108-18055-1

DESIGN OBJECTIVE

for Micro-Timer 2
Contact

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We declare our consent herewith.

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(Customer's signature)

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LTR	REVISION RECORD	APP	DATE
A	New Specification		

DIST

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SHEET 1 OF 15

AMP DEUTSCHLAND GmbH
Langen b. FfM

LOC		NO	REV
AI	A4	108-18055-1	A

NAME Micro-Timer 2 Contact

11/6/95

1 SCOPE

1.1 Content

This specification describes the design, the characteristics, the versions, the tests and the quality requirements of the Micro-Timer 2 contact.

1.2 Product Numbers

The various versions of the contact systems are shown in the table of part numbers (Table 2).

2 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the case of a conflict between this specification and the specified documents, this specification has priority.

2.1 AMP Specifications

A. AMP Spec. 114-18... ..... Application specification for the Micro-Timer 2 contact.
B. AMP Spec. 108-18279.....Product specification: Test tab for the Timer contacts

2.2 Other Standards

A	DIN 1 777/01.86	Wrought copper alloy strip for spring; technical terms of delivery
B	DIN 17 224/02.82	Wire and strip of stainless steel for springs; technical terms of delivery.
C.	DIN 17 666/12.83	Wrought copper alloys, low alloys, chemical composition
D.	DIN 17 670	Plate sheet and strip of wrought copper alloys Part 1/12.83: Characteristics Part 2/06.69: Technical terms of delivery
E.	DIN 41 640	Measuring methods and testing procedures for electromechanical components; general
F.	DIN 40 046	Environmental testing procedure for electrical engineering
G.	DIN IEC 352/06.80	Part 2: solderless connections
H.	DIN 41 639/03.76	Part 1: (IEC 50 Part 581) terms and definitions for electromechanical components
I.	DIN 50 015/08.75	Climates and their technical applications, constant test climates

J.	DIN 50 017/10.82	Condensed water containing climates
K.	DIN 72 551/01.92	Part 6: low tension cables
L.	DIN 72 551/07.72	Part 2: electrical conductors
M.	DIN/IEC 68	Basic environmental testing procedures Part 2-11/08.82: Salt fog Part 2-14/06.87: Temperature cycling Part 2-30/09.86: Humidity temp. cycling Part 2-52/08.85: Salt fog, cyclic

N. IEC Instructions

3 DESCRIPTION

3.1 Design and Construction (Fig. 3)

The design, construction and dimensions of the Micro-Timer 2 contact are shown in the product drawings and are inspected in accordance with the AMP Quality Guidelines.

The Micro-Timer 2 contact is a two-part flat contact with two independent leaf springs, arranged symmetrically with respect to the insertion axis and clamped at one end, and a steel cantilever spring which reinforces the contact force. The cantilever spring provides long-term mechanical and electrical stability. The locking lances on the contact body engage in the contact cavity.
A short and wide connection between the crimp and the contact body, together with large-area contact points, ensures a low contact resistance.
The mating components are tabs or tab headers with the dimensions 1.6 x 0,6mm.
The tab tip should be shaped like that of the test tab specified in section 4.3.2.

3.2. Materials

A.	Basic material:	wrought copper alloy (CuFe2, CuSn4) in accordance with AMP specifications.
B.	Contact plating:	- tin and heat-treated tin - gold on nickel in contact area, tin elsewhere
C.	Cantilever spring:	stainless steel

4 REQUIREMENTS

4.1 General Requirements

All tests executed with the contact system must comply with the inspection plan in this specification.

- Wire range: any, see Table 2
- Storage temperature: -40°C to 120°C
- Wire types: FLR to DIN 72 551 P.6
- Crimp with specified AMP crimp tools
- Crimp quality in accordance with AMP Specification
- Maximum permissible voltage to IEC 664/IEC 664A (DIN VDE 0110)
- Necessary mating parts should be made of low-alloy wrought copper alloys
- The plating and, if applicable, the wire size of the mating part should be identical with those of the contact being tested.
  Contacts with heat-treated tin surfaces may be combined only with a mating part with a tin plating which has not been heat-treated.
- Housings must comply with AMP Specifications

