Product Specification

AMP DR-DIN Connector

1. Scope:

This specification covers the requirements for product performance and test methods of AMP DR-DIN connectors, of the following part numbers.

Part Number	Connector Descriptions	Mounting Type
174252-1	32-pos. Male Connector	Vertical Mount Action Pin Type
174253-1/-3	32-pos. Female Connector	Horizontal Mount Soldering Type
5-174253-1	32-pos. Female Connector	Horizontal Mount Soldering Type with Retention Leg
174254-1	32-pos. Male Connector	Vertical Mount Soldering Type
174252-2	64-pos. Male Connector	Vertical Mount Action Pin Type
174253-2	64-pos. Female Connector	Horizontal Mount Soldering Type
174253-4	64-pos. Female Connector	Horizontal Mount Soldering Type
174254-2	64-pos. Male Connector	Vertical Mount Soldering Type
175500-2	64-pos. Female Connector	Vertical Mount Soldering Type
175449-2	64-pos. Male Connector	Vertical Mount Soldering Type
174776-3	80-pos. Female Connector	Vertical Mount Soldering Type
174254-3	80-pos. Male Connector	Vertical Mount Soldering Type

2. Product Design Feature, Construction and Dimensions:

Product connectors shall be designed conforming to the design feature, construction and dimensions specified in the applicable product drawing(s) and DIN 41612, IEC 603-1/-2.

3. Material and Finish:

3.1 Material: CA-725 (Copper, Tin, Nickel Alloy), Used for action pin type contact
Phosphor Bronze, Used for solder mounting type female contact
Brass, Used for solder mounting type male contact

3.2 Finish: 0.2 µm min. thick gold plating, over 1.25 µm min. thick nickel underplate, with porosity sealing finish treated

The material and finish shall be conforming to the specification of the applicable product drawing(s).

3.2 Housing: Thermoplastic Polyester Molding Compound, conforming to UL94V-0, gray, glass-filled P.B.T.

4. Ratings:

4.1 Voltage Rating: 250V, AC

4.2 Current Rating: 1.5 A

4.3 Temperature Rating: $-55^{o}C$ / $+105^{o}C$ (including temperature rise due to energized current)

LTR	REVISION RECORD	DR	CHK	DATE
A	ECN FJ00-2488-95	S.H	H.K	4 MAY '95
01	Revised RFA-1481	[illegible]	[illegible]	7.20 '89
0	Released RFA-1410	[illegible]	TY	3.20 '89

DR: [signature] 3-17-89
CHK: T. Kobayashi 3/20 '89
APP: [signature] 22 MAR '89

AMP (Japan), Ltd. TOKYO, JAPAN

LOC: J A | NO: 108-5299 | REV: A

NAME: Product Specification AMP DR-DIN Connectors

AMP 522

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5. Performance Requirements:

When tested in accordance with the requirements specified in Fig. 1, the tested results shall meet in all the testing items.

Fig. 1

Paragraph	Test Items	Performance Requirements	Test Paragraph Number
5.1	Appearance:	Connector and contact shall be free from the defects, such as deformation, blister, flaws and cracks.	7.1
5.2	Termination Resistance: (Low Level)	Initial: 20mΩ max. Final: 40mΩ max.	7.2
5.3	Insulation Resistance:	1,000MΩ min.	7.3
5.4	Surge Voltage Resistivity:	Connector shall withstand without abnormalities when tested by applying specified surge voltage between the adjacent contacts.	7.4
5.5	Dielectric Strength:	No insulation break-down nor flashover shall take place, when tested by applying test potential of AC 1,000V.	7.5
5.6	Capacitance:	2 pF max., between the adjacent contacts	7.6
5.7	Contact Extraction Force: (Receptacle Contact)	20 g min. per contact, (using gage ping)	7.7
5.8	Connector Insertion Force:	80-pos. 8 kg max. 64-pos. 6 kg max. 32-pos. 3 kg max.	7.8
5.9	Connector Extraction Force:	80-pos. 2.5 kg min. 64-pos. 1.4 kg min. 32-pos. 0.7 kg min.	7.9
5.10	Repeated Insertion/Extraction Force:	No exposure of nickel underplate shall occur at 50th. cycle. No exposure of base metal shall occur at 100th. cycle. The requirements per Para. 5.2, Para. 5.8 & Para. 5.9 shall be met.	7.10
5.11	Action Pin Insertion Force:	16.0 kg max. per contact position	7.11
5.12	Action Pin Retention Force:	2.0 kg min. per contact position	7.12
5.13	Action Pin Insertion Force: (Total Connector)	64-pos. 1,200 kg max. 32-pos. 800 kg max.	7.13

