



**ndb Technologie inc.**  
111-1405, St-Jean-Baptiste  
Québec (Qc)  
Canada G2E 5K2  
Tél : (418) 877-7701  
Fax : (418) 877-7787  
E-mail : [mkt@ndb.qc.ca](mailto:mkt@ndb.qc.ca)  
Web : [www.ndbtech.com](http://www.ndbtech.com)



## AL-40

### Welded Electrical connections Tester

The AL-40 allows a precise and easy quality control of welded electrical connections. The instrument measures the electrical resistance formed by the fusion of the weld with the conductors.

#### The secret: a 0,01 $\mu\Omega$ resolution



The electrical resistance value of a good exothermic weld is about ten micro ohms, and the difference between a good and a bad weld can be as low as one micro ohm. In order to be able to measure this difference, the accuracy and resolution of the tool used are very important. In addition, these joints are welded in the field, and so the tool must be portable and easy to use. The AL-40 is alone in this category.

#### A unique probe

The AL-40 is equipped with a probe designed specifically for exothermic welds. It uses the four-points measuring method. This technique consists of injecting a known current through two current contacts and then measuring the voltage with the help of two voltage contacts placed in between. The current is read as well to eliminate the contact-resistance factor. The instrument is also equipped with a microprocessor that eliminates offsets and parasite voltages. Thanks to its unique filtering system, the AL-40 can be used in the presence of intense magnetic fields.



#### Quick and easy measuring

The measuring is done automatically when the probe is pressed against the weld. Once the AL-40 has detected the presence of the four contacts, the result is displayed instantly. Additional measurements can be made by lifting the probe and pressing it back against the weld.



Measuring an aluminothermic joint

*The AL-40 takes a measuring automatically as soon as the four contacts are pressed against the weld.*

#### The relative mode

A relative measuring mode ("REL" Key) allows the user to compare the difference between a reference measurement and the ones obtained during the quality control.



Example of a reading, in relative mode

### Options and accessories

- Nylon protective bag
- Transportation suitcase
- Reference resistance of 9,5μΩ
- Custom probes available

### Technical specifications

Four points measuring method

Accuracy	0,15% of the reading, +/- 2 counts
Measuring Range	0.01 μΩ to 1Ω
Measuring scales	20.00μΩ to 1.0000Ω
Resolution	0,01μΩ
Injection currents	5A, 250mA et 5mA, selected automatically
Autonomy	> 5000 measurements, at 5A
	> 10 000 measurements for other currents
Dimensions	203,3 X 114,3 X 50,8 mm (8 X 4.5 X 2 in.)
Weight	0.86 kg (1.9 lbs.)



### Application exemple Quality control of exothermic joints

The quality of energy and grounding networks joints is of prime importance for the companies who produce or use high power electric energy (power plants, substations, railways, aluminium foundries, etc). A bad quality joint causes a decay of the network's performance, that soon translates into excessive maintenance. The traditional method of checking welded electrical connection used to be visual inspection, but this method is now considered ineffective because many factors can escape notice. Oxidation of conductors, insufficient preheating temperature or traces of humidity can all result in a solid, good looking weld the resistance value of which is still too high.



Example of a rejected weld, despite satisfying visual appearance: bubbles appeared in the mix, because traces of humidity remained in the mold.



Example of a rejected weld, despite satisfying visual appearance: poor preparation of an oxyded conductor prevented the proper fusion of conductor and weld.



Example of a rejected weld, despite satisfying visual appearance: insufficient preheating prevented the proper fusion, once again. Note the conductor, separating from weld.



Example of a good weld: Its clear that the conductor and the weld now form a compact and homogeneous block.



Other example of a good weld: Its impossible to distinguish the conductor from the weld material, sign of a perfect weld.



### Advantages of the AL-40

The refined voltage measuring system of the AL-40 enables it to use very low injection currents (up to 5 Amps), which presents many advantages:

- it works on batteries; so it is lightweight and handy
- the low injection current allows the use of very fine contact points (see image on the left)
- waterproof and shock resistant, it is suitable either for laboratory or field applications
- Its liquid crystal display with backlight allows the use of the AL-40 in weak lighting conditions.