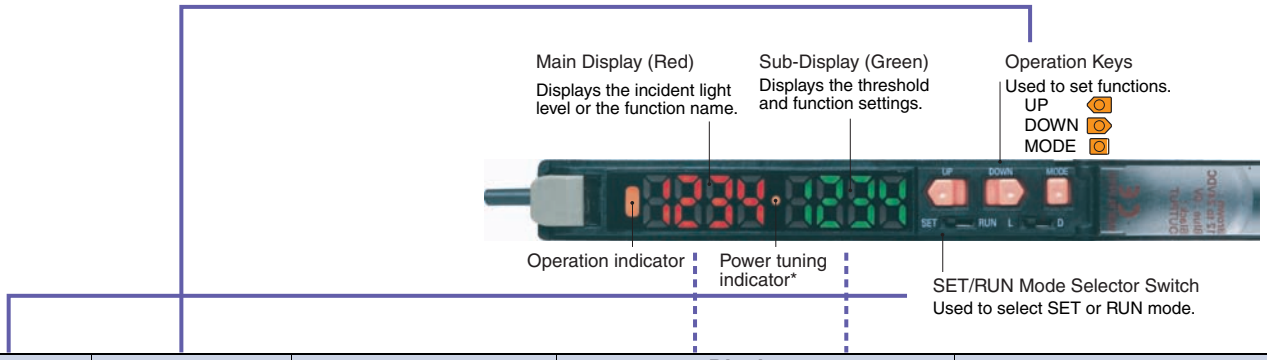
E3X-DA-S/E3X-MDA

Operation Reference



SET/RUN mode	Operation keys	Operation	Displays		Remarks
			Main display	Sub-display	
Detection/ adjustment	UP / DOWN	Adjusting thresholds	Incident level	Threshold	➜**Page 3** Refer to ***3. Setting Thresholds Manually***.
RUN (Factory-set to RUN)	MODE	Executing user-specified functions (factory-set to power tuning)	4000	1234	Used to execute power tuning and various teaching operations. ➜**Page 3.** Refer to ***2. Adjusting the Power***.
Function settings	UP / DOWN	Teaching and changing setting details	Setting item: tEch → I-Fn → 2-tF	Setting: HS → Stnd → Hr-ES	➜**Page 4.** Refer to ***4. Teaching the Threshold***.
SET	MODE	Switching settings			➜**Page 5** Refer to ***5. Setting Functions in SET Mode***.

SET/RUN mode	Operation keys	Operation	Displays		Remarks
			Main display	Sub-display	
RUN (Factory-set to RUN)	UP + MODE	Locking and unlocking keys	LOC	ON	Locks key operation to prevent incorrect operation. ➜**Page 10** Refer to ***6. Convenient Functions***.
SET	UP + DOWN	Initialization	INIT	YES?	Returns the system to its default settings. ➜**Page 10** Refer to ***6. Convenient Functions***.

*Except on the E3X-MDA□, E3X-DA□TW-S, and E3X-DA□AT-S.
These models have an operation indicator (ch2) instead of a power tuning indicator.

1 Setting the Operation Mode

The operation mode is set with the Mode Selector Switch.

Operation mode		Operation
Light ON	L-ON	L ■□ (Factory-set)
Dark ON	D-ON	□■ D

E3X-DA□TW-S/E3X-DA□AT-S/E3X-MDA:
The operation mode is set in SET mode.
➜**Refer to *5. Setting Functions in SET Mode*** on page 5.

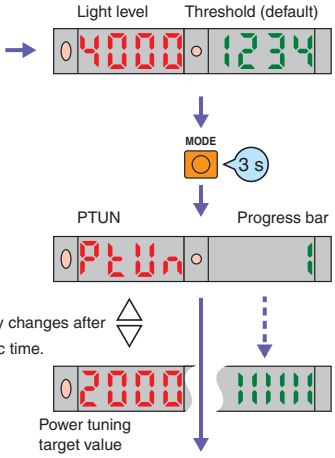
E3X-DA□TW-S/E3X-DA□AT-S/E3X-MDA (Same for All Adjustments):
Set the Channel Selector Switch to the desired channel before making any adjustments or settings.