5. (Continued)

Paragraph	Test Items	Performance Requirements	Test Paragraph Number
5.14	Vibration:	No electrical discontinuity greater than 1 μsec. shall take place during the test. No physical abnormalities shall be evident after the test. The requirement per Para. 5.2 shall be met.	7.14
5.15	Physical Shock:	No electrical discontinuity greater than 1 μsec. shall take place during the test. No physical abnormalities shall be evident after the test. The requirement per Para. 5.2 shall be met.	7.15
5.16	Thermal Shock:	No physical abnormalities shall be evident after the test. The requirement per Para. 5.2 shall be met.	7.16
5.17	Heat Resistivity:	No physical abnormalities shall be evident after the test. The requirement per Para. 5.2 shall be met.	7.17
5.18	Temperature-Humidity Cycling:	No physical abnormalities shall be evident after the test. The requirements per Para. 5.2 and Para. 5.3 shall be met.	7.18
5.19	Humidity:	No physical abnormalities shall be evident after the test. The requirements per Para. 5.2, Para. 5.3 and Para. 5.5 shall be met.	7.19
5.20	Salt Spray:	No physical abnormalities shall be evident after the test. The requirements per Para. 5.2, Para. 5.3 and Para. 5.5 shall be met.	7.20
5.21	Sulfurous Acid Gas Exposure:	No physical abnormalities shall be evident after the test. The requirement per Para. 5.2 shall be met.	7.21
5.22	Solvent Resistivity:	No physical abnormalities shall be evident after the test. The requirement per Para. 5.2 shall be met.	7.22
5.23	Soldering Heat Resistivity:	No physical abnormalities shall be evident after the test.	7.23
5.24	Solderability:	After the test, more than 95% of the tested area shall appear with fresh, wet coverage of solder, without concentrated voids etc.	7.24
5.25	Retention Leg Retention Force:	3.0 kg min. per contact position	7.25

6. Quality Assurance Provisions:

6.1 Test Specimens:

The test specimens to be employed for the test shall be selected from the lots that are normally controlled under the specified requirements, and the printed circuit boards conforming to the PCB specification per Fig. 3 shall be used for the tests.

6.2 Test Conditions:

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

Temperature:	15	-	35°C
Relative Humidity:	45	-	75%
Atmospheric Pressure:	650	-	800mmHg

7. Test Methods:

7.1 Appearance:

Appearance checking shall be made by visual method.

7.2 Termination Resistance (Low Level):

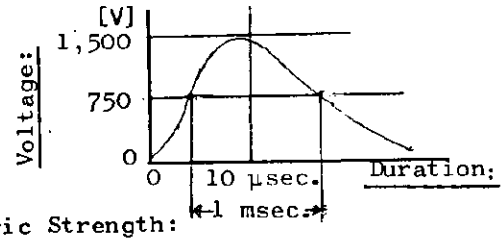
As shown in Fig. 3, measure by millivolt drop method with the use of closed circuit current of 10 mA max, at open circuit voltage of 20 mV max, flowing through the test circuit.

7.3 Insulation Resistance:

Measure by applying test potential of 500V DC between the adjacent contacts per Condition B, Method 302 of MIL-STD-202, without PCB mounted condition.

7.4 Surge Voltage Resistivity:

Measure by applying the test potential as specified below, between the adjacent contacts.



7.5 Dielectric Strength:

Measure by applying the test potential of 1,000V AC between the adjacent contacts and beteen the paired contacts, per Method 301 of MIL-STD-202, and hold the potential for 1 minute, without PCB mounted condition.

7.6 Capacitance:

Measure between the adjacent contacts with test frequency of 1 MHz, per Method 305 of MIL-STD-202, without PCB mounted condition.

