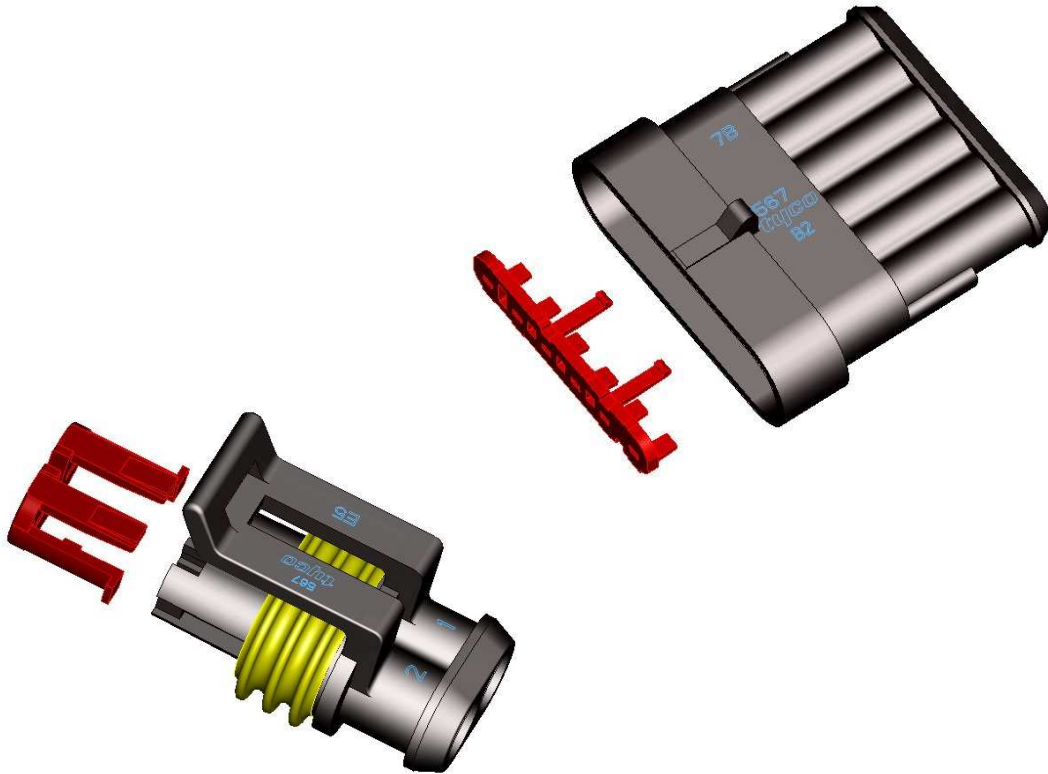


Description.  
AMP SUPERSEAL 1,5 SERIES CONNECTORS

## AMP SUPERSEAL 1,5 SERIES CONNECTORS



Product Code: M098

GPL: N38

rev letter	rev. record	DR	Date	CHK	Date
C3	REVISED	M.G.	26/03/2014	M.G.	26/03/2014
C2	REVISED	M.G.	28/08/2009	M.G.	31/08/2009
C1	REVISED	M.G.	22/01/2008	R.M.	31/01/2008
DR.		DATE	APVD		DATE
A.BRUNI		SEP. '91	A.BRUNI		SEP. '91

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LOC I

**1.0 SCOPE:**

This specification covers the requirements for products performance, test methods and quality assurance provisions of following products:

<b>NR. OF POSITIONS</b>	<b>FEMALE CONNECTORS</b> (Housings assemblies for receptacle contacts, 1 to 6 positions, with sealing gasket and anti-backout device which warns if a contact is not correctly inserted in housing and doesn't allow the gasket to slip-off during the unmating operation)	<b>MALE CONNECTORS</b> Housings assemblies for tab contacts, 1 to 6 positions, with anti-backout device which warns when a contact is not correctly inserted in housing)
<b>1</b>	282079-X	282103-X
<b>2</b>	282080-X	282104-X
<b>3</b>	282087-X	282105-X
<b>4</b>	282088-X	282106-X
<b>5</b>	282089-X	282107-X
<b>6</b>	282090-X	282108-X

<b>WIRE SIZE RANGE (mm<sup>2</sup>)</b>	<b>MINI-MIC RECEPTACLE CONTACTS</b>	<b>MINI-MIC TAB CONTACTS</b>
0.35 – 0.5	282403-X	282404-X
0.75 – 1.5	282110-X	282109-X
1.5 – 2.5	282466-X	282465-X

Single wire seals for both tab and receptacle contacts : 281934-X

Rubber plug to seal unused cavities : 282081-1

## REQUIREMENTS:

### 2.0 DESIGN AND CONSTRUCTION:

Product shall comply with the design, construction and physical dimensions specified in the applicable product drawing.

