

PIV

Positive Infinitely Variable
GEAR UNITS



PIV.GEAR UNITS

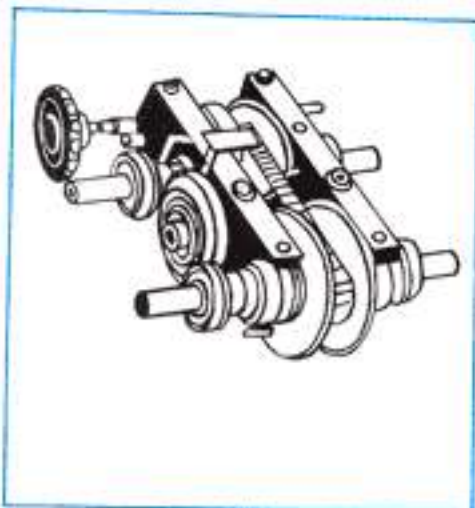
For reliable and accurate variable speed control in a wide field of applications the Stone-Platt range of fully metricated Positive Infinitely Variable (PIV) gear units is second to none. The basic PIV units offer variable speed ratios up to 6:1, output speeds up to 3550 r.p.m. and an input power range from 0.75kW to 7.5kW (1 to 10 hp).

Additional input and output gear modules give extremely low output speeds, with accuracy of speed holding within 0.01%, a wide speed range and high powers. With such a comprehensive range of PIV units and modules Stone-Platt Transmissions can solve most mechanical speed control problems.

This brochure outlines the general capability of Stone-Platt Transmissions PIV Gear Units. More detailed technical information giving specific data (reduction ratios, output speed, dimensions, etc.) covering the range of units is contained in a series of Application Data Sheets, available on request.

Operation

The heart of the PIV unit is the all metal slatted chain and the grooved wheelfaces. The slats in the chain move laterally to engage the grooves in the wheelfaces. Therefore the chain cannot slip. The pitch diameter of both pairs of wheelfaces is controlled to an infinite number of positions by the pivoting control levers and the control screw.

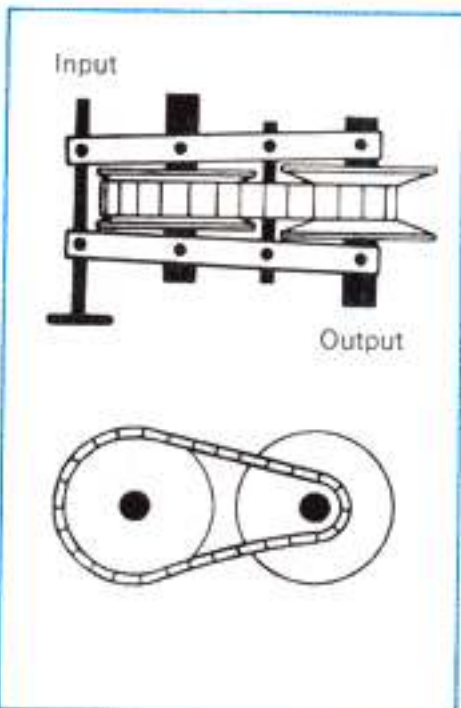


Features

- Positive transmission of power
- Outstanding stability of speed
- Simplicity of design
- Reliability of operation
- High efficiency
- Exceptional torque characteristics
- Operationally reversible
- All metal construction
- Suitable for horizontal or vertical mounting
- Dual drive shafts provide flexibility of coupling
- Totally enclosed construction enables use in hostile environments

Maximum speed setting

The input shaft wheelfaces are close together, forming a large driving diameter. The output shaft wheelfaces are automatically separated to form a small driven diameter.



Continuous oil lubrication

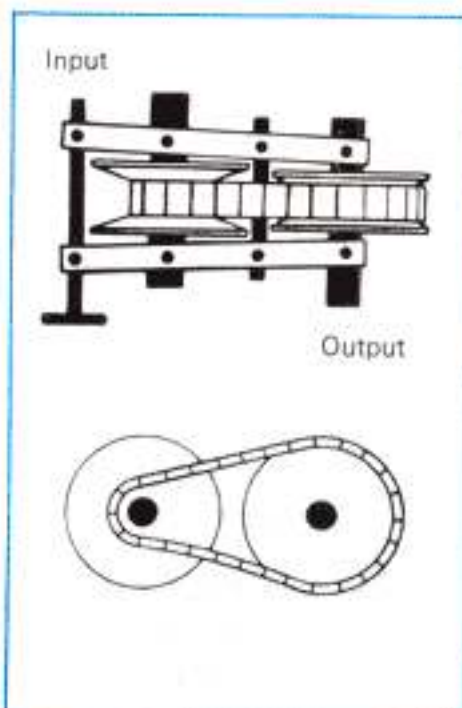
Range of auxiliary gear modules extends field of application

