

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

L.206

(08/2017)

SERIES L: ENVIRONMENT AND ICTS, CLIMATE
CHANGE, E-WASTE, ENERGY EFFICIENCY;
CONSTRUCTION, INSTALLATION AND PROTECTION
OF CABLES AND OTHER ELEMENTS OF OUTSIDE
PLANT

Optical infrastructures – Infrastructure including node
elements (except cables)

Requirements for passive optical nodes – Outdoor optical cross-connect cabinets

Recommendation ITU-T L.206

ITU-T L-SERIES RECOMMENDATIONS

ENVIRONMENT AND ICTS, CLIMATE CHANGE, E-WASTE, ENERGY EFFICIENCY; CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

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Recommendation ITU-T L.206

Requirements for passive optical nodes – Outdoor optical cross-connect cabinets

Summary

Recommendation ITU-T L.206 refers to outdoor optical cross-connect cabinets deployed as passive optical nodes in outdoor environments. It deals with the cabinet housing, internal fibre management system, cable attachment and termination system, and also specifies the mechanical and environmental characteristics.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T L.206	2017-08-13	15	11.1002/1000/13296

Keywords

Enclosures, interconnection, optical cross-connect cabinets, outside plant, passive optical nodes.

To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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Introduction

Cabinets are widely used for protection of cross-connection points among multiple cables in outdoor environments. A cabinet along with internal functional assemblies can be referred to as an outdoor cross-connect cabinet.

An optical cross-connect cabinet comprises a mechanical structure (cabinet housing) for mechanical protection and environmental sealing of internal systems, a fibre management system for guiding and managing the fibres and fibre connections inside the node, and a cable attachment and termination system for attaching and terminating the cable ends. Patch cords, splitters and other passive optical devices are optional accessories of a cabinet. The optical cross-connect cabinet will:

- work as a cross-connection area in outdoor plant;
- protect the fibres, fibre joints and optical devices from the outdoor environment at ground level (normally, on a concrete base) and above ground (e.g., wall mounted or pole mounted by steel supports);
- provide for the organization of the fibre joints, passive devices and the storage of fibre overlength (excess fibre length);
- provide electrical bonding and grounding of the metal parts of the cable sheath and strength members.

This Recommendation specifies the requirements of optical cross-connect cabinets and the means for characterization and evaluation of the performance of cabinets according to the principles of [ITU-T L.200]. This includes mechanical performance, sealing performance and optical stability of the product which simulate the effect of environmental factors or interventions related to network maintenance and reconfiguration. It contains a basic test programme for the cabinet that is globally applicable. Additional requirements may be agreed between customer and supplier to reflect local or special conditions. All functions and features that a product may contain should be reflected in the mix of test samples that are subjected to the test programme.

Recommendation ITU-T L.206

Requirements for passive optical nodes – Outdoor optical cross-connect cabinets

1 Scope

This Recommendation:

- refers to optical cross-connect cabinets as passive optical nodes in outdoor environments;
- deals with the cabinet housing as well as the fibre management system, and the cable attachment and termination system;
- specifies mechanical and environmental characteristics of the optical cabinets;
- specifies characteristics of the fibre management system;
- provides a test plan for the performance evaluation of outdoor optical cross-connect cabinets;
- supplies the simulation of the effect of interventions related to network maintenance and reconfiguration;
- gives a checklist for a systematic product characterization according to [ITU-T L.200].

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

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| [ITU-T G.652] | Recommendation ITU-T G.652 (2016), <i>Characteristics of a single-mode optical fibre and cable</i> . |
| [ITU-T G.657] | Recommendation ITU-T G.657 (2016), <i>Characteristics of a bending-loss insensitive single-mode optical fibre and cable</i> . |
| [ITU-T K.11] | Recommendation ITU-T K.11 (2009), <i>Principles of protection against overvoltages and overcurrents</i> . |
| [ITU-T K.47] | Recommendation ITU-T K.47 (2012), <i>Protection of telecommunication lines against direct lightning flashes</i> . |
| [ITU-T L.200] | Recommendation ITU-T L.200/L.51 (2003), <i>Passive node elements for fibre optic networks – General principles and definitions for characterization and performance evaluation</i> . |
| [ITU-T L.361] | Recommendation ITU-T L.361/L.64 (2012), <i>ID tag requirements for infrastructure and network elements management</i> . |
| [IEC 60529] | IEC 60529:2013, <i>Degrees of protection provided by enclosures (IP Code)</i> . |
| [IEC 61300-2-1] | IEC 61300-2-1:2009, <i>Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibration (sinusoidal)</i> . |

