COMPONENT SPECIFICATION

M40 SERIES CONNECTORS

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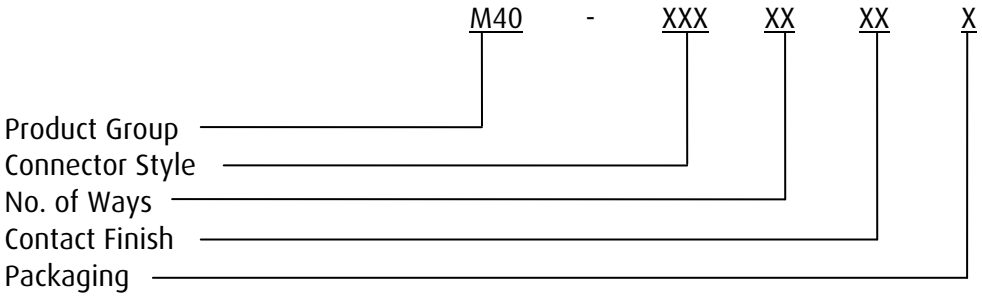
COMPONENT SPECIFICATION
M40 SERIES CONNECTORS

1. DESCRIPTION OF CONNECTOR AND INTENDED APPLICATION.

A selection of 1.00mm pitch connectors, comprising vertical board to board surface mount plugs and sockets.

2. MARKING OF THE CONNECTOR AND/OR PACKAGE (ORDER CODE).

The marking (order code) shall appear on the package and shall be of the following style:



Connector Style:

- Surface Mount Plug.....600
- Surface Mount Socket.....620
- Surface Mount Socket 310
- Surface mount Pin Header 320

No. of Ways, Finish & Packaging:
See individual drawings

3. RATINGS.

3.1. MATERIAL & FINISH.

Materials:

- Mouldings:
  - M40-310/320 ..... Glass-Filled PA6T, UL94V-0
  - M40-600/620..... Glass-Filled PA46, UL94V-0
- Contacts..... Copper Alloy
- Retainer..... Brass

Finish:..... See Individual Drawings

3.2. ENVIRONMENTAL CHARACTERISTICS.

Temperature Range:

- M40-310/320..... -40°C to +105°C
- M40-600/620..... -55°C to +100°C

COMPONENT SPECIFICATION
M40 SERIES CONNECTORS (continued)

3. RATINGS (continued).

3.3. ELECTRICAL CHARACTERISTICS.

Current Rating:
- M40-310 ..... 1.0A AC/DC
- M40-320 ..... 0.75A AC/DC
- M40-600/620 ..... 0.5A AC/DC

Voltage Rating: ..... 100V AC/DC

Contact Resistance (initial):
- M40-310/320 ..... 20 mΩ max
- M40-600/620 ..... 50 mΩ max

Contact Resistance (after conditioning):
- M40-310/320 ..... 30 mΩ max
- M40-600/620 ..... 75 mΩ max

Dielectric Withstanding Voltage:
- M40-310/320 ..... 500V AC_{rms} for 1 minute
- M40-600/620 ..... 250V AC_{rms} for 1 minute

Insulation resistance:
- M40-310/320 ..... 1,000 MΩ min
- M40-600/620 ..... 500 MΩ min

3.4. MECHANICAL CHARACTERISTICS.

Contact Retention in moulding:
- M40-320 ..... 1.47N min
- M40-600 ..... 4.9N min
- M40-620 ..... 5.9N min

Retainer retention in moulding:
- M40-600/620 ..... 7.8N min

Soldered retainer retention on PC Board:
- M40-600/620 ..... 29.4N min

Insertion force (per contact):
- M40-310/320 ..... 1.5N max
- M40-600/620:
  - Initial ..... 2.7N max
  - After 2 cycles ..... 2.0N max
  - After 30 cycles ..... 1.1N max

Withdrawal force (per contact):
- M40-310/320 ..... 0.1N min
- M40-600/620:
  - Initial ..... 0.9N min
  - After 2 cycles ..... 0.7N min
  - After 30 cycles ..... 0.4N min

Durability
- M40-310/320 ..... 300 cycles
- M40-600/620 ..... 30 cycles

COMPONENT SPECIFICATION
M40 SERIES CONNECTORS (continued)

APPENDIX A - TEST METHODS AND PERFORMANCE – M40-310/320.

