Tyco Electronics AMP Italia S.r.l.

Description.
AMP SUPERSEAL 1,5 SERIES CONNECTORS

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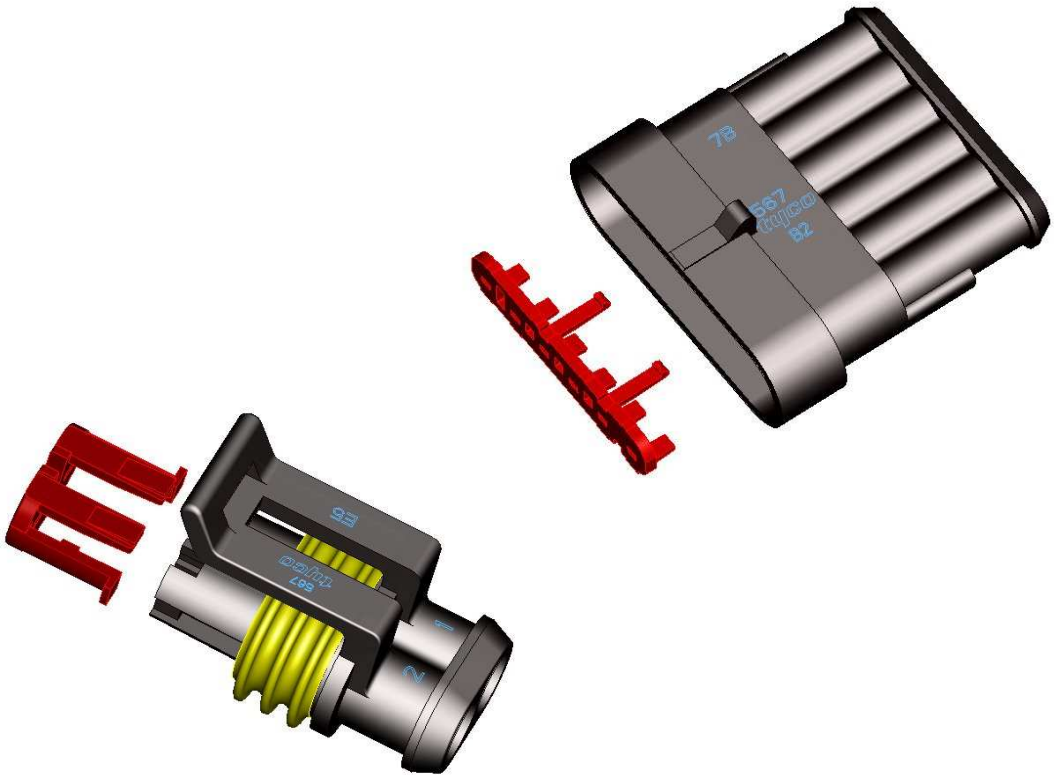

Product Code: M098

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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
rev letter	rev. record	DR	Date	CHK	Date

DR.	DATE	APVD	DATE
A.BRUNI	SEP. '91	A.BRUNI	SEP. '91

1.0 SCOPE:

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

NR. OF POSITIONS	FEMALE CONNECTORS (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)	MALE CONNECTORS Housings assemblies for tab contacts, 1 to 6 positions, with anti-backout device which warns when a contact is not correctly inserted in housing)
1	282079-X	282103-X
2	282080-X	282104-X
3	282087-X	282105-X
4	282088-X	282106-X
5	282089-X	282107-X
6	282090-X	282108-X

WIRE SIZE RANGE (mm^2)	MINI-MIC RECEPTACLE CONTACTS	MINI-MIC TAB CONTACTS
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^2 wire

B. Temperature Rating: -40℃ to +125℃ 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℃
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	≤ 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	≤ 3 mΩ on new contacts.
3.3 Insulation Resistance	(mated connectors) Between adjacent contacts apply 500 Vd.c. for 1 min.	≥ 200 MΩ (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.: ≤ 80N 2÷6 pos. conn.: ≤ 120N
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: ≥ 145N b) 1 pos. conn.: ≤ 80N 2÷6 pos. conn.: ≤ 120N

