



**Приложение 2 към Техническо предложение**

**За обособена позиция № 1:**

„Доставка на електромерни табла НН, за директно измерване“

**ИЗИСКВАНИ ДОКУМЕНТИ ОТ ТЕХНИЧЕСКИ**

**ИЗИСКВАНИЯ И СПЕЦИФИКАЦИИ**

**Приложение 6**



# ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC  
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHHECHISCHE REPUBLIK  
INSTITUT ELECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÈQUE  
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lisem 129/2, 171 02 Praha 8 - Troja

## CERTIFICATE

No.: 1190155

**Product:** Electrometer switchgear assembly

**Type:** TEPO:  
0-P, 1-P, 2-P, 3-P

**Rating:** 230/400 V, 50 Hz, to 160 A, IP44, I<sub>k</sub>10

**Ordering firm:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Manufacturer:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Factories:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Trade mark:**

**The test results are stated in the test-report No.:** 910674-01/01 of: 12.03.2019

**A sample of the product was found to be in conformity with:**  
ČSN EN 61439-3:12 (EN 61439-3:2012), ČSN EN 61439-5 ed. 2:15 (EN 61439-5:2015),  
ČSN EN 61439-1 ed. 2:12 (EN 61439-1:2011)

**Other data:**

Certificate was issued on the basis of fulfillment of requirements of the "EZÚ certificate" certification scheme and on the basis of agreement No. 910674 between the client and the Electrotechnical Testing Institute.

**Compliance of the product with mentioned standards and regulations ensures compliance of the product with essential requirements of Government Order No. 117/2016 Sb. (2014/30/EU), 118/2016 Sb. (2014/35/EU) as amended and the certificate may be used as a supporting document for the EU Declaration of Conformity under Act No. 90/2016 Coll., on Conformity Assessment of Products When Made Available on the Market, as amended.**

**The validity of the certificate is limited to:** 31.03.2022

12.03.2019

Prague

на основание чл. 36а, ал. 3 от  
ЗОП

Mgr. Miroslav Sedláček  
Head of Certification Body



910674-01



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC  
 ELEKTROTECHNISCHE PRUFANSTALT - TSCHHECHISCHE REPUBLIK  
 INSTITUT ELECTROTECHNIQUE D'ESSAIS - REPUBLIQUE TSCHEQUE  
 ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lisem 129/2, 171 02 Praha 8 - Troja

Превод от английски език

# СЕРТИФИКАТ

№.: 1190155

**Продукт:** Електромерни табла

**Тип:** ТЕПО  
О-Р, 1-Р, 2-Р, 3-Р

**Класове:** 230/400 V, 50 Hz, до 160А, IP44, Ik10.

**Възложител:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

**Производител:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

**Производство:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

Търговска марка:

Резултатите от изпитването са посочени в протокол за изпитване №.: 910674-01/01 от: 12.03.2019

**Беше установено, че мостра на продукта е в съответствие с:**

CSN EN 61439-3:12 (EN 61439-3:2012), CSN EN 61439-5 издание 2:15 (EN61439-5:2015),  
 CSN EN 61439-1 издание 2:12 (EN61439-1:2011)

**Други данни:**

Сертификатът е издаден въз основа на изпълнението на изискванията на сертификационната схема "EZU сертификат" и въз основа на договор № 910674 между клиента и Института за електротехнически изпитвания.

Съответствието на продукта със споменатите стандарти и разпоредби, гарантира съответствие на продукта със съществените изисквания на правителствената заповед № 117/2016 Sb. (2014/33/EU), 118/2016 Sb. (2014/35/EU), както и измененията, и сертификатът може да се използва като придружителен документ за ЕС Декларация за съответствие съгласно Закон № 90/2016 Coll., относно оценката на съответствието на продуктите, които се предлагат на пазара, както и измененията.

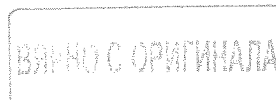
Валидността на сертификата е до: 31.03.2022

12.03.2019

(подпис – не се чете)

Прага

Маг. Мирослав Седлачек  
 Ръководител на Сертифициращ орган





# TEST REPORT

Test Report No.: 910674-01/01

Issued: 12. 3. 2019

**Name of product:** Electrometer switchgears

**Type of product:** TEPO: 0-P, 1-P, 2-P, 3-P

**Ratings:** 230/400V, 50Hz, to 160A, IP44, Ik10

**Serial number:** -

**Manufacturer:** Engineering EAD  
Komatevsko Shose Str. 92 , 4004 Plovdiv, Bulgaria

**Production site:** Engineering EAD  
Komatevsko Shose Str. 92 , 4004 Plovdiv, Bulgaria

**Ordering firm:** Engineering EAD  
Komatevsko Shose Str. 92 , 4004 Plovdiv, Bulgaria

**Number of tested samples:** 0

**Samples submitted on:** -

**Location of testing:** Elektrotechnický zkušební ústav, s. p.

**Tests performed** from 8. 3. 2019 through 12. 3. 2019

**Other data:** The results of some tests were taken from the test reports EZÚ No.: 300595-01/01, 400503-01/01, 400503-01/02, 400502-01/05

**Tested according to:** ČSN EN 61439-3:12 (EN 61439-3:2012).,  
ČSN EN 61439-5 ed. 2:15 (EN 61439-5:2015),  
ČSN EN 61439-1 ed. 2:12 (EN 61439-1:2011)

на основание чл. 36а, ал. 3 от  
ЗОП

на основание чл. 36а, ал. 3 от  
ЗОП

Compiled by: Ing. Vladimír Řehořek

Approved by: Ing. Petra Marie Tůmová  
Testing laboratory technical manager



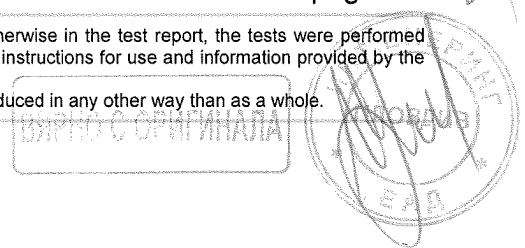
No. of pages: 12

No. of annexes: 0

No. of annexes pages: 0

Test results stated in the test report apply only to the tested subject and unless specified otherwise in the test report, the tests were performed using the method and under the conditions determined in the test regulations, technical norm, instructions for use and information provided by the manufacturer on the tested subject and using accessories required by the manufacturer.  
Without written consent of Elektrotechnický zkušební ústav, s. p., this report must not be reproduced in any other way than as a whole.

Tel.: 266 104 111, Fax: 284 680 070, www.ezu.cz



**Product Name: Electrometer switchgears****Type: TEPO: 0-P, 1-P, 2-P, 3-P**

<b>The supplied sample:</b>	<b>TEPO 1-P</b>
<b>Rated voltage (<math>U_n</math>):</b>	230/400 V, AC
<b>Rated current (<math>I_{nA}</math>):</b>	160 A
<b>Degree of protection:</b>	IP 44 / 30
<b>Mechanical impact protection:</b>	IK 10
<b>Short-circuit withstand strength:</b>	50 kA

**Enclosure manufacturer:** DCK Holoubkov Bohemia a.s.  
**Type:** SS

**Constr. material of the enclosure:**  sheet metal  concrete  plastic  stainless steel

**Performance:**  surface  recessed  enclosure  on column

**Total dimensions: (w x h x d):** 470 x 620 x 250 [mm]

**Application:**  electricity meter distributor  
 instrument enclosure  
 socket enclosure  
 residential distributor

**Documentation:**  enclosure certificate  type range table  
 catalog of enclosure  general assembly drawing  
 circuit diagram  others: operating and maintenance instructions for the distributor

**Tested according to:**

**ČSN EN 61439-1 ed.2:12, ČSN EN 61439-3:12, ČSN EN 61439-5 ed.2:15**

**Art.: 5; 6; 10: 10.1, 10.2, 10.2.1, 10.2.2, 10.2.3, 10.2.4, 10.2.5, 10.2.6, 10.2.7, 10.2.101, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.9.2, 10.9.3, 10.9.4, 10.10, 10.10.4, 10.11, 10.11.5, 10.13**

БЪРНО С ОПРИГНАТА



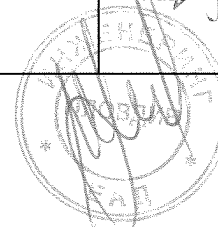
ČSN EN 61439-1 ed.2:12, ČSN EN 61439-3:12, ČSN EN 61439-5 ed.2:15		
<b>5</b>	<b>INTERFACE CHARACTERISTICS</b>	
<b>5.1</b>	<b>GENERAL</b>	
	The characteristics of the ASSEMBLY shall ensure compatibility with the ratings of the circuits to which it is connected and the installation conditions and shall be declared by the assembly manufacturer using the criteria.	--
<b>5.2</b>	<b>VOLTAGE RATINGS</b>	
<b>5.2.1</b>	<b>RATED VOLTAGE (<math>U_n</math>) (OF THE ASSEMBLY)</b>	
	The rated voltage shall be at least equal to the nominal voltage of the electrical system.	$U_n = 230/400 \text{ V, AC}$
<b>5.2.2</b>	<b>RATED OPERATIONAL VOLTAGE (<math>U_e</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>	
	The rated operational voltage of any circuit shall not be less than the nominal voltage of the electrical system to which it is to be connected.	$U_e = 230/400 \text{ V, AC}$
<b>5.2.3</b>	<b>RATED INSULATION VOLTAGE (<math>U_i</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>	
	The rated insulation voltage of a circuit of an ASSEMBLY is the voltage value to which dielectric test voltages and creepage distances are referred. The rated insulation voltage of a circuit shall be equal or higher than the values stated for $U_n$ and for $U_e$ for the same circuit.	$U_i = 500 \text{ V, AC}$
<b>5.2.4</b>	<b>RATED IMPULSE WITHSTAND VOLTAGE (<math>U_{imp}</math>) (OF THE ASSEMBLY)</b>	
	The rated impulse withstand voltage shall be equal to or higher than the values stated for the transient overvoltages occurring in the electrical system(s) to which the circuit is designed to be connected. DBO's shall comply with a minimum overvoltage category III	$U_{imp} = 8,0 \text{ kV (1,2/50 } \mu\text{s)}$
<b>5.3</b>	<b>CURRENT RATINGS</b>	
<b>5.3.1</b>	<b>RATED CURRENT OF THE ASSEMBLY (<math>I_{nA}</math>)</b>	
	The rated current of the ASSEMBLY is the smaller of: the sum of the rated currents of the incoming circuits within the ASSEMBLY operated in parallel; the total current which the main busbar is capable of distributing in the particular ASSEMBLY arrangement. This current shall be carried without the temperature rise of the individual parts exceeding the limits specified in 9.2.	$I_{nA} = 160 \text{ A}$
<b>5.3.5</b>	<b>RATED CONDITIONAL SHORT-CIRCUIT CURRENT OF AN ASSEMBLY (<math>I_{cc}</math>)</b>	
	The rated conditional short-circuit current shall be equal to or higher than the prospective r.m.s. value of short-circuit current ( $I_{cp}$ ) for a duration limited by the operation of the short-circuit protective device that protects the ASSEMBLY.	$I_{cc} = 50 \text{ kA}$
<b>5.4</b>	<b>RATED DIVERSITY FACTOR (RDF)</b>	
	The rated diversity factor is the per unit value of the rated current, assigned by the ASSEMBLY manufacturer, to which outgoing circuits of an ASSEMBLY can be continuously and simultaneously loaded taking into account the mutual thermal influences.	$RDF=0,8$

Pass

Pass

Pass

ВЪРХО С ОРГИНАЛА





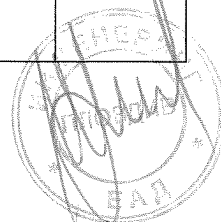
<b>6</b>	<b>INFORMATION</b>		
<b>6.1</b>	<b>ASSEMBLY DESIGNATION MARKING</b>		
	<p>The ASSEMBLY manufacturer shall provide each ASSEMBLY with one or more labels, marked in a durable manner and located in a place such that they are visible and legible when the ASSEMBLY is installed and in operation. Compliance is checked according to the test of 10.2.7 and by inspection.</p> <p>The test of 10.2.7 only applies to DBOs intended for outdoor installation.</p> <p>The following information regarding the ASSEMBLY shall be provided on the designation label(s):</p>	see fig No. 1	Pass
	a) ASSEMBLY manufacturer's name or trade mark		
	b) type designation or identification number or any other means of identification, making it possible to obtain relevant information from the ASSEMBLY manufacturer	type: TEPO 1-P s. n.: 2453345	
	c) means of identifying date of manufacture	13. 02. 2019	
	d) IEC 61439-3	yes	
	e) rated current of the DBO using the symbol $I_{nA}$	$I_{nA} = 160 A$	
	f) degree of protection if greater than IP 2XC	IP 44/30	
<b>6.2</b>	<b>DOCUMENTATION</b>		
<b>6.2.1</b>	<b>INFORMATION RELATING TO THE ASSEMBLY</b>		Pass
	All the interface characteristics according to chapter 5 can be contained in the distributor manufacturer's technical documentation delivered with it.	see chapter 5	
<b>6.2.2</b>	<b>INSTRUCTIONS FOR HANDLING, INSTALATION, OPERATION AND MAINTENANCE</b>		Pass
	In the documentation or catalogs the distributor manufacturer shall determine eventually conditions of handling, installation, operation and maintenance of the distributor and devices contained in it.	catalogue	
<b>6.3</b>	<b>DEVICE AND/OR COMPONENT IDENTIFICATION</b>		
	It must be possible to identify particular circuits and their protective devices inside the equipment. Identification labels must be legible, durable and suitable for real environment.	devices are marked, wires are color-coded	

ВЕРНО С ОРИГИНАЛА



<b>10</b>	<b>DESIGN VERIFICATION</b>		
<b>10.1</b>	<b>GENERAL</b>		
	The design examination serves to a purpose whether the distributor or its system design meets regulations contained in this set of standards.		--
<b>10.2</b>	<b>STRENGTH OF MATERIALS AND PARTS</b>		
<b>10.2.1</b>	<b>GENERAL</b>		
	The mechanical, electrical and thermal capability of constructional materials and parts of the ASSEMBLY shall be deemed to be proven by verification of construction and performance characteristics.	enclosure: <b>DCK Holoubkov Bohemia a.s.</b> type: <b>SS</b>  test reports EZÚ No.: <b>300595-01/01</b> <b>400503-01/01,02</b>	Pass
<b>10.2.2</b>	<b>RESISTANCE TO CORROSION</b>		
<b>10.2.2.1</b>	<b>TEST PROCEDURE</b>		
	The resistance to corrosion of representative samples of ferrous metallic enclosures including internal and external ferrous metallic constructional parts of the assembly shall be verified.	tested hinges, locks and fasteners	--
<b>10.2.2.2</b>	<b>SEVERITY TEST A</b>		
	This test is applicable to: – metallic indoor enclosures; – external metallic parts of indoor assemblies; – internal metallic parts of indoor and outdoor assemblies upon which intended mechanical operation may depend.	test report EZÚ No.: 400502-01/05	Pass
<b>10.2.2.3</b>	<b>SEVERITY TEST B</b>		
	This test is applicable to: – metallic outdoor enclosures; – external metallic parts of outdoor assemblies	test report EZÚ No.: 400502-01/05	Pass
<b>10.2.2.4</b>	<b>RESULTS TO BE OBTAINED</b>		
	Compliance is checked by visual inspection to determine that: – there is no evidence of iron oxide, cracking or other deterioration more than that allowed by ISO 4628-3 for a degree of rusting Ri1. However surface deterioration of the protective coating is allowed. – the mechanical integrity is not impaired; – seals are not damaged, – doors, hinges, locks, and fastenings work without abnormal effort.	test report EZÚ No.: 400502-01/05	Pass
<b>10.2.3</b>	<b>PROPERTIES OF INSULATING MATERIALS</b>		
<b>10.2.3.1</b>	<b>VERIFICATION OF THERMAL STABILITY OF ENCLOSURES</b>		
	The test shall be carried out according to IEC 60068-2-2 Test Bb, at a temperature of 70 °C, with natural air circulation, for a duration of 168 h and with a recovery of 96 h.  The enclosure or sample shall show no crack visible to normal or corrected vision without additional magnification nor shall the material have become sticky or greasy.	test report EZÚ No.: 400503-01/02	Pass

