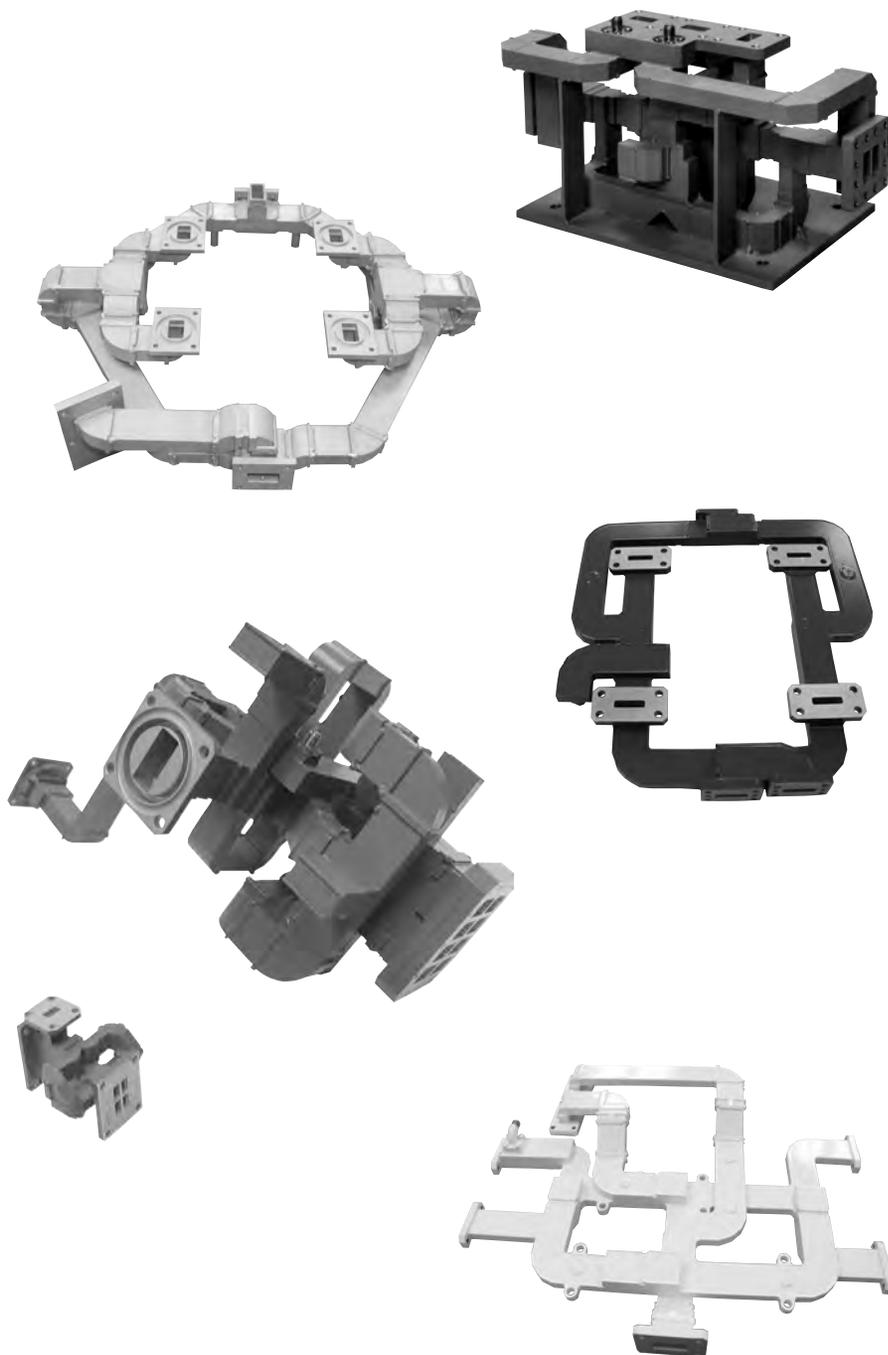


Section 2

Monopulse Antenna Feed Comparators

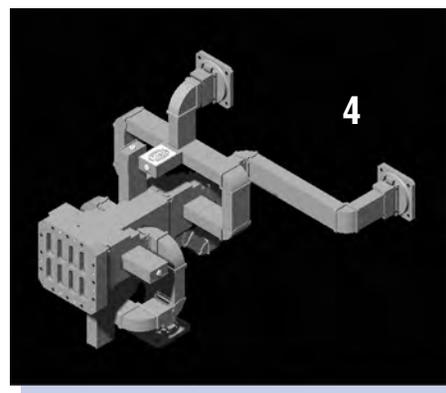
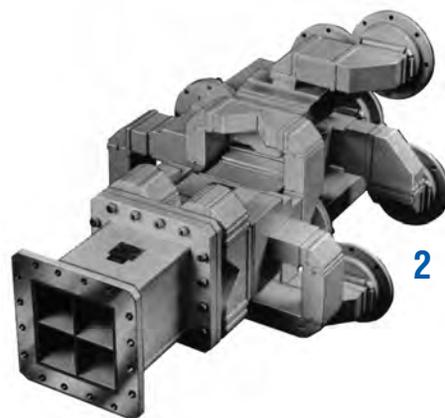
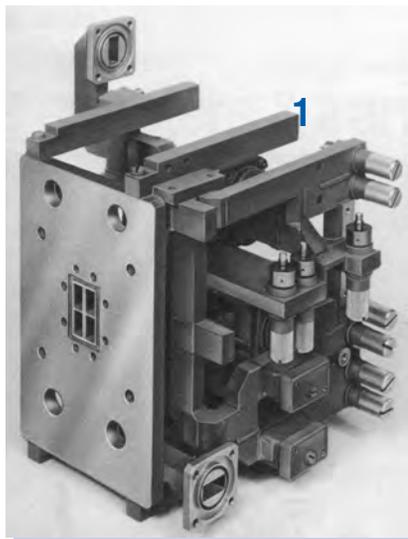


Introduction

MDL monopulse antenna feed comparators are designed from proven stock components, and provide excellent phase and amplitude control to ensure deep nulls and minimal boresight shift with frequency. Dual polarization monopulses employing orthogonal transducers in conjunction with hybrid networks are available. This unique design permits the use of both horizontal and vertical polarization in any antenna feed system. Matching polarizers to generate circular polarization are also available on request. Just a few typical designs of the many monopulse antenna feed comparators available are described here. MDL is ready to quote on custom-designing monopulse antenna feed comparators to meet your special requirements.

Custom Design Monopulses

- 1** WR51 Monopulse Comparator consisting of MDL standard castings and customized components.
- 2** The WR187 comparator is used in a circularly polarized system and is assembled from heavy-wall stock components.
