



DSA Series

Laser Type Amplifier Unit DSA-M□S
 DSA-M□3S
 DSA-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.

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



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.



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

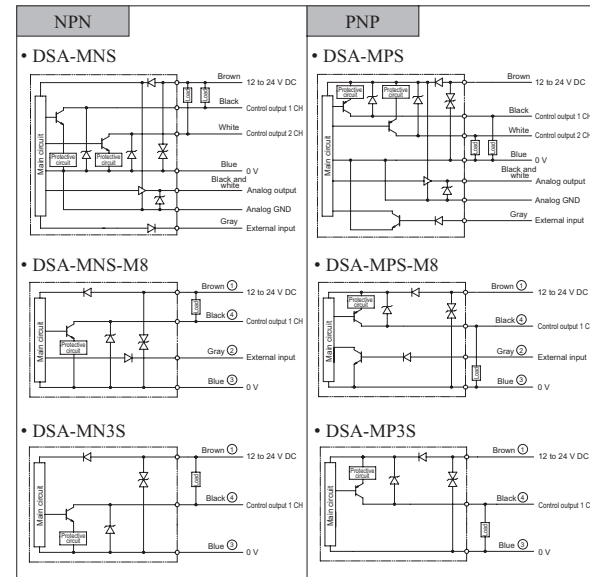


- Use the specified sensor head to connect this product. Any use other than specified will cause accident or product damage.
- It is dangerous to wire or attach/remove the connector with the power on. Make sure to turn off the power before operation.
- Make sure to use the product with the protective cover attached and closed.
- Installing in the following places may result in malfunction:
 1. A dusty or steamy place
 2. A place generating corrosive gas
 3. A place directly receiving scattering 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 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.

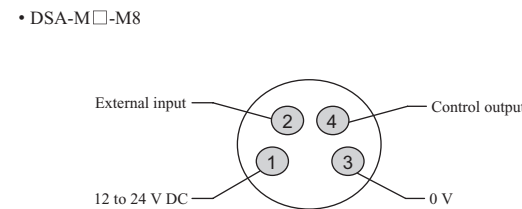
Specification

Model	Advanced Model (2CH)	Standard Model (1CH)
Cable type	DSA-M(N/P)S	DSA-M(N/P)3S
M8 connector type	-	DSA-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 (1 point teaching, synchronizing input, floodlight off, counter reset) Output setting (2CH output + Alarm output) * Settable only with DSA-M□S-M8	External input setting (1 point 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 codes)	Cable type: 65 g M8 connector type: 30 g	

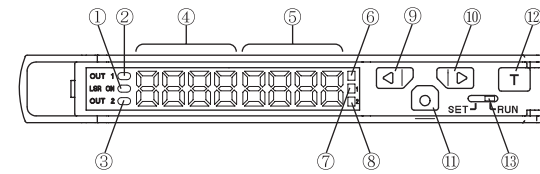
Input/Output Schematic



Pin layout



Each Part



No.	Name	Function
①	Laser emission indicator light	Turns on while the amplifier is powered.
②	1 CH output indicator light	Turns on when the output of 1 CH is ON.
③	2 CH 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.
⑩	DOWN button	Function mode: Selects the function or changes the numerical values.
⑪	Mode button	RUN mode: Switches to the Function mode. (0.5 s ≥) Function mode: Fix the selection.
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.

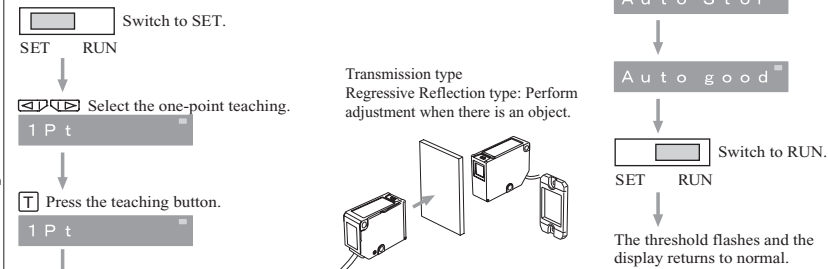
* The button function varies in each mode: RUN mode, Function mode, and SET mode.
 * DSA-M□3S/DSA-M□S-M8 are 1 output (1 CH) type, ③ and ⑧ do not turn on. The channel switching of ⑬ also becomes invalid.

Adjustment

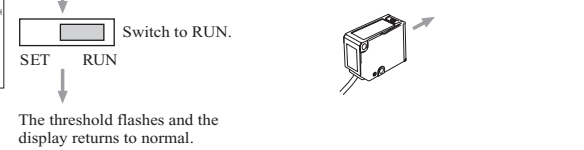
The available teaching depends on "5.3 Detection Mode setting." Refer to below:

Stn (Standard detection)	All teachings are valid.
hd / hd (Edge detection)	No teaching are valid.
dIFF (Differential detection)	Only one point teaching is valid.

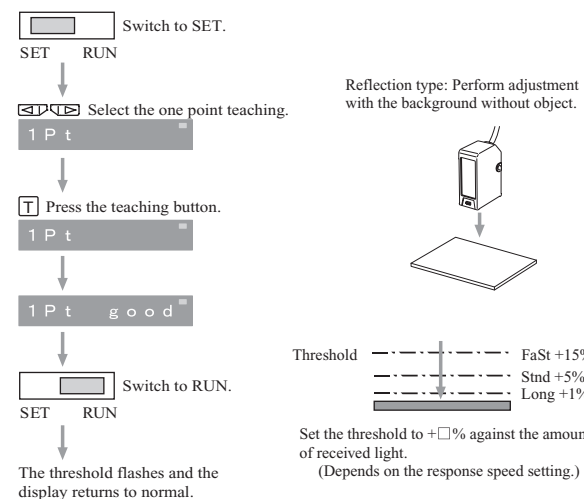
Setting Maximum Sensitivity



Transmission type
 Regressive Reflection type: Perform adjustment when there is an object.

