R55F Series
Fiber optic color mark sensor

- **Outstanding color contrast sensitivity**
- **Fast 50 µs response**
- **Choose from four beam colors to optimise contrast detection**
- **Static or dynamic teach**
- **Automatic or manual sensitivity adjustment**
- **Choose glass or plastic fiber models**
- **Mounts by using the included brackets or fits on a 35 mm DIN rail**

The R55F fiber optic sensor was developed to provide simplicity of operation and access to tight areas for color mark (registration) sensing applications. The R55F is a technological advancement from earlier R55 models.

R55F sensors feature TEACH mode sensitivity adjustment, as the light and the dark sensing conditions are presented to the sensor. In addition, sensitivity may be fine-tuned at any time by simply clicking the "+" or "-" buttons on the sensor. The ten-element signal strength light bar clearly displays the relative received signal strength.

The bipolar (one npn and one pnp) outputs may be programmed to include a 20 or 40-millisecond pulse stretcher (OFF Delay), if required.

Both TEACH mode sensitivity adjustment and output SETUP are accomplished using the push buttons on the sensor or by supplying input pulses via the Remote Teach input.

TEACH mode has two options: static TEACH and dynamic TEACH. Static TEACH is used to manually set the two sensing conditions individually. The setting can then manually be fine-tuned using the push buttons.

Dynamic TEACH provides a means for teaching a series of conditions "on-the-fly"; the R55F "averages" the sensing events and automatically sets the switch point between light and dark conditions. The internal microprocessor periodically updates the switch point via the adaptive threshold feature.

The R55F is available with red, green, blue or white sensing beam. Green beams are the first choice for many color mark sensing applications. Blue is excellent at detecting the yellow family, including difficult 20 % yellow on newsprint. Red detects the blue/green color family effectively. White beams excel at specialized applications, and hold promise to become the best choice overall. Because of the wide variety of possible combinations, contact your Banner representative for a demonstration.

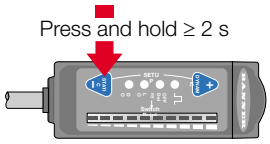
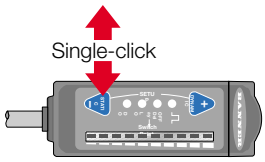
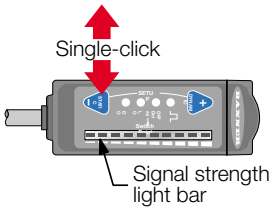
Fibers are easy to install without tools, both for glass and plastic fiber models.

Glass fibers have randomly mixed emitter and receiver strands for the best color mark sensing results. They offer the best chemical resistance and can operate at high temperatures. They are not recommended for applications requiring bending or repeated flexing.

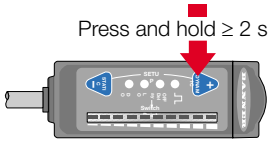
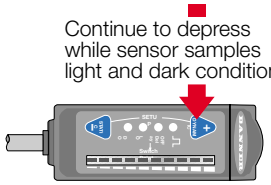
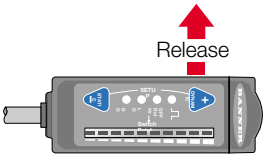
Plastic fibers are more economical, they can be cut to length in the field and stand up to repeated flexing. They are not recommended for harsh environments.

R55F Series
Fiber optic color mark sensor

Static TEACH procedure

Push button		Resulting indicator status
Press and hold STATIC button until LO and DO indicators alternately flash, then release button.		**LO and DO**: alternately flash green ⎍ : ON amber (indicating ready to teach output ON condition) **Light Bar**: goes OFF
TEACH condition # 1 (output ON state) Present the output ON sensing condition and single-click STATIC button.		**LO and DO**: alternately flash green ⎍ : OFF (indicating ready to teach output OFF condition) **Light Bar**: remains OFF
TEACH condition # 2 (output OFF state) Present the output OFF sensing condition and single-click STATIC button.		If contrast is accepted, one of the ten segments on the signal strength light bar flashes for 3 s to indicate relative contrast, and then the sensor enters RUN mode. If contrast is too low, every other segment of the light bar flashes for 3 s to indicate low contrast, and sensor returns to TEACH condition #1.

Dynamic TEACH procedure

Push button		Resulting indicator status
Press and hold DYNAMIC button.		**LO and DO**: alternately flash green ⎍ : OFF **Light Bar**: goes OFF
Present alternating light and dark sensing conditions.		**LO and DO**: alternately flash green ⎍ : OFF **Light Bar**: remains OFF
Release the DYNAMIC button.		Light bar shows the relative contrast for 3 seconds, or flashes every other light bar segment to indicate that the conditions are not accepted. Sensor returns to RUN mode with new or old setting.

Output SETUP procedure

Press and hold both push buttons until light bar goes OFF. Click either push button to toggle through six possible settings.

