

High Speed, Multi-Point Laser Displacement Sensor Controller
HL-D3C

CMJE-HLD3(04) No.0039-89V

Thank you very much for purchasing our product. Please read this manual carefully before operation and use the product with the most appropriate method. Please keep this manual with caution.

For details, refer to the "HL-D3 series Users Manual" (PDF file) stored in the accompanying setup CD-ROM. Perform settings using the HL-D3SMI software before operation.



Warning

- This product is not a safety sensor designed or intended to protect life and prevent bodily injury or property damage from dangerous parts of machinery.
- Avoid using this product as detection system to protect life and prevent bodily injury.
- Use the product that complies with each country's law and regulation related to human protection such as OSHA, ANSI, and IEC, etc.
- Install a fail-safe device when the product is used for the purpose which is expected a possibility of physical injury or serious extensive damage.
- Do not use the product in flammable gas atmosphere to prevent explosion.

Preface

Check the following before using this product.



Checking controller model

Check the model at the side of the controller. The product name you purchased is indicated.

Checking the items accompanied

- Check if the following items are available.
- Main Unit of Controller ×1
 - Instruction Manual (this document) ×1
 - USB cable (2m) ×1
 - HL-D3 Series Setup CD-ROM ×1

1 Description

- This product is the special controller of the high speed multiple laser displacement sensor HL-D3 series.
- When the sensor head of the HL-D3 series is connected, the height or step of the target object can be measured at a high speed and high accuracy in the longitudinal direction of the radiated line laser from the multiple displacements in the specified range or preferred points.
- In addition to the settings with USB and RS-232C and the monitoring function of measuring results, it has the judgment output for calculation results.

2 Major Specifications

| | |
|---|---|
| Model | HL-D3C |
| Power Supply Voltage | 24 V DC ±10%, including ripple 0.5V peak to peak |
| Current Consumption | Current is approx. 1.0A or less when two sensor heads are connected. |
| Sampling cycle | Dependent upon the measurement mode and other setting conditions |
| Multi-Zone Beam Control | Standard 12.2ms (*1) |
| Whole-Synchronized | Fastest 2.5ms (*2) |
| Multi-Select Displacement | Fastest 80µs (*3) |
| **Output (Output Name : 01~08) Terminal Name : HI*,GO*,LO*,AL*) | N-ch FET open drain Max. sink current : 100mA Applied voltage : 30V DC or less (between ALARM output and -0V) ON resistance: 5 ohm or less |
| Output Operation | Output is open when in output operation. (selectable) |
| Short circuit protection | Provided |
| Laser control input | Photocoupler insulated input Laser is radiated when connected to external insulated common (-); laser radiation is halted when open. Applied voltage: 30V DC or less (at leak current 0.1mA) Photocoupler insulated input |
| ** Input (Input Name : I1~I6) Terminal Name : ZS*,TM*,RS*) | ON when connected to external insulated common (-); OFF when open. Applied voltage: 30V DC or less (at leak current 0.1mA) Photocoupler insulated input ON when connected to external insulated common (-); OFF when open. |
| Memory Change input (Terminal Name : IN0~IN2) | Photocoupler insulated input ON when connected to external insulated common (-); OFF when open. |
| RS-232C Interface | Baud Rate: 9600 , 19200 , 38400 , 57600 , 115200 bps |
| USB Interface | USB 2.0 Full Speed (USB 1.1 compatible) compliant |
| Connectable Sensor Head | Max. 2 units |

| | |
|----------------------------|---|
| Setting / Data Display | HL-D3SMI (bundled application software) or dedicated API |
| Power Indicator | Green LED glows when power is on. Green LED |
| HEAD Indicator (A, B) | During continuous measurement: it glows when laser is radiated; it blinks twice (OFF for 1 second) when laser radiation is off. During measurement stops: it blinks (ON/OFF alternately for 1 second each) when laser is radiated; it blinks once when laser radiation is off. No head Connection : OFF |
| Alarm Indicator | Red LED It glows when a measurement alarm is issued or when the head is disconnected. |
| Vibration Withstand | 10 to 55 Hz frequency(1 min. cycle), 0.75 mm double amplitudes, applied in X, Y, and Z direction for 30 minutes |
| Mechanical Shock Withstand | 196m/s ² applied in X, Y, and Z directions 3 times each |
| Ambient Temperature | Operation: 0 to +50 °C (With no dew condensation nor icing) Storage: -20 to +70°C |
| Ambient Humidity | 35 to 85% RH |
| Enclosure material | Enclosure: Aluminum |
| Weight | About 300g |

Unspecified measurement conditions (with sensor head) are subject to the followings. power supply: 24V DC, ambient temperature: 20°C, measurement mode: Multi-Zone Beam Control (MZBC), adjusting increment: Width 100µm, unit detection time: 100 µs, measurement center distance, average number: 64 times, sensing object: white diffusive object (which is specified by us). Other measuring conditions are initial settings.

