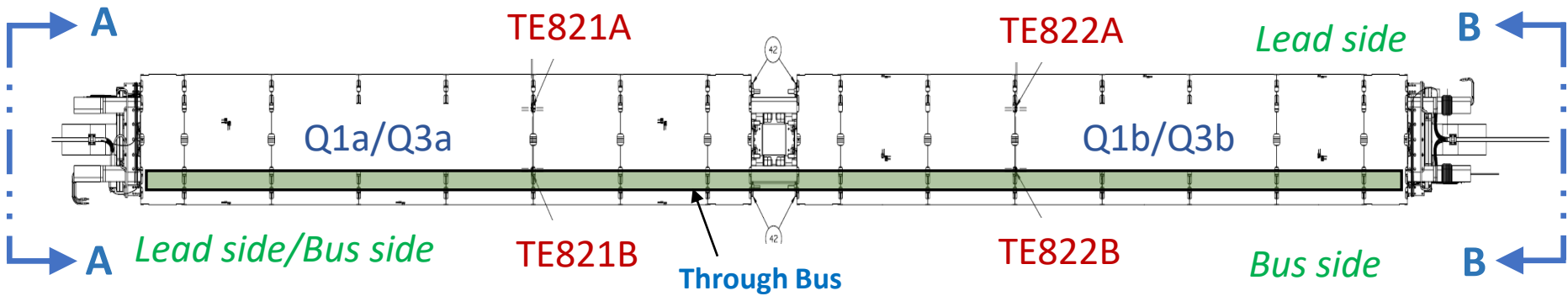


# CERN RTD positions on LMQXFA01

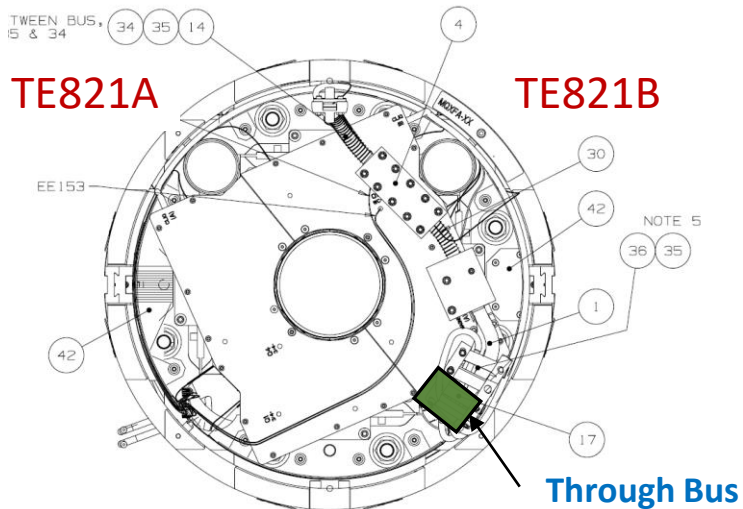
R. Bossert, F. Nobrega, S.  
Feher, L. Martin, T. Strauss

9/12/24

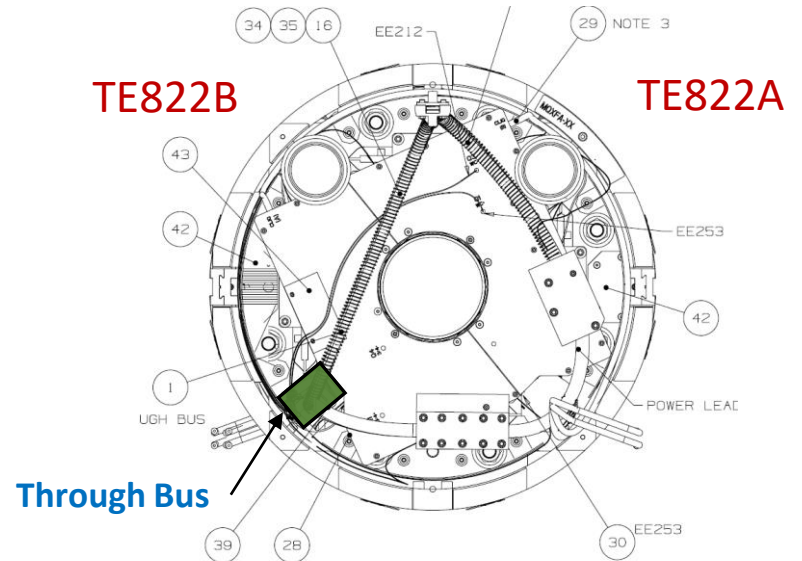
**Plan view (view from above) with CERN desired layout of Q1/Q3**



