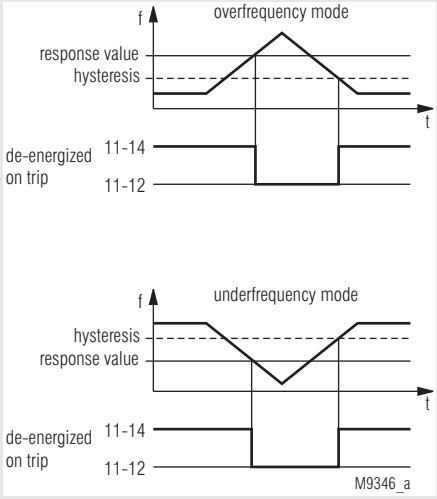
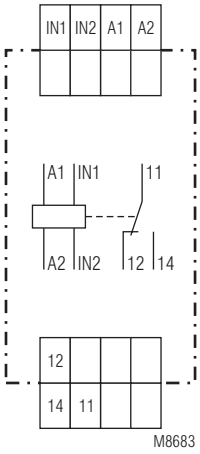
# VARIMETER
# Frequency Relay
# IL 9837, SL 9837

0265347


## Function Diagram




## Circuit Diagram




IL 9837, SL 9837

- According to IEC/EN 60 255-1
- Overfrequency or underfrequency monitoring of AC voltages
- Adjustable response value $f_{min.}$ or $f_{max}$ 5 ... 200 Hz or 15 ... 600 Hz
- Adjustable hysteresis
- Large voltage range of the measuring input (nominal voltage AC 24 ... 440 V)
- De-energized on trip
- LED indication for auxiliary voltage, measuring voltage and contact position
- 1 changeover contact
- As option for frequency inverters with a range of 1 … 300 Hz
- 2 changeover contacts available on request
- As option adjustable start-up delay available
- Energized on trip function available on request
- Devices available in 2 enclosure versions:
  IL 9837: depth 58 mm, with terminals at the bottom for installation systems and industrial distribution systems according to DIN 43 880
  SL 9837: depth 98 mm, with terminals at the top for cabinets with mounting plate and cable duct
- 35 mm width

## Approvals and Markings

A025518

* only for IL 9837

## Application

- Frequency monitoring of A.C. voltages
- Monitoring of the rotor frequency of slipring motors
- Control / monitoring of drives in crane systems
- Frequency monitoring in frequency inverters (IL 9837.11/500)

## Function

The frequency to be monitored is applied to measuring input IN1-IN2. The measuring circuit is electrically separated from the auxiliary voltage input A1-A2, to which the supply voltage of the frequency relay is connected.

The measured frequency is compared to a response value to be set at the unit.

In overfrequency mode, the output relay switches into alarm position when the preset response value is exceeded. When the system frequency once more falls below the response value minus the preset hysteresis, the output relay will switch back into normal position.

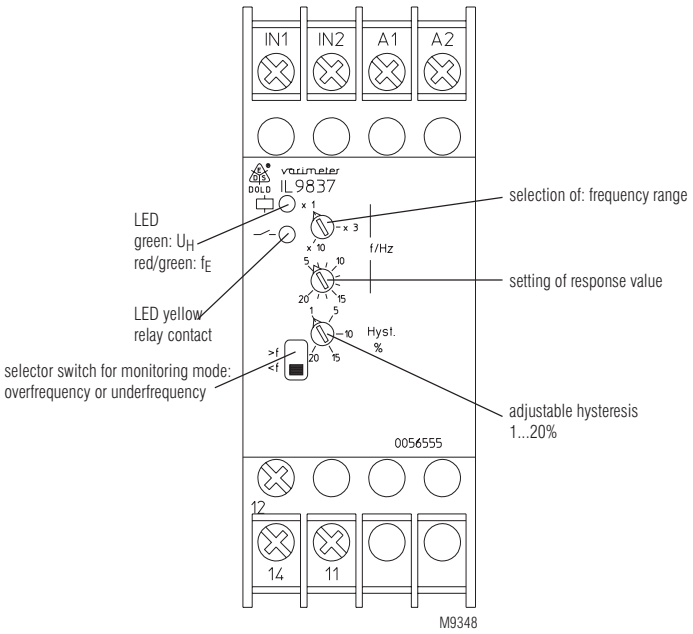
In underfrequency mode, the output relay switches into alarm position when the actual value falls below the preset response value. When the system frequency once more exceeds the response value plus hysteresis, the output relay will switch back into normal position.

If de-energized on trip is selected, the output relay is energized (11-14 closed) in normal status.
If energized on trip is selected, the output relay is energized (11-14 closed) in alarm status.

