

(For VHF/UHF Bands : 130MHz—1.5GHz)

HELICAL FILTERS

for Communications Equipment



- Car telephone
- Two way radio
- Paging system
- Amateur radio equipment
- Satellite TV receivers
- Measuring instruments

HELICAL FILTERS

for Communications Equipment

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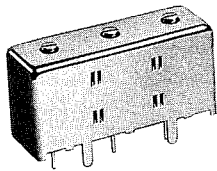
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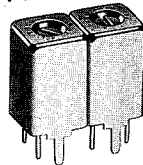
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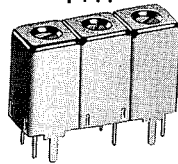
CBT



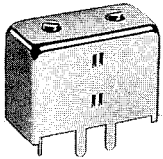
7HW



7HT



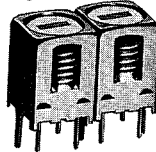
CBW



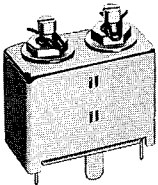
For Use in—

- Car telephone.
- Two way radio.
- Paging system.
- Amateur radio equipment.
- Satellite TV receivers.
- Measuring instruments.

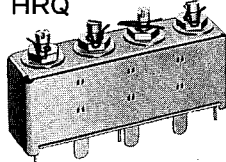
5HW



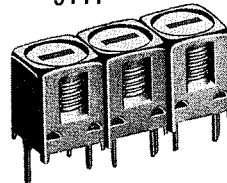
HRW



HRQ



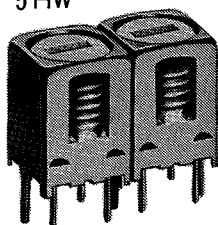
5HT



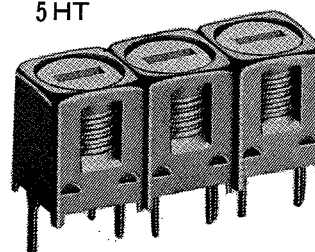
Series	Resonator	Frequency Range
5HW	Two	650~1500MHz
5HT	Three	650~1500MHz
7HW	Two	350~1000MHz
7HT	Three	350~1000MHz
HRW	Two	350~ 520MHz
HRQ	Four	350~ 520MHz
CBW	Two	130~ 220MHz
CBT	Three	130~ 220MHz

Specifications in this catalog are subject to change without notice.
Please confirm when ordering.

5HW



5HT



5HW•5HT

Helical Filters for Communications Equipment

5HW•5HT

5HW and 5HT Series

The 5HW and 5HT Series Helical Filters are designed for use in 0.65 to 1.5GHz frequency range.

The filters are most suited for use in cordless phones, car radiophones, amateur radio sets and other equipment used in the UHF band.

FEATURES

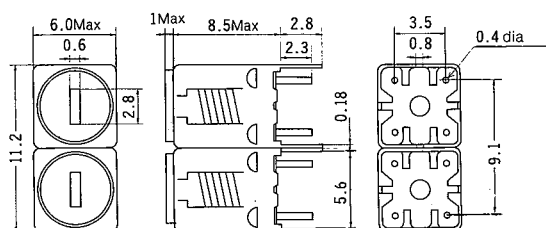
- Miniature in size with low profile.
- Two types, 5HW (two pole) and 5HT (three pole) available.
- Available for coverage in the 0.65 to 1.5GHz.
- Simple circuit design.
- Adjustable core used in capacitance variation.
- High cost-performance characteristic.
- Superior environmental and mechanical characteristics.

APPLICATIONS

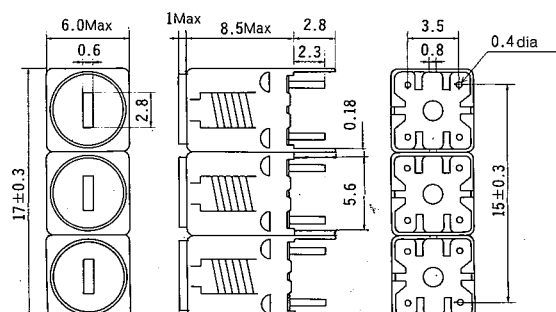
- In pager communications equipment and car radio-telephones.
- In measuring instruments.

PHYSICAL DIMENSIONS (Unit=mm)

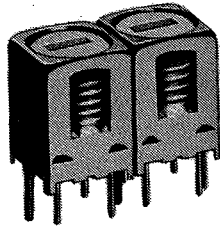
5HW TYPE



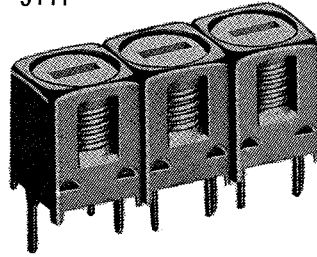
5HT TYPE



5HW



5HT



5HW•5HT

Helical Filters for Communications Equipment

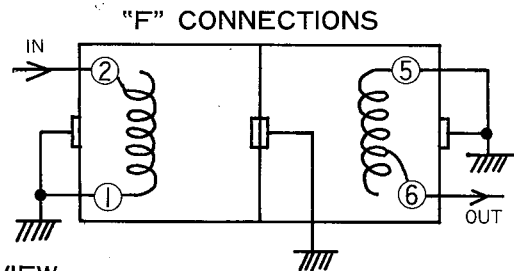
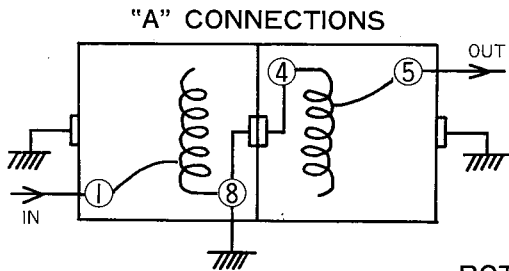
5HW•5HT

ELECTRICAL CHARACTERISTICS

Type	5HW	5HT
TOKO NO.	367MN-107A ("A" Connections)	384MN-124F ("F" Connections)
Item		
Center Frequency	959MHz	959MHz
Bandwidth. (1dB)	18MHz Min	25MHz Min
Selectivity	+100MHz	21dB Min
	-100MHz	24dB Min
Ripple	1dB Max	1dB Max
Insertion Loss	3.5dB Max	4dB Max
Impedance	50Ω	50Ω

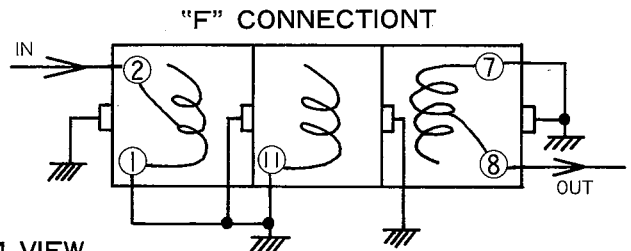
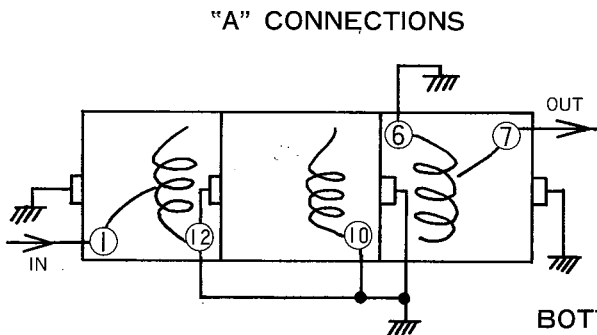
STANDARD TEST CIRCUITS

● 5HW



BOTTOM VIEW

● 5HT



BOTTOM VIEW

5HW•5HT Notes : Case lugs should be grounded ; connection will be concerned with bandwidth.

