

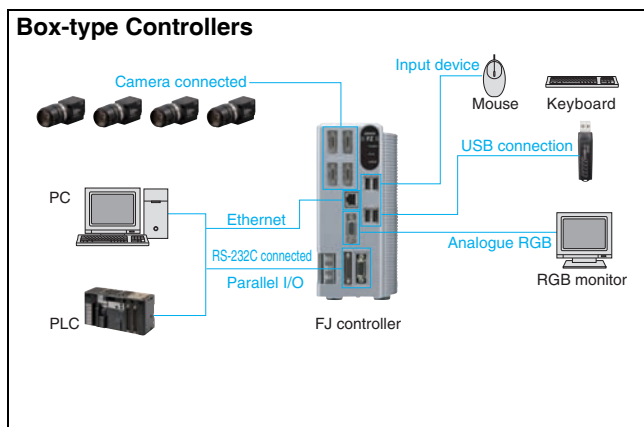
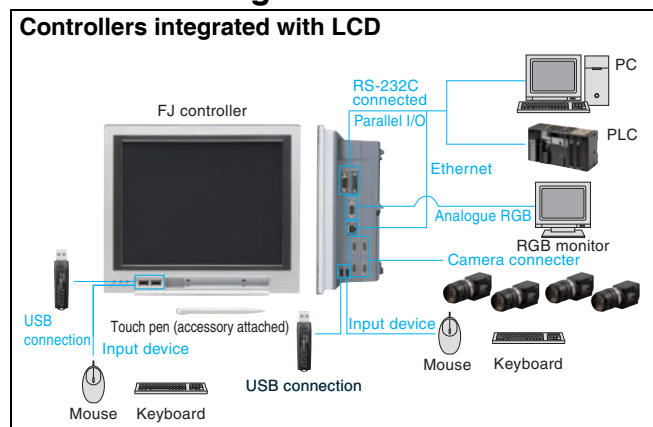
# All-in-One Vision System

- PC-based, flexible image processing system
- A variety of ready-to-use image processing parts
- Customized samples to quickly build ideal machine vision
- Highly robust, advanced measurement algorithm
- Lineup of connection-guaranteed peripheral devices, including Windows Embedded Standard-based FJ Controller



## System configuration

### Standard Configuration



### For Customization

Development environment Application producer



Sample codes and Development Wizard for easy customization are available.

## Ordering Information

### Controller

| CPU             | Type                              | Dual-task | HALCON installed<br>(See note 1) | No. of<br>Cameras | Output | Model                    |
|-----------------|-----------------------------------|-----------|----------------------------------|-------------------|--------|--------------------------|
| Core i5 2.4 GHz | Controller integrated<br>with LCD | Yes       | No                               | 2                 | NPN    | FJ-3000 (See note 4)     |
|                 |                                   | Yes       | No                               | 4                 | NPN    | FJ-3000-10 (See note 4)  |
|                 |                                   | Yes       | No                               | 2                 | PNP    | FJ-3005 (See note 4)     |
|                 |                                   | Yes       | No                               | 4                 | PNP    | FJ-3005-10 (See note 4)  |
|                 |                                   | Yes       | Yes                              | 2                 | NPN    | FJ-H3000 (See note 4)    |
|                 |                                   | Yes       | Yes                              | 4                 | NPN    | FJ-H3000-10 (See note 4) |
|                 |                                   | Yes       | Yes                              | 2                 | PNP    | FJ-H3005 (See note 4)    |
|                 |                                   | Yes       | Yes                              | 4                 | PNP    | FJ-H3005-10 (See note 4) |
|                 | Box-type Controller               | Yes       | No                               | 2                 | NPN    | FJ-3050 (See note 2)     |
|                 |                                   | Yes       | No                               | 4                 | NPN    | FJ-3050-10 (See note 2)  |
|                 |                                   | Yes       | No                               | 2                 | PNP    | FJ-3055 (See note 2)     |
|                 |                                   | Yes       | No                               | 4                 | PNP    | FJ-3055-10 (See note 2)  |
|                 |                                   | Yes       | Yes                              | 2                 | NPN    | FJ-H3050 (See note 3)    |
|                 |                                   | Yes       | Yes                              | 4                 | NPN    | FJ-H3050-10 (See note 3) |
|                 |                                   | Yes       | Yes                              | 2                 | PNP    | FJ-H3055 (See note 3)    |
|                 |                                   | Yes       | Yes                              | 4                 | PNP    | FJ-H3055-10 (See note 3) |
| Atom 1.6 GHz    | Box-type Controller               | No        | No                               | 2                 | NPN    | FJ-350 (See note 4)      |
|                 |                                   | No        | No                               | 4                 | NPN    | FJ-350-10 (See note 4)   |
|                 |                                   | No        | No                               | 2                 | PNP    | FJ-355 (See note 4)      |
|                 |                                   | No        | No                               | 4                 | PNP    | FJ-355-10 (See note 4)   |

**Note:** 1. HALCON runtime license has been installed. The development of HALCON requires HDevelop.

2. The production of the FJ-series Controllers FJ-305□/-305□-10 were discontinued at the end of October 2015.

3. The production of the FJ-series Controllers FJ-H305□/-H305□-10 were discontinued at the end of September 2016.

4. The production of the FJ-series Controllers FJ-300□/-300□-10/-H300□/-H300□-10/-35□/-35□-10 will be discontinued at the end of March 2018.

## Development Environment

| Type                                                                                                      | Model         | Operating environment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application Producer<br> | <b>FJ-AP1</b> | <ul style="list-style-type: none"> <li>CPU: Intel Pentium Processor (SSE2 or higher)</li> <li>OS: Windows XP Professional (32bit) Service pack 3 or later, or Windows 7 Professional (32bit) or Enterprise (32bit) or Ultimate (32bit)</li> <li>.NET Framework: .NET Framework 3.5 or higher</li> <li>Memory: At least 2 GB RAM</li> <li>Available disk space: At least 2 GB</li> <li>Browser: Microsoft® Internet Explorer 6.0 or later</li> <li>Display: XGA (1024×768), True Color (32-bit) or higher</li> <li>Optical drive: CD/DVD drive</li> <li>The following software is required to customize the software: Microsoft® Visual Studio® 2010 Professional</li> </ul> |

## Cameras

| Appearance                                                                          | Type                        |                            |            | Model            | Remarks                             |
|-------------------------------------------------------------------------------------|-----------------------------|----------------------------|------------|------------------|-------------------------------------|
|    | Digital Cameras             | 300,000-pixels             | Color      | <b>FZ-SC</b>     | Lens required                       |
|                                                                                     |                             |                            | Monochrome | <b>FZ-S</b>      |                                     |
|    | Digital Cameras             | 2 million pixels           | Color      | <b>FZ-SC2M</b>   |                                     |
|                                                                                     |                             |                            | Monochrome | <b>FZ-S2M</b>    |                                     |
|    | Digital Cameras             | 5 million pixels           | Color      | <b>FZ-SC5M3</b>  | Lens required                       |
|                                                                                     |                             |                            | Monochrome | <b>FZ-S5M3</b>   |                                     |
|    | Small Digital Cameras       | 300,000-pixel flat type    | Color      | <b>FZ-SFC</b>    | Lens for small cameras required     |
|                                                                                     |                             |                            | Monochrome | <b>FZ-SF</b>     |                                     |
|  | Small Digital Cameras       | 300,000-pixel pen type     | Color      | <b>FZ-SPC</b>    |                                     |
|                                                                                     |                             |                            | Monochrome | <b>FZ-SP</b>     |                                     |
|  | High-speed Cameras          | 300,000-pixels             | Color      | <b>FZ-SHC</b>    | Lens required                       |
|                                                                                     |                             |                            | Monochrome | <b>FZ-SH</b>     |                                     |
|  | Intelligent Compact Cameras | Wide View (Long-distance)  | Color      | <b>FZ-SQ100F</b> | Camera + Lens + High-power Lighting |
|                                                                                     |                             | Wide View (Short-distance) | Color      | <b>FZ-SQ100N</b> |                                     |
|                                                                                     |                             | Standard                   | Color      | <b>FZ-SQ050F</b> |                                     |
|                                                                                     |                             | Narrow View                | Color      | <b>FZ-SQ010F</b> |                                     |

## Cameras Peripheral Devices

| Appearance                                                                        | Type                             |                              | Model                                                                                                     | Remarks                                                           |
|-----------------------------------------------------------------------------------|----------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
|  | CCTV Lenses                      |                              | 3Z4S-LE Series                                                                                            | —                                                                 |
|                                                                                   | Extension Tubes                  |                              |                                                                                                           |                                                                   |
|  | Low-distortion Lenses            |                              | 3Z4S-LE SV-0614H/<br>SV-0814H/SV-1214H/<br>SV-1614H/SV-2514H/<br>SV-3514H/SV-5014H/<br>SV-7525H/SV-10028H | Low distortion lens for 2-million and 5-<br>million Pixel Cameras |
|  | Lenses for Small Camera          |                              | FZ-LES3/LES6/LES16/LES30                                                                                  | Lens for 300,000-pixel Small Cameras                              |
|                                                                                   | Extension Tubes for Small Camera |                              | FZ-LESR                                                                                                   | Extension Tubes for 300,000-pixel Small Cameras                   |
|  | For Intelligent Compact Camera   | Mounting brackets            | FQ-XL/XL2                                                                                                 | —                                                                 |
|  |                                  | Polarizing Filter Attachment | FQ-XF1                                                                                                    |                                                                   |

