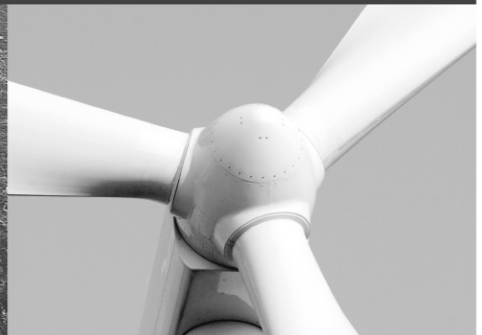




-power in control



## DATA SHEET



### Insulation monitor, ADL-111Q96

- Monitoring of insulation resistance on a DC network
- 24 V, 110 V or 220 V DC
- Accepts up to 120 $\mu$ F leakage capacitance



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**Application**

The ADL is used for supervision of the insulation resistance between an insulated voltage distribution network (IT network) and earth cable/safety cable. The instrument is applicable in conjunction with DC networks of 24 V, 110 V or 220 V DC.

This type of insulation measurement is only carried out on DC networks where both conductors are isolated from the protective earth/the hull of the ship.

The ADL can be used for marine installations and other types of insulated voltage networks, for example DC manoeuvre voltages of transformer stations.

**Measuring principle**

The insulation is monitored between the negative conductor and the safety cable.

The instrument emits alternating polarity DC voltage, and the resulting current is measured. To be able to eliminate the influence from the monitored network capacitances and DC components, the ADL performs an automatic measuring cycle that will compensate for these. Measurement time depends on the setting for  $C_e$ , higher capacity results in longer measurement time.

**Indicators**

The measuring can be monitored by looking at the indicators, *Fig 1.*

Indicator	General functionality
<b>METER</b>	Shows the measured resistance value.
<b>FAULT LED (red)</b>	Glows when the measured earth resistance is below the chosen set point.
<b>SUPERVISION LED (green)</b>	Glows when aux. power is connected and measuring is in progress. Flashes when the measuring fluctuates, and the meter will then show the last steady result.



*Fig 1.*

**Relay output**

The ADL is equipped with one change-over relay contact. By means of a built-in switch (S1), which is located under the rear cover, the relay can be configured to either

- NE (normally energised contact), recommended for alarm purposes.
- ND (normally de-energised contact), recommended for control purposes.

By default the instrument will be delivered with the relay set to NE.

**Product variants**

The ADL is available in two different versions – standard and advanced.