5HW·5HT

Helical Filters for Communications Equipment

5HW·5HT

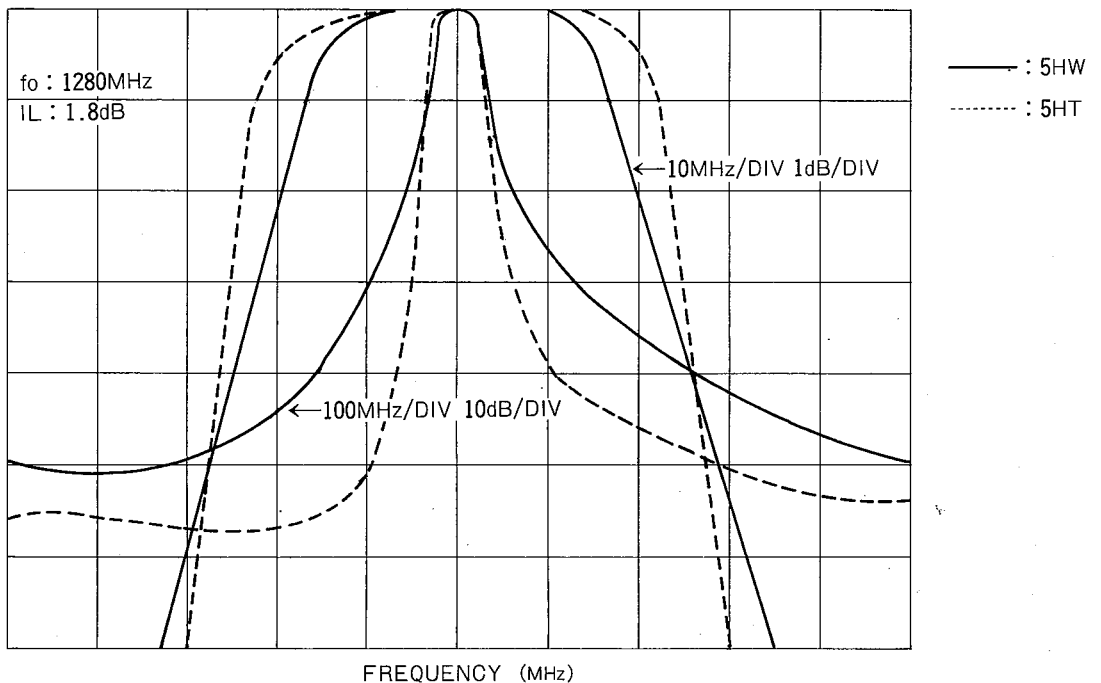
ENVIRONMENTAL & MECHANICAL CHARACTERISTICS (Typical values)

Characteristic	Center Frequency	Bandwidth (1dB)	Selectivity		Ripple	Insertion Loss	Condition	
			fo-80MHz	fo+80MHz				
At Low Temperature	±0.05%	+1.5%	+1%	-1%	±0dB	±0.5dB	-25°C, 96hr	
At High Temperature	+0.1%	+0.05%	+1%	-1.5%		±0.5dB	+80°C, 96hr	
Temperature Cycling	±0.1%	±0.5%	±0.5%	±0.5%		±0.5dB	5 cycles at 80° to -25°C	
Humidity Test	-0.2%	-3%	-4.5%	-1%		-0.3dB	500hr at +40°C, 90-95% R.H.	
Temperature Test	+60°C	-0.1%	-1.5%	-1.5%		+1%	±0.5dB	-10° to 25° to +60°C
	-10°C	+0.2%	+1.5%	+1.5%		-0.5%	-0.2%	
Vibration Test	±0.05%	±0.5%	±0.5%	±0.5%		±0.5dB	Note (1)	
Shock Test	+0.05%	±0.5%	±0.5%	±0.5%		±0.5%	Note (2)	

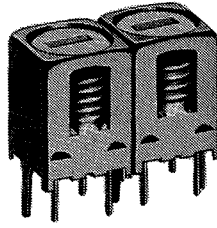
Notes : (1) At 10-55Hz, 1.5mm amplitude for 2hr in each of 3 orientations.

(2) 100G, 3 times in each of 3 orientations.

TYPICAL FREQUENCY RESPONSE 5HW·5HT, for 1.28GHz(1.25GHz) Amateur Radio Use Sample No. 367MN-113F (5HW), No. 384MN-125F (5HT)

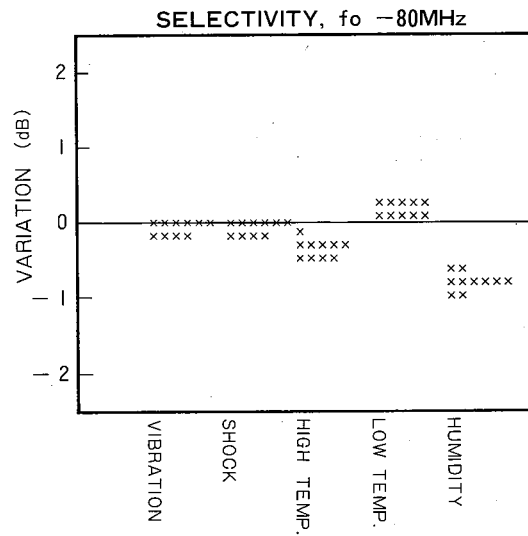
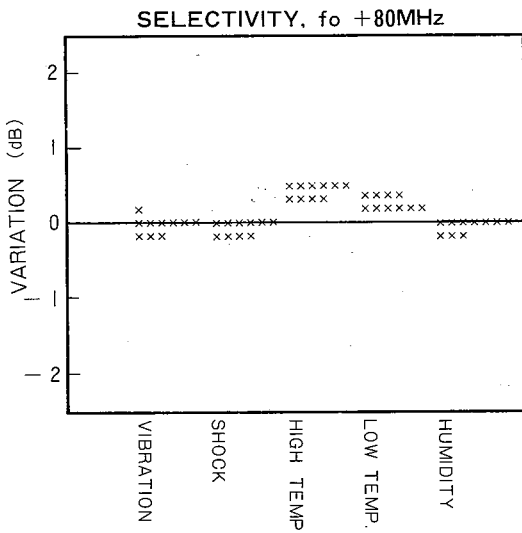
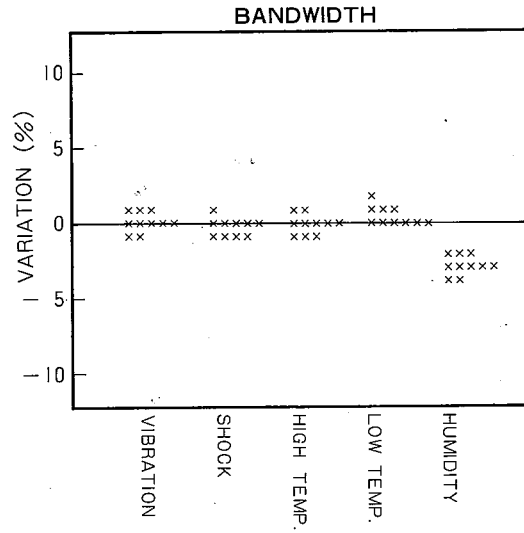
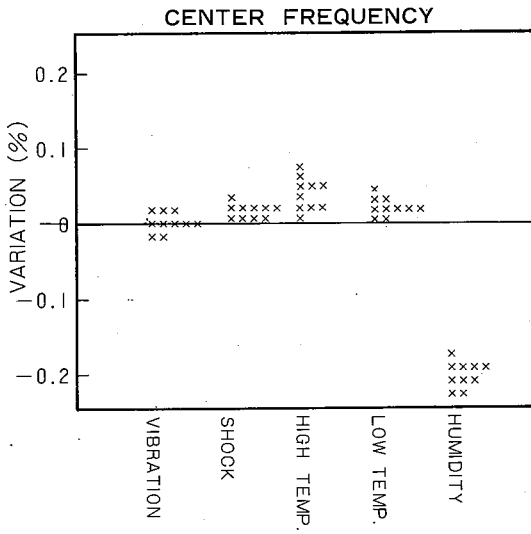


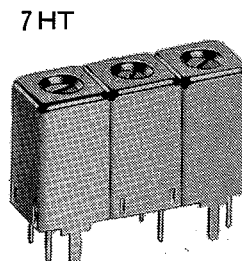
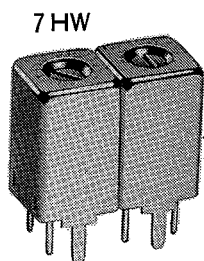
5HW



5HW Helical Filters for Communications Equipment 5HW

5HW ENVIRONMENTAL CHARACTERISTICS





7HW·7HT

Helical Filters for Communications Equipment

7HW·7HT

7HW and 7HT Series

The 7HW and 7HT Series Helical Filters are designed for use in 350 to 1000MHz frequency range. Due to their small size, the filters are most suited for incorporation in the high frequency stage in DBS, TVRO, special service and general purpose radio-telephones.

