Cable Monitoring Device
Type 8532/8533 in acc. to VDV papers 515 4/93

8532/8533 ESN

Description

The cable monitoring device is suitable for monitoring cable systems for supplying the traction current to direct current railways and O-buses with rated voltages of up to 750 V (other voltages on request). The cable monitoring device is designed according to VDV papers 515, issue 4/93 and can be connected to all cables with concentric shield respectively conductor and insulating outer sheath.

Depending on the polarity of the contact line, version 8532... (for contact line +) or version 8533.. (for contact line -) is used. (The function of the two versions is otherwise identical).

The cable monitoring device allows for both standard insulation monitoring of the insulation systems "conductor-shield" (I) and "shield-earth" (E), and the additional monitoring of the shield for interruption.

Various different terminating resistors and connection points make it possible to evaluate the shield interruption message as "internal fault" or "earth fault" so that the system can be adjusted to take account of increased demands when it comes to operating conditions, direction in which the alarm is given or triggered, consideration of voltage losses on feed or return cables, etc.

An external display unit, which can be mounted for example in the door of the switchgear unit, shows both the current limit values and the trends of the current insulation status (option).

A potential-free contact is available for the message "traction voltage fault" (also voltage supply fault). This contact is operated in the idle current principle so that the contact opens in the event of voltage fault. A potential-free closing contact is available for the short-circuit message "shield-earth" (E). Two separate potential-free contacts are available for signalising and switching off in the event of a short circuit "conductor-shield" (I), which also allow for separate voltages to be switched. LEDs indicate when the values fall below the limit levels. The cable monitoring device is accommodated in a plastic protective housing, protection mode IP 50, and prepared both for mounting on support rails and for fastening with screws. Additional display of the operating statuses as bargraph display is possible by means of a separate unit for installing on front panels or doors.

The unit has two concealed test buttons for function testing which verify the insulation defect "conductor-shield" and "shield-earth"; it also has two concealed potentiometers for adjusting the limit values. The test buttons and potentiometers are both accessible from the front.

Test unit, part no. 510600 is available for adjusting the limit values or for test purposes.

The cable monitoring device, type 8532/8533 fulfils all current requirements made of a cable monitoring unit and takes particular consideration of the many years of

Technical Data

Dimensions	W/H/D 145/70/112 mm
Housing Protection	Housing: IP 50 / terminals: IP 10
Material	Housing: ABS / terminals: polycarbonate
Fastening	2 screws M4 or M5, or standard support rail DIN EN 50022
Ambient temp.	20°C to +60°C
Auxiliary voltage	DC 24 – 60 V (via internal switching-mode power supply)
Power consumption	approx. 5 W (incl. display)
Fuses	0.5 A medium-slow acting (external)
Traction voltage Un DC 500-900 V	Positive potential at contact line → **8532 --** Negative potential at contact line → **8533 --**
Power consumption	approx. 1 W
Fuse	approx. 35 mA medium-slow acting (external)
Shield voltage	approx. 40 V (at DC 750 V)
Switching points	adjustable insulation defects
Conductor-shield	350 – 1500 k (I)
Shield-earth	10 – 400 k (E)
Switching on delay	auxiliary voltage approx. 10 s traction voltage approx. 2 s
Response delay	„I" internal fault approx. 2 s, „E" earth fault approx. 15 s
Test buttons	separate for „I" internal fault and „E" earth fault
Outputs	1 potential-free closing contact each operation = idle current operation earth fault = working current mode 2 separate potential-free closing contacts internal fault = working current mode
Switching	AC 11 as per VDE 660 T2
Voltage	max. DC 120 V / AC 250 V
Current	max. 5 A at AC 230 V
Power	max. 120 W / 1250 VA
Version	without shield interruption monitoring → 853**- 00** with shield interruption monitoring (as "I" internal fault) 853**- 10** with shield interruption monitoring (as "E" earth fault) 853**- 20**
Displays (integrated)	by means of LEDs „operation" 0 yellow, „I and E fault" = red
(external)	bargraph display for current insulation status and adjusted limit value (trend display) one each for „I and E fault" **part no.: 510400**
Dimensions (ext. display)	W/H/D 97/97/6 + 60 mm (for mounting in front panel, cabinet door, etc.; cut-out 92x92 mm)
Connection	7-wire lead (auxiliary voltage potential, galvanically separated from the railway voltage)
Accessories	Terminating resistor see leaflet 853196 Test unit for adjusting and testing **part no. 510600**

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

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experience gained by our company in the construction of cable monitoring units.

Function

Resistances for the monitored insulation lines „conductor-shield“ and „shield-earth“ are switched in parallel in order to achieve the necessary low ohm properties (defined measuring voltage conditions, insensitive to charging and recharging and other forms of interference). These resistances are however high-ohmic enough to limit the measuring current through the shield (in operating mode „monitoring for shield interruption“) to less than 1 mA and the rated shield voltage to approx. 40 V. The evaluation of the insulation conditions or their change takes place according to the principle of measuring the voltage against earth (bridge principle). The voltage at the shield is taken in high-ohm form and fed to the evaluation unit by optical fibres.

The evaluation itself is of a classical nature, as performed for years by our company's commercially available, tried and tested cable monitoring units.

In addition, the voltage condition at the shield and the adjusted level at the switching point for the corresponding set insulation limit value are made available for an externally connected bargraph display.
The advantage of this is that rapid information about the current condition is available from the optical difference between the adjusted limit value and the current insulation value.

Two versions are available for monitoring the shield for interruptions.

The standard method, which has a terminating resistor of 68 kOhm attached to the end of the cable. The disadvantage of this method is the direction in which it works. The interruption of the shield is synonymous with „inner short circuit“ and thus causes shut-down of the cable.

If the earth reference point of this terminal resistance at the end of the cable is in a remote location outside, then the possible adjustment sensitivity for monitoring „conductor-shield“ is limited, as in addition the voltage loss for a corresponding load on the return cable must be added to the shield voltage, and the response threshold „internal fault“ may not be below this load-dependent increase in voltage, as this otherwise results in a fault shut-down.

The operating mode terminating resistor 1.12 Mohm between conductor and shield rectifies these disadvantages. The great advantage is that the direction in which the „shield interruption“ works only results in the message „earth fault“, and that load-dependent fluctuations in voltage have no effect on the sensitivity setting „internal fault“.

Note

No dangerous contact voltages arise when connecting up the cable monitoring device to the shield. The contact voltages are within the adjustment range of the voltages and times required as per VDE 0141. However, it should be noted that regardless of this, in the case of insulation defects „conductor-shield“, the wattage-limiting effect of the cable monitoring device may under certain circumstances be bypassed. The terminal resistances supplied as standard also take this problem into account. These terminating resistors are available in suitable housings (leaflet 853196) for easier mounting.

In order to protect the cable monitoring device from extreme voltage when testing the cable, the use of disconnect terminals is recommended.

When the cable is shutdown by the cable monitoring device after this has been triggered, a possibly installed line testing device may possibly have to be bridged.