

PLC

HMI

SENSOR

ENCODER

COUNTER

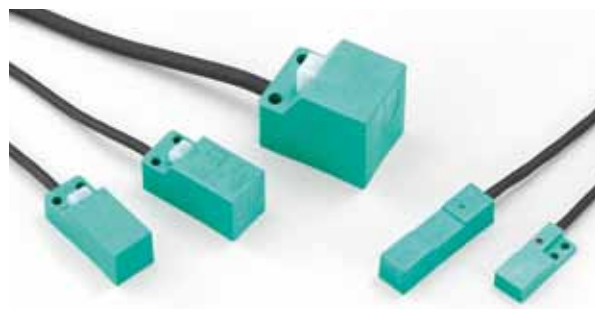
INFORMATION

APS-F/U Series

Features

PBT Resin Square Type, 2-wire/3-wire DC System

- Wide variety from thin 7mm model
- Maximum detection distance: 10 mm
- Front Surface / Upper Surface detection
- Models of different frequency are available for adjacent installation
- NO/NPN/PNP output



Type

2-wire DC System

Output Form	Operating Distance (mm)				Output Form	Model Number	Remarks
Non-flush Mount Type	3				NO	APS3-16F-Z	
	4				NO	APS4-12U-Z	Ultra-thin
						APS4-12BU-Z	
						APS4-12BF-Z	
	5				NO	APS5-18F-Z	
	10				NO	APS10-30F-Z	

3-wire DC System

Output Form	Operating Distance (mm)				Output Form	Model Number	Remarks
Non-flush Mount Type	3				NPN NO	APS3-16F-E	Different frequency-classified models are available. ("L" or "H" is attached to the end of model number.)
					PNP NO	APS3-16F-E2	
	4				NPN NO	APS4-12U-E	Ultra-thin
					NPN NO	APS5-18F-E	Different frequency-classified models are available. ("L" or "H" is attached to the end of model number.)
	5				PNP NO	APS5-18F-E2	Different frequency-classified models are available. ("L" or "H" is attached to the end of model number.)
					NPN NO	APS10-30F-E	Different frequency-classified models are available. ("L" is attached to the end of model number.)
	10				PNP NO	APS10-30F-E2	

* Different frequency-classified models (H and L) are made-to-order products.






APS-S/M

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2-wire DC System Non-flush Mount Type

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Cylinder Type




Square Type

Capacitive Type

APS-S/M

APS-F/U

APS-10 to 15

Effective Operating Distance			3 mm ±10%	5 mm ±10%	10 mm ±10%
Photo					
Remarks			Front surface detection	Front surface detection	Front surface detection
Output Form	NO	Model Number	APS3-16F-Z	APS5-18F-Z	APS10-30F-Z
		Price	Open	Open	Open
Rated Working Voltage			12/24 V DC (10 to 30 V DC) Allowable ripple rate: 10% p-p or less (Maximum peak voltage: 30 V or less)		
Standard Target Object (mm)			Iron 20 x 20 x 1 t	Iron 25 x 25 x 1 t	Iron 30 x 30 x 1 t
Guaranteed Operating Distance			0 to 2.4 mm	0 to 4.0 mm	0 to 8.0 mm
Reaction Material			Iron/Non ferrous metal (Operating distance changes depending on materials.)		
Hysteresis			20% or less		
Operating Cycle Frequency			1 kHz	800 Hz	500 Hz
Rated Working Current			5 to 200 mA		
Voltage Drop			3 V or lower		
Off-state Current			TYP0.8 mA or lower (Up to 1.0mA or lower)		
Circuit Protection			Surge absorption circuit		
Indicator Lamp			Operation indication		
Use Ambient Temperature			-25 to +70°C		
Temperature Characteristics			Within ±10% (At the operating distance at +20°C)		
Withstand Voltage			1,000 V AC 50/60 Hz (1 minute)		
Insulation Resistance			50 MΩ or higher (500 V DC)		
Vibration Resistance			Double amplitude: 1.5 mm, 10 to 55 Hz (2 h each for X, Y and Z direction)		
Impact Resistance			300 m/s², within 11 ms (10 times each for X, Y and Z direction)		
Protection Level			IP67		
Case Material			PBT resin		
Lead Wire			Oilproof vinyl chloride cable 1 m Outside diameter (Approx. ϕ 4) 0.3 mm², 2 core		Oilproof vinyl chloride cable 1 m Outside diameter (Approx. ϕ 6) 0.5 mm², 2 core
Tightening Torque			0.5 Nm or less	0.7 Nm or less	1.0 Nm or less
Weight (g)			Approx. 35	Approx. 45	Approx. 100