The following range of accessories is available for use with all units:

Electric remote control, remote hand control, fine adjustment control, lever control, bevel control, electrical speed indication.

Minimum speed setting

The input shaft wheelfaces are far apart, forming a small driving diameter. The output shaft wheelfaces are automatically closed to form a large driven diameter.

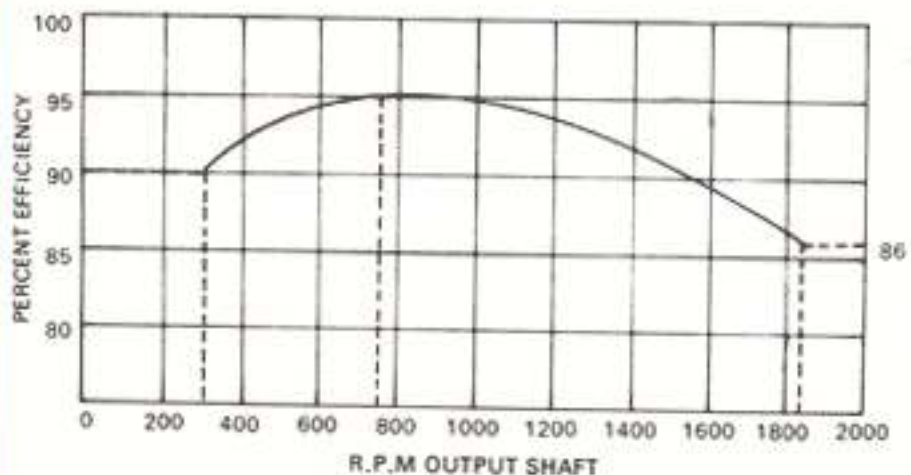


Performance graphs

Full load efficiency

The graph shows the efficiency of a basic variator, which may be taken as typical for all sizes. It will be seen that under full load conditions this is 86% at top speed and 90% at bottom speed, and 95% at mean speed.

With compound attachments the efficiency is reduced by $1\frac{1}{2}\%$ for each pair of spur gears and between 20% and 30% for worm gears in the 'W' portion.



Capacity

The power which can be transmitted at output speeds between maximum and minimum is shown in the graph by considering the speed concerned as a percentage of maximum speed. The power at this speed is then read off the graph as a percentage of the power at maximum speed.

