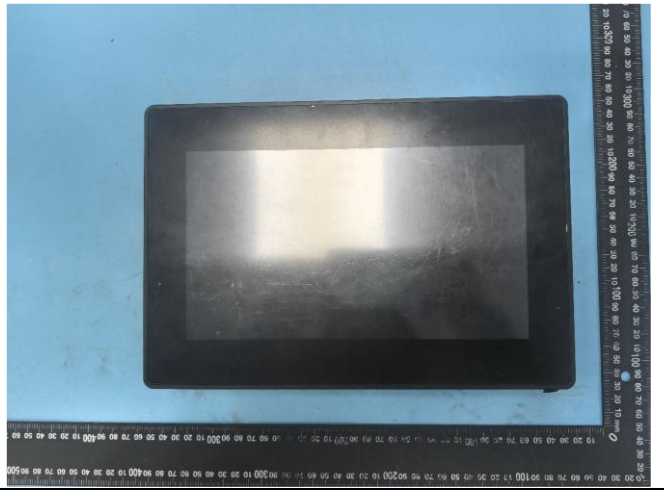


Prüfbericht-Nr.: Test report no.:	CN26E2R4 001	Auftrags-Nr.: Order no.:	180357533	Seite 1 von 44 Page 1 of 44
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2025-12-22	
Auftraggeber: Client:	CET Electric Technology Inc. 8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China			
Prüfgegenstand: Test item:	Distributed Temperature Sensing			
Bezeichnung / Typ-Nr.: Identificatin / Type no.:	PMC-3601F			
Auftrags-Inhalt: Order content:	To issue AK certificate			
Prüfgrundlage: Test specification:	EN 54-22:2015+A1:2020 EN 54-18:2005+AC:2007 EN 54-2:1997+A1:2006			
Wareneingangsdatum: Date of sample receipt:	2026-01-19			
Prüfmuster-Nr.: Test sample no.:	A004189771-001 to 012			
Prüfzeitraum: Testing period:	2026-03-13 - 2026-05-12			
Ort der Prüfung: Place of testing:	See Page 5			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:	X 	genehmigt von: authorized by:	X 	
Datum: Date: 2026-05-28	Signed by: Qiang Ye	Ausstellungsdatum: Issue date: 2026-05-28	Signed by: Jane Hu	
Stellung / Position:	Project Engineer	Stellung / Position:	Authorizer	
Sonstiges / Other: 1. Relevant entrusted tests were performed on Distributed Temperature Sensing PMC-3601F, details see test report. 2. Attachment 1: test report of EN 54-18:2005+AC:2007 (16 pages). 3. Attachment 2: test report of EN 54-2:1997+A1:2006 (8 pages). 4. Attachment 3: Test equipment list (1 page). / 5. Attachment 4: Photo Documentation (8 pages) Trainee: Jack Xu 				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

Prüfbericht-Nr.: CN26E2R4 001
Test report no.:

Seite 2 von 44
Page 2 of 44

Anmerkungen Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
2	Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: go.tuv.com/digital-signature <i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: go.tuv.com/digital-signature</i>
3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>



TEST REPORT EN 54-22 Fire detection and fire alarm systems Part 22: Resettable line-type heat detectors	
Report Number. :	CN26E2R4 001
Date of issue..... :	See cover page
Total number of pages	See cover page
Name of Testing Laboratory preparing the Report	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32, Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China
Applicant's name..... :	CET Electric Technology Inc.
Address..... :	8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Manufactory's name	CET Electric Technology Inc.
Address	8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Test specification: Standard : EN 54-22:2015+A1:2020 Test procedure : AK certificate Non-standard test method : N/A	
Test Report Form No. :	EN 54-22_1A
Test Report Form(s) Originator.... :	TÜV Rheinland / CCIC (Ningbo)
Master TRF..... :	Dated 2026-03-26
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General disclaimer: The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description..... :	Distributed Temperature Sensing
Trade Mark..... :	
Manufacturer..... :	CET Electric Technology Inc. 8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Model/Type reference..... :	PMC-3601F
Ratings..... :	24VDC

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32, Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China
Testing location/ address		1.Shanghai Institute of Quality Inspection and Technical Research Co., Ltd. No.900, Jiangyue Road, Minhang District, Shanghai, China 2. TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32, Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China
Tested by (name, function, signature)		See cover page See cover page
Approved by (name, function, signature) ..		See cover page See cover page
☐	Testing procedure: CTF Stage 1:	N/A
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature) ..		
☐	Testing procedure: CTF Stage 2:	N/A
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) ..		
Approved by (name, function, signature) ..		
☐	Testing procedure: CTF Stage 3:	N/A
☐	Testing procedure: CTF Stage 4:	N/A
Testing location/ address		
Tested by (name, function, signature)		
Witnessed by (name, function, signature) ..		
Approved by (name, function, signature) ..		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

See cover page

Summary of testing:

According to "General product information" in page 9 to 14 of test report CN26E2R4 001, all relevant entrusted tests were performed on PMC-3601F, detail tests as follow table.

Tests performed (name of test and test clause):

For Distributed Temperature Sensing PMC-3601F
Sample No.1

Clause	Testing
4.1.2.1	Heat response for room protection application
4.1.2.2	Heat response for local protection application
5.6.1.3	Cold (operational) for sensing element
5.6.1.4	Cold (operational)for sensor control unit
5.6.5.1	Electromagnetic compatibility (EMC), immunity tests (operational)

Sample No. 2

Clause	Testing
5.6.1.1	Dry heat (operational) test for sensor control unit
5.6.2.2	Damp heat, cyclic(operational)for sensing element
5.6.2.3	Damp heat, cyclic(operational)for sensor control unit

Testing location:

Shanghai Institute of Quality Inspection and Technical Research Co., Ltd.

No.900, Jiangyue Road, Minhang District, Shanghai, China

For Distributed Temperature Sensing PMC-3601F
Sample No.3

Clause	Testing
4.3.3	Requirements for software-controlled detectors

TÜV Rheinland / CCIC (Ningbo) Co., Ltd.

3F, Building C13, R&D Park, No.32, Lane 299
Guanghua Road, National Hi-Tech Zone, Ningbo
315048, P.R. China

Summary of compliance with National Differences (List of countries addressed):

N/A

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ Statement not required by the standard used for type testing

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

PMC-3601F

Model: PMC-3601F-C1AAAAA

Power Supply: DC 24V

Channel: 4

Fiber: Below 150°C

Response Grade: A1N, A2N, EN

Environmental Grade: Sensor control unit II

Sensing element III

Standard: EN 54-22:2015+A1:2020

EN 54-18:2005+AC:2007

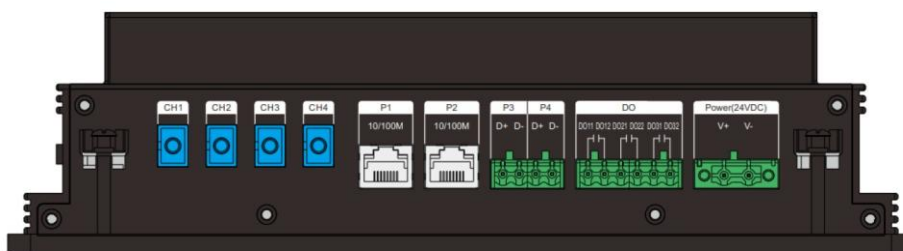
EN 54-2:1997+A1:2006



SN: 3511049499

MAC Address 1: E4-C8-06-0F-6E-39

MAC Address 2: E4-C8-06-0F-6E-3A



Remark:

The SN code in the upper right corner of the nameplate has the first two digits representing the year (35 for 2025), the next two digits representing the month (11 for November), and the last six digits representing the production serial number of that month.

Test item particulars: Distributed Temperature Sensing	
Classification of installation and use: N/A	
Supply Connection: DC 24V	
Possible test case verdicts: - test case does not apply to the test object : N/A - test object does meet the requirement : P (Pass) - test object does not meet the requirement : F (Fail)	
Testing : Date of receipt of test item : See cover page Date (s) of performance of tests : See cover page	
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☒ comma / ☐ point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided:	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies).....: CET Electric Technology Inc. 8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China	

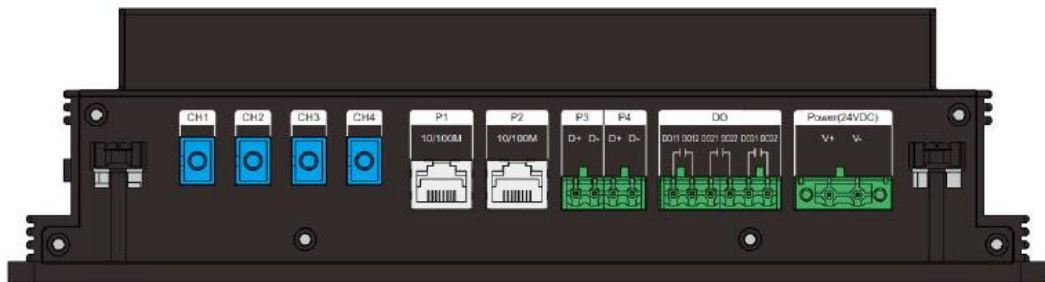
General product information:

1. Distributed Temperature Sensing information:

Type Reference	Distributed Temperature Sensing PMC-3601F
Power supply	24VDC
Channel	4
Heat response for room protection application	A1N, A2N
Heat response for local protection application	EN
Environmental Grade	Sensor Control unit II Sensing element III
Software version number	V1.00.02
Type of optical fiber	Standard 62.5/125mm multimode optical fiber
Temperature measurement range	Below 150°C
Farthest measurement distance	10km

2. According to the customer's requirements, the distributed temperature sensor PMC-3601F converts 220V/50Hz to 24VDC power supply through a power adapter. During the testing process, the customer provided three sensor control units and one sensing element, with a distance of 10 kilometers. This 10-kilometer sensing element consists of 9,800 meters of bare optical fiber and 200 meters of armored optical fiber. During the test, the actual connection length of the PMC-3601F to the optical fiber was 10 kilometers. Due to the significant fluctuations in the measurement data of the first and last 30 meters, it was not within the scope of the assessment. In the experiment, the L1 connection to the test location was between 9960 meters and 9970 meters (the effective temperature measurement of the device could ensure 10 kilometers).

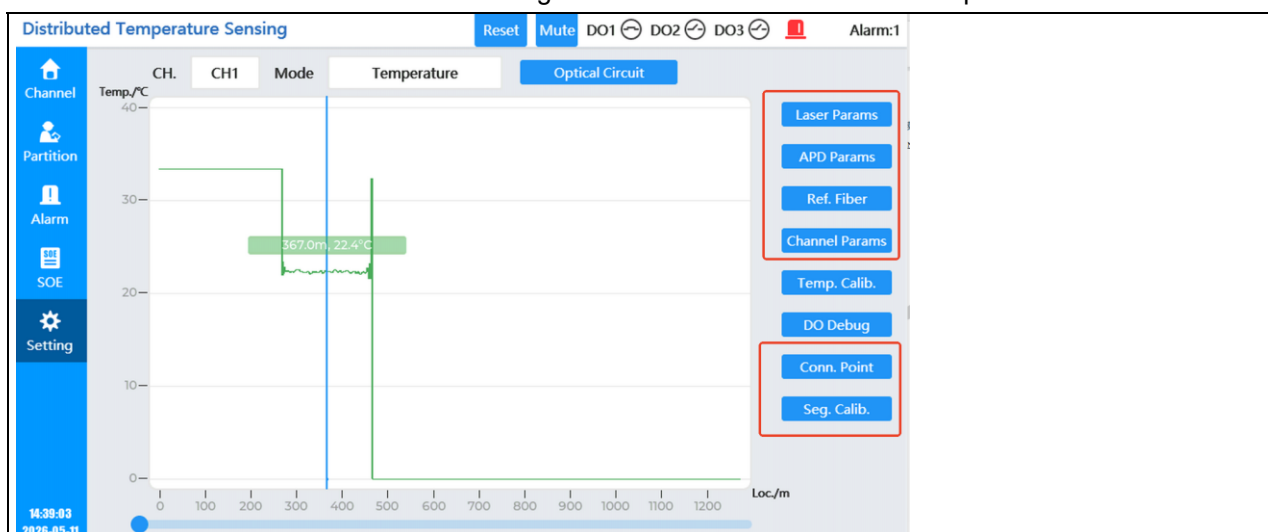
3. The Distributed Temperature Sensing PMC-3601F provides the following interfaces.



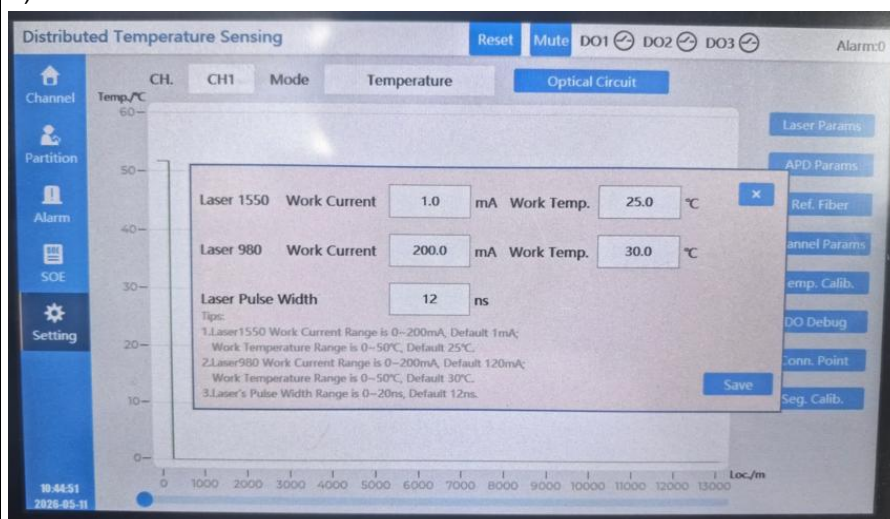
CH1-CH4 are optical fiber temperature measurement channels. P1 and P2 are RJ45 network communication ports. P3 and P4 are RS485 serial communication ports (The P1, P2, P3, P4 and 485 series communication ports are not involved in the test.). The DO11, DO12, DO21, DO22, DO31 and DO32 interfaces are electromagnetic relay output interfaces. V+ and V- are the power input interfaces.

4. During the testing process, the internal parameters of the Distributed Temperature sensing are set as follows (According to the customer's statement, each device will be debugged on site, and the parameter Settings will change according to requirements such as distance and temperature):

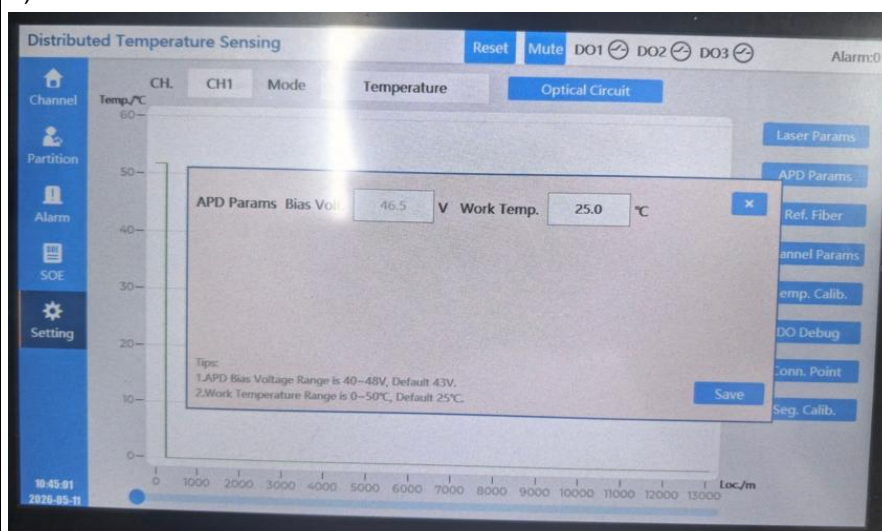
Before the test, set each parameter in the red box of the following interface.



