Megger

Operating Manual

Cable Fault Burn-Down Instrument

BT 500-IS-1

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Consultation with Megger

The present system manual has been designed as an operating guide and for reference. It is meant to answer your questions and solve your problems in as fast and easy a way as possible. Please start with referring to this manual should any trouble occur.

In doing so, make use of the table of contents and read the relevant paragraph with great attention. Furthermore, check all terminals and connections of the instruments involved.

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Terms of Warranty

Megger accept responsibility for a claim under warranty brought forward by a customer for a product sold by Megger under the terms stated below.

Megger warrant that at the time of delivery Megger products are free from manufacturing or material defects which might considerably reduce their value or usability. This warranty does not apply to faults in the software supplied. During the period of warranty, Megger agree to repair faulty parts or replace them with new parts or parts as new (with the same usability and life as new parts) according to their choice.

Megger reject all further claims under warranty, in particular those from consequential damage. Each component and product replaced in accordance with this warranty becomes the property of Megger.

All warranty claims versus Megger are hereby limited to a period of 12 months from the date of delivery. Each component supplied by Megger within the context of warranty will also be covered by this warranty for the remaining period of time but for 90 days at least.

Each measure to remedy a claim under warranty shall exclusively be carried out by Megger or an authorized service station.

To register a claim under the provisions of this warranty, the customer has to complain about the defect, in case of an immediately detectable fault within 10 days from the date of delivery.

This warranty does not apply to any fault or damage caused by exposing a product to conditions not in accordance with this specification, by storing, transporting, or using it improperly, or having it serviced or installed by a workshop not authorized by Megger. All responsibility is disclaimed for damage due to wear, will of God, or connection to foreign components.

For damage resulting from a violation of their duty to repair or re-supply items, Megger can be made liable only in case of severe negligence or intention. Any liability for slight negligence is disclaimed.

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1 General Safety Instructions

1.1 General Notes

Safety precautions

This manual contains basic instructions for the commissioning and operation of the device / system. For this reason, it is important to ensure that the manual is always available to the authorised and trained operator. He needs to read the manual thoroughly. The manufacturer is not liable for damage to material or humans due to non-observance of the instructions and safety advices provided by this manual. Locally applying regulations have to be observed!

Labelling of safety instructions

The following symbols are used on the product:

Symbol	Description
	Serves to highlight warnings and safety instructions. As a warning label on the product it is used to draw attention to potential hazards which have to be avoided by reading the manual.
	Serves to highlight warnings and safety instructions that explicitly indicate the risk of an electric shock.
	Serves as a warning indicating that the marked item can be hot and should not be touched without taking care.
	Serves to request the user of the equipment to carefully read the user manual and adhere to the instructions.
	Protective Ground. This symbol identifies the terminal which is intended for connection to an external conductor for protection against electrical shock in case of a fault, or the terminal of a protective earth (ground) electrode.

Working with products from Megger
It is important to observe the generally applicable electrical regulations of the country in which the device will be installed and operated, as well as the current national accident prevention regulations and internal company directives (work, operating and safety regulations).
After working on the system, it must be voltage-free and secured against reconnection as well as having been discharged, earthed and short-circuited.
Use genuine accessories to ensure system safety and reliable operation. The use of other parts is not permitted and invalidates the warranty.

Operating staff
In its normal operation, the Cable Fault Burn-Down Instrument BT 500-IS-1 generates a voltage >1 kV which is dangerous to touch. The system may only be installed and operated by an authorized electrician. An electrician is defined as someone whose knowledge, experience and familiarity with the applicable regulations enable him to recognize potential hazards.
Anyone else must be kept away!

Declaration of Conformity (CE)
The product meets the following security requirements of the European Council Directives:

- EMC Directive (2014/30/EC)
- Low Voltage Directive (2014/35/EC)
- RoHS Directive (2011/65/EU)

1.2 General Safety Instructions and Warnings

Intended application
The operating safety is only guaranteed if the delivered system is used as intended. Incorrect use may result in danger to the operator, to the system and the connected equipment.
The thresholds listed in the technical data may not be exceeded under any circumstances.

Behaviour at malfunction of normal operation
The equipment may only be used when working properly. When irregularities or malfunctions appear that cannot be solved consulting this manual, the equipment must immediately be put out of operation and marked as not functional. In this case inform the person in charge who should inform the Megger service to resolve the problem. The instrument may only be operated when the malfunction is resolved.

Five safety rules
Always abide by the 5 rules of safety, in particular when making or breaking connections:

The five safety rules must always be followed when working with HV (High Voltage):

1. De-energize
2. Protect against re-energizing
3. Confirm absence of voltage
4. Earth and short-circuit
5. Cover up or bar-off neighboring energized parts

Using cardiac pacemaker

Physical processes during operation of high voltage may endanger persons wearing a cardiac pacemaker when near these high voltage facilities.

WARNING

Dangers when working with high voltage

Working on high voltage systems and equipment – especially in non-stationary operation – requires particular care and safety-conscious action on the part of test personnel. VDE regulations 0104 on setting up and operating electrical test systems, as well as EN 50191 and national standards and regulations must be strictly adhered to.

- The BT 500-IS-1 test system generates a dangerous voltage of up to 2 kV DC.
- The test system may not be operated without supervision.
- Never fail to use safety equipment or put it out of operation.
- To prevent dangerous charge accumulation, earth all metal parts in the vicinity of the high voltage equipment and the test object.

Observe all commonly applicable regulations regarding the operation of devices which generate voltages that are dangerous to touch (e.g. VDE and EN for Germany/Europe).

