Product Change Notification

TE Connectivity

Product Change Notification: P-23-024742 **PCN Date:** 20-JUN-23

TE would like to inform you of the following change(s) to the listed TE Connectivity Product. In case of any further questions about this change(s), please contact your TE Connectivity Sales Engineer. Affected part, drawing and/or specification numbers are listed on the attached sheet(s).

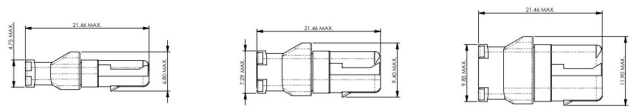
General Product Description:
369 Harsh Environment Connectors - With Contacts

Description of Changes

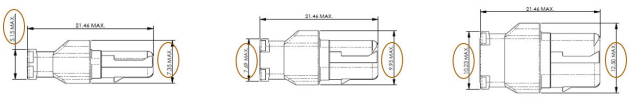
Replacement tooling and minor component geometry changes

369 Harsh Receptacle Changes

D369-HR**-***00000 Current - From D611253-ENV

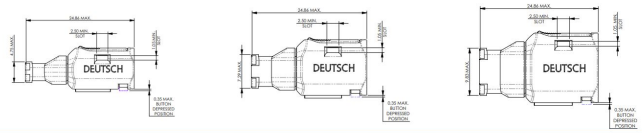


D369-HR**-***00000 New - From D612826-ENV

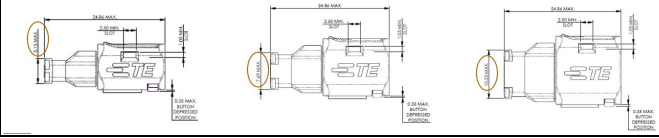


369 Harsh Plug Changes

D369-HP**-***00000 Current – From D611252-ENV



D369-HP**-***00000 New - From D612827-ENV



Other attachments:

369 Inline Harsh Environment Connectors Summary of Testing

Reason for Changes:	
Product improvement.Upgrade all mould tools to expand capacity and improve the performance of the connectors. The opportunity was taken to introduce component geometry changes to improve component strength, robustness and durability of the connectors in service. Dimensional changes have no impact on intermateability of connectors or accessories. The outer envelope dimensions of the mated connector pair remain unchanged. Qualification testing was performed to validate connector performance remains in line with specifications. Copy of summery test report 502-160649 is available on request.	
Estimated Dates:	
Last Order Date (Obsolete Parts Only):	**First Date To Ship** (Changed Parts Only):
	18-AUG-2023
Last Ship Date (Obsolete Parts Only):	**Last Date for Mixed Shipments:** (Changed Parts Only):
	18-FEB-2024

The documents listed below are being modified. Related parts that are not explicitly listed on this PCN are not being modified or discontinued as per the PCN. The Last Order Date, Last Ship Date, First Date to Ship Changed Parts and last date for Mixed Shipments apply only to parts explicitly listed on this PCN.

Note: This PCN contains only document changes, these changes do not affect the form, fit or function of the parts referenced.

Customer Drawing(s) Being Modified:

Drawing Number	Related Part Number	Customer Part Number	Current Revision	New Revision
D611252-ENV	YD369-HP33-NP00000		AB	
D611253-ENV	YD369-HR33-NP00000		AB	

The documents listed below are being modified. Related parts that are not explicitly listed on this PCN are not being modified or discontinued as per the PCN. The Last Order Date, Last Ship Date, First Date to Ship Changed Parts and last date for Mixed Shipments apply only to parts explicitly listed on this PCN.

Customer Drawing(s) Being Modified:

Drawing Number	Related Part Number	Customer Part Number	Current Revision	New Revision
D611252-ENV	YD369-HP33-NP00000		AB	
D611253-ENV	YD369-HR33-NP00000		AB	

369 Inline 'Harsh Environment' Connectors – Summary of Testing

1. INTRODUCTION

1.1. Purpose

Testing was performed on the TE Connectivity (TE) 369 Inline 'Harsh Environment' Connector Range to determine its conformance to the requirements of TE Product Specification 108-163019 Rev AA.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of 369 inline 'Harsh Environment' connectors. Testing was performed at the TE Hastings Environmental Test Laboratory between August 18, 2021 and August 17, 2022.