### 2.1 MATERIALS:

Components	Material	Finish, for contacts only
Contacts	Receptacle contacts: Phosphor Bronze Tab contacts: Brass	PreTin plated
Housings / Sec. Lock	PA 6.6, Glassfiber filled	/
Radial Sealing / Single wire seals	Liquid silicone rubber	/

### 2.2 RATINGS:

- A. Current Rating : 14A max. with 1,5 mm<sup>2</sup> wire
- B. Temperature Rating: -40°C to +125°C including the temperature increasing due to working current flow
- C. Maximum Operating Voltage: 24 Vd.c.. For application at higher voltage please contact Tyco Electronics.
- D. Protection Degree: IP 67, IPX6K, IP X9K according to IEC 529 and to ISO 20653.

### 2.3 QUALITY ASSURANCE PROVISION:

#### A. Sample preparation:

The test samples to be used for the tests shall be prepared by randomly selecting from the current production, and the contact crimped in accordance with the Application Specification 114-20045. No sample shall be reused, unless otherwise specified.

#### B. Test Environment:

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

Room temperature: 23 ± 2°C  
Relative Humidity: 45÷70%  
Atmospheric Pressure: 860÷1060 mbar

### 3.0 TEST REQUIREMENTS AND PROCEDURES SUMMARY:

FEATURES	TEST CONDITIONS	LIMITS
3.1 Voltage Drop	(mated connectors) Between two points on wires at 1cm from the housing edges.  Test currents: 6A for 0,5sqmm wire 11A for 1,0sqmm wire 14A for 1,5sqmm wire	$\leq 3$ mV/A on new contacts. The voltage drop of wire must be subtracted
3.2 Contact resistance	(mated contacts) Between the ends of crimps.  Test current: 10mA	$\leq 3$ m $\Omega$ on new contacts.
3.3 Insulation Resistance	(mated connectors)  Between adjacent contacts apply 500 Vd.c. for 1 min.	$\geq 200$ M $\Omega$ (new contacts)
3.4 Dielectric withstanding voltage	Between adjacent contacts apply 1500Va.c. for 1 min.	No breakdown or flashes
3.5 Connector mating force	Mate connectors with their contacts loaded at a speed of 25÷100mm/min	1 pos. conn.: $\leq 80$ N  2÷6 pos. conn.: $\leq 120$ N
3.6 Connector unmating force	Unmate connectors with their contacts loaded at a speed of 25÷100mm/min: a) Without operate the locking lance b) Operating the locking lance	a) All positions: $\geq 145$ N b) 1 pos. conn.: $\leq 80$ N 2÷6 pos. conn.: $\leq 120$ N

FEATURES	TEST CONDITIONS	LIMITS
3.7 Single contact engaging force	Engage single rec.ctc. onto tab counterpart using a free floating fixture with a rate of 25-100mm/min of travel speed (tab as shown in Fig.1)	$\leq 8N$
3.8 Single contact disengaging force	Separate single rec.ctc. from tab counterpart using a free floating fixture with a rate of 25-100mm/min of travel speed (tab as shown in Fig.1)	$\geq 2,5N$
3.9 Retention force of the single contact in the housings	Apply an axial force to pull out contacts from relevant hsg. cavity using a free floating fixture with a tensile speed of 50-70mm/min. with and without anti-backout device	Without anti-backout device: $\geq 70N$  With anti-backout device: $\geq 80 N$
3.10 Crimping Tensile Strength	Pull out the contacts from the relevant wire using a free floating fixture at a tensile speed of 25 - 100 mm/min.	0,35sqmm wires: $> 60N$ 0,5sqmm wires: $> 70N$ 1,0sqmm wires: $> 115N$ 1,5sqmm wires: $> 155N$
3.11: Corrosion Test  3.11a Salt spray corrosion	Subject mated contacts energized with voltage of 12Vd.c. to 150 hours of salt mist at 35°C (5% of NaCl)  (single contacts mated in free air)	Voltage drop $\leq 5mV/A$
3.11b Kesternich corrosion	4 cycles composed of : - 8 hrs. of exposure to an atmosphere with 0.66% of SO <sub>2</sub> at 40±2°C and 95% humidity - 16 hrs in free air.  (single contacts mated in free air)	

