Digital Fiber Sensor

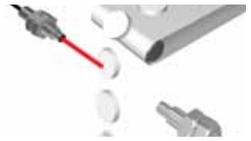
D2RF series

Digital Fiber Amplifier with Two Independent Outputs. High speed 60 micro second response.

6 teach methods for individual applications

Full Power Teaching
Standard detection mode for Thru-beam type sensing but applicable for retro-reflective sensing also.

Full automatic Teaching
Set while the equipment is operating.

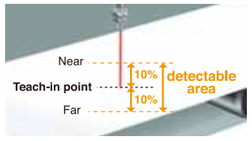


Single point Teaching
Set without a target present.

Transparent / Glass Teaching
Ideal for the detection of glass, film, plastic or any transparent material.

Two points Teaching
Standard detection mode for Diffuse type sensing.
It is possible to make fine adjustments.

Zone Teaching
Similar to Area Teach Mode.
This is useful if the conveyor moves closer to and farther from the sensor. An area +/- 10% of the teach point can be detected.



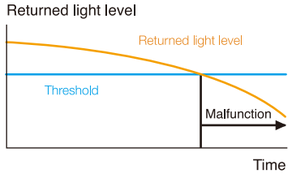
SAM Circuit - The ASC function (Auto Sensitivity Control)

Our engineer "SAM" designed this function. The lens and/or reflector may be contaminated over time. The D2RF amplifier monitors the change in light level and automatically resets the threshold value.

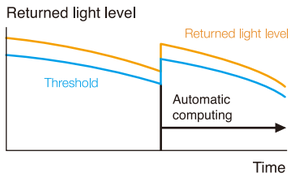
After cleaning off the lens / reflector it used to be necessary to reset the threshold setting. The D2RF does not require this step. Simply clean off the lens and wait three seconds without a target present. The sensor will automatically reset the threshold level for the change. This is how the SAM circuit works.

After cleaning the incoming light level will increase suddenly. The SAM circuit computes the preset threshold based on the increase in light intensity.
This function is available only in Transparent Detection Mode.

Conventional Sensor
Contamination on the lens will eventually cause the sensor to malfunction.

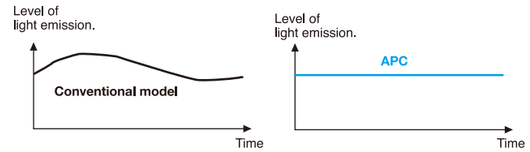


D2RF series
SAM Circuit
The threshold will auto-matically return to the preset level after the lens is cleaned off.



APC Function (Auto Power Control)

The APC function ensures precise sensing even when there are changes in the temperature or environmental conditions.
APC maintains a constant power level of light emission by regulating the current flow into the light emission element. The APC function can be turned On and Off.



Two four digit display's.

Received Light Level and Threshold Setting

IP66 and IP50, two types.

If your application is around water or high humidity.
There is a model of the D2RF-T series with an IP66 rating.

Long Term Stable Detection.

A conventional 3 element LED will lose brightness over time. This results in a decrease in sensitivity in the sensor. Optex FA's new D2RF uses a 4 element LED to provide long service life. The Green LED type D2GF uses a "Glan N2" LED, which offers the best performance for Mark Detection with a Green LED light source.

60 micro second high speed response.

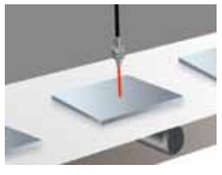
Both outputs can be set to operate at this speed.
This response time is available in 5 of the teach modes.

LED Power adjustment - 3 step adjustment of LED emitting power.

A highly reflective target will cause the amplifier to saturate making adjustment difficult. This can also happen if the fiber cable is mounted too close to the target.
In situations where the amplifier is saturated due to excessive reflected light, the power level of the emitting LED can be decreased to 50 or 25 percent.

