

Third edition
2000-12-15

Corrected and reprinted
2002-01-15

**Road vehicles — Connections for on-board
electrical wiring harnesses —**

Part 2:
**Definitions, test methods and general
performance requirements**

iTeh STANDARD PREVIEW

*Véhicules routiers — Connexions pour faisceaux de câblage électrique
embarqués —*

Partie 2: Définitions, méthodes d'essai et exigences générales

ISO 8092-2:2000

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Reference number
ISO 8092-2:2000(E)

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Printed in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 8092 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 8092-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This third edition cancels and replaces the second edition (ISO 8092-2:1996), which has been technically revised.

ISO 8092 consists of the following parts (under the general title *Road vehicles — Connections for on-board electrical wiring harnesses*):

- *Part 1: Tabs for single-pole connections — Dimensions and specific requirements*
- *Part 2: Definitions, test methods and general performance requirements*
- *Part 3: Tabs for multi-pole connections — Dimensions and specific requirements*
- *Part 4: Pins for single- and multi-pole connections — Dimensions and specific requirements*

Annexes A and B of this part of ISO 8092 are for information only.

Road vehicles — Connections for on-board electrical wiring harnesses —

Part 2:

Definitions, test methods and general performance requirements

1 Scope

This part of ISO 8092 defines terms and specifies test methods and general performance requirements for single- and multi-pole connections used with on-board electrical wiring harnesses in road vehicles.

This part of ISO 8092 is applicable to connectors designed to be disconnected after mounting in the vehicle for repair and maintenance only. It does not cover one-part connections, i.e. where one part of the connection has direct contact with the pattern of the printed circuit board.

This part of ISO 8092 is not applicable to the internal connections of electronic devices.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 8092. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 8092 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1817, *Rubber, vulcanized — Determination of the effect of liquids.*

ISO 6722-3, *Road vehicles — Unscreened low-tension cables — Part 3: Conductor sizes and dimensions for thick-wall insulated cables.*

ISO 6722-4, *Road vehicles — Unscreened low-tension cables — Part 4: Conductor sizes and dimensions for thin-wall insulated cables.*

ISO 7309, *Road vehicles — Hydraulic braking systems — ISO reference petroleum base fluid.*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests.*

IEC 60050-581, *International Electrotechnical Vocabulary — Electromechanical components for electronic equipment.*

IEC 60068-2-27, *Environmental testing — Part 2: Tests — Test Ea and guidance: Shock.*

IEC 60512-11-7, *Electromechanical components for electronic equipment — Basic testing procedures and measuring methods — Part 11: Climatic tests — Section 7: Test 11 g: Flowing mixed gas corrosion test.*

IEC 60529, *Degrees of protection provided by enclosures (IP code).*

SAE J311b, *Fluid for passenger car type automatic transmissions.*

3 Terms and definitions

For the purposes of this part of ISO 8092, the terms and definitions given in IEC 60050-581 and the following apply.

3.1 connection

two mated connectors or contacts

See Figure 1 for examples.

