

# MICROWAVE TUNING ELEMENTS

General matters

## GENERAL MATTERS

### Description

Microwave tuning elements are an economical means of introducing variable reactance to waveguides, cavities and other microwave structures. They are excellent for applications requiring precision, low loss high resolution tuning. The self-locking, constant torque drive mechanism eliminates the need for locking nuts and assures stable, noise free adjustment in application from DC to W band.

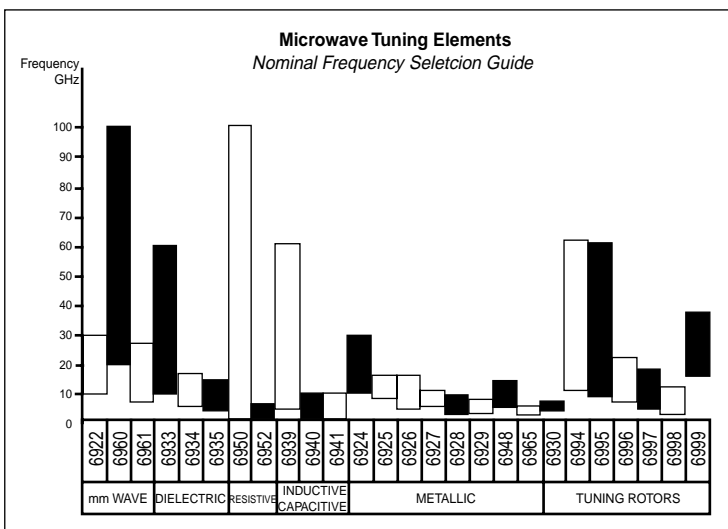
A microwave tuning element consists of a mounting bushing with an integral tuning rotor.

### Features

- High tuning resolution
- Excellent tuning stability and very low dynamic noise
- Frequency range from 0 to 100 GHz and more
- Easy to use, one hand tuning
- Gold and chromate finish (other plating upon request)
- Metallic, dielectric and resistive types available
- All tuning rotors available separately
- High reliability versions available upon request

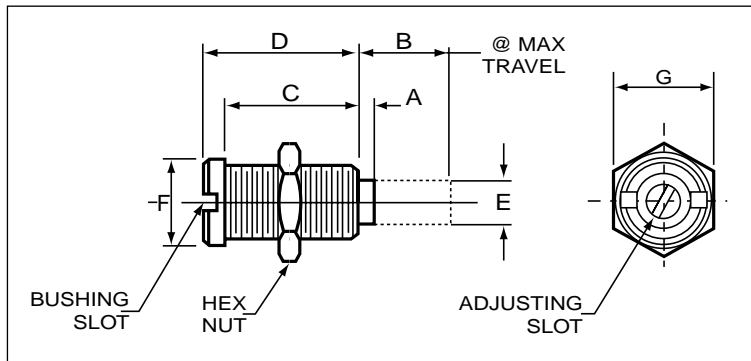
### Applications

- Combine filters - Interdigital filters
- Impedance transformers - Attenuators
- Impatt and Gunn oscillators
- Microstrip and strip-line circuits
- Coaxial structures - Waveguide circuitry



A - BUSHING WITH METALLIC ROTOR

Tuning elements with metallic posts are simple and straight-forward in design. Each tuning unit consists of two parts, a threaded mounting bushing and a self-locking rotor screw that won't vibrate loose. Noise free, low resistance contacting is maintained between both parts by the "spring loaded" webbing which forces the threads together. High Q tuning is possible from the smooth, short, non threaded slug with less exposed surface area than with standard screws.



Technical data

Dimensions (mm)