FEATURES

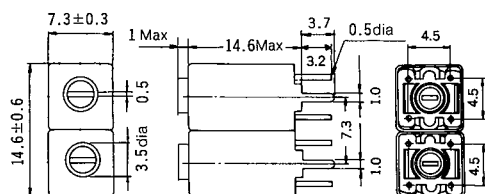
- Two types, 7HW (two pole) and 7HT (three pole) available.
- Wideband coverage, 350 to 1000MHz.
- High Q and low insertion loss.
- Simplifies circuit design.
- Adjustable core (screw type) used in capacitance variation.
- High cost-performance characteristic.
- Superior performance with respect to environmental conditions (temperature, humidity, vibration and shock).

APPLICATIONS

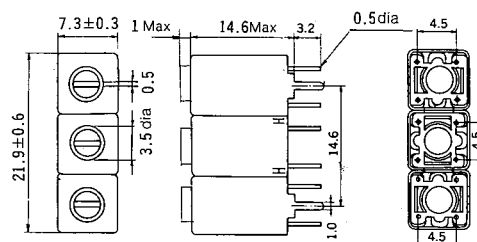
- In pager. DBS, communications equipment and car radio-telephones.
- In measuring instruments.

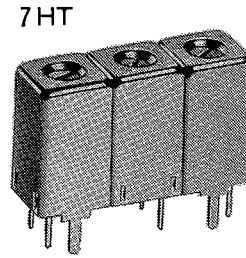
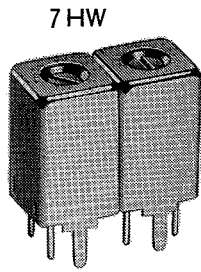
PHYSICAL DIMENSIONS (Unit=mm)

TYPE 7HW



TYPE 7HT





7HW·7HT

Helical Filters for Communications Equipment

7HW·7HT

EXAMPLES OF ELECTRICAL CHARACTERISTICS

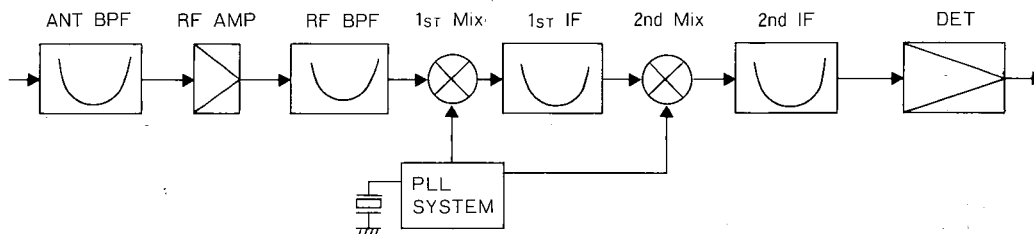
TYPE 7HW

Item	Example	Example I	Example II
Center Frequency		465MHz	855MHz
Bandwidth, at -1dB		8MHz Min	10MHz Min
Selectivity	+30MHz	17dB Min	14dB Min
	-30MHz	18dB Min	16dB Min
Ripple		1dB Max	1dB Max
Insertion Loss		2.5dB Max	3dB Max
Impedance		50Ω	50Ω

TYPE 7HT

Center Frequency	855MHz
Bandwidth, at -1dB	12MHz Min
Selectivity	+30MHz 18dB Min
	-30MHz 22dB Min
Ripple	1dB Max
Insertion Loss	5dB Max
Impedance	50Ω

EXAMPLES IN APPLICATION



REMARKS

* Recommended Toko products are given below for use together with the 7HW or 7HT Series.

Application	Type
1st IF Circuit, 20~60MHz	Coil : Type 7KL or 7KM
2nd IF Circuit, 455kHz	Coil : Type 7PL or 7P
FM Detector Circuit	IC : TK 10420D Detector coil 7NP : 233LE-1203Z Phase coil 7BS : 283AS-102K
Indicator Driver Source	DC-DC convertor : cp-1082

7HW-7HT

Helical Filters for Communications Equipment

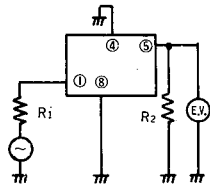
7HW-7HT

PERSONAL SIGNALLING EQUIPMENT

7HW : 252HN-1423 F

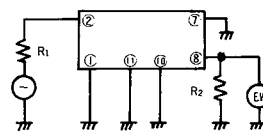
7HT : 302HN-018B

Test Circuits

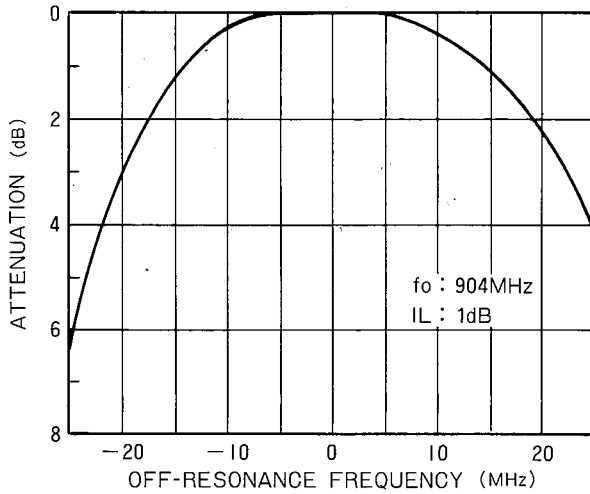


(BOTTOM VIEW)

