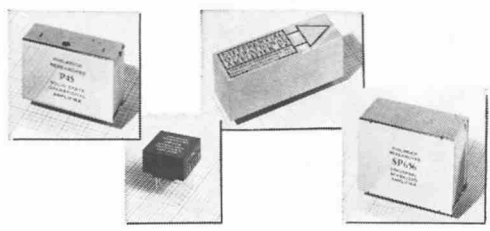


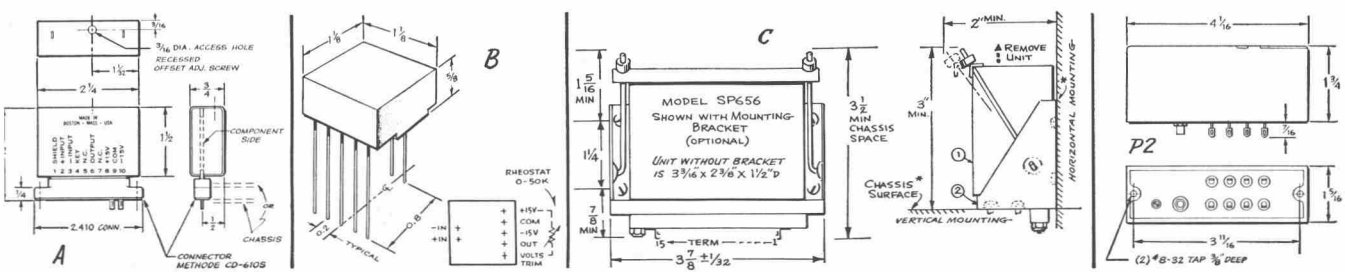
PHILBRICK produces a wide variety of cool, reliable, solid state operational amplifiers to meet the gamut of application requirements in measurement, computing, control, data processing, and testing. The units shown in this chart are a few of the most popular differential types now in production. In addition to these, Philbrick is developing new and improved types to meet the ever-increasing challenges to operational amplifier performance. Besides basic amplifiers, one can obtain voltage and current boosters, regulated dc power supplies, and operational manifolds from Philbrick. You are invited to discuss the application of operational amplifiers to the solution of your problems with Philbrick or our nearest Representative.