2 Adjusting the Power (RUN Mode)

The current incident light level can be adjusted near the power tuning target value (default: 2,000).

*Confirm that the MODE Key setting is PTUN (power tuning). The default setting is PTUN.
➜**Refer to *5. Setting Functions in SET Mode*** on page 5.
*If power tuning is executed while SHS is selected for the detection function, the minimum power will be set.

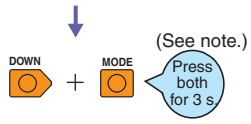
Set the SET/RUN Mode Selector Switch to RUN.
RUN
(Factory-set to RUN)



Release the key after the progress bar is displayed.

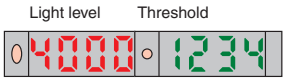
The Power Tuning indicator will light when the adjustment has been completed. (Except on the E3X-DA□TW-S, E3X-DA□AT-S, and E3X-MDA.)

To restore the default power settings:



"OFF" will flash twice.

The Power Tuning indicator will go out when the default setting has been restored.



*Setting Errors
An error has occurred if one of the following displays appears after the progress bar is displayed.

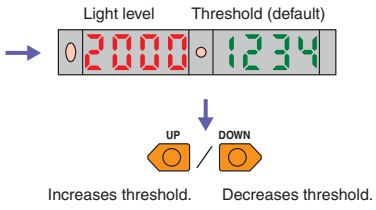
Display	Error	Action
Flashes twice PtUn ○ oUEr PTUN OVER	**Over Error** The incident light level is too low for the power tuning target value.	The power will not be tuned. The power can be increased up to approximately 5 times the incident light value.
Flashes twice PtUn ○ botn PTUN BOTM	**Bottom Error** The incident light level is too high for the power tuning target value.	The power will be turned to the minimum level. The power can be decreased down to approximately 1/25th the incident light value.

Note: Press the DOWN Key right after pressing the MODE Key.

3 Setting Thresholds Manually (RUN Mode)

A threshold can be set manually. A threshold can also be adjusted manually after teaching to fine-tune it.

Set the Mode Selector Switch to RUN.
RUN
(Factory-set to RUN)



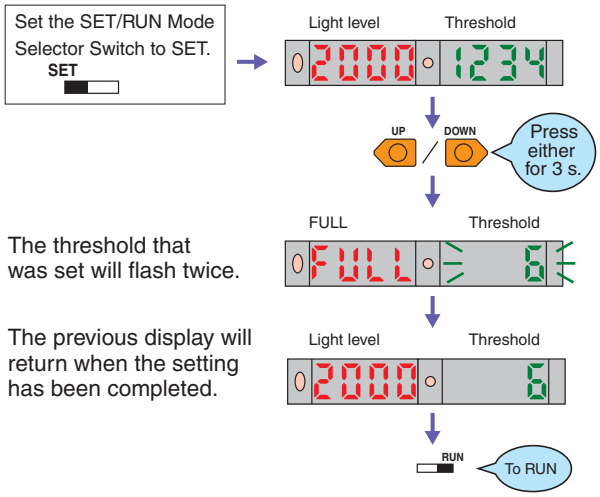
*Even if the display method is changed, the threshold will appear on the sub-display when the key is pressed.

4 Teaching the Threshold (SET Mode)

*There are four methods that can be used for teaching, as described below. Use the method most suitable for the application.
Teaching (with/without workpiece teaching and automatic teaching) can be performed in RUN mode.
For operating procedures, refer to the *Instruction Sheet* provided with the product.
*An error has occurred if OVER, LO, or NEAR is displayed on the sub-display. If that occurs, repeat the operation from the beginning.

