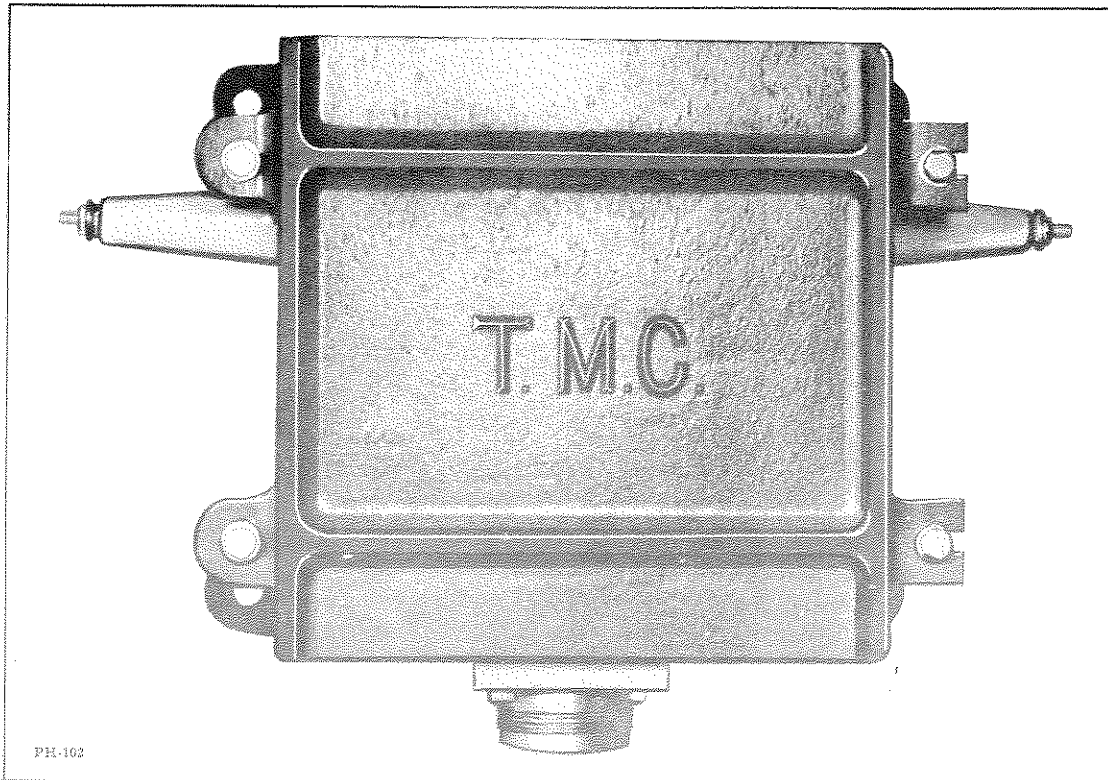
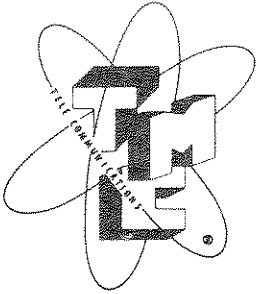


Rhombic Antenna Couplers,
Models RAC



The Models RAC, Rhombic Antenna Couplers, are a series of broad band transformers designed by the TMC engineering department. They are impedance matching devices in a weather tight case measuring approximately 9" x 9" x 5", coupling the impedance of a receiving Rhombic to an unbalanced transmission line.