- *1 The value is applicable under the following conditions: Measurement mode: Multi-Zone Beam Control (MZBC), Number of sensor head connected: 1, Each measurement range: maximum, Beam power control count: 0 (continuous), Judgment output: 2 output (output 1,2)
 - *2 Under the following conditions, the value is applicable in case of getting displacement figure profiles by data buffering. Measurement mode: Whole-Synchronized, Number of sensor head connected: 2, Each measurement range: minimum, No OUT calculation.
 - *3 The value is applicable under the following conditions: Measurement mode: Multi-Select Displacement Sensing (MSDS), Number of sensor head connected: 1, unit receiving time: 40 µs, Number of laser intensity control: 0 (continuous), Number of selected position: 2, Wide-cell: none, Judgment output: 2 output (output 1,2)
- * The sensor head of Ver.1.20 or earlier can not connect to a Ver.2.0x controller. The alarm output of the head will turn On.

3 Cautions

- This product is designed and manufactured for industrial use.
- Do not use the product beyond the range of rating, environment or other specifications. Doing so may cause abnormal heat or smoke generation.
- Do not disassemble or remodel the product. Electrical shock or smoke generation may result.
- Connect electric wires securely with terminal screws. Imperfect connection may cause abnormal heat or smoke generation.
- Do not touch the terminal during energization of the product to prevent electrical shock.

Installation

Controller

- Install the controller unit assuring plenty of space around it. If it is installed in a manner other than specified, failures may occur due to temperature rise.
- If the controller is mounted on a control board, etc., internally where air circulation is blocked, ambient temperature will rise due to heat generated by the controller, so use forced cooling.
- Vent holes for heat radiation are provided at the top and bottom of controller unit. Provide adequate space for heat radiation, not to block the holes.

Wire Connections and Connectors

- Connect all wirings securely according to the explanations for I/O circuit and description on the unit.
- Turn off the power of controller before connecting or disconnecting the connectors. When connecting and disconnecting connectors, take hold of the connector, being careful not to exert undue force on cables.
- Be careful not to touch terminals or to let foreign objects get in the connector after disconnecting connectors.

Power supply

Power Supply

- Select a power supply with a ripple 0.5V or less (P-P) and a current capacity 2A or more.
- When using a commercial switching regulator, be sure to ground the frame ground (F.G.) terminal to avoid the influence of high frequency noise.
- When using a transformer in the power supply, use an insulated transformer. If an auto transformer (single turn transformer) is used, this product or the power supply may be damaged.
- Use an insulated power supply that incorporates a protective circuit to protect against abnormal voltages from the power line. When using a power supply that does not incorporate a protective circuit, be sure to supply power through a protective element such as a fuse.

Power Supply Sequence for Controller

- Arrange the power supply sequence so the controller turns off prior to the I/O power.
- If the I/O power turns off prior to the controller, the controller detects the change in level of input signals and this may cause wrong operation.
- Leave an interval for at least 10 seconds between turning off the controller and turning on the power again.
- It takes approx. 40 to 50 seconds depending on the stored setting after power is supplied to until the controller is ready for operation (after completion of start-up). Do not use output in the interval because output varies during start-up.
- Do not turn off the power while saving the settings. In the worst case, the system of controller is destroyed and may fail to restart.

Instantaneous Power Failure

If an instantaneous power failure occurs, the system operates continuously, or goes to the same state as power-on state, depending on the duration of power failure. Avoid using in the situation short interruption occurs.

Precautions for positive ground environment

When the sensor is used in a positive ground environment, a short circuit may occur via the ground of the personal computer or USB.

- Please prepare a separate power supply for the sensor, and do not connect the positive (+) terminal.
- When performing a positive ground of the DC power supply of the equipment, do not ground the frame ground (F.G.) of the sensor or the computer.

