Product information guide

Standards and installation practices relevant to NL432PV

DATE CREATED: 15/04/2021

[Background]:

As of June 30th, 2019, the new standards around Solar PV Installations became mandatory. The Clean Energy Council provide guidelines and expand on application of these standards. They represent latest industry best practice for the installation of grid-connected PV systems.

Accredited installer shall comply with the **current versions** of the following standards:

AS/NZS 3000	Wiring rules
AS/NZS 5033	Installation and safety requirements for photovoltaic (PV) arrays
AS/NZS 4509	Stand-alone power systems – Design
AS/NZS 1170	Structural design actions – Wind actions
AS/NZS 4777	Grid connection of energy systems via inverters – Installation requirements
AS/NZS 1768	Lightning protection
AS/NZS 3008	Electrical installations – Selection of cables

[Scope]:

The NL432PV DC PV Isolator complies to the requirements of these standards and the guidelines from the Clean Energy Council. In this information guide we will focus on installation practices, with condensation issues now included as a consideration in AS/NZS3000:2018

[Requirements]:

The Clean Energy Council advises that if condensation is going to be an issue in the enclosure that a breather/pressure equalisation valve must be installed. Refer to clause 7.9.5 below. **This is down to the installer to deem whether condensation will be an issue.**

Any breathers/pressure equalisation devices need to meet the same requirements of the entry and exit glands. The devices need to be IP56 or above. Refer to clause 8.3.14 below.

There is no requirement for the glands and breathers/pressure equalisation values to be IP56NW.

Clause: 7.9.5

Where a condensation issue could arise within electrical equipment, a breathing/pressure equalisation valve shall be installed. Refer to AS/NZS3000:2018 clause 1.7.2

Clause: 8.3.14

Where the entry/exit to an enclosure is a cable gland, the following conditions shall be met:

- *The gland shall be rated to at least IP 56.*
- *Where multiple cables go through one gland, a multi-hole cable gland shall be used.*
- *Where a multi-hole cable gland is used, each cable shall go through an appropriately sized hole.*
- *Products like silicone are not appropriate as a primary means of sealing.*

EXCEPTION: This is not a requirement where cables enter/exit a conduit that is open at both ends (e.g. surface mounted conduits used for mechanical protection linking modules from one part of a string to another).

Clause: 8.3.11

Penetrations shall be sealed following manufacturer's instructions including using glue or nylon tape if necessary.

Clause: 8.3.12

Installers shall use penetrations at the lower entry face first. Entry points on the vertical side are only to be used if:

- *permitted by the manufacturer,*
- *the IP rating is maintained; and*
- *it is not practical to enter via the lower entry face.*

Top entry face penetrations are not permitted when installed outdoors.

In the case of NL432PV - it is rated at IP66NW. To maintain this rating, it is recommended to use glands and breathers/pressure equalisation devices with an IP66 rating.

[Mounting]:

To maintain IP rating switch must be fixed on a 90° vertical surface with the switch in a vertical or horizontal position. **At no time shall the wall switch be mounted on a horizontal surface with the switch handle facing up**.

[Installation]:

When installing a PV DC Isolation device, the installer will need to make sure they meet the requirements entry/exit points to the enclosure, refer to clause 8.3 (1-14)

The specific clauses 8.3.11, 8.3.12 for the installation of breathers/pressure equalisation devices, advise that installers shall use the bottom entries unless permitted by the manufacture or it is not practical to enter via the lower entry face.

NOTE:

1. *NHP provides a M25-M12 reducer as part of the DC isolator to be able to install a M12 pressure compensation valve which is supplied separately*
2. *Given a rooftop installation, the DC isolator is to be mounted horizontally as best practice. In this case, the pressure compensation device can be installed on either of the conduit entries (top or bottom) as the mounting orientation is horizonta*l.

[Part Numbers]:

[1] PV Isolator – **NL432PV**

[2] M25 to M12 reducer (Supplied with DC isolator)- **NLARDM25M12**

[3] Breather/Pressure Equalisation Device – **DA2840**

Frequently asked questions

1. *How does NL432PV comply to - AS/NZS 3000:2018, clause 1.7.1 and 1.7.2(a,b,i,j) specifically related to environmental effects and condensation?*

1.7 SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT

1.7.1 General

Electrical equipment forming part of an electrical installation shall be—

(a) selected and installed to operate in a safe and reliable manner in the course of normal operating conditions;

(b) selected and installed so as not to cause a danger from electric shock, fire, high temperature or physical injury in the event of reasonably expected conditions of abnormal operation, overload, fault or external influences that may apply in the electrical installation; and

(c) electrical equipment shall be installed in accordance with the requirements of this Standard and the additional requirements as specified in the manufacturer's instructions.

