**TECHNICAL SPECIFICATIONS FOR AUTOMATIC TRANSFER SWITCHING EQUIPMENT (ATSE Enclosed)**

1. **SCOPE**

This specification covers the requirements of design, manufacture, assembly, delivery, testing and commissioning of ATSE Enclosed panel

Note: This specification is part of LT switchboards specifications, all technical details shall be complied with the LT switchboard/LT Panel specification and shall follow ATSE technical specifications.

The ratings and withstand capacity of the ATSE with Enclosure shall be as per the SLD or as given in the Bill of Quantities (BOQ).

1. **SITE CONDITIONS & ELECTRICAL SUPPLY MINUTIAE**

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| --- | --- |
| Altitude:  | Upto 2000m |
| Ambient Temperature:  | -10Deg C to +40 Deg C |
| Relative Humidity: | 80%  |
| Design Ambient Temperature: | +40 Deg C |
| Supply Voltage: | Upto 415V |
| Voltage Variation Tolerance:  | +/-20% |
| No. of Phases:  | 3 |
| Frequency:  | 50/60Hz |
| Ingress Protection: | IP55 |
| Fault Level: | As per SLD, not exceeding 50kA at 415V |
| Auxiliary Supply:  | As per SLD |

1. **STANDARDS**

The transfer switching equipment shall comply fully with the following standards whilst compliance with the said standards must be shown on the product sticker:

IEC60947-1 (Low-voltage switchgear and controlgear –Part 1: General rules)

IEC60947-6-1 (Low-voltage switchgear and controlgear: - Multiple function equipment – Transfer switching equipment)

IEC 60947-3: (Low-voltage switchgear and control gear – Switches, disconnectors, switch-disconnectors and fuse-combination units).

1. **ATSE CHARACTERISTICS**

The ATSE shall be of 4 pole, 3 position open transition type in full conformity with IEC 60947-6-1 (Class PC) with minimal power supply interruption to the load during transfer. The ATSE shall - include mechanically interlocked switches to ensure fast switching whilst providing a stable neutral (0 - Off) position and ensure that the main and alternative power supplies do not overlap. The interlocked switches shall have self-cleaning contacts which shall prevent any accumulation of debris and hence maintenance free throughout its life.

The ATSE shall be pad lockable at ‘0’ position and shall be pad locked during maintenance of the installation, providing safe isolation between both supply sources and the load.

The ATSE shall have simultaneous 4 poles switching (<2ms as per IEC 60947), to avoid potential floating neutral issues during switching. The neutral pole shall be 100% rated as that of the phases.

The ATSE shall be able to operate manually with a removable handle. In case of emergency this handle shall be used to operate the ATSE manually without disconnection of controller.

The manual operation of the ATSE shall be possible from front ensuring the operator safety. The speed of operation of the ATSE shall be same while operated in manual as well as automatic which shall ensure that switch behaves in same manner irrespective of the way it is operated. The handle for manual operation shall be stored along with the switch & inside of the enclosure so that in the event of emergencies the operator can access the handle immediately and perform the manual operation.

The ATSE shall come with an integrated dual power supply that accepts remote orders through volt-free contacts

The ATSE shall have line load reversibility and incoming and outgoing shall be interchangeable to reduce the complexities during installation and to match the project requirement.

1. **ATSE Enclosure**

Enclosure should be IP55 Minimum when door closed

Open door should have protection for accidental direct contact to power terminals (IP 20)

Top & Bottom Plate should be removable to connect the power cables

Top & Bottom both plates should be undrilled (Without any Knockouts), so that User can drill the same based on Gland/cable sizes available at site

Controller Provided on ATSE Door should have extra door to avoid the unauthorized access

Wall mounting accessory loose provided so that user can fix them on site with Direction as Vertical or Horizontal based on space & Location

Control Wiring provided should have option for Load-Line reversibility without adding any extra accessories

1. **ATSE CONTROLLER**

This specification describes ATS (Automatic Transfer Switch) Controller designed to pilot remotely operated or automatic transfer switches with a safe and reliable transfer from one supply source to the other, independently of the type of sources (transformers or gensets or both).

