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PURCHASE SPECIFICATION FOR
FIBER OPTIC CABLE SET FOR 6000HP 3-Ø AC
LOCOMOTIVE
GROUP: TRACTION ENGINEERING

P.S NO: PS4452666

REV. NO: 00

PAGE: 01 OF 06

REVISION HISTORY SHEET

REV. NO	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
00	11.12.2019	FIRST ISSUE	--	KRISHNA VVNSSRM	SHEKAR R

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Reference Document: CLW Specification No. CLW/ES/3/0141

REVISIONS 00 DT: 11.12.2019

APPROVED BY: R.SHEKAR

PREPARED BY:

ISSUED BY

DATE

KRISHNA VVNSSRM

TRACTION ENGG

11.12.2019

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SPECIFICATION FOR FIBER OPTIC CABLE SET FOR 6000HP LOCO

Brief description

This specification covers the requirements of fiber optic cable set used as communication interface between various sub-systems in 6000HP 3-Ø AC locomotives which is shown in the Fig-1. Each cable in the set is a twin multimode-fiber optic cable equipped with connectors.

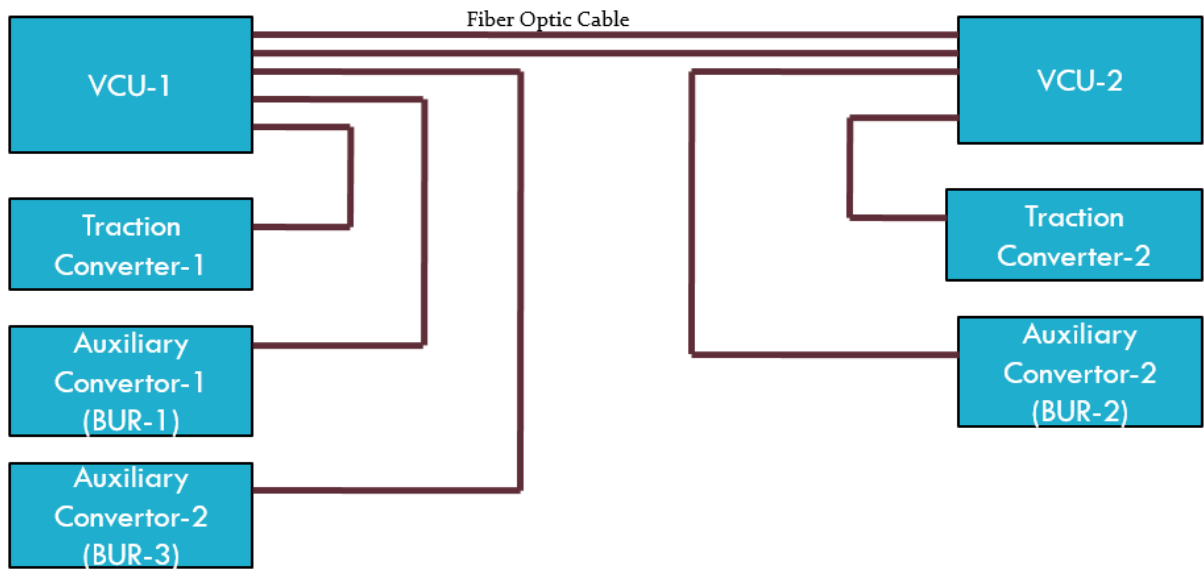


Fig-1: Communication Interface between sub-systems in a locomotive

Scope of Supply

Fiber Optic cable set meeting the technical specifications given in the document and each cable having ST bayonet type connectors at both ends having protective cap, one as transmitter and receiver.

