

F&C[®] Digital fiber optic sensor

FF-400 series

NEW

High Speed/dual Output Digital Amplifier



Characteristic

- Four-bit dual digital display fiber amplifier
- Automatic teaching setting, delay mode
- Normally closed adjustable, delay output
- Strong anti-interference ability
- Digital display, easy to operate

<http://www.fcsensor.com>

Obtain More Sensor Technical Information about F&C

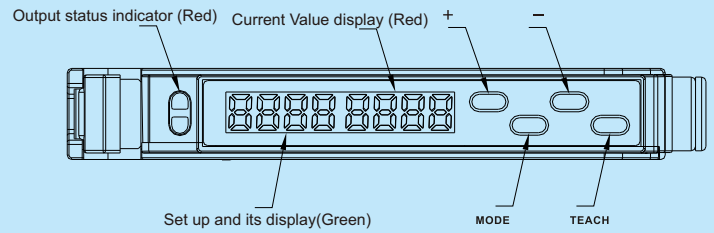


Official Wechat



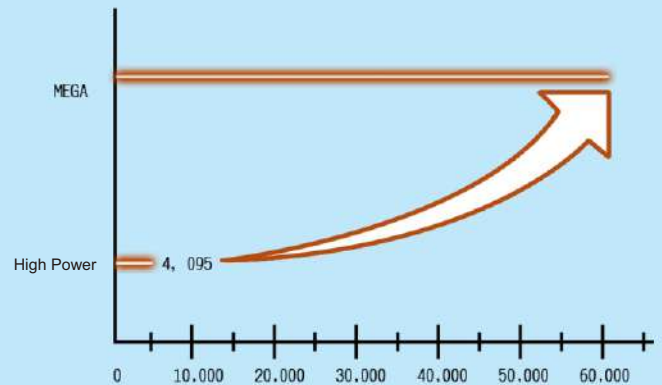
Technical Wechat

MODE Buttons make setup easier

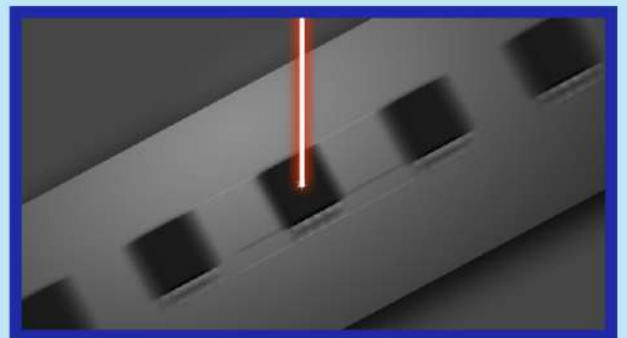


High Power

The dynamic range is 16 times of conventional model



High Speed



Product list

Product list

Type	Model	Through-beam Sensing Range	Diffuse Reflective Sensing Range	Light Source	Reaction Time
Two-way output	FF-402	1000mm	600mm	Red Light	100us
Conventional	FF-403	1000mm	500mm	Red Light	100us
Blue Light	FF-403B	1000mm	400mm	Blue Light	100us
Green Light	FF-403G	1000mm	350mm	Green Light	100us
Analog	FF-403V	1000mm	500mm	Red Light (Other light sources can be customized)	100us
White Light	FF-403W	1000mm	400mm	White Light	100us
Infrared Light	FF-403F	400mm	150mm	Infrared Light	100us
Regional Output	FF-403A	1000mm	200mm	Red Light	100us
High Speed	FF-401	1200mm	220mm	Red Light	50us
Ambient Light Detection	FF-413	None	None	None	5ms

Integrated designed High Performance Amplifier

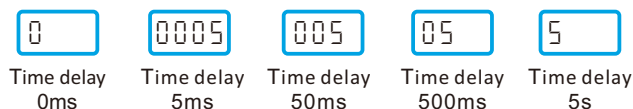
MANUAL threshold value setting

In the detection mode, press "+" "-" keys to adjust the threshold value "+ 1" "- 1".



Output Delay Function

Press MODE key 3s, wait for the green value to appear "SEL". After that, press three times TEACH key until the green value appears "0" to enter the delay setting, press "+", "-" adjust the delay output time. After setting, press TEACH key to exit the setting.



Speed Setting

Press MODE key 3s, wait for the green value to appear "SEL". After that, press five times TEACH key until the green value appears "LONG" to enter speed setting, press "+", "-" adjust the amplifier speed. After setting, press TEACH key to exit the setting.



