

# Part Numbers and Specifications

## Part No. List

### ● System Configuration Products

Name	Part No.	Content
LightPix AE20 Main Unit	ANE2000	Visual Field: 2 × 1.6 mm Installation Distance: 15 mm
	ANE2010	Visual Field: 10 × 8 mm Installation Distance: 45 mm
	ANE2020	Visual Field: 30 × 25 mm Installation Distance: 55 mm
	ANE2030	Visual Field: 80 × 70 mm Installation Distance: 170 mm
LightPix AE20 Optional Cables	ANE2803	For connection to Operation Unit Cable Length: 3 m
	ANE2823	For connection to RS-232C/ Operation Unit. Cable Length: 3 m
LightPix AE10 Operation Unit	ANE11	Setting device for parameter inputs (Accessories: installation fitting)
LightPix AE10 Finder Unit	ANE12	2-inch color LCD display (Accessories: installation fitting)
Mounting Bracket	ANE8870	—
AETOOOL	—	Settings Tool software

## General Specifications

### ● General Specifications

Item	Specification
Rated Operating Voltage	24 V DC
Operating Voltage Range	21.6 to 26.4 V DC (including ripples)
Rated Current Consumption	0.5 A max.
Ambient Temperature in Use	0 to +40°C
Storage Ambient Temperature	-20 to +60°C (no freezing or condensation)
Ambient Humidity in Use	35 to 85 %RH (at 25°C no freezing or condensation)
Storage Ambient Humidity	35 to 85 %RH (at 25°C no freezing or condensation)
Insulation Resistance	100 MΩ max. (500 VDC) *1
Breakdown Voltage	500 V AC/1 min (600 V AC/1 sec) *1
Noise Immunity	1000 V pulse width 50 ns/1 μs (using noise simulator method)
Protective Structure	IP67 *2
Weight	Approx: 300 g (Main Unit)
Vibration Resistance	10 to 55 Hz, 1 sweep/min, Double amplitude of 1.5 mm, 30 min. each in X, Y and Z directions
Shock Resistance	196 m/s <sup>2</sup> , 5 times each in X, Y and Z directions

Note \*1: Evaluation was carried out with the primary side power supply varistor and capacitor removed from the internal circuit of the device.  
Cutoff Current: 10 mA

Note \*2: Evaluation was carried out with the USB cable not connected and the waterproof cap in place. This product conforms to EU EMC standards (EN61000-6-4 and EN61000-6-2) in accordance with EMC Directive 89/336/EEC.

## Function Specifications

### ● Main Unit

Item	Specification				
Model	ANE2000	ANE2010	ANE2020	ANE2030	
	Installation Distance (mm)	15 - 0.5	45 - 2.5	55 - 5	170 (145 to 220)
	Visual Field (mm)	2 × 1.6	10 × 8	30 × 25	80 × 70 (70-86 to 100-80)*3
	Resolution (mm)	0.02	0.1	0.3	0.5
Photo Acceptance Unit	Color C-MOS 330,000 pixels				
Valid Pixels	352 horizontal × 288 vertical pixels (100,000 pixels)				
Image Capture Light Source	White LED				
Expected Life (Conditions)	SPEED	High with internal trigger (during continuous measurement)			
	Processing time at time of internal trigger *4	ANE201 *30 ms (exposure time 2 ms) ANE202 *30 ms (exposure time 3 ms) ANE203 *30 ms (exposure time 2 ms) ANE204 *30 ms (exposure time 3 ms)			
	Shutter timing and interlock (alteration possible from operation unit: 0.03 to 0.5 ms)	White LED			
	Visual Field Marker Light Source	Photo coupler input: 5 points, photoMOS relay output: 5 points			
Parallel	USB 1.1 (Windows XP/2000, ME, 98 (SE))				
USB	Usage possible with optional RS-232C cable				
Serial	Settings possible up to 57600 bits				

### ● Application

#### (1) Color Extraction

Item	Specification	
Function Name	Color Area	
Color Resolution	12 colors (Use the Gretag Macbeth Color Rendition Chart for confirmation)	
Function	Detects area of registered color on object	
Execution Time (Execution time at time of internal trigger)	30 ms (approx. 100,000 pixels, data culling: none)	
No. of Registered Items	7 types	
Color Registration Method	Teaching (teaches color)	
Evaluation Input Value	Upper and lower limit values for area judgment	
Serial	RS-232C (when using optional cable)	
	I/O Command	Trigger Input, Type Switching (types 1 to 7)
Input	Teaching Command	Exposure Time Setting
	Evaluation Criteria Command	Upper and lower values for area
Output	Evaluation result (OK/NG), computation result and error output	
	Power I/O Cable	
Parallel	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)	
	Input	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)
Output	Evaluation result (OK/NG), READY, Alarm	

Note \*3: With ANE2030, the visual range changes between 70 × 56 mm to 100 × 80 mm depending on the installation distance.

