

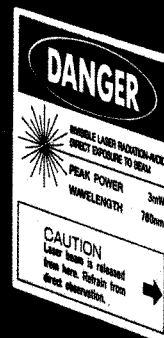
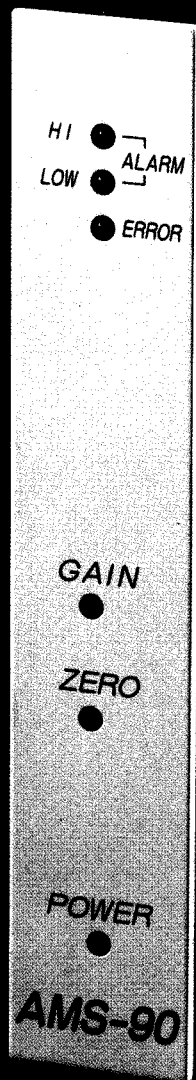
LASER DISPLACEMENT SENSORS

AMS series

Model

●AMS-90-A ●AMS-90-B ●AMS-90-AH ●AMS-90-BH

Model AMS-90 is a displacement sensor to output continuously an analog signal corresponding to an amount of displacement of a measuring object by means of a semiconductor laser and PSD (positioning sensor diode). We attained the long measuring distance of 50mm to 130mm and a high-speed response time of 10mS. In addition, we minimized the size of a sensor head and set our sales price attractive. Therefore, it can be used in the wide field of application.



KODEN INDUSTRY CO.,LTD.

AMS

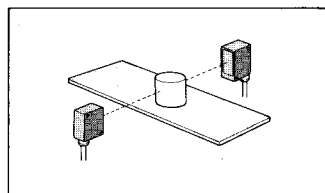
FEATURES

- Owing to its optical measuring method, non-contact measurement of the shape and displacement of the measuring object is possible.
- At measuring distance of 90mm, it has a wide measuring range of ± 40 mm.
- Owing to its high-speed response time of 10mS, a high speed measurement is possible.
- Owing to ample control signal outputs and inputs, such as synchronous output and input to prevent an interference between the sensor heads, a signal input to control the light emission of the laser, etc., it can cope with a wide range of application.
- Miniaturization of the sensor head is attained.
- An economical price is attained.

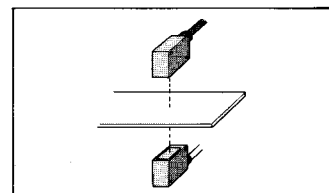
SPECIFICATIONS

Model name	AMS-90-A	AMS-90-B	AMS-90-AH	AMS-90-BH
Measuring method	Optical triangular measuring method			
Measuring distance	90mm \pm 1mm (from the front of the sensor head)			
Measuring range	\pm 40mm			
Resolution	50 μ m (at 100mS), 150 μ m (at 10mS)			
Response time	10mS, 100mS (selectable)			
Linearity	\pm 0.6% of f.s			
Light source	Semiconductor laser diode (780nm, 3mW max.)			
Spot diameter	below 2mm			
Light receiving element	PSD (positioning sensor diode)			
Analog output	\pm 4V (max. +9V, -6V)		0 ~ +8V (max. +9V, 0V)	
Power supply	DC 10V~15V	DC 20V~30V	DC 10V~15V	DC 20V~30V
Current consumption	below 200mA			
Adjustment function	Zero point adjustment (potentiometer) Gain adjustment (potentiometer)			
Control function	Synchronous input and output to prevent an interference (when 2 sensor heads are used) Input to control the light emission of the laser (ON-OFF input) Hi-alarm output (photocoupler open-collector) Low-alarm output (photocoupler open-collector)			
Display unit	HI-ALARM, LOW-ALARM, ERROR, POWER			
Working temperature	0 ~ +50°C			
Working humidity	0 ~ 80% (without dewing)			
Degree of protection	Sensor head unit : IP-64 Amplifier unit : IP-50			
Weight	Sensor head unit : approx 150g (including cable) Amplifier unit : approx 380g			
Cable length	2000mm			

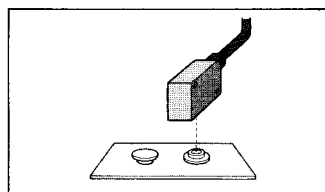
TYPICAL APPLICATIONS



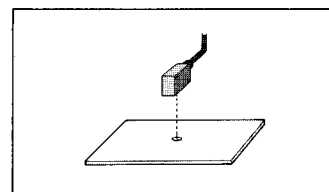
● Measuring outer dimension of the product on conveyor.



