



Emergency Backstop Mechanism Installation Requirements

Supplement to the Queensland Electricity Connection Manual

Version 3 Effective 3 April 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 <i>network</i> which is not a <i>transmission network</i> . This Standard refers to the Low Voltage or High Voltage portion of the Distribution Network.
Distribution System	A <i>distribution network</i> , together with the <i>connection assets</i> associated with the <i>distribution network</i> , which is connected to another <i>transmission system</i> or <i>distribution system</i> . The relevant <i>distribution system</i> owned and operated by the Distributor to which the Small IES Unit(s) is, or will be, <i>connected</i> .
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 <i>power system</i> . 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
Grid Protection Relay (or GPR)	A central protection device with the characteristics, settings and requirements as defined in the EG system standards STNW1174 and STNW3511.
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
GPR	Grid Protection Relay
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 intended 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);

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- the QECM; and
- this QECM Supplement
- this QECM Supplement will prevail.

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

4.2.1 General

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 is 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) Where the Proponent assesses a requirement to use a protective device for short-circuit protection of the GSD conductor the installation shall meet the requirements of clause 4.2.2.
- (e) 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.
 - iii. installed in such a manner so as to reduce to a minimum the risk of fire or other danger.
- (f) The GSD shall be located in either:
 - i. the main switchboard; or
 - ii. the distribution board with the protective device for inverter supply.
- (g) The GSD control cable may be extended as required.
- (h) 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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4.2.2 Alternative arrangement for additional short-circuit protection

The following requirements apply to a GSD for EG Systems that are to have an Emergency Backstop Mechanism and is alternate arrangement where the Proponent has assessed a requirement for additional short-circuit protection for the GSD conductor:

- (a) The GSD shall be installed in compliance with AS/NZS 3000.
- (b) A connection with an individual inverter that is required under a Standard to have a GSD shall meet the requirements of the relevant wiring diagrams in Section 4.3 of this QECM Supplement, based on aggregate inverter capacity as per Table 1:

Table 1: GSD for individual inverter, additional short-circuit protection requirement

Aggregate inverter capacity at Premises ¹	Wiring Diagram No.
≥ 10 k VA and ≤ 30 kVA	G04
> 30 kVA	G07

NOTE 1 - Including inverters with ESS DC sources

- (c) A connection with multiple inverters that are required under a Standard to have a GSD shall meet the requirements of the relevant wiring diagrams in Section 4.3 of this QECM Supplement, based on aggregate inverter capacity as per Table 2:

Table 2: GSD for multiple inverters, additional short-circuit protection requirement

Aggregate inverter capacity at Premises ¹	Wiring Diagram No.
≥ 10 k VA and ≤ 30 kVA	G05 or G06
> 30 kVA	G08 or G09

NOTE 1 - Including inverters with ESS DC sources

- (d) The conductor connected between the protective device for GSD 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.
 - iii. additionally protected for short-circuit protection.
 - iv. Where the aggregated system capacity of all inverters at the Premises is above 30 kVA, the GSD shall be installed in parallel with the Grid Protection Relay (GPR) in a fail-safe configuration.
 - v. installed in such a manner so as to reduce to a minimum the risk of fire or other danger.

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- (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 the relevant wiring diagram, based on aggregate inverter capacity as per Table 3, to the inverter via a Demand Response Site Controller.

Table 3: GSD for multiple inverters, additional short-circuit protection requirement

Aggregate inverter capacity at Premises ¹	Wiring Diagram No.
≥ 10 k VA and ≤ 30 kVA	G06
> 30 kVA	G09