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)	≤ 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)	≥ 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: ≥ 70N With anti-backout device: ≥ 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℃ (5% of NaCl) (single contacts mated in free air)	Voltage drop ≤ 5mV/A
3.11b Kesternich corrosion	4 cycles composed of : - 8 hrs. of exposure to an atmosphere with 0.66% of SO_2 at 40±2℃ and 95% humidity - 16 hrs in free air. (single contacts mated in free air)	

FEATURES	TEST CONDITIONS	LIMITS
3.12 Water resistance: Static immersion	Mated connectors subjected to 5 cycles composed of: - 30 min. in oven at +125℃ - 30 min. immersed in water with 5% of NaCl under a pressure of 0,01bar at a temperature of 23℃	-Insulation resistance: ≥200MΩ -No leakage detected to a visual examination
3.13 Water resistance: Dynamic immersion	Mated connectors immersed in water with 5% on NaCl, under a pressure of 0,01bar at a temperature of 23℃. Wire pulled with a force of 1,5÷2,5N oscillated 100.000 times (as per Fig. 2). Oscillation frequency: 50cycles/min.	-Insulation resistance: ≥200MΩ -No leakage detected to a visual examination
3.14 Water resistance: IP X6K Test	Test according to ISO 20653. Duration: 3min. minimum Subject mated connectors completely loaded with terminals to water jet with following parameters: nozzle:6.3mm dia pressure: 1000kPa (test setup as per Fig. 4)	-Insulation resistance as above specified. -No leakage detected to a visual examination
3.15 Water resistance: IP X9K Test	Test according to ISO 20653. Duration: 30s for each nozzle. Subject mated connectors completely loaded with terminals to the cumulative action of the four nozzles. (test setup as per Fig. 5)	-Insulation resistance and dielectric withstanding voltage as above specified. -No leakage detected to a visual examination

FEATURES	TEST CONDITIONS	LIMITS
3.16 Thermal cycling	Mated connectors subjected to: - 14 cycles composed of: • 16 hours at +40℃, 95% r.h. • 2 hours at -40℃ • 2 hours at +125℃ • 4 hours at +23℃ (max.time to change condition: 3min.) - exposure for 24 hours at +40℃ and 95% r.h. - 10 mating and unmating operations	- No damages - Insulation resistance and dielectric withstanding resistance as above specified. - Voltage drop ≤ 5mV/A - Contact retention in housing, mating/unmating forces as above specified
3.17 Ageing resistance	Mated connectors subjected to: - 100 hours at +125℃ - 10 mating/unmating operations	- No damages - Insulation resistance and dielectric withstanding resistance as above specified - Voltage drop ≤ 5mV/A - Contact retention in housing, mating/unmating forces as above specified
3.18 Chemical resistance	Mated connectors immersed for 3 min. in: - Brake fluid at +50℃ - Anti-freeze fluid at +23℃ - Transmission and engine oil at +100℃ - Gasoline at +23℃ - Diesel fuel at +23℃ - Window cleaner at +23℃	- No damages - No leakages detected at visual examination - Contact retention in housing, mating/unmating forces as above specified
3.19 Ozone gas resistance	Mated connectors exposed for 70 hours at an atmosphere with 0,5ppM of ozone at 50℃	- No damages - Contact retention in housing, mating/unmating forces as above specified

