



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

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Technical Specification

Add-on component for the existing JEOL NMR600 MHz Spectrometer

- 3rd CHANNEL ATTACHMENTS** for existing JEOL 600 MHz ECZR NMR Spectrometer to do triple resonance experiments and Variable Temperature (Low temperature and High temperature) experiments
600MHZ 1LF EXTENSION UNIT
600MHZ 1LF POWER AMPLIFIER STANDARD.
- 5 mm FG/HCN Probe** for existing JEOL 600 MHz ECZR series NMR Spectrometer
Capable of performing ^1H NMR observation while irradiating the ^{15}N and the ^{13}C nuclei simultaneously and applying a pulsed gradient magnetic field in FT NMR systems.
All required accessories for Variable temperature (Low Temperature and High Temperature) capability should be included.

A. Specifications

- | | | |
|---|---|---|
| a) Sample tube diameter | : | 5 mm |
| b) Observation nucleus | : | ^1H |
| c) Irradiation nuclei | : | ^{13}C and ^{15}N |
| d) NMR lock nucleus | : | ^2H |
| e) ^1H line shape of chloroform (spinning) | : | FWHM: ≤ 0.45 Hz
0.55% width ≤ 6 Hz
0.11% width ≤ 12 Hz |
| f) Spinning side band | : | $\leq 1\%$ for ^1H observation |
| g) ^1H line shape of chloroform (Non spinning) | : | 0.55% width ≤ 6 Hz
0.11% width ≤ 12 Hz |
| h) Sensitivity | : | ≥ 1050 for ^1H (0.1% Ethylbenzene, 1 scan) |
| i) 90° pulse width | : | ≤ 7 μs for ^1H at 30 W
≤ 13 μs for ^{13}C at 300 W
≤ 40 μs for ^{15}N at 300 W |
| j) Variable temperature range | : | -20 to +100 $^\circ\text{C}$ |
| k) Field gradient output | : | Approximately 0.3 T/m (at 10 A) |
| l) Field gradient duty cycle | : | i. 2% or less (at 10 A), (room temperature),
ii. 0.4% or less (at 30 A), (room temperature) |

- m) Field gradient current duration : i. 20 ms or less (at 10 A)
 ii. 10 ms or less (at 30 A)

B. Configuration

- a) Probe Unit and spinner rotor : 1 set

3. 1 MM HXMAS Probe with 5 Nos. (or more) of 1mm rotors

1MM HXMAS probe with 1mm rotor and fast MAS ≥ 80 KHz spinning should be compatible to the existing JEOL 600 MHz ECZR series NMR Spectrometer. The probe should be equipped with a spinner module for a 1 mm sample tube, and include a dual resonant circuit tuned to High Frequency ($^1\text{H}/^{19}\text{F}$) and Low Frequency (^{31}P , ^7Li , ^{11}B , ^{23}Na , ^{27}Al , ^{13}C , ^{79}Br , ^{207}Pb , ^{29}Si , ^6Li , ^{15}N , ^{14}N) as well as Variable temperature (Low and High) capability in the range of -40°C to $+40^\circ\text{C}$ or better.

All required accessories for Variable temperature capability should be included and must be compatible with the existing JEOL 600 MHz ECZR series NMR Spectrometer. All accessories required for sample packing for 1mm rotor should be included.

90° pulse width:

Nucleus	Standard Amp	Middle Amp
	Pw 90 (μs)	Pw 90 (μs)
^1H	0.9	0.9
^{13}C	1.0	1.0

Sensitivity: ^{13}C : 180 or higher ($^{13}\text{C}_3$, ^{15}N , L-alanine, 2 scans, reference value)

Configuration :

- a) Probe body.....1 set
 b) Stick.....1 set
 c) Dial table.....1
 d) Probe file.....1
 e) Instruction manual.....1
 f) All required sample packing tools for 1mm Rotor1 set

4. Software and Pulse sequences: Should include all latest pulse sequences for performing multi-dimensional (2D and 3D) experiments. Specific pulse sequences for assignment of proteins and nucleic acids as well as pulse sequences for measuring dynamics and analysis of dynamics data, relaxation (T_1 , T_2 , $T_{1\rho}$, hetNOE), relaxation dispersion (CPMG) and CEST experiments should also be included.

5. STEREOMICROSCOPE (for packing 1mm HXMAS Rotors)

6. Warranty: One-year warranty for all the probes , Stereomicroscope and associated accessories.

7. Training: At least one-week training on applications using different pulse sequences, processing of data and proper use of the Probes.