

4. Warranty

All valves manufactured by "Pulsed Technologies Co. Ltd." (The Manufacturer) are guaranteed to be free of defects in workmanship, materials and construction and are designed to give satisfactory service when used under normal operating conditions. The Manufacturer guarantees conformity of thyratrons to the parameters specified in the appropriate clause of the thyratrons' certificate within a period of 12 months from the date of delivery, confirmed by shipping documents, or within a minimum operating time equal to 5×10^4 pulses, either within a filament life of 1000 hours whichever comes first. The above conditions should be considered provided the thyratrons are treated in accordance with the technical parameters stated in the appropriate clause of the thyratrons' certificate (p.1.1).

For valves failing before expiration of operating time 10^4 pulses, a valve may at the option of Manufacturer be replaced free of charge or credited in full, provided that the filament life guaranteed has not expired. For valves failing with a filament life in excess of the initial period up to operating time 10^4 pulses, but less than the total warranty minimum operating life, replacement or credit will be given on pro rata basis determine by the ratio of the unrealised portion of the warranted operating life to the total warranty minimum operating life. The operating life is considered to start when the valve is first put into service, even though it may subsequently be removed and held as a spare.

Conditions of Warranty. The warranty is valid only if the following conditions are met :

1. The valve is supplied direct from the Manufacturer or via an agency, representative or other selling medium authorized by Manufacturer.
2. The valve is operated within the published minimum and maximum ratings, provided that safety devices for protection against overcurrent in terms of average current are fitted and operation time counter is used.
3. The valve is not subjected to any negligence in use, storage, transportation or handling.
4. The decision of Manufacturer on the cause of failure and on the value and form of any applicable allowances is accepted by the customer.
5. Right of access to equipment for the purpose of checking operating conditions is granted to any representative of Manufacturer where Manufacturer may so require.
6. Manufacturer is notified within 30 days of the valve failure.
7. The valve is withdrawn from service as soon as possible after the failure is alleged to have occurred.

5. Claims Information. In case of a premature failure of a thyatron it should be returned to the Manufacturer within 30 days together with the Certificate stating the following information:

Storage time _____
Date of putting into operation _____
Date of failure _____
Specifications of a mode of operation _____

Operating time in the specified mode _____ of hours (total switched charge).
The reasons for removal of a thyatron from operation _____
The items of information are filled _____

(Date, signature)

In case of absence of the filled passport the claim is not accepted.

Individual № _____, Manufacturing date _____

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TDI1-100k/150H THYRATRON

Certificate. Certificate of Quality.

TDI1-100k/150H thyatron (Copper Arc Thyatron, Grounded Grid Thyatron) is intended for use as a switch tube in pulse circuits of capacitive storages with sub-microsecond and microsecond pulse duration. The thyatron is manufactured in conformity with technical conditions KBФM.433.212.020TY for use in various installations for domestic as well as export delivery.

1. Basic Technical Data.

Pulse thyatron has a ceramic/metal envelope, six high-voltage sections, filled with hydrogen (deuterium) as buffer gas at $20 \div 60$ Pa in operational mode only. Semiconductor igniter is used to trigger the switch. Special dielectric coating protects internal surface of the envelope against damage in cases when anode reverse voltage achieves 100% of forward voltage. The tube is environmental-friendly product, has internal shield for minimization of X-Ray emission from the region of anode. The double-ended thyatron TDI1-100k/150D is a bi-directional switch. In TDI1-100k/150D variant the thyatron comprises hollow anode with added igniter and is used, for example, for operation in modes with oscillating current, as well as for triggering both from cathode and anode part. Design of the thyatron is covered by Russian Federation patents №2300157, 2418339, International Patents PCT/RU2005/000298, PCT/RU2011/000038 and US Patent No.7,825,595 B2.

1.1. Electrical Parameters in Optimum Operation Mode

Parameter	Value	Fact. value
Forward anode voltage, kV	25÷120	
Peak forward anode current, kA	20	
Anode current 1st half-wave width, μs	5.0	
Pulse repetition rate, Hz	0.5	
Heater R voltage, V , (not less/not more)	3.0/7.0	
Heater G voltage, V , (not less/not more)	5.5/6.5	
Heater R current (at nominal $U_{hr} = V$), A	2.5	
Heater G current (at nominal $U_{hg} = V$), A	2.5	
Peak open circuit trigger voltage, kV , (not less/not more)	4.0/10.0	
Peak trigger current, A , (not less/not more)	80/200	
Trigger current pulse duration, μs	2÷4	
Tube warm-up time, <i>minutes</i>	5.0	

1.2. Absolute ratings (maximus, nonsimultaneous)*

Parameter	Value
Peak forward anode voltage, kV (Notes 1, 2,3)	10÷150
Peak reverse anode voltage, kV (Notes 3)	50
Peak forward anode current, Ib , kA	100
Peak reverse anode current, Ibx , kA (Note 4)	up to 95% of Ib
Maximum anode current rise rate, A/s (Note 5)	$5 \cdot 10^{11}$
Anode current pulse duration, μs	0.1÷100.0
Pulse repetition rate, f , Hz (Note 6)	300
Switched energy per shot, J	20 000
Anode Dissipation Factor ($Pb = V \times A \times pps$) (Note 6)	$70 \cdot 10^9$
Root mean square current, $RMS = \sqrt{Ib \times ib}$ ($ib = C \cdot U \cdot f$) (Note 6)	700
Peak open circuit trigger voltage, kV , (not less/not more)	4.0/10.0
Peak trigger current, A , (not less/not more)	80/250
Rate of rise of ignition voltage pulse, $kV/\mu s$, not less	5.0
Time Jitter, ns (Note 7)	5

Notes *Operation of the thyatron when two or more parameters listed in p.1.1 are exceeded simultaneously may be permitted only upon agreement with the Manufacturer.

¹⁾ Immerse the tube into SF₆, N₂ or oil when operating at voltage over 45 kV.

