# E2EQ

CSM\_E2EQ\_DS\_E\_9\_3

# **Spatter-resistant Fluororesin-coated Proximity Sensor**

- Superior spatter resistance.
- Long Sensing-distance Models added for sensing distances up to 15 mm.
- Pre-wired Smartclick Connector Models are also available.



For the most recent information on models that have been certified for safety standards, refer to your OMRON website.



Be sure to read *Safety Precautions* on page 6.

## **Ordering Information**

Sensors [Refer to Dimensions on page 7.]

**Pre-wired Models** 

#### **Long Sensing-distance Models**

Appearance		Sensing distance	Output configuration	Operation mode	Model
	M12	4 mm			E2EQ-X4X1 2M
Shielded	M18	8 mm	DC 2-wire (no polarity)	NO	E2EQ-X8X1 2M
	M30	15 mm			E2EQ-X15X1 2M

### **Standard Models**

Appearar	Appearance		ance	Output configuration	Operation mode	Model
	M12	3 mm				E2EQ-X3D1 2M
Shielded	M18	7 mm		DC 2-wire	NO	E2EQ-X7D1 2M
	M30	10 mm				E2EQ-X10D1 2M

#### **Pre-wired Smartclick Connector Models (M12)**

#### **Long Sensing-distance Models**

Appearar	псе	Sensing distance	Output configuration	Operation mode	Model
Chielded	M12	4 mm	DC 2-wire		E2EQ-X4X1-M1TJ 0.3M
Shielded	M18	8 mm	(no polarity) (3)-(4)	NO	E2EQ-X8X1-M1TJ 0.3M
	M30	15 mm	pin arrangement		E2EQ-X15X1-M1TJ 0.3M

#### **Standard Models**

Standard Models		Sensing distance		Output configuration	Operation mode	Model
Chioldod	M12	3 mm		DC 2-wire		E2EQ-X3D1-M1TGJ 0.3M
Shielded	M18	7 mm		(1)-(4)	NO	E2EQ-X7D1-M1TGJ 0.3M
	M30	10 mm		pin arrangement		E2EQ-X10D1-M1TGJ 0.3M

## **Pre-wired Connector Models (M12)**

## **Long Sensing-distance Models**

Appearar	nce	Sensing distance		Output configuration	Operation mode	Model
	M12		E2EQ-X4X1-M1J 0.3	E2EQ-X4X1-M1J 0.3M		
Shielded	M18	8 mm		(without polarity) (3)-(4)	NO	E2EQ-X8X1-M1J 0.3M
	M30	15 mm		pin arrangement		E2EQ-X15X1-M1J 0.3M

#### **Standard Models**

Standard M	odels	Sensing distance		Output configuration	Operation mode	Model
	M12	3 mm		DC 2-wire		E2EQ-X3D1-M1GJ 0.3M
Shielded	M18	7 mm		(1)-(4)	NO	E2EQ-X7D1-M1GJ 0.3M
	M30	10 mm		pin arrangement		E2EQ-X10D1-M1GJ 0.3M

## **Accessories (Order Separately)**

Sensor I/O Connectors (M12, Sockets on One Cable End)

(Models with Pre-wired Connectors: A Connector is not provided with the Sensor. Be sure to order a Connector separately.) [Refer to XS2, XS5.]

Appearance	Cable length	Sensor I/O Connector model number	Applicable Proximity Sensor model number
Straight	2 m	XS2F-D421-DC0-F	
	5 m	XS2F-D421-GC0-F	E2EQ-X□X1-M1J
L-shape	2 m	XS2F-D422-DC0-F	
L-shape	5 m	XS2F-D422-GC0-F	
Straight	2 m	XS2F-D421-DA0-F	
A STATE OF THE STA	5 m	XS2F-D421-GA0-F	E2EQ-X□D1-M1GJ
L-shape	2 m	XS2F-D422-DA0-F	LZEQ XII WI GO
2 onapo	5 m	XS2F-D422-GA0-F	
Smartclick Connector	2 m	XS5F-D421-D80-F	E2EQ-X□X1-M1TJ
Connector Straight	5 m	XS5F-D421-G80-F	E2EQ-X□D1-M1TGJ

Note: Refer to Introduction to Sensor I/O Connectors/Sensor Controllers for details.

