

R55 *Expert*™ Color mark sensor

- Outstanding color contrast sensitivity
- Fast 50 μ s response
- Choose from 3 LED colors to optimise contrast detection
- Choose between a vertical or horizontal 1,2 x 3,8 mm sensing spot
- Static or dynamic teach plus manual sensitivity adjustment
- Easy programming by push button or remote teach
- Bipolar (pnp and npn) and analog outputs
- Robust IP67 metal housing



The R55 *Expert* offers maintenance-free solid-state reliability for all color contrasts found in common product and material registration applications. Fast 50 μ s sensing response produces excellent registration repeatability, even in ultra-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.

R55 *Expert* 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.

TEACH mode has two options: static TEACH and dynamic TEACH. Static

TEACH is used to manually set the two sensing conditions individually.

Dynamic TEACH provides a means for teaching a series of conditions "on-the-fly"; the R55 *Expert* samples the sensing events and automatically sets (and periodically updates via the adaptive threshold feature) the switch point between light and dark conditions.

The discrete bipolar (one npn and one pnp) outputs may be programmed in SETUP mode to include a 20- or 40-millisecond pulse stretcher (OFF Delay), if required. A third, dedicated, 0 to 10 milliamp analog output may be used for applications such as measuring or monitoring of surface brightness or texture.

Both TEACH mode sensitivity and output SETUP are accomplished either by using the push buttons on the sensor, or by

supplying input pulses via the remote TEACH input.

The construction of the R55 *Expert* is extremely robust, with a die-cast metal housing, plastic optics, and IP67 leakproof design for harsh sensing environments.

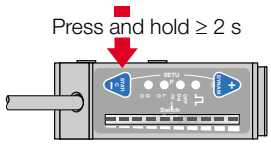

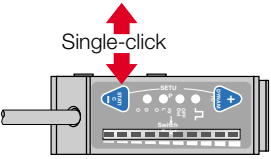

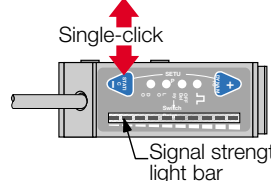
The R55 *Expert* is available with green, blue or white sensing beam. Green beams are the first choice for many color mark sensing applications. Blue is excellent at detecting the yellow family, including difficult 20 % yellow on newsprint. White beams excel at specialized applications, and hold promise to become the best choice overall. Because of the wide variety of possible combinations, contact your Banner representative for a demonstration.

The acrylic lens of the R55 *Expert* may be installed at either of two lens ports, for mounting flexibility.

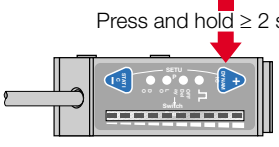

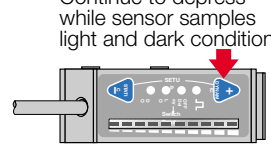

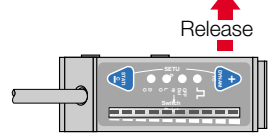
Photoelectric sensors

R55 Expert™ 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.	<p>Press and hold ≥ 2 s</p> 	<p>LO and DO: alternately flash green</p> <p> : ON amber (indicating ready to teach output ON condition)</p> <p>Light Bar: goes OFF</p>
TEACH condition # 1 (output ON state) Present the output ON sensing condition and single-click STATIC button.	<p>Single-click</p> 	<p>LO and DO: alternately flash green</p> <p> : OFF (indicating ready to teach output OFF condition)</p> <p>Light Bar: remains OFF</p>
TEACH condition # 2 (output OFF state) Present the output OFF sensing condition and single-click STATIC button.	<p>Single-click</p>  <p>Signal strength light bar</p>	<p>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 the sensor returns to TEACH condition #1.</p>

Dynamic TEACH procedure

Push button		Resulting indicator status
Press and hold DYNAMIC button.	<p>Press and hold ≥ 2 s</p> 	<p>LO and DO: alternately flash green</p> <p> : OFF</p> <p>Light Bar: goes OFF</p>
Present alternating light and dark sensing conditions.	<p>Continue to depress while sensor samples light and dark conditions</p> 	<p>LO and DO: alternately flash green</p> <p> : OFF</p> <p>Light Bar: remains OFF</p>
Release the DYNAMIC button.	<p>Release</p> 	<p>Light bar shows the relative contrast for 3 seconds, or flashes every other segment to indicate that the conditions are not accepted. Sensor returns to RUN mode with new or old setting.</p>

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 R55 Expert 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.

