

**LIST OF FIBERS**

**Thru-beam type (one pair set)**



Fibers are listed in alphabetic order. Refer to p.5~ "Fiber Selection" for details of each fiber.

| Model No.                     | Sensing range (mm in) (Note 1) |                        |               |               |               |               |               |              |              | Dimensions |
|-------------------------------|--------------------------------|------------------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|------------|
|                               | Red LED                        |                        |               | Blue LED      |               |               | Green LED     |              |              |            |
|                               | LONG                           | STD                    | S-D           | LONG          | STD           | FAST          | LONG          | STD          | FAST         |            |
| <b>FT-140</b>                 | 19,600 771.654 (Note 2)        | 16,000 629.921         | 8,700 342.520 | 8,100 318.898 | 4,000 157.480 | 3,100 122.047 | 5,000 196.850 | 2,400 94.488 | 1,600 62.992 | P.51       |
| <b>FT-30</b>                  | 310 12.205                     | 150 5.906              | 60 2.362      | 55 2.165      | 28 1.102      | 18 0.709      | 28 1.102      | 13 0.512     | 9 0.354      | P.51       |
| <b>FT-31</b>                  | 290 11.417                     | 142 5.591              | 49 1.929      | 50 1.969      | 25 0.984      | 16 0.630      | 24 0.945      | 12 0.472     | 8 0.315      | P.51       |
| <b>FT-31S</b>                 | 290 11.417                     | 140 5.512              | 49 1.929      | 50 1.969      | 25 0.984      | 16 0.630      | 24 0.945      | 12 0.472     | 8 0.315      | P.51       |
| <b>FT-31W</b>                 | 230 9.055                      | 100 3.937              | 30 1.181      | 31 1.220      | 15 0.591      | 10 0.394      | 15 0.591      | 8 0.315      | 5 0.197      | P.51       |
| <b>FT-40</b>                  | 900 35.433                     | 450 17.717             | 180 7.087     | 155 6.102     | 76 2.992      | 45 1.772      | 90 3.543      | 40 1.575     | 26 1.024     | P.51       |
| <b>FT-42</b>                  | 800 31.496                     | 400 15.748             | 150 5.906     | 150 5.906     | 75 2.953      | 40 1.575      | 80 3.150      | 35 1.378     | 24 0.945     | P.51       |
| <b>FT-42S</b>                 | 800 31.496                     | 400 15.748             | 150 5.906     | 150 5.906     | 75 2.953      | 40 1.575      | 70 2.756      | 35 1.378     | 24 0.945     | P.51       |
| <b>FT-42W</b>                 | 710 27.953                     | 330 12.992             | 130 5.118     | 110 4.331     | 50 1.969      | 30 1.181      | 56 2.205      | 28 1.102     | 20 0.787     | P.51       |
| <b>FT-43</b>                  | 1,400 55.118                   | 610 24.016             | 250 9.843     | 220 8.661     | 110 4.331     | 75 2.953      | 120 4.724     | 61 2.402     | 43 1.693     | P.51       |
| <b>FT-45X</b>                 | 1,100 43.307                   | 570 22.441             | 230 9.055     | 130 5.118     | 65 2.559      | 45 1.772      | 70 2.756      | 34 1.339     | 25 0.984     | P.52       |
| <b>FT-A11</b>                 | 3,600 141.732 (Note 2)         | 2,700 106.299          | 1,000 39.370  | 880 34.646    | 420 16.535    | 270 10.630    | 430 16.929    | 220 8.661    | 120 4.724    | P.52       |
| <b>FT-A11W</b>                | 3,600 141.732 (Note 2)         | 3,100 122.047          | 1,200 47.244  | 820 32.283    | 420 16.535    | 280 11.024    | 460 18.110    | 220 8.661    | 140 5.512    | P.52       |
| <b>FT-A32</b>                 | 3,600 141.732 (Note 2)         | 3,600 141.732          | 2,900 114.173 | 1,800 70.866  | 710 27.953    | 400 15.748    | 970 38.189    | 320 12.598   | 180 7.087    | P.52       |
| <b>FT-A32W</b>                | 3,600 141.732 (Note 2)         | 3,600 141.732 (Note 2) | 2,100 82.677  | 2,000 78.740  | 830 32.677    | 420 16.535    | 1,000 39.370  | 350 13.780   | 180 7.087    | P.52       |
| <b>FT-AL05</b>                | 680 26.772                     | 330 12.992             | 130 5.118     | 100 3.937     | 48 1.890      | 32 1.260      | 56 2.205      | 27 1.063     | 18 0.709     | P.52       |
| <b>FT-E13</b>                 | 13 0.512                       | 6 0.236                | 2 0.079       | 2 0.079       | 1 0.039       | —             | 1 0.039       | —            | —            | P.52       |
| <b>FT-E23</b>                 | 65 2.559                       | 31 1.220               | 12 0.472      | 8 0.315       | 4 0.157       | 3 0.118       | 4 0.157       | 2 0.079      | 1 0.039      | P.52       |