- [IEC 61300-2-4] IEC 61300-2-4:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-4: Tests – Fibre/cable retention.*
- [IEC 61300-2-5] IEC 61300-2-5:2009, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-5: Tests – Torsion.*
- [IEC 61300-2-9] IEC 61300-2-9:2017, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-9: Tests – Shock.*
- [IEC 61300-2-12] IEC 61300-2-12:2009, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-12: Tests – Impact.*
- [IEC 61300-2-22] IEC 61300-2-22:2007, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature.*
- [IEC 61300-2-26] IEC 61300-2-26:2006, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-26: Tests – Salt mist.*
- [IEC 61300-2-33] IEC 61300-2-33:2012, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-33: Tests – Assembly and disassembly of fibre optic mechanical splices, fibre management systems and closures.*
- [IEC 61300-2-34] IEC 61300-2-34:2009, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-34: Tests – Resistance to solvents and contaminating fluids of interconnecting components and closures.*
- [IEC 61300-2-37] IEC 61300-2-37:2016, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-37: Tests – Cable bending for fibre optic closures.*
- [IEC 61300-3-1] IEC 61300-3-1 (2005), *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-1: Examinations and measurements – Visual examination.*
- [IEC 61300-3-3] IEC 61300-3-3:2009, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-3: Examinations and measurements – Active monitoring of changes in attenuation and return loss.*
- [IEC 61300-3-28] IEC 61300-3-28:2012, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-28: Examinations and measurements – Transient loss.*

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 optical cross-connect cabinet: A cabinet with an integrated fibre management system to protect the cross-connections of optical fibre cables.

3.2.2 cabinet housing: The outer shell of a cabinet, including lockable doors and not including the fibre management system or the cable attachment and termination system. Its main functions are protection and sealing of its contents.

3.2.3 fibre management system (organizer system): The whole of the means and features that guide and store fibres and passive devices inside a node, at any location where they are not protected by the cable sheath. In a cabinet, the optical fibres are properly managed and guided from where cables enter the node until their exit.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ID	Identification
IP	Ingress Protection
ME	Multiple Element (mass storage)
OA	Outdoor Above ground
OG	Outdoor Ground level
SC	Single Circuit
SE	Single Element
SF	Single Fibre
SMC	Sheet Moulding Compound
SR	Single Ribbon

5 Conventions

None.

6 Characteristics of optical cross-connect cabinets

6.1 General requirements

The general structure of optical cabinets is shown in Figure 1.

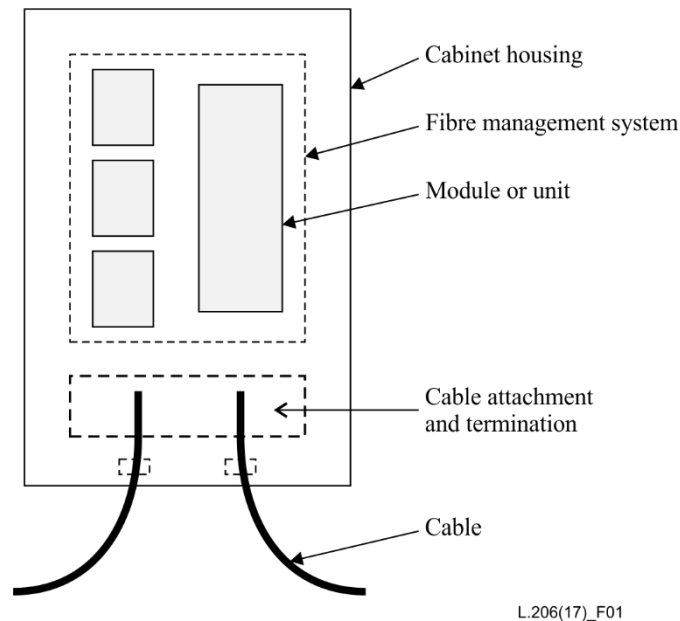


Figure 1 – General structure of optical cabinets

Each cabinet should comply with the general requirements as listed in clause 8 of [ITU-T L.200].

Figures I.1 to I.4 show examples of cabinets to illustrate their structures and internal fibre organization systems.

6.2 Cabinet housing

The following should be considered:

- dimensions should be compatible with internal contents and installation site. Generally, the maximum height of cabinet should be less than 1.6 m;
- the doors should be re-openable for installation, maintenance or reconfiguration. The opening angle of the door should not be less than 110° and the lock on the door should have sufficient protection ability;
- the protection level of the cabinet housing should comply with the requirements of IP54 or higher degrees in [IEC 60529];
- the cabinet housing should be made from high strength materials to provide sufficient mechanical strength, e.g., metal or sheet moulding compound (SMC; sheet form glass-fibre reinforced polyester material processed by compression moulding);
- the metallic parts of the cabinet housing should be electrically bonded and grounded;
- the housing should allow access for multiple cable ends. The cables may be of different sizes or types. Normally, the cables enter the cabinet from the bottom of the housing via cable entry holes. The apertures between cables and the housing should allow sealing by putty or other materials to ensure adequate performance, and the sealing material should be easily removable for reconfiguration;
- the housing should stand and be fixable on a concrete base or steel supports;
- if the housing is limited to use in certain applications and environments in the network, any limitations should be clearly indicated to the user – a detailed characterization of features and compatibility of a cabinet can be assessed using the checklist in Appendix II;
- if necessary, a cabinet can be equipped with an access control system that makes remote door control (via a dedicated network) available;