Purpose of This Checklist

This checklist captures the engineering data needed to perform Short Circuit Studies, ensuring accurate fault analysis, reliable protection design, and full system security.

- Estimates are acceptable note them as 'approx.'
- Attach existing SLD, relay setting files, or test reports.
- Partial data is useful our engineers will follow up on gaps.

Project / Contact Details

Company / Organization:

Project Name :

Site / Facility Name:

Contact Name & Role :

Email Address :
Phone Number:
Date Submitted:

A. SYSTEM OVERVIEW & NETWORK CONFIGURATION

System Type	*Industrial / Utility / Renewable / Hybrid*	**Applicable Standards**	*IEC / IEEE / Utility-specific / All*
Voltage Levels in Network	*e.g. 132 kV / 33 kV / 11 kV / 415 V*	**Earthing / Grounding Philosophy**	*Solid / Resistance / Unearthed / Petersen coil*
Network Configuration	*Radial / Ring / Meshed / Mixed*	**Is Latest SLD Available?**	*Yes, attach / Partial / No*
Known System Issues / Constraints	*e.g. Known protection gaps, recurring faults, planned expansion, grid interface restrictions...*		

B. GRID / UTILITY FAULT DATA (Point of Common Coupling, PCC)

Maximum Fault Level at PCC	*e.g. 25 kA / 500 MVA (all sources connected)*	**Minimum Fault Level at PCC**	*e.g. 10 kA (weak grid / reduced generation)*
X/R Ratio at PCC	*e.g. 10 (from utility, affects DC offset)*	**Grid Grounding at PCC**	*Solid / Resistance / Unearthed*
Utility Protection Interface Requirements	*e.g. Anti-islanding, DTT, ROCOF, Vector shift*	**Fault Level Contribution (kA)**	*Positive / zero sequence if available*

C. EQUIPMENT ELECTRICAL PARAMETERS

Transformers

Tag / ID	Rating (MVA/kVA)	Voltage Ratio	% Impedance	Vector Group	Z0 / Grounding
e.g. TR-01	*10 MVA*	*33/11 kV*	*10%*	*Dyn11*	*Solid earth*

Generators / DG Sets / Inverter-Based Sources (IBR)

Tag / ID	Rating (MVA/kW)	Type	X"d / X'd	Neutral Grounding	Fault Contribution
e.g. GEN-01	*5 MVA*	*Sync / Async / IBR*	*0.15 / 0.25 pu*	*Resistance earthed*	*Confirmed / Estimated*

Motors

Motor ratings & locations	Sub-transient reactance X"d (if known)	Starting method	Neutral grounding
e.g. 630 kW MV motor, Compressor A	*e.g. 0.17 pu from datasheet*	*DOL / Soft starter / VFD*	*e.g. Resistance / Solid / Unearthed*

D. CABLE & NETWORK IMPEDANCE DATA

Positive, negative, and zero-sequence impedances are all required for accurate earth fault and SLG fault calculations. Zero-sequence data is frequently overlooked.

Cable / Feeder ID	From → To	Type & Size	Length (m)	R1 / X1 (Ω/km)	R0 / X0 (Ω/km)
e.g. CB-01	*Bus-A → TR-01 LV*	*XLPE 3×185mm²*	*350 m*	*0.099 / 0.08*	*0.31 / 0.25*

E. BUSBAR & SWITCHGEAR RATINGS

Bus / Panel ID	Voltage Level	Bus Rating (A)	SC Withstand (kA)	CB Breaking (kA)	CB Making (kA pk)
e.g. MV-BUS-01	*11 kV*	*1250 A*	*25 kA / 1 s*	*25 kA*	*63 kA*

Fuse details (if applicable)	*Rating, type, manufacturer, time-current curve ref*	Existing fault level utilization (%)	*e.g. 18 kA of 25 kA capacity = 72%*

F. PROTECTION SYSTEM DETAILS

Protection Relays

Relay Tag	Make & Model	Protection Functions	Location / Panel	Existing Settings?	Comms / Protocol
e.g. R-01	*SEL-751 / GE P14D*	*OCR, EFR, O/V, U/V*	*Feeder CB-01*	*Yes attach file*	*IEC 61850 / Modbus*

Current & Voltage Transformers (CT / VT)

