

TAKING CARE OF YOUR POWER

HOLEC 

**SHORT-CIRCUIT INDICATOR
MAGNEFIX**



• SELF-RESETTING

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INTRODUCTION

HOLEC - HOLLAND N.V.

A safe and reliable distribution of electricity; that is what Holec Holland N.V. is aiming at, being one of the largest Dutch manufacturers of systems and components for electrical power engineering. Holec develops, manufactures and supplies complete systems and switching components for the distribution of electrical energy in the area of medium and low voltage. Furthermore, products and services of Holec can be applied in distribution stations for medium voltage, in residential and utility installations and in light and heavy industrial applications.

Resulting from their specializations, Holec Holland N.V. consists of the subsidiaries: Holec Middenspanning B.V., Holec Laagspanning B.V. and Holec Algemene Toelevering B.V.. They all work on their own national and international markets. Besides, Holec companies are active in Belgium, Germany, Great Britain, Denmark, Finland, Sweden and Australia. Other countries are being marketed by local representatives with support of Holec product specialists.

Holec Middenspanning B.V.

Holec Middenspanning is specialized in switchgear installations and components for applications in distribution networks (main and substations, transformer stations) and industrial applications. The switchgear systems are air or epoxyresin insulated and are mainly provided with circuitbreakers on the basis of Holec vacuum interrupters. Holec Middenspanning thus offers an extensive range in switchgear systems and equipment, with which a safe and reliable distribution of electrical energy is guaranteed.



Magnefix MF switchcap with self-resetting short-circuit indicator

INTRODUCTION

SHORT-CIRCUIT INDICATORS

Short-circuit indicators are instruments which are tripped by the magnetic field of a conductor through which current is flowing and indicate that this has occurred.

By using short-circuit indicators, the time taken to locate faults in medium voltage networks is greatly reduced. They can be fitted to Magnefix types MD4 and MF switchboards or busbar systems.

When the current at which the indicator is set is exceeded, an orange flag appears in the window.

The direction of the short-circuit current between the supply source and the spot where the fault has occurred is indicated by tripped short-circuit indicators.

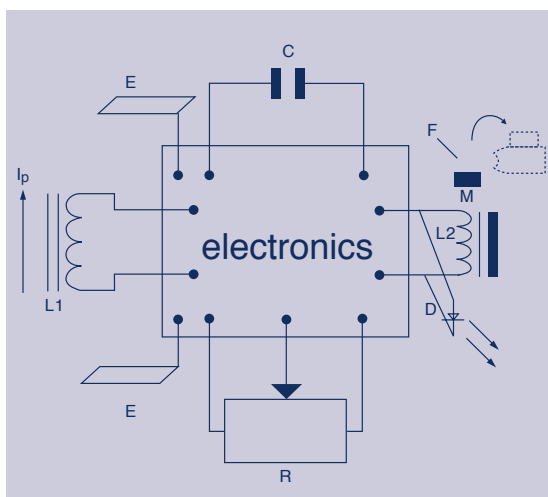
The fault itself is located between the last indicator that has tripped and the first that has not.



THE PRODUCT

Characteristics short-circuit indicator

- self-resetting
- very small
- easy to install
- hermetically sealed
- is not affected by switching operations
- can withstand test voltages
- can withstand currents up to 50 kA peak
- self resetting after switching on inrush currents
- contains no battery
- very good visible indications
- setting currents for MD4: 250-1500 A
- setting currents for MF: 200-1500 A
- maintenance free



Principal diagram of electronic indicator

- IP = primary current
- E = electrodes for the supply
- C = capacitor for energy storage
- L1 = detection coil for the primary current
- R = potentiometer to adjust the setting point
- L2 = polarisable magnet with coil
- F = flap with small magnet M
- D = LED indicator

THE PRODUCT

SHORT-CIRCUIT INDICATOR

The indicator is designed for application in Magnefix installations and is suitable for detecting currents of 200 up to 1500 A.

The indicator has no battery, but uses the energy of the electrical field around the Magnefix switchcap. It will automatically reset after a fault has been cleared and after the system voltage has returned.

Application of self-resetting indicators will also avoid errors in interpreting signs of new faults (when an indicator has been forgotten to be reset by hand). The indicator is filled with elastic rubber and hermetically sealed thus making it insensitive to dust and moisture.

If an installation is in normal operation, both electrodes are in an electrical field. One electrode is located on the bottom and one electrode at the top of the indicator. Between both electrodes is a voltage difference. This voltage is enough to load a capacitor and supply the electronic circuit. The detection coil L1 is on the bottom of the indicator as near as possible to the main conductor. The detection coil is only used for detecting the current through the main conductor. With a 20-turn potentiometer the setting point can be precisely adjusted.

The heart of the indicator is a magnetic polarisable metal bar of special composition that has been specially treated. This metal has permanent magnetic properties so that the direction of the magnetic pole can be changed by magnetising the metal in opposite directions. This metal has therefore two stable magnetic conditions. During normal operation the coil L2 is continually magnetizing the metal bar by pulses of the electronic circuit, so that the indication stays black.

If the current exceeds the set value, the electronic circuit will produce a pulse with opposite polarity a light-emitting diode gives a bright flash and the magnetic direction will also be turned. If this happens the movable flap with the permanent magnet will also turn and the fluorescent orange side of the flap will be visible.

The only moving part of the indicator is the signalflap with small permanent magnet. To protect this flap from dust and moisture it is housed in a completely closed chamber with a transparent window.

After clearing the fault the voltage of the system will return and in 2 to 5 minutes the indicator will reset itself.