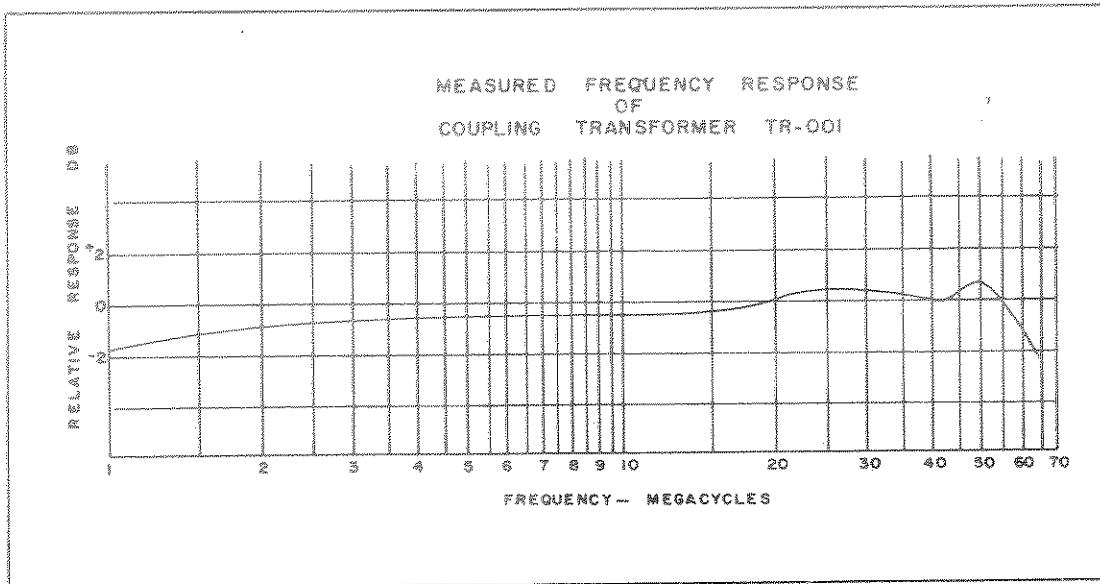
The couplers have been designed to mount on a pole carrying the terminals of a receiving Rhombic and will provide impedance matching as per Table I. The devices provide protection from static charges and permit DC checking of the continuity of the antenna and transmission line.

Essentially, the Models RAC consist of a broad band transformer using core materials of recent design to accomplish the transformation with minimum insertion loss. Since the devices use no tubes and require no current supply, they are linear for all types of signals, and are particularly resistant to cross modulation and other disturbing effects. A built-in lightning arrester prevents the build-up of static charges which might injure associated equipment.

Two types of RAC units are available. The RAC series numbered through 29 provide standard lightning protection using air gaps. The series numbered from 30 up feature hermetically sealed lightning gaps and plug-in fuses.

TECHNICAL SPECIFICATIONS

INPUT IMPEDANCES:	See Table I.
OUTPUT IMPEDANCES:	See Table I.
FREQUENCY RANGE:	2 to 60 megacycles.
FREQUENCY RESPONSE:	Flat within 3 db over the frequency range.
EQUIPMENT CASE:	Weather resistant, cast of aluminum alloy.
INPUT TERMINALS:	Two ceramic insulators, properly spaced to accommodate the Rhombic terminals.
OUTPUT TERMINALS:	See Table I.
MOUNTING:	Pole mounting by means of four heavy cast mounting flanges. Four 1/2" holes on 7-3/4" x 10-1/4" mounting centers.
WEIGHT:	Net - 13 lbs. Gross - 16 lbs, packed for domestic shipment.
COMPONENTS AND CONSTRUCTION.	Equipment is manufactured in accordance with JAN/MIL specifications wherever practicable.



Response Curve

As indicated in the above response curve, the part TR-001 is used as the standard transformer for the basic Model RAC. This transformer as well as the others listed in Table I are available as replacement parts for units now in the field.

