

# COOL-11000L(C)(W)

Cooled 11 MPixel Ultra-High Resolution  
CCD Camera with 12-bit Digital-Output

Air Cooled



Water Cooled

## Features

- 4024 (H) x 2680 (V) square pixels
- 1.6 frames/sec.
- Effective camera dynamics  $\geq 1:1300$  ( $\geq 62$  dB)
- **Air** or **water** cooled
- Peltier cooled down to 0°C (air) or -10°C (water)
- Asynchronous shutter up to 1/1000 sec.
- Interline-transfer sensor (36 x 24 mm)
- Digital RS-644 output with 12-bit (LVDS)
- Optional: color sensor (Bayer filter)

The **COOL-11000** offers the possibility of longer exposure times even at a high resolution.

The **COOL-11000** is offered in different versions:

- **COOL-11000L** with a cooling down to 0°C by fan cooling
- **COOL-11000LW** with a cooling down to an absolute temperature of -10°C by water cooling
- **COOL-11000LC** color version of COOL-11000L
- **COOL-11000LCW** color version of COOL-11000LW

When cooling the camera down to 0°C, an exposure time of 60 sec. is achievable at an acceptable noise level (hot pixels).

The cooling down to -10°C enables you to more than double the longest possible exposure time at the same noise level.

By means of the very big sensor in 35 mm format (36 x 24 mm) many applications can be much better realized than by smaller sensors. In addition to the 35 mm format many F-mount lenses are available without any changing in the illustration scale.

By means of the progressive interline transfer sensor very short exposure times up to 1/1000 sec. can be achieved at a full resolution. The exposure time can be regulated in steps of approx. 232 µs. Due to the asynchronous operation (image on demand) the exposure starts 15 µs after an external trigger pulse. Therefore the camera is especially useful for recording moved objects.

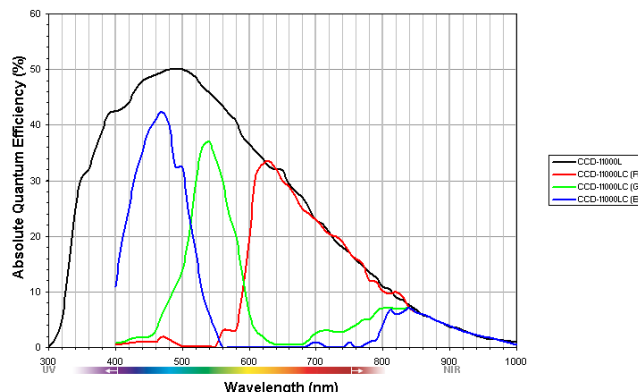
The effective dynamic of the complete camera

$$D = \frac{Sat_{(count)} - Dark_{(count)}}{RMSNoise_{(count)}}$$

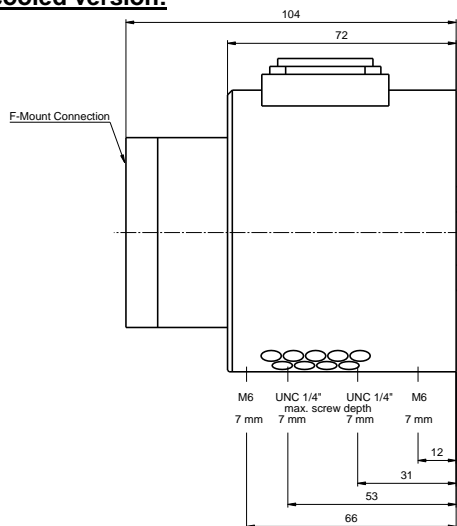
is more than 1300 and therefore offers reserves even at difficult lighting conditions or very short exposure times. The RS-644 digital output supplies image data with 12-bit precision. The **COOL-11000** is mostly identical regarding the mechanic and pin-compatible to the CCD-1300 camera line.

- Lens mount: F-mount
- Optional: color sensor (Bayer filter)
- CE standard
- Made in Germany

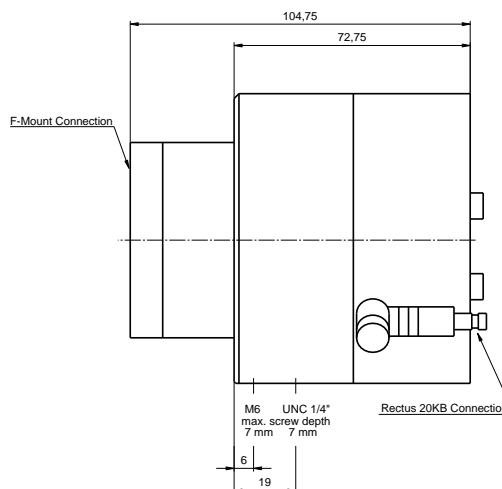
**Spectral sensitivity**



**Air cooled version:**



**Water cooled version:**



**Technical Data**

- Resolution: 4024 (H) x 2680 (V) pixels
- Progressive scan
- Image rate: up to 1.6 frames/sec. (4024 x 2680) or up to 3.2 frames/sec. (4024 x 1340)
- Pixel size: 9 µm x 9 µm
- Active sensor size: 36.18 (H) mm x 24.12 (V) mm
- Interline transfer sensor (no mech. shutter required)
- Electronic shutter up to 1/1000 sec.; adjustable in 232 µs steps
- Air-cooled: Exposure time up to 60 sec.
- Water-cooled: Exposure time up to 120 sec., if the water temperature is < 18°C
- Image on demand
- Effective dynamics: ≥ 1:1300 (≥ 62 dB)
- Sensor saturation: ≥ 60,000 e
- Readout noise: ≤ 45e
- Dark current: 0.2 e / pixel / sec.
- Anti-blooming circuit
- Digital output: 12-bit, RS-644 (LVDS)
- Frame system: 2732 lines
- Pixel clock: 21 MHz
- Video gain: 1 or 2 (+ 6 dB)
- Power supply: + 12 V (SELV), max. 2.7 A
- Ambient air temperature: 0° to 40° C