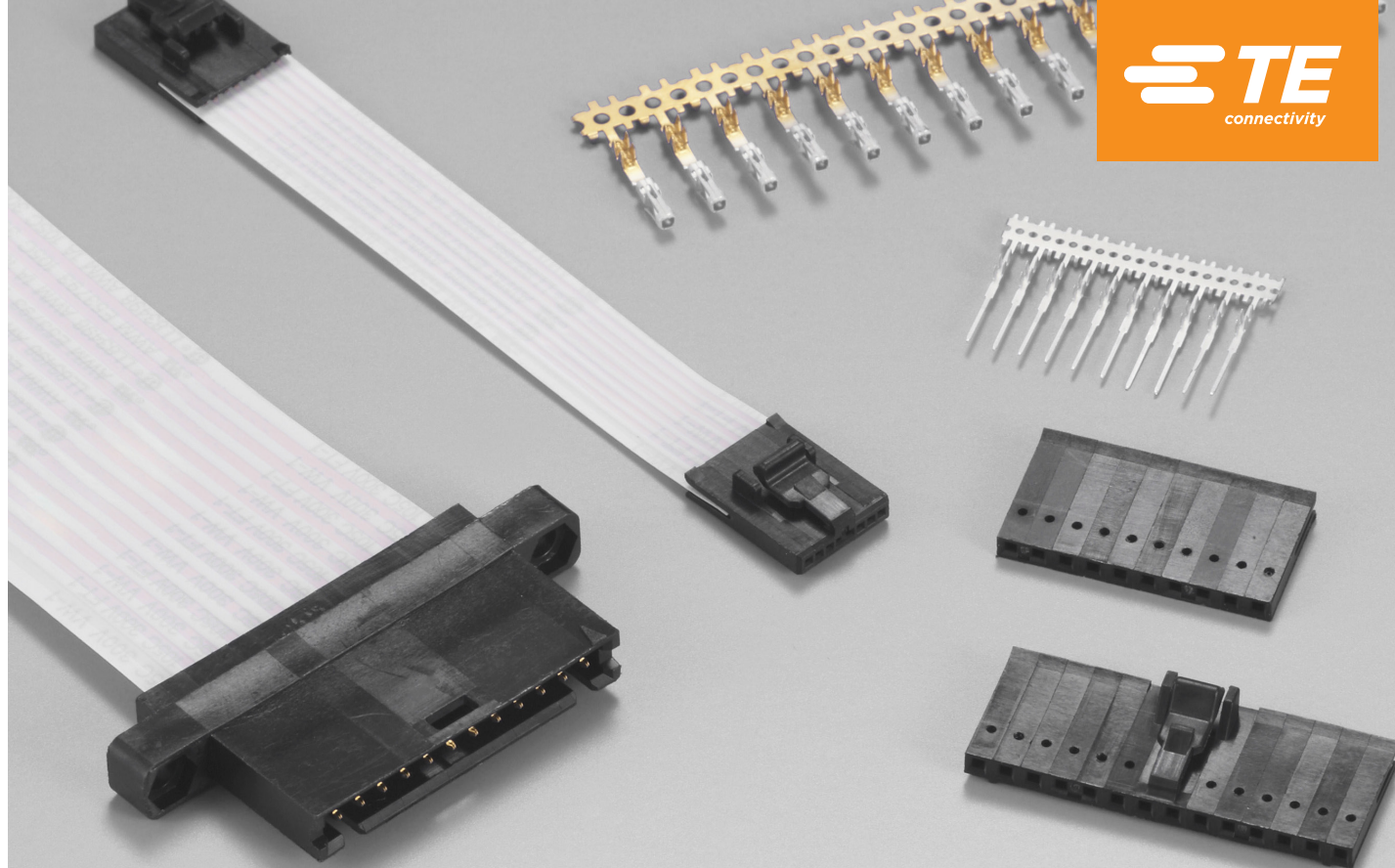




## FLAT FLEXIBLE CABLE (FFC) CONNECTORS

TE Connectivity's (TE) family of FFC connectors includes a variety of high density cable-to-board and cable-to-cable connectors designed for automated assembly. The family is composed of wire-to-board products on .100 in [2.54 mm] and 0.050 in [1.27 mm] centerlines and wire-to-wire products on 0.100 in [2.54 mm] centerlines. Receptacle housings not only mate with the pin housings, but also with an array of printed circuit board (PCB) headers from other TE product families, including AMPMODU and AMP-LATCH connectors. The FFC family also includes the higher performance FLEXPAC connector system, the specialized TRIO-MATE connector system and a ZIF (zero insertion force) connector family.

