Failures of 624kV Class Surge Arrester in POWERGRID network – A Case Study

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SURGE ARRESTER - POPULATION

- Around 9400 nos. Surge Arresters are installed in various POWERGRID substations.

- Voltage Class Wise Population of Surge Arresters are as follows:

Sl	Voltage Class	Number of Surge Arrester
1.	624 kV	1400
2.	390/336 kV	5200
3.	216 kV	2000
4.	120 kV	8000

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CASE STUDIES

Two number Mechanical Failures have been observed in 624kV Class Surge Arresters as per the following:

- Case Study – I : Mechanical Damage/Failure in Surge Arrester on account of problem with insulating bases

- Case Study – II : Mechanical failures of Surge Arrester due to pull exerted by Conductor during storm/windy weather

CASE STUDY - I

- Mechanical Damage/failure of Surge Arrester was observed at one of the substation during storm/wind ⇨
- During Investigation, it was found that failed Arrester was not vertical as out of total 8 nos. insulating bolts 2 nos. bolts were missing.
- Only 6 nos. insulating bolts were used during erection of Surge Arresters against 8 nos. insulating bolts as specified in the manufacturer drawing. ⇨
- To avoid such mistakes , insulating bolts were replaced with single insulating base. ⇨

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CASE STUDY - II

- Mechanical Failure of 624kV Surge Arrester was observed during stormy conditions
- On further analysis, it was found that failure were result of pull being exerted by Quad Conductor on Surge Arrester during stormy condition.
- Connection Arrangement for Surge Arrester was modified from Quad to Twin Conductor so as to avert failure on account of pull of conductor.
- Twin Conductors were first connected to BPI and then connection was extended to Surge Arrester using through type conductor.

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FUTURE MODIFICATIONS

- Modifications proposed in Technical Specifications:

✓ Cantilever Strength of Polymer Housing is proposed to be increased to 500 kg from existing value of 150kg.

✓ Maximum Number of Stacks to be specified as three

✓ Maximum deflection during cantliever strength test to be specified as 200 mm.

✓ Base of Surge Arrester shall be single insulator having matching flanges on both the sides.

- Connection Arrangement for Surge Arrester was further modified by providing 2 nos. BPI and same were connected by Al tube. Connection to Surge Arrester was extended from BPI using flexible Conductor.

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CONCULSION

- With the help of above changes like modifications in connection arrangement of Surge Arresters, Surge Arrester mounting base, failure rate has reduced considerably.

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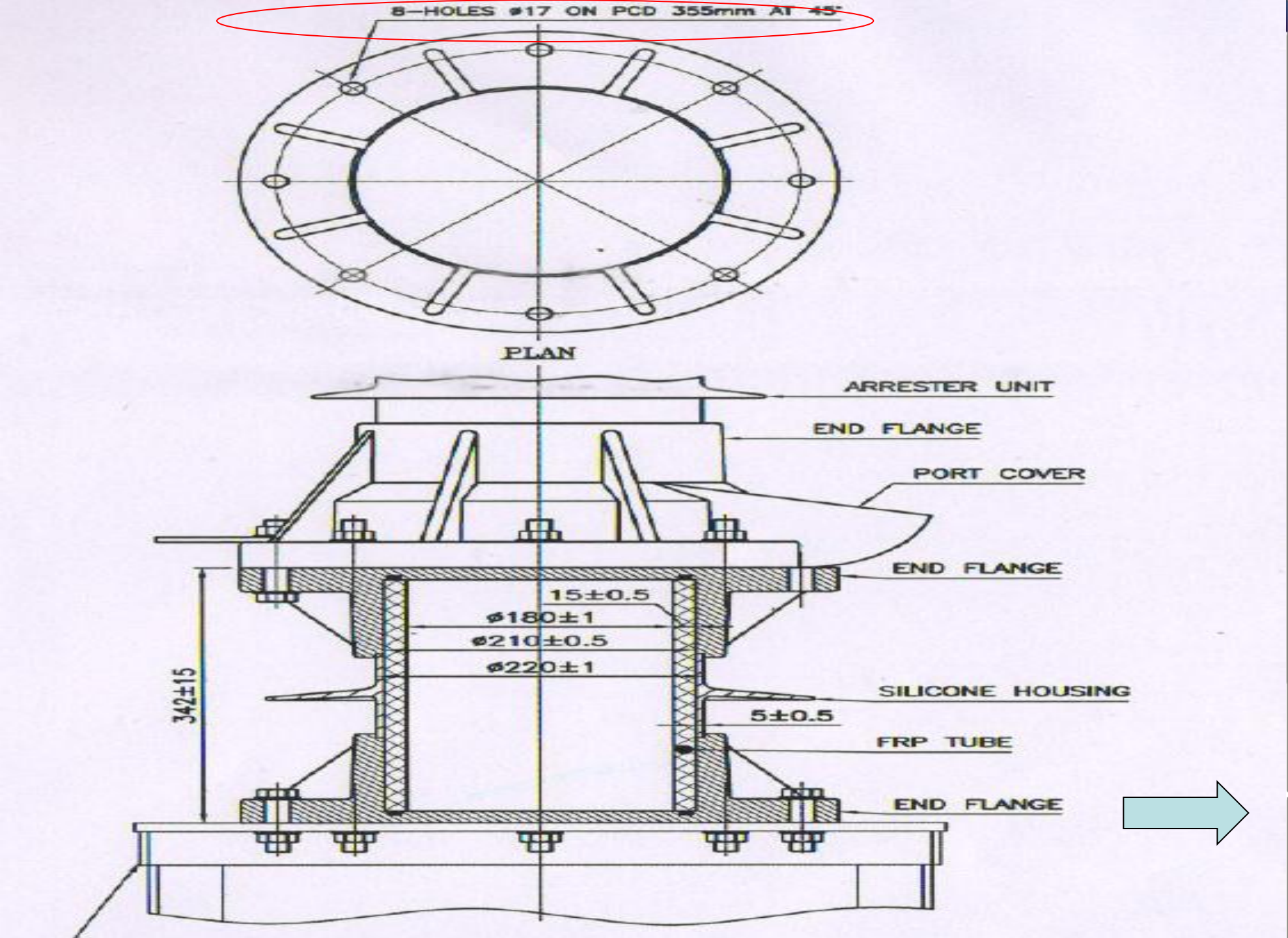
8–HOLES ø17 ON PCD 355mm AT 45°
PLAN
ARRESTER UNIT
END FLANGE
PORT COVER
END FLANGE
15±0.5
ø180±1
ø210±0.5
ø220±1
342±15
SILICONE HOUSING
5±0.5
FRP TUBE
END FLANGE