1.3. Conclusion

All part numbers listed in Paragraph 1.4 conformed to the electrical, mechanical, and environmental performance requirements of 108-163019 Rev AA.

1.4. Qualification by Similarity

Groups 2, 4, 5, 7, 8 & 9 are qualified by similarity to the 369 'Cabin Environment' connectors as specified in 108-160151 Rev AA. See test report 502-160280 Rev AB for detail.

The two connector ranges differ only by the absence of bonding between internal insert components for the 'Cabin Environment' connectors, plus an alternative 'rear body' colour (blue for 'Harsh Environment' connectors and black used on 'standard' connectors).

1.5. Test Specimens

Test Group	Quantity	Part Number	Description
1	3	YD369-HR99-NS10000	D369 9 Way Receptacle HE, Socket
	3	YD369-HP99-NP10000	D369 9 Way Plug HE, Pin
3	3	YD369-HR99-NS10000	D369 9 Way Receptacle HE, Socket
	3	YD369-HP99-NP10000	D369 9 Way Plug HE, Pin
	6	D369-STB-9	D369 9 Way Back Fitting
6	3	YD369-HR99-NS10000	D369 9 Way Receptacle HE, Socket
	3	YD369-HP99-NP10000	D369 9 Way Plug HE, Pin
	6	D369-STB-9	D369 9 Way Back Fitting
IPx7	3	YD369-HR99-NS10000	D369 9 Way Receptacle HE, Socket
		YD369-HP99-NP10000	D369 9 Way Plug HE, Pin

Figure 1

1.6. Test Sequence

TEST OR EXAMINATION	TEST GROUP (a). See Section 1.4								
	1	2	3	4	5	6	7	8	9
	TEST SEQUENCE (b)								
Visual Examination	1, 10	1, 3, 5	1, 9, 20	1, 5, 10	1, 3	1, 7, 20, 24	1, 3	1, 8, 12	1, 4
Examination of dimensions and mass	2								
Mating and unmating forces	3		2, 13	2, 7		19		7	3
Insert retention in housing (axial)	9		19	9					
Measurement of insulation resistance	4		3, 10, 15, 16	3, 6		2, 5, 16, 22		5, 10	
Voltage proof test	5		4, 11, 17			3, 6, 17, 23		6, 11	
Humidity			14						
Contact insertion and extraction forces			18			11, 13			
Contact retention in insert				8		14			
Rapid change of temperature						4			
Altitude						21			
Durability of contact retention system and seals (Maintenance ageing)						12			
Engagement of contacts			6						
Sinusoidal and random vibration			7						
Shock			8						
Contact resistance at rated current	6							4	
External bending moment		2							
Mechanical Strength of Rear accessories		4							
Mechanical Endurance						15			
Fluid resistance				4					
Contact retention system effectiveness								13	
Use of tools	8								
Contact protection effectiveness (scoop-proof)								2	
Electrical overload								3	
Contact resistance -Low level			5, 12			10, 18			
Pin contact stability	7								
Endurance at temperature					2				

Insulation Resistance (elevated temp.)						8			
Voltage proof test (at altitude)						9			
Ingress Protection (IP6x)							2		
Ingress Protection (IPx7)								9	
Flammability								14	
Impact Test									2

Figure 2

NOTE
(a) See paragraph 1.4
(b) Numbers indicate sequence in which tests are performed.

1.7. Environmental Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions shown in Figure 3.

Temperature	15°C – 35°C
Relative Humidity	45% – 75%
Atmospheric Pressure	86.6 – 106.6 kPa

Figure 3

2. SUMMARY OF TESTING

2.1. Visual Inspection

Specimens were visually examined and no physical damage detrimental to product performance was visible during any of the test groups.

2.2. Examination of dimensions and mass

The dimensional measurements of the samples met all drawing requirements. The mass of the samples was recorded for reference purposes. The samples were wired with BS 3G210-B 22 cable.

2.3. Mating and unmating forces

The samples were fixtured onto the materials test machine and the forces required to fully mate and unmate them were recorded. The samples passed within limits.