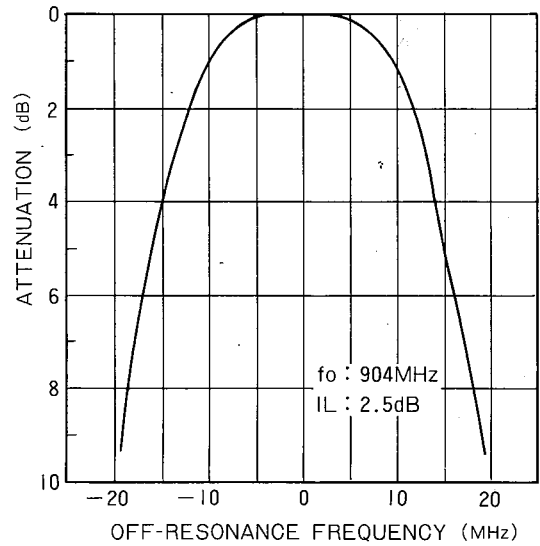
Test Circuits



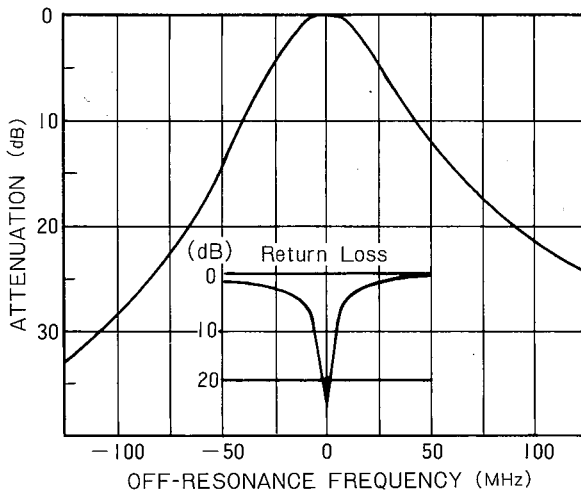
BANDWIDTH CHARACTERISTIC



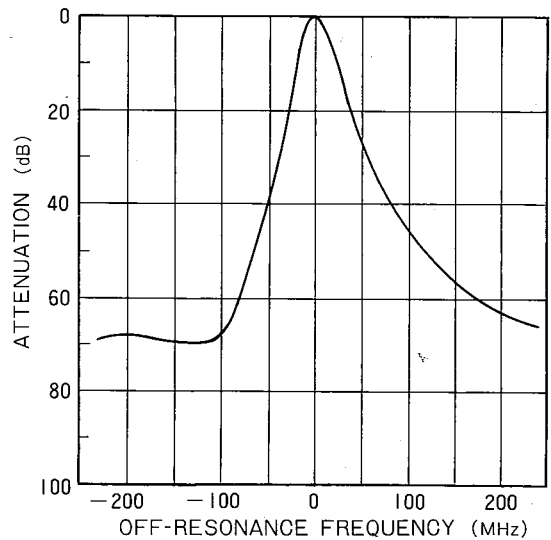
BANDWIDTH CHARACTERISTIC



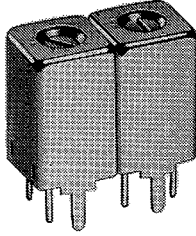
SELECTIVITY



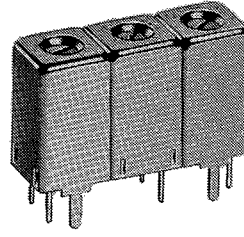
SELECTIVITY



7HW



7HT



7HW·7HT

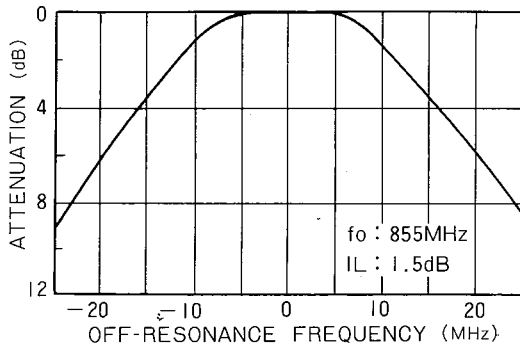
Helical Filters for Communications Equipment

7HW·7HT

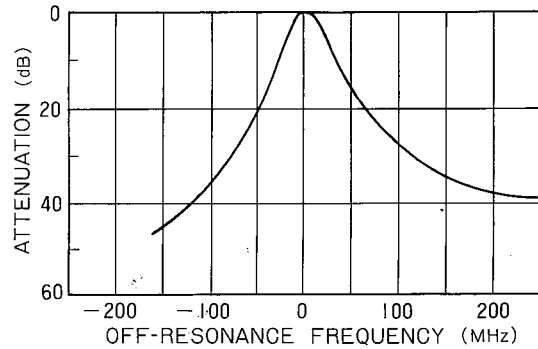
■ TYPICAL CHARACTERISTICS FOR MCA RADIOS (Multi channel access radio system in Japan)