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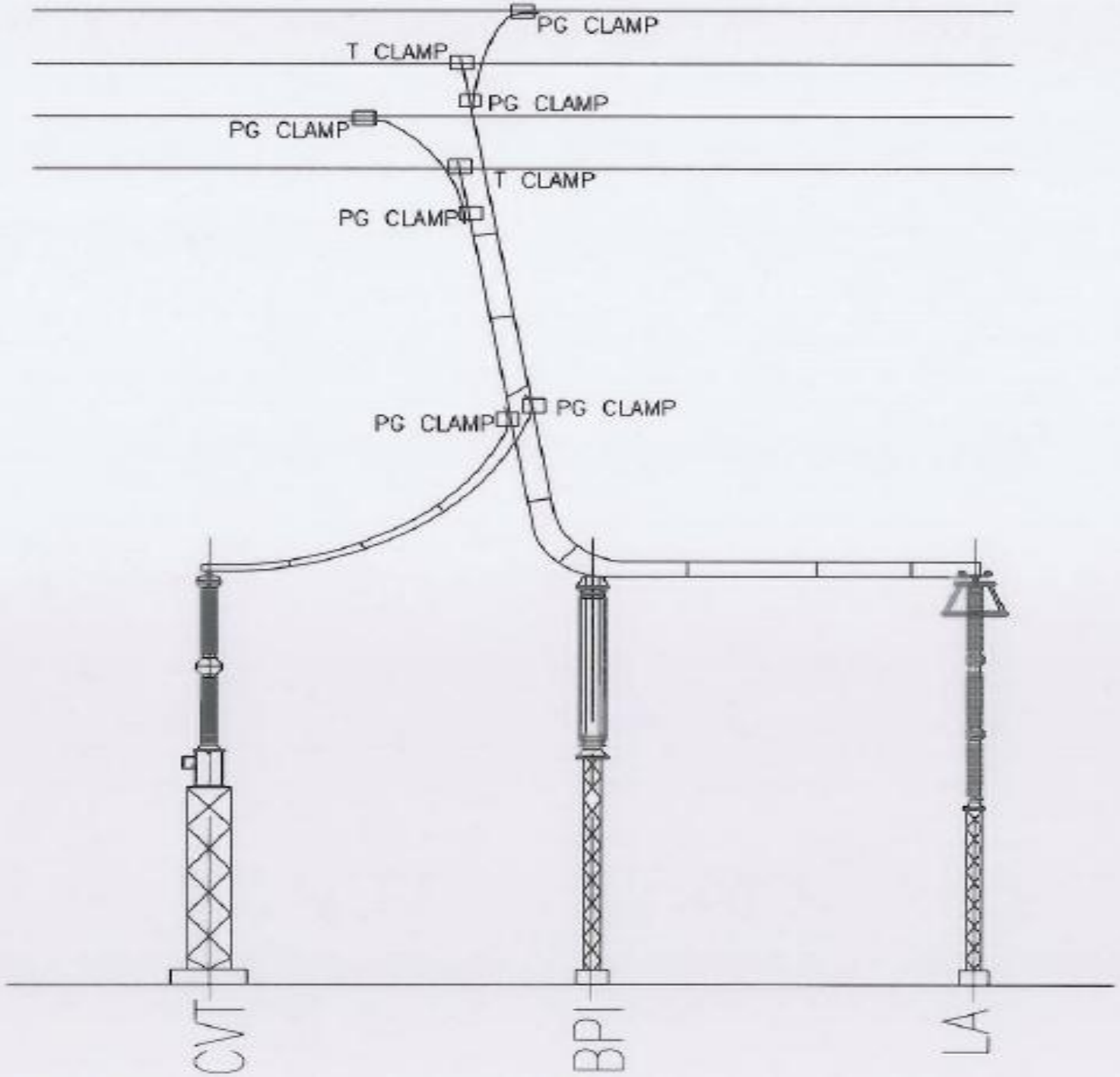
