electrical Code
3.13	38-SDMS-03	LV Digital Panel Meters

4.0 DESIGN AND CONSTRUCTION REQUIREMENTS

4.1 Auto Transfer Switch Design Requirement

4.1.1 Automatic transfer switch (ATS) shall be floor mounted, free standing, metal enclosed dead front or multi-cubicle assembly as specified in the technical data schedule, integrally designed with all necessary control, instruments, meters and other appurtenances.

4.1.2 ATS shall be suitable for installation of 3-phase, 4 wire system inside residential /commercial buildings/at customer premises.

4.1.3 Automatic Transfer Switch shall have no. of poles, current rating, voltage ratings, fault current withstand rating , withstand close ratings (WCR. Switches shall be mechanically interlocked, double throw construction and include a microprocessor -based controller for automatic operation.

4.1.4 The transfer switches shall have 1000 volt insulation on all parts according to IEC, UL, NEMA standards. The current rating shall be considered as continuous when the switch is installed in an enclosure. And shall conform to temperature rise standards.

4.1.5 Transfer switches shall be electrically operated and mechanically held with double throw construction, and operated by a momentarily energized solenoid mechanism.

4.1.6 All open and delayed transition-type ATS shall include mechanical type interlock to ensure two possible position: connected-to-normal or connected to emergency. ATS shall include mechanism interlock to prevent momentary closure of both sources to load.

4.1.7 ATS shall include a manual handle and provisions for manual operations for maintenance purpose. Manual operations shall be with the ATS switch de-energized. ATS bye-bass selector switch has to be provided in the front of the panel.

4.1.8 Switches shall be mechanically latched and unaffected by momentary source power outages, swells and surges such that contact pressure is maintained at a constant value and contact temperature is minimized. Switches shall drive power to transfer from source into which it is transferred to.

4.1.9 Switches constructed of circuit breakers or electrical contractors not certified and tested as a complete Automatic Transfer Switch assembly under either UL-1008 or IEC 60947-6-01 standard shall not be accepted

4.1.10 The automatic switch must be equipped with self-diagnostic programmable solenoid protection. This protection shall remove power from the solenoid after a maximum of two (2) unsuccessful transfer attempts to prevent the solenoid from overheating. This condition shall be latched and annunciated on the micro-processor controller screen and capable of annunciation via a communication port, and configurable as an alarm status output signal. Reset signal require manual intervention by an operator.

4.1.11 All relays shall be continuous duty industrial type with wiping contacts. Coils, relays, timers and accessories shall be readily front accessible. The control panel and power section shall be interconnected with a harness and keyed disconnect plugs for maintenance.

4.1.12 The auto transfer switch shall be single ATS unit. Multi ATS units shall not be accepted.

4.2 CONTROL

4.2.1 The transfer switch shall be equipped with a microprocessor based control panel. The control panel shall perform the operational and display functions of the transfer switch. The display function of the control panel shall include ATS position, source availability, sequence indication and diagnostics.

4.2.2 All programmable and control functions shall be password code protected and accessible through the keypad.

4.2.3 The control panel shall be provided with a simple user interface for transfer switch monitoring, control, and field changeable functions and settings.

4.2.4 The automatic transfer switch must be equipped with a solenoid protection scheme that removes any attempts of operating the solenoid after (3) consecutive trials until manual intervention by an operator.

4.2.5 Mechanical/electrical interlock is required between both sources to prevent closing both sources in the same time and avoid parallel operation in LV network.

4.3 SEQUENCE OF OPERATION

- The automatic transfer switch shall incorporate adjustable three phase under voltage sensing on the main source

a. When the voltage of any phase of the main source is reduced to 65% of normal voltage for a period of 0-10 seconds (programmable), a pilot contact shall close to initiate starting of transfer.

b. The ATS shall incorporate adjustable under voltage and under frequency sensing on the emergency source.

c. When the emergency source has reached a voltage value above 90 % of nominal and achieved frequency within 95 % of the rated value and after switching off the main source, the load shall be transferred to the emergency source after a programmable time delay (0-10 seconds).

d. When the main source has been restored to not less than 90% of rated voltage on all phases, the load shall be retransferred to the normal source after a time delay of 0-60 minutes (programmable) The emergency source shall be switched off before closing the main source to avoid connecting both sources at the same time The emergency source shall be ready for automatic operation upon next failure of the main source.

e. If the emergency source fails while carrying the load re-transfer to the main source shall be made instantaneously upon restoration of proper voltage (90%) on the main source.

f. The mode of sequence shall be as mentioned in below table.

