



D2SA-M□ D2SA-M□3  
 D2SA-S□ D2SA-S□1  
 D2SA-M□-M8 D2SA-S□-M8

# Instruction Manual

Thank you for purchasing DSA Series. We hope you are fully satisfied with this product and enjoy its performance.  
 Carefully read this instruction manual and keep it for future reference.

## Safety Precautions

Carefully read and understand the safety precautions before operation. The important information is provided to protect your health and property. Do not apply any other installing or operating procedure other than that described in this manual.

### Meaning of Safety Symbols

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

**CAUTION** Indicates a possible hazard that may result in personal injury or property damage if the product is used without observing the stated instructions.

## Mandatory Requirements

- This product is not an explosion-proof construction. Do not use the product under flammable, explosive gas or liquid environment.
- Do not use the product in water.
- Do not disassemble, repair, or convert the product. Failure to do this may cause failure, fire, or electric shock.
- Operate within the rated range.

This product cannot be used as a safety device to protect human body.

## Operational Precautions

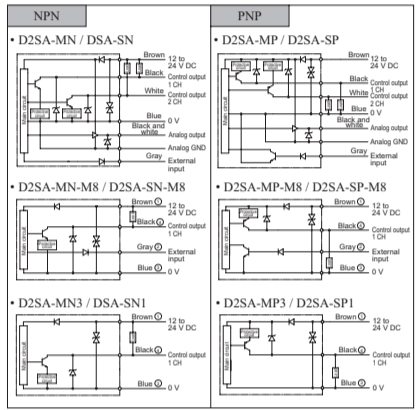
- Use the specified sensor head to connect this product. Any use other than specified will cause accident or product damage.
- It is dangerous to wire or attach/remove the connector with the power on. Make sure to turn off the power before operation.
- Make sure to use the product with the protective cover attached and closed.
- 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 transient state after power on (approx. 100 ms).
- Do not wire with the high voltage cable or the power line. Failure to do this will cause malfunction by induction or damage.
- The sensor performance or digital display values may depend on the individual units or the condition of detected product.

## Specification

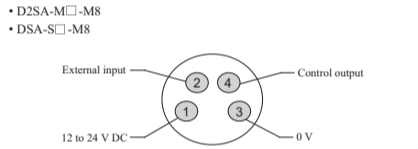
Model	Advanced Model (2CH)		Standard Model (1CH)	
	Base unit	Handset	Base unit	Handset
Cable type	D2SA-M(N/P)	D2SA-S(N/P)	D2SA-M(N/P)3	D2SA-S(N/P)1
M8 connector type	-	-	D2SA-M(N/P)-M8	D2SA-S(N/P)-M8
Adaptable sensor head	DS Series			
Power source, voltage	12 - 24 V DC ± 10% including a ripple			
Consumption current	45 mA or less / 24 V			
Response time	60µs/500µs/2ms (Fast/Standard/Long)			
Control output	NPN / PNP Open collector			
Load current	100 mA or less Residual voltage: 1.8 V or less			
Indicator light	Laser emission indicator light: Green, Output Indicator light: Orange (1 2CH) Teaching indicator light: Red Channel indicator light: Green (1 2CH)			
Digital display	7 segment 8 digit display			
Timer function	OFF, On delay, Off delay, One-shot			
Timer time	1 ms - 9 s			
Mutual interference prevention function	Yes: Up to 4 machines			
Output method	Light on / Dark on Switching type in the function			
Analog output	Current output 4 - 20 mA			
External input setting	Teaching, synchronizing input, floodlight off, counter reset		Teaching, synchronizing input, floodlight off, counter reset	
Setting input/output	Output setting (2CH output + Alarm output) * Settable only with D2SA-M□-M8			
Operating temperature/humidity	-25 to +55°C / 35 to 85% RH (No freezing)			
Store temperature/humidity	-40 to +70°C / 35 to 85% RH (No condensation)			
Shock resistance	10 to 55 Hz Double amplitude 1.5 mm 2 hours for each direction of X, Y, and Z			
Protective category	IP50			
Material	PC: Case and cover			
Weight (including the codes)	Cable type: 65 g M8 connector type: 30 g			

\*1 Operating temperature may differ according to the number of connection. See as follows:  
 1 - 3 machines(s): -25 to +55°C  
 4 - 8 machines: -25 to +50°C  
 \* When not using analog output.  
 \* Base units and handsets of the advanced or standard models can be connected with any combination. However, some combination may be restricted. For details, contact our Customer Service.

