

OPERATION MANUAL

JITTER METER

**KJM6135A**

First Edition

KIKUSUI ELECTRONICS CORPORATION  
(KIKUSUI PART NO. Z1-000-492)

M-93122

# Power Requirements of this Product

Power requirements of this product have been changed and the relevant sections of the Operation Manual should be revised accordingly.

(Revision should be applied to items indicated by a check mark )

Input voltage

The input voltage of this product is \_\_\_\_\_ VAC,  
and the voltage range is \_\_\_\_\_ to \_\_\_\_\_ VAC. Use the product within this range only.

Input fuse

The rating of this product's input fuse is \_\_\_\_\_ A, \_\_\_\_\_ VAC, and \_\_\_\_\_.

### WARNING

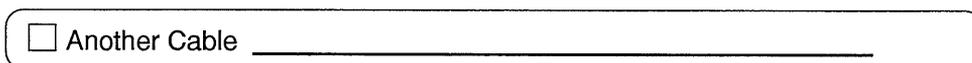
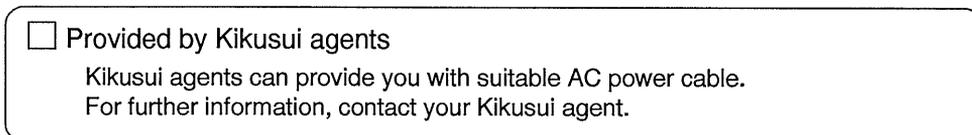
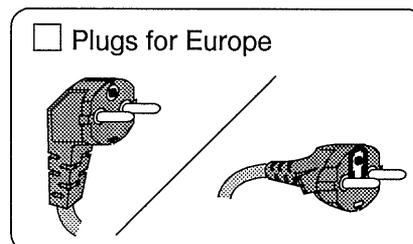
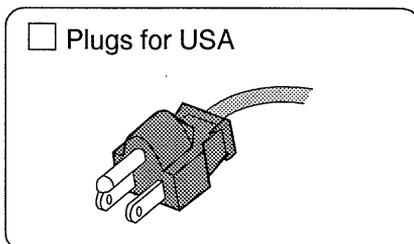
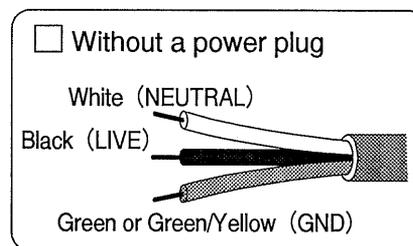
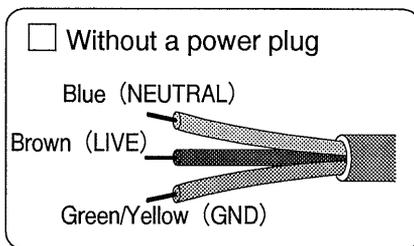
- To avoid electrical shock, always disconnect the AC power cable or turn off the switch on the switchboard before attempting to check or replace the fuse.
- Use a fuse element having a shape, rating, and characteristics suitable for this product. The use of a fuse with a different rating or one that short circuits the fuse holder may result in fire, electric shock, or irreparable damage.

AC power cable

The product is provided with AC power cables described below. If the cable has no power plug, attach a power plug or crimp-style terminals to the cable in accordance with the wire colors specified in the drawing.

### WARNING

- The attachment of a power plug or crimp-style terminals must be carried out by qualified personnel.



# CONTENTS

	Page
1. INTRODUCTION .....	1
1.1 General Description .....	1
1.2 Features .....	2
2. SPECIFICATIONS .....	3
3. PREPARATION FOR USE .....	5
3.1 Unpacking and Inspection .....	5
3.2 Line Voltage and Fuse Selection .....	5
3.3 Surrounding Temperature/Humidity, Warm-up Time, and Installation Place .....	5
4. OPERATION .....	6
4.1 Front Panel Features .....	6
4.2 Rear Panel Features .....	8
4.3 Initial Operation .....	9
4.4 Jitter Measurement .....	9

## 1. INTRODUCTION

### 1.1 General Description

The KJM6135A is a jitter meter for the signal (EFM\* signal) output from the optical pickup mainly used for a compact disc (CD) player.

This instrument adopts a newly developed delayed sampling method.

