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INTERNATIONAL STANDARD



Fibre optic sensors – Part 2-2: Temperature measurement – Distributed sensing

INTERNATIONAL
ELECTROTECHNICAL
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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions	8
4 General test setups for measurement of performance parameters.....	11
4.1 General and test setup requirements	11
4.2 General required information to be documented	13
5 Measurement procedures for performance parameters	14
5.1 Temperature measurement error	14
5.1.1 Test procedure and conditions.....	14
5.1.2 Parameter calculation	14
5.2 Spatial resolution	16
5.2.1 Test procedure and conditions.....	16
5.2.2 Parameter calculation	17
5.3 Temperature repeatability.....	17
5.3.1 Test procedure and conditions.....	17
5.3.2 Parameter calculation	18
5.3.3 Formulas	19
5.4 Spatial temperature uncertainty	19
5.4.1 Test procedure and conditions.....	19
5.4.2 Parameter calculation	19
5.5 Environmental temperature stability.....	20
5.5.1 Test procedure and conditions.....	20
5.5.2 Parameter calculation	21
5.6 Warm-up time	22
5.6.1 Test procedure and conditions.....	22
5.6.2 Parameter calculation	23
5.7 Attenuation range.....	24
5.7.1 Test procedure and conditions.....	24
5.7.2 Parameter calculation	25
Annex A (informative) Measurement parameter performance table.....	26
Annex B (informative) Point defect effects	28
B.1 General.....	28
B.2 Point defect.....	28
B.3 Test procedures and conditions	28
Bibliography	31
Figure 1 – Example of a temperature trace with temperature sample points.....	10
Figure 2 – General test setup: single-ended	12
Figure 3 – General test setup: loop configuration.....	12
Figure 4 – Temperature measurement error calculation: step 1	15
Figure 5 – Temperature measurement error calculation: steps 2 through 3.....	16
Figure 6 – Temperature measurement error calculation: steps 4 through 5.....	16

Figure 7 – Spatial resolution illustration.....	17
Figure 8 – Temperature repeatability calculated from Figure 4	18
Figure 9 – Spatial temperature uncertainty calculated from Figure 4	20
Figure 10 – Environmental temperature cycle (example for a DTS instrument with an operating temperature range of 0 °C to 40 °C).....	21
Figure 11 – Environmental temperature stability parameter calculation method	22
Figure 12 – Example illustrating calculation of warm-up time.....	23
Figure B.1 – Point defect measurement (example).....	29
Table A.1 – Blank measurement parameter performance table.....	26

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC SENSORS –

Part 2-2: Temperature measurement – Distributed sensing

FOREWORD

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International Standard IEC 61757-2-2 has been prepared by subcommittee SC 86C: Fibre optic systems and active devices of IEC technical committee 86: Fibre optics.

The text of this standard is based on the following documents:

CDV	Report on voting
86C/1323/CDV	86C/1354/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61757 series, published under the general title *Fibre optic sensors*, can be found on the IEC website.

This International Standard is to be used in conjunction with IEC 61757-1:2012.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

It has been decided to restructure the IEC 61757 series with the following logic. From now on, the sub-parts will be renumbered as IEC 61757-*M-T* where *M* denotes the measure and *T* the technology.

The existing part IEC 61757-1:2012 will be renumbered as IEC 61757 when it will be revised and will serve as an umbrella document over the entire series.

FIBRE OPTIC SENSORS –

Part 2-2: Temperature measurement – Distributed sensing

1 Scope

This part of IEC 61757 defines detail specifications for distributed temperature measurement by a fibre optic sensor, also known as fibre optic distributed temperature sensing (DTS). DTS includes the use of Raman scattering, Brillouin scattering and Rayleigh scattering effects. In addition, Raman scattering and Rayleigh scattering based measurements are performed with a single-ended fibre configuration only. Brillouin scattering based measurements are performed with a single-ended fibre or fibre loop configuration. The technique accessible from both sides at same time (e. g. Brillouin optical time domain analysis, BOTDA) is referred to here as a loop configuration. Generic specifications for fibre optic sensors are defined in IEC 61757-1:2012.

This part of IEC 61757 specifies the most important DTS performance parameters and defines the procedures for their determination. In addition to the group of performance parameters, a list of additional parameters has been defined to support the definition of the measurement specifications and their associated test procedures. The definitions of these additional parameters are provided for informational purposes and should be included with the sets of performance parameters.

A general test setup is defined in which all parameters can be gathered through a set of tests. The specific tests are described within the clause for each measurement parameter. This general test setup is depicted and described in Clause 4 along with a list of general information that should be documented based upon the specific DTS instrument and test setup used to measure these parameters as per IEC 61757-2-2.

Annex A provides a blank performance parameter table which should be used to record the performance parameter values for a given DTS instrument and chosen optical test setup configuration.

Annex B provides guidelines for optional determination of point defect effects.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at <http://www.electropedia.org>)

IEC 61757-1:2012, *Fibre optic sensors – Part 1: Generic specification*

IEC TR 61931, *Fibre optic – Terminology*

ISO/IEC Guide 99, *International vocabulary of metrology – Basic and general concepts and associated terms (VIM)*