Digital Fiber Sensors

E3X-DA-S/MDA

CSM_E3X-DA-S_MDA_DS_E_10_1

OMRON's Next-generation Platform for a Wide Range of Detection

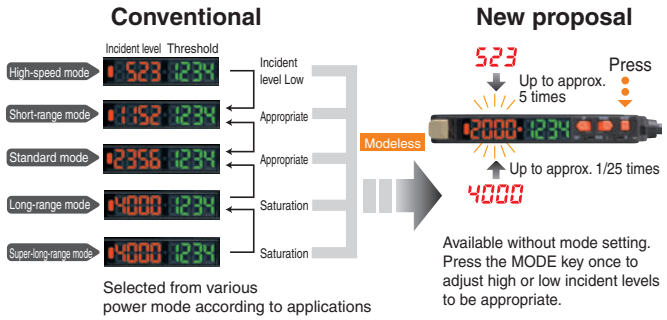
- Features a Power Tuning function that optimizes light reception at the press of a button.
- Combines newly developed 4-element LEDs with an APC circuit to ensure stable, long-term LED performance.
- Utilizes OMRON's innovative wire-saving connector.
- 2-channel models achieve the thinnest profile in the industry, at only 5 mm per channel.
- 2-channel models also offer AND/OR control output.

Be sure to read *Safety Precautions* on page 15.

Features

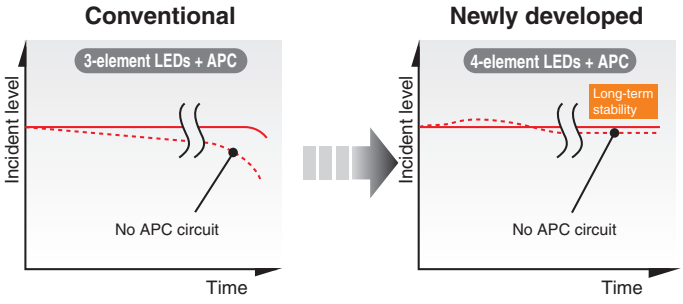
Equipped with an Industry's First Power Tuning (Optimum Light Setting) Function

The E3X-DA-S/MDA features a Power Tuning function that optimizes power at the press of a button.
This function easily but securely resolves saturation due to short sensing distances or insufficient incident light due to long sensing distances.
In addition, the response speed does not change as mode selection has tuned the power.



Adoption of Newly Developed 4-Element LEDs and an APC (Auto Power Control) Circuit Achieves Long-term Reliable Detection at the Highest Level in the Industry

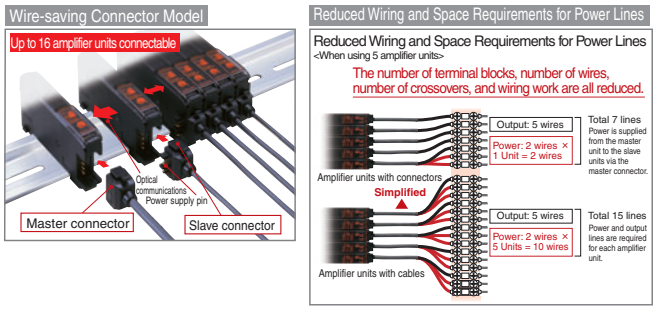
The long-term reliable detection at the highest level in the industry is achieved with the innovative APC circuit whose performance is proved by E3X-DA-N series and the newly developed high-power LEDs (4-element type) to ensure super stable, long-term LED performance.
Stable performance is always available without the ON/OFF setting of an APC circuit.



OMRON's Innovative Wire-saving Connector Inherited from the E3X-DA-N

The amplifier units with connectors supply the power to slave connectors via a master connector. This offers three following advantages.

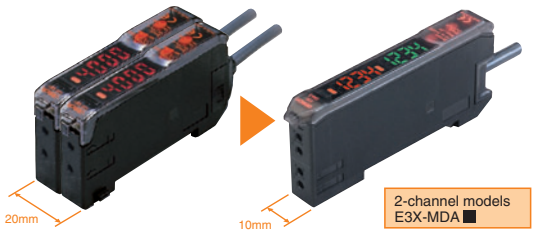
1. Greatly reduced wiring work
2. Improved space usability due to the unnecessity of relay connectors
3. Simple stock management due to the unnecessity of distinction between master and slave for amplifiers



Models available for a wide variety of applications at manufacturing sites

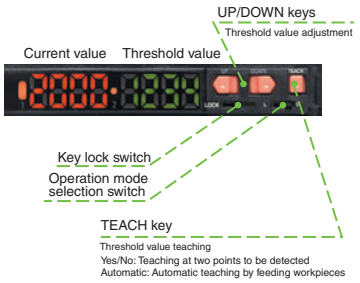
Industry Leading Two Amplifiers Loaded in a Small Body ···· 2-channel models

Two amplifiers are loaded in a 10 mm-wide body.
Space usability can be approximately doubled.
In addition, approximately 40% of the energy can be saved.
(compared to the value per channel of the former model)



Simpler Digital Fiber Sensors ···· Simple & Easy Single-function Models

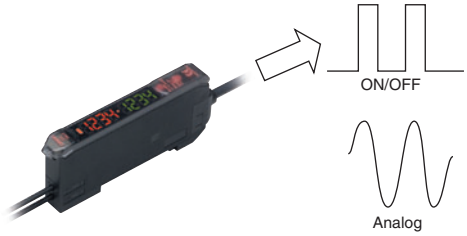
Required performance and functions have been reviewed from basic points to improve high-performance but hard-to-use digital models. Digital fiber sensors, used in the sense as if using volume type sensors, are added to the basic functions such as an APC function and digital display.



High-speed and High-resolution Analog Output Supports Wide Variety of Applications ···· Advanced Analog Output Models

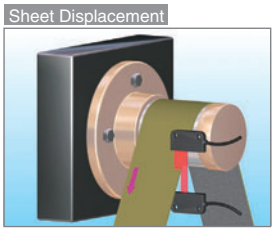
Analog Control Output

The voltage in the range of 1 to 5 V is output according to the incident level (digital display). Wide variety of applications is possible including positioning control or difference detection with multiple levels.



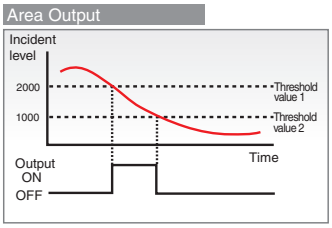
High-speed and High Resolution

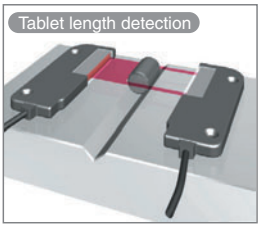
Detection modes can be switched in accordance with applications. High-speed response of 80 μs (super-high-speed mode) supports the positioning controls that require high-speed control.



Area Output Function Area Judgment Is Possible ···· Advanced, Twin-output Models

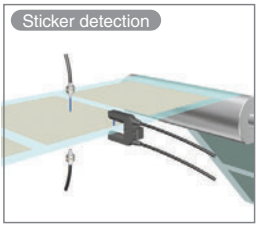
Only one sensor is enough for area judgment for height or others that has required multiple sensors.
Setting two threshold values allows easy output inside and outside range.





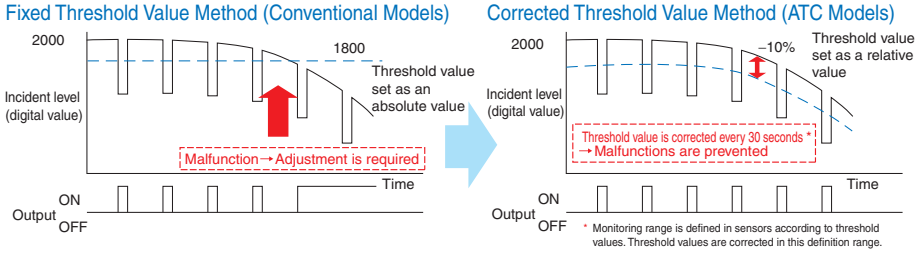
Remote Input Function Sensors Controlled from Outside ···· Advanced, External-input Models

Remote settings for teaching/power tuning/light OFF are possible with input signals.
The remote input function meets the diversifying demands such as remote settings made for frequent teaching due to level change corresponding to workpiece change or remote operation check of sensors before operation.



Equipped with an Industry's First ATC Function that Resolves Problems at Manufacturing Sites ···· Advanced ATC Models

OMRON's unique algorithm is equipped to distinguish dust or dirt and the change of workpieces. Automatic correction of threshold values by sensors in accordance with changes prevents malfunctions and improves the operating rates of machines. The ATC function is especially effective for the applications that require high-resolution detection.



Ordering Information

Amplifier Units

Amplifier Units with Cables (2 m) [Refer to *Dimensions* on page 17.]