## Cables

| Appearance                                                                          | Type                                                                                                                             | Cable length:    | Model        |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------|--------------|
|    | Camera Cable                                                                                                                     | 2m               | FZ-VS3 2M    |
|                                                                                     |                                                                                                                                  | 3m               | FZ-VS3 3M    |
|                                                                                     |                                                                                                                                  | 5m               | FZ-VS3 5M    |
|                                                                                     |                                                                                                                                  | 10m (See note 2) | FZ-VS3 10M   |
|  | Bend resistant Camera Cable                                                                                                      | 2m               | FZ-VSB3 2M   |
|                                                                                     |                                                                                                                                  | 3m               | FZ-VSB3 3M   |
|                                                                                     |                                                                                                                                  | 5m               | FZ-VSB3 5M   |
|                                                                                     |                                                                                                                                  | 10m (See note 2) | FZ-VSB3 10M  |
|  | Right-angle Camera Cable (See note 1)                                                                                            | 2m               | FZ-VSL3 2M   |
|                                                                                     |                                                                                                                                  | 3m               | FZ-VSL3 3M   |
|                                                                                     |                                                                                                                                  | 5m               | FZ-VSL3 5M   |
|                                                                                     |                                                                                                                                  | 10m (See note 2) | FZ-VSL3 10M  |
|  | Bend resistant Right-angle Camera Cable (See note 1)                                                                             | 2m               | FZ-VSLB3 2M  |
|                                                                                     |                                                                                                                                  | 3m               | FZ-VSLB3 3M  |
|                                                                                     |                                                                                                                                  | 5m               | FZ-VSLB3 5M  |
|                                                                                     |                                                                                                                                  | 10m (See note 2) | FZ-VSLB3 10M |
|  | Long-distance Camera Cable                                                                                                       | 15m (See note 3) | FZ-VS4 15M   |
|  | Long-distance Right-angle Camera Cable (See note 1)                                                                              | 15m (See note 3) | FZ-VSL4 15M  |
|  | Cable Extension Unit<br>Up to two Extension Units and threecables can be connected.<br>(Maximum cable length: 45 m) (See note 4) | —                | FZ-VSJ       |
|  | Monitor Cable                                                                                                                    | 2m               | FZ-VM 2M     |
|                                                                                     |                                                                                                                                  | 5m               | FZ-VM 5M     |
|  | Parallel Cable                                                                                                                   | 2m               | FZ-VP 2M     |
|                                                                                     |                                                                                                                                  | 5m               | FZ-VP 5M     |
|  | Parallel I/O Cable for Connector-terminal Conversion Unit (See note 5)                                                           | 2m               | FZ-VPX 2M    |
|                                                                                     |                                                                                                                                  | 5m               | FZ-VPX 5M    |

**Note: 1.** This Cable has an L-shaped connector on the Camera end.

**2.** The 10-m Cable cannot be used for the 5-million pixel camera.

**3.** The 15-m Cable cannot be used for the 5-million pixel camera.

**4.** Maximum cable length depends on type of camera and cable length to connect. For details, refer to "Cameras / Cables Connection Table" on page 7.

**5.** Connector-Terminal Block Conversion Units can be connected (Recommended Products: OMRON XW2R-J50G-T, XW2R-E50G-T, XW2R-P50G-T).

## Peripheral Devices

| Appearance                                                                        | Type                     |               | Model            | Remarks                                                 |
|-----------------------------------------------------------------------------------|--------------------------|---------------|------------------|---------------------------------------------------------|
|  | LCD Monitor              |               | <b>FZ-M08</b>    | For box-type controller                                 |
|  | USB Memory               |               | <b>FZ-MEM2G</b>  | Capacity: 2 GB                                          |
|                                                                                   |                          |               | <b>FZ-MEM8G</b>  | Capacity: 8 GB                                          |
|  | VESA attachment          |               | <b>FZ-VESA</b>   | For installing the controller integrated with LCD       |
|  | Desktop controller stand |               | <b>FZ-DS</b>     | For installing the controller integrated with LCD       |
|  | Lighting Controller      | For FL-Series | <b>FL-TCC1</b>   | Required to control external lighting from a Controller |
| —                                                                                 | External Lighting        |               | <b>FL-Series</b> | —                                                       |

## Lenses

### High-resolution, Low-distortion Lenses

| Model                             | 3Z4S-LE SV-0614H                                                                  | 3Z4S-LE SV-0814H                                                                  | 3Z4S-LE SV-1214H                                                                  | 3Z4S-LE SV-1614H                                                                  | 3Z4S-LE SV-2514H                                                                   | 3Z4S-LE SV-3514H                                                                    | 3Z4S-LE SV-5014H                                                                    | 3Z4S-LE SV-7525H                                                                    | 3Z4S-LE SV-10028H                                                                   |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Appearance/<br>Dimensions<br>(mm) |  |  |  |  |  |  |  |  |  |
| Focal length                      | 6mm                                                                               | 8mm                                                                               | 12mm                                                                              | 16mm                                                                              | 25mm                                                                               | 35mm                                                                                | 50mm                                                                                | 75mm                                                                                | 100mm                                                                               |
| Brightness                        | F1.4                                                                              | F1.4                                                                              | F1.4                                                                              | F1.4                                                                              | F1.4                                                                               | F1.4                                                                                | F1.4                                                                                | F2.5                                                                                | F2.8                                                                                |
| Filter size                       | M40.5<br>P0.5                                                                     | M35.5<br>P0.5                                                                     | M27.0<br>P0.5                                                                     | M27.0<br>P0.5                                                                     | M27.0<br>P0.5                                                                      | M35.5<br>P0.5                                                                       | M40.5<br>P0.5                                                                       | M34.0<br>P0.5                                                                       | M37.5<br>P0.5                                                                       |

### CCTV Lenses

| Model                             | 3Z4S-LE SV-03514V                                                                   | 3Z4S-LE SV-04514V                                                                   | 3Z4S-LE SV-0614V                                                                    | 3Z4S-LE SV-0813V                                                                    | 3Z4S-LE SV-1214V                                                                     | 3Z4S-LE SV-1614V                                                                      | 3Z4S-LE SV-2514V                                                                      | 3Z4S-LE SV-3518V                                                                      | 3Z4S-LE SV-5018V                                                                      | 3Z4S-LE SV-7527V                                                                      | 3Z4S-LE SV-10035V                                                                     |
|-----------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Appearance/<br>Dimensions<br>(mm) |  |  |  |  |  |  |  |  |  |  |  |
| Focal length                      | 3.5mm                                                                               | 4.5mm                                                                               | 6mm                                                                                 | 8mm                                                                                 | 12mm                                                                                 | 16mm                                                                                  | 25mm                                                                                  | 35mm                                                                                  | 50mm                                                                                  | 75mm                                                                                  | 100mm                                                                                 |
| Brightness                        | F1.4                                                                                | F1.4                                                                                | F1.4                                                                                | F1.3                                                                                | F1.4                                                                                 | F1.4                                                                                  | F1.4                                                                                  | F1.8                                                                                  | F1.8                                                                                  | F2.7                                                                                  | F3.5                                                                                  |
| Filter size                       | —                                                                                   | —                                                                                   | M27<br>P0.5                                                                         | M25.5<br>P0.5                                                                       | M27<br>P0.5                                                                          | M27<br>P0.5                                                                           | M27<br>P0.5                                                                           | M27<br>P0.5                                                                           | M30.5<br>P0.5                                                                         | M30.5<br>P0.5                                                                         | M30.5<br>P0.5                                                                         |

### Lenses for small camera

| Model                             | FZ-LES3                                                                             | FZ-LES6                                                                             | FZ-LES16                                                                            | FZ-LES30                                                                            |
|-----------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Appearance/<br>Dimensions<br>(mm) |  |  |  |  |
| Focal length                      | 3mm                                                                                 | 6mm                                                                                 | 16mm                                                                                | 30mm                                                                                |
| Brightness                        | F2.0                                                                                | F2.0                                                                                | F3.4                                                                                | F3.4                                                                                |

### Extension Tubes

| Model    | 3Z4S-LE SV-EXR                                                                                               |
|----------|--------------------------------------------------------------------------------------------------------------|
| Contents | Set of 7 tubes (40 mm, 20 mm, 10 mm, 5 mm, 2.0 mm, 1.0 mm, and 0.5 mm)<br>Maximum outer diameter: 30 mm dia. |

### Extension Tubes for small camera

| Model    | FZ-LESR                                                                   |
|----------|---------------------------------------------------------------------------|
| Contents | Set of 3 tubes (15 mm, 10 mm, 5 mm)<br>Maximum outer diameter: 12 mm dia. |

- Do not use the 0.5-mm, 1.0-mm, and 2.0-mm Extension Tubes attached to each other. Since these Extension Tubes are placed over the threaded section of the Lens or other Extension Tube, the connection may loosen when more than one 0.5-mm, 1.0-mm or 2.0-mm Extension Tube are used together.
- Reinforcement is required to protect against vibration when Extension Tubes exceeding 30 mm are used.