The user shall not position the equipment so that it is difficult to operate it. Special attention shall be given to the safety-relevant controls and functions.

The main power cord plug ultimately serves as the master disconnect for the BT 500-IS-1 so must always remain accessible and in case of a fault with the unit the plug should be removed from the wall socket to de-energize the unit.

Non-Stationary Test Equipment
The site where the BT 500-IS-1 is put up and installed, including the near end of the cable to be tested, is regarded as a ***non-stationary test equipment*** (according to VDE 0104-10-89). It must be looked at as a test site without forced protection against accidental contact. The same applies to the end (or ends) of the connected test object.

High-Risk Area
Any test site without forced protection against accidental contact must be sealed off, safeguarded and marked accordingly, as it is regarded as a high-risk area with various danger zones.

2 Description

2.1 General Introduction

Figure 1 : View of the BT 500-IS-1

Note: The BT 500-IS-1 is available for nominal mains supply voltages of either 230 Vac or 115 Vac. The information provided in the user documentation is valid for both versions of the BT 500-IS-1 unless stated otherwise. In case of differences, the text “230 Volt version” or “115 Volt version” are used to differentiate. In case of doubt the version can be determined by checking the supply voltage as provided on the type label:

Figure 2 : Type label 230 Volt version vs. 115 Volt version

The Cable Fault Burn-Down Instrument BT 500-IS-1 is mainly for converting (burning down) high-resistance cable faults in signal, control and telecommunication cables.
Its voltage source is adjustable between 0 and 2 kV. It has a balanced output, i. e. a faulty pair of wires can be connected to its terminals in balanced (floating) circuit.

Optionally the instrument can be used in conjunction with Sheath Fault Prelocating Device MVG 5 for prelocating sheath faults. Sheath fault postlocation and line-to-earth fault location can be carried out using the step voltage method by combining the BT 500-IS-1 with an Earth Fault Locator (e.g. ESG NT).

The BT 500-IS-1 may also be used for testing the withstand voltage of telecommunication cables and cable sheaths made of PVC or PE.

2.2 Functions

The output voltage of the device can be pre-set at ranges 500, 1000 and 2000 Volts (rotary switch [4]). Within the preselected voltage range, voltage can be adjusted continuously between approx. 0 Volt and the preselected full-scale voltage by means of the rotary control [6]. There is yet another rotary control for adjusting current between 10 % and 100 % of its maximum value.

The BT 500-IS-1 features voltage and current regulation to prevent overload of the cable burn-down instrument at any range. Whenever the cable fault suddenly turns into a short circuit or shows low-resistance behavior, current is automatically kept constant at the value preselected by means of the rotary control. Voltage is also maintained, however, so the ignited spark will not be interrupted. In this manner burning-down can be carried out using a very small current in order to reduce the risk of damage to adjoining wires or cables as much as possible.

There are two analog meters for indicating output voltage and output current.

When the instrument is switched off, a built-in automatic discharge device drains residual charges and connects the test object to earth.

2.3 Power Supply

The instrument is powered from the mains through the supplied earthing-contact cable connected to socket [10]. Depending on the version of the instrument it accepts a nominal mains voltage of 230 Vac or 115 Vac (50 or 60 Hz).
When the detachable-key switch [11] is switched from 0 to I, the instrument changes over to the standby mode. Power standby is signaled by the white LED [20].

2.4 Technical Specification

	230 Volt version	115 Volt version
Installed load	700 VA	
Mains connection	230 Vac (± 15%), 3 A, 50 Hz	115 Vac (± 15%), 6 A, 60 Hz
Maximum output current	1 A	
Maximum output voltage	2 kV DC	
DC output ranges	500 V / 1 A 1000 V / 0.5 A 2000 V / 0.25 A	
Current regulator	switching controller 10 to 100%	
Voltage regulator	switching controller 0.5 to 100%	
Dimensions (H x W x D)	200 x 360 x 360 mm (without handles)	
Weight	approx. 9 kg	
Operating temperature	- 10° C .. + 50° C	
Storage temperature	- 20° C .. + 60° C	
Relative humidity	93% at 30 °C (non-condensing)	
Integrated discharging circuit	max. 600 J (max. 2 discharges / min)	

2.5 Items Supplied

Cable Fault Burn-Down Instrument	BT 500-IS-1 230 Volt version	BT 500-IS-1 115 Volt version
Cable set consisting of:		
HV connect. lead 3.0 m	HSK 2-B	
Tap-off clip black	AK 41-B	
Tap-off clip red	AK 42-B	
Earth lead	EK 7	
Earth clip	AK 49-B	
Mains lead	NKG 1	NKG 1-US

2.6 Special Accessory Equipment

	230 Volt version	**115 Volt version**
Emergency-off switch	NAG 1 for stand-alone operation	(not available)
Emergency-off switch	NAG 2 for operation in conjunction with MVG 5	(not available)
HV connection lead with damping resistor (stabilization of the arc for conductors with a small cross section)	BT 500-IS-1-DR	

