

FluorCam FC 800-C/1010-S, GFPCam FC 800-C/1010-GFP

CCD Detector			
Camera	High resolution CCD camera TOMI-2		
Resolution	1 360 × 1 024 pixels		
A/D Converter Resolution	16 bit (65 536 grey levels)		
Pixel Size	6.45 μm × 6.45 μm		
Frame Rate	20 frames per second for full resolution		
CCD Detector Wavelength Range	400 – 1 000 nm		
Spectral Response	QE max at 540 nm (~72%), 50% roll-off at 350 nm and 800 nm		
Read-Out Noise	< 8 electrons RMS		
Full-Well Capacity	> 22 000 electrons		
Dynamic Range	65 dB		
Connectivity	Control and data: Gigabit Ethernet		
Operating Modes	Video (ChIF), Snapshot (long integration times for fluorescence proteins detection)		
Lights	FC 800-C/1010-S		FC 800-C/1010-GFP
Light Sources	Red-Orange (619 – 626 nm) Cool White (6 500 K CCT)		Red-Orange (619 - 626 nm) Royal Blue (444 - 464 nm)/opt. Blue (460 – 470 nm)
Super Pulse Intensity	4 000 μmol.m ⁻² .s ⁻¹ (optional light upgrade: 6 000 μmol.m ⁻² .s ⁻¹)		4 000 μmol.m ⁻² .s ⁻¹ (optional light upgrade: 6 000 μmol.m ⁻² .s ⁻¹)
Actinic Light Intensity	Up to 2 000 μmol.m ⁻² .s ⁻¹ (optional light upgrade: 3 000 μmol.m ⁻² .s ⁻¹)		Up to 2 000 μmol.m ⁻² .s ⁻¹ (optional light upgrade: 3 000 μmol.m ⁻² .s ⁻¹)
Optional: Single Turnover Flash	120 000 μmol. m ⁻² . s ⁻¹ in 100 μs pulse (QA re-ox)		120 000 μmol. m ⁻² . s ⁻¹ in 100 μs pulse (QA re-ox)
Optional: 1 additional Light Pannel	UVA (395 - 410 nm) UVB (303 - 317 nm) Far-Red (720 – 740 nm) NDVI: Deep-Red (635-666 nm)/Far-Red (720 – 740 nm)		UVA (395 - 410 nm) UVB (303 - 317 nm) Far-Red (720 – 740 nm) NDVI: Deep-Red (635-666 nm)/Far-Red (720 – 740 nm)
Emission Filters	FC 800-C/1010-S		FC 800-C/1010-GFP
Detection Channels	1, for Chlorophyll Fluorescence Emission Up to 6 Selected Emission Filters in an optional Filter Wheel		2, for Chlorophyll & GFP Fluorescence Emission Up to 5 Selected Emission Filters in a Filter Wheel
Chlorophyll Emission Filter	695 - 770 nm		695 - 770 nm
GFP Emission Filter	-		517/20 nm (optional 513/13 nm)
Optional: Filters for Multicolor	440/40, 520/28, 690/8, 747/33 nm		440/40, 520/28, 690/8, 747/33 nm
Optional: Filter for NDVI	Glass		Glass
Lens	SV-0614H	SV-0814H	SV-1214H
Focal Length	6 mm	8 mm	12 mm
Brightness	F1.4 ~ 16	F1.4 ~ 16	F1.4 ~ 16
Field of View	90 × 90 mm	90 × 90 mm	90 × 80 mm
Technical Data			
Sample Height	150 mm		
Dimensions (W × H × D)	472 × 513 × 479 mm		
Weight (C/L)	35 kg		
Electrical	88 – 264 V AC		
Power Consumption	240 - 300 W		
Operating Conditions	0 to 90% (non-condensing)		
Software			
FluorCam10	- fully automated control of FC device - image acquisition <i>via</i> automated experimental protocols - numerous image manipulation tools - automated data analysis and parameters computation (F₀, F_M, F_V, F₀['], F_M['], F_V['], F_T, F_V/F_M, F_V[']/F_M['], ΦPSII, NPQ, qN, qP, Rfd, ...		

