Product Specification
108-60016
AMP Common Termination (CT), Connector
2mm Pitch, M/T Type, Lead Free Version

1. Scope:

1.1 Contents:

This specification covers the requirements for product performance, test methods and quality assurance provisions of AMP Common Termination (CT), Connector, 2mm Pitch, M/T Type. The applicable product description and part numbers are as shown in Fig.1:

Product Part No.	Descriptions
x-173977-x	M/T Receptacle Connector Assembly, 2-15-Pos. #28/#26 AWG
x-179694-x	M/T Receptacle Connector Assembly, 2-15-Pos. #24 AWG

2. Applicable Documents

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements this specification and referenced documents, this specification shall take precedence.

2.1 AMP Specifications:

A. 109-5000 Test Specification, General Requirements for Test Methods

B. 114- 5104 Application Specification

C. 501-60003 Test Report

D. 108-60016-8 Special Specification for SWARCO FUTURIT

2.2 Military Standard and Specifications:

MIL-STD-202: Test Methods for Electronic and Electrical Component Parts.

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TITLE
AMP Common Termination (CT), Connector, 2mm Pitch, M/T Type, Lead Free Version

3. Requirements:

3.1 Design and Construction:

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2 Materials:

A. MT Receptacle Housing Assembly

Housing	: Glass-filled, PBT (UL94 V-0)
Receptacle Contact	: Phosphor Bronze, Tin Plating

B. Post Header Horizontal (H), Vertical (V) & Relay Use (R)

Post Header Housing	: 6/6 Nylon (UL94V-0)
Post Contact	: Brass, Tin Plating

C. Post Header Horizontal (H), Vertical (V) & Relay Use (R), Gold Plated Product

Housing	: 6/6 Nylon (UL94V-0)
Post	: Brass, Gold Plating and Tin Plating

D. Post Header Horizontal (H), Vertical (V) & Relay use (R)

Housing	: 6/6 Nylon GF Type (UL94V-0)
Post	: Brass, Tin plating

E. SMT Type Post Header Horizontal (H), Vertical (V)

Housing	: 6T PA (UL94V-0)
Post	: Brass, Tin Plating

3.3 Ratings:

A. Voltage Rating : 125 V(AC/DC)

B. Current Rating : 3A #24 AWG
2A #26 AWG
1A #28 AWG

C. Temperature Rating: -40°C to +105°C

The upper limit of the temperature includes the temperature rising resulted by the energised electrical current.

3.4 Applicable Wires:

A. Wire Size : #28 AWG, #26 AWG (0.08mm^2/0.14mm^2)
Recommended UL Grade: UL 1061, UL 1571
#24 AWG (0.22mm^2)
Recommended UL Grade: UL 1728

B. Insulation Diameter : 0.83mm/1.05mm
0.95~1.05mm (Only AWG #24)

3.5 Applicable Printed Circuit Board

A. Board Thickness : 0.8mm/1.6mm

B. Hole Diameter : 0.8mm/0.9mm (for punched holes)
0.85mm/0.9mm (for drilled holes)

3.6 Applicable Panel Thickness

0.8~1.6mm (To be used for post header assembly relay)

3.7 Performance Requirements and Test Descriptions:

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig.2, Para. 3.8. All tests shall be performed in the room temperature unless otherwise specified.