## Ratings and Performance

### Controller

| Model                             |                                                                               |                        | NPN Output                                                                                                                                                                                                             | FJ-3000    | FJ-3000-10     | FJ-3050             | FJ-3050-10     | FJ-H3000                       | FJ-H3000-10    | FJ-H3050   | FJ-H3050-10         | FJ-350     | FJ-350-10                                                                                                          |   |
|-----------------------------------|-------------------------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|---------------------|----------------|--------------------------------|----------------|------------|---------------------|------------|--------------------------------------------------------------------------------------------------------------------|---|
|                                   |                                                                               |                        | PNP Output                                                                                                                                                                                                             | FJ-3005    | FJ-3005-10     | FJ-3055             | FJ-3055-10     | FJ-H3005                       | FJ-H3005-10    | FJ-H3055   | FJ-H3055-10         | FJ-355     | FJ-355-10                                                                                                          |   |
| Controller type                   |                                                                               |                        | Controller integrated with LCD                                                                                                                                                                                         |            |                | Box-type controller |                | Controller integrated with LCD |                |            | Box-type controller |            | Box-type controller                                                                                                |   |
| No. of cameras                    |                                                                               |                        | 2                                                                                                                                                                                                                      | 4          | 2              | 4                   | 2              | 4                              | 2              | 4          | 2                   | 4          | 2                                                                                                                  | 4 |
| CPU                               |                                                                               |                        | Intel Core i5-520E Processor 2.40 GHz                                                                                                                                                                                  |            |                |                     |                |                                |                |            |                     |            | Intel Atom N270 Processor 1.6 GHz                                                                                  |   |
| Main memory                       |                                                                               |                        | 3 GB                                                                                                                                                                                                                   |            |                |                     |                |                                |                |            |                     |            | 2 GB                                                                                                               |   |
| Storage                           |                                                                               |                        | Compact Flash 2 GB                                                                                                                                                                                                     |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| OS                                |                                                                               |                        | Windows Embedded Standard 2009                                                                                                                                                                                         |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| Dual-task                         |                                                                               |                        | Yes                                                                                                                                                                                                                    |            |                |                     |                |                                |                |            |                     |            | No                                                                                                                 |   |
| HALCON installed                  |                                                                               |                        | No                                                                                                                                                                                                                     |            |                |                     |                | Yes                            |                |            |                     |            | No                                                                                                                 |   |
| Connected camera                  |                                                                               |                        | Can be connected to all cameras.                                                                                                                                                                                       |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| Operation                         |                                                                               |                        | Controller integrated with LCD: touch pen, mouse, etc.<br>Box-type controller: mouse, etc.                                                                                                                             |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| Processing resolution             |                                                                               |                        | Intelligent Compact Camera: 752 (H) × 480 (V)<br>300,000-pixel camera: 640 (H) × 480 (V)<br>2-million pixel camera: 1600 (H) × 1200 (V), 5-million pixel camera: 2488 (H) × 2044 (V)                                   |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| No. of scenes                     |                                                                               |                        | 32                                                                                                                                                                                                                     |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| Number of logged images           | When connected to an Intelligent Compact Camera                               | Connected to 1 camera  | 214                                                                                                                                                                                                                    |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 2 cameras | 107                                                                                                                                                                                                                    |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 3 cameras | 71                                                                                                                                                                                                                     |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 4 cameras | 53                                                                                                                                                                                                                     |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   | When connected to a 300,000-pixel camera                                      | Connected to 1 camera  | Color camera: 250, Monochrome Camera: 252                                                                                                                                                                              |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 2 cameras | Color camera: 125, Monochrome Camera: 126                                                                                                                                                                              |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 3 cameras | Color camera: 83, Monochrome Camera: 84                                                                                                                                                                                |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 4 cameras | Color camera: 62, Monochrome Camera: 63                                                                                                                                                                                |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   | When connected to a 2 million-pixel camera                                    | Connected to 1 camera  | Color camera: 40, Monochrome Camera: 40                                                                                                                                                                                |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 2 cameras | Color camera: 20, Monochrome Camera: 20                                                                                                                                                                                |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 3 cameras | Color camera: 13, Monochrome Camera: 13                                                                                                                                                                                |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 4 cameras | Color camera: 10, Monochrome Camera: 10                                                                                                                                                                                |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   | When connected to a 5 million-pixel camera                                    | Connected to 1 camera  | Color camera: 15, Monochrome Camera: 15                                                                                                                                                                                |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 2 cameras | Color camera: 7, Monochrome Camera: 7                                                                                                                                                                                  |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 3 cameras | Color camera: 5, Monochrome Camera: 5                                                                                                                                                                                  |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
|                                   |                                                                               | Connected to 4 cameras | Color camera: 3, Monochrome Camera: 3                                                                                                                                                                                  |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| Serial communications             |                                                                               |                        | RS-232C/422A: 1CH                                                                                                                                                                                                      |            |                |                     |                |                                |                |            |                     |            | RS-232C: 1CH                                                                                                       |   |
| Network communications            |                                                                               |                        | Ethernet 100BASE-TX/10BASE-T                                                                                                                                                                                           |            |                |                     |                |                                |                |            |                     |            | Ethernet 1000BASE-T/100BASE-TX/10BASE-T                                                                            |   |
| EtherNet/IP                       |                                                                               |                        | Ethernet port baud rate: 100 Mbps (100BASE-TX)                                                                                                                                                                         |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| Parallel I/O                      |                                                                               |                        | 17 inputs (RESET, STEP0/ENCTRIG_Z0, STEP1/ENCTRIG_Z1, DSA0 to 1, ENCTRIG_A0 to 1, ENCTRIG_B0 to 1, DI0 to 7)<br>29 outputs (RUN/BUSY1, BUSY0, GATE0 to 1, OR0 to 1, READY0 to 1, ERROR, STGOUT0 to 3*, DO0 to 15)      |            |                |                     |                |                                |                |            |                     |            | 11 inputs (RESET, STEP, DSA, DI0 to 7)<br>26 outputs (RUN, BUSY, GATE, OR, READY, ERROR, STGOUT0 to 3*, DO0 to 15) |   |
| Monitor interface                 |                                                                               |                        | Controller integrated with LCD: integrated controller and LCD 12.1 inch TFT color LCD (Resolution: XGA 1,024 × 768 dots)<br>Box-type controller: Analog RGB video output, 1 channel (Resolution: XGA 1,024 × 768 dots) |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| USB interface                     |                                                                               |                        | 4 channels (supports USB 1.1 and 2.0)                                                                                                                                                                                  |            |                |                     |                |                                |                |            |                     |            | 2 channels (supports USB 1.1 and 2.0)                                                                              |   |
| Power supply voltage              |                                                                               |                        | 20.4 to 26.4 VDC                                                                                                                                                                                                       |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| Current consumption (at 24.0 VDC) | When connected to an Intelligent Compact Camera                               | 5.0 A max.             | 7.5 A max.                                                                                                                                                                                                             | 5.0 A max. | 7.5 A max.     | 5.0 A max.          | 7.5 A max.     | 5.0 A max.                     | 7.5 A max.     | 5.0 A max. | 7.5 A max.          | 4.0 A max. | 5.5 A max.                                                                                                         |   |
|                                   | When connected to a 300,000-pixel, 2 million-pixel, or 5 million-pixel camera | 3.7 A max.             | 4.9 A max.                                                                                                                                                                                                             | 3.7 A max. | 4.9 A max.     | 3.7 A max.          | 4.9 A max.     | 3.7 A max.                     | 4.9 A max.     | 3.7 A max. | 4.9 A max.          | 2.6 A max. | 2.9 A max.                                                                                                         |   |
| Ambient temperature range         |                                                                               |                        | Operating:<br>0 to +45°C for low cooling fan speeds<br>0 to +50°C for high cooling fan speeds<br>Storage: -20 to 65°C (with no icing or condensation)                                                                  |            |                |                     |                |                                |                |            |                     |            | Operating: 0 to 50°C<br>Storage: -20 to 65°C (with no icing or condensation)                                       |   |
| Ambient humidity range            |                                                                               |                        | Operating and storage: 35 to 85°C (with no condensation)                                                                                                                                                               |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |
| Weight                            |                                                                               |                        | Approx. 3.4 kg                                                                                                                                                                                                         |            | Approx. 1.9 kg |                     | Approx. 3.4 kg |                                | Approx. 1.9 kg |            | Approx. 1.8 kg      |            |                                                                                                                    |   |
| Accessories                       |                                                                               |                        | Controller integrated with LCD: touch pen (one, inside the front panel), Instruction Manual, 6 mounting brackets, Member registration sheet<br>Box-type controller: Instruction Manual, Member registration sheet      |            |                |                     |                |                                |                |            |                     |            |                                                                                                                    |   |

\* STGOUT 2 to 3 only for camera 4ch type

## Digital Cameras

|                                        | FZ-S                                                                         | FZ-SC | FZ-S2M                                                                       | FZ-SC2M | FZ-S5M3                                                                      | FZ-SC5M3 |
|----------------------------------------|------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------|----------|
| Image elements                         | Interline transfer reading all pixels, 1/3-inch CCD image elements           |       | Interline transfer reading all pixels, 1/1.8-inch CCD image elements         |         | CMOS image elements (2/3-inch equivalent)                                    |          |
| Color/Monochrome                       | Monochrome                                                                   | Color | Monochrome                                                                   | Color   | Monochrome                                                                   | Color    |
| Effective pixels                       | 640 (H) × 480 (V)                                                            |       | 1600 (H) × 1200 (V)                                                          |         | 2448 (H) × 2048 (V)                                                          |          |
| Pixel size                             | 7.4 (μm) × 7.4 (μm)                                                          |       | 4.4 (μm) × 4.4 (μm)                                                          |         | 3.45 (μm) × 3.45 (μm)                                                        |          |
| Shutter function                       | Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s            |       | Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s            |         | Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s            |          |
| Partial function                       | 12 to 480 lines                                                              |       | 12 to 1200 lines                                                             |         | 4 to 2048 lines                                                              |          |
| Frame rate (image read time)           | 80 fps (12.5 ms)                                                             |       | 30 fps (33.3 ms)                                                             |         | 25.6 fps (38.2 ms)                                                           |          |
| Field of vision, installation distance | Selecting a lens according to the field of vision and installation distance  |       |                                                                              |         |                                                                              |          |
| Ambient temperature range              | Operating: 0 to 50°C<br>Storage: -25 to 65°C (with no icing or condensation) |       | Operating: 0 to 40°C<br>Storage: -25 to 65°C (with no icing or condensation) |         | Operating: 0 to 40°C<br>Storage: -25 to 65°C (with no icing or condensation) |          |
| Ambient humidity range                 | Operating and storage: 35% to 85% (with no condensation)                     |       |                                                                              |         |                                                                              |          |
| Weight                                 | Approx. 55 g                                                                 |       | Approx. 76 g                                                                 |         | Approx. 85 g                                                                 |          |
| Accessories                            | Instruction manual                                                           |       |                                                                              |         |                                                                              |          |

