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Technical Query

CCD cameras for diagnostics

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Category A - cameras without glass protecting sensor

Table 1: Item type 1.

Number of devices	50
Sensor type	CCD (Without glass protecting sensor*)
Area / line	Area
Color / monochromatic	Monochromatic
Physical case	Yes, with housing
Lens mount	C-mount
Radiometric resolution (min.)	12 bit
Interface	GigE
Power supply	PoE and external power source
Operating system compatibility	Linux 64-bit
Standard compliance	GenICam
Spatial resolution - active area (min.)	1,25 Mpx
Sensor size (optical)	$1/3'' \leq \text{size} \leq 2/3''$
Hardware triggering (external signal)	Yes (TTL)
Include power supply	Yes
Include cable for triggering	Yes
Include cable for power supply	Yes
Programmable exposure control	Yes
Shutter	Global

Category B - CoaXPress cameras with large sensor

Table 2: Item type 6.

Number of devices	2
Sensor type	CCD
Area / line	Area
Color / monochromatic	Monochromatic
Interface	CoaXPress
Spatial resolution (min.)	4 Mpx
Hardware triggering (external signal)	Yes
Frame rate at full resolution (min.)	10 fps
Sensor size (optical)	$> 1''$
Radiometric resolution (min.)	8 bit
Programmable exposure control	Yes
Lens mount	C-mount / CS-mount
Include power supply	Yes
Include cable for triggering	Yes
Physical case	Yes, with housing

* Protective glass must be either removed and per-piece checked afterwards or the CCD is provided without the protective glass „out of a box“.

Table 3: Item type 7.

Number of devices	1
Sensor type	CMOS
Area / line	Area
Color / monochromatic	Monochromatic
Interface	CoaXPress
Spatial resolution (min.)	4 Mpx
Hardware triggering (external signal)	Yes
Frame rate at full resolution (min.)	60 fps
Sensor size (optical)	> 1"
Radiometric resolution (min.)	8 bit
Programmable exposure control	Yes
Lens mount	C-mount / CS-mount
Include power supply	Yes
Include cable for triggering	Yes
Physical case	Yes, with housing

Category C - cameras with standard sensor size with dimension limitations

Table 4: Item type 2.

Number of devices	4
Sensor type	CCD
Area / line	Area
Color / monochromatic	Monochromatic
Interface	GigE
Spatial resolution (min.)	2 Mpx
Hardware triggering (external signal)	Yes
Frame rate at full resolution (min.)	10 fps
Radiometric resolution (min.)	12 bit
Physical dimensions - width (max.)	45 mm
Physical dimensions - height (max.)	45 mm
Physical dimensions - depth (max.)	45 mm
Sensor size (optical)	$1/3'' \leq \text{size} \leq 2/3''$
Programmable exposure control	Yes
Lens mount	C-mount / CS-mount
Include power supply (if needed)	Yes
Include cable for triggering	Yes
Physical case	Yes, with housing

Table 5: Item type 3.

Number of devices	2
Sensor type	CCD
Area / line	Area
Color / monochromatic	Color
Interface	GigE
Spatial resolution (min.)	2 Mpx
Hardware triggering (external signal)	Yes
Frame rate at full resolution (min.)	10 fps
Radiometric resolution (min.)	12 bit
Physical dimensions - width (max.)	45 mm
Physical dimensions - height (max.)	45 mm
Physical dimensions - depth (max.)	45 mm
Sensor size (optical)	$1/3'' \leq \text{size} \leq 2/3''$
Programmable exposure control	Yes
Lens mount	C-mount / CS-mount
Include power supply (if needed)	Yes
Include cable for triggering	Yes
Physical case	Yes, with housing

Table 6: Item type 4.

Number of devices	4
Sensor type	CMOS
Area / line	Area
Color / monochromatic	Monochromatic
Interface	GigE
Spatial resolution (min.)	5 Mpx
Hardware triggering (external signal)	Yes
Frame rate at full resolution (min.)	10 fps
Radiometric resolution (min.)	12 bit
Physical dimensions - width (max.)	45 mm
Physical dimensions - height (max.)	45 mm
Physical dimensions - depth (max.)	45 mm
Sensor size (optical)	$1/3'' \leq \text{size} \leq 2/3''$
Programmable exposure control	Yes
Lens mount	C-mount / CS-mount
Include power supply (if needed)	Yes
Include cable for triggering	Yes
Physical case	Yes, with housing

Table 7: Item type 5.

Number of devices	2
Sensor type	CMOS
Area / line	Area
Color / monochromatic	Color
Interface	GigE
Spatial resolution (min.)	5 Mpx
Hardware triggering (external signal)	Yes
Frame rate at full resolution (min.)	10 fps
Radiometric resolution (min.)	12 bit
Physical dimensions - width (max.)	45 mm
Physical dimensions - height (max.)	45 mm
Physical dimensions - depth (max.)	45 mm
Sensor size (optical)	$1/3'' \leq \text{size} \leq 2/3''$
Programmable exposure control	Yes
Lens mount	C-mount / CS-mount
Include power supply (if needed)	Yes
Include cable for triggering	Yes
Physical case	Yes, with housing

