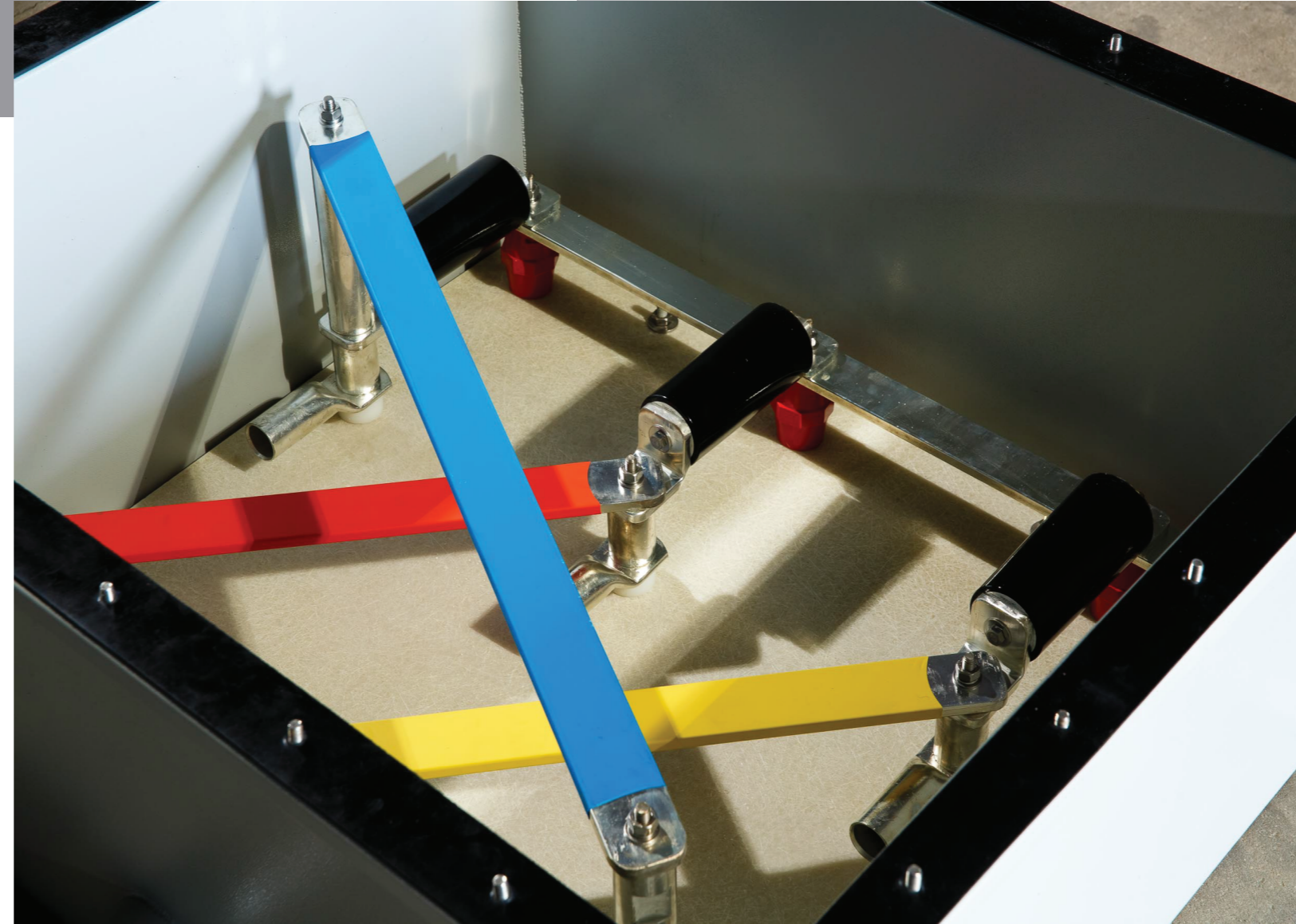


LINK BOXES

CATALOGUE



GET IN TOUCH

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About Link Boxes

With the development of high voltage and ultra-high voltage applications in power system, the single-core XLPE cables are usually used instead of three-core cables