Note \*4: Processing time at the time of the internal trigger changes according to the application software. If an external trigger is used and the measurement interval increases, LED life can be extended.

### (2) Color Discrimination

Item	Specification	
Function Name	Color Discrimination	
Color Resolution	12 colors (Use the Gretag Macbeth Color Rendition Chart for confirmation)	
Function	Distinguishes which color among a maximum of 7 registered colors	
Execution Time (Execution time at time of internal trigger)	High	60 ms (approx. 6,000 pixels, data culling: 1/16)
	Low	180 ms (approx. 25,000 pixels, data culling: 1/4)
No. of Registered Items	High	600 ms (approx. 100,000 pixels, data culling: none)
	Low	600 ms (approx. 100,000 pixels, data culling: none)
Color Registration Method	Teaching (teaches color)	
Evaluation Input Value	Upper and lower limit values for area judgment	
Serial	RS-232C (when using optional cable)	
	I/O Command	Trigger Input, Type Switching (types 1 to 7)
Input	Teaching Command	Exposure Time Setting
	Evaluation Criteria Command	Upper and lower values for area
Output	Evaluation result, type No., computation result, error output	
	Power I/O Cable	
Parallel	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)	
	Input	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)
Output	Evaluation result, type No., READY, Alarm	

### (3) Edge Detection

Item	Specification	
Function Name	Edge Detection	
Detection Capability	Resolution (differs according to speed)	
Execution Time (Execution time at time of internal trigger)	High	60 ms (approx. 6,000 pixels, data culling: 1/16)
	Low	180 ms (approx. 25,000 pixels, data culling: 1/4)
No. of Registered Items	High	600 ms (approx. 100,000 pixels, data culling: none)
	Low	600 ms (approx. 100,000 pixels, data culling: none)
Function	Detects edges of object using binary images.	
Color Registration Method	Teaching (teaches color)	
Evaluation Input Value	Extent of permissible area around base point	
Serial	RS-232C (when using optional cable)	
	I/O Command	Trigger Input, Type Switching (types 1 to 7)
Input	Teaching Command	Exposure Time Setting, Binarization Level
	Evaluation Criteria Command	Permissible area (X/Y)
Output	Evaluation result (OK/NG), computation result, error output	
	Power I/O Cable	
Parallel	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)	
	Input	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)
Output	Evaluation result (OK/NG), READY, Alarm	

### (4) Apex Detection

Item	Specification	
Function Name	Apex Detection	
Detection Capability	Resolution (differs according to speed)	
Execution Time (Execution time at time of internal trigger)	High	Resolution × 4 times
	Low	Resolution × 2 times
No. of Registered Items	High	Resolution
	Low	Resolution
Function	Detects apex of object using binary images.	
Execution Time (Execution time at time of internal trigger)	30 ms	
No. of Registered Items	7 types	
Type Registration Method	Teaching (teaches base point)	
Evaluation Input Value	Extent of permissible area around base coordinate	
Serial	RS-232C (when using optional cable)	
	I/O Command	Trigger Input, Type Switching (types 1 to 7)
Input	Teaching Command	Exposure Time Setting, Binarization Level
	Evaluation Criteria Command	Permissible area (X/Y)
Output	Evaluation result (OK/NG), computation result, error output	
	Power I/O Cable	
Parallel	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)	
	Input	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)
Output	Evaluation result (OK/NG), READY, Alarm	

### (5) Size Measurement

Item	Specification	
Function Name	Size Measurement	
Detection Capability	Resolution × 2 times (differs according to speed)	
Function	High	Resolution × 8 times
	Low	Resolution × 4 times
Function	Detects max. and min. of X and Y values for object using binary images	
Execution Time (Execution time at time of internal trigger)	High	30 ms (approx. 6,000 pixels, data culling: 1/16)
	Low	60 ms (approx. 25,000 pixels, data culling: 1/4)
No. of Registered Items	High	600 ms (approx. 100,000 pixels, data culling: none)
	Low	600 ms (approx. 100,000 pixels, data culling: none)
Type Registration Method	Teaching (Teaches base vertical size (max./min.) and base horizontal size (max./min.))	
Evaluation Input Value	Permissible range from vertical base point (max./min.) and horizontal base point (max./min.) and min. detection size	
Serial	RS-232C (when using optional cable)	
	I/O Command	Trigger Input, Type Switching (types 1 to 7)
Input	Teaching Command	Exposure Time Setting, Binarization Level
	Evaluation Criteria Command	Permissible range for X max. width, X min. width, Y max. width and Y min. width
Output	Evaluation result (OK/NG), computation result, error output	
	Power I/O Cable	
Parallel	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)	
	Input	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Run/Teaching)
Output	Evaluation result (OK/NG), computation result, error output	
	Power I/O Cable	

