Eskom	Standard	Group Technology

Title: **LABELLING OF FIBRE OPTIC CABLES**

Unique Identifier:	**240-46263618**
Part	**22 - Cables**
Area of Applicability:	**Transmission Engineering** **Distribution Engineering**
Documentation Type:	**Standard**
Revision:	**0**
Total Pages:	**13**
Next Review Date:	**June 2017**

Disclosure Classification: **Controlled Disclosure**

Compiled by

Rishi Hariram

Chief Engineer

Date: 25/06/2012.

Approved by (SCOWT SC Chairperson)

Prudence Phaala

M&C Technology and support Manager

Date: 25/06/2012

Functional Responsibility (Dx)

Steven Papadopoulos

Control Automation Manager

Date: 26/06/2012

Authorized by

Richard McCurrach

PTM&C Manager

Date: 26/06/2012

Content

Foreword

Not applicable.

Revision history

This is a new document.

Date	Rev.	Compiled By	Clause	Remarks
June 2012	0	R Hariram	Clause no.	First issue Included Telecoms and Teleprotection requirements.

Acceptance

This document has been seen and accepted by:	
Name	**Designation**
R McCurrach	PTM & C Manager
S Papadopoulos	Control Automation Manager
P Phaala	M&C Technology and support Manager

This standard shall apply throughout Eskom Holdings Limited, its divisions, subsidiaries and entities wherein Eskom has a controlling interest.

Development team

Rishi Hariram

Hennie De Klerk

Paddy Griffith

Tejin Gosai

Introduction

Eskom's vision to migrate to a substation automation system for all Transmission and Distribution substations entails the use of fibre optic cables within the control room as well as from the control room to the DMKs in the case of stations where the Breaker and a Half is deployed. This document is therefore necessary in order to standardise the way these fibre optic cables are labelled.

Keywords

Substation Automation, Fibre optic cables, Breaker and a Half

1 Scope

This standard aims to define the convention to be used when labelling fibre optic cables. This standard is required to cater for all applications where fibre optic cables need to be installed for substation automation, telecommunication as well as teleprotection purposes.

2 Normative references

Parties using this document shall use the most recent edition(s) of the document(s) listed in this section.

Eskom Divisional documents(s):

TSP41-665: Multimode Fibre Optic Duct Cable

41-1069: IEC61850 Fibre Optic Standard

TST41-115: Substation Fibre Optic Cable Installations

TSP41-66: Multi-mode Fibre Optic Duct Cable

Eskom National document(s):

32-9: Definition of Eskom documents.

32-644: Eskom documentation management standard.

474-65: Operating Manual of the Steering Committee of Wires Technologies (SCOWT)

3 Definitions and abbreviations

3.1 Definitions

D400: GE Substation Data Manager

D20: GE Station Remote Terminal Unit (RTU)

MA: Naming system for the diameter. M stands for 765 kV and A is the first diameter. The second would be MB, third MC, etc.

TA1: Auxiliary Transformer 1

TIE: The breaker that is shared between Bay 1 and Bay 2

3.2 Abbreviations

ADM	Add/Drop Multiplexer
BR11	Busbar Reactor 11
DMK	Diameter Marshalling Kiosk
CAP	Committee for Accepted Products

EWS	Engineering Work Station
FP	Fibre Optic Panel
FR1	Feeder 1 Reactor
GM	General Manager
ID	Identification
iHMI	Integrated Human Machine Interface
JB	Junction Box
LAP	List of Accepted Products
M&C	Metering and Control
T1A	Auxiliary Transformer 1
n/a	not applicable
PTM&C	Protection, Telecoms, Metering and Control
RTU	Remote Terminal Unite

4 Substation Automation Fibre Labels

4.1 Cables, leads, labelling types and uses

a) Fibre optic cables shall be used in Transmission and Distribution stations for substation automation purposes.

b) Fibre patch leads shall only be used for connections within a cabinet.

c) Interfacing between cabinets shall be done using fibre optic cables.

d) The types of fibre and labelling used are defined in [2] 41-1069

4.2 Breaker and a Half Stations

4.2.1 Labelling Convention

a) Each fibre cable shall be labelled according to:

1) the a prefix identifying the bay to which it is associated, followed by

2) the destination cabinet in which it will be terminated, and

3) a number denoting a voltage level of the bay,

4) and then the type of fibre used and the number of fibre cores.

b) The number convention denoting voltage level is as follows:

1)	For a 765kV fibre optic cable:	8070
2)	For a 400kV fibre optic cable:	170
3)	For a 275kV and 220kV optic cable:	270
4)	For a 132kV fibre optic cable:	370
5)	For a 88kV, 66kV and 44kV fibre optic cable:	470
6)	For a 33kV, 22kV and 11kV fibre optic cable:	570

c) The labelling convention can be summarized as:

(Originating Bay).(Destination cabinet).(Voltage Level)

4.2.2 Fibre-optic cabling scenarios

Two fibre optic cabling scenarios exist for the substations where the Breaker and a half technology is being used, namely:

a) Intra-control room cabling

b) Diameter Marshalling Kiosk (DMK) to control room cabling.

