

Laser Displacement Sensor MD SERIES


FDA
MD SERIES
RoHS

240620

MD-INSTRUCTIONS-BA

Thank you for purchasing ViziFuze product, Please read this Instruction Manual carefully and operate the product in a correct and proper way. Kindly keep this manual in a convenient place for quick reference.

Download the MD Series User's Manual from our Website. (<http://viziFuze.com>). Please be sure to refer to the User's Manual for information before setting and using the sensor.

⚠ WARNING

- This product is intended to detect the objects and does not have the control function to ensure safety as accident prevention.
- Do not use the product as a sensing device to protect human body.
- Please use the products that comply with local laws and standards for human body protection specified by e.g., OSHA, ANSI and IEC.
- Install a fail-safe device when the products is used for the purpose that has a possibility of physical injury or serious extended damage.
- Do not use the product in the atmosphere of flammable gas, to prevent explosion.

1 CONFIRM THE PACKING ITEMS

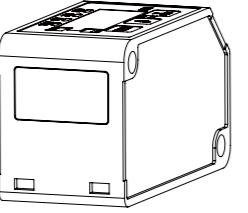
- Before using the product, Please check the following items

Confirm Sensor model

Check the model name of the product at the top of sensor head.

Confirm components

- Sensor*1
- Instruction*1
- Screw*2



2 SAFE USE OF LASERS

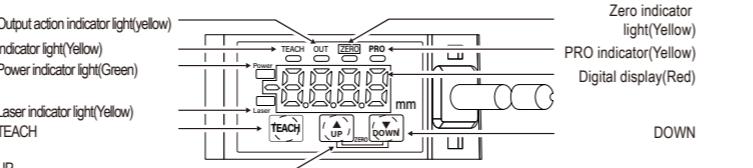
- In order to prevent the accidents by laser product and protect the users, IEC, JIS, GB, KS and FDA establish the following standards respectively.

IEC:IEC 60825-1-2014(EN60825-1-2014)
JIS:JIS C 6802-2014
GB:GB 7247-2012
KS:KS C IEC 60825-1-2013
FDA:PART 1040—Implementation standards for radio luminescent products—

Required items	Level ^{※1}					Conductor color
	I	II a	II	III a	III b	
Information(All laser products)	R ^{※2}	R ^{※2}	R ^{※2}	R ^{※2}	R ^{※2}	(Brown) +V
User information[1040.10(h)(1)]	R ^{※3,4}	R ^{※3,4}	R ^{※3,4}	R ^{※3,4}	R ^{※3,4}	(Black) Judgment output
Product literature[1040.10(h)(2)(i)]	N/A	R	R	R	R	Load
Service information[1040.10(h)(2)(ii)]	R	R	R	R	R	50mA MAX.
Performance(Laser systems)						12V~24V DC ±10%
Remote control connector[1040.10(f)(3)]	N/A	N/A	N/A	N/A	R	
Master controller[1040.10(f)(4)]	N/A	N/A	N/A	R	R	
Radiation indicator[1040.10(f)(5)]	N/A	N/A	R	R	R	
Beam attenuator[1040.10(f)(6)]	N/A	N/A	R	R	R	
Reset[1040.10(f)(10)]	N/A	N/A	N/A	N/A	R ^{※10}	
Performance(Special purpose product)						
Medical[1040.11(a)]	S	S	S	S ^{※8}	S ^{※8}	
Measure the leveling arrangement[1040.11(b)]	S	S	S	NP	S ^{※11}	
Display[1040.11(c)]	S	S	S	S ^{※11}	S ^{※11}	
Label display(All laser products)	R	D	R	R ^{※5}	R ^{※5}	
Proof and identification[1040.2,3]	N/A	N/A	N/A	R ^{※5}	R ^{※5}	
Protective case[1040.10(g)(6),(7)]	N/A	N/A	R ^{※6}	N/A	N/A	
Openness[1040.10(g)(4)]	N/A	R ^{※7}	R ^{※5}	N/A	R ^{※9}	
Level warning[1040.10(g)(1),(2),(3)]	N/A	N/A	R ^{※8}	R ^{※5}	N/A	
Information(All laser products)	R	N/A	R	R	R	
User information[1040.10(h)(1)]	R	R	R	R	R	
Product literature[1040.10(h)(2)(i)]	N/A	R	R	R	R	
Service information[1040.10(h)(2)(ii)]	R	R	R	R	R	
R:Requirements N/A:Not applicable S:Applicable, same as for other products in this category NP:Be disapproved						

