

# Line Impedance Kit

## Accessory for TRAX



- **K-factors automatically calculated in dedicated Line impedance app**
- **Safe testing with high current/high voltage protection against lightning**
- **Measurement method using variable frequency for noise suppression and accurate measurements**

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### DESCRIPTION

The Line Impedance Kit is an accessory for the TRAX instrument. It consists of TSA230, a surge arrester box and TPB230, a protection box, plus cables and accessories.

The purpose of the line impedance measurement is to determine the line model's parameters. In line model using symmetrical components these parameters are defined by zero sequence impedances  $Z_1$  and  $Z_0$ , and they are used for calculation of the k-Factors.

Seven different test set-ups have to be measured. At each set-up, testing is done at two frequencies other than power frequency to allow power frequency interference to be effectively suppressed. The results will be shown at power frequency by interpolation of the measured points.

The performance of most distance protection relays depends on the positive sequence reactance  $X_1$  and the k factor.  $X_1$  is used to define the zone reach, which is crucial for the relay to decide in which zone a fault occurs.

APPLICATION EXAMPLE

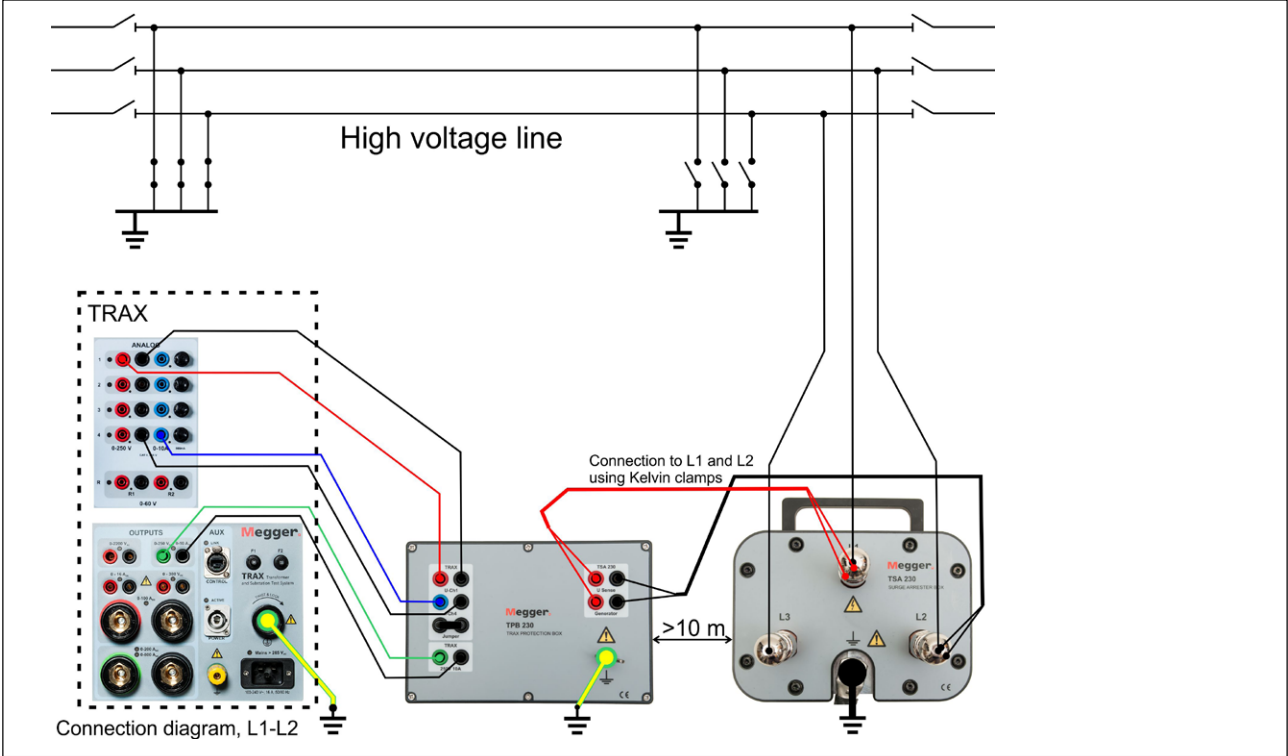


Diagram illustrating the test set-up for TRAX incl. TPB and TSA measuring L1-L2. Seven measurements have to be performed, the measurements are done between the phases and between phases and grounds

## SPECIFICATIONS

Specifications are valid at nominal input voltage and an ambient temperature of +25°C, (77°F). Specifications are subject to change without notice.

