TECHNICAL DATA

( )* = factory setting

Insulation co-ordination	
Rated insulation voltage (IEC 60664-1)	AC 250 V
Rated impulse voltage (IEC 60664-1)	4 kV
Overvoltage category	III
Pollution degree	2
Protective separation (reinforced insulation) between	(A1,A2)-(13,14)-(23,24)-(X1,X2,X3)
Voltage test acc. to IEC 61010-1	2.2 kV
Supply voltage	
Supply voltage range U_s	AC/DC 24…240 V
Tolerance of U_s	-20…+15 %
Frequency range of U_s	DC, 50…400 Hz[1][2]
Response values	
Insulation fault location response value ($I_{\Delta L}$)	DLD440-12(W): 2…10 mA (5 mA)*, DLD240-12(W): 0.2…1 mA (0.5 mA)*
Response uncertainty ($I_{\Delta L}$)	DLD440-12(W): ±30 %, ±2 mA[3], DLD240-12(W): ±30 %, ±0.2 mA[3]
Residual current measurement response value ($I_{\Delta n}$)	DLD440-12(W): 100 mA…10 A (10 A)*, DLD240-12(W): 100 mA…1 A (1 A)*
Response uncertainty ($I_{\Delta n}$) DLD440-12(W) / DLD240(W) (42…60 Hz)	±5 %
Response uncertainty ($I_{\Delta n}$) DLD440-12(W) (61…1000 Hz)	-20…0 %
Measuring circuit	
Nominal system voltage Un DLD440-12(W)	see test current generator (e.g. ISOM ALD495)
Nominal system voltage Un DLD240-12(W)	AC 20…276 V, DC 20…308 V
Measuring ranges	
Rated frequency range	DC, 42…1000 Hz[4]
Insulation fault location measurement range ($I_{\Delta L}$)	DLD440-12(W): 1.5…25 mA (50 mA in DC networks), DLD240-12(W): 0.15…5 mA
Residual current measurement range ($I_{\Delta n}$)	DLD440-12(W): 100mA…20 A, DLD240-12(W): 100mA…2 A
Interfaces	
Interface/protocol	RS-485/IS
Switching elements	
Switching elements	2 changeover contacts
Operating mode	N/C operation / N/O operation*
Function contacts 13,14/23,24	None, Alarm $I_{\Delta L}$, Alarm $I_{\Delta n}$, device fault, transformer connection fault, common alarm
Electrical endurance under rated operating conditions	30,000 cycles
Rated operating voltage	250 VAC
Rated operational current	7 A
Rated insulation voltage	4 kV
Max. switching capacity	300 W / 2770 VA
Max. switching voltage	30 VDC / 277 VAC
Other	
EMC	IEC 61326-2-4
Degree of protection, built-in components (DIN EN 60529)	IP40
Degree of protection, terminals (DIN EN 60529)	IP20

1) For frequencies >60 Hz, the k1…12, I1…12, M+, GND, I1 and I2 connections must be safe to touch. Min. acc. to the overvoltage category 2 (300 V).
2) Only 50/60 Hz are permitted for UL applications.
3) Impact of a residual current >100 mA results in a greater response uncertainty.
4) The $I_{\Delta n}$ function of the DLD240-12(W)… is suitable for 50/60 Hz only.

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QUICK START GUIDE EN

553159A

Insulating fault locator
DLD440-12 / DLD240-12

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⚠ DANGER

Risk of electric shock! Make sure the system is de-energized before installing the device. Otherwise there is a risk of electric shock. Furthermore, the electrical installation may be damaged and the device may be destroyed beyond repair.

Provide line protection! According to IEC 60364-4-43, a line protection shall be provided for the supply voltage.

This quick-start guide applies to the DLD440- 12, DLD440-12W, DLD240-12, DLD240-12W devices. It does not replace the operating manual.

INTENDED USE

The insulation fault locator DLD440…/DLD240... locates insulation faults in ungrounded DC, AC and three-phase supplies (IT systems).

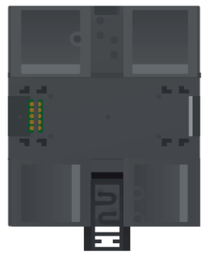
With an active test current generator (INJ), AC and three-phase networks in the range AC 0…1000 V and DC networks in the range DC 0…1500 V can, depending on the INJ type, be monitored. An AC residual current in the range 42 Hz…1 kHz, 100mA…20 A (DLD440-12(W)) or 50/60 Hz, 100 mA…2 A (DLD240...) can be displayed.

Network configuration, mains voltage, mains frequency, leakage capacitance and test current influence the responsiveness of the DLD system. Please refer to the response sensitivity curve in the manual.

DIN rail mounting

1. Fix one of the mounting clips supplied, either manually or by means of a tool, into position as shown in the illustration below.

2. Snap the DLD… device onto the DIN rail.

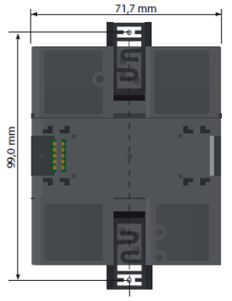


Screw mounting

1. Fix the two mounting clips supplied, either manually or by means of a tool, into position as shown in the illustration below.

2. Drill the mounting holes for the M4 thread according to the dimensioned drilling template.

Then fix the DLD… using two (2) M4 screws.