● Measuring material thickness.

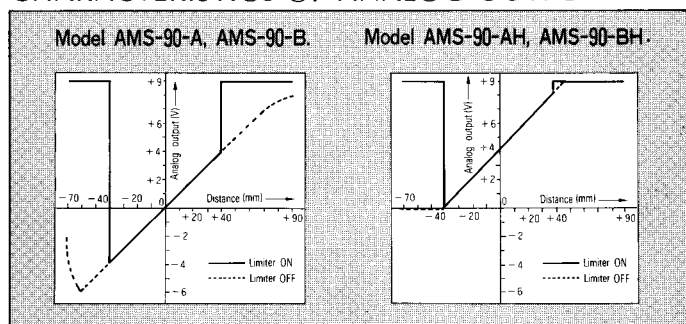


● Detection of obverse or reverse of minute part.

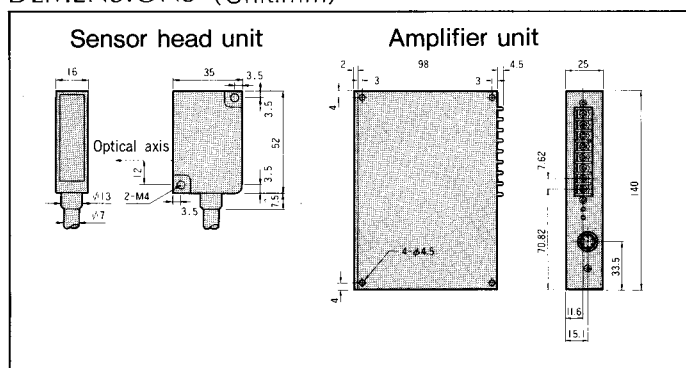


● Check of scar on the surface of product.

CHARACTERISTICS OF ANALOG OUTPUT



DEMENSIONS (Unit:mm)



EXTENSION CABLES (optional)

Model name	Cable length
AMSC-1000	1000mm
AMSC-2000	2000mm
AMSC-3000	3000mm

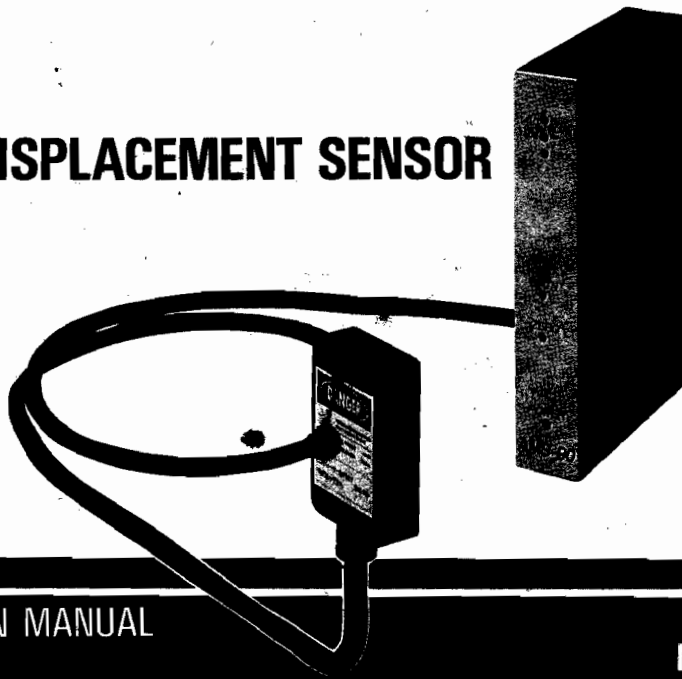
Note:

All dimensions shown in this catalog are in units of millimeters.
To convert millimeters into inches, multiply by 0.03937.
To convert grams into ounces, multiply by 0.03527.
Specifications are subject to change without notice.

