Emergency Backstop Mechanism Installation Requirements

Supplement to the Queensland Electricity Connection Manual

Effective 6 February 2023

Part of Energy Queensland

Emergency Backstop Mechanism Installation Requirements

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1 SCOPE

An Emergency Backstop Mechanism has been introduced in Queensland and applies to IES. This document has been developed as a supplement to the Queensland Electricity Connection Manual (QECM) to provide the installation requirements and associated wiring diagrams for connections requiring inverters to be configured for the Emergency Backstop Mechanism.

This QECM Supplement document shall be considered in conjunction with the latest version of the QECM. It is a requirement that all premises be connected in compliance with the QECM.

The requirements for the Emergency Backstop Mechanism will be included in the next release of the QECM.

2 DEFINITIONS AND ABBREVIATIONS

2.1 Definitions

Term	Definition
Demand Response	The automated alteration of an inverter mode of operation in response to an initiating signal originating from or defined by the Distributor.
Demand Response Site Controller	A device which interprets the operational instructions from the GSD and operates the Emergency Backstop Mechanism for multiple inverters at a Premises.
Distribution Network	A *network* which is not a *transmission network*. This Standard refers to the Low Voltage or High Voltage portion of the Distribution Network.
Distribution System	A *distribution network*, together with the *connection assets* associated with the *distribution network,* which is connected to another *transmission system* or *distribution system*. The relevant *distribution system* owned and operated by the Distributor to which the Small IES Unit(s) is, or will be, *connected.*
Emergency Backstop Mechanism	Involves the use of Generation Signalling Devices to provide a Demand Response that causes an IES to temporarily cease or reduce generation in emergency contingency events within the *power system*. The mechanism may be called upon to respond to a direction by AEMO issued in accordance with the NEL.
Generation Signalling Device (GSD)	A DRED providing functionalities and capabilities to achieve Demand Response, which satisfies the requirements of AS/NZS 4755.1[1].

[1] A list of Approved GSD can be found at Energex at: https://www.energex.com.au/home/our-services/connections/low-voltage-generation/emergency-backstop-mechanism and Ergon Energy Network at: https://www.ergon.com.au/network/connections/low-voltage-generation/emergency-backstop-mechanism

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Term	Definition
Inverter Energy System (or IES)	A system comprising one or more inverters together with one or more energy sources (which may include an ESS) and controls, where the inverter(s) satisfies the requirements of AS/NZS 4777.2.
QECM Supplement	This document which shall apply to connections in addition to the Queensland Electricity Connection Manual (QECM)
Standard	Refers to a DNSP controlled document described in clause 3.1.1 or clause 3.1.2.

2.2 Abbreviations

Term, abbreviation, or acronym	Definition
AEMO	Australian Energy Market Operator
AFLC	Audio Frequency Load Control
AS/NZS	A jointly developed Australian and New Zealand Standard
DRED	Demand Response Enabling Device
ESS	Energy Storage System
GSD	Generation Signalling Device
IES	Inverter Energy System
NEL	National Electricity Law
PV	Photovoltaic
QECM	Queensland Electricity Connection Manual

3 RELEVANT RULES, REGULATIONS, STANDARDS AND CODES

3.1 Standards and codes

The QECM sets out a range of applicable standards and industry codes that apply to electrical installations and electrical equipment that are (or inted to be) interconnected to the Distribution Network.

In the event of any inconsistency between:

- applicable Australian and international standards and industry codes (except for legislated industry codes);
- the QECM; and
- this QECM Supplement
- this QECM Supplement will prevail.

