

11T short dipole instrumentation system

This document summarises the instrumentation system of 11T short dipole (in figure 1). The instrumentation system consists of voltage taps and quench heaters. The coil has two layers: outer and inner layer. Both layers are divided in blocks (from A to B and layer jump at the outer layer and from A to D + layer jump at the inner layer) that are monitored with voltage taps. See cross section of the 11T short dipole in figure 2 for details. These blocks have a few points of interest such as the peak magnetic field region at the top of the coil, layer jump and the middle plane layers at the coil centre. These areas of interest are heavily instrumented i.e. have higher voltage tap density. In quench analysis high voltage tap density enables better view into the quench event and can reveal key parameters such as quench velocity or the location of spontaneous normal zone development.

In 11T short dipole each of the coil blocks are monitored with at least two voltage taps. In this schematic blue voltage tap colour indicates that the voltage tap is located at the lower part of the block where as an orange voltage tap indicates that it is located at the upper part. Depending on the block the upper or the lower part can contain multiple voltage taps. The purple voltage taps are used to monitor the splice voltages. They are located outside the coil on the current leads.

In this schematic the page 2 contains an overview of the 11T short dipole instrumentation system with wire labelling and sector blocks plus their individual colours. In the overview the dipole is presented as an exploded view drawing to clarify the instrumentation wiring. Pages from 3 to 7 cover outer layer and inner layer separately.



Figure 1. 11T short dipole – inner and outer layer

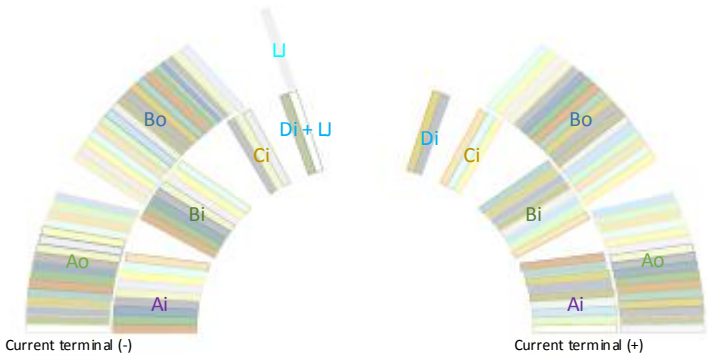


Figure 2. Cross section of the 11 T short dipole – blocks from A to D + LJ (layer jump)

Instrumentation wire labelling system

Instrumentation wire ID at CERN consists of capital-, lower case letters and numerals. In this document the labels for voltage taps and quench heater inputs are as defined below:

Voltage tap labelling

Example: EE5o11 – Coil number 105, voltage tap at the outer layer, non-splice tap, index number 11

EEsxyy

- EE: used for voltage taps
- s: if letter 's' exists before the numeral then the particular voltage tap is one of the LTS splice taps
- x: the numeral refers to the coil number e.g. HCMBHSP0003_105
- o/i: o as the outer layer & i as the inner layer
- yy: index number, voltage tap index number runs from positive current leads to negative current leads i.e. the smaller the number the closer it is to the positive current lead.