FEATURES	TEST CONDITIONS	LIMITS
3.20 Vibration Test	Mated connectors placed on a platform as per Fig.3, subjected to vibrations with following parameters: - Frequency: 10 - 500 - 10Hz - Speed of frequency variation: 1octave/min. - Displacement: 0,75mm for frequencies below 70Hz. Over 70Hz maintain a constant acceleration of 150m/s^2 - Duration: 2hours each axis - 10 cycles mating/unmating	- No damages - Dielectric withstanding resistance as above specified - Voltage drop ≤ 5mV/A - Contact retention in housing, mating/unmating forces as above specified - No circuit break greater than 1µs
3.21 High temperature resistance with current load	Mated connectors subjected to a temperature of 80℃ for 5 hours with all contacts loaded with max.current of 14A (1,5sqmm wires)	Max. increase of temperature detected on transition between contact body and wire barrel: 50℃
3.22 Current overload	Mated connectors subjected to 500 cycles with current of 21A (1,5sqmm wires). Each cycle composed of: - 45 min. current ON - 15 min. current OFF	Max. increase of temperature detected on transition between contact body and wire barrel: 60℃
3.23 Durability	Mate-unmate 10 times the tabs of Fig.1 at a constant speed of 25÷100mm/min.	Voltage drop: ≤ 3mV/A Contact resistance: ≤ 3mΩ

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 STRENGHT			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