### Key Features

- .050" and .100" centerlines
- ZIF options available for higher mating cycles
- TRIO-MATE is available for high retention force LIF applications
- Single and dual row options available
- Latching and polarizing options available
- Terminates FFC, FPC and FEC cable

### Key Benefits

- Space savings over other wire-to-board connectors
- High-speed sequential application of multiple crimp contacts
- Field testable
- In-line manufacturing testable

### Applications

- Membrane switches
- 3D, laser and inkjet printers
- Disk drives
- Data systems
- Business and retail equipment
- Industrial controls
- Test equipment
- Appliances
- Medical devices

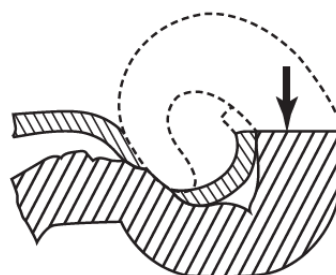
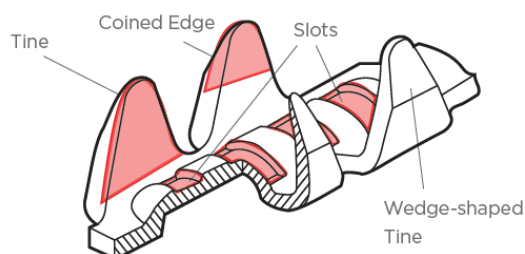
## Flat Flexible Cable (FFC) Connectors

### Contacts

Our FFC contacts are one of the most important components of an FFC connection and are well proven within the industry. These products can accommodate many combinations of applied centerline, contact gender, cable thickness and plating requirements.

Our FFC contact is crimped onto FFC cables in a unique way:

- Four separate tines on a TE FFC contact pierce through the cable insulation and curl back into the metal conductor, as seen in the cross section below.
- The combination of the tines' tapered design and the crimping operation produces maximum stored energy.
- This design creates a residual force system with multiple points of redundancy, creating higher reliability in your electrical connection.
- Each contact tine also has coined edges which assist in insulation piercing a greater surface area contact with the metal conductor, as well as the four slots in the wire barrel area to accept the contact tines and develop a gas tight connection.

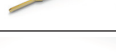


| Base Number | Image | Centerline     | Cable Type | Contact Type   | Mating Area Plating  | Crimp Area Plating  | Packaging Method | Wire Range | Wire Insulation Diameter | Product Spec | Application Spec |
|-------------|-------|----------------|------------|----------------|----------------------|---------------------|------------------|------------|--------------------------|--------------|------------------|
| 487923      |       | .050" [1.27mm] | FFC        | Pin/Solder Tab | Tin, Tin-Lead        | Gold, Tin-Lead      | Strip            | N/A        | N/A                      | 108-16022    | 114-16008        |
| 487940      |       | .050" [1.27mm] | FFC        | Pin/Solder Tab | Tin                  | Gold, Tin           | Strip            | N/A        | N/A                      | 108-16022    | 114-16008        |
| 487547      |       | .050" [1.27mm] | FFC        | Socket         | Gold*                | Gold, Tin-Lead      | Strip            | N/A        | N/A                      | 108-16022    | 114-16008        |
| 88976       |       | .100" [2.54mm] | FFC        | Pin            | Gold*, Tin, Tin-Lead | Gold                | Strip            | N/A        | N/A                      | 108-9024     | 114-16015        |
| 88117       |       | .100" [2.54mm] | FFC        | Pin            | Gold*, Tin, Tin-Lead | Gold, Tin-Lead      | Strip            | N/A        | N/A                      | 108-9024     | 114-16015        |
| 487561      |       | .100" [2.54mm] | FFC        | Pin/Solder Tab | Gold, Tin-Lead       | Tin, Tin-Lead       | Strip            | N/A        | N/A                      | 108-16022    | 114-16008        |
| 88997       |       | .100" [2.54mm] | FFC        | Pin/Solder Tab | Gold, Tin-Lead       | Gold, Tin-Lead      | Strip            | N/A        | N/A                      | 108-9024     | 114-16015        |
| 487137      |       | .100" [2.54mm] | FFC        | Pin/Solder Tab | Tin-Lead             | Nickel              | Strip            | N/A        | N/A                      | 108-9024     | 114-16015        |
| 485800      |       | .100" [2.54mm] | FFC        | Socket         | Gold                 | Gold, Tin-Lead      | Strip            | N/A        | N/A                      | 108-9024     | 114-16015        |
| 487117      |       | .100" [2.54mm] | FFC        | Socket         | Gold, Tin, Tin-Lead  | Gold, Tin-Lead      | Strip            | N/A        | N/A                      | 108-9024     | 114-16015        |
| 788143      |       | .100" [2.54mm] | FFC        | Socket         | Gold                 | Gold                | Strip            | N/A        | N/A                      | 108-9024     | 114-16015        |
| 487406      |       | .100" [2.54mm] | FFC        | Socket         | Gold*, Tin, Tin-Lead | Gold, Tin, Tin-Lead | Strip            | N/A        | N/A                      | 108-9024     | 114-16015        |