- 3** The WR90 circularly-polarized comparator weighs approximately 1 pound. It includes a transmit, a sum, and two different channels.
- 4** Eight port Monopulse assembly with bit coupler and pressure window.

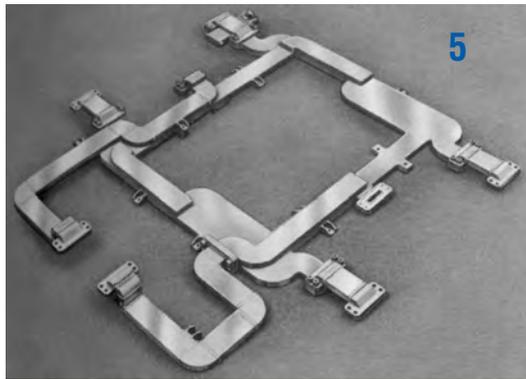


Custom Design Flat Plate Monopulses

Custom Flat Plate comparators available from WR28 through WR90 in full and reduced height waveguide sizes.

These flat plate comparators are usually manufactured by machining the waveguide paths into a solid plate and then dipbrazing a cover on. By using this technique one can maintain better mechanical and electrical specifications. MDL has a plethora of designs of these tees, bends, hybrids etc. that we can transpose into cad format which allows these comparators to be readily machined into solid plates with extreme accuracy

Our customers only have to give our engineer the input/output locations and the desired RF performance. Our engineers will mechanically design the monopulse using the latest Solid Works 3D modeling. Then they will analyze the RF circuit using Ansoft HSFF Version 9 and Optimetrics/Parametrics software. All Design, manufacturing and testing will be performed inhouse.