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2-wire DC System Non-flush Mount Type

Effective Operating Distance			4 mm ±10%		4 mm ±10%	
Photo						
Remarks			Upper surface detection		Upper surface detection	Front surface detection
Output Form	NO	Model Number	APS4-12U-Z		APS4-12BU-Z	APS4-12BF-Z
		Price	Open		Open	Open
Rated Working Voltage			12/24 V DC (10 to 30 V DC) Allowable ripple rate: 5% p-p or less		12/24 V DC (10 to 30 V DC) Allowable ripple rate: 10% p-p or less	
Standard Target Object (mm)			Iron 12 x 12 x 1 t		Iron 20 x 20 x 1 t	
Guaranteed Operating Distance			0 to 3.2 mm			
Reaction Material			Iron/Non ferrous metal (Operating distance changes depending on materials.)			
Hysteresis			20% or less			
Operating Cycle Frequency			400 Hz			
Rated Working Current			5 to 100 mA			
Voltage Drop			3 V or lower			
Off-state Current			TYP0.8 mA or lower (Up to 1.0mA or lower)			
Indicator Lamp			Operation indication			
Use Ambient Temperature			-25 to +70°C			
Temperature Characteristics			Within ±10% (At the operating distance at +20°C)			
Withstand Voltage			1,000 V AC 50/60 Hz (1 minute)			
Insulation Resistance			50 MΩ or higher (500 V DC)			
Vibration Resistance			Double amplitude: 1.5 mm, 10 to 55 Hz (2 h each for X, Y and Z direction)			
Impact Resistance			300 m/s², within 11 ms (10 times each for X, Y and Z direction)			
Protection Level			IP67			
Case Material			PBT resin			
Lead Wire			Oilproof vinyl chloride cable 1 m Outside diameter (Approx. ϕ3.5) 0.14 mm², 2 core		Oilproof vinyl chloride cable 1.5 m Outside diameter (Approx. ϕ4) 0.3 mm², 2 core	
Tightening Torque			0.4 Nm or less		0.5 Nm or less	
Weight (g)			Approx. 30		Approx. 50	






APS-S/M

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3-wire DC System Non-flush Mount Type

