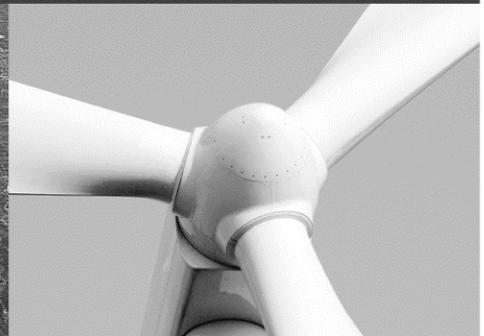




-power in control



## DATA SHEET



### Insulation monitors, AAL-2

- Warning delay and power-up delay
- Indication of set point on front
- Measuring range up to 440 V AC



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**Application**

The AAL-2 continuously monitors the insulation resistance between the connected AC network (IT network) and protective ground (PE).

Due to the warning delay functionality, the AAL-2 can be used in applications with some capacitance.

**Measuring principle**

12 V DC is superimposed on the system that is monitored, and the resulting current is measured.

**Basic operation**

The functionality of the product is to measure and monitor the insulation resistance between the network and PE.

**Functionality**

The green power indicator will be ON when auxiliary power is connected. The insulation resistance is then measured continuously and is readable on the meter.

When the measured resistance is lower than the set point, a relay is activated and the red warning indicator is ON.

When the measured resistance is higher than the set point, the relay is de-activated and the red warning indicator is turned OFF.

**Indicators**

The measuring can be monitored by looking at the indicators.

Indicator	General functionality	Remarks
<b>POWER</b>	Always <b>ON when power is connected</b>	If OFF, check power and wiring
<b>WARNING</b>	<b>OFF when measurement is higher than set point</b> - ON when measurement is lower than set point	WARNING always follows RELAY operation, within an on delay of 4 s (user-selectable 0 or 4 s)
<b>METER</b>	<b>Shows the actual measurement</b>	In case of capacitance on the network, the meter will show an insulation error until capacitance is fully charged

**Set point adjustment**

The warning set point is set on the back of the housing by means of a screwdriver.

The warning set point can then be indicated permanently on the meter by means of the adjustable red marker pointer.

**Relay output**

One change-over relay contact. By means of a built-in switch, located under the rear cover, the relay can be configured to either:

- NE (normally energised contact). Recommended for alarm purposes. In case of an auxiliary supply drop-out, the contact is activated immediately. It is recommended to supply the AAL-2 from a separate source if this type is used.
- ND (normally de-energised contact). Recommended for control purposes. Also recommended if the auxiliary supply for the AAL-2 comes from the same power system under supervision. An auxiliary supply failure will not result in an unwanted activation of the relay contact.

Advanced functionality

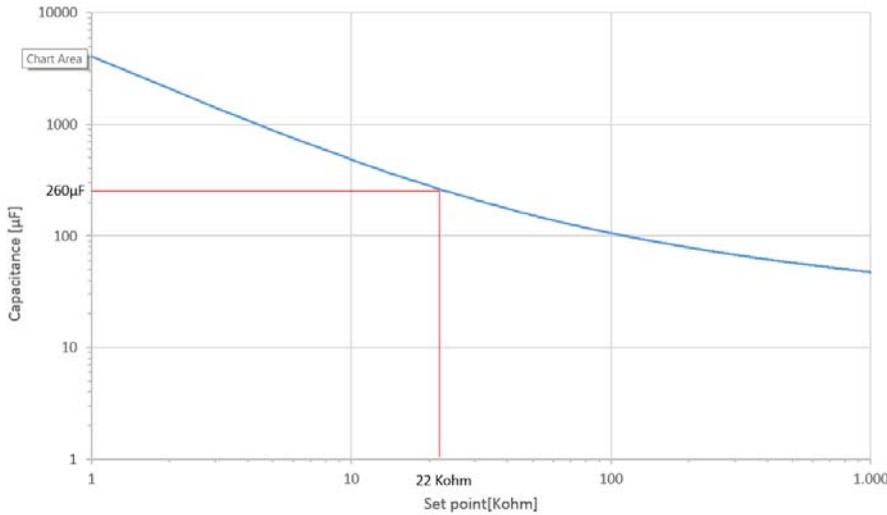
Delays

To minimise the number of unwanted warnings, delay functionalities are available in the product.

Description	Time	Remarks
Power ON delay	3 seconds	When powering up the product
Warning ON delay	0 or 4 seconds	Delay between warning indication and relay operation
Warning OFF delay	-	

By means of a jumper it is possible to select between no warning delay or 4 s warning delay.