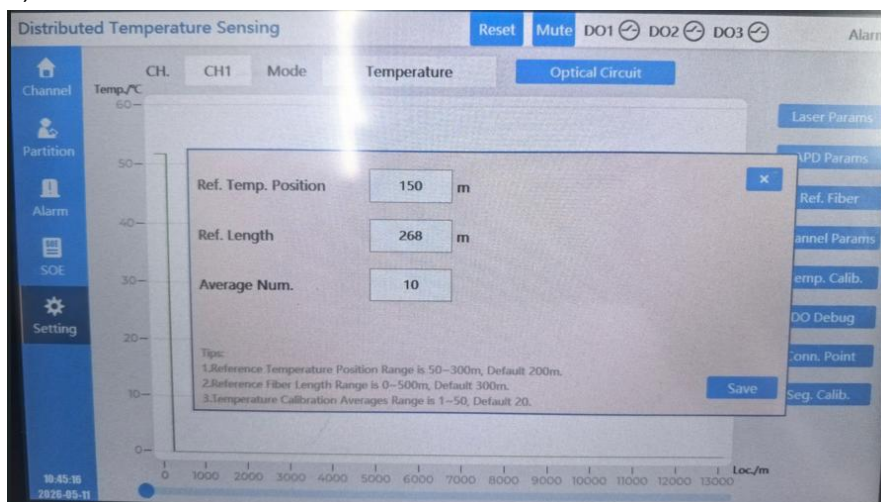
1) Laser Params.



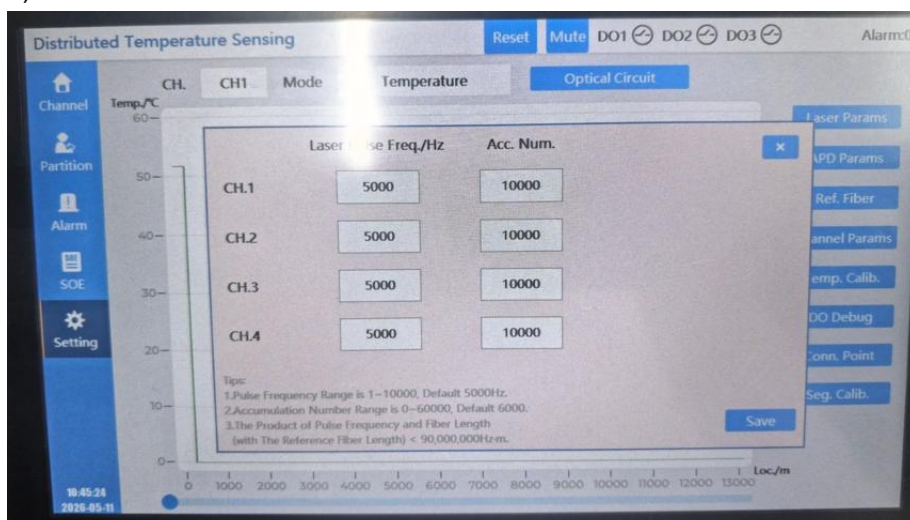
2) APD Params.



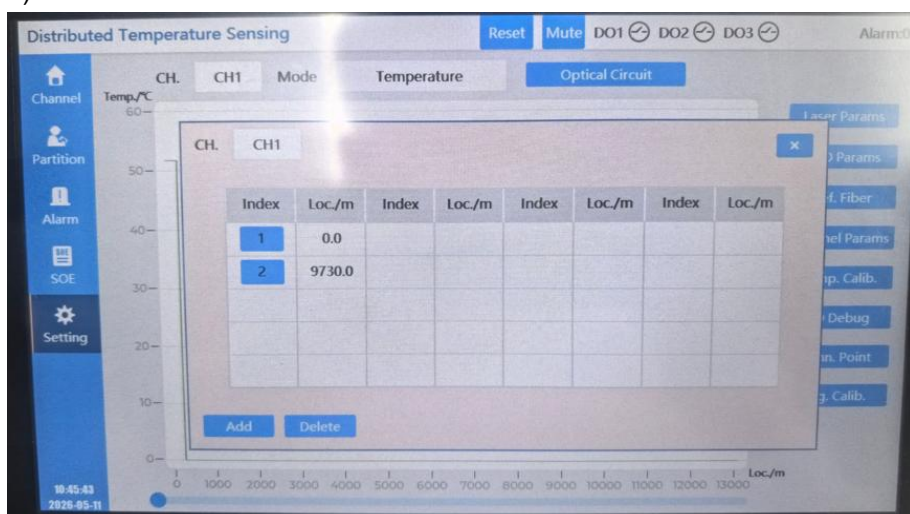
3) Reference Fiber Params.



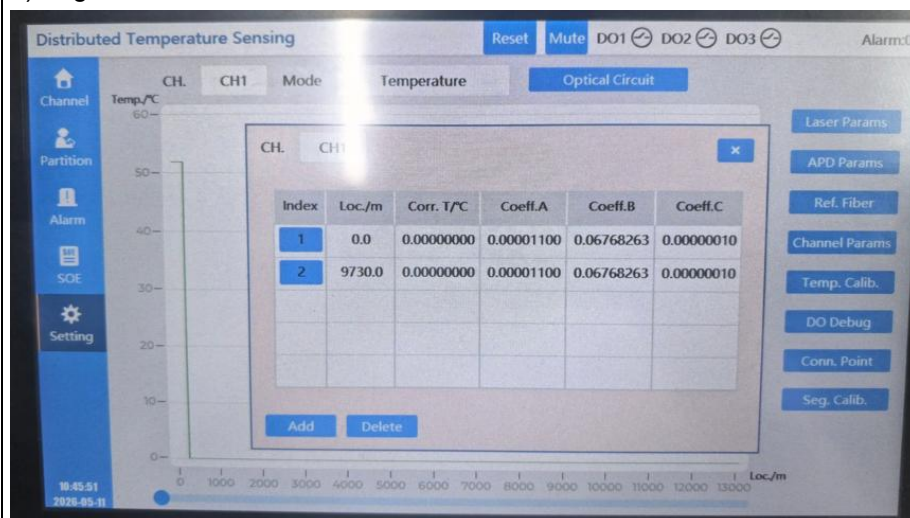
4) Channel Params.



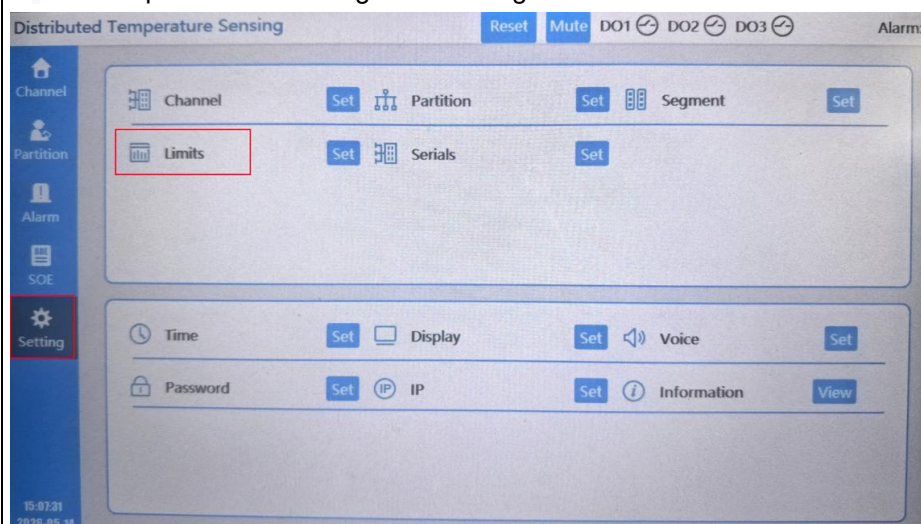
5) Connection Point.



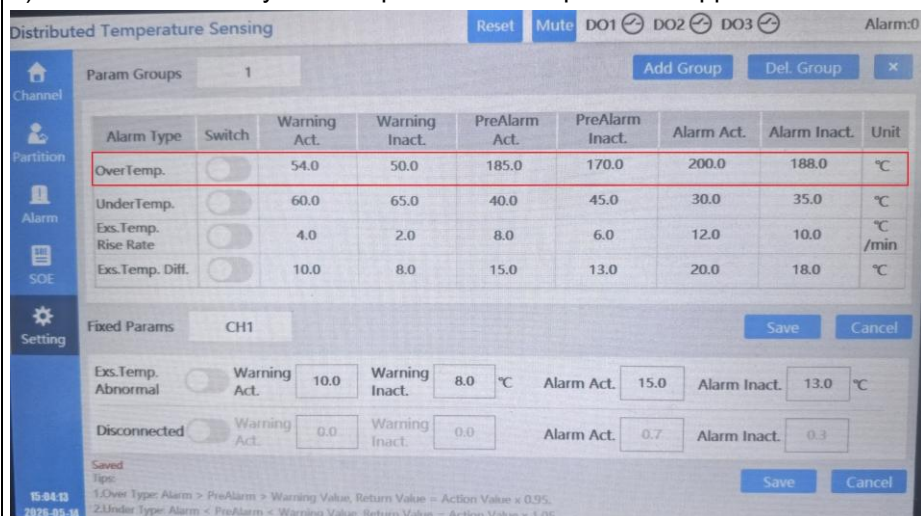
6) Segment Calibration.



5. The limit parameters in the general settings are set as follows:



1) Parameters used by Heat response for room protection application.



2) Parameters used for other tests and the limiting parameters can be applied by turning on the switch.

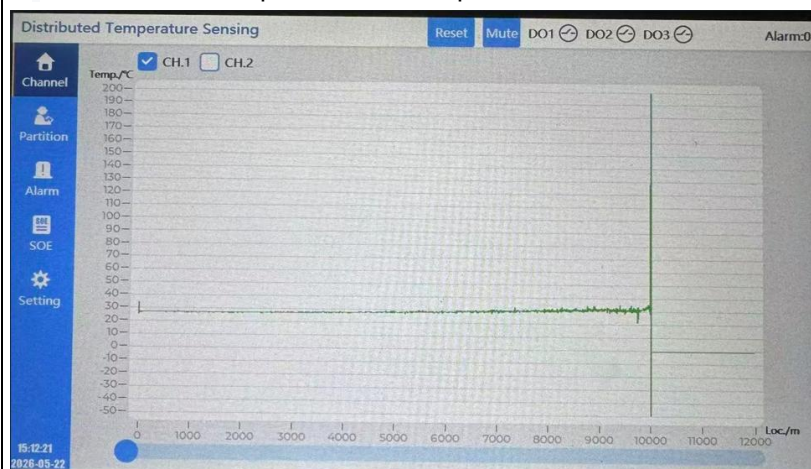
Alarm Type	Switch	Warning Act.	Warning Inact.	PreAlarm Act.	PreAlarm Inact.	Alarm Act.	Alarm Inact.	Unit
OverTemp.	☒	130.0	120.0	185.0	170.0	200.0	188.0	°C
UnderTemp.	☐	60.0	65.0	40.0	45.0	30.0	35.0	°C
Exs.Temp. Rise Rate	☐	4.0	2.0	8.0	6.0	12.0	10.0	°C/min
Exs.Temp. Diff.	☐	10.0	8.0	15.0	13.0	20.0	18.0	°C

6. Set the acousto-optic parameters of the Distributed Temperature Sensing PMC-3601F to be associated with the alarm DO.

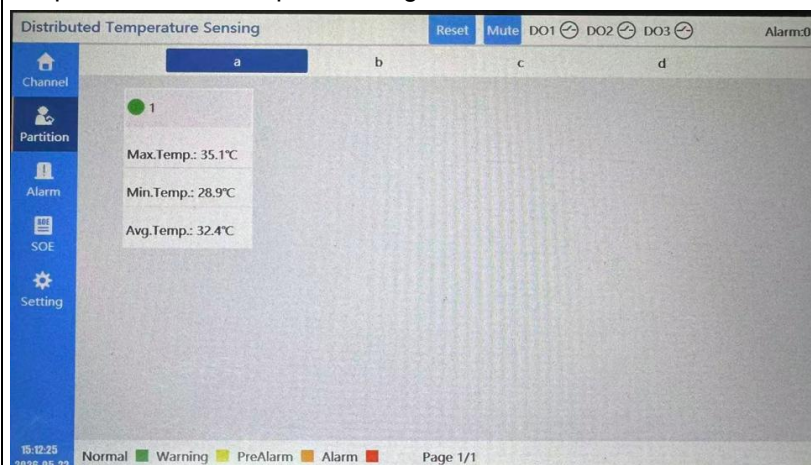
7. Set up interval segments to monitor the temperature at the farthest distance.

Index	Segment Name	Segment Information	Type	Limit Params
1	1	Partition Channel 1: Location Start: 9900m, Location End: 9962m	Fiber Segment	1

8. The measured temperature at each position can be observed through the channel interface.



9. Through the Partition interface, the maximum temperature, minimum temperature and average temperature within the partition segment can be seen in real time.



10. When the sensor triggers a fault alarm, the LCD screen immediately displays the location of the current fault alarm, event type, event description, and alarm category.

Distributed Temperature Sensing

Reset Mute DO1 DO2 DO3 Alarm:76

Index	Alarm Position	Event Type	Event Description	Alarm Type
11	Channel1 55.0m	verTemp. PreAlar	Partition demo->Segment cc Value: 22.4°C	
12	Channel1 55.5m	mp. PreAlarm	Partition demo->Segment cc Value: 22.4°C	
13	Channel1 56.0m	OverTemp. PreAl	Partition demo->Segment cc Value: 22.4°C	
14	Channel1 56.5m	OverTemp. PreAl	Partition demo->Segment cc Value: 22.4°C	
15	Channel1 57.0m	OverTemp. PreAl	Partition demo->Segment cc Value: 22.3°C	
16	Channel1 57.5m	OverTemp. PreAl	Partition demo->Segment cc Value: 22.3°C	
17	Channel1 58.0m	OverTemp. PreAl	Partition demo->Segment cc Value: 22.3°C	
18	Channel1 58.5m	OverTemp. PreAl	Partition demo->Segment cc Value: 22.3°C	
19	Channel1 59.0m	OverTemp. PreAl	Partition demo->Segment cc Value: 22.4°C	
20	Channel1 59.5m	OverTemp. PreAl	Partition demo->Segment cc Value: 22.4°C	

Warning PreAlarm Alarm

Page 2/8

Prev Next

EN 54-22																																																											
Clause	Requirement + Test						Result - Remark				Verdict																																																
4	Product characteristics										P																																																
4.1	General										P																																																
4.1.1	Compliance										N/A																																																
	In order to comply with this standard, resettable line-type heat detectors shall meet the provisions of Clause 4, which shall be verified by visual inspection or engineering assessment as described in Clause 5 and shall meet the requirements of the tests.						Conduct commissioned tests based on the client's requirements.				N/A																																																
4.1.2	Heat response classes										P																																																
4.1.2.1	Heat response for room protection application										P																																																
	For room protection application the heat response of RLTHD is classified as indicated in Table 1. NOTE Test fires TF6S, TF6 and TF6F are specified in Annex B.						A1N and A2N				P																																																
Table 1—Heat response,room protection for integrating and non-integrating RLTHD <table><tr><th colspan="2">Heat response class</th><th>Typical application temperature °C</th><th>Maximum application temperature °C</th><th>Minimum static response temperature °C</th><th>Maximum static response temperature °C</th><th colspan="2">TF6S response time</th><th colspan="2">TF6 response time</th><th colspan="2">TF6F response time</th></tr><tr><th>non-integrating RLTHD</th><th>Integrating RLTHD</th><th></th><th></th><th></th><th></th><th>Lower value s</th><th>Upper value s</th><th>Lower value s</th><th>Upper value s</th><th>Lower value s</th><th>Upper value s</th></tr><tr><td>A1N</td><td>A1I</td><td>25</td><td>50</td><td>54</td><td>65</td><td>50</td><td>400</td><td>30</td><td>210</td><td>20</td><td>130</td></tr><tr><td>A2N</td><td>A2I</td><td>25</td><td>50</td><td>54</td><td>70</td><td>120</td><td>600</td><td>60</td><td>300</td><td>40</td><td>180</td></tr></table>												Heat response class		Typical application temperature °C	Maximum application temperature °C	Minimum static response temperature °C	Maximum static response temperature °C	TF6S response time		TF6 response time		TF6F response time		non-integrating RLTHD	Integrating RLTHD					Lower value s	Upper value s	Lower value s	Upper value s	Lower value s	Upper value s	A1N	A1I	25	50	54	65	50	400	30	210	20	130	A2N	A2I	25	50	54	70	120	600	60	300	40	180
Heat response class		Typical application temperature °C	Maximum application temperature °C	Minimum static response temperature °C	Maximum static response temperature °C	TF6S response time		TF6 response time		TF6F response time																																																	
non-integrating RLTHD	Integrating RLTHD					Lower value s	Upper value s	Lower value s	Upper value s	Lower value s	Upper value s																																																
A1N	A1I	25	50	54	65	50	400	30	210	20	130																																																
A2N	A2I	25	50	54	70	120	600	60	300	40	180																																																
4.1.2.2	Heat response for local protection application										P																																																
	For local protection application the heat response of the RLTHD is classified as indicated in Table 2.						EN				P																																																
Table 2—Heat response local protection for integrating and non-integrating RLTHD <table><tr><th colspan="2">Heat response class</th><th>Typical application temperature °C</th><th>Maximum application temperature °C</th><th>Minimum static response temperature °C</th><th>Maximum static response temperature °C</th></tr><tr><th>non-integrating RLTHD</th><th>Integrating RLTHD</th><th></th><th></th><th></th><th></th></tr><tr><td>BN</td><td>BI</td><td>40</td><td>65</td><td>69</td><td>85</td></tr><tr><td>CN</td><td>CI</td><td>55</td><td>80</td><td>84</td><td>100</td></tr><tr><td>DN</td><td>DI</td><td>70</td><td>95</td><td>99</td><td>115</td></tr><tr><td>EN</td><td>EI</td><td>85</td><td>110</td><td>114</td><td>130</td></tr><tr><td>FN</td><td>FI</td><td>100</td><td>125</td><td>129</td><td>145</td></tr><tr><td>GN</td><td>GI</td><td>115</td><td>140</td><td>144</td><td>160</td></tr></table>												Heat response class		Typical application temperature °C	Maximum application temperature °C	Minimum static response temperature °C	Maximum static response temperature °C	non-integrating RLTHD	Integrating RLTHD					BN	BI	40	65	69	85	CN	CI	55	80	84	100	DN	DI	70	95	99	115	EN	EI	85	110	114	130	FN	FI	100	125	129	145	GN	GI	115	140	144	160
Heat response class		Typical application temperature °C	Maximum application temperature °C	Minimum static response temperature °C	Maximum static response temperature °C																																																						
non-integrating RLTHD	Integrating RLTHD																																																										
BN	BI	40	65	69	85																																																						
CN	CI	55	80	84	100																																																						
DN	DI	70	95	99	115																																																						
EN	EI	85	110	114	130																																																						
FN	FI	100	125	129	145																																																						
GN	GI	115	140	144	160																																																						
4.1.3	Environmental groups										P																																																
	Different environmental groups are necessary to reflect the different service environments of the components of a line-type heat detector:										P																																																
	The sensing element is in either environmental group II or III.						Sensing element III				P																																																
	The sensor control unit and the functional unit are in either environmental group I,II or III.						Sensor control unit II				P																																																