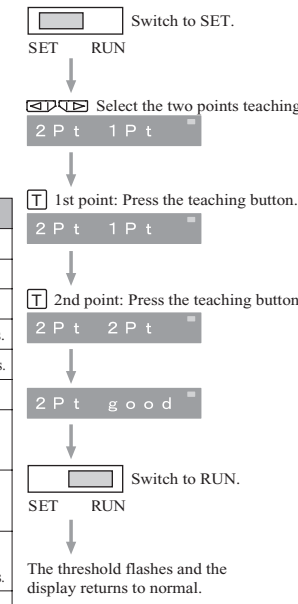


One Point Teaching

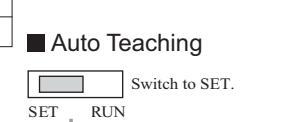


Threshold
 FaSt +15%
 Std +5%
 Long +1%
 Set the threshold to +□% against the amount of received light. (Depends on the response speed setting.)

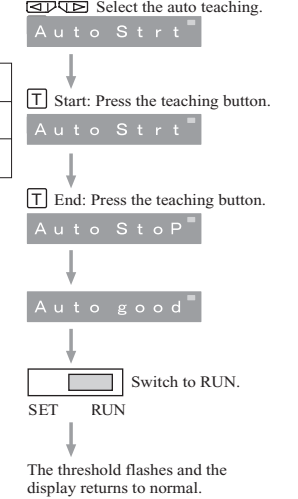
Two Points Teaching



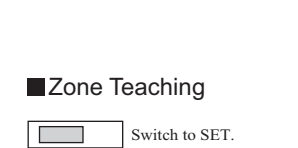
Reflection type
 1st: Perform adjustment when there is an object.
 2nd: Perform adjustment with the background without object.



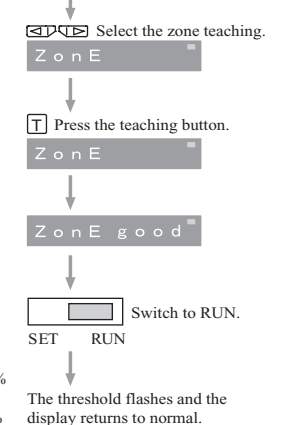
Auto Teaching



Reflection, Transmission, Regressive Reflection Type
 Start and End: Perform adjustment while the object is passing.



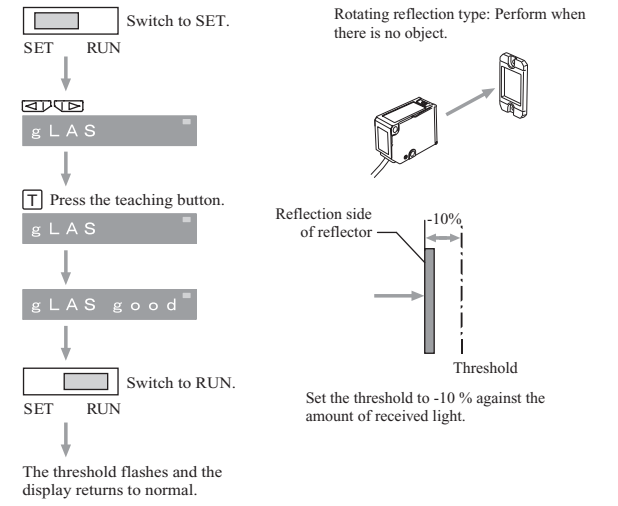
Zone Teaching



Reflection type: Perform adjustment with the background without object, and when there is an object.

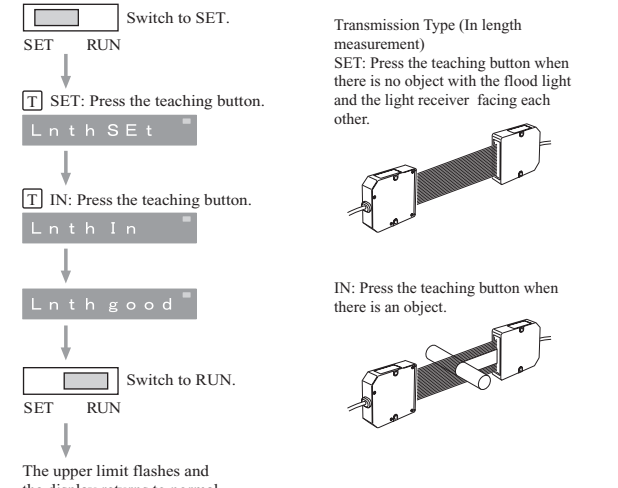
Threshold
 Near Upper limit
 Lower limit
 Far
 Set the zone (detection range) to ±10% against the amount of received light.

Teaching Transparent Object



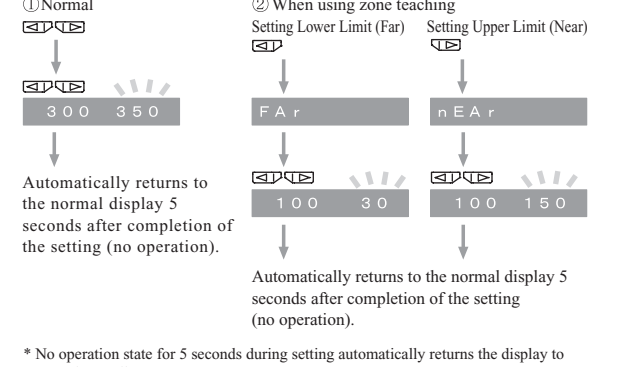
Rotating reflection type: Perform when there is no object.
 Reflection side of reflector
 -10%
 Threshold
 Set the threshold to -10% against the amount of received light.

Teaching Length Measurement



Valid only when the length measurement function is set. Allows to determine the size or the length of object.
 * Not displayed on the teaching mode menu unless the application of length measurement is selected in the detection mode setting.
 * Teaching length measurement or length measurement mode does not measure the actual length of object accurately.

