

Insulation Resistance Testers – Internal sales guide

Megger®

Product coverage

This sales guide covers all Megger insulation testers designed for use in the industrial, power utility, production and railway sectors. Specifically, it covers the new Mark 2 versions of the MIT515, MIT525, MIT1025, MIT1525, S1-568, S1-1068 and S1-1568. It also covers one new product: the MIT1015.



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ENGLISH

Insulation Resistance Testers

– Internal sales guide

Introduction

Our highly regarded range of insulation resistance testers continues to be successful in the marketplace, but after careful consideration, we have decided that the time has come to reposition the instruments in the range. The objectives are to make it easier for users to select the right instrument to suit their needs and budget and for the sales team to guide users in their product choices.

Why are we repositioning our insulation testers?

Until now, our insulation testers have been grouped into two categories – the MIT range, which we have considered to be made up of products primarily aimed at industrial users, and the S1 range, which we have designated as products for the power utilities. However, feedback from the sales team and analysis of sales have shown that these categories do not reflect customers' real purchasing habits. Purchasing decisions are usually based on technical requirements, meaning some industrial users opt for S1 products, while many power utilities purchase products from the MIT range.

Another concern with the present categorisation of our insulation testers is that we may seem to offer too much choice. We offer eight different products – with the addition of the new MIT1015 – and it can be challenging for customers to make detailed comparisons and select the best product to meet their needs. In reality, the situation is much simpler than it appears, and our new positioning strategy will make this clear.

How are we repositioning our insulation testers?

We are no longer grouping our insulation testers by the type of user; instead, we are positioning them according to user requirements. There are now three categories: Essential, Advanced and Expert. Instruments in the Essential category perform all of the most commonly needed tests. Those in the Advanced category provide additional functionality for users with more demanding requirements, and instruments in the Expert category offer the highest levels of performance and versatility.

Note that instruments in the Essential category should not be described as 'basic'. Basic suggests an inferior product with limited performance. This is not an accurate description of any of our IRT products as all of them – including those in the Essential category – provide outstanding performance, reliability and accuracy.

Why have we added a new model to the range?

Many customers are moving toward purchasing insulation resistance testers with 10 kV capability. While we already had 10 kV models in our range, we did not have a model that offered only the features needed for the Essential category. As a result, if a customer needed a 10 kV tester, we asked them to pay for features they did not require, which sometimes made our offer uncompetitive. The new MIT1015, an Essential category tester with 10 kV capabilities, addresses this issue.

Which instruments are in each of the new categories?

Instruments in the Essential category are:

- MIT515/2
- MIT1015

Instruments in the Advanced category are:

- MIT525/2
- MIT1025/2
- MIT1525/2

Instruments in the Expert category are:

- S1-568/2
- S1-1068/2
- S1-1568/2

In all cases, /2 at the end of the model number indicates the new Mk 2 version of the instrument. Other than this addition, we have retained the existing model numbers to avoid possible problems where our instruments are written into customers' specifications.

How will the new positioning help when we're selling insulation testers?

With the new categories, customers who want to buy an insulation tester now only have to make one major decision: do they want an instrument from the Essential, Advanced, or Expert categories? In other words, they only have to make a three-way comparison, and there are very clear distinctions between the categories, as explained later. Having made this decision, the only remaining choice is the maximum test voltage they want, a topic many customers will already have clear ideas about.

Budgetary concerns will, of course, influence buying decisions, but the new categories will make it easier for customers to see which areas of functionality are affected if they opt for a lower cost instrument and, therefore, to make an informed decision about whether the trade-off between price and functionality is justified.

Overall, the new positioning simplifies and streamlines the buying process, which will benefit customers and the sales team.

What's new with the Mark 2 instruments?

All categories

- **Colour display.** This makes the instruments more intuitive to operate. In addition, the new display is easier to read in direct sunlight viewing angle than the monochrome displays used on previous models. It also gives instruments a more up-to-date appearance, which enhances sales appeal.
- **PI predictor.** This patented feature is already available on S1 models and has been added to all models in the range. It reduces the time needed to perform PI tests up to 50% or more, making PI testing a much more attractive option for assessing the insulation health of assets such as motors.

Insulation Resistance Testers

– Internal sales guide

■ **Negative test current handling.** In noisy electrical environments, the test current can momentarily go negative during tests conducted over a period of time. With ordinary averaging filters, these negative excursions can seriously affect the accuracy of the final results. The software used in the latest instruments eliminates this problem.

■ **Re<Act mode.** Possibly a game changer in DC insulation testing. Re>Act, short for Reabsorption Current Test, is a totally new and unique test mode. This patent applied feature can be used both before or after an insulation test. Before insulation testing the mode monitors the level of reabsorption current coming out of the insulation, then indicates to the user what effect this will have on the insulation test if it was carried out at that time. After testing the reabsorption current discharge can be monitored to ensure it is fully discharged to ensure a potentially dangerous return voltage down not occur.