Item		Appearance	Functions	Model	
				NPN output	PNP output
Single-function models			---	E3X-DA11SE-S 2M	E3X-DA41SE-S 2M
Standard models			Timer, Response speed change	E3X-DA11-S 2M	E3X-DA41-S 2M
Mark-detecting models (multiple color light sources)	Green LED			E3X-DAG11-S 2M	E3X-DAG41-S 2M
	Blue LED			E3X-DAB11-S 2M	E3X-DAB41-S 2M
	Infrared LED			E3X-DAH11-S 2M	E3X-DAH41-S 2M
Advanced models	External-input models		Remote setting, counter, differential operation	E3X-DA11RM-S 2M	E3X-DA41RM-S 2M
	Twin-output models		Area output, self-diagnosis, differential operation	E3X-DA11TW-S 2M	E3X-DA41TW-S 2M
	ATC function models		ATC (Threshold value automatic correction)	E3X-DA11AT-S 2M	E3X-DA41AT-S 2M
	Analog output models		Analog output models	E3X-DA11AN-S 2M	E3X-DA41AN-S 2M
2-channel models			AND/OR output	E3X-MDA11 2M	E3X-MDA41 2M

Amplifier Units with Connectors

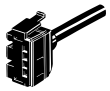
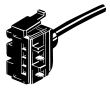
Item		Appearance	Functions	Model	
				NPN output	PNP output
Single-function models			---	E3X-DA6SE-S	E3X-DA8SE-S
Standard models			Timer, Response speed change	E3X-DA6-S	E3X-DA8-S
Mark-detecting models (multiple color light sources)	Green LED			E3X-DAG6-S	E3X-DAG8-S
	Blue LED			E3X-DAB6-S	E3X-DAB8-S
	Infrared LED			E3X-DAH6-S	E3X-DAH8-S
Advanced models	External-input models		Remote setting, counter, differential operation	E3X-DA6RM-S	E3X-DA8RM-S
	Twin-output models		Area output, self-diagnosis, differential operation	E3X-DA6TW-S	E3X-DA8TW-S
	ATC function models		ATC (Threshold value automatic correction)	E3X-DA6AT-S	E3X-DA8AT-S
2-channel models			AND/OR output	E3X-MDA6	E3X-MDA8

Ratings and Specifications

		Light source	Response time	Control output/input			Functions					
				ON/OFF output	Input	Analog output	Power tuning	Timer	Interference prevention	Differential detection	counter	ATC
Single-function models		Red LED	1 ms	Only main	---	---	---	---	○	---	---	---
Standard models			50 µs to 4 ms				○	○				
Mark-detecting models	E3X-DA□G-S	Green LED	50 µs to 4 ms	Only main	---	---	○	○	○	---	---	---
	3X-DA□B-S	Blue LED										
	E3X-DA□H-S	Infrared LED										
Advanced models	Twin-output models	Red LED	50 µs to 4 ms	Only main	○ (1 line)	---	○	○	○	○	○	---
	External-input models		80 µs to 4 ms	Main + sub (2 lines)	---						---	
	ATC function models		130 µs to 4 ms									○
	Analog output		80 µs to 4 ms	Only main		○ (1 line)				---		---
2-channel models		Red LED	130 µs to 4 ms	Main + main (2 independent lines)	---	---	○	○	○	---	---	---

Amplifier Unit Connectors (Order Separately)

Note: Protector seals are provided as accessories. [Refer to *Dimensions* on page 19.]

Item	Appearance	Cable length	No. of conductors	Model
Master Connector		2 m	3	**E3X-CN11**
			4	**E3X-CN21**
Slave Connector			1	**E3X-CN12**
			2	**E3X-CN22**

Combining Amplifier Units and Connectors

Amplifier Units and Connectors are sold separately. Refer to the following tables when placing an order.

Amplifier Unit				Applicable Connector (Order Separately)	
Model	NPN output	PNP output		Master Connector	Slave Connector
Single-function models	E3X-DA6SE-S	E3X-DA8SE-S	+	E3X-CN11	E3X-CN12
Standard models	E3X-DA6-S	E3X-DA8-S			
Mark-detecting models (multiple color light sources)	E3X-DAG6-S	E3X-DAG8-S			
	E3X-DAB6-S	E3X-DAB8-S			
	E3X-DAH6-S	E3X-DAH8-S			
Advanced models	E3X-DA6TW-S	E3X-DA8TW-S		E3X-CN21	E3X-CN22
	E3X-DA6RM-S	E3X-DA8RM-S			
	E3X-DA6AT-S	E3X-DA8AT-S			
2-channel models	E3X-MDA6	E3X-MDA8			

When Using 5 Amplifier Units

Amplifier Units (5 Units)	+	1 Master Connector + 4 Slave Connectors

Mobile Console (Order Separately) [Refer to *Dimensions* on page 20.]

Appearance	Model	Remarks
	**E3X-MC11-SV2** (model number of set)	Mobile Console with Head, Cable, and AC adapter provided as accessories
	**E3X-MC11-C1-SV2**	Mobile Console
	**E3X-MC11-H1**	Head
	**E39-Z12-1**	Cable (1.5 m)

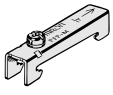
Note: Use the E3X-MC11-SV2 Mobile Console for the E3X-DA-S/MDA-series Amplifier Units.
The E3X-MC11-SV2 is an upgraded version of the E3X-MC11-S that is fully interchangeable with the older model.

Accessories (Order Separately)

Mounting Bracket [Refer to *E39-L/F39-L/E39-S/E39-R.*]

Appearance	Model	Quantity
	**E39-L143**	1

End Plate [Refer to *PFP-□.*]

Appearance	Model	Quantity
	**PFP-M**	1

Ratings and Specifications

Refer to pages 17 to 20 for dimensions.

Amplifier Units

Item \ Type		Single-function models	Standard models	Mark-detecting models (multiple color light sources)		
				Green LED	Blue LED	Infrared LED
Item	Model	E3X-DA□SE-S	E3X-DA□-S	E3X-DAG□-S	E3X-DAB□-S	E3X-DAH□-S
Light source (wavelength)		Red LED (635 nm)		Green LED (525 nm)	Blue LED (470 nm)	Infrared LED (870nm)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.				
Power consumption		960 mW max. (current consumption: 40 mA max. at power supply voltage of 24 VDC)				
Control output		Load power supply voltage: 26.4 VDC; NPN/PNP open collector; load current: 50 mA max.; residual voltage: 1 V max.				
Remote control input		No-voltage input (contact/non-contact)	---			
Protection circuits		Reverse polarity for power supply connection, output short-circuit				
Response time	Super-high-speed mode	---	Operate: 48 μs, reset: 50 μs *1, *2			
	High-speed mode	---	Operate/reset: 250 μs			
	Standard mode	Operate or reset: 1 ms				
	High-resolution mode	---	Operate or reset: 4 ms			
Sensitivity setting		Teaching or manual method				
Functions	Power tuning	---	Light emission power and reception gain, digital control method			
	Timer function	---	Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)			
	Automatic power control (APC)	High-speed control method for emission current				
	Zero-reset	---	Negative values can be displayed. (Threshold value is shifted.)			
	Initial reset	Settings can be returned to defaults as required.				
	Mutual interference prevention	Possible for up to 10 Units *3				
Display		Operation indicator (orange)	Operation indicator (orange), Power Tuning indicator (orange)			
Digital display		incident level + threshold	Select from incident level + threshold or other 6 patterns			
Display orientation		---	Switching between normal/reversed display is possible.			
Ambient illumination (Receiver side)		Incandescent lamp: 10,000 lux max. Sunlight: 20,000 lux max.				
Ambient temperature range		Operating: Groups of 1 to 2 Amplifiers: −25°C to 55°C Groups of 3 to 10 Amplifiers: −25°C to 50°C Groups of 11 to 16 Amplifiers: −25°C to 45°C Storage: −30°C to 70°C (with no icing or condensation)				
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)				
Insulation resistance		20 MΩ min. (at 500 VDC)				
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute				
Vibration resistance		Destruction: 10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions				
Shock resistance		Destruction: 500 m/s^2, for 3 times each in X, Y and Z directions				
Degree of protection		IEC 60529 IP50 (with Protective Cover attached)				
Connection method		Pre-wired or amplifier unit connector				
Weight (packed state)		Pre-wired model: Approx. 100 g, Amplifier unit connector model: Approx. 55 g				
Materials	Case	Polybutylene terephthalate (PBT)				
	Cover	Polycarbonate (PC)				
Accessories		Instruction manual				

*1. Communications are disabled if the detection mode is selected during super-high-speed mode, and the communications functions for mutual interference prevention and the Mobile Console will not function.
*2. PNP output is as follows: Operate: 53 μs, reset: 55 μs.
*3. Mutual interference prevention can be used for only up to 6 Units if power tuning is enabled.

