



Innovative Electrical Automation Solutions

IES NETWORK PROTECTION BOARD

With Inverter Distribution

Installation and User Manual



**Model
IPS04**

**CONTAINS IMPORTANT INSTALLATION AND TESTING PROCEDURES
THAT MUST BE FOLLOWED TO ENSURE COMPLIANCE WITH THE
DISTRIBUTION NETWORK SERVICE PROVIDER.**

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Designed and Manufactured by



Disclaimer

The Information contained in this document is subject to change without notice. Integrelec reserves the right to make modifications and/or improvements to this document as well as to the products that this document refers to. Such changes will be incorporated into new editions of this document.

The IPS series feed-in limiters and grid protection devices are designed and manufactured by Integrelec.

The design, installation and certification of the solar installation (including the equipment this manual refers to) must also be done in accordance with all regulations and requirements of the local distribution network service provider.

The IPS04 IES Network Protection Board has been designed and verified to comply with AS/NZS61439 when installed in accordance with this manual only.

Warranty Information

This product is supplied with 12 months manufacturer warranty which covers all aspects of workmanship and component functionality in so far as these have not been compromised during installation (E.g., tampering with control wiring, relay settings, component mountings etc).

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1 Product Overview

The IPS range of Inverter Energy System Grid Feed-In Limiters (GFIL) and Grid Protection Boards have been developed specifically to meet the requirements set by Energex and Ergon Energy for small and medium scale inverter installations. These are also suitable for use in other states and territories subject to local regulations.

The IPS04 model provides secondary network protection as well as inverter power distribution for up to 200A of inverter capacity and 6 inverters. Export control is not provided but space provisions in the board have been made to accommodate inverter manufacturer's export control, monitoring and communications systems.

Other products in the IPS range include:

- IPS01 (export control only)
- IPS02 (export control and secondary network protection)
- IPS03 (secondary network protection only – 3rd party export control systems can be fitted)

