

Displacement sensor

FASTUS 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 Indicates a possible hazard that may result in death, serious injury, WARNINGS or serious property damage if the product is used without observing the stated instructions.

Warning Mandatory Requirements

- The light source of this product applies the visible light semiconductor laser. Do not allow the laser beam to enter an eye, either directly or reflected from reflective object. If the laser beam enters an eye, it may cause blindness.
- This product is not an explosion 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 it may cause personal 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

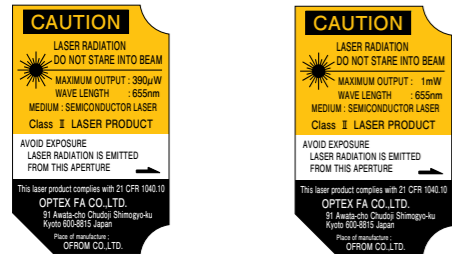
- It is dangerous to wire or attach/remove the connector while the power is on. Make sure to turn off the power before operation.
- Installing in the following places may result in malfunction:
 - A dusty or steamy place
 - A place generating corrosive gas
 - A place directly receiving scattering water or oil.
 - 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 (Approx. 15min. 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 use the product in water.
- Operate within the rated range.
- Wipe off dirt on the emitting/receiving parts to maintain correct detection. Also, avoid direct impact on the product.

Precautions for using laser

Laser label
 This product is classified as Class 2 (II) Laser Product by JIS C6802/IEC/FDA Laser Safety Standard.

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

CD22□-□□□□ (Class 1 type) CD22-□□□ M122 (Class 2 type)

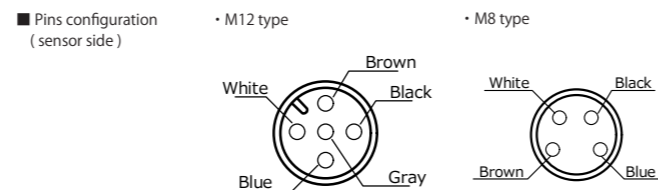
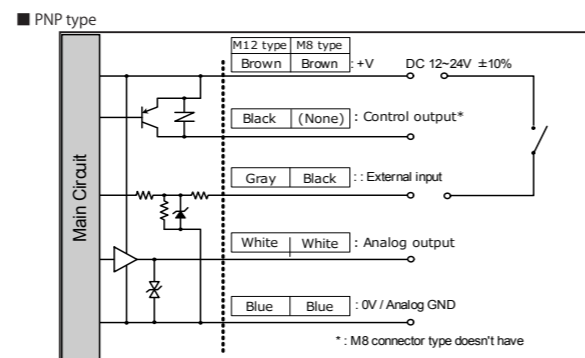
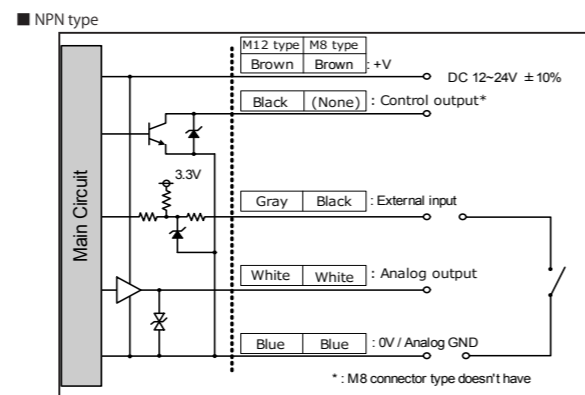


