

# Optical Fiber Sensor Amplifier

High Speed Digital Amplifier

# FOX-HD



## SALIENT FEATURES

- ◆ 2 Output
- ◆ ECO Mode
- ◆ Edge Sensing
- ◆ 16µsec response
- ◆ Wide LED Display
- ◆ 5x Sensing Distance
- ◆ Auto Power Control
- ◆ Auto Sensitivity Control

## Model Number Legend

**FOX-HD-□□-□**  
 1    2    3 4    5

### 1. Series

FOX

### 2. Type

HD: High Speed Digital Amplifier

### 3. Sensing Type

S: Standard

### 4. Output

N: NPN Output

P: PNP Output

N2: 2 NPN Outputs

P2: 2 PNP Outputs

### 5. Connection

2M: 2m Cable

### #. Accessories included

Surface Mounting Bracket : 1 No.

### Example:

FOX-HD-SN2-2M

FOX Series - High Speed Digital Amplifier - Standard Type - 2 NPN Outputs - 2m Cable

**NOTE:** Contact us for models not shown in catalogue.

## Product Highlights

The FOX-HD - New generation High Speed Smart Optical Fiber Sensor Amplifiers offering advanced stabilization techniques for Zero Maintenance and ease of operation.

### ◆ Our Fastest Sensor yet!

The new generation DUO processor enables fastest speed in its class of 16μS (1-HS mode). It can detect over 30,000 pieces per second!

### ◆ % display

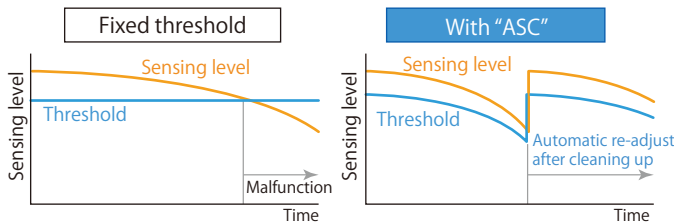
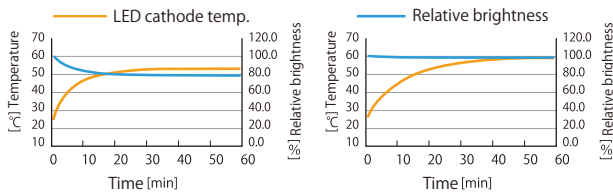
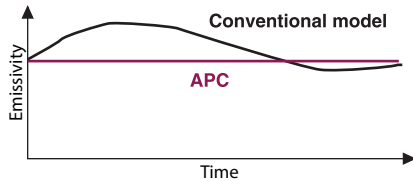
The display of the sensor can be changed between percentage (0-100) and sensitivity value. The percentage reading makes it easy to recognize level changes

### ◆ Multiple Output Modes

Multiple output modes like On/ Off delay, One shot, On+Off delay, On delay + One shot (0.1~9.999ms) are available

### ◆ Auto Power Control (APC)

The APC function ensures precise sensing under varying environments by maintaining a constant light emission level by regulating the current flow to light element.



Sensing level changes when light path got some contamination and then it works wrongly. It needs re-teaching.

Threshold level is adjusted optimized level automatically according to sensing level continuously.

### ◆ Longer Sensing Distance

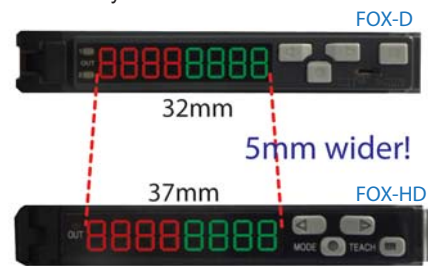
The FOX-HD has a longer sensing distance than most other sensors in its class. This is enabled by the High- power LED, highly efficient collective lens on the receiver and pulse emission technique. The amplifier received enough light to realize around 3 times longer sensing distance for diffuse and 5 times longer sensing distance for through beam sensing.

### ◆ ECO Mode

The FOX-HD comes with a ECO mode that enables power saving by switching off the Sub (Green) display and reducing the brightness of the Main (Red) display to 30% of full brightness.

### ◆ Extra Wide Display

37mm Wide 7 segment hi- bright LED display for added visibility.



### ◆ Auto Brightness Stabilizer

The stabilizer ensures that the LED brightness stays constant by adjusting the LED current even under fluctuation of LED temperature after power up.

