

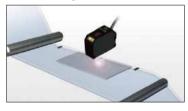
RGB color/mark sensor for automatically selecting light source color

- 3-color (red, green, blue) light source switching function
- Threshold value digital adjustment function
- 8-bank switching function

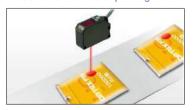
Selection table

Time	Chana	Canaina diatawa	Bank function	Model						
Туре	Shape	Sensing distance	Dank function	NPN type	PNP type					
Color/ mark detection type		18 ±2 mm	8CH	DM-18TN	DM-18TP					

Detection of registration marks on films



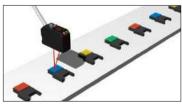
Detection of multicolor printing marks



Trigger signal for vision sensors



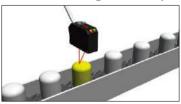
Connector color detection



Mark detection on tube injection machines



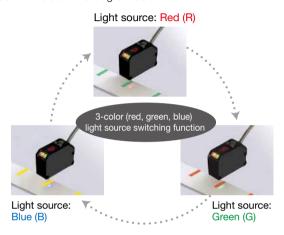
Detection of wrong color of caps



3-color (red, green, blue) light source switching function

Versatile and high precision

Thanks to a built-in RGB 3-color light source and because the optimum light source is automatically selected to match the base and mark color, there is no need to change the sensor depending on the color. Additionally, since the light source most easily contrasted is automatically selected, mark detection can easily be performed even under difficult conditions as in the diagram below.

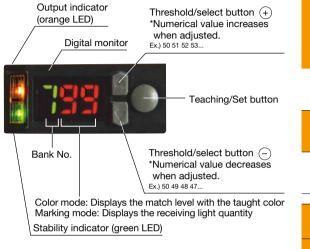


Digital adjustment function

Adjustment while watching values possible

Simple settings and fine adjustments are possible. Thanks to the teaching method, setting is possible by simply pressing a button. There are also buttons for manual adjustments, making it possible to configure sensitivity settings to the desired level while viewing the digital display.

Digital color/mark detection type DM series



Bank switching function

Settings can be registered

Up to 8 settings can be recalled with the built-in bank switching function. Eliminates time wasted when changing setup of multi-product lines. Of course, external recall is also possible.

■ Bank number and input signal (NPN)

Bank number	Lead wire											
Dank number	Green wire	Pink wire	Yellow wire									
0	OFF	OFF	OFF									
1	OFF	OFF	ON									
2	OFF	ON	OFF									
3	OFF	ON	ON									
4	ON	OFF	OFF									
5	ON	OFF	ON									
6	ON	ON	OFF									
7	ON	ON	ON									

ON: Connected to the blue wire (0 V)
OFF: Open or connected to the brown wire (+V)

Equipped with color mode

Color detection possible, tolerant to variations

Built-in color mode for color detection. Only the colors set can be distinguished. 3 colors (red, green, blue) are always emitted and the ratio thereof is calculated, making it tolerant to workpiece variation. Depending on the object to be detected, mark mode and color mode can be selected with 1 sensor.



Specifications

Applicable standards

Company standards

Material

Ambient temperature/humidity

Ambient illuminance
Vibration resistance

Degree of protection

Shock resistance

Weight (including cable)

Included accessories

	Туре	Color/mark detection					
Model	NPN	DM-18TN					
Mo	PNP	DM-18TP					
Sen	sing distance	18 ± 2 mm					
Ligh	t source	R / G / B Mark mode: 1 color selection during teaching Color mode: 3 color simultaneous illumination					
Spo	t size	Approx. 1 × 6 mm at a distance of 18 mm					
Res	ponse time	Mark mode: 0.25, 0.5, 1.2 ms switching Color mode: 0.8, 1.6, 4 ms switching					
Dist	ance adjustment	Mark mode: 2-point teaching, auto-teaching Color mode: 1-point teaching					
Thre	shold adjustment	Manual adjustment is possible after teaching					
Indi	cators	Output indicator (orange), Stability indicator (green)					
Digi	tal display	7-segment, 3-digit display					
Con	trol output	NPN/PNP open collector Max. 100 mA/30 VDC					
Exte	ernal input	8-bank switching					
Time	er function	ON delay / OFF delay / One-shot 0 to 990 ms (setting is possible in 10 ms increments),					
1 11111	er fullction	1 to 10 s (setting is possible in 1 s increments)					
Out	out mode	Light ON (output when matched) / Dark ON (output when mismatched) selectable by setting					
Con	nection type	Cable type: Cable length: 2 m ø4 mm					
Insu	lation resistance	20 MΩ or more (with 500 VDC)					
Rating	Supply voltage	10 to 30 VDC, including 10% ripple (p-p)					
Rat	Current consumption	40 mA					
App	licable regulations	EMC directive (2004/108/EC)					