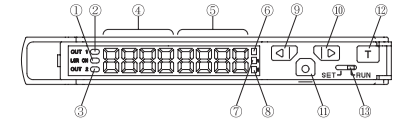
## Input/Output Schematic



### Pin layout



## Each Part



No.	Name	Function
①	Laser emission indicator light	Turns on while the amplifier is powered.
②	1CH output indicator light	Turns on when the output of 1 CH is ON.
③	2CH output indicator light	Turns on when the output of 2 CH is ON.
④	Main monitor (Red)	Displays light intensity, function, and the number of counts.
⑤	Sub monitor (Green)	Displays the threshold, function selection, and the number of counts.
⑥	Teaching mode indicator light	Turns on in the Teaching mode.
⑦	Valid channel indicator light (1 CH)	Keeps turning ON when the monitor display value, adjustment, and the function setting are valid to 1 CH.
⑧	Valid channel indicator light (2 CH)	Keeps turning ON when the monitor display value, adjustment, and the function setting are valid to 2 CH.
⑨	UP button	RUN mode: Displays or changes the threshold. Function mode: Selects the function or changes the numerical values.
⑩	DOWN button	RUN mode: Switches to the Function mode. (0.5 ± 0.2) Function mode: Fix the selection.
⑪	Mode button	RUN mode: Switches the channel. Function mode: Returns to RUN mode or performs scaling. Set mode: Run the teaching.
⑫	Teaching button	RUN mode: Switches the channel. Function mode: Returns to RUN mode or performs scaling. Set mode: Run the teaching.
⑬	SET/RUN selection switch	Switches between Teaching mode and RUN mode.

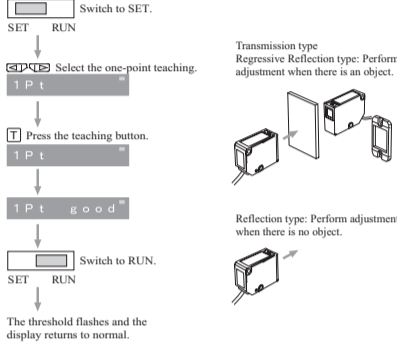
\* The button function varies in each mode: RUN mode, Function mode, and SET mode.  
 \* As D2SA-M□/D2SA-S□/D2SA-M□-M8/D2SA-S□-M8 are 1 output (1CH) type, ④ and ⑤ do not turn on. The channel switching of ④ also becomes invalid.

## Adjustment

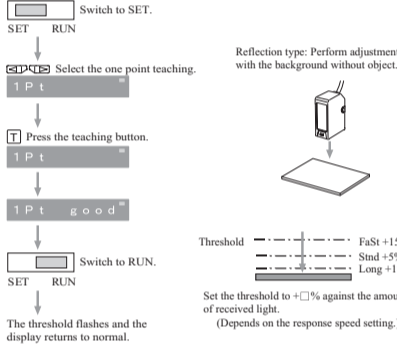
The available teaching depends on "5.3 Detection Mode setting." Refer to below:

St n (Standard detection)	All teachings are valid.
h d J / h d L (Edge detection)	No teaching are valid.
d i F F (Differential detection)	Only one point teaching is valid.