| <b>FT-H13-FM2</b>             | 880 34.646                     | 440 17.323             | 155 6.102     | 72 2.835      | 36 1.417      | 26 1.024      | 32 1.260      | 16 0.630     | 10 0.394     | P.52       |
| <b>FT-H20-J20-S (Note 3)</b>  | 390 15.354                     | 200 7.874              | 60 2.362      | 60 2.362      | 20 0.787      | —             | 35 1.378      | —            | —            | P.53       |
| <b>FT-H20-J30-S (Note 3)</b>  | 390 15.354                     | 200 7.874              | 60 2.362      | 60 2.362      | 20 0.787      | —             | 35 1.378      | —            | —            | P.53       |
| <b>FT-H20-J50-S (Note 3)</b>  | 390 15.354                     | 200 7.874              | 60 2.362      | 60 2.362      | 20 0.787      | —             | 35 1.378      | —            | —            | P.53       |
| <b>FT-H20-M1</b>              | 550 21.654                     | 280 11.024             | 90 3.543      | 100 3.937     | 50 1.969      | 35 1.378      | 50 1.969      | 25 0.984     | 18 0.709     | P.53       |
| <b>FT-H20-VJ50-S (Note 3)</b> | 550 21.654                     | 280 11.024             | 90 3.543      | 85 3.346      | 30 1.181      | —             | 50 1.969      | —            | —            | P.53       |
| <b>FT-H20-VJ80-S (Note 3)</b> | 550 21.654                     | 280 11.024             | 90 3.543      | 85 3.346      | 30 1.181      | —             | 50 1.969      | —            | —            | P.53       |
| <b>FT-H20W-M1</b>             | 310 12.205                     | 140 5.512              | 50 1.969      | 44 1.732      | 22 0.866      | 14 0.551      | 22 0.866      | 11 0.433     | 7 0.276      | P.53       |
| <b>FT-H30-M1V-S (Note 4)</b>  | 250 9.843                      | 125 4.922              | 50 1.969      | —             | —             | —             | —             | —            | —            | P.53       |
| <b>FT-H35-M2</b>              | 550 21.654                     | 280 11.024             | 90 3.543      | 100 3.937     | 50 1.969      | 35 1.378      | 50 1.969      | 25 0.984     | 18 0.709     | P.53       |
| <b>FT-H35-M2S6</b>            | 550 21.654                     | 280 11.024             | 90 3.543      | 100 3.937     | 50 1.969      | 35 1.378      | 50 1.969      | 25 0.984     | 18 0.709     | P.53       |
| <b>FT-HL80Y</b>               | 3,500 137.795                  | 1,350 53.150           | 480 18.898    | 80 3.150      | 40 1.575      | 25 0.984      | 110 4.331     | 55 2.165     | 40 1.575     | P.53       |
| <b>FT-KS40</b>                | 3,600 141.732 (Note 2)         | 2,700 106.299          | 850 33.465    | 740 29.134    | 280 11.024    | 220 8.661     | 420 16.535    | 180 7.087    | 81 3.189     | P.54       |
| <b>FT-KV26</b>                | 710 27.953                     | 310 12.205             | 120 4.724     | 81 3.189      | 36 1.417      | 21 0.827      | 44 1.732      | 8 0.315      | —            | P.54       |
| <b>FT-KV40</b>                | 3,600 141.732 (Note 2)         | 2,500 98.425           | 1,000 39.370  | 710 27.953    | 270 10.630    | 210 8.268     | 420 16.535    | 180 7.087    | 100 3.937    | P.54       |
| <b>FT-KV40W</b>               | 3,600 141.732 (Note 2)         | 2,000 78.740           | 810 31.890    | 860 33.858    | 400 15.748    | 260 10.236    | 420 16.535    | 210 8.268    | 140 5.512    | P.54       |
| <b>FT-L80Y</b>                | 3,500 137.795 (Note 2)         | 1,500 59.055           | 530 20.866    | 160 6.299     | 80 3.150      | 50 1.969      | 160 6.299     | 80 3.150     | 50 1.969     | P.54       |
| <b>FT-R31</b>                 | 290 11.417                     | 130 5.118              | 49 1.929      | 45 1.772      | 23 0.906      | 15 0.591      | 24 0.945      | 12 0.472     | 8 0.315      | P.54       |
| <b>FT-R40</b>                 | 710 27.953                     | 330 12.992             | 130 5.118     | 110 4.331     | 54 2.126      | 36 1.417      | 55 2.165      | 26 1.024     | 20 0.787     | P.54       |
| <b>FT-R41W</b>                | 710 27.953                     | 330 12.992             | 130 5.118     | 110 4.331     | 50 1.969      | 30 1.181      | 56 2.205      | 28 1.102     | 20 0.787     | P.54       |
| <b>FT-R42W</b>                | 1,600 62.992                   | 770 30.315             | 320 12.598    | 280 11.024    | 130 5.118     | 90 3.543      | 140 5.512     | 70 2.756     | 47 1.850     | P.54       |
| <b>FT-R43</b>                 | 710 27.953                     | 290 11.417             | 110 4.331     | 96 3.780      | 50 1.969      | 33 1.299      | 53 2.087      | 25 0.984     | 17 0.669     | P.54       |

