F80R Series

Digital display
Fiber optic sensors

CE
RoHS
UL

- User friendly and low cost design
- "Long distance" mode for dramatically increased detecting distance
- 8 times$^{(*)}$ wider dynamic range and 0 to 8,000 scaled indication enable precise monitoring.
- 4.5 times$^{(*)}$ larger display allows easy and quick adjustment.
- Low power consumption

 (*) compared with conventional Takex product

■ Type

Detection method/detecting distance	Model		Operation mode	Output mode	Light source
	NPN output	PNP output			
Dependent on fiber optic cable	F80R	F80RPN	Light ON/Dark ON selectable	Open collector output	Red LED

■ Applications

Positioning of fluorescent tubes

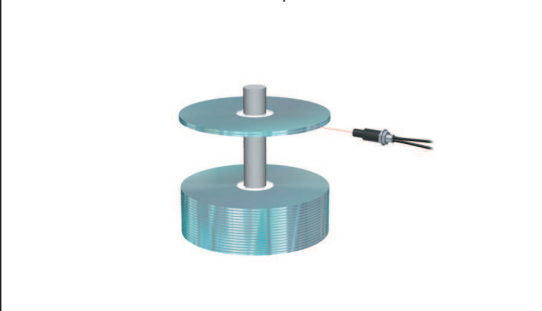Electrodes detected for positioning prior to marking fluorescent tubes.
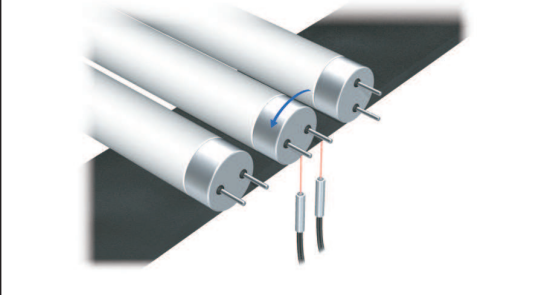
Checking for upside down electronic components
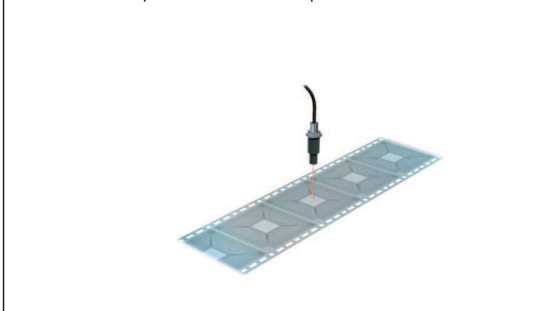
Sides of electronic components determined on part chute.

Detection of double feed of CDs

Detected from the side with small spot beam.

Checking of presence of silver paste

Small amount of paste detected with spot of 0.5 mm in diameter.

■ High Speed, Long Distance Capability

High speed mode or long distance mode is selectable according to the application.

> **Switching the mode by pressing the button and hold 5 secs.**
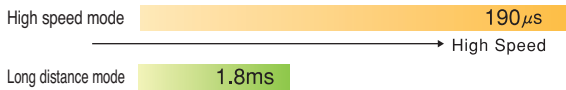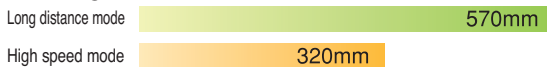
High speed mode

TAKEX **H-SP** + ◄ ○ ► − | OFF D. □■□—NORM | D.ON ■□□—L.ON

Long distance mode

TAKEX **Lon9** + ◄ ○ ► − | OFF D. □■□—NORM | D.ON ■□□—L.ON

Yellow LED in the middle illuminated to indicate long distance mode

● Response time

| High speed mode | 190μs |
| Long distance mode | 1.8ms |

High Speed

● Detecting distance (when combined with fiber optic cable FR105BC)

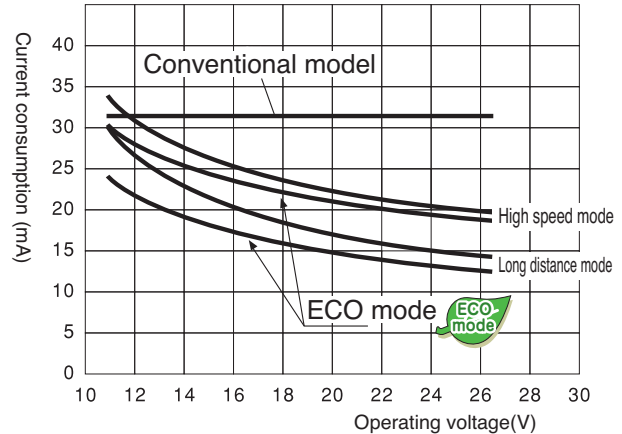| Long distance mode | 570mm |
| High speed mode | 320mm |

■ Simple Operation

Easy monitoring of operation level

Pressing the button once activates flashing indication of the current threshold.
Pressing the button again brings the view back to the received light level indication.