Bundled goods in the box

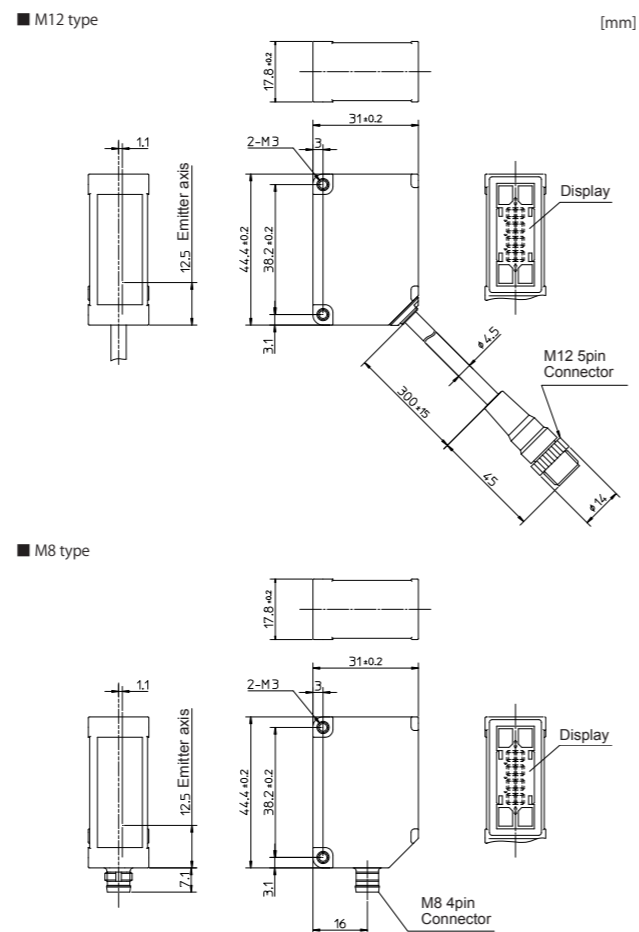
Please confirm following goods bundled in the box.

- CD22□-□□□□
- This instruction manual
- Screws M3 × 25...2
- Laser label

Connection diagram

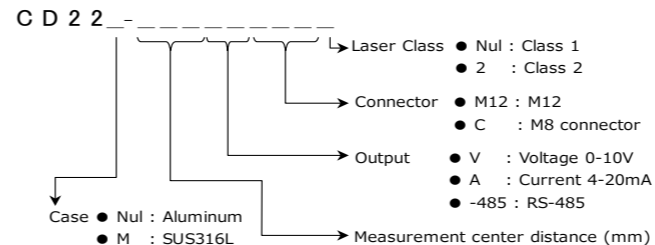


Dimensions



Specifications

● Part number legend



● Specifications per measurement range

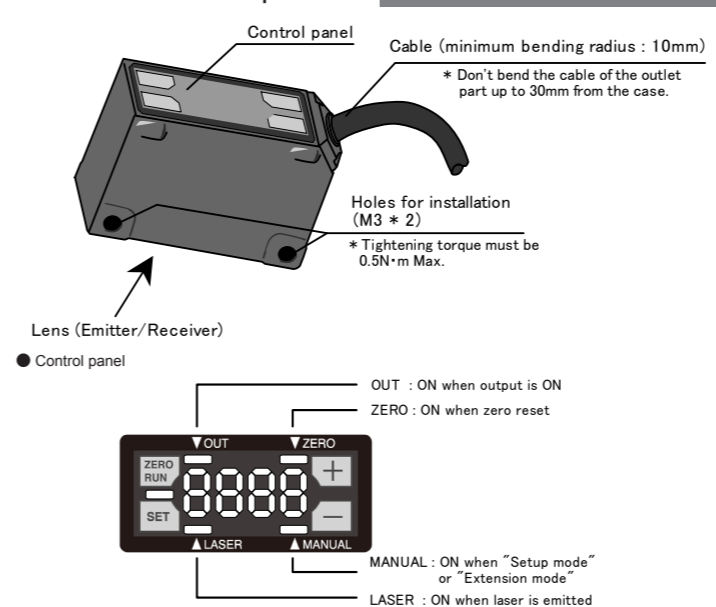
Part number	Aluminum housing	CD22-15□□	CD22-35□□	CD22-100□□
Center of measurement range	SUS housing	15mm	35mm	100mm
Measurement range		±5mm	±15mm	±50mm
Light source		Red laser Diode (wave length 655nm)		
		Max. output: 390 μW		
Laser class	IEC/JIS	Suffix nul: CLASS 1 / 2: CLASS 2		
	FDA	Class II		
Spot size *1		500 * 700μm	450 * 800μm	600 * 700μm
Linearity		0.1% of F.S.	0.1% of F.S.	0.1% of F.S.
Repeatability *2		1μm	6μm	20μm
Sampling period		500μs / 1000μs / 2000μs / 4000μs / AUTO		
Temperature drift (typical value)		±0.02% / °C of F.S.	±0.02% / °C of F.S.	±0.05% / °C of F.S.
Indicator		Laser indicator: Green / Zero reset indicator: Red Output indicator: Orange / Mode indicator: Red		
External Input		Laser OFF, Teaching, Sample & Hold, One shot, Zero reset		
Control Output		NPN/PNP max.100mA/DC30V ((Residual voltage 1.8 V max.))		
Current consumption		70mA max. including Analog output current		
Protection circuit		Reverse connection protection, Over current protection		
Protection category		IP67 including connection part		
Operating Temp./Humid.		-10 ~ 50°C / 35 ~ 85% RH without frosting or condensation		
Storage Temp./Humid.		-20 ~ 60°C / 35 ~ 85%RH		
Ambient illuminance		Incandescent lamp: 3,000 lx max.		
Vibration resistance		10 ~ 55Hz, Double amplitude 1.5mm, X,Y,Z for 2 hours		
Shock resistance		500mm/s ² (approx. 50G) X,Y,Z 3 times each		
Material		Case: Aluminum/SUS316L, Front lens: PPSU, Display: PET		
Weight		Aluminum case with M12 connector : Approx. 60g including 300mm cable with connector SUS case with M12 connector type : Approx. 90g including 300mm cable with connector Aluminum case with M8 connector : Approx. 40g SUS case with M8 connector : Approx. 70g		

