

**Hakuto Co.,Ltd.**

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QUOTATION

NO.	17F1-NU028C	DATE	Dec.7, 2017
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To: University of Milano-Bicocca**Attn :**

Dear Sirs.

We hereby have the pleasure to quote for the goods specified below subject to the terms and condition given below
 INCLUDING ALL THOSE TERMS AND CONDITIONS OF SALE PRINTED ON THE REVERSE SIDE HEREOF OR ATTACHED HERETO.

Place of delivery	D.A.P University of Milano-Bicocca	Method of Shipment	AIR FREIGHT
Terms of Payment	30days after acceptance	Time of Shipment	4 MONTHS UPON ORDER (ON BOARD)

Terms of Insurance	TO BE COVERED BY BUYER	Remarks	Subject to our final confirmation
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(SEE HAKUTO CO., LTD. TERMS AND CONDITIONS OF SALE ON REVERSE SIDE HEREOF OR ATTACHED HERETO)

ITEM NO.	P/N	DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
<u>High Density Radical Source (HDRS)</u>					
#1		High Density Radical Source <u>Model : HDRS</u> Radical Source Matching Box for Radical Source Inspection at Nagoya University before shipping * RF Power Supply is not included.	1 SET	€ 75,000	€ 75,000
#2		RF Power Supply	1 SET	€ 10,000	€ 10,000
				Special Academic Discount	▲€10,000
TOTAL D.A.P.					€ 75,000

REMARKS

The price includes: cost of delivery, installation, acceptance test on site, and the related expenses of engineer.

The price does not include: preparation of utilities(gas, water, electricity etc..) for the system on site.

VAT, Tax: NOT Include

Offer Validity : 30 days after quotation date

Warranty: A year from date of acceptance

Shipping charge and travel expenses of engineer shall be covered by the customer.

Repair: At factory side

Others: This product does not have CE certification.

Hakuto Co.,Ltd.

TOSHIHIRO ISHIMURA
 GENERAL MANAGER
 ELECTRONIC EQUIPMENT SALES DEPT.
 KANSAI BRANCH

Specifications

1. Purpose

This document shows the performance and specifications of high density radical source (HDRS).

2. Manufacturer

NU-Rei Co.,Ltd.

Katagiri Engineering Co., Ltd.

3. Sales Agency

Hakuto Co.,Ltd.

4. Machine abstract

This equipment is to generate high density nitrogen radicals in an original discharge plasma.

5. Component

Item	Component items	Quantity
1	High density nitrogen radical source	1 unit
2	RF power supply	1 unit
3	RF Matching box	1 unit
4	Instruction manual	1 book

6. List of specifications

6-1 High density nitrogen radical source

Item	Performance & Specifications	Remarks
Plasma-generating method	CCP & ICP Hybrid Method	CCP: Capacitively coupled plasma ICP: Inductively coupled plasma
RF Power Supply	Frequency: 13.56MHz Variation range: 0~600W	
N ₂ flow rate for discharge	Breakdown at : 10sccm Variation : 1~15sccm	This performance might depend on exhaust systems.
Generated radical species	Nitrogen radical initiated	
Radical density (target absolute value)	More than $1 \times 10^{12} \text{ cm}^{-3}$	It should be measured at 100mm in diffusion off HDRS.
DC power supply for retarding of charged species	0~500V	Please prepare the DC power supply.

Cooling	Liquid-cooled (More than 1 l/min) Connector:1/4 inch- ϕ Swagelok	
Mounting flange	ICF114	Default size

6-2 RF power supply

Item	Performance & Specifications	Remarks
Frequency	13.56MHz	
Output power	600W (50 Ω)	
Output method	Continuous wave	
Variation range	0~600W	
Input power supply	AC200-240V(1 ϕ), 50-60Hz, Typ1.2kVA	Please input the AC power.
Voltage fluctuation	Rated voltage +/-10%	
RF cable	7.5m in length	
AC input connector	Original connector of 1 ϕ -AC cable with 10m-length (containing earth line)	Please prepare additional AC power source.
Output connector	N-type receptacle	
Cooling	Air-cooled	

6-3 RF matching box

Item	Performance & Specifications	Remarks
Frequency	13.56MHz	
Maximum RF input power	600W	
Input power supply	AC200-240V(1 ϕ), 50-60Hz, typ20VA(Maximum of 50VA)	Please input the AC power.
Matching time	< 10s	
RF input connector	HN-type of connector	
Output connector	Copper plate	Connected to HDRS
Cooling	Air-cooled	

※The RF matching box would be adjusted in advance. If you would prepare the other power supply, the RF matching box should be re-adjusted based on the instruction manual.

7. Utility

For the HDRS running, please prepare the following utility.

Item	Capacity	Quantity
RF power supply	AC200~240V(1 ϕ), 50-60Hz, Typ1.2kVA	1 unit
RF matching box	AC200-240V(1 ϕ), 50-60Hz, Typ20VA(Max.: 50VA)	1 unit
Cooling Water	<HDRS> Flow rate: 1 l/min Temperature: 10~35°C Pressure: 0.2MPa Connector: 1/4 inch- ϕ Swagelok	1 line(in/out)
N ₂ gas	Gas purity: More than 99.9999% Gas flow control: MFC(0~20sccm) Connector: 1/4 inch- ϕ VCR(male)	1 line

The articles expected to be prepared.

DC power supply for retarding	Output: 0~500V	1 unit
Cable for connection to retard	HBNC cable	2 lines

8. Size and weight

Item	Specification	Remarks
Exterior dimensions (L x W x H)	800 x 50mm ϕ	Main unit of HDRS
	530 x 270 x 145 mm	RF power supply
	400 x 250 x 200 mm	RF matching box
Weight	15kg	Main unit of HDRS
	9kg	RF power supply
	12kg	RF matching box

※These specifications are subject to change without notice.