A1.1. TEST CONDITIONS.

Unless otherwise specified, all tests and measurements shall be performed under the conditions and in accordance with EIA 364.

A1.2. TEST METHODS.

A1.2.1. Electrical.

i) Contact Resistance.

Test Method ..... EIA 364-23

Solder a plug and a socket to PC Boards and mate them together. Measure the contact resistance between the two mated boards. Apply the low-level condition of 20mV max. for the open circuit voltage and 100mA max. for the closed circuit current. Contact resistance must not exceed the values stated in section 3.3.

ii) Dielectric Withstanding Voltage.

Mate a plug and socket together (not soldered to a PC Board). Apply between neighbouring contacts a 500V AC current for 1 minute in accordance with EIA 364-20. No creeping discharge, flash-over or insulator break-down is allowed. Current leakage must be less than 0.5mA.

iii) Insulation Resistance.

Mate a plug and socket together (not soldered to a PC Board). Apply between neighbouring contacts a 500V DC voltage for 1 minute. Measurement is taken in accordance with EIA 364-21. Insulation resistance must not be less than the value stated in section 3.3.

A1.2.2. Mechanical.

i) Contact Retention Force.

Test Method ..... EIA 364-29

Place a connector on a push-on/pull-off machine. Apply force onto the contact head and push the contact in the direction opposite to insertion. Measure the force when the contact dislodges from the moulding. Contact retention must conform to the figure stated in section 3.4.

ii) Insertion/Withdrawal Force.

Test Method ..... EIA 364-13

Place a mated connector pair on a push-on/pull-off machine. Repeat insertion and withdrawal for 30 cycles, at a speed of 50mm/min. along the mating axis. Insertion and withdrawal forces before, during and after the test must conform to those stated in section 3.4.

iii) Durability.

Place a mated connector pair on a push-on/pull-off machine. Repeat insertion and withdrawal for 300 cycles, at a speed of 200 cycles per hour, along the mating axis. Contact resistance before and after the test must meet the values stated in section 3.3.

COMPONENT SPECIFICATION
M40 SERIES CONNECTORS (continued)

APPENDIX A - TEST METHODS AND PERFORMANCE – M40-310/320 (continued).

A1.2. TEST METHODS (continued).

A1.2.3. Environmental.

i) Solderability

Test Method ..... EIA-364-52 Category 3
Steam Aging Temperature ..... 90 to 96°C
Steam Aging Duration ..... 8 Hours ±5 minutes
Soldering Temperature ..... 245° ±5°C
Soldering Time ..... 4 to 5 seconds

Result: More than 95% of the surface must have continuous solder coating.

ii) Vibration.

Test Method ..... EIA-364-28, Condition V, Test letter A
Test Condition ..... Random
Frequency ..... 50 – 2000Hz
PSD value ..... 3.13 G_{rms} min
Directions ..... Three mutually perpendicular directions
Duration ..... 15 minutes / axis.

Contact resistance before and after testing must meet the values specified in section 3.3. No electrical discontinuity greater than 1µs must occur during testing. Looseness amongst parts, chipping, breakage or other detrimental damage must not occur.

iii) Shock.

Test Method ..... EIA-364-27, Condition H
Wave form ..... Half-sinusoidal
Peak acceleration ..... 30G (294m/s^2)
Shock Duration ..... 11 milliseconds
Directions ..... Three mutually perpendicular directions
Test Duration ..... 3 shocks in each direction, totalling 18 shocks

Contact resistance before and after testing must meet the values specified in section 3.3. No electrical discontinuity greater than 1µs must occur during testing. Looseness amongst parts, chipping, breakage or other detrimental damage must not occur.

iv) Humidity.

Test Method ..... EIA-364-31, Method III, Test Condition A
Temperature ..... 25°C to 65°C
Humidity ..... 90% to 95% RH
Duration ..... 96 Hours

Contact resistance before and after the test must meet the values stated in section 3.3. There must be no evidence of damage.

v) Thermal Shock.