The specifications are based on the condition unless otherwise designated: Ambient temperature: 23°C, Supply voltage: 24VDC, Sampling period: 500μs, Averaging: 64, Measuring distance: Center of the range, Testing object: White ceramic
 ※ 1 Defined with center strength 1/e²(13.5%) at the center. There may be leak light other than the specified spot size. The sensor may be affected when there is a highly reflective object close to the detection area.
 ※ 2 512 averaging time
 ※ 3 for Laser Class 2 type (Model : CD22-100AM122, CD22-100VM122)

● Specifications per output

Part number	CD22□-□□V	CD22□-□□A	CD22□-□□-485
Type	Voltage output	Current output	RS-485 type
Analog output range	0 ~ 10V	4 ~ 20mA	—
Maximum load impedance	—	300Ω	—
Output impedance	100Ω	—	—
Power supply	DC18-24V±10%	DC12-24V ±10%	

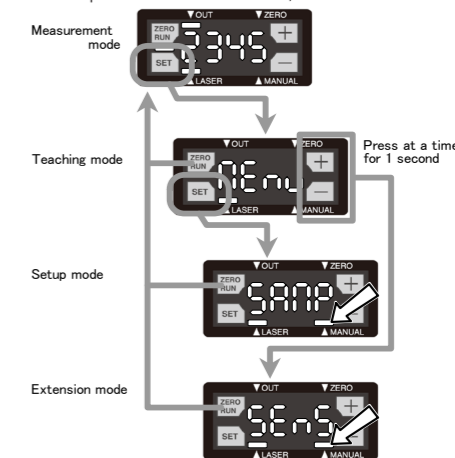
Functions of components



Setup

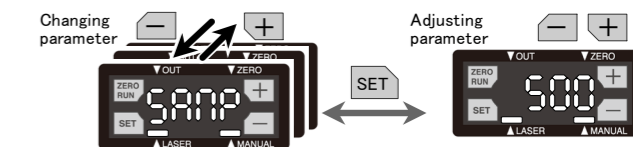
● Changing mode

While it's "Teach mode", "Setup mode" or "Extension mode", you can change the mode to "Measurement mode" by pressing "ZERO/RUN" button. While it's "Setup mode" or "Extension mode", the LED "MANUAL" is lit.

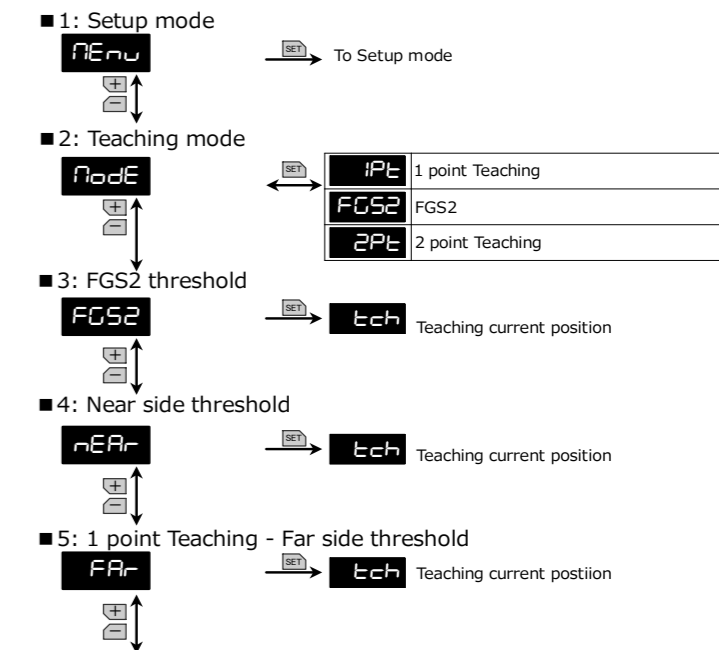


● Changing parameters

You can choose and adjust the parameters by pressing "+" and "-" buttons. The mode will be changed to "Measurement mode" by pressing "ZERO/RUN" button.



