

□ **ILT-107-V.4**

Insulation, Load and Temperature Monitoring Device



Product Information

Application

The ILT-107-V.4 is a multifunction monitoring device for insulation systems in conformity with DIN VDE 0100-710 (VDE 0100 T 710):2002-11. It is used for monitoring:

- the insulation resistance of a single- or three phase AC 230 V insulation system
- the insulation resistance of an AC 24 V insulation system (operating theatre lamps, 1 or 2 single-phase circuits)
- the load current of single- or three-phase transformers through converters (three-phase systems with optional device RCM-W8) and
- the temperature of the transformer (through a PTC or break contact)

Monitoring of all measuring lines in conformity with DIN VDE 0100-710 (VDE 0100 T 710):2002-11 (section 710.531.3.1) is ensured.

In connection with optional equipment, an IFS-710-PSG (test signal generator) and at least one IFS-710-W6 (insulation fault locator), the ILT-107-V.4 can be extended to an insulation fault locating system. In addition to insulation monitoring this also enables the localisation of the faulty outgoing circuit. The device is able to display the insulation resistance and the (fuse) designation of the faulty outgoing circuit.

The LED indicators and the fully integrated full-graphics display visualise all status and error messages. The messages are stored with the time stamp in the history. The user-friendly and intuitive menu-assisted operation enables parameterisation of the device. All set operate values and control commands are saved in a non-volatile EEPROM.

Functions

Insulation Monitoring 230 V

The device monitors and measures the insulation resistance in single- or three-phase 230 V AC insulation systems. Monitoring is realised on the basis of a patented pulse method. AC insulation systems to be monitored may also have direct-voltage components.

It automatically adapts to the various system discharge capacities (to a maximum of 5 μ F). The response values can be parameterised through the menu within specified limits (50 to 500 kOhm).

Insulation Monitoring 24 V

The device monitors and measures the insulation resistance in single-phase 24 V AC insulation systems. Monitoring is realised on the basis of a direct-voltage superposition method. It is possible to monitor one or two independent circuits.

The response values can be parameterised through the menu within specified limits (100 to 500 kOhm).

Load Current Monitoring

Load current monitoring for single-phase transformers is accomplished through a special external current transformer type ILT-W. This transformer is directly connected to the ILT-107-V.4. The transformer connection is permanently monitored. The operate values for load current monitoring are set through the menu. Recommended operate values for load current monitoring of single-phase IT systems are shown in Table 1 on page 6.

With three-phase transformers the load current is measured with the RCM-W8, which in this case, in combination with appropriate transformers, is solely used for operating current measurement. The detected current values are transmitted through the CAN-bus to the ILT-107-V.4, where they are evaluated and monitored. If the RCM-W8 is used, the corresponding data sheets (technical documentation) must be observed.

Temperature Monitoring

Temperature is measured through the PTC-thermistors or break contacts integrated in the transformer winding. Several PTC-thermistors / break contacts in series connection can be connected to the device.

Fault Signals / Communication Interface

Fault signals are submitted through both the LED display and the text display and through potential-free contacts of an integrated signal relay. They are stored in the non volatile message memory (history) with date and time.

Forwarding of current operation and error states to external peripheral device and the intrusion to the building services control system can be accomplished through the bus interface (CAN).

When using e.g. the signalling and testing combination BMTI 5, a visual and audible alarm is submitted by this device.