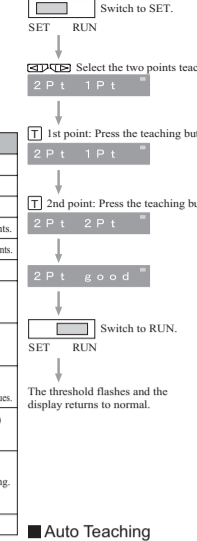
### Setting Maximum Sensitivity



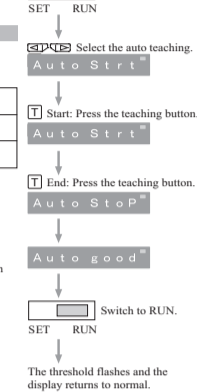
### One Point Teaching



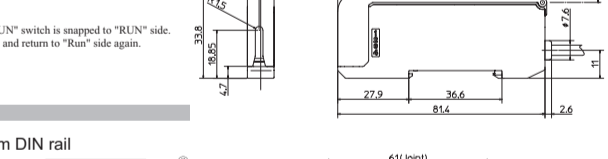
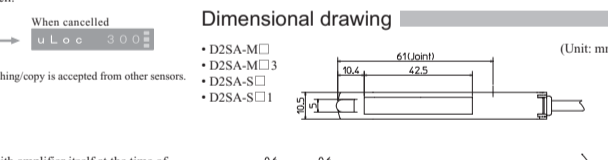
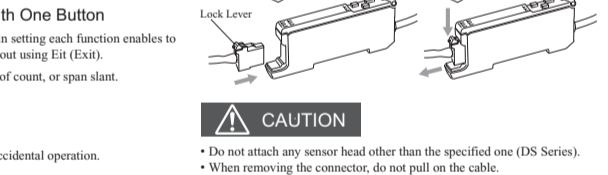
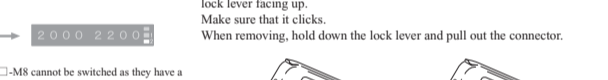
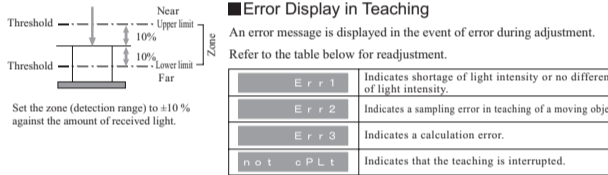
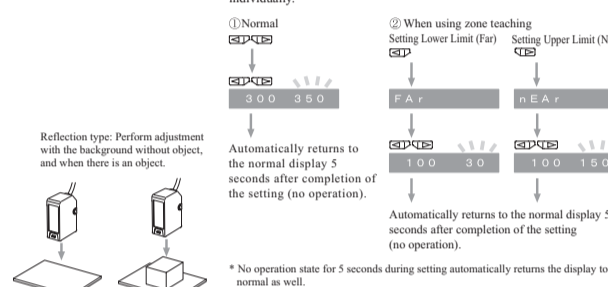
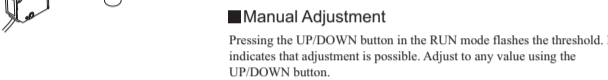
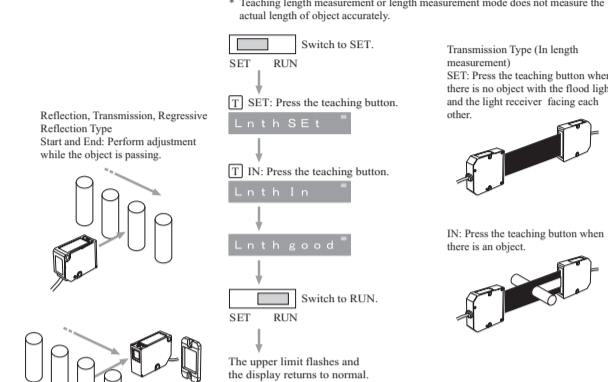
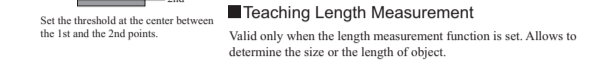
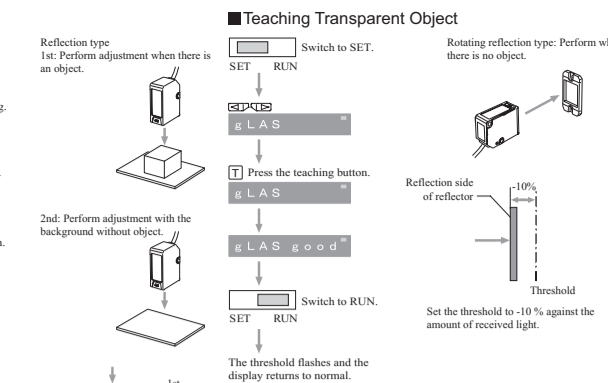
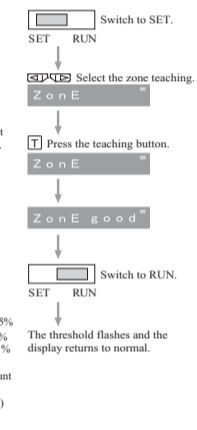
## Two Points Teaching