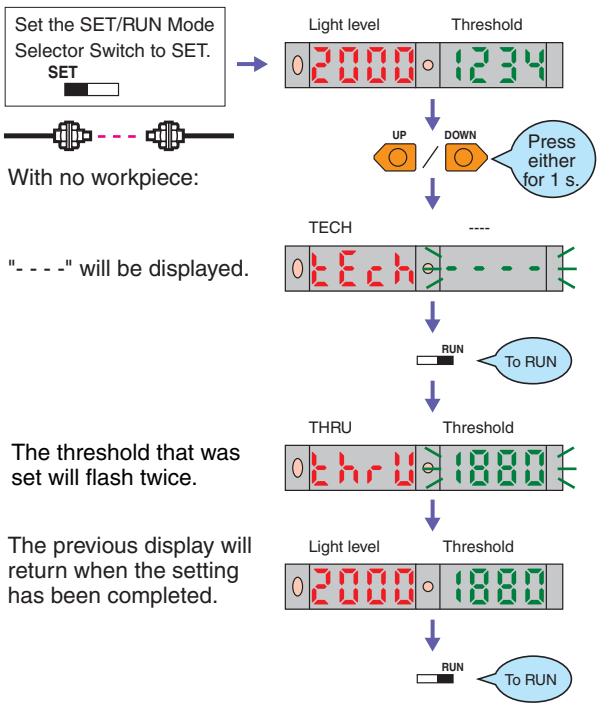
4-1. Setting the Threshold at Maximum Sensitivity

The threshold can be set to the maximum sensitivity. This method is ideal when using a Through-beam Fiber Unit to detect workpieces so that detection is not influenced to any great degree by dust and other environmental factors.



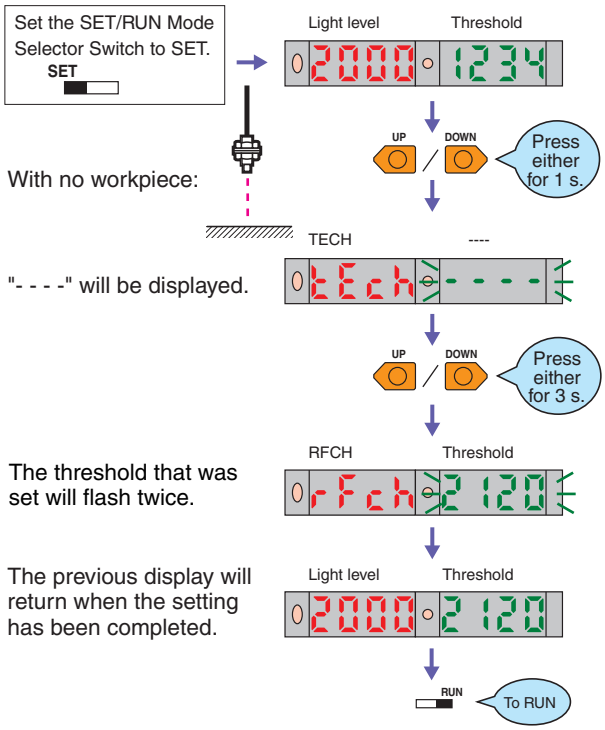
4-2. Teaching a Through-beam Fiber Unit without a Workpiece

A value about 6% less than the incident light level can be set as the threshold. This method is ideal when detecting very small differences in light level, such as when detecting very fine workpieces or transparent workpieces like transparent fibers.



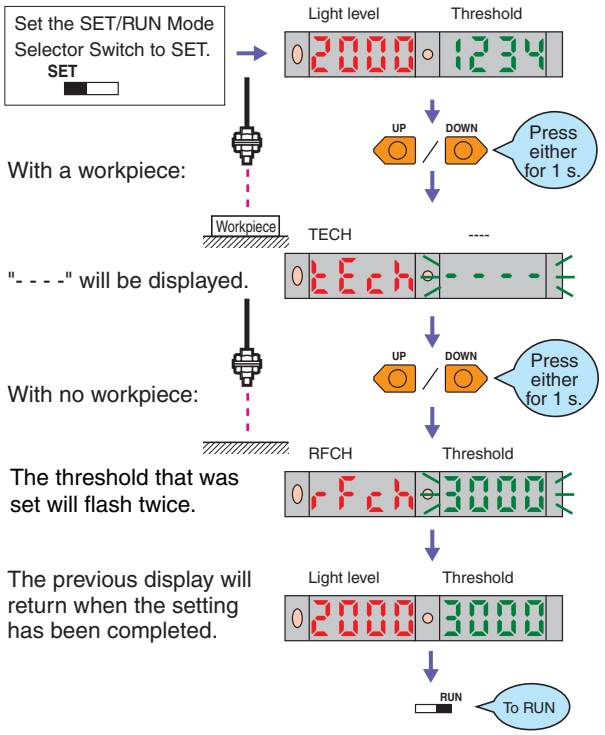
4-3. Teaching a Reflective Fiber Unit without a Workpiece

A value about 6% greater than the incident light level can be set as the threshold. This method is ideal when using a Reflective Fiber Unit to detect workpieces so that detection is not influenced to any great degree by dust and other environmental factors.