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Cylinder Type




Square Type

Capacitive Type

APS-S/M

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APS-10 to 15

Effective Operating Distance			3mm±10%	5 mm ±10%	10 mm ±10%
Photo					
Remarks			Different frequency-classified models are available. Front surface detection	Different frequency-classified models are available. Front surface detection	Different frequency-classified models are available. Front surface detection
Output Form	NPN NO	Model Number	APS3-16F-E	APS5-18F-E	APS10-30F-E
		Price	Open	Open	Open
	PNP NO	Model Number	APS3-16F-E2	APS5-18F-E2	APS10-30F-E2
		Price	Open	Open	Open
Rated Working Voltage			12/24 V DC (10 to 30 V DC) Allowable ripple rate: 3% p-p or less		
No-load Current			20 mA or lower		
Standard Target Object (mm)			Iron 20 x 20 x 1 t	Iron 25 x 25 x 1 t	Iron 30 x 30 x 1 t
Guaranteed Operating Distance			0 to 2.4 mm	0 to 4.0 mm	0 to 8.0 mm
Reaction Material			Iron/Non ferrous metal (Operating distance changes depending on materials.)		
Hysteresis			20% or less		
Operating Cycle Frequency			1 kHz	800 Hz	500 Hz
Rated Working Current			Up to 100 mA (12 V DC)/Up to 200 mA (24 V DC)		
Voltage Drop			1.5 V or lower (1.0 V TYP)		
Off-state Current			100 μA or less		
Indicator Lamp			Operation indication		
Use Ambient Temperature			-25 to +70°C		
Temperature Characteristics			Within ±10% (At the operating distance at +20°C)		
Withstand Voltage			500 V AC 50/60 Hz (1 minute)		
Insulation Resistance			5 MΩ or higher (500 V DC)		
Vibration Resistance			Double amplitude: 1.5 mm, 10 to 55 Hz (2 h each for X, Y and Z direction)		
Impact Resistance			300 m/s², within 11 ms (10 times each for X, Y and Z direction)		
Protection Level			IP67		
Case Material			PBT resin (Polycarbonate for the indicator lamp of APS3, APS5 and APS10)		
Lead Wire			Oilproof vinyl chloride cable 1 m Outside diameter (Approx. ϕ4) 0.3 mm², 3 core		Oilproof vinyl chloride cable 1 m Outside diameter (Approx. ϕ6) 0.5 mm², 3 core
Approx.			0.5 Nm or less	0.7 Nm or less	1.0 Nm or less
Weight (g)			Approx. 35	Approx. 45	Approx. 100

* "L" or "H" is attached to the end of model number of the various frequency-classified models. (Made-to-order product)

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APS-F/U Series

3-wire DC System Non-flush Mount Type

Effective Operating Distance		4 mm ±10%	
Photo			
Remarks		Upper surface detection	
Output Form	NPN NO	Model Number	APS4-12U-E
		Price	Open
Rated Working Voltage		12/24 V DC (10 to 30 V DC) Allowable ripple rate: 10% p-p or less	
No-load Current		10 mA or lower	
Standard Target Object (mm)		Iron 12 x 12 x 1 t	
Guaranteed Operating Distance		0 to 3.2 mm	
Reaction Material		Iron/Non ferrous metal (Operating distance changes depending on materials.)	
Hysteresis		20% or less	
Operating Cycle Frequency		400 Hz	
Rated Working Current		Up to 100 mA	
Voltage Drop		1.5 V or lower (1.0 V TYP)	
Off-state Current		100 μA or less	
Indicator Lamp		Operation indication	
Use Ambient Temperature		-25 to +70°C	
Temperature Characteristics		Within ±10% (At the operating distance at +20°C)	
Withstand Voltage		1,000 V AC 50/60 Hz (1 minute)	
Insulation Resistance		50 MΩ or higher (500 V DC)	
Vibration Resistance		Double amplitude: 1.5 mm, 10 to 55 Hz (2 h each for X, Y and Z direction)	
Impact Resistance		300 m/s ² , within 11 ms (10 times each for X, Y and Z direction)	
Protection Level		IP67	
Case Material		PBT resin	
Lead Wire		Oilproof vinyl chloride cable 1 m Outside diameter (Approx. $\phi 3.5$) 0.14 mm ² , 3 core	
Tightening Torque		0.4 Nm or less	
Weight (g)		Approx. 30	






APS-S/M

APS-F/U

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Connection and Operation

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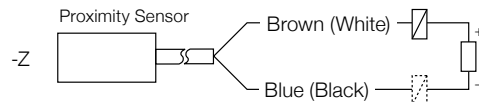
Cylinder Type

Square Type

Capacitive Type

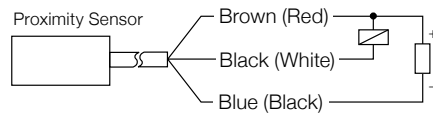
Connection/Operation

2-wire DC System

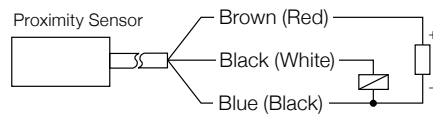


The load can be connected to either side of the power source.

3-wire DC System NPN Output -E



3-wire DC System PNP Output -E2

Note:  indicates a load.

