TBTCF0228-LVD

Technical Construction File

For

Zhejiang Weierpu Electric Co., Ltd.

Terminal block

Model:

UK,UK-2.5B,URTK/S,UK5-HESI,UK-10-DRESD,UKK3,UKK5,UDK4,UK5,MKKB,UKKB5,DIKD 1.5,USLKG,KLM-A,UBE/D,ZB4,ZB5,ZB6,ZB12,ZB8,ZB16,ZB10,D-UK2.5,EB,FB1,E-UK,UKH,M TK,UK10,D-URTK,D-UK3/10,MBK,SUK,ATP,UKKB2.5,SAK,ASK,WTL,JXB,EK,EW-35,DK,D1, AP,JDX,JF5,JF6,H2519,H3801,STTB2.5,PTTB2.5,FJ,H,JX0,JX2,JXC,LT,PT2.5,ST-2.5,ST,STTB,D-ST,PT,PTTB,D-PT,FBS,IN,INTBK-F,X3,X5,JX5,XP,FJ6,JHD,NJD,FX,UT,OT,DT,EU2.5,JH1,JH2,J H5,JH6,JH8,JH9,JH10,JH14,JH20,JY1,JL1,JL2,YB2,CM1,CM2,MJ1,MJ2,JM1,JM2,PCT,C45,TA,TB ,TBC,TBR,TBD,TC,TD,TS,TK,TZ,260,280,281,CF1,ET,BT,FT7,FX

Prepared For : **Zhejiang Weierpu Electric Co., Ltd.**
XiaMen Village, Liushi Town, Yueqing City, Wenzhou, Zhejiang, China

Prepared By : **China Ceprei (Sichuan) Laboratory**

No.45 Wenming Dong Road Longquanyi District, Chengdu, Sichuan

Report Number: **TBTCF0228-LVD**

Date of Test: **Mar.01, 2024**

Date of Report: **Mar.01, 2024**

TBTCF0228-LVD

TEST REPORT DECLARATION

Applicant	:	Zhejiang Weierpu Electric Co., Ltd.
Address	:	XiaMen Village, Liushi Town, Yueqing City, Wenzhou, Zhejiang, China
Manufacturer	:	Zhejiang Weierpu Electric Co., Ltd.
Address	:	XiaMen Village, Liushi Town, Yueqing City, Wenzhou, Zhejiang, China
EUT Description	:	Terminal block
Model No.	:	UK2.5B
Remark	:	N/A

Test Procedure Used:
EN 60947-7-1:2009

The results of this test report are only valid for the mentioned equipment under test. The test report with all its sub-reports, e.g. tables, photographs and drawings, is copyrighted. Unauthorized utilization, especially without permission of the test laboratory, is not allowed and punishable. For copying parts of the test report, a written permission by the test laboratory is needed.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : Mar.01, 2024

Prepared by : (Jack)

Checked by : (Gina)

Approved by : (Johnson)

EN 60947- 7- 1			
Clause		Result - Remark	Verdict
5	**Product information**		**P**
5.1	**Marking**		P
	A terminal block shall be marked in a durable and legible manner with the following:		P
	a) the name of the manufacturer or a trade mark by which the manufacturer can be readily identified;	Zhejiang Weierpu Electric Co., Ltd.	P
	b) a type reference permitting its identification in order to obtain relevant information from the manufacturer or his catalogue.		P
5.2	**Additional information**		P
	The following information shall be stated by the manufacturer, if applicable, e.g. in the manufacturer's data sheet or his catalogue or on the packing unit:		P
	a) IEC 60947-7-1, if the manufacturer claims compliance with this standard;	compliance	P
	b) the rated cross-section;		P
	c) the rated connecting capacity, if different from table 2, including the number of conductors simultaneously connectable;		P
	d) the rated insulation voltage;	1000V	P
	e) the rated impulse withstand voltage, when determined;	2500V	P
	f) service conditions, if different from those of clause 6.		P
6	**Normal service, mounting and transport conditions**		P
6.1	**Normal service conditions**		P

	Equipment complying with this standard shall be capable of operating under the following standard conditions		P

	NOTE For non-standard conditions in service, see Annex B. These may require agreement between manufacturer and user.		P
6.1.1	**Ambient air temperature**		P
	The ambient air temperature does not exceed +40 °C and its average over a period of 24 h does not exceed +35 °C.		P
	The lower limit of the ambient air temperature is –5 °C.		P
	Ambient air temperature is that existing in the vicinity of the equipment if supplied without enclosure, or in the vicinity of the enclosure if supplied with an enclosure.		P
	NOTE 1 Equipment intended to be used in ambient air temperature above +40 °C (e.g. in forges, boiler rooms, tropical countries) or below –5 °C (e.g. –25 °C, as required by IEC 60439-1 for outdoor installed low-voltage switchgear and controlgear assemblies) should be designed or used according to the relevant product standard, where applicable, or according to agreement between manufacturer and user.		P
	Information given in the manufacturer's catalogue may take the place of such an agreement.		P
	NOTE 2 Standard reference air temperature for certain types of equipment, e.g., circuit-breakers or overload relays for starters, is indicated in the relevant product standard.		P
6.1.2	**Altitude**		P
	The altitude of the site of installation does not exceed 2 000 m.		P
	NOTE For equipment to be used at higher altitudes, it is necessary to take into account the reduction of the dielectric strength and the cooling effect of the air.		P

