Alectra Utilities
Distributed Energy Resource (DER)
Non-Micro Connection Information Package (>10kW)

Prepared by: Station Design – DER

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1. Introduction

This guideline provides a set of references that are intended to familiarize Alectra Utilities customers with the overall information and explain the process, requirements, and options for connecting generation facilities to Alectra Utilities' distribution or the sub-transmission system. This is a guide only; final design approval for all generators will be made by the Station Design - Distributed Energy Resource Team.

1.1. What is Alectra Utilities responsible for?

Alectra Utilities is responsible for the safety, reliability, efficiency of its distribution and sub-transmission system, and ensuring that the new generation connection does not adversely affect the distribution system or existing customers. Alectra Utilities is also responsible to serve as the liaison between the Generator and Hydro One Networks Inc.

1.2. What is the Generator (Customer) responsible for?

The Generator (Customer) is responsible for the safety, design, construction, operation, metering, protection and control, and maintenance of their generating facility.

The Customer must contact all applicable agencies involved and obtain all approvals prior to connection being permitted.

The Customer must ensure that all necessary submissions and agreements are completed, and all required payments have been made to Alectra Utilities and to Hydro One Networks Inc.

The Customer should consider using a consultant to assist with the connection requirements, process, and approvals.

1.3. What is the process for connecting a generator facility?

The process for connecting a generation facility to Alectra Utilities' distribution system depends on the size of the generation facility. Generator Classification as shown in the table below:

Generator Classification	Rating
Micro	≤ 10 kW
Small	a) ≤ 500 kW but > 10kW, connected on distribution system voltage < 15 kV
	b) ≤ 1 MW but > 10kW, connected on distribution system voltage ≥ 15kV
Mid-Sized	a) > 500 kW but ≤ 10 MW, connected on distribution system voltage < 15 kV
	b) > 1 MW but ≤ 10 MW, connected on distribution system voltage ≥ 15 kV
Large	> 10 MW

1.4. Alectra Utilities Service Area

Alectra East: Alliston, Aurora, Barrie, Beeton, Bradford West Gwillimbury, Markham, Penetanguishene, Richmond Hill, Thornton, Tottenham, Vaughan (Legacy PowerStream)

Alectra Central - South: Mississauga (Legacy Enersource)

Alectra Central - North: Brampton (Legacy Hydro One Brampton)

Alectra West: Hamilton, St. Catharines (Legacy Horizon)

Alectra Guelph: Guelph, Rockwood (Legacy Guelph Hydro)

2. Roles of government agencies and organizations

It is important for Alectra Utilities' customers to understand the roles of government bodies, agencies and organizations and their involvement in generation connections. Depending on the size, type, fuel, and location of generation facilities, the connection of the generation facility to the distribution system may require approvals from various regulators that govern the electricity industry in Ontario. Below are some of the relevant organizations you may need to engage for the connection of a generation facility.

Organization	Roles and Responsibilities
Ministry of Energy	• Establishes public policy and develops legislation and regulations relating to electricity • Legislative responsibility for the Independent Electricity System Operator (IESO), the Ontario Energy Board (OEB), and other agencies • Significant legislation: Electricity Act, 1998 and Regulations, Ontario Energy Board Act, 1998, Electricity Restructuring Act, 2004, Green Energy and Green Economy Act, 2009
Independent Electricity System Operator (IESO)	The Independent Electricity System Operator (IESO) operates and manages Ontario's electricity system at the generation and transmission level. It does not design, build or own the system; it co-ordinates how the system interacts and performs. The IESO monitors the performance, reliability and future adequacy of the system to provide electricity to Ontarians. The IESO creates electricity market rules, matches generation with load 24/7, establishes the Hourly Ontario Energy Price (HOEP) and settles wholesale electricity payments.
Ontario Energy Board (OEB)	• Regulates the electricity sector in Ontario. This includes generators, transmitters (greater than 50 kV) and distributors (less than 50 kV) • Issues licenses for generators, transmitters, distributors, and retailers • Responsible for protecting the interests of consumers with respect to prices, reliability, and adequacy and quality of electricity service • Approves the rates charged by transmitters and distributors • Creates codes and regulations for certain aspects of how transmitters and distributors conduct their business • Responsible for promoting economic efficiency of generation, transmission, and distribution.
Ontario Power Generation (OPG)	Ontario Power Generation (OPG) owns and operates most of Ontario's generating capacity. The Province of Ontario owns OPG.
Hydro One	• The province's largest transmission company • Owns the provincial transmission grid • Distributes electricity outside of the major urban centers • Supplies Local Distribution Companies (LDCs) from transformer stations and distribution stations • Owned by the Province of Ontario.
Electrical Safety Authority (ESA)	The Electrical Safety Authority (ESA) is responsible for ensuring that electrical equipment is installed safely and meets required standards in accordance with the Ontario Electrical Safety Code (OESC). Before connecting to Alectra Utilities' distribution system, the customer is required to have the ESA inspect their generation facility and provide an Authorization to Connect to their respective LDC.

Measurement Canada (MC)	Measurements Canada (MC) is a federal agency of Industry Canada with the mandate of regulating meters and metering throughout the country. MC administers the Electricity and Gas Inspection Act. R.S. 1985, C.E-4
Ontario Ministry of Environment (MOE)	The Ontario Ministry of Environment (MOE) sets environmental standards for electricity projects in Ontario and ensures that generators, distributors, and transmitters follow rules and standards when constructing and operating facilities.
Canadian Environmental Assessment Agency (CEAA)	The CEAA controls the federal environmental assessment process, and it applies whenever a federal authority has a specified decision-making responsibility for a project. Depending on the impact of the generation facilities on federal jurisdiction, a federal environmental assessment may be required.

3. Alectra Utilities Contact Information

a) Distributed Energy Resources - General Information:

Alectra Utilities Corporation
Stations Design – Distributed Generation
161 Cityview Boulevard
Vaughan, Ontario, L4H 0A9

Email: DER@alectrautilities.com
Phone: 905-283-3982

Note: Please ensure that all email correspondence includes the generator address, including town or city, in the subject line.

4. Alectra Utilities Reference Links

a) Alectra Utilities' Distributed Generation Main Home Page:
Link: alectrautilities.com/connecting-generation

b) PCIR – Preliminary Consultation Information Request:
Link: alectrautilities.com/sites/default/files/assets/AlectraDERCP-PreliminaryConsultationInformationRequest.pdf

c) Connection Impact Assessment (CIA) Application:
Link: alectrautilities.com/sites/default/files/assets/AlectraDERCP-ConnectionImpactAssessmentApplication.pdf

d) Alectra Utilities Study Agreement (for reference only)
Link: alectrautilities.com/sites/default/files/assets/pdf/AlectraUtilitiesStudyAgreement-Sample.pdf

e) Alectra Utilities Commissioning Verification Form (> 10kW)
Link: alectrautilities.com/sites/default/files/assets/pdf/AlectraUtilitiesCVF-Small-MidSizeGenerators.pdf

f) Alectra Confirmation of Verification Evidence Report (COVER) (≥ 10kW)
Link: https://alectrautilities.com/sites/default/files/assets/pdf/alectrautilitiesder-cover.doc

g) Connection Agreement (for reference only) (> 10kW)
Link: https://www.oeb.ca/documents/cases/EB-2005-0447/appendixe_201206.pdf#page=7

h) Remote Monitoring (RM) and Remote Shutdown (RS) Information Package
Link: https://alectrautilities.com/sites/default/files/assets/pdf/alectrautilitiesder-remotemonitoringinformation.pdf

5. Small, Mid-sized and Large DER (>10kW) Connection Process

a) Preliminary Consultation

Customer completes and submits a PCIR – Preliminary Consultation Information Request to Alectra Utilities at DER@alectrautilities.com.