Test Method ..... EIA 364-32, Test Condition I
Temperature ..... -55°C to +85°C
Cycles 5
Exposure times at temperature extremes ..... 30 Minutes

Contact resistance before and after the test must meet the values stated in section 3.3. There must be no evidence of damage.

COMPONENT SPECIFICATION
M40 SERIES CONNECTORS (continued)

APPENDIX A - TEST METHODS AND PERFORMANCE – M40-310/320 (continued).

A1.2. TEST METHODS (continued).

A1.2.3. Environmental (continued).

vi) Salt Spray.

Test Method ..... EIA364-26, Test Condition A
Temperature ..... 35 ±1.1°C
Humidity ..... 95 to 98% RH
PH Value ..... 6.5 to 7.2
Duration ..... 8 Hours

Contact resistance before and after the test must meet the values stated in section 3.3. There must be no evidence of damage.

vii) Heat Resistant.

Test Method ..... EIA-364-17, Test Condition 3, Method A
Temperature ..... 85°C ±2°C
Duration ..... 96 Hours

Contact resistance before and after the test must meet the values stated in section 3.3. There must be no evidence of damage.

viii) Resistance to Soldering Heat

Test Method ..... EIA-364-56, Procedure 3, Test Condition C
Temperature ..... 260 ±5°C
Time ..... 5 to 10 seconds

Contact resistance before and after the test must meet the values stated in section 3.3. There must be no evidence of damage. Mechanical performance before and after the test must meet the values stated in section 3.4.

IR Reflow Temperature profile ..... 220°C, 225°C, 230°C, 240°C, 265°C
Speed 8mm/second
At 217°C, the connector needs to stay in the IR Reflow oven for 90 seconds min.
At 260°C, the connector needs to stay in the IR Reflow oven for 5 seconds min.

Contact resistance before and after the test must meet the values stated in section 3.3. There must be no evidence of damage. Mechanical performance before and after the test must meet the values stated in section 3.4.

COMPONENT SPECIFICATION
M40 SERIES CONNECTORS

APPENDIX B - TEST METHODS AND PERFORMANCE – M40-600/620.

B1.1. TEST CONDITIONS.

Unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202:

Temperature .....15°C to 35°C
Humidity..... 45% to 75% RH
Atmospheric pressure ..... 650 to 850mmHg

B1.2. TEST METHODS.

B1.2.1. Electrical.

i) Contact Resistance.

Solder a plug and a socket to PC Boards and mate them together. Measure the contact resistance using the 4-terminal method as shown in Figure 1. Apply the low-level condition of 20mV max. for the open circuit voltage and 10mA DC max. for the closed circuit current. Contact resistance must not exceed the values stated in section 3.3.