## Small Digital Cameras

|                                               | FZ-SF                                                                                                                | FZ-SFC | FZ-SP                                                                                                                | FZ-SPC |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------|--------|
| <b>Image elements</b>                         | Interline transfer reading all pixels, 1/3-inch CCD image elements                                                   |        |                                                                                                                      |        |
| <b>Color/Monochrome</b>                       | Monochrome                                                                                                           | Color  | Monochrome                                                                                                           | Color  |
| <b>Effective pixels</b>                       | 640 (H) × 480 (V)                                                                                                    |        |                                                                                                                      |        |
| <b>Pixel size</b>                             | 7.4 (μm) × 7.4 (μm)                                                                                                  |        |                                                                                                                      |        |
| <b>Shutter function</b>                       | Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s                                                    |        |                                                                                                                      |        |
| <b>Partial function</b>                       | 12 to 480 lines                                                                                                      |        |                                                                                                                      |        |
| <b>Frame rate (image read time)</b>           | 80 fps (12.5 ms)                                                                                                     |        |                                                                                                                      |        |
| <b>Field of vision, installation distance</b> | Selecting a lens according to the field of vision and installation distance                                          |        |                                                                                                                      |        |
| <b>Ambient temperature range</b>              | Operating: 0 to 50°C (camera amp)<br>0 to 45°C (camera head)<br>Storage: -25 to 65°C (with no icing or condensation) |        | Operating: 0 to 50°C (camera amp)<br>0 to 45°C (camera head)<br>Storage: -25 to 65°C (with no icing or condensation) |        |
| <b>Ambient humidity range</b>                 | Operating and storage: 35% to 85% (with no condensation)                                                             |        | Operating and storage: 35% to 85% (with no condensation)                                                             |        |
| <b>Weight</b>                                 | Approx. 150 g                                                                                                        |        | Approx. 150 g                                                                                                        |        |
| <b>Accessories</b>                            | Instruction manual, installation bracket, Four mounting brackets(M2)                                                 |        | Instruction manual                                                                                                   |        |

## High-speed Cameras

|                                               | FZ-SH                                                                        | FZ-SHC |
|-----------------------------------------------|------------------------------------------------------------------------------|--------|
| <b>Image elements</b>                         | Interline transfer reading all pixels, 1/3-inch CCD image elements           |        |
| <b>Color/Monochrome</b>                       | Monochrome                                                                   | Color  |
| <b>Effective pixels</b>                       | 640 (H) × 480 (V)                                                            |        |
| <b>Pixel size</b>                             | 7.4 (μm) × 7.4 (μm)                                                          |        |
| <b>Shutter function</b>                       | Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s            |        |
| <b>Partial function</b>                       | 12 to 480 lines                                                              |        |
| <b>Frame rate (image read time)</b>           | 204 fps (4.9 ms)                                                             |        |
| <b>Field of vision, installation distance</b> | Selecting a lens according to the field of vision and installation distance  |        |
| <b>Ambient temperature range</b>              | Operating: 0 to 40°C<br>Storage: -25 to 65°C (with no icing or condensation) |        |
| <b>Ambient humidity range</b>                 | Operating and storage: 35% to 85% (with no condensation)                     |        |
| <b>Weight</b>                                 | Approx. 105 g                                                                |        |
| <b>Accessories</b>                            | Instruction manual                                                           |        |

## Intelligent Compact Cameras

|                              | FZ-SQ010F                                                                                             | FZ-SQ050F              | FZ-SQ100F               | FZ-SQ100N               |
|------------------------------|-------------------------------------------------------------------------------------------------------|------------------------|-------------------------|-------------------------|
| Image elements               | 1/3-inch CMOS image elements                                                                          |                        |                         |                         |
| Color/Monochrome             | Color                                                                                                 |                        |                         |                         |
| Effective pixels             | 752 (H) × 480 (V)                                                                                     |                        |                         |                         |
| Pixel size                   | 6.0 (μm) × 6.0 (μm)                                                                                   |                        |                         |                         |
| Shutter function             | 1/250 to 1/32,258                                                                                     |                        |                         |                         |
| Partial function             | 8 to 480 lines                                                                                        |                        |                         |                         |
| Frame rate (image read time) | 60 fps                                                                                                |                        |                         |                         |
| Field of vision              | 7.5 × 4.7 to 13 × 8.2 mm                                                                              | 13 × 8.2 to 53 × 33 mm | 53 × 33 to 240 × 153 mm | 29 × 18 to 300 × 191 mm |
| Installation distance        | 38 to 60 mm                                                                                           | 56 to 215 mm           | 220 to 970 mm           | 32 to 380 mm            |
| LED class *                  | Risk Group 2                                                                                          |                        |                         |                         |
| Ambient temperature range    | Operating: 0 to 50°C Storage: -25 to 65°C                                                             |                        |                         |                         |
| Ambient humidity range       | Operating and storage: 35% to 85% (with no condensation)                                              |                        |                         |                         |
| Weight                       | Approx. 150 g                                                                                         |                        | Approx. 140 g           |                         |
| Accessories                  | Mounting bracket (FQ-XL), polarizing filter attachment (FQ-XF1), instruction manual and warning label |                        |                         |                         |

\* Applicable standards : IEC62471-2

## LCD Monitor

|                           | FZ-M08                                                                    |
|---------------------------|---------------------------------------------------------------------------|
| Size                      | 8.4 inches                                                                |
| Type                      | Liquid crystal color TFT                                                  |
| Resolution                | 1,024 × 768 dots                                                          |
| Input signal              | Analog RGB video input, 1 channel                                         |
| Power supply voltage      | 21.6 to 26.4 VDC                                                          |
| Current consumption       | Approx. 0.7 A max.                                                        |
| Ambient temperature range | Operating: 0 to 50°C Storage: -25 to 65°C (with no icing or condensation) |
| Ambient humidity range    | Operating and storage: 35 to 85% (with no condensation)                   |
| Weight                    | Approx. 1.2 kg                                                            |
| Accessories               | Instruction Sheet and 4 mounting brackets                                 |

## Camera Cables

|                                     | FZ-VS3<br>(2 m)                                                           | FZ-VSB3<br>(2 m) | FZ-VSL3<br>(2 m) | FZ-VSLB3<br>(2 m)             |
|-------------------------------------|---------------------------------------------------------------------------|------------------|------------------|-------------------------------|
| Type                                | Standard                                                                  | Bend resistant   | Right-angle      | Bend resistant<br>Right-angle |
| Shock resistiveness<br>(durability) | 10 to 150 Hz single amplitude 0.15 mm<br>3 directions, 8 strokes, 4 times |                  |                  |                               |
| Ambient temperature range           | Operation and storage: 0 to 65 °C<br>(with no icing or condensation)      |                  |                  |                               |
| Ambient humidity range              | Operation and storage: 40 to 70%RH<br>(with no condensation)              |                  |                  |                               |
| Ambient atmosphere                  | No corrosive gases                                                        |                  |                  |                               |
| Material                            | Cable sheath, connector: PVC                                              |                  |                  |                               |
| Minimum bending radius              | 69mm                                                                      | 69mm             | 69mm             | 69mm                          |
| Weight                              | Approx. 170 g                                                             | Approx. 180 g    | Approx. 170 g    | Approx. 180 g                 |

## Monitor Cable

|                           | FZ-VM                                                                           |
|---------------------------|---------------------------------------------------------------------------------|
| Vibration resistiveness   | 10 to 150 Hz single amplitude 0.15 mm 3<br>directions, 8 strokes, 4 times       |
| Ambient temperature range | Operation: 0 to +50°C; Storage: -20 to +65°C<br>(with no icing or condensation) |
| Ambient humidity range    | Operation and storage: 35 to 85%RH<br>(with no condensation)                    |
| Ambient atmosphere        | No corrosive gases                                                              |
| Material                  | Cable sheath: heat-resistant PVC Connector: PVC                                 |
| Minimum bending radius    | 75 mm                                                                           |
| Weight                    | approx. 170 g                                                                   |

## Cable Extension Unit

|                                    | FZ-VSJ                                                                       |
|------------------------------------|------------------------------------------------------------------------------|
| Power supply voltage (See note 1.) | 11.5 to 13.5 VDC                                                             |
| Current consumption (See note 2.)  | 1.5 A max.                                                                   |
| Ambient temperature range          | Operating: 0 to 50°C Storage: -25 to 65°C<br>(with no icing or condensation) |
| Ambient humidity range             | Operating and storage: 35 to 85%<br>(with no condensation)                   |
| Maximum Units connectable          | 2 Units per Camera                                                           |
| Weight                             | Approx. 240 g                                                                |
| Accessories                        | Instruction Sheet and 4 mounting screws                                      |

**Note:** 1. A 12-VDC power supply must be provided to the Cable Extension Unit when connecting the Intelligent camera, the Intelligent Compact Camera, the Strobe controller, or the Lighting Controller.  
2. The current consumption shows when connecting the Cable Extension Unit to an external power supply.