Warming Up

Allow at least 30 minutes of warming up after turning on the power to ensure the performance of the product.

Use environment

Ambient Temperature and Ambient Humidity

- Ambient temperature Controller: 0 to +50°C
- Store the product in the temperature specification range -20 to +70°C.

Use the sensor within a range of 35 to 85% RH.

Avoid using it in places that may be exposed to dew condensation due to rapid temperature change.

Environment

- If the external surge voltage exceeds ±500V [(1.2/50) µs unipolar full wave voltage], the internal circuit may be destroyed. If there is danger of external surge voltages exceeding 500V, install a surge absorber between the power supply and input terminal.

Do not install the product in the following conditions.

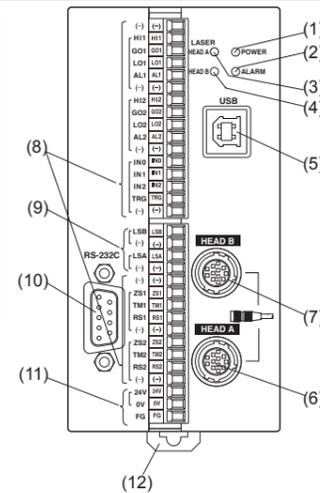
- Location where ambient temperature, ambient humidity and extraneous light immunity and could exceed the rated range.
- Where dew condensation occurs due to rapid temperature change
- Where covered or filled with dust, iron powder and salt
- Where direct sunlight is received
- In an atmosphere which is likely to be exposed to organic solvent such as benzene, thinner or alcohol, or to strong alkaline materials such as ammonia or sodium hydroxide
- In an atmosphere of corrosive gas or flammable gas
- Where heavy vibration or impact is applied
- Where water, oil or chemicals splashes

Measures to Noise

- Install the product as far away as possible from noise source such as high-voltage lines, high-voltage device, power lines, power device, machines which generate a large starting and stopping surge, welding machines and inverter motor.
- Mount this product as far as possible from equipment with transmitter such as amateur radio equipment.
- For input signal lines and output signal lines, run them separately, not rolled up with the power line and power supply line. Keep them at least 100 mm apart. All signal lines should be connected as short as possible.
- For signal lines for RS-232C or for I/O terminals, use shielded cables and connect the shielding wire to the frame ground (F.G.) to reduce electric noise.
- Use an exclusive class D frame ground and avoid sharing the ground with other devices. This may produce an opposite effect.

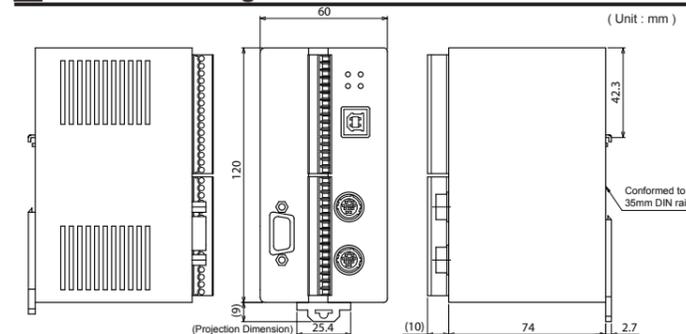
4 Terminal Block

| Terminal Name | Function |
|------------------------|------------------------------|
| (-) (External COM (-)) | External COM (-) |
| HI1 | O1 Output |
| GO1 | O2 Output |
| LO1 | O3 Output |
| AL1 | O4 Output |
| (-) (External COM (-)) | External COM (-) |
| HI2 | O5 Output |
| GO2 | O6 Output |
| LO2 | O7 Output |
| AL2 | O8 Output |
| (-) (External COM (-)) | External COM (-) |
| INO | Memory Change |
| IN1 | (8 Kinds of Memory) |
| IN2 | |
| TRG | External trigger input |
| (-) (External COM (-)) | External COM (-) |
| LSB | Head B laser control input |
| (-) (External COM (-)) | External COM (-) |
| LSA | Head A laser control input |
| (-) (External COM (-)) | External COM (-) |
| (-) (External COM (-)) | External COM (-) |
| ZS1 | I1 input |
| TM1 | I2 input |
| RS1 | I3 input |
| (-) (External COM (-)) | External COM (-) |
| ZS2 | I4 input |
| TM2 | I5 input |
| RS2 | I6 input |
| (-) (External COM (-)) | External COM (-) |
| +24V | 24VDC input for power supply |
| 0V | Power supply ground 0V |
| F.G. | Frame ground |