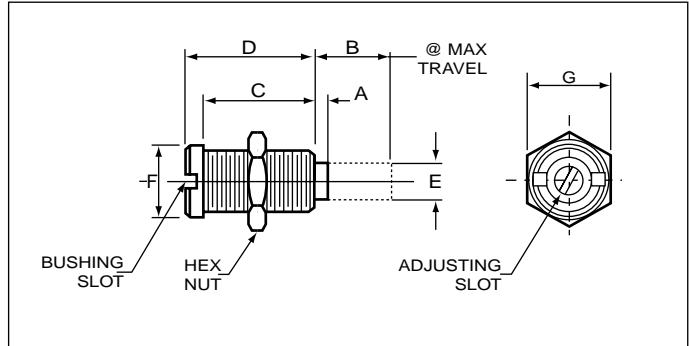
Temex Part N°	Nominal frequency band	Bushing thread	Tap reference	Typ. tap drill	Mounting torque g. cm	A	B	C	D	E	F	G
AT6924-0 SL	X and K	.120 - 80	7060	2.75	700	0	3.8	5.1	6.0	1.8	3.4	4.0
AT6924-1 SL	X and K	.120 - 80	7060	2.75	700	1.2	1.9	2.2	3.1	1.8	3.4	4.0
AT6924-2 SL	X and K	.120 - 80	7060	2.75	700	0	1.9	5.1	6.0	1.8	3.4	4.0
AT6924-3 SL	X and K	.120 - 80	7060	2.75	700	0	0.8	2.2	3.1	1.8	3.4	4.0
AT6925-0 SL	C and X	10 - 64	7061	4.45	2100	0	3.8	5.4	6.4	3.2	5.3	5.6
AT6925-1 SL	C and X	10 - 64	7061	4.45	2100	0	0.6	2.2	3.2	3.2	5.3	5.6
AT6925-2 SL	C and X	10 - 64	7061	4.45	2100	0	3.2	5.4	6.4	1.6	5.3	5.6
AT6925-3 SL	C and X	10 - 64	7061	4.45	2100	3.3	7.1	5.4	6.4	3.2	5.3	5.6
AT6925-7 SL	C and X	10 - 64	7061	4.45	2100	1.1	4.9	5.4	6.4	3.2	5.3	5.6
AT6925-8 SL	C and X	10 - 64	7061	4.45	2100	0.2	2.0	3.2	4.2	3.2	5.3	5.6
AT6925-9 SL	C and X	10 - 64	7061	4.45	2100	0	2.3	6.6	7.6	3.2	5.3	5.6
AT6926-0 SL	C and X	15/64 - 64	7062	5.5	3500	0	2.7	4.6	5.4	4.1	6.8	7.0
AT6926-1 SL	C and X	15/64 - 64	7062	5.5	3500	0	0.7	2.4	3.2	4.1	6.8	7.0
AT6926-4 SL	C and X	15/64 - 64	7062	5.5	3500	2.3	8.8	5.5	9.1	4.1	6.8	7.0
AT6926-5 SL	C and X	15/64 - 64	7062	5.5	3500	0.6	2.7	4.0	4.8	4.1	6.8	7.0
AT6926-6 SL	C and X	15/64 - 64	7062	5.5	3500	2.6	11.5	5.4	11.5	4.1	6.8	7.0
AT6926-7 SL	C and X	15/64 - 64	7062	5.5	3500	1.9	4.6	4.6	5.4	4.1	6.8	7.0
AT6926-9 SL	C and X	15/64 - 64	7062	5.5	3500	0	2.7	5.5	9.1	4.1	6.8	7.0
AT6926-10 SL	C and X	15/64 - 64	7062	5.5	3500	0	4.6	5.5	9.1	4.1	6.8	7.0
AT6927-0 SL	C and X	15/64 - 64	7062	5.55	3500	0	6.5	5.5	9.7	4.1	6.8	7.0
AT6928-0 SL	C	15/64 - 64	7062	5.55	3500	0	8.8	5.4	11.5	4.1	6.8	7.0
AT6928-2 SL	C	15/64 - 64	7062	5.55	3500	6.1	8.8	4.6	5.4	4.1	6.8	7.0
AT6929-0 SL	C	10 - 64	7061	4.45	2100	0	11.4	13.0	14.0	3.2	5.3	5.6
AT6948-0 SL	C and X	.312 - 64	7065	7.55	8400	0	5.9	8.2	9.2	5.3	9.5	10
AT6965-0 SL	L and S	.469 - 32		11.10	16800	0	12.7	17.3	18.3	8.8	13.5	14.2

# MICROWAVE TUNING ELEMENTS

## General matters

### B - BUSHING WITH POWER ABSORBENT ROTOR

The AT6950 series tuning elements are unique in that they absorb varying amounts of microwave power. The amount of power absorbed depends on the insertion of the slug into the waveguide or cavity. When properly mounted in the input or the output ports of microwave amplifiers, oscillators, etc., they may provide the test engineer a convenient means to trim the microwave power. The slug material is a magnetically loaded epoxide rod, chosen for its broadband lossy properties.