Connections

Connection Diagram

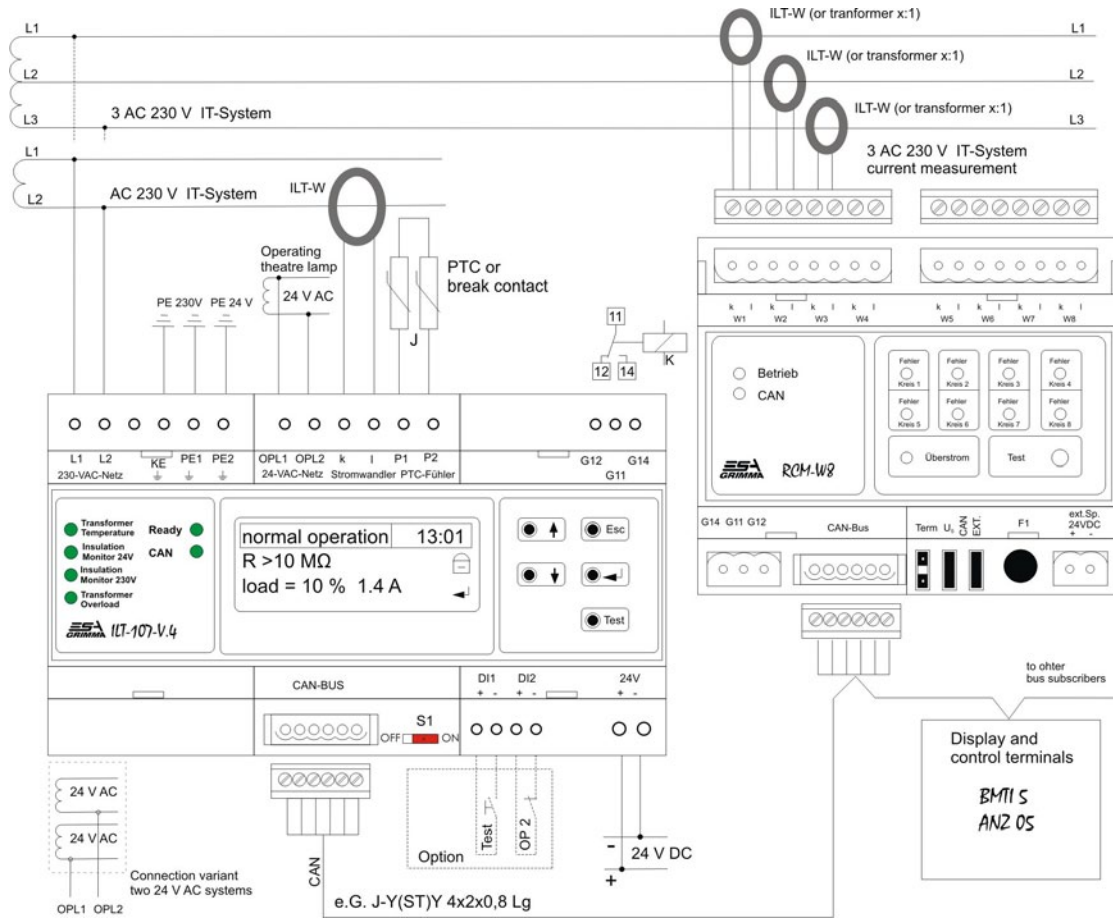


Figure 1: Connection diagram

Pin Assignment

L1	system to be monitored, AC 230 V, 50 Hz, ¹⁾		
L2	system to be monitored, AC 230 V, 50 Hz, ¹⁾		
KE	functional earthing for ISO measurement AC 230 V ¹⁾		
PE1	functional earthing for ISO measurement AC 230 V ¹⁾		
PE2	functional earthing for ISO measurement AC 24 V ¹⁾		
OPL1	system to be monitored, AC 24 V, 50 Hz, ¹⁾		
OPL2	system to be monitored, AC 24 V, 50 Hz, ¹⁾		
k / I	transformer connection ¹⁾		
P1 / P2	PTC-sensor or break contact ¹⁾		
G12	potential-free contact signal relay (fault signal)		
G11	potential-free contact signal relay (fault signal)		
G14	potential-free contact signal relay (fault signal)		
24 V +	supply voltage 24 V DC (PELV) for ILT-107-V.4		
24 V -	supply voltage 24 V DC (PELV) for ILT-107-V.4		
DI1+	digital input, optional connection of external button "ISO-Test 230 V"		
DI1-	digital input, GND		
DI2+	digital input, optional connection of insulation device, evaluation 24 V AC		
DI2-	digital input, GND		
S1	connectible bus terminating resistor, under cover		
CAN-Bus	bus interface CAN (2.0)		
	Pin 1:	24 V DC GND,	Pin 2: CAN-Low, Pin 3: Shield,
	Pin 4:	CAN-High, Pin 5: + 24 V DC,	Pin 6: Shield

¹⁾ Measuring connection is monitored for correct connection or interruption



Connections DI1 / DI2 must only be used for the connection of original accessories or connected with potential-free contacts!

Incorrect connection can cause destruction of the device!