	Electrical equipment intended to operate under these conditions shall be designed or used in accordance with an agreement between manufacturer and user.		P
6.1.3	**Atmospheric conditions**		P
6.1.3.1	**Humidity**		P

	The relative humidity of the air does not exceed 50 % at a maximum temperature of +40 °C.		P
	Higher relative humidities may be permitted at lower temperatures, e.g. 90 % at +20 °C.		P
	Special measures may be necessary in cases of occasional condensation due to variations in temperature.		P
	NOTE Pollution degrees, as stated in 6.1.3.2, define the environmental conditions more precisely.		P
6.1.3.2	**Pollution degree**		P
	The pollution degree (see 2.5.58) refers to the environmental conditions for which the equipment is intended.		P
	NOTE 1 The micro-environment of the creepage distance or clearance and not the environment of the equipment determines the effect on the insulation.		P
	The micro-environment might be better or worse than the environment of the equipment.		P
	It includes all factors influencing the insulation, such as climatic and electromagnetic conditions, generation of pollution, etc.		P
	For equipment intended for use within an enclosure or provided with an integral enclosure, the pollution degree of the environment in the enclosure is applicable.		P

	For the purpose of evaluating clearances and creepage distances, the following four degrees of pollution of the micro-environment are established (clearances and creepage distances according to the different pollution degrees are given in Tables 13 and 15):		P
	Pollution degree 1		N/A
	No pollution or only dry, non-conductive pollution occurs.		N/A
	Pollution degree 2:		N/A
	Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation may be expected.		N/A
	Pollution degree 3:		P
	Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation.		P
	Pollution degree 4:		N/A
	The pollution generates persistent conductivity caused, for instance, by conductive dust or by rain or snow.		N/A
	Standard pollution degree of industrial applications:		N/A
	Unless otherwise stated by the relevant product standard, equipment for industrial applications is generally for use in pollution degree 3 environment.		N/A
	However, other pollution degrees may be considered to apply depending upon particular applications or the micro-environment.		N/A
	NOTE 2 The pollution degree of the micro-environment for the equipment may be influenced by installation in an enclosure.		P
	Standard pollution degree of household and similar applications		P

	Unless otherwise stated by the relevant product standard, equipment for household and similar applications is generally for use in pollution degree 2 environment.		P
6.1.4	**Shock and vibration**		P
	Standard conditions of shock and vibration to which the equipment can be submitted are under consideration.		P
6.2	**Conditions during transport and storage**		P
	A special agreement shall be made between user and manufacturer if the conditions during transport and storage, e.g. temperature and humidity, differ from those defined in 6.1, except that, unless otherwise specified, the following temperature range applies during transport and storage: between –25 °C and +55 °C and, for short periods not exceeding 24 h, up to +70 °C.		P
	Equipment subjected to these extreme temperatures without being operated shall not undergo any irreversible damage and shall then operate normally under the specified conditions.		P
6.3	**Mounting**		P
	The equipment shall be mounted in accordance with the manufacturer's instructions.		P
7**.1**	**Constructional and performance requirement**		-
7.1.1	Materials		P
	Resistance to abnormal heat and fire (according to 8.1.1.1 of IEC 60947-1) of insulating current-carrying parts		P
	The suitability of materials used is verified by making tests:		P
	a) on the equipment; or		P
	b) on sections taken from the equipment; or		P
	c) on samples of identical material having representative cross-section.		P

	The suitability shall be determined with respect to resistance to abnormal heat and fire.		P
	The manufacturer shall indicate which tests, amongst a), b) and c), shall be used.		P
	If an identical material having representative cross-sections has already satisfied the requirements of any of the tests of 8.2.1, then those tests need not be repeated.		P
	Clamping units		P
	The clamping units shall allow the conductors to be connected by means ensuring that a reliable mechanical linkage and electrical contact is properly maintained.		P
	NOTE Screw-type clamping units are not suitable for the connection of flexible conductors with tin soldered ends.		P
	The clamping units shall be able to withstand the forces that can be applied through the connected conductors.		P

	Compliance is checked by inspection and by the tests of 8.3.3.1, 8.3.3.2 and 8.3.3.3.		P
	No contact pressure shall be transmitted through insulating materials other than ceramic, or other material with characteristics not less suitable, unless there is sufficient resiliency in the metallic parts to compensate for any possible shrinkage of the insulating material.		P
	The corresponding test is under consideration		P
7.1.2	**Mounting**		P
	Terminal blocks shall be provided with means that allow them to be securely attached to a rail or a mounting surface.		P
	Tests shall be made in accordance with 8.3.2.		P
	NOTE Information on mounting on rails can be found in IEC 60715.		P
7.1.3	**Clearances and creepage distances**		P