FEATURES	TEST CONDITIONS	LIMITS
<p>3.12 Water resistance: Static immersion</p>	<p>Mated connectors subjected to 5 cycles composed of:</p> <ul style="list-style-type: none"> <li>- 30 min. in oven at +125°C</li> <li>- 30 min. immersed in water with 5% of NaCl under a pressure of 0,01bar at a temperature of 23°C</li> </ul>	<ul style="list-style-type: none"> <li>-Insulation resistance: <math>\geq 200M\Omega</math></li> <li>-No leakage detected to a visual examination</li> </ul>
<p>3.13 Water resistance: Dynamic immersion</p>	<p>Mated connectors immersed in water with 5% on NaCl, under a pressure of 0,01bar at a temperature of 23°C.</p> <p>Wire pulled with a force of 1,5÷2,5N oscillated 100.000 times (as per Fig. 2).</p> <p>Oscillation frequency: 50cycles/min.</p>	<ul style="list-style-type: none"> <li>-Insulation resistance: <math>\geq 200M\Omega</math></li> <li>-No leakage detected to a visual examination</li> </ul>
<p>3.14 Water resistance: IP X6K Test</p>	<p>Test according to ISO 20653.</p> <p>Duration: 3min. minimum</p> <p>Subject mated connectors completely loaded with terminals to water jet with following parameters:</p> <p>nozzle:6.3mm dia pressure: 1000kPa</p> <p>(test setup as per Fig. 4)</p>	<ul style="list-style-type: none"> <li>-Insulation resistance as above specified.</li> <li>-No leakage detected to a visual examination</li> </ul>
<p>3.15 Water resistance: IP X9K Test</p>	<p>Test according to ISO 20653.</p> <p>Duration: 30s for each nozzle.</p> <p>Subject mated connectors completely loaded with terminals to the cumulative action of the four nozzles.</p> <p>(test setup as per Fig. 5)</p>	<ul style="list-style-type: none"> <li>-Insulation resistance and dielectric withstanding voltage as above specified.</li> <li>-No leakage detected to a visual examination</li> </ul>

FEATURES	TEST CONDITIONS	LIMITS
<p>3.16 Thermal cycling</p>	<p>Mated connectors subjected to:</p> <ul style="list-style-type: none"> <li>- 14 cycles composed of:               <ul style="list-style-type: none"> <li>• 16 hours at +40°C, 95% r.h.</li> <li>• 2 hours at -40°C</li> <li>• 2 hours at +125°C</li> <li>• 4 hours at +23°C</li> </ul> </li> <li>(max.time to change condition: 3min.)</li> <li>- exposure for 24 hours at +40°C and 95% r.h.</li> <li>- 10 mating and unmating operations</li> </ul>	<ul style="list-style-type: none"> <li>- No damages</li> <li>- Insulation resistance and dielectric withstanding resistance as above specified.</li> <li>- Voltage drop <math>\leq 5mV/A</math></li> <li>- Contact retention in housing, mating/unmating forces as above specified</li> </ul>
<p>3.17 Ageing resistance</p>	<p>Mated connectors subjected to:</p> <ul style="list-style-type: none"> <li>- 100 hours at +125°C</li> <li>- 10 mating/unmating operations</li> </ul>	<ul style="list-style-type: none"> <li>- No damages</li> <li>- Insulation resistance and dielectric withstanding resistance as above specified</li> <li>- Voltage drop <math>\leq 5mV/A</math></li> <li>- Contact retention in housing, mating/unmating forces as above specified</li> </ul>
<p>3.18 Chemical resistance</p>	<p>Mated connectors immersed for 3 min. in:</p> <ul style="list-style-type: none"> <li>- Brake fluid at +50°C</li> <li>- Anti-freeze fluid at +23°C</li> <li>- Transmission and engine oil at +100°C</li> <li>- Gasoline at +23°C</li> <li>- Diesel fuel at +23°C</li> <li>- Window cleaner at +23°C</li> </ul>	<ul style="list-style-type: none"> <li>- No damages</li> <li>- No leakages detected at visual examination</li> <li>- Contact retention in housing, mating/unmating forces as above specified</li> </ul>
<p>3.19 Ozone gas resistance</p>	<p>Mated connectors exposed for 70 hours at an atmosphere with 0,5ppM of ozone at 50°C</p>	<ul style="list-style-type: none"> <li>- No damages</li> <li>- Contact retention in housing, mating/unmating forces as above specified</li> </ul>