In this method, a zone (window) which is n times as long as one channel bit of EFM signal (n=integer) is provided, the zero-cross points in that window are sampled in the direction of time axis, and the sampled values are output as voltage. Compared with the conventional method of observing the jitter of waveforms by an oscilloscope, this method does not present the problem of difference among operators in the result of the quantitative measurement because the result is expressed in numeric data.

The jitter, to be evaluated in the unit of rms, is not only indicated by a meter but also displayed in digital mode.

The KJM6135A can be effectively used for the production and inspection of CD players.

\* EFM = Eight to Fourteen Modulation

## 1.2 Features

- (1) The newly developed delayed sampling method is used, and the result of measurement in this method is well correlated with the result of measurement in the conventional method (by oscilloscope).
- (2) An overall measurement can be done irrespective of the pulse width (3T to 11T).
- (3) Compared with the measurement by an oscilloscope, the quantitative measurement by the KJM6135A does not present the problem of difference among operators because the result of measurement is not only indicated by a meter but also displayed in digital mode.
- (4) Unlike the counter method, the analog detection method adopted by the KJM6135A does not create quantization errors, and jitter can be measured in realtime mode.
- (5) By the use of a monitor terminal, the input signal or jitter components can be observed.
- (6) By using the jitter output terminal on the rear panel, the changes of sampled jitter can be observed.
- (7) The instrument is small, light, and portable.

## 2. SPECIFICATIONS

### o Input

Input signal : EFM signal (Clock = 4.3218MHz)  
Input level : 1Vp-p to 5Vp-p  
Input impedance : 50 $\Omega$  or 100k $\Omega$  unbalanced, selected by switch  
Input terminal : BNC connector

### o Jitter measurement

Range of measurement: 20ns rms, full scale  
Resolution : 0.1ns rms  
Accuracy :  $\pm 0.3$ ns for 10ns at the jitter modulation frequency of 1kHz  
rms conversion time : 0.1 s or 1 s, selected by switch constant  
Window : Three points (21T, 22T, 23T), with center indicator  
Residual jitter :  $\leq 1$ ns rms

### o Monitor Output

Output signal : Input signal waveform or jitter detect waveform  
Output level : Approx. 0.1V/ns rms in JITT mode Same as the input level in RF IN mode  
Output impedance : 600 $\Omega$  unbalanced  
Output terminal : BNC connector

o Jitter output

Output signal : Jitter change waveform

Output level : 0.1V/ns rms (Typical)

Output impedance : 50Ω

Output terminal : BNC

o Power source

Applicable voltage : ±10% of 100V, 115V, 215V, or 230V (250V max.)  
range (selected by switch on rear panel)

Frequency : 50Hz/60Hz

Power dissipation : 13VA approx.

o Structure

External dimensions : 200W x 80H x 300D mm (body)  
(7.84W x 3.15H x 11.81D in.)

215W x 90H x 330D mm (maximum)  
(8.46W x 3.54H x 12.99D in.)

Weight : 2kg (4.4 lbs) approx.

o Environmental conditions (Temperature and humidity)

Range to guarantee : 5-35°C (41-95°F), 85% or less  
specifications

Operable range : 0-40°C (32-104°F), 90% or less

o Accessories

Power supply cord : 1

Operation manual : 1

Fuse 1.0A : 1

Fuse 0.5A : 1

### 3. PREPARATION FOR USE

#### 3.1 Unpacking and Inspection

Before being shipped from the factory, the KJM6135A goes through mechanical and electrical examinations and inspections, and its correct operation is confirmed and guaranteed.

On receiving the instruments, inspect it for any damage that may have been caused during transportation. Should a damage be found, notify the Sales Office immediately.

#### 3.2 Line Voltage and Fuse Selection

Select a voltage range from the table below by the voltage selection plug on the rear panel of KJM6135A, and the instrument can be used in the selected voltage range.

Before connecting the power supply cord to the instrument, verify that the voltage selection is matched to the power source. When the voltage range is changed, change the fuse also according to the table below.

Application of a voltage beyond the selected range will cause in complete operation or failure.

