

# DATA SHEET

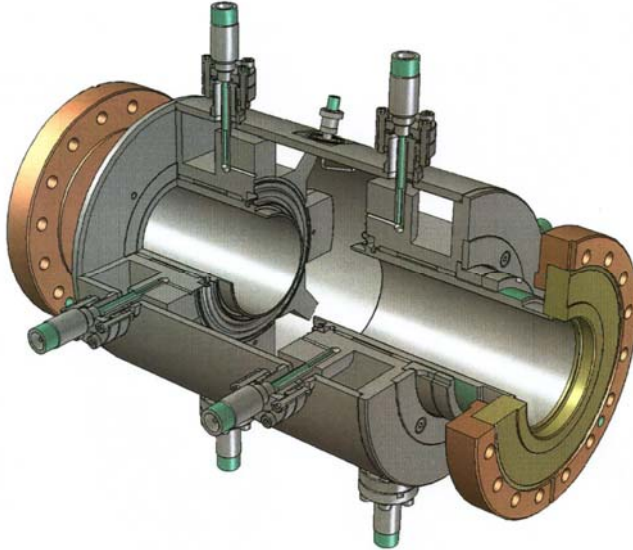
## Feedback Kicker-Cavity

DESY-MHFe, Vers. 3.0

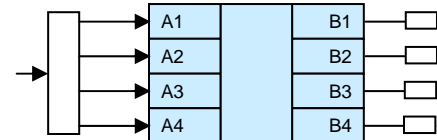
Januar 2011

Type: Modified DAΦNE / PSI

Manufacturer: DESY



Standard wiring for maximum bandwidth



**Technical Data Table 1:**

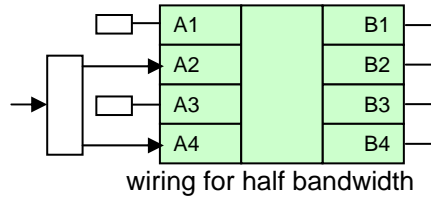
	Unit					Remarks
<b>Gap width <math>s_G</math></b>	<b>mm</b>	<b>52</b>	<b>55</b>	<b>60</b>	<b>68</b>	
Nose cones $s_A, s_B$	mm	14	12.5	10	6	
Frequency	MHz	1405	1430	1470	1510	Data combined from lab measurements and inSitu measurements at PETRA in Jan 2011
Bandwidth B	MHz	340	320	310	255	
Filling time	ns	0.94	0.99	1.03	1.25	$\tau=1/(\pi B)$
Coupling factor $\beta_{Cplr}$		1	1	1	1	Input reflection coefficient <2%
Gap coupling coefficient		0,905	0,891	0,864	0,818	$\beta_{Gap} = \frac{\sin\left(\pi \cdot \frac{s_G}{\lambda}\right)}{\pi \cdot \frac{s_G}{\lambda}}$
$\frac{R}{Q \cdot \beta_{Gap}}$		81	81	81	81	Average value from Table 2
R/Q	$\Omega$	73	72	70	66	from $\frac{R}{Q} \frac{1}{\beta_{Gap}}$ and $\beta_{Gap}$
Loaded quality factor $Q_L$	-	4.1	4.5	4.7	5.9	Data combined from lab measurements and inSitu measurements at PETRA in Jan 2011
Shunt-Impedance	$\Omega$	600	650	660	780	$\frac{R}{Q} \cdot Q_L (1 + \beta_{Cplr})$
Feedback voltage	V	690	720	725	790	$V_{FB} = \sqrt{2(P_{fwd} - P_{rfl})R_S}$ @ $P_{fwd}=400W$ ; $P_{rfl}=0$

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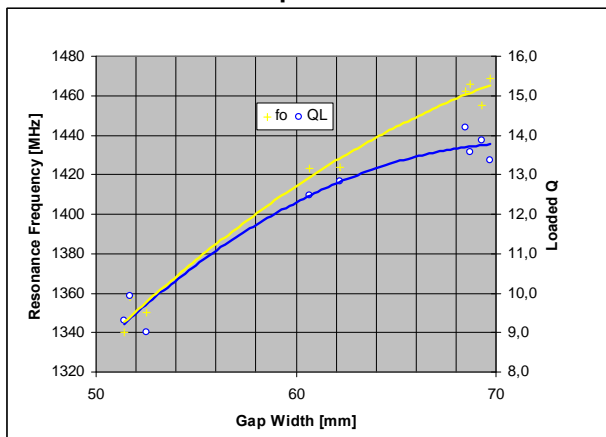