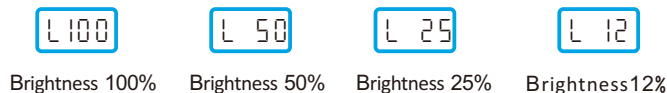
Adjust normally open normally closed

Keep pressing the key "MODE"(3S+) until "SEL" showed on panel. Press the TEACH key twice, and enter the setting of normally open and normally closed after "NO 0" is displayed. After setting, press the TEACH key to exit the setting



Led Brightness Setting

Press MODE key 3s, wait for the green value to appear "SEL". After that, press four times TEACH key until the green value appears "L 100" to enter the led brightness setting, press "+", "-" adjust the brightness of LED. After setting, press TEACH key to exit the setting.



Select Delay Mode

After the optic fiber is fixed, check the optic fiber type. Select the reflection delay mode for the diffuse reflective fiber. Select the through-beam delay mode for the through-beam optic fiber.



Specification

Type	規格參數
Model	FF-401/FF-401P
Power supply voltage	12~24VDC±10% Below P-P10%
Current consumption	≤40mA/24V
Load Current	100mA
Leakage current	<0.01mA
Residual voltage	<1.5VDC(oad current100mA, 2M cable)
Response time	50us、300us、1ms、2ms ms can be set
Output	<NPN/PNP Output type NPN/PNP open collector transistor · Maximum external incoming current 100mA · External voltage: 30VDC · Residual voltage: <2V
Short circuit protection	Insurance resistance output
Frequency Setting	A、B、C、D four groups can be adjusted
Working Indicator	Red LED
Digital Display	4-digit (green) + 4-digit (red) LCD display
Sensitivity Setting	Auto/Manual Adjustment
Timer function	"OFF"/"ON-D"/"OF-D"/"SHOT"are four modes: No Delay/On Delay/Off Delay/ Pulse Delay
Timer time	0.1ms-9S
Setting Inputs	External input setting Auto teach/test/sync setting
Transmitted power	10%、20%、30%..... 100% ten kinds of transmitting power can be adjusted
Light source	630nm(other light sources can be customized)
Anti-shake detection	Differential function ON/OFF
Operating Temperature / Humidity	-10~+50℃ / 30~85% (No frost or ice)
Storage Temperature / Humidity	-20~+70℃/30~85% (No frost or ice)
Output mode	NPN . NO . NC adjustable/PNP. NO. NC adjustable
Anti-vibration	Frequency 10~150Hz Double amplitude 0.75m x XYZ direction 2 hours
Protection level	IP50
Material	ABS/PC
Weight	Main body weight:65g, M8 connector type:18g

TEACH set-up method steps

TEACH setting

PI	Single point TEACH set Quick and easy setup can be applied to standard applications.	
SEt1	Two points TEACH set Setting more accurate threshold value between the detected object and environment, so that the system has the smallest margin	
ArEL	Area TEACH Setting This is what we call the windowing technique, which defines a suitable threshold interval after identifying the detected object. It is suitable for detecting marks or ignoring foreground and background interference.	

Single point TEACH set

☑ Press TEACH key 2 seconds

↓

☑ Select single point TEACH setting

↓

☑ Press the TEACH button

↓

Threshold blinks, display returns to normal

Maximum Agility Through-beam fiber optic tube - object to be detected

Adjusting Diffused Fiber Optic Tubes to Background

Threshold-----+5%

Adjust the threshold value to 5% more received volume according to the fiber reception volume.

Two points TEACH set

☑ Press TEACH 2 seconds

↓

☑ Select two points TEACH setting

↓

☑ First: Press the button to teach

↓

☑ Second: Press TEACH button

↓

Threshold blinks, display returns to normal

In any condition
Step 1: TEACH setting on the detected object

Step 2: TEACH again after removing the detected object Set once.

Threshold value-----1.
-----2.

The threshold value will be defined between the first and second point

Area TEACH settings

☑ Press the TEACH button for 2 seconds

↓

☑ Select area TEACH setting

↓

☑ Press the area TEACH setting button

↓

Setting successfully when display returns to normal

Step 2: Stop TEACH setting

Near-End Limit superior area
Area
Limit inferior area Far-End

Threshold value-----10%-----10%

Adjust interval according to receiving light amount, range±10%. This mode is specially used detect transparent objects.

