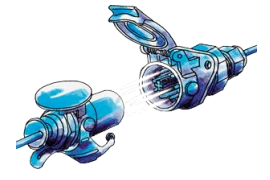


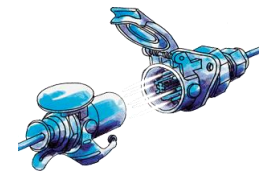


A good connection...
...needs reliable contacts



Our test laboratory - Apparatebau Kirchheim-Teck GmbH

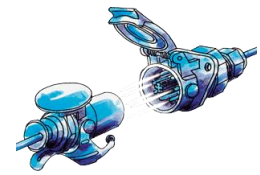




Test laboratory equipment 1

- Microsection lab for crimp contacts
- Tensile, pressure and bending test machine: Static + dynamic
- Vibration test: Vibration + shock
- Climate tests: Temperature + humidity
- High current tests up to 2000 A
- High current analysis with electrical loads
- Thermal imaging camera
- Leakage test station
- Measure- and test equipment for electrical analysis: Oscilloscope, different power supplies, multimeter, megohmmeter (megger), LCR-measuring instrument

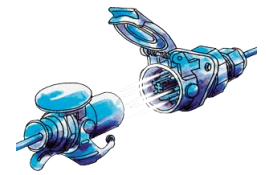




Test laboratory equipment 2

- Internal developed test stations:
 - Articulation test station + strain test station for coils according ISO 4141
 - Cyclic extension test station for coils according ISO 4141
 - Dynamic test station for door contact
 - IPx9K - test station **NEW!**
- Documentation of each analysis in a full test report
- Calibration of Measure- and test equipment with accredited laboratories
- Cooperation with external test laboratories

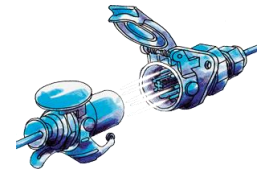




Microsection lab for crimp contacts

- Water-cooled 2-fold grinding table
- Swivel-mounted sample holder
- Copper etching bath
- Zeiss microscope up to 80-fold extension
- Monitor for inspection
- Thermal transfer printer (photo-quality)

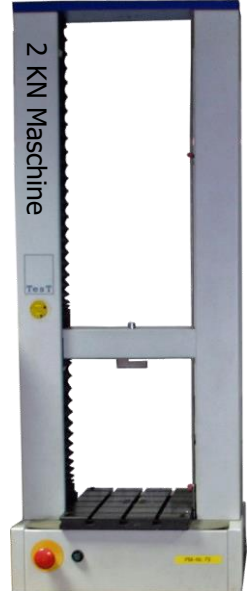




Tensile, pressure, and bending test machine: Static + dynamic



- Static and dynamic tests up to 10 KN
- Programmable test sequences
- Testing speed: 0,01 – 500 mm/min
- Stroke resolution: < 1 μ m
- Force resolution: +/-60.000 Digits

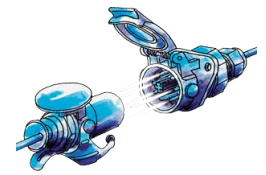


Extraction force - crimp connection



Cable extraction force - junction box





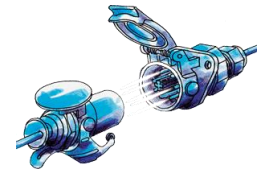
Vibration tests: Vibration + shock

- Electromagnetic shakers are designed for simulation and reproduction of environmental influences, the exploration of the dynamic behavior of structures and the fatigue of materials in the test lab.
- Internal load support capacity: 100 kg
- Max. velocity: 700 mm/s (PEAK)
- Max. displacement s-s: 25,4 mm
- Max. acceleration: 688 m/s²(PEAK)
- Useful frequency range: 5 – 4.000 Hz
- Swivel-mounted rack – vertical + horizontal position possible.
- Power amplifier sine power 1.400 Watt



