1mm Pitch Connectors for Vertical Connection

FX5 Series

Features

1. Header Side: 2 Types Available
   Two header types are available, low and high profiles. Combined with various contact positions, the FX5 is versatile to work in many applications. (See Fig.1 and 2)

2. Two-step, Sequential Mating
   The mating sequence features a 2-step, "first mate-last break" condition that helps to protect the circuit.

3. Mating Guide
   A guide rib is provided along with a self-alignment range of ±1mm to allow for easy mating operations.

4. SMT Coplanarity
   The coplanarity of SMT soldered area has a high accuracy of 0.1mm.

5. Miniaturization
   The FX5 uses about 30% less mounting area on the board compared with a 1.27mm pitch connector.

Connecting Height: Low profile

Connecting Height: High profile

In cases where the application will demand a high level of reliability, such as automotive, please contact a company representative for further information.
# FX5 Series 1mm Pitch Connectors for Vertical Connection

## Product Specifications

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Current rating</th>
<th>0.5A</th>
<th>Operating Temperature Range</th>
<th>-55°C to +85°C (Note 1)</th>
<th>Storage Temperature Range</th>
<th>-10°C to +60°C (Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating</td>
<td>100V AC</td>
<td>Operating Humidity Range</td>
<td>40% to 80%</td>
<td>Storage Humidity Range</td>
<td>40% to 70%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Insulation Resistance</td>
<td>100M ohms min.</td>
<td>250V DC</td>
</tr>
<tr>
<td>2. Withstanding voltage</td>
<td>No flashover or insulation breakdown.</td>
<td>300V AC/1 minute</td>
</tr>
<tr>
<td>3. Contact Resistance</td>
<td>50m ohms max.</td>
<td>100mA</td>
</tr>
<tr>
<td>4. Vibration Resistance</td>
<td>No electrical discontinuity of 1μs or more</td>
<td>Frequency: 10 to 55 Hz, single amplitude of 0.75 mm, 2 hours in each of the 3 directions.</td>
</tr>
<tr>
<td>5. Moisture Resistance</td>
<td>Contact resistance: 60m ohms max. Insulation resistance: 100M ohms min.</td>
<td>96 hours at temperature of 40°C and humidity of 90% to 95%</td>
</tr>
<tr>
<td>6. Temperature Cycle</td>
<td>Contact resistance: 60m ohms max. Insulation resistance: 100M ohms min.</td>
<td>(-55°C: 30 minutes, 15 to 35°C: 2 to 3 minutes 85°C: 30 minutes, 15 to 35°C: 2 to 3 minutes) 5 cycles</td>
</tr>
<tr>
<td>7. Mating Cycles</td>
<td>Contact resistance: 60m ohms max.</td>
<td>500 cycles</td>
</tr>
</tbody>
</table>

**Note 1:** Includes temperature rise caused by current flow.  
**Note 2:** The term "storage" refers to products stored for a long time prior to use. Operating temperature and humidity range includes a non-conducting state of installed connectors in storage, shipment, or during transportation.

## Material

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
<th>Finish</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator</td>
<td>Polyamide</td>
<td>Beige</td>
<td>UL94V-0</td>
</tr>
<tr>
<td>Header Contact</td>
<td>Brass</td>
<td>Contact area: Gold plated</td>
<td>————</td>
</tr>
<tr>
<td>Receptacle Contact</td>
<td>Phosphor bronze</td>
<td>Lead area: Tin plated</td>
<td>————</td>
</tr>
</tbody>
</table>

**Note:** The black dots on the insulator will not affect performance.

## Product Number Structure

### Header

| FX5 – P – SH 3 |
|---|---|---|
| 1 | Series Name : FX5 |
| 2 | Number of Contacts : 20, 40, 52, 56, 68, 80 |
| 3 | Connector Type : P: Header |
| 4 | Contact type |
| 5 | SH : Right angle SMT type |

