



## Application Note 11 - CP Wiring

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## Contents

<b>1</b>	<b>Revisions</b>	<b>3</b>
<b>2</b>	<b>Introduction</b>	<b>3</b>
<b>3</b>	<b>Physical Wiring</b>	<b>3</b>
<b>4</b>	<b>Additional Thoughts</b>	<b>9</b>
<b>5</b>	<b>Contact</b>	<b>9</b>

## 1 Revisions

Revision	Release Date	Changes
1	April 1, 2020	Initial release

## 2 Introduction

Proximity Pilot (PP) and Control Pilot (CP) signals are necessary for a successful charging session. While PP is just carrying an analog signal CP carries a high speed communication signal with a bandwidth of multiple Megahertz in ISO 15118 complaint applications. So special attention must be paid in the wiring of the CP signal in the charging station design.

## 3 Physical Wiring

Signal paths always form a loop with its way and way back. Loops make signal paths prone to interferences. Therefore loops should be minimized in size as far as possible.

In the following we show different examples of CP wiring and which to prefer.

Rating	Wiring	Example
Bad	CP wire far away from PE	Figure 1
Better	CP wire close to PE	Figure 2
Good	twisted CP / PE pair	Figure 3
Best	CP wire shielded with PE	Figure 4
Bad	CP wire shielded but shield connected on both ends to PE	Figure 5