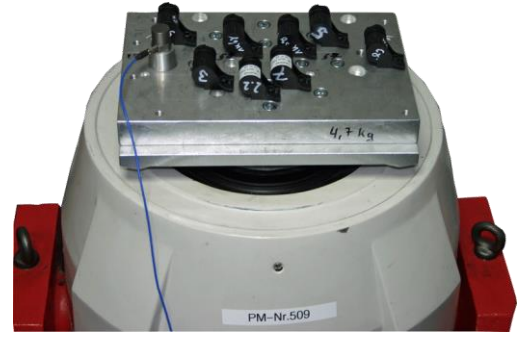


A good connection...
...needs reliable contacts

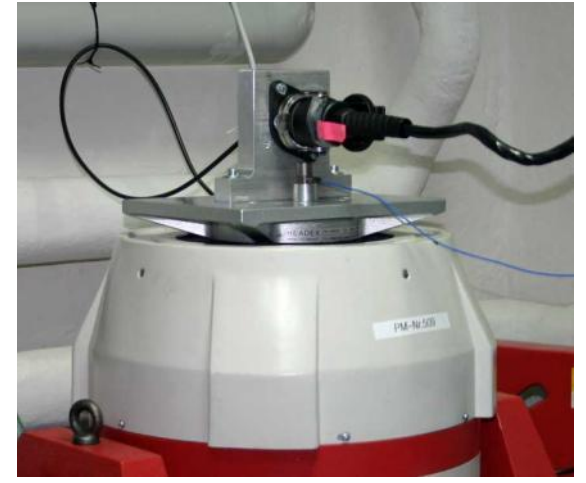


Vibration tests: Vibration + shock

ADR-Fuses

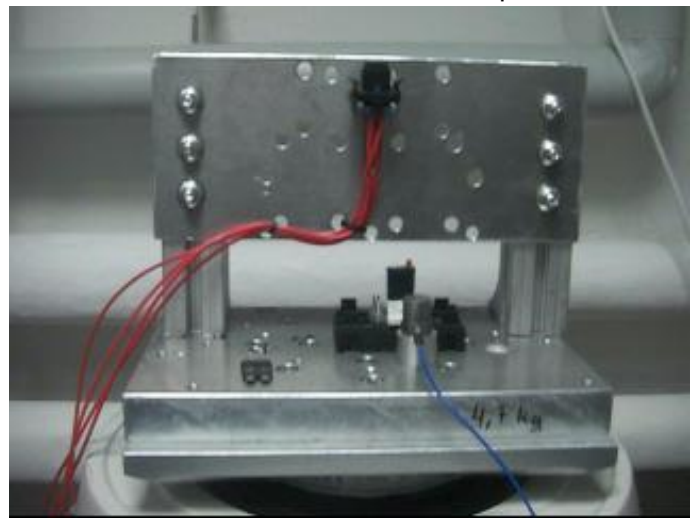


ISO 7638 Connectors & coiled cables

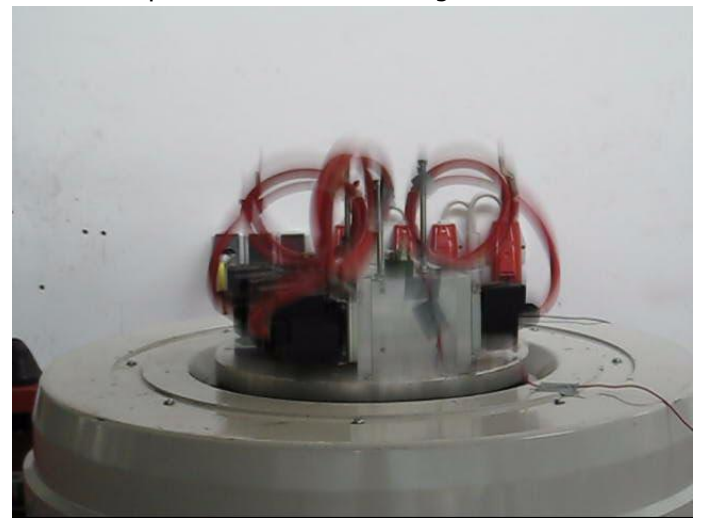


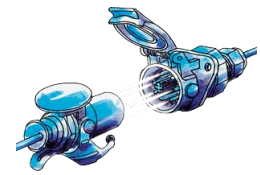
Vibration examples - Movies

Fuse holder Ato + Mini - waterproof



Help start – tested according to ISO 16750





Climate tests: Temperature + humidity

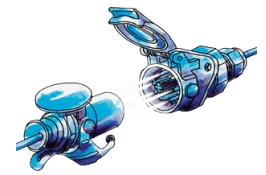
- Temperature range: -40 °C up to 180 °C
- Humidity range: 10 % up to 98 % *RH*
- Test space capacity in liters: 350 L
- Temperature change rate cooling and heating are according to IEC 680068-3-5