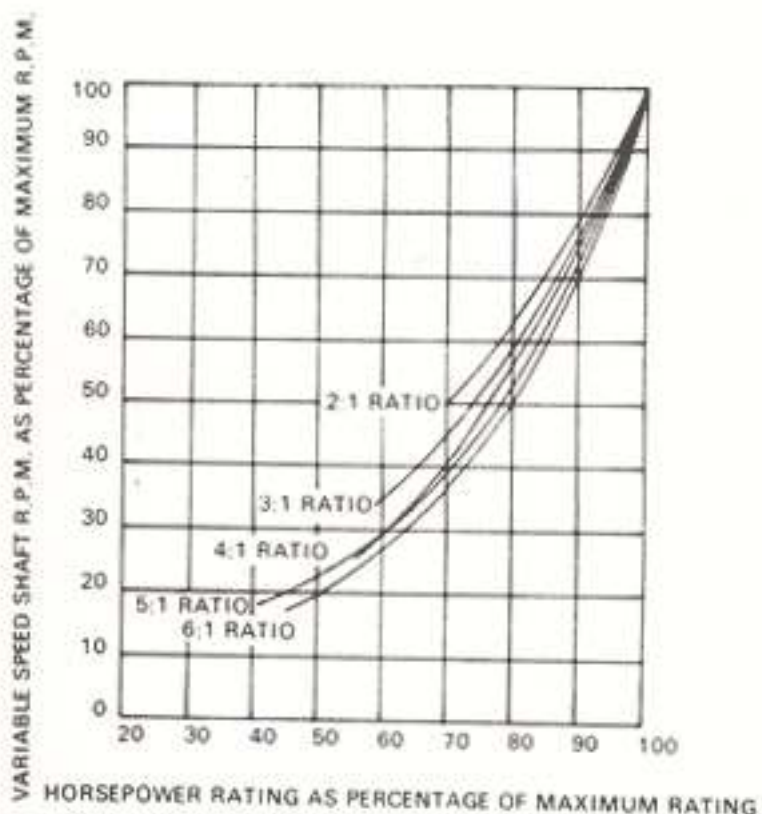
Selection data

Data required for unit selection is:-
Speed ratio
Power or torque at maximum or minimum speed, or motor horsepower available
Operation conditions, e.g., running time per day, frequency of starts, uniformity of loads.

Auxiliary PIV gear modules

The basic PIV gear unit is able to cope with a considerable range of power transmission requirements. However, PIV operation can be considerably extended by the incorporation of auxiliary gear modules to the input and/or the output side of the basic PIV unit.

Three types of input gear modules are available, for top mounted or flange mounted motor drives, and where single reduction/increase input is required.



Temperature rise

The permissible temperature rise of any PIV unit is 60°C (140°F) above ambient, subject to a maximum working temperature of 82°C (180°F). Normal ambient temperature is 15°C to 21°C (60°F

to 70°F), but higher ambient temperatures can be accommodated by using suitable oils. However, when lower temperatures may be encountered, please consult us.

Basic PIV ratings

The 'size of unit' is numerically equal to the recommended maximum input horsepower.

Load factor

The maximum input horsepower of basic PIV units given in the ratings tables are for units operating under uniform load for 12 hours per day. Where operating conditions differ, multiply the required power by the factors shown:

Running time per day	Uniform load	Moderate shock load	Heavy shock load
6 hours	0.8	1.0	1.25
12 hours	1.0	1.25	1.50
24 hours	1.25	1.50	1.75

