

DATE: FEB., 15, 2000

SPECIFICATION
OF
THERMOPILE
INFRARED SENSOR

MODEL NO. TS-1NMB

PART NO. _____

THERMOPILE INFRARED SENSOR

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SCOPE

THIS SPECIFICATION DESCRIBES A THERMOPILE INFRARED SENSOR SUPPLIED BY NIPPON CERAMIC CO., LTD.

TYPE OF SENSOR

SINGLE ELEMENT TYPE.

PHYSICAL CONFIGURATION

- 1) PACKAGE : TO-18 METAL CAN WITH DIMENSIONS SHOWN IN FIGURE 1-C (GOLD-PLATED)
- 2) ELEMENT GEOMETRY : SENSITIVE AREA 0.5 mm²
- 3) ELEMENT ORIENTATION : SEE FIGURE 1-B
- 4) LEAD CONFIGURATION : SEE FIGURE 1-C, 1-D

ELECTRICAL CHARACTERISTICS (AT 25 ± 5 °C)

- 1) CIRCUIT CONFIGURATION : FOUR-TERMINAL SENSOR
SEE FIGURE 2
- 2) SIGNAL OUTPUT : 200 mVo-p ± 30%

SIGNAL OUTPUT IS MEASURED BY USING SHUTTER WHEN CONNECTED TO THE AMPLIFIER OF GAIN 74 dB (AT 1 Hz) AND SUBMITTED TO THE EMISSION OF INFRARED ENERGY OF 167 μW/cm² FROM 700K BLACK BODY.
SEE FIGURE 3

- 3) RESISTANCE OF THERMOPILE (Pin 1 ~ Pin 2)
: 50KΩ ± 15 KΩ (at 25° C)
- 4) REFERENCE RESISTOR (Pin 3 ~ Pin 4)
: 100KΩ ± 10% (at 25° C)

OPTICAL CHARACTERISTICS

- 1) FIELD OF VIEW : 113° FROM CENTER OF SENSITIVE ELEMENT
: SEE FIGURE 1-A
- 2) FILTER SUBSTRATE : SILICON

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- 3) CUT ON (5% TABS) : $5.0 \pm 0.5 \mu\text{m}$
- 4) TRANSMISSION : $\geq 70\%$ AVERAGE $7.0 \sim 14 \mu\text{m}$

ENVIRONMENTAL REQUIREMENTS

- 1) OPERATING TEMPERATURE : $-20\text{ }^\circ\text{C}$ TO $+50\text{ }^\circ\text{C}$
- 2) STORAGE TEMPERATURE : $-30\text{ }^\circ\text{C}$ TO $+70\text{ }^\circ\text{C}$
- 3) RELATIVE HUMIDITY :
 THE SENSOR SHALL OPERATE WITHOUT INCREASE IN NOISE OUTPUT WHEN EXPOSED TO
 $90 \sim 95\%$ RH AT $30\text{ }^\circ\text{C}$ CONTINUOUSLY.