Integrated designed High performance amplifier

- 1、 Initialization: Place the amplifier in a non-sensitive state and press "+" and "-" simultaneously for about 3 seconds to initialize the internal settings of the amplifier.
- 2、 Setting

Normally open and normally closed adjustment

Press the "MODE" key and hold it down. After 3 seconds, the display will show "0 L n0" / "0 L nL", to enter the parameter setting mode. (If no key is pressed within 3 minutes after entering the setting mode, the setting mode will be automatically exited). Press "MODE" to set the current parameter by pressing "+"/"-" key. After setting, press "MODE" key again to stop blinking, then you can press "+"/"-" key to enter the previous or next setting.

0 L n0

0 L nL

Response Time

The green value show "Long 1234" (long distance 2mS) / "SEnd 1234" (standard 1mS) / "FAST 1234" (fast 300uS) / " " (maximum speed 50uS) . Press the "MODE" key, after green value flash and then press "+"/"-" to adjust the parameter. After adjusting, press "MODE" key again.

Long 1234

SEnd 1234

FAST 1234

HIgE 1234

Timer Setting

After entering the timer delay setting mode, the green digital shows "oFF" / "on d 1234" / "oFFd 1234" / "SHoE 1234" are no delay/on delay/off delay/pulse delay respectively. When pressing "MODE", red digital button flash, press "+"/"-" to set the delay time, 1 - 9999ms adjustable. After setting the delay mode and time, press the TEACH button to exit the timer setting mode.

oFF

on d 1234

oFFd 1234

SHoE 1234

LED power setting

The green value appears "POWR", red value shows the power percentage ratio, "10" 10%, "20" 20% "100" 100%, press the "MODE" key after the red value flashes. Press the "+"/"-" keys to adjust the parameters, and then press the "MODE" key after the adjustment is done.

POwr 0010

POwr 0020

POwr 0050

POwr 0100

Expert settings

When "EiIPt" appears in green, press "MODE" to enter the expert level setting.

EiIPt

Expert setting

Display forward and reverse settings

tdrn no

External input settings

inPt oFF

Lock key setting

LoCK no

Energy saving settings

EoC no

Frequency setting

FrEY R

Tolerance Setting

toLE 5

Automatic gain calibration

AGC no

Differential settings

dIFF no

Return Difference Setting

HYSt 0

Zone output threshold Setting

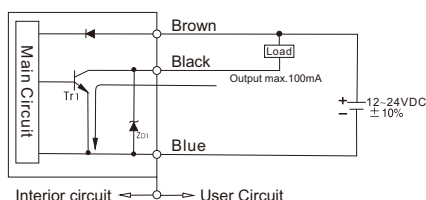
AREH

Specifications

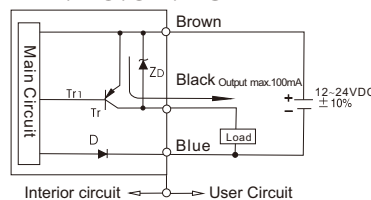
Specification	Type	Type								
		Two-ways Output	Conventional	Analog	Area Output	Ambient Light Detection	Blue Light	White Light	Infrared Light	Green light
Item		FF-402	FF-403	FF-403V	FF-403A	FF-413	FF-403B	FF-403W	FF-403F	FF-403G
		FF-402P	FF-403P	FF-403VP	FF-403AP	FF-413P	FF-403BP	FF-403WP	FF-403FP	FF-403GP
Diffuse Reflective Sensing Range		600mm	500mm	500mm	200mm	None	400mm	400mm	150mm	350mm
Through-beam Sensing Range		1000mm	1000mm	1000mm	1000mm	None	1000mm	1000mm	400mm	1000mm
Straight outlet		FF-402	FF-403	FF-403V	FF-403A	FF-413	FF-403B	FF-403W	FF-403F	FF-403G
With M8 connector		FF-402/D	FF-403/D	FF-403V/D	FF-403A/D	FF-413A/D	FF-403B/D	FF-403W/D	FF-403F/D	FF-403G/D
150mm lwad wire with M8 connector		FF-402/15D	FF-403/15D	FF-403V/15D	FF-403A/15D	FF-413A/15D	FF-403B/15D	FF-403W/15D	FF-403F/15D	FF-403G/15D
Operating Voltage	12~24VDC±10%(P-P) Below 10% (5V can be customized)									
Current Consumption	<40mA									
Load Current	100mA									
Leakage Current	<0.01mA No Load									
Residual Voltage	≤1.5VDC(load current100mA, 2M cable)									
Four-bit dual digital display	Setting Value: Green Current Value: Red									
Indicator Light	Output LED: Red									
Power reverse polarity protection	Yes									
Output short circuit protection	Yes									
Output	NPN.NO.OR.NC/PNP.NO.OR.NC NPN.NO.NC/PNP.NO.NC									
Reaction time	100us,300us,1ms,2ms Can be set									
Delay power	About 5ms,50ms,500ms,5s and no delay output, five kinds of delay can be set by button									
Isolation resistance	>20MΩ (between charging part and outer shell)									
Voltage withstand	1000VDC 50~60Hz 1min (between charging part and outer shell)									
Ambient temperature	-10~50°C(Nofrostandice)									
Ambient Humidity	35~85% HR RelativeHumidity									
Ambient Light Level	Incandescent Lamp:<2000LX ;Sunshine:<3000LX									
Storage temperature	-20~60°C(No frost and ice)									
Storage Humidity	35~95% HR Relative Humidity									
Protection level	IP64									
Connection method	Φ4.0x2M/3-wires Φ4.0x2M/4-wires Φ4.0 150cm lead wire with M8 connector With M8 Connector									
Shell Material	ABS+PC									
Weight	148g									