3.8 Test Requirements and Procedures Summary:

<table>
<tr><th>Para.</th><th>Test Items</th><th>Requirements</th><th>Procedures</th></tr>
<tr><td colspan="4">Mechanical Performance Requirements</td></tr>
<tr><td>3.8.1
(1)</td><td>Connector Mating/ Unmating Force</td><td>
For post HDR.
[Max.] [Min.]
<table>
<tr><th>No. of Pos.</th><th>Insertion</th><th>Extraction</th></tr>
<tr><td>2
3
4</td><td>34.3 N
(3.5 kgf)</td><td>4.9 N
(0.5 kgf)</td></tr>
<tr><td>5
6
7</td><td>49 N
(5.0 kgf)</td><td>6.86 N
(0.7 kgf)</td></tr>
<tr><td>8
9
10</td><td>63.7 N
(6.5 kgf)</td><td>9.8 N
(1.0 kgf)</td></tr>
<tr><td>11
≀
15</td><td>73.5 N
(7.5 kgf)</td><td>13.72 N
(1.4 kgf)</td></tr>
</table>
For Relay HDR
[Max.] [Min.]
<table>
<tr><th rowspan="2">No. of Pos.</th><th colspan="2">Insertion</th><th colspan="2">Extraction</th></tr>
<tr><th>Non - Lock Side</th><th>Lock Side</th><th>Non - Lock Side</th><th>Lock Side</th></tr>
<tr><td>2
3
4</td><td>34.3 N
(3.5 kgf)</td><td>49 N
(5.0 kgf)</td><td>4.9 N
(0.5 kgf)</td><td>7.84 N
(0.8 kgf)</td></tr>
<tr><td>5
6
7</td><td>49 N
(5.0 kgf)</td><td>63.7 N
(6.5 kgf)</td><td>6.86 N
(0.7 kgf)</td><td>9.8 N
(1.0 kgf)</td></tr>
<tr><td>8
9
10</td><td>63.7 N
(6.5 kgf)</td><td>78.4 N
(8.0 kgf)</td><td>9.8 N
(1.0 kgf)</td><td>12.74 N
(1.3 kgf)</td></tr>
<tr><td>11
≀
15</td><td>73.5 N
(7.5 kgf)</td><td>88.2 N
(9.0 kgf)</td><td>13.72 N
(1.4 kgf)</td><td>16.66 N
(1.7 kgf)</td></tr>
</table>
</td><td>Subject terminated connector and header to mate and unmate to measure the force required to engage and disengage by operating the head at a rate of 50 mm a minute. Record by using autograph.

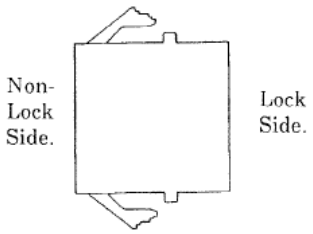
Relay HDR
 
</td></tr>
</table>

Fig. 2 (To be continued)

<table>
<tr><th>Para.</th><th>Test Items</th><th>Requirements</th><th>Procedures</th></tr>
<tr><td>3.8.1 (2)</td><td>Contact Unmating Force</td><td>0.784 N (80 gf) Min.</td><td>After preconditioning by using applicable post for 3 cycles, measure the force required to unmate post by operating the head at a rate of 50mm a minute.</td></tr>
<tr><td>3.8.1 (3)</td><td>Tensile Strength of Wire Termination</td><td>
<table>
<tr><td>Wire Size (AWG)</td><td>Traverse Direction Min.</td><td>Axial Direction Min.</td></tr>
<tr><td># 28</td><td>11.8 N (1.2 kgf)</td><td>14.7 N (1.5 kgf)</td></tr>
<tr><td># 26 (UL 10272)</td><td>11.8 N (1.2 kgf)</td><td>19.6 N (2.0 kgf)</td></tr>
<tr><td># 26 (except UL 10272) & #24</td><td>14.7 N (1.5 kgf)</td><td>19.6 N (2.0 kgf)</td></tr>
<tr><td># 26 (UL11668)</td><td>7.8 N (0.8 kgf)</td><td>19.6 N (2.0 kgf)</td></tr>
<tr><td colspan="3">Apply Ribbon Cables and Flat Shielded Wire</td></tr>
<tr><td>Wire Size (AWG)</td><td>Traverse Direction Min.</td><td>Axial Direction Min.</td></tr>
<tr><td># 28</td><td rowspan="2">7.8 N (0.8 kgf)</td><td>14.7 N (1.5 kgf)</td></tr>
<tr><td># 26 & #24</td><td>19.6 N (2.0 kgf)</td></tr>
</table>
</td><td>Apply a pull-off load to terminated wire of contact secured on the tester, at a rate of 100mm (4.0”) a minute.
The load is applied in the axial and lateral directions as specified.</td></tr>
<tr><td>3.8.1 (4)</td><td>Post Contact Retention Force</td><td>For SMT type:

7.84N(0.8Kgf) Min. per contact

For other type:

14.7N(1.5Kgf) Min. per contact.</td><td>Apply axial load to contact by operating at a rate of 50 mm a minute, after preconditioning for 3 insertion/extraction cycles by using applicable post contact.
See Fig. 5</td></tr>
</table>

Fig.2. (To be continued)