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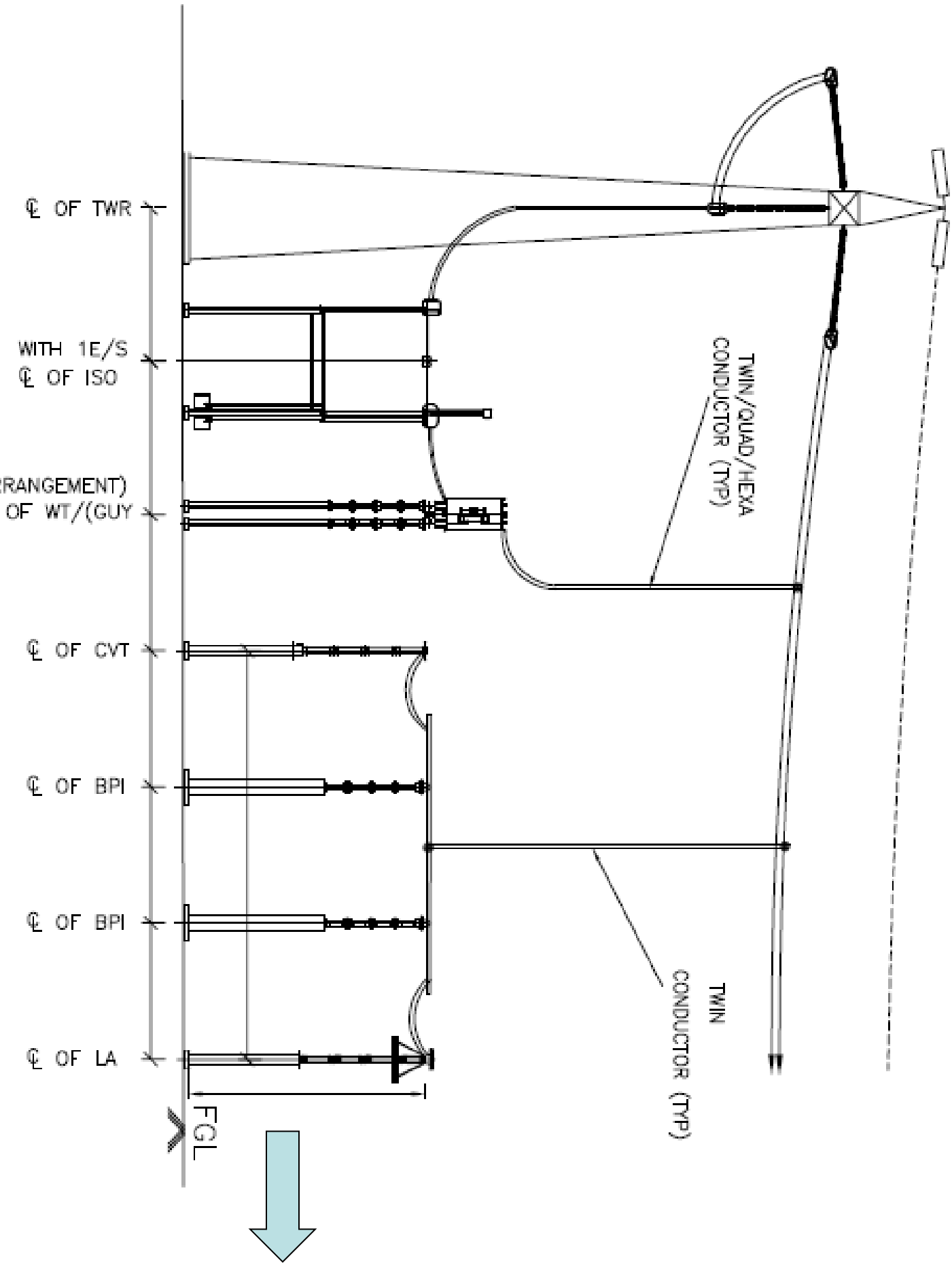
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