

EAO Docs

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Carlstrom Gunn Oscillator

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Oscillator Failures
Date : 17 Jan 1991

Carlstrom Oscillators:

S/N H72

No mechanical problem has occurred in this unit to date.

S/N H80

This unit had a diode failure shortly before the receiver was shipped to Hawaii. It was repaired by John Carlstrom at no charge. This was the first device ever returned to him with a fatal error. The diode was destroyed by flakes in the backshort guide banging up against it. He has never seen this before. It may have been due to a problem in the original machining process. However, it is more likely due to the fact that it was the prototype for the motorized micrometer design. I have a feeling that it was assembled at one point with too much side thrust on the micrometer head which may have led to flaking in the backshort. It failed intermittently a couple of times before it died for good.

S/N H92

This unit is brand new and consequently has not had much testing.

General:

I don't see mechanical problems with the Carlstrom backshorts anywhere near as frequent as those from Millitech. Except for that one incident, they work well and show no signs of repeatability problems. The micrometers even have a much better feel to them. Also, I have not heard of any problems with the motorized units at the Hat Creek interferometer or Kitt Peak 12-m telescope.

J. E. Carlstrom Co.

Sept. 1991

Specifications for Oscillator: H117

Bias: 10 Volts

Frequency (GHz)	Tuning mic. (mils)	Backshort mic.* (mils)	Power mW	dV/(100MHz) Volts
69.0	86.0	138.0	51	0.45
69.5	83.4	0/154.0	86	0.70
69.8	81.8	59.0/200	96	0.80
70.0	80.5	99.5	100	0.60
70.5	77.5	103.5	102	0.70
71.0	74.3	102.0	102	0.65
72.0	68.1	96.0	100	0.65
73.0	62.5	88.0	103	0.90
74.0	57.6	80.0	107	0.70
75.0	52.9	71.0	108	0.80
76.0	48.7	58.5	111	0.90
77.0	44.8	40.5	111	0.70
78.0	41.2	9.5/126	113	0.75
79.0	38.0	104.0	111	0.80
80.0	35.1	88.0	109	0.70
81.0	32.5	76.0	108	0.75
82.0	30.1	68.5	106	0.60
83.0	28.0	60.0	106	0.65
84.0	25.9	53.0	102	0.70
85.0	24.0	42.5	98	0.70
86.0	22.2	26.5	90	0.80
87.0	20.7	12.5/104/197	81	0.80
88.0	19.2	184.0	74	0.70
89.0	17.7	166.0	63	0.75
90.0	16.3	157.0	52	0.75
91.0	15.2	149.0	51	0.70
92.0	14.1	143.0	47	0.65
93.0	13.0	136.0	34	0.75
94.0	12.0	132.5	28	0.75
95.0	11.0	128.5	24	0.75
96.0	10.1	124.5	20	0.70
97.0	9.2	122.0	15	0.75
98.0	8.4	120.5	13	0.75
99.0	7.7	116.0	12	0.80
100.0	7.0	108.5	5.2	0.75
101.0	6.2	110.0	9.4	0.75
102.0	5.7	107.0	16	0.75
103.0	5.1	102.5	16	0.75
104.0	4.4	99.5	15	0.80
105.0	3.9	95.0	13	0.90
106.0	3.2	91.0	11	0.95
107.0	2.8	87.5	8.6	1.10
108.0	2.2	83.5	6.0	1.20
109.0	1.8	78.5	4.4	1.20
109.8	1.3(limit)	73.0	3.2	1.20

SCANNED

CARLSTROM H117

BIAS = 10.0 Volts; ~160 mA; **Do not operate above 10.5 Volts.**

INTERNAL PROTECTIVE CIRCUITRY- Internal protection is provided against overvoltage and reverse bias. Bias greater than 10.7 Volts will trip crowbar circuit. Turn oscillator off to reset.

LIMITS - Internal stops are provided. **Do not force micrometer against limits.**

Frequency tuning micrometer: 0.0013" - 0.140"

Backshort micrometer: 0.000" - 0.200"

Do not remove micrometer knobs or disassemble oscillator.

* At frequencies less than 100 GHz, backshort position that produces maximum power and best tuning characteristics is also the position that 'pulls' oscillator to highest frequency.

Specifications for Oscillator: H92

Tuning mic (mils)	Freq (GHz)	Power (mW)	Backshort mic (mils)	df/dV ~ 150 MHz/volt
77.2	72.0	47	109	
72.4	73.0	84	53	
67.7	74.0	85	78	
62.6	75.0	80	73	
57.9	76.0	80	65	
53.7	77.0	81	59	
49.3	78.0	84	48	
45.3	79.0	86	33	
42.0	80.0	86	15/125	
38.8	81.0	78	99	
35.9	82.0	76	80	
33.0	83.0	87	69	
30.3	84.0	90	60	
27.9	85.0	89	51	
25.3	86.0	84	41	
23.2	87.0	82	30	
21.1	88.0	76	22	
19.3	89.0	65	10/99	
17.7	90.0	57	84	
16.1	91.0	55	75	
14.6	92.0	50	64	
13.2	93.0	43	57	
11.9	94.0	35	53	
10.7	95.0	31	49	
9.2	96.0	25	44	
8.2	97.0	16	41	
7.1	98.0	14	43	
6.0	99.0	15	44	
5.0	100.0	12	40	