Para.	Test Items	Requirements	Procedures
3.8.1 (5)	Panel Mounting Force (To be applied to post header for relay use)	49N (5kgf) Max.	By using AMP recommended panel cut-out layout dimension, specified in AMP Customer Drawing, measure the force required to mount header into the panel. Loading is made from the punch entering direction of the cut-out hole. See Fig. 6
3.8.1 (6)	Panel Retention Force	83.3N (8.5kgf) Min.	By using AMP recommended panel cut-out layout dimensions, specified in AMP Customer Drawing, measure the force required to dislodge header from the cut-out hole. AMP specification, 109-49
3.8.1 (7)	Examination of Product	Product shall be confirming to the requirements of applicable product drawing and Application Specification 114-5104	Visually, dimensionally and functionally inspected per applicable inspection plan.
Electrical Performance Requirements			
3.8.2 (1)	Termination Resistance (Low Level)	10 mΩ Max. (Initial) 20 mΩ Max. (Final)	Subject mated contacts assembled in housing to closed circuit current of 10 mA max. at open circuit voltage of 20 mV max. Fig. 3. AMP Spec. 109-5306
3.8.2 (2)	Dielectric Strength	Connector must withstand test potential of 1.0 kV (AC) for 1 minute. Current leakage must be 5.0 mA max.	Measure by applying test potential between the adjacent contacts, and between the contacts and ground in the mated connector assembly. (Measure on housing surface.) MIL-STD-202, Method 301
3.8.2 (3)	Insulation Resistance	1000 MΩ Min. (Initial)	Measure by applying test potential between the adjacent contact, and between the contacts and ground in the mated connector assembly. MIL-STD-202, Method 302, Condition B.
3.8.2 (4)	Temperature Rising vs. Current	30°C max. under loaded specified current	Measure temperature rising by energized current probing on the tine area of the post. AMP Spec. 109-5310

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
Environmental Performance Requirements			
3.8.3 (1)	Vibration Sinusoidal Low Frequency	No electrical discontinuity greater than 1 microsecond shall occur. Termination resistance (low level) shall be met	Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52 mm amplitude 2 hours each of 3 mutually perpendicular planes MIL-STD-202, Method 201, Condition A
3.8.3 (2)	Physical Shock	No electrical discontinuity greater than 1 microsecond shall occur. Termination resistance (low level) shall be met.	Subject mated connectors to 490.3 m/s^2 halfsine shock pulses of 11milisecond duration; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks. MIL-STD-202, Method 213 Condition A
3.8.3 (3)	Temperature Life	Termination resistance (low level) shall be met.	Subject mated connectors to temperature life; testing atmosphere at 85±2°C for 96 hours
3.8.3 (4)	Resistance to Cold	Termination resistance (low level) shall be met	Subject mated connectors to cold testing atmosphere at -25±3°C for 48 hours. Subsequent measurement shall be done after reconditioning in the room temperature for 1 hour.
3.8.3 (5)	Humidity, Steady State	Insulation resistance (Final) 500 MΩ min. Termination resistance (low level) shall be met.	Subject mated connectors to steady state humidity at 40°C and 90-95 % (R.H.) MIL-STD-202, Method 103 Condition B
3.8.3 (6)	Thermal Shock	Termination resistance (low level) shall be met	Subject mated connectors to 5 cycles between –55°C and 85°C for 30 minutes each duration at temperature extremes. MIL-STD-202, Method 107 Condition A
3.8.3 (7)	Salt Spray	Resistance (low level) (Final) must meet visual & electrical requirements, which applicable	Subject mated/unmated connectors to 5% salt concentration for 48 hours MIL-STD-202, Method 101 Condition B
3.8.3 (8)	Sulfurous Acid Gas	Termination resistance (low level) shall be met.	Subject mated connectors to sulfurous acid gas atmosphere of 3±1 ppm concentration at 40±2°C for 240 hours. Subsequent measurement shall be done after reconditioning in the room temperature for 1 hour.
3.8.3 (9)	Solderability	Solderable area shall have a solder coverage of 95% minimum	Subject contacts to soderability testing, as specified. MIL-STD-202, Method 208