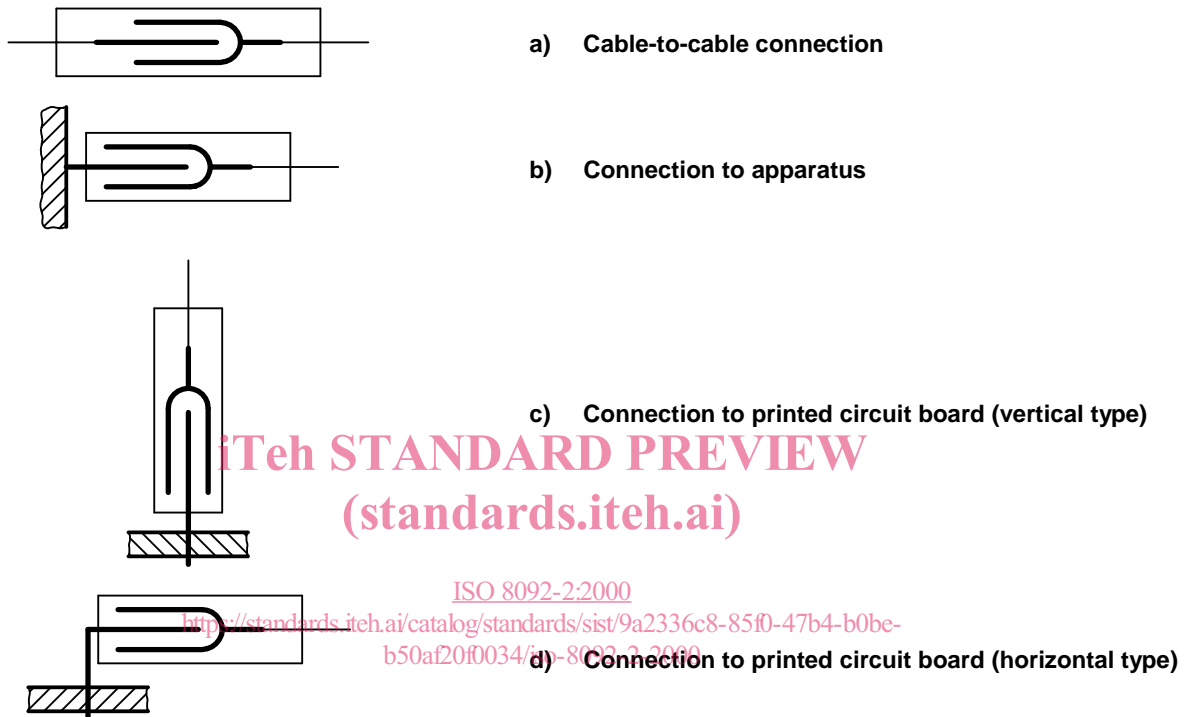


Figure 1 — Typical examples of connections

3.2 connector

assembly of contact and housing that terminates conductors for the purpose of providing connection and disconnection to a suitable mating connector

3.3 contact

conductive element in a connector (including means for cable attachment) that mates with a corresponding element to provide an electrical path

3.4 contact area

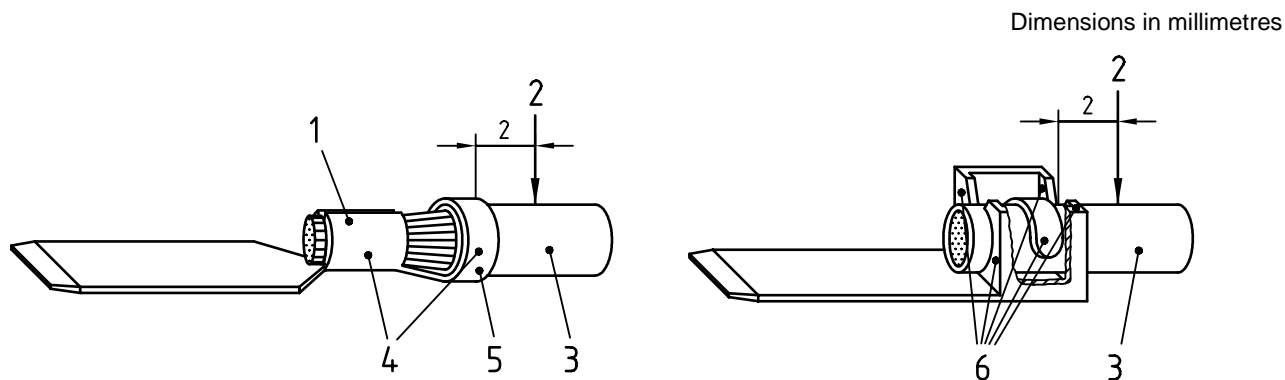
area in contact between two mated contacts that provides an electrical path

3.5 male contact

contact (including means for cable attachment) designed for electrical engagement on its outer surface and to enter a female contact, thus forming an electrical connection

EXAMPLES Tab, pin, blade.

See Figure 2.

**Key**

- 1 Conductor crimp
- 2 Reference point
- 3 Cable
- 4 Cable attachment
- 5 Insulation support / sealing grip
- 6 Cable attachment by insulation displacement

Figure 2 — Male contact

3.6 female contact

contact (including means for cable attachment) designed for electrical engagement on its inner surface, and to accept the entry of a male contact, thus forming an electrical connection

EXAMPLES Receptacle, sleeve.