Alectra Utilities establishes the generator classification and provides the connection details of the proposed project and available capacity.

1) **Simplified CIA Application Eligibility**

Requests which meet the criteria in the table below may be eligible for a simplified CIA. Alectra will indicate if the proposed project is eligible for a simplified CIA when providing the Preliminary Consultation Report (PCR).

Simplified CIA Eligibility	
Nameplate Size	**Distribution System Voltage**
10kW < size <= 30kW (Single Phase)	Any
10kW < size <= 50kW	<15kV
10kW < size <= 100kW	>=15kV

b) Connection Impact Assessment (CIA) Application

Customer completes and submits Connection Impact Assessment (CIA) Application and SLD to Alectra Utilities at DER@alectrautilities.com. The full package should be P. Eng stamped. A complete Form B includes the following items:

(i) Simplified SLD
(ii) SLD
(iii) Protection Philosophy (See Appendix A in this document for sample).
(iv) Site Plan
(v) Sequence of Operations
(vi) Operation Details (Appendix B or C in the CIA application)

c) Study Agreement and Form B Complete

Alectra Utilities issues a Study Agreement outlining the CIA cost and timeframe. Customer returns the signed Study Agreement along with payment for the CIA. Alectra Utilities reviews the Form B application in detail and once all requirements are met, a Form B Complete confirmation letter is sent to the customer.

d) Connection Impact Assessment (CIA)

The CIA looks at the generator's impact on power flow, feeder voltage, current loading, fault currents and power factor. For generators exceeding 500kW on a feeder fed from a Hydro One TS, Hydro One will be required to perform its own CIA, at additional cost to the customer.

Alectra Utilities performs a CIA and issues the report to the customer, which is valid for 6 months. If the CIA expires or the generator revises the original design, the customer must submit an updated P.Eng. stamped Form B and SLD along with payment for the revised CIA.

The Customer is allocated capacity upon completion of the CIA by Alectra Utilities and Hydro One (if applicable).

If the customer is satisfied with the results of the CIA and would like to proceed with the connection, Alectra Utilities will perform a connection cost estimate.

e) Connection Cost Agreement

The Connection Cost Agreement (CCA) specifies the scope of work to be performed by Alectra Utilities and/or the customer to complete the generation connection including, the costs associated with such work, the connection date, and any requirements that must be met.

For generators connecting on a Hydro One shared feeder or to a Hydro One Station, Hydro One will be required to perform its own CCA and the associated costs will be included in the CCA provided by Alectra Utilities.

If the Customer decides to proceed with the project, Customer signs the CCA and makes the required payments.

Please note, an applicant shall have its capacity allocation removed if a connection cost agreement has not been signed in relation to the connection of the embedded generation facility within 6 months of the date on which the applicant received a capacity allocation for the proposed embedded generation facility. (DSC 6.2.4.1)

f) SCADA Monitoring

If applicable, Alectra Utilities issues the Remote Monitoring Control Form to the customer. Customer completes the necessary fields and returns the document to Alectra Utilities.

g) Design and Build

Alectra Utilities performs the work required to make the connection. The customer completes the construction of the generation facility and applies to the Electrical Safety Authority (ESA) for an electrical inspection. The customer submits final detailed design documents to Alectra Utilities for review.

h) Commissioning

Customer confirms that communication is established with Alectra Utilities for generation metering and SCADA monitoring, as required.

Customer completes and submits Alectra Commissioning Verification Form or Alectra COVER where applicable.

Alectra Utilities may request to witness all testing and commissioning.

i) Connection Agreement

Alectra Utilities will require the following documentation for the Connection Agreement:

i) Single Line Diagram (as built)
ii) Contact Information (Owner, Contractual, and Operational contacts)
iii) Certificate of Insurance
iv) Commissioning Report
v) Alectra Utilities confirmation of metering requirements, if applicable
vi) Alectra Utilities confirmation of remote monitoring, if applicable

The Connection Agreement will detail any operating conditions and responsibilities. For projects equal to or greater than 100kW, a separate Operating Agreement will be required.

Alectra Utilities issues the Connection Agreement to be executed with the load customer. Customer completes and submits the Connection Agreement prior to energization.

j) Connect, Operate and Maintain

When the Commissioning Report is approved, the final ESA Connection Authorization is received, and the Connection Agreement (and the Operating Agreement, if applicable) is signed, Alectra utilities will authorize connection of the generation facility to the Alectra Utilities distribution system.

Note: The ESA “Connection Authorization” is sent to Alectra Utilities directly from the Electrical Safety Authority.

Alectra Utilities will work with the customer to set up the appropriate settlement arrangement based on the project type.

6. Fees Schedule

Please note as Alectra is going under consolidation, the applicable fees may change at any point.

6.1. Connection Impact Assessment Fees (> 10kW)

DER projects >10kW are subject to Alectra Connection Impact Assessment (CIA) fee schedule below as of June 2nd 2025. This is also available on our website: here.

The following fees are to complete the Connection Impact Assessment study only. Additional interconnection cost will apply based on each project during the Connection Cost Agreement Stage.

Alectra CIA Fee Schedule				
Nameplate Size	**Distribution System Voltage**	**CIA Fee**	**HST**	**Total (Including HST)**
10kW < size <= 30kW (Single Phase)(Simplified CIA)	Any			
10kW < size <= 50kW (Simplified CIA)	<15kV	$ 500.00	$ 65.00	$ 565.00
10kW < size <= 100kW (Simplified CIA)	>=15kV			
10kW < size <= 50kW	Any	$ 1,500.00	$ 195.00	$ 1,695.00
50kW < size <= 500kW	Any	$ 2,500.00	$ 325.00	$ 2,825.00
Size < 1MW	Any	$ 4,000.00	$ 520.00	$ 4,520.00
1MW <= size < 10MW	Any	$ 6,000.00	$ 780.00	$ 6,780.00
size >= 10MW	Any	$ 8,000.00	$ 1,040.00	$ 9,040.00
Re-CIA Original (expired CIA with same design)	-	$ 500.00	$ 65.00	$ 565.00
Re-CIA Original (revised CIA with different design)	-	$ 1,000.00	$ 130.00	$ 1,130.00

For generators on a feeder fed from a Hydro One Transmission Station, Hydro One will be required to perform its own CIA (Detailed Technical Connection Assessment - 'DTCA'), at an additional cost to the customer. Alectra will apply on the customer's behalf to Hydro One DTCA.

You can find Hydro One fee, under section 'Greater than CAE – Capacity Allocation Required Projects' at: https://www.hydroone.com/business-services/commercial-industrial-generators-and-ldcs/connection-impact-assessment

6.2. Connection Cost Agreement Fees (> 10kW)

Generators >10kW will require to pay Alectra Connection Cost Agreement (CCA) fees. This is cost is specific to each project based on the design, requirements, and available solutions. This cost will be specified in the Alectra CCA (Connection Cost Agreement).

Generators connecting on a Hydro One shared feeder or to a Hydro One Station, Hydro One will be required to perform its own CCA (CCRA) and the associated costs will be included in the CCA provided by Alectra Utilities.

Customer is required to pay both Alectra and Hydro One cost if they wish to proceed with the project.

7. Payment Instructions

Customer is to advise DER once payment has been sent. DER will follow up internally to confirm receipt.