FEATURES	TEST CONDITIONS	LIMITS
3.20 Vibration Test	<p>Mated connectors placed on a platform as per Fig.3, subjected to vibrations with following parameters:</p> <ul style="list-style-type: none"> <li>- Frequency: 10 - 500 - 10Hz</li> <li>- Speed of frequency variation: 1octave/min.</li> <li>- Displacement: 0,75mm for frequencies below 70Hz. Over 70Hz maintain a constant acceleration of 150m/s<sup>2</sup></li> <li>- Duration: 2hours each axis</li> <li>- 10 cycles mating/unmating</li> </ul>	<ul style="list-style-type: none"> <li>- No damages</li> <li>- Dielectric withstanding resistance as above specified</li> <li>- Voltage drop ≤ 5mV/A</li> <li>- Contact retention in housing, mating/unmating forces as above specified</li> <li>- No circuit break greater than 1μs</li> </ul>
3.21 High temperature resistance with current load	<p>Mated connectors subjected to a temperature of 80°C for 5 hours with all contacts loaded with max.current of 14A (1,5sqmm wires)</p>	<p>Max. increase of temperature detected on transition between contact body and wire barrel: 50°C</p>
3.22 Current overload	<p>Mated connectors subjected to 500 cycles with current of 21A (1,5sqmm wires).</p> <p>Each cycle composed of:</p> <ul style="list-style-type: none"> <li>- 45 min. current ON</li> <li>- 15 min. current OFF</li> </ul>	<p>Max. increase of temperature detected on transition between contact body and wire barrel: 60°C</p>
3.23 Durability	<p>Mate-unmate 10 times the tabs of Fig.1 at a constant speed of 25÷100mm/min.</p>	<p>Voltage drop: ≤ 3mV/A</p> <p>Contact resistance: ≤ 3mΩ</p>

NOTE: SEE NEXT PAGE FOR TEST GROUPS AND SEQUENCE.



NUM.	TEST DESCRIPTION	GROUPS AND SEQUENCE																
		A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	
3.0	VISUAL EXAMINATION	1, 10	1, 3	1, 3	1, 5	1, 5	1, 15	1, 5	1, 5	1, 11	1, 5	1, 15	1, 8	1, 9	1, 5	1, 5	1, 7	
3.1	VOLTAGE DROP	3, 9			2, 4	2, 4	4, 12	2, 4	2, 4	4, 7		4, 11						
3.2	CONTACT RESISTANCE	4, 1																
3.3	INSULATION RESISTANCE						5, 10				2, 4	5, 9			2, 4	2, 4	2, 5	
3.4	DIELECTRIC WITHSTANDING VOLTAGE						6, 11					6, 10					3, 6	
3.5	CONNECTOR MATING FORCE						2			2, 8	2, 12	2, 5	2, 6					
3.6	CONNECTOR UNMATING FORCE						3, 13			3, 9	3, 13	3, 6	3, 7					
3.7	CTC. ENGAGING FORCE	2, 7																
3.8	CTC. DISENGAGING FORCE	5, 8																
3.9	CONTACT RETENTION IN HSG.		2				14			10		14	7	8				
3.10	CRIMP TENSILE STRENGTH			2														
3.11a	SALT SPRAY CORROSION								3									
3.11b	KESTERNICH CORROSION							3										
3.12	STATIC IMMERSION										3							
3.13	DYNAMIC IMMERSION						9 (**)							5 (**)	3			
3.14	IP X6K TEST															3		
3.15	IP X9K TEST																4	
3.16	THERMAL CYCLING						7											
3.17	AGEING RESISTANCE											7						
3.18	CHEMICAL RESISTANCE												4					
3.19	OZONE GAS RESISTANCE													4				
3.20	VIBRATION TEST									5								
3,21	HIGH TEMP. RESISTANCE W. CURRENT LOAD				3													
3.22	CURRENT OVERLOAD					3												
3.23	DURABILITY	6					8			6		8						