## Long-distance Camera Cables

|                                     | FZ-VS4 (15 m)                                                             | FZ-VSL4 (15 m) |
|-------------------------------------|---------------------------------------------------------------------------|----------------|
| Type                                | Standard                                                                  | Right-angle    |
| Shock resistiveness<br>(durability) | 10 to 150 Hz single amplitude 0.15 mm<br>3 directions, 8 strokes, 4 times |                |
| Ambient temperature range           | Operation and storage: 0 to 65 °C<br>(with no icing or condensation)      |                |
| Ambient humidity range              | Operation and storage: 40 to 70%RH<br>(with no condensation)              |                |
| Ambient atmosphere                  | No corrosive gases                                                        |                |
| Material                            | Cable sheath, connector: PVC                                              |                |
| Minimum bending radius              | 78 mm                                                                     |                |
| Weight                              | Approx. 1400 g                                                            |                |

## Parallel Cable

|                           | FZ-VP                                                                           | FZ-VPX        |
|---------------------------|---------------------------------------------------------------------------------|---------------|
| Vibration resistiveness   | 10 to 150 Hz single amplitude 0.15 mm 3<br>directions, 8 strokes, 4 times       |               |
| Ambient temperature range | Operation: 0 to +50°C; Storage: -20 to +65°C<br>(with no icing or condensation) |               |
| Ambient humidity range    | Operation and storage: 35 to 85%RH<br>(with no condensation)                    |               |
| Ambient atmosphere        | No corrosive gases                                                              |               |
| Material                  | Cable sheath: heat-resistant PVC Connector: resin                               |               |
| Minimum bending radius    | 75 mm                                                                           |               |
| Weight                    | approx. 160 g                                                                   | approx. 180 g |

## Cameras / Cables Connection Table

| Type of camera                                                          | Model               | Cable length | High-speed cameras | Digital cameras |                 |                 | Small digital cameras<br>Pen type / flat type | Intelligent compact cameras |
|-------------------------------------------------------------------------|---------------------|--------------|--------------------|-----------------|-----------------|-----------------|-----------------------------------------------|-----------------------------|
|                                                                         |                     |              |                    | 300,000-pixel   | 2 million-pixel | 5 million-pixel |                                               |                             |
| Camera Cables<br>Right-angle camera cables                              | FZ-VS3<br>FZ-VSL3   | 2m           | Yes                | Yes             | Yes             | Yes             | Yes                                           | Yes                         |
|                                                                         |                     | 3m           | Yes                | Yes             | Yes             | Yes             | Yes                                           | Yes                         |
|                                                                         |                     | 5m           | Yes                | Yes             | Yes             | Yes             | Yes                                           | Yes                         |
|                                                                         |                     | 10m          | Yes                | Yes             | Yes             | No              | Yes                                           | Yes                         |
| Bend resistant camera cables<br>Bend resistant Right-angle Camera Cable | FZ-VSB3<br>FZ-VSLB3 | 2m           | Yes                | Yes             | Yes             | Yes             | Yes                                           | Yes                         |
|                                                                         |                     | 3m           | Yes                | Yes             | Yes             | Yes             | Yes                                           | Yes                         |
|                                                                         |                     | 5m           | Yes                | Yes             | Yes             | Yes             | Yes                                           | Yes                         |
|                                                                         |                     | 10m          | Yes                | Yes             | Yes             | No              | Yes                                           | Yes                         |
| Long-distance camera cable<br>Long-distance right-angle camera cable    | FZ-VS4<br>FZ-VSL4   | 15m          | Yes                | Yes             | Yes             | No              | Yes                                           | Yes                         |

## Processing Items

\*The red items are available only with controllers with HALCON.

| Group                     | Icon                                                                                | Processing Item             |                                                                                                                        |
|---------------------------|-------------------------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------|
| Inspections / Measurement |    | Search                      | Used to identify the shapes and calculate the position of measurement objects.                                         |
|                           |    | Flexible Search             | Recognizing the shapes of workpieces with variation and detecting their positions.                                     |
|                           |    | Sensitive Search            | Search a small difference by dividing the search model in detail, and calculating the correlation.                     |
|                           |    | ECM Search                  | Used to search the similar part of model form input image. Detect the evaluation value and position.                   |
|                           |    | Ec Circle Search            | Extract circles using "round " shape information and get position, radius and quantity in high preciseness.            |
|                           |    | Shape Search+               | Used to Search the similar part of models from input image. Detect the evaluation value and position.                  |
|                           |    | Classification              | Used when various kinds of products on the assembly line need to be sorted and identified.                             |
|                           |    | Edge Position               | Measure position of measurement objects according to the color change in measurement area.                             |
|                           |    | Edge Pitch                  | Detect edges by color change in measurement area. Used for calculating number of pins of IC and connectors.            |
|                           |    | Scan Edge Position          | Measure peak/bottom edge position of workpieces according to the color change in separated measurement area.           |
|                           |    | Scan Edge Width             | Measure max/min/average width of workpieces according to the color change in separated measurement area.               |
|                           |    | Color Data                  | Used for detecting presence and mixed varieties of products by using color average and deviation.                      |
|                           |    | Gravity and Area            | Used to measure area, center of gravity of workpieces by extracting the color to be measured.                          |
|                           |    | Labeling                    | Used to measure number, area and gravity of workpieces by extracting registered color.                                 |
|                           |   | Label Data                  | Selecting one region of extracted Labeling, and get that measurement. Area and Gravity position can be got and judged. |
|                           |  | Labeling+                   | Extract objects of registered color, and measure many features such as number and circularity.                         |
|                           |  | Defect                      | Used for appearance measurement of plain-color measurement objects such as defects, stains and burrs.                  |
|                           |  | PreciseDefect               | Check the defect on the object. Parameters for extraction defect can be set precisely.                                 |
|                           |  | Fine Matching               | Difference can be detected by overlapping and comparing(matching) registered fine images with input images.            |
|                           |  | Character Inspection        | Recognize character according correlation search with model image registered in [Model Dictionary].                    |
|                           |  | Date Verification           | Reading character string is verified with internal date.                                                               |
|                           |  | Model Dictionary            | Register character pattern as dictionary. The pattern is used in [Character Inspection].                               |
|                           |  | Barcode+<br>(See note 1)    | Recognize barcode, verify and output decoded characters.                                                               |
|                           |  | 2DCode+<br>(See note 2)     | Recognize 2D code, verify and output decoded characters.                                                               |
|                           |  | Circle Angle                | Used for calculating angle of inclination of circular measurement objects.                                             |
| Image Capturing           |  | Camera Image Input          | To input images from cameras. And set up the conditions to input images from cameras.                                  |
|                           |  | Camera Image Input HDR      | Create high-dynamic range images by acquiring several images with different conditions.                                |
|                           |  | Camera Image Input HDR Lite | HDR function for FZ-SQ□ Intelligent Compact Cameras.                                                                   |
|                           |  | Camera Switching            | To switch the cameras used for measurement. Not input images from cameras again.                                       |
|                           |  | Measurement Image Switching | To switch the images used for measurement. Not input images from camera again.                                         |
| Correcting images         |  | Position Compensation       | Used when positions are differed. Correct measurement is performed by correcting position of input images.             |
|                           |  | Trapezoidal Correction+     | Rectify the trapezoidal deformed image.                                                                                |
|                           |  | Filtering                   | Used for processing images input from cameras in order to make them easier to be measured.                             |

**Note: 1.** Bar Codes that can be read : JAN/EAN/UPC (including add-on codes), Code 39, Codabar (NW-7), ITF (Interleaved 2 of 5), Code 93, Code 128, GS1-128, GS1 DataBar (RSS-14 / RSS Limited / RSS Expanded), Pharmacode  
**2.** 2D Codes that can be read : Data Matrix (ECC200), QR Code

\*The red items are available only with controllers with HALCON.

| Group                               | Icon                                                                                | Processing Item           |                                                                                                                |
|-------------------------------------|-------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------|
| Correcting images                   |    | Background Suppression    | To enhance contrast of images by extracting color in specified brightness.                                     |
|                                     |    | Color Gray Filter         | Color image is converted into monochrome images to emphasize specific color.                                   |
|                                     |    | Extract Color Filter      | Convert color image to color extracted image or binary image.                                                  |
|                                     |    | Anti Color Shading        | To remove the irregular color/pattern by uniformizing max.2 specified colors.                                  |
|                                     |    | Stripes Removal Filter+   | Remove the background pattern of stripes.                                                                      |
|                                     |    | Halation Cut+             | Remove halation from input image.                                                                              |
|                                     |    | Panorama+                 | Combine multiple image to create one big image.                                                                |
|                                     |    | Polar Transformation      | Rectify the image by polar transformation. Useful for OCR or pattern inspection printed on circle.             |
| Assisting inspections / measurement |    | Macro                     | Advanced arithmetic processing can be easily incorporated into workflow as macro processing items.             |
|                                     |    | Calculation               | Used when using the judge results and measured values of Procltem which are registered in processing units.    |
|                                     |    | Line Regression           | Used for calculating regression line from plural measurement coordinate.                                       |
|                                     |    | Circle Regression         | Used for calculating regression circle from plural measurement coordinate.                                     |
|                                     |    | Calibration+              | Transform (X,Y) position to the real coordinate system.                                                        |
|                                     |   | Set Unit Data             | Used to change the Procltem data (setting parameters,etc.) that has been set up in a scene.                    |
|                                     |  | Get Unit Data             | Used to get one data (measured results, setting parameters,etc.) of Procltem that has been set up in a scene.  |
|                                     |  | Set Unit Figure           | Used for re-setting the figure data (model, measurement area) registered in an unit.                           |
|                                     |  | Get Unit Figure           | Used for get the figure data (model, measurement area) registered in an unit.                                  |
|                                     |  | Trend Monitor             | Used for displaying the information about results on the monitor, facilitating to avoid NG and analyze causes. |
|                                     |  | Image Logging             | Used for saving the measurement images to the memory and USB memory.                                           |
|                                     |  | Data Logging              | Used for saving the measurement data to the memory and USB memory.                                             |
|                                     |  | Elapsed Time              | Used for calculating the elapsed time since the measurement trigger input.                                     |
|                                     |  | Wait                      | Processing is stopped only at the set time. The standby time is set by the unit of [ms].                       |
|                                     |  | Focus                     | Focus setting is supported.                                                                                    |
|                                     |  | Iris                      | Focus and aperture setting is supported.                                                                       |
| Branching processing                |  | Conditional Branch        | Used where more than two kinds of products on the production line need to detected separately.                 |
|                                     |  | End                       | This Procltem must be set up as the last processing unit of a branch.                                          |
|                                     |  | DI Branch                 | Same as Procltem "Branch". But you can change the targets of conditional branching via external inputs.        |
| Outputting results                  |  | Data Output               | Used when you need to output data to the external devices such as PLC or PC via serial ports.                  |
|                                     |  | Parallel Data Output      | Used when you need to output data to the external devices such as PLC or PC via parallel ports.                |
|                                     |  | Parallel Judgement Output | Used when you need to output judgement results to the external devices such as PLC or PC via parallel ports.   |
|                                     |  | Fieldbus Data Output      | Outputs data to an external device, such as a Programmable Controller, through a fieldbus interface.           |
| Displaying results on the monitor   |  | Result Display            | Used for displaying the texts or the figures in the camera image .                                             |
|                                     |  | Display Image File        | Display selected image file.                                                                                   |
|                                     |  | Display Last NG Image     | Display the last NG images.                                                                                    |

