# INSTRUCTIONS

# JNM-PMX60SI

## HIGH RESOLUTION NMR INSTRUMENT

No. I-E061-4
(NM105179)

Serving Advanced Technology
JEOL 日本電子

8601SP-100

# JNM-PMX60SI HIGH RESOLUTION NMR INSTRUMENT

I-E061

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# CHAPTER 1 GENERAL DESCRIPTION

## 1.1 OUTLINE

The JNM-PMX60SI is a compact high resolution $^{1}H$ NMR instrument that even a beginner will find easy to operate.

- Especially designed for measurements of hydrogen nuclei, both the field and the resolution of this instrument are very stable. This is achieved through the adoption of a magnetically shielded permanent magnet whose temperature is precision-controlled.

- Due to the adoption of a large-sized X-Y recorder and chart paper that is calibrated into Hz and ppm, spectrum analysis can be easily carried out.

- Almost all operations are performed by feather-touch key or push button. Since an automatic mode (interlocking mechanism) is provided, even a beginner can easily carry out measurements.

- With the incorporation of all solid-state circuitry, this instrument provides both high reliability and high stability. Moreover, maintenance is simple.

- The instrument has low power consumption. Only 150 W is required when no attachments are used. 400 W is required with all the attachments in use.

- Spin decoupling and NMR internal lock are built in.

# 1.2 SPECIFICATIONS

## 1.2.1 INSTRUMENT SPECIFICATIONS

| | | |
|---|---|---|
| 1. | Applicable nuclei | $^1H$ |
| 2. | Standard frequency | 60 MHz |
| 3. | Standard field | 1.4092 T (14,092 G) |
| 4. | Resolution | 0.4 Hz |
| 5. | Sensitivity | S/Nav ≥ 40 (Ratio between maximum peak (S) of 1% ethylbenzene quartet and average noise (Nav).) |
| 6. | Integration accuracy | 2% or less (Average deviation when integration waveform of 5% ethylbenzene is successively repeated five times and recorded.) |
| 7. | Sweep | |
| | Method | Magnetic field sweep |
| | Width | 60, 120, 180, 240, 300, 360, 480, 600, 1200 Hz |
| | Time | 25, 50, 100, 250, 500, 1000 sec |
| 8. | Magnetic field shift | |
| | Offset | ±60, ±600 Hz |
| | Rough shift | 4 kHz (1 kHz steps) |
| | Continuous shift | 1.5 kHz (Continuously variable) |
| 9. | Sample tube dia. (Outer) | 5 mmϕ |
| 10. | Sample volume | 0.3 mℓ (Approx.) |
| 11. | Internal lock | |
| | Reproducibility | 0.2 Hz (Average deviation when successively repeated 5 times and recorded at sweep time of 250 sec.) |
| | Sweep method | Magnetic field/frequency sweep |
| 12. | Spin decoupling | |
| | Frequency range | 2.2 kHz |
| | Offset | Rough adjustment: -600, 0, 600 Hz<br>Fine adjustment: 1,000 Hz, continuously variable |

| | |
|---|---|
| Frequency stability | 0.2 Hz |
| Irradiation method | Magnetic field/frequency synchro-track |
| 13. Recorder | Plane-surface type X-Y recorder |
| Chart size | 280 mm (vert.) × 420 mm (horiz.) |
| 14. Power | AC 100/115 V, single phase 50/60 Hz, 400 VA |

15. Dimensions/weight

| Console | Dimensions (cm) | | | Weight (kg) |
|---|---|---|---|---|
| | Width | Depth | Height | |
| Spectrometer inc. stand | 80 | 73 | 97 | 64 |
| Magnet console | 84 | 69 | 87 | 350 |

## 1.2.2 INSTALLATION REQUIREMENTS

The following requirements must be met before the PMX60SI can be installed.