### (6) Color and Pattern Matching

Item	Specification	
Function Name	Color and Pattern Matching	
Detection Capability	Resolution (differs according to speed) The speed setting sets the data compression during search.	
Function	High	Resolution × 2 times (8 compression → 4 compression → 2 compression)
	Low	Resolution (8 compression → 4 compression → no compression)
Function	Detects objects close the registered colors and shapes	
Execution Time	High	Computation time (84 × 48 pixel template, default settings) is as a guideline only. Computation time changes according to template size and individual settings.
	Low	100 ms
No. of Registered Items	High	400 ms
	Low	400 ms
Type Registration Method	Teaching (Registers a template)	
Evaluation Input Value	Permissible range around center coordinates (X coordinate), (Y coordinate) of the template, correlation value (0 to 100)	
Serial	RS-232C (when using optional cable)	
	I/O Command	Trigger Input, Type Switching (types 1 to 7)
Input	Teaching Command	Exposure Time Setting, Binarization Level
	Evaluation Criteria Command	Permissible range for X coordinate and Y coordinate
Output	Evaluation result (OK/NG), computation result (center coordinates of template, X and Y coordinates, and evaluation result), error output	
	Power I/O Cable	
Parallel	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Teaching/Run/View)	
	Input	Trigger Input, Type Switching (types 1 to 7), Mode Switching (Teaching/Run/View)
Output	Evaluation result (OK/NG) → OUT1: result whether detected or not, OUT2: X coordinate evaluation result, OUT3: Y coordinate evaluation result, READY, Alarm	

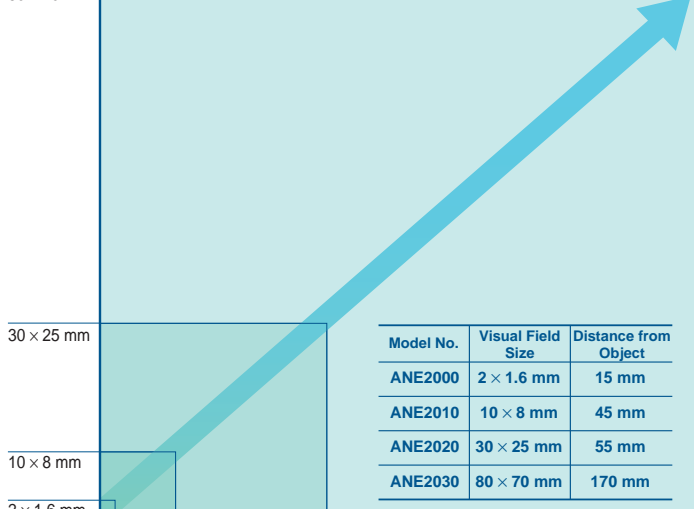
\* The total processing time from receiving the trigger input to output is calculated as follows:  
Total Processing Time = Exposure Time + Data Transfer Time (3.8 ms) + Computation Time

## Rich Visual Field Lineup

High-precision inspections can be carried out with the optimum visual field size.

### ● Actual Size of Visual Fields

80 × 70 mm



30 × 25 mm

10 × 8 mm

2 × 1.6 mm

### ● Modes

Item	Specification	
Operation Modes	a. Teaching Mode	Sets the search area which stores the evaluation criteria. Set Exposure Time With Color Detection/Color Discrimination: Teaching Area With Edge Detection/Size Measurement: Binary Level With Color and Pattern Matching: Template
	b. RUN Mode	Execution Mode
	c. RUN-VIEW Mode	Displays images in the finder while carrying out processing (1 unit of processing approx. 0.3 s)
Environment Settings Modes	a. Speed	(selects communication baud rate)
	b. Device No.	(device number with serial communication)
	c. Output Delay	(evaluation output delay)
	d. Acquisition Delay	(delay between trigger input and image acquisition)
	e. Trigger Selection	(switches between continuous measurement/external trigger)
	f. Type on Startup	(initial type setting at startup)
	g. Backlight Shutoff Time	(when shutting the finder unit backlight off)
	h. Auto-save	(switches auto-save ON/OFF)
	i. Initialization	(returns unit to default settings)
	j. Light ON/OFF	(switches white lighting on the main unit ON and OFF)
	k. Processing Speed	(switches between SPEED: High/Middle/Low)
	l. Buffering Delay	Answer-back ON/OFF Switch
[Size Measurement Only]	o. Extracted Color Switch (Black or White)	
[Color and Pattern Matching Only]	p. Detailed Settings ON/OFF Switch	
q. No. of Search Candidates	(setting for 0 to 3 ON and OFF)	
r. Exposure Correction	(switches exposure correction function ON/OFF)	