Assembly, Connection, Start-up, Service and Tests

The device is installed inside installation distributors conforming to DIN 43871 on top-hat rails conforming to DIN EN 60715. Assembly, connection and start-up must only be performed by skilled electricians and in strict compliance with applicable safety regulations and standards.

The device automatically monitors all connected external or internal sensors and connections with respect to function or correct performance and therefore does not require regular servicing.

Detailed references for connections, start-up and tests contains the operating manual of the device.

Transformer, 1-phase in kVA	Recommended operate value when exceeding the load current limit in A
0.5	2
3.15	14
4	18
5	22
6.3	28
8	35
10	45

Table 1: Recommended values for load current monitoring

If the control command "W8S" in menu option "5.5 load-monitor:" is activated, the operate value for the load current in the three-phase IT-system can be adjusted up to 100 A.

Meaning of LED Indicators and Status of Plain Text Messages

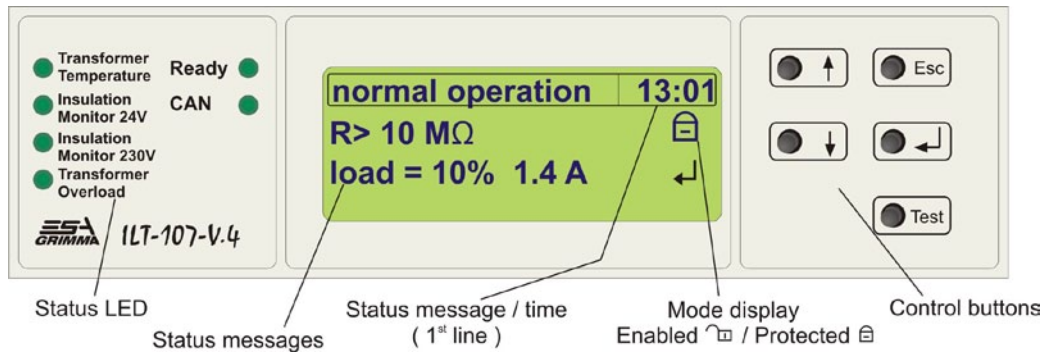


Figure 2: Front view ILT-107-V.4 in normal operation (no errors / faults present)

The text display supplies the “Basic Screen”.

⊗ “Transformer Temperature”	Temperature status of the IT system transformer		
	Green	Temperature O.K.:	< 120°C
	Yellow	Temperature too high:	> 120°C
⊗ “Insulation Monitor 24V”	Insulation monitoring 24 V AC system 1 and 2		
	Green	Insulation resistance O.K.:	> setting (R-on24)
	Yellow	Insulation resistance N.O.K.:	< setting (R-on24)
⊗ “Insulation Monitor 230V”	Insulation monitoring 230 V AC system		
	Green	Insulation resistance O.K.:	> setting (R-on230)
	Yellow	Insulation resistance N.O.K.:	< setting (R-on230)
	Red flashing	Connection fault L1 / L2 or connection fault KE / PE1	
⊗ “Transformer Overload”	Load current status of the IT system transformer		
	Green	Load current O.K.	< setting (load)
	Yellow	Load current too high	> setting (load)
	Red flashing	Connection fault current transformer or connection fault k/l	
⊗ “Ready”	Status of the ILT-107-V.4		
	Green	Normal operation	
	Yellow	Malfunction of device	
⊗ “CAN”	Status of bus connection		
	Green flashing	Bus O.K. (communication O.K.)	
	Red flashing	Bus error (address conflict)	
	off	Bus out of operation	

With the device in normal operation without any errors / faults present (Figure 2), the text display shows the “Basic Screen”. The following items are displayed:

- the status of the device with the adjusted time
- the insulation resistance of the monitored 230 V IT system
- the utilisation of the IT system transformer in percent (%)
- the load current of the IT system transformer in Ampere (A)

Errors or faults are displayed as plain text in the first line. In case of several messages appearing at the same time these will automatically be displayed alternating.