CASE	LV 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. Programmable time delay (0-10 seconds).
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. Programmable time delay (0-60 minutes).

4.4 STANDARD ACCESSORIES

4.4.1 Adjustable time delay to override momentary main source failure prior to initiate the transfer. Field programmable 0-10 seconds factory set at 3 seconds.

4.4.2 Adjustable time delay on retransfer to main source (programmable) 0-60 minutes factory set at 30 minutes. If the emergency source fails during retransfer time delay, the transfer switch controls shall automatically bye-pass the time delay and immediately retransfer to the main source position.

4.4.3 A set of customer contacts shall be provided to indicate both emergency and main source position

4.5 ENCLOSURE

4.5.1 The load bearing members such as mainframe, mounting brackets etc. shall be Fabricated from a minimum of 2.5 mm thick steel sheet suitably braced or supported. The non-load bearing members like side, rear, top doors etc. shall be fabricated from a minimum 1.5 mm thick steel sheet suitably braced or supported. Where other metals are used, the thickness may be modified to provide equivalent strength and deflection.

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

4.5.3 The Panels shall be reinforced to provide a rigid self-supporting structure. The freestanding panels shall be floor mounted by means of anchor bolts.

4.5.4 Each floor-mounted panel shall be furnished with a removable, bolted rear door if required.

4.5.5 Each compartment 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.

4.5.6 Panel/compartment 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.

4.5.7 Any one compartment door of main 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(latest revision).

4.5.8 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.

4.5.9 The enclosure shall be provided with a degree of protection as specified in 01-SDMS-01 latest rev.

4.5.10 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.

4.5.11 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.

4.5.12 The maximum height of panel shall be 2200mm including mounting channel

4.5.13 The main panel may consist of one or more sections to form a complete panel assembly. Each panel shall be provided with detachable (bolted) side/end cover to facilitate future expansion.

4.5.14 Cold punctured cutouts shall be provided in panels/individual compartment for front access mounting of circuit breaker push buttons, operating handle, instruments, relays, switches etc.

4.5.15 All panels 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.

4.5.16 Floor mounted free standing panels 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.

4.5.17 The paint finish of panel(s) shall be RAL 7035.

4.5.18 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 in each panel. The outlet shall be suitable for use with three (3) pin plug.

4.6 CIRCUIT BREAKERS

a. The circuit breaker shall generally comply with IEC 60947-2. The circuit breaker shall be air type (ACB) and have 4 poles. The rating of circuit breaker shall not exceed the rating of source side L bus bar.

b. Multi-pole breakers shall have a single operating handle, which shall operate all poles simultaneously to close or trip the breaker. The operating handle shall clearly indicate whether the breakers are in "ON" or "OFF" or "TRIPPED" position.

c. The breaker shall be rated for minimum short time withstand current of 50 kA at 220V and 25 kA at 400 V or otherwise as specified in Data Schedule.

d. Circuit breakers shall be sized and selected in accordance with load requirements and shall be rated for 20% overloading. Calculations in evidence of adequacy of the offered sizes shall be furnished with the client/customer. However the rating shall not exceed source side LV panel busbar.

e. Circuit breaker shall be temperature compensated and de-rated for specified ambient conditions.

f. The main terminals shall be tin plated copper.

g. The circuit breaker operating mechanism shall ensure quick make and break operation and shall not hold in any intermediate position. Fault on any one pole shall trip all the poles simultaneously.

h. The breaker shall be designed for panel mounting and indoor applications.

i. Circuit breakers shall be provided with sealable, self-fitting, knock out type terminal covers.

j. The contacts shall be heavy duty spring loaded type and shall be silver plated.

k. Each circuit breaker shall be provided with Brass or hot-dipped galvanized steel bolts of sufficient length for panel mounting the breaker on specially adapted accessories.

l. Circuit breaker of the same interrupting rating, similar application and with the same type overloading elements shall be interchangeable.

m. Overload and short circuit settings shall be site adjustable type.

n. Circuit breakers shall be provided with auxiliary contacts for alarm purpose unless otherwise specified in the Data Schedule.

4.7 BUS BARS

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

4.7.2 Bus bars and inter-connectors shall be insulated with colored PVC heat Shrink sleeve.

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

4.7.4 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.

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

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

4.7.7 Transparent acrylic plate/cover shall be provided between busbars and compartment doors.

4.8 RELAYS, METERS, INSTRUMENTS AND CONTACTORS

4.8.1 Relays and contactors shall be designed such that reasonable mechanical Shock or external vibration does not operate or damage them.

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

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

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

4.8.5 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.