ANTENNA CIRCUIT FILTER 7HW:252HN-1253

BANDWIDTH CHARACTERISTIC

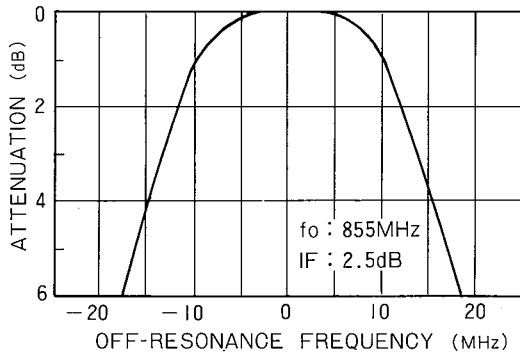


SELECTIVITY

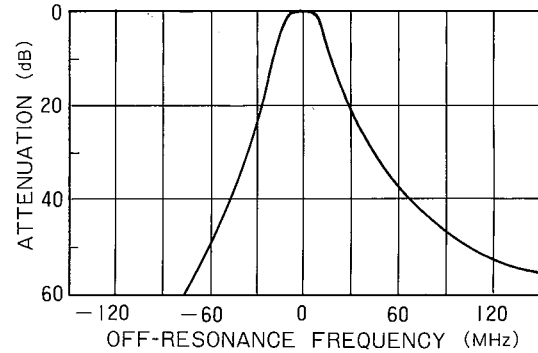


RF CIRCUIT FILTER 7HT:302HN-004

BANDWIDTH CHARACTERISTIC

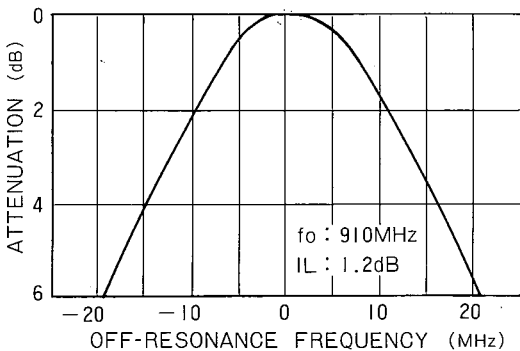


SELECTIVITY

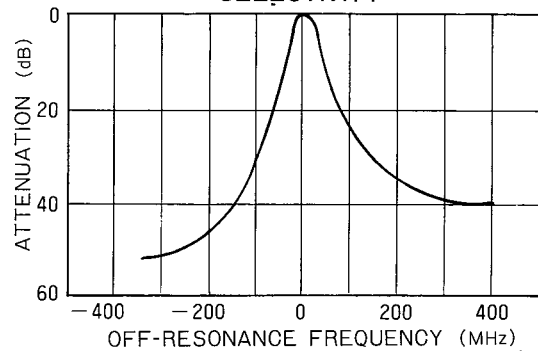


LOCAL OSC. FILTER 7HW:252HN-1228

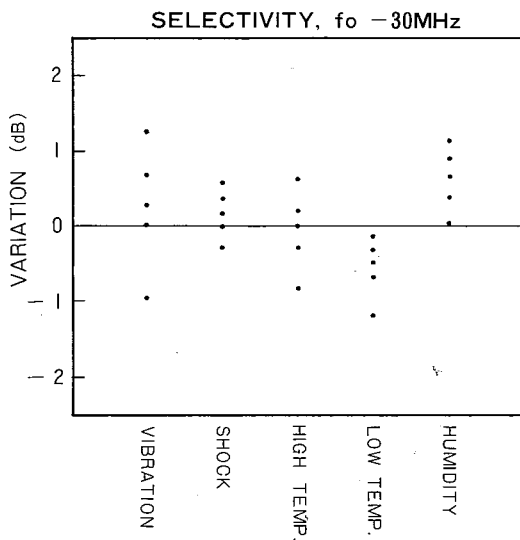
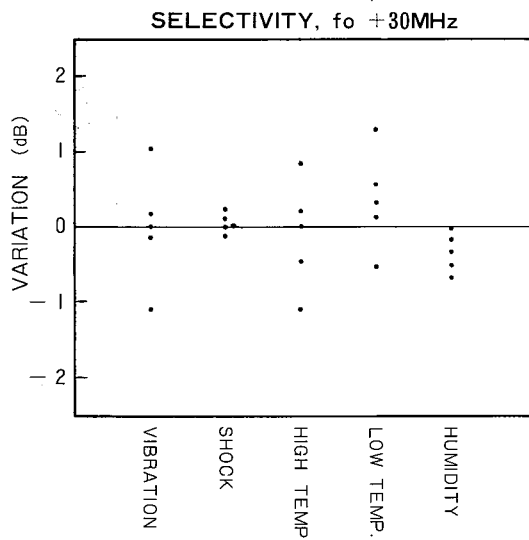
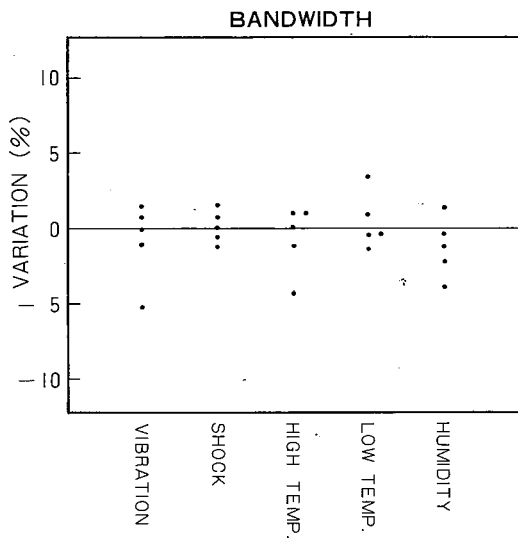
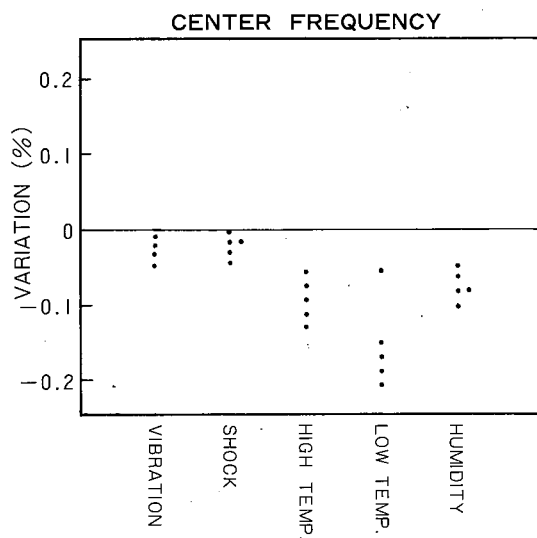
BANDWIDTH CHARACTERISTIC

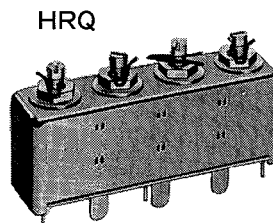
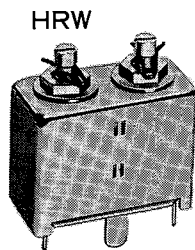


SELECTIVITY



7HW ENVIRONMENTAL CHARACTERISTICS





HRW·HRQ

Helical Filters for Communications Equipment

HRW·HRQ

HRW and HRQ Series

The HRW and HRQ Series are helical filters developed specially for use in the 350 to 520MHz frequency range. The helical filters have superior characteristics the UHF range and are being widely used. Two series, HRW (two pole) and HRQ (four pole) are recommended for incorporation in special (marine, mobile) and in amateur communications equipment.

FEATURES

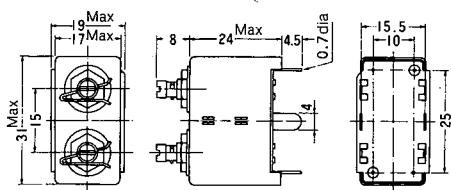
- Usadle in multi-stage circuits.
- Resin-sealed coil section for superior performance with respect to environmental conditions.
- High Q figure, 700~1000, and low insertion loss.

APPLICATIONS

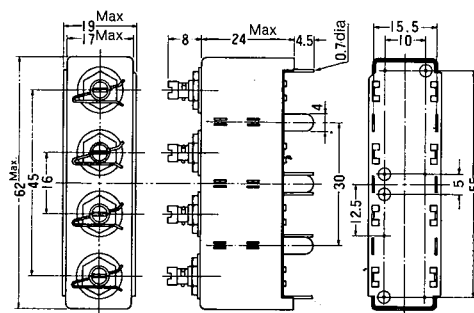
- In UHF communications equipment.
- In amateur radio equipment.
- In measuring instruments.

PHYSICAL DIMENSIONS (Unit=mm)

TYPE HRW

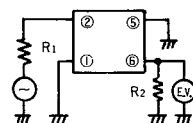
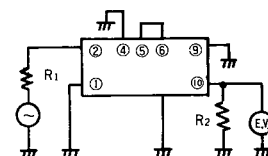


TYPE HRQ



ELECTRICAL CHARACTERISTICS

Item	Type	HRW (231MT-1001A)	HRQ (232MT-1001A)
Center Frequency		435MHz	435MHz
Bandwidth, at 3dB		12MHz Min	11MHz
Attenuation		20dB Min at +30MHz	25dB Min at +15MHz
		20dB Min at -30MHz	25dB Min at -15MHz
Ripple		1.5dB Max	2dB Max
Insertion Loss		2.5dB Max	4dB Max
Impedance		50Ω	50Ω

TEST CIRCUITS (BOTTOM VIEW)
HRW

HRQ


Notes: 1. Case lugs must be grounded.

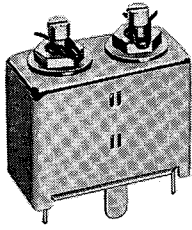
ENVIRONMENTAL & MECHANICAL (Typical values)
TYPE HRW

Item	Rating Limits		Selectivity		Ripple	Insertion Loss	Remarks
	Center Frequency	Bandwidth	fo +30MHz	fo -30MHz			
	Within ±0.3%	Within ±15%	Within ±4dB	Within ±5dB	Within ±0.7dB	Within ±0.7dB	
Low Temp. Test	±0.05%	±6%	±2dB	±1dB	±0.1dB	±0.1dB	96hr at -25°C
High Temp. Test	±0.05%	±4%	±1dB	±2dB	±0.1dB	±0.2dB	96hr at +85°C
Temp. Cycling	±0.15%	±7%	±2dB	±2dB	±0.1dB	±0.2dB	
Humidity Test	±0.15%	±3%	±2dB	±2dB	±0.1dB	±0.1dB	500hr: 40°C, 90%~95% R.H.
Temp. Characteristic	±0.13%	±4%	±2dB	±2dB	±0.1dB	±0.5dB	
Vibration Test	±0.1%	±8%	±1dB	±3dB	±0.1dB	±0.3dB	
Shock Test	±0.12%	±4%	±1dB	±2dB	±0.1dB	±0.1dB	

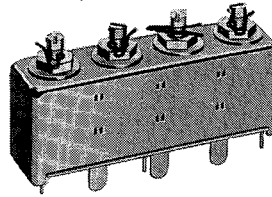
TYPE HRQ

Item	Rating Limits		Selectivity		Ripple	Insertion Loss	Remarks
	Center Frequency	Bandwidth	fo +30MHz	fo -30MHz			
	Within ±0.3%	Within ±15%	Within ±4dB	Within ±5dB	Within ±1dB	Within ±1dB	
Low Temp. Test	±0.12%	±8%	±1dB	±3dB	±0.3dB	±0.3dB	96hr at -25°C
High Temp. Test	±0.11%	±4%	±2dB	±3dB	±0.1dB	±0.2dB	96hr at +85°C
Temp. Cycling	±0.15%	±12%	±2dB	±1dB	±0.3dB	±0.6dB	
Humidity Test	±0.08%	±5%	±1dB	±1dB	±0.1dB	±0.1dB	500hr: 40°C, 90%~95% R.H.
Temp. Characteristic	±0.11%	±4%	±2dB	±3dB	±0.1dB	±0.5dB	
Vibration Test	±0.05%	±4%	±2dB	±3dB	±0.1dB	±0.2dB	
Shock Test	±0.12%	±7%	±1dB	±2dB	±0.2dB	±0.2dB	