(\*\*): 10.000 CYCLES ONLY

TEST TAB DIMENSIONS

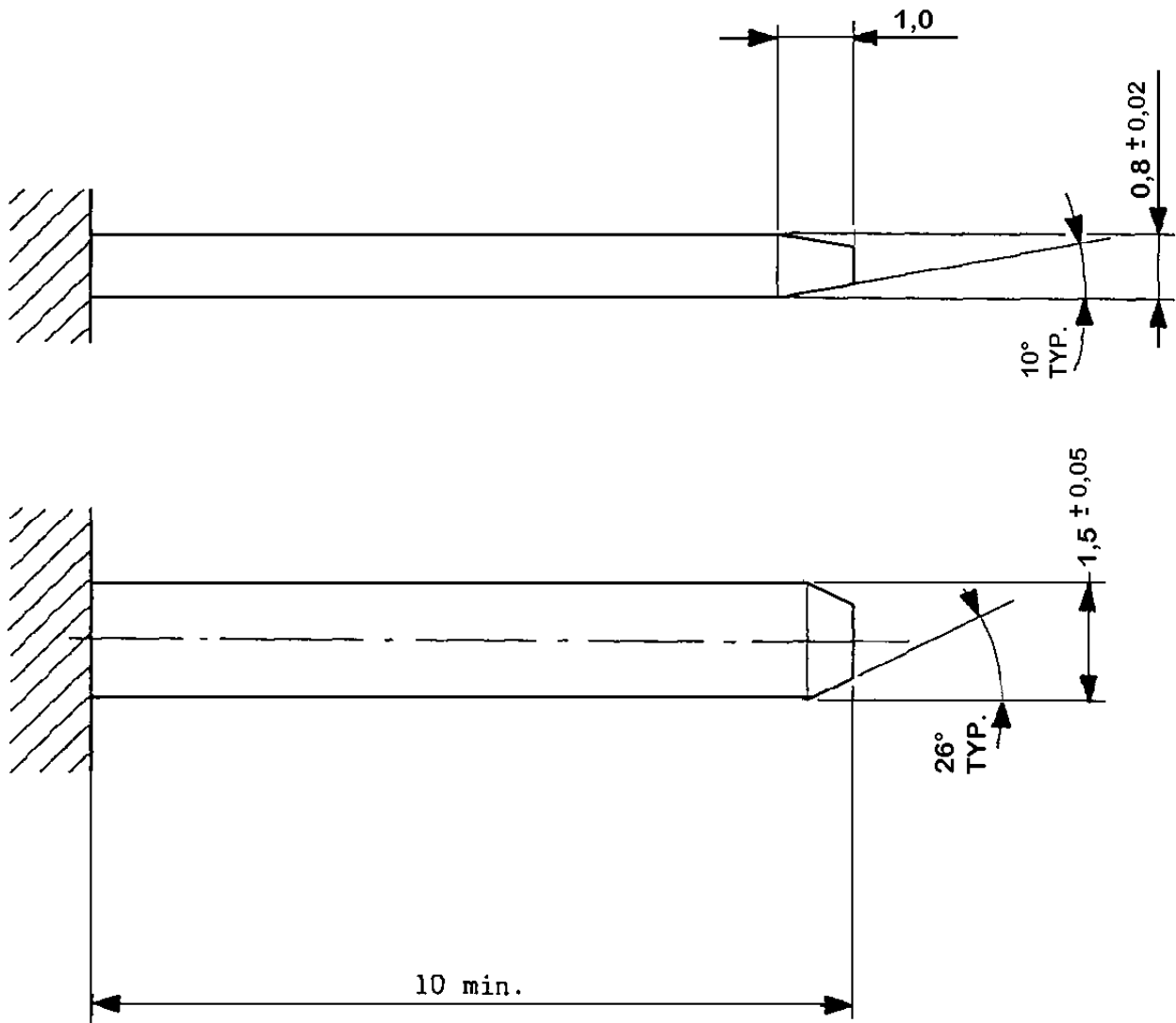


FIG. 1