**Looking into Qa from connection end**  
**(View A-A)**



**Looking into Qb from connection end**  
**(View B-B)**



*As we believe installed on CA01*

Thermometer Labels and identifying numbers from traveler

Consistent with CERN Schematic

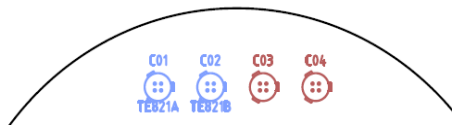
CERN RTD Designations				
		From CERN Thermometer Traveler		
CA01 Wire Label Ref. resistance vs last measured resistance		Serial number from Anthony	CERN Part Identifier	Other Identification
TE821B 57.24 $\Omega$	Qa Bus 58.051 $\Omega$	CX_LS_20677	HCQITESCXT-CR029420	CX_LS_20677
TE821A 54.04 $\Omega$	Qa no Bus 54.899 $\Omega$	CX_LS_20707	HCQITESCXT-CR029670	CX_LS_20707
TE822B 56.87 $\Omega$	Qb Bus 57.877 $\Omega$	CX_LS_X20695	HCQITESCXT-CR029580	CX_LS_X20695
TE822A 56.90 $\Omega$	Qb no Bus 57.814 $\Omega$	CX_LS_X20667	HCQITESCXT-CR029360	CX_LS_X20667

## The big BUT:

We found one problem when the spreadsheet was created, it should be an issue on the Qa end for CA01. We noticed that in the assignment we mixed up the Pin1 TE821A & Pin 2 TE821B assignment.

Name	Magnet Name	Location	Label	First row	2nd row	3rd row	4th row	Wire Insulation color	IFS Head Pin	Cryostat Side	IFS Box Connector	IF
Body Thermometers supplied by CERN	MQXFA04	Qa - end	Lead Side	TE821B I+	Blue	Yellow	White	Pink	yellow	1 - C	Qa - end	C10
				TE821B U+					black	1 - A		
			(Bus Side)	TE821B U-	red	1 - B						
				TE821B I-	green	1 - D						
		Non-Lead Side	(No Bus)	TE821A I+	Blue	Yellow	Green	Pink	yellow	2 - C		
				TE821A U+					black	2 - A		
			(Bus)	TE821A U-	red	2 - B						
				TE821A I-	green	2 - D						
	MQXFA03	Qb end	Lead Side	TE822A I+	Blue	Silver	White	Pink	yellow	1 - C	Qb end	C12
				TE822A U+					black	1 - A		
			(No Bus)	TE822A U-	red	1 - B						
				TE822A I-	green	1 - D						
		Non-Lead Side	(Bus side)	TE822B I+	Blue	Silver	Green	Pink	yellow	2 - C		
				TE822B U+					black	2 - A		
			(No Bus)	TE822B U-	red	2 - B						
				TE822B I-	green	2 - D						

Cover Flange 48HV-4LV 1 T  
Q1A - Q3A  
Top View



Cover Flange 48HV-4LV 2 T  
Q1B - Q3B  
Top View



We also note that there is an indication the sensor on the Qb end are swapped, they are really close in value and on the CERN sheet moved opposite in value. We can see from our cold data a small offset between the two values

**Part Description:** Cryogenic Thermometer  
**CERN Part Identifier:** HCQITESCXT-CR029580  
**Other Identification:** CX\_LS\_X20695  
**Instrument Name:** TT824A  
**Top Assembly:**  
**Functional Equipment Identifier:**