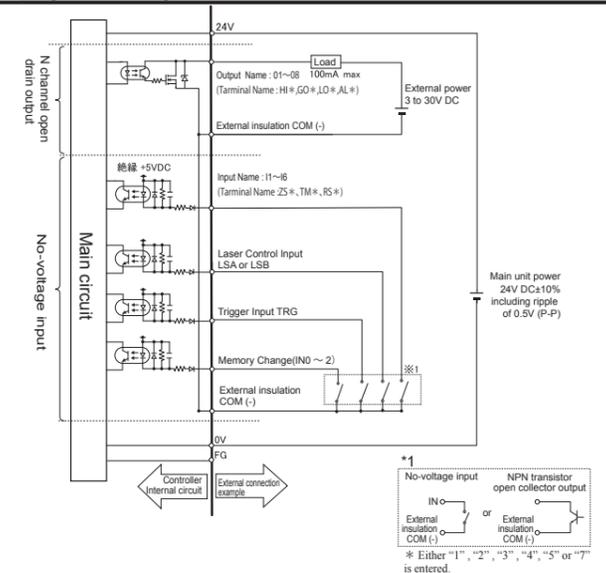


- (1) POWER Indicator
- (2) Alarm Indicator
- (3) HEAD A Indicator
- (4) HEAD B Indicator
- (5) USB Connector
- (6) Sensor Head A Connection Connector
- (7) Sensor Head B Connection Connector
- (8) Input / Output terminal
- (9) Laser Control Terminal
- (10) RS-232C Connector
- (11) Power Terminal
- (12) DIN Rail Mounting Hook

5 Dimension Diagram

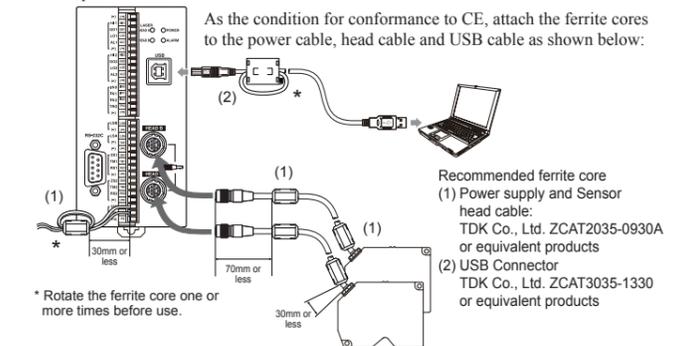


6 Input / Output circuit



7 Conforming Standard/Regulation

This product conforms to the following standard/regulation.
<European Directive> EMC directive 2004/108/EC



<Contact for CE> Panasonic Marketing Europe GmbH Panasonic Testing Center Winsbergring 15, 22525 Hamburg, Germany

8 Warranty

Warranted Period

Panasonic Industrial Devices SUNX warrants this product manufactured by it for twelve(12) months from the date of shipment or delivery to purchaser's appointed warehouse.

Scope of Warranty

- During the above mentioned period, if a failure of the products occurs under normal use and operation, and found by Panasonic Industrial Devices SUNX that it is responsible for the failure, it shall remedy the defect or tender substitution for exchange at its cost and expenses. However, in no event shall Panasonic Industrial Devices SUNX be liable for the failure, damage or loss stipulated below:
- (1) Failure caused by instructions, standards, or handling specified by the customer.
 - (2) Failure caused by modifications done in the structure, capabilities, specifications, etc., without consulting Panasonic Industrial Devices SUNX, after the purchase or the delivery of the product.
 - (3) Failure caused by a development which could not be foreseen based upon the technology in proactive at the time of purchase or contract.
 - (4) Failure caused by use which deviates from the condition/environment given in the product catalog or specifications.
 - (5) Failure which could be avoided if the customer's machine had functions and structure commonly accepted in the industry in case this product is used by being incorporated in the customer's machine.
 - (6) Failure due to happening of Force Majeure
- Further, the warranty given here is limited only to this product which has been purchased or delivered. Panasonic Industrial Devices SUNX shall not be responsible for any consequential damage or loss arising out of the failure of this product. (Scope of Service)
The cost of delivered product does not include the cost of dispatching an engineer, etc. In case any such service is needed, it should be separately requested.

Panasonic Industrial Devices SUNX Co., Ltd.

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