7.7 Contact Extraction Force:

Fix connector to which female contact is loaded on the tensile testing machine, and mate with the gage pin specified in Fig. 4. Apply an axial pull-off load to the gage pin by operating the head to travel at a rate of 100mm a minute.

7.8 Connector Insertion Force:

Fix a pair of connectors on tensile testing machine, and apply a load to mate the connectors by operating the head at a rate of 100mm a minute.

7.9 Connector Extraction Force:

Fix a pair of mated connectors on tensile testing machine, and apply an axial pull off load to one of them, to separate them by operating the head to travel at a rate of 100mm a minute.

7.10 Repeated Insertion/Extraction:

Fix a pir of connectors on tensile testing machine and repeat insertion and extraction of them by operating the head to travel at a rate of 100mm a minute, for 100 cycles. At 50th. and 100th. cycles, inspect the contact surface by using 10X mgnifying glass.

7.11 Action Pin Insertion Force:

Measure the force required to insert action pin into the applicable printed circuit board hole.

7.12 Action Pin Retention Force:

Measure the force required to dislodge the inserted action pin from the inserted PCB hole, by applying an axial push out load from the side opposite to the inserting direction of the contact pin, with the use of the force gage.

7.13 Action Pin Insertion Force (Total Connector Assembly):

Measure the force required to insert contact-loaded connector to applicable printed circuit board, with the use of appropriate jig fixture.

7.14 Vibration:

Test the mated connectors in accordance with Condition A, Method 204C of MIL-STD-202, by applying test current of 0.1A, after all the contacts series wired.

Test Frequencies:	10 - 500 Hz
Amplitude:	1.52mm max. both sides, or 10G's max.
Duration:	Three axial directions, X, Y & Z for 3 hours each, totally 9 hours.

7.15 Physical Shock:

Test the mated connectors in accordance with Condition A, Method 213B of MIL-STD-202, by applying physical shock impact, after having all the contacts series-wired and applying test current of 100mA flowing through the circuit. The terminated wires shall'be secured on the test fixture or fixed with the use of cable clamps.

Duration:	11 msec.
Maximum Accelerated Velocity:	50 G's
Wave Form:	Half sine wave
Directions and Number of Impacts:	X, Y & Z directions, 3 rops each (Totally 18 drops)

7.16 Thermal Shock:

Test the mated pair of connectors in accordance with Condition A, Method 107D of MIL-STD-202 by exposing under the following conditions.

Temperature:	$-55^{\circ}C$ -- $+85^{\circ}C$ (30 minutes at each extreme)
Cycles:	5 cycles

7.17 Heat Resistivity:

Test the mated pair of connectors in accordance with Condition A, Method 108A of MIL-STD 202 by exposing under the following conditions.

Temperature:	$105^{\circ}C$ $\pm 3^{\circ}C$
Duration:	96 hours

7.18 Temperature-Humidity Cycling:

Test the mated pair of connectors in accordance with Method 106D of MIL-STD-202 except Step 7b, by exposing under the following conditions.

Temperature Range:	$25^{\circ}C$ - $+65^{\circ}C$
Relative Humidity:	95%
Number of Cycles:	10 cycles

7.19 Humidity(Steady State):

Test the mated pair of connectors in accordance with Condition B, Method 103B of MIL-STD-202, by exposing under the following conditions.

Relative Humidity:	95%
Temperature:	$40^{\circ}C$
Duration:	96 hours

7.20 Salt Spray:

Test the mated pair of connectors, by exposing under the following conditions.

Salt Concentration:	5%
Temperature:	$35^{\circ}C$
Duration:	48 hours

7.21 Sulfurous Acid Gas Resistivity:

Test the mated pair of connectors by exposing under the following test condition.

Gas Concentration:	10 ± 3 PPM
Humidity:	90% min.
Temperature:	Room Temperature
Duration:	96 hours

7.22 Solvent Resistivity:

Test the connector by exposing under the atmosphere of vaporized trichloroethane at $80^{\circ}C$ maximum for 10 minutes. After having the connector dried in the room temperature without powered ventilation, visually inspect for evidence of abnormalities.

7.23 Soldering Heat Resistivity:

Test in accordance with Conditon B, Method 210A of MIL-STD-202 under the following test conditions.