## **Ratings and Specifications**

## **Long Sensing-distance Models**

	Model	E2EQ-X4X1	E2EQ-X8X1	E2EQ-X15X1			
Item		E2EQ-X4X1-M1(T)J	E2EQ-X8X1-M1(T)J	E2EQ-X15X1-M1(T)J			
Sensing d	istance	4 mm ±10%	8 mm ±10%	15 mm ±10%			
Set distan	ce *1	0 to 3.2 mm	0 to 6.4 mm	0 to 12 mm			
Differentia	ıl travel	15% max. of sensing distance					
Standard :	sensing object	Iron, 12 × 12 × 1 mm	Iron, 18 × 18 × 1 mm	Iron, 30 × 30 × 1 mm			
Response	frequency *2	1 kHz	0.5 kHz	0.25 kHz			
Control	Load current	3 to 100 mA					
output	Residual voltage *3	5 V max. (Load current: 100 mA, Cable length: 2 m)					
	mode (with sensing proaching)	Load ON: NO; For details, refer to the timing charts on page 5.					
Protection	circuits	Load short-circuit protection, Surge suppressor					
Ambient to	emperature range	Operating: –25 to 70°C, Storage: –40 to 85°C, (with no icing or condensation)					
Temperatu	ure influence	±15% max. of sensing distance at 23°C in the temperature range of -25 to 70°C    ±15% max. of sensing distance at 23°C the temperature range of -25 to 70°C    ±15% max. of sensing distance at 23°C the temperature range of -25 to 70°C					
Voltage in	fluence	$\pm$ 1% max. of sensing distance at rated voltage in the rated voltage $\pm$ 15% range					
Shock res	istance	Destruction: 1,000m/s² 10 times each in X, Y, and Z directions					
Connection method		Pre-wired Models (Standard cable length	: 2 m), Pre-wired Connector Models				
Weight	Pre-wired Models	Approx. 65 g	Approx. 140 g	Approx. 190 g			
(packed state)	Pre-wired Connector Models	Approx. 20 g	Approx. 40 g	Approx. 90 g			

<sup>\*1.</sup> Use the Sensor within the range in which the green indicator is ON.
\*2. The response frequency is an average value.
\*3. The residual voltage is 5 V. Make sure that the device connected to the Sensor can withstand the residual voltage.

#### **Standard Models**

	Model	E2EQ-X3D1	E2EQ-X7D1	E2EQ-X10D1		
Item		E2EQ-X3D1-M1(T)GJ	E2EQ-X7D1-M1(T)GJ	E2EQ-X10D1-M1(T)GJ		
Sensing dist	ance	3 mm ±10%	7 mm ±10%	10 mm ±10%		
Set distance		0 to 2.4 mm	0 to 5.6 mm	0 to 8 mm		
Differential to	ravel	10% max. of sensing distance				
Standard ser	nsing object	Iron, 12 × 12 × 1 mm	Iron, 18 × 18 × 1 mm	Iron, $30 \times 30 \times 1$ mm		
Response fre	equency *	1 kHz	500 Hz	400 Hz		
Control	Load current	3 to 100 mA				
output	Residual voltage	3 V max. (Load current: 100 mA, Cable length: 2 m)				
Operation mode (with sensing object approaching)		Load ON: NO; For details, refer to the timing charts on page 5.				
Protection ci	rcuits	Load short-circuit protection, Surge suppressor				
Ambient tem	perature range	Operating/Storage: –25 to 70°C (with no icing or condensation)				
Temperature	influence	±10% max. of sensing distance at 23°C in the temperature range of –25 to 70°C				
Voltage influ	ence	±2.5% max. of sensing distance at rated voltage in the rated voltage ±15% range				
Shock resistance		Destruction: 1,000 m/s <sup>2</sup> 10 times each in X, Y, and Z directions				
Connection method		E2EQ-X□D1: Pre-wired Models (Standard cable length: 2 m) E2EQ-X□D1-M1GJ: Pre-wired Connector Models (Standard cable length: 300mm)				
Weight Pre-wired Models		Approx. 120 g	Approx. 160 g	Approx. 220 g		
(packed	Pre-wired Connector Models	Approx. 80 g	Approx. 110 g	Approx. 190 g		

<sup>\*</sup> The response frequency is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