Note, during Fluid Testing (Group 4), Sample 1 exceeded the initial mating force – but following cleaning and drying as specified in 108-160151, the retested sample was found to pass within limits.

2.4. Insert retention in housing (axial)

The receptacles were subjected to the insert retention in housing (axial) test. The insert displacement post-test was measured and found to be within limits.

2.5. Measurement of insulation resistance

The insulation resistance was measured on unmated samples and found to be within limits.

2.6. Voltage proof test

The voltage proof was tested on both mated and unmated samples and found to be within limits.

2.7. Humidity

The mated samples were fitted with back fittings, loaded into the humidity chamber and subjected to 48 hours humidity cycling.

2.8. Contact insertion and extraction forces

The connectors were measured for the forces required to insert and extract the contacts. All connectors passed within limits.

2.9. Contact retention in insert

The connectors were tested for retention of the contact in the insert. All connectors passed within limits.

2.10. Rapid change of temperature

The mated connector pairs were subjected to rapid change of temperature. The purpose of this test is to determine the resistance of the connectors to exposure at extremes of high and low temperatures and the shock of alternate exposure to these extremes, simulating the worst probable conditions of storage, transportation and application.

2.11. Immersion at low air pressure

The connectors were tested for sealing to EN 2591-314, 12.1kPa. All connectors passed within limits.

2.12. Durability of contact retention system and seals (Maintenance ageing)

The connectors were tested for the durability of the contact retention system. All connectors passed within limits.

2.13. Engagement of contacts

The engagement of contacts was measured on mated samples and found to be within limits.

2.14. Random vibration

The mated samples were fitted with D369-STB-9 back fittings and subjected to 8 hours random vibration in 3 axes. There was no evidence of degradation or electrical discontinuities.

2.15. Shock

The mated samples were subjected to 1 shock per direction of 3 axes. There was no evidence of degradation or electrical discontinuities.

2.16. Contact resistance at rated current

The contact resistance at rated current was measured on mated samples and found to be within limits.

2.17. Mechanical Endurance

The connectors were mated to test durability. All connectors passed within limits.

2.18. Use of tools

The samples were subjected to use of tools test and passed with no damage to the retention system.

2.19. Contact resistance -Low level

The contacts were tested for low level resistance for initial and post test. All connectors passed within limits.

2.20. Pin contact stability

All samples were unwired. The pin contact stability was measured on the pin plug samples and found to be within limits.

2.21. Insulation Resistance (elevated temp.)

The connectors were held at maximum operating temperature and subjected to the electrical testing of insulation resistance. All tests passed within limits.

2.22. Voltage proof test (at altitude)

The connectors were held at altitude and subjected to the electrical testing for voltage proof. All tests were passed within limits.

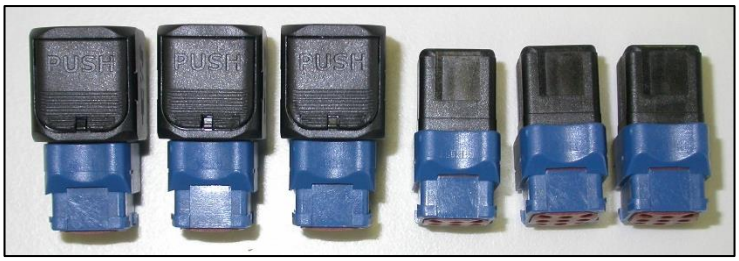
2.23. Ingress Protection (IPx7)

The mated connectors were immersed in a column of water to a depth of 1 meter for 30 minutes per IEC 60529. On removal, the excess water was removed by brief exposure to a compressed air line and electrically tested to check for ingress of water. All samples were subsequently tested for insulation resistance and dielectric withstand voltage - both tests passed within limits.

3. TEST METHODS

3.1. Visual Inspection

Procedure: EN 2591-101. The connectors, accessories and piece parts were visually examined to ensure conformance with the specification. No loosening of parts, crack, excessive wear or detached part shall be observed.