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

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

4.8.8 Meters is required to be 3 phase, 4 wire Digital Power Demand Meter (DPDM) to read current, voltage, MW and MVAR with maximum demand and MWH and MVARH.

4.8.9 All AC meters shall be rated for 60 Hz operation. 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 1. The scales for analogue meters shall preferably be circular type (240º) for easy readability. All meter shall be digital type...

4.8.10 All meters shall be capable of withstanding long duration overloads up to 120% of the rated electrical input quantity (ies) without affecting calibration.

4.9 INSTRUMENT TRANSFORMERS

4.9.1 Bus Bar primary/window type Current Transformer (CTs) shall be used at load side for metering purpose.

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

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

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

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

4.9.6 Potential transformers (if applicable) shall be provided with fuse on primary side.

4.10 WIRING

4.10.1 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. All CT secondary related circuits within the panel shall not be smaller than 2.5mm^2. For Control Output Signals and indications the wiring size shall not be less than 1.5 mm2.

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

4.10.3 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.

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

4.11 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. Terminal blocks shall be mounted on DIN rails. The DIN rails shall be mounted on the bottom and sides of the panel.

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

e. Where the switches 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.

f. All spare contacts of relays, contactors, switches etc. shall be wired up to the terminal block for future use.

4.12 EXTERNAL CABLING

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

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

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

4.12.4 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.

4.12.5 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

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

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

4.13 GROUNDING

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

4.13.2 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.

4.13.3 Two (2) solderless 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.

4.13.4 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.

4.13.5 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 braids of size 16 mm2 can be used for copper braids.

4.13.6 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.

4.13.7 Draw out carriage of all removable elements shall have a direct ground connection with the panel ground bus through suitable flexible or pressure sliding contact type connections designed to carry the rated fault current for the rated duration.

4.14 NAME PLATE

4.14.1 Each panel shall bear nameplate of stainless steel/Aluminum or other non-corrodible material fastened to the panel by stainless steel screws or rivets.

4.14.2 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. 31-SDMS-13 Rev:0

Each panel of the line-up shall be provided with a nameplate of adequate size to indicate the function of the panel.

5.0 TESTS

All the tests shall be carried out in accordance with IEC 60439 or equivalent ANSI.

5.1 Design (Type) Tests

All design (Type) tests prescribed in the relevant IEC or equivalent ANSI/IEEE/ UL standards, as listed under clause 3.0 including (and not limited to) below mentioned tests shall be performed on a complete functional assembly of one representative unit/panel have same design, arrangement and ratings as of those to be supplied or on the first unit/panel of every new design, rating size.

i. Short Circuit Test.

The panel rated 400V and 230 V shall be capable of carrying the short circuit current 25 kA and 50 kA symmetrical (rums) for 2 seconds respectively.

ii. Temperature Rise Test

a. Temperature rise test shall be conducted as per BSI EN 60439-1
b. Temperature, at any point shall not exceed 60 ◦C relevant to the maximum ambient temperature as specified in SEC specifications no. 01-SDMS-01
c. For instruments inside the panel, the temperature shall not exceed the allowable temperature of the instrument.

iii. Salt spray test and tape scratch shall be as per specification 01-SDMS-01. In lieu of the actual design (type) tests, certified test reports of design (type) test performed on an identical unit/panel may can also be accepted.

5.2 Production (Routine) Tests

All production (routine) tests prescribed in the relevant IEC or equivalent ANSI/IEEE Standards as listed under clause 3.0 shall be performed on every panel assembly prior to delivery to client/customer.

5.3 Tests for relay, meters and instruments

Tests for relays, meters and instruments shall comply with the manufacturer's standard tests.

5.4 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.

6.0 INSPECTION:

Client/customer 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 client/customer of the manufacturing and test schedule.

7.0 PACKING AND SHIPPING:

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

i. The ATS shall be delivered ready for service.
ii. Supplier shall provide complete installation, operation and maintenance Instructions both in English an Arabic in a secure pocket inside the panel.
iii. Packing crates shall be marked with the following:

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

8.0 WARRANTY

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.

9.0 SUBMITTALS

Submittals required with tender:

The supplier shall complete and return one copy of Data Schedule given by client/customer.

The supplier shall provide following drawings /details along with offer for each rating offered:

- Outline diagram of switch.
- Approximate dimensions of ATS
- Single line diagram of ATS
- Clarifications regarding battery backup if required.
- Dimensional drawings showing (front elevation with door, front elevation without door, side sectional views, foundation drawings and top plan view of ATS) and wiring diagram
- Details of terminals.
- Mounting arrangements.
- Lifting arrangements.
- Details of cable terminations and cable clamps.
- Type test certificates for switches / of identical design.

