**Displacement sensor**

**CD22 Series**

**CD22-15□□**
- CD22M-15□□

**CD22-35□□**
- CD22M-35□□

**CD22-100□□**
- CD22M-100□□

**Instruction manual**

- Thank you for purchasing CD22 series. We hope you are satisfied with its performance.
- Please read this manual carefully and keep it for future reference.

**Warning Mandatory Requirements**

- The high intensity laser makes the product visible using the red light semiconductor laser: Do not allow the laser beam to enter an eye, either directly or reflected from a reflective object. The laser may cause blindness.
- Do not use the product under flammable, explosive gas or liquid environments.
- The product is not suitable for use with explosive gases. Warn others that this product is not suitable for use with explosive gases. Warn others that this product is not suitable for use with explosive gases.
- Do not disassemble or modify the product since it is designed to automatically shut down laser emissions when operating at maximum output and may cause personal injury, fire, or electric shock.

**Warning Safety Precautions**

- It is necessary to set up and test the sensor before operating the product. Take care not to turn on the power before operation.
- Installing the following places may result in malfunction:
  1. A dusty or dirty place
  2. A place generating excessive noise
  3. A place where the sensor will not be disturbed
- The product is not designed for outdoor use.
- Do not use the sensor in a transient state at power on (Approx. 15min. Warm up period).
- Do not disassemble or modify the product since it is not designed to automatically shut down laser emissions when operating at maximum output and may cause personal injury, fire, or electric shock.
- Operate within the rated range.

**Precautions for using laser**

- Regulations in the USA
  - When exporting laser devices to the USA, the USA laser control, EEA (Eye and Ear Administration) is applied. This product has been already reported to the EEA Center for Devices and Radiological Health. For details, contact your customer service.
- When using the product, be aware of the following:
  1. Not to use the product in water.
  2. Not to wire with the high voltage cable or the power lines.
  3. Not to use the sensor in a transient state at power on (Approx. 15min. Warm up period).
  4. A place suffered from heavy vibration or impact.
  5. The mode will be changed to "Teach mode" by pressing "ZERO/RUN" button.
  6. Changing the parameters.
    - You can change and adjust the parameters by pressing "+" and "-" buttons.
    - The mode will be changed to "Teach mode" by pressing "ZERO/RUN" button.

**Bundled goods in the box**

- CD22□-□□V
- CD22□-□□A
- CD22□-□□-485
- Display (Emitter/Receiver)
- Lens (Emitter/Receiver)
- Switching lens (Sensor Side)
- Control panel
- Display
- Connections (M8 4pin)
- Connections (M12 5pin)
- Laser WARNING label
- Case ● Nul : Aluminum
- M3 × 15…2
- Screws
- RS-485 type
- FGS2
- 1 point Teaching

**Connection diagram**

**Specifications**

- Part number legend
  - Laser Class : Nut / Class 1
  - Monitor : M12 / M8 connector
  - Output : Voltage 0-10V / Analog GND

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- Specifications per measurement range

<table>
<thead>
<tr>
<th>Part number</th>
<th>Measurement range</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD22-15□□</td>
<td>5mm</td>
</tr>
<tr>
<td>CD22-35□□</td>
<td>15mm</td>
</tr>
<tr>
<td>CD22-100□□</td>
<td>50mm</td>
</tr>
</tbody>
</table>

- Laser characteristics
  - Wave length: 655nm
  - Max output: 10mW
  - 9° degree type.

- Operate within the rated range.

- Do not use the product in water.

- Do not wire with the high voltage cable or the power lines.

- Do not disassemble or modify the product since it is not designed to automatically stop laser emissions when operating at maximum output and may cause personal injury, fire, or electric shock.

**Teach mode**

- 1 point Teaching
- 2 point Teaching
- FGS2
- 1 point Teaching - Far side threshold
- 2 point Teaching - Near side threshold
- Teaching current position

**Functions of components**

- Display
- Outputs
- Control panel

- Note for installation
  - Notes for installation must be followed.

- Notes for installation
- " Teach mode" or " Extension mode".

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- Notes for installation
- " Teach mode" or " Extension mode".
**Measurement mode**

- **Teaching**: Teaching is done at a position. When the measurement distance is closer than that position, the output will be ON.
- **FGS2**: FGS2 Teaching is done at a position. When the measurement distance is between those positions, the output will be ON.

**Setup mode**

- **Analog output setup**: (varies by type)
  - **Voltage type**: 10V
  - **Current type**: 4mA

**Analog Output**

- Analog Current or Analog Voltage type outputs Analog output according to the measurement distance.

**External Input**

- Multiple functions can be set as an external input. When it's set as "Teaching" or "Zero reset", the function changes according to the input period.

**Setup mode**

- **Analog output setup**: (varies by type)
  - **Voltage type**: 10V
  - **Current type**: 4mA

**Analog Output**

- Analog Current or Analog Voltage type outputs Analog output according to the measurement distance.

**External Input**

- Multiple functions can be set as an external input. When it's set as "Teaching" or "Zero reset", the function changes according to the input period.

**Extension mode**

- Extension mode is chosen by pressing "SET" button from "Run". (** means default value)

- **1. Analog output setup**: (varies by type)
  - **Voltage type**: 10V
  - **Current type**: 4mA

**Analog Output**

- Analog Current or Analog Voltage type outputs Analog output according to the measurement distance.

**External Input**

- Multiple functions can be set as an external input. When it's set as "Teaching" or "Zero reset", the function changes according to the input period.

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**Specifications**

- **Zero reset function**
  - Set Zero reset

- **Key lock function**
  - Activate Key lock

- **Extension mode**
  - Extension mode is chosen by pressing "+" and "-" button at a time for 1 second.

