KEMTRAK

TC007
Industrial Turbidimeter

FEATURES

- ISO 7027 compliant
- High performance LED light source
- Real time inline measurement
- Suitable for hazardous area use
- Alarm, 4-20 mA and Modbus TCP communications
- Supports QuickCal verification & calibration

The Kemtrak TC007 is an industrial fiber optic coupled turbidimeter for high resolution, real time, inline concentration measurement. Measurement capability is from ultra clear liquids to high concentration slurries and emulsions.
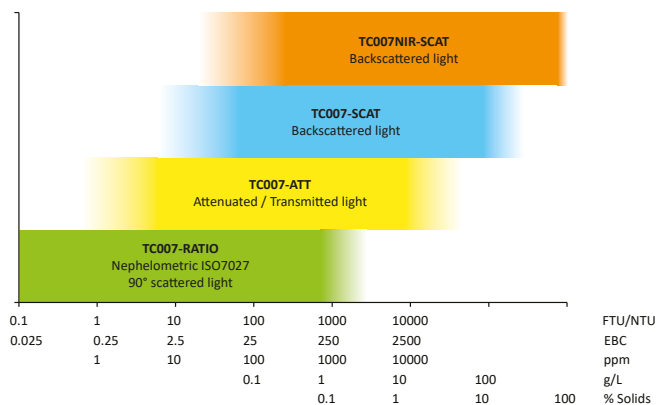
A high performance LED light source with robust fiber optics assures drift free operation with exceptionally high precision. Industrial-grade measurement cells and probes with scratch-resistant sapphire windows contain no electronics or moving parts, making them ideal for high-temperature and hazardous area use. All wetted materials are FDA compliant, assuring compatibility in sanitary processes.

For ultra precise measurement of low turbidities (0.01 – 1 000 NTU) in accordance with ISO 7027, our measurement cells will compensate for sample color and fouling of the optical windows in real time to assure reliable and trouble free operation. High concentration suspended solids (exceeding 80% solids) are reliably measured by a precision backscatter probe that will not go blind at high optical densities.

QuickCal validation and calibration accessories simplify the procedure of instrument calibration and verification by removing the time-consuming and hazardous task of handling liquid standards.

Kemtrak TC007 Measurement Range

				TC007NIR-SCAT Backscattered light				
			TC007-SCAT Backscattered light					
		TC007-ATT Attenuated / Transmitted light						
TC007-RATIO Nephelometric ISO7027 90° scattered light								

0.1	1	10	100	1000	10000			FTU/NTU
0.025	0.25	2.5	25	250	2500			EBC
	1	10	100	1000	10000			ppm
			0.1	1	10	100		g/L
				0.1	1	10	100	% Solids

Standard features include 16 separate linearization/calibration tables for multiple product operation, remote zeroing, automatic cleaning cycle operation and advanced signal filtering. An on-board graphical internet based configuration utility allows remote operation, calibration, verification, and data trending using a standard PC.

All Kemtrak products are designed to meet the most demanding application specifications and are made from the highest quality materials to ensure exceptionally long life and the highest reliability.

TYPICAL APPLICATIONS:

- Filtration monitoring
- Centrifuge control
- Cell & biomass density
- Crystallization control
- Phase separation
- Water clarity
- Concentration measurement
- Leak, carryover & interface detection

TC007
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TECHNICAL DATA

HOUSING

Stainless steel EN 1.4301 (X5CrNi18-10), AISI 304 (V2A)
Cam lock with double bit insert & external mounting brackets
224 x 215 x 125 mm (L x W x D)
IP 65 / EN 60529

DISPLAY

16 x 4 alphanumeric white on blue dot matrix LCD display
LED background illuminated
Measurement updates every second

LED 1 (green):	Power on
LED 2 (red):	System fault
LED 3 & 4 (orange):	Alarm 1 & Alarm 2
LED 5 (blue):	Clean / Hold

OPERATION

Menu based with 4 operator buttons
Remote HTML/Java interface (TCP/IP connection via Ethernet port)

SOFTWARE FEATURES

Auto gain:	Fully automatic signal gain controller
Auto zero:	Automatically, locally or remotely activated zero
Calibration:	16 linearization tables for concentration & mA output
Damping:	From 0 to 9999 s with noise (air bubble / particle) filter
Memory:	Nonvolatile - all data retained upon power failure
Security:	Alphanumeric password protection

DATA LOGGER

>17000 data points (timestamp, average, max. & min.), ring buffer
Configurable log time interval 1 s to 24 hr

EVENT LOGGER

>16000 events, ring buffer
Timestamp, alarms, zeroing, cleaning, product change, calibration &
system events (power, system warning & error messages)

AUTOMATIC CLEANING CONTROL

Automatic cleaning sequence, triggering dedicated relay output
Manual trigger or external trigger via digital input
Configurable automatic cleaning interval, 15 min to 2 months
Configurable cleaning duration from 0 to 9999 s
Auto-zero after clean option
Hold value during clean 0 to 9999 s
Hold value after clean (to equilibrate) 0 to 9999 s

REMOTE INPUT

5 x Digital input (potential free contact) for:

Input 1-3:	Product/range selection
Input 4:	Zero, instant zero, clean or clean & Zero
Input 5:	Hold (freeze output), data log or light source control

MEASUREMENT METHOD

Attenuated light, scattered light or a combination of both using a
nephelometric ratio algorithm
ISO7027:1999(E) compliant when measuring scattered light at 90°

InGaAs or silicone near infrared (NIR) photodiode.