PHILBRICK ALL-SOLID-STATE OPERATIONAL AMPLIFIERS

CHARACTERISTICS	TYPICAL MODEL	P45 All-Silicon Wide bandwidth High performance Plug-in ±20 ma Output	P55A All-Silicon Utility Modest performance & price Plug-in	PP55A All-Silicon Utility Modest performance & price Wire-in Compact	P65A All-Silicon General Purpose Plug-in	PP65A All-Silicon General Purpose Wire-in (Compact)	P2 Floating differential inputs High input impedances negligible common mode error Built-in adjustment	P75 All-Silicon High impedance Low input currents Plug-in	SP656 All-Silicon Chopper stabilized High Gain/Low Drift Mechanical or photochopper Plug-in
1. Application features									
2. Voltage gain (dc open loop) +25°C, rated load, minimum +85°C, " " " " , typical -25°C, " " " " , minimum +25°C, no load, typical		20,000 30,000 10,000 200,000	20,000 35,000 5,000 60,000	20,000 35,000 5,000 60,000	20,000 40,000 10,000 80,000	20,000 40,000 10,000 80,000	30,000 — — 30,000	20,000 40,000 10,000 80,000	10* 2×10* 5×10* 2×10*
3. Response (open loop, as inverter, 25°C) Full output (worst case) Small signal unity gain-bandwidth Gain at 1.0 Mc, typical Gain at 10 Mc, typical		300 Kc (100 Mc) 100 10	10Kc 1Mc 1 —	10Kc 1Mc 1 —	10Kc 1.3Mc 1.3 —	10Kc 1.3Mc 1.3 —	0.6Kc 60Kc — —	10Kc 1Mc 1 —	10Kc 1Mc 1 —
4. Rated output (-25°C to +85°C) Voltage Current Load		±10V ±20ma 500Ω	±11V ±2.2ma 5K	±11V ±2.2ma 5K	±11V ±2.2ma 5K	±11V ±2.2ma 5K	(+20°C to +45°C) { ±10V ±1ma 10K }	±11V ±1ma 10K	±11V ±20ma*** 500Ω***
5. Suggested booster type: for 20-100 ma @ ±10V " 10 ma @ ±25V* " 5 ma @ ±50V* " 50 ma @ ±50V*		— * * *	P66 * * *	PP66 * * *	P66 * * *	PP66 * * *	P5 or P66 * * *	P66 * * *	* * *
6. Input voltage offset Adjustment (built-in or external) Max. vs Temp. (-25°C to +85°C) Max. vs Temp. (+10°C to +60°C) vs Time (per day) vs Time (½ hour) Narrow-band noise (p-p)		External 10mV** 2.5mV** 100µV** 15µV** 5µV	External 20mV 5mV 100µV 25µV 10µV	External 20mV 5mV 100µV 25µV 10µV	Built-in 6mV 1.5mV 50µV 10µV 2µV	External 6mV 1.5mV 50µV 10µV 2µV	[Built-in 5mV +20°C to +45°C 100µV 4µV	Built-in 12mV 3mV 100µV 25µV 10µV	External 50µV 20µV 1µV 1µV 10µV
7. Input current offset 25°C worst case without trims 25°C worst case (nominal trims) Max. vs Temp. (-25°C to +85°C) Max. vs Temp. (+10°C to +60°C) vs Time (per day) typical vs Time (½ hour) typical Narrow-band noise (p-p) typical		External trim 600na 100na 1.2µa** 300na** 30na** 3na** 1na	Built-in trim 200na 4µa 1µa 100na 10na 1na	External trim 2µa 200na 4µa 1µa 100na 10na 1na	Built-in trim 100na 800na 200na 20na 2na 0.5na	External 400na 100na 800na 200na 20na 2na 0.5na	N/A — — 5×10 ⁻¹¹ amp 10 ⁻¹¹ amp 10 ⁻¹¹ amp 10 ⁻¹¹ amp	No trims used 10na 20na 5na 1na 0.2na 0.05na	N/A 10 ⁻¹¹ amp 10 ⁻¹¹ amp 3×10 ⁻¹¹ amp <10 ⁻¹¹ amp <10 ⁻¹¹ amp 10 ⁻¹¹ amp
8. Input impedance (25°C) (resistive comp.) Between inputs Either input to com (untrimmed)		100K >20M	75K >10M	75K >10M	150K >20M	150K >20M	>100 M >10,000M	5-10M >100M	440K DC —
9. Common mode Input range Max. dc error (25°C)		±10V ±10mV	±10V ±20mV	±10V ±20mV	±10V ±10mV	±10V ±10mV	±200V <0.0001%	±10V ±10mV	— —
10. Temperature range (in ° Centigrade) Max. operating Max. storage Typical operating (best performance vs. reliability) Max. operating, with derated specs.		-25 to +85 -55 to +85 +10 to +55 -45 to +85	-25 to +85 -55 to +85 +10 to +60 -45 to +85	-25 to +85 -55 to +85 +10 to +60 -45 to +85	-25 to +85 -55 to +85 +10 to +60 -45 to +85	-25 to +85 -55 to +85 +10 to +60 -45 to +85	+20 to 45 -55 to +65 +20 to +45 0 to +55	-25 to +85 -55 to +85 +10 to +60 -45 to +85	-25 to +85 (M) -55 to +85 (M) +10 to +60 -45 to +85 (M)
11. Power requirements (+25°C) Voltage Current at +15V (Quiescent) Current at +15V (Full load) Current at -15V (Quiescent) Current at -15V (Full load)		±15V 4.5 ma 24 ma 4.5 ma 24 ma	±15V 5.5ma 8ma 5.5ma 5ma	±15V 5.5ma 8ma 5.5ma 5ma	±15V 5.5 ma 8ma 5.5 ma 5ma	±15V 5.5 ma 8ma 5.5 ma 5ma	±15V 12ma 16ma 12ma 13ma	±15V 4ma 5ma 4ma 4ma	*AC for chopper plus ±15V 6.5ma 21ma 6.5ma 21ma
12. Outline dimensions & connections (See below)		A	A	B	A	B	P2	A	C
13. Price (subject to change)	1-4 5-14 15-24 25+*	\$135 125 110 *	\$54 53 51 *	\$57 56 54 *	\$85 83 80 *	\$85 83 80 *	\$227(1-9) 218(10-24) * *	\$135 127 112 *	\$247(1-4) 239(5-9) 229(10-14) *

*Philbrick or your nearest Philbrick Representative will welcome your inquiry ** (Quiescent) *** Corresponding figures for early units are ±15ma, 667Ω (M) Mechanical chopper

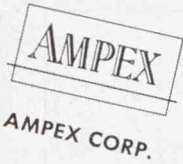


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<p>BOSTON, MASS. September 9th Charter House Route 128, Waltham, Massachusetts Hours: 12 noon—7:30 pm</p>	<p>GREAT NECK, L. I., N. Y. September 11th Leonard's of Great Neck 380 Northern Boulevard Hours: 12 noon—7:30 pm</p>	<p>BETHPAGE, L. I., N. Y. September 12th Holiday Manor 345 Hicksville Road Hours: 12 noon—7:30 pm</p>	<p>EATONTOWN, N. J. September 16th Civic Auditorium Monmouth Shopping Center Hours: 12 noon—7:30 pm</p>	<p>TOTOWA, N. J. September 17th Gladiator's Arena Route 46 Hours: 12 noon—7:30 pm</p>
<p>PHILADELPHIA, PA. September 23rd Marriott Motor Hotel City Line Avenue & Monument Road Hours: 12 noon—7:30 pm</p>	<p>PRINCETON, N. J. September 24th Flagpost Motor Lodge Route U. S. 1 Hours: 12 noon—7:30 pm</p>	<p>SYRACUSE, N. Y. September 26th Randolph House Exit 37, N. Y. State Thruway Hours: 12 noon—7:30 pm</p>	<p>WATCHUNG, N. J. September 30th Wally's Tavern 154 Bonnie Burn Road Hours: 12 noon—7:30 pm</p>	<p>WASHINGTON, D. C. October 2nd International Inn Thomas Circle, 14th & M Sts., N.W. Hours: 12 noon—7:30 pm</p>

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