

ELECTRONIC TUBE REFERENCE

RYG10

Specialized - Switching Tube electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

COUNTERSELECTORSWITCH

Ten-position trochotron counter using controlled electron-beam motion to advance through stable counting positions for digital and instrumentation systems.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 CounterSelectorSwitch	
MAXIMUM PLATE DISSIPATION	2 W
Published ratings and characteristics audited; additional numerical data retained in TUBE_SECTION_PARAMETER.	

The RYG10 is a high-vacuum trochotron beam-switching tube used as a ten-position ring or decade counter. A magnetic field steers the electron beam among ten spade electrodes, with electrical and fluorescent indication of the selected position; applications include Geiger-Mueller equipment, industrial counters, electronic computers, and frequency dividers.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1960 Ericsson

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1960 ERICSSON

Section 1 · CounterSelectorSwitch

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
cathode /fig	1 gauss	cathode /fig. 1/, designed to operate in a magnetic field as
by rotating the direction of the magnetic field	180 gauss	by rotating the direction of the magnetic field 180 degrees.
¥Ig [1]	1 A	¥Ig 1 TROCHOTRON RYG 10, SHOWN IN A PLANE FIG 2 CURRENT TO OKE SPADE AND TO THE FLATE
¥Ig [2]	10 A	¥Ig 1 TROCHOTRON RYG 10, SHOWN IN A PLANE FIG 2 CURRENT TO OKE SPADE AND TO THE FLATE
¥Ig [3]	2 A	¥Ig 1 TROCHOTRON RYG 10, SHOWN IN A PLANE FIG 2 CURRENT TO OKE SPADE AND TO THE FLATE
spade is connected an RC circuit as in Fig	4	spade is connected an RC circuit as in Fig.4. Assume at first
that spade n in fig	4	that spade n in fig. 4 is "locked down". Most of the electron
current from the cathode thus goes to the plate /confer Fig	2 A	current from the cathode thus goes to the plate /confer Fig.2/
moment the beam is locked to spade /n +	1	moment the beam is locked to spade /n + 1/ and is divided bet-
ween the plate and one spade	1	ween the plate and one spade 1in the same manner as before, but
FIG [1]	3	FIG 3 THE BEAM FORMATION WHEN ONE SPADE IS FIC 4 A SINPLE STEPPING DEVICE USING THE
FIG [2]	4	FIG 3 THE BEAM FORMATION WHEN ONE SPADE IS FIC 4 A SINPLE STEPPING DEVICE USING THE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
of [1]	1	of 1.000.000 counts/sec. while reasonable simple driver cir=-
of [2]	0	of 1.000.000 counts/sec. while reasonable simple driver cir=-
cuits permit counting speeds up to	400	cuits permit counting speeds up to 400.000 counts per sec.
Heater Volbase s @ w o a als l o o [1]	9	Heater Volbase s @ w o a als l o o 9 . e 63 volts
Heater Volbase s @ w o a als l o o [2]	63	Heater Volbase s @ w o a als l o o 9 . e 63 volts
Heater Current [1]	5 A	Heater Current .5 & s e o 5 site w ae 0.3 amps
Heater Current [2]	5 A	Heater Current .5 & s e o 5 site w ae 0.3 amps
Heater Current [3]	300 mA	Heater Current .5 & s e o 5 site w ae 0.3 amps
Plate Dissipation maximum .+ ¢« « « o =«	1 W	Plate Dissipation maximum .+ ¢« « « o =« 1.0 watt -
Spade Dissipation, each spade	0.5 W	Spade Dissipation, each spade 0.5 watt
Spade Volbage [1]	-5	Spade Volbage -5 s o ¢ o .5 s« & & = » 100 volts
Spade Volbage [2]	5	Spade Volbage -5 s o ¢ o .5 s« & & = » 100 volts
Spade Volbage [3]	100	Spade Volbage -5 s o ¢ o .5 s« & & = » 100 volts
Plate Volbape [1]	1	Plate Volbape 1o v s ¢ mee o % & aow b 100 volts -
Plate Volbape [2]	100	Plate Volbape 1o v s ¢ mee o % & aow b 100 volts -
Magnetic Induction, approx: « « o« o« o	350 gauss	Magnetic Induction, approx: « « o« o« o 350 gauss
Cathode Current, approx ¢« « « ¢ o« & o	10 mA	Cathode Current, approx ¢« « « ¢ o« & o 10 mA
Spade ResSisStor o« o o o ¢ o o o o o o	0.2	Spade ResSisStor o« o o o ¢ o o o o o o 0.2 megohm W
Other spades: Vsp=	100	Other spades: Vsp= 100 volts
SPADE [1]	10	SPADE 10 SPADE 1
SPADE [2]	1	SPADE 10 SPADE 1
SPADE [1]	9	SPADE 9 SPADE 2
SPADE [2]	2	SPADE 9 SPADE 2
SPADE & SPADE	5	SPADE & SPADE 5 i

