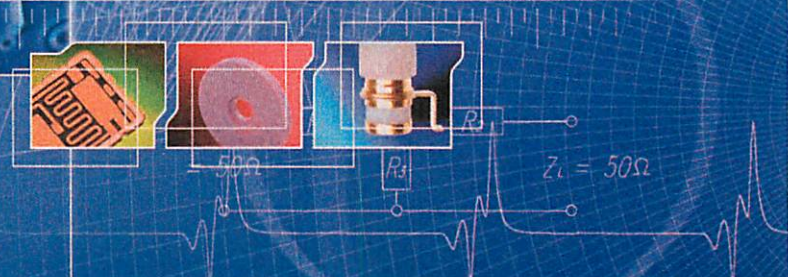


**ELECTRONIC ACCURACY**  
THROUGH MECHANICAL PRECISION

U.024

$$Q = \frac{|C_c - X_i|}{ESR}$$



*Johanson*

## Contents

	<b>Applications</b>	<b>Series #</b>	<b>Page#</b>
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## Hybrid Couplers (JCC) and Dual Directional (JDC)

Part no. (PDF file)	Frequency	Power (W)	Size LxW (inches)	Port Impedance	VSWR	Insertion Loss (dB)	Amplitude Balance (dB)	Phase Balance (degrees)	Isolation (db)	Coupling (db)	Directivity (db)	Coupled Flatness (dB)
JCC-1001	0.8 - 1.0 GHz	400	1.5 x 0.6	50	< 1.15:1	< .2	+/-0.15	90 +/- 1.0	> 24	3	N/A	N/A
JCC-1001SM	0.8 - 1.0 GHz	400	1.5 x 0.6	50	< 1.15:1	< .2	+/-0.15	90 +/- 1.0	> 24	3	N/A	N/A
JCC-1002	120-230 MHz	400	2.20 x .80	50	< 1.2:1	< .15	+/-0.15	90 +/- 3	> 20	3	N/A	N/A
JCC-1002SM	120-230 MHz	400	2.20 x .80	50	< 1.2:1	< .15	+/-0.15	90 +/- 3	> 20	3	N/A	N/A
JCC-1002-2	0.5 - 2.5 GHz	300	2.20 x .80	50	< 1.30:1	< 0.50	+/- 0.65	90 +/- 5	> 18	3	N/A	N/A
JCC-1002-2SM	0.5 - 2.5 GHz	300	2.20 x .80	50	< 1.30:1	< 0.50	+/- 0.65	90 +/- 5	> 18	3	N/A	N/A
JCC-1002-3	1.0 - 4.2 GHz	300	2.20 x .80	50	< 1.30:1	< 0.50	+/- 0.50	90 +/- 5	> 18	3	N/A	N/A
JCC-1002-3SM	1.0 - 4.2 GHz	300	2.20 x .80	50	< 1.30:1	< 0.50	+/- 0.50	90 +/- 5	> 18	3	N/A	N/A
JCC-1003	225 - 0.4 GHz	400	1.62 x .57	50	< 1.2:1	< .15	+/-0.5	90 +/- 2	> 21	3	N/A	N/A
JCC-1003SM	225 - 0.4 GHz	400	1.62 x .57	50	< 1.2:1	< .15	+/-0.5	90 +/- 2	> 21	3	N/A	N/A
JCC-1004	301 - 500 MHz	400	1.35 x .51	50	< 1.2:1	< .2	+/-0.4	90 +/- 5	> 21	3	N/A	N/A
JCC-1004SM	301 - 500 MHz	400	1.35 x .51	50	< 1.2:1	< .2	+/-0.4	90 +/- 5	> 21	3	N/A	N/A
JCC-1004-1	0.8 - 2.1 GHz	300	1.35 x .50	50	< 1.25:1	< 0.25	+/-0.75	90 +/- 5	> 18	3	N/A	N/A
JCC-1004-1SM	0.8 - 2.1 GHz	300	1.35 x .50	50	< 1.25:1	< 0.25	+/-0.75	90 +/- 5	> 18	3	N/A	N/A
JCC-1006	470 - 860 MHz	1000	2.65 x 2.40	50	< 1.25:1	< 0.20	+/- 0.65	90 +/- 5	> 18	3	N/A	N/A
JCC-1006SM	470 - 860 MHz	1000	2.65 x 2.40	50	< 1.25:1	< 0.20	+/- 0.65	90 +/- 5	> 18	3	N/A	N/A
JCC-1006-1	470 - 860 MHz	200	2.65 x 2.65	50	< 1.25:1	< .3	+/- 0.15	90 +/- 5	> 18	3	N/A	N/A
JCC-1006-1SM	470 - 860 MHz	200	2.65 x 2.65	50	< 1.25:1	< .3	+/- 0.15	90 +/- 5	> 18	3	N/A	N/A
JCC-1006-2	30 - 88 MHz	450	2.65 x 2.65	50	< 1.30:1	< 0.25	+/- .95	90 +/- 5	> 18	3	N/A	N/A
JCC-1006-2SM	30 - 88 MHz	450	2.65 x 2.65	50	< 1.30:1	< 0.25	+/- .95	90 +/- 5	> 18	3	N/A	N/A
JCC-1007	2 - 6 GHz	200	1.30 x .25	50	< 1.30:1	< 0.3	+/- 1.0	90 +/- 5	> 18	3	N/A	N/A
JCC-1007SM	2 - 6 GHz	200	1.30 x .25	50	< 1.30:1	< 0.3	+/- 1.0	90 +/- 5	> 18	3	N/A	N/A
JCC-1008	200 - 1.0 GHz	300	3.20 x .90	50	< 1.30:1	< 0.50	+/- 0.75	90 +/- 5	> 16	3	N/A	N/A
JCC-1008SM	200 - 1.0 GHz	300	3.20 x .90	50	< 1.30:1	< 0.50	+/- 0.75	90 +/- 5	> 16	3	N/A	N/A
JCC-1009	225 - 520 MHz	450	2.00 x .50	50	< 1.25:1	< 0.25	+/- 0.70	90 +/- 5	> 20	3	N/A	N/A
JCC-1009SM	225 - 520 MHz	450	2.00 x .50	50	< 1.25:1	< 0.25	+/- 0.70	90 +/- 5	> 20	3	N/A	N/A
JCC-1010	225-400	499	1.19 x 1.09	50	< 1.20:1	< 0.15	0.5	90 +/- 5	> 21	3	N/A	N/A
JCC-1010SM	225-400	499	1.19 x 1.09	50	< 1.20:1	< 0.15	0.5	90 +/- 5	> 21	3	N/A	N/A
JDC-1000	136-174 MHz	250	2.5 x 1.5	50	< 1.25:1	< 0.25	N/A	N/A	N/A	40.0 +/- 1.0	> 20	+/- 0.25
JDC-1000SM	136-174 MHz	250	2.5 x 1.5	50	< 1.25:1	< 0.25	N/A	N/A	N/A	40.0 +/- 1.0	> 20	+/- 0.25
JDC-1000-1	136-174 MHz	550	2.5 x 1.5	50	< 1.25:1	< 0.25	N/A	N/A	N/A	40.0 +/- 1.0	> 20	+/- 0.25
JDC-1000-1SM	136-174 MHz	550	2.5 x 1.5	50	< 1.25:1	< 0.25	N/A	N/A	N/A	40.0 +/- 1.0	> 20	+/- 0.25
JDC-1000-2	500-2500 MHz	500	2.5 x 1.3	50	< 1.25:1	< 0.25	N/A	N/A	N/A	40.0 +/- 1.0	> 18	+/- .50
JDC-1000-2SM	500-2500 MHz	500	2.5 x 1.3	50	< 1.25:1	< 0.25	N/A	N/A	N/A	40.0 +/- 1.0	> 18	+/- .50
JDC - 1001	2 - 8 GHz	400	2.1 x 1.1	50	< 1.20:1	< 0.20	N/A	N/A	N/A	40.0 +/- 1.0	> 18	+/- 0.5

## Variable Inductors

Surface Mount								
Part No. (PDF file)	L(nH)				Q (@ 100MHz)	SRF (GHz)	TURNS	THREAD LENGTH (MM)
	MIN	NOM	MAX	NO CORE				
JLC02E030TRSM	32	33	34	39	90	1.2	2	6
JLC03E048TRSM	46	49	52	59	95	1	3	6
JLC04E065TRSM	60	64	68	78	101	0.9	4	6
JLC05E088TRSM	74	81	87	99	114	0.9	5	8
JLC06E110TRSM	94	107	119	123	119	0.7	6	8
JLC07E130TRSM	104	118	133	142	121	0.7	7	10

Vertical Mount - Surface Mount								
Part No. (PDF file)	L(nH)				Q (@ 100MHz)	SRF (GHz)	TURNS	THREAD LENGTH (MM)
	MIN	NOM	MAX	NO CORE				
JLC02E030TRVSM	32	33	34	39	90	1.2	2	6
JLC03E048TRVSM	46	49	52	59	95	1	3	6
JLC04E065TRVSM	60	64	68	78	101	0.9	4	6
JLC05E088TRVSM	74	81	87	99	114	0.9	5	8
JLC06E110TRVSM	94	107	119	123	119	0.7	6	8
JLC07E130TRVSM	104	118	133	142	121	0.7	7	10

Vertical Mount - PC Style								
Part No. (PDF file)	L(nH)				Q (@ 100MHz)	SRF (GHz)	TURNS	THREAD LENGTH (MM)
	MIN	NOM	MAX	NO CORE				
JLC02E030TRVPC	32	33	34	39	90	1.2	2	6
JLC03E048TRVPC	46	49	52	59	95	1	3	6
JLC04E065TRVPC	60	64	68	78	101	0.9	4	6
JLC05E088TRVPC	74	81	87	99	114	0.9	5	8
JLC06E110TRVPC	94	107	119	123	119	0.7	6	8
JLC07E130TRVPC	104	118	133	142	121	0.7	7	10

PATENT PENDING

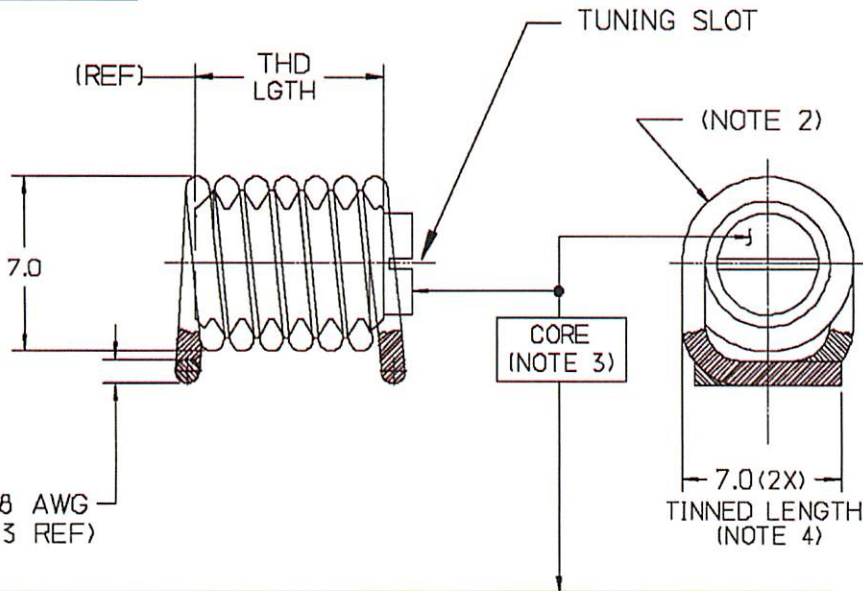
MI DRG. NO. JLCXXEYYYYTRSM REV. D

**JLCXXEYYYYTRSM**  
**VARIABLE INDUCTOR COIL**  
**(NONMAGNETIC)**

FILE AIROUT

NOTES:

1. a. DIMENSIONS mm  
 b. DIMENSIONS (inches) FOR REFERENCE ONLY
2. COIL  
 a. MATERIAL:  
 COPPER ALLOY (COATED)  
 b. TEMP RANGE UP TO 200°C
3. CORE  
 a. MATERIAL:  
 PTFE / COPPER ALLOY  
 b. SELF-RESONANT FREQUENCY (SRF) IS MEASURED WITH THE CORE FULLY ENGAGED AS DEPICTED  
 c. L MIN MEASURED WITH CORE ENGAGING FULL WINDINGS. L MAX MEASURED WITH CORE ENGAGING A SINGLE TURN.
4. TINNING  
 a. MATERIAL:  
 RoHS COMPLIANT "SAC" ALLOY



JMC P/N	L (nH)				Q (@ 100 MHz)	SRF (GHz)	TURNS
	MIN	NOM	MAX	NO CORE			
JLC02E030TRSM	32	33	34	39	90	1.2	2
JLC03E048TRSM	46	49	52	59	95	1.0	3
JLC04E065TRSM	60	64	68	78	101	0.9	4
JLC05E088TRSM	74	81	87	99	114	0.9	5
JLC06E110TRSM	94	107	119	123	119	0.7	6
JLC07E130TRSM	104	118	133	142	121	0.7	7

READINGS TAKEN ON AGILENT/8358-A METER.

D	09/08/09	SDJ	SDJ	MAI	000787
C	06/25/09	SDJ	SDJ	MAI	000780
B	06/24/09	SDJ	SDJ	MAI	000779
LEVEL	DATE	DRN.	CHK.	APP.	ECN

REVISIONS

DRN.	CHK.	APP.	SCALE
MAI	MAI	MAI	NONE
DATE	DATE	DATE	.XX ± .752
03/19/09	03/19/09	03/19/09	.XXX ± .254



**JOHANSON MANUFACTURING CORPORATION**  
 ROCKAWAY VALLEY ROAD, BOONTON, N.J. 07005 (973)534-2676 FAX (973)534-2954  
 ELECTRONIC ACCURACY THROUGH MECHANICAL PRECISION

PROPRIETARY INFORMATION CONTAINED NOT TO BE USED WITHOUT JOHANSON MANUFACTURING CORPORATION APPROVAL

PATENT PENDING

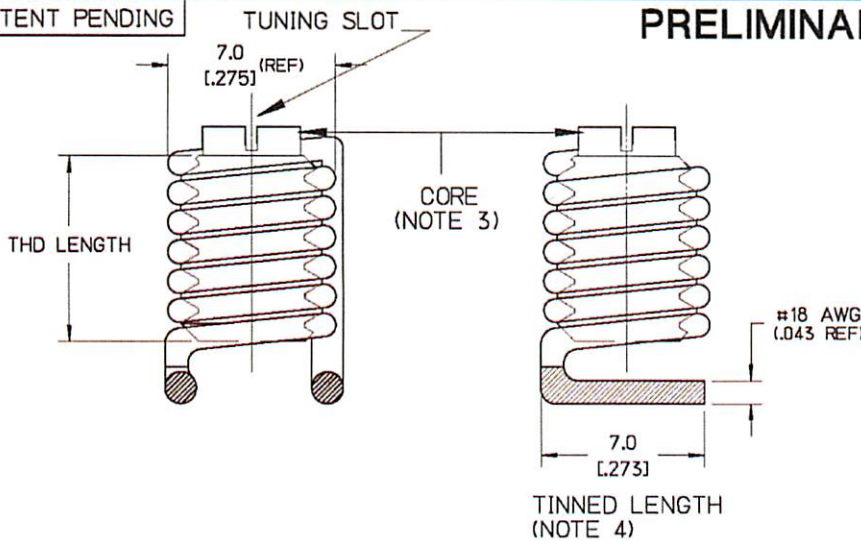
PRELIMINARY

MI DRG. NO. JLCXXEYYYYTRVSM REV. A

JLCXXEYYYYTRVSM A

VARIABLE INDUCTOR COIL  
VERTICAL-SURFACE MOUNT  
(NONMAGNETIC)

FILE: AIROUT



NOTES:

1. a. DIMENSIONS: mm  
b. DIMENSIONS: (inches) FOR REFERENCE ONLY
2. COIL :  
a. MATERIAL:  
COPPER ALLOY (COATED)  
b. TEMP RANGE: UP TO 200°C
3. CORE :  
a. MATERIAL:  
PTFE / COPPER ALLOY  
b. SELF-RESONANT FREQUENCY (SRF) IS MEASURED WITH THE CORE) FULLY ENGAGED AS DEPICTED  
c. L MIN MEASURED WITH CORE ENGAGING FULL WINDINGS. L MAX MEASURED WITH CORE ENGAGING A SINGLE TURN.
4. TINNING :  
a. MATERIAL:  
RoHS COMPLIANT "SAC" ALLOY

JMC P/N	L (nH)				Q (@ 100 MHz)	SRF (GHz)	TURNS	THD LGTH mm (in)
	MIN	NOM	MAX	NO CORE				
JLC02E030TRSM	32	33	34	39	90	1.2	2	6(.236)
JLC03E048TRSM	46	49	52	59	95	1.0	3	6(.236)
JLC04E065TRSM	60	64	68	78	101	0.9	4	6(.236)
JLC05E088TRSM	74	81	87	99	114	0.9	5	8(.315)
JLC06E110TRSM	94	107	119	123	119	0.7	6	8(.315)
JLC07E130TRSM	104	118	133	142	121	0.7	7	10(.394)

READINGS TAKEN ON AGILENT/8358-A METER.

A	02/11/10	SAF			000
LEVEL	DATE	DRN.	CHK.	APP.	ECN
REVISIONS					
DRN.	SAF	CHK.	APP.	SCALE NONE	
DATE	02/11/10	DATE	DATE	.XX ± .762 .XXX ± .254	



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PATENT PENDING

TUNING SLOT

PRELIMINARY

MI DRG. NO.

JLCXXEYYYTRVPC

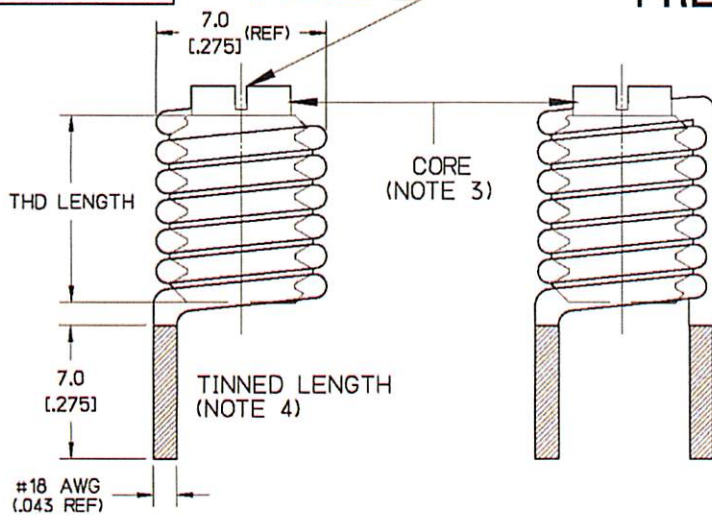
REV.

JLCXXEYYYTRVPC

A

VARIABLE INDUCTOR COIL  
VERTICAL MOUNT PC STYLE  
(NONMAGNETIC)

FILE: AIROUT



NOTES:

1. a. DIMENSIONS: mm  
b. DIMENSIONS: (inches) FOR REFERENCE ONLY
2. COIL :  
a. MATERIAL: COPPER ALLOY (COATED)  
b. TEMP RANGE: UP TO 200°C
3. CORE :  
a. MATERIAL: PTFE / COPPER ALLOY  
b. SELF-RESONANT FREQUENCY (SRF) IS MEASURED WITH THE CORE) FULLY ENGAGED AS DEPICTED  
c. L MIN MEASURED WITH CORE ENGAGING FULL WINDINGS. L MAX MEASURED WITH CORE ENGAGING A SINGLE TURN.
4. TINNING :  
a. MATERIAL: RoHS COMPLIANT "SAC" ALLOY

JMC P/N	L (nH)				Q (@ 100 MHz)	SRF (GHz)	TURNS	THD LGTH mm (in)
	MIN	NOM	MAX	NO CORE				
JLC02E030TRSM	32	33	34	39	90	1.2	2	6(.236)
JLC03E048TRSM	46	49	52	59	95	1.0	3	6(.236)
JLC04E065TRSM	60	64	68	78	101	0.9	4	6(.236)
JLC05E088TRSM	74	81	87	99	114	0.9	5	8(.315)
JLC06E110TRSM	94	107	119	123	119	0.7	6	8(.315)
JLC07E130TRSM	104	118	133	142	121	0.7	7	10(.394)

READINGS TAKEN ON AGILENT/8358-A METER.