2.7 Front View

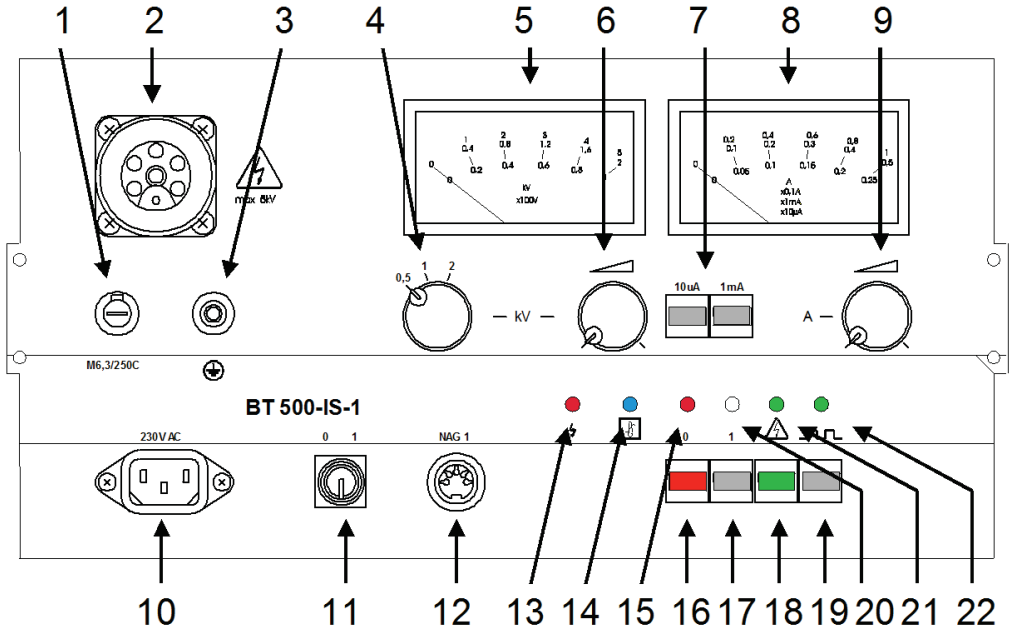

Figure 3 : Front View of BT 500-IS-1

1	Miniature fuse - replace blown fuse by type as shown on the front panel. 230 V version: M6,3 / 250C 115 V version: 10A/125V Time-Delay (CSA/UL approved)	12	Emergency-Off socket (not applicable for the 115 Volt version)
2	Output socket	13	Lamp repeater – Indication of dangerous contact voltage
3	Earth socket	14	Lamp repeater – Indication of overtemperature
4	Rotary switch for voltage ranges 500 V, 1 kV, 2 kV	15	Lamp repeater – Switching-on standby
5	Output voltage indicator	16	Push button HV – OFF
6	Rotary control for voltage	17	Push button Operation standby – ON
7	Push-button switch for full-scale sensitivities 10 µA or 1 mA	18	Push button HV – ON
8	Output current indicator	19	Push button Pulsed operation
9	Rotary control for current	20	Lamp repeater – Mains standby
10	Mains socket	21	Lamp repeater – Operation standby
11	Rotary key switch	22	Lamp repeater – Pulsed operation

3 Safety Precautions

3.1 Rotary Key Switch [11]

For reason of the European product liability and according to VDE 104-10-89 pos. 3.9.4, the instrument must be protected against any unauthorized start-up. To this effect, the BT 500-IS-1 has on its front panel a rotary key switch [11] which meets this requirement.
The instrument is at mains standby as soon as rotary switch [11] is turned from 0 to I.

3.2 Operation Standby

Is indicated by the green lamp repeater [21]. The instrument is switched on but does not generate any high voltage. Its output is shorted and connected to earth.

3.3 Switching-On Standby

In line with safety standards (e.g. German VDE 0104-10-89 pos. 3.9.4.2.), two deliberate operations must be performed to change over to switching-on standby. For the BT 500-IS-1, the rotary control [6] must be turned down to zero (left stop!) and the green push button [18] must be depressed. The red lamp repeater [15] will light up and the green lamp repeater [21] will go out. From now on the instrument must be regarded as switched on. Any deliberate turning of the rotary control [6] will generate high voltage.

If upon pressing the green push button [18] lamp repeater [21] goes out without the red lamp repeater [15] lighting up, this situation must also be regarded as: Switching-on standby!! There is the risk of electric shock.
If the BT 500-IS-1 generates a DC voltage which is dangerous to touch, the red LED [13] lights up.

3.4 Mains Standby

For enhancing safety, the BT 500-IS-1 is furthermore equipped with another lamp repeater [20] the color of which is white. This lamp indicates that the instrument is connected to the mains. The instrument is not switched on, no auxiliary circuits are activated.

3.5 Emergency-Off Switch

For the BT 500-IS-1, several emergency-off switches are available as optional extras to be used depending on the mode of operation. They can be connected to connector [12] on the front panel of the instrument. This option is not available for the 115 Volt version.

3.6 Earth Connection (Protective Measures)

Take the following protective measures or check them before switching the instrument on:

- Connection of earth socket [3] to earth (e. g. station earth).
- Use the supplied connecting lead with protective contact.
- Make end of connection lead and all ends of the test object safe against any contact.

3.7 Temperature Monitoring

To protect the BT 500-IS-1 from being damaged due to overheating, it is equipped with a temperature monitor. The blue lamp repeater [14] will light up in case of overtemperature and the instrument will shut down. After the instrument has cooled down for a certain time period, the instrument will return to mains standby.

4 Getting Started and Operation

When used as a stand-alone instrument, the BT 500-IS-1 can be employed for burning down high-resistance faults as well as for sheath testing and locating sheath faults on telecommunication and power cables.
The BT 500-IS-1 can be used for sheath fault prelocation only in conjunction with sheath fault prelocating instrument MVG 5.
You may use your BT 500-IS-1 in horizontal or in vertical position, as desired. The permissible on-time of the instrument is 100 %.
The instrument changes over into mains standby as soon as the key switch [11] is turned from 0 to I.