接線圖

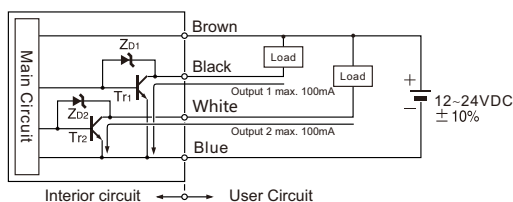
NPN.NO.OR.NC



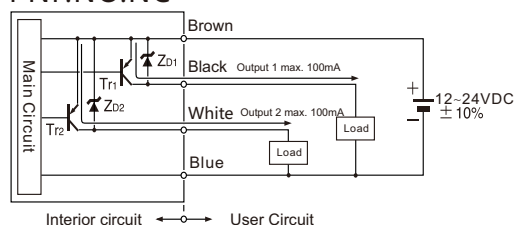
PNP.NO.OR.NC



NPN.NO.NC

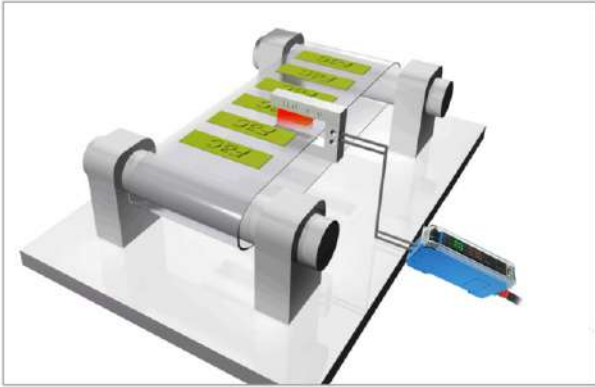


PNP.NO.NC

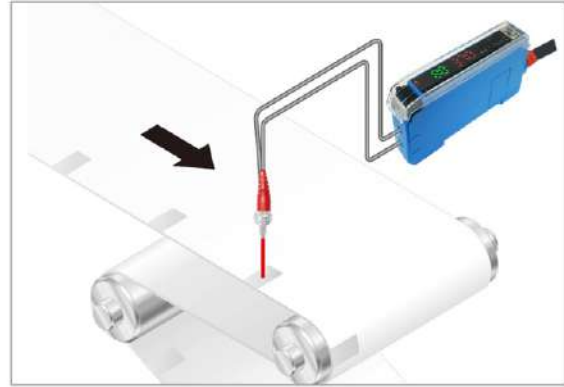


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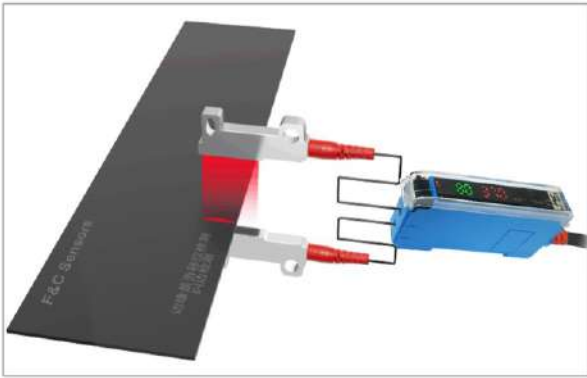
Label detection