HRW



HRQ



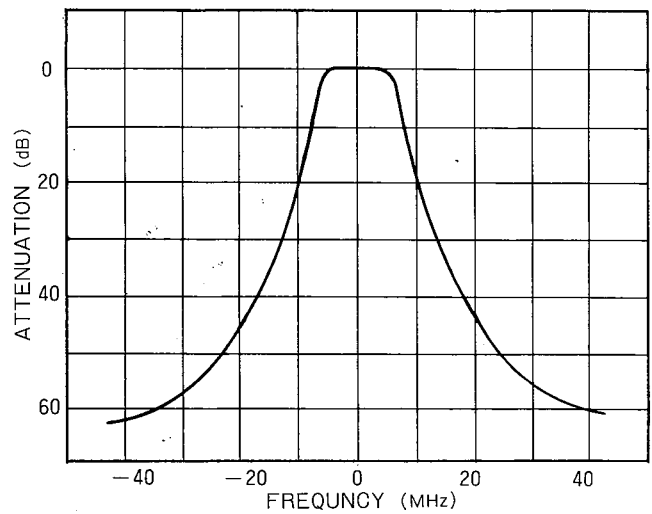
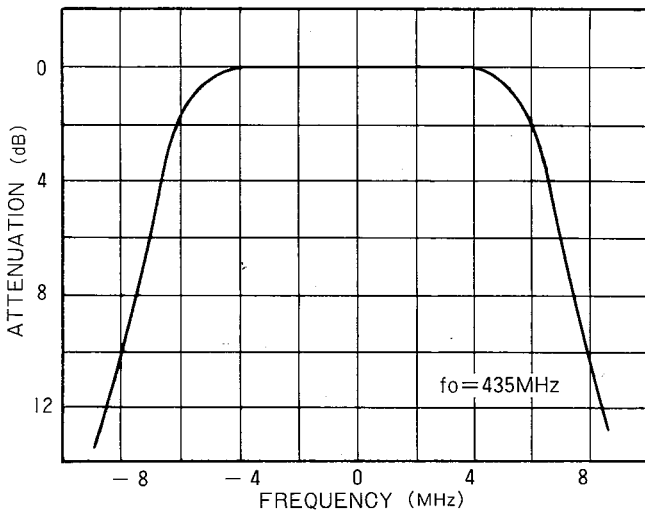
HRW·HRQ

Helical Filters for Communications Equipment

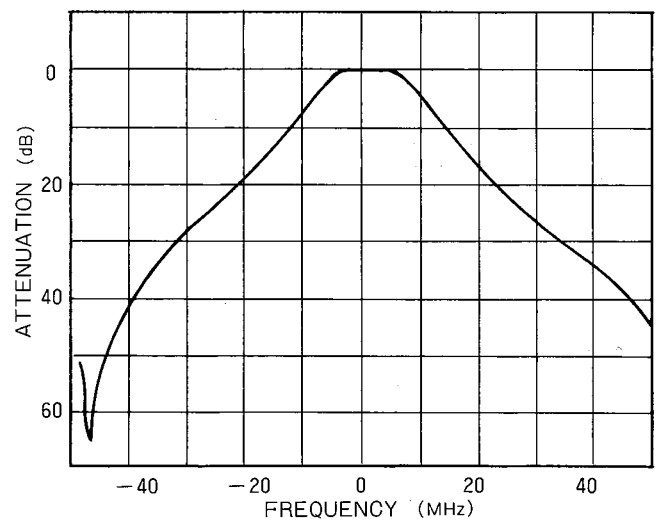
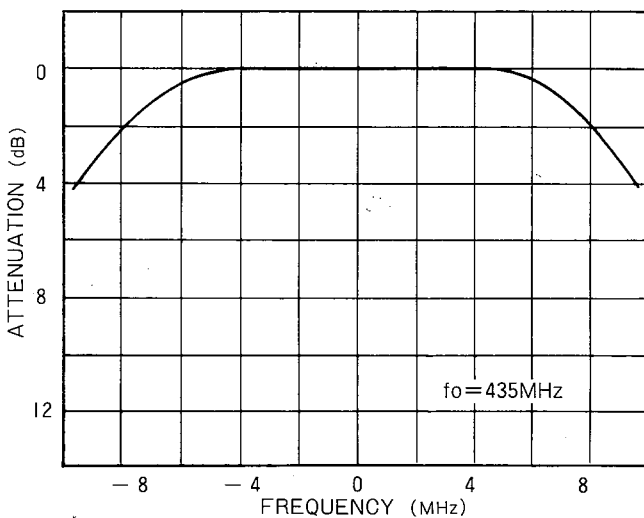
HRW·HRQ

SELECTIVITY CHARACTERISTICS

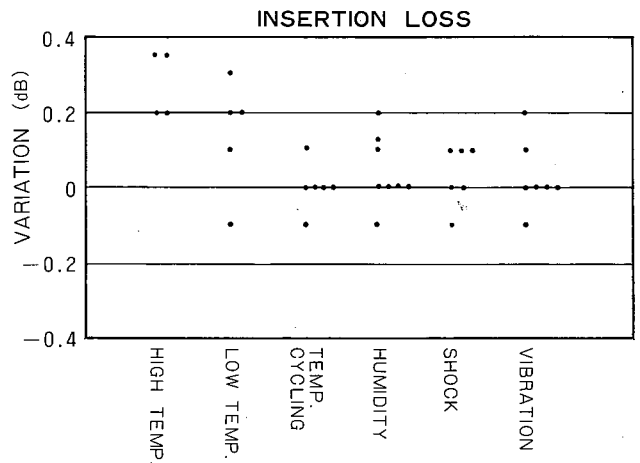
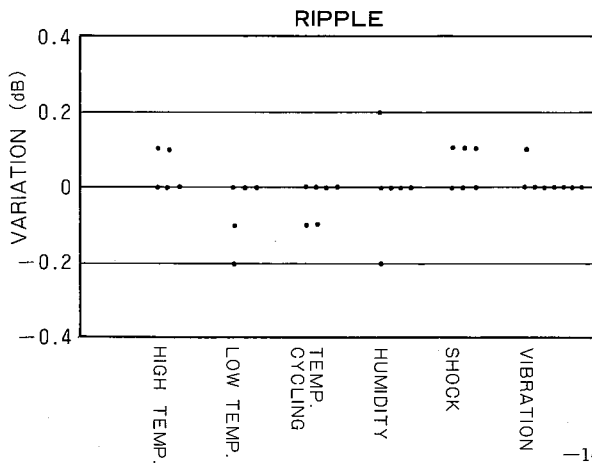
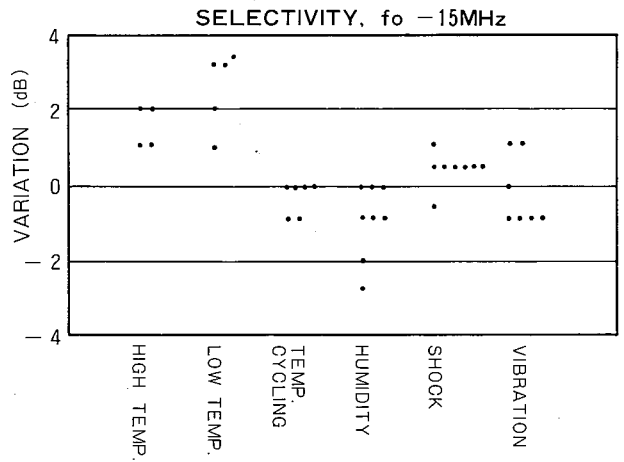
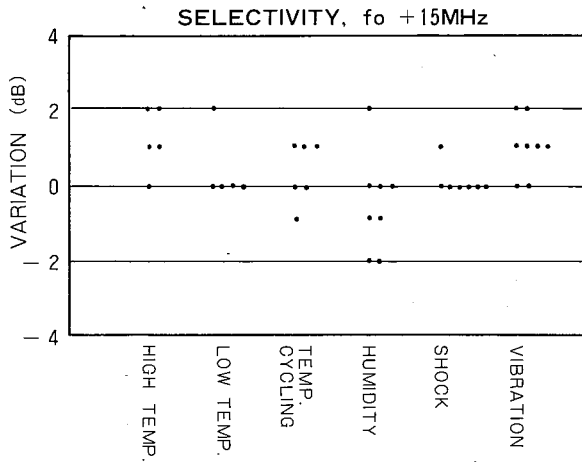
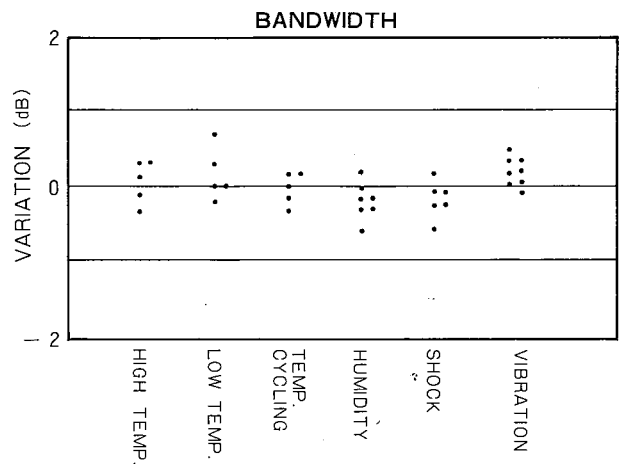
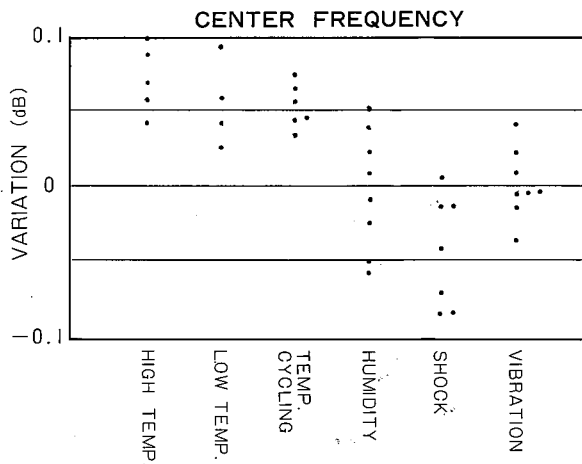
HRQ(232MT-1001A)