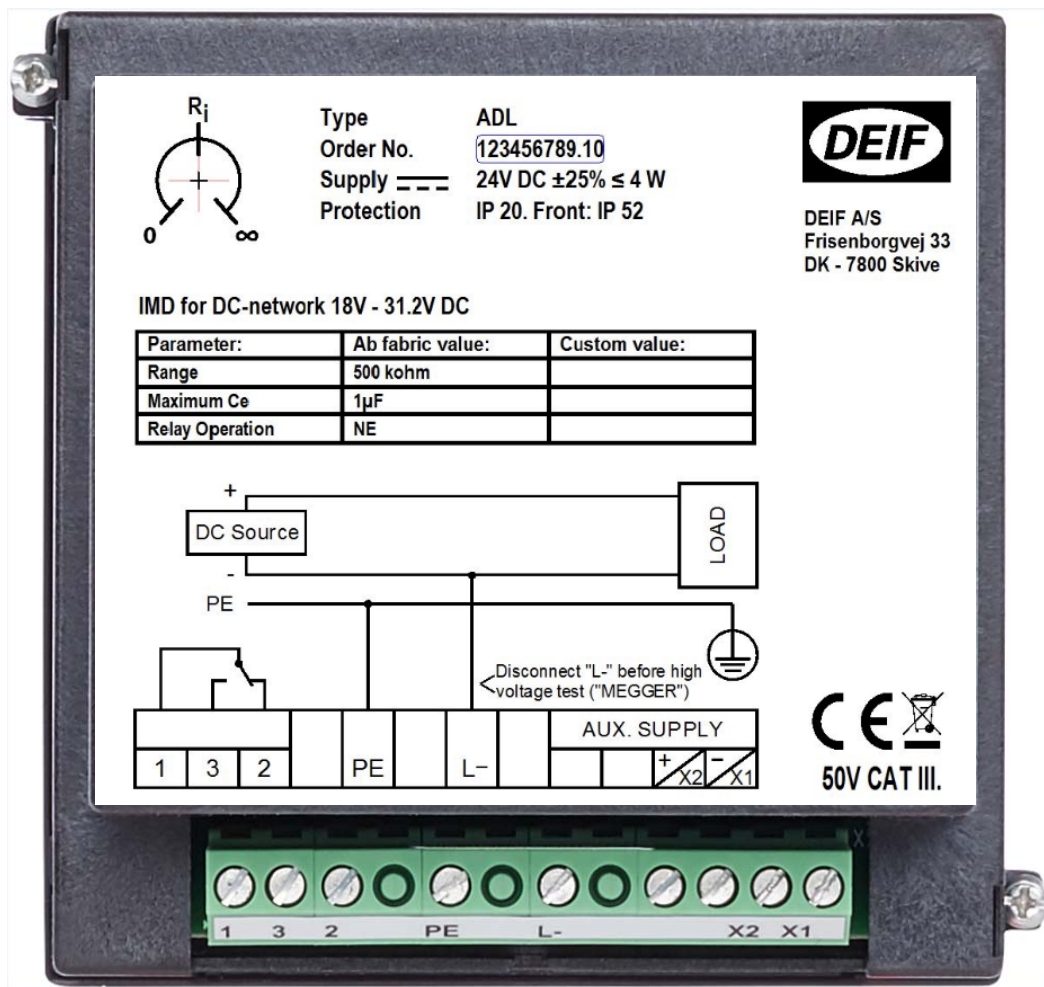
**Standard versions:**

Type	Variant no.	Network/aux. voltage	Measuring range	Note
ADL-111Q96 24 V DC	01	24 V DC	0 to 50 kΩ	≤20μF capacitance (1μF default)
ADL-111Q96 110 V DC	02	110 V DC	0 to 250 kΩ	≤20μF capacitance (1μF default)
ADL-111Q96 220 V DC	03	220 V DC	0 to 500 kΩ	≤20μF capacitance (1μF default)

- 1μF or 20μF maximum capacitance on network (user-selectable via S1 under the rear cover). See ADL Quick guide.
- Set point adjustment from ohm scale at the rear of the instrument.

**Set point**

The requested alarm limit value is set on an ohm scale at the rear of the instrument.



Advanced versions:

Type	Variant no.	Network/aux. voltage	Measuring range	Note
ADL-111Q96 24 V DC	04	24 V DC	0 to 500 kΩ	≤120μF capacitance (1μF default)
ADL-111Q96 24 V DC	05	24 V DC	0 to 1 MΩ	≤120μF capacitance (1μF default)
ADL-111Q96 24 V DC	06	24 V DC	0 to 10 MΩ	≤120μF capacitance (1μF default)

- 1μF to 120μF maximum capacitance on network (selectable via S1 under the rear cover). See ADL Quick guide.
- Set point is automatically visible on front scale during power-up and adjustment.
- Due to the low injection voltage, problems with activation of possible over-voltage protections are eliminated.

**Set point**

A new feature makes accurate setting of set point much easier. When the set point potentiometer at the rear of the instrument is turned, the product automatically goes to meter indication of set point during setting and power-up. As soon as the set point potentiometer is turned, the product enters setting mode. This is indicated by the fast flashing of the SUPERVISION LED, and by the meter pointer showing the set point setting instead of actual measurement.

When the desired set point level is reached, the product automatically returns to normal measuring mode after a few seconds, by which the SUPERVISION LED stops flashing fast, and the meter pointer returns to normal reading.

**Set point test/control**

During power-up, for a few seconds, the meter pointer shows the actual set point setting while the SUPERVISION LED is flashing fast. This function enables a test function for fast control of settings from the front of the switchboard.



Technical specifications

Standard range:

Network voltage	Range - Measurement - Scale - Set point	Product variant	Aux. voltage	Internal resistance, Ri	Injection voltage	C <sub>leakage</sub> – 1µF	C <sub>leakage</sub> – 20µF
						Response time	Response time
24 V DC	0 to 50 kΩ Scale midpoint: 1.1 kΩ	01	24 V DC +30 %/-25 %	12 kΩ	±12 V DC	1 s	4 s
110 V DC	0 to 250 kΩ Scale midpoint: 5.5 kΩ	02	110 V DC +30 %/-25 %	55 kΩ	±25.5 V DC	4 s	23 s
220 V DC	0 to 500 kΩ Scale midpoint: 11 kΩ	03	220 V DC +30 %/-25 %	110 kΩ	±25.5 V DC	5 s	46 s

Advanced range:

Network voltage	Range - Measurement - Scale - Set point	Product variant	Aux. voltage	Internal resistance, Ri	Injection voltage	C <sub>leakage</sub> – 1µF	C <sub>leakage</sub> – 50µF	C <sub>leakage</sub> – 120µF
						Response time	Response time	Response time
24 V DC	0 to 500 kΩ Scale midpoint: 11 kΩ	04	24 V DC +30 %/-25 %	11 kΩ	±5 V DC	1 s	9 s	20 s
	0 to 1 MΩ Scale midpoint: 22 kΩ	05		22 kΩ	±5 V DC	1 s	4 s	54 s
	0 to 10 MΩ Scale midpoint: 220 kΩ	06		220 kΩ	±5 V DC	4 s	165 s	396 s

General technical specifications		
<b>Meter</b>	- Accuracy	±5 % of scale length
	- Temperature drift	Max. 0.5 % of scale length per 10 °C
	- Aux. supply influence	Max. 0.2 % of scale length at U <sub>s</sub> +20 to -15 % Max. 5.0 % at scale centre at U <sub>s</sub> -15 to -20 %
	- Accuracy	±5 % of scale length for potentiometer
	- Reproduceability	
	- Hysteresis	
<b>Warning</b> (Set point/relay)  IEC 61557-8	- Temperature drift	±1 % of scale length for potentiometer
	- Voltage drift	±2 % of scale length for potentiometer
	- Relay output	Max. 0.2 % of scale length for potentiometer per 10 °C Max. 0.2 % of scale length for potentiometer at U <sub>s</sub> ±20 %
	Contact rating	Change-over contact AC1: 8 A, 250 V AC – DC1: 8 A, 24 V DC AC15: 3 A, 250 V AC – DC13: 3 A, 24 V DC Life mechanical: 2 × 10 <sup>7</sup> operations Life electrical: 1 × 10 <sup>5</sup> operations
	Relay coupling	Normally energised NE or normally de-energised ND

The ADL is CE-marked for residential, commercial and light industry plus industrial environment.	
EMC	To IEC 61000-6-1, 61000-6-2, 61000-6-3, 61000-6-4, SS4361503 (PL4), IEC 255-4 (class 3) and IEC 61326-2-4
Galvanic separation	Between aux. voltage and measuring circuit/relay output: 2200 V (max. 1.9 mA) Between measuring circuit and aux. voltage/relay output: 2200 V (max. 1.9 mA) Between relay output and measuring circuit/aux. voltage: 3250 V (max. 2.4 mA)
Temperature	-10 to 55 °C (nominal), -25 to 60 °C (operating), -25 to 65 °C (storage)
Climate	Class HUE, to DIN 40040
Protection	Front: IP52 (IP54 optional). Rear/terminals: IP20. To IEC 529 and EN 60529 With "red marker pointer" option, protection is limited to IP52
Connections	Screw terminals: 2.5 mm <sup>2</sup> (multi-stranded), 4 mm <sup>2</sup> (single-stranded)
Materials	All plastic materials are self-extinguishing to UL94 (V0)

Approvals are available on the DEIF website, [www.deif.com](http://www.deif.com) – search for ADL and find them under Documentation.



**Available variants**

Type	Variant no.	Description	Item no.	Note
ADL-111Q96 24 V DC	01	24 V DC, 0 to 50 kΩ	2911750110-01	≤20μF capacitance
ADL-111Q96 110 V DC	02	110 V DC, 0 to 250 kΩ	2911750110-02	≤20μF capacitance
ADL-111Q96 220 V DC	03	220 V DC, 0 to 500 kΩ	2911750110-03	≤20μF capacitance
ADL-111Q96 24 V DC	04	24 V DC, 0 to 500 kΩ	2911750110-04	≤120μF capacitance
ADL-111Q96 24 V DC	05	24 V DC, 0 to 1 MΩ	2911750110-05	≤120μF capacitance
ADL-111Q96 24 V DC	06	24 V DC, 0 to 10 MΩ	2911750110-06	≤120μF capacitance

**Available options**

Option	Description	Type	Note
AG glass	Anti-glare glass	Glass	
IP54	IP54 protection incl. rubber gasket	Protection	
Glass with red adjustable pointer (IP52 only)	Red pointer, individually adjustable	Indication	IP52 only

**Order specifications**

**Product variants**

Mandatory information			Additional options to a standard variant		
Item no.	Type	Variant no.	Option	Option	Option

Example:

Mandatory information			Additional options to a standard variant		
Item no.	Type	Variant no.	Option	Option	Option
2911750110-01	ADL-111Q96 24 V DC	01	AG glass	IP54	-

Due to our continuous development we reserve the right to supply equipment which may vary from the described.



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