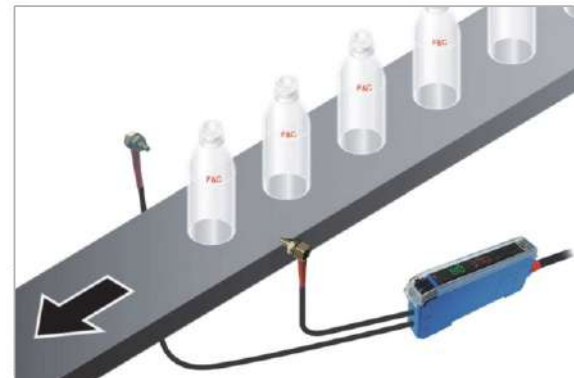
Mark Detection



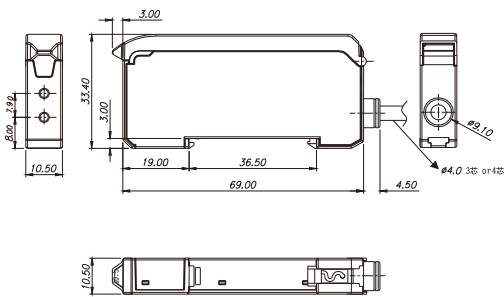
Alignment detection



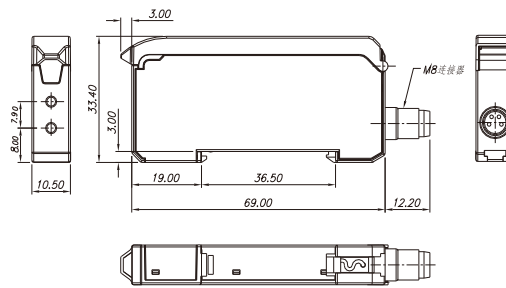
Detection of transparent objects



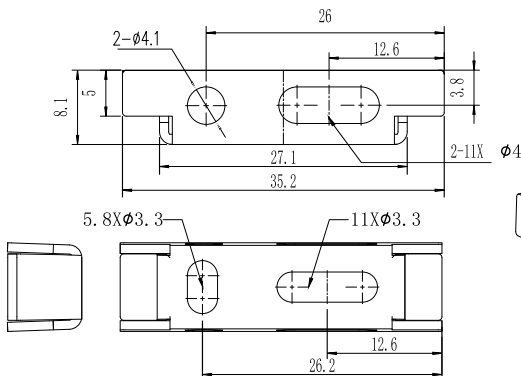
Dimension drawing



FF-400 Series Dimension drawing



FF-400 series with M8 connector dimension drawing



Mounting bracket dimension drawing

F&C[®] Digital fiber optic sensor

Color-mark amplifier

NEW



Feature

- Adopting the principle of RGB color component proportion to distinguish detected object, it is easier to distinguish the detected object with similar reflectivity.
- One-touch key TEACH to detect the object color, easy to set up.
- For objects with similar colors, but with different gray level, we can choose the energy detection mode.

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Obtain More Sensor Technical Information about F&C