**Note:** The 56 contact header is for SH 3 type only.

### Receptacle

| FX5 – S 2 A – DSA L |
|---|---|---|---|---|
| 1 | Series Name : FX5 |
| 2 | Number of Contacts : 20, 40, 52, 56, 68, 80 |
| 3 | Connector Type : S: Receptacle |
| 4 | Contact Sequence |
| 5 | Serial No. : A |
| 6 | Contact type |
| 7 | Board prefixed pin |

**Note:**  
- DSA : Straight through hole type  
- Blank : Without board prefixed pin  
- L : With board Prefixed pin
### Header

#### Low profile

#### High profile

---

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
<th>No. of contacts</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>RoHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX5-20P-SH(71)</td>
<td>575-0001-7 71</td>
<td>20</td>
<td>9</td>
<td>24</td>
<td>22.9</td>
<td>19</td>
<td>9.5</td>
<td>20</td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>FX5-20P-SH3(71)</td>
<td>575-0041-1 71</td>
<td>40</td>
<td>19</td>
<td>34</td>
<td>32.9</td>
<td>29</td>
<td>19.5</td>
<td>30</td>
<td>23.6</td>
<td></td>
</tr>
<tr>
<td>FX5-40P-SH(71)</td>
<td>575-0005-8 71</td>
<td>52</td>
<td>25</td>
<td>40</td>
<td>38.9</td>
<td>35</td>
<td>25.5</td>
<td>36</td>
<td>29.6</td>
<td>Yes</td>
</tr>
<tr>
<td>FX5-40P-SH3(71)</td>
<td>575-0045-2 71</td>
<td>56</td>
<td>27</td>
<td>42</td>
<td>40.9</td>
<td>37</td>
<td>27.5</td>
<td>38</td>
<td>31.6</td>
<td></td>
</tr>
<tr>
<td>FX5-52P-SH(71)</td>
<td>575-0006-0 71</td>
<td>68</td>
<td>33</td>
<td>48</td>
<td>46.9</td>
<td>43</td>
<td>33.5</td>
<td>44</td>
<td>37.6</td>
<td></td>
</tr>
<tr>
<td>FX5-52P-SH3(71)</td>
<td>575-0046-5 71</td>
<td>80</td>
<td>39</td>
<td>54</td>
<td>52.9</td>
<td>49</td>
<td>39.5</td>
<td>50</td>
<td>43.6</td>
<td></td>
</tr>
</tbody>
</table>

Unit: mm

---

* (number of contacts)/2
# FX5 Series

1mm Pitch Connectors for Vertical Connection

## Receptacle

![Receptacle Diagram](image)

### Part No. Specifications

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
<th>No. of contacts</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Order of Contact Sequence (Contact No.)</th>
<th>RoHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX5-20S2A-DSA(71)</td>
<td>575-0101-1 71</td>
<td>20</td>
<td>9</td>
<td>19</td>
<td>15.08</td>
<td>a1,a2,a9,a10, a3 to a8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FX5-20S2A-DSAL(71)</td>
<td>575-0121-9 71</td>
<td>40</td>
<td>19</td>
<td>29</td>
<td>25.08</td>
<td>a1,a2,a19,a20, a3 to a18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FX5-40S2A-DSA(71)</td>
<td>575-0105-2 71</td>
<td>52</td>
<td>25</td>
<td>35</td>
<td>31.08</td>
<td>a1,a2,a25,a26, a3 to a24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FX5-40S2A-DSAL(71)</td>
<td>575-0125-0 71</td>
<td>56</td>
<td>27</td>
<td>37</td>
<td>33.08</td>
<td>a1,a2,a27,a28, a3 to a26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FX5-68S2A-DSA(71)</td>
<td>575-0110-8 71</td>
<td>68</td>
<td>33</td>
<td>43</td>
<td>39.08</td>
<td>a1,a2,a33,a34, a3 to a32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FX5-68S2A-DSAL(71)</td>
<td>575-0128-8 71</td>
<td>80</td>
<td>39</td>
<td>49</td>
<td>45.08</td>
<td>a1,a2,a39,a40, a3 to a38</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unit: mm