Item \ Type		Advanced models				2-channel models
		External input models	Twin output models	ATC function models	Analog output models	
	Model	E3X-DA□RM-S	E3X-DA□TW-S	E3X-DA□AT-S	E3X-DA□AN-S	E3X-MDA□
Light source (wavelength)		Red LED (635 nm)				
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.				
Power consumption		1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)				
Control output	ON/OFF output	Load power supply voltage: 26.4 VDC; NPN/PNP open collector; load current: 50 mA max.; residual voltage: 1 V max.				
	Analog output	---			**Control output** Voltage output: 1 to 5 VDC (Connection load 10 kΩ min.) **Temperature characteristics** 0.3%F.S./°C **Response speed/repeat accuracy** Super-high-speed mode: 80 μs/1.5%F.S. High-speed mode: 250 μs/1.5%F.S. Standard mode: 1 ms/1%F.S. High-resolution mode: 4 ms/0.75%F.S.	---
Remote control input		No-voltage input (contact/non-contact) *1	---			
Protection circuits		Reverse polarity for power supply connection, output short-circuit				
Response time	Super-high-speed mode	Operate: 48 μs, reset: 50 μs *2, *3, *4	Operate or reset: 80 μs *2	Operate or reset: 130 μs *2	Operate or reset: 80 μs *2	Operate or reset: 130 μs *2, *5
	High-speed mode	Operate or reset: 250 μs				Operate or reset: 450 μs
	Standard mode	Operate or reset: 1ms				
	High-resolution mode	Operate or reset: 4ms				
Sensitivity setting		Teaching or manual method				
Functions	Power tuning	Light emission power and reception gain, digital control method				
	Differential detection	Switchable between single edge and double edge detection mode Single edge: Can be set to 250 μs, 500 μs, 1 ms, 10 ms, or 100 ms. Double edge: Can be set to 500 μs, 1 ms, 2 ms, 20 ms, or 200 ms.			---	
	Timer function	Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)				
	Automatic power control (APC)	High-speed control method for emission current				
	Zero-reset	Negative values can be displayed. (Threshold value is shifted.)				
	Initial reset	Settings can be returned to defaults as required.				
	Mutual interference prevention	Possible for up to 10 Units *6				Possible for up to 9 Units (18 channels) *7
	Counter	Switchable between up counter and down counter. Set count: 0 to 9,999,999	---			

*1. Input Specifications

	Contact input (relay or switch)	Non-contact input (transistor)
NPN	ON: Shorted to 0 V (sourcing current: 1 mA max.). OFF: Open or shorted to Vcc.	ON: 1.5 V max. (sourcing current: 1 mA max.) OFF: Vcc - 1.5 V to Vcc (leakage current: 0.1 mA max.)
PNP	ON: Shorted to Vcc (sinking current: 3 mA max.). OFF: Open or shorted to 0 V.	ON: Vcc - 1.5 V to Vcc (sinking current: 3 mA max.) OFF: 1.5 V max. (leakage current: 0.1 mA max.)

*2. Communications are disabled if the detection mode is selected during super-high-speed mode, and the communications functions for mutual interference prevention and the Mobile Console will not function.
*3. PNP output is as follows: Operate: 53 μs, reset: 55 μs.
*4. When counter is enabled: 80 μs for operate and reset respectively.
*5. When differential output is selected for the output setting, the second channel output is 200 μs for operation and reset respectively.
*6. Mutual interference prevention can be used for only up to 6 Units if power tuning is enabled.
*7. Mutual interference prevention can be used for up to 5 Units (10 channels) if power tuning is enabled.

Item	Model	Advanced models: External input models	Advanced models: Twin-output models	Advanced models: ATC function models	Advanced models: Analog output models	2-channel models
	Type	External input models	Twin-output models	ATC function models	Analog output models	2-channel models
	Model	E3X-DA□RM-S	E3X-DA□TW-S	E3X-DA□AT-S	E3X-DA□AN-S	E3X-MDA□
Functions	I/O setting	External input setting (Select from teaching, power tuning, zero reset, light OFF, or counter reset.)	Output setting (Select from channel 2 output, area output, or self-diagnosis.)	Output setting (Select from channel 2 output, area output, self-diagnosis output, or ATC error output)	Analog output setting (offset voltage adjustable)	Output setting (Select from channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output)
Display		Operation indicator (orange), Power Tuning indicator (orange)	Operation indicator for channel 1 (orange), Operation indicator for channel 2 (orange)		Operation indicator (orange), Power Tuning indicator (orange)	Operation indicator for channel 1 (orange), Operation indicator for channel 2 (orange)
Digital display		Select from incident level + threshold or other 7 patterns	Select from incident level + threshold or other 6 patterns			Select from incident level for channel 1 + incident level for channel 2 or other 7 patterns
Display orientation		Switching between normal/reversed display is possible.				
Ambient illumination (Receiver side)		Incandescent lamp: 10,000 lux max. Sunlight: 20,000 lux max.				
Ambient temperature range		Operating: Groups of 1 to 2 Amplifiers: –25°C to 55°C Groups of 3 to 10 Amplifiers: –25°C to 50°C Groups of 11 to 16 Amplifiers: –25°C to 45°C				
		Storage: –30°C to 70°C (with no icing or condensation)				
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)				
Insulation resistance		20 MΩ min. (at 500 VDC)				
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute				
Vibration resistance		Destruction: 10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions				
Shock resistance		Destruction: 500 m/s^2, for 3 times each in X, Y and Z directions				
Degree of protection		IEC 60529 IP50 (with Protective Cover attached)				
Connection method		Pre-wired or amplifier unit connector				
Weight (packed state)		Pre-wired model: Approx. 100 g, Amplifier unit connector model: Approx. 55 g				
Materials	Case	Polybutylene terephthalate (PBT)				
	Cover	Polycarbonate (PC)				
Accessories		Instruction manual				

Amplifier Unit Connectors

Item	Model	E3X-CN11/21/22	E3X-CN12
Rated current		2.5 A	
Rated voltage		50 V	
Contact resistance		20 mΩ max. (20 mVDC max., 100 mA max.) (The figure is for connection to the Amplifier Unit and the adjacent Connector. It does not include the conductor resistance of the cable.)	
No. of insertions		Destruction: 50 times (The figure for the number of insertions is for connection to the Amplifier Unit and the adjacent Connector.)	
Materials	Housing	Polybutylene terephthalate (PBT)	
	Contacts	Phosphor bronze/gold-plated nickel	
Weight (packed state)		Approx. 55 g	Approx. 25 g

Mobile Console

Item	Model	E3X-MC11-SV2
Applicable Sensors		E3X-DA-S E3X-MDA E3C-LDA E2C-EDA
Power supply voltage		Charged with AC adapter
Connection method		Connected via adapter
Weight (packed state)		Approx. 580 g (Console only: 120 g)

Refer to *Instruction Manual* provided with the Mobile Console for details.

Sensing Distance

Through-beam Models

(Unit: mm)

Type		Model	E3X-DA□-S				E3X-MDA□			
			High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode	High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode
Standard models	Flexible (new standard)	E32-T11R/E32-T12R/E32-T15XR/ E32-TC200BR(B4R)	700	530	350	140	450	350	230	140
		E32-T14LR/E32-T15YR/E32-T15ZR	270	210	130	50	170	130	85	50
		E32-T21R/E32-T22R/E32-T222R/ E32-T25XR/E32-TC200FR(F4R)	160	130	75	30	100	75	50	30
		E32-T24R/E32-T25YR/E32-T25ZR	60	50	25	10	35	27	18	10
	Standard	E32-TC200/E32-T12/E32-T15X/ E32-TC200B(B4)	1,000	760	500	200	650	500	330	200
		E32-T14L/E32-T15Y/E32-T15Z	600	460	300	120	390	300	200	120
		E32-TC200A	900	680	450	180	580	450	300	180
		E32-TC200E/E32-T22/E32-T222/ E32-T25X/E32-TC200F(F4)	270	220	125	50	170	130	85	50
		E32-T24/E32-T25Y/E32-T25Z	160	130	75	30	100	70	45	30
	Break-resistant	E32-T11/E32-T12B/E32-T15XB	900	680	450	180	580	450	300	180
		E32-T21/E32-T221B/E32-T22B	240	200	110	45	150	110	70	45
		E32-T25XB	180	150	85	35	125	95	60	35
	Fluorine coating	E32-T11U	900	680	450	180	580	450	300	180
Special-beam models	Long-distance, high power	E32-T17L	20,000*1	20,000*1	10,000	4,000	13,000	10,000	6,500	4,000
		E32-TC200 + E39-F1	4,000*2	4,000*2	2,600	1,500	4,000	3,700	2,400	1,500
		E32-T11R + E39-F1	4,000*2	3,700	2,400	970	3,100	2,400	1,600	970
		E32-T11 + E39-F1	4,000*2	3,600	2,300	930	3,000	2,300	1,500	930
		E32-T14	4,000*2	3,400	2,250	900	2,900	2,200	1,450	900
		E32-T11L/E32-T12L	1,700	1,330	870	350	1,100	870	580	350
		E32-T11L + E39-F2	910	800	500	180	600	520	340	180
		E32-T11R + E39-F2	520	400	250	100	330	260	170	100
		E32-T11 + E39-F2	820	660	430	160	530	430	280	160
		E32-T21L/E32-T22L	540	440	250	100	340	260	170	100
	Ultracompact, ultrafine sleeve	E32-T223R	160	130	75	30	110	85	55	30
		E32-T33-S5	53	44	25	10	35	28	18	10
		E32-T333-S5	12	10	6	4	8	6	5	4
		E32-T334-S5	6	5	3	2	4	3	2	2
	Fine beam	E32-T22S	2,500	1,900	1,250	500	1,600	1,250	830	500
		E32-T24S	1,750	1,300	870	350	1,100	870	580	350
	Area sensing	E32-T16PR	1,100	840	560	220	730	560	370	220
		E32-T16P	1,500	1,100	750	300	970	750	500	300
		E32-T16JR	980	750	480	190	600	480	320	190
		E32-T16J	1,300	1,000	650	260	800	650	430	260
		E32-T16WR	1,700	1,300	850	340	1,100	860	570	340
		E32-T16W	2,300	1,800	1,150	450	1,400	1,100	730	450
		E32-T16	3,700	2,800	1,850	740	2,400	1,800	1,200	740
		E32-M21	750	610	350	140	470	360	240	140