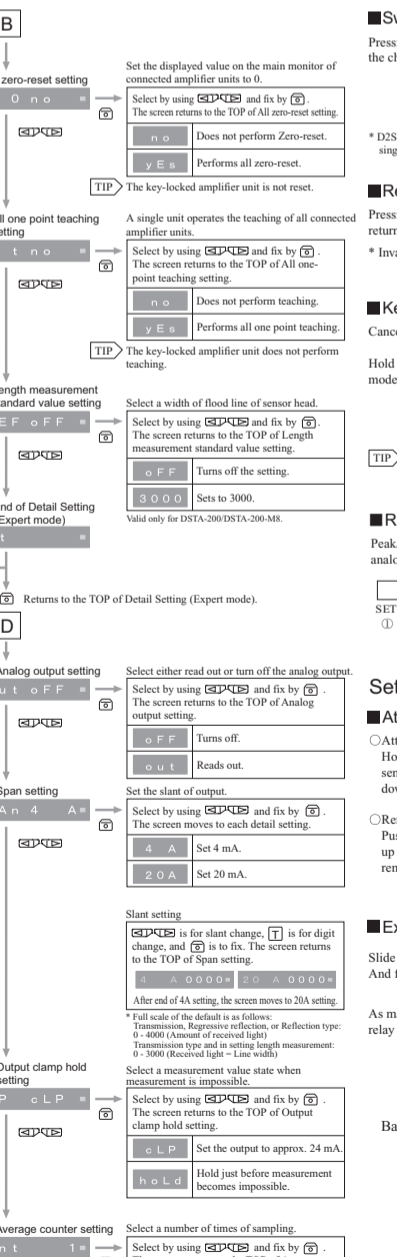
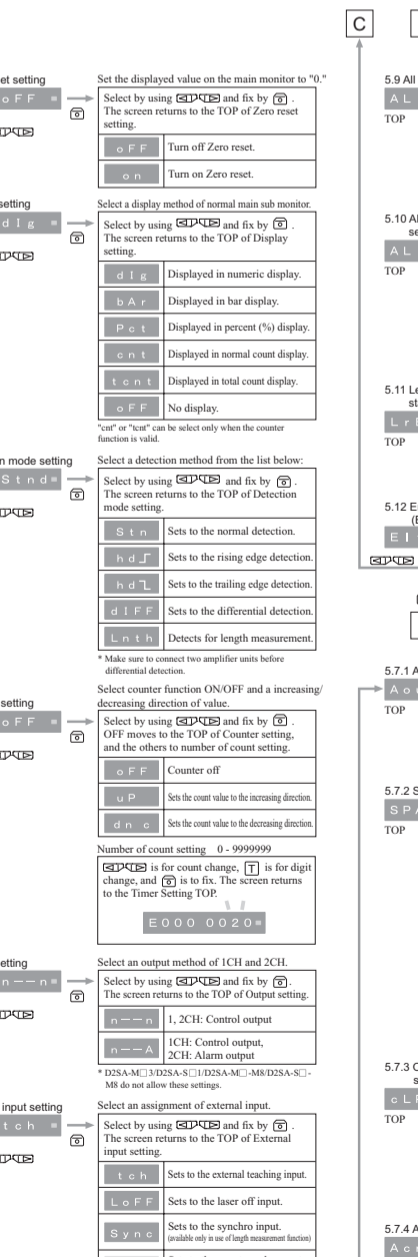
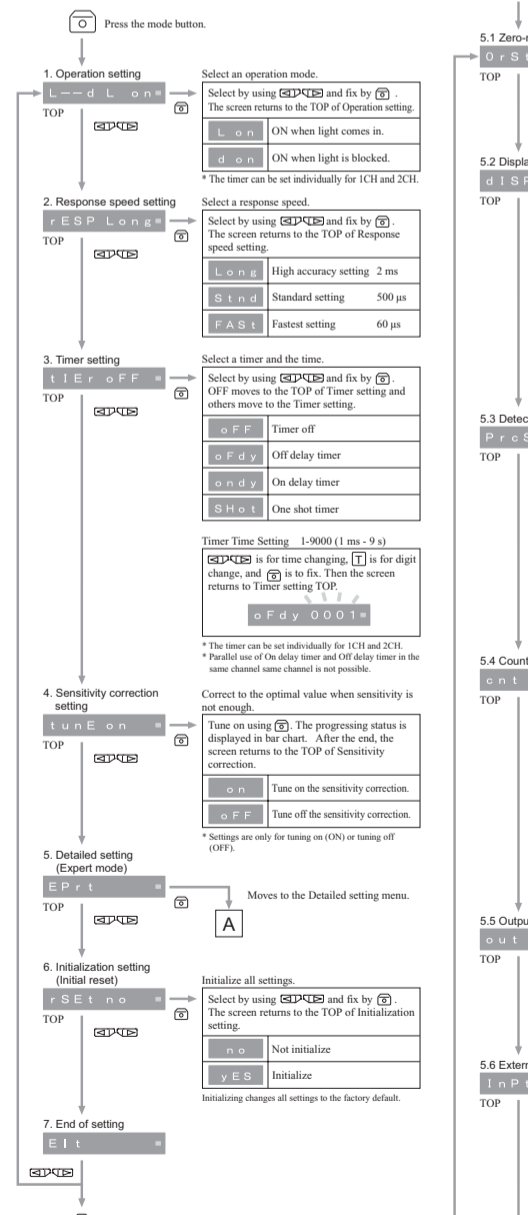
## Auto Teaching



