

Manufactured by:



# Fault - Circuit Indicator for Overhead Lines Navigator - LM



- Load-dependent self-adjustment
- Visible LED-indication
- Automatic battery control
- Automatic Reset

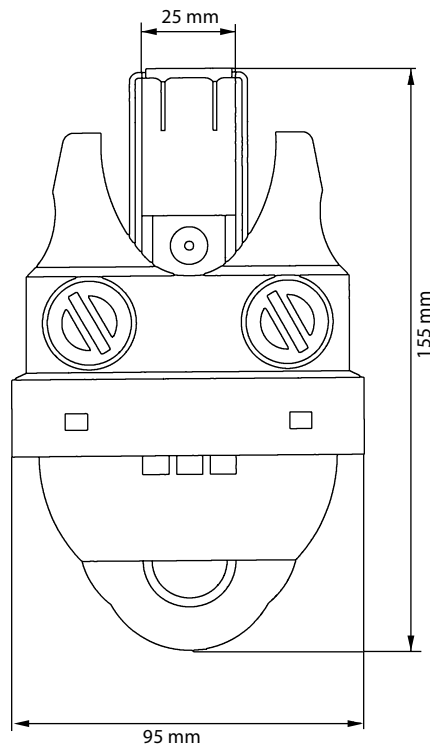
## Description

The Navigator-LM Short-Circuit Indicator is an electronic device which is designed for medium-voltage utility overhead lines. It consists of a housing made from black UV-stable polyamide material with a stainless steel clamping mechanism, a transparent cap, a display unit with light emitting diodes, and an electronic circuit. The Short-Circuit Indicator is powered by replaceable long-life lithium batteries which have a life expectancy of 15-20 years. The display unit is provided with an integrated battery control. When the battery capacity decreases from a total indicating time of 400 hours to a residual time of 50 hours, the indicator will signal this condition via a flashing yellow indicator light for up to 6 months. The Short-Circuit Indicator is installed on and removed from overhead lines with a hot stick. The display unit provides excellent visibility from all sides.

## Function

The Navigator -LM is provided with a load-dependent-self-adjustment of the trip current, i.e. the indicator continuously samples the load current on the overhead line and electronically sets a corresponding trip point for a fault according to the load current. The maximum load current is kept in a 72 hour high load memory so that the indicator is most favourably adapted to the network to be monitored even if low load is present.

The Navigator-LM allows for differentiating between two subsequent short-circuit detections. The detection of the first short-circuit results in an equally flashing LED, whereas upon detecting a second short-circuit (e.g. after ARC) the LED is switched to double flashing.



## Special features of different types

### Navigator-LM Version A

Indication by 6 high intensity LEDs. Automatic reset either by return of current or after passage of a preset time whichever occurs first, or manual reset.

### Navigator-LM Version B

Indication by 6 high intensity LEDs. Automatic reset after passage of a preset time, or manual reset.

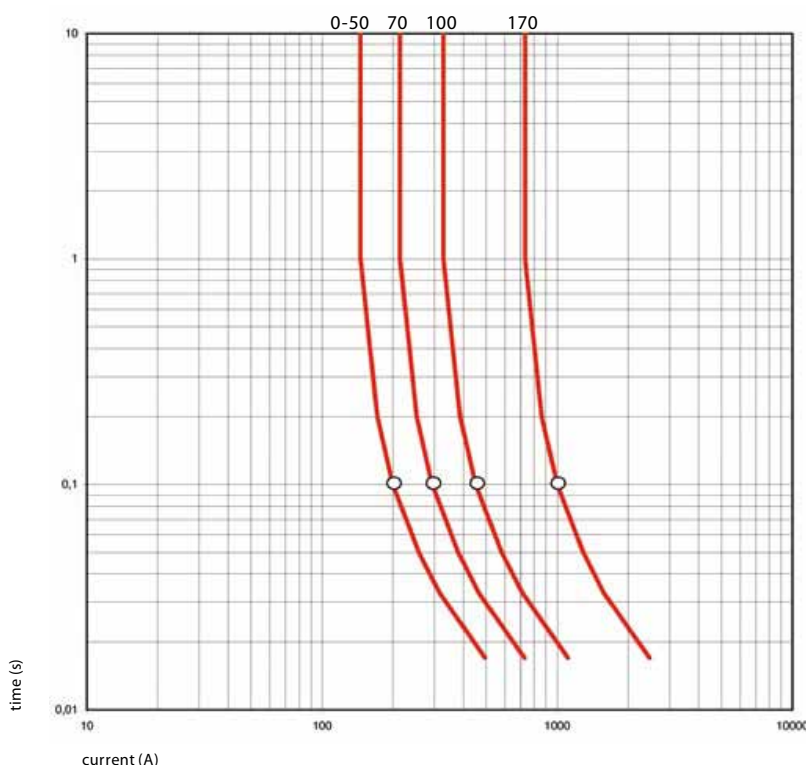
### Navigator-LM Version C

Indication by 4 red LEDs and 2 high intensity yellow LEDs. Automatic reset of the red LEDs either by return of current or after passage of a preset time or manual reset. Automatic reset of the yellow LEDs exclusively after passing of a preset time or manual reset.