4.2 Ratings

Current carrying capacity	max. 10 A see 4.3.1
Minimum transfer current signal (depending on the circuit in question)	Standard value: mA range for tin-plated contacts µA range for gold-plated contacts
Maximum mating cycles	10 for tin-plated contacts 100 for gold-plated contacts
Temperature range	-40°C to 120°C for tin-plated contacts -40°C to 140°C for gold-plated contacts

4.3 Test Requirements and Procedure Summary

4.3.1 ELECTRICAL		
TEST DESCRIPTION	**REQUIREMENTS**	**PROCEDURE**
Contact resistance	$R_k \leq 4$ mΩ for CuFe2 $R_k \leq 5$ mΩ for CuSn4	**Test conditions** No-load voltage ≤ 20 mV Test current < 100 mA Measure the contact resistance in new condition in accordance with IEC 512-2 Test 2a /DIN 41 640 P.4 (see Fig. 1)
Crimp resistance	See Table 1	The crimp resistance is measured on contacts terminated with AMP crimp tools in accordance with AMP Spec. 114-18.... Test to DIN IEC 352 P.2 /IEC 512-2 Test 2a (see Fig. 1)
Current carrying capacity	Max. 10 A See Diagram 2	Contact in free air (spacing 40mm), wire size 1.0 mm^2, at room temperature. Test to IEC 512-3/DIN 41 640 P.3
Current ratings depending on the ambient temperature	See Diagrams 3,4 (to be provided)	Contacts in housing. Test to IEC 512-3/DIN 41 640 P.3

4.3.2 MECHANICAL		
TEST DESCRIPTION	**REQUIREMENTS**	**PROCEDURE**
Mating force	F ≤ 4 N	Measure the mating and unmating forces with test tab PN: 965 848-1 (product specification: 108-18279) without additional lubrication. Measure at a rate of 25 mm/min to DIN 41 640 P.36
Unmating force	F > 2 N	
Crimp extraction force	See Table 1	Measure the extraction force at a rate of 25 mm/min to DIN IEC 352 P.2.
Contact retention force in the housing	Contact retention force in the cavity without the secondary locking feature F_1 > 40 N Retention force of the secondary locking feature without the function of the locking lances F_2 > 100 N	Measure the contact retention force at a rate of 25 mm/min. Execute the test in a steel test cavity. Contact retention forces for plastic housing: see housing specification.

4.3.3	ENVIRONMENTALS	
TEST DESCRIPTION	**REQUIREMENTS**	**PROCEDURE**
Electrical stress test	The increase of all total contact resistance (contact + crimp resistance) at the end of the entire test to be not more than 400% of the initial value for tin-plated contacts or 200% of the initial value for gold-plated contacts.	**Condition and sequence of test:** see 4.4 Temperature: -40°C to 80°C per 6h; see Diagram 1 Current during the warm phase: see derating curve at 80°C ambient temperature (see Diagrams 3,4)
Salt fog in changing climates	The increase of all total resistance of the tin-plated contacts at the end of the test to be not more then 200% of the initial value. The increase of all total resistance of the contacts plated with noble metals at the end of the test to be not more than 100% of the initial value.	**Condition of testing** Samples installed in a complete housing. Measure in mated condition with housings engaged. **Sequence of testing** see 4.4
Environmental simulation	The increase of all total resistance of the tin-plated contacts at the end of the test to be not more than 400% of the initial value. The increase of all total resistance of the contacts plated with noble metals at the end of the test to be not more the 200% of the initial value.	**Condition of testing** Samples installed in a complete housing. Measure in mated condition with housings engaged. **Sequence of testing** see 4.4
Dynamical mechanical load	The increase of all total resistance of the tin-plated contacts at the end of the test to be not more than 400% of the initial value. The increase of all total resistance of the contacts plated with noble metals at the end of the test to be not more than 200% of the initial value. There should be no mechanical damage. Maximum duration of discontinuities $t \leq 1\ \mu s$	Monitor for discontinuities during the entire duration of the test. **Condition of testing** Samples installed in a complete housing. Measure in mated condition with housings engaged. Sequence of testing: see 4.4 Test equipment: see Fig. 2 Test to DIN IEC 68 P. 2-6