## Zone Teaching



## Function Setting



**Precautions for Function Setting**

- Some function settings automatically delete the invalid settings or settings, of which concomitant use is not allowed, from the displayed items. This does not indicate any failure.
- Some functions are not incorporated or not settable to D2SA-M□3 / D2SA-S□1 / D2SA-M□-M8 / D2SA-S□-M8.
- Hold down the operation button for approx. 0.3 seconds if not especially specified.
- Analog output and Analog setting is available when response time setting becomes "Long" or "Standard".
- The sub monitor starts flashing when each setting selection becomes available.
- The monitor in use of the counter function displays "UP" when the up-counter is selected, and displays "d" when the down-counter is selected.
- For functions other than Operation setting and Timer setting, both settings of 1 CH and 2 CH are changed when the setting of each function is modified.
- The "all setting" described in 5.8 to 5.10 is reflected only on the amplifier unit connected to the right side from the cable connector of operated amplifier unit.

\* The key-locked amplifier unit setting is not modified.

\* Full scale of the default is as follows:  
 Transmission, Regressive reflection type: 0 - 4000 (Amount of received light)  
 Transmission type and setting length measurement: 0 - 3000 (Received light - Line width)  
 After end of 4A setting, the screen moves to 20A setting.

**CAUTION**

- Make sure to turn off the power before operation.
- Make sure to use the DIN rail and the end unit (BEF-BE01-W190) in expanding the amplifier unit.
- After expansion, make sure to check the operating temperature (See "Specification").
- To avoid short of connecting terminal, protection cover need to be attached to ones which are not in use.
- Do not remove the combined units all together from DIN rail.

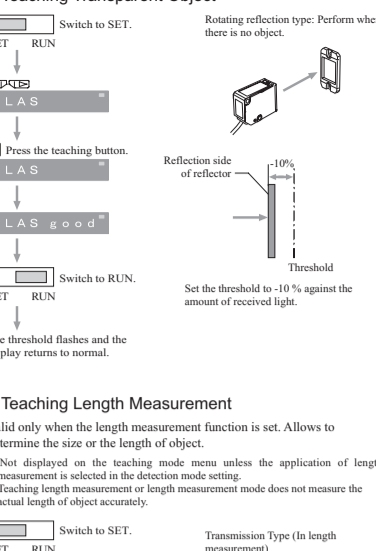
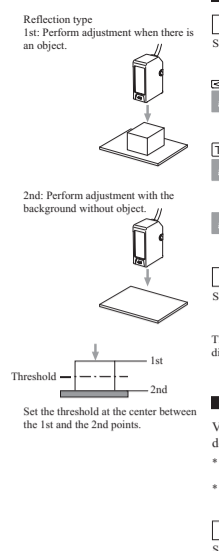
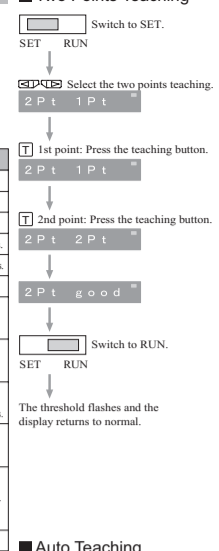
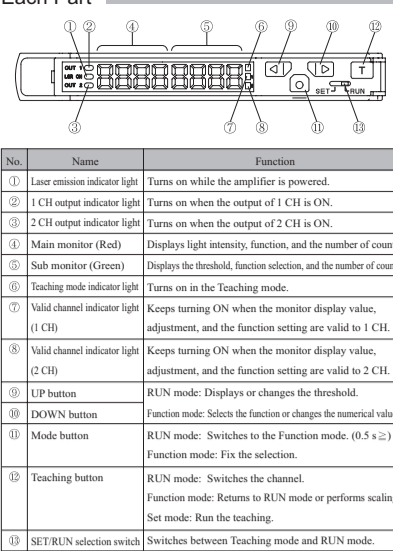
Digital Amplifier Detachable Photoelectric Sensor  
**D2SA Series**  
 Laser Type Amplifier Unit D2SA-M□S  
 D2SA-M□3S  
 D2SA-M□S-M8

# Instruction Manual

- Thank you for purchasing DSA Series. We hope you are fully satisfied with this product and enjoy its performance.
- Carefully read this instruction manual and keep it for future reference.

