



Line Traps

Air-Core, Dry-Type up to 1100kV



GERMANY HAMBURG • WIRGES • KIRCHAICH • DRESDEN
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Power Line Carrier (PLC) is the most common, reliable and cost-effective method for communications utilizing the existing transmission lines. A PLC system provides remote metering and control for tele-protection, as well as voice and data communications between stations.

The Line Trap is a critical component of the PLC system and is connected in series with the HV transmission line. It must be designed and manufactured to withstand the high mechanical forces that are generated by the short-circuit current during a fault condition. The primary purpose of the Line Trap is to present a high impedance at the carrier frequency and a negligible impedance at the power frequency. The tuning circuit, together with the main coil inductance, provide the necessary blocking characteristics. The net result is that the power frequency current is allowed to flow normally while the high frequency carrier signals are prevented from being dissipated in the substation.

Ritz has a long history of supplying line traps around the world. As such, Ritz can provide a complete range of line traps up to 1100kV and 5000A.

Construction

Ritz line traps are designed and manufactured to meet IEEE/ANSI C93.3, IEC 60353, or any other international standard.

Line traps are comprised of three main components: the main coil, the tuning device, and the protective device.

The main coil is a resin encapsulated air-core dry-type inductor. The windings consist of aluminum wire or cable, which are insulated to the appropriate insulation temperature index, and fully encapsulated with resin impregnated fiberglass. All current carrying supports and conductors utilize welded connections to ensure a robust line trap. This type of construction provides the line trap with a high mechanical strength. This is critical since line traps are series connected with the HV transmission line and must be designed to withstand the high mechanical forces generated during a short-circuit on the HV transmission system.

The aluminum supports or cross-arms, at the top and bottom of the line trap, provide mechanical support as well as the electrical connection to the windings. These cross-arms are also utilized to support the tuning device(s), the lightning arrester, any corona protection, mounting pedestals and lifting attachments.

The tuning device, connected in parallel with the main coil, forms a blocking circuit which provides high impedance over a specified frequency range of the power line carrier channel. The bandwidth of a line trap is the frequency range over which the line trap provides a specified minimum blocking impedance or resistance.

The various types of tuning include: Single Frequency; Double Frequency; and Wideband. The tuning device consists of several combinations of capacitors, resistors and inductors of comparative low power ratings. To protect the tuning circuit from mechanical damage and environmental conditions, it is mounted inside one or more fiberglass cylinders which are filled with resin compound and sealed. The tuning device is mounted to one of the bottom cross-arms inside the main coil.

The protective device safeguards the tuning device and the main coil against high voltage surges. The surge arrester is bolted to one of the cross-arms and is in parallel with the main coil and tuning device. It reduces the transient overvoltages to levels corresponding to distribution voltage class insulation. The Ritz line traps utilize a metal-oxide type surge arrester with a discharge current rating of 10kA. Proper insulation coordination between main coil and insulation level and the surge arrester characteristic is achieved to ensure reliable protection.



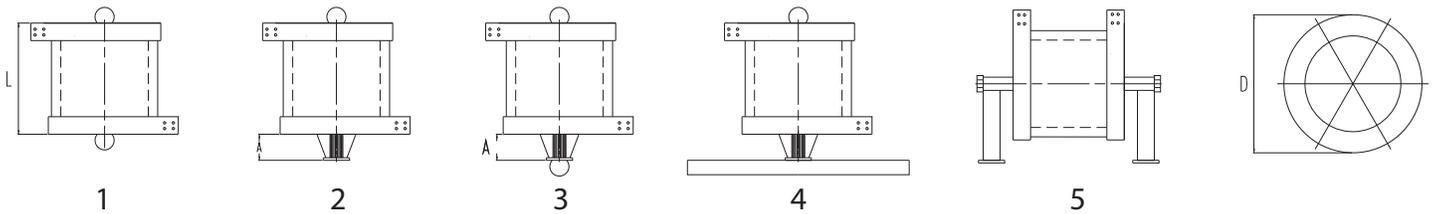
Mounting

Ritz line traps can be mounted in a variety of different configurations.

Suspension mounted line traps are designed to be suspended from single-point or multi-point suspension brackets.