- Software-controlled with RS232 interface
- Complies with current CE and EMV regulations



Sample applications



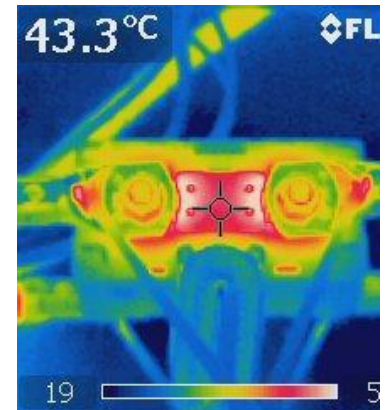
A good connection...
...needs reliable contacts



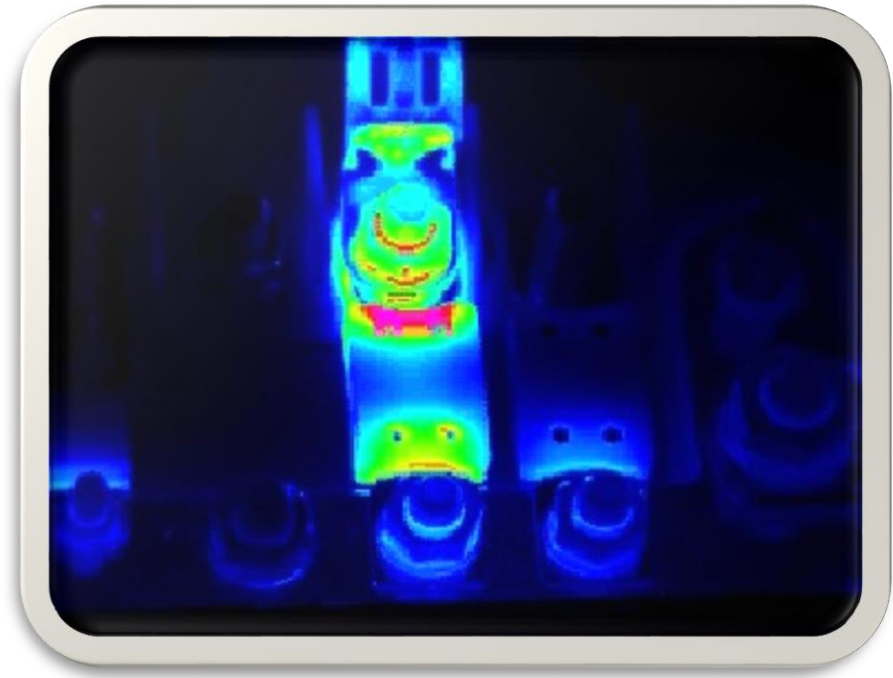
High current test station up to 2.000 A

- Current simulation up to 2.000 Ampere
- Big appliance simulated with electrical loads: 2x 125 A, 1x 200 A, 1x 400 A
- Thermal imaging camera for heating analysis
- Temperature sensors for record the temperature

Thermal imaging picture:
Mega-Fuse

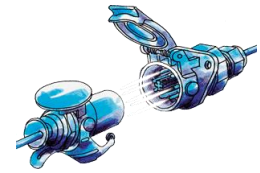


Thermal imaging video @ 500 Ampere – Power box



Electrical loads





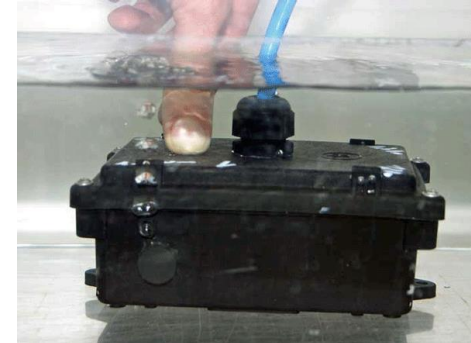
Internal developed test stations:

Leakage test station with internal pressure

- Simple and fast test to analyze the water proof class
 - If there is a leak, bubbles come out of the housing
- You can see, where the leak is and at which pressure the leak occurs



Junction box



ISO 7638 Connector

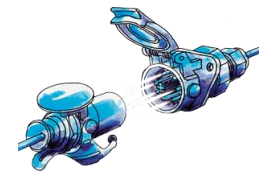


ISO 3731 Connector





A good connection...
...needs reliable contacts



Internal developed test stations:

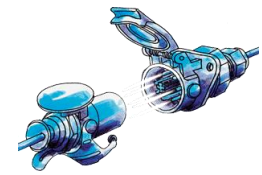
Articulation test station for coils

(According to ISO 4141-4)

Video –Articulation test



- Test current continuous 5 A over all contacts
- If an interruption in the cable occurs (more than 1,0 A for 10 ms), the test station stops automatically
- Test speed: 15 cycles per minute
- Movement in each direction: 90 °
- Software-controlled test procedures



Internal developed test stations:

Torsion strain test station for coils

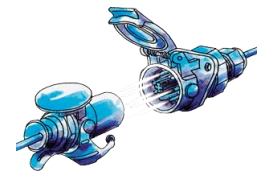
(According to ISO 4141-4)



- Test current continuous 5 A over all contacts
- If an interruption in the cable occurs (more than 1,0 A for 10 ms), the test station stops automatically
- Test speed: 15 ° per seconds
- Movement in each direction: 360 °
- Software-controlled test procedures

Video –Torsion strain test



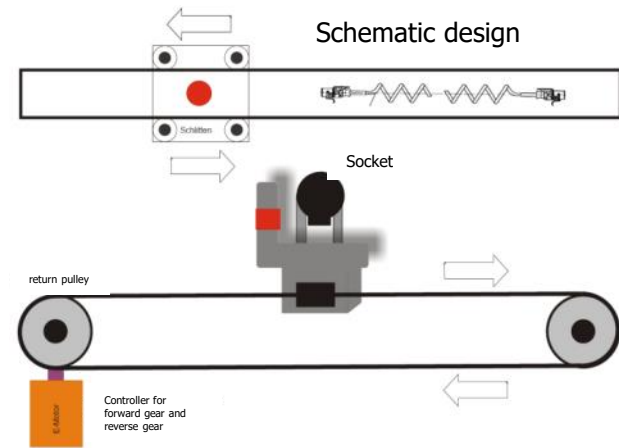


Internal developed test stations:

Cyclic extension test station for coils

(According to ISO 4141-2)

- Test current continuous 5 A over all contacts
- If an interruption in the cable occurs (more than 1,0 A for 10 ms), the test station stops automatically
- Test speed: 10 cycles per minute
- Software-controlled test procedures



Video –Cyclic extension test

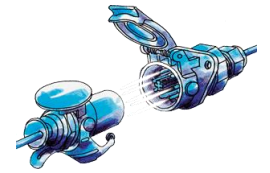


Control system





A good connection...
...needs reliable contacts



Internal developed test stations:

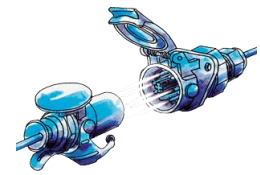
Dynamic test station for door contact

- Life time test: Min. 200.000 cycles
- Simulated kinetic radius of the door
- Impact speed: 1,2 m/s
- Absorbed test chamber



Test station door contact





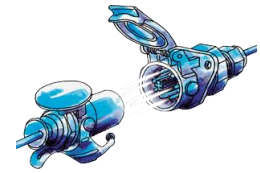
Internal developed test stations:

IPx9K - test station → High pressure water jet



Video -IPx9K - Test

- According ISO 20653 (DIN 40 050 part 9)
- Water pressure 80 bar / 1160 Psi
- Water temperature +80 °C