Manual Adjustment



When using the zone teaching, the threshold of upper/lower limit can be set individually.

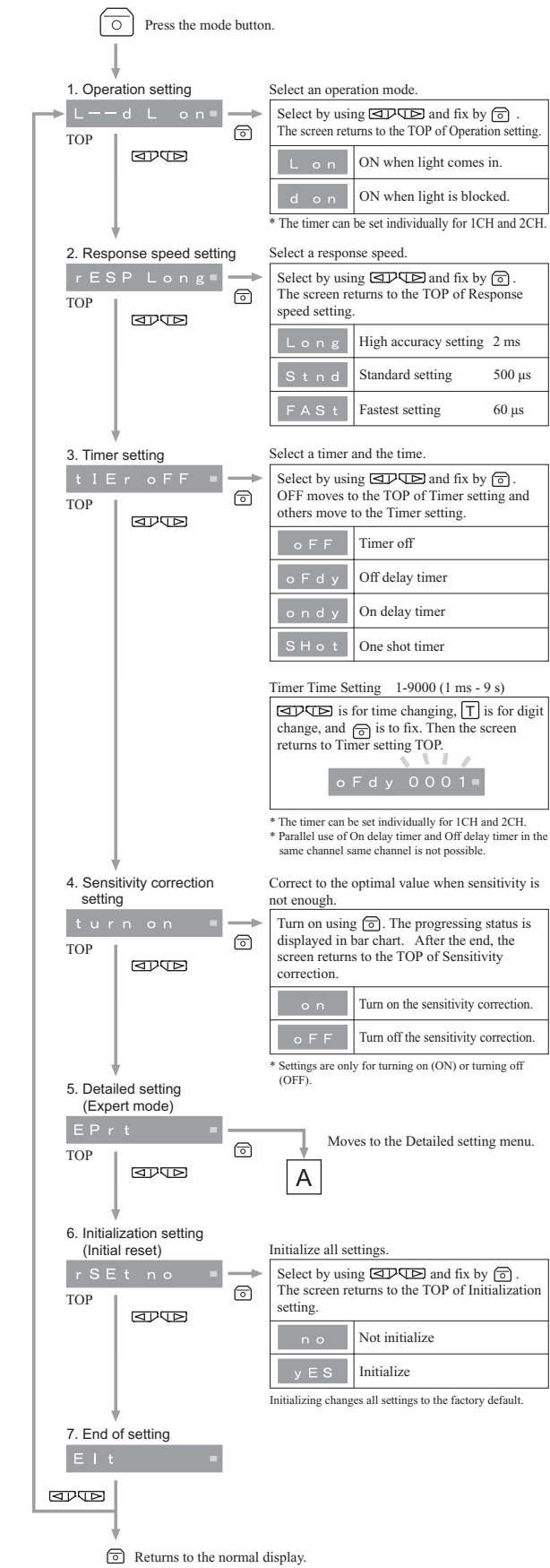
① Normal	300 350
② When using zone teaching	Setting Lower Limit (Far) Setting Upper Limit (Near)
	Far nEA r
	100 30 100 150

* No operation state for 5 seconds during setting automatically returns the display to normal as well.