The following examples describe this concept.

4.2.3 Examples of labelling convention

4.2.3.1 Intra-control Room Example:

a) If the cable is to be installed between the 765 kV Protection Scheme Interface Panel and Fibre Optic Switching panel, the cable shall be labelled as: ***.IP.FSP#.8070**

Where,

* = {T1A; BR11; F1R; MA, etc}

= {1; 2; 3;…}

b) If the cable is to be installed between the IHMI/EWS/D400/D20 and Fibre Optic Switching panel, the cable shall be numbered as: ****.FSP#.8070**

Where,

** = {iHMI; EWS; D400; D20}

= {1; 2; 3;…}

4.2.3.2 DMK to Control Room Example:

a) Patch panels installed in the TIE Bay JB panel located in the DMK shall be used to terminate the fibre optic cable.

b) Where there is no TIE bay JB panel in the DMK, the Bay 2 JB panel is to be used

c) If the cable is to be installed between the DMK TBJBP or DMK B2JBP and Fibre Optic Switching panel in the control room, the cable shall be numbered as: **α.β.FSP#.8070**

Where,

α = {MA; MB; MC; ….}

β = {TBJBP; B2JBP}

= {1; 2; 3;…}

4.3 Conventional Stations (400kV & lower Voltage)

4.3.1 Labelling Convention

a) Each fibre cable shall be labelled by:

1) a Bay ID identifying the bay to which it is associated, followed by
2) the fibre optic switching panel to which it will be terminated, and
3) a number denoting a voltage level of the bay, and
4) the type of fibre used and
5) the number of fibre cores.

b) The bay ID is as per the associated station electric diagram.

c) The labelling convention can be summarized as:

(Originating Bay prefix).(Destination cabinet).(Voltage Level)

4.3.2 Intra-control Room Example:

If the fibre optic cable is to be installed between the 400kV protection bay and fibre optic switching panel, the cable shall be numbered as: ***.FSP#.170**

Where,

*** = {A;B;C…; A1;B1;C1…; etc)

= {1; 2; 3;…}

5 Teleprotection Fibre Lables

Fibre optic cables are also used in Transmission and Distribution stations for teleprotection purposes. The convention of how these cables shall be labelled is illustrated in the examples below.

5.1 Purpose of labels

Teleprotection fibre labels are used to label fibre-optic cables that are used in Transmission and Distribution stations for teleprotection purposes.

5.2 Examples of labelling convention

a) If a single mode fibre optic cable is to be installed between the Feeder 1 Gantry and Fibre Optic panel, the cable shall be labelled as: **FP#.80#**

Where,

= {1; 2; 3;…}

b) If a fibre-optic cable is to be installed between the fibre-optic panel and a conventional Feeder 1 protection cabinet, the cable shall be labelled*****.80#**

Where,

*** = {A;B;C…; A1;B1;C1…; etc)

= {1; 2; 3;…}

c) If a fibre optic cable is to be installed between the Fibre Optic panel and a breaker and a half Feeder 1 protection cabinet, the cable shall be labelled as: ***.F#.800 for (main 1) and *.F#.801 for (main 2)**

Where,

* = (MA, MB, GA, GB,…. etc)

= (F1, F2, F3,… etc)

d) If a 24 core single mode fibre optic cable is to be installed between the 400kV and 765kV control rooms at a station, the cable shall be labelled as**: P#.80#**

Where,

= {1; 2; 3;…}

6 Telecommunication FIbre Lables

Fibre optic cables are also used in Transmission and Distribution stations for telecommunication purposes. The convention of how these cables shall be labelled is illustrated in the examples below.

6.1 Purpose of labels

Telecommunication fibre labels are used to label fibre-optic cables that are used in Transmission and Distribution stations for telecommunication purposes.

6.2 Labelling convention

a) Each fibre cable label shall be labelled according to:

1) the cable source point, followed by

2) the cable termination point, and

3) a number denoting that it is a telecommunication function.

b) The number 901 shall be used to denote a telecommunication function.

c) The labelling convention can be summarized as:

(Source Point).(Termination Point).(901)

6.3 Examples of labelling convention

a) If a fibre optic cable is to be installed between Fibre Optic panel to the ADM in the Eskom Telecoms Cabinet, the cable shall be labelled as**: FP#.ET#.901**

Where,

= {1; 2; 3;…}

b) If a fibre optic cable is to be installed between Fibre Optic panel to the DMK for telephones, the cable shall be labelled as: **FP#. α.901**

Where,

= {1; 2; 3;…}

α = {MA; MB; MC; ….}

Annex A – Impact Assessment
(Normative)

Impact assessment form to be completed for all documents.