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See Figure 3.

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3.7 positive-locking female contact

female contact with automatic positive-locking and manual unlocking device engaging a hole or dimple in the male contact

3.8 cable attachment

any permanent joining of cable to contact

EXAMPLES Crimp, insulation displacement, welding, screwing.

3.9 detent

raised portion of the female contact that engages a hole or dimple in the male contact thus providing a latch for the mated parts

3.10 reference point

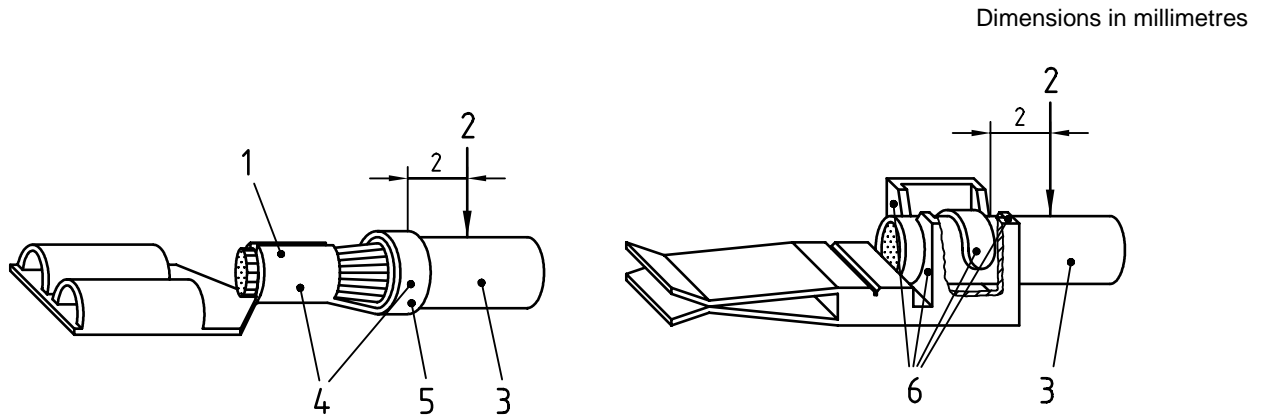
point 2 mm away from the rear-most edge of a male or female contact used for measuring the connection resistance (voltage drop)

See Figures 2 and 3, and 4.8.

3.11 multi-pole connection

two mated connectors with more than one contact pair

See Figure 4.

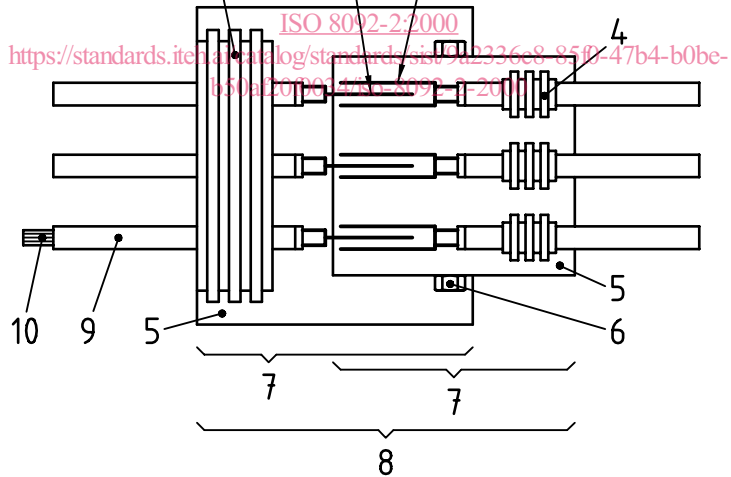


Key

- 1 Conductor crimp
- 2 Reference point
- 3 Cable
- 4 Cable attachment
- 5 Insulation support / sealing grip
- 6 Cable attachment by insulation displacement

Figure 3 — Female contact

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Key

- | | |
|-----------------------|----------------|
| 1 Multiple cable seal | 6 Housing seal |
| 2 Male contact | 7 Connector |
| 3 Female contact | 8 Connection |
| 4 Single cable seal | 9 Cable |
| 5 Housing | 10 Conductor |

Figure 4 — Multi-pole connectors/connection

3.12 connector polarization

device or connector shape preventing connection in any but the manner specified

3.13**connector coding**

device, either visual, mechanical or sensitive, or combination of these, preventing connection of connectors from the same family and having the same number of contacts, but with different coding

4 Tests and requirements**4.1 General****4.1.1 Preconditioning**

All test samples shall be preconditioned at (23 ± 5) °C and 45 % to 75 % relative humidity for 24 h before the start of any test sequence.

