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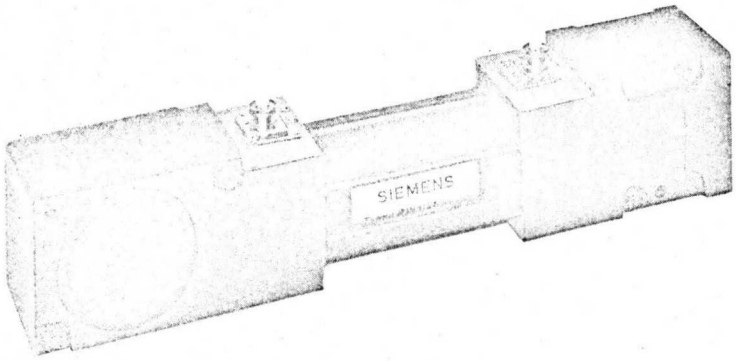
Conduction cooled power traveling wave tube with long life and high reliability for broadband radio relay systems with a power output of 22 W in the frequency range 10.7 to 13.25 GHz.

By using the most contemporary technic (double stage collector) an efficiency up to 38% is reached. The dissipated heat is low and indipendent of the RF input power. If the RF input power fails, no temperature rise will occur.

The tube is focused by an integrated periodic permanent magnet.

The RF power is coupled in and out by way of coaxial connections.

For operation of the tube RW 1125 a power supply can be delivered under the type-designation RWN 1125 (supply voltage 24 V, by choice minus or plus connected with case; other supply voltages on request).



Weight:	approx. 1.4 kg (3.1 lbs)
Dimensions:	approx. 42 mm × 52 mm × 262 mm (1.65" × 2.05" × 10.3")
RF connections:	Siemens socket connector 1.4/4.4 (50 Ω)
Mounting Position:	any

Heating

Heater voltage	U_F	6.3±0.2	V [1]
Heater current	I_F	0.64	A
Preheating time	t_h	none	

indirected by dc, +pole on cathode, parallel supply.
Metal capillary dispenser cathode.

Characteristics (f = 12.7 GHz, I_K = 43 to 53 mA)

		min	nom	max	
Gain	Vp		40.5		dB
Gain slope (Load VSWR ≦ 1.2)	ΔVp/Δf		0.01		dB/MHz
VSWR cold	s			1.8	[2]
Cold attenuation	α	80			dB

Typical Operation for P_2 = 22 W

Frequency range	f	10.7 to 11.7	11.7 to 12.7	12.7 to 13.25	GHz
Power output	P_2	22	22	22	W
Power input	P_1	2±1 dB	2±1 dB	2±1 dB	mW
Collector 1 voltage	U_{C1}	1450	1450	1300	V
Collector 2 voltage	U_{C2}	600	600	550	V
Helix voltage	U_H	3100 to 3500	3100 to 3500	3100 to 3500	V [3]
Grid 2 voltage	U_{G2}	≈2600	≈2600	≈2600	V [4]
Cathode current	I_K	43 to 53	43 to 53	43 to 55	mA
Collector 1 current with Rf	I_{C1}	≈27	≈27	≈31	mA
Collector 2 current with RF	I_{C2}	≈20	≈20	≈18	mA
Collector 1 current without RF	$I_{C1\,0}$	≈ 3	≈ 3	≈ 3	mA
Collector 2 current without RF	$I_{C2\,0}$	≈45	≈45	≈45	mA
Helic current	I_H	≈1	≈ 1	≈ 1	mA
Grid 2 current	I_{G2}	≦±0.1	≦±0.1	≦±0.1	mA
Noise figure	F	≦27	≦27	≦27	dB
AM/PM conversion	k_p	≦ 5	≦ 5	≦ 5	°/dB [5]
Total efficiency	η_{total}	≈38	≈38	≈38	%

[1] If the maximum variation of the heater voltage exceeds the absolute limits of ± 0.2 V, the operating performance of the tube will be impaired and its life shortened.
[2] At input and output of cold tube in the frequency range 10.7 to 13.25 GHz.
[3] A fix setting value for any frequency ranges will be stated later.
[4] It is adjusted at a power input of 2 mW for a power output of 11 W.
[5] AM/PM conversion is the phase shift of the output signal when changing the input by 1 dB.