Fig. 2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.8.3 (10)	Resistance to Soldering Heat	No physical damage shall be evident after testing	Subject product mounted on printed circuit boards to solder bath at 245±5ºC for 10±1 seconds MIL-STD-202, Method 210 except as indicated above when testing by manual soldering iron, apply it as 350±10oC for 3 $^{+1}_{-0}$ seconds without forcing pressure to affect the tine of contact. SMT product mounted on printed circuit boards to solder reflow as like Fig. 7. (Measured at housing surface)
3.8.3 (11)	Sequence Testing	The requirements for the each testing level shall be met.	See Para. 3.8.3 (11-1) and Para. 3.8.3 (11-2)
3.8.3 (11-1)	Connector Repeated Mating/Unmating	After testing, terminator resistance (low level) shall be met.	Subject connector assembly to 30 cycles of repeated mating/unmating at a rate of 10 cycles a minute
3.8.3 (11-2)	Temperature Humidity Cycling	After testing, termination resistance (low level) shall be met	Subject mated connector to temperature chang between 25ºC and 65ºC with 95 %(R.H.) for 5 cycles. JIS C 0028

Fig. 2 (End)

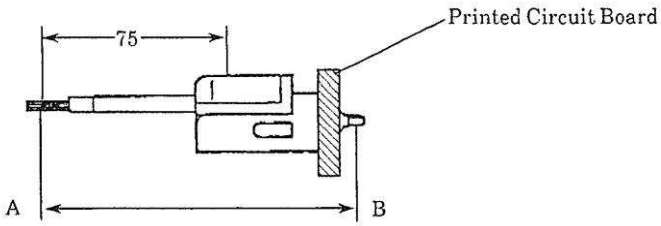


Fig.3

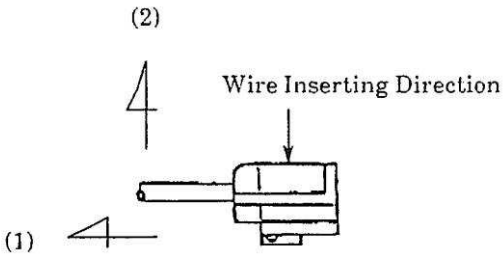


Fig.4

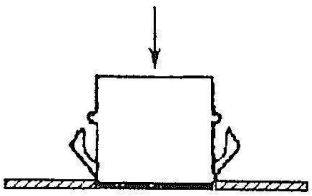
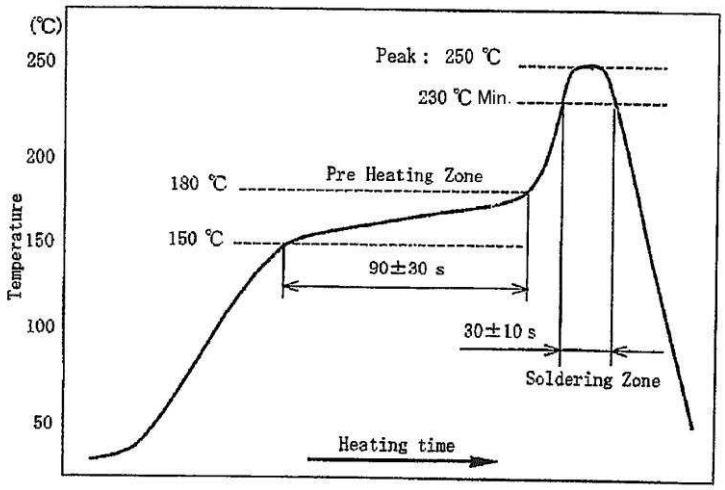


Fig.5 Fig.6



(Measured at housing surface)

Fig.7

4. Quality Assurance Provisions:

4.1 Test Condition:

Unless otherwise specified, all the tests shall be performed under any combination of the following test conditions.

Temperature : 15-30ºC

Relative Humidity : 45-75 %

Atmosphere Pressure : 86.7~107kPa (650-800 mmHg)

4.2 Test Specimens:

The test specimens to be used for the performance evaluation testing, shall be prepared in accordance with AMP Application Specification, 114-5104, Termination of AMP CT Connector, 2 mm Pitch, M/T Type, by using the samples selected from the current production at random, and conforming to the requirements of the applicable product drawing.

5. Applicable Wires:

(Note: For compatibility of the wires for termination, the wires must be evaluated respectively, by the manufacturers, brand, tradenames and product catalogue numbers.)