*LHC-QIT-QA-0002*

### CABLING

Connector Tag Name

**Thermometer Cable for Type ST**  
 ρ (300 K) = 0.32 Ohm/m  
 Copper AWG 30  
 Length = 8 m

**Extension**  
 ρ (300 K) = 0.07 Ohm/m  
 Copper AWG 24  
 Length = cm

Glued   
 Other

### TESTS

Date/ DD-MMM-YYYY	Check Point	R(U+,U-)	R(U-,I-)	R(U+,I+)	R(U+,GND)	Temperature [K]	Firm/Laboratory	Checked by
19-Jun-2020	T	56.95	0.1	0.1	OVL	298	CERN	M. Lafifi
24-Jun-2020	W	56.87	5.27	5.21	OVL	297	CERN	M. Lafifi
16 mar 21	T	57.5			OL	22,40	FNAL	A. LAKE
16 mar 21	W		green 3.5	red 3.4	yellow 3.3	black 3.3		

**Part Description:** Cryogenic Thermometer  
**CERN Part Identifier:** HCQITESCXT-CR029360  
**Other Identification:** CX\_LS\_X20667  
**Instrument Name:**  
**Top Assembly:**  
**Functional Equipment Identifier:**

*LHC-QIT-QA-0002*

### CABLING

Top View

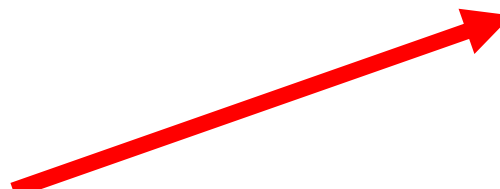
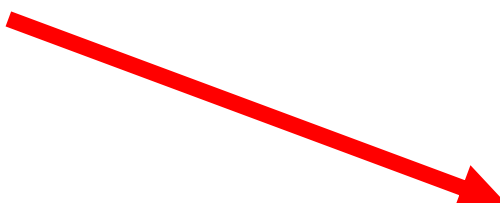
**Thermometer Cable for Type ST**  
 ρ (300 K) = 0.32 Ohm/m  
 Copper AWG 30  
 Length = 8 m