### Environment

<i>Application field</i>	The instrument is intended for use in high-voltage substations and industrial environments.
<i>Temperature</i>	
<i>Operating</i>	-20°C to +55°C (-4°F to +131°F)
<i>Storage &amp; transport</i>	-40°C to +70°C (-40°F to +158°F)
<i>Humidity</i>	5% – 95% RH, non-condensing
<i>Shock/Vibration/Fall</i>	
<i>Instrument only</i>	ETSI EN 300 019-2-7 class 7M2
<i>Instrument in transport case</i>	ISTA 2A
<i>Altitude</i>	
<i>Operating</i>	<3000 m (10000 ft)
<i>Storage</i>	<10000 m (33000 ft)
<i>Encapsulation class</i>	IP20

### CE-marking

<i>EMC</i>	IEC61326-1
<i>LVD</i>	IEC61010-1:2010 & IEC61010-2-030

### General

<i>Dimensions</i>	
<i>TPB230</i>	225 x 150 x 110 mm (8.8" x 5.9" x 4.3")
<i>TSA230</i>	210 x 150 x 90 mm (8.3" x 5.9" x 3.5")
<i>Weight</i>	18 kg (40 lbs) total inkl accessories and transport case

## Output/Input

### TPB230

#### U-Ch1

Voltage divider

<i>Ratios</i>	20.43 (gain 1, 2), 23.86 (gain 3), 21.34 (gain 4, 5)
<i>Amplitude accuracy</i>	±0.4%
<i>Phase accuracy</i>	±1 degrees (max 5 m leads)

### I-CH4

Current transformer

Designed to be connected to TRAX Ch1\_U, Ch4\_I

<i>Ratio</i>	10.04
<i>Accuracy class</i>	0.2S (max 2 VA burden)
<i>Impedances</i>	
<i>Current output</i>	50 mA – 10 A
<i>Voltage output</i>	200 mV – 250 V
<i>Impedance range</i>	20 mΩ – 5 kΩ

### TSA230

#### L1, L2, L3

<i>Nominal ac spark-over voltage</i>	< 1000 Vrms
<i>Lightning impulse voltage</i>	< 2000 V
<i>Short-circuit capability</i>	30 kA (< 100 ms) / 75 kA

## ORDERING INFORMATION

Item	Art. No.
<b>Line Impedance Kit</b>	AJ-69690
<b>Included parts:</b>	
TSA 230, TRAX Surge Arrester	1 AJ-97050
TPB 230, TRAX Protection Box	1 AJ-97060
Ground cable, 5 meter	1 GC-30095
TSA ground cable, 2 meter	1 GC-32202
RS1020, 20 mm	3 07-00520
RS1525, 25 mm	3 07-00525
Ground clamp JK27V M12	1 07-00510
Test lead, 5 meter, black	3 04-35050
Test lead, 5 meter, red	1 04-35052
Test lead, 5 meter, green	1 04-35055
Test lead, 5 meter, blue	1 04-35056
Transport case	1 GD-00175
Ground fuse puck	6 (3)* 53-30243
O-Ring 10-2 72 NBR 872	6 (3)* 05-00310
Insulation washer	6 (3)* 55-13345
Ground fuse isolation pipe	3 55-13346
*Included spare parts	

### SALES OFFICE

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### Line-Impedance-Kit\_DS\_en\_V01a

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ISO 9001:2008

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