KODEN INDUSTRY CO.,LTD.

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TEL.03-3768-5211 FAX.03-3763-9321

LASER DISPLACEMENT SENSOR



Model
AMS-90-A
AMS-90-B
AMS-90-AH
AMS-90-BH

INSTRUCTION MANUAL

KODEN INDUSTRY CO., LTD.

WARNINGS

This sensor uses a semiconductor laser diode as a light source. This laser diode is classified at CLASS 3b regarding safety standards (according to IEC publ. 825). The laser beam of this semiconductor laser diode is such a level that it does not damage the skin. However, it will damage the eye if it enters the eye directly or by a reflex action.

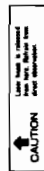
We suggest you to avoid the following cases for your safety.

- ① Visual confirmation or setting method by which laser beam enters the eye directly.
- ② Handling or setting method by which laser beam hits the human body.

Warning labels are pasted on the laser beam emitting part of the sensor head to call an attention to those warnings. In addition, another warning label is delivered with the sensor so that the user can paste it on the place near to the sensor head.



Warning label pasted on the sensor head.



Warning label pasted on the laser beam emitting part of the sensor head.



Warning label to be pasted on the place near to the sensor head.

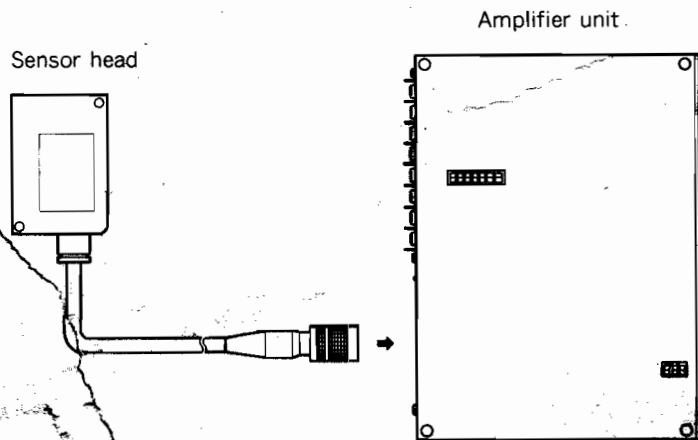
1. CAUTIONS

- ① Prevent the attachment of any water, oil, etc. which interrupt the laser beam onto the front glass of the sensor head. When there are such attachments, measuring error will occur.
- ② Prevent strong disturbing light from entering the light emitting part of the sensor head.
- ③ The sensor head and the amplifier unit are adjusted as a set in our factory and carry the same manufacturing number. Therefore, use the sensor head and the amplifier unit carrying the same manufacturing number as a set.
- ④ Be sure to connect the sensor head and the amplifier unit before turning on the power. Connection after turning on the power will damage the sensor head.

2. CONNECTION OF SENSOR HEAD AND AMPLIFIER UNIT

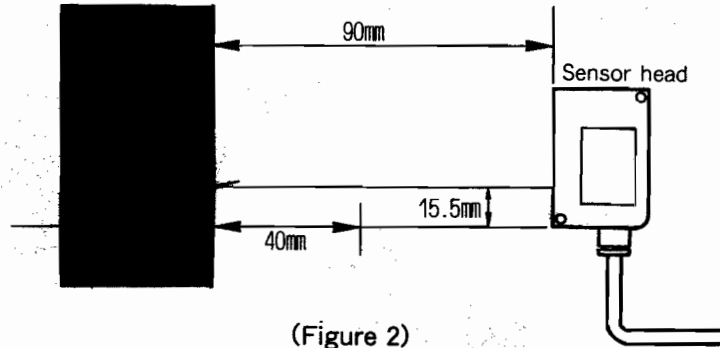
Be sure to connect the sensor head and the amplifier unit with the power supply OFF. In case that connection or disconnection of the sensor head and amplifier unit while the power supply is ON, there is a possibility that the inner electronic circuits of the sensor head will be damaged. Take extra caution.

- Insert the connector (plug) of the sensor head to the J1 connector (receptacle) of the amplifier unit. There is a position in the plug and receptacle that fits together. Rotate the plug while inserting it slightly to the receptacle and after confirming the fitting position, insert the plug firmly to the receptacle.