※1 According to the maximum level of exposure during the operation.
※2 Unless laser projection beyond Level 1 limits is not required to perform product functions, it is required anywhere and anytime.
※3 If it is not necessary to open the chassis, the protection machine opened during operation or maintenance must be followed.
※4 Interlocking requirements vary according to the level of internal radioactivity.
※5 The text expression depends on the laser beam level and wavelength in the protection case.
※6 A label that displays warnings.
※7 CAUTION (note) the sign.
※8 For the purpose of human irradiation, it is necessary to measure the laser beam grade.
※9 When it is lower than 2.5mWcm⁻², CAUTION is used. Above 2.5mWcm⁻², it is DANGER.
※10 There needs to be a time lag between indicating and emitting the laser.
※11 Exceptions are required for Class IIIb or IV laser products or laser demonstrations.
※12 The sign of DANGER.
※13 Standards to be met after 20 August 1986.

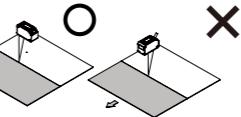
3 NAME OF EACH PART



Mounting direction

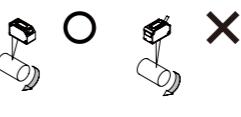
Relative to the direction of the moving body

< material, color difference case >
- When measuring, moving measurement objects with different materials and color extremes are installed in the direction shown below, so that measurement errors can be controlled to a minimum.



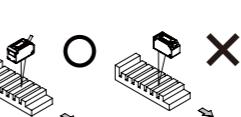
Make a measurement of a rotating object

- When measuring a rotating object, mount it in the direction shown in the figure on the right to suppress the effects of up and down vibration and position shift of the object.



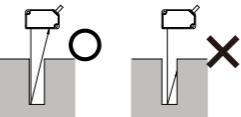
in the case of segment difference

- In the case of a moving measurement object with segment aberration, it is possible to suppress the effect of segment aberration edges by mounting it in the way shown on the right.



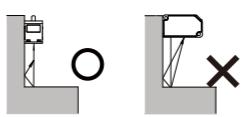
Measurement in tight places and recessed areas

- In the case of measurement in narrow places and holes, when installing, please take care to avoid blocking the light path from the projected light to the light-receiving part.



In the case of measurement in narrow places and holes

- Please install it in the way shown on the right, so that the multiple reflected light generated by the wall will not enter the light-receiving part. In addition, if the reflectivity of the wall is high, good results can be obtained by changing to a non-glossy black color.

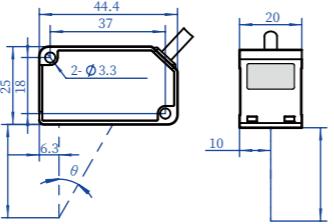


4 PRODUCT SPECIFICATIONS

EXAMPLE: MD-□□□
1 Sensor range:

030:30±5mm 200:200±80mm
050:50±15mm 400:400±200mm
100:100±35mm

5 OVERALL DIMENSION



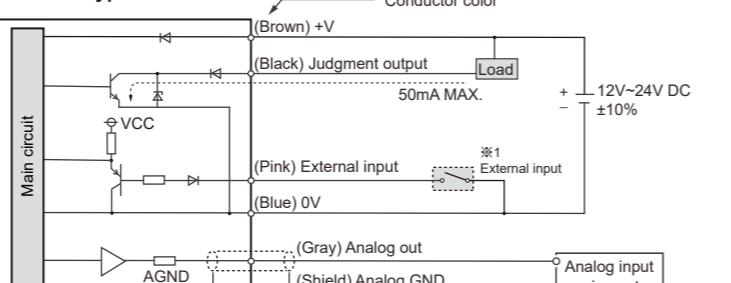
Type	Detection center distance	θ
MD-030	30mm	30°
MD-050	50mm	22°
MD-100	100mm	13°
MD-200	200mm	7°
MD-400	400mm	3.5°

