

---

Air cooled  
vibration testing systems

---

0.7 to 6.67 kN (150 - 1500 lbf)

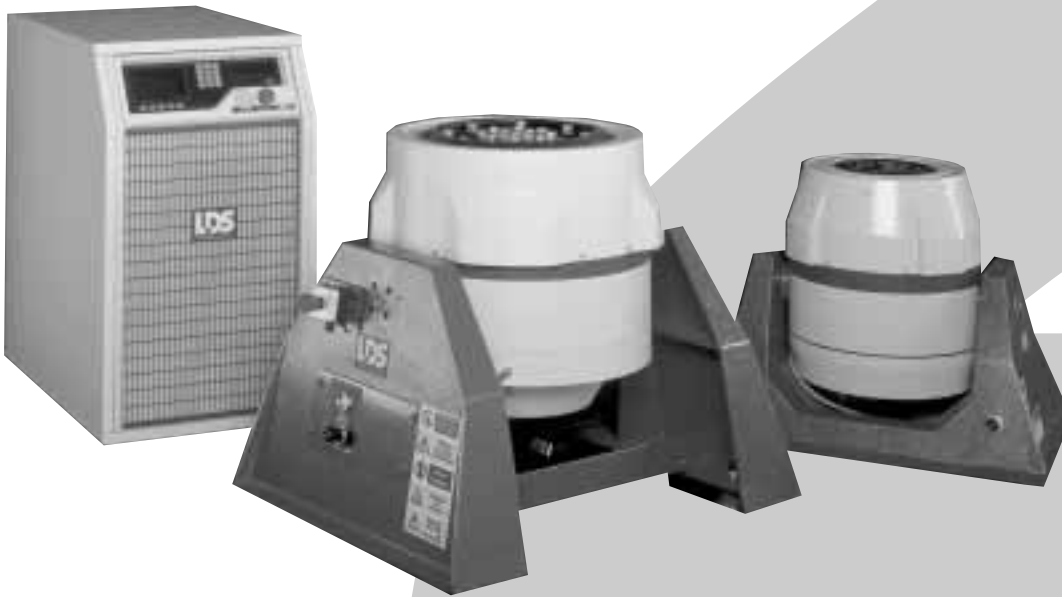
---

V550, V650, V721 and V780 Shakers

---

PA and HPA-K Amplifiers

---



---

### Typical system applications

- automotive component testing
  - electronic assembly testing
  - structural testing
  - in-house calibration
  - modal investigation
- 

A range of vibration systems designed to minimise operational costs whilst providing the maximum flexibility for the test engineer.

Featuring:-

- Lightweight, high performance armature design
- 25.4 mm (1") Continuous displacement
- Choice of amplifiers; linear or switching
- Advanced PA linear amplifiers featuring FET output and excellent random performance
- HPA-K switching amplifiers incorporate advanced MOSFET power devices and hybrid circuitry
- Microprocessor-based control with clear LCD provides simple set up and display of system parameters
- LDS equipment complies with European & USA safety and EMC regulations
- Easy, self-installation – simply plug directly into the mains supply

---

### Total system solutions

Used with a DSC 4 Sine Controller or DVC48 Sine, Random and Shock Controllers, and one of a range of standard or customised jigs and fixtures, LDS can provide a total testing solution. The LDS range of instrumentation is described in our vibration control systems brochure.

Alternatively, all LDS vibration systems are designed to interface with any standard third party controller.

Whichever route you choose, you can be assured that all LDS products will be supported by our unique international customer training and after-sales service anywhere in the world.

# LDS PA and HPA-K Amplifiers

LDS' low cost, single-phase linear power amplifiers support LDS' permanent magnet shakers, and when used with an external field power supply (FPS 10L) also support LDS V500, V600 and V700 series electro-magnetic shakers. Plugging directly into the mains, they are easy to install and operate.

LDS new HPA-K amplifiers are designed to support both LDS V600 and V700 series shakers. Representing the state-of-the-art, they offer high reliability, robust construction and simple wiring in compact units. Three sigma clipping allows for a more compact unit than a 2 sigma amplifier for the equivalent capability, so saving valuable floor space, reducing installation costs and power consumption.