- Ensures accurate measurements are made
- Can help prevent insulation tests being failed when it shouldn't have
- Can help prevent insulation tests being passed when it shouldn't have
- Can help prevent leaving insulation with a dangerous return voltage

More information can be found in our new application note.

■ **Hazardous peak voltage detect.** Safety has always been a priority for Megger which is reflected in the many safety features that go above the requirements of IEC safety standards. This is now reinforced with another unique safety feature.

Normally live voltage warnings occur prior to performing an insulation test. The Hazardous peak voltage detection operates during an insulation test for additional protection. Should the voltage on the terminals increase to a level where it becomes higher than the instrument's reinforced insulation level the instrument automatically stops the insulation test to remove the test voltage being the overall voltage on the insulation down, then warns the operator not to touch the instrument until the external voltage has been safely removed.

Advanced category

- **Burn mode current.** Now selectable as either 3 mA or 6 mA. (6 mA available only when instrument is mains powered.) The higher current can be useful when burning faults in cables, so the fault location can be determined more easily with a time-domain reflectometer (TDR).
- **Test/charge current.** This defaults to 3 mA, but the user can optionally change it to 1 mA or 6 mA (on mains supply only). The lower current is useful to limit damage if insulation breakdown occurs and to reduce the impact of electric shock if a live connection is accidentally touched. The higher current reduces charging time when testing assets with high capacitance, such as long cables.
- **Noise immunity.** Increased to 6 mA. This means stable

measurements can be made in LV, MV and HV environments up to 230 kV.

■ **Bluetooth connectivity.** This allows wireless data transfer to CertSuite Asset or PowerDB for easy reporting and archiving of results. Data transfer via a wired USB connection is also supported. Bluetooth LE support allows connectivity with Android and iOS devices.

■ **PDC test** with a new switch position. Not a completely new test, having been used for specialized insulation testing on assets such as motors. PDC, or Polarisation / Depolarisation Current testing is a bit like performing a DAR, PI and DD testing all in one. The test requires the complete charge and discharge current to be graphed, and is typically either a 10 + 10 or 30 + 30 test (minutes duration).

More information can be found in our new application note.

Expert category

■ **Test/charge current.** This defaults to 6 mA, but the user can set it to 1, 2, 3, 4, 5 or 6 mA according to the application. Lower currents are useful to limit damage if insulation breakdown occurs and to reduce the impact of electric shock if a live connection is accidentally touched. Higher currents reduce charging time when testing assets with high capacitance, such as long cables.

■ **Noise immunity.** This is 8 mA, as previously, but as well as averaging filters, expert instruments now feature adaptive filters. These software filters are in addition to the hardware filter used in Essential and Advanced category models. This combination of hardware and software filters allows stable measurements to be made in extreme LV, MV, HV and EHV environments up to 1,000 kV.

■ **Bluetooth connectivity.** Provided as standard, this allows wireless data transfer to CertSuite Asset or PowerDB for easy reporting and archiving of results. Bluetooth LE support allows connectivity with Android and iOS devices. Data transfer via a wired USB connection is also supported.

■ **PDC test** with a new switch position. Not a completely new test, having been used for specialized insulation testing on assets such as motors. PDC, or Polarisation / Depolarisation Current testing is a bit like performing a DAR, PI and DD testing all in one. The test requires the complete charge and discharge current to be graphed, and is typically either a 10 + 10 or 30 + 30 test (minutes duration).

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Insulation Resistance Testers

– Internal sales guide

What are the main differences between Essential, Advanced and Expert instruments?

The principal differences between the categories are explained in the bullet points and summarised in the table that follows.