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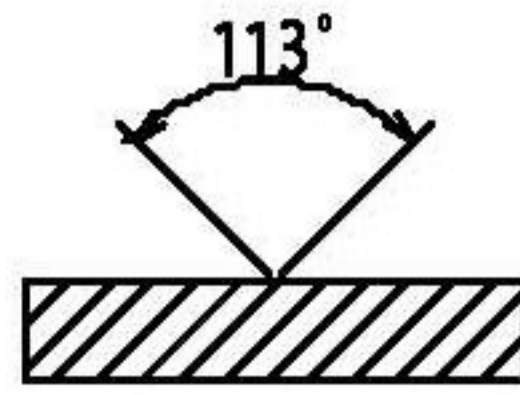
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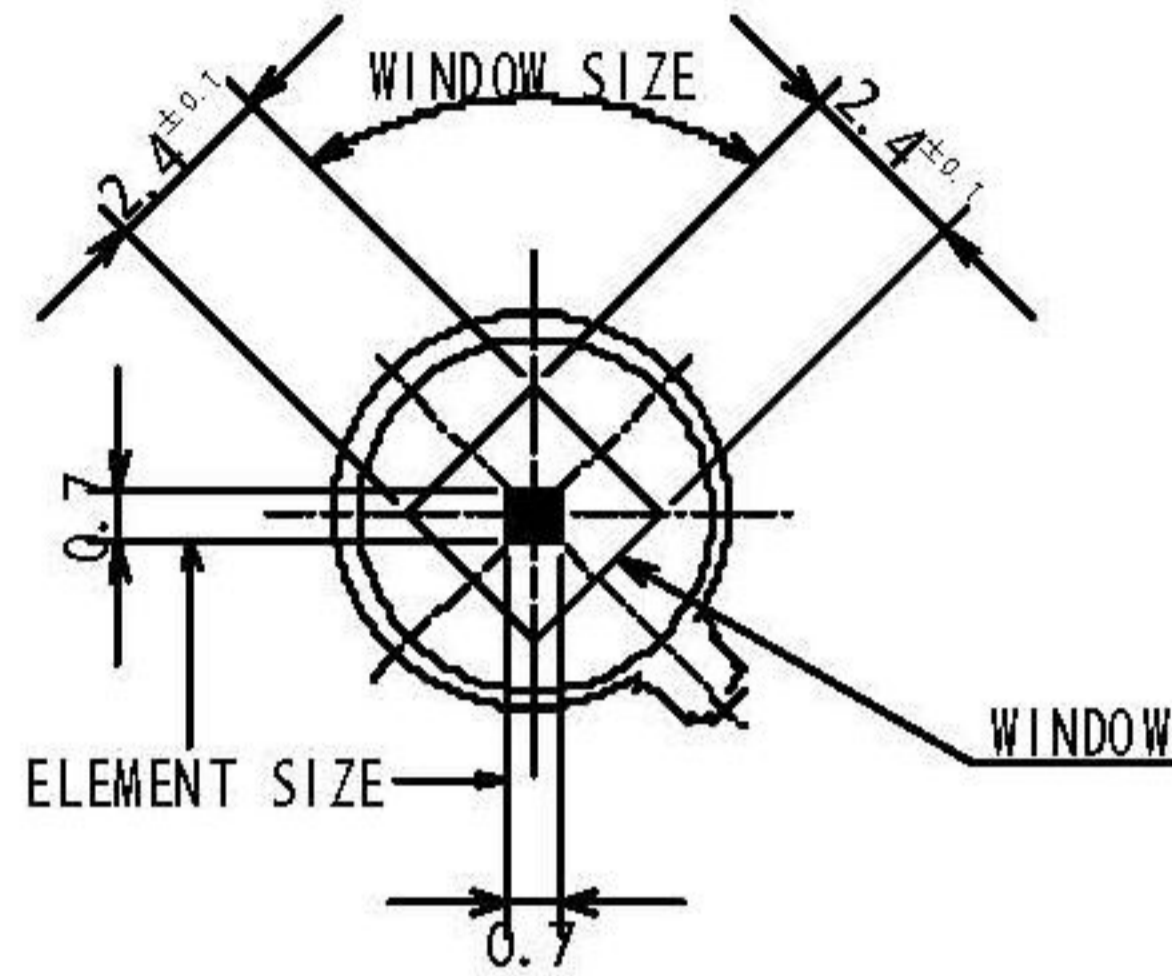
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CONFIGURATION (FIGURE 1)