Underground power cable system design presents unique design and installation challenges not found in the overhead transmission lines

Poorer thermal dissipation, confined spaces, lack of visibility, more difficult fault diagnosis, circulating earth currents, and frequent joints in an unfriendly environment are all problems that cable engineering design must overcome to deliver a reliable long term installation

Link Boxes are used with cable joints and terminations to limit voltage build-up on the sheath & also provide easy access to shield breaks for onsite test purposes. The link box is part of bonding system, which is essential of improving current carrying capacity and human protection



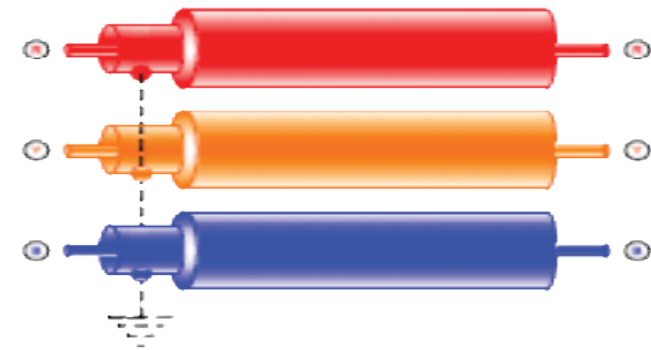
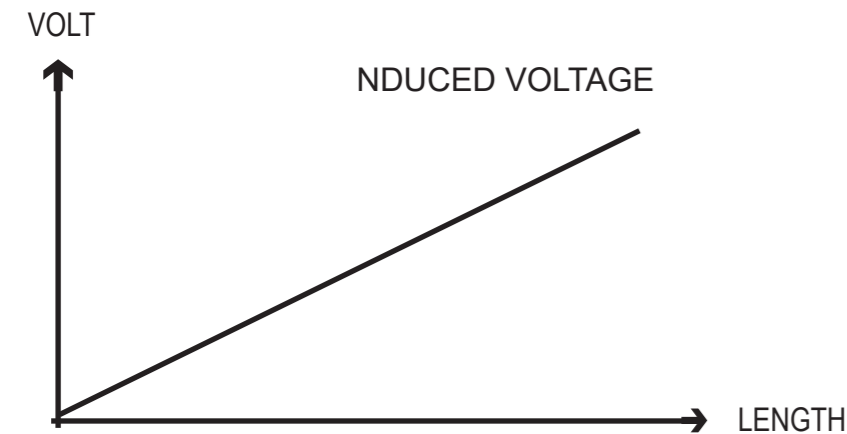
When these cables are in service, circulating currents flows in the sheaths. Large circulating current leads to the big loss & heating in the sheaths and thus reduces the permissible current of the cables. Moreover, it will also enhance the danger in the cable maintenance and reduce the lifetime of the cables or cause the faults by the breakdown of insulation or cable jacket. Lightning, fault currents and switching operations can cause over voltages on the cable sheath

The link box optimizes loss management in the cable shield, the bonding system is so designed that the cable sheaths are bonded and earthed with or without SVL in such a way as to eliminate or reduce the circulating sheath currents

- Rated voltage of Circuit
- Total Length of the circuit
- Total full load current & fault current of circuit
- Cable formation flat or trefoil formation
- The permissible induced voltage for the circuit

Single Point Bonding

This is the simplest form of bonding. The sheaths of the three cable sections are connected and grounded at one point only along their length. At all other points, there will be a voltage between sheath and ground that will be at its maximum at the farthest point from the ground bond. The sheaths must therefore be adequately insulated from ground. Since there is no closed sheath circuit, current does not normally flow along the sheaths and no sheath circulation current loss occurs