NOTE 1 - Including inverters with ESS DC sources

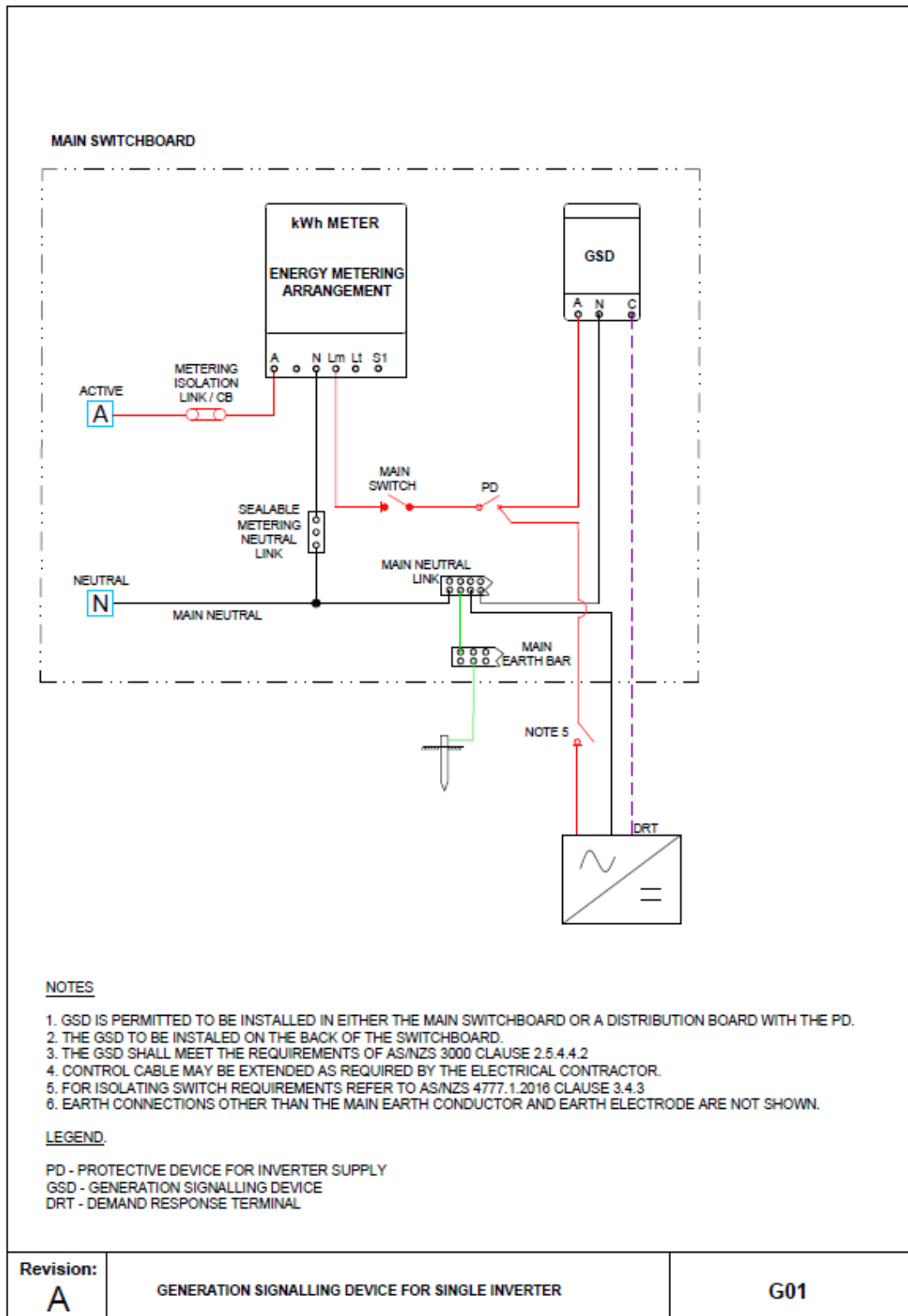
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4.3 Wiring diagrams