Optional accessories

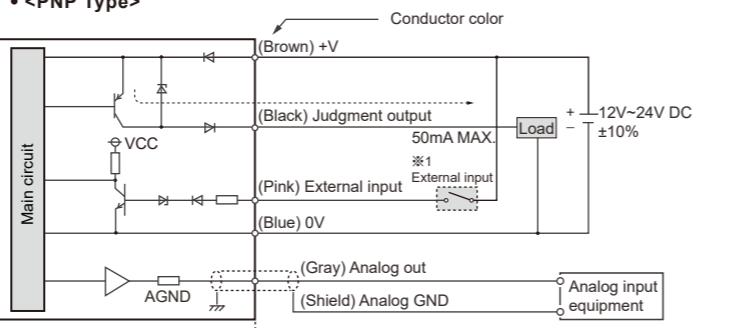
Product name	Type	Content	Appearance
Easy mounting bracket	MS-MD-01	Vertical mounting bracket Comes with 2 pads and M3 screws (length 25mm)(SPCC)	

6 INPUT/OUTPUT CIRCUIT DIAGRAM

<NPN Type>



<PNP Type>

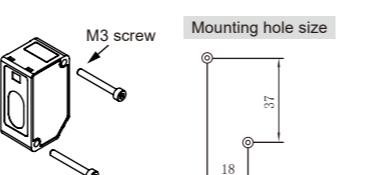


7 INSTALL

- Please use M3 screws when installing this product. Use a tightening torque

- of 0.5N.m.

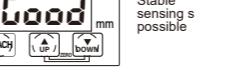
When installing this product using the sensor mounting bracket (sold separately), also use 0.5N.m.



8 TEACHING

2-point teaching

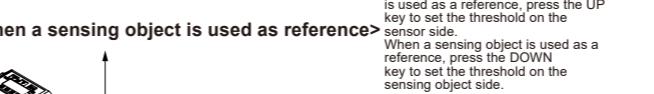
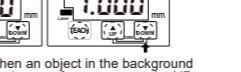
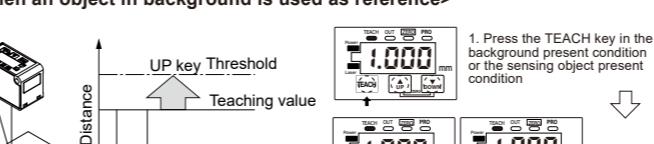
- This is the basic teaching method.



Limit-teaching

- This is teaching method in case small object or object in background are existing

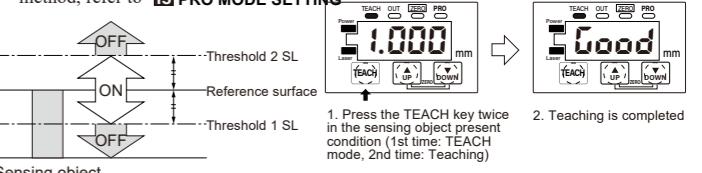
<When an object in background is used as reference>



3.Teaching is completed.

1-point teaching (window comparator mode)

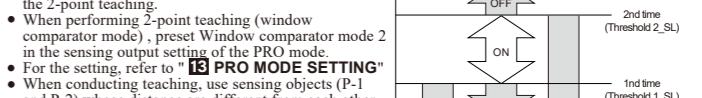
- This mode is used for setting the threshold range for the distance from the reference value of the sensing object, by performing 1-point teaching. This mode is used for sensing within the threshold range.
- When performing 1-point teaching (window comparator mode), preset "Window comparator mode 1" in the sensing output setting of the PRO mode. For the setting method, refer to "PRO MODE SETTING".



1. Press the TEACH key twice in the sensing object present condition (1st time: TEACH mode, 2nd time: Teaching)

2. Teaching is completed

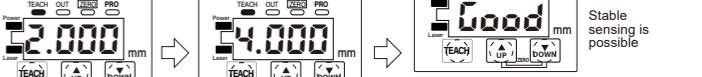
Sensing object



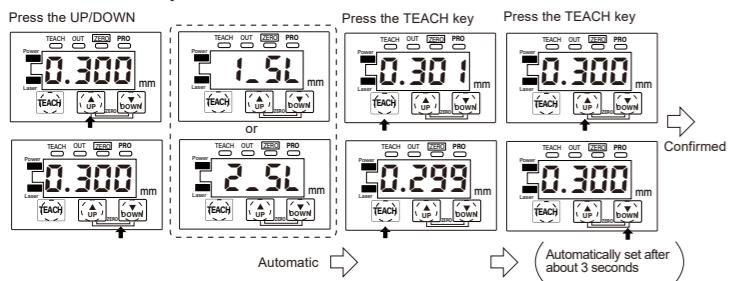
1. Press the TEACH key in the sensing object P_1 present condition. (1st time)