1. Room area

   Floor space: 2 m × 2.5 m

   Room entrance: 80 cm wide or over

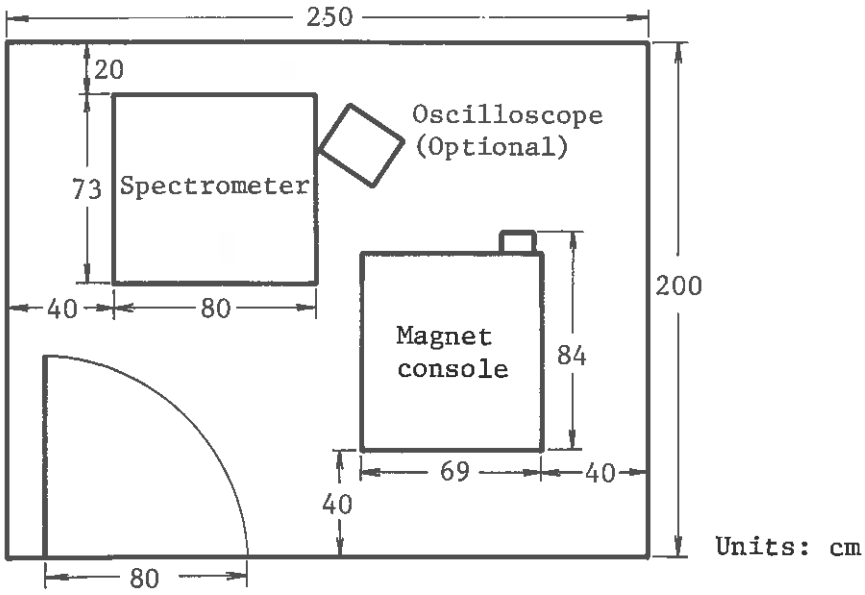



Fig. 1-1 Installation layout

| | |
|---|---|
| 2. Floor strength | 350 kg/$m^2$ or over, no vibration |
| 3. Temperature | 18°C ∿ 28°C<br>Permissible fluctuation: ±1°C/hr,<br>±3°C/24hrs. |
| 4. External magnetic field | Install the PMX60SI in an area where magnetic field fluctuation is minimum. Do not install it near a large transformer, an elevator, a magnetic field generator, or a magnetic substance. If ferromagnetic objects are in motion nearby, poor reproducibility will result. |
| 5. Power | AC 100 V ±10%, 50/60 Hz, 500 VA<br>• Use an automatic voltage regulator in areas where line voltage fluctuation is large.<br>• Be sure to ground the green wire of the power cable.<br>• The power outlet should be within 3 m of the instrument.<br>• Do not use the same outlet as an air conditioner. |

*Note: These specifications may be changed without notice so as to reflect modifications.*