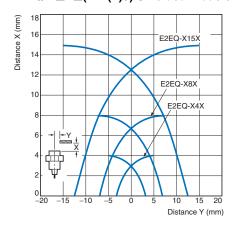
## **Common Ratings and Performance**

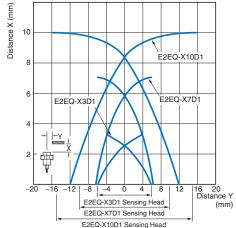
Model		E2EQ-X4X1 E2EQ-X4X1-M1(T)J E2EQ-X3D1 E2EQ-X3D1-M1(T)GJ	E2EQ-X8X1 E2EQ-X8X1-M1(T)J E2EQ-X7D1 E2EQ-X7D1-M1(T)GJ	E2EQ-X15X1 E2EQ-X15X1-M1(T)J E2EQ-X10D1 E2EQ-X10D1-M1(T)GJ		
Detectable o	bject	Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to Engineering Data on page 4.)				
Power suppl (operating v	ly voltage oltage range)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.				
Leakage cur	rent	0.8 mA max.				
Indicators		Operation indicator (red), Setting indicator (green)				
Ambient hur	midity range	Operating/Storage: 35% to 95% (with no condensation)				
Insulation re	sistance	50 MΩ min. (at 500 VDC) between current-carrying parts and case				
Dielectric str	rength	1,000 VAC for 1 min between current-carrying parts and case				
Vibration res	sistance	Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions				
Degree of pr	otection	IEC 60529 IP67, in-house standards: oil-resistant				
	Case	Fluororesin coating (Base material: brass)				
Materials Sensing surface		Fluororesin				
waterials	Clamping nuts	Fluororesin coating (Base material: brass)				
	Toothed washer	Zinc-plated iron				
Accessories		Instruction manual				

## **Engineering Data (Reference Value)**

## **Sensing Area**

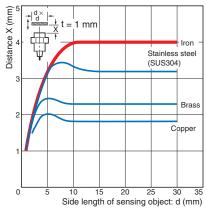
## $\begin{tabular}{ll} E2EQ-X \square X \square (-M1(T)J) \ Shielded \ Models \\ \end{tabular} \begin{tabular}{ll} E2EQ-X \square D \square (-M1(T)GJ) \\ \end{tabular}$



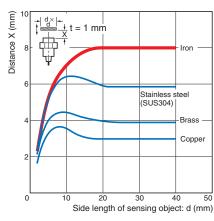


#### **Influence of Sensing Object Size and Material**

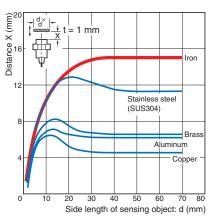
## E2EQ-X4X1(-M1(T)J)



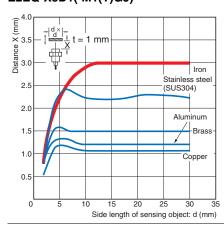
## E2EQ-X8X1(-M1(T)J)



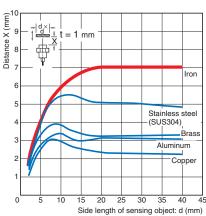
#### E2EQ-X15X1(-M1(T)J)



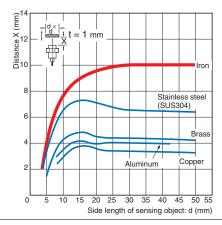
## E2EQ-X3D1(-M1(T)GJ)



#### E2EQ-X7D1(-M1(T)GJ)

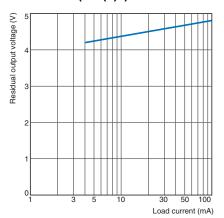


## E2EQ-X10D1(-M1(T)GJ)

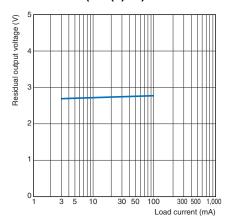


## **Residual Output Voltage**

## $\mathsf{E2EQ\text{-}X}\square\mathsf{X}\square(\mathsf{-M1}(\mathsf{T})\mathsf{J})$

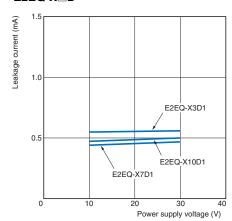


 $\mathsf{E2EQ\text{-}X} \square \mathsf{D} \square (\mathsf{-M1}(\mathsf{T})\mathsf{GJ})$ 