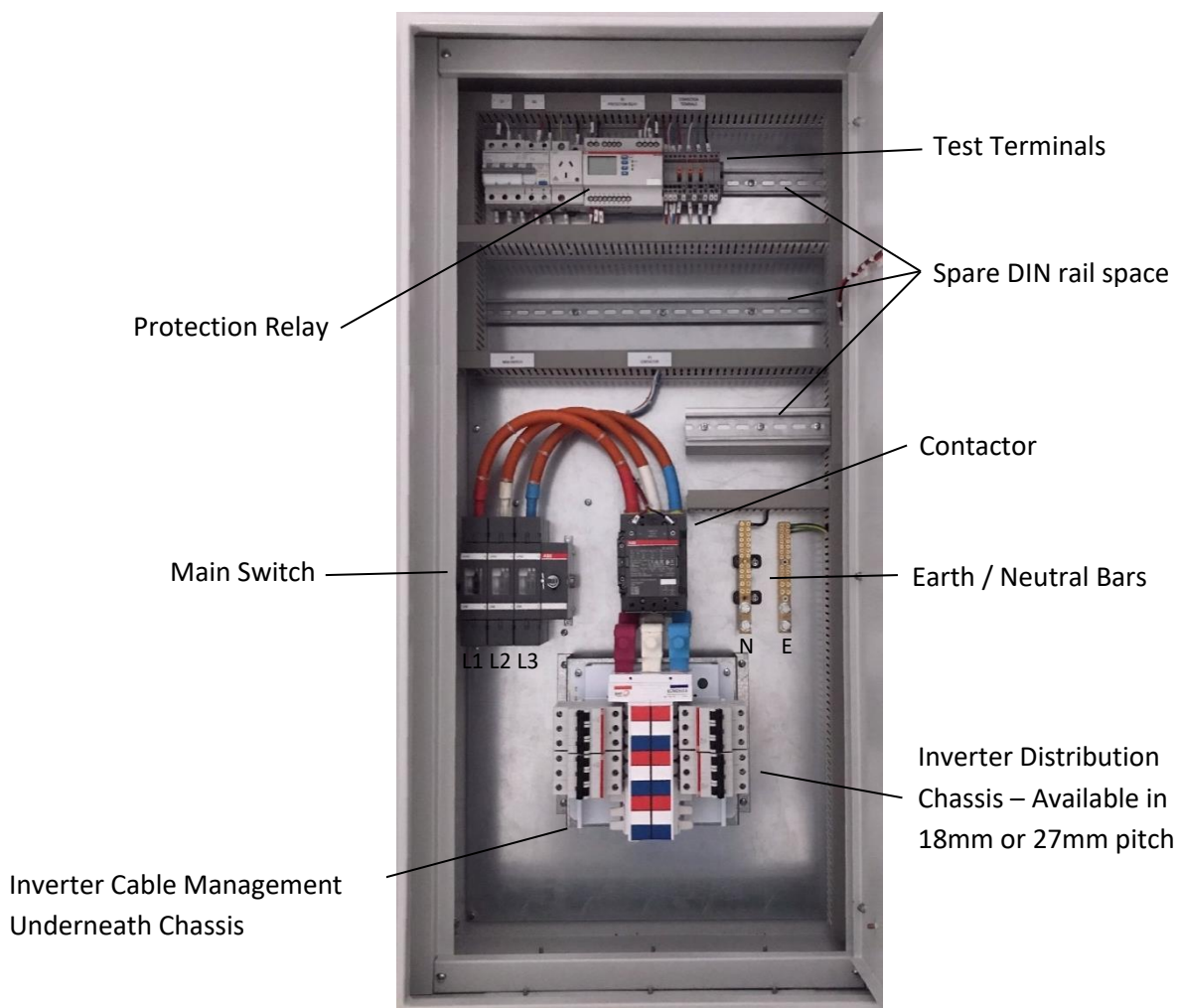


Figure 1 – IPS04 Internal Layout

1.1 Functional Description

- After switching on, a start delay of 60 seconds will occur while the network protection relay monitors for fault conditions. Stable network supply must be observed for 60 seconds before the system allows inverters supplied from the distribution chassis to energise via the internal contactor.
- Once in normal operation, if the network protection relay detects a network fault, the relay will isolate all inverters via the internal contactor. All inverters remain isolated for the duration of the fault or power outage and for a further 60 seconds of no-fault conditions. This allows loads to come back online and the grid to stabilise before allowing the inverters to attempt to synchronise and re-connect.
- The protection relay is supplied preconfigured with the network protection settings as required by Energy Queensland, current at the time of manufacture.

2 Package Contents

- 1 x Installation and User Manual
- 1 x IPS04 IES Network Protection Board

In addition, the installer must also supply:

- Circuit breakers for each inverter. The included distribution chassis is compatible with ABB miniature circuit breakers.

3 Safety instructions

Installation and testing of this device must be performed by a licenced electrician in accordance with AS3000, AS4777 and other applicable standards.

4 Installation

For the IPS-04 to function as an approved network protection device in accordance with Energy Queensland requirements as discussed in Sec. 1, it must be installed as follows.