7.1 Cheques

a) Payments are done by a cheque payable to "Alectra Utilities Corporation"
b) Confirm the expected day to receive the cheque.
c) Cheque Memo should state: "[address] – DER – [CIA or CCA] fee"
d) Send a scan of the cheque to DER@alectrautlities.com ('reply all' to this email).
e) Mail the cheque to the below address:

Alectra Utilities
55 John Street North, Hamilton, Ontario, L8R 3M8
Attn: Payments 2nd Floor

7.2 EFT

a) Add a memo on the EFT, if possible: "DER – [address] – [CIA or CCA] fee".
b) Fill in the EFT Remittance Form below and send to EFT@alectrautilities.com once completed.

7.2.1 EFT Remittance Form

EFT Notification Advise - Alectra Utilities
Please update remittance information to the chart below

Work Order # required to ensure payment is processed

Remittance Total **$0**

Project Name	Project address	Work Order #	Customer Name	NS or UPS #	Remittance Amount	Deposit Date	Design Technologist
[address or project name]	[address, city, postal code]	TBD by Alectra	TBD by customer	N/A	TBD by customer	TBD by customer	TBD by Alectra

Alectra Electronic Payment (EFT) Details

VENDOR INFORMATION

VENDOR NAME	ALECTRA UTILITIES CORPORATION
ADDRESS	P.O. BOX 3700
CITY	CONCORD
PROVINCE	ONTARIO
POSTAL CODE	L4K 5N2
HST Number	728604299
TELEPHONE NUMBER	1-833-ALECTRA (253-2872)

REMITTANCE EMAIL: EFT@alectrautilities.com

** Payment details including Alectra Account number, payment amount, payment date to be sent to the above email

BANK INFORMATION

FINANCIAL INSTITUTION	ROYAL BANK OF CANADA
BANK ADDRESS	Main Br – Toronto, 200 Bay St., Main Floor
CITY	TORONTO
PROVINCE	ONTARIO
POSTAL CODE	M5J 2J5

BANK ACCOUNT DETAILS

INSTITUTION #	003
TRANSIT/BRANCH	00002
BANK ACCOUNT #	1441195
SWIFT Address	ROYCCAT2
CURRENCY	CANADIAN

Please note that banks in Canada do not use IBAN numbers. If the banking information changes, you will be notified.