## 1.3 COMPOSITION

### 1.3.1 STANDARD COMPOSITION

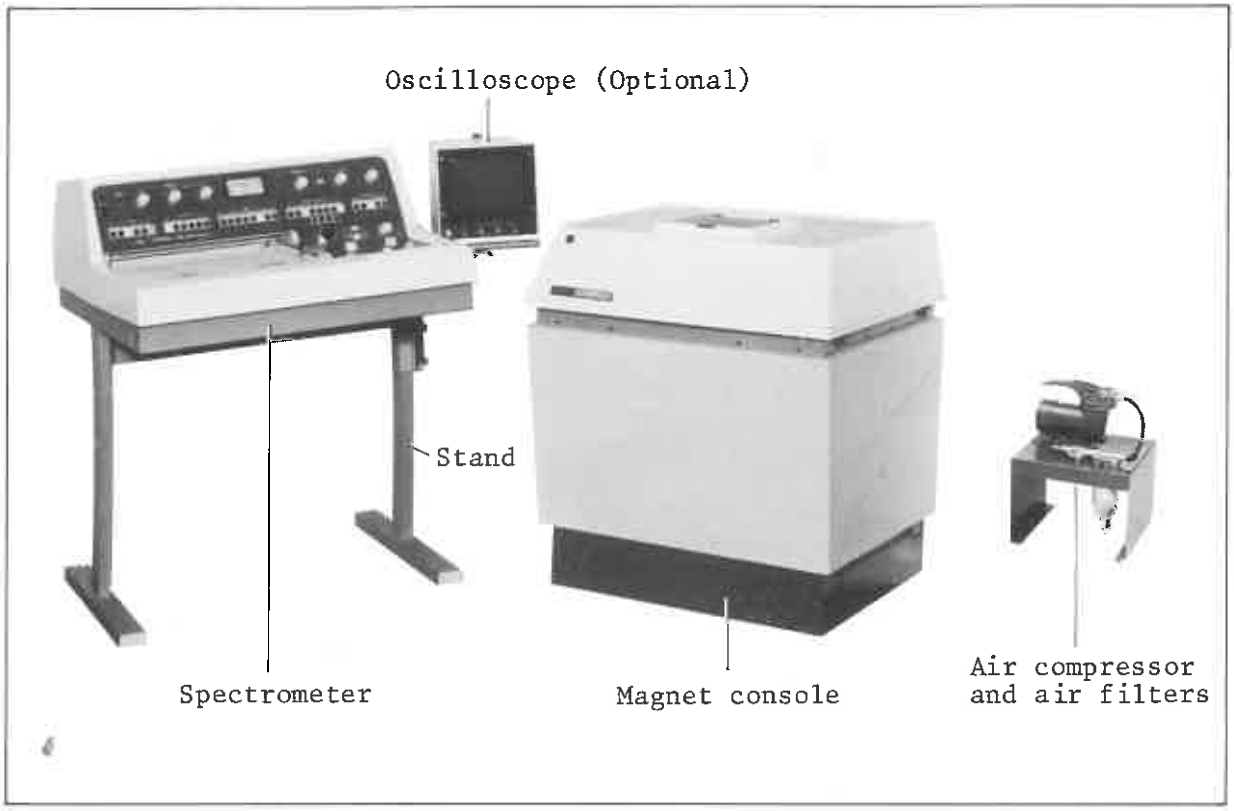



Fig. 1-2 Standard layout

| Item | Pcs. |
|---|---|
| 1. Spectrometer (Inc. stand) | 1 |
| 2. Magnet console | 1 |
| 3. Air compressor with 3 filters | 1 |
| 4. Cables/hoses | 1 set |
| 5. Accessories (May be changed without notice.) | |
| ① Chart paper (Standard) | 100 sheets |
| (White paper) | 100 sheets |
| ② Sample tubes | 10 |
| ③ Sample tube plugs | 10 |
| ④ Standard sample (5% mixed sample) | 1 |

| | | |
|---|---|---|
| ⑤ | Probe cleaning rods (For bobbin and for stator) | 1 each |
| ⑥ | Tools | 1 set |
| ⑦ | Recorder accessories | 1 set |
| ⑧ | Air filters (5 μ, 10 μ, 60 μ) | 1 each |
| ⑨ | Spare parts (fuses, lamps) | 1 set |
| ⑩ | Vinyl cover | 1 |
| ⑪ | Instruction manual | 1 vol. |