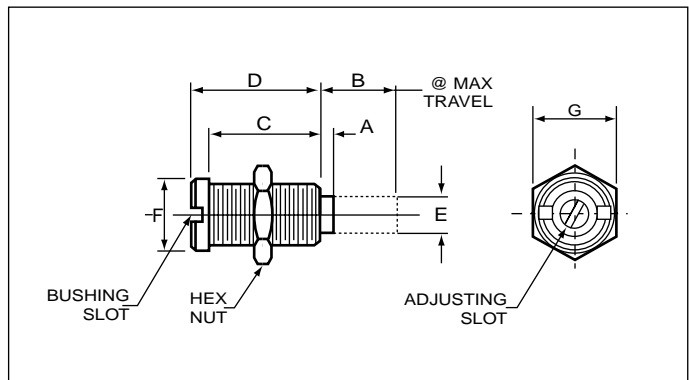
### Technical data

Temex Part N°	Nominal frequency band	Bushing thread	Tap reference	Typ. tap drill	Mounting torque g. cm	A	B	C	D	E	F	G
AT6950-0 SL	Broad	.120 - 80	7060	2.75	700	0.6	4.3	5.1	6.0	1.6	3.4	4.0
AT6950-1 SL	Band	.120 - 80	7060	2.75	700	0	3.3	5.1	6.0	2.0	3.4	4.0
AT6952-0 SL		15/64 - 64	7062	5.55	3500	0	6.4	5.5	9.1	3.9	6.8	7.0

### Dimensions (mm)

### C - BUSHING WITH DIELECTRIC ROTOR

Dielectric tuning elements are used whenever the ultimate is required in high frequency low loss tuning. When a dielectric rod is introduced into a microwave cavity, the cavity "appears" electrically larger and the resonant frequency is lowered. This change in resonant frequency is dependent on the depth of dielectric rod insertion, the dissipation factor (DF) which must be kept low to minimize circuit loss, the dielectric constant (K) of the material for tuning resolution, the diameter of the rod and its placement in the circuit. Ideal applications are Gunn diode and impatt oscillators.



### Technical data

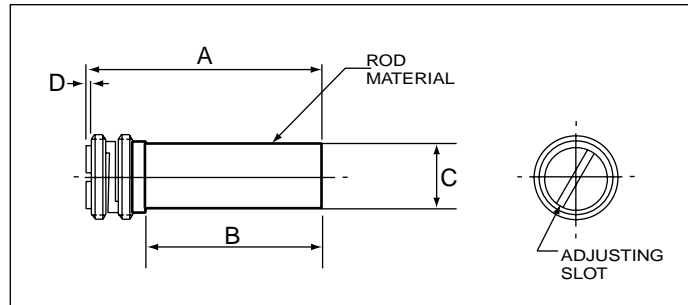
Temex Part N°	Rod mat.	Nominal frequency band	Bushing thread	Tap reference	Typ. tap drill	Mounting torque g. cm	A	B	C	D	E	F	G
AT6933-0 SL	S	X and K	.120 - 80	7060	2.75	700	0.8	4.3	5.1	6.0	1.6	3.4	4.0
AT6933-1 SL	S	X and K	.120 - 80	7060	2.75	700	0.8	3.3	5.1	6.0	0.9	3.4	4.0
AT6933-2 SL	Q	K	.120 - 80	7060	2.75	700	0.6	4.3	5.1	6.0	1.6	3.4	4.0
AT6934-0 SL	S	C, X and K	15/64 - 64	7062	5.55	3500	0.8	3.0	4.6	5.4	3.9	6.8	7.0
AT6935-0 SL	S	X and K	15/64 - 64	7062	5.55	3500	0.8	6.8	5.5	9.1	3.9	6.8	7.0

### Dimensions (mm)

Rod material	Approximate K @ 10 GHz	Approximate DF @ 10 GHz
S SAPPHIRE	9.9	0.0001
Q QUARTZ	3.8	0.0001
A ALUMINA	9.7	0.0002

**D - TUNING ROTOR**

Extended range high Q dielectric and metallic rotors are used where direct insertion of the tuning element is desired. Taps designed specifically to insure proper fit are available from the factory and are listed below.