2. Press the TEACH key in the sensing object P_2 present condition. (2nd time)

Sensing object P-1 Sensing object P-2

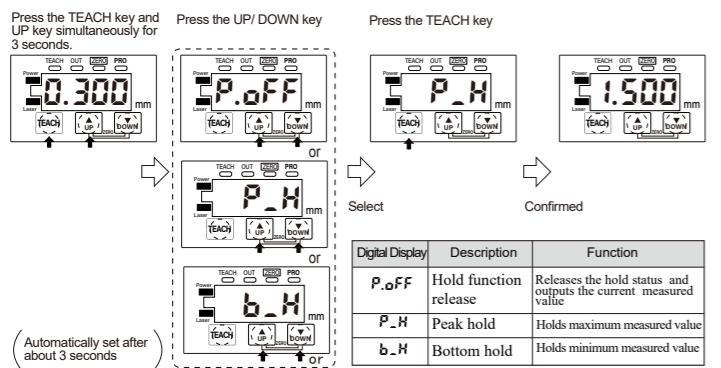


- When performing a fine adjustment of the threshold of "1.5L" and "2.5L" press the UP key or DOWN key. After "1.5L" and "2.5L" is displayed, the fine adjustment of the threshold can be performed.



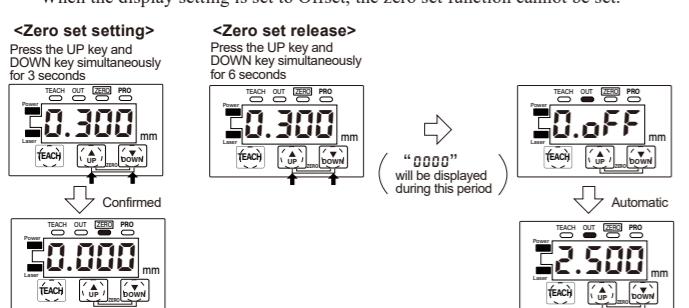
10 PEAK BOTTOM HOLD FUNCTION

- The peak/bottom hold function, is for displaying the peak value and bottom value
- When the zero set function is executed while the peak bottom hold function is set to "Peak hold" or "Bottom hold", the held measured value will be reset.



11 ZARO SET FUNCTION

- The zero set function is the function to compulsorily set the measured value to "zero"
- The zero set indicator (yellow) will turn ON when the zero set is valid.
- When the zero set function is executed while the peak bottom hold function is valid, the held measured value will be reset.
- When the display setting is set to Offset, the zero set function cannot be set.



- The setting or releasing of the zero set from an external input operates as in the following figure.

ON

OFF

10ms or more

Zero set setting

1s

Zero set release

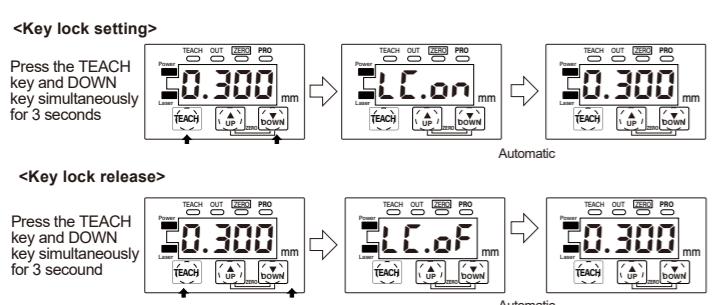
Zero set valid period

- When the power is turned ON again, zero set from external input can be released. At this time the zero set will not be saved.
- Even when the zero set is set in the sensor, the zero set can be set or released from an external input. However, when the power is turned ON again, the zero set set in the sensor will be displayed.

(*) For the setting method, refer to "13 PRO MODE SETTING"

12 KEY LOCK FUNCTION

- The key lock function means that key operations are not accepted to prevent incorrect changes to the setting conditions in each setting mode.
- When the key is locked, "Loc" will appear on the numeric display if the key is operated.