Output configuration	Delay indicator	LO indicator	DO indicator
Light operate with no delay	OFF	ON	OFF
Light operate with 20 ms delay	flashing	ON	OFF
Light operate with 40 ms delay	ON	ON	OFF
Dark operate with no delay	OFF	OFF	ON
Dark operate with 20 ms delay	flashing	OFF	ON
Dark operate with 40 ms delay	ON	OFF	ON

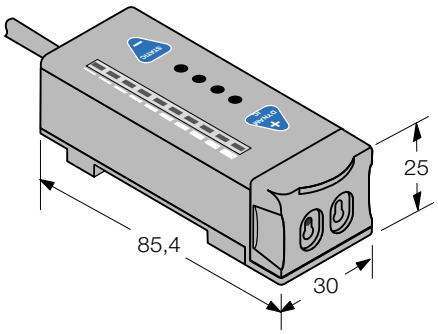
Remote TEACH

The R55F can also be set up by pulsing the remote Teach line. Connect the Teach wire to DC common for more than 0,04 s and less than 0,8 s to create one pulse.
Static TEACH can be achieved by presenting the ON condition and giving one pulse, then presenting the OFF condition and giving another pulse.
Dynamic TEACH can be achieved by holding down the Teach line for > 2 s while light and dark conditions are presented.
The push buttons can be disabled/enabled with four consecutive pulses.

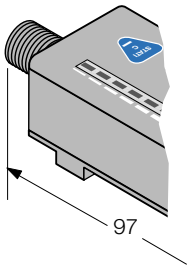
R55F Series
Fiber optic color mark sensor

Dimensions [mm]

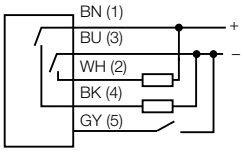
- **Cable**



- **Connector**



Wiring



Wave length	
Visible red	650 nm
Visible green	525 nm
Visible blue	475 nm
Visible white	450-650 nm
Adjustments	sensitivity (automatic) dark/light operate output off delay (none, 20 ms, 40 ms) push button lockout
Supply	
Supply voltage U_B	10...30 VDC
Ripple V_{pp}	10 %
No load current	< 70 mA
Delay upon power up	100 ms
Protection	reverse polarity transient voltages short-circuit continuous overload false pulse on power-up
Output	
2 transistor outputs	1 npn and 1 pnp output
Continuous load current	≤ 150 mA (each output)
Response time	50 µs
Material	
Housing	black ABS, polycarbonate blend
Clip	nylon fiber
Protection class (IEC 60529/EN 60529)	IP67
Temperature range	-10…+55 °C
Cable	2 m, PVC 5 x 0,34 mm²
Connector	euro*con*
Indicator LEDs	
10-segment light bar, green	signal strength
LO, green	light operate selected
DO, green	dark operate selected
⎍⎍ , yellow	outputs conducting
OFF Delay, green	OFF Delay selected

Accessories

Brackets		
SMBR55FRA		side-mounting bracket (included)
SMBR55F01		flat-mounting bracket (included)
Connectors		
WAK4.5-2/P00	80 085 76	straight type
WWAK4.5-2/P00	80 085 83	right-angled type

Photoelectric sensors

R55F Series
Fiber optic color mark sensor

Model	Range	Fiber type	Light source	Connection	Ident number
R55F-V	110 mm*	glass	red	cable	30 580 06
R55F-V-Q	110 mm*	glass	red	connector	30 580 08
R55F-VG	50 mm*	glass	green	cable	30 580 09
R55F-VG-Q	50 mm*	glass	green	connector	30 580 11
R55F-VB	50 mm*	glass	blue	cable	30 580 12
R55F-VB-Q	50 mm*	glass	blue	connector	30 580 14
R55F-VW	50 mm*	glass	white	cable	30 580 15
R55F-VW-Q	50 mm*	glass	white	connector	30 580 17
R55F-P	60 mm**	plastic	red	cable	30 580 18
R55F-P-Q	60 mm**	plastic	red	connector	30 580 20
R55F-PG	28 mm**	plastic	green	cable	30 580 21
R55F-PG-Q	28 mm**	plastic	green	connector	30 580 23
R55F-PB	28 mm**	plastic	blue	cable	30 580 24
R55F-PB-Q	28 mm**	plastic	blue	connector	30 580 26
R55F-PW	28 mm**	plastic	white	cable	30 580 27
R55F-PW-Q	28 mm**	plastic	white	connector	30 580 29

* using a BF23S fiber
** using a PBT46U fiber

• Using the R55F sensor

RUN mode

Normal operation mode for the R55F is called RUN mode. Either the light operate or the dark operate LED is ON. The delay configuration indicator LED may be ON or OFF, indicating the state. The output LED is ON when the outputs are conducting. The 10-segment light bar shows the signal strength with respect to the sensing threshold. The sensitivity can be manually adjusted by pressing the “+” or “-” button; each click translates to ½ segment on the signal strength light bar.

TEACH mode

The R55F has 2 TEACH modes:

Static TEACH mode
If the different conditions can be presented individually; the condition taught first is the output ON condition.
The sensor sets the threshold midway between the dark and the light condition.

Dynamic TEACH mode
The light and dark conditions are presented during actual machine conditions; the output ON condition must be taught using SETUP mode. The threshold is automatically adjusted as long as no manual adjustment is made.

SETUP mode

SETUP mode is used to select dark operate or light operate and to select 20 ms, 40 ms or no OFF Delay.

• Application notes

Do not mount the fiber tip directly perpendicular to shiny surfaces. Position at approximately a 15° angle in relation to the surface. Minimize web or product “flutter” whenever possible to maximize sensing reliability.

Subject to changes without notice • Edition 02.00 • P/N ED063B0A