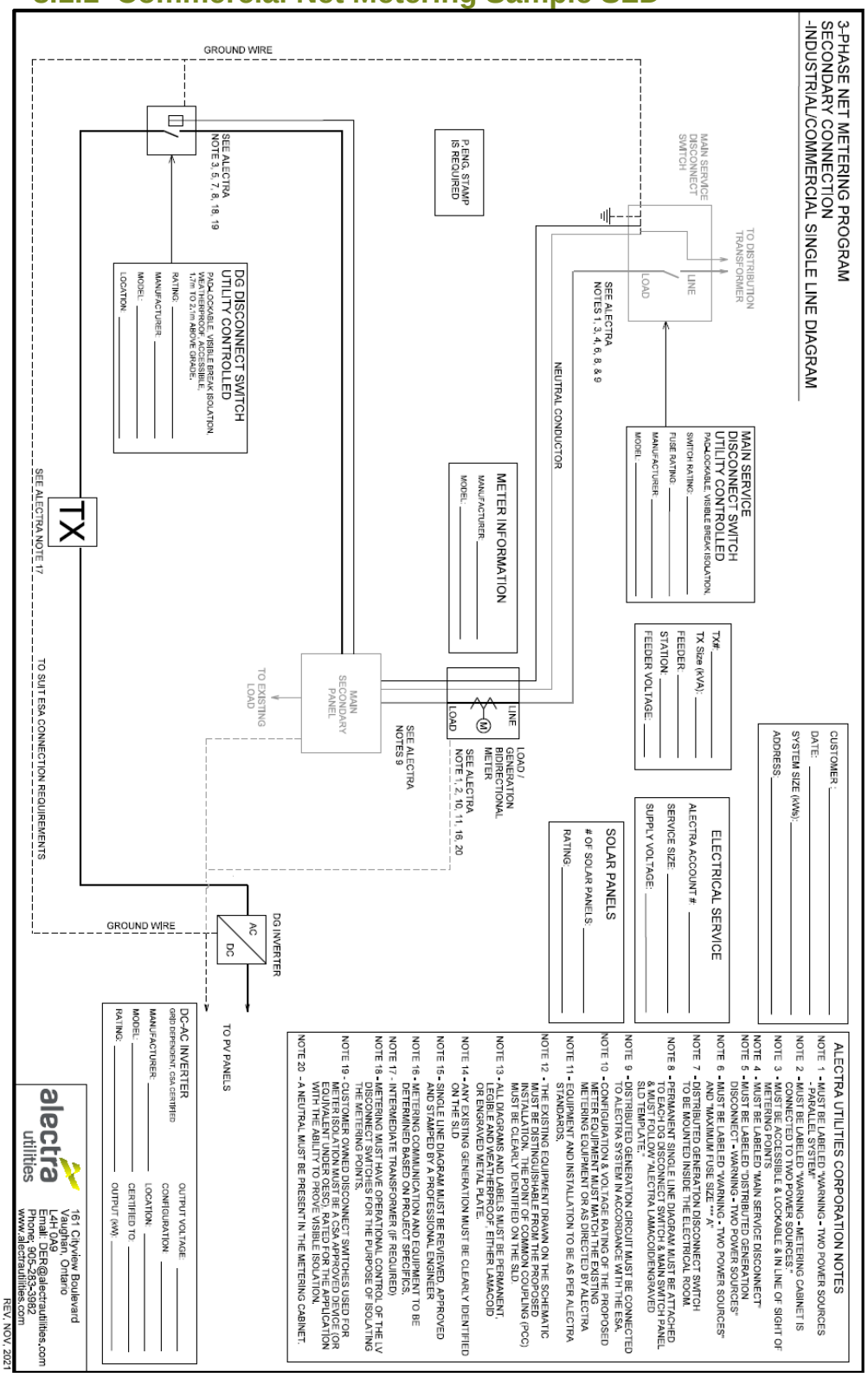
8. Technical Requirements

8.1. Sample Single Line Diagram (SLD)

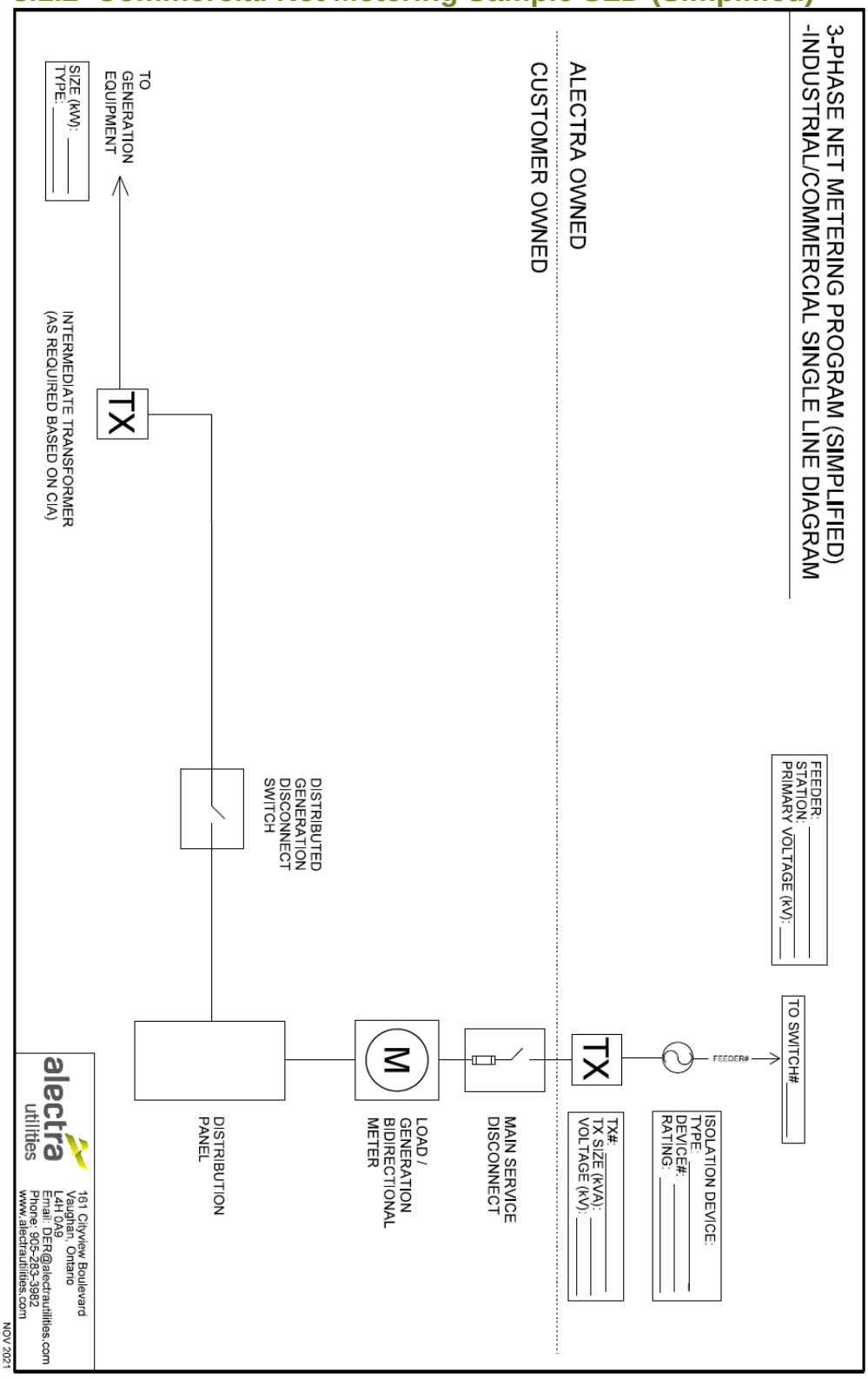
The following are sample SLD for the most common types of projects received in Alectra territory as a general guideline to minimum requirements to be shown on the applicable project's SLD. The provided sample SLDs are for parallel secondary connections. Alectra may apply additional and/or different requirements based on each project specific details. The following serve as a sample only, as the customer must create their own SLD. Alectra does not accept simply filled sample SLD.

Please refer to the next pages for sample SLD based on project type.

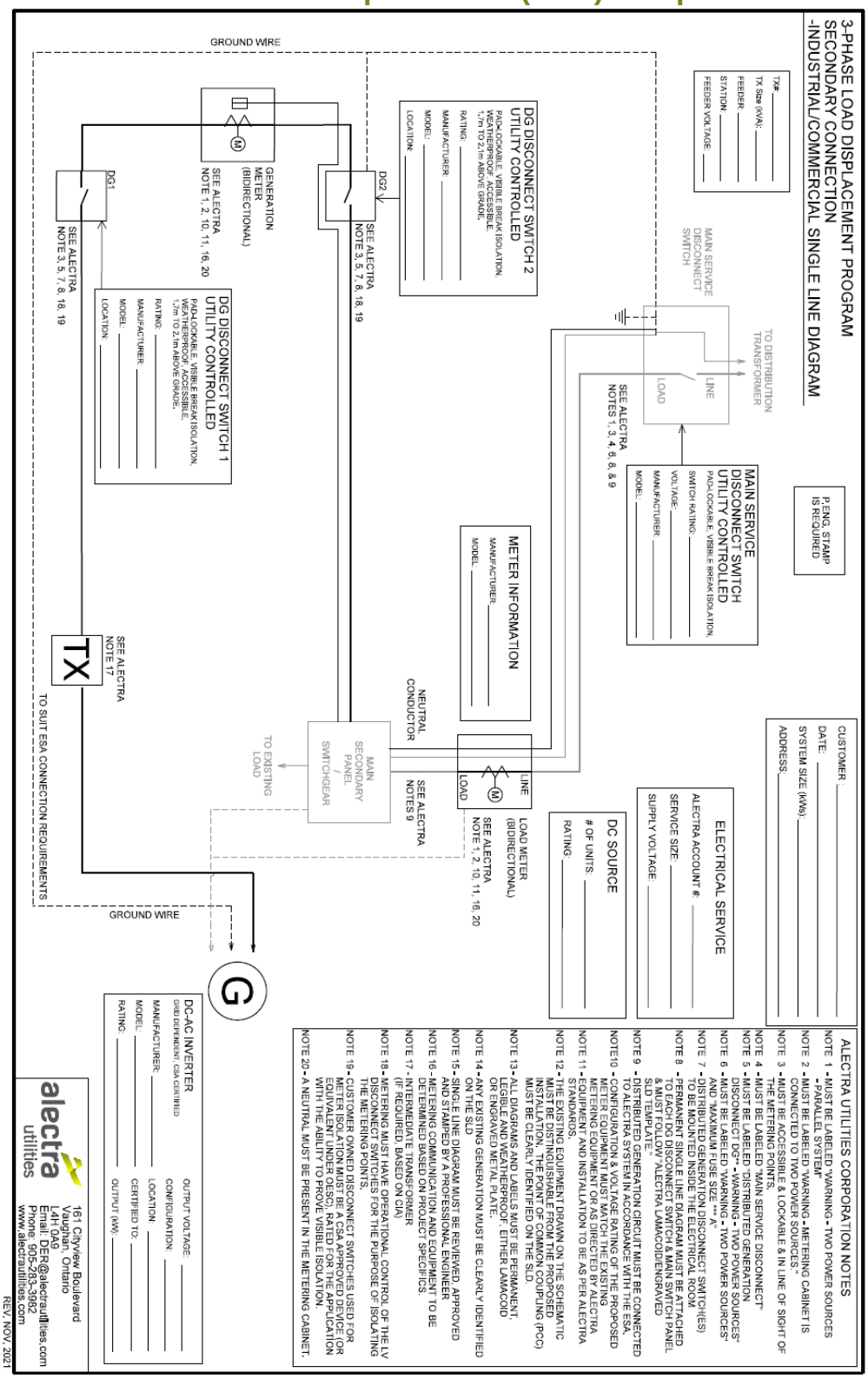
8.1.1 Commercial Net Metering Sample SLD