Table 8: Item type 8: ambient air target alignment cameras

Number of devices	10
Sensor type	CCD or CMOS (choose cheapest)
Area / line	Area
Color / monochromatic	Monochromatic
Interface	GigE preferred (USB 3.0 OK)
Diagonal sensor size	Less than 0.4". Greater than 0.2".
Spatial resolution	At least 2 Mpx, with at least 1500 px in each dimension. Each pixel size should be less than 5 μm x 5 μm .
Radiometric resolution (min.)	12 bit
Programmable exposure control	Yes
Physical dimensions - height (max.)	40 mm
Physical dimensions - width (max.)	40 mm
Physical dimensions - depth (max.)	40 mm
Video output	Any format that can be displayed live

Table 9: Item type 9: in vacuum monitoring cameras

Number of devices	6
Sensor type	CMOS
Color / monochromatic	Monochromatic
Interface	Optical preferred if the additional price is not more than 150 Euro per camera. Otherwise GigE
Diagonal sensor size	Less than 0.4". Greater than 0.2".
Spatial resolution	At least 2 Mpx, with at least 1500 px in each dimension. Each pixel size should be less than 5 μm x 5 μm .
Frame rate at full resolution (min.)	10 fps
Radiometric resolution (min.)	12 bit
Programmable exposure control	Yes
Physical dimensions - height (max.)	40 mm
Physical dimensions - width (max.)	40 mm
Physical dimensions - depth (max.)	40 mm
Video output	Any format that can be displayed live
Max power consumption	3 Watts

Table 10: Item type 10: hardened sensors for active measurement (operating in atmosphere)

Number of devices	2
Sensor type	CMOS
Color / monochromatic	Monochromatic
Interface	Optical preferred if the additional price is not more than 150 Euro per camera. Otherwise GigE
Diagonal sensor size	Less than 0.4". Greater than 0.2".
Spatial resolution	At least 2 Mpx, with at least 1500 px in each dimension. Each pixel size should be less than 5 μm x 5 μm .
Hardware triggering (external signal)	Yes
Frame rate at full resolution (min.)	10 fps
Radiometric resolution (min.)	12 bit
Programmable exposure control	Yes
Physical dimensions - height (max.)	40 mm
Physical dimensions - width (max.)	40 mm
Physical dimensions - depth (max.)	40 mm
Kind of exposure	Global shutter (not rolling shutter)

Category D - USB 3.0 cameras with standard/large sensor*Table 11: Item type 11.*

Number of devices	12
Sensor type	CCD
Area / line	Area
Color / monochromatic	Monochromatic
Pixel size	<5µm
Radiometric resolution (min.)	12 bit
Interface	USB 3.0
Chip size (optical)	6 mm < diagonal < 10 mm; aspect ratio max. 3:2
Frame rate	>20fps
Triggering	External and internal

Table 12: Item type 12.

Number of devices	6
Sensor type	CCD
Area / line	Area
Color / monochromatic	Monochromatic
Pixel size	<6µm
Radiometric resolution (min.)	12 bit
Interface	USB 3.0
Chip size (optical)	10 mm < diagonal < 15 mm; aspect ratio max. 3:2
Frame rate	>10fps
Triggering	External and internal

Table 13: Item type 13.

Number of devices	2
Sensor type	CCD
Area / line	Area
Color / monochromatic	Monochromatic
Pixel size	<6µm
Radiometric resolution (min.)	12 bit
Interface	USB 3.0
Chip size (optical)	15 mm < diagonal < 20 mm; aspect ratio max. 3:2
Frame rate	>10fps
Triggering	External and internal

Table 14: Item type 14.

Number of devices	14
Sensor type	CMOS
Area / line	Area
Color / monochromatic	Monochromatic
Pixel size	<4µm
Radiometric resolution (min.)	8-12 bit
Interface	USB 3.0
Chip size (optical)	6 mm < diagonal < 10 mm; aspect ratio max. 3:2
Frame rate	>20fps
Triggering	External and internal

Table 15: Item type 15.

Number of devices	8
Sensor type	CMOS
Area / line	Area
Color / monochromatic	Monochromatic
Pixel size	<6um
Radiometric resolution (min.)	8-12 bit
Interface	USB 3.0
Chip size (optical)	10 mm < diagonal < 15 mm; aspect ratio max. 3:2
Frame rate	>20fps
Triggering	External and internal

Table 16: Item type 16.

Number of devices	4
Sensor type	CMOS
Area / line	Area
Color / monochromatic	Monochromatic
Pixel size	<4um
Radiometric resolution (min.)	8-12 bit
Interface	USB 3.0
Chip size (optical)	15 mm < diagonal < 20 mm; aspect ratio max. 3:2
Frame rate	>10fps
Triggering	External and internal

Category E - USB cameras with very large sensor

Table 17: Item type 17.

Number of devices	2
Sensor type	CCD
Area / line	Area
Color / monochromatic	Monochromatic
Pixel size	<20um
Radiometric resolution (min.)	16 bit
Interface	USB
Chip size (optical)	> 25 mm x 12.5 mm
Triggering	External and internal

Table 18: Item type 18.

Number of devices	3
Sensor type	CCD
Area / line	Area
Color / monochromatic	Monochromatic
Pixel size	<20um
Radiometric resolution (min.)	16 bit
Interface	USB
Chip size (optical)	> 25 mm x 25 mm
Triggering	External and internal