EN 60947-5-2

Noise resistance: Feilen Level 3 cleared

-25 to +55°C (no freezing) / 35 to 85% RH (no condensation)
Sunlight: 10,000 lx or less Incandescent light: 3,000 lx or less

10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions

Approx. 50 G (500 m/s²), 3 times in each of the X, Y, and Z directions

IP67
Housing: ABS Lens front cover: PMMA

Approx. 75 g

Mounting bracket: BEF-WK-190

Specifications are subject to change without prior notice for product improvement purposes.

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Color Sensors Mark Sensors

DM

^{*}During mark mode 2-point teaching, the first point color becomes the ON color.

Distance adjustment

	Order	Diagram	Teaching procedure
e G	1		Apply the spot light to the color to be detected at the sensor sensing distance.
Color mode	2	PUSH	Press the teaching button.
ŏ	3	OK!	Setting is complete.
	1		Apply the spot light to the mark to be detected at the sensor sensing distance.
<u>e</u>	2	PUSH	Press the teaching button.
Mark mode	3		Apply the spot light to the base at the sensor sensing distance.
Ž	4	PUSH	Press the teaching button.
	5	Р О ОК!	Setting is complete. The threshold value is set and stored between the base and the mark (intermediate reflectivity). In addition, the optimal Light source is determined automatically.

[•]To adjust threshold using the buttons, press the Up or Down button. The status display will show the threshold and flash. Adjust the threshold using the Up and Down buttons. Pressing the teach button will return to Run Mode. (Even if the teach button is not pressed, a return to Run Mode will occur after 10 sec.)

Photoelectric Sensors

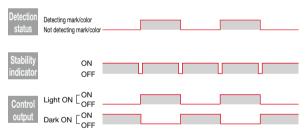
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DM

Operation mode



^{*}The operation mode is the same for NPN output and PNP output.

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I/O circuit diagram

10 to 30 VDC Brown Load Green Bank select 0 Pink Bank select 1 Yellow Bank select 2 Main circuit Black Control output Protection circuit Blue 0 V

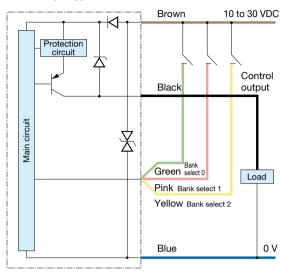
Digital color/mark detection type DM series

■ Bank number and input signal (NPN)

Bank number	Lead wire										
Darik Hulliber	Green wire	Pink wire	Yellow wire								
0	OFF	OFF	OFF								
1	OFF	OFF	ON								
2	OFF	ON	OFF								
3	OFF	ON	ON								
4	ON	OFF	OFF								
5	ON	OFF	ON								
6	ON	ON	OFF								
7	ON	ON	ON								

ON : Connected to the blue wire (0 V) OFF: Open or connected to the brown wire (+V)

■ PNP output type



Connecting

■ When the bank switching line is not needed, cut the lead wire and wrap it individually with insulating tape, and do not connect it to any other terminal.

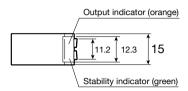
Notes

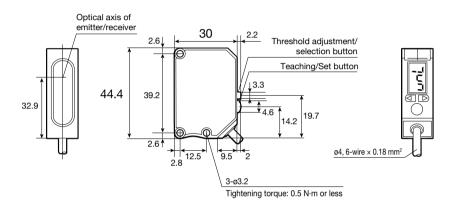
- When using a switching regulator for the power supply, be sure to ground the frame ground terminal.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- Avoid using the transient state while the power is on (approx. 100 ms).

