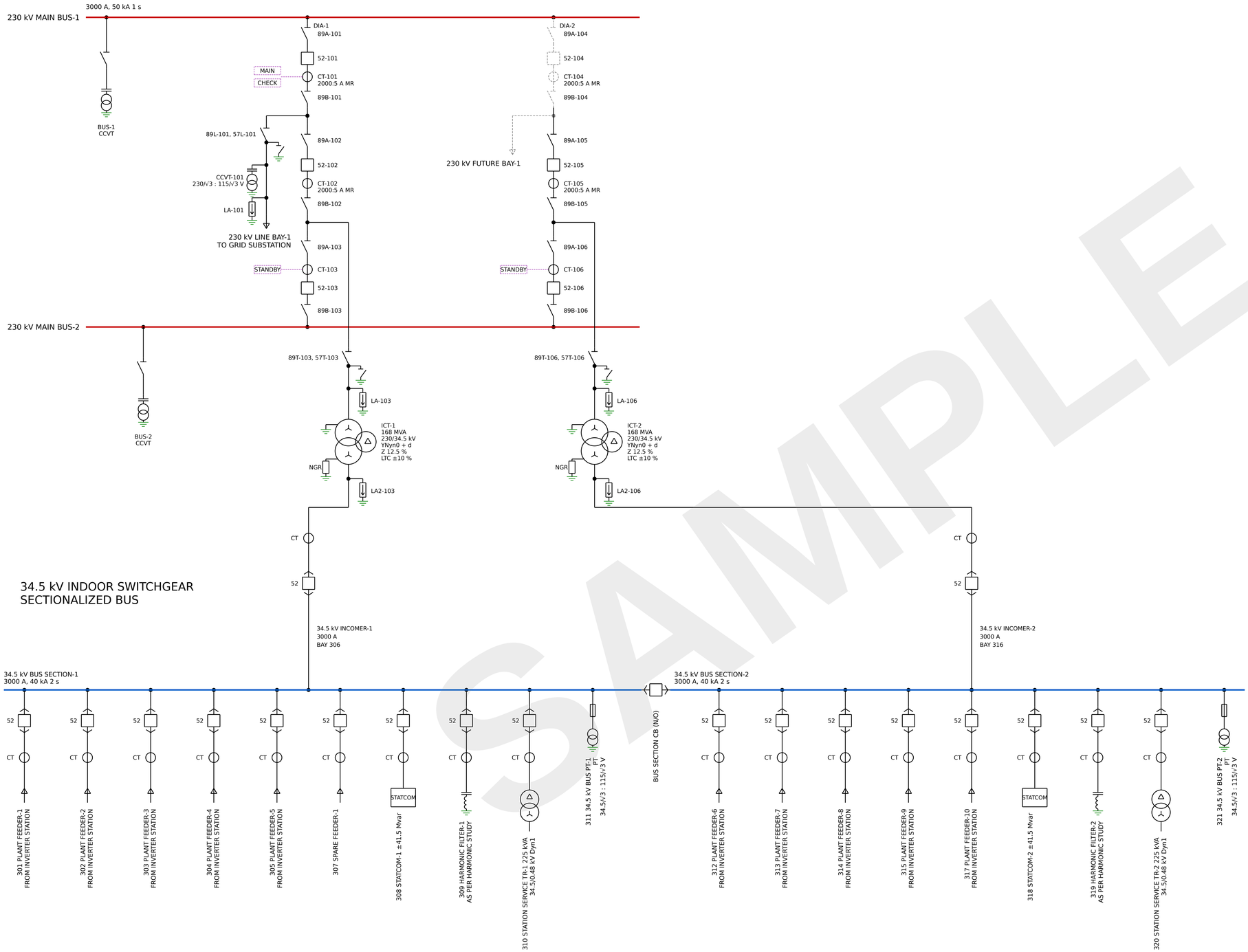
230 kV SWITCHYARD: AIS, ONE-AND-A-HALF BREAKER