\*Gold performance plating ie. gold over palladium nickel

## Flat Flexible Cable (FFC) Connectors

### Contacts Continued

| Base Number | Image                                                                               | Centerline     | Cable Type | Contact Type | Mating Area Plating        | Crimp Area Plating  | Packaging Method | Wire Range                            | Wire Insulation Diameter    | Product Spec | Application Spec |
|-------------|-------------------------------------------------------------------------------------|----------------|------------|--------------|----------------------------|---------------------|------------------|---------------------------------------|-----------------------------|--------------|------------------|
| 494034      |    | .100" [2.54mm] | Round Wire | Pin          | Gold                       | Tin                 | Loose Piece      | .20-.40mm <sup>2</sup><br>[24-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 494033      |    | .100" [2.54mm] | Round Wire | Pin          | Gold                       | Tin, Tin-Lead       | Strip            | .20-.40mm <sup>2</sup><br>[24-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 86658       |    | .100" [2.54mm] | Round Wire | Pin          | Gold*                      | Gold                | Loose Piece      | .20-.40mm <sup>2</sup><br>[24-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 88048       |    | .100" [2.54mm] | Round Wire | Pin          | Gold*                      | Gold                | Strip            | .03-.15mm <sup>2</sup><br>[32-26 AWG] | .025-.048"<br>[.64-1.22mm]  | 108-9024     | 114-16015        |
| 86656       |    | .100" [2.54mm] | Round Wire | Pin          | Gold*                      | Gold                | Strip            | .20-.40mm <sup>2</sup><br>[24-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 86561       |    | .100" [2.54mm] | Round Wire | Pin          | Gold, Tin, Tin-Lead        | Gold, Tin, Tin-Lead | Loose Piece      | .12-.40mm <sup>2</sup><br>[26-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 86557       |    | .100" [2.54mm] | Round Wire | Pin          | Gold, Tin, Tin-Lead        | Gold, Tin, Tin-Lead | Strip            | .12-.40mm <sup>2</sup><br>[26-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 86566       |    | .100" [2.54mm] | Round Wire | Socket       | Gold, Gold*, Tin, Tin-Lead | Gold, Tin, Tin-Lead | Strip            | .12-.40mm <sup>2</sup><br>[26-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 86571       |    | .100" [2.54mm] | Round Wire | Socket       | Gold*                      | Gold, Tin           | Loose Piece      | .12-.40mm <sup>2</sup><br>[26-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 86657       |    | .100" [2.54mm] | Round Wire | Socket       | Gold*                      | Gold                | Loose Piece      | .20-.40mm <sup>2</sup><br>[24-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |
| 88017       |  | .100" [2.54mm] | Round Wire | Socket       | Gold*                      | Gold                | Strip            | .03-.15mm <sup>2</sup><br>[32-26 AWG] | .025-.048"<br>[.64-1.22mm]  | 108-9024     | 114-16015        |
| 86655       |  | .100" [2.54mm] | Round Wire | Socket       | Gold*                      | Gold                | Strip            | .20-.40mm <sup>2</sup><br>[24-22 AWG] | .040-.056"<br>[1.02-1.42mm] | 108-9024     | 114-16015        |