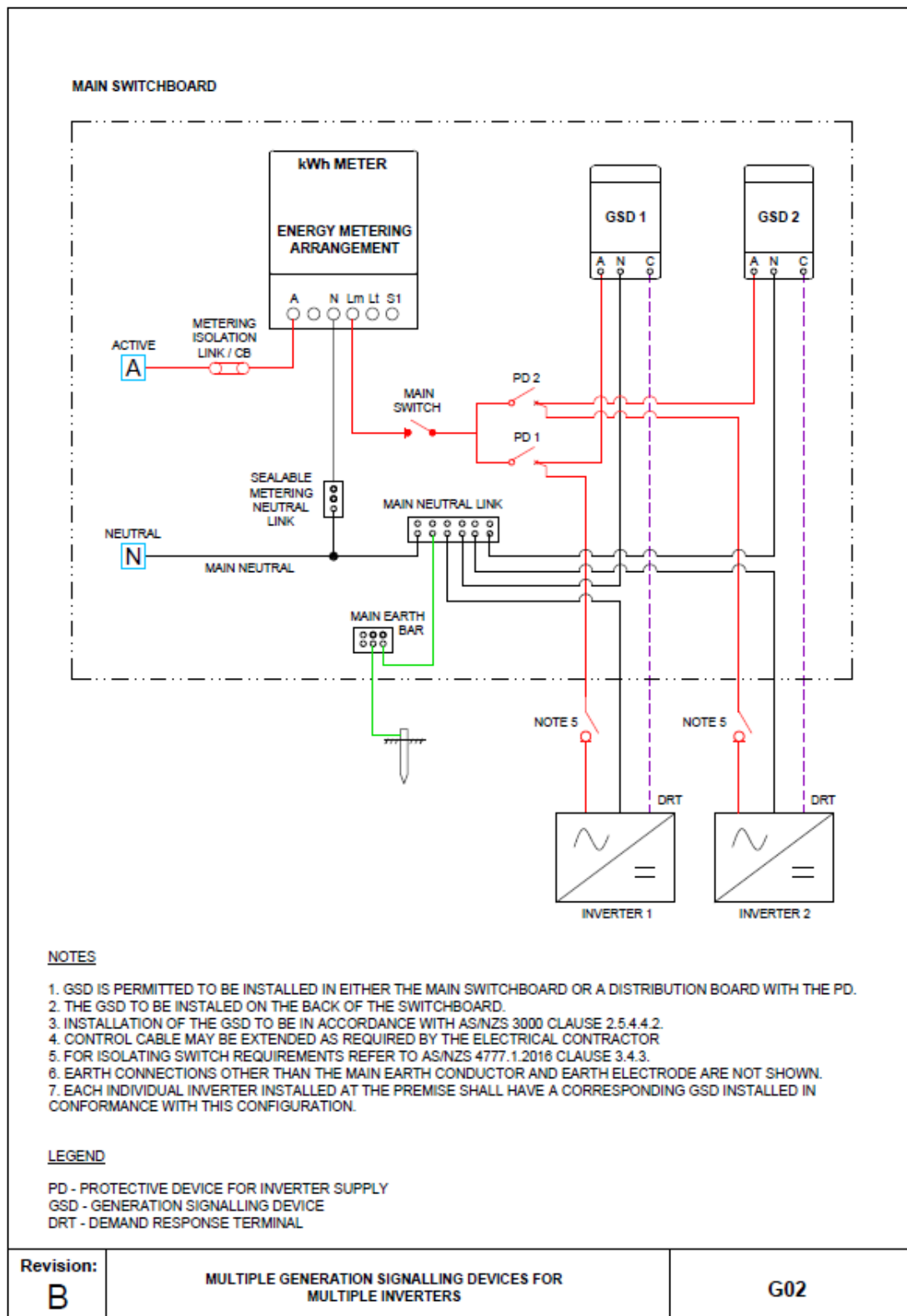
Table 4: GSD wiring diagrams for Emergency Backstop Mechanism

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
G04	Generation signalling device for single inverter – additional short-circuit protection option, Small IES
G05	Multiple generation signalling devices for multiple inverters– additional short-circuit protection option, Small IES
G06	Generation signalling device with Demand Response Site Controller for multiple inverters– additional short-circuit protection option, Small IES
G07	Generation signalling device for single inverter – additional short-circuit protection option, LV IES
G08	Multiple generation signalling devices for multiple inverters– additional short-circuit protection option, LV IES
G09	Generation signalling device with Demand Response Site Controller for multiple inverters– additional short-circuit protection option, LV IES

