

33kV & 11kV FAULT PASSAGE INDICATOR (FPI)

14.1. PURPOSE:

To locate the exact passage of faults on overhead lines. The FPI shall indicate both transient as well as permanent faults on the O/H lines

14.2. OPERATION:

The Fault Passage Indicator shall operate on either passing over of the absolute threshold current (user settable) or the current variation (di/dt). Upon the installation of the indicator, the FPI shall adjust itself to the network frequency and voltage of perform required function.

14.3. FAULT TYPES:

The FPI shall detect and indicate both earth faults as well as phase to phase faults. In addition to this, the FPI shall also detect and indicate transient and permanent faults.

14.4.1. INRUSH RESTRAINT:

The FPI shall be equipped to filter out the inrush current due to transformer magnetizing currents thus avoiding the possible false indication of faults.

14.4.2. RESET:

Once the fault is cleared, the FPI shall reset itself upon the power return, it shall also have a facility of resetting with settable time duration and the manual reset.

14.5. TRANSIENT FAULT EVOLUTION:

If FPI is busy in flashing on transient fault and if the permanent fault occurs, the FPI shall automatically change the priority and shall start flashing differently to show the permanent fault; thus helping maintenance crew to review the priorities.

14.6. These FPI shall be of pole mounted type and shall have four separate sensors for all the three phases and for ground. These sensors shall be interfaced with common FPI controller device through wired or wireless medium.

FPI shall have LED/flag to indicate the passage of fault current through sensor. There

shall be various features to reset the FPI LED/ Flag

- a) Self reset after set reset time (Through inbuilt timer)
- b) Self reset after restoration of voltage
- c) Manual reset from local through push button
- d) Remote reset from SCADA control centre by issuing command

It shall also be possible to test the FPI by manually setting the FPI LED/Flag through push button.

The FPI shall be capable to communicate the FPI status to SCADA control centre using GSM/CDMA network over IEC-101/IEC-104 protocol. There shall be provision to power-up and connect the modem to this FPI for communication with SCADA control centre.

It shall be possible to configure the FPI as per the requirement from remote SCADA control centre. The necessary hardware and software required for the configuration of FPI shall be provided by supplier.

14.6.1. Detail Characteristics

Sr No.	Details	Specific Requirements
1	Type	Spread spectrum low power license-free
2	Frequency	Free Band allowed in India
3	RF output	FCC part 15.249 and AS/NZS 4268:2003 approved radio
4	Communication media	Embedded GPRS modem
5	Communication protocol	DNP3, IEC 870-5-103/104
6	Type	!(min), !(max), !(mean) and I(inst)
7	Number of HV lines monitored per RTU	9 phases
8	Mechanical Large enclosure Small box Cabinet	100m
9	Earth fault indication	(phase A, B, or C), (beginning time, ending time)
10	Phase fault or !max	b Phase fault indication (phase A, B, or C), (beginning time, ending time)

11	Transient fault detection if enabled	Transient fault indication and time stamping
12	Voltage loss indication	Voltage loss indication (phase A, B, or C) and time stamping and Voltage recovery time indication
13	Equipment monitoring	Equipment monitoring
14	Local radio communication faulty	Communication with FPNos. XX faulty (after a number of attempts) and time stamping
15	FPIbattery alarm	Battery low in FPI no.x and time stamping
16	AC supply alarm	AC supply alarm External AC supply off
17	Inputs	6 digital inputs
18	Outputs	3 relay outputs 220 Vac/1 A
19	Local archive of Date and time stamped events and measures	100 events
20	Downloading of local archive	Remote via SCADA application
21	Power supply	In built Battery of suitable rating
22	Operating temperature	-25°C to +70°C
23	Storage temperature	40°C to +85°C
24	Net weight in kg	8 kg
25	Protection level	IP 54
26	Standards	Standards
27	Vibrations and shocks test	IEC 68-2-6 and 68-2-29
28	EMI/EFImmunity	IEC 801-3 and FCC Part 15
29	Salt spray and humidity tests	IEC 68-2-11 and 68-2-30