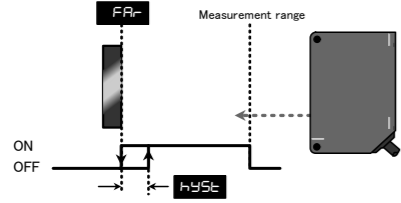
Teach mode



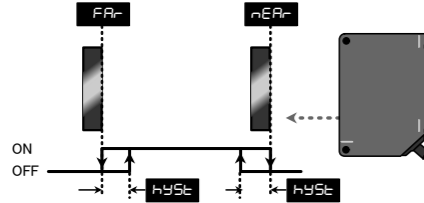
Measurement mode

CD22 has 3 measurement mode. The mode is chosen by "Teach mode".
Output can be reversed by setting "Output polarity" **Act**.
Following output shows its ON/OFF status as "Light ON **L on**".

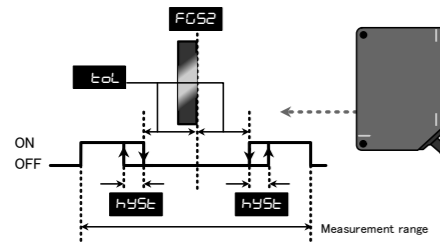
- 1 point Teaching
Teaching is done at a position. When the measurement distance is closer than that position, the output will be ON.



- 2 point Teaching
Teaching is done at 2 positions. While the measurement distance is between those positions, the output will be ON.

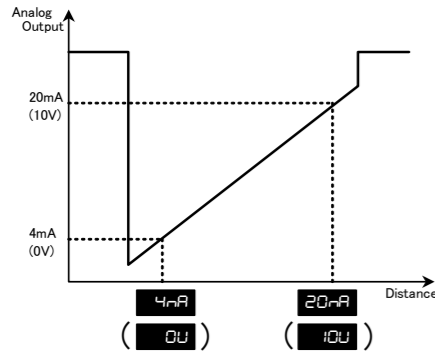


- FGS2
Teaching is done at a position. When the measurement distance is closer than the distance set by "Hysteresis" **tch** from the position that Teaching is done, the output will be ON. It works as FGS sensor.



Analog Output

Analog Current or Analog Voltage type outputs Analog output according to the measurement distance.
The distance range for Analog output is set in Teaching mode or Setup mode.



- Default value of each Analog output type

Current (Voltage)	CD22□-15□□	CD22□-35□□	CD22□-100□□
4mA (0V)	- 5.000	- 15.000	- 50.00
20mA (10V)	5.000	15.000	50.00

External Input

Multiple function can be set at external input. When it's set as "Teaching" or "Zero reset", the function varies by input period as follows.

input period (sec.)	What to teach (Teaching current position)
0 to 0.5 sec.	Do nothing
0.5 to 1.5 sec.	Current output type : 4mA/ Voltage output type : 0V
1.5 to 2.5 sec.	Current output type : 20mA/ Voltage output type : 10V
2.5 to 3.5 sec.	Near side threshold
3.5 to 4.5 sec.	Far side threshold
over 4.5 sec.	FGS2 threshold

input (sampling)	Function
0 to 1,999	Zero reset
over 2,000	Release Zero reset

Setup mode

Setup mode is chosen by pressing "SET" button from "Menu". (* means default value)

- 1: Analog output setup (varies by type)

■ Voltage type
10V 10V ← **0.123** Set the value
0V 0V ← **0.123** Set the value

■ Current type
20mA 20mA ← **0.123** Set the value
4mA 4mA ← **0.123** Set the value

■ RS-485 type - no setup stage

- 2: Near side threshold
nEAR ← **0.123** Set the value
 (Default: CD22□-15□□ -1.000
 CD22□-35□□ -03.00
 CD22□-100□□ -10.00)

- 3: 1 point Teaching - Far side threshold
FAR ← **0.123** Set the value
 (Default: CD22□-15□□ 1.000
 CD22□-35□□ 03.00
 CD22□-100□□ 10.00)

- 4: FGS2 threshold
FGS2 ← **0.123** Set the value
 (Default: CD22□-15□□ 0.000
 CD22□-35□□ 00.00
 CD22□-100□□ 00.00)