4.1 Installation Location

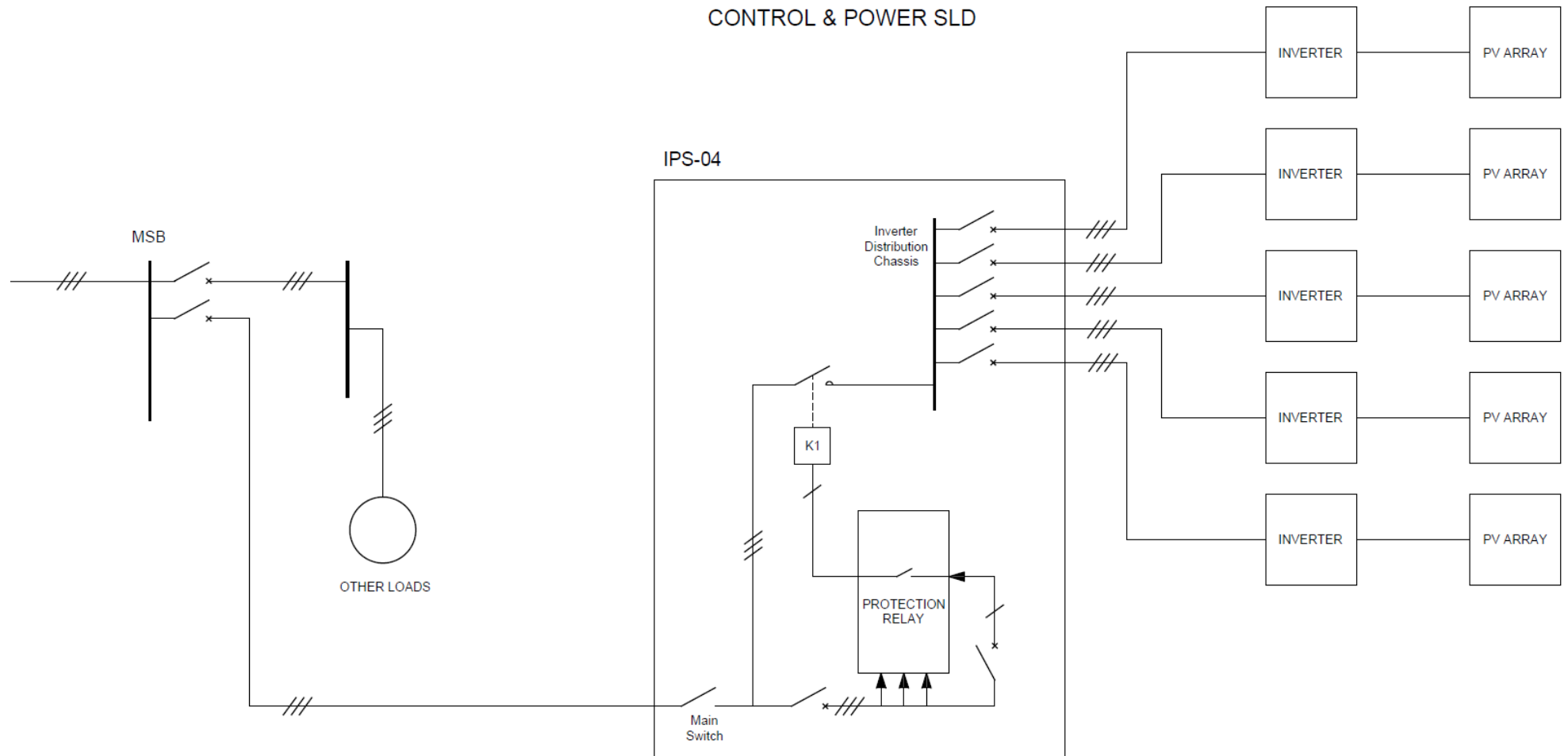
The IPS-04 board must be wall mounted and installed in one of the following locations:

- Supplied from a suitably selected circuit breaker directly at the site's main switchboard
- Supplied from a suitably selected circuit breaker at another distribution board which is electrically closer to the site's main switchboard than all other solar within the installation.

To comply with AS/NZS61439, refer to the electrical interface characteristics in the Technical Data section below.

4.2 Configuration

Figure 2 shows the overall cable topology for installation.



4.3 Electrical Connections

Main Supply

Connect the main supply at the main switch and earth / neutral bars. Cable selection and circuit protection should be in accordance with AS3000 and AS4777 to accommodate the supply from all connected inverters.

Inverter Supply

Connect each inverter at the distribution chassis and earth / neutral bars. (Circuit breakers not included with supply of IPS-04). Cable selection and circuit protection should be in accordance with AS3000 and AS4777 for the respective inverter.

Inverter cables may be passed through the openings beneath the distribution chassis for easier cable management.

Note that additional equipment such as export control or monitoring gear must not be supplied off the distribution chassis as this supply is disconnected during a network protection relay trip. Spare terminals (81, 82, 83, N) are supplied for this purpose.

4.3.1 Network Protection Relay

The network protection relay is supplied preconfigured to comply with Energex / Ergon requirements, current at the time of manufacture. Testing and verification must be carried out at the time of final commissioning by the RPEQ engineer certifying the installation.

5 End User Guide

Once installed and tested, the IPS-04 is a fully automated system that requires no end user interaction. The two built in status indicators – ‘fault’ and ‘running’ show current status of the protection system.

Note: Persons opening the enclosure or operating any component (including the main isolator switch) must be suitable trained to do so by the installer. Refer AS61439.2 rating in the Technical Data section below.