**Technical Data Table 2:**

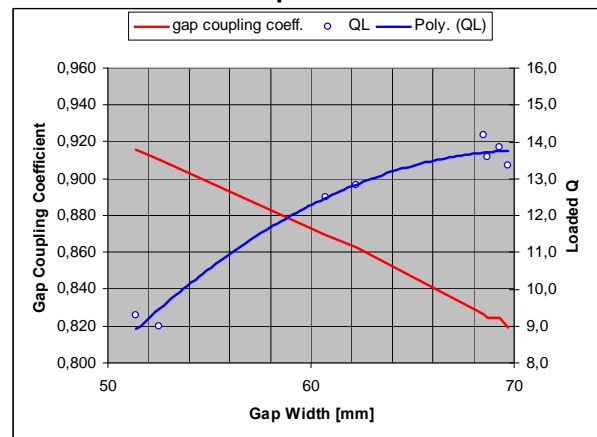
	Unit					Remarks
Gap width $s_G$	mm	<b>52</b>	<b>55</b>	<b>60</b>	<b>68</b>	
Nose cones $s_A, s_B$	mm	14	12.5	10	6	
Frequency	MHz	1350	1375	1415	1460	Data from acceptance measurements
Bandwidth	MHz	143	128	115	106	Data from acceptance measurements
Filling time	ns	2.22	2.49	2.77	3.00	$\tau=1/(\pi B)$
Coupling factor $\beta_{Cplr}$		1	1	1	1	Spread of input reflection coefficient between units: 1%...10%
Gap coupling coefficient		0,912	0,899	0,873	0,829	$\beta_{Gap} = \frac{\sin\left(\pi \cdot \frac{s_G}{\lambda}\right)}{\pi \cdot \frac{s_G}{\lambda}}$
Loaded quality factor $Q_L$	-	9.5	10.7	12.3	13.7	Data from acceptance measurements
Shunt-Impedance (measured in-situ with beam)	$\Omega$	1430	1590 <sup>1)</sup>	1740 <sup>1)</sup>	1810	$R_S = P_B / I_{BDC}^2$ P <sub>B</sub> :coupled out rf power
R/Q	$\Omega$	75	74	71	66	$R/Q = P_B / \left[ (1 + \beta_{Cplr}) \cdot Q_L \cdot I_{BDC}^2 \right]$
$\frac{R}{Q \cdot \beta_{Gap}}$		82	82	81	80	
Feedback voltage	kV	1.07	1.13	1.18	1.20	$V_{FB} = \sqrt{2(P_{fwd} - P_{rfl})R_S}$ @ P <sub>fwd</sub> =400W; P <sub>rfl</sub> =0
Coupling of pick-up loop	dB	-26.4	-26.1	-25.7	-25.0	±0.5dB spread between units

<sup>1)</sup> Scaled using  $R_{S_2} = R_{S_1} \frac{Q_{L_2} \cdot \beta_{Gap_2}}{Q_{L_1} \cdot \beta_{Gap_1}}$

**Resonance Frequency and Loaded Q versus Gap Width**



**Gap Coupling Coefficient and Loaded Q versus Gap Width**



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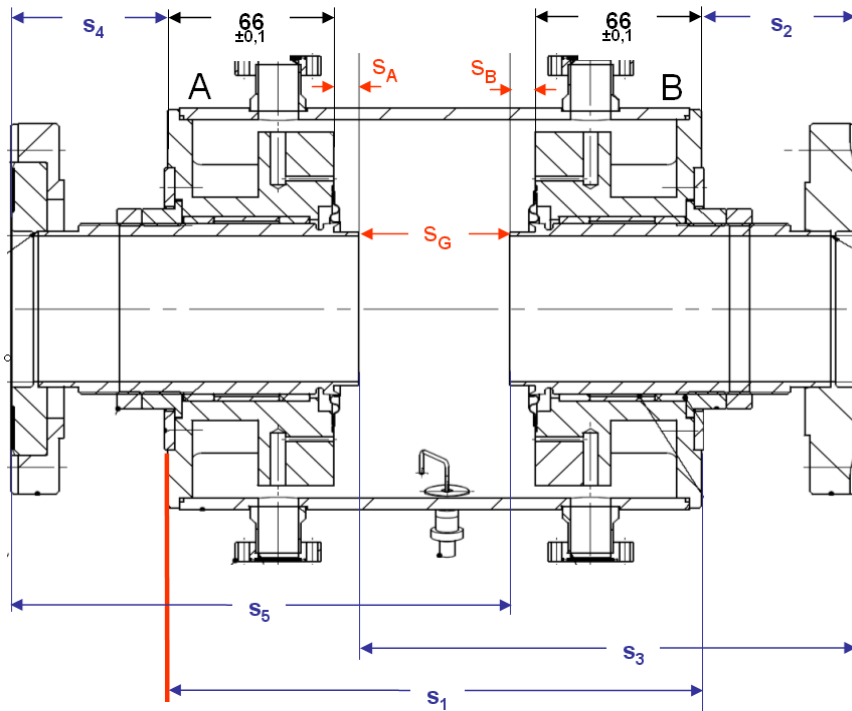
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**Technical Data Table 3:**

	Unit	Min.	Nom.	Max.	Remarks
Beam tube cut-off frequency	GHz		2.93 3.83		H <sub>11</sub> E <sub>01</sub>
Input power per port	W <sub>ave</sub>			200	Port surface temperature can reach 100°C. Loss-factor of the feed-through: <b>tanδ ≈ 6.5·10<sup>-3</sup></b>
Total length	mm	328	336	344	Flange to flange
Outside diameter	mm		165 295		Body Port to port without plugs
Beam tube diameter	mm		60		
Weight	kg		20		



**Flange type:** Conflat UHV

Upstream (A-ports): CDA DN100  
 Downstream (B-Ports): CA DN100