Fixing Case  
 Thread   
 Hole   
 Stud

Glued   
 Other

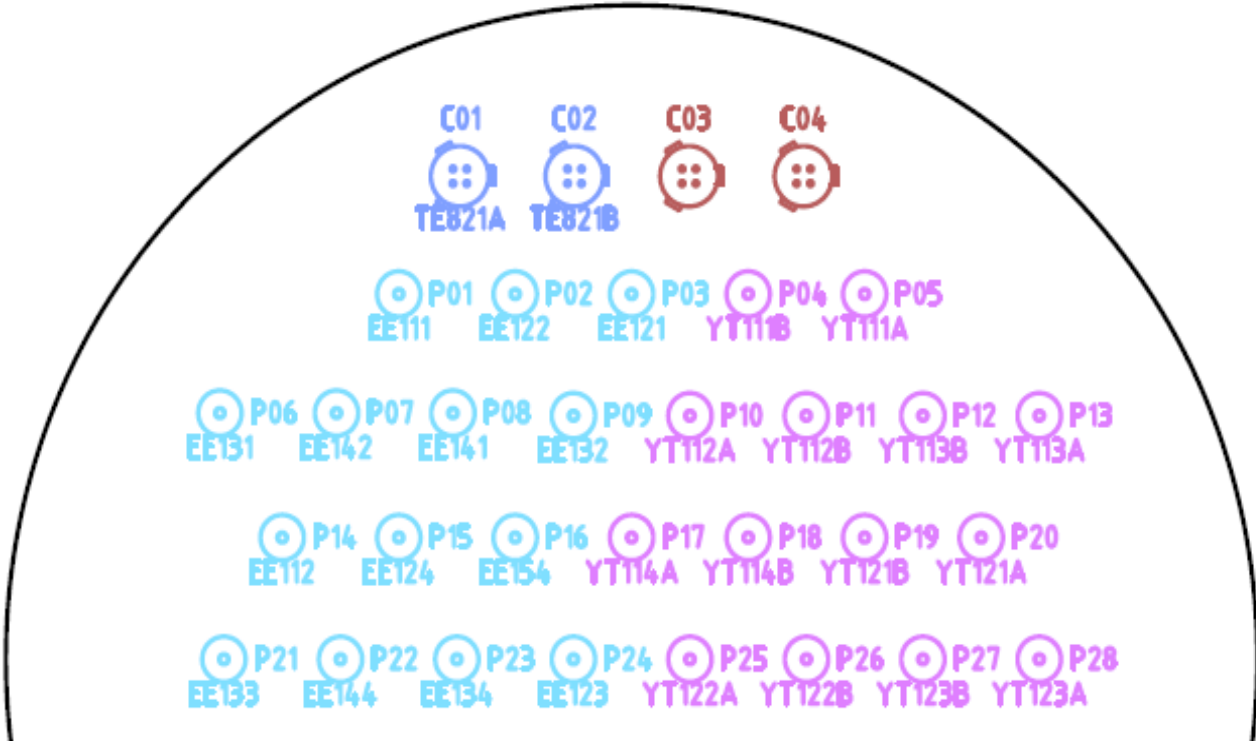
### TESTS

Intervention	Date/ DD-MMM-YYYY	Check Point	R(U+,U-)	R(U-,I-)	R(U+,I+)	R(U+,GND)	Temperature [K]	Firm/Laboratory	Checked by
Reception	19-Jun-2020	T	56.71	0.1	0.1	OVL			
Pre-cabling	24-Jun-2020	W	56.90	5.25	5.41	OVL			
install	16/MAR 21	T	57.5			OL			
	16 MAR 21	W		green 3.2	red 3.2	yellow			

