

Panasonic

INSTRUCTION  
MANUAL

LED Beam Reflective Type Wafer Mapping Sensor  
M-DW1

CMJE-MDW1 No.0037-18V

Thank you very much for purchasing Panasonic products.  
Read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product.  
Kindly keep this manual in a convenient place for quick reference.

WARNING

- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.
- In case the product may be subjected to electrostatic discharge, make sure to ground the stainless case.

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PART DESCRIPTION

Stability indicator (Green)

Output setting switch

Operation indicator (Orange)

Switch

Sensitivity setting button

Timer operation mode switch

Output operation mode switch

Sensitivity selection switch

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MOUNTING

- Set the distance between the sensor detection surface and the wafer edge to be 45mm and mount the sensor so that sensing is done at an angle of 12.5° with respect to the wafer. Mount using M4 (length 16mm) screws. The tightening torque should be 1.2N·m or less. Further, although the sensing distance may change due to variation in the wafer position (wafer protrusion, orientation flat position, etc.), if it is within 5mm, stable sensing is possible.

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DETECTING WAFER HAVING ORIENTATION FLAT

- When detecting a wafer having an orientation flat, mount the sensor so that a portion other than the orientation flat is detected. Further, arrange to detect the wafer from two different angles by moving the robot arm, etc., and OR the signal so obtained.

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I/O CIRCUIT DIAGRAMS

- The output can be selected as NPN output or PNP output by the output setting switch.

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OUTPUT OPERATION

- The output operation can be set either Light-ON or Dark-ON by the output operation mode switch.

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SENSITIVITY SELECTION SETTING

- Sensitivity can be selected from four levels by appropriate setting of the sensitivity selection switch (2 bit).

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EXTERNAL SENSITIVITY SELECTION INPUT

- The external sensitivity selection input (violet) becomes ON when it is connected to 0 to 3V, or 9V to +V (26.4V max.), and becomes OFF when it is kept open or connected to 4 to 8V.
- If the sensitivity is selected with the external sensitivity selection input, set the sensitivity selection switch as shown in the table below.

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SENSITIVITY SETTING

- Although this sensor has an optical system which makes it difficult for the background to affect the detection, the background may have an effect when detecting small diameter wafers. Hence, if the background gets detected, or the stability indicator (green) lights off when the cassette has no wafers, sensitivity setting should be done so that the background does not have an effect. However, the sensitivity reduces when sensitivity setting is done.

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TIMER FUNCTION

- Using the timer operation mode switch, it is possible to select an approx. 2ms fixed OFF-delay timer. Since the output is extended by a fixed period, it is useful when the connected device has a slow response time.

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LIGHT EMISSION CONTROL FUNCTION

- Light emission is halted when the external light emission control input (pink) is connected to 0 to 3V, or 9V to +V (26.4V max.). In this case, the output turns to the dark state.

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SENSING SIGNAL

- Sensing signal width
- The sensing signal which is output from the sensor is as follows

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CAUTIONS

- This product has been developed / produced for industrial use only.
- Make sure that the power supply is off while wiring.
- Take care that wrong wiring will damage the product.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Extension up to total 10m, or less, is possible with 0.15mm<sup>2</sup>, or more, cable. However, in order to reduce noise, make the wiring as short as possible.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable joint.
- Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp, a high frequency lighting device or sunlight etc., as it may affect the sensing performance.
- Make sure to use an isolation transformer for the DC power supply. If an autotransformer (single winding transformer) is used, this product or the power supply may get damaged.
- In case a surge is generated in the used power supply, connect a surge absorber to the supply and absorb the surge.
- Avoid dust, dirt, and steam.
- Take care that the product does not come in contact with water, oil, grease or organic solvents, such as, thinner, etc.
- Do not allow any water, oil, fingerprints, etc., which may refract light, or dust, dirt, etc., which may block light, to stick to the sensing surfaces of the sensor. In case they are present, wipe them with a clean, dust-free soft cloth or lens paper.

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SPECIFICATIONS

Designation	LED beam reflective type wafer mapping sensor
Item	Model No. <b>M-DW1</b>
Center measuring distance	45mm
Sensing object	3 inch or larger semiconductor wafer (Note 1)
Detectable surface	Surface having a side edge which reflects light in the light receiving direction (Note 2)
Sensing angle	12.5° ±5° (Note 3)
Wafer pitch	Separate sensing is possible at normal sensitivity for 3mm pitch or more (Note 4)
Suitable cassette	SEMI standard FOUP cassette / open cassette
Supply voltage	12 to 24V DC ±10% Ripple P-P 10% or less
Current consumption	65mA or less
Output	NPN output / PNP output, selectable with output selection switch <b>&lt;NPN output&gt;</b> NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between output and 0V) • Residual voltage: 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current) <b>&lt;PNP output&gt;</b> PNP open-collector transistor • Maximum source current: 100mA • Applied voltage: 30V DC or less (between output and +V) • Residual voltage: 1V or less (at 100mA source current) 0.4V or less (at 16mA source current)
Output operation	Light-ON / Dark-ON, selectable by switch
Short-circuit protection	Incorporated (restored automatically)
Response time	500μs or less
External light emission control input	0 to 3V, or 9V to +V (26.4V max.); Emission halted Open, or 4 to 8V: Emission
External sensitivity selection input	0 to 3V, or 9V to +V (26.4V max.): Input ON Open, or 4 to 8V: Input OFF
Ambient temperature	0 to +55°C (No dew condensation) Storage: -10 to +70°C
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH
Emitting element	LED (modulated)
Material	Enclosure: ABS / Stainless steel (SUS 301) Lens: Acrylic
Cable	0.15mm <sup>2</sup> 5-core cabtyre cable, 300mm long
Weight	Approx. 75g

Notes: 1) In case of 8 inch or less wafers, the wafer pitch, orientation flat or the surface condition may affect the sensing.  
2) Polished wafers, etc., which have a sharp edge cannot be detected since they do not reflect the light in the light receiving direction.  
3) Since the position of the orientation flat may vary by ±20° due to its rotation, refer to "3 DETECTING WAFER HAVING ORIENTATION FLAT" for detection of a wafer having an orientation flat.  
4) This is the pitch of an 8 inch wafer near its center region when it is inserted in an inclined fashion. When detecting a wafer having an orientation flat, the wafer pitch becomes still smaller when sensing at positions which avoid the orientation flat. In this case, the sensing signal cannot be resolved and it becomes a continuous, broad signal. For details, refer to "11 SENSING SIGNAL."

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INTENDED PRODUCTS FOR CE MARKING

- The models listed under "13 SPECIFICATIONS" come with CE Marking. As for all other models, please contact our office.
- Contact for CE  
<Until June 30, 2013>  
Panasonic Electric Works Europe AG  
Rudolf-Diesel-Ring 2, D-83607 Holzkirchen, Germany  
<From July 1, 2013>  
Panasonic Marketing Europe GmbH Panasonic Testing Center  
Winsbergring 15, 22525 Hamburg, Germany

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OVERSEAS SALES DIVISION (HEAD OFFICE)

2431-1 Ushiyama-cho, Kasugai-shi, Aichi, 486-0901, Japan  
Phone: +81-568-33-7861 FAX: +81-568-33-8591  
About our sale network, please visit our website.

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