### Navigator-LM Version E

The indicator samples the line current and the line voltage. Activation of indication is enabled under the condition that the line has been under voltage for at least 60 seconds. Reset 60 sec. after voltage recovery, after passage of the preset time or manual reset. Thus, high inrush currents, even after reclosure, are blocked for indication.

## Time / current characteristic Navigator LM



Load current [A]	0 - 50	70	100	170
Trip current [A] / 100 ms	200	294	450	1000

		A	B	C	E
Trip Current, self-adjustment depending on load current	≥ 200 A/ 100 ms (see current/time characteristic)	•	•	•	•
Temperature range	-30 °C to +70°C (ANSI standard testing - 40°C to +85 °C)	•	•	•	•
Accuracy	± 10% @ 20° C	•	•	•	•
Load tracking	Load current ≥ 50 A	•	•	•	•
Trip factor	4-6 times the load current (see current/time characteristic)	•	•	•	•
Adjusting delay	≥50 sec. load current flow period	•	•	•	•
Load memory for self-adjustment	72 hours	•	•	•	•
Indication	4 red LEDs (>5000 mcd respectively 7000 mCd each)	•	•	•	•
	2 yellow LEDs	•	•	•	•
Resetting	Resetting by return of current >3 A load current	•		•	
	Automatic reset by time, after passage of 4 hours ±10% (optional 2 or 8 hours)	•	•	•	•
	Reset after restoration of voltage, line voltage, ≥5 kV				•
	Manual reset	•	•	•	•
Flashing frequency	30 per minute	•	•	•	•
Total Indicating Time	> 400 hours	•	•	•	•
Power supply	2 lithium battery packs replaceable, shelf life > 15 years	•	•	•	•
Battery Check	One yellow LED, flashing frequency: 6 per minute	•	•	•	•
Maximum Operating Voltage	≤ 46 kV / 60 Hz	•	•	•	•
Current withstand	25 kA / 200 ms	•	•	•	•
No influence to indicator by adjacent cables due to immunity	Horizontal conductor distance >250 mm	•	•	•	•
Cable Diameter range	8-29 mm	•	•	•	•
Housing Material	UV-stable polycarbonate / polyamide	•	•	•	•
Clamping mechanism	Stainless steel	•	•	•	•
Function Test/ reset	By means of a permanent magnet	•	•	•	•
Visibility	>50 m at daytime, > 150 m at night / 360 degree visibility	•	•	•	•
Weight	470 g	•	•	•	•
Degree of protection	IP 68	•	•	•	•

Navigator- PM without self-adjustment and with fixed trip current (e.g. 800 A/100 ms) ex factory after consultation available.

## Short-Circuit Indicator for Overhead Lines Navigator-LM Radio

- Radio Transmitter
- Control LED

The Navigator-LM Radio Short-Circuit Indicator for overhead lines is used for the detection and remote indication of short-circuits in medium-voltage overhead lines.

The Navigator-LM Radio works always in combination with a radio receiver which is mounted on the overhead line pole. Once a short-circuit has been detected, the Navigator emits a signal to the radio receiver via an incorporated transmitter. The radio signals are evaluated by the receiver and the resultant status including battery control is provided to the output contacts. Four different code configurations – A, B, C and D – can be adjusted. Permanent or momentary contact, battery monitoring as well as coding of the group message can be adjusted on the receiver.

Technical Data	
Trip Current	100 A / 100 ms (without load tracking)
Accuracy	±10% @ 20°C, ±20% @ -20°C to +70°C
Load tracking	Load ≥30 A
Trip factor / trip delay	4 times the load / delay ≥ 50 s, level memory ≥72 h
Current resetting / Time resetting	≈ 3 A / 4 h ±20%
Indication / flashing frequency	Red LED flashes every 2 s on excitation
Battery control	Yellow LED flashes every 10 s upon reaching 500 h active time
Function test	By means of a magnet that must be applied along the SET / RESET point
Total indicating time (flashing time)	> 700 hours
Power supply	2 replaceable lithium battery packs, approx. 15 years shelf life
High-voltage / frequency	≤ 46 kV / 50 Hz
Current withstand / Immunity against external field influence	25 kA effective @ 200 ms / 22 cm @ 10 kA
Cable diameter	8 – 29 mm
Temperature range	-30°C to +75°C
Housing / installation	UV-stable polycarbonate / hot-stick application
Weight	480 g
Clamping mechanism	Stainless steel
<b>Radio transmission</b>	Integrated antenna
Frequency / capacity / Modulation / transmission	869,850 MHz ±25 kHz / 1 mW / FM/ periodically every 1 to 1.6 s for 100 ms
Transmission range / Compatibility	>30 m / EN 300 220-3, EN 301489-3 (EMV)
Coding	A, B, C and D, each with excitation and battery control

Associated facility	
28-7000-007	Radio Receiver with 6 relay outputs



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