### Specification

Model	Advanced Model (2CH)	Standard Model (1CH)
Cable type	D2SA-M(N/P)S	D2SA-M(N/P)3S
M8 connector type	-	D2SA-M(N/P)S-M8
Adaptable sensor head	DS Series	
Power source, voltage	12 - 24 V DC ± 10% including a ripple	
Consumption current	45 mA or less / 24 V	
Response time	60µs/500µs/2ms (Fast/Standard/Long)	
Control output	NPN / PNP Open collector Load current: 100 mA or less Residual voltage: 1.8 V or less	
Indicator light	Laser emission indicator light: Green, Output Indicator light: Orange (1,2CH) Teaching indicator light: Red Channel indicator light: Green (1,2CH)	
Digital display	7 segment 8 digit display	
Timer function	OFF, On delay, Off delay, One-shot	
Timer time	1 ms - 9 s	
Output method	Light on / Dark on Switching type in the function	
Analog output	Current output 4 - 20 mA	
Setting input/output	External input setting (teaching, synchronizing input, floodlight off, counter reset) Output setting (2CH output + Alarm output) * Settable only with DSA-M□S-M8	External input setting (teaching, synchronizing input, floodlight off, counter reset)
Operating temperature/humidity	-25 to +55°C / 35 to 85% RH (No freezing)	
Store temperature/humidity	-40 to +70°C / 35 to 85% RH (No condensation)	
Shock resistance	10 to 55 Hz Double amplitude 1.5 mm 2 hours for each direction of X, Y, and Z	
Protective category	IP50	
Material	PC: Case and cover	
Weight (including the cables)	Cable type: 65 g M8 connector type: 30 g	



### Safety Precautions

Carefully read and understand the safety precautions before operation. The important information is provided to protect your health and property. Do not apply any other installing or operating procedure other than that described in this manual.

#### Meaning of Safety Symbols

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

**CAUTION** Indicates a possible hazard that may result in personal injury or property damage if the product is used without observing the stated instructions.

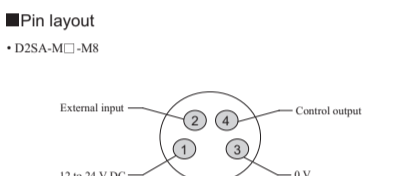
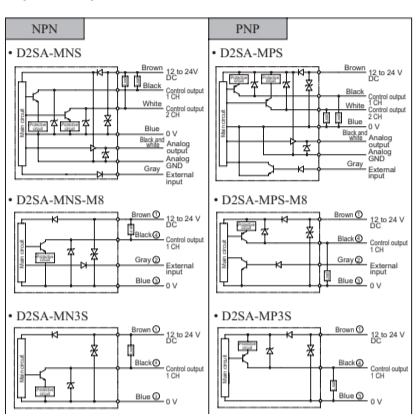
### Mandatory Requirements

- This product is not an explosion-proof construction. Do not use the product under flammable, explosive gas or liquid environment.
  - Do not use the product in water.
  - Do not disassemble, repair, or convert the product. Failure to do this may cause failure, fire, or electric shock.
  - Operate within the rated range.
- This product cannot be used as a safety device to protect human body.

### Operational Precautions

- Use the specified sensor head to connect this product. Any use other than specified will cause accident or product damage.
- It is dangerous to wire or attach/remove the connector with the power on. Make sure to turn off the power before operation.
- Make sure to use the product with the protective cover attached and closed.
- 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 transient state after power on (approx. 100 ms).
- Do not wire with the high voltage cable or the power line. Failure to do this will cause malfunction by induction or damage.
- The sensor performance or digital display values may depend on the individual units or the condition of detected product.

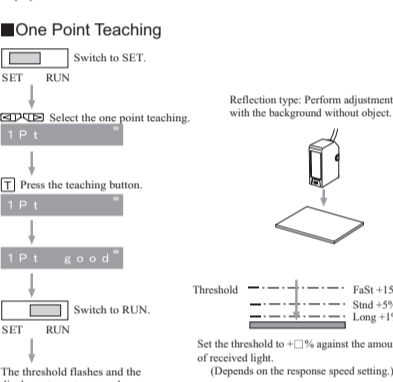
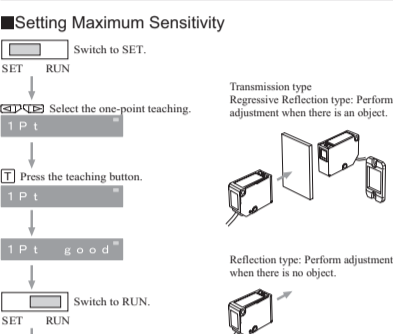
### Input/Output Schematic



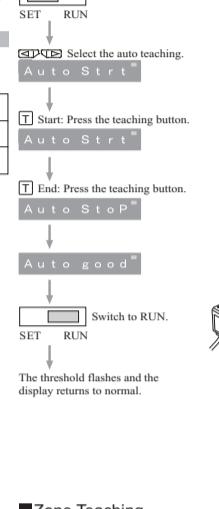
### Adjustment

The available teaching depends on "5.3 Detection Mode setting." Refer to below:

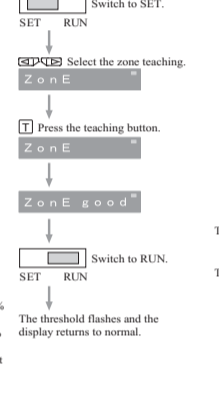
Standard detection	All teachings are valid.
Edge detection	No teaching are valid.
Differential detection	Only one point teaching is valid.