(Target Object Not Present Present)

Output

OFF ON

Operation
Indication

OFF ON

Output

OFF ON

Operation
Indication

OFF ON

Output

OFF ON

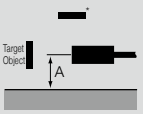
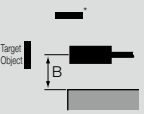
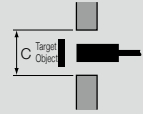
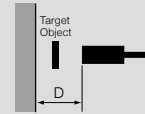
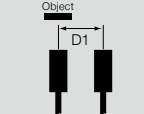
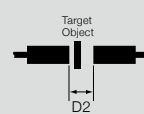
Operation
Indication

OFF ON

Installation / Effects of Surrounding Metal

Since the proximity sensor is affected by surrounding metal, install it remotely enough from the described dimensions.

(Unit: mm)

Installation	- Parallel arrangement of infinite plane metal body	- Parallel arrangement of plane metal body to the detector surface	- Arrangement to fenestrate metal body	- Arrangement of metal body at the front	- Parallel arrangement	- Opposing arrangement (Front detection type)
Model Number						
APS3-16F-...	22	10	50	10	40	50
APS5-18F-...	28	13	60	15	50	60
APS10-30F-...	43	23	70	30	100	120
APS4-12U-...	3.5	3.5	52	12	25	35
APS4-12BU-Z	10	6	25	10	30	40
APS4-12BF-Z	10	6	25	10	30	40

* Position of the target body in the top detection models

- When there is metal around the proximity sensor, the operating distance changes and makes operation unstable. Therefore, place the surrounding metal as remotely as possible from the proximity sensor.

- Since the D dimension (mm) is the minimum value from the proximity sensor's detector surface to the surrounding metal body, place the metal more remotely than the numeric values shown in the table above.

Mutual Interference and Frequency Classification

When two or more proximity sensors are closely installed, the installation interval of the sensors should be more than 10 times the operating distance (between centers).

If the interval is too short, mutual interference may occur.

If the interval cannot be sufficiently secured, use modes with differently classified frequency.

The frequency classification is represented by the alphabet after the operating distance in the normal model number.

- Models with a classified frequency are shown by the mark on the cable.

H : Yellow spiral

L : Red spiral

(Example)

APS3-16F-E (M) Model of standard frequency (M is not normally indicated.)




-E2 (M)

APS3-16F-EL Model with lower frequency than the standard

APS3-16F-EH Model with higher frequency than the standard

Combination of Models Classified by Frequency
(The sensors can be mounted with the cases tightly attached.)

APS3-16F-E(M)LH
APS5-18F-E(M)LH
APS5-18F-E2(M)LH

L 
(M) 
H 

* It requires consideration when 4 or more sensors are closely mounted.

APS10-30F-E(M)L

L 
(M) 

* It requires consideration when 3 or more sensors are closely mounted.

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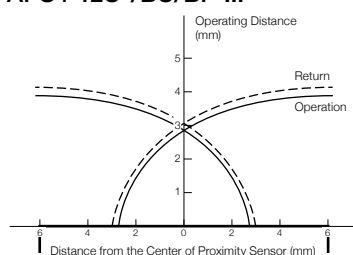
Capacitive Type

APS-F/U Series

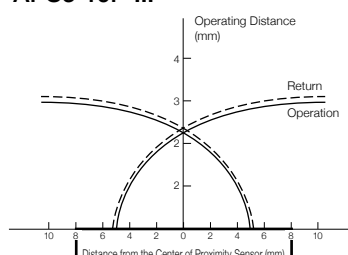
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Detection Range Diagram (Representative Examples)

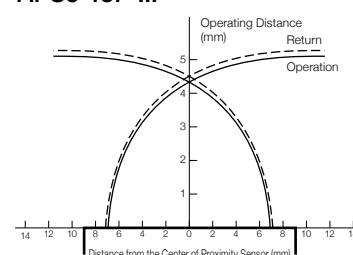
APS4-12U-/BU/BF-...