ВІРНО С ОРІГІНАЛОМ



<b>10.2.3.2</b>	<b>VERIFICATION OF RESISTANCE OF INSULATING MATERIALS TO ABNORMAL HEAT AND FIRE DUE TO INTERNAL ELECTRIC EFFECTS</b>		
	<p>The glow-wire test principles of IEC 60695-2-10 and the details given in IEC 60695-2-11 shall be used to verify the suitability of materials used:</p> <p>a) on parts of assemblies, or b) on parts taken from these parts.</p> <p>The temperature of the tip of the glow-wire shall be as follows:</p> <ul style="list-style-type: none"> <li>- 960 °C for parts necessary to retain current-carrying parts in position;</li> <li>- 850 °C for enclosures intended for mounting in hollow walls;</li> <li>- 650 °C for all other parts, including parts necessary to retain the protective conductor.</li> </ul>	<p>enclosure made of SMC mounting plate made of PC 960 °C / 650 °C</p> <p><b>960 °C:</b> flame had extinguished in 1 second after removing the glow - wire (SMC) flame had extinguished in 10 seconds after removing the glow - wire (PC) tissue paper had not been lit</p> <p><b>650 °C:</b> sample had not been lit</p>	Pass
<b>10.2.3.101</b>	<b>DRY WARM TEST</b>		
	<p>The complete distributor must be put into a furnace with its inner temperature being increased up to 100 (± 2) °C during 2 to 3 hours and this final temperature shall be then maintained during 5 hours.</p>	<p>test reports EZÚ No.: 300595-01/01 400503-01/02</p>	Pass
<b>10.2.3.102</b>	<b>CHECKING THE COMBUSTIBILITY CATEGORY</b>		
	<p>Typical samples from all materials of covers, separators and other insulating parts shall be exposed to the flammability test according to method A - i.e. the test by burning in the horizontal sample position according to IEC 60695-11-10.</p>	<p>test reports EZÚ No.: 700534-01/01 203464-01/02</p>	Pass
<b>10.2.4</b>	<b>RESISTANCE TO ULTRA-VIOLET (UV) RADIATION</b>		
	<p>This test applies only to enclosures and external parts of assemblies intended to be installed outdoors and which are constructed of insulating materials or metals that are entirely coated by synthetic material.</p>	<p>test reports EZÚ No.: 803380-01/01,02</p>	Pass
<b>10.2.5</b>	<b>LIFTING</b>		
	<p>For ASSEMBLIES with provision for lifting means compliance is verified by the following tests.</p>	<p>switchgear does not contain any lifting means</p>	--
<b>10.2.6</b>	<b>MECHANICAL IMPACT</b>		
	<p>Mechanical impact tests where required by the specific assembly standard are to be carried out in accordance with IEC 62262.</p>	<p>test reports EZÚ No.: 404013-01/01 400503-01/01,02</p>	Pass
<b>10.2.7</b>	<b>MARKING</b>		
	<p>The test shall be performed by wiping marking by hand during 15 seconds with a textile piece moistened in water and then again during 15 seconds with a textile piece moistened in mineral spirit.</p> <p>After the test the marking shall be legible to normal or corrected vision without additional.</p> <p>This test only applies to DBO's intended for outdoor installation.</p>	<p>small wear, marking is easy to read</p>	Pass

ВЕРНО С ОПРИГНАЛА

<b>10.2.101</b>	<b>CHECKING MECHANICAL STRENGTH</b>		
	Tests must be performed at ambient temperature 10°C to 40°C All tests must be carried out with a switchgear mounted as for normal operation.	--	--
<b>10.2.101.2</b>	<b>CHECKING RESISTANCE AGAINST STATIC LOAD</b>		
	<b>Test 1</b> – Regularly distributed load 8500 N/m <sup>2</sup> must affect the roof part of the cover during 5 minutes <b>Test 2</b> – Strength 1200 N must affect step by step the front and back upper edge of the roof part of the cover during 5 minutes	test reports EZÚ No.: 300595-01/01 403559-01/01	
<b>10.2.101.3</b>	<b>CHECKING RESISTANCE AGAINST SHOCK LOAD</b>		
	Suspended punched sandbag with an arc from a height of 1 m to the center of the top of the enclosure surface.	test report EZÚ No.: 300595-01/01	
<b>10.2.101.4</b>	<b>CHECKING TWISTING STRESS RESISTANCE</b>		
	The switchgear with its door closed must be exposed to twisting force 2x1000 N during 30 s.	test report EZÚ No.: 400503-01/01,02	
<b>10.2.101.5</b>	<b>CHECKING IMPACT FORCE RESISTANCE</b>		
	Punched steel ball punch 2 kg from 1m height to walls visible after switchgear installation.	test reports EZÚ No.: 300595-01/01 404013-01/01	
<b>10.2.101.6</b>	<b>CHECKING MECHANICAL STRENGTH OF THE DOOR</b>		
	Tests must be performed with the door completely opened and in contact with a designed limiting device.	test reports EZÚ No.: 300595-01/01 404013-01/01	
<b>10.2.101.7</b>	<b>OVĚŘENÍ ODOLNOSTI KOVOVÝCH VLOŽEK V SYNTETICKÉM MATERIÁLU PROTI AXIÁLNÍMU ZATÍŽENÍ</b>		
	The test shall be carried out on a representative sample of a metal liner of each type and size.	test report EZÚ No.: 400503-01/01,02	
<b>10.2.101.8</b>	<b>CHECKING RESISTANCE AGAINST MECHANICAL IMPACTS CAUSED BY THINGS WITH SHARP EDGES</b>		
	The impact element is to be lifted up to height 0.4 m and let fall and impact the surface of the distributor under test in order to reach impact energy 20 J.	test reports EZÚ No.: 300595-01/01 404013-01/01	
<b>10.3</b>	<b>DEGREE OF PROTECTION OF ASSEMBLIES</b>		
	The protection degree must be estimated according to IEC 60529.	<b>IP 44 / 30</b>	
	If an empty enclosure according to IEC 62208 is used, there is necessary to carry out an evaluation of the examination in order to state that any outer modification having performed has not decreased the protection code. In that case any other examinations are not required.	test reports EZÚ No.: 402753-01/03 404013-01/01	

Pass

Pass

ВЕРНО С ОРИГИНАЛА



<b>10.4</b>	<b>CLEARANCES AND CREEPAGE DISTANCES</b>		
	ČSN EN 61439-1 table 1 and 2	pollution degree 3	Pass
	a) $U_{imp} = 8,0 \text{ kV} \Rightarrow$ min. air clearance: 8,0 mm	test reports EZÚ No.: 300595-01/01 402753-01/01	
	b) $U_1 = 500 \text{ V} \Rightarrow$ min. creepage distance: 8,0 mm		
	The clearances and creepage distances are used among phases, between a phase and the zero conductor and, except for the case that an electric wire is connected directly with the earth, among a phase, the zero conductor and the earth.		
<b>10.5</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK AND INTEGRITY OF PROTECTIVE CIRCUITS</b>		
	It shall be verified that the different exposed conductive parts of the assembly are effectively connected to the terminal for the incoming external protective conductor and that the resistance of the circuit does not exceed $0,1 \Omega$ .	all-plastic design without conductive parts	--
<b>10.6</b>	<b>INCORPORATION OF SWITCHING DEVICES AND COMPONENTS</b>		
	Meeting structural requirements on the switch instruments and components installed must be confirmed by scrutiny and verified according to this standard.	devices are in accordance with the standards, Installation according to the instructions	Pass
<b>10.7</b>	<b>INTERNAL ELECTRICAL CIRCUITS AND CONNECTIONS</b>		
	Meeting structural requirements on the inner electric circuits and connections must be confirmed by scrutiny and verified according to this standard.	wires can be identified by means of marks and colors	Pass
<b>10.8</b>	<b>TERMINALS FOR EXTERNAL CONDUCTORS</b>		
	Meeting structural requirements on the terminals for external electric wires must be confirmed by scrutiny and verified according to this standard.	wires are not stressed, the terminals correspond to rated currents	Pass
<b>10.9</b>	<b>DIELECTRIC PROPERTIES</b>		
<b>10.9.2</b>	<b>POWER-FREQUENCY WITHSTAND VOLTAGE</b>		
	The main and control circuits being connected with the main circuit can be exposed to the test voltage according to table 8 ( IEC 61439-1 ).		
<b>10.9.2.3</b>	<b>APPLICATION OF THE TEST VOLTAGE</b>		
	The voltage of industrial frequency must not exceed 50% of the full test value at the application moment. After that it must be increased progressively to this full value and maintained at it during 5 seconds.	$U_1 = 500 \text{ V}$ test voltage: <b>1890 V</b>	Pass
	a) among all the together connected live parts of the main circuit and non-live parts, with main contacts of all the switch instruments in switched on position or bridged by a suitable jumper of low resistance; b) among every part of the main circuit with a different potential and other live parts with the different potential and the together connected non-live parts, with main contacts of all the switch instruments in switched on position or bridged by a suitable jumper of low resistance;	no breakdowns have occurred	

<b>10.9.3</b>	<b>IMPULSE WITHSTAND VOLTAGE</b>		Pass
<b>10.9.3.2</b>	<b>IMPULSE WITHSTAND VOLTAGE TEST</b>		
	The voltage shock generator must be adjusted to the required impulse voltage with the distributor connected. The value of the test voltage must be selected according to table 10 IEC 61439-1.	<b>U<sub>imp</sub> = 8,0 kV</b> test voltage: <b>9,6 kV</b>	
	There must be applied impulse voltage 1.2/50 μs five times for every polarity. The measurement shall be performed on the circuit according to Art. 10.9.2.3 a), b)	no flash-over or breakdowns have occurred	
<b>10.9.4</b>	<b>TESTING OF ENCLOSURES MADE OF INSULATING MATERIAL</b>		Pass
	For assemblies with enclosures made of insulating material, an additional dielectric test shall be carried out by applying an a.c. test voltage between a metal foil laid on the outside of the enclosure over openings and joints, and the interconnected live and exposed conductive parts within the ASSEMBLY located next to the openings and joints. For this additional test, the test voltage shall be equal to 1,5 times the values indicated in 10.9.2.3	<b>U<sub>zk</sub> = 2835 V, AC</b> no breakdowns have occurred	
<b>10.10</b>	<b>VERIFICATION OF TEMPERATURE RISE</b>		
<b>10.10.4</b>	<b>VERIFICATION ASSESSMENT</b>		Pass
	It must be verified, if warming limits according to 9.2 of different parts of the distributor are not going to be exceeded. Increase of temperature of the distributor parts [K]:  <input type="checkbox"/> metal outer cover 30 <input checked="" type="checkbox"/> <b>insulating outer cover</b> 40  Kind of cooling: natural <input checked="" type="checkbox"/> , forced <input type="checkbox"/>	verified by calculation according to IEC TR 60890  <b>P<sub>ztr</sub> ≈ 54 W, RDF = 0,8</b> <b>Δt<sub>1,0</sub> ≈ 19 K</b>	
<b>10.11</b>	<b>SHORT-CIRCUIT WITHSTAND STRENGTH</b>		
	The short-circuit current ratings declared shall be verified except where exempt, see 10.11.2. Verification may be, by comparison with a reference design (10.11.3 and 10.11.4.) or by test (10.11.5).		Pass
<b>10.11.5</b>	<b>CIRCUITS OF ASSEMBLIES WHICH ARE EXEMPTED FROM THE VERIFICATION OF THE SHORT-CIRCUIT WITHSTAND STRENGTH</b>		
	The assembly or its parts as necessary to complete the test shall be mounted as in normal use. It is sufficient to test a single functional unit if the remaining functional units are of the same construction.	test reports <b>IVEP, a.s. No.: 88-0854, 88-0855</b>	
<b>10.13</b>	<b>MECHANICAL OPERATION</b>		
	There must be a satisfactory mechanical function verified after the installation into distributors for parts which requires verifying by the test. Number of operational cycles must be 50.	tested locks and door hinges	Pass

**PHOTO-DOCUMENTATION**



Fig. 1 – Labels of switchgears

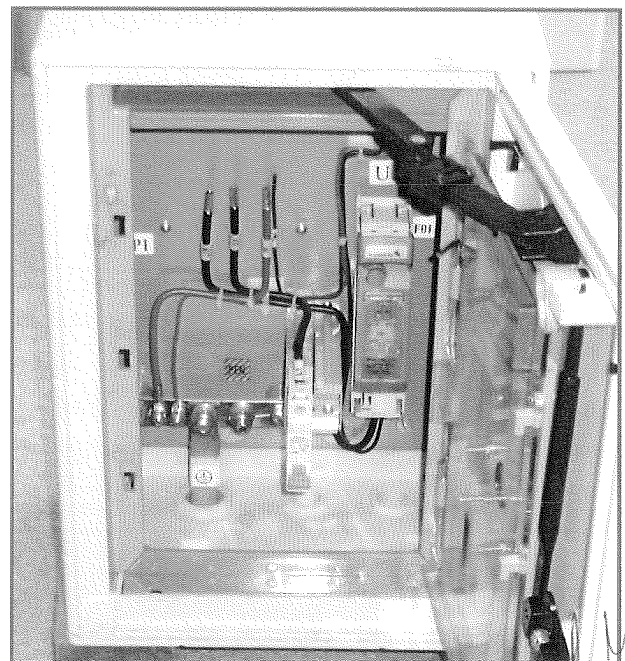
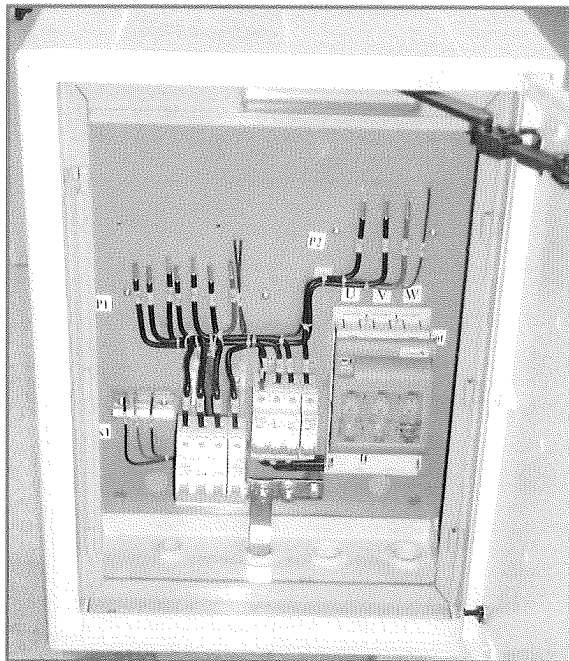
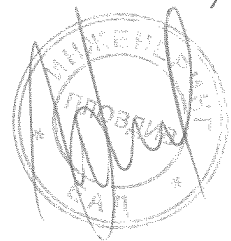


Fig. 2 – Switchgears TEPO P . . .

ВАРЧО С ОРИГИНАЛА



**INSTRUMENTS AND TESTING EQUIPMENT USED:**

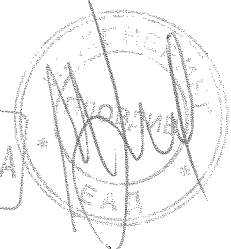
<u>Name, type</u>	<u>registration number</u>
HV source TOS 5301	110284
Impulse wave generator RG 542	110269
Digital slide gauge	551553
Tester Fluke T 100	551521
Electric furnace HS 202A	5844
Glow - wire test PTL 5090005 T 03.35	110195

на основание чл. 36а, ал. 3 от  
ЗОП

Prepared by: Ing. Vladimír Řehořek

Dated: 12. 3. 2019

ВЯРНО С ОРИГИНАЛА



# ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC  
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHECHISCHE REPUBLIK  
INSTITUT ELECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÈQUE  
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lisem 129/2, 171 02 Praha 8 - Troja

## CERTIFICATE

No.: 1190179

**Product:** Electrometer switchgear assembly

**Type:** TEPO  
1-PV, 2-PV, 3-PV  
see Annex

**Rating:** 230/400 V, 50 Hz, 160 A, 50 kA, IP44/IP20C, IK10

**Ordering firm:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Manufacturer:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Factories:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Trade mark:**

**The test results are stated in the test-report No.:** 910836-01/01 of: 22.03.2019

**A sample of the product was found to be in conformity with:**  
ČSN EN 61439-3:12 (EN 61439-3:2012), ČSN EN 61439-5 ed. 2:15 (EN 61439-5:2015),  
ČSN EN 61439-1 ed. 2:12 (EN 61439-1:2011)

**Other data:**

Certificate was issued on the basis of fulfillment of requirements of the "EZÚ certificate" certification scheme and on the basis of agreement No. 910836 between the client and the Electrotechnical Testing Institute.

**Compliance of the product with mentioned standards and regulations ensures compliance of the product with essential requirements of Government Order No. 117/2016 Sb. (2014/30/EU), 118/2016 Sb. (2014/35/EU) as amended and the certificate may be used as a supporting document for the EU Declaration of Conformity under Act No. 90/2016 Coll., on Conformity Assessment of Products When Made Available on the Market, as amended.**

**The validity of the certificate is limited to:** 31.03.2022

27.03.2019

Prague

на основании чл. 36а, ал. 3 от  
ЗОП

Mgr. Miroslav Sedláček  
Head of Certification Body

ВЯРНО С ОРИГИНАЛА



\* C E R / 1 1 9 0 1 7 9 \*



910836-01

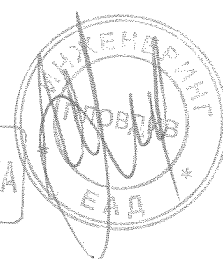


### Type of switchboard: PV

typ	Popis
1-PV	Electrometer switchgear designed for two single-phase measurements or for one single-phase and one three-phase measurements, compact column
2-PV	Electrometer switchgear designed for four single-phase measurements or for two single-phase and one three-phase measurements or for two three-phase measurements, compact column
3-PV	Electrometer switchgear designed for six single-phase measurements or for four single-phase and one three-phase measurements or for two three-phase measurements, compact column



ВЕРНО С ОРИГИНАЛА





ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC  
 ELEKTROTECHNISCHE PRUFANSTALT - TSCHISCHEISCHE REPUBLIK  
 INSTITUT ELECTROTECHNIQUE D'ESSAIS - REPUBLIQUE TSCHEQUE  
 ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lisem 129/2, 171 02 Praha 8 - Troja

Превод от английски език

# СЕРТИФИКАТ

№.: 1190179

**Продукт:** Електромерни табла

**Тип:** ТЕПО  
1-PV, 2-PV, 3-PV  
Виж Приложението

**Класове:** 230/400 V, 50 Hz, 100A, IP44/IP20C, IK10.

**Възложител:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

**Производител:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

**Производство:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

Търговска марка:

Резултатите от изпитването са посочени в протокол за изпитване № .: 910836-01/01 от: 22.03.2019

Беше установено, че мостра на продукта е в съответствие с:  
 CSN EN 61439-3:12 (EN 61439-3:2012), CSN EN 61439-5 издание 2:15 (EN61439-5:2015),  
 CSN EN 61439-1 издание 2:12 (EN61439-1:2011)

**Други данни:**  
 Сертификатът е издаден въз основа на изпълнението на изискванията на сертификационната схема "EZU сертификат" и въз основа на договор № 910836 между клиента и Института за електротехнически изпитвания.