4.4 Product Qualification and Requalification Tests

Test or Examination	Test Sequence			
	Test group Electrical stress	Test group Dynamical mechanical load	Test group Salt fog in changing climates	Test group Environmntl. simulation
Vidual inspection	1.|	1.| 6.	1.| 5.	1. | 8.| 14.|
Contact resistance to IEC 512-2 DIN 41 640 P.4	2.| 6.	2.| 5.|	2.| 4.|	2.| 5.| 7. 11.|13.| 16.
Thermal shock to IEC 68 P.2-14 Na Duration: 5 cycles/temperature: -40 to 100°C per 1h				3.|
Temperature cycling to IEC 68 P.2-14 Nb Duration: 10 cycles/temperature: -40 to 100°C per 3h				4.|
Salt fog to IEC 68 P.2-11				9.|
Salt fog in changing climates to IEC 68 P.2-52 Severity: 1 / duration: 1 cycle			3.|	
Industrial mixed flowing gas (0.2 ppm SO_2, 0.01 ppm H_2S, 0.2 ppm NO_2, 0.01 ppm Cl_2/ 25°C / 75% / 21 d) rate of flow 1 m^3/h				10.|
Humidity temperature cycling to IEC 68 P. 2-30 Duration: 5 cycles/ maximum temperature 55°C	4.|			12.|
Storage in dry temperature to IEC 68 P.2-2 Bb Duration: 48h / temperature: 100°C				6.|
Vibration test f: 15 to 500 Hz Amplitude 2mm below fü = 60Hz above fü: 20g fü = transition frequency Duration: frequency cycles per spatial axis 20 for tin-plated contacts 30 for gold-plated contacts Sweep rate: 1 octave per minute		3.|		
Vibration test f: 15 to 1000 Hz / a = 5g Duration: 5h per spatial axis Sweep rate: 1 octave per minute				15.|
Continual shocks t = 6 ms, a = 30g Number of shocks: 7500 per spatial axis		4.|		
Temperature/current changing test 30 test cycles (1 test cycle: -40°C to 80°C per 6h; see Diagram 1)	3.| 5.*|			

* Not for CuSn 4.

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Crimp Extraction Force and Crimp Resistance		
Test Description	**Wire size /mm²**	**Test Data**
Crimp extraction force	0.35	> 50 N
	0.5	> 60 N
	1.0	> 100 N
Crimp resistance	0.2 to 0.5	< 1 mΩ
	0.5 to 1.0	< 0.8 mΩ