4.1 Burning Down

As a rule, the BT 500-IS-1 is connected to the test object in floating circuit (wire – wire) for performing fault conversion (burning down).
Both connecting terminals are floating, i. e. they are **not** connected to the casing or protective terminal within the instrument.

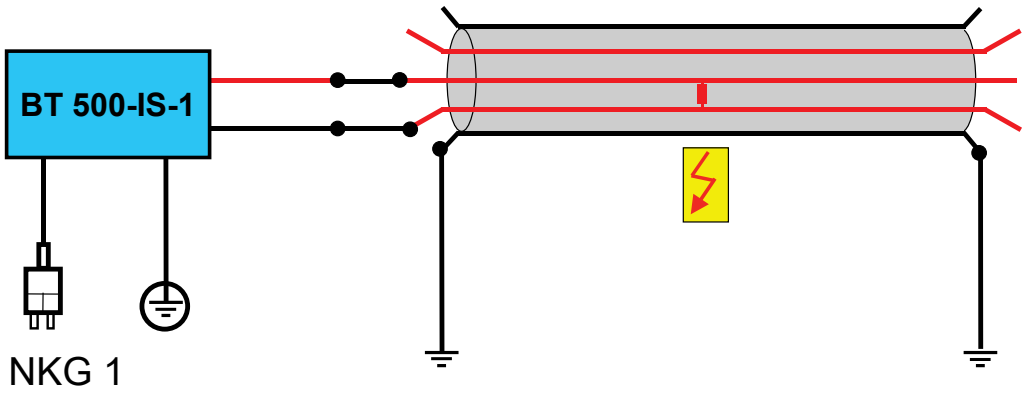

Figure 4 : How to Connect the BT 500-IS-1 for Burning Down, Mode Wire / Wire

In the event of low-voltage cables, connection depends on the fault situation and may be wire / wire, wire / neutral wire, wire / insulation. In this case connect the red terminal to the faulty wire and the black terminal to system earth (neutral wire, shield).

When connecting to low-voltage cables with a small cross-section (e.g. for measurements on the heating cables of an electric underfloor heating system), the optional connection cable with integrated damping resistor (BT 500-IS-1-DR) can be used instead of the standard connection cable to stabilize the arc during the burning process.
This is necessary in order to attenuate the transient currents occurring in the case of a high line resistance and also to ensure continuous operation on this type of conductor.
The connection is made as shown in Figure 4.

Use the voltage selector switch [4] to select the output voltage. In doing so please make sure that the selected voltage does not exceed the maximum permissible voltage of the test object (observe type of cable and regulations !!)

NOTICE:
If the optional HV connection cable with the integrated damping resistor is used (see above), continuous operation is only possible with 2 kV output voltage. If the output voltage is set to 1 kV instead, operation must be paused for 30 minutes after 5 minutes. Operation with 500 V output voltage is not allowed!

4.1.1 Preparation of Burning-Down

Turn the rotary output voltage control [6] into its zero position (left stop) before switching on (voltage is monitored !!). If you forget to do so, an acoustic signal will sound as soon as the green push button HV – ON [18] is pressed. The output voltage indicated on the rotary control will not be applied to the terminals.

The rotary output current control [9] may be in any position. For burning down a cable fault we recommend to turn the current control clockwise to its right stop. In this position the maximum possible current will be supplied.

Now the instrument can be switched on by pressing the grey push button labelled Operation Standby ON [17]. When the instrument is switched on, the green lamp repeater [21] is alight. The instrument is ready for use.

Pressing the green push button HV – ON [18] results in the BT 500-IS-1 changing over to switching-on standby (Attention!!: Consider the test object as being live, i. e. under high voltage!).

4.1.2 Burning-Down

After the instrument has been switched on, burning down can be started. To this end the rotary output voltage control [6] is slowly turned clockwise until the fault is ignited. This is signalled by the breakdown of output voltage as indicated by the voltmeter.

The ammeter indicates the intensity of the current flowing through the faulty wires. When the pointer is in a stable position, an optimum arc is burning and the fault is burnt down in the best possible way.

After some time the fault resistance in the cable will decrease. As a consequence, the voltage across the fault resistance is reduced, too. As soon as the voltage has become lower than the maximum voltage of the next lower range, we recommend to switch down the voltage range one step. Continue this procedure until the lowermost range 500 V is reached.

If the arc has been interrupted by doing so, switch back to the next higher voltage range. You will possibly need to repeat this procedure several times.

4.1.3 Power Diagram of Fault Location

Pinpointing a sheath fault by the method of step voltage requires a test current of between 10 and 100 mA. Although a higher test current will also generate a cone of higher voltage, we suggest that you should refrain from using too high a current during pinpointing in order to limit the thermal effects at the place of fault and avoid any damage to adjacent cables. To this end the BT 500-IS-1 is equipped with an automatic current regulator.

Since maximum power is limited to 500 W, the current will increase with decreasing fault resistance only up to a certain limit. Starting from this limit, the current regulator maintains the current constant. With dropping error resistance the output voltage drops, too.

Figure 5 and the following example demonstrate these circumstances.

Maximum current output at each range step is limited to the value stated in the following tabulation.