A	02/11/10	SAF			000
LEVEL	DATE	DRN.	CHK.	APP.	ECN
REVISIONS					
DRN.	SAF	CHK.	APP.	SCALE NONE	
DATE	02/11/10	DATE	DATE	.XX ± .762 .XXX ± .254	



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## Resistors

Package	Material	Power (max)	Resistance (Ohm)	Frequency* (GHz)	Maximum Derating Temperature (max °C)
Chip CR Series	BeO	1000	5 - 1000	DC - 6.0	250
SMD RS Series	AlN	600	5 - 1000	DC - 6.0	250
	BeO	1000	5 - 1000	DC - 6.0	250
	Alumina	100	5 - 1000	DC - 6.0	250
Flangeless RL Series	AlN	600	5 - 1000	DC - 6.0	250
	BeO	1000	5 - 1000	DC - 6.0	250
Flanged RF Series	AlN	600	5 - 1000	DC - 6.0	250
	BeO	1000	5 - 1000	DC - 6.0	250

\*typical

Part Number	Package	Material	Size LxW (Inches)	Power (max)	Resistance (Ohm)	Frequency* (GHz)	Maximum Derating Temperature (max °C)
CR1X1BR5CA	Chip	BeO	1.040 X 1.000	1,000	8.33	DC - 3.0	250
RF002BB01	Flanged	BeO	.200 X .300	5	50	DC - 3.0	250
RF005BB01	Flanged	BeO	.300 X .250	5	50	DC - 3.0	250
RF010AA01	Flanged	AlN	.300 X .200	10	100	DC - 3.0	250
RF010AA02	Flanged	AlN	.500 X .200	10	100	DC - 3.0	250
RF010AB01	Flanged	AlN	.300 X .200	10	50	DC - 3.0	250
RF010AC01	Flanged	AlN	.300 X .200	10	75	DC - 3.0	250
RF010AE01	Flanged	AlN	.300 X .200	10	150	DC - 3.0	250
RF010BA01	Flanged	BeO	.300 X .200	10	100	DC - 3.0	250
RF010BA02	Flanged	BeO	.500 X .200	10	100	DC - 3.0	250
RF010BB01	Flanged	BeO	.300 X .200	10	50	DC - 3.0	250
RF010BF01	Flanged	BeO	.300 X .200	10	25	DC - 3.0	250
RF010BG01	Flanged	BeO	.300 X .200	10	150	DC - 3.0	250
RF010BJ01	Flanged	BeO	.300 X .200	10	15	DC - 3.0	250
RF010BN01	Flanged	BeO	.300 X .200	10	120	DC - 3.0	250
RF020AA01	Flanged	AlN	.300 X .200	20	100	DC - 3.0	250
RF020AA03	Flanged	AlN	.515 X .250	20	100	DC - 3.0	250
RF020AD03-040	Flanged	AlN	.515 X .250	20	200	DC - 3.0	250
RF020BA02	Flanged	BeO	.500 X .100	20	100	DC - 3.0	250
RF020BA03-010	Flanged	BeO	.515 X .250	20	100	DC - 3.0	250
RF020BA03	Flanged	BeO	.515 X .250	20	100	DC - 3.0	250
RF020BA22	Flanged	BeO	.511 X .138	20	100	DC - 3.0	250
RF020BB03	Flanged	BeO	.515 X .250	20	50	DC - 3.0	250
RF020BD01	Flanged	BeO	.300 X .200	20	200	DC - 3.0	250
RF020BF03	Flanged	BeO	.515 X .250	20	25	DC - 3.0	250
RF020BI03	Flanged	BeO	.515 X .250	20	10	DC - 3.0	250
RF020BP03	Flanged	BeO	.515 X .250	20	6.25	DC - 3.0	250
RF025AB01	Flanged	AlN	.300 X .200	25	50	DC - 3.0	250
RF030BA03	Flanged	BeO	.515 X .250	30	100	DC - 3.0	250
RF040AA04	Flanged	AlN	.800 X .225	40	100	DC - 3.0	250
RF040AA05	Flanged	AlN	.975 X .225	40	100	DC - 3.0	250
RF040BA03	Flanged	BeO	.515 X .250	40	100	DC - 3.0	250
RF040BA04-100	Flanged	BeO	.800 X .230	40	100	DC - 3.0	250
RF040BA04	Flanged	BeO	.800 X .225	40	100	DC - 3.0	250
RF040BA05	Flanged	BeO	.975 X .225	40	100	DC - 3.0	250
RF040BB03	Flanged	BeO	.515 X .250	40	50	DC - 3.0	250
RF040BB04	Flanged	BeO	.800 X .225	40	50	DC - 3.0	250
RF040BF03	Flanged	BeO	.515 X .250	40	25	DC - 3.0	250
RF040BG04	Flanged	BeO	.800 X .225	40	250	DC - 3.0	250
RF040BI03	Flanged	BeO	.515 X .250	40	10	DC - 3.0	250
RF050AA06	Flanged	AlN	.560 X .375	50	100	DC - 3.0	250
RF050BA06	Flanged	BeO	.560 X .375	50	100	DC - 3.0	250

## Resistors

Part Number	Package	Material	Size LxW (Inches)	Power (max)	Resistance (Ohm)	Frequency* (GHz)	Maximum Derating Temperature (max °C)
RF050BB06-010	Flanged	BeO	.560 X .375	50	50	DC - 3.0	250
RF050BB06	Flanged	BeO	.560 X .375	50	50	DC - 3.0	250
RF060AA03	Flanged	AlN	.515 X .250	60	100	DC - 3.0	250
RF060BE03	Flanged	BeO	.515 X .250	60	150	DC - 3.0	250
RF075AA08	Flanged	AlN	.800 X .225	75	100	DC - 3.0	250
RF075AD08	Flanged	AlN	.800 X .225	75	200	DC - 3.0	250
RF075AE08	Flanged	AlN	.800 X .225	75	150	DC - 3.0	250
RF100AB04	Flanged	AlN	.800 X .225	100	50	DC - 3.0	250
RF100BA08	Flanged	BeO	.800 X .225	100	100	DC - 3.0	250
RF100BB08	Flanged	BeO	.800 X .225	100	50	DC - 3.0	250
RF100BF08	Flanged	BeO	.800 X .225	100	25	DC - 3.0	250
RF100BL3A	Flanged	BeO	.515 X .250	100	11.3	DC - 3.0	250
RF125AA09	Flanged	AlN	.800 X .225	125	100	DC - 3.0	250
RF125AA10	Flanged	AlN	.975 X .225	125	100	DC - 3.0	250
RF125AA11	Flanged	AlN	.870 X .375	125	100	DC - 3.0	250
RF150AA11	Flanged	AlN	.870 X .375	150	100	DC - 3.0	250
RF150AB11	Flanged	AlN	.870 X .375	150	50	DC - 3.0	250
RF150BA09	Flanged	BeO	.800 X .225	150	100	DC - 3.0	250
RF150BA10	Flanged	BeO	.975 X .225	150	100	DC - 3.0	250
RF150BA11	Flanged	BeO	.870 X .375	150	100	DC - 3.0	250
RF150BB09-100	Flanged	BeO	.800 X .230	150	50	DC - 3.0	250
RF150BB09	Flanged	BeO	.800 X .225	150	50	DC - 3.0	250
RF150BD11	Flanged	BeO	.870 X .375	150	200	DC - 3.0	250
RF150BK10	Flanged	BeO	.975 X .225	150	30	DC - 3.0	250
RF150BM11	Flanged	BeO	.870 X .375	150	18.3	DC - 3.0	250
RF200AA12	Flanged	AlN	.975 X .375	200	100	DC - 3.0	250
RF200AB12	Flanged	AlN	.975 X .375	200	50	DC - 3.0	250
RF250AA12-100	Flanged	AlN	.975 X .385	250	100	DC - 3.0	250
RF250AA12	Flanged	AlN	.975 X .375	250	100	DC - 3.0	250
RF250AB12-100	Flanged	AlN	.975 X .385	250	50	DC - 3.0	250
RF250AB12	Flanged	AlN	.975 X .375	250	50	DC - 3.0	250
RF250BA12-010	Flanged	BeO	.975 X .375	250	100	DC - 2.0	250
RF250BA12	Flanged	BeO	.975 X .375	250	100	DC - 3.0	250
RF250BB12-003	Flanged	BeO	.975 X .375	250	50	DC - 3.0	250
RF250BB12-010	Flanged	BeO	.975 X .375	250	50	DC - 2.0	250
RF250BB12-013	Flanged	BeO	.975 X .375	250	50	DC - 3.0	250
RF250BB12-100	Flanged	BeO	.975 X .385	250	50	DC - 3.0	250
RF250BB12	Flanged	BeO	.975 X .375	250	50	DC - 3.0	250
RF250BF12	Flanged	BeO	.975 X .375	250	25	DC - 3.0	250
RF250BN12	Flanged	BeO	.975 X .375	250	12.5	DC - 3.0	250
RF250BU12	Flanged	BeO	.975 X .375	250	350	DC - 3.0	250
RF400AB15	Flanged	AlN	1.250 X .500	400	50	DC - 3.0	250
RF400BA13	Flanged	BeO	1.100 X .500	400	100	DC - 3.0	250
RF400BA24	Flanged	BeO	1.299 X 1.496	400	100	DC - 3.0	250
RF400BB13-010	Flanged	BeO	1.100 X .500	400	50	DC - 0.5	250
RF400BB13	Flanged	BeO	1.100 X .500	400	50	DC - 3.0	250
RF400BN13	Flanged	BeO	1.100 X .500	400	12.5	DC - 3.0	250
RF500BA15-040	Flanged	BeO	1.250 X .500	500	100	DC - 3.0	250
RF500BA15A	Flanged	BeO	1.250 X .500	500	100	DC - 3.0	250
RF500BB15-040	Flanged	BeO	1.250 X .500	500	50	DC - 3.0	250
RF800BA14-004	Flanged	BeO	1.900 X 1.040	800	100	DC - 3.0	250
RF800BA14	Flanged	BeO	1.900 X 1.040	800	100	DC - 3.0	250
RF800BA25	Flanged	BeO	2.362 X 2.362	800	100	DC - 3.0	250
RF800BB14-004	Flanged	BeO	1.900 X 1.040	800	50	DC - 3.0	250
RL005CI23	Flangeless	AlPO <sub>3</sub>	.180 X .180	5	10	DC - 3.0	250
RL030AA16	Flangeless	AlN	.200 X .100	30	100	DC - 3.0	250
RL030AB16	Flangeless	AlN	.200 X .100	30	50	DC - 3.0	250
RL030BA16	Flangeless	BeO	.200 X .100	30	100	DC - 3.0	250
RL030BB16	Flangeless	BeO	.200 X .100	30	50	DC - 3.0	250
RL030BC16	Flangeless	BeO	.200 X .100	30	75	DC - 3.0	250
RL030BD16	Flangeless	BeO	.200 X .100	30	200	DC - 3.0	250
RL030BE16-08	Flangeless	BeO	.200 X .100	30	150	DC - 3.0	250
RL030BE16	Flangeless	BeO	.200 X .100	30	150	DC - 3.0	250
RL030BH16	Flangeless	BeO	.200 X .100	30	300	DC - 3.0	250
RL030BJ16	Flangeless	BeO	.200 X .100	30	15	DC - 3.0	250
RL030BS16	Flangeless	BeO	.200 X .100	30	430	DC - 3.0	250
RL030BT16	Flangeless	BeO	.200 X .100	30	560	DC - 3.0	250
RL040AA17	Flangeless	AlN	.250 X .250	40	100	DC - 3.0	250
RL040BA17	Flangeless	BeO	.250 X .250	40	100	DC - 3.0	250
RL040BB17	Flangeless	BeO	.250 X .250	40	50	DC - 3.0	250
RL100AA18	Flangeless	AlN	.350 X .225	100	100	DC - 3.0	250
RL125AA19	Flangeless	AlN	.375 X .250	125	100	DC - 3.0	250
RL125BA18	Flangeless	BeO	.350 X .225	125	100	DC - 3.0	250
RL150AA20	Flangeless	AlN	.350 X .225	150	100	DC - 3.0	250
RL150BA19	Flangeless	BeO	.375 X .250	150	100	DC - 3.0	250
RL200BA20	Flangeless	BeO	.350 X .225	200	100	DC - 3.0	250
RL250AA21	Flangeless	AlN	.375 X .375	250	100	DC - 3.0	250
RL250AB21	Flangeless	AlN	.375 X .375	250	50	DC - 3.0	250
RL300BA21	Flangeless	BeO	.375 X .375	300	100	DC - 3.0	250
RL300BB21	Flangeless	BeO	.375 X .375	300	50	DC - 3.0	250
RS005AA2010Y	Surface Mount	AlN	.200 X .090	5	100	DC - 3.0	250
RS010AA2010X	Surface Mount	AlN	.100 X .095	10	100	DC - 3.0	250

## Power Terminations

Package	Material	Power (max)	Capacitance (pF)	Frequency* (GHz)	VSWR Range
SMD TS Series	AlN	600	.3 to 2.0	DC - 6.0	1.01:1 - 1.25:1
	BeO	1000	.3 to 2.0	DC - 6.0	1.01:1 - 1.25:1
	Al <sub>2</sub> O <sub>3</sub>	100	.3 to 2.0	DC - 6.0	1.01:1 - 1.25:1
Flangeless TL Series	AlN	600	.9 to 4.2	DC- 6.0	1.01:1 - 1.25:1
	BeO	1000	.25 to 3.5	DC - 6.0	1.01:1 - 1.25:1
Flanged TF Series	AlN	600	.9 to 4.2	DC- 6.0	1.01:1 - 1.25:1
	BeO	1500	.75 to 9.0	DC - 6.0	1.01:1 - 1.25:1
Chip CT Series	AlN	500	.75 to 9.0	DC - 6.0	1.07:1
	BeO	600	.75 to 9.0	DC - 6.0	1.07:1

\*typical

Part Numbers	Package	Material	Size LxW (inches)	Power (max)	Frequency*	VSWR Range
CT1206CB5C	Chip	Al <sup>2</sup> O <sup>3</sup>	.120 X .060	8	DC - 3.5 GHz	<1.20:1
CT1X1AB5C	Chip	AlN	1.000 X 1.040	600	DC - 3.5 GHz	<1.20:1
CT1X1BB5C	Chip	BeO	1.000 X 1.040	800	DC - 3.5 GHz	<1.20:1
CT2010AB5C	Chip	AlN	.200 X .100	10	DC - 2 GHz / 2 - 3 GHz	<1.05:1 / <1.15:1
CT2335AB5C-01	Chip	AlN	.350 X .225	100	DC - 5 GHz	<1.1:1
CT2335AB5C-04	Chip	AlN	.350 X .225	150	DC - 3 GHz	<1.1:1
CT2335AB5C	Chip	AlN	.350 X .225	100	DC - 3.5 GHz	<1.20:1
CT2525AB5C-02	Chip	AlN	.250 X .250	100	DC - 2 GHz / 2 - 4 GHz	<1.06:1 / <1.11:1
CT3725AB5C	Chip	AlN	.375 X .250	150	DC - 3.5 GHz	<1.20:1
CT3725AB5C-03	Chip	AlN	.250 X .250	150	DC - 2 GHz / 2 - 4 GHz	<1.06:1 / <1.11:1
CT3735AB5C-05	Chip	AlN	.375 X .375	250	DC - 2 GHz	<1.05:1
ST1206CB5C	Surface Mount	Al <sup>2</sup> O <sup>3</sup>	.120 X .060	8	DC - 6 GHz	<1.25:1
ST2010CB5C	Surface Mount	Al <sup>2</sup> O <sup>3</sup>	.200 X .100	16	DC - 6 GHz	<1.15:1
TF010AA02	Flanged	AlN	.500 X .200	10	DC - 3.5 GHz	<1.20:1
TF010AA1C	Flanged	AlN	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010AA1L	Flanged	AlN	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010AA1R	Flanged	AlN	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010AB02	Flanged	AlN	.500 X .200	10	DC - 3.5 GHz	<1.20:1
TF010AB1C	Flanged	AlN	.300 X .100	10	DC - 3.5 GHz	<1.20:1
TF010AB1L	Flanged	AlN	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010AB1R	Flanged	AlN	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010BA02	Flanged	BeO	.500 X .200	10	DC - 3.5 GHz	<1.20:1
TF010BA1C	Flanged	BeO	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010BA1L	Flanged	BeO	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010BA1R	Flanged	BeO	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010BB02	Flanged	BeO	.500 X .200	10	DC - 3.5 GHz	<1.20:1
TF010BB1C	Flanged	BeO	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010BB1L	Flanged	BeO	.300 X .200	10	DC - 3.5 GHz	<1.20:1
TF010BB1R	Flanged	BeO	.300 X .200	10	DC - 4 GHz	<1.35:1
TF020AB3C	Flanged	AlN	.515 X .250	20	DC - 3.5 GHz	<1.20:1
TF020AB3L	Flanged	AlN	.515 X .250	20	DC - 3.5 GHz	<1.20:1
TF020AB3R	Flanged	AlN	.515 X .250	20	DC - 3.5 GHz	<1.20:1
TF020BB3C	Flanged	BeO	.515 X .250	20	DC - 3.5 GHz	<1.20:1
TF020BB3L	Flanged	BeO	.515 X .250	20	DC - 3.5 GHz	<1.20:1
TF020BB3L-040	Flanged	BeO	.515 X .250	20	DC - 6 GHz	<1.25:1
TF020BB3R	Flanged	BeO	.515 X .250	20	DC - 3.5 GHz	<1.20:1
TF030AB3C	Flanged	AlN	.515 X .250	30	DC - 3.5 GHz	<1.20:1
TF040AB04C	Flanged	AlN	.800 X .225	40	DC - 3.5 GHz	<1.20:1
TF040AB05B	Flanged	AlN	.975 X .225	40	DC - 3.5 GHz	<1.20:1
TF040BA04C	Flanged	BeO	.800 X .225	40	DC - 3.5 GHz	<1.20:1
TF040BB04	Flanged	BeO	.800 X .225	40	DC - 3.5 GHz	<1.20:1
TF040BB04-100	Flanged	BeO	.800 X .230	40	DC - 3.5 GHz	<1.20:1
TF040BB05	Flanged	BeO	.975 X .225	40	DC - 3.5 GHz	<1.20:1
TF040BB3C	Flanged	BeO	.515 X .250	40	DC - 3.5 GHz	<1.20:1
TF050AB04	Flanged	AlN	.800 X .225	50	DC - 3.5 GHz	<1.20:1
TF050AB6L	Flanged	AlN	.560 X .375	50	DC - 3.5 GHz	<1.20:1
TF050AB6R	Flanged	AlN	.560 X .375	50	DC - 3.5 GHz	<1.20:1