Dimensions

Sensor (Unit: mm)

■ Cable type





Photoelectric Sensors

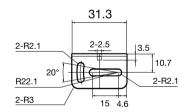
Specialized Photoelectric Sensors

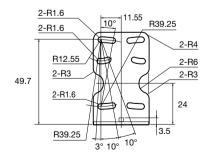
Laser Displacement Sensors

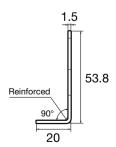
Color Sensors Mark Sensors

Mounting bracket (included)

■ BEF-WK-190







Specialized Iotoelectric Sensors

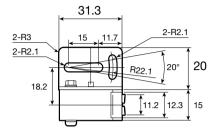
Digital color/mark detection type DM series

Dimensions

With mounting bracket

■ BEF-WK-190 floor-mounted

(Unit: mm)

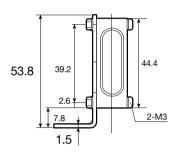


Photoelectric Sensors

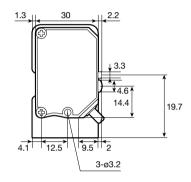
Specialized Photoelectric Sensors

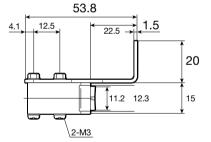
Laser Displacement Sensors

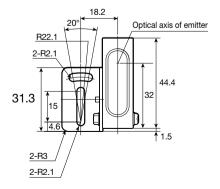
Color Sensors Mark Sensors

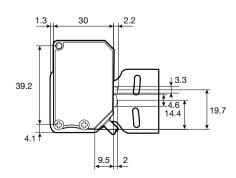












Photoelectric Sensors

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Laser Displacement Sensors

Color Sensors Mark Sensors

Typical characteristic data

Color mode color detection data < How to view characteristic data>

Tolerances used for color detection between the colors indicated by columns and rows are expressed using colors. The relationship between tolerance and colors is as follows.