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Clause	Requirement + Test	Result - Remark	Verdict
	NOTE Environmental group I covers equipment likely to be installed indoors in commercial/industrial premises but for which the avoidance of extreme environmental conditions can be taken into account in the selection of the mounting site. Environmental group II covers equipment likely to be installed indoors in commercial/industrial premises in all general areas. Environmental group III covers equipment which is intended to be installed out of doors.		P
4.3.3	Requirements for software-controlled detectors		P
4.3.3.1	General		P
	For RLTHD, which rely on software control in order to fulfil the requirements of this standard, the requirements of 4.3.3.2, 4.3.3.3 and 4.3.3.4 shall be met	Fulfilled	P
4.3.3.2	Software documentation		P
4.3.3.2.1	The manufacturer shall submit documentation, which gives an overview of the software design. This documentation shall provide sufficient detail for the design to be inspected for compliance with this standard and shall include the following as a minimum:		P
	a) a functional description of the main program flow (e.g. as a flow diagram or struct gram) including;	Fulfilled	P
	1) a brief description of the modules and the functions that they perform,	Fulfilled	P
	2) the way in which the modules interact,	Fulfilled	P
	3) the overall hierarchy of the program,	Fulfilled	P
	4) the way in which the software interacts with the hardware,	Fulfilled	P
	5) the way in which the modules are called, including any interrupt processing,	Fulfilled	P
	b) a description of which areas of memory are used for the various purposes (e.g. the program, site specific data and running data);	Fulfilled	P
	c) a designation, by which the software and its version can be uniquely identified.	Fulfilled	P
4.3.3.2.2	The manufacturer shall have available detailed design documentation, which only needs to be provided if required by the testing laboratory. It shall comprise at least the following:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	a) an overview of the whole system configuration, including all software and hardware components;	Fulfilled	P
	b) a description of each module of the program, containing at least:	Fulfilled	P
	1) the name of the module,	Fulfilled	P
	2) a description of the tasks performed,	Fulfilled	P
	3) a description of the interfaces, including the type of data transfer, the valid data range and the checking for valid data,	Fulfilled	P
	c) full source code listings, as hard copy or in machine-readable form (e.g. ASCII-code), including all global and local variables, constants and labels used, and sufficient comment for the program flow to be recognized;	Fulfilled	P
	d) details of any software tools used in the design and implementation phase (e.g. CASE-tools compilers).	Fulfilled	P
4.3.3.3	Software design		P
	In order to ensure the reliability of the RLTHD, the following requirements for software design shall apply:		P
	a) the software shall have a modular structure;	Fulfilled	P
	b) the design of the interfaces for manually and automatically generated data shall not permit invalid data to cause error in the program operation;	Fulfilled	P
	c) the software shall be designed to avoid the occurrence of deadlock of the program flow.	Fulfilled	P
4.3.3.4	The storage of programs and data		P
	The program necessary to comply with this standard and any preset data, such as manufacturer's settings, shall be held in non-volatile memory. Writing to areas of memory containing this program and data shall only be possible by the use of some special tool or code and shall not be possible during normal operation of the RLTHD.	Fulfilled	P
	Site-specific data shall be held in memory which will retain data for at least two weeks without external power to the detector, unless provision is made for the automatic renewal of such data, following loss of power, within 1h of power being restored.	Fulfilled	P
	To confirm this, the detector shall be assessed in accordance with 5.3.3.	Fulfilled	P

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Clause	Requirement + Test	Result - Remark	Verdict
4.6	Durability of nominal activation conditions/sensitivity		P
4.6.1	Temperature resistance		P
4.6.1.1	Dry heat (operational) sensor control unit		P
	The sensor control unit of the RLTHD shall function correctly, at high ambient temperatures as specified in 5.6.1.1.		P
4.6.1.2	Dry heat (endurance)for sensor control unit and sensing element		N/A
	The sensor control unit and the sensing element of the RLTHD shall be capable of withstanding long-term exposure to high temperature as specified in 5.6.1.2.		N/A
4.6.1.3	Cold (operational) for sensing element		P
	The RLTHD shall function correctly even if the sensing element is exposed to low ambient temperatures as specified in 5.6.1.3.		P
4.6.1.4	Cold (operational)for sensor control unit		P
	The sensor control unit of the RLTHD shall function correctly at low ambient temperatures as specified in 5.6.1.4.		P
4.6.2	Humidity resistance		P
4.6.2.1	Damp heat, steady state(endurance)for sensor control unit and sensing element		N/A
	The RLTHD shall be capable of withstanding long term exposure to a high level of continuous humidity as specified in 5.6.2.1.		N/A
4.6.2.2	Damp heat, cyclic (operational)for sensing element		P
	The RLTHD shall function correctly even if the sensing element is exposed to a high level of humidity as specified in 5.6.2.2.		P
4.6.2.3	Damp heat, cyclic (operational)for sensor control		P
	The sensor control unit of the RLTHD shall function correctly at a high level of humidity as specified in 5.6.2.3.		P
4.6.2.4	Damp heat, steady state (operational)for sensor control unit		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The sensor control unit of the RLTHD shall function correctly at a high level of humidity as specified in 5.6.2.4.		N/A
4.6.2.5	Damp heat, cyclic(endurance)for sensor control unit and sensing element		N/A
	The RLTHD shall be capable withstanding the effect of cyclic humidity levels as specified in 5.6.2.5.		N/A
4.6.3	Shock and vibration resistance		N/A
4.6.3.1	Shock(operational)for sensor control unit		N/A
	The sensor control unit of the RLTHD shall operate correctly when submitted to mechanical shocks as specified in 5.6.3.1.		N/A
4.6.3.2	Impact(operational)for sensor control unit		N/A
	The sensor control unit of the RLTHD shall operate correctly when submitted to mechanical impacts as specified in 5.6.3.2.		N/A
4.6.3.3	Impact(operational)for sensing element		N/A
	The RLTHD shall function correctly even if the sensing element is submitted to mechanical impacts as specified in 5.6.3.3.		N/A
4.6.3.4	Vibration, sinusoidal (operational)for sensor control unit		N/A
	The sensor control unit of the RLTHD shall operate correctly when submitted to sinusoidal vibration as specified in 5.6.3.4.		N/A
4.6.3.5	Vibration, sinusoidal (operational)for sensing element		N/A
	The RLTHD shall function correctly even if the sensing element is submitted to sinusoidal vibration as specified in 5.6.3.5.		N/A
4.6.3.6	Vibration, sinusoidal(endurance)for sensor control unit		N/A
	The sensor control unit of the RLTHD shall be capable of withstanding the effect of sinusoidal vibration as specified in 5.6.3.6.		N/A
4.6.3.7	Vibration, sinusoidal (endurance)for sensing element		N/A
	The sensing element of the RLTHD shall be capable of withstanding the effect of sinusoidal vibration as specified in 5.6.3.7.		N/A
4.6.4	Corrosion resistance		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.6.4.1	Sulphur dioxide (SO₂) corrosion(endurance)for sensing element		N/A
	The sensing element of the RLTHD shall be capable of withstanding exposure to an SO ₂ corrosive atmosphere as specified in 5.6.4.1.		N/A
4.6.4.2	Sulphur dioxide (SO₂) corrosion (endurance)for sensor control unit		N/A
	The sensor control unit of the RLTHD shall be capable of withstanding exposure to an SO ₂ corrosive atmosphere as specified in 5.6.4.2.		N/A
4.6.5	Electrical stability		P
4.6.5.1	Electromagnetic immunity		P
	The RLTHD shall operate correctly when submitted to electromagnetic interference as specified in 5.6.5.1.		P
5	Testing assessments and sampling methods		P
5.1	General		P
5.1.1	Atmospheric conditions for tests		P
	Unless otherwise stated in a test procedure, the testing shall be carried out after the test specimen has been allowed to stabilize in the standard atmospheric conditions for testing as specified in EN 60068-1:1994 as follows:		P
	a) temperature:(15 to 35)°C;	23.4°C	P
	b) relative humidity:(25 to 75) %;	56.6%RH	P
	c) air pressure:(86 to 106) kPa	101.2kPa	P
	If variations in these parameters have a significant effect on a measurement, then such variations should be kept to a minimum during a series of measurements carried out as part of one test on one specimen.		P
5.1.2	Operating conditions for tests		P

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Clause	Requirement + Test	Result - Remark	Verdict
	If a test method requires a specimen to be operational, then the specimen shall be connected to suitable supply and monitoring equipment, with characteristics as required by the manufacturer's data. Unless otherwise specified in the test method, the supply parameters applied to the specimen shall be set within the manufacturer's specified range(s) and shall remain constant throughout the tests. The value chosen for each parameter shall normally be the nominal value, or the mean of the specified range. If a test procedure requires a specimen to be monitored to detect any alarm or fault signals, then connections shall be made to any necessary ancillary devices (e.g. through wiring to an end-of-line device for conventional detectors to allow a fault signal to be recognized).	Conduct commissioned tests based on the client's requirements.	P
	The details of the supply and monitoring equipment and the alarm criteria used should be given in the test report.	See general product information	P
5.1.3	Mounting arrangements		P
	Unless otherwise stated, the specimen shall be mounted by its normal means of attachment in accordance with the manufacturer's instructions. If these instructions describe more than one method of mounting, then the method considered to be most unfavorable shall be chosen for each test.		P
5.1.4	Tolerances		P
	Unless otherwise stated, the tolerances for the environmental test parameters shall be as specified in the basic reference standards for the test (e.g. the relevant part of EN 60068).	Fulfilled	P
	If a specific tolerance or deviation limit is not specified in a requirement or test procedure, then a deviation limit of $\pm 5\%$ shall be applied.	Fulfilled	P
5.1.5	Procedure for measurement of response time		P
5.1.5.1	General		P
	The purpose of this procedure is to establish any deviation in system response time following the environmental tests.	Fulfilled	P
	The specimen shall be connected to a suitable supply and monitoring equipment in accordance with 5.1.2.	Fulfilled	P
	The response time of the RLTHD shall be measured using the heat tunnel described in Annex F.	Fulfilled	P

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Clause	Requirement + Test	Result - Remark	Verdict
	The orientation of the sensing element in the heat tunnel shall be chosen arbitrarily and shall be the same for each measurement.	Fulfilled	P
	Before the measurement, stabilize the temperature of the air stream and the section of sensing element to be heated at a typical application temperature according to 4.1.2 unless otherwise specified. The measurement is then made by increasing the air temperature in the tunnel, linearly with respect to time and at the rate of rise specified in the applicable test procedure, until the supply and monitoring equipment indicates an alarm.	Fulfilled	P
	During the measurement, the airflow in the tunnel shall be maintained at a constant mass flow, equivalent to $(0,8 \pm 0,1)$ m/s at 25°C. The air temperature shall be controlled to within ± 2 K of the nominal temperature required at any time during the test.	Fulfilled	P
	The response time, shall be measured from the moment the temperature starts increasing to the indication of an alarm from the supply and monitoring equipment.	Fulfilled	P
	NOTE1 Linear extrapolation of the stabilized and the increasing temperature against time lines can be used to establish the effective start time of the temperature increase.	Fulfilled	P
	NOTE 2 It is advised to take care not to subject detectors to a damaging thermal shock when transferring them to and from a stabilized or alarm temperature.	Fulfilled	P
5.1.5.2	Linear heat detectors		P
	For measurement of the response time of linear heat detectors, the length of sensing element, L_1 which shall be connected to the sensor control unit shall be chosen to be the worst case for the technology employed. This shall be agreed between the manufacturer and the testing laboratory.	Fulfilled	P
	NOTE1 It is advised to determine the worst case taking into account the effect on the temperature measurement of noise and losses in the sensing element.	Fulfilled	P

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Clause	Requirement + Test	Result - Remark	Verdict
	A section of $(10 \pm 0,1)$ m (L_1 test) of sensing element shall be wrapped around a test frame as described in Annex C and Annex D and heated in the heat tunnel. This section shall be kept the same for all relevant tests to allow the comparison of the response time before, during and after the environmental tests	L_1 test at 9960-9970m	P
	The remaining section of the sensing element (L_1 -Ltest) not exposed to the induced test temperature shall remain at ambient temperature (23 ± 5) °C during the measurement unless otherwise stated in the individual tests.	Fulfilled	P
	NOTE 2 To facilitate the test procedure, it may be necessary to introduce easily detachable connections between different sections of the sensing element. It is advised to take into account the losses introduced by these connections when determining L_1 .	Fulfilled	P
	NOTE3 The manufacturer can specify a minimum length of sensing element that needs to be connected before and/or after the section of the sensing element being heated (L test).	Fulfilled	P
	NOTE 4 To reduce validation time for integrating line-type heat detectors the system setting used in the test 5.1.5 can be more sensitive than the system settings used in the performance tests (see 5.5 and 5.3.6).		N/A
5.1.5.3	Multipoint heat detectors		N/A
	For measurement of the response time of multipoint heat detectors, the length of sensing element, L_1 which shall be connected to the sensor control unit shall be chosen to be the worst case for the technology employed. This shall be agreed between the manufacturer and the testing laboratory.		N/A
	A When testing the response time of multipoint detectors, one single sensor of the multipoint detector shall be placed in the centre of the tunnel measuring section (see Annex E). All other sensors shall be outside the heat tunnel and shall remain at ambient temperature (23 ± 5) °C during the measurement unless otherwise stated in the individual tests.		N/A
	NOTE The manufacturer can specify a minimum length of sensing element that needs to be connected before and/or after the section of the sensing element being heated.		N/A
5.1.6	Provision for tests		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Three specimens of sensor control unit, at least three specimens of sensing element and, if applicable, at least three specimens of each functional unit shall be provided to conduct the tests in 5.1.7. The exact number and length of sensing elements shall be agreed between the manufacturer and the testing laboratory.	The customer provided Three specimens of sensor control unit and one specimen of sensing element, details see general product information.	N/A
	If there are different types of sensor control units, sensing elements and/or functional units (e.g. with different environment groups), at least three specimens shall be provided for each type.	The customer provided Three specimens of sensor control unit and one specimen of sensing element. The environmental grade of sensor control unit is II and the environmental grade of sensing element is III.	N/A
	The specimens submitted shall be deemed representative of the manufacturer's normal production with regard to their construction and calibration.		P
	This implies that the mean response time of the three specimens as found in the reproducibility test should also represent the production mean. The limits specified in the reproducibility test should also be applicable to the manufacturer's production.	According to the customer's statement, the reproducibility test will not be conducted.	N/A
5.1.7	Test schedule		P