4-4. Teaching with and without a Workpiece

Two points, with and without the workpiece, are detected, and the intermediate point is set as the threshold.



5 Setting Functions in SET Mode

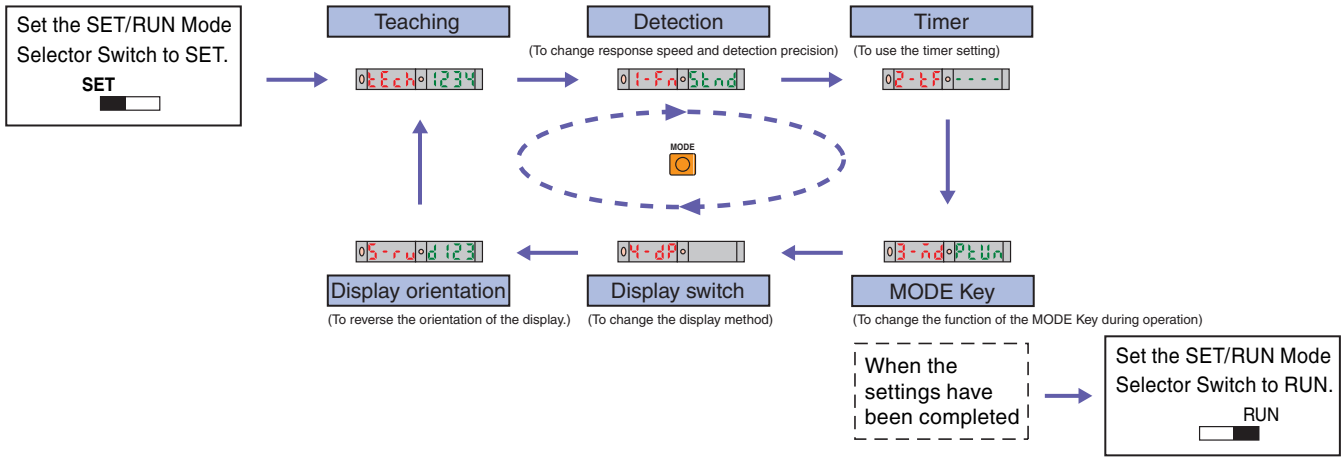
*The function transition boxes show the default settings.
*More functions may be displayed depending on the detailed settings.

Standard Mark Detection Models

E3X-DA□-S

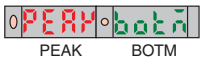
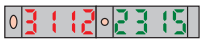
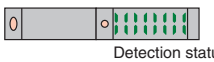
Moving between Functions

➜Refer to *4. Teaching the Threshold* on page 4.



Functions

UP / DOWN Use the UP and DOWN Keys to change the settings.

Function	Setting (display)	Description
Detection	Super-high-speed: SHS, High-speed: HS Standard: Stnd, High-precision: HrES	Used to change the response speed or detection precision.
Timer	Timer disabled: ----, OFF-delay timer: oFFd, ON-delay timer: on-d, One-shot timer: 1Sht	Used to enable or disable timers.
Time (timer enabled)	1 to 20 ms: 1-ms increments, 20 to 200 ms: 5-ms increments, 200 ms to 1 s: 100-ms increments, 1 to 5 s: 1-s increments	Used to change timer settings when timers are enabled. The timer can be set from 1 to 5000 ms.
MODE Key	Executes power tuning: PtUn, Executes a zero reset: 0rSt, With/without workpiece teaching: 2Pnt, Automatic teaching: AUto	Used to change the function of the MODE Key during operation.
Power tuning target value (when performing power tuning is selected)	Setting range: 100 to 3,900 (increments of 100) Maximum power M: FULL	Used to set target values during power tuning. ➜Refer to ***2. Adjusting the Power*** **on page 3**.
Display switch	 Light level Threshold	Used to display the incident light level and the threshold.
	 % light level Threshold	Used to display the incident light level as a percentage of the threshold and the threshold.
	 PEAK BOTM ◀▶ Fixed interval 	Used to display the peak and bottom levels of incident light within a set time. (Updated every 2 s.)
	 L-PE D-BT	Use to display the incident light peak level and no incident light bottom level. (Refreshed when output turns ON or OFF.)
	 Detection status	Analog bar display. The current detection status is displayed as an analog bar. The bar will lengthen from the right as ON status is reached. (ON: Red, OFF: Green)
	 Current light level PEAK ◀▶ Fixed interval  Current light level Peak light level	Used to display the current incident light level and the peak incident light level. Display changes at a fixed interval.
	 Light level Channel (unit number)	Used to display the incident light level and the channel (unit number).
Display orientation	Normal display: d123, Up/down reversed display: E2IP	Used to reverse the orientation of the display.