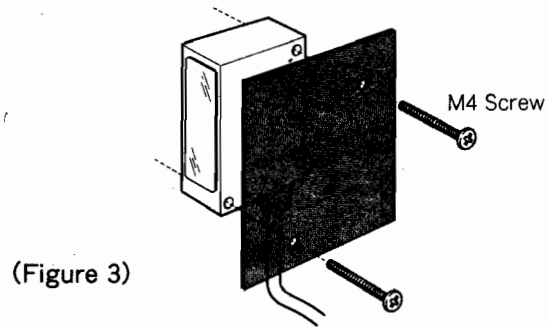


(Figure 1)

3. INSTALLATION OF SENSOR HEAD



Measuring range of the sensor head is as per Fig. 2. Referring to Fig. 3, fix the sensor head using M4 (pitch 0.7mm) fixing holes provided on the sensor head. Fixing torque must be less than 8kgf·cm.

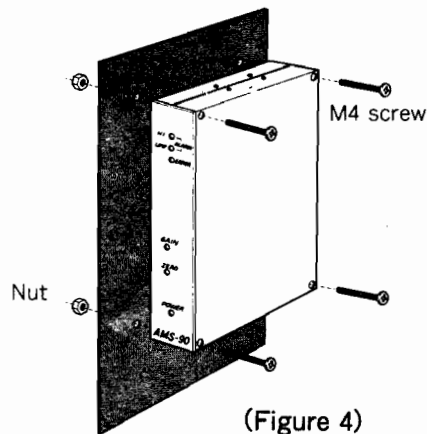


By placing a white paper within the measuring range and darkening the surroundings, the measuring spot can be observed as a weak red light spot (diameter: less than 2mm).

4. INSTALLATION OF AMPLIFIER UNIT

Referring to Fig. 4, fix the amplifier unit using the fixing holes (penetrated holes) provided on the amplifier unit.

Fixing torque must be less than $8\text{kgf}\cdot\text{cm}$.

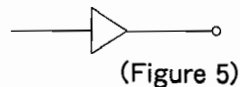


(Figure 4)

5. OUTPUT CIRCUITS

① Analog output (OUT terminal)

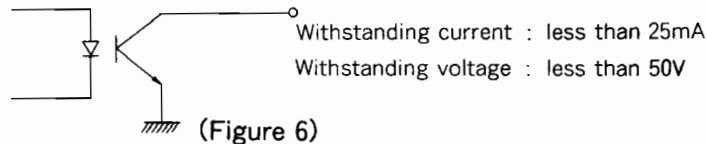
Analog output is a voltage output. Refer to Fig. 5.



Output impedance: 0Ω

② Alarm outputs (H, L terminals)

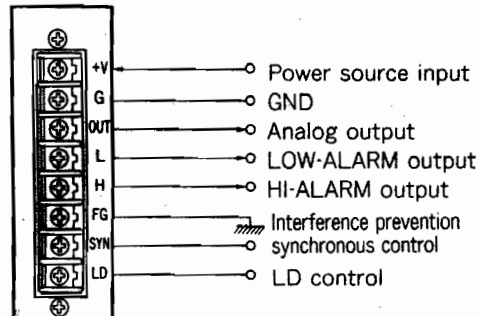
Alarm outputs is a photo coupler NPN open collector output. Refer to Fig. 6.



Alarm outputs are effective even when the limiter setting is OFF.

6. WIRING DIAGRAM

Refer to
Fig. 7.



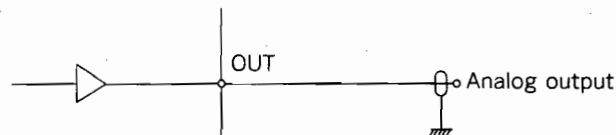
*FG terminal must be connected to the ground.

(Figure 7)

7. WIRING OF INPUT AND OUTPUT CABLES

Do not wire the input and output cables in parallel with a power line or a high-tension line for a long section. Otherwise, it may result in an influence by noise. In such a case, conduct the wiring in accordance with the method for isolated wiring.

- Be sure to use a shielded wire for analog output cable.



