DAΦNE TECHNICAL NOTE

INFN - LNF, Accelerator Division

Frascati, April 24, 1996

Note: **I-14**

TRANSFER LINES UPDATE

C. Biscari

The transfer lines between the four accelerators of the DAΦNE complex have been built and their installation almost completed.

Several small modifications with respect to the original design[1] have been done during the construction of the lines, so an update of the element positions and quadrupole strength is necessary.

A first table summarizes the line acceptance of the different configurations. Tables containing the quadrupole strengths follow. Plots of the optical functions and of the beam envelopes along the lines, together with the vacuum chamber aperture, are represented in figures 1/4. Finally the list containing the magnetic elements, the diagnostic devices and the vacuum components is presented in the appendix.

The major modification with respect to the original design is that quadrupoles in the Linac will not change polarity between electron and positron configurations, and therefore betatron motions will be in opposite phase in the two modes. This involves a strong modification of the quadrupole settings corresponding to the electron transport.

Injection parameters in the accumulator[2] and in the main rings[3] have been now redefined. Beam matching between the lines and the storage rings has been updated.

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1 C. Biscari, F. Sannibale - DAΦNE Techninal Note I-10, June 18 1992.

2 M.R. Masullo, C. Milardi, M.A. Preger - DAΦNE Techninal Note I-12, March 7, 1994.

3 M.E. Biagini, C. Biscari, S. Guiducci - "DAΦNE Main Rings Lattice Update" - DAΦNE Techninal Note L-22, April 1996.

Table 1 - Acceptance of the transfer lines and nominal optical functions

Beams from Linac

	Positrons	Electrons
ε_x (m rad)	10^{-5}	10^{-6}
ε_y (m rad)	10^{-5}	10^{-6}
$\Delta p/p$	± 1.5%	± 0.5%

$$\text{Envelope} = \sqrt{\varepsilon\beta + (D\,\Delta p / p)^2} = e_{x,y}$$

@ center of last Linac quadrupole

	Positrons	Electrons
β_x (m)	3	6
α_x	0	0
β_y (m)	6	3
α_y	0	0

Beams from Accumulator

	Positrons	Electrons
ε_x (m rad)	2.8×10^{-7}	2.8×10^{-7}
ε_y (m rad)	1.4×10^{-7}	1.4×10^{-7}
$\Delta p/p$	± 1%	± 1%

$$\text{Envelope} = C\sqrt{\varepsilon\beta + (D\,\Delta p / p)^2} = e_{x,y} \quad (C = 3)$$

@ beginning of first septum

	Positrons	Electrons
β_x (m)	3.22	3.22
α_x	0.66	0.66
β_y (m)	4.53	4.53
α_y	0.37	0.37

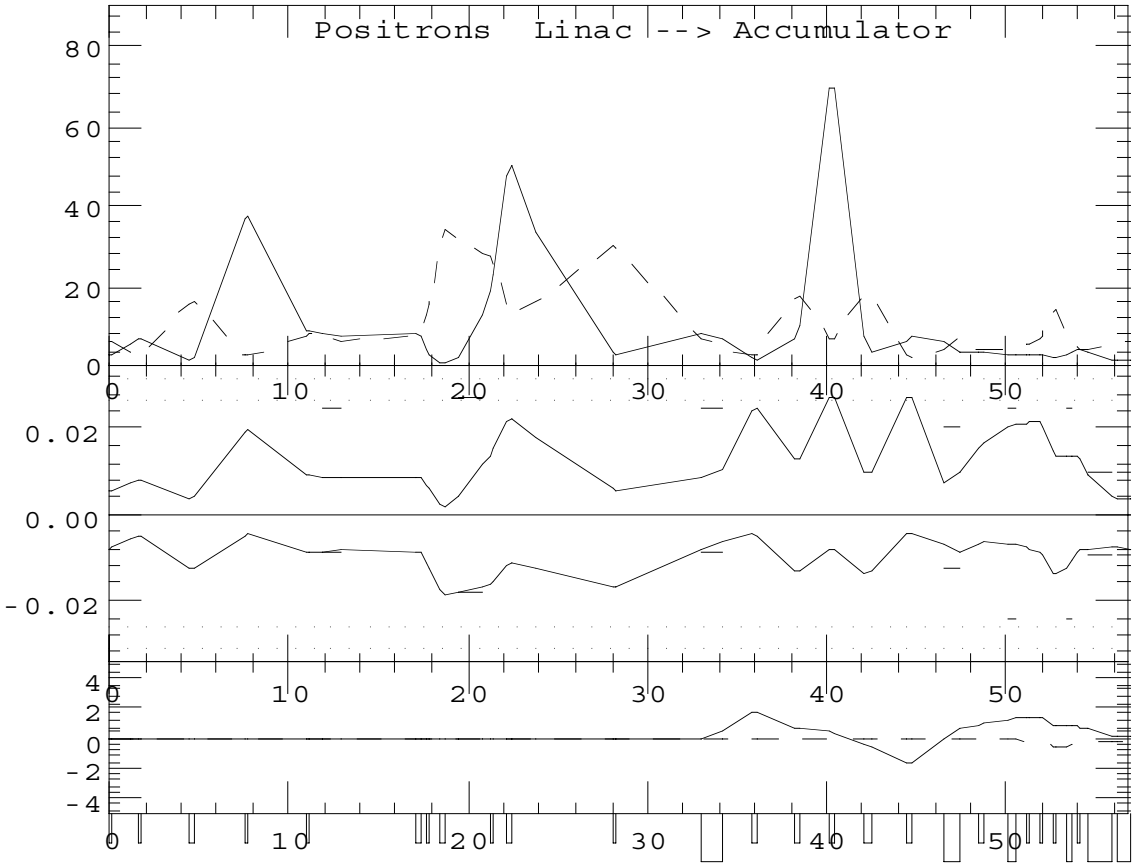

Fig. 1 - Positrons Linac → Accumulator.

Table 2 - Quadrupole settings for positron injection in the Accumulator

Quadrupole name	K2 (m^{-2})	Quadrupole name	K2 (m^{-2})
QUALI001	-2.00000000	QUATT005	2.39762671
QUATM001	3.40595695	QUATT004	-1.73923756
QUATM002	-2.25045473	QUATT003	2.49919318
QUATM003	2.14909617	QUATT002	-1.86181628
QUATM004	-1.31597567	QUATT001	2.94829964
QUATM005	2.65722793	QUATR005	1.15094155
QUATM006	1.39509969	QUATR004	0.08089194
QUATM007	-2.57210576	QUATR003	2.78828769
QUATM008	-1.51729647	QUATR002	-4.14582168
QUATM009	2.83472205	QUATR001	2.97819902
QUATT006	-0.89550646		