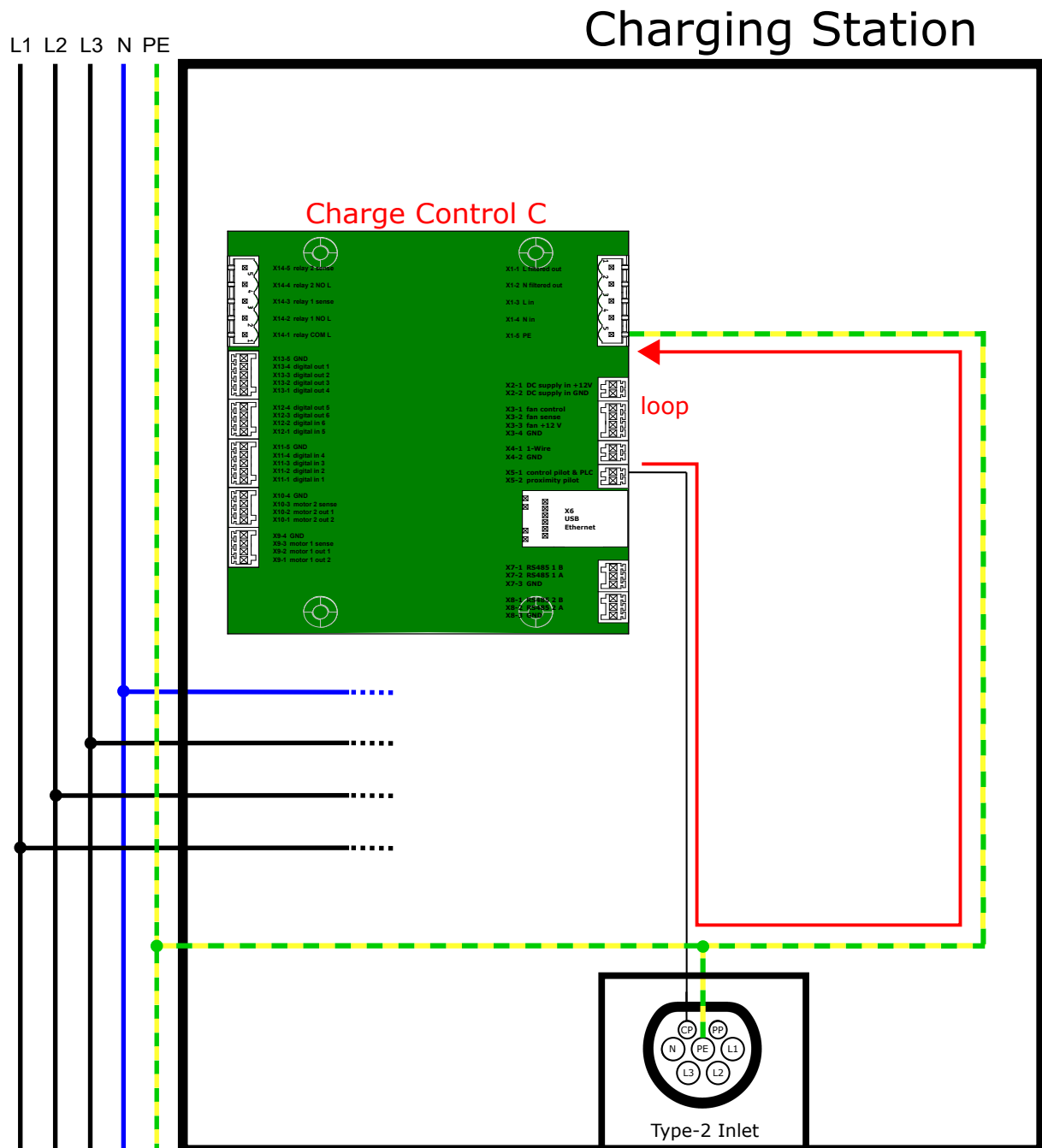


Figure 1: Bad CP wiring: CP wire far away from PE

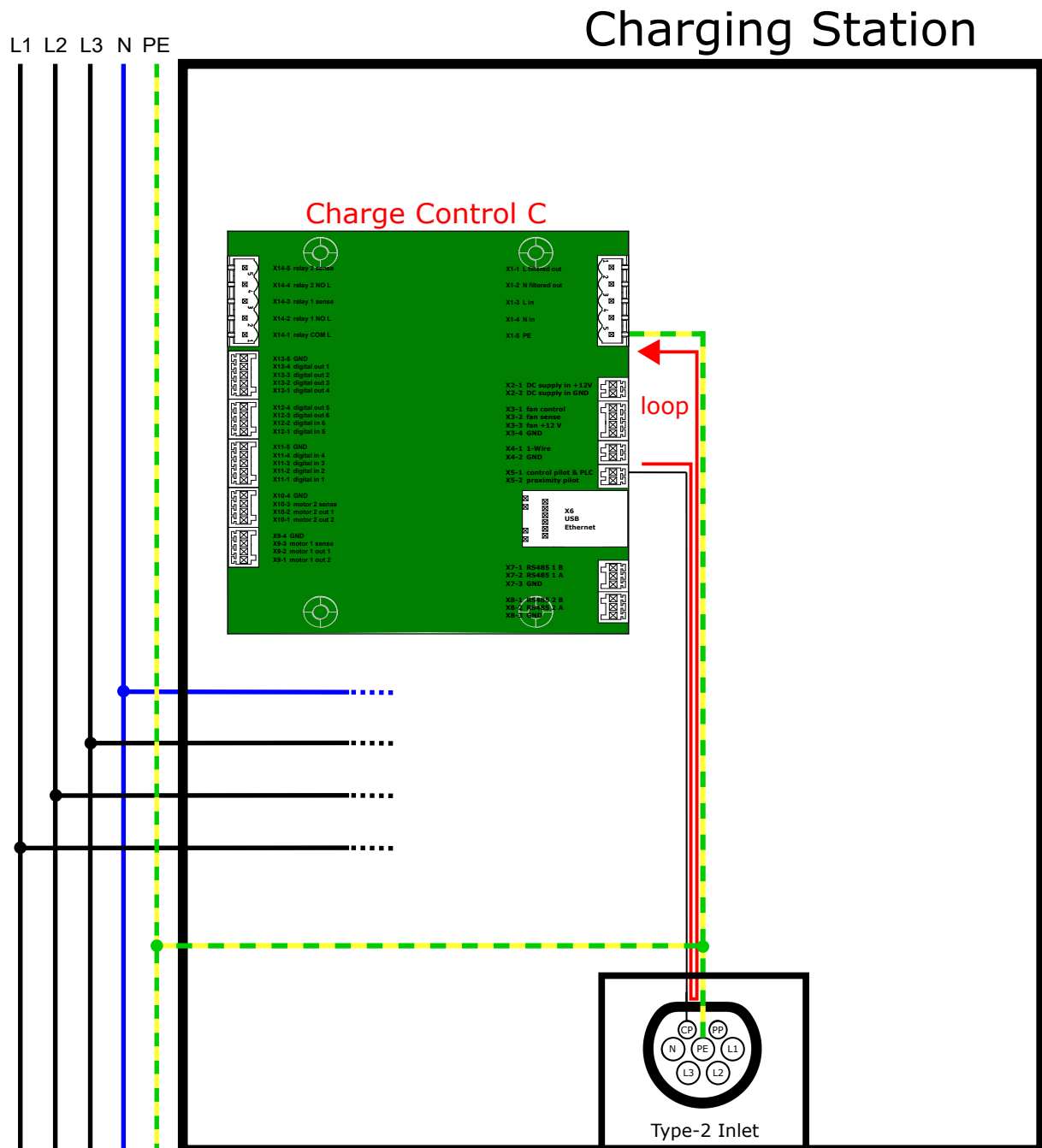


Figure 2: Better CP wiring: CP wire close to PE

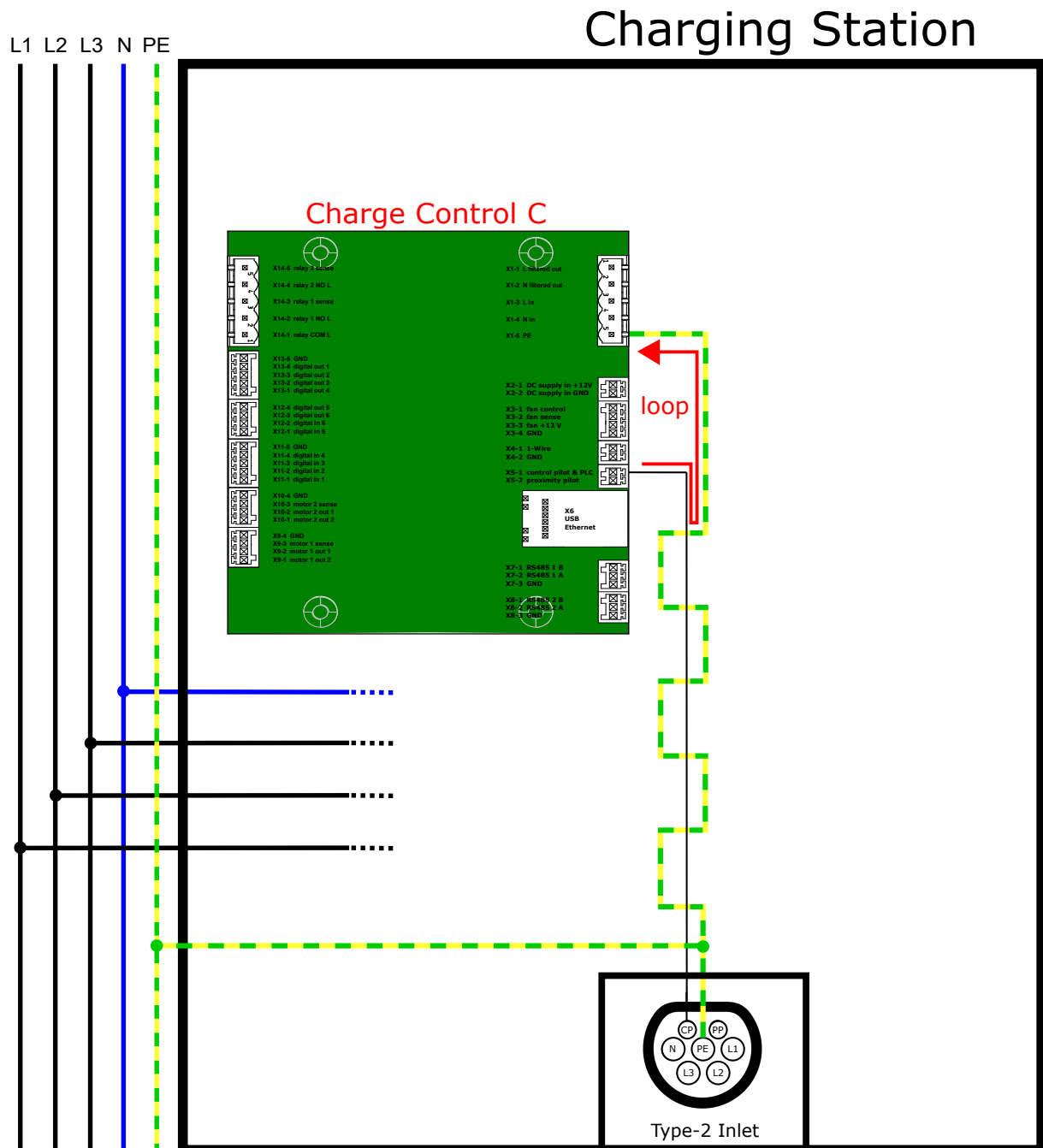


Figure 3: Good CP wiring: twisted CP / PE pair

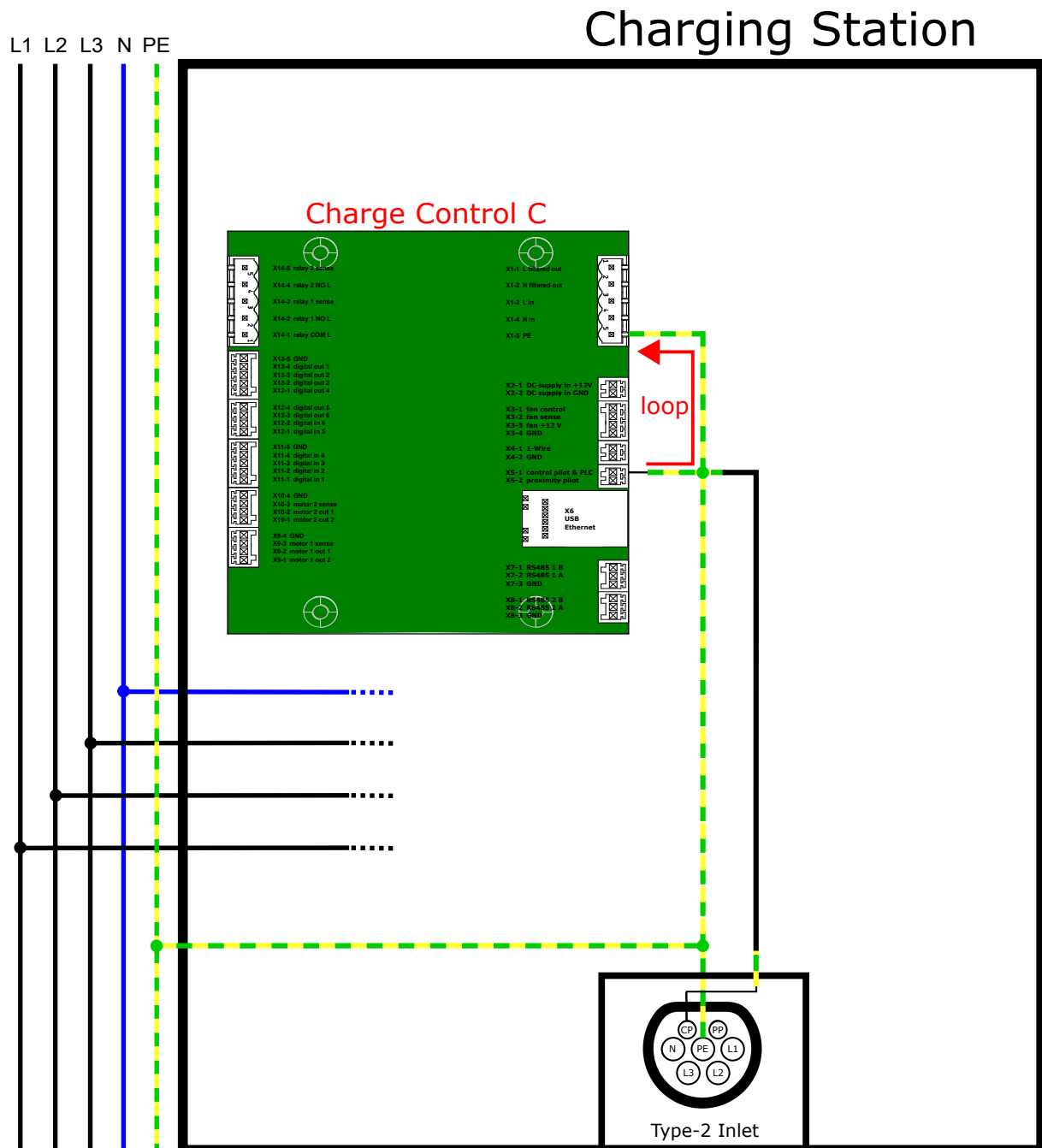


