

# Cable Monitoring Device Type 8532/8533 in acc. to VDV papers 515 10/2008

# 8532/8533 ESN

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## Description

This cable monitoring device can be used to monitor cable systems for the traction power supply of DC urban rail systems and trolleybus systems with nominal voltages up to DC 750 V (other voltages on enquiry). The cable monitoring device has been designed in accordance with VDV Recommendation 515 of 10/2008 and can be connected to all cables with concentric shield or conductor and with insulating outer sheath.

The polarity on the contact wire decides whether the design of the type 8532 xx (contact wire = +) or the design of the type 8533 xx (contact wire = -) is to be applied. Apart from this function, the two designs are identical.

The cable monitoring device can monitor the standard insulation of the insulating clearances between the conductor and the shield as well as between the shield and the earth. Moreover, it can monitor the shield for interruptions.

Different terminating resistors and connecting points make it possible to evaluate the shield interrupt signal as an "internal fault" or as an "earth fault" and to consider the increased requirements for the operating conditions, the direction of action of the alarm signals or the disconnection and loss of voltage on the feeder cables or return cables etc.

Both the current limit values and the tendencies of the current state of the insulation can be displayed via an external display unit to be mounted e.g. in the door of the switchgear cubicle (option).

One potential-free contact is available for the signal indicating a failure of the traction power (also the supply voltage). This contact is operated in accordance

with the closed-circuit principle, i.e. it is opened if there is a power failure. There is also one potential-free make contact for the signal indicating a fault between the shield and the earth. Another two separate potential-free contacts indicate a fault between the conductor and the shield and initiate a disconnection. These two contacts also allow that separate currents are switched. LEDs show that the values are below the limit values. The cable monitoring device is fitted in a plastic housing (degree of protection: IP 50) and has been prepared for fitting on mounting rails and for fastening with screws. The operating states are shown on a separate bar graph display, which is a separate device to be mounted on the front cover or the door.

There are two hidden test buttons on the device for the functional test, i.e. one for testing insulation faults between the conductor and the shield and one for testing insulation faults between the shield and the earth. Moreover, there are two hidden potentiometers on the device for adjustment of the limit values. The test buttons and potentiometers are accessible from the front.

The test device with the article number 510600 is suited for adjustment of the limit values and for testing.

The cable monitoring device of the type 8532 / 8533 fulfils all the present requirements for a cable monitoring device. Of course, our many years' of experience with the construction of cable monitoring devices has been considered fully.

## Technical data

Dimensions	W/H/D 150/70/115 mm
Degree of Protection	Housing: IP 50 / terminals: IP 10
Material	Housing: ABS / terminals: polycarbonate
Fastening	2 screws M4 or M5, or standard mounting rail acc. to EN 50022
Ambient air temper.	20°C to +60°C
Auxiliary supply	DC 18 – 110 V (via internal switched-mode power supply)
Power	Approx. 5 W (incl. display)
Fuse protection	0.5 A medium time lag (external)
Traction supply	Positive potential on contact line
Un DC 500-900 V	<input checked="" type="checkbox"/> 8532 -- Negative potential on contact line <input checked="" type="checkbox"/> 8533 --
Shield voltage	Approx. 40 V (at DC 750 V)
Switching points	Adjustable insulation defect
Conductor-shield insul.	ca. 350–1500 kΩ (I) (fact.set 1000 kΩ)
Shield-earth insulation	ca. 10–300 kΩ (E) (fact. set 100 kΩ)
Switch-on delay	Auxiliary supply approx. 10s Traction supply approx. 2s
Threshold delay	»conductor-shield« fault approx. 2s »shield-earth« fault approx. 15s
Test buttons	1 for »conductor-shield fault and 1 for »shield-earth« fault
Outputs	1 potential-free make contact for operation = closed circuit working 1 for earth fault = open-circuit working 2 for internal fault = open-circuit working
Circuit	AC 11 acc. VDE 660 part 2
Voltage	Max. DC 120 V / AC 250 V
Current	Max. 5 A at AC 230 V
Power	Max. 120 W / 1250 VA
Designs	Without shield interruption signal type 853- 00 With shield interruption signal (»conductor-shield« fault) 853- 10 With shield interruption signal (»shield-earth« fault) 853- 20
Displays fitted	Via LEDs Yellow: operation Red: »conductor – shield« fault or »shield – earth« fault Bar graph display for current insulation state and set limit value (tendency display) for »conductor – shield« fault or »shield – earth« fault (Article No. 510400)
External Display	
Dimensions (of external display)	W/H/D 97/97/6 + 60 mm mounted on front cover, cubicle door etc.; cutout 92x92 mm
Connection	7-core cable (auxiliary voltage potential, separated galvanically from the traction power)
Terminating resistor	see data sheet type 853196
Test device for setting and testing	Article No. 510600

## Ordering Information

Type	Order No.
8532 00	510200
8532 10	510201
8532 20	510202
8533 00	510300
8533 10	510301
8533 20	510302

8532/8533

Function

Resistors are switched in parallel to achieve the required low resistance (defined conditions of the measuring voltage, insensitivity against charging and charge reversal as well as other interferences) for the insulation clearance to be monitored, i.e. "conductor – shield" and "shield – earth", respectively. However, these resistors are still so high-resistance that they limit the measuring current through the shield (in the "monitoring for shield interruption" operation mode) to under 1 mA and the nominal shield voltage to approx. 40 V. The states of the insulation or alterations of the insulation are evaluated in accordance with the principle of measuring the voltage towards the earth (bridge principle). The voltage on the shield is tapped as high-resistance voltage and led to evaluation via optical fibres.

The evaluation itself is the classic evaluation as it has always been performed by our reliable cable monitoring devices, which have been on the market for years.

Moreover, the voltage state on the shield and the set level at the switching point for the set insulation limit value are made available for a bar graph display, which is to be connected externally.

Due to the optical distance between the set limit value and the current insulation value

fast information about the current state can be delivered.

Two designs of the cable monitoring device are available for the monitoring of the shield for interruption.

For the standard method a terminating resistor of 68 kOhm is fitted at the end of the cable. However, the disadvantage of this design is the direction of action. An interruption of the shield is an "internal fault" and therefore leads to disconnection of the cable. If the earth reference point of this terminating resistor is at the end of the cable out on the field, the adjustable sensitivity for the "conductor – shield" monitoring is limited as the voltage drop has to be added to the shield voltage when the return cable is loaded and as the response threshold of the "internal fault" may not be lower than this load-dependent voltage rise because a spurious disconnection would be the result otherwise.

This disadvantage is overcome by means of a design with a terminating resistor of 1.12 MOhm between the conductor and the shield. In this design the direction of action of the shield interruption only leads to an "earth fault" signal, the load-dependent voltage variations do not affect the sensitivity setting of the "internal fault".

Pointers

No dangerous touch voltages arise when the cable monitoring device is connected to the shield. The touch voltages within the setting ranges are under the voltages and times required in VDE 0141. However, it should be born in mind that the power-limiting effect of the cable monitoring device might nevertheless be eluded in case of an insulation defect between the conductor and the shield. The terminating resistors, which are available as accessories, also consider these conditions. These terminating resistors have been fitted in suitable housings for easy mounting (see data sheet 8531 96).

It is recommended to use disconnect terminals to protect the cable monitoring device against too high voltage by the cable tests.

If the cable has been disconnected by the cable monitoring device because it has been triggered, a section testing device, if fitted, has to be jumpered.

Special versions, mounting plates, special housings, display housings etc. on request.