	Voltage range	Max. output current
1.	500 Volt DC current	1.0 A at $R_f \leq 500\Omega$
2.	1000 Volt DC current	0.5 A at $R_f \leq 2\ k\Omega$
3.	2000 Volt DC current	0.25 A at $R_f \leq 8\ k\Omega$

Example:
In a cable fault of 500 Ω, a maximum current of only 0.25 A is generated in spite of the small fault resistance due to the effect of the current limiter at switch position 3 (2000 Volt). In this case the power supplied to the fault is only I^2 x R = approx. 32 Watts. However, in switch position 2 the power to the fault is increased to be 125 Watt. It is only in switch position 1 that the total power of the instrument amounting to 500 Watts is effective in the fault.

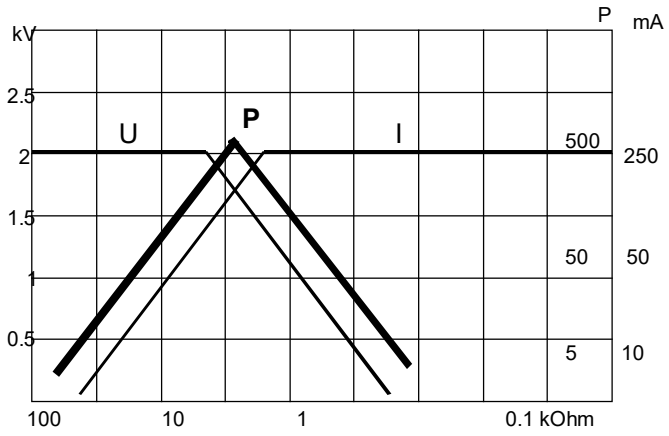

Figure 5 : Power Diagram of Fault Location

In this manner the full power of the BT 500-IS-1 can be exploited for burning down the high-resistance fault into a low-resistance one. Localization proper of the low-resistance fault is performed using no more than just a few times 10 Watts. Thermal stress is reduced still further by pulsed operation since in this manner the on-time of current flow is reduced.

4.2 Sheath Fault Postlocation

The Cable Fault Burn-Down Instrument BT 500-IS-1 is connected to the shield of the faulty cable or conductor with an earth fault (e. g. in a 4-wire low-voltage cable), on the one hand, and system earth, on the other. Depending on the size of fault resistance R_F the current escaping at the place of fault may differ. This current produces a voltage drop when flowing through the soil. Earth rods are used to measure this voltage drop occurring on the ground by means of Indicator ESG 80-2. As Fig 6 shows, polarity is reversed behind the place of fault as compared with positions in front of it. These different polarities are used to determine the direction to the fault and the point of polarity reversal is used to pinpoint the exact place of fault. For this reason please make sure that the earth rods are always rammed into the ground in the same direction.

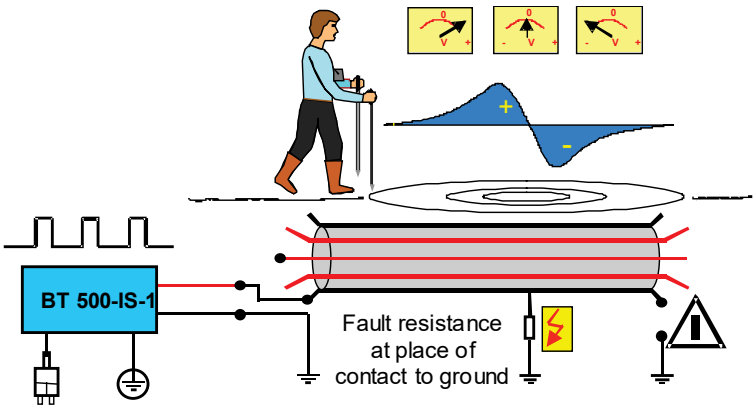

Figure 6 : Principle of Sheath Fault Postlocation

Also make sure that the ESG 80-2 is oriented in parallel to the cable, with the + terminal in the direction of the source and the – terminal in the direction of the far cable end. If you change the direction of the instrument, you will not be able to find out the direction to the fault.

In order to protect the fault from drying out, pulsed voltage is employed. In this mode the output voltage is cycled on and off by a built-in electronic switch (push button Pulsed operation [19]), with the on-time being approx. 1 second and the off-time approx. 3 seconds.
For more details please refer to the instruction manual of ESG 80 –2.

4.3 Sheath Fault Prelocation in Conjunction with MVG 5

Note: This option is not applicable for the 115 Volt version.

Megger also sells a high voltage measuring bridge labelled MVG 5. The measuring techniques described in chapter 3.3 can only be implemented if you combine MVG 5 with BT 500-IS-1.
The red terminal of the BT 500-IS-1 must be connected to the contact pin for voltage feed (HSP) of the MVG 5, the black terminal to the contact pin of system earth of the MVG 5 (see also instruction manual of MVG 5). Within the MVG 5, the black terminal is connected to its case and protective earth contact.

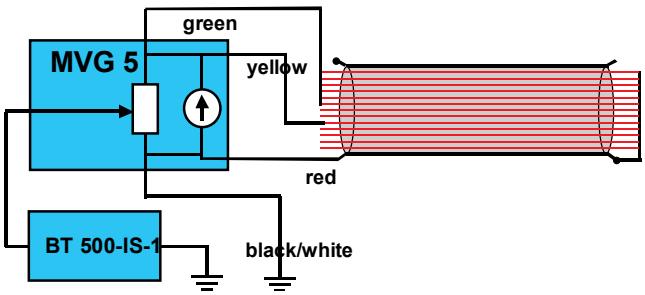

Figure 7 : Schematic Diagram of Sheath Fault Prelocation Using MVG 5 and BT 500-IS-1

Use the voltage selector switch [4] for selecting the output voltage range. In doing so, please make sure that you do not select a higher voltage than the maximum one permissible for the faulty cable or the test lead (observe regulations and cable type !!!).