## Power Terminations

Part Numbers	Package	Material	Size LxW (inches)	Power (max)	Frequency*	VSWR Range
TF050BB6L	Flanged	BeO	.560 X .375	50	DC - 3.5 GHz	<1.20:1
TF050BB6R	Flanged	BeO	.560 X .375	50	DC - 3.5 GHz	<1.20:1
TF050BF6L	Flanged	BeO	.560 X .375	50	DC - 3.5 GHz	<1.20:1
TF060AB3L	Flanged	AIN	.515 X .250	60	DC - 3.5 GHz	<1.20:1
TF060BB3C	Flanged	BeO	.515 X .250	60	DC - 3.5 GHz	<1.20:1
TF060BB3L	Flanged	BeO	.515 X .250	60	DC - 3.5 GHz	<1.20:1
TF060BB3R	Flanged	BeO	.515 X .250	60	DC - 3.5 GHz	<1.20:1
TF075AB08	Flanged	AIN	.800 X .225	75	DC - 3.5 GHz	<1.20:1
TF075AB3C	Flanged	AIN	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF075AB3C-004	Flanged	AIN	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF075AB3L	Flanged	AIN	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF075AB3L-004	Flanged	AIN	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF075AB3R	Flanged	AIN	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF075AB3R-004	Flanged	AIN	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF075BB3C	Flanged	BeO	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF075BB3L	Flanged	BeO	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF075BB3R	Flanged	BeO	.515 X .250	75	DC - 3.5 GHz	<1.20:1
TF120BB3C	Flanged	BeO	.515 X .250	120	DC - 3.5 GHz	<1.20:1
TF125AB09	Flanged	AIN	.800 X .225	125	DC - 3.5 GHz	<1.20:1
TF125AB10	Flanged	AIN	.975 X .225	125	DC - 3.5 GHz	<1.20:1
TF125AB11	Flanged	AIN	.870 X .375	125	DC - 3.5 GHz	<1.20:1
TF125AB11-040	Flanged	AIN	.870 X .375	125	DC - 3.5 GHz	<1.20:1
TF1500BB26	Flanged	BeO	4.331 X 2.362	1500	DC - 3.5 GHz	<1.20:1
TF150AB11	Flanged	AIN	.870 X .375	150	DC - 2 GHz	<1.2:1
TF150AB11-000	Flanged	AIN	.870 X .375	150	350-2,000 MHz / 2.0 - 2.3 GHz	<1.06:1 / <1.1:1
TF150AB11-006	Flanged	AIN	.870 X .375	150	350-2,000 MHz / 2.0 - 2.3 GHz	<1.06:1 / <1.1:1
TF150AB11-009	Flanged	AIN	.870 X .375	150	DC - 2 GHz	<1.2:1
TF150AB11-080	Flanged	AIN	.870 X .375	150	350-2,000 MHz / 2.0 - 2.3 GHz	<1.06:1 / <1.1:1
TF150AB11-089	Flanged	AIN	.870 X .375	150	DC - 2.0 GHz / 2.1 - 2.7 GHz	<1.1:1 / <1.2:1
TF150AB11-300	Flanged	AIN	.870 X .375	150	350-2,000 MHz	<1.06:1
TF150BB09	Flanged	BeO	.800 X .225	150	DC - 1 GHz	<1.20:1
TF150BB09-100	Flanged	BeO	.800 X .230	150	DC - 3.5 GHz	<1.20:1
TF150BB10	Flanged	BeO	.975 X .225	150	DC - 3.5 GHz	<1.20:1
TF150BB11	Flanged	BeO	.870 X .375	150	DC - 3.5 GHz	<1.20:1
TF200AB12	Flanged	AIN	.975 X .375	200	DC - 3.5 GHz	<1.20:1
TF200AB12-020	Flanged	AIN	.975 X .375	200	DC - 3.5 GHz	<1.20:1
TF250AB12	Flanged	AIN	.975 X .375	250	DC - 3.5 GHz	<1.20:1
TF250AB12-007	Flanged	AIN	.975 X .375	250	DC - 900 MHz / 1 - 2.2 GHz	<1.05:1 / <1.10:1
TF250AB12-020	Flanged	AIN	.975 X .375	250	DC - 3.5 GHz	<1.20:1
TF250AB12-027	Flanged	AIN	.975 X .375	250	DC - 900 MHz	<1.05:1
TF250AB12-040	Flanged	AIN	.975 X .375	250	DC - 3.5 GHz	<1.20:1
TF250AB12-100	Flanged	AIN	.975 X .385	250	DC - 3.5 GHz	<1.20:1
TF250AB12-481	Flanged	AIN	.975 X .375	250	DC - 2.3 GHz	<1.10:1
TF250AB12-549	Flanged	AIN	1.043 X .375	250	DC - 2 GHz	<35 dB R/L
TF250AC12	Flanged	AIN	.975 X .375	250	DC - 3.5 GHz	<1.20:1
TF250BB12	Flanged	BeO	.975 X .375	250	DC - 3.5 GHz	<1.20:1
TF250BB12-040	Flanged	BeO	.975 X .375	250	DC - 3.5 GHz	<1.20:1
TF250BB12-100	Flanged	BeO	.975 X .385	250	DC - 3.5 GHz	<1.20:1
TF300BB12-234	Flanged	BeO	.870 X .375	300	DC - 3.5 GHz	<1.20:1
TF400AB13	Flanged	AIN	1.100 X .500	400	DC - 3.5 GHz	<1.20:1
TF400AB15	Flanged	AIN	1.250 X .500	400	DC - 3.5 GHz	<1.20:1
TF400BB13	Flanged	BeO	1.100 X .500	400	DC - 3.5 GHz	<1.20:1
TF400BB13-010	Flanged	BeO	1.100 X .500	400	DC - 3.5 GHz	<1.20:1
TF500AB13	Flanged	AIN	1.100 X .500	500	DC - 3.5 GHz	<1.20:1
TF500BB13	Flanged	BeO	1.100 X .500	500	DC - 3.5 GHz	<1.20:1
TF500BB15-040	Flanged	BeO	1.250 X .500	500	DC - 3.5 GHz	<1.20:1
TF500BB15-04A	Flanged	BeO	1.250 X .500	500	DC - 3.5 GHz	<1.20:1
TF600AB14-060	Flanged	AIN	1.900 X 1.040	600	150-860 MHz	<1.1:1
TF600AB14-061	Flanged	AIN	1.900 X 1.040	600	150-860 MHz	<1.1:1
TF600AB14-065	Flanged	AIN	1.900 X 1.040	600	150-860 MHz	<1.1:1
TF800AB14	Flanged	AIN	1.900 X 1.040	800	DC - 3.5 GHz	<1.20:1
TF800AB14-004	Flanged	AIN	1.900 X 1.040	800	DC - 3.5 GHz	<1.20:1
TF800BA14	Flanged	BeO	1.900 X 1.040	800	DC - 3.5 GHz	<1.20:1
TF800BA14-061	Flanged	BeO	1.900 X 1.040	800	DC - 3.5 GHz	<1.20:1
TF800BB14	Flanged	BeO	1.900 X 1.040	800	DC - 3.5 GHz	<1.20:1
TF800BB14-061	Flanged	BeO	1.900 X 1.040	800	860-1500 MHz	<1.22:1
TF100AB04	Flanged	AIN	.800 X .225	100	DC - 3.5 GHz	<1.20:1
TF100AB04-030	Flanged	AIN	.800 X .225	100	DC - 3.5 GHz	<1.20:1
TF100AB3C-074	Flanged	AIN	.515 X .250	100	DC - 3.5 GHz	<1.20:1
TF100BB08	Flanged	BeO	.800 X .225	100	DC - 3.5 GHz	<1.20:1
TF100BB08-100	Flanged	BeO	.800 X .230	100	DC - 3.5 GHz	<1.20:1
TF100BB3C	Flanged	BeO	.515 X .250	100	DC - 3.5 GHz	<1.20:1
TF100BB3L	Flanged	BeO	.515 X .250	100	DC - 3.5 GHz	<1.20:1
TF100BB3R	Flanged	BeO	.515 X .250	100	DC - 3.5 GHz	<1.20:1
TL030AA0C	Flangeless	AIN	.200 X .100	30	DC - 3.5 GHz	<1.20:1
TL030AA16	Flangeless	AIN	.200 X .100	30	DC - 3.5 GHz	<1.20:1
TL030AB0C	Flangeless	AIN	.200 X .100	30	DC - 3.5 GHz	<1.20:1
TL030AB16	Flangeless	AIN	.200 X .100	30	DC - 3.5 GHz	<1.20:1
TL030BA0C	Flangeless	BeO	.200 X .100	30	DC - 3.5 GHz	<1.20:1
TL030BA16	Flangeless	BeO	.200 X .100	30	DC - 3.5 GHz	<1.20:1
TL030BB0C	Flangeless	BeO	.200 X .100	30	DC - 3.5 GHz	<1.20:1
TL030BB16	Flangeless	BeO	.200 X .100	30	DC - 3.5 GHz	<1.20:1
TL040AB17	Flangeless	AIN	.250 X .250	40	DC - 3.5 GHz	<1.20:1
TL040BB17	Flangeless	BeO	.250 X .250	40	DC - 3.5 GHz	<1.20:1
TL100AB17-04	Flangeless	AIN	.250 X .250	100	DC - 3.5 GHz	<1.20:1
TL100AB18	Flangeless	AIN	.350 X .225	100	DC - 3.5 GHz	<1.20:1
TL100AB18-001	Flangeless	AIN	.350 X .225	100	DC - 3 GHz	<1.1:1
TL125AB19	Flangeless	AIN	.375 X .250	125	DC - 3.5 GHz	<1.20:1
TL125BB18	Flangeless	BeO	.350 X .225	125	DC - 3.5 GHz	<1.20:1
TL150AB19	Flangeless	AIN	.375 X .250	150	DC - 3.5 GHz	<1.20:1
TL150BB19	Flangeless	BeO	.375 X .250	150	DC - 3.5 GHz	<1.20:1
TL150AB20	Flangeless	AIN	.350 X .225	160	DC - 3.5 GHz	<1.20:1
TL200BB20	Flangeless	BeO	.350 X .225	200	DC - 3.5 GHz	<1.20:1
TL250AB21	Flangeless	AIN	.375 X .375	250	DC - 3.5 GHz	<1.20:1
TL300BB21	Flangeless	BeO	.375 X .375	300	DC - 3.5 GHz	<1.20:1
TS010AB2010Z	Surface Mount	AIN	.130 X .100	10	DC - 3.5 GHz	<1.20:1
TS016AB2525Z	Surface Mount	AIN	.240 X .180	16	DC - 3.5 GHz	<1.20:1
TS030AB2010Z	Surface Mount	AIN	.130 X .100	30	DC - 3.5 GHz	<1.20:1
TS030AB2010Z-01A	Surface Mount	AIN	.130 X .100	30	DC - 3.5 GHz	<1.20:1
TS030BB2010Z	Surface Mount	BeO	.130 X .100	30	DC - 3.5 GHz	<1.20:1
TS100AB3737Z	Surface Mount	AIN	.365 X .292	100	DC - 3.5 GHz	<1.20:1

## Attenuators

Package	Material	Power (CW)	Attenuation (dB)	Frequency* (GHz)	VSWR Range
SMD SA Series	Al <sub>2</sub> O <sub>3</sub>	25 - 200	1 - 30	DC - 3.5	1.20:1
Chip CA Series	AlN	25 - 200	0.5 - 35	DC - 3.5	1.20:1
Flanged AF Series	AlN	25 - 200	0.5 - 30	DC - 3.5	1.20:1
	BeO	30 - 200	1 - 30	DC - 3.5	1.20:1

\*typical

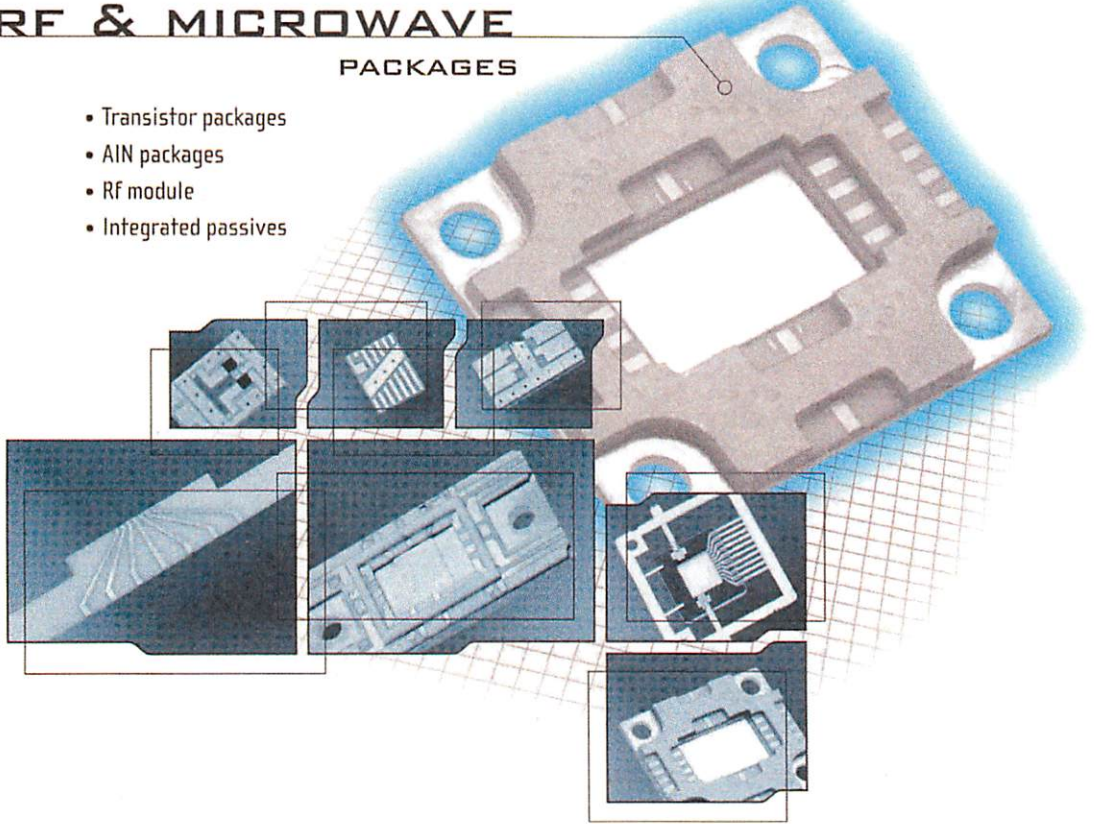
Part Number	Package	Size LxW (Inches)	Material	Power (CW)	Attenuation (dB)	Frequency* (GHz)	VSWR Range	Note
AF025A0R53A	Flanged	.515 x .250	AlN	25	0.5	DC - 3.0	<1.25:1	
AF030B0203A	Flanged	.515 x .250	BeO	30	20	DC - 3.0	<1.25:1	
AF030B0303A	Flanged	.515 x .250	BeO	30	30	DC - 3.0	<1.25:1	
AF100A00104-001	Flanged	.800 x .225	AlN	100	1	DC - 3.0	<1.25:1	
AF100A00204-001	Flanged	.800 x .225	AlN	100	2	DC - 3.0	<1.15:1	
AF100A00304-001	Flanged	.800 x .225	AlN	100	3	DC - 3.0	<1.12:1	
AF100A00504-001	Flanged	.800 x .225	AlN	100	5	DC - 3.0	<1.15:1	
AF100A00604-001	Flanged	.800 x .225	AlN	100	6	DC - 3.0	<1.11:1	
AF100A00904-001	Flanged	.800 x .225	AlN	100	9	DC - 3.0	<1.09:1	
AF100A01004-001	Flanged	.800 x .225	AlN	100	10	DC - 3.0	<1.09:1	
AF100A02004-001	Flanged	.800 x .225	AlN	100	20	DC - 2.5	<1.20:1	
AF100B00104	Flanged	.800 x .225	BeO	100	1	DC - 3.0	<1.25:1	
AF100B00204	Flanged	.800 x .225	BeO	100	2	DC - 3.0	<1.25:1	
AF100B00304	Flanged	.800 x .225	BeO	100	3	DC - 3.0	<1.25:1	
AF100B00404	Flanged	.800 x .225	BeO	100	4	DC - 3.0	<1.25:1	
AF100B00504	Flanged	.800 x .225	BeO	100	5	DC - 3.0	<1.25:1	
AF100B00604	Flanged	.800 x .225	BeO	100	6	DC - 3.0	<1.25:1	
AF100B00704	Flanged	.800 x .225	BeO	100	7	DC - 3.0	<1.25:1	
AF100B00804	Flanged	.800 x .225	BeO	100	8	DC - 3.0	<1.25:1	
AF100B00904	Flanged	.800 x .225	BeO	100	9	DC - 3.0	<1.25:1	
AF100B01004	Flanged	.800 x .225	BeO	100	10	DC - 3.0	<1.25:1	
AF100B01104	Flanged	.800 x .225	BeO	100	11	DC - 3.0	<1.25:1	
AF100B01204	Flanged	.800 x .225	BeO	100	12	DC - 3.0	<1.25:1	
AF100B01304	Flanged	.800 x .225	BeO	100	13	DC - 3.0	<1.25:1	
AF100B01404	Flanged	.800 x .225	BeO	100	14	DC - 3.0	<1.25:1	
AF100B01504	Flanged	.800 x .225	BeO	100	15	DC - 3.0	<1.25:1	
AF100B01604	Flanged	.800 x .225	BeO	100	16	DC - 3.0	<1.25:1	
AF100B01704	Flanged	.800 x .225	BeO	100	17	DC - 3.0	<1.25:1	
AF100B01804	Flanged	.800 x .225	BeO	100	18	DC - 3.0	<1.25:1	
AF100B01904	Flanged	.800 x .225	BeO	100	19	DC - 3.0	<1.25:1	
AF100B02004	Flanged	.800 x .225	BeO	100	20	DC - 3.0	<1.25:1	
AF100B02104	Flanged	.800 x .225	BeO	100	21	DC - 3.0	<1.25:1	
AF100B02204	Flanged	.800 x .225	BeO	100	22	DC - 3.0	<1.25:1	
AF100B02304	Flanged	.800 x .225	BeO	100	23	DC - 3.0	<1.25:1	
AF100B02404	Flanged	.800 x .225	BeO	100	24	DC - 3.0	<1.25:1	
AF100B02504	Flanged	.800 x .225	BeO	100	25	DC - 3.0	<1.25:1	
AF100B02604	Flanged	.800 x .225	BeO	100	26	DC - 3.0	<1.25:1	
AF100B02704	Flanged	.800 x .225	BeO	100	27	DC - 3.0	<1.25:1	
AF100B02804	Flanged	.800 x .225	BeO	100	28	DC - 3.0	<1.25:1	
AF100B02904	Flanged	.800 x .225	BeO	100	29	DC - 3.0	<1.25:1	
AF100B03004	Flanged	.800 x .225	BeO	100	30	DC - 3.0	<1.25:1	
AF100B03104	Flanged	.800 x .225	BeO	100	31	DC - 3.0	<1.25:1	
AF100B03004	Flanged	.800 x .225	AlN	100	30	DC - 2.5	<1.20:1	
AF150B00104	Flanged	.800 x .225	BeO	150	1	DC - 3.5	<1.20:1	
AF200A02012-080	Flanged	.975 x .375	AlN	200	20	DC - 2.0	<1.20:1	0.210 Ht
AF200A02012-480	Flanged	.975 x .375 LP	AlN	200	20	DC - 2.0	<1.20:1	0.180 Ht
CA2335A0208C-06	Chip	.350 x .225	AlN	120	20	DC - 3.5	<1.20:1	
CA2335A0208C	Chip	.350 x .225	AlN	150	20	DC - 3.5	<1.20:1	
CA2335A0308C-06	Chip	.350 x .225	AlN	120	30	DC - 3.5	<1.20:1	
CA2335A0308C	Chip	.350 x .225	AlN	150	30	DC - 3.5	<1.20:1	
GA3725A0207C	Chip	.375 x .250	AlN	100	20	DC - 3.5	<1.20:1	
SA3737C0207C	Surface Mount	.375 x .375	Al <sub>2</sub> O <sub>3</sub>	30	20	DC - 3.5	<1.20:1	

\*typical

# CERAMIC PACKAGES

## RF & MICROWAVE PACKAGES

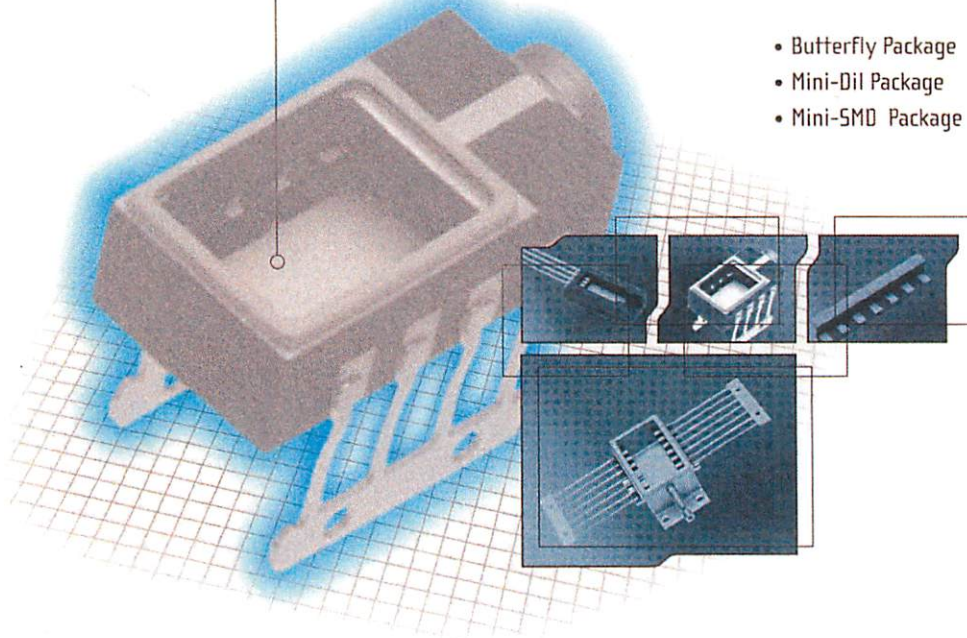
- Transistor packages
- AIN packages
- RF module
- Integrated passives



## OPTOELECTRONIC PACKAGES

### PACKAGES

- Butterfly Package
- Mini-Dil Package
- Mini-SMD Package



# CERAMIC PACKAGES

Johanson offers complete design to manufacturing capabilities to provide custom solutions to meet your ceramic packaging needs.

## DESIGNS

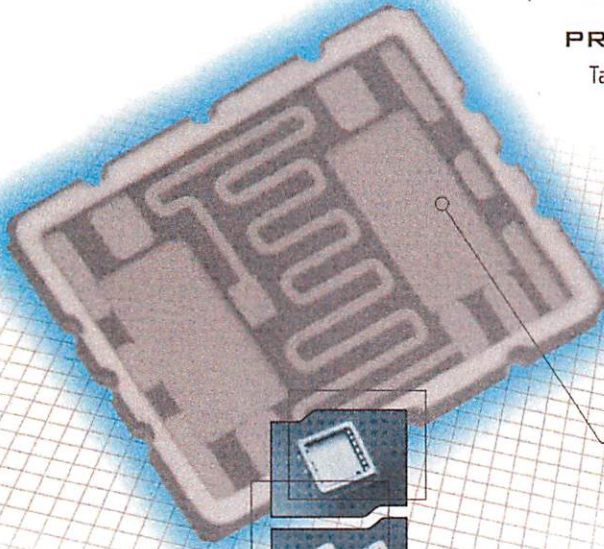
Johanson's custom solutions guarantee control from material formulations through the end product resulting in "Johanson Quality" parts.

## FORMULATIONS

Materials are available in  $Al_2O_3$ , AlN and custom dielectric materials (HTCC and LTCC).

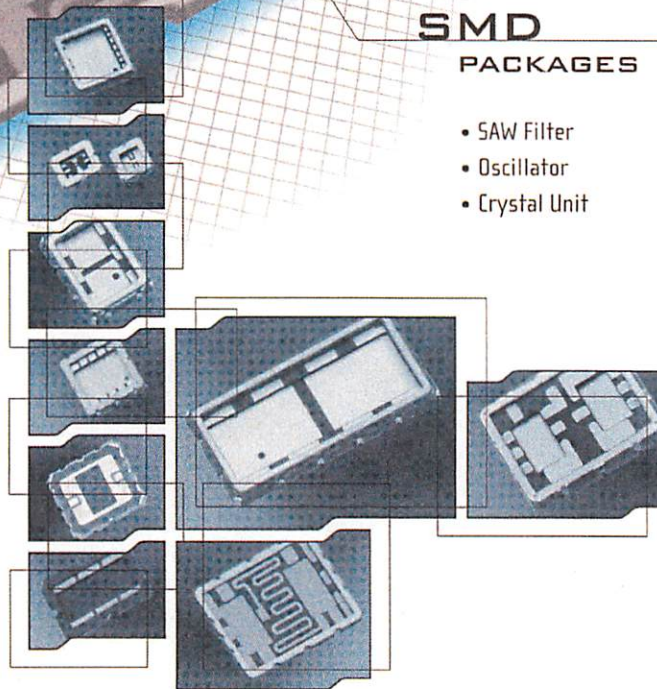
## PROCESSING

Tape casting, punching, printing, laminating, cutting/scribing, sintering, and precious and non-precious alloys.