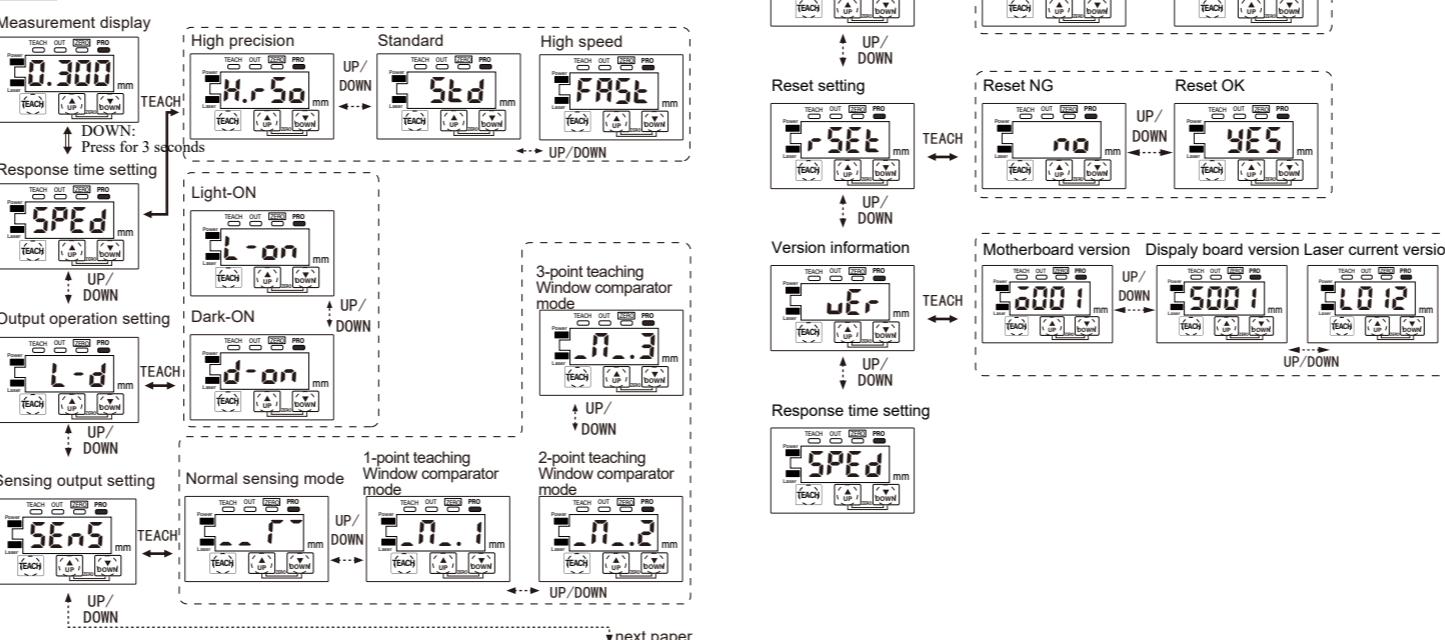
13 PRO MODE SETTING



- The PRO indicator (yellow) will turn ON when the PRO mode is set.
- When the DOWN key is pressed for 3 seconds or more in the middle of the PRO MODE setting, the display returns to the measurement display.