Power setting

100%
50%
25%



Cross Talk Prevention

The amplifier frequencies are automatically set between the Master and Slave units. Cross talk prevention is possible for up to 4 amplifiers.

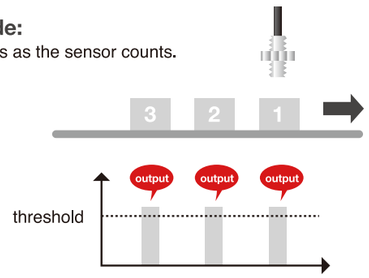
Automatic Tuning

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.

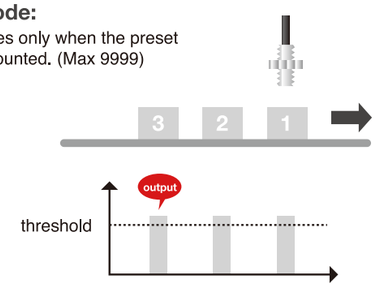
Counter Mode

The D2RF 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 count.

Normal Mode:
An output comes as the sensor counts.



Counter Mode:
An output comes only when the preset numbers are counted. (Max 9999)



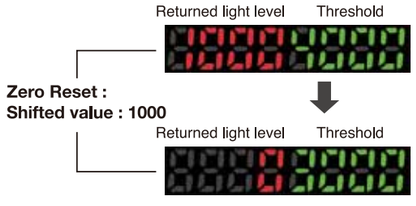
Edge Sensing

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.

Rising Edge Sensing Mode **Falling Edge Sensing Mode**

Zero Reset

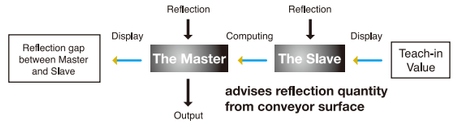
The sensor display can be reset to zero. This is useful for adjusting the display's of the Master and Slave units to read the same. It is also good to set the value to zero when the light is interrupted.



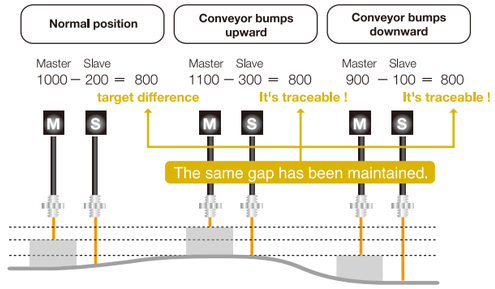
Differential Sensing Mode

A bumpy conveyor always makes stable detection difficult. The D2RF-T solves this problem with the Differential Sensing Mode. The Master and Slave amplifiers will calculate the difference between the reflection from the background and the target (see picture below). No matter how much the surface of the conveyor moves up and down the D2RF-T can follow the change and reliably detect the target.

Operation Flow:

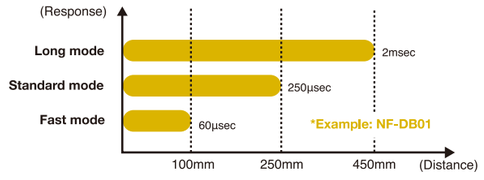


How to follow the changing condition!



Selectable Response Time

The Response time will affect the sensing distance. The D2RF-T has three choices (Long, Standard, and Fast), select the response time based on the required sensing distance.
Long Mode boosts the power for the maximum sensing distance with a 2 msec. response time.
The Fast Mode has a reduced sensing distance but provides high speed 60µsec. response.



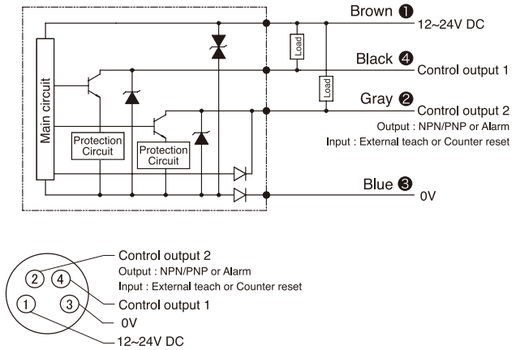
Long mode

Standard mode

Fast mode

Two Independent Outputs. Each output can be set separately.