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3.1.1 Energex controlled documents

A copy of the latest version of the QECM may be obtained by searching for QECM from the following website: https://www.energex.com.au/

A copy of other controlled documents include:

Document number	Document name	Document type
STNW1170	Standard for Small IES Connections	Standard
STNW1174	Standard for LV EG Connections	Standard
STNW3510	Dynamic Standard for Small IES Connections	Standard
STNW3511	Dynamic Standard for LV EG Connections	Standard

3.1.2 Ergon Energy controlled documents

A copy of the latest version of the QECM may be obtained by searching for QECM from the following website: https://www.ergon.com.au/network/

A copy of other controlled documents include:

Document number	Document name	Document type
STNW1170	Standard for Small IES Connections	Standard
STNW1174	Standard for LV EG Connections	Standard
STNW3510	Dynamic Standard for Small IES Connections	Standard
STNW3511	Dynamic Standard for LV EG Connections	Standard

3.1.3 Australian and New Zealand Standards

Document number	Document name	Document type
AS/NZS 3000	Electrical Installations – Wiring Rules	AU/NZ Joint Standard
AS/NZS 4755.1	Demand response capabilities and supporting technologies for electrical products – Part 1: Demand response framework and requirements for demand response enabling devices (DREDs)	AU/NZ Joint Standard
AS/NZS 4777	Grid connection of energy systems via inverters, (multiple parts)	AU/NZ Joint Standard

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4 EMERGENCY BACKSTOP MECHANISM

4.1 General

Any IES that are required under a relevant Standard to be configured for the Emergency Backstop Mechanism, shall ensure that the GSD is installed in compliance with this QECM Supplement.

4.2 Installation Requirements

The following requirements apply to a GSD for EG Systems that are to have an Emergency Backstop Mechanism:

(a) The GSD shall be installed in compliance with AS/NZS 3000.

(b) A connection with an individual inverter that are required under a Standard to have a GSD shall meet the requirements of the G01 wiring diagrams in Section 4.3 of this QECM Supplement.

(c) A connection with multiple inverters that are required under a Standard to have a GSD shall meet the requirements of either G02 or G03 in Section 4.3 of this QECM Supplement.

(d) The conductor connected between the protective device for inverter supply and the GSD shall be:

  i. of a length that does not exceed three meters;

  ii. protected mechanically or otherwise protected so that the risk of short-circuit is reduced to a minimum; and

  iii. installed in such a manner so as to reduce to a minimum the risk of fire or other danger.

(e) The GSD shall be located in either:

  i. the main switchboard; or

  ii. the distribution board with the protective device for inverter supply.

(f) The GSD control cable may be extended as required.

(g) The GSD control cable shall connect:

  i. directly to the inverter; or

  ii. to the inverter via the external device used to provide demand response mode, where the inverter does not have an integrated device; or

  iii. where compliant with wiring diagram G03, to the inverter via a Demand Response Site Controller.

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4.3 Wiring diagrams

No.	Wiring Diagram
G01	Generation signalling device for single inverter
G02	Multiple generation signalling devices for multiple inverters
G03	Generation signalling device with Demand Response Site Controller for multiple inverters