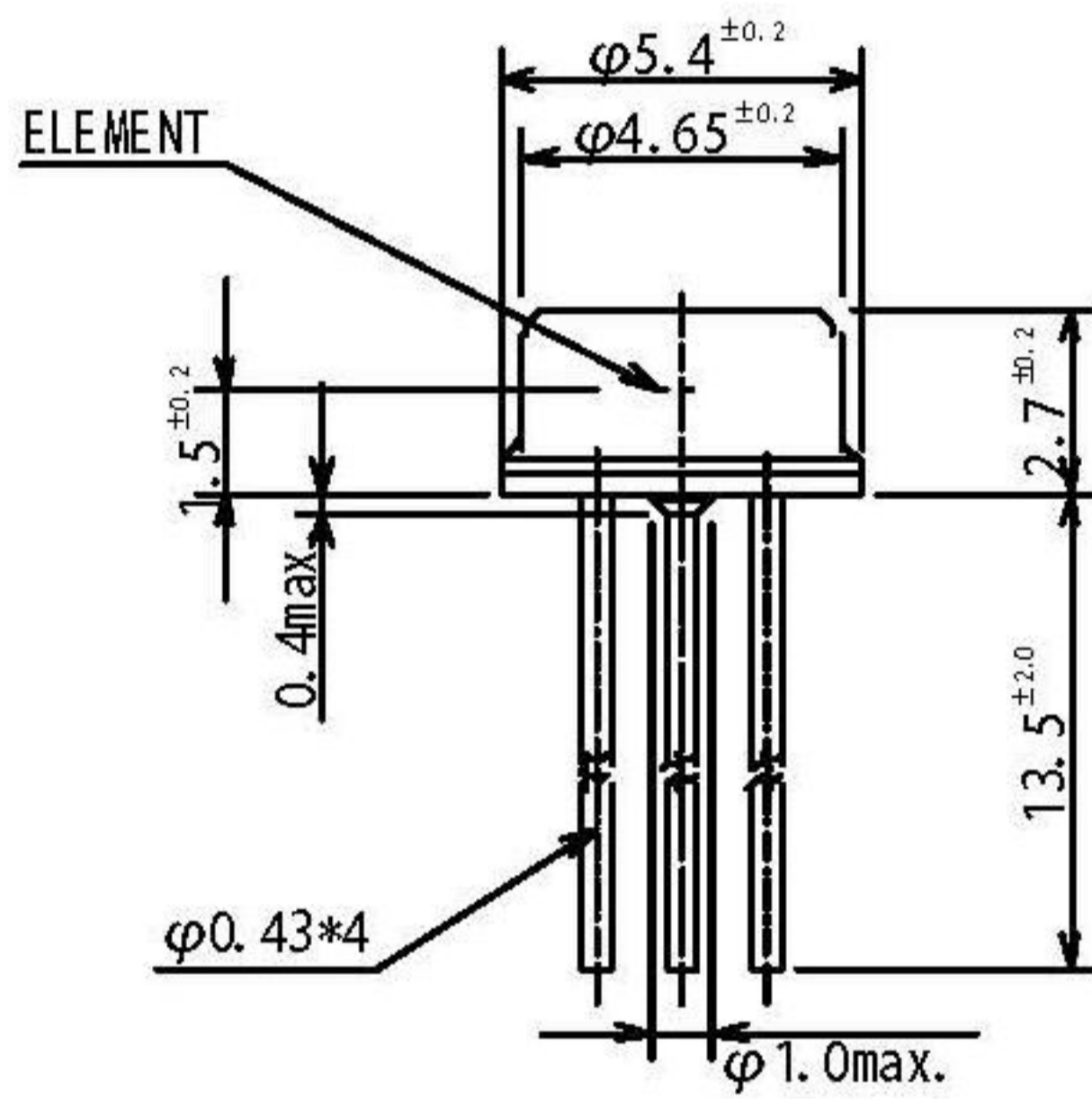
FIELD OF VIEW
(FIGURE 1-A)