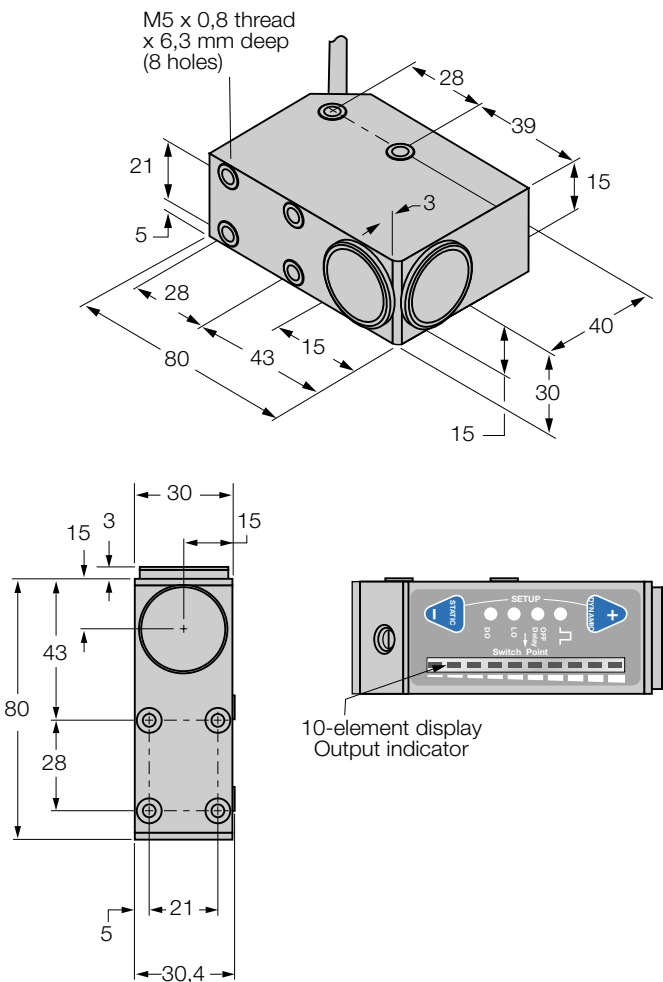
The push buttons can be disabled/enabled with four consecutive pulses.



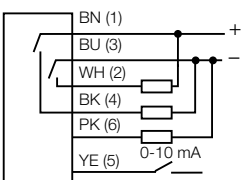
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Dimensions [mm]



Wiring



Wave length

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	< 80 mA
Delay upon power up	1 s

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: zinc alloy die-cast and steel, black acrylic polyurethane finish
Lens: acrylic
Lens port cap and lens holder: ABS
Protection class (IEC 60529/EN 60529): IP67

Temperature range: -10...+55 °C
Cable: 2 m, PVC 6 x 0,34 mm²
Connector: eurocon

Indicator LEDs

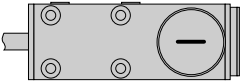
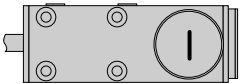
10-segment light bar, green	signal strength
Green	light operate
Green	dark operate
Yellow	outputs conducting
Green	OFF Delay

Accessories

Brackets		
SMB55A	30 532 59	15° offset bracket
SMB55F	30 532 60	flat-mounting bracket
SMB55RA	30 532 61	right-angle bracket
SMB55S	30 532 65	15° offset bracket
Connectors		
WAK6-2/P00	80 070 19	straight type
WWAK6-2/P00	80 127 27	right-angled type
Replacement lens		
UC-R55	30 550 09	replacement lens

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		Connection	Range	Light source	Type	Ident number
Sensing image parallel to sensor length		cable	10 +/- 3 mm	green	R55E-CG1	30 594 91
		connector	10 +/- 3 mm	green	R55E-CG1-Q	30 594 92
		cable	10 +/- 3 mm	blue	R55E-CB1	30 594 97
		connector	10 +/- 3 mm	blue	R55E-CB1-Q	30 594 98
		cable	10 +/- 3 mm	white	R55E-CW1	30 594 85
		connector	10 +/- 3 mm	white	R55E-CW1-Q	30 594 86
Sensing image perpendicular to sensor length		cable	10 +/- 3 mm	green	R55E-CG2	30 594 94
		connector	10 +/- 3 mm	green	R55E-CG2-Q	30 594 95
		cable	10 +/- 3 mm	blue	R55E-CB2	30 595 00
		connector	10 +/- 3 mm	blue	R55E-CB2-Q	30 595 01
		cable	10 +/- 3 mm	white	R55E-CW2	30 594 88
		connector	10 +/- 3 mm	white	R55E-CW2-Q	30 594 89

● Using the R55 *Expert* sensor

RUN mode

Normal operation mode for the R55 *Expert* 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 R55 *Expert* 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 sensor lens directly perpendicular to shiny surfaces. Position the sensor at approximately a 15° angle in relation to the surface. Minimize web or product "flutter" whenever possible to maximize sensing reliability. The analog output is proportional to the received light signal and is not affected by the manual sensitivity adjustments.

Subject to changes without notice • Edition 05.00 • P/N ED064E0A



IMPORTANT SAFETY WARNING ! These sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can result in either an energised or de-energised output condition. These products should not be used as sensing devices for personnel safety.