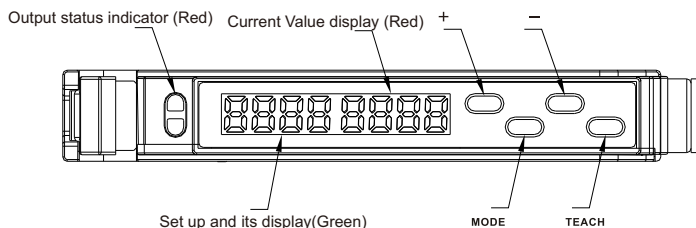


Official Wechat



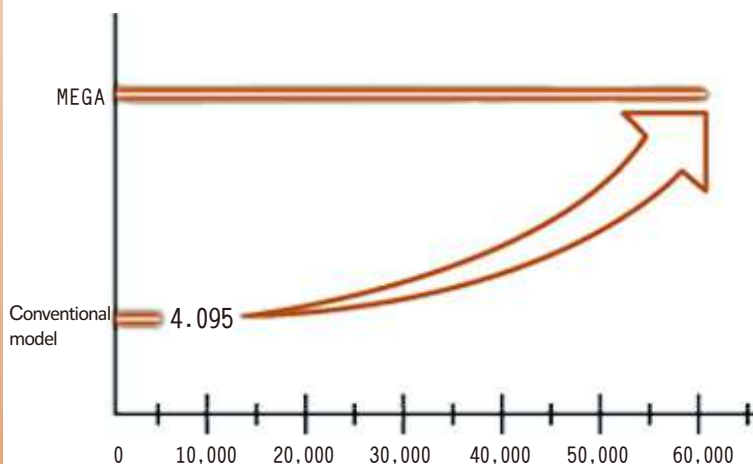
Technical Wechat

MODE Buttons make setup easier



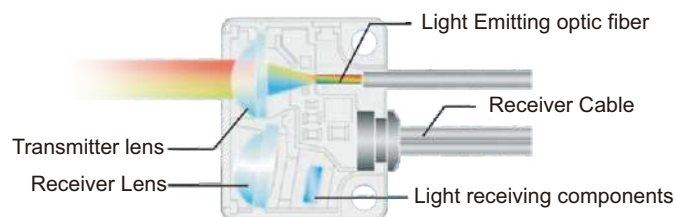
High Power

We have inherited developed noise reduction circuitry in the CPU, thus realizing extremely high power.



Small and high power detection head

The composite structure of the detector head and the fiber optic emitter enable the generation of an incredible single spot, while reducing the size of the sensing head and the light receiving loop built into the head, thereby improving detection capability and stability.



Note: Equipped with dedicated optical fiber FFRX-610/FFR-D16

Specifications

Type	Specifications
Model	FF-401RGB
Power Supply Voltage	12~24VDC± 10%(P-P) Below 10%
Current consumption	≤40mA/24V
Load Current	100mA
Leakage current	<0.01mA
Residual voltage	≤1.5VDC(load current100mA, 2M cable)
Response time	50us, 300us, 1 ms, 2 ms can be set
Output	NPN/PNP Output type NPN/PNP open collector transistor Maximum external incoming current 100mA External voltage:30VDC Residual voltage: <2V
Short circuit protection	Insurance resistance output
Detection Mode	Color detection mode and energy detection mode can be adjusted
Working Indicator	Red LED
Digital Display	4-digit (green) + 4-digit (red) LCD display
Sensitivity Setting	Auto/Manual Adjustment
Timer function	"OFF"/"ON- D"/"OF- D"/"SHOT" are four modes respectively: No Delay/On Delay/Off Delay/Pulse Balance Delay.
Timer time	0.1ms-9S
Transmitted power	10%, 20%, 30% 100% ten kinds of transmitting power can be adjusted.
Light source	R:630nm+G:530nm+B:470nm
Anti-shake detection	Differential function ON/OFF
Operating Temperature/ Humidity	-10~+50°C/30~85% (No frost or ice)
Storage Temperature/ Humidity	-20~+70°C/30~85% (No frost or ice)
Output method	NPN . NO . NC Adjustable/PNP. NO. NC Adjustable
Anti-vibration	Frequency 10~150Hz Double amplitude 0.75mm XYZ direction 2 hours
Protection level	Ip54
Material	ABS/PC
Weight	Main body weight:65g, M8 connector type:18g

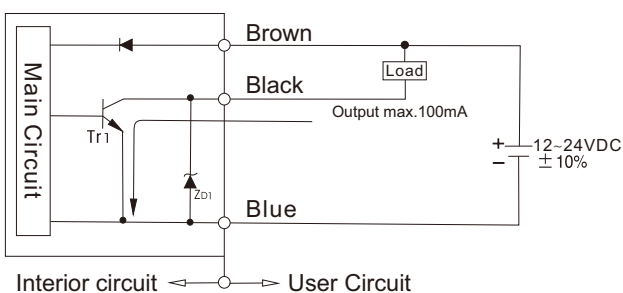
Red value represent current detected object and setting color similarity, up to 99.99% (999), green values represent current detected object and setting similarity to the threshold value of the output, the highest valid value of 99% (999).

When the detection value is less than or greater than the normal range, the red value shows "--".

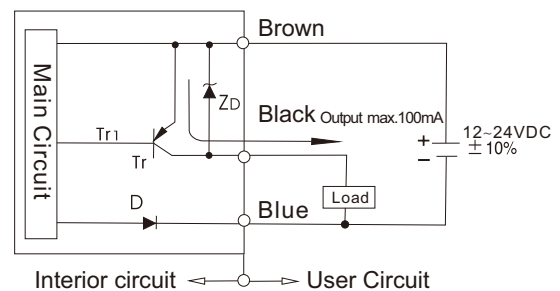
- 1、 Initialization: Unplug the fiber optic sensor, align the amplifier to the non-inductive status, and press "+" and "-" keys simultaneously for about 3 seconds to initialize the internal settings of the amplifier.
- 2、 Color similarity threshold setting: Press "+" and "-" keys in running mode to increase or decrease the color similarity by 1, long press "+" and "-" key, the color similarity value increases or decreases rapidly.