Notes: 1) Note that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.

2) The fiber cable length practically limits the sensing range.

3) Heat-resistant joint fibers and ordinary-temperature fibers (FT-42) are sold as a set.

4) Sold as a set comprising vacuum type fiber + photo-terminal (FV-BR1) + fiber at atmospheric side (FT-J8).

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FX-301-F

## LIST OF FIBERS

### Thru-beam type (one pair set)



Fibers are listed in alphabetic order. Refer to p.5~ "Fiber Selection" for details of each fiber.

| Model No.        | Sensing range (mm in) (Note 1) |              |            |            |            |           |            |           |           |      | Dimensions |
|------------------|--------------------------------|--------------|------------|------------|------------|-----------|------------|-----------|-----------|------|------------|
|                  | Red LED                        |              |            | Blue LED   |            |           | Green LED  |           |           |      |            |
|                  | LONG                           | STD          | S-D        | LONG       | STD        | FAST      | LONG       | STD       | FAST      |      |            |
| <b>FT-R44Y</b>   | 710 27.953                     | 290 11.417   | 110 4.331  | 96 3.780   | 50 1.969   | 33 1.299  | 53 2.087   | 25 0.984  | 17 0.669  | P.55 |            |
| <b>FT-R60Y</b>   | 1,800 70.866                   | 830 32.677   | 350 13.780 | 250 9.843  | 120 4.724  | 80 3.150  | 140 5.512  | 70 2.756  | 50 1.969  | P.55 |            |
| <b>FT-S11</b>    | 80 3.150                       | 31 1.220     | 14 0.551   | 12 0.472   | 5 0.197    | 4 0.157   | 5 0.197    | 2.5 0.098 | 1.5 0.059 | P.55 |            |
| <b>FT-S20</b>    | 310 12.205                     | 150 5.906    | 60 2.362   | 55 2.165   | 28 1.102   | 18 0.709  | 28 1.102   | 13 0.512  | 9 0.354   | P.55 |            |
| <b>FT-S21</b>    | 290 11.417                     | 142 5.591    | 49 1.929   | 50 1.969   | 25 0.984   | 16 0.630  | 24 0.945   | 12 0.472  | 8 0.315   | P.55 |            |
| <b>FT-S21W</b>   | 230 9.055                      | 100 3.937    | 30 1.181   | 31 1.220   | 15 0.591   | 10 0.394  | 15 0.591   | 8 0.315   | 5 0.197   | P.55 |            |
| <b>FT-S30</b>    | 900 35.433                     | 450 17.717   | 180 7.087  | 155 6.102  | 76 2.992   | 45 1.772  | 90 3.543   | 40 1.575  | 26 1.024  | P.55 |            |
| <b>FT-S31W</b>   | 710 27.953                     | 330 12.992   | 130 5.118  | 110 4.331  | 50 1.969   | 30 1.181  | 56 2.205   | 28 1.102  | 20 0.787  | P.55 |            |
| <b>FT-S32</b>    | 2,400 94.488                   | 1,100 43.307 | 510 20.079 | 420 16.535 | 200 7.874  | 130 5.118 | 220 8.661  | 100 3.937 | 72 2.835  | P.55 |            |
| <b>FT-V23</b>    | 380 14.961                     | 170 6.693    | 63 2.480   | 65 2.559   | 26 1.024   | 18 0.709  | 26 1.024   | 13 0.512  | 8 0.315   | P.55 |            |
| <b>FT-V24W</b>   | 90 3.543                       | 40 1.575     | 15 0.591   | 6 0.236    | 2 0.079    | —         | 3 0.118    | —         | —         | P.56 |            |
| <b>FT-V25</b>    | 200 7.874                      | 90 3.543     | 35 1.378   | 25 0.984   | 12 0.472   | 9 0.354   | 16 0.630   | 7 0.276   | 5 0.197   | P.56 |            |
| <b>FT-V30</b>    | 420 16.535                     | 200 7.874    | 70 2.756   | 80 3.150   | 40 1.575   | 22 0.866  | 40 1.575   | 14 0.551  | 8 0.315   | P.56 |            |
| <b>FT-V40</b>    | 3,600 141.732 (Note 2)         | 1,700 66.929 | 690 27.165 | 400 15.748 | 200 7.874  | 130 5.118 | 200 7.874  | 100 3.937 | 65 2.559  | P.56 |            |
| <b>FT-V80Y</b>   | 800 31.496                     | 400 15.748   | 140 5.512  | 120 4.724  | 60 2.362   | 35 1.378  | 80 3.150   | 40 1.575  | 25 0.984  | P.56 |            |
| <b>FT-Z20HBW</b> | 290 11.417                     | 130 5.118    | 50 1.969   | 39 1.535   | 19 0.748   | 12 0.472  | 20 0.787   | 10 0.394  | 6 0.236   | P.56 |            |
| <b>FT-Z20W</b>   | 570 22.441                     | 250 9.843    | 90 3.543   | 82 3.228   | 37 1.457   | 23 0.906  | 44 1.732   | 18 0.709  | 11 0.433  | P.56 |            |
| <b>FT-Z30</b>    | 1,900 74.803                   | 850 33.465   | 340 13.386 | 120 4.724  | 60 2.362   | 40 1.575  | 96 3.780   | 45 1.772  | 30 1.181  | P.56 |            |
| <b>FT-Z30E</b>   | 3,100 122.047                  | 1,600 62.992 | 670 26.378 | 540 21.260 | 250 9.843  | 170 6.693 | 270 10.630 | 130 5.118 | 91 3.583  | P.56 |            |
| <b>FT-Z30EW</b>  | 2,700 106.299                  | 1,200 47.244 | 500 19.685 | 540 21.260 | 260 10.236 | 170 6.693 | 260 10.236 | 120 4.724 | 88 3.465  | P.57 |            |
| <b>FT-Z30H</b>   | 3,100 122.047                  | 1,600 62.992 | 670 26.378 | 650 25.591 | 310 12.205 | 200 7.874 | 340 13.386 | 160 6.299 | 110 4.331 | P.57 |            |
| <b>FT-Z30HW</b>  | 3,100 122.047                  | 1,500 59.055 | 610 24.016 | 540 21.260 | 260 10.236 | 170 6.693 | 260 10.236 | 120 4.724 | 88 3.465  | P.57 |            |
| <b>FT-Z30W</b>   | 1,400 55.118                   | 640 25.197   | 260 10.236 | 83 3.268   | 40 1.575   | 25 0.984  | 73 2.874   | 36 1.417  | 25 0.984  | P.57 |            |
| <b>FT-Z40HBW</b> | 710 27.953                     | 330 12.992   | 130 5.118  | 110 4.331  | 50 1.969   | 30 1.181  | 56 2.205   | 28 1.102  | 20 0.787  | P.57 |            |
| <b>FT-Z40W</b>   | 1,300 51.181                   | 630 24.803   | 260 10.236 | 180 7.087  | 90 3.543   | 60 2.362  | 90 3.543   | 50 1.969  | 35 1.378  | P.57 |            |
| <b>FT-Z802Y</b>  | 3,500 137.795                  | 1,500 59.055 | 530 20.866 | 320 12.598 | 160 6.299  | 120 4.724 | 160 6.299  | 80 3.150  | 60 2.362  | P.57 |            |

Notes: 1) Note that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.  
2) The fiber cable length practically limits the sensing range.