34.5 kV INDOOR SWITCHGEAR SECTIONALIZED BUS

NOTES

1. Short-circuit ratings are checked in calculation SSL-C-SCC-001. The arrester rating follows the insulation coordination study and the STATCOM rating the reactive power study.
2. 230 kV: AIS, one-and-a-half breaker, 2 diameters. An incomplete diameter has its main and tie CBs, with space kept for the third CB. 34.5 kV: sectionalized bus, one section per transformer, bus-section CB normally open, indoor switchgear (drawout VCB).
3. Revenue meters: Main + Check on each 230 kV line, Standby on each transformer HV, from the summated main and tie CB CTs, on the metering cores of the CTs and CCVTs.
4. No wave trap: protection and SCADA over OPGW.
5. Standards: ANSI C84.1 voltages, IEEE C37.04-2018 ratings, IEEE C37.2 device numbers, IEEE C57.13 instrument transformers, RUS Bulletin 1724E-300 clearances.
6. Device function numbers of IEEE C37.2, then the bay: 52 AC circuit breaker, 89A / 89B the bus disconnect switches, in a diameter the disconnect switches either side of a breaker, 89L / 89T / 89R the line, transformer and reactor disconnect switches, 57 grounding switch. CT, CCVT and surge arrester by name. Bay numbers: 1xx the 230 kV yard, 3xx the 34.5 kV bus.

EQUIPMENT RATINGS

230 kV: rated maximum 245 kV, BIL 900 kVp, 50 kA 1 s.

230 kV bus 3000 A, bays 2000 A, surge arrester 180 kV.

Transformer: 2 × 168 MVA, 230/34.5 kV, YNyn0 + d tertiary, Z 12.5 %, LTC ±10 % in 1.25 % steps. ONAN/ONAF/ONAF 101/135/168 MVA.

34.5 kV: rated maximum 38 kV, BIL 200 kVp, 40 kA 2 s, surge arrester 30 kV.

34.5 kV bus 3000 A, incomers 3000 A, feeders 1200 A.

STATCOM 2 × ±41.5 Mvar.

230 kV CT 2000:5 A MR, 5 cores: 0.15B-1.8, 0.15B-1.8, C800, C800, C800, 45 VA. CCVT 230/√3 : 115/√3 V, 3 secondaries: 0.15, 0.3, 1.2, 50 VA.

34.5 kV CT: incomers 3000:5 A MR, feeders 1200:5 A MR, STATCOM 1200:5 A MR, harmonic filter 1200:5 A MR, station service TR 600:5 A MR, the same cores. Bus PT 34.5/√3 : 115/√3 V, 3 secondaries: 0.15, 0.3, 1.2, 50 VA.

Station service TR 2 × 225 kVA, 34.5/0.48 kV: one duty, one standby through a low-voltage transfer.

BAY NUMBERS

230 kV: 101 DIA-1 MAIN-1 (LINE BAY-1), 102 DIA-1 TIE, 103 DIA-1 MAIN-2 (ICT-1), 104 DIA-2 MAIN-1 (FUTURE BAY-1) (future), 105 DIA-2 TIE, 106 DIA-2 MAIN-2 (ICT-2).

34.5 kV: 301 PLANT FEEDER-1, 302 PLANT FEEDER-2, 303 PLANT FEEDER-3, 304 PLANT FEEDER-4, 305 PLANT FEEDER-5, 306 INCOMER-1, 307 SPARE FEEDER-1, 308 STATCOM-1, 309 HARMONIC FILTER-1, 310 STATION SERVICE TR-1, 311 34.5 kV BUS PT-1, 312 PLANT FEEDER-6, 313 PLANT FEEDER-7, 314 PLANT FEEDER-8, 315 PLANT FEEDER-9, 316 INCOMER-2, 317 PLANT FEEDER-10, 318 STATCOM-2, 319 HARMONIC FILTER-2, 320 STATION SERVICE TR-2, 321 34.5 kV BUS PT-2.

LEGEND

- Circuit breaker (SF6)
- Drawout VCB
- Disconnect switch
- Disconnect switch with grounding switch
- Current transformer
- Fuse
- CCVT
- Bus PT with fuse
- Surge arrester
- Transformer YNyn0 + d
- Station service transformer Dyn1
- Static synchronous compensator
- Harmonic filter
- Feeder from the plant
- Line to the grid
- Revenue meter
- Future bay

SubstationLayout			
REV	DATE	DESCRIPTION	BY
0	4 Nov 2026	Issued	Sample engineer

PROJECT	Sample 230/34.5 kV pooling substation
CLIENT	Sample client
LOCATION	Sample site
TITLE	KEY ONE-LINE DIAGRAM 230/34.5 kV POOLING SUBSTATION, 250 MW

	NAME	DATE
DRAWN	Sample engineer	4 Nov 2026
CHECKED	Sample engineer	4 Nov 2026
APPROVED	Sample engineer	4 Nov 2026

DRG. NO.	SSL-E-EKD-001	REV.	0
SCALE	NTS	SIZE ANSI D	Sheet 1 of 1

SAMPLE