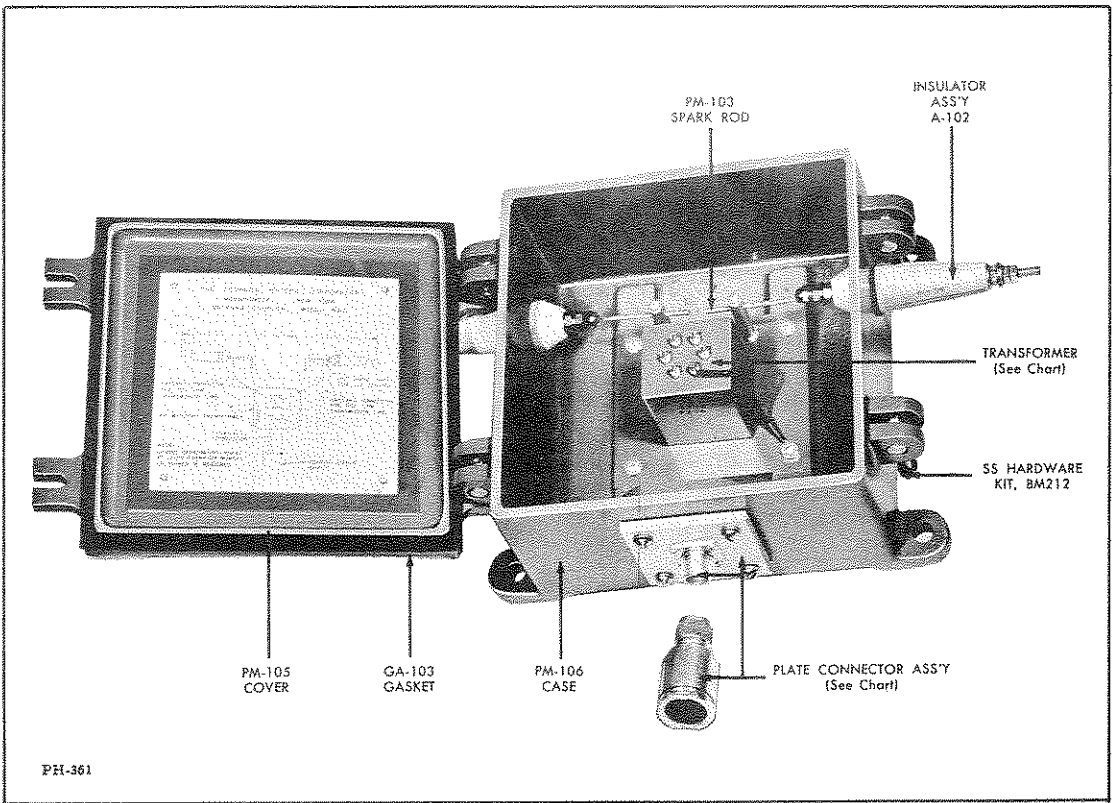
In addition to varying transformer designs, any Model RAC can be adapted to use other cable types by the use of a Plate/Connector Assy. (See Table I for types available). Special combinations are available at your request, and we invite your inquiry.