Error Display in Teaching

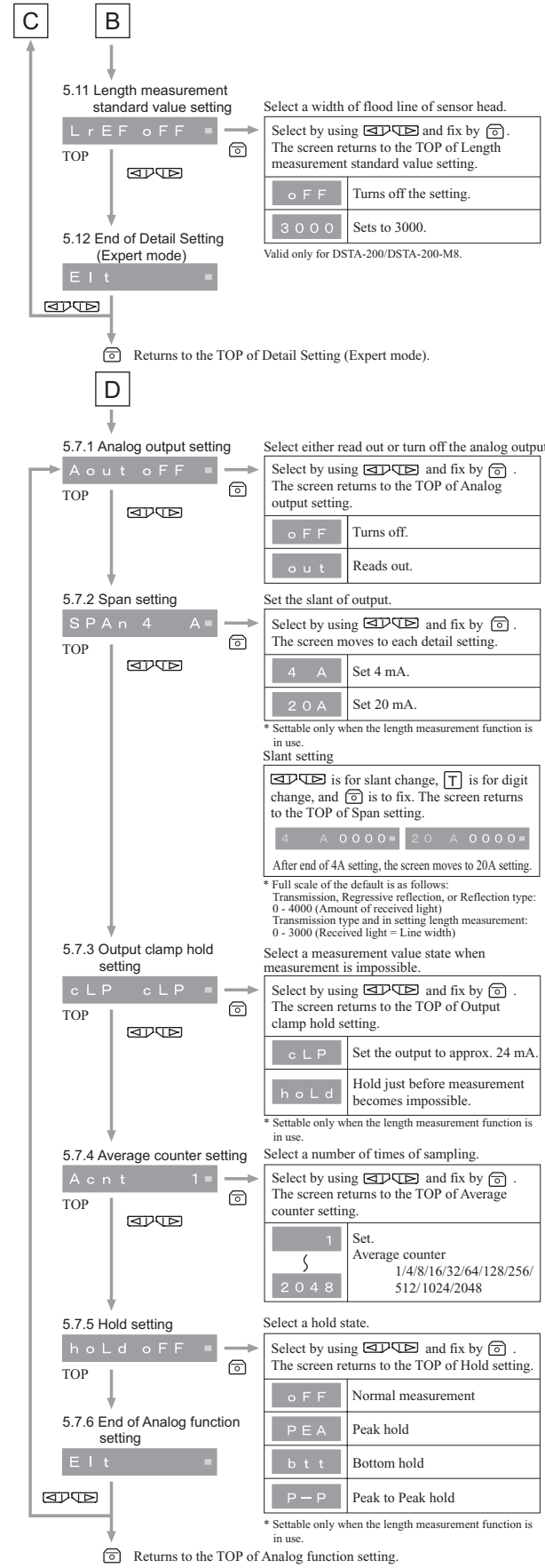
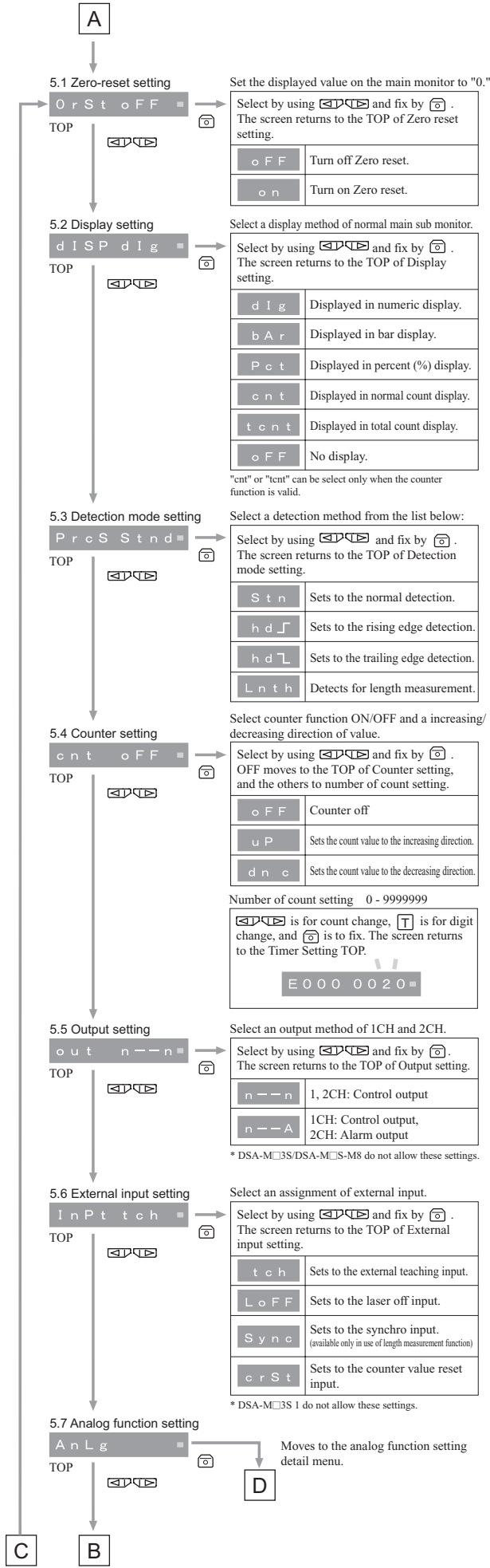
Err 1	Indicates shortage of light intensity or no difference of light intensity.
Err 2	Indicates a sampling error in teaching of a moving object.
Err 3	Indicates a calculation error.
not cPLt	Indicates that the teaching is interrupted.

Function Setting



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 DSA-M□3S / DSA-M□S-M8.
- * Hold down the operation button for approx. 0.3 seconds if not especially specified.
- * Analog output is not sent when the response speed setting is set to Fast. Output is available only when the setting is set to Long or Std (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.



Switching Channel

Pressing the **T** button during the RUN mode allows switching. At the same time the channel indicator light switches.



* DSA-M□3S / DSA-M□S-M8 cannot be switched as they have a single output (1CH).

Returning to Normal Display with One Button

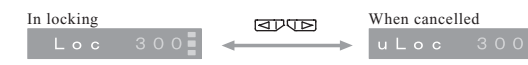
Pressing the **T** button for 2 seconds or more in setting each function enables to return to the normal display (RUN mode) without using Eit (Exit).

* Invalid while setting the timer time, number of count, or span slant.

Key Lock

Cancels all the operations. Useful to prevent accidental operation.

Hold down the **←** buttons for 2 seconds or more simultaneously in the RUN mode. Operate in the same way to cancel as well.

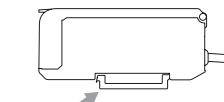


Setting Amplifier Unit

Attaching and Removing to/from DIN rail

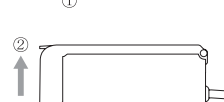
Attachment of Amplifier Unit

Hook the claw on the connecting side of sensor head to the DIN rail. Then press down the hook until it locks.



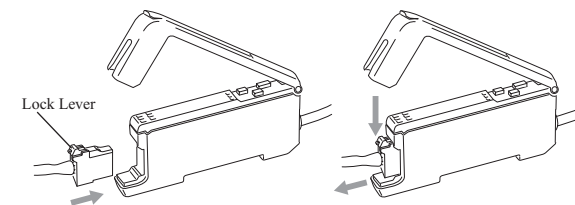
Removal of Amplifier Unit

Pushing the unit in the direction of ①, hold up the connecting side of sensor head and remove the unit.



Connecting Sensor Head

Open the protective cover and plug the connector into the amplifier unit with the lock lever facing up. Make sure that it clicks. When removing, hold down the lock lever and pull out the connector.

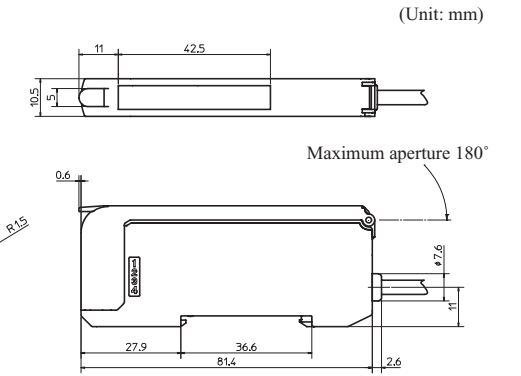


CAUTION

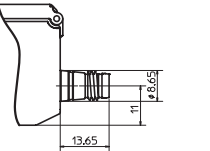
- * Do not attach any sensor head other than the specified one (DS Series).
- * When removing the connector, do not pull on the cable. Failure to do so will break the cable or damage the product.