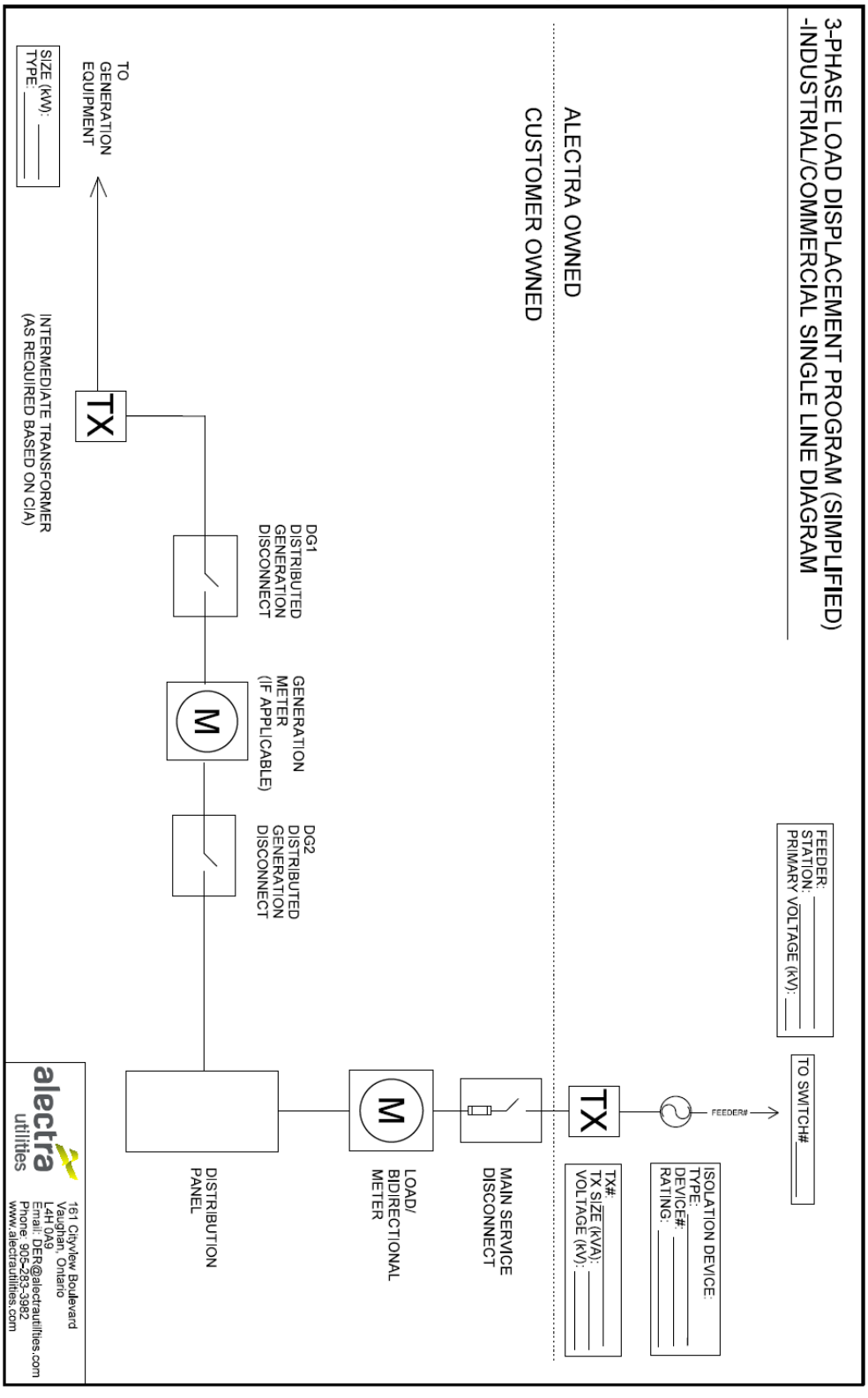
8.1.2 Commercial Net Metering Sample SLD (Simplified)



8.1.3 Commercial Load Displacement (GLB) Sample SLD



8.1.4 Commercial Load Displacement (GLB) Sample SLD (Simplified)



8.2 List of Labels

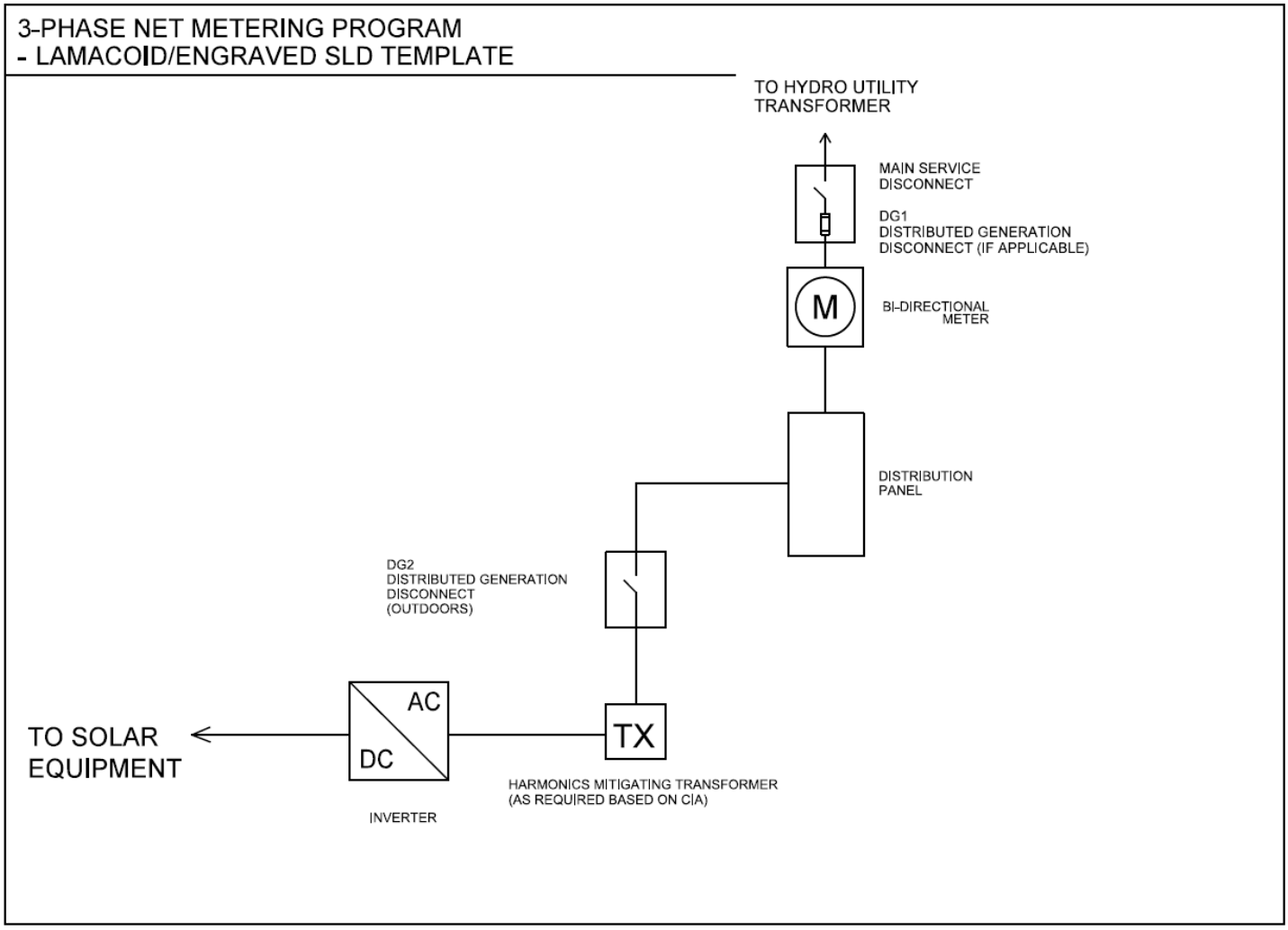
Three Phase DER project – Labeling Requirements

All Labels must be Lamacoid Engraved.

