

Detailed Report

Date of Submission : 10-08-2026 12:52

EDAMON - 220KV tripped at 01-08-2026 02:19 and restored at 01-08-2026 02:19

Summary of Event (घटना का सारांश) : The 220 kV Edamon Substation is provided with GE Multilin B90 busbar protection relays for Main-1 and Main-2 protection.

The incident involved sequential tripping of the 220 kV Edamon–Pothencode #2 (2EMPC #2) and Sabarigiri–Edamon #2 (2SBEM #2) feeders, followed by operation of the 220 kV Bus-2 busbar protection.

Time and Date of the event (घटना का समय और दिनांक) : 01-08-2026 02:19

Name of the Substation/Generating Station/Pooling Station affected (Along with Voltage level) : EDAMON - 220KV

Event Category (श्रेणी के साथ इवेंट प्रकार) : GI-1

Location/Control Area (स्थान/नियंत्रण क्षेत्र) : KERALA

Configuration of Bus (HV/LV) . Along with details of Bus split Operation (if any) :

Bus Configuration Type : Double Bus with Bus coupler

Bus Coupler Status : NA

Bus 1 Connected Elements	Bus 2 Connected Elements	Bus 3 Connected Elements	Bus 4 Connected Elements
1. 220KV-EDAMON-SABARIGIRI-3	1. 220KV-TIRUNELVELI-EDAMON-1	1. 220KV-EDAMON-KUNDARA-1	1. 220KV-EDAMON-POTHENCODE-1

Bus 1 Connected Elements	Bus 2 Connected Elements	Bus 3 Connected Elements	Bus 4 Connected Elements
2. EDAMON - 220KV - Bus 1	2. 220KV-EDAMON-SABARIGIRI-2 3. 220KV-EDAMON-EDAPPON-1 4. EDAMON - 220KV - Bus 2	2. 220KV-EDAMON-POTHENCODE-2	2. 220KV-EDAMON-PATHANAMTHITTA-1

Station Connectivity / SLD during antecedent : The normal 220 kV bus arrangement at Edamon Substation is as follows:

- **Bus-1:**
 - 220 kV Sabarigiri–Edamon #3 (2SBEM #3)
 - 220 kV Thirunelveli–Edamon No. II (2TNEM #2)
- **Bus-2:**
 - 220 kV Thirunelveli–Edamon No. I (2TNEM #1)
 - 220 kV Sabarigiri–Edamon #2 (2SBEM #2)
 - 220 kV Edamon–Edappon (2EMEP)
 - 220/110 kV, 200 MVA Transformer
- **Bus-3:**
 - 220 kV Edamon–Kundara (2EMKD)
 - 220 kV Edamon–Pothencode #2 (2EMPC #2)
- **Bus-4:**
 - 220 kV Edamon–Pathanamthitta (2EMPT)
 - 220 kV Edamon–Pothencode #1 (2EMPC #1)

Weather Conditions : Normal

Elements under outage prior to the event : 1. 220KV-EDAMON-POTHENCODE-2
2. 220KV-EDAMON-SABARIGIRI-2

Other Information (Antecedent Cnditions) : **1. Tripping of 220 kV Edamon–Pothencode #2 (2EMPC #2)**

On 01.08.2026 @ **02:09 Hrs**, the 220 kV Edamon–Pothencode #2 feeder tripped on a single pole, followed by operation of auto-reclosure.

As the fault persisted, the feeder tripped again and the auto-reclose sequence resulted in **AR lockout**.

At Edamon end, the busbar protection system registered Main-1 and Main-2 protection annunciations. The feeder relay indicated an **L1-N fault in Zone-1**, with approximately **6.9 kA fault current in Phase-A** and an indicated fault location of approximately **13.16 km**.

The relay indications at the Pothencode end were recorded as follows:

ANN:

- M1 DP & M2 DP operated
- AR Lockout
- Carrier Received
- AR operated

Main-1:

- DP: R-G
- Zone-1
- SOTF operated
- Fault location: 29.81 km

Main-2:

- DP: A-G
- Zone-1
- Fault location: 36.38 km
- AR operated

The feeder was subsequently charged at approximately **14:25 Hrs**.

2. Tripping of 220 kV Sabarigiri–Edamon #2 (2SBEM #2)

At **02:12 Hrs**, the 220 kV Sabarigiri–Edamon #2 feeder tripped on **Zone-1 protection for an L2-L3 fault**.

Three-pole auto-reclose operated; however, the fault persisted and the feeder tripped again, resulting in **AR lockout**. Carrier received indication was also observed.

