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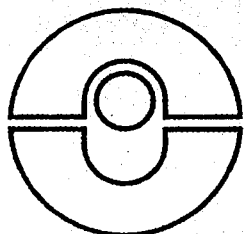
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1st edition, 1.1.96

Remote control and data cable

**Standard technical features for the
equipping of RIC coaches**



International Union of Railways

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Leaflet to be classified in volumes :

- IV - Operating
- V - Transport stock
- VII - Way and Works
- VIII - Technical specifications

Amendments

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Preliminary remarks :

Obligatory provisions are preceded by an asterisk : *

A double vertical line (||) in the margin denotes amendments made on the date shown at the foot of the page.

Enforcement of this leaflet is governed by the provisions listed under "Application" at the end of the document.

Note

This leaflet forms part of a series which also includes :

- Leaflet 440 - Loudspeaker systems in RIC coaches.
- Leaflet 555 - Electric lighting in passenger rolling stock.
- Leaflet 556 - Data transmission in the train (train bus).
- Leaflet 560 - Doors, entrance platforms, windows, steps, handles and handrails of coaches and luggage vans.
- Leaflet 568 - Loudspeaker and telephone systems in RIC coaches.
- Leaflet 648 - Connections for electric cables and air pipes on headstocks of motive power units.
- Leaflet 751-3 - Regulations for international ground-to-train radio systems.
- Leaflet 895 - Technical specification for the supply of insulated electric cables for railway vehicles.

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Plate 7.3 : 18-pin connector

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***1 - General**

1.1 - These provisions specify the characteristics to be met by remote control and data cables in RIC passenger coaches.

These provisions also apply to installation in traction units.

1.2 - The remote control and data cable is comprised of the following elements:

- flexible cables, connected to 18-pin couplers, together with 18-pin coupler sockets at each end wall,
- multi-pin connection points inside the coach in the end wall area,
- a multi-core transit cable inside the coach between the connection points in the end wall area,
- a double-conductor screened cable, with redundant capacity, between the connection points in the end wall area and the connections of the data communication system,
- connection lines from the connection points in the end wall area to the control box and to the public address system in accordance with UIC Leaflet 568.

1.3 - The cable has the following functions

1.3.1 - The function, assignment and numbering of the individual conductors are set out in Plate 1.

1.3.2 - Two quads serve for signal transmission and remote control for the public address system and voice communication between the traction unit and the coaches (Leaflet 568).

1.3.3 - One quad serves for remote control of the lighting and remote closing of the doors (Leaflets 555 and 560).

1.3.4 - Three conductors provide for central door locking and feedback from closed doors (Leaflet 560, under revision).

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1.3.5 - The double-conductor screened cables are used for the transmission of binary data (in accordance with UIC Leaflet 556).

1.4 - Plate 8 shows the connection of cables, coupler fittings and connection points for the cable.

Their layout relative to the vehicle ends and sides is shown in Plate 6.

2 - Cables

*2.1 - Layout and mechanical properties of the flexible cable

*2.1.1 - The flexible cable is comprised of:

- 16 conductors, arranged as four quads
- a double-conductor screened cable
- a common screen
- a common sheath.

2.1.2 - The cross-section of each of the 16 fine-strand conductors is 1 mm^2 . The cross-section of the cores of the double-conductor screened cable is 0.75 mm^2 .

The quads are star quads, i.e. the centre-line through a pair of conductors is at all points perpendicular to the axis through the other pair, in order to reduce any interaction between them.

2.1.3 - The layout and characteristic technical parameters of the cable shall conform to Plate 2.

2.1.4 - The insulation of the conductors and of the outer sheath for the cable between coaches shall be weather-resistant, and capable of withstanding temperatures from -40°C up to $+90^\circ\text{C}$, without any significant effects on the mechanical properties of the cable.

2.1.5 - The insulation materials of the cable shall be resistant to:

- fire: testing to IEC 332-1 (1)
- ozone: testing to IEC 811-2-1 Article 8 (1)
- hydrocarbons: testing in accordance with UIC leaflet 895, clause 43.2.2 (1).

The outer sheath should also be resistant to acid (standard solution of hydrochloric acid) and basic cleaning agent (standard solution of caustic soda).

2.1.6 - The flexible cable shall be designed to withstand a tensile force of at least 1500 N.

The assembly of the cores in the quads and of the quads themselves, also of the two-conductor screened cable, should be flexible, so that cores and quads may slide longitudinally.

2.2 - Layout and mechanical properties of the transit cable

*2.2.1 - The transit cable is comprised of at least 15 fine-strand conductors, arranged as a minimum of three quads and three conductors in a common sheath with screen.

Given the design of the cable, the addition of a 16th conductor to form a fourth quad is permissible.

*2.2.2 - The cross-section of each of the conductors is 1 mm².

The quads are star quads, i.e. the centre-line through a pair of conductors is at all points perpendicular to the axis through the other pair, in order to reduce any interaction between them.

2.2.3 - An example of the layout of the cable is shown in Plate 3.

*2.2.4 - The characteristic technical parameters of the transit cable shall conform to Plate 3.

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***2.2.5 - The insulation materials of the cable shall be resistant to:**

- fire: testing to IEC 332-1 (1)
- ozone: testing to IEC 811-2-1 Article 8 (1)

***2.3 - Layout and mechanical properties of the double-conductor screened cable**

***2.3.1 - The cable is comprised of two twisted conductors, with a screen and an outer sheath. The twisting shall comprise at least 12 turns per metre.**

2.3.2 - The cross-section of each of the conductors shall be 0.75 mm².

2.3.3 - The layout and characteristic technical parameters of the cable shall conform to Plate 4.

2.3.4 - The insulation materials of the cable shall be resistant to:

- fire: testing to IEC 332-1 (1)
- ozone: testing to IEC 811-2-1 Article 8 (1)

***2.4 - Electrical properties and test conditions of the flexible cable (excluding the integrated double-conductor screened cable) and the transit cable**

2.4.1 - The common screen of the cable shall be insulated from the mass of the passenger coach.

2.4.2 - In operation, the insulation resistance of each conductor of the through cable installed in a passenger coach (from the coupler plug or coupler socket at coach end 1 to the coupler plug or coupler socket at coach end 2) shall not exceed 10 MΩ relative to other conductors and to the outer sheath. The measurement shall be made with 500 volts d.c. voltage.

2.4.3 - Dielectric testing between conductors, between conductor and screen, and between screen/outer covering/mass, shall be effected at a voltage of at least 1500 V 50 Hz for a period of 15 minutes.

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