Location of Labels	Label Contents
Main Service Disconnect Switch	1) "MAIN SERVICE DISCONNECT" 2) DISTIBUTED GENERATION DISCONNECT DG1" (if applicable) 3) "WARNING – TWO POWER SOURCES PARALLEL SYSTEM" 4) Single Line Diagram 5) "MAXIMUM FUSE …A"
Main Service Metering Cabinet	1) "WARNING – TWO POWER SOURCES PARALLEL SYSTEM" 2) "WARNING – METERING CABINET IS CONNECTED TO TWO POWER SOURCES. DG2 AND MAIN SERVICE DISCONNECT SWITCH (AND/OR DG1) MUST BE OPENED AND LOCKED OUT PRIOR TO OPENING METERING CABINET" 3) Single line Diagram
Distributed Generation Disconnect DG	1) "DISTRIBUTED GENERATION DISCONNECT DG2" 2) "WARNING – TWO POWER SOURCES" 3) Single Line Diagram 4) "MAXIMUM FUSE …A" (if applicable)

8.3 Sample Lamacoid

8.3.1 Three Phase DER project – Lamacoid SLD Sample



8.4 List of Approved Meter Bases

METRIC LINEAR DIMENSIONS IN MILLIMETER	No.	Revision	Drawn by	Checked by	Apprvd by	Date	Std. No. (1 of 2) 20-0001
	-	-	-	-	-	-	

	Table No.	120/240V 1-Phase, 3-Wire	SERVICE SIZE (Main Panel)		METER BASE † (O/H) – LOCATED OUTSIDE Hydel	Eaton Cutler-Hammer	Microlectric	Reference Alectra Metering Standards
RESIDENTIAL	1	4-Jaw	Up to 200 A		EK400RO	LM2	BS2-TCV	Std. 20-0020 Std. 20-0040
					METER BASE † (U/G) – LOCATED OUTSIDE			
	2	4-Jaw	Up to 200 A	Single dwelling	MSC400TW	CLX	MO2-VO	Std. 20-0030 Std. 20-0070
				Townhouse	MSC400TW-3	-	-	
		5-Jaw	400A (Complete with current transformer)		CT4-TS5	TCC5-TH	-	Std. 20-0210
		5-Jaw	400 A or Larger (w/ 20 A Remote Meter)		CTS409PW	TCC5-0	CL5-V	Std. 20-0250 Std. 20-0211
					METER BASE † (O/H) – LOCATED OUTSIDE			
	3	4-Jaw	2 Multiple Positions: 200 A Main & 200 A / Position		HC22R	-	BDA2-V BDA2-VH	Std. 20-0050
		4-Jaw	3 Multiple Positions: 200 A Main & 200 A / Position		HC23R	-	-	
		4-Jaw	4 Multiple Positions: 200 A Main & 200 A / Position		HC24R	-	-	
					METER BASE † (U/G) – LOCATED OUTSIDE			
	4	4-Jaw	2 Multiple Positions: 200 A Main & 200 A / Position		MSC22R	2KU2CLX	BDC2-V BDC2-VH	Std. 20-0060 Std. 20-0080
		4-Jaw	3 Multiple Positions: 200 A Main & 200 A / Position		MSC23R	3KU2CLX	BDC3-V	
		4-Jaw	4 Multiple Positions: 200 A Main & 200 A / Position		MSC24R	4KU2CLX	BDC4-V	

† - Other meter bases may be approved by Alectra through the regular evaluation process if they provide functionality not provided by the listed meter bases. Final approval is not guaranteed.

	Table No.	120/240V 1-Phase, 3-Wire	SERVICE SIZE (Main Panel)	METER BASE † (O/H) – LOCATED OUTSIDE Hydel	Eaton Cutler-Hammer	Microlectric	Reference Alectra Metering Standards
INDUSTRIAL/COMMERCIAL	5	4-Jaw	Up to 200 A	EK400RO	LM2	BS2-TCV	Std. 20-0020 Std. 20-0040
				METER BASE † (U/G) – LOCATED OUTSIDE			
	6	4-Jaw	Up to 200 A	MSC400TW	CLX	MO2-VO	Std. 20-0030 Std. 20-0130
		5-Jaw	400A (Complete with current transformer)	CT4-TS5	TCC5-TH	-	Std. 20-0210
		5-Jaw	400 A or Larger (w/ 20 A Remote Meter)	CTS409PW	TCC5-0	CL5-V	Std. 20-0250
				METER BASE † (U/G) – LOCATED INSIDE			
	7	347/600 V & 120/208 V 3-Phase, 4-Wire	100 A	SFC703PW	P27-0-IN2	PL17-IN-TCV	Std. 20-0160 Std. 20-0170 Std. 20-0180
			200 A	STC703RK		PL27-IN-TCV	
		120/208 V 2-Phase, 3-Wire 5-Jaw*	Up to 200 A	MSC400TW*	CLX*	MO2-VO*	Std. 20-0160 Std. 20-0170 Std. 20-0180
		600 V 3-Phase, 3-Wire	100 A	SE400RW-SXK503	-	BE1-TCV ††	
			200 A	EK400RO-SXK503	-	BS2-TCV ††	
				ENCLOSURE (U/G) – LOCATED OUTSIDE[a]			
	8	ALL (1-Phase & 3-Phase) for meterbase selection consult w/ Metering	Up to 200 A	>1200mm x 1200mm x 300mm(48"x48"x12") FOR METER BASE & DISCONNECT SW OR			Std. 20-0130 Std. 20-0140 Std. 20-0150
				>900mm x 600mm x 300mm (36" x 24" x 12") FOR METER BASE ONLY			
				ENCLOSURE (U/G) – LOCATED INSIDE[b]			
	9	120/240V (1-Phase, 3-Wire) for meterbase selection consult w/ Metering	600 A	>900mm x 900mm x 300mm (36" x 36" x 12") FOR INSTRUMENT TRANSFORMER			Std. 20-0250
		347/600 V & 120/208 V 3-Phase, 4-Wire for meterbase selection consult w/ Metering	400 A and 600 A	>1200mm x 1200mm x 300mm(48"x48"x12") FOR INSTRUMENT TRANSFORMER AND >300mm x 300mm x 150mm (12" x 12" x 6") FOR COMMUNICATION			Std. 20-0240
			800 A TO 7000 A (EQUIPPED W/ SWITCHBOARD)	>500mm x 635mm x 165mm (20" X 25" x 6.5") FOR INSTRUMENT TRANSFORMER			Std. 20-0310

* - Must have 5th Jaw at 9 O'clock position. A sample installation is at an apartment
† - Other meter bases may be approved by Alectra through the regular evaluation process if they provide functionality not provided by the listed meter bases. Final approval is not guaranteed.
†† - Must order with 5th jaw, standard or full capacity, at 9 O'clock position
a - Minimum 14 gauge, CSA approved, Minimum NEMA 3 Stainless Steel
b - Minimum 14 gauge, CSA approved, Minimum NEMA 3

alectra utilities	Construction Standard Certificate of Approval The Construction Standard meets the safety requirements of Section 4 of Regulation 22/04 Al Fernandez (Name) 06/2024 (Date) P.Eng. (Signature & Professional Designation)	ORIGINAL Drawn by: J.I. Checked by: S.I. Approved by: A.F. Date: Jun-2024	Title: APPROVED LIST OF METER BASES, ENCLOSURES, PEDESTALS AND FOUNDATIONS

METRIC LINEAR DIMENSIONS IN MILLIMETER	No.	Revision	Drawn by	Checked by	Apprvd by	Date	Std. No. (2 of 2) 20-0001
	-	-	-	-	-	-	

INDUSTRIAL / COMMERCIAL / RESIDENTIAL (AS APPROVED)

Table No.	120/240V 1-Phase, 3-Wire	SERVICE SIZE	METER BASE † (U/G) – LOCATED OUTSIDE				REFERENCE ALECTRA METERING STANDARDS
		400 A Main 200 A Position	Hydel	Eaton Cutler-Hammer	Microlectric L.H. Entry	Microlectric R.H. Entry	
10	4-Jaw	2	MSC42TW	2K4	BS42-V	BS42-V-H	Std. 20-0220 Std. 20-0230
		3	MSC43TW	3K4	BS43-V	BS43-V-H	
		4	MSC44TW JAL40R *	4K4	BS44-V	BS44-V-H	
		5	MSC45TW	5K4	BS45-V	BS45-V-H	
		6	MSC46TW	6K4	BS46-V	BS46-V-H	

† - Other meter bases may be approved by Alectra through the regular evaluation process if they provide functionality not provided by the listed meter bases. Final approval is not guaranteed.
* - This meter base is only approved for use where the ESA/OESC requires an upstream protective device for the individual service/position cable.