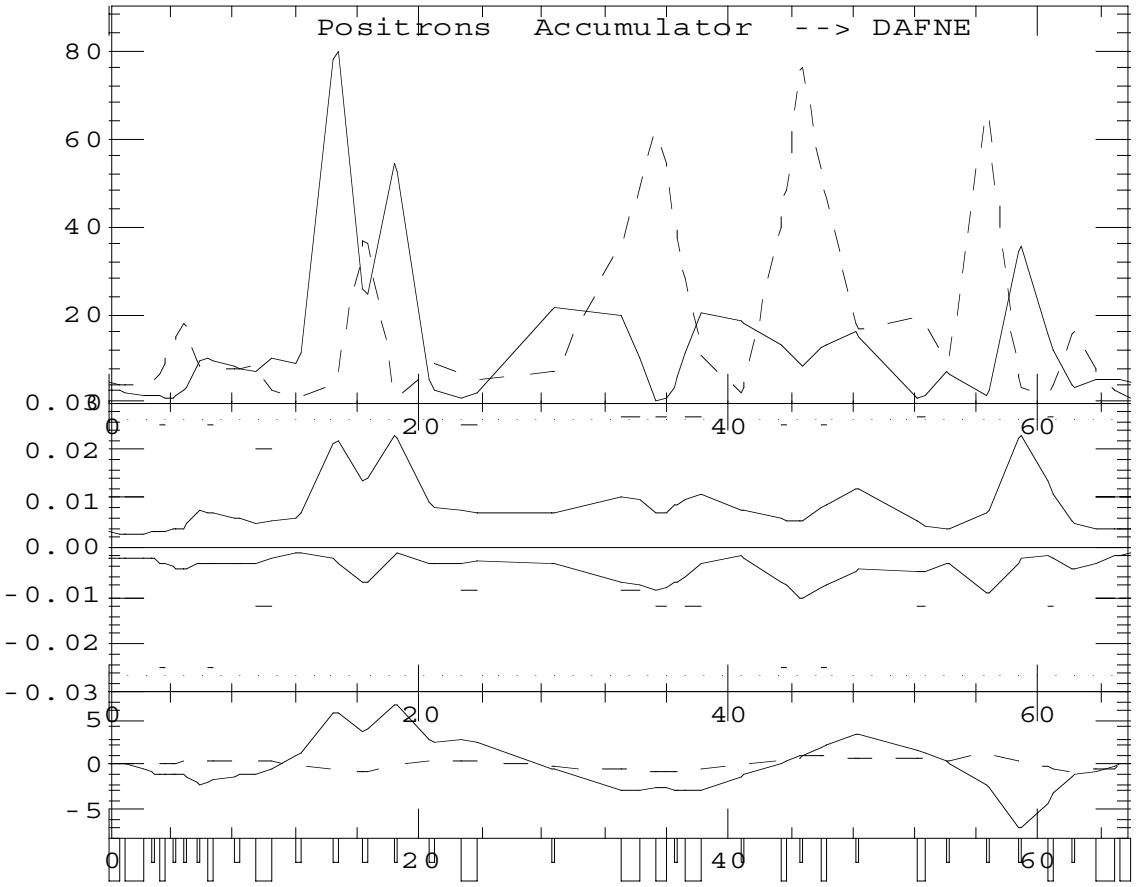

Fig. 2 - Positrons Accumulator → DAΦNE.

Table 3 - Quadrupole settings for positron injection in the Main Ring

Quadrupole name	K2 (m^{-2})	Quadrupole name	K2 (m^{-2})
QUATL001	2.40401645	QUATT006	0.89550646
QUATL002	-0.84960961	QUATT007	0.14233026
QUATL003	-2.97461007	QUATT008	0.21523635
QUATL004	2.99990760	QUATT009	-1.83103145
QUATL005	0.14693474	QUATT010	1.63825435
QUATT001	-2.94829964	QUATP001	4.79746270
QUATT002	1.86181628	QUATP002	-3.14204719
QUATT003	-2.49919318	QUATP003	2.91251948
QUATT004	1.73923756	QUATP004	-3.18592801
QUATT005	-2.39762671		

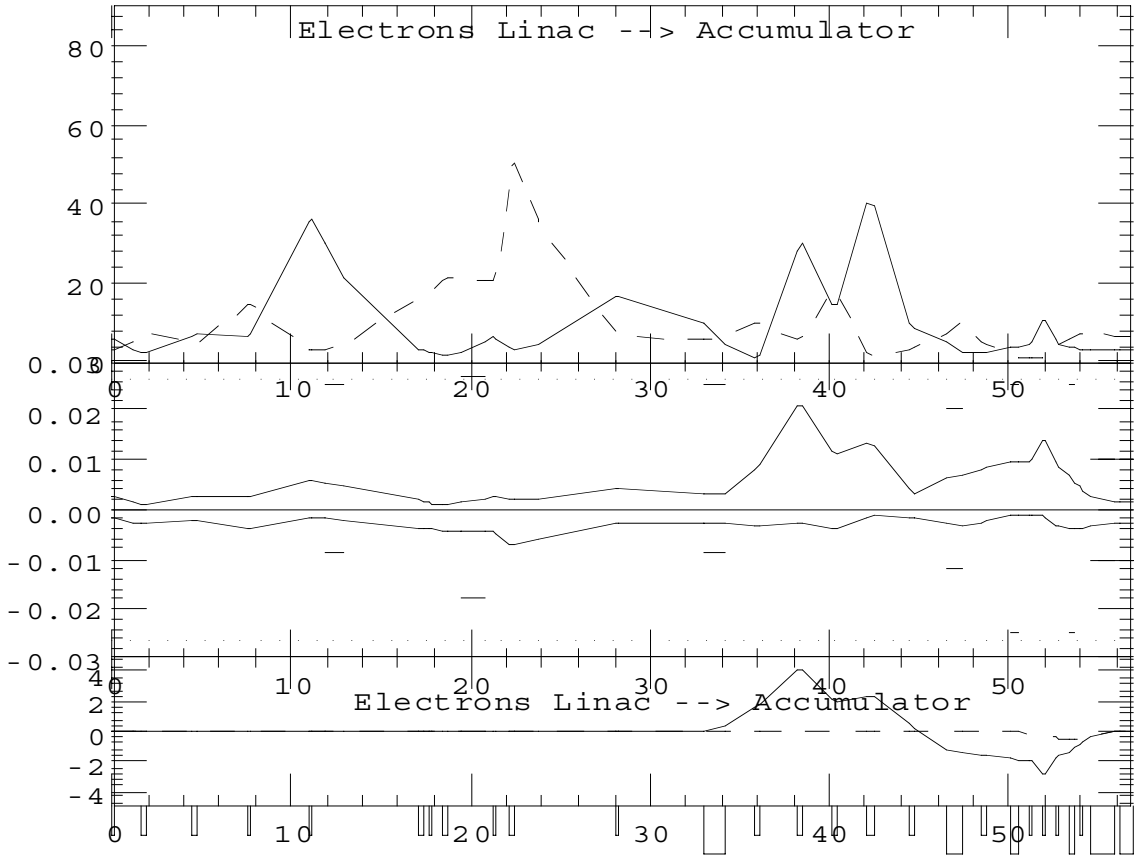

Fig. 3 - Electrons Linac → Accumulator.