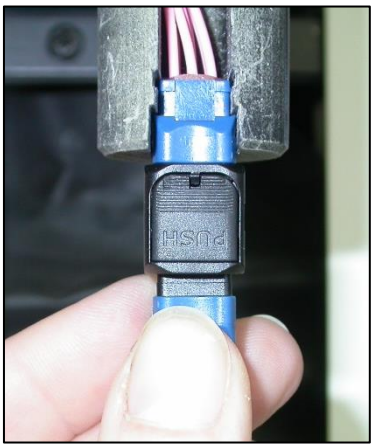
3.2. Examination of dimensions and mass

Procedure: EN 2591-102. According to envelope drawings. The checking of inaccessible dimensions on the finished product were carried out on Inspection Reports provided by the TE quality organization.

3.3. Mating and unmating forces

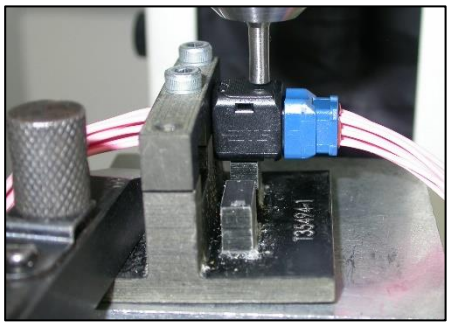
Connector mating force: The force required to fully mate and unmate each wired connector pair was measured using the materials test machine and appropriate fixturing. Procedure: EN 2591-408 Method A.

Engagement/separation forces: (Size 9, 9 way) engagement 80N max; separation 39.5N max./0.6N min



Push button unmating force:

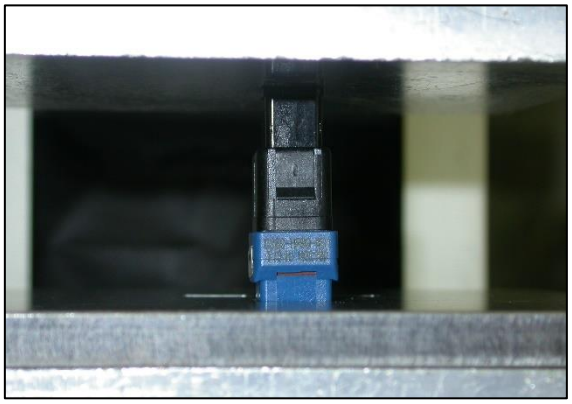
The force required to unlatch the push button on each mated connector pair was measured using the materials test machine and appropriate fixturing. Button push 2.3N min to 80N max.



3.4. Insert retention in housing (axial)

The unwired receptacles were mounted onto the materials test machine and an axial load of 69.7N was applied to the front of the socket insert and held for 5 seconds. The insert displacement post test was recorded. Displacement <0.3 mm after application of the load. Tested on receptacle side only.

Procedure: EN 2591-410. Connector not fitted with contacts.



3.5. Measurement of insulation resistance

The insulation resistance was measured on unmated connectors at a level of 500V DC. Measurements were taken between each contact in turn to all others. Readings were taken after one minute or when a steady state reading was obtained. Procedure: EN 2591-206 Method A. Minimum insulation resistance:

Method A minimum insulation resistance:

– at ambient temperature: 5 000 MΩ (unmated connectors);

– at maximum operating temperature: 1 000 MΩ (unmated connectors);

– after tests EN 2591-314: 1 000 MΩ (mated connectors);

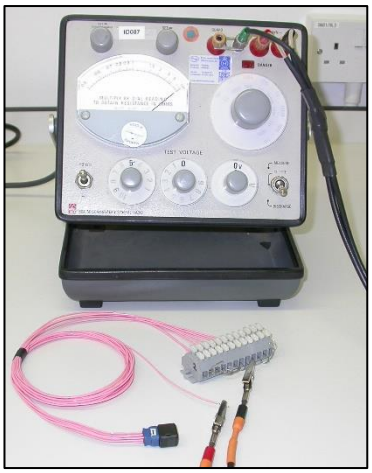
– after tests EN 2591-315: 100 MΩ (unmated connectors) except conductive fluids;

– during tests EN 2591-301: 100 MΩ (mated connectors).

– after test EIA-364-31 Within 5 hours of the final test cycle: 100 MΩ (mated connectors).