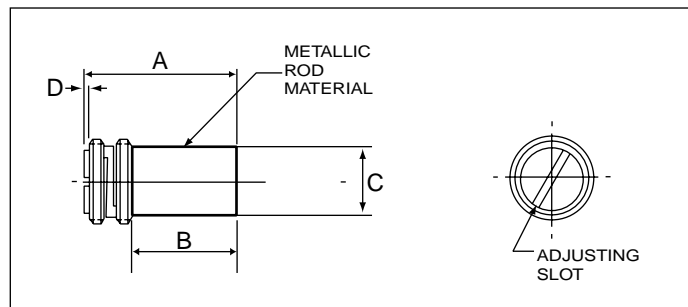
**Dielectric rotors**

**Technical data**

**Dimensions (mm)**

Temex Part N°	Rod material	Thread UNS-2A	Tap reference	Typ. tap drill	A	B	C	D	Slot W x L
AT6930-4	Sapphire	3/32 - 80	7064	2.05	5.8	2.5	0.9	0.5	0.4 x 1.5
AT6930-8	Sapphire	3/32 - 80	7064	2.05	6.6	3.5	1.6	0.5	0.4 x 1.5

Other dielectric materials available upon request



**Metallic rotors**

**Technical data**

**Dimensions (mm)**

Temex Part N°	Rod material	Thread	Tap reference	Typ. tap drill	A	B	C	D	Slot W x L
AT6501-3	Brass	M 1.5 x 0.25	AT7071	1.25	4.4	2.3	1.1	0.4	0.25 x 1.10
AT6501-0	Brass	M 2.5 x 0.25	AT7070	2.25	5.4	3.3	2.1	0.4	0.4 x 1.90
AT6501-1	Brass	M 2.5 x 0.25	AT7070	2.25	4.4	2.3	2.1	0.4	0.4 x 1.90
AT6501-2	Brass	M 2.5 x 0.25	AT7070	2.25	7.7	5.6	2.1	0.4	0.4 x 1.90
AT6995-0	Brass	3/32 - 80	AT7064	2.05	3.1	0.8	1.8	0.5	0.4 x 150
AT6995-1	Brass	3/32 - 80	AT7064	2.05	4.2	1.9	1.8	0.5	0.4 x 150
AT6995-2	Brass	3/32 - 80	AT7064	2.05	6.1	3.8	1.8	0.5	0.4 x 150
AT6996-0	Brass	5/32 - 64	AT7059	3.55	5.8	3.2	1.6	0.25	0.50 x 3.0
AT6996-1	Brass	5/32 - 64	AT7059	3.55	6.4	3.8	3.2	0.25	0.50 x 3.0
AT6996-2	Brass	5/32 - 64	AT7059	3.55	9.7	7.1	3.2	0.25	0.50 x 3.0
AT6996-3	Brass	5/32 - 64	AT7059	3.55	14.0	11.4	3.2	0.25	0.50 x 3.0
AT6996-4	Brass	5/32 - 64	AT7059	3.55	3.2	0.6	3.2	0.25	0.50 x 3.0
AT6996-5	Brass	5/32 - 64	AT7059	3.55	7.5	4.9	3.2	0.25	0.50 x 3.0
AT6996-6	Brass	5/32 - 64	AT7059	3.55	4.6	2.0	3.2	0.25	0.50 x 3.0
AT6996-8	Brass	5/32 - 64	AT7059	3.55	4.9	2.3	3.2	0.25	0.50 x 3.0
AT6997-0	Brass	10 - 64	AT7061	4.45	14.1	11.5	4.1	0.3	0.50 x 3.70
AT6997-1	Brass	10 - 64	AT7061	4.45	5.3	2.7	4.1	0.3	0.50 x 3.70
AT6997-2	Brass	10 - 64	AT7061	4.45	9.1	6.5	4.1	0.3	0.50 x 3.70
AT6997-3	Brass	10 - 64	AT7061	4.45	11.4	8.8	4.1	0.3	0.50 x 3.70
AT6997-4	Brass	10 - 64	AT7061	4.45	3.3	0.7	4.1	0.3	0.50 x 3.70
AT6997-5	Brass	10 - 64	AT7061	4.45	7.2	4.6	4.1	0.3	0.50 x 3.70

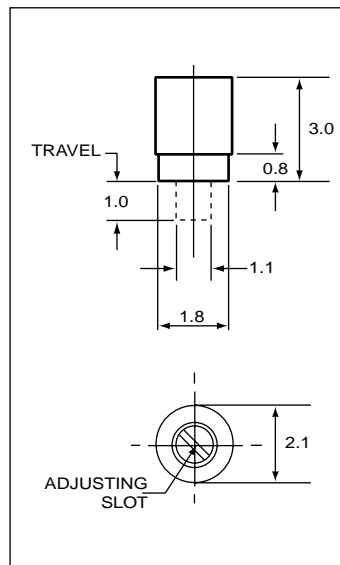
Other materials available upon request



## MICROWAVE TUNING ELEMENTS

### E - MICROWAVE TUNING ELEMENTS

The millimeter wave tuning elements are higher frequency versions of both the metallic and dielectric tuning elements described in this catalog. Please contact TEMEX for further information.