Size of Unit	Ratio (Chain) ref.	Input Speed r.p.m.	Output Speeds r.p.m.	Output Power		Output Torque		Size of Unit	Ratio (Chain) ref.	Input Speed r.p.m.	Output Speeds r.p.m.	Output Power		Output Torque	
				hp	kW	kgf m	lbf in					hp	kW	kgf m	lbf in
U12 (M2)	2:1	750	1060	1.38	1.02	0.94	82	M3	2:1	750	1060	1.80	1.34	1.23	107
			531	1.00	0.75	1.37	119				531	1.45	1.08	1.98	172
		950	1.343	1.50	1.11	0.81	70.4			950	1.343	2.30	1.72	1.24	108
	(P.226)	1450	2050	1.00	0.75	0.35	30.7		(P.227)	1450	2050	1.99	1.49	0.70	61
	1025		1.43	1.06	1.01	87.5	1025		2.17		1.62	1.53	133		
	750		1.299	1.36	1.01	0.76	66		(P.226)		750	1.299	1.74	1.30	0.97
	(P.225)	950	433	0.81	0.60	1.36	118		433	1.18		0.88	1.98	172	
	950		1645	1.50	1.11	0.66	57.4		1645	2.30	1.72	1.01	88		
		(P.225)	1450	549	1.00	0.75	1.32		115	549	1.50	1.12	1.98	172	
	3.75:1	750		2511	1.17	0.87	0.34		29.4	(P.226)	1450	2511	1.96	1.46	0.56
			837	1.38	1.02	1.19	103		837	2.03		1.51	1.76	153	
		(P.225)	950	1452	1.39	1.03	0.69		60.3	750	1500	1.70	1.27	0.82	71
950	388	0.8		0.59	1.50	130	375	0.95	0.71		1.84	160			
	(P.225)	1450	1839	1.50	1.11	0.59	51.4	950	1900	2.00	1.49	0.76	68		
1450	491		1.00	0.75	1.48	128.3	475		1.20	0.90	1.83	159			
	(P.225)	1450	2808	1.00	0.75	0.26	22.4	(P.225)	1450	2900	2.15	1.60	0.54	47	
1450	749		1.39	1.03	1.35	117	725	1.73		1.29	1.73	150			
	U23	2:1	960	1360	3.7	2.5	1.9	172	M4	2:1	750	1060	2.79	2.08	1.91
680				3.5	2.4	3.7	327	531				2.23	1.66	3.05	265
(P.235)		750	1062	3.6	2.5	2.4	215	950		1343	3.54	2.64	1.91	166	
531			3.0	2.1	4.0	355	672			2.75	2.05	2.97	258		
(P.234)		960	1660	3.6	2.5	1.6	137	(P.227)		1450	2050	3.88	2.89	1.37	119
553			3.1	2.1	4.0	354	1025	3.65			2.72	2.58	224		
(P.234)		750	1300	3.5	2.4	1.9	173	3:1		750	1299	2.78	2.07	1.56	135
433			2.5	1.7	4.3	374	433				1.82	1.36	3.05	265	
(P.233)		750	1500	3.5	2.4	1.7	150	950		1645	3.50	2.61	1.54	134	
375			2.2	1.5	4.2	372	549			2.31	1.72	3.05	266		
(P.232)		750	1680	3.4	2.4	1.5	130	(P.226)		1450	2511	3.75	2.80	1.08	94
336			1.9	1.3	4.1	360	837	3.23			2.41	2.80	243		
(P.232)	750	1840	3.4	2.4	1.3	118	4:1	750	1500	2.44	1.82	1.18	102		
307		1.6	1.1	3.9	348	375			1.38	1.03	2.67	232			
U25	2:1	750	1062	4.8	3.4	3.2	284	M4	2:1	750	1060	2.79	2.08	1.91	168
			531	3.4	2.4	4.6	403				531	2.23	1.66	3.05	265
	(P.329)	750	1300	4.5	3.1	2.5	218		950	1343	3.54	2.64	1.91	166	
	433		3.2	2.2	5.3	466	672			2.75	2.05	2.97	258		
	(P.328)	750	1500	4.4	3.1	2.1	184		(P.227)	1450	2050	3.88	2.89	1.37	119
	375		2.6	1.8	5.0	443	1025		3.65		2.72	2.58	224		
(P.328)	750	1680	4.2	3.0	1.8	157	3:1	750	1299	2.78	2.07	1.56	135		
336		2.3	1.6	4.9	431	433			1.82	1.36	3.05	265			
(P.328)	750	1840	4.0	2.8	1.6	137	950	1645	3.50	2.61	1.54	134			
307		2.0	1.4	4.7	410	549		2.31	1.72	3.05	266				
M1	2:1	750	1060	0.67	0.49	0.46	39.8	M4	2:1	750	1060	2.79	2.08	1.91	168
			531	0.37	0.27	0.51	43.9				531	2.23	1.66	3.05	265
		(P.128)	950	1343	0.75	0.55	0.41			35.2	950	1343	3.54	2.64	1.91
	672	0.44		0.32	0.48	41.3	672		2.75	2.05		2.97	258		
	(P.128)	1450	2050	0.68	0.50	0.24	20.9		(P.227)	1450	2050	3.88	2.89	1.37	119
	1025		0.52	0.38	0.37	32.0	1025		3.65		2.72	2.58	224		
	(P.127)	750	1299	0.66	0.49	0.37	32.0		3:1	750	1299	2.78	2.07	1.56	135
	433		0.31	0.23	0.52	45.1	433				1.82	1.36	3.05	265	
	(P.127)	950	1645	0.75	0.55	0.33	28.7		950	1645	3.50	2.61	1.54	134	
	549		0.38	0.27	0.50	43.6	549			2.31	1.72	3.05	266		
	(P.127)	1450	2511	0.67	0.49	0.19	16.8		(P.226)	1450	2511	3.75	2.80	1.08	94
	837		0.50	0.37	0.43	37.6	837		3.23		2.41	2.80	243		
(P.127)	750	1500	0.68	0.50	0.33	28.6	4:1	750	1500	2.44	1.82	1.18	102		
375		0.28	0.20	0.54	47.0	375			1.38	1.03	2.67	232			
(P.127)	950	1900	0.75	0.55	0.29	24.9	950	1900	2.80	2.16	1.11	96			
475		0.35	0.26	0.53	46.4	475		1.73	1.29	2.64	229				
(P.127)	1450	2900	0.62	0.46	0.16	13.5	(P.225)	1450	2900	3.48	2.60	0.88	76		
725		0.48	0.35	0.48	41.7	725	2.53		1.89	2.53	220				

Examples of uniform loads

Fans, blowers, compressors uniformly loaded belt conveyors.