HRW(231MT-1001A)



HRW ENVIRONMENTAL CHARACTERISTICS





CBW·CBT Helical Filters for Communications Equipment CBW·CBT

CBW and CBT Series

The CBW and CBT Series are small-sized helical filters developed for use in the 130 to 220MHz frequency range. The helical type filters have superior characteristics and are widely used in the VHF band. Double-tuned and triple-tuned types are available to meet with circuit design requirements. The units are most suited for incorporation in specialized service and amateur communications equipment.

FEATURES

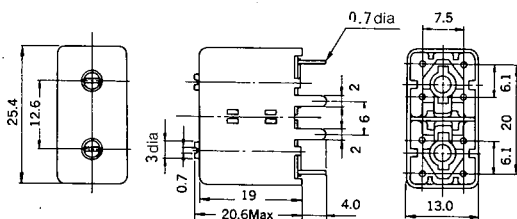
- Two types, CBW (two pole) and CBT (three pole), available.
- Frequency range: 130 to 220MHz.
- High Q figure and low insertion loss.
- Simplifies circuit design.
- High cost-performance characteristic.
- Superior performance with regard to environmental conditions (temperature, humidity, vibration and shock).

APPLICATIONS

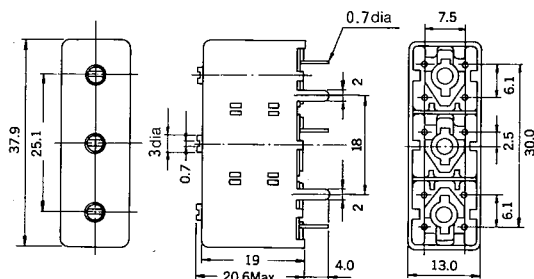
- In amateur radio communications equipment.
- In specialized service communications equipment.
- CATV

PHYSICAL DIMENSIONS (Unit=mm)

TYPE CBW



TYPE CBT

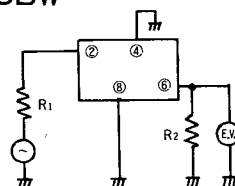


EXAMPLES OF ELECTRICAL CHARACTERISTICS

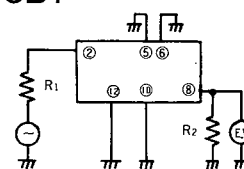
Item	Type	CBW	CBT
Center Frequency		145MHz	145MHz
Bandwidth, at 1dB		3MHz	3MHz
Attenuation	fo + 10MHz	20dB	28dB
	fo - 10MHz	22dB	35dB
Ripple		0.3dB	0.5dB
Insertion Loss		1.3dB	2dB
Impedance		50Ω	50Ω

TEST CIRCUITS (BOTTOM VIEW)

CBW



CBT



Notes: 1. Case lugs must be grounded.

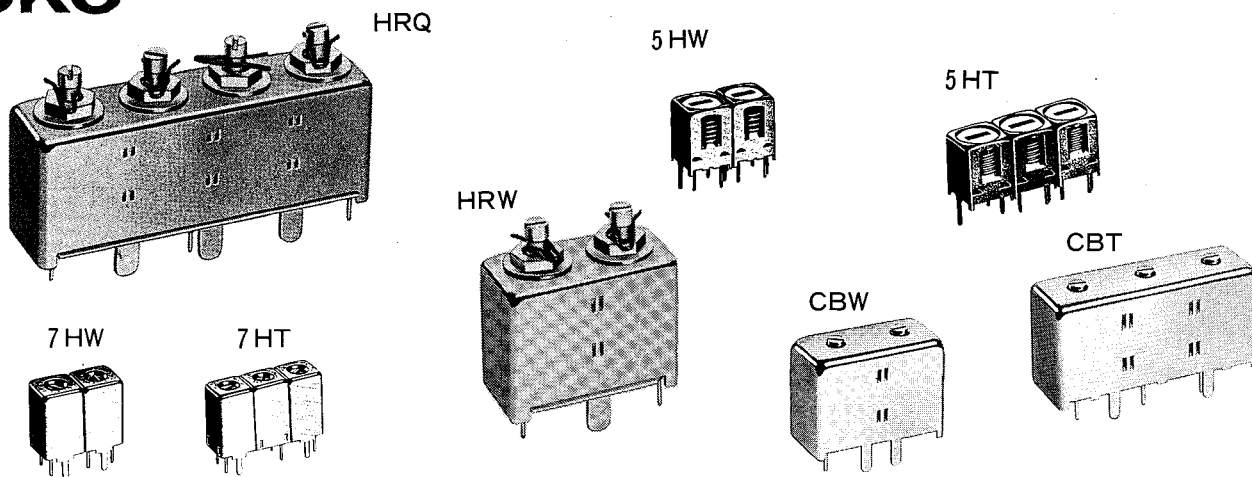
ENVIRONMENTAL & MECHANICAL (Typical values)

TYPE CBW

Item	Rating Limits		Selectivity		Ripple	Insertion Loss	Remarks
	Center Frequency	Bandwidth	fo + 15MHz	fo - 15MHz			
	Within ±0.5%	Within ±15%	Within ±4dB	Within ±4dB			
Low Temp. Test	±0.15%	±7%	±1dB	±0dB	±0dB	±0.2dB	96hr at -25°C
High Temp. Test	±0.4%	±7%	±1dB	±1dB	±0dB	±0.2dB	96hr at +85°C
Temp. Cycling	±0.4%	±5%	±1dB	±2dB	±0dB	±0.1dB	
Humidity Test	±0.4%	±7%	±1dB	±2dB	±0.01dB	±0.3dB	500hr: 40°C, 90%~95% R.H.
Temp. Characteristic	±0.1%	±5%	±2dB	±2dB	±0dB	±0.3dB	
Vibration Test	±0.2%	±8%	±1dB	±1dB	±0dB	±0.3dB	
Shock test	±0.25%	±7%	±1dB	±0dB	±0dB	±0.2dB	