	For terminal blocks for which the manufacturer has stated values of rated impulse withstand voltage *U*imp and rated insulation voltage *U*i, minimum values of clearances and creepage distances are given in tables 13 and 15 of IEC 60947-1.		P
	For terminal blocks for which the manufacturer has determined no value of rated impulse withstand voltage *U*imp, guidance for minimum values is given in annex A..		P
	Electrical requirements are given in 7.2.2		P
7.1.4	**Terminal identification and marking**		P
	Subclause 7.1.7.4 of IEC 60947-1 applies with the following addition.		P
	A terminal block shall have provision, or at least space, for identification marks or numbers for each clamping unit or terminal assembly related to the circuit of which it forms a part.		P
	NOTE Such provision may consist of separate marking items, such as marking tags, identification labels, etc.		P

7.1.5	**Resistance to abnormal heat and fire**		P
	The insulation materials of terminal blocks shall not be adversely affected by abnormal heat and fire.		P
	Compliance is checked by the needle flame test according to IEC 60695-2-2 (see note in 7.1.1.1 of IEC 60947-1), as specified in 8.5 of this standard.		P
7.1.6	**Rated cross-section and rated connecting capacity**		P
	Terminal blocks shall be so designed that conductors of the rated cross-section and the rated connecting capacity, if applicable, can be accepted.		P
	Compliance is checked by the test described in 8.3.3.4.		P

	The verification of the rated cross-section may be performed by the special test according to 8.3.3.5.		P
7.2	**Performance requirements**		P
7.2.1	**Temperature-rise**		P
	Terminal blocks shall be tested in accordance with 8.4.5. The temperature-rise of the Terminal shall not exceed 45 K.		P
7.2.2	**Dielectric properties**		P
	If the manufacturer has declared a value of the rated impulse withstand voltage *U*imp (see 4.3.1.3 of IEC 60947-1), the requirements of 7.2.3 and 7.2.3.1 of IEC 60947-1 apply.		P
	If applicable, the impulse withstand voltage test shall be carried out in accordance with 8.4.3 a).		P
	For the verification of solid insulation, the requirements of 7.2.3, 7.2.3.2 and 7.2.3.5 of IEC 60947-1 apply.		P
	The power-frequency withstand voltage test shall be carried out in accordance with 8.4.3 b).		P
	The verification of sufficient clearances and creepage distances shall be made in accordance with 8.4.2.		P
	If no value of *U*imp has been declared, the verification of clearance and creepage distances shall be made as stated in annex A.		P

7.2.3	**Rated short-time withstand current**		P
	A terminal block shall be capable of withstanding for 1 s the rated short-time withstand current which corresponds to 120 A/mm2 of its rated cross-section, in accordance with 8.4.6.		P
7.2.4	**Voltage drop**		P
	The voltage drop on a terminal block caused by the conductor connection, measured according to 8.4.4, shall not exceed the values specified in 8.4.4 and, where applicable, in 8.4.7.		P

7.2.5	**Electrical performance after ageing (for screwless-type terminal blocks only)**		P
	Terminal blocks shall be capable of withstanding the ageing test comprising 192 temperature cycles in accordance with 8.4.7.		P
7.3	**Electromagnetic compatibility (EMC)**		P
8	**Tests**		P
8.1	**Kinds of test**		P
	Subclause 8.1.1 of IEC 60947-1 applies with the following addition.		P
	No routine tests are specified.		P
	The verification of the rated cross-section according to 8.3.3.5 is a special test. All other tests are type tests.		P
8.2	General		P
8.3	**Verification of Mechanical properties of Terminal**		**P**
8.3.1	General		
8.3.3.1	Mechanical strength of Terminal		P
	maximum cross-sectional area of conductor (mm²) .....:	185	P
	diameter of thread (mm) .....:		P
	torque (Nm) ..... :		P
	5 times on 2 separate clamping units	5 times	P
8.3.3.2	Testing for damage to and accidental loosening of conductor (flexion test)		-

	Subclauses 8.2.4.1 and 8.2.4.3 of IEC 60947-1 apply with the following modification. Each test shall be carried out on two clamping units of one terminal block.		
	For screw-type clamping units with a diameter of threads up to and including 2,8 mm, the tightening torque shall be in accordance with table C.1 or the torque specified by the manufacturer.		

