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.
**Photoelectric sensors**

**R55F Series**

**Fiber optic color mark sensor**

### Static TEACH procedure

<table>
<thead>
<tr>
<th>Push button</th>
<th>Resulting indicator status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press and hold STATIC button until LO and DO indicators alternately flash, then release button.</td>
<td>LO and DO: alternately flash green</td>
</tr>
<tr>
<td>Press and hold ≥ 2 s</td>
<td>Light Bar: goes OFF</td>
</tr>
</tbody>
</table>

**TEACH condition # 1**
(output ON state)

Present the output ON sensing condition and single-click STATIC button.

**TEACH condition # 2**
(output OFF state)

Present the output OFF sensing condition and single-click STATIC button.

### Dynamic TEACH procedure

<table>
<thead>
<tr>
<th>Push button</th>
<th>Resulting indicator status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press and hold DYNAMIC button.</td>
<td>LO and DO: alternately flash green</td>
</tr>
<tr>
<td>Press and hold ≥ 2 s</td>
<td>Light Bar: goes OFF</td>
</tr>
<tr>
<td>Present alternating light and dark sensing conditions.</td>
<td>LO and DO: alternately flash green</td>
</tr>
<tr>
<td>Continue to depress while sensor samples light and dark conditions</td>
<td>Light Bar: remains OFF</td>
</tr>
<tr>
<td>Release the DYNAMIC button.</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Output SETUP procedure

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

<table>
<thead>
<tr>
<th>Output configuration</th>
<th>Delay indicator</th>
<th>LO indicator</th>
<th>DO indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light operate with no delay</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Light operate with 20 ms delay</td>
<td>flashing</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Light operate with 40 ms delay</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Dark operate with no delay</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Dark operate with 20 ms delay</td>
<td>flashing</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Dark operate with 40 ms delay</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

### 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.
**Dimensions** [mm]

- **Cable**
  - 25
  - 85.4
  - 30

- **Connector**
  - 97

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**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 $U_d$: 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
- Continuous load current: ≤ 150 mA (each output)
- Response time: 50 µs

**Material**
- Housing: black ABS, polycarbonate blend
- Clip: nylon fiber
- Protection class: IP67
- Temperature range: -10...+55 °C
- Cable: 2 m, PVC 5 x 0.34 mm²
- Connector: eurocon

**Indicator LEDs**
- 10-segment light bar, green
- LO, green
- DO, green
- , yellow
- OFF Delay, green

**OFF Delay, green**
- signal strength
- light operate selected
- dark operate selected
- outputs conducting
- 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

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

* 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

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.