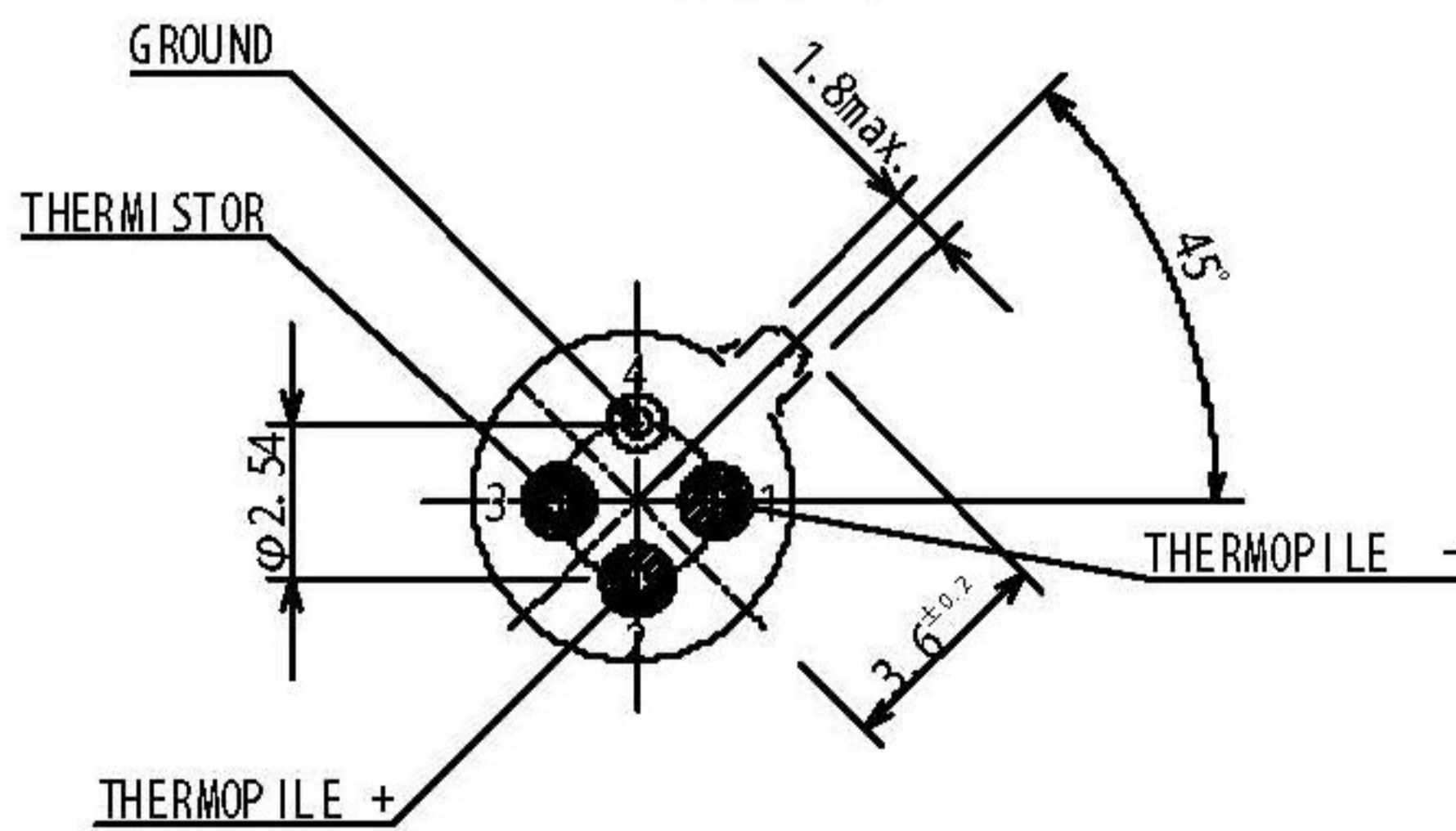
TOP VIEW
(FIGURE 1-B)



SIDE VIEW
(FIGURE 1-C)



BASE VIEW
(FIGURE 1-D)



