Technical Specification

For

Non-communicable Fault Passage Detection System for 33KV and 11KV Overhead Networks.

Technical Specification for Non-communicable Fault Passage detection System for 33KV and 11KV overhead Networks.

1.0 :General

1.1 Scope of Work: *Bidder shall design, engineering, manufacturing, testing at manufacturer's works, supply, delivery, erection, testing and commission of non-communicable (as per the scope of bidder for particular tender)* Fault passage Indicator (*FPI)/* Fault Sensing Indicator (*FSI) in the selected feeders.*

Bidder shall supply, install and commission FPI/FSI as per clause no. 2.1.4 of this specification in the selected feeders of the Utility. Suitable Hot stick,>60KV insulated, preferably 09 meter long and Magnet for Manual reset shall be part of the supply.

Non communicable FPI/FSI shall be used in the selected feeders to optimise the system. Bidder has to design the system to optimise the quantity of FPI/FSI to get the desired benefit i.e. easy localisation of fault out of the proposed system.

This specification applies to a system allowing monitoring appearance of faults on an Overhead Medium Voltage network so that to localise faulty sections and send patrols for rectification of localized fault / reconfiguration of the network accordingly.

The system shall be made of:

- Fault Passage detection and Indication systems to be installed on 33KV & 11KV Overhead Electric networks.

1.2 Quality Assurance:

The Bidder shall supply documentary proof that the manufacturer possesses ISO 9001 and ISO 14001 Quality insurance certification, for the design, manufacture and testing of Fault Indicators for medium voltage lines.

2.1.1 System parameters

The Fault detection systems shall be designed to operate on a 33KV & 11KV overhead network with the following characteristics:

- Nominal Operation Voltage : 33KV for 33KV networks and 11KV for 11KVnetworks
- System Maximum Voltage : 36 kV &12KV
- Frequency : 50Hz
- No. of phases 3
- System fault current : 25KA / 3 sec for 33KV system & 18.4KA / 3 sec for 11KVSystem.
- Type of neutral earthing : For 33KV: Earth through earthing transformer
  For 11KV: Solidly grounded system.
- Conductordiameter : 5 to 16 mm

One single product shall be proposed to cover the whole range of above characteristics: Particularly, the same product should be installed on any network for 11KV or 33 kV.

2.1.2 Climatic Conditions:

The Fault detection system shall be designed to operate in the following environmental conditions:

i)	Temp.Variation	: +4 °C to +50 °C
ii)	Max. Daily average temperature	: +45°C
iii)	Max.relative humidity	:100%
iv)	Average rainfall	:200cm
v)	Max. Height above sea level	: 1000meters
vi)	Max. Wind Pressure & wind speed	: 150Kg/sq.m& 4 2 m/sec
vii)	Average no. of thunderstorm days per year	:200.

2.1.3 Purpose of equipment

The main functions of the equipment are:

-To detect phase-to-phase and phase-to-earth fault currents on the MV network at both 11 kv & 33 kv O/H feeders.
-To detect voltage presence interruptions.
-To provide a local light indication of fault.
-To provide patrol gangs with all useful information for fault finding and preventive maintenance.
-To be self-supplied at all times, including during outages.

2.1.4. Components:

The detection system shall be comprising of the following parts, under the scope of bidder:

-Fault Passage Indicators/ Fault Sensing Indicator shall be clipped on the overhead lines. One such device shall be clipped on each phase so that to measure current and Voltage presence in this phase and compute fault detection algorithm accordingly.

2.1.4.1 Fault Passage Indicator (FPI)/Fault Sensing Indicator(FSI)

The Fault Passage Indicator (FPI)/Fault Sensing Indicator (FSI) shall be designed to be clipped on the Overhead line. 3 Fault Passage Indicators/ Fault Sensing Indicator shall be clipped on one three phase line, one on each phase. *In case of either vertical or horizontal configuration of line, efficiency of FPI/FSI should not be degraded*. It shall include the following functions:

- Measurement of current running in the phase it is clipped on

- Detection of Voltage absence/presence on the phase it is clipped on

- Detection of phase-to-phase and phase-to-earth faults

It shall be self-supplied with a non-rechargeable (lithium-ion) battery of a minimum life time 10 years, in the atmospheric temperature conditions specified above. For Non communicable type FPI/FSI, 800 hours flashing for fault indication over 10 years shall beprovided.