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TEST TAB DIMENSIONS

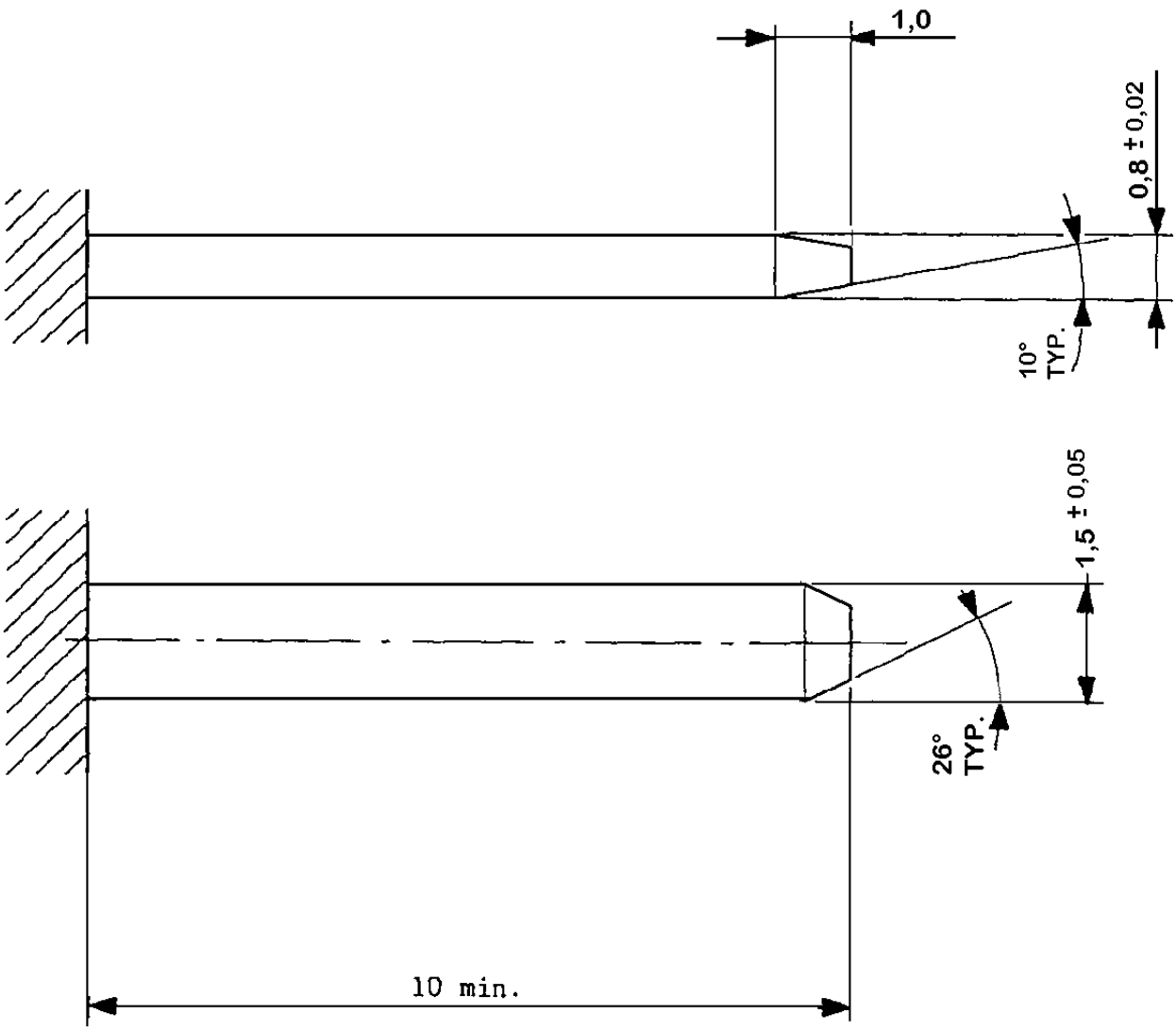

FIG. 1

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DYNAMIC IMMERSION TEST SETUP