## SMD PACKAGES

- SAW Filter
- Oscillator
- Crystal Unit




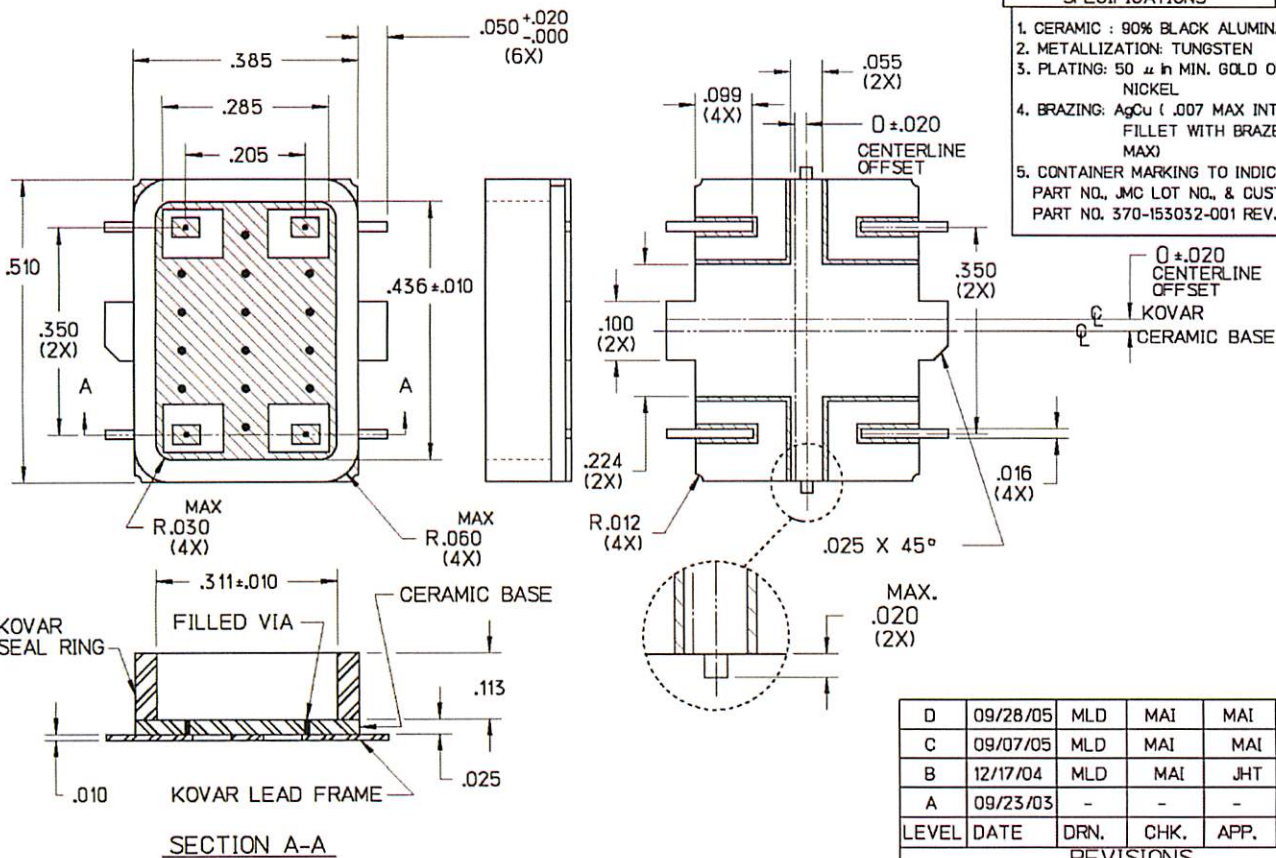
MI DRG. NO. JC1013-101D REV.

# JC1013-101 D

HOUSING, SMT 10 X 13

SHEET 1 OF 1

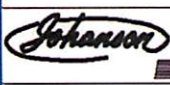
 =METALLIZATION



- SPECIFICATIONS FILE: JC
1. CERAMIC : 90% BLACK ALUMINA (CS-AH)
  2. METALLIZATION: TUNGSTEN
  3. PLATING: 50  $\mu$  in MIN. GOLD OVER 50-350  $\mu$  in NICKEL
  4. BRAZING: AgCu (.007 MAX INTERNAL BRAZE FILLET WITH BRAZE RUNOUT .030 MAX)
  5. CONTAINER MARKING TO INDICATE, JMC PART NO., JMC LOT NO., & CUSTOMER PART NO. 370-153032-001 REV. C

D	09/28/05	MLD	MAI	MAI	000284
C	09/07/05	MLD	MAI	MAI	000269
B	12/17/04	MLD	MAI	JHT	000166
A	09/23/03	-	-	-	000044
LEVEL	DATE	DRN.	CHK.	APP.	ECN

REVISIONS				
DRN.	CHK.	APP.	SCALE	
MAI	TAM	JHT	4" = 1"	
DATE	DATE	DATE	.XX ± .01	
09/23/03	09/24/03	09/25/03	.XXX ± .005	



**JOHANSON MANUFACTURING CORPORATION**  
 ROCKAWAY VALLEY ROAD, BOONTON, N.J. 07005 (973)334-2676 FAX (973)334-2954  
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PROPRIETARY INFORMATION CONTAINED NOT TO BE USED WITHOUT JOHANSON MANUFACTURING CORPORATION APPROVAL.



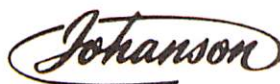


## JOHANSON MANUFACTURING MIL/SPEC\* CROSS REFERENCE INDEX TO COTS EQUIVALENTS

MIL/SPEC P/N	DISCONTINUED JOHANSON P/N	COTS JOHANSON P/N	MIL/SPEC P/N	DISCONTINUED JOHANSON P/N	COTS JOHANSON P/N
CV98F2R5	9620CV	R9620	PC23J1R2	27264PC	R27264
CV98F2R5SL	9620SLCV	R9620SL	PC23J2R5	27284PC	R27284
CV98H100	9622CV	R9622	PC23J4R5	27274PC	R27274
CV98H100SL	9622SLCV	R9622SL	PC23K080	27294PC	R27294
CV98J150	9628CV	R9628	PC24J1R2	27263PC	R27263
CV98J150SL	9628SLCV	R9628SL	PC24J2R5	27283PC	R27283
CV98K200	9629CV	R9629	PC24J4R5	2723PC	R2723
CV98K200SL	9629SLCV	R9629SL	PC24K080	2729PC	R27293
CV98Q250	9626CV	R9626	PC25J060	5700PC	R5700
CV98Q250SL	9626SLCV	R9626SL	PC25J100	5200PC	R5200
CV98W5R0	9621CV	R9621	PC25J140	5400PC	R5400
CV98W5R0SL	9621SLCV	R9621SL	PC25J200	5500PC	R5500
CV99L4R5	9610CV	R9610	PC26J060	5701PC	R5701
CV99L4R5SL	9610SLCV	R9610SL	PC26J100	5201PC	R5201
CV99M100	9611CV	R9611	PC26J140	5401PC	R5401
CV99M100SL	9611SLCV	R9611SL	PC26J200	5501PC	R5501
CV99N180	9612CV	R9612	PC26J300	5601PC	R5601
CV99N180SL	9612SLCV	R9612SL	PC26T100	5201PC	R5201
CV99P250	9615CV	R9615	PC26T140	5401PC	R5401
CV99P250SL	9615SLCV	R9615SL	PC26T200	5501PC	R5501
CV99Q350	9613CV	R9613	PC27J3R5	5800PC	R5800
CV99Q350SL	9613SLCV	R9613SL	PC28J050	5851PC	R5851
CV99Q400	9614CV	R9614	PC28J3R5	5801PC	R5801
CV99Q400SL	9614SLCV	R9614SL	PC29J050	5852PC	R5852
CV99Q500	9616CV	R9616	PC29J100	5752PC	R5752
CV99Q500SL	9616SLCV	R9616SL	PC29J3R5	5802PC	R5802
PC21J1R2	27261PC	R27261	PC30J3R5	8051PC	R8051
PC21J2R5	27281PC	R27281	PC30J5R0	5853PC	R5853
PC21J4R5	27271PC	R27271	PC31J060	5702PC	R5702
PC21K080	27291PC	R27291	PC31J100	5202PC	R5202
PC22J1R2	27261SLPC	R27261SL	PC31J140	5402PC	R5402
PC22J2R5	27281SLPC	R27281SL	PC31J200	5502PC	R5502
PC22J4R	27271SLPC	R27271SL	PC32T140	8053PC	R8053
PC22K080	27291SLPC	R27291SL			

\* Most parts per MIL-PRF-14409 and MIL-PRF-81 tested in accordance with MIL-STD-202

## High Reliability



.....THE INDUSTRY STANDARD OF EXCELLENCE.

When required by aerospace and defense contracts, Johanson capacitors are available in high reliability configurations. Inspection and testing of high reliability capacitors are conducted in our in-house test laboratory. To order high reliability units, add an "R" prefix letter to the standard Johanson part number.

## Electronic Accuracy through Mechanical Precision

## COTS HI-REL TESTING OPTIONS

The following list states testing per MIL-STD 202 that is available to replace the PC and CV units listed on the MIL/SPEC REFERENCE INDEX thru Johanson Manufacturing:

### **Group A**

Thermal shock  
Visual and mechanical examination: Material  
Body dimensions  
Design and construction (other than body dimensions)  
Marking, Workmanship  
Capacitance, Change of capacitance  
Insulation resistance (at 25°C)  
Dielectric withstanding voltage  
Quality factor (Q)  
Driving torque (room ambient temperature)

### **Group B**

Seal (sealed units only)  
Torque, bushing strength (panel-mount units only)  
Solderability (all solderable terminals)

### **Group C**

Insulation resistance (at high temperature)  
Temperature coefficient and capacitance drift  
Thermal shock  
Driving torque, Terminal strength  
Resistance to soldering heat  
Immersion (sealed units only)  
Salt atmosphere (corrosion)  
Moisture resistance  
Shock (specified pulse)  
Vibration, high frequency

Each Group and testing within the Group will incur charges not included in the unit cost of the COTS part. You will need to be specific as to which tests would apply to your particular application.

# Air Dielectric Trimmer Capacitors



## description

**STANDARD** trimmer air capacitors are designed specifically for RF applications, VHF through microwave, and have become the industry standard of excellence. High Q and temperature stability are a result of proper attention to geometry and choice of optimum materials. The heart of this trimmer is the one piece self-locking constant torque drive mechanism\* illustrated to the right. This mechanism utilizes transverse slots to create a spring effect between two threaded sections resulting in substantial contact areas which insure uniform torque, high Q and low dynamic tuning noise.

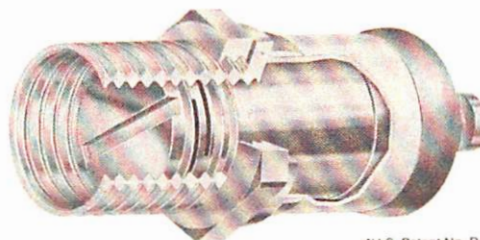
**MINIATURE** trimmer air capacitors offer an even further size reduction of the standard air capacitors coupled with finer tuning resolution and ultra high Q making them ideal for use in microwave circuits.

Both standard and miniature capacitors are available in vertical mounting configurations which save board space and allow top tuning. **VERTICAL MOUNT** capacitors are available in single, dual and low inductance leads with upright or inverted tuning.

Keeping pace with the growth of medical electronics, Johanson also produces **NON-MAGNETIC** air capacitors for low magnetic signature applications.

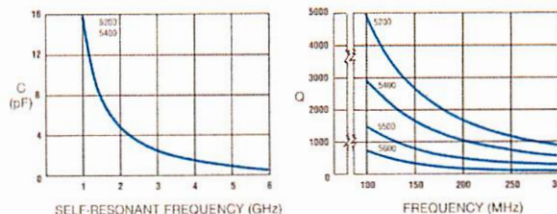
Where **HIGH VOLTAGE** is a requirement, the 5300 series air capacitors, not pictured in this catalog, are an excellent replacement for comparable range glass capacitors. Utilizing the basic design of the standard air capacitor, these units offer the same advantages plus a 500 VDC rating.

High Reliability versions are available on special order; to order add an "R" prefix letter to the standard Johanson part number.

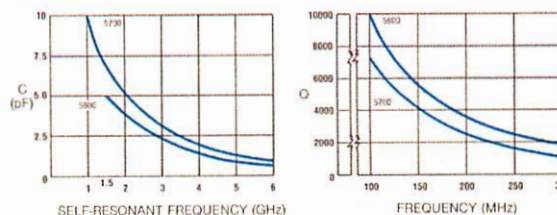


\*U.S. Patent No. Re. 30,406

### STANDARD AIR DATA



### MINIATURE AIR DATA



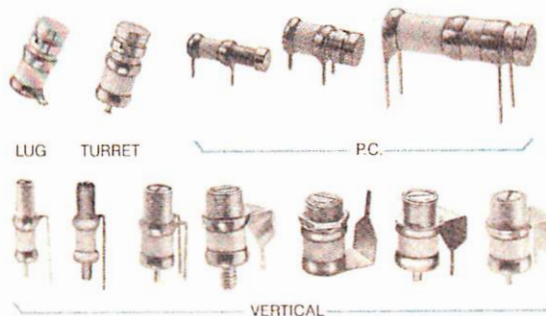
## applications

- RF Amplifiers and Oscillators
- Impedance matching
- Filter tuning
- Crystal trimming
- Interstage coupling

## characteristics

- Rated Voltage 250 VDC (5300 series 500 VDC)
- Torque 5200, 5400, 5500 & 5600 series 1 to 5 oz. in., 5700 series .4 to 4 oz. in., 5800 series .3 to 3 oz. in. & 5300 series 1 to 6 oz. in.
- Insulation Resistance  $>10^6$  Meg  $\Omega$  @ 500 VDC
- Contact Resistance  $<.01\Omega$
- Self-Resonant Frequency to  $>5$  GHz (5700 & 5800 series to  $>6$  GHz)
- Vibration 60 g, 10-2000 Hz
- Shock 1500 g, 0.5 milliseconds
- MIL-C-14409 qualified
- 574°F solder used in construction
- Operating temperature  $-65^\circ\text{C}$  to  $+125^\circ\text{C}$

## standard configurations



JMC Tuning Tool 8777



JMC Mounting Tool 4956 — for 5700 series  
4958 — for 5800 series

ELECTRONIC ACCURACY THROUGH MECHANICAL PRECISION



STANDARD AIR CAPACITORS

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5200 PC25J100	.8 to 10 >6 TURNS	0 ± 15	5000	
5201 *PC26T100	.8 to 10 >6 TURNS	0 ± 15	5000	
5202 PC31J100	.8 to 10 >6 TURNS	0 ± 15	5000	

VERTICAL MOUNT AIR CAPACITORS

JMC P/N	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5243 (NON-MAGNETIC)	1.5 to 10 >6 TURNS	50 ± 50	4000	
8052	1 to 10 >7 TURNS	0 ± 15	5000	
8090	1 to 10 >6 TURNS	0 ± 20	2000	

\*CONSULT FACTORY FOR DETAILS.

JOHANSON MANUFACTURING CORPORATION, ROCKAWAY VALLEY ROAD, BOONTON, NEW JERSEY USA 07005 201-334-2676 FAX-201-334-2954 TWX 710-987-8367

STANDARD AIR CAPACITORS

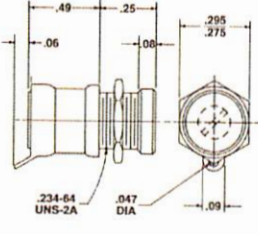
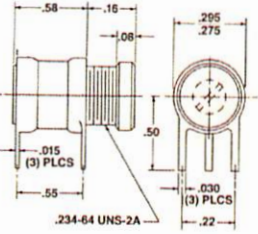
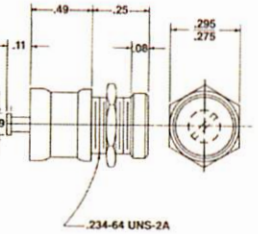
JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5400 PC25J140	1 to 14 >6 TURNS	0 ± 25	3000	
5401 *PC26T140	1 to 14 >6 TURNS	0 ± 25	3000	
5402 PC31J140	1 to 14 >6 TURNS	0 ± 25	3000	

VERTICAL MOUNT AIR CAPACITORS

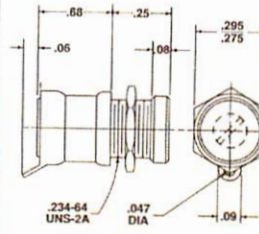
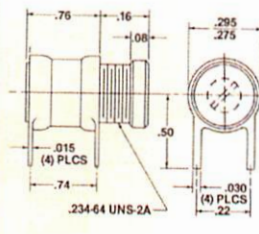
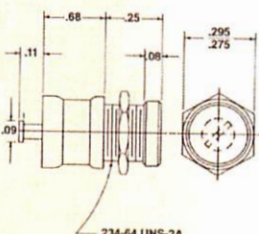
JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5453	1.5 to 16 >7 TURNS	0 ± 30	3000	
8053 *PC32T140	1.5 to 14 >6 TURNS	0 ± 25	3000	
8091	1.5 to 14 >6 TURNS	0 ± 20	2000	
8092	1.5 to 14 >6 TURNS	0 ± 20	2000	
8093	1.5 to 14 >6 TURNS	0 ± 20	2000	

\*CONSULT FACTORY FOR DETAILS.

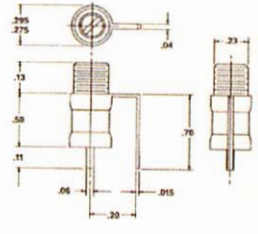
STANDARD AIR CAPACITORS

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5500 PC25J200	1 to 20 >12 TURNS	0 ± 30	1500	
5501 *PC26T200	1 to 20 >12 TURNS	0 ± 30	1500	
5502 PC31J200	1 to 20 >12 TURNS	0 ± 30	1500	

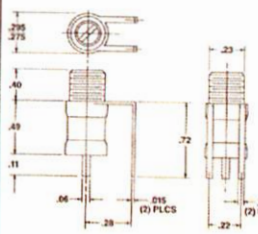
STANDARD AIR CAPACITORS

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5600	1 to 30 >20 TURNS	0 ± 30	800	
5601 *PC26J300	1 to 30 >20 TURNS	0 ± 30	800	
5602	1 to 30 >20 TURNS	0 ± 30	800	

VERTICAL MOUNT

JMC P/N	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
8054	1.5 to 20 >12 TURNS	0 ± 30	1500	

VERTICAL MOUNT

JMC P/N	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
8098	1.5 to 30 >20 TURNS	0 ± 30	800	

\*CONSULT FACTORY FOR DETAILS

\*CONSULT FACTORY FOR DETAILS

JOHANSON MANUFACTURING CORPORATION, ROCKAWAY VALLEY ROAD, BOONTON, NEW JERSEY USA 07005 201-334-2676 FAX-201-334-2954 TWX 710-987-8367

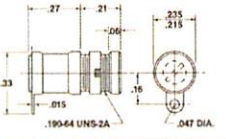
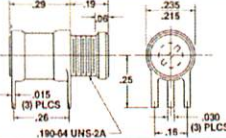
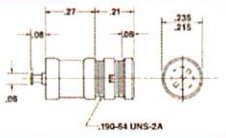


5700 Type 

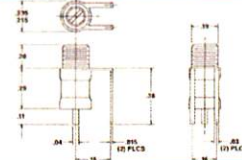
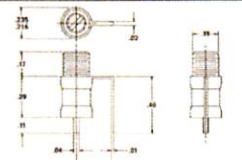
.6 to 6pF

Additional ranges shown.

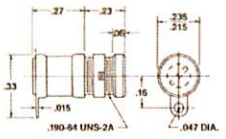
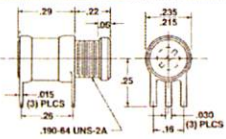
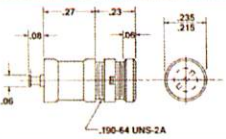
MINIATURE AIR CAPACITORS

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5700 PC25J060	.6 to 6 >8 TURNS	0 ± 15	10000	
5701 *PC26J060	.6 to 6 >8 TURNS	0 ± 15	10000	
5702 PC31J060	.6 to 6 >8 TURNS	0 ± 15	10000	

VERTICAL MOUNT

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5753	1 to 10 >8 TURNS	0 ± 50	7500	
8050	.7 to 6 >8 TURNS	0 ± 15	10000	

EXTENDED RANGE

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5750	.8 to 10 >8 TURNS	0 ± 50	7500	
5751	.8 to 10 >8 TURNS	0 ± 50	7500	
5752 PC29J100	.8 to 10 >8 TURNS	0 ± 50	7500	

\*CONSULT FACTORY FOR DETAILS.