Съответствието на продукта със споменатите стандарти и разпоредби, гарантира съответствие на продукта със съществените изисквания на правителствената заповед № 117/2016 Sb. (2014/33/EU), 118/2016 Sb. (2014/35/EU), както и измененията, и сертификатът може да се използва като придружителен документ за ЕС Декларация за съответствие съгласно Закон № 90/2016 ДВ, относно оценката на съответствието на продуктите, които се предлагат на пазара, както и измененията.

Валидността на сертификата е до: 31.03.2022

27.03.2019

(подпис – не се чете)

Прага

Маг. Мирослав Седлачек  
 Ръководител на Сертифициращ орган

ВЪРНО С ОРИГИНАЛА





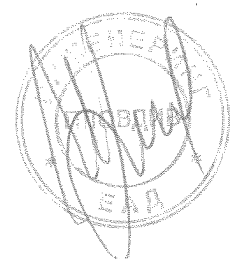
Тип на таблото: PV

Тип	Описание
1-PV	Електромерно табло, проектирано за две еднофазни измервания или за едно монофазно и едно трифазно измерване, компактна колона.
2-PV	Електромерно табло, проектирано за четири еднофазни измервания или за две монофазни и едно трифазно измерване, или за две трифазни измервания, компактна колона.
3-PV	Електромерно табло, проектирано за шест еднофазни измервания или за четири монофазни и едно трифазно измерване, или за две трифазни измервания, компактна колона.

(подпис – не се чете)



ВЯРНО С ОРИГИНАЛА





## TEST REPORT

Test Report No.: 910836-01/01

Issued: 22. 3. 2019

**Name of product:** Electrometer switchgear assembly  
**Type of product:** TEPO:  
1-PV, 2-PV, 3-PV  
**Ratings:** 230/400 V, 50 Hz, 160 A, 50 kA, IP44/IP20C, IK10  
**Serial number:** 2453348  
**Manufacturer:** Engineering EAD  
Komatevsko Shose Str. 92 , 4004 Plovdiv, Bulgaria  
**Production site:** Engineering EAD  
Komatevsko Shose Str. 92 , 4004 Plovdiv, Bulgaria  
**Ordering firm:** Engineering EAD  
Komatevsko Shose Str. 92 , 4004 Plovdiv, Bulgaria  
**Number of tested samples:** 1  
**Samples submitted on:** 19. 3. 2019  
**Location of testing:** Elektrotechnický zkušební ústav, s. p.  
**Tests performed** from 19. 3. 2019 through 21. 3. 2019  
**Other data:** The results of some tests were taken from the test reports EZÚ No.: 300595-01/01, 400503-01/01, 400503-01/02, 400502-01/05  
**Tested according to:** ČSN EN 61439-3:12 (EN 61439-3:2012),  
ČSN EN 61439-5 ed. 2:15 (EN 61439-5:2015),  
ČSN EN 61439-1 ed. 2:12 (EN 61439-1:2011)

на основание чл. 36а, ал. 3 от  
ЗОП

на основание чл. 36а, ал. 3 от  
ЗОП

Compiled by: Ing. Vladimír Řehořek

Approved by: Ing. Petra Marie Tůmová  
Testing laboratory technical manager

No. of pages: 12

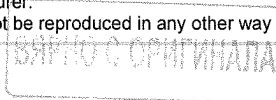
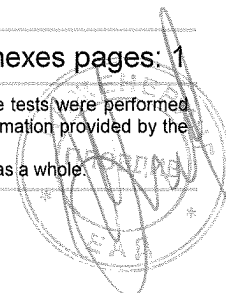
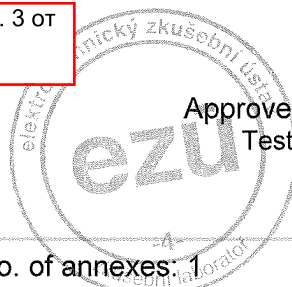
No. of annexes: 1

No. of annexes pages: 1

Test results stated in the test report apply only to the tested subject and unless specified otherwise in the test report, the tests were performed using the method and under the conditions determined in the test regulations, technical norm, instructions for use and information provided by the manufacturer on the tested subject and using accessories required by the manufacturer.

Without written consent of Elektrotechnický zkušební ústav, s. p., this report must not be reproduced in any other way than as a whole.

Tel.: 266 104 111, Fax: 284 680 070, www.ezu.cz



**Product Name: Electrometer switchgears****Type: TEPO: 1-PV, 2-PV, 3-PV ( see annex )**

<b>The supplied sample:</b>	<b>TEPO 1-PV</b>
<b>Rated voltage (<math>U_n</math>):</b>	230/400 V, AC
<b>Rated current (<math>I_{nA}</math>):</b>	160 A
<b>Degree of protection:</b>	IP 44 / 30
<b>Mechanical impact protection:</b>	IK 10
<b>Short-circuit withstand strength:</b>	50 kA

**Enclosure manufacturer:** DCK Holoubkov Bohemia a.s.  
**Type:** SS

**Constr. material of the enclosure:**  sheet metal  concrete  plastic  stainless steel

**Performance:**  compact column  recessed  enclosure  on column

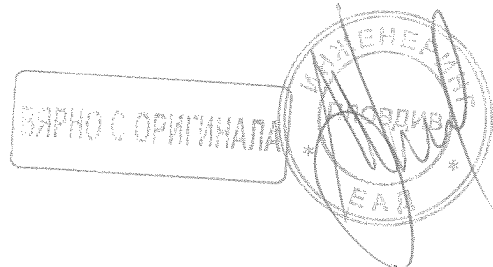
**Total dimensions: (w x h x d):** 470 x 1850 x 250 [mm]

**Application:**  electricity meter distributor  
 instrument enclosure  
 socket enclosure  
 residential distributor

**Documentation:**  enclosure certificate  type range table  
 catalog of enclosure  general assembly drawing  
 circuit diagram  others: operating and maintenance instructions for the distributor

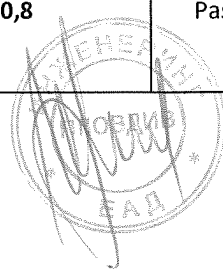
**Tested according to:****ČSN EN 61439-1 ed.2:12, ČSN EN 61439-3:12, ČSN EN 61439-5 ed.2:15**

**Cl.: 5; 6; 10:** 10.1, 10.2, 10.2.1, 10.2.2, 10.2.3, 10.2.4, 10.2.5, 10.2.6, 10.2.7, 10.2.101, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.9.2, 10.9.3, 10.9.4, 10.10, 10.10.4, 10.11, 10.11.5, 10.13



	<b>ČSN EN 61439-1 ed.2:12, ČSN EN 61439-3:12, ČSN EN 61439-5 ed.2:15</b>		
<b>5</b>	<b>INTERFACE CHARACTERISTICS</b>		
<b>5.1</b>	<b>GENERAL</b>		
	The characteristics of the ASSEMBLY shall ensure compatibility with the ratings of the circuits to which it is connected and the installation conditions and shall be declared by the assembly manufacturer using the criteria.		--
<b>5.2</b>	<b>VOLTAGE RATINGS</b>		
<b>5.2.1</b>	<b>RATED VOLTAGE (<math>U_n</math>) (OF THE ASSEMBLY)</b>		Pass
	The rated voltage shall be at least equal to the nominal voltage of the electrical system.	$U_n = 230/400 \text{ V, AC}$	
<b>5.2.2</b>	<b>RATED OPERATIONAL VOLTAGE (<math>U_e</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>		
	The rated operational voltage of any circuit shall not be less than the nominal voltage of the electrical system to which it is to be connected.	$U_e = 230/400 \text{ V, AC}$	
<b>5.2.3</b>	<b>RATED INSULATION VOLTAGE (<math>U_i</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>		
	The rated insulation voltage of a circuit of an ASSEMBLY is the voltage value to which dielectric test voltages and creepage distances are referred. The rated insulation voltage of a circuit shall be equal or higher than the values stated for $U_n$ and for $U_e$ for the same circuit.	$U_i = 500 \text{ V, AC}$	
<b>5.2.4</b>	<b>RATED IMPULSE WITHSTAND VOLTAGE (<math>U_{imp}</math>) (OF THE ASSEMBLY)</b>		Pass
	The rated impulse withstand voltage shall be equal to or higher than the values stated for the transient overvoltages occurring in the electrical system(s) to which the circuit is designed to be connected. DBO's shall comply with a minimum overvoltage category III	$U_{imp} = 8,0 \text{ kV (1,2/50 } \mu\text{s)}$	
<b>5.3</b>	<b>CURRENT RATINGS</b>		
<b>5.3.1</b>	<b>RATED CURRENT OF THE ASSEMBLY (<math>I_{nA}</math>)</b>		Pass
	The rated current of the ASSEMBLY is the smaller of: the sum of the rated currents of the incoming circuits within the ASSEMBLY operated in parallel; the total current which the main busbar is capable of distributing in the particular ASSEMBLY arrangement. This current shall be carried without the temperature rise of the individual parts exceeding the limits specified in 9.2.	$I_{nA} = 160 \text{ A}$	
<b>5.3.5</b>	<b>RATED CONDITIONAL SHORT-CIRCUIT CURRENT OF AN ASSEMBLY (<math>I_{cc}</math>)</b>		
	The rated conditional short-circuit current shall be equal to or higher than the prospective r.m.s. value of short-circuit current ( $I_{cp}$ ) for a duration limited by the operation of the short-circuit protective device that protects the ASSEMBLY.	$I_{cc} = 50 \text{ kA}$	
<b>5.4</b>	<b>RATED DIVERSITY FACTOR (RDF)</b>		
	The rated diversity factor is the per unit value of the rated current, assigned by the ASSEMBLY manufacturer, to which outgoing circuits of an ASSEMBLY can be continuously and simultaneously loaded taking into account the mutual thermal influences.	$RDF = 0,8$	Pass

ВЕРНО С ОРИГИНАЛА



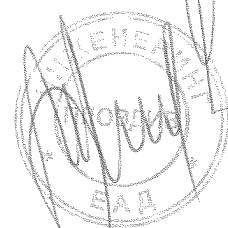
<b>5.5</b>	<b>RATED FREQUENCY (<math>f_n</math>)</b>		
	The rated frequency of a circuit is the value of frequency to which the operating conditions are referred. Where the circuits of an ASSEMBLY are designed for different values of frequency, the rated frequency of each circuit shall be given.	$f_n = 50 \text{ Hz}$	Pass
<b>5.6</b>	<b>OTHER CHARACTERISTICS</b>		
	a) additional requirements depending on the specific service conditions of a functional unit	--	--
	b) pollution degree	3	Pass
	c) types of system earthing for which the ASSEMBLY is designed	TN-C	Pass
	d) indoor and/or outdoor installation	indoor/ outdoor	Pass
	e) stationary or movable	stationary	Pass
	f) degree of protection	IP 44/30	Pass
	g) intended for use by skilled or ordinary persons	for ordinary persons	Pass
	h) electromagnetic compatibility (EMC) classification	environment B	Pass
	i) special service conditions, if applicable	--	--
	j) external design	compact column	Pass
	k) mechanical impact protection, if applicable	IK 10	Pass
	l) the type of construction – fixed or removable parts	fixed parts	Pass
	m) the nature of short-circuit protective device (s)	circuit breakers	Pass
	n) measures for protection against electric shock	automatic disconnection of supply	Pass
	o) overall dimensions, if required (w x h x d) [mm]	470 x 620 x 250 [mm]	Pass
	p) the weight, if required [kg]	19 [kg]	Pass
	q) type A or type B DBO	type B DBO	Pass

ИДНО С ОРИГИНАЛА



<b>6</b>	<b>INFORMATION</b>		
<b>6.1</b>	<b>ASSEMBLY DESIGNATION MARKING</b>		
	<p>The ASSEMBLY manufacturer shall provide each ASSEMBLY with one or more labels, marked in a durable manner and located in a place such that they are visible and legible when the ASSEMBLY is installed and in operation. Compliance is checked according to the test of 10.2.7 and by inspection.</p> <p>The test of 10.2.7 only applies to DBOs intended for outdoor installation.</p> <p>The following information regarding the ASSEMBLY shall be provided on the designation label(s):</p>	see fig No. 1	Pass
	a) ASSEMBLY manufacturer's name or trade mark		
	b) type designation or identification number or any other means of identification, making it possible to obtain relevant information from the ASSEMBLY manufacturer	type: TEPO 1-PV s. n.: 2453348	
	c) means of identifying date of manufacture	13. 02. 2019	
	d) IEC 61439-3, IEC 61439-5	yes	
	e) rated current of the DBO using the symbol $I_{nA}$	$I_{nA} = 160 \text{ A}$	
	f) degree of protection if greater than IP 2XC	IP 44/30	
<b>6.2</b>	<b>DOCUMENTATION</b>		
<b>6.2.1</b>	<b>INFORMATION RELATING TO THE ASSEMBLY</b>		Pass
	All the interface characteristics according to chapter 5 can be contained in the distributor manufacturer's technical documentation delivered with it.	see chapter 5	
<b>6.2.2</b>	<b>INSTRUCTIONS FOR HANDLING, INSTALATION, OPERATION AND MAINTENANCE</b>		Pass
	In the documentation or catalogs the distributor manufacturer shall determine eventually conditions of handling, installation, operation and maintenance of the distributor and devices contained in it.	catalogue	
<b>6.3</b>	<b>DEVICE AND/OR COMPONENT IDENTIFICATION</b>		
	It must be possible to identify particular circuits and their protective devices inside the equipment. Identification labels must be legible, durable and suitable for real environment.	devices are marked, wires are color-coded	

ВЕРНО С ОРИГИНАЛА





<b>10</b>	<b>DESIGN VERIFICATION</b>		
<b>10.1</b>	<b>GENERAL</b>		
	The design examination serves to a purpose whether the distributor or its system design meets regulations contained in this set of standards.		--
<b>10.2</b>	<b>STRENGTH OF MATERIALS AND PARTS</b>		
<b>10.2.1</b>	<b>GENERAL</b>		
	The mechanical, electrical and thermal capability of constructional materials and parts of the ASSEMBLY shall be deemed to be proven by verification of construction and performance characteristics.	enclosure: <b>DCK Holoubkov Bohemia a.s.</b> type: <b>SS</b>  test reports EZÚ No.: <b>300595-01/01</b> <b>400503-01/01,02</b>	Pass
<b>10.2.2</b>	<b>RESISTANCE TO CORROSION</b>		
<b>10.2.2.1</b>	<b>TEST PROCEDURE</b>		
	The resistance to corrosion of representative samples of ferrous metallic enclosures including internal and external ferrous metallic constructional parts of the assembly shall be verified.	tested hinges, locks and fasteners	--
<b>10.2.2.2</b>	<b>SEVERITY TEST A</b>		
	This test is applicable to: – metallic indoor enclosures; – external metallic parts of indoor assemblies; – internal metallic parts of indoor and outdoor assemblies upon which intended mechanical operation may depend.	test report EZÚ No.: 400502-01/05	Pass
<b>10.2.2.3</b>	<b>SEVERITY TEST B</b>		
	This test is applicable to: – metallic outdoor enclosures; – external metallic parts of outdoor assemblies	test report EZÚ No.: 400502-01/05	Pass
<b>10.2.2.4</b>	<b>RESULTS TO BE OBTAINED</b>		
	Compliance is checked by visual inspection to determine that: – there is no evidence of iron oxide, cracking or other deterioration more than that allowed by ISO 4628-3 for a degree of rusting Ri1. However surface deterioration of the protective coating is allowed. – the mechanical integrity is not impaired; – seals are not damaged, – doors, hinges, locks, and fastenings work without abnormal effort.	test report EZÚ No.: 400502-01/05	Pass
<b>10.2.3</b>	<b>PROPERTIES OF INSULATING MATERIALS</b>		
<b>10.2.3.1</b>	<b>VERIFICATION OF THERMAL STABILITY OF ENCLOSURES</b>		
	The test shall be carried out according to IEC 60068-2-2 Test Bb, at a temperature of 70 °C, with natural air circulation, for a duration of 168 h and with a recovery of 96 h.  The enclosure or sample shall show no crack visible to normal or corrected vision without additional magnification nor shall the material have become sticky or greasy.	test report EZÚ No.: 400503-01/02	Pass