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1. Detailed Specification

1. Optical Parameters

1. Attenuation ($\lambda=850$ nm) for -40°C to $+85^{\circ}\text{C}$: $\leq 1\text{db}/50\text{m}$
2. Bandwidth ($\lambda=820$ nm) : >17 MHz
3. Numerical Aperture : 0.37

2. Mechanical Parameters

1. Diameter of the core glass : $200 \pm 5 \mu\text{m}$
2. Diameter of the cladding : $230 \mu\text{m}$
3. Outer diameter : $500 \mu\text{m}$
4. Material : Hard Clad Silica
5. Cladding Eccentricity error : $< 5 \mu\text{m}$
6. Bending Radius
 - 6.1 During Installation : > 25 mm
 - 6.2 During operation : >50 mm
7. Tensile Strength during
 - 7.1 Installation : $2*400$ N
 - 7.2 Operation : $2*300\text{N}$
8. Maximum cable diameter : $2.6 \text{ mm} \pm 0.1 \text{ mm}$
9. Compression strength : 1800 N/cm

3. Connectors

1. Connectors : ST connector with Bayonet fastener
2. Insertion loss : $< 1.5 \text{ db}/\text{way}$
3. Mechanical life : > 500 mating cycles
4. Housing material : Metal
5. Boot Colour : Black

4. Functional Requirements

1. Flammability : Class D
2. Smoke/Fumes Emission : Class F3
3. Operating Temperature : -40°C to $+85^{\circ}\text{C}$
4. Humidity : 100% during rainy season
5. Jacket material : Halogen free, Self-Extinguishing

2. Standards

IEC standard	Description
IEC 60794-1	Optical fiber cables - Generic specification - General
IEC 60794-2	Optical fiber cables - Indoor cables
IEC 60794-3	Optical fiber cables - Outdoor cables
IEC-60874-1	Fiber optic interconnecting devices and passive components

3. Dimensional details

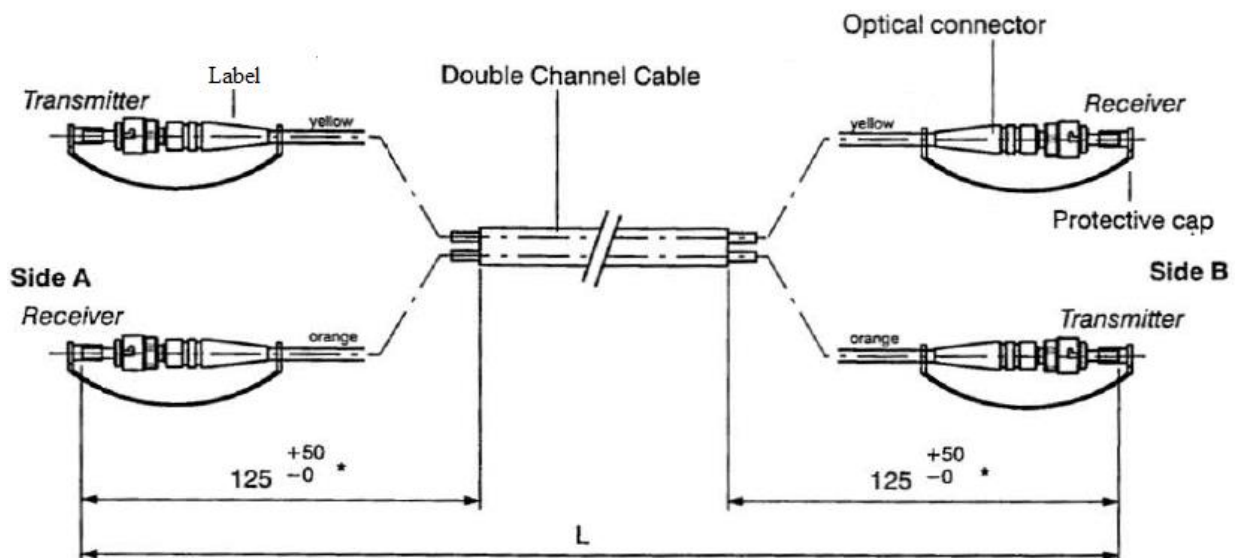
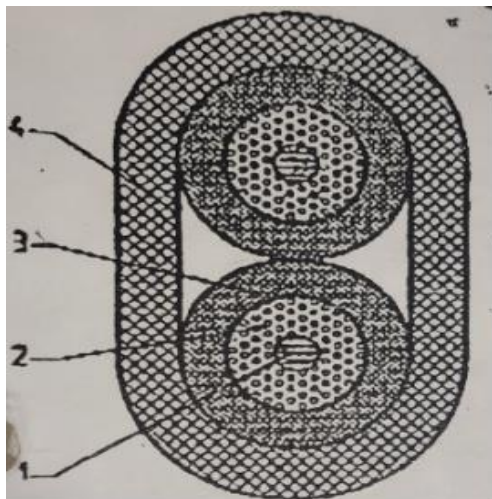


