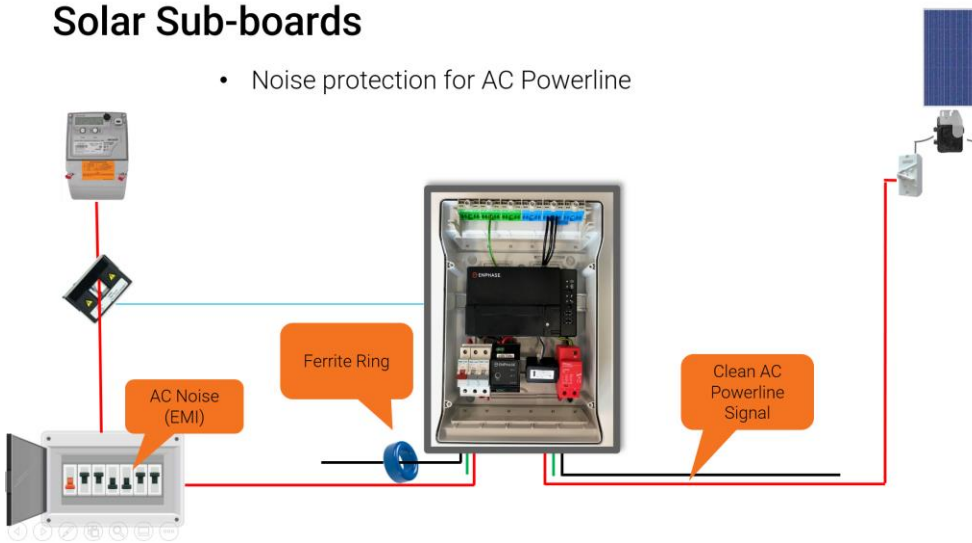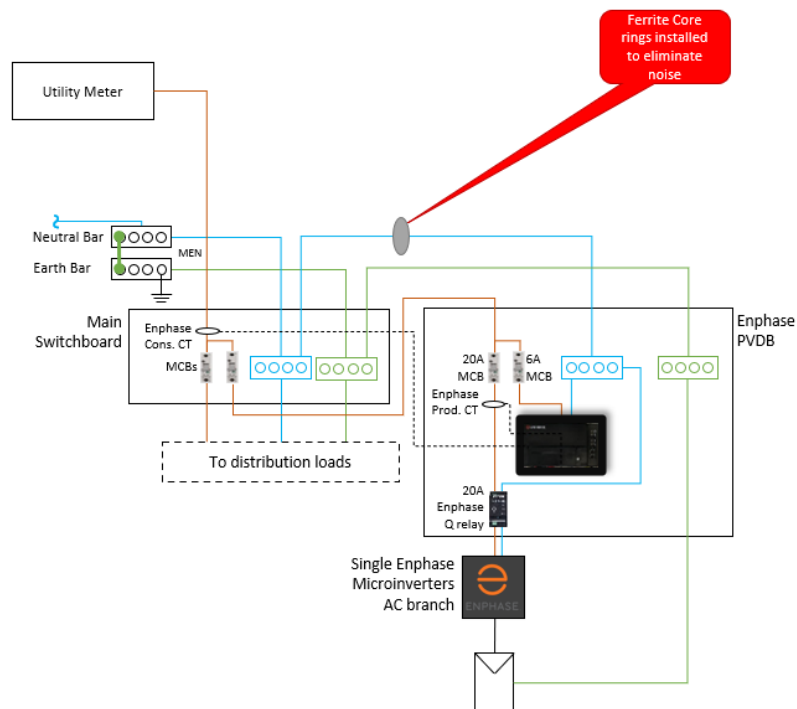## Ferrite Core Installation to suppress site noise issues

The application for using Ferrite Cores to suppress noise is to separate the Power Line Communications (PLC) of the Enphase system from the rest of the household loads. This allows the envoy **to** communicate to the micros without any external interference from any of the circuit in the rest of the house. Recommended Ferrite Cores can be purchased are TDK and our wholesalers such as ACSW. To achieve this the Ferrite Cores should be installed around the neutral to the sub board as shown below:



### Solar Sub-boards

- Noise protection for AC Powerline

Ferrite Ring

AC Noise (EMI)