Press
Press

F80R
BROWN
BLUE
BLACK
12 to 24 V DC
0V PUT
OUT PUT
MADE IN JAPAN 5060

OFF D. NORM.
D.ON L.ON
− L − L.ON

4.5 times larger
● Large digital display for improved visibility

The digital display features LED indication of about 4.5 times larger than conventional model. Orange LED is used instead of red, which is often used as a danger signal.

3.0
6.4

■ Low Power Consumption Achieved through Energy-Saving Design

> **Power consumption comparison between F80 and conventional model**

(Typical example)

Current consumption (mA)
40
35
30
25
20
15
10
5
0

Conventional model

High speed mode

Long distance mode

ECO mode ECO mode

10 12 14 16 18 20 22 24 26 28 30
Operating voltage(V)
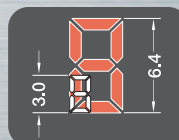
● Lower power consumption of less than half of that of a conventional model (by utilizing ECO operation), achieving power consumption of about 15 mA at 24 V (in long distance mode).

● Dark illumination enabled during normal operation, (when viewing of digital display tends to be less frequent, has reduced power consumption down to about 1/5 of that of illuminated digital display).

F80R

■ Rating/Performance/Specification

Type	NPN output	PNP output
Model	F80R	F80RPN
Power supply	12 - 24VDC ±10% / Ripple 10% or less	
Power consumption	650 mW or less (25 mA or less at 24 V)	830 mW or less (32 mA or less at 24 V)
Output mode	NPN open collector output	PNP open collector output
	Rating: Sink current 100 mA (30 VDC) or less	Rating: Source current 100 mA (30 VDC) or less
	Residual voltage: 1 V or less	Residual voltage: 2 V or less
Operation mode	Light ON/Dark ON selectable with sliding switch	
Timer	Off delay/disabled selectable with sliding switch	
	Delay time: 45 ms fixed	
Response time (*1)	High speed mode: 190 μs or less / Long distance mode: 1.8 ms or less	
Light source (wavelength)	Red LED (680 nm)	
Indicator	Operation indicator: orange LED / Mode indicator: yellow LED / Teaching indicator: green LED	
Display	Received light level: 4 digits in orange LED (0 - 8000)	
Switch	Output mode selector switch x 1 / Timer selector switch: 1 /	
	Teaching and sensitivity adjustment push + 4-direction button switch x 1	
Sensitivity setting	Full auto teaching / Auto teaching	
Sensitivity adjustment function	Provided (manual sensitivity adjustment)	
Protection circuit	Reverse connection protection / Short circuit protection	
Material	Polycarbonate	
Wiring	2m attached cable (Outer dimension: dia.3.7mm) 0.2sq. 3 cores	
Weight	Approx. 60 g (including 2m cable and mounting bracket)	
Accessory	Mounting bracket / Operation manual	

(*1) For initial setting and checking, output operation is disabled for about 1.5 seconds after power-up.
The factory setting is long-distance mode.