Temperature:	$260 \pm 5^{\circ}C$
Duration:	10 ± 1 seconds

7.24 Solderability:

After immersing soldering area of post contact into rosin based flux solution for 5 to 10 seconds, immerse the sample contact into the soldering tub which is controlled at $230 \pm 5^{\circ}C$ for 5 ± 0.5 seconds.

7.25 Retention Leg Retention Force:

Apply a axial push-out load to the retention leg set in affect in the direction opposite to the leg insertion. Measure the force required to dislodge the retention leg from the engaged position.

8. Test Sequence:
All the tests shall be performed in the sequence specified in Fig. 2.

Paragraph No.	Test Items	Sample Groups																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
5.1	Appearance:	1,7	1,7	1,7	1,3	1,3	1,3	1,6,11	1	1,3	1,6	1,5	1,5	1,5	1,5	1,5	1,5	1,3	1,3	1,3	1,3
5.2	Termination Resistance (Low Level)							2,10			2,5	2,4	2,4	2,4	2,4	2,4	2,4				
5.3	Insulation Resistance:	2,5	2,5	2,5																	
5.4	Surge Voltage Resistibility:				2																
5.5	Dielectric Strength:	3,6	3,6	3,6																	
5.6	Capacitance:					2															
5.7	Contact Extraction Force:						2														
5.8	Connector Insertion Force:							3,8													
5.9	Connector Extraction Force:							4,9													
5.10	Connector Repeated Insertion/Extraction							5,7													
5.11	Action Pin Insertion Force								2												
5.12	Action Pin Retention Force:								3												
5.13	Action Pin Connector Insertion Force:									2											
5.14	Vibration:										3										
5.15	Physical Shock:										4										
5.16	Thermal Shock:											3									
5.17	Heat Resistivity:												3								
5.18	Temperature-Humidity Cycling	4												3							
5.19	Humidity(Steady State)		4												3						
5.20	Salt Spray:			4												3					
5.21	Sulfurous Acid Gas Exposure:																3				
5.22	Solvent Resistivity:																	2			
5.23	Soldering Heat Resistivity:																		2		
5.24	Solderability:																			2	
5.25	Retention Leg Retention Force:																				2