Figure 4: Best CP wiring: CP wire shielded with PE

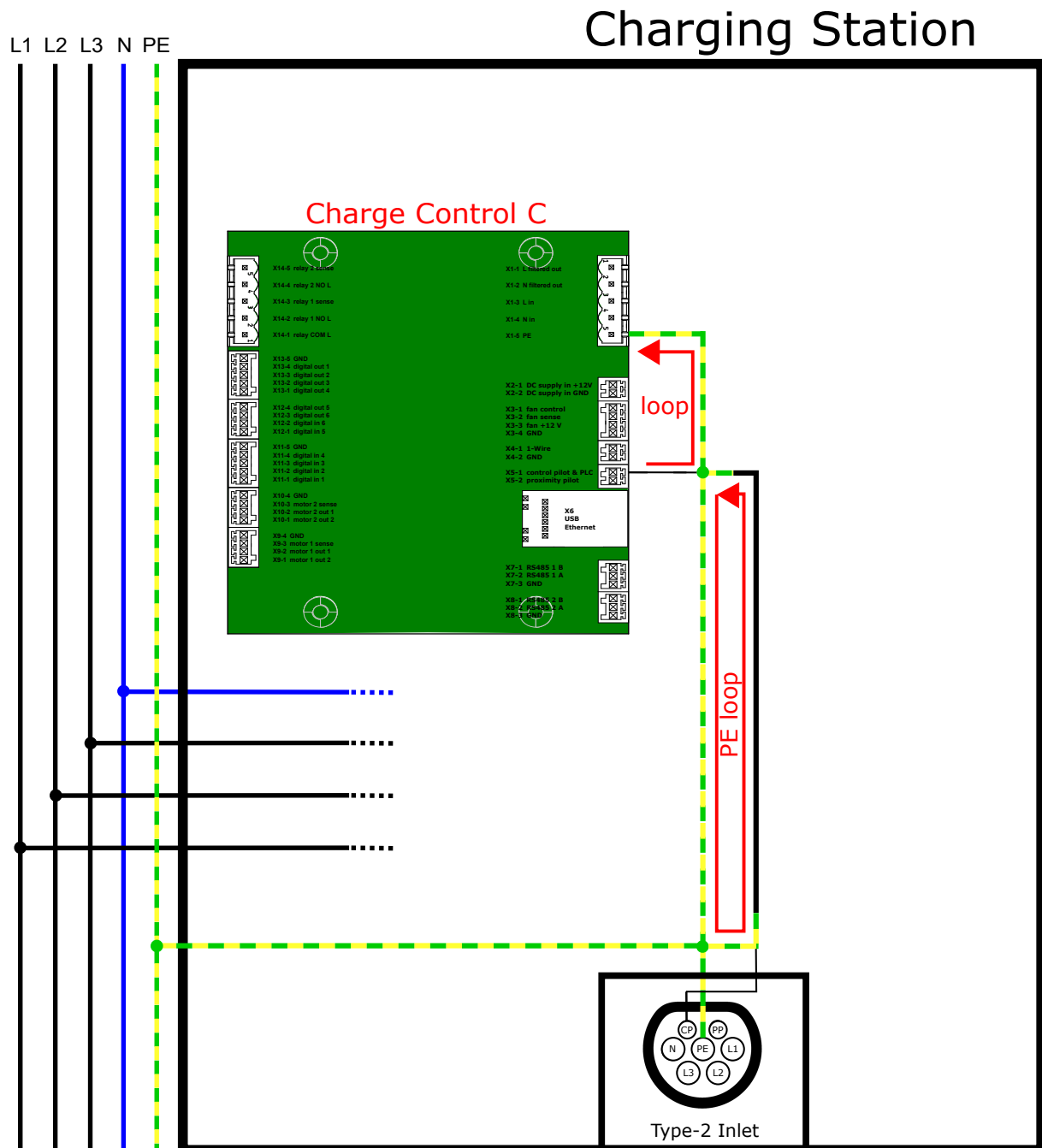


Figure 5: Bad: an additional PE loop appeared, because of the doubled PE shield connection



## 4 Additional Thoughts

1. twisting of the wires (CP an PE) is recommended instead of building large loops
  - a. by twisting small loops are created which ideally extinguish each other
2. shielding of the wires is recommended as the best wiring method
  - a. connect shield only at one end to prevent from additional PE loop
  - b. connection of PE on Type 2 connector side is preferred
3. minimize the number of clamp-points
  - a. if necessary as close to the Type 2 connector as possible
  - b. also PE connection of controller board (connector X1 pin 5) should be connected as close to the Type 2 connector as possible
4. all the hints given in this application note apply the same way on fixed cable topology instead of Type 2 connector

## 5 Contact

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