Reliability and performance benefits come from simplicity of construction, high switching frequency and low harmonic distortion.

Test set up and troubleshooting couldn't be simpler thanks to a unique micro-processor control unit. System parameters and diagnostic data are displayed clearly on LCDs, saving users valuable time and improving reliability.

Much attention has been paid to safety to ensure adequate protection for operators, test specimens and the systems themselves. For example, synchronised loss protection automatically shuts systems down in the event of power failure. And like all LDS manufactured equipment, all amplifiers meet international standards and comply with legislation on safety and EMC.



## PA 500L and PA 1000L Linear power amplifiers

- Compact stand-alone amplifiers designed to support LDS permanent magnet shakers and LDS V500, V600 and V700 series electro-dynamic shakers, when used with a separate field power supply (FPS 10L).
- Latest MOSFET technology used in linear mode eliminates saturation effects.
- Cost effective, light duty testing with excellent random performance.
- Unconditionally stable irrespective of load.
- True RMS metering with over-current protection.
- Full range of system interlock circuits.
- Remote control facilities.

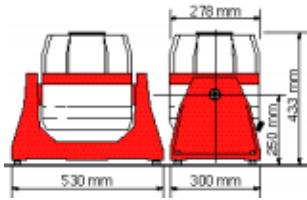
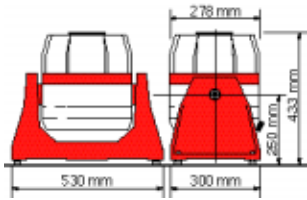

## HPA-K Switching power amplifiers

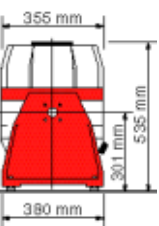
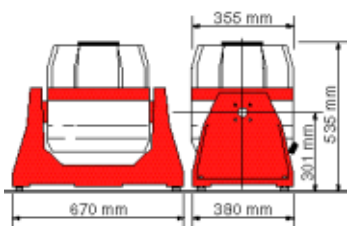
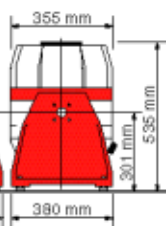
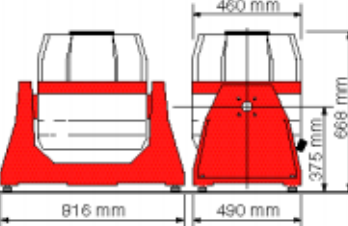
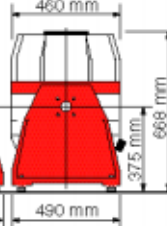
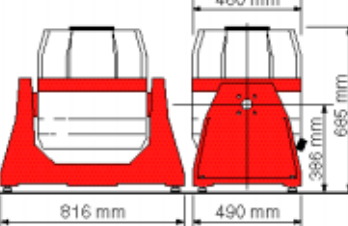
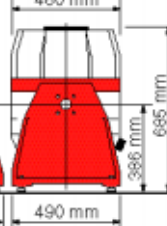
- Dedicated 5 kVA amplifier designed for use in conjunction with LDS V600 and V700 series air cooled shakers.
- Compact, stand-alone cabinets.
- Easy to self-install.
- Micro-processor control unit and LCD function display provides simple set up and fast troubleshooting.
- Peak current rating of 3 sigma meets ISO standards.
- Distortion less than 0.15% at full power.