5 Setting Functions in SET Mode

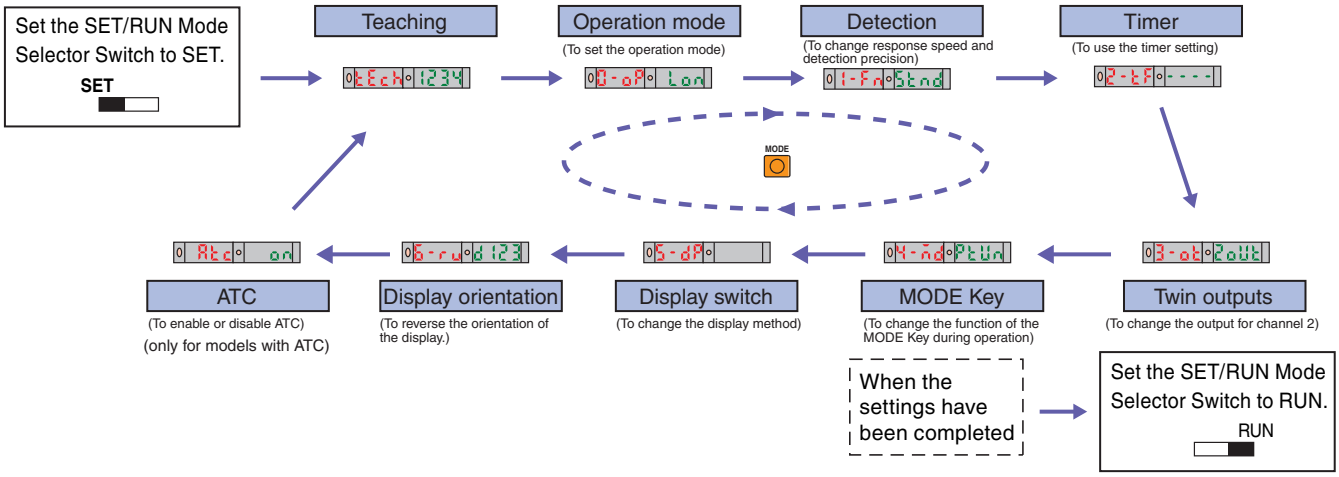
*The function transition boxes show the default settings.
*More functions may be displayed depending on the detailed settings.

Advanced (Twin-output, ATC) Models

E3X-DA□TW-S and E3X-DA□AT-S

Moving between Functions

➜Refer to *4. Teaching the Threshold* on page 4.



Functions (Only functions not supported by standard models are listed. For information on basic functions, refer to information on the standard models.)

UP / DOWN Use the UP and DOWN Keys to change the settings.