TABLE I

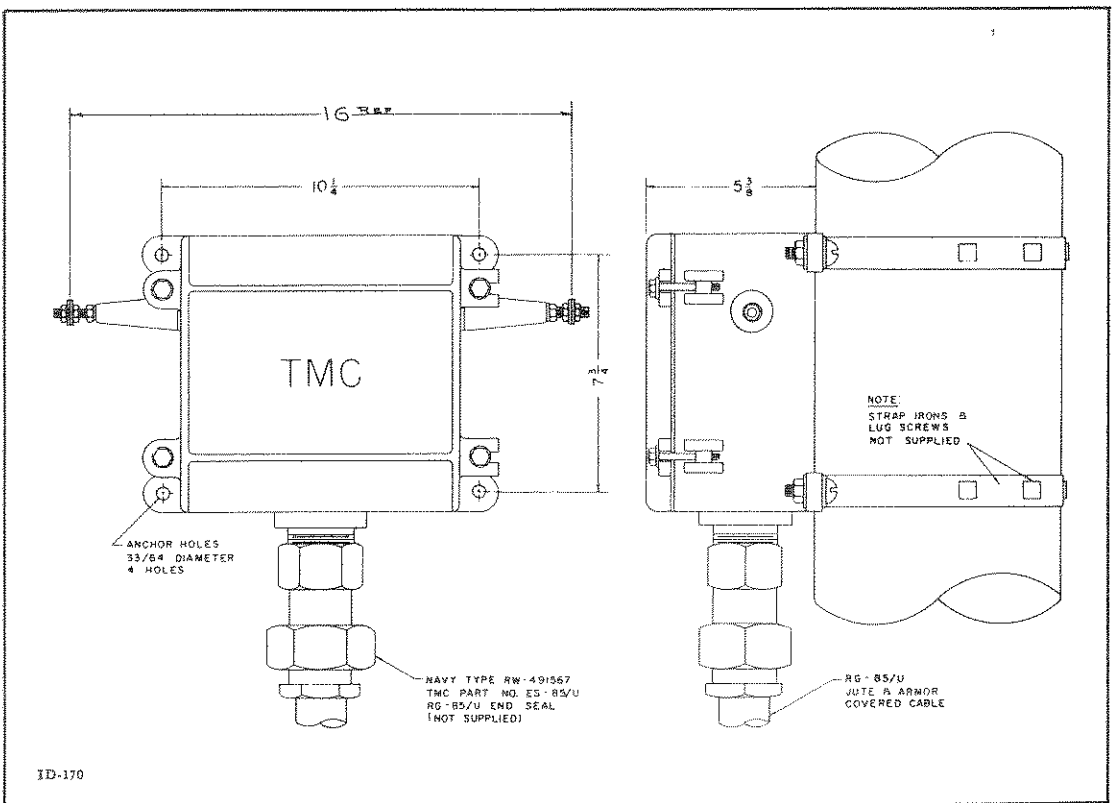
MODEL RAC	NOM. PRI. IMP. (OHMS)	SEC. IMP. (OHMS)	TRANS- FORMER PART NO.	FOR USE WITH CABLE TYPE	CONNECTOR SERIES RECEPTACLE PLUG (loose)	TYPE	PLATE/ CONNECTOR ASSEMBLY
RAC	700 bal. 200 bal.	70 unbal.	TR001	RG85/U	PM107*	--	--
RAC-1	700 bal. 200 bal.	70 unbal.	TR001	RG 11,12,13/U	SO239 PL259A	UHF	A-754
RAC-2	700 bal. 200 bal.	70 unbal.	TR001	RG 11,12,13/U	UG58A/U UG21B/U	N	A-777
RAC-3	700 bal. 400 bal.	95 unbal.	TR048	RG 22, 22A/U	UG422/U UG421/U	UHFT	A-755
RAC-7	600 bal. 200 bal.	52 unbal.	TR032	RG 8,9,10/U	UG58A/U UG21B/U	N	A-777
** RAC-7A	600 bal.	52 unbal.	TR069	RG 8,9,10/U	UG58A/U UG21B/U	N	A-777
RAC-8	700 bal. 200 bal.	70 bal.	TR001	RG 22, 22A/U	UG422/U UG421/U	UHFT	A-755
RAC-9	475 bal.	52 unbal.	TR034	RG 8, 9, 10/U	UG58A/U UG21B/U	N	A-777
RAC-10	700 bal. 200 bal.	70 unbal.	TR001	RG 59/U	UG447/U UG260/U	BNC	A-757
RAC-11	300 bal.	52 unbal.	TR012	RG 8,9,10/U	UG58A/U UG21B/U	N	A-777
RAC-12	800 bal.	52 unbal.	TR112	RG 17, 18/U	UG496/U UG495/U	HN	A-756
RAC-13	500 bal.	70 unbal.	TR061	RG 11,12,13/U	SO239 PL259A	UHF	A-754
RAC-14	700 bal. 200 bal.	70 unbal.	TR001	RG 11,12,13/U	UG580/U UG59B/U	HN	A-1241
RAC-15	600 bal. 300 bal.	52 unbal.	TR118	RG 22, 22A/U	UG422/U UG421/U	UHF	A-755
RAC-17	700 bal. 200 bal.	70 unbal.	TR001	Styroflex 7/8" 70 ohm	ESW787		
RAC-18	700 bal. 200 bal.	70 unbal.	TR001	RG 11,12,13/U	UG58A/U UG21B/U	N	A-777
RAC-20	600 bal. 200 bal.	70 unbal.	TR054	Styroflex 7/8" 70 ohm	ESW 787		
RAC-24	600 bal.	52 unbal.	TR069	RG 8,9,10/U	UG58A/U UG21B/U	N	A-777
RAC-30	700 bal. 200 bal.	70 unbal.	TR130	RG85/U	PM107*	--	--
RAC-30A	600 bal. 200 bal.	70 unbal.	TR132	RG85/U	PM107*	--	--
RAC-31	600 bal. 200 bal.	70 unbal.	TR132	Styroflex 1/2" 70 ohm	ESW 750		
RAC-32	600 bal. 200 bal.	70 unbal.	TR132	Styroflex 7/8" 70 ohm	ESW 787		