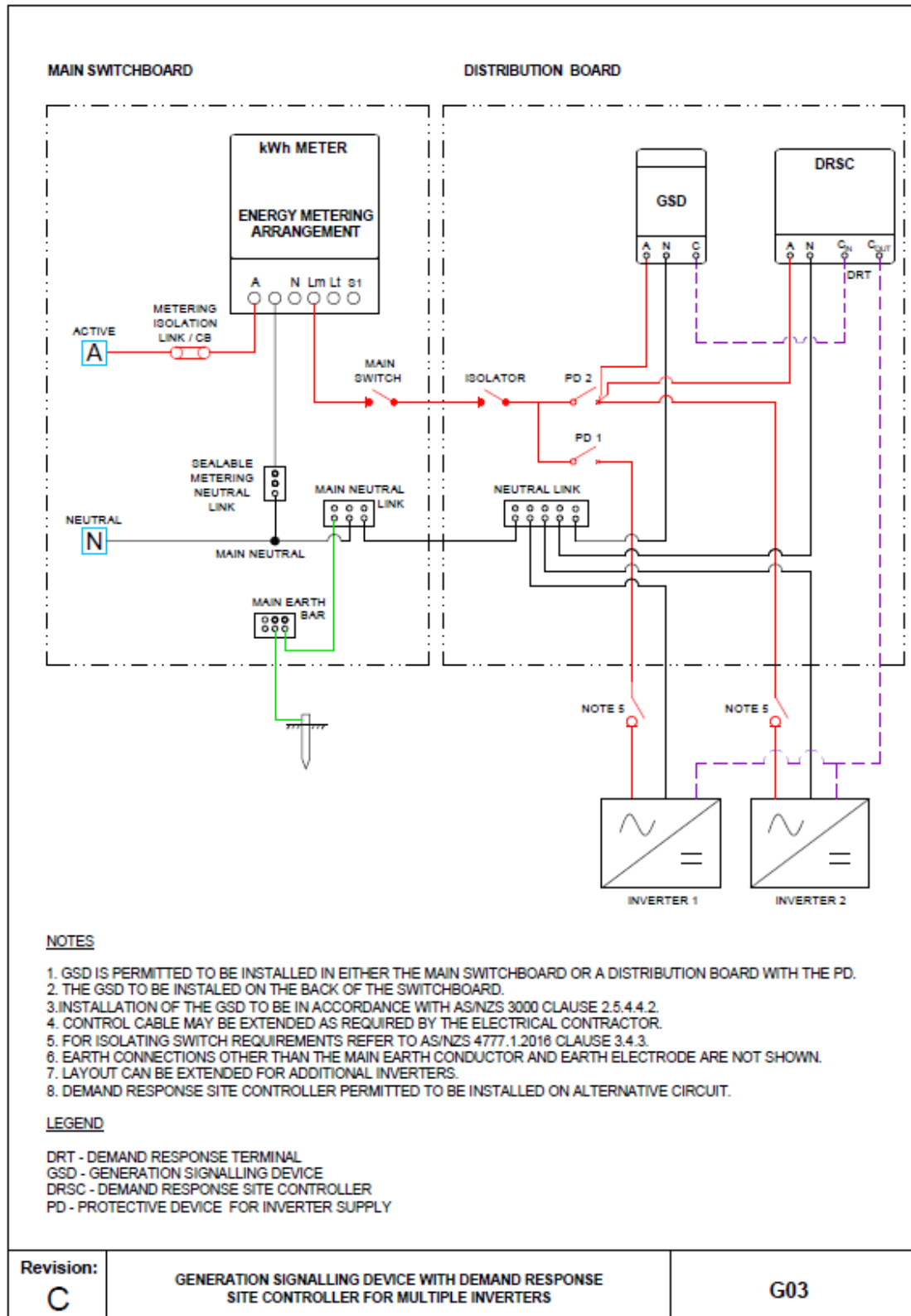
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