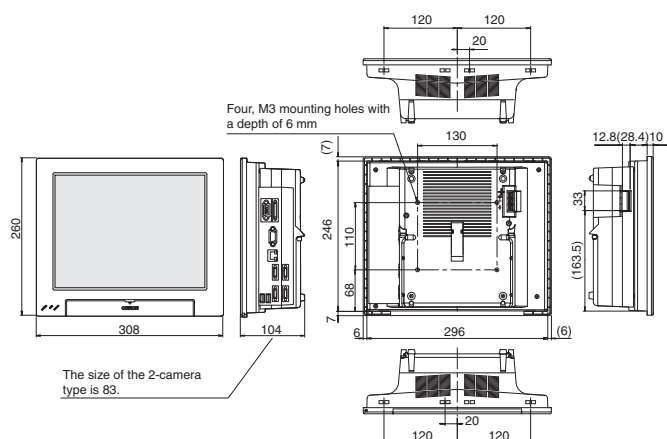
## External Dimensions

### Controllers

#### ■ LCD-integrated type

FJ-300□/FJ-300□-10

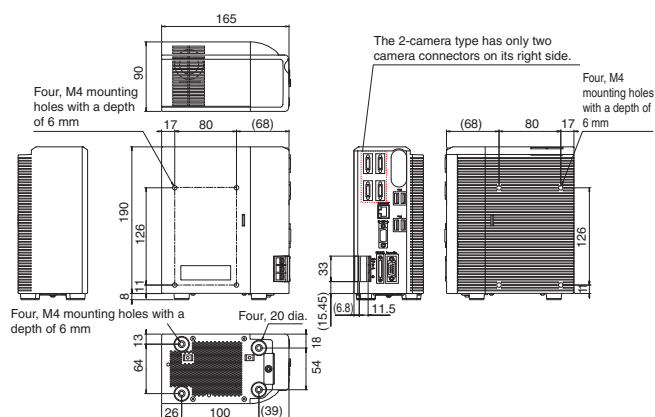
FJ-H300□/FJ-H300□-10



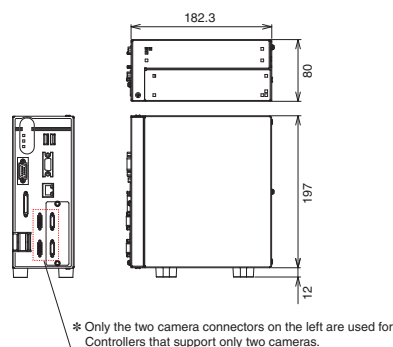
#### ■ Box-type

FJ-305□/FJ-305□-10

FJ-H305□/FJ-H305□-10



FJ-35□/FJ-35□-10

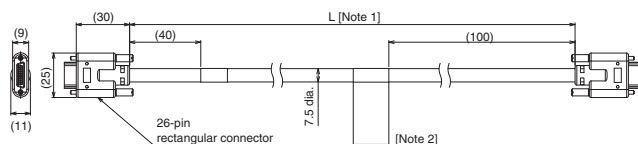


\* Only the two camera connectors on the left are used for Controllers that support only two cameras.

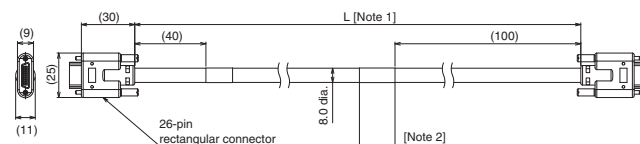
## Cable Camera Cable

### Camera Cable

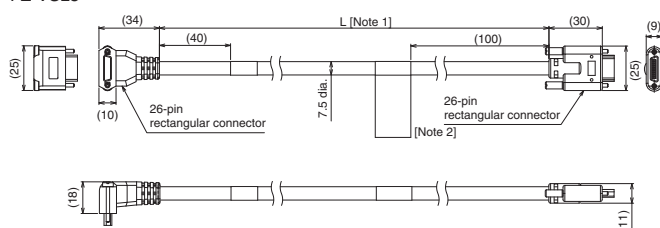
Camera Cable  
FZ-VS3



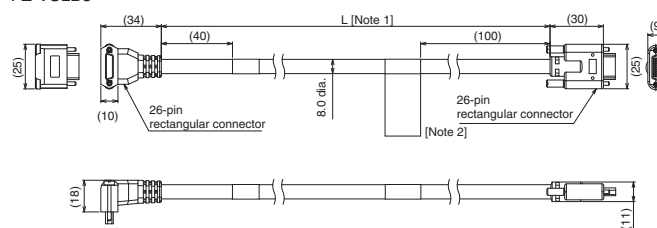
Bend resistant Camera Cable  
FZ-VSB3



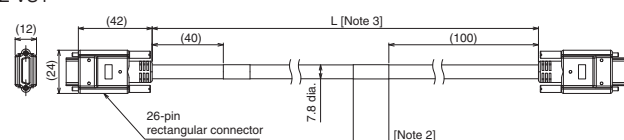
Right-angle Camera Cable  
FZ-VSL3



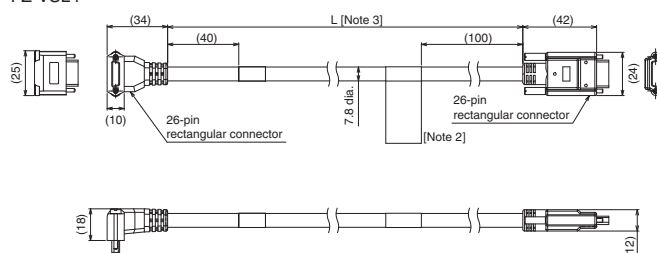
Bend resistant Right-angle Camera Cable  
FZ-VSLB3



Long-distance Camera Cable  
FZ-VS4



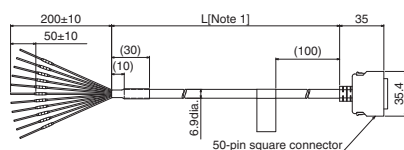
Long-distance Right-angle Camera Cable  
FZ-VSL4



Note1. Cable is available in 2m/3m/5m/10m.  
Note2. Each camera cables has polarity.  
Please ensure that the name plate side of the cable is connected to the controller.  
Note3. Cable is available in 15m.

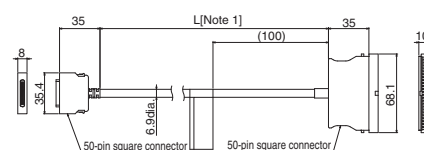
## Parallel Cable

FZ-VP



[Note1]: cable is available in 2m/5m.

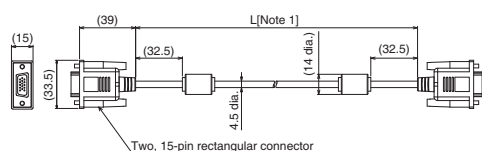
FZ-VPX



[Note1]: cable is available in 2m/5m.

## Monitor Cable

FZ-VM



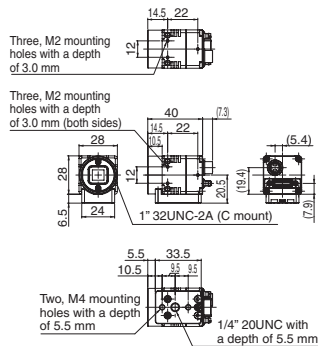
[Note1]: cable is available in 2m/5m.

## Cameras

### ■ Digital cameras

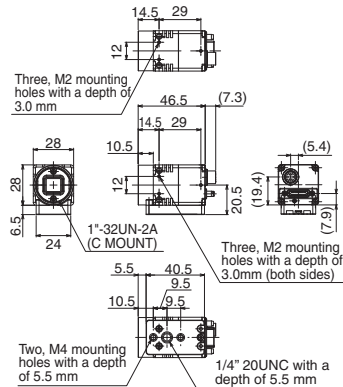
#### 300,000-pixel camera

FZ-S  
FZ-SC



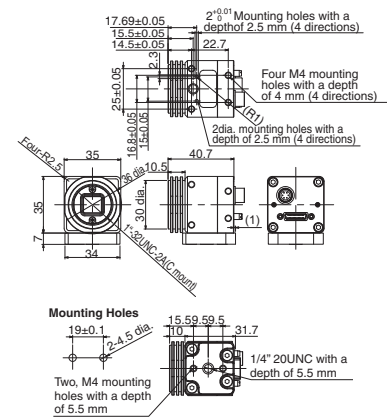
#### 2 million-pixel camera

FZ-S2M  
FZ-SC2M



#### 5 million-pixel camera

FZ-S5M3  
FZ-SC5M3

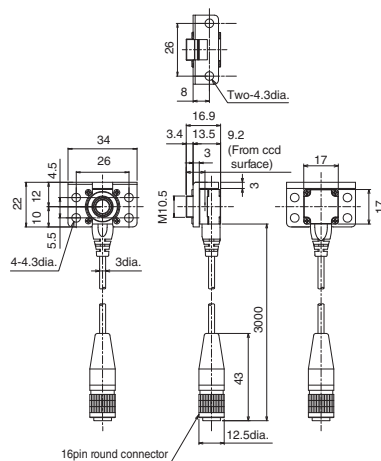


### ■ Small digital cameras

#### Camera head

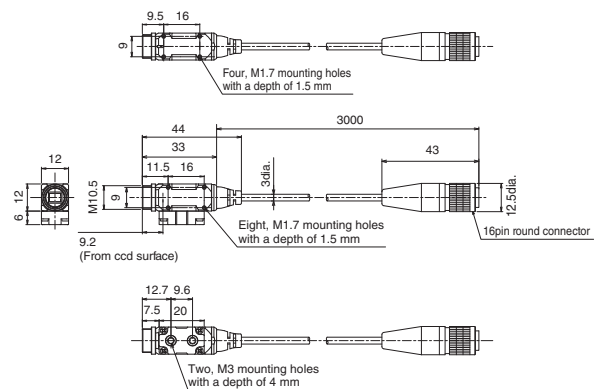
#### Flat camera

FZ-SF  
FZ-SFC



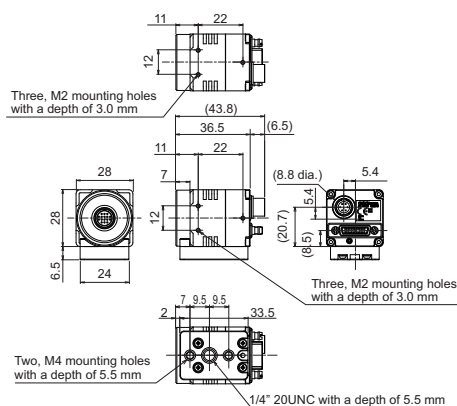
#### Pen-shaped camera

FZ-SP  
FZ-SPC



#### Camera amplifier

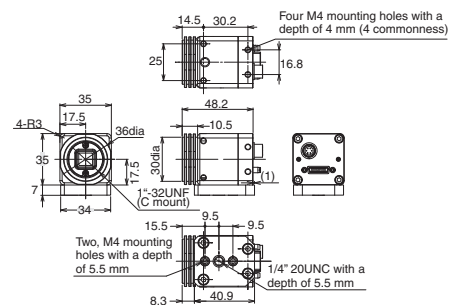
Can be used for both flat cameras and pen-shaped cameras



