

## Industrial Photometer

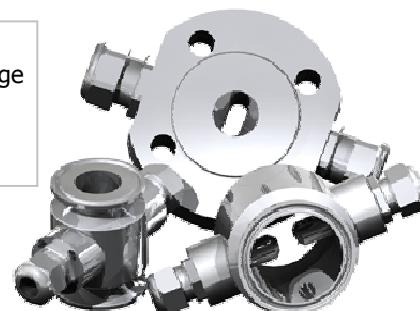
The Kemtrak DCP007 is an industrial UV-VIS-NIR fiber optic photometer designed to accurately measure the concentration of light absorbing substances.

The Kemtrak DCP007 uses a combination of long life, solid state LED lamps with fiber optics that provide a measurement with very high precision. Thanks to a proprietary dual wavelength four channel measurement technique and advanced digital electronics design, high concentration to ppm trace analysis is no problem. The primary "absorbing" wavelength measures any changes in the process medium, while the second reference wavelength, which is not absorbed by the process medium, compensates for turbidity and/or fouling of the optical windows.

Since optic fibers are used to pipe light to the measurement point and back, the measurement cell contains no electronics, moving parts or sources of heat that result in condensation on the optical surfaces. Standard measurement cells are machined in sanitary grade stainless steel with sapphire glass.



Measurement flanges- DIN Flange DN25, ISO DN25 TriClamp & ISO DN50 TriClamp.



### Features

<ul style="list-style-type: none"> <li>• Real time, in-line measurement</li> <li>• Color &amp; Concentration: 280 - 1050 nm</li> <li>• Zero maintenance</li> <li>• Long life LED lamps</li> <li>• Fiber optics - high performance, intrinsically safe</li> <li>• Extensive range of industrial sensor designs</li> <li>• Alarm signals for data and system failures</li> </ul>	<ul style="list-style-type: none"> <li>• Inbuilt PID Controller</li> <li>• Data &amp; system event logger for quality control</li> <li>• Analogue output (0/4-20 mA)</li> <li>• Supply voltage 110/240 VAC</li> <li>• IP65 protection</li> <li>• ATEX I I 2 GD EExd-IIB-T5 I (optional)</li> <li>• Overall dimensions:220 x 120 x 100 mm (L x W x D)</li> </ul>
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### Process Flowcell

<b>Manifolds</b>	Standard designs include DIN Flange (DIN 2633), Tri-Clamp® (ISO 2852& DIN 32676), Sanitary Thread SC (DIN 11851), Straight Pipe Thread (DINISO 228 BSP). Line size up to DN100.
<b>Materials</b>	Standard material stainless steel EN 1.4435 / 316L. Other materials include Titanium, Hastelloy C-276, PEEK, TFMC (TFM 25% Carbon), PCTFE, PVC-C, PVDF
<b>Window</b>	Sapphire glass
<b>Elastomers</b>	NBR (nitrile), FKM (FPM, Viton®, Fluorel®), EPDM, Silicone, Neoprene (CR) and others
<b>Operating Conditions</b>	Ambient & process temperatures up to 200°C (392°F) Process pressure from 10 mbar to 100 bar (Operating conditions subject to material and design in use)
<b>Fibre Optic cable</b>	Hard clad silica with fully-interlocked flexible stainless steel jacket or Kevlar® reinforced PVC jacketing. Terminated with SMA 905 connectors. Operating temperature -20°C to +125°C (-4°F to +257°F), Autoclave. up to 50m (164 foot). (Higher temperatures available on request)
<b>Protection</b>	IP66 / EN 60529, ATEX (option)



