
**Road vehicles — Multi-core connecting
cables —**

Part 4:
**Articulation test method and requirements
for coiled cable assemblies**

Véhicules routiers — Câbles de raccordement multiconducteurs —

*Partie 4: Méthode d'essai d'articulation et exigences pour les câbles spiralés
assemblés*



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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 4141 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4141-4 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 4141 consists of the following parts, under the general title *Road vehicles — Multi-core connecting cables*:

- *Part 1: Test methods and requirements for basic performance sheathed cables*
- *Part 2: Test methods and requirements for high performance sheathed cables*
- *Part 3: Construction, dimensions and marking of unshielded sheathed low-voltage cables*
- *Part 4: Articulation test method and requirements for coiled cable assemblies*

Annex A forms a normative part of this part of ISO 4141.

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Road vehicles — Multi-core connecting cables —

Part 4:

Articulation test method and requirements for coiled cable assemblies

1 Scope

This part of ISO 4141 specifies a test method and performance requirements for an articulation test of electrical coiled cable assemblies for the connection of towing and towed road vehicles equipped with nominal 12 V or 24 V systems.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 4141. 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 4141 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 1185, *Road vehicles — Electrical connections between towing and towed vehicles with 24 V systems — 7 pole connector type 24 N (normal)*

ISO 3731, *Road vehicles — Electrical connections between towing and towed vehicles with 24 V systems — 7 pole connector type 24 S (supplementary)*

ISO 4141-3, *Road vehicles — Multi-core connecting cables — Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables*

ISO 7638-1, *Road vehicles — Electrical connectors for braking systems — Part 1: Connectors for 24 V nominal supply voltage*

ISO 7638-2, *Road vehicles — Electrical connectors for braking systems — Part 2: Connectors for 12 V nominal supply voltage*

ISO 12098, *Commercial vehicles with 24 V systems — 15-pole connectors between towing vehicles and trailers — Dimensions and contact allocation*

3 Test temperature

The test shall be performed at $(23 \pm 5) ^\circ\text{C}$.

4 Tests and requirements

4.1 Articulation test

Perform this test on coiled cables according to ISO 4141-3, assembled with appropriate connectors according to ISO 1185, ISO 3731, ISO 7638-1, ISO 7638-2, or ISO 12098, together with its anti-kink protection where such protection is present.

Precondition by elongation the coiled cable assembly as delivered to its maximum admitted extension length and restore it to rest condition within 30 s max. Use axis A specified in annex A as the reference to determine the length of the unbent cable assembly.

Firmly attach the assembly by one of the end connectors and then extend it to its maximum admitted extension length and secure it.

A connector shall be articulated 90° each way in respect of the longitudinal axis of the closed coil.

The articulation cycle shall comprise the following steps performed within (3 ± 1) s (see annex A).

- a) Position 1: datum.
- b) Rotation around the axis A 180° to position 2.
- c) Rotation back to position 1 completes the cycle.

Conductor breakage shall be monitored by applying a current of $(5 \pm 0,5)$ A to all conductors and contacts fitted during the entire test phase (see Figure 1). If breakage occurs, the test procedure shall stop automatically.

If no breakage occurs, perform the withstand voltage test.