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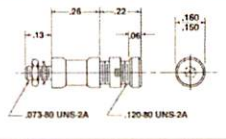
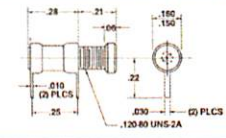
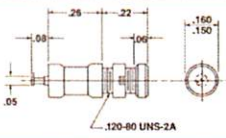


5800 Type 

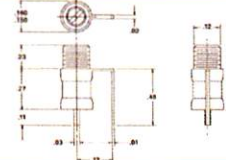
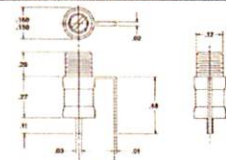
.35 to 3.5pF

Additional ranges shown.

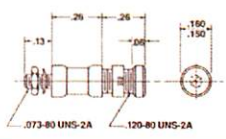
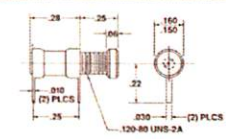
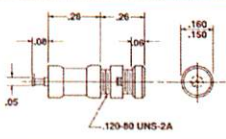
MINIATURE AIR CAPACITORS

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5800 PC27J3R5	.35 to 3.5 >9 TURNS	0 ± 15	10000	
5801 PC28J3R5	.35 to 3.5 >9 TURNS	0 ± 15	10000	
5802 PC29J3R5	.35 to 3.5 >9 TURNS	0 ± 15	10000	

VERTICAL MOUNT

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5853 *PC30J5R0	.6 to 5 >9 TURNS	0 ± 50	7500	
8051 *PC30J3R5	.6 to 3.5 >9 TURNS	0 ± 15	10000	

EXTENDED RANGE

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
5850	.5 to 5 >9 TURNS	0 ± 50	7500	
5851 PC28J050	.5 to 5 >9 TURNS	0 ± 50	7500	
5852 PC29J050	.5 to 5 >9 TURNS	0 ± 50	7500	

\*CONSULT FACTORY FOR DETAILS.

# Giga-Trim<sup>®</sup> Trimmer Capacitors

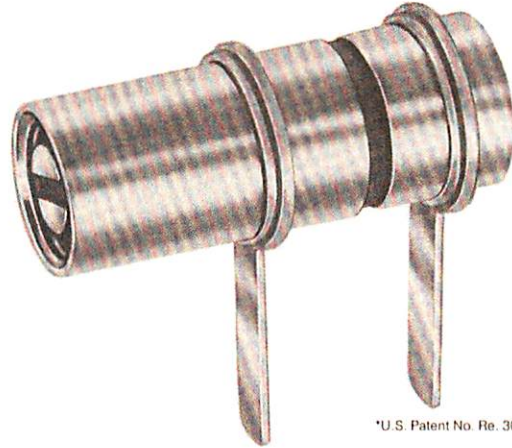


## description

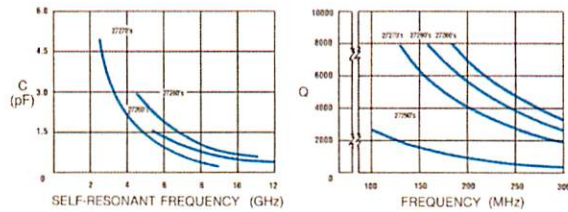
GIGA-TRIMS<sup>®</sup> (gigahertz trimmers) are tiny trimmer capacitors which provide a straight-forward technique for fine tuning RF and microwave circuits by eliminating time consuming methods of abrasive trimming, cut and try adjustment techniques, and interchange of fixed capacitors.

The design evolved from the need for a virtually indestructible miniature trimmer with superior electrical characteristics. GIGA-TRIMS<sup>®</sup> withstand the rigors of soldering heat, excessive tuning and rough handling. As a result of the excellent dielectric and insulation properties of the sapphire housing, high break-down voltage is achieved. Incorporating the patented self-locking constant torque drive mechanism\* which eliminates the need for external bushing slots, the new GIGA-TRIM<sup>®</sup> offers many improvements: a fixed length, increased Q, essentially zero tuning noise and reduced susceptibility to solder flux intrusion during installation.

A variety of mounting styles is available for vertical, printed circuit, panel, cavity and strip-line applications. All units meet the requirements of MIL-C-14409 and those identified are qualified to that specification. High Reliability versions are available on special order; to order add an "R" prefix letter to the standard Johanson part number.



\*U.S. Patent No. Re. 30,406



## applications

- Impedance matching
- Crystal trimming
- Interstage coupling
- Gap trimming in microstrip
- Filter tuning
- Cavity tweaking

## characteristics

- Rated Voltage 500 VDC
- Insulation resistance >10<sup>6</sup> Meg Ω 500 VDC
- Rotational life exceeds MIL-C-14409
- Contact resistance <.01Ω
- Operating temperature -65°C to +125°C
- Self-Resonant Frequency to >12 GHz
- Vibration 60 g 10-2000 Hz
- Shock 100 g, 6 milliseconds

## terminal options

To order following, substitute style number for the last digit in JMC P/N.



\*\*MIL-SPEC QUALIFIED, SEE PAGES 8 & 9



JMC Tuning Tool 8762 — for 27260 series



JMC Tuning Tool 8777 — for the remainder listed.

ELECTRONIC ACCURACY THROUGH MECHANICAL PRECISION

GIGA-TRIM® CAPACITORS

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 250 MHz	DIMENSIONS (INCHES)
27261SL PC22J1R2	.3 to 1.2 >5 TURNS	0 ± 50	5000	
27261 PC21J1R2	.3 to 1.2 >5 TURNS	0 ± 50	5000	
27263 PC24J1R2	.3 to 1.2 >5 TURNS	0 ± 50	5000	
27264 PC23J1R2	.3 to 1.2 >5 TURNS	0 ± 50	5000	

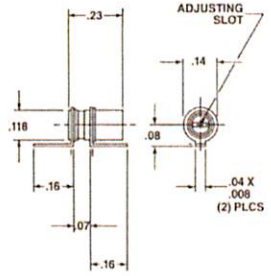
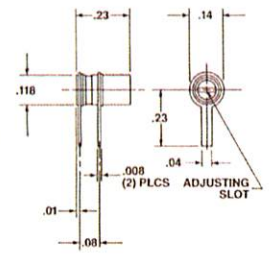
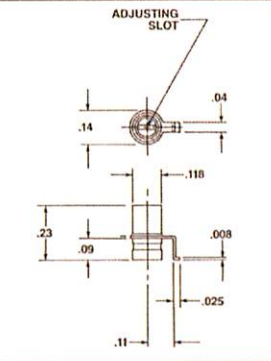
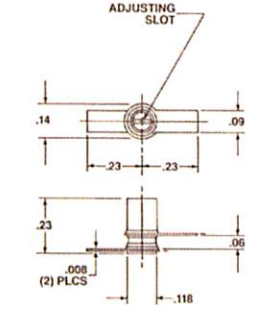
GIGA-TRIM® CAPACITORS

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 250 MHz	DIMENSIONS (INCHES)
27271SL PC22J4R5	.6 to 4.5 >8 TURNS	0 ± 50	3000	
27271 PC21J4R5	.6 to 4.5 >8 TURNS	0 ± 50	3000	
27273 PC24J4R5	.6 to 4.5 >8 TURNS	0 ± 50	3000	
27274 PC23J4R5	.6 to 4.5 >8 TURNS	0 ± 50	3000	

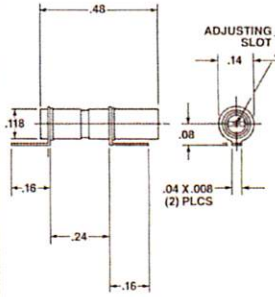
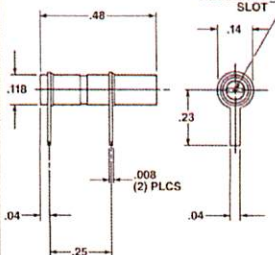
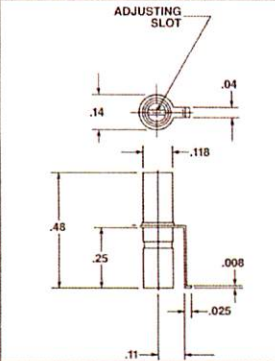
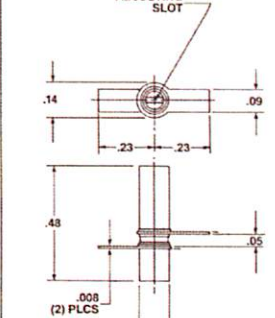
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GIGA-TRIM® CAPACITORS

JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 250 MHz	DIMENSIONS (INCHES)
27281SL PC22J2R5	.4 to 2.5 >4 TURNS	0 ± 50	4000	
27281 PC21J2R5	.4 to 2.5 >4 TURNS	0 ± 50	4000	
27283 PC24J2R5	.4 to 2.5 >4 TURNS	0 ± 50	4000	
27284 PC23J2R5	.4 to 2.5 >4 TURNS	0 ± 50	4000	

GIGA-TRIM® CAPACITORS

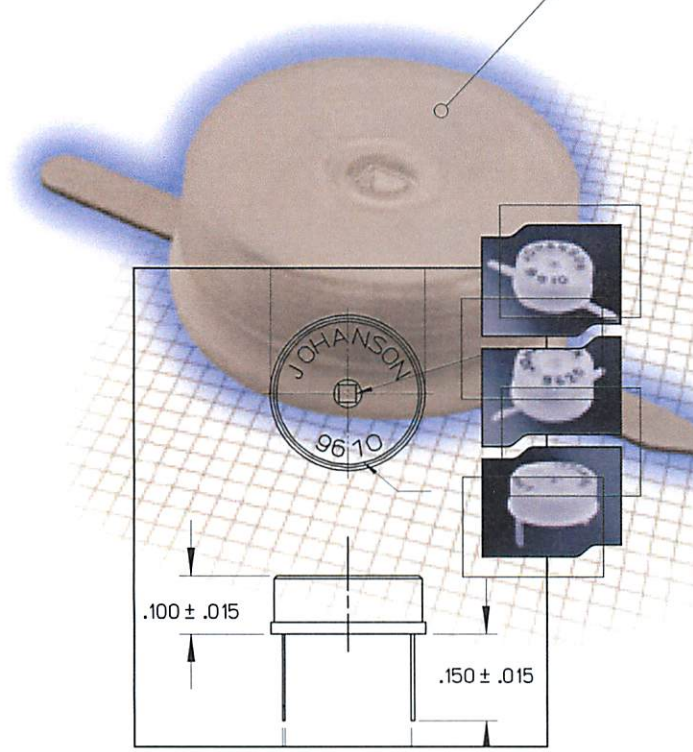
JMC P/N MIL SPEC	RANGE pF	TC PPM/°C	MIN. Q @ 100 MHz	DIMENSIONS (INCHES)
27291SL PC22K080	.8 to 8 >16 TURNS	0 ± 75	3000	
27291 PC21K080	.8 to 8 >16 TURNS	0 ± 75	3000	
27293 PC24K080	.8 to 8 >16 TURNS	0 ± 75	3000	
27294 PC23K080	.8 to 8 >16 TURNS	0 ± 75	3000	

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# SEAL-TRIM

Our Seal-Trims are also built around the Thin-Trim capacitors. These capacitors are encased in a high performance polymer housing that is wave solderable and protects the trimmer from contamination.



## APPLICATIONS

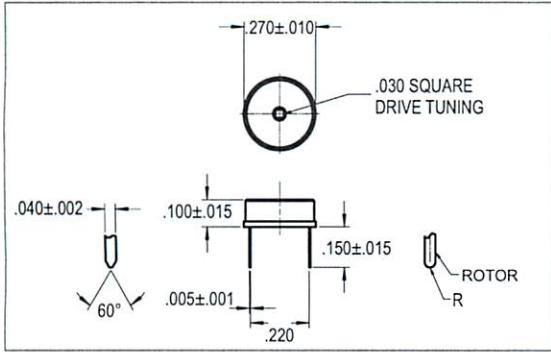
- RF amplifier
- LC Filters and Networks
- Broadband Wireless LAN
- Medical Devices
- Cordless and Cellular phones
- DR/Crystal Oscillator
- Microstrip line filters

## CHARACTERISTICS

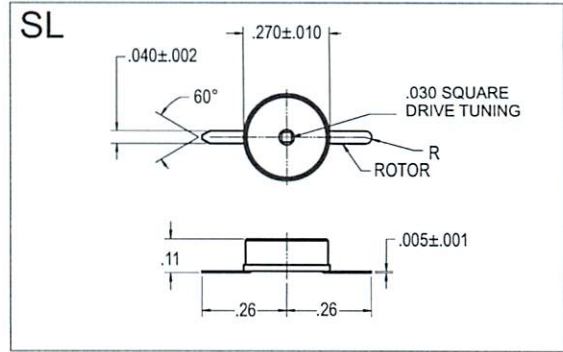
- Working Voltage: 250 VDC (500 VDC Test)
- Long Rotational life
- Insulation Resistance: > 10<sup>4</sup> MΩ
- Temperature Range: -55°C to +125°C
- RoHS Compliant parts available

SERIES	DISK SIZE	CAPACITANCE AVAILABLE	TUNING RESOLUTION
9610/9810	.270" (6.86 mm)	1 TO 50 pF	180°
9620/9820	.180" (4.57 mm)	.5 TO 25 pF	180°

**9610 SERIES** TUNING TOOL: 4193

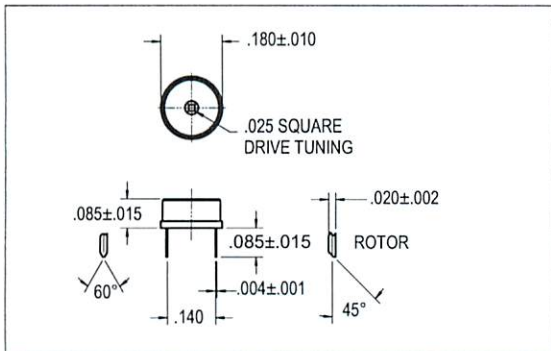


JMC P/N	RANGE PF	MIN Q @ 100MHZ
9610	9610SL	1.5 TO 4.5 >1000
9611	9611SL	2.5 TO 10.0 >1000
9612	9612SL	4.0 TO 18.0 >700
9613	9613SL	6.0 TO 35.0 >200
9614	9614SL	7.0 TO 40.0 >200
9615	9615SL	5.0 TO 25.0 >200
9616	9616SL	8.0 TO 50.0 >200

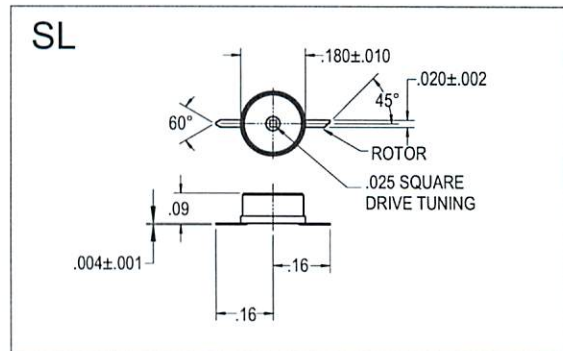


ROHS	Pb	RANGE PF	MIN Q @ 100MHZ
9810	9810SL	1.5 TO 4.5 >1000	
9811	9811SL	2.5 TO 10.0 >1000	
9812	9812SL	4.0 TO 18.0 >700	
9813	9813SL	6.0 TO 35.0 >200	
9814	9814SL	7.0 TO 40.0 >200	
9815	9815SL	5.0 TO 25.0 >200	
9816	9816SL	10.5 TO 50.0 >200	

**9620 SERIES** TUNING TOOL: 4192



JMC P/N	RANGE PF	MIN Q @ 100MHZ
9620	9620SL	0.5 TO 2.5 >1000
9621	9621SL	1.0 TO 5.0 >1000
9622	9622SL	2.5 TO 10.0 >1000
9626	9626SL	8.5 TO 25.0 >300
9628	9628SL	5.0 TO 15.0 >750
9629	9629SL	7.5 TO 18.0 >500

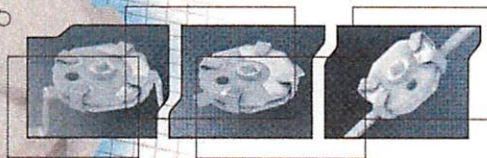
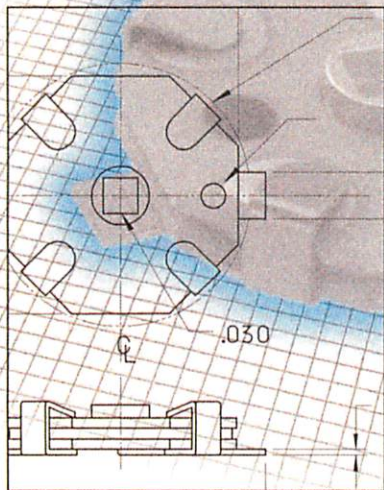


ROHS	Pb	RANGE PF	MIN Q @ 100MHZ
9820	9820SL	0.5 TO 2.5 >1000	
9821	9821SL	1.0 TO 5.0 >1000	
9822	9822SL	2.5 TO 10.0 >1000	
9826	9826SL	8.5 TO 25.0 >300	
9828	9828SL	5.0 TO 15.0 >750	
9829	9829SL	7.5 TO 18.0 >500	



# THIN-TRIM

Our Thin-Trim capacitors are ideal for applications where size and performance are most critical. These single-turn capacitors exhibit remarkable electrical characteristics for their small size. Useful up to 2 GHz, these trimmers are perfect for low-profile applications.



## CHARACTERISTICS

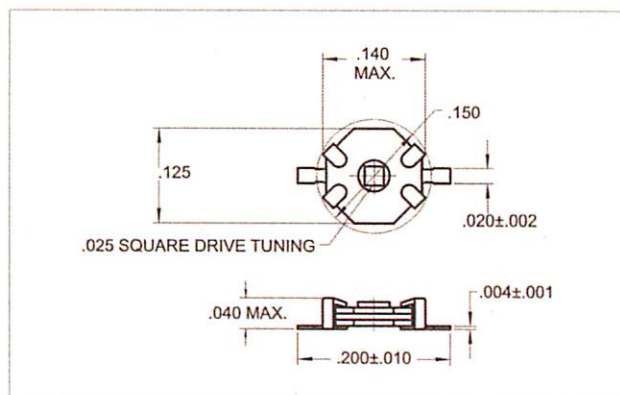
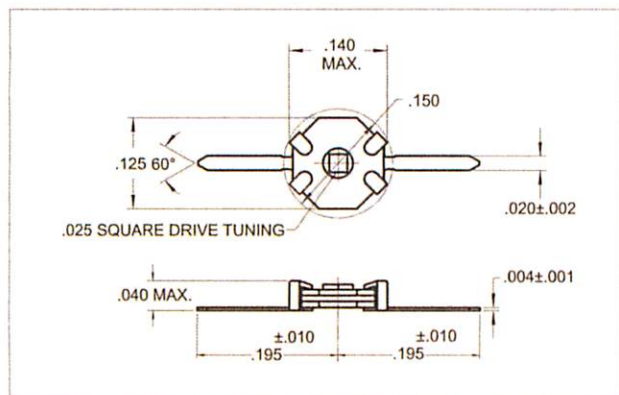
- Working Voltage: 250 VDC (500 VDC Test)
- Insulation Resistance: > 10<sup>4</sup> MΩ
- Temperature Range: -55°C to +125°C
- RoHS Compliant parts available

## APPLICATIONS

- RF amplifier
- LC Filters and Networks
- Broadband Wireless LAN
- Medical Devices
- Cordless and Cellular phones
- DR/Crystal Oscillator

SERIES	DISK SIZE	CAPACITANCE AVAILABLE	TUNING RESOLUTION
9401	.140" (3.56 MM)	.25 TO 4.0 pF	90°
9402	.125" (3.18 MM)	.5 TO 25 pF	180°
9410	.200" (5.08 MM)	1 TO 50 pF	180°

## 9401 SERIES Tuning Tool: 4194

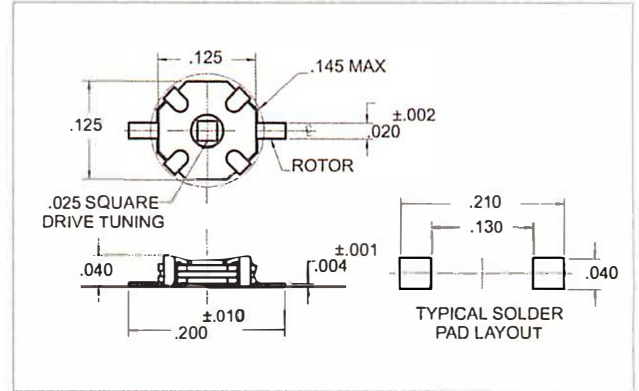
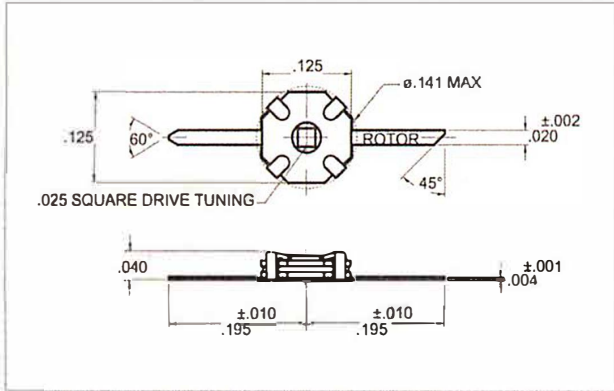