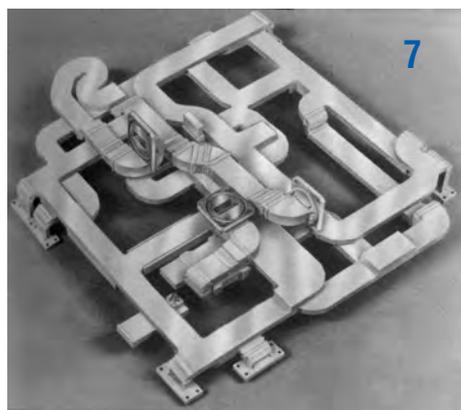
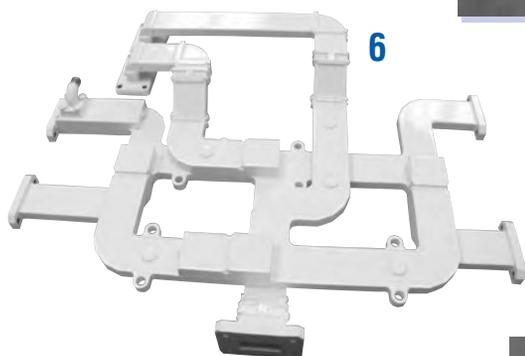


5 Internally milled, this reduced height comparator can be phase-controlled from piece to piece to give equal phase to ± 3 degrees or better.

6 Reduced Height Custom Comparator

7 Basic design of a half-height WR90 Monopulse Comparator machined from a solid aluminum plate and dip-brazed with assembly of waveguide hybrid junctions, directional couplers, waveguide E and H and flanges.

8 WR51 reduced height custom comparator using N/C machine technology.



Monopulse Comparators

Standard

W/G SIZE	OPERATING FREQ. (GHz)	MODEL NUMBER	MAXIMUM VSWR			MIN. INPUT ISOL dB	MAX.	MAX.	MAX.	OUTPUT PHASE VAR. VS. FREQ.
			SUM ARM	DIFF. ARM1	DIFF. ARM2		OUTPUT POWER UNBALANCE dB	OUTPUT PHASE ERROR (SUM)*	OUTPUT PHASE ERROR (DIFF.)**	

Single Polarization

WR28	30.0-32.0	28CM26	1.30	1.50	1.40	30	0.25	4°	4°	2.5°
	33.0-34.0		1.40	1.50	1.55	30	0.25	4°	4°	2.5°
	34.0-36.0	28CM16	1.35	1.50	1.45	30	0.25	4°	4°	2.5°
	34.0-36.0	28CM36	1.30	1.50	1.40	30	0.25	4°	4°	2.5°
	36.0-38.0	28CM46	1.50	1.65	1.65	32	0.35	5°	4°	2.5°
WR42	23.0-24.0	42CM16	1.25	1.50	1.35	30	0.25	4°	4°	2°
	20.0-21.0		1.25	1.25	1.25	32	0.15	3°	2°	2°
	21.0-22.0	42CM26	1.40	1.30	1.50	35	0.25	4°	4°	2°
WR51	15.8-17.0	51CM16	1.15	1.25	1.25	40	0.15	3°	2°	1°
WR62	15.5-17.0	62CM16	1.25	1.35	1.35	35	0.15	3°	3°	2°
	15.2-17.2	62CM26	1.40	1.50	1.50	30	0.20	3°	3°	3°
	13.0-14.8		1.30	1.35	1.35	35	0.20	3°	3°	3°
	14.8-15.2	62CM36	1.30	1.35	1.50	35	0.20	3°	3°	3°
WR90	8.5-9.6	90CM26	1.15	1.25	1.25	40	0.10	3°	2°	1°
	8.5-9.6	90CM46	1.15	1.25	1.25	40	0.10	3°	2°	1°
WR112	7.1-8.5	112CM36	1.20	1.50	1.50	40	0.10	3°	2°	1°
	7.35-8.3	112CM46	1.20	1.50	1.50	40	0.10	3°	2°	1°
	7.5-8.5	112CM16	1.15	1.20	1.20	40	0.10	3°	2°	1°
	7.5-8.4	112CM26	1.25	1.25	1.25	40	0.10	3°	2°	1°
WR137	5.4-5.9	137CM26	1.15	1.20	1.20	35	0.10	3.5°	1.5°	1°
WR187	5.4-5.9	187CM16	1.15	1.20	1.20	35	0.10	3.5°	1.5°	1°
	5.4-5.9	187CM26	1.40	1.40	1.40	30	0.10	6°	4°	2°
WR284	2.7-3.15	284CM16	1.25	1.35	1.35	35	0.10	3°	2°	1°