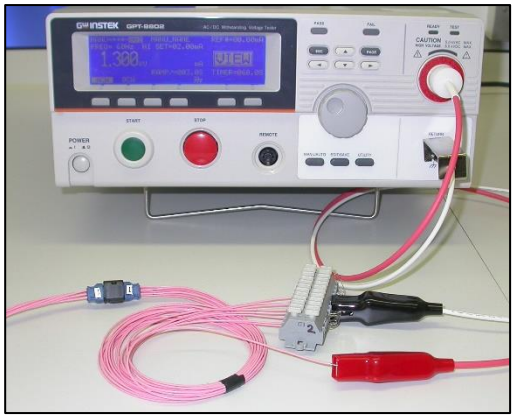
24 hours after test: 5 000 MΩ (mated connectors).

– after IPX7 test: 500 MΩ (mated connectors



3.6. Voltage proof test

The mated connectors were subjected to a voltage of 1300V AC RMS between each contact to all others. This voltage was applied at a rate not exceeding 500V per second and maintained for 60 seconds. Procedure: EN 2591-207 Method A. For tests at low pressure, voltage was applied after 30 min at the pressure indicated.



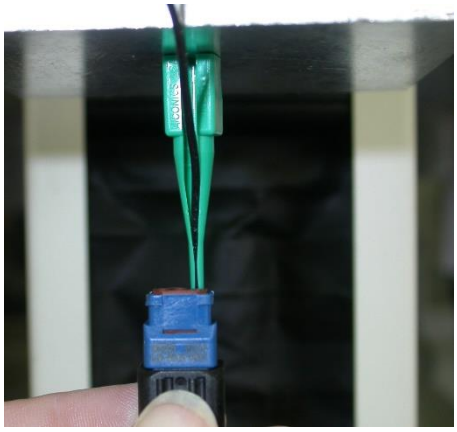
3.7. Humidity

The mated connectors were placed in the humidity chamber with their cable ends through an external port to prevent ingress of moisture. They were subjected to humidity as per EIA-364-31; Method IV, 10 cycles with cold shock.

Within one hour of completion of the humidity cycles the samples were warmed up for 15 minutes at the maximum operating temperature of +175°c, then immediately subjected to insulation resistance.

3.8. Contact insertion and extraction forces

50% of the contacts of each connector were inserted and removed for 10 cycles. The insertion and extraction forces were measured during the first and last of these cycles using the materials test machine.



3.9. Contact retention in insert

The samples were populated with unwired contacts and an axial load of 44N for #22 applied to all contacts in turn for 10 seconds. The force was applied towards the rear and then repeated towards the front of the connector.

3.10. Rapid change of temperature

The wired, mated connectors were subjected to 10 temperature cycles. Each cycle consisted of 30 minutes at -55°C and 30 minutes at +175°C. The maximum transfer between temperatures was 1 minute.

3.11. Immersion at low air pressure

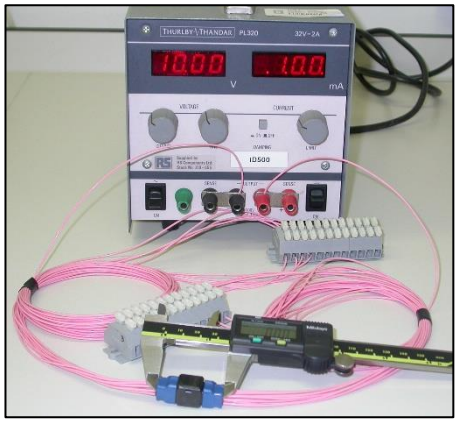
The mated samples were fitted with D369-STB-9 backshells, immersed in 5% salt solution, placed in the vacuum chamber and subjected to 3 cycles of low pressure.

