

**INTERFACE CONTROL DOCUMENT TITLE AND APPROVAL PAGE**

**(Page 1)**

**ICD Number:** ICD-19-3-0001

**Primary Author:** B. Nelson

**Impacted WBS Elements:** WBS-3 to WBS-19

**Type of Interface:** Mechanical/Envelope Interface

**Description of Interface:**

The vacuum vessel ports are oriented toward the magnetic axis. This ICD describes the magnetic axis geometry that will be used for the port orientation. The axis to be used is an axis that is midway between the M50\_E04 curve and the S1, S2, and S5 group of curves. By doing this, a port axis would never miss the magnetic axis by more than 2-3 cm (less in most cases).

Physics has been requested to review and confirm this model.

**Record of Revisions**

Revision Number	Description	Date
0	Initial Issue	January 20, 2004

**Approvals**

<b>WBS Manager:</b>	<b>WBS Manager:</b>
<b>Project Engineer:</b>	<b>Project Engineer:</b>
<b>Project Physics Head</b>	
<b>Systems Engineering Support Manager:</b>	

**ICD DETAIL SHEET**

**ICD-14-310-0003**

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**(Use Continuation Sheets as Necessary to Include the Following Applicable Information)**

**Scope of Interface:**

This interface impacts the design and fabrication of the Stellarator Core (WBS1) and diagnostics (WBS3).

**Equipment and Responsibility List:**

Stellarator Core (WBS 19): Nelson

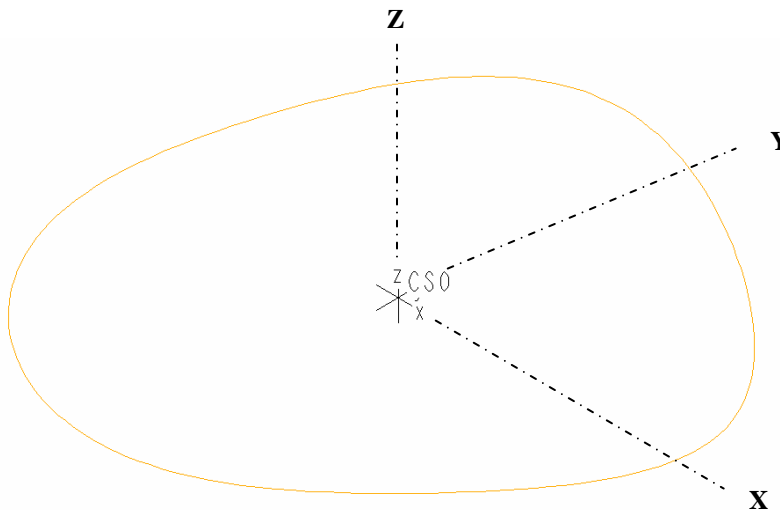
Diagnostics (WBS 3): Johnson

**Related ICDs:**

**Notes and Abbreviations:**

**Interface Block Diagrams:**

Magnetic axis with respect to coordinate system:



**Installation Information:**

N/A

**Other Pertinent Information:**

The cartesian coordinates of points defining the magnetic axis are listed below in inches:

	<u>X</u>	<u>Y</u>	<u>Z</u>
1	6.30456E+01	0.00000E+00	0.00000E+00
2	6.29864E+01	2.06196E+00	2.57374E-01
3	6.28089E+01	4.11671E+00	5.11969E-01
4	6.25139E+01	6.15708E+00	7.60972E-01
5	6.21030E+01	8.17601E+00	1.00153E+00
6	6.15785E+01	1.01666E+01	1.23076E+00
7	6.09441E+01	1.21225E+01	1.44579E+00
8	6.02047E+01	1.40378E+01	1.64389E+00
9	5.93667E+01	1.59073E+01	1.82250E+00
10	5.84377E+01	1.77269E+01	1.97941E+00