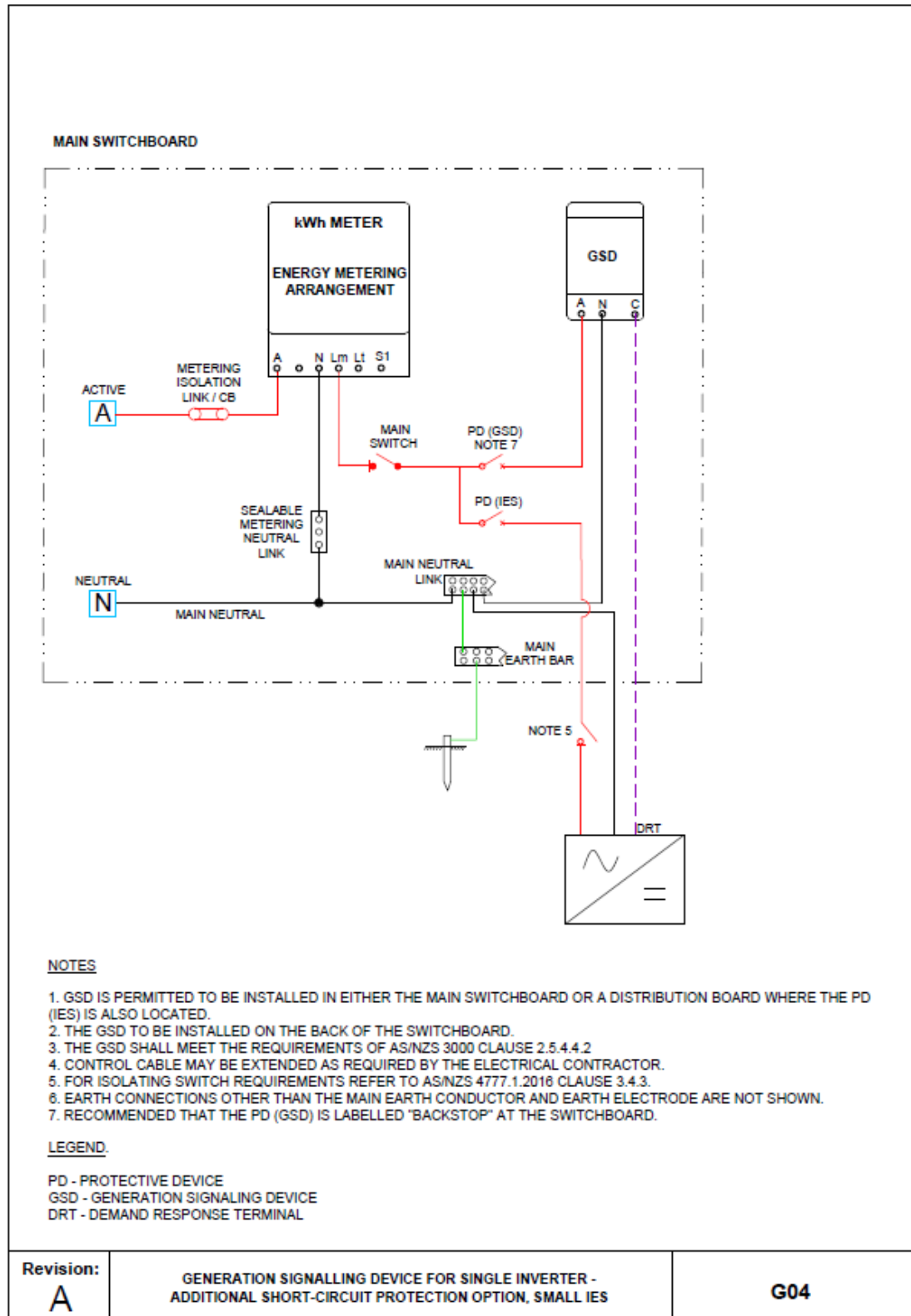
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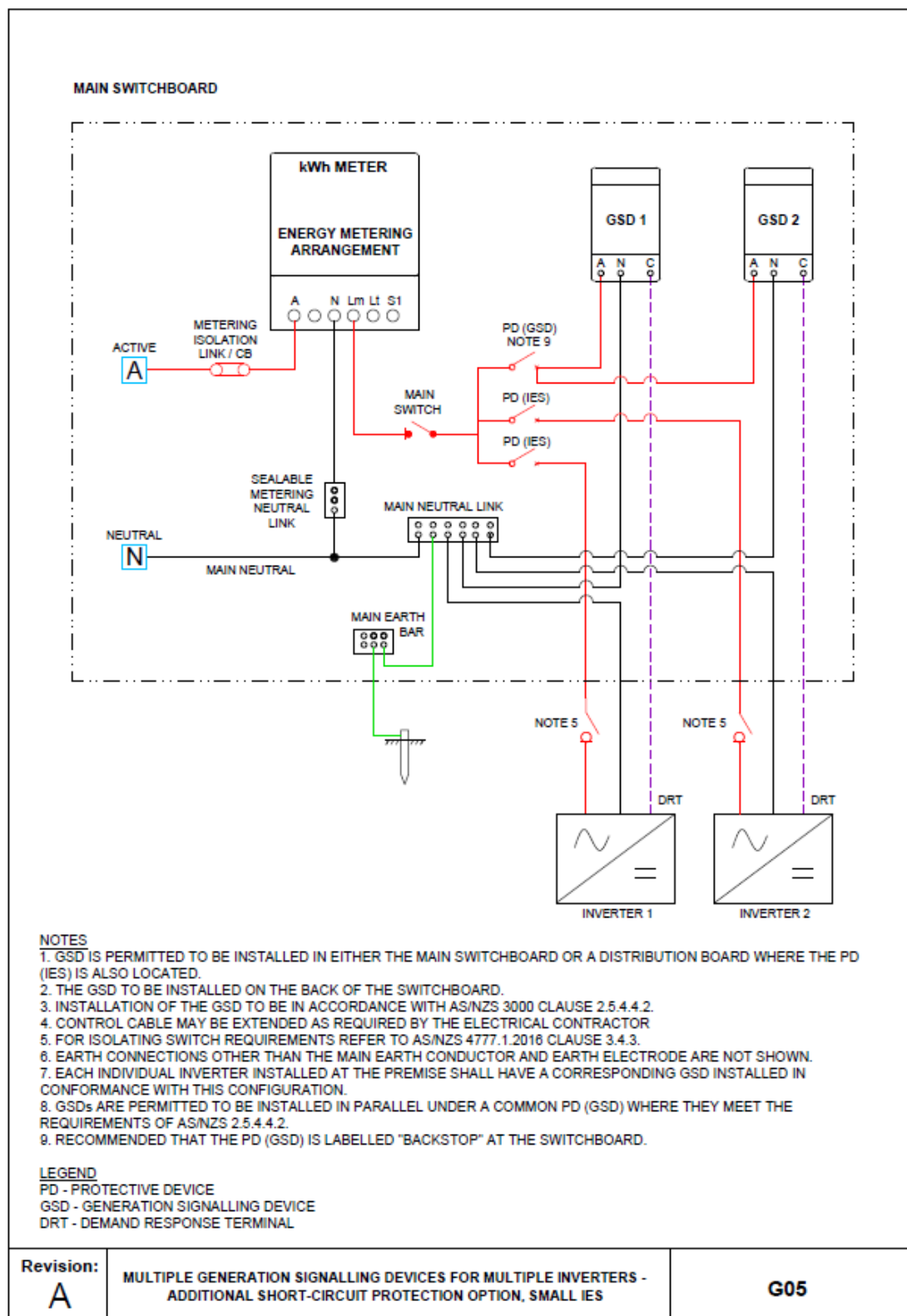