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Clause	Requirement + Test	Result - Remark	Verdict																																																																																																																																																							
	The specimens shall be tested according to the following test schedule (see Table 3). Table 3—Test schedule <table><tr><th rowspan="2">Test d</th><th rowspan="2">Clause</th><th colspan="3">Specimen Noa</th></tr><tr><th>Sensorr control units</th><th>Sensing elements</th><th>Functional units</th></tr><tr><td>Repeatability</td><td>5.2.3</td><td>One specimen, chosen arbitrarily</td><td>One specimen, chosen arbitrarily</td><td>One specimen (of each type), chosen arbitrarily</td></tr><tr><td>Reproducibility C</td><td>5.2.4</td><td>1 to 3</td><td>1 to 3b</td><td>1 to 3b</td></tr><tr><td>Sensing element fault</td><td>5.3.4</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Variation in supply parameters</td><td>5.4.1</td><td>1</td><td>1</td><td>1</td></tr><tr><td>Low voltage fault (sensor control unit with external power supply)</td><td>5.4.2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Fire sensitivity for room protection application</td><td>5.5.1</td><td>1</td><td>1</td><td>1</td></tr><tr><td>Static response temperature test</td><td>5.5.2</td><td>1</td><td>2</td><td>2</td></tr><tr><td>Dry heat (operational) sensor control unit</td><td>5.6.1.1</td><td>1</td><td>2</td><td>2</td></tr><tr><td>Maximum ambient temperature test (sensing element)</td><td>5.3.6</td><td>2</td><td>3</td><td>3</td></tr><tr><td>Dry heat (endurance) sensor control unit and sensing element A</td><td>5.6.1.2</td><td>2</td><td>3</td><td>3</td></tr><tr><td>Cold (operational) sensing element</td><td>5.6.1.3</td><td>2</td><td>3</td><td>3</td></tr><tr><td>Cold (operational) for sensor control unit</td><td>5.6.1.4</td><td>2</td><td>3</td><td>3</td></tr></table> <table><tr><th rowspan="2">Test d</th><th rowspan="2">Clause</th><th colspan="3">Specimen Noa</th></tr><tr><th>Sensor control units</th><th>Sensing elements</th><th>Functional units</th></tr><tr><td>Damp heat, steady state (endurance) for sensor control unit and sensing element</td><td>5.6.2.1</td><td>3</td><td>2</td><td>2</td></tr><tr><td>Damp heat, cyclic (operational) for sensing element</td><td>5.6.2.2</td><td>2</td><td>3</td><td>3</td></tr><tr><td>Damp heat, cyclic (operational) for sensor control unit</td><td>5.6.2.3</td><td>2</td><td>3</td><td>3</td></tr><tr><td>Damp heat, steady state (operational) for sensor control unit</td><td>5.6.2.4</td><td>2</td><td>3</td><td>3</td></tr><tr><td>Damp heat, cyclic (endurance) for sensor control unit and sensing element</td><td>5.6.2.5</td><td>2</td><td>3</td><td>3</td></tr><tr><td>Shock (operational) for sensor control unit</td><td>5.6.3.1</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Impact (operational) for sensor control unit</td><td>5.6.3.2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Impact (operational) for sensing element</td><td>5.6.3.3</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Vibration, sinusoidal (operational) for sensor control unit</td><td>5.6.3.4</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Vibration, sinusoidal (operational) for sensing element</td><td>5.6.3.5</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Vibration, sinusoidal (endurance) for sensor control unit</td><td>5.6.3.6</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Vibration, sinusoidal (endurance) for sensing element</td><td>5.6.3.7</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Sulphur dioxide (SO₂) corrosion (endurance) for sensing element</td><td>5.6.4.1</td><td>2</td><td>3</td><td>3</td></tr><tr><td>Sulphur dioxide (SO₂) corrosion (endurance) for sensor control unit</td><td>5.6.4.2</td><td>3</td><td>3</td><td>3</td></tr><tr><td>Electromagnetic compatibility (EMC), immunity tests (operational)</td><td>5.6.5.1</td><td>2</td><td>2</td><td>2</td></tr></table> a The schedule shows the specimen numbers recommended for each test. Other arrangements can be used by agreement between the various parties (e.g. approval body, testing laboratory, manufacturer etc.) in order to improve the efficiency or cost of testing, or to reduce the number of specimens damaged by the testing. However, the reproducibility of the sensitivity of at least three specimens shall be measured in the reproducibility test. If fewer specimens are to be used for the rest of the tests then, the possible damaging effects of subjecting a specimen to a number of tests, especially endurance tests have to be considered. b Assigned arbitrarily to the sensor control units. If more than 2 sensing elements may be connected to the sensor control unit (single ended or loop configuration) and/or there are sensing elements for different environment groups, then the number of tests shall be agreed between the manufacturer and the testing laboratory. c For the reproducibility test only combinations of sensor control units with functional units and sensing elements that are used in 5.2 to 5.6 shall be used. d The test order remains open to allow optimisation of test program to minimize test time and cost.	Test d	Clause	Specimen Noa			Sensorr control units	Sensing elements	Functional units	Repeatability	5.2.3	One specimen, chosen arbitrarily	One specimen, chosen arbitrarily	One specimen (of each type), chosen arbitrarily	Reproducibility C	5.2.4	1 to 3	1 to 3b	1 to 3b	Sensing element fault	5.3.4	2	2	2	Variation in supply parameters	5.4.1	1	1	1	Low voltage fault (sensor control unit with external power supply)	5.4.2	2	2	2	Fire sensitivity for room protection application	5.5.1	1	1	1	Static response temperature test	5.5.2	1	2	2	Dry heat (operational) sensor control unit	5.6.1.1	1	2	2	Maximum ambient temperature test (sensing element)	5.3.6	2	3	3	Dry heat (endurance) sensor control unit and sensing element A	5.6.1.2	2	3	3	Cold (operational) sensing element	5.6.1.3	2	3	3	Cold (operational) for sensor control unit	5.6.1.4	2	3	3	Test d	Clause	Specimen Noa			Sensor control units	Sensing elements	Functional units	Damp heat, steady state (endurance) for sensor control unit and sensing element	5.6.2.1	3	2	2	Damp heat, cyclic (operational) for sensing element	5.6.2.2	2	3	3	Damp heat, cyclic (operational) for sensor control unit	5.6.2.3	2	3	3	Damp heat, steady state (operational) for sensor control unit	5.6.2.4	2	3	3	Damp heat, cyclic (endurance) for sensor control unit and sensing element	5.6.2.5	2	3	3	Shock (operational) for sensor control unit	5.6.3.1	2	2	2	Impact (operational) for sensor control unit	5.6.3.2	2	2	2	Impact (operational) for sensing element	5.6.3.3	2	2	2	Vibration, sinusoidal (operational) for sensor control unit	5.6.3.4	2	2	2	Vibration, sinusoidal (operational) for sensing element	5.6.3.5	2	2	2	Vibration, sinusoidal (endurance) for sensor control unit	5.6.3.6	2	2	2	Vibration, sinusoidal (endurance) for sensing element	5.6.3.7	2	2	2	Sulphur dioxide (SO ₂) corrosion (endurance) for sensing element	5.6.4.1	2	3	3	Sulphur dioxide (SO ₂) corrosion (endurance) for sensor control unit	5.6.4.2	3	3	3	Electromagnetic compatibility (EMC), immunity tests (operational)	5.6.5.1	2	2	2	Conduct commissioned tests based on the client's requirements.	N/A
Test d	Clause			Specimen Noa																																																																																																																																																						
		Sensorr control units	Sensing elements	Functional units																																																																																																																																																						
Repeatability	5.2.3	One specimen, chosen arbitrarily	One specimen, chosen arbitrarily	One specimen (of each type), chosen arbitrarily																																																																																																																																																						
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Sensing element fault	5.3.4	2	2	2																																																																																																																																																						
Variation in supply parameters	5.4.1	1	1	1																																																																																																																																																						
Low voltage fault (sensor control unit with external power supply)	5.4.2	2	2	2																																																																																																																																																						
Fire sensitivity for room protection application	5.5.1	1	1	1																																																																																																																																																						
Static response temperature test	5.5.2	1	2	2																																																																																																																																																						
Dry heat (operational) sensor control unit	5.6.1.1	1	2	2																																																																																																																																																						
Maximum ambient temperature test (sensing element)	5.3.6	2	3	3																																																																																																																																																						
Dry heat (endurance) sensor control unit and sensing element A	5.6.1.2	2	3	3																																																																																																																																																						
Cold (operational) sensing element	5.6.1.3	2	3	3																																																																																																																																																						
Cold (operational) for sensor control unit	5.6.1.4	2	3	3																																																																																																																																																						
Test d	Clause	Specimen Noa																																																																																																																																																								
		Sensor control units	Sensing elements	Functional units																																																																																																																																																						
Damp heat, steady state (endurance) for sensor control unit and sensing element	5.6.2.1	3	2	2																																																																																																																																																						
Damp heat, cyclic (operational) for sensing element	5.6.2.2	2	3	3																																																																																																																																																						
Damp heat, cyclic (operational) for sensor control unit	5.6.2.3	2	3	3																																																																																																																																																						
Damp heat, steady state (operational) for sensor control unit	5.6.2.4	2	3	3																																																																																																																																																						
Damp heat, cyclic (endurance) for sensor control unit and sensing element	5.6.2.5	2	3	3																																																																																																																																																						
Shock (operational) for sensor control unit	5.6.3.1	2	2	2																																																																																																																																																						
Impact (operational) for sensor control unit	5.6.3.2	2	2	2																																																																																																																																																						
Impact (operational) for sensing element	5.6.3.3	2	2	2																																																																																																																																																						
Vibration, sinusoidal (operational) for sensor control unit	5.6.3.4	2	2	2																																																																																																																																																						
Vibration, sinusoidal (operational) for sensing element	5.6.3.5	2	2	2																																																																																																																																																						
Vibration, sinusoidal (endurance) for sensor control unit	5.6.3.6	2	2	2																																																																																																																																																						
Vibration, sinusoidal (endurance) for sensing element	5.6.3.7	2	2	2																																																																																																																																																						
Sulphur dioxide (SO ₂) corrosion (endurance) for sensing element	5.6.4.1	2	3	3																																																																																																																																																						
Sulphur dioxide (SO ₂) corrosion (endurance) for sensor control unit	5.6.4.2	3	3	3																																																																																																																																																						
Electromagnetic compatibility (EMC), immunity tests (operational)	5.6.5.1	2	2	2																																																																																																																																																						
5.3.1	Test procedures operational reliability		P																																																																																																																																																							
5.3.3	Requirements for software controlled detectors		P																																																																																																																																																							
	For detectors that rely on software for their operation, a visual inspection of samples of documentation provided by the manufacturer shall be conducted to verify that the device complies with the requirements specified in 4.3.3.		P																																																																																																																																																							

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Clause	Requirement + Test	Result - Remark	Verdict												
5.6	Durability of nominal activation conditions/sensitivity		P												
5.6.1	Temperature resistance		P												
5.6.1.1	Dry heat (operational)test for sensor control unit		P												
5.6.1.1.1	object		P												
	To demonstrate the ability of the sensor control unit to function correctly at high ambient temperatures appropriate to the anticipated service environment.	Fulfilled	P												
5.6.1.1.2	Reference		P												
	The test apparatus and procedure shall be as described in EN60068-2-2:2007, Test Bb or Bd, and as indicated below.	Fulfilled	P												
5.6.1.1.3	State of the specimen during conditioning		P												
	The specimen shall be mounted as described in 5.1.3 and shall be connected to supply and monitoring equipment as described in 5.1.2.	Fulfilled	P												
	The length of sensing element used in the test shall correspond to the most unfavorable operating condition of the RLTHD technology under test. The configuration shall be the same as chosen in 5.1.5.	Fulfilled	P												
	The sensing element shall be maintained at normal atmospheric conditions (see 5.1.1).	Fulfilled	P												
5.6.1.1.4	Conditioning		P												
	The conditioning shall be applied to the sensor control unit in accordance with the applicable environmental group shown in Table 5. Table 5 — Conditions for dry heat (operational) test for sensor control unit <table><tr><th>Environmental group</th><th>Temperature °C</th><th>Duration h</th></tr><tr><td>I</td><td>40 ± 2</td><td>16</td></tr><tr><td>II</td><td>55 ± 2</td><td>16</td></tr><tr><td>III</td><td>70 ± 2</td><td>16</td></tr></table> NOTE If a sensor control unit is specified for more than one environmental group, the test needs only be carried out for the most severe group.	Environmental group	Temperature °C	Duration h	I	40 ± 2	16	II	55 ± 2	16	III	70 ± 2	16	Environmental group: II	P
Environmental group	Temperature °C	Duration h													
I	40 ± 2	16													
II	55 ± 2	16													
III	70 ± 2	16													
5.6.1.1.5	Measurements during conditioning		P												
	The specimen shall be monitored during the conditioning period to detect any fault or alarm condition. During the last hour of the conditioning stimulated an alarm condition by means agreed with the manufacturer.	Fulfilled	P												
5.6.1.1.6	Final measurements		P												

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Clause	Requirement + Test	Result - Remark	Verdict
	After the conditioning and a recovery period of at least 1h, the functional test as described in 5.1.5 shall be conducted at a rate of rise of 3 Kmin-1 and the response time recorded.	Fulfilled	P
	The greater response time value measured in this test and that measured for the same specimen in the reproducibility test, shall be designated t(3)max and the lesser shall be designated t(3)min.	Fulfilled	P
5.6.1.1.7	Requirements		P
	No alarm or fault signal shall be given during the period that the temperature is increasing to the stabilization temperature or during the stabilized period.	Fulfilled	P
	An alarm shall be generated when stimulated according to 5.6.1.1.5.	Fulfilled	P
	An alarm shall be generated during the functional test in 5.6.1.1.6.	Fulfilled	P
	The ratio of the response times t(3) max:t(3) min shall be not greater than 1,3.	Fulfilled	P
5.6.1.3	Cold (operational) for sensing element		P
5.6.1.3.1	object		P
	To demonstrate the ability of the RLTHD to function correctly even if the sensing element is exposed to low ambient temperatures appropriate to the anticipated service environment.	Fulfilled	P
5.6.1.3.2	Reference		P
	The test apparatus and procedure shall be as described in EN 60068-2-1:2007, test Ab.	Fulfilled	P
5.6.1.3.3	State of the specimen during conditioning		P
	The specimen shall be mounted as described in 5.1.3 and shall be connected to supply and monitoring equipment as described in 5.1.2.	Fulfilled	P
	The length of sensing element used in the test shall correspond to the most unfavorable operating condition of the RLTHD technology under test. The configuration shall be the same as chosen in 5.1.5.	Fulfilled	P
	The sensor control unit shall be maintained at normal ambient conditions defined in 5.1.1.	Fulfilled	P
5.6.1.3.4	Conditioning		P

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Clause	Requirement + Test	Result - Remark	Verdict									
	Conditioning shall be applied to the specimen as indicated in Table 7. Table 7 — Conditions for cold (operational) test for sensing element <table> <tr> <th>Environmental group</th><th>Temperature °C</th><th>Duration h</th></tr> <tr> <td>II</td><td>-10 ± 3</td><td>16</td></tr> <tr> <td>III</td><td>-25 ± 3 ^a</td><td>16</td></tr> </table> ^a In countries with very cold outside temperatures test condition of (- 40 ± 3) °C should be used.	Environmental group	Temperature °C	Duration h	II	-10 ± 3	16	III	-25 ± 3 ^a	16	Environmental group: III	P
Environmental group	Temperature °C	Duration h										
II	-10 ± 3	16										
III	-25 ± 3 ^a	16										
	NOTE If the sensor control unit and the sensing element belong to the same environmental group the test can be done concurrently with 5.6.1.4.		N/A									
5.6.1.3.5	Measurements during conditioning		P									
	The specimen shall be monitored during the conditioning period to detect any fault or alarm condition.	Fulfilled	P									
5.6.1.3.6	Final measurements		P									
	After the conditioning and a recovery period of at least 1h, the functional test as described in 5.1.5 shall be conducted at a rate of rise of 3 Kmin-1 and the response time recorded.	Fulfilled	P									
	The greater response time value measured in this test and that measured for the same specimen in the reproducibility test, shall be designated t(3)max and the lesser shall be designated t(3)min.	Fulfilled	P									
5.6.1.3.7	Requirements		P									
	No alarm or fault signal shall be given during the period that the temperature is decreasing to the stabilization temperature or during the stabilized period.	Fulfilled	P									
	The ratio of the response times t (3) max: t (3) min shall be not greater than 1,3.	Fulfilled	P									
5.6.1.4	Cold (operational)for sensor control unit		P									
5.6.1.4.1	object		P									
	To demonstrate the ability of the RLTHD sensor control unit to function correctly at low ambient temperatures appropriate to the anticipated service environment.	Fulfilled	P									
5.6.1.4.2	Reference		P									
	The test apparatus and procedure shall be as described in EN 60068-2-1:2007.	Fulfilled	P									