Dimensional drawing

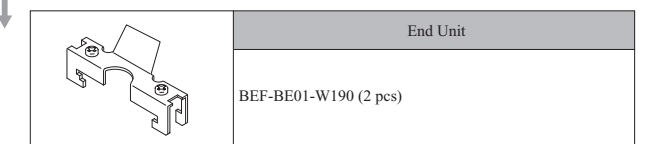
- DSA-M□S
- DSA-M□3S



- DSA-M□S-M8



Options



- 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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TEL: +81-(0)75-594-8123
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Website: <http://www.optex-fa.com>
0537310 ver.1.0

Digital Amplifier Detachable Photoelectric Sensor

DSA Series

Laser Type Amplifier Unit

DSA-M□
DSA-S□
DSA-M□-M8



DSA-M□3
DSA-S□1

Instruction Manual

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Safety Precautions

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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



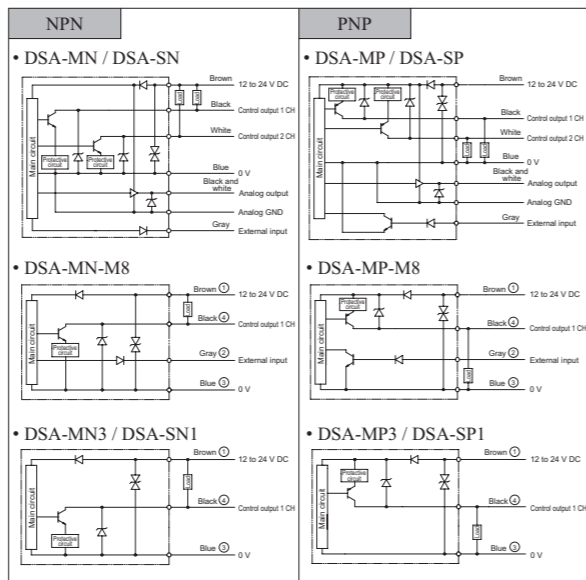
- Use the specified sensor head to connect this product. Any use other than specified will cause accident or product damage.
- It is dangerous to wire or attach/remove the connector with the power on. Make sure to turn off the power before operation.
- Make sure to use the product with the protective 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 6 lines	Handset 4 lines	Base unit 3 lines	Handset 1 line
Cable type	DSA-M(N/P)	DSA-S(N/P)	DSA-M(N/P)3	DSA-S(N/P)1
M8 connector type	-	-	DSA-M(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		-	
Setting input/output	External input setting (1 point teaching, synchronizing input, floodlight off, counter reset) Output setting (2CH output + Alarm output) * Settable only with DSA-M□-M8		External input setting (1 point 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 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 machine(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.

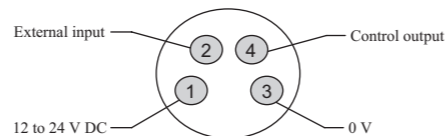
Input/Output Schematic



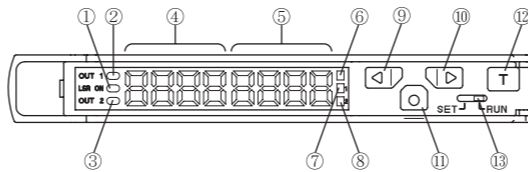
* DSA-S□/DSA-S□1 of the handset do not have power wires (brown, blue) as they receive the power supply from the base unit.

Pin layout

• DSA-M□-M8



Each Part



No.	Name	Function
①	Laser emission indicator light	Turns on while the amplifier is powered.
②	1 CH output indicator light	Turns on when the output of 1 CH is ON.
③	2 CH 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.
⑩	DOWN button	Function mode: Selects the function or changes the numerical values.
⑪	Mode button	RUN mode: Switches to the Function mode. (0.5 s ≥) Function mode: Fix the selection.
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.

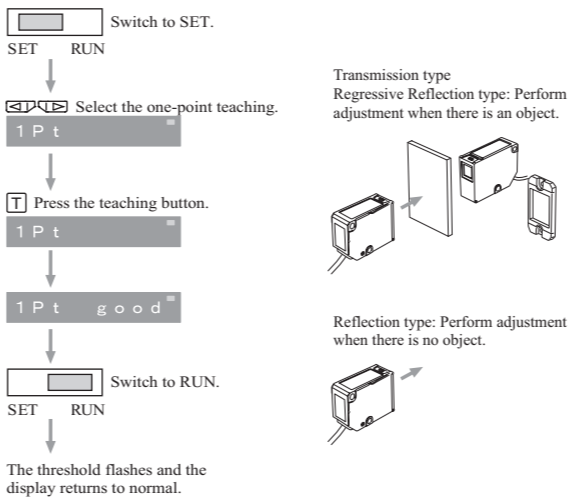
* The button function varies in each mode: RUN mode, Function mode, and SET mode.
* As DSA-M□3/DSA-S□1/DSA-M□-M8 are 1 output (1 CH) type, ③ and ⑧ do not turn on. The channel switching of ⑫ also becomes invalid.

Adjustment

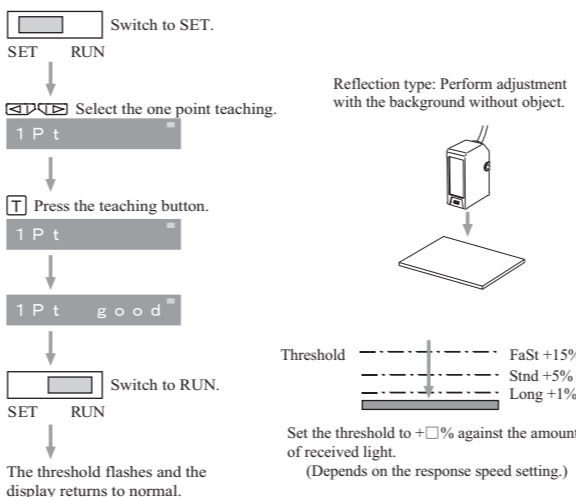
The available teaching depends on "5.3 Detection Mode setting." Refer to below:

St n	(Standard detection)	All teachings are valid.
hd┘ / hd└	(Edge detection)	No teaching are valid.
d I F F	(Differential detection)	Only one point teaching is valid.