To be more specific, the combination of BT 500-IS-1 and MVG 5 allows the following tests to be performed on telecommunication and power cables using test voltages up to 2 kV:

1. Sheath fault prelocation on shielded telecommunication and control cables with PVC or PE-type shields
2. Sheath fault prelocation on shielded medium-high voltage cables with PVC-type shields (2 kV maximum test voltage)
3. Prelocation of earth-to-wire faults on plastic-sheathed low-voltage cables.

Make sure the emergency-off switch NAG 2 is installed to ensure safe operation of the BT 500-IS-1 and the MVG 5.
For further details please refer to the instruction manual of the MVG 5.

4.4 Voltage Testing

Using the BT 500-IS-1, the following voltage tests can be performed:

- Shield to earth (sheath testing)
- Wires to shield (insulation testing)
- Wire to wire (insulation testing)

To perform sheath testing, connect the red terminal of the BT 500-IS-1 to the shield to be tested and the black terminal to system earth.

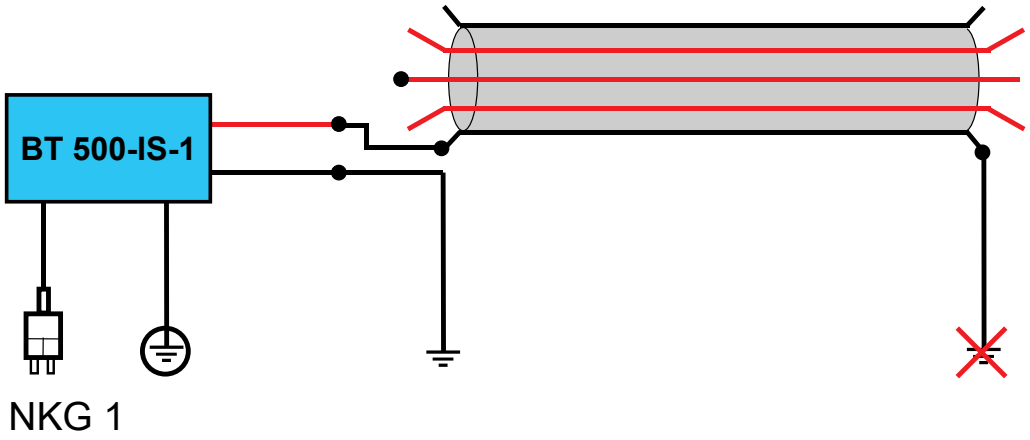

Figure 8 : How to Connect the BT 500-IS-1 for Sheath Testing

Use the voltage selector switch [4] for selecting the output voltage range. In doing so, please make sure that you do not select a higher voltage than the maximum one permissible for the faulty test cable (observe regulations and cable type !!!).
The maximum recommended leakage current for sheath testing is approx. 20 µA per km (32 µA per mile) for PE-type sheaths and approx. 800 per km (1280 µA per mile) for PVC-type sheaths.

On voltage range 2 kV, press the push button [7] to switch the sensitivity of the meter when you want to determine the leakage current in a sheath or insulation test (refer to chapter 3.4.2).

4.4.1 Preparation of Voltage testing

Prior to switching on, turn the rotary output voltage control [6] into its zero position (left stop) (voltage is monitored). If you forget to do so, an acoustic signal is sounded as soon as you press the green push button HV – ON [18]. The voltage indicated on the rotary control will not be supplied to the output terminal!

The rotary output current control [9] may be in any position. For voltage testing we recommend to turn the current control anti-clockwise to its left stop. In this position 10 % of the maximum possible current is supplied.

Now the instrument can be switched on by pressing the grey push button labelled Operation Standby ON [17]. When the instrument is switched on, the green lamp repeater [21] is alight. The instrument is ready for use.

Pressing the green push button HV – ON [14] results in the BT 500-IS-1 being on switching-on standby (Attention !!: Consider the test object as being live, i. e. under high voltage!).

4.4.2 Voltage Testing

After the instrument has been switched on, high-voltage testing can be started. To this end the rotary output voltage control [6] is slowly turned clockwise until the desired test voltage has been reached.

The ammeter indicates the intensity of the test current. For measuring small currents between 1 µA and 1 mA, press the push button [7] on the 2-kV range to switch the full-scale sensitivity of the ammeter to 10 µA or 1 mA, respectively. After the push button [7] has been released, the instrument regains its full-scale sensitivity of 250 mA.

When working in the 1 mA range, the rotary output current control should be set to the maximum value since otherwise the max. current of 1 mA cannot be achieved (current limit).

4.5 Switching Off

Press the red push button [16] to switch the instrument off. The switch simultaneously shortens both output terminals, allowing the cable to be discharged through a discharge resistor.

Protect the instrument from being switched on again by turning the detachable key switch to position – **O –** and taking the key out.

Prior to disconnecting both connected wires, use a short-circuit cable to additionally verify the absence of voltage at both terminals.

In order to guarantee the absence of voltage on the test cable, make sure that the test lead is equipped with a fixed earthing facility. In this manner you can prevent the cable from being unintentionally re-charged due to physical effects.

The energy stored in the test object (cable) shall not exceed 600 Joule [Ws]. Otherwise the internal discharging circuit may be destroyed. A discharge of 600 J [Ws] can be performed up to two times within one minute.