* Mates TMC End Seal, ES85/U. (See SSB No. 164)

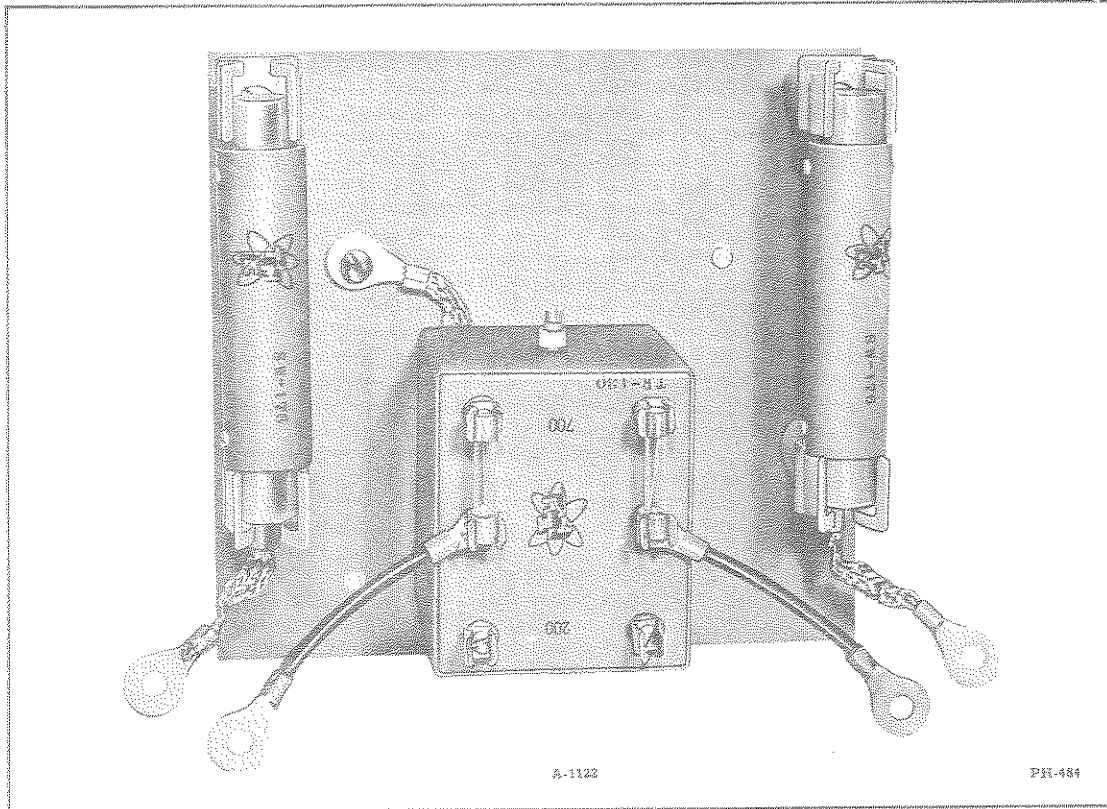
** Insulators on case Top opposite connector with 6 in. spacing center to center.



Model RAC-7, standard transformer, fitted for RG-17/U Cable.