### ◆ Auto Sensitivity Control (ASC)

The lens/ reflector may get contaminated with dust over time. The FOX-HD amplifier monitors the change in light level and resets the threshold value. In conventional amplifiers; after cleaning off the lens/ reflector it is necessary to reset the threshold setting. In FOX-HD this is not required. Simply clean the lens/ reflector and the sensor will automatically reset the threshold level for the change.

After cleaning the incoming light level will increase suddenly. This change is computed and the threshold is reset based on the increase in light intensity.

## Product Highlights

## FOX-HD



### POWER SETTING



### ◆ Emitter Power Adjustment

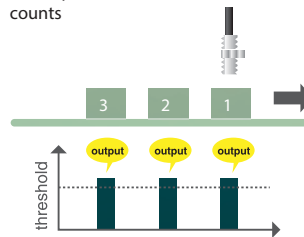
A highly reflective target will cause high return intensity and saturate the amplifier, making adjustment difficult. This can also happen if the object and target are too close. In situations like this the amplifier saturation can be reduced by decreasing the emitter LED's power.

### ◆ Counter Mode

The FOX-D amplifier features a built-in counter. This makes it convenient to count parts, for example 10 pcs. in a bag. The output turns on once the sensor has counted the desired quantity. Simply program in the number of parts to be counted.

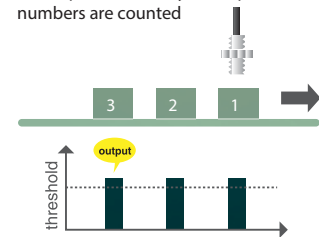
#### Normal Mode

An output comes when the sensor counts



#### Counter Mode

An output comes only when preset numbers are counted



### ◆ Automatic Tuning

This provides a way to boost or dampen the excess gain level of the amplifier in poor sensing conditions (low light level, low sensitivity or saturating condition). Automatic tuning is ideal when you need a little bit better excess gain level, or when detecting a dark object with diffuse reflective fiber cables.

### ◆ Edge Sensing

The sensor output triggers when there is a sudden increase or decrease in the light level. This is ideal for sensing objects without being influenced by a dusty environment

### ◆ Seven Response Time Modes

The FOX-HD has seven response time modes. High Speed: 16µs; Fast: 70µs; Standard: 250µs; Long: 500µs; Power Long: 1ms; Ultra Long: 2ms; Extra Long: 8ms

The sensing distance and the response time are inversely proportional. Choose faster mode when the object to be detected is moving fast and is at a closer distance. Choose slower mode for detecting objects at a longer distance.

### ◆ Adjustable Hysteresis

Hysteresis can be adjusted from 1% to 40% as necessary. This enables flexible setup of sensitivity according to the site condition.



Detecting sheet objects

Detecting parts leads

### ◆ Eight Teach Modes

The FOX-HD has eight teaching modes for various applications.

2 Point teach, 1 Point Teach for long distance, 1 Point teach, Through teach, Zone teach, Automatic teach, % teach, 0% teach.

### ◆ Reversible Display

Depending on the mounting direction the display can be inverted by 180°. This helps in making the display readable irrespective of the mounting direction.

### ◆ Key Lock Function

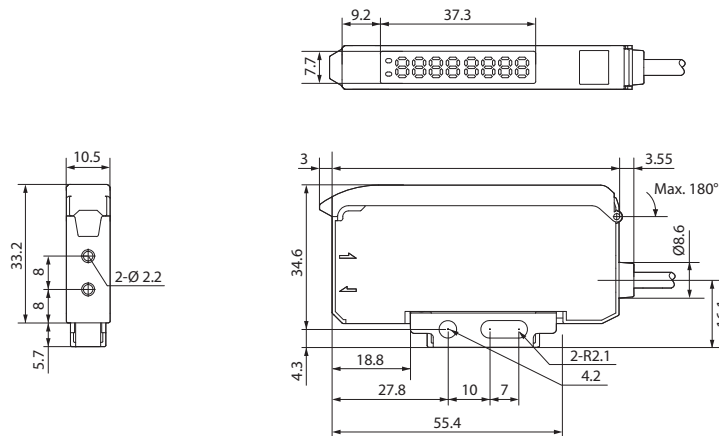
Built in key lock function with two lock levels to prevent un-intended access to the sensor settings.