Table 4 - Quadrupole settings for electron injection in the Accumulator

Quadrupole name	K2 (m^{-2})	Quadrupole name	K2 (m^{-2})
QUALI001	2.30000000	QUATT005	-0.73800000
QUATM001	-1.81888441	QUATT004	1.77000000
QUATM002	1.32000737	QUATT003	-2.08000000
QUATM003	-1.71831636	QUATT002	1.56500000
QUATM004	1.49906689	QUATT001	-1.23000000
QUATM005	-0.47011501	QUATL005	0.16196106
QUATM006	0.45871454	QUATL004	-3.19041757
QUATM007	-0.63559150	QUATL003	4.99079564
QUATM008	3.06146208	QUATL002	-2.44547182
QUATM009	-2.60239194	QUATL001	-1.30936296
QUATT006	0.93000000		

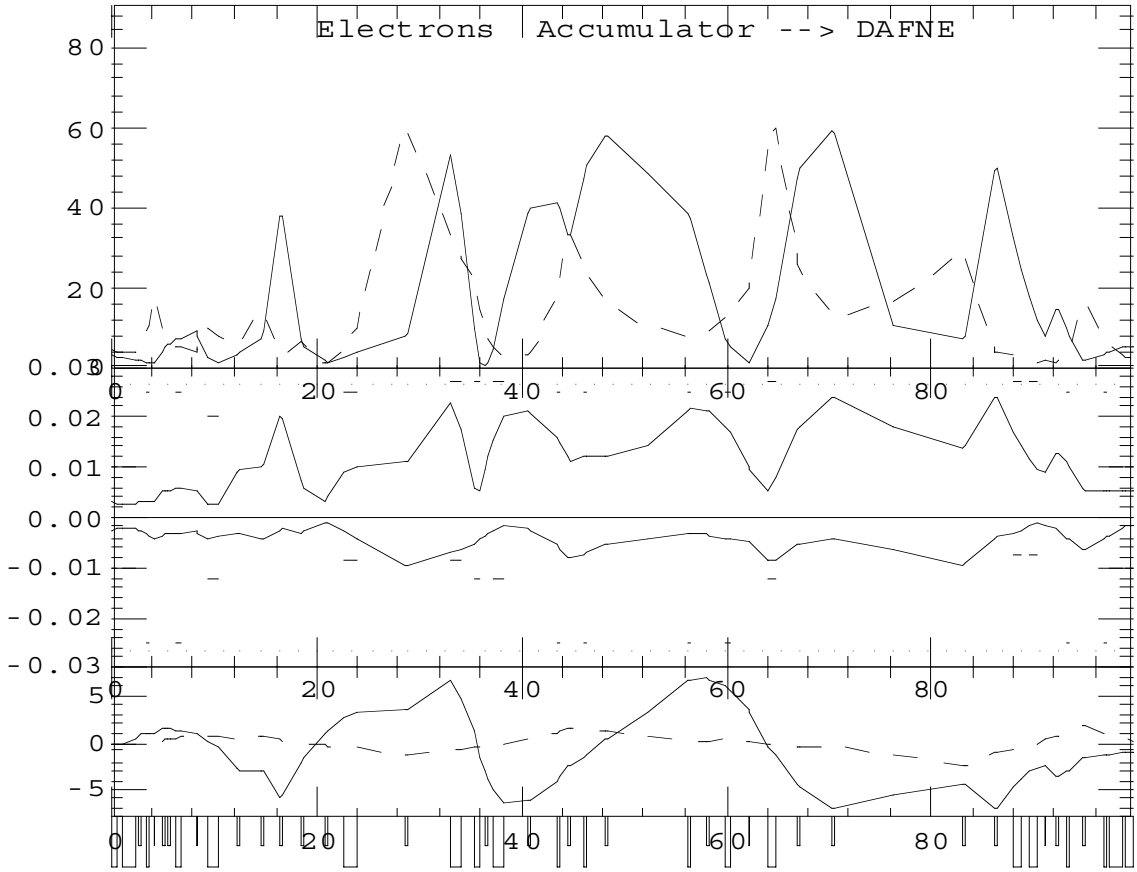

Fig. 4 - Electrons Accumulator → DAΦNE.

Table 5 - Quadrupole settings for electron injection in the Main Ring

Quadrupole name	K2 (m^{-2})	Quadrupole name	K2 (m^{-2})
QUATR001	3.21863898	QUATT008	0.64345553
QUATR002	-4.48004126	QUATT009	-1.39087444
QUATR003	3.26418356	QUATT010	0.28675979
QUATR004	-0.04281161	QUATE001	0.44624265
QUATR005	2.52384917	QUATE002	1.30420414
QUATT001	1.23000000	QUATE003	0.78165547
QUATT002	-1.56500000	QUATE004	0.64325668
QUATT003	2.08000000	QUATE005	-1.23192318
QUATT004	-1.77000000	QUATE006	1.67382668
QUATT005	0.73800000	QUATE007	-3.48714405
QUATT006	-0.93000000	QUATE008	2.53616049
QUATT007	2.12027969	QUATE009	-2.30714140

Parameter list for positron injection in the Accumulator

I	IDENT	TYPE	NAME	LENGTH	IN.POS	K1	FI	TETA	B	E1	E2	RO	Ax	Ay	STATUS
				(m)	(m)	(m-2)	(rad)	(rad)	(T)	(rad)	(rad)	(m)	(mm)	(mm)	
1		1	D0	0.0000	0.0000	0.00000									
2		2	QUALIXX	0.1250	0.1250	-2.00000									
3		1	DL0	1.0000	1.1250	0.00000									
4			Interface Point	0.0000	1.1250	0.00000									
5		1	DL1	0.5300	1.6550	0.00000									
6		2	QUATM001	0.2000	1.8550	3.40596							52	52	
7		80	SIPTM001	0.0000	1.8550	0.00000									
8		1	DL2	2.6200	4.4750	0.00000									
9		2	QUATM002	0.2000	4.6750	-2.25045							52	52	
10		50	BPSTM001	0.0000	4.6750	0.00000									
11		1	DL3	2.9200	7.5950	0.00000									
12		2	QUATM003	0.2000	7.7950	2.14910							52	52	
13		1	DL4	0.2560	8.0510	0.00000									
14		56	CHVTM001	0.0000	8.0510	0.00000									
15		1	DL4	2.9440	10.9950	0.00000									
16		99	WCMTM001	0.0000	10.9950	0.00000									
17		99	BPFTM001	0.0000	10.9950	0.00000									
18		2	QUATM004	0.2000	11.1950	-1.31598							52	52	
19		1	DL5	0.4280	11.6230	0.00000									
20		56	CHVTM002	0.0000	11.6230	0.00000									
21		1	DL5	0.1890	11.8120	0.00000									
22		1	DL5	1.1850	12.9970	0.00000								18	
23		1	DL5	3.8520	16.8490	0.00000									
24		80	SIPTM002	0.0000	16.8490	0.00000							52	52	
25		56	CHVTM003	0.0000	16.8490	0.00000									
26		1	DL5	0.2560	17.1050	0.00000									
27		2	QUATM005	0.2000	17.3050	2.65723							52	52	
28		99	TGTTM001	0.0000	17.3050	0.00000									
29		1	DL5B	0.4000	17.7050	0.00000									
30		2	QUATM006	0.2000	17.9050	1.39510							52	52	
31		50	BPSTM002	0.0000	17.9050	0.00000									
32		1	DL6	0.6000	18.5050	0.00000									
33		2	QUATM007	0.2000	18.7050	-2.57211							52	52	
34		1	DL7A	0.7570	19.4620	0.00000									
35		99	SLTTM001	0.0000	19.4620	0.00000									
36		50	BSTTM001	0.0000	19.4620	0.00000									
37		80	VALTM001	0.0000	19.4620	0.00000									
38		1	DL7B	1.8430	21.3050	0.00000									
39		2	QUATM008	0.2000	21.5050	-1.51730							52	52	
40		1	DL8	0.1900	21.6950	0.00000									
41		56	CHVTM004	0.0000	21.6950	0.00000									
42		1	DL8	0.5100	22.2050	0.00000									
43		2	QUATM009	0.2000	22.4050	2.83472							52	52	
44		50	BPSTM003	0.0000	22.4050	0.00000									
45		1	DL9	1.3510	23.7560	0.00000									
46		1	D17	4.3490	28.1050	0.00000									
47		99	FL2TT002	0.0000	28.1050	0.00000									
48		2	QUATT006	0.2000	28.3050	-0.89551							52	52	
49		50	BPSTT004	0.0000	28.3050	0.00000									
50		1	D16	0.5610	28.8660	0.00000									
51		56	CHVTT005	0.0000	28.8660	0.00000									
52		1	D18	4.1890	33.0550	0.00000									
53		4	DHPTT001	1.1130	34.1680	0.00000		0.7854		0	0	1.417116	50	18	
54		50	BPSTT003	0.0000	34.1680	0.00000									
55		99	FL2TT001	0.0000	34.1680	0.00000									
56		80	SIPTT002	0.0000	34.1680	0.00000									
57		1	D15	1.6500	35.8180	0.00000									
58		2	QUATT005	0.3000	36.1180	2.39763							62	62	
59		1	D14	0.2560	36.3740	0.00000									
60		56	CHVTT004	0.0000	36.3740	0.00000									