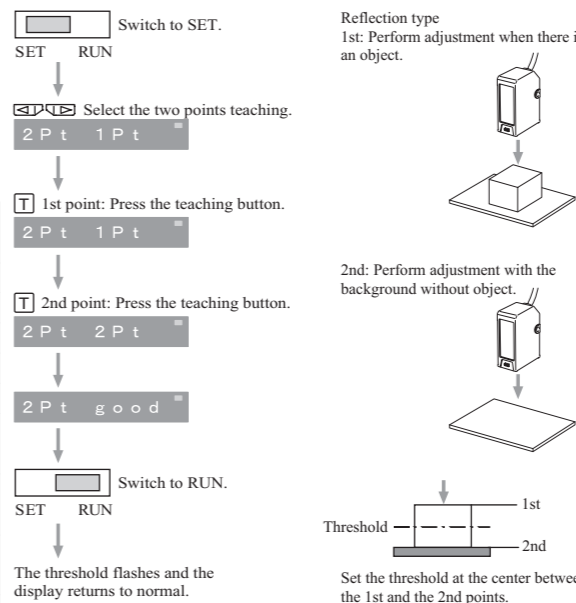
Setting Maximum Sensitivity



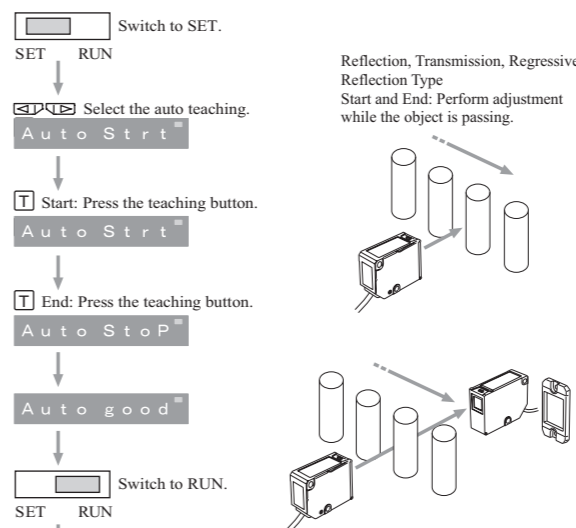
One Point Teaching



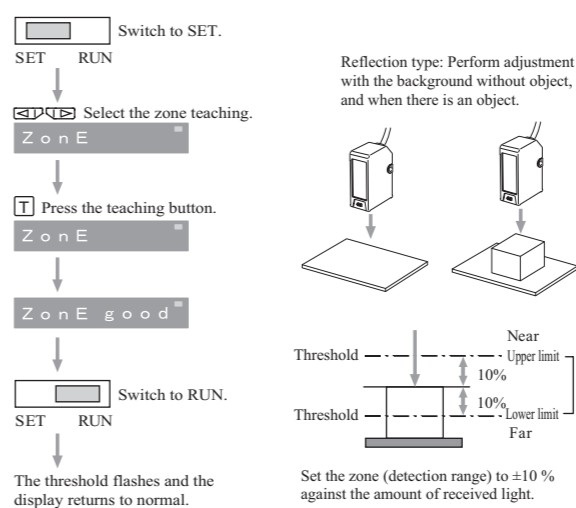
Two Points Teaching



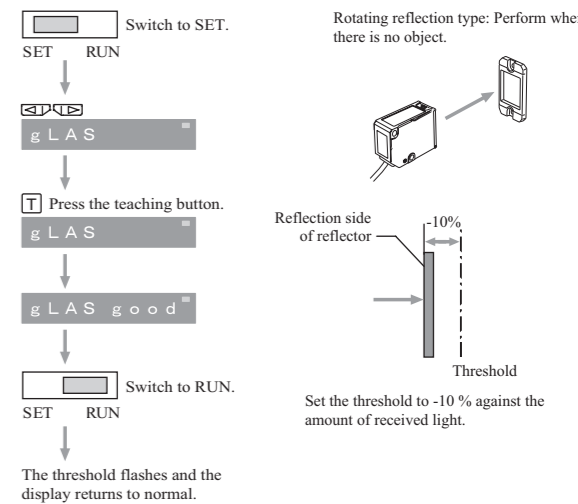
Auto Teaching



Zone Teaching

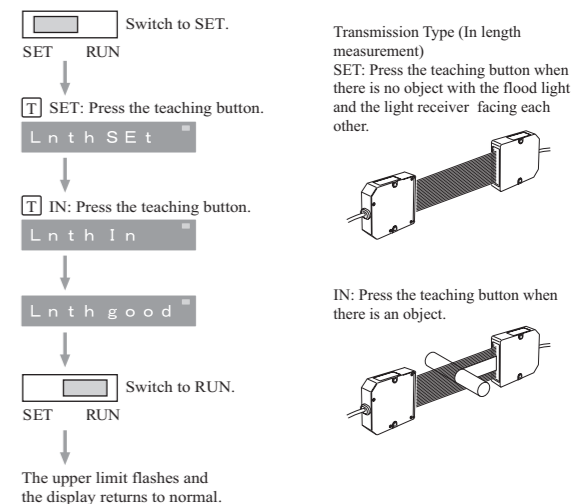


Teaching Transparent Object



Teaching Length Measurement

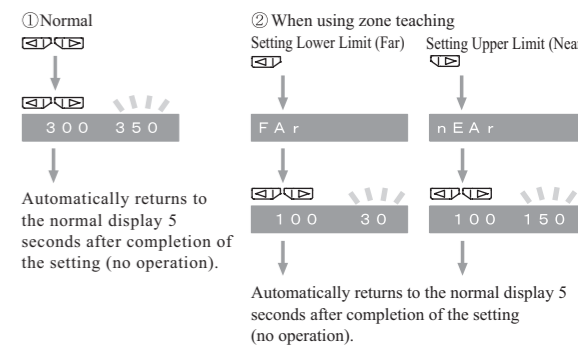
Valid only when the length measurement function is set. Allows to determine the size or the length of object.
* Not displayed on the teaching mode menu unless the application of length measurement is selected in the detection mode setting.
* Teaching length measurement or length measurement mode does not measure the actual length of object accurately.