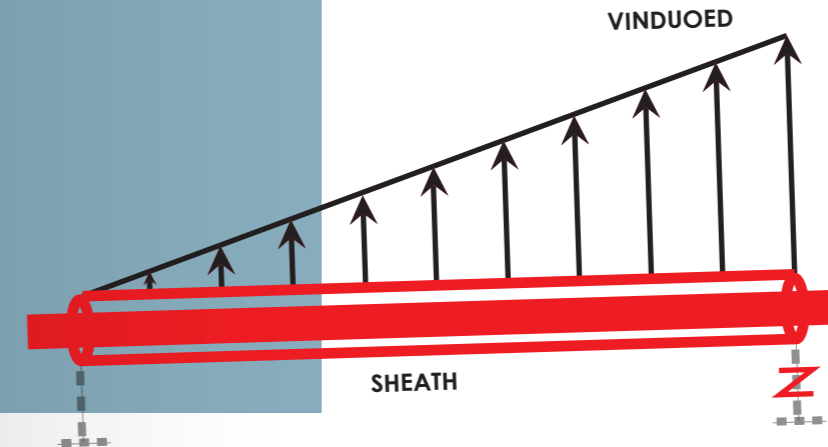


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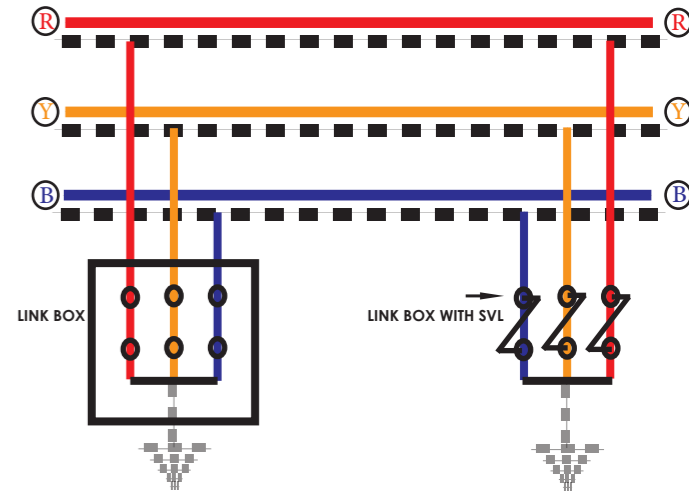
Both End Bonding

Most Simple and Common method. Cable screen is bonded to earth grids at both ends (via link box). This eliminates the need for the parallel continuity conductor used in single bonding systems. It also eliminates the need to provide SVL, such as that used at the free end of single-point bonding cable circuits. Significant circulating current in the screen Proportional to the core current and cable length and de rates cable. Could lay cable in compact trefoil formation if permissible. Suitable for route length Meter. Very small standing 500 of more than order of several volts voltage in the order of several volts