RESIDENTIAL

Table No.	120/240V 1-Phase, 3-Wire	STACKABLE MODULE † (U/G) - LOCATED OUTSIDE	MANUFACTURER	MODEL NUMBER	REFERENCE ALECTRA METERING STANDARDS
11	4-Jaw	400 A MAIN CIRCUIT BREAKER	EATON	1PMB400R ‡	Std. 20-0360
		600 A MAIN CIRCUIT BREAKER	EATON	1PMB600R ‡	
		6 - METER STACK 125 A / METER SOCKET	EATON	C1MM612R * ‡	

† - Other stackable modules may be approved by Alectra through the regular evaluation process if they provide functionality not provided by the listed stackable modules. Final approval is not guaranteed.
* - As per manufacturer, the fifth jaw at 9 o'clock position is included (Note: To be removed by the Customer as Alectra does not require this feature)
‡ - Consult manufacturer instructions for additional components required when installing AWG 500kcmil or AWG 750kcmil cable.

PEDESTALS AND FOUNDATIONS

Table No.	MANUFACTURER	MODEL NUMBER	DIMENSION (L x D x H) in mm (inches)	FOUNDATION	REMARKS	REFERENCE ALECTRA METERING STANDARDS
12	Pedestal Solutions Inc.	HSLM27-Typical	457.2 mm x 508 mm x 688.98 mm (18" x 20" x 27.125")	UP2022 (Utilicon)	Can be used with BS2-TCV or equivalent †††	Std. 20-0120 Std. 20-0260
	Pedestal Solutions Inc.	SLM42 - Typical	457.2 mm x 508 mm x 1069.98 mm (18" x 20" x 42.125")	UP2022 (Utilicon)	Can be used with BS2-TCV or equivalent †††	
	Pedestal Solutions Inc.	SLT-Typical	457.2 mm x 203.2 mm x 1879.6 mm (18" x 8" x 74")	UP1420 (Utilicon)	Can be used with BS2-TCV or equivalent †††	
	The Durham Company	SKT/SW/PED 20A 5T DB FW	184.15 mm x 88.9 mm x 1524 mm (7.25" x 3.5" x 60")	With Stabilizer Foot included	Factory Wired, 5 Terminal Non-Circuit Closing Socket	
	The Durham Company	1 SKT/PED 20A 5T PM	368.8 mm x 330.2 mm x 1168.4 mm (14.52" x 13" x 46")	UP1420 (Utilicon)	Factory Wired, 5 Terminal Non-Circuit Closing Socket	

Note: Other pedestals may be approved by Alectra through the regular evaluation process if they provide functionality not provided by the listed pedestals.
††† - Consult manufacturer for other meter bases that would fit pedestal.

alectra utilities	Construction Standard Certificate of Approval The Construction Standard meets the safety requirements of Section 4 of Regulation 22/04 Al Fernandez — Name 06/2024 — Date P.Eng. — Signature & Profesional Designation	ORIGINAL Drawn by: J.I. Checked by: S.I. Approved by: A.F. Date: Jun-2024	Title: APPROVED LIST OF METER BASES, ENCLOSURES, PEDESTALS AND FOUNDATIONS

8.5 Small, Mid-Sized or Large DER Design Requirements:

8.5.1 Three Phase DER Design Requirements:

As per sample, the SLD should include the following items:

a) Show disconnects
b) Show step-up transformer (if applicable)
c) Show meter and disconnects location in electrical room
d) Show where connection to existing service is to be made.

8.5.2 Three Phase Metering Requirements:

Customer to:

a) Supply and mount a single line diagram and a plan view next to main meter.
b) Install an isolation device, within line of sight, before and after the generation metering cabinet/base on load side, connected in parallel with distribution panel.
c) All metering and DG disconnect switches to be mounted inside main electrical room.
d) Please refer to the “Approved List of Meter Bases, Enclosures, Pedestals and Foundations” for a list of acceptable equipment.
e) Ensure location of installed meter socket is compliant with building and fire codes to ensure safe accessibility.
f) All installation must meet Alectra Metering Standards.
g) Generation metering (Gross Load Billing – GLB metering) may be on the utility side of the customer’s intermediate transformer. This ensures that the customer’s intermediate transformer losses are captured.
h) The metering is to be for three (3) phase, four (4) wire.
i) A neutral connection is required for Generation metering (Gross Load Billing – GLB metering) metering and the customer is required to install neutral wiring to the GLB metering cabinet
j) Metering Communication and equipment to be determined based on the project specifics.
k) Metering must have operational control of the LV disconnect switches for the purpose of isolating the metering points.

l) Sites that have a switch gear with a meter cabinet
   i) The cabinet must be CSA approved and be listed as a metering cabinet.
   ii) Please provide the date that the metering cabinet and its associated equipment will be installed

Alectra Utilities to:

a) Supply and install new generation meter(s) based on the CIA.

8.5.3 Three Phase DER Project Requirements

a) The customer must design and submit a Single Line Diagram (SLD) of the proposed project. The customer must provide an original SLD.
b) The electrical Single Line Diagram (SLD) should show all primary and secondary voltage facilities connected to the generator(s) including any interlocking schemes, rating of protective devices or fuses, primary and secondary switchgear, and metering facilities.
c) The voltage rating and phase configuration of the proposed generation connection must match the existing load connection.
d) The customer shall supply and install the Distributed Generation (DG) disconnect switch(es). The Distributed Generation (DG) Disconnect Switch:
   i. Must be a CSA Approved device (or equivalent under the OESC), rated for the application.
   ii. Shall have a visible break isolation
   iii. Should be accessible, weatherproof, and pad-lockable from outdoors.
e) If applicable, the main service disconnect switch may be used as DG disconnect switch(es), subject to inspection and approval from Alectra Utilities' Metering department.
f) For >10kW projects, a Connection Impact Assessment (CIA) is required. The customer must submit a completed SLD and "Form B", all of which must be sealed and signed by a Professional Engineer. To cover the CIA cost, the customer must submit a payment depending on the project size. The connection cost will be outlined in the Connection Cost Agreement (CCA).

g) The customer must supply and install all labels at the specified locations according to the “Labelling Requirements for Three-Phase Projects” list. Please note that all labels must be lamacoid engraved.
   i. Generation meter
   ii. Generation disconnects
   iii. Caution – Main building service – 2 power supplies
h) The project will be subject to Alectra Utilities site inspection, if required.
i) The Customer shall provide the following information for review and approval by the DER team, as requested:
   i. Trip settings and delays at the interface devices;
   ii. A coordination study of all levels of protective devices is to be performed. The time current characteristics shall be plotted on a log-log graph paper.
j) Alectra Utilities shall connect the project to its distribution system after the following occurring:
   i. ESA provides Authorization to Connect directly to Alectra Utilities;
   ii. Alectra Utilities inspector and metering department authorize connection;
   iii. Project has satisfied all applicable service conditions and received all necessary approvals; and
   iv. The customer enters into a Connection Agreement with Alectra Utilities.