The 2nd output can be configured as an external Teach input.



The operation of each output can be set to Light-On / Dark-On. Also, the Threshold level, Timer settings, etc. of each output can be set independently. The Analog output type (D2RF-TAN/P) provides a 4 ~ 20 mA (gray wire) analog output and a NPN (or PNP) digital output (black wire).

The second output can be configured as an Alarm output (self-diagnostic). It can also be set to operate as an External Teach Input or Counter Reset Input if the Counter function is being used.

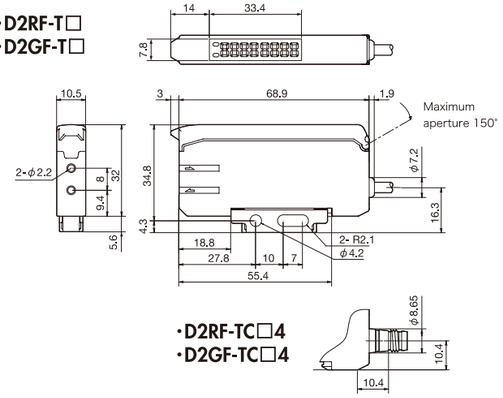
External Teach Input (CH2)

It is possible to have a Remote Teach Input if the CH2 output is re-assigned as an input.
When using the Remote Teach with Interconnected amplifiers all units will perform the Teach function simultaneously.
(This function is not available for Analogue Type)