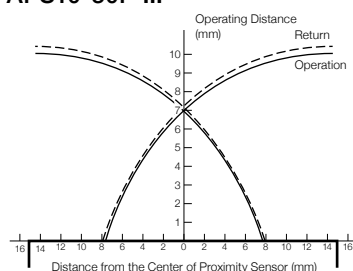
APS3-16F-...



APS5-18F-...

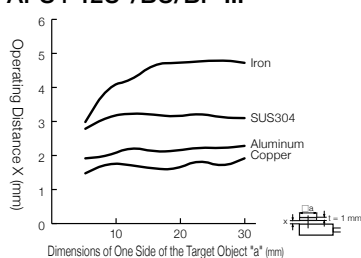


APS10-30F-...

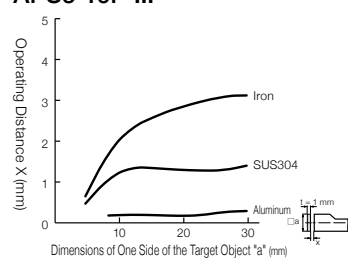


Shape Based Characteristics (Representative Examples)

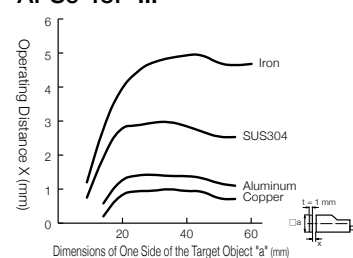
APS4-12U-/BU/BF-...



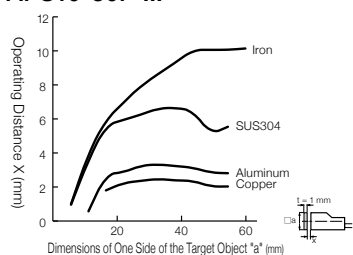
APS3-16F-...



APS5-18F-...



APS10-30F-...



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Dimensions

P L C



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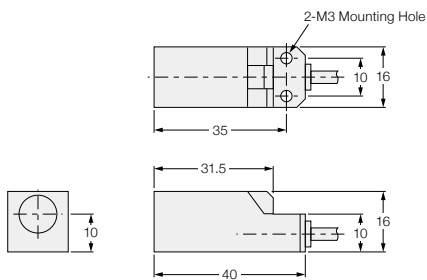
APS-S/M

APS-F/U

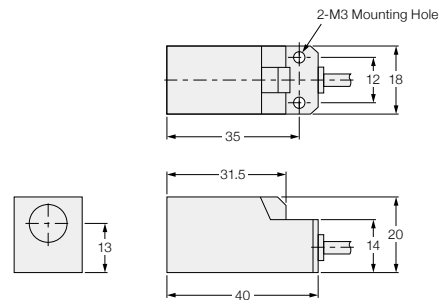
APS-10 to 15

Dimensions (Unit: mm)

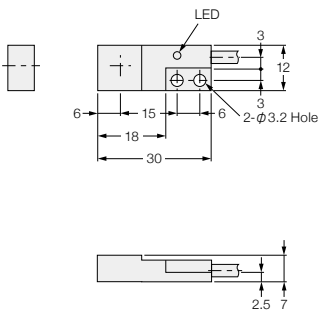
APS3-16F-...



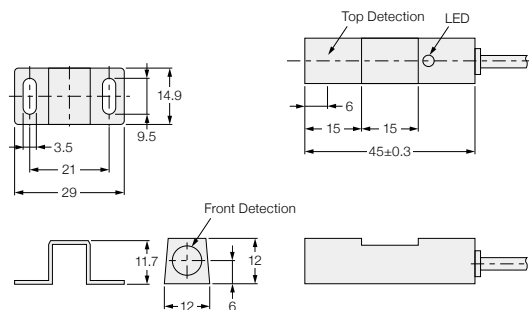
APS5-18F-...



APS4-12U-...



APS4-12BU/BF-....



APS10-30F-...