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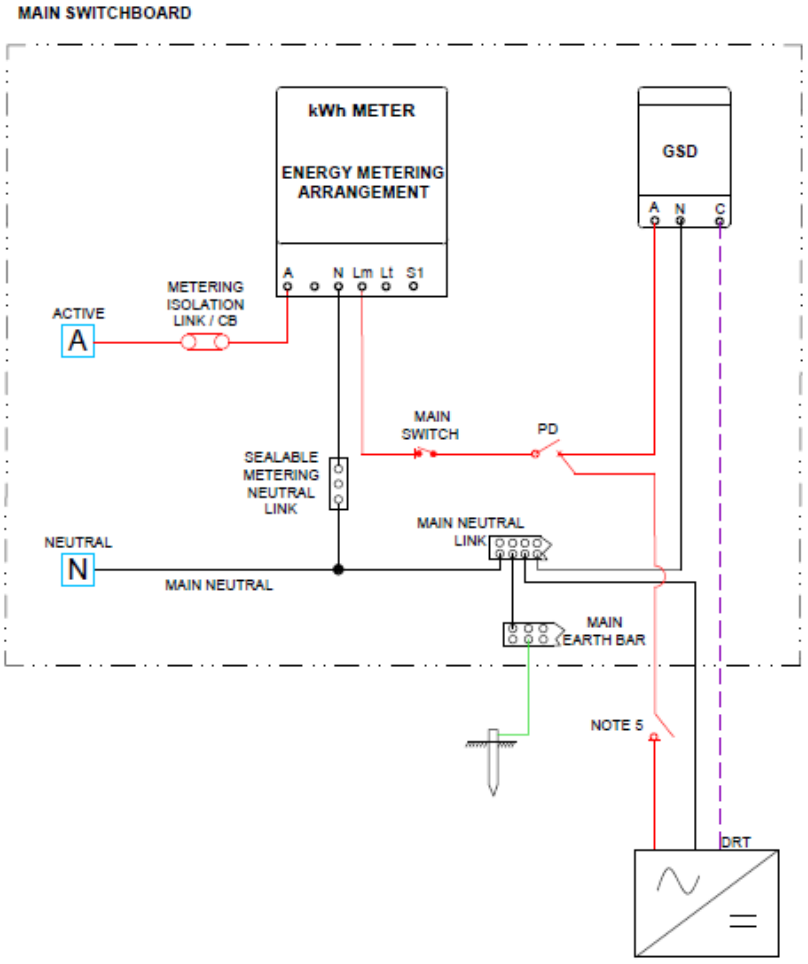

NOTES

1. GSD IS PERMITTED TO BE INSTALLED IN EITHER THE MAIN SWITCHBOARD OR A DISTRIBUTION BOARD WITH THE PD.
2. THE GSD TO BE INSTALED ON THE BACK OF THE SWITCHBOARD.
3. THE GSD SHALL MEET THE REQUIREMENTS OF AS/NZS 3000 CLAUSE 2.5.4.4.2
4. CONTROL CABLE MAY BE EXTENDED AS REQUIRED BY THE ELECTRICAL CONTRACTOR.
5. FOR ISOLATING SWITCH REQUIREMENTS REFER TO AS/NZS 4777.1.2016 CLAUSE 3.4.3
6. EARTH CONNECTIONS OTHER THAN THE MAIN EARTH CONDUCTOR AND EARTH ELECTRODE ARE NOT SHOWN.

LEGEND.