CT/VT Tag	Location	Ratio	Class	Burden (VA)	Knee Point / ALF
e.g. CT-01	*Feeder CB-01*	*200/1 A*	*5P20*	*15 VA*	*e.g. Vk = 180 V / ALF 20*

Auto-reclosing schemes in use?	*Yes describe / No*	**Interlocking / busbar protection?**	*Yes describe / No*
Load shedding scheme?	*Yes describe / No*	**Backup protection philosophy**	*e.g. Time-graded IDMT / Definite time*
Special protection requirements or constraints	*e.g. Selectivity requirements, utility interface relay, arc flash limitation, protection for renewable source...*		

G. FAULT SCENARIOS, INSULATION & THERMAL DATA

Fault Study Scenarios Required tick all applicable

- ☐ 3-Phase symmetrical fault (all busbars)
- ☐ Line-to-Line (LL) fault
- ☐ Near-end feeder faults
- ☐ Transformer terminal faults (HV & LV)
- ☐ Minimum fault condition (weak grid / DG OFF)
- ☐ Islanded operation fault scenarios
- ☐ Single Line-to-Ground (SLG) fault
- ☐ Double Line-to-Ground (DLG) fault
- ☐ Far-end feeder faults
- ☐ Maximum fault condition (all sources ON)
- ☐ N-1 contingency (transformer / feeder outage)
- ☐ Motor starting voltage drop / fault contribution

Insulation Coordination

Equipment BIL (Basic Insulation Level)	*e.g. 95 kV BIL for 11 kV equipment*	**Lightning Impulse Withstand (kVp)**	*e.g. 95 kV from equipment test cert*

Switching Impulse Withstand (kVp)	*e.g. 250 kV (for HV systems)*	**System Maximum Overvoltage (pu)**	*e.g. 1.4 pu temporary / 1.7 pu transient*
Surge Arrester Ratings & Locations	*e.g. 10 kV MCOV at HV transformer terminals*	**Arrester Manufacturer / Model**	*e.g. ABB PEXLIM / Siemens 3EP*

Thermal & RMS Withstand

Cable short circuit withstand (I^2t)	*e.g. from cable datasheet, 185mm² XLPE*	**Maximum fault clearing time allowed**	*e.g. 0.5 s (protection must clear within this)*
Transformer damage curves available?	*Yes, attach ANSI / IEC curve / No*	**Motor thermal damage curves available?**	*Yes, attach / No / Not applicable*

H. EXISTING DATA, SITE HISTORY & STUDY OBJECTIVES

Documents & Data Available:

- ☐ Single Line Diagram (SLD) with protection devices
- ☐ Previous short circuit / protection study report
- ☐ CT / VT test records or excitation curves
- ☐ Generator / DG datasheets (reactance values)
- ☐ Arc flash study (if previously performed)
- ☐ Equipment nameplate photographs
- ☐ Relay setting files (*.rcp, *.iid, *.cfg, etc.)
- ☐ Transformer test certificates (impedance confirmed)
- ☐ Cable schedule with impedance data
- ☐ Fault / tripping history or event logs
- ☐ Utility interconnection agreement / requirements
- ☐ SCADA / DCS fault record exports

Known system issues / fault history	*e.g. Repeated nuisance tripping on feeder 3, upstream CB failing to clear, discrimination issue on LV board...*

Study Objectives

- ☐ Short circuit fault level calculation at all buses
- ☐ Selectivity / discrimination verification
- ☐ Earth fault protection design (SLG/DLG)
- ☐ Insulation coordination & surge arrester selection
- ☐ Grid code / utility compliance verification
- ☐ Arc flash assessment (IEEE 1584 / IEC 62271)
- ☐ Protection relay setting calculation & coordination
- ☐ Equipment protection adequacy check (SC rating vs fault level)
- ☐ Differential / distance protection setting
- ☐ RMS / transient overvoltage study
- ☐ Protection for renewable / inverter-based generation
- ☐ Other, describe below

Specific compliance or utility requirement	*e.g. DNO requires protection study before grid connection, utility has issued notice, permit/approval needed...*
Project completion timeline	*e.g. Grid connection approval needed by June / No fixed deadline*

COMPANY NAME

Full Name: _____
Designation: _____
Signature: _____
Date: _____

What Happens Next

Our engineer will review your form shortly and contact you.