(Figure 8)

8. POWER SUPPLY SOURCE

When you use a switching regulator available on the market as a power supply source, be sure to connect Frame Ground (FG) terminal to the ground.

9. ADJUSTMENT

● Zero Adjustment

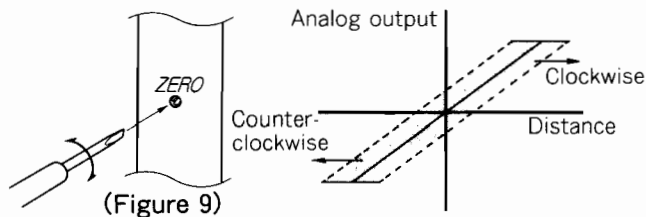
Zero adjustment is to adjust 0V position of the analog output voltage to the distance between the front of the sensor head and a measuring object.

For Zero adjustment, turn the potentiometer for Zero adjustment slowly with a small slotted screwdriver.

Zero adjustment potentiometer is 10-turn potentiometer with ratchet mechanism.

When Zero adjustment potentiometer is turned clockwise, 0V position of the analog output voltage moves to a further distance from the standard measuring distance of 90mm.

When Zero adjustment potentiometer is turned counter-clockwise, 0V position of analog output voltage moves to this side of the standard measuring distance.



When delivered from our factory, it is so adjusted that analog output voltage is 0V at the standard measuring distance of 90mm (for AMS-90-B, AMS-90-A) or 4V (for AMS-90-AH, AMS-90-BH).

● Gain Adjustment

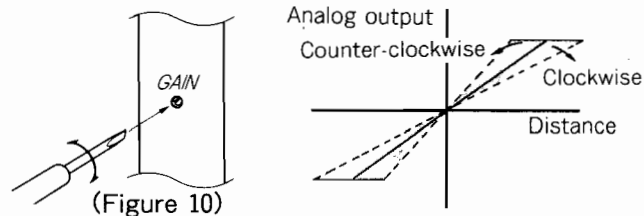
Gain adjustment is to adjust the linearity of the analog output voltage to the measuring distance.

For Gain adjustment, turn the potentiometer for Gain adjustment slowly with a small slotted screwdriver.

Gain adjustment potentiometer is 10-turn potentiometer with ratchet mechanism.

When Gain adjustment potentiometer is turned clockwise, the ratio of the analog output voltage to the measuring distance becomes smaller.

When Gain adjustment potentiometer is turned counter-clockwise, the ratio of the analog output voltage to the measuring distance becomes larger.



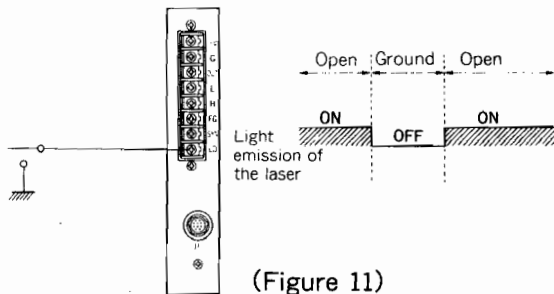
When delivered from our factory, it is so adjusted that the analog output voltage is from -4V to +4V against the measuring distance ± 40 mm (for AMS-90-A, AMS-90-B) or from 0V to +8V (for AMS-90-AH, AMS-90-BH).

10. CONTROL

● LD control (LD terminal)

LD control input is for stopping light emission of the laser diode (LD) while the power supply is ON.

By short-circuiting LD terminal with the ground, the light emission is stopped.



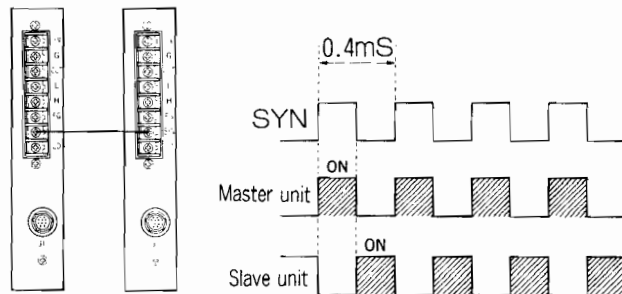
(Figure 11)

● Synchronous control (SYN terminal)

By connecting the SYN terminals of two amplifier units, interference prevention synchronous control can be used to avoid mutual interference between two sensor heads doing measurement for the same area.