---

* = (number of contacts)/2

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Polarity Mark: ±0.3

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FX5 Series ● 1mm Pitch Connectors for Vertical Connection

**PCB mounting pattern**

● **Header**

FX5-**-SH, FX5-**-SH3

![Diagram of PCB mounting pattern]

No. of contacts | A | B | C | D | E | F
--- | --- | --- | --- | --- | --- | ---
20 | 16 | 13.6 | 9.5 | 20 | 9 | 15
40 | 26 | 23.6 | 19.5 | 30 | 19 | 25
52 | 32 | 29.6 | 25.5 | 36 | 25 | 31
56 | 34 | 31.6 | 27.5 | 38 | 27 | 33
68 | 40 | 37.6 | 33.5 | 44 | 33 | 39
80 | 46 | 43.6 | 39.5 | 50 | 39 | 45

Unit: mm

Note: If the connector uses a mounting area over the recommended size, it could cause defects in mounting and soldering. For best results, mount the connector using the recommended PCB mounting pattern.

● **Receptacle**

FX5-**S2A-DSA

FX5-**S2A-DSAL

![Diagram of Receptacle]

Note: If the connector uses a mounting area over the recommended size, it could cause defects in mounting and soldering. For best results, mount the connector using the recommended PCB mounting pattern.

**Recommended Temperature Profile**

![Temperature profile graph]

**HRS test conditions**

Test board: Glass epoxy 110mm×40mm×1.6mm thick
Solder method: Reflow
Solder composition: Paste, 96.5%Sn/3%Ag/0.5%Cu
Metal mask: 0.15mm thick
Reflow cycles: 1 cycles

The temperature profile is based on the above conditions. In individual applications the actual temperature may vary, depending on solder paste type, volume/thickness and board size/thickness. Consult your solder paste and equipment manufacturer for specific recommendations.
Cleaning Conditions

1. Organic Solvent Cleaning

<table>
<thead>
<tr>
<th>Solvent</th>
<th>Cold Cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPA (Isopropyl alcohol)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Methylene chloride is not suitable for this product.

2. Liquid Cleaning

2. When cleaning with liquid detergents (e.g. terpene, alkali saponifiers), consult the manufacturer’s specifications and make sure that the cleaner is suitable for use with the metal and resin components of this connector. Also, do not leave the connector outside where it moisture could infiltrate the product.

3. Cautions for Cleaning

3. If any organic solvent or other liquid cleaner or flux remains in the connector, it can cause electrical performance degradation. Please make sure that the connector is completely free of any cleaner or flux before use.
Connector Precautions

1. Tolerance Clearance on Mating Side
   The effective clearance of this product is 1.6mm. Please make sure that your design accounts for 1mm mating clearance between the header and receptacle.

2. Header Connector Height
   Because the SMT height specification for the header does not account for the thickness of the solder paste, please remember to account for the extra height in the total stacking height.

3. Screw Fastening Torque (SMT Type)
   When the screw is fastened, please use the M2 screw. The recommended fastening torque is 0.15(N.m) max.

4. Prefixed Process to Board (Through hole Type)
   If the prefixed process is required for board mounting, please use the prefixed pin type. (Applicable Thickness $t = 1.6 \pm 0.1$)
   **Note:**
   When the connector is mounted on the board, the dip post is guided into the through-hole first. To prevent dip post damage, make sure that the connector is parallel to the board during this process.

5. Plug and Play
   Please consult your Hirose representative if you will be mating/unmating the connector while the circuit is energized.

6. Others
   - Excessive force during mating/unmating will damage the connector.
   - Avoid using the mated connectors as a means of holding the PCB together. The PCBs need to be secured together with screws, spacers or other means which do not rely on the connectors as the primary support mechanism.
   - The resin color of the product may vary slightly with different production lots. This does not effect the performance.
The characteristics and the specifications contained herein are for reference purpose. Please refer to the latest customer drawings prior to use.

The contents of this catalog are current as of date of 04/2015. Contents are subject to change without notice for the purpose of improvements.

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