11	5.74260E+01	1.94935E+01	2.11278E+00
12	5.63410E+01	2.12052E+01	2.22125E+00
13	5.51916E+01	2.28611E+01	2.30394E+00
14	5.39869E+01	2.44612E+01	2.36048E+00
15	5.27353E+01	2.60062E+01	2.39080E+00
16	5.14441E+01	2.74974E+01	2.39556E+00
17	5.01199E+01	2.89367E+01	2.37573E+00
18	4.87682E+01	3.03261E+01	2.33253E+00
19	4.73940E+01	3.16676E+01	2.26746E+00
20	4.60009E+01	3.29638E+01	2.18222E+00
21	4.45924E+01	3.42170E+01	2.07865E+00
22	4.31712E+01	3.54297E+01	1.95866E+00
23	4.17395E+01	3.66046E+01	1.82411E+00
24	4.02989E+01	3.77440E+01	1.67678E+00
25	3.88505E+01	3.88505E+01	1.51830E+00
26	3.73949E+01	3.99261E+01	1.35011E+00
27	3.59322E+01	4.09728E+01	1.17348E+00
28	3.44620E+01	4.19920E+01	9.89577E-01
29	3.29835E+01	4.29849E+01	7.99473E-01
30	3.14958E+01	4.39524E+01	6.04266E-01
31	2.99979E+01	4.48950E+01	4.05109E-01
32	2.84885E+01	4.58132E+01	2.03244E-01
33	2.69666E+01	4.67075E+01	0.00000E+00
34	2.54312E+01	4.75783E+01	-2.03244E-01
35	2.38813E+01	4.84264E+01	-4.05109E-01
36	2.23160E+01	4.92524E+01	-6.04266E-01
37	2.07343E+01	5.00570E+01	-7.99473E-01
38	1.91352E+01	5.08409E+01	-9.89577E-01
39	1.75174E+01	5.16046E+01	-1.17348E+00
40	1.58796E+01	5.23480E+01	-1.35011E+00
41	1.42203E+01	5.30708E+01	-1.51830E+00
42	1.25379E+01	5.37719E+01	-1.67678E+00
43	1.08307E+01	5.44498E+01	-1.82411E+00
44	9.09742E+00	5.51023E+01	-1.95866E+00
45	7.33655E+00	5.57267E+01	-2.07865E+00
46	5.54702E+00	5.63198E+01	-2.18222E+00
47	3.72799E+00	5.68782E+01	-2.26746E+00
48	1.87900E+00	5.73976E+01	-2.33253E+00
49	3.54518E-15	5.78734E+01	-2.37573E+00
50	-1.90856E+00	5.83006E+01	-2.39556E+00
51	-3.84564E+00	5.86732E+01	-2.39080E+00
52	-5.80948E+00	5.89846E+01	-2.36048E+00
53	-7.79750E+00	5.92279E+01	-2.30394E+00
54	-9.80621E+00	5.93953E+01	-2.22125E+00
55	-1.18311E+01	5.94792E+01	-2.11278E+00
56	-1.38669E+01	5.94719E+01	-1.97941E+00
57	-1.59073E+01	5.93667E+01	-1.82250E+00
58	-1.79453E+01	5.91577E+01	-1.64389E+00
59	-1.99736E+01	5.88404E+01	-1.44579E+00
60	-2.19847E+01	5.84119E+01	-1.23076E+00
61	-2.39708E+01	5.78708E+01	-1.00153E+00
62	-2.59248E+01	5.72172E+01	-7.60972E-01
63	-2.78393E+01	5.64524E+01	-5.11969E-01
64	-2.97075E+01	5.55788E+01	-2.57374E-01
65	-3.15228E+01	5.45991E+01	0.00000E+00
66	-3.32789E+01	5.35168E+01	2.57374E-01