Examples of moderate shock loads

Reciprocating pumps, reeling machines, non-uniformly loaded belt conveyors, frequent stopping and starting.

Examples of heavy shock loads

Heavy rubber and paper machinery, continuous stopping and starting, high inertia loads.

Constant torque applications

Use maximum speed ratings.

Constant horsepower applications

Use minimum speed ratings.

Low input speed applications

Lower speeds than shown in the rating table will reduce output horsepower in direct proportion to the difference in input speed.

Size of Unit	Ratio (Chain) ref.	Input Speed r.p.m.	Output Speeds r.p.m.	Output Power		Output Torque		
				hp	kW	kgf m	lbf in	
M5	2:1 (P.328)	750	1060	3.55	2.65	2.43	211	
			531	2.82	2.10	3.85	334	
		950	1343	4.04	3.01	2.18	189	
				672	3.33	2.48	3.59	312
	1450 (P.327)	750	1299	3.52	2.63	1.97	171	
			433	2.30	1.72	3.85	334	
		950	1645	4.00	2.98	1.76	153	
				549	2.90	2.16	3.84	333
	1450 (P.230)	750	2511	2.42	1.81	0.71	61	
			837	3.76	2.81	3.26	283	
		950	1900	3.60	2.69	1.57	119	
				475	2.32	1.73	3.55	308
1450 (P.229)	750	2900	3.07	2.29	0.77	67		
		725	3.31	2.47	3.32	288		
	950	1677	3.17	2.36	1.32	119		
			335	1.61	1.20	3.49	303	
1450 (P.229)	750	2124	3.55	2.65	1.21	105		
		425	2.02	1.51	3.44	299		
	950	3242	3.20	2.39	0.71	62		
			649	2.96	2.21	3.31	287	
1450 (P.229)	750	1837	3.00	2.24	1.19	103		
		306	1.50	1.12	3.56	309		
	950	2327	3.50	2.61	1.09	95		
			388	1.90	1.42	3.55	308	
			1450	3.551	2.31	0.63	55	
			592	2.70	2.07	3.41	296	
M6	2:1 (P.328)	750	1060	4.48	3.34	3.06	266	
			531	3.58	2.67	4.90	425	
		950	1343	5.56	4.15	3.00	261	
				672	4.33	3.23	4.68	406
	1450 (P.327)	750	2050	4.86	3.63	1.72	149	
			1025	5.32	3.97	3.77	327	
		950	1299	4.31	3.22	2.41	209	
				433	2.92	2.18	4.90	425
	1450 (P.327)	750	1645	5.50	4.10	2.43	211	
			549	3.70	2.76	4.90	425	
		950	2511	4.70	3.51	1.36	118	
				837	4.96	3.70	4.30	373
1450 (P.230)	750	1500	4.00	2.98	1.94	163		
		375	2.32	1.73	4.48	389		
	950	1900	4.58	3.42	1.75	152		
			475	2.93	2.19	4.46	387	
1450 (P.229)	750	2900	4.49	3.35	1.13	98		
		725	4.17	3.11	4.17	362		
	950	1677	3.85	2.87	1.67	145		
			335	2.05	1.53	4.45	386	
1450 (P.229)	750	2124	4.49	3.35	1.53	133		
		425	2.56	1.91	4.37	379		
	950	3242	4.60	3.43	1.03	89		
			649	3.71	2.77	4.15	360	
1450 (P.229)	750	1837	3.91	2.92	1.54	134		
		306	1.88	1.40	4.46	387		
	950	2327	4.50	3.36	1.41	122		
			388	2.40	1.79	4.48	389	
			1450	3.551	2.39	0.93	81	
			592	3.50	2.61	4.29	372	

