CONTRAST SENSORS

- Wide-spectrum RGB LED emission
- 3 different versions: basic, standard and enhanced
- Automatic, manual and dynamic setting
- 15, 20 or 30 kHz switching frequency
- NPN/PNP and analogue outputs
- Standard fixing, M12 connector rotatable on 5 positions

The new digital contrast sensor line of the TL46 series is characterised by excellent performances in terms of resolution, definition and precision of the light spot emitted by RGB LEDs, low response time and high switching speed. The sensor, developed in a sturdy metal housing with standard fixing, is available in 3 different versions able to better satisfy all applications offering avantgarde technology at the best price/performance ratio. The TL46-W basic version has only one set push-button, 2 LEDs indicating respectively the output status and sensor acquisition condition. The performances and use ease have been optimised and offered at a competitive price. The TL46-WL standard version has set 3 push-buttons, 4 LEDs signalling the output status, sensor acquisition condition, delay output activation and push-button activation. A bargraph is also available for manual setting of the threshold to detect particularly difficult contrasts. The standard version supplies excellent performances in general at a 20 kHz switching frequency. The TL46-WLF enhanced version presents a 4-digit display for the setting of the most advanced functions, such as dynamic acquisition of the contrast mark. The sensor reaches the maximum market performances at 30 kHz switching frequency. Accessory lenses with 9 - 40 mm focal distance are available for all versions, as well as a high-resolution focussing lens and a PMMA plastic patent-covered lens particularly suitable to food applications with standard 9 mm focal distance.

DIGITAL CONTRAST SENSOR WITH METAL HOUSING

DATASENSOR

value through detection
The switching threshold is set pressing twice the SET push-button; the first for the mark the second for the background.
The threshold level can be set manually, in the TL46-WL/WLF version, pressing the ‘+’ and ‘-’ push-buttons which increase or reduce the threshold as visualised on the bargraph or display.
The dynamic setting, present in the TL46-WLF version, detects the moving mark by simply keeping the SET push-button pressed, or activating the Remote/Dyn input.

**INDICATORS AND PUSH-BUTTONS**

**A** yellow OUTPUT LED  
**B** green READY LED  
**C** orange DELAY LED  
**D** orange KEYLOCK LED  
**E** Bargraph  
**F** +/- push-buttons  
**G** SET push-button  
**H** Display

**CONNECTIONS**

<table>
<thead>
<tr>
<th>VERSION</th>
<th>PIN 1 (brown)</th>
<th>PIN 2 (white)</th>
<th>PIN 3 (blue)</th>
<th>PIN 4 (black)</th>
<th>PIN 5 * (grigio)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL46-W Base</td>
<td>+10...30Vdc</td>
<td>1...5.5Vdc output</td>
<td>0Vdc</td>
<td>NPN/PNP output</td>
<td>Delay</td>
</tr>
<tr>
<td>TL46-WL Std.</td>
<td>+10...30Vdc</td>
<td>1...5.5Vdc output</td>
<td>0Vdc</td>
<td>NPN/PNP output</td>
<td>Remote</td>
</tr>
<tr>
<td>TL46-WLF Enh.</td>
<td>+10...30Vdc</td>
<td>Dark/Light Dyn.</td>
<td>0Vdc</td>
<td>NPN/PNP output</td>
<td>Remote/Dyn.</td>
</tr>
</tbody>
</table>

* A M12 4-pole connector can be used if the PIN5 function is not necessary.
**TECHNICAL DATA**

**VERTICAL SPOT**

- **Power supply:** 10 ... 30 Vdc, reverse polarity protection
- **Consumption:** 85 mA max.
- **Light emission:** RGB LED (630nm red, 520nm green, 465nm blue)
- **Spot dimension:** 1.5 x 5 mm (with standard 9 mm lens)
- **Spot orientation:** horizontal
- **Operating distance:** 6 ... 12 mm (with standard 9 mm lens)
- **Depth of field:** ± 3 mm (with standard 9 mm lens)
- **Setting:** automatic / manual / remote / dynamic
- **Indicators:**
  - yellow OUTPUT LED
  - green READY LED
  - orange DELAY LED
  - orange KEYLOCK LED
  - 5-segment bargraph
  - 4-digit display
- **Output type:** NPN/PNP programmable
- **Output current:** 100 mA max.
- **Saturation voltage:** ≤ 2 V
- **Response time:**
  - 33 µs
  - 25 µs
  - 17 µs
- **Switching frequency:**
  - 15 kHz
  - 20 kHz
  - 30 kHz
- **Operating mode:** dark/light selectable
- **Analogue output:**
  - 1 ... 5.5 V (3 V on 90% white)
  - 0 ... 100 ms programmable
- **Auxiliary functions:**
  - keylock
  - fine hysteresis regulation
- **Connections:**
  - M12 5-pole connector
- **Electrical protection:** class 2, double insulation
- **Mechanical protection:** IP67
- **Protection devices:** A, B
- **Housing material:** aluminum
- **Lens material:** PMMA / glass
- **Weight:** 170 g max.
- **Operating temperature:** -10...+65°C
- **Storage temperature:** -20...+70°C
- **Reference standard:** EN 60947-5-2