I	IDENT	TYPE	NAME	LENGTH	IN.POS	K1	R	TETA	B	E1	E2	RO	Ax	Ay	STATUS
				(m)	(m)	(m-2)	(rad)	(rad)	(T)	(rad)	(rad)	(m)	(mm)	(mm)	
61		1	D14	1.7890	38.1630	0.00000									
62		99	SLTTT001	0.0000	38.1630	0.00000									
63		99	WCMTT001	0.0000	38.1630	0.00000									
64		2	QUATT004	0.3000	38.4630	-1.73924							62	62	
65		1	D13	0.2560	38.7190	0.00000									
66		56	CHVTT003	0.0000	38.7190	0.00000									
67		1	D13	1.4440	40.1630	0.00000									
68		2	QUATT003	0.3000	40.4630	2.49919							62	62	
69		1	D12B	0.2560	40.7190	0.00000									
70		56	CHVTT002	0.0000	40.7190	0.00000									
71		1	D12B	0.5940	41.3130	0.00000									
72		50	BPSTT002	0.0000	41.3130	0.00000									
73		1	D12A	0.8500	42.1630	0.00000									
74		80	SIPTT001	0.0000	42.1630	0.00000									
75		2	QUATT002	0.3000	42.4630	-1.86182							62	62	
76		1	D11	0.2560	42.7190	0.00000									
77		56	CHVTT001	0.0000	42.7190	0.00000									
78		1	D11	1.7140	44.4330	0.00000									
79		2	QUATT001	0.3000	44.7330	2.94830							62	62	
80		1	D10	1.7720	46.5050	0.00000									
81		80	VALTT001	0.0000	46.5050	0.00000									
82		50	BPSTT001	0.0000	46.5050	0.00000									
83		4	DHYTT001	1.0000	47.5050	0.00000		-0.6283		0	-0.6283	1.591549	40	25	
84		50	BPSTR002	0.0000	47.5050	0.00000									
85		99	WCMTR001	0.0000	47.5050	0.00000									
86		1	D9	0.9630	48.4680	0.00000									
87		2	QUATR005	0.2000	48.6680	1.15094							52	52	
88		1	D9	0.2560	48.9240	0.00000									
89		56	CHVTR003	0.0000	48.9240	0.00000									
90		99	FL2TR001	0.0000	48.9240	0.00000									
91		1	D8	1.2570	50.1910	0.00000									
92		44	DVRTR002	0.3500	50.5410	0.00000		-0.192		-0.096	-0.096	1.823048	50	50	
93		1	D7	0.5500	51.0910	0.00000									
94		2	QUATR004	0.2000	51.2910	0.08089							52	52	
95		1	D6	0.2940	51.5850	0.00000									
96		56	CHVTR002	0.0000	51.5850	0.00000									
97		1	D6	0.2560	51.8410	0.00000									
98		2	QUATR003	0.2000	52.0410	2.78829							52	52	
99		80	SIPTR001	0.0000	52.0410	0.00000									
100		1	D5	0.5430	52.5840	0.00000									
101		2	QUATR002	0.2000	52.7840	-4.14582							52	52	
102		1	D4	0.3180	53.1020	0.00000									
103		50	BPSTR001	0.0000	53.1020	0.00000									
104		56	CHVTR001	0.0000	53.1020	0.00000									
105		1	D4	0.2310	53.3330	0.00000									
106		44	DVRTR001	0.3500	53.6830	0.00000		0.192		0.096	0.096	1.823048	50	50	
107		1	D3	0.2770	53.9600	0.00000									
108		2	QUATR001	0.2000	54.1600	2.97820							52	52	
109		1	D2	0.4754	54.6354	0.00000									
110		99	FL2TR001	0.0000	54.6354	0.00000									
111		80	VALTR001	0.0000	54.6354	0.00000									
112		7	SPTA2001	1.2330	55.8684	0.00000		0.5934		0	0	2.077656			
113		1	D1	0.3900	56.2584	0.00000									
114		7	SPTA2002	0.6230	56.8814	0.00000		0.038		0	0	16.3947			

Parameter list for positron injection in the Main Ring

I	IDENT	TYPE	NAME	LENGTH (m)	IN.POS (m)	K1 (m-2)	FI (rad)	TETA (rad)	B (T)	E1 (rad)	E2 (rad)	RO (m)	Ax (mm)	Ay (mm)	STATUS
1		1	D0	0.0000	0.0000	0.00000									
2		7	SPTA1002	0.6230	0.6230	0.00000		-0.038		0	0	16.3947			
3		1	D1	0.3900	1.0130	0.00000									
4		7	SPTA1001	1.2330	2.2460	0.00000		-0.5934		0	0	2.077858			
5		80	VALTL001	0.0000	2.2460	0.00000									
6		99	FL2TL001	0.0000	2.2460	0.00000									
7		1	D2	0.4754	2.7214	0.00000									
8		2	QUATL001	0.2000	2.9214	2.40402							52	52	
9		1	D3	0.2770	3.1984	0.00000									
10		44	DVRTL001	0.3500	3.5484	0.00000		0.192		0.096	0.096	1.8230475	50	50	
11		1	D4	0.2310	3.7794	0.00000									
12		58	CHVTL001	0.0000	3.7794	0.00000									
13		50	BPSTL001	0.0000	3.7794	0.00000									
14		1	D4	0.3180	4.0974	0.00000									
15		2	QUATL002	0.2000	4.2974	-0.84861							52	52	
16		1	D5	0.5430	4.8404	0.00000									
17		80	SPTL001	0.0000	4.8404	0.00000									
18		2	QUATL003	0.2000	5.0404	-2.97461							52	52	
19		1	D6	0.2560	5.2964	0.00000									
20		58	CHVTL002	0.0000	5.2964	0.00000									
21		1	D6	0.2940	5.5904	0.00000									
22		2	QUATL004	0.2000	5.7904	2.99891							52	52	
23		1	D7	0.5500	6.3404	0.00000									
24		44	DVRTL002	0.3500	6.6904	0.00000		-0.192		-0.096	-0.096	1.8230475	50	50	
25		1	D8	1.2670	7.9574	0.00000									
26		DIAG	FL2TL002	0.0000	7.9574	0.00000									
27		58	CHVTL003	0.0000	7.9574	0.00000									
28		1	D8	0.2560	8.2134	0.00000									
29		2	QUATL005	0.2000	8.4134	0.14693							52	52	
30		1	D9	0.9630	9.3764	0.00000									
31		DIAG	WCMTL001	0.0000	9.3764	0.00000									
32		DIAG	BPSTL002	0.0000	9.3764	0.00000									
33		4	DHYTT001	1.0000	10.3764	0.00000		0.6283		0.6283	0	1.591549	40	25	
34		DIAG	BPSTT001	0.0000	10.3764	0.00000									
35		80	VALTT001	0.0000	10.3764	0.00000									
36		1	D10	1.7720	12.1484	0.00000									
37		2	QUATT001	0.3000	12.4484	-2.84830							62	62	
38		1	D11	1.7140	14.1624	0.00000									
39		56	CHVTT001	0.0000	14.1624	0.00000									
40		1	D11	0.2560	14.4184	0.00000									
41		2	QUATT002	0.3000	14.7184	1.86182							62	62	
42		80	SPTT001	0.0000	14.7184	0.00000									
43		1	D12A	0.8500	15.5684	0.00000									
44		50	BPSTT002	0.0000	15.5684	0.00000									
45		1	D12B	0.5940	16.1624	0.00000									
46		56	CHVTT002	0.0000	16.1624	0.00000									
47		1	D12B	0.2560	16.4184	0.00000									
48		2	QUATT003	0.3000	16.7184	-2.49319							62	62	
49		1	D13	1.4440	18.1624	0.00000									
50		56	CHVTT003	0.0000	18.1624	0.00000									
51		1	D13	0.2560	18.4184	0.00000									
52		2	QUATT004	0.3000	18.7184	1.73924							62	62	
53		99	WCMTT001	0.0000	18.7184	0.00000									
54		99	SLTT0T01	0.0000	18.7184	0.00000									
55		1	D14	1.7890	20.5074	0.00000									
56		56	CHVTT004	0.0000	20.5074	0.00000									
57		1	D14	0.2560	20.7634	0.00000									
58		2	QUATT005	0.3000	21.0634	-2.39763							62	62	
59		1	D15	1.6500	22.7134	0.00000									
60		80	SPTT002	0.0000	22.7134	0.00000									
61		99	FL2TT001	0.0000	22.7134	0.00000									
62		50	BPSTT003	0.0000	22.7134	0.00000									
63		4	DHPTT001	1.1130	23.8264	0.00000		0.7854		0	0	1.417116	50	18	
64		1	D16	4.1890	28.0154	0.00000									
65		56	CHVTT005	0.0000	28.0154	0.00000									
66		1	D16	0.5610	28.5764	0.00000									
67		50	BPSTT004	0.0000	28.5764	0.00000									
68		2	QUATT006	0.2000	28.7764	0.89551							52	52	
69		99	FL2TT002	0.0000	28.7764	0.00000									
70		1	D17	4.3490	33.1254	0.00000									
71		4	DHPTT002	1.1130	34.2384	0.00000		-0.7854		0	0	1.417116	54	18	
72		1	D18	0.2470	34.4854	0.00000									