3.12. Durability of contact retention system and seals (Maintenance ageing)

A contact was inserted and extracted for a total of 10 cycles from all cavities using IPA. Post-test the insertion and extraction forces were measured and recorded

3.13. Engagement of contacts

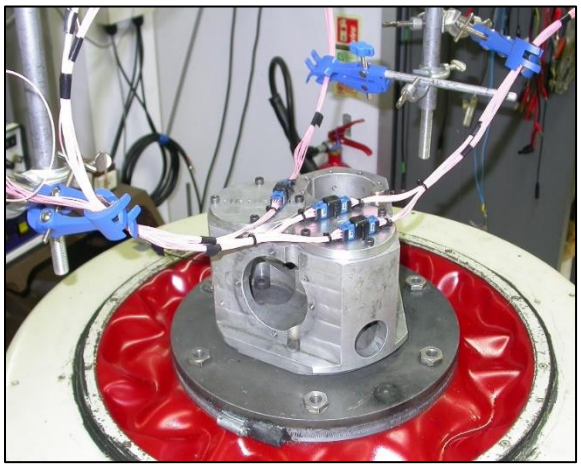
The contacts of each connector pair were wired in a continuous series circuit and connected into a circuit suppling 100mA at 10V. The connectors were mated slowly up to the point where the circuit was complete and the overall length measured. The connectors were then fully mated and re measured. The electrical engagement value was taken as the difference between the two readings.

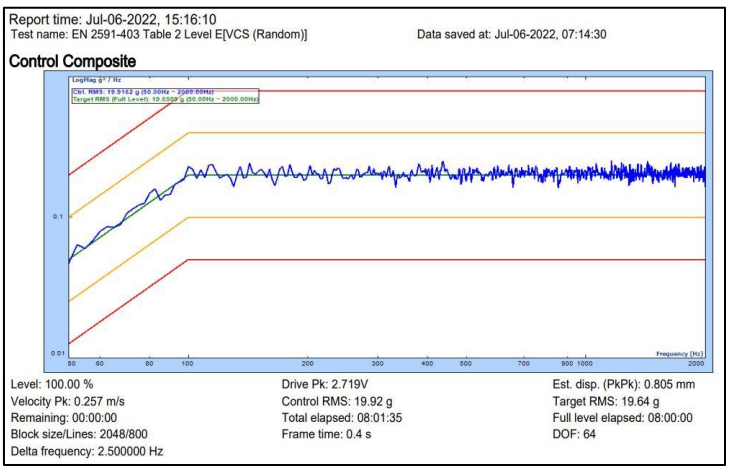


3.14. Random vibration

All contacts of the mated samples were wired in a continuous series circuit and mounted onto the vibration block. They were subjected to the random vibration profile stated in BS EN 2591-403, figure 3, table 2, level E, to a test level of 0.2G²/Hz, from 50 to 2000Hz for 8 hours in each axis.

All contacts were supplied with a test current of 100mA and monitored for discontinuities in excess of 1µsec throughout testing.

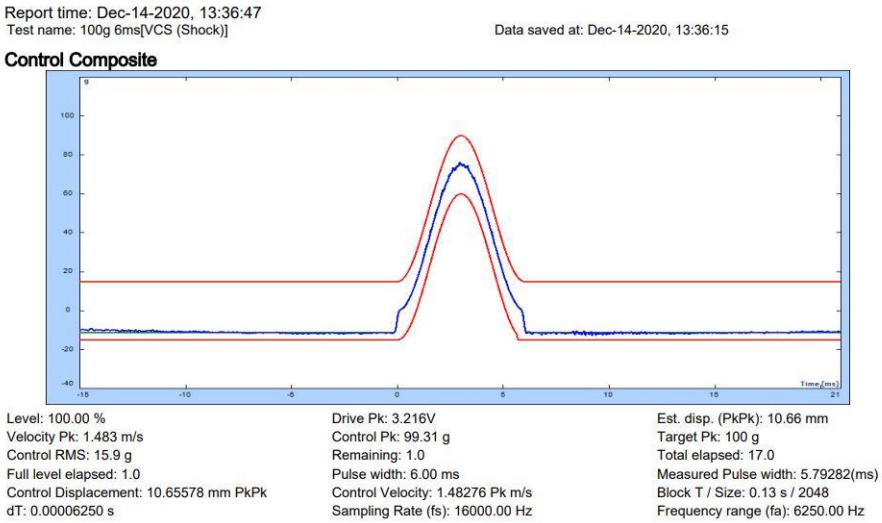




3.15. Shock

Procedure EN 2591-402 Method A, Severity 100. All contacts of the mated samples were wired in a continuous series circuit and mounted onto the vibration block. They were subjected to 1 shock per direction of 3 axis. The shock used was a half sine wave pulse at 100g for a 6ms duration. There was a total of 6 shocks.