TYPE CBT

Item	Rating Limits		Selectivity		Ripple	Insertion Loss	Remarks
	Center Frequency	Bandwidth	fo + 6MHz	fo - 6MHz			
	Within ±0.5%	Within ±15%	Within ±4dB	Within ±4dB			
Low Temp. Test	±0.1%	±12%	±1dB	±2dB	±0dB	±0.4dB	96hr at -25°C
High Temp. Test	±0.35%	±5%	±2dB	±2dB	±0dB	±0.3dB	96hr at +85°C
Temp. Cycling	±0.3%	±4%	±2dB	±2dB	±0dB	±0.3dB	
Humidity Test	±0.2%	±10%	±2dB	±2dB	±0dB	±0.5dB	500hr: 40°C, 90%~95% R.H.
Temp. Characteristic	±0.15%	±6%	±2dB	±2dB	±0dB	±0.5dB	
Vibration Test	±0.1%	±5%	±1dB	±1dB	±0dB	±0.3dB	
Shock Test	±0.2%	±7%	±1dB	±2dB	±0dB	±0.3dB	



5HW•5HT•7HW•7HT

Helical Filters for Communications Equipment

CBW•CBT•HRW•HRQ

ENVIRONMENTAL TEST CONDITIONS

- Shock Test : Application of 200G three times in each of three orientations
- Vibration test : Vibration in range 10 to 55Hz, 1.5mm overall amplitude, applied at rate of 10-55-10Hz per minute for 2hr in each of three orientations (total 6hr).
- High Temperature test : Exposure to $85^{\circ} \pm 2^{\circ}\text{C}$ in a test chamber for 12hr and then exposed to room temperature for over 1hr but less than 2hr.
- Low Temperature Test : Exposure to $-25^{\circ} \pm 2^{\circ}\text{C}$ in a test chamber for 12hr and then exposed to room temperature for over 1hr but less than 2hr.
- Humidity Test : Exposure to 40°C , 90%-95% relative humidity for 12hr and then exposed to room temperature for over 1hr but less than 2hr.
- Temperature Cycling : Five cycles at rate of 30min at -25°C , 10min at $+25^{\circ}\text{C}$ and 30min at $+85^{\circ}\text{C}$ per cycle and exposure to ambient temperature for over 1hr but less than 2hr.
- Solderability : Terminals of the coil under test are dipped in flux at ambient temperature for 5 to 10 sec and dipped in solder at $230^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for $2 \pm 0.5\text{sec}$ to within 1.5mm from the base plate.

Head Office

1-17, 2-chome, Higashi-Yukigaya, Ohta-ku, Tokyo, Japan 〒145
 Tel : Tokyo 727-1161, 1164, 1165, 1168 Telex : RCL TOKO J22696
 Facsimile : 03-728-4690, 4697 (GIII) Cable : "RADIOCOILAB" TOKYO

W. Germany

Toko Electronic Europe GmbH
 Burgmullerstr. 7, D-4000 Dusseldorf 1, W.Germany
 Tel : 0211-682281
 Telex : 41-8582643(8582643 TOKO D)
 Facsimile : 49-211-6799567(GIII)

France

Les Composants Toko S.A.R.L.
 34, Rue Balard, F-75015 Paris, France
 Tel : 1-4557-4465 ~ 9
 Telex : 42-204248(TOKOFRA 204248F)
 Facsimile : 01-4554-2837(GIII)

United Kingdom

Toko U.K. Ltd.
 Ward Royal Parade.
 Alma Road, Windsor, Berks, 3HR, England
 Tel : 753-854057 ~ 9
 Telex : 51-848095(848095 TOKOUK G)
 Facsimile : 44-753-850323(GIII)

U.S.A

Toko America Inc.
 1250 Feehanville Drive
 Mt. Prospect, IL 60056
 Tel : 312-297-0070
 Telex : 230-72-4372
 Facsimile : 312-699-7864(GIII)

Toko America Inc. East Coast Office

6 Corporate Park Drive
 Suite 307
 White Plains, NY 10604
 Tel : 914-694-5618
 Facsimile : 914-694-6280(GIII)

Toko America Inc. West Coast Office

10080 N. Wolfe Rd. SW3 Suite 361
 Cupertino, California 95014
 Tel : 408-996-7575
 Facsimile : 1-408-996-7280(GIII)

Toko America South Eastern Office

555 Sparkman Drive Suite 820-C
 Huntsville, Alabama 35816
 Tel : 205-830-0952, 4509
 Facsimile : 205-830-5399 (GIII)

Brasil

Toko Do Brasil Inc. E. Com. Ltda.
 Rua Jose Mari 80, Parque Assuncao,
 CEP-06750 Taboao Da Serra, Sao Paulo,
 S.P. Brasil
 Tel : 11-491-5500
 Telex : 38-1133373(1133373 TOKO BRGGG)
 Facsimile : 55-011-491-2639(GIII)

Korea

Korea Toko Co., Ltd.
 BG 7 Masan Free Export Zone. No 975
 Yang-Douk-Dong. Masan.
 Kyung-Sang-Nam-Do. Korea
 Tel : 93-1101 ~ 3
 Telex : 801-3434-(KR TOKO K3434)
 Facsimile : 82-551-93-1110(GIII)

Korea Toko Co., Ltd. Seoul Office

25-9 1-Ga Chungmu-Ro. Jung-Gu. Seoul. Korea
 Tel : 2-752-5826
 Telex : 801-28515(K TOKOS K28515)
 Facsimile : 82-2-753-9962(GIII)

Taiwan

Taiwan Toko Electronics Co., Ltd.
 Nan-Tze Export Processing Zone.
 Kaonsiung 813. Taiwan
 Tel : 7-3612011 ~ 18
 Telex : 785-71121
 Facsimile : 886-7-361-7010(GIII)

Huacheng Toko Electronics Co., Ltd.

RM 2. 4th Floor CHI-DER Building No 16.
 Nanking East Road. Sec 5., Taipei. Taiwan.
 ROC
 Tel : 2-768-4131 ~ 4
 Telex : 21791 TP TOKO BR(21791 TP TOKO BR)
 Facsimile : 886-2-763-1139(GIII)

Hong Kong

Toko, Inc. Hong Kong Branch
 49-Hoi Yuen Road. 3rd Fl. Kwun-Tong. Kowloon.
 Hong Kong
 Tel : 3-428131 ~ 6
 Telex : 802-39126(39126 TOKOM HX)
 Facsimile : 852-123-4339(GIII)

Singapore

Toko, Inc. Singapore Branch
 970 Toa Payoh North #04-16
 Singapore 1231
 Tel : 2554000
 Telex : 87-21444(SP TOKO RS21444)
 Facsimile : 65-250-8134(GIII)

Malaysia

Toko Electronic (Malaysia) SDN, BHD.
 Lot No. 1 Phase 1 Sungai Way. Free Trade Zone.
 Seiangor. Malaysia
 Tel : 3-7761927, 7761763
 Telex : 84-37552 (KL TOKO MA37552)
 Facsimile : 60-3-753031 (GIII)

Toko Electronic (Malaysia) SDN, BHD.

Penang Liaison Office
 54A-9 1st Fl. Tung Hing Bidg. Burmah
 Road. Penang. Malaysia
 Tel : 4-368319
 Telex : PG TOKO MA 40625

AGENT

Italy

Tokos S.R.L.
 Via delle Querce. 1. 20156 Milano Italy
 Tel : 2-325384, 367131
 Telex : 43-315029 TOKOS I
 Facsimile : 001-39-2-349347 (GIII)

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