In this case, it is necessary to set one of the amplifier unit as the master unit and the other as the slave unit.

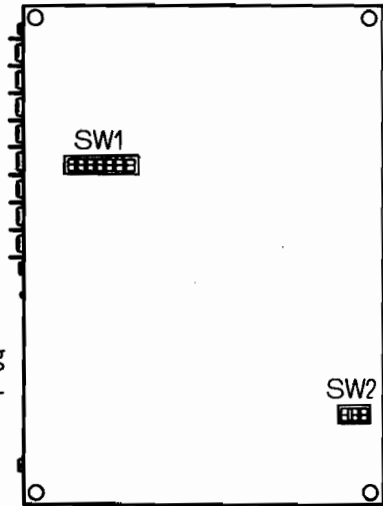
(Regarding the setting method, refer to 11. DIPSWITCH SETTINGS.)



(Figure 12)

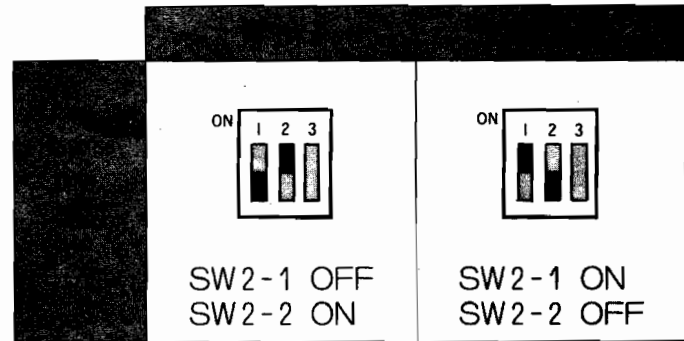
11. DIPSWITCH SETTINGS

- Carry out SW setting after turning the power supply OFF.



(Figure 13)

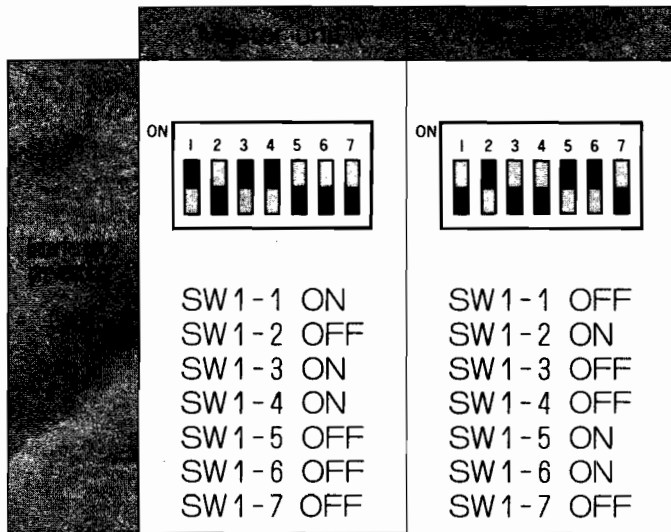
- Setting of response time



- When delivered from our factory, it is set at 10ms.

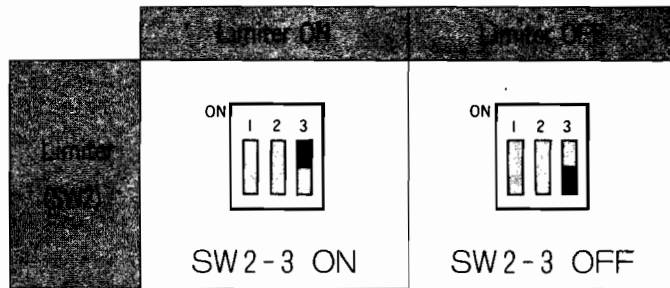
● Setting of the master unit and slave unit.

(Use for interference prevention synchronous control.)