| Base Number | Image                                                                               | Centerline     | Cable Type         | Contact Type      | Mating Area Plating | Crimp Area Plating | Packaging Method | Wire Range                            | Wire Insulation Diameter   | Product Spec | Application Spec |
|-------------|-------------------------------------------------------------------------------------|----------------|--------------------|-------------------|---------------------|--------------------|------------------|---------------------------------------|----------------------------|--------------|------------------|
| 86773       |  | .100" [2.54mm] | FFC and Round Wire | FFC to Round Wire | Gold                | Tin                | Strip            | .12-.40mm <sup>2</sup><br>[26-22 AWG] | .035-.060"<br>[.89-1.52mm] | 108-9024     | 114-16015        |
| 86774       |  | .100" [2.54mm] | FFC and Round Wire | FFC to Round Wire | Gold                | Gold               | Loose Piece      | .12-.40mm <sup>2</sup><br>[26-22 AWG] | .035-.060"<br>[.89-1.52mm] | 108-9024     | 114-16015        |
| 87941       |  | .100" [2.54mm] | FFC and Round Wire | FFC to Round Wire | Tin-Lead            | Gold, Tin-Lead     | Strip            | N/A                                   | N/A                        | 108-16022    | 114-16008        |

\*Gold performance plating ie. gold over palladium nickel

## Flat Flexible Cable (FFC) Connectors

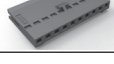
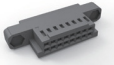
### Housings

The cable with contacts applied is loaded directly into a cable side housing to create a complete FFC cable assembly. Standard FFC housings are loaded with the prepared FFC cable assembly before it is mated with a board side header or another FFC cable assembly.

TE FFC connector housings are available in:

- Standard or slimline for low-profile applications
- Single or dual-row for increased density
- With or without latching for increased retention
- With or without mounting ears for increased cable or PCB retention

Please note: In some cases, certain housing/header combinations will not be compatible with all contacts. To confirm compatibility of housing/header/contact combinations, please contact TE at TE.com or at the phone numbers listed on page 8.