Vertical pedestal mounted line traps can be single-point or multi-point mounted. Single-point vertical pedestal mounted line traps are designed to mount on a post-insulator or Coupling Capacitor Voltage Transformer. For multi-point vertical pedestal mounting, the number of support insulators can be configured based on the customer's request.

Horizontal pedestal mounted line traps are supplied with 2 or 4 aluminum mounting pedestals.



Mounting Types

1. Suspension
2. Vertical Pedestal
3. Universal (Optional Suspension or Vertical Pedestal)
4. Vertical with Horizontal Channel
5. Horizontal Pedestal

D = Coil Diameter

L = Coil Length

A = Pedestal Height

Standard 0.265mH Line Traps as per IEEE Standard

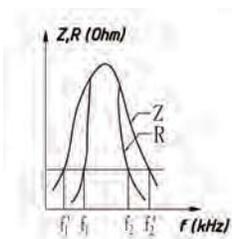
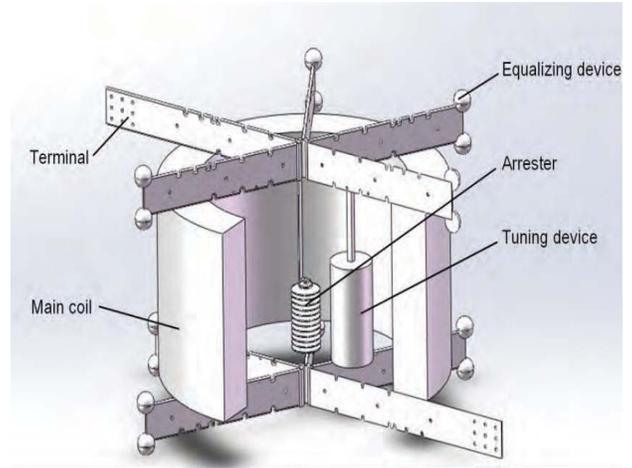
Model Type	Current (A)	Mounting Type	$I_{5/c}$ 2-sec (kA)	I_{peak} (kA)	D (inches)	L (inches)	A (inches)	Approximate Weight (lbs)
1	400	1, 2, 3, 4, 5	15	38.3	23 4/5"	25"	6"	190
2	800	1, 2, 3, 4, 5	20	51.0	34"	25 3/5"	6"	335
3	1200	1, 2, 3, 4, 5	36	91.8	46"	30 4/5"	10"	585
4	1600	1, 2, 3, 4	44	112.2	37 4/5"	36 4/5"	10"	810
5	1600	5	44	112.2	55 3/5"	67"	-	1165
6	2000	1, 2, 3, 4	63	160.7	40 7/10"	37 2/5"	15"	1055
7	2000	5	63	160.7	61 3/5"	76 2/5"	-	1682
8	3000	1, 2, 3, 4	63	160.7	42 7/10"	42 1/5"	15"	1240
9	4000	1, 2, 3, 4	80	204.0	52 1/5"	47"	15"	2560
10	5000	1, 2, 3, 4	80	204.0	58 3/5"	46"	15"	3440

High Frequency Blocking Characteristics

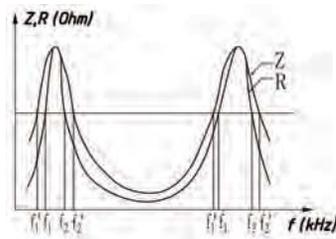
The frequency range for PLC application is 30kHz to 500kHz. The line trap is designed to present a high impedance at the specified PLC frequencies and a negligible impedance at power frequency.

The types of tuning available are:

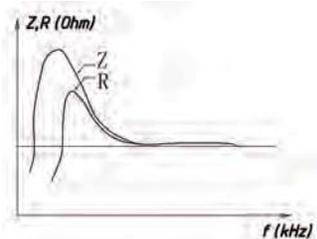
- Single Frequency
- Double Frequency
- Wide Band
- Self-Tuned



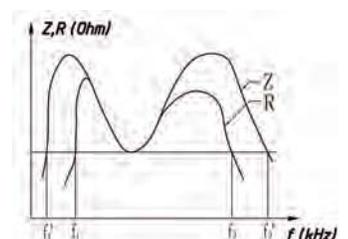
Single Frequency Tuning



Double Frequency Tuning



Self-Tuning



Wide Band Tuning



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