### ■ High speed camera

#### FZ-SHC

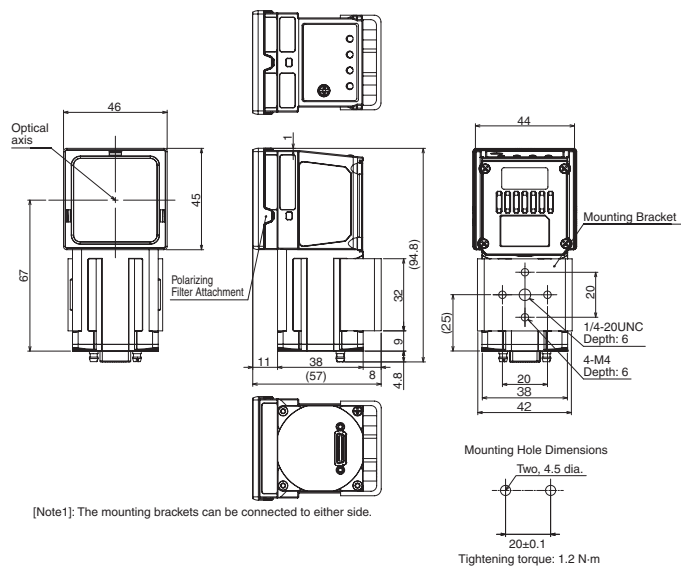
FZ-SH



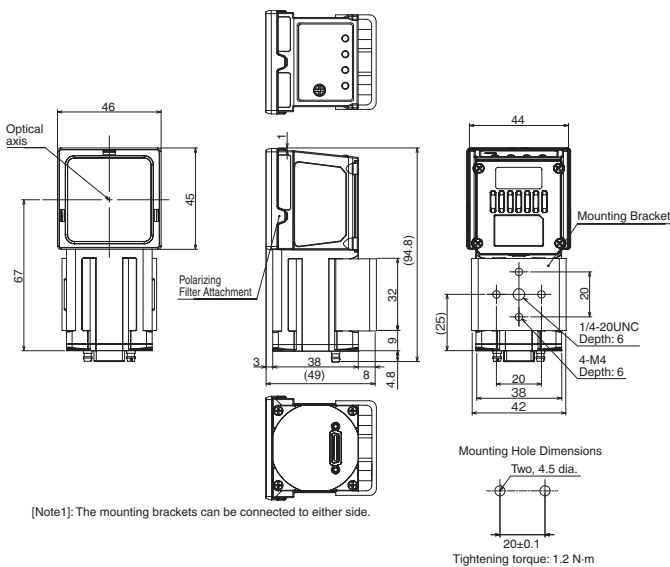
## Intelligent Compact Cameras

(Dimensional drawings are provided here only for the products that have undergone design changes as of Dec. 2012.)

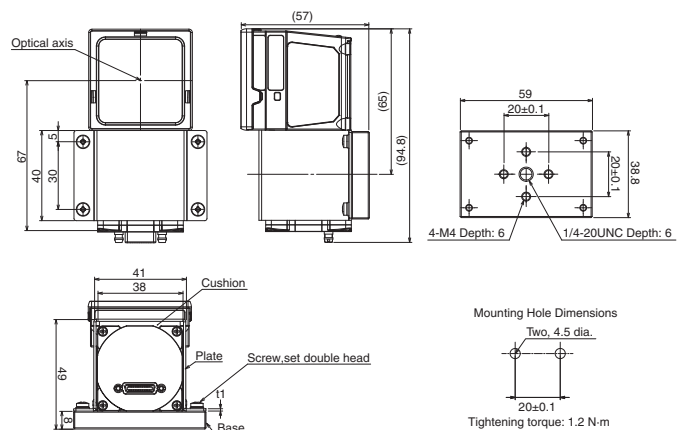
### Narrow view / Standard FZ-SQ010F FZ-SQ050F



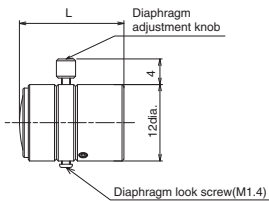
### Wide View FZ-SQ100F (long-distance) FZ-SQ100N (short-distance)



See the diagram below when mounting bracket FQ-XL2 is attached.

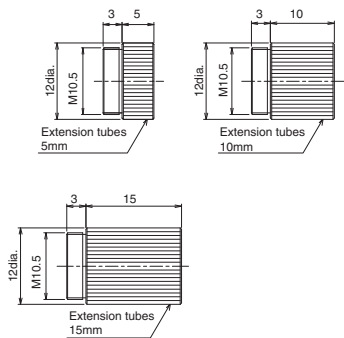


Lens for small camera  
FZ-LES Series

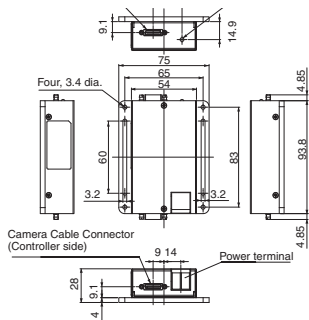


| LensesModel | Focal length | Brightness | Maximum outside diameter | Overall length |
|-------------|--------------|------------|--------------------------|----------------|
| FZ-LES3     | 3mm          | F2.0       | 12 dia.                  | 16.4mm         |
| FZ-LES6     | 6mm          | F2.0       | 12 dia.                  | 19.7mm         |
| FZ-LES16    | 16mm         | F3.4       | 12 dia.                  | 23.1mm         |
| FZ-LES30    | 30mm         | F3.4       | 12 dia.                  | 25.5mm         |

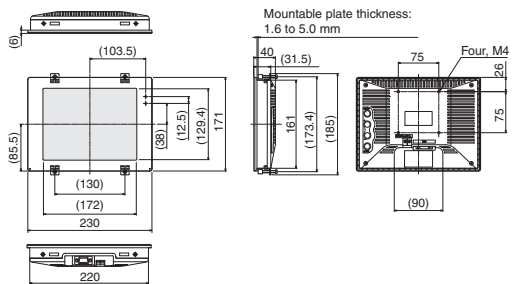
Extension Tubes for small camera  
FZ-LESR