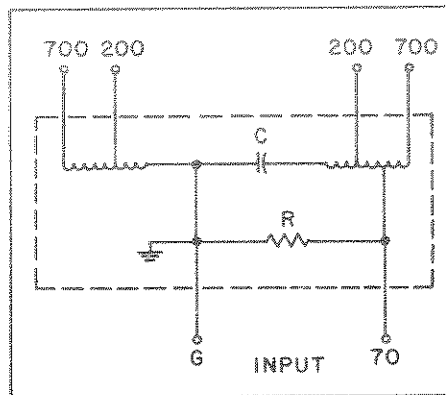
Installation Mounting Dimensions



The above illustrates the replacement sub-assembly for the RAC-30 series and features plug-in hermetically sealed gas filled lightning gaps and plug-in fuses. This sub-assembly fits into existing RAC's for those activities requiring vacuum spark gap and fuse protection.

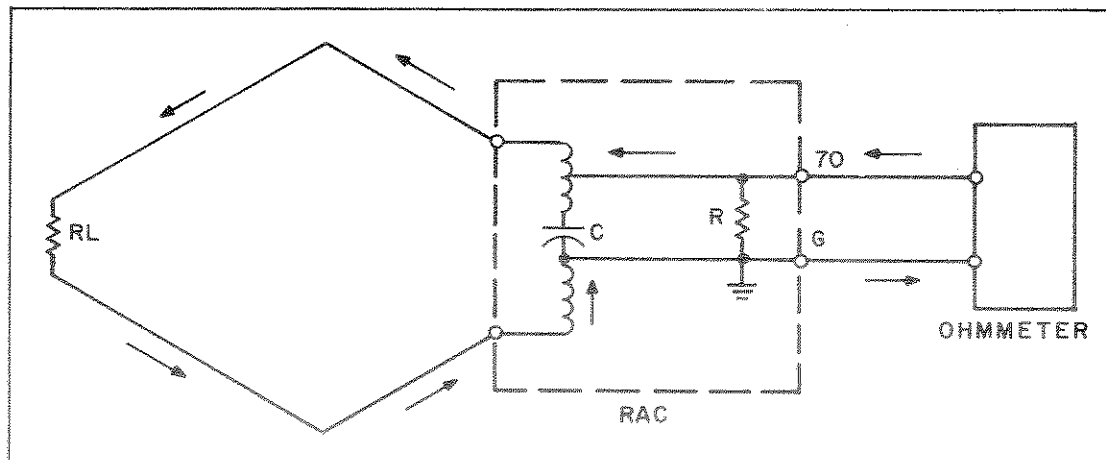
THEORY OF OPERATION

The coupler consists essentially of a broadband auto-transformer. TR001 is typical of this configuration and is shown below.



The resistor R across the 70 ohm input has a value of 10,000 ohms and since this is much greater than 70 ohms the shunting effect on the 70 ohm winding is negligible. The purpose of this resistor is to allow a leakage path to ground for static charges which may accumulate on the antenna.

The capacitor C connecting the halves of the transformer has a value of .05 mfd. Its reactance over the frequency range is also negligible, acting as a short circuit to radio frequencies. Its purpose is to isolate the windings for DC current to permit resistance measurements of antenna termination.



OPERATION

A simplified diagram is shown above showing capacitor function in DC measurements.

If a DC ohmmeter is connected to the 70 ohm terminals, the current will be limited by RL, since R is greater than RL, therefore the ohmmeter will record essentially the termination resistance RL, 700 ohms, or 200 ohms as the case may be.

DC ohmmeter measurements on the RAC with both input and output terminations open-circuited should give the following results:

70-G	10,000 ±20%
700-700	10,000 ±20%
200-200	10,000 ±20%

A short circuit across either the 700 ohm or 200 ohm terminations should produce a short circuit at the 70 ohm input.

NOTE:

In the RAC-30 series the 10,000 ohm resistor between the 70 ohm terminal and ground has been omitted. The DC continuity remains as stated above except that the ohmmeter reading will be the same as the termination used, very high if the termination is open, or zero if the termination is shorted.

PREVENTIVE MAINTENANCE

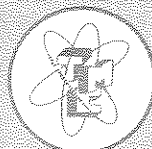
Change the dehydrant every 6 months or sooner if required. Where a new supply of dehydrant is not readily available, the old may be reactivated by baking in an oven for 1 hour at 220 deg. F.

THE TECHNICAL MATERIEL CORPORATION

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