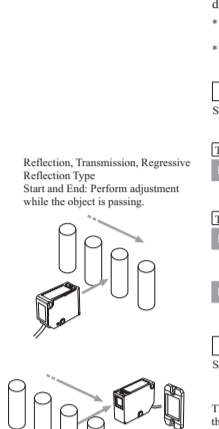
### Auto Teaching



### Zone Teaching



### Manual Adjustment

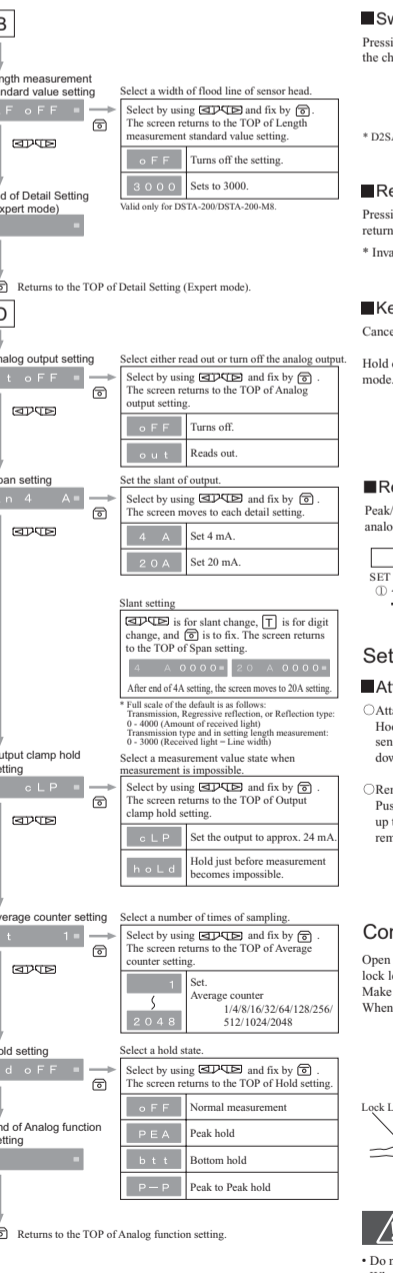
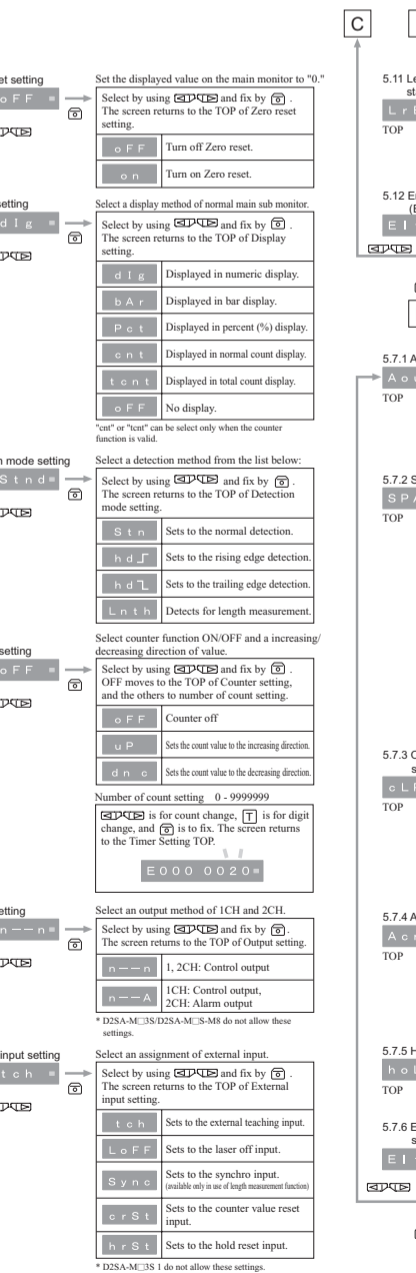
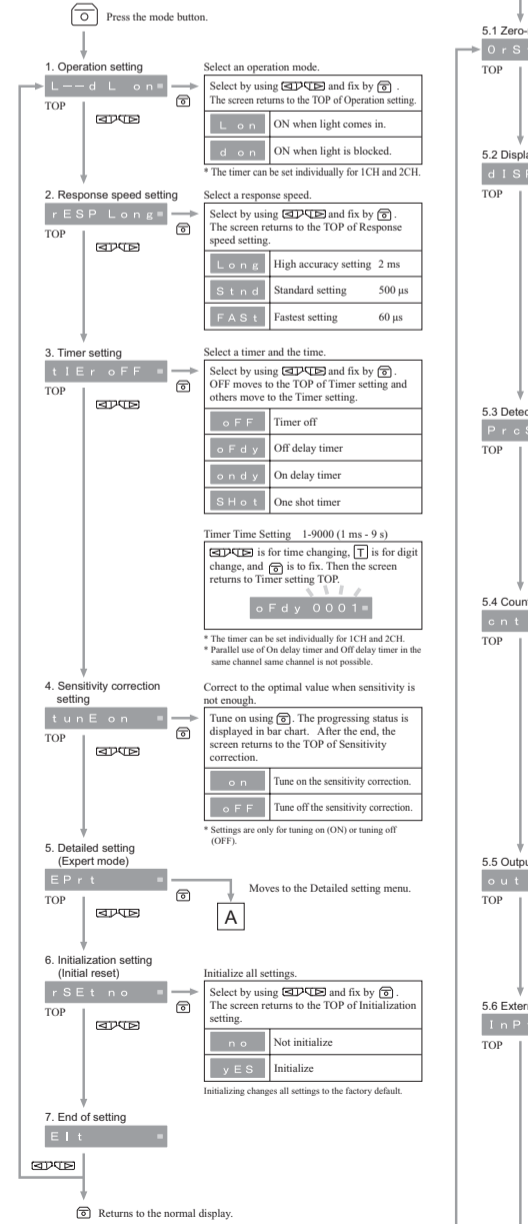