The relay indicated a fault location of approximately **4.64 km**, with fault currents of approximately:

- Phase-B: **11.8 kA**
- Phase-C: **11.68 kA**

The relay indications recorded at the Sabarigiri end were:

ANN:

- Feeder CB Open
- Air Pressure Alarm

Main-1:

- DP: Pickup B
- Pickup E
- Zone-1
- Aided Trip
- Disturbance Loop: L2-L3 Fault ON
- Fault location: 44.4 km

Main-2:

- DP: Pickup B
- Pickup E
- Zone-1
- AR operated
- Disturbance Pickup: L3-E ON
- Disturbance Loop: L3-EF ON
- Fault location: 40.5 km

The feeder could not subsequently be charged because of a problem associated with the **Hybrid PASS module**.

3. Subsequent Busbar Protection Operation

At approximately **02:19 Hrs**, the 220 kV busbar protection **B90 operated for Zone-2 (Bus-2)**.

The operation resulted in tripping of the following equipment:

- 220 kV Thirunelveli–Edamon No. I (2TNEM #1)
- 220 kV Sabarigiri–Edamon #2 (2SBEM #2)
- 220 kV Edamon–Edappon (2EMEP)
- 220/110 kV, 200 MVA Transformer
- Bus Section-2
- Bus Coupler-1

The protection operation effectively isolated **Bus-2** from the connected circuits.

Renewable Energy Trip : False

Details of SPS Operation (if any): : False

Reason of tripping : Others

Other Reason : Busbar protection operation

Load and Generation Loss (लोड और जेनरेशन हानि) :

Total Generation Loss (MW)	Total Load Loss(MW)
0 MW	0 MW

Duration of interruption (रुकावट की अवधि) :

Details of Equipment Failure (if any during the event): :

Equipment Type	Equipment Make
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List of elements tripped during the event :
1. 220KV-TIRUNELVELI-EDAMON-1
2. 220KV-EDAMON-EDAPPON-1
3. EDAMON - 220KV - Bus 2

Station Connectivity/SLD during the event :

Analysis of the event	: On verifying the DR taken by Relay team on 1/8/26 it is confirmed that the Bus Bar Protection was operated at 02:19 hr without any intervention from any other external or manual inputs. On 1/08/26 after the PET testing of the Hybrid PASS Unit of 2SBEM#2 feeder it is confirmed that it is having low insulation issues and the equipment has now declared as faulty. It is suspected that along with the operation of the 2SBEM#2 Hybrid PASS Unit to clear the line to line fault at 02:14 hr there developed some internal arcing or some issues which deteriorated the insulation values. As the isolator was connected to the 220kV Bus the insulation value issue gradually worsened and eventually resulted in insulation loss and thus the Bus Bar Protection operation at 02:19hr.
Protection / Operational Issues observed	: Following the repeated tripping of the 2SBEM #2 feeder and the subsequent Bus-2 busbar protection operation, the Hybrid PASS module associated with the 220 kV Sabarigiri–Edamon #2 feeder was inspected by the Substation Maintenance Team. During inspection, a suspected insulation failure was observed in the PASS module. Further examination indicated evidence of arcing within the isolator chamber of the Hybrid PASS unit. Based on the physical inspection, relay indications and disturbance records, the arcing/insulation failure associated with the Hybrid PASS module is identified as the probable initiating cause of the Bus-2 Zone-2 busbar protection operation.
Restoration Details	: Following the incident, restoration and test charging of the affected system were carried out as follows: • 01.08.2026 at 04:26 Hrs: Bus Section-2 was test charged.

- **01.08.2026 at 05:03 Hrs:** 220 kV Tirunelveli–Edamon No. 1 was test charged.
- **01.08.2026 at 05:10 Hrs:** 220 kV Edamon–Edappon was test charged.
- **02.08.2026 at 16:16 Hrs:** 2SBEM #2 was radially charged from Moozhiyar end up to the gantry of Edamon Substation.

DR Time synchronization issues observed (सुरक्षा/प्रचालन समस्या) : False

Remedial Measures Taken (सुधारात्मक सुझाव) : On 01.08.2026 at 04:26 hrs - Test charged Bus Section 2.

05:03hrs - Test charged 220 kV Tirunelveli Edamon No 1 .

05:10 hrs - Test charged 220 kV Edamon Edappon . and

On 02.08.2026 at 16:16 hrs 2SBEM#2 radially charged from Moozhiyar end to th eGantry of Edamon S/s .

Relay/PLCC Operation Details :

Control Panel Anunciation :

Main I Relay Indications :

Main II Relay Indications :

Other Relay Indications :

PLCC Counter Increment I/T :

PLCC Counter Increment D/T :

Fault Current Value (kAmp) : None

LA Counter :

Remarks :

Attachments

: 1. [SLD/Connectivity Diagram](#)