■ Input/Output Circuit and Connection

● NPN output

Brown: 12-24 VDC
Black: Control output
Blue: 0V
Internal circuit

● PNP output

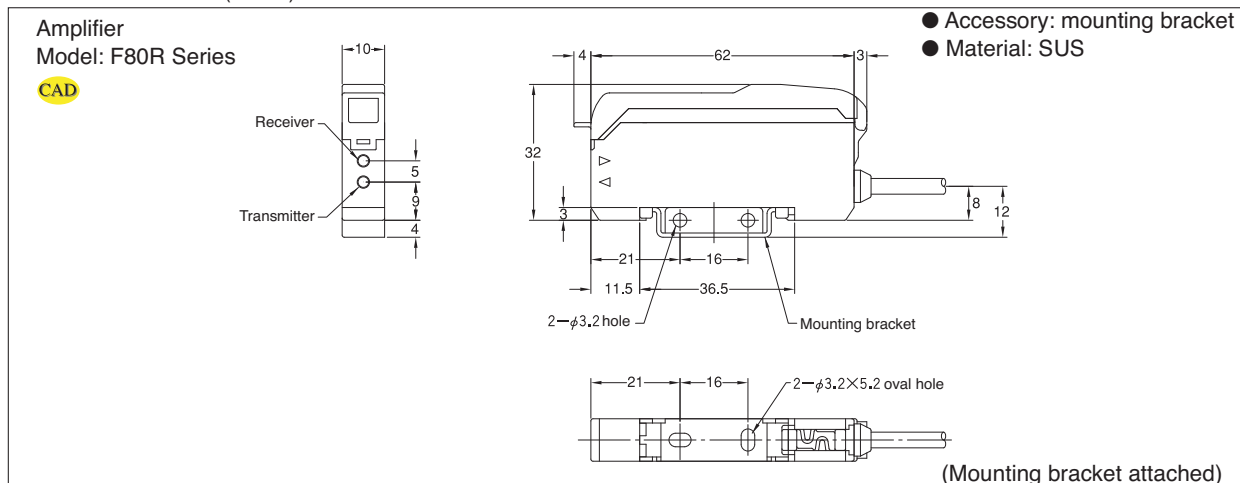Brown: 12-24 VDC
Black: Control output
Blue: 0V
Internal circuit
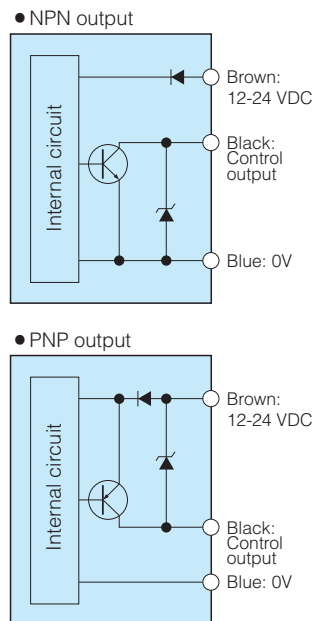
In the condition of load short circuit or overload, the output transistor turns off. Check the load condition before restarting.

■ Environmental Specification

Ambient light	Illumination on light receiving surface: 3,500 lx (incandescent lamp)
Ambient temperature	1-5 adjacent units in operation: –25 - +55 °C / Over 6 adjacent units in operation: –25 - +50 °C
	Storage: –40 - +70 °C (non-freezing)
Ambient humidity	35 - 85%RH (non-condensing)
Protective structure	IP40
Vibration	10 - 55 Hz / 1.5 mm double amplitude / 2 hours each in 3 directions
Shock	500 m/s^2 / 3 times each in 3 directions
Dielectric withstanding	1000 VAC for 1 minute
Insulation resistance	500 VDC, 20MΩ or more

■ Dimensions (in mm)

Amplifier
Model: F80R Series
CAD

● Accessory: mounting bracket
● Material: SUS

Receiver
Transmitter

2－φ3.2 hole
Mounting bracket

2－φ3.2×5.2 oval hole

(Mounting bracket attached)
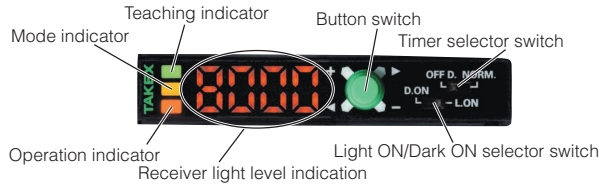
■ For Correct Use

Be sure to follow the instructions in the operation manual provided for correct use of the product.

●Operation panel

Teaching indicator
Mode indicator
Button switch
Timer selector switch
Operation indicator
Receiver light level indication
Light ON/Dark ON selector switch

Teaching indicator (green LED) : Flashes/illuminated during teaching.

Mode indicator (yellow LED) : Illuminated when the long distance mode is selected. Not illuminated in the high speed mode.

Operation indicator (orange LED) : Illuminated when the output is activated.