5.1 Network Protection Relay

If there is a network fault or power outage, the protection relay will isolate the inverters from the electricity grid via contactors. If there is still power supplied to the IPS-04, the red ‘fault’ indicator on the front of the panel will be lit to show that the inverters have been disconnected.

The green ‘running’ indicator shows that all faults are clear and inverters are energised.

The IPS04 is supplied with the network protection relay settings preconfigured as required by Energy Queensland, current at the time of manufacture.

6 Technical Data

Characteristic	Value	Application Notes
Model Identification		
Manufacturer Part Number	IPS04	
Voltage ratings		
Rated voltage of Assembly U_n and of all Outgoing circuits U_e	415V 3phase+N	The nominal voltage of the installation in which the IPS04 is installed, must not exceed this value or the U_i value below.
Rated insulation voltage U_i	500V	
Rated impulse withstand voltage U_{imp}	6kV	The installation environment must be of a nature whereby transient voltages are not expected above this value. (See note 1)
Current ratings		
Rated current of assembly I_{nA}	200A	The total current being fed into the installation by the inverters connected to the IPS04 must not exceed this value.
Rated current of each outgoing circuit I_{nc}	Per MCBs installed. Max 80A/ea	Various rated MCBs can be installed on the in-built chassis to suit the connected inverters. Ensure these match the circuit per AS3000 sec 2.5.3
Rated short-time withstand current I_{cw}	10kA/0.2s	Either the prospective short circuit current at the IPS04 incoming terminals must be less than this kA value, or the circuit breaker feeding the IPS04 must not let through more energy than the I^2t equivalent of this value. (See note 2)
Rated peak withstand current I_{pk}	17kA	The circuit feeding the IPS04 must be protected by a fuse or circuit breaker capable of limiting the short circuit current to less or equal this value, for under ¼ of the period of the AC sinusoidal waveform. I.e., 5ms. (See note 2)
Frequency		
Rated frequency f_n	50Hz	
Other characteristics		
Pollution degree	3	The board will tolerate a small amount of dust and condensation which typically occurs in industrial and commercial applications. Installation must be avoided in environments of severe or frequent condensing atmospheres.
Installation condition	Indoors or Outdoors	For maximum service life outdoors, it is preferable to avoid situations where water may remain on the top of the enclosure for extended periods of time.
Stationary or moveable	Stationary	Not to be installed on a moving platform or vehicle.
Degree of Ingress Protection	IP66	Will protect devices inside the enclosure from both dust and jets of water from any direction (provided compression glands of equivalent rating are installed for cable penetrations).

Intended for use by skilled or ordinary persons	Skilled (AS61439.2)	Any person intended to open the enclosure or operate the isolation switch must be adequately trained in safe methods and implications of doing so. Not to be installed in a domestic residence.
Electromagnetic compatibility (EMC) classification	A	Satisfactory for installation in an electrical system supplying industrial or commercial apparatus where reasonably high magnetic fields may exist and/or can be tolerated. Not suitable for residential or directly adjacent retail, office or laboratory environments.
Type of construction (fixed or removable parts)	Fixed	There are no withdrawable parts in the IPS04.
Measures for protection against electric shock	Class 1	All accessible metal parts of the IPS04 including inner escutcheon door are bonded to the protective earth bar.
Overall dimensions	1200mm (h) 600mm (w) 300mm (d)	
Weight	60kg	
Power Consumption	10W	Consumption of in-built grid protection relay and associated components.
Supply Networks	Energex, Ergon Energy	Satisfies the specific requirements for protection of embedded energy generation systems in Queensland. May satisfy some or all requirements of other jurisdictions also.
Grid Protection Relay	ABB CM-UFD.M33	This relay is approved for use as grid protection under Energy Queensland STN1174.
Maintenance Requirements	None	The IPS04 does not require any periodic inspection or preventative maintenance activities to be carried out following installation.

Note 1: All points downstream of the main switchboard in Australian Commercial and Industrial installations are generally accepted to experience transient voltages no greater than 6kV.

Note 2: The instantaneous level of available fault current at the point of installation may be higher than these values, provided the short circuit current limiting device feeding the IPS04 can ensure that the I^2t let through energy is below these values. For assistance determining if your installation environment meets these conditions, or to obtain engineering services to design the feed circuit to ensure it meets these conditions, please contact Integrelec.

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