One End Solidly Grounder Another connected through Sheath Voltage Limiters

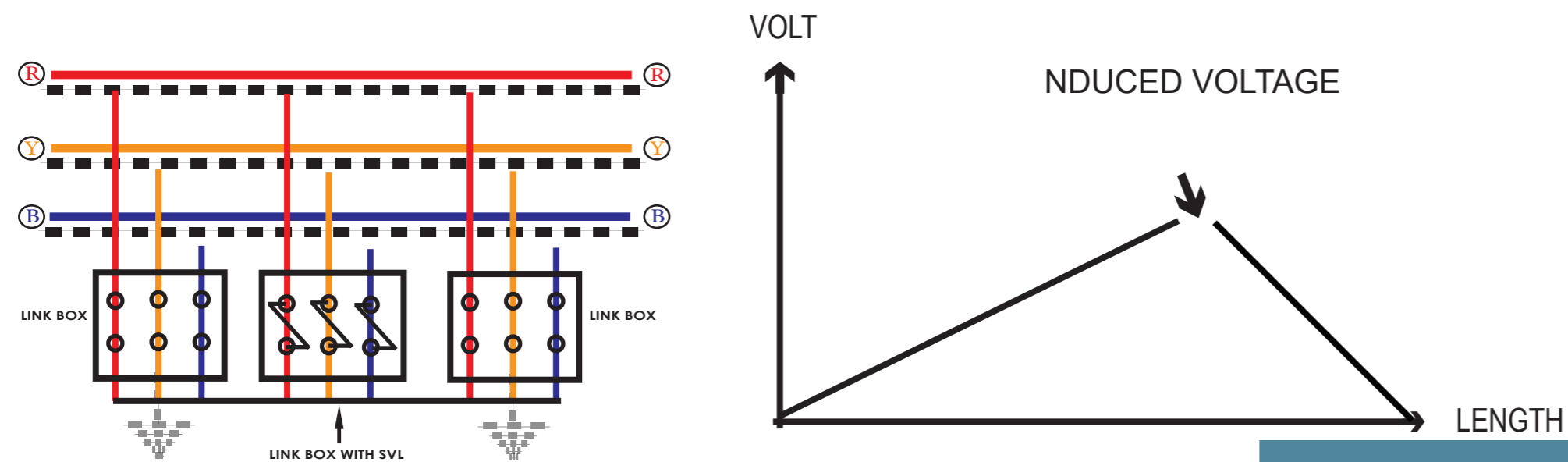


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Split Single Bonding System

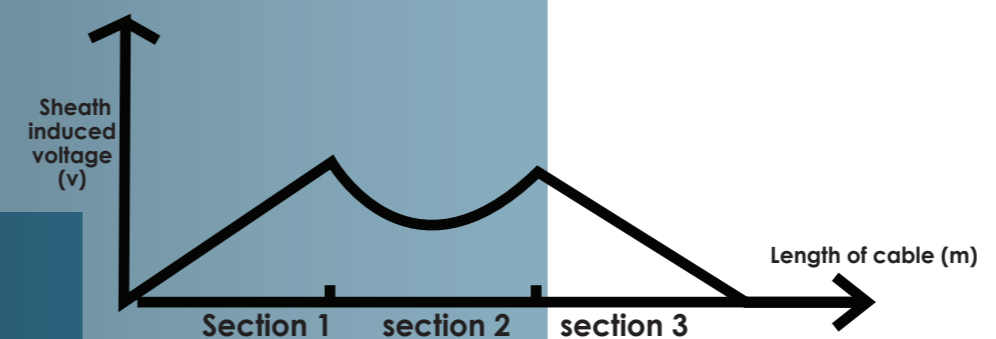
It is also known as double length single point bonding System. Cable screen continuity is interrupted at the midpoint and link boxes with SVLs at isolation joints. An Earth continuity link boxes 3 conductor is layer connecting earthing point of all



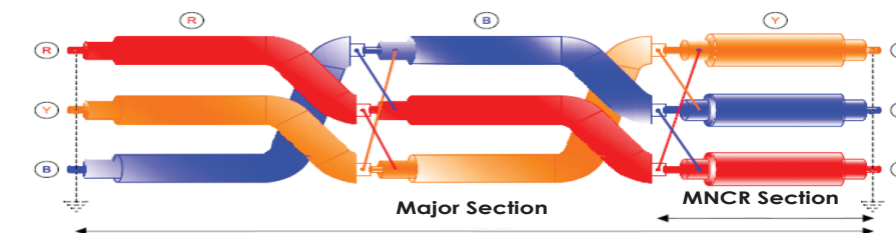
Cross Bonding

Cross bonded link box are installed at every transposition point/joint to transpose the metallic cable sheaths, connecting sheath of one phase to other as per transposition pattern

This cross connection of the sheaths effectively cancels circulating sheath currents. Surge voltage limiters or arrestors are routinely used between sheaths and earth to limit induced voltage spikes that may occur during transient and fault conditions



Transposing the position of the cables as shown in figure below, relative to each other at every joint bay. This ensures that sheath induced voltage is balanced in each cable. For cross bonding, the cable length is divided into three approximately equal sections. Each of the three alternating magnetic fields induces a voltage in the cable shields. The "120 with a phase shift of cross bonding takes place in the link boxes. Ideally, the vectorial addition of the induced voltages results in $U_{ires} = 0$. In practice, the cable length and the laying conditions will vary, resulting in a small residual voltage and a negligible current. Since there is no current flow, there are practically no losses in the screen. The total of the three voltages is zero, thus the ends of the three sections can be grounded