10.2.3.2	<b>VERIFICATION OF RESISTANCE OF INSULATING MATERIALS TO ABNORMAL HEAT AND FIRE DUE TO INTERNAL ELECTRIC EFFECTS</b>		
	<p>The glow-wire test principles of IEC 60695-2-10 and the details given in IEC 60695-2-11 shall be used to verify the suitability of materials used:</p> <p>a) on parts of assemblies, or b) on parts taken from these parts.</p> <p>The temperature of the tip of the glow-wire shall be as follows:</p> <p>– 960 °C for parts necessary to retain current-carrying parts in position; – 850 °C for enclosures intended for mounting in hollow walls; – 650 °C for all other parts, including parts necessary to retain the protective conductor.</p>	<p>enclosure made of SMC mounting plate made of PC 960 °C / 650 °C</p> <p>960 °C: flame had extinguished in 1 second after removing the glow - wire (SMC) flame had extinguished in 10 seconds after removing the glow - wire (PC) tissue paper had not been lit</p> <p>650 °C: sample had not been lit</p>	Pass
10.2.3.101	<b>DRY WARM TEST</b>		
	<p>The complete distributor must be put into a furnace with its inner temperature being increased up to 100 (± 2) °C during 2 to 3 hours and this final temperature shall be then maintained during 5 hours.</p>	<p>test reports EZÚ No.: 300595-01/01 400503-01/02</p>	Pass
10.2.3.102	<b>CHECKING THE COMBUSTIBILITY CATEGORY</b>		
	<p>Typical samples from all materials of covers, separators and other insulating parts shall be exposed to the flammability test according to method A - i.e. the test by burning in the horizontal sample position according to IEC 60695-11-10.</p>	<p>test reports EZÚ No.: 700534-01/01 203464-01/02</p>	Pass
10.2.4	<b>RESISTANCE TO ULTRA-VIOLET (UV) RADIATION</b>		
	<p>This test applies only to enclosures and external parts of assemblies intended to be installed outdoors and which are constructed of insulating materials or metals that are entirely coated by synthetic material.</p>	<p>test reports EZÚ No.: 803380-01/01,02</p>	Pass
10.2.5	<b>LIFTING</b>		
	<p>For ASSEMBLIES with provision for lifting means compliance is verified by the following tests.</p>	<p>switchgear does not contain any lifting means</p>	--
10.2.6	<b>MECHANICAL IMPACT</b>		
	<p>Mechanical impact tests where required by the specific assembly standard are to be carried out in accordance with IEC 62262.</p>	<p>test reports EZÚ No.: 404013-01/01 400503-01/01,02</p>	Pass
10.2.7	<b>MARKING</b>		
	<p>The test shall be performed by wiping marking by hand during 15 seconds with a textile piece moistened in water and then again during 15 seconds with a textile piece moistened in mineral spirit.</p> <p>After the test the marking shall be legible to normal or corrected vision without additional.</p> <p>This test only applies to DBO's intended for outdoor installation.</p>	<p>small wear, marking is easy to read</p>	Pass

<b>10.2.101</b>	<b>CHECKING MECHANICAL STRENGTH</b>		
	Tests must be performed at ambient temperature 10°C to 40°C All tests must be carried out with a switchgear mounted as for normal operation.	--	--
<b>10.2.101.2</b>	<b>CHECKING RESISTANCE AGAINST STATIC LOAD</b>		
	<b>Test 1</b> – Regularly distributed load 8500 N/m <sup>2</sup> must affect the roof part of the cover during 5 minutes <b>Test 2</b> – Strength 1200 N must affect step by step the front and back upper edge of the roof part of the cover during 5 minutes	test reports EZÚ No.: 300595-01/01 403559-01/01	
<b>10.2.101.3</b>	<b>CHECKING RESISTANCE AGAINST SHOCK LOAD</b>		
	Suspended punched sandbag with an arc from a height of 1 m to the center of the top of the enclosure surface.	test report EZÚ No.: 300595-01/01	
<b>10.2.101.4</b>	<b>CHECKING TWISTING STRESS RESISTANCE</b>		
	The switchgear with its door closed must be exposed to twisting force 2x1000 N during 30 s.	test report EZÚ No.: 400503-01/01,02	
<b>10.2.101.5</b>	<b>CHECKING IMPACT FORCE RESISTANCE</b>		
	Punched steel ball punch 2 kg from 1m height to walls visible after switchgear installation.	test reports EZÚ No.: 300595-01/01 404013-01/01	
<b>10.2.101.6</b>	<b>CHECKING MECHANICAL STRENGTH OF THE DOOR</b>		
	Tests must be performed with the door completely opened and in contact with a designed limiting device.	test reports EZÚ No.: 300595-01/01 404013-01/01	Pass
<b>10.2.101.7</b>	<b>CHECKING RESISTANCE OF METAL INSERTS IN SYNTHETIC MATERIAL AGAINST AXIAL LOAD</b>		
	The test shall be carried out on a representative sample of a metal liner of each type and size.	test report EZÚ No.: 400503-01/01,02	
<b>10.2.101.8</b>	<b>CHECKING RESISTANCE AGAINST MECHANICAL IMPACTS CAUSED BY THINGS WITH SHARP EDGES</b>		
	The impact element is to be lifted up to height 0.4 m and let fall and impact the surface of the distributor under test in order to reach impact energy 20 J.	test reports EZÚ No.: 300595-01/01 404013-01/01	
<b>10.2.101.9</b>	<b>TESTING THE MECHANICAL STRENGTH OF THE BASE TO BE EMBEDDED IN THE GROUND</b>		
	This test must be performed with PENDA-O fixed to the base according to installation instructions of the manufacturer. The mechanical force is transferred through a thick-walled steel pipe and it must be applied in the lowest part of the longest section of the PENDA base which shall stay under earth level after the installation. The force must be applied during 1min. It shall be checked visually whether the base has not been broken and the degree of protection of this PENDA-O and of the part staying above earth is still right.	test reports EZÚ No.: 400503-01/01,02	

<b>10.3</b>	<b>DEGREE OF PROTECTION OF ASSEMBLIES</b>		
	The protection degree must be estimated according to IEC 60529.	<b>IP 44 / 30</b>	Pass
	If an empty enclosure according to IEC 62208 is used, there is necessary to carry out an evaluation of the examination in order to state that any outer modification having performed has not decreased the protection code. In that case any other examinations are not required.	test reports EZÚ No.: 402753-01/03 404013-01/01	
<b>10.4</b>	<b>CLEARANCES AND CREEPAGE DISTANCES</b>		
	ČSN EN 61439-1 table 1 and 2	pollution degree 3	Pass
	a) $U_{imp} = 8,0 \text{ kV} \Rightarrow$ min. air clearance: <b>8,0 mm</b>	test reports EZÚ No.: 300595-01/01 402753-01/01	
	b) $U_1 = 500 \text{ V} \Rightarrow$ min. creepage distance: <b>8,0 mm</b>		
	The clearances and creepage distances are used among phases, between a phase and the zero conductor and, except for the case that an electric wire is connected directly with the earth, among a phase, the zero conductor and the earth.		
<b>10.5</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK AND INTEGRITY OF PROTECTIVE CIRCUITS</b>		
	It shall be verified that the different exposed conductive parts of the assembly are effectively connected to the terminal for the incoming external protective conductor and that the resistance of the circuit does not exceed $0,1 \Omega$ .	all-plastic design without conductive parts	--
<b>10.6</b>	<b>INCORPORATION OF SWITCHING DEVICES AND COMPONENTS</b>		
	Meeting structural requirements on the switch instruments and components installed must be confirmed by scrutiny and verified according to this standard.	devices are in accordance with the standards, Installation according to the instructions	Pass
<b>10.7</b>	<b>INTERNAL ELECTRICAL CIRCUITS AND CONNECTIONS</b>		
	Meeting structural requirements on the inner electric circuits and connections must be confirmed by scrutiny and verified according to this standard.	wires can be identified by means of marks and colors	Pass
<b>10.8</b>	<b>TERMINALS FOR EXTERNAL CONDUCTORS</b>		
	Meeting structural requirements on the terminals for external electric wires must be confirmed by scrutiny and verified according to this standard.	wires are not stressed, the terminals correspond to rated currents	Pass
<b>10.9</b>	<b>DIELECTRIC PROPERTIES</b>		
<b>10.9.2</b>	<b>POWER-FREQUENCY WITHSTAND VOLTAGE</b>		
	The main and control circuits being connected with the main circuit can be exposed to the test voltage according to table 8 ( IEC 61439-1 ).		--

ЗАРУЧНО СЕРТИФИКАТА

<b>10.9.2.3</b>	<b>APPLICATION OF THE TEST VOLTAGE</b>		
	The voltage of industrial frequency must not exceed 50% of the full test value at the application moment. After that it must be increased progressively to this full value and maintained at it during 5 seconds.	<b>U<sub>i</sub> = 500 V</b> test voltage: <b>1890 V</b>	
	a) among all the together connected live parts of the main circuit and non-live parts, with main contacts of all the switch instruments in switched on position or bridged by a suitable jumper of low resistance; b) among every part of the main circuit with a different potential and other live parts with the different potential and the together connected non-live parts, with main contacts of all the switch instruments in switched on position or bridged by a suitable jumper of low resistance;	no breakdowns have occurred	
<b>10.9.3</b>	<b>IMPULSE WITHSTAND VOLTAGE</b>		
<b>10.9.3.2</b>	<b>IMPULSE WITHSTAND VOLTAGE TEST</b>		
	The voltage shock generator must be adjusted to the required impulse voltage with the distributor connected. The value of the test voltage must be selected according to table 10 IEC 61439-1.	<b>U<sub>imp</sub> = 8,0 kV</b> test voltage: <b>9,6 kV</b>	Pass
	There must be applied impulse voltage 1.2/50 μs five times for every polarity. The measurement shall be performed on the circuit according to Art. 10.9.2.3 a), b)	no flash-over or breakdowns have occurred	
<b>10.9.4</b>	<b>TESTING OF ENCLOSURES MADE OF INSULATING MATERIAL</b>		
	For assemblies with enclosures made of insulating material, an additional dielectric test shall be carried out by applying an a.c. test voltage between a metal foil laid on the outside of the enclosure over openings and joints, and the interconnected live and exposed conductive parts within the ASSEMBLY located next to the openings and joints. For this additional test, the test voltage shall be equal to 1,5 times the values indicated in 10.9.2.3	<b>U<sub>zk</sub> = 2835 V, AC</b> no breakdowns have occurred	Pass
<b>10.10</b>	<b>VERIFICATION OF TEMPERATURE RISE</b>		
<b>10.10.4</b>	<b>VERIFICATION ASSESSMENT</b>		
	It must be verified, if warming limits according to 9.2 of different parts of the distributor are not going to be exceeded. Increase of temperature of the distributor parts [K]: <input type="checkbox"/> metal outer cover                      30 <input checked="" type="checkbox"/> <b>insulating outer cover</b> 40 Kind of cooling: natural <input checked="" type="checkbox"/> , forced <input type="checkbox"/>	verified by calculation according to IEC TR 60890  P <sub>ztr</sub> ≈ 54 W, RDF = 0,8 <b>Δt<sub>1,0</sub> ≈ 19 K</b>	Pass
<b>10.11</b>	<b>SHORT-CIRCUIT WITHSTAND STRENGTH</b>		
	The short-circuit current ratings declared shall be verified except where exempt, see 10.11.2. Verification may be, by comparison with a reference design (10.11.3 and 10.11.4.) or by test (10.11.5).		Pass

ВЕРНО С ОРИГИНАЛА

10.11.5	<b>CIRCUITS OF ASSEMBLIES WHICH ARE EXEMPTED FROM THE VERIFICATION OF THE SHORT-CIRCUIT WITHSTAND STRENGTH</b>	
	The assembly or its parts as necessary to complete the test shall be mounted as in normal use. It is sufficient to test a single functional unit if the remaining functional units are of the same construction.	test reports <b>IVEP, a.s. No.: 88-0854, 88-0855</b>  Pass
10.13	<b>MECHANICAL OPERATION</b>	
	There must be a satisfactory mechanical function verified after the installation into distributors for parts which requires verifying by the test. Number of operational cycles must be 50.	tested locks and door hinges  Pass

**INSTRUMENTS AND TESTING EQUIPMENT USED:**

Name, type	registration number
HV source TOS 5301	110284
Impulse wave generator RG 542	110269
Digital slide gauge	551553
Tester Fluke T 100	551521
Electric furnace HS 202A	5844
Glow - wire test PTL 5090005 T 03.35	110195

**PHOTO-DOCUMENTATION**

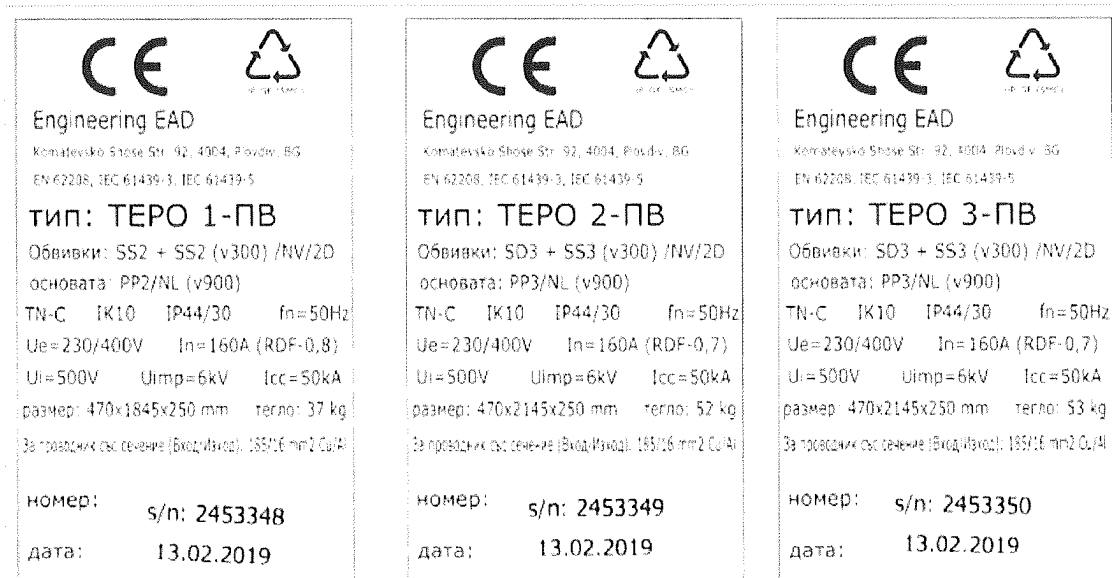


Fig. 1 – Labels of switchgears

Копие на оригинала

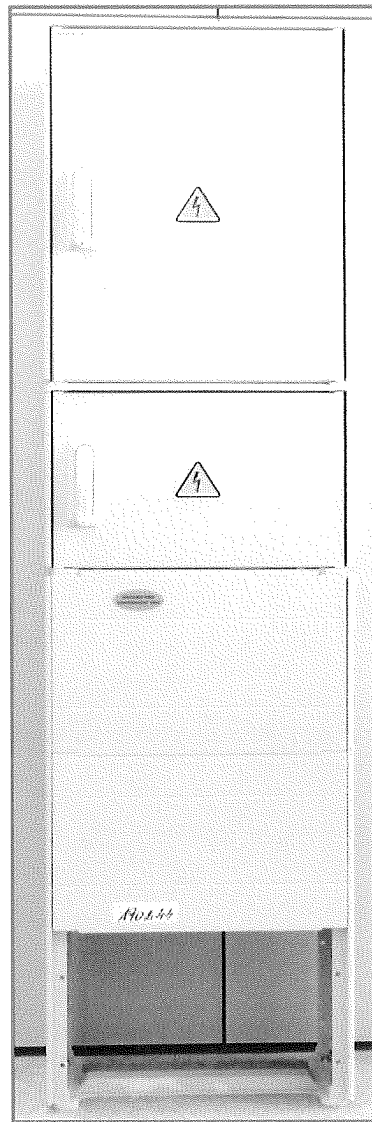
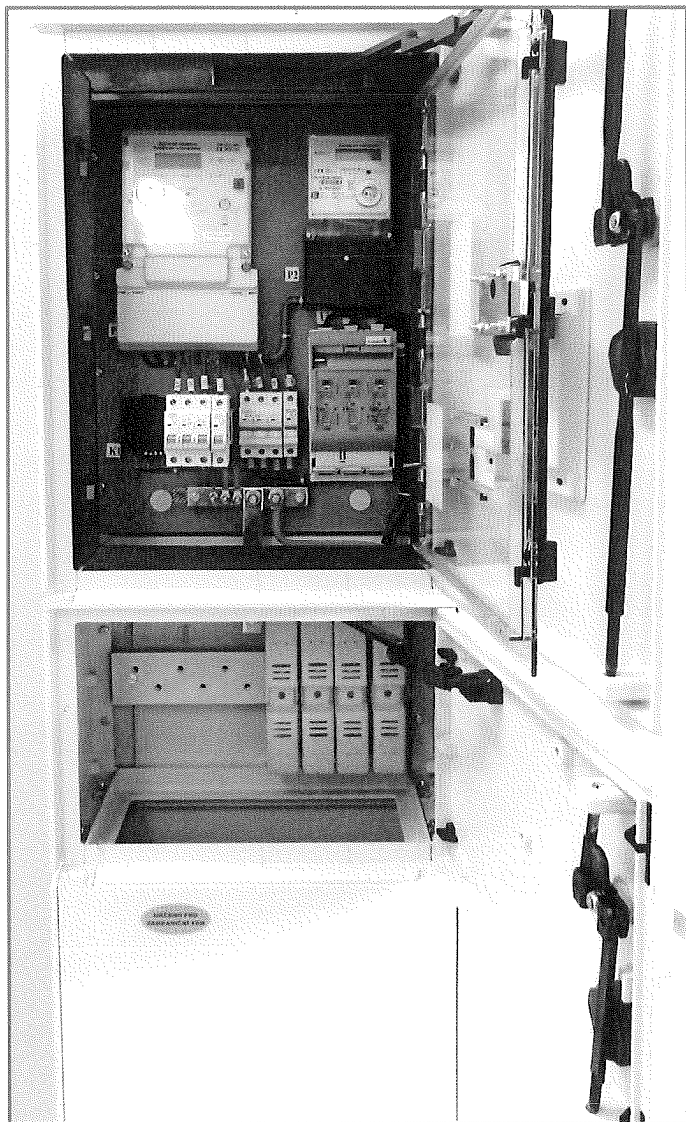


Fig. 2 – Switchgear TEPO 1-PV

Prepared by: Ing. Vladimír Řehořek *Řehořek*

Dated: 21. 3. 2019

ВЕРНО С ОРИГИНАЛА

**Type of switchboard: PV**

typ	Popis
1-PV	Electrometer switchgear designed for two single-phase measurements or for one single-phase and one three-phase measurements, compact column
2-PV	Electrometer switchgear designed for four single-phase measurements or for two single-phase and one three-phase measurements or for two three-phase measurements, compact column
3-PV	Electrometer switchgear designed for six single-phase measurements or for four single-phase and one three-phase measurements or for two three-phase measurements, compact column

ВЪРНО С ОРГИНАЛА



# ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC  
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHHEISCHE REPUBLIK  
INSTITUT ELECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÉQUE  
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lisem 129/2, 171 02 Praha 8 - Troja

## CERTIFICATE

No.: 1190148

**Product:** Electrometer switchgear assembly

**Type:** TEPO  
O-PK-1F, 1-PK-1F, 1-PK-3F

**Rating:** 230/400 V, 50 Hz, to 100 A, IP44, IK10

**Ordering firm:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Manufacturer:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Factories:** Engineering EAD  
Komatevsko Shose Str. 92, 4004 Plovdiv, Bulgaria

**Trade mark:**

**The test results are stated in the test-report No.:** 803863-01/01 of: 07.03.2019, 803863-01/02 of: 06.03.2019

**A sample of the product was found to be in conformity with:**  
ČSN EN 61439-1 ed. 2:12, ČSN EN 61439-3:12, ČSN EN 61439-5 ed. 2:15

**Other data:**

Certificate was issued on the basis of fulfillment of requirements of the "EZÚ certificate" certification scheme and on the basis of agreement No. 803863 between the client and the Electrotechnical Testing Institute.

