

DELIVERY RECORD

Client: High Energy Accelerator Research Organization (KEK)

Facility: KEKB / SuperKEKB

Location: Ibaraki, Japan

1 October 2018

 **MITSUBISHI HEAVY INDUSTRIES MECHATRONICS SYSTEMS, LTD.**

Machinery Systems Sales Department

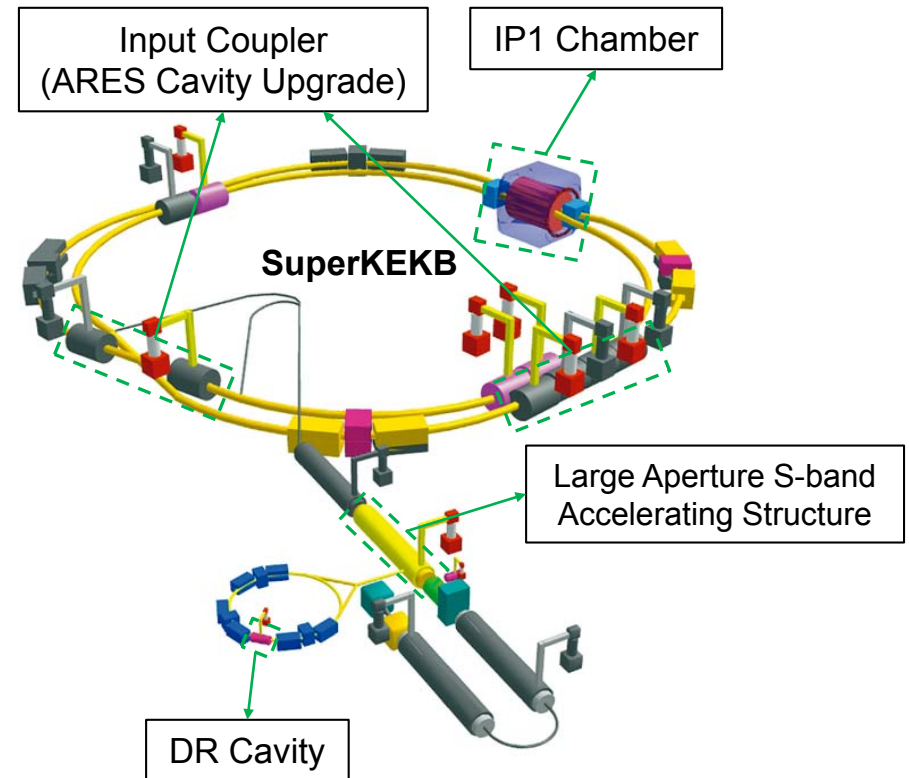
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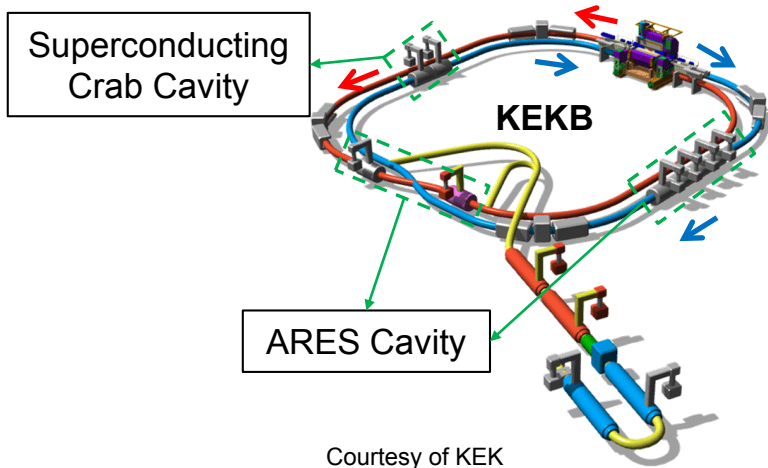
1. OVERVIEW

List of Main Supplies

KEKB	Superconducting Crab Cavity
	ARES Cavity
SuperKEKB	IP1 Chamber
	Input Coupler (ARES Cavity Upgrade)
	Large Aperture S-band Accelerating Structure
	DR Cavity
	Antechamber (R&D)