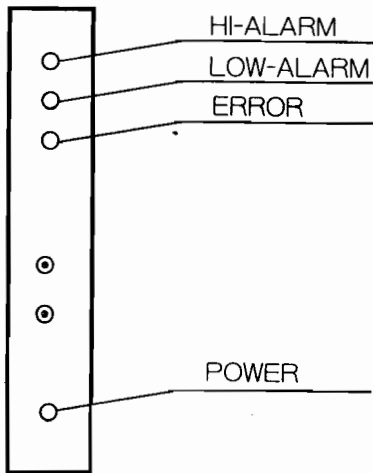
● When delivered from our factory, it is set as a master unit.

● Limiter setting



- Regardless of ON/OFF of the limiter, HI-ALARM and LOW-ALARM outputs are effective.
- When delivered from our factory, the limiter is set at ON.

12. FUNCTION OF DISPLAY



(Figure 14)

● HI-ALARM

This lights up when the measuring distance has exceeded 130mm. Simultaneously, the voltage at H terminal drops to 0V.

● LOW-ALARM

This lights up when the measuring distance has become below 50mm. Simultaneously, the voltage at L terminal drops to 0V.

● ERROR

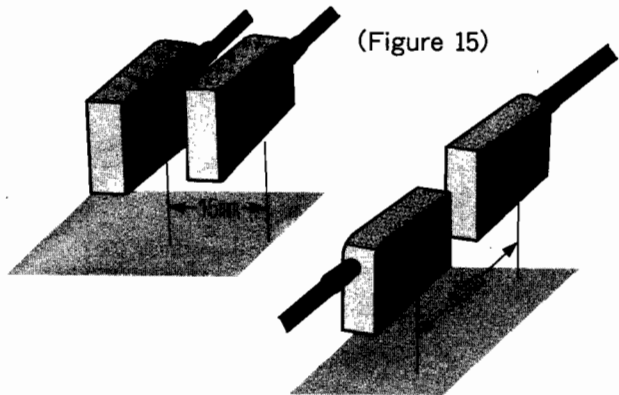
This lights up when the light reflected by a measuring object has become so weak that the measurement cannot be made.

● POWER

This keeps lighting while the power supply is ON.

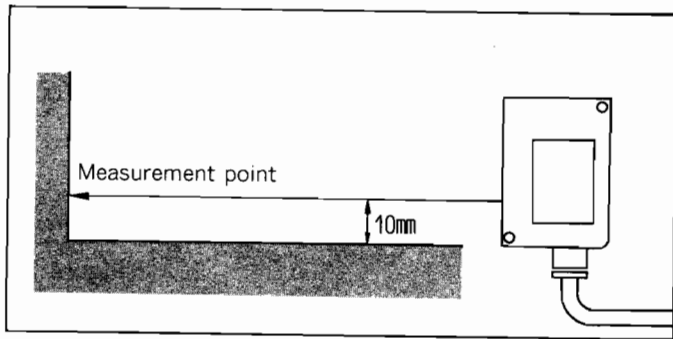
13. NOTES FOR MEASUREMENT

- When measuring the same area by two sensor heads, if two sensor heads are set within the distance shown in Fig. 15, it will cause mutual interference and measuring error will occur. In this case, wider the distance between the sensor heads or use interference prevention synchronous control function.



- When there is a surface parallel to the optical path of the sensor head as shown in Fig. 16, measuring error will occur. In this case, separate the parallel surface from the optical path by more than 10mm.

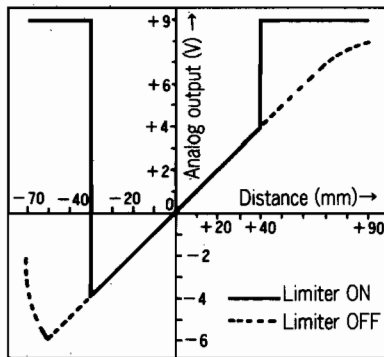
(Figure 16)



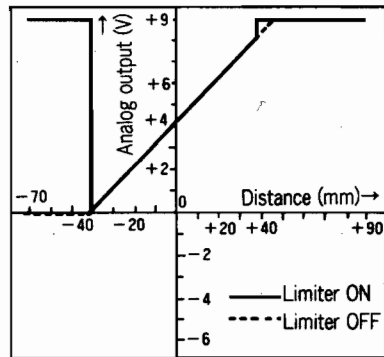
14. ANALOG OUTPUT CHARACTERISTICS

Refer to Fig. 17 for the output characteristic of Model AMS-90-A and AMS-90-B.
Refer to Fig. 18 for the output characteristic of Model AMS-90-AH and Model AMS-90-BH.