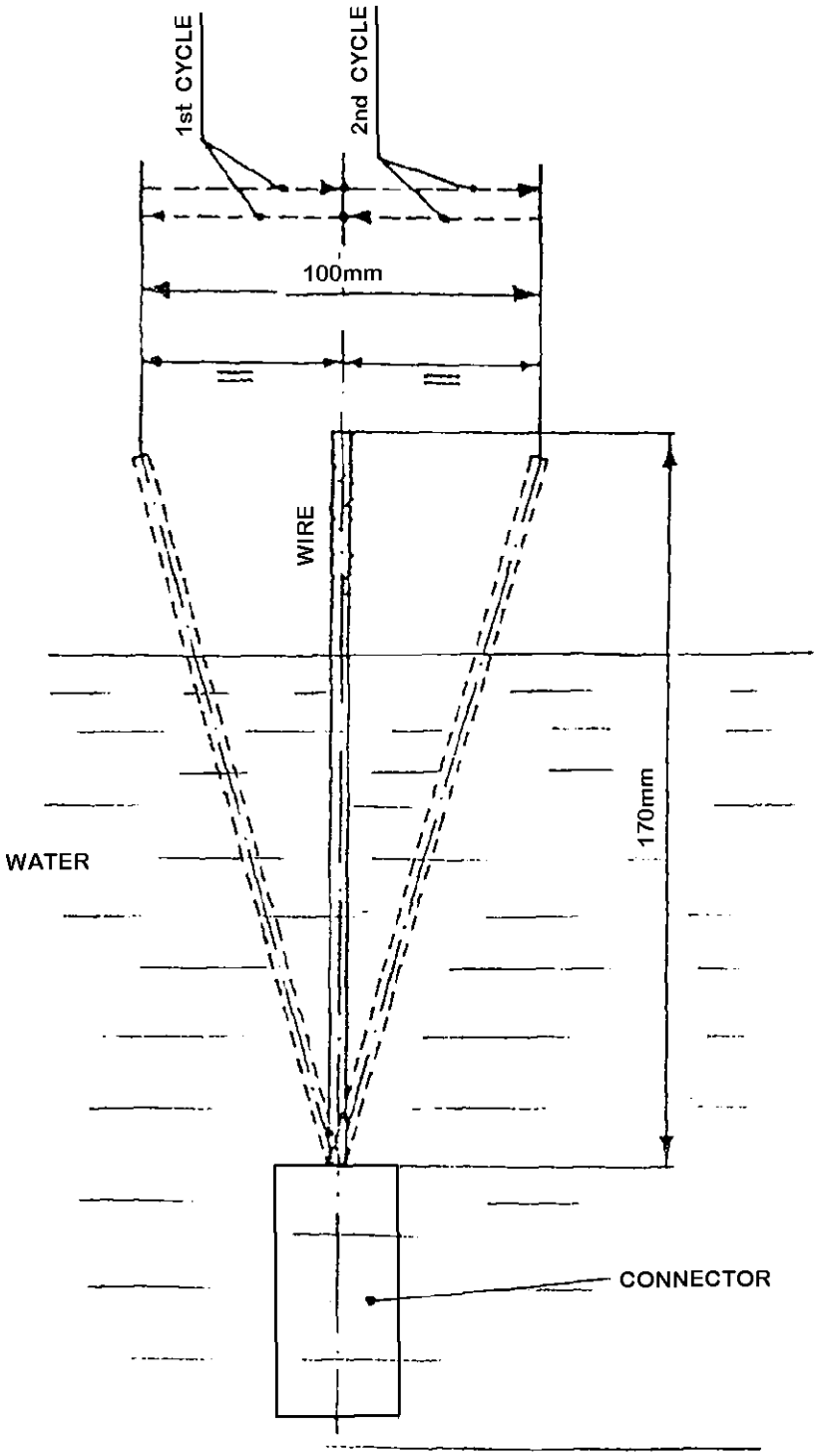

FIG. 2

VIBRATION TEST SETUP

