# SPECIFICATIONS

PARTICLE SENSOR

KS-18FX

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# Outline

The KS-18FX is a sensor which uses the light scattering method for measuring the particle number concentration in liquid. The particle count is determined for various sizes. Sample fluid contacting parts are made of sapphire and PFA, allowing direct measurement of hydrofluoric acid.

By connecting the KS-18FX to the controller KE-40B1, a liquid-borne particle counter system with up to ten size ranges can be created.
Using the KE-40B1, it is also possible to freely specify the size ranges 0.04 μm to 0.15 μm for particle detection. The factory default setting is four channels (≥0.04 μm, ≥0.08 μm, ≥0.1 μm, ≥0.15 μm).

The rated flow rate is 10 mL per minute, and counting efficiency is 3%. The effective flow rate at which particles are detected and measured is the rated flow rate multiplied by the counting efficiency, i.e. 0.3 mL per minute.

The KS-18FX does not have measurement controls or a display for measurement results. It is designed to be used under control of a separate controller KE-40B1 which also supplies power to the KS-18FX.
The KS-18FX incorporates a leak sensor. If a leak is detected, an alarm output can be activated.
As the KS-18FX does not incorporate a flow control circuit for the sample fluid, the flow rate of the sample fluid must be controlled by external means.

# Specifications

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| Optical system | 90° sideway light scattering method |
| Light source | Diode pumped solid state laser<br>(rated output 500 mW; wave length 532 nm) |
| Laser product class | |
| | Class 1, IEC 60825-1 (2007)<br>Internal particle detection mechanism uses Class 4 laser |
| Collecting optics | Spherical lens |
| Light detector | Silicon photodiode |
| Allowable sample fluid type | |
| | Fluids which do not corrode the fluid contact materials |
| Calibration | By polystyrene latex (PSL) particles with refractive index 1.6 in pure water<br>The particles for calibration are traceable to the NIST (National Institute of Standards and Technology) standard |
| Minimum detectable particle size | |
| 0.04 μm (with spherical particles of refractive index 1.6 in pure water) | |
| Measurable particle size range | |
| | 0.04 μm to 0.15 μm (with spherical particles of refractive index 1.6 in pure water) |
| Size range | Freely settable to 0.04 to 0.15 μm<br>(Up to 10 channels in 0.01 μm steps can be set with controller |

KE-40B1. Upper limit for smallest particle size channel (CH 1) is 0.08 μm)
The factory default setting is four channels (≥0.04 μm, ≥0.08 μm, ≥0.1 μm, ≥0.15 μm)

Flow rate: 10 mL/min

Sample inlet (INLET) / sample outlet (OUTLET)
2×4 dia. flared tube joint

Purge gas

In the cases listed below, the interior of the unit should be cleaned with purge gas to prevent adverse effects on the optical system and electrical circuitry

If the optional purge air unit is installed, there is no need to supply purge gas

- If the cleanliness of usage environment is lower than classification of air cleanliness class 6 defined by ISO 14644-1.
- If the temperature of the sample fluid is lower than the environmental temperature, so that moisture condensation may occur on the flow cell.
- If there is the possibility that corrosive gases in the vicinity may intrude into the unit.
- If there is the possibility that corrosive gases in the sample fluid may permeate through the internal tube.

Purge air port: One-touch type joint for dia. 6 tube

Purge gas requirements

- Dry clean air or nitrogen gas
- Temperature +15°C to +35°C
- Flow rate 5 L/min to 10 L/min

Sample pressure range
300 kPa or less (gauge pressure)

Sample temperature range
+15°C to +35°C (no moisture condensation on fl ow cell)

Materials of parts exposed to sample
Sapphire, PFA

Counting efficiency: 3% ±1% (Determined by comparative measurement with suspension of 0.15 μm range PSL particles in fluid with refractive index of 1.26 to 1.43 related to the light source wavelength, using standard unit (particle counter))

Effective sampling flow rate
0.3 mL ± 0.1 mL/min (Determined by comparative measurement with suspension of 0.15 μm range PSL particles in fluid with refractive index of 1.26 to 1.43 related to the light source wavelength, using standard unit (particle counter))

Maximum particle number concentration
30,000 particles/mL (coincidence loss is 10% or less)

False count rate: Average 0.6 particles/mL or less (measured with light source off, in order to limit measurement to noise from sources other than

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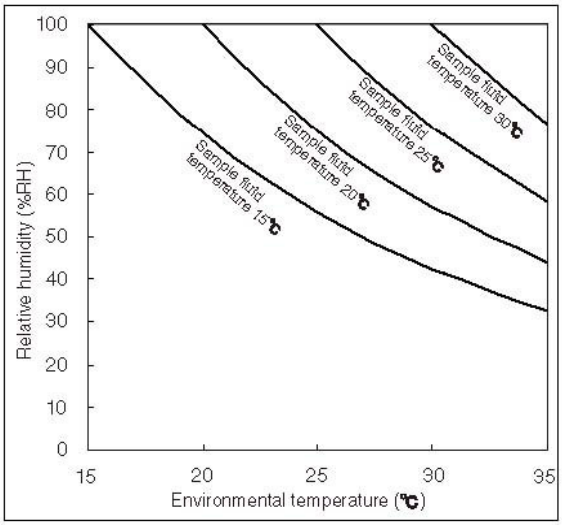
| | particles) |
| Warm-up time | Max. 15 minutes (after power-on)<br>Max. 5 minutes (from receiving laser-on command in measurement pause/laser off condition) |
| Indicators | Two color light emitting diode |
| PARTICLE MONITOR | Briefly fl ashes green when particles of minimum detectable particle size or above are detected |
| LIQUID LEAK | Lit (green) during normal operation<br>Lit (red) when leak is detected within chassis |
| CELL | Lit (green) during normal operation<br>Lit (red) when flow cell is contaminated, condensation occurs or particle number concentration in sample fluid exceeded maximum particle number concentration<br>Off when light source is off |
| LASER | Lit (green) during normal operation<br>Flashing (green) when laser current has increased above a certain threshold (light source nearing end of service life; maintenance within 1 month recommended)<br>Lit (red) when light source temperature is not normal<br>Flashing (red) when light source output is not normal<br>Off when light source is off |
| POWER | Lit (green) while power to unit is on |
| Input/output connectors | |
| CONTROLLER | For connection of controller KE-40B1 |
| LIQUID LEAK ALARM | Shorted during normal operation, open when internal leak is detected (accepts electric wire with a 1.25 $mm^2$ cross section (AWG16))<br>Maximum load: 30 V DC, 1 A |
| Installation inclination angle | Max. 2° (range for normal operation of internal leak sensor) |
| Environmental conditions for operation | +15°C to +35°C, 80% RH or less. (no condensation)<br>The graph below plots environmental temperature and relative humidity for different sample fluid temperatures. In the region to the top right of the respective curve, condensation on the flow cell may occur |