- **Range of tests.** Essential category instruments offer standard insulation resistance measurement, plus dielectric absorption ratio (DAR) and polarisation index (PI) tests, with PI predictor for faster testing included as standard. This combination of tests is ideal for users looking for simple go/no-go testing. As well as the tests offered by the Essential instruments, Advanced and Expert models offer dielectric discharge (DD), step voltage (SV), ramp voltage and, when used in conjunction with PowerDB or CertSuite Asset, polarisation/depolarisation (PDC) tests.
- **Burn mode current.** Essential instruments have a fixed burn mode current of 3 mA, whereas Advanced instruments provide a choice of 3 mA or 6 mA (on mains supply) and Expert instruments offer a choice of 3 mA or 6 mA for both mains and battery operation.
- **Test/charge current.** Fixed at 3 mA for Essential instruments, selectable 3 mA or 6 mA (on mains supply) for Advanced instruments, selectable in 1 mA increments from 1 mA to 6 mA for Expert instruments on mains or battery supply.
- **Noise immunity.** For Essential instruments, noise immunity is 3 mA, which meets requirements for LV and MV environments up to 45 kV. For Advanced instruments, it's 6 mA, which is sufficient for environments up to 230 kV. For Expert instruments, it's 8 mA, with advanced software filtering to meet the requirements of extreme environments up to 1,000 kV.
- **Data storage.** Essential instruments do not have on-board storage for results, whereas Advanced and Expert instruments have extensive storage, eliminating the need to write down results by hand.
- **Communication.** Essential instruments have no communication facilities. Advanced and Expert instruments support the transfer of test results to CertSuite Asset and PowerDB wirelessly via Bluetooth or via a wired USB connection. They also support streaming results via a USB connection, allowing live graphing of insulation resistance, current and voltage. This graphing is required for ramp and PDC testing.
- **Remote control.** Expert instruments, used in conjunction with CertSuite Asset or PowerDB offer full remote control via a wired USB connection



Insulation Resistance Testers

– Internal sales guide

	= New feature for 2025	MIT515/2 MIT1015	MIT525/2 MIT1025/2 MIT1525/2	S1-568/2 S1-1068/2 S1-1568/2
	FEATURE	ESSENTIAL	ADVANCED	EXPERT
Test capability	High Guard Terminal performance	■	■	■
	IR	■	■	■
	IR(t)	■	■	■
	PI Polarisation Index	■	■	■
	PI Predictor	■	■	■
	DAR Dielectric Absorption Ratio	■	■	■
	DD Dielectric Discharge		■	■
	Ramp test		■	■
	RE>Act mode	■	■	■
	PDC test		■	■
Test voltage	Max. voltages available	5 kv or 10 kv	5 kv, 10 kv or 15 kv	5 kv, 10 kv or 15 kv
Charging and burn mode current	Default maximum current	3 mA	3 mA	6 mA
	User selectable max. current values	N/A	1 mA, 3 mA, 6 mA (6 mA only from mains supply)	1 mA, 2 mA, 3 mA 4 mA, 5 mA, 6 mA (6 mA from internal battery and mains supply)
Noise immunity	Max. noise current with measurement withing accuracy spec.	3 mA (LV and MV <45 kV)	6 mA (HV <230 kV)	8 mA (EHV <1000 kV)
	Adaptive filter			■
	Negative current handling	■	■	■
	Averaging filter			■
Safety	CAT IV 1000 V		■	■
	CAT IV 600 V	■	■	■
	Hazardous peak voltage detection during IR measurement	■	■	■
Data storage / features	On board - time stamped		■	■
	Temperature value stored		■	■
	Humidity value stored			■
Communications	Test result transfer via wired USB		■	■
	Test results transfer via wireless Bluetooth LE		■	■
	Test result live streaming via wired USB		■	■
	Test result live streaming via wireless Bluetooth LE		■	■
	Remote control via wired USB			■
Display	New custom colour display	■	■	■
Accessories	Carry all holdall	■	■	■
	Deeper lid pouch	■	■	■
Software support	CertSuite Asset Lite compatible		■	■
	CertSuite Asset compatible		■	■
	Power DB Lite supplied free		■	■
	Power DB Advance or Pro support		■	■

Insulation Resistance Testers

– Internal sales guide

Who are the target customers?

The target customers for our range of insulation resistance testers have stayed the same, but the sales approach, based on our new positioning strategy, is different. Instead of deciding which instruments to offer according to the customer's industry sector, the decision should now be based on an understanding of the customer's actual testing requirements.

Nevertheless, market analysis has shown that particular classes of instruments are likely to be the best match for certain types of users, as shown below. The list is not exhaustive, and the information it contains should only be used as a general guide – your customer's requirements may not be the same as the 'average case', so it's always essential to find out exactly what those requirements are.

Power utilities

■ Distribution – for commissioning and testing after a repair

First choice: Advanced. Second choice: Essential

■ Distribution – for maintenance

First choice: Advanced. Second choice: Essential

■ Transmission – for commissioning and testing after a repair

First choice: Expert. Second choice: Advanced

■ Transmission – for maintenance

First choice: Expert. Second choice: Advanced

Industrial users

■ HV motor testing

First choice: Advanced. Second choice: Essential

■ Maintenance

First choice: Advanced. Second choice: Essential

Railway applications

■ Traction motor testing

First choice: Advanced. Second choice: Essential

■ Third-rail power system testing

First choice: Advanced. Second choice: Essential

Production/manufacturing applications

■ Cable manufacturers

First choice: Advanced. Second choice: Expert

■ Production testing

First choice: Advanced. Second choice: Expert

Useful questions

These are some suggested questions to ask customers to help them choose the best instrument to meet their requirements. This is not an exhaustive list, and the questions are not in any particular order. No doubt there will be many other questions you will want to ask!

