

Customer Information

Customer Name	Sai Sankar Gupta, K.B.
Operator Name	Sai Sankar Gupta, K.B.
Company	University of Leiden
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Bruker Information

Office	GSEC
Engineer	Alban GARCIN
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Probe Information

Order No.	442759
Contract No.	
Description	PH MASDVT750W4 BL1.3 X/Y/H
P/N	H170225
S/N	0001

Installation Summary

I, an authorized customer representative, acknowledge that the above referenced probe was installed and demonstrated to operate in accordance with the specifications mutually agreed upon by both parties. We accept the delivery and installation of this probe as specified in the purchase order and release Bruker from any further obligation, other than those obligations as specified during the warranty period. If the contract requires a formal acceptance protocol this document serves as such.

Warranty

The warranty period commences according to the contractual agreement.

Place	2333 AL Leiden, Netherlands	Place	2333 AL Leiden, Netherlands
Date	April 14, 2023	Date	April 14, 2023

Sai Sankar Gupta, K.B.
Customer representative signature

Alban GARCIN
Bruker representative signature

Spectrometer Information

Order No.	442759
System	Avance Neo 750
Location	
TopSpin Version	TopSpin 4.1.3 - Build 17

NMR Probe

Description	Probe ID	Inspection Lot	Status
PH MASDVT750W4 BL1.3 X/Y/H	H170225_0001	2023-04-1_DBres	pass

Copies of all spectra (default and additional) are included in customer's PDF report.

Installation Checklist

Installation	pass	fail	n/a	Optional Components	pass	fail	n/a
All firmware	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample Changer	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cortab for required nuclei	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MAS controller	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lift / spin calibration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	High power equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Customer Training	pass	fail	n/a	LC-NMR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Basic safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Liquid Handler SamplePro Tube	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Handling of cryogenic liquids	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Micro-Imaging	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Troubleshooting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Diffusion	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Backup (nmr_save, Images)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CryoProbe / Cryoplatfrom	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Introduction to IconNMR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BNL / BSNL	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Assure-SST / Performance check	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Additional cooling/heating units (like BCU1 / BCU2)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CryoProbe	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	LT-MAS (Low Temperature MAS equipment)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Handling / cleaning of probe	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Gyrotron magnet and DNP console	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
He cylinder exchange	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
He compressor cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
RF heating / power limits	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
RF routing	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Acceptance and Warranty	pass	fail	n/a				
Explanation of warranty	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Customer support hotlines	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				

General Test Information

Summary of Inspection Lot

Description	Probe ID	Inspection Lot
PH MASDVT750W4 BL1.3 X/Y/H	H170225_0001	2023-04-1_DBres

Experiments Measured

Sample	Experiment	Status
Z151270	Magic Angle setting, MAS (NPT_79Br_MAS_magicAngle)	pass
Z151270	Maximum spin rate testing, MAS (NPT_79Br_MAS_maxSpinRate)	pass
Z151270	Optimization of 79Br frequency (NPT_79Br_MAS_fieldsetting)	pass
Z151271	Optimization of 13C frequency (NPT_13C_MAS_fieldsetting_dec1h)	pass
Z151271	P90 1H pulse calibration, MAS (NPT_1H_MAS_p90det_1h)	pass
Z151270	P90 79Br pulse calibration, MAS (NPT_79Br_MAS_p90det_79br)	pass
Z151273	P90 13C 1H-13C CP pulse calibration, MAS (NPT_13C_MAS_p90det_cp1h_13c)	pass
Z151273	P90 13C 1H-13C CP shortest pulse calibration, MAS (NPT_13C_MAS_shortestPulse_cp1h_13c)	pass
Z151271	P90 13C pulse calibration, MAS (NPT_13C_MAS_p90det_13c)	pass
Z151273	P90 15N 1H-15N CP pulse calibration, MAS (NPT_15N_MAS_p90det_cp1h_15n)	pass
Z151273	P90 15N pulse calibration, MAS (NPT_15N_MAS_p90det_15n)	pass
Z151274	P90 31P 1H-31P CP pulse calibration, MAS (NPT_31P_MAS_p90det_cp1h_31p)	pass
Z151274	P90 31P 1H-31P CP shortest pulse calibration, MAS (NPT_31P_MAS_shortestPulse_cp1h_31p)	pass
Z151274	P90 31P pulse calibration, MAS (NPT_31P_MAS_p90det_31p)	pass
Z151272	CP 1H-13C sensitivity, MAS (NPT_13C_MAS_sino_cp1h_13c)	pass
Z151272	CP 1H-15N sensitivity, MAS (NPT_15N_MAS_sino_cp1h_15n)	pass
Z151274	CP 1H-31P sensitivity, MAS (NPT_31P_MAS_sino_cp1h_31p)	pass
Z151271	13C sensitivity, MAS (NPT_13C_MAS_sino_13c)	pass
Z151271	1H sensitivity, MAS (NPT_1H_MAS_sino_1h)	pass
Z151273	CP 1H-13C parameter optimization, MAS (NPT_13C_MAS_paropt_cp1h_13c)	pass
Z151273	CP 1H-15N parameter optimization, MAS (NPT_15N_MAS_paropt_cp1h_15n)	pass