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Clause	Requirement + Test	Result - Remark	Verdict												
	The tests with gradual changes in temperature shall be used. Test Ad shall be used for heat-dissipating specimens (as defined in EN 60068-2-1) and test Ab for non heat-dissipating specimens.	Fulfilled	P												
5.6.1.4.3	State of the specimen during conditioning		P												
	The specimen shall be mounted as described in 5.1.3 and shall be connected to supply and monitoring equipment as described in 5.1.2.	Fulfilled	P												
	The length of sensing element used in the test shall correspond to the most unfavorable operating condition of the RLTHD technology under test. The configuration shall be the same as chosen in 5.1.5.	Fulfilled	P												
	The sensing element shall be maintained at normal ambient conditions defined in 5.1.1.	Fulfilled	P												
5.6.1.4.4	Conditioning		P												
	Conditioning shall be applied to the specimen as indicated in Table 8. Table 8 — Conditions for cold (operational) test for sensor control unit <table><tr><th>Environmental group</th><th>Temperature °C</th><th>Duration h</th></tr><tr><td>I</td><td>-5 ± 3</td><td>16</td></tr><tr><td>II</td><td>-10 ± 3</td><td>16</td></tr><tr><td>III</td><td>-25 ± 3</td><td>16</td></tr></table>	Environmental group	Temperature °C	Duration h	I	-5 ± 3	16	II	-10 ± 3	16	III	-25 ± 3	16	Environmental group: II	P
Environmental group	Temperature °C	Duration h													
I	-5 ± 3	16													
II	-10 ± 3	16													
III	-25 ± 3	16													
	NOTE If the sensor control unit and the sensing element belongs to the same environmental group the test can be done concurrently with 5.6.1.3.		N/A												
5.6.1.4.5	Measurements during conditioning		P												
	The specimen shall be monitored during the conditioning period to detect any fault or alarm condition. During the last hour of the conditioning simulate an alarm condition by means agreed with the manufacturer.	Fulfilled	P												
5.6.1.4.6	Final measurements		P												
	After the conditioning and a recovery period of at least 1h, the functional test as described in 5.1.5 shall be conducted at a rate of rise of 3 Kmin-1 and the response time recorded.	Fulfilled	P												
	The greater response time value measured in this test and that measured for the same specimen in the reproducibility test, shall be designated t(3)max and the lesser shall be designated t(3)min.	Fulfilled	P												
5.6.1.4.7	Requirements		P												

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Clause	Requirement + Test	Result - Remark	Verdict
	No alarm or fault signal shall be given during the period that the temperature is decreasing to the stabilization temperature or during the stabilized period.	Fulfilled	P
	An alarm shall be generated during the functional test in 5.6.1.4.6.	Fulfilled	P
	The ratio of the response times $t(3)_{\max}$: $t(3)_{\min}$ shall be not greater than 1,3.	Fulfilled	P
5.6.2	Humidity resistance		P
5.6.2.2	Damp heat, cyclic(operational)for sensing element		P
5.6.2.2.1	object of the test		P
	To demonstrate the ability of the RLTHD to function correctly even if the sensing element is exposed to high relative humidity which may occur for short periods in the anticipated service environment.	Fulfilled	P
5.6.2.2.2	Principle		P
	The lower severity (with an upper temperature of 40°C) is intended for areas where light condensation may infrequently occur for short periods (e.g. during the warming up of storage areas with limited or no temperature control).		N/A
	The higher severity (with an upper temperature of 55°C) is intended for areas where heavy and/or frequent condensation can occur (e.g. outdoors or in wet rooms etc.)	Environmental group: III	P
5.6.2.2.3	Reference		P
	The test apparatus and procedure shall be as described in EN60068-2-30:2005, using the Variant 2 test cycle and controlled recovery conditions.	Fulfilled	P
	NOTE The test consists of exposing the specimen to cyclic temperature variations between 25°C and the appropriate upper temperature (40°C or 55°C). The relative humidity is maintained at $(93 \pm 3)\%$ during the high temperature phase and above 95% during the low temperature and temperature changing phases. The rates of increase of temperature are such that condensation should occur on the surface of the specimen.	The upper temperature: 55°C.	P
5.6.2.2.4	State of the specimen during conditioning		P
	The specimen shall be mounted as described in 5.1.3 and shall be connected to the supply and monitoring equipment as described in 5.1.2.	Fulfilled	P

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Clause	Requirement + Test			Result - Remark	Verdict																				
	The length of sensing element used in the test shall correspond to the most unfavorable operating condition of the RLTHD technology under test. The configuration shall be the same as chosen in 5.1.5.			Fulfilled	P																				
	The sensor control unit shall be maintained at normal ambient conditions defined in 5.1.1.			Fulfilled	P																				
5.6.2.2.5	Conditioning				P																				
	Conditioning shall be applied to the specimen as indicated in the Table 10. Table 10—Conditions for damp heat,cyclic(operational)test for sensing element			Environmental group: III	P																				
<table><tr><th rowspan="2">Environmental group</th><th rowspan="2">Lower temperature °C</th><th rowspan="2">Upper temperature °C</th><th colspan="2">Relative humidity %</th><th rowspan="2">Number of cycles</th></tr><tr><th>At lower temperature</th><th>At upper temperature</th></tr><tr><td>II</td><td>25±2</td><td>40±2</td><td>≥95</td><td>93±3</td><td>2</td></tr><tr><td>III</td><td>25±2</td><td>55±2</td><td>≥95</td><td>93±3</td><td>2</td></tr></table>						Environmental group	Lower temperature °C	Upper temperature °C	Relative humidity %		Number of cycles	At lower temperature	At upper temperature	II	25±2	40±2	≥95	93±3	2	III	25±2	55±2	≥95	93±3	2
Environmental group	Lower temperature °C	Upper temperature °C	Relative humidity %		Number of cycles																				
			At lower temperature	At upper temperature																					
II	25±2	40±2	≥95	93±3	2																				
III	25±2	55±2	≥95	93±3	2																				
	NOTE1 If the sensor control unit and the sensing element belong to the same environmental group the test can be done concurrently with 5.6.2.3.				N/A																				
	NOTE 2 For RLTHD class A1 and A2 system under environmental group II the minimum static response temperature is 54°C so it could be possible that the system triggers an alarm if it works at the lower end of thee tolerance. Therefore the minimum static response temperature needs to be greater than 55°C plus the tolerance of 2°C.			Environmental group: III	N/A																				
5.6.2.2.6	Measurements during conditioning				P																				
	The specimen shall be monitored during the conditioning period to detect any fault or alarm condition.			Fulfilled	P																				
5.6.2.2.7	Final measurements				P																				
	After the conditioning and a recovery period of at least 1h, the functional test as described in 5.1.5 shall be conducted at a rate of rise of 3 Kmin-1 and the response time recorded.			Fulfilled	P																				
	The greater response time value measured in this test and that measured for the same specimen in the reproducibility test, shall be designated t(3)max and the lesser shall be designated t(3)min.			Fulfilled	P																				
5.6.2.2.8	Requirements				P																				
	No alarm or fault signal shall be given during the conditioning and the following recovering period.			Fulfilled	P																				
	The ratio of the response times t(3)max :t(3)min shall be not greater than 1,3.			Fulfilled	P																				

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Clause	Requirement + Test	Result - Remark	Verdict
5.6.2.3	Damp heat, cyclic(operational)for sensor control unit		P
5.6.2.3.1	object of the test		P
	To demonstrate the ability of the RLTHD sensor control unit to function correctly at high relative humidity which may occur for short periods during the anticipated service environment.	Fulfilled	P
5.6.2.3.2	Principle		P
	The lower severity (with an upper temperature of 40°C) is intended for areas where light condensation may infrequently occur for short periods (e.g. during the warming up of storage areas with limited or no temperature control).	Fulfilled	P
	The higher severity (with an upper temperature of 55°C) is intended for areas where heavy and/or frequent condensation can occur (e.g. outdoors or in wet rooms etc.)		N/A
5.6.2.3.3	Reference		
	The test apparatus and procedure shall be as described in EN 60068-2-30:2005 using the Variant 2 test cycle and controlled recovery conditions.	Fulfilled	P
	NOTE The test consists of exposing the specimen to cyclic temperature variations between 25°C and the appropriate upper temperature (40°C or 55°C). The relative humidity is maintained at $(93 \pm 3) \%$ during the high temperature phase and above 95% during the low temperature and temperature changing phases. The rates of increase of temperature are such that condensation should occur on the surface of the specimen.	Fulfilled	P
5.6.2.3.4	State of the specimen during conditioning		P
	The specimen shall be mounted as described in 5.1.3 and shall be connected to the supply and monitoring equipment as described in 5.1.2.	Fulfilled	P
	The length of sensing element used in the test shall correspond to the most unfavorable operating condition of the RLTHD technology under test. The configuration shall be the same as chosen in 5.1.5.	Fulfilled	P
	The sensing element shall be maintained at normal ambient conditions defined in 5.1.1.	Fulfilled	P
5.6.2.3.5	Conditioning		P

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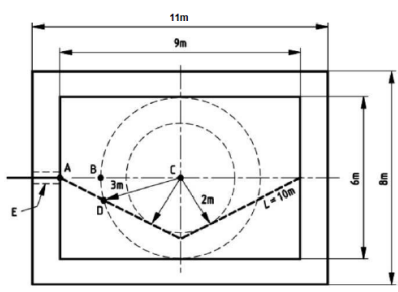
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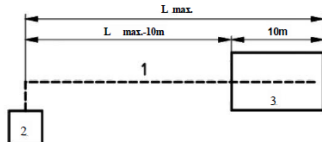
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Clause	Requirement + Test	Result - Remark	Verdict																										
	Conditioning shall be applied to the specimen as indicated in Table 11. Table 11—Conditions for damp heat,cyclic(operational)test for sensor control unit <table><tr><th rowspan="2">Environmental group</th><th rowspan="2">Lower Temperature °C</th><th rowspan="2">Upper Temperature °C</th><th colspan="2">Relative humidity %</th><th rowspan="2">Number of cycles</th></tr><tr><th>At lower temperature</th><th>At upper temperature</th></tr><tr><td>I</td><td colspan="5">No test</td></tr><tr><td>II</td><td>25±2</td><td>40±2</td><td>≥95</td><td>93±3</td><td>2</td></tr><tr><td>III</td><td>25±2</td><td>55±2</td><td>≥95</td><td>93±3</td><td>2</td></tr></table>	Environmental group	Lower Temperature °C	Upper Temperature °C	Relative humidity %		Number of cycles	At lower temperature	At upper temperature	I	No test					II	25±2	40±2	≥95	93±3	2	III	25±2	55±2	≥95	93±3	2	Environmental group: II	P
Environmental group	Lower Temperature °C				Upper Temperature °C	Relative humidity %		Number of cycles																					
		At lower temperature	At upper temperature																										
I	No test																												
II	25±2	40±2	≥95	93±3	2																								
III	25±2	55±2	≥95	93±3	2																								
	NOTE1 If the sensor control unit and the sensing element belong to the same environmental group the test can be done concurrently with 5.6.2.2.		N/A																										
	NOTE 2 If the sensor control unit is classified in environmental group I then the damp heat, steady state (operational) test for sensor control units is conducted instead.		N/A																										
5.6.2.3.6	Measurements during conditioning		P																										
	The specimen shall be monitored during the conditioning period to detect any fault or alarm condition. During the last hour of the conditioning simulate an alarm condition by means agreed with the manufacturer.	Fulfilled	P																										
5.6.2.3.7	Final measurements		P																										
	After the conditioning and a recovery period of at least 1h, the functional test as described in 5.1.5 shall be conducted at a rate of rise of 3 Kmin-1 and the response time recorded.	Fulfilled	P																										
	The greater response time value measured in this test and that measured for the same specimen in the reproducibility test, shall be designated t(3)max and the lesser shall be designated t(3)min.	Fulfilled	P																										
5.6.2.3.8	Requirements		P																										
	No alarm or fault signal shall be given during the conditioning and the following recovering period.	Fulfilled	P																										
	An alarm shall be generated during the functional test in 5.6.2.3.7.	Fulfilled	P																										
	The ratio of the response times t(3)max:t(3)min shall be not greater than 1,3.	Fulfilled	P																										
5.6.5	Electrical stability		P																										
5.6.5.1	Electromagnetic compatibility (EMC), immunity tests (operational)		P																										
5.6.5.1.1	General		P																										
	The following EMC immunity tests as specified in EN 50130-4:2011 shall be carried out:		P																										

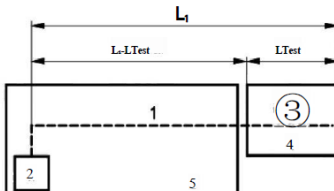
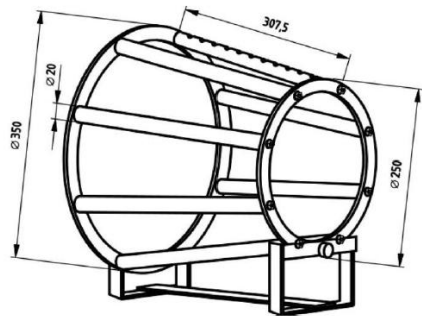
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Clause	Requirement + Test	Result - Remark	Verdict
	a) electrostatic discharge;	Fulfilled	P
	b) radiated electromagnetic fields;	Fulfilled	P
	c) conducted disturbances induced by electromagnetic fields;	Fulfilled	P
	d) fast transient bursts;	Fulfilled	P
	e) slow high energy voltage surges.	Fulfilled	P
5.6.5.1.2	State of the specimen during conditioning		P
	The length of sensing element used in the test shall correspond to the most unfavourable operating condition of the RLTHD technology under test. The configuration shall be the same as chosen in 5.1.5.		P
5.6.5.1.3	Final measurements		P
	After the conditioning, the functional test as described in 5.1.5 shall be conducted at a rate of rise of 3 Kmin-1 and the response time recorded.		P
	The greater response time value measured in this test and that measured for the same specimen in the reproducibility test, shall be designated t(3)max and the lesser shall be designated t(3)min.		P
5.6.5.1.4	Requirements		P
	For these tests the criteria for compliance specified in EN 50130-4:2011 and the following shall apply	Fulfilled	P
	No alarm or fault signal shall be given during conditioning.	Fulfilled	P
	The ratio of the response times t(3)max:t(3)min shall be not greater than 1,3.	Fulfilled	P
8	Marking, labelling and packaging		P
8.1	General		P
	The marking of resettable line-type heat detectors shall be visible during installation and shall be accessible during maintenance.		P
	The marking shall not be placed on easily removable parts like screws.		P
	Where any marking on the device uses symbols or abbreviations not in common use then these shall be explained in the data supplied with the device.		P
	NOTE Where regulatory marking provisions require information on some or all items listed in this clause, the requirements of this clause concerning those common items are deemed to be met.		P
8.2	Marking of sensor control unit		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The sensor control unit shall be clearly marked with the following information:		P
	a) the number and date of this standard (i.e. EN 54-22:2015);	See Copy of marking plate	P
	b) the heat response Class(es) of the RLTHD (e.g. A1N, A2N, BN, CN, or A1I-GI).	See Copy of marking plate	P
	c) environmental group (I, II or III);	See Copy of marking plate	P
	d) the name or trademark of the manufacturer or supplier;	See Copy of marking plate	P
	e) the model designation (type or number);	See Copy of marking plate	P
	f) the wiring terminal designations;	See Copy of marking plate	P
	g) some mark(s) or code(s) (e.g. serial number or batch code), by which the manufacturer can identify, at least, the date or batch and place of manufacture, and the version number(s) of any software, contained within the sensor control unit.	See Copy of marking plate	P
8.3	Marking of sensing element		N/A
	Each sensing element (batch) shall be marked with the following information:		N/A
	a) name or trademark of the manufacturer or supplier;		N/A
	b) model designation (type or number);		N/A
	c) environment group (II or III);		N/A
	d) some mark(s) or code(s) (e.g. serial number or batch code), by which the manufacturer can identify, at least, the date or batch and place of manufacture, and the version number(s) of any software, contained within the sensing element, if applicable.		N/A
	e) marking of sensor location and orientation (if applicable, e.g. for multipoint heat detector);		N/A
	If it is not possible to mark directly on the sensing element then the marking shall be affixed to the coil or other packaging used to protect the sensing element during transport and the use of at least one label securely fixed to the sensing element once installed is permitted.		N/A
8.4	Marking of functional units		N/A
	Each functional unit shall be marked with the following information:		N/A
	a) the number and date of this standard (i.e. EN 54-22:2015);		N/A