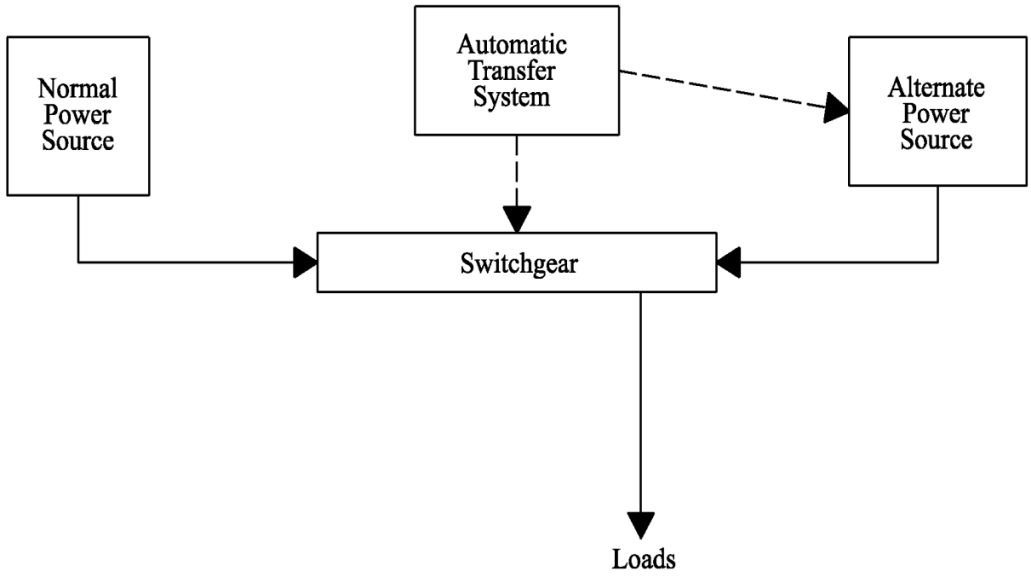

Figure 1 : Typical LV ATS Block Diagram

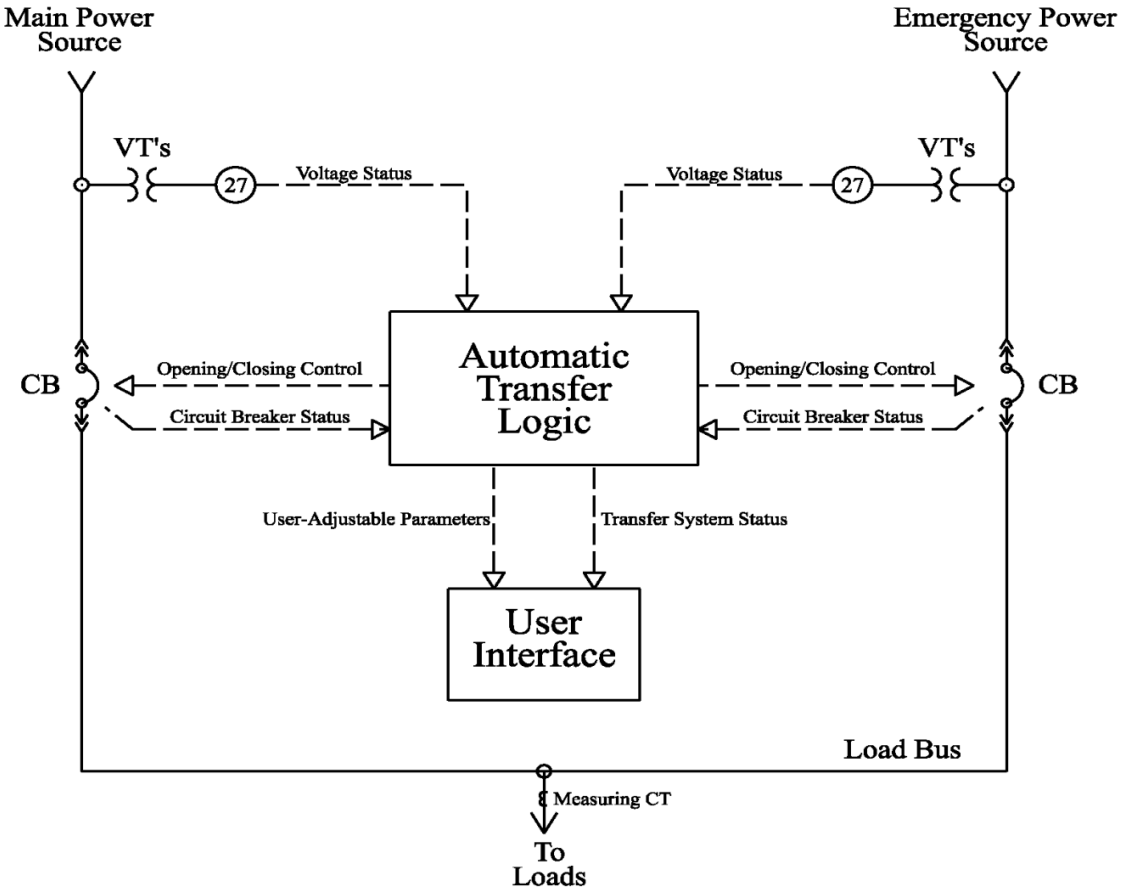

Figure 2 : Typical LV ATS Key Diagram

10.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCHES)

(Page 1 of 7)

Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
3.0	**APPLICABLE CODES AND STANDARDS**			
	Applicable Industry Standards			
4.0	**DESIGN AND CONSTRUCTION REQUIREMENTS**			
4.1				
1	Country of Origin			
2	Make/Model			
3	Switch voltage rating			
4	Switch current rating			
5	Open transition load transfer with selectable phase check or programmed transition		Yes	
6	3 phase voltage sensing on the normal and emergency source		Yes	
7	Front panel indicators and push buttons for easy use		Yes	
8	Simple-to –read control Panel that features universal symbols for easy status recognition		Yes	
9	Adjustable time delays		Yes	
10	Switch current rating			
11	No. of poles			
12	Voltage rating Transfer time Operating temperature			
13	Operating Humidity		30° to +70°C 99%	
14	Time delay to transfer from main to emergency Restoration time to main source		0-10 s (adj.) 0-60 min. (adj.)	

10.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCHES)
(Page 2 of 7)

Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
4.2	**Circuit Breakers** ACB ACB make ACB 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)		* *	

10.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCHES)
(Page 3 of 7)

Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
			*	
4.3	Operating Mechanism		*	
	(Mechanical /Electrical)		*	
	No. of Auxiliary Contacts		*	
	NO contacts		*	
	NC contacts		*	
	Auxiliary Contacts provided for			
	Alarm		*	
	No. of NO contacts		*	
	No. of NC contacts			
			*	
	Trip		*	
	No. of NO contacts		*	
	No. of NC contacts			
	Protection Release setting through			
	Electronic / Potentio meter		*	