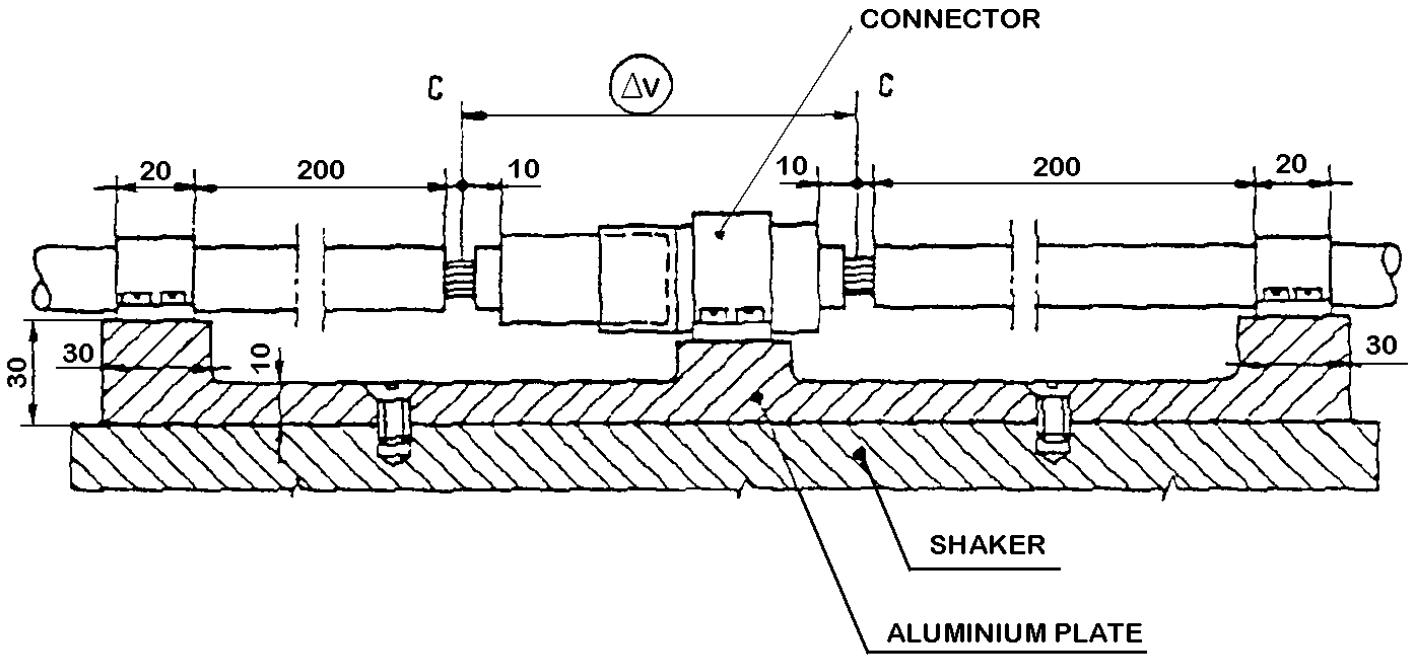

FIG. 3

IP X6K TEST SETUP

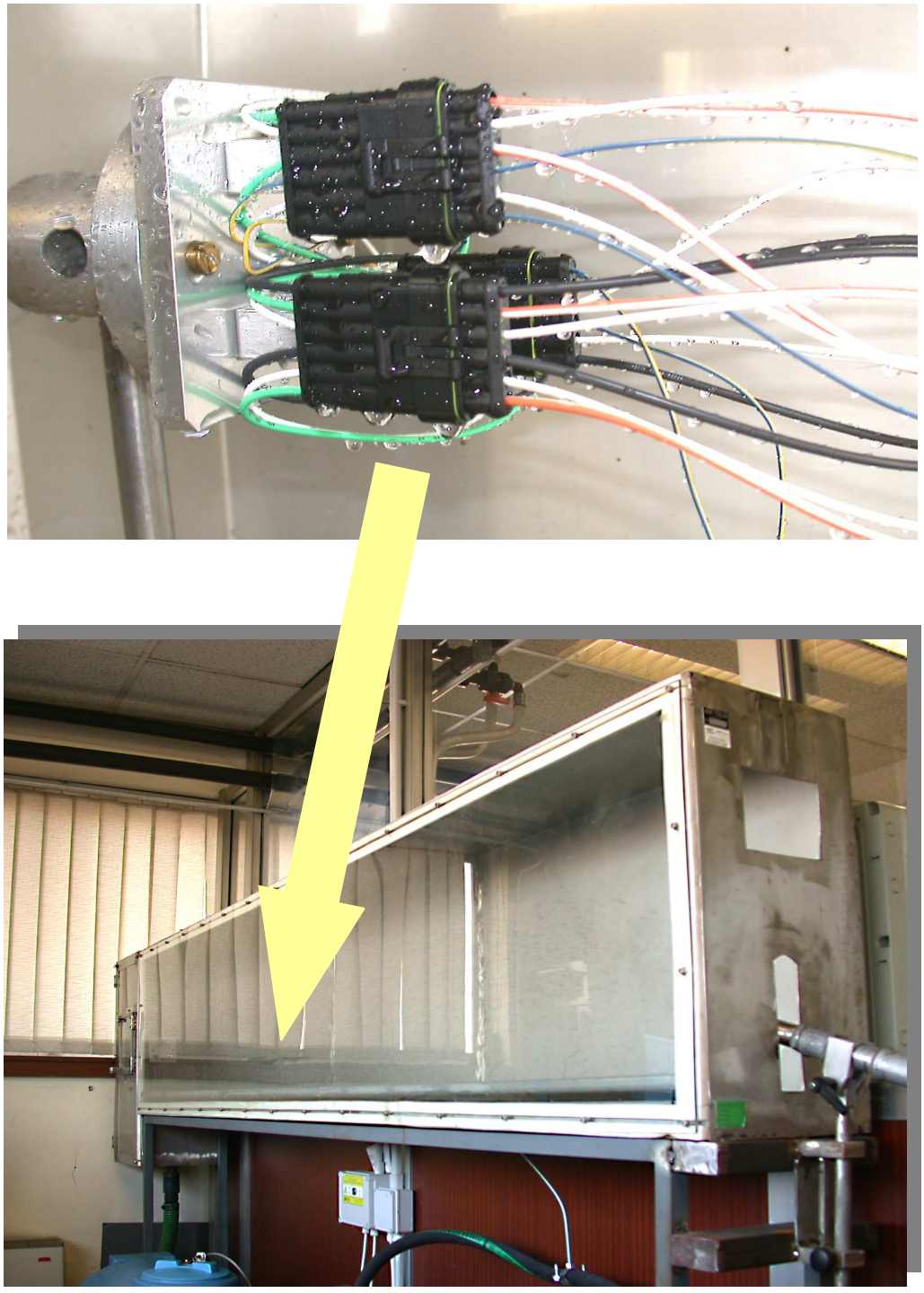