I	IDENT	TYPE	NAME	LENGTH	IN.POS	K1	FI	TETA	B	E1	E2	RO	Ax	Ay	STATUS
				(m)	(m)	(m-2)	(rad)	(rad)	(T)	(rad)	(rad)	(m)	(mm)	(mm)	
73		56	CHVTT008	0.0000	34.4854	0.00000									
74		50	BPSTT005	0.0000	34.4854	0.00000									
75		1	D18	0.8340	35.3194	0.00000									
76		99	BSTTT001	0.0000	35.3194	0.00000									
77		99	FL1TT001	0.0000	35.3194	0.00000									
78		4	DHRTT001	0.7570	36.0764	0.00000		-0.5236		-0.2618	-0.2618	1.4457635	54	25	
79		1	D19	0.4240	36.5004	0.00000									
80		2	QUATT007	0.2000	36.7004	0.14233							52	52	
81		1	D20	0.4570	37.1574	0.00000									
82		99	SLTTT002	0.0000	37.1574	0.00000									
83		4	DHSTT001	1.1130	38.2704	0.00000		-0.7854		0	0	1.417116	54	25	
84		80	VALTT001	0.0000	38.2704	0.00000									
85		99	FL1TT002	0.0000	38.2704	0.00000									
86		80	SIPTT001	0.0000	38.2704	0.00000									
87		1	D21A	2.2440	40.5144	0.00000									
88		56	CHVTT007	0.0000	40.5144	0.00000									
89		1	D21B	0.2560	40.7704	0.00000									
90		2	QUATT008	0.2000	40.9704	0.21524							52	52	
91		50	BPSTT006	0.0000	40.9704	0.00000									
92		1	D22	2.3870	43.3574	0.00000									
93		99	WCMTT002	0.0000	43.3574	0.00000									
94		44	DVRTT001	0.3500	43.7074	0.00000		0.192		0.096	0.096	1.823048	50	50	
95		1	D23	0.6510	44.3584	0.00000									
96		56	CHVTT008	0.0000	44.3584	0.00000									
97		1	D23	0.2560	44.6144	0.00000									
98		2	QUATT009	0.2000	44.8144	-1.83103							52	52	
99		50	BPSTT007	0.0000	44.8144	0.00000									
100		1	D24	1.1090	45.9234	0.00000									
101		44	DVRTT002	0.3500	46.2734	0.00000		-0.192		-0.096	-0.096	1.823048	50	50	
102		80	SIPTT002	0.0000	46.2734	0.00000									
103		1	D25	1.4180	47.6914	0.00000									
104		56	CHVTT009	0.0000	47.6914	0.00000									
105		1	D24	0.3400	48.0314	0.00000									
106		50	BPSTT008	0.0000	48.0314	0.00000									
107		1	D24	0.2490	48.2804	0.00000									
108		2	QUATT010	0.2000	48.4804	1.63825							52	52	
109		99	FL1TT003	0.0000	48.4804	0.00000									
110		1	D26	3.1400	51.6204	0.00000									
111		56	CHVTT010	0.0000	51.6204	0.00000									
112		1	D24	0.5560	52.1764	0.00000									
113		4	DHRTP001	0.4510	52.6274	0.00000		-0.3188		-0.1594	-0.1594	1.41468	54	25	
114		1	D27	1.4130	54.0404	0.00000									
115		50	BPSTP001	0.0000	54.0404	0.00000									
116		80	VALTP001	0.0000	54.0404	0.00000									
117		80	SIPTP001	0.0000	54.0404	0.00000									
118		2	QUATP001	0.2000	54.2404	4.79746							52	52	
119		1	D28	2.3340	56.5744	0.00000				-					
120		56	CHVTP001	0.0000	56.5744	0.00000									
121		1	D28	0.2560	56.8304	0.00000									
122		2	QUATP002	0.2000	57.0304	-3.14205							52	52	
123		99	FL1TP001	0.0000	57.0304	0.00000									
124		1	D29	1.6280	58.6584	0.00000									
125		56	CHVTP002	0.0000	58.6584	0.00000									
126		1	D28	0.2560	58.9144	0.00000									
127		2	QUATP003	0.2000	59.1144	2.91252							52	52	
128		1	D30	1.7084	60.8228	0.00000									
129		4	DHRTP002	0.4520	61.2748	0.00000		-0.2365		-0.1182	-0.1182	1.911205	54	24	
130		1	D31	0.9710	62.2458	0.00000									
131		80	SIPTP002	0.0000	62.2458	0.00000									
132		56	CHVTP003	0.0000	62.2458	0.00000									
133		1	D28	0.2560	62.5018	0.00000									
134		2	QUATP004	0.2000	62.7018	-3.18593							52	52	
135		50	BPSTP002	0.0000	62.7018	0.00000									
136		1	D32	1.2120	63.9138	0.00000									
137		99	FL1TP002	0.0000	63.9138	0.00000									
138		99	FVLTP001	0.0000	63.9138	0.00000									
139		80	VALTP002	0.0000	63.9138	0.00000									
140		99	WCMTP001	0.0000	63.9138	0.00000									
141		7	SPTPL101	1.2330	65.1468	0.00000		-0.5934		0	0	2.077856			
142		1	D33	0.3905	65.5373	0.00000									
143		7	SPTPL102	0.6230	66.1603	0.00000		-0.038		0	0	16.3947			