	Other (specify)			
4.4	**Bus bars**		*	
	Rate Voltage (V)		*	
	AC Voltage (Vrms)			
	Current (A)		*	
	Short time Current for 2 sec. (kA)			
	Size of bus bar (mm x mm)			
	No. Of Bus bar			
	Material of Bus bar		*	

10.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCHES)
(Page 4 of 7)

Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
4.6	Relays, Meters, Instruments and Contactors			
	Complete list of required protective Relays and Dc contactors provided		Yes	
	Drawing Attachments			
	Relay one line diagram		*	
	Panel layout		*	
	Technical literature or catalogue of all Relays/ and Dc contactors required		*	
	Relays			
	Make		*	
	Type/Function		*	
	Digital AC Meters			
	KWH meter			
	Relevant SDMS		*	
	Make		*	
	Accuracy class		0.5	
	Digital AC Ammeter			
	Make		*	
	Accuracy Class		0.5	
	Digital AC Voltmeter			
	Make		*	
	Accuracy class		0.5	

10.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCHES)
(Page 5 of 7)

Enquiry No. _____ Item No. _____

Ref. No.	Description	Unit	Specified Values	Vendor Pro-posed Values
4.7	Instrument Transformer CT Secondary Rating (A) Accuracy Class Metering Protection		 1 A 0.5 *	
4.8	Wiring and Terminal blocks Type of Insulated wire Type of Terminal Blocks (Vendor to provide literature or catalogue) Enclosure		 * 	
4.9	For AC System Panel Dimensions (mm) Width Depth Height Degree of Protection No. of main panels (AC/DC)		 *	

10.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCHES)
(Page 6 of 7)

Enquiry No. _____ Item No. _____

SEC Ref.	Description	Unit	Specified Values	Vendor Proposed Values
			*	
4.10	Grounding 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**

10.0 TECHNICAL DATA SCHEDULE

(AUTO TRANSFER SWITCHES)

(Page 7 of 7)

Enquiry No: _____ Item No: _____

A) Additional technical information or features specified by 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		