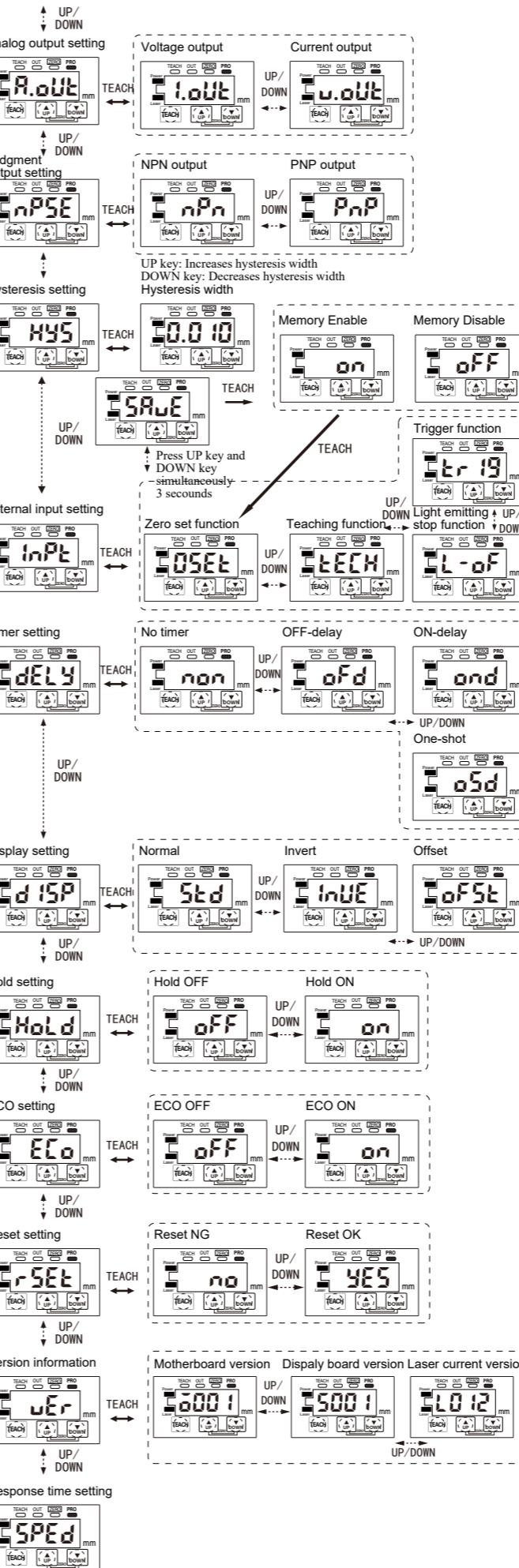
Item	Default setting	Description
Response speed setting	H.r50	Set the response time "H.r50" :High precision 10ms, "Std" :Standard 5ms, "FASr" :High speed 1.5ms
Output operation	L-on	Select the control output operation mode, "L-on" :Light-ON, "d-on" :Dark-ON
Sensing output setting	--F	Set the sensing output "--F" :Nomal sensing mode "--L, --T" :1-point teaching (window comparator mode) "--L, --Z" :2-point teaching (window comparator mode) "--L, --3" :3-point teaching (window comparator mode)
Analog output setting	u.out	Set the analog output "u.out" :Voltage output(4-20mA) "d.out" :Current output(0-5V)
Judgment output setting	nPN	Setting judgment output type "nPN" :NPN output "pPN" :PnP output
Hysteresis setting	<MD-030> <MD-050> 0.0 0.03 <MD-100> <MD-200> 0.07 0.2 <MD-400> 0.8	Set the hysteresis width MD-030: 0.001mm-5.0mm MD-050: 0.01mm-15.0mm MD-100: 0.02mm-35.0mm MD-200: 0.1mm-80.0mm MD-400: 0.2mm-200.0mm
External input setting	05E	Set the external input "05E" :Zero set function "EECH" :Teaching function "L-of" :Light emitting stop function, "tr-15" :trigger function
Timer setting	non	Set the timer operation. The timer time is fixed at 5ms "non" :NO timer, "ofd" :OFF-delay timer, "ond" :ON-delay timer, "osd" :ONE-shot timer
Display setting	Std	The display of the measured value can be changed "Std" :Normal, "invE" :Invert, "of5t" :Offset
Hold setting	off	Set the control output and the analog output operation when a measurement error occurs (infrared light intensity, saturation of light intensity, out of measurement range) "off" :Hold OFF, "on" :Hold ON
ECO setting	off	The digital display can be set to go OFF when key operation is not performed for 30 seconds. Current consumption can be reduced "off" :ECO OFF, "on" :ECO ON
Reset setting	no	Restore to initial state (factory state) "no" :Reset NG, "YES" :Reset OK
Zero setting	off	Zeroing is saved in memory based on external input. "off" :Memory save invalid, "on" :Memory save valid
Version information		"0808" :Motherboard version, "5808" :Display board version, "L808" :Laser current version

