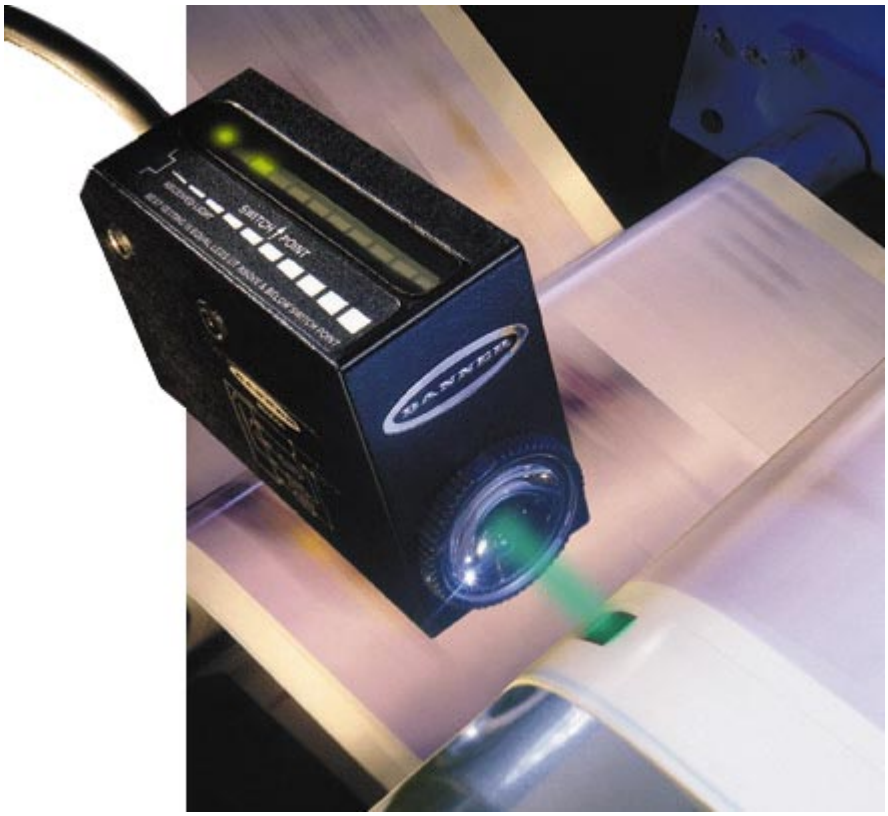
R55 series
Color mark sensor

- **Reliable detection of the toughest color mark contrasts**
- **10 000 actuations per second**
- **Unique bargraph for easy setup**
- **High tolerance to web flutter**
- **DIP-switch selectable timing functions**
- **Digital PNP & NPN and analog outputs**
- **Robust metal housing IP 67**
- **Models with horizontal and vertical sensing image**



The R55 offers maintenance-free solid-state reliability, with sensing performance until now offered only by short-lived incandescent color mark sensors. The R55 reliably detects all color contrasts found in common product registration color mark applications – even extremely low contrasts such as 20% yellow printed on white. In addition, a green LED light source and hybrid optics eliminate the need to switch between different color light sources for different color contrasts.

The lens of the R55 may be installed on either of the two lens ports. This allows significant mounting flexibility. The lens and the lens port cap can be easily exchanged by hand no tools required.

50 microsecond sensing response produces excellent registration repeatability, even in very high-speed applications.

This fast response, coupled with the small 1.2 x 3.8 mm sensing image, allows color marks to be made small and inconspicuous.

The R55 has built-in pulse-stretching output timing logic to permit reliable interfacing to slower inputs, such as those associated with some programmable logic controllers (PLCs). A 4-position DIP # switch is accessed beneath the tethered switch cap (see fig. 4). Switches #2 and #3 allow you to select between different timing functions, a 50 ms non-retriggerable one-shot pulse, a 50 ms off-delay, a 100 ms retriggerable one-shot or no timing.

The R55 offers a 10-element moving LED light bar which displays signal strength, relative to the switch point setting. The display is invaluable during setup. Switch #4 is used to disable the light bar display during normal operation, if desired.

There are two switching outputs which are bipolar – one PNP and one NPN. Both switching outputs will switch loads up to 150 mA. DIP-switch #1 selects dark operate (outputs energize when the darker condition is sensed) or light operate (outputs energize when the lighter condition is sensed).

The construction of the R55 is extremely robust with a die-cast metal housing, plastic optics, and IP 67 leakproof design for harsh sensing environments.

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R55 Mounting

The R55 includes a total of eight M5 threaded holes for mounting. These threaded holes are positioned to match industrial standards.
The R55 focus is located at 10 mm ahead of the lens surface.

When sensing a color mark on a reflective (shiny) material, it is advisable to introduce an angle to place the centerline at approx. 15° off perpendicular to the material.