DYNAMIC IMMERSION TEST SETUP

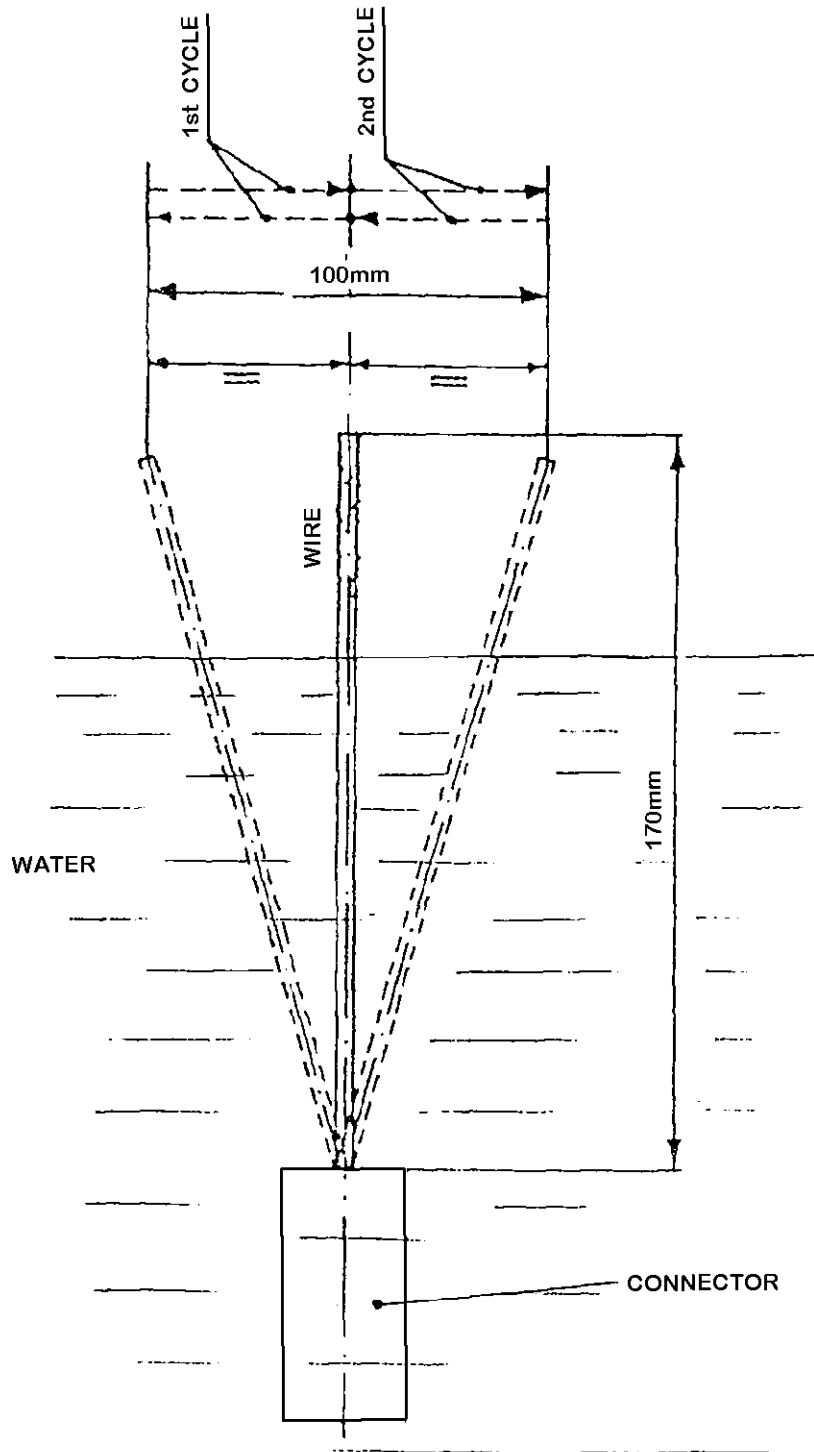


FIG. 2

VIBRATION TEST SETUP