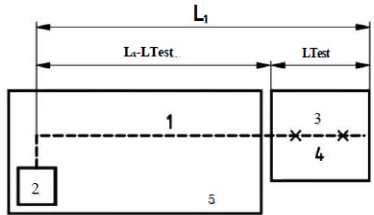
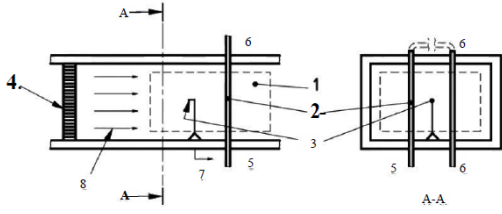
EN 54-22			
Clause	Requirement + Test	Result - Remark	Verdict
	b) name or trademark of the manufacturer or supplier;		N/A
	c) model designation (type or number);		N/A
	d) environment group (I, II or III);		N/A
	e) the wiring terminal designations (if applicable);		N/A
	f) some mark(s) or code(s) (e.g. serial number or batch code), by which the manufacturer can at least identify, the date or batch and place of manufacture, and the version number(s) of any software, contained within the functional unit.		N/A
Annex A	Arrangement of the sensing element in the fire test room		P
A.1	General		P
	This annex specifies the arrangement of the sensing element for the fire tests (see 5.5.1).		P
A.2	Fire test room arrangement		P
	A part of sensing element shall be mounted as shown in Figure A.1 in a fire test room as described in EN 54-7:2000.  Key A Starting point of the sensing element B Location of the temperature probe (distance from ceiling (50±10)mm) C Location of the test fire (centre of the floor) D In case of a multipoint sensing element location of one sensor E Thermal insulation in case of a fire test room exceeding the minimum dimensions NOTE The inner rectangle shows the arrangement of sensing element in the smallest permissible size of the fire test room. The outer rectangle shows the arrangement of sensing element in the largest permissible size of the fire test room. Figure A.1—Arrangement of the sensing element in the fire test room		P
A.3	Sensing element outside the fire test room		P

EN 54-22																			
Clause	Requirement + Test	Result - Remark	Verdict																
	The remaining part of the sensing element shall be arranged in a stable environment at $(23\pm 5)^{\circ}\text{C}$ as shown in Figure A.2.  Key 1 Sensing element 2 Sensor control unit 3 Fire test room as in Figure A.1. Figure A.2—Arrangement of sensing element outside the fire test room		P																
Annex B	Flaming liquid test fires (TF6F, TF6 and TF6S)		P																
B.1	General		P																
	This annex specifies the details of the test fires (see 5.5.1).		P																
B.2	Arrangement		P																
	The fuel shall be burnt in a square steel tray. The precise dimension of the steel tray and quantity of fuel may be varied to obtain valid tests. The proposed dimensions are mentioned in Table B.1. Table B.1-Test fires for RLTHD <table><tr><th>A Test fire</th><th>Dimensions of steel tray mm</th><th>Fuel (by volume)</th><th>Amount of fuel kg</th></tr><tr><td>TF6F</td><td>500×500×50</td><td>Methylated spirit [90%Ethanol -C₂H₅OH to which has been added 10%denaturant impurity (Methanol)]</td><td>2</td></tr><tr><td>TF6</td><td>435×435×50</td><td>Methylated spirit [90%Ethanol -C₂H₅OH to which has been added 10%denaturant impurity (Methanol)]</td><td>2</td></tr><tr><td>TF6S</td><td>390×390×50</td><td>Methylated spirit [90%Ethanol -C₂H₅OH to which has been added 10%denaturant impurity (Methanol)]</td><td>2</td></tr></table> NOTE TF6F(=fast)and TF6S(=slow)are fast and slow developing fires obtained by varying the size of the standard TF6 steel tray.	A Test fire	Dimensions of steel tray mm	Fuel (by volume)	Amount of fuel kg	TF6F	500×500×50	Methylated spirit [90%Ethanol -C ₂ H ₅ OH to which has been added 10%denaturant impurity (Methanol)]	2	TF6	435×435×50	Methylated spirit [90%Ethanol -C ₂ H ₅ OH to which has been added 10%denaturant impurity (Methanol)]	2	TF6S	390×390×50	Methylated spirit [90%Ethanol -C ₂ H ₅ OH to which has been added 10%denaturant impurity (Methanol)]	2		P
A Test fire	Dimensions of steel tray mm	Fuel (by volume)	Amount of fuel kg																
TF6F	500×500×50	Methylated spirit [90%Ethanol -C ₂ H ₅ OH to which has been added 10%denaturant impurity (Methanol)]	2																
TF6	435×435×50	Methylated spirit [90%Ethanol -C ₂ H ₅ OH to which has been added 10%denaturant impurity (Methanol)]	2																
TF6S	390×390×50	Methylated spirit [90%Ethanol -C ₂ H ₅ OH to which has been added 10%denaturant impurity (Methanol)]	2																
B.3	Ignition		P																
	Ignition shall be by flame or spark, etc.		P																
B.4	End of test condition		P																
	The end of test condition shall be as shown in Table B.2. Table B.2-End of test <table><tr><th>Test fire</th><th>End of test s</th></tr><tr><td>TF6F</td><td>300</td></tr><tr><td>TF6</td><td>300</td></tr><tr><td>TF6S</td><td>600</td></tr></table>	Test fire	End of test s	TF6F	300	TF6	300	TF6S	600		P								
Test fire	End of test s																		
TF6F	300																		
TF6	300																		
TF6S	600																		
B.5	Test validity criteria		P																

EN 54-22																																																									
Clause	Requirement + Test	Result - Remark	Verdict																																																						
	The development of the fire shall be such that the temperature, T, versus time, t, is within the limits given in Tables B.3 to B.5. Table B.3—Test validity criteria for test fire TF6F <table><tr><th>Time from ignition t s</th><th>Min. temperature Tmin °C</th><th>Max. temperature Tmax °C</th></tr><tr><td>0</td><td>18</td><td>28</td></tr><tr><td>50</td><td>43</td><td>57</td></tr><tr><td>100</td><td>57</td><td>77</td></tr><tr><td>200</td><td>80</td><td>103</td></tr><tr><td>300</td><td>95</td><td>120</td></tr></table> Table B.4—Test validity criteria for test fire TF6 <table><tr><th>Time from ignition t s</th><th>Min. temperature Tmin °C</th><th>Max. temperature Tmax °C</th></tr><tr><td>0</td><td>18</td><td>28</td></tr><tr><td>50</td><td>39</td><td>54</td></tr><tr><td>100</td><td>47</td><td>67</td></tr><tr><td>200</td><td>65</td><td>88</td></tr><tr><td>300</td><td>75</td><td>100</td></tr></table> Table B.5—Test validity criteria for test fire TF6S <table><tr><th>Time from ignition s</th><th>Min. temperature Tmin °C</th><th>Max. temperature Tmax °C</th></tr><tr><td>0</td><td>18</td><td>28</td></tr><tr><td>100</td><td>47</td><td>59</td></tr><tr><td>200</td><td>60</td><td>75</td></tr><tr><td>300</td><td>66</td><td>86</td></tr><tr><td>600</td><td>79</td><td>104</td></tr></table>	Time from ignition t s	Min. temperature Tmin °C	Max. temperature Tmax °C	0	18	28	50	43	57	100	57	77	200	80	103	300	95	120	Time from ignition t s	Min. temperature Tmin °C	Max. temperature Tmax °C	0	18	28	50	39	54	100	47	67	200	65	88	300	75	100	Time from ignition s	Min. temperature Tmin °C	Max. temperature Tmax °C	0	18	28	100	47	59	200	60	75	300	66	86	600	79	104		P
Time from ignition t s	Min. temperature Tmin °C	Max. temperature Tmax °C																																																							
0	18	28																																																							
50	43	57																																																							
100	57	77																																																							
200	80	103																																																							
300	95	120																																																							
Time from ignition t s	Min. temperature Tmin °C	Max. temperature Tmax °C																																																							
0	18	28																																																							
50	39	54																																																							
100	47	67																																																							
200	65	88																																																							
300	75	100																																																							
Time from ignition s	Min. temperature Tmin °C	Max. temperature Tmax °C																																																							
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600	79	104																																																							
Annex C	Test arrangement for the sensing element of linear heat detector in the heat tunnel		P																																																						
C.1	General		P																																																						
	This annex specifies those properties of the sensing element test arrangement and mounting apparatus which are of primary importance for making repeatable and reproducible measurements of response time and static response temperature (see 5.1.5)		P																																																						
C.2	Test arrangement for the sensing element		P																																																						
	Approximately ten windings of sensing element shall be wrapped around a conical frame (see Annex D). The total length of sensing element in the tunnel shall be (10±0,1) m.		P																																																						

Clause	Requirement + Test	Result - Remark	Verdict
	The apparatus with the sensing element shall be placed in the heat tunnel so the air flows from the smaller to the larger diameter of the apparatus. See Figure C.1.  Key 1 sensing element 2 sensor control unit 3 test apparatus with the sensing element wrapped tightly around it 4 heat tunnel working section 5 standard atmospheric conditions Figure C.1—Test arrangement		P
Annex D	Apparatus for mounting of the sensing element of linear heat detector in the heat tunnel		P
D.1	General		P
	This annex describes an example of a mounting frame for testing the sensing element of linear heat detectors in the heat tunnel as described in Annex C.		P
D.2	Test apparatus		P
	The apparatus (Figure D.1) should have a conical working section with a smaller diameter of (250 ± 10) mm, a larger diameter of (350 ± 10) mm.		P
	The apparatus should be constructed of materials capable of withstanding temperature of at least 160°C . Means should be provided for thermally insulating the sensing element from the apparatus.		P
	NOTE Teflon or Polyamide would be a suitable thermal insulation.  Figure D.1—Test apparatus—mounting arrangement for testing linear heat detectors		P

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Clause	Requirement + Test	Result - Remark	Verdict
Annex E	Mounting of the sensing element of multipoint RLTHD in the heat tunnel		N/A
E.1	General		N/A
	A This annex specifies those properties of multipoint sensing element mounting arrangement which are of primary importance for making repeatable and reproducible measurements of response time and static response temperature (see 5.1.5.3 and 5.5.2.2.3).		N/A
E.2	Mounting arrangement of multipoint sensing element		N/A
	A The multipoint sensing element shall be vertically placed in the working section of the heat tunnel. The amount of discrete temperature sensors placed in the heat tunnel working volume shall be 1.		N/A
	EXAMPLE: With 4m sensor spacing there would be 2 discrete temperature sensors in the heat tunnel (see Figure E.2).		N/A

Clause	Requirement + Test	Result - Remark	Verdict
	The multipoint sensing element to be tested shall be mounted vertically in the middle of the heat tunnel, such that the sensor is located in the working volume as defined in Annex F. A means shall be provided for creating a stream of air through the working volume at the constant temperatures and rates of rise of air temperature specified for the classes of detector to be tested. This air stream shall be essentially laminar and maintained at a constant mass flow, equivalent to $(0,8 \pm 0,1) \text{ ms}^{-1}$ at 25°C (see Figure E.1 and Figure E.2).  Key 1 sensing element 2 sensor control unit 3 discrete temperature sensor(s) (vertical arrangement, see Figure E.2) 4 heat tunnel working section - X position of discrete temperature sensor(s) as a part of the multipoint RLTHD Figure E.1—Test arrangement  Key - working volume - multipoint sensing element under test - temperature sensor 4 turbulence reducer 5 from sensor control unit 6 remainder of sensing element 7 output control and measuring equipment Figure E.2—Heat tunnel-working section and cross-section showing the mounting arrangement for testing a multipoint sensing element		N/A
Annex F	Heat tunnel for response time and response temperature measurements		P
F.1	General		P

EN 54-22			
Clause	Requirement + Test	Result - Remark	Verdict
	This annex specifies those properties of the heat tunnel which are of primary importance for making repeatable and reproducible measurements of response time and static response temperature of RLTHD (see 5.1.5 and 5.4.2). However, since it is not practical to specify and measure all parameters which may influence the measurements, the background information in Annex G should be carefully considered and taken into account when a heat tunnel is designed and used to make measurements in accordance with this part of EN 54.		P
F.2	Description of the heat tunnel		P
	The heat tunnel shall meet the following requirements for each class of RLTHD it is used to test.		P
	A The heat tunnel shall have a horizontal working section containing a working volume. The working volume is a defined part of the working section, where the air temperature and air flow conditions are within ± 2 K and $\pm 0,1$ ms ⁻¹ , respectively, of the nominal test conditions. Conformance with this requirement shall be regularly verified under both static and rate-of-rise conditions by measurements at an adequate number of points distributed within and on the imaginary boundaries of the working volume while the test apparatus is not installed. The cross section of the working volume perpendicular to the airflow shall be a minimum of 200 mm $\times$ 200 mm.		P
	The temperature-measuring sensor shall be positioned at least 50 mm upstream of the RLTHD. The air temperature shall be controlled to within ± 2 K of the nominal temperature required at any time during the test		P
	The air-temperature measuring system shall have an overall time constant of not greater than 2 s, when measured in air with a mass flow equivalent to $(0,8 \pm 0,1)$ ms ⁻¹ at 25°C.		P
	Means shall be provided for measuring the response time of the detector under test to an accuracy of ± 1 s.		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.1.2.1	Heat response for room protection application		P
Test fire	TF6S	TF6	TF6F
Response Temperature (°C)	54.84	60.52	52.65
Response Time (s)	165	138	77
Remark:			

4.1.2.2	Heat response for local protection application			P
Temperature rising rate (K/min)	Response Temperature (°C)	Response Time (s)	The ratio of the response times $t_{\max} : t_{\min}$	
3	131.2	919	1.12	
	127.1	821		
	130.5	861		
Remark: The Temperature rising rate is derived from Clause 5.2.4 Reproducibility.to establish response time data for comparison with the response times measured after the environmental tests.				

5.6.1.1	Dry heat (operational) test for sensor control unit— After Conditioning			P
Temperature rising rate (K/min)	Response Temperature (°C)	Response Time (s)	The ratio of the response times $t_{\max}:t_{\min}$	
3	130.5	865	1.11	
	130.2	921		
	131.6	962		
Remark:				

5.6.1.3	Cold (operational) test for sensing element— After Conditioning			P
Temperature rising rate (K/min)	Response Temperature (°C)	Response Time (s)	The ratio of the response times $t_{\max} : t_{\min}$	
3	128.8	830	1.13	
	131.3	941		
	130.0	917		
Remark:				

5.6.1.4	Cold (operational) for sensor control unit— After Conditioning			P
Temperature rising rate (K/min)	Response Temperature (°C)	Response Time (s)	The ratio of the response times $t_{\max} : t_{\min}$	
3	126.4	835	1.15	
	132.8	961		
	131.9	939		
Remark:				

EN 54-22			
Clause	Requirement + Test	Result - Remark	Verdict

5.6.2.2	Damp heat, cyclic (operational) for sensing element— After Conditioning			P
Temperature rising rate (K/min)	Response Temperature (°C)	Response Time (s)	The ratio of the response times t _{max} :t _{min}	
3	135.6	1008	1.16	
	137.2	1175		
	136.2	1087		
Remark:				

5.6.2.3	Damp heat, cyclic (operational) for sensor control unit— After Conditioning			P
Temperature rising rate (K/min)	Response Temperature (°C)	Response Time (s)	The ratio of the response times t _{max} :t _{min}	
3	135.9	1011	1.19	
	136.1	1113		
	137.4	1210		
Remark:				

5.6.5.1	Electromagnetic compatibility (EMC), immunity tests (operational)			P
Temperature rising rate (K/min)	Response Temperature (°C)	Response Time (s)	The ratio of the response times $t_{\max} : t_{\min}$	
3	130.2	883	1.08	
	130.8	891		
	131.1	956		
Remark:				

TEST REPORT EN 54-18 Fire detection and fire alarm systems Part 18: Input/output devices	
Report Number.	Attachment 1 of CN26E2R4 001
Date of issue	See cover page
Total number of pages	See cover page
Name of Testing Laboratory preparing the Report	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32, Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China
Applicant's name	CET Electric Technology Inc.
Address	8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Manufactory's name	CET Electric Technology Inc.
Address	8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Test specification:	
Standard	EN 54-18:2005+AC:2007
Test procedure	AK certificate
Non-standard test method	N/A
Test Report Form No.	EN 54-18_1A
Test Report Form(s) Originator	TÜV Rheinland / CCIC (Ningbo)
Master TRF	Dated 2026-03-31
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General disclaimer: The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description :	Distributed Temperature Sensing
Trade Mark :	
Manufacturer :	CET Electric Technology Inc. 8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Model/Type reference :	PMC-3601F
Ratings :	24VDC

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	GB Testing Laboratory:	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32, Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China
Testing location/ address		Shanghai Institute of Quality Inspection and Technical Research Co., Ltd. No.900, Jiangyue Road, Minhang District, Shanghai, China
Tested by (name, function, signature)		See cover page See cover page
Approved by (name, function, signature) ..		See cover page See cover page
☐	Testing procedure: CTF Stage 1:	N/A
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature) ..		
☐	Testing procedure: CTF Stage 2:	N/A
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) ..		
☐	Testing procedure: CTF Stage 3:	N/A
☐	Testing procedure: CTF Stage 4:	N/A
Testing location/ address		
Tested by (name, function, signature)		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) ..		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

See cover page

Summary of testing:

According to "General product information" in page 9 to 14 of test report CN26E2R4 001, all relevant entrusted tests were performed on PMC-3601F, detail tests as follow table.