Fig-2: Dual channel fiber optic cable with connectors



Position	Description	Size
1	Optical fiber	D= 500µm
2	Reinforcement	
3	2 single fiber cable/Jacket	D= 2.6 mm
4	Jacket	3.9*6.6 mm

Single Fiber Colour: Orange/Yellow
Jacket Colour: Orange

Fig-3: Sectional view of Dual channel fiber optic cable



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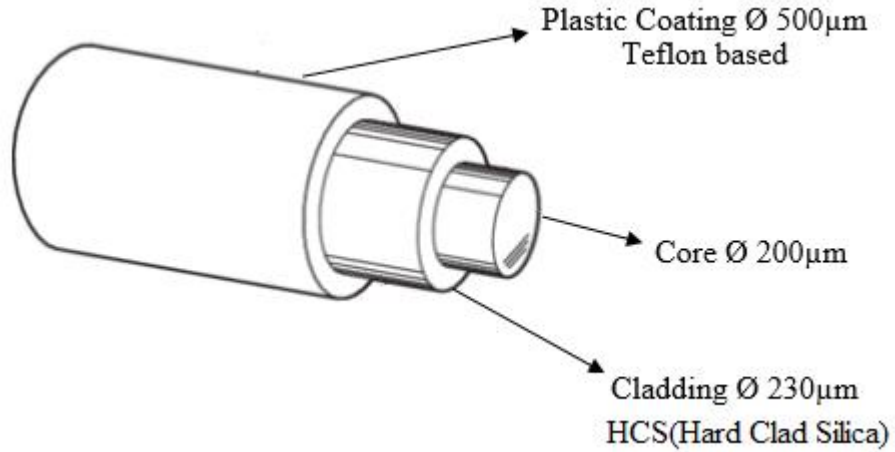


Fig-4: Fiber optic cable

Slno	Cable Reference	Length (L) in meters	Qty/Set
1	811	10	1 no
2	812	17	1 no
3	813	26	1 no
4	814	26	1 no
5	815	22	1 no
6	816	13	1 no
7	817	9.5	1 no
8	820	26	1 no

Table-1: Cable reference and length of each cable

Cable Colour: Yellow				Cable Colour: Orange		
Cable Ref	Cable No	Connector Label		Cable No	Connector Label	
		Side A	Side B		Side A	Side B
811	F126A	411.WG	426/1.BB	F226A	411.WH	426/1.BA
812	F115A	411.WE	415/1.RB	F215A	411.WF	415/1.RA
813	F211	411.WA	412.WB	F111	411.WB	412.WA
814	F112	411.WC	412.WD	F212	411.WD	412.WC
815	F126C	411.WI	426/3.BB	F226C	411.WJ	426/3.BA
816	F115B	415/2.RB	412.WE	F215B	415/2.RA	412.WF
817	F126B	426/2.BB	412.WG	F226B	426/2.BA	412.WH
820	F	411	412	F	411	412

Table-2: Labelling Information

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4. Marking

The following information shall be printed on each cable

1. Name of the Manufacturer/ Monogram
2. Identification number
3. Manufacturing Month and Year
4. Serial number
5. Cable No and Connector labelling as per table-2

5. Documentation

1. Datasheet
2. Dimensional Drawing
3. Type test Procedure, Type test Report
4. Routine test Procedure, Routine test Report

6. Acceptance

1. Routine test report conducted as per relevant IEC standard to be submitted along with each delivery
2. Equipment shall be packed in a manner suitable for delivery and storage at the appointed delivery address. Transport packaging will provide adequate protection against accidental damage during normal handling.

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