*1. The optical fiber for the E32-T17L is 10 m long on each side, so the value is 20,000 mm
*2. The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

Type		Model	E3X-DA□-S				E3X-MDA□			
			High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode	High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode
Environment resistant models	Heat-resistant	E32-T51	1,000	760	500	200	650	500	330	200
		E32-T54	300	230	150	60	190	150	100	60
		E32-T81R-S	360	280	180	70	230	180	120	70
		E32-T61-S + E39-F2	600	450	300	120	390	300	200	120
		E32-T61-S + E39-F1	4,000	3,400	2,200	900	3,000	2,200	1,450	900
		E32-T84S-S	1,750	1,300	870	350	1,100	870	570	350
		E32-T61-S	600	450	300	120	390	300	200	120
	Chemical resistant	E32-T11F	2,500	2,000	1,300	520	1,600	1,300	850	520
		E32-T12F	4,000*	3,000	2,000	800	2,600	2,000	1,300	800
		E32-T14F	500	400	250	100	320	250	160	100
		E32-T51F	1,800	1,400	900	350	1,190	920	600	350
		E32-T81F-S	920	700	460	190	600	460	300	190
	Vacuum resistant	E32-T51V	260	200	130	50	170	130	85	50
		E32-T51V + E39-F1V	1,350	1,000	680	260	850	650	430	260
		E32-T54V	210	130	100	35	110	85	55	35
		E32-T54V + E39-F1V	660	500	330	180	420	320	210	180
		E32-T84SV	630	480	320	130	410	310	200	130

* The optical fiber for the E32-T12F is 2 m long on each side, so the sensing distance is 4,000 mm.

Reflective Models **(Unit: mm)**

Type		Model	E3X-DA□-S				E3X-MDA□			
			High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode	High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode
Standard models	Flexible (new standard)	E32-D11R/E32-D12R/E32-D15XR/ E32-DC200BR(B4R)	300	170	120	50	170	120	80	50
		E32-D14LR	80	45	30	14	45	33	22	14
		E32-D15YR/E32-D15ZR	70	40	26	12	40	29	19	12
		E32-D211R/E32-D21R/E32-D22R/ E32-D25XR/E32-DC200FR(F4R)	50	30	20	8	30	22	14	8
		E32-D24R	26	15	10	4	15	10	6	4
		E32-D25YR/E32-D25ZR	14	8	5	2	8	5	3.3	2
	Standard	E32-DC200/E32-D15X/ E32-DC200B(B4)	500	300	200	90	300	210	130	90
		E32-D12	400	230	160	70	230	160	100	70
		E32-D14L	200	110	80	36	110	80	50	36
		E32-D15Y/E32-D15Z	170	100	65	30	100	70	45	30
		E32-D211/E32-DC200E/E32-D22/ E32-D25X/E32-DC200F(F4)	130	80	50	22	80	55	35	22
		E32-D24	50	30	20	8	30	22	14	8
		E32-D25Y/E32-D25Z	35	20	12	6	20	14	9	6
	Break-resistant	E32-D11/E32-D15XB	300	170	120	50	170	125	80	50
		E32-D21B/E32-D221B	110	70	45	20	70	50	30	20
		E32-D21/E32-D22B	50	30	20	8	30	22	14	8
		E32-D25XB	85	50	30	15	50	35	23	15
	Fluorine coating	E32-D11U	300	170	120	50	170	125	80	50

Type		Model	E3X-DA□-S				E3X-MDA□			
			High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode	High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode
Special-beam models	Long distance, high power	E32-D16	40 to 1,000	40 to 700	40 to 450	40 to 240	40 to 600	40 to 490	40 to 300	40 to 240
		E32-D11L	650	400	260	110	400	270	180	110
		E32-D21L/E32-D22L	210	130	80	35	130	85	55	35
	Ultracompact, ultrafine sleeve	E32-D33	25	16	10	4	16	10	6	4
		E32-D331	5	3	2	0.8	3	2	1.3	0.8
	Coaxial/small spot	E32-CC200R	250	150	100	45	150	105	65	45
		E32-CC200	500	300	200	90	300	210	140	90
		E32-D32L	250	150	100	45	150	100	65	45
		E32-C31/E32-D32	120	75	50	22	75	50	30	22
		E32-C42 + E39-F3A	Spot diameter variable in the range 0.1 to 0.6 mm at distances in the range 6 to 15 mm.							
		E32-D32 + E39-F3A	Spot diameter variable in the range 0.5 to 1mm at distances in the range 6 to 15 mm.							
		E32-C41 + E39-F3A-5	0.1-mm dia. spot at a distance of 7 mm.							
		E32-C31 + E39-F3A-5	0.5-mm dia. spot at a distance of 7 mm.							
		E32-C41 + E39-F3B	0.2-mm dia. spot at a distance of 17 mm.							
		E32-C31 + E39-F3B	0.5-mm dia. spot at a distance of 17 mm.							
		E32-C31 + E39-F3C	Spot diameter of 4 mm max. at distances in the range 0 to 20 mm.							
	Area sensing	E32-D36P1	250	150	100	45	150	100	65	45
	Retroireflective	E32-R21 + E39-R3 (provided)	10 to 250							
		E32-R16 + E39-R1 (provided)	150 to 1,500							
	Convergent-reflective	E32-L25/E32-L25A	3.3							
		E32-L24S	0 to 4							
		E32-L24L	2 to 6 (center 4)							
		E32-L25L	5.4 to 9 (center 7.2)							
		E32-L86	4 to 10							
Environment-resistant models	Heat-resistant	E32-D51	400	230	160	72	230	165	110	72
		E32-D81R-S E32-D61-S	150	90	60	27	90	63	40	27
		E32-D73-S	100	60	40	18	60	40	25	18
	Chemical-resistant	E32-D12F	160	95	65	30	95	70	45	30
		E32-D14F	70	40	30	10	40	28	18	10

Application-specific Models

(Unit: mm)

Type		Model	E3X-DA□-S				E3X-MDA□			
			High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode	High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode
Application-specific models	Label detection	E32-G14	10							
		E32-T14	4,000*	3,400	2,250	900	2,900	2,200	1,450	900
	Liquid-level detection	E32-L25T	Applicable tube: Transparent tube with a diameter in the range 8 to 10 mm and a recommended wall thickness of 1 mm							
		E32-D36T	Applicable tube: Transparent tube (no restriction on diameter)							
		E32-A01	Applicable tube: Transparent tube with a diameter of 3.2, 6.4, or 9.5 mm and a recommended wall thickness of 1 mm							
		E32-A02	Applicable tube: Transparent tube with a diameter in the range 6 to 13 mm and a recommended wall thickness of 1 mm							
		E32-D82F1(F2)	Liquid-contact model							
	Glass-substrate alignment	E32-L16-N	0 to 15			0 to 12	0 to 15			0 to 12
		E32-A08	10 to 20			---	10 to 20			---
		E32-A07E1(E2)	15 to 25			---	15 to 25			---
		E32-L66	5 to 18		5 to 16	---	5 to 18		5 to 14	---
	Glass-substrate Mapping	E32-A09/E32-A09H	15 to 38			---	15 to 38			---
		E32-A09H2	20 to 30			---	20 to 30			---
	Wafer mapping	E32-A03/E32-A03-1	1,150	890	600	250	750	580	380	250
		E32-T24S	1,750	1,300	870	350	1,100	870	580	350
		E32-A04/E32-A04-1	460	340	225	100	300	220	145	100
	Soda glass with reflection factor If 7%	E32-L64	1 to 5			---	---	1 to 5	2 to 4	---
		E32-A10	0 to 8		0 to 6	0 to 4	0 to 8	0 to 6	0 to 4	

* The optical fiber for the E32-T14 is 2 m long on each side, so the sensing distance is 4,000 mm.