1. **Standards and certificates**

The ATS controller must comply fully with the following standards whilst compliance with the said standards must show on the product label:

* IEC 61010-2-201
* GB/T 14048.11 Annex C

The ATS controller is to be designed and built by a recognised transfer switch manufacturer and shall be tested to IEC 61010-2-201, the standard that specifies the safety requirements and related verification tests for any product performing the function of control equipment.

Its research and development as well as the manufacturing facility must certified to ISO 14001 for environmental management systems and to ISO 9001 for quality management.

1. **General Characteristics**

The ATS Controller shall include:

* User selectable working modes for maintained or impulse logic RTSE
* Electronic controlled orders for open transition break-before-make (I – 0 – II) transfers, in full compliance with IEC 60947-6-1 when type tested with an IEC 60947-6-1 RTSE, avoiding source overlapping (both sources closing contacts must not be active at the same time in automatic or control mode).
* Controller should be Panel door mounting only with Extra Window Provided
* Dip Switches should be provided on Front for ease of Programming
* Transparent window cover should be provided to avoid unauthorised access to program the Controller
* ZERO Position LED indication should be provided on Controller to See real position of ATSE
* Product self-supplied from the voltage sensing on both sources.
* 3 phase sensing on both source supplies.
* 24VDC auxiliary supply for optional DC power input.
* Off line options for setting configurations
* Dedicated pushbuttons for Control (remote control for the switch) and Automatic mode selection.
* HMI must show with LED the availability of the source, position of the switch and state of the switch.
* Double power supply should be part of Controller; Extra relay/contactor arrangement is not acceptable.
* ATSE Controller should be completely Wired internally with Product to Work in Automatic mode

The ATS Controller shall be IEC 60664 overvoltage category CATIII and it must be able to withstand minimum 6kV between phases of different sources and 4kV between phases of the same source according to GB/T 14048.11 Annex C.

The ATS Controller shall have a minimum of 4 inputs and 4 volt-free relay outputs. Outputs shall be rated for minimum 5A AC1 250VAC 50/60Hz and 5A DC1 24VDC

The ATS controller shall include an input to receive availability information from the RTSE. The controller shall analyse / test its condition (self-test) periodically and communicate through dry contacts to report the ability of the transfer switching equipment to operate (watchdog function).

1. **Functions and performance**

The ATS controller shall also include the following functions:

* Phase rotation detection when both sources are available
* Configurable timers, thresholds and alarms through the HMI.
* 24 VDC activated fire input

The ATS controller shall include Off-Load tests associated with Mains-Gen applications. A dedicated TEST button, for Off-load testing, shall be provided on the front face for initiating tests as well as a test ongoing LED.

The ATS controller shall have a Button on Front where service operators can press the button to Select Mode Auto/Manual mode & in manual mode can check the operation of ATSE with Manual Push Button Provided on HMI. When Controller is in manual mode, Controller should accept any automatic command. Once Controller is working in Auto Mode then Push button provided on HMI should be Inactive.

The ATS Controller shall have real-time measurements for both sources availability based on Voltage/Frequency threshold range programmed. A “source present” indication provided should glow healthy in case a source is present within its availability thresholds. When working on three-phase network Phase sequence monitoring of Sources to check/Show the Healthiness of Sources should also work & based on that LED Indication Provided on Controller HMI should glow steady.

The priority of sources shall be configurable (Source I or No Priority)

Source Availability LED Indicator should Continue Blink (Not Glowing Steady) when source is available but not within the Threshold limit or Phase Sequence is not Correct so that Operator can get information directly by reading the LED status.

If a major fault or a critical alarm activated, the controller shall alert the user through an LED on its front face, and a buzzer sound.