- 1: THERMOPILE -
- 2: THERMOPILE +
- 3: THERMISTOR
- 4: GROUND

UNIT : mm

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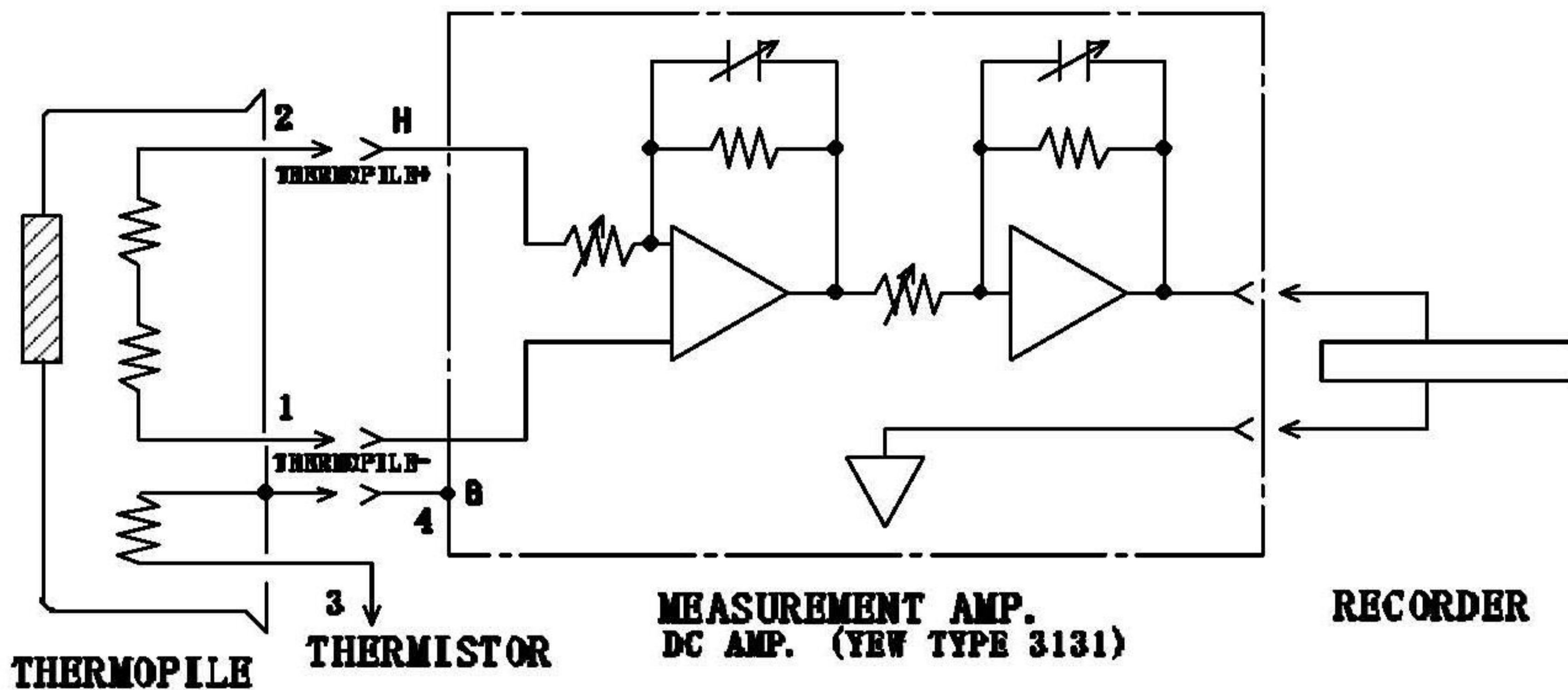
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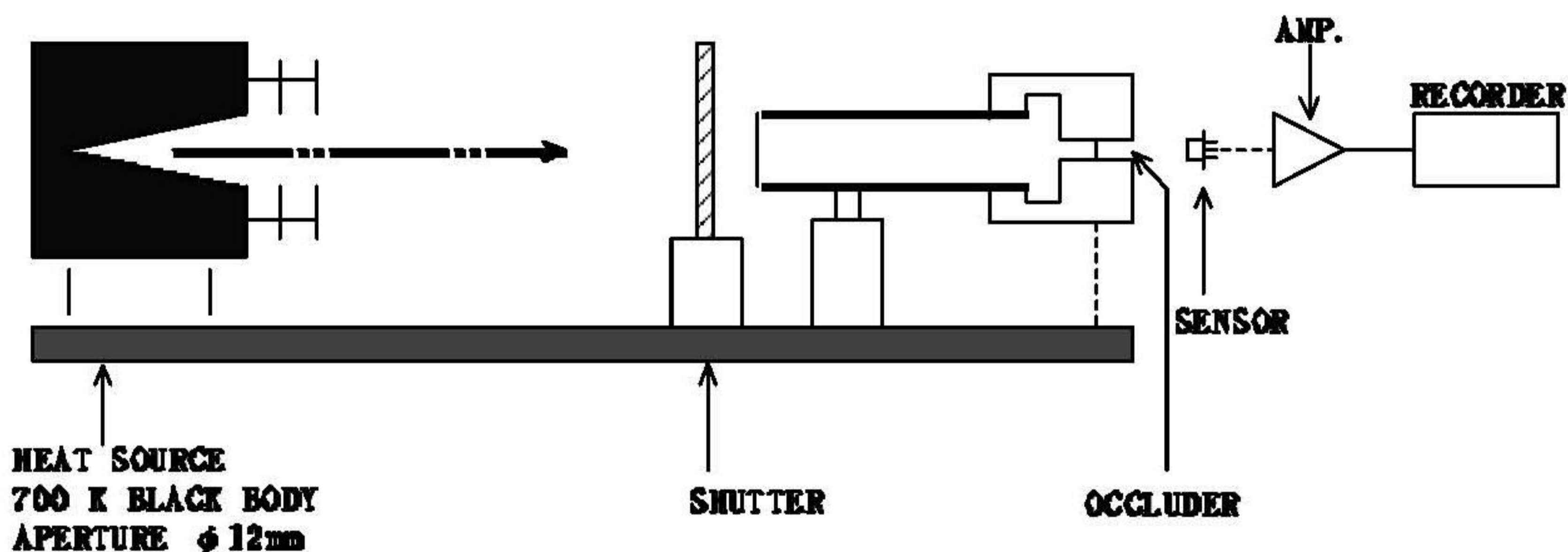
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CIRCUIT CONFIGURATION (FIGURE 2)