4.1.2 Test conditions

All tests shall be carried out at an ambient temperature of (23 ± 5) °C, unless otherwise stated in the test plan.

Each test sequence (see Table 1) shall be started with unused test samples manufactured to conform to the dimensions specified in the applicable part of ISO 8092.

Contacts with a locking device shall be tested with adequate counterparts to permit locking.

Cables shall be in conformance with ISO 6722-3 or ISO 6722-4, and the cable or cables used shall be noted in the test report.

Cable attachment shall be performed in accordance with the contact manufacturer's recommendations.

Care shall be taken so that test samples do not influence each other (e.g. in a heat chamber).

Each connector shall have the full complement of contacts fitted, unless otherwise specified by the test method. Measurements shall be taken on a minimum of four contacts per connector, unless otherwise specified in the test method. For 1-, 2- and 3-pole connectors, all contacts shall be measured.

During the entire test sequence, lubrication or other means of attaining better test results shall not be added to the test surface. However, production-related remains of lubricants on the contacts are permitted.

4.1.3 Multiple-position connections

Connectors or contacts that allow connections for multiple positions shall meet the requirements of this part of ISO 8092 in all intended positions.

4.1.4 Test sequences

The test sequence for each sample group shall be in accordance with Table 1 (sequences are indicated by Xs, ordered from top to bottom). Also given in the same table is the applicability of test sequences to sealed or unsealed connectors.

Table 1 — Test sequences and requirements

Test		Test sample group ^a /sequence													Requirement
		A	B	C	D	E	F	G	H	I	K	L	M	N	
Unsealed connectors	Subclause	X	X	X	X	X	X	X	X	X	X	X			Subclause
Sealed connectors		X	X	X	X	X	X	X	X	X			X	X	
Visual examination	4.2.1	X	X	X	X	X	X	X	X	X	X	X	X	X	4.2.2
Contact insertion	4.6.1	X													4.6.2
Contact retention in housing	4.7.1	X													4.7.2
Tensile strength of conductor-to-contact attachment	4.4.1							X							4.4.2
Connector coding and polarization	4.15.1		X												4.15.2
First connection	4.3.1		X												4.3.2
Connection resistance (voltage drop)	4.8.1		X	X	X	X			X	X	X				4.8.2
1st connection to 10th disconnection	4.3.1		X												4.3.2
Current cycling	4.17.1			X											4.17.2
Insulation resistance	4.12.1				X								X		4.12.2
Withstand voltage	4.13.1				X					X					4.13.2
Temperature/humidity cycling	4.10.1				X										4.10.2
Combined temperature and vibration	4.11.1					X									4.11.2
Thermal ageing	4.18.1												X		4.18.2
Chemical fluids	4.23.2												X	X	4.23.3
Temperature rise	4.14.1						X								4.14.2
Mechanical shock	4.19.2								X						4.19.3
Connection resistance (voltage drop)	4.8.1		X	X		X									4.8.2
Locking device strength	4.5.2		X									X		X	4.5.3
Contact retention in housing	4.7.1											X			4.7.2
Water tightness	4.9.1.1												X ^b		4.9.2.1
Insulation resistance	4.12.1				X								X ^b	X	4.12.2
High pressure water jet	4.9.1.2									X			X ^b		4.9.2.2
Insulation resistance	4.12.1											X			4.12.2
Withstand voltage	4.13.1				X					X	X				4.13.2
Rapid change of temperature	4.22.1		X												4.22.2
Salt spray	4.16.1									X					4.16.2
Flowing gas corrosion	4.24.1								X						4.24.2
Connection resistance (voltage drop)	4.8.1		X		X				X	X	X				4.8.2
Drop	4.20.1											X		X	4.20.2
Dust	4.21.1			X											4.21.2
Visual examination	4.2.1	X	X	X	X	X	X	X	X	X	X	X	X	X	4.2.2

^a See 4.1.4 and 4.1.5.