When sensing a color mark on a clear material, position a reflective surface directly behind the clear material. The printed mark, regardless of its color, becomes the dark condition as it blocks the light from reaching the reflective surface.

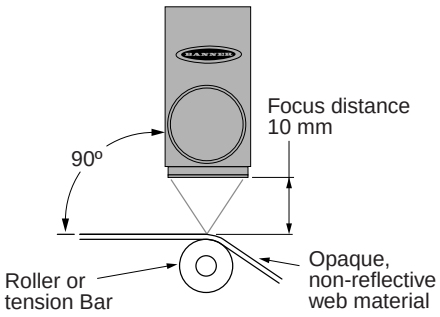


Fig. 1 Mounting for sensing opaque non-reflective materials

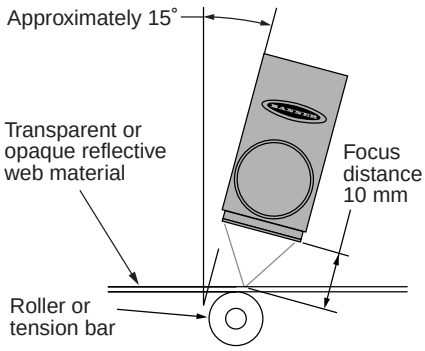
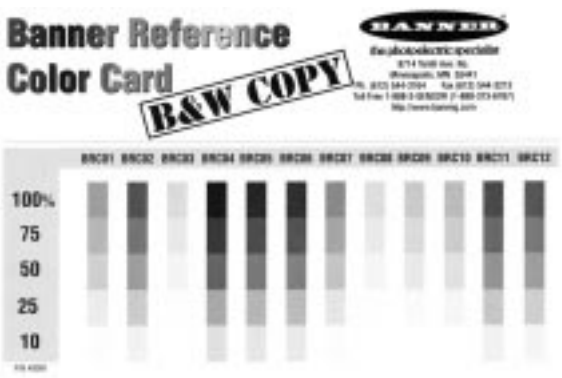


Fig. 2 Mounting for sensing opaque reflective and transparent materials

Whenever possible, it is a good idea to sense the web material at a location where it passes a tension bar or roller to minimize the adverse effects of web „flutter" or sag.

R55 Sensitivity Adjustment



Every color registration mark application involves sensing the difference between two colors, which relates, optically, to differentiating between two gray scale levels. One color returns more reflected light to the sensor than the other. The condition which returns the greater amount of light is referred to as the "light condition". The light condition is usually obvious to the eye. However the light bar displays exactly how the sensor "sees" the difference between the color mark and its background.

The 10-element moving LED light bar displays received light strength, relative to the switch point setting. After mounting the R55, apply power to the sensor. Hookup information is shown on a side label. Alternately present the light and the dark conditions to the R55 and adjust the Sensitivity so that the "switch point" is centered between the light bar readings for the two sensing conditions.
The contrast level is acceptable if the light bar alternates between LED#4 and LED#7. If the contrast is lower, care must be taken that all sensing variables remain strictly stable.
Sensitivity must be adjusted to display an equal reading above and below the switching point (fig. 3).

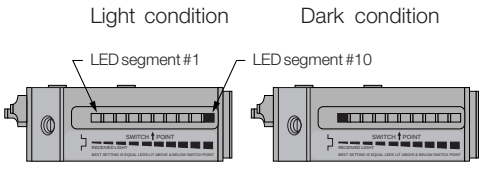


Fig. 3a High contrast (best)

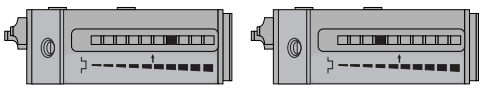


Fig. 3b Minimum recommended contrast

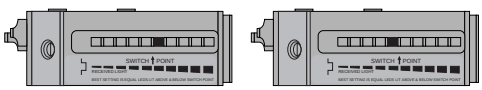
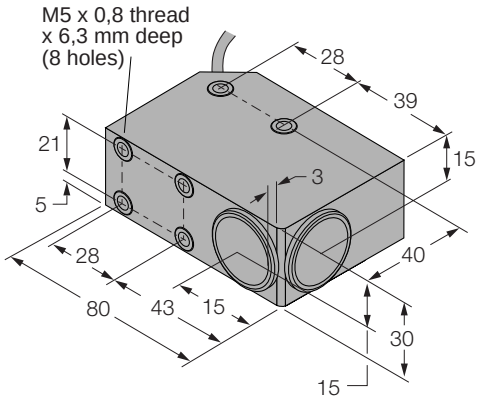
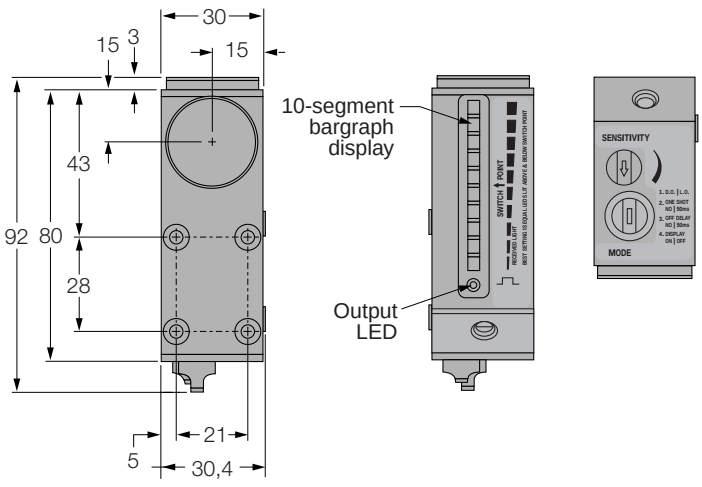


