

Reaching new heights for
renewable energy

Megger[®]



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Megger helps a valued customer reach new heights

Testing the lightning protection circuit of wind turbines is not a new application for Megger. For some time now, Megger has been at the forefront of this application providing the instruments and the very long test leads required to do this critical test.

After all, the lightning protection on a wind turbine protects millions of dollars of critical equipment from destruction. Indeed, there are plenty of videos on YouTube showing the consequences of lightning protection that failed.

Recently, a valued customer who had been using their trusty Megger BT51 instruments for some years came to us wanting to order hundreds more for a massive testing campaign they had been planning. However, the BT51 had just been made obsolete so the customer initially was not overly happy. The next stage was to introduce them to the new DLRO2 and DLRO2X instruments. Straight away, the customer liked the handheld, lightweight format of the new instruments, but was not confident that a handheld unit would perform as well as a much larger, and a perceived more powerful, instrument like the BT51. Their concerns were reduced a little when they were shown the dedicated long test lead mode on these instruments, so they agreed to trial the new instrument.

The first challenge was on the test leads. Up to now, the customer had been using a combination of the Megger KC100 (100 m test lead on a cable drum) and leads they had created themselves designed to fit the BT51s terminal posts using hook terminations. The customer reported that the KC100 test leads were expensive, which is why they had made a number of test leads for the cable drums themselves to save money. They certainly didn't want to throw away their current test leads, so they had to work with the DLRO2 range. They didn't need to worry though, because Megger was able to supply them with adaptors, and could even offer a kit that would allow them to modify their own test leads to fit the DLRO2 range. Not only that, but the customer was also introduced to a newly designed 100 m test lead kit: the KC100-C. The new KC100C cable reels take advantage of the DLRO2 and DLRO2X's long test lead modes, allowing them to test with a massive 3.2 ohms between the terminals, compared to the BT51s limit of 2 ohms, and at half the weight and cost of the original leads.

This meant that there was now no need for the customer to make their own leads. Speaking of reduced weight, it's worth highlighting that this was a key benefit to our customer. These instruments and test leads have to be hauled up the side of a turbine and have to work at height, and therefore have to be factored into a risk assessment. The reduction in weight for both the instrument and test leads meant a considerable reduction in risk. It's simple; less weight means more safety.



The next challenge the customer had was ease of use. We need to remember many of the people engaged in testing lightning protection on wind turbines are not electrical specialists. They are employed because of their skill at working at height in very difficult and dangerous situations. The BT51 was a favourite because of it only ever provided measurements in $m\Omega$. That meant the user didn't have to interpret changes in units. In addition, the instrument needed virtually no set up, just switch on and test. The customer's concern that DLRO2 and DLRO2X would not be as easy to use was quickly removed when the operation of their long test lead modes was explained. There are simply no settings to select on this test mode and the instrument is already ready to go. The Long test lead mode locks the test current to 1 A, (1 A being minimum current specified for these tests) with a positive-only accuracy tolerance, locks the measurement to $m\Omega$ only, and locks the current into a unidirectional test - could it be any simpler?



Fig 1: Noise Rejection Mode

We then went onto the field trials. The customer decided to use the DLRO2X trial unit side-by-side with the BT51. In use, they quickly found that the DLRO2 gave very similar measurements to their BT51, and soon grew to prefer it. During these trials, they also discovered an unexpected benefit regarding the case that it comes with. The instrument is secured into the case with a flap to insert the test leads, so the instrument can be used while still in its case. However, the real benefit was the clip at the base of the case as this meant it could be secured to the operator's belt or other clothing, providing hands-free operation. Yet another safety plus when working at height!

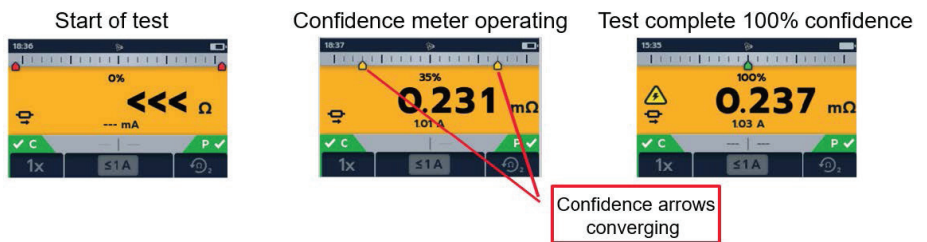


Fig 2: Confidence Meter Operation

The final hurdle came from recording measurements. With the BT51, the customer disliked needing to use a mobile device to take photographs of the test results on the instruments display, then having to transfer them into a homemade report when they returned to the office. It's no surprise then that they were delighted with the DLRO2X's internal memory. With the DLRO2X, test limits can be applied to measurements if desired, and all test result data is stored against a user-defined asset ID. You can have up to 256 assets. When back at ground level, test results can be transferred to a memory stick for on-site data backup. Then when back at the office, the results can then be pulled into the supplied Megger PowerDB Lite PC-based software and put into one of two test report forms.

A report is then ready to go to our customer's clients - easy! The successful field trials led to an order of over a hundred units and in-use, the instruments have proved their worth by carrying out critical testing. Recently, it has been commented that about 10 % of turbines can suffer with electrical noise issues when performing this test. However, yet again, Megger has a unique solution in the DLRO2X; a dedicated noise rejection test mode (Fig. 1). When the normal fast testing modes of the instrument are being affected by noise, and the instruments noise indicator is activated, the user has the option of switching to the noise rejection test mode.

In this test mode, the test current is applied continuously to allow a stream of results to be fed into the patented Confidence Meter™. The unique algorithm can then refine the noisy results into a stable, accurate result. The confidence in the measurement is also indicated during the test to the user using a scale as shown in Figure 2.

When the confidence in the measurement reaches 100 %, the test automatically stops, and the final accurate measurement values are displayed. Overall, the customer's testing skills reached new heights, thanks to the abilities of the DLRO2 and DLRO2X. To learn more about Megger's testing solutions, visit www.us.megger.com