## LIST OF FIBERS

### Retroreflective type



Fibers are listed in alphabetic order. Refer to p.5~ "Fiber Selection" for details of each fiber.

| Model No.       | Sensing range (mm in) (Note 1, 2) |                            |                            |                          |                          |                         |                          |                         |      | Dimensions |
|-----------------|-----------------------------------|----------------------------|----------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-------------------------|------|------------|
|                 | Red LED                           |                            |                            | Blue LED                 |                          |                         | Green LED                |                         |      |            |
|                 | LONG                              | STD                        | S-D                        | LONG                     | STD                      | FAST                    | LONG                     | STD                     | FAST |            |
| <b>FR-KZ22E</b> | 15 to 330 0.591 to 12.992         | 15 to 210 0.591 to 8.268   | 15 to 90 0.591 to 3.543    | —                        | —                        | —                       | —                        | —                       | —    | P.58       |
| <b>FR-KZ50E</b> | 20 to 300 0.787 to 11.811         | 20 to 200 0.787 to 7.874   | 20 to 200 0.787 to 7.874   | 20 to 160 0.787 to 6.299 | 20 to 100 0.787 to 3.937 | 20 to 60 0.787 to 2.362 | 20 to 110 0.787 to 4.331 | 20 to 54 0.787 to 2.126 | —    | P.58       |
| <b>FR-KZ50H</b> | 20 to 300 0.787 to 11.811         | 20 to 200 0.787 to 7.874   | 20 to 200 0.787 to 7.874   | 20 to 140 0.787 to 5.512 | 20 to 70 0.787 to 2.756  | 20 to 52 0.787 to 2.047 | 20 to 90 0.787 to 3.543  | 20 to 40 0.787 to 1.575 | —    | P.58       |
| <b>FR-Z50HW</b> | 100 to 810 3.937 to 31.890        | 100 to 580 3.937 to 22.835 | 100 to 270 3.937 to 10.630 | —                        | —                        | —                       | —                        | —                       | —    | P.58       |

- Notes: 1) Note that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.  
 The sensing range of **FR-KZ22E** is specified for the attached reflector. The sensing range of **FR-KZ50E** and **FR-KZ50H** is specified for the attached reflector **RF-003**. The sensing range of **FR-Z50HW** is specified for the **RF-13**.  
 2) The sensing range is the possible setting range for the attached reflector. The fiber can detect an object less than setting range for the reflector. However, note that if there are any white or highly-reflective surfaces near the fiber head, reflected incident light may affect the fiber head. If this occurs, adjust the threshold value of the amplifier unit before use.

### Sensing range when using in combination with FR-Z50HW reflector (Optional)

The sensing ranges are the value for red LED types.

| Reflector Model No. | Sensing range (mm in)         |                              |                              |
|---------------------|-------------------------------|------------------------------|------------------------------|
|                     | FX-311                        |                              |                              |
|                     | LONG                          | STD                          | S-D                          |
| <b>RF-230</b>       | 100 to 3,200 3.937 to 125.984 | 100 to 2,000 3.937 to 78.740 | 100 to 1,000 3.937 to 39.370 |
| <b>RF-220</b>       | 100 to 2,400 3.937 to 94.488  | 100 to 1,300 3.937 to 51.181 | 100 to 600 3.937 to 23.622   |
| <b>RF-210</b>       | 100 to 1,700 3.937 to 66.929  | 100 to 910 3.937 to 35.827   | 100 to 460 3.937 to 18.110   |

Note: The sensing range is the possible setting range for the reflector. The fiber can detect an object less than 100 mm 3.937 in. However, note that if there are any white or highly-reflective surfaces near the fiber head, reflected incident light may affect the fiber head. If this occurs, adjust the threshold value of the amplifier unit before use.

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LASER SENSORS

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MICRO PHOTO-ELECTRIC SENSORS

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PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

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FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

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**FX-100**

**FX-300**

**FX-410**

**FX-311**

FX-301-F7/  
FX-301-F

**LIST OF FIBERS**

**Reflective type**



Fibers are listed in alphabetic order. Refer to p.5~ "Fiber Selection" for details of each fiber.

