

1) Progress in the modifications to add cryogenic instrumentation in sect.1-2.

2) Report on the damage/repair of the helium level gauge feed-through on the SSS

V.Parma (AT/MCS)

with contributions from:

1) N.Bourcey, B.Vullierme, A.Musso, N.Vautier

2) N.Bourcey, P.Campos, F.Fessia, A.Musso, J.Ph.Tock

Progress in the modifications to add cryogenic instrumentation in sect.1-2.

Installation of additional T gauge TT952A/B on line E:

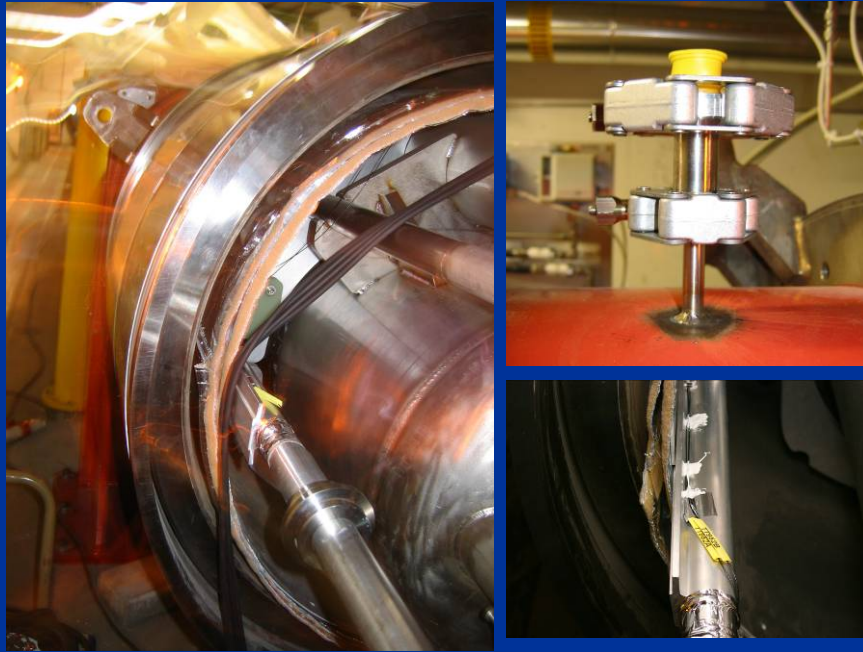
- 1) Inner Triplet: Interconnect Q3-DFBX
 - Additional port welded on vacuum vessel
 - T gauges glued, wires *thermalised* and routed through Th.shield
- 2) Q4-D2: Interconnect Q4-D2
 - Used existing instrumentation feed-through on Q4
 - T gauges in interconnect, wires routed through Q4
- 3) DSLB: Jumper Q4
 - Additional port welded on vacuum vessel
 - T gauges mounted in jumper interconnect
- 4) DFBAB: Still to be done (DFBAB under vacuum)

Documentation:

- 1) ECR by ACR (ready) to be issued, will become ECO → **Action: V.Parma**
- 2) MTF. NC opened on equipment with feed-through: → **Done**
 - link to ECO when available
 - Photographic documentation attached
 - Document and close NC → **Action: ACR+V.Parma**
- 3) PID scheme drawings to be updated → **Action: ACR**