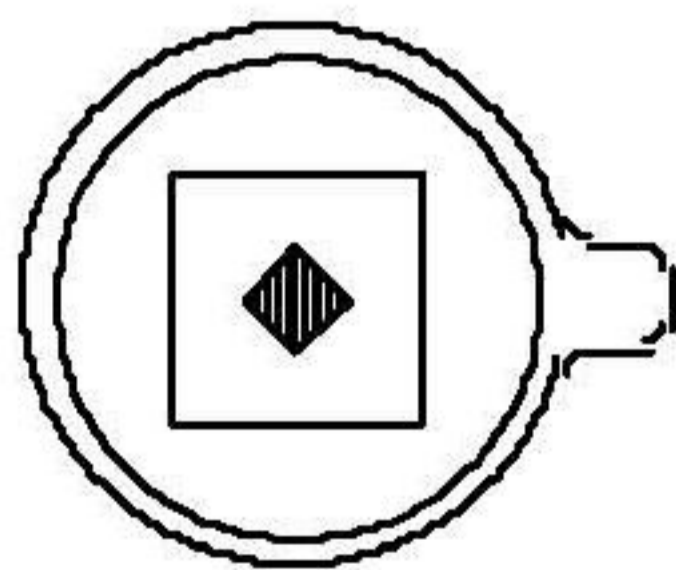


※ MEASUREMENT AMP.: DC AMP. YEW TYPE 3131, GAIN 74 dB AT 1 Hz.