## Indicators

| | |
|---|---|
| Upper LED: | green light is permanently on, when only the auxiliary voltage has been applied to A1-A2, |
| | green-red alternating light, when measuring frequency has also been |
| applied | to IN1-IN2 |
| Yellow LED: | is on, when the output relay is energized (contacts 11-14 closed) |

## Setting




## Notes

Monitoring mode underfrequency or overfrequency
The mode can be selected by means of the slide switch at the front of the unit. The operating mode de-energized or energized on trip as well as the response value do not change.

Setting of the hysteresis
With input frequencies < 15 Hz (4 Hz with variant IL 9837.11/500), the hysteresis should not be set to minimum values to avoid cycling of the output relay.

In the “underfrequency” monitoring mode (“< f”), with input frequencies close to the end of the respective range, hysteresis can only be set to a maximum of 4 … 10% for proper resetting; this is due to reasons of the switching operation. If applicable, select the next higher frequency range.

Variant IL 9837.11/500 for frequency inverter
This variant can be used with frequency inverter to monitor the frequency of 1 … 300 Hz generated by the frequency inverter. It has a specifically dimensioned measuring input with low pass character to suppress the cycle frequency of the inverter. Simultaneously, the input sensitivity is adjusted to the voltage/frequency characteristic of the inverter.

## Technical Data

**Measuring Circuit**

| | |
|---|---|
| **Measuring input:** | IN1-IN2 |
| **Nominal voltage $U_N$:** | AC 24 ... 440 V |
| **Voltage range:** | 0.8 ... 1.1 $U_N$ |
| **Input resistance:** | approx. 1 MΩ |
| **Frequency range:** | 5 ... 20 Hz, 15 ... 60 Hz, 50 ... 200 Hz or 15 ... 60 Hz, 45 ... 180 Hz, 150 ... 600 Hz selected with rotary switch |
| **Response value** | |
| infinitely adjustable: | 1 : 4 in each frequency range |
| **Hysteresis** | |
| infinitely adjustable: | 1 ... 20 % of the set response value |
| **Measuring input:** | IL 9837.11/500 |
| **Max. input voltage:** | AC 500 V |
| **Min. measuring voltage:** | approx. AC 10 V with 1 Hz … AC 220 V with 300 Hz, see diagramm M8681 |
| **Input resistance:** | approx. 700 kΩ |
| **Frequency range:** | 1 ... 10 Hz, 5 ... 50 Hz, 30 ... 300 Hz selected with rotary switch |
| **Response value** | |
| infinitely adjustable: | 1 : 10 in each frequency range |
| **Hysteresis** | |
| infinitely adjustable: | 1 ... 20 % of the set response value |

## Technical Data

**Auxiliary Circuit**

| | |
|---|---|
| **Nominal voltage $U_H$:** | AC 24, 42, 115, 127, 230, 240, 400 V<br>DC 12, 24, 48 V |
| **Voltage range** | |
| AC: | 0.8 ... 1.1 $U_H$ |
| DC: | 0.9 ... 1.25 $U_H$ |
| **Nominal consumption** | |
| AC: | approx. 1.5 VA |
| DC: | approx. 1 Watt |
| **Frequency range** | |
| AC: | 45 ... 400 Hz |

**Output**

| | | |
|---|---|---|
| **Contacts:** | 1 changeover contact | |
| **Thermal current $I_{th}$:** | 4 A | |
| **Switching capacity** | | |
| to AC 15 | | |
| NO contact: | 3 A / AC 230 V | IEC/EN 60 947-5-1 |
| NC contact: | 1 A / AC 230 V | IEC/EN 60 947-5-1 |
| to DC 13: | | |
| NO contact: | 1 A / DC 24 V | IEC/EN 60 947-5-1 |
| NC contact: | 1 A / DC 24 V | IEC/EN 60 947-5-1 |
| **Contact life:** | | |
| to AC 15 at 1 A, AC 230V: | 1.5 x $10^5$ switch. cycles | IEC/EN 60 947-5-1 |
| **Short circuit strenght** | | |
| **max. fuse rating:** | 4 A gL | IEC/EN 60 947-5-1 |
| **Mechanical life:** | ≥ 30 x $10^6$ switching cycles | |

