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Principles of protection against over-voltages and over-currents

通信设备过电压过电流保护导则

(English Translation)

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Foreword

This standard is equivalent to using ITU-TK. 11.1993 "over-voltage and over-current protection principles." Appendix A of this standard is a normative appendix.

The standard proposed by the People's Republic of China Ministry of Information Industry.

The standard by the China Communications Standards Association.

This standard was drafted. China Telecommunications Corporation (Guangzhou Research Institute), Guangdong Tin Lok Communication Equipment Co., Ltd.

1.1.1 Direct lightning strike

Direct lightning strike can cause thousands of amps, flows along the wire or cable, sustained several microseconds. This can physically damaged, and the number of KV line over-voltage shocks will dielectric equipment and terminal equipment of a threat.

Circle has some fusible member, usually when 500mA current flows through the 200s on the action.

1.3.6 Resettable limiting devices

The disadvantage is that the fuse and the heating coil, when they make the operation of the circuit is permanently interrupted and must be replaced by a manual. Some variable

resistance Anti-devices are available, when the overload current flows through the heat and increase its resistance to high value. When the overload current cancellation, this is Resistance member will return to its normal low resistance. It should be noted the response time and the ability to withstand these devices.

1.3.7 Fusible cable

In the communication lines and power distribution line prolonged exposure to failure, by means of a fusible wire connected to the communication line to prevent the installation of non-melting Over-voltage wire security component generates the risk of overheating.

Connected by a fusible wire is typically connected in series with the communication line of insulated conductors, and installed in the communication line and the power line affected by Paul an assembly between. These wire diameter than the wire terminating on the security component of the conductor is generally at least two smaller number of wires number and and have the appropriate length to avoid continuous arc in the power system can not be quickly blown off but the wires have been the case. in case Fusible cable or part of it installed in a building or other potential fire hazard place, it should be sealed in a fusible cable Cable sheath, splice case or other suitable box to suppress arcing wires that may occur when blown.

1.4 Residual effects

Take measures to protect the fundamental purpose is to ensure that since most of the power dissipation caused by interference is not easily damaged parts in the device, and it does not extend to personal expansion. However, none of the devices have ideally eliminate all interference voltage or current characteristics, for the following reasons.

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1.4.1 Residual overvoltage

It should take into account.

- a) protection device is not functioning when the voltage, since it is below the operating voltage protection devices;
- b) the transient voltage before the device action adopted;
- c) After the device operation held residual voltage;
- d) operation of the device produced a voltage transients.

1.4.2 Transverse Voltage

The same line of security devices on two wires may not be operated simultaneously, which may produce a transverse voltage pulses. In some cases, special Do not be protected when the impedance of the device if the lower two protectors action may prevent a further protection action. Thus, as long as the presence of voltage on the line longitudinal and transverse voltage will continue to exist.

1.4.3 Influence of the circuit to work - Coordination Design

It should be enough margin between the protection device operating voltage and the maximum voltage produced on line during normal operation. Similarly, the protection element Characteristic element (internal impedance) must be protected with the performance of the device to adapt.

1.4.4 Effect of changes in state

Protection device may make a portion of the line to be protected, and the other part was sacrifice. For example. If the main distribution frame (MDF) melting Since the contact wire and power line fuse, so that the ground when the communication is disconnected, the voltage on the line may rise to full voltage power line.

Similarly, since a certain protection action, and the impedance of the equivalent circuit relating to the device connected to it much less likely, whereupon produce it can cause damage to the circulation.

1.4.5 Primary protection and secondary protection coordination

To protect sensitive equipment, it is sometimes necessary to use several protection devices. For example. small fast acting current devices (such as semiconductor devices) and slower movements high current devices (such as a gas discharge tube). In this case, several steps must be taken to ensure that in the event of a sustained when over-voltage, low-current devices will not interfere with operation of high current devices. This is because if Once this happens, the device can be a small current be destroyed, or the internal connection lines through excessive current.

1.4.6 Temperature Rise

Design and installation protection element should be considered when making the temperature rise caused by them during their operation Buzhi Yu damage property or endanger personal safety.

1.4.7 Circuit Availability

When the protective device operation, the service protection circuit may temporarily or permanently interrupted.

1.4.8 the consequences of failure After the use of protective devices, because the device is not reliable, it will cause a problem in need of repair. In addition, further protection may prevent some lines Road and devices for testing.

1.5 Risk assessment

1.5.1

overvoltage-related communication system performance depends on.

Overvoltage value --- surroundings, that is associated with the system line network produced its probability;

- Line network configuration method, see Chapter 2;
- Devices in the system overpressure resistance capability;
- Protection devices provided;
- Grounding protective device quality system operation and settings.

1.5.2 Environment

In assessing the environment, a number of factors mentioned in this standard 1.1 should be considered.

In different locations, there is a great difference in the severity of the overvoltage caused by lightning. In high lightning and high soil resistivity areas, suffer direct Then lightning and an increased risk of lightning strikes nearby. At the same time, due to lightning is the cause of most of the power system faults, so sensing and ground potential rise High impact also increases. On the other hand, buried metal facilities such as water pipes, telephone cables and other armored cables from the shielding effect, greatly reduced Overvoltage generated by lightning or induction.

Higher costs, but often do not require follow-up investments.

b) over-voltage or over-current damage may not have thick insulated cable itself, but the cable that will over-voltage or over-current lead Network easier to damage other portions. At this time, other easily damaged cables require additional protection, especially for maintenance and for the many users with high service capacity underground cable for additional protection is particularly important.

c) traction power lines or line failure caused by over-voltage sensing is still possible even