PD - PROTECTIVE DEVICE FOR INVERTER SUPPLY
GSD - GENERATION SIGNALLING DEVICE
DRT - DEMAND RESPONSE TERMINAL

Revision: A	GENERATION SIGNALING DEVICE FOR SINGLE INVERTER	G01

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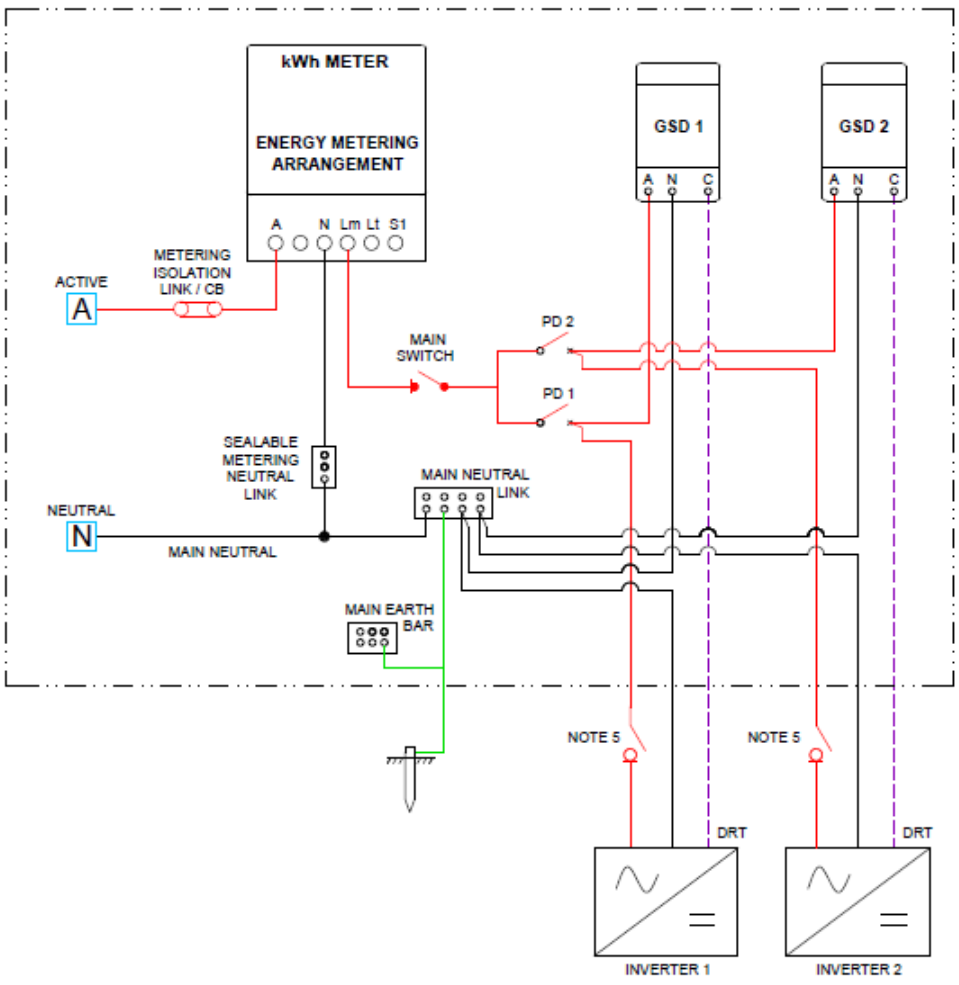

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2. THE GSD TO BE INSTALED ON THE BACK OF THE SWITCHBOARD.
3. INSTALLATION OF THE GSD TO BE IN ACCORDANCE WITH AS/NZS 3000 CLAUSE 2.5.4.4.2.
4. CONTROL CABLE MAY BE EXTENDED AS REQUIRED BY THE ELECTRICAL CONTRACTOR
5. FOR ISOLATING SWITCH REQUIREMENTS REFER TO AS/NZS 4777.1.2016 CLAUSE 3.4.3.
6. EARTH CONNECTIONS OTHER THAN THE MAIN EARTH CONDUCTOR AND EARTH ELECTRODE ARE NOT SHOWN.
7. EACH INDIVIDUAL INVERTER INSTALLED AT THE PREMISE SHALL HAVE A CORRESPONDING GSD INSTALLED IN CONFORMANCE WITH THIS CONFIGURATION.

