

THE APPLICATION OF OPTICAL FIBER COMPOSITE LOW-VOLTAGE CABLE (OPLC) IN SMART GRID OF CHINA

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ABSTRACT

This paper introduces an application of optical fiber composite low voltage cable in smart grid, coordinated with passive optical network technology, to achieve the possibility of power information collection, intelligent power two-way interaction, and multi-network integration businesses etc.

KEYWORDS

Smart power; optical fiber composite low voltage cable; data communication.

INTRODUCTION

Optical Fiber Composite Low-Voltage Cable (OPLC) consists of optical fiber and low-voltage power lines which were laid synchronously to achieve the optical fiber of low voltage power distribution network to the home. Coordinated with passive optical network technology, it carries power information collection, intelligent power two-way interaction, and multi-network integration businesses etc.

In China, using OPLC to achieve power fiber to the home (PFTTH) has received powerful support from the government. And it has become one of the important cable products in smart grid construction of China. The product needs a construction only once, and can solve a variety of business issues about the accessing of electricity, internet, voice telephone and cable TV etc at a time. OPLC can reduce the cost of network construction effectively. At present, it's the one of the highest cost performance "multi-network integration" cable products.

Hengtong Group is one of the leader corporations in Chinese cable field, the cable businesses of which across the telecommunications, electricity and other fields. It takes the lead in researching and designing OPLC, and has achieved largescale application.

STRUCTURE OF OPLC

By now, we have built dozens of pilot application projects with OPLC in China. Its products are mainly two types:

- OPLC that used for network distribution mainly be used in intelligent community or office building, as branch of the network distribution, connected to the electro-optical branch box by pipeline, tunnel or direct burial.
- OPLC that used for accessing home mainly be used in the user's access. It can be vertical or horizontal layout, connected to intelligent meters or optical device terminals, to achieve power and optical signal accessing home synchronously. See figure 1.

When we designed the structure, we took into account the product performance requirements, the difficulties of process, and reasonable manufacturing costs and other factors. Ultimately, we determined the typical structure shown in figure 2.

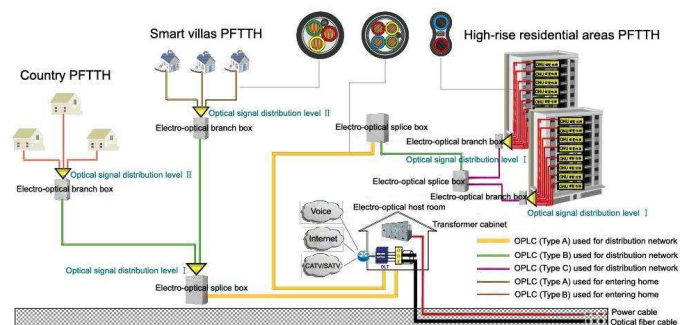


Figure 1: Cabling diagram of OPLC to achieve PFTTH

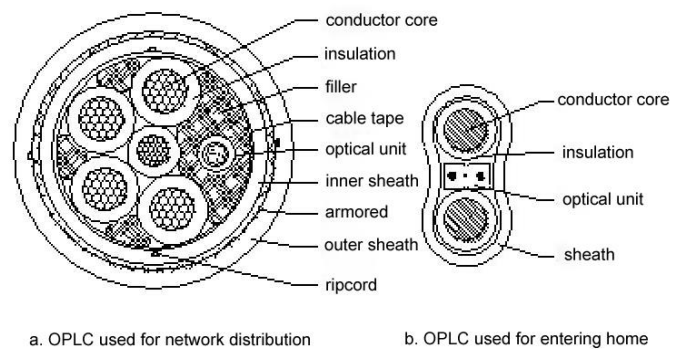


Figure 2: Structural drawing of OPLC

CHARACTERISTICS OF OPLC

The most important characteristic of OPLC is the integrated function of optical fiber communication and power transmission. When we developed the product, we based on the aspects about the product's features and service conditions. Compared with single function transmission cable, it owns following characteristics:

- It integrates optical fiber and power transmission into one, without secondary wiring, which reducing the cost of network construction effectively. Compared to conventional FTTH, using OPLC as a client access solution of smart grid saved a lot of metal, pipes, plastic and other resources, reduced the cost of accessing community and home effectively. It is the highest cost performance "the last hundred meters" access solution.
- It can be used in a variety of businesses, well-adapted, extensible, adapt to a wide range of services. Matching OPLC to corresponding equipment and devices, by which built the mainstream xPON(EPON and GPON) technology and achieved a variety of businesses on one transmission line, such as IPTV, internet access, multimedia phone, voice communications, and the family intelligent control businesses etc.