Applicable Wire Specifications (Nominal)	Wire Size	No. of Diameter Conductors of a Conductor (mm)	Calculated Cross-sectional Area (mm^2)	Insulation Diameter (mm)
Discrete Wire UL 1571 UL 1061 Ribbon Cable UL 2651 UL 20058 Flat Shielded Wire UL 1533 UL 2547 UL 1691 UL 2791	# 26 AWG # 28 AWG	# 26 AWG (7/0.16) # 28 AWG (7/0.127)	# 26 AWG (0.14) # 28 AWG (0.08)	# 26 AWG (0.93/1.05) # 28 AWG (0.83/0.97)
Discrete Wire UL 1728	# 24 AWG	# 24 AWG (7/0.203)	# 24 AWG (0.22)	# 24 AWG (0.95/1.06)

The applicable product descriptions and part numbers are as shown in Appendix 1.

Product Part No.	Product Descriptions	No. of Pos.
x-292253-x	Post Header, Horizontal (H)	2~15 Pos.
x-292167-x	Post Header, Horizontal (H) in Tube	2~15 Pos.
x-292143-x	Post Header, Horizontal (H) w/o Kink	2~15 Pos.
x-292168-x	Post Header, Horizontal (H) w/o Kink in Tube	2~15 Pos.
x-292161-x	Post Header, Vertical (V)	2~15 Pos.
x-292169-x	Post Header, Vertical (V) in Tube	2~15 Pos.
x-292145-x	Post Header, Vertical (V) w/o Kink	2~15 Pos.
x-292170-x	Post Header, Vertical (V) w/o Kink in Tube	2~15 Pos.
x-292132-x	Post Header, Vertical (V), Box Type	2~15 Pos.
x-292165-x	Post Header, Vertical (V), Box Type in Tube	2~15 Pos.
x-292133-x	Post Header, Vertical (V), Box Type w/o Kink	2~15 Pos.
x-292166-x	Post Header, Vertical (V), Box Type w/o Kink in Tube	2~15 Pos.
x-292134-x	Post Header, Vertical (V) Gold-plated Contact, Box Type	2~6 Pos.
x-292135-x	Post Header, Vertical (V), Short Tine, Box Type w/o Kink	2~15 Pos.
x-292251-x	Post Header, Vertical (V), Box Type, Polarized	2~15 Pos.
x-292250-x	Post Header, Horizontal (H), Box Type	2~15 Pos.
x-292164-x	Post Header, Horizontal (H), Box Type in Tube	2~15 Pos.
x-292130-x	Post Header, Horizontal (H) Short Tine, Box Type	9~10 Pos.
x-292254-x	Post Header, w/Panel Lock, for Relay	2~15 Pos.

Product Part No.	Product Descriptions	No. of Pos.
x-292156-x	Post Header, Free Hanging, for Relay	2~5 Pos.
x-292147-x	Post Header, Vertical (V), Box Type, SMT Type	6 Pos.
x-292153-x	Post Header, Vertical (V), SMT Type	2~9 Pos.
x-292171-x	Post Header, Vertical (V), SMT Type, in Tube	2~9 Pos.
x-292154-x	Post Header, Vertical (V), SMT Type, w/o Embossment	2~9 Pos.
x-292172-x	Post Header, Vertical (V), SMT Type, in Tube w/o Embossment	2~9 Pos.
x-292148-x	Post Header, Horizontal (H) SMT Type, Box Type	2~6, 8 Pos.
x-292149-x	Post Header, Horizontal (H) SMT Type, Box Type	2~6, 8 Pos.
x-292173-x	Post Header, Horizontal (H) SMT Type, Box Type, on Embossment Tape	2~6, 8 Pos.
x-292146-x	Post Header, Vertical (V) GF Type	2, 4, 8~11 Pos.
x-292136-x	Post Header, Vertical (V), Box Type, Polarized GF Type	7~10, 13 Pos.
x-292151-x	Post Header, Vertical (V), SMT Type, Box Type	2~8 Pos.
x-292175-x	Post Header, Vertical (V), SMT Type, Box Type on Embossment Tape	2~8 Pos.
x-292150-x	Post Header, Vertical (V), SMT Type, Box Type with Boss	2~8 Pos.
x-292174-x	Post Header, Vertical (V), SMT Type, Box Type on Embossment Tape	2~8 Pos.
x-292112-x	CT Conn MT Rec Assy.	2~15 Pos.