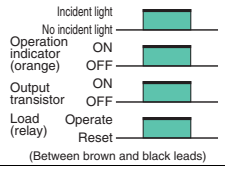
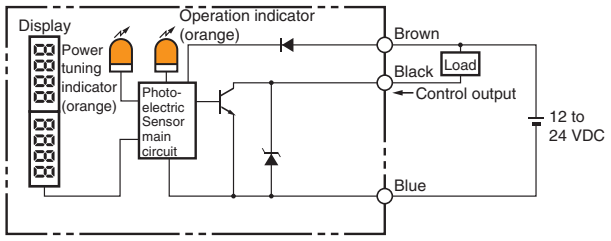
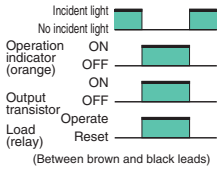
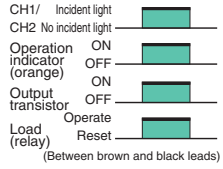
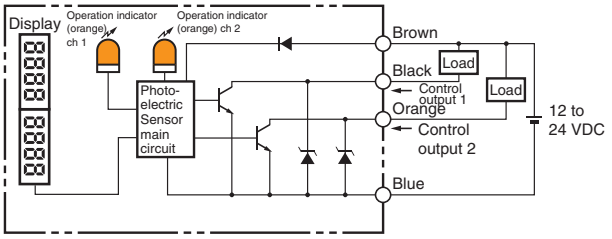
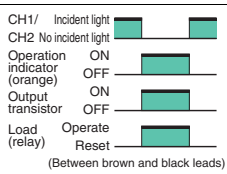
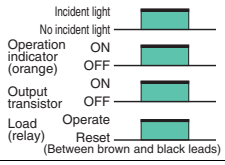
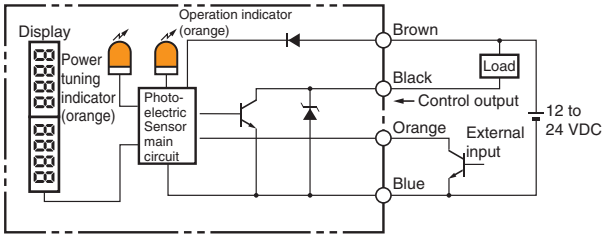
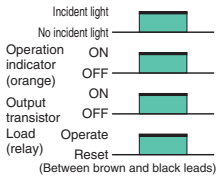
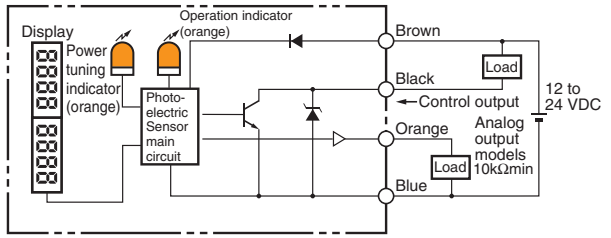
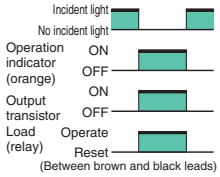
Green, Blue, and Infrared Light Sources (Unit: mm)

Type		Model	E3X-DAG□-S/DAB□-S				E3X-DAH□-S			
			High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode	High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode
Through-beam models	Standard	E32-T11R/E32-T12R/E32-T15XR/ E32-TC200BR(B4R)	65	50	35	30	280	190	130	55
		E32-T14LR/E32-T15YR/E32-T15ZR	25	20	22	12	100	75	80	21
		E32-TC200/E32-T12/E32-T15X/ E32-TC200B(B4)	100	75	50	45	400	280	180	80
		E32-T14L/E32-T15Y/E32-T15Z	50	40	30	25	240	160	110	45
	Special beam	E32-T11L/E32-T12L	150	120	85	75	700	490	320	140
Reflective models	Standard	E32-D11R/E32-D12R/E32-D15XR/ E32-DC200BR(B4R)	17	14	10	8	120	90	60	21
		E32-D14LR	4.4	3.5	2.5	2.2	32	24	16	5.5
		E32-D15YR/E32-D15ZR	4.2	3.3	2.2	2.1	28	20	13	5
		E32-DC200/E32-D15X/ E32-DC200B(B4)	32	25	16	16	200	150	100	35
		E32-D14L	11	9	6	5.5	80	60	40	14
		E32-D15Y/E32-D15Z	10	8	5.5	5	65	50	33	11
	Special beam	E32-D11L	44	35	22	22	260	190	130	45
		E32-CC200R	15	12	8	7.5	100	75	50	17
		E32-CC200	32	25	16	16	200	150	100	35
		E32-D32L	15	12	8	7.5	100	75	50	17
		E32-C31/E32-D32	7.5	6	4	3.5	50	37	25	8.5
Application-specific models	Label detection	E32-T14	320	260	220	160	1,800	1,200	820	360
		E32-G14	10				10			

Refer to *E32 Series* for details on Fiber Units.

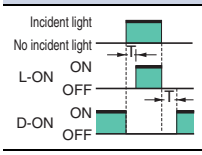
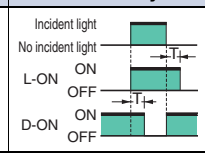
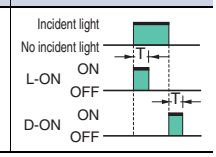
Output Circuit Diagrams

NPN Output

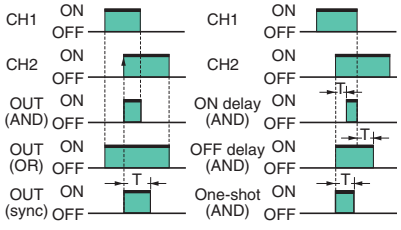
Model	Operation mode	Timing charts	Operation selector	Output circuit
E3X-DA11-S E3X-DA6-S E3X-DAG11-S E3X-DAG6-S E3X-DAB11-S E3X-DAB6-S E3X-DA11SE-S E3X-DA6SE-S	Light-ON		LIGHT ON (L-ON)	
	Dark-ON		DARK ON (D-ON)	
E3X-DA11TW-S E3X-DA6TW-S E3X-MDA11 E3X-MDA6 E3X-DA11AT-S E3X-DA6AT-S	Light-ON		LIGHT ON (L-ON)	
	Dark-ON		DARK ON (D-ON)	
E3X-DA11RM-S E3X-DA6RM-S	Light-ON		LIGHT ON (L-ON)	
	Dark-ON		DARK ON (D-ON)	
E3X-DA11AN-S	Light-ON		LIGHT ON (L-ON)	
	Dark-ON		DARK ON (D-ON)	

Note: 1. The ON/OFF regions when areas settings are used with the E3X-DA□TW-S are as follows:
LIGHT ON: ON when the incident level is between the thresholds for channels 1 and 2.
DARK ON: OFF when the incident level is between the thresholds for channels 1 and 2.

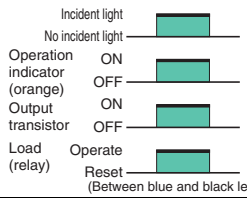
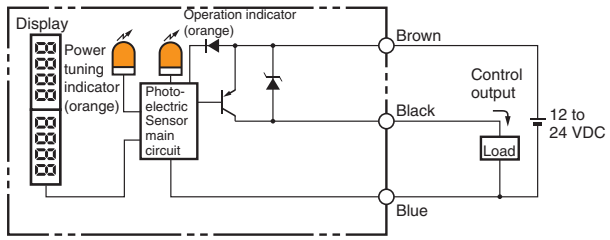
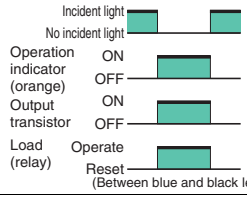
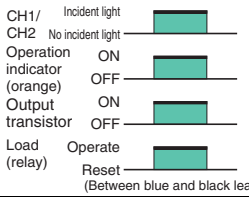
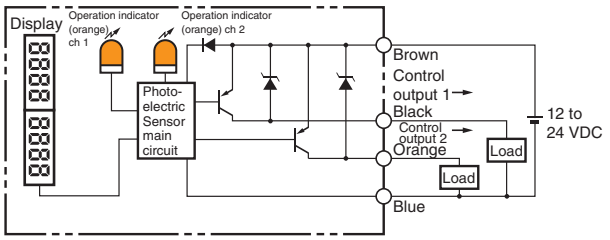
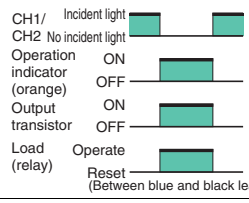
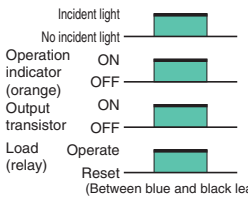
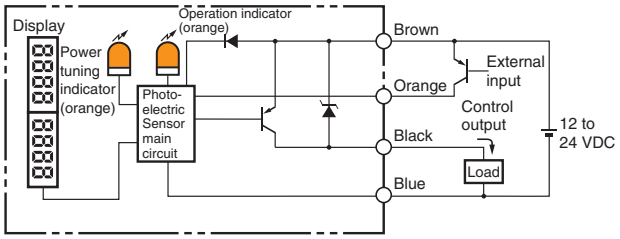
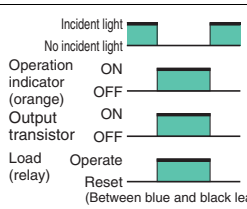
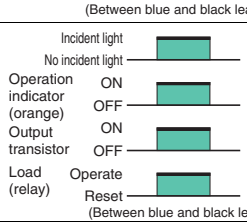
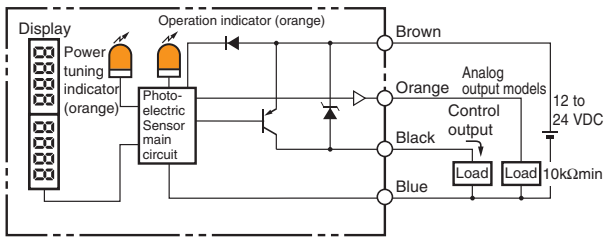
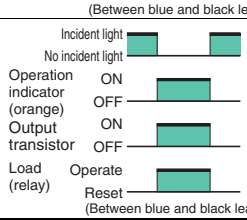
2. Timing Charts for Timer Function Settings (T: Set Time)