Typical Operation for $P_2 = 11$ W

Frequency range	f	10.7 to 11.7	11.7 to 12.7	12.7 to 13.25	GHz
Power output	P_2	11	11	11	W
Power input	P_1	1±1 dB	1±1 dB	1±1 dB	mW
Collector 1 voltage	U_{C1}	1200	1150	1100	V
Collector 2 voltage	U_{C2}	600	600	550	V
Helix voltage	U_H	2900 to 3400	2900 to 3400	2900 to 3400	V [1]
Grid 2 voltage	U_{G2}	≈2200	≈2200	≈2200	V [2]
Cathode current	I_K	33 to 43	33 to 43	33 to 43	mA
Collector 1 current with RF	I_{C1}	≈14	≈14	≈14	mA
Collector 2 current with RF	I_{C2}	≈23	≈23	≈23	mA
Collector 1 current without RF	$I_{C1\,O}$	≈ 2	≈ 2	≈ 2	mA
Collector 2 current without RF	$I_{C2\,O}$	≈36	≈36	≈36	mA
Helix current	I_H	≈ 1	≈ 1	≈ 1	mA
Grid 2 current	I_{G2}	≦±0.1	≦±0.1	≦±0.1	mA
Noise figure	F	≦26	≦26	≦26	dB
AM/PM conversion	k_p	≦4.5	≦4.5	≦4.5	°/dB[3]
Total efficiency	η_{total}	≈30	≈30	≈30	%

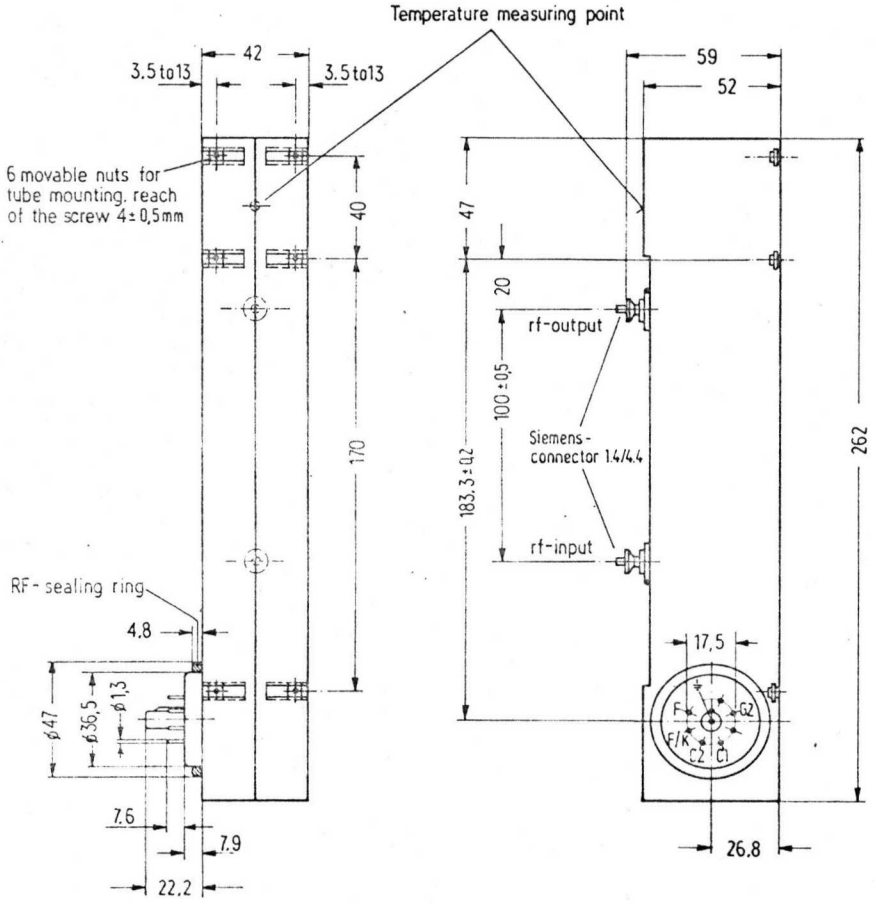
[1] A fix setting value for any frequency ranges will be stated later.
[2] It is adjusted at a power input of 1 mW for a power output of 11 W.
[3] AM/PM conversion is the phase shift of the output signal when changing the input by 1 dB.