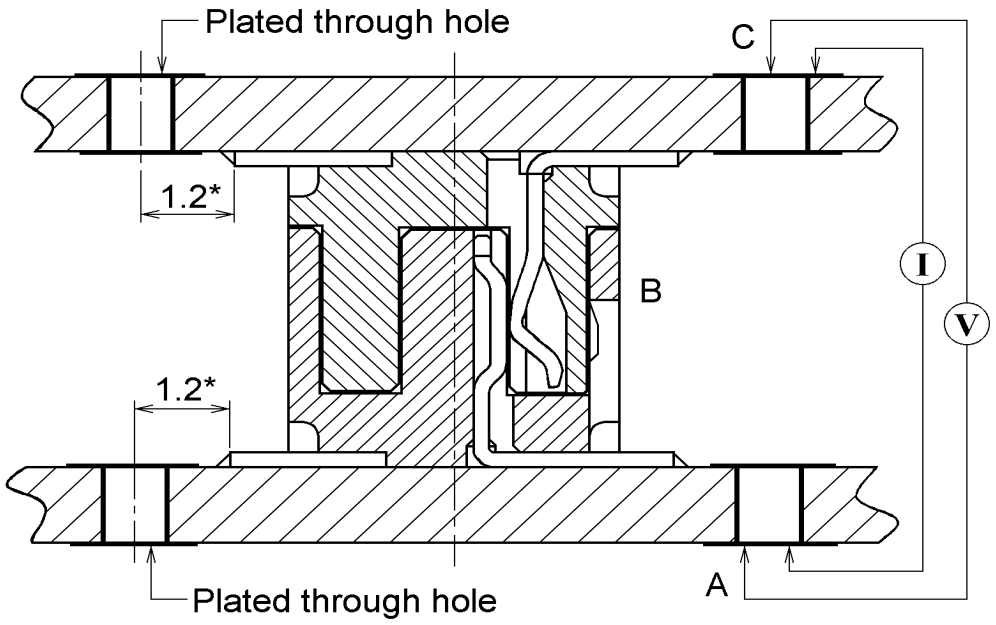


Figure 1: Contact Resistance

Note: Contact resistance is defined as R_{ABC}, i.e. the electrical resistance from point A on the back face of the lower PCB, through contact point B, to point C on the back face of the upper PCB. * = 2.7mm on the next line.

ii) Dielectric Withstanding Voltage.

Mate a plug and socket together (not soldered to a PC Board). Apply between neighbouring contacts a 250V AC rms current for 1 minute in accordance with MIL-STD-202, Method 301. No creeping discharge, flash-over or insulator break-down is allowed.

iii) Insulation Resistance.

Mate a plug and socket together (not soldered to a PC Board). Apply between neighbouring contacts a 100V DC voltage. Measurement is taken in accordance with MIL-STD-202, Method 302. Insulation resistance must not be less than the value stated in section 3.3.

COMPONENT SPECIFICATION
M40 SERIES CONNECTORS (continued)

APPENDIX B - TEST METHODS AND PERFORMANCE – M40-600/620 (continued).

B1.2. TEST METHODS (continued).

B1.2.2. Environmental.

i) Heat Resistant.

Solder a plug and a socket to PC Boards and mate them together. Expose the mated connectors to the following environment:

Temperature .....+80° ±3°C
Duration.....500 ±12 hours

Contact resistance before and after the test must meet the values stated in section 3.3.

ii) Cold Resistant.

Solder a plug and a socket to PC Boards and mate them together. Expose the mated connectors to the following environment:

Temperature .....-30° ±3°C
Duration.....500 ±12 hours

Contact resistance before and after the test must meet the values stated in section 3.3.

iii) Thermal Shock.

Solder a plug and a socket to PC Boards and mate them together. Expose the mated connectors to the following environment:

Temperature ..... -30° (30 min.) Normal temp. (5 min.)
+70°C (30 min.) Normal temp. (5 min.)
Transition time.....5 minutes max.
Number of cycles.....5

Contact resistance before and after the test must meet the values stated in section 3.3. Detrimental damage affecting the performance must not occur.

iv) Humidity.

Solder a plug and a socket to PC Boards and mate them together. Expose the mated connectors to the following environment in accordance with MIL-STD-202, Method 103 Condition B:

Temperature .....40° ±2°C
Humidity..... 90% to 95% RH
Duration.....500 ±12 hours

Contact resistance before and after the test must meet the values stated in section 3.3.

v) Salt Spray.

Solder a plug and a socket to PC Boards and mate them together. Expose the mated connectors to the following environment in accordance with MIL-STD-202, Method 101 Condition B:

Temperature .....35°C
Salt water density .....5% (by weight)
Duration.....48 hours

Contact resistance before and after the test must meet the values stated in section 3.3. Detrimental damage affecting the performance must not occur.

COMPONENT SPECIFICATION
M40 SERIES CONNECTORS (continued)

APPENDIX B - TEST METHODS AND PERFORMANCE – M40-600/620 (continued).

B1.2. TEST METHODS (continued).

B1.2.2. Environmental (continued).

vi) Gas.

Solder a plug and a socket to PC Boards and mate them together. Expose the mated connectors to the following environment:

Chamber temperature.....25° ±2°C
Gas.....H_2S, 10ppm
Duration.....24 hours

Contact resistance before and after the test must meet the values stated in section 3.3. Detrimental damage affecting the performance must not occur.

vii) Vibration.

