Data Physics

Power Amplifiers
SignalForce®

Amplifiers

A member of the NVT GROUP

Data Physics

Data Physics SignalForce Amplifiers combine high levels of efficiency with superior performance, while occupying little space and are suitable for driving shakers from all manufacturers.

Data Physics provides robust, reliable and efficient amplifier products that supply the power used to drive your test system to its limits. When selecting an appropriate amplifier, you need to consider the mass of your shaker's armature, head expander, device under test and your test performance specifications, as these variables dictate overall power requirements. Data Physics offers a range of standard amplifier products specifically designed to meet comprehensive power delivery requirements while simultaneously assuring long-term, reliable operation.

Managing and minimizing the effects of EMC has been a major factor in the design of our digital switching amplifiers. Full use has been made of Faraday cages, compartmentalization, filtered interconnections, segmented wiring, common mode chokes for symmetrical currents, mains filters, optical coupling of signals and screened cables. All amplifiers are available CE compliant.

- Linear amplifiers from 30 VA to 1 kVA
- Digital switching amplifiers from 1 kVA to 405 kVA
- Up to 95% efficient
- Switches at >105 kHz
- 1 KVA, 5 KVA, and 15 KVA modules
- Includes field and degaussing supplies
- Safety interlocks
- Protection against over current and over temperature
- Remote and chamber interfaces
- Drives all shaker brands

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Along with our SignalForce Power Amplifiers and Shakers, SignalStar® Vibration Controllers and SignalCalc® Dynamic signal analyzers, Data Physics provides fully integrated test and measurement solutions, all delivered from a single source. Our Engineers can match our modern power amplifiers to any electrodynamic shaker.

Selection of Appropriate Power Amplifiers

When considering what power amplifier is applicable for your testing needs, it's important to remember Newton's 2nd Law of Motion…the simple equation, F=ma, or Force = Mass x Acceleration.

Acceleration: is given by the profiles to be tested, typically units of g for Sine and Shock, and g rms for Random.

Mass: is the total moving mass including the shaker's armature. The DUT, fixture, head expander (if applicable) or slip table + drive bar + bearings, and the shaker's armature all add into the mass.

Force: is the required force of the shaker for the given acceleration and mass. Vibration systems have different force ratings for Random, Sine, and Shock.

If we think of force as directly proportional to an amplifier's current output rating, then in general terms, the bigger and heavier the test item, the more power you'll need to conduct your testing. Additionally, the higher the required test acceleration (g or g rms), the more power you'll need. In sizing the proper replacement amplifier, it is important to know the system's operational characteristics to match the best suited solution. Just as force is directly proportional to current, the shaker's velocity is directly proportional to voltage.
The maximum power of the shaker system is usually found right at the velocity to acceleration cross-over point.

Data Physics offers a variety of power amplifiers to address a broad range of testing requirements. Our Linear Amplifiers provide compact and efficient solutions for smaller test items with comparably lower-intensity test inputs. These amplifiers also provide solutions for inertial and modal shaker applications. Our Digital Switching Amplifiers can be provided in a broad array of configurations, tailored to deliver the power necessary for more challenging testing requirements.

Data Physics

Linear Amplifiers

** Note - Models available with optional Current Mode operation for Modal and Intertial shaker applications.*

	PA30E	PA100E*	PA300E*	SS1000*	BAA1000*
Supply Voltage	115 V/230 V, 50/60 Hz, 1 ph	115 V/230 V, 50/60 Hz, 1 ph	115 V/230 V, 50/60 Hz, 1 ph	115 V/230 V, 50/60 Hz, 1 ph	120 V/220 V, 50/60 Hz, 1 ph
Output Voltage (rms)	0-10 V	0-10 V	0-10 V	0-26 V	0-72 V
Output Current (rms)	3 A	10 A	30 A	38.5 A	18 A
Frequency Range	DC-20 kHz	DC-20 kHz	DC-20 kHz	DC-20 kHz	DC-10 kHz
Signal to noise ratio	< 10 mV rms	< 10 mV rms	< 10 mV rms	< 10 mV rms	< 20 mV rms
Input sensitivity for full output	1 V rms	700 mV rms	700 mV rms	1 V rms	<5 V rms
Weight	6.5 lbs. (3 kg)	14 lbs. (6.4 kg)	19 lbs. (8.6 kg)	95 lbs. (43 kg)	88 lbs. (40 kg)

