

National Taiwan University of Science and Technology
Test Report by Department of Electrical Engineering
EE Test No. 005/2009

Test requested company: Double Dragon Development & Trading Corp.
Tested Product: Phazzer Dragon Electronic Control Device

Tested Result:

Average Voltage output: **60 kV \pm 2 %**

Max. Voltage output: **63 kV \pm 2 %** and under

Analog Load **(100 M Ω)** output current: **500 μ A \pm 2 %** and under

Above data derived was tested by the samples Double Dragon Development & Trading Corp. provided, and this report contain 2 pages just for study reference but not for lawsuit use.

Tester: Professor Hsiao, Hong-Chin
Chief of Department of Electrical Engineering
National Taiwan University of Science and Technology

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Double Dragon Development & Trading Corp. Electronic Control Device Tested Result & Report				
Product:	Test Result			
	Voltage	Current	Influence to Human Body	Tested by:
Titan-Phazzer (Also called Phazzer Dragon Electronic Control Device)	60 kV ~ 63kV	500 μ A \pm 2 % and under	Influence to human body <input checked="" type="checkbox"/> Harmless <input type="checkbox"/> Harmful	Department of Electrical Engineering, National Taiwan University of Science and Technology
End				

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1. High voltage electronic control device is made by means of the high voltage destroys the air insulation to produce electrical arc phenomenon. The process is the electrical circuit is vibrated by the batteries power and step up through transformer, and then go to 2 electrical pins on the top of the device to produce electrical arc and sound and that will cause intimidation and electrical shock to the attacker. Level sufficient to cause neural muscular incapacitation but well below levels of fibrillation or death.
2. Voltage output high or low depends on distance and shape of the electrode, the insulation voltage is 30 kV/cm under dried air but it will need to be amended if the electric field is not normal. Max. voltage of the electronic control device is called voltage output before it is activated, and till the high voltage destroy the air insulation then the voltage starts to output, in this point the electrical arc sparks becomes part of the electric conductor and electrical arc sparks voltage will

drop off rapidly under 50kV. Therefore, evaluate the unit safe or no depends on if the electric current being under the safety titer.

3. What will the proper safety electric current titer? It would see what part and how large dimension, and how long the electrical current will contact the human body. According to the analysis and test result from Dr. C.F. Dalziel, Professor of Columbia University, U.S.A.;

$$I = 0.165/\sqrt{t} \quad \text{Time Range: 0.03 ~ 3 second.}$$

$$I^2 t = 0.027$$

I: *I* indicates the effective current titer while it goes through the human body, and the unit is AMPERE (A).

t: *T* indicates the timing of shocking and sparks

0.027 indicates maximum tolerance capacity of human body.

4. According to electrical shock defense of International Electrical Engineering Committee rule IEC 479-1; AC lower than $500 \mu\text{A}$, DC lower than $2000 \mu\text{A}$, it will not cause injury to human body. And the current is lower than $100 \mu\text{A}$, it will not cause any harm or danger.
5. Page 33, IEC 479-2 indicates painfulness critical current allowance is $50 - 100 \times 10^{-6} (\text{A}^2\text{S})$ by single electrical current pulse, and the painfulness critical current will be about $25 - 50 \mu\text{A}$ by 2 seconds electrical current pulse contact.

All above data is tested from left hand to the ground, and the electrical Arc is only partial contact so the safety electrical current can be upgrade.

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