

Corinex Installation Guide

Coupling on LV

LV coupling scenarios for G.hn project

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1. Introduction

This document describes the LV coupling scenario in Distribution Transformer Stations (DTSs) as well as the LV coupling in Street Cabinet (SC) related to DTS for the G.hn project.

2. DTS

An injection of G.hn signal in DTS will be provided by using of external 3 wires external USB couplers:

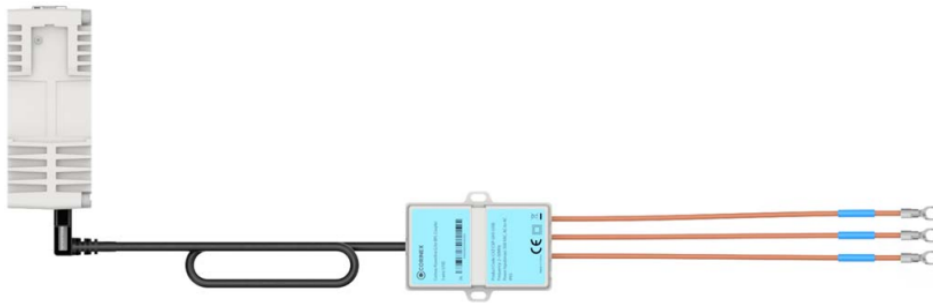


Figure 1: External 3 wires USB coupler

The wires of the coupler are labeled as L1, L2, and L3. The channels configuration in MIMO mode of this coupler is as follows:

CH1+ : L1

CH1- : L3

CH2+ : L1 and L3

CH2- : L2

A default coupling mode used in DTS is MIMO mode usually which means 2 channels are used for the signal transmission as described above.

A splitting of G.hn signal is possible to provide by the external USB splitters which are two types: 1 to 2 and 1 to 3 USB splitters. It is possible to combine these splitters as well to have more signal outputs if needed.



Figure 2: 1 to 2 USB splitter



Figure 3: 1 to 3 USB splitter

An Installation in DTS is recommended according to the following principle connections:

Example of Injection to 3 feeders

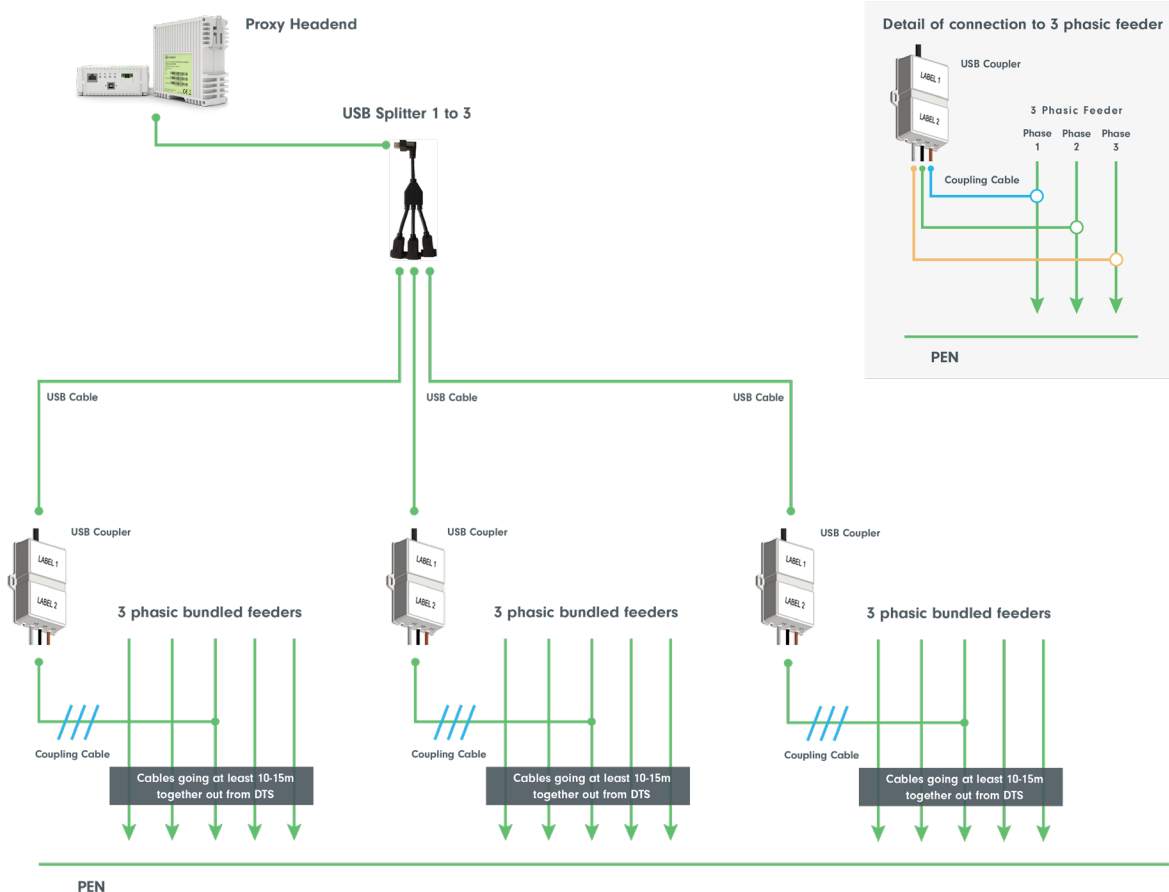


Figure 4: LV three phasic coupling scenario in MIMO mode – three couplers used (bundled feeders)

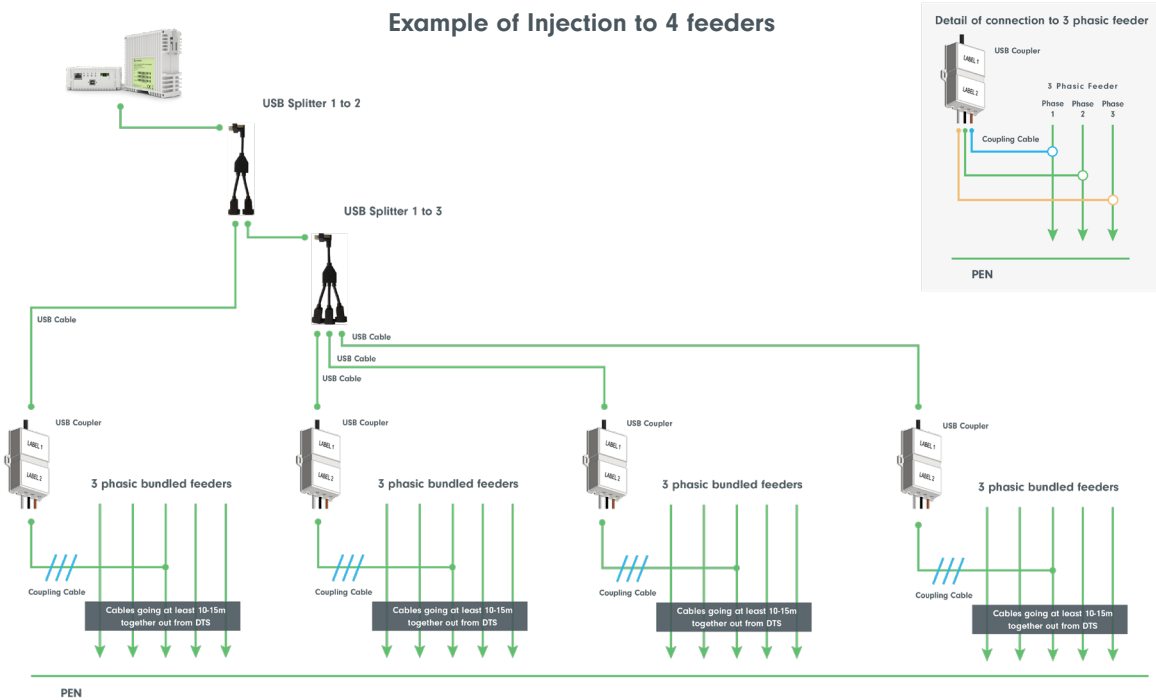


Figure 5: LV three phasic coupling scenario in MIMO mode – four couplers used (bundled feeders)