^b The subsequent test shall be performed within 1 h of the test indicated.

4.1.5 Number of test samples

Each test sample group shall contain a minimum of

- 20 test samples in the case of single-pole connectors,
- 10 test samples in the case of 2-pole connectors,
- 7 test samples in the case of 3-pole connectors, or
- 5 test samples in the case of 4-pole connectors.

Moreover, no less than 20 contacts of each type shall be tested.

Unless otherwise specified, all test samples shall be used for all tests in a test sample group.

4.1.6 Material

The test report shall provide detailed information on the material used for the connectors.

4.2 Visual examination

4.2.1 Test

Carry out a visual examination of all connectors and contacts with the naked eye, at normal strength of vision and colour perception, at the most favourable viewing distance, and with suitable illumination.

4.2.2 Requirements

Identification, appearance, workmanship and the finish of each item shall be as specified.

For crimped cable attachments, both insulation and the conductor shall be visible between the conductor crimp and the insulation support on the male and female contacts, as shown in Figure 5. Conductors shall protrude from the conductor crimp but shall not interfere with the mating part. All wire strands shall be enclosed by the conductor crimp. There shall be no damaged wire strands.

For other types of cable attachment, no visible damage is allowed.

During visual examination of the connectors, for all test sample groups, special care shall be taken to ensure, as a minimum requirement, that no cracking, discoloration, deformation or — where applicable — ingress of water is in evidence.

4.3 Connection and disconnection

4.3.1 Test

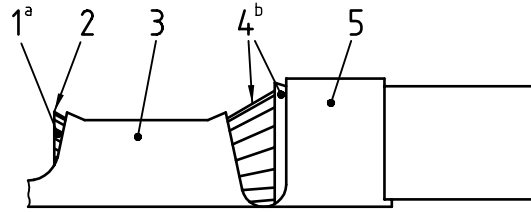
Perform connection and disconnection as specified by the connector manufacturer at a constant speed between 25 mm/min and 100 mm/min. Note the speed applied in the test report.

Subject the connector to 10 connections and disconnections. Measure the force necessary at the first connection and the first and tenth disconnection.

For positive-locking female connectors perform an eleventh cycle with the locking device engaged for the locking device strength test as in 4.5.2.2.

4.3.2 Requirement

The contacts, tested according to 4.3.1, shall conform to the requirements specified in the applicable part of ISO 8092. In the case of multi-pole connections, the connection and disconnection forces, determined in 4.3.1, shall be as in the particular specification.



Key

- 1 Conductor end
- 2 Wire strand
- 3 Conductor crimp
- 4 Conductor and insulation
- 5 Insulation support
- a Conductor end shall be visible.
- b Conductor and insulation shall be visible.

Figure 5 — Conductor crimp and insulation support

4.4 Tensile strength of conductor-to-contact attachment

4.4.1 Test

Test the tensile strength of the conductor-to-contact attachment using suitable test apparatus operated at a constant speed within the range 25 mm/min to 100 mm/min. Note the speed applied in the test report.

Attach each test sample to the corresponding cable or cables as specified by the connector manufacturer.

If the contact has a crimped cable attachment, and if the cable insulation support mechanism is mechanically ineffective, perform the test with contacts alone. When more than one cable is attached, apply the force according to Table 2 to each cable by using separate samples.

In the case of cable attachment by insulation displacement, the test may be performed with the contacts located in the housing (see annex B).

NOTE Other types of cable attachment are under consideration [for insulation displacement connections (IDC), see annex B].

4.4.2 Requirement

The tensile strength of the conductor crimp, tested according to 4.4.1, shall withstand the minimum values specified in Table 2.

4.5 Locking device strength

4.5.1 Purpose

The purpose of the test is to check the ability of locked connectors to withstand a specific static load. Connectors for single- and multi-pole connections shall be tested according to 4.5.2.1 or 4.5.2.2, as appropriate.

4.5.2 Test

4.5.2.1 For single-pole and multi-pole connectors with integral-housing locking devices and without a positive locking female contact, carry out the following test procedure.