# V550/1, V555/6, V650/1, V721/2, V780

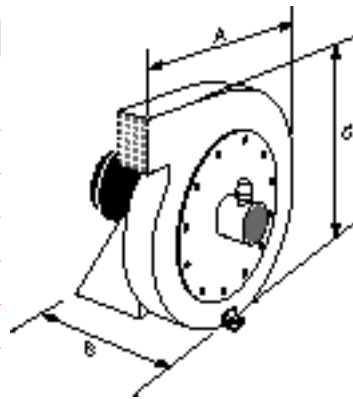
## Shaker system configuration & performance parameters

Model	V550/1 – PA 500L		V555/6 – PA 1000L		V650/1 –
					
	Metric	American	Metric	American	Metric
Armature diameter	110 mm	4.33 in	110 mm	4.33 in	156 mm
Sine force – peak	667 N	150 lbf	939 N	211 lbf	1620 N
Random force – rms	556 N	125 lbf	636 N	143 lbf	1090 N
Armature resonance – fn	4850 Hz	4850 Hz	4850 Hz	4850 Hz	3800 Hz
Useful frequency range	DC – 6300 Hz	DC – 6300 Hz	DC – 6300 Hz	DC – 6300 Hz	DC – 5000 Hz
Effective mass of moving element	0.99 kg	2.18 lb	0.94 kg	2.07 lb	2.24 kg
Max. velocity – sine peak	1.06 m/s	41.7 in/s	1.5 m/s	59.1 in/s	1.4 m/s
Max. acceleration – sine peak	675 m/s <sup>2</sup>	68.8 gn	981 m/s <sup>2</sup>	100 gn	723 m/s <sup>2</sup>
Max. acceleration – random rms	562 m/s <sup>2</sup>	57.3 gn	677 m/s <sup>2</sup>	69 gn	486 m/s <sup>2</sup>
Stray magnetic field – 150 mm above table					
Degauss coils not energised	< 5 mT	< 50 gauss	< 5 mT	< 50 gauss	< 5 mT
Degauss coils energised	< 0.5 mT	< 5 gauss	< 0.5 mT	< 5 gauss	< 0.5 mT
LDS amplifier model	PA 500L	PA 500L	PA 1000L	PA 1000L	PA 1000L
Suspension axial stiffness	15.8 kN/m	90 lbf/in	15.8 kN/m	90 lbf/in	15.8 kN/m
Cross-axial stiffness	2452 kN/m	14000 lbf/in	2452 kN/m	14000 lbf/in	2452 kN/m
Displacement (continuous) pk – pk	25.4 mm	1.0 in	25.4 mm	1.0 in	25.4 mm
Shaker body mass Mb-including trunnion	97.5 kg	215 lb	97.5 kg	215 lb	189 kg
Body suspension resonance					
Rubber mounts	< 15 Hz	< 15 Hz	< 15 Hz	< 15 Hz	< 15 Hz
Air isolation	-	-	-	-	-
Internal load support capability	25 kg	55 lb	25 kg	55 lb	50 kg
Cooling air flow – suction					
*HPA-K rating includes field and cooling fan power supplies Shaker – through remote cooling fan:	0.033 m <sup>3</sup> /s	70 ft <sup>3</sup> /min	0.043 m <sup>3</sup> /s	90 ft <sup>3</sup> /min	0.061 m <sup>3</sup> /s
Amplifier:	0.045 m <sup>3</sup> /s	94 ft <sup>3</sup> /min	0.09 m <sup>3</sup> /s	188 ft <sup>3</sup> /min	0.09 m <sup>3</sup> /s