TEST SET-UP BLOCK DIAGRAM (FIGURE 3)



OCCLUDER POSITION



SIGNAL OUTPUT

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※ NOTES1. DESIGN RESTRICTIONS/PRECAUTIONS

FOR OUTDOOR APPLICATIONS, BE SURE TO APPLY SUITABLE SUPPLEMENTARY OPTICAL FILTER AND DRIP-PROOF, ANTI-DEW CONSTRUCTION. THIS SENSOR IS DESIGNED FOR INDOOR USE. IN CASES WHERE SECONDARY ACCIDENTS DUE TO OPERATION FAILURE OR MALFUNCTIONS CAN BE ANTICIPATED, ADD A FAIL SAFE FUNCTION TO THE DESIGN.

2. USAGE RESTRICTIONS/PRECAUTIONS

TO PREVENT SENSOR MALFUNCTIONS, OPERATIONAL FAILURE OR ANY DETERIORATION OF ITS CHARACTERISTICS, DO NOT USE THIS SENSOR IN THE FOLLOWING, OR SIMILAR, CONDITIONS.

- A. IN RAPID ENVIRONMENTAL TEMPERATURE CHANGES.
- B. IN STRONG SHOCK OR VIBRATION.
- C. IN A PLACE WHERE THERE ARE OBSTRUCTING MATERIALS (GLASS, FOG, ETC.) THROUGH WHICH INFRARED RAYS CANNOT PASS WITHIN DETECTION AREA.
- D. IN FLUID, CORROSIVE GASES AND SEA BREEZE.
- E. CONTINUAL USE IN HIGH HUMIDITY ATMOSPHERE.
- F. IN FIELD OF STATIC ELECTRICITY OR STRONG ELECTROMAGNETIC WAVES.
- G. EXPOSED TO DIRECT WIND FROM A HEATER OR AIR CONDITIONER.

3. ASSEMBLY RESTRICTIONS/PRECAUTIONS

SOLDERING -----

- A. USE SOLDERING IRONS WHEN SOLDERING.
- B. AVOID KEEPING PINS OF THIS SENSOR HOT FOR A LONG TIME AS EXCESSIVE HEAT MAY CAUSE DETERIORATION OF ITS QUALITY. (E.G. WITHIN 10 SEC. AT 260 °C)

WASHING -----

- A. BE SURE TO WASH OUT ALL FLUX AFTER SOLDERING AS REMAINDER MAY CAUSE MALFUNCTIONS.
- B. USE A BRUSH WHEN WASHING. WASHING WITH AN ULTRASONIC CLEANER MAY CAUSE OPERATIONAL FAILURE.

4. HANDLING AND STORAGE RESTRICTIONS/PRECAUTIONS

TO PREVENT SENSOR MALFUNCTIONS, OPERATIONAL FAILURE, APPEARANCE DAMAGE OR ANY DETERIORATION OF ITS CHARACTERISTICS, DO NOT EXPOSE THIS SENSOR TO THE FOLLOWING OR SIMILAR, HANDLING AND STORAGE CONDITIONS.

- A. VIBRATION FOR A LONG TIME.
- B. STRONG SHOCK.
- C. STATIC ELECTRICITY OR STRONG ELECTROMAGNETIC WAVES.
- D. HIGH & LOW TEMPERATURE AND HUMIDITY FOR A LONG TIME.
- E. CORROSIVE GASES OR SEA BREEZE.
- F. DIRTY AND DUSTY ENVIRONMENTS THAT MAY CONTAMINATE THE OPTICAL WINDOW.

SENSOR TROUBLES RESULTING FROM MISUSE, INAPPROPRIATE HANDLING OR STORAGE ARE NOT THE MANUFACTURER'S RESPONSIBILITY.

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