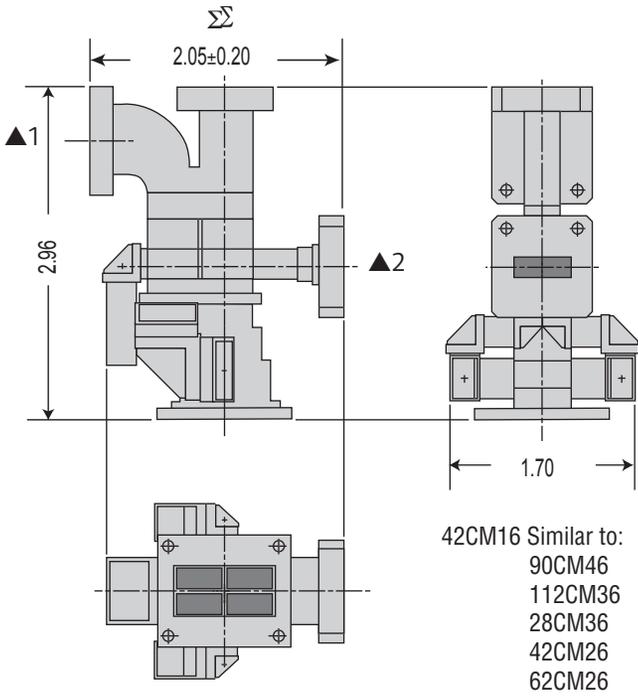
Dual Polarization

WR90	8.5-9.6	90CM66	1.30	1.25	1.25	40	0.10	3°	2°	1°
WR187	5.4-5.9	187CM36	1.40	1.30	1.30	35	0.15	3°	2°	2°

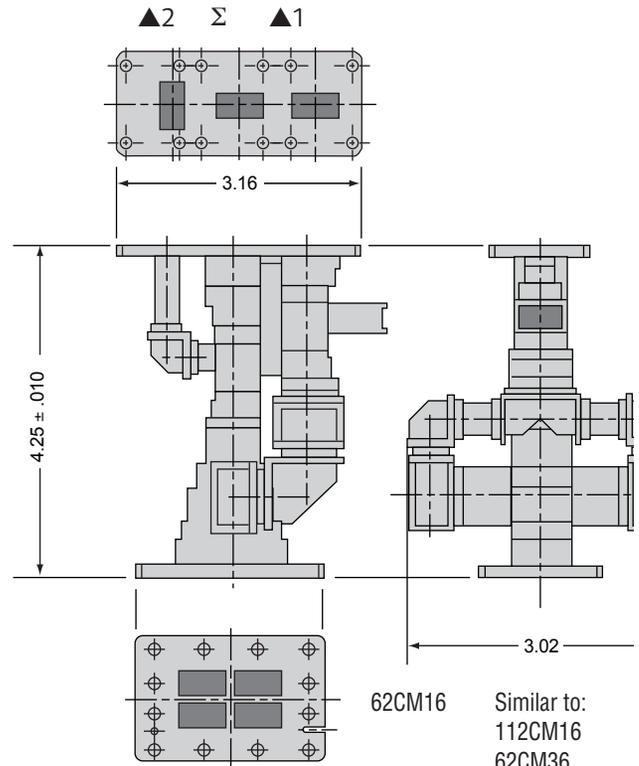
*Between any two adjacent output ports that comprise a sum pattern.