Clean AC Powerline Signal

**Concept: isolating Enphase system from external noises generating from MSB**



Ferrite Core rings installed to eliminate noise

Utility Meter

Neutral Bar
MEN
Earth Bar

Main Switchboard
Enphase Cons. CT
MCBs

To distribution loads

20A MCB
6A MCB
Enphase Prod. CT

Enphase PVDB

20A Enphase Q relay

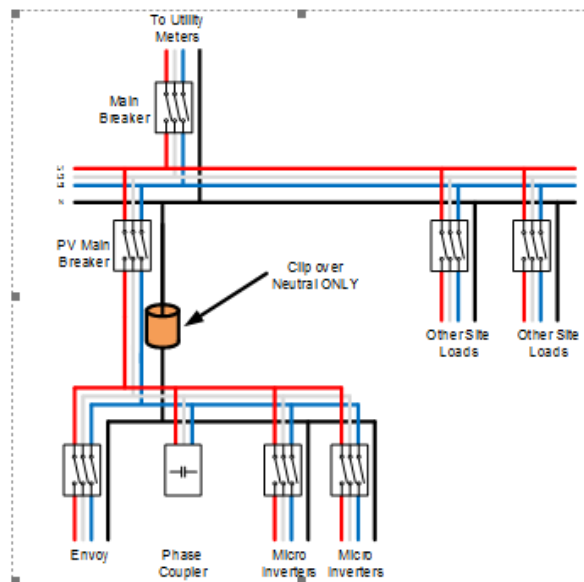Single Enphase Microinverters AC branch

May 2020

## Concept: isolating Enphase system from external noises generating from MSB and 3rd party generators
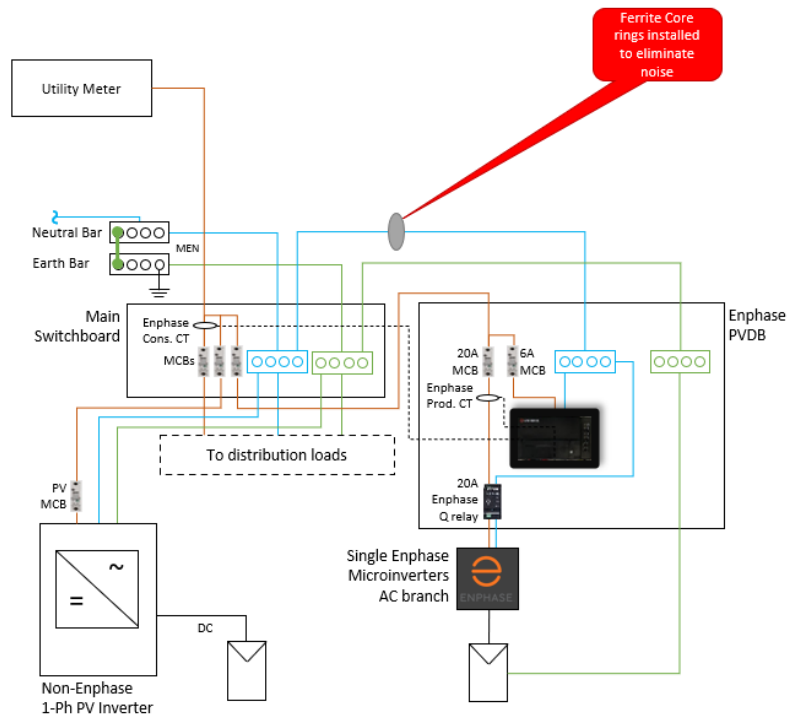
For two and three-phase the same principle applies with ferrite cores deployed only on the neutral as shown below:

### 3.1. Multi-phase with comms L1/L2/L3 - N, ETD cable

May 2020

To increase the effectiveness of the Ferrite Cores the number of ferrite cores installed can be increase, as shown below. Please note a ferrite core should be added for every 20 A of return current, this can be calculated by the number of circuits e.g. 2 x microinverter circuits (cables to the roof and Q-relays) = 2 ferrite cores. This is the same principle for single, two and three-phase systems.