Control Buttons and Status



Button	Function
↵	Enter button in normal operation: to activate the control menu within the menu: to invoke sub-menus and menu options in parameterization mode: to accept values
↑ ↓	Up / Down buttons in normal operation: no function within the menu: to navigate through sub-menus and between menu options in parameterization mode: to set values
Esc	Escape button in normal operation: no function within the menu: to navigate back one menu level in parameterization mode: if values were changed, they are not accepted
Test	Test button in normal operation: to activate the device self-test Pressing this button for at least 2 sec. generates an internal insulation fault. This simultaneously tests the functions of the signalling LEDs, the measuring circuits themselves and the mains or PE connection. The test run of the individual monitoring functions is documented on the device. Messages are thereby submitted through the signal relay and the CAN-bus as well as saved in the history.
Status	Meaning
	is equivalent to "Protected" Values in the menu cannot be changed, but viewed only. The release (change to the parameterization mode) takes place in menu option "1.2 parameter lock".
	is equivalent to "Enabled" The parameterization mode is active. Values in the menu can be changed and saved.

Table 2: Control buttons and status

Technical Data

General operating data	
Rated voltage U_e (insulation coordination acc. to IEC 60664-1)	AC 250 V
Rated impulse withstand voltage.....	4 kV
Pollution degree	3
Supply voltage U_s	DC 24 V (PELV)
Operating range	0.85 to 1.25 x U_s
Internal consumption.....	approx. 7 W
Insulation monitoring 230 V	
System monitored	AC 120 to 265 V, 50 to 60 Hz
Operate value / hysteresis	parameterizable 50 to 500 k Ω / fixed 25 %
System discharge capacity	max. 5 μ F
Measurement recording time at 1 μ F/5 μ F	approx. 2 s / approx. 7 s
Measuring-circuit voltage / measuring-circuit current	20 V / 77 μ A
External direct current U_{fg}	max. 300 V DC
Internal resistance R_i	261 k Ω
Alarm via	plain text display / LED / signal relay / CAN-Bus
Insulation monitoring 24 V	
System monitored	AC 0 to 30 V, 50 to 60 Hz
Operate value / hysteresis	parameterizable 100 to 500 k Ω / fixed 25 %
Measuring-circuit voltage / measuring-circuit current	12 V / 54 μ A
Internal resistance R_i	222 k Ω
Alarm via	plain text display / LED / signal relay / CAN-Bus
Load current monitoring in connection with transformer ILT-W or RCM-W8 device	
Operate value / hysteresis	parameterizable 5 to 50 A (with RCM-W8: 5 to 100 A) / fixed 4 %
Alarm via	plain text display / LED / signal relay / CAN-Bus
Temperature monitoring (120°C)	
Operate value / drop-out value.....	4 k Ω / 1.5 k Ω
PTC-thermistor acc. to DIN 44081	max. 4 in line
Alarm via	plain text display / LED / signal relay / CAN-Bus
Signal relay (alarm)	
Contact elements	1 two-way contact
Rated contact voltage	AC 250 V / DC 30 V
Making capacity	AC / DC 5 A
Operating mode	parameterizable: Load or bias current
Delayed triggering (for certain alarms).....	parameterizable 0 to 10 s
Digital inputs DI1 / DI2	
Voltage (permanently applied, internally generated).....	DC 24 V
Connection only with original accessories or potential-free contacts	
History	200 data sets
Communication interface / Protocol	CAN / CAN (2.0) in compliance with ISO 11898
Electromagnetic compatibility check (EMC)	
Interference immunity factor in conformity with EN 61000-6-2: March 2000 General standard for interference immunity in industrial areas	
Emitted interference in conformity with EN 50081-1-1:	
Installation conditions	
Ambient temperature (during operation) in conformity with EN 61557-8:1997	-5 °C to +45 °C
Ambient temperature (during storage) in conformity with EN 61557-8:1997	-25 °C to +70 °C
Climatic category in conformity with IEC 721	3K5, without thawing and icing
Installation position.....	vertical
Mounting	top-hat rail in conformity with DIN EN 60715
Device dimensions in mm (H x W x D).....	90 x 160 x 73
Type of connection.....	modular terminal blocks
Connection cross-section /single-core/multi-core	0.2 to 4 mm ² /0.2 to 2.5 mm ² (AWG 24-12)
Degree of protection in conformity with DIN EN 60529 for installations / terminals.....	IP30 / IP20
Flammability class.....	UL94V-0
Weight	approx. 400 g
Order information	
ILT-107-V.4	Art.-No.: 0080010
ILT-W.....	Art.-No.: 0080037

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