67	-3.49696E+01	5.23357E+01	5.11969E-01
68	-3.65892E+01	5.10601E+01	7.60972E-01
69	-3.81321E+01	4.96947E+01	1.00153E+00
70	-3.95938E+01	4.82452E+01	1.23076E+00
71	-4.09704E+01	4.67178E+01	1.44579E+00
72	-4.22594E+01	4.51199E+01	1.64389E+00
73	-4.34594E+01	4.34594E+01	1.82250E+00
74	-4.45707E+01	4.17451E+01	1.97941E+00
75	-4.55949E+01	3.99856E+01	2.11278E+00
76	-4.65348E+01	3.81901E+01	2.22125E+00
77	-4.73941E+01	3.63668E+01	2.30394E+00
78	-4.81775E+01	3.45235E+01	2.36048E+00
79	-4.88896E+01	3.26670E+01	2.39080E+00
80	-4.95355E+01	3.08032E+01	2.39556E+00
81	-5.01199E+01	2.89367E+01	2.37573E+00
82	-5.06473E+01	2.70715E+01	2.33253E+00
83	-5.11219E+01	2.52106E+01	2.26746E+00
84	-5.15479E+01	2.33561E+01	2.18222E+00
85	-5.19290E+01	2.15097E+01	2.07865E+00
86	-5.22687E+01	1.96725E+01	1.95866E+00
87	-5.25702E+01	1.78452E+01	1.82411E+00
88	-5.28367E+01	1.60278E+01	1.67678E+00
89	-5.30708E+01	1.42203E+01	1.51830E+00
90	-5.32745E+01	1.24219E+01	1.35011E+00
91	-5.34496E+01	1.06318E+01	1.17348E+00
92	-5.35971E+01	8.84892E+00	9.89577E-01
93	-5.37178E+01	7.07208E+00	7.99473E-01
94	-5.38118E+01	5.30000E+00	6.04266E-01
95	-5.38791E+01	3.53143E+00	4.05109E-01
96	-5.39196E+01	1.76515E+00	2.03244E-01
97	-5.39332E+01	6.60761E-15	0.00000E+00
98	-5.39196E+01	-1.76515E+00	-2.03244E-01
99	-5.38791E+01	-3.53143E+00	-4.05109E-01
100	-5.38118E+01	-5.30000E+00	-6.04266E-01
101	-5.37178E+01	-7.07208E+00	-7.99473E-01
102	-5.35971E+01	-8.84892E+00	-9.89577E-01
103	-5.34496E+01	-1.06318E+01	-1.17348E+00
104	-5.32745E+01	-1.24219E+01	-1.35011E+00
105	-5.30708E+01	-1.42203E+01	-1.51830E+00
106	-5.28367E+01	-1.60278E+01	-1.67678E+00
107	-5.25702E+01	-1.78452E+01	-1.82411E+00
108	-5.22687E+01	-1.96725E+01	-1.95866E+00
109	-5.19290E+01	-2.15097E+01	-2.07865E+00
110	-5.15479E+01	-2.33561E+01	-2.18222E+00
111	-5.11219E+01	-2.52106E+01	-2.26746E+00
112	-5.06473E+01	-2.70715E+01	-2.33253E+00
113	-5.01199E+01	-2.89367E+01	-2.37573E+00
114	-4.95355E+01	-3.08032E+01	-2.39556E+00
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117	-4.73941E+01	-3.63668E+01	-2.30394E+00
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126	-3.65892E+01	-5.10601E+01	-7.60972E-01
127	-3.49696E+01	-5.23357E+01	-5.11969E-01
128	-3.32789E+01	-5.35168E+01	-2.57374E-01
129	-3.15228E+01	-5.45991E+01	0.00000E+00
130	-2.97075E+01	-5.55788E+01	2.57374E-01
131	-2.78393E+01	-5.64524E+01	5.11969E-01
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142	-5.80948E+00	-5.89846E+01	2.36048E+00
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144	-1.90856E+00	-5.83006E+01	2.39556E+00
145	3.54518E-15	-5.78734E+01	2.37573E+00
146	1.87900E+00	-5.73976E+01	2.33253E+00
147	3.72799E+00	-5.68782E+01	2.26746E+00
148	5.54702E+00	-5.63198E+01	2.18222E+00
149	7.33655E+00	-5.57267E+01	2.07865E+00
150	9.09742E+00	-5.51023E+01	1.95866E+00
151	1.08307E+01	-5.44498E+01	1.82411E+00
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154	1.58796E+01	-5.23480E+01	1.35011E+00
155	1.75174E+01	-5.16046E+01	1.17348E+00
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160	2.54312E+01	-4.75783E+01	2.03244E-01
161	2.69666E+01	-4.67075E+01	0.00000E+00
162	2.84885E+01	-4.58132E+01	-2.03244E-01
163	2.99979E+01	-4.48950E+01	-4.05109E-01
164	3.14958E+01	-4.39524E+01	-6.04266E-01
165	3.29835E+01	-4.29849E+01	-7.99473E-01
166	3.44620E+01	-4.19920E+01	-9.89577E-01
167	3.59322E+01	-4.09728E+01	-1.17348E+00
168	3.73949E+01	-3.99261E+01	-1.35011E+00
169	3.88505E+01	-3.88505E+01	-1.51830E+00
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178	5.14441E+01	-2.74974E+01	-2.39556E+00

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180	5.39869E+01	-2.44612E+01	-2.36048E+00
181	5.51916E+01	-2.28611E+01	-2.30394E+00
182	5.63410E+01	-2.12052E+01	-2.22125E+00
183	5.74260E+01	-1.94935E+01	-2.11278E+00
184	5.84377E+01	-1.77269E+01	-1.97941E+00
185	5.93667E+01	-1.59073E+01	-1.82250E+00
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188	6.15785E+01	-1.01666E+01	-1.23076E+00
189	6.21030E+01	-8.17601E+00	-1.00153E+00
190	6.25139E+01	-6.15708E+00	-7.60972E-01
191	6.28089E+01	-4.11671E+00	-5.11969E-01
192	6.29864E+01	-2.06196E+00	-2.57374E-01
193	6.30456E+01	0.00000E+00	0.00000E+00