Fig. 3c Low contrast - All sensing variables must remain stable

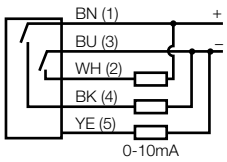
R55 Color mark sensor

Dimensions [mm]





Wiring



Wave length

Visible green	525 nm
Sensing distance	10 mm (± 3mm)

Adjustments	sensitivity timing functions

Supply

Supply voltage	10...30 VDC
Ripple V_{pp}	10 %
No load current	< 70 mA

Protection	short-circuit (pulsed) reverse polarity

Output

Continuous load current	≤ 150 mA (each output)
Switching frequency	10 KHz

Analog output

Output current	0...10 mA
Max. load	700 Ω

Material

Housing	zinc alloy die-cast
Cover	steel
Mode switch cap	Delrin®
Lens	acrylic
Lens port cap and lens holder	ABS
Protection class (IEC 529/DIN 40050-9)	IP 67
Temperature range	-10…+55 °C
Cable	2 m, PVC 5 x 0.34 mm²
Connector	*Conprox®*

Indicator LEDs

Green	output
10-segment green bargraph display	signal strength

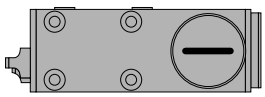
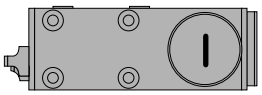
Accessories

Connectors

RK4.5T-2	66 338 03	straight type
WK4.5T-2	66 600 02	right-angled type

Photoelectric sensors

R55 Color mark sensor

		Connection	Type	Ident number
Sensing image parallel to sensor length		cable cable 0,3 m with pigtail connector connector	**R55-CG1** **R55-CG1-QP** **R55-CG1-Q**	30 483 01 30 483 03 30 513 93
Sensing image perpendicular to sensor length		cable cable 0,3 m with pigtail connector connector	**R55-CG2** **R55-CG2-QP** **R55-CG2-Q**	30 483 02 30 483 04 30 513 94

R55 DIP switch setting configurations

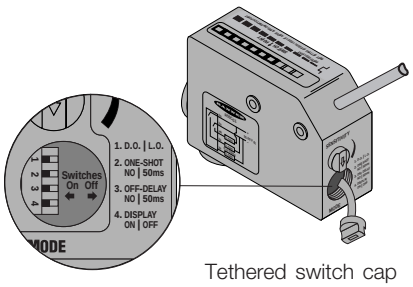
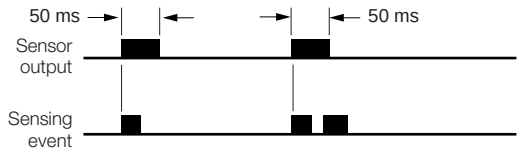
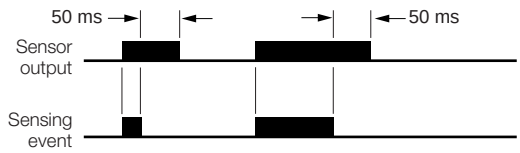
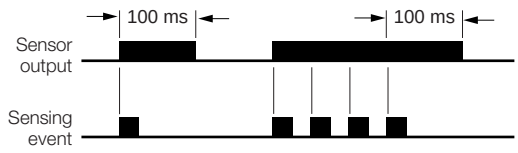


Fig. 4 R55 mode settings

Tethered switch cap

Switch	Position	Function	Description
1	ON	Dark operate	Transition from light to dark
1	OFF	Light operate	Transition from dark to light
2	ON OFF	no one-shot timer 50 ms non-retriggerable one-shot	
3 2	ON OFF	no off delay timer, 50 ms off delay timer	
2 and 3	OFF	retriggerable one-shot, 100 ms	
2 and 3	ON	no output timer	
4	ON	10-segment light bar display enabled	
4	OFF	10-element light bar display disabled	