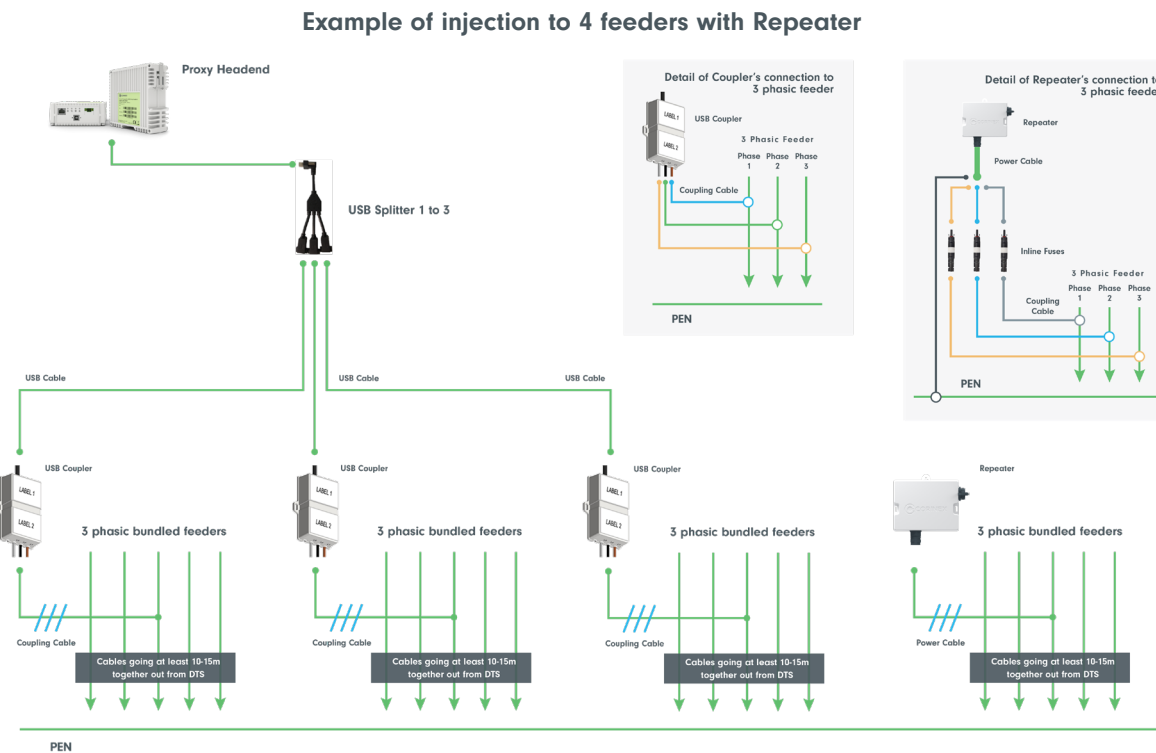


Figure 6: LV three phasic coupling scenario in MIMO mode – three Couplers and Repeater used (bundled feeders)

Description of the solution:

- **All three phases** from feeder are selected for the signal injections.
- Three coupling cables marked as L1, L2, and L3 on coupler are connected to the relevant phases of feeders.
- If several outgoing cables from different feeders going together in one conduit (bundled cables) at least 10-15m out from DTS then just **one longest feeder** from them is selected for signal injection.
- As a next step, the feeders where the installed Repeaters/Endpoint modems achieve the high PHY speeds might be then disconnected from couplers. This step can bring to us the improvement of the PHY speeds on other feeders as well as to keep the signal injection simple as possible.
- All couplers are connected to one BPL Proxy HE and each coupler is used for each selected feeder.
- It is recommended to connect **4 couplers max.** per one Proxy HE.
- Couplers are connected to the outgoing cables/feeders directly behind the power bars of distribution panel by the coupling LV cables.
- Coupling LV cables should be **short as possible.**
- It is good if coupler can be placed near to outgoing feeders (not away from feeders).
- Feeders that are connected to the short outgoing cables (30-50 meters long) can be skipped from the signal injection as well as feeders where no Repeaters or Endpoint modems will be installed (e.g., public lights, photovoltaic).
- In case that more as 3-4 couplers is needed to be used or it is needed to inject signal to feeders which are physically far away (LV board 2) from the first group of feeders (LV board 1) then it is recommended to use the Repeater(s) in DTS too. The PEN cable of Repeater should be connected to PEN bus bar as close as possible to the feeder where the phase cables of feeder will be used for connection with Repeater.

3. Street cabinets/Fuse boxes

The installation in street cabinets is recommended according to the following principle connections:

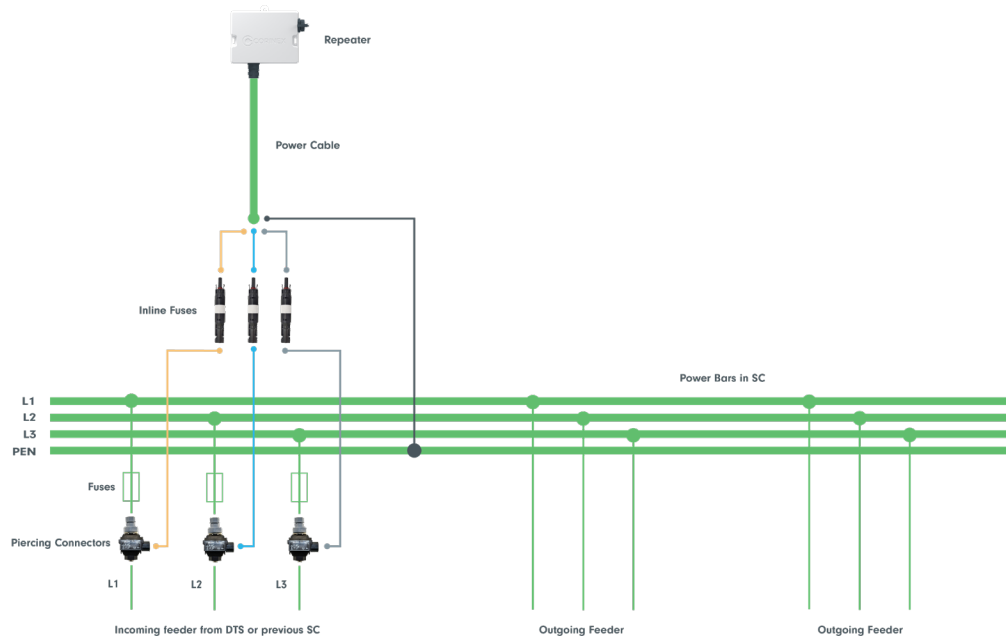


Figure 7: Repeater Connections in Street Cabinet/Fuse box

The Repeater should be connected preferably to the incoming feeder in terms of DTS or previous SC/FB with the installed Repeater.

The Repeater has an internal BPL coupler, which injects two g.hn BPL channels (MIMO) onto the power line. There are two possibilities for coupling modes:

- **Phase to Phase:**

Pin 1 and 3, CH1
Pin 2 and 3, CH2

- **Phase to Neutral:**

Pin 1 and 3, CH1
Pin 2 and N, CH2

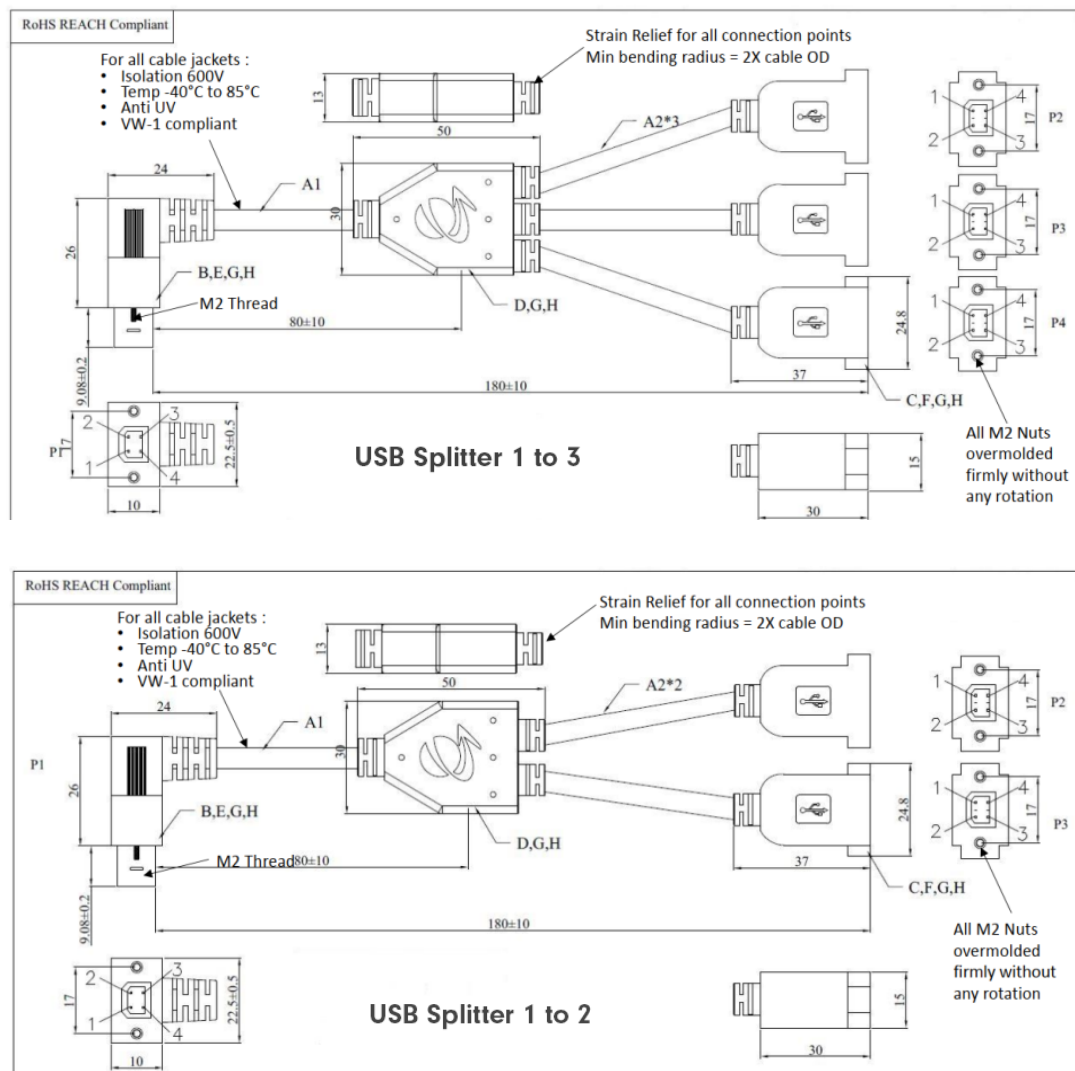
Phase to phase or phase to neutral, but only one coupling mode can be active at a time. The

selection of coupling mode is done by the Repeater automatically during the booting time, where it uses an internal logic which compares the BPL speed in both modes. Phase to phase coupling is the default coupling mode and it will be changed to phase to neutral if it is found to be better. The Repeater will remember the new settings, and it will become the new default coupling mode.

More details about Repeater available in the installation guide: [Corinex Ultrafast Smart Gateway -I&II_Installation Manual V1.0.pdf](#)

4. Technical drawings

4.1 Splitters



4.2 Couplers