The Fault Passage Indicators/ Fault Sensing Indicator shall be suitable for outdoor use in the tropical climate condition stipulated in the relevant paragraph. The components used in the Fault Passage Indicators shall be suitably protected from direct sunlight to prevent malfunctioning due to solar radiation. The Fault Passage Indicators shall be suitable for mounting on live line conductors and suitable clamps shall have to be designed so that the Fault Passage Indicator/ Fault Sensing Indicator can withstand winds pressure as specified without falling from the line. The Fault Passage Indicator shall be fully self-contained type without any external connection, indicator or sensors. The Fault Passage Indicators/ Fault Sensing Indicator shall be suitable for use on multiple lines supported by the same pole.

2.2 Operational specifications

2.2.1 Fault detection:

Fault detection shall be performed by the Fault Passage Indicator/ Fault Sensing Indicator described above. Fault sensing shall be made from current measurement and Voltage presence detection, based on detection of the electromagnetic field and its variations.

The Fault Passage Indicator/ Fault Sensing Indicator shall be of the self programmable type, suitable for sensing:

- Short-circuit faults
- Low earth leakage faults down to 6A.

The Fault Passage Indicators Fault Sensing Indicator / shall detect faults based on 02(two) simultaneous tripping criteria:

- In order to high fault currents (typically phase-to-phase faults), it shall operate when the phase current exceeds an absolute threshold for a fixed duration of about 50 ms. This absolute threshold must be user configurable to different values preferably between 75A to 800A based on nominal currents.

- In order to detect low fault currents (typically resistant phase-to-earth faults), it shall operate when it detects the phase current increase within a fixed duration (about 50ms) exceeds a relative threshold. This threshold must be configurable to at least 6 different values between 6A and160A.

In case of faults, the Fault Passage Indicator/ Fault Sensing Indicator which are detecting the variation of the electromagnetic field due to fault current (Fault Passage Indicators/ Fault Sensing Indicator installed between the circuit breaker and fault point) shall provide a fault indication, while Fault Passage Indicators downstream the fault or on non-faulty branches shall not provide any indication.

The fault indication shall be provided:

- by the means of a flashing light system offering a good contrast against sunshine (red colour) and an MTBF of the light emitting system at least 45000 Hours (LEDs for instance). It shall provide a very high visibility of an intensity of 40 Lumens (minimum) and give a 360° visibility angle from at least 50m in sunny day conditions, and at least 300m at night. Total flash duration for Non communicable type FPI/FSI shall not be less than 800 hours. Flashing period for permanent faults shall be 2 flash in every 12 sec.

The Fault indication shall remain until:

- a time-out, configurable to at least 4 possible values between 2 and 16 hours, has expired,
- the line voltage is back,

- the Fault Passage Indicator is resetmanually,

- whatever condition comes first.

Caution: since the load current might be very low upon MV return, load current reset is not acceptable.

The Fault indication reset shall consist in:

- stopping the local light indicationflashing

The Fault Passage Indicator/ Fault Sensing Indicator shall include some self-test possibility usable when it is on the line (powered or not).

The Fault Passage Indicator /Fault Sensing Indicator shall be selective in action as indicated below

- It shall not respond to any sudden variation (increases/decrease) in load current
- It shall not respond to an over current not due to a fault
- It shall not respond to high magnetising inrush currents, created upon line energising.

2.3 Additional requirements

2.3.1 Marking

Each Fault Passage Indicator/ Fault Sensing Indicator shall carry a weather and corrosion proof plate indicating the following particulars.

- Property of WBSEDCL
- Manufacturer's identification.
- Date & Model or type number (as per catalogue)
- Year of manufacture in characters big enough to allow reading from the ground so that to provide indication of battery age.

