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 suppresion and accurate measurements**

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 Z1 and Z0, 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 X1 and the k factor. X1 is used to define the zone reach, which is crucial for the relay to decide in which zone a fault occurs.

APPLICATION EXAMPLE

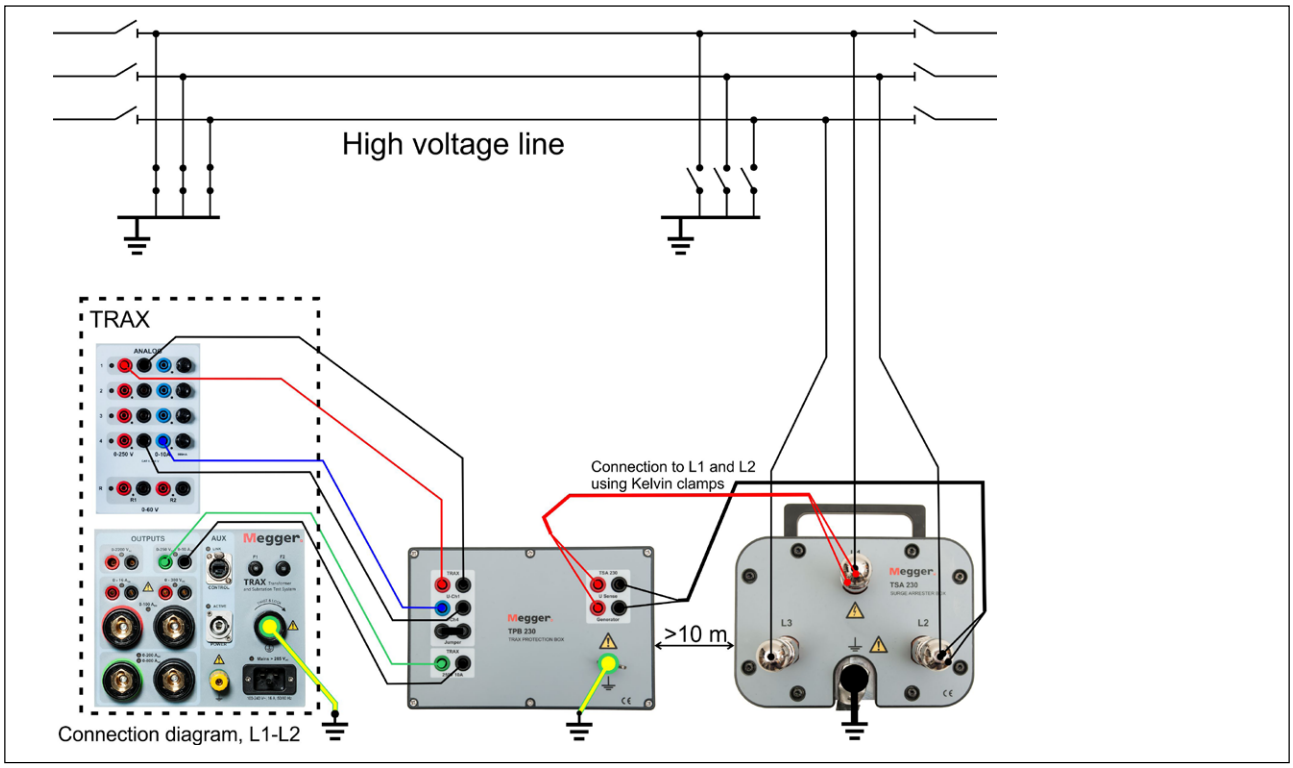

Diagram illustrating the test set-up for TRAX incl. TPB and TSA measuring L1-L2.
Seven measurements have to be performed, the measurements are done between the phases and between phases and grounds

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

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

CE-marking

EMC	IEC61326-1
LVD	IEC61010-1:2010 & IEC61010-2-030

General

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

Output/Input

TPB230

U-Ch1
Voltage divider

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

I-CH4

Current transformer
Designed to be connected to TRAX Ch1_I-Ch4_I.

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

TSA230

L1, L2, L3

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

ORDERING INFORMATION

Item		Art. No.
Line Impedance Kit		AJ-69690
Included parts:		
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		

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