PA 1000L	V650/1 – HPA-K		V721/2 – PA 1000L		V780 – HPA-K	
						
American	Metric	American	Metric	American	Metric	American
6.14 in	156 mm	6.14 in	180 mm	7.09 in	180 mm	7.09 in
364 lbf	2.2 kN	495 lbf	2958 N	665 lbf	5.12 kN	1150 lbf
245 lbf	1.54 kN	346 lbf	1899 N	427 lbf	4.23 kN	950 lbf
3800 Hz	3800 Hz	3800 Hz	3150 Hz	3150 Hz	2950 Hz	2950 Hz
DC – 5000 Hz	DC – 5000 Hz	DC – 5000 Hz	DC – 4000 Hz	DC – 4000 Hz	DC – 4000 Hz	DC – 4000 Hz
4.94 lb	2.24 kg	4.94 lb	4.31 kg	9.5 lb	4.7 kg	10.36 lb
55.1 in/s	1.5 m/s	59.1 in/s	0.7 m/s	27.6 in/s	1.9 m/s	74.8 in/s
73.7 gn	981 m/s <sup>2</sup>	100 gn	686 m/s <sup>2</sup>	70 gn	1089 m/s <sup>2</sup>	111 gn
49.6 gn	686 m/s <sup>2</sup>	70 gn	440 m/s <sup>2</sup>	44.9 gn	490 m/s <sup>2</sup>	50 gn
< 50 gauss < 5 gauss	< 5 mT < 0.5 mT	< 50 gauss < 5 gauss	< 5 mT < 0.5 mT	< 50 gauss < 5 gauss	< 5 mT < 1.0 mT	< 50 gauss < 10 gauss
PA 1000L	HPA-K	HPA-K	PA 1000L	PA 1000L	HPA-K	HPA-K
90 lbf/in	15.8 kN/m	90 lbf/in	31.5 kN/m	180 lbf/in	31.5 kN/m	180 lbf/in
14000 lbf/in	2452 kN/m	14000 lbf/in	2574 kN/m	14700 lbf/in	2574 kN/m	14700 lbf/in
1.0 in	25.4 mm	1.0 in	25.4 mm	1.0 in	25.4 mm	1.0 in
417 lb	189 kg	417 lb	381 kg	840 lb	381 kg	840 lb
< 15 Hz	< 15 Hz	< 15 Hz	< 15 Hz	< 15 Hz	< 15 Hz	< 15 Hz
-	-	-	-	-	-	-
110 lb	50 kg	110 lb	100 kg	220 lb	100 kg	220 lb
130 ft <sup>3</sup> /min	0.071 m <sup>3</sup> /s	150 ft <sup>3</sup> /min	0.085 m <sup>3</sup> /s	180 ft <sup>3</sup> /min	0.12 m <sup>3</sup> /s	260 ft <sup>3</sup> /min
188 ft <sup>3</sup> /min	0.3 m <sup>3</sup> /s	636 ft <sup>3</sup> /min	0.09 m <sup>3</sup> /s	188 ft <sup>3</sup> /min	0.3 m <sup>3</sup> /s	636 ft <sup>3</sup> /min

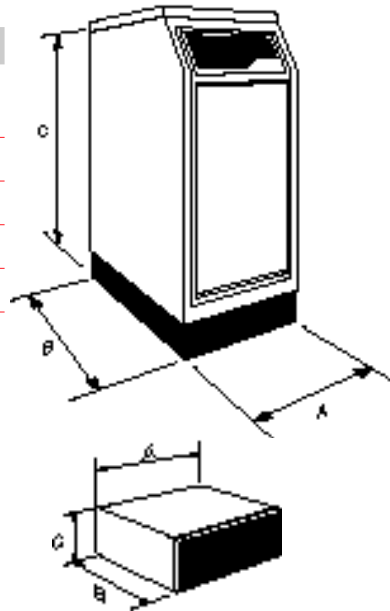
### Cooling fans

Fan	Wt kg	A mm	B mm	C mm
V550/1	17	395	350	430
V555/6	17	395	350	430
V650/1	23	447	361	476
V721/2	23	447	361	476
V780, V650/1 (HPA-K)	38	535	386	575



### PA, FPS and HPA-K amplifiers

Amplifier	Wt kg	A mm	B mm	C mm
PA 500L	20	448	412	188
PA 1000L	35	448	412	188
FPS 10L	21.8	448	412	188
HPA-K	210	537	825	1000



### Armature insert patterns

Shaker	V550/1	V555/6	V650/1	V721/2	V780
Armature dia mm	110	110	156	180	180
Centre insert	1	1	1	1	1
76.2 mm PCD	-	-	-	-	-
90 mm PCD*	8	8	-	-	-
125 mm PCD*	-	-	8	-	-
150 mm PCD*	-	-	-	8	8
152.4 mm PCD	-	-	-	-	-
304.8 mm PCD	-	-	-	-	-

\* Inserts equi-spaced 22.5° to the trunnion axis.