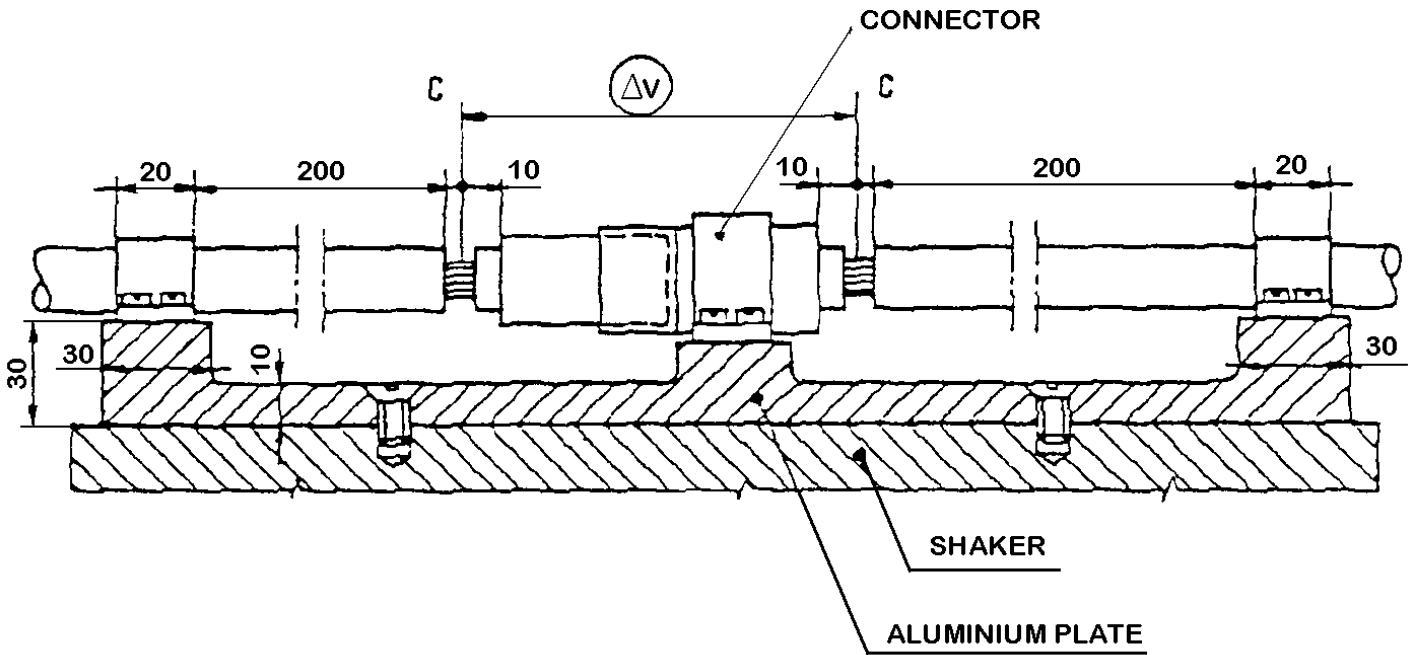


FIG. 3

IP X6K TEST SETUP

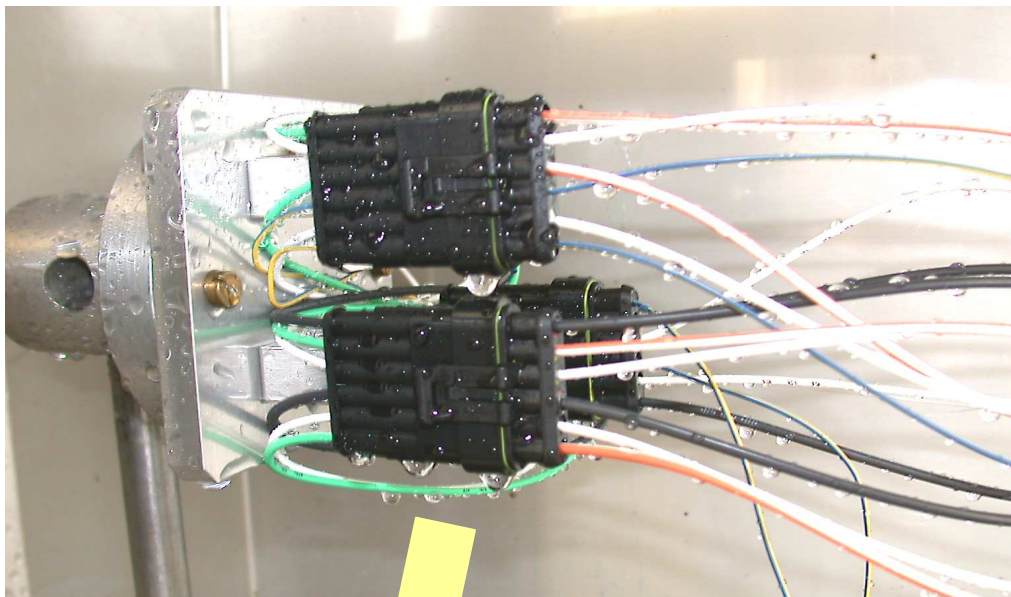