NAME AMP DR-DIN Connector Product Specification

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LOC J A

NO 108-5299

REV. A

AMP (Japan), Ltd. TOKYO, JAPAN

64-Position,
32-Position

80-Position

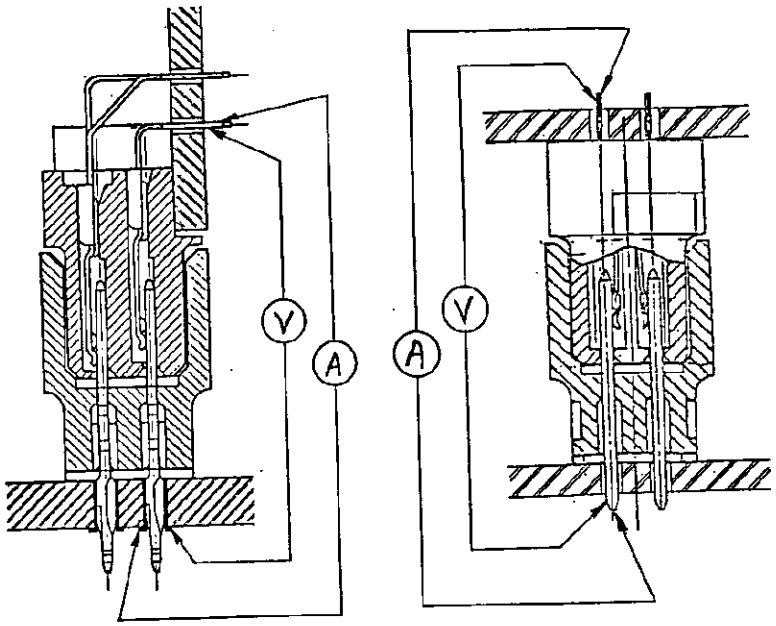

Fig. 3 Termination Resistance Measurement Points

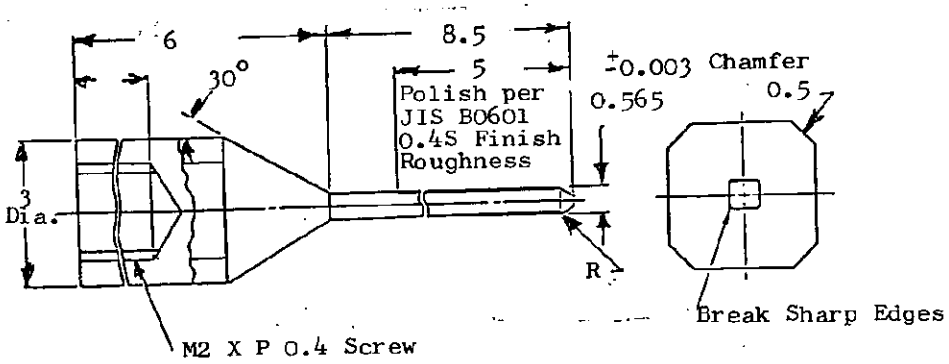

Fig. 4 Extraction Force Measuring Gage

Note: JIS B0601 0.4S Finish is equivalent to 4 microinch finish surface.

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	LOC J A	NO. 108-5299	REV. A
NAME	Product Specification AMP DR-DIN Connector		

Part Numbers	No of Pos.	A	B	C	Reference
174252-1(*) 174254-1	32	49.3	-//	38.1	Fig. 5
174253-1/-3 5-174253-1	32	-//	48.2	38.1	Fig. 6
174252-2 (*) 174254-2	64	90.0	-//	78.74	Fig. 5
174253-2	64	-//	88.9	78.74	Fig. 6
174776-3 174254-3	80	-//	110.3	99.06	Fig. 5

(*) For the hole dimension specification of the asterisk-marked items, refer to the specification for action pin, shown in the separate sheet.

Fig. 5

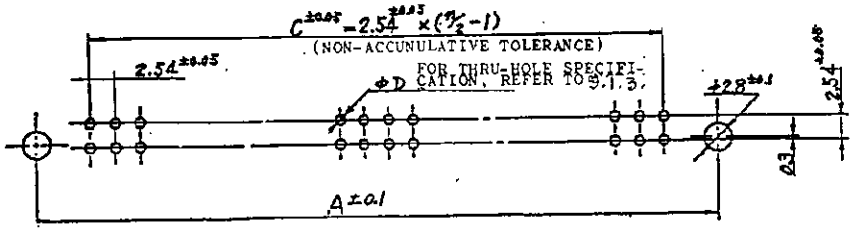
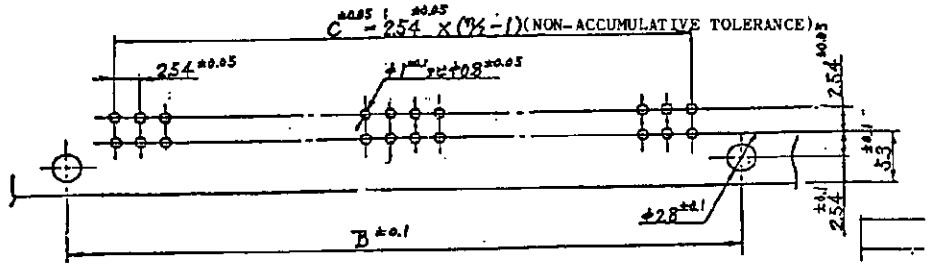


Fig. 6



Note:

For the mounting of the products other than those specified herein, refer to the applicable product drawing(s).

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9. Printed Circuit Board Specifications for Action Pin Type Application:

9.1 Material of Printed Circuit Board:

9.1.1 Glass-filled, Epoxy Board conforming to NEMA Grade G10, G11, FR4, DIN 7735, HGV Type, DIN 40802 EP Type

9.1.2 Thickness of Printed Circuit Board:

1.6 ±0.19, 2.4 ±0.19 mm

9.1.3 Thru Hole Specifications:

Diameter of Drilled Hole:	0.9mm dia. ±0.025
Thickness of Copper Clad:	25 µm -- 75 µm
Hardness of Copper Layer:	150 Knoop max.
Finished Diameter:	0.8 dia. ±0.05mm

(6 µm minimum solder plating inclusive)

Hole Pitch Tolerance: ± 0.05 mm (Non-accumulative)