**Figure 7: Multiple Toroid Rings Fitted on a Larger Core Cable**

If you do not have a dedicated PV sub-board on site, you will need to either find the noisy circuit and install the core around the active of that circuit which can be difficult to find. The best option is to try and separate the neutral connections between the Envoy and the microinverters, as shown below:



Concept: isolating Enphase system from external noises generating from MSB with a split N bar for Enphase
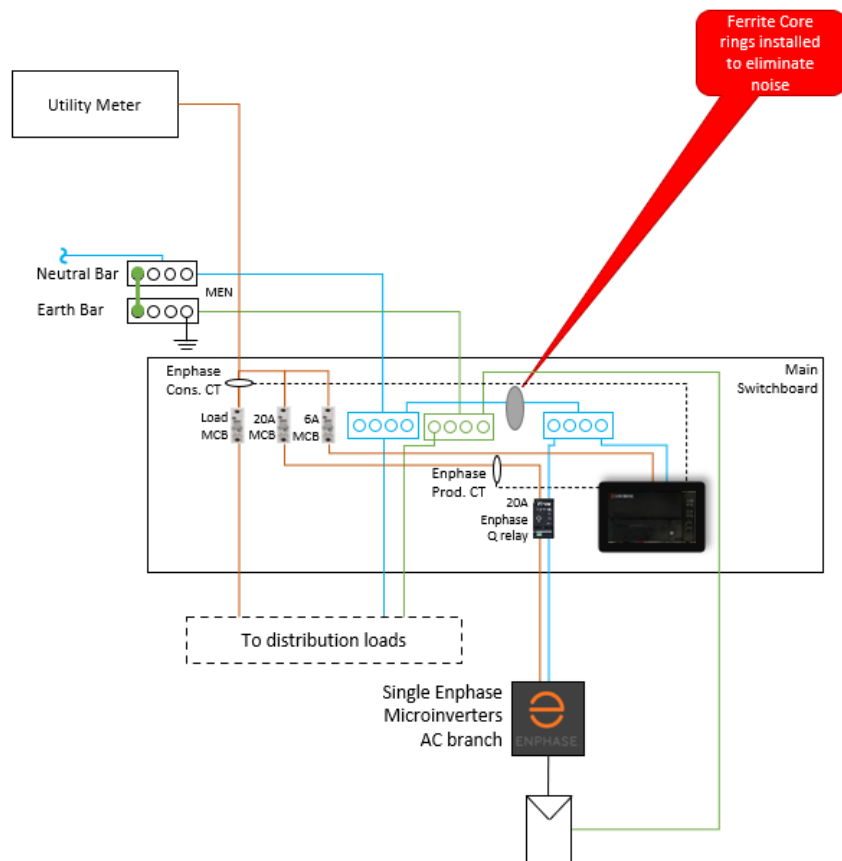
Once installed you should restart the microinverter circuit then login to the installer toolkit and check if all the microinverters are now communicating and the comms status for each microinverter to see if they are reporting or not, this is found in under "microinverter" then "status".

A poor PLC level is shown below:

| | |
|---|---|
| ● 121719033579 | ▲ |
| Last Report: **23 W** 01/05/2020 10:05 AM | |
| Status: | **OK** |
| Last Report: | **23 W** 01/05/2020 10:05 AM |
| Detected: | 13 Feb, 2020 2:07 PM<br>Assigned via provisioning |
| Comm Level: | ▮▯▯▯ |
| Grid Profile: | Profile Set (AU AS4777.2:2015) |
| Phase: | L2(B) |
| Part Number: | 800-00586-r03 |
| Running Image: | 520-00066-r01-v00.34.09<br>Updated 02/02/2017 4:51 AM |

Compared to good PLC level (after Ferrite Core installation):

| | |
|---|---|
| ● 121719031436 | ▲ |
| Last Report: **21 W** 01/05/2020 10:06 AM | |
| Status: | **OK** |
| Last Report: | **21 W** 01/05/2020 10:07 AM |
| Detected: | 13 Feb, 2020 2:06 PM<br>Assigned via provisioning |
| Comm Level: | ▮▮▮▮ |
| Grid Profile: | Profile Set (AU AS4777.2:2015) |
| Phase: | L1(A) |
| Part Number: | 800-00586-r03 |
| Running Image: | 520-00066-r01-v00.34.09<br>Updated 02/02/2017 4:51 AM |