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
is shown in fig	1	is shown in fig. 1. Round an oxide-coated cathode forming the axis are ten
the emission of electrons, fig	2 A	the emission of electrons, fig. 2. In that condition no current flows in the
receiving electrode, fig	3 A	receiving electrode, fig. 3. An electron current is thus obtained in the tube,
electrode is continuous, as will be seen from fig	4 A	electrode is continuous, as will be seen from fig. 4, which shows the current-
Fig [1]	3 V	Fig. 3 X 4930 control electrode is negative, i.e. that the current increases if the voltage
Fig [2]	4930 V	Fig. 3 X 4930 control electrode is negative, i.e. that the current increases if the voltage
electrode on cathode voltage and the	1 V	electrode on cathode voltage and the 1 ALFVEN, H. & ROMANUS H.: Valve with trochoidal electronic motion. Nature
is connected in series with a sufficiently high resistance. In fig	4 ohm	is connected in series with a sufficiently high resistance. In fig. 4 a load line
with a [1]	100 V	with a 100 V control electrode feed voltage, a resistance of about 200,000 (2
with a [2]	200 V	with a 100 V control electrode feed voltage, a resistance of about 200,000 (2
with a [3]	2 V	with a 100 V control electrode feed voltage, a resistance of about 200,000 (2
As is scen from fig	4 A	As is scen from fig. 4, only part of the current in the tube is received by
RYG	10	RYG 10 as pulse counter is mainly based on its ability to compel the beam
Fig [1]	5	Fig. 5 w4032 is heated by a 6.3 V, 0.3 A coiled filament. The magnctic field required for
Fig [2]	32	Fig. 5 w4032 is heated by a 6.3 V, 0.3 A coiled filament. The magnctic field required for
Fig [3]	6.3	Fig. 5 w4032 is heated by a 6.3 V, 0.3 A coiled filament. The magnctic field required for
Fig [4]	0.3	Fig. 5 w4032 is heated by a 6.3 V, 0.3 A coiled filament. The magnctic field required for
Fig [1]	6 V	Fig. 6 X 7658 magnet surrounding the tube. At a control electrode voltage of 100 V the
Fig [2]	7658 V	Fig. 6 X 7658 magnet surrounding the tube. At a control electrode voltage of 100 V the

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Fig [3]	100 V	Fig. 6 X 7658 magnet surrounding the tube. At a control electrode voltage of 100 V the
Wiring diagram for decade counter requisite magnetic field is about	345 gauss	Wiring diagram for decade counter requisite magnetic field is about 345 gauss.
trode. A voltage of about	100 V	trode. A voltage of about 100 V is required for clear indication.
electrode resistors are coupled in parallel to	25 pF	electrode resistors are coupled in parallel to 25 puF capacitors. A drop in
voltage of	100 V	voltage of 100 V for a locked control electrode at a total control electrode
capacitance of	40 pF	capacitance of 40 yuF corresponds to a charge of
At a control electrode voltage of [1]	100 V	At a control electrode voltage of 100 V the beam current is about 10 mA
At a control electrode voltage of [2]	10 V	At a control electrode voltage of 100 V the beam current is about 10 mA
phase changer and the amplifier ¥	7	phase changer and the amplifier ¥7,. The pulses to be counted enter ¥, in
speed of the counter to about [1]	400	speed of the counter to about 400,000 pulses per second, while RYG 10 with
speed of the counter to about [2]	10	speed of the counter to about 400,000 pulses per second, while RYG 10 with
a more complex pulse generator comes up to	10	a more complex pulse generator comes up to 10% pulses per second.
pulse, the shunt capacitor of control electrode no	0 pF	pulse, the shunt capacitor of control electrode no. 0 is connected in series
with a resistance. Every time the beam enters box	0 ohm	with a resistance. Every time the beam enters box 0, a sharp negative outgoing
control electrodes. Control electrode No	0 V	control electrodes. Control electrode No. 0 does not reach full voltage until
precision components it functions at variations in feed voltage of from	200 V	precision components it functions at variations in feed voltage of from 200
RYG	10	RYG 10 is up to this time the only commercial decade pulse counter tube
The RYG	190	The RYG 190 is a pulse counting tube in
Published value [1]	1	1 Spade 1
Published value [2]	1	1 Spade 1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Published value [1]	2	2 Spade 2
Published value [2]	2	2 Spade 2
Published value	3	3 Cathode
Published value [1]	4	4 Spade 3
Published value [2]	3	4 Spade 3
Published value [1]	5	5 Spade 4
Published value [2]	4	5 Spade 4
Published value	6	6 Plate
Published value [1]	1	1 Spade 5
Published value [2]	5	1 Spade 5
Published value [1]	8	8 Spade 6
Published value [2]	6	8 Spade 6
g Spade	7	g Spade 7
Published value	10	10 Heater
Published value [1]	11	11 Heater FIG. 1
Published value [2]	1	11 Heater FIG. 1
Published value [1]	12	12 Spade 8 BOTTOM VIEW
Published value [2]	8	12 Spade 8 BOTTOM VIEW
Published value [1]	13	13 Spade 9
Published value [2]	9	13 Spade 9
Published value [1]	14	14 Spade 10
Published value [2]	10	14 Spade 10
Heater Voltage	6.3 V	Heater Voltage 6.3 volts
Heater Current	300 mA	Heater Current 0.3 amp e
Plate Dissipation, max	2 W	Plate Dissipation, max. 2.0 watts