FIG. 4

IP X9K TEST SETUP

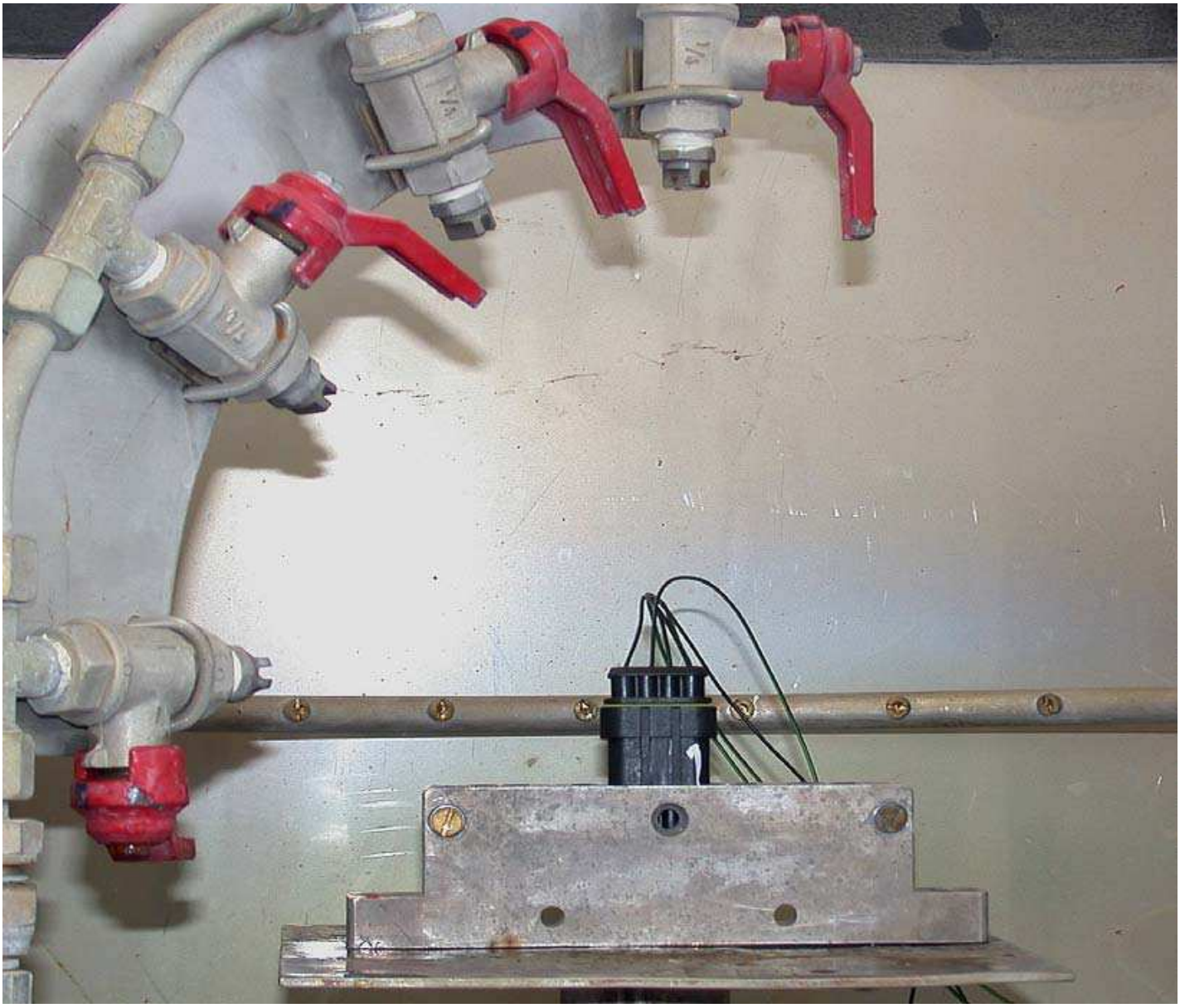

FIG. 5