Setting Position	Center Voltage	Line Voltage Range	Fuse
A	100V	90 - 110V	1.0A
B	115V	104 - 125V	
C	215V	194 - 236V	0.5A
D	230V	207 - 250V	

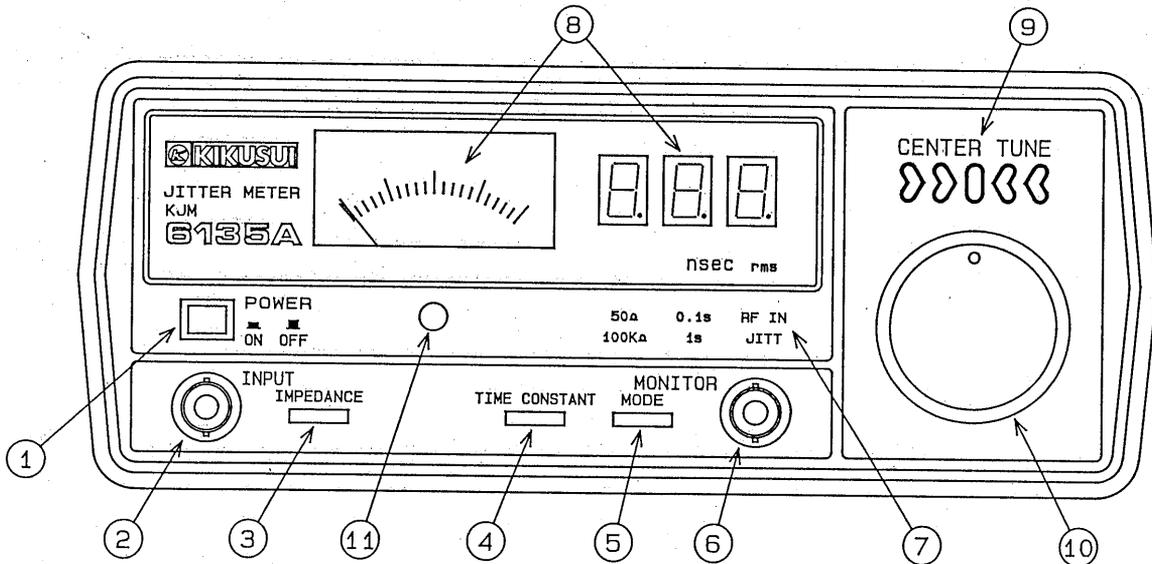
#### 3.3 Surrounding Temperature/Humidity, Warm-up Time, and Installation Place

The KJM6135A operates correctly in temperatures from 0°C to 40°C. If the instrument is used or placed under high temperature and humidity for a long time, failures will occur and the life of the instrument will be shortened.

The instrument requires the warm-up time of 30 minutes. Do not use the instrument near a strong magnetic field or electromagnetic waves.