PTE Link Boxes

PTE Link Boxes are used by Utilities, Contractors and Cable Manufacturers across GCC

Using modern manufacturing technology, PTE can deliver a robust design capable of withstanding extreme Electrical, Mechanical & environmental stresses a link box may face

PTE's designs are type tested as per latest IEC standards, enclosure made of SS with routine testing 100%. Brass and Fiber Glass process ensures that each link box provides, high insulation, Low contact resistance & a moisture free environment for the cable metal sheath connections and links

PTE link boxes are designed using removable isolation links to provide the operator improved access to the cable connections and links, thus reducing installation and testing times

Different cable sheath earthing practices require a number of link box designs. These designs are suitable for either single core or coaxial bonding cables, and can be directly earthed or earthed through surge voltage limiters

Key Features Of PTE Link Boxes

- Compact Design
- Degree of Protection 67-IP
- Made of Stainless Steel, Fiber Glass & Brass
- Custom design cable glands and lugs sizes
- Underground & above ground installation designs
- Indoor & outdoor designs
- Removable disconnecting links for onsite testing
- Design Manufactured & Tested as per International Standards

IEEE STD-575
for Ingress Protection IEC-60529
for Insulation level IEC-60060-1
for Lighting impulse -IEC 60230
Short Circuit Withstand -IEC-62271

Sheath Voltage Limiter SVL

These special surge arresters are of relatively low continuous operating voltage

The correct sheath voltage limiter (SVL) is dictated by the need to withstand the highest external transient voltages that can occur from, short circuit fault, switching surges and lightning, which generate damaging over-voltages

The SVL used in PTE link boxes are manufactured by Insulect (AK Power) Australia, these zinc oxide SVLs are capable of withstanding high current surges and have the capacity to absorb and dissipate this energy

PTE's Link Boxes Configuration

Sl. No.	Item Code	Single Line Diagram	Description	SVL Earthing Option	Gland Entry	Enclosure
1	PTE-DE-1S		1/1way-Single Phase Direct Earthing Without SVL	Direct Earthing	1 in, 1out	Stainless Steel, Brass & Fiber Glass
2	PTE-ES-1S		1/1Way-Single Phase Direct Earthing With SVL	SVL Protection	1 in, 1out	Stainless Steel, Brass & Fiber Glass
3	PTE-DE-3S		3/1 Way -Three Phase Direct Earthing Without SVL	Direct Earthing	3 in, 1out	Stainless Steel, Brass & Fiber Glass
4	TE-ES-3S		3/1 Way -Three Phase With 3 SVLs.	SVL Protection	3 in, 1out	Stainless Steel, Brass & Fiber Glass
5	PTE-DE-6S		6/1 way-3 Phase Direct Earthing for joints-Without SVL (Coaxial Bonding Cable)	Direct Earthing	3 in, 1out	Stainless Steel, Brass & Fiber Glass
6	PTE-CES-6S		6/1 Way- 3 Phase Cross bonding for Joints with 3 SVLs (Coaxial Bonding Cable)	SVL Protection	3 in, 1out	Stainless Steel, Brass & Fiber Glass
7	PTE-CES-6S1		6/1 Way- 3 Phase Cross bonding for Joints with 3 SVLs (Single Core Bonding Cable)	SVL Protection	6 in, 1out	Stainless Steel, Brass & Fiber Glass
8	PTE-SES-6S		6/1 Way- 3 Phase Straight for Joints with 3 SVLs (Coaxial Bonding Cable)	SVL Protection	6 in, 1out	Stainless Steel, Brass & Fiber Glass
9	PTE-SES-6S1		6/1 Way- 3 Phase Straight for Joints with 3 SVLs (Single Core Bonding Cable)	SVL Protection	3 in, 1out	Stainless Steel, Brass & Fiber Glass
10	PTE-DE-6S1		6/1 Way- 3 Phase Straight for Joints using Single core bonding cable without SVLs	Direct Earthing	6 in, 1out	Stainless Steel, Brass & Fiber Glass
11	PTE-SESS-6S1		6/1 Way- 3 Phase Straight for Joints with 6 SVLs (Coaxial Bonding Cable)	SVL Protection	3 in, 1out	Stainless Steel, Brass & Fiber Glass

Receiving And Inspection

- Upon receiving unit, check for any interior and exterior damage, and if found, report it immediately to the carrier.
- Also check that all accessory items are accounted as stated in delivery note or packing list, for and are damage free.