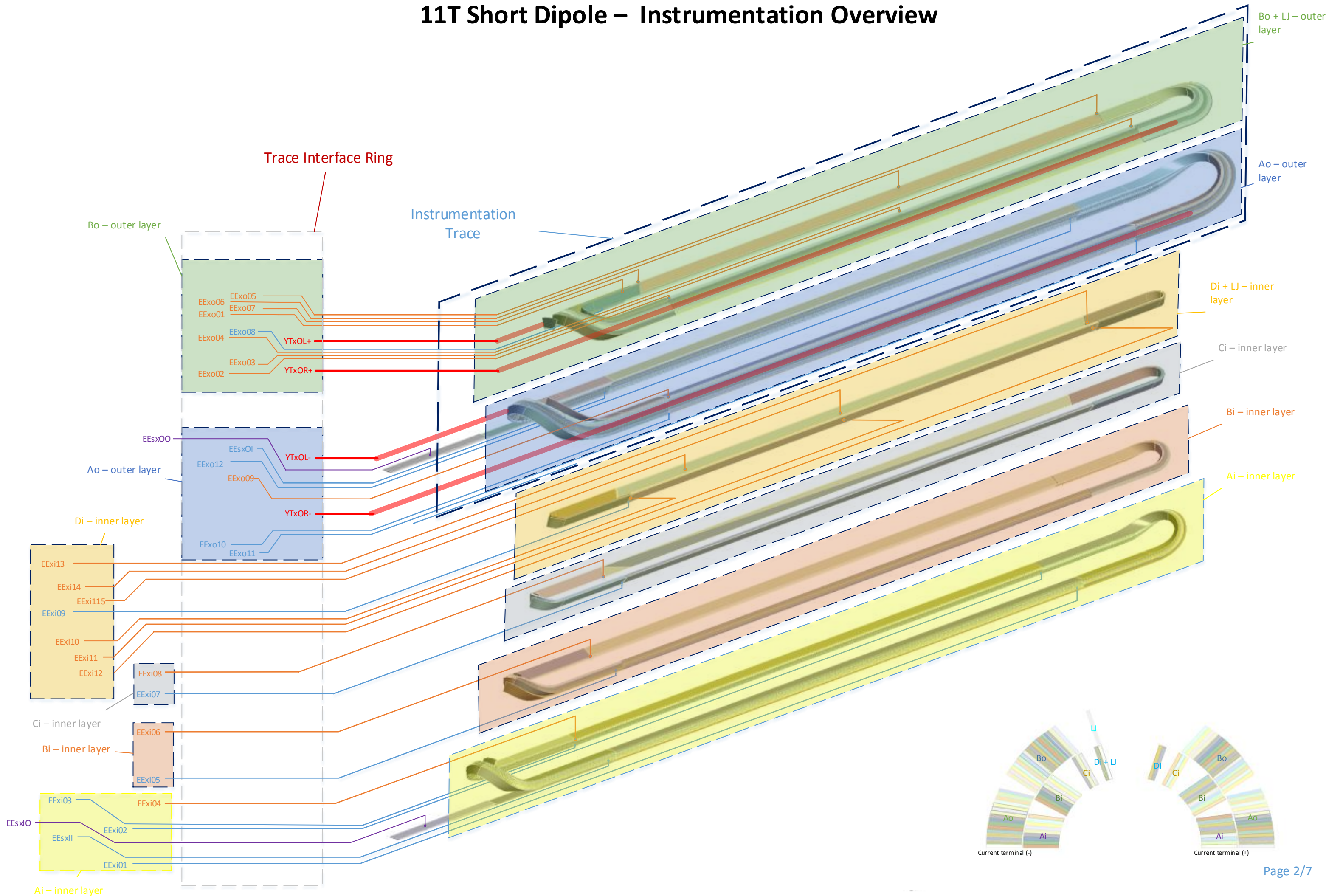
Quench heater input wire labelling

Example: YT5OL- – Coil number 105, quench heater input on the outer layer at the left hand side, negative polarity