Self-resetting short-circuit indicator

THE PRODUCT

Transformer inrush currents

When a distribution transformer is switched on, high inrush current peaks can occur. It is certainly possible that the magnitudes of these inrush currents are far higher than the setting of the indicator. If this is the case, the indicator will trip and the orange flag will appear in the window. After the switching-on phenomena have disappeared, a normal load current will start to flow again. A stable situation will then prevail and the medium voltage switchboard will be energized by the mains voltage. Due to the presence of the latter, the indicator will automatically reload and after a short period, the orange flag will disappear.

Overload currents

If in the network an overload current occurs that is higher than the set value, the indicator will operate. If the overload current in question is not tripped by another protection device, the normal mains voltage will continue to be present. Consequently, after a certain time, the orange flag will disappear again. If at that moment the overload currents are still flowing, the orange flag will re-appear. This process will repeat itself until the current drops below the set values of the indicator.

Earth fault currents

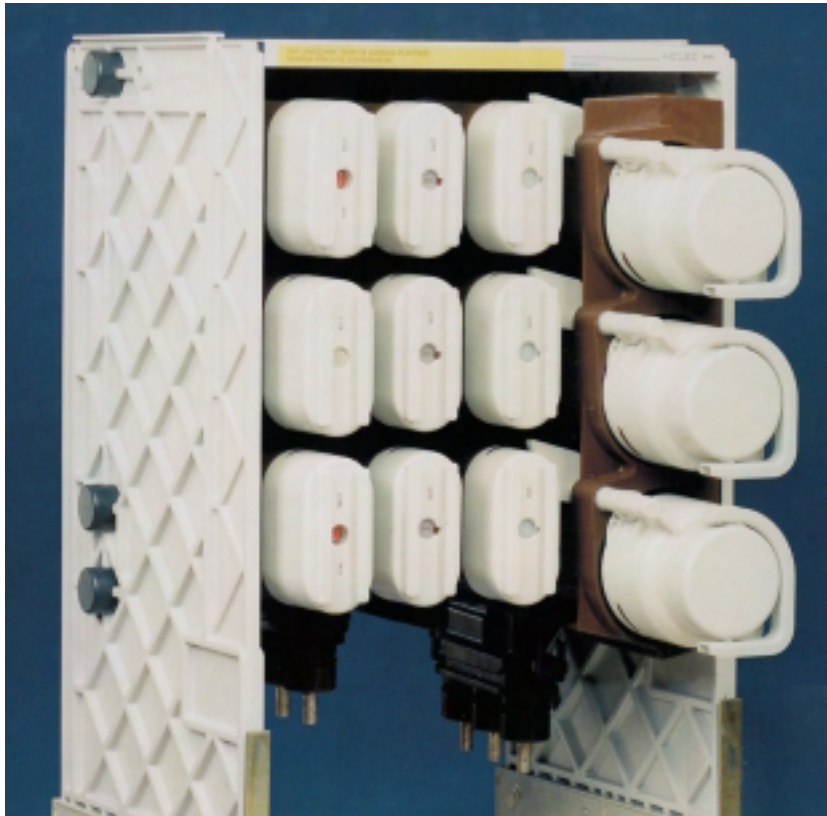
If earth fault currents occur that are higher than the set values of the indicator, and these currents are not tripped by other protection devices, the indicator will act in exactly the same manner as when overload currents occur. If the earth fault in the mean time has been tripped and, as a consequence, the mains voltage disappears, the indicator will continue to register this situation until the mains voltage returns.

Short-circuit currents

If a short-circuit current exceeds the set value, the indicator will trip. Under normal circumstances, the short-circuit current will be interrupted. The mains voltage will also disappear and the indicator's orange flag will continue to show until the mains voltage returns. After the mains voltage has returned, the indicator will automatically reload and, after a certain time, be reset.

TECHNICAL DATA:

- setting current MD4:
250-450-500-650-800-1000-1500 A
- setting current MF:
200-450-500-650-800-1000-1500 A
- tolerances: 10 %
- reset time: 2-5 minutes
- ambient temperature: -5 till 80 °C



Magnefix MD4 ring main unit

THE APPLICATION

APPLICATION

The application is Magnefix MD4 up to 12 kV and Magnefix MF up to 15 kV. Existing switchcaps with normal short-circuits indicators can also easily be adapted. This can be done by the client and takes only a few minutes per switchcap.

Replacing normal indicators with self-resetting indicators is only possible with pressure gelled switchcaps. For Magnefix type MD4 supplied in and after 1978 and for MF on switchcaps supplied in and after 1984.

The indicators can also be applied in 12-24 kV busbar systems or on cables. However, it is necessary that the busbar or cable are surrounded by an electrical field, because the energy this field possesses actuated the indicator.

The indicator can be mounted to the busbar or cable by means of a clamp that has been special developed for this purpose.

By placing an adapter in front of the screen with the LED behind it, a fibre optic catches the flash of light. This flash is transported by the fibre to an intelligent modem, that automatically connects up to a centrally placed computer when a status input is changed. In the central computer all the alarms are filed in a database program. If the modem cannot communicate (for instance if the line is occupied), it automatically tries again after a user defined delay time. It is also possible to switch remotely (from the central computer) the 2 output contacts of the modem in the RMU cabinet.

This also enables remote control of switchgear to be incorporated.

This system is called Antara RS.



Diagram Antara RS

HOLEC HOLLAND N.V.

- medium voltage switchgear systems and components
- low voltage switchgear systems and components
- general supplies

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