Capacitive load on network as function of set point, 1 MΩ range

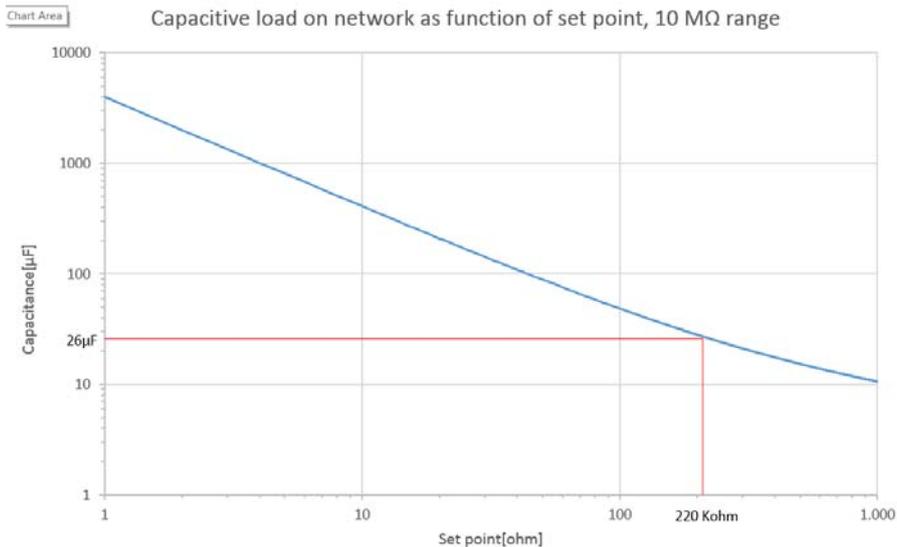


The shown 22 kΩ set point will accept capacitance up to 260 µF on 1 MΩ range, without false warning.

For higher capacitive load, the set point will have to be decreased accordingly.

If the resulting set point is unacceptably low, it is recommended to apply a Selectable Insulation Monitor (SIM).

Capacitive load on network as function of set point, 10 MΩ range



The shown 220 kΩ set point will accept capacitance up to 26 µF on 10 MΩ range, without false warning.

For higher capacitive load, the set point will have to be decreased accordingly.

If the resulting set point is unacceptably low, it is recommended to apply a Selectable Insulation Monitor (SIM).

**Standard products**

The following products are “off-the-shelf” products with very short delivery times and optimised prices.

**AAL-2, Standard 1:**

- Measuring range/scale: 10 to 0 MΩ (corresponding to 0.22 MΩ at scale centre)
- Red marker pointer
- NE relay
- Warning delay: 4 seconds

**AAL-2, Standard 2:**

- Measuring range/scale: 10 to 0 MΩ (corresponding to 0.22 MΩ at scale centre)
- Red marker pointer
- ND relay
- Warning delay: 4 seconds

**AAL-2, Standard 3:**

- Measuring range/scale: 1 to 0 MΩ (corresponding to 22 KΩ at scale centre)
- Red marker pointer
- ND relay
- Warning delay: 4 seconds

It is not possible to change the configuration of these products during ordering; use the custom product instead.

**On-site flexibility**

The product’s built-in flexibility enables the user to make some on-site configurations of the above-mentioned standards:

- Scale change
  - Scale change is possible through a sliding slot in the top of the housing
- Relay function
  - The relay contact can be changed from ND to NE by means of a jumper
- Warning delay
  - The range can be changed from 0 to 4 seconds by means of a jumper

**Custom product**

If the above-mentioned standard versions do not fulfil your needs, the product can be ordered with custom specifications. The following options are available:

- Standard or custom-designed scale/design/logo
- Red pointer marker
- Anti-glare front glass
- 0 to 10 MΩ or 0 to 1 MΩ measuring range
- NE or ND relay (can be changed on-site)
- 0 or 4 seconds warning delay (can be changed on-site)

**Test**

An instrument self-test can be carried out according to IEC 61557-8, as shown in Fig. 1 below. ¼ W resistance and switch ratings according to network voltages.

