Installation / Monitoring Technique

VARIMETER
Frequency Relay
IL 9837, SL 9837

DOLD ®

IL 9837   SL 9837
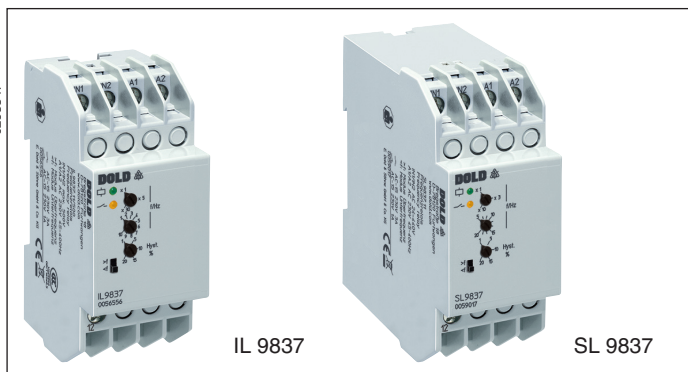
- According to IEC/EN 60255-1
- Overfrequency or underfrequency monitoring of AC voltages
- Adjustable response value $f_{min.}$ or f_{max} 5 ... 200 Hz or 15 ... 600 Hz
- Adjustable hysteresis
- Large voltage range of the measuring input (nominal voltage AC 24 ... 440 V)
- De-energized on trip
- LED 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 43880
  SL 9837:   Depth 98 mm, with terminals at the top for cabinets with mounting plate and cable duct
- 35 mm width

Product Description

The frequency relay IL 9837, SL 9837 can be used to monitor the frequency of AC voltage systems, rotor frequency of slip ring motors, control/monitoring of motors on cranes, monitoring the output frequency of inverters (IL9837.11/500).

Function Diagram
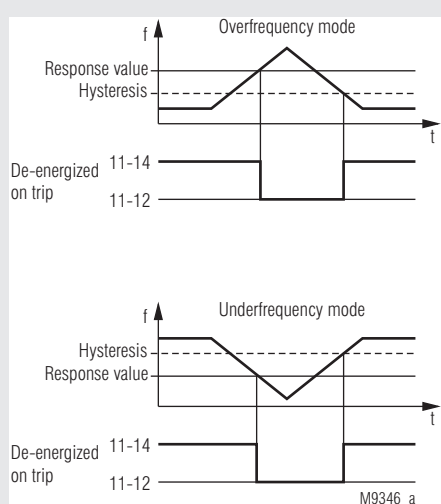
Approvals and Markings

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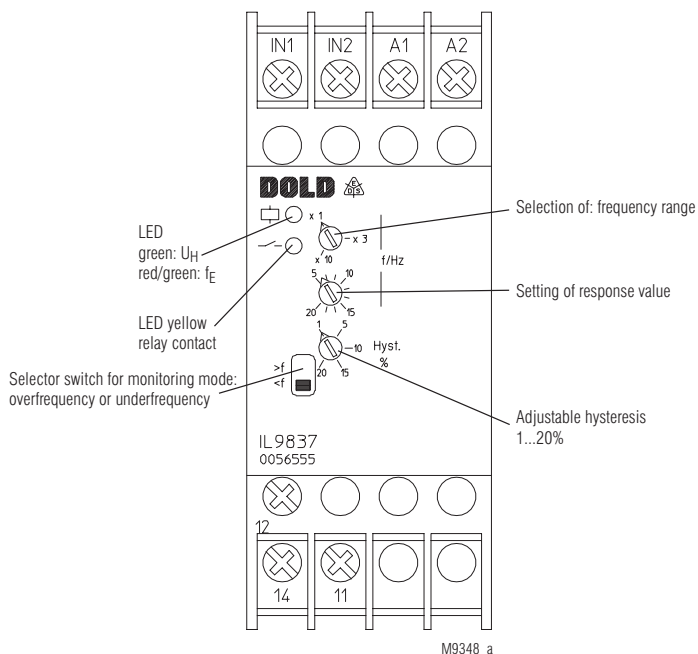If energized on trip is selected, the output relay is energized (11-14 closed) in alarm status.