### Error Display in Teaching

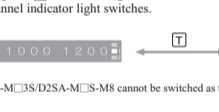
An error message is displayed in the event of error during adjustment. Refer to the table below for readjustment.

Error Code	Description
Err 1	Indicates shortage of light intensity or no difference of light intensity.
Err 2	Indicates a sampling error in teaching of a moving object.
Err 3	Indicates a calculation error.
not cPlt	Indicates that the teaching is interrupted.

### Function Setting



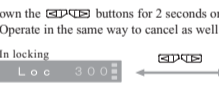
### Switching Channel



### Returning to Normal Display with One Button

Pressing the [T] button for 2 seconds or more in setting each function enables to return to the normal display (RUN mode) without using [Exit].

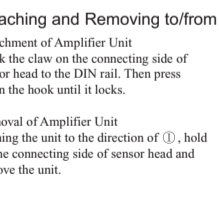
### Key Lock



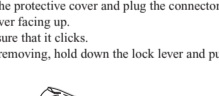
### Reset "Peak/ Bottom hold"

Peak/Bottom hold can be reset by operating with amplifier itself at the time of analog output.

### Setting Amplifier Unit



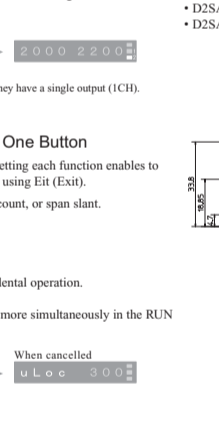
### Connecting Sensor Head



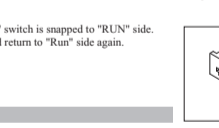
### CAUTION

- Do not attach any sensor head other than the specified one (DS Series).
- When removing the connector, do not pull on the cable.
- Failure to do so will break the cable or damage the product.

### Dimensional drawing



### Options



- #### Precautions for Function Setting
- Some function settings automatically delete the invalid settings or settings, of which concomitant use is not allowed, from the displayed items. This does not indicate any failure.
  - Some functions are not incorporated or not settable to D2SA-M□3S/D2SA-M□S-M8.
  - Hold down the operation button for approx. 0.3 seconds if not especially specified.
  - Analog output and Analog setting is available when response time setting is "Long" or "Standard".
  - The sub monitor starts flashing when each setting selection becomes available.
  - The monitor in use of the counter function displays "U" when the up-counter is selected, and displays "d" when the down-counter is selected.
  - For functions other than Operation setting and Timer setting, both settings of 1 CH and 2 CH are changed when the setting of each function is modified.

- The product specification may change without notice for improvement.
- For any inquiry, please contact the manufacture/vendor below.

# OPTEX FA CO., LTD.

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Website: <http://www.optex-fa.com>