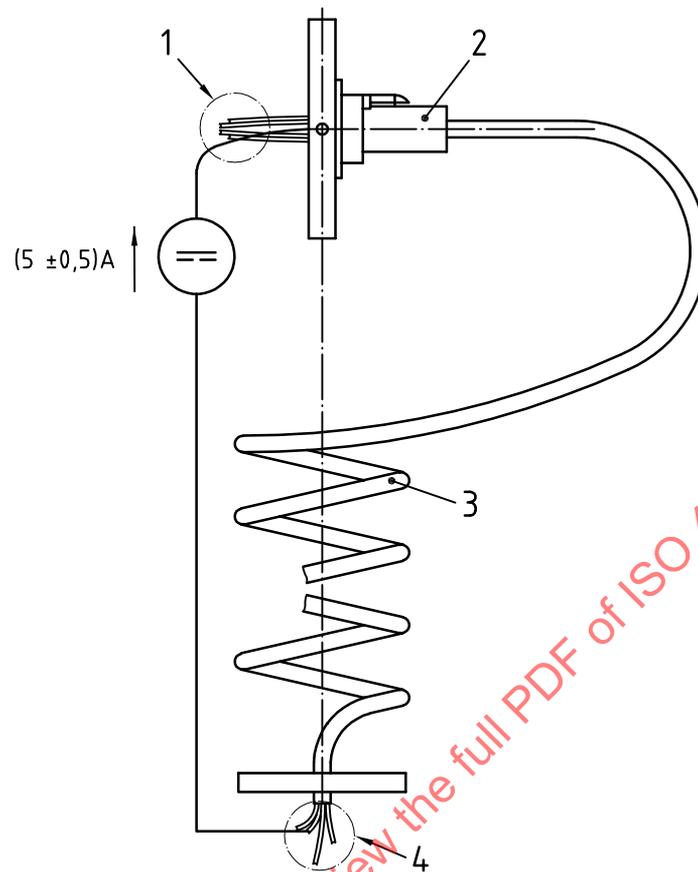
4.2 Withstand voltage test

Apply a test voltage of 1 kV r.m.s, 50 Hz or 60 Hz, or 1 600 V DC, for 1 min between each conductor and the remaining conductors connected together.

4.3 Requirements

4.3.1 The sample shall endure at least 10 000 continuous cycles and shall show no signs of cracking of the cable or displacement of the anti-kink protection, where present.

4.3.2 Breakdown shall not occur.



Key

- 1 Contacts connected in series
- 2 Connector
- 3 Coiled cable
- 4 Conductors connected in series

Figure 1 — Test arrangement

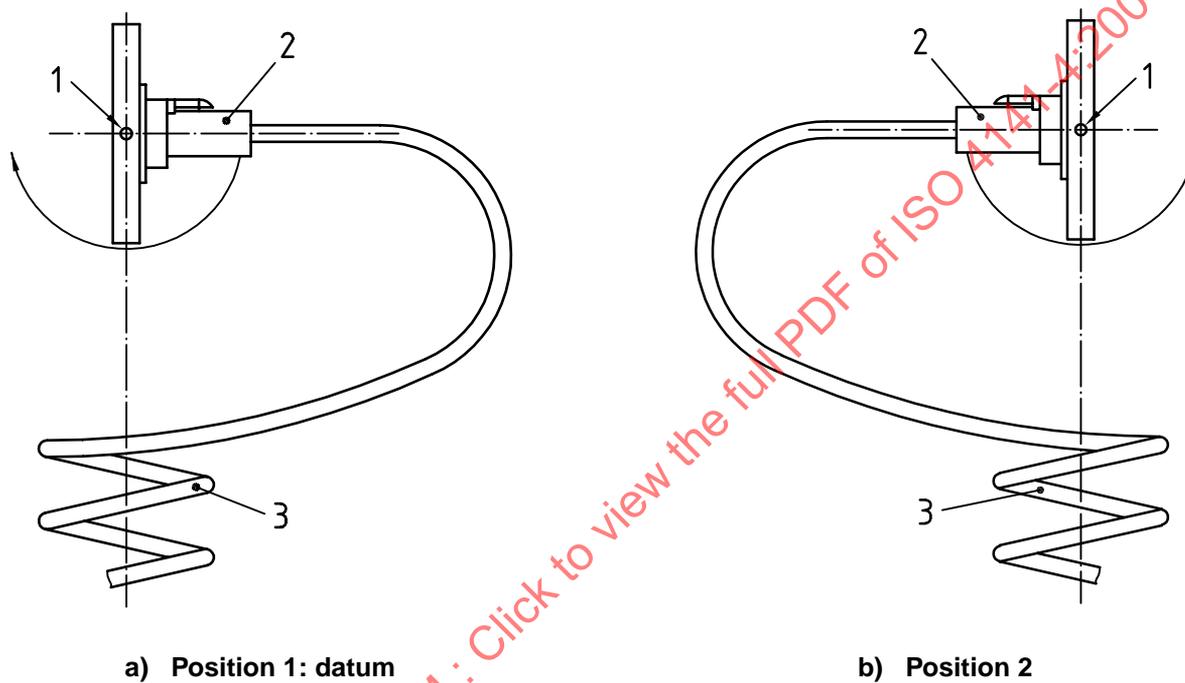
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Annex A
(normative)

Test arrangement for the articulation test

Figure A.1 shows the test arrangement and the positions of one cycle of the articulation test.

Axis A is vertical to the plane of the paper.



- Key**
- 1 Axis A
 - 2 Connector
 - 3 Coiled cable

Figure A.1 — Test arrangement — Top view