WARNING!!

Installation of link boxes should only be performed by a qualified professional who has read and understands these instructions and is familiar with proper safety precautions. Improper installation poses serious of damage to link box and Surge Voltage Limiters installed in Link Box or injury to person for not following proper safety procedures. Read this manual thoroughly before installing or servicing this equipment. ALWAYS disconnect power & Earth the 3 phase bus bars prior to carry out any routine check of maintenance while in service.

Save these instructions:

This document is the property of the owner of this equipment and is required for future maintenance. Leave this document with the owner when installation or service is complete.

Installation & Assembly Procedure

Refer to the project blueprints for proper plumbing and electrical installation according to instruction. CAUTION: Do not apply power before plumbing and electrical connections are complete on the Link Box.

- 1- Please verify the Link Box dimension and rating as per approved drawings.
- 2- Please check the Manhole drawing along with Link Box drawing to ensure cable entry height and gland sizes.
- 3- Verify the size and rating of bonding cable as per link box drawing to match cable gland size.
- 4- Make sure the manhole is not damaged and is fully protected from any kind of water and dust ingress.
- 5- Make sure the bonding cable is of enough length to be terminated in Link Box without any horizontal or vertical stress on clamps and Lugs.
- 6- Do not step/stand inside or top of link boxes during installation or testing.
- 7- Ensure the Lugs and Clamps are of suitable size for the bonding cable.
- 8- The complete cable needs to be fed through the grommet hole.
- 9- The shield then needs to be wrapped backwards over the grommet and fed through the cord grip nut.
- 10- Assembly of all parts should same as given in drawing.
- 11- Perform Insulation test prior to cable termination in Link Box.
- 12- Check the enclosure of link box in clean, Dust, Nuts, Bolts or any other thing that not is part of enclosure should be out before closing the cover.
- 13- Check the gasket in properly installed before tightening the cover.
- 14- Also perform the insulation test on link box after cable installation.
- 15- Nuts Bolts washer and spring washer should be installed according to standard.
- 16- Ensure all the bolts are tightened properly.
- 17- Protect the link box from dust, rain, water ingress or moisture during installation.
- 18- Final test on the Link Box to be performed as per Site Inspection & Test Plan of end user or Client or any other international standard referred by End user or client.

MAINTENANCE:

To guarantee trouble free operation of this Equipment, the manufacturer suggests following these guidelines. Most problems associated are directly related to poor service and maintenance. Please record any maintenance or service performed on this equipment in the documentation section located at the end of this manual.

Check Following:

- 1- Ensure proper tightening of electrical cable lug connection.
- 2- Ensure proper tightening of Nuts & Bolts tightening.
- 3- Check insulators tightening and physical condition.
- 4- Check for signs of any water ingress point in manhole.
- 5- Physical Condition of Link Box internal and external.
- 6- Check paint chipping or dents on link box body.
- 7- Check the Gasket is intact and in good condition.
- 8- Check Cable Glands are intact.
- 9- Check physical appearance of SVLs (Surge Voltage Limiters).

In case of any abnormalities please submit the detail report along with photographs to the manufacturer at inquiry@pte-sa.com.

Use your own format for periodic maintenance to record the findings.

WARRANTY:

This equipment is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 24 months from date of shipment or 18 months from the date installation whichever comes earlier.

The warranty voids if: -

- 1- The equipment is not installed by a qualified installer per the MANUFACTURER'S installation instructions shipped with the product.
- 2- The equipment is misused or neglected.
- 3- Any Physical damage during installation.
- 4- The equipment is not operated within its published capacity.
- 5- If used unprofessional person for installation purpose & he damaged the equipment, so the manufacturer is not responsible.