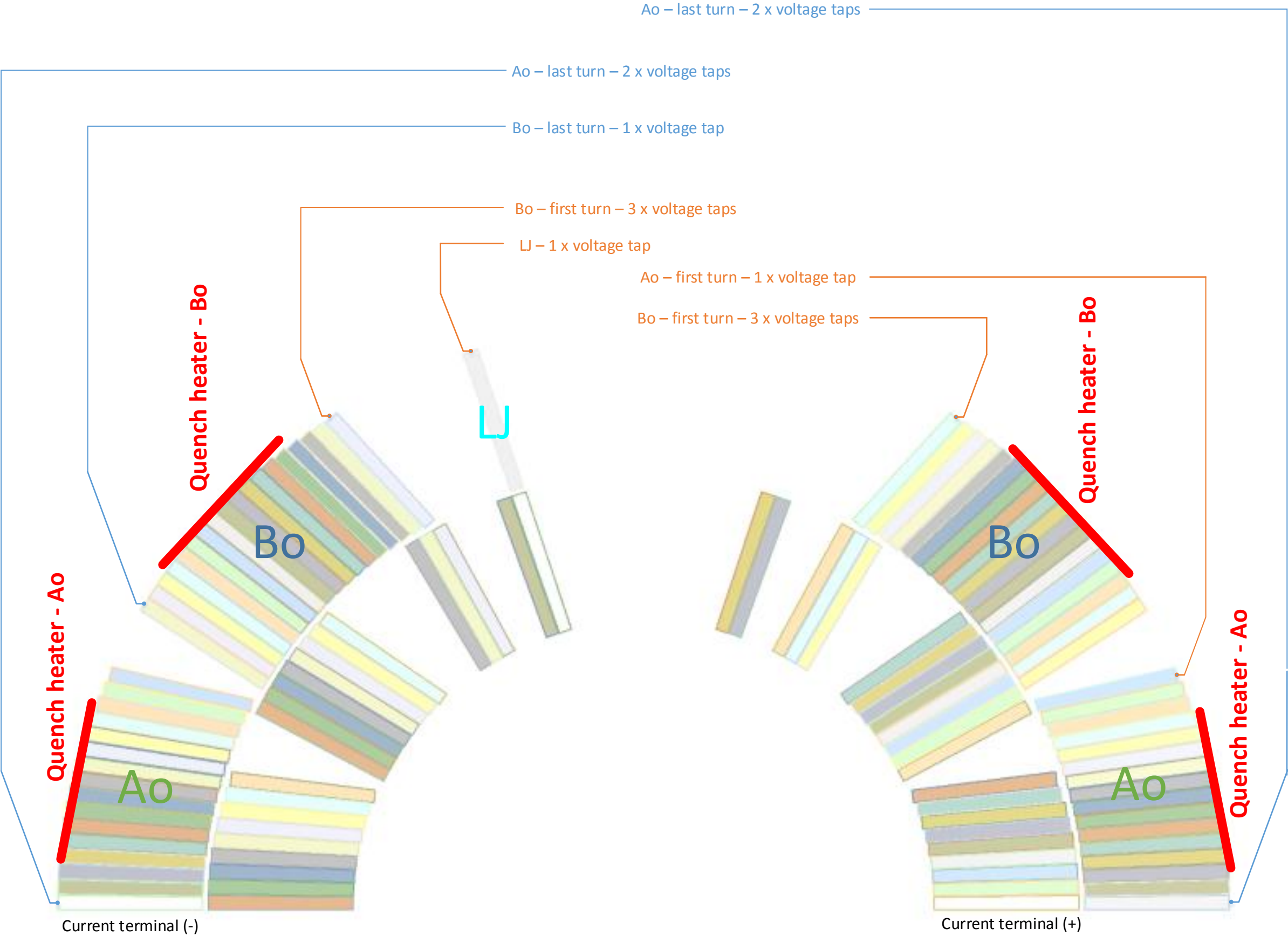
YTxyy+

- YT: used for quench heaters
- x: the numeral identifies the coil number e.g. HCMBHSP0003_105
- yy: OL as outer layer – left side or OR as outer layer – right side
- +: plus or minus depending on the polarity

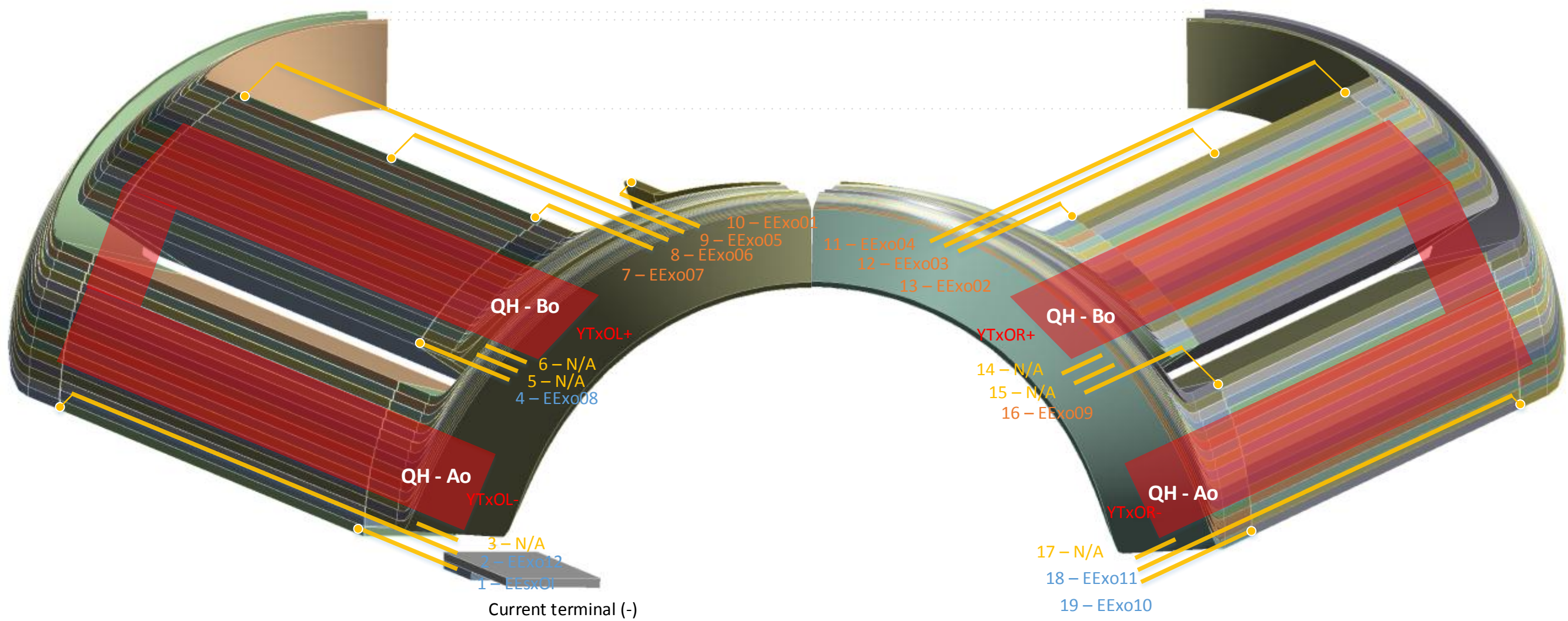
11T Short Dipole – Instrumentation Overview