Photo gallery of intervention

1) Interconnect Q3-DFBX



2) Interconnect Q4-D2

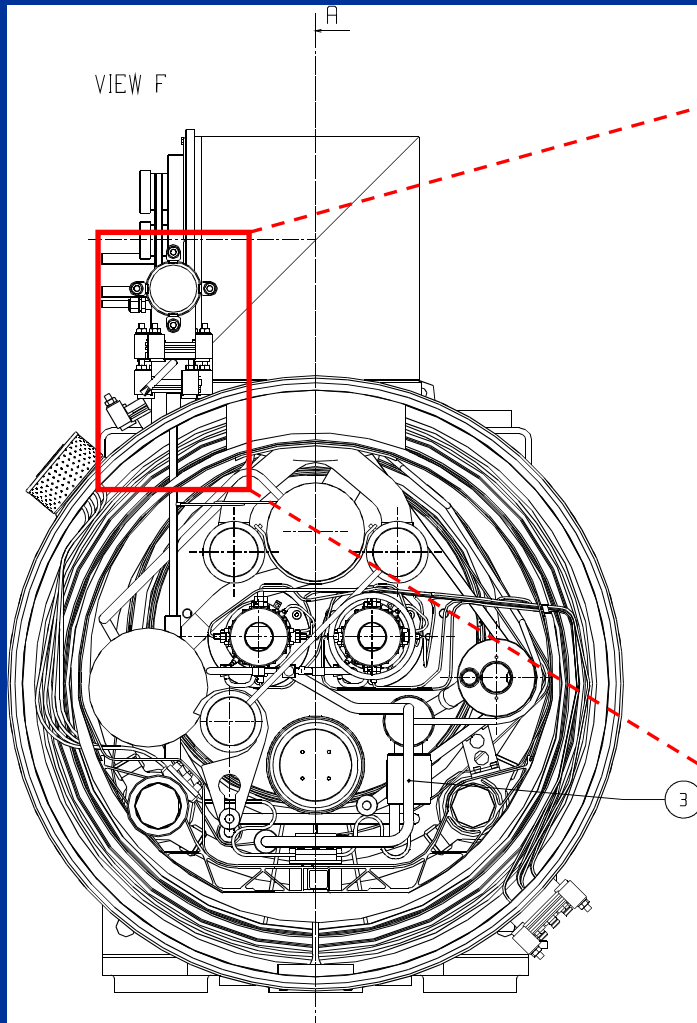


4) DFBAB: pending

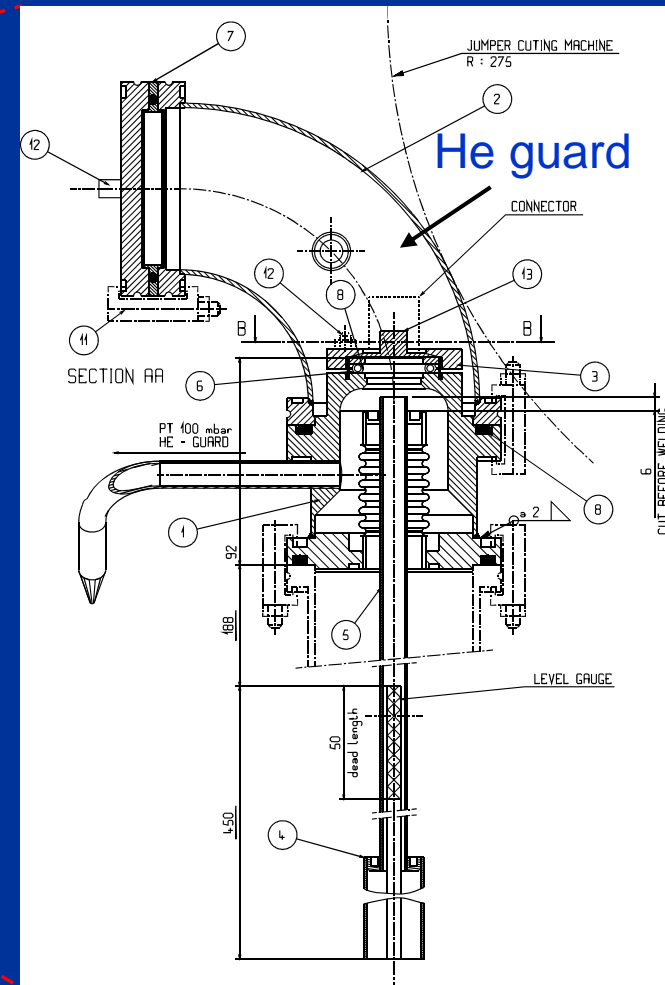
3) Jumper Q4



helium level gauge feed-through on SSS



Front view



Side view

Damaged feed-throughs

The discovery:

- First sporadic discoveries ~ end September
 - Unscrewed (or removed!) clamps
 - Rotated helium guard/pinch-off tube flange
 - **Damaged bellows due to twisting**
- Larger extent of events discovered in 2-3 and 1-2



View inside cryostat



Why? Who? (still unclear):

- Rotation of flange for improved accessibility (US brazing machines?)
- Interference on closing of interconnects bellows? (1 case confirmed by IEG)



Result of Visual Inspection

Sect.1-2 (still to be P tested)