**Compliance of the product with mentioned standards and regulations ensures compliance of the product with essential requirements of Government Order No. 117/2016 Sb. (2014/30/EU), 118/2016 Sb. (2014/35/EU) as amended and the certificate may be used as a supporting document for the EU Declaration of Conformity under Act No. 90/2016 Coll., on Conformity Assessment of Products When Made Available on the Market, as amended.**

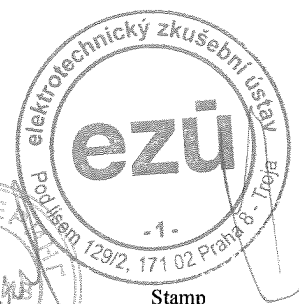
**The validity of the certificate is limited to:** 31.03.2022

11.03.2019

Prague

на основании чл. 36а, ал. 3 от  
ЗОП

Mgr. Miroslav Sedláček  
Head of Certification Body



803863-01



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC  
 ELEKTROTECHNISCHE PRUFANSTALT - TSCHIECHISCHE REPUBLIK  
 INSTITUT ELECTROTECHNIQUE D'ESSAIS - REPUBLIQUE TCHIQUE  
 ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lisem 129/2, 171 02 Praha 8 - Troja

*Превод от английски език*

# СЕРТИФИКАТ

№.: 1190148

**Продукт:** Електромерни табла

**Тип:** ТЕПО  
О-РК-1F, 1-РК-1F, 1-РК-3F

**Класове:** 230/400 V, 50 Hz, до 100А, IP44, Ik10.

**Възложител:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

**Производител:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

**Производство:** Инженеринг ЕАД  
ул. Коматевско шосе № 92, 4004 Пловдив, България

Търговска марка:

Резултатите от изпитването са посочени в протокол за изпитване № : 803863-01/01 от: 06.03.2019

Беше установено, че мостра на продукта е в съответствие с:  
 CSN EN 61439-1 издание 2:12, CSN EN 61439-3:12, CSN EN 61439-5 издание 2:15

**Други данни:**

Сертификатът е издаден въз основа на изпълнението на изискванията на сертификационната схема "EZU сертификат" и въз основа на договор № 803863 между клиента и Института за електротехнически изпитвания.

Съответствието на продукта със споменатите стандарти и разпоредби, гарантира съответствие на продукта със съществените изисквания на правителствената заповед № 117/2016 Sb. (2014/33/EU), 118/2016 Sb. (2014/35/EU), както и измененията, и сертификатът може да се използва като придружителен документ за ЕС Декларация за съответствие съгласно Закон № 90/2016 Coll., относно оценката на съответствието на продуктите, които се предлагат на пазара, както и измененията.

Валидността на сертификата е до: 31.03.2022

11.03.2019

*(подпис – не се чете)*

Прага

Маг. Мирослав Седлачек  
 Ръководител на Сертифициращ орган

ВЪРНО С ОРИГИНАЛА





*[Handwritten signature]*

# TEST REPORT

Test Report No.: 803863-01/01

Issued: 7. 3. 2019

**Name of product:** Electrometer switchgear

**Type of product:** TEPO - 0-PK-1F, 1-PK-1F. 1-PK-3F

**Ratings:** 230/400V, 50Hz, to 100A, IP44, IK10

**Serial number:** 2453340, 2453341, 2453342

**Manufacturer:** Engineering EAD  
Komatevsko Shose Str. 92, 4004, Plovdiv, Bulgaria

**Production site:** Engineering EAD  
Komatevsko Shose Str. 92, 4004, Plovdiv, Bulgaria

**Ordering firm:** Engineering EAD  
Komatevsko Shose Str. 92, 4004, Plovdiv, Bulgaria

**Number of tested samples:** 3

**Samples submitted on:** 19. 2. 2019

**Location of testing:** Elektrotechnický zkušební ústav, s. p.

**Tests performed** from 25. 2. 2019 through 7. 3. 2019

**Other data:** The results of some tests were taken from the test reports EZÚ No.: 400503-01/02, 910567-01/01, 203464-01/02, 910673-01/01

**Tested according to:** ČSN EN 61439-1 ed. 2:12, ČSN EN 61439-5 ed. 2:15

на основание чл. 36а, ал. 3 от  
ЗОП

на основание чл. 36а, ал. 3 от  
ЗОП

Compiled by: Ing. Vladimír Řehořek

Approved by: Ing. Petra Marie Tůmová  
Testing laboratory technical manager



No. of pages: 10

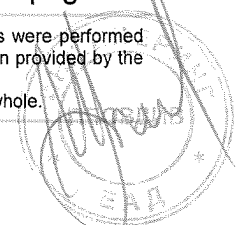
No. of annexes: 1

No. of annexes pages: 1

Test results stated in the test report apply only to the tested subject and unless specified otherwise in the test report, the tests were performed using the method and under the conditions determined in the test regulations, technical norm, instructions for use and information provided by the manufacturer on the tested subject and using accessories required by the manufacturer. Without written consent of Elektrotechnický zkušební ústav, s. p., this report must not be reproduced in any other way than as a whole.

Tel.: 266 104 111, Fax: 284 680 070, www.ezu.cz

ВАРНО С ОПРИГНАТА



**Product Name: Electrometer switchgear****Type: TEPO 0-PK-1F, TEPO 1-PK-1F, TEPO 1-PK-3F ( see annex )**

<b>The supplied supported samples:</b>	TEPO 0-PK-1F, TEPO 1-PK-1F, TEPO 1-PK-3F
<b>Rated voltage (<math>U_n</math>):</b>	230/400 V, 50 Hz
<b>Rated current (<math>I_{nA}</math>):</b>	to 63 A, to 100 A
<b>Degree of protection:</b>	IP 44/00
<b>Mechanical impact protection:</b>	IK 10
<b>Short-circuit withstand strength:</b>	10 kA

**Enclosure manufacturer:** DCK Holoubkov Bohemia a.s.  
**Type:** SS

**Constr. material of the enclosure:**  sheet metal  concrete  plastic  stainless steel

**Performance:**  surface  recessed  enclosure  on column

**Total dimensions: (w x h x d):** 320 x 470 x 250 [mm] / 470 x 320 x 250 [mm]

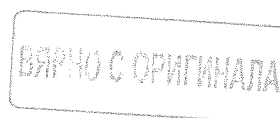
**Application:**  electricity meter distributor  
 instrument enclosure  
 socket enclosure  
 residential distributor

**Documentation:**  enclosure certificate  type range table  
 catalog of enclosure  general assembly drawing  
 circuit diagram  others: operating and maintenance instructions for the distributor

**Tested according to:**

ČSN EN 61439-1 ed.2:12 and ČSN EN 61439-5 ed.2:15

**Art.: 5; 6; 10:** 10.1, 10.2, 10.2.1, 10.2.3, 10.2.3.1, 10.2.3.101, 10.2.3.102, 10.2.7, 10.2.101, 10.2.101.2, 10.2.101.3, 10.2.101.4, 10.2.101.5, 10.2.101.5.1, 10.2.101.6, 10.2.101.7, 10.2.101.8

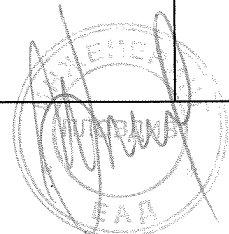


ČSN EN 61439-1 ed.2:12, ČSN EN 61439-5 ed.2:15		
<b>5</b>	<b>INTERFACE CHARACTERISTICS</b>	
<b>5.1</b>	<b>GENERAL</b>	
	The characteristics of the ASSEMBLY shall ensure compatibility with the ratings of the circuits to which it is connected and the installation conditions and shall be declared by the assembly manufacturer using the criteria.	--
<b>5.2</b>	<b>VOLTAGE RATINGS</b>	
<b>5.2.1</b>	<b>RATED VOLTAGE (<math>U_n</math>) (OF THE ASSEMBLY)</b>	
	The rated voltage shall be at least equal to the nominal voltage of the electrical system.	$U_n = 230/400 \text{ V, AC}$
<b>5.2.2</b>	<b>RATED OPERATIONAL VOLTAGE (<math>U_e</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>	
	The rated operational voltage of any circuit shall not be less than the nominal voltage of the electrical system to which it is to be connected.	$U_e = 230/400 \text{ V, AC}$
<b>5.2.3</b>	<b>RATED INSULATION VOLTAGE (<math>U_i</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>	
	The rated insulation voltage of a circuit of an ASSEMBLY is the voltage value to which dielectric test voltages and creepage distances are referred. The rated insulation voltage of a circuit shall be equal or higher than the values stated for $U_n$ and for $U_e$ for the same circuit.	$U_i = 500 \text{ V, AC}$
<b>5.2.4</b>	<b>RATED IMPULSE WITHSTAND VOLTAGE (<math>U_{imp}</math>) (OF THE ASSEMBLY)</b>	
	The rated impulse withstand voltage shall be equal to or higher than the values stated for the transient overvoltages occurring in the electrical system(s) to which the circuit is designed to be connected. DBO's shall comply with a minimum overvoltage category III	$U_{imp} = 6,0 \text{ kV (1,2/50 } \mu\text{s)}$
<b>5.3</b>	<b>CURRENT RATINGS</b>	
<b>5.3.1</b>	<b>RATED CURRENT OF THE ASSEMBLY (<math>I_{nA}</math>)</b>	
	The rated current of the ASSEMBLY is the smaller of: the sum of the rated currents of the incoming circuits within the ASSEMBLY operated in parallel; the total current which the main busbar is capable of distributing in the particular ASSEMBLY arrangement. This current shall be carried without the temperature rise of the individual parts exceeding the limits specified in 9.2.	$I_{nA} \leq 63 \text{ A (0-PK-1F, 1-PK-1F)}$ $I_{nA} \leq 100 \text{ A (1-PK-3F)}$
<b>5.3.2</b>	<b>RATED CURRENT OF A CIRCUIT (<math>I_{nc}</math>)</b>	
	The rated current of a circuit is the value of the current that can be carried by this circuit loaded alone, under normal service conditions. This current shall be carried without the temperature rise of the various parts of the ASSEMBLY exceeding the limits specified in 9.2.	$I_{nc} \leq 63 \text{ A}$ $I_{nc} \leq 100 \text{ A}$
<b>5.3.3</b>	<b>RATED PEAK WITHSTAND CURRENT (<math>I_{pk}</math>)</b>	
	The rated peak withstand current shall be equal to or higher than the values stated for the peak value of the prospective short-circuit current of the supply system(s) to which the circuit(s) is (are) designed to be connected.	--

Pass

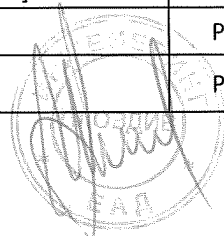
Pass

ВЕРНО С ОРИГИНАЛА



<b>5.3.4</b>	<b>RATED SHORT-TIME WITHSTAND CURRENT (<math>I_{cw}</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>		Pass
	The rated short-time withstand current shall be equal to or higher than the prospective r.m.s. value of the short-circuit current ( $I_{cp}$ ) at each point of connection to the supply. Different values of $I_{cw}$ for different durations (e.g. 0,2 s; 1 s; 3 s) may be assigned to an ASSEMBLY.	--	
<b>5.3.5</b>	<b>RATED CONDITIONAL SHORT-CIRCUIT CURRENT OF AN ASSEMBLY (<math>I_{cc}</math>)</b>		Pass
	The rated conditional short-circuit current shall be equal to or higher than the prospective r.m.s. value of short-circuit current ( $I_{cp}$ ) for a duration limited by the operation of the short-circuit protective device that protects the ASSEMBLY.	$I_{cc} \leq 10 \text{ kA}$	
<b>5.4</b>	<b>RATED DIVERSITY FACTOR (RDF)</b>		Pass
	The rated diversity factor is the per unit value of the rated current, assigned by the ASSEMBLY manufacturer, to which outgoing circuits of an ASSEMBLY can be continuously and simultaneously loaded taking into account the mutual thermal influences.	<b>RDF = 1</b>	
<b>5.5</b>	<b>RATED FREQUENCY (<math>f_n</math>)</b>		Pass
	The rated frequency of a circuit is the value of frequency to which the operating conditions are referred. Where the circuits of an ASSEMBLY are designed for different values of frequency, the rated frequency of each circuit shall be given.	<b><math>f_n = 50 \text{ Hz}</math></b>	
<b>5.6</b>	<b>OTHER CHARACTERISTICS</b>		Pass
	a) additional requirements depending on the specific service conditions of a functional unit	--	
	b) pollution degree	3	
	c) types of system earthing for which the ASSEMBLY is designed	TN-C	
	d) indoor and/or outdoor installation	Indoor/ outdoor	
	e) stationary or movable	stationary	
	f) degree of protection	IP 44/00	
	g) intended for use by skilled or ordinary persons	for ordinary persons	
	h) electromagnetic compatibility (EMC) classification	environment B	
	i) special service conditions, if applicable	--	
	j) external design	surface	
	k) mechanical impact protection, if applicable	IK 10	
	l) the type of construction – fixed or removable parts	fixed parts	
	m) the nature of short-circuit protective device (s)	circuit breakers	
	n) measures for protection against electric shock	automatic disconnection of supply	
	o) overall dimensions, if required (w x h x d) [mm]	320 x 470 x 250 [mm] 470 x 320 x 250 [mm]	
	p) the weight, if required [kg]	9 [kg]	
	q) type A or type B DBO	type B DBO	

ВЕРНО С ОРИГИНАЛА



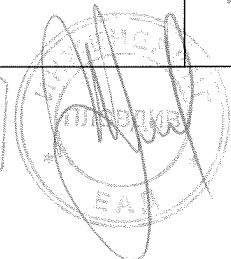
<b>6</b>	<b>INFORMATION</b>		
<b>6.1</b>	<b>ASSEMBLY DESIGNATION MARKING</b>		
	<p>The ASSEMBLY manufacturer shall provide each ASSEMBLY with one or more labels, marked in a durable manner and located in a place such that they are visible and legible when the ASSEMBLY is installed and in operation. Compliance is checked according to the test of 10.2.7 and by inspection.</p> <p>The test of 10.2.7 only applies to DBOs intended for outdoor installation.</p> <p>The following information regarding the ASSEMBLY shall be provided on the designation label(s):</p>	see fig No. 1	Pass
	a) ASSEMBLY manufacturer's name or trade mark	Engineering EAD	
	b) type designation or identification number or any other means of identification, making it possible to obtain relevant information from the ASSEMBLY manufacturer	type: 0-PK-1F s. n.: 2453340	
	c) means of identifying date of manufacture	13. 02. 2019	
	d) IEC 61439-5	yes	
	e) rated current of the DBO using the symbol $I_{nA}$	$I_{nA}$ : 63 A	
	f) degree of protection if greater than IP 2XC	IP 44	
<b>6.2</b>	<b>DOCUMENTATION</b>		
<b>6.2.1</b>	<b>INFORMATION RELATING TO THE ASSEMBLY</b>		Pass
	All the interface characteristics according to chapter 5 can be contained in the distributor manufacturer's technical documentation delivered with it.	see chapter 5	
<b>6.2.2</b>	<b>INSTRUCTIONS FOR HANDLING, INSTALATION, OPERATION AND MAINTENANCE</b>		
	In the documentation or catalogs the distributor manufacturer shall determine eventually conditions of handling, installation, operation and maintenance of the distributor and devices contained in it.	catalogue	
<b>6.3</b>	<b>DEVICE AND/OR COMPONENT IDENTIFICATION</b>		
	It must be possible to identify particular circuits and their protective devices inside the equipment. Identification labels must be legible, durable and suitable for real environment.	switchboards are supplied without equipment, wires are color coded	