## **Leakage Current**

## E2EQ-X□D



## I/O Circuit Diagrams

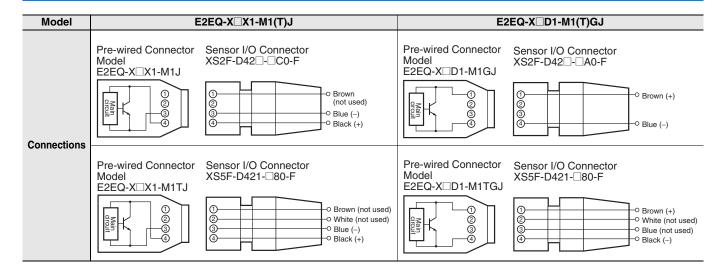
## **Long Sensing-distance Models**

Model	Operation mode	Timing Chart	Output circuit
E2EQ-X4X1 E2EQ-X8X1 E2EQ-X15X1 E2EQ-X4X1-M1(T)J E2EQ-X8X1-M1(T)J E2EQ-X15X1-M1(T)J	NO	Non-sensing area area Stable sensing area  Sensing object  (%)  Rated sensing distance  ON Setting indicator OFF (green)  ON Operation indicator OFF (red)  ON Control output	Note 1. The load can be connected to either the +V or 0 V side.  Note 2. There is no polarity. Therefore, the brown and blue lines have no polarity.  Connector Pin Arrangement  1 2 4 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

## **Standard Models**

Model	Operation mode	Timing Chart	Output circuit
E2EQ-X3D1 E2EQ-X7D1 E2EQ-X10D1 E2EQ-X3D1-M1(T)GJ E2EQ-X7D1-M1(T)GJ E2EQ-X10D1-M1(T)GJ	NO	Very Set position  Sensing area area  Stable sensing area  Stable sensing area  Proximity Sensor  Proximity Sensor  ON Setting indicator OFF (green)  ON Operation indicator (red) ON Control output	Note: Pins 2 and 3 are not used.

## **Pre-wired Connector Model Connections**



## **Safety Precautions**

## Refer to Warranty and Limitations of Liability.



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



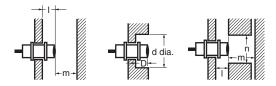
### **Precautions for Correct Use**

Do not use this product under ambient conditions that exceed the ratings.

#### Design

## **Influence of Surrounding Metal**

When mounting the Sensor within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the Sensor.



#### Influence of Surrounding Metal (Unit: mm)

Model Iter	n I	d	D	m	n
E2EQ-X4X1(-M1(T)J)	2.4	18	2.4	12	18
E2EQ-X8X1(-M1(T)J)	3.6	27	3.6	24	27
E2EQ-X15X1(-M1(T)J)	6	45	6	45	45
E2EQ-X3D1(-M1(T)GJ)		12		8	18
E2EQ-X7D1(-M1(T)GJ)	0	18	0	20	27
E2EQ-X10D1(-M1(T)GJ)		30		40	45

#### **Mutual Interference**

When installing two or more Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.





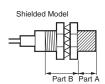
#### Mutual Interference (Unit: mm)

Model Item	Α	В
E2EQ-X4X1(-M1(T)J)	30	20
E2EQ-X8X1(-M1(T)J)	60	35
E2EQ-X15X1(-M1(T)J)	110	90
E2EQ-X3D1(-M1(T)GJ)	30	20
E2EQ-X7D1(-M1(T)GJ)	50	35
E2EQ-X10D1(-M1(T)GJ)	100	70

## Mounting

Do not tighten the nut with excessive force. A washer must be used with the nut.





Note: 1. The allowable tightening strength depends on the distance from the edge of the head, as shown in the following table. (A is the distance from the edge of the head. B includes the nut on the head side. If the edge of the nut is in part A, the tightening torque for part A applies instead.)