接綫圖

NPN.NO.OR.NC

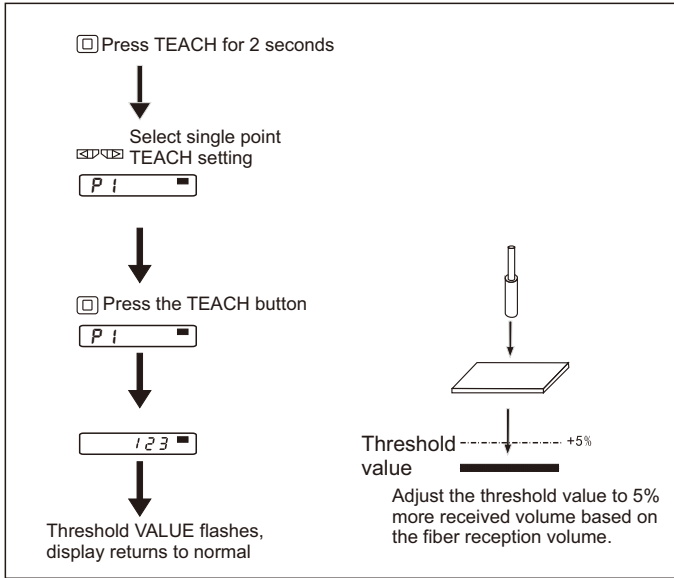


PNP.NO.OR.NC

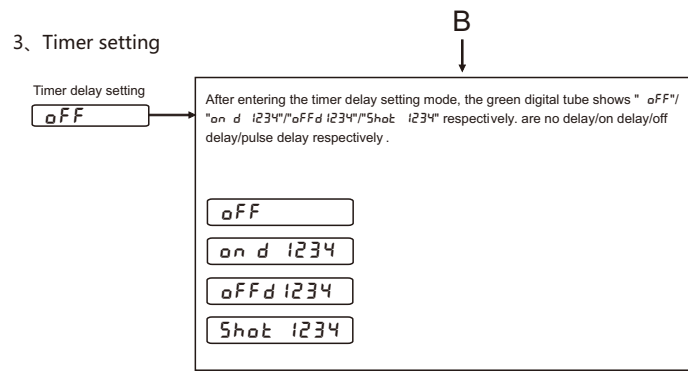
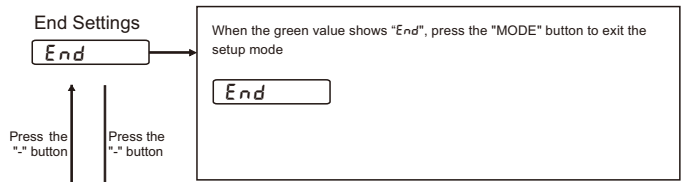
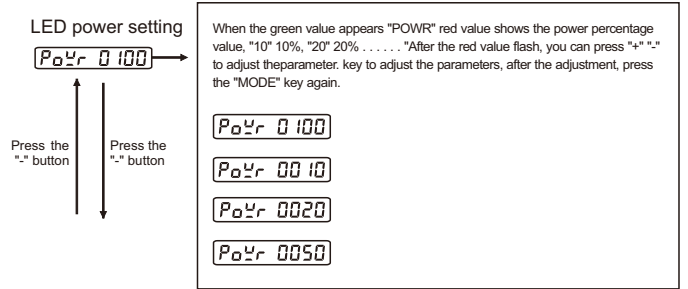
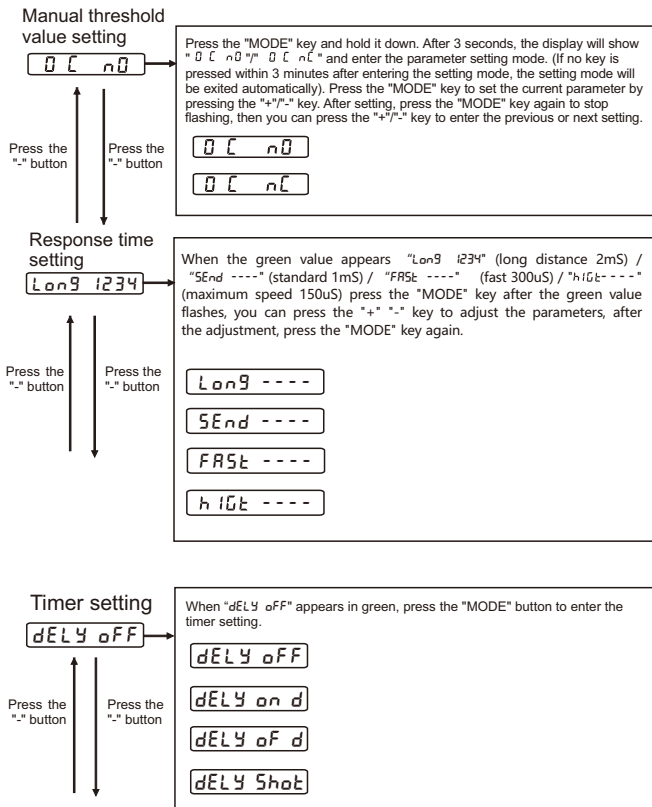