			: Reliable detection												: Good detection : Can be detection									ion	: Cannot be detection													
													Determination color																									
			3	3 N (viole	et)	4	3 N	(blu	e)	47 N	V (lig	jht b	lue)	54	4 N (gree	n)	4	N (/ello	w)	8	N (c	oran	ge)	2	23 N	(red)	77	N (brow	/n)	88	8 N (I	blac	k)
			100	75	50	25	100	75	50	25	100	75	50	25	100	75	50	25	100	75	50	25	100	75	50	25	100	75	50	25	100	75	50	25	100	75	50	25
	et	100		88	63	34	0	0	0	2	0	0	0	0	0	0	0	3	30	32	38	31	59	57	57	42	67	69	67	47	55	54	38	21	60	58	42	23
	(violet)	75	90		74	44	1	0	2	12	0	0	0	0	0	0	1	12	32	33	40	41	60	58	58	54	58	66	69	56	56	57	47	32	61	60	54	32
	z	50	66	77		68	26	21	27	36	0	0	0	22	1	8	21	36	43	45	51	61	45	54	70	71	34	42	76	76	69	68	68	54	75	72	71	54
	33	25	37	46	70	\geq	40	51	55	66	0	0	10	50	22	38	52	66	51	60	65	75	15	25	54	85	4	12	47	88	59	74	84	84	55	67	86	84
	<u>•</u>	100	0	0	0	0		90	61	18	43	47	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	(blue)	75	0	0	0	0	88		68	24	52	54	55	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	z g	50	0	0	0	0	67	74		77	0	4	48	68	16	31	47	0	0	0	0	0	0	0	0	0	0	0	0	0	14	33	0	0	22	26	51	0
	43	25	1	10	34	63	40	49	76		0	1	42	85	37	53	69	80	15	26	44	67	0	0	18	54	0	0	10	52	23	37	61	76	18	32	57	77
	<u>e</u>	100	0	0	0	0	47	51	56	28		88	60	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	(light blue	75	0	0	0	0	51	55	57	40	85		75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	z	50	0	0	0	0	0	0	34	70	66	79		0	39	56	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	6	30	0
	47	25	0	1	24	55	31	42	67	89	0	9	50	\setminus	45	61	76	86	5	17	35	57	0	0	9	45	0	0	1	43	10	28	51	68	12	20	52	62
	e G	100	0	0	0	0	0	0	0	14	36	42	41	34		83	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12	0
	(green)	75	0	0	0	0	0	0	0	27	32	46	54	48	85		78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	0	0	0	1	24	0
	z	50	0	0	0	9	0	0	1	42	28	41	62	69	62	79		78	0	11	38	66	0	0	0	38	0	0	0	20	0	22	45	54	0	3	35	52
	54	25	4	13	38	66	18	28	56	80	0	0	38	84	57	69	85		17	29	47	70	0	0	22	58	0	0	14	55	23	40	65	80	23	33	56	80
color	3	100	30	32	43	51	1	0	10	17	0	0	0	4	0	0	5	17		87	69	47	64	72	72	60	53	60	62	62	74	74	52	35	68	70	57	35
ngc	le le	75	31	34	44	59	1	10	19	26	0	0	0	12	0	2	17	30	88		80	60	52	61	74	71	39	48	63	67	75	75	64	50	71	71	70	48
Teaching	z	50	38	40	51	65	6	17	36	44	0	0	0	29	7	16	33	47	70	82		76	34	46	74	80	24	33	67	75	76	82	80	64	75	78	79	65
₽	4	25	34	44	61	76	16	25	53	68	0	0	14	53	27	37	57	68	48	60	78		12	24	52	86	1	11	44	83	51	70	92	87	52	64	89	88
	ge)	100	58	61	43	14	0	0	0	0	0	0	0	0	0	0	0	0	62	51	32	12		86	58	23	87	88	66	25	59	40	15	1	60	47	22	1
	oran	75	57	60	53	25	0	0	0	0	0	0	0	0	0	0	0	0	72	62	43	22	89		69	34	78	86	78	36	71	53	26	11	72	56	32	14
	Ž	50	57	60	69	54	10	4	12	21	0	0	0	5	0	0	6	22	72	74	74	51	60	70		63	47	57	88	68	96	80	56	42	91	85	61	41
	8	25	45	55	70	85	26	34	49	57	0	0	2	42	22	27	45	58	57	71	80	87	23	34	63		12	21	55	93	63	80	93	75	65	76	95	76
	(red)	100	64	56	31	3	0	0	0	0	0	0	0	0	0	0	0	0	54	41	22	1	87	76	47	12		90	56	15	46	30	4	0	54	35	10	0
		75	69	63	41	12	0	0	0	0	0	0	0	0	0	0	0	0	59	49	32	10	88	86	56	22	90		64	24	54	39	16	1	58	47	20	0
	23 N	50	67	71	76	45	2	0	3	13	0	0	0	0	0	0	0	14	61	63	65	42	68	78	89	55	56	67		69	86	72	47	31	91	82	52	33
	╙	25	49	58	75	87	26	33	45	53	0	0	0	41	18	25	40	53	61	68	74	83	27	37	66	93	14	25	59	$\overline{}$	69	86	89	74	64	75	91	72
	(brown)	100	0	0	0	0	1	1	11	19	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0		79	0	0	85	85	58	0
	bro	75	0	0	0	0	15	16	31	0	0	0	0	27	1	9	26	0	0	0	0	0	0	0	0	0	0	0	0	0	81	/	0	0	90	94	74	0
	z	50	40	50	69	84	25	35	54	60	0	0	5	48	32	32	48	63	51	64	80	90	19	28	58	92	7	16	49	89	60	75		82	70	66	95	83
	12	25	25	34	57	85	23	35	62	78	0	0	20	63	42	50	64	80	38	48	66	88	3	12	42	76	0	0	34	74	44	60	84	\triangle	52	50	80	97
	ick)	100	0	0	0	0	10	13	24	35	0	0	0	0	1	9	21	0	0	0	0	0	0	0	0	0	0	0	0	0	85	91	0	0		92	71	0
	(black)	75	0	0	0	0	11	8	21	32	0	0	0	0	0	5	15	0	0	0	0	0	0	0	0	0	0	0	0	0	89	92	0	0	80		69	0
	z	50	0	0	0	0	25	32	48	0	0	0	0	0	24	30	44	0	0	0	0	0	0	0	0	0	0	0	0	0	70	85	0	0	87	77		0
	88	25	26	35	57	86	25	35	63	78	0	0	20	64	45	52	64	78	37	46	68	88	3	13	43	77	0	1	34	75	41	58	84	97	56	53	78	

n < 80)
80<=n < 85	5
85<=n < 90)
90<=n	

Setting of response time	Hysteresis
H1: 0.8 ms	8
H2:1.6 ms	6
L : 4 ms	4

^{*}Please contact a sales representative for marking mode characteristic data that may be required.