Calculation: $W = ½ * C * U^2$

W: Energy, measured in Joule [Ws]
C: Capacity of the test object, measured in Farad [F]
U: applied Voltage, measured in Volt [V]

5 Customer Service

Please contact your nearest Megger service department when your BT 500-IS-1 is not functional any more.

If the instrument is exposed to extreme temperature fluctuations, there may be isolated cases that condensation precipitates on components under high voltage (due to falling below the dew point). This condensation reduces the disruptive strength of the components and so may result in a short circuit which may damage the instrument. For this reason we recommend that in any case, when a high-voltage instrument such as the BT 500-IS-1 has been moved from an extremely cold into an extremely warm environment, it should be given 1 hour to get acclimatised to its new environment before it is put into operation.

Tento symbol indikuje, že výrobek nesoucí takovéto označení nelze likvidovat společně s běžným domovním odpadem. Jelikož se jedná o produkt obchodovaný mezi podnikatelskými subjekty (B2B), nelze jej likvidovat ani ve veřejných sběrných dvorech. Pokud se potřebujete tohoto výrobku zbavit, obraťte se na organizaci specializující se na likvidaci starých elektrických spotřebičů v blízkosti svého působiště.

Dit symbool duidt aan dat het product met dit symbool niet verwijderd mag worden als gewoon huishoudelijk afval. Dit is een product voor industrieel gebruik, wat betekent dat het ook niet afgeleverd mag worden aan afvalcentra voor huishoudelijk afval. Als u dit product wilt verwijderen, gelieve dit op de juiste manier te doen en het naar een nabij gelegen organisatie te brengen gespecialiseerd in de verwijdering van oud elektrisch materiaal.

This symbol indicates that the product which is marked in this way should not be disposed of as normal household waste. As it is a B2B product, it may also not be disposed of at civic disposal centres. If you wish to dispose of this product, please do so properly by taking it to an organisation specialising in the disposal of old electrical equipment near you.

Този знак означава, че продуктът, обозначен по този начин, не трябва да се изхвърля като битов отпадък. Тъй като е B2B продукт, не бива да се изхърля и в градски пунктове за отпадъци. Ако желаете да извърлите продукта, го занесете в пункт, специализиран в изхвърлянето на старо електрическо оборудване.

Dette symbol viser, at det produkt, der er markeret på denne måde, ikke må kasseres som almindeligt husholdningsaffald. Eftersom det er et B2B produkt, må det heller ikke bortskaffes på offentlige genbrugsstationer. Skal dette produkt kasseres, skal det gøres ordentligt ved at bringe det til en nærliggende organisation, der er specialiseret i at bortskaffe gammelt el-udstyr.

Sellise sümboliga tähistatud toodet ei tohi käidelda tavalise olmejäätmena. Kuna tegemist on B2B-klassi kuuluva tootega, siis ei tohi seda viia kohalikku jäätmekäitluspunkti. Kui soovite selle toote ära visata, siis viige see lähimasse vanade elektriseadmete käitlemisele spetsialiseerunud ettevõttesse.

Tällä merkinnällä ilmoitetaan, että kyseisellä merkinnällä varustettua tuotetta ei saa hävittää tavallisen kotitalousjätteen seassa. Koska kyseessä on yritysten välisen kaupan tuote, sitä ei saa myöskään viedä kuluttajien käyttöön tarkoitettuihin keräyspisteisiin. Jos haluatte hävittää tämän tuotteen, ottakaa yhteys lähimpään vanhojen sähkölaitteiden hävittämiseen erikoistuneeseen organisaatioon.

Ce symbole indique que le produit sur lequel il figure ne peut pas être éliminé comme un déchet ménager ordinaire. Comme il s'agit d'un produit B2B, il ne peut pas non plus être déposé dans une déchetterie municipale. Pour éliminer ce produit, amenez-le à l'organisation spécialisée dans l'élimination d'anciens équipements électriques la plus proche de chez vous.

Cuireann an siombail seo in iúl nár cheart an táirgeadh atá marcáilte sa tslí seo a dhiúscairt sa chóras fuíoll teaghlaigh. Os rud é gur táirgeadh ghnó le gnó (B2B) é, ní féidir é a dhiúscairt ach oiread in ionaid dhiúscartha phobail. Más mian leat an táirgeadh seo a dhiúscairt, déan é a thógáil ag eagraíocht gar duit a sainfheidhmíonn i ndiúscairt sean-fhearas leictrigh.

Dieses Symbol zeigt an, dass das damit gekennzeichnete Produkt nicht als normaler Haushaltsabfall entsorgt werden soll. Da es sich um ein B2B-Gerät handelt, darf es auch nicht bei kommunalen Wertstoffhöfen abgegeben werden. Wenn Sie dieses Gerät entsorgen möchten, bringen Sie es bitte sachgemäß zu einem Entsorger für Elektroaltgeräte in Ihrer Nähe.

Αυτό το σύμβολο υποδεικνύει ότι το προϊόν που φέρει τη σήμανση αυτή δεν πρέπει να απορρίπτεται μαζί με τα οικιακά απορρίμματα. Καθώς πρόκειται για προϊόν B2B, δεν πρέπει να απορρίπτεται σε δημοτικά σημεία απόρριψης. Εάν θέλετε να απορρίψετε το προϊόν αυτό, παρακαλούμε όπως να το παραδώσετε σε μία υπηρεσία συλλογής ηλεκτρικού εξοπλισμού της περιοχής σας.