- 5: Teaching mode
ModE ← **1Pt** 1 point Teaching
FGS2 FGS2
2Pt 2 point Teaching *

- 6: FGS2 hysteresis
tch ← **0.123** Set the value
 (Default: CD22□-15□□ 1.000
 CD22□-35□□ 03.00
 CD22□-100□□ 10.00)

- 7: External input function
inp ← **off** MF OFF : Disable external input *
Lsr Laser OFF : Kill laser power when input is ON
tch Teaching : Set current value as threshold
sh Sample hold : Keep the level when input is ON
one One shot : Active when input is ON
zero Zero reset : Set current position as "0"

- 8: Sampling period
SAMP ← **500** 500μs (2kHz) *
1000 1000μs (1kHz)
2000 2000μs (500Hz)
4000 4000μs (250Hz)
Auto AUTO (Sensor will optimize automatically)

- 9: Output polarity
Act ← **L on** Light ON: ON when exceeds the threshold *
d on Dark ON: ON when less than the threshold

- 10: NPN/PNP selection
n_p ← **n_p** Set input/output as NPN *
p_p Set input/output as PNP
 This parameter won't be change by reset

- 11: Averaging number
Avg ← **1** Once
8 8 times
64 64 times *
512 512 times

- 12: Alarm setting
ALRN ← **clmp** Clamp : display "9999" *
hold Hold : keep previous value

- 12-2: Alarm - Hold and Clamp
hdct ← **0000** Set sampling number to Hold
- When Alarm is set as **hold**, measurement data will be as follows for Alarm
- "Hold and Clamp" is active
 Keep the previous data for the period and clamp to "9999" after that.
 - "Hold and Clamp" is not active (when it's set "0000")
 Keep the previous data while it's Alarm status.

- 13: Reset (Initializing)
resE ← **yes** Initialize the parameters to default setting
no Do nothing

- 14: Display setting
d.sp ← **on** Activate the display while "Key lock" *
off Disable the display while "Key lock"

Extension mode

Extension mode is chosen by pressing "+" and "-" buttons at a time for 1 second.
Parameters in Extension mode must be set correctly otherwise it might not work correctly.
Please use with default setting when changing parameters is not needed. (* ** means default setting)

- 1: Hysteresis
hyst ← **0.123** Set the value
 (Default: CD22□-15□□ 0.050
 CD22□-35□□ 00.15
 CD22□-100□□ 00.50)

- 2: Measurement point
ntop ← **max** MAX : Maximum distance *
pt5 Pt5 : 5th point from sensor side
pt4 Pt4 : 4th point from sensor side
pt3 Pt3 : 3rd point from sensor side
pt2 Pt2 : 2nd point from sensor side
pt1 Pt1 : Closest point from sensor side

- 3: Threshold
thre ← **base** Base : Set threshold to lowest level *
p400 P400 : Set threshold to upper level
p200 P200 : Set threshold to middle level
p100 P100 : Set threshold to lower level

- 4: Time out
tout ← **off** Disable Time out *
100n Time out in 100ms
SAMP Time out in sampling period

- 5: External input filter
inct ← **1** Once *
 Set filtering number for external input. The unit is sampling times.
256 256 times

- 6: Zero shift
zero ← **0.123** Set the value

- 7: Sensitivity
SENS ← **Auto** Auto : Adjust automatically *
n_6 6 : Maximum sensitivity
n_1 1 : Minimum sensitivity

Miscellaneous function

- Zero reset function
 - Set Zero reset
 While it's measurement mode, press **ZERO RUN** for 2 seconds. Then, **0000** will be shown. The position of decimal point varies by sensor type.
 When setting Zero reset, the red indicator LED "ZERO" will be ON.
 - Release zero reset
 While it's measurement mode, press **ZERO RUN** for 4 seconds to release Zero reset.
- Key lock function
 - Activate Key lock
 While it's measurement mode, press **+** **-** at a time for 1 second. Then, **Loc** will be shown.
 While **Loc** is shown, any access except "Releasing Key lock" will be neglected.
 - Release Key lock
 While Key lock is activated, it will be released by pressing **+** **-** at a time for 3 seconds. Then, **uLoc** will be shown.
 After this process, every access will be accepted.



Attention: Not to be Used for Personnel Protection.
Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death. These sensors do not include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Please consult our distributors about safety products which meet OSHA, ANSI and IEC standards for personnel protection.

- Specifications and equipment are subject to change without any obligations on the part of manufacture.
- For more information, questions and comments regarding products, please contact us below.

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