ВІДНО С ОРИГІНАЛА



<b>10</b>	<b>DESIGN VERIFICATION</b>		
<b>10.1</b>	<b>GENERAL</b>		
	The design examination serves to a purpose whether the distributor or its system design meets regulations contained in this set of standards.	--	--
<b>10.2</b>	<b>STRENGTH OF MATERIALS AND PARTS</b>		
<b>10.2.1</b>	<b>GENERAL</b>		
	The mechanical, electrical and thermal capability of constructional materials and parts of the ASSEMBLY shall be deemed to be proven by verification of construction and performance characteristics. Where an empty enclosure in accordance with IEC 62208 is used, and it has not been modified so as to degrade the performance of the enclosure, no repetition of the enclosure testing to 10.2 is required.	enclosure: <b>DCK Holoubkov Bohemia a.s.</b> type: <b>SS</b>  test reports EZÚ No.: <b>910567-01/01</b> <b>910567-01/02</b> <b>400503-01/02</b>	Pass
<b>10.2.3</b>	<b>PROPERTIES OF INSULATING MATERIALS</b>		
<b>10.2.3.1</b>	<b>VERIFICATION OF THERMAL STABILITY OF ENCLOSURES</b>		
	The thermal stability of enclosures manufactured from insulated material is verified by the dry heat test . . The test is carried out according to IEC 60068-2-2 Test Bb, at a temperature of 70 °C, with natural air circulation, for a duration of 168 h and with a recovery of 96 h.  The enclosure or sample shows no crack visible to normal or corrected vision without additional magnification nor does the material have become sticky or greasy.	test reports EZÚ No.: <b>910567-01/01</b> <b>400503-01/02</b>	Pass
<b>10.2.3.101</b>	<b>DRY HEAT TEST</b>		
	The complete ASSEMBLY placed in an oven, the internal temperature of which is raised to (100±2) °C over a period of 2 h to 3 h and maintained at this temperature for 5 h	test report EZÚ No.: <b>400503-01/02</b>	Pass
<b>10.2.3.102</b>	<b>VERIFICATION OF CATEGORY OF FLAMMABILITY</b>		
	Representative specimens of each of the materials of enclosures, barriers and other insulating parts subjected to a flammability test in accordance with test method A – horizontal burning test of IEC 60695-11-10	test reports EZÚ No.: <b>203464-01/02</b> <b>910673-01/01</b>	Pass
<b>10.2.7</b>	<b>MARKING</b>		
	Marking performed by shaping, pressing, engraving or similar procedures including labels with layered plastic coats must not be exposed to the following test.  The test shall be performed by wiping marking by hand during 15 seconds with a textile piece moistened in water and then again during 15 seconds with a textile piece moistened in mineral spirit.  After the test the marking shall be legible to normal or corrected vision without additional.	small wear, marking is easy to read	Pass 

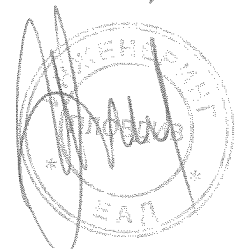
БЯРНО С ОРНИЦИАТА





<b>10.2.101</b>	<b>VERIFICATION OF MECHANICAL STRENGTH</b>		
	The tests carried out at an ambient temperature of between 10 °C and 40 °C	tested in the range of 20 ° C to 30 ° C	--
<b>10.2.101.2</b>	<b>VERIFICATION OF RESISTANCE TO STATIC LOAD</b>		
	<p><b>Test 1</b> - load of 8500 N/m<sup>2</sup>; for 5 min to the roof of the enclosure</p> <p><b>Test 2</b> - force 1200 N; for 5 min in turn to the front and back upper edges of the roof of the enclosure</p> <p>It shall be verified by verification after the test that the degree of protection of the cover is adequate and that the function of the door and the locking points is not impaired; it shall also be verified that the electrical clearances remained satisfactory for the duration of the tests.</p>	test report EZÚ No.: <b>400503-01/02</b>	Pass
<b>10.2.101.3</b>	<b>VERIFICATION OF RESISTANCE TO SHOCK LOAD</b>		
	<p>A bag with dry sand, mass 15 kg, at least 1 m above the highest point of the CDC</p> <p>one blow to upper parts of each of the vertical surfaces (If enclosure cylindrical, three blows)</p> <p>It shall be verified by verification after the test that the degree of protection of the cover is adequate and that the function of the door and the locking points is not impaired; it shall also be verified that the electrical clearances remained satisfactory for the duration of the tests.</p>	test report EZÚ No.: <b>400503-01/02</b>	Pass
<b>10.2.101.4</b>	<b>VERIFICATION OF RESISTANCE TO TORSIONAL STRESS</b>		
	<p>The test is carried out using a horizontally rotating frame mounted in the roof of the switchgear.</p> <p>A torque force of 2 x 1000 N for 30 seconds must be applied to the switchboard with the door closed.</p> <p>Checks are made after the test that the door remains closed for the duration of the test and that the protection level still remains.</p>	test report EZÚ No.: <b>400503-01/02</b>	Pass

КОПИО С ОРЪГИНАЛА



<b>10.2.101.5</b>	<b>VERIFICATION OF IMPACT FORCE WITHSTAND</b>		
<b>10.2.101.5.1</b>	<b>TEST APPLICABLE TO PENDAS DESIGNED FOR AMBIENT TEMPERATURES OF BETWEEN 40°C AND -25°C</b>		
	<p>The test must be carried out using a pendulum test apparatus. The pendulum must be arranged so as to move in the vertical arc.</p> <p>At one end, a massive 2 kg steel ball is attached, which must be lifted by 1 m and allowed to fall and hit the surface of the test cabinet, resulting in an impact energy of 20 J. The test shall consist of one strike pointing at the center of each of the perpendicular surfaces of the switchgear which is visible when the switchgear is installed in its normal operating position.</p> <p><b>Test 1:</b> ambient air temperature between 10°C and 40°C, PENDA not less than 12 h</p> <p><b>Test 2:</b> ambient air temperature between 10°C and 40°C, after PENDA at -25°C not less than 12 h</p> <p><b>This test is carried out at the request of the enclosure manufacturer:</b></p> <p><b>Test 3:</b> ambient air temperature between 10°C and 40°C, after PENDA at -35°C not less than 12 h</p> <p>It shall be verified by verification after the test that the degree of protection of the cover is adequate and that the function of the door and the locking points is not impaired; it shall also be verified that the electrical clearances remained satisfactory for the duration of the tests.</p>	<p>test report EZÚ No.: <b>400503-01/02</b></p> <p>door (transparent PC): not apparent damage</p>	<p>Pass</p>
<b>10.2.101.6</b>	<b>VERIFICATION OF MECHANICAL STRENGTH OF DOORS</b>		
	<p>The tests must be carried out with the door completely open and in contact with the designation of the limiting device.</p> <p>At the top edge of the door a load of 50 N should be applied perpendicular to the plane of the door at a distance of 300 mm from the hinged edge and must be maintained for 3 s.</p> <p>Checks are made to verify that the door is not slipped from the hinges and the function of the door, hinges and locking points is not disturbed and that the protection level of the cover still corresponds to the closing of the door after the tests.</p>	<p>door (transparent PC): load: <b>F = 50 N</b> not apparent damage</p>	<p>Pass</p>
<b>10.2.101.7</b>	<b>VERIFICATION OF RESISTANCE TO AXIAL LOAD OF METAL INSERTS IN SYNTHETIC MATERIAL</b>		
	<p>This test applies to all kind of enclosures when threaded metal inserts are provided to retain the mounting plate or switchgear and controlgear supports in place. The test shall be carried out by applying an axial load for 10 s to representative samples. At the end of the test, the insert shall still be in its original position; any sign of movement is not acceptable. Cracks and splits in the material containing the insert are also not acceptable.</p>	<p>size inserts: <b>M6, M8</b> size of load: <b>500 N</b></p> <p>not apparent damage</p>	<p>Pass</p>

ВЪРНЕНО С ОРИГИНАЛА

10.2.101.8	VERIFICATION OF RESISTANCE TO MECHANICAL SHOCK IMPACTS INDUCED BY SHARP-EDGED OBJECTS		
	<p>The test must be carried out using the impact test apparatus described in 12.2.101.2.1 of this standard, but having a 5 kg steel sharp puncture with a sharp tip. The test must be performed using the impact test apparatus described in 12.2.101.2. 1 of this standard, but which has a 5-kg steel strike with a sharp tip.</p> <p>The impact element must be lifted by 0.4 m and allowed to fall and hit the surface of the test cabinet to achieve an impact energy of 20 J.</p> <p>Each test shall consist of one strike directed at the center of each of the perpendicular surfaces of the switchgear which is visible when the switchgear is installed in its normal operating position.</p>	<p>test report EZÚ No.: <b>400503-01/02</b></p> <p>door (transparent PC): the tip did not penetrate the material, min. damage</p>	<p>Pass</p>
<p><b>Test 1:</b> ambient air temperature between 10°C and 40°C, PENDA not less than 12 h</p>			
<p><b>Test 2:</b> ambient air temperature between 10°C and 40°C, after PENDA at -25°C not less than 12 h</p>			
<p><b>This test is carried out at the request of the enclosure manufacturer:</b></p> <p><b>Test 3:</b> ambient air temperature between 10°C and 40°C, after PENDA at -35°C not less than 12 h</p>			
<p>It is inspected with a view that the cracks caused by the punches are in a circle with a maximum diameter of 15 mm. If the tip of the striker has penetrated into the enclosure, it is not possible to insert a 4 mm diameter with a hemispherical end attached to opening by a force of 5 N.</p>			

**PHOTO-DOCUMENTATION**

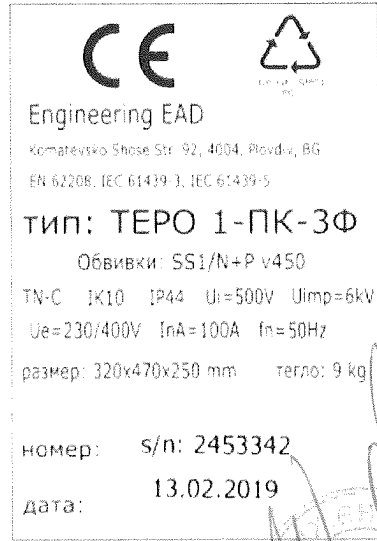
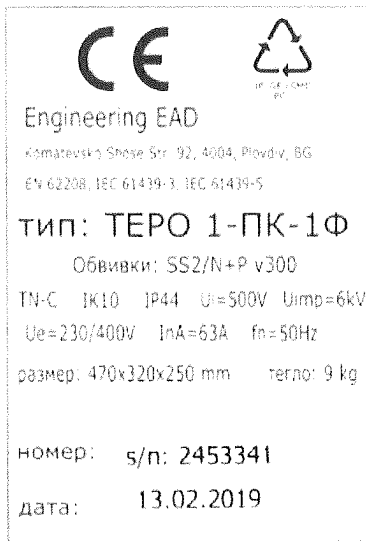
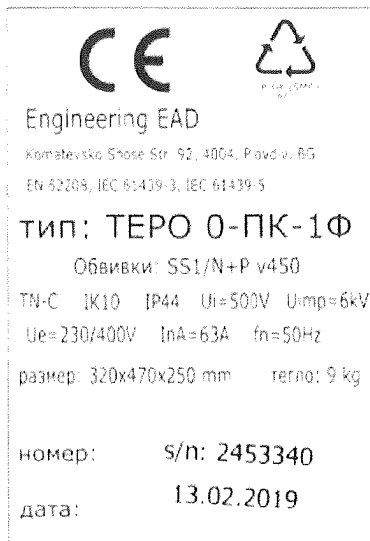


Fig. 1 - Labels of the distributors

ВЪРНО С ОРИГИНАЛА

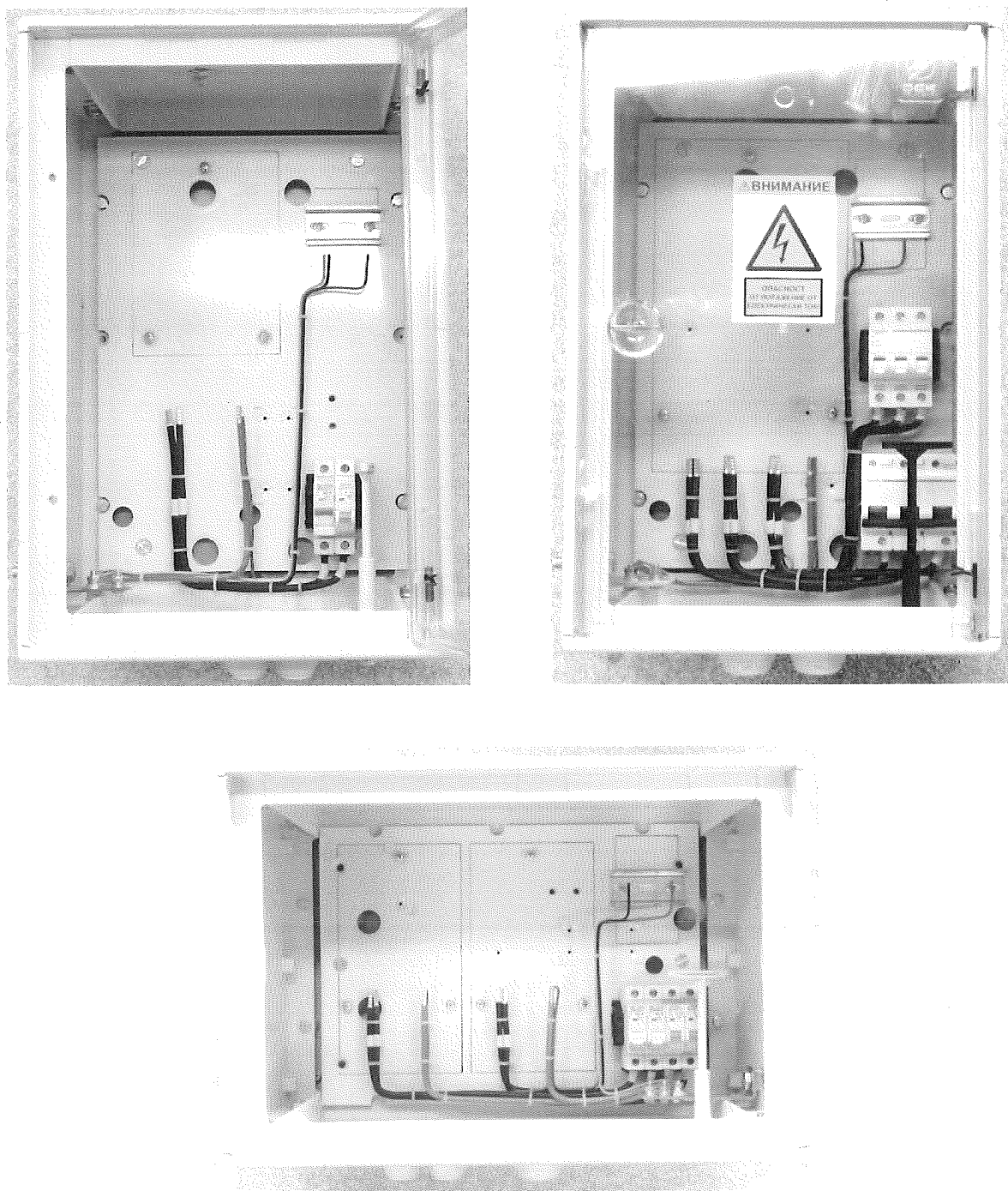


Fig. 2 – Switchgears TEPO PK . . .

на основании чл. 36а, ал. 3 от  
ЗОП

Prepared by: Ing. Vladimír Řehořek

Dated: 6. 3. 2019

**Type of switchboard: PK**

type	description
0-PK-1F	Electrometer switchgear designed for one single-phase measurements
1-PK-1F	Electrometer switchgear designed for two single-phase measurements
1-PK-3F	Electrometer switchgear designed for one three-phase measurements

ВЯРНО С ОРИГИНАЛА



*Handwritten signature*

# TEST REPORT

Test Report No.: 803863-01/02

Issued: 6. 3. 2019

**Name of product:** Electrometer switchgear

**Type of product:** TEPO - 0-PK-1F, 1-PK-1F, 1-PK-3F

**Ratings:** 230/400V, 50Hz, to 100A, IP44, IK10

**Serial number:** 2453340, 2453341, 2453342

**Manufacturer:** Engineering EAD  
Komatevsko Shose Str. 92, 4004, Plovdiv, Bulgaria

**Production site:** Engineering EAD  
Komatevsko Shose Str. 92, 4004, Plovdiv, Bulgaria

**Ordering firm:** Engineering EAD  
Komatevsko Shose Str. 92, 4004, Plovdiv, Bulgaria

**Number of tested samples:** 3

**Samples submitted on:** 19. 2. 2019

**Location of testing:** Elektrotechnický zkušební ústav, s. p.

**Tests performed** from 25. 2. 2019 through 6. 3. 2019

**Other data:** The results of some tests were taken from the test reports EZÚ No.: 400503-01/02, 910567-01/01

**Tested according to:** ČSN EN 61439-1 ed. 2:12, ČSN EN 61439-3:12

на основание чл. 36а, ал. 3 от  
ЗОП

на основание чл. 36а, ал. 3 от  
ЗОП

Compiled by: Ing. Vladimír Řehořek

Approved by: Ing. Petra Marie Tůmová  
Testing laboratory technical manager



*Handwritten signature*

No. of pages: 10

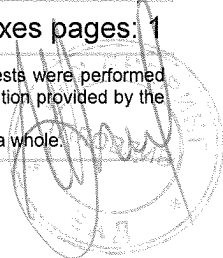
No. of annexes: 1

No. of annexes pages: 1

Test results stated in the test report apply only to the tested subject and unless specified otherwise in the test report, the tests were performed using the method and under the conditions determined in the test regulations, technical norm, instructions for use and information provided by the manufacturer on the tested subject and using accessories required by the manufacturer. Without written consent of Elektrotechnický zkušební ústav, s. p., this report must not be reproduced in any other way than as a whole.