Function	Setting (display)	Description
Operation mode *	Light ON: Lon, Dark ON: don,	➜**Refer to *1. Setting the Operation Mode*** on page 3.
Detection	Super-high-speed: SHS, High-speed: HS, Standard: Stnd, High-precision: HrES, Differential operation: d IFF (advanced models only)	Used to change the response speed and detection precision.
Differential edge (differential operation selected)	Single edge: _F_, Double edge: _A_	Used to set the edge to be detected.
Differential time	Single edge···250 µs: 1, 500 µs: 2, 1 ms: 3, 10 ms: 4, 100 ms: 5, Double edge···500 µs: 1, 1 ms: 2, 2 ms: 3, 20 ms: 4, 200 ms: 5	Used to set the differential response time.
Twin outputs	ATC error output: AtAL (ATC models only), Output for each channel: 2oUt, Output if level is between the two thresholds: ArEA, Self-diagnosis output: SELF	Used to change the output for channel 2. This setting is disabled if differential operation is set for the detection function. (Alarm outputs are always used for differential operation.)
ATC (E3X-DA□AT-S only)	ATC enabled: on, ATC disabled: oFF	Used to enable or disable ATC.
Setting at Power-ON (ATC ON)	No setting: oFF, ATC start processing: Atc, Power tuning and ATC start processing: PtAt	Used to set the processing to be performed when the power is turned ON.

*The operation mode and timer function can be set for each channel specified using the Channel Selector Switch. The settings for other functions will be the same for channel 1 and channel 2.

5 Setting Functions in SET Mode

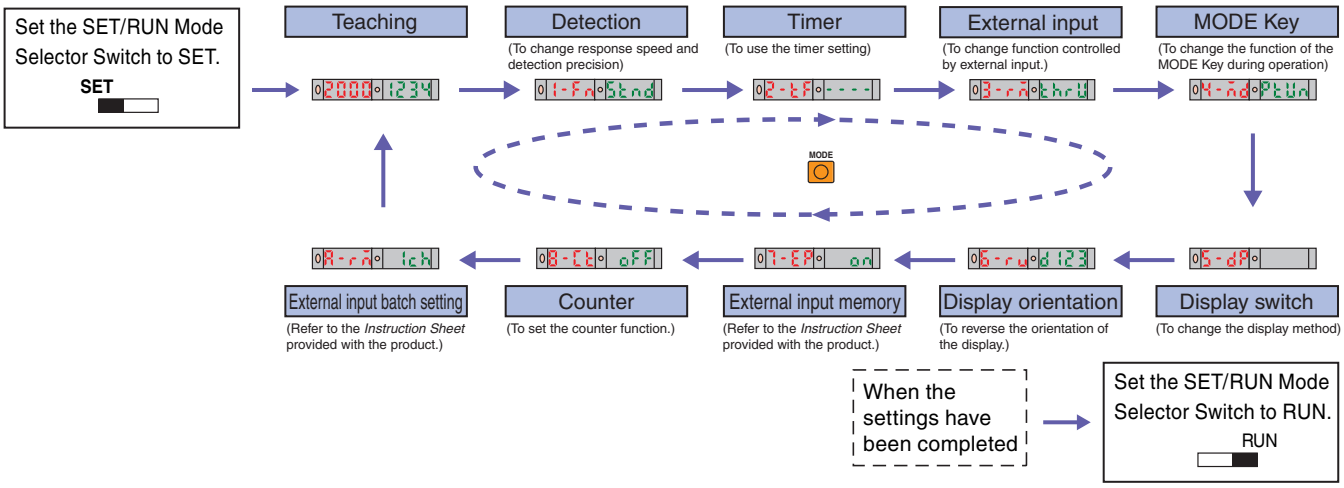
*The function transition boxes show the default settings.
*More functions may be displayed depending on the detailed settings.

Advanced (External Input) Models

E3X-DA□RM-S

Moving between Functions

➜Refer to *4. Teaching the Threshold* on page 4.



Functions (Only functions not supported by standard models are listed. For information on basic functions, refer to information on the standard models.)

UP / DOWN Use the UP and DOWN Keys to change the settings.