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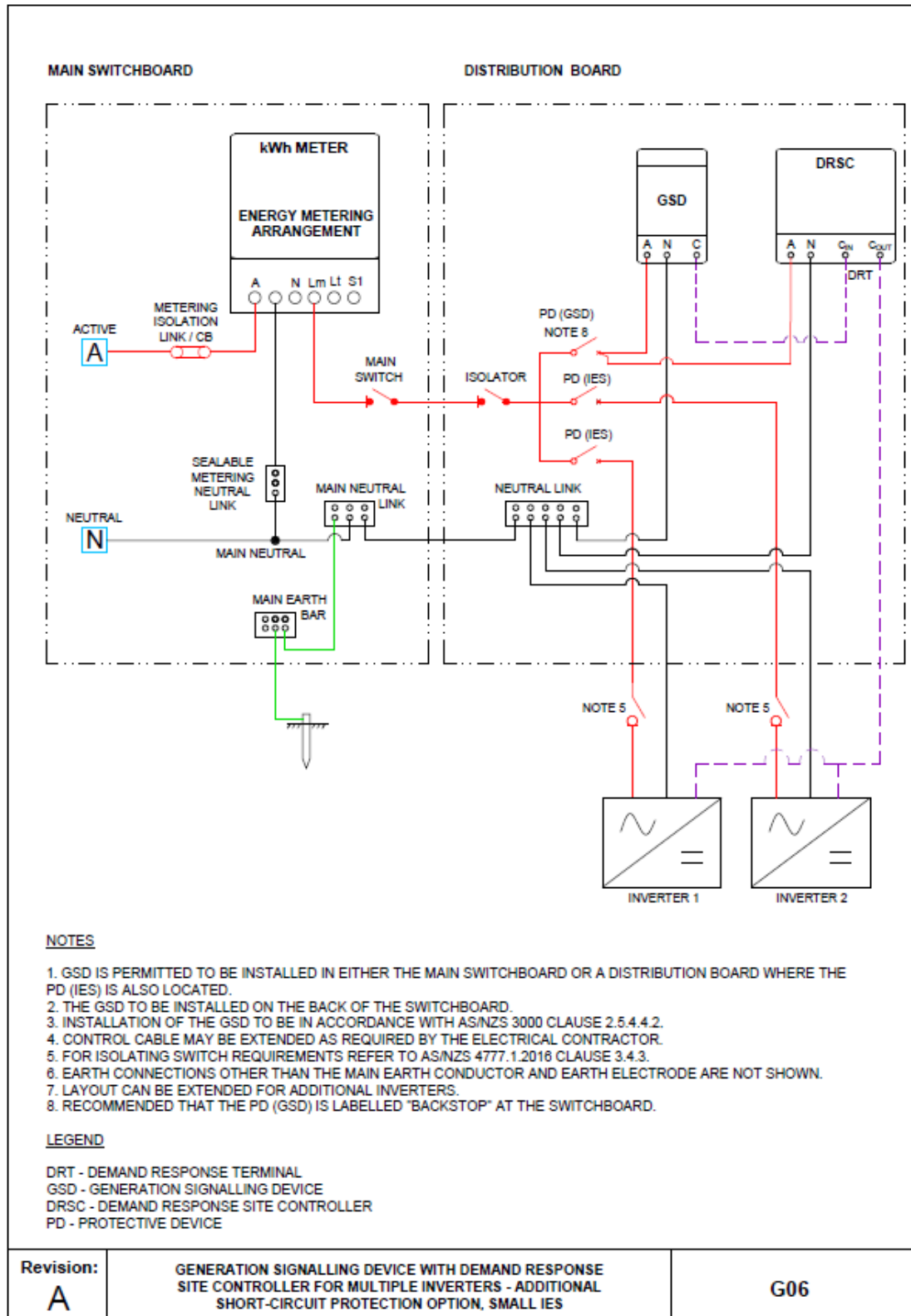