**Connections**

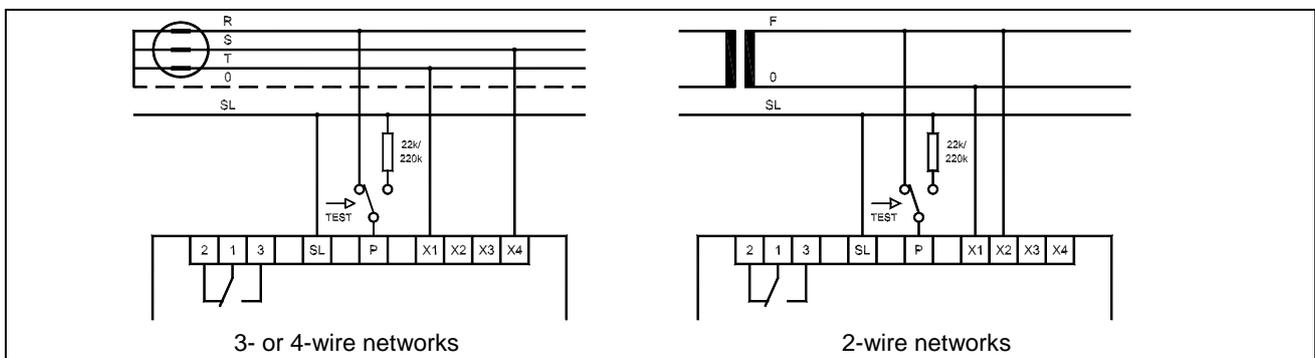
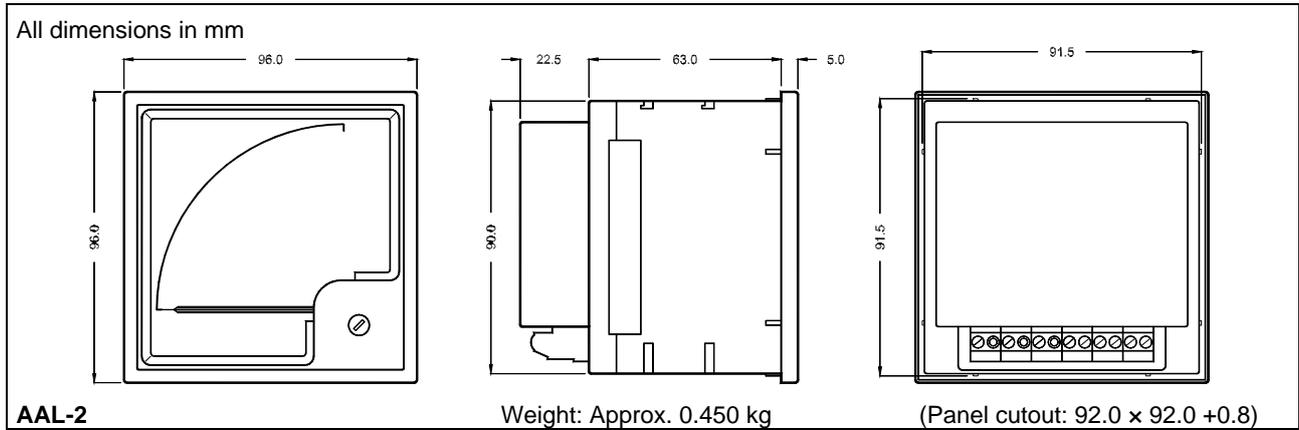


Fig. 1

**Warning:** If a high-voltage "MEGGER" is used, the AAL-2 must be disconnected at terminal "P" before testing is carried out. Omitting this may result in damage to the AAL-2.

**Dimensions**



**Technical specifications**

Technical specifications		
DC resistance (R <sub>i</sub> ):	22 kΩ or 220 kΩ ±5 % (1 M/10 M range)	
AC impedance (Z <sub>i</sub> ):	>100 kΩ at 50 Hz	
Measuring output voltage:	12 V DC ±10 %	
AC input voltage (max.):	528 V AC continuously (440 V AC +20 %)	
Leakage capacitance (max.):	25/250 uF (depending on settings - see table)	
Response time (1 MΩ):	<0.5 s	
Response time (10 MΩ):	<3.5 s	
Frequency range:	45 to 500 Hz	
Set point, 0 to 1 MΩ:	0 to 150 kΩ (if set point above 150 kΩ is selected, warning relay will be disabled)	
Set point, 0 to 10 MΩ	0 to 1.5 MΩ (if set point above 1.5 MΩ is selected, warning relay will be disabled)	
Relay:	Change-over contact Standard: Normally de-energised (ND). Optional: Normally energised (NE)	
	Contact ratings: AC1: 8 A, 250 V AC – DC1: 8 A, 24 V DC AC15: 3 A, 250 V AC – DC13: 3 A, 24 V DC Mechanical life: 2 × 10 <sup>7</sup> operations, electrical life: 1 × 10 <sup>5</sup> operations	
AC auxiliary:	115 V AC ±20 % (X1+X2) 230 V AC ±20 % (X1+X3) 400 V AC ±20 % (X1+X4)	Frequency range: 45 to 65 Hz  Load: <4 VA

**Type test specifications**

<b>Temperature</b>	-25 to 60 °C (operating) -25 to 65 °C (storage)	IEC/EN 60068-2-1 IEC/EN 60068-2-2
<b>Climate</b>	55 °C 97 % RH	IEC/EN 60068-2-30, test Db
<b>Vibration</b>	3 to 13.2 Hz: 2mm <sub>pp</sub> 13.2 to 100 Hz: 0.7 g	IEC/EN 60068-2-6 & IACS UR E10
<b>Shock</b>	50 g, 11 ms, half sine Tested with 3 impacts in each direction in all 3 axes. A total of 18 impacts per test	IEC/EN 60068-2-27, test Ea
<b>Safety</b>	Installation Cat. III 600 V Pollution degree 2	IEC/EN 61010-1 tested at 50 Hz, 1 min. Each galvanic group is tested to other galvanic groups and to protection earth
<b>EMC</b>		IEC/EN 61000-6-1/2/3/4 IEC/EN 60255-26 IEC/EN 60533 power distr. zone IACS UR E10 power distr. zone
<b>Materials</b>	All plastic parts are self-extinguishing	UL94 (V0)
<b>Protection</b>	Front: IP52 (IP66 optional by means of gasket) Housing/terminals: IP20	IEC/EN 60529
<b>Approvals and certificates</b>	See the DEIF homepage for valid approvals and certificates	<a href="http://www.deif.com">www.deif.com</a>

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



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