All contacts were supplied with a test current of 100mA and monitored for discontinuities in excess of 1µsec throughout testing.

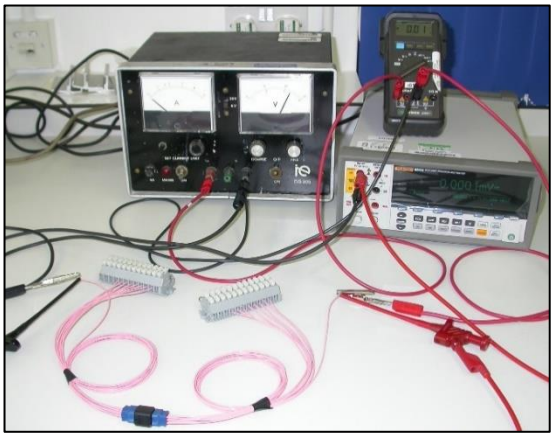


3.16. Contact resistance at rated current

Procedure: EN 2591-202. Test applicable to contact defined by the standards for contacts specified in EN 4165-002. Initial value: ≤8mΩ; After tests: ≤11mΩ.

The samples were mated and a DC power supply was connected across the contact under test and supplied with a test current of 5A. The voltage drop across the contact was measured in both directions and the average recorded. The voltage drop of the cable was subtracted from the results. The contact resistance was then calculated.

Measurements were taken on 50% of contacts.



3.17. Mechanical Endurance

The connectors were subjected to 500 full matings, by hand, at a rate that did not exceed 5 matings per minute.

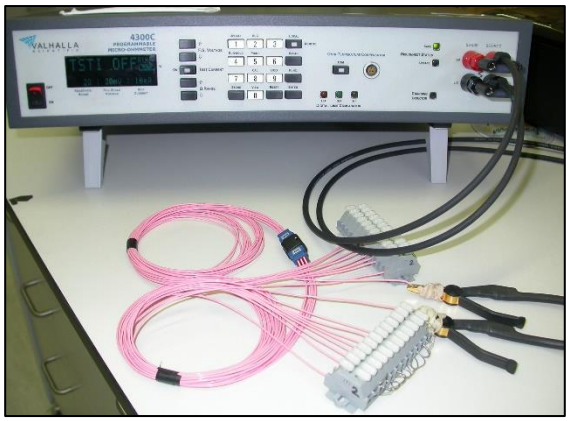
3.18. Contact resistance -Low level

The low level contact resistance was measured on 50% of mated contacts. A 4 wire precision micro-ohmmeter was connected across each contact in turn at a level of 10mA, 20mV maximum. The resistance was measured 3 times in each polarity and the average calculated. The resistance of the cable was subtracted from the result.

Procedure: EN 2591-201. Test applicable to contact defined by the standards for contacts specified in EN 4165-002.

- Initial value: ≤8mΩ

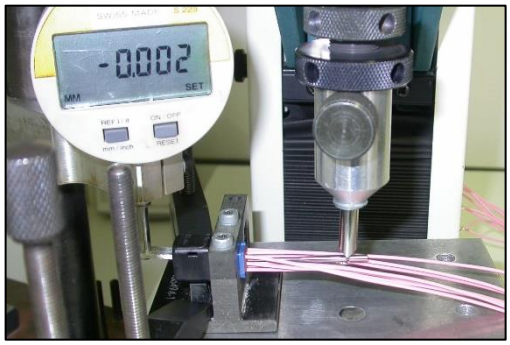
- After tests: ≤11mΩ



3.19. Pin contact stability

The unwired plug connectors were mounted horizontally on the materials test machine. A test gauge pin as detailed in EN4165-001:2010 Section 10.2 was inserted into the centre cavity. A load of 1.2N was applied to the groove of the gauge and the deflection at the pin end calculated. This was repeated with the load applied in the opposite direction. The total deflection was recorded as the sum of the two readings.

Procedure: EN 2591-419.