- 2 leaks
- 11 damaged bellows:
 - 7 repaired
 - 4 to be repaired

Sect.2-3

- No leaks after P test
- 4 potentially damaged bellows

INSPECTION JAUGES HELIUM					
SECTEUR	IC	SSS	Angle	Inspection	Action
1-2	QBQI.7R1	625	5°	OK	
1-2	QBQI.9R1	677	-5°	OK	
1-2	QBQI.11R1	521	15°	OK	
1-2	QBQI.13R1	340	60°	A remplacer.	Fait le 20.11.2007
1-2	QBQI.15R1	352	35°	A remplacer.	Fait le 20.11.2007
1-2	QBQI.17R1	342	5°	OK	
1-2	QBQI.19R1	353	30°	OK	
1-2	QBQI.21R1	47	0°	OK	
1-2	QBQI.23R1	359	25°	FUITE. A remplacer.	Fait le 13.11.2007
1-2	QBQI.25R1	343	70°	A remplacer.	Fait le 20.11.2007
1-2	QBQI.27R1	358	10°	OK	
1-2	QBQI.29R1	346	10°	A remplacer.	Fait le 14.11.2007
1-2	QBQI.31R1	356	60°	FUITE. A remplacer.	Fait le 14.11.2007
1-2	QBQI.33R1	351	30°	OK	
1-2	QBQI.34L2	370	80°	A remplacer.	
1-2	QBQI.32L2	357	20°	OK	
1-2	QBQI.30L2	368	60°	A remplacer.	
1-2	QBQI.28L2	355	10°	OK	
1-2	QBQI.26L2	347	20°	OK	
1-2	QBQI.24L2	354	25°	OK	
1-2	QBQI.22L2	341	55°	A remplacer.	
1-2	QBQI.20L2	271	10°	OK	
1-2	QBQI.18L2	348	15°	Tube à déplier.	
1-2	QBQI.16L2	361	60°	A remplacer.	
1-2	QBQI.14L2	256	5°	OK	
1-2	QBQI.12L2	522	30°	OK	
1-2	QBQI.10L2	666	60°	A remplacer.	Fait le 15.11.2007
1-2	QBQI.8L2				

INSPECTION JAUGES HELIUM					
SECTEUR	IC	SSS	Angle	Inspection	Action
2-3	QBQI.7R2	675	10°		
2-3	QBQI.9R2	639	0°		
2-3	QBQI.11R2	533	35°	Soufflet à inspecter.	
2-3	QBQI.13R2	134	20°		
2-3	QBQI.15R2	137	10°		
2-3	QBQI.17R2	124	-10°		
2-3	QBQI.19R2	144	10°	Tube à déplier	
2-3	QBQI.21R2	125	10°		
2-3	QBQI.23R2	138	10°	Tube à déplier	
2-3	QBQI.25R2	131	25°	Soufflet à inspecter.	
2-3	QBQI.27R2	139	10°	Tube à déplier	
2-3	QBQI.29R2	129	5°	Tube à déplier	
2-3	QBQI.31R2	140	5°	Tube à déplier	
2-3	QBQI.33R2	135	5°	Tube à déplier	
2-3	QBQI.34L3	130	0°		
2-3	QBQI.32L3	141	0°		
2-3	QBQI.30L3	57	-5°		
2-3	QBQI.28L3	143	0°		
2-3	QBQI.26L3	127	60°	Soufflet à inspecter.	
2-3	QBQI.24L3	142	0°		
2-3	QBQI.22L3	133	-10°		
2-3	QBQI.20L3	99	60°	Soufflet à inspecter.	
2-3	QBQI.18L3	126	-10°		
2-3	QBQI.16L3	145	-5°		
2-3	QBQI.14L3	132	-10°		
2-3	QBQI.12L3	502	20°		
2-3	QBQI.10L3	509	15°		
2-3	QBQI.8L3	501	-		