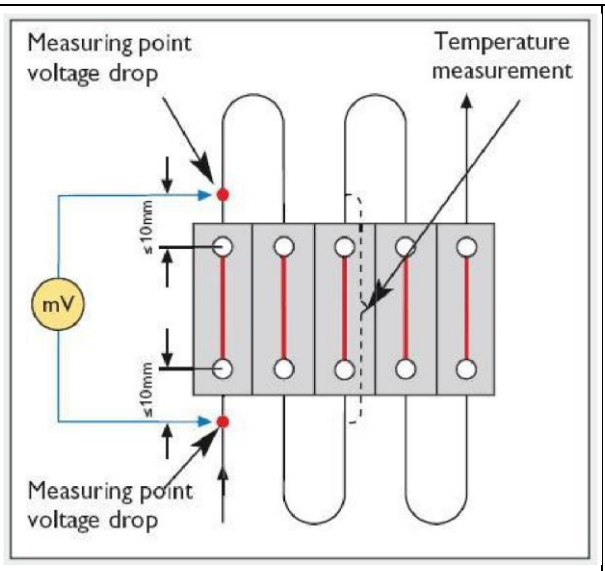
	The tests shall be made with the type (rigid and/or flexible) and the number of conductors stated by the manufacturer as follows:		
	with the different types of conductor of the specified smallest cross-section (only one conductor connected);		
	with the different types of conductor of the specified rated cross-section (only one conductor connected);		
	and, if applicable,		P
	– with the type(s) of conductor of the largest connectable cross-section, if larger than the rated cross-section (only one conductor connected);		P
	- with the different types and maximum number of conductors of the smallest cross-section simultaneously connectable;		P
	- with the different types and maximum number of conductors of the largest cross-section simultaneously connectable;		P
	- with the different types and maximum number of conductors of the smallest and largest cross-section simultaneously connectable.		P

8.3.3.3	Pull-out test		P
	Force (N) .....:		P
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit	No slip out, no break near the clamping unit	P
	Flexion test		P
	conductor of the largest cross-sectional area (mm²) .....:	185mm^2	P
	number of conductor of the largest cross-sectional .....:		P

	diameter of bushing hole (mm) ..... :		P
	Height between the equipment and the platen (mm) ..... :		P
	Mass at the conductor(s) (kg) .....:		P
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
8.3.4	Connecting capacity		P
	type of conductors .....:		-
	minimum cross-sectional area of conductor (mm²) .....:	2,5	P
	maximum cross-sectional area of conductor (mm²) .....:	185	P
	number of conductors simultaneously connectable to the terminal .....:		P
8.3.5	Connection		P
	Terminal for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P

8.4.2	Verification of clearances and creepage distances		
8.4.2.1	General		P
8.4.2.2	Clearances		P
	Rated impulse withstand voltage		P
	Creepage distances		-
	Pollution degree ..... :		P
	Comparative tracking index (V) .....:		P
	Material group .....:		P

	Rated insulation voltage Ui (V) .....:	1000V	P
	Minimum creepage distances (mm) ..... :	5,6	—
	Measured creepage distances (mm) .....:	7,0	P
	In case Uimp is not indicated		P
8.4.4	**Verification of the voltage drop**		P
	The voltage drop shall be verified		P
	a) before and after the test of mechanical strength of clamping units (see 8.3.3.1);		P
	b) before and after the temperature-rise test (see 8.4.5);		P
	c) before and after the short-time withstand current test (see 8.4.6);		P
	d) before, during and after the ageing test (see 8.4.7).		P
	The verification is made as specified in 8.3.3.1, 8.4.5, 8.4.6 and 8.4.7.		P
	The voltage drop is measured on each terminal block as indicated in figure 2.		P
	The measurement is made with a direct current of 0,1 times the value given in table 4 or table 5.		P
	Before the tests according to a), b), c) and d) above, the voltage drop shall not exceed 3,2 mV.		P
	If the measured value exceeds 3,2 mV, the voltage drop is determined on each individual clamping unit separately, which shall not exceed 1,6 mV.		P
	After the tests according to a), b) and c), the voltage drop shall not exceed 150 % of the values measured before the test.		P
	During and after the test according to d), the voltage drop measured shall not exceed the values specified in 8.4.7.		P

			P
8.4.5	**Temperature rise**		-
	The test is made simultaneously on five adjacent terminal blocks connected in series by PVC insulated conductors of the rated cross-section, as shown in figure 2.		P
	The conductors shall be tightened with a torque according to table 4 of IEC 60947-1, with the respective table C.1 for screw-type clamping units with a diameter of threads up to and including 2,8 mm, or to a higher value specified by the manufacturer, if applicable.		P
	The minimum length of each of the six conductors shall be 1 m for rated cross-sections up to and including 10 mm2 (AWG 8), and 2 m for larger rated cross-sections.		P

	The test circuit shall be located horizontally on a wooden surface as shown in figure 2 (e.g. table top or floor), the terminal blocks being securely fixed to this surface and the conductors lying freely on it.		P
	If the rated cross-section is below 10 mm2 (AWG 8), the conductors shall be solid. For rated cross-sections equal to or higher than 10 mm2 (AWG 8), the conductors shall be rigid stranded. Dur ing the test, screws of clamping units shall not be retightened.		P