High-performance TS AlGaAs NIR LED light source

Wavelength range:	TC007	850 nm
	TC007NIR	1440 nm

Other wavelengths available upon request
Typical LED lifetime: >10 years

RANGE OF MEASUREMENT

TC007-ATT	0 – 5 OD (10 mm OPL)
	0 – 100 OD (0.5 mm OPL)
	0 – 10 % solids
	0 – 10000 FTU
TC007-RATIO	0 – 1000* FTU
	0 – 250 EBC
TC007-SCAT	0.001% (ca. 10 FTU) – 10 % solids
TC007NIR-SCAT	0.001 % (ca. 10 FTU) – >80 % solids

Other measurement units include AU, ASBC-FNU, ppm etc.
* Range can be extended to 4000 FTU using a shorter OPL

RESOLUTION

Typically < ± 0.05 % of respective measuring range
For Scattered light (90°) measurement:

0.01 – 10 FTU	0.01 FTU (0.0025 EBC)
10 – 100 FTU	0.1 FTU (0.025 EBC)
100 – 1000 FTU	1 FTU (0.25 EBC)

REPEATABILITY

< ±1% of reading or 0.01 FTU, whichever is greater

ACCURACY

< ±2% of reading plus stray light
Stray light typically < 0.05 FTU

mA OUTPUT

1 x selectable 0 – 20 mA / 4 - 20 mA
NAMUR NE43 compliant
Galvanically isolated, 500 VDC

Accuracy:	<0.1 %
Resolution:	0.025 %
Load:	0 – 600 Ohm

Optional second mA output

RELAY OUTPUTS

1 x 1 A 240 VAC Failsafe output (active when system is ok)
2 x 1 A 240 VAC User configurable (alarm, PID)
1 x 1 A 240 VAC Automatic cleaning control
Fuses: 4 x 1 A (type: MXT), max 100 A breaking capacity
LED status indicators flash when relays are active

FAIL-SAFE

Dedicated relay output, 1A 240 VAC
mA output value used to signal a system fault
mA outputs compliant to NAMUR NE43

NETWORK INTERFACE
(REMOTE COMMUNICATIONS)

TCP/IP, 10Base-T and 100Base-TX Link
Connector: RJ45
Protocol:
1. HTML interface using native protocol over TCP/IP
   Java® version 8 update 202 or later required
2. MODBUS slave over TCP/IP (V1.1b3 compliant)
   Functions: (0x03, 0x04, 0x2B/0x0E - conformity 0x01)

OPERATING CONDITIONS

Ambient temperature:	0 °C to +50 °C (32 °F to 122 °F)
Transport:	-20 °C to +70 °C (-4 °F to 158 °F)

POWER SUPPLY

100-240 VAC, 50-60 Hz & 22 - 30 VAC/VDC, 25 VA (max.)
Mains fuse: 1 A (type MST), Max breaking capacity 35 A

CERTIFICATES

CE & RoHS compliant

PROCESS MEASUREMENT CELL

PROCESS CONNECTION

Standard designs include DIN Flange
(DIN 2633), ANSI (ASME B16.5),
Tri-Clamp® (ISO 2852 & DIN 32676),
Straight pipe thread (DIN ISO 228 BSP),
NPT tapered pipe thread (ANSI B 1.20.1),
single use barbed hose.
Line size up to DN200 / 8".

MATERIALS

Wetted surfaces in stainless steel
EN 1.4435 or EN 1.4404 (316L). Other
materials include Titanium Gr 2, Hastelloy
C-276 & C-22, Monel 400 & PTFE C25
(TFMC, carbon filled Teflon®), PPSU.

WINDOW

Sapphire, UV fused silica.

SURFACE FINISH

Fine machine (smooth).
Ra <0.38 µm (electropolished) wetted
surfaces on hygienic measurement cells.

ELASTOMERS

FPM (FKM/Viton®, FDA), FFKM (Chemraz®/
Kalrez®, FDA), EPDM (FDA).

OPERATING CONDITIONS

Ambient & process temperatures up to
275 °C (527 °F). Process pressure from
10 mbar to 200 bar (0,14 – 2900 psi).

Operating conditions subject to material
and design in use. Higher pressures &
temperatures on request.

FIBER OPTIC CABLE

Silica core photonic fiber with Kevlar®
reinforced flexible LZSH coated stainless
steel jacket. Fully-interlocked stainless steel
conduit for use above 85 °C (185 °F).
Terminated with SMA 905 connectors.
Lengths up to 100 m (328 foot).

PROTECTION

IP66 / EN 60529

Kemtrak is the leading manufacturer of
high performance LED based industrial
photometers and automation products for the
process engineering industry.

Kemtrak provides tailor made solutions to
meet the needs of a wide range of industries
including chemical, petrochemical & offshore,
biotech, pharmaceutical, food & beverage,
pulp and paper and water & environment.

Kemtrak has trained representatives and
support personnel globally and is certified
according to ISO 9001:2015.