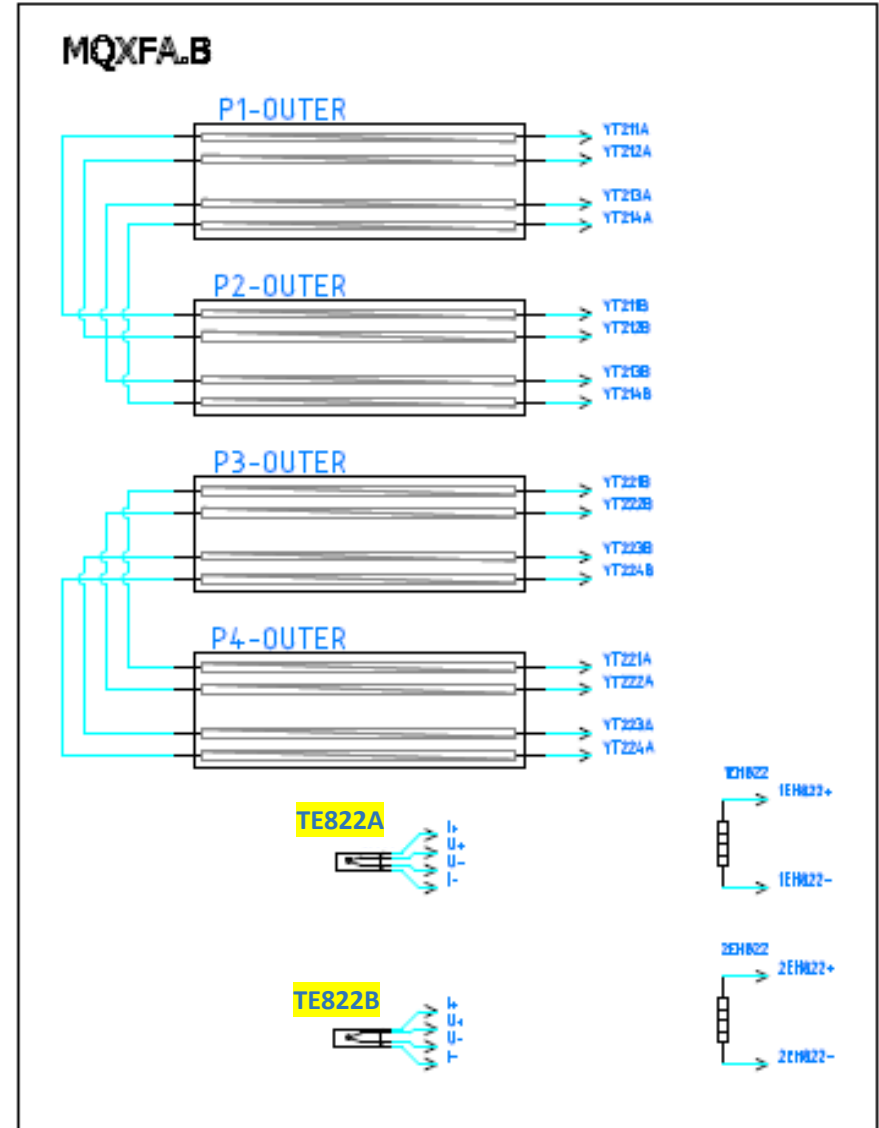
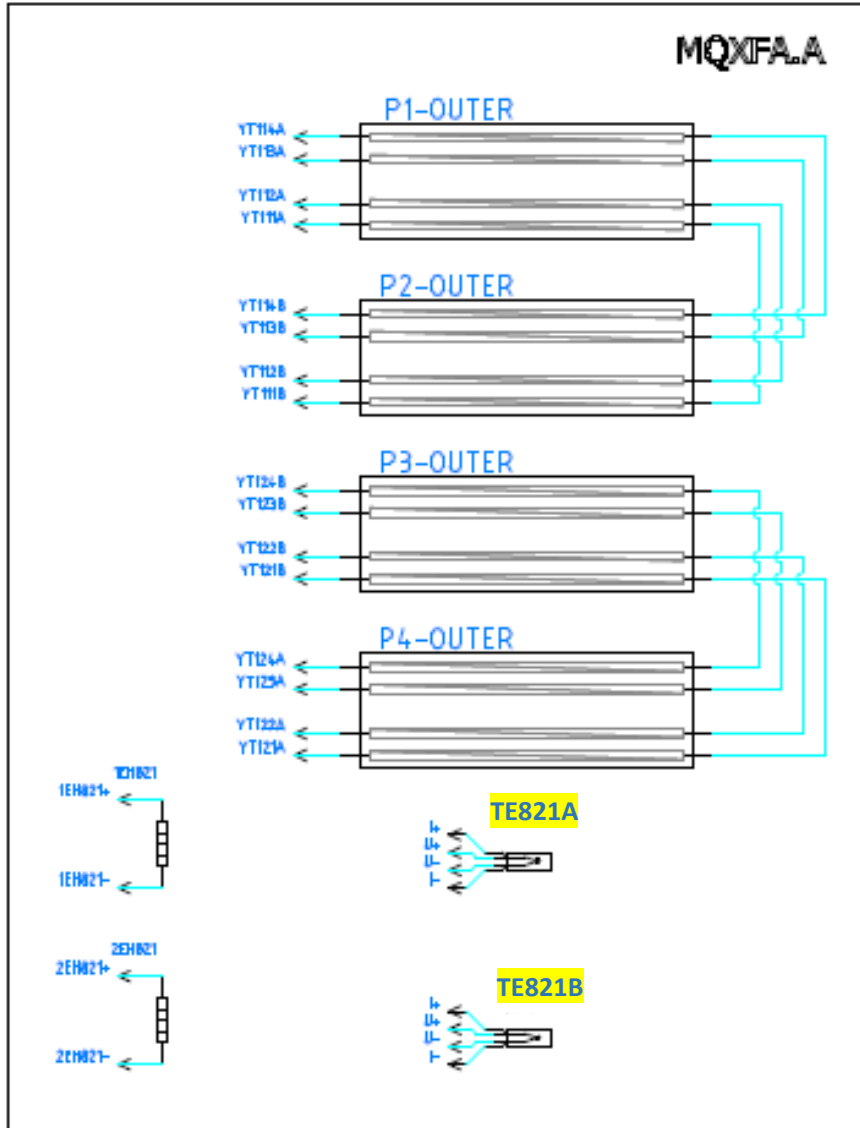


- We might have the CERNOX location on the assembly wiring reversed from the expectation to CERN
- We implement edchanges for CM & CA assembly to prevent this in the future (excl. CA02, which is completed and from data shows the first issue persisted)

Cover Flange 48HV-4LV 1 T  
Q1A - Q3A  
Top View



# CERN Schematic showing RTD positions in plan view (updated in 2022, past CM01 assembly)



TE821B = CX\_LS\_X20707

TE821A = CX\_LS\_X20677

TE822B = CX\_LS\_X20667

TE822A = CX\_LS\_X20695



# CERN Schematic showing RTD positions in end views

QHs - LMQXF Convention - View from connection side of coil