	After verification of the voltage drop according to 8.4.4, the test is made with a.c. singlephase current as given in table 4 or table 5 according to the rated cross-section, and is continued until steady temperature is reached.		P
	A variation of less than 1 K between any two out of three consecutive measurements made at an interval of 5 min is considered as steady temperature.		P
	For multi-tier terminal blocks, the test is made either with an a.c. single-phase current as given in table 4 or table 5, or with the current specified by the manufacturer.		P
	The temperature-rise of any part of the centrally located terminal block shall not exceed the limit given in 7.2.1 (see figure 2).		P
	At the end of the test, after cooling down to ambient air temperature and without any change in the arrangement, the terminal blocks shall pass the voltage drop test according to 8.4.4.		P
	ambient temperature 10- 40 C ..... :	20	
	Contactor		-
	test enclosure W x H x D (mm x mm x mm) ..... :		
	material of enclosure ..... :	plastic	

8.4.6	**Short-time withstand current test**		-
	The purpose of this test is to verify the ability to withstand a thermal shock.		P
	The test is performed on one terminal block installed according to the manufacturer's instructions.		P

	It is wired with a conductor of the rated cross-section, tightened with the torque according to table 4 of IEC 60947-1, with the respective table C.1 for screw-type clamping units with a diameter of threads up to and including 2,8 mm, or with a higher value specified by the manufacturer, if applicable.		P
	If the rated cross-section is below 10 mm2 (AWG 8), the conductors shall be solid. For rated cross-sections equal to or higher than 10 mm2 (AWG 8), the conductors shall be rigid stranded.		P
	After verification of the voltage drop according to 8.4.4, the value and the duration of the test current shall be in accordance with 7.2.3.		P
	At the end of the test no damage that may impair further use shall have occurred to any part of the terminal block.		P
	After cooling down to ambient temperature and without any change in the arrangement, the terminal block shall pass the voltage drop test according to 8.4.4.		P
8.4.7	**Ageing test for screwless-type terminal blocks**		-
	The test is made simultaneously on five adjacent terminal blocks connected in series by conductors of the rated cross-section, as shown in figure 2.		P
	If the rated cross-section is below 10 mm2 (AWG 8), the conductors shall be solid. For rated cross-sections equal to or higher than 10 mm2 (AWG 8), the conductors shall be rigid stranded.		P

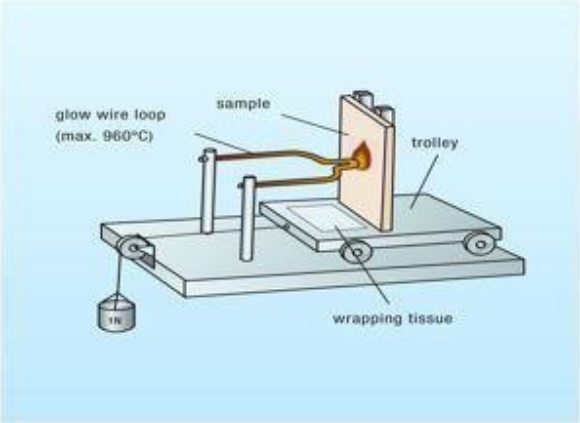
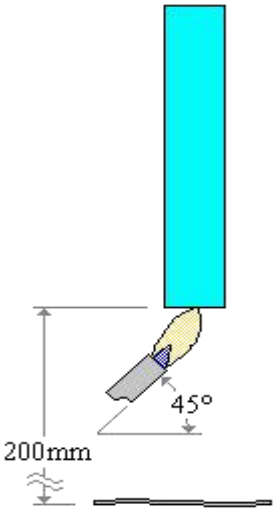
	For terminal blocks intended for use under “normal service conditions” (maximum 40 ° C according to 6.1.1 of IEC 60947-1), PVC-insulated conductors shall be used.		P
	For terminal blocks for which the manufacturer has specified “maximum service conditions above 40 ° C” (see 6.1.1, note 1, of IEC 60947-1), heat-resistant, insulated or non-insulated conductors shall be used.		P

	The minimum length of the conductor bridges shall be 300 mm.		P
	The terminal blocks are placed in a heating cabinet which is initially kept at a temperature of (20 +/- 2) ° C and then submitted to the verification of the voltage drop test.		P
	The whole test arrangement, including the conductors, shall not be moved until the voltage drop test has been completed.		P
	The terminal blocks are submitted to 192 temperature cycles as follows.		P
	The temperature in the heating cabinet is increased to 40 ° C according 8.3.3.3.1 of IEC 60947-1 or to the temperature value declared by the manufacturer for “maximum service conditions”.		P
	The temperature is maintained within _5 ° C of this value for approximately 10 min.		P
	During this test period the current according to 8.4.5 is applied.		P
	The terminal blocks are then cooled down to a temperature of approximately 30 ° C, forced cooling being allowed; they are kept at this temperature for approximately 10 min and, if necessary for measuring the voltage drop, it is allowed to cool down further to a temperature of (20 _ 5) ° C.		P
	NOTE As a guide, a value for the heating and cooling rate of the heating cabinet of approximately 1,5 ° C/min may be taken as a basis.		P