步骤



14 SPECIFICATION

Basic model	MD-030	MD-050	MD-100	MD-200	MD-400
Reference distance	30mm	50mm	100mm	200mm	400mm
Detection range	25-35mm	35-65mm	65-135mm	120-280mm	200-600mm
linearity	±0.1%	±0.1%	±0.2%	±0.3%	
Repetition accuracy	10μm	30μm	70μm	200μm	800μm
Light source	Visible semiconductor laser wavelength 650nm, maximum output 1mW, Class 2 laser(IEC/GB/FDA)				
Spot size	50μm	70μm	120μm	300μm	500μm
Light-receiving device	CMOS				
Supply voltage	12-24V DC±10% Power supply rippleP-10%				
Consumption current	Below 40mA(24V DC)				
Judgment output	<NPN> Maximum inflow current: 50mA Applied voltage below 30V DC Residual voltage: 1.5V Leakage current: below 0.1mA	<PNP> Maximum outflow current: 50mA Applied voltage below 30V DC Residual voltage: 1.5V Leakage current: below 0.1mA			
Output action	Switchable: ON in light/ ON in non-light				
Output short-circuit protection	Equipped with(automatic reset type)				
Analog output	4-20mA(Load impedance:below 300Ω); 0-5V(Output impedance100Ω)				
Response time	Switchable: 1.5ms/5ms/10ms				
External output	<NPN> No contact input, Invalid: +8~+V DC or disconnected No contact output, Invalid: 0V~+6V DC or disconnected Effective: +4V~+V DC Input impedance: about 10kΩ	<PNP> No contact input, Invalid: +8~+V DC or disconnected No contact output, Invalid: 0V~+6V DC or disconnected Effective: +4V~+V DC Input impedance: about 10kΩ			
Action indicator light	Power green LED; Laser, OUT, ZERO, AL, PRO yellow LED				
Digital display	4-bit break code display				
Temperature characteristic	0.05°F.S./°C				
Use ambient illumination	Incandescent with surface illumination up to 3000lux				
Ambient temperature range	Working time: 0-40°C; Storage time: -15°C to 65°C				
Ambient humidity range	Working time: 0-40°C; Storage time: -15°C to 65°C				
Impact resistance	Acceleration 500m/s ² , XYZ 3 times in each direction				
Shock resistance	10-55Hz double amplitude 1.5mm, XYZ for 2 hours in each direction				
Cable length	24AWG 5-core composite cable; Length: 2m				
Protection class	IEC IP67				
Material	Shell body: Cast aluminum; Front cover: PMMA				



15 ERROR DISPLAY

- The following measures should be taken in case of error:

Error display	Content	Solutions
<Keep OFF> <Keep ON> -----	The amount of reflected light is insufficient and the detected object is out of the detection range.	- Please confirm whether the detected object is within the measuring range. - Adjust the mounting Angle of the sensor.
Er 01	The flash memory is damaged or has reached the end of its useful life.	- Please consult our company.
Er 11	Detect excessive current caused by short circuit of the output load.	- Please cut off the power supply to confirm the load.
Er 21	The semiconductor laser is damaged or has reached the end of its useful life.	- Please consult our company.
Er 31	Failed to measure correctly during zero adjustment.	- Please confirm whether the detection distance is within the specification range. - Please set the display to something other than offset.
Er 41	Failure to measure properly when performing instruction.	- Please confirm whether the detection distance is within the specification range.
Er 90 Er 91 Er 92 Er 93	System error.	- Please consult our company.

10 CAUTIONS

- This product is developed/manufactured for use in industrial environments.
- Be sure to perform wiring with the power off.
- Mistaken wiring may cause malfunction.
- Avoid parallel wiring with high-voltage and power lines, or using the same wiring duct. Otherwise, it may cause malfunction due to induction.
- Check the power supply change so that the power input does not exceed the rated value.
- If a commercially available conversion regulator is used in the power supply, be sure to ground the case ground (F.G.) terminal of the power supply.
- When using equipment that generates interference around the sensor installation (changeover regulator, inverter motor, etc.), be sure to ground the frame ground (F.G.) terminal of the equipment.
- Please avoid using it in the transition state when the power is turned on.
- For cable extension, use a cable of 0.3mm² or more for a full length of up to 10m.
- Do not bend the lead-in portion of the cable with brute force, and avoid applying pressure such as pulling.
- Although it varies by type, light from quick-start type and high-frequency bright light type fluorescent lamps and solar energy, etc. may affect detection, so please take care to avoid direct light entry.
- Do not use outdoors.
- Do not attach water, oil, fingerprints and other substances that reflect light, or substances that block light, such as dust and garbage, to the light throwing and receiving surfaces of this product. In case of adhesion, wipe with a soft cloth or lens paper that does not generate dust.
- Be careful to avoid organic solvents such as thinner, strong acids, strong bases, oils and grease.
- When sweeping the light throwing window/light receiving window on the head of the sensor, be sure to do so with the power off.
- The directionality of this product may deviate. When using this product, keep the optical axis of the mounting bracket etc. adjustable.
- The memory has a write life of about 100,000 times. "ON" ; Please note the write life when using the memory save valid.

Manufacturer: VizeFuze