Tests performed (name of test and test clause):

For Distributed Temperature Sensing PMC-3601F

Sample No.1

Clause	Testing
4.3.2	Data
5.4	Cold (operational)
5.12	Electromagnetic Compatibility (EMC) Immunity tests

Sample No.2

Clause	Testing
4.3.2	Data
5.3	Dry heat (operational)
5.5	Damp heat, cyclic (operational)

Testing location:

Shanghai Institute of Quality Inspection and Technical Research Co., Ltd.

No.900, Jiangyue Road, Minhang District, Shanghai, China

Summary of compliance with National Differences (List of countries addressed):

N/A

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

See test report of CN26E2R4 001.

Test item particulars: Distributed Temperature Sensing	
Classification of installation and use: N/A	
Supply Connection: DC 24V	
Possible test case verdicts: - test case does not apply to the test object: N/A - test object does meet the requirement: P (Pass) - test object does not meet the requirement: F (Fail)	
Testing : Date of receipt of test item: See cover page Date (s) of performance of tests: See cover page	
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☒ comma / ☐ point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) : CET Electric Technology Inc. 8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China	

General product information:

See test report CN26E2R4 001.

EN 54-18			
Clause	Requirement + Test	Result - Remark	Verdict

4	Requirements		P
4.1	Compliance		P
	In order to comply with this European Standard, the input/output devices shall meet the requirements of this clause, which shall be verified by inspection and engineering assessment, shall be tested as described in Clause 5 and shall meet the requirements of the tests. For input/output devices integrated into another device, which is already covered by an existing European Standard, the environmental conditioning shall be performed in accordance with that European Standard, with the addition of the functional tests before, during and/or after conditioning, as required in this European Standard.	Fulfilled	P
	In some detector standards/specifications, the dry heat (operational) test is conducted in special test equipment (e.g. in the heat tunnel for heat detectors). The required functional testing of the integrated input/output device before, during and after the dry heat conditioning may be done in this equipment, if this is possible without disrupting the detector measurements. Otherwise, a separate dry heat test, with the same conditioning, shall be conducted. For heat detectors, the test temperature is the maximum application temperature.	Fulfilled	P
4.2	Monitoring of detachable devices		N/A
	If an input/output device is detachable (i.e. it is attached to a detachable mounting base), then a means shall be provided for a remote monitoring system (e.g. the control and indicating equipment) to detect the removal of the device from the base, in order to give a fault signal.	Fulfilled	N/A
4.3	Marking and data		P
4.3.1	Marking		P
	Each input/output device shall be clearly marked with the following information:		P
	a) number and date of this European Standard (i.e. EN 54-18:2005);	See copy of marking plate of CN26E2R4 001	P
	b) name or trademark of the manufacturer or supplier;	See copy of marking plate of CN26E2R4 001	P
	c) model designation (type or number);	See copy of marking plate of CN26E2R4 001	P

EN 54-18			
Clause	Requirement + Test	Result - Remark	Verdict
	d) wiring terminal designations;	See copy of marking plate of CN26E2R4 001	P
	e) some mark(s) or code(s) (e.g. a serial number or batch code), by which the manufacturer can identify, at least, the date or batch and place of manufacture, and the version number(s) of any software, contained within the device.	See copy of marking plate of CN26E2R4 001	P
	For detachable devices, the head shall be marked with a), b) and d), and the base shall be marked with at least b) (i.e. its own model designation) and c).		N/A
	Where any marking on the device uses symbols or abbreviations not in common use then these shall be explained in the data supplied with the device.		N/A
	The marking shall be visible during installation and shall be accessible during maintenance.		P
	The markings shall not be placed on screws or other easily removable parts.		P
	NOTE Where ZA.3 covers the same information as required by this subclause, the requirements of this subclause are met.		N/A
4.3.2	Data		P
	Input/output devices shall be supplied with sufficient technical, installation and maintenance data to ensure their correct installation and operation. These data shall include the parameters necessary to define the input and/or output functions (e.g. output voltage and current ratings, alarm and fault trip levels, logic levels). If all of these data are not supplied with each device, then reference to the appropriate data sheet(s) shall be given on, or with, each device. To enable correct operation of the input/output device, these data shall describe the requirements for the correct processing of the signals from the device. This can be in the form of a full technical specification of these signals, a reference to the appropriate signalling protocol or a reference to suitable types of control and indicating equipment etc.	Fulfilled In the alarm state, DO1, DO2, and DO3 act	P
4.4	Documentation		P
	The manufacturer shall prepare and provide design documentation (e.g. drawings, parts lists, block diagrams, circuit diagrams). Where appropriate, this shall include documentation of the signal processing principle.	Fulfilled	P
5	Tests		P

EN 54-18			
Clause	Requirement + Test	Result - Remark	Verdict
5.1	General		P
5.1.1	Atmospheric conditions for tests		P
	Unless otherwise stated in a test procedure, the testing shall be carried out after the test specimen has been allowed to stabilize in the standard atmospheric conditions for testing as described in EN 60068-1 as follows:		P
	a) temperature : (15 to 35) °C;	23.4°C	P
	b) relative humidity : (25 to 75) %;	56.6%RH	P
	c) air pressure : (86 to 106) kPa.	101.2kPa	P
	If variations in these parameters have a significant effect on a measurement, then such variations shall be kept to a minimum during a series of measurements carried out as part of one test on one specimen.	Fulfilled	P
5.1.2	Operating conditions for tests		P
	If a test method requires a specimen to be operational, then the specimen shall be connected to suitable supply and monitoring equipment with characteristics as required by the manufacturer's data. Unless otherwise specified in the test method, the supply parameters applied to the specimen shall be set within the manufacturer's specified range(s) and shall remain substantially constant throughout the tests. The value chosen for each parameter shall normally be the nominal value, or the mean of the specified range.	Fulfilled	P
	The details of the supply and monitoring equipment used shall be given in the test report.	Fulfilled	P
5.1.3	Mounting arrangements		P
	When necessary, the specimen shall be mounted by its normal means of attachment in accordance with the manufacturer's instructions. If these instructions describe more than one method of mounting then the method considered to be most unfavourable shall be chosen for each test.	Fulfilled	P
5.1.4	Functional test		P
	Each function of the input/output device shall be activated, by a suitable means in accordance with the manufacturer's specification, and appropriate observations or measurements shall be made to confirm the correct operation of the device.	Fulfilled	P

EN 54-18			
Clause	Requirement + Test	Result - Remark	Verdict
	NOTE The variety and the diversity of the equipment within the scope of this European Standard make it difficult to define the precise details of this functional test. This functional test is intended to exercise each function of the device in a simple way. A more complete assessment of the performance of these functions, in accordance with the manufacturer's specification, is made in the performance and variation in supply voltage test (see 5.2).		P
5.1.5	Tolerances		P
	Unless otherwise stated, the tolerances for the environmental test parameters shall be as given in the basic reference standards for the test (e.g. the relevant parts of EN 60068-2).		P
	If a requirement or test procedure does not specify a tolerance or deviation limits, then deviation limits of $\pm 5\%$ shall be applied.		P
5.1.6	Provision for tests		P
	Twelve specimens are required to conduct the tests as indicated in the test schedule (see 5.1.7). These specimens shall be numbered 1 to 12 arbitrarily.	2 specimens	N/A
	NOTE The number of specimens may be reduced to a minimum of 9 if the same specimen is used for more than one EMC test (see Table 1, note).		N/A
	The specimens submitted shall be representative of the manufacturer's normal production with regard to their construction.		P
5.1.7	Test schedule		P

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Clause	Requirement + Test	Result - Remark	Verdict																																				
	The specimens shall be tested according to the test schedule in Table 1. Table 1 — Test schedule for input/output devices <table><tr><th>Test</th><th>Clause</th><th>Specimen number</th></tr><tr><td>Performance and variation of supply parameters</td><td>5.2</td><td>1</td></tr><tr><td>Dry heat (operational)</td><td>5.3</td><td>2</td></tr><tr><td>Cold (operational)</td><td>5.4</td><td>2</td></tr><tr><td>Damp heat, cyclic (operational)</td><td>5.5</td><td>3</td></tr><tr><td>Damp heat, steady state (endurance)</td><td>5.6</td><td>4</td></tr><tr><td>SO₂ corrosion (endurance)</td><td>5.7</td><td>5</td></tr><tr><td>Shock (operational)</td><td>5.8</td><td>6</td></tr><tr><td>Impact (operational)</td><td>5.9</td><td>7</td></tr><tr><td>Vibration (operational)</td><td>5.10</td><td>8</td></tr><tr><td>Vibration (endurance)</td><td>5.11</td><td>8</td></tr><tr><td>Electromagnetic Compatibility (EMC), immunity tests</td><td>5.12</td><td>9 to 12*</td></tr></table> NOTE In the interests of test economy, it is permitted to use the same specimen for more than one EMC test. In this case, intermediate functional test(s) on the specimen(s) used for more than one test may be deleted, and a functional test conducted at the end of the sequence of tests. However it should be noted that in the event of a failure, it may not be possible to identify which test exposure caused the failure (see EN 50130-4:1995, Clause 4).	Test	Clause	Specimen number	Performance and variation of supply parameters	5.2	1	Dry heat (operational)	5.3	2	Cold (operational)	5.4	2	Damp heat, cyclic (operational)	5.5	3	Damp heat, steady state (endurance)	5.6	4	SO ₂ corrosion (endurance)	5.7	5	Shock (operational)	5.8	6	Impact (operational)	5.9	7	Vibration (operational)	5.10	8	Vibration (endurance)	5.11	8	Electromagnetic Compatibility (EMC), immunity tests	5.12	9 to 12*	Conduct commissioned tests based on the client's requirements.	N/A
Test	Clause	Specimen number																																					
Performance and variation of supply parameters	5.2	1																																					
Dry heat (operational)	5.3	2																																					
Cold (operational)	5.4	2																																					
Damp heat, cyclic (operational)	5.5	3																																					
Damp heat, steady state (endurance)	5.6	4																																					
SO ₂ corrosion (endurance)	5.7	5																																					
Shock (operational)	5.8	6																																					
Impact (operational)	5.9	7																																					
Vibration (operational)	5.10	8																																					
Vibration (endurance)	5.11	8																																					
Electromagnetic Compatibility (EMC), immunity tests	5.12	9 to 12*																																					
5.3	Dry heat (operational)		P																																				
5.3.1	Object		P																																				
	To demonstrate the ability of the input/output device to function correctly at high ambient temperatures, which may occur for short periods in the service environment.	Fulfilled	P																																				
5.3.2	Test procedure		P																																				
5.3.2.1	Reference		P																																				
	The test apparatus and procedure shall be as described in EN 60068-2-2, Test Bb and as described in 5.3.2.2 to 5.3.2.6.	Fulfilled	P																																				
5.3.2.2	Initial measurements		P																																				
	Before conditioning, the functional test shall be conducted as described in 5.1.4.		P																																				
5.3.2.3	State of the specimen during conditioning		P																																				
	The specimen shall be mounted as described in 5.1.3 and shall be connected to its supply and monitoring equipment as described in 5.1.2.		P																																				
5.3.2.4	Conditioning		P																																				
	The following conditioning shall be applied:		P																																				
	Temperature: (+ 55 ± 2) ° C	Fulfilled	P																																				
	Duration: 16 h	Fulfilled	P																																				
5.3.2.5	Measurements during conditioning		P																																				

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Clause	Requirement + Test	Result - Remark	Verdict
	The specimen shall be monitored during the conditioning period to detect any unwanted or unspecified functioning.		P
	During the last hour of the conditioning period, a functional test shall be conducted as described in 5.1.4.		P
5.3.2.6	Final measurements		P
	After a recovery period of at least 1 h at laboratory conditions, the functional test shall be conducted as described in 5.1.4.		P
5.3.3	Requirements		P
	No unwanted or unspecified function shall occur during conditioning.	In the alarm state, DO1, DO2, and DO3 act	P
	In the functional tests, the specimen shall function correctly as specified by the manufacturer.		P
5.4	Cold (operational)		P
5.4.1	Object	Fulfilled	P
	To demonstrate the ability of the input/output device to function correctly at low ambient temperatures appropriate to the anticipated service environment.		P
5.4.2	Test procedure		P
5.4.2.1	Reference		P
	The test apparatus and procedure shall be as described in EN 60068-2-1, Test Ab and as described in 5.4.2.2 to 5.4.2.6.	Fulfilled	P
5.4.2.2	Initial measurements		P
	Before conditioning, the functional test shall be conducted as described in 5.1.4.		P
5.4.2.3	State of the specimen during conditioning		P
	The specimen shall be mounted as described in 5.1.3 and shall be connected to its supply and monitoring equipment as described in 5.1.2.		P
5.4.2.4	Conditioning		P
	The following conditioning shall be applied:		P
	Temperature: $(-10 \pm 3)^\circ \text{C}$	Fulfilled	P
	Duration: 16 h	Fulfilled	P
5.4.2.5	Measurements during conditioning		P

EN 54-18			
Clause	Requirement + Test	Result - Remark	Verdict
	The specimen shall be monitored during the conditioning period to detect any unwanted or unspecified functioning.		P
	During the last hour of the conditioning period, a functional test shall be conducted as described in 5.1.4.		P
5.4.2.6	Final measurements		P
	After a recovery period of at least 1 h at laboratory conditions, the functional test shall be conducted as described in 5.1.4.		P
5.4.3	Requirements		P
	No unwanted or unspecified function shall occur during conditioning.	In the alarm state, DO1, DO2, and DO3 act	P
	In the functional tests, the specimen shall function correctly as specified by the manufacturer.		P
5.5	Damp heat, cyclic (operational)		P
5.5.1	Object		P
	To demonstrate the ability of the input/output device to function correctly at high relative humidity (with condensation), which may occur for short periods in the anticipated service environment.	Fulfilled	P
5.5.2	Test procedure		P
5.5.2.1	Reference		P
	The test apparatus and procedure shall be generally as described in EN 60068-2-30, Test Db, using the variant 1 test cycle and controlled recovery conditions, and as described in 5.5.2.2 to 5.5.2.6.	Fulfilled	P
5.5.2.2	Initial measurements		P
	Before conditioning, the functional test shall be conducted as described in 5.1.4.		P
5.5.2.3	State of the specimen during conditioning		P
	The specimen shall be mounted as described in 5.1.3 and shall be connected to its supply and monitoring equipment as described in 5.1.2.		P
5.5.2.4	Conditioning		P
	The following conditioning shall be applied:		P
	Lower temperature: $(25 \pm 3)^\circ \text{C}$	Fulfilled	P
	Upper temperature: $(40 \pm 2)^\circ \text{C}$	Fulfilled	P
	Relative humidity:		P

EN 54-18			
Clause	Requirement + Test	Result - Remark	Verdict
	at lower temperature > 95 %	Fulfilled	P
	at upper temperature (93 ± 3) %	Fulfilled	P
	Number of cycles: 2	Fulfilled	P
5.5.2.5	Measurements during conditioning		P
	The specimen shall be monitored during the conditioning period to detect any unwanted or unspecified functioning.	In the alarm state, DO1, DO2, and DO3 act	P
	During the last hour of the conditioning period, a functional test shall be conducted as described in 5.1.4.		P
5.5.2.6	Final measurements		P
	After the recovery period, the functional test shall be conducted as described in 5.1.4.		P
5.5.3	Requirements		
	No unwanted or unspecified function shall occur during conditioning.		P
	In the functional tests, the specimen shall function correctly as specified by the manufacturer.		P
5.12	Electromagnetic Compatibility (EMC) Immunity tests		P
	EMC immunity tests shall be carried out as described in EN 50130-4. This means conducting the following tests:		P
	a) mains supply voltage variations ¹⁾ – if the input/output device incorporates a mains supply;	Fulfilled	P
	b) mains supply voltage dips and short interruptions – if the input/output device incorporates a mains supply;	Fulfilled	P
	c) electrostatic discharge;	Fulfilled	P
	d) radiated electromagnetic fields;	Fulfilled	P
	e) conducted disturbances induced by electromagnetic fields;	Fulfilled	P
	f) fast transient bursts;	Fulfilled	P
	g) slow high-energy surges.	Fulfilled	P
	For these tests the following shall apply:		P
	1) the functional test, called for in the initial and final measurements, shall be the functional test described in 5.1.4;		N/A
	2) the acceptance criteria shall be that:		P