	The voltage drop in each terminal block is also determined according to 8.4.4 after each of 24 temperature cycles and after the 192 temperature cycles have been completed, each time at a temperature of (20 +/- 5) ° C.		P
	In no case the voltage drop shall exceed 4,8 mV or 1,5 times the value measured after the 24th cycle, whichever is the lower.		P

	If one of the terminal blocks does not withstand the test, the test is repeated on a second set of terminal blocks, all of which shall then comply with the repeated test.		P
	After this test, a visual inspection shall show no changes impairing further use such as cracks, deformations or the like.		P
	Furthermore, the pull-out test according to 8.3.3.3 shall be carried out.		P
	Max temperature		P
8.5	**Test of resistance to heat**		-
8.5.1	Test:		P
	- without removable covers..... 1 h (100 2) °C		P
	- removable covers..... 1 h (70 2) °C		P
	After the test no access to live parts, marking still legible		P
8.5.2	Ball pressure test for external parts of insulating material (parts retaining current-carrying parts and parts of the protective circuit in position) T = 125°C Ø of impression 2 mm		P
8.5.3	Ball pressure test for external parts of insulating material (parts not retaining current-carrying parts and parts of the protective circuit in position T = (70 2)°C or T = ___ °C = (40 2)°C + max. temperature rise of sub-clause 8.8 Ø of impression 2 mm		N

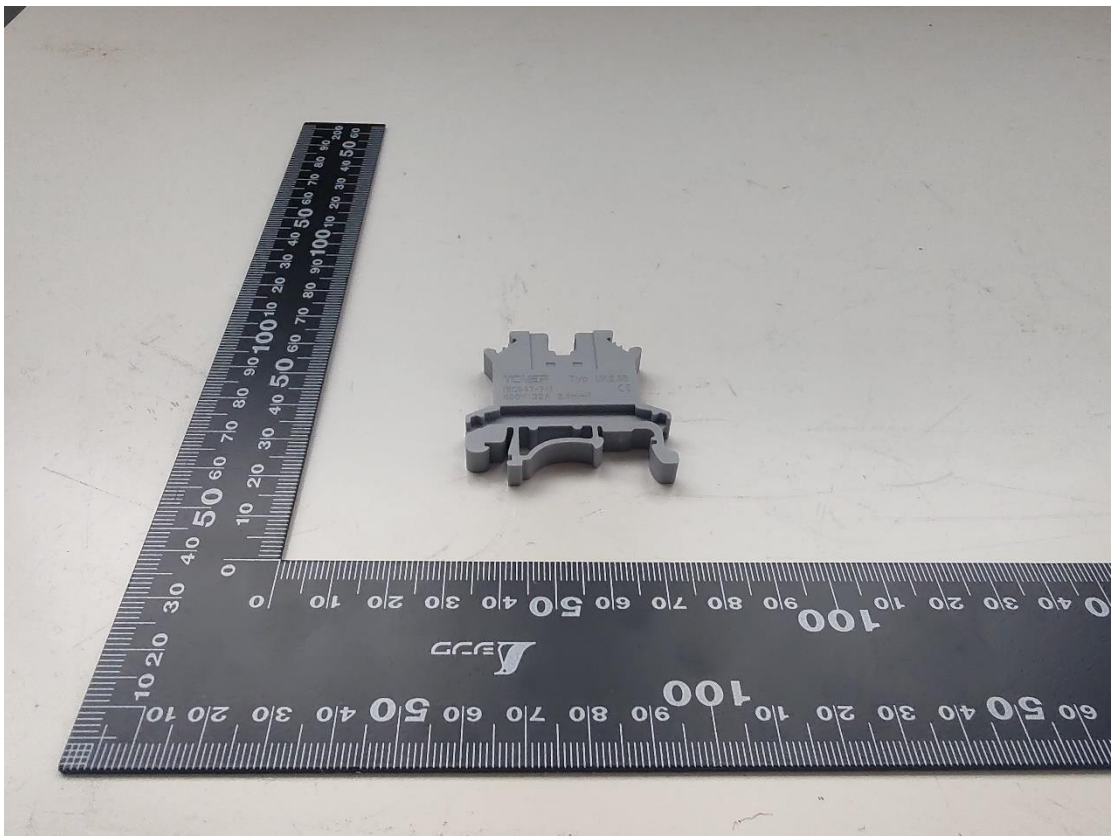
8.5.4	Resistance to abnormal heat and to fire		P
	External parts of insulating material shall not ignite or spread fire under fault or overload conditions		P
8.5.5	**Resistance to abnormal heat and to fire**		P
	Glow wire test:		