ON delay	OFF delay	One-shot
		

3. Control Output (AND, OR, Sync) and Timing Chart for Timer Settings (T: Set Time)



PNP Output

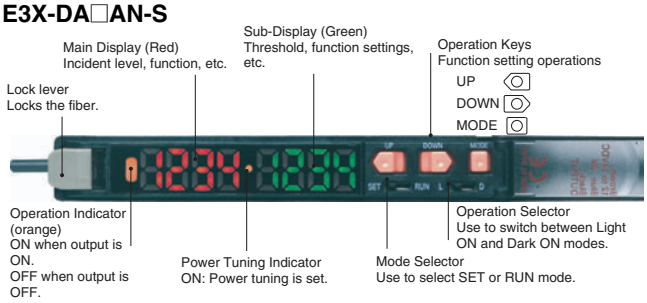
Model	Operation mode	Timing chart	Operation selector	Output circuit
E3X-DA41-S E3X-DA8-S E3X-DAG41-S E3X-DAG8-S E3X-DAB41-S E3X-DAB8-S E3X-DA41SE-S E3X-DA8SE-S	Light-ON		LIGHT ON (L-ON)	
	Dark-ON		DARK ON (D-ON)	
E3X-DA41TW-S E3X-DA8TW-S E3X-MDA41 E3X-MDA8 E3X-DA41AT-S E3X-DA8AT-S	Light-ON		LIGHT ON (L-ON)	
	Dark-ON		DARK ON (D-ON)	
E3X-DA41RM-S E3X-DA8RM-S	Light-ON		LIGHT ON (L-ON)	
	Dark-ON		DARK ON (D-ON)	
E3X-DA41AN-S	Light-ON		LIGHT ON (L-ON)	
	Dark-ON		DARK ON (D-ON)	

Note: The ON/OFF regions when areas settings are used with the E3X-DA□TW-S are as follows:
LIGHT ON: ON when the incident level is between the thresholds for channels 1 and 2.
DARK ON: OFF when the incident level is between the thresholds for channels 1 and 2.

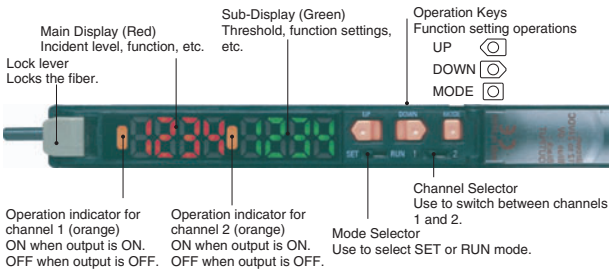
Nomenclature

Amplifier Units

E3X-DA□-S
E3X-DA□RM-S
E3X-DA□AN-S



E3X-DA□TW-S
E3X-DA□AT-S
E3X-MDA□



Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly.
Do not use it for such purposes.

Precautions for Correct Use

Do not use the product in atmospheres or environments that exceed product ratings.

Amplifier Unit

● Designing

Operation after Turning Power ON

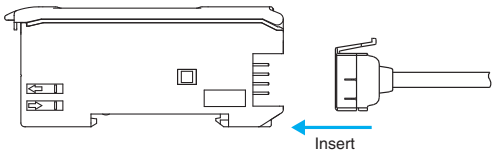
The Sensor is ready to detect within 200 ms after the power supply is turned ON. If the Sensor and load are connected to separate power supplies, be sure to turn ON the Sensor first.

● Mounting

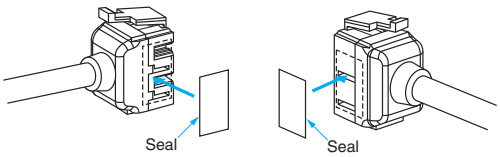
Connecting and Disconnecting Connectors

Mounting Connectors

1. Insert the Master or Slave Connector into the Amplifier Unit until it clicks into place.



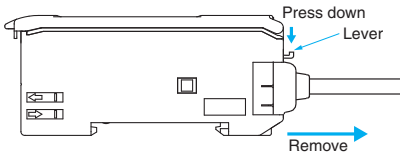
2. Attach the protector seals (provided as accessories) to the sides of master and slave connectors that are not connected.



Note: Attach the seals to the sides with grooves.

Removing Connectors

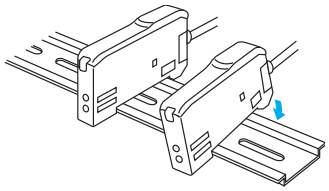
1. Slide the slave Amplifier Unit(s) for which the Connector is to be removed away from the rest of the group.
2. After the Amplifier Unit(s) has been separated, press down on the lever on the Connector and remove it. (Do not attempt to remove Connectors without separating them from other Amplifier Units first.)



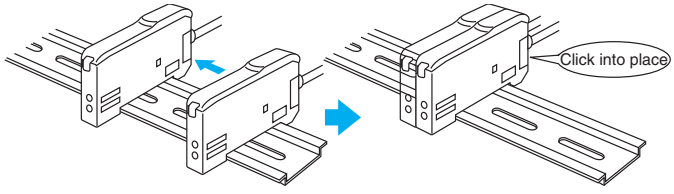
Adding and Removing Amplifier Units

Adding Amplifier Units

1. Mount the Amplifier Units one at a time onto the DIN track.



2. Slide the Amplifier Units together, line up the clips, and press the Amplifier Units together until they click into place.



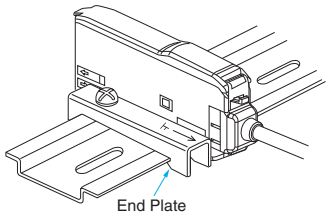
Removing Amplifier Units

Slide Amplifier Units away from each other, and remove from the DIN track one at a time. (Do not attempt to remove Amplifier Units from the DIN track without separating them first.)

Note: 1. The specifications for ambient temperature will vary according to the number of Amplifier Units used together. For details, refer to *Ratings and Specifications*.
2. Always turn OFF the power supply before joining or separating Amplifier Units.

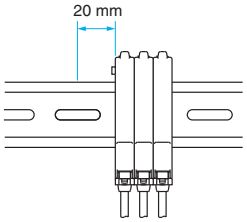
Mounting the End Plate (PFP-M)

An End Plate should be used if there is a possibility of the Amplifier Unit moving, e.g., due to vibration. If a Mobile Console is going to be mounted, connect the End Plate in the direction shown in the following diagram.



Mounting the Mobile Console Head

Leave a gap of at least 20 mm between the nearest Amplifier Unit and the Mobile Console head.

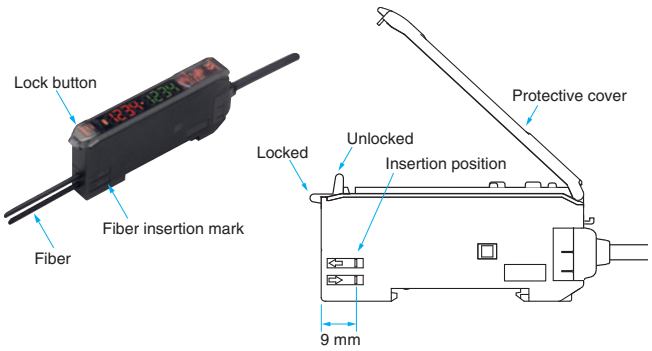


Fiber Connection

The E3X Amplifier Unit has a lock button for easy connection of the Fiber Unit. Connect or disconnect the fibers using the following procedures:

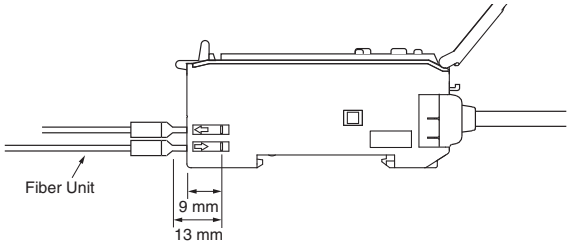
1. Connection

Open the protective cover, insert the fibers according to the fiber insertion marks on the side of the Amplifier Unit, and lower the lock lever.