Function	Setting (display)	Description
Detection	Super-high-speed: SHS, High-speed: HS, Standard: Stnd, High-precision: HrES, Differential operation: d IFF (advanced models only)	Used to increase the response speed and detection precision.
Differential edge (differential operation selected)	Single edge: -F-, Double edge: -M-	Used to set the edge to be detected.
Differential time	Single edge···250 µs: 1, 500 µs: 2, 1 ms: 3, 10 ms: 4, 100 ms: 5, Double edge···500 µs: 1, 1 ms: 2, 2 ms: 3, 20 ms: 4, 200 ms: 5	Used to set the differential response time.
External input	Through-beam, no-workpiece teaching: thrU, Reflective, no-workpiece teaching: rFct, With/Without-workpiece teaching: 2Pnt, Automatic teaching: AUto, Power tuning: PtUn, Zero reset: 0rSt, Light OFF: LoFF, Counter reset: crSt	Used to change function controlled by external input. (Refer to *Instruction Sheet* provided with the product.)
Display switch (Settings are added.)	C 112 3286 Count	Used to display the counter value.
External input memory	Write results to EEPROM: on, Don't write results: oFF	Used to set writing the results. (Refer to *Instruction Sheet* provided with the product.)
Counter	Counter disabled: oFF, Count incremented when output turns ON: cUP, Count decremented when output turns ON: cdo	Used to set the counter function.
Count	Setting range: 1 to 9,999,999	Used to set the counter value when the counter function is enabled.
External input batch setting	Only Sensor that receives external input: Ich, All linked Sensors: ALL	Used to set linked Amplifiers at the same time using an external input.

5 Setting Functions in SET Mode

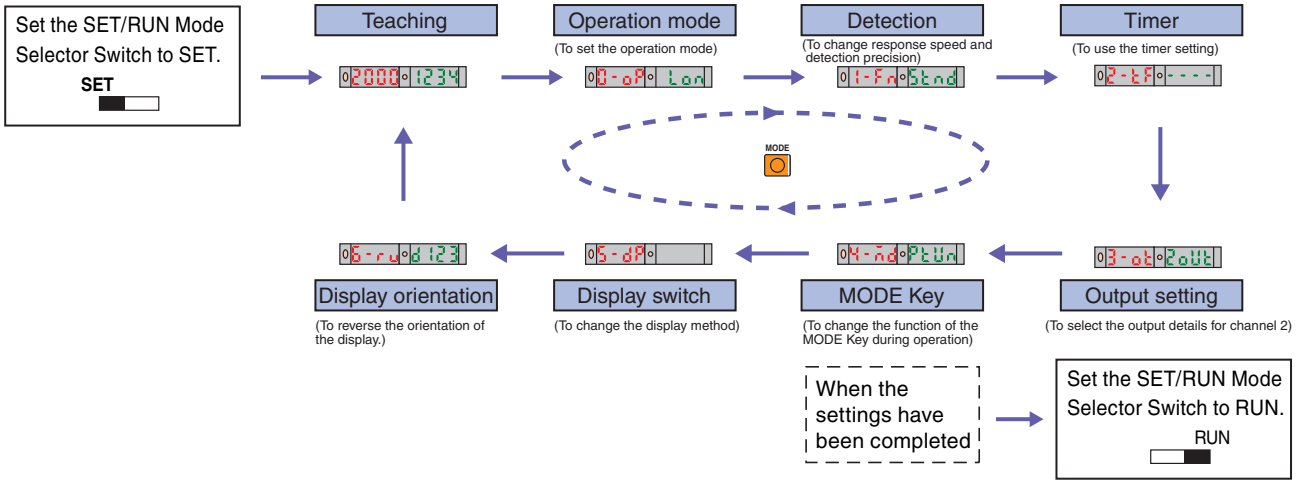
*The function transition boxes show the default settings.
*More functions may be displayed depending on the detailed settings.

Two-channel Models

E3X-MDA

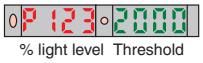
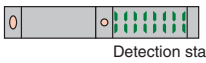
Moving between Functions

➜Refer to *4. Teaching the Threshold* on page 4.



Functions

UP / DOWN Use the UP and DOWN Keys to change the settings.