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Circuit Diagram
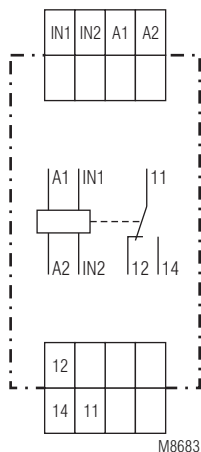
IL 9837, SL 9837

Connection Terminals

Terminal designation	Signal description
A1, A2	Supply voltage
IN1, IN2	Measuring input
11, 12, 14	Changeover contact

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

LED green: U_H
red/green: f_E

LED yellow relay contact

Selector switch for monitoring mode: overfrequency or underfrequency

Selection of: frequency range

Setting of response value

Adjustable hysteresis 1...20%

IL 9837
0056555

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

Auxiliary Circuit

Nominal voltage U_H:	AC 24, 42, 115, 127, 230, 240, 400 V 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 W

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 60947-5-1
NC contact: 1 A / AC 230 V   IEC/EN 60947-5-1
To DC 13:
NO contact: 1 A / DC 24 V   IEC/EN 60947-5-1
NC contact: 1 A / DC 24 V   IEC/EN 60947-5-1

Contact life:
To AC 15 at 1 A, AC 230V: 1.5 x 10^5 switch. cycles IEC/EN 60947-5-1

Short circuit strenght
max. fuse rating: 4 A gG / gL   IEC/EN 60947-5-1

Mechanical life: $\geq$ 30 x 10^6 switching cycles

General Data

Nominal operation:	Continous operation

Temperature range
Operation: - 20 ... + 60 °C
Storage - 25 ... + 60 °C

Altitude: $\leq$ 2000 m

Clearance and creepage distances
Rated rated impulse voltage voltage /
Pollution degree: 4 kV / 2

EMC
Electrostatic discharge (ESD): 8 kV (air)   IEC/EN 61000-4-2
HF irradiation
80 MHz ... 1 GHz: 10 V / m   IEC/EN 61000-4-3
1 GHz ... 2 GHz: 3 V / m   IEC/EN 61000-4-3
2 GHz ... 2.7 GHz: 1 V / m   IEC/EN 61000-4-3
Fast transients: 2 kV   IEC/EN 61000-4-4
Surge
Between
supply lines: 1 kV   IEC/EN 61000-4-5
HF voltage driven: 10 V   IEC/EN 61000-4-5
Interference suppression: Limit value class B   EN 55011

Technical Data

Degree of protection
Housing: IP 40   IEC/EN 60529
Terminals: IP 20   IEC/EN 60529

Housing:	Thermoplast with V0 behavior according to UL Subject 94
Vibration resistance:	Amplitude 0.35 mm Frequency 10 ... 55 Hz IEC/EN 60068-2-6
Climate resistance:	20 / 060 / 04 IEC/EN 60068-1
Terminal designation:	DIN EN 50005
Wire connection:	DIN 46228-1/-2/-3/-4
Cross section:	2 x 0.6 ... 2.5 mm² solid or 2 x 0.28 ... 1.5 mm² stranded wire with and without ferrules
Stripping length:	10 mm
Wire fixing:	Captive plus-minus terminal screws M3,5 self-lifting clamping piece
Fixing torque:	0.8 Nm
Mounting:	DIN rail IEC/EN 60715

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 60947-5-1
To DC 13: 2 A / DC 24 V   IEC/EN 60947-5-1

Info **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_H 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
Selection of overfrequency or underfrequency
Selectable frequency range
1 ... 10 Hz, 5 ... 50 Hz, 30 ... 300 Hz
Response value infinitely adjustable 1:10
Auxiliary voltage U_H AC 230 V
De-energized on trip
Output contact 1 changeover contact

IL 9837.11/_ _4:   With adjustable start-up delay
0.1 ... 20 s

Ordering example for variants

IL 9837 .11 /_ _ _ 5 ... 200 Hz U_H AC 230 V 1 ...20 %

- Hysteresis
- Auxiliary voltage
- Frequency range
- Variant, if required
- Contacts
- Type

Characteristic

M9349_a
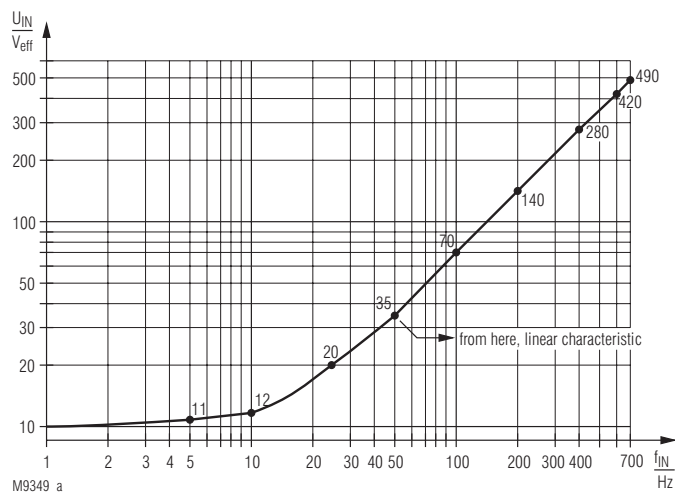
Typical input sensitivity of the measuring input
with variant IL 9837.11/500

Connection Example

M11363

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