Received light level indication : The received light level is indicated in a 4-digit number between 0 and 8000. The number indication is slow for ease of reading. For instantaneous light reception (or light blocking), even slower indication is given for the level of received light for light reception (or light blocking).
For an application in which the sensor output alternates between on and off consecutively, the levels of received light for light reception and blocking are alternately displayed.

ECO mode : The number indication is illuminated brightly immediately after power-up or during switch operation. When about 7 seconds have passed after power-up or end of switch operation, the number indication is dimmed and the mode enters the ECO operation state requiring less power.

Button switch : Used for teaching or sensitivity adjustment. The button can be pressed downwards and in 4 directions.

Timer selector switch : Switched for selecting the off delay timer.
　OFFD. : Off delay timer enabled
　NORM. : Timer disabled

Light ON/Dark ON selector switch : Selects an output mode.

　L.ON : Light ON (output activated when light is received)
　D.ON : Dark ON (output activated when light is blocked)
When the mode is switched with the power on, turn off the power once and back on or manually repeat turning on and off.

●Sensitivity setting

■The setting condition is displayed after sensitivity setting has been completed:

good [Good]　Optimum teaching achieved.
high [High]　Maximum sensitivity set.
HArd [Hard]　The hysteresis is small and the setting is severe.
　　　　　　　This indication is also given for positioning teaching.
SAtu [Saturated]　The power is too high and the teaching condition is not optimum. Replacing with a thinner fiber optic cable is recommended when a thick cable is used. Use in the high-speed mode is recommended when the long-distance mode is selected.
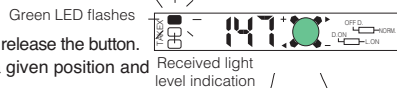
■Sensitivity setting using stationary work
　<auto teaching>
[Reflective type]
　①With no work placed, press and hold down the button for 3 seconds. The indication rotates in the order of 1 →2→3→SEt.

　3 seconds
　Green LED flashes
　Received light level indication

When SEt appears, release the button.
　②Place the work in a given position and press the button.
When SEt appears, release the button to complete sensitivity setting.
[Note] The steps in the sensitivity setting process described above may be reversed by pressing the button first with the work placed.
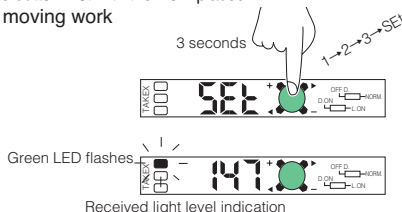
■Sensitivity setting using moving work
　<full auto teaching>
　①Press and hold down the button for 3 seconds. The indication rotates in the order of 1→2→3 →SEt. When SEt appears, release the button.

　3 seconds
　Green LED flashes
　Received light level indication

②Press and hold the button for 3 seconds again.

　3 seconds
　・SEt is shown while the button is held down.
　・Release the button when Auto appears.
　LEDs on the sides alternately flashes

③The LEDs alternately flash to indicate activation of full auto teaching. Let the work pass in this condition. There is no time limit.
　LEDs on the sides alternately flashes

④Press the button to complete sensitivity setting.
　Received light level indication

■Maximum sensitivity setting
[Through beam type]
　Use a work, etc. to black the light. Set the sensitivity in this condition.
[Reflective type]
　Use of a reflective-type fiber optic cable at the maximum sensitivity may cause inadequate light blocking. Be sure to use a work for sensitivity setting.

●Sensitivity adjustment (manual adjustment of activation level)

＜The value for the flashing number can be changed by pressing the button.＞

①Press the button once.
The current activation level appears, allowing changing of the flashing number.
　・Pressing in the + direction increases the activation level = SENS DOWN.
　・Pressing in the － direction decreases the activation level = SENS UP
[Note] Holding down the button changes the indication faster.
　・Pressing the button in the ▲ or ▼ direction shifts the active digit .
②When the adjustment is finished, press the button once to complete sensitivity setting.

●Activation level checking (for finding the current activation level)

①Press the button once.
The number flashes and the activation level is shown.

　・For Light ON, the value for the level that activates the output for light reception is displayed.
　・For Dark ON, the value for the level that activates the output for light blocking is displayed.

②Press the button once to complete sensitivity setting.

●Switching between the long distance and high speed modes

Press and hold down the button for about 5 seconds.
When Long or H-SP appears on the display, release the button to complete switching.

　5 seconds

　H-SP　High speed mode
　Lon9　Long distance mode

Yellow LED in the middle illuminated to indicate long-distance mode