EN 54-18			
Clause	Requirement + Test	Result - Remark	Verdict
	a) no unwanted or unspecified function shall occur during conditioning and	Fulfilled	P
	b) in the functional tests, the specimen shall function correctly, as specified by the manufacturer.	In the alarm state, DO1, DO2, and DO3 act	P



TEST REPORT EN 54-2 Fire detection and fire alarm systems Part 2: Control and indicating equipment	
Report Number. :	Attachment 2 of CN26E2R4 001
Date of issue..... :	See cover page
Total number of pages	See cover page
Name of Testing Laboratory preparing the Report	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32, Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China
Applicant's name..... :	CET Electric Technology Inc.
Address..... :	8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Manufactory's name	CET Electric Technology Inc.
Address	8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Test specification: Standard : EN 54-2:1997+A1:2006 Test procedure : AK certificate Non-standard test method : N/A	
Test Report Form No. : EN 54-2_1A Test Report Form(s) Originator.... : TÜV Rheinland / CCIC (Ningbo) Master TRF..... : Dated 2026-03-28	
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General disclaimer: The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description :	Distributed Temperature Sensing
Trade Mark :	
Manufacturer :	CET Electric Technology Inc. 8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China
Model/Type reference :	PMC-3601F
Ratings :	24VDC

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32, Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China
Testing location/ address		Shanghai Institute of Quality Inspection and Technical Research Co., Ltd. No.900, Jiangyue Road, Minhang District, Shanghai, China
Tested by (name, function, signature)		See cover page See cover page
Approved by (name, function, signature) ..		See cover page See cover page
☐	Testing procedure: CTF Stage 1:	N/A
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature) ..		
☐	Testing procedure: CTF Stage 2:	N/A
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) ..		
Approved by (name, function, signature) ..		
☐	Testing procedure: CTF Stage 3:	N/A
☐	Testing procedure: CTF Stage 4:	N/A
Testing location/ address		
Tested by (name, function, signature)		
Witnessed by (name, function, signature) ..		
Approved by (name, function, signature) ..		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

See cover page

Summary of testing:

According to "General product information" in page 9 to 14 of test report CN26E2R4 001, all relevant entrusted tests were performed on PMC-3601F, detail tests as follow table.

Tests performed (name of test and test clause):

For Distributed Temperature Sensing PMC-3601F
Sampel No.1:

Clause	Testing
7.6	Reset from the fire alarm condition

Testing location:

Shanghai Institute of Quality Inspection and Technical Research Co., Ltd.

No.900, Jiangyue Road, Minhang District, Shanghai, China

Summary of compliance with National Differences (List of countries addressed):

N/A

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

See test report of CN26E2R4 001.

Test item particulars: Distributed Temperature Sensing	
Classification of installation and use: N/A	
Supply Connection: DC 24V	
Possible test case verdicts: - test case does not apply to the test object : N/A - test object does meet the requirement : P (Pass) - test object does not meet the requirement : F (Fail)	
Testing : Date of receipt of test item : See cover page Date (s) of performance of tests : See cover page	
General remarks: "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☒ comma / ☐ point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... : CET Electric Technology Inc. 8/F, Westside, Building 201, Terra Industrial & Tradepark, Che Gong Miao, Shenzhen, 518040 Guangdong P.R. China	

General product information:

See test report CN26E2R4 001.

EN 54-2			
Clause	Requirement + Test	Result - Remark	Verdict
7	The fire alarm condition		P
7.6	Reset from the fire alarm condition		P
7.6.1	The CIE shall be capable of being reset from the fire alarm condition. This shall only be possible by means of a separate manual control, at access level 2. This control shall be used only for reset and may be the same as that used for reset from the fault warning condition.	Only tested sensor control unit and sensor element.	P
7.6.2	Following a reset operation, the indication of the correct functional conditions, corresponding to any received signals, shall either remain, or be re-established within 20 s	Conduct commissioned tests based on the client's requirements. Only tested sensor control unit and sensor element.	P

Test Equipment List

Description	MTE Type	model ID	Next Calibration Date
☒ Fire laboratory control system	-	DZ-A-A1-0295	16.03.2027
☒ Walk-in high and low temperature constant temperature and humidity chamber	SEWTH-Z-090UHS	DZ-A-A3-0034	19.01.2027
☒ Temperature condition testing machine for temperature-sensing fire alarm	SH5604A	DZ-A-A1-0197	12.01.2027
☒ Temperature and humidity meter	-	DZ-B-A3-0021	17.11.2026
☒ Empty box barometer	DYM3	DZ-B-A1-50-078	08.10.2026
☒ Electrostatic Discharge (ESD) GUN	ESS-S3011A (GT-30RA)	DZ-A-A1-0369	01.06.2026
☒ Radiation immunity test system	TS9982	DZ-A-A1-0127	07.02.2027
☒ Test System for Conducted and Radiated Immunity	NSG 4070	DZ-A-A1-0065	30.10.2026
☒ EFT/Surge Generators	NSG 3060	DZ-A-A1-0121	16.08.2026
☒ Shielded room (EMS)	SLD 15/21/M	DZ-A-A1-0071	05.03.2028

PHOTO DOCUMENTATION

Attachment 4 of CN26E2R4 001

for

Distributed Temperature Sensing

PMC-3601F

CET Electric Technology Inc.



This documentation consists of 7 pages (excluding this cover page)

Report Number: Attachment 4 of CN26E2R4 001

Model: PMC-3601F



PMC-3601F



PMC-3601F

Report Number: Attachment 4 of CN26E2R4 001

Model: PMC-3601F

PMC-3601F



PMC-3601F



Model: PMC-3601F

PMC-3601F
 Model: PMC-3601F-CANADA
 Power supply: DC 24V
 Channel: 4
 Power: 360W
 Frequency: 50/60Hz
 Input Voltage: 100-240V
 Efficiency: >85%
 Safety: Class II
 Dimensions: 150mm x 150mm x 40mm
 Weight: 0.5kg
 Manufacturer: PMC Technology Co., Ltd.
 Made in Canada

Report Number: Attachment 4 of CN26E2R4 001

Model: PMC-3601F



PMC-3601F



PMC-3601F

Report Number: Attachment 4 of CN26E2R4 001

Model: PMC-3601F



PMC-3601F
DC Brushless
EUB0405MD-G

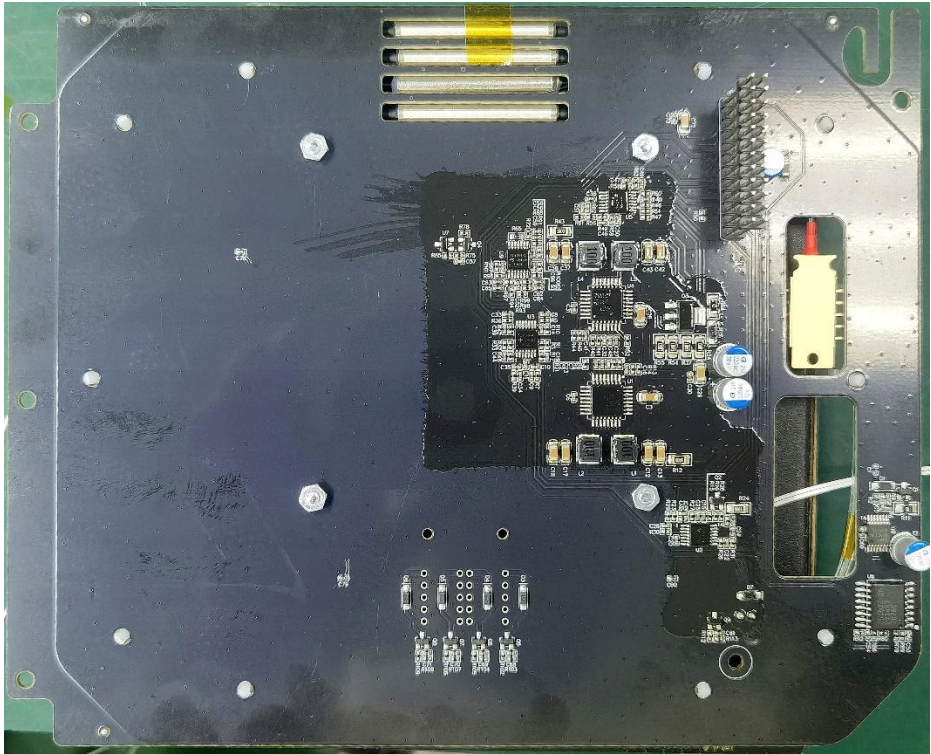


PMC-3601F
DC Brushless
EUB0405MD-G

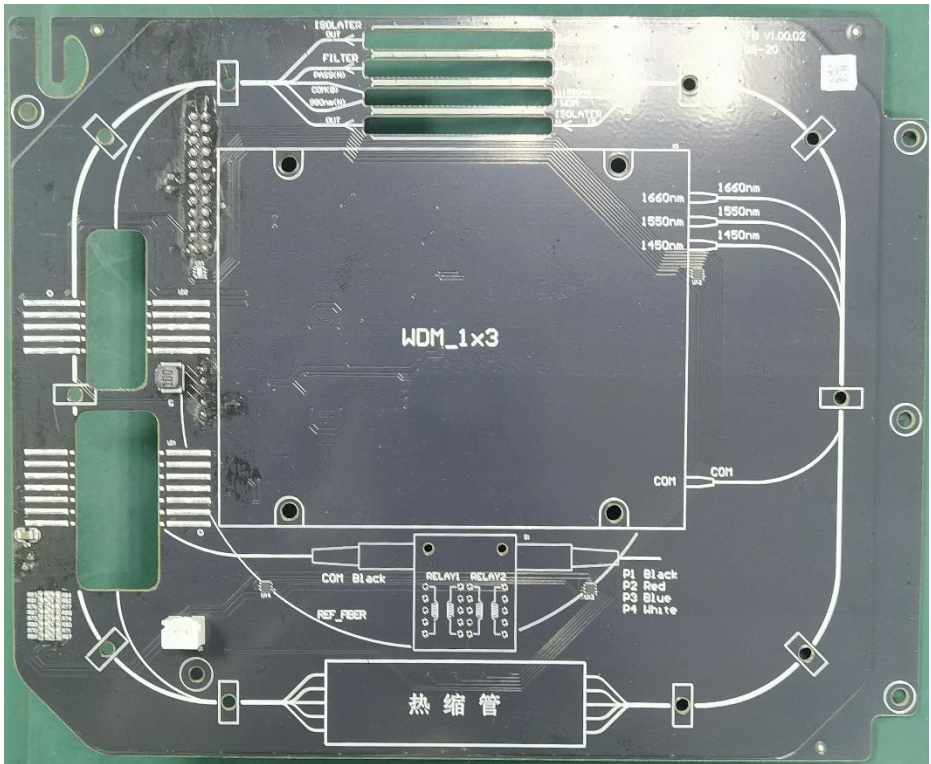
Report Number: Attachment 4 of CN26E2R4 001

Model: PMC-3601F

PCBA of PMC-3601F

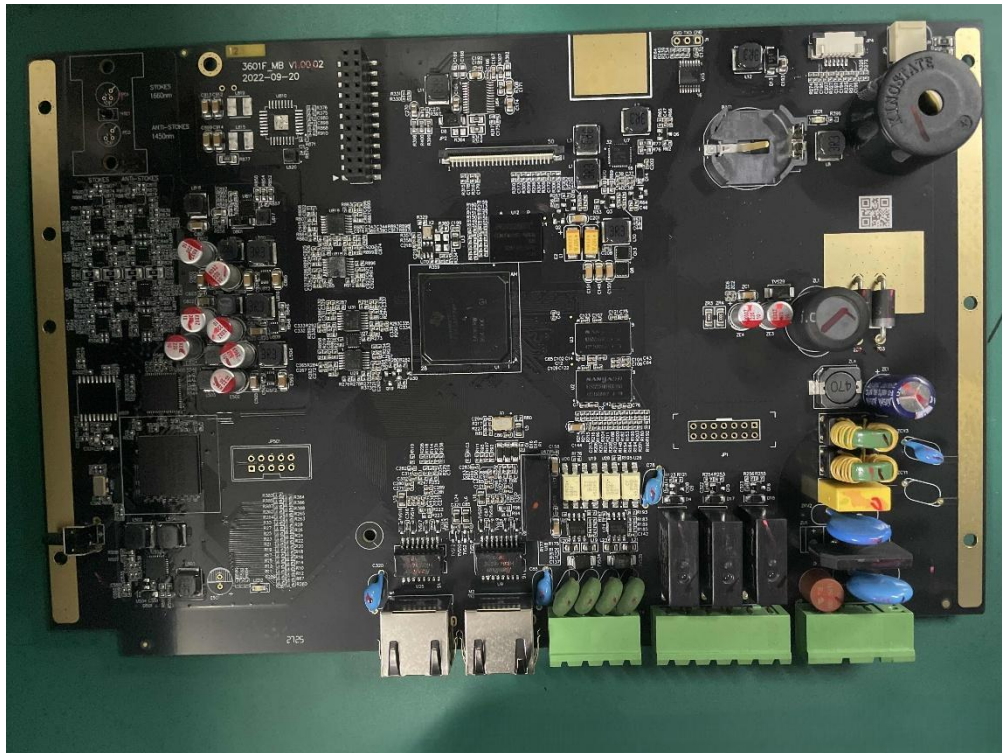


PCBA of PMC-3601F

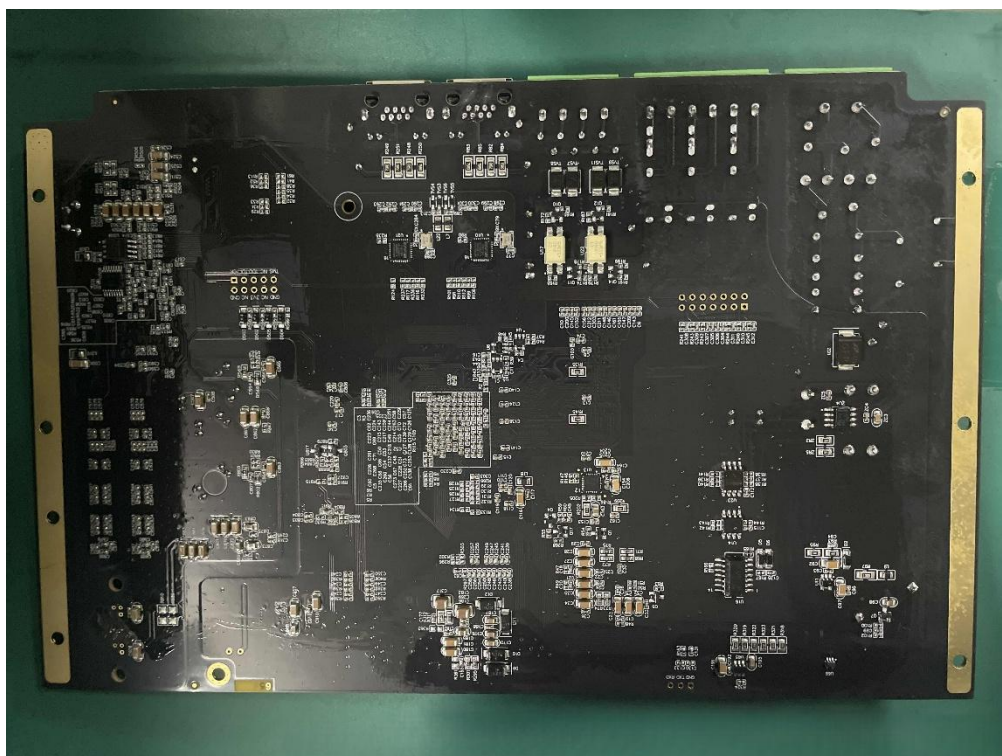


Report Number: Attachment 4 of CN26E2R4 001

Model: PMC-3601F



PCBA of PMC-3601F



PCBA of PMC-3601F