Digital Switching Amplifiers

	DSA5	DSA15
Power Supply Range	DSA5-1K: 110 - 240 V 50/60 Hz, 1 phase DSA5-2K: 208 - 480 V 50/60 Hz, 3 phase DSA5-5K and above: 380 - 480 V 50/60 Hz, 3 phase	380 - 600 V 50/60 Hz, 3 phase
Voltage Output	0-82 V rms	0-200 V rms
Current Output	60 A rms (per module)	83 A rms (per module)
Frequency Range	Full Power 5 Hz - 5 kHz	5 Hz - 2 kHz at full power to 3 kHz at reduced power/ Roll-off at 3 kHz is -6dB/Oct.
Distortion (at rated output)	< 0.4% 5 Hz ~ 1 kHz < 1.0% 1 ~ 5 kHz 0.25% Typically	< 0.5% 5 Hz ~ 1.5 kHz < .75% 1.5 ~ 2 kHz 1.0% 2 ~ 3 kHz
Hum and Noise	>-75 dB at full output	>-70 dB at full output
DC Stability	<0.05% of full output voltage with +/- 10% change in input voltage	
Input Drive	Models DSA5-1K & DSA5-2K: 1.414 V rms Models DSA5-5K and above: 2.3 V rms for full output power, typical (10 k ohm input impedance)	1.5 V rms for full output power (10 k ohm input impedance)
Cooling	120 cfm (.056 m^3/sec) per module	230 cfm (.109 m^3/sec) per module
Heat Rejected to Air (full output)	1500 BTU/hr (.44 kw) per module	4500 BTU/hr (1.32 kw) per module
Isolation	Floating	Output isolated and may be grounded at terminal "J" only
Temperature	Full Power to 40 C, derated at 2% per degree C beyond 40 degrees to 55 C maximum	
Humidity	0 to 80% RH (wet bulb temp. not to exceed 27 degrees C.)	

Note - GW-DSA5 amplifiers are matched with appropriate GW-series shaker systems. LE-DSA15 amplifiers are matched with appropriate LE-series shaker systems. Other non-standard field supply voltages to suit other manufacturer's shakers are available to order and must be quoted separately.

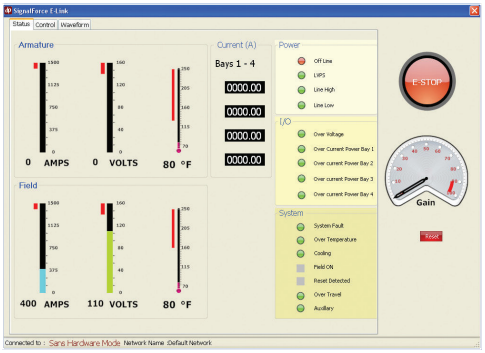
Digital Switching Amplifier Specifications

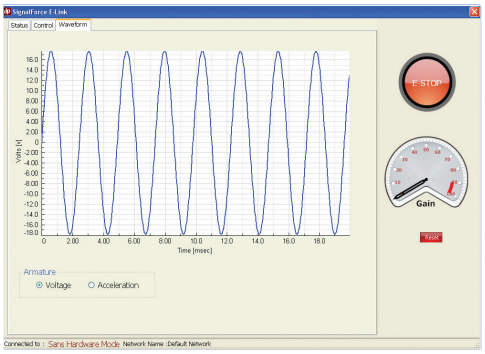
Amplifier Model	Modules	Bays	Depth (inches / mm)	Width (inches / mm)	Height (inches / mm)	Maximum Output (kVA)	Current Output (rms)	Voltage Output (rms)	Total Weight (lbs. / kg)
GW-DSA5-1K	1	0	26/660	19/482	10.6/270	1	14	72	92/42
GW-DSA5-2K	1	0	26/660	19/482	10.6/270	2	28	72	132/60
GW-DSA5-5K	1	1	32/800	24/600	50/1273	5	60	82	616/280
GW-DSA5-10K	2	1	32/800	24/600	50/1273	10	120	82	638/290
GW-DSA5-15K	3	1	32/800	24/600	50/1273	15	180	82	660/300
GW-DSA5-20K	4	1	32/800	24/600	50/1273	20	240	82	682/310
GW-DSA5-25K	5	1	32/800	24/600	50/1273	25	300	82	704/320
GW-DSA5-30K	6	1	32/800	24/600	76.38/1940	30	360	82	1157/526
GW-DSA5-35K	7	1	32/800	24/600	76.38/1940	35	420	82	1179/536
GW-DSA5-40K	8	1	32/800	24/600	76.38/1940	40	480	82	1201/546
GW-DSA5-45K	9	1	32/800	24/600	76.38/1940	45	540	82	1223/556
GW-DSA5-50K	10	1	32/800	24/600	76.38/1940	50	600	82	1245/566
GW-DSA5-55K	11	1	32/800	24/600	76.38/1940	55	660	82	1267/576
LE-DSA15-1	1	1	50.5/1283	22.10/561.34	52/1321	15	83	200	715/325
LE-DSA15-2	2	1	50.5/1283	22.10/561.34	52/1321	30	166	200	750/341
LE-DSA15-3	3	1	50.5/1283	22.10/561.34	52/1321	45	249	200	785/357
LE-DSA15-4	4	1	50.5/1283	22.10/561.34	68.5/1740	60	332	200	820/373
LE-DSA15-5	5	1	50.5/1283	22.10/561.34	68.5/1740	75	415	200	855/389
LE-DSA15-6	6	1	50.5/1283	22.10/561.34	68.5/1740	90	498	200	890/404
LE-DSA15-7	7	1	50.5/1283	22.10/561.34	68.5/1740	105	581	200	925/420
LE-DSA15-8	8	1	50.5/1283	22.10/561.34	68.5/1740	120	664	200	960/436
LE-DSA15-10	10	2	43/1092	68/1704	82/2071	150	830	200	4000/1814
LE-DSA15-12	12	3	43/1092	92/2327	78/1981	180	996	200	5290/2400
LE-DSA15-14	14	3	43/1092	92/2327	78/1981	210	1162	200	5360/2431
LE-DSA15-16	16	3	43/1092	92/2327	78/1981	240	1328	200	5430/2463
LE-DSA15-18	18	3	43/1092	92/2327	78/1981	270	1494	200	5500/2495
LE-DSA15-21	21	4	43/1092	116/2938	78/1981	315	1743	200	6790/3080
LE-DSA15-24	24	4	43/1092	116/2938	78/1981	360	1992	200	6895/3128
LE-DSA15-27	27	4	43/1092	116/2938	78/1981	405	2241	200	7000/3175