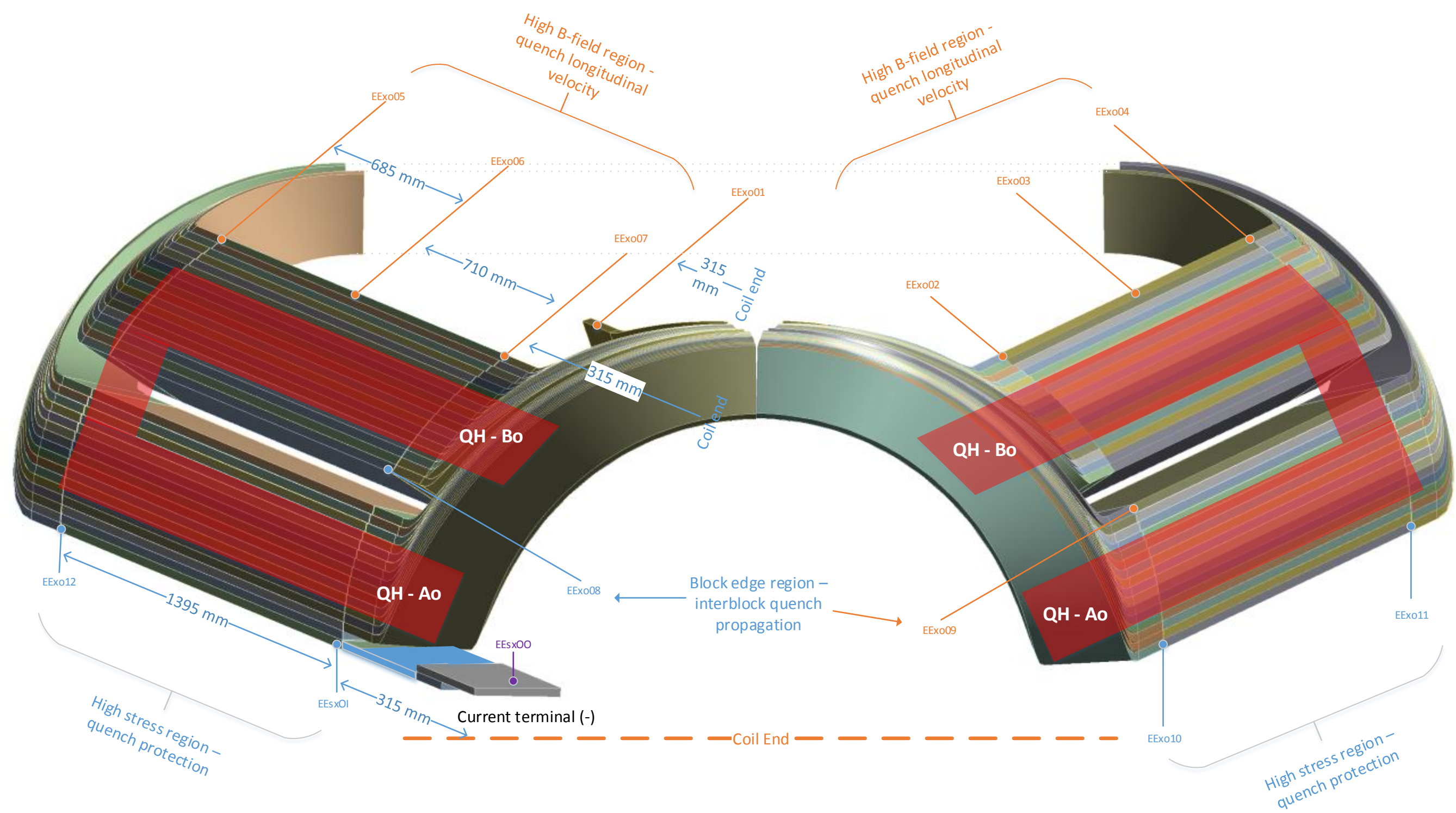
11T Short Dipole – Outer Layer – Instrumentation Overview