| Model No.                       | Sensing range (mm in) (Note 1, 2) / Description   |                          |                        |          |                          |                          |                          |                         |                           |      | Dimensions |
|---------------------------------|---|--------------------------|------------------------|----------|--------------------------|--------------------------|--------------------------|-------------------------|---------------------------|------|------------|
|                                 | Red LED   |                          |                        | Blue LED |                          |                          | Green LED                |                         |                           |      |            |
|                                 | LONG  | STD                      | S-D                    | LONG     | STD                      | FAST                     | LONG                     | STD                     | FAST                      |      |            |
| <b>FD-30</b>                    | 110 4.331   | 50 1.969                 | 18 0.709               | 19 0.748 | 9 0.354                  | 6 0.236                  | 9 0.354                  | 4.5 0.177               | 2.5 0.098                 |      | P.59       |
| <b>FD-31</b>                    | 95 3.740  | 45 1.772                 | 16 0.630               | 18 0.709 | 8 0.315                  | 5 0.197                  | 8 0.315                  | 4 0.157                 | 2 0.079                   |      | P.59       |
| <b>FD-31W</b>                   | 40 1.575  | 20 0.787                 | 10 0.394               | 7 0.276  | 4 0.157                  | 1 to 2.5 0.039 to 0.098  | 5 0.197                  | 1 to 2 0.039 to 0.079   | ————                      |      | P.59       |
| <b>FD-32G</b>                   | 120 4.724   | 60 2.362                 | 20 0.787               | 22 0.866 | 11 0.433                 | 8 0.315                  | 15 0.591                 | 6 0.236                 | 4 0.157                   |      | P.59       |
| <b>FD-32GX</b>                  | 140 5.512   | 70 2.756                 | 25 0.984               | 25 0.984 | 11 0.433                 | 8 0.315                  | 16 0.630                 | 6 0.236                 | 4 0.157                   |      | P.59       |
| <b>FD-40</b>                    | 110 4.331   | 50 1.969                 | 18 0.709               | 19 0.748 | 9 0.354                  | 6 0.236                  | 9 0.354                  | 4.5 0.177               | 2.5 0.098                 |      | P.59       |
| <b>FD-41</b>                    | 95 3.740  | 45 1.772                 | 16 0.630               | 18 0.709 | 8 0.315                  | 5 0.197                  | 8 0.315                  | 4 0.157                 | 2 0.079                   |      | P.59       |
| <b>FD-41S</b>                   | 95 3.740  | 45 1.772                 | 16 0.630               | 18 0.709 | 8 0.315                  | 5 0.197                  | 8 0.315                  | 4 0.157                 | 2 0.079                   |      | P.59       |
| <b>FD-41SW</b>                  | 40 1.575  | 20 0.787                 | 10 0.394               | 9 0.354  | 1 to 4 0.039 to 0.157    | 1 to 2.5 0.039 to 0.098  | 1 to 4 0.039 to 0.157    | 1 to 2 0.039 to 0.079   | ————                      |      | P.59       |
| <b>FD-41W</b>                   | 220 8.661   | 95 3.740                 | 40 1.575               | 32 1.260 | 1 to 15 0.039 to 0.591   | 1 to 9 0.039 to 0.354    | 17 0.669                 | 1 to 7.5 0.039 to 0.295 | 1.5 to 4.5 0.059 to 0.177 |      | P.59       |
| <b>FD-42G</b>                   | 120 4.724   | 60 2.362                 | 20 0.787               | 22 0.866 | 11 0.433                 | 8 0.315                  | 15 0.591                 | 6 0.236                 | 4 0.157                   |      | P.60       |
| <b>FD-42GW</b>                  | 85 3.346  | 35 1.378                 | 14 0.551               | 14 0.551 | 7 0.276                  | 5 0.197                  | 6 0.236                  | 4 0.157                 | 2 0.079                   |      | P.60       |
| <b>FD-60</b>                    | 350 13.780  | 160 6.299                | 70 2.756               | 55 2.165 | 28 1.102                 | 18 0.709                 | 30 1.181                 | 15 0.591                | 10 0.394                  |      | P.60       |
| <b>FD-61</b>                    | 320 12.598  | 145 5.709                | 60 2.362               | 48 1.890 | 24 0.945                 | 16 0.630                 | 26 1.024                 | 13 0.512                | 8 0.315                   |      | P.60       |
| <b>FD-61G</b>                   | 200 7.874   | 90 3.543                 | 40 1.575               | 46 1.811 | 23 0.906                 | 15 0.591                 | 26 1.024                 | 12 0.472                | 8 0.315                   |      | P.60       |
| <b>FD-61S</b>                   | 320 12.598  | 145 5.709                | 60 2.362               | 48 1.890 | 24 0.945                 | 16 0.630                 | 26 1.024                 | 13 0.512                | 8 0.315                   |      | P.60       |
| <b>FD-61W</b>                   | 220 8.661   | 95 3.740                 | 40 1.575               | 32 1.260 | 1 to 15 0.039 to 0.591   | 1 to 9 0.039 to 0.354    | 17 0.669                 | 1 to 7.5 0.039 to 0.295 | 1.5 to 4.5 0.059 to 0.177 |      | P.60       |
| <b>FD-62</b>                    | 480 18.898  | 220 8.661                | 90 3.543               | 80 3.150 | 1 to 40 0.039 to 1.575   | 1 to 27 0.039 to 1.063   | 1 to 42 0.039 to 1.654   | 1 to 21 0.039 to 0.827  | 1 to 14 0.039 to 0.551    |      | P.60       |
| <b>FD-64X</b>                   | 200 7.874   | 85 3.346                 | 35 1.378               | 32 1.260 | 0.5 to 16 0.020 to 0.630 | 0.5 to 10 0.020 to 0.394 | 0.5 to 16 0.020 to 0.630 | 0.5 to 8 0.020 to 0.315 | 0.5 to 5 0.020 to 0.197   |      | P.61       |
| <b>FD-A16</b>                   | 200 7.874   | 150 5.906                | 50 1.969               | 19 0.748 | 14 0.551                 | ————                     | 20 0.787                 | 13 0.512                | ————                      |      | P.61       |
