AEI Forced Air Cooled Triode ESA1500

GENERAL

The ESA1500 is a forced air cooled triode having a directly heated thoriated tungsten filament. It is intended for use in induction and dielectric heating equipment.

RATINGS*

Filament voltage	V_f	8·0	V
Filament current	I_f	26†	A
Maximum anode voltage	$V_{a(max)}$	6·0	kV
Maximum anode dissipation	$P_{a(max)}$	3·0	kW
Maximum peak cathode current	$i_{k(pk)max}$	6·0	A
Maximum operating frequency at maximum ratings	f_{max}	40	Mc/s
Minimum air flow for maximum dissipation		300	ft^3/min

* Limiting values are absolute values.

† The filament is suitable for direct switching without additional current limitation in the circuit.

INTER-ELECTRODE CAPACITANCES

Anode/grid	c_{a-g}	11·5	pF
Anode/filament	c_{a-f}	0·8	pF
Grid/filament	c_{g-f}	14·5	pF

CHARACTERISTICS

Anode voltage	V_a	5·0	kV
Anode current	I_a	400	mA
Anode impedance	r_a	3·2	kΩ
Mutual conductance	g_m	7·5	mA/V
Amplification factor	μ	24	
Perveance		0·56	$mA/V^{\frac{3}{2}}$

COOLING

This is by forced air blast, and should be employed for all conditions of valve service, including filament dissipation only.

It is recommended that a minimum air flow of 300 ft^3/min at maximum power output be used. Direction of flow is through the anode cooler and over the glass bulb.

At the higher frequencies grid connectors should be designed to assist cooling, and both connections should be made to reduce the current taken by each pin.

Care should be taken to ensure all connections to the valve make good electrical contact to avoid overheating pins and seals.

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TYPICAL OPERATION (See " Notes " below)

Anode voltage	V_a	5·0	6·0	kV
Mean anode current	$I_{a(av)}$	1·55	1·5	A
Mean grid current	$I_{g(av)}$	145	135	mA
Bias voltage	V_g	250	350	V
Bias resistor	R_g	1·75	2·6	kΩ
Peak cathode current	$i_{k(pk)}$	6·0	6·0	A
Peak anode current	$i_{a(pk)}$	5·0	5·0	A
Peak grid current	$i_{g(pk)}$	1·0	1·0	A
Anode dissipation	p_a	2·5	2·5	kW
Grid dissipation	p_g	70	65	W
Anode efficiency		69	72	%
Power output (oscillator)	P_{out}	5·3	6·3	kW
Power output at 85% transfer efficiency	P_{out}	4·5	5·35	kW

NOTES

The typical operating conditions given, are for valve service as a class C self oscillator and are calculated assuming a d.c. or three-phase full-wave rectified anode voltage. Where conditions of service make the valve liable to excessive mains variation, poor regulation of supplies, or power supplies with a high peak to mean ratio, care should be taken to see that the limiting values are not exceeded.

It is recommended that a protective resistance of 10Ω/kV be connected between the h.t. supply and the valve anode to avoid damage to the valve in the event of intermittent flash over.

Some cases (e.g., intermittent operation where the duty factor is suitable) allow increased anode dissipation and peak cathode current. Each case should be treated on its merits and more information on this type of duty may be had on request.

MOUNTING POSITION—Vertical, anode down

BASE—Special