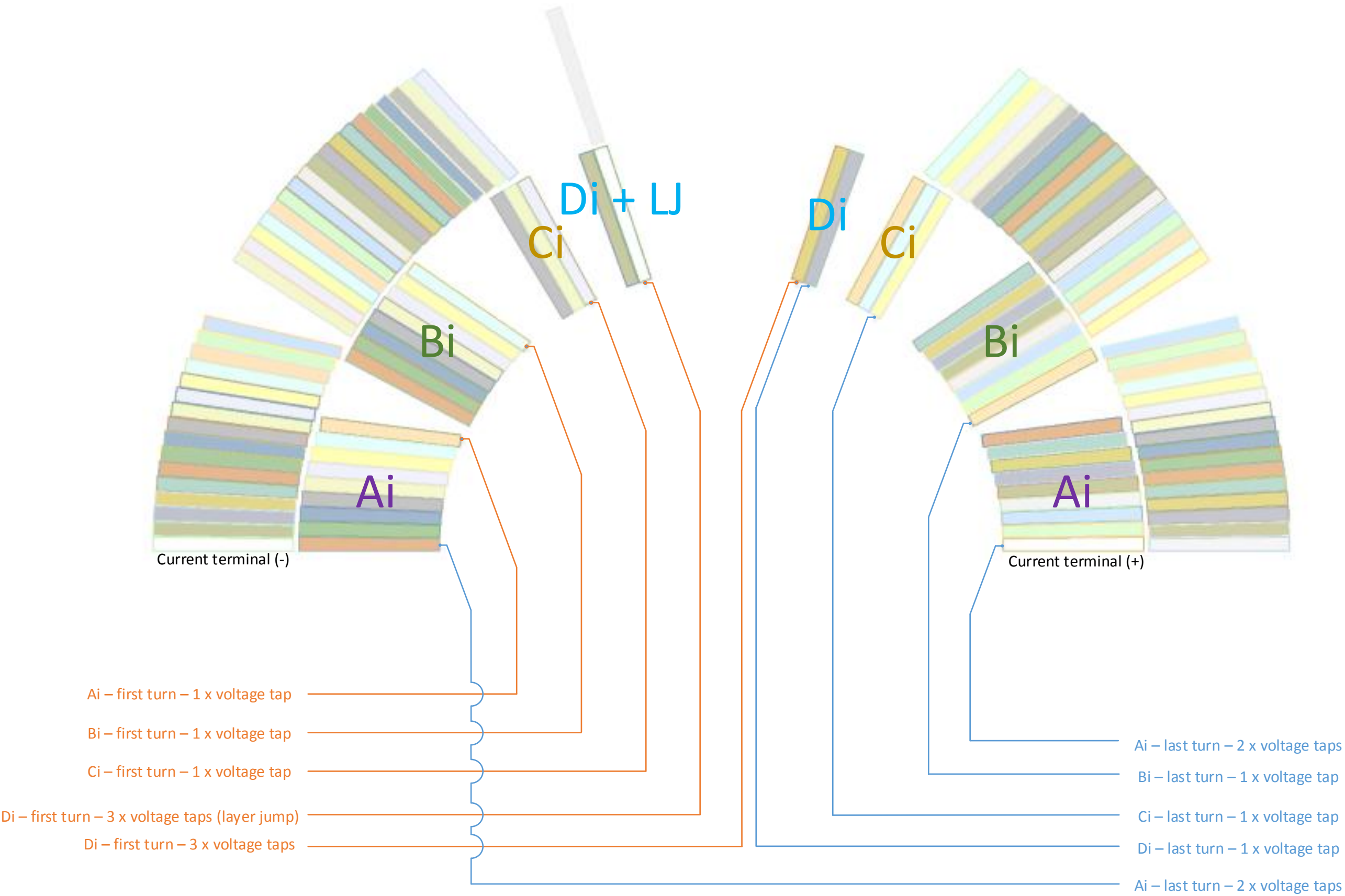
11T Short Dipole – Outer Layer – Instrumentation Trace



11T Short Dipole – Outer Layer – Instrumentation Voltage Tap Locations



11T Short Dipole – Inner Layer – Instrumentation Overview



11T Short Dipole – Inner Layer – Instrumentation Voltage Tap Locations