| Base Number | Image                                                                               | Centerline     | Contact Type | Housing Size | Gender | Number of Rows | Mounting Ears | Number of Positions | Headers                                                                                                | Contacts                                                                                                          |
|-------------|-------------------------------------------------------------------------------------|----------------|--------------|--------------|--------|----------------|---------------|---------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 487973*     |    | .050" [1.25mm] | Socket       | Slimline     | Rec    | Single         | Without       | 10                  | N/A                                                                                                    | 487547                                                                                                            |
| 88190       |    | .100" [2.54mm] | Pin          | Standard     | Plug   | Dual           | With          | 6-40                | 88637                                                                                                  | 86557, 86561, 86656, 86658, 88048, 494033, 494034                                                                 |
| 88189       |    | .100" [2.54mm] | Pin          | Standard     | Plug   | Dual           | Without       | 6-26                | 88179, 879631                                                                                          | 88117, 86557, 86561, 86656, 86658, 88048, 494033, 494034                                                          |
| 485893      |    | .100" [2.54mm] | Pin          | Standard     | Plug   | Single         | Without       | 3-20                | 88859-3                                                                                                | 86557, 86561, 86656, 86658, 88048, 494033, 494034                                                                 |
| 487378      |   | .100" [2.54mm] | Socket       | Slimline     | Rec    | Single         | Without       | 2-34                | 103329, 102974, 103323, 102976, 102972, 103321                                                         | 487117, 487406                                                                                                    |
| 487526      |  | .100" [2.54mm] | Socket       | Slimline     | Rec    | Single         | Without       | 2-25                | 103634, 103635, 103906, 103672, 103673, 103904, 103639, 103638, 103735, 103669, 103670, 103908         | 487117, 487406                                                                                                    |
| 487769      |  | .100" [2.54mm] | Socket       | Slimline     | Rec    | Single         | Without       | 3-24                | 102203, 102523, 103361, 102202, 103080, 103414                                                         | 487117, 487406                                                                                                    |
| 88637       |  | .100" [2.54mm] | Socket       | Standard     | Rec    | Dual           | With          | 16-70               | 88190                                                                                                  | 487117, 487137, 487406, 487547, 487561, 487923, 487940, 494033, 494034, 788143, 86566, 86571, 86655, 86657, 88017 |
| 88179       |  | .100" [2.54mm] | Socket       | Standard     | Rec    | Dual           | Without       | 6-50                | 88189, 102619, 103619                                                                                  | 487117, 487137, 487406, 487547, 487561, 487923, 487940, 494033, 494034, 788143, 86566, 86571, 86655, 86657, 88017 |
| 487223      |  | .100" [2.54mm] | Socket       | Standard     | Rec    | Dual           | Without       | 10-60               | 102153, 102154, 102154, 102155, 102156, 102159, 102160, 102162, 111446, 103308, 103309, 103310, 103311 | 487117, 487137, 487406, 487547, 487561, 487923, 487940, 494033, 494034, 788143, 86566, 86571, 86655, 86657, 88017 |
| 88859       |  | .100" [2.54mm] | Socket       | Standard     | Rec    | Single         | Without       | 3-35                | 485893-8                                                                                               | 487117, 487137, 487406, 487547, 487561, 487923, 487940, 494033, 494034, 788143, 86566, 86571, 86655, 86657, 88017 |
| 925430      |  | .100" [2.54mm] | Socket       | Standard     | Rec    | Single         | Without       | 2-33                | N/A                                                                                                    | N/A                                                                                                               |

\*Product Specification 108-16022 | Application Specification 114-16008

All others: Product Specification 108-9024 | Application Specification 114-6015

## Flat Flexible Cable (FFC) Connectors

### FLEXPAC Connectors

Our FLEXPAC interconnect system is a multi-piece connector solution, consisting of a contact crimped to an FFC cable, a plastic housing and a board side header. The FLEXPAC connector system is designed for high quality and reliability and offers an array of locking and latching housing and header combinations, as well as many polarization options to ensure proper mating.

#### Headers

| Base Number | Image | PCB Mounting Orientation | Gender     | Contact Type | Number of Rows | Number of Positions | Termination Method to PCB | Mating Area Contact Plating | Termination Area Contact Plating |
|-------------|-------|--------------------------|------------|--------------|----------------|---------------------|---------------------------|-----------------------------|----------------------------------|
| 1437254     |       | Right Angle              | Plug       | Pin          | Dual           | 16                  | Through Hole              | Gold                        | Tin-Lead                         |
| 1658548     |       | Right Angle              | Plug       | Pin          | Single         | 4-32                | Through Hole              | Gold, Tin                   | Tin                              |
| 1658549     |       | Vertical                 | Plug       | Pin          | Dual           | 8-64                | Through Hole              | Gold, Tin                   | Tin                              |
| 1888291     |       | Vertical                 | Plug       | Pin          | Single         | 4-40                | Through Hole              | Gold, Tin                   | Tin                              |
| 1888292     |       | Right Angle              | Plug       | Pin          | Dual           | 8-64                | Through Hole              | Gold, Tin                   | Gold, Tin                        |
| 1888290     |       | Right Angle              | Receptacle | Socket       | Single         | 8-24                | Through Hole              | Tin                         | Tin                              |

#### Receptacles

| Base Number | Image | Number of Rows | Style       | Gender | Polarized | Number of Positions |
|-------------|-------|----------------|-------------|--------|-----------|---------------------|
| 1437250     |       | Dual           | Straight    | Female | Yes       | 4-62                |
|             |       |                |             | Female | No        | 4-62                |
|             |       |                |             | Male   | No        | 20                  |
| 1437251     |       | Single         | Straight    | Female | Yes       | 4-32                |
|             |       |                |             |        | No        | 10-31               |
|             |       |                |             | Male   | No        | 4-18                |
| 1437252     |       |                | Right Angle | Female | Yes       | 4-26                |
|             |       |                |             |        | No        | 5-31                |