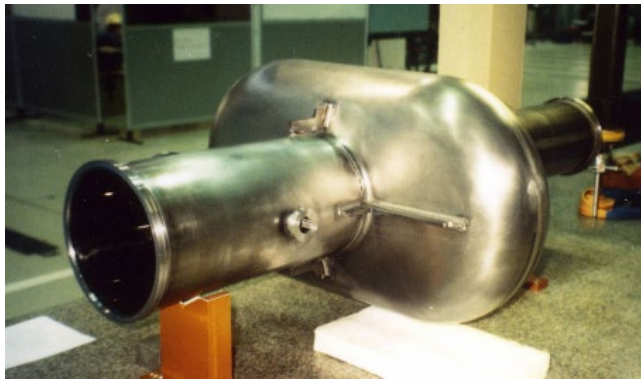
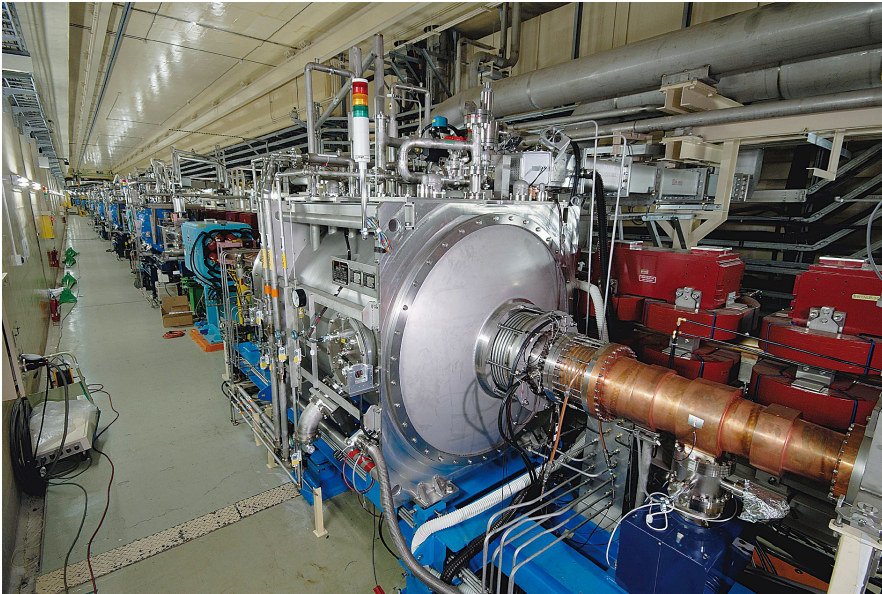
Courtesy of KEK



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2. SUPERCONDUCTING CRAB CAVITY



Main Parameters

Electrical Peak Field	21 MV/m (design value)
Frequency	508 MHz
RF Mode	TM110
Material	Pure Niobium
Number of Delivery	2 modules
Fabrication Method	Hydro forming & EBW

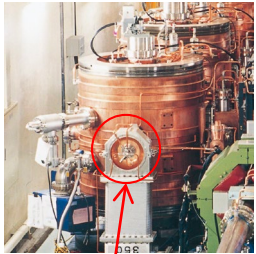
3. ARES CAVITY

Main Parameters

Structure	Accelerator resonantly coupled with energy storage
Accelerating Field	0.5MV/cavity (Design Value)
Q-value	110,000
Frequency	508.89MHz
Section Length	1.6m
Mode	Standing wave $\pi/2$ -mode
Number of Delivery	28



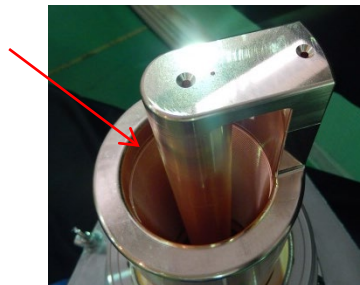
4. INPUT COUPLER (ARES CAVITY UPGRADE)