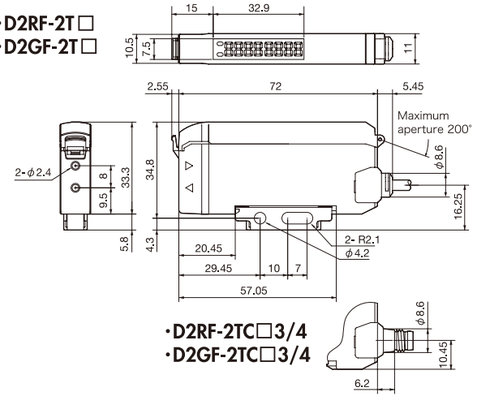
Dimensions

Stand-alone model

·D2RF-T□
·D2GF-T□



·D2RF-2T□
·D2GF-2T□

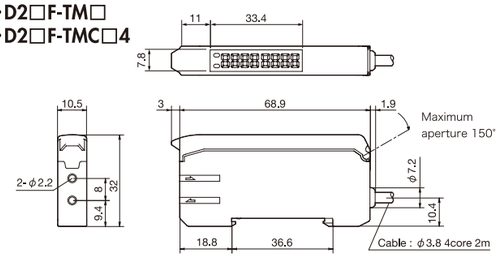


·D2RF-TC□4
·D2GF-TC□4

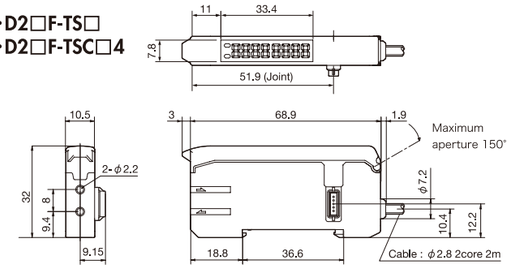
·D2RF-2TC□3/4
·D2GF-2TC□3/4

Interconnection model

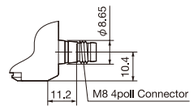
·D2□F-TM□
·D2□F-TMC□4



·D2□F-TS□
·D2□F-TSC□4

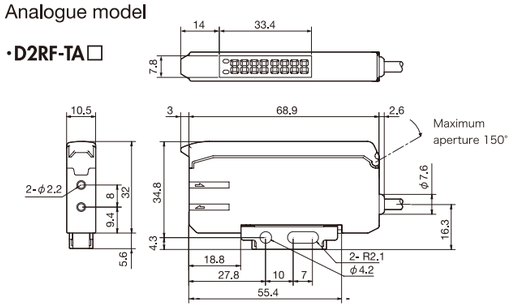


·M8 Connector type

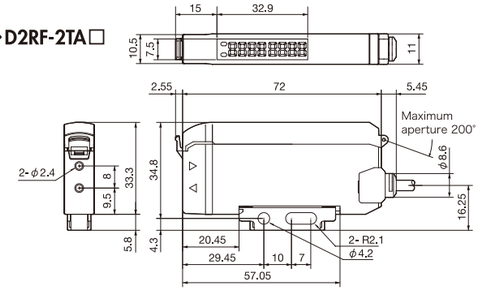


Analogue model

·D2RF-TA□



·D2RF-2TA□



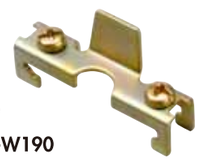
Specifications

Model		Standard	Mark sensor	Analogue
Stand-alone Type				
IP50 type	**Cable type NPN / PNP**	**D2RF-TN / TP**	**D2GF-TN / TP**	**D2RF-TAN / TAP**
	M8 QD 4pin, NPN / PNP	**D2RF-TCN4 / TCP4**	**D2GF-TCN4 / TCP4**	**NA**
IP66 type	**Cable type NPN / PNP**	**D2RF-2TN / 2TP**	**D2GF-2TN / 2TP**	**D2RF-2TAN / 2TAP**
	M8 QD 4pin, NPN / PNP	**D2RF-2TCN4 / 2TCP4**	**D2GF-2TCN4 / 2TCP4**	**NA**
	M8 QD 3pin, NPN / PNP	**D2RF-2TCN3 / 2TCP3**	**D2GF-2TCN3 / 2TCP3**	**NA**
Interconnection Type				
Master unit	**Cable type NPN / PNP**	**D2RF-TMN / TMP**	**D2GF-TMN / TMP**	**NA**
	M8 QD 4pin, NPN / PNP	**D2RF-TMCN4 / TMCP4**	**D2GF-TMCN4 / TMCP4**	**NA**
Slave unit	**Cable type NPN / PNP**	**D2RF-TSN / TSP**	**D2GF-TSN / TSP**	**NA**
	M8 QD 4pin, NPN / PNP	**D2RF-TSCN4 / TSCP4**	**D2GF-TSCN4 / TSCP4**	**NA**
Light source		Red LED	**Green LED**	**Red LED**
Response time		60 micro sec (Fast mode), 250 micro sec (standard), 2.0 ms (Long distance)		
Auto control system		APC / ASC		
LED Power control		3 steps ; 100%, 50% and 25%		
Timer functions		On delay/Off delay /One shot, 1-9,999msec (1msec increment)		
Sensitivity adjustment		Teach-in + fine adjustment		
Output indicator		Output (orange) : 1CH / 2CH common		Output (orange)
Digital indicator		7 segment LED, 4 digits in Red, 4 digits in Green		
Teach-in mode		Full Power / One point / Two points / Full Automatic / Differential / Zone / Transparent		
Control output		2CH, NPN or PNP open collector, DC30V, 100mA Max		1CH, NPN or PNP
Analogue output		NA		4-20mA, Resolution 0.1%FS
Parallel installation		Up to 16 sets		
Crosstalk prevention		Up to 4 sets		
Operating mode		Light on / Dark on selectable		
Sensing mode		Long Distance Mode, Standard, Fast mode,		
Display		Regular dislay plus ; bar, %, eco (off, run mode only)		
External input		Teaching / Counter Reset		
Supply voltage		DC 10-24V +/- 10% ripple		
Power consumption		45mA Max (24V)		
Circuit protection		Reverse Polarity, Overcurrent, Short circuit		
Warm-up time		100m sec		
Operating temp / humidity		–25 to 55°C, 35 to 85% RH		
Storage temp / humidity		–40 to 70°C, 35 to 85% RH		
Environmental illuminance		Sunlight 10,000 lux, High Frequency Lamp 3,000 lux		
Protection category		IEC, IP50 (except Stand-alone IP66 types)		
Comformity		IEC, CE		
Shock resistance		IEC 68, 50G		
Weight		Cable type 21g, M8 connector type 23g		
Factory default settings		Response time (Standard), Output (Light On), Timer (OFF), APC (OFF),		