Tel.: 266 104 111, Fax: 284 680 070, www.ezu.cz

ВЪРНИ С ОРИГИНАЛА



*Handwritten signature*

**Product Name: Electrometer switchgear****Type: TEPO 0-PK-1F, TEPO 1-PK-1F, TEPO 1-PK-3F ( see annex )**

<b>The supplied supported samples:</b>	TEPO 0-PK-1F, TEPO 1-PK-1F, TEPO 1-PK-3F
<b>Rated voltage (<math>U_n</math>):</b>	230/400 V, 50 Hz
<b>Rated current (<math>I_{nA}</math>):</b>	to 63 A, to 100 A
<b>Degree of protection:</b>	IP 44/00
<b>Mechanical impact protection:</b>	IK 10
<b>Short-circuit withstand strength:</b>	10 kA

**Enclosure manufacturer:** DCK Holoubkov Bohemia a.s.  
**Type:** SS

**Constr. material of the enclosure:**  sheet metal  concrete  plastic  stainless steel

**Performance:**  surface  recessed  enclosure  on column

**Total dimensions: (w x h x d):** 320 x 470 x 250 [mm] / 470 x 320 x 250 [mm]

**Application:**  electricity meter distributor  
 instrument enclosure  
 socket enclosure  
 residential distributor

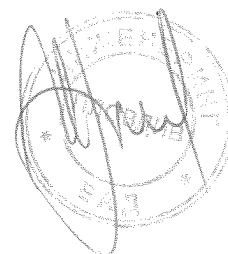
**Documentation:**  enclosure certificate  type range table  
 catalog of enclosure  general assembly drawing  
 circuit diagram  others: operating and maintenance instructions for the distributor

**Tested according to:**

**ČSN EN 61439-1 ed.2:12 and ČSN EN 61439-3:12**

**Art.: 5; 6; 10:** 10.1, 10.2, 10.2.1, 10.2.7, 10.3, 10.4, 10.5, 10.6, 10.6.2, 10.7, 10.8, 10.9, 10.9.2, 10.9.3, 10.9.4, 10.10, 10.10.4, 10.11, 10.11.2, 10.12 ( J.9.4.3, J.9.4.4 ), 10.13

ВЕРНО С ОРНИНАТА





ČSN EN 61439-1 ed.2:12, ČSN EN 61439-3:12		
<b>5</b>	<b>INTERFACE CHARACTERISTICS</b>	
<b>5.1</b>	<b>GENERAL</b>	
	The characteristics of the ASSEMBLY shall ensure compatibility with the ratings of the circuits to which it is connected and the installation conditions and shall be declared by the assembly manufacturer using the criteria.	--
<b>5.2</b>	<b>VOLTAGE RATINGS</b>	
<b>5.2.1</b>	<b>RATED VOLTAGE (<math>U_n</math>) (OF THE ASSEMBLY)</b>	
	The rated voltage shall be at least equal to the nominal voltage of the electrical system.	$U_n = 230/400 \text{ V, AC}$
<b>5.2.2</b>	<b>RATED OPERATIONAL VOLTAGE (<math>U_e</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>	
	The rated operational voltage of any circuit shall not be less than the nominal voltage of the electrical system to which it is to be connected.	$U_e = 230/400 \text{ V, AC}$
<b>5.2.3</b>	<b>RATED INSULATION VOLTAGE (<math>U_i</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>	
	The rated insulation voltage of a circuit of an ASSEMBLY is the voltage value to which dielectric test voltages and creepage distances are referred. The rated insulation voltage of a circuit shall be equal or higher than the values stated for $U_n$ and for $U_e$ for the same circuit.	$U_i = 500 \text{ V, AC}$
<b>5.2.4</b>	<b>RATED IMPULSE WITHSTAND VOLTAGE (<math>U_{imp}</math>) (OF THE ASSEMBLY)</b>	
	The rated impulse withstand voltage shall be equal to or higher than the values stated for the transient overvoltages occurring in the electrical system(s) to which the circuit is designed to be connected. DBO's shall comply with a minimum overvoltage category III	$U_{imp} = 6,0 \text{ kV (1,2/50 } \mu\text{s)}$
<b>5.3</b>	<b>CURRENT RATINGS</b>	
<b>5.3.1</b>	<b>RATED CURRENT OF THE ASSEMBLY (<math>I_{nA}</math>)</b>	
	The rated current of the ASSEMBLY is the smaller of: the sum of the rated currents of the incoming circuits within the ASSEMBLY operated in parallel; the total current which the main busbar is capable of distributing in the particular ASSEMBLY arrangement. This current shall be carried without the temperature rise of the individual parts exceeding the limits specified in 9.2.	$I_{nA} \leq 63 \text{ A (0-PK-1F, 1-PK-1F)}$ $I_{nA} \leq 100 \text{ A (1-PK-3F)}$
<b>5.3.2</b>	<b>RATED CURRENT OF A CIRCUIT (<math>I_{nc}</math>)</b>	
	The rated current of a circuit is the value of the current that can be carried by this circuit loaded alone, under normal service conditions. This current shall be carried without the temperature rise of the various parts of the ASSEMBLY exceeding the limits specified in 9.2.	$I_{nc} \leq 63 \text{ A}$ $I_{nc} \leq 100 \text{ A}$
<b>5.3.3</b>	<b>RATED PEAK WITHSTAND CURRENT (<math>I_{pk}</math>)</b>	
	The rated peak withstand current shall be equal to or higher than the values stated for the peak value of the prospective short-circuit current of the supply system(s) to which the circuit(s) is (are) designed to be connected.	--

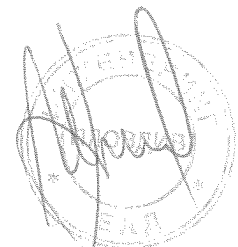


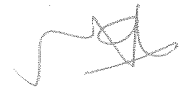
<b>5.3.4</b>	<b>RATED SHORT-TIME WITHSTAND CURRENT (<math>I_{cw}</math>) (OF A CIRCUIT OF AN ASSEMBLY)</b>		Pass
	The rated short-time withstand current shall be equal to or higher than the prospective r.m.s. value of the short-circuit current ( $I_{cp}$ ) at each point of connection to the supply. Different values of $I_{cw}$ for different durations (e.g. 0,2 s; 1 s; 3 s) may be assigned to an ASSEMBLY.	--	
<b>5.3.5</b>	<b>RATED CONDITIONAL SHORT-CIRCUIT CURRENT OF AN ASSEMBLY (<math>I_{cc}</math>)</b>		Pass
	The rated conditional short-circuit current shall be equal to or higher than the prospective r.m.s. value of short-circuit current ( $I_{cp}$ ) for a duration limited by the operation of the short-circuit protective device that protects the ASSEMBLY.	$I_{cc} \leq 10 \text{ kA}$	
<b>5.4</b>	<b>RATED DIVERSITY FACTOR (RDF)</b>		
	The rated diversity factor is the per unit value of the rated current, assigned by the ASSEMBLY manufacturer, to which outgoing circuits of an ASSEMBLY can be continuously and simultaneously loaded taking into account the mutual thermal influences.	<b>RDF = 1</b>	Pass
<b>5.5</b>	<b>RATED FREQUENCY (<math>f_n</math>)</b>		
	The rated frequency of a circuit is the value of frequency to which the operating conditions are referred. Where the circuits of an ASSEMBLY are designed for different values of frequency, the rated frequency of each circuit shall be given.	<b><math>f_n = 50 \text{ Hz}</math></b>	Pass
<b>5.6</b>	<b>OTHER CHARACTERISTICS</b>		
	a) additional requirements depending on the specific service conditions of a functional unit	--	--
	b) pollution degree	3	Pass
	c) types of system earthing for which the ASSEMBLY is designed	TN-C	Pass
	d) indoor and/or outdoor installation	Indoor/ outdoor	Pass
	e) stationary or movable	stationary	Pass
	f) degree of protection	IP 44/00	Pass
	g) intended for use by skilled or ordinary persons	for ordinary persons	Pass
	h) electromagnetic compatibility (EMC) classification	environment B	Pass
	i) special service conditions, if applicable	--	--
	j) external design	surface	Pass
	k) mechanical impact protection, if applicable	IK 10	Pass
	l) the type of construction – fixed or removable parts	fixed parts	Pass
	m) the nature of short-circuit protective device (s)	circuit breakers	Pass
	n) measures for protection against electric shock	automatic disconnection of supply	Pass
	o) overall dimensions, if required (w x h x d) [mm]	320 x 470 x 250 [mm] 470 x 320 x 250 [mm]	Pass
	p) the weight, if required [kg]	9 [kg]	Pass
	q) type A or type B DBO	type B DBO	Pass

ВЕРНО С ОРИГИНАЛА

<b>6</b>	<b>INFORMATION</b>		
<b>6.1</b>	<b>ASSEMBLY DESIGNATION MARKING</b>		
	<p>The ASSEMBLY manufacturer shall provide each ASSEMBLY with one or more labels, marked in a durable manner and located in a place such that they are visible and legible when the ASSEMBLY is installed and in operation. Compliance is checked according to the test of 10.2.7 and by inspection.</p> <p>The test of 10.2.7 only applies to DBOs intended for outdoor installation.</p> <p>The following information regarding the ASSEMBLY shall be provided on the designation label(s):</p>	see fig No. 1	Pass
	a) ASSEMBLY manufacturer's name or trade mark	Engineering EAD	
	b) type designation or identification number or any other means of identification, making it possible to obtain relevant information from the ASSEMBLY manufacturer	type: 0-PK-1F s. n.: 2453340	
	c) means of identifying date of manufacture	13. 02. 2019	
	d) IEC 61439-3	yes	
	e) rated current of the DBO using the symbol $I_{nA}$	$I_{nA}$ : 63 A	
	f) degree of protection if greater than IP 2XC	IP 44	
<b>6.2</b>	<b>DOCUMENTATION</b>		
<b>6.2.1</b>	<b>INFORMATION RELATING TO THE ASSEMBLY</b>		
	All the interface characteristics according to chapter 5 can be contained in the distributor manufacturer's technical documentation delivered with it.	see chapter 5	Pass
<b>6.2.2</b>	<b>INSTRUCTIONS FOR HANDLING, INSTALATION, OPERATION AND MAINTENANCE</b>		
	In the documentation or catalogs the distributor manufacturer shall determine eventually conditions of handling, installation, operation and maintenance of the distributor and devices contained in it.	catalogue	
<b>6.3</b>	<b>DEVICE AND/OR COMPONENT IDENTIFICATION</b>		
	It must be possible to identify particular circuits and their protective devices inside the equipment. Identification labels must be legible, durable and suitable for real environment.	switchboards are supplied without equipment, wires are color coded	

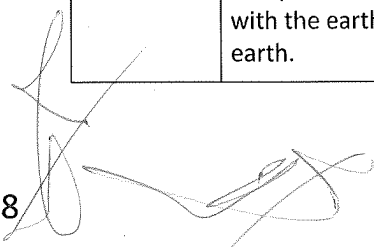
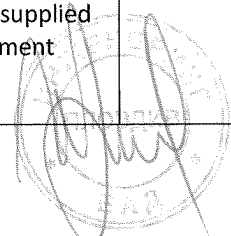
ВЪРНО С ОРИГИНАЛА





<b>10</b>	<b>DESIGN VERIFICATION</b>		
<b>10.1</b>	<b>GENERAL</b>		
	The design examination serves to a purpose whether the distributor or its system design meets regulations contained in this set of standards.	--	--
<b>10.2</b>	<b>STRENGTH OF MATERIALS AND PARTS</b>		
<b>10.2.1</b>	<b>GENERAL</b>		
	The mechanical, electrical and thermal capability of constructional materials and parts of the ASSEMBLY shall be deemed to be proven by verification of construction and performance characteristics. Where an empty enclosure in accordance with IEC 62208 is used, and it has not been modified so as to degrade the performance of the enclosure, no repetition of the enclosure testing to 10.2 is required.	enclosure: <b>DCK Holoubkov Bohemia a.s.</b> type: <b>SS</b>  test reports EZÚ No.: <b>910567-01/01</b> <b>400503-01/02</b>	Pass
<b>10.2.7</b>	<b>MARKING</b>		
	Marking performed by shaping, pressing, engraving or similar procedures including labels with layered plastic coats must not be exposed to the following test.  The test shall be performed by wiping marking by hand during 15 seconds with a textile piece moistened in water and then again during 15 seconds with a textile piece moistened in mineral spirit.  After the test the marking shall be legible to normal or corrected vision without additional.  This test only applies to DBO's intended for outdoor installation.	small wear, marking is easy to read	Pass
<b>10.3</b>	<b>DEGREE OF PROTECTION OF ASSEMBLIES</b>		
	The protection degree must be estimated according to IEC 60529.	<b>IP 44</b>	Pass
	If an empty enclosure according to IEC 62208 is used, there is necessary to carry out an evaluation of the examination in order to state that any outer modification having performed has not decreased the protection code. In that case any other examinations are not required.	enclosure <b>SS – IP 44</b>  no changes have been made to the enclosures	
<b>10.4</b>	<b>CLEARANCES AND CREEPAGE DISTANCES</b>		
	ČSN EN 61439-1 table 1 and 2	Pollution degree <b>3</b>	Pass
	a) $U_{imp} = 6,0 \text{ kV} \Rightarrow$ min. air clearance: <b>5,5 mm</b>	<b>&gt; 8,0 mm</b>	
	b) $U_1 = 500 \text{ V} \Rightarrow$ min. creepage distance: <b>8,0 mm</b>	<b>&gt; 10,0 mm</b>	
	The clearances and creepage distances are used among phases, between a phase and the zero conductor and, except for the case that an electric wire is connected directly with the earth, among a phase, the zero conductor and the earth.	switchboards are supplied without equipment	

ВЪРНО С ОРГИНАЛА



<b>10.5</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK AND INTEGRITY OF PROTECTIVE CIRCUITS</b>		
	It shall be verified that the different exposed conductive parts of the ASSEMBLY are effectively connected to the terminal for the incoming external protective conductor and that the resistance of the circuit does not exceed 0,1 $\Omega$ .	all-plastic design without conductive parts	--
	All-plastic design with no metal parts		--
<b>10.6</b>	<b>INCORPORATION OF SWITCHING DEVICES AND COMPONENTS</b>		
	Meeting structural requirements on the switch instruments and components installed must be confirmed by scrutiny and verified according to this standard.	devices are in accordance with the standards; installation according to the instructions	Pass
<b>10.6.2</b>	<b>ELECTROMAGNETIC COMPATIBILITY</b>		
	Technical demands in reference to the electromagnetic compatibility according to J.9.4 must be confirmed by scrutiny and verified by the test, if it is necessary.	see clause 10.12	Pass
<b>10.7</b>	<b>INTERNAL ELECTRICAL CIRCUITS AND CONNECTIONS</b>		
	Meeting structural requirements on the inner electric circuits and connections must be confirmed by scrutiny and verified according to this standard.	wires can be identified by means of marking and colors	Pass
<b>10.8</b>	<b>TERMINALS FOR EXTERNAL CONDUCTORS</b>		
	Meeting structural requirements on the terminals for external electric wires must be confirmed by scrutiny and verified according to this standard.	wires are not stressed, the terminals are marked	Pass
<b>10.9</b>	<b>DIELECTRIC PROPERTIES</b>		
<b>10.9.2</b>	<b>POWER-FREQUENCY WITHSTAND VOLTAGE</b>		Pass
	The main and control circuits being connected with the main circuit can be exposed to the test voltage according to table 8 ( IEC 61439-1 ).		
<b>10.9.2.3</b>	<b>APPLICATION OF THE TEST VOLTAGE</b>		Pass
	The voltage of industrial frequency must not exceed 50% of the full test value at the application moment. After that it must be increased progressively to this full value and maintained at it during 5 seconds.	<b>U<sub>i</sub> = 500 V</b> test voltage: <b>1890 V</b>	
	a) among all the together connected live parts of the main circuit and non-live parts, with main contacts of all the switch instruments in switched on position or bridged by a suitable jumper of low resistance;  b) among every part of the main circuit with a different potential and other live parts with the different potential and the together connected non-live parts, with main contacts of all the switch instruments in switched on position or bridged by a suitable jumper of low resistance;	no breakdowns have occurred	