## Options

Shaker model	V550	V551	V555	V556	V650	V651	V721	V722	V780
Alternative inserts: M6	●	-	●	-	-	-	-	-	-
M8	-	-	-	-	●	-	●	-	○
1/4" UNF	-	●	-	●	-	-	-	-	-
5/16" UNF	-	-	-	-	-	●	-	-	-
3/8" UNF	-	-	-	-	-	-	-	●	○
Internal load support	●	●	●	●	●	●	●	●	●
Rubber mount isolation	●	●	●	●	●	●	●	●	●
Air mount isolation	-	-	-	-	-	-	-	-	-
Castors	-	-	-	-	-	-	-	-	-
Thermal barrier	○	○	○	○	○	○	○	○	○
RFI suppression kit (HPA-K)	-	-	-	-	●	●	●	●	●
Combination slip table	-	-	-	-	-	-	○	○	○
Field power supply FPS 10L	●	●	●	●	-	-	-	-	-
Integral field & cooling fan drive (HPA-K)	-	-	-	-	●	●	●	●	●

KEY ● standard ○ standard option - not available

## PA series linear amplifier characteristics – class AB

Amplifier model	PA 500L	PA 1000L
Rated sinusoidal power output	500 W	1000 W
Maximum continuous sinusoidal VA output (0.5pf)	700 VA	1400 VA
Frequency range at rated power	10 Hz – 14 kHz	10 Hz – 14 kHz
Total harmonic distortion at rated output (20 Hz – 14 kHz)	Typically 0.2 % when measured into resistive load	
Maximum output voltage	40 V rms	80 V rms
Maximum no load voltage	45 V rms	86 V rms
Voltage regulation	2 %	2 %
Output current at rated VA	18 A rms	18 A rms
Random output current	54 A pk	54 A pk
Overcurrent trip level	19 A rms	19 A rms
Input sensitivity for maximum output (400 Hz)	1.0 V rms	1.0 V rms
Signal to noise ratio	>75 dB	>80 dB
Amplifier efficiency	59 %	59 %
Protection	True RMS metering with overcurrent protection	

## HPA-K series switching amplifier characteristics – class D

Power output	5 kVA
Total harmonic distortion	Typically 0.15 % when measured into resistive load
Input impedance	10 k ohm nominal
Input sensitivity	1 V rms for 100 V rms output (Differential Input). Compatible with standard controllers
Signal to noise ratio	> 68 dB
Amplifier efficiency	> 90 %
Switching frequency	150 kHz
Modulation range	dc to 5 kHz
Rated output voltage	100 V rms (sine)
Continuous output current	50 A rms (sine and random)
Transient output current	150 A for 100 ms
Module efficiency	93 %
Protection	Integral protection to prevent the power devices working outside of their limits

Some of the features listed are available as standard, others as options.

Please contact LDS for advice on the optimum specification to meet your system needs.

Specifications are correct at time of going to print. LDS reserves the right to amend specifications without prior notice.



World leaders in vibration and environmental test systems

An SPX Company

Ling Dynamic Systems Limited  
Heath Works, Baldock Road, Royston,  
Hertfordshire SG8 5BQ, England.  
Tel (UK) 01763 242424  
International + 44 1763 242424  
Fax (UK) 01763 249715  
International + 44 1763 249715  
Email sales@lds-group.com  
www.lds-group.com

Ling Dynamic Systems Inc  
60 Church Street, Yalesville,  
Connecticut 06492, USA.  
Tel (203) 265 7966  
Toll Free # 1- 800 - GO TO LDS  
Fax (203) 284 9399  
Email sales@lds-group.com

LDS SARL  
Z.I. l'Eglantier - 17, rue des Cerisiers,  
CE 1528 Lisses - 91015 Evry Cedex,  
France.  
Tel (1) 69 11 21 30  
Fax (1) 69 11 21 31  
Email sales@lds-group.com

Ling Dynamic Systems GmbH  
Freisinger Straße 32,  
D-85737 Ismaning, Germany.  
Tel (+49) 89 96 98 9180  
Fax (+49) 89 96 98 9189  
Email sales@lds-group.com



All LDS equipment complies with current European and USA safety and EMC regulations



I S O  
Cert No. FM 26616