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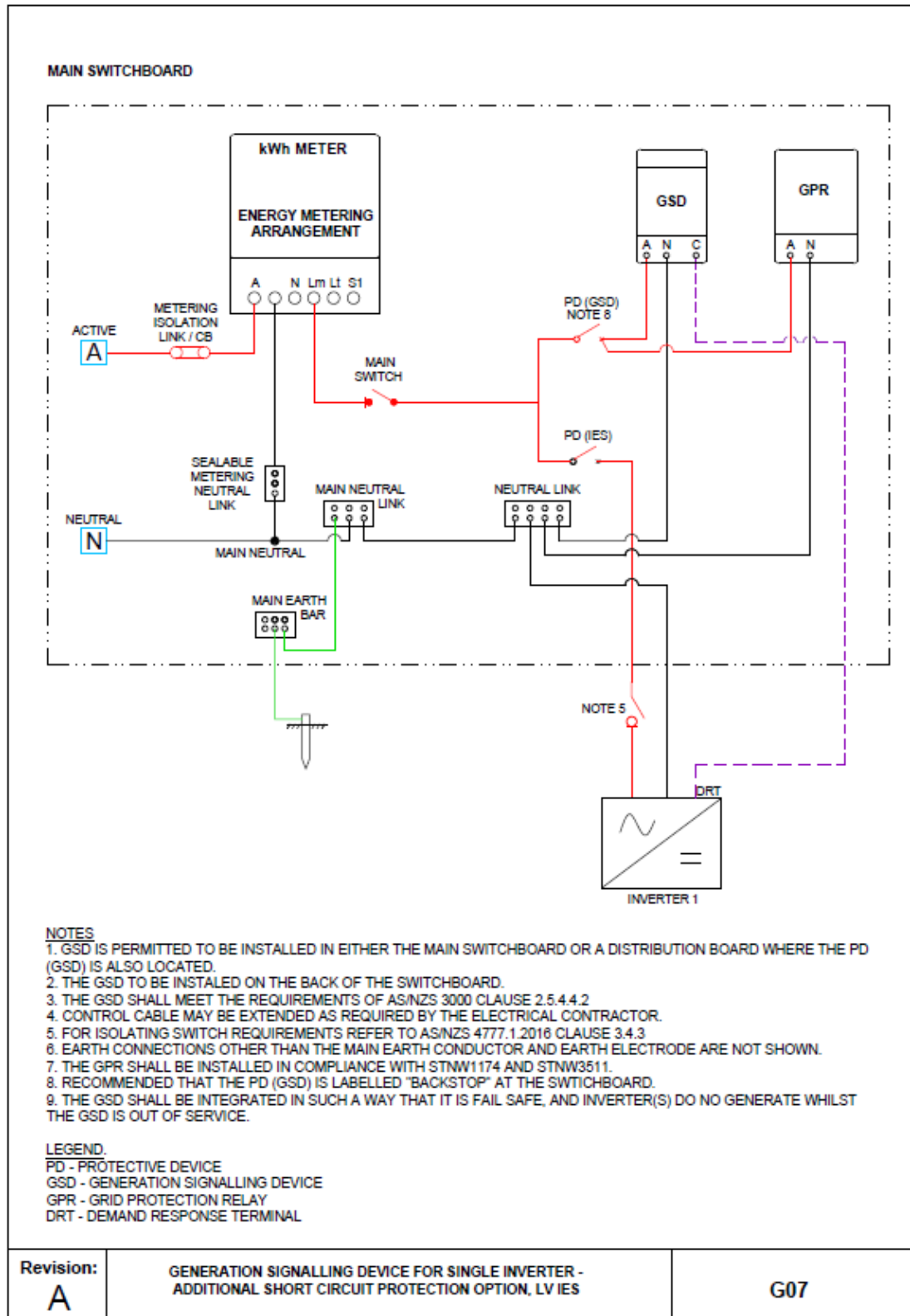
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