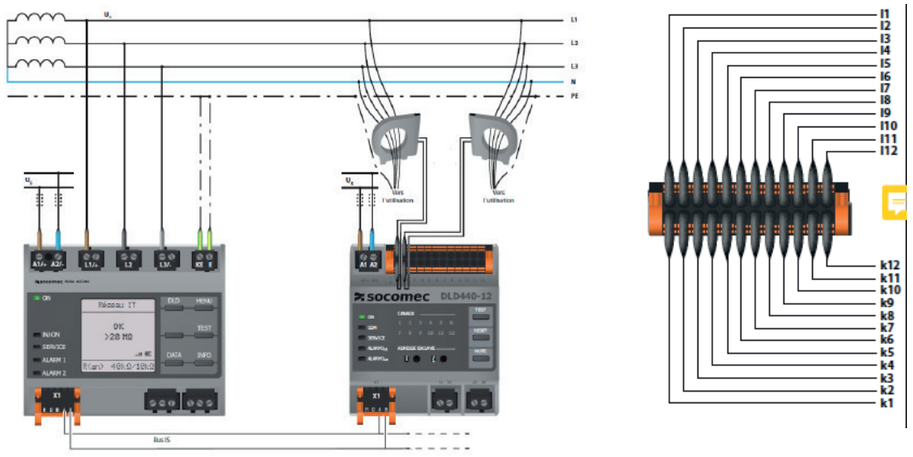
CONNECTION

Connect the device according to the wiring diagram. Also refer to the technical data. After connecting the device, install the upper and lower terminal cover.

For UL applications:
Use 60/75 °C copper wires only! For UL and CSA applications,
the supply voltage must be protected via 5 A fuses.

The maximum voltage of the monitored network must not be greater than the rated insulation voltage of all components used. Select cables and cable lengths according to the technical data.

WIRING DIAGRAM



Legend to wiring diagram

Terminal	DLD440-12/DLD240-12 connections
A1/+, A2/-	Connection to supply voltage Us
k1-12/I1-12	Measuring current transformer connection
I1, I2 (X1)	Configurable digital inputs (e.g. Test, Reset)
A, B (X1)	Serial interface RS-485 (IS bus), Input or output interface (assignment is arbitrary)
⊥ (X1)	Reference potential ground
M+ (X1)	Configurable digital current output 0 or 20 mA, e.g. for PLC current input
13-14 / 23-24	Alarm relay Different functions can be selected
R	Terminating resistor to terminate the RS-485 interface (IS bus)

COMMISSIONING OF THE DEVICE

Prior to initial commissioning

Make sure that…

- The PE line is not conducted through a measuring current tansformer.
- There are no interfering magnetic fields located near the current transformer.
- The maximum permissible cable length is in compliance to the measuring current transformers.
- The beginning and end of the IS bus is terminated, i.e. R (= ON).
- The permissible length of the IS bus line (max. 1200 m) and the number of DLD… devices in the bus system (21) is not exceeded (max. 252 measuring channels).
- An address is not assigned twice.

INITIAL COMMISSIONING

- Connect the device and the current transformer.
- Connect the devices to each other via the IS bus (DLD 440-12 and DLD 240-12).
- Switch the supply voltage on. The LED «ON» flashes during power up until the device is ready for operation.
- Set the appropriate IS bus address. DLD 440-12 and DLD 240-12: by using the DLD rotary switches. The selected channel address is indicated by a lighting LED.
- Eliminate all possible displayed insulation and device faults via the ISOM or the DLD 440-12 and DLD 240-12 RESET button.
- Ensure the DLD… is properly connected.
- A transformer connection test is carried out every 10 minutes. During each test, the «ON» LED flashes.

To commission the ISOM and the system from the DLD… and ISOM, refer to the ISOM documentation.

OPERATION

The DLD 440-12 and the DLD 240-12 are operated via the following three keys and otherwise via the ISOM.

TEST	Initiate self test
RESET	Reset fault memory
MUTE	Disable buzzer for the current alarm message

ALARM AND ITS EFFECT

General sequence of an alarm message

- The ISOM display indicates a fault and, if applicable, a measured value or channel.

DLD 440-12 and DLD 240-12 only:

- The corresponding LEDs light or flash.
- The buzzer sounds intermittently if activated.
- Assigned alarm relays will switch (DLD 440-12, DLD 240-12).
- Assigned digital outputs will switch.
- An alarm message is then sent over the IS bus (DLD 440-12 and DLD 240-12).

ALARM MESSAGES (DLD 440-12 AND DLD 240-12)

- Insulation fault: Both the LED "ALARM IΔL" (main alarm) and the measuring channel LED, corresponding to where the error was found, light.
- If the residual current threshold is exceeded: Both the LED „ALARM IΔn“ and the measuring channel LED, corresponding to where the error was found, light.
- Device fault, transformer connection fault:

The «SERVICE» LED lights. In addition, the corresponding channel LED flashes.

- Alarm messages: The channel LED of the affected measuring channel flashes.
- If several error messages are simultaneously output, individual messages can be distinguished by observing which alarm or service LED lights or flashes with which channel LED.

The audible alarm (buzzer) can be assigned the following error messages and deactivated with the MUTE button:

Alarm IΔL, Alarm IΔn, device fault, connection fault, common alarm, active insulation fault location.

RESET ALARM MESSAGES (RESET)

Requirement: The fault memory has been activated and the error is no longer active.

Execute a RESET to reset the alarms. There are 3 possibilities:

- Press the DLD 440-12 or the DLD 240-12 RESET button for at least 1s.
- Press an external reset button connected to the DLD…
- Transmit a RESET command from an ISOM over the IS bus.

Press the «ESC» button on the ISOM to exit the display of the current alarm message.