Independent settings between CH1 and CH2 are possible at Threshold setting. Timer setting and Light/Dark setting.
Ambient Temperature is limited up to 50°C when amplifires are connected in parallel over 4 pcs.

Options

End plate
BEF-EB01-W190



JCN-S : 2 meter
JCN-5S : 5 meter
JCN-10S : 10 meter

JCN-S : M8 Straight type

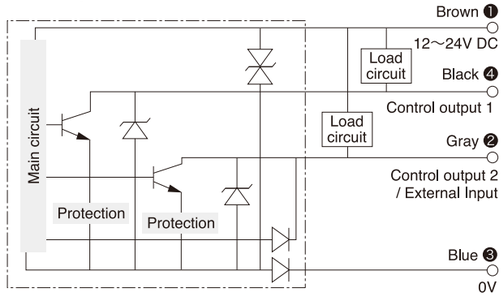
JCN-L : 2 meter
JCN-5L : 5 meter
JCN-10L : 10 meter

JCN-L : M8 L-shape type

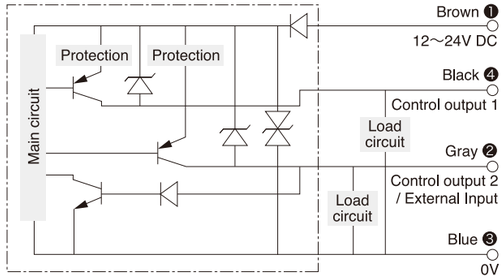
Circuit diagram

Stand-alone model

NPN output

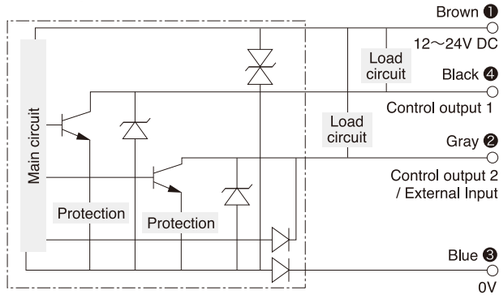


PNP output

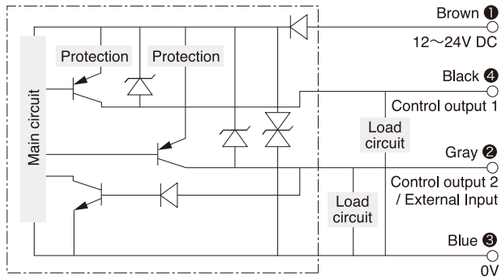


Interconnection model

NPN output



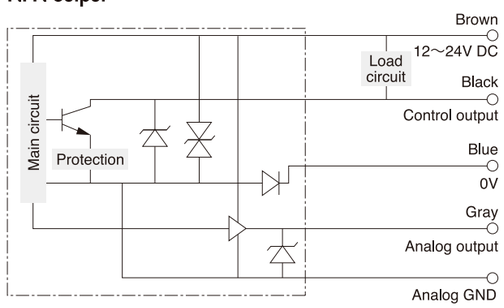
PNP output



・Power wires (Brown ❶, Blue ❸) are not attached to Handset unit, both on cable and connector type.

Analogue model

NPN output



PNP output