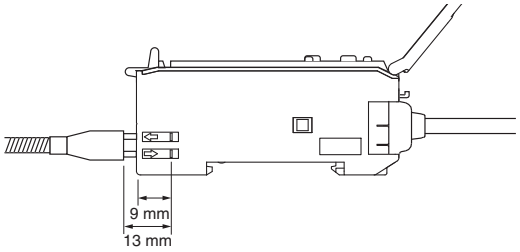


Note: If one of the fibers from the Fiber Unit has a white line, such as with a Coaxial Sensor, that fiber is for the Emitter. Insert it into the Emitter section. Refer to Dimensions for the Fiber Unit to see if there is an Emitter fiber.

Fibers with E39-F9 Attachment

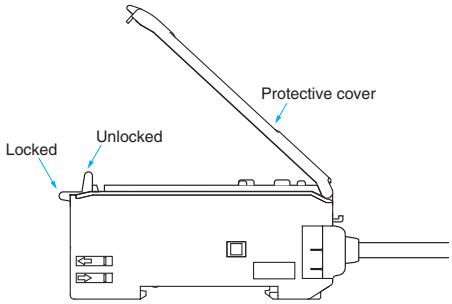


Fibers That Cannot Be Free-Cut (with Sleeves)



2. Disconnecting Fibers

Remove the protective cover and raise the lock lever to pull out the fibers.



Note: 1. To maintain the fiber properties, confirm that the lock is released before removing the fibers.
2. Be sure to lock or unlock the lock button within an ambient temperature range between −10°C and 40°C.

● Adjusting

Mutual Interference Protection Function

There may be some instability in the digital display values due to light from other sensors. If this occurs, decrease the sensitivity (i.e., decrease the power or increase the threshold) to perform stable detection.

EEPROM Writing Error

If the data is not written to the EEPROM correctly due to a power failure or static-electric noise, initialize the settings with the keys on the Amplifier Unit. ERR/EEP will flash on the display when a writing error has occurred.

Optical Communications

Several Amplifier Units can be slid together and used in groups. Do not, however, slide the Amplifier Units or attempt to remove any of the Amplifier Units during operation.

● Others

Protective Cover

Always keep the protective cover in place when using the Amplifier Unit.

Mobile Console

Use the E3X-MC11-SV2 Mobile Console for the E3X-DA-S-series Amplifier Units.

Dimensions

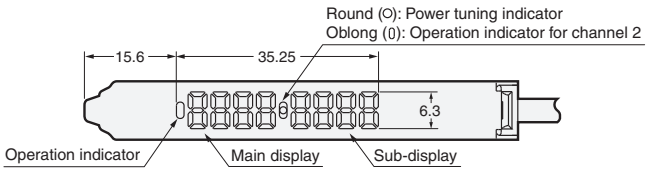
(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Amplifier Units

Amplifier Units with Cables

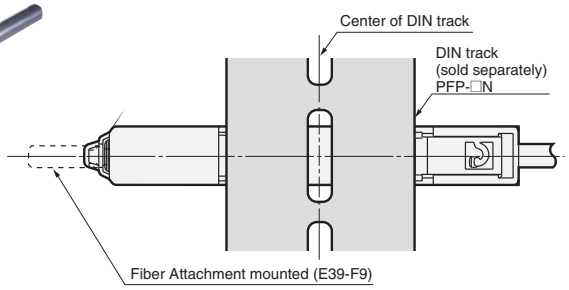
E3X-DA11-S
E3X-DA41-S
E3X-DAG11-S
E3X-DAG41-S
E3X-DAB11-S
E3X-DAB41-S
E3X-DA11RM-S
E3X-DA41RM-S
E3X-DA11TW-S
E3X-DA41TW-S
E3X-DA11SE-S
E3X-DA41SE-S
E3X-DA11AT-S
E3X-DA41AT-S
E3X-DA11AN-S
E3X-DA41AN-S
E3X-MDA11
E3X-MDA41

Area of digital indication

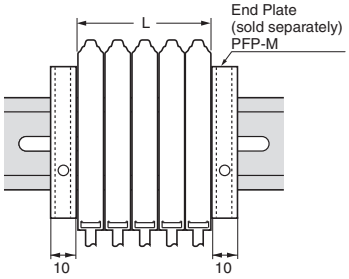


E3X-DA□-S
(E3X-MDA□)

DIN track mounting



Multiple connection diagram

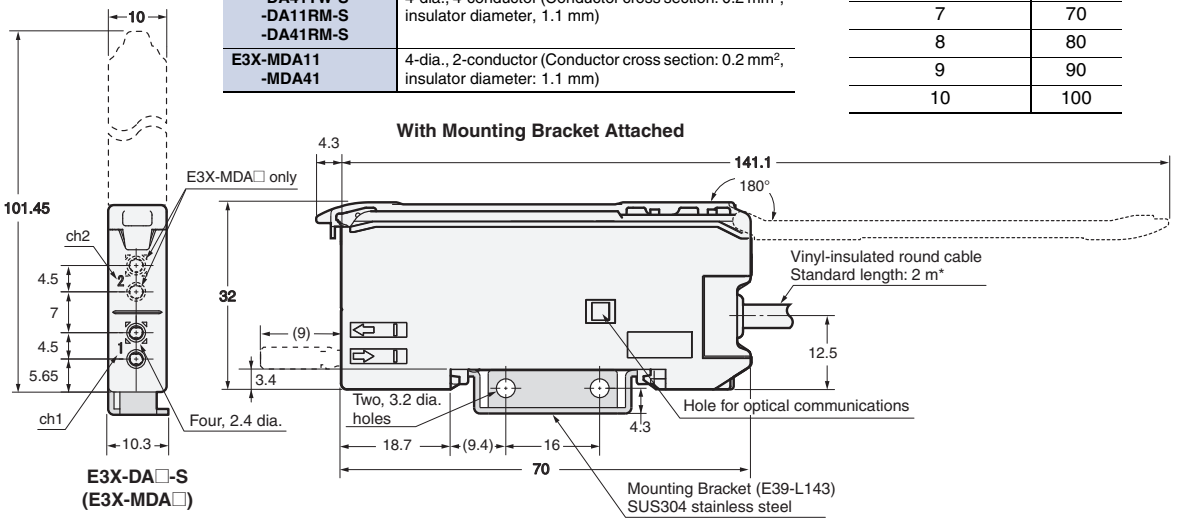


The number of expansion	L (mm)
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
10	100

* Cable Specifications

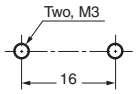
E3X-DA11-S -DA41-S -DAG11-S -DAG41-S -DAB11-S -DAB41-S	4-dia., 3-conductor (Conductor cross section: 0.2 mm², insulator diameter: 1.1 mm)
E3X-DA11TW-S -DA41TW-S -DA11RM-S -DA41RM-S	4-dia., 4-conductor (Conductor cross section: 0.2 mm², insulator diameter, 1.1 mm)
E3X-MDA11 -MDA41	4-dia., 2-conductor (Conductor cross section: 0.2 mm², insulator diameter: 1.1 mm)

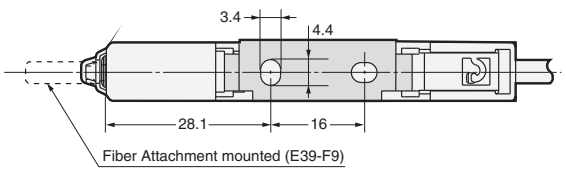
With Mounting Bracket Attached



E3X-DA□-S
(E3X-MDA□)

Mounting Holes



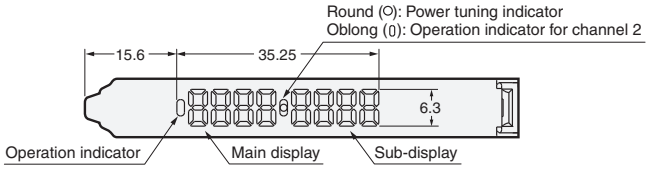


Note: When using E39-L143 Mounting Brackets, there will be small gaps between the Amplifier Units if they are mounted side by side.