Manual Adjustment

Pressing the UP/DOWN button in the RUN mode flashes the threshold. It indicates that adjustment is possible. Adjust to any value using the UP/DOWN button.

When using the zone teaching, the threshold of upper/lower limit can be set individually.



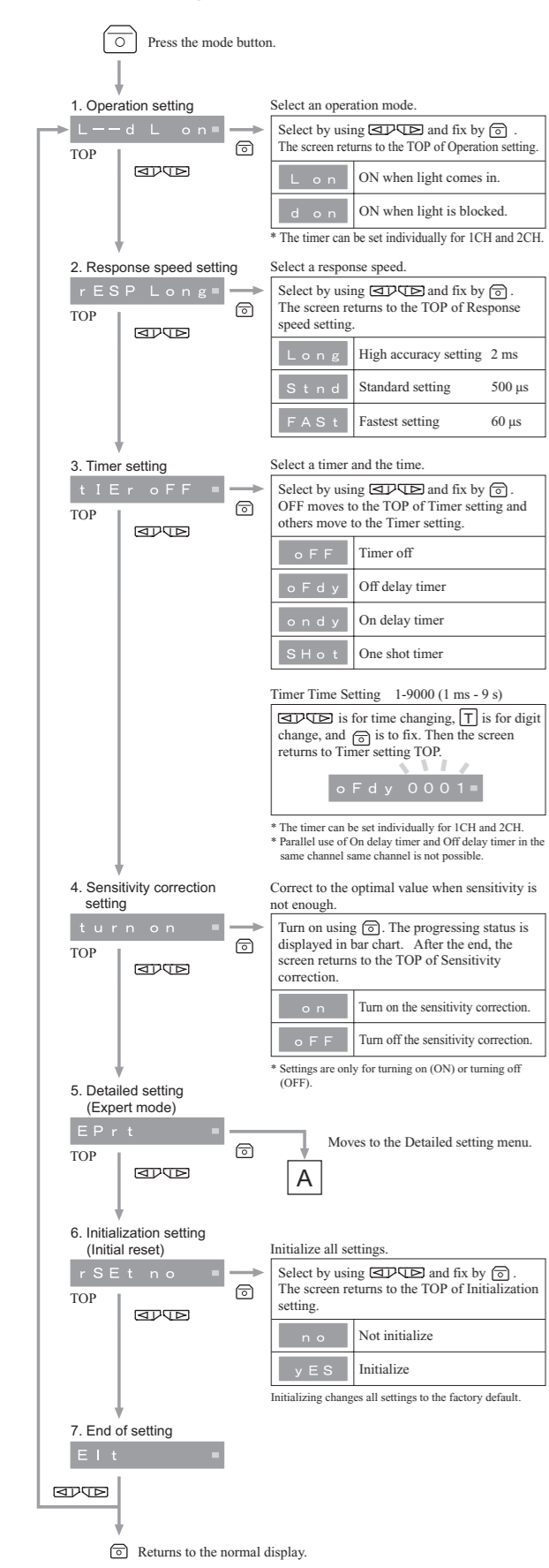
* No operation state for 5 seconds during setting automatically returns the display to normal as well.