FluorCam FC 800-C/1010-S with the FAST camera

Global Shutter CMOS Sensor	
Camera	FAST CMOS camera (TOMI-3)
Resolution	1.3 M pixel sensor
A/D Converter Resolution	12 bit (4096 grey levels)
Pixel Size	6.6 μm $\times$ 6.6 μm
Frame Rate	full resolution: 1 000 images per second – frame period 1000 μs – resolution 1280 $\times$ 1020 binning mode: 2 000 images per second - frame period 500 μs – resolution: 640 $\times$ 510 pixels 3 333 images per second - frame period 300 μs – resolution: 640 $\times$ 381 pixels 10 000 images per second - frame period 100 μs – resolution: 640 $\times$ 123 pixels 50 000 images per second - frame period 20 μs – resolution: 640 $\times$ 21 pixels
CMOS Detector Wavelength Range	400 – 1 000 nm
Spectral Response	QE max at 550 nm (50%)
Read-Out Noise	< 25 electrons RMS
Full-Well Capacity	> 17 000 electrons (unbinned)
Dynamic Range	57 dB
Connectivity	Control and data: Gigabit Ethernet
Operating Mode	Real
Lights	
Light Sources	Red-Orange (610 - 620 nm) Cool White
Super Pulse Intensity	4 000 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$ (optional light upgrade: 6 000 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$)
Actinic Light Intensity	Up to 2 000 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$ (optional light upgrade: 3 000 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$)
Optional: additional Light Pannel	Far-Red 740 nm
Emission Filters	
Detection Channels	1, for Chlorophyll Fluorescence Emission
Chlorophyll Emission Filter	695 - 770 nm
Lens	
Lens Type	SV-0614H
Focal Length	6 mm
Brightness	F1.4 ~ 16
Field of View	90 $\times$ 90 mm
Technical Data	
Sample Height	150 mm
Dimensions (W $\times$ H $\times$ D)	472 $\times$ 513 $\times$ 479 mm
Weight (C/L)	35 kg
Electrical	88 – 264 V AC
Power Consumption	240 - 300 W
Operating Conditions	0 to 90% (non-condensing)
Software	
FluorCam10	- fully automated control of FC device - image acquisition <i>via</i> automated experimental protocols - numerous image manipulation tools - automated data analysis and parameters computation (F_0, F_M, F_V, F_0', F_M', F_V', F_T, F_V/F_M, F_V'/F_M', ΦPSII, NPQ, qN, qP, Rfd, ...)

Thermoregulator TR 6000

Parameters		
Thermoregulation system	200 W Peltier element	
Range (ambient temperature around 23°C)	18°C - 75°C	
Control accuracy	0.1°C	
Regulation accuracy and Temperature uniformity	0.1°C at < 20°C 0.1°C at 30°C 0.4°C at 70°C	0.1°C at < 20°C 0.3°C at 30°C 0.5°C at 70°C
Time of heating	< 3 min (20°C to 70°C)	
Thermoblock Module		
Type	TB-48W	
Capacity	48 wells	
Well operating volume, dimensions	400 µL, Ø 10.3 mm and depth 10 mm	
Size (h × l × d), Weight	74 mm × 127 mm × 85 mm, 1.3 kg	
Thermoregulator Unit		
Size (h × l × d)	88 mm × 192 mm × 151 mm, 1.5 kg	
Communication port	USB mini	
PC Requirements		
Operating system	Windows 10	
Communication port	USB 2.0	
Compatibility with FluorCam 10 SW	Memory RAM 16 GB, Storage 256 GB SSD + 1 TB HDD, Processor > i3, Gigabit Ethernet	
Software		
Thermoregulator GUI	For online monitoring and control of Thermoregulator TR6000 • Manual Mode with slope or time control regime • Protocol Mode for automatic control of the user defined regulation course • time range of Manual Mode 1s – 60 min (longer in Protocol Mode) • automatic start of the FC protocol at the user defined time of the thermoregulation protocol • automatic transfer of the temperature course of the regulation to the measured FC data • automatic saving of the temperature course of the regulation to a file	
FluorCam 10	• fully automated control of FC device • image acquisition via automated experimental protocols • numerous image manipulation tools • automated data analysis and parameters computation	
	Fluorescence Parameters: Measured: F ₀ , F _M , F _V , F _{0'} , F _{M'} , F _{V'} , F _T , calculated: F _V /F _M , F _{V'} /F _{M'} , Φ _{PSII} , NPQ, qN, qP, Rfd, ...	
Technical Data		
Electrical	110 - 240 V AC	
Max. power consumption	Max. 240 W	
Operating temperature	5 - 40°C	
Operating humidity	0 to 90% (non-condensing)	
Accessories		
Customized FC shelf	Required for use in FC 800	
Plastic inserts	Expand operating volume up to 850 µL	