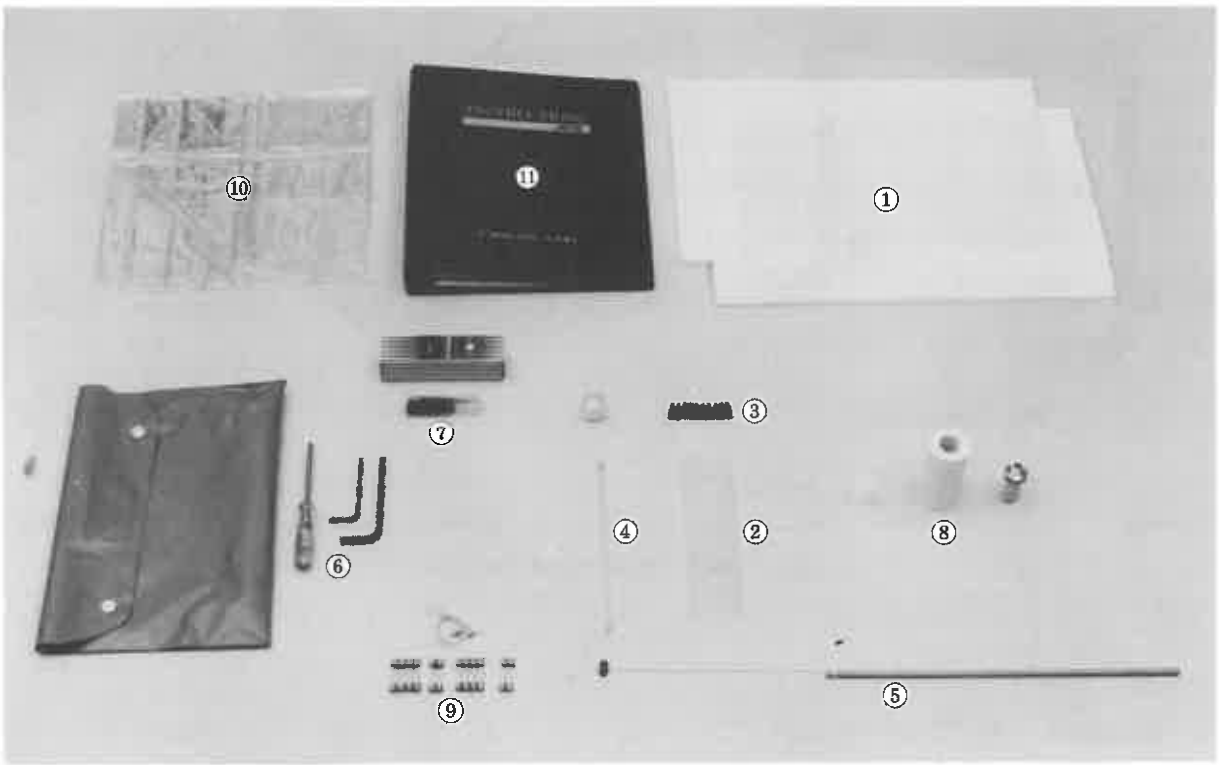



Fig. 1-3 Accessories

## 1.3.2 OPTIONS

1. Oscilloscope

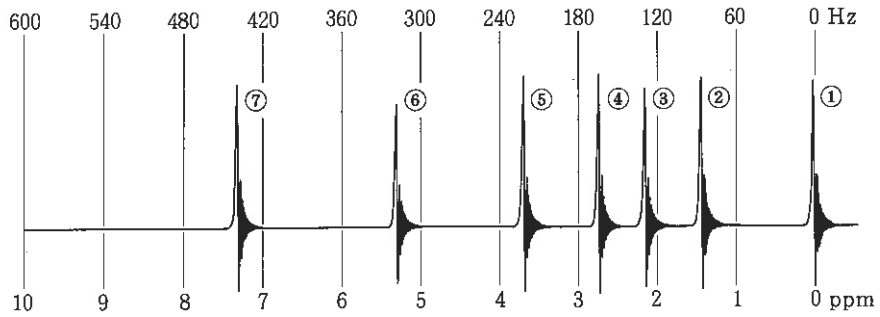
2. Cartridge pen set

# 1.4 STANDARD SAMPLES AND CONSUMABLES

## 1.4.1 STANDARD PMX60SI SAMPLES

| Sample | Color | Application | Escaping gas | Standard signal | Solvent |
|---|---|---|---|---|---|
| Mixed sample* | Sky blue | o General adjustment<br>o Resolution<br>o Sweep width correction | × | TMS | $CDCl_3$ |

* Spectrum of mixed sample




| Corresponding signal No. (See above) | Sample | Position where signal appears (Hz) ppm |
|---|---|---|
| ① | TMS | 0 |
| ② | Cyclohexane | 85.6 1,43 |
| ③ | Acetone | 129 2,15 |
| ④ | Trichloroethane | 164 2,73 |
| ⑤ | P-Dioxane | 221 3,68 |
| ⑥ | Dichloromethane | 318 5,3 |
| ⑦ | Chloroform | 439 7,32 |

## 1.4.2 SPECIAL ORDER CONSUMABLES AND STANDARD SAMPLES

Method of ordering: Always indicate part No. and nomenclature.

• Consumable Items

| Item | Standard designation | Part No. |
|---|---|---|
| Chart paper | PMX60SI | 421000368 |
| Recorder pen | HP disposable type<br>Red: No. 5081-1190<br>Blue: No. 5081-1191 | |
| Sample tube | 5 mmϕ | 422000400 |
| Spin rotor | PMX60SI | |
| Recorder pen | K & E cartridge pen | |
| Recorder ink for cartridge pen | Black | |

• Standard Samples

| Sample | Color | Application | Escaping gas | Standard signal | Solvent | Part No. |
|---|---|---|---|---|---|---|
| 90% ethylbenzene | | Ordinary adjustment | ○ | TMS | $CDCl_3$ | 427000467 |
| 5% ethylbenzene | | Ordinary adjustment, resolution, integration | ○ | TMS | $CDCl_3$ | 427000521 |
| 1% ethylbenzene | | Sensitivity | | TMS | $CDCl_3$ | 427000491 |
| 90% crotonaldehyde | | Spin decoupling | ○ | TMS | $CDCl_3$ | 427000548 |
| 20% acetoaldehyde | | Resolution | ○ | TMS | $CDCl_3$ | 427000572 |
| 95% chloroform | | Spinning sidebands | ○ | TMS | $CDCl_3$ | 427000653 |