Table 1

Temperature / current changing cycle for contact systems

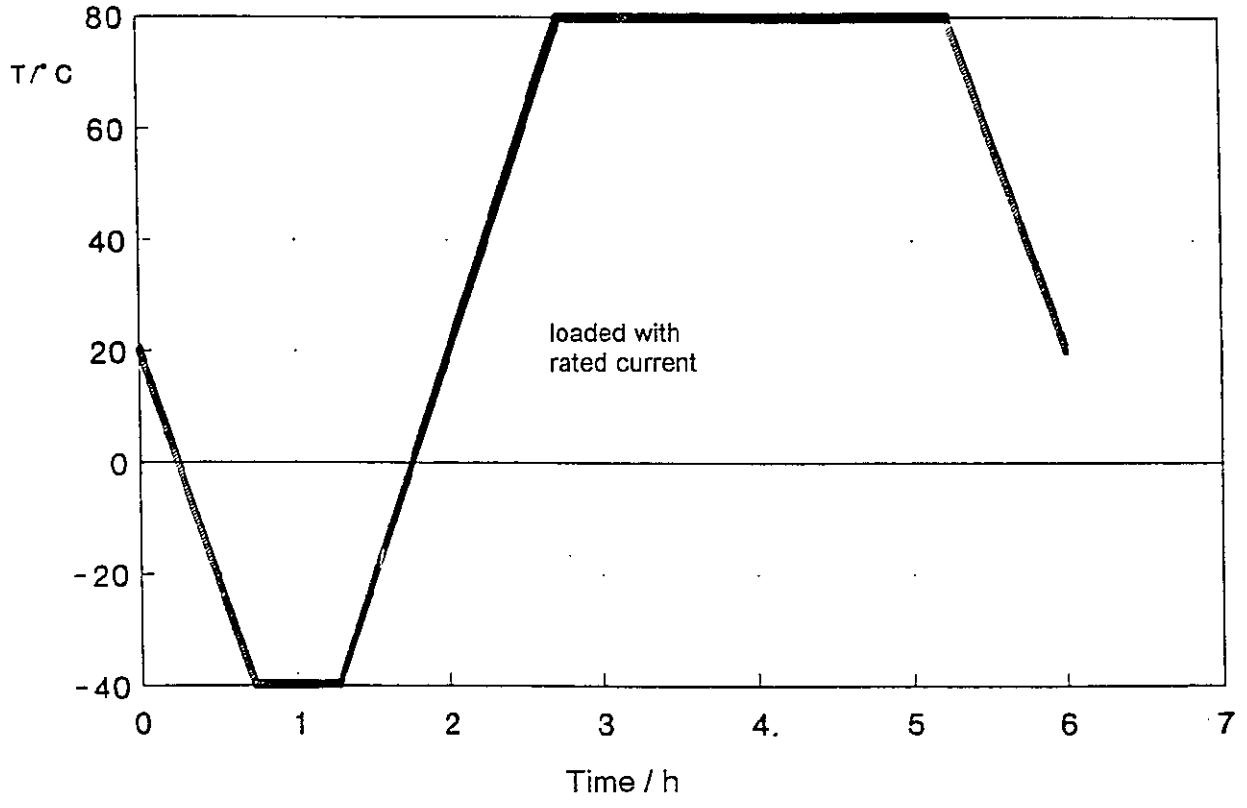

Diagram 1

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SHEET	AMP	AMP DEUTSCHLAND GmbH Langen b. FfM			
8 OF 15	LOC AI	A4	NO 108-18055-1	REV A	
NAME					
Micro-Timer 2 Contact					

PART NUMBERS				Micro-Timer 2 Contact					
CONTACT	WIRE TYPE	WIRE SIZE /mm²	INSULATION Ø /mm	PART NO.			APPLICATOR NO.	SINGLE WIRE SEAL NO.	MATING TAB
				STRIP	LOOSE PIECE	CONTACT PLATING			
MICRO-TIMER 2	FLR	0.2...0.5	1.15...1.6	962 942	962 944	-1/-2/-3/-4/-5/	878 607-2		963 898
	FLR	0.5...1	1.4...2	962 943	962 945	-1/-2/-3/-4/-5/-6	878 608-2		963 900
MICRO-TIMER 2 Single wire sealing system	FLR	0.2...0.5	2.8	962 875	963 710	-1/-2/-3/-5	878 615-2	963 530-1	963 902
	FLR	0.5...1	2.8	962 876	963 711	-1/-2/-3/-5/	878 616-2	963 530-1	963 904

NOTES: Extraction tool 726 534.
Contact dash numbers: -1 CuSn4, pretinned; -2 CuFe2, pretinned; -3 CuSn4, gold-plated; -4 CuSn4, gold-plated, short-circuit variant; -5 CuFe2, gold-plated; -6 CuSn4, special gold-plated.
Minimum pitch: 3.25 x 4mm; with single-wire sealing system: 4 x 4mm.