2. The following torque assume washers are being used.

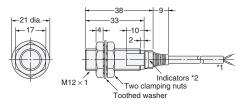
Torque	Part A		Part B	
Model	Dimension (mm)	Torque	Torque	
E2EQ-X4X1(-M1(T)J)		30 N⋅m		
E2EQ-X8X1(-M1(T)J)		70 N⋅m		
E2EQ-X15X1(-M1(T)J)		180	N⋅m	
E2EQ-X3D1(-M1(T)GJ)	24	15 N·m		
E2EQ-X7D1(-M1(T)GJ)	29	13 14-111		
E2EQ-X10D1(-M1(T)GJ)	26	39 N⋅m	78 N⋅m	

#### **Pre-wired Models**

#### **Long Sensing-distance Models**

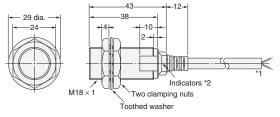


#### E2EQ-X4X1



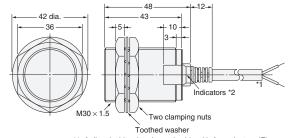
- \*1. 4-dia. vinyl-insulated round cable with 2 conductors (Flame-resistant, Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
- The cable can be extended up to 200 m (separate metal conduit). \*2. Operation indicator (red), Setting indicator (green)

#### E2EQ-X8X1



- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Flame-resistant, Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m The cable can be extended up to 200 m (separate metal conduit).
  \*2. Operation indicator (red), Setting indicator (green)

#### E2EQ-X15X1

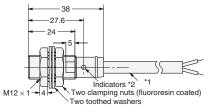


- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Flame-resistant, Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
  The cable can be extended up to 200 m (separate metal conduit).
  \*2. Operation indicator (red), Setting indicator (green)

## **Standard Models**

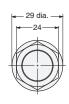
### E2EQ-X3D1

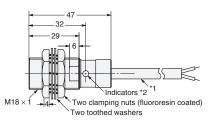




- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Flame-resistant, Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m The cable can be extended up to 200 m (separate metal
- \*2. Operation indicator (red), Setting indicator (green)

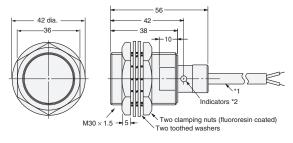
#### E2EQ-X7D1





- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Flame-resistant, Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m The cable can be extended up to 200 m (separate metal
- \*2. Operation indicator (red), Setting indicator (green)

## E2EQ-X10D1



- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Flame-resistant, Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
- The cable can be extended up to 200 m (separate metal conduit).

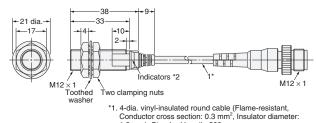
  \*2. Operation indicator (red), Setting indicator (green)

#### **Pre-wired Connector Models**

#### **Long Sensing-distance Models**

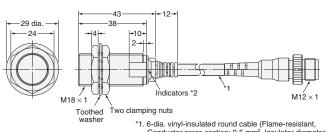


## E2EQ-X4X1-M1(T)J



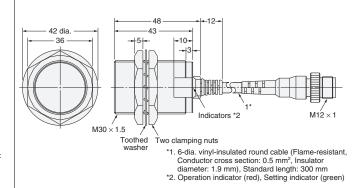
- 1.3 mm), Standard length: 300 mm
  \*2. Operation indicator (red), Setting indicator (green)

#### E2EQ-X8X1-M1(T)J



- \*1. 6-dia. vinyl-insulated round cable (Flame-resistant, Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 300 mm \*2. Operation indicator (red), Setting indicator (green)

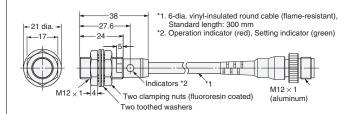
#### E2EQ-X15X1-M1(T)J



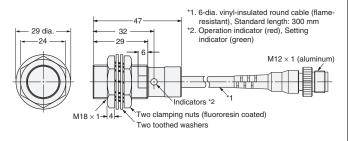
#### **Standard Models**



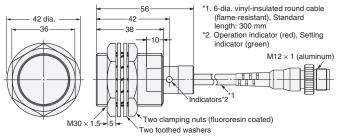
## E2EQ-X3D1-M1(T)GJ



#### E2EQ-X7D1-M1(T)GJ



## E2EQ-X10D1-M1(T)GJ



#### **Mounting Hole Dimensions**



Model	E2EQ-X4X E2EQ-X3	E2EQ-X8X  E2EQ-X7	E2EQ-X15X E2EQ-X10
F (mm)	12.5 <sub>0</sub> <sup>+0.5</sup> dia.	18.5 <sub>0</sub> <sup>+0.5</sup> dia.	30.5 <sub>0</sub> <sup>+0.5</sup> dia.

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Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

#### Suitability of Use.

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

#### Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

#### Performance Data.

Data presented in Omron Company websites, catalogs and other materials 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 user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

#### 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 part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions. Information presented by Omron Companies has been 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.