(a) Appropriate construction and operating characteristics of the equipment to protect against the mechanical, environmental or other external influences, including condensation, to which it is likely to be exposed at the intended point of installation. The means of protection, which shall not be impaired in the process of installation, may be integral to the equipment or an additional enclosure provided as part of the electrical installation.

(b) Installation instructions provided by the equipment supplier.

(i) Condensation issues—a breathing/pressure equalization valve shall be installed to assist with changes in humidity and drainage of moisture.

(j) Electrical equipment shall be installed to manufacturer's instructions to ensure that the marked IP rating is maintained.

Answer:

Clause 1.7.1 is highlighted in **bold** text to explain the **intent** behind a particular installation.

Clause 1.7.2 emphasizes the different requirements by which one can achieve the actual intent (clause 1.7.1) through safe and sound installation work practices.

- How does NL432PV comply to clause 1.7.2(a)?

  The NL432PV enclosure is IP6NW rated (with/without the pressure compensation device). The injected TPE gasket ensures the enclosure is sealed tight. In addition, all 4xM25 threaded entries include an integrated TPE seal too.

In the long run, the degree of ingress protection (IP) and reliability of an enclosure is mainly dependent on the properties of its gasket. Key performance factors of a gasket are its compression set and proper fit in the gasket groove.

Property	Unit	TPE	PUR	EPDM	Neoprene	Silicon
Temperature range	°C	-40 - +120	-50 - +130	-50 - +120	-40 - +100	-60 - +170
Tensile strength	Mpa	5	0,4	13,0	8,0	9,4
Elongation at break	%	700	110	300	250	540
Hardness	Shore A	30	12	65	66	52
Density	g/cm3	1,13	0,33	1,12	1,6	1,15
Compression set	%	17	5	20	35	14

In addition to the TPE seal, the installation instructions (clause 1.7.2 b, j) clearly highlight the additional use of **neutral cure silicone** where needed to seal all fixing points to ensure IP66NW rating is maintained.

Chemical Performance	TPE	PUR	EPDM	Neoprene	Silicon
Neutral salts	****	****	****	****	****
Acids, low concentrations	****	***	****	***	***
Acids, high concentrations	***	*	***	*	*
Alkalis, low concentrations	****	***	****	****	***
Alkalis, high concentrations	***	*	****	***	*
Petroleums	*	*	*	***	*
Hydraulic oils	*	****	*	***	*
Alcohols	**	***	****	****	****
Cooling fluids	***	***	****	***	****

- How does NL432PV comply to clause 1.7.2(i)?

> (i) Condensation issues—a breathing/pressure equalization valve shall be installed to assist with changes in humidity and drainage of moisture.

Pressure differentials in enclosures with a high degree of protection are a result of internal and external temperature changes. In the case of negative pressure or partial vacuum, dust and humidity can enter the enclosure through the lid. When the air inside the enclosure cools down, condensation may occur because the humidity cannot escape the enclosure.

The easy-to-install pressure compensation device DA 28406 provides compensation of pressure at a protection degree of IP66. Even with a slight overpressure, a waterproof membrane inside the plug **allows the humidity to escape whilst blocking water and dirt from entering the enclosure**.

It is important to note that the clause 1.7.2(i) is often misread thus misinterpreted. **Moisture is eliminated by airtightness (TPE seal) and further compensation of pressure through a device if ambient conditions change.**
The core requirement of this clause is that – where there is a potential possible condensation issue at an installation site, a pressure compensation valve shall be installed to tackle this situation. In humid conditions, condensation occurs especially when the enclosure is not **thermally insulated.**

It is also important to note that the NL432PV is extremely well thermally insulated provided safe installation practices as followed as per the instruction sheet. By installing a pressure compensation device - an additional layer of protection is ensured to maintain the IP66NW rating at humid locations.

- Why isn't the pressure compensation device already pre-installed on NL432PV?

NL432PV complies to all current and relevant AS/NZ standards as stated in this document. While it is fair to benchmark NHP's product to its competitors – NHP offers the pressure compensation device as an add-on accessory as not all installations require it.