Table 2

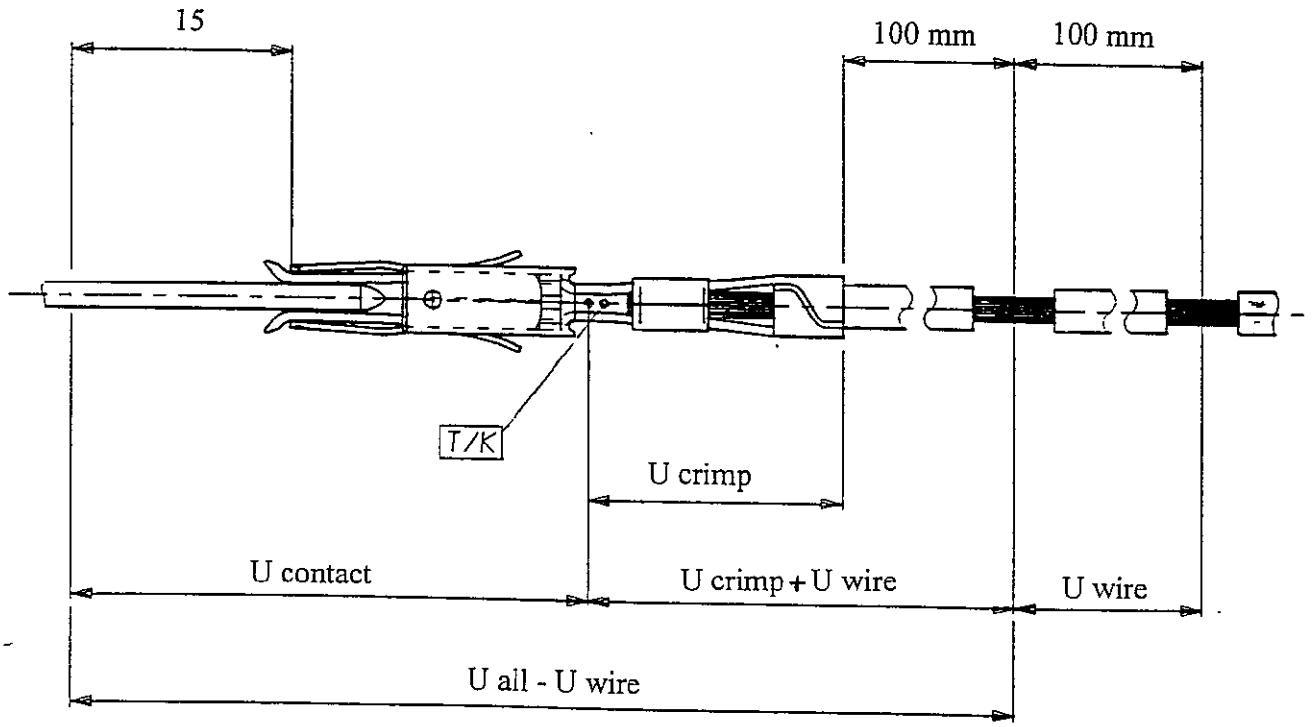

Fig. 1: Test equipment, crimp and contact resistance

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SHEET	AMP	AMP DEUTSCHLAND GmbH Langen b. FfM			
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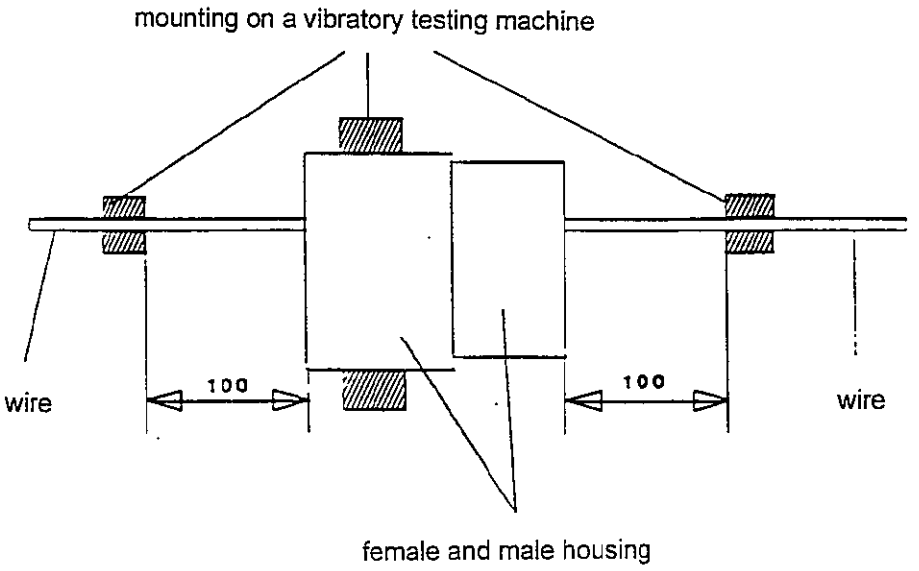
NAME Micro-Timer 2 Contact					