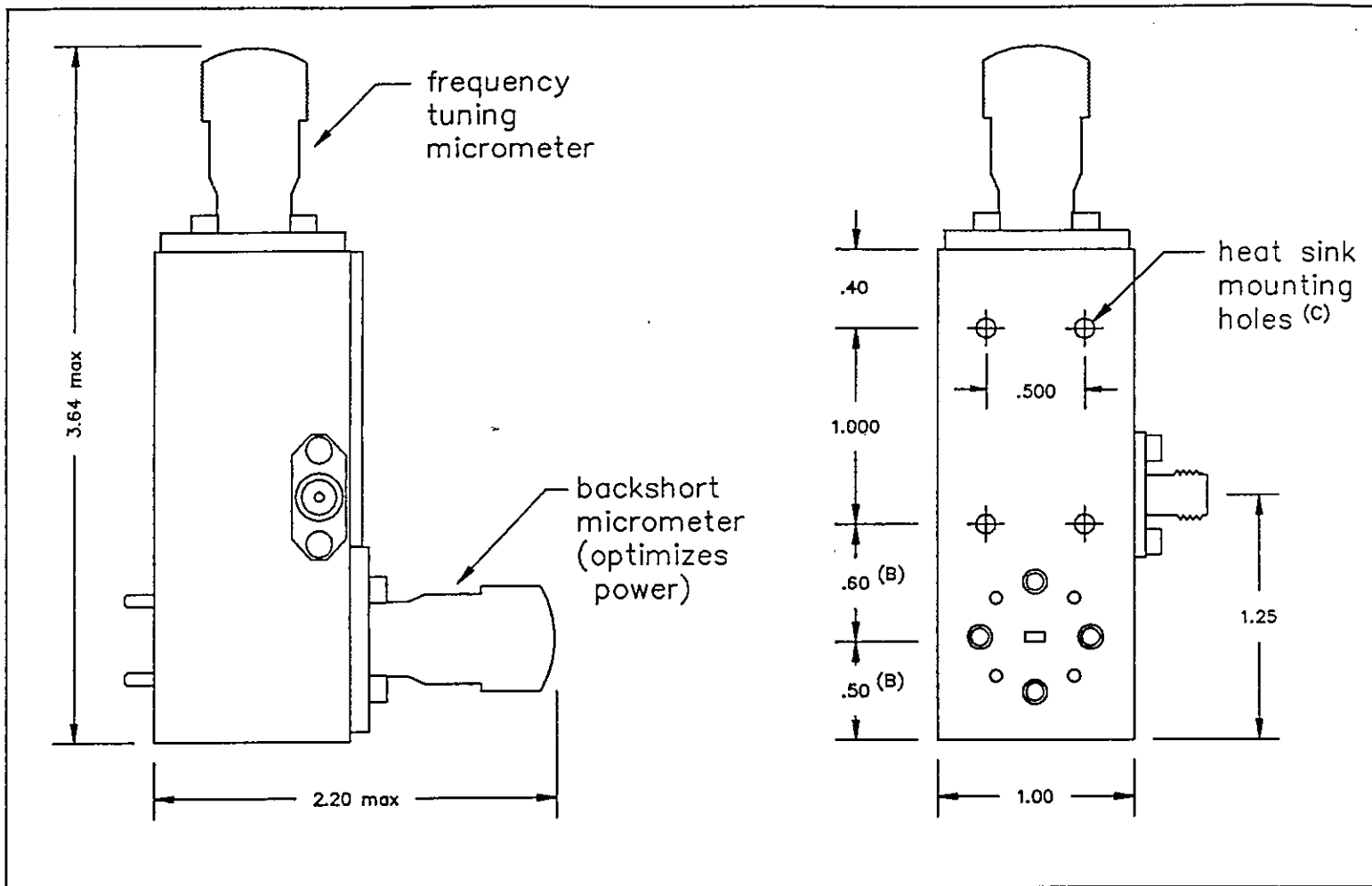
SCANNED

BIAS = 10.0 volts; ~160 mA; DO NOT OPERATE ABOVE 10.7 VOLTS.
 INTERNAL PROTECTIVE CIRCUITRY - internal protection is provided against overvoltage and reverse bias. Bias greater than 10.5 volts will trip crowbar circuit. Turn oscillator off to reset.
 LIMITS - For best results do not exceed range in above table. Internal stops are provided.
 Frequency tuning micrometer: 0.000" - 0.140"
 Backshort micrometer: 0.000" - 0.200"
 Do not force micrometers against limits.
 Do not remove micrometer knobs or disassemble oscillator.

J. E. CARLSTROM Co

Wideband Mechanically Tuned Gunn Oscillators

H92



- NOTES: (A) all dimensions in inches
(B) these dimensions measured to bottom edge of waveguide
(C) 4 holes, 0.25 inches deep, threaded 4-40