Amplifier Units with Connectors

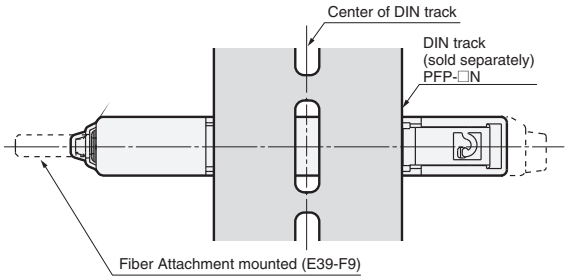
E3X-DA6-S
E3X-DA8-S
E3X-DAG6-S
E3X-DAG8-S
E3X-DAB6-S
E3X-DAB8-S
E3X-DA6RM-S
E3X-DA8RM-S
E3X-DA6TW-S
E3X-DA8TW-S
E3X-DA6SE-S
E3X-DA8SE-S
E3X-DA6AT-S
E3X-DA8AT-S
E3X-MDA6
E3X-MDA8

Area of digital indication

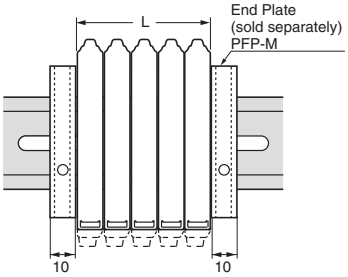


E3X-DA□-S
(E3X-MDA□)

DIN track mounting



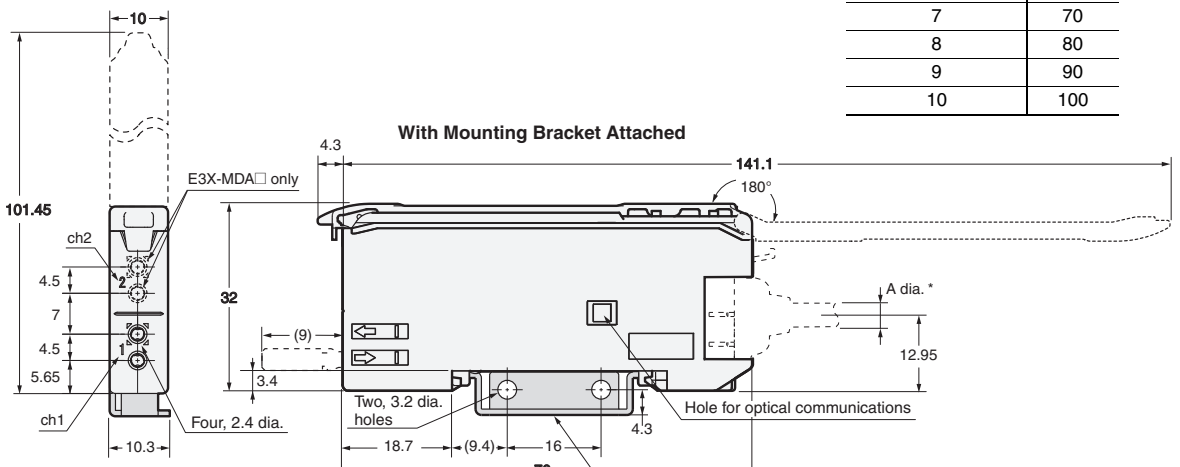
Multiple connection diagram



The number of expansion	L (mm)
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
10	100

* Cable Diameters

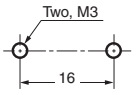
E3X-CN22 (2 conductors) **E3X-CN21 (4 conductors)** **E3X-CN11 (3 conductors)**	4.0-mm dia.
E3X-CN12 (1 conductor)	2.6-mm dia.

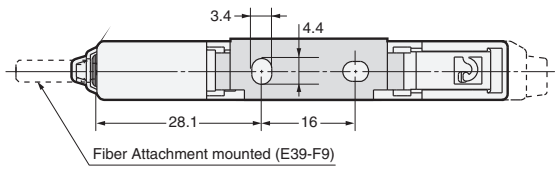


E3X-DA□-S
(E3X-MDA□)

With Mounting Bracket Attached

Mounting Holes



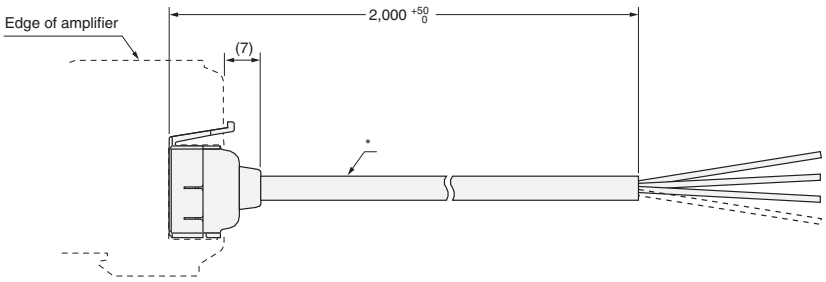


Note: When using E39-L143 Mounting Brackets, there will be small gaps between the Amplifier Units if they are mounted side by side.

Amplifier Unit Connectors

Master Connectors

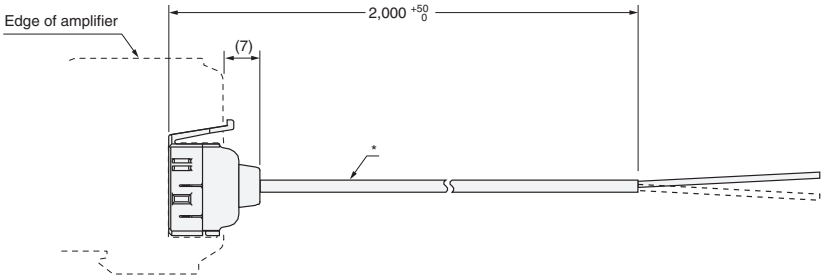
E3X-CN11
E3X-CN21



* E3X-CN11: **4 dia.** cable / **3 conductors** / Standard length: 2 m (Conductor cross section: 0.2 mm^2 (AWG24), Insulator diameter: 1.1 mm)
E3X-CN21: **4 dia.** cable / **4 conductors** / Standard length: 2 m (Conductor cross section: 0.2 mm^2 (AWG24), Insulator diameter: 1.1 mm)

Slave Connectors

E3X-CN12
E3X-CN22

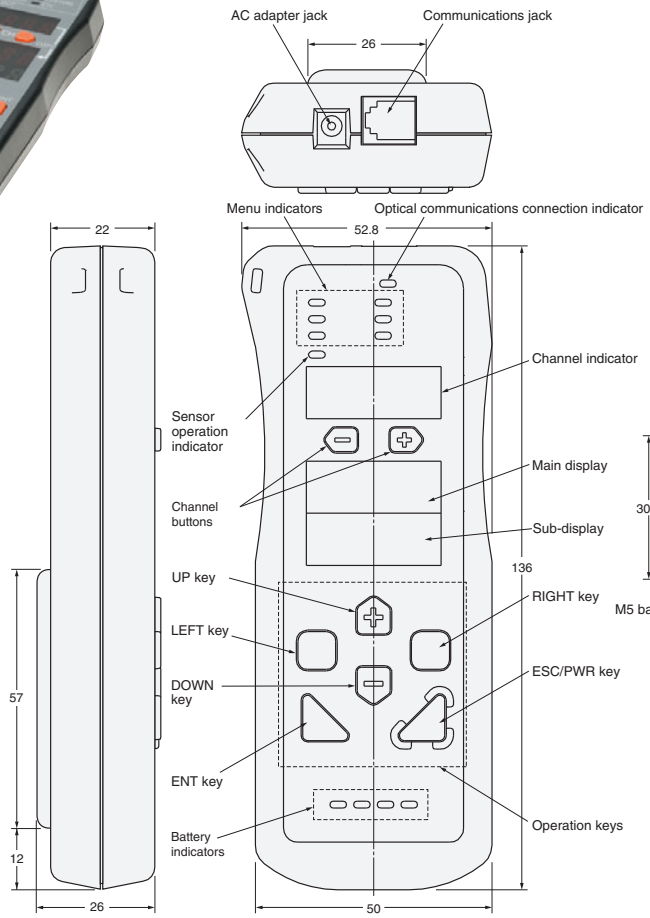


* E3X-CN12: **2.6 dia.** cable / **1 conductor** / Standard length: 2 m (Conductor cross section: 0.2 mm^2 (AWG24), Insulator diameter: 1.1 mm)
E3X-CN22: **4 dia.** cable / **2 conductors** / Standard length: 2 m (Conductor cross section: 0.2 mm^2 (AWG24), Insulator diameter: 1.1 mm)

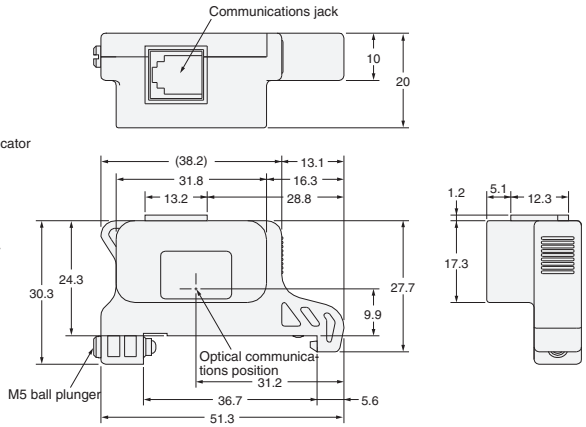
Mobile Console

E3X-MC11-SV2

Mobile Console



Mobile Console Head



Refer to *E32 Series* for details on Fiber Units.

Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

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In the interest of product improvement, specifications are subject to change without notice.

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