2.3.2 Type Test Report

The offered item shall be type tested at any NABL accredited laboratory in accordance with relevant IEC. The type test report shall not be more than 5 (five) years old. A copy of the Type Test results shall be enclosed with the offer.

2.3.2.1 Environmental specifications:

Mechanical resistance to vibration and shocks
The equipment shall have vibration resistance in accordance with
As per IEC 60068.2.6: 10 to 500 Hz; 0.7 mm peak to peak from 10 to 59Hz and 5g from 59 to 500 Hz.
As per IEC 60068.2.27: 40g / 6 ms / 2000 positive and 2000 negative shocks in each direction, in the three directions.

2.3.2.2 Dielectric withstand

As per IEC61010 : Insulation : 2 kV for 1 min at 50 Hz. As per EN 60-950 Impulse wave (1.2/50 μs): 5 kV

2.3.2.3 Electromagneticcompatibility:

Electrostatic discharge as per IEC 61000-4-2 : Level 3
Radiated fields as per IEC 61000-4-3 : Level 3
Radio frequency as per IEC 61000-4-6 : Level 3
Magnetic immunity, 50 Hz, as per IEC 61000-4-8 : Level 4
Emissions as per EN 55011 : Class A

TRANSPORT OF EQUIPMENT TO SITE. The bidder shall be responsible for the loading, transport, handling and off loading of all equipment and materials from the place of manufacture to site. The bidder shall be responsible for any type of damage during transportation.

2.3.5 Training

Before Commissioning of the FPI/FSI, the successful bidder shall deliver installation, Operation & Maintenance Training at different site to the personnel as deputed by the awarding authority. The successful bidder shall submit the training schedule to the site authority for WBSEDCL. The Training should be comprehensive to the satisfaction of the trainees.

The Trainer should cover both theoretical & practical aspects of the modules, operation & maintenance requirements of the modules etc. The trainer shall also exhibit major components of the modules separately for visual clarity of the trainees with better understanding. The successful bidder shall bear every cost required for the Training.

Guarantee : All equipments /materials shall be guaranteed complying policy guideline of WBSEDCL.

2.3.5 Documentation

Each device shall be supplied with a user manual for installation, maintenance and commissioning at site.

GUARANTED TECHNICAL PARTICULARS I.R.O NON COMMUNICABLE FAULT PASSAGE INDICATOR (FPI) / FAULT SENSING INDICATOR (FSI)
(TO BE FILLED UP BY BIDDERS)

SL.NO	DESCRIPTION	11KV NON COMMUNICABLE	33KV NON COMMUNICABLE
1.	Name of the bidder		
(i)	Office address with contact details		
(ii)	Factory address with contact details		
(iii)	Whether OEM		
(iv)	If not ,then name of the channel partner with address and contact details(supporting documents to be submitted)		
(v)	Address ,contact and E-mail ID of service centre		
2.	Hot stick details		
(i)	Insulating voltage of the hot stick		
(ii)	Length of the hot stick		
3.	Quality insurance certificate for ISO 9001 & ISO 14001 on fault indicator and remote mounting and control equipment available or not		
4.	FPI nominal operating voltage		
5.	Highest system voltage		
6.	Frequency		
7.	No. of phases		
8.	STC for 3 sec		
9.	Type of Neutral Earthing		
10.	Conductor Diameter (mm)		
11.	Non rechargeable battery		
(i)	Type		
(ii)	Capacity (AH)		
(iii)	Make		
(iv)	Life span (years)		
(v)	Minimum Flashing hours for communicable & non communicable FPIs/FSIs		
(vi)	Backup (Hours)		
12.	Operational Specifications		
13.	Minimum Earth Leakage Faults(Amp)		

14.	High fault current threshold range(Amp)		
(i)	Minimum duration of phase to phase fault for operation of FPI		
(ii)	Range of operation for phase to phase fault		
15.	No. of configurable positions (minimum 4 nos.) for low fault current within 6A to 160A		
16.	Minimum intensity of flashing light (Lumens)		
17.	Minimum flash duration of flashing light(hours)		
18.	Flashing period for permanent faults		
19.	Marking details of FPIs/FSIs		
20.	Guarantee		