**Between any two adjacent output ports that comprise a difference pattern.

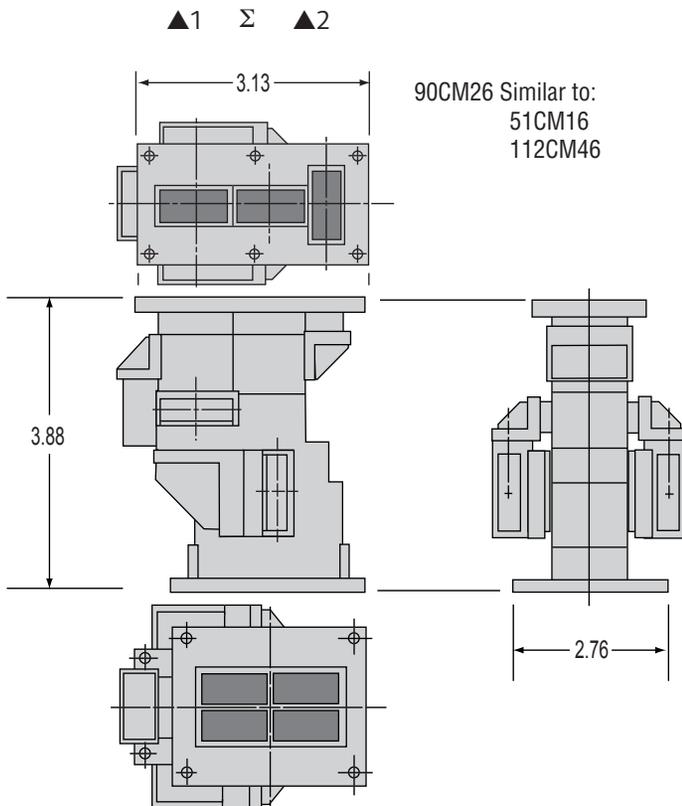
Monopulse Comparators



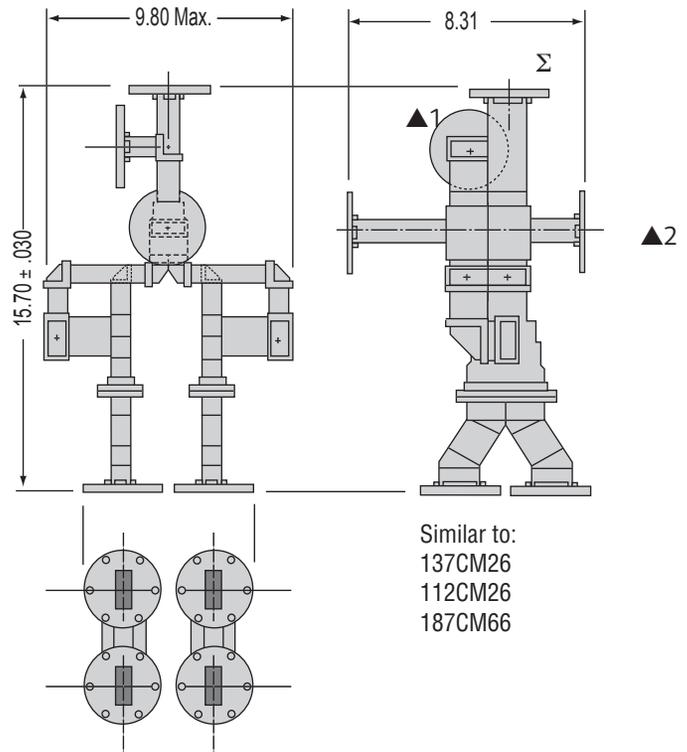
42CM16 Similar to:
 90CM46
 112CM36
 28CM36
 42CM26
 62CM26



62CM16 Similar to:
 112CM16
 62CM36
 28CM16
 28CM26



90CM26 Similar to:
 51CM16
 112CM46



Similar to:
 137CM26
 112CM26
 187CM66

Monopulse Comparators