Size of Unit	Ratio (Chain) ref.	Input Speed r.p.m.	Output Speeds r.p.m.	Output Power		Output Torque		
				hp	kW	kgf m	lbf in	
M8	2:1 (P.429)	750	1060	5.35	3.99	3.66	318	
			531	3.93	2.93	5.37	466	
		950	1343	7.12	5.31	3.85	334	
				672	4.72	3.52	5.10	443
	1450 (P.428)	750	1299	5.30	3.95	2.96	257	
			433	3.50	2.61	5.86	509	
		950	1645	7.00	5.22	3.09	268	
				549	4.50	3.36	5.94	516
	1450 (P.334)	750	1500	5.31	3.96	2.57	223	
			375	3.07	2.29	5.95	516	
		950	1900	6.36	4.74	2.43	211	
				475	3.77	2.81	5.76	500
1450 (P.333)	750	1677	5.20	3.88	2.25	195		
		335	2.69	2.00	5.83	506		
	950	2124	6.37	4.75	2.18	189		
			425	3.33	2.48	5.69	494	
1450 (P.333)	750	1837	5.30	3.95	2.10	182		
		306	2.50	1.87	5.93	515		
	950	2327	6.48	4.83	2.02	175		
			388	3.14	2.34	5.88	510	
M10	2:1 (P.429)	750	1060	7.19	5.36	4.92	427	
			531	5.79	4.32	7.91	687	
		950	1343	9.15	6.83	4.94	429	
				672	6.54	4.88	7.06	613
	1450 (P.428)	750	1299	7.19	5.36	4.02	349	
			433	4.73	3.53	7.93	688	
		950	1645	9.00	6.71	3.97	345	
				549	6.00	4.48	7.93	688
	1450 (P.334)	750	1500	6.63	4.95	3.21	279	
			375	3.85	2.87	7.45	647	
		950	1900	7.59	5.66	2.89	251	
				475	4.78	3.57	7.30	634
1450 (P.333)	750	1677	6.55	4.89	2.83	246		
		335	3.44	2.57	7.45	647		
	950	2124	7.56	5.64	2.58	224		
			425	4.25	3.17	7.26	630	
1450 (P.333)	750	1837	6.53	4.87	2.58	224		
		306	3.14	2.34	7.45	647		
	950	2327	7.50	5.60	2.34	203		
			388	4.00	2.98	7.48	649	
M15	2:1 (P.547)	600	850	14.7	10.3	12.5	1085	
			425	9.0	6.3	15.2	1322	
	3:1 (P.545)	600	1040	14.5	10.1	10.0	875	
			347	8.3	5.0	17.3	1510	
	4:1 (P.544)	600	1200	14.1	10.0	8.5	740	
			300	8.1	5.1	19.5	1700	
5:1 (P.543)	600	1300	14.0	10.0	7.6	660		
		268	7.0	4.9	19.0	1650		
6:1 (P.543)	500	1225	14.3	10.0	8.5	736		
		225	5.7	4.0	20.1	1750		
M25	2:1 (P.638)	600	850	22.6	15.8	19.3	1680	
			425	14.0	10.0	23.8	2070	
	3:1 (P.637)	600	1040	22.5	15.8	15.6	1360	
			347	12.8	9.0	26.6	2320	
	4:1 (P.636)	600	1200	22.4	15.8	13.4	1170	
			300	11.5	8.0	27.7	2410	
5:1 (P.635)	600	1340	22.3	15.8	12.0	1042		
		268	10.5	7.3	28.0	2460		
6:1 (P.635)	500	1225	22.2	15.5	13.1	1140		
		204	8.6	6.00	30.4	2650		

New improved design... High efficiency



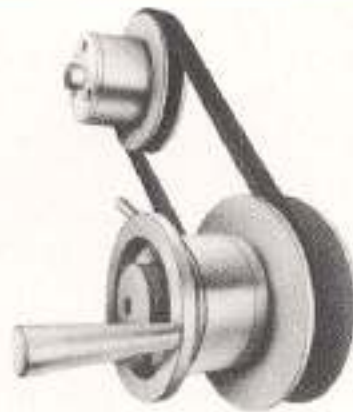
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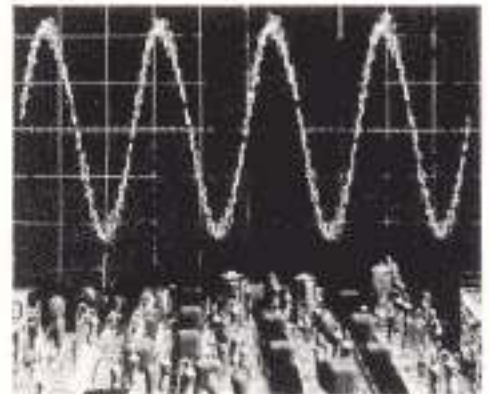
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