	No visible flame, no sustained glowing or flames and glowing extinguish within 30 s		P
	external parts retaining current-carrying parts and parts of the protective circuit in position ..... (960 15)°C  	Terminal block body no flame and no glowing on the sample.	P
	all other external parts .....(650 10)°C		N
	Needle flame test  	Terminal body: no flame and no glowing on the sample. Flame extinguished in 3s	P
8.6	**Verification of EMC characteristics**		P
8.6.1	**Immunity**		P
	Terminal blocks within the scope of this standard are not sensitive to electromagnetic disturbances and therefore no immunity tests are necessary.		P
8.6.2	**Emission**		P

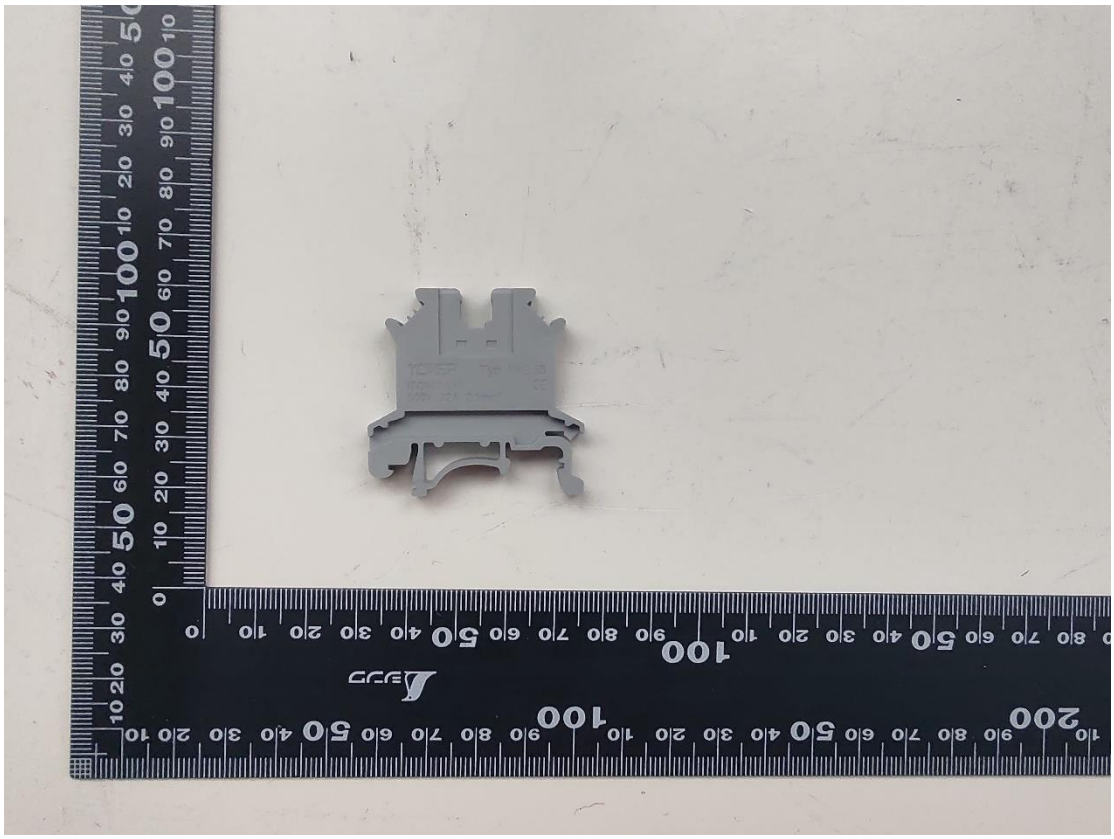
	Terminal blocks within the scope of this standard do not generate electromagnetic disturbances and therefore no emission tests are necessary.		P
8.6.1	**Immunity**		P
	Terminal blocks within the scope of this standard are not sensitive to electromagnetic disturbances and therefore no immunity tests are necessary.		P
8.6.2	**Emission**		P
	Terminal blocks within the scope of this standard do not generate electromagnetic disturbances and therefore no emission tests are necessary.		P