Maximum Ratings (absolute values)

Cold collector 1 voltage	U_{C1O}	max	3000	V
Collector 1 voltage	U_{C1}	max	1800	V [1]
Collector 1 dissipation	P_{C1}	max	55	W
Cold collector 2 voltage	U_{C2O}	max	1000	V
Collector 2 voltage	U_{C2}	max	800	V [2]
Collector 2 dissipation	P_{C2}	max	50	W
Cold helix voltage	U_{HO}	max	3800	V
Helix voltage	U_H	max	3600	V
Helix current	I_H	max	4	mA [3]
Grid 2 voltage	U_{G2}	max	3600	V
Grid 2 current	I_{G2}	max	±0.3	mA
Cathode current	I_K	max	60	mA
Load reflection	P_{refl}	max	3	W
Case temperature	t_{case}	max	100	°C [4]
Ambient temperature	t_{amp}	min	−30	°C
Ambient temperature	t_{amp}	max	65	°C
Storage temperature	t_{stor}	min	−40	°C
Storage temperature	t_{stor}	max	70	°C
Storage life		max	5	years

[1] The collector 1 voltage must not fall more than 50 V below the indicated operating value (stability and accuracy included).
[2] The collector 2 voltage must not fall more than 30 V below the indicated operating value (stability and accuracy included).
[3] Switch-off value of the protection relay.
[4] Measured on the temperature measuring point (see drawing).

For operating instructions, recommendations for the design of a power supply and detailed datas please refer to the obligatory specifications.



C1 : Collector 1
C2 : Collector 2
G2 : Grid 2
F : Heater
F/K: Heater/Cathode
⏚ : Ground

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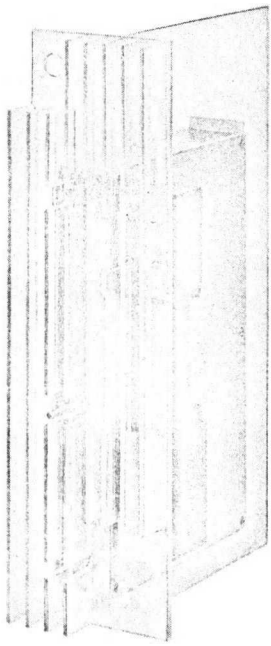
TWT-amplifier with long life and high reliability for broadband radio relay systems with a power output of 11 W in the frequency range 5.9 to 6.425 GHz.

It consists of a RW 88 tube and a RWN 88/24 power supply for 24 V supply voltage or RWN 88/30 for 30 V supply voltage (mounting recommendation see "drilling diagram for front panel").

The amplifier operates with a constant helix voltage. The power output will be set by a step switch for grid 2 voltage (single-dial control). For monitoring of cathode and helix current are provided connections. After switching off due to excessive helix current the power supply switches on 4 to 6 times until definit switch off. Further switch on cycles can be released by "Reset" command.

The total efficiency of the amplifier is nominal 23%.



Weight of tube:	approx. 1.4 kg (3.1 lbs)
Weight of power supply:	approx. 2.8 kg
Dimensions of tube:	approx. 46 mm × 54 mm × 262 mm (1.8" × 2.1" × 10.3")
Dimensions of power supply:	approx. 50 mm × 310 mm × 190 mm (2" × 12.2" × 7.5")
RF connections:	N connector, female
Low-voltage feed:	soldering terminals
Mounting position:	any

Typical Operation

Frequency range	f	5.9 to 6.425	GHz
Power output	P_2	11	W
Drive power	P_1	1.4 ±1 dB	mW
Setting accurancy of the power output with step-switch for grid 2 voltage		±0.25	dB
Gain slope	$\Delta Vp/\Delta f$	≈0.01	dB/MHz
Noise figure	F	≦25	dB
AM/PM conversion	k_p	≦5	°/dB [1]
RF-leakage		≧70	dB
Input current for RWA 88/24	I_1	≈2	A
Input current for RWA 88/30	I_1	≈1.6	A
Total efficiency	η_{total}	≈23	%

[1] AM/PM conversion is the phase shift of the output signal when changing the input by 1 dB.