E-Link Shaker Systems Control for DSA15 Amplifiers

Reduce energy consumption and operating costs while extending the life of your shaker system.
With the SignalForce E-Link option, you can remotely control and monitor the performance of SignalForce shakers powered by DSA15 series multi-bay amplifiers. Designed for easy access via Ethernet, SignalForce E-Link allows control of all amplifier functions and provides a remote dashboard of all amplifier parameters. This means that you can optimize the amplifier setup for each test right from your control desk. The easy-to-use interface allows you to shutdown extra power bays or reduce field current when running low force tests. Never waste energy again, reduce maintenance costs and extend the life of your system.

The optional E-Link package can be purchased with new, or added to existing Data Physics DSA15 or Ling amplifiers.

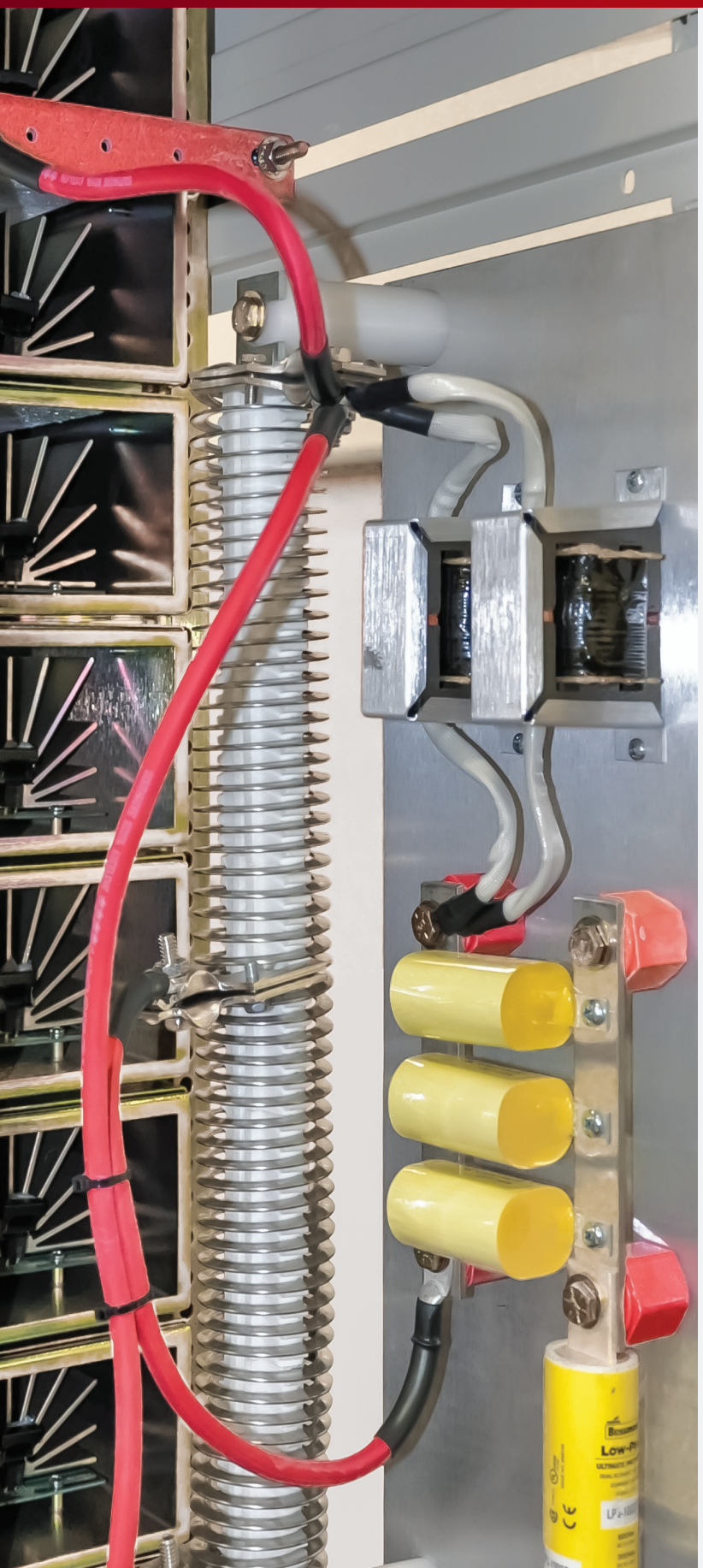




Product Features:

- TCP/IP connectivity - not cable length prohibited, such as RS-232 or USB devices
- Complete amplifier control and status monitoring
- Digital gain control
- Digital armature voltage and current readouts with visual indications showing high and low limits
- Digital field supply voltage and current readouts with visual indications showing high and low limits
- Armature and field coil water temperature monitoring
- Armature temperature monitoring
- Persistent emergency stop and gain control on every tab
- Fully integrated fault monitoring
- Switching for sine/random selection
- Switching for field current- 50% and 100% field
- *Output waveform display for diagnostics**
- *Embedded accelerometer monitoring**

** For future option.*

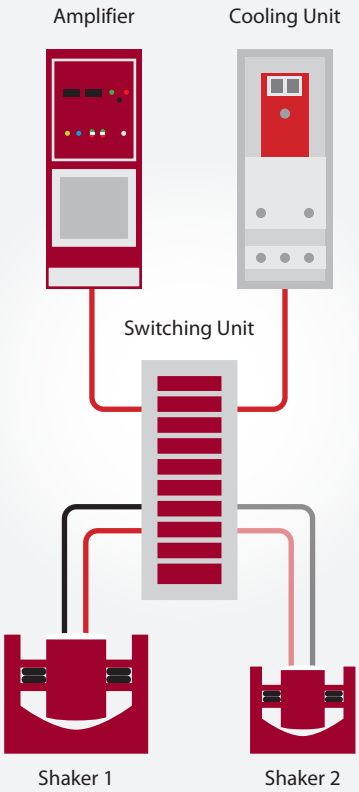


Switching Units for Maximizing Available Power

Vibration test labs that utilize multiple shakers often don't require those test systems to be running simultaneously. To save on cost, a common amplifier, or set of amplifiers can be used to power select, individual shakers that are deemed appropriate for given test requirements. In addition to saving on an initial test equipment investment, switching units allow users to save on floor space and maintenance activities. Switchers have been made for both air cooled and water cooled systems in a variety of configurations and sizes.

Switching units can be built into amplifiers for switching power between two shakers or can be custom designed for more elaborate user setups that include cooling. For larger setups, a specifically designed touch pad user interface is used to control the various switching combinations.

2x1 switching arrangement with shakers:



Parts & Service

Data Physics has one of the largest shaker service operations in the world with service operations located in eastern, central and western USA, as well as the UK and China. Our uniquely qualified and experienced team of service engineers can service Data Physics, Ling and all other brands and models of vibration test equipment installed in test labs around the world. Equipment installation, relocation, repair, calibration and maintenance services are available.

Spare parts are available for all SignalForce and Ling equipment including shakers made long ago by Ling Electronics. Spare parts for many other shaker brands are also available directly from Data Physics. All spare parts are produced to the highest quality standards. In many cases, Data Physics can supply obsolete parts no longer manufactured by the original equipment manufacturer.

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