TEACH setting

Press "TEACH" for 3 seconds, the green value shows "P1", then turn on the "TEACH" key, place the detected object in the optic fiber detection position, and then press the "TEACH" key again. When the green value shows 950, automatic TEACH success, if the green value shows 999, automatic TEACH fail.



- 1、 Initialization: Place the amplifier in a non-sensitive state and press "+" and "-" simultaneously for about 3 seconds to initialize the internal settings of the amplifier.
- 2、 Setting:



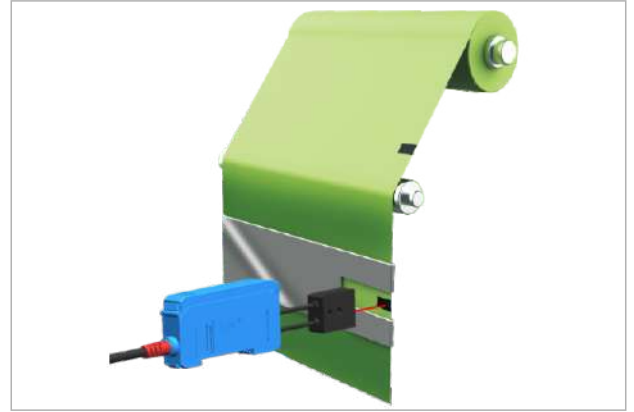
Note: In normal detection mode, press the "TEACH" key to switch between color detection mode and energy detection mode.

Product Application

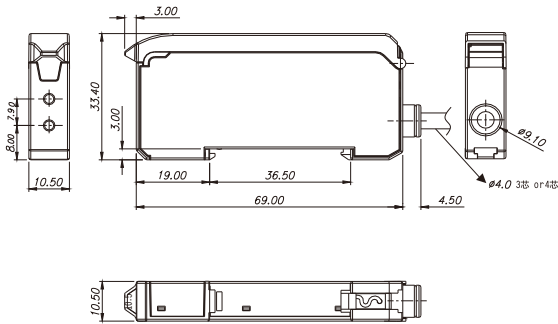
Detecting different colors of cups



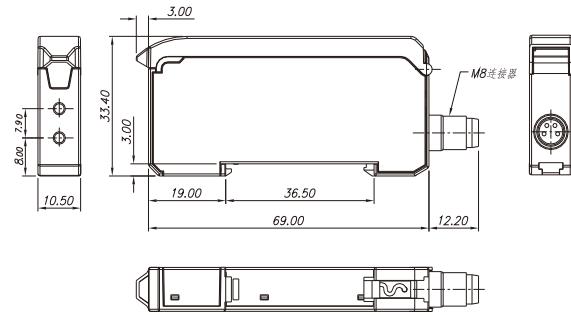
Detecting different color markings of the tape



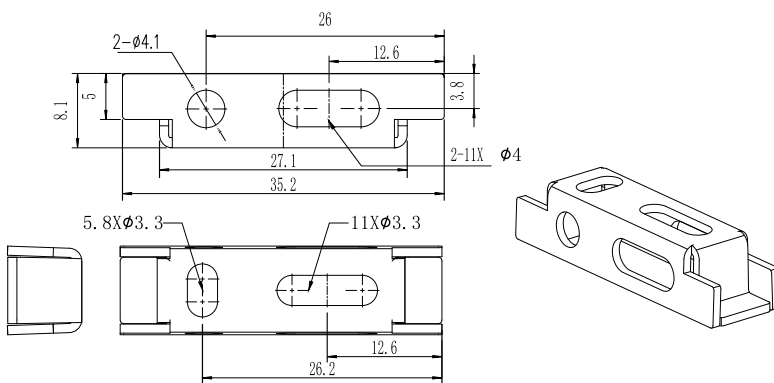
Dimension drawing



FF-401RGB Series dimension drawing



FF-401RGB/D with M8 connector dimension drawing



Mounting bracket dimension drawing