Annex：Technical Information

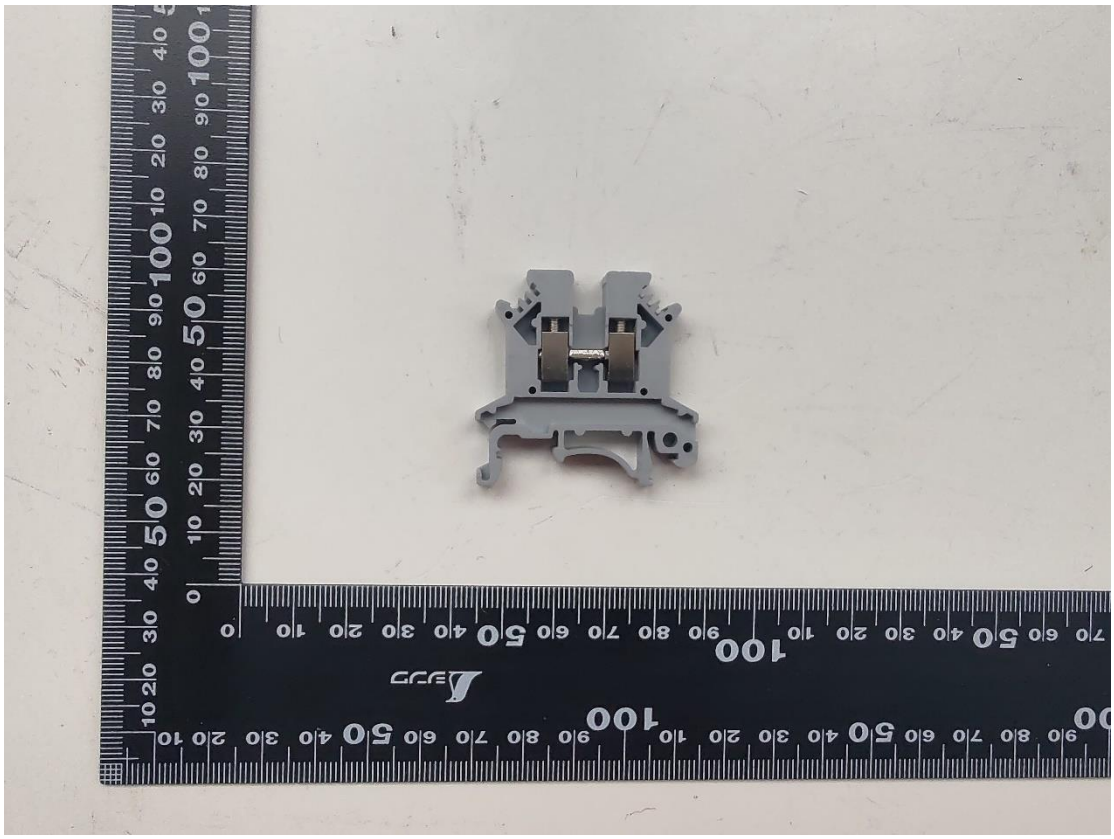
(1) Product Photos



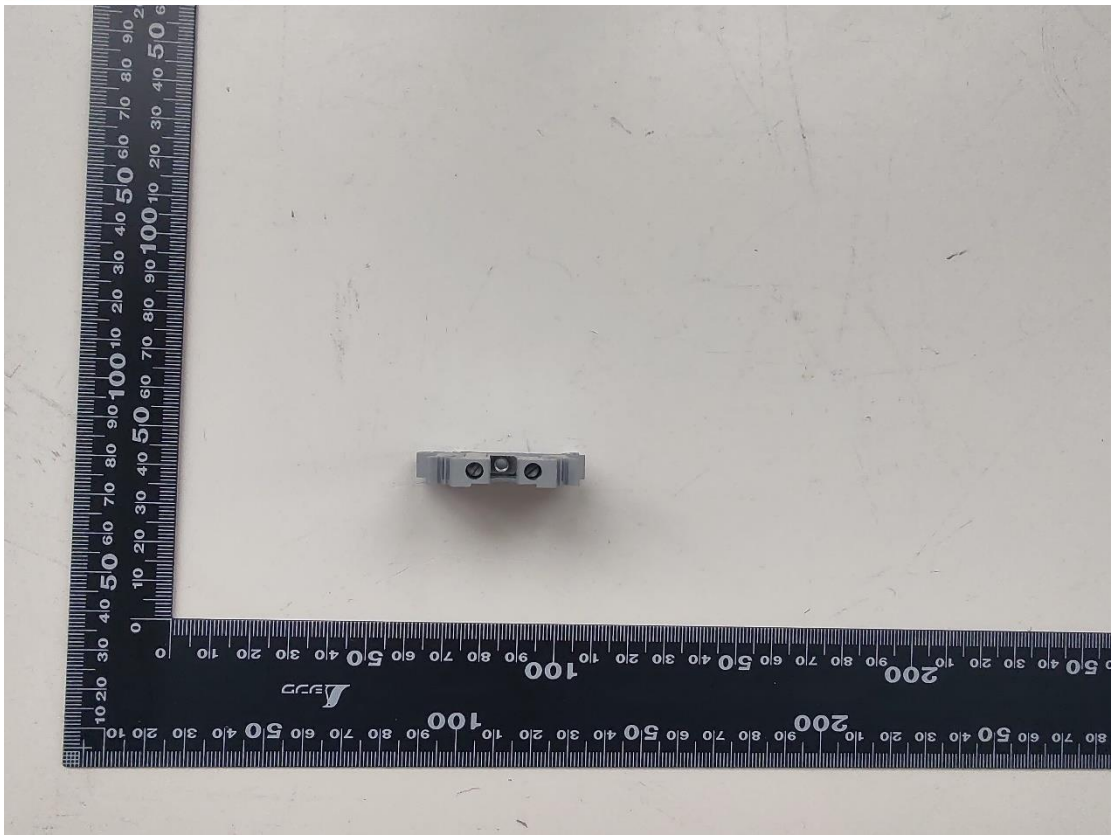
A.1



A.2



A.3



A.4