Ez a jelzés azt jelenti, hogy az ilyen jelzéssel ellátott terméket tilos a háztartási hulladékokkal együtt kidobni. Mivel ez vállalati felhasználású termék, tilos a lakosság számára fenntartott hulladékgyűjtőkbe dobni.Ha a terméket ki szeretné dobni, akkor vigye azt el a lakóhelyéhez közel működő, elhasznált elektromos berendezések begyűjtésével foglalkozó hulladékkezelő központhoz.

Questo simbolo indica che il prodotto non deve essere smaltito come un normale rifiuto domestico. In quanto prodotto B2B, può anche non essere smaltito in centri di smaltimento cittadino. Se si desidera smaltire il prodotto, consegnarlo a un organismo specializzato in smaltimento di apparecchiature elettriche vecchie.

Šī zīme norāda, ka iztrādājumu, uz kura tā atrodas, nedrīkst izmest kopā ar parastiem mājsaimniecības atkritumiem. Tā kā tas ir izstrādājums, ko cits citam pārdod un lieto tikai uzņēmumi, tad to nedrīkst arī izmest atkritumos tādās izgāztuvēs un atkritumu savākšanas vietās, kas paredzētas vietējiem iedzīvotājiem. Ja būs vajadzīgs šo izstrādājumu izmest atkritumos, tad rīkojieties pēc noteikumiem un nogādājiet to tuvākajā vietā, kur īpaši nodarbojas ar vecu elektrisku ierīču savākšanu.

Šis simbolis rodo, kad juo paženklinto gaminio negalima išmesti kaip paprastų buitinių atliekų. Kadangi tai B2B (verslas verslui) produktas, jo negalima atiduoti ir buitinių atliekų tvarkymo įmonėms. Jei norite išmesti šį gaminį, atlikite tai tinkamai, atiduodami jį arti jūsų esančiai specializuotai senos elektrinės įrangos utilizavimo organizacijai.

Dan is-simbolu jindika li l-prodott li huwa mmarkat b'dan il-mod m'għandux jintrema bħal skart normali tad-djar. Minħabba li huwa prodott B2B , ma jistax jintrema wkoll f'ċentri ċiviċi għar-rimi ta' l-iskart. Jekk tkun tixtieq tarmi dan il-prodott, jekk jogħġbok għamel dan kif suppost billi tieħdu għand organizzazzjoni fil-qrib li tispeċjalizza fir-rimi ta' tagħmir qadim ta' l-elettriku.

Dette symbolet indikerer at produktet som er merket på denne måten ikke skal kastes som vanlig husholdningsavfall. Siden dette er et bedriftsprodukt, kan det heller ikke kastes ved en vanlig miljøstasjon. Hvis du ønsker å kaste dette produktet, er den riktige måten å gi det til en organisasjon i nærheten som spesialiserer seg på kassering av gammelt elektrisk utstyr.

Ten symbol oznacza, że produktu nim opatrzonego nie należy usuwać z typowymi odpadami z gospodarstwa domowego. Jest to produkt typu B2B, nie należy go więc przekazywać na komunalne składowiska odpadów. Aby we właściwy sposób usunąć ten produkt, należy przekazać go do najbliższej placówki specjalizującej się w usuwaniu starych urządzeń elektrycznych.

Este símbolo indica que o produto com esta marcação não deve ser deitado fora juntamente com o lixo doméstico normal. Como se trata de um produto B2B, também não pode ser deitado fora em centros cívicos de recolha de lixo. Se quiser desfazer-se deste produto, faça-o correctamente entregando-o a uma organização especializada na eliminação de equipamento eléctrico antigo, próxima de si.

Acest simbol indică faptul că produsul marcat în acest fel nu trebuie aruncat ca şi un gunoi menajer obişnuit. Deoarece acesta este un produs B2B, el nu trebuie aruncat nici la centrele de colectare urbane. Dacă vreţi să aruncaţi acest produs, vă rugăm s-o faceţi într-un mod adecvat, ducând-ul la cea mai apropiată firmă specializată în colectarea echipamentelor electrice uzate.

Tento symbol znamená, že takto označený výrobok sa nesmie likvidovať ako bežný komunálny odpad.Keďže sa jedná o výrobok triedy B2B, nesmie sa likvidovať ani na mestských skládkach odpadu. Ak chcete tento výrobok likvidovať, odneste ho do najbližšej organizácie, ktorá sa špecializuje na likvidáciu starých elektrických zariadení.

Ta simbol pomeni, da izdelka, ki je z njim označen, ne smete zavreči kot običajne gospodinjske odpadke. Ker je to izdelek, namenjen za druge proizvajalce, ga ni dovoljeno odlagati v centrih za civilno odlaganje odpadkov. Če želite izdelek zavreči, prosimo, da to storite v skladu s predpisi, tako da ga odpeljete v bližnjo organizacijo, ki je specializirana za odlaganje stare električne opreme.

Este símbolo indica que el producto así señalizado no debe desecharse como los residuos domésticos normales. Dado que es un producto de consumo profesional, tampoco debe llevarse a centros de recogida selectiva municipales. Si desea desechar este producto, hágalo debidamente acudiendo a una organización de su zona que esté especializada en el tratamiento de residuos de aparatos eléctricos usados.

Den här symbolen indikerar att produkten inte får blandas med normalt hushållsavfall då den är förbrukad. Eftersom produkten är en så kallad B2B-produkt är den inte avsedd för privata konsumenter, den får således inte avfallshanteras på allmänna miljö- eller återvinningsstationer då den är förbrukad. Om ni vill avfallshantera den här produkten på rätt sätt, ska ni lämna den till myndighet eller företag, specialiserad på avfallshantering av förbrukad elektrisk utrustning i ert närområde.