Parameter list for electron injection in the Accumulator

I	IDENT	TYPE	NAME	LENGTH	IN.POS	K1	FI	TETA	B	E1	E2	RO	Ax	Ay	STATUS
				(m)	(m)	(m-2)	(rad)	(rad)	(T)	(rad)	(rad)	(m)	(mm)	(mm)	
1		1	D0	0.0000	0.0000	0.00000									
2		2	QUALIXX	0.1250	0.1250	2.30000									
3		1	DL0	1.0000	1.1250	0.00000									
4			Interface Point	0.0000	1.1250	0.00000									
5		1	DL1	0.5300	1.6550	0.00000									
6		2	QUATM001	0.2000	1.8550	-1.81868							52	52	
7		80	SIPTM001	0.0000	1.8550	0.00000									
8		1	DL2	2.6200	4.4750	0.00000									
9		2	QUATM002	0.2000	4.6750	1.32001							52	52	
10		50	BPSTM001	0.0000	4.6750	0.00000									
11		1	DL3	2.9200	7.5950	0.00000									
12		2	QUATM003	0.2000	7.7950	-1.71832							52	52	
13		1	DL4	0.2560	8.0510	0.00000									
14		56	CHVTM001	0.0000	8.0510	0.00000									
15		1	DL4	2.9440	10.9950	0.00000									
16		99	WCMTM001	0.0000	10.9950	0.00000									
17		99	BPFTM001	0.0000	10.9950	0.00000									
18		2	QUATM004	0.2000	11.1950	1.49907							52	52	
19		1	DL5	0.4280	11.6230	0.00000									
20		56	CHVTM002	0.0000	11.6230	0.00000									
21		1	DL5	0.1890	11.8120	0.00000									
22		1	DL5	1.1850	12.9970	0.00000								18	
23		1	DL5	3.8520	16.8490	0.00000									
24		80	SIPTM002	0.0000	16.8490	0.00000							52	52	
25		56	CHVTM003	0.0000	16.8490	0.00000									
26		1	DL5	0.2560	17.1050	0.00000									
27		2	QUATM005	0.2000	17.3050	-0.47012							52	52	
28		99	TGTTM001	0.0000	17.3050	0.00000									
29		1	DL5B	0.4000	17.7050	0.00000									
30		2	QUATM006	0.2000	17.9050	0.45871							52	52	
31		50	BPSTM002	0.0000	17.9050	0.00000									
32		1	DL6	0.6000	18.5050	0.00000									
33		2	QUATM007	0.2000	18.7050	-0.63559							52	52	
34		1	DL7A	0.7570	19.4620	0.00000									
35		99	SLTTM001	0.0000	19.4620	0.00000									
			after BTF	0.0000	19.4620	0.00000									
36		99	BSTTM001	0.0000	19.4620	0.00000									
37		80	VALTM001	0.0000	19.4620	0.00000									
38		1	DL7B	1.8430	21.3050	0.00000									
39		2	QUATM008	0.2000	21.5050	3.06146							52	52	
40		1	DL8	0.1900	21.6950	0.00000									
41		56	CHVTM004	0.0000	21.6950	0.00000									
42		1	DL8	0.5100	22.2050	0.00000									
43		2	QUATM009	0.2000	22.4050	-2.60239							52	52	
44		50	BPSTM003	0.0000	22.4050	0.00000									
45		1	DL9	1.3510	23.7560	0.00000									
46		1	D17	4.3490	28.1050	0.00000									
47		99	FL2TT002	0.0000	28.1050	0.00000									
48		2	QUATT008	0.2000	28.3050	0.93000							52	52	
49		50	BPSTT004	0.0000	28.3050	0.00000									
50		1	D16	0.5610	28.8660	0.00000									
51		56	CHVTT005	0.0000	28.8660	0.00000									
52		1	D16	4.1890	33.0550	0.00000									
53		4	DHPTT001	1.1130	34.1680	0.00000		0.7854		0	0	1.417116	50	18	
54		50	BPSTT003	0.0000	34.1680	0.00000									
55		99	FL2TT001	0.0000	34.1680	0.00000									
56		80	SIPTT002	0.0000	34.1680	0.00000									
57		1	D15	1.6500	35.8180	0.00000									
58		2	QUATT005	0.3000	36.1180	-0.73800							62	62	
59		1	D14	0.2580	36.3740	0.00000									
60		56	CHVTT004	0.0000	36.3740	0.00000									

I	IDENT	TYPE	NAME	LENGTH	IN.POS	K1	FI	TETA	B	E1	E2	RO	Ax	Ay	STATUS
				(m)	(m)	(m-2)	(rad)	(rad)	(T)	(rad)	(rad)	(m)	(mm)	(mm)	
61		1	D14	1.7890	38.1630	0.00000									
62		99	SLTTT001	0.0000	38.1630	0.00000									
63		99	WCMTT001	0.0000	38.1630	0.00000									
64		2	QUATT004	0.3000	38.4630	1.77000							62	62	
65		1	D13	0.2560	38.7190	0.00000									
66		56	CHVTT003	0.0000	38.7190	0.00000									
67		1	D13	1.4440	40.1630	0.00000									
68		2	QUATT003	0.3000	40.4630	-2.08000							62	62	
69		1	D12B	0.2560	40.7190	0.00000									
70		56	CHVTT002	0.0000	40.7190	0.00000									
71		1	D12B	0.5940	41.3130	0.00000									
72		50	BPSTT002	0.0000	41.3130	0.00000									
73		1	D12A	0.8500	42.1630	0.00000									
74		80	SIPTT001	0.0000	42.1630	0.00000									
75		2	QUATT002	0.3000	42.4630	1.56500							62	62	
76		1	D11	0.2560	42.7190	0.00000									
77		56	CHVTT001	0.0000	42.7190	0.00000									
78		1	D11	1.7140	44.4330	0.00000									
79		2	QUATT001	0.3000	44.7330	-1.23000							62	62	
80		1	D10	1.7720	46.5050										
81		80	VALTT001	0.0000	46.5050	0.00000									
82		50	BPSTT001	0.0000	46.5050	0.00000									
83		4	DHYTT001	1.0000	47.5050	0.00000		0.6283		0	0.6283	1.591549	40	25	
84		50	BPSTL002	0.0000	47.5050	0.00000									
85		99	WCMTL001	0.0000	47.5050	0.00000									
86		1	D9	0.9630	48.4680	0.00000									
87		2	QUATL005	0.2000	48.6680	0.16196							52	52	
88		1	D9	0.2560	48.9240	0.00000									
89		56	CHVTL003	0.0000	48.9240	0.00000									
90		99	FL2TL001	0.0000	48.9240	0.00000									
91		1	D8	1.2670	50.1910	0.00000									
92		44	DVRTL002	0.3500	50.5410	0.00000		-0.192		-0.096	-0.096	1.823048	50	50	
93		1	D7	0.5500	51.0910	0.00000									
94		2	QUATL004	0.2000	51.2910	-9.19042							52	52	
95		1	D6	0.2940	51.5850	0.00000									
96		56	CHVTL002	0.0000	51.5850	0.00000									
97		1	D6	0.2560	51.8410	0.00000									
98		2	QUATL003	0.2000	52.0410	4.99080							52	52	
99		80	SIPTL001	0.0000	52.0410	0.00000									
100		1	D5	0.5430	52.5840	0.00000									
101		2	QUATL002	0.2000	52.7840	-2.44547							52	52	
102		1	D4	0.3180	53.1020	0.00000									
103		50	BPSTL001	0.0000	53.1020	0.00000									
104		56	CHVTL001	0.0000	53.1020	0.00000									
105		1	D4	0.2310	53.3330	0.00000									
106		44	DVRTL001	0.3500	53.6830	0.00000		0.192		0.096	0.096	1.823048	50	50	
107		1	D3	0.2770	53.9600	0.00000									
108		2	QUATL001	0.2000	54.1600	-1.30936							52	52	
109		1	D2	0.4754	54.6354	0.00000									
110		99	FL2TL001	0.0000	54.6354	0.00000									
111		80	VALTL001	0.0000	54.6354	0.00000									
112		7	SPTA1001	1.2330	55.8684	0.00000		-0.5934		0	0	2.077856			
113		1	D1	0.3900	56.2584	0.00000									
114		7	SPTA1002	0.6230	56.8814	0.00000		-0.038		0	0	16.3947			