Solder a plug and a socket to PC Boards and mate them together. Place the mated connectors on a vibrator machine, and apply the following vibration in accordance with MIL-STD-202, Method 201. Care should be taken to fix the boards firmly to the vibrator machine to avoid any unnecessary resonance of the boards. During the testing, run a 100mA DC current to check for any electrical discontinuity. The test cycle must cover the following parameters:

a) Frequency..... 10Hz - 55Hz - 10Hz over 1 minute approx.
b) Directions ..... Three mutually perpendicular directions
c) Total amplitude.....1.52mm
d) Sweep duration..... Two hours for each direction, totalling 6 hours.

Contact resistance before and after testing must meet the values specified in section 3.3. No electrical discontinuity greater than 10µs must occur during testing. Looseness amongst parts, chipping, breakage or other detrimental damage must not occur.

viii) Shock.

Solder a plug and a socket to PC Boards and mate them together. Place the mated connectors on a shock machine, and apply the following shock in accordance with MIL-STD-202, Method 213 Condition A. Care should be taken to fix the boards firmly to the shock machine to avoid any unnecessary resonance of the boards. During the testing, run a 100mA DC current to check for any electrical discontinuity. The test cycle must cover the following parameters:

a) Maximum shock.....50g (490m/s^2)
b) Standard duration.....11 milliseconds
c) Wave form.....Half-sinusoidal

No electrical discontinuity greater than 10µs must occur during testing. Looseness amongst parts, chipping, breakage or other detrimental damage must not occur.

ix) Solderability.

Dip the solder tine of a plug and socket connector in a flux of RMA or R type for 5 to 10 seconds. Then dip the tine into a solder bath (210° ±5°C) for 5 ±0.5 seconds. This test is in accordance with MIL-STD-202, Method 208. More than 95% of the dipped surface must be evenly wet.

COMPONENT SPECIFICATION
M40 SERIES CONNECTORS (continued)

APPENDIX B - TEST METHODS AND PERFORMANCE – M40-600/620 (continued).

B1.2. TEST METHODS (continued).

B1.2.2. Environmental (continued).

x) Soldering Heat Resistance (Surface Mount).

Subject a surface mount connector to the following reflow soldering profile, no more than twice:

Pre-heat .....150-216°C for 30-90 seconds
Reflow solder.....235° ±5°C
220°C min. within 20 seconds
240°C max. within 5 seconds

Detrimental damage affecting the performance of the connector must not occur.

xi) Soldering Heat Resistance (Hand-soldered).

Hand-solder a plug and a socket connector to a PC Board, using a temperature of 350°C for no more than 3 seconds. Detrimental damage affecting the performance of the connector must not occur.

B1.2.3. Mechanical.

i) Contact Retention Force.

Place a connector on a push-on/pull-off machine. Apply force onto the contact head and push the contact in the direction opposite to insertion, at a speed of 25 ±3mm/min. Measure the force when the contact dislodges from the moulding. Plug and socket contact retention must conform to the figures stated in section 3.4.

ii) Retainer Retention Force.

Place a connector on a push-on/pull-off machine. Apply force onto the retainer in the direction opposite to insertion, at a speed of 25 ±3mm/min. Measure the force when the retainer dislodges from the connector. Retainer retention must conform to the figure stated in section 3.4.

iii) Soldered Retainer Retention Force.

Solder a connector to a PC Board, using only the retainers. Place the board onto a push-on/pull-off machine. Pull the connector at a speed of 25 ±3mm/min. Measure the force when the retainer breaks away from the board. Soldered retainer retention must conform to the figure stated in section 3.4.

iv) Repeated Insertion/Withdrawal Force.

Solder a plug and a socket to PC Boards. Place the boards onto a push-on/pull-off machine. Repeat insertion and withdrawal for 30 cycles, at a speed of 25 ±3mm/min. along the mating axis. Insertion and withdrawal forces before, during and after the test must conform to those stated in section 3.4.

v) Electrical Continuity Durability.

Solder a plug and a socket to PC Boards. Place the boards onto a push-on/pull-off machine. Repeat insertion and withdrawal for 30 cycles, at a speed of 25 ±3mm/min. along the mating axis. Contact resistance before and after the test must meet the values stated in section 3.3.