Result of Visual Inspection

Sect.7-8

- No leaks after P test
- 1 damaged bellows

INSPECTION JAUGES HELIUM					
SECTEUR	IC	SSS	Angle	Inspection	Action
7-8	QBQI.7R7	511	N.A.		
7-8	QBQI.9R7	506	-5°		
7-8	QBQI.11R7	508	0°		
7-8	QBQI.13R7	19	5°		
7-8	QBQI.15R7	59	0°		
7-8	QBQI.17R7	39	0°		
7-8	QBQI.19R7	60	5°		
7-8	QBQI.21R7	21	-10°	Pas de dommage majeur observé.	
7-8	QBQI.23R7	81	-10°	Pas de dommage majeur observé.	
7-8	QBQI.25R7	3	-5°		
7-8	QBQI.27R7	78	-5°		
7-8	QBQI.29R7	14	0°		
7-8	QBQI.31R7	76	-40°	A remplacer.	
7-8	QBQI.33R7	9	5°		
7-8	QBQI.34L8	26	0°		
7-8	QBQI.32L8	77	-5°		
7-8	QBQI.30L8	7	-5°		
7-8	QBQI.28L8	82	-10°		
7-8	QBQI.26L8	29	0°		
7-8	QBQI.24L8	83	0°		
7-8	QBQI.22L8	48	5°		
7-8	QBQI.20L8	84	0°		
7-8	QBQI.18L8	42	5°		
7-8	QBQI.16L8	49	-5°		
7-8	QBQI.14L8	349	0°		
7-8	QBQI.12L8	507	0°		
7-8	QBQI.10L8	613	-10°		
7-8	QBQI.8L8	604	N.A.		

Sect.8-1

- No leaks after P test
- 2 potentially damaged bellows

INSPECTION JAUGES HELIUM					
SECTEUR	IC	SSS	Angle	Inspection	Action
8-1	QBQI.7R8	611	5°		
8-1	QBQI.9R8	627	-10°		
8-1	QBQI.11R8	503	0°		
8-1	QBQI.13R8	96	0°		
8-1	QBQI.15R8	85	-5°		
8-1	QBQI.17R8	1257	0°		
8-1	QBQI.19R8	136	-5°		
8-1	QBQI.21R8	58	0°		
8-1	QBQI.23R8	87	0°		
8-1	QBQI.25R8	95	25°		
8-1	QBQI.27R8	88	-10°		
8-1	QBQI.29R8	92	0°		
8-1	QBQI.31R8	89	10°		
8-1	QBQI.33R8	173	0°		
8-1	QBQI.34L1	128	0°		
8-1	QBQI.32L1	91	20°		
8-1	QBQI.30L1	34	5°		
8-1	QBQI.28L1	93	0°		
8-1	QBQI.26L1	56	0°		
8-1	QBQI.24L1	94	5°		
8-1	QBQI.22L1	79	0°		
8-1	QBQI.20L1	97	10°		
8-1	QBQI.18L1	98	0°		
8-1	QBQI.16L1	86	0°		
8-1	QBQI.14L1	100	0°		
8-1	QBQI.12L1	524	-5°		
8-1	QBQI.10L1	616	0°		
8-1	QBQI.8L1	618	N.A.		

Sect.3-4

- No leaks after P test
- 2 potentially damaged bellows

INSPECTION JAUGES HELIUM					
SECTEUR	IC	SSS	Angle	Inspection	Action
3-4	QBQI.7R3	72	-40°		
3-4	QBQI.9R3	514	-10°		
3-4	QBQI.11R3	525	-75°		
3-4	QBQI.13R3	217	0°		
3-4	QBQI.15R3	229	0°		
3-4	QBQI.17R3	218	5°		
3-4	QBQI.19R3	228	-5°		
3-4	QBQI.21R3	225	5°		
3-4	QBQI.23R3	233	0°		
3-4	QBQI.25R3	219	0°		
3-4	QBQI.27R3	230	10°		
3-4	QBQI.29R3	221	-5°		
3-4	QBQI.31R3	192	0°		
3-4	QBQI.33R3	227	0°		
3-4	QBQI.34L4	220	0°		
3-4	QBQI.32L4	191	-5°		
3-4	QBQI.30L4	222	5°		
3-4	QBQI.28L4	232	0°		
3-4	QBQI.26L4	223	N.A.		
3-4	QBQI.24L4	231	0°		
3-4	QBQI.22L4	226	0°		
3-4	QBQI.20L4	234	-5°		
3-4	QBQI.18L4	216	-10°		
3-4	QBQI.16L4	235	0°		
3-4	QBQI.14L4	224	5°		
3-4	QBQI.12L4	526	0°		
3-4	QBQI.10L4	630	0°		
3-4	QBQI.8L4	632	0°		

Next Steps

- Continue repairs (between 4 and 13 cases)
- Inspect remaining sectors (4-5, 5-6, 6-7)
- Procure additional feed-throughs (~17 remaining)
- *“Fragile, do not touch!”* labels on all units