**Technical Specification:**

<b>Housing</b>	<ul style="list-style-type: none"> <li>- Glass-fibre reinforced polyester &amp; polyester front panel</li> <li>- Captive lid screws &amp; wall mounting brackets stainless steel</li> <li>- 220 x 120 x 90 mm (8.66 x 4.72 x 3.54 inch) L x W x D</li> <li>- IP 65 / EN 60529</li> </ul>
<b>Display</b>	<ul style="list-style-type: none"> <li>- 16 x 2 alphanumeric dot matrix LCD display &amp; LED background illuminated</li> <li>- Display update: 0.5 seconds</li> <li>- Display units: g/L, ppm, %, M, AU. User configurable.</li> <li>- LED 1 (green): power on</li> <li>- LED 2 (red): alarm</li> <li>- LED 3 (red): clean</li> </ul>
<b>Operation</b>	<ul style="list-style-type: none"> <li>- 4 push buttons</li> </ul>
<b>Software Features</b>	<ul style="list-style-type: none"> <li>- Auto gain: Gain switching is fully software controlled</li> <li>- Auto zero: Automatic, local or remote zero</li> <li>- Calibration: Concentration &amp; mA output</li> <li>- Damping: from 0 to 9999s with noise (air bubble / particle) filter</li> <li>- Memory: Non volatile - configuration and data retained upon power failure</li> <li>- Security: Alphanumeric password protection</li> </ul>
<b>Data Logger</b>	<ul style="list-style-type: none"> <li>- 6 900 data points (timestamp, average, max. &amp; min.), ring buffer</li> <li>- Configurable log time interval 1s to 24hr</li> </ul>
<b>Event Logger</b>	<ul style="list-style-type: none"> <li>- 10 000 events</li> <li>- Alarms, zeroing, cleaning, calibration &amp; system events (power, system failures, high/low system temperature)</li> </ul>
<b>Automatic Cleaning Control</b>	<ul style="list-style-type: none"> <li>- Automatic cleaning sequence with dedicated relay output</li> <li>- Manual trigger or external trigger via digital input</li> <li>- Configurable automatic cleaning interval, 15min to 24hr</li> <li>- Configurable cleaning duration from 0 to 9999s</li> <li>- Auto-zero after clean option</li> <li>- Hold value after clean (to equilibrate) 0 to 9999s</li> </ul>
<b>PID Controller</b>	<ul style="list-style-type: none"> <li>- Control method: Pulse width modulated relay output or 0/4-20mA output</li> <li>- Control period: 0 - 99s</li> <li>- Proportional gain: 0.0000 - 999 999</li> <li>- Integral time: 0.0000 - 999 999s</li> <li>- Derivative time: 0.0000 - 999 999s</li> </ul>
<b>Light Source</b> ( Note: Measurement wavelengths must be factory installed.)	<ul style="list-style-type: none"> <li>- High performance light emitting diode (LED)</li> <li>- Wavelength range: 280 - 2 000nm</li> <li>- Full Width-Half Maximum (FWHM): 5 nm</li> <li>- Central Wavelength (CWL) Accuracy: <math>\pm 1</math>nm</li> <li>- Typical lamp lifetime &gt;100 000 hrs</li> </ul>
<b>Photometric Range</b>	<ul style="list-style-type: none"> <li>- At 500nm, 10mm OPL: 0.000 - 3.000 AU</li> </ul>
<b>Photometric Accuracy</b>	<ul style="list-style-type: none"> <li>- At 1AU (NIST 930D filter): <math>\pm 0.001</math> AU</li> <li>- At 2AU (NIST 1930D filter): <math>\pm 0.005</math> AU</li> </ul>
<b>Photometric Noise</b>	<ul style="list-style-type: none"> <li>- At 1AU, 25°C, 500nm: <math>\pm 0.0001</math> AU</li> </ul>
<b>Linearity</b>	<ul style="list-style-type: none"> <li>- <math>\pm 0.5\%</math> of respective measuring range</li> </ul>
<b>Remote Input</b>	<ul style="list-style-type: none"> <li>1 x Digital input (potential free contact) for: <ul style="list-style-type: none"> <li>- Auto clean</li> <li>- Zero</li> <li>- Hold output</li> </ul> </li> </ul>
<b>mA Output</b>	<ul style="list-style-type: none"> <li>1 x 0/4 - 20 mA galvanically isolated</li> <li>- Accuracy: &lt;0.2%</li> <li>- Resolution: &lt; 0.05%</li> <li>- Load: 0 - 400 Ohm</li> </ul>
<b>Relay Outputs</b>	<ul style="list-style-type: none"> <li>- 2 x 0.5A 240VAC User configurable (alarm, PID, system fault)</li> <li>- 1 x 0.5A 240VAC Automatic cleaning control</li> <li>- PTC resistor fuses in series with the relays</li> <li>- LED status indicators flash when relays are active</li> </ul>
<b>PC Communications</b>	<ul style="list-style-type: none"> <li>- USB (mini-USB connector)</li> </ul>
<b>Operating Conditions</b>	<ul style="list-style-type: none"> <li>- Ambient temperature: -10°C to +50°C (14°F to 122°F)</li> <li>- Transport: -20°C to +70°C (-4°F to 158°F)</li> </ul>
<b>Power Supply</b>	<ul style="list-style-type: none"> <li>- 115/230V AC selectable, 50-60Hz, 1A</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>- 25 VA (max.)</li> </ul>
<b>Certificates</b>	<ul style="list-style-type: none"> <li>- ISO 9001:2000, CE, ATEX I I 2 GD EExd-IIB-T5 I (option)</li> </ul>

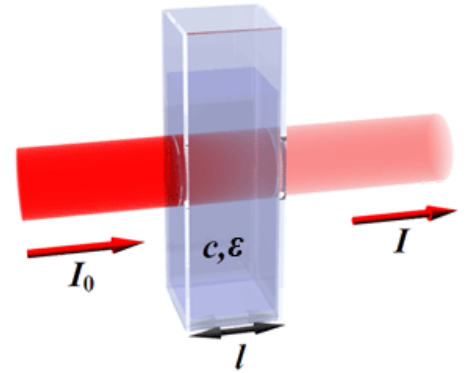


## Measuring Principle:

Fiber optics are used to shine a precisely focused light beam through the process medium and back to a silicon photo-detector. A second photo-detector is used directly on the lamps to compensate for temperature effects and aging. The resulting measurements are very accurate with low drift and long-term calibration stability.

The attenuation of the transmitted light beam caused by light absorbing substances in the process medium is mathematically described by the Beer-Lambert law.

Applying the Beer-Lambert law (below), the concentration of the sample can be calculated.



$$A = \epsilon l c$$

Where:

A	=	absorbance (= - log transmittance)
$\epsilon$	=	molar absorptivity coefficient
l	=	optical path length
c	=	concentration of absorbing species

The Kemtrak DCP007 photometer measures at two wavelengths. A primary "absorbing" wavelength is used to measure the substance being monitored while a "non absorbing" reference wavelength is used to compensate for turbidity, air bubbles and/or fouling.