<b>10.9.3</b>	<b>IMPULSE WITHSTAND VOLTAGE</b>		Pass
<b>10.9.3.2</b>	<b>IMPULSE WITHSTAND VOLTAGE TEST</b>		
	The voltage shock generator must be adjusted to the required impulse voltage with the distributor connected. The value of the test voltage must be selected according to table 10 IEC 61439-1.	$U_{imp} = 6,0$ kV test voltage: 7,2 kV	
	There must be applied impulse voltage 1.2/50 $\mu$ s five times for every polarity. The measurement shall be performed on the circuit according to Art. 10.9.2.3 a), b)	no flash-over or breakdowns have occurred	
<b>10.9.4</b>	<b>TESTING OF ENCLOSURES MADE OF INSULATING MATERIAL</b>		Pass
	For assemblies with enclosures made of insulating material, an additional dielectric test shall be carried out by applying an a.c. test voltage between a metal foil laid on the outside of the enclosure over openings and joints, and the interconnected live and exposed conductive parts within the ASSEMBLY located next to the openings and joints. For this additional test, the test voltage shall be equal to 1,5 times the values indicated in 10.9.2.3	$U_{zk} = 2835$ V, AC no breakdowns have occurred	
<b>10.10</b>	<b>VERIFICATION OF TEMPERATURE RISE</b>		Pass
<b>10.10.4</b>	<b>VERIFICATION ASSESSMENT</b>		
	It must be verified, if warming limits according to 9.2 of different parts of the distributor are not going to be exceeded. Increase of temperature of the distributor parts [K]: <input type="checkbox"/> metal outer cover 30 <input checked="" type="checkbox"/> insulating outer cover 40 Kind of cooling: natural <input checked="" type="checkbox"/> , forced <input type="checkbox"/>	verified by calculation according to IEC TR 60890  $P_{ztr} \approx 50$ W, RDF = 1 $\Delta t_{1,0} \approx 28$ K  (1-PK-3F, 80 A)	
<b>10.11</b>	<b>SHORT-CIRCUIT WITHSTAND STRENGTH</b>		Pass
	The short-circuit current ratings declared shall be verified except where exempt, see 10.11.2. Verification may be, by comparison with a reference design (10.11.3 and 10.11.4.) or by test (10.11.5).		
<b>10.11.2</b>	<b>CIRCUITS OF ASSEMBLIES WHICH ARE EXEMPTED FROM THE VERIFICATION OF THE SHORT-CIRCUIT WITHSTAND STRENGTH</b>		
	A verification of the short-circuit withstand strength is not required for the following: - assemblies having a rated short-time withstand current or rated conditional short-circuit current not exceeding 10 kA.		
		$I_{cw} < 10$ kA	
<b>10.12</b>	<b>ELECTROMAGNETIC COMPATIBILITY (EMC)</b>		--
	Functional units in distributors which does not meet requirements J.9.4.2 a) and b) must not be subjected to tests.		
<b>J.9.4.3</b>	<b>IMUNITY</b>		Pass
	The switchboard does not contain electronic circuits	no resistance tests are required	
<b>J.9.4.4</b>	<b>EMISSIONS</b>		Pass
	The switchboard does not contain electronic circuits	verification is not required	

10.13	<b>MECHANICAL OPERATION</b>		
	There must be a satisfactory mechanical function verified after the installation into distributors for parts which requires verifying by the test. Number of operational cycles must be 50.	tested door hinges	Pass

**PHOTO-DOCUMENTATION**



Fig. 1 - Labels of the distributors

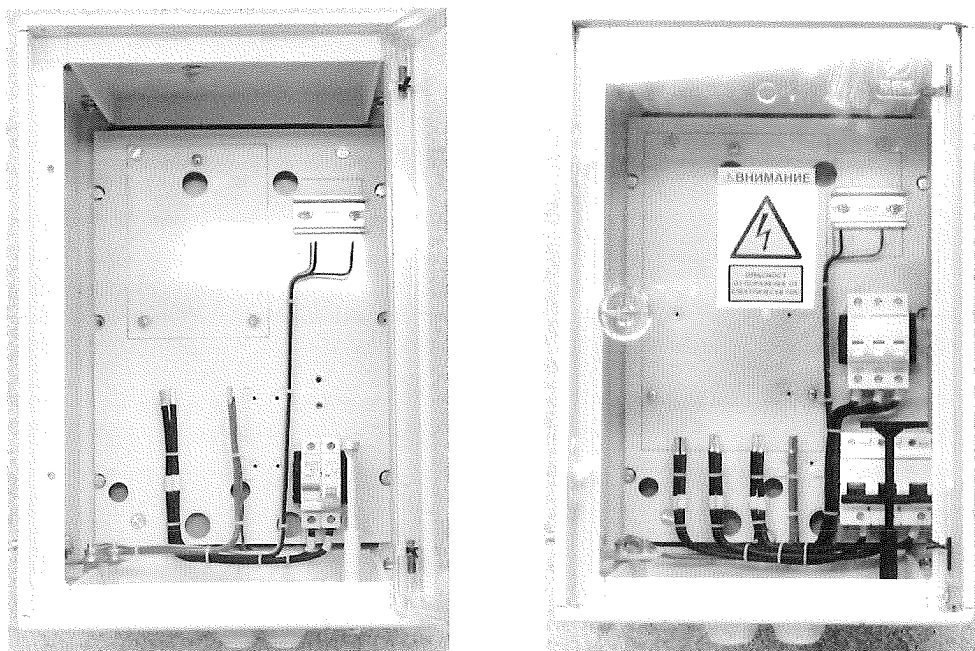


Fig. 2 – Switchgears TEPO PK . . .

ВАРИАНТ С ОРИГИНАЛА

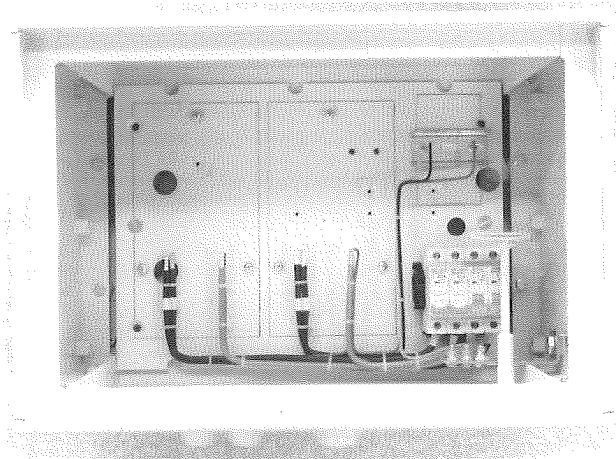


Fig. 3 – Switchgear TEPO PK . . .

**INSTRUMENTS AND TESTING EQUIPMENT USED:**

<u>Name, type</u>	<u>registration number</u>
HV source TOS 5301	110284
Impulse wave generator RG 542	110269
Digital slide gauge	551553
Tester Fluke T 100	551521

на основание чл. 36а, ал. 3 от  
ЗОП

Prepared by: Ing. Vladimír Řehořek

Dated: 6. 3. 2019

ВЪРНИ С ОПРИНАТА

Stamp and signature area containing a circular stamp with text and a handwritten signature.

**Type of switchboard: PK**

type	description
0-PK-1F	Electrometer switchgear designed for one single-phase measurements
1-PK-1F	Electrometer switchgear designed for two single-phase measurements
1-PK-3F	Electrometer switchgear designed for one three-phase measurements

363

ВЯРНО С ОРИГИНАЛА





ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV, s.p.  
Pod Lisem 129  
171 02 Praha 8 - Troja

Počet stran: 3  
Počet příloh/Počet stran příloh: -/  
Zn.: Bz/Sa

Číslo protokolu: 004907-01/01

Datum vydání: 3. 2. 2011



## PROTOKOL O ZKOUŠCE

**Výrobek:** Materiály rozváděčů a piliřů  
**Typ:** PC DCK1, SMC 0200  
**Jmenovité hodnoty:** vzorky 125 x 13,5 x 4 mm  
**Výrobní číslo:** ---  
**Výrobce:** DCK Holoubkov Bohemia a. s.,  
Holoubkov 79, 338 01 Holoubkov, Česká republika  
**Výrobní místo:** dtto výrobce  
**Číselník výrobků EZÚ:** 105001 - ostatní služby  
**Objednavatel:** DCK Holoubkov Bohemia a. s.,  
Holoubkov 79, 338 01 Holoubkov, Česká republika  
**Počet zkoušených vzorků:** 30  
**Vzorky předloženy dne:** 9.12.2010  
**Místo provedení zkoušek:** Elektrotechnický zkušební ústav, s.p.  
**Zkoušky prováděny v době od** 10.1.2011 **do** 25.1.2011  
**Jiné údaje:** ---  
**Zkušební předpis:** ČSN EN 60695-11-10:00+A1:04 - metoda B

Výsledky zkoušek uvedené v protokolu se týkají pouze zkoušeného předmětu. Hodnoty v tomto protokolu jsou měřeny s přesností předepsanou ve zkušebním předpisu. Veškeré použité měřicí přístroje jsou řádně navázány.

Bez písemného souhlasu EZÚ nesmí být tento protokol reprodukován jinak než celý!

на основании чл. 36а, ал. 3 от  
ЗОП



на основании чл. 36а, ал. 3 от  
ЗОП

Zpracoval: J. Šašek

Schválil: Ing. J. Bažant  
technický vedoucí zkušební laboratoře

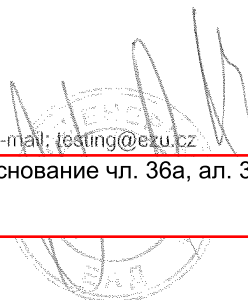
Tel.: 266104111

Fax: 284680070

E-mail: testing@ezu.cz

на основании чл. 36а, ал. 3 от  
ЗОП

ВЕРНО С ОРИГИНАЛОМ



Popis vzorku

Ke zkoušce byly předloženy dva materiály pro rozvaděče a piliře ve formě zkušebních těles:

- I. polykarbonát PC DCK1 (barva: tmavě šedá)
- II. polyester SMC 0200 (barva: světle šedá)

ZkoušeníZkoušky plamenem o výkonu 50 W

dle ČSN EN 60695-11-10:00+A1:04 (idt. EN 60695-11-10:99)

Zkušební metoda B – Zkouška ve svislé poloze

dle ČSN EN 60695-11-10:00+A1:04, odd. 9

Zkušební zařízení: Bunsenův kahan, inv. č. 19327  
digitální stopky PRISMA 200, inv. č. 551705  
mikrometr Schut, inv. č. 551764  
termostat HS 201 A, inv. č. 4244  
exsikátor se silikagelem

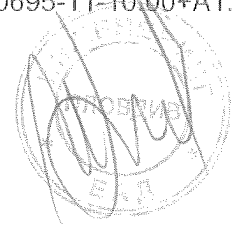
Parametry zkoušky: použitý plyn: metan  
vzorky: 125 x 13,5 x 4 mm  
kondicionování: a) 23 °C / 50 % RV / 48 h  
b) 70 °C / 168 h + 4 h chlazení  
doba přiložení plamene: 2 x 10 s

I. polykarbonát PC DCK1

1. sada vzorků:

vz. č.	kondicionování	doba hoření (s)		doba žhnutí (s)	zapálení bavlny
		t <sub>1</sub>	t <sub>2</sub>		
1	a)	3,2	5,9	0	ne
2		1,2	6,2	0	ne
3		1,4	12,4	0	ne
4		1,3	8,2	0	ne
5		1,1	9,9	0	ne
suma		8,2	42,6	0	-
6	b)	2,4	6,8	0	ne
7		1,5	6,8	0	ne
8		1	8,2	0	ne
9		1,5	8,6	0	ne
10		1	10,5	0	ne
suma		7,4	40,9	0	-

Protože u vzorků 3 a 10 byla zjištěna doba samovolného plamenného hoření t<sub>2</sub> > 10 s, bylo přikročeno ke zkoušení druhé sady vzorků téhož materiálu dle ČSN EN 60695-11-10:00+A1:04, čl. 9.2.6.



2. sada vzorků:

vz. č.	kondicionování	doba hoření (s)		doba žhnutí (s)	zapálení bavlny
		t <sub>1</sub>	t <sub>2</sub>	t <sub>3</sub>	
11	a)	2	9,1	0	ne
12		1	6,5	0	ne
13		1	9,7	0	ne
14		1,5	6,8	0	ne
15		1,2	5,4	0	ne
suma		6,7	10	0	-
16	b)	1,8	9,3	0	ne
17		1	9,6	0	ne
18		1	9,8	0	ne
19		1,6	4,2	0	ne
20		1	9,8	0	ne
suma		6,4	42,7	0	-

Zjištění: Materiál PC DCK1 **vyhovuje** klasifikaci V-0.

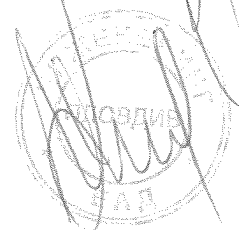
## II. polyester SMC 0200

vz. č.	kondicionování	doba hoření (s)		doba žhnutí (s)	zapálení bavlny
		t <sub>1</sub>	t <sub>2</sub>	t <sub>3</sub>	
1	a)	0	<1	0	ne
2		0	<1	0	ne
3		0	<1	0	ne
4		0	<1	0	ne
5		0	<1	0	ne
suma		0	<5	0	-
6	b)	0	<1	0	ne
7		0	<1	0	ne
8		0	<1	0	ne
9		0	<1	0	ne
10		0	<1	0	ne
suma		0	<5	0	-

Zjištění: Materiál SMC 0200 **vyhovuje** klasifikaci V-0.

Zkoušel: J. Šašek

ВАРНО С ОРГИНАЛА





## ПРОТОКОЛ ОТ ИЗПИТВАНЕ

**Име на продукта:** Материали за корпус и колона  
**Тип на продукта:** PC DCK1, SMC 0200  
**Класове:** мостри 125 x 13,5 x 4 мм  
**Сериен номер:**  
**Производител:** DCK Holoubkov Bohemia a.s.  
Holoubkov 336, 338 01 Holoubkov, Czech Republic  
**Производство:** също като производител  
**EZU система за продуктов код:** 105001 – други услуги  
**Възложител:** DCK Holoubkov Bohemia a.s.  
Holoubkov 336, 338 01 Holoubkov, Czech Republic  
**Брой проби за изпитване:** 30  
**Пробите са дадени за изпитване на:** 09.12.2010  
**Място на изпитването:** Електротехнически изпитателен институт  
**Тестовите са извършени:** от 10.01.2011 до 25.01.2011  
**Други данни:** --  
**Регламент за изпитването:** ČSN EN 60695-11-10:00+A1:04 – метод B

Резултатите от изпитването, посочени в този протокол се отнасят само за предмета на изпитването. Стойностите, посочени в този протокол са измерени с точността, посочена в регламентите за изпитване. Всички използвани средства за измерване са правилно проследими.

Без писменото съгласие на EZU този протокол не трябва да се възпроизвежда по никакъв друг начин, освен в неговата цялост.

(подписи – не се четат)

Съставен от: И. Шашек

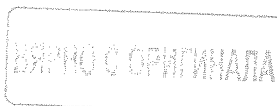
Одобен от: Инж. И. Базант

Tel.: 266104 111

Fax: 284680 070

e-mail: [testing@ezu.cz](mailto:testing@ezu.cz)

[http:// www.ezu.cz](http://www.ezu.cz)



004907-01/01

**Описание на пробата**

Два материала за шкафове и колони под формата на образци за изпитване бяха подложени на изпитване

I. Поликарбонат PC DCK1 (цвет: тъмно сив)

II. Полиестер SMC 0200 (цвет: светло сиво)

**Изпитване****Изпитване на пламък 50 W**

Съгл. ČSN EN 60695-11-10:00 + A1:04 (EN 60695-11-10:99)

**Метод на изпитване В - изпитване във вертикална позиция**

Съгл. ČSN EN 60695-11-10:00 + A1:04, сек. 9

**Използвани средства за изпитване:**

Горелка Bunsen, инв. № 19327  
 Цифров хронометър PRISMA 200, инв. № 551705  
 Микрометър Schut, инв. № 551764  
 Термостат HS 201 A, инв. № 4244  
 Ексикатор със силикагел

**Параметри на изпитване:**

Използван газ: метан  
 Проби: 125 x 13,5 x 4 mm  
 Околна среда: а) 23 ° C / 50% RV / 48 h  
 б) 70 ° C / 168 h + 4 h  
 време на приложение на пламъка: 2 x 10 s

**I. Поликарбонат PC DCK1****1. Набор от мостри**

№	Околна среда	Времена горене (s)		Време на затишване (s)	Запалване
		t <sub>1</sub>	t <sub>2</sub>		
1	a)	3,2	5,9	0	не
2		1,2	6,2	0	не
3		1,4	12,4	0	не
4		1,3	8,2	0	не
5		1,1	9,9	0	не
сума		<b>8,2</b>	<b>42,6</b>	<b>0</b>	-
6	b)	2,4	6,8	0	не
7		1,5	6,8	0	не
8		1	8,2	0	не
9		1,5	8,6	0	не
10		1	10,5	0	не
сума		<b>7,4</b>	<b>40,9</b>	<b>0</b>	-

Тъй като беше установено, че проби 3 и 10 имат време на спонтанно горене 12 > 10 s, беше направено изпитване на втори комплект от проби съгласно ČSN EN 60695-11-10:00 + A1:04, сек. 9.2.6

368

ИДНО С ОРГИНАЛА

2. Набор от мостри

№	Околна среда	Времена горене (s)		Време на затихване (s)	Запалване
		t <sub>1</sub>	t <sub>2</sub>		
11	a)	2	9,1	0	не
12		1	6,5	0	не
13		1	9,7	0	не
14		1,5	6,8	0	не
15		1,2	5,4	0	не
сума		<b>6,7</b>	<b>10</b>	<b>0</b>	-
16	b)	1,8	9,3	0	не
17		1	9,6	0	не
18		1	9,8	0	не
19		1,6	4,2	0	не
20		1	9,8	0	не
сума		<b>6,4</b>	<b>42,7</b>	<b>0</b>	-

Установено: Материал PC DCK1 отговаря на класификация V-0.

II. Полиестер SMC 0200

№	Околна среда	Времена горене (s)		Време на затихване (s)	Запалване
		t <sub>1</sub>	t <sub>2</sub>		
1	a)	0	<1	0	не
2		0	<1	0	не
3		0	<1	0	не
4		0	<1	0	не
5		0	<1	0	не
сума		<b>0</b>	<b>&lt;5</b>	<b>0</b>	-
6	b)	0	<1	0	не
7		0	<1	0	не
8		0	<1	0	не
9		0	<1	0	не
10		0	<1	0	не
сума		<b>0</b>	<b>&lt;5</b>	<b>0</b>	-

Установено: Материал SMC 0200 отговаря на класификация V-0.

Съставил: И. Шашек

369

ИДНО С ОРИГИНАЛА