# 1.5 CONNECTING UP OSCILLOSCOPE (OPTIONAL)

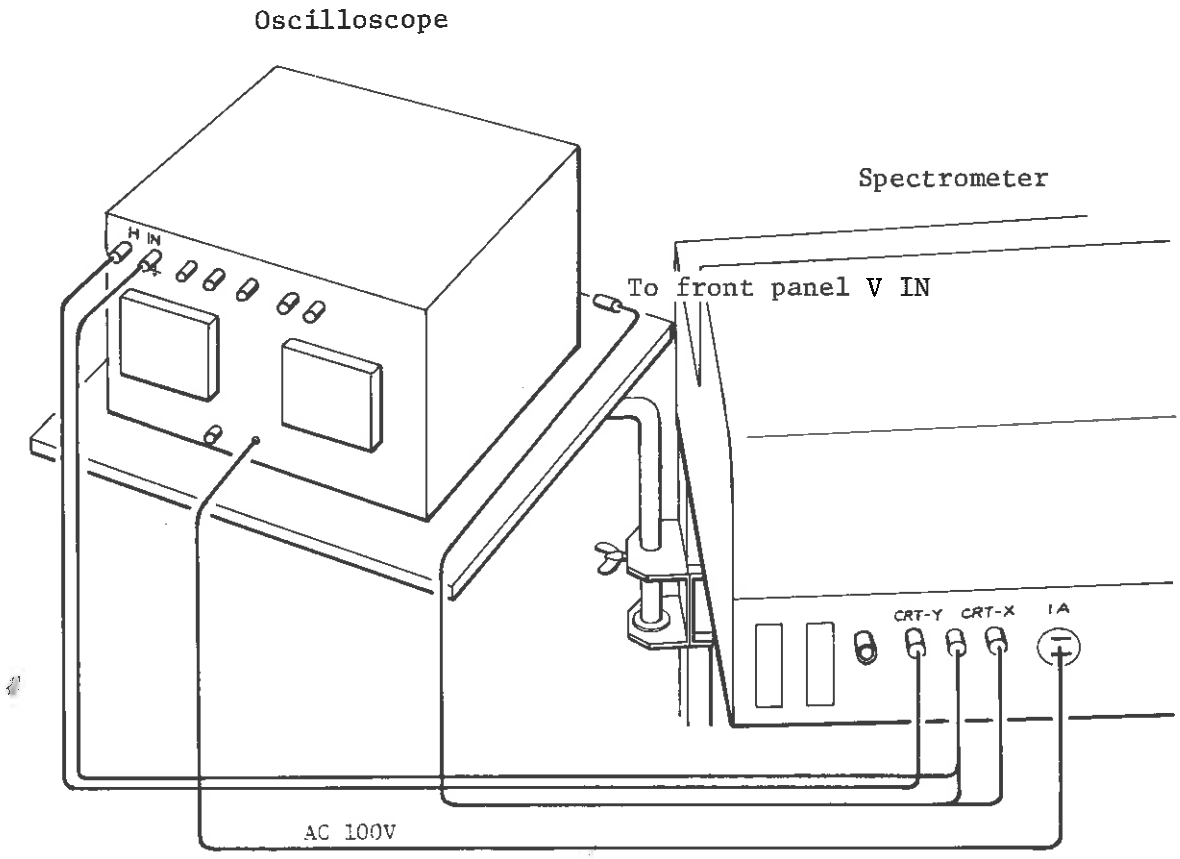



Fig. 1-4

Pr. No. 15084

JEOL

# CERTIFICATION

**Instrument:** HIGH RESOLUTION NMR SPECTROMETER

**Model:** JNM - PMX 60 Si

**Serial No.:** NM 105206-619

*This is to certify that the subject instrument has passed the final performance inspection at our factory.*

Date of Inspection: 20.JUL.1987

Inspected by: M. IWASA

Approved by: K. OHTAKA

JEOL LTD. Synthesis 日本電子

*Manager* K.OHTAKA

**Inspection Department** Final Test **Division**

**JEOL LTD./日本電子**

**Tokyo, Japan**

Y-5415α
62.2

# CERTIFICAT D'INSTALLATION

DE JEOL LTD
New Tokyo Bldg.
3-2, Marunouchi, Chiyoda-ku, Tokyo, JAPAN

Installation et réglage de l'appareil : NMR SPECTROMETER

Modèle : JNM-PMX 60Si N° d'Identification : NM10S206-619

A compléter et signer par l'utilisateur.

Date : 29 septembre 1987

Signature :

Nom : LE GUILLANTON

Qualité : Directeur de Recherche au CNRS

Organisation : CNRS / UCO

Adresse : BP 808
(N° Rue)

49005 ANGERS Cedex
(Département Ville)

Téléphone : 41 88 33 12 Poste : 450

Telex :

Signature de l'Ingénieur JEOL :

H. Ogawara

La signature de ce certificat signifie le début de la période de garantie de l'appareil de base et des accessoires y figurant

| Accessoires | N° | Accessoires | N° |
|---|---|---|---|
| | | | |
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