#### Contacts

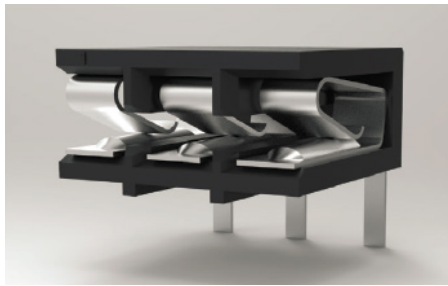
| Base Number | Image | Centerline | Contact Type | Plating |
|-------------|-------|------------|--------------|---------|
| 1437249     |       | .100"      | Socket       | Gold    |
| 1658665     |       | .100"      | Socket       | Tin     |

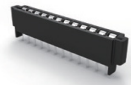
## Flat Flexible Cable (FFC) Connectors

### TRIO-MATE Connectors

TRIO-MATE is a one piece FFC connector system where the board side TRIO-MATE connector mates directly to a prepared FFC cable. This connection requires that the FFC cable have prepared contact pads already in place.

The unique TRIO-MATE contact design provides distinctive advantages for this connector type. As shown in these cross sectional views, TRIO-MATE connectors use a sequential contact layout. This means the connector makes contact with each sequential contact in three different locations (three different insertion depths). As you insert the FFC cable, you first mate with contacts in position one. Then, as the cable is inserted further, you also mate with contacts in position two and then in position three. This design allows for reduced cable insertion force, while maintaining the same high extraction force.



| Base Number | Image                                                                               | Centerline (mm) | Orientation | Solder Tail Style | Solder Tail Length (mm) | Number of Positions | Product Spec | Application Specification |
|-------------|-------------------------------------------------------------------------------------|-----------------|-------------|-------------------|-------------------------|---------------------|--------------|---------------------------|
| 120628*     |    | 2.54            | Vertical    | Kinked Legs       | 3.56                    | 8-20                | 108-2038     | 114-2062                  |
| 520315      |  | 2.54            | Vertical    | Kinked Legs       | 3.56                    | 2-20                | 108-2038     | 114-2062                  |
| 487509      |  | 2.54            | Vertical    | Kinked Legs       | 4.06                    | 2-20                | 108-2038     | 114-2062                  |
| 520415      |  | 2.54            | Vertical    | Straight Legs     | 2.79                    | 2-19                | 108-2038     | 114-2062                  |
| 520355      |  | 2.54            | Vertical    | Straight Legs     | 3.81                    | 16-20               | 108-2038     | 114-2062                  |
| 520314      |  | 2.54            | Right Angle | Kinked Legs       | 2.54                    | 2-19                | 108-2038     | 114-2062                  |
| 487508      |  | 2.54            | Right Angle | Kinked Legs       | 3.18                    | 4-19                | 108-2038     | 114-2062                  |
| 520353      |  | 2.54            | Right Angle | Straight Legs     | 2.54                    | 4-12                | 108-2038     | 114-2062                  |
| 176982      |  | 2.54            | Right Angle | Straight Legs     | 3.05                    | 2-10                | 108-2038     | 114-2062                  |

\*Includes special locking feature

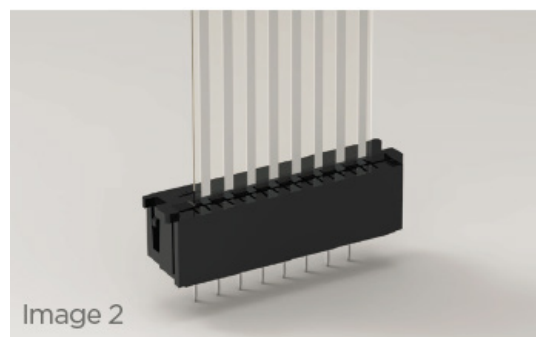
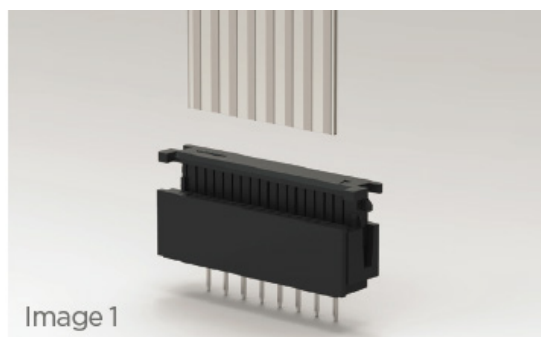