JMC P/N	JMC ROHS P/N	RANGE PF	MIN Q @ 100MHZ
9401-0	9701-0	0.25 TO 0.7	>1000
9401-1	9701-1	0.5 TO 1.3	>1000
9401-2	9701-2	0.6 TO 2.0	>1000
9401-4	9701-4	1.5 TO 4.0	>500

JMC P/N	JMC ROHS P/N	RANGE PF	MIN Q @ 100MHZ
9401-0SL1	9701-0SL1	0.25 TO 0.7	>1000
9401-1SL1	9701-1SL1	0.5 TO 1.3	>1000
9401-2SL1	9701-2SL1	0.6 TO 2.0	>1000
9401-4SL1	9701-4SL1	1.5 TO 4.0	>500

Available in Tape/Reel: 1500 per reel, add suffix R3

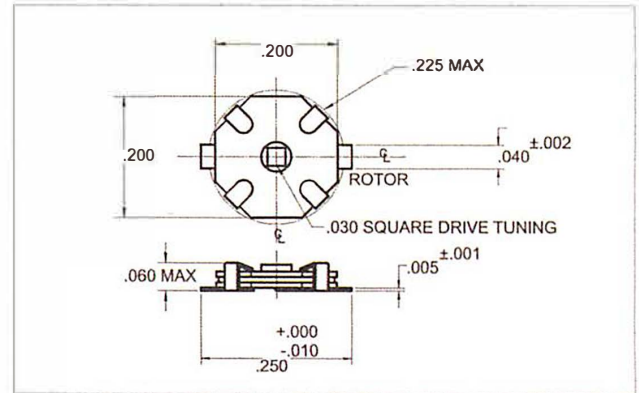
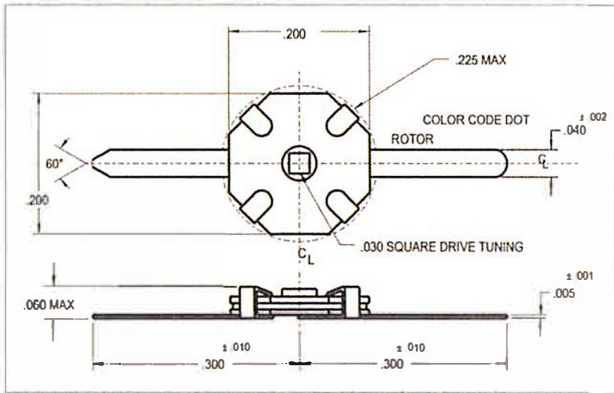
# 9402 SERIES Tuning Tool: 4194



JMC P/N	JMC ROHS P/N	RANGE PF	MIN Q @ 100MHZ
9402-0	9702-0	0.5 to 2.5	>3000
9402-1	9702-1	1.0 to 5.0	>1000
9402-2	9702-2	2.5 to 10.0	>1000
9402-4	9702-4	3.0 to 12.0	>500
9402-6	9702-6	6.0 to 25.0	>300
9402-8	9702-8	5.0 to 15.0	>750
9402-9	9702-9	5.0 to 18.0	>500

JMC P/N	JMC ROHS P/N	RANGE PF	MIN Q @ 100MHZ
9402-05L-1	9702-05L-1	0.5 to 2.5	>3000
9402-15L-1	9702-15L-1	1.0 to 5.0	>1000
9402-25L-1	9702-25L-1	2.5 to 10.0	>1000
9402-45L-1	9702-45L-1	3.0 to 12.0	>500
9402-65L-1	9702-65L-1	6.0 to 25.0	>300
9402-85L-1	5L-19702-8	5.0 to 15.0	>750
9402-95L-1	9702-95L-1	5.0 to 18.0	>500

# 9410 SERIES Tuning Tool: 4193



JMC P/N	JMC ROHS P/N	RANGE PF	MIN Q @ 100MHZ
9410-0	9710-0	1.0 to 4.5	>1000
9410-1	9710-1	2.5 to 10.0	>1000
9410-2	9710-2	4.0 to 18.0	>700
9410-3	9710-3	6.0 to 35.0	>200
9410-4	9710-4	7.0 to 40.0	>200
9410-5	9710-5	8.0 to 50.0	>250
9410-25	9710-25	5.0 to 25.0	>200

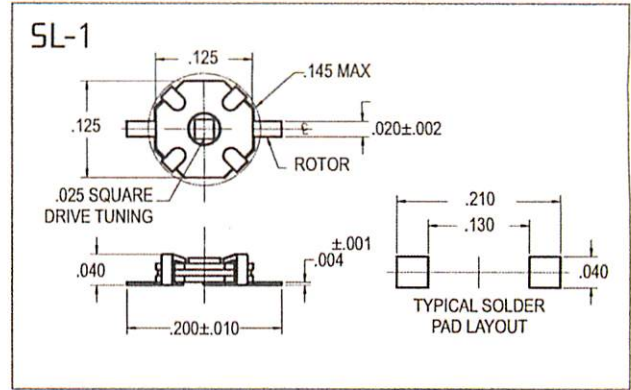
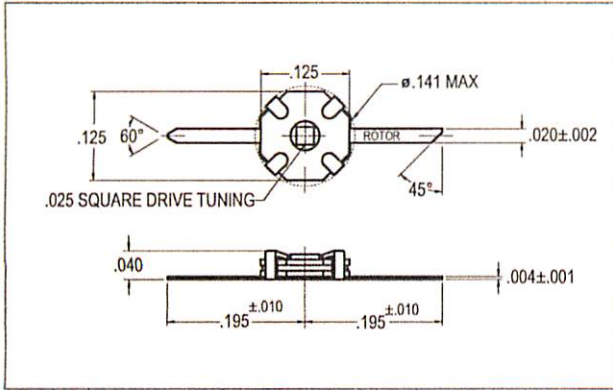
JMC P/N	JMC ROHS P/N	RANGE PF	MIN Q @ 100MHZ
9410-05L-1	9710-05L-1	1.0 to 4.5	>1000
9410-15L-1	9710-15L-1	2.5 to 10.0	>1000
9410-25L-1	9710-25L-1	4.0 to 18.0	>700
9410-35L-1	9710-35L-1	6.0 to 35.0	>200
9410-45L-1	9710-45L-1	7.0 to 40.0	>200
9410-55L-1	9710-55L-1	8.0 to 50.0	>250
9410-255L-1	9710-25L-1	5.0 to 25.0	>200

Available in Tape/Reel: 3000 per reel, add suffix R7

Available in Tape/Reel: 3000 per reel, add suffix R7



# 9402/9702 SERIES TUNING TOOL: 4194



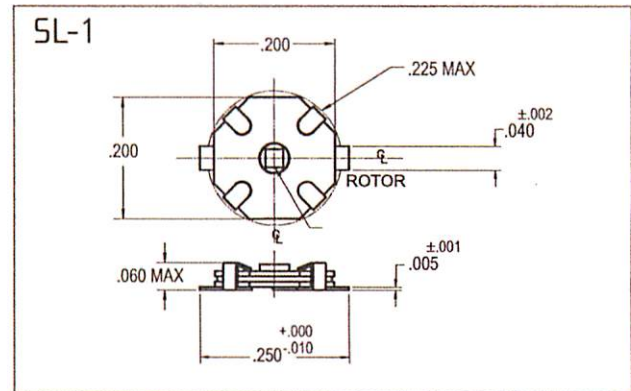
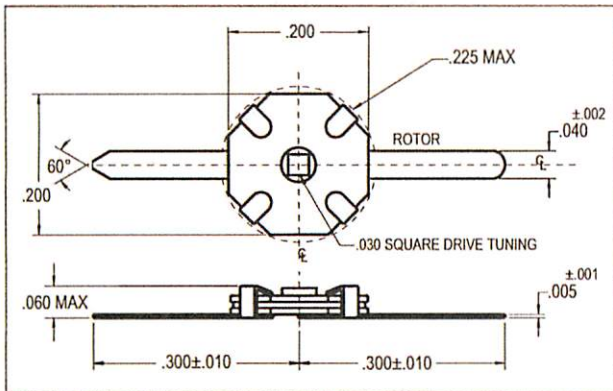
JMC P/N	RANGE PF	MIN Q @100MHZ	
9402-0	9402-OSL-1	0.5 To 2.5	>3000
9402-1	9402-1SL-1	1.0 To 5.0	>1000
9402-2	9402-2SL-1	2.5 To 10.0	>1000
9402-4	9402-4SL-1	3.0 To 12.0	>500
9402-6	9402-6SL-1	6.0 To 25.0	>300
9402-8	9402-8SL-1	5.0 To 15.0	>750
9402-9	9402-9SL-1	5.0 To 18.0	>500

SL-1 AVAILABLE IN TAPE/REEL: 1500 PER REEL, ADD SUFFIX R3

ROHS	RANGE PF	MIN Q @100MHZ	
9702-0	9702-OSL-1	0.5 To 2.5	>3000
9702-1	9702-1SL-1	1.0 To 5.0	>1000
9702-2	9702-2SL-1	2.5 To 10.0	>1000
9702-4	9702-4SL-1	3.0 To 12.0	>500
9702-6	9702-6SL-1	8.0 To 25.0	>300
9702-8	9702-8SL-1	5.0 To 15.0	>750
9702-9	9702-9SL-1	7.0 To 18.0	>500

SL-1 AVAILABLE IN TAPE/REEL: 1500 PER REEL, ADD SUFFIX R3

# 9410/9710 SERIES TUNING TOOL: 4193



JMC P/N	RANGE PF	MIN Q @100MHZ	
9410-0	9410-OSL-1	1.0 To 4.5	>1000
9410-1	9410-1SL-1	2.5 To 10.0	>1000
9410-2	9410-2SL-1	4.0 To 18.0	>700
9410-3	9410-3SL-1	6.0 To 35.0	>200
9410-4	9410-4SL-1	7.0 To 40.0	>200
9410-5	9410-5SL-1	8.0 To 50.0	>250
9410-25	9410-25SL-1	5.0 To 25.0	>200

AVAILABLE IN TAPE/REEL: 3000 PER REEL, ADD SUFFIX R7

ROHS	RANGE PF	MIN Q @100MHZ	
9710-0	9710-OSL-1	1.0 To 4.5	>1000
9710-1	9710-1SL-1	2.5 To 10.0	>1000
9710-2	9710-2SL-1	4.0 To 18.0	>700
9710-3	9710-3SL-1	6.0 To 35.0	>200
9710-4	9710-4SL-1	7.0 To 40.0	>200
9710-5	9710-5SL-1	10.0 To 50.0	>250
9710-25	9710-25SL-1	5.0 To 25.0	>200

AVAILABLE IN TAPE/REEL: 3000 PER REEL, ADD SUFFIX R7



# Ceramic Trimmer Capacitors

*Johanson*  
9300 Type

2 to 12pF	3.5 to 20pF	6 to 55pF
2.5 to 23pF	4 to 34pF	6 to 60pF
1.8 to 5pF	2.8 to 12.5pF	5 to 25pF
1.8 to 6pF	3 to 10pF	5 to 30pF
2 to 8pF	3.5 to 18pF	5.5 to 45pF
		6 to 70pF
		9 to 50pF
		12 to 100pF

## description

These ceramic trimmer capacitors are designed for broadband applications, from audio to 500 MHz, and afford an ideal low cost means of trimming circuitry.

High Reliability versions are available on special order; to order add an "R" prefix letter to the standard Johanson part number.

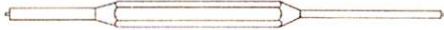
## applications

- All varieties of communication and test equipment
- LC Filter
- Crystal oscillators
- Impedance matching
- CATV amplifiers

## characteristics

- Operating temp. -55°C to +85°C
- Rated voltage 250 VDC
- Insulation resistance >10<sup>4</sup> MegΩ @ 250 VDC

JMC Tuning Tool 8777



**TOP TUNING**

ACTUAL SIZE	JMC P/N	RANGE pF	TC PPM/C°	MIN. Q @ 10 MHz	TORQUE OZ. IN.	COLOR CODE
	9300	2 to 8	NPO ± 200	300	.56 to 5.6	RED
	9301	2 to 12	NPO ± 200	300	.56 to 5.6	NONE
	9302	2.5 to 23	-450 ± 200	300	.56 to 5.6	BLUE
	9303	4 to 34	-550 ± 800	300	.56 to 5.6	ORANGE
	9304	5.5 to 45	-1400 ± 800	200	.56 to 5.6	BROWN
	9305	6 to 55	-1400 ± 800	200	.56 to 5.6	GREEN
	9314	6 to 60	-1400 ± 800	200	.56 to 5.6	PINK
	9315	6 to 70	-1400 ± 800	200	.56 to 5.6	GRAY
9328	12 to 100	-1400 ± 800	200 @ 1 MHz	.56 to 5.6	WHITE	

**TOP TUNING**

ACTUAL SIZE	JMC P/N	RANGE pF	TC PPM/C°	MIN. Q @ 10 MHz	TORQUE OZ. IN.	COLOR CODE
	9306	2 to 8	NPO ± 200	300	.56 to 5.6	RED
	9307	2 to 12	NPO ± 200	300	.56 to 5.6	NONE
	9308	2.5 to 23	-450 ± 200	300	.56 to 5.6	BLUE
	9309	4 to 34	-550 ± 800	300	.56 to 5.6	ORANGE
	9310	5.5 to 45	-1400 ± 800	200	.56 to 5.6	BROWN
	9311	6 to 55	-1400 ± 800	200	.56 to 5.6	GREEN
	9338	6 to 70	-1400 ± 800	200	.56 to 5.6	GRAY
9339	12 to 100	-1400 ± 800	200 @ 1 MHz	.56 to 5.6	WHITE	

**TOP TUNING**

ACTUAL SIZE	JMC P/N	RANGE pF	TC PPM/C°	MIN. Q @ 10 MHz	TORQUE OZ. IN.	COLOR CODE
	9371	1.8 to 5	NPO ± 250	300	.3 to .3	BLACK
	9372	3 to 10	-600 ± 300	300	.3 to .3	NONE
	9373	3.5 to 18	-800 ± 300	300	.3 to .3	BLUE
	9374	5 to 25	-1500 ± 500	200	.3 to .3	PURPLE
	9376	9 to 50	-1500 ± 500	200 @ 1 MHz	.3 to .3	GREEN

**TOP & BOTTOM TUNING**

ACTUAL SIZE	JMC P/N	RANGE pF	TC PPM/C°	MIN. Q @ 10 MHz	TORQUE OZ. IN.	COLOR CODE
	9390	2 to 8	NPO ± 200	300	.56 to 5.6	RED
	9391	2 to 12	NPO ± 200	300	.56 to 5.6	NONE
	9392	2.5 to 23	-450 ± 200	300	.56 to 5.6	BLUE
	9393	4 to 34	-550 ± 800	300	.56 to 5.6	ORANGE
	9394	5.5 to 45	-1400 ± 800	200	.56 to 5.6	BROWN
	9395	6 to 55	-1400 ± 800	200	.56 to 5.6	GREEN
	9396	6 to 70	-1400 ± 800	200	.56 to 5.6	GRAY
	9397	12 to 100	-1400 ± 800	200 @ 1 MHz	.56 to 5.6	WHITE

**SIDE TUNING**

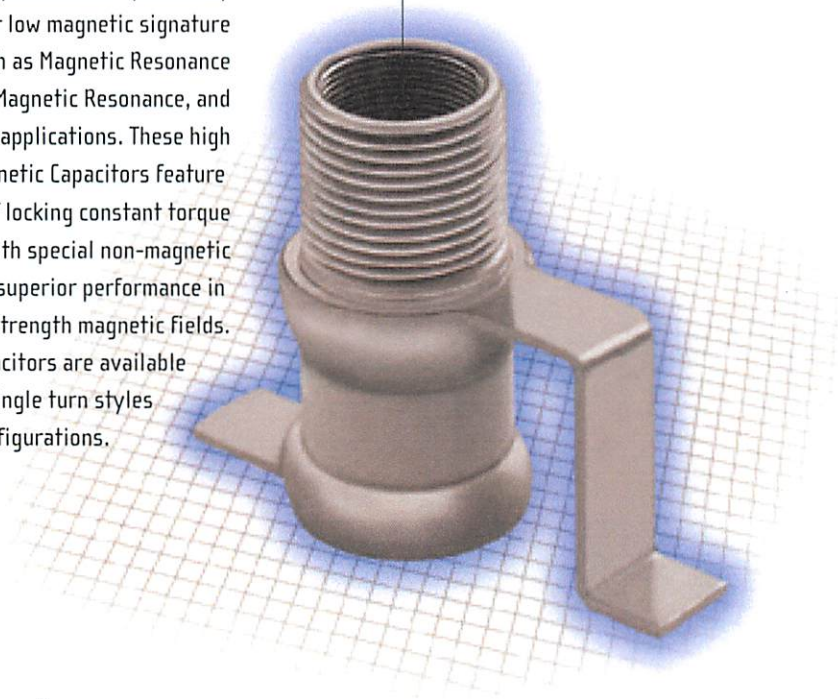
ACTUAL SIZE	JMC P/N	RANGE pF	TC PPM/C°	MIN. Q @ 10 MHz	TORQUE OZ. IN.	COLOR CODE
	9380	1.8 to 6	NPO ± 250	300	.5 to .3	RED
	9381	2.8 to 12.5	-600 ± 300	300	.5 to .3	NONE
	9382	3.5 to 20	-750 ± 300	300	.5 to .3	BLUE
	9383	5 to 30	-1500 ± 500	200	.5 to .3	ORANGE
	9384	9 to 50	-1500 ± 500	200 @ 1 MHz	.5 to .3	BROWN

JOHANSON MANUFACTURING CORPORATION, ROCKAWAY VALLEY ROAD, BOONTON, NEW JERSEY USA 07005 201-334-2676 FAX-201-334-2954 TWX 710-987-8367



# NON-MAGNETIC CAPACITORS

Non-magnetic Capacitors are specifically designed for low magnetic signature applications such as Magnetic Resonance Imaging, Nuclear Magnetic Resonance, and other medical applications. These high stability Non-magnetic Capacitors feature the one piece self locking constant torque mechanism along with special non-magnetic construction for superior performance in very high strength magnetic fields. Non-magnetic Capacitors are available in multi-turn and single turn styles and various configurations.



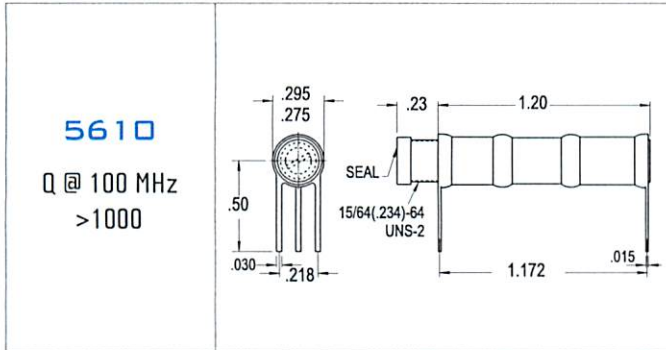
## CHARACTERISTICS

- Working Voltage: From 250 VDC to 5000 VDC
- Long Rotational life
- Insulation Resistance: > 10<sup>6</sup> MΩ
- Temperature range: -65°C to +125°C
- RoHS Compliant

WORKING VOLTAGE	CAPACITANCE RANGE	SERIES	Q	PAGE
5000 VDC	1 TO 7.5 pF	5610	> 1000 @100MHz	2
1250 VDC	1.5 TO 10 pF	52H	> 1400 @195MHz	2
1000 VDC	1.5 TO 19 pF	55H	> 1000 @175MHz	2
	1 TO 25 pF	59H	> 1000 @175MHz	2,3
	2 TO 30 pF	56H	> 1000 @175MHz	3
250 VDC	.4 TO 3.5 pF	5860	> 10000 @100MHz	3
	.6 TO 6.0 pF	5760	> 10000 @100MHz	3,4
	.8 TO 10 pF	5240	> 4000 @100MHz	4
	1 TO 30 pF	5640	> 800 @100MHz	4
250 VDC (90° TO 180° RESOLUTION)	UP TO 50 pF	THIN-TRIM	SEE DATASHEET	THIN-TRIM
	UP TO 22 pF	CERA-TRIM	SEE DATASHEET	CERA-TRIM
	UP TO 50 pF	SEAL-TRIM	SEE DATASHEET	SEAL-TRIM

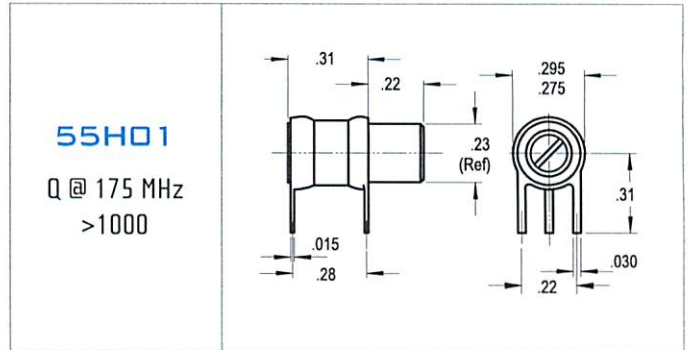
## 5000 VDC - 1 TO 7.5 pF

- Capacitance Range: 1 to 7.5 pF (>26 turns)
- Working Voltage: 5000 VDC (9000 VDC Test)
- Torque: 1 to 5.0 oz. In.
- Tuning Tool: 8764
- Gold, Silver, Chromate Finish
- RoHS Compliant