3.20. Insulation Resistance (elevated temp.)

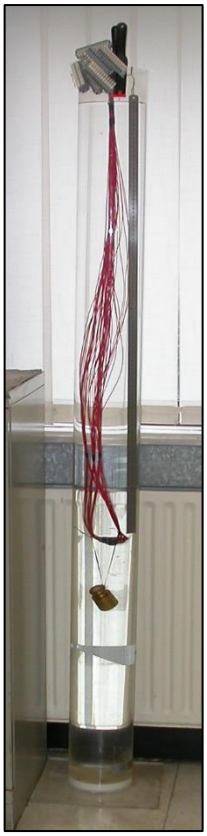
The insulation resistance was measured per BS EN 2591-206 on unmated connectors at a level of 500V DC whilst in a chamber at +175°C. Measurements were taken between each contact in turn to all other contacts. Readings were taken after one minute or when a steady state reading was obtained.

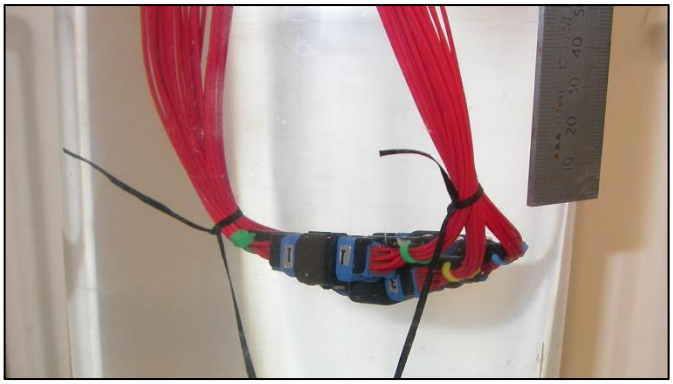
3.21. Voltage proof test (at altitude)

After 30 minutes stabilising at altitude the mated connectors were subjected to a voltage of 1000V AC for size 22 contacts, applied between each contact to all others. This voltage was applied at a rate not exceeding 500V per second and maintained for 60 seconds.

3.22. Ingress Protection (IPx7)

The mated connectors were immersed in a column of water to a depth of 1 meter for 30 minutes. On removal, the excess water was removed by brief exposure to a compressed air line and electrically tested to check for ingress of water.





4. EQUIPMENT

4.1. Calibration Statement

All equipment containing a calibration number is calibrated and traceable through TE Connectivity (TE).

4.2. Equipment List

Equipment Name	Calibration Number
DIGITAL SCALES, KERN EMB	C20616
MATERIALS TEST MACHINE, TINIUS OLSEN H5KT	C17434
MEGOHMMETER, GENERAL RADIO 1864	ID088, ID087, ID1238
WITHSTAND TESTER, G W INSTEK GPT-715A	ID1066
WITHSTAND TESTER, G W INSTEK GPT-9802	ID01793
DIGITAL MULTIMETER, FLUKE 8845A	ID1698
DIGITAL MULTIMETER, ISO-TECH IDM67	ID504
DC POWER SUPPLY UNIT, IE DS 305	N/A – USE WITH CALIBRATED METER
#22 PIN CONTACT STABILITY GAUGE	C20441
ELECTRICAL DROP CLOCK, SYLVAC S229	C14985
STAND, WALLACE	C1105
ELECTRONIC TIMER	ID956, ID108
DC POWER SUPPLY UNIT, THURLBY PL320	ID500, ID505
PC OSCILLOSCOPE, PICOSCOPE 3405A	ID1410
DIGITAL MICRO-OHMMETER, VALHALLA 4300C	ID1425
DIGITAL VERNIER, MITUTOYO	C21448
VIBRATION CONTROLLER, SPIDER-81B	ID1447
CHARGE AMPLIFIER, EE 2027	ID062
POWER MODULE, EE 2022	ID706
ACCELEROMETER	ID343
HIGH TEMPERATURE CHAMBER, LENTON	ID1080, ID1081, ID1079
HUMIDITY CHAMBER, TAS HTCL 750FS	ID900
TEMPERATURE CHAMBER, TAS LT600FS	ID01787
ABSOLUTE PRESSURE METER, BALZERS APG010	ID342