**AT6922**

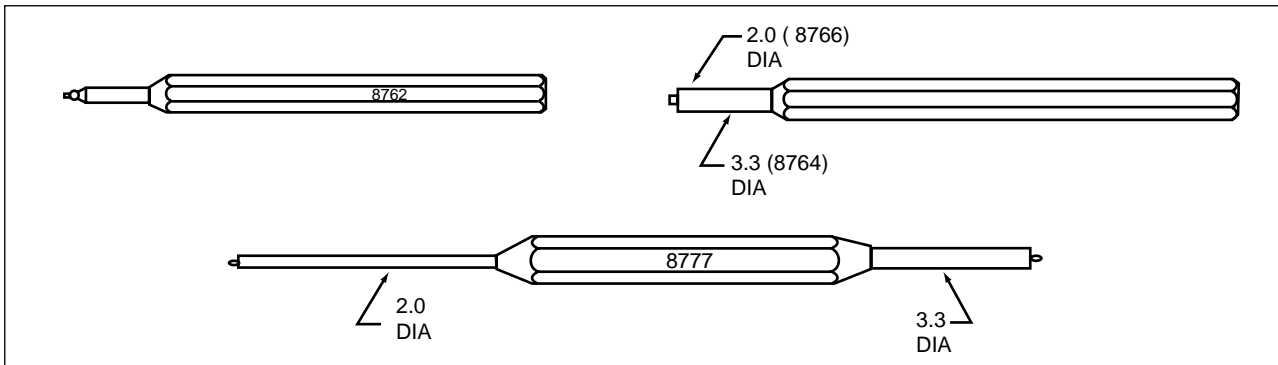
# FREQUENCY TUNING COMPONENTS

Tuning tools, taps

## TUNING TOOLS, TAPS

### TUNING TOOLS

- Slot tuning tools



Temex Part N°	APPLICATION	
AT8762	AT(x) 7260 Gigahertz trimmers Series AT6922 Tuning elements	
AT8764	3.3 DIA Standard Air Series AT5700 Miniature Series	
AT8766	2.0 DIA AT(x) 7270, 80 90 Gigahertz trimmers Series AT5800 Miniature Air Series	
AT8777	3.3 DIA Standard Air Series AT5700 Miniature Series	2.0 DIA AT(x) 7270, 80 90 Gigahertz trimmers Series AT5800 Miniature Air Series

- Square drive tuning tools

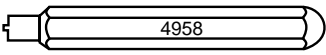
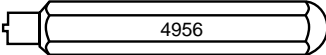
Temex Part N°	APPLICATION	
AT4192	AT9401 } Thin trimmers Series AT9402 } AT2320 Ceramic trimmers	
AT4193	AT9410 Thin trimmers Series	



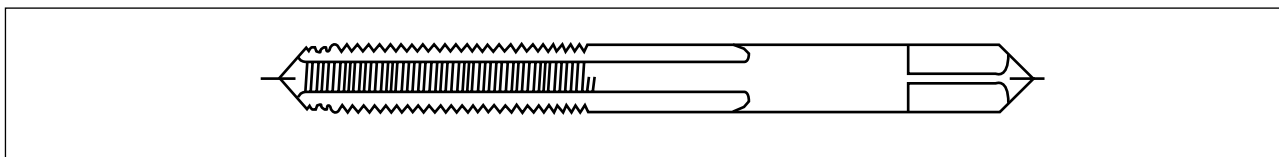
## FREQUENCY TUNING COMPONENTS

Tuning tools, taps

- Round nut wrenches*

Temex Part N°	APPLICATION	
AT4958	5800 Miniature Air Series	
AT4956	5700 Miniature Air Series	

### Taps



Temex Part N°	THREAD SIZE UNS-2	RECOMMENDED TAP DRILL
AT7057	.200 - 80	4.75
AT7059	5/32 - 64	3.55
AT7060	.120 - 80	2.75
AT7061	10 - 64	4.45
AT7062	15/64 - 64	5.55
AT7063	1/4 - 64	5.95
AT7064	3/32 - 80	2.05
AT7065	.312 - 64	7.50
AT7070	M 2.5 x 0.25	2.25
AT7071	M 1.5 x 0.25	1.25