9. Appendices

Appendix A - Sample Protection Philosophy for Battery Energy Storage System

Sample Protection Philosophy for Distributed Energy Resource Proponents Applying for Connection (DERCP Appendix A)

This document is a summary of a sample protection philosophy for non-exporting, inverter-based (NE/I) connections including storage, solar, and wind. The OEB intends it as a guide for applicants regarding the kinds of protections, and particularly the categories of protections, that distributors will require for connection.

This is one example of a protection philosophy that would meet the requirements for a complete protection philosophy for the purpose of a CIA application[4]. Other philosophies may also meet the standards. It provides guidance to a distributed energy resource (DER) proponent on good utility practice as it relates to protection requirements of non- exporting, inverter-based (NE/I) DERs. To form a protection scheme, all the elements for each category within any given protection philosophy are requirements.

This document is not an approval for connection. This information should help applicants file better and more complete applications for connection. An applicant will need to submit detailed protection settings after the utility has completed the impact assessment of the submitted connection application.

The standards and certification testing referenced in this document should be read as referring to the current versions of these standards at time of reading.

Sample Protection Philosophy for Non-exporting Inverter-based Sources

Project Name:
Project ID#:
Project Type:
Capacity:
Connection feeder (optional):

In compliance with the technical interconnection requirements of the local distribution company for which this project will interconnect, the protection system of the connection will be designed to:

- Detect internal faults with the generator facility, downstream of the Point of Common Coupling (PCC), and automatically disconnect the NE/I source
- Detect external faults on the utility feeder and automatically disconnect the NE/I source
- Detect islanding conditions and disconnect the NE/I source
- Detect export of power from the NE/I source to the utility feeder and automatically disconnect the NE/I source

Internal Faults Within the Generator Facility

The following protections are in place to protect against internal faults resulting from the NE/I source:

[4] The contents of this document, although intended as guidance, conform to the interconnection and approval requirements prevalent at the time of its issuance. At all times, the current versions of relevant codes and standards govern.

- **Multi-Function Relay-**At the PCC, a multi-function relay will be installed to monitor internal faults resulting from the NE/I source. The 52 Trip Breaker will trip if it detects the following:

- 25 - Synchronization Check
- 27 - Undervoltage
- 59 - Overvoltage
- 81O/U - Under and Over Frequency
- ID -Active Anti-Islanding

- **Inverter Breakers** - Each inverter is equipped with an AC breaker at the output of the inverter providing additional overcurrent protection

- **Facility Overcurrent Protection** - All circuits within the facility are protected from both phase-to-phase and phase-to-ground faults by appropriate overcurrent protection devices. Fuses are sized to clear under fault conditions within the generator facility

External Phase and Ground Faults in the Distribution System

The following protections are in place to protect against external faults resulting from the utility feeder:

- **Multi-Function Relay** - At the main utility service, prior to the first facility load, a multi- function relay will be installed to monitor faults from the utility feeder. The 52 Trip Breaker at the NE/I source PCC will trip under the following faults:
  - 27 - Undervoltage
  - 32R- Reverse Power
  - 50/51- Overcurrent
  - 59 - Overvoltage
  - 81O/U - Under and Over Frequency
  - 67 - Directional
- **Inverter Protection:** The inverters proposed for this project are certified to UL 1741, IEEE 1547, CSA C22.2 107.1-01 standards[5] and will behave accordingly.

Anti-Islanding

- The Energy Resource Facility will operate in a grid following mode and will not operate islanded.
- **Anti-Islanding Inverters** -The NE/I source inverters contain both passive and active anti- islanding protection as required by IEEE 1547 and UL1741 SA. If the utility normal power supply is interrupted, the inverters detect the loss of power and disconnect.

Reverse Power

Reverse Power Protection - In addition to the multi-function relay at the utility supply monitoring reverse power (32R), the load is continually monitored to ensure the NE/I source discharge is below the consumption of the facility. This additionally protects against power injection to the utility grid.

[5] All references to standards or testing certifications should be read as the most current version.

Directional Overcurrent

- **Directional overcurrent protection** - Directional overcurrent relays are normally used on incoming line circuit breakers on buses which have two or more sources. They are connected to trip an incoming line breaker for fault current flow back into the source, so that a fault on one source is not fed by the other sources.

Special Comment Regarding Inverter Based Generation

The inverters specified for this project have a limited fault current contribution.

- Because inverters are current-limited devices, unlike rotating generators, the fault current is very close to the maximum output current, limiting the fault current in the system to 120% -140% of FLA.

Breaker Failure Scheme (Facilities with an aggregate output > 500kW)

In the event that 52-A fails to open when intertie protection relay calls for a trip, 52-B will instantaneously trip and lock out.

Reconnection

Manual reconnection: There is no automatic reconnection scheme at this facility. A manual reconnection will only be executed when given permission by the respective controlling authority.

OR

Automatic reconnection scheme: Intertie protection relay will initiate automatic reconnection of DER only after a fault event has occurred on the utility feeder and not after a fault event within the DER facility. Stable voltage and frequency measurement within ranges and for time period stipulated in the technical interconnection requirements will be met prior to automatic reconnection. Internal faults will be distinguished from external faults by pickup of directional overcurrent 67/67N protection element looking into DER facility. This will ensure reconnection into facility fault is prohibited by blocking of automatic reconnection scheme for facility faults.

Open Phase Protection

This project consists of multiple 1-phase inverters connecting to a 3-phase service or multiple 3-phase inverters connecting to a 3-phase service; therefore, open phase protection will be provided by 46 and/or 47 element(s) in the intertie protection relay to ensure the BESS maintains a balanced 3-phase output and detects loss of voltage in one or more phases and will trip the entire generating facility upon detection of such.

OR

Attached is a signed letter from the inverter manufacturer stating that a facility comprising of multiple inverters is capable of maintaining a balanced 3-phase

output and will detect loss of voltage in one or more phases and will trip the entire

Communications and Transfer Trip/DGEO (if applicable)

Summarize communication systems and transfer trip/DGEO timing (if applicable).

Table 1: Protection Summary Matrix

Description	IEEE Device	Internal Faults	External Faults	Anti-Islanding	Reverse Power	Trips 52-A	Trips 52-B	Disables Inverters
Over-Voltage	59	X	X	X		X		X
Under-Voltage	27	X	X	X		X		X
Over-Frequency	81O	X	X	X		X		X
Under-Frequency	81U	X	X	X		X		X
Instantaneous Over-Current Phase	50	X	X			X		X
Timed Over-Current Phase	51	X	X			X		X
Reverse Power	32R			X	X	X		
Breaker Fail	50BF						X	
Active Anti-Islanding	IEEE 1547			X				X

Table 2: Protection Elements

Protection Element Function	Device#	Feeder Protection Relay/Shunt Trip	IEEE 1741 SA Inverter
Over-Voltage	59	X	Y
Under-Voltage	27	X	Y
Over-Frequency	81O	X	Y
Under-Frequency	81U	X	Y
Synchronization Check	25	X	Y
Reverse Power	32R	X	
Overcurrent	50/51	X	Y
Directional	67	X	
Active Anti-islanding	ID		X

X = Primary Y = Secondary