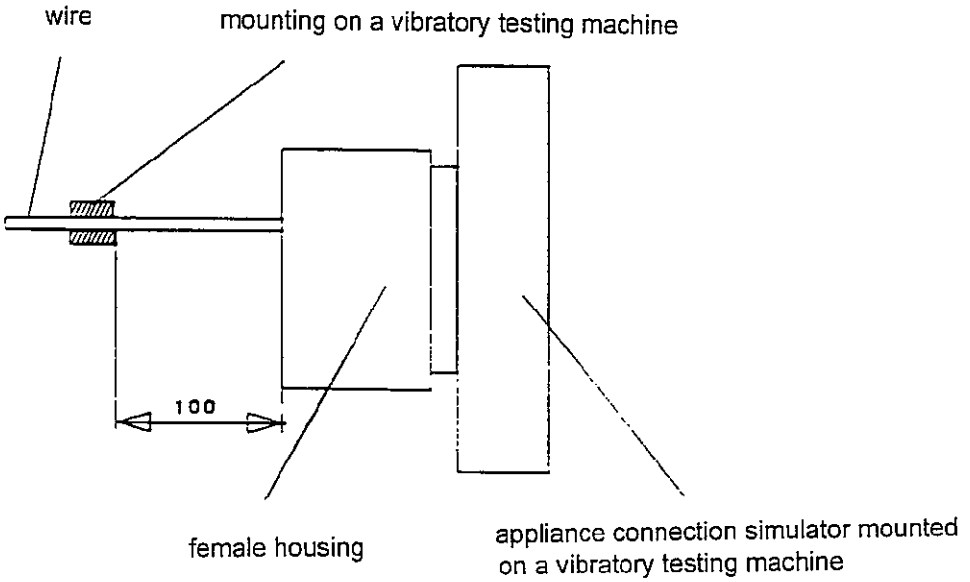


Fig. 2: Test equipment for vibration test

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SHEET 11 OF 15	AMP AMP DEUTSCHLAND GmbH Langen b. FfM			
	LOC AI	A4	NO 108-18055-1	REV A
NAME Micro-Timer 2 Contact				