FIG. 4

IP X9K TEST SETUP

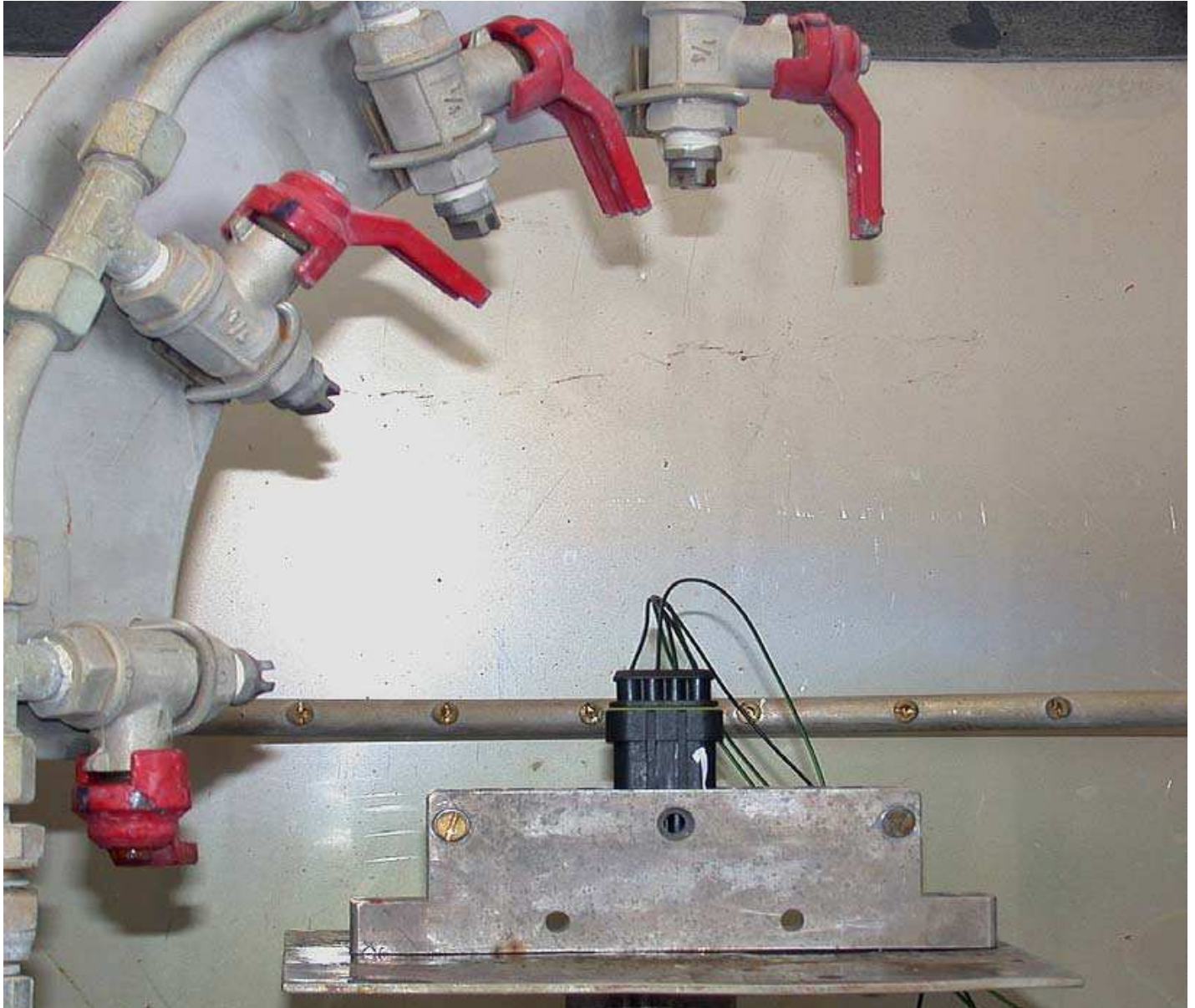


FIG. 5