■ Tell me about your application

This background information will help put the answers to the other questions into context and may provide an early indication of which category of tester will be most appropriate. Even if this is the case, it is still important to explore further, as the customer may have requirements that are not typical for their application.

■ Do you need simple go/no-go testing, or are you looking for something more comprehensive?

If the customer only needs simple tests, an Essential model may be suitable, but it is worth considering whether they may have even an occasional requirement for more sophisticated tests, in which case an Advanced model is likely to be a better choice.

■ Which tests do you need to carry out?

If the customer wants tests other than IRT, PI and DAR, they will need either an Advanced or Expert instrument.

■ Do you frequently perform PI tests?

If the answer is yes, the customer is likely to be interested in the PI Predictor function. This won't help with deciding which instrument they need because all of our current insulation testers incorporate PI Predictor. It does mean, however, that if the customer wants this feature, they will have to buy a Megger product as it's a patented feature that's unavailable from any other supplier.

Insulation Resistance Testers

– Internal sales guide

■ Is it important for you to be able to adjust the test current?

Setting a low current limits damage if breakdown occurs, but a higher current will charge capacitive test objects more quickly. Essential instruments have a fixed test current of 3 mA, the Advanced products give options of 1, 3 mA or 6 mA (if powered from a mains supply), and the Expert products allow the current to be set between 1 mA and 6 mA in 1 mA increments.

■ How (electrically) noisy is the environment where you want to carry out tests?

This is an important differentiator between the instrument categories. Essential instruments have a noise capability of 3 mA, which is completely satisfactory for most applications other than those in electrical substations. 15 kV Advanced instruments increase this to 6 mA, extending their range of use to include substations up to 230 kV. Expert instruments have a noise capability of 8 mA. This may seem like a small increase over the Advanced instruments, but it is accompanied by innovative digital filtering, which means these class-leading instruments deliver reliable results even in EHV substations operating at up to 1000 kV.

■ Is internal data storage for results important to you?

This is standard on Advanced and Expert products but is not available on Essential products.

■ Are you likely to need Bluetooth downloading for results?

This is standard on Advanced and Expert instruments. Essential instruments, with no data storage, neither have nor need communication facilities. Bluetooth downloading is advantageous as no electrical connection has to be made with the instrument, which is not only convenient – data leads and connectors are notoriously prone to damage – but also increases safety.

■ Will you need to analyse, archive and report results?

For this, we offer two options: PowerDB - a comprehensive asset and test data management package that runs on Windows® PCs, and CertSuite Asset - a convenient asset management app available in Apple iOS and Android versions. CertSuite Asset is also available as a browser-based version. These software solutions are compatible only with Advanced and Expert instruments.

■ Have you considered the benefits of remote control?

For many users, this won't be necessary, but for those working in particularly hazardous environments, like HV and EHV substations, and high energy industrial locations, the option to control the instrument and capture results from a safe area, away from the actual test location, is potentially a very big benefit. The remote control option is only available with Expert instruments.

The answers to the questions above should clarify whether the customer's best choice is an Essential, Advanced or Expert instrument. As mentioned earlier, however, the available budget may well influence the final decision, so it will probably be important to discuss with the customer which features they regard as 'must have' and which they see as 'nice to have'. With the decision made between Essential, Advanced or Expert, there remains one further question to ask:

■ What is the highest test voltage you want to use?

Essential instruments are available in 5 kV and (new!) 10 kV versions, whereas Advanced and Expert models are available in 5 kV, 10 kV and 15 kV versions. The customer will likely have a clear idea of the maximum test voltage they want to use, with 10 kV instruments now growing in popularity for general applications at the expense of 5 kV types. 15 kV versions are usually reserved for more specialised applications. It may be useful to bear in mind that 5 kV instruments test at the peak phase-to-phase voltage of a 3.3 kV system, 10 kV instruments at the peak phase-to-phase voltage of a 6.6 kV system and 15 kV instruments at the peak phase-to-phase voltage of an 11 kV system. If budget is tight, choosing an instrument with a lower maximum test voltage may be a better option than, for example, selecting an Essential model instead of an Advanced model unless, of course, the higher test voltage is definitely needed.

Insulation Resistance Testers

– Internal sales guide

Additional information

This sales guide is intended only to highlight points that may be of benefit to the sales team when selling our repositioned range of insulation resistance testers. It does not include detailed technical information for the products, but this is readily available in other documents, including product data sheets and application notes, which are available on the DAM.