| <b>FD-AL11</b>                  | 250 9.843   | 110 4.331                | 40 1.575               | 33 1.299 | 16 0.630                 | 10 0.394                 | 18 0.709                 | 8 0.315                 | 4.5 0.177                 |      | P.61       |
| <b>FD-E13</b>                   | 11 0.433  | 6 0.236                  | 2 0.079                | 2 0.079  | 0.8 0.031                | 0.5 0.020                | 0.8 0.031                | ————                    | ————                      |      | P.61       |
| <b>FD-E23</b>                   | 45 1.772  | 19 0.748                 | 7 0.276                | 6 0.236  | 3 0.118                  | 2 0.079                  | 3 0.118                  | 1.5 0.059               | 1 0.039                   |      | P.61       |
| <b>FD-EG30</b>                  | 45 1.772  | 19 0.748                 | 7 0.276                | 6 0.236  | 3 0.118                  | 2 0.079                  | 3 0.118                  | 1.5 0.059               | 1 0.039                   |      | P.61       |
| <b>FD-EG30S</b>                 | 45 1.772  | 19 0.748                 | 7 0.276                | 6 0.236  | 3 0.118                  | 2 0.079                  | 3 0.118                  | 1.5 0.059               | 1 0.039                   |      | P.62       |
| <b>FD-EG31</b>                  | 15 0.591  | 8 0.315                  | 3 0.118                | 2 0.079  | 1 0.039                  | 0.5 0.020                | 1 0.039                  | ————                    | ————                      |      | P.62       |
| <b>FD-F4</b>                    | Applicable pipe diameter: Outer dia. $\phi 6$ to $\phi 26$ mm $\phi 0.236$ to $\phi 1.024$ in transparent pipe [PFA (fluorine resin) or equivalently transparent pipe, wall thickness 1 mm 0.039 in]  |                          |                        |          |                          |                          |                          |                         |                           |      | P.62       |
| <b>FD-F41</b>                   | Applicable pipe diameter: Outer dia. $\phi 6$ to $\phi 26$ mm $\phi 0.236$ to $\phi 1.024$ in transparent pipe [PVC, fluorine resin, polycarbonate, acrylic, glass, wall thickness 1 to 3 mm 0.039 to 0.118 in]   |                          |                        |          |                          |                          |                          |                         |                           |      | P.62       |
| <b>FD-F41Y</b><br>(Note 3)      | $\phi 4$ mm $\phi 0.157$ in<br>Protective tube: Fluorine resin, length 500 mm 19.685 in (cuttable)<br>Liquid surface not contacted: Beam received, Liquid surface contacted: Beam interrupted   |                          |                        |          |                          |                          |                          |                         |                           |      | P.62       |
| <b>FD-F8Y</b>                   | ————  | ————                     | ————                   | ————     | ————                     | ————                     | ————                     | ————                    | ————                      | ———— | P.62       |
| <b>FD-FA93</b>                  | Applicable pipe diameter: Outer dia. $\phi 8$ mm $\phi 0.315$ in or more transparent pipe (When used with the tying bands: $\phi 8$ to $\phi 80$ mm $\phi 0.315$ to $\phi 3.150$ in) [PFA (fluorine resin), including translucent] Liquid absent: Beam received, Liquid present: Beam interrupted |                          |                        |          |                          |                          |                          |                         |                           |      | P.62       |
| <b>FD-H13-FM2</b>               | 310 12.205  | 140 5.512                | 47 1.850               | 20 0.787 | 11 0.433                 | 7 0.276                  | 20 0.787                 | 11 0.433                | 7 0.276                   |      | P.63       |
| <b>FD-H18-L31</b>               | 0 to 15 0 to 0.591  | 0 to 10 0 to 0.394       | 2 to 6 0.079 to 0.236  | ————     | ————                     | ————                     | ————                     | ————                    | ————                      |      | P.63       |
| <b>FD-H20-21</b>                | 270 10.630  | 140 5.512                | 47 1.850               | 36 1.417 | 18 0.709                 | 12 0.472                 | 20 0.787                 | 10 0.394                | 7 0.276                   |      | P.63       |
| <b>FD-H20-M1</b>                | 270 10.630  | 140 5.512                | 47 1.850               | 36 1.417 | 18 0.709                 | 12 0.472                 | 20 0.787                 | 10 0.394                | 7 0.276                   |      | P.63       |
| <b>FD-H25-L43</b> (Note 4)      | 3 to 25 0.118 to 0.984  | 4 to 20 0.157 to 0.787   | 4 to 16 0.157 to 0.630 | ————     | ————                     | ————                     | ————                     | ————                    | ————                      |      | P.63       |
| <b>FD-H25-L45</b> (Note 4)      | 6 to 41 0.236 to 1.614  | 7 to 38 0.276 to 1.496   | ————                   | ————     | ————                     | ————                     | ————                     | ————                    | ————                      |      | P.63       |
| <b>FD-H30-KZ1V-S</b> (Note 4,5) | 20 to 200 0.787 to 7.874  | 25 to 130 0.984 to 5.118 | ————                   | ————     | ————                     | ————                     | ————                     | ————                    | ————                      |      | P.64       |
| <b>FD-H30-L32</b>               | 0 to 15 0 to 0.591  | 0 to 10 0 to 0.394       | 2 to 6 0.079 to 0.236  | ————     | ————                     | ————                     | ————                     | ————                    | ————                      |      | P.64       |
| <b>FD-H30-L32V-S</b> (Note 4,5) | 0 to 8 0 to 0.315   | 1.5 to 5 0.059 to 0.197  | ————                   | ————     | ————                     | ————                     | ————                     | ————                    | ————                      |      | P.64       |