Function	Setting (display)	Description
Operation mode	Light ON: Lon, Dark ON: don	➜**Refer to *1. Setting the Operation Mode*** on page 3.
Detection	Super-high-speed: SHS, High-speed: HS Standard: Stnd, High-precision: HrES	Used to change the response speed or detection precision.
Timer	Timer disabled: ----, OFF-delay timer: oFFd, ON-delay timer: on-d, One-shot timer: 1Sht	Used to enable or disable timers.
Time (timer enabled)	1 to 20 ms: 1-ms increments, 20 to 200 ms: 5-ms increments, 200 ms to 1 s: 100-ms increments, 1 to 5 s: 1-s increments	Used to change timer settings when timers are enabled. The timer can be set from 1 to 5000 ms.
Output setting	Each channel: 2oUt, AND: And, OR: or, Rising edge synchronization: S_r^, Falling edge synchronization: S^L_, Differential operation: 1-2	Used to change the output details for channel 2.
Timer function for output setting	Timer disabled: ----, OFF-delay timer: oFFd, ON-delay timer: on-d, One-shot timer: 1Sht	Used to enable or disable the timer function for output settings of channel 2.
Timer time	1 to 20 ms: 1-ms increments, 20 to 200 ms: 5-ms increments, 200 ms to 1 s: 100-ms increments, 1 to 5 s: 1-s increments	Used to change timer setting when timer is enabled. The timer can be set from 1 to 5,000 ms.
MODE Key	Executes power tuning: PtUn, Executes a zero reset: 0rSt, With/without workpiece teaching: 2Pnt, Automatic teaching: AUto	Used to change the function of the MODE Key during operation.
Power tuning target value (performing power tuning)	Setting range: 100 to 3,900 (increments of 100) Maximum power M: FULL	Used to set target values during power tuning. ➜Refer to ***2. Adjusting the Power* on page 3**.
Display switch		Used to display the incident light level and the threshold.
		Used to display the incident light level as a percentage of the threshold and the threshold.
		Used to display the peak and bottom levels of incident light within a set time. (Updated every 2 s.)
		Use to display the incident light peak level and no incident light bottom level. (Refreshed when output turns ON or OFF.)
		Analog bar display. The current detection status is displayed as an analog bar. The bar will lengthen from the right as ON status is reached. (ON: Red, OFF: Green)
		Used to display the current incident light level and the peak incident light level. Display changes at a fixed interval.
		Used to display the incident light level and the channel.
Display orientation	Normal display: d123, Up/down reversed display: E2iP	Used to reverse the orientation of the display.

Note: The operation mode and timer function can be set for each channel. The setting will be executed for channels specified using the Channel Selector Switch.

6 Convenient Functions

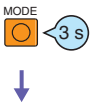
6-1. Zeroing the Digital Display (Zero Reset)

The incident light level on the main display can be set to 0.

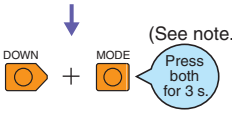
*Change the function to 0RST (zero reset) with the MODE Key.
The default setting is PTUN.
➜**Refer to *5. Setting Functions in SET Mode*** on page 5.

Set the SET/RUN Mode Selector Switch to RUN.
RUN
Factory setting

To reset to 0 again:



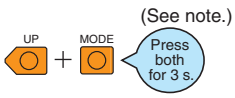
To return to original value for incident light level:



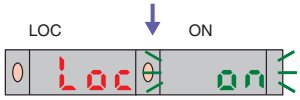
6-2. Locking the Keys (Key Lock)

All key operations can be disabled.

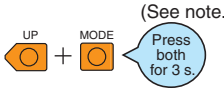
Set the SET/RUN Mode Selector Switch to RUN.
RUN
Factory setting



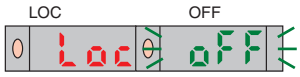
"ON" will flash twice and key operations will be disabled.



To release the lock:



"OFF" will flash twice and key operations will be disabled.



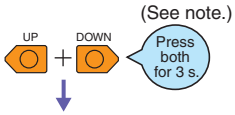
*If a key is pressed while key operations are locked, "LOC" will flash twice on the display to indicate that key operations have been disabled.

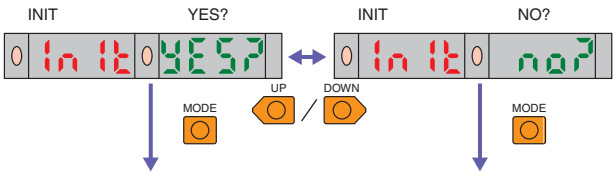
Note: Press the UP Key right after pressing the MODE Key.

6-3. Initializing Settings (Initial Reset)

All settings can be returned to their original default settings.

Set the SET/RUN Mode Selector Switch to SET.
SET





Settings initialized.

Operation canceled.