Input Coupler



Fine grooves against
Multipactoring



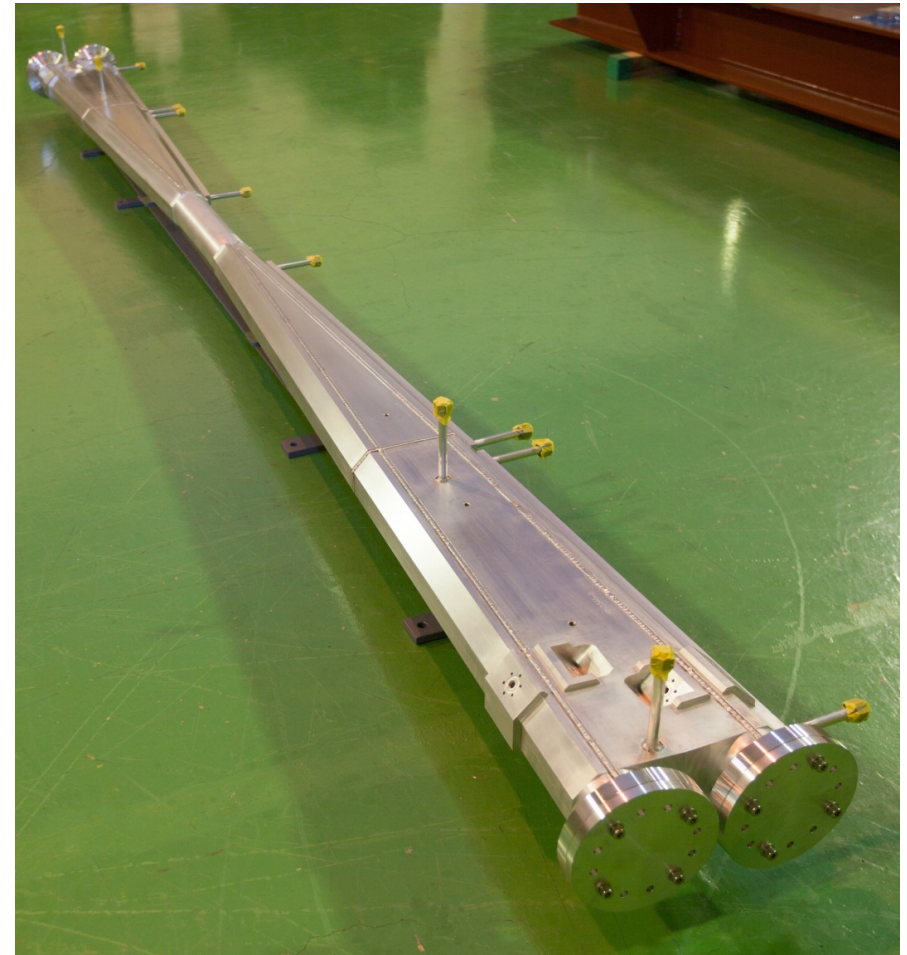
Main Parameters

Frequency	508.9MHz
Input Power	800kW, CW
Coupling	8 (max.)
Window Type	Coaxial Disk Alumina (95%)
Waveguide	Input / WR1500 Cavity side / WX-77D
Cooling	Water
Length	~0.8 m

5. IP1 CHAMBER

Main Parameters

Length	4000 mm
Material	A5083
Welding Process	TIG Welding
Tolerance of Length	± 2 mm
Straightness Tolerance	Horizontal : ± 2 mm Vertical : ± 1 mm
Flange	Demountable flange



6. LARGE APERTURE S-BAND ACCELERATING STRUCTURE



Photo courtesy of KEK

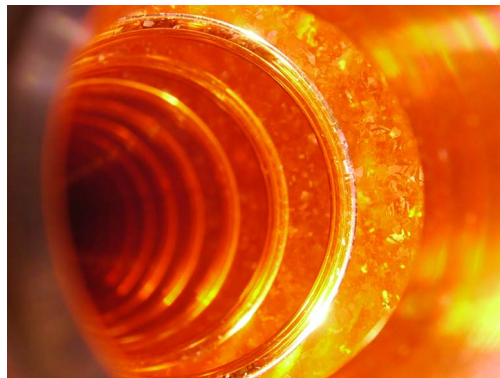


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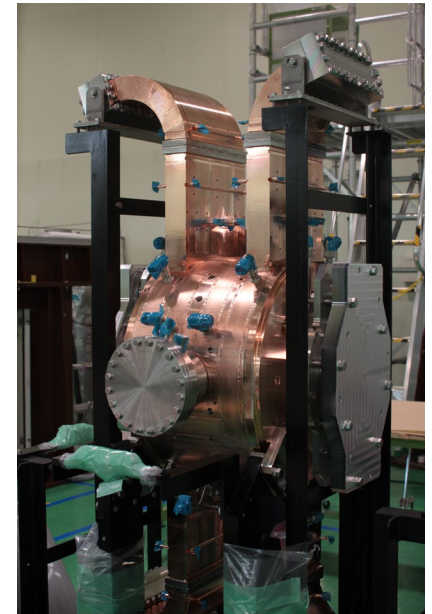
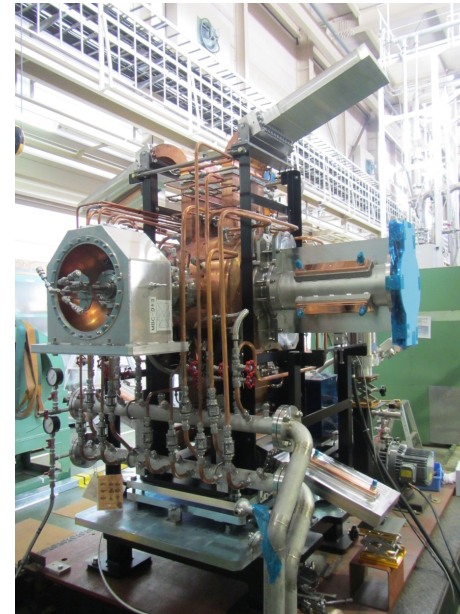
Main Parameters

Operation Frequency	2856 MHz
Type	$2\pi/3$ Quasi-Constant-Gradient Type
Cell Number	57+2 Couplers
Length / Weight	2m / 200 kg
Output Beam-Hole Diameter	$\phi 30$ mm
Attenuation Constant τ	0.12
Filling Time τ_F	185 ns

7. DR CAVITY

Main Parameters

Frequency	508.9 MHz
R_{sh}/Q_0	150 Ω
Q-value	~ 30000
Cavity Voltage	0.8 MV
Wall Loss Power	~ 140 kW
Length	1.6 m
Delivery Number	3 Modules



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