Camera Cable Extension Unit  
FZ-VSJ

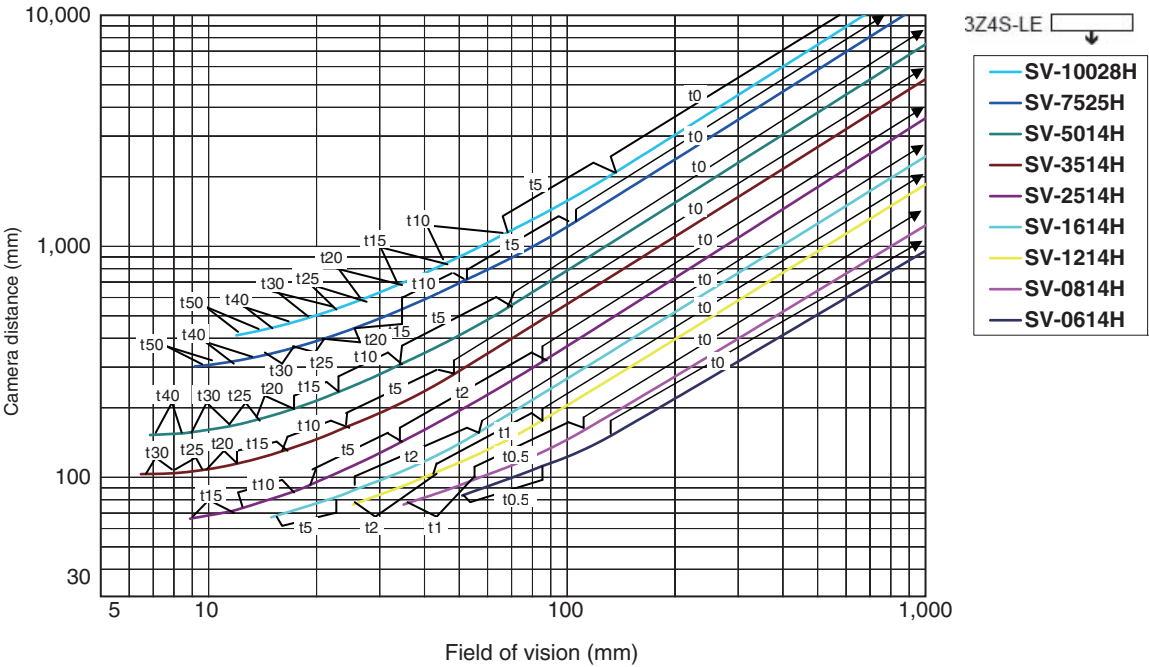


LCD Monitor  
FZ-M08

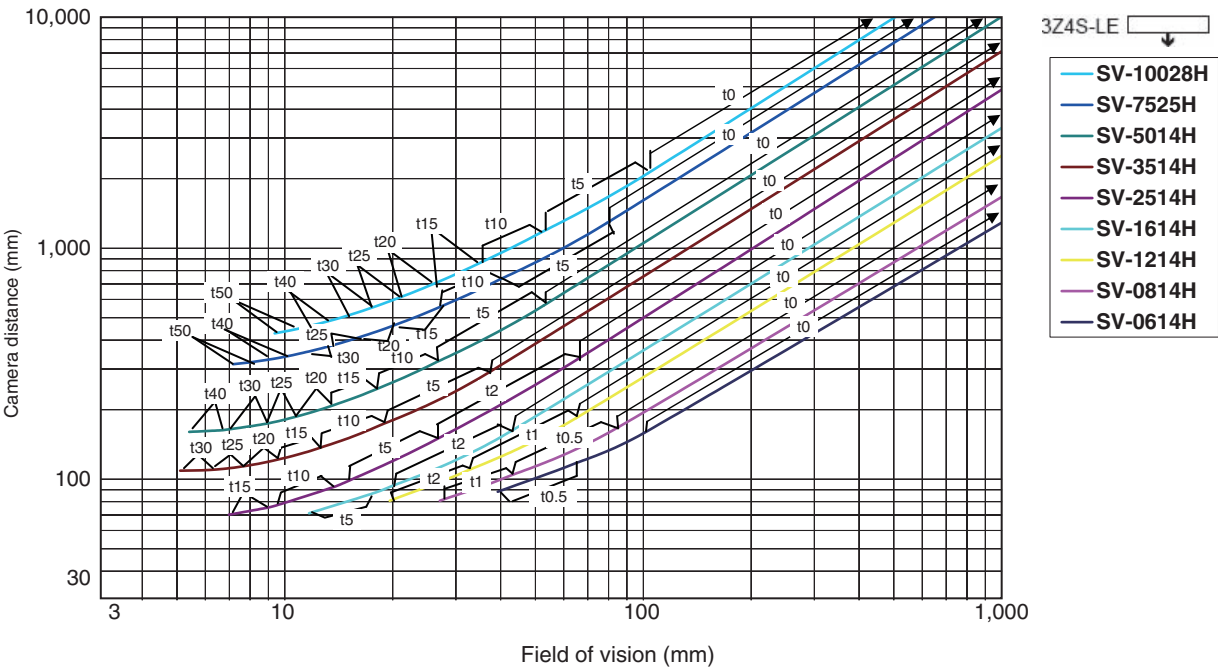


Optical Chart

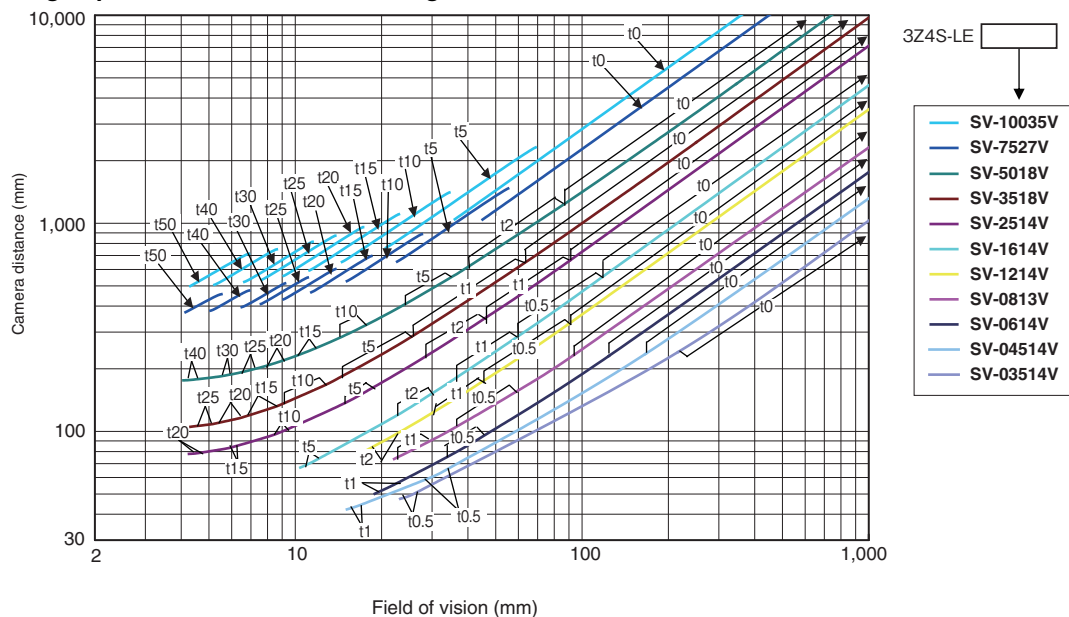
5 million-pixel digital camera FZ-S□5M3



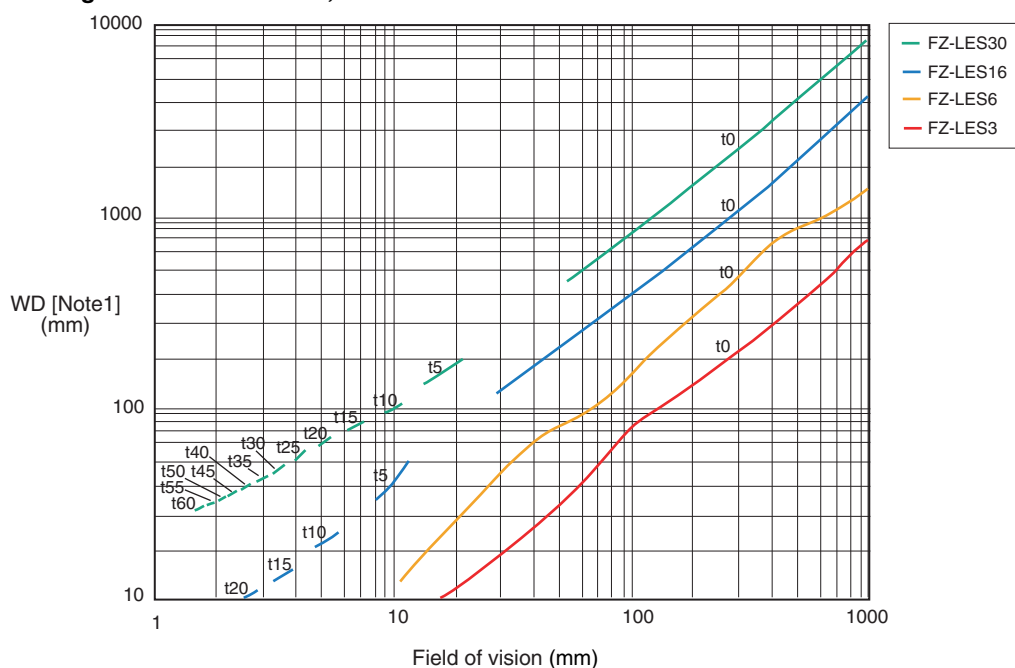
2 million-pixel digital camera FZ-S□2M



### 300,000-pixel High-speed camera FZ-SH□, and Digital camera FZ-S□



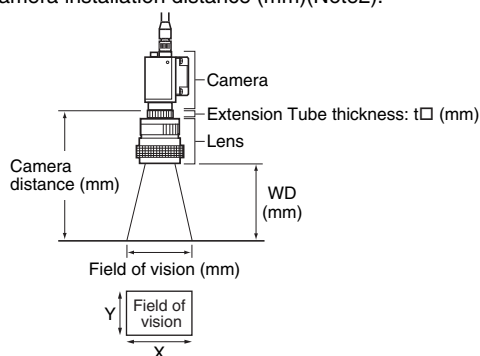
### 300,000-pixel small digital cameras FZ-SF□, FZ-SP□



**Note: 1.** The vertical axis represents WD, not installation distance.

#### ■ Meaning of Optical Chart

The X axis of the optical chart shows the field of vision (mm)(Note1), and the Y axis of the optical chart shows the camera installation distance (mm)(Note2).



**Note: 1.** The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.  
**2.** The vertical axis represents WD for small cameras.

## Intelligent Compact Cameras

■ **Narrow View**

FZ-SQ010F

■ **Standard**

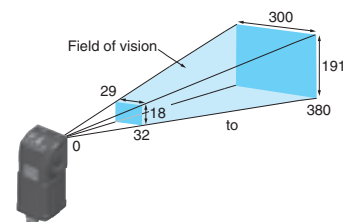
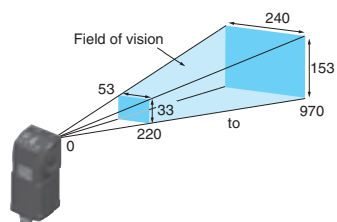
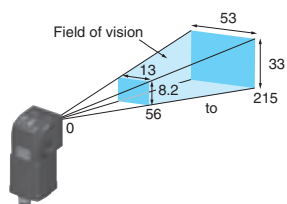
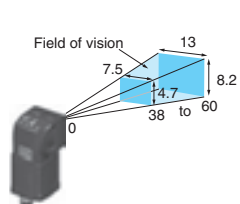
FZ-SQ050F

■ **Wide View (Long-distance)**

FZ-SQ100F

■ **Wide View (Short-distance)**

FZ-SQ100N



MEMO

MEMO

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## LED Safety

### ⚠ WARNING

The lighting of Intelligent Compact Cameras emits visible light, which may adversely affect the eyes in rare instances.  
Do not look directly into the light emitted from the lighting. When the subject is a specular reflective object, protect your eyes from reflected light.



### Displaying LED Labels

Attached the enclosed warning label in a readily visible location near the product, such as on the cable.



**Note: Do not use this document to operate the Unit.**

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Tokyo, JAPAN

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