

Mitigation method/Results/Conclusion

It is assumed that a lightning surge on the mains exceeds the breakdown voltage of the power supply transformer (8 kVd.c.) and injects current limited surges into the payphone 21 Va.c. power supply. This type of damage was not detected during testing of the mains input at 6 kV 10/700 μ s (enhanced inherent mains port test).

The implemented solution is shown in Figure 2.6-2. A gas discharge tube (GDT) has been added to the low-voltage power connection to the electronics. This GDT is bonded to the frame earth, the same earth as the exchange line surge protective device (SPD), to reduce the level of stress which can occur between the low-voltage port and the telecommunication line port.

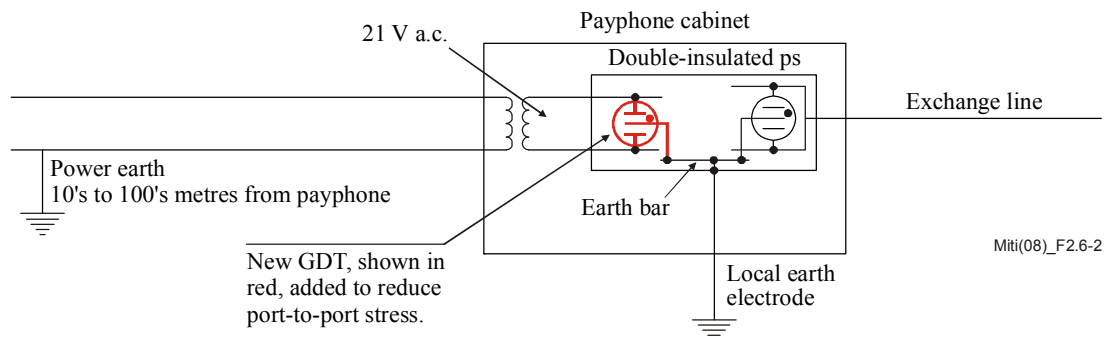


Figure 2.6-2 – Implemented solution

It is necessary to be careful when using a GDT on an a.c. circuit as it may not switch off after being triggered by a lightning surge. If the GDT continued to conduct a.c. current, the power supply and the payphone electronics could be damaged, due to overheating of the GDT. There are a number of ways to overcome the problem of the GDT conducting a.c. current:

- Use a special GDT for a.c. circuits.
- Use a positive temperature coefficient thermistor (PTC) or similar between the GDT and the transformer.
- Use an alternative mitigation technique.

An alternative solution is shown in Figure 2.6-3 below. The GDT does not conduct a.c. current in this case, due to the low voltage (21 V) involved.

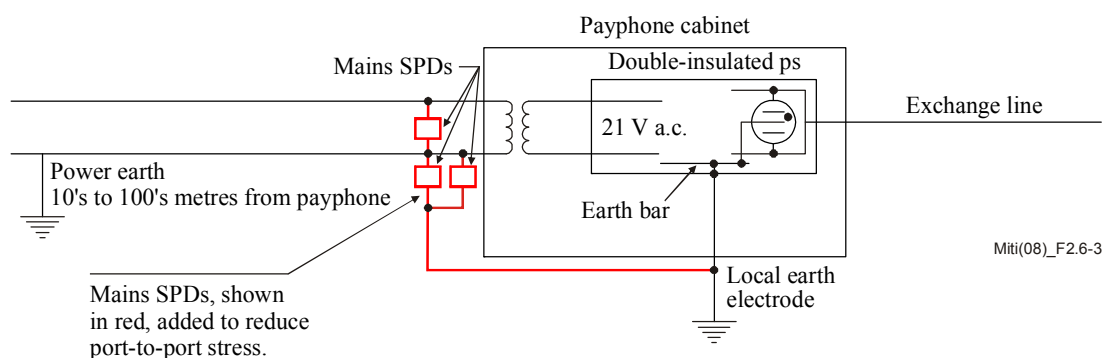


Figure 2.6-3 – Alternative solution

References

Recs ITU-T K.21 and ITU-T K.44.