Micro-Timer 2 Contact

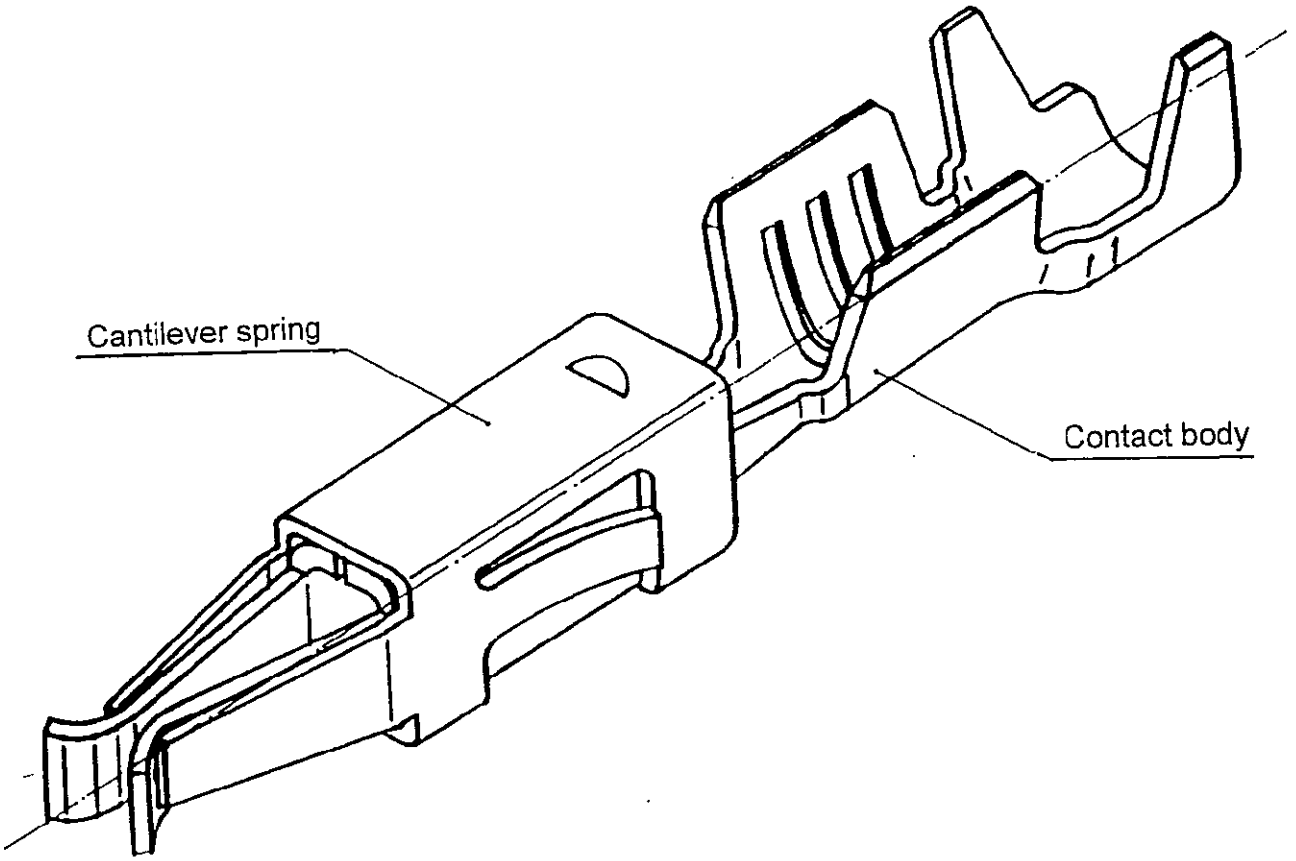

Fig. 3: Contact design

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	LOC AI	A4	NO 108-18055-1	REV A
NAME Micro-Timer 2 Contact				

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Female contact	:	962876-2
Material	:	Cu Fe 2 pretinned
Wire size	:	1.0 mm²
Crimp tool	:	Applicator
Male contact	:	963904-1
Material	:	Cu Sn 4 pretinned
Wire size	:	1.0 mm²
Housing	:	28 pos. bayonet coupling
Test equipment	:	Housing loaded with one contact in centre (=approximatly in free air)

Derating - Curve

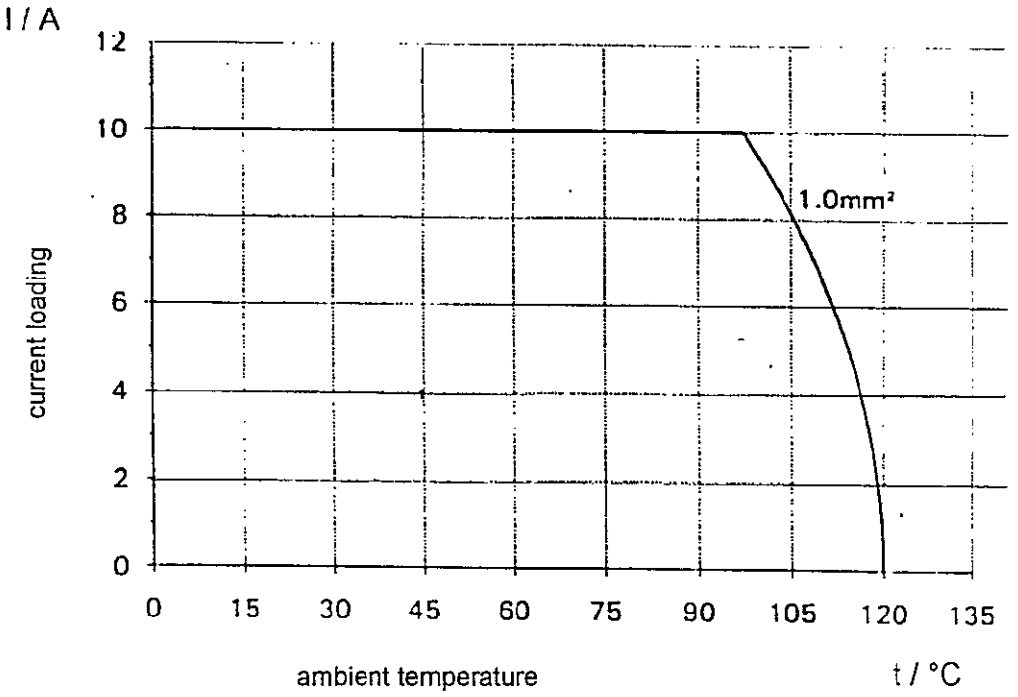

Diagram 2: Current carrying capacity in free air

Diagram 3: Current carrying capacity in housing

Diagram 4: Current carrying capacity in housing