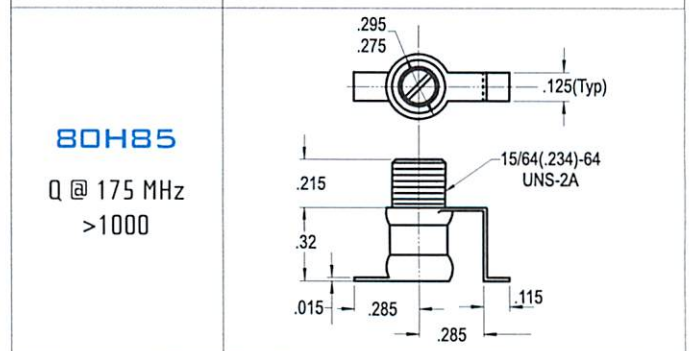
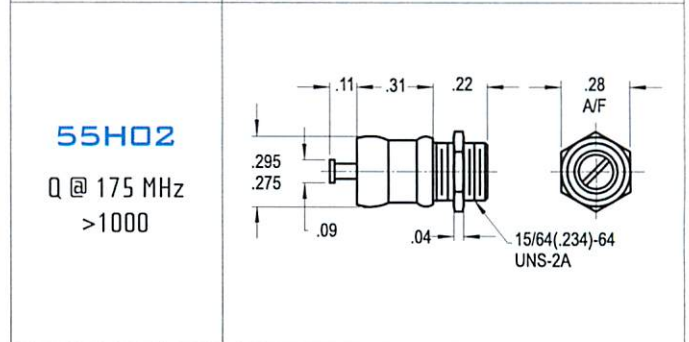
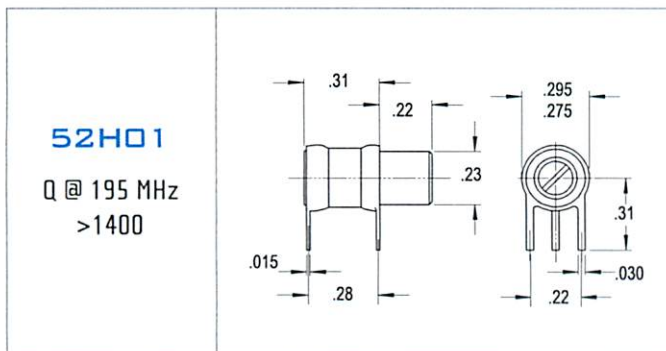
## 1000 VDC - 1 TO 19 pF

- Capacitance Range: 1.5 to 19 pF (>18 turns)
- Working Voltage: 1000 VDC (2000 VDC Test)
- Torque: 1 to 5.0 oz. In.
- Tuning Tool: 8764
- Gold, Silver, Chromate Finish
- RoHS Compliant



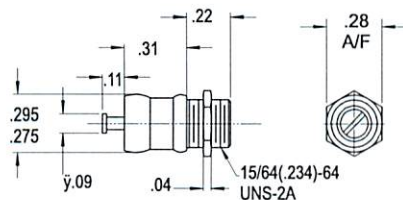
## 1250 VDC - 1 TO 10 pF

- Capacitance Range: 1.5 to 10 pF (>18 turns)
- Working Voltage: 1250 VDC (2500 VDC Test)
- Torque: 1 to 5.0 oz. In.
- Tuning Tool: 8764
- Gold, Silver, Chromate Finish
- RoHS Compliant



## 52H02

Q @ 195 MHz  
>1400



## 1000 VDC - 1 TO 25 pF

- Capacitance Range: 1 to 25 pF (>23 turns)
- Working Voltage: 1000 VDC (2000 VDC Test)
- Torque: 1 to 5.0 oz. In.
- Tuning Tool: 8764
- Gold, Silver, Chromate Finish
- RoHS Compliant

## 1000 VDC - 1 TO 25 pF

<p><b>59H01</b> Q @ 175 MHz &gt;1000</p>	
<p><b>59H18</b> Q @ 175 MHz &gt;1000</p>	

## 1000 VDC - 2 TO 30 pF

- Capacitance Range: 2 to 30 pF (>25 turns)
- Working Voltage: 1000 VDC (2000 VDC Test)
- Torque: 1 to 5.0 oz. In.
- Tuning Tool: 8764
- Gold, Silver, Chromate Finish
- RoHS Compliant

<p><b>56H01</b> Q @ 175 MHz &gt;1000</p>	
<p><b>56H02</b> Q @ 175 MHz &gt;1000</p>	

## 250 VDC - 0.4 TO 3.5 pF

- Capacitance Range: .4 to 3.5 pF (>9 turns)
- Working Voltage: 250 VDC (500 VDC Test)
- Torque: .3 to 3.0 oz. In.
- Tuning Tool: 8766
- Gold, Silver, Chromate Finish
- RoHS Compliant

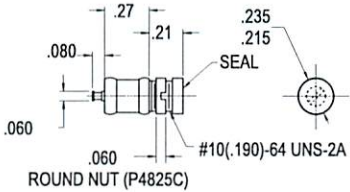
<p><b>5862</b> Q @ 100 MHz &gt;10000</p>	
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## 250 VDC - 0.6 TO 6.0 pF

- Capacitance Range: .6 to 6 pF (>8 turns)
- Working Voltage: 250 VDC (500 VDC Test)
- Torque: .4 to 4.0 oz. In.
- Tuning Tool: 8764
- Gold, Silver, Chromate Finish
- RoHS Compliant

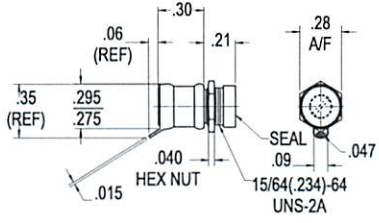
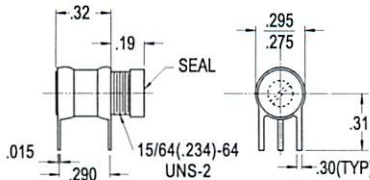
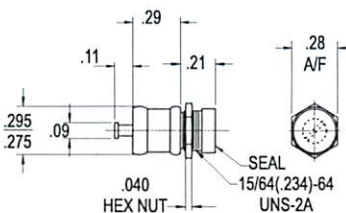
<p><b>5760</b> Q @ 100 MHz &gt;10000</p>	
<p><b>5761</b> Q @ 100 MHz &gt;10000</p>	

**250 VDC - 0.6 TO 6 PF**

<p><b>5762</b></p> <p>Q @ 100 MHz &gt;10000</p>	
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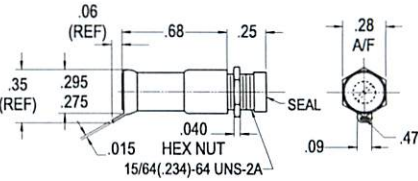
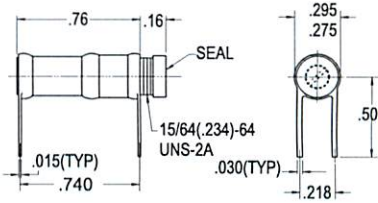
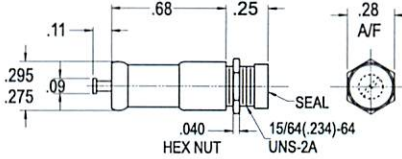
**250 VDC - 0.8 TO 10 PF**

- Capacitance Range: .8 to 10 pF (>6 turns)
- Working Voltage: 250 VDC (500 VDC Test)
- Torque: 1 to 5.0 oz. In.
- Tuning Tool: 8764
- Gold, Silver, Chromate Finish
- RoHS Compliant

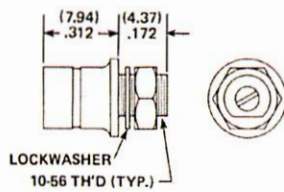
<p><b>5240</b></p> <p>Q @ 100 MHz &gt;4000</p>	
<p><b>5241</b></p> <p>Q @ 100 MHz &gt;4000</p>	
<p><b>5242</b></p> <p>Q @ 100 MHz &gt;4000</p>	

**250 VDC - 1 TO 30 PF**

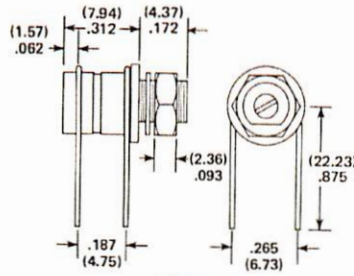
- Capacitance Range: 1 to 30 pF (>23 turns)
- Working Voltage: 250 VDC (500 VDC Test)
- Torque: 1 to 5.0 oz. In.
- Tuning Tool: 8764
- Gold, Silver, Chromate Finish
- RoHS Compliant

<p><b>5640</b></p> <p>Q @ 100 MHz &gt;800</p>	
<p><b>5641</b></p> <p>Q @ 100 MHz &gt;800</p>	
<p><b>5642</b></p> <p>Q @ 100 MHz &gt;800</p>	

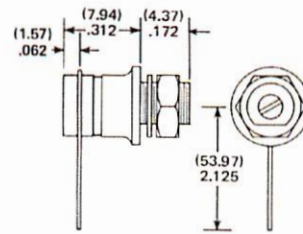
# GLASS PISTON CAPACITORS



7330



7331



7334

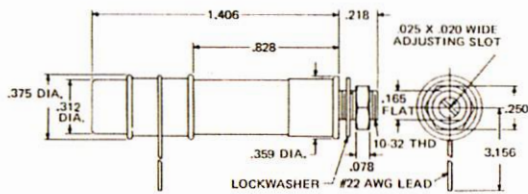
The Johanson 7330 series of variable capacitors is ideally suited for both commercial and military applications. The unique solid metal band design assures electrical and mechanical reliability in excess of conventional trimmers. The three mounting configurations available in this series give the circuit designer wide latitude in mechanical layout.

JMC PART NO.	Q FACTOR @ 100 MHz	CAPACITY RANGE pF	TEMP. COEFF. PPM/°C
7330	>1000	1.0- 10	+75±75
7331	>1000	1.5- 10	+75±75
7334	>1000	1.0- 10	+75±75

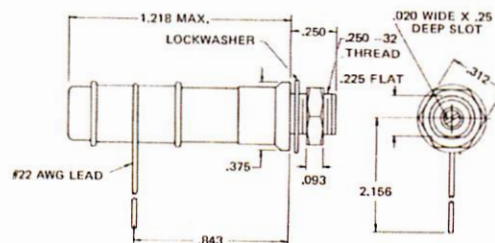
## SPECIFICATIONS

<b>Dielectric With-standing Voltage:</b>	Rating 500 VDC, Breakdown 1,000 VDC Max. C.	Measured @
<b>Operating Temperature Range:</b>	-65°C To +125°C	
<b>Torque:</b>	1 To 5 In. Oz. (72 To 360 g. cm.)	Average 2 In. Oz. (144 g. cm.)
<b>Rotational Life:</b>	>800 Revolutions	MIL-C-14409C
<b>Insulation Resistance:</b>	>10 <sup>6</sup> Megohms @ 500 VDC	Measured @ 25°C & 50% R.H.
<b>Vibration:</b>	15 g's 10-2000 Hz	MIL-STD-202E, Method 204C
<b>Shock:</b>	100 g's 6 Milli-seconds	MIL-STD-202E, Method 213B

# HIGH RF VOLTAGE CAPACITORS



7168



7585

The Johanson 7168 and 7585 quartz trimmer capacitors feature a working voltage of 2500 VDC and 2500 volt peak RF at 30 MHz with a dielectric strength of 10,000 VDC. This series bridges the gap between the low power handling capabilities of conventional piston trimmer capacitors and the extremely high power capabilities of vacuum capacitors.

## SPECIFICATIONS

<b>Capacitance Rating:</b>	7168 0.5 pf - 5.0 pf 7585 0.8 pf - 10.0 pf
<b>Q Factor @ 1 MHz:</b>	>2000
<b>Voltage Rating:</b>	2500 VDC & 2500v peak RF @ 30 MHz applied simultaneously. 10,000 VDC
<b>Dielectric Strength:</b>	10,000 VDC
<b>Insulation Resistance @ 25°C:</b>	>10 <sup>6</sup> megohms
<b>Temperature Coefficient:</b>	0 ± 100 ppm/°C
<b>Current at 30 MHz:</b>	2 Amps

# Johanson Dyna-Trim™ DR Tuners

Johanson  
4000 Type



## description

The Johanson DYNA-TRIM™ is a precision device designed exclusively for tuning dielectric resonator devices such as filters and oscillators. Available in 3 basic configurations, DYNA-TRIM™ is compatible to a wide variety of puck diameters and mounting configurations.

The hermetic version consists of a mounting bushing with an integral hermetically sealed dielectric window inside which a tuning rotor intercepts the puck's magnetic field.

The commercial DYNA-TRIM™ features a mounting bushing with a process seal cap and internal tuning rotor. Both the hermetic and process seal unit employ the patented slotted rotor torque mechanism.

The consumer DYNA-TRIM™ consists of a fine pitch threaded rod with a tuning slot and locking hex nut.

High Reliability versions are available on special order; to order add an "R" prefix letter to the standard Johanson part number.

## applications

- Dielectric resonator oscillators
- Dielectric resonator filters

## characteristics

- Contact resistance < .01Ω
- Operating temperature - 65°C to + 125°C

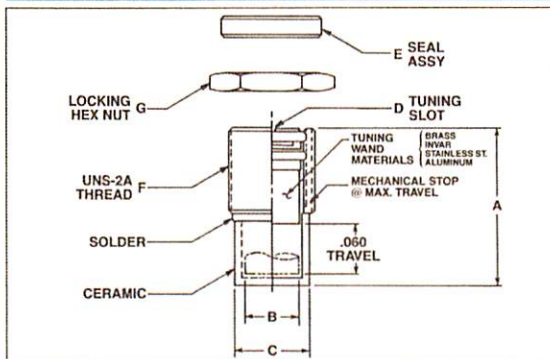
## standard configurations



JMC Tuning Tool 8777

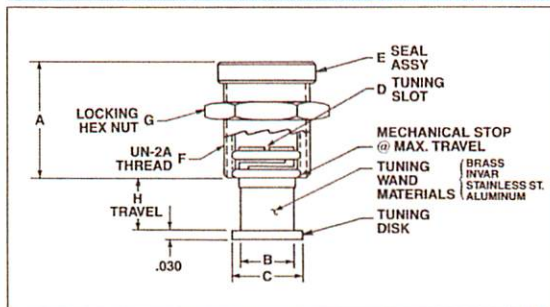


### 4000 SERIES HERMETIC



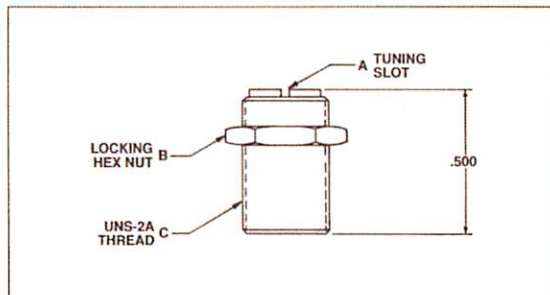
JMC P/N	DIMENSIONS (INCHES)							NOM. FREQ. GHz
	A	B	C	D	E	F	G	
4003-1	.360	.245	.320	.02W x .23	.08 x .41	.375-.64	.06 x .44	6
4005-1	.335	.152	.210	.02W x .14	.08 x .28	.250-.64	.06 x .31	10
4007-1	.270	.084	.135	.015W x .09	.06 x .22	.190-.64	.04 x .22	18

### 4010 SERIES COMMERCIAL



JMC P/N	DIMENSIONS (INCHES)								NOM. FREQ. GHz
	A	B	C	D	E	F	G	H	
4010-1	.60	.335	.975	.03W x .32	.11 x .50	.469-.32	.08 x .56	.39	2
4011-1	.47	.75	.75	.03W x .32	.11 x .50	.469-.32	.08 x .56	.26	3
4012-1		.50							4
4014-1	.45	.19	.25	.02W x .20	.11 x .34	.312-.64	.06 x .375 A/F	.28	9
4015-1									11

### 4020 SERIES CONSUMER



JMC P/N	DIMENSIONS (INCHES)			NOM. FREQ. GHz
	A	B	C	
4023-1	.03W x .32	.06 x .44	.375-.64	6
4024-1	.02W x .17	.06 x .31	.250-.64	8

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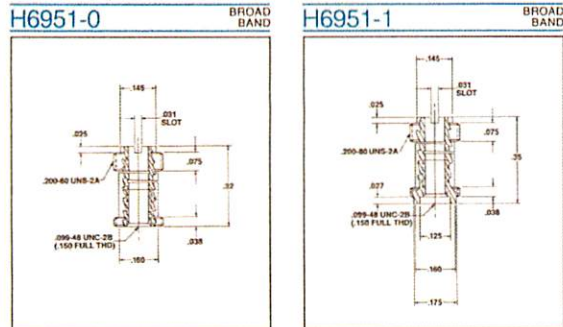
Adjustable  
Microwave  
Diode Holders

*Johanson*  
H6900 Type

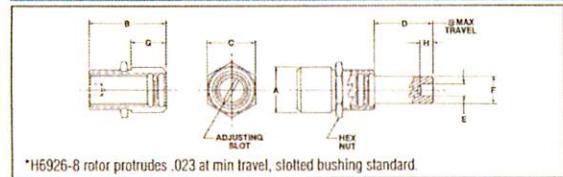
description

Johanson Microwave Diode Holders are an efficient and inexpensive means of securing and tuning microwave diodes into precise attitudes for optimum circuit performance. The self-locking, constant torque drive mechanism (U.S. Patent No. Re. 30,406) results in very low dynamic noise and high Q throughout the full travel excursion of the diode holder. The center access hole in the H6951 series will accept a torque screwdriver so that the diode can be mounted without danger of physical damage. Advantages include: relaxation of costly mechanical tolerances, one-hand tuning in cramped quarters, ultra precise adjustment and excellent diode to holder thermal conductivity. The type illustrated is designed for use with G.E. case styles FTC, FTG and Varian N33, N34, N57 or equivalents.

For special applications contact factory.  
High Reliability versions are available on special order; to order add an "R" prefix letter to the standard Johanson part number.

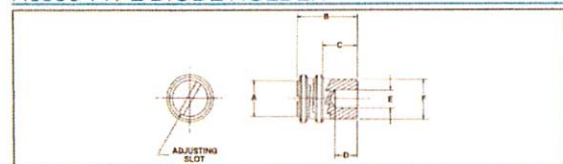


H6900 TYPE DIODE HOLDER



JMC P/N	DIMENSIONS (INCHES)								MOUNTING THREAD UNS-2A
	A	B	C	D	E	F	G	H	
H6926-8	.267	.187	.280	.106	.067	.160	.031	.090	234-64
H6928-1	.267	.450	.280	.345	.069	.160	.240	.100	234-64
H6928-5	.267	.450	.280	.345	.102	.160	.240	.100	234-64
H6928-7	.267	.450	.280	.345	.069	.160	.240	.100	234-64
H6929-1	HEX	.550	.281	.078	.067	.125	.050	.075	190-64
H6933-7	.135	.240	.160	.030	.062	.072	.035	.047	120-80
H6935-13	.267	.359	.280	.030	.152	.162	.144	.055	234-64

H6990 TYPE DIODE HOLDER



JMC P/N	DIMENSIONS (INCHES)					THREAD UNS-2A
	A	B	C	D	E	
H6996-10	.120	.180	.078	.075	.067	.125
H6997-7	.145	.450	.346	.100	.069	.160
H6997-8	.145	.210	.106	.090	.067	.160
H6997-11	.145	.450	.346	.100	.102	.160

Johanson  
Phase-Trim®

*Johanson*  
3050 Type



description

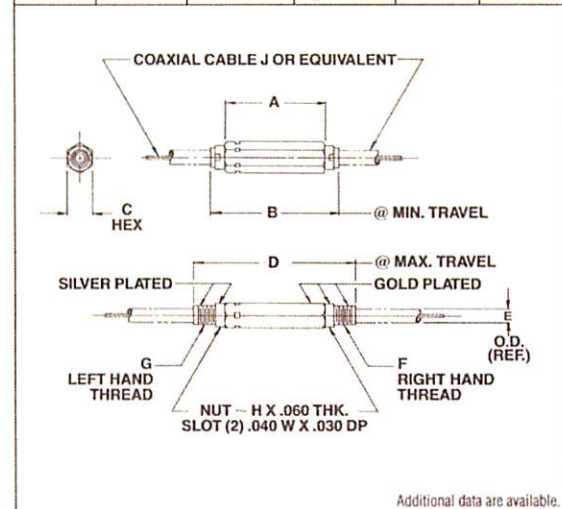
The JOHANSON PHASE-TRIM® is a low noise, high resolution mechanical line stretcher which permits adjustments of cable phase length under actual operating conditions.

When installed in a microwave transmission line the JOHANSON PHASE-TRIM® will control the line length and therefore the relative phase angle of the wave energy transmitted. Unlike the cut-and-try method, PHASE-TRIM® can be easily reset in the factory or the field.

The 3050 series is designed specifically for .141 and .085 diameter semi-rigid cable. Installation is similar to that of an SMA connector and permits .20" of cable assembly phase length adjustment. The self-locking, constant torque drive mechanism (U.S. Patent No. Re. 30,406) provides virtually noise free adjustment with micrometer accuracy over the operating frequency range of the cable. Spanner locking nuts are provided to prevent unintentional adjustments.

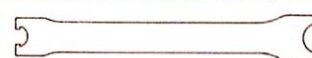
High Reliability versions are available on special order; to order add an "R" prefix letter to the standard Johanson part number.