For both cases, measuring range of within $\pm 40\text{mm}$ is the guaranteed accuracy range. In ranges exceeding $\pm 40\text{mm}$, both linearity and resolution are not guaranteed.



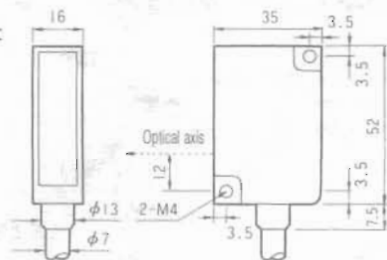
(Figure 17)



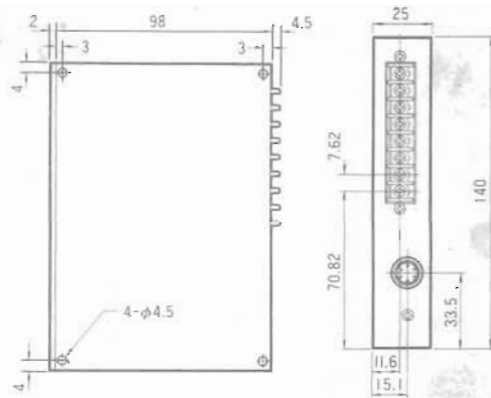
(Figure 18)

15. OUTER DIMENSIONS (Unit:mm)

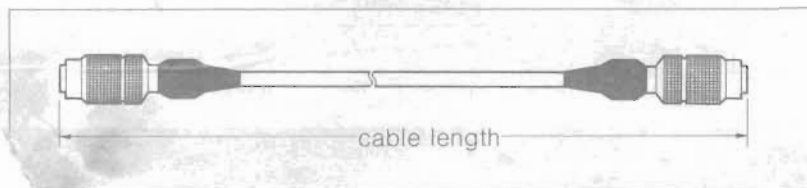
● Sensor head unit



● Amplifier unit



16. EXTENSION CABLE (OPTION AT EXTRA COST)



When extending the distance between the sensor head and amplifier unit, use an optional extension cable available at extra cost.

Model name	Cable length
AMSC-1000	1 m
AMSC-2000	2 m
AMSC-3000	3 m

SPECIFICATIONS

Model name	AMS-90-A	AMS-90-B	AMS-90-AH	AMS-90-BH	Model name	AMS-90-A	AMS-90-B	AMS-90-AH	AMS-90-BH
Measuring distance	90mm ± 1mm (from the front of the sensor head)				Spot diameter	less than 2mm			
Measuring range	± 40mm				Analog output	± 4V (at ± 40mm)		0 ~ + 8V (at ± 40mm)	
Measuring range (at the limiter OFF)	- 50mm ~ + 80mm		- 40mm ~ + 50mm		Maximum analog output range (at the limiter OFF)	+ 9V, - 6V (MAX)		0V, + 9V (MAX)	
Resolution	50 μm (100mS)		150 μm (10mS)		Power supply	DC 10 ~ 15V	DC 20 ~ 30V	DC 10 ~ 15V	DC 20 ~ 30V
Response time	10mS, 100mS (selectable by SW)				Current consumption	below 200mA			
Accuracy	± 0.6% of F.S				Working temperature	0 ~ + 50°C			
Temperature drift	Sensor head		0.04%/°C of F.S		Working humidity	0 ~ 80% (without dewing)			
	Amplifier unit		0.10%/°C of F.S		Degree of protection	Sensor head IP64 / Amplifier unit IP50			
Light emitting device	Semiconductor laser diode (wavelength 780nm)				Weight	Sensor head 150g / Amplifier unit 380g			
Light receiving device	PSD (positioning sensor diode)				Cable length	2000mm			
Output frequency	20kHz								

* at measuring distance of 100mm. ** against a white paper.

KODEN INDUSTRY CO., LTD.

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