Documentation of each analysis in a full test report

- Comprehensive description of the test procedures
- Accurate analysis of the test results
- Detailed visual presentation

Test report



Test report no.: PB 2010 058

Page 1 of 10

Title of the test:	Testing Cable Box	
Date of the test:	2010-05-27 – 2010-07-07	
Client:	Volvo Powertrain	
Test object:	Cable Box	
Samples date of receipt:	2010-05-24	
Object identification:	Test samples No. 1 – 15	
(article number/description/customer)	Volvo Part No.21484107 AK193026054 (drawing change level: h; 2010-01-29)	
Specification/test method:	Volvo TECHNICAL REGULATION (TR) 21356365: - 5.3.1 Conditioning of test sample - 5.3.2 Cold test - 5.3.3 Damp heat (cyclic) test - 5.3.4 Temperature change test - 5.2 Functional test - 5.3.5 Stone impact test - 5.3.6 Free fall or drop	
Place of the test:	Apparatebau Kirchheim-Teck GmbH Alleenstraße 36 D-73230 Kirchheim-Teck	TEUS Test laboratory for environment simulation GmbH Bodenackerstr. 12 D-73266 Bisingen-Teck
Participant:	Michael Berndt	
Test result:	All test samples passed the tests. We have no crackings or damages on the test samples.	
Notes:		

Tester	Originator	Release
Date: 2010-07-14 Name: Michael Berndt Signature: <i>[Signature]</i>	Date: 2010-07-14 Name: Michael Berndt Signature: <i>[Signature]</i>	Date: 2010-07-14 Name: Rainer Matteme Signature: <i>[Signature]</i>

4.1. Prüfablaufablauf

Die Prüfungen werden nach folgendem Prüfablauf durchgeführt

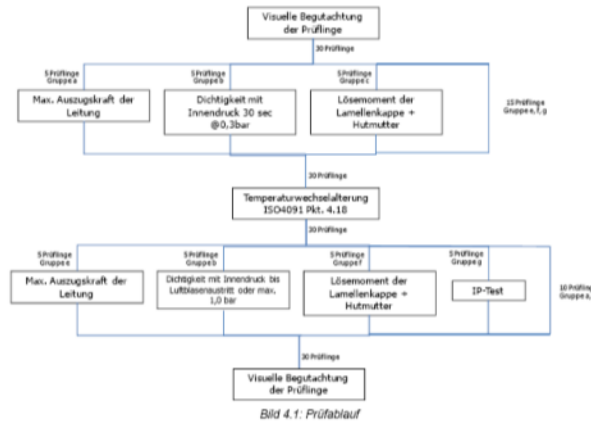


Bild 4.1: Prüfablauf

4.2. Visuelle Begutachtung der Prüflinge

Die Prüflinge werden einer Sichtprüfung unterzogen
Es dürfen keine Brüche, Risse, Quellungen, Verfärbungen, Verklebungen oder sonstige sichtbaren Beschädigungen erkennbar sein.

Prüfbericht



Bericht Nr.: PB 2009 112

Seite 9 von 10



Bild 4.3: Prüfablauf Dichtigkeits-test

4.5. Löseomente Lamellenkappe + Hutmutter

Mit Hilfe eines Zehndrehmomentschlüssels wird vor und nach der Temperaturwechselalterung das Löseoment der Hutmutter und der Lamellenkappe an der ABS/EBS-Steckdose gemessen.



Den Versatz des Drehpunktes zwischen Mittelpunkt der Kappen und Drehpunkt des Drehmomentschlüssels wird berechnet und abgezogen.



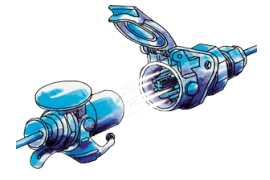
Bild 4.6: Drehmomentschlüssel

Erstellt von: M. Berndt
Erstellt am: 11.07.2010
PB_2009_112
Abgabemanager: R. Matteme
Autorisierungs-Nr.: 1116/08





A good connection...
...needs reliable contacts



Start

Examples of
use