A1 Guidelines

- All comments must be completed.
- Motivate why items are N/A (not applicable)
- Indicate actions to be taken, persons or organisations responsible for actions and deadline for action.
- Change control committees to discuss the impact assessment, and if necessary give feedback to the compiler of any omissions or errors.

A2 Critical points

A2.1 Importance of this document. E.g. is implementation required due to safety deficiencies, statutory requirements, technology changes, document revisions, improved service quality, improved service performance, optimised costs.

Comment: Implementation required due to standardisation on the implementation of technology.

A2.2 If the document to be released impacts on statutory or legal compliance - this need to be very clearly stated and so highlighted.

Comment: Does not impact on statutory or legal compliance

A2.3 Impact on stock holding and depletion of existing stock prior to switch over.

Comment: No impact

A2.4 When will new stock be available?

Comment: N/A

A2.5 Has the interchangeability of the product or item been verified - i.e. when it fails is a straight swop possible with a competitor's product?

Comment: N/A

A2.6 Identify and provide details of other critical (items required for the successful implementation of this document) points to be considered in the implementation of this document.

Comment: N/A

A2.7 Provide details of any comments made by the Regions regarding the implementation of this document.

Comment: (N/A during commenting phase)

Annex A
(continued)

A3 Implementation timeframe

A3.1 Time period for implementation of requirements.

Comment: Implement as soon as possible.

A3.2 Deadline for changeover to new item and personnel to be informed of DX wide change-over.

Comment: N/A

A4 Buyers Guide and Power Office

A4.1 Does the Buyers Guide or Buyers List need updating?

Comment: No

A4.2 What Buyer's Guides or items have been created?

Comment: N/A

A4.3 List all assembly drawing changes that have been revised in conjunction with this document.

Comment: N/A

A4.4 If the implementation of this document requires assessment by CAP, provide details under 5

A4.5 Which Power Office packages have been created, modified or removed?

Comment: N/A

A5 CAP / LAP Pre-Qualification Process related impacts

A5.1 Is an ad-hoc re-evaluation of all currently accepted suppliers required as a result of implementation of this document?

Comment: No

A5.2 If NO, provide motivation for issuing this specification before Acceptance Cycle Expiry date.

Comment: This is a design standard and not a specification

A5.3 Are ALL suppliers (currently accepted per LAP), aware of the nature of changes contained in this document?

Comment: N/A

Annex A
(continued)

A5.4 Is implementation of the provisions of this document required during the current supplier qualification period?

Comment: No

A5.5 If Yes to 5.4, what date has been set for all currently accepted suppliers to comply fully?

Comment: N/A

A5.6 If Yes to 5.4, have all currently accepted suppliers been sent a prior formal notification informing them of Eskom's expectations, including the implementation date deadline?

Comment: N/A

A5.7 Can the changes made, potentially impact upon the purchase price of the material/equipment?

Comment: No

A5.8 Material group(s) affected by specification: (Refer to Pre-Qualification invitation schedule for list of material groups)

Comment: N/A

A6 Training or communication

A6.1 Is training required?

Comment: NO

A6.2 State the level of training required to implement this document. (E.g. awareness training, practical / on job, module, etc.)

Comment: N/A

A6.3 State designations of personnel that will require training.

Comment: N/A

A6.4 Is the training material available? Identify person responsible for the development of training material.

Comment: N/A

A6.5 If applicable, provide details of training that will take place. (E.G. sponsor, costs, trainer, schedule of training, course material availability, training in erection / use of new equipment, maintenance training, etc).

Comment: N/A

Annex A
(continued)

A6.6 Was Technical Training Section consulted w.r.t module development process?

Comment: N/A

A6.7 State communications channels to be used to inform target audience.

Comment: N/A

A7 Special tools, equipment, software

A7.1 What special tools, equipment, software, etc will need to be purchased by the Region to effectively implement?

Comment: None

A7.2 Are there stock numbers available for the new equipment?

Comment: N/A

A7.3 What will be the costs of these special tools, equipment, software?

Comment: N/A

A8 Finances

A8.1 What total costs would the Regions be required to incur in implementing this document? Identify all cost activities associated with implementation, e.g. labour, training, tooling, stock, obsolescence

Comment: None

Impact assessment completed by:

Name: _____Rishi Hariram_____

Designation: _____ Chief Engineer, PTM & C _____