# Ratings and Specifications

## FOX-HD

Type		NPN Output	PNP Output
Models	1 Output	FOX-HD-SN-2M	FOX-HD-SP-2M
	2 Output	FOX-HD-SN2-2M	FOX-HD-SP2-2M
Light Source	Red LED, 632nm		
Response Time (modes)	High Speed: 16µs; Fast: 70µs; Standard: 250µs; Long Distance: 500µs; Power Long Distance: 1ms; Ultra Long Distance: 2ms; Extra- Ultra Long Distance: 8ms		
Display	Type	37mm; Red- 4 digit 8-segment LED display; Green- 4 digit 8-segment LED display	
	Power Control	3 Steps: 100%, 50%, 25%	
Timer	On Delay/ Off Delay/ One Shot (1~9999ms)/ On + Off Delay/ On Delay + One Shot (1~9999ms)		
Teach Mode	2 Point/ 1 Point/ Through/ Zone/ Automatic/ Percentage/ Zero Percentage Teach		
Sensing Mode	Standard, Long Distance, Fast Modes		
Operation Mode	Light ON/ Dark ON Selectable		
Supply Voltage	10 - 24 VDC (Ripple Max 10%)		
Current Consumption	39mA max. @ 24VDC/ 28mA max. @ 24VDC ( ECO mode)		
Protection Circuits	Reverse Polarity, Shortcircuit, Output Overcurrent		
Ext. Input	Teach-in, Emitter Stop, Counter Reset		
Control Output	2 Channel, NPN/ PNP		
Control Output Rating	Load Voltage: max. 30 VDC; Load Current: max 100mA; Residual Voltage: 1.8V or less		
Output Indication	CH1, CH2 - Orange LED		
Vibration Resistance	10-55Hz; 1.5mm for 2 hours in X, Y, Z directions		
Shock Resistance	50G in X, Y, Z directions 3 times		
Environmental Illuminance	Sunlight: 10,000 lux, Lamp: 3,000 lux		
Ambient Temperature	Operation: -25° ~ 55°C; Storage: -40° ~ 70°C (non- freezing; non- condensing)		
Ambient Humidity	Operation: 35 ~ 85% RH; Storage: 35 ~ 85% RH (non- condensing)		
Protection Class	IP50		
Weight	aprox. 70g with cable		
Material	PC (Cover and Case)		

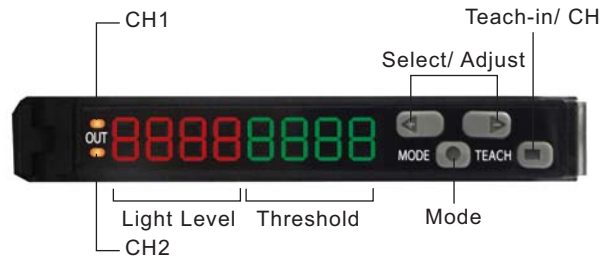
# Sensor Dimension Drawing



All dimensions are in mm

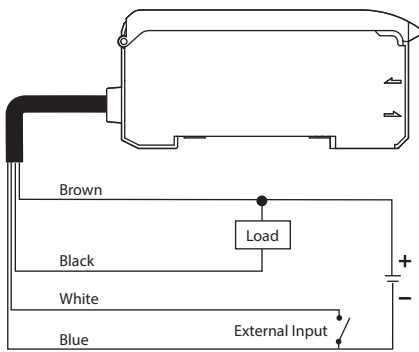
# Nomenclature

# FOX-HD



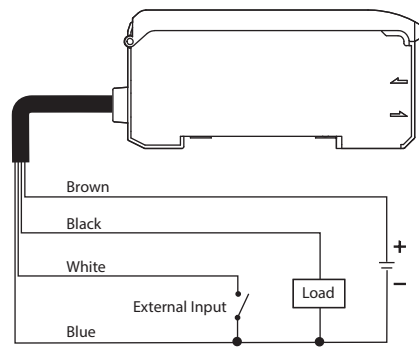
# Connection

◆ FOX-HD-SN-2M



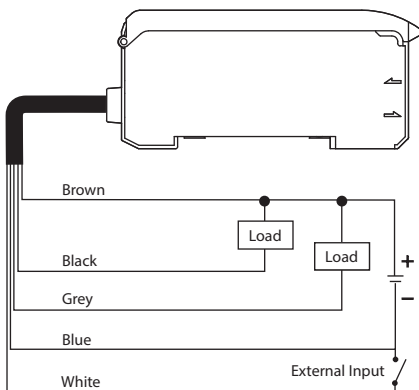
Brown : DC 12~24V      Black : Control Output 1