Parameter list for electron injection in the Main Ring

1	IDENT	TYPE	NAME	LENGTH	IN.POS	K1	FI	ANGLE	B	E1	E2	RO	Ax	Ay	STATUS
				(m)	(m)	(m-2)	(rad)	(rad)	(T)	(rad)	(rad)	(m)	(mm)	(mm)	
1		1	D0	0.0000	0.0000	0.00000									
2		7	SPTA2001	0.6230	0.6230	0.00000		0.0380		0.0000	0.0000	16.3947			
3		1	D1	0.3900	1.0130	0.00000									
4		7	SPTA2002	1.2330	2.2460	0.00000		0.5934		0.0000	0.0000	2.0779			
5		80	VALTR001	0.0000	2.2460	0.00000									
6		99	FL2TR001	0.0000	2.2460	0.00000									
7		1	D2	0.4754	2.7214	0.00000									
8		2	QUATR001	0.2000	2.9214	3.21864							52	52	
9		1	D3	0.2770	3.1984	0.00000									
10		44	DVRTR001	0.3500	3.5484	0.00000		0.1920		0.0960	0.0960	1.8230	50	50	
11		1	D4	0.2310	3.7794	0.00000									
12		56	CHVTR001	0.0000	3.7794	0.00000									
13		50	BPSTR001	0.0000	3.7794	0.00000									
14		1	D4	0.3180	4.0974	0.00000									
15		2	QUATR002	0.2000	4.2974	-4.48004							52	52	
16		1	D5	0.5430	4.8404	0.00000									
17		80	SIPTR001	0.0000	4.8404	0.00000									
18		2	QUATR003	0.2000	5.0404	3.26418							52	52	
19		1	D6	0.2560	5.2964	0.00000									
20		56	CHVTR002	0.0000	5.2964	0.00000									
21		1	D6	0.2940	5.5904	0.00000									
22		2	QUATR004	0.2000	5.7904	-0.04281							52	52	
23		1	D7	0.5500	6.3404	0.00000									
24		44	DVRTR002	0.3500	6.6904	0.00000		-0.1920		-0.0960	-0.0960	1.8230	50	50	
25		1	D8	1.2670	7.9574	0.00000									
26		99	FL2TR002	0.0000	7.9574	0.00000									
27		56	CHVTR003	0.0000	7.9574	0.00000									
28		1	D8	0.2560	8.2134	0.00000									
29		2	QUATR005	0.2000	8.4134	2.52365							52	52	
30		1	D9	0.9630	9.3764	0.00000									
31		99	WCMTR001	0.0000	9.3764	0.00000									
32		50	BPSTR002	0.0000	9.3764	0.00000									
33		4	DHYTT001	1.0000	10.3764	0.00000		-0.8283		-0.8283	0.0000	1.5915	40	25	
34		50	BPSTT001	0.0000	10.3764	0.00000									
35		80	VALTT001	0.0000	10.3764	0.00000									
36		1	D10	1.7720	12.1484	0.00000									
37		2	QUATT001	0.3000	12.4484	1.23000							62	62	
38		1	D11	1.7140	14.1624	0.00000									
39		56	CHVTT001	0.0000	14.1624	0.00000									
40		1	D11	0.2560	14.4184	0.00000									
41		2	QUATT002	0.3000	14.7184	-1.56500							62	62	
42		80	SIPTT001	0.0000	14.7184	0.00000									
43		1	D12A	0.8500	15.5684	0.00000									
44		50	BPSTT002	0.0000	15.5684	0.00000									
45		1	D12B	0.5940	16.1624	0.00000									
46		56	CHVTT002	0.0000	16.1624	0.00000									
47		1	D12B	0.2560	16.4184	0.00000									
48		2	QUATT003	0.3000	16.7184	2.08000							62	62	
49		1	D13	1.4440	18.1624	0.00000									
50		56	CHVTT003	0.0000	18.1624	0.00000									
51		1	D13	0.2560	18.4184	0.00000									
52		2	QUATT004	0.3000	18.7184	-1.77000							62	62	
53		99	WCMTT001	0.0000	18.7184	0.00000									
54		99	SLTTT001	0.0000	18.7184	0.00000									
55		1	D14	1.7890	20.5074	0.00000									
56		56	CHVTT004	0.0000	20.5074	0.00000									
57		1	D14	0.2560	20.7634	0.00000									
58		2	QUATT005	0.3000	21.0634	0.73800							62	62	
59		1	D15	1.6500	22.7134	0.00000									
60		80	SIPTT002	0.0000	22.7134	0.00000									
61		99	FL2TT001	0.0000	22.7134	0.00000									
62		50	BPSTT003	0.0000	22.7134	0.00000									
63		4	DHPTT001	1.1130	23.8264	0.00000		0.7854		0.0000	0.0000	1.4171	50	18	
64		1	D18	4.1890	28.0154	0.00000									
65		56	CHVTT005	0.0000	28.0154	0.00000									