Notes: 1) Note that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.  
 2) The sensing range of reflective type is the value for white non-glossy paper (as for **FD-H30-L32** and **FD-H18-L31** 50 × 50 mm 1.969 × 1.969 in glass substrate).  
 3) Liquid inflow prevention joint, protective tube extension joint, fiber mounting joint are available. Please refer to p.38 for details.  
 4) The sensing range is specified for transparent glass 100 × 100 × t0.7 mm 3.937 × 3.937 × t0.028 in.  
 5) Sold as a set comprising vacuum type fiber + photo-terminal (**FV-BR1**) + fiber at atmospheric side (**FT-J8**).

**LIST OF FIBERS**

**Reflective type**



Fibers are listed in alphabetic order. Refer to p.5~ "Fiber Selection" for details of each fiber.

| Model No.                   | Sensing range (mm in) (Note 1, 2) / Description   |                          |                           |                          |                        |                           |                        |                          |                           | Dimensions |
|-----------------------------|---|--------------------------|---------------------------|--------------------------|------------------------|---------------------------|------------------------|--------------------------|---------------------------|------------|
|                             | Red LED   |                          |                           | Blue LED                 |                        |                           | Green LED              |                          |                           |            |
|                             | LONG  | STD                      | S-D                       | LONG                     | STD                    | FAST                      | LONG                   | STD                      | FAST                      |            |
| <b>FD-H35-20S</b>           | 160 6.299   | 80 3.150                 | 26 1.024                  | 22 0.866                 | 11 0.433               | 7 0.276                   | 12 0.472               | 6 0.236                  | 4 0.157                   | P.64       |
| <b>FD-H35-M2</b>            | 270 10.630  | 140 5.512                | 47 1.850                  | 36 1.417                 | 18 0.709               | 12 0.472                  | 20 0.787               | 10 0.394                 | 7 0.276                   | P.64       |
| <b>FD-H35-M2S6</b>          | 270 10.630  | 140 5.512                | 47 1.850                  | 36 1.417                 | 18 0.709               | 12 0.472                  | 20 0.787               | 10 0.394                 | 7 0.276                   | P.64       |
| <b>FD-HF40Y</b><br>(Note 3) | ø4 mm ø0.157 in<br>Protective tube: Fluorine resin, length 500 mm 19.685 in (cuttable)<br>Liquid surface not contacted: Beam received, Liquid surface contacted: Beam interrupted |                          |                           |                          |                        |                           |                        |                          |                           | P.64       |
| <b>FD-L10</b> (Note 4)      | 0 to 4.5 0 to 0.177   | 0 to 4 0 to 0.157        | 0 to 3.5 0 to 0.138       | 0-3.5 0 to 0.138         | 0 to 3 0 to 0.118      | 0.5 to 2.5 0.020 to 0.098 | 0 to 3 0 to 0.118      | 1 to 2 0.039 to 0.079    | ————                      | P.65       |
| <b>FD-L11</b> (Note 4)      | 0 to 8 0 to 0.315   | 0 to 7 0 to 0.906        | 0 to 6 0 to 0.236         | 7 0.276                  | 6.5 0.256              | 0.5 to 5.5 0.020 to 0.217 | 6.5 0.256              | 1 to 4 0.039 to 0.157    | ————                      | P.65       |
| <b>FD-L12W</b> (Note 4)     | 0.5 to 8 0.019 to 0.315   | 1 to 5.5 0.039 to 0.217  | ————                      | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.65       |
| <b>FD-L20H</b>              | 2 to 23 0.079 to 0.906  | 4 to 14 0.157 to 0.551   | 4.8 to 9.5 0.188 to 0.374 | 4.5 to 10 0.177 to 0.394 | 5 to 9 0.197 to 0.354  | 5.5 to 8 0.217 to 0.315   | 5 to 9 0.197 to 0.354  | 5.5 to 8 0.217 to 0.315  | ————                      | P.65       |
| <b>FD-L21</b> (Note 4)      | 2 to 18 0.079 to 0.709  | 3 to 16 0.118 to 0.630   | 5 to 11 0.197 to 0.433    | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.65       |
| <b>FD-L21W</b> (Note 4)     | 3 to 14 0.118 to 0.551  | 6 to 12 0.236 to 0.472   | ————                      | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.65       |
| <b>FD-L22A</b> (Note 4)     | 0 to 23 0 to 0.906  | 0 to 23 0 to 0.906       | 1 to 17 0.039 to 0.669    | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.65       |
| <b>FD-L23</b> (Note 4)      | 0 to 30 0 to 1.181  | 0 to 30 0.039 to 1.181   | 2 to 27 0.079 to 1.063    | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.65       |
| <b>FD-L30A</b> (Note 4)     | 0 to 43 0 to 17.441   | 0 to 37 0 to 1.457       | 0 to 26 0 to 1.024        | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.65       |
| <b>FD-L31A</b> (Note 4)     | 4 to 33 0.157 to 1.299  | 5 to 32 0.197 to 1.260   | 6 to 18 0.236 to 0.709    | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.65       |
| <b>FD-L32H</b> (Note 4)     | 0 to 50 0 to 1.969  | 15 to 35 0.591 to 1.378  | ————                      | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.66       |
| <b>FD-R31G</b>              | 92 3.622  | 44 1.732                 | 17 0.669                  | 17 0.669                 | 8 0.315                | 5 0.197                   | 8 0.315                | 4 0.157                  | 2 0.079                   | P.66       |
| <b>FD-R32EG</b>             | 45 1.772  | 19 0.748                 | 7 0.276                   | 6 0.236                  | 3 0.118                | 1.5 0.059                 | 2 0.079                | 1 0.039                  | ————                      | P.66       |
| <b>FD-R33EG</b>             | 15 0.591  | 6 0.236                  | 2 0.079                   | 2 0.079                  | 0.8 0.031              | 0.5 0.020                 | 1 0.039                | ————                     | ————                      | P.66       |