Error Display in Teaching

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

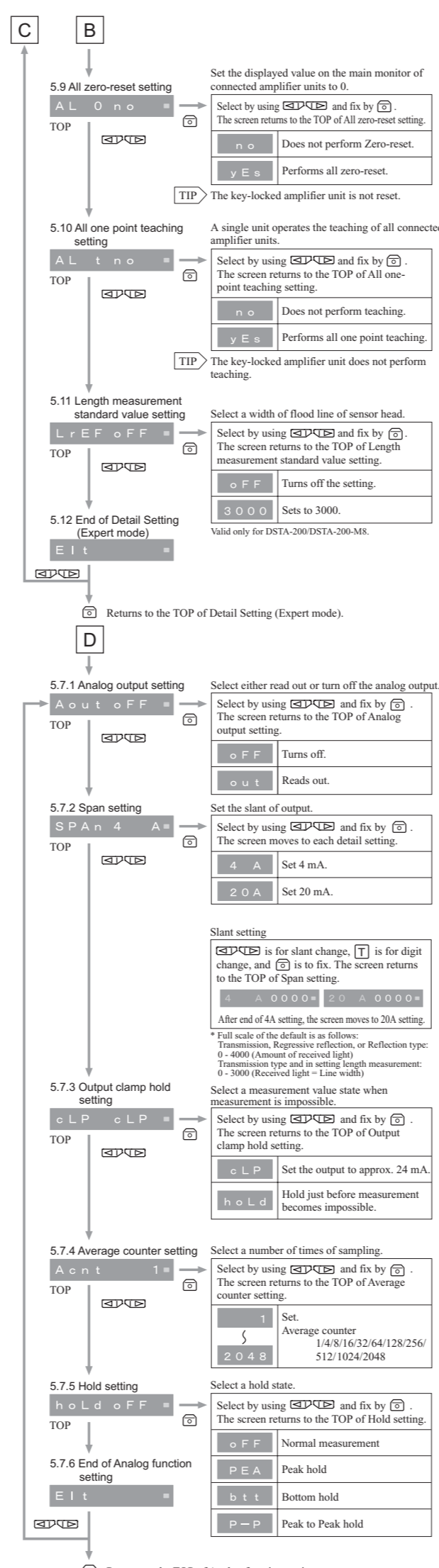
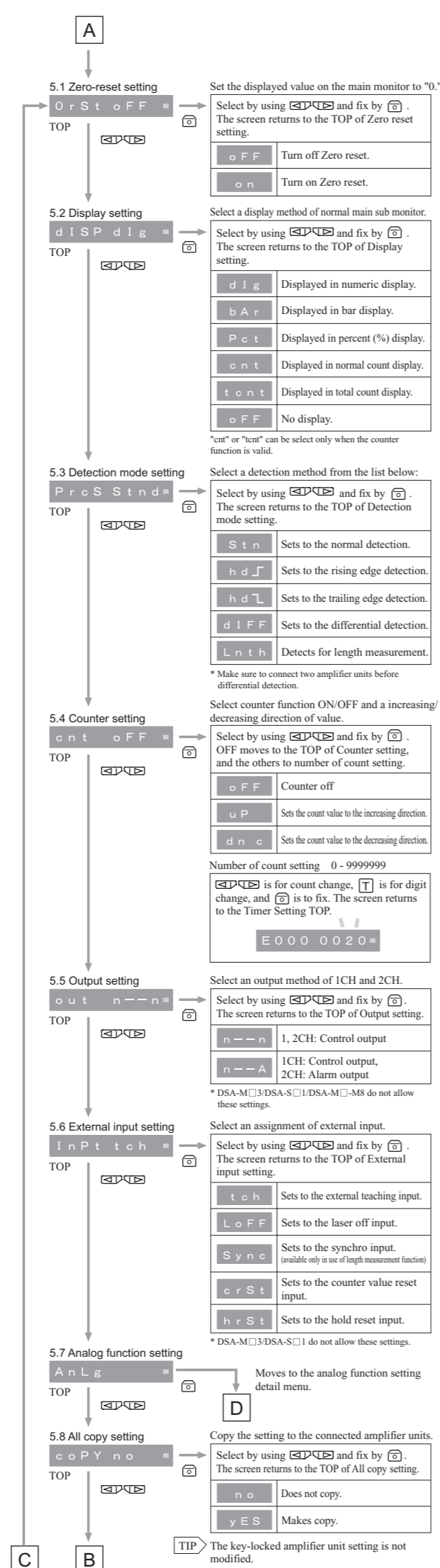
Err 1	Indicates shortage of light intensity or no difference of light intensity.
Err 2	Indicates a sampling error in teaching of a moving object.
Err 3	Indicates a calculation error.
not cPLt	Indicates that the teaching is interrupted.

Function Setting



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 DSA-M□3/DSA-S□1/DSA-M□-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 "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.



Switching Channel

Pressing the **[T]** button during the RUN mode allows switching. At the same time the channel indicator light switches.

* DSA-M□3/DSA-S□1/DSA-M□-M8 cannot be switched as they have a single output (1CH).

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 Eit (Exit).

* Invalid while setting the timer time, number of count, or span slant.

Key Lock

Cancels all the operations. Useful to prevent accidental operation.

Hold down the **[Left]** buttons for 2 seconds or more simultaneously in the RUN mode. Operate in the same way to cancel as well.

TIP: During key lock, no command such as all teaching/copy is accepted from other sensors.

Reset "Peak/ Bottom hold"

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

Confirm the position of "SET/RUN" switch is snapped to "RUN" side. Move the position to "SET" side and return to "Run" side again.

Setting Amplifier Unit

Attaching and Removing to/from DIN rail

Attachment of Amplifier Unit: Hook the claw on the connecting side of sensor head to the DIN rail. Then press down the hook until it locks.

Removal of Amplifier Unit: Pushing the unit to the direction of ①, hold up the connecting side of sensor head and remove the unit.

Expansion of Amplifier Unit

As many as 8 units can be combined with the relay connector.

1. Open the protective cover of the connector on the connecting side by sliding to attach the relay connector.

Table of Relay Connector

Amplifier unit	Model
Cable type	STE-WLL190-05P (for DSA-S□ · DSA-S□1)
M8 connector type	STE-WLL190-03P (for DSA-M□-M8)

* Make sure that the relay connector has two different types: cable type and M8 connector type.

2. Attach each amplifier unit to the DIN rail. Open the protective cover of the connector of the other unit. Insert the relay connector to the other one by sliding the cover. Then fix both sides of each unit by the end unit.

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").
- * Make sure to keep the protective cover for the connector on the non-connecting side closed in using, or when not connecting to prevent short circuit of connector on the joint of main unit.
- * When connecting the M8 connector type, make sure to select either one of the followings: to receive power supply from the base unit or to supply from the M8 connector cable of individual amplifier unit. Supply from both sides may cause malfunction or failure.
- * Do not remove the combined units all together from DIN rail.
- * Unit combination is not possible with DRF/DGF Series (our fiber amplifier).

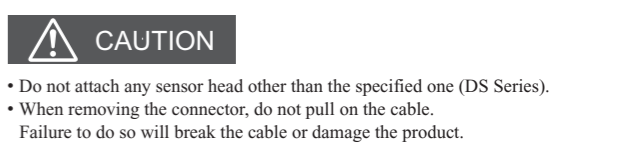
Connecting Sensor Head

Open the protective cover and plug the connector into the amplifier unit with the lock lever facing up. Make sure that it clicks. When removing, hold down the lock lever and pull out the connector.

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

Relay connector for expansion	
Cable type	STE-WLL190-05P
Connector type	STE-WLL190-03P
End Unit	
BEF-BE01-W190 (2 pcs)	

• The product specification may change without notice for improvement.

• For any inquiry, please contact the manufacture/vendor below.

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