JMC P/N	IMPEDANCE	MECHANICAL ADJUSTMENT	PHASE ADJUSTMENT RANGE	TORQUE OZ. IN.	MATERIAL
3050-0	50 Ω	>6 TURNS	0° to 30° @ 8.2 GHz	1.0 to 5.0	BRASS, BeCu
3050-1		>7 TURNS	0° to 50° @ 12.4 GHz	0.5 to 3.0	



JMC P/N	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
3050-0	.70	.88	.219	1.08	.14	190-64 UNS-2A	190-64 UNS-2A-LH	.218	UT-.141	
3050-1	.63	.81	.156	1.02	.087	120-80 UNS-2A	120-80 UNS-2A-LH	.150	UT-.85	

Spanner Locking Wrench  
JMC 4953



# Microwave Tuning Elements



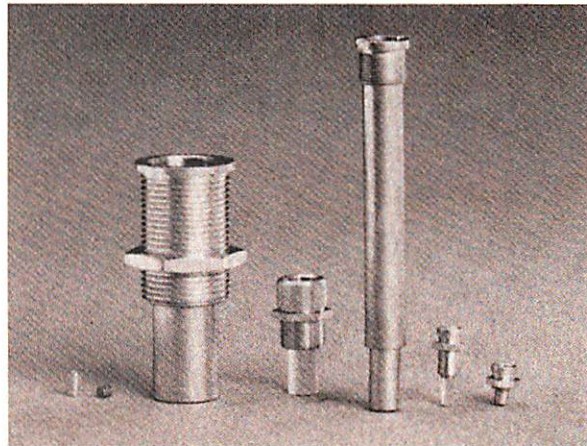
## description

Microwave tuning elements are an economical means of introducing a 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 (U.S. Patent No. Re. 30,406) 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.

High Reliability versions are available on special order; to order add an "R" prefix letter to the standard Johanson part number.

## applications

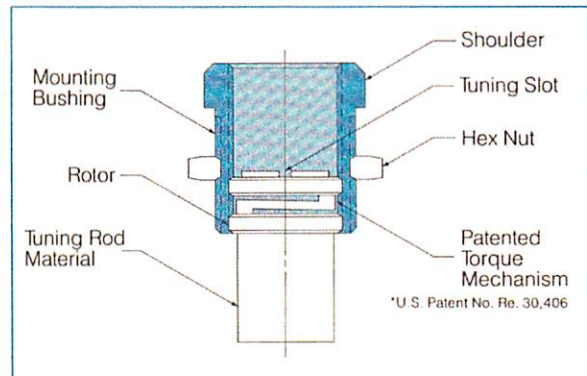
- Combine filters   ■ Interdigital filters   ■ Impedance transformers
- Impatt and Gunn oscillators   ■ Microstrip and strip-line circuits
- Attenuators   ■ Coaxial structures   ■ Waveguide circuitry



## NOMINAL FREQUENCY SELECTION GUIDE

JMC SERIES	OPERATING FREQUENCY (GHz)								
	10	20	30	40	50	60	70	80	90
6922									
6960									
6961									
6933									
6934									
6935									
6950									
6952									
6939									
6940									
6941									
6924									
6925									
6926									
6927									
6928									
6929									
6948									
6965									
6930									
L6994									
L6995									
L6996									
L6997									
L6998									
L6999									

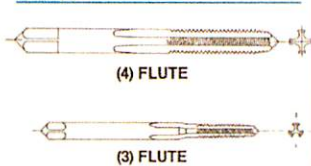
## ANATOMY OF A TUNING ELEMENT



## OPTIONAL CONFIGURATIONS

Bushing Options	STANDARD	SLOTTED	UNDERCUT	MIN/MAX STOP
	80 thds/in. 094-80 UNS 120-80 UNS	64 thds/in. 156-64 UNS 190-64 UNS 234-64 UNS	250-64 UNS 312-64 UNS 375-64 UNS	.469-32 UNS
Other thread sizes available upon request.				
Rotor Options TIR 1% nominal	STANDARD	ROD MAT'L Abrumum Supurum Quartz Eccororb	HIGH RESOLUTION PISTON	SEALED CONSTRUCTION
	108 thds/in. .060-108 UNS	80 thds/in. 060-80 UNS 094-80 UNS 120-80 UNS 200-80 UNS	64 thds/in. 156-64 UNS 190-64 UNS 234-64 UNS 250-64 UNS 375-64 UNS	
Other thread sizes available upon request.				
Surface Finishes	GOLD	CHROMATE	SILVER	TIN
	Hardware			
HEX NUT				ROUND NUT
LOCK-WASHER				SEAL CAP
SLOTTED SEAL CAP				

## TAPS



JMC P/N	THREAD SIZE	RECOMMENDED TAP DRILL
7059	156-64	9/64 (.1406)
7060	120-80	7/64 (.1094)
7061	190-64	#17 (.173)
7062	234-64	7/32 (.2187)
7063	250-64	15/64 (.2344)

JMC P/N	THREAD SIZE	RECOMMENDED TAP DRILL
7054	094-80	#45 (.082)

ELECTRONIC ACCURACY THROUGH MECHANICAL PRECISION

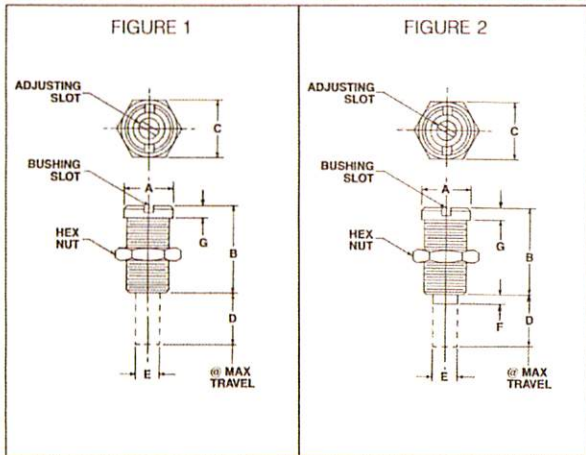




**METALLIC**

Metallic tuning elements consist of a mounting bushing with an integral tuning rotor. The rotor's patented low noise, self-locking torque mechanism provides smooth, high resolution tuning over its entire travel without need of locknuts or jam screws.

JMC P/N	FIG. #	NOMINAL FREQ. BAND	EXTERNAL THREAD UNS-2	RECOMMENDED TAP DRILL	JMC TAP #	MOUNTING TORQUE OZ. IN.
6924-9	1	X and K	.120-80	.109	7060	10
6924-10	2	X and K	.120-80	.109	7060	10
6924-11	1	X and K	.120-80	.109	7060	10
6924-12	2	X and K	.120-80	.109	7060	10
6925-4	1	C and X	.190-64	.173	7061	30
6925-5	1	C and X	.190-64	.173	7061	30
6926-13	1	C and X	.234-64	.219	7062	50
6926-14	1	C and X	.234-64	.219	7062	50
6926-16	2	C and X	.234-64	.219	7062	50
6926-17	2	C and X	.234-64	.219	7062	50
6927-3	1	C and X	.234-64	.219	7062	50
6928-3	1	C	.234-64	.219	7062	50
6928-6	1	C	.234-64	.219	7062	50
6929-2	1	C	.190-64	.173	7061	30
6934-2	2	C, X and K	.234-64	.219	7062	50
6948-1	1	C and X	.312-64	.297	-	120
6965-1	1	L and S	.469-32	.438	-	240

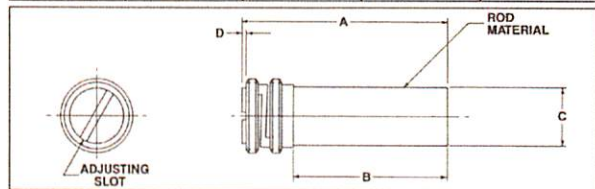


JMC P/N	FIG. #	DIMENSIONS (INCHES)						
		A	B	C	D	E	F	G
6924-9	1	.135	.240	.156	.148	.072	-	.035
6924-10	2	.135	.120	.156	.075	.072	.047	.035
6924-11	1	.135	.240	.156	.075	.072	-	.035
6924-12	2	.135	.120	.156	.030	.072	.002	.035
6925-4	1	.210	.250	.220	.148	.125	-	.037
6925-5	1	.210	.125	.220	.023	.125	-	.037
6926-13	1	.267	.210	.280	.106	.160	-	.035
6926-14	1	.267	.130	.280	.025	.160	-	.035
6926-16	2	.267	.187	.280	.106	.160	.023	.031
6926-17	2	.267	.210	.280	.180	.160	.074	.035
6927-3	1	.267	.360	.280	.255	.160	-	.145
6928-3	1	.267	.450	.280	.340	.160	-	.240
6928-6	1	.267	.450	.280	.345	.160	-	.240
6929-2	1	.210	.552	.220	.450	.125	-	.042
6934-2	2	.267	.359	.280	.265	.152	.010	.144
6948-1	1	.375	.363	.380	.234	.210	-	.040
6965-1	1	.531	.720	.560	.500	.345	-	.040

**TUNING ROTORS**

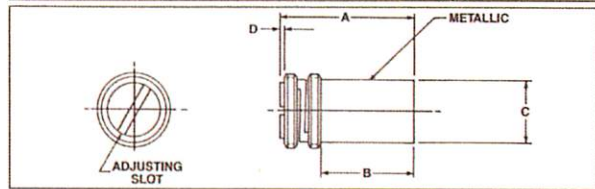
Extended range high Q dielectric and metallic rotors are used where direct insertion of the tuning element is desired. Taps designed specifically to insure proper fit are available from the factory and are listed below.

JMC P/N	ROD MATERIAL	THREAD UNS-2A	RECOMMENDED TAP DRILL	JMC TAP #
6930-0	QUARTZ	.375-64	.359	-
6930-3	ALUMINA	.190-64	.173	7061
6930-5	ALUMINA	.190-64	.173	7061
6930-7	ALUMINA	.190-64	.173	7061
6930-9	SAPPHIRE	.094-80	.082	7064
6930-15	ALUMINA	.190-64	.173	7061
6930-17	ALUMINA	.190-64	.173	7061



JMC P/N	DIMENSIONS (INCHES)				
	A	B	C	D	ADJUSTING SLOT W x L
6930-0	.652	.372	.320	.030	.060 x .320
6930-3	.475	.345	.152	.010	.020 x .145
6930-5	.625	.495	.152	.010	.020 x .145
6930-7	.884	.750	.152	.010	.020 x .145
6930-9	.300	.178	.062	.020	.015 x .060
6930-15	.430	.300	.152	.010	.020 x .145
6930-17	.674	.490	.062	.020	.020 x .145

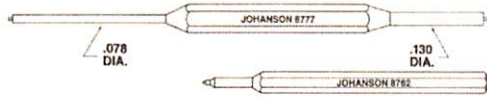
JMC P/N	THREAD 2A	RECOMMENDED TAP DRILL	JMC TAP #
L6994-0	.086-56 UNC	.067	-
L6995-0	.094-80 UNS	.082	7064
L6996-1	.156-64 UNS	.141	7059
L6997-0	.190-64 UNS	.173	7061
L6998-0	.375-64 UNS	.359	-
L6999-0	.060-80 UNF	.047	-



JMC P/N	DIMENSIONS (INCHES)				
	A	B	C	D	ADJUSTING SLOT W x L
L6994-0	.215	.100	.060	.020	.015 x .060
L6995-0	.122	.030	.072	.020	.015 x .060
L6996-1	.250	.148	.125	.010	.020 x .120
L6997-0	.554	.450	.160	.010	.020 x .145
L6998-0	.370	.150	.345	.030	.060 x .320
L6999-0	.500	.385	.040	.020	.010 x .040

# Tuning Tools

## SLOT TUNING TOOLS



JMC P/N	APPLICATION
8777	.130 DIA. { 5200 5400 5500 5600 STANDARD AIR SERIES 5700 MINIATURE AIR SERIES 9300 CERAMIC TRIMMER SERIES } 078 DIA. { 27270 } GIGA-TRIM® SERIES 27280 } 27290 } 5800 MINIATURE AIR SERIES
8762	27260 GIGA-TRIM® SERIES 6922 TUNING ELEMENT

## SQUARE DRIVE TUNING TOOLS

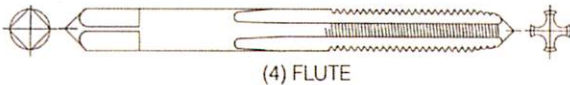
JMC P/N	APPLICATION
2190	9690 SEAL-TRIM® SERIES 9910 THIN-TRIM® SERIES
4192	9401 THIN-TRIM® SERIES 9402 } 9620 SEAL-TRIM® SERIES 9630 }
4193	9410 THIN-TRIM® SERIES 9610 SEAL-TRIM® SERIES

*featuring non-metallic composition*

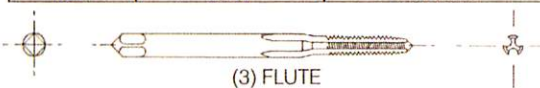
## ROUND NUT WRENCHES

JMC P/N	APPLICATION
4956	5700 MINIATURE AIR SERIES
4958	5800 MINIATURE AIR SERIES
4953	3050 PHASE-TRIM® SERIES

# Taps



JMC P/N	THREAD SIZE UNS-2	RECOMMENDED TAP DRILL
7057	.200-80	3/16 (.1875)
7059	.156-64	9/64 (.1406)
7060	.120-80	7/64 (.1094)
7061	.190-64	#17 (.173)
7062	.234-64	7/32 (.2187)
7063	.250-64	15/64 (.2344)



JMC P/N	THREAD SIZE UNS-2	RECOMMENDED TAP DRILL
7064	.094-80	#45 (.082)

JOHANSON MANUFACTURING CORPORATION, ROCKAWAY VALLEY ROAD, BOONTON, NEW JERSEY USA 07005 201-334-2676 FAX-201-334-2954 TWX 710-987-8367

# Hardware

		JMC P/N		
		MOUNTING THREAD UNS-2		
		.234-64	.190-64	.120-80
	STANDARD SEAL ASS'Y	3978	4674	6775
	NON-MAGNETIC TYPE	8877	8876	8875
	SLOTTED SEAL ASS'Y	4613	6486	6487
	MIN. STOP SEAL ASS'Y	3237	3236	3235
	NON-MAGNETIC TYPE	8877-1	8876-1	8875-1
	HEX NUT	3469	4537	6389
	NON-MAGNETIC TYPE	8882	8881	-
	ROUND NUT	6546	4825	4680
	NON-MAGNETIC TYPE	-	8879	8880
	LOCKWASHER (NON-MAGNETIC)	1999	1994	1993
	INSULATED ADAPTERS	6515	6516	6517
		8705	8702	8701

# Care and Handling

**MOUNTING:** Recommended mounting torque for bushing mounted capacitors:

BUSHING THREAD	TORQUE OZ. IN.
.234-64	50
.190-64	30
.120-80	10

**SOLDERING:** Use low temperature solder. Use a temperature controlled 40 watt iron for most applications. Solder joint should be made in 3 seconds or less. Suggested tip temperature 500°F. Do not solder directly to bushing or stator.

**CLEANING:** Capacitors should be protected from penetration of cleaning solvents as they tend to wash in flux and wash out lubricant.

### AIR CAPACITORS

Clean with seal caps securely in place.

### GIGA-TRIM® CAPACITORS & MINI-TRIM® CAPACITORS

Install after circuit boards are cleaned. If not possible, use a small plastic cap to prevent solvent from washing out rotor lubricant.

### SEAL-TRIM® CAPACITORS & CERA-TRIM® CAPACITORS

Withstand solvent cleaning and are well suited to water cleaning.

### THIN-TRIM® CAPACITORS

Withstand solvent cleaning. Rough torque or binding of the rotor can be caused by dirty solvents. If this occurs, reclean the capacitor in fresh solvent and dry thoroughly.

### ADJUSTING:

Always use the recommended tuning tool. Johanson tuning tools are designed specifically for tuning Johanson products; use of other tools may damage the internal bushing thread causing the rotor to bind.

# Prototyping Kits



For prototyping specify:

## AIR DIELECTRIC

### JK-500 CAPACITOR KIT

QTY.	UNIT	RANGE pF
3	5201	.8 to 10
3	5202	.8 to 10
3	5701	6 to 6
3	5702	6 to 6
3	5801	.35 to 3.5
3	5802	.35 to 3.5
1	8777	TUNING TOOL

## GIGA-TRIM®

### JK-272 CAPACITOR KIT

QTY.	UNIT	RANGE pF
3	27261	.3 to 1.2
3	27263	.3 to 1.2
3	27271	.6 to 4.5
3	27284	.4 to 2.5
3	27285	.4 to 2.5
3	27291	.8 to 8
1	8762	TUNING TOOL
1	8777	TUNING TOOL

## CERA-TRIM®

### JK-023 SURFACE MOUNT CAPACITOR KIT

QTY.	UNIT	RANGE pF
4	2320-0	.6 to 2.5
4	2320-1	1 to 5
4	2320-2	2.5 to 10
4	2320-3	5 to 18
4	2320-4	6.5 to 25
1	4192	TUNING TOOL
1		SAMPLE 12mm TAPE

## THIN-TRIM®

### JK-940 CAPACITOR KIT

QTY.	UNIT	RANGE pF
5	9410-0	1 to 4.5
5	9410-1	2.5 to 10
5	9410-2	4 to 18
5	9410-3	6 to 35
1	4193	TUNING TOOL

### JK-941 CAPACITOR KIT

QTY.	UNIT	RANGE pF
5	9401-0	.25 to .7
5	9401-1	.5 to 1.3
5	9401-2	6 to 2
5	9401-4	1.5 to 4
1	4192	TUNING TOOL

### JK-942 CAPACITOR KIT

QTY.	UNIT	RANGE pF
4	9402-0	.6 to 2.5
4	9402-1	1 to 5
4	9402-2	2.5 to 10
4	9402-6	6 to 25
4	9402-8	5 to 15
4	9402-9	5 to 18
1	4192	TUNING TOOL

## SEAL-TRIM®

### JK-960 CAPACITOR KIT

QTY.	UNIT	RANGE pF
3	9610	1 to 4.5
3	9611	2.5 to 10
3	9612	4 to 18
3	9613	6 to 35
3	9614	7 to 40
3	9615	5 to 25
1	4193	TUNING TOOL

### JK-962 CAPACITOR KIT

QTY.	UNIT	RANGE pF
4	9620	.6 to 2.5
4	9621	1 to 5
4	9622	2.5 to 10
4	9629	5 to 18
1	4192	TUNING TOOL

### JK-969 CAPACITOR KIT

QTY.	UNIT	RANGE pF
4	9692	6 to 25
4	9694	7.5 to 50
4	9697	20 to 100
1	2190	TUNING TOOL

## CERAMIC TRIMMER

### JK-930 CAPACITOR KIT

QTY.	UNIT	RANGE pF
5	9308	2.5 to 23
5	9309	4 to 34
5	9310	5.5 to 45
10	9372	3 to 10
10	9374	5 to 25
3	9382	3.5 to 20
1	8777	TUNING TOOL

## MICROWAVE TUNING ELEMENT

### JK-690 TUNING ELEMENT KIT

QTY.	UNIT	@ MAX TRAVEL	ROD DIA.
5	6924-9	.148	.072
5	6925-4	.148	.125
5	6926-13	.106	.160
5	6927-3	.255	.160
3	6928-3	.340	.160
4	6933-3	.168	.062
1	7060		.120-80 TAP
1	7061		.190-64 TAP
1	7062		.234-64 TAP

## JOHANSON PHASE-TRIM®

### JK-350 JOHANSON PHASE-TRIM® KIT

QTY.	UNIT	REF. COAXIAL CABLE DIA.
3	3050-0	.141
1	4953	LOCKING WRENCH

### JK-351 JOHANSON PHASE-TRIM® KIT

QTY.	UNIT	REF. COAXIAL CABLE DIA.
3	3050-1	.085
1	4953	LOCKING WRENCH

JOHANSON MANUFACTURING CORPORATION, ROCKAWAY VALLEY ROAD, BOONTON, NEW JERSEY USA 07005 201-334-2676 FAX-201-334-2954 TWX 710-987-8367  
Johanson Manufacturing Corporation reserves the right to make design and price changes without notice.



## Precision Screw Machining and Electroplating

### Equipment

32 Tornos cam machines 3/32"-3/8"  
(2.4mm-10mm)  
15 with Iemca automatic barloaders  
12 Star CNC machines 3/32"-1 1/4" (2.4mm-  
32mm)  
All with Iemca automatic barloaders

### Common Materials

Brass 360 Half hard  
Phosphor Bronze  
Teflon  
Delrin  
ABS Plastic  
Titanium  
Invar 36  
303 , 416 , 440 Stainless steels  
Copper alloy C1100  
Aluminum 6061-T6 and 2011-T3

### Tolerances:

+.0002/-.0002 on diameters  
+.0005/-.0005 on lengths in brass,  
phosphor bronze and aluminum  
+.0005/-.0005 on diameters and  
lengths in stainless and tool steels

- ISO 9001:2000 Certified
- Plating Meets Military and ASTM Certifications
- X-Ray measurement
- In-house chemical control laboratory to maintain chemistry of plating solutions
- Zero Discharge System

### Plating Finishes

Gold  
Silver  
Nickel  
Copper  
Bright Tin  
60/40 Tin Lead  
Electroless Nickel

### Surface Finishes

Passivation  
Chromate  
Anodizing