| <b>FD-R34EG</b>             | 38 1.496  | 16 0.630                 | 6 0.236                   | 5 0.197                  | 2 0.079                | 1.5 0.059                 | 2 0.079                | 1 0.039                  | ————                      | P.66       |
| <b>FD-R41</b>               | 150 5.906   | 70 2.756                 | 28 1.102                  | 24 0.945                 | 1 to 13 0.039 to 0.512 | 1 to 9 0.039 to 0.354     | 1 to 15 0.039 to 0.591 | 1 to 8 0.039 to 0.315    | 3 to 6 0.118 to 0.236     | P.66       |
| <b>FD-R60</b>               | 240 9.449   | 120 4.724                | 45 1.772                  | 42 1.654                 | 20 0.787               | 0.5 to 13 0.020 to 0.512  | 21 0.827               | 0.5 to 10 0.020 to 0.394 | 0.5 to 7 0.020 to 0.276   | P.66       |
| <b>FD-R61Y</b>              | 230 9.055   | 110 4.331                | 45 1.771                  | 36 1.417                 | 17 0.669               | 0.5 to 11 0.020 to 0.433  | 19 0.748               | 0.5 to 9 0.020 to 0.354  | 1 to 6 0.039 to 0.236     | P.66       |
| <b>FD-S21</b>               | 50 1.969  | 25 0.984                 | 9 0.354                   | 8 0.315                  | 3.5 0.138              | 2 0.079                   | 5 0.197                | 2 0.079                  | 1.3 0.051                 | P.66       |
| <b>FD-S30</b>               | 110 4.331   | 50 1.969                 | 18 0.709                  | 19 0.748                 | 9 0.354                | 6 0.236                   | 9 0.354                | 4.5 0.177                | 2.5 0.098                 | P.67       |
| <b>FD-S31</b>               | 95 3.740  | 45 1.772                 | 16 0.630                  | 18 0.709                 | 8 0.315                | 5 0.197                   | 8 0.315                | 4 0.157                  | 2 0.079                   | P.67       |
| <b>FD-S32</b>               | 270 10.630  | 140 5.512                | 55 2.165                  | 48 1.890                 | 24 0.945               | 16 0.630                  | 26 1.024               | 13 0.512                 | 8 0.315                   | P.67       |
| <b>FD-S32W</b>              | 220 8.661   | 95 3.740                 | 40 1.575                  | 32 1.260                 | 1 to 15 0.039 to 0.591 | 1 to 9 0.039 to 0.354     | 17 0.669               | 1 to 7.5 0.039 to 0.295  | 1.5 to 4.5 0.059 to 0.177 | P.67       |
| <b>FD-S33GW</b>             | 85 3.346  | 35 1.378                 | 14 0.551                  | 14 0.551                 | 7 0.276                | 5 0.197                   | 6 0.236                | 4 0.157                  | 2 0.079                   | P.67       |
| <b>FD-S60Y</b>              | 360 14.173  | 170 6.693                | 70 2.756                  | 50 1.969                 | 20 0.787               | 3 to 12 0.118 to 0.472    | 28 1.102               | 3 to 9 0.118 to 0.394    | ————                      | P.67       |
| <b>FD-V30</b>               | 45 1.772  | 20 0.787                 | 7 0.276                   | 9 0.354                  | ————                   | ————                      | ————                   | ————                     | ————                      | P.67       |
| <b>FD-V30W</b>              | 15 0.591  | 7 0.276                  | ————                      | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.67       |
| <b>FD-V50</b>               | 100 3.937   | 45 1.772                 | 16 0.630                  | 12 0.472                 | ————                   | ————                      | 6 0.236                | ————                     | ————                      | P.68       |
| <b>FD-Z20HBW</b>            | 1 to 70 0.09 to 2.756   | 2 to 30 0.079 to 1.181   | 3 to 10 0.118 to 0.394    | 4 to 10 0.157 to 0.394   | ————                   | ————                      | ————                   | ————                     | ————                      | P.68       |
| <b>FD-Z20W</b>              | 1 to 59 0.09 to 2.323   | 3 to 27 0.118 to 1.063   | ————                      | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.68       |
| <b>FD-Z40HBW</b>            | 0.5 to 230 0.02 to 9.055  | 1 to 100 0.039 to 3.937  | 1 to 40 0.039 to 1.575    | 1 to 36 0.039 to 1.417   | 3 to 17 1.181 to 0.669 | 3 to 11 1.181 to 0.433    | 2 to 19 0.079 to 0.748 | 3 to 8 0.118 to 0.315    | 4 to 5 0.157 to 0.197     | P.68       |
| <b>FD-Z40W</b>              | 180 7.087   | 1 to 87 0.039 to 3.425   | 2.5 to 32 0.098 to 1.260  | 4 to 20 0.157 to 0.787   | ————                   | ————                      | 4 to 14 0.157 to 0.551 | ————                     | ————                      | P.68       |
| <b>FD-Z50HW</b>             | 10 to 540 0.394 to 21.260   | 10 to 250 0.393 to 9.843 | 15 to 100 0.591 to 3.937  | ————                     | ————                   | ————                      | ————                   | ————                     | ————                      | P.68       |

Notes: 1) Note that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.  
 2) The sensing range of reflective type is the value for white non-glossy paper.  
 3) Liquid inflow prevention joint, protective tube extension joint, fiber mounting joint are available. Please refer to p.38 for details.  
 4) The sensing range is specified for transparent glass 100 × 100 × t0.7 mm 3.937 × 3.937 × t0.028 in (FD-L32H: R edge, FD-L21 and FD-L21W: t2 mm 10.079 in) [FD-L10: silicon wafers 100 × 100 mm 3.937 × 3.937 in].

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SMALL WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC ELECTRICITY PREVENTION DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

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Selection Guide

Fibers

Fiber Amplifiers

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**FX-500**

**FX-100**

**FX-300**

**FX-410**

**FX-311**

FX-301-F7/  
FX-301-F