- **Attention**
  - Not to be Used for Personnel Protection

- **Manufactured and sold by**
  - OPTEX FA CO., LTD.

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**For more information, questions and comments regarding products, please contact us below.**

TEL: +81-(0)75-325-2920
FAX: +81-(0)75-325-2921
Website: http://www.optex-fa.com
Warning Mandatory Requirements

- The light source of the product applies the visible light semiconductor laser. Do not allow the laser beam to enter your eye, neither directly nor reflected from reflective object. If the laser beam enters your eye, it may cause blindness.
- This product is not an exploration-proof construction. Do not use the product under flammable, explosive gas or liquid environment.
- Do not disassemble or modify the product since it is not designed to automatically stop the laser emission when open. Disassembling or modifying at customer's end may cause personnel injury, fire or electric shock.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Warning Safety Precautions

- It is dangerous to wire or attach/withdraw the connector while the power is on. Make sure the power is turned off before operation.
- Installing in the following places may result in malfunction:
  1. A dusty or steamy place
  2. A place generating corrosive gas
  3. A place directly receiving spraying water or oil
  4. A place suffered from heavy vibration or impact.
- The product is not designed for outdoor use.
- Do not use the sensor in a transient state at power on (Up to 1 minute. Warm-up period)
- Do not wire with the high voltage cable or the power lines. Failure to do this will cause malfunction by induction or damage.
- Do not disassemble the case.
- Wipe off dirt on the emitting/receiving parts to maintain correct detection. Avoid any smear or contamination on the emitting/receiving parts.

Precautions for using laser

- Regulations in the USA
  When expunging laser devices to the USA, the USA laser control, FDA (Food and Drug Administration) is applied. This product has been already reportized by FDA (Center for Devices and Radiological Health). For details contact our customer service.

Specifications

- Laser:
  - Wave length: 655nm
  - Max output: 10mW
  - 9° degree type.
- Ambient illuminance:
  - Incandescent lamp: 3,000 lx max.
  - IEC/JIS Suffix 300mm housing length

Dimensions

- M8 type
- M12 type

Included items

- CD22 instruction manual
- CD22-100-485□□
- CD22M-100-485□□
- CD22-35-485□□
- CD22M-35-485□□

Included items

- Laser WARNING label
- Laser Classification label
- Laser mode
- Laser button
- Laser wire
- Laser label

Connections

- Control panel
  - OUT : ON when output is ON
  - LED : ON when area reset

Teach mode

- 1: Setup mode
  - To Setup mode
- 2: Teaching mode
  - 3: FGS2 threshold
  - 4: Near side threshold
  - 5: 1 point Teaching - Far side threshold

Measurement mode

- CD22 has 3 measurement mode. The mode is chosen by "Teach mode".
- Output can be measured by setting "Output polarity"

Changing parameters

You can choose and adjust the parameters by pressing "+" and "-" button.

Changing parameters

Changing "Teach mode" 

Changing "Measurement mode"

Changing 2 point Teaching

Changing 1 point Teaching
Setup mode

- 1. Start rate
- 2. Near side threshold
- 3. Teaching - Pay side threshold
- 4. Interfered circuitry
- 5. Teaching mode
- 6. Near interferes
- 7. Sampling period
- 8. Output polarity
- 9. Averaging number

Extension mode

- 10. On/Off rate
- 11. On/Off polarity
- 12. Display setting
- 13. Extension mode
- 14. Data format
- 15. Command
- 16. Communication
- 17. Setting parameter table

Miscellaneous function

- 18. Zero reset function
- 19. Key lock function

Communication

Specifications as follows:

- Communication method: STX-1048协议 (RS485协议) not supported
- Baud rate: 9600bps (9.6k), 19200bps (19.2k), 38400bps (38.4k), 57600bps (57.6k), 115200bps (115.2k), 230400bps (230.4k), 312500bps (312.5k), 400000bps (460k), 500000bps (500k), 625000bps (625k), 833333bps (833.3k), 921600bps (921.6k)

Data format

- Data format: STX COMMAND DATA1 DATA2 ETX
- Incoming data: STX COMMAND DATA1 DATA2 ETX
- Outgoing data: STX COMMAND DATA1 DATA2 ETX
- Baud rate: 9600bps (9.6k), 19200bps (19.2k), 38400bps (38.4k), 57600bps (57.6k), 115200bps (115.2k), 230400bps (230.4k), 312500bps (312.5k), 400000bps (460k), 500000bps (500k), 625000bps (625k), 833333bps (833.3k), 921600bps (921.6k)

Parameter table (Reading out Measurement Value/Output status)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>00h</td>
<td>Lowest level</td>
</tr>
<tr>
<td>Pt2</td>
<td>01h</td>
<td>2nd point from sensor side</td>
</tr>
<tr>
<td>Pt3</td>
<td>02h</td>
<td>3rd point from sensor side</td>
</tr>
<tr>
<td>Pt5</td>
<td>03h</td>
<td>5th point from sensor side</td>
</tr>
<tr>
<td>AUTO</td>
<td>04h</td>
<td>Auto mode</td>
</tr>
<tr>
<td>RST</td>
<td>05h</td>
<td>Reset mode</td>
</tr>
</tbody>
</table>

Writing data

Writing in a line as following procedure.

1. Readout settings
   - Execute Command "R" (Read out) on the target parameter.
   - Set "Address" at 00h and "W/RA/WR".

2. Write the settings
   - Execute Command "W" (Writing the settings on the target parameter.
   - Set "Address" at the address set in "R", "Read setting".

   Example:
   - Setting "Sampling period" to 10ms:

   1. Readout "Sampling period"
   2. Write the settings

   Parameter Name: Sampling period
   - Enter 1000µs (1kHz) in the setting window.

   "Reading out" command "W" (Writing the settings) will be "OK" and "GW".