**General Data**

| | | |
|---|---|---|
| **Nominal operation:** | Continous | |
| **Temperature range:** | - 20 ... + 60°C | |
| **Clearance and creepage distances** | | |
| Rated rated impulse voltage voltage / | | |
| Pollution degree: | 4 kV / 2 | |
| **EMC** | | |
| Electrostatic discharge (ESD): | 8 kV (air) | IEC/EN 61 000-4-2 |
| Fast transients: | 2 kV | IEC/EN 61 000-4-4 |
| Surge | | |
| between | | |
| supply lines: | 1 kV | IEC/EN 61 000-4-5 |
| HF voltage driven: | 10 V | IEC/EN 61 000-4-5 |
| Interference suppression: | Limit value class B | EN 55 011 |
| **Degree of protection** | | |
| Housing: | IP 40 | IEC/EN 60 529 |
| Terminals: | IP 20 | IEC/EN 60 529 |
| **Housing:** | Thermoplast with V0 behavior according to UL Subject 94 | |
| **Vibration resistance:** | Amplitude 0.35 mm Frequency 10 ... 55 Hz | IEC/EN 60 068-2-6 |
| **Climate resistance:** | 20 / 060 / 04 | IEC/EN 60 068-1 |
| **Terminal designation:** | DIN EN 50 005 | |
| **Wire connection:** | 2 x 2.5 mm² massive, or 2 x 1.5 mm² stranded wire ferruled DIN 46 228-1/-2/-3 | |
| **Wire fixing:** | Screw terminals with self-lifting clamping piece | IEC/EN 60 999-1 |
| **Mounting:** | DIN rail | IEC/EN 60 715 |
| **Net weight** | | |
| IL 9837: | approx. 137 g | |
| SL 9837: | approx. 164 g | |

**Dimensions**

| | |
|---|---|
| **Width x height x depth** | |
| IL 9837: | 35 x 90 x 59 mm |
| SL 9837: | 35 x 90 x 98 mm |

## CCC-Data for IL 9837

**Thermal current $I_{th}$:** 4 A

**Switching capacity**

| | | |
|---|---|---|
| to AC 15: | 5 A / AC 230 V | IEC/EN 60 947-5-1 |
| to DC 13: | 2 A / DC 24 V | IEC/EN 60 947-5-1 |

**Technical data that is not stated in the CCC-Data, can be found in the technical data section.**

## Standard Type

IL 9837.11 5 ... 200 Hz $U_n$ AC 230 V Hyst. 1 ... 20 %

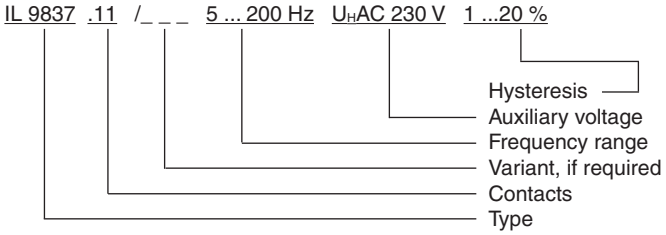
Article number: 0056555

- De-energized on trip
- Selection of overvoltage or undervoltage
- Selectable frequency range: 5 ... 20 Hz, 15 ... 60 Hz, 50 ... 200 Hz
- Response value:Infinitely adjustable 1:4
- Auxiliary voltage $U_H$: AC 230 V
- Hysteresis: 1 ... 20 % adjustable
- Output contact: 1 changeover contact
- Width: 35 mm

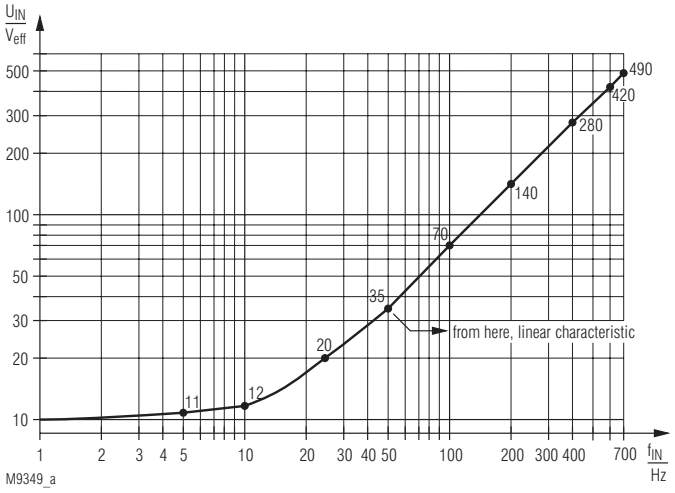
## Varianten

| | |
|---|---|
| IL 9837.11/500: | Input designed for frequency inverters<br>Selection of overfrequency or underfrequency<br>Selectable frequency range<br>1 ... 10 Hz, 5 ... 50 Hz, 30 ... 300 Hz<br>Response value infinitely adjustable 1:10<br>Auxiliary voltage $U_H$ AC 230 V<br>De-energized on trip<br>Output contact 1 changeover contact |
| IL 9837.11/_ _4: | with adjustable start-up delay<br>0.1 ... 20 s |

**Ordering example for variants**




## Characteristic




Typical input sensitivity of the measuring input with variant IL 9837.11/500

## Connection Example