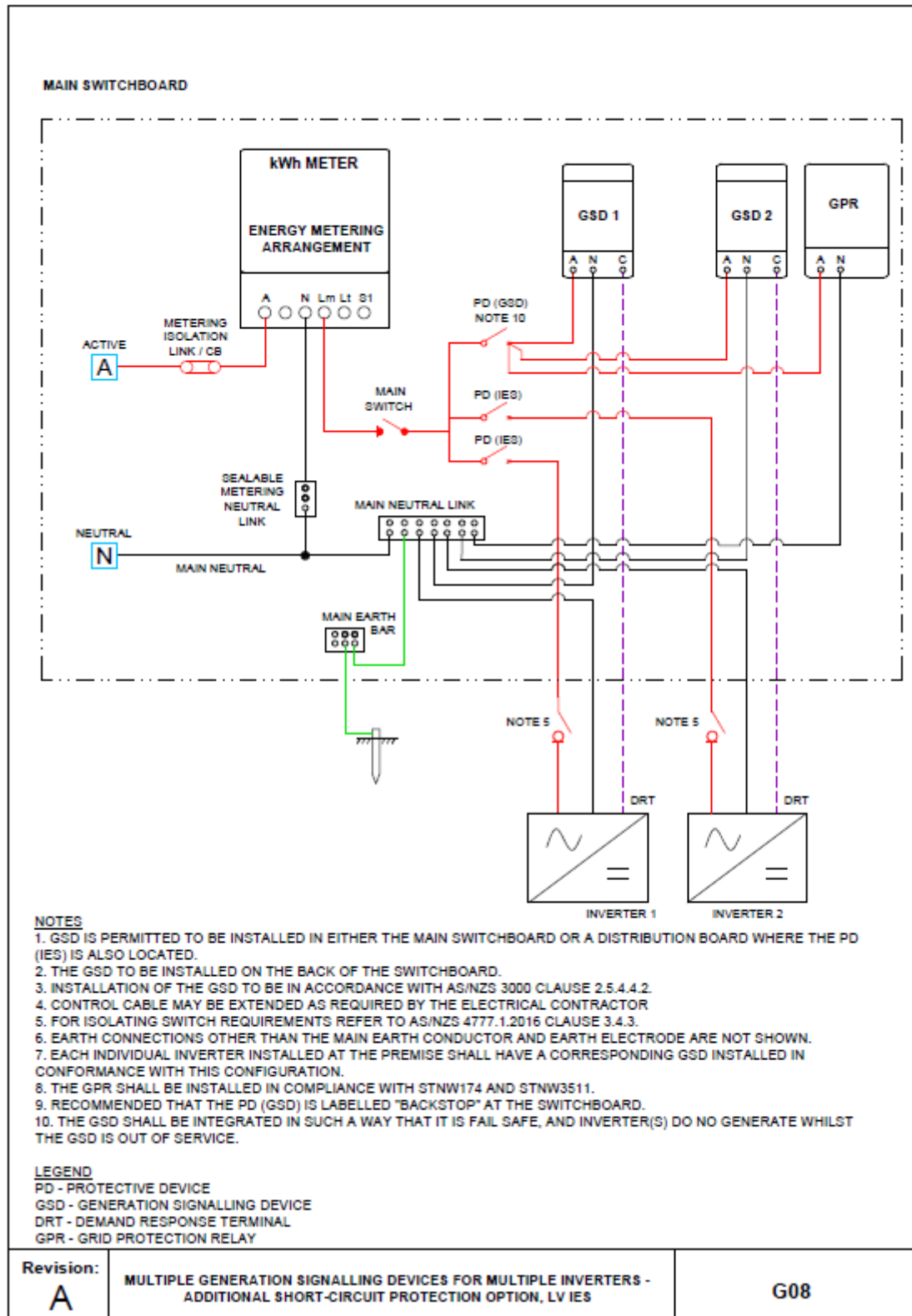
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