I	IDENT	TYPE	NAME	LENGTH	IN.POS	K1	FI	ANGLE	B	E1	E2	RO	Ax	Ay	STATUS
				(m)	(m)	(m-2)	(rad)	(rad)	(T)	(rad)	(rad)	(m)	(mm)	(mm)	
66		1	D16	0.5610	28.5764	0.00000									
67		50	BPSTT004	0.0000	28.5764	0.00000									
68		2	QUATT006	0.2000	28.7764	-0.93000							52	52	
69		99	FL2TT002	0.0000	28.7764	0.00000									
70		1	D17	4.3490	33.1254	0.00000									
71		4	DHPTT002	1.1130	34.2384	0.00000		-0.7854		0.0000	0.0000	1.4171	54	18	
72		1	D18	0.2470	34.4854	0.00000									
73		56	CHVTT006	0.0000	34.4854	0.00000									
74		50	BPSTT005	0.0000	34.4854	0.00000									
75		1	D18	0.8340	35.3194	0.00000									
76		50	BSTTT001	0.0000	35.3194	0.00000									
77		99	FL1TT001	0.0000	35.3194	0.00000									
78		4	DHRTT001	0.7570	36.0764	0.00000		-0.5236		-0.2618	-0.2618	1.4458	54	25	
79		1	D19	0.4240	36.5004	0.00000									
80		2	QUATT007	0.2000	36.7004	2.12028							52	52	
81		1	D20	0.4570	37.1574	0.00000									
82		99	SLTTT002	0.0000	37.1574	0.00000									
83		4	DHSTT001	1.1130	38.2704	0.00000		-0.7854		0.0000	0.0000	1.4171	54	25	
84		80	VALTT001	0.0000	38.2704	0.00000									
85		99	FL1TT002	0.0000	38.2704	0.00000									
86		80	SIPTT001	0.0000	38.2704	0.00000									
87		1	D21A	2.2440	40.5144	0.00000									
88		56	CHVTT007	0.0000	40.5144	0.00000									
89		1	D21B	0.2560	40.7704	0.00000									
90		2	QUATT008	0.2000	40.9704	0.64346							52	52	
91		50	BPSTT006	0.0000	40.9704	0.00000									
92		1	D22	2.3870	43.3574	0.00000									
93		99	WCMTT002	0.0000	43.3574	0.00000									
94		44	DVRTT001	0.3500	43.7074	0.00000		0.1920		0.0960	0.0960	1.8230	50	50	
95		1	D23	0.6510	44.3584	0.00000									
96		56	CHVTT008	0.0000	44.3584	0.00000									
97		1	D23	0.2560	44.6144	0.00000									
98		2	QUATT009	0.2000	44.8144	-1.39087							52	52	
99		50	BPSTT007	0.0000	44.8144	0.00000									
100		1	D24	1.1090	45.9234	0.00000									
101		44	DVRTT002	0.3500	46.2734	0.00000		-0.1920		-0.0960	-0.0960	1.8230	50	50	
102		1	D25	1.4180	47.6914	0.00000									
103		56	CHVTT009	0.0000	47.6914	0.00000									
104		1	D25	0.3400	48.0314	0.00000									
105		50	BPSTT008	0.0000	48.0314	0.00000									
106		1	D25	0.2490	48.2804	0.00000									
107		2	QUATT010	0.2000	48.4804	0.28676							52	52	
108		99	FL1TT003	0.0000	48.4804	0.00000									
109		1	D26	3.1400	51.6204	0.00000									
110		56	CHVTT010	0.0000	51.6204	0.00000									
111		1	D26	0.5560	52.1764	0.00000									
112		50	BPSTE001	0.0000	52.1764	0.00000									
113		80	VALTE001	0.0000	52.1764	0.00000									
114		80	SIPTE001	0.0000	52.1764	0.00000									
115		1	D51	4.0890	56.2454	0.00000									
116		44	DVRTE001	0.3500	56.5954	0.00000		0.1920		0.0960	0.0960	1.8230	50	50	
117		1	D52	1.3020	57.8974	0.00000									
118		56	CHVTE001	0.0000	57.8974	0.00000									
119		1	D52	0.2560	58.1534	0.00000									
120		2	QUATE001	0.2000	58.3534	0.44624							52	52	
121		1	D53	1.5600	59.9134	0.00000									
122		44	DVRTE002	0.3500	60.2634	0.00000		-0.1920		-0.0960	-0.0960	1.8230	50	50	
123		1	D54	1.8888	62.1522	0.00000									
124		2	QUATE002	0.2000	62.3522	1.30420							52	52	
125		1	D55	1.0550	63.4072	0.00000									
126		56	CHVTE002	0.0000	63.4072	0.00000									
127		1	D55	0.7200	64.1272	0.00000									
128		50	BPSTE002	0.0000	64.1272	0.00000									
129		4	DHRTE001	0.7570	64.8842	0.00000		0.5236		0.2618	0.2618	1.4458	54	25	
130		80	SIPTE002	0.0000	64.8842	0.00000									

I	IDENT	TYPE	NAME	LENGTH	INPOS	K1	FI	ANGLE	B	E1	E2	RO	Ax	Ay	STATUS
				(m)	(m)	(m-2)	(rad)	(rad)	(T)	(rad)	(rad)	(m)	(mm)	(mm)	
131		1	D56	2.1050	66.9892	0.00000									
132		2	QUATE003	0.2000	67.1892	0.78166							52	52	
133		1	D57	2.9440	70.1332	0.00000									
134		56	CHVTE003	0.0000	70.1332	0.00000									
135		1	D57	0.2560	70.3892	0.00000									
136		2	QUATE004	0.2000	70.5892	0.64326							52	52	
137		50	BPSTE003	0.0000	70.5892	0.00000									
138		1	D58	5.8000	76.3892	0.00000									
139		99	FL1TE001	0.0000	76.3892	0.00000									
140		1	D59	6.7277	83.1170	0.00000									
141		2	QUATE005	0.2000	83.3170	-1.23192							52	52	
142		1	D59	0.2560	83.5730	0.00000									
143		56	CHVTE004	0.0000	83.5730	0.00000									
144		1	D60	1.2440	84.8170	0.00000									
145		80	SIPTE003	0.0000	84.8170	0.00000									
146		1	D60	1.5000	86.3170	0.00000									
147		2	QUATE006	0.2000	86.5170	1.67383							52	52	
148		1	D61	1.4510	87.9680	0.00000									
149		50	BPSTE004	0.0000	87.9680	0.00000									
150		4	DHRTE002	0.7570	88.7250	0.00000		-0.5411		-0.2705	-0.2705	1.3990	54	15	
151		1	D62	0.8226	89.5476	0.00000									
152		4	DHRTE003	0.7570	90.3046	0.00000		-0.5411		-0.2705	-0.2705	1.3990	54	15	
153		99	FL1TE002	0.0000	90.3046	0.00000									
154		80	VALTE002	0.0000	90.3046	0.00000									
155		1	D63	0.7730	91.0776	0.00000									
156		2	QUATE007	0.2000	91.2776	-3.48714							52	52	
157		80	SIPTE004	0.0000	91.2776	0.00000									
158		1	D64	0.6140	91.8916	0.00000									
159		56	CHVTE005	0.0000	91.8916	0.00000									
160		1	D64	0.2560	92.1476	0.00000									
161		2	QUATE008	0.2000	92.3476	2.53618							52	52	
162		50	BPSTE005	0.0000	92.3476	0.00000									
163		1	D65	0.7860	93.1336	0.00000									
164		44	DVRTE003	0.3500	93.4836	0.00000		-0.1920		-0.0960	-0.0960	1.8230	50	50	
165		1	D66	1.3580	94.8416	0.00000									
166		50	BPSTE006	0.0000	94.8416	0.00000									
167		2	QUATE009	0.2000	95.0416	-2.30714							52	52	
168		80	SIPTE005	0.0000	95.0416	0.00000									
169		1	D67	0.5950	95.6366	0.00000									
170		56	CHVTE006	0.0000	95.6366	0.00000									
171		99	FL1TE003	0.0000	95.6366	0.00000									
172		80	FVLTE001	0.0000	95.6366	0.00000									
173		80	VALTE003	0.0000	95.6366	0.00000									
174		99	WCMTE001	0.0000	95.6366	0.00000									
175		1	D67	1.1650	96.8016	0.00000									
176		44	DVRTE004	0.3500	97.1516	0.00000		0.1920		0.0960	0.0960	1.8230	50	50	
177		1	D68	0.2130	97.3646	0.00000									
178		7	SPTEL101	1.2330	98.5976	0.00000		-0.5934		0.0000	0.0000	2.0779			
179		1	D69	0.3905	98.9881	0.00000									
180		7	SPTEL102	0.6230	99.6111	0.00000		-0.0380		0.0000	0.0000	16.3947			