LEGEND

PD - PROTECTIVE DEVICE FOR INVERTER SUPPLY
GSD - GENERATION SIGNALLING DEVICE
DRT - DEMAND RESPONSE TERMINAL

Revision:		
A	MULTIPLE GENERATION SIGNALING DEVICES FOR MULTIPLE INVERTERS	G02

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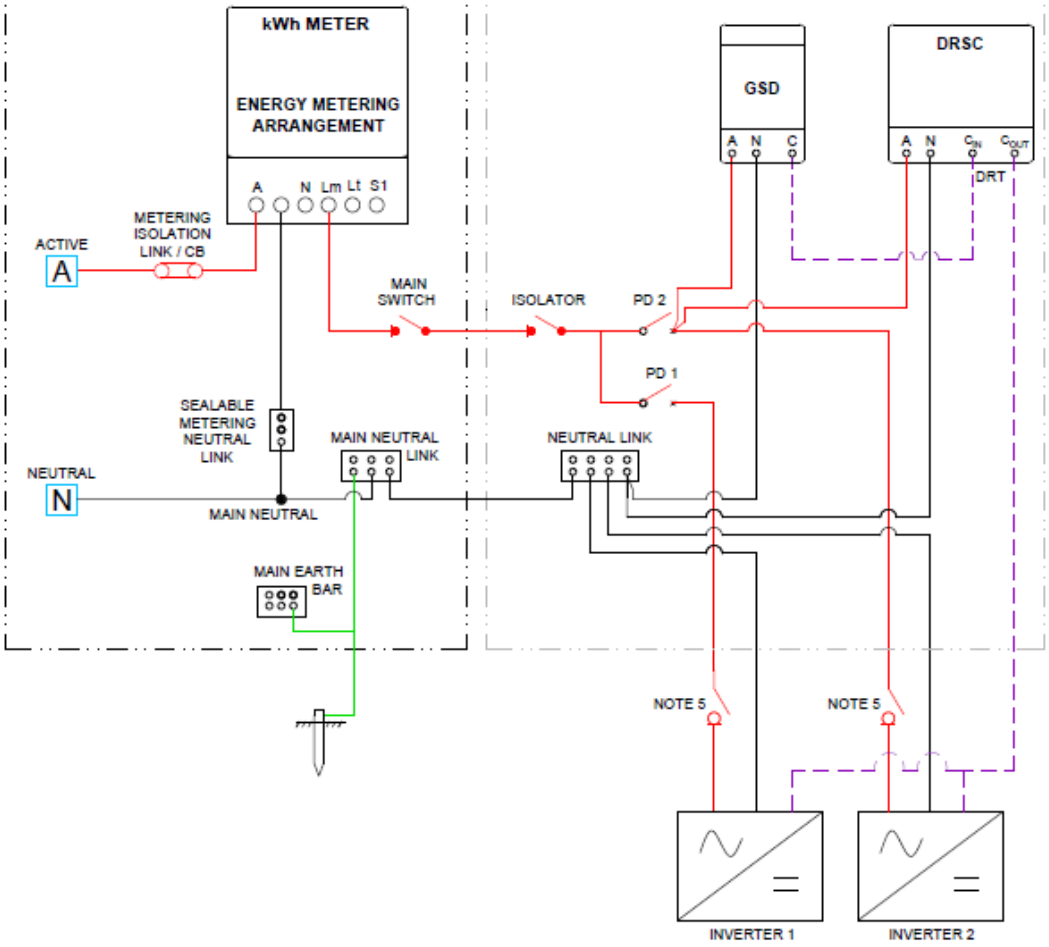

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1. GSD IS PERMITTED TO BE INSTALLED IN EITHER THE MAIN SWITCHBOARD OR A DISTRIBUTION BOARD WITH THE PD.
2. THE GSD TO BE INSTALED ON THE BACK OF THE SWITCHBOARD.
3. INSTALLATION OF THE GSD TO BE IN ACCORDANCE WITH AS/NZS 3000 CLAUSE 2.5.4.4.2.
4. CONTROL CABLE MAY BE EXTENDED AS REQUIRED BY THE ELECTRICAL CONTRACTOR.
5. FOR ISOLATING SWITCH REQUIREMENTS REFER TO AS/NZS 4777.1.2016 CLAUSE 3.4.3.
6. EARTH CONNECTIONS OTHER THAN THE MAIN EARTH CONDUCTOR AND EARTH ELECTRODE ARE NOT SHOWN.
7. LAYOUT CAN BE EXTENDED FOR ADDITIONAL INVERTERS.
8. DEMAND RESPONSE SITE CONTROLLER PERMITTED TO BE INSTALLED ON ALTERNATIVE CIRCUIT.

LEGEND

DRT - DEMAND RESPONSE TERMINAL
GSD - GENERATION SIGNALLING DEVICE
DRSC - DEMAND RESPONSE SITE CONTROLLER
PD - PROTECTIVE DEVICE FOR INVERTER SUPPLY

Revision: B	GENERATION SIGNALING DEVICE WITH DEMAND RESPONSE SITE CONTROLLER FOR MULTIPLE INVERTERS	G03