## Flat Flexible Cable (FFC) Connectors

### ZIF Connectors

Our zero insertion force (ZIF) solution is a one piece FFC connector system where the board side ZIF connector mates directly to a prepared FFC cable. This connection requires that the FFC cable have prepared contact pads already in place.

ZIF connectors utilize a moving actuator to create a zero insertion force connection capable of achieving high mating cycles and providing a high level of cable retention and reliability. To use a ZIF style connector, slide the actuator to an open position (image 1), insert the cable and slide the actuator to a closed position (image 2). Closing the actuator creates the force required to make contact between the cable and the connector.



| Base Number | Image                                                                               | Centerline (mm) | Orientation | Number of Positions | Product Spec | Application Spec |
|-------------|-------------------------------------------------------------------------------------|-----------------|-------------|---------------------|--------------|------------------|
| 487925      |   | 2.54            | Vertical    | 3-18                | 108-16025    | 114-16014        |
| 487576      |  | 1.27            | Vertical    | 9-40                | 108-16025    | 114-16009        |

### Application Tooling

We also offer a full range of tooling products for the termination of FFC contacts onto FFC cables, ranging from hand tools to semi-automated bench tools.

The fully programmable, semi-automated FFC bench tool is a key differentiator for TE's FFC product and allows for ease of use when terminating FFC contacts. This machine is an electrical driven semi-automatic assembly tool that uses different die sets to terminate reel-fed FFC contacts to manually supplied FFC cables. It terminates a predefined number of contacts to the supplied cable end and also allows individual wire positions to be skipped during the assembly sequence.

#### Features

- Alignment of the cable is effected in the machine
- The number of pins can be programmed
- Pitches between 1.27mm and 5.08mm can be programmed
- Individual wire positions can be skipped
- Operator friendly interface via touch screen
- Interchangeable applicators available for different products
- Quick change of the applicator

For more information TE's FFC tooling, please contact TE at TE.com or at the phone numbers listed on page 8.

### Frequently Asked Questions

**Question 1:**

Are you looking for a crimp solution or a direct cable mating solution?

**Answer 1:**

Our FFC products can accommodate both termination styles. Our standard FFC and FLEXPAC offerings can accommodate crimp termination, while our TRIO-MATE and ZIF offerings can accommodate direct cable mating.

**Question 2:**

Do you need to terminate FFC, FPC or FEC cable?

**Answer 2:**

Our FFC offering, along with its sister product, Flexible Printed Circuit (FPC) connectors can solve your cable termination needs.

**Question 3:**

What centerline (pitch) is required for your applications?

**Answer 3:**

The standard FFC centerlines are .05" (1.25mm) and .100" (2.54mm). However, we can accommodate smaller centerlines if needed with our FPC product family.

**Question 4:**

Do you require any application tooling?

**Answer 4:**

We offer a full range of application tooling associated with our FFC products. Please review the tooling section to learn more.

**Question 5:**

Does your application require latching?

**Answer 5:**

Our standard FFC offering and the FLEXPAC product family have latching options available

**Question 6:**

Does your application require any agency approvals?

**Answer 6:**

Many of our FFC products carry UL and CSA agency approvals.

### te.com

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### TE Technical Support Center

|                   |                    |
|-------------------|--------------------|
| USA:              | 1.800.522.6752     |
| Canada:           | 1.905.475.6222     |
| Mexico:           | 52.0.55.1106.0800  |
| Latin/S. America: | 54.0.11.4733.2200  |
| Germany:          | 49.0.6251.133.1999 |
| UK:               | 44.0.800.267666    |
| France:           | 33.0.1.3420.8686   |
| Netherlands:      | 31.0.73.6246.999   |
| China:            | 86.0.400.820.6015  |