## 4. OPERATION

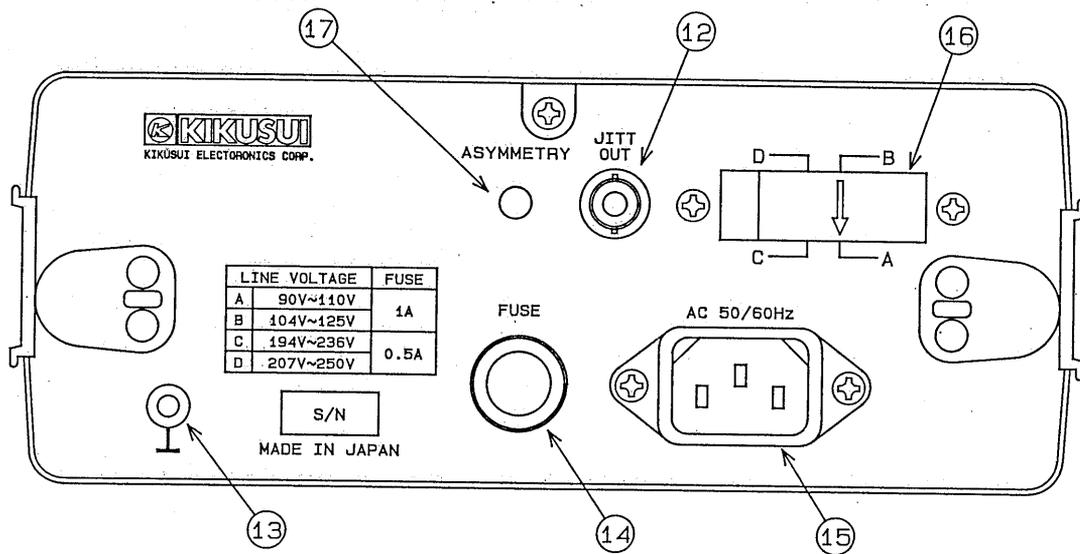
### 4.1 Front Panel Features



- ① **POWER** switch : Powers on/off the instrument.
- ② **INPUT (BNC) terminal**: EFM modulated signal input terminal
- ③ **IMPEDANCE** switch : Selects 50Ω or 100kΩ as the input impedance.
- ④ **TIME CONSTANT** : Selects 0.1s or 1s as the time constant switch to be used for expressing jitter value in rms.
- ⑤ **MODE** switch : Selects the signal output mode for MONITOR terminal. In the RF IN mode, the signal applied to INPUT terminal is monitored, and in the JITT mode, the jitter signal converted into rms is monitored.
- ⑥ **MONITOR (BNC) terminal**: Monitor output terminal. Outputs the signal terminal selected by ⑤.
- ⑦ Indicates the items selected by switches ③, ④, and ⑤.

- ⑧ Analog meter and digital display for indicating jitter value
  
- ⑨ CENTER TUNE : Window center indicator. Use the instrument indicator when green lamp is on in this indicator.
  
- ⑩ CENTER TUNE : Window center adjustment dial. The jitter dial can be measured at three points, namely, 21T, 22T, and 23T. Turn the dial clockwise or counterclockwise and use the instrument when the green lamp is turned on (center = 22T).
  
- ⑪ Mechanical zero-set adjuster for meter

## 4.2 Rear Panel Features



- ⑫ Jitter change output terminal :  
Output of the jitter sampled before the rms conversion
- ⑬ Earth terminal :  
Earth terminal for the instrument
- ⑭ FUSE :  
Fuse for AC line voltage. The fuse must be replaced according to the AC line voltage.
- ⑮ AC connector :  
AC power inlet
- ⑯ VOLTAGE SELECTOR :  
AC line voltage selector. Set the plug so that the arrow on the plug points to the line voltage to be applied.
- ⑰ ASYMMETRY adjuster:  
Turn this adjuster till the jitter value displayed on front panel becomes minimum.

### 4.3 Initial Operation

- (1) Confirm that the indicator of the meter points to the mechanical zero. If it does not point to the mechanical zero, adjust it by the zero-set adjuster ⑪.
- (2) Connect the power supply cord to the power source of the correct line voltage, and press the POWER switch ①.

The keys on front panel are set as follows:

Input impedance = 100k $\Omega$   
rms conversion time constant = 1s  
Output mode = Jitter mode

### 4.4 Jitter Measurement

- (1) Apply an EFM signal to the INPUT terminal ② on the front panel.
- (2) Set the input impedance to the desired value (100k $\Omega$  or 50 $\Omega$ ) by the IMPEDANCE switch ③.

*Note: When the input impedance is set to 100k $\Omega$ , the parallel capacitance of approximately 30pF is added. Since the energy spectrum of the EFM signal is distributed over a wide range, use a low capacitance cable as the input connection cable so that the frequency characteristic may not be deteriorated.*

- (3) Turn the CENTER TUNE dial ⑩ till the green lamp is turned on in the CENTER TUNE indicator ⑨.

*Note: The green lamp is turned on at the three points of 21T, 22T, and 23T. Turn the CENTER TUNE dial ⑩ counter-clockwise up to the maximum and turn it clockwise gradually; then, the green lamp is turned on at the point of 21T. It is turned on at the points of 22T and 23T in this order as the dial is turned further. The point of 22T is obtained around the center of the dial, and normally, the instrument is used in this standard state.*

- (4) Turn ASYMMETRY adjuster ⑩ for asymmetry adjustment on the rear panel till the jitter value displayed on the front panel becomes minimum.

*Note: The asymmetry is adjusted on the basis of our standard disc before the instrument is shipped from our factory. Theoretically, the correct jitter value cannot be obtained if the asymmetry is not adjusted.*

- (5) If a great change is observed in the displayed numeric value momentarily, select 1 s by the TIME CONSTANT switch ④.
- (6) If necessary, connect an oscilloscope to the MONITOR terminal to observe the input waveform (RF IN) or detected value (JITT). The switching between RF IN and JITT can be done by the MODE switch ⑤.
- (7) After the above operations, the EFM signal jitter amount is indicated in the meter and seven-segment display ⑧.