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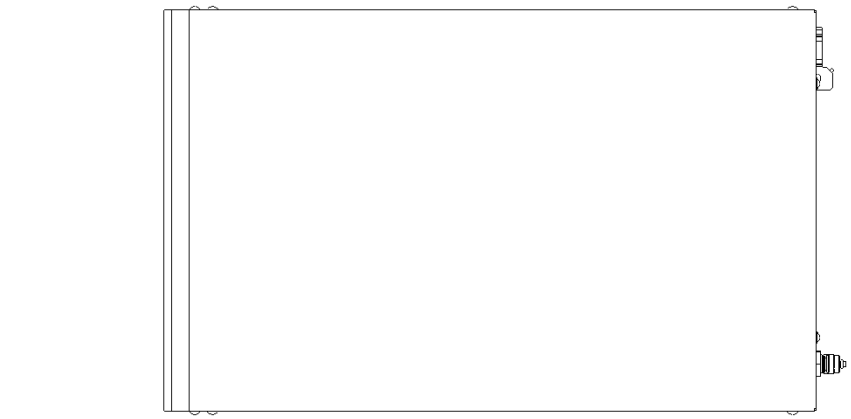
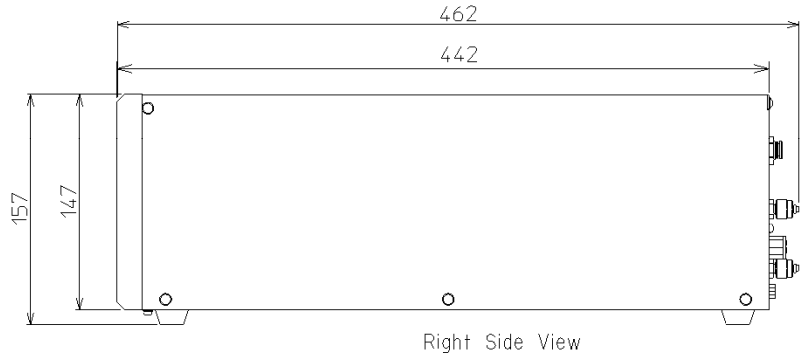
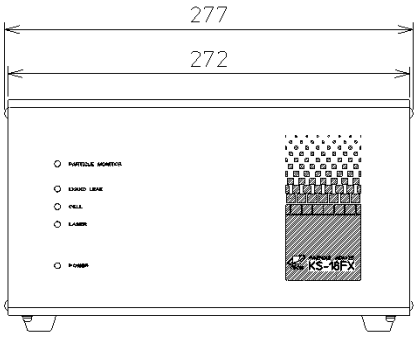
| Environmental conditions for storage | | |
| | -10°C to +50°C, 90% RH or less. (no condensation and no freezing in internal piping) | |
| Power | 12 V DC (supplied via controller KE-40B1) | |
| Electric power consumption | | |
| | 90 VA | |
| Environmental Requirements | | |
| Operation Environments | | |
| | Indoor Use Only | |
| Altitude | Up to 2000 m | |
| Overvoltage Category | Ⅱ (when connected to controller KE-40B1) | |
| Pollution Degree | 2 | |
| Protection Class | Ⅰ | |
| Dimensions | 157 (H) × 277 (W) × 462 (D) mm (maximum) | |
| | 147 (H) × 272 (W) × 442 (D) mm (excluding protruding parts) | |
| Weight | Approx. 12 kg | |
| Supplied Accessories | Tube A vacuum pack | 1 |
| | (2×4 dia., 1.5 m flared PFA tube 2, union joint 1) | |
| | Connection cable A (1 m) KS-42-125 | 1 |
| | Instruction manual | 1 |
| | Instruction sheet for “Transport and Installation” | 1 |
| | Liquid-borne particle counter usage precautions | 1 |
| | Inspection certificate | 1 |
| Options | Controller KE-40B1 | |
| | Purge air unit | |
| Replacement of consumables | | |
| | Laser, Flow cell, Air packing for the case | |
| Calibration interval | One year | |



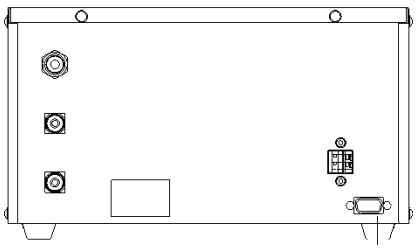
Top View




Right Side View




Front View



Rear View

Unit: mm

Dimensional drawings

Specifications Subject to change without notice