◆ FOX-HD-SP-2M



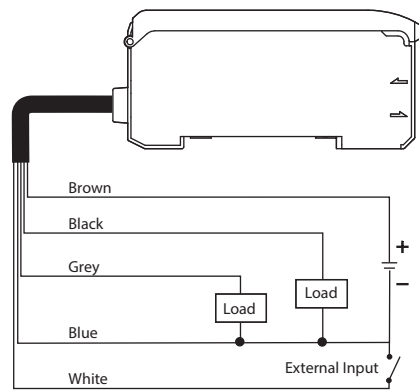
Brown : DC 12~24V      Black : Control Output 1  
 White : External Input      Blue : 0V

◆ FOX-HD-SN2-2M



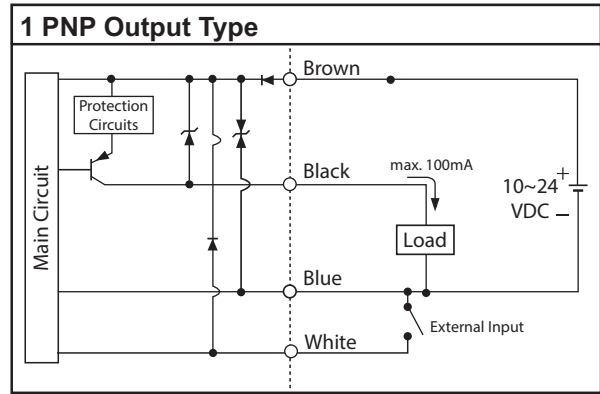
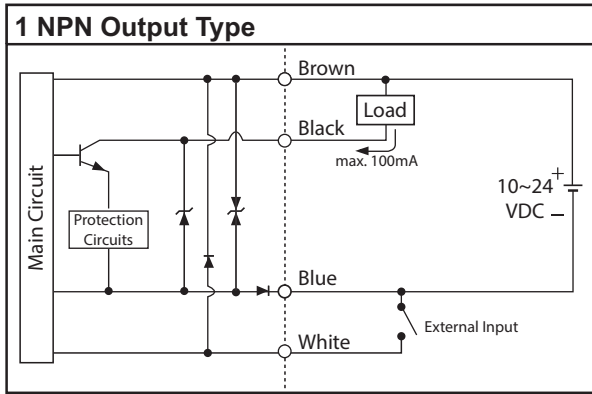
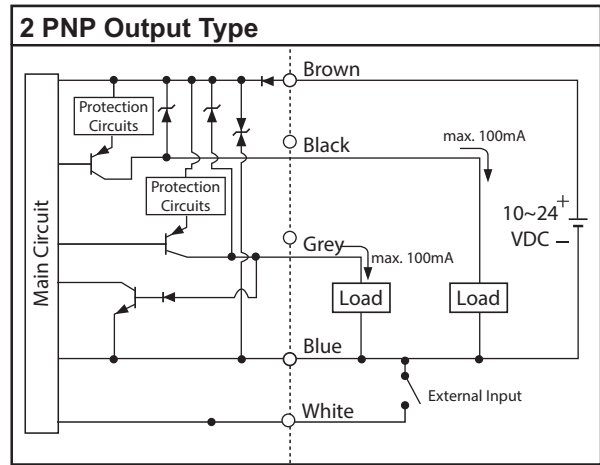
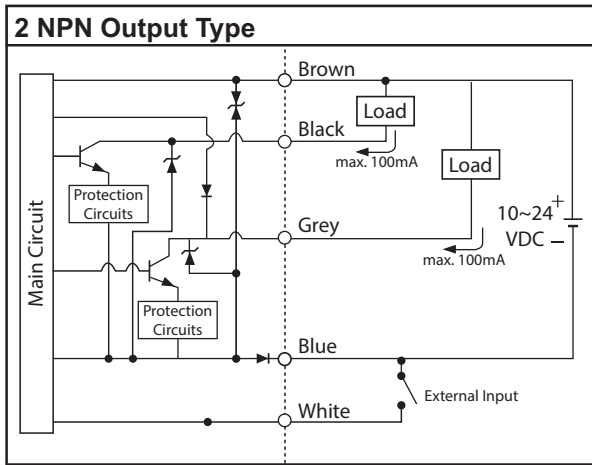
Brown: DC 12~24V      Black: Control Output 1      Grey: Control Output 2      Blue: 0V      White: External Input

◆ FOX-HD-SP2-2M



Brown: DC 12~24V      Black: Control Output 1      Grey: Control Output 2      Blue: 0V      White: External Input

Control Output Diagram



- Brown : DC 10~24V
- Black : Control Output 1
- Grey : Control Output 2
- Blue : 0V
- White : External Input

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