**HORIZONTAL SPOT**

Horizontal spot is present in the TL46 models with final ‘-L’ suffix

**TECHNICAL NOTES**

1. Limit values
2. Average life of 100.000 h with $T_a = +25$ °C
3. Connector block rotatable on 5 positions
4. A - reverse polarity protection
   B - overload and short-circuit protection

**DETECTION DIAGRAMS**

- **Standard 9 mm lens**
  (1.5 x 5 mm spot on focal point)
- **Accessory 18 mm lens**
  (2 x 7 mm spot on focal point)
- **Accessory 22 mm lens**
  (2 x 8 mm spot on focal point)
- **Accessory 28 mm lens**
  (2 x 9 mm spot on focal point)
- **Accessory 40 mm lens**
  (2.5 x 11 mm spot on focal point)
MODEL SELECTION AND ORDER INFORMATION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>VERSION</th>
<th>SPOT</th>
<th>ORDER N°</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL46-W-815</td>
<td>basic</td>
<td>vertical</td>
<td>954601000</td>
</tr>
<tr>
<td>TL46-W-815L</td>
<td>basic</td>
<td>horizontal</td>
<td>954601010</td>
</tr>
<tr>
<td>TL46-WL-815</td>
<td>standard</td>
<td>vertical</td>
<td>954601020</td>
</tr>
<tr>
<td>TL46-WL-815L</td>
<td>standard</td>
<td>horizontal</td>
<td>954601030</td>
</tr>
<tr>
<td>TL46-WLF-815</td>
<td>enhanced</td>
<td>vertical</td>
<td>954601040</td>
</tr>
<tr>
<td>TL46-WLF-815L</td>
<td>enhanced</td>
<td>horizontal</td>
<td>954601050</td>
</tr>
</tbody>
</table>

ACCESSORY LENSES

DIMENSIONS

Lens No.9 glass

Lens No.9 PMMA

Lens HI-RES glass

Lens 18 mm glass

Lens 22 mm glass

Lens 28 mm glass

Lens 40 mm glass

ACCESSORY SELECTION AND ORDER INFORMATION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>ORDER N°</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-A1-03-G-03</td>
<td>axial M12 NO-NC 5-poles 3 m</td>
<td>95ACC2110</td>
</tr>
<tr>
<td>CS-A1-03-G-05</td>
<td>axial M12 NO-NC 5-poles 5 m</td>
<td>95ACC2120</td>
</tr>
<tr>
<td>CS-A1-03-G-10</td>
<td>axial M12 NO-NC 5-poles 10 m</td>
<td>95ACC2140</td>
</tr>
<tr>
<td>Lens No.9 glass</td>
<td>glass lens with 9 mm focus</td>
<td>95ACC2670</td>
</tr>
<tr>
<td>Lens No.9 PMMA</td>
<td>plastic lens with 9 mm focus</td>
<td>95ACC2540</td>
</tr>
<tr>
<td>Lens Hi-Res glass</td>
<td>additional focussing glass lens (*)</td>
<td>95ACC1050</td>
</tr>
<tr>
<td>Lens No.18 glass</td>
<td>glass lens with 18 mm focus</td>
<td>95ACC2680</td>
</tr>
<tr>
<td>Lens No.22 glass</td>
<td>glass lens with 22 mm focus</td>
<td>95ACC1100</td>
</tr>
<tr>
<td>Lens No.28 glass</td>
<td>glass lens with 28 mm focus</td>
<td>890000194</td>
</tr>
<tr>
<td>Lens No.40 glass</td>
<td>glass lens with 40 mm focus</td>
<td>95ACC2740</td>
</tr>
</tbody>
</table>

* focussing lens to screw between the sensor and normal 9 mm lens to reduce the light spot dimension and increase resolution

Please refer also to Sensor Accessories

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HEADQUARTERS

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