Achieved Specifications

Pulse Width

Nucleus	Sample		90° Pulse		Power Limit [W]	Method	Status
			Duration [μs]	Power [W]			
¹ H	Z151271	spec.	1.50	-	60	direct	pass
		ach.	1.48	56.5			
¹³ C	Z151271	spec.	2.80	-	120	direct	pass
		ach.	2.75	25.1			
¹³ C	Z151273	spec.	2.80	25.0	120	with CP	pass
		ach.	2.63	24.2			
¹³ C	Z151273	spec.	2.00	50.0	120	shortest pulse with CP	pass
		ach.	1.85	50.0			
¹⁵ N	Z151273	spec.	5.00	-	220	direct	pass
		ach.	4.94	35.7			
¹⁵ N	Z151273	spec.	5.00	75.0	220	with CP	pass
		ach.	4.48	34.9			
³¹ P	Z151274	spec.	4.00	-	80	direct	pass
		ach.	3.28	33.0			
³¹ P	Z151274	spec.	4.00	33.0	80	with CP	pass
		ach.	3.93	22.2			
³¹ P	Z151274	spec.	3.00	50.0	80	shortest pulse with CP	pass
		ach.	2.65	50.0			
⁷⁹ Br	Z151270	spec.	3.00	-	120	direct	pass
		ach.	2.88	22.3			

Sensitivity

Nucleus	Sample		S/N	Remarks	Status
¹³ C	Z151272	spec.	76.0	sensitivity of ¹ H- ¹³ C cross-polarization	pass
		ach.	130.0		
¹⁵ N	Z151272	spec.	-	sensitivity of ¹ H- ¹⁵ N cross-polarization	pass
		ach.	22.4		
³¹ P	Z151274	spec.	-	sensitivity of ¹ H- ³¹ P cross-polarization	pass
		ach.	2490.2		

Sensitivity with NS

Nucleus	Sample		S/N	FWHM [Hz]	NS	Remarks	Status
¹ H	Z151271	spec.	-	-	16	noise: 20 ppm variable, method: sino best	pass
		ach.	5156.7	134.6	16		
¹³ C	Z151271	spec.	-	12.0	16	noise: 20 ppm variable, method: sino best	pass
		ach.	49.0	4.2	16		

Samples used for Inspection Lot

Sample	Description
Z151270	Potassium Bromide (KBr, 3.0 ul)
Z151271	Adamantane (3.0 ul)
Z151272	Alpha-glycine (2 mg, 3.0 ul)
Z151273	2- ¹³ C, ¹⁵ N alpha-glycine (2 mg, 3.0 ul)
Z151